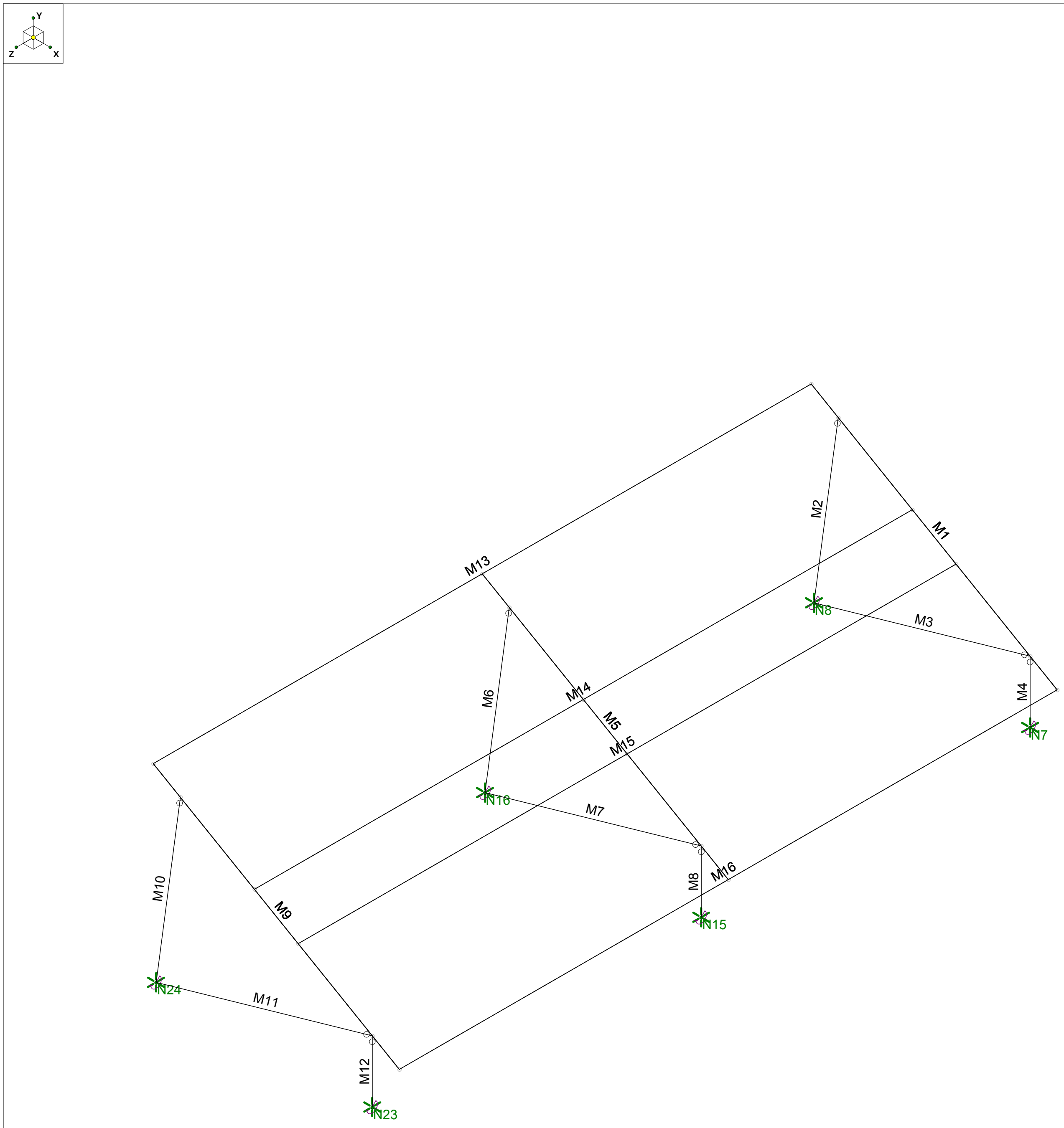


Schletter, Inc.		30° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-10	

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.

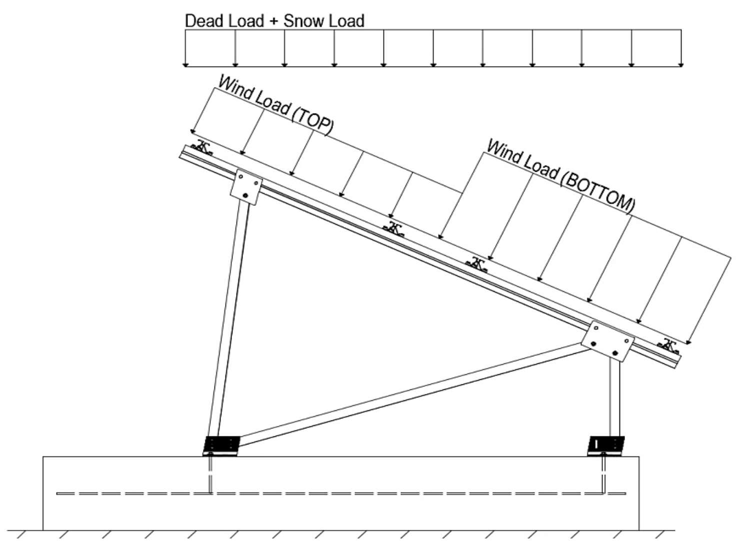
1.2 Construction

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

g_{MIN} = 1.75 psf

Self-weight of the PV modules.

2.2 Snow Loads

Ground Snow Load, P_g =	30.00 psf	
Sloped Roof Snow Load, P_s =	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 =	130 mph	Exposure Category = C
Height <	15 ft	Importance Category = II

Peak Velocity Pressure, q_z = 26.53 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

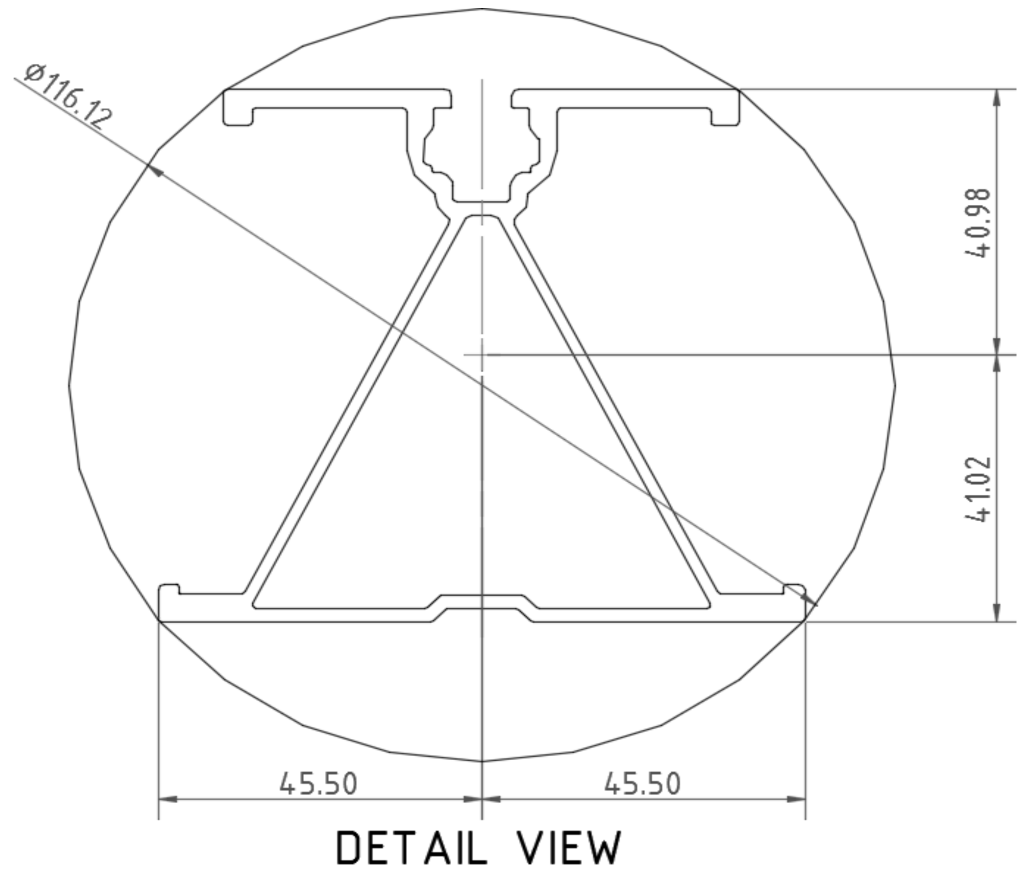
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

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).

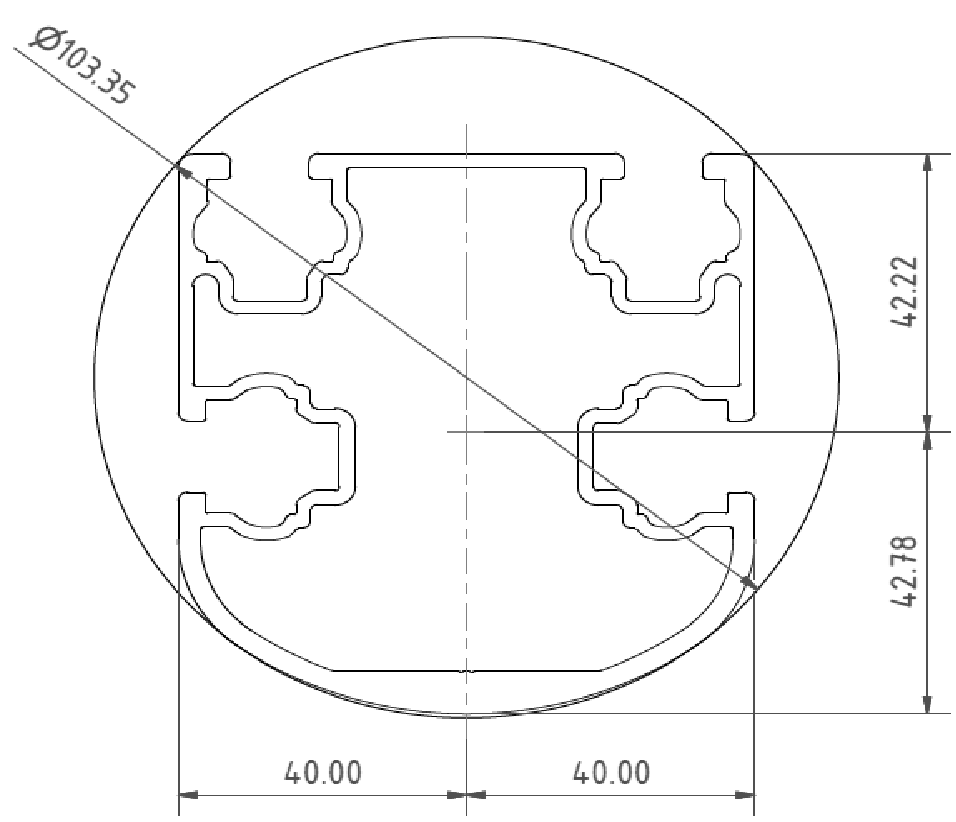
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	126	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	1.886	k-ft
M_z =	0.373	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	100%	



4.2 Girder Design

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

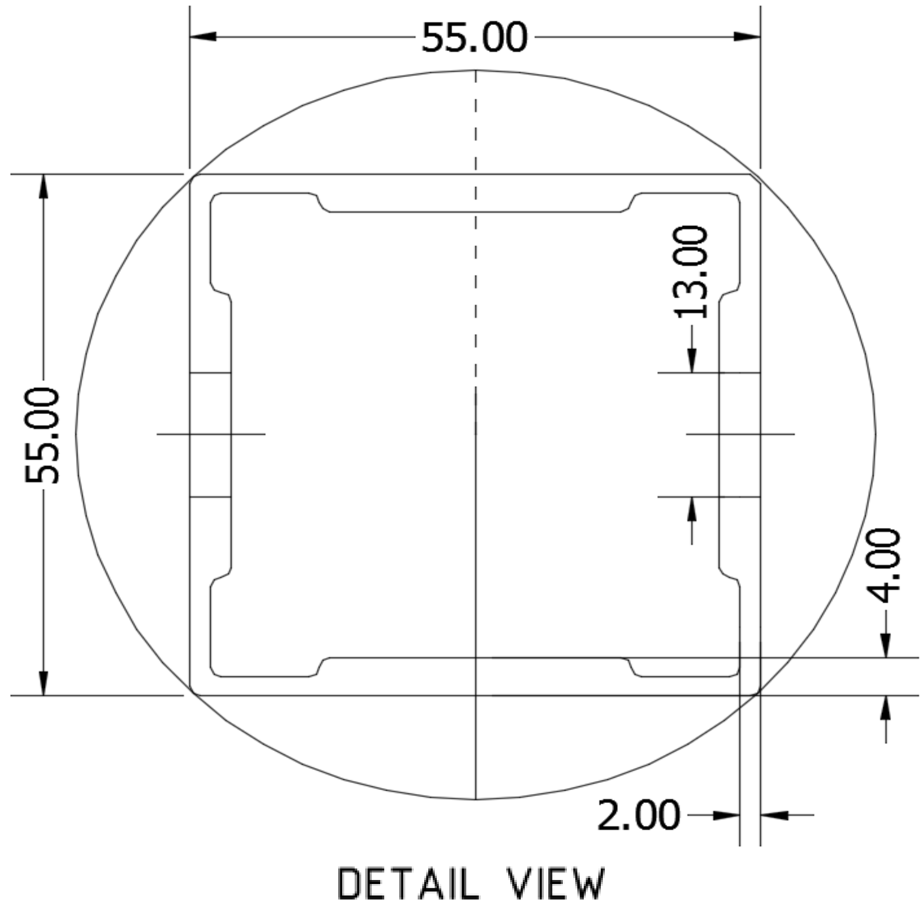
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.164	k-ft
M_z =	0.000	k-ft
P_n =	-0.904	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	93%	



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).

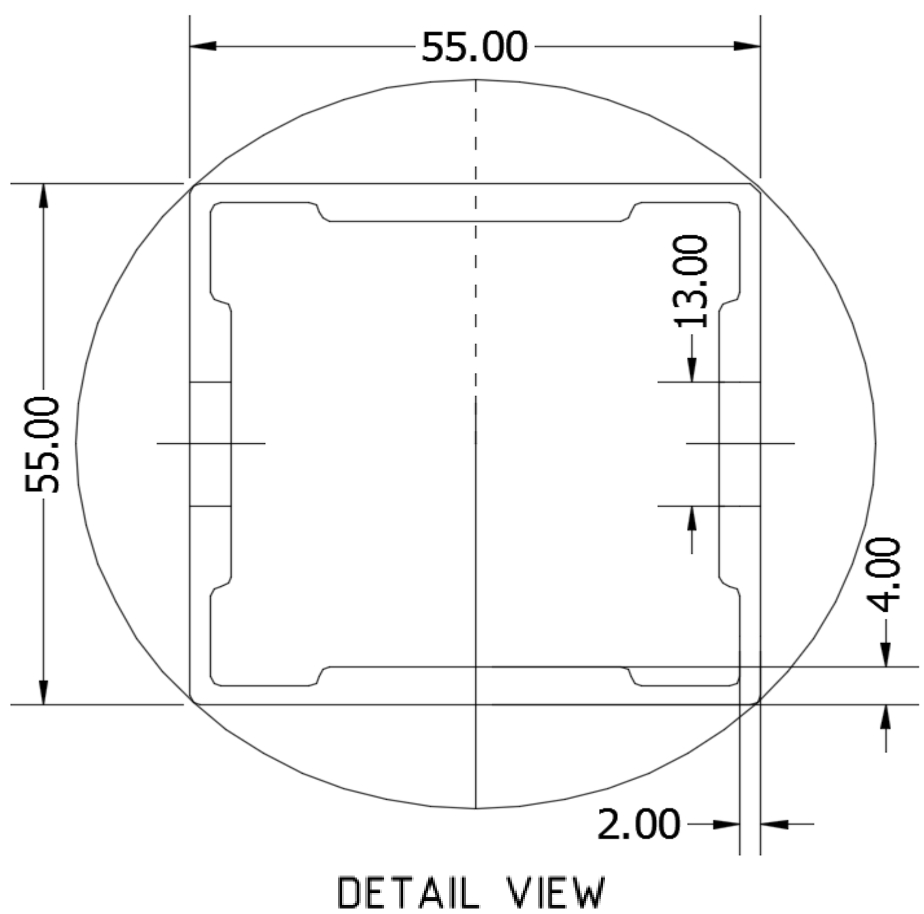
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.568	k-ft
P_n =	0.621	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	43%	



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).

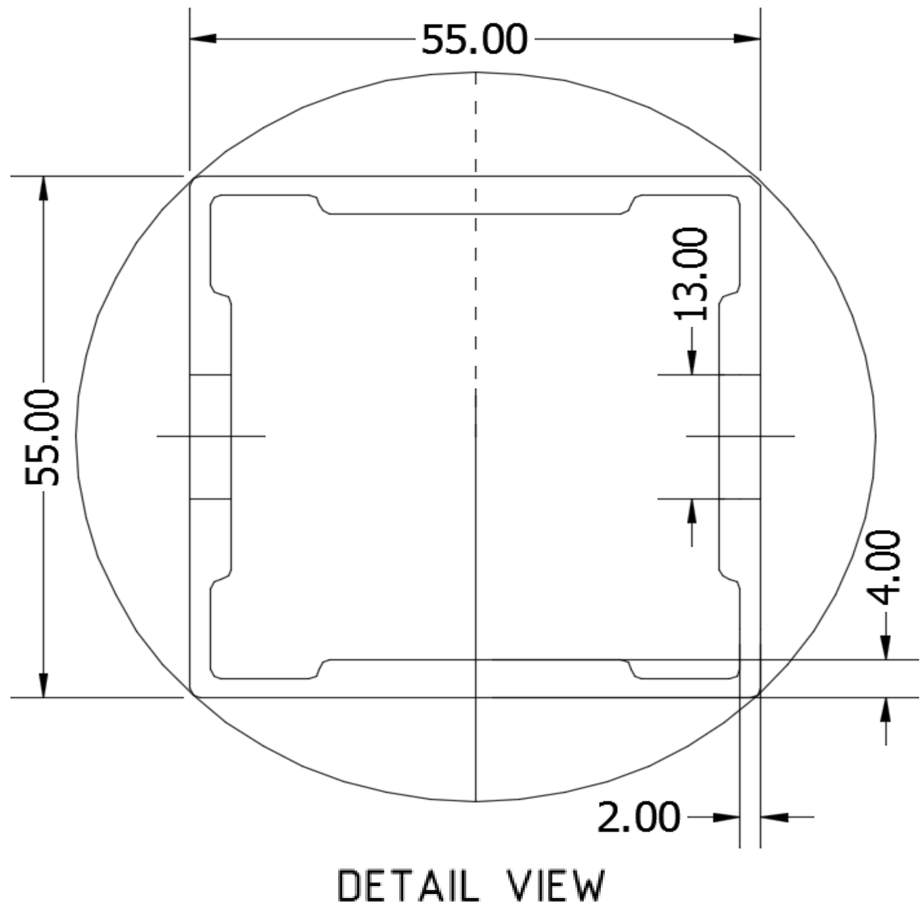
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.010	k-ft
M_z =	0.000	k-ft
P_n =	2.648	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 =	3.358	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	10.365	k
Utilization =	33%	



5. FOUNDATION DESIGN CALCULATIONS

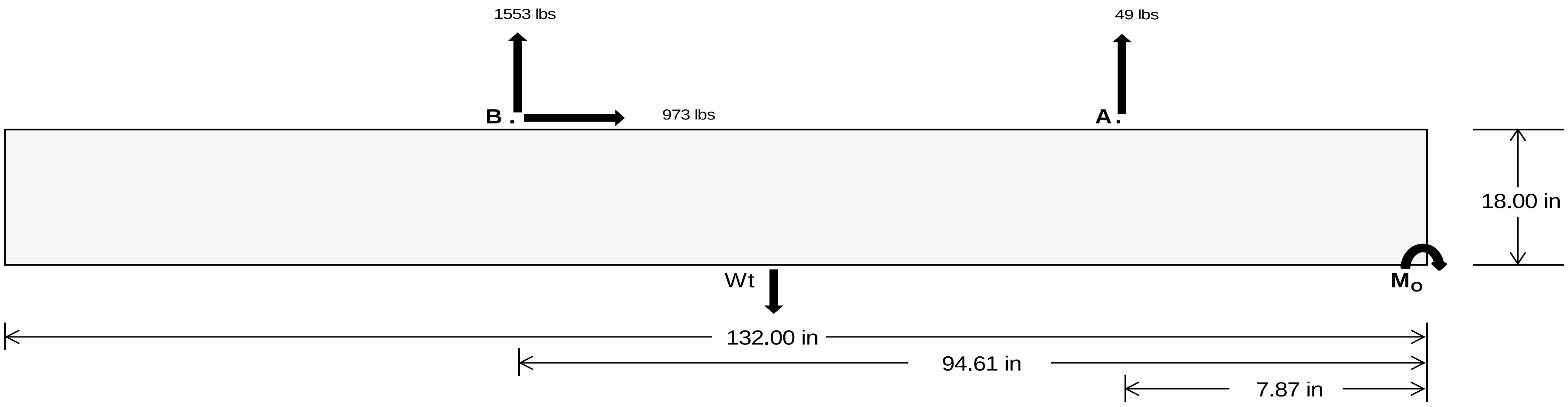
5.1 Helical Pile Foundations

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 =	233.46	6751.00	k
Compressive Load =	3662.91	5278.23	k
Lateral Load =	393.85	4219.71	k
Moment (Weak Axis) =	0.76	0.29	k

5.2 Design of Ballast Foundations

Ballast foundations are used to secure the racking structure in place. The foundations are checked for potential overturning and sliding. Bearing pressures applied by the racking and ballast foundations are checked against the allowable bearing pressures provided by the IBC table 1806.2 (2012, 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 =	164854.3 in-lbs
Resisting Force Required =	2497.79 lbs
S.F. =	1.67
Weight Required =	4162.99 lbs
Minimum Width =	34 in in
Weight Provided =	6778.75 lbs

A minimum 132in long x 34in wide x 18in tall ballast foundation is required to resist overturning.

Sliding

Force =	973.22 lbs
Friction =	0.4
Weight Required =	2433.05 lbs
Resisting Weight =	6778.75 lbs
Additional Weight Required =	0 lbs

Use a 132in long x 34in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

Cohesion

Sliding Force =	973.22 lbs
Cohesion =	130 psf
Area =	31.17 ft^2
Resisting =	3389.38 lbs
Additional Weight Required =	0 lbs

Use a 132in long x 34in 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			
	34 in	35 in	36 in	37 in
P_{ftg} = (145 pcf)(11 ft)(1.5 ft)(2.83 ft) =	6779 lbs	6978 lbs	7178 lbs	7377 lbs

ASD LC	1.0D + 1.0S				1.0D + 0.6W				1.0D + 0.75L + 0.45W + 0.75S				0.6D + 0.6W			
Width	34 in	35 in	36 in	37 in	34 in	35 in	36 in	37 in	34 in	35 in	36 in	37 in	34 in	35 in	36 in	37 in
F_A	1287 lbs	1287 lbs	1287 lbs	1287 lbs	1316 lbs	1316 lbs	1316 lbs	1316 lbs	1816 lbs	1816 lbs	1816 lbs	1816 lbs	-97 lbs	-97 lbs	-97 lbs	-97 lbs
F_B	1226 lbs	1226 lbs	1226 lbs	1226 lbs	2218 lbs	2218 lbs	2218 lbs	2218 lbs	2454 lbs	2454 lbs	2454 lbs	2454 lbs	-3107 lbs	-3107 lbs	-3107 lbs	-3107 lbs
F_V	196 lbs	196 lbs	196 lbs	196 lbs	1769 lbs	1769 lbs	1769 lbs	1769 lbs	1454 lbs	1454 lbs	1454 lbs	1454 lbs	-1946 lbs	-1946 lbs	-1946 lbs	-1946 lbs
P_{total}	9292 lbs	9491 lbs	9691 lbs	9890 lbs	10313 lbs	10512 lbs	10712 lbs	10911 lbs	11048 lbs	11248 lbs	11447 lbs	11646 lbs	863 lbs	983 lbs	1103 lbs	1222 lbs
M	3603 lbs-ft	3603 lbs-ft	3603 lbs-ft	3603 lbs-ft	3743 lbs-ft	3743 lbs-ft	3743 lbs-ft	3743 lbs-ft	5128 lbs-ft	5128 lbs-ft	5128 lbs-ft	5128 lbs-ft	4015 lbs-ft	4015 lbs-ft	4015 lbs-ft	4015 lbs-ft
e	0.39 ft	0.38 ft	0.37 ft	0.36 ft	0.36 ft	0.36 ft	0.35 ft	0.34 ft	0.46 ft	0.46 ft	0.45 ft	0.44 ft	4.65 ft	4.08 ft	3.64 ft	3.29 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}	235.1 psf	234.6 psf	234.1 psf	233.6 psf	265.4 psf	264.0 psf	262.7 psf	261.5 psf	264.7 psf	263.4 psf	262.1 psf	260.9 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	361.2 psf	357.1 psf	353.2 psf	349.5 psf	396.4 psf	391.3 psf	386.5 psf	381.9 psf	444.2 psf	437.8 psf	431.6 psf	425.9 psf	239.2 psf	158.8 psf	131.8 psf	119.3 psf

Maximum Bearing Pressure =	444 psf
Allowable Bearing Pressure =	1500 psf

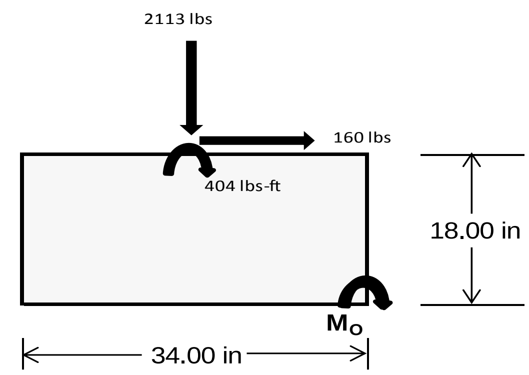
Use a 132in long x 34in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 2349.2 ft-lbs
Resisting Force Required = 1658.27 lbs
S.F. = 1.67
Weight Required = 2763.78 lbs
Minimum Width = 34 in in
Weight Provided = 6778.75 lbs

A minimum 132in long x 34in 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	34 in			34 in			34 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	305 lbs	658 lbs	214 lbs	794 lbs	2113 lbs	724 lbs	121 lbs	192 lbs	31 lbs
F_V	222 lbs	217 lbs	226 lbs	163 lbs	160 lbs	176 lbs	223 lbs	219 lbs	224 lbs
P_{total}	8697 lbs	9050 lbs	8606 lbs	8783 lbs	10102 lbs	8712 lbs	2575 lbs	2646 lbs	2485 lbs
M	862 lbs-ft	852 lbs-ft	875 lbs-ft	641 lbs-ft	644 lbs-ft	686 lbs-ft	862 lbs-ft	849 lbs-ft	867 lbs-ft
e	0.10 ft	0.09 ft	0.10 ft	0.07 ft	0.06 ft	0.08 ft	0.33 ft	0.32 ft	0.35 ft
L/6	0.47 ft	0.47 ft	0.47 ft	0.47 ft	0.47 ft	0.47 ft	0.47 ft	0.47 ft	0.47 ft
f_{min}	220.5 psf	232.5 psf	216.6 psf	238.2 psf	280.4 psf	233.0 psf	24.1 psf	27.2 psf	20.8 psf
f_{max}	337.6 psf	348.3 psf	335.6 psf	325.3 psf	367.9 psf	326.1 psf	141.2 psf	142.6 psf	138.7 psf

Maximum Bearing Pressure = 368 psf
Allowable Bearing Pressure = 1500 psf

Use a 132in long x 34in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 132in long x 34in 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.

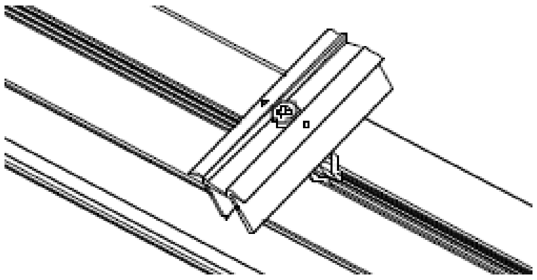
6. DESIGN OF JOINTS AND CONNECTIONS

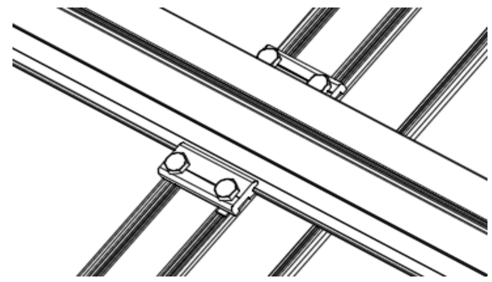
6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

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 =	0.648	k
Allowable Uplift =	1.214	k
Utilization =	53%	

Fastening of Purlins to Girders		
Maximum Uplifting Force =	2.425	k
Allowable Uplift =	4.357	k
Utilization =	56%	





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 =	2.818	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	38%	

Rear Strut		
Maximum Axial Load =	4.499	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	61%	

Diagonal Strut		
Maximum Axial Load =	2.725	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	37%	

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

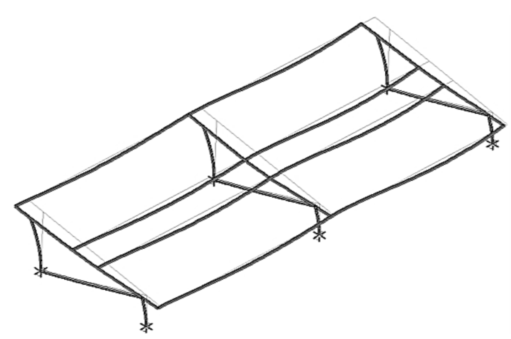
7.1 Seismic Drift

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} =	0.709	in

$0.709 \leq 0.965$, 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 =	126 in
J =	0.432
	348.575

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 27.2 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 =	126
J =	0.432
	221.673

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 28.5

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)
$\varphi F_L = \varphi c[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 25.1 ksi

b/t = 37.0588
S1 = 12.21
S2 = 32.70
$\varphi F_L = (\varphi ck2*\sqrt{(BpE)})/(1.6b/t)$
$\varphi F_L =$ 21.9 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87
S2 = 131.3
$\varphi F_L = \varphi yFcy$
$\varphi F_L =$ 33.25 ksi

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

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

Girder = **BF0**

Strong Axis:

3.4.14

$L_b =$ 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
$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)}/2))}]$
$\varphi F_L =$ 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
$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 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
$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)}/2))}]$
$\varphi F_L =$ 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
$\varphi F_L = \varphi yFcy$
$\varphi F_L =$ 33.3 ksi

3.4.16.1 Used

Rb/t = 18.1

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= φb[Bt-Dt*√(Rb/t)]

φF_L= 31.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 7.4

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

S1 = 35.2

m = 0.68

C_0 = 41.067

Cc = 43.717

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

S2 = 73.8

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 29.4 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

M_{max}St = 3.363 k-ft

3.4.18

h/t = 16.2

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

S1 = 36.9

m = 0.65

C_0 = 40

Cc = 40

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 in^3

M_{max}Wk = 3.904 k-ft

Compression

3.4.9

b/t = 16.2

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

φF_L= φyFcy

φF_L= 33.3 ksi

3.4.10

Rb/t = 18.1

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

S1 = 6.87

S2 = 131.3

φF_L= φc[Bt-Dt*√(Rb/t)]

φF_L= 31.09 ksi

φF_L= 31.09 ksi

A = 1215.13 mm^2

1.88 in^2

P_{max} = 58.55 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 24.8 in

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

Weak Axis:

3.4.14

L_b = 24.8

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

$\lambda =$ 0.57371

r = 0.81 in

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

$S1^* =$ 0.33515

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

$S2^* =$ 1.23671

$\varphi cc =$ 0.87952

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

$\varphi F_L =$ 28.0279 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

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

$\varphi F_L =$ 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

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

$\varphi F_L =$ 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 28.03 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 28.85 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

$L_b =$ 86.60 in

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

$\varphi F_L =$ 29.6 ksi

Weak Axis:

3.4.14

$L_b =$ 86.6

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

$\varphi F_L =$ 29.6

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

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

$\varphi F_L =$ 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

$\varphi F_L = 1.17\varphi yFcy$

$\varphi F_L =$ 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

$C_0 =$ 27.5

Cc = 27.5

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

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

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

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

$\varphi F_L =$ 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

$C_0 =$ 27.5

Cc = 27.5

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

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

Compression

3.4.7

$\lambda =$ 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

$\varphi cc =$ 0.86047

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

$\varphi F_L =$ 7.50396 ksi

3.4.9

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

b/t = 24.5
S1 = 12.21
S2 = 32.70
$\varphi F_L = \varphi c[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87
S2 = 131.3
$\varphi F_L = \varphi yFcy$
$\varphi F_L =$ 33.25 ksi

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

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

Strut = **55x55**

Strong Axis:

3.4.14

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

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L = 1.17φyFcy

φF_L = 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L = 1.3φyFcy

φF_L = 43.2 ksi

φF_LSt = 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L = 1.3φyFcy

φF_L = 43.2 ksi

φF_LWk = 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 1.63853

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)/(λ^2)

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	-85.097	-85.097	0	0
2	M14	y	-85.097	-85.097	0	0
3	M15	y	-136.895	-136.895	0	0
4	M16	y	-136.895	-136.895	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	192.393	192.393	0	0
2	M14	y	147.995	147.995	0	0
3	M15	y	81.397	81.397	0	0
4	M16	y	81.397	81.397	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	827.435	2	1238.672	2	.722	1	.003	1	0	1	0	1
2		min	-1018.643	3	-1586.148	3	-36.378	5	-.218	4	0	1	0	1
3	N7	max	.04	9	1087.766	1	-.732	12	-.001	12	0	1	0	1
4		min	-.207	2	-31.165	5	-302.96	4	-.588	4	0	1	0	1
5	N15	max	.033	9	2817.623	1	0	2	0	2	0	1	0	1
6		min	-2.295	2	-179.581	3	-288.574	4	-.568	4	0	1	0	1
7	N16	max	3009.671	2	4060.179	2	0	1	0	1	0	1	0	1
8		min	-3245.932	3	-5193.08	3	-36.192	5	-.22	4	0	1	0	1
9	N23	max	.044	14	1087.766	1	12.686	1	.025	1	0	1	0	1
10		min	-.207	2	-23.292	3	-293.655	5	-.573	4	0	1	0	1
11	N24	max	827.435	2	1238.672	2	-.049	12	0	12	0	1	0	1
12		min	-1018.643	3	-1586.148	3	-37.062	5	-.22	4	0	1	0	1
13	Totals:	max	4661.832	2	10888.479	2	0	2						
14		min	-5283.411	3	-8591.543	3	-988.765	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	123.436	1	438.551	2	-9.731	12	.001	3	.295	1	0	4
2			min	7.303	12	-739.333	3	-190.841	1	-.014	2	.018	12	0	3
3		2	max	123.436	1	307.18	2	-7.647	12	.001	3	.132	4	.735	3
4			min	7.303	12	-520.289	3	-146.752	1	-.014	2	.007	12	-.435	2
5		3	max	123.436	1	175.809	2	-5.563	12	.001	3	.069	5	1.214	3
6			min	7.303	12	-301.245	3	-102.663	1	-.014	2	-.047	1	-.717	2
7		4	max	123.436	1	44.438	2	-3.48	12	.001	3	.035	5	1.438	3
8			min	7.303	12	-82.201	3	-58.574	1	-.014	2	-.141	1	-.845	2
9		5	max	123.436	1	136.844	3	-1.396	12	.001	3	.004	5	1.406	3
10			min	7.303	12	-86.933	2	-28.293	4	-.014	2	-.184	1	-.82	2
11		6	max	123.436	1	355.888	3	29.604	1	.001	3	-.009	12	1.118	3
12			min	3.232	15	-218.304	2	-21.167	5	-.014	2	-.175	1	-.642	2
13		7	max	123.436	1	574.932	3	73.692	1	.001	3	-.007	12	.575	3
14			min	-6.81	5	-349.675	2	-17.942	5	-.014	2	-.115	1	-.311	2
15		8	max	123.436	1	793.976	3	117.781	1	.001	3	.001	10	.174	2
16			min	-18.786	5	-481.045	2	-14.718	5	-.014	2	-.066	4	-.223	3
17		9	max	123.436	1	1013.021	3	161.87	1	.001	3	.16	1	.811	2
18			min	-30.762	5	-612.416	2	-11.494	5	-.014	2	-.079	5	-1.277	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	123.436	1	1232.065	3	205.959	1	.014	2	.375	1	1.603	2
20			min	7.303	12	-743.787	2	-125.062	14	-.001	3	.014	12	-2.587	3
21		11	max	123.436	1	612.416	2	-6.94	12	.014	2	.16	1	.811	2
22			min	7.303	12	-1013.021	3	-161.87	1	-.001	3	.005	12	-1.277	3
23		12	max	123.436	1	481.045	2	-4.856	12	.014	2	.063	4	.174	2
24			min	7.303	12	-793.976	3	-117.781	1	-.001	3	-.004	3	-.223	3
25		13	max	123.436	1	349.675	2	-2.772	12	.014	2	.028	5	.575	3
26			min	7.303	12	-574.932	3	-73.692	1	-.001	3	-.115	1	-.311	2
27		14	max	123.436	1	218.304	2	-.688	12	.014	2	-.002	15	1.118	3
28			min	7.303	12	-355.888	3	-32.658	4	-.001	3	-.175	1	-.642	2
29		15	max	123.436	1	86.933	2	14.485	1	.014	2	-.008	12	1.406	3
30			min	.382	15	-136.844	3	-22.208	5	-.001	3	-.184	1	-.82	2
31		16	max	123.436	1	82.201	3	58.574	1	.014	2	-.006	12	1.438	3
32			min	-11.113	5	-44.438	2	-18.984	5	-.001	3	-.141	1	-.845	2
33		17	max	123.436	1	301.245	3	102.663	1	.014	2	0	3	1.214	3
34			min	-23.089	5	-175.809	2	-15.76	5	-.001	3	-.088	4	-.717	2
35		18	max	123.436	1	520.289	3	146.752	1	.014	2	.098	1	.735	3
36			min	-35.065	5	-307.18	2	-12.535	5	-.001	3	-.092	5	-.435	2
37		19	max	123.436	1	739.333	3	190.841	1	.014	2	.295	1	0	2
38			min	-47.041	5	-438.551	2	-9.311	5	-.001	3	-.105	5	0	3
39	M14	1	max	61.857	4	464.025	2	-9.988	12	.009	3	.335	1	0	4
40			min	3.041	12	-579.752	3	-196.527	1	-.011	2	.019	12	0	3
41		2	max	55.58	1	332.654	2	-7.904	12	.009	3	.187	4	.579	3
42			min	3.041	12	-412.506	3	-152.438	1	-.011	2	.009	12	-.465	2
43		3	max	55.58	1	201.284	2	-5.82	12	.009	3	.101	5	.963	3
44			min	3.041	12	-245.259	3	-108.349	1	-.011	2	-.021	1	-.776	2
45		4	max	55.58	1	69.913	2	-3.736	12	.009	3	.053	5	1.151	3
46			min	3.041	12	-78.013	3	-64.26	1	-.011	2	-.122	1	-.934	2
47		5	max	55.58	1	89.234	3	-1.652	12	.009	3	.009	5	1.145	3
48			min	.584	15	-61.458	2	-41.666	4	-.011	2	-.171	1	-.939	2
49		6	max	55.58	1	256.481	3	23.918	1	.009	3	-.008	12	.943	3
50			min	-11.038	5	-192.829	2	-32.988	5	-.011	2	-.169	1	-.791	2
51		7	max	55.58	1	423.727	3	68.007	1	.009	3	-.007	12	.546	3
52			min	-23.015	5	-324.2	2	-29.764	5	-.011	2	-.115	1	-.489	2
53		8	max	55.58	1	590.974	3	112.095	1	.009	3	0	10	0	15
54			min	-34.991	5	-455.571	2	-26.54	5	-.011	2	-.105	4	-.046	3
55		9	max	55.58	1	758.22	3	156.184	1	.009	3	.147	1	.574	2
56			min	-46.967	5	-586.942	2	-23.316	5	-.011	2	-.13	5	-.833	3
57		10	max	79.751	4	925.467	3	200.273	1	.011	2	.355	1	1.335	2
58			min	3.041	12	-718.313	2	-127.918	14	-.009	3	.013	12	-1.815	3
59		11	max	67.775	4	586.942	2	-6.684	12	.011	2	.187	4	.574	2
60			min	3.041	12	-758.22	3	-156.184	1	-.009	3	.004	12	-.833	3
61		12	max	55.799	4	455.571	2	-4.6	12	.011	2	.099	5	0	15
62			min	3.041	12	-590.974	3	-112.095	1	-.009	3	-.01	1	-.046	3
63		13	max	55.58	1	324.2	2	-2.516	12	.011	2	.051	5	.546	3
64			min	3.041	12	-423.727	3	-68.007	1	-.009	3	-.115	1	-.489	2
65		14	max	55.58	1	192.829	2	-.432	12	.011	2	.007	5	.943	3
66			min	3.041	12	-256.481	3	-42.543	4	-.009	3	-.169	1	-.791	2
67		15	max	55.58	1	61.458	2	20.171	1	.011	2	-.008	12	1.145	3
68			min	3.041	12	-89.234	3	-33.198	5	-.009	3	-.171	1	-.939	2
69		16	max	55.58	1	78.013	3	64.26	1	.011	2	-.005	12	1.151	3
70			min	-5.224	5	-69.913	2	-29.974	5	-.009	3	-.122	1	-.934	2
71		17	max	55.58	1	245.259	3	108.349	1	.011	2	.002	3	.963	3
72			min	-17.2	5	-201.284	2	-26.75	5	-.009	3	-.11	4	-.776	2
73		18	max	55.58	1	412.506	3	152.438	1	.011	2	.131	1	.579	3
74			min	-29.176	5	-332.654	2	-23.525	5	-.009	3	-.133	5	-.465	2
75		19	max	55.58	1	579.752	3	196.527	1	.011	2	.335	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	-41.152	5	-464.025	2	-20.301	5	-.009	3	-.159	5	0	3
77	M15	1	max	88.34	5	668.002	2	-9.933	12	.011	2	.339	4	0	2
78			min	-58.499	1	-317.689	3	-196.501	1	-.008	3	.019	12	0	3
79		2	max	76.364	5	476.2	2	-7.849	12	.011	2	.225	4	.318	3
80			min	-58.499	1	-228.14	3	-152.412	1	-.008	3	.009	12	-.667	2
81		3	max	64.388	5	284.398	2	-5.765	12	.011	2	.129	5	.532	3
82			min	-58.499	1	-138.591	3	-108.323	1	-.008	3	-.021	1	-1.111	2
83		4	max	52.412	5	92.597	2	-3.681	12	.011	2	.07	5	.642	3
84			min	-58.499	1	-49.042	3	-64.398	4	-.008	3	-.122	1	-1.331	2
85		5	max	40.435	5	40.507	3	-1.597	12	.011	2	.015	5	.647	3
86			min	-58.499	1	-99.205	2	-50.884	4	-.008	3	-.171	1	-1.327	2
87		6	max	28.459	5	130.055	3	23.944	1	.011	2	-.008	12	.547	3
88			min	-58.499	1	-291.007	2	-42.168	5	-.008	3	-.169	1	-1.1	2
89		7	max	16.483	5	219.604	3	68.033	1	.011	2	-.007	12	.343	3
90			min	-58.499	1	-482.809	2	-38.943	5	-.008	3	-.115	1	-.648	2
91		8	max	4.507	5	309.153	3	112.122	1	.011	2	0	10	.035	3
92			min	-58.499	1	-674.611	2	-35.719	5	-.008	3	-.131	4	-.003	9
93		9	max	-3.551	12	398.702	3	156.211	1	.011	2	.147	1	.926	2
94			min	-58.499	1	-866.413	2	-32.495	5	-.008	3	-.167	5	-.378	3
95		10	max	-3.551	12	488.251	3	200.3	1	.008	3	.355	1	2.049	2
96			min	-58.499	1	-1058.215	2	-132.629	14	-.011	2	.013	12	-.895	3
97		11	max	-.892	15	866.413	2	-6.739	12	.008	3	.224	4	.926	2
98			min	-58.499	1	-398.702	3	-156.211	1	-.011	2	.004	12	-.378	3
99		12	max	-3.551	12	674.611	2	-4.655	12	.008	3	.125	5	.035	3
100			min	-58.499	1	-309.153	3	-112.122	1	-.011	2	-.01	1	-.003	9
101		13	max	-3.551	12	482.809	2	-2.571	12	.008	3	.066	5	.343	3
102			min	-58.499	1	-219.604	3	-68.033	1	-.011	2	-.115	1	-.648	2
103		14	max	-3.551	12	291.007	2	-.487	12	.008	3	.011	5	.547	3
104			min	-58.499	1	-130.055	3	-51.79	4	-.011	2	-.169	1	-1.1	2
105		15	max	-3.551	12	99.205	2	20.145	1	.008	3	-.008	12	.647	3
106			min	-63.966	4	-40.507	3	-42.382	5	-.011	2	-.171	1	-1.327	2
107		16	max	-3.551	12	49.042	3	64.234	1	.008	3	-.005	12	.642	3
108			min	-75.942	4	-92.597	2	-39.158	5	-.011	2	-.122	1	-1.331	2
109		17	max	-3.551	12	138.591	3	108.323	1	.008	3	.002	3	.532	3
110			min	-87.918	4	-284.398	2	-35.933	5	-.011	2	-.138	4	-1.111	2
111		18	max	-3.551	12	228.14	3	152.412	1	.008	3	.131	1	.318	3
112			min	-99.894	4	-476.2	2	-32.709	5	-.011	2	-.172	5	-.667	2
113		19	max	-3.551	12	317.689	3	196.501	1	.008	3	.335	1	0	2
114			min	-111.87	4	-668.002	2	-29.485	5	-.011	2	-.208	5	0	5
115	M16	1	max	86.326	5	643.427	2	-9.55	12	.01	2	.297	1	0	2
116			min	-132.482	1	-297.974	3	-191.1	1	-.011	3	.017	12	0	3
117		2	max	74.35	5	451.625	2	-7.466	12	.01	2	.173	4	.295	3
118			min	-132.482	1	-208.425	3	-147.011	1	-.011	3	.007	12	-.639	2
119		3	max	62.374	5	259.823	2	-5.382	12	.01	2	.098	5	.486	3
120			min	-132.482	1	-118.876	3	-102.922	1	-.011	3	-.046	1	-1.054	2
121		4	max	50.398	5	68.021	2	-3.298	12	.01	2	.053	5	.573	3
122			min	-132.482	1	-29.327	3	-58.833	1	-.011	3	-.141	1	-1.245	2
123		5	max	38.422	5	60.222	3	-1.214	12	.01	2	.012	5	.555	3
124			min	-132.482	1	-123.781	2	-37.889	4	-.011	3	-.184	1	-1.212	2
125		6	max	26.446	5	149.771	3	29.345	1	.01	2	-.009	12	.432	3
126			min	-132.482	1	-315.582	2	-30.621	5	-.011	3	-.175	1	-.956	2
127		7	max	14.47	5	239.32	3	73.434	1	.01	2	-.006	12	.205	3
128			min	-132.482	1	-507.384	2	-27.397	5	-.011	3	-.115	1	-.476	2
129		8	max	2.494	5	328.869	3	117.523	1	.01	2	0	10	.228	2
130			min	-132.482	1	-699.186	2	-24.173	5	-.011	3	-.093	4	-.126	3
131		9	max	-6.188	15	418.418	3	161.612	1	.01	2	.159	1	1.155	2
132			min	-132.482	1	-890.988	2	-20.949	5	-.011	3	-.116	5	-.562	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	-7.476	12	507.967	3	205.7	1	.011	3	.373	1	2.307	2
134			min	-132.482	1	-1082.79	2	-129.836	14	-.01	2	.015	12	-1.102	3
135		11	max	-6.445	15	890.988	2	-7.122	12	.011	3	.178	4	1.155	2
136			min	-132.482	1	-418.418	3	-161.612	1	-.01	2	.005	12	-.562	3
137		12	max	-7.476	12	699.186	2	-5.038	12	.011	3	.09	4	.228	2
138			min	-132.482	1	-328.869	3	-117.523	1	-.01	2	-.004	1	-.126	3
139		13	max	-7.476	12	507.384	2	-2.954	12	.011	3	.043	5	.205	3
140			min	-132.482	1	-239.32	3	-73.434	1	-.01	2	-.115	1	-.476	2
141		14	max	-7.476	12	315.582	2	-.87	12	.011	3	0	15	.432	3
142			min	-132.482	1	-149.771	3	-42.154	4	-.01	2	-.175	1	-.956	2
143		15	max	-7.476	12	123.781	2	14.744	1	.011	3	-.008	12	.555	3
144			min	-132.482	1	-60.222	3	-31.644	5	-.01	2	-.184	1	-1.212	2
145		16	max	-7.476	12	29.327	3	58.833	1	.011	3	-.006	12	.573	3
146			min	-132.482	1	-68.021	2	-28.419	5	-.01	2	-.141	1	-1.245	2
147		17	max	-7.476	12	118.876	3	102.922	1	.011	3	0	12	.486	3
148			min	-132.482	1	-259.823	2	-25.195	5	-.01	2	-.117	4	-1.054	2
149		18	max	-7.476	12	208.425	3	147.011	1	.011	3	.1	1	.295	3
150			min	-132.482	1	-451.625	2	-21.971	5	-.01	2	-.132	5	-.639	2
151		19	max	-7.476	12	297.974	3	191.1	1	.011	3	.297	1	0	2
152			min	-137.894	4	-643.427	2	-18.747	5	-.01	2	-.156	5	0	3
153	M2	1	max	1038.898	2	1.957	4	.569	1	0	12	0	3	0	1
154			min	-1373.419	3	.473	15	-35.573	4	0	4	0	2	0	1
155		2	max	1039.374	2	1.872	4	.569	1	0	12	0	1	0	15
156			min	-1373.063	3	.453	15	-35.99	4	0	4	-.012	4	0	4
157		3	max	1039.85	2	1.786	4	.569	1	0	12	0	1	0	15
158			min	-1372.706	3	.433	15	-36.406	4	0	4	-.023	4	-.001	4
159		4	max	1040.326	2	1.701	4	.569	1	0	12	0	1	0	15
160			min	-1372.349	3	.413	15	-36.822	4	0	4	-.035	4	-.002	4
161		5	max	1040.801	2	1.615	4	.569	1	0	12	0	1	0	15
162			min	-1371.992	3	.393	15	-37.239	4	0	4	-.047	4	-.002	4
163		6	max	1041.277	2	1.529	4	.569	1	0	12	0	1	0	15
164			min	-1371.635	3	.372	15	-37.655	4	0	4	-.059	4	-.003	4
165		7	max	1041.753	2	1.444	4	.569	1	0	12	.001	1	0	15
166			min	-1371.279	3	.352	15	-38.071	4	0	4	-.072	4	-.003	4
167		8	max	1042.229	2	1.358	4	.569	1	0	12	.001	1	0	15
168			min	-1370.922	3	.332	15	-38.488	4	0	4	-.084	4	-.004	4
169		9	max	1042.704	2	1.273	4	.569	1	0	12	.001	1	-.001	15
170			min	-1370.565	3	.299	12	-38.904	4	0	4	-.096	4	-.004	4
171		10	max	1043.18	2	1.187	4	.569	1	0	12	.002	1	-.001	15
172			min	-1370.208	3	.266	12	-39.32	4	0	4	-.109	4	-.005	4
173		11	max	1043.656	2	1.101	4	.569	1	0	12	.002	1	-.001	15
174			min	-1369.851	3	.232	12	-39.737	4	0	4	-.122	4	-.005	4
175		12	max	1044.132	2	1.016	4	.569	1	0	12	.002	1	-.001	15
176			min	-1369.494	3	.199	12	-40.153	4	0	4	-.135	4	-.005	4
177		13	max	1044.607	2	.93	4	.569	1	0	12	.002	1	-.001	15
178			min	-1369.138	3	.166	12	-40.569	4	0	4	-.148	4	-.006	4
179		14	max	1045.083	2	.863	2	.569	1	0	12	.002	1	-.001	15
180			min	-1368.781	3	.132	12	-40.986	4	0	4	-.161	4	-.006	4
181		15	max	1045.559	2	.796	2	.569	1	0	12	.003	1	-.002	15
182			min	-1368.424	3	.099	12	-41.402	4	0	4	-.174	4	-.006	4
183		16	max	1046.035	2	.729	2	.569	1	0	12	.003	1	-.002	12
184			min	-1368.067	3	.066	12	-41.819	4	0	4	-.188	4	-.006	4
185		17	max	1046.51	2	.663	2	.569	1	0	12	.003	1	-.002	12
186			min	-1367.71	3	.017	3	-42.235	4	0	4	-.202	4	-.007	4
187		18	max	1046.986	2	.596	2	.569	1	0	12	.003	1	-.002	12
188			min	-1367.354	3	-.033	3	-42.651	4	0	4	-.215	4	-.007	4
189		19	max	1047.462	2	.529	2	.569	1	0	12	.003	1	-.002	12

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-1366.997	3	-.083	3	-43.068	4	0	4	-.229	4	-.007	4
191	M3	1	max	710.727	2	7.8	4	5.696	4	0	12	0	1	.007	4
192			min	-860.499	3	1.844	15	.015	12	0	4	-.033	4	.002	12
193		2	max	710.556	2	7.036	4	6.233	4	0	12	0	1	.004	2
194			min	-860.627	3	1.664	15	.015	12	0	4	-.031	4	0	12
195		3	max	710.386	2	6.272	4	6.77	4	0	12	0	1	.002	2
196			min	-860.754	3	1.484	15	.015	12	0	4	-.028	4	-.001	3
197		4	max	710.216	2	5.507	4	7.307	4	0	12	0	1	0	2
198			min	-860.882	3	1.305	15	.015	12	0	4	-.025	4	-.002	3
199		5	max	710.045	2	4.743	4	7.844	4	0	12	0	1	0	15
200			min	-861.01	3	1.125	15	.015	12	0	4	-.022	4	-.004	6
201		6	max	709.875	2	3.978	4	8.381	4	0	12	.001	1	-.001	15
202			min	-861.138	3	.945	15	.015	12	0	4	-.018	5	-.005	6
203		7	max	709.705	2	3.214	4	8.918	4	0	12	.001	1	-.002	15
204			min	-861.265	3	.765	15	.015	12	0	4	-.015	5	-.007	6
205		8	max	709.534	2	2.449	4	9.455	4	0	12	.001	1	-.002	15
206			min	-861.393	3	.586	15	.015	12	0	4	-.011	5	-.008	6
207		9	max	709.364	2	1.685	4	9.992	4	0	12	.001	1	-.002	15
208			min	-861.521	3	.406	15	.015	12	0	4	-.007	5	-.009	6
209		10	max	709.194	2	.92	4	10.529	4	0	12	.001	1	-.002	15
210			min	-861.649	3	.206	12	.015	12	0	4	-.003	5	-.009	6
211		11	max	709.023	2	.28	2	11.066	4	0	12	.002	4	-.002	15
212			min	-861.776	3	-.162	3	.015	12	0	4	0	12	-.01	6
213		12	max	708.853	2	-.133	15	11.603	4	0	12	.007	4	-.002	15
214			min	-861.904	3	-.609	6	.015	12	0	4	0	12	-.01	6
215		13	max	708.683	2	-.313	15	12.139	4	0	12	.012	4	-.002	15
216			min	-862.032	3	-1.374	6	.015	12	0	4	0	12	-.009	6
217		14	max	708.512	2	-.492	15	12.676	4	0	12	.017	4	-.002	15
218			min	-862.16	3	-2.138	6	.015	12	0	4	0	12	-.008	6
219		15	max	708.342	2	-.672	15	13.213	4	0	12	.022	4	-.002	15
220			min	-862.287	3	-2.903	6	.015	12	0	4	0	12	-.007	6
221		16	max	708.172	2	-.852	15	13.75	4	0	12	.028	4	-.001	15
222			min	-862.415	3	-3.667	6	.015	12	0	4	0	12	-.006	6
223		17	max	708.001	2	-1.031	15	14.287	4	0	12	.034	4	-.001	15
224			min	-862.543	3	-4.432	6	.015	12	0	4	0	12	-.004	6
225		18	max	707.831	2	-1.211	15	14.824	4	0	12	.04	4	0	15
226			min	-862.671	3	-5.196	6	.015	12	0	4	0	12	-.002	6
227		19	max	707.661	2	-1.391	15	15.361	4	0	12	.046	4	0	1
228			min	-862.798	3	-5.96	6	.015	12	0	4	0	12	0	1
229	M4	1	max	1084.7	1	0	1	-.732	12	0	1	.038	4	0	1
230			min	-32.596	5	0	1	-301.787	4	0	1	0	12	0	1
231		2	max	1084.87	1	0	1	-.732	12	0	1	.004	4	0	1
232			min	-32.516	5	0	1	-301.934	4	0	1	0	12	0	1
233		3	max	1085.04	1	0	1	-.732	12	0	1	0	12	0	1
234			min	-32.437	5	0	1	-302.082	4	0	1	-.031	4	0	1
235		4	max	1085.211	1	0	1	-.732	12	0	1	0	12	0	1
236			min	-32.357	5	0	1	-302.23	4	0	1	-.066	4	0	1
237		5	max	1085.381	1	0	1	-.732	12	0	1	0	12	0	1
238			min	-32.278	5	0	1	-302.377	4	0	1	-.101	4	0	1
239		6	max	1085.551	1	0	1	-.732	12	0	1	0	12	0	1
240			min	-32.198	5	0	1	-302.525	4	0	1	-.135	4	0	1
241		7	max	1085.722	1	0	1	-.732	12	0	1	0	12	0	1
242			min	-32.119	5	0	1	-302.672	4	0	1	-.17	4	0	1
243		8	max	1085.892	1	0	1	-.732	12	0	1	0	12	0	1
244			min	-32.039	5	0	1	-302.82	4	0	1	-.205	4	0	1
245		9	max	1086.062	1	0	1	-.732	12	0	1	0	12	0	1
246			min	-31.96	5	0	1	-302.968	4	0	1	-.24	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	1086.233	1	0	1	-.732	12	0	1	0	12	0	1
248			min	-31.88	5	0	1	-303.115	4	0	1	-.274	4	0	1
249		11	max	1086.403	1	0	1	-.732	12	0	1	0	12	0	1
250			min	-31.801	5	0	1	-303.263	4	0	1	-.309	4	0	1
251		12	max	1086.573	1	0	1	-.732	12	0	1	0	12	0	1
252			min	-31.721	5	0	1	-303.411	4	0	1	-.344	4	0	1
253		13	max	1086.744	1	0	1	-.732	12	0	1	0	12	0	1
254			min	-31.642	5	0	1	-303.558	4	0	1	-.379	4	0	1
255		14	max	1086.914	1	0	1	-.732	12	0	1	0	12	0	1
256			min	-31.562	5	0	1	-303.706	4	0	1	-.414	4	0	1
257		15	max	1087.084	1	0	1	-.732	12	0	1	-.001	12	0	1
258			min	-31.483	5	0	1	-303.854	4	0	1	-.449	4	0	1
259		16	max	1087.255	1	0	1	-.732	12	0	1	-.001	12	0	1
260			min	-31.403	5	0	1	-304.001	4	0	1	-.483	4	0	1
261		17	max	1087.425	1	0	1	-.732	12	0	1	-.001	12	0	1
262			min	-31.324	5	0	1	-304.149	4	0	1	-.518	4	0	1
263		18	max	1087.595	1	0	1	-.732	12	0	1	-.001	12	0	1
264			min	-31.244	5	0	1	-304.296	4	0	1	-.553	4	0	1
265		19	max	1087.766	1	0	1	-.732	12	0	1	-.001	12	0	1
266			min	-31.165	5	0	1	-304.444	4	0	1	-.588	4	0	1
267	M6	1	max	3349.647	2	2.308	2	0	1	0	1	0	4	0	1
268			min	-4498.725	3	.128	3	-35.957	4	0	4	0	1	0	1
269		2	max	3350.123	2	2.242	2	0	1	0	1	0	1	0	3
270			min	-4498.368	3	.078	3	-36.374	4	0	4	-.012	4	0	2
271		3	max	3350.598	2	2.175	2	0	1	0	1	0	1	0	3
272			min	-4498.011	3	.028	3	-36.79	4	0	4	-.024	4	-.001	2
273		4	max	3351.074	2	2.108	2	0	1	0	1	0	1	0	3
274			min	-4497.654	3	-.022	3	-37.206	4	0	4	-.036	4	-.002	2
275		5	max	3351.55	2	2.042	2	0	1	0	1	0	1	0	3
276			min	-4497.297	3	-.072	3	-37.623	4	0	4	-.048	4	-.003	2
277		6	max	3352.026	2	1.975	2	0	1	0	1	0	1	0	3
278			min	-4496.941	3	-.122	3	-38.039	4	0	4	-.06	4	-.003	2
279		7	max	3352.501	2	1.908	2	0	1	0	1	0	1	0	3
280			min	-4496.584	3	-.172	3	-38.456	4	0	4	-.072	4	-.004	2
281		8	max	3352.977	2	1.841	2	0	1	0	1	0	1	0	3
282			min	-4496.227	3	-.222	3	-38.872	4	0	4	-.085	4	-.005	2
283		9	max	3353.453	2	1.775	2	0	1	0	1	0	1	0	3
284			min	-4495.87	3	-.272	3	-39.288	4	0	4	-.097	4	-.005	2
285		10	max	3353.929	2	1.708	2	0	1	0	1	0	1	0	3
286			min	-4495.513	3	-.322	3	-39.705	4	0	4	-.11	4	-.006	2
287		11	max	3354.404	2	1.641	2	0	1	0	1	0	1	0	3
288			min	-4495.156	3	-.372	3	-40.121	4	0	4	-.123	4	-.006	2
289		12	max	3354.88	2	1.575	2	0	1	0	1	0	1	0	3
290			min	-4494.8	3	-.422	3	-40.537	4	0	4	-.136	4	-.007	2
291		13	max	3355.356	2	1.508	2	0	1	0	1	0	1	0	3
292			min	-4494.443	3	-.472	3	-40.954	4	0	4	-.149	4	-.007	2
293		14	max	3355.832	2	1.441	2	0	1	0	1	0	1	0	3
294			min	-4494.086	3	-.522	3	-41.37	4	0	4	-.163	4	-.008	2
295		15	max	3356.307	2	1.375	2	0	1	0	1	0	1	.001	3
296			min	-4493.729	3	-.572	3	-41.786	4	0	4	-.176	4	-.008	2
297		16	max	3356.783	2	1.308	2	0	1	0	1	0	1	.001	3
298			min	-4493.372	3	-.622	3	-42.203	4	0	4	-.19	4	-.009	2
299		17	max	3357.259	2	1.241	2	0	1	0	1	0	1	.001	3
300			min	-4493.016	3	-.672	3	-42.619	4	0	4	-.204	4	-.009	2
301		18	max	3357.735	2	1.175	2	0	1	0	1	0	1	.002	3
302			min	-4492.659	3	-.722	3	-43.035	4	0	4	-.217	4	-.01	2
303		19	max	3358.21	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	-4492.302	3	-.772	3	-43.452	4	0	4	-.231	4	-.01	2
305	M7	1	max	2647.738	2	7.812	6	5.378	4	0	1	0	1	.01	2
306			min	-2722.596	3	1.834	15	0	1	0	4	-.033	4	-.002	3
307		2	max	2647.568	2	7.048	6	5.915	4	0	1	0	1	.007	2
308			min	-2722.724	3	1.654	15	0	1	0	4	-.031	4	-.003	3
309		3	max	2647.397	2	6.283	6	6.452	4	0	1	0	1	.005	2
310			min	-2722.852	3	1.475	15	0	1	0	4	-.028	4	-.005	3
311		4	max	2647.227	2	5.519	6	6.989	4	0	1	0	1	.003	2
312			min	-2722.979	3	1.295	15	0	1	0	4	-.026	4	-.006	3
313		5	max	2647.057	2	4.755	6	7.526	4	0	1	0	1	0	2
314			min	-2723.107	3	1.115	15	0	1	0	4	-.023	4	-.007	3
315		6	max	2646.886	2	3.99	6	8.063	4	0	1	0	1	0	2
316			min	-2723.235	3	.936	15	0	1	0	4	-.019	4	-.007	3
317		7	max	2646.716	2	3.226	6	8.599	4	0	1	0	1	-.002	15
318			min	-2723.363	3	.756	15	0	1	0	4	-.016	4	-.008	3
319		8	max	2646.546	2	2.516	2	9.136	4	0	1	0	1	-.002	15
320			min	-2723.49	3	.481	12	0	1	0	4	-.012	4	-.008	3
321		9	max	2646.375	2	1.92	2	9.673	4	0	1	0	1	-.002	15
322			min	-2723.618	3	.183	12	0	1	0	4	-.008	4	-.009	4
323		10	max	2646.205	2	1.324	2	10.21	4	0	1	0	1	-.002	15
324			min	-2723.746	3	-.25	3	0	1	0	4	-.004	4	-.009	4
325		11	max	2646.035	2	.729	2	10.747	4	0	1	0	4	-.002	15
326			min	-2723.874	3	-.697	3	0	1	0	4	0	1	-.01	4
327		12	max	2645.864	2	.133	2	11.284	4	0	1	.005	4	-.002	15
328			min	-2724.001	3	-1.143	3	0	1	0	4	0	1	-.01	4
329		13	max	2645.694	2	-.322	15	11.821	4	0	1	.01	4	-.002	15
330			min	-2724.129	3	-1.59	3	0	1	0	4	0	1	-.009	4
331		14	max	2645.523	2	-.502	15	12.358	4	0	1	.015	4	-.002	15
332			min	-2724.257	3	-2.125	4	0	1	0	4	0	1	-.008	4
333		15	max	2645.353	2	-.682	15	12.895	4	0	1	.02	4	-.002	15
334			min	-2724.385	3	-2.89	4	0	1	0	4	0	1	-.007	4
335		16	max	2645.183	2	-.861	15	13.432	4	0	1	.026	4	-.001	15
336			min	-2724.513	3	-3.654	4	0	1	0	4	0	1	-.006	4
337		17	max	2645.012	2	-1.041	15	13.969	4	0	1	.031	4	-.001	15
338			min	-2724.64	3	-4.419	4	0	1	0	4	0	1	-.004	4
339		18	max	2644.842	2	-1.221	15	14.506	4	0	1	.037	4	0	15
340			min	-2724.768	3	-5.183	4	0	1	0	4	0	1	-.002	4
341		19	max	2644.672	2	-1.4	15	15.043	4	0	1	.043	4	0	1
342			min	-2724.896	3	-5.948	4	0	1	0	4	0	1	0	1
343	M8	1	max	2814.556	1	0	1	0	1	0	1	.036	4	0	1
344			min	-181.881	3	0	1	-291.109	4	0	1	0	1	0	1
345		2	max	2814.727	1	0	1	0	1	0	1	.003	5	0	1
346			min	-181.753	3	0	1	-291.256	4	0	1	0	1	0	1
347		3	max	2814.897	1	0	1	0	1	0	1	0	1	0	1
348			min	-181.625	3	0	1	-291.404	4	0	1	-.031	4	0	1
349		4	max	2815.067	1	0	1	0	1	0	1	0	1	0	1
350			min	-181.498	3	0	1	-291.552	4	0	1	-.064	4	0	1
351		5	max	2815.238	1	0	1	0	1	0	1	0	1	0	1
352			min	-181.37	3	0	1	-291.699	4	0	1	-.098	4	0	1
353		6	max	2815.408	1	0	1	0	1	0	1	0	1	0	1
354			min	-181.242	3	0	1	-291.847	4	0	1	-.131	4	0	1
355		7	max	2815.578	1	0	1	0	1	0	1	0	1	0	1
356			min	-181.114	3	0	1	-291.994	4	0	1	-.165	4	0	1
357		8	max	2815.749	1	0	1	0	1	0	1	0	1	0	1
358			min	-180.987	3	0	1	-292.142	4	0	1	-.198	4	0	1
359		9	max	2815.919	1	0	1	0	1	0	1	0	1	0	1
360			min	-180.859	3	0	1	-292.29	4	0	1	-.232	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	2816.089	1	0	1	0	1	0	1	0	1	0	1
362			min	-180.731	3	0	1	-292.437	4	0	1	-.266	4	0	1
363		11	max	2816.26	1	0	1	0	1	0	1	0	1	0	1
364			min	-180.603	3	0	1	-292.585	4	0	1	-.299	4	0	1
365		12	max	2816.43	1	0	1	0	1	0	1	0	1	0	1
366			min	-180.476	3	0	1	-292.733	4	0	1	-.333	4	0	1
367		13	max	2816.6	1	0	1	0	1	0	1	0	1	0	1
368			min	-180.348	3	0	1	-292.88	4	0	1	-.366	4	0	1
369		14	max	2816.771	1	0	1	0	1	0	1	0	1	0	1
370			min	-180.22	3	0	1	-293.028	4	0	1	-.4	4	0	1
371		15	max	2816.941	1	0	1	0	1	0	1	0	1	0	1
372			min	-180.092	3	0	1	-293.176	4	0	1	-.434	4	0	1
373		16	max	2817.111	1	0	1	0	1	0	1	0	1	0	1
374			min	-179.965	3	0	1	-293.323	4	0	1	-.467	4	0	1
375		17	max	2817.282	1	0	1	0	1	0	1	0	1	0	1
376			min	-179.837	3	0	1	-293.471	4	0	1	-.501	4	0	1
377		18	max	2817.452	1	0	1	0	1	0	1	0	1	0	1
378			min	-179.709	3	0	1	-293.618	4	0	1	-.535	4	0	1
379		19	max	2817.623	1	0	1	0	1	0	1	0	1	0	1
380			min	-179.581	3	0	1	-293.766	4	0	1	-.568	4	0	1
381	M10	1	max	1038.898	2	1.901	6	-.03	12	0	1	0	2	0	1
382			min	-1373.419	3	.435	15	-35.924	4	0	5	0	3	0	1
383		2	max	1039.374	2	1.815	6	-.03	12	0	1	0	10	0	15
384			min	-1373.063	3	.415	15	-36.34	4	0	5	-.012	4	0	6
385		3	max	1039.85	2	1.729	6	-.03	12	0	1	0	12	0	15
386			min	-1372.706	3	.395	15	-36.757	4	0	5	-.024	4	-.001	6
387		4	max	1040.326	2	1.644	6	-.03	12	0	1	0	12	0	15
388			min	-1372.349	3	.374	15	-37.173	4	0	5	-.035	4	-.002	6
389		5	max	1040.801	2	1.558	6	-.03	12	0	1	0	12	0	15
390			min	-1371.992	3	.354	15	-37.59	4	0	5	-.048	4	-.002	6
391		6	max	1041.277	2	1.473	6	-.03	12	0	1	0	12	0	15
392			min	-1371.635	3	.334	15	-38.006	4	0	5	-.06	4	-.003	6
393		7	max	1041.753	2	1.387	6	-.03	12	0	1	0	12	0	15
394			min	-1371.279	3	.314	15	-38.422	4	0	5	-.072	4	-.003	6
395		8	max	1042.229	2	1.301	6	-.03	12	0	1	0	12	0	15
396			min	-1370.922	3	.294	15	-38.839	4	0	5	-.085	4	-.004	6
397		9	max	1042.704	2	1.216	6	-.03	12	0	1	0	12	0	15
398			min	-1370.565	3	.274	15	-39.255	4	0	5	-.097	4	-.004	6
399		10	max	1043.18	2	1.13	6	-.03	12	0	1	0	12	-.001	15
400			min	-1370.208	3	.254	15	-39.671	4	0	5	-.11	4	-.004	6
401		11	max	1043.656	2	1.063	2	-.03	12	0	1	0	12	-.001	15
402			min	-1369.851	3	.232	12	-40.088	4	0	5	-.123	4	-.005	6
403		12	max	1044.132	2	.996	2	-.03	12	0	1	0	12	-.001	15
404			min	-1369.494	3	.199	12	-40.504	4	0	5	-.136	4	-.005	6
405		13	max	1044.607	2	.929	2	-.03	12	0	1	0	12	-.001	15
406			min	-1369.138	3	.166	12	-40.92	4	0	5	-.149	4	-.005	6
407		14	max	1045.083	2	.863	2	-.03	12	0	1	0	12	-.001	15
408			min	-1368.781	3	.132	12	-41.337	4	0	5	-.163	4	-.006	6
409		15	max	1045.559	2	.796	2	-.03	12	0	1	0	12	-.001	15
410			min	-1368.424	3	.099	12	-41.753	4	0	5	-.176	4	-.006	6
411		16	max	1046.035	2	.729	2	-.03	12	0	1	0	12	-.001	15
412			min	-1368.067	3	.066	12	-42.169	4	0	5	-.19	4	-.006	6
413		17	max	1046.51	2	.663	2	-.03	12	0	1	0	12	-.001	15
414			min	-1367.71	3	.017	3	-42.586	4	0	5	-.203	4	-.006	6
415		18	max	1046.986	2	.596	2	-.03	12	0	1	0	12	-.001	15
416			min	-1367.354	3	-.033	3	-43.002	4	0	5	-.217	4	-.006	6
417		19	max	1047.462	2	.529	2	-.03	12	0	1	0	12	-.001	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
418			min	-1366.997	3	-.083	3	-43.418	4	0	5	-.231	4	-.007	6
419	M11	1	max	710.727	2	7.756	6	5.531	4	0	1	0	12	.007	6
420			min	-860.499	3	1.814	15	-.269	1	0	4	-.033	4	.001	15
421		2	max	710.556	2	6.992	6	6.068	4	0	1	0	12	.004	2
422			min	-860.627	3	1.634	15	-.269	1	0	4	-.031	4	0	12
423		3	max	710.386	2	6.228	6	6.605	4	0	1	0	12	.002	2
424			min	-860.754	3	1.455	15	-.269	1	0	4	-.028	4	-.001	3
425		4	max	710.216	2	5.463	6	7.142	4	0	1	0	12	0	2
426			min	-860.882	3	1.275	15	-.269	1	0	4	-.025	4	-.002	3
427		5	max	710.045	2	4.699	6	7.679	4	0	1	0	12	0	15
428			min	-861.01	3	1.095	15	-.269	1	0	4	-.022	4	-.004	4
429		6	max	709.875	2	3.934	6	8.216	4	0	1	0	12	-.001	15
430			min	-861.138	3	.915	15	-.269	1	0	4	-.019	4	-.006	4
431		7	max	709.705	2	3.17	6	8.753	4	0	1	0	12	-.002	15
432			min	-861.265	3	.736	15	-.269	1	0	4	-.015	4	-.007	4
433		8	max	709.534	2	2.405	6	9.289	4	0	1	0	12	-.002	15
434			min	-861.393	3	.556	15	-.269	1	0	4	-.012	4	-.008	4
435		9	max	709.364	2	1.641	6	9.826	4	0	1	0	12	-.002	15
436			min	-861.521	3	.376	15	-.269	1	0	4	-.008	4	-.009	4
437		10	max	709.194	2	.876	6	10.363	4	0	1	0	12	-.002	15
438			min	-861.649	3	.197	15	-.269	1	0	4	-.004	4	-.01	4
439		11	max	709.023	2	.28	2	10.9	4	0	1	.001	5	-.002	15
440			min	-861.776	3	-.162	3	-.269	1	0	4	-.002	1	-.01	4
441		12	max	708.853	2	-.163	15	11.437	4	0	1	.006	5	-.002	15
442			min	-861.904	3	-.653	4	-.269	1	0	4	-.002	1	-.01	4
443		13	max	708.683	2	-.342	15	11.974	4	0	1	.011	5	-.002	15
444			min	-862.032	3	-1.418	4	-.269	1	0	4	-.002	1	-.009	4
445		14	max	708.512	2	-.522	15	12.511	4	0	1	.016	5	-.002	15
446			min	-862.16	3	-2.182	4	-.269	1	0	4	-.002	1	-.009	4
447		15	max	708.342	2	-.702	15	13.048	4	0	1	.021	5	-.002	15
448			min	-862.287	3	-2.947	4	-.269	1	0	4	-.002	1	-.007	4
449		16	max	708.172	2	-.881	15	13.585	4	0	1	.027	5	-.001	15
450			min	-862.415	3	-3.711	4	-.269	1	0	4	-.002	1	-.006	4
451		17	max	708.001	2	-1.061	15	14.122	4	0	1	.032	5	-.001	15
452			min	-862.543	3	-4.476	4	-.269	1	0	4	-.002	1	-.004	4
453		18	max	707.831	2	-1.241	15	14.659	4	0	1	.038	5	0	15
454			min	-862.671	3	-5.24	4	-.269	1	0	4	-.002	1	-.002	4
455		19	max	707.661	2	-1.421	15	15.196	4	0	1	.045	5	0	1
456			min	-862.798	3	-6.004	4	-.269	1	0	4	-.002	1	0	1
457	M12	1	max	1084.7	1	0	1	13.084	1	0	1	.037	5	0	1
458			min	-25.592	3	0	1	-293.702	4	0	1	-.002	1	0	1
459		2	max	1084.87	1	0	1	13.084	1	0	1	.003	5	0	1
460			min	-25.464	3	0	1	-293.85	4	0	1	0	1	0	1
461		3	max	1085.04	1	0	1	13.084	1	0	1	0	1	0	1
462			min	-25.336	3	0	1	-293.997	4	0	1	-.031	4	0	1
463		4	max	1085.211	1	0	1	13.084	1	0	1	.002	1	0	1
464			min	-25.209	3	0	1	-294.145	4	0	1	-.064	4	0	1
465		5	max	1085.381	1	0	1	13.084	1	0	1	.004	1	0	1
466			min	-25.081	3	0	1	-294.293	4	0	1	-.098	4	0	1
467		6	max	1085.551	1	0	1	13.084	1	0	1	.005	1	0	1
468			min	-24.953	3	0	1	-294.44	4	0	1	-.132	4	0	1
469		7	max	1085.722	1	0	1	13.084	1	0	1	.007	1	0	1
470			min	-24.825	3	0	1	-294.588	4	0	1	-.166	4	0	1
471		8	max	1085.892	1	0	1	13.084	1	0	1	.008	1	0	1
472			min	-24.697	3	0	1	-294.736	4	0	1	-.2	4	0	1
473		9	max	1086.062	1	0	1	13.084	1	0	1	.01	1	0	1
474			min	-24.57	3	0	1	-294.883	4	0	1	-.233	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	1086.233	1	0	1	13.084	1	0	1	.011	1	0	1
476			min	-24.442	3	0	1	-295.031	4	0	1	-.267	4	0	1
477		11	max	1086.403	1	0	1	13.084	1	0	1	.013	1	0	1
478			min	-24.314	3	0	1	-295.179	4	0	1	-.301	4	0	1
479		12	max	1086.573	1	0	1	13.084	1	0	1	.014	1	0	1
480			min	-24.186	3	0	1	-295.326	4	0	1	-.335	4	0	1
481		13	max	1086.744	1	0	1	13.084	1	0	1	.016	1	0	1
482			min	-24.059	3	0	1	-295.474	4	0	1	-.369	4	0	1
483		14	max	1086.914	1	0	1	13.084	1	0	1	.017	1	0	1
484			min	-23.931	3	0	1	-295.621	4	0	1	-.403	4	0	1
485		15	max	1087.084	1	0	1	13.084	1	0	1	.019	1	0	1
486			min	-23.803	3	0	1	-295.769	4	0	1	-.437	4	0	1
487		16	max	1087.255	1	0	1	13.084	1	0	1	.02	1	0	1
488			min	-23.675	3	0	1	-295.917	4	0	1	-.471	4	0	1
489		17	max	1087.425	1	0	1	13.084	1	0	1	.022	1	0	1
490			min	-23.548	3	0	1	-296.064	4	0	1	-.505	4	0	1
491		18	max	1087.595	1	0	1	13.084	1	0	1	.023	1	0	1
492			min	-23.42	3	0	1	-296.212	4	0	1	-.539	4	0	1
493		19	max	1087.766	1	0	1	13.084	1	0	1	.025	1	0	1
494			min	-23.292	3	0	1	-296.36	4	0	1	-.573	4	0	1
495	M1	1	max	190.849	1	739.296	3	47.009	5	0	2	.295	1	.001	3
496			min	-9.311	5	-437.853	2	-123.272	1	0	3	-.105	5	-.014	2
497		2	max	191.565	1	738.366	3	48.25	5	0	2	.23	1	.217	2
498			min	-8.977	5	-439.094	2	-123.272	1	0	3	-.08	5	-.389	3
499		3	max	531.233	3	519.55	2	14.811	5	0	3	.165	1	.438	2
500			min	-307.082	2	-538.97	3	-122.951	1	0	2	-.054	5	-.763	3
501		4	max	531.771	3	518.31	2	16.053	5	0	3	.1	1	.17	1
502			min	-306.366	2	-539.9	3	-122.951	1	0	2	-.046	5	-.478	3
503		5	max	532.308	3	517.069	2	17.294	5	0	3	.035	1	-.003	15
504			min	-305.65	2	-540.831	3	-122.951	1	0	2	-.037	5	-.193	3
505		6	max	532.845	3	515.829	2	18.536	5	0	3	-.002	12	.093	3
506			min	-304.933	2	-541.761	3	-122.951	1	0	2	-.035	4	-.382	2
507		7	max	533.382	3	514.588	2	19.777	5	0	3	-.006	12	.379	3
508			min	-304.217	2	-542.691	3	-122.951	1	0	2	-.094	1	-.653	2
509		8	max	533.919	3	513.348	2	21.018	5	0	3	-.005	15	.666	3
510			min	-303.501	2	-543.622	3	-122.951	1	0	2	-.159	1	-.925	2
511		9	max	549.549	3	51.278	2	63.295	5	0	9	.093	1	.777	3
512			min	-220.895	2	.375	15	-178.579	1	0	3	-.142	5	-1.06	2
513		10	max	550.086	3	50.037	2	64.536	5	0	9	0	10	.757	3
514			min	-220.179	2	0	5	-178.579	1	0	3	-.109	4	-1.086	2
515		11	max	550.623	3	48.797	2	65.777	5	0	9	-.006	12	.737	3
516			min	-219.463	2	-1.532	4	-178.579	1	0	3	-.096	4	-1.112	2
517		12	max	566.163	3	357.393	3	164.225	5	0	2	.157	1	.642	3
518			min	-136.835	2	-619.198	2	-120.146	1	0	3	-.226	5	-.986	2
519		13	max	566.701	3	356.463	3	165.467	5	0	2	.094	1	.454	3
520			min	-136.119	2	-620.438	2	-120.146	1	0	3	-.139	5	-.659	2
521		14	max	567.238	3	355.533	3	166.708	5	0	2	.03	1	.266	3
522			min	-135.403	2	-621.679	2	-120.146	1	0	3	-.051	5	-.332	2
523		15	max	567.775	3	354.602	3	167.95	5	0	2	.037	5	.079	3
524			min	-134.686	2	-622.919	2	-120.146	1	0	3	-.033	1	-.026	1
525		16	max	568.312	3	353.672	3	169.191	5	0	2	.126	5	.326	2
526			min	-133.97	2	-624.16	2	-120.146	1	0	3	-.096	1	-.108	3
527		17	max	568.849	3	352.741	3	170.433	5	0	2	.216	5	.655	2
528			min	-133.254	2	-625.4	2	-120.146	1	0	3	-.16	1	-.294	3
529		18	max	18.412	5	645.262	2	-7.476	12	0	3	.212	5	.33	2
530			min	-191.809	1	-297.128	3	-139.279	4	0	2	-.227	1	-.146	3
531		19	max	18.746	5	644.021	2	-7.476	12	0	3	.156	5	.011	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	-191.093	1	-298.058	3	-138.037	4	0	2	-.297	1	-.01	2
533	M5	1	max	411.903	1	2463.984	3	103.58	5	0	1	0	1	.028	2
534			min	18.05	12	-1483.354	2	0	1	0	4	-.24	4	-.003	3
535		2	max	412.619	1	2463.053	3	104.822	5	0	1	0	1	.811	2
536			min	18.408	12	-1484.594	2	0	1	0	4	-.185	4	-1.303	3
537		3	max	1712.164	3	1585.824	2	74.762	4	0	4	0	1	1.558	2
538			min	-1079.231	2	-1741.89	3	0	1	0	1	-.13	4	-2.551	3
539		4	max	1712.701	3	1584.583	2	76.003	4	0	4	0	1	.721	2
540			min	-1078.515	2	-1742.821	3	0	1	0	1	-.091	4	-1.632	3
541		5	max	1713.238	3	1583.343	2	77.245	4	0	4	0	1	.004	9
542			min	-1077.798	2	-1743.751	3	0	1	0	1	-.05	4	-.712	3
543		6	max	1713.775	3	1582.102	2	78.486	4	0	4	0	1	.208	3
544			min	-1077.082	2	-1744.681	3	0	1	0	1	-.009	5	-.95	2
545		7	max	1714.313	3	1580.862	2	79.728	4	0	4	.033	4	1.129	3
546			min	-1076.366	2	-1745.612	3	0	1	0	1	0	1	-1.784	2
547		8	max	1714.85	3	1579.621	2	80.969	4	0	4	.075	4	2.05	3
548			min	-1075.65	2	-1746.542	3	0	1	0	1	0	1	-2.618	2
549		9	max	1741.468	3	171.463	2	208.476	4	0	1	0	1	2.357	3
550			min	-905.212	2	.376	15	0	1	0	1	-.21	4	-2.984	2
551		10	max	1742.005	3	170.223	2	209.717	4	0	1	0	1	2.286	3
552			min	-904.496	2	.002	15	0	1	0	1	-.1	4	-3.074	2
553		11	max	1742.543	3	168.982	2	210.959	4	0	1	.011	4	2.216	3
554			min	-903.78	2	-1.348	6	0	1	0	1	0	1	-3.164	2
555		12	max	1769.34	3	1145.709	3	241.651	4	0	1	0	1	1.948	3
556			min	-733.387	2	-1927.97	2	0	1	0	4	-.335	4	-2.833	2
557		13	max	1769.878	3	1144.779	3	242.893	4	0	1	0	1	1.344	3
558			min	-732.671	2	-1929.211	2	0	1	0	4	-.207	4	-1.816	2
559		14	max	1770.415	3	1143.848	3	244.134	4	0	1	0	1	.74	3
560			min	-731.954	2	-1930.451	2	0	1	0	4	-.079	4	-.798	2
561		15	max	1770.952	3	1142.918	3	245.376	4	0	1	.051	4	.221	2
562			min	-731.238	2	-1931.692	2	0	1	0	4	0	1	-.004	13
563		16	max	1771.489	3	1141.988	3	246.617	4	0	1	.18	4	1.241	2
564			min	-730.522	2	-1932.932	2	0	1	0	4	0	1	-.466	3
565		17	max	1772.026	3	1141.057	3	247.858	4	0	1	.311	4	2.261	2
566			min	-729.806	2	-1934.173	2	0	1	0	4	0	1	-1.069	3
567		18	max	-18.769	12	2170.246	2	0	1	0	4	.35	4	1.165	2
568			min	-412.13	1	-1015.525	3	-24.764	5	0	1	0	1	-.559	3
569		19	max	-18.411	12	2169.006	2	0	1	0	4	.337	4	.02	2
570			min	-411.414	1	-1016.455	3	-23.522	5	0	1	0	1	-.023	3
571	M9	1	max	190.849	1	739.296	3	123.272	1	0	3	-.018	12	.001	3
572			min	9.731	12	-437.853	2	7.302	12	0	4	-.295	1	-.014	2
573		2	max	191.565	1	738.366	3	123.272	1	0	3	-.014	12	.217	2
574			min	10.089	12	-439.094	2	7.302	12	0	4	-.23	1	-.389	3
575		3	max	531.233	3	519.55	2	122.951	1	0	2	-.01	12	.438	2
576			min	-307.082	2	-538.97	3	7.272	12	0	3	-.165	1	-.763	3
577		4	max	531.771	3	518.31	2	122.951	1	0	2	-.006	12	.17	1
578			min	-306.366	2	-539.9	3	7.272	12	0	3	-.1	1	-.478	3
579		5	max	532.308	3	517.069	2	122.951	1	0	2	-.002	12	-.003	15
580			min	-305.65	2	-540.831	3	7.272	12	0	3	-.052	4	-.193	3
581		6	max	532.845	3	515.829	2	122.951	1	0	2	.03	1	.093	3
582			min	-304.933	2	-541.761	3	7.272	12	0	3	-.024	5	-.382	2
583		7	max	533.382	3	514.588	2	122.951	1	0	2	.094	1	.379	3
584			min	-304.217	2	-542.691	3	7.272	12	0	3	-.004	5	-.653	2
585		8	max	533.919	3	513.348	2	122.951	1	0	2	.159	1	.666	3
586			min	-303.501	2	-543.622	3	7.272	12	0	3	.009	12	-.925	2
587		9	max	549.549	3	51.278	2	178.579	1	0	3	-.005	12	.777	3
588			min	-220.895	2	.382	15	10.306	12	0	9	-.179	4	-1.06	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	550.086	3	50.037	2	178.579	1	0	3	.001	1	.757	3
590			min	-220.179	2	.008	15	10.306	12	0	9	-.108	4	-1.086	2
591		11	max	550.623	3	48.797	2	178.579	1	0	3	.095	1	.737	3
592			min	-219.463	2	-1.481	6	10.306	12	0	9	-.06	5	-1.112	2
593		12	max	566.163	3	357.393	3	212.602	4	0	3	-.009	12	.642	3
594			min	-136.835	2	-619.198	2	6.762	12	0	2	-.289	4	-.986	2
595		13	max	566.701	3	356.463	3	213.843	4	0	3	-.005	12	.454	3
596			min	-136.119	2	-620.438	2	6.762	12	0	2	-.176	4	-.659	2
597		14	max	567.238	3	355.533	3	215.085	4	0	3	-.002	12	.266	3
598			min	-135.403	2	-621.679	2	6.762	12	0	2	-.063	4	-.332	2
599		15	max	567.775	3	354.602	3	216.326	4	0	3	.051	4	.079	3
600			min	-134.686	2	-622.919	2	6.762	12	0	2	.002	12	-.026	1
601		16	max	568.312	3	353.672	3	217.568	4	0	3	.165	4	.326	2
602			min	-133.97	2	-624.16	2	6.762	12	0	2	.005	12	-.108	3
603		17	max	568.849	3	352.741	3	218.809	4	0	3	.28	4	.655	2
604			min	-133.254	2	-625.4	2	6.762	12	0	2	.009	12	-.294	3
605		18	max	-9.908	12	645.262	2	132.642	1	0	2	.302	4	.33	2
606			min	-191.809	1	-297.128	3	-87.806	5	0	3	.013	12	-.146	3
607		19	max	-9.55	12	644.021	2	132.642	1	0	2	.297	1	.011	3
608			min	-191.093	1	-298.058	3	-86.564	5	0	3	.017	12	-.01	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	.001	1	.109	2	.009	3	9.081e-3	2	NC	1	NC	1
2			min	-.736	4	-.017	3	-.005	2	-1.774e-3	3	NC	1	NC	1
3		2	max	.001	1	.387	3	.049	1	1.051e-2	2	NC	5	NC	2
4			min	-.736	4	-.116	1	-.026	5	-1.907e-3	3	623.16	3	5190.609	1
5		3	max	0	1	.715	3	.12	1	1.194e-2	2	NC	5	NC	3
6			min	-.736	4	-.284	1	-.031	5	-2.04e-3	3	344.395	3	2111.478	1
7		4	max	0	1	.913	3	.182	1	1.336e-2	2	NC	5	NC	3
8			min	-.736	4	-.379	1	-.02	5	-2.173e-3	3	270.903	3	1393.655	1
9		5	max	0	1	.959	3	.213	1	1.479e-2	2	NC	5	NC	3
10			min	-.736	4	-.387	1	-.002	5	-2.307e-3	3	258.264	3	1185.592	1
11		6	max	0	1	.855	3	.206	1	1.622e-2	2	NC	5	NC	5
12			min	-.736	4	-.311	1	.011	15	-2.44e-3	3	289.082	3	1227.496	1
13		7	max	0	1	.632	3	.162	1	1.765e-2	2	NC	5	NC	10
14			min	-.737	4	-.169	1	.011	10	-2.573e-3	3	388.163	3	1565.554	1
15		8	max	0	1	.35	3	.094	1	1.907e-2	2	NC	4	NC	3
16			min	-.737	4	-.009	9	.002	10	-2.706e-3	3	686.932	3	2720.286	1
17		9	max	0	1	.189	2	.036	4	2.05e-2	2	NC	4	NC	1
18			min	-.737	4	.004	15	-.008	10	-2.839e-3	3	2272.55	3	7084.404	4
19		10	max	0	1	.261	2	.029	3	2.193e-2	2	NC	3	NC	1
20			min	-.737	4	-.022	3	-.02	2	-2.972e-3	3	1659.264	2	NC	1
21		11	max	0	12	.189	2	.031	3	2.05e-2	2	NC	4	NC	1
22			min	-.737	4	.004	15	-.021	5	-2.839e-3	3	2272.55	3	NC	1
23		12	max	0	12	.35	3	.094	1	1.907e-2	2	NC	4	NC	3
24			min	-.737	4	-.009	9	-.021	5	-2.706e-3	3	686.932	3	2720.286	1
25		13	max	0	12	.632	3	.162	1	1.765e-2	2	NC	5	NC	5
26			min	-.737	4	-.169	1	-.006	5	-2.573e-3	3	388.163	3	1565.554	1
27		14	max	0	12	.855	3	.206	1	1.622e-2	2	NC	5	NC	5
28			min	-.737	4	-.311	1	.009	15	-2.44e-3	3	289.082	3	1227.496	1
29		15	max	0	12	.959	3	.213	1	1.479e-2	2	NC	5	NC	3
30			min	-.737	4	-.387	1	.021	10	-2.307e-3	3	258.264	3	1185.592	1
31		16	max	0	12	.913	3	.182	1	1.336e-2	2	NC	5	NC	3
32			min	-.737	4	-.379	1	.018	12	-2.173e-3	3	270.903	3	1393.655	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
33		17	max	0	12	.715	3	.12	1	1.194e-2	2	NC	5	NC	3
34			min	-.737	4	-.284	1	.011	10	-2.04e-3	3	344.395	3	2111.478	1
35		18	max	0	12	.387	3	.049	1	1.051e-2	2	NC	5	NC	2
36			min	-.737	4	-.116	1	.002	10	-1.907e-3	3	623.16	3	5190.609	1
37		19	max	0	12	.109	2	.009	3	9.081e-3	2	NC	1	NC	1
38			min	-.737	4	-.017	3	-.005	2	-1.774e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.234	3	.008	3	5.362e-3	2	NC	1	NC	1
40			min	-.544	4	-.355	2	-.004	2	-4.096e-3	3	NC	1	NC	1
41		2	max	0	1	.62	3	.034	1	6.451e-3	2	NC	5	NC	2
42			min	-.544	4	-.703	2	-.038	5	-5.012e-3	3	652.308	3	6339.662	5
43		3	max	0	1	.946	3	.097	1	7.539e-3	2	NC	15	NC	3
44			min	-.544	4	-1.001	2	-.045	5	-5.928e-3	3	353.992	3	2620.343	1
45		4	max	0	1	1.169	3	.156	1	8.627e-3	2	NC	15	NC	3
46			min	-.544	4	-1.217	2	-.029	5	-6.844e-3	3	269.451	3	1621.797	1
47		5	max	0	1	1.27	3	.19	1	9.715e-3	2	NC	15	NC	3
48			min	-.544	4	-1.334	2	-.002	5	-7.761e-3	3	243.239	3	1332.23	1
49		6	max	0	1	1.249	3	.188	1	1.08e-2	2	9991.065	15	NC	3
50			min	-.544	4	-1.35	2	.017	10	-8.677e-3	3	248.292	3	1349.025	1
51		7	max	0	1	1.128	3	.15	1	1.189e-2	2	NC	15	NC	3
52			min	-.544	4	-1.283	2	.011	10	-9.593e-3	3	271.715	2	1693.632	1
53		8	max	0	1	.949	3	.088	1	1.298e-2	2	NC	15	NC	3
54			min	-.544	4	-1.164	2	.002	10	-1.051e-2	3	311.735	2	2904.317	1
55		9	max	0	1	.778	3	.051	4	1.407e-2	2	NC	5	NC	1
56			min	-.544	4	-1.042	2	-.007	10	-1.143e-2	3	366.83	2	5056.371	4
57		10	max	0	1	.698	3	.026	3	1.516e-2	2	NC	5	NC	1
58			min	-.544	4	-.984	2	-.018	2	-1.234e-2	3	400.706	2	NC	1
59		11	max	0	12	.778	3	.028	3	1.407e-2	2	NC	5	NC	1
60			min	-.544	4	-1.042	2	-.037	5	-1.143e-2	3	366.83	2	6703.716	5
61		12	max	0	12	.949	3	.088	1	1.298e-2	2	NC	15	NC	3
62			min	-.544	4	-1.164	2	-.042	5	-1.051e-2	3	311.735	2	2904.317	1
63		13	max	0	12	1.128	3	.15	1	1.189e-2	2	NC	15	NC	3
64			min	-.544	4	-1.283	2	-.026	5	-9.593e-3	3	271.715	2	1693.632	1
65		14	max	0	12	1.249	3	.188	1	1.08e-2	2	9990.68	15	NC	3
66			min	-.545	4	-1.35	2	.001	15	-8.677e-3	3	248.292	3	1349.025	1
67		15	max	0	12	1.27	3	.19	1	9.715e-3	2	NC	15	NC	3
68			min	-.545	4	-1.334	2	.018	10	-7.761e-3	3	243.239	3	1332.23	1
69		16	max	0	12	1.169	3	.156	1	8.627e-3	2	NC	15	NC	3
70			min	-.545	4	-1.217	2	.015	10	-6.844e-3	3	269.451	3	1621.797	1
71		17	max	0	12	.946	3	.097	1	7.539e-3	2	NC	15	NC	3
72			min	-.545	4	-1.001	2	.008	10	-5.928e-3	3	353.992	3	2620.343	1
73		18	max	0	12	.62	3	.053	4	6.451e-3	2	NC	5	NC	2
74			min	-.545	4	-.703	2	0	10	-5.012e-3	3	652.308	3	4729.26	4
75		19	max	0	12	.234	3	.008	3	5.362e-3	2	NC	1	NC	1
76			min	-.545	4	-.355	2	-.004	2	-4.096e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.238	3	.008	3	3.548e-3	3	NC	1	NC	1
78			min	-.44	4	-.354	2	-.004	2	-5.608e-3	2	NC	1	NC	1
79		2	max	0	12	.482	3	.035	1	4.349e-3	3	NC	5	NC	2
80			min	-.44	4	-.813	2	-.05	5	-6.75e-3	2	549.068	2	4926.521	5
81		3	max	0	12	.693	3	.097	1	5.15e-3	3	NC	15	NC	3
82			min	-.44	4	-1.202	2	-.059	5	-7.893e-3	2	297.225	2	2612.966	1
83		4	max	0	12	.846	3	.157	1	5.95e-3	3	NC	15	NC	3
84			min	-.44	4	-1.473	2	-.041	5	-9.035e-3	2	225.256	2	1618.165	1
85		5	max	0	12	.932	3	.191	1	6.751e-3	3	NC	15	NC	3
86			min	-.44	4	-1.602	2	-.008	5	-1.018e-2	2	201.946	2	1329.448	1
87		6	max	0	12	.948	3	.188	1	7.552e-3	3	NC	15	NC	3
88			min	-.44	4	-1.59	2	.017	10	-1.132e-2	2	203.941	2	1346.003	1
89		7	max	0	12	.907	3	.15	1	8.352e-3	3	NC	15	NC	3

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
90			min	-.44	4	-1.461	2	.011	10	-1.246e-2	2	227.705	2	1688.796	1
91		8	max	0	12	.829	3	.093	4	9.153e-3	3	NC	15	NC	3
92			min	-.44	4	-1.264	2	.002	10	-1.361e-2	2	277	2	2763.536	4
93		9	max	0	12	.748	3	.062	4	9.954e-3	3	NC	5	NC	1
94			min	-.44	4	-1.072	2	-.007	10	-1.475e-2	2	351.108	2	4188.08	4
95		10	max	0	1	.71	3	.024	3	1.075e-2	3	NC	5	NC	1
96			min	-.44	4	-.982	2	-.017	2	-1.589e-2	2	401.445	2	NC	1
97		11	max	0	1	.748	3	.026	3	9.954e-3	3	NC	5	NC	1
98			min	-.44	4	-1.072	2	-.048	5	-1.475e-2	2	351.108	2	5263.727	5
99		12	max	0	1	.829	3	.088	1	9.153e-3	3	NC	15	NC	3
100			min	-.44	4	-1.264	2	-.055	5	-1.361e-2	2	277	2	2890.239	1
101		13	max	0	1	.907	3	.15	1	8.352e-3	3	NC	15	NC	3
102			min	-.44	4	-1.461	2	-.035	5	-1.246e-2	2	227.705	2	1688.796	1
103		14	max	0	1	.948	3	.188	1	7.552e-3	3	NC	15	NC	3
104			min	-.44	4	-1.59	2	0	15	-1.132e-2	2	203.941	2	1346.003	1
105		15	max	0	1	.932	3	.191	1	6.751e-3	3	NC	15	NC	3
106			min	-.44	4	-1.602	2	.018	12	-1.018e-2	2	201.946	2	1329.448	1
107		16	max	0	1	.846	3	.157	1	5.95e-3	3	NC	15	NC	3
108			min	-.44	4	-1.473	2	.015	12	-9.035e-3	2	225.256	2	1618.165	1
109		17	max	0	1	.693	3	.099	4	5.15e-3	3	NC	15	NC	3
110			min	-.44	4	-1.202	2	.009	10	-7.893e-3	2	297.225	2	2549.787	4
111		18	max	0	1	.482	3	.065	4	4.349e-3	3	NC	5	NC	2
112			min	-.44	4	-.813	2	.001	10	-6.75e-3	2	549.068	2	3886.827	4
113		19	max	0	1	.238	3	.008	3	3.548e-3	3	NC	1	NC	1
114			min	-.44	4	-.354	2	-.004	2	-5.608e-3	2	NC	1	NC	1
115	M16	1	max	0	12	.096	2	.007	3	6.215e-3	3	NC	1	NC	1
116			min	-.148	4	-.077	3	-.004	2	-7.48e-3	2	NC	1	NC	1
117		2	max	0	12	.067	3	.049	1	7.386e-3	3	NC	5	NC	2
118			min	-.148	4	-.238	2	-.039	5	-8.526e-3	2	754.538	2	5225.091	1
119		3	max	0	12	.179	3	.12	1	8.556e-3	3	NC	5	NC	3
120			min	-.148	4	-.505	2	-.047	5	-9.572e-3	2	419.316	2	2117.825	1
121		4	max	0	12	.24	3	.181	1	9.727e-3	3	NC	5	NC	3
122			min	-.148	4	-.66	2	-.034	5	-1.062e-2	2	333.257	2	1395.023	1
123		5	max	0	12	.24	3	.213	1	1.09e-2	3	NC	5	NC	3
124			min	-.148	4	-.683	2	-.01	5	-1.166e-2	2	323.53	2	1184.728	1
125		6	max	0	12	.181	3	.207	1	1.207e-2	3	NC	5	NC	3
126			min	-.148	4	-.577	2	.011	15	-1.271e-2	2	374.614	2	1224.073	1
127		7	max	0	12	.077	3	.163	1	1.324e-2	3	NC	5	NC	3
128			min	-.148	4	-.369	2	.014	10	-1.376e-2	2	541.69	2	1555.754	1
129		8	max	0	12	.002	13	.095	1	1.441e-2	3	NC	4	NC	3
130			min	-.148	4	-.112	2	.004	10	-1.48e-2	2	1209.697	2	2679.513	1
131		9	max	0	12	.129	1	.045	4	1.558e-2	3	NC	2	NC	2
132			min	-.148	4	-.16	3	-.006	10	-1.585e-2	2	3020.454	3	5562.431	4
133		10	max	0	1	.222	2	.021	3	1.675e-2	3	NC	4	NC	1
134			min	-.148	4	-.21	3	-.016	2	-1.69e-2	2	1893.565	3	NC	1
135		11	max	0	1	.129	1	.027	1	1.558e-2	3	NC	2	NC	2
136			min	-.148	4	-.16	3	-.031	5	-1.585e-2	2	3020.454	3	8064.164	5
137		12	max	0	1	.001	13	.095	1	1.441e-2	3	NC	4	NC	3
138			min	-.148	4	-.112	2	-.032	5	-1.48e-2	2	1209.697	2	2679.513	1
139		13	max	0	1	.077	3	.163	1	1.324e-2	3	NC	5	NC	3
140			min	-.147	4	-.369	2	-.014	5	-1.376e-2	2	541.69	2	1555.754	1
141		14	max	0	1	.181	3	.207	1	1.207e-2	3	NC	5	NC	3
142			min	-.147	4	-.577	2	.009	15	-1.271e-2	2	374.614	2	1224.073	1
143		15	max	0	1	.24	3	.213	1	1.09e-2	3	NC	5	NC	3
144			min	-.147	4	-.683	2	.018	12	-1.166e-2	2	323.53	2	1184.728	1
145		16	max	0	1	.24	3	.181	1	9.727e-3	3	NC	5	NC	3
146			min	-.147	4	-.66	2	.015	12	-1.062e-2	2	333.257	2	1395.023	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	.001	1	.179	3	.12	1	8.556e-3	3	NC	5	NC	3
148			min	-.147	4	-.505	2	.011	12	-9.572e-3	2	419.316	2	2117.825	1
149		18	max	.001	1	.067	3	.059	4	7.386e-3	3	NC	5	NC	2
150			min	-.147	4	-.238	2	.003	10	-8.526e-3	2	754.538	2	4238.353	4
151		19	max	.001	1	.096	2	.007	3	6.215e-3	3	NC	1	NC	1
152			min	-.147	4	-.077	3	-.004	2	-7.48e-3	2	NC	1	NC	1
153	M2	1	max	.007	2	.008	2	.01	1	1.604e-3	5	NC	1	NC	2
154			min	-.009	3	-.014	3	-.689	4	-2.724e-4	1	8506.225	2	101.569	4
155		2	max	.007	2	.007	2	.009	1	1.705e-3	5	NC	1	NC	2
156			min	-.009	3	-.013	3	-.633	4	-2.568e-4	1	9852.821	2	110.514	4
157		3	max	.006	2	.006	2	.008	1	1.806e-3	5	NC	1	NC	2
158			min	-.008	3	-.013	3	-.578	4	-2.411e-4	1	NC	1	121.122	4
159		4	max	.006	2	.005	2	.007	1	1.907e-3	5	NC	1	NC	2
160			min	-.008	3	-.012	3	-.523	4	-2.255e-4	1	NC	1	133.822	4
161		5	max	.005	2	.004	2	.006	1	2.007e-3	5	NC	1	NC	1
162			min	-.007	3	-.012	3	-.469	4	-2.098e-4	1	NC	1	149.198	4
163		6	max	.005	2	.003	2	.006	1	2.108e-3	5	NC	1	NC	1
164			min	-.007	3	-.011	3	-.416	4	-1.941e-4	1	NC	1	168.054	4
165		7	max	.005	2	.002	2	.005	1	2.209e-3	5	NC	1	NC	1
166			min	-.006	3	-.011	3	-.365	4	-1.785e-4	1	NC	1	191.528	4
167		8	max	.004	2	.001	2	.004	1	2.31e-3	5	NC	1	NC	1
168			min	-.006	3	-.01	3	-.316	4	-1.628e-4	1	NC	1	221.277	4
169		9	max	.004	2	0	2	.004	1	2.411e-3	5	NC	1	NC	1
170			min	-.005	3	-.009	3	-.269	4	-1.471e-4	1	NC	1	259.779	4
171		10	max	.004	2	0	2	.003	1	2.512e-3	4	NC	1	NC	1
172			min	-.005	3	-.009	3	-.225	4	-1.315e-4	1	NC	1	310.891	4
173		11	max	.003	2	0	2	.002	1	2.618e-3	4	NC	1	NC	1
174			min	-.004	3	-.008	3	-.184	4	-1.158e-4	1	NC	1	380.883	4
175		12	max	.003	2	0	15	.002	1	2.725e-3	4	NC	1	NC	1
176			min	-.004	3	-.007	3	-.146	4	-1.001e-4	1	NC	1	480.519	4
177		13	max	.002	2	0	15	.001	1	2.831e-3	4	NC	1	NC	1
178			min	-.003	3	-.006	3	-.111	4	-8.446e-5	1	NC	1	629.594	4
179		14	max	.002	2	0	15	.001	1	2.938e-3	4	NC	1	NC	1
180			min	-.003	3	-.005	3	-.081	4	-6.88e-5	1	NC	1	867.897	4
181		15	max	.002	2	0	15	0	1	3.044e-3	4	NC	1	NC	1
182			min	-.002	3	-.004	3	-.054	4	-5.313e-5	1	NC	1	1285.693	4
183		16	max	.001	2	0	15	0	1	3.151e-3	4	NC	1	NC	1
184			min	-.002	3	-.003	3	-.033	4	-3.746e-5	1	NC	1	2126.865	4
185		17	max	0	2	0	15	0	1	3.257e-3	4	NC	1	NC	1
186			min	-.001	3	-.002	3	-.016	4	-2.18e-5	1	NC	1	4263.97	4
187		18	max	0	2	0	15	0	1	3.364e-3	4	NC	1	NC	1
188			min	0	3	-.001	3	-.005	4	-6.132e-6	1	NC	1	NC	1
189		19	max	0	1	0	1	0	1	3.47e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	3.773e-7	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-1.792e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-8.734e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.016	4	2.215e-5	1	NC	1	NC	1
194			min	0	2	-.002	6	0	12	-1.706e-4	5	NC	1	NC	1
195		3	max	0	3	0	15	.031	4	5.392e-4	4	NC	1	NC	1
196			min	0	2	-.004	6	0	12	2.682e-6	12	NC	1	5607.561	14
197		4	max	.001	3	-.001	15	.045	4	1.245e-3	4	NC	1	NC	1
198			min	-.001	2	-.006	6	0	12	4.112e-6	12	NC	1	3894.37	14
199		5	max	.002	3	-.002	15	.058	4	1.952e-3	4	NC	1	NC	1
200			min	-.001	2	-.008	6	0	12	5.543e-6	12	NC	1	3038.637	14
201		6	max	.002	3	-.002	15	.069	4	2.658e-3	4	NC	1	NC	1
202			min	-.002	2	-.009	6	0	12	6.973e-6	12	9766.913	6	2524.63	14
203		7	max	.002	3	-.002	15	.08	4	3.364e-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	8.404e-6	12	8403.479	6	2180.217	14
205		8	max	.003	3	-.003	15	.09	4	4.071e-3	4	NC	1	NC	1
206			min	-.002	2	-.012	6	0	12	9.834e-6	12	7562.914	6	1931.438	14
207		9	max	.003	3	-.003	15	.1	4	4.777e-3	4	NC	2	NC	1
208			min	-.003	2	-.013	6	0	12	1.126e-5	12	7068.123	6	1741.168	14
209		10	max	.004	3	-.003	15	.11	4	5.483e-3	4	NC	5	NC	1
210			min	-.003	2	-.013	6	0	12	1.269e-5	12	6833.372	6	1588.681	14
211		11	max	.004	3	-.003	15	.119	4	6.19e-3	4	NC	5	NC	1
212			min	-.003	2	-.013	6	0	12	1.413e-5	12	6824.225	6	1461.494	14
213		12	max	.005	3	-.003	15	.128	4	6.896e-3	4	NC	3	NC	1
214			min	-.004	2	-.013	6	0	12	1.556e-5	12	7044.34	6	1351.677	14
215		13	max	.005	3	-.003	15	.138	4	7.602e-3	4	NC	1	NC	1
216			min	-.004	2	-.012	6	0	12	1.699e-5	12	7538.584	6	1254.011	14
217		14	max	.005	3	-.002	15	.148	4	8.308e-3	4	NC	1	NC	1
218			min	-.004	2	-.011	6	0	12	1.842e-5	12	8416.081	6	1165.01	14
219		15	max	.006	3	-.002	15	.159	4	9.015e-3	4	NC	1	NC	1
220			min	-.005	2	-.009	6	0	12	1.985e-5	12	9917.906	6	1082.356	14
221		16	max	.006	3	-.001	15	.171	4	9.721e-3	4	NC	1	NC	1
222			min	-.005	2	-.007	6	0	12	2.128e-5	12	NC	1	1004.549	14
223		17	max	.007	3	0	15	.184	4	1.043e-2	4	NC	1	NC	1
224			min	-.005	2	-.006	1	0	12	2.271e-5	12	NC	1	930.678	14
225		18	max	.007	3	0	15	.199	4	1.113e-2	4	NC	1	NC	1
226			min	-.006	2	-.004	1	0	12	2.414e-5	12	NC	1	860.254	14
227		19	max	.007	3	0	5	.215	4	1.184e-2	4	NC	1	NC	2
228			min	-.006	2	-.002	1	0	12	2.557e-5	12	NC	1	793.08	14
229	M4	1	max	.003	1	.006	2	0	12	1.089e-4	1	NC	1	NC	3
230			min	0	5	-.008	3	-.215	4	6.287e-6	12	NC	1	115.264	4
231		2	max	.002	1	.005	2	0	12	1.089e-4	1	NC	1	NC	3
232			min	0	5	-.007	3	-.198	4	6.287e-6	12	NC	1	125.249	4
233		3	max	.002	1	.005	2	0	12	1.089e-4	1	NC	1	NC	3
234			min	0	5	-.007	3	-.181	4	6.287e-6	12	NC	1	137.138	4
235		4	max	.002	1	.005	2	0	12	1.089e-4	1	NC	1	NC	3
236			min	0	5	-.006	3	-.164	4	6.287e-6	12	NC	1	151.424	4
237		5	max	.002	1	.005	2	0	12	1.089e-4	1	NC	1	NC	3
238			min	0	5	-.006	3	-.147	4	6.287e-6	12	NC	1	168.777	4
239		6	max	.002	1	.004	2	0	12	1.089e-4	1	NC	1	NC	2
240			min	0	5	-.006	3	-.13	4	6.287e-6	12	NC	1	190.128	4
241		7	max	.002	1	.004	2	0	12	1.089e-4	1	NC	1	NC	2
242			min	0	5	-.005	3	-.114	4	6.287e-6	12	NC	1	216.796	4
243		8	max	.002	1	.004	2	0	12	1.089e-4	1	NC	1	NC	2
244			min	0	5	-.005	3	-.099	4	6.287e-6	12	NC	1	250.708	4
245		9	max	.001	1	.003	2	0	12	1.089e-4	1	NC	1	NC	2
246			min	0	5	-.004	3	-.084	4	6.287e-6	12	NC	1	294.761	4
247		10	max	.001	1	.003	2	0	12	1.089e-4	1	NC	1	NC	2
248			min	0	5	-.004	3	-.07	4	6.287e-6	12	NC	1	353.486	4
249		11	max	.001	1	.003	2	0	12	1.089e-4	1	NC	1	NC	1
250			min	0	5	-.003	3	-.057	4	6.287e-6	12	NC	1	434.291	4
251		12	max	.001	1	.002	2	0	12	1.089e-4	1	NC	1	NC	1
252			min	0	5	-.003	3	-.045	4	6.287e-6	12	NC	1	549.994	4
253		13	max	0	1	.002	2	0	12	1.089e-4	1	NC	1	NC	1
254			min	0	5	-.003	3	-.034	4	6.287e-6	12	NC	1	724.375	4
255		14	max	0	1	.002	2	0	12	1.089e-4	1	NC	1	NC	1
256			min	0	5	-.002	3	-.025	4	6.287e-6	12	NC	1	1005.807	4
257		15	max	0	1	.001	2	0	12	1.089e-4	1	NC	1	NC	1
258			min	0	5	-.002	3	-.016	4	6.287e-6	12	NC	1	1505.77	4
259		16	max	0	1	0	2	0	12	1.089e-4	1	NC	1	NC	1
260			min	0	5	-.001	3	-.01	4	6.287e-6	12	NC	1	2532.33	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
261		17	max	0	1	0	2	0	12	1.089e-4	1	NC	1	NC	1
262			min	0	5	0	3	-.005	4	6.287e-6	12	NC	1	5227.175	4
263		18	max	0	1	0	2	0	12	1.089e-4	1	NC	1	NC	1
264			min	0	5	0	3	-.001	4	6.287e-6	12	NC	1	NC	1
265		19	max	0	1	0	1	0	1	1.089e-4	1	NC	1	NC	1
266			min	0	1	0	1	0	1	6.287e-6	12	NC	1	NC	1
267	M6	1	max	.023	2	.031	2	0	1	1.708e-3	4	NC	4	NC	1
268			min	-.03	3	-.044	3	-.695	4	0	1	1602.584	3	100.599	4
269		2	max	.021	2	.028	2	0	1	1.806e-3	4	NC	4	NC	1
270			min	-.029	3	-.041	3	-.639	4	0	1	1698.735	3	109.46	4
271		3	max	.02	2	.026	2	0	1	1.905e-3	4	NC	4	NC	1
272			min	-.027	3	-.039	3	-.583	4	0	1	1807.201	3	119.969	4
273		4	max	.019	2	.023	2	0	1	2.003e-3	4	NC	4	NC	1
274			min	-.025	3	-.036	3	-.528	4	0	1	1930.534	3	132.551	4
275		5	max	.018	2	.021	2	0	1	2.102e-3	4	NC	4	NC	1
276			min	-.024	3	-.034	3	-.473	4	0	1	2072.014	3	147.784	4
277		6	max	.016	2	.018	2	0	1	2.2e-3	4	NC	4	NC	1
278			min	-.022	3	-.031	3	-.42	4	0	1	2235.939	3	166.465	4
279		7	max	.015	2	.016	2	0	1	2.299e-3	4	NC	1	NC	1
280			min	-.02	3	-.029	3	-.369	4	0	1	2428.036	3	189.724	4
281		8	max	.014	2	.013	2	0	1	2.397e-3	4	NC	1	NC	1
282			min	-.018	3	-.026	3	-.319	4	0	1	2656.124	3	219.201	4
283		9	max	.013	2	.011	2	0	1	2.496e-3	4	NC	1	NC	1
284			min	-.017	3	-.024	3	-.272	4	0	1	2931.15	3	257.352	4
285		10	max	.011	2	.009	2	0	1	2.594e-3	4	NC	1	NC	1
286			min	-.015	3	-.021	3	-.227	4	0	1	3268.94	3	308.002	4
287		11	max	.01	2	.007	2	0	1	2.693e-3	4	NC	1	NC	1
288			min	-.013	3	-.019	3	-.185	4	0	1	3693.238	3	377.364	4
289		12	max	.009	2	.006	2	0	1	2.791e-3	4	NC	1	NC	1
290			min	-.012	3	-.016	3	-.147	4	0	1	4241.375	3	476.113	4
291		13	max	.008	2	.004	2	0	1	2.89e-3	4	NC	1	NC	1
292			min	-.01	3	-.014	3	-.112	4	0	1	4975.585	3	623.876	4
293		14	max	.006	2	.003	2	0	1	2.988e-3	4	NC	1	NC	1
294			min	-.008	3	-.012	3	-.081	4	0	1	6007.923	3	860.113	4
295		15	max	.005	2	.002	2	0	1	3.087e-3	4	NC	1	NC	1
296			min	-.007	3	-.009	3	-.055	4	0	1	7562.54	3	1274.361	4
297		16	max	.004	2	.001	2	0	1	3.186e-3	4	NC	1	NC	1
298			min	-.005	3	-.007	3	-.033	4	0	1	NC	1	2108.613	4
299		17	max	.003	2	0	2	0	1	3.284e-3	4	NC	1	NC	1
300			min	-.003	3	-.005	3	-.017	4	0	1	NC	1	4229.05	4
301		18	max	.001	2	0	2	0	1	3.383e-3	4	NC	1	NC	1
302			min	-.002	3	-.002	3	-.005	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	3.481e-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	-8.756e-4	4	NC	1	NC	1
307		2	max	.001	3	0	2	.016	4	0	1	NC	1	NC	1
308			min	-.001	2	-.003	3	0	1	-1.883e-4	4	NC	1	NC	1
309		3	max	.003	3	0	2	.031	4	4.99e-4	4	NC	1	NC	1
310			min	-.003	2	-.005	3	0	1	0	1	NC	1	NC	1
311		4	max	.004	3	-.001	15	.045	4	1.186e-3	4	NC	1	NC	1
312			min	-.004	2	-.008	3	0	1	0	1	NC	1	8604.597	4
313		5	max	.005	3	-.002	15	.058	4	1.874e-3	4	NC	1	NC	1
314			min	-.005	2	-.01	3	0	1	0	1	NC	1	7823.661	4
315		6	max	.007	3	-.002	15	.069	4	2.561e-3	4	NC	1	NC	1
316			min	-.006	2	-.012	3	0	1	0	1	8744.621	3	7797.252	4
317		7	max	.008	3	-.003	15	.08	4	3.248e-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	7813.264	3	8394.696	4
319		8	max	.009	3	-.003	15	.09	4	3.935e-3	4	NC	1	NC	1
320			min	-.009	2	-.015	3	0	1	0	1	7262.585	3	9789.26	4
321		9	max	.011	3	-.003	15	.1	4	4.623e-3	4	NC	1	NC	1
322			min	-.01	2	-.016	3	0	1	0	1	6978.813	3	NC	1
323		10	max	.012	3	-.003	15	.109	4	5.31e-3	4	NC	1	NC	1
324			min	-.011	2	-.016	3	0	1	0	1	6878.291	4	NC	1
325		11	max	.013	3	-.003	15	.118	4	5.997e-3	4	NC	1	NC	1
326			min	-.013	2	-.016	3	0	1	0	1	6866.817	4	NC	1
327		12	max	.014	3	-.003	15	.127	4	6.684e-3	4	NC	1	NC	1
328			min	-.014	2	-.016	3	0	1	0	1	7086.331	4	NC	1
329		13	max	.016	3	-.003	15	.136	4	7.372e-3	4	NC	1	NC	1
330			min	-.015	2	-.015	3	0	1	0	1	7581.742	4	NC	1
331		14	max	.017	3	-.003	15	.145	4	8.059e-3	4	NC	1	NC	1
332			min	-.017	2	-.014	3	0	1	0	1	8462.609	4	NC	1
333		15	max	.018	3	-.002	15	.156	4	8.746e-3	4	NC	1	NC	1
334			min	-.018	2	-.013	3	0	1	0	1	9971.146	4	NC	1
335		16	max	.02	3	-.002	15	.167	4	9.433e-3	4	NC	1	NC	1
336			min	-.019	2	-.012	3	0	1	0	1	NC	1	NC	1
337		17	max	.021	3	-.001	15	.179	4	1.012e-2	4	NC	1	NC	1
338			min	-.02	2	-.01	3	0	1	0	1	NC	1	NC	1
339		18	max	.022	3	0	10	.193	4	1.081e-2	4	NC	1	NC	1
340			min	-.022	2	-.008	3	0	1	0	1	NC	1	NC	1
341		19	max	.024	3	0	10	.208	4	1.15e-2	4	NC	1	NC	1
342			min	-.023	2	-.006	3	0	1	0	1	NC	1	NC	1
343	M8	1	max	.007	1	.022	2	0	1	0	1	NC	1	NC	1
344			min	0	3	-.024	3	-.208	4	-4.042e-5	4	NC	1	119.188	4
345		2	max	.006	1	.021	2	0	1	0	1	NC	1	NC	1
346			min	0	3	-.023	3	-.191	4	-4.042e-5	4	NC	1	129.523	4
347		3	max	.006	1	.02	2	0	1	0	1	NC	1	NC	1
348			min	0	3	-.022	3	-.175	4	-4.042e-5	4	NC	1	141.827	4
349		4	max	.006	1	.018	2	0	1	0	1	NC	1	NC	1
350			min	0	3	-.02	3	-.158	4	-4.042e-5	4	NC	1	156.611	4
351		5	max	.005	1	.017	2	0	1	0	1	NC	1	NC	1
352			min	0	3	-.019	3	-.142	4	-4.042e-5	4	NC	1	174.569	4
353		6	max	.005	1	.016	2	0	1	0	1	NC	1	NC	1
354			min	0	3	-.018	3	-.126	4	-4.042e-5	4	NC	1	196.663	4
355		7	max	.004	1	.015	2	0	1	0	1	NC	1	NC	1
356			min	0	3	-.016	3	-.111	4	-4.042e-5	4	NC	1	224.26	4
357		8	max	.004	1	.014	2	0	1	0	1	NC	1	NC	1
358			min	0	3	-.015	3	-.096	4	-4.042e-5	4	NC	1	259.353	4
359		9	max	.004	1	.012	2	0	1	0	1	NC	1	NC	1
360			min	0	3	-.014	3	-.081	4	-4.042e-5	4	NC	1	304.939	4
361		10	max	.003	1	.011	2	0	1	0	1	NC	1	NC	1
362			min	0	3	-.012	3	-.068	4	-4.042e-5	4	NC	1	365.708	4
363		11	max	.003	1	.01	2	0	1	0	1	NC	1	NC	1
364			min	0	3	-.011	3	-.055	4	-4.042e-5	4	NC	1	449.327	4
365		12	max	.003	1	.009	2	0	1	0	1	NC	1	NC	1
366			min	0	3	-.01	3	-.044	4	-4.042e-5	4	NC	1	569.06	4
367		13	max	.002	1	.007	2	0	1	0	1	NC	1	NC	1
368			min	0	3	-.008	3	-.033	4	-4.042e-5	4	NC	1	749.517	4
369		14	max	.002	1	.006	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.007	3	-.024	4	-4.042e-5	4	NC	1	1040.759	4
371		15	max	.001	1	.005	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.005	3	-.016	4	-4.042e-5	4	NC	1	1558.16	4
373		16	max	.001	1	.004	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.004	3	-.009	4	-4.042e-5	4	NC	1	2620.55	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
375		17	max	0	1	.002	2	0	1	0	1	NC	1	NC	1
376			min	0	3	-.003	3	-.005	4	-4.042e-5	4	NC	1	5409.548	4
377		18	max	0	1	.001	2	0	1	0	1	NC	1	NC	1
378			min	0	3	-.001	3	-.001	4	-4.042e-5	4	NC	1	NC	1
379		19	max	0	1	0	1	0	1	0	1	NC	1	NC	1
380			min	0	1	0	1	0	1	-4.042e-5	4	NC	1	NC	1
381	M10	1	max	.007	2	.008	2	0	12	1.722e-3	4	NC	1	NC	2
382			min	-.009	3	-.014	3	-.695	4	1.687e-5	12	8506.225	2	100.707	4
383		2	max	.007	2	.007	2	0	12	1.819e-3	4	NC	1	NC	2
384			min	-.009	3	-.013	3	-.638	4	1.591e-5	12	9852.821	2	109.578	4
385		3	max	.006	2	.006	2	0	12	1.915e-3	4	NC	1	NC	2
386			min	-.008	3	-.013	3	-.582	4	1.496e-5	12	NC	1	120.099	4
387		4	max	.006	2	.005	2	0	12	2.012e-3	4	NC	1	NC	2
388			min	-.008	3	-.012	3	-.527	4	1.4e-5	12	NC	1	132.696	4
389		5	max	.005	2	.004	2	0	12	2.109e-3	4	NC	1	NC	1
390			min	-.007	3	-.012	3	-.473	4	1.304e-5	12	NC	1	147.946	4
391		6	max	.005	2	.003	2	0	12	2.206e-3	4	NC	1	NC	1
392			min	-.007	3	-.011	3	-.42	4	1.208e-5	12	NC	1	166.65	4
393		7	max	.005	2	.002	2	0	12	2.303e-3	4	NC	1	NC	1
394			min	-.006	3	-.011	3	-.368	4	1.112e-5	12	NC	1	189.937	4
395		8	max	.004	2	.001	2	0	12	2.399e-3	4	NC	1	NC	1
396			min	-.006	3	-.01	3	-.319	4	1.016e-5	12	NC	1	219.449	4
397		9	max	.004	2	0	2	0	12	2.496e-3	4	NC	1	NC	1
398			min	-.005	3	-.009	3	-.271	4	9.206e-6	12	NC	1	257.648	4
399		10	max	.004	2	0	2	0	12	2.593e-3	4	NC	1	NC	1
400			min	-.005	3	-.009	3	-.227	4	8.248e-6	12	NC	1	308.362	4
401		11	max	.003	2	0	2	0	12	2.69e-3	4	NC	1	NC	1
402			min	-.004	3	-.008	3	-.185	4	7.29e-6	12	NC	1	377.815	4
403		12	max	.003	2	-.001	2	0	12	2.787e-3	4	NC	1	NC	1
404			min	-.004	3	-.007	3	-.147	4	6.331e-6	12	NC	1	476.697	4
405		13	max	.002	2	-.001	15	0	12	2.883e-3	4	NC	1	NC	1
406			min	-.003	3	-.006	3	-.112	4	5.373e-6	12	NC	1	624.668	4
407		14	max	.002	2	-.001	15	0	12	2.98e-3	4	NC	1	NC	1
408			min	-.003	3	-.005	3	-.081	4	4.414e-6	12	NC	1	861.256	4
409		15	max	.002	2	-.001	15	0	12	3.077e-3	4	NC	1	NC	1
410			min	-.002	3	-.004	3	-.055	4	3.456e-6	12	NC	1	1276.164	4
411		16	max	.001	2	0	15	0	12	3.174e-3	4	NC	1	NC	1
412			min	-.002	3	-.003	3	-.033	4	2.498e-6	12	NC	1	2111.877	4
413		17	max	0	2	0	15	0	12	3.271e-3	4	NC	1	NC	1
414			min	-.001	3	-.002	4	-.017	4	1.539e-6	12	NC	1	4236.577	4
415		18	max	0	2	0	15	0	12	3.367e-3	4	NC	1	NC	1
416			min	0	3	-.001	4	-.005	4	5.81e-7	12	NC	1	NC	1
417		19	max	0	1	0	1	0	1	3.464e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-9.533e-6	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	3.945e-6	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-8.709e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.016	4	-1.251e-6	12	NC	1	NC	1
422			min	0	2	-.002	4	0	1	-1.808e-4	4	NC	1	NC	1
423		3	max	0	3	0	15	.031	4	5.121e-4	5	NC	1	NC	1
424			min	0	2	-.004	4	0	1	-4.825e-5	1	NC	1	NC	1
425		4	max	.001	3	-.001	15	.045	4	1.2e-3	4	NC	1	NC	1
426			min	-.001	2	-.006	4	0	1	-7.435e-5	1	NC	1	9014.716	4
427		5	max	.002	3	-.002	15	.057	4	1.89e-3	4	NC	1	NC	1
428			min	-.001	2	-.008	4	0	1	-1.005e-4	1	NC	1	8268.347	4
429		6	max	.002	3	-.002	15	.069	4	2.58e-3	4	NC	1	NC	1
430			min	-.002	2	-.01	4	0	1	-1.266e-4	1	9484.47	4	8338.243	4
431		7	max	.002	3	-.003	15	.08	4	3.27e-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	-.012	4	0	1	-1.527e-4	1	8178.838	4	9130.171	4
433		8	max	.003	3	-.003	15	.09	4	3.96e-3	4	NC	1	NC	1
434			min	-.002	2	-.013	4	-.001	1	-1.788e-4	1	7374.466	4	NC	1
435		9	max	.003	3	-.003	15	.099	4	4.65e-3	4	NC	2	NC	1
436			min	-.003	2	-.014	4	-.001	1	-2.049e-4	1	6902.752	4	NC	1
437		10	max	.004	3	-.003	15	.108	4	5.341e-3	4	NC	5	NC	1
438			min	-.003	2	-.014	4	-.002	1	-2.31e-4	1	6682.263	4	NC	1
439		11	max	.004	3	-.004	15	.117	4	6.031e-3	4	NC	5	NC	1
440			min	-.003	2	-.014	4	-.002	1	-2.57e-4	1	6680.734	4	NC	1
441		12	max	.005	3	-.003	15	.126	4	6.721e-3	4	NC	3	NC	1
442			min	-.004	2	-.014	4	-.003	1	-2.831e-4	1	6902.704	4	NC	1
443		13	max	.005	3	-.003	15	.136	4	7.411e-3	4	NC	1	NC	1
444			min	-.004	2	-.013	4	-.003	1	-3.092e-4	1	7392.86	4	NC	1
445		14	max	.005	3	-.003	15	.145	4	8.101e-3	4	NC	1	NC	1
446			min	-.004	2	-.012	4	-.004	1	-3.353e-4	1	8258.844	4	NC	1
447		15	max	.006	3	-.003	15	.156	4	8.791e-3	4	NC	1	NC	1
448			min	-.005	2	-.01	4	-.005	1	-3.614e-4	1	9737.862	4	NC	1
449		16	max	.006	3	-.002	15	.167	4	9.482e-3	4	NC	1	NC	1
450			min	-.005	2	-.008	4	-.006	1	-3.875e-4	1	NC	1	NC	1
451		17	max	.007	3	-.002	15	.18	4	1.017e-2	4	NC	1	NC	1
452			min	-.005	2	-.006	4	-.007	1	-4.136e-4	1	NC	1	NC	1
453		18	max	.007	3	-.001	15	.194	4	1.086e-2	4	NC	1	NC	1
454			min	-.006	2	-.004	1	-.008	1	-4.397e-4	1	NC	1	NC	1
455		19	max	.007	3	0	10	.21	4	1.155e-2	4	NC	1	NC	2
456			min	-.006	2	-.002	1	-.009	1	-4.658e-4	1	NC	1	9939.644	1
457	M12	1	max	.003	1	.006	2	.009	1	4.536e-5	5	NC	1	NC	3
458			min	0	3	-.008	3	-.21	4	-1.089e-4	1	NC	1	118.347	4
459		2	max	.002	1	.005	2	.008	1	4.536e-5	5	NC	1	NC	3
460			min	0	3	-.007	3	-.193	4	-1.089e-4	1	NC	1	128.602	4
461		3	max	.002	1	.005	2	.008	1	4.536e-5	5	NC	1	NC	3
462			min	0	3	-.007	3	-.176	4	-1.089e-4	1	NC	1	140.812	4
463		4	max	.002	1	.005	2	.007	1	4.536e-5	5	NC	1	NC	3
464			min	0	3	-.006	3	-.16	4	-1.089e-4	1	NC	1	155.483	4
465		5	max	.002	1	.005	2	.006	1	4.536e-5	5	NC	1	NC	3
466			min	0	3	-.006	3	-.143	4	-1.089e-4	1	NC	1	173.304	4
467		6	max	.002	1	.004	2	.006	1	4.536e-5	5	NC	1	NC	2
468			min	0	3	-.006	3	-.127	4	-1.089e-4	1	NC	1	195.23	4
469		7	max	.002	1	.004	2	.005	1	4.536e-5	5	NC	1	NC	2
470			min	0	3	-.005	3	-.111	4	-1.089e-4	1	NC	1	222.617	4
471		8	max	.002	1	.004	2	.004	1	4.536e-5	5	NC	1	NC	2
472			min	0	3	-.005	3	-.096	4	-1.089e-4	1	NC	1	257.443	4
473		9	max	.001	1	.003	2	.004	1	4.536e-5	5	NC	1	NC	2
474			min	0	3	-.004	3	-.082	4	-1.089e-4	1	NC	1	302.683	4
475		10	max	.001	1	.003	2	.003	1	4.536e-5	5	NC	1	NC	2
476			min	0	3	-.004	3	-.068	4	-1.089e-4	1	NC	1	362.99	4
477		11	max	.001	1	.003	2	.002	1	4.536e-5	5	NC	1	NC	1
478			min	0	3	-.003	3	-.056	4	-1.089e-4	1	NC	1	445.973	4
479		12	max	.001	1	.002	2	.002	1	4.536e-5	5	NC	1	NC	1
480			min	0	3	-.003	3	-.044	4	-1.089e-4	1	NC	1	564.794	4
481		13	max	0	1	.002	2	.001	1	4.536e-5	5	NC	1	NC	1
482			min	0	3	-.003	3	-.033	4	-1.089e-4	1	NC	1	743.875	4
483		14	max	0	1	.002	2	.001	1	4.536e-5	5	NC	1	NC	1
484			min	0	3	-.002	3	-.024	4	-1.089e-4	1	NC	1	1032.893	4
485		15	max	0	1	.001	2	0	1	4.536e-5	5	NC	1	NC	1
486			min	0	3	-.002	3	-.016	4	-1.089e-4	1	NC	1	1546.336	4
487		16	max	0	1	0	2	0	1	4.536e-5	5	NC	1	NC	1
488			min	0	3	-.001	3	-.01	4	-1.089e-4	1	NC	1	2600.578	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
489		17	max	0	1	0	2	0	1	4.536e-5	5	NC	1	NC	1
490			min	0	3	0	3	-.005	4	-1.089e-4	1	NC	1	5368.117	4
491		18	max	0	1	0	2	0	1	4.536e-5	5	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-1.089e-4	1	NC	1	NC	1
493		19	max	0	1	0	1	0	1	4.536e-5	5	NC	1	NC	1
494			min	0	1	0	1	0	1	-1.089e-4	1	NC	1	NC	1
495	M1	1	max	.009	3	.109	2	.737	4	1.62e-2	2	NC	1	NC	1
496			min	-.005	2	-.017	3	0	12	-2.996e-2	3	NC	1	NC	1
497		2	max	.009	3	.051	2	.713	4	8.482e-3	4	NC	4	NC	1
498			min	-.005	2	-.005	3	-.007	1	-1.482e-2	3	1998.06	2	NC	1
499		3	max	.009	3	.014	3	.688	4	1.384e-2	4	NC	5	NC	1
500			min	-.005	2	-.011	2	-.01	1	-1.895e-4	1	962.198	2	6025.755	5
501		4	max	.009	3	.048	3	.663	4	1.208e-2	4	NC	5	NC	1
502			min	-.005	2	-.081	2	-.009	1	-5.387e-3	3	606.704	2	4330.859	5
503		5	max	.009	3	.092	3	.637	4	1.032e-2	4	NC	5	NC	1
504			min	-.005	2	-.155	2	-.006	1	-1.063e-2	3	437.445	2	3482.542	5
505		6	max	.009	3	.139	3	.611	4	1.416e-2	2	NC	15	NC	1
506			min	-.005	2	-.226	2	-.003	1	-1.587e-2	3	344.275	2	2973.011	5
507		7	max	.009	3	.184	3	.584	4	1.888e-2	2	NC	15	NC	1
508			min	-.005	2	-.289	2	0	12	-2.111e-2	3	289.315	2	2612.803	4
509		8	max	.008	3	.222	3	.556	4	2.36e-2	2	9331.948	15	NC	1
510			min	-.004	2	-.34	2	0	12	-2.635e-2	3	256.824	2	2349.668	4
511		9	max	.008	3	.247	3	.527	4	2.704e-2	2	8719.14	15	NC	1
512			min	-.004	2	-.372	2	0	1	-2.646e-2	3	239.918	2	2186.276	4
513		10	max	.008	3	.256	3	.495	4	2.962e-2	2	8532.555	15	NC	1
514			min	-.004	2	-.383	2	0	12	-2.316e-2	3	234.969	2	2138.808	4
515		11	max	.008	3	.249	3	.461	4	3.22e-2	2	8718.811	15	NC	1
516			min	-.004	2	-.372	2	0	12	-1.986e-2	3	240.774	2	2187.331	4
517		12	max	.008	3	.228	3	.425	4	3.129e-2	2	9331.201	15	NC	1
518			min	-.004	2	-.338	2	-.001	1	-1.656e-2	3	259.444	2	2344.833	4
519		13	max	.007	3	.194	3	.385	4	2.51e-2	2	NC	15	NC	1
520			min	-.004	2	-.285	2	0	1	-1.325e-2	3	295.725	2	2746.904	4
521		14	max	.007	3	.151	3	.343	4	1.891e-2	2	NC	15	NC	1
522			min	-.004	2	-.219	2	0	12	-9.949e-3	3	358.026	2	3580.097	4
523		15	max	.007	3	.103	3	.299	4	1.272e-2	2	NC	5	NC	1
524			min	-.004	2	-.146	2	0	12	-6.643e-3	3	465.861	2	5369.46	4
525		16	max	.007	3	.053	3	.257	4	9.52e-3	4	NC	5	NC	1
526			min	-.004	2	-.073	2	0	12	-3.338e-3	3	666.904	2	NC	1
527		17	max	.007	3	.005	3	.216	4	1.07e-2	4	NC	5	NC	1
528			min	-.004	2	-.006	2	0	12	-3.31e-5	3	1099.484	2	NC	1
529		18	max	.007	3	.048	2	.18	4	1.236e-2	2	NC	4	NC	1
530			min	-.004	2	-.037	3	0	12	-5.262e-3	3	2349.025	2	NC	1
531		19	max	.007	3	.096	2	.147	4	2.48e-2	2	NC	1	NC	1
532			min	-.004	2	-.077	3	-.001	1	-1.069e-2	3	NC	1	NC	1
533	M5	1	max	.029	3	.261	2	.737	4	0	1	NC	1	NC	1
534			min	-.02	2	-.022	3	0	1	-5.202e-6	4	NC	1	NC	1
535		2	max	.029	3	.12	2	.718	4	7.114e-3	4	NC	5	NC	1
536			min	-.02	2	-.001	3	0	1	0	1	824.351	2	8284.025	4
537		3	max	.029	3	.046	3	.695	4	1.401e-2	4	NC	5	NC	1
538			min	-.02	2	-.037	2	0	1	0	1	389.271	2	4842.148	4
539		4	max	.029	3	.141	3	.669	4	1.142e-2	4	9895.301	15	NC	1
540			min	-.02	2	-.222	2	0	1	0	1	239.426	2	3737.841	4
541		5	max	.028	3	.268	3	.641	4	8.821e-3	4	6928.221	15	NC	1
542			min	-.02	2	-.422	2	0	1	0	1	169.18	2	3210.316	4
543		6	max	.027	3	.41	3	.613	4	6.225e-3	4	5335.974	15	NC	1
544			min	-.019	2	-.619	2	0	1	0	1	131.148	2	2889.831	4
545		7	max	.027	3	.547	3	.584	4	3.628e-3	4	4416.068	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	-.019	2	-.798	2	0	1	0	1	109.02	2	2639.22	4
547		8	max	.026	3	.662	3	.555	4	1.032e-3	4	3881.023	15	NC	1
548			min	-.019	2	-.941	2	0	1	0	1	96.084	2	2392.701	4
549		9	max	.026	3	.736	3	.527	4	0	1	3606.577	15	NC	1
550			min	-.018	2	-1.031	2	0	1	-3.68e-6	5	89.423	2	2181.349	4
551		10	max	.025	3	.762	3	.495	4	0	1	3523.891	15	NC	1
552			min	-.018	2	-1.062	2	0	1	-3.568e-6	5	87.477	2	2152.326	4
553		11	max	.025	3	.743	3	.461	4	0	1	3606.688	15	NC	1
554			min	-.018	2	-1.031	2	0	1	-3.455e-6	5	89.753	2	2212.36	4
555		12	max	.024	3	.679	3	.426	4	7.57e-4	4	3881.288	15	NC	1
556			min	-.017	2	-.936	2	0	1	0	1	97.159	2	2301.722	4
557		13	max	.023	3	.576	3	.386	4	2.662e-3	4	4416.619	15	NC	1
558			min	-.017	2	-.785	2	0	1	0	1	111.797	2	2705.566	4
559		14	max	.023	3	.446	3	.342	4	4.566e-3	4	5337.067	15	NC	1
560			min	-.017	2	-.597	2	0	1	0	1	137.384	2	3762.741	4
561		15	max	.022	3	.301	3	.295	4	6.471e-3	4	6930.402	15	NC	1
562			min	-.017	2	-.394	2	0	1	0	1	182.708	2	6796.619	4
563		16	max	.022	3	.154	3	.25	4	8.376e-3	4	9899.893	15	NC	1
564			min	-.016	2	-.194	2	0	1	0	1	269.809	2	NC	1
565		17	max	.021	3	.016	3	.209	4	1.028e-2	4	NC	5	NC	1
566			min	-.016	2	-.02	2	0	1	0	1	463.587	2	NC	1
567		18	max	.021	3	.113	2	.175	4	5.22e-3	4	NC	5	NC	1
568			min	-.016	2	-.103	3	0	1	0	1	1024.582	2	NC	1
569		19	max	.021	3	.222	2	.148	4	0	1	NC	1	NC	1
570			min	-.016	2	-.21	3	0	1	-3.091e-6	4	NC	1	NC	1
571	M9	1	max	.009	3	.109	2	.736	4	2.996e-2	3	NC	1	NC	1
572			min	-.005	2	-.017	3	-.001	1	-1.62e-2	2	NC	1	NC	1
573		2	max	.009	3	.051	2	.717	4	1.482e-2	3	NC	4	NC	1
574			min	-.005	2	-.005	3	0	12	-7.946e-3	2	1998.06	2	8505.559	4
575		3	max	.009	3	.014	3	.694	4	1.399e-2	4	NC	5	NC	1
576			min	-.005	2	-.011	2	0	12	-2.223e-5	10	962.198	2	4922.128	4
577		4	max	.009	3	.048	3	.668	4	1.098e-2	5	NC	5	NC	1
578			min	-.005	2	-.081	2	0	12	-4.712e-3	2	606.704	2	3759.206	4
579		5	max	.009	3	.092	3	.641	4	1.063e-2	3	NC	5	NC	1
580			min	-.005	2	-.155	2	0	12	-9.434e-3	2	437.445	2	3197.831	4
581		6	max	.009	3	.139	3	.613	4	1.587e-2	3	NC	15	NC	1
582			min	-.005	2	-.226	2	0	12	-1.416e-2	2	344.275	2	2859.422	4
583		7	max	.009	3	.184	3	.584	4	2.111e-2	3	NC	15	NC	1
584			min	-.005	2	-.289	2	0	1	-1.888e-2	2	289.315	2	2606.899	4
585		8	max	.008	3	.222	3	.555	4	2.635e-2	3	9310.22	15	NC	1
586			min	-.004	2	-.34	2	-.001	1	-2.36e-2	2	256.824	2	2375.107	4
587		9	max	.008	3	.247	3	.527	4	2.646e-2	3	8699.111	15	NC	1
588			min	-.004	2	-.372	2	0	12	-2.704e-2	2	239.918	2	2179.31	4
589		10	max	.008	3	.256	3	.495	4	2.316e-2	3	8513.025	15	NC	1
590			min	-.004	2	-.383	2	0	1	-2.962e-2	2	234.969	2	2140.164	4
591		11	max	.008	3	.249	3	.461	4	1.986e-2	3	8698.8	15	NC	1
592			min	-.004	2	-.372	2	0	1	-3.22e-2	2	240.774	2	2196.575	4
593		12	max	.008	3	.228	3	.426	4	1.656e-2	3	9309.627	15	NC	1
594			min	-.004	2	-.338	2	0	12	-3.129e-2	2	259.444	2	2320.38	4
595		13	max	.007	3	.194	3	.385	4	1.325e-2	3	NC	15	NC	1
596			min	-.004	2	-.285	2	0	12	-2.51e-2	2	295.725	2	2749.214	4
597		14	max	.007	3	.151	3	.341	4	9.949e-3	3	NC	15	NC	1
598			min	-.004	2	-.219	2	-.002	1	-1.891e-2	2	358.026	2	3732.342	5
599		15	max	.007	3	.103	3	.296	4	6.643e-3	3	NC	5	NC	1
600			min	-.004	2	-.146	2	-.006	1	-1.272e-2	2	465.861	2	6100.67	5
601		16	max	.007	3	.053	3	.251	4	8.228e-3	5	NC	5	NC	1
602			min	-.004	2	-.073	2	-.008	1	-6.535e-3	2	666.904	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	.21	4	1.036e-2	4	NC	5	NC	1
604			min	-.004	2	-.006	2	-.009	1	-6.168e-4	1	1099.484	2	NC	1
605		18	max	.007	3	.048	2	.176	4	5.262e-3	3	NC	4	NC	1
606			min	-.004	2	-.037	3	-.006	1	-1.236e-2	2	2349.025	2	NC	1
607		19	max	.007	3	.096	2	.148	4	1.069e-2	3	NC	1	NC	1
608			min	-.004	2	-.077	3	0	12	-2.48e-2	2	NC	1	NC	1

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, 14-42 Inch Width		
Address:			
Phone:			
E-mail:			

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

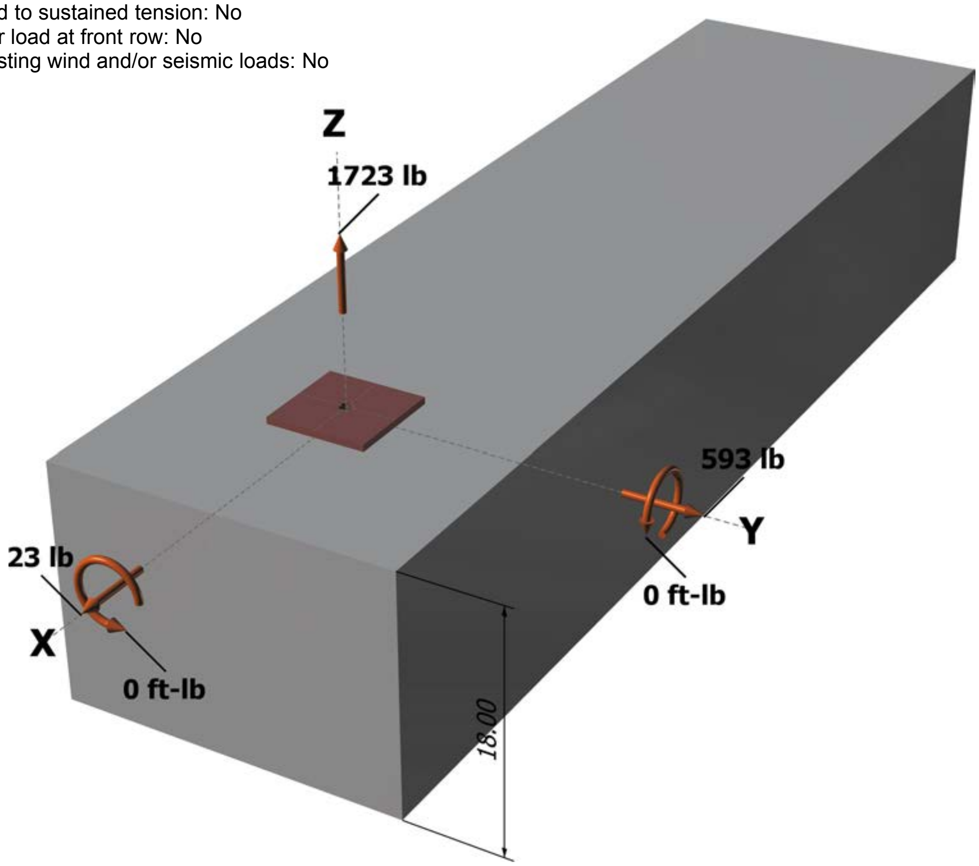
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

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

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

<Figure 1>



Company:	Schletter, Inc.	Date:	11/17/2015
Engineer:	HCV	Page:	2/5
Project:	Standard PVMax - Worst Case, 14-42 Inch Width		
Address:			
Phone:			
E-mail:			

<Figure 2>

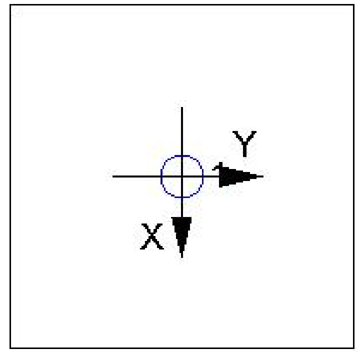
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

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

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

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in y-direction:

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

Shear parallel to edge in y-direction:

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

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

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

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

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

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

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

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

11. Results

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

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

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

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

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

12. Warnings

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

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

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

SIMPSON Strong-Tie	Anchor Designer™ Software Version 2.4.5673.0

Company:	Schletter, Inc.	Date:	11/17/2015
Engineer:	HCV	Page:	1/5
Project:	Standard PVMax - Worst Case, 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

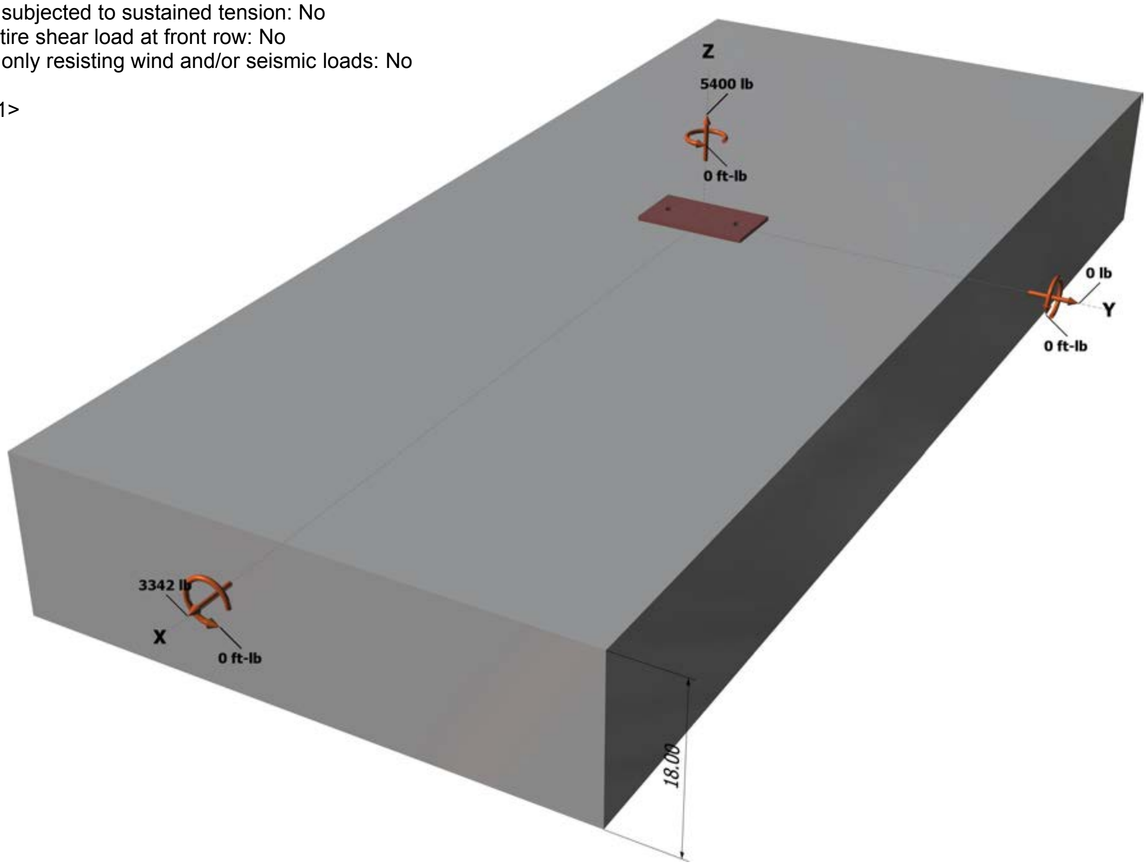
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

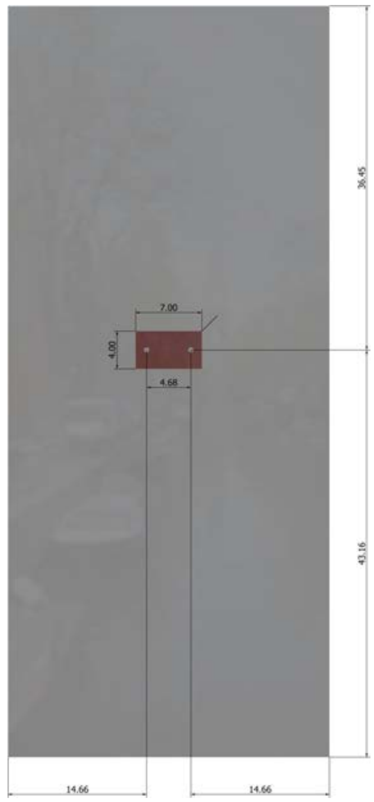
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout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



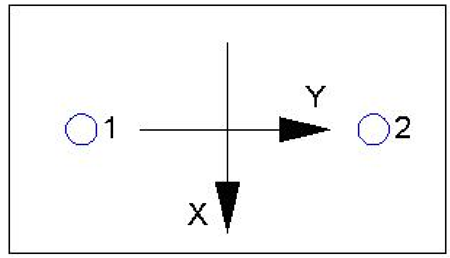
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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, $øN_n$ (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, $øV_n$ (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.