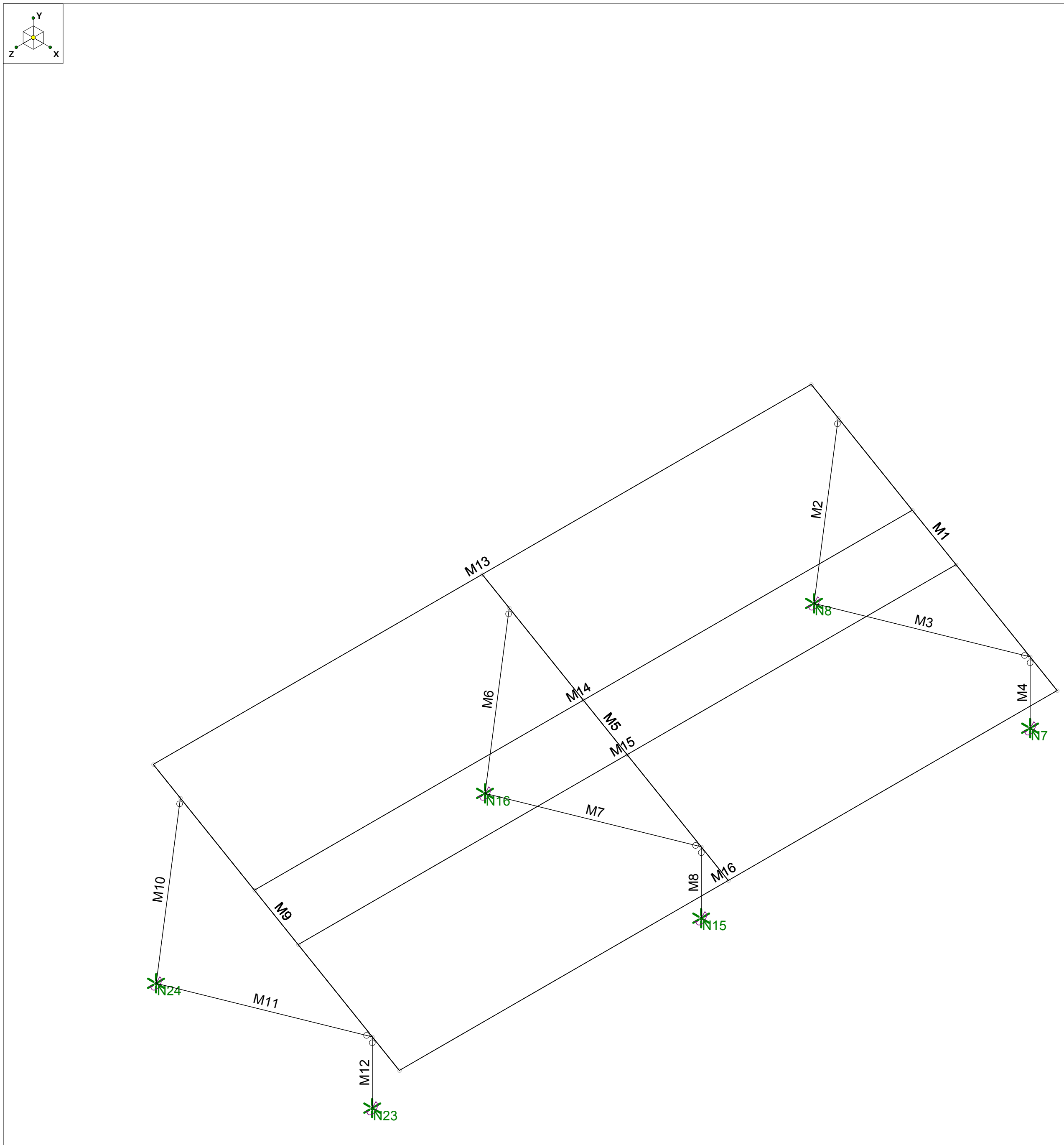


Schletter, Inc.		30° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-10	

1. INTRODUCTION

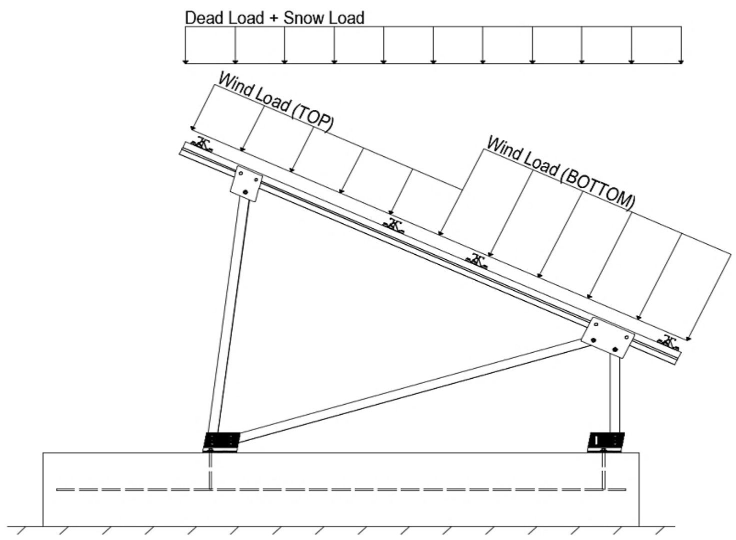
1.1 Project Description
The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. PVMax ground mount system.

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

PV modules are required to meet the following specifications:

	Maximum		Minimum
Height =	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 =	30°
Maximum Height Above Grade =	3 ft



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

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

2. LOAD ACTIONS

2.1 Permanent Loads

g_{MAX} =	3.00 psf	*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 =	16.49 psf	*(ASCE 7-10, Eq. 7.4-1)*
I_s =	1.00	
C_s =	0.73	
C_e =	0.90	
C_t =	1.20	

2.3 Wind Loads

Design Wind Speed, V =	160 mph	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

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

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 =	0.06	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

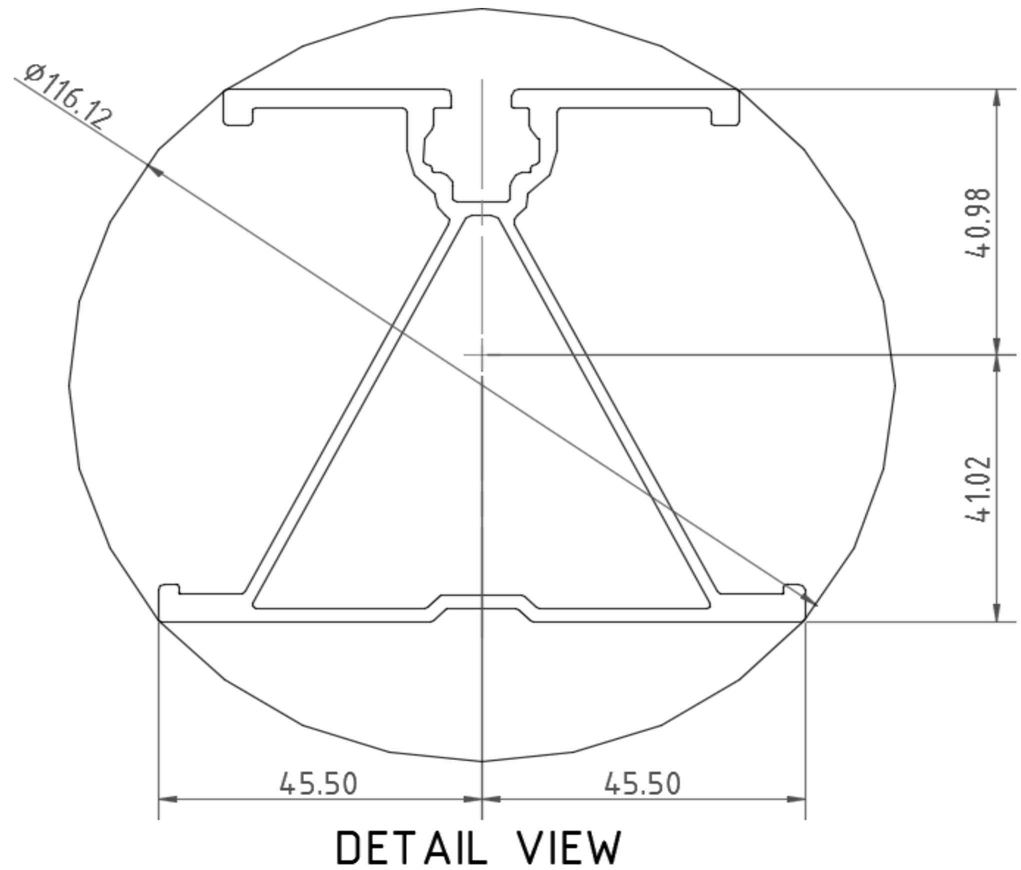
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

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).

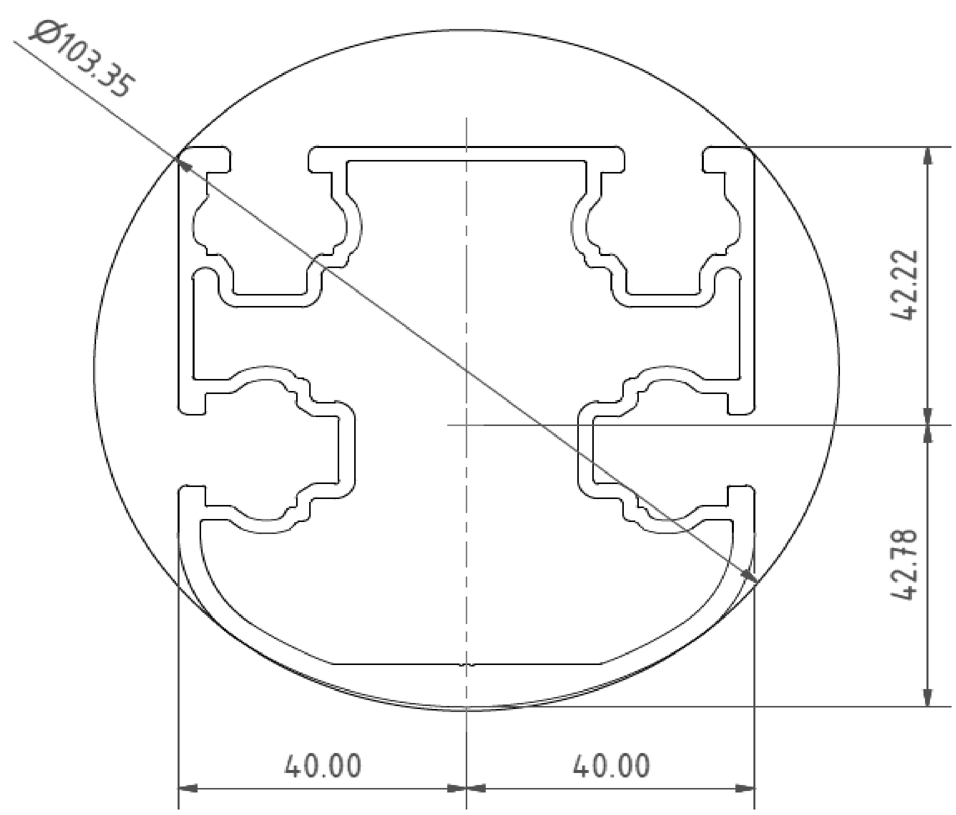
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	87	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	-1.861	k-ft
M_z =	0.000	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	67%	



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).

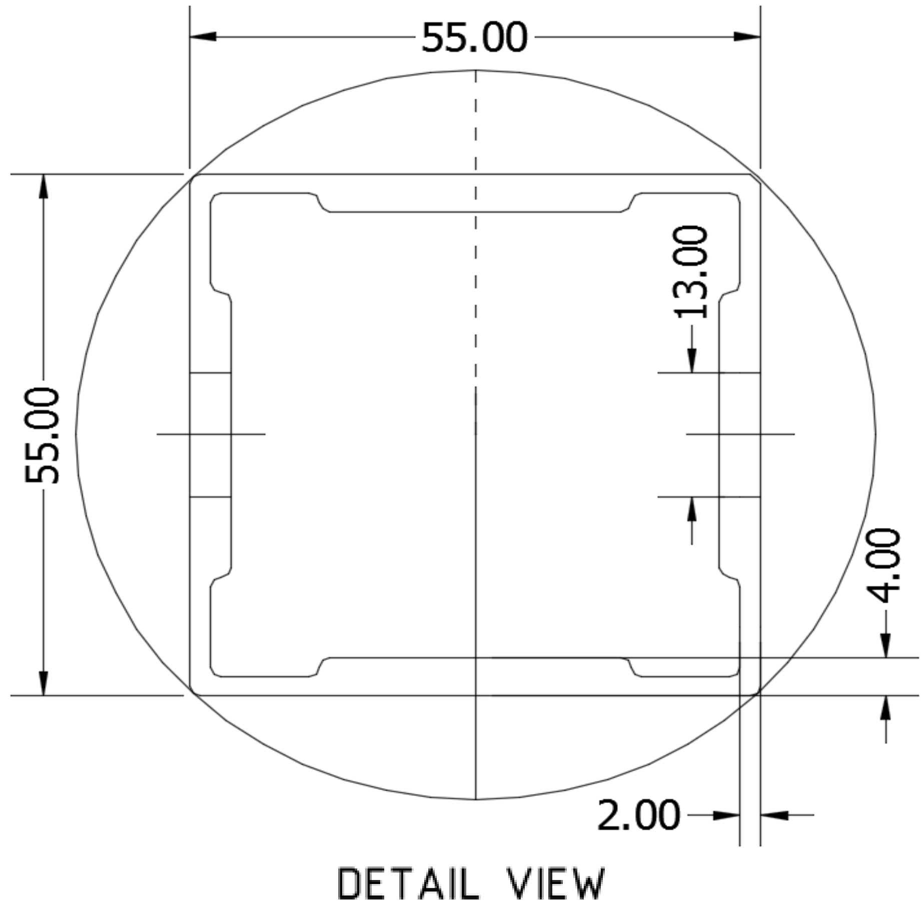
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-2.907	k-ft
M_z =	0.000	k-ft
P_n =	-0.934	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	86%	



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).

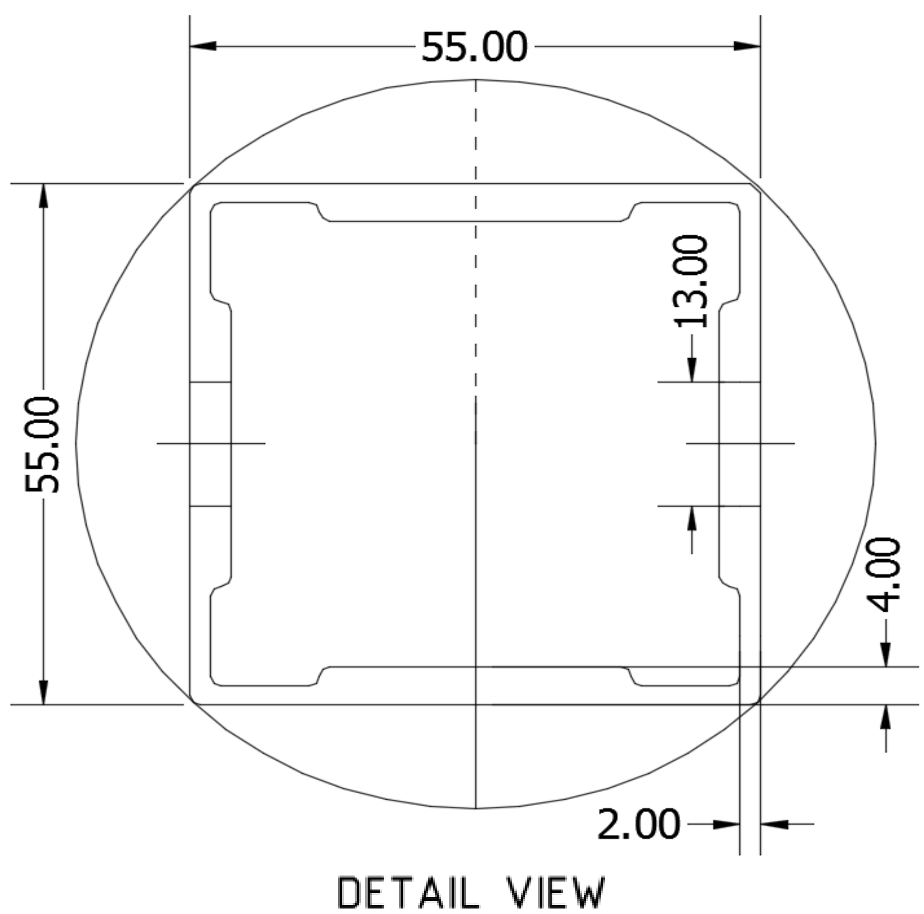
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.407	k-ft
P_n =	0.438	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).

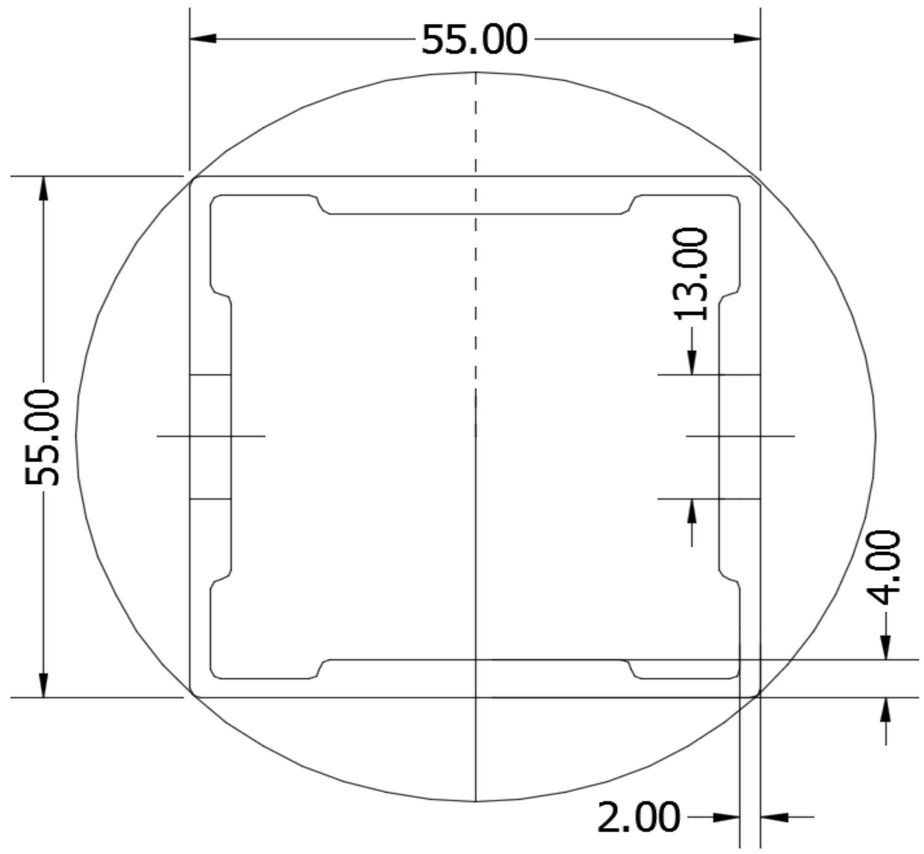
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.010	k-ft
M_z =	0.000	k-ft
P_n =	2.701	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	7.371	k
Utilization =	37%	



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 =	70.83	in
$\Phi F_{ty\ AXIAL}$ =	10.55	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 =	-0.010	k-ft
M_z =	0.000	k-ft
P_n =	3.182	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	10.365	k
Utilization =	31%	



DETAIL VIEW

5. FOUNDATION DESIGN CALCULATIONS

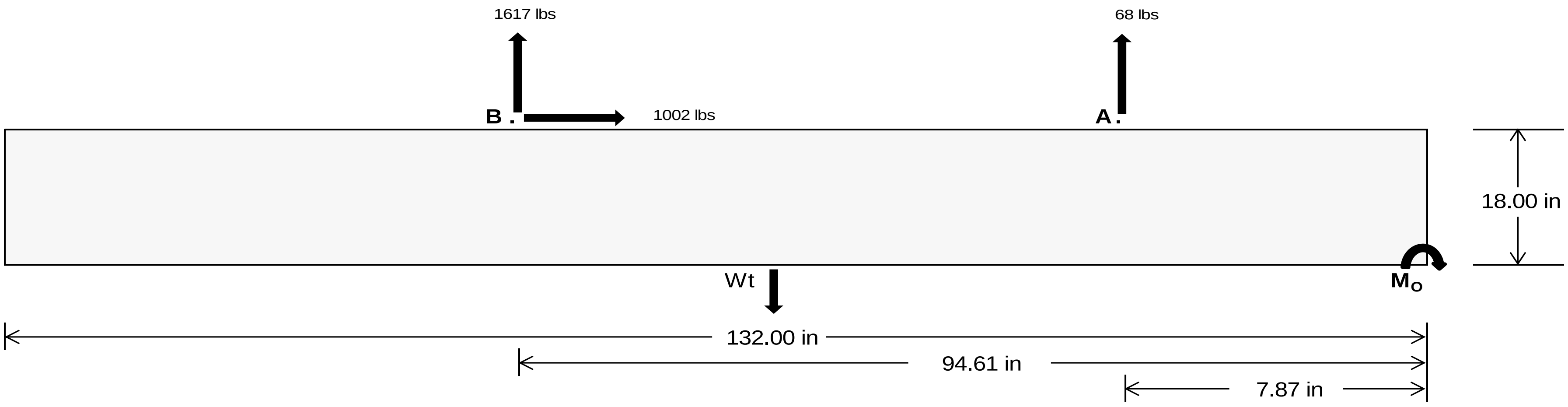
5.1 Helical Pile Foundations

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 =	313.26	7020.01	k
Compressive Load =	3106.94	5070.15	k
Lateral Load =	288.78	4344.08	k
Moment (Weak Axis) =	0.55	0.18	k

5.2 Design of Ballast Foundations

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



Concrete Properties

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

Footing Reinforcement

Use fiber reinforcing with (2) #5 rebar.

Overturning Check

M_O =	171566.0 in-lbs
Resisting Force Required =	2599.48 lbs
S.F. =	1.67
Weight Required =	4332.47 lbs
Minimum Width =	35 in in
Weight Provided =	6978.13 lbs

A minimum 132in long x 35in wide x 18in tall ballast foundation is required to resist overturning.

Sliding

Force =	1002.37 lbs
Friction =	0.4
Weight Required =	2505.94 lbs
Resisting Weight =	6978.13 lbs
Additional Weight Required =	0 lbs

Use a 132in long x 35in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

Cohesion

Sliding Force =	1002.37 lbs
Cohesion =	130 psf
Area =	32.08 ft^2
Resisting =	3489.06 lbs
Additional Weight Required =	0 lbs

Use a 132in long x 35in wide x 18in tall ballast foundation. Cohesion is OK.

Shear Key

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

Shear key is not required.

Bearing Pressure

	Ballast Width			
	35 in	36 in	37 in	38 in
P_{ftg} = (145 pcf)(11 ft)(1.5 ft)(2.92 ft) =	6978 lbs	7178 lbs	7377 lbs	7576 lbs

ASD LC	1.0D + 1.0S				1.0D + 0.6W				1.0D + 0.75L + 0.45W + 0.75S				0.6D + 0.6W			
Width	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in
F_A	894 lbs	894 lbs	894 lbs	894 lbs	1279 lbs	1279 lbs	1279 lbs	1279 lbs	1532 lbs	1532 lbs	1532 lbs	1532 lbs	-137 lbs	-137 lbs	-137 lbs	-137 lbs
F_B	836 lbs	836 lbs	836 lbs	836 lbs	2194 lbs	2194 lbs	2194 lbs	2194 lbs	2181 lbs	2181 lbs	2181 lbs	2181 lbs	-3234 lbs	-3234 lbs	-3234 lbs	-3234 lbs
F_V	119 lbs	119 lbs	119 lbs	119 lbs	1799 lbs	1799 lbs	1799 lbs	1799 lbs	1427 lbs	1427 lbs	1427 lbs	1427 lbs	-2005 lbs	-2005 lbs	-2005 lbs	-2005 lbs
P_{total}	8708 lbs	8908 lbs	9107 lbs	9306 lbs	10450 lbs	10650 lbs	10849 lbs	11049 lbs	10692 lbs	10891 lbs	11091 lbs	11290 lbs	816 lbs	935 lbs	1055 lbs	1175 lbs
M	2517 lbs-ft	2517 lbs-ft	2517 lbs-ft	2517 lbs-ft	3662 lbs-ft	3662 lbs-ft	3662 lbs-ft	3662 lbs-ft	4362 lbs-ft	4362 lbs-ft	4362 lbs-ft	4362 lbs-ft	4039 lbs-ft	4039 lbs-ft	4039 lbs-ft	4039 lbs-ft
e	0.29 ft	0.28 ft	0.28 ft	0.27 ft	0.35 ft	0.34 ft	0.34 ft	0.33 ft	0.41 ft	0.40 ft	0.39 ft	0.39 ft	4.95 ft	4.32 ft	3.83 ft	3.44 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}	228.6 psf	228.3 psf	228.0 psf	227.8 psf	263.5 psf	262.2 psf	261.0 psf	259.8 psf	259.1 psf	257.9 psf	256.8 psf	255.8 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	314.2 psf	311.5 psf	309.0 psf	306.6 psf	388.0 psf	383.3 psf	378.8 psf	374.5 psf	407.4 psf	402.1 psf	397.2 psf	392.4 psf	339.8 psf	175.9 psf	136.5 psf	120.0 psf

Maximum Bearing Pressure = 407 psf
Allowable Bearing Pressure = 1500 psf

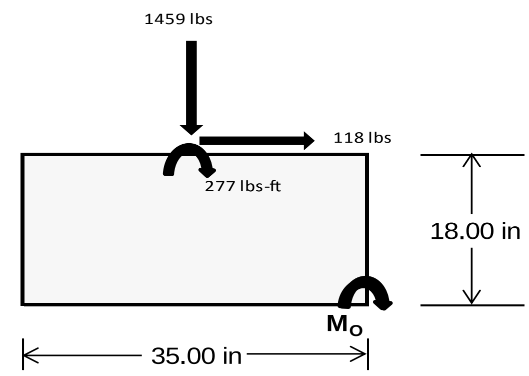
Use a 132in long x 35in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O =	1673.7 ft-lbs
Resisting Force Required =	1147.65 lbs
S.F. =	1.67
Weight Required =	1912.76 lbs
Minimum Width =	35 in in
Weight Provided =	6978.13 lbs

A minimum 132in long x 35in wide x 18in tall ballast foundation is required to resist overturning.



Bearing Pressure

ASD LC	1.238D + 0.875E			1.1785D + 0.65625E + 0.75S			0.362D + 0.875E		
Width	35 in			35 in			35 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	247 lbs	466 lbs	147 lbs	584 lbs	1459 lbs	508 lbs	107 lbs	136 lbs	8 lbs
F_V	162 lbs	159 lbs	164 lbs	120 lbs	118 lbs	126 lbs	163 lbs	160 lbs	164 lbs
P_{total}	8886 lbs	9104 lbs	8786 lbs	8808 lbs	9683 lbs	8732 lbs	2634 lbs	2662 lbs	2534 lbs
M	611 lbs-ft	603 lbs-ft	618 lbs-ft	456 lbs-ft	454 lbs-ft	476 lbs-ft	612 lbs-ft	602 lbs-ft	613 lbs-ft
e	0.07 ft	0.07 ft	0.07 ft	0.05 ft	0.05 ft	0.05 ft	0.23 ft	0.23 ft	0.24 ft
L/6	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft
f_{min}	237.8 psf	245.1 psf	234.2 psf	245.3 psf	272.7 psf	241.7 psf	42.8 psf	44.4 psf	39.6 psf
f_{max}	316.2 psf	322.4 psf	313.4 psf	303.8 psf	330.9 psf	302.6 psf	121.3 psf	121.5 psf	118.3 psf

Maximum Bearing Pressure = 331 psf
Allowable Bearing Pressure = 1500 psf

Use a 132in long x 35in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 132in long x 35in wide x 18in tall ballast foundation and fiber reinforcing with (2) #5 rebar.

5.3 Foundation Anchors

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

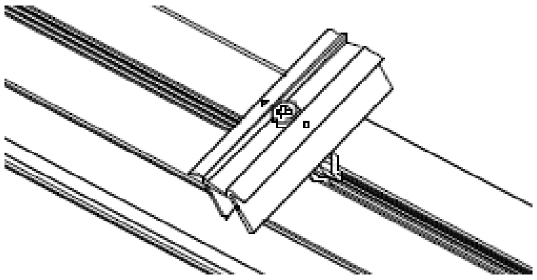
6. DESIGN OF JOINTS AND CONNECTIONS

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

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

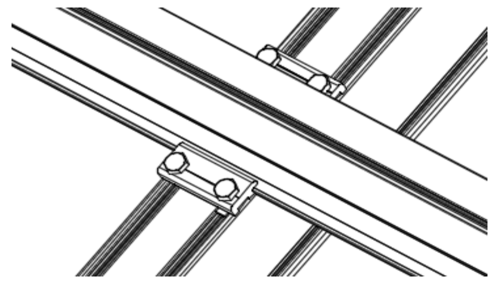
Fastening of Modules to Purlins

Maximum Uplifting Force =	0.989 k
Allowable Uplift =	1.214 k
Utilization =	81%



Fastening of Purlins to Girders

Maximum Uplifting Force =	2.572 k
Allowable Uplift =	4.357 k
Utilization =	59%



6.2 Strut Connections

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

Front Strut

Maximum Axial Load =	2.390 k
M12 Bolt Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	32%

Rear Strut

Maximum Axial Load =	4.688 k
M12 Bolt Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	63%

Diagonal Strut

Maximum Axial Load =	2.797 k
M12 Bolt Shear Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	38%

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

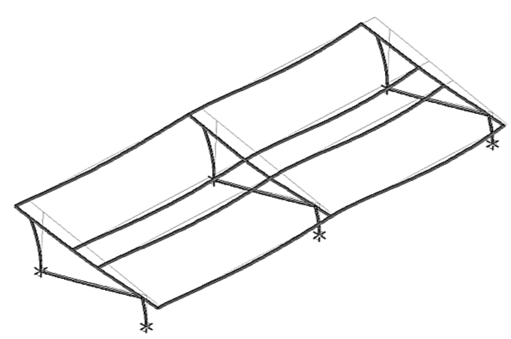
7.1 Seismic Drift

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} =	48.27 in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$
	0.965 in
Max Drift, Δ_{MAX} =	0.429 in

0.429 ≤ 0.965, 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 = 87 in

J = 0.432

240.683

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 28.3 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 = 87

J = 0.432

153.06

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.4

3.4.16

b/t = 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

Rb/t = 18.1

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

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

$\varphi F_L =$ 31.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 7.4

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

S1 = 35.2

m = 0.68

C_0 = 41.067

Cc = 43.717

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

S2 = 73.8

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 29.4 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

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 in^3

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

Compression

3.4.9

b/t = 16.2

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

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

$\varphi F_L =$ 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.3 ksi

3.4.10

Rb/t = 18.1

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

S1 = 6.87

S2 = 131.3

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

$\varphi F_L =$ 31.09 ksi

$\varphi F_L =$ 31.09 ksi

A = 1215.13 mm^2

1.88 in^2

P_{max} = 58.55 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 24.8 in

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

Weak Axis:

3.4.14

L_b = 24.8

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 0.57371

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.87952

φF_L= φcc(Bc-Dc*λ)

φF_L= 28.0279 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

φF_L= φyFcy

φF_L= 33.25 ksi

φF_L= 28.03 ksi

A = 663.99 mm^2

1.03 in^2

P_{max} = 28.85 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 86.60 in

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.6 ksi

Weak Axis:

3.4.14

L_b = 86.6

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.6

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in³

M_{max}St = 1.460 k-ft

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in³

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 2.00335

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

φF_L= (φccFcy)/(λ²)

φF_L= 7.50396 ksi

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

φF_L= 7.50 ksi
A = 663.99 mm^2
1.03 in^2
P_{max} = 7.72 kips

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

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

Strong Axis:

3.4.14

L_b = 70.83 in
J = 0.942
110.537

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

S1 = 0.51461

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

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

3.4.16

b/t = 24.5

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

S1 = 12.2

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

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

Weak Axis:

3.4.14

L_b = 70.83
J = 0.942
110.537

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

S1 = 0.51461

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

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

3.4.16

b/t = 24.5

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

S1 = 12.2

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

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

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L = 1.17φyFcy

φF_L = 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18 (strong direction)

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 direction)

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 = 1.63853

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.80939

φF_L = (φccFcy)/(λ²)

φF_L = 10.5516 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L = φc[Bp-1.6Dp*b/t]

φF_L = 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L = φc[Bp-1.6Dp*b/t]

φF_L = 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

$\varphi F_L = \varphi y Fcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 10.55 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 10.86 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	-39.836	-39.836	0	0
2	M14	Y	-39.836	-39.836	0	0
3	M15	Y	-39.836	-39.836	0	0
4	M16	Y	-39.836	-39.836	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	-128.904	-128.904	0	0
2	M14	y	-128.904	-128.904	0	0
3	M15	y	-207.368	-207.368	0	0
4	M16	y	-207.368	-207.368	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	291.436	291.436	0	0
2	M14	y	224.182	224.182	0	0
3	M15	y	123.3	123.3	0	0
4	M16	y	123.3	123.3	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	921.236	2	1255.819	2	.354	1	.001	1	0	1	0	1
2		min	-1092.102	3	-1711.48	3	-23.756	5	-.135	4	0	1	0	1
3	N7	max	.018	9	856.317	1	-.509	12	0	12	0	1	0	1
4		min	-.221	2	-59.584	5	-222.137	4	-.42	4	0	1	0	1
5	N15	max	.021	9	2389.951	2	0	11	0	11	0	1	0	1
6		min	-2.189	2	-240.969	3	-213.301	4	-.407	4	0	1	0	1
7	N16	max	3036.104	2	3900.114	2	0	1	0	1	0	1	0	1
8		min	-3341.602	3	-5400.004	3	-23.928	5	-.137	4	0	1	0	1
9	N23	max	.026	14	856.317	1	5.83	1	.011	1	0	1	0	1
10		min	-.221	2	-43.626	3	-217.265	5	-.413	4	0	1	0	1
11	N24	max	921.236	2	1255.819	2	-.038	10	0	10	0	1	0	1
12		min	-1092.102	3	-1711.48	3	-24.256	5	-.136	4	0	1	0	1
13	Totals:	max	4875.944	2	10433.522	2	0	1						
14		min	-5526.08	3	-9151.185	3	-721.87	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	56.162	4	415.415	2	-8.17	12	0	15	.131	4	0	4
2			min	5.192	10	-782.878	3	-129.144	1	-.014	2	.012	10	0	3
3		2	max	54.446	1	289.418	2	-6.731	12	0	15	.084	4	.538	3
4			min	5.192	10	-551.848	3	-98.702	1	-.014	2	.001	10	-.284	2
5		3	max	54.446	1	163.42	2	-5.292	12	0	15	.049	5	.889	3
6			min	5.192	10	-320.819	3	-68.259	1	-.014	2	-.03	1	-.466	2
7		4	max	54.446	1	37.423	2	-3.586	10	0	15	.027	5	1.054	3
8			min	5.192	10	-89.789	3	-37.817	1	-.014	2	-.072	1	-.547	2
9		5	max	54.446	1	141.24	3	.389	10	0	15	.007	5	1.034	3
10			min	5.192	10	-88.575	2	-26.457	4	-.014	2	-.091	1	-.527	2
11		6	max	54.446	1	372.27	3	23.068	1	0	15	-.005	12	.827	3
12			min	.934	15	-214.572	2	-21.959	5	-.014	2	-.084	1	-.404	2
13		7	max	54.446	1	603.299	3	53.51	1	0	15	-.005	10	.434	3
14			min	-6.72	5	-340.57	2	-19.733	5	-.014	2	-.053	1	-.181	2
15		8	max	54.446	1	834.329	3	83.952	1	0	15	.005	2	.144	2
16			min	-14.99	5	-466.567	2	-17.506	5	-.014	2	-.044	4	-.145	3
17		9	max	54.446	1	1065.358	3	114.395	1	0	15	.082	1	.571	2
18			min	-23.259	5	-592.565	2	-15.28	5	-.014	2	-.057	5	-.91	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	54.446	1	1296.388	3	144.837	1	.014	2	.186	1	1.099	2
20			min	5.192	10	-718.562	2	-90.993	14	-.002	3	0	3	-1.861	3
21		11	max	54.446	1	592.565	2	-3.341	12	.014	2	.087	4	.571	2
22			min	5.192	10	-1065.358	3	-114.395	1	0	15	-.005	3	-.91	3
23		12	max	54.446	1	466.567	2	-1.903	12	.014	2	.044	4	.144	2
24			min	5.192	10	-834.329	3	-83.952	1	0	15	-.007	3	-.145	3
25		13	max	54.446	1	340.57	2	-.366	3	.014	2	.02	5	.434	3
26			min	5.192	10	-603.299	3	-53.51	1	0	15	-.053	1	-.181	2
27		14	max	54.446	1	214.572	2	1.793	3	.014	2	0	15	.827	3
28			min	4.339	15	-372.27	3	-30.491	4	0	15	-.084	1	-.404	2
29		15	max	54.446	1	88.575	2	7.375	1	.014	2	-.004	12	1.034	3
30			min	-1.69	5	-141.24	3	-22.921	5	0	15	-.091	1	-.527	2
31		16	max	54.446	1	89.789	3	37.817	1	.014	2	-.001	12	1.054	3
32			min	-9.959	5	-37.423	2	-20.695	5	0	15	-.072	1	-.547	2
33		17	max	54.446	1	320.819	3	68.259	1	.014	2	.004	3	.889	3
34			min	-18.229	5	-163.42	2	-18.469	5	0	15	-.06	4	-.466	2
35		18	max	54.446	1	551.848	3	98.702	1	.014	2	.038	1	.538	3
36			min	-26.498	5	-289.418	2	-16.243	5	0	15	-.067	5	-.284	2
37		19	max	54.446	1	782.878	3	129.144	1	.014	2	.129	1	0	2
38			min	-34.767	5	-415.415	2	-14.016	5	0	15	-.08	5	0	3
39	M14	1	max	35.475	4	476.048	2	-8.447	12	.012	3	.19	4	0	4
40			min	2.562	12	-637.903	3	-134.308	1	-.013	2	.015	12	0	3
41		2	max	31.02	1	350.05	2	-7.009	12	.012	3	.129	4	.443	3
42			min	2.562	12	-461.05	3	-103.865	1	-.013	2	.004	10	-.333	2
43		3	max	31.02	1	224.053	2	-5.57	12	.012	3	.077	5	.743	3
44			min	2.562	12	-284.198	3	-73.423	1	-.013	2	-.013	1	-.564	2
45		4	max	31.02	1	98.056	2	-4.131	12	.012	3	.043	5	.901	3
46			min	2.214	15	-107.345	3	-52.113	4	-.013	2	-.06	1	-.694	2
47		5	max	31.02	1	69.508	3	-.22	10	.012	3	.011	5	.916	3
48			min	-4.947	5	-27.942	2	-42.782	4	-.013	2	-.082	1	-.722	2
49		6	max	31.02	1	246.36	3	17.904	1	.012	3	-.005	12	.789	3
50			min	-13.217	5	-153.939	2	-36.89	5	-.013	2	-.08	1	-.649	2
51		7	max	31.02	1	423.213	3	48.346	1	.012	3	-.005	12	.519	3
52			min	-21.486	5	-279.937	2	-34.663	5	-.013	2	-.062	4	-.474	2
53		8	max	31.02	1	600.065	3	78.789	1	.012	3	.003	2	.107	3
54			min	-29.755	5	-405.934	2	-32.437	5	-.013	2	-.078	4	-.198	2
55		9	max	31.02	1	776.918	3	109.231	1	.012	3	.073	1	.18	2
56			min	-38.024	5	-531.932	2	-30.211	5	-.013	2	-.101	5	-.448	3
57		10	max	58.171	4	953.771	3	139.673	1	.013	2	.19	4	.659	2
58			min	2.562	12	-657.929	2	-95.638	14	-.012	3	0	3	-1.145	3
59		11	max	49.902	4	531.932	2	-3.064	12	.013	2	.128	4	.18	2
60			min	2.562	12	-776.918	3	-109.231	1	-.012	3	-.005	3	-.448	3
61		12	max	41.633	4	405.934	2	-1.625	12	.013	2	.075	5	.107	3
62			min	2.562	12	-600.065	3	-78.789	1	-.012	3	-.007	3	-.198	2
63		13	max	33.364	4	279.937	2	.056	3	.013	2	.04	5	.519	3
64			min	2.562	12	-423.213	3	-52.945	4	-.012	3	-.054	1	-.474	2
65		14	max	31.02	1	153.939	2	2.214	3	.013	2	.008	5	.789	3
66			min	2.562	12	-246.36	3	-43.613	4	-.012	3	-.08	1	-.649	2
67		15	max	31.02	1	27.942	2	12.538	1	.013	2	-.003	12	.916	3
68			min	2.562	12	-69.508	3	-37.089	5	-.012	3	-.082	1	-.722	2
69		16	max	31.02	1	107.345	3	42.981	1	.013	2	0	3	.901	3
70			min	.666	15	-98.056	2	-34.862	5	-.012	3	-.066	4	-.694	2
71		17	max	31.02	1	284.198	3	73.423	1	.013	2	.006	3	.743	3
72			min	-7.225	5	-224.053	2	-32.636	5	-.012	3	-.082	4	-.564	2
73		18	max	31.02	1	461.05	3	103.865	1	.013	2	.058	1	.443	3
74			min	-15.495	5	-350.05	2	-30.41	5	-.012	3	-.104	5	-.333	2
75		19	max	31.02	1	637.903	3	134.308	1	.013	2	.154	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	-23.764	5	-476.048	2	-28.184	5	-.012	3	-.128	5	0	3
77	M15	1	max	65.26	5	689.452	2	-8.284	12	.014	2	.236	4	0	2
78			min	-31.984	1	-364.105	3	-134.339	1	-.01	3	.014	12	0	3
79		2	max	56.991	5	500.248	2	-6.845	12	.014	2	.165	4	.255	3
80			min	-31.984	1	-268.518	3	-103.897	1	-.01	3	.004	10	-.479	2
81		3	max	48.722	5	311.043	2	-5.406	12	.014	2	.104	5	.433	3
82			min	-31.984	1	-172.931	3	-74.01	4	-.01	3	-.013	1	-.806	2
83		4	max	40.453	5	121.838	2	-3.967	12	.014	2	.059	5	.533	3
84			min	-31.984	1	-77.345	3	-64.679	4	-.01	3	-.06	1	-.98	2
85		5	max	32.183	5	18.242	3	-.303	10	.014	2	.017	5	.557	3
86			min	-31.984	1	-67.366	2	-55.348	4	-.01	3	-.082	1	-1.002	2
87		6	max	23.914	5	113.828	3	17.872	1	.014	2	-.005	12	.504	3
88			min	-31.984	1	-256.571	2	-49.422	5	-.01	3	-.08	1	-.872	2
89		7	max	15.645	5	209.415	3	48.315	1	.014	2	-.005	12	.374	3
90			min	-31.984	1	-445.775	2	-47.196	5	-.01	3	-.076	4	-.589	2
91		8	max	7.376	5	305.002	3	78.757	1	.014	2	.003	2	.167	3
92			min	-31.984	1	-634.98	2	-44.97	5	-.01	3	-.102	4	-.154	2
93		9	max	-.514	15	400.588	3	109.199	1	.014	2	.073	1	.434	2
94			min	-31.984	1	-824.184	2	-42.743	5	-.01	3	-.135	5	-.118	3
95		10	max	-2.996	10	496.175	3	139.642	1	.01	3	.235	4	1.174	2
96			min	-31.984	1	-1013.389	2	-102.029	14	-.014	2	0	3	-.479	3
97		11	max	-2.81	15	824.184	2	-3.228	12	.01	3	.163	4	.434	2
98			min	-31.984	1	-400.588	3	-109.199	1	-.014	2	-.004	3	-.118	3
99		12	max	-2.996	10	634.98	2	-1.789	12	.01	3	.099	5	.167	3
100			min	-31.984	1	-305.002	3	-78.757	1	-.014	2	-.007	3	-.154	2
101		13	max	-2.996	10	445.775	2	-.217	3	.01	3	.055	5	.374	3
102			min	-31.984	1	-209.415	3	-65.535	4	-.014	2	-.054	1	-.589	2
103		14	max	-2.996	10	256.571	2	1.942	3	.01	3	.012	5	.504	3
104			min	-37.242	4	-113.828	3	-56.204	4	-.014	2	-.08	1	-.872	2
105		15	max	-2.996	10	67.366	2	12.57	1	.01	3	-.003	12	.557	3
106			min	-45.512	4	-18.242	3	-49.625	5	-.014	2	-.082	1	-1.002	2
107		16	max	-2.996	10	77.345	3	43.012	1	.01	3	0	3	.533	3
108			min	-53.781	4	-121.838	2	-47.399	5	-.014	2	-.082	4	-.98	2
109		17	max	-2.996	10	172.931	3	73.455	1	.01	3	.005	3	.433	3
110			min	-62.05	4	-311.043	2	-45.173	5	-.014	2	-.109	4	-.806	2
111		18	max	-2.996	10	268.518	3	103.897	1	.01	3	.058	1	.255	3
112			min	-70.319	4	-500.248	2	-42.947	5	-.014	2	-.141	5	-.479	2
113		19	max	-2.996	10	364.105	3	134.339	1	.01	3	.154	1	0	2
114			min	-78.588	4	-689.452	2	-40.72	5	-.014	2	-.174	5	0	5
115	M16	1	max	63.074	5	631.626	2	-7.627	12	.008	2	.18	4	0	2
116			min	-58.958	1	-312.744	3	-129.549	1	-.012	3	.011	12	0	3
117		2	max	54.805	5	442.422	2	-6.189	12	.008	2	.122	4	.213	3
118			min	-58.958	1	-217.157	3	-99.107	1	-.012	3	.002	10	-.433	2
119		3	max	46.536	5	253.217	2	-4.75	12	.008	2	.077	5	.35	3
120			min	-58.958	1	-121.571	3	-68.664	1	-.012	3	-.029	1	-.713	2
121		4	max	38.266	5	64.013	2	-3.311	12	.008	2	.045	5	.409	3
122			min	-58.958	1	-25.984	3	-48.542	4	-.012	3	-.072	1	-.841	2
123		5	max	29.997	5	69.602	3	.071	10	.008	2	.014	5	.392	3
124			min	-58.958	1	-125.192	2	-39.211	4	-.012	3	-.09	1	-.816	2
125		6	max	21.728	5	165.189	3	22.663	1	.008	2	-.005	12	.297	3
126			min	-58.958	1	-314.396	2	-34.584	5	-.012	3	-.084	1	-.639	2
127		7	max	13.459	5	260.775	3	53.105	1	.008	2	-.005	12	.126	3
128			min	-58.958	1	-503.601	2	-32.358	5	-.012	3	-.055	4	-.309	2
129		8	max	5.19	5	356.362	3	83.547	1	.008	2	.004	2	.172	2
130			min	-58.958	1	-692.806	2	-30.132	5	-.012	3	-.068	4	-.123	3
131		9	max	-1.976	15	451.949	3	113.99	1	.008	2	.081	1	.807	2
132			min	-58.958	1	-882.01	2	-27.906	5	-.012	3	-.09	5	-.449	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	-5.172	12	547.535	3	144.432	1	.012	3	.185	1	1.594	2
134			min	-58.958	1	-1071.215	2	-97.363	14	-.008	2	.003	12	-.851	3
135		11	max	-3.798	15	882.01	2	-3.884	12	.012	3	.121	4	.807	2
136			min	-58.958	1	-451.949	3	-113.99	1	-.008	2	-.002	3	-.449	3
137		12	max	-5.172	12	692.806	2	-2.445	12	.012	3	.067	4	.172	2
138			min	-58.958	1	-356.362	3	-83.547	1	-.008	2	-.005	3	-.123	3
139		13	max	-5.172	12	503.601	2	-1.006	12	.012	3	.034	5	.126	3
140			min	-58.958	1	-260.775	3	-53.105	1	-.008	2	-.054	1	-.309	2
141		14	max	-5.172	12	314.396	2	.889	3	.012	3	.002	5	.297	3
142			min	-58.958	1	-165.189	3	-43.152	4	-.008	2	-.084	1	-.639	2
143		15	max	-5.172	12	125.192	2	7.78	1	.012	3	-.004	12	.392	3
144			min	-58.958	1	-69.602	3	-35.528	5	-.008	2	-.09	1	-.816	2
145		16	max	-5.172	12	25.984	3	38.222	1	.012	3	-.002	12	.409	3
146			min	-61.779	4	-64.013	2	-33.302	5	-.008	2	-.072	4	-.841	2
147		17	max	-5.172	12	121.571	3	68.664	1	.012	3	.003	3	.35	3
148			min	-70.048	4	-253.217	2	-31.076	5	-.008	2	-.088	4	-.713	2
149		18	max	-5.172	12	217.157	3	99.107	1	.012	3	.039	1	.213	3
150			min	-78.317	4	-442.422	2	-28.849	5	-.008	2	-.105	5	-.433	2
151		19	max	-5.172	12	312.744	3	129.549	1	.012	3	.131	1	0	2
152			min	-86.587	4	-631.626	2	-26.623	5	-.008	2	-.127	5	0	5
153	M2	1	max	1028.699	2	1.963	4	.251	1	0	3	0	3	0	1
154			min	-1483.175	3	.475	15	-20.704	4	0	4	0	2	0	1
155		2	max	1029.174	2	1.878	4	.251	1	0	3	0	1	0	15
156			min	-1482.818	3	.455	15	-21.12	4	0	4	-.007	4	0	4
157		3	max	1029.65	2	1.792	4	.251	1	0	3	0	1	0	15
158			min	-1482.462	3	.435	15	-21.536	4	0	4	-.014	4	-.001	4
159		4	max	1030.126	2	1.706	4	.251	1	0	3	0	1	0	15
160			min	-1482.105	3	.415	15	-21.953	4	0	4	-.021	4	-.002	4
161		5	max	1030.602	2	1.621	4	.251	1	0	3	0	1	0	15
162			min	-1481.748	3	.395	15	-22.369	4	0	4	-.028	4	-.002	4
163		6	max	1031.077	2	1.535	4	.251	1	0	3	0	1	0	15
164			min	-1481.391	3	.375	15	-22.785	4	0	4	-.035	4	-.003	4
165		7	max	1031.553	2	1.45	4	.251	1	0	3	0	1	0	15
166			min	-1481.034	3	.352	12	-23.202	4	0	4	-.043	4	-.003	4
167		8	max	1032.029	2	1.364	4	.251	1	0	3	0	1	0	15
168			min	-1480.678	3	.319	12	-23.618	4	0	4	-.05	4	-.004	4
169		9	max	1032.505	2	1.278	4	.251	1	0	3	0	1	-.001	15
170			min	-1480.321	3	.285	12	-24.034	4	0	4	-.058	4	-.004	4
171		10	max	1032.98	2	1.193	4	.251	1	0	3	0	1	-.001	15
172			min	-1479.964	3	.252	12	-24.451	4	0	4	-.066	4	-.005	4
173		11	max	1033.456	2	1.107	4	.251	1	0	3	0	1	-.001	15
174			min	-1479.607	3	.219	12	-24.867	4	0	4	-.074	4	-.005	4
175		12	max	1033.932	2	1.022	4	.251	1	0	3	0	1	-.001	15
176			min	-1479.25	3	.185	12	-25.284	4	0	4	-.082	4	-.005	4
177		13	max	1034.408	2	.952	2	.251	1	0	3	0	1	-.001	12
178			min	-1478.893	3	.152	12	-25.7	4	0	4	-.09	4	-.006	4
179		14	max	1034.883	2	.885	2	.251	1	0	3	.001	1	-.001	12
180			min	-1478.537	3	.119	12	-26.116	4	0	4	-.099	4	-.006	4
181		15	max	1035.359	2	.819	2	.251	1	0	3	.001	1	-.001	12
182			min	-1478.18	3	.085	12	-26.533	4	0	4	-.107	4	-.006	4
183		16	max	1035.835	2	.752	2	.251	1	0	3	.001	1	-.001	12
184			min	-1477.823	3	.044	3	-26.949	4	0	4	-.116	4	-.006	4
185		17	max	1036.311	2	.685	2	.251	1	0	3	.001	1	-.001	12
186			min	-1477.466	3	-.006	3	-27.365	4	0	4	-.125	4	-.007	4
187		18	max	1036.786	2	.619	2	.251	1	0	3	.001	1	-.001	12
188			min	-1477.109	3	-.056	3	-27.782	4	0	4	-.133	4	-.007	4
189		19	max	1037.262	2	.552	2	.251	1	0	3	.001	1	-.001	12

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-1476.753	3	-.106	3	-28.198	4	0	4	-.143	4	-.007	4
191	M3	1	max	809.76	2	7.805	4	3.961	4	0	3	0	1	.007	4
192			min	-920.993	3	1.845	15	.012	12	0	4	-.021	4	.001	12
193		2	max	809.59	2	7.041	4	4.498	4	0	3	0	1	.004	2
194			min	-921.121	3	1.666	15	.012	12	0	4	-.019	4	0	3
195		3	max	809.419	2	6.276	4	5.035	4	0	3	0	1	.002	2
196			min	-921.249	3	1.486	15	.012	12	0	4	-.017	4	-.001	3
197		4	max	809.249	2	5.512	4	5.572	4	0	3	0	1	0	2
198			min	-921.376	3	1.306	15	.012	12	0	4	-.015	4	-.003	3
199		5	max	809.078	2	4.747	4	6.109	4	0	3	0	1	0	15
200			min	-921.504	3	1.127	15	.012	12	0	4	-.012	5	-.004	3
201		6	max	808.908	2	3.983	4	6.646	4	0	3	0	1	-.001	15
202			min	-921.632	3	.947	15	.012	12	0	4	-.01	5	-.005	6
203		7	max	808.738	2	3.218	4	7.183	4	0	3	0	1	-.002	15
204			min	-921.76	3	.767	15	.012	12	0	4	-.007	5	-.007	6
205		8	max	808.567	2	2.454	4	7.72	4	0	3	0	1	-.002	15
206			min	-921.887	3	.588	15	.012	12	0	4	-.004	5	-.008	6
207		9	max	808.397	2	1.689	4	8.257	4	0	3	0	1	-.002	15
208			min	-922.015	3	.408	15	.012	12	0	4	0	5	-.009	6
209		10	max	808.227	2	.925	4	8.794	4	0	3	.003	4	-.002	15
210			min	-922.143	3	.196	12	.012	12	0	4	0	12	-.009	6
211		11	max	808.056	2	.298	2	9.331	4	0	3	.007	4	-.002	15
212			min	-922.271	3	-.18	3	.012	12	0	4	0	12	-.01	6
213		12	max	807.886	2	-.131	15	9.868	4	0	3	.011	4	-.002	15
214			min	-922.398	3	-.626	3	.012	12	0	4	0	12	-.01	6
215		13	max	807.716	2	-.311	15	10.405	4	0	3	.015	4	-.002	15
216			min	-922.526	3	-1.369	6	.012	12	0	4	0	12	-.009	6
217		14	max	807.545	2	-.491	15	10.942	4	0	3	.02	4	-.002	15
218			min	-922.654	3	-2.134	6	.012	12	0	4	0	12	-.008	6
219		15	max	807.375	2	-.67	15	11.479	4	0	3	.025	4	-.002	15
220			min	-922.782	3	-2.898	6	.012	12	0	4	0	12	-.007	6
221		16	max	807.205	2	-.85	15	12.015	4	0	3	.029	4	-.001	15
222			min	-922.909	3	-3.663	6	.012	12	0	4	0	12	-.006	6
223		17	max	807.034	2	-1.03	15	12.552	4	0	3	.035	4	-.001	15
224			min	-923.037	3	-4.427	6	.012	12	0	4	0	12	-.004	6
225		18	max	806.864	2	-1.209	15	13.089	4	0	3	.04	4	0	15
226			min	-923.165	3	-5.192	6	.012	12	0	4	0	12	-.002	6
227		19	max	806.694	2	-1.389	15	13.626	4	0	3	.046	4	0	1
228			min	-923.293	3	-5.956	6	.012	12	0	4	0	12	0	1
229	M4	1	max	853.25	1	0	1	-.509	12	0	1	.038	4	0	1
230			min	-61.015	5	0	1	-220.002	4	0	1	0	12	0	1
231		2	max	853.421	1	0	1	-.509	12	0	1	.013	4	0	1
232			min	-60.935	5	0	1	-220.15	4	0	1	0	10	0	1
233		3	max	853.591	1	0	1	-.509	12	0	1	0	12	0	1
234			min	-60.856	5	0	1	-220.298	4	0	1	-.013	4	0	1
235		4	max	853.762	1	0	1	-.509	12	0	1	0	12	0	1
236			min	-60.776	5	0	1	-220.445	4	0	1	-.038	4	0	1
237		5	max	853.932	1	0	1	-.509	12	0	1	0	12	0	1
238			min	-60.697	5	0	1	-220.593	4	0	1	-.063	4	0	1
239		6	max	854.102	1	0	1	-.509	12	0	1	0	12	0	1
240			min	-60.618	5	0	1	-220.74	4	0	1	-.089	4	0	1
241		7	max	854.273	1	0	1	-.509	12	0	1	0	12	0	1
242			min	-60.538	5	0	1	-220.888	4	0	1	-.114	4	0	1
243		8	max	854.443	1	0	1	-.509	12	0	1	0	12	0	1
244			min	-60.459	5	0	1	-221.036	4	0	1	-.139	4	0	1
245		9	max	854.613	1	0	1	-.509	12	0	1	0	12	0	1
246			min	-60.379	5	0	1	-221.183	4	0	1	-.165	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	854.784	1	0	1	-.509	12	0	1	0	12	0	1
248			min	-60.3	5	0	1	-221.331	4	0	1	-.19	4	0	1
249		11	max	854.954	1	0	1	-.509	12	0	1	0	12	0	1
250			min	-60.22	5	0	1	-221.479	4	0	1	-.216	4	0	1
251		12	max	855.124	1	0	1	-.509	12	0	1	0	12	0	1
252			min	-60.141	5	0	1	-221.626	4	0	1	-.241	4	0	1
253		13	max	855.295	1	0	1	-.509	12	0	1	0	12	0	1
254			min	-60.061	5	0	1	-221.774	4	0	1	-.267	4	0	1
255		14	max	855.465	1	0	1	-.509	12	0	1	0	12	0	1
256			min	-59.982	5	0	1	-221.922	4	0	1	-.292	4	0	1
257		15	max	855.635	1	0	1	-.509	12	0	1	0	12	0	1
258			min	-59.902	5	0	1	-222.069	4	0	1	-.318	4	0	1
259		16	max	855.806	1	0	1	-.509	12	0	1	0	12	0	1
260			min	-59.823	5	0	1	-222.217	4	0	1	-.343	4	0	1
261		17	max	855.976	1	0	1	-.509	12	0	1	0	12	0	1
262			min	-59.743	5	0	1	-222.364	4	0	1	-.369	4	0	1
263		18	max	856.146	1	0	1	-.509	12	0	1	0	12	0	1
264			min	-59.664	5	0	1	-222.512	4	0	1	-.394	4	0	1
265		19	max	856.317	1	0	1	-.509	12	0	1	0	12	0	1
266			min	-59.584	5	0	1	-222.66	4	0	1	-.42	4	0	1
267	M6	1	max	3173.32	2	2.309	2	0	1	0	1	0	4	0	1
268			min	-4687.7	3	.097	3	-20.911	4	0	4	0	1	0	1
269		2	max	3173.796	2	2.242	2	0	1	0	1	0	1	0	3
270			min	-4687.343	3	.047	3	-21.328	4	0	4	-.007	4	0	2
271		3	max	3174.272	2	2.175	2	0	1	0	1	0	1	0	3
272			min	-4686.986	3	-.003	3	-21.744	4	0	4	-.014	4	-.001	2
273		4	max	3174.747	2	2.109	2	0	1	0	1	0	1	0	3
274			min	-4686.63	3	-.053	3	-22.16	4	0	4	-.021	4	-.002	2
275		5	max	3175.223	2	2.042	2	0	1	0	1	0	1	0	3
276			min	-4686.273	3	-.103	3	-22.577	4	0	4	-.028	4	-.003	2
277		6	max	3175.699	2	1.975	2	0	1	0	1	0	1	0	3
278			min	-4685.916	3	-.153	3	-22.993	4	0	4	-.036	4	-.003	2
279		7	max	3176.175	2	1.909	2	0	1	0	1	0	1	0	3
280			min	-4685.559	3	-.203	3	-23.409	4	0	4	-.043	4	-.004	2
281		8	max	3176.65	2	1.842	2	0	1	0	1	0	1	0	3
282			min	-4685.202	3	-.253	3	-23.826	4	0	4	-.051	4	-.005	2
283		9	max	3177.126	2	1.775	2	0	1	0	1	0	1	0	3
284			min	-4684.846	3	-.303	3	-24.242	4	0	4	-.058	4	-.005	2
285		10	max	3177.602	2	1.709	2	0	1	0	1	0	1	0	3
286			min	-4684.489	3	-.353	3	-24.658	4	0	4	-.066	4	-.006	2
287		11	max	3178.078	2	1.642	2	0	1	0	1	0	1	0	3
288			min	-4684.132	3	-.404	3	-25.075	4	0	4	-.074	4	-.006	2
289		12	max	3178.553	2	1.575	2	0	1	0	1	0	1	0	3
290			min	-4683.775	3	-.454	3	-25.491	4	0	4	-.083	4	-.007	2
291		13	max	3179.029	2	1.509	2	0	1	0	1	0	1	0	3
292			min	-4683.418	3	-.504	3	-25.907	4	0	4	-.091	4	-.007	2
293		14	max	3179.505	2	1.442	2	0	1	0	1	0	1	0	3
294			min	-4683.062	3	-.554	3	-26.324	4	0	4	-.099	4	-.008	2
295		15	max	3179.981	2	1.375	2	0	1	0	1	0	1	.001	3
296			min	-4682.705	3	-.604	3	-26.74	4	0	4	-.108	4	-.008	2
297		16	max	3180.456	2	1.308	2	0	1	0	1	0	1	.001	3
298			min	-4682.348	3	-.654	3	-27.156	4	0	4	-.117	4	-.009	2
299		17	max	3180.932	2	1.242	2	0	1	0	1	0	1	.002	3
300			min	-4681.991	3	-.704	3	-27.573	4	0	4	-.126	4	-.009	2
301		18	max	3181.408	2	1.175	2	0	1	0	1	0	1	.002	3
302			min	-4681.634	3	-.754	3	-27.989	4	0	4	-.135	4	-.01	2
303		19	max	3181.884	2	1.108	2	0	1	0	1	0	1	.002	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	-4681.277	3	-.804	3	-28.405	4	0	4	-.144	4	-.01	2
305	M7	1	max	2700.637	2	7.802	6	3.724	4	0	1	0	1	.01	2
306			min	-2794.582	3	1.832	15	0	1	0	4	-.021	4	-.002	3
307		2	max	2700.467	2	7.037	6	4.261	4	0	1	0	1	.007	2
308			min	-2794.71	3	1.653	15	0	1	0	4	-.019	4	-.004	3
309		3	max	2700.296	2	6.273	6	4.798	4	0	1	0	1	.005	2
310			min	-2794.838	3	1.473	15	0	1	0	4	-.017	4	-.005	3
311		4	max	2700.126	2	5.508	6	5.335	4	0	1	0	1	.003	2
312			min	-2794.966	3	1.293	15	0	1	0	4	-.015	4	-.006	3
313		5	max	2699.956	2	4.744	6	5.872	4	0	1	0	1	0	2
314			min	-2795.093	3	1.114	15	0	1	0	4	-.013	4	-.007	3
315		6	max	2699.785	2	3.98	6	6.408	4	0	1	0	1	0	2
316			min	-2795.221	3	.934	15	0	1	0	4	-.01	4	-.008	3
317		7	max	2699.615	2	3.215	6	6.945	4	0	1	0	1	-.002	15
318			min	-2795.349	3	.754	15	0	1	0	4	-.007	4	-.008	3
319		8	max	2699.445	2	2.516	2	7.482	4	0	1	0	1	-.002	15
320			min	-2795.477	3	.466	12	0	1	0	4	-.004	5	-.008	3
321		9	max	2699.274	2	1.921	2	8.019	4	0	1	0	1	-.002	15
322			min	-2795.604	3	.169	12	0	1	0	4	-.001	5	-.009	4
323		10	max	2699.104	2	1.325	2	8.556	4	0	1	.002	4	-.002	15
324			min	-2795.732	3	-.274	3	0	1	0	4	0	1	-.009	4
325		11	max	2698.934	2	.729	2	9.093	4	0	1	.006	4	-.002	15
326			min	-2795.86	3	-.721	3	0	1	0	4	0	1	-.01	4
327		12	max	2698.763	2	.134	2	9.63	4	0	1	.01	4	-.002	15
328			min	-2795.988	3	-1.168	3	0	1	0	4	0	1	-.01	4
329		13	max	2698.593	2	-.324	15	10.167	4	0	1	.014	4	-.002	15
330			min	-2796.115	3	-1.614	3	0	1	0	4	0	1	-.009	4
331		14	max	2698.422	2	-.504	15	10.704	4	0	1	.018	4	-.002	15
332			min	-2796.243	3	-2.136	4	0	1	0	4	0	1	-.008	4
333		15	max	2698.252	2	-.683	15	11.241	4	0	1	.023	4	-.002	15
334			min	-2796.371	3	-2.9	4	0	1	0	4	0	1	-.007	4
335		16	max	2698.082	2	-.863	15	11.778	4	0	1	.028	4	-.001	15
336			min	-2796.499	3	-3.665	4	0	1	0	4	0	1	-.006	4
337		17	max	2697.911	2	-1.043	15	12.315	4	0	1	.033	4	-.001	15
338			min	-2796.627	3	-4.429	4	0	1	0	4	0	1	-.004	4
339		18	max	2697.741	2	-1.222	15	12.852	4	0	1	.038	4	0	15
340			min	-2796.754	3	-5.194	4	0	1	0	4	0	1	-.002	4
341		19	max	2697.571	2	-1.402	15	13.389	4	0	1	.044	4	0	1
342			min	-2796.882	3	-5.958	4	0	1	0	4	0	1	0	1
343	M8	1	max	2386.885	2	0	1	0	1	0	1	.036	4	0	1
344			min	-243.268	3	0	1	-213.229	4	0	1	0	1	0	1
345		2	max	2387.055	2	0	1	0	1	0	1	.012	4	0	1
346			min	-243.141	3	0	1	-213.377	4	0	1	0	1	0	1
347		3	max	2387.226	2	0	1	0	1	0	1	0	1	0	1
348			min	-243.013	3	0	1	-213.525	4	0	1	-.013	4	0	1
349		4	max	2387.396	2	0	1	0	1	0	1	0	1	0	1
350			min	-242.885	3	0	1	-213.672	4	0	1	-.037	4	0	1
351		5	max	2387.566	2	0	1	0	1	0	1	0	1	0	1
352			min	-242.757	3	0	1	-213.82	4	0	1	-.062	4	0	1
353		6	max	2387.737	2	0	1	0	1	0	1	0	1	0	1
354			min	-242.63	3	0	1	-213.967	4	0	1	-.086	4	0	1
355		7	max	2387.907	2	0	1	0	1	0	1	0	1	0	1
356			min	-242.502	3	0	1	-214.115	4	0	1	-.111	4	0	1
357		8	max	2388.077	2	0	1	0	1	0	1	0	1	0	1
358			min	-242.374	3	0	1	-214.263	4	0	1	-.136	4	0	1
359		9	max	2388.248	2	0	1	0	1	0	1	0	1	0	1
360			min	-242.246	3	0	1	-214.41	4	0	1	-.16	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	2388.418	2	0	1	0	1	0	1	0	1	0	1
362			min	-242.119	3	0	1	-214.558	4	0	1	-.185	4	0	1
363		11	max	2388.588	2	0	1	0	1	0	1	0	1	0	1
364			min	-241.991	3	0	1	-214.706	4	0	1	-.21	4	0	1
365		12	max	2388.759	2	0	1	0	1	0	1	0	1	0	1
366			min	-241.863	3	0	1	-214.853	4	0	1	-.234	4	0	1
367		13	max	2388.929	2	0	1	0	1	0	1	0	1	0	1
368			min	-241.735	3	0	1	-215.001	4	0	1	-.259	4	0	1
369		14	max	2389.099	2	0	1	0	1	0	1	0	1	0	1
370			min	-241.607	3	0	1	-215.149	4	0	1	-.284	4	0	1
371		15	max	2389.27	2	0	1	0	1	0	1	0	1	0	1
372			min	-241.48	3	0	1	-215.296	4	0	1	-.308	4	0	1
373		16	max	2389.44	2	0	1	0	1	0	1	0	1	0	1
374			min	-241.352	3	0	1	-215.444	4	0	1	-.333	4	0	1
375		17	max	2389.61	2	0	1	0	1	0	1	0	1	0	1
376			min	-241.224	3	0	1	-215.591	4	0	1	-.358	4	0	1
377		18	max	2389.781	2	0	1	0	1	0	1	0	1	0	1
378			min	-241.096	3	0	1	-215.739	4	0	1	-.383	4	0	1
379		19	max	2389.951	2	0	1	0	1	0	1	0	1	0	1
380			min	-240.969	3	0	1	-215.887	4	0	1	-.407	4	0	1
381	M10	1	max	1028.699	2	1.901	6	-.024	12	0	1	0	4	0	1
382			min	-1483.175	3	.433	15	-20.862	4	0	5	0	3	0	1
383		2	max	1029.174	2	1.816	6	-.024	12	0	1	0	10	0	15
384			min	-1482.818	3	.413	15	-21.279	4	0	5	-.007	4	0	6
385		3	max	1029.65	2	1.73	6	-.024	12	0	1	0	10	0	15
386			min	-1482.462	3	.393	15	-21.695	4	0	5	-.014	4	-.001	6
387		4	max	1030.126	2	1.645	6	-.024	12	0	1	0	10	0	15
388			min	-1482.105	3	.373	15	-22.111	4	0	5	-.021	4	-.002	6
389		5	max	1030.602	2	1.559	6	-.024	12	0	1	0	10	0	15
390			min	-1481.748	3	.353	15	-22.528	4	0	5	-.028	4	-.002	6
391		6	max	1031.077	2	1.473	6	-.024	12	0	1	0	10	0	15
392			min	-1481.391	3	.333	15	-22.944	4	0	5	-.035	4	-.003	6
393		7	max	1031.553	2	1.388	6	-.024	12	0	1	0	10	0	15
394			min	-1481.034	3	.313	15	-23.36	4	0	5	-.043	4	-.003	6
395		8	max	1032.029	2	1.302	6	-.024	12	0	1	0	10	0	15
396			min	-1480.678	3	.293	15	-23.777	4	0	5	-.051	4	-.004	6
397		9	max	1032.505	2	1.219	2	-.024	12	0	1	0	10	0	15
398			min	-1480.321	3	.272	15	-24.193	4	0	5	-.058	4	-.004	6
399		10	max	1032.98	2	1.152	2	-.024	12	0	1	0	10	0	15
400			min	-1479.964	3	.252	12	-24.609	4	0	5	-.066	4	-.004	6
401		11	max	1033.456	2	1.085	2	-.024	12	0	1	0	10	-.001	15
402			min	-1479.607	3	.219	12	-25.026	4	0	5	-.074	4	-.005	6
403		12	max	1033.932	2	1.019	2	-.024	12	0	1	0	10	-.001	15
404			min	-1479.25	3	.185	12	-25.442	4	0	5	-.082	4	-.005	6
405		13	max	1034.408	2	.952	2	-.024	12	0	1	0	10	-.001	15
406			min	-1478.893	3	.152	12	-25.858	4	0	5	-.091	4	-.005	6
407		14	max	1034.883	2	.885	2	-.024	12	0	1	0	10	-.001	15
408			min	-1478.537	3	.119	12	-26.275	4	0	5	-.099	4	-.006	6
409		15	max	1035.359	2	.819	2	-.024	12	0	1	0	10	-.001	15
410			min	-1478.18	3	.085	12	-26.691	4	0	5	-.108	4	-.006	6
411		16	max	1035.835	2	.752	2	-.024	12	0	1	0	10	-.001	15
412			min	-1477.823	3	.044	3	-27.107	4	0	5	-.116	4	-.006	6
413		17	max	1036.311	2	.685	2	-.024	12	0	1	0	10	-.001	15
414			min	-1477.466	3	-.006	3	-27.524	4	0	5	-.125	4	-.006	2
415		18	max	1036.786	2	.619	2	-.024	12	0	1	0	10	-.001	15
416			min	-1477.109	3	-.056	3	-27.94	4	0	5	-.134	4	-.007	2
417		19	max	1037.262	2	.552	2	-.024	12	0	1	0	10	-.001	12

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
418			min	-1476.753	3	-.106	3	-28.356	4	0	5	-.143	4	-.007	2
419	M11	1	max	809.76	2	7.757	6	3.873	4	0	1	0	10	.007	2
420			min	-920.993	3	1.813	15	-.141	1	0	4	-.021	4	.001	12
421		2	max	809.59	2	6.993	6	4.41	4	0	1	0	10	.004	2
422			min	-921.121	3	1.633	15	-.141	1	0	4	-.019	4	0	3
423		3	max	809.419	2	6.228	6	4.946	4	0	1	0	12	.002	2
424			min	-921.249	3	1.454	15	-.141	1	0	4	-.017	4	-.001	3
425		4	max	809.249	2	5.464	6	5.483	4	0	1	0	12	0	2
426			min	-921.376	3	1.274	15	-.141	1	0	4	-.015	4	-.003	3
427		5	max	809.078	2	4.699	6	6.02	4	0	1	0	12	0	15
428			min	-921.504	3	1.094	15	-.141	1	0	4	-.012	4	-.004	4
429		6	max	808.908	2	3.935	6	6.557	4	0	1	0	12	-.001	15
430			min	-921.632	3	.914	15	-.141	1	0	4	-.01	4	-.006	4
431		7	max	808.738	2	3.17	6	7.094	4	0	1	0	12	-.002	15
432			min	-921.76	3	.735	15	-.141	1	0	4	-.007	4	-.007	4
433		8	max	808.567	2	2.406	6	7.631	4	0	1	0	12	-.002	15
434			min	-921.887	3	.555	15	-.141	1	0	4	-.004	4	-.008	4
435		9	max	808.397	2	1.641	6	8.168	4	0	1	0	12	-.002	15
436			min	-922.015	3	.375	15	-.141	1	0	4	0	1	-.009	4
437		10	max	808.227	2	.893	2	8.705	4	0	1	.003	5	-.002	15
438			min	-922.143	3	.196	12	-.141	1	0	4	0	1	-.01	4
439		11	max	808.056	2	.298	2	9.242	4	0	1	.007	5	-.002	15
440			min	-922.271	3	-.18	3	-.141	1	0	4	0	1	-.01	4
441		12	max	807.886	2	-.164	15	9.779	4	0	1	.011	5	-.002	15
442			min	-922.398	3	-.653	4	-.141	1	0	4	0	1	-.01	4
443		13	max	807.716	2	-.343	15	10.316	4	0	1	.015	5	-.002	15
444			min	-922.526	3	-1.417	4	-.141	1	0	4	0	1	-.009	4
445		14	max	807.545	2	-.523	15	10.853	4	0	1	.019	4	-.002	15
446			min	-922.654	3	-2.182	4	-.141	1	0	4	0	1	-.009	4
447		15	max	807.375	2	-.703	15	11.39	4	0	1	.024	4	-.002	15
448			min	-922.782	3	-2.946	4	-.141	1	0	4	-.001	1	-.007	4
449		16	max	807.205	2	-.883	15	11.927	4	0	1	.029	4	-.001	15
450			min	-922.909	3	-3.711	4	-.141	1	0	4	-.001	1	-.006	4
451		17	max	807.034	2	-1.062	15	12.464	4	0	1	.034	4	-.001	15
452			min	-923.037	3	-4.475	4	-.141	1	0	4	-.001	1	-.004	4
453		18	max	806.864	2	-1.242	15	13.001	4	0	1	.039	4	0	15
454			min	-923.165	3	-5.239	4	-.141	1	0	4	-.001	1	-.002	4
455		19	max	806.694	2	-1.422	15	13.538	4	0	1	.045	4	0	1
456			min	-923.293	3	-6.004	4	-.141	1	0	4	-.001	1	0	1
457	M12	1	max	853.25	1	0	1	5.971	1	0	1	.037	4	0	1
458			min	-45.926	3	0	1	-216.241	4	0	1	-.001	1	0	1
459		2	max	853.421	1	0	1	5.971	1	0	1	.012	4	0	1
460			min	-45.798	3	0	1	-216.389	4	0	1	0	1	0	1
461		3	max	853.591	1	0	1	5.971	1	0	1	0	1	0	1
462			min	-45.67	3	0	1	-216.537	4	0	1	-.013	4	0	1
463		4	max	853.762	1	0	1	5.971	1	0	1	.001	1	0	1
464			min	-45.542	3	0	1	-216.684	4	0	1	-.037	4	0	1
465		5	max	853.932	1	0	1	5.971	1	0	1	.002	1	0	1
466			min	-45.415	3	0	1	-216.832	4	0	1	-.062	4	0	1
467		6	max	854.102	1	0	1	5.971	1	0	1	.002	1	0	1
468			min	-45.287	3	0	1	-216.98	4	0	1	-.087	4	0	1
469		7	max	854.273	1	0	1	5.971	1	0	1	.003	1	0	1
470			min	-45.159	3	0	1	-217.127	4	0	1	-.112	4	0	1
471		8	max	854.443	1	0	1	5.971	1	0	1	.004	1	0	1
472			min	-45.031	3	0	1	-217.275	4	0	1	-.137	4	0	1
473		9	max	854.613	1	0	1	5.971	1	0	1	.004	1	0	1
474			min	-44.904	3	0	1	-217.423	4	0	1	-.162	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	854.784	1	0	1	5.971	1	0	1	.005	1	0	1
476			min	-44.776	3	0	1	-217.57	4	0	1	-.187	4	0	1
477		11	max	854.954	1	0	1	5.971	1	0	1	.006	1	0	1
478			min	-44.648	3	0	1	-217.718	4	0	1	-.212	4	0	1
479		12	max	855.124	1	0	1	5.971	1	0	1	.006	1	0	1
480			min	-44.52	3	0	1	-217.865	4	0	1	-.237	4	0	1
481		13	max	855.295	1	0	1	5.971	1	0	1	.007	1	0	1
482			min	-44.393	3	0	1	-218.013	4	0	1	-.262	4	0	1
483		14	max	855.465	1	0	1	5.971	1	0	1	.008	1	0	1
484			min	-44.265	3	0	1	-218.161	4	0	1	-.287	4	0	1
485		15	max	855.635	1	0	1	5.971	1	0	1	.009	1	0	1
486			min	-44.137	3	0	1	-218.308	4	0	1	-.312	4	0	1
487		16	max	855.806	1	0	1	5.971	1	0	1	.009	1	0	1
488			min	-44.009	3	0	1	-218.456	4	0	1	-.337	4	0	1
489		17	max	855.976	1	0	1	5.971	1	0	1	.01	1	0	1
490			min	-43.882	3	0	1	-218.604	4	0	1	-.362	4	0	1
491		18	max	856.146	1	0	1	5.971	1	0	1	.011	1	0	1
492			min	-43.754	3	0	1	-218.751	4	0	1	-.387	4	0	1
493		19	max	856.317	1	0	1	5.971	1	0	1	.011	1	0	1
494			min	-43.626	3	0	1	-218.899	4	0	1	-.413	4	0	1
495	M1	1	max	129.149	1	782.827	3	34.741	5	0	2	.129	1	0	15
496			min	-14.016	5	-414.879	2	-54.398	1	0	3	-.08	5	-.014	2
497		2	max	129.865	1	781.897	3	35.983	5	0	2	.101	1	.205	2
498			min	-13.682	5	-416.12	2	-54.398	1	0	3	-.061	5	-.415	3
499		3	max	570.198	3	532.791	2	16.885	5	0	3	.072	1	.414	2
500			min	-330.493	2	-598.144	3	-54.223	1	0	2	-.042	5	-.811	3
501		4	max	570.735	3	531.55	2	18.126	5	0	3	.043	1	.133	2
502			min	-329.776	2	-599.074	3	-54.223	1	0	2	-.033	5	-.495	3
503		5	max	571.272	3	530.31	2	19.368	5	0	3	.015	1	-.003	15
504			min	-329.06	2	-600.004	3	-54.223	1	0	2	-.023	5	-.178	3
505		6	max	571.81	3	529.069	2	20.609	5	0	3	-.001	12	.138	3
506			min	-328.344	2	-600.935	3	-54.223	1	0	2	-.016	4	-.426	2
507		7	max	572.347	3	527.829	2	21.85	5	0	3	0	15	.456	3
508			min	-327.628	2	-601.865	3	-54.223	1	0	2	-.043	1	-.705	2
509		8	max	572.884	3	526.588	2	23.092	5	0	3	.011	5	.774	3
510			min	-326.912	2	-602.796	3	-54.223	1	0	2	-.071	1	-.984	2
511		9	max	586.426	3	52.934	2	48.01	5	0	9	.045	1	.9	3
512			min	-271.851	2	.374	15	-85.267	1	0	3	-.097	5	-1.124	2
513		10	max	586.963	3	51.694	2	49.251	5	0	9	0	10	.88	3
514			min	-271.135	2	-.001	5	-85.267	1	0	3	-.072	4	-1.152	2
515		11	max	587.501	3	50.453	2	50.493	5	0	9	-.004	12	.861	3
516			min	-270.418	2	-1.561	4	-85.267	1	0	3	-.056	4	-1.179	2
517		12	max	600.772	3	404.718	3	122.054	5	0	2	.07	1	.754	3
518			min	-215.231	2	-637.99	2	-53.294	1	0	3	-.178	5	-1.047	2
519		13	max	601.31	3	403.788	3	123.295	5	0	2	.042	1	.54	3
520			min	-214.515	2	-639.23	2	-53.294	1	0	3	-.113	5	-.71	2
521		14	max	601.847	3	402.858	3	124.537	5	0	2	.014	1	.327	3
522			min	-213.799	2	-640.471	2	-53.294	1	0	3	-.048	5	-.372	2
523		15	max	602.384	3	401.927	3	125.778	5	0	2	.018	5	.115	3
524			min	-213.082	2	-641.711	2	-53.294	1	0	3	-.014	1	-.046	1
525		16	max	602.921	3	400.997	3	127.02	5	0	2	.085	5	.305	2
526			min	-212.366	2	-642.952	2	-53.294	1	0	3	-.042	1	-.097	3
527		17	max	603.458	3	400.066	3	128.261	5	0	2	.152	5	.645	2
528			min	-211.65	2	-644.192	2	-53.294	1	0	3	-.07	1	-.308	3
529		18	max	26.288	5	633.333	2	-5.173	12	0	5	.166	5	.326	2
530			min	-130.261	1	-311.901	3	-87.842	4	0	2	-.1	1	-.152	3
531		19	max	26.623	5	632.092	2	-5.173	12	0	5	.127	5	.012	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
532			min	-129.545	1	-312.831	3	-86.6	4	0	2	-.131	1	-.008	2
533	M5	1	max	289.665	1	2592.725	3	71.219	5	0	1	0	1	.028	2
534			min	9.562	12	-1434.497	2	0	1	0	4	-.164	4	0	15
535		2	max	290.381	1	2591.794	3	72.461	5	0	1	0	1	.785	2
536			min	9.92	12	-1435.738	2	0	1	0	4	-.127	4	-1.364	3
537		3	max	1769.64	3	1476.066	2	54.791	4	0	4	0	1	1.508	2
538			min	-1061.812	2	-1788.983	3	0	1	0	1	-.088	4	-2.678	3
539		4	max	1770.177	3	1474.825	2	56.032	4	0	4	0	1	.729	2
540			min	-1061.096	2	-1789.913	3	0	1	0	1	-.059	4	-1.734	3
541		5	max	1770.714	3	1473.585	2	57.273	4	0	4	0	1	.018	9
542			min	-1060.38	2	-1790.844	3	0	1	0	1	-.029	4	-.789	3
543		6	max	1771.252	3	1472.344	2	58.515	4	0	4	.001	4	.156	3
544			min	-1059.664	2	-1791.774	3	0	1	0	1	0	1	-.826	2
545		7	max	1771.789	3	1471.104	2	59.756	4	0	4	.033	4	1.102	3
546			min	-1058.947	2	-1792.704	3	0	1	0	1	0	1	-1.603	2
547		8	max	1772.326	3	1469.863	2	60.998	4	0	4	.064	4	2.048	3
548			min	-1058.231	2	-1793.635	3	0	1	0	1	0	1	-2.379	2
549		9	max	1785.704	3	179.233	2	159.585	4	0	1	0	1	2.356	3
550			min	-935.93	2	.371	15	0	1	0	1	-.148	4	-2.719	2
551		10	max	1786.241	3	177.993	2	160.826	4	0	1	0	1	2.279	3
552			min	-935.214	2	-.003	15	0	1	0	1	-.064	4	-2.814	2
553		11	max	1786.778	3	176.752	2	162.068	4	0	1	.021	4	2.204	3
554			min	-934.498	2	-1.503	6	0	1	0	1	0	1	-2.907	2
555		12	max	1800.696	3	1171.577	3	176.126	4	0	1	0	1	1.932	3
556			min	-812.45	2	-1830.575	2	0	1	0	4	-.256	4	-2.605	2
557		13	max	1801.234	3	1170.646	3	177.368	4	0	1	0	1	1.314	3
558			min	-811.734	2	-1831.816	2	0	1	0	4	-.163	4	-1.638	2
559		14	max	1801.771	3	1169.716	3	178.609	4	0	1	0	1	.697	3
560			min	-811.017	2	-1833.056	2	0	1	0	4	-.069	4	-.672	2
561		15	max	1802.308	3	1168.786	3	179.851	4	0	1	.026	4	.296	2
562			min	-810.301	2	-1834.297	2	0	1	0	4	0	1	0	13
563		16	max	1802.845	3	1167.855	3	181.092	4	0	1	.121	4	1.264	2
564			min	-809.585	2	-1835.537	2	0	1	0	4	0	1	-.537	3
565		17	max	1803.382	3	1166.925	3	182.333	4	0	1	.217	4	2.233	2
566			min	-808.869	2	-1836.778	2	0	1	0	4	0	1	-1.153	3
567		18	max	-11.003	12	2145.694	2	0	1	0	4	.26	4	1.149	2
568			min	-289.588	1	-1094.427	3	-15.04	5	0	1	0	1	-.603	3
569		19	max	-10.645	12	2144.454	2	0	1	0	4	.252	4	.017	2
570			min	-288.872	1	-1095.358	3	-13.798	5	0	1	0	1	-.025	3
571	M9	1	max	129.149	1	782.827	3	56.276	4	0	3	-.012	10	0	15
572			min	8.169	12	-414.879	2	5.192	10	0	4	-.131	4	-.014	2
573		2	max	129.865	1	781.897	3	57.517	4	0	3	-.01	10	.205	2
574			min	8.527	12	-416.12	2	5.192	10	0	4	-.101	4	-.415	3
575		3	max	570.198	3	532.791	2	54.223	1	0	2	-.007	10	.414	2
576			min	-330.493	2	-598.144	3	5.169	10	0	3	-.072	1	-.811	3
577		4	max	570.735	3	531.55	2	54.223	1	0	2	-.004	10	.133	2
578			min	-329.776	2	-599.074	3	5.169	10	0	3	-.05	4	-.495	3
579		5	max	571.272	3	530.31	2	54.223	1	0	2	-.001	10	-.003	15
580			min	-329.06	2	-600.004	3	5.169	10	0	3	-.029	4	-.178	3
581		6	max	571.81	3	529.069	2	54.223	1	0	2	.014	1	.138	3
582			min	-328.344	2	-600.935	3	5.169	10	0	3	-.01	5	-.426	2
583		7	max	572.347	3	527.829	2	54.223	1	0	2	.043	1	.456	3
584			min	-327.628	2	-601.865	3	5.169	10	0	3	.003	15	-.705	2
585		8	max	572.884	3	526.588	2	54.223	1	0	2	.071	1	.774	3
586			min	-326.912	2	-602.796	3	5.169	10	0	3	.007	10	-.984	2
587		9	max	586.426	3	52.934	2	85.267	1	0	3	-.004	12	.9	3
588			min	-271.851	2	.383	15	8.02	12	0	9	-.115	4	-1.124	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	586.963	3	51.694	2	85.267	1	0	3	0	1	.88	3
590			min	-271.135	2	.008	15	8.02	12	0	9	-.072	4	-1.152	2
591		11	max	587.501	3	50.453	2	85.267	1	0	3	.045	1	.861	3
592			min	-270.418	2	-1.509	6	8.02	12	0	9	-.038	5	-1.179	2
593		12	max	600.772	3	404.718	3	143.933	4	0	3	-.006	12	.754	3
594			min	-215.231	2	-637.99	2	4.678	12	0	2	-.207	4	-1.047	2
595		13	max	601.31	3	403.788	3	145.174	4	0	3	-.004	12	.54	3
596			min	-214.515	2	-639.23	2	4.678	12	0	2	-.13	4	-.71	2
597		14	max	601.847	3	402.858	3	146.416	4	0	3	-.001	12	.327	3
598			min	-213.799	2	-640.471	2	4.678	12	0	2	-.054	4	-.372	2
599		15	max	602.384	3	401.927	3	147.657	4	0	3	.024	4	.115	3
600			min	-213.082	2	-641.711	2	4.678	12	0	2	.001	12	-.046	1
601		16	max	602.921	3	400.997	3	148.898	4	0	3	.102	4	.305	2
602			min	-212.366	2	-642.952	2	4.678	12	0	2	.004	12	-.097	3
603		17	max	603.458	3	400.066	3	150.14	4	0	3	.181	4	.645	2
604			min	-211.65	2	-644.192	2	4.678	12	0	2	.006	12	-.308	3
605		18	max	-7.986	12	633.333	2	59.005	1	0	2	.206	4	.326	2
606			min	-130.261	1	-311.901	3	-64.45	5	0	3	.009	12	-.152	3
607		19	max	-7.628	12	632.092	2	59.005	1	0	2	.18	4	.012	3
608			min	-129.545	1	-312.831	3	-63.209	5	0	3	.011	12	-.008	2

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	.122	2	.01	3	1.021e-2	2	NC	1	NC	1
2			min	-.446	4	-.031	3	-.006	2	-2.878e-3	3	NC	1	NC	1
3		2	max	0	1	.115	3	.012	3	1.118e-2	2	NC	4	NC	1
4			min	-.446	4	.002	15	-.008	5	-2.728e-3	3	1197.465	3	NC	1
5		3	max	0	1	.233	3	.028	1	1.216e-2	2	NC	4	NC	2
6			min	-.446	4	-.004	9	-.011	5	-2.578e-3	3	659.767	3	6104.465	1
7		4	max	0	1	.307	3	.041	1	1.313e-2	2	NC	5	NC	2
8			min	-.446	4	-.016	1	-.008	5	-2.428e-3	3	516.064	3	4148.276	1
9		5	max	0	1	.326	3	.047	1	1.411e-2	2	NC	5	NC	2
10			min	-.446	4	-.013	1	-.003	5	-2.278e-3	3	487.252	3	3617.005	1
11		6	max	0	1	.294	3	.044	1	1.508e-2	2	NC	4	NC	2
12			min	-.446	4	-.003	9	-.003	10	-2.128e-3	3	536.031	3	3857.815	1
13		7	max	0	1	.22	3	.033	1	1.606e-2	2	NC	4	NC	2
14			min	-.446	4	.002	15	-.006	10	-1.979e-3	3	695.086	3	5180.019	1
15		8	max	0	1	.146	2	.029	3	1.703e-2	2	NC	1	NC	1
16			min	-.446	4	.003	15	-.01	2	-1.829e-3	3	1126.209	3	9031.166	3
17		9	max	0	1	.2	2	.03	3	1.801e-2	2	NC	4	NC	1
18			min	-.446	4	.004	15	-.018	2	-1.679e-3	3	2231.13	2	8780.667	3
19		10	max	0	1	.224	2	.03	3	1.898e-2	2	NC	4	NC	1
20			min	-.446	4	-.004	3	-.021	2	-1.529e-3	3	1708.555	2	8740.795	3
21		11	max	0	10	.2	2	.03	3	1.801e-2	2	NC	4	NC	1
22			min	-.446	4	.004	15	-.018	2	-1.679e-3	3	2231.13	2	8780.667	3
23		12	max	0	10	.146	2	.029	3	1.703e-2	2	NC	1	NC	1
24			min	-.446	4	.002	15	-.01	2	-1.829e-3	3	1126.209	3	9031.166	3
25		13	max	0	10	.22	3	.033	1	1.606e-2	2	NC	4	NC	2
26			min	-.446	4	.001	15	-.006	10	-1.979e-3	3	695.086	3	5180.019	1
27		14	max	0	10	.294	3	.044	1	1.508e-2	2	NC	4	NC	2
28			min	-.446	4	-.003	9	-.003	10	-2.128e-3	3	536.031	3	3857.815	1
29		15	max	0	10	.326	3	.047	1	1.411e-2	2	NC	5	NC	2
30			min	-.446	4	-.013	1	-.001	10	-2.278e-3	3	487.252	3	3617.005	1
31		16	max	0	10	.307	3	.041	1	1.313e-2	2	NC	5	NC	2
32			min	-.446	4	-.016	1	0	10	-2.428e-3	3	516.064	3	4148.276	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
33		17	max	0	10	.233	3	.028	1	1.216e-2	2	NC	4	NC	2
34			min	-.446	4	-.004	9	-.002	10	-2.578e-3	3	659.767	3	6104.465	1
35		18	max	0	10	.115	3	.014	4	1.118e-2	2	NC	4	NC	1
36			min	-.446	4	0	15	-.003	10	-2.728e-3	3	1197.465	3	NC	1
37		19	max	0	10	.122	2	.01	3	1.021e-2	2	NC	1	NC	1
38			min	-.446	4	-.031	3	-.006	2	-2.878e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.277	3	.009	3	5.682e-3	2	NC	1	NC	1
40			min	-.343	4	-.381	2	-.006	2	-4.75e-3	3	NC	1	NC	1
41		2	max	0	1	.452	3	.01	3	6.59e-3	2	NC	5	NC	1
42			min	-.343	4	-.543	2	-.013	5	-5.589e-3	3	989.125	3	NC	1
43		3	max	0	1	.606	3	.021	1	7.498e-3	2	NC	5	NC	2
44			min	-.343	4	-.687	2	-.017	5	-6.428e-3	3	527.842	3	7993.517	1
45		4	max	0	1	.722	3	.034	1	8.406e-3	2	NC	5	NC	2
46			min	-.343	4	-.804	2	-.012	5	-7.268e-3	3	390.365	3	5027.003	1
47		5	max	0	1	.793	3	.041	1	9.314e-3	2	NC	5	NC	2
48			min	-.343	4	-.884	2	-.003	5	-8.107e-3	3	337.164	3	4197.604	1
49		6	max	0	1	.816	3	.039	1	1.022e-2	2	NC	5	NC	2
50			min	-.343	4	-.929	2	-.003	10	-8.946e-3	3	317.836	2	4353.121	1
51		7	max	0	1	.8	3	.03	1	1.113e-2	2	NC	5	NC	2
52			min	-.343	4	-.94	2	-.005	10	-9.785e-3	3	311.478	2	5724.819	1
53		8	max	0	1	.758	3	.026	3	1.204e-2	2	NC	5	NC	1
54			min	-.343	4	-.927	2	-.009	2	-1.062e-2	3	318.779	2	7175.867	4
55		9	max	0	1	.711	3	.026	3	1.295e-2	2	NC	5	NC	1
56			min	-.343	4	-.904	2	-.016	2	-1.146e-2	3	332.509	2	9869.806	3
57		10	max	0	1	.687	3	.027	3	1.385e-2	2	NC	5	NC	1
58			min	-.343	4	-.892	2	-.019	2	-1.23e-2	3	340.867	2	9807.916	3
59		11	max	0	12	.711	3	.026	3	1.295e-2	2	NC	5	NC	1
60			min	-.343	4	-.904	2	-.016	2	-1.146e-2	3	332.509	2	9869.806	3
61		12	max	0	12	.758	3	.026	3	1.204e-2	2	NC	5	NC	1
62			min	-.343	4	-.927	2	-.016	5	-1.062e-2	3	318.779	2	NC	1
63		13	max	0	12	.8	3	.03	1	1.113e-2	2	NC	5	NC	2
64			min	-.343	4	-.94	2	-.011	5	-9.785e-3	3	311.478	2	5724.819	1
65		14	max	0	12	.816	3	.039	1	1.022e-2	2	NC	5	NC	2
66			min	-.343	4	-.929	2	-.003	10	-8.946e-3	3	317.836	2	4353.121	1
67		15	max	0	12	.793	3	.041	1	9.314e-3	2	NC	5	NC	2
68			min	-.343	4	-.884	2	-.001	10	-8.107e-3	3	337.164	3	4197.604	1
69		16	max	0	12	.722	3	.034	1	8.406e-3	2	NC	5	NC	2
70			min	-.343	4	-.804	2	-.001	10	-7.268e-3	3	390.365	3	5027.003	1
71		17	max	0	12	.606	3	.027	4	7.498e-3	2	NC	5	NC	2
72			min	-.343	4	-.687	2	-.002	10	-6.428e-3	3	527.842	3	6494.855	4
73		18	max	0	12	.452	3	.018	4	6.59e-3	2	NC	5	NC	1
74			min	-.343	4	-.543	2	-.003	10	-5.589e-3	3	989.125	3	9623.826	4
75		19	max	0	12	.277	3	.009	3	5.682e-3	2	NC	1	NC	1
76			min	-.343	4	-.381	2	-.006	2	-4.75e-3	3	NC	1	NC	1
77	M15	1	max	0	10	.282	3	.008	3	4.141e-3	3	NC	1	NC	1
78			min	-.286	4	-.38	2	-.005	2	-5.947e-3	2	NC	1	NC	1
79		2	max	0	10	.409	3	.009	3	4.873e-3	3	NC	5	NC	1
80			min	-.286	4	-.58	2	-.019	5	-6.904e-3	2	870.353	2	8661.487	5
81		3	max	0	10	.524	3	.021	1	5.604e-3	3	NC	5	NC	2
82			min	-.286	4	-.756	2	-.023	5	-7.862e-3	2	462.992	2	7051.07	5
83		4	max	0	10	.616	3	.034	1	6.335e-3	3	NC	5	NC	2
84			min	-.286	4	-.891	2	-.017	5	-8.819e-3	2	340.598	2	5004.006	1
85		5	max	0	10	.682	3	.041	1	7.066e-3	3	NC	5	NC	2
86			min	-.286	4	-.976	2	-.005	5	-9.776e-3	2	291.903	2	4176.142	1
87		6	max	0	10	.719	3	.04	1	7.797e-3	3	NC	5	NC	2
88			min	-.286	4	-1.01	2	-.002	10	-1.073e-2	2	276.035	2	4324.66	1
89		7	max	0	10	.731	3	.03	1	8.528e-3	3	NC	5	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	-.286	4	-1	2	-.005	10	-1.169e-2	2	280.471	2	5667.654	1
91		8	max	0	10	.723	3	.031	4	9.259e-3	3	NC	5	NC	1
92			min	-.286	4	-.961	2	-.008	2	-1.265e-2	2	299.616	2	5853.238	4
93		9	max	0	10	.708	3	.025	3	9.991e-3	3	NC	5	NC	1
94			min	-.286	4	-.914	2	-.015	2	-1.36e-2	2	325.936	2	8241.944	4
95		10	max	0	1	.699	3	.025	3	1.072e-2	3	NC	5	NC	1
96			min	-.286	4	-.89	2	-.018	2	-1.456e-2	2	341.203	2	NC	1
97		11	max	0	1	.708	3	.025	3	9.991e-3	3	NC	5	NC	1
98			min	-.286	4	-.914	2	-.018	5	-1.36e-2	2	325.936	2	9570.297	5
99		12	max	0	1	.723	3	.024	3	9.259e-3	3	NC	5	NC	1
100			min	-.286	4	-.961	2	-.021	5	-1.265e-2	2	299.616	2	8161.45	5
101		13	max	0	1	.731	3	.03	1	8.528e-3	3	NC	5	NC	2
102			min	-.286	4	-1	2	-.014	5	-1.169e-2	2	280.471	2	5667.654	1
103		14	max	0	1	.719	3	.04	1	7.797e-3	3	NC	5	NC	2
104			min	-.286	4	-1.01	2	-.002	10	-1.073e-2	2	276.035	2	4324.66	1
105		15	max	0	1	.682	3	.041	1	7.066e-3	3	NC	5	NC	2
106			min	-.286	4	-.976	2	-.001	10	-9.776e-3	2	291.903	2	4176.142	1
107		16	max	0	1	.616	3	.034	1	6.335e-3	3	NC	5	NC	2
108			min	-.286	4	-.891	2	0	10	-8.819e-3	2	340.598	2	5004.006	1
109		17	max	0	1	.524	3	.033	4	5.604e-3	3	NC	5	NC	2
110			min	-.286	4	-.756	2	-.002	10	-7.862e-3	2	462.992	2	5182.741	4
111		18	max	0	1	.409	3	.023	4	4.873e-3	3	NC	5	NC	1
112			min	-.286	4	-.58	2	-.003	10	-6.904e-3	2	870.353	2	7450.231	4
113		19	max	0	1	.282	3	.008	3	4.141e-3	3	NC	1	NC	1
114			min	-.286	4	-.38	2	-.005	2	-5.947e-3	2	NC	1	NC	1
115	M16	1	max	0	12	.108	2	.007	3	7.679e-3	3	NC	1	NC	1
116			min	-.113	4	-.095	3	-.005	2	-8.487e-3	2	NC	1	NC	1
117		2	max	0	12	.016	1	.012	1	8.563e-3	3	NC	4	NC	1
118			min	-.113	4	-.054	3	-.014	5	-9.076e-3	2	1688.468	2	NC	1
119		3	max	0	12	.002	13	.028	1	9.448e-3	3	NC	4	NC	2
120			min	-.113	4	-.076	2	-.019	5	-9.665e-3	2	943.184	2	6085.012	1
121		4	max	0	12	0	5	.042	1	1.033e-2	3	NC	5	NC	2
122			min	-.113	4	-.122	2	-.015	5	-1.025e-2	2	756.981	2	4119.207	1
123		5	max	0	12	0	13	.048	1	1.122e-2	3	NC	4	NC	2
124			min	-.113	4	-.124	2	-.007	5	-1.084e-2	2	748.037	2	3575.23	1
125		6	max	0	12	.003	4	.045	1	1.21e-2	3	NC	4	NC	2
126			min	-.113	4	-.086	2	-.001	10	-1.143e-2	2	896.927	2	3785.992	1
127		7	max	0	12	.015	9	.034	1	1.298e-2	3	NC	3	NC	2
128			min	-.113	4	-.088	3	-.004	10	-1.202e-2	2	1413.041	2	5009.573	1
129		8	max	0	12	.074	1	.022	4	1.387e-2	3	NC	1	NC	2
130			min	-.113	4	-.136	3	-.006	10	-1.261e-2	2	4237.53	3	8483.949	4
131		9	max	0	12	.148	2	.022	3	1.475e-2	3	NC	4	NC	1
132			min	-.113	4	-.178	3	-.013	2	-1.32e-2	2	2095.793	3	NC	1
133		10	max	0	1	.182	2	.021	3	1.564e-2	3	NC	4	NC	1
134			min	-.113	4	-.197	3	-.017	2	-1.379e-2	2	1713.328	3	NC	1
135		11	max	0	1	.148	2	.022	3	1.475e-2	3	NC	4	NC	1
136			min	-.113	4	-.178	3	-.013	2	-1.32e-2	2	2095.793	3	NC	1
137		12	max	0	1	.074	1	.021	3	1.387e-2	3	NC	1	NC	2
138			min	-.113	4	-.136	3	-.012	5	-1.261e-2	2	4237.53	3	9586.951	1
139		13	max	0	1	.015	9	.034	1	1.298e-2	3	NC	3	NC	2
140			min	-.113	4	-.088	3	-.005	5	-1.202e-2	2	1413.041	2	5009.573	1
141		14	max	0	1	.003	6	.045	1	1.21e-2	3	NC	4	NC	2
142			min	-.113	4	-.086	2	-.001	10	-1.143e-2	2	896.927	2	3785.992	1
143		15	max	0	1	0	13	.048	1	1.122e-2	3	NC	4	NC	2
144			min	-.113	4	-.124	2	0	10	-1.084e-2	2	748.037	2	3575.23	1
145		16	max	0	1	0	13	.042	1	1.033e-2	3	NC	5	NC	2
146			min	-.113	4	-.122	2	0	10	-1.025e-2	2	756.981	2	4119.207	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	.002	13	.031	4	9.448e-3	3	NC	4	NC	2
148			min	-.113	4	-.076	2	0	10	-9.665e-3	2	943.184	2	5565.916	4
149		18	max	0	1	.016	1	.02	4	8.563e-3	3	NC	4	NC	1
150			min	-.113	4	-.054	3	-.002	10	-9.076e-3	2	1688.468	2	8453.019	4
151		19	max	0	1	.108	2	.007	3	7.679e-3	3	NC	1	NC	1
152			min	-.113	4	-.095	3	-.005	2	-8.487e-3	2	NC	1	NC	1
153	M2	1	max	.007	2	.009	2	.004	1	1.291e-3	5	NC	1	NC	1
154			min	-.01	3	-.015	3	-.422	4	-1.117e-4	1	7419.253	2	165.926	4
155		2	max	.007	2	.008	2	.004	1	1.334e-3	5	NC	1	NC	1
156			min	-.009	3	-.014	3	-.388	4	-1.055e-4	1	8502.717	2	180.465	4
157		3	max	.006	2	.007	2	.004	1	1.377e-3	5	NC	1	NC	1
158			min	-.009	3	-.014	3	-.354	4	-9.924e-5	1	9935.723	2	197.694	4
159		4	max	.006	2	.006	2	.003	1	1.421e-3	5	NC	1	NC	1
160			min	-.008	3	-.013	3	-.32	4	-9.301e-5	1	NC	1	218.31	4
161		5	max	.005	2	.005	2	.003	1	1.464e-3	5	NC	1	NC	1
162			min	-.008	3	-.012	3	-.288	4	-8.678e-5	1	NC	1	243.257	4
163		6	max	.005	2	.004	2	.003	1	1.507e-3	5	NC	1	NC	1
164			min	-.007	3	-.012	3	-.255	4	-8.055e-5	1	NC	1	273.837	4
165		7	max	.005	2	.003	2	.002	1	1.551e-3	5	NC	1	NC	1
166			min	-.007	3	-.011	3	-.224	4	-7.432e-5	1	NC	1	311.893	4
167		8	max	.004	2	.002	2	.002	1	1.594e-3	5	NC	1	NC	1
168			min	-.006	3	-.01	3	-.194	4	-6.809e-5	1	NC	1	360.105	4
169		9	max	.004	2	0	2	.002	1	1.637e-3	5	NC	1	NC	1
170			min	-.006	3	-.01	3	-.166	4	-6.186e-5	1	NC	1	422.486	4
171		10	max	.003	2	0	2	.001	1	1.68e-3	5	NC	1	NC	1
172			min	-.005	3	-.009	3	-.138	4	-5.563e-5	1	NC	1	505.279	4
173		11	max	.003	2	0	2	.001	1	1.724e-3	4	NC	1	NC	1
174			min	-.004	3	-.008	3	-.113	4	-4.94e-5	1	NC	1	618.635	4
175		12	max	.003	2	0	15	0	1	1.77e-3	4	NC	1	NC	1
176			min	-.004	3	-.007	3	-.09	4	-4.317e-5	1	NC	1	779.988	4
177		13	max	.002	2	0	15	0	1	1.815e-3	4	NC	1	NC	1
178			min	-.003	3	-.006	3	-.068	4	-3.694e-5	1	NC	1	1021.409	4
179		14	max	.002	2	0	15	0	1	1.86e-3	4	NC	1	NC	1
180			min	-.003	3	-.006	3	-.05	4	-3.071e-5	1	NC	1	1407.404	4
181		15	max	.002	2	0	15	0	1	1.905e-3	4	NC	1	NC	1
182			min	-.002	3	-.005	3	-.034	4	-2.449e-5	1	NC	1	2084.424	4
183		16	max	.001	2	0	15	0	1	1.95e-3	4	NC	1	NC	1
184			min	-.002	3	-.003	3	-.02	4	-1.826e-5	1	NC	1	3448.69	4
185		17	max	0	2	0	15	0	1	1.996e-3	4	NC	1	NC	1
186			min	-.001	3	-.002	3	-.01	4	-1.203e-5	1	NC	1	6920.768	4
187		18	max	0	2	0	15	0	1	2.041e-3	4	NC	1	NC	1
188			min	0	3	-.001	3	-.003	4	-5.797e-6	1	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.086e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	-6.224e-7	3	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	8.184e-8	3	NC	1	NC	1
192			min	0	1	0	1	0	1	-5.232e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.01	4	1.078e-5	1	NC	1	NC	1
194			min	0	2	-.002	6	0	3	-5.113e-5	5	NC	1	9188.918	4
195		3	max	0	3	0	15	.019	4	4.271e-4	4	NC	1	NC	1
196			min	0	2	-.004	6	0	3	1.926e-6	12	NC	1	4799.041	4
197		4	max	.001	3	-.001	15	.027	4	9.023e-4	4	NC	1	NC	1
198			min	-.001	2	-.006	6	0	3	2.865e-6	12	NC	1	3337.476	4
199		5	max	.002	3	-.002	15	.035	4	1.377e-3	4	NC	1	NC	1
200			min	-.002	2	-.007	6	0	12	3.805e-6	12	NC	1	2606.35	4
201		6	max	.002	3	-.002	15	.042	4	1.853e-3	4	NC	1	NC	1
202			min	-.002	2	-.009	6	0	12	4.745e-6	12	9796.215	6	2165.762	4
203		7	max	.003	3	-.002	15	.048	4	2.328e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
204			min	-.002	2	-.011	6	0	12	5.685e-6	12	8426.726	6	1868.804	4
205		8	max	.003	3	-.003	15	.055	4	2.803e-3	4	NC	1	NC	1
206			min	-.003	2	-.012	6	0	12	6.625e-6	12	7582.377	6	1652.305	4
207		9	max	.004	3	-.003	15	.061	4	3.278e-3	4	NC	2	NC	1
208			min	-.003	2	-.013	6	0	12	7.564e-6	12	7085.172	6	1484.542	4
209		10	max	.004	3	-.003	15	.067	4	3.753e-3	4	NC	5	NC	1
210			min	-.004	2	-.013	6	0	12	8.504e-6	12	6848.929	6	1347.839	4
211		11	max	.004	3	-.003	15	.073	4	4.228e-3	4	NC	5	NC	1
212			min	-.004	2	-.013	6	0	12	9.444e-6	12	6838.979	6	1231.629	4
213		12	max	.005	3	-.003	15	.08	4	4.703e-3	4	NC	2	NC	1
214			min	-.004	2	-.013	6	0	12	1.038e-5	12	7058.889	6	1129.317	4
215		13	max	.005	3	-.003	15	.087	4	5.179e-3	4	NC	1	NC	1
216			min	-.005	2	-.012	6	0	12	1.132e-5	12	7553.539	6	1036.719	4
217		14	max	.006	3	-.002	15	.095	4	5.654e-3	4	NC	1	NC	1
218			min	-.005	2	-.011	6	0	12	1.226e-5	12	8432.206	6	951.208	4
219		15	max	.006	3	-.002	15	.104	4	6.129e-3	4	NC	1	NC	1
220			min	-.005	2	-.009	6	0	12	1.32e-5	12	9936.359	6	871.208	4
221		16	max	.007	3	-.001	15	.113	4	6.604e-3	4	NC	1	NC	1
222			min	-.006	2	-.007	6	0	12	1.414e-5	12	NC	1	795.859	4
223		17	max	.007	3	0	15	.124	4	7.079e-3	4	NC	1	NC	1
224			min	-.006	2	-.005	3	0	12	1.508e-5	12	NC	1	724.778	4
225		18	max	.008	3	0	15	.137	4	7.554e-3	4	NC	1	NC	1
226			min	-.007	2	-.004	3	0	12	1.602e-5	12	NC	1	657.872	4
227		19	max	.008	3	0	5	.152	4	8.029e-3	4	NC	1	NC	1
228			min	-.007	2	-.002	3	0	12	1.696e-5	12	NC	1	595.201	4
229	M4	1	max	.002	1	.007	2	0	12	7.509e-4	4	NC	1	NC	2
230			min	0	5	-.008	3	-.152	4	5.405e-6	12	NC	1	163.651	4
231		2	max	.002	1	.006	2	0	12	7.509e-4	4	NC	1	NC	2
232			min	0	5	-.008	3	-.14	4	5.405e-6	12	NC	1	177.635	4
233		3	max	.002	1	.006	2	0	12	7.509e-4	4	NC	1	NC	2
234			min	0	5	-.007	3	-.128	4	5.405e-6	12	NC	1	194.297	4
235		4	max	.002	1	.006	2	0	12	7.509e-4	4	NC	1	NC	2
236			min	0	5	-.007	3	-.116	4	5.405e-6	12	NC	1	214.327	4
237		5	max	.002	1	.005	2	0	12	7.509e-4	4	NC	1	NC	2
238			min	0	5	-.006	3	-.104	4	5.405e-6	12	NC	1	238.668	4
239		6	max	.001	1	.005	2	0	12	7.509e-4	4	NC	1	NC	2
240			min	0	5	-.006	3	-.092	4	5.405e-6	12	NC	1	268.623	4
241		7	max	.001	1	.004	2	0	12	7.509e-4	4	NC	1	NC	1
242			min	0	5	-.006	3	-.081	4	5.405e-6	12	NC	1	306.044	4
243		8	max	.001	1	.004	2	0	12	7.509e-4	4	NC	1	NC	1
244			min	0	5	-.005	3	-.07	4	5.405e-6	12	NC	1	353.631	4
245		9	max	.001	1	.004	2	0	12	7.509e-4	4	NC	1	NC	1
246			min	0	5	-.005	3	-.06	4	5.405e-6	12	NC	1	415.449	4
247		10	max	.001	1	.003	2	0	12	7.509e-4	4	NC	1	NC	1
248			min	0	5	-.004	3	-.05	4	5.405e-6	12	NC	1	497.848	4
249		11	max	0	1	.003	2	0	12	7.509e-4	4	NC	1	NC	1
250			min	0	5	-.004	3	-.041	4	5.405e-6	12	NC	1	611.216	4
251		12	max	0	1	.003	2	0	12	7.509e-4	4	NC	1	NC	1
252			min	0	5	-.003	3	-.032	4	5.405e-6	12	NC	1	773.517	4
253		13	max	0	1	.002	2	0	12	7.509e-4	4	NC	1	NC	1
254			min	0	5	-.003	3	-.024	4	5.405e-6	12	NC	1	1018.077	4
255		14	max	0	1	.002	2	0	12	7.509e-4	4	NC	1	NC	1
256			min	0	5	-.002	3	-.018	4	5.405e-6	12	NC	1	1412.669	4
257		15	max	0	1	.001	2	0	12	7.509e-4	4	NC	1	NC	1
258			min	0	5	-.002	3	-.012	4	5.405e-6	12	NC	1	2113.441	4
259		16	max	0	1	.001	2	0	12	7.509e-4	4	NC	1	NC	1
260			min	0	5	-.001	3	-.007	4	5.405e-6	12	NC	1	3551.752	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	7.509e-4	4	NC	1	NC	1
262			min	0	5	0	3	-.003	4	5.405e-6	12	NC	1	7325.468	4
263		18	max	0	1	0	2	0	12	7.509e-4	4	NC	1	NC	1
264			min	0	5	0	3	-.001	4	5.405e-6	12	NC	1	NC	1
265		19	max	0	1	0	1	0	1	7.509e-4	4	NC	1	NC	1
266			min	0	1	0	1	0	1	5.405e-6	12	NC	1	NC	1
267	M6	1	max	.021	2	.032	2	0	1	1.344e-3	4	NC	4	NC	1
268			min	-.032	3	-.045	3	-.425	4	0	1	1558.758	3	164.497	4
269		2	max	.02	2	.029	2	0	1	1.386e-3	4	NC	4	NC	1
270			min	-.03	3	-.042	3	-.391	4	0	1	1652.799	3	178.913	4
271		3	max	.019	2	.026	2	0	1	1.428e-3	4	NC	4	NC	1
272			min	-.028	3	-.04	3	-.357	4	0	1	1758.943	3	195.997	4
273		4	max	.018	2	.024	2	0	1	1.47e-3	4	NC	4	NC	1
274			min	-.026	3	-.037	3	-.323	4	0	1	1879.694	3	216.44	4
275		5	max	.017	2	.021	2	0	1	1.512e-3	4	NC	4	NC	1
276			min	-.025	3	-.035	3	-.29	4	0	1	2018.276	3	241.177	4
277		6	max	.015	2	.018	2	0	1	1.554e-3	4	NC	4	NC	1
278			min	-.023	3	-.032	3	-.258	4	0	1	2178.91	3	271.501	4
279		7	max	.014	2	.016	2	0	1	1.596e-3	4	NC	1	NC	1
280			min	-.021	3	-.03	3	-.226	4	0	1	2367.222	3	309.241	4
281		8	max	.013	2	.014	2	0	1	1.638e-3	4	NC	1	NC	1
282			min	-.019	3	-.027	3	-.196	4	0	1	2590.893	3	357.051	4
283		9	max	.012	2	.012	2	0	1	1.68e-3	4	NC	1	NC	1
284			min	-.018	3	-.024	3	-.167	4	0	1	2860.681	3	418.914	4
285		10	max	.011	2	.01	2	0	1	1.722e-3	4	NC	1	NC	1
286			min	-.016	3	-.022	3	-.14	4	0	1	3192.135	3	501.022	4
287		11	max	.01	2	.008	2	0	1	1.764e-3	4	NC	1	NC	1
288			min	-.014	3	-.019	3	-.114	4	0	1	3608.589	3	613.444	4
289		12	max	.008	2	.006	2	0	1	1.806e-3	4	NC	1	NC	1
290			min	-.012	3	-.017	3	-.09	4	0	1	4146.729	3	773.472	4
291		13	max	.007	2	.004	2	0	1	1.848e-3	4	NC	1	NC	1
292			min	-.011	3	-.014	3	-.069	4	0	1	4867.715	3	1012.921	4
293		14	max	.006	2	.003	2	0	1	1.889e-3	4	NC	1	NC	1
294			min	-.009	3	-.012	3	-.05	4	0	1	5881.675	3	1395.783	4
295		15	max	.005	2	.002	2	0	1	1.931e-3	4	NC	1	NC	1
296			min	-.007	3	-.009	3	-.034	4	0	1	7408.905	3	2067.353	4
297		16	max	.004	2	.001	2	0	1	1.973e-3	4	NC	1	NC	1
298			min	-.005	3	-.007	3	-.02	4	0	1	9963.506	3	3420.764	4
299		17	max	.002	2	0	2	0	1	2.015e-3	4	NC	1	NC	1
300			min	-.004	3	-.005	3	-.01	4	0	1	NC	1	6865.729	4
301		18	max	.001	2	0	2	0	1	2.057e-3	4	NC	1	NC	1
302			min	-.002	3	-.002	3	-.003	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	2.099e-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	-5.263e-4	4	NC	1	NC	1
307		2	max	.001	3	0	2	.01	4	0	1	NC	1	NC	1
308			min	-.001	2	-.003	3	0	1	-6.285e-5	5	NC	1	9132.77	4
309		3	max	.003	3	0	2	.019	4	4.014e-4	4	NC	1	NC	1
310			min	-.003	2	-.006	3	0	1	0	1	NC	1	4771.494	4
311		4	max	.004	3	-.001	15	.027	4	8.652e-4	4	NC	1	NC	1
312			min	-.004	2	-.008	3	0	1	0	1	NC	1	3320.269	4
313		5	max	.005	3	-.002	15	.035	4	1.329e-3	4	NC	1	NC	1
314			min	-.005	2	-.01	3	0	1	0	1	NC	1	2595.058	4
315		6	max	.007	3	-.002	15	.042	4	1.793e-3	4	NC	1	NC	1
316			min	-.007	2	-.012	3	0	1	0	1	8618.212	3	2158.73	4
317		7	max	.008	3	-.003	15	.048	4	2.257e-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	-.008	2	-.014	3	0	1	0	1	7705.019	3	1865.291	4
319		8	max	.009	3	-.003	15	.055	4	2.721e-3	4	NC	1	NC	1
320			min	-.009	2	-.015	3	0	1	0	1	7165.848	3	1651.947	4
321		9	max	.011	3	-.003	15	.061	4	3.184e-3	4	NC	1	NC	1
322			min	-.01	2	-.016	3	0	1	0	1	6889.165	3	1487.135	4
323		10	max	.012	3	-.003	15	.067	4	3.648e-3	4	NC	1	NC	1
324			min	-.012	2	-.016	3	0	1	0	1	6825.109	3	1353.234	4
325		11	max	.013	3	-.003	15	.073	4	4.112e-3	4	NC	1	NC	1
326			min	-.013	2	-.016	3	0	1	0	1	6831.552	4	1239.673	4
327		12	max	.015	3	-.003	15	.079	4	4.576e-3	4	NC	1	NC	1
328			min	-.014	2	-.016	3	0	1	0	1	7051.565	4	1139.814	4
329		13	max	.016	3	-.003	15	.086	4	5.04e-3	4	NC	1	NC	1
330			min	-.016	2	-.016	3	0	1	0	1	7546.011	4	1049.411	4
331		14	max	.018	3	-.003	15	.093	4	5.504e-3	4	NC	1	NC	1
332			min	-.017	2	-.015	3	0	1	0	1	8424.09	4	965.77	4
333		15	max	.019	3	-.002	15	.102	4	5.968e-3	4	NC	1	NC	1
334			min	-.018	2	-.013	3	0	1	0	1	9927.071	4	887.255	4
335		16	max	.02	3	-.002	15	.111	4	6.431e-3	4	NC	1	NC	1
336			min	-.02	2	-.012	3	0	1	0	1	NC	1	812.966	4
337		17	max	.022	3	-.001	15	.121	4	6.895e-3	4	NC	1	NC	1
338			min	-.021	2	-.01	3	0	1	0	1	NC	1	742.505	4
339		18	max	.023	3	0	10	.133	4	7.359e-3	4	NC	1	NC	1
340			min	-.022	2	-.008	3	0	1	0	1	NC	1	675.794	4
341		19	max	.024	3	0	10	.147	4	7.823e-3	4	NC	1	NC	1
342			min	-.023	2	-.006	3	0	1	0	1	NC	1	612.931	4
343	M8	1	max	.006	2	.023	2	0	1	6.559e-4	4	NC	1	NC	1
344			min	0	3	-.025	3	-.147	4	0	1	NC	1	168.526	4
345		2	max	.005	2	.021	2	0	1	6.559e-4	4	NC	1	NC	1
346			min	0	3	-.024	3	-.136	4	0	1	NC	1	182.937	4
347		3	max	.005	2	.02	2	0	1	6.559e-4	4	NC	1	NC	1
348			min	0	3	-.022	3	-.124	4	0	1	NC	1	200.105	4
349		4	max	.005	2	.019	2	0	1	6.559e-4	4	NC	1	NC	1
350			min	0	3	-.021	3	-.112	4	0	1	NC	1	220.744	4
351		5	max	.004	2	.018	2	0	1	6.559e-4	4	NC	1	NC	1
352			min	0	3	-.02	3	-.101	4	0	1	NC	1	245.824	4
353		6	max	.004	2	.016	2	0	1	6.559e-4	4	NC	1	NC	1
354			min	0	3	-.018	3	-.09	4	0	1	NC	1	276.689	4
355		7	max	.004	2	.015	2	0	1	6.559e-4	4	NC	1	NC	1
356			min	0	3	-.017	3	-.079	4	0	1	NC	1	315.246	4
357		8	max	.003	2	.014	2	0	1	6.559e-4	4	NC	1	NC	1
358			min	0	3	-.015	3	-.068	4	0	1	NC	1	364.278	4
359		9	max	.003	2	.013	2	0	1	6.559e-4	4	NC	1	NC	1
360			min	0	3	-.014	3	-.058	4	0	1	NC	1	427.971	4
361		10	max	.003	2	.011	2	0	1	6.559e-4	4	NC	1	NC	1
362			min	0	3	-.013	3	-.048	4	0	1	NC	1	512.871	4
363		11	max	.003	2	.01	2	0	1	6.559e-4	4	NC	1	NC	1
364			min	0	3	-.011	3	-.039	4	0	1	NC	1	629.681	4
365		12	max	.002	2	.009	2	0	1	6.559e-4	4	NC	1	NC	1
366			min	0	3	-.01	3	-.031	4	0	1	NC	1	796.908	4
367		13	max	.002	2	.008	2	0	1	6.559e-4	4	NC	1	NC	1
368			min	0	3	-.008	3	-.024	4	0	1	NC	1	1048.894	4
369		14	max	.002	2	.006	2	0	1	6.559e-4	4	NC	1	NC	1
370			min	0	3	-.007	3	-.017	4	0	1	NC	1	1455.473	4
371		15	max	.001	2	.005	2	0	1	6.559e-4	4	NC	1	NC	1
372			min	0	3	-.006	3	-.011	4	0	1	NC	1	2177.542	4
373		16	max	0	2	.004	2	0	1	6.559e-4	4	NC	1	NC	1
374			min	0	3	-.004	3	-.007	4	0	1	NC	1	3659.59	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
375		17	max	0	2	.003	2	0	1	6.559e-4	4	NC	1	NC	1
376			min	0	3	-.003	3	-.003	4	0	1	NC	1	7548.154	4
377		18	max	0	2	.001	2	0	1	6.559e-4	4	NC	1	NC	1
378			min	0	3	-.001	3	0	4	0	1	NC	1	NC	1
379		19	max	0	1	0	1	0	1	6.559e-4	4	NC	1	NC	1
380			min	0	1	0	1	0	1	0	1	NC	1	NC	1
381	M10	1	max	.007	2	.009	2	0	10	1.344e-3	4	NC	1	NC	1
382			min	-.01	3	-.015	3	-.424	4	1.007e-5	10	7419.253	2	164.874	4
383		2	max	.007	2	.008	2	0	10	1.385e-3	4	NC	1	NC	1
384			min	-.009	3	-.014	3	-.39	4	9.498e-6	10	8502.717	2	179.323	4
385		3	max	.006	2	.007	2	0	10	1.426e-3	4	NC	1	NC	1
386			min	-.009	3	-.014	3	-.356	4	8.926e-6	10	9935.723	2	196.447	4
387		4	max	.006	2	.006	2	0	10	1.467e-3	4	NC	1	NC	1
388			min	-.008	3	-.013	3	-.322	4	8.354e-6	10	NC	1	216.938	4
389		5	max	.005	2	.005	2	0	10	1.509e-3	4	NC	1	NC	1
390			min	-.008	3	-.012	3	-.289	4	7.783e-6	10	NC	1	241.733	4
391		6	max	.005	2	.004	2	0	10	1.55e-3	4	NC	1	NC	1
392			min	-.007	3	-.012	3	-.257	4	7.211e-6	10	NC	1	272.129	4
393		7	max	.005	2	.003	2	0	10	1.591e-3	4	NC	1	NC	1
394			min	-.007	3	-.011	3	-.226	4	6.639e-6	10	NC	1	309.958	4
395		8	max	.004	2	.002	2	0	10	1.632e-3	4	NC	1	NC	1
396			min	-.006	3	-.01	3	-.195	4	6.068e-6	10	NC	1	357.884	4
397		9	max	.004	2	0	2	0	10	1.673e-3	4	NC	1	NC	1
398			min	-.006	3	-.01	3	-.167	4	5.496e-6	10	NC	1	419.897	4
399		10	max	.003	2	0	2	0	10	1.715e-3	4	NC	1	NC	1
400			min	-.005	3	-.009	3	-.139	4	4.924e-6	10	NC	1	502.207	4
401		11	max	.003	2	0	2	0	10	1.756e-3	4	NC	1	NC	1
402			min	-.004	3	-.008	3	-.114	4	4.353e-6	10	NC	1	614.909	4
403		12	max	.003	2	0	2	0	10	1.797e-3	4	NC	1	NC	1
404			min	-.004	3	-.007	3	-.09	4	3.781e-6	10	NC	1	775.344	4
405		13	max	.002	2	-.001	2	0	10	1.838e-3	4	NC	1	NC	1
406			min	-.003	3	-.006	3	-.069	4	3.209e-6	10	NC	1	1015.415	4
407		14	max	.002	2	-.001	15	0	10	1.88e-3	4	NC	1	NC	1
408			min	-.003	3	-.006	3	-.05	4	2.638e-6	10	NC	1	1399.302	4
409		15	max	.002	2	-.001	15	0	10	1.921e-3	4	NC	1	NC	1
410			min	-.002	3	-.005	3	-.034	4	2.066e-6	10	NC	1	2072.744	4
411		16	max	.001	2	0	15	0	10	1.962e-3	4	NC	1	NC	1
412			min	-.002	3	-.003	3	-.02	4	1.494e-6	10	NC	1	3430.153	4
413		17	max	0	2	0	15	0	10	2.003e-3	4	NC	1	NC	1
414			min	-.001	3	-.002	4	-.01	4	9.226e-7	10	NC	1	6886.239	4
415		18	max	0	2	0	15	0	10	2.045e-3	4	NC	1	NC	1
416			min	0	3	-.001	4	-.003	4	3.509e-7	10	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.086e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-4.327e-7	2	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	6.917e-7	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-5.227e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.01	4	-9.859e-7	12	NC	1	NC	1
422			min	0	2	-.002	4	0	1	-5.48e-5	4	NC	1	9192.13	4
423		3	max	0	3	0	15	.019	4	4.135e-4	5	NC	1	NC	1
424			min	0	2	-.004	4	0	1	-2.225e-5	1	NC	1	4802.73	4
425		4	max	.001	3	-.001	15	.027	4	8.811e-4	4	NC	1	NC	1
426			min	-.001	2	-.006	4	0	1	-3.371e-5	1	NC	1	3341.763	4
427		5	max	.002	3	-.002	15	.035	4	1.349e-3	4	NC	1	NC	1
428			min	-.002	2	-.008	4	0	1	-4.518e-5	1	NC	1	2611.314	4
429		6	max	.002	3	-.002	15	.042	4	1.817e-3	4	NC	1	NC	1
430			min	-.002	2	-.01	4	0	1	-5.665e-5	1	9487.62	4	2171.468	4
431		7	max	.003	3	-.003	15	.048	4	2.285e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
432			min	-.002	2	-.011	4	0	1	-6.812e-5	1	8181.349	4	1875.303	4
433		8	max	.003	3	-.003	15	.054	4	2.753e-3	4	NC	1	NC	1
434			min	-.003	2	-.013	4	0	1	-7.959e-5	1	7376.576	4	1659.629	4
435		9	max	.004	3	-.003	15	.06	4	3.221e-3	4	NC	2	NC	1
436			min	-.003	2	-.014	4	0	1	-9.106e-5	1	6904.607	4	1492.7	4
437		10	max	.004	3	-.003	15	.066	4	3.689e-3	4	NC	5	NC	1
438			min	-.004	2	-.014	4	0	1	-1.025e-4	1	6683.96	4	1356.808	4
439		11	max	.004	3	-.004	15	.073	4	4.157e-3	4	NC	5	NC	1
440			min	-.004	2	-.014	4	0	1	-1.14e-4	1	6682.347	4	1241.348	4
441		12	max	.005	3	-.003	15	.079	4	4.624e-3	4	NC	2	NC	1
442			min	-.004	2	-.014	4	-.001	1	-1.255e-4	1	6904.298	4	1139.689	4
443		13	max	.005	3	-.003	15	.086	4	5.092e-3	4	NC	1	NC	1
444			min	-.005	2	-.013	4	-.001	1	-1.369e-4	1	7394.501	4	1047.61	4
445		14	max	.006	3	-.003	15	.094	4	5.56e-3	4	NC	1	NC	1
446			min	-.005	2	-.012	4	-.002	1	-1.484e-4	1	8260.616	4	962.451	4
447		15	max	.006	3	-.003	15	.102	4	6.028e-3	4	NC	1	NC	1
448			min	-.005	2	-.01	4	-.002	1	-1.599e-4	1	9739.892	4	882.618	4
449		16	max	.007	3	-.002	15	.112	4	6.496e-3	4	NC	1	NC	1
450			min	-.006	2	-.008	4	-.003	1	-1.713e-4	1	NC	1	807.243	4
451		17	max	.007	3	-.002	15	.123	4	6.964e-3	4	NC	1	NC	1
452			min	-.006	2	-.006	4	-.003	1	-1.828e-4	1	NC	1	735.946	4
453		18	max	.008	3	-.001	15	.135	4	7.432e-3	4	NC	1	NC	1
454			min	-.007	2	-.004	3	-.004	1	-1.943e-4	1	NC	1	668.657	4
455		19	max	.008	3	0	10	.149	4	7.9e-3	4	NC	1	NC	1
456			min	-.007	2	-.002	3	-.004	1	-2.057e-4	1	NC	1	605.461	4
457	M12	1	max	.002	1	.007	2	.004	1	7.181e-4	5	NC	1	NC	2
458			min	0	3	-.008	3	-.149	4	-5.753e-5	1	NC	1	166.473	4
459		2	max	.002	1	.006	2	.004	1	7.181e-4	5	NC	1	NC	2
460			min	0	3	-.008	3	-.137	4	-5.753e-5	1	NC	1	180.698	4
461		3	max	.002	1	.006	2	.003	1	7.181e-4	5	NC	1	NC	2
462			min	0	3	-.007	3	-.125	4	-5.753e-5	1	NC	1	197.646	4
463		4	max	.002	1	.006	2	.003	1	7.181e-4	5	NC	1	NC	2
464			min	0	3	-.007	3	-.114	4	-5.753e-5	1	NC	1	218.023	4
465		5	max	.002	1	.005	2	.003	1	7.181e-4	5	NC	1	NC	2
466			min	0	3	-.006	3	-.102	4	-5.753e-5	1	NC	1	242.783	4
467		6	max	.001	1	.005	2	.002	1	7.181e-4	5	NC	1	NC	2
468			min	0	3	-.006	3	-.091	4	-5.753e-5	1	NC	1	273.255	4
469		7	max	.001	1	.004	2	.002	1	7.181e-4	5	NC	1	NC	1
470			min	0	3	-.006	3	-.08	4	-5.753e-5	1	NC	1	311.321	4
471		8	max	.001	1	.004	2	.002	1	7.181e-4	5	NC	1	NC	1
472			min	0	3	-.005	3	-.069	4	-5.753e-5	1	NC	1	359.729	4
473		9	max	.001	1	.004	2	.002	1	7.181e-4	5	NC	1	NC	1
474			min	0	3	-.005	3	-.059	4	-5.753e-5	1	NC	1	422.613	4
475		10	max	.001	1	.003	2	.001	1	7.181e-4	5	NC	1	NC	1
476			min	0	3	-.004	3	-.049	4	-5.753e-5	1	NC	1	506.433	4
477		11	max	0	1	.003	2	.001	1	7.181e-4	5	NC	1	NC	1
478			min	0	3	-.004	3	-.04	4	-5.753e-5	1	NC	1	621.756	4
479		12	max	0	1	.003	2	0	1	7.181e-4	5	NC	1	NC	1
480			min	0	3	-.003	3	-.032	4	-5.753e-5	1	NC	1	786.854	4
481		13	max	0	1	.002	2	0	1	7.181e-4	5	NC	1	NC	1
482			min	0	3	-.003	3	-.024	4	-5.753e-5	1	NC	1	1035.631	4
483		14	max	0	1	.002	2	0	1	7.181e-4	5	NC	1	NC	1
484			min	0	3	-.002	3	-.017	4	-5.753e-5	1	NC	1	1437.026	4
485		15	max	0	1	.001	2	0	1	7.181e-4	5	NC	1	NC	1
486			min	0	3	-.002	3	-.012	4	-5.753e-5	1	NC	1	2149.879	4
487		16	max	0	1	.001	2	0	1	7.181e-4	5	NC	1	NC	1
488			min	0	3	-.001	3	-.007	4	-5.753e-5	1	NC	1	3612.987	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
489		17	max	0	1	0	2	0	1	7.181e-4	5	NC	1	NC	1
490			min	0	3	0	3	-.003	4	-5.753e-5	1	NC	1	7451.762	4
491		18	max	0	1	0	2	0	1	7.181e-4	5	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-5.753e-5	1	NC	1	NC	1
493		19	max	0	1	0	1	0	1	7.181e-4	5	NC	1	NC	1
494			min	0	1	0	1	0	1	-5.753e-5	1	NC	1	NC	1
495	M1	1	max	.01	3	.122	2	.446	4	6.504e-3	2	NC	1	NC	1
496			min	-.006	2	-.031	3	0	10	-1.56e-2	3	NC	1	NC	1
497		2	max	.01	3	.057	2	.434	4	4.779e-3	4	NC	4	NC	1
498			min	-.006	2	-.012	3	-.003	1	-7.723e-3	3	1778.625	2	NC	1
499		3	max	.01	3	.016	3	.421	4	8.553e-3	4	NC	5	NC	1
500			min	-.006	2	-.012	2	-.004	1	-1.001e-4	3	861.564	2	8850.849	5
501		4	max	.01	3	.058	3	.408	4	7.335e-3	4	NC	5	NC	1
502			min	-.006	2	-.088	2	-.004	1	-3.537e-3	3	547.898	2	6424.325	5
503		5	max	.009	3	.11	3	.394	4	6.329e-3	2	NC	5	NC	1
504			min	-.006	2	-.167	2	-.003	1	-6.974e-3	3	397.932	2	5203.451	5
505		6	max	.009	3	.166	3	.379	4	9.481e-3	2	NC	15	NC	1
506			min	-.006	2	-.244	2	-.001	1	-1.041e-2	3	314.952	2	4455.935	5
507		7	max	.009	3	.219	3	.364	4	1.263e-2	2	NC	15	NC	1
508			min	-.006	2	-.311	2	0	3	-1.385e-2	3	265.785	2	3914.076	4
509		8	max	.009	3	.263	3	.349	4	1.578e-2	2	NC	15	NC	1
510			min	-.006	2	-.365	2	0	12	-1.728e-2	3	236.621	2	3494.31	4
511		9	max	.009	3	.291	3	.334	4	1.782e-2	2	NC	15	NC	1
512			min	-.005	2	-.399	2	0	1	-1.768e-2	3	221.406	2	3198.796	4
513		10	max	.009	3	.302	3	.317	4	1.911e-2	2	NC	15	NC	1
514			min	-.005	2	-.41	2	0	10	-1.605e-2	3	216.96	2	3086.495	4
515		11	max	.008	3	.294	3	.298	4	2.04e-2	2	NC	15	NC	1
516			min	-.005	2	-.398	2	0	12	-1.442e-2	3	222.229	2	3107.387	4
517		12	max	.008	3	.27	3	.278	4	1.962e-2	2	NC	15	NC	1
518			min	-.005	2	-.363	2	0	1	-1.245e-2	3	239.079	2	3259.623	4
519		13	max	.008	3	.23	3	.254	4	1.573e-2	2	NC	15	NC	1
520			min	-.005	2	-.307	2	0	1	-9.966e-3	3	271.674	2	3761.677	4
521		14	max	.008	3	.179	3	.229	4	1.184e-2	2	NC	15	NC	1
522			min	-.005	2	-.236	2	0	12	-7.481e-3	3	327.37	2	4869.43	4
523		15	max	.008	3	.122	3	.203	4	7.954e-3	2	NC	5	NC	1
524			min	-.005	2	-.158	2	0	12	-4.996e-3	3	423.154	2	7325.532	4
525		16	max	.007	3	.063	3	.177	4	6.696e-3	4	NC	5	NC	1
526			min	-.005	2	-.079	2	0	12	-2.511e-3	3	600.3	2	NC	1
527		17	max	.007	3	.005	3	.152	4	7.769e-3	4	NC	5	NC	1
528			min	-.005	2	-.007	2	0	12	-2.631e-5	3	978.496	2	NC	1
529		18	max	.007	3	.054	2	.131	4	5.542e-3	2	NC	4	NC	1
530			min	-.005	2	-.046	3	0	12	-2.217e-3	3	2073.292	2	NC	1
531		19	max	.007	3	.108	2	.113	4	1.112e-2	2	NC	1	NC	1
532			min	-.005	2	-.095	3	0	1	-4.516e-3	3	NC	1	NC	1
533	M5	1	max	.03	3	.224	2	.446	4	0	1	NC	1	NC	1
534			min	-.021	2	-.004	3	0	1	-8.102e-6	4	NC	1	NC	1
535		2	max	.03	3	.102	2	.437	4	4.385e-3	4	NC	5	NC	1
536			min	-.021	2	.002	15	0	1	0	1	954.667	2	NC	1
537		3	max	.03	3	.048	3	.425	4	8.642e-3	4	NC	5	NC	1
538			min	-.021	2	-.035	2	0	1	0	1	447.805	2	7308.142	4
539		4	max	.029	3	.137	3	.411	4	7.041e-3	4	NC	15	NC	1
540			min	-.021	2	-.2	2	0	1	0	1	273.001	2	5663.906	4
541		5	max	.029	3	.261	3	.396	4	5.439e-3	4	NC	15	NC	1
542			min	-.021	2	-.38	2	0	1	0	1	191.543	2	4874.145	4
543		6	max	.028	3	.401	3	.38	4	3.837e-3	4	8099.789	15	NC	1
544			min	-.02	2	-.559	2	0	1	0	1	147.712	2	4380.197	4
545		7	max	.027	3	.537	3	.364	4	2.235e-3	4	6688.636	15	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
546			min	-.02	2	-.722	2	0	1	0	1	122.334	2	3972.772	4
547		8	max	.027	3	.652	3	.349	4	6.337e-4	4	5870.196	15	NC	1
548			min	-.019	2	-.852	2	0	1	0	1	107.551	2	3555.135	4
549		9	max	.026	3	.725	3	.334	4	0	1	5451.271	15	NC	1
550			min	-.019	2	-.935	2	0	1	-5.913e-6	5	99.96	2	3190.125	4
551		10	max	.026	3	.751	3	.316	4	0	1	5325.224	15	NC	1
552			min	-.019	2	-.963	2	0	1	-5.736e-6	5	97.749	2	3109.129	4
553		11	max	.025	3	.732	3	.297	4	0	1	5451.683	15	NC	1
554			min	-.018	2	-.935	2	0	1	-5.558e-6	5	100.367	2	3146.943	4
555		12	max	.024	3	.668	3	.278	4	5.502e-4	4	5871.14	15	NC	1
556			min	-.018	2	-.848	2	0	1	0	1	108.904	2	3201.292	4
557		13	max	.024	3	.565	3	.255	4	1.941e-3	4	6690.474	15	NC	1
558			min	-.018	2	-.709	2	0	1	0	1	125.893	2	3687.021	4
559		14	max	.023	3	.436	3	.228	4	3.332e-3	4	8103.249	15	NC	1
560			min	-.018	2	-.537	2	0	1	0	1	155.835	2	5014.084	4
561		15	max	.023	3	.294	3	.2	4	4.723e-3	4	NC	15	NC	1
562			min	-.017	2	-.352	2	0	1	0	1	209.508	2	8717.03	4
563		16	max	.022	3	.149	3	.173	4	6.114e-3	4	NC	15	NC	1
564			min	-.017	2	-.173	2	0	1	0	1	314.37	2	NC	1
565		17	max	.021	3	.016	3	.148	4	7.505e-3	4	NC	5	NC	1
566			min	-.017	2	-.019	2	0	1	0	1	552.309	2	NC	1
567		18	max	.021	3	.093	2	.128	4	3.809e-3	4	NC	5	NC	1
568			min	-.017	2	-.096	3	0	1	0	1	1243.429	2	NC	1
569		19	max	.021	3	.182	2	.113	4	0	1	NC	1	NC	1
570			min	-.017	2	-.197	3	0	1	-4.819e-6	4	NC	1	NC	1
571	M9	1	max	.01	3	.122	2	.446	4	1.56e-2	3	NC	1	NC	1
572			min	-.006	2	-.031	3	0	1	-6.504e-3	2	NC	1	NC	1
573		2	max	.01	3	.057	2	.436	4	7.723e-3	3	NC	4	NC	1
574			min	-.006	2	-.012	3	0	10	-3.191e-3	2	1778.625	2	NC	1
575		3	max	.01	3	.016	3	.424	4	8.615e-3	4	NC	5	NC	1
576			min	-.006	2	-.012	2	0	10	-2.851e-5	10	861.564	2	7726.383	4
577		4	max	.01	3	.058	3	.41	4	6.842e-3	5	NC	5	NC	1
578			min	-.006	2	-.088	2	0	10	-3.178e-3	2	547.898	2	5845.964	4
579		5	max	.009	3	.11	3	.395	4	6.974e-3	3	NC	5	NC	1
580			min	-.006	2	-.167	2	0	10	-6.329e-3	2	397.932	2	4920.416	4
581		6	max	.009	3	.166	3	.38	4	1.041e-2	3	NC	15	NC	1
582			min	-.006	2	-.244	2	0	10	-9.481e-3	2	314.952	2	4347.851	4
583		7	max	.009	3	.219	3	.364	4	1.385e-2	3	NC	15	NC	1
584			min	-.006	2	-.311	2	0	1	-1.263e-2	2	265.785	2	3913.914	4
585		8	max	.009	3	.263	3	.349	4	1.728e-2	3	NC	15	NC	1
586			min	-.006	2	-.365	2	0	1	-1.578e-2	2	236.621	2	3520.952	4
587		9	max	.009	3	.291	3	.334	4	1.768e-2	3	NC	15	NC	1
588			min	-.005	2	-.399	2	0	10	-1.782e-2	2	221.406	2	3190.671	4
589		10	max	.009	3	.302	3	.317	4	1.605e-2	3	NC	15	NC	1
590			min	-.005	2	-.41	2	0	1	-1.911e-2	2	216.96	2	3087.551	4
591		11	max	.008	3	.294	3	.298	4	1.442e-2	3	NC	15	NC	1
592			min	-.005	2	-.398	2	0	1	-2.04e-2	2	222.229	2	3116.717	4
593		12	max	.008	3	.27	3	.278	4	1.245e-2	3	NC	15	NC	1
594			min	-.005	2	-.363	2	0	10	-1.962e-2	2	239.079	2	3236.783	4
595		13	max	.008	3	.23	3	.254	4	9.966e-3	3	NC	15	NC	1
596			min	-.005	2	-.307	2	0	10	-1.573e-2	2	271.674	2	3758.076	4
597		14	max	.008	3	.179	3	.228	4	7.481e-3	3	NC	15	NC	1
598			min	-.005	2	-.236	2	-.001	1	-1.184e-2	2	327.37	2	4990.675	5
599		15	max	.008	3	.122	3	.201	4	4.996e-3	3	NC	5	NC	1
600			min	-.005	2	-.158	2	-.003	1	-7.954e-3	2	423.154	2	7897.611	5
601		16	max	.007	3	.063	3	.174	4	6.099e-3	5	NC	5	NC	1
602			min	-.005	2	-.079	2	-.004	1	-4.065e-3	2	600.3	2	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
603		17	max	.007	3	.005	3	.15	4	7.61e-3	4	NC	5	NC	1
604			min	-.005	2	-.007	2	-.004	1	-2.935e-4	1	978.496	2	NC	1
605		18	max	.007	3	.054	2	.129	4	3.753e-3	5	NC	4	NC	1
606			min	-.005	2	-.046	3	-.003	1	-5.542e-3	2	2073.292	2	NC	1
607		19	max	.007	3	.108	2	.113	4	4.516e-3	3	NC	1	NC	1
608			min	-.005	2	-.095	3	0	12	-1.112e-2	2	NC	1	NC	1

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

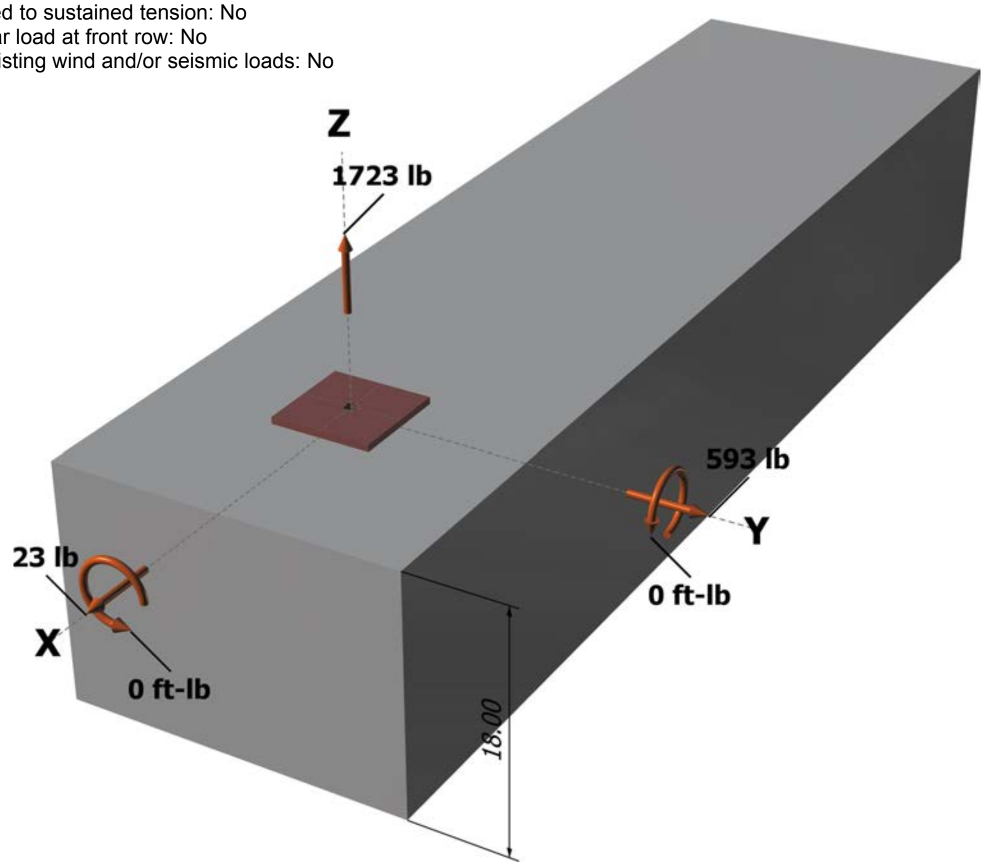
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

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

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

<Figure 1>



<Figure 2>

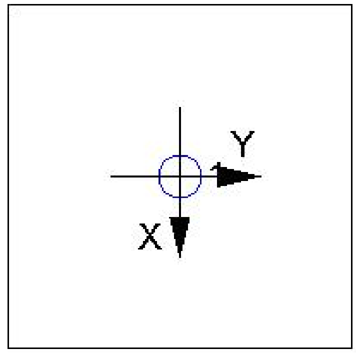
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

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

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

<Figure 3>



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

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

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

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

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

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

A_{Nc} (in²)	A_{Nco} (in²)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	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} (in²)	A_{Na0} (in²)	$\Psi_{ed,Na}$	$\Psi_{p,Na}$	N_{a0} (lb)	ϕ	ϕN_a (lb)
109.66	109.66	1.000	1.000	9755	0.55	5365

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

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

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

Shear perpendicular to edge in y-direction:

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

Shear parallel to edge in y-direction:

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

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

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

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

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

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

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

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

11. Results

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

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	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, ϕV_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, 34-35 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

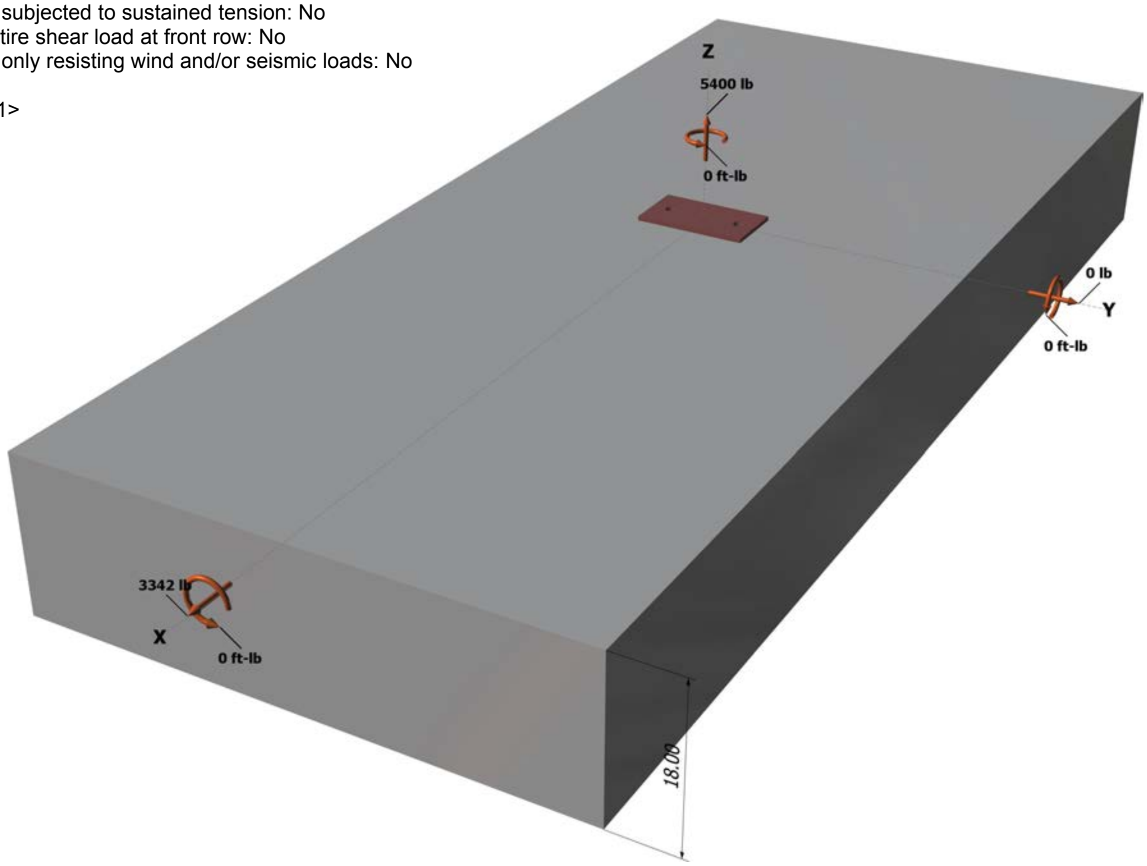
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

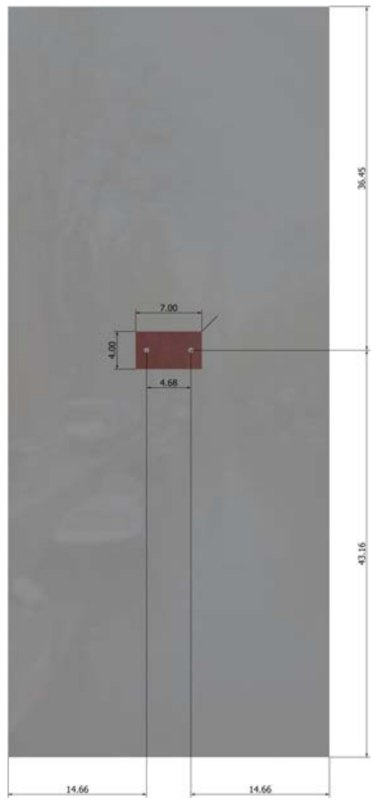
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout 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>



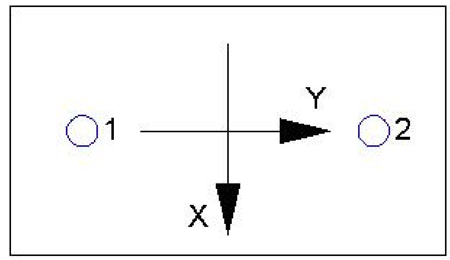
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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	2700.0	1671.0	0.0	1671.0
2	2700.0	1671.0	0.0	1671.0
Sum	5400.0	3342.0	0.0	3342.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 5400
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)
612.00	648.00	1.000	0.944	1.000	1.000	15593	0.70	9735

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	14.66	21056

$\phi V_{cbx} = \phi\,(2)(A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (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)
791.64	967.12	1.000	1.000	1.000	21056	0.70	24129

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, ϕN_n (lb)	Ratio	Status
Steel	2700	6071	0.44	Pass
Concrete breakout	5400	10231	0.53	Pass
Adhesive	**5400**	**8093**	**0.67**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	**1671**	**3156**	**0.53**	**Pass (Governs)**
T Concrete breakout x+	3342	9735	0.34	Pass
|| Concrete breakout y-	1671	24129	0.07	Pass
Pryout	3342	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	119.7 %	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.