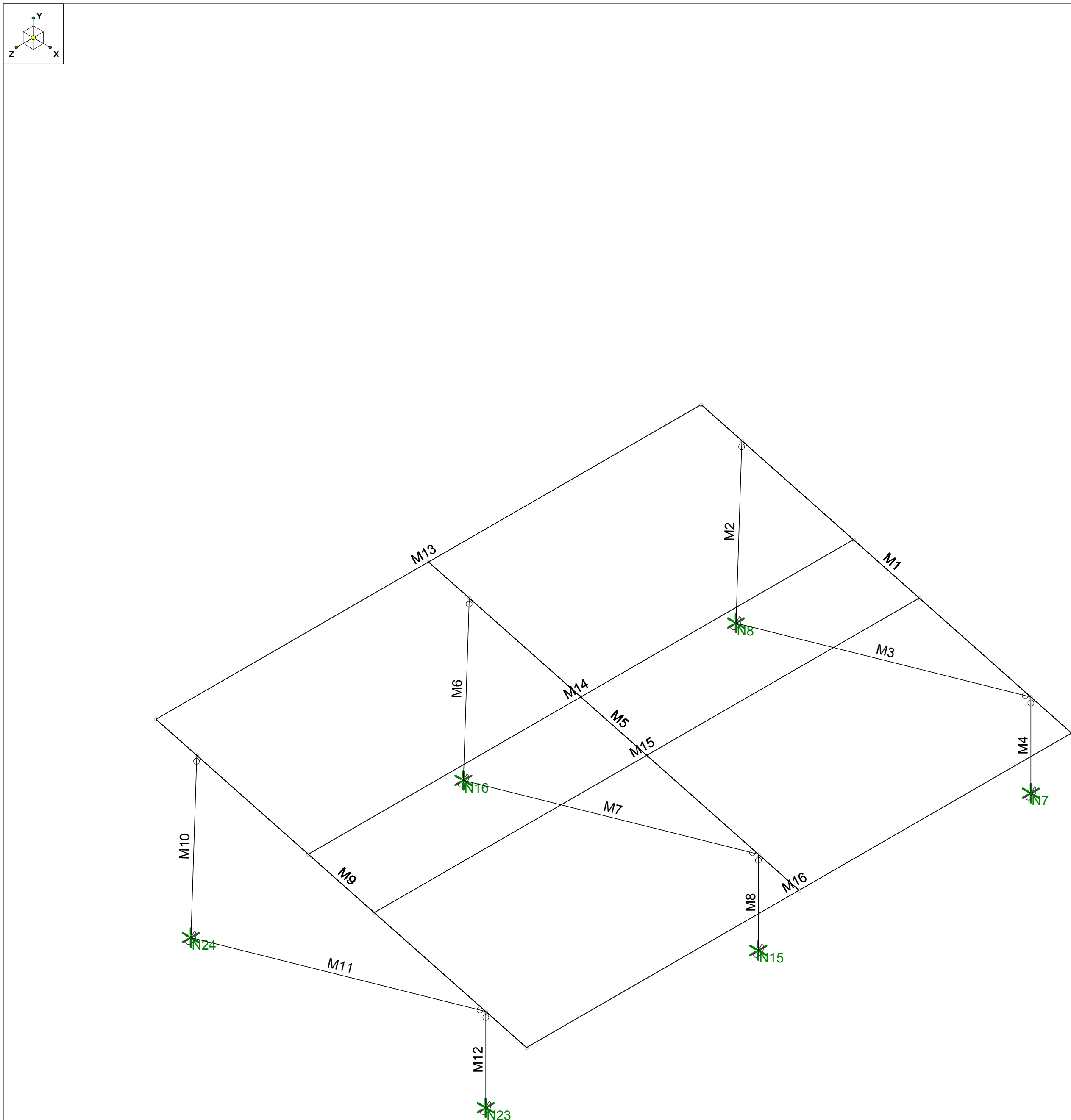


Schletter, Inc.	Standard PVMax Racking System Representative Calculations - ASCE 7-10	15° Tilt w/ Seismic Design
HCV		

1. INTRODUCTION

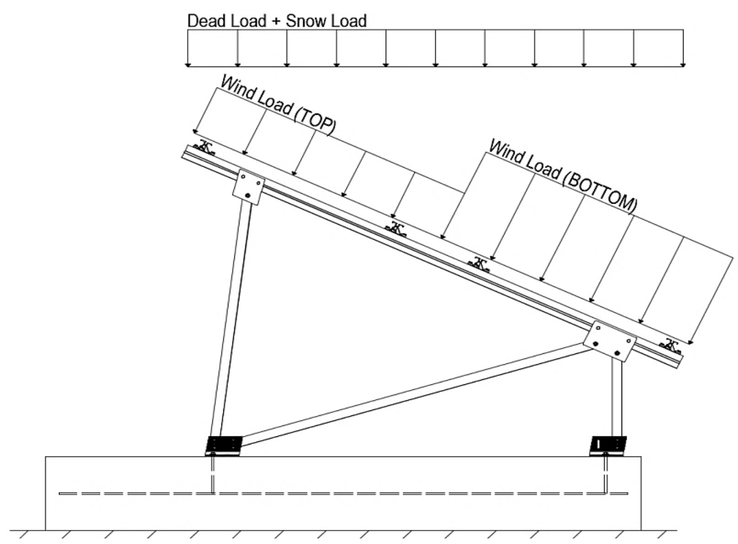
1.1 Project Description
The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. PVMax ground mount system.

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

PV modules are required to meet the following specifications:

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

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



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

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

2. LOAD ACTIONS

2.1 Permanent Loads
g_{MAX} = 3.00 psf
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 = 22.68 psf *(ASCE 7-10, Eq. 7.4-1)*
I_s = 1.00
C_s = 1.00
C_e = 0.90
C_t = 1.20

2.3 Wind Loads
Design Wind Speed, V = 115 mph
Height < 15 ft

Exposure Category = C
Importance Category = II

Peak Velocity Pressure, q_z = 20.76 psf *Including the gust factor, G=0.85. (ASCE 7-10, Eq. 27.3-1)*

Pressure Coefficients

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

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

2.4 Seismic Loads

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

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

2.5 Combination of Loads

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

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

1.2D + 1.6S + 0.5W	
1.2D + 1.0W + 0.5S	
0.9D + 1.0W [M]	
1.54D + 1.3E + 0.2S [R]	*(ASCE 7, Eq 2.3.2-1 through 2.3.2-7) & (ASCE 7, Section 12.4.3.2)*
0.56D + 1.3E [R]	
1.54D + 1.25E + 0.2S [O]	
0.56D + 1.25E [O]	

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]	*(ASCE 7, Eq 2.4.1-1 through 2.4.1-8) & (ASCE 7, Section 12.4.3.2)*
1.238D + 0.875E [O]	
1.1785D + 0.65625E + 0.75S [O]	
0.362D + 0.875E [O]	

[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

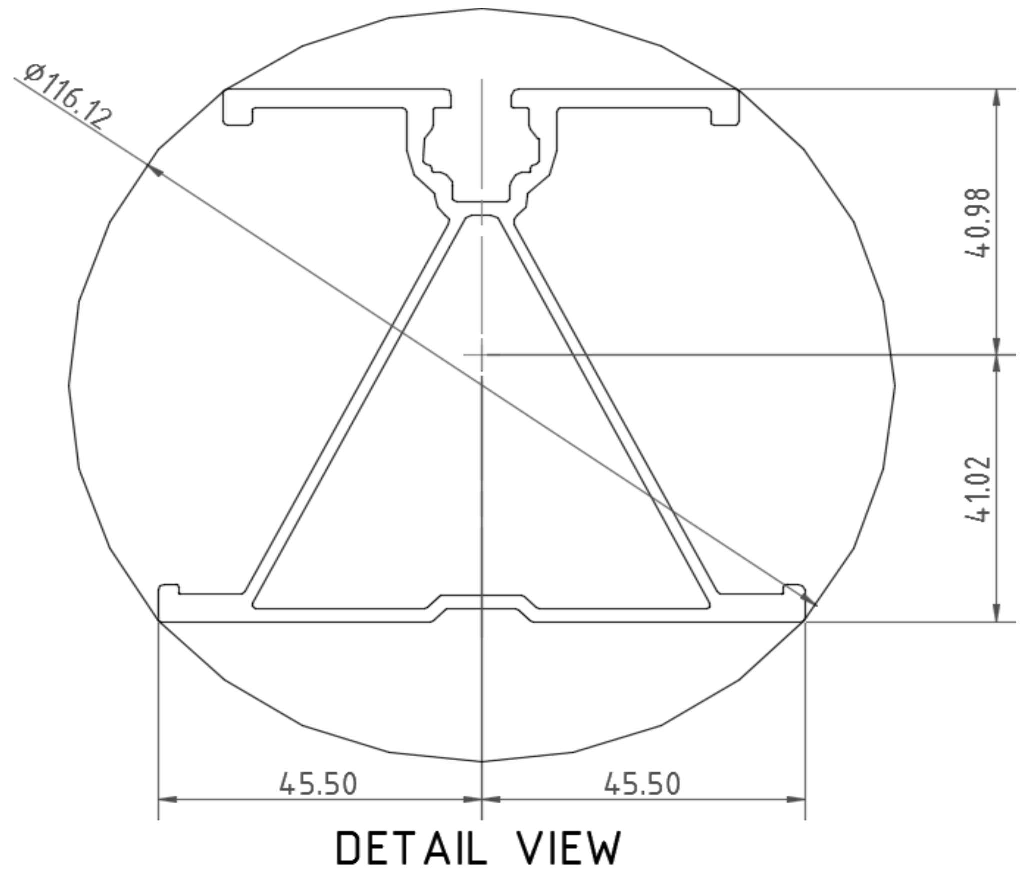
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

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).

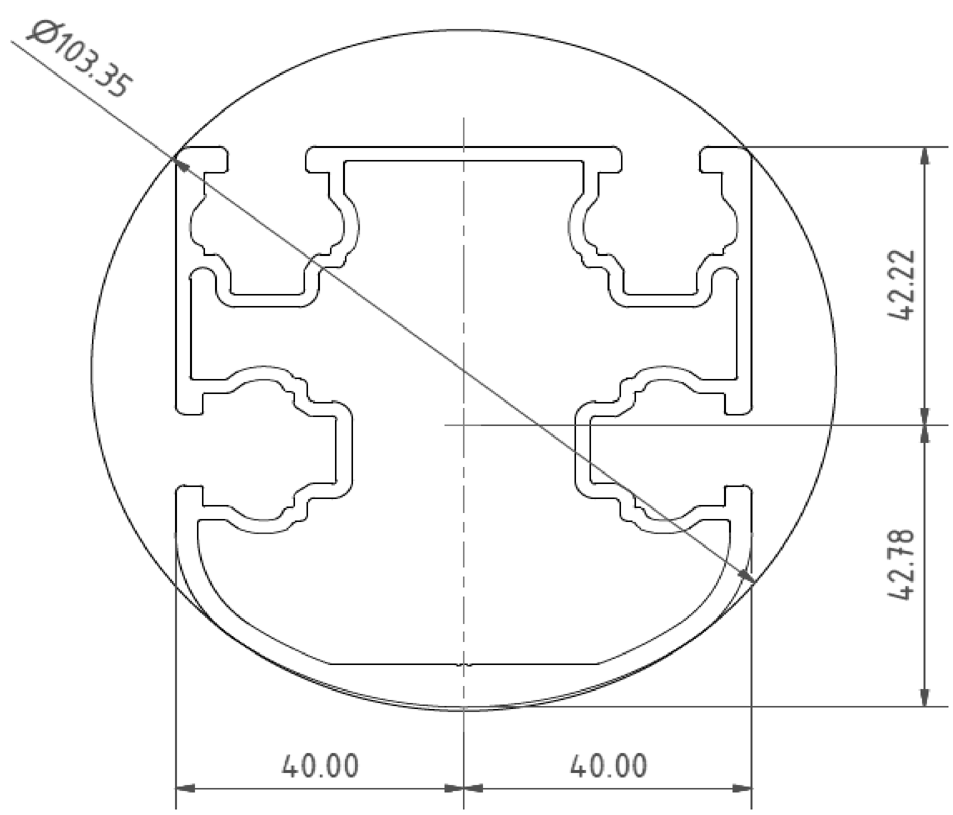
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	123	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	2.050	k-ft
M_z =	0.267	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	97%	



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).

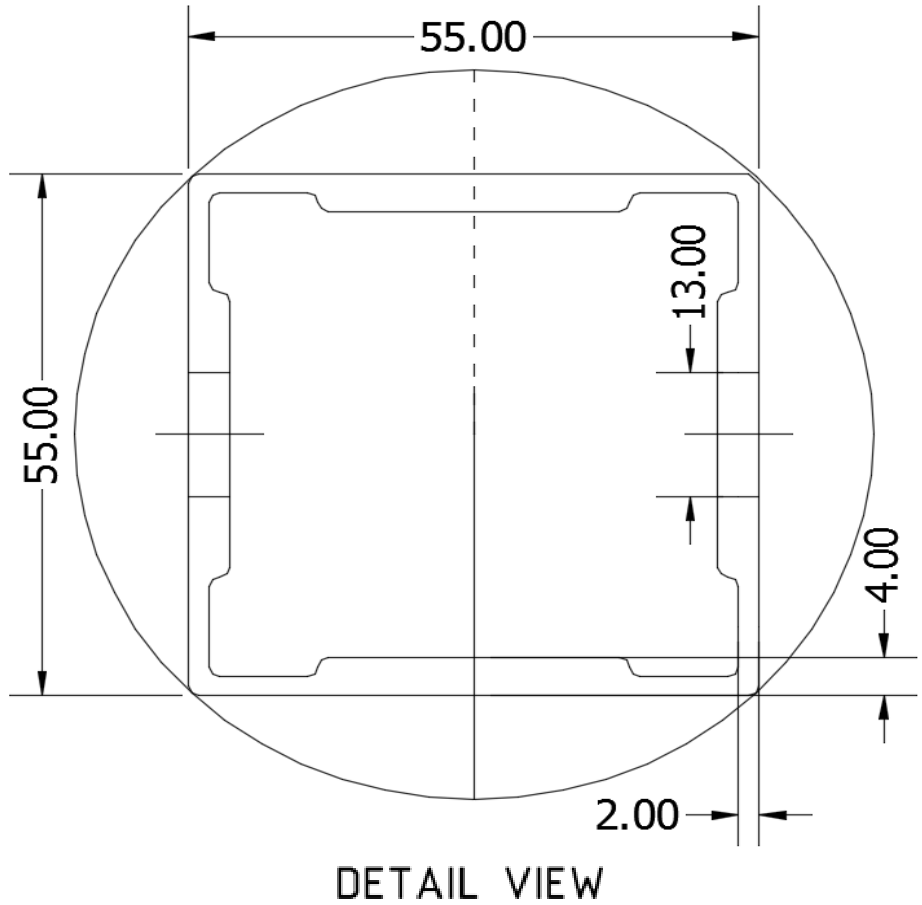
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.185	k-ft
M_z =	0.000	k-ft
P_n =	-0.201	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	92%	



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).

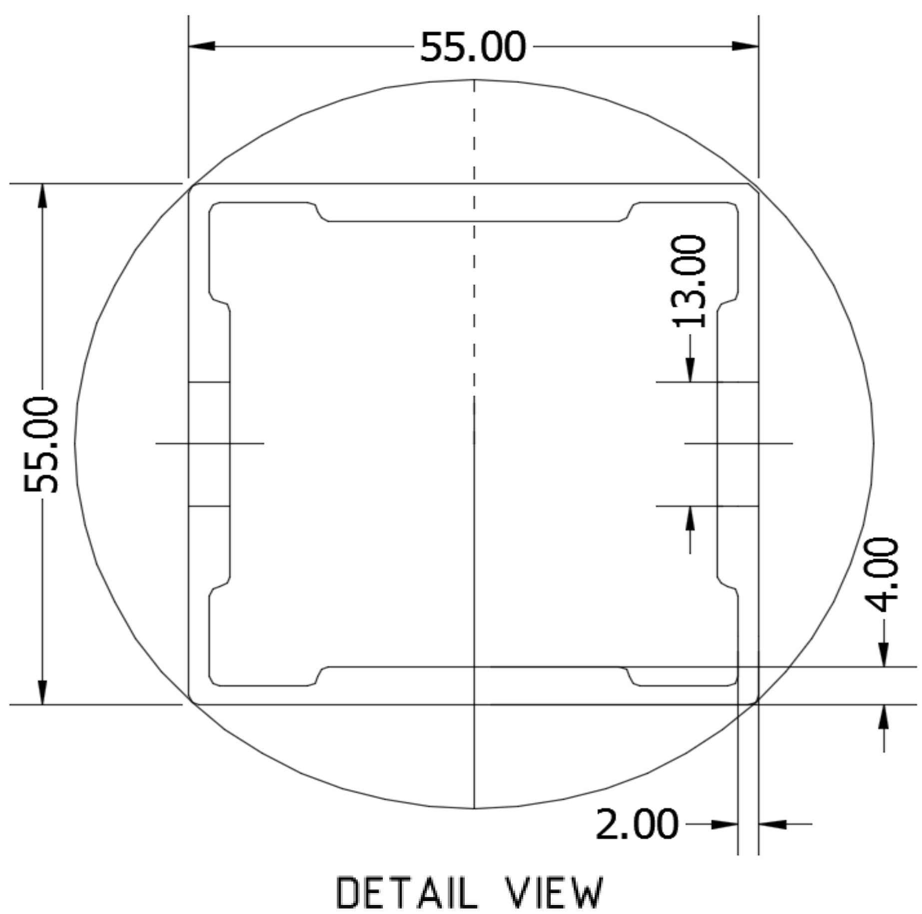
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.480	k-ft
P_n =	0.704	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	37%	



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).

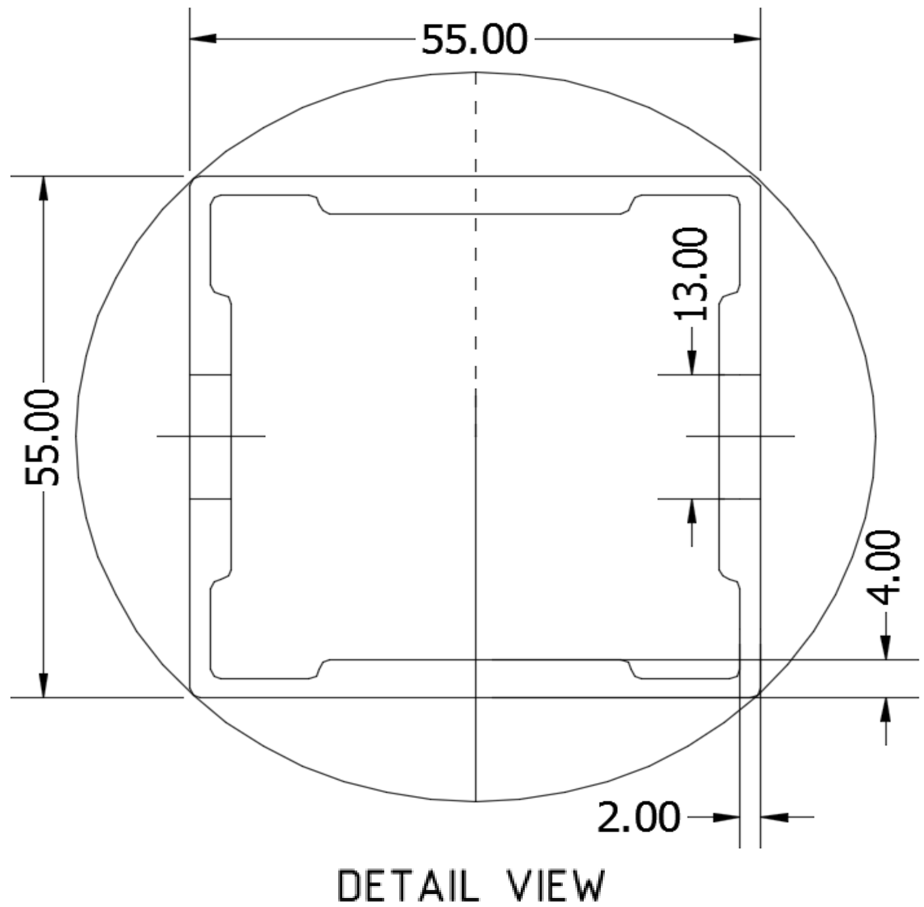
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.010	k-ft
M_z =	0.000	k-ft
P_n =	1.022	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	7.371	k
Utilization =	15%	



4.5 Rear Strut Design

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

Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	48.30	in
$\Phi F_{ty\ AXIAL}$ =	18.93	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	-0.009	k-ft
M_z =	-0.335	k-ft
P_n =	0.713	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	18.592	k
Utilization =	28%	



5. FOUNDATION DESIGN CALCULATIONS

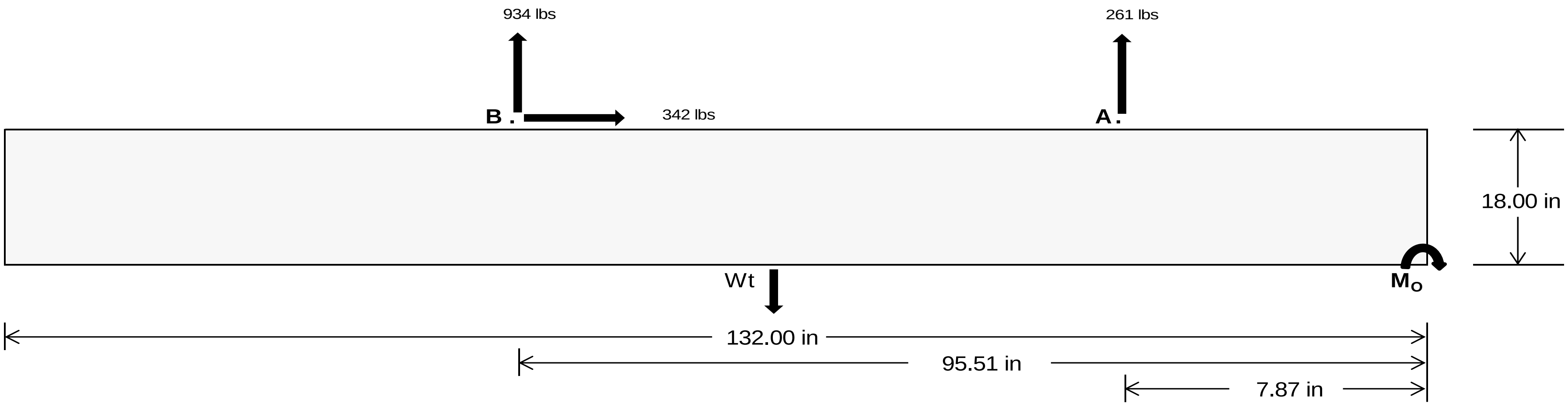
5.1 Helical Pile Foundations

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 =	1154.32	4069.21	k
Compressive Load =	4714.78	4892.98	k
Lateral Load =	313.75	1484.72	k
Moment (Weak Axis) =	0.64	0.43	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).



<u>Concrete Properties</u>

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

<u>Footing Reinforcement</u>

Use fiber reinforcing with (1) #5 rebar.

<u>Overturning Check</u>

M_O = 97425.0 in-lbs
Resisting Force Required = 1476.14 lbs
S.F. = 1.67
Weight Required = 2460.23 lbs
Minimum Width = <u>22 in</u> in
Weight Provided = 4386.25 lbs

A minimum 132in long x 22in wide x 18in tall ballast foundation is required to resist overturning.

<u>Sliding</u>

Force = 342.29 lbs
Friction = 0.4
Weight Required = 855.72 lbs
Resisting Weight = 4386.25 lbs
Additional Weight Required = 0 lbs

Use a 132in long x 22in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

<u>Cohesion</u>

Sliding Force = 342.29 lbs
Cohesion = 130 psf
Area = 20.17 ft^2
Resisting = 2193.13 lbs
Additional Weight Required = 0 lbs

Use a 132in long x 22in wide x 18in tall ballast foundation. Cohesion is OK.

<u>Shear Key</u>

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.

<u>Bearing Pressure</u>

	Ballast Width			
	<u>22 in</u>	<u>23 in</u>	<u>24 in</u>	<u>25 in</u>
P_{ftg} = (145 pcf)(11 ft)(1.5 ft)(1.83 ft) =	<u>4386 lbs</u>	<u>4586 lbs</u>	<u>4785 lbs</u>	<u>4984 lbs</u>

ASD LC	1.0D + 1.0S				1.0D + 0.6W			
Width	22 in	23 in	24 in	25 in	22 in	23 in	24 in	25 in
F_A	1767 lbs	1767 lbs	1767 lbs	1767 lbs	1349 lbs	1349 lbs	1349 lbs	1349 lbs
F_B	1831 lbs	1831 lbs	1831 lbs	1831 lbs	1400 lbs	1400 lbs	1400 lbs	1400 lbs
F_V	157 lbs	157 lbs	157 lbs	157 lbs	614 lbs	614 lbs	614 lbs	614 lbs
P_{total}	7985 lbs	8184 lbs	8384 lbs	8583 lbs	7135 lbs	7334 lbs	7534 lbs	7733 lbs
M	4292 lbs-ft	4292 lbs-ft	4292 lbs-ft	4292 lbs-ft	4014 lbs-ft	4014 lbs-ft	4014 lbs-ft	4014 lbs-ft
e	0.54 ft	0.52 ft	0.51 ft	0.50 ft	0.56 ft	0.55 ft	0.53 ft	0.52 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
f_{min}	279.9 psf	277.2 psf	274.7 psf	272.4 psf	245.2 psf	244.0 psf	242.9 psf	241.9 psf
f_{max}	512.0 psf	499.2 psf	487.5 psf	476.7 psf	462.4 psf	451.7 psf	442.0 psf	433.0 psf

ASD LC	1.0D + 0.75L + 0.45W + 0.75S				0.6D + 0.6W			
Width	22 in	23 in	24 in	25 in	22 in	23 in	24 in	25 in
F_A	2206 lbs	2206 lbs	2206 lbs	2206 lbs	-523 lbs	-523 lbs	-523 lbs	-523 lbs
F_B	2288 lbs	2288 lbs	2288 lbs	2288 lbs	-1868 lbs	-1868 lbs	-1868 lbs	-1868 lbs
F_V	568 lbs	568 lbs	568 lbs	568 lbs	-685 lbs	-685 lbs	-685 lbs	-685 lbs
P_{total}	8880 lbs	9079 lbs	9279 lbs	9478 lbs	241 lbs	361 lbs	480 lbs	600 lbs
M	5911 lbs-ft	5911 lbs-ft	5911 lbs-ft	5911 lbs-ft	1035 lbs-ft	1035 lbs-ft	1035 lbs-ft	1035 lbs-ft
e	0.67 ft	0.65 ft	0.64 ft	0.62 ft	4.29 ft	2.87 ft	2.15 ft	1.72 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
f_{min}	280.4 psf	277.7 psf	275.2 psf	272.9 psf	0.0 psf	0.0 psf	0.0 psf	1.6 psf
f_{max}	600.2 psf	583.6 psf	568.3 psf	554.3 psf	72.6 psf	47.7 psf	47.8 psf	50.8 psf

Maximum Bearing Pressure = 600 psf
Allowable Bearing Pressure = 1500 psf

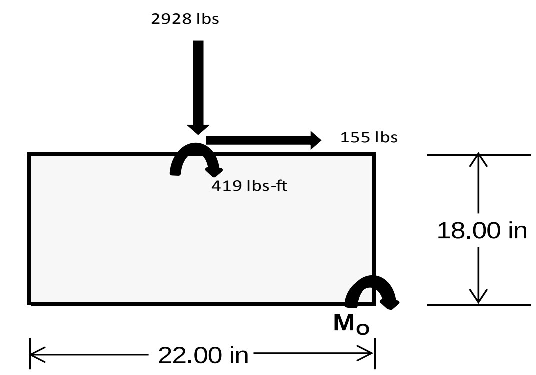
Use a 132in long x 22in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O =	2032.2 ft-lbs
Resisting Force Required =	2216.99 lbs
S.F. =	1.67
Weight Required =	3694.98 lbs
Minimum Width =	22 in in
Weight Provided =	4386.25 lbs

A minimum 132in long x 22in 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	22 in			22 in			22 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	256 lbs	661 lbs	228 lbs	971 lbs	2928 lbs	949 lbs	85 lbs	193 lbs	57 lbs
F_V	216 lbs	213 lbs	218 lbs	161 lbs	155 lbs	169 lbs	216 lbs	214 lbs	217 lbs
P_{total}	5686 lbs	6091 lbs	5658 lbs	6140 lbs	8097 lbs	6118 lbs	1673 lbs	1781 lbs	1644 lbs
M	866 lbs-ft	859 lbs-ft	871 lbs-ft	657 lbs-ft	652 lbs-ft	681 lbs-ft	862 lbs-ft	856 lbs-ft	864 lbs-ft
e	0.15 ft	0.14 ft	0.15 ft	0.11 ft	0.08 ft	0.11 ft	0.52 ft	0.48 ft	0.53 ft
L/6	0.31 ft	0.31 ft	0.31 ft	0.31 ft	0.31 ft	0.31 ft	0.31 ft	0.31 ft	0.31 ft
f_{min}	141.4 psf	162.6 psf	139.2 psf	197.9 psf	295.8 psf	192.8 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	422.6 psf	441.5 psf	421.9 psf	411.1 psf	507.3 psf	413.9 psf	252.8 psf	247.5 psf	254.8 psf

Maximum Bearing Pressure = 507 psf
Allowable Bearing Pressure = 1500 psf

Use a 132in long x 22in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 132in long x 22in wide x 18in tall ballast foundation and fiber reinforcing with (1) #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.

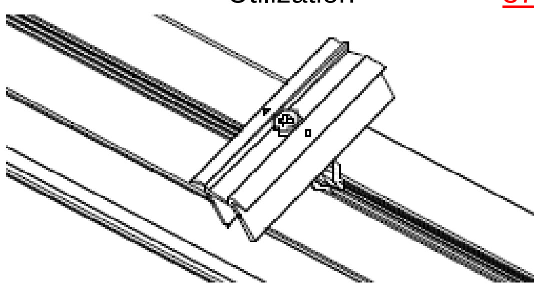
6. DESIGN OF JOINTS AND CONNECTIONS

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.

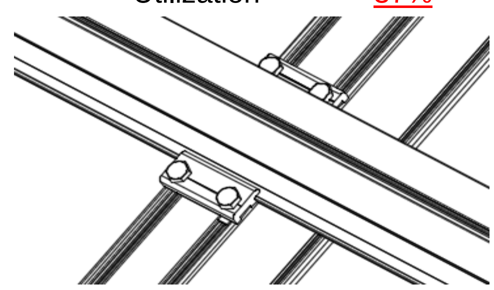
Fastening of Modules to Purlins

Maximum Uplifting Force =	0.444	k
Allowable Uplift =	1.214	k
Utilization =	37%	



Fastening of Purlins to Girders

Maximum Uplifting Force =	1.598	k
Allowable Uplift =	4.357	k
Utilization =	37%	



6.2 Strut Connections

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

Front Strut

Maximum Axial Load =	3.627	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	49%	

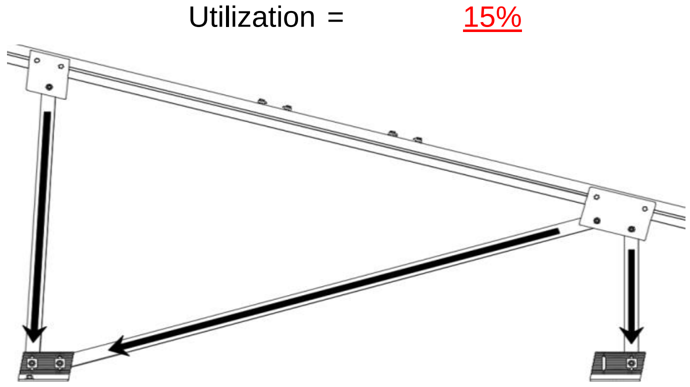
Rear Strut

Maximum Axial Load =	3.588	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	48%	

Diagonal Strut

Maximum Axial Load =	1.081	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	15%	

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



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

7. SEISMIC DESIGN

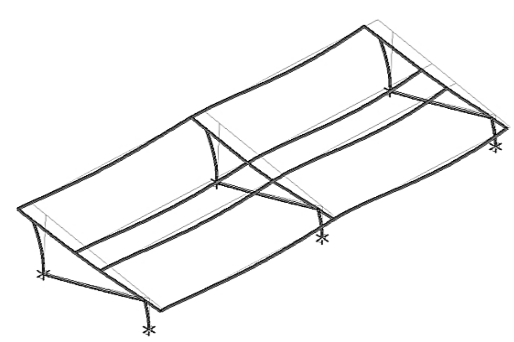
7.1 Seismic Drift

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

Mean Height, h_{sx} =	36.30 in	
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$ 0.726 in	
Max Drift, Δ_{MAX} =	0.466 in	

$0.466 \leq 0.726$, OK.

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



APPENDIX A

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

Purlin = **S1.5**

Strong Axis:

3.4.14

L_b = 123 in

J = 0.432

340.276

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

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= 27.3 ksi

3.4.16

b/t = 32.195

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 25.1 ksi

3.4.16.1 Not Used

Rb/t =

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 37.0588

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

S1 = 36.9

m = 0.65

C_0 = 40.985

Cc = 41.015

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

S2 = 77.2

φF_L= φb[Bbr-mDbr*h/t]

φF_L= 43.2 ksi

φF_LSt= 25.1 ksi

Ix = 897074 mm^4

2.155 in^4

y = 41.015 mm

Sx = 1.335 in³

M_{max}St = 2.788 k-ft

Weak Axis:

3.4.14

L_b = 123

J = 0.432

216.395

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

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= 28.6

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

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

$\varphi F_L =$ 31.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 7.4

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

S1 = 35.2

m = 0.68

C_0 = 41.067

Cc = 43.717

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

S2 = 73.8

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 29.4 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

$M_{max}St =$ 3.363 k-ft

3.4.18

h/t = 16.2

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

S1 = 36.9

m = 0.65

C_0 = 40

Cc = 40

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 in^3

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

Compression

3.4.9

b/t = 16.2

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

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

$\varphi F_L =$ 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.3 ksi

3.4.10

Rb/t = 18.1

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

S1 = 6.87

S2 = 131.3

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

$\varphi F_L =$ 31.09 ksi

$\varphi F_L =$ 31.09 ksi

A = 1215.13 mm^2

1.88 in^2

$P_{max} =$ 58.55 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 24.8 in

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in³

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 in³

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 0.57371

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.87952

φF_L= φcc(Bc-Dc*λ)

φF_L= 28.0279 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

φF_L= φyFcy

φF_L= 33.25 ksi

φF_L= 28.03 ksi

A = 663.99 mm^2

1.03 in^2

P_{max} = 28.85 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 86.60 in

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.6 ksi

Weak Axis:

3.4.14

L_b = 86.6

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.6

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 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

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 2.00335

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.86047

φF_L= (φccFcy)/(λ²)

φF_L= 7.50396 ksi

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 48.30 in
J = 0.942
75.3767

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

S1 = 0.51461

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

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 30.6 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

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

Weak Axis:

3.4.14

L_b = 48.3
J = 0.942
75.3767

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

S1 = 0.51461

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

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 30.6

3.4.16

b/t = 24.5

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

S1 = 12.2

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

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

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L = 1.17φyFcy

φF_L = 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L = 1.3φyFcy

φF_L = 43.2 ksi

φF_LSt = 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L = 1.3φyFcy

φF_L = 43.2 ksi

φF_LWk = 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 1.11734

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.76536

φF_L = φcc(Bc-Dc*λ)

φF_L = 18.9268 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L = φc[Bp-1.6Dp*b/t]

φF_L = 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L = φc[Bp-1.6Dp*b/t]

φF_L = 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

$\varphi F_L = \varphi y Fcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 18.93 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 19.48 kips

APPENDIX B

B.1

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

Basic Load Cases

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

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

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

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

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

Member Distributed Loads (BLC 3 : Snow Load)

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

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

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	y	-57.906	-57.906	0	0
2	M14	y	-57.906	-57.906	0	0
3	M15	y	-92.65	-92.65	0	0
4	M16	y	-92.65	-92.65	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	133.185	133.185	0	0
2	M14	y	103.073	103.073	0	0
3	M15	y	57.906	57.906	0	0
4	M16	y	57.906	57.906	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	258.579	2	1119.571	1	1.114	1	.005	1	0	1	0	1
2		min	-362.764	3	-950.644	3	-85.106	5	-.328	4	0	1	0	1
3	N7	max	.047	1	1238.132	1	-.318	12	0	12	0	1	0	1
4		min	-.057	2	-254.573	3	-241.348	4	-.491	4	0	1	0	1
5	N15	max	.024	9	3626.757	1	0	1	0	1	0	1	0	1
6		min	-.853	2	-887.942	3	-232.674	5	-.48	4	0	1	0	1
7	N16	max	1081.446	2	3763.834	1	0	3	0	3	0	1	0	1
8		min	-1142.09	3	-3130.158	3	-84.828	5	-.331	4	0	1	0	1
9	N23	max	.047	1	1238.132	1	8.089	1	.017	1	0	1	0	1
10		min	-.057	2	-254.573	3	-236.504	4	-.482	4	0	1	0	1
11	N24	max	258.579	2	1119.571	1	-.049	12	0	12	0	1	0	1
12		min	-362.764	3	-950.644	3	-85.599	4	-.331	4	0	1	0	1
13	Totals:	max	1597.637	2	12105.997	1	0	1						
14		min	-1868.01	3	-6428.534	3	-961.413	4						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M13	1	max	88.769	1	512.877	1	-4.856	12	0	3	.211	1	0	1
2			min	3.498	12	-491.901	3	-139.849	1	-.013	1	.008	12	0	3
3		2	max	88.769	1	359.34	1	-3.802	12	0	3	.073	4	.477	3
4			min	3.498	12	-346.113	3	-107.544	1	-.013	1	.003	12	-.497	1
5		3	max	88.769	1	205.804	1	-2.749	12	0	3	.038	5	.788	3
6			min	3.498	12	-200.325	3	-75.24	1	-.013	1	-.034	1	-.818	1
7		4	max	88.769	1	52.268	1	-1.696	12	0	3	.02	5	.933	3
8			min	3.498	12	-54.538	3	-42.935	1	-.013	1	-.101	1	-.965	1
9		5	max	88.769	1	91.25	3	-.643	12	0	3	.003	5	.913	3
10			min	3.498	12	-101.269	1	-16.042	4	-.013	1	-.132	1	-.938	1
11		6	max	88.769	1	237.038	3	21.674	1	0	3	-.004	12	.726	3
12			min	3.498	12	-254.805	1	-11.938	5	-.013	1	-.125	1	-.735	1
13		7	max	88.769	1	382.826	3	53.978	1	0	3	-.003	12	.373	3
14			min	-4.006	5	-408.342	1	-10.308	5	-.013	1	-.082	1	-.357	1
15		8	max	88.769	1	528.614	3	86.283	1	0	3	0	10	.195	1
16			min	-15.697	5	-561.878	1	-8.679	5	-.013	1	-.036	4	-.146	3
17		9	max	88.769	1	674.402	3	118.587	1	0	3	.114	1	.923	1
18			min	-27.388	5	-715.414	1	-7.05	5	-.013	1	-.044	5	-.831	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	88.769	1	868.951	1	-4.622	12	.005	14	.268	1	1.825	1
20			min	3.498	12	-820.19	3	-150.892	1	-.013	1	.007	12	-1.682	3
21		11	max	88.769	1	715.414	1	-3.569	12	.013	1	.114	1	.923	1
22			min	3.498	12	-674.402	3	-118.587	1	0	3	.002	12	-.831	3
23		12	max	88.769	1	561.878	1	-2.516	12	.013	1	.035	4	.195	1
24			min	3.498	12	-528.614	3	-86.283	1	0	3	-.002	1	-.146	3
25		13	max	88.769	1	408.342	1	-1.463	12	.013	1	.016	5	.373	3
26			min	3.498	12	-382.826	3	-53.978	1	0	3	-.082	1	-.357	1
27		14	max	88.769	1	254.805	1	-.41	12	.013	1	0	15	.726	3
28			min	.768	15	-237.038	3	-21.674	1	0	3	-.125	1	-.735	1
29		15	max	88.769	1	101.269	1	10.631	1	.013	1	-.004	12	.913	3
30			min	-10.431	5	-91.25	3	-12.477	5	0	3	-.132	1	-.938	1
31		16	max	88.769	1	54.538	3	42.935	1	.013	1	-.003	12	.933	3
32			min	-22.122	5	-52.268	1	-10.848	5	0	3	-.101	1	-.965	1
33		17	max	88.769	1	200.325	3	75.24	1	.013	1	0	12	.788	3
34			min	-33.813	5	-205.804	1	-9.219	5	0	3	-.049	4	-.818	1
35		18	max	88.769	1	346.113	3	107.544	1	.013	1	.07	1	.477	3
36			min	-45.504	5	-359.34	1	-7.59	5	0	3	-.051	5	-.497	1
37		19	max	88.769	1	491.901	3	139.849	1	.013	1	.211	1	0	1
38			min	-57.195	5	-512.877	1	-5.96	5	0	3	-.058	5	0	3
39	M14	1	max	63.36	4	540.735	1	-4.99	12	.006	3	.24	1	0	1
40			min	1.507	12	-386.579	3	-144.087	1	-.011	1	.009	12	0	3
41		2	max	51.669	4	387.199	1	-3.937	12	.006	3	.104	4	.377	3
42			min	1.507	12	-275.085	3	-111.783	1	-.011	1	.004	12	-.528	1
43		3	max	40.774	1	233.662	1	-2.883	12	.006	3	.056	5	.627	3
44			min	1.507	12	-163.592	3	-79.478	1	-.011	1	-.015	1	-.882	1
45		4	max	40.774	1	80.126	1	-1.83	12	.006	3	.03	5	.749	3
46			min	1.507	12	-52.098	3	-47.173	1	-.011	1	-.087	1	-1.061	1
47		5	max	40.774	1	59.396	3	-.777	12	.006	3	.006	5	.745	3
48			min	1.507	12	-73.411	1	-23.778	4	-.011	1	-.122	1	-1.064	1
49		6	max	40.774	1	170.889	3	17.436	1	.006	3	-.004	12	.614	3
50			min	-3.427	5	-226.947	1	-18.655	5	-.011	1	-.121	1	-.893	1
51		7	max	40.774	1	282.383	3	49.74	1	.006	3	-.003	12	.356	3
52			min	-15.118	5	-380.483	1	-17.026	5	-.011	1	-.082	1	-.548	1
53		8	max	40.774	1	393.876	3	82.045	1	.006	3	0	10	0	15
54			min	-26.808	5	-534.02	1	-15.397	5	-.011	1	-.058	4	-.033	2
55		9	max	40.774	1	505.37	3	114.349	1	.006	3	.104	1	.669	1
56			min	-38.499	5	-687.556	1	-13.767	5	-.011	1	-.072	5	-.541	3
57		10	max	62.173	4	841.093	1	-4.488	12	.006	3	.253	1	1.539	1
58			min	1.507	12	-616.864	3	-146.654	1	-.011	1	.007	12	-1.18	3
59		11	max	50.482	4	687.556	1	-3.435	12	.011	1	.105	4	.669	1
60			min	1.507	12	-505.37	3	-114.349	1	-.006	3	.002	12	-.541	3
61		12	max	40.774	1	534.02	1	-2.382	12	.011	1	.054	5	0	15
62			min	1.507	12	-393.876	3	-82.045	1	-.006	3	-.007	1	-.033	2
63		13	max	40.774	1	380.483	1	-1.329	12	.011	1	.028	5	.356	3
64			min	1.507	12	-282.383	3	-49.74	1	-.006	3	-.082	1	-.548	1
65		14	max	40.774	1	226.947	1	-.276	12	.011	1	.004	5	.614	3
66			min	1.507	12	-170.889	3	-24.335	4	-.006	3	-.121	1	-.893	1
67		15	max	40.774	1	73.411	1	14.869	1	.011	1	-.004	12	.745	3
68			min	-4.325	5	-59.396	3	-18.768	5	-.006	3	-.122	1	-1.064	1
69		16	max	40.774	1	52.098	3	47.173	1	.011	1	-.002	12	.749	3
70			min	-16.016	5	-80.126	1	-17.139	5	-.006	3	-.087	1	-1.061	1
71		17	max	40.774	1	163.592	3	79.478	1	.011	1	0	3	.627	3
72			min	-27.707	5	-233.662	1	-15.509	5	-.006	3	-.061	4	-.882	1
73		18	max	40.774	1	275.085	3	111.783	1	.011	1	.094	1	.377	3
74			min	-39.397	5	-387.199	1	-13.88	5	-.006	3	-.074	5	-.528	1
75		19	max	40.774	1	386.579	3	144.087	1	.011	1	.24	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	-51.088	5	-540.735	1	-12.251	5	-.006	3	-.089	5	0	3
77	M15	1	max	80.277	5	607.5	1	-4.967	12	.012	1	.24	1	0	2
78			min	-42.852	1	-213.138	3	-144.067	1	-.005	3	.009	12	0	3
79		2	max	68.586	5	434.179	1	-3.914	12	.012	1	.14	4	.209	3
80			min	-42.852	1	-153.084	3	-111.762	1	-.005	3	.004	12	-.593	1
81		3	max	56.895	5	260.858	1	-2.861	12	.012	1	.081	5	.349	3
82			min	-42.852	1	-93.031	3	-79.458	1	-.005	3	-.015	1	-.989	1
83		4	max	45.204	5	87.537	1	-1.808	12	.012	1	.045	5	.42	3
84			min	-42.852	1	-32.977	3	-47.153	1	-.005	3	-.087	1	-1.187	1
85		5	max	33.513	5	27.076	3	-.755	12	.012	1	.011	5	.424	3
86			min	-42.852	1	-85.784	1	-32.517	4	-.005	3	-.122	1	-1.188	1
87		6	max	21.822	5	87.129	3	17.456	1	.012	1	-.004	12	.359	3
88			min	-42.852	1	-259.106	1	-27.392	5	-.005	3	-.121	1	-.992	1
89		7	max	10.131	5	147.183	3	49.76	1	.012	1	-.003	12	.225	3
90			min	-42.852	1	-432.427	1	-25.763	5	-.005	3	-.082	1	-.598	1
91		8	max	-1.007	15	207.236	3	82.065	1	.012	1	0	10	.024	3
92			min	-42.852	1	-605.748	1	-24.133	5	-.005	3	-.082	4	-.009	9
93		9	max	-1.724	12	267.29	3	114.369	1	.012	1	.104	1	.782	1
94			min	-42.852	1	-779.069	1	-22.504	5	-.005	3	-.106	5	-.247	3
95		10	max	-1.724	12	952.39	1	-4.511	12	.012	1	.253	1	1.768	1
96			min	-42.852	1	-327.343	3	-146.674	1	-.005	3	.007	12	-.585	3
97		11	max	8.747	5	779.069	1	-3.458	12	.005	3	.139	4	.782	1
98			min	-42.852	1	-267.29	3	-114.369	1	-.012	1	.002	12	-.247	3
99		12	max	-1.724	12	605.748	1	-2.404	12	.005	3	.079	5	.024	3
100			min	-42.852	1	-207.236	3	-82.065	1	-.012	1	-.007	1	-.009	9
101		13	max	-1.724	12	432.427	1	-1.351	12	.005	3	.043	5	.225	3
102			min	-42.852	1	-147.183	3	-49.76	1	-.012	1	-.082	1	-.598	1
103		14	max	-1.724	12	259.106	1	-.298	12	.005	3	.009	5	.359	3
104			min	-42.852	1	-87.129	3	-33.087	4	-.012	1	-.121	1	-.992	1
105		15	max	-1.724	12	85.784	1	14.849	1	.005	3	-.004	12	.424	3
106			min	-47.149	4	-27.076	3	-27.506	5	-.012	1	-.122	1	-1.188	1
107		16	max	-1.724	12	32.977	3	47.153	1	.005	3	-.002	12	.42	3
108			min	-58.84	4	-87.537	1	-25.876	5	-.012	1	-.087	1	-1.187	1
109		17	max	-1.724	12	93.031	3	79.458	1	.005	3	0	3	.349	3
110			min	-70.531	4	-260.858	1	-24.247	5	-.012	1	-.087	4	-.989	1
111		18	max	-1.724	12	153.084	3	111.762	1	.005	3	.094	1	.209	3
112			min	-82.222	4	-434.179	1	-22.618	5	-.012	1	-.109	5	-.593	1
113		19	max	-1.724	12	213.138	3	144.067	1	.005	3	.24	1	0	2
114			min	-93.913	4	-607.5	1	-20.989	5	-.012	1	-.134	5	0	5
115	M16	1	max	80.103	5	579.902	1	-4.782	12	.012	1	.212	1	0	1
116			min	-93.666	1	-199.775	3	-140.021	1	-.007	3	.008	12	0	3
117		2	max	68.412	5	406.581	1	-3.729	12	.012	1	.104	4	.193	3
118			min	-93.666	1	-139.722	3	-107.716	1	-.007	3	.003	12	-.562	1
119		3	max	56.721	5	233.259	1	-2.676	12	.012	1	.06	5	.318	3
120			min	-93.666	1	-79.668	3	-75.412	1	-.007	3	-.033	1	-.926	1
121		4	max	45.03	5	59.938	1	-1.623	12	.012	1	.033	5	.375	3
122			min	-93.666	1	-19.615	3	-43.107	1	-.007	3	-.101	1	-1.093	1
123		5	max	33.339	5	40.439	3	-.57	12	.012	1	.008	5	.363	3
124			min	-93.666	1	-113.383	1	-23.357	4	-.007	3	-.131	1	-1.063	1
125		6	max	21.648	5	100.492	3	21.502	1	.012	1	-.004	12	.283	3
126			min	-93.666	1	-286.704	1	-19.185	5	-.007	3	-.125	1	-.835	1
127		7	max	9.958	5	160.546	3	53.807	1	.012	1	-.003	12	.134	3
128			min	-93.666	1	-460.025	1	-17.556	5	-.007	3	-.082	1	-.41	1
129		8	max	-1.1	15	220.599	3	86.111	1	.012	1	0	10	.213	1
130			min	-93.666	1	-633.346	1	-15.927	5	-.007	3	-.056	4	-.083	3
131		9	max	-3.549	12	280.652	3	118.416	1	.012	1	.114	1	1.033	1
132			min	-93.666	1	-806.668	1	-14.297	5	-.007	3	-.072	5	-.368	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
133		10	max	-3.549	12	979.989	1	-4.696	12	.012	1	.267	1	2.05	1
134			min	-93.666	1	-340.706	3	-150.72	1	-.007	3	.008	12	-.722	3
135		11	max	4.006	5	806.668	1	-3.643	12	.007	3	.114	1	1.033	1
136			min	-93.666	1	-280.652	3	-118.416	1	-.012	1	.003	12	-.368	3
137		12	max	-3.549	12	633.346	1	-2.59	12	.007	3	.054	4	.213	1
138			min	-93.666	1	-220.599	3	-86.111	1	-.012	1	-.003	1	-.083	3
139		13	max	-3.549	12	460.025	1	-1.536	12	.007	3	.027	5	.134	3
140			min	-93.666	1	-160.546	3	-53.807	1	-.012	1	-.082	1	-.41	1
141		14	max	-3.549	12	286.704	1	-.483	12	.007	3	.002	5	.283	3
142			min	-93.666	1	-100.492	3	-25.97	4	-.012	1	-.125	1	-.835	1
143		15	max	-3.549	12	113.383	1	10.803	1	.007	3	-.004	12	.363	3
144			min	-93.666	1	-40.439	3	-19.715	5	-.012	1	-.131	1	-1.063	1
145		16	max	-3.549	12	19.615	3	43.107	1	.007	3	-.003	12	.375	3
146			min	-93.666	1	-59.938	1	-18.086	5	-.012	1	-.101	1	-1.093	1
147		17	max	-3.549	12	79.668	3	75.412	1	.007	3	0	12	.318	3
148			min	-93.666	1	-233.259	1	-16.457	5	-.012	1	-.071	4	-.926	1
149		18	max	-3.549	12	139.722	3	107.716	1	.007	3	.071	1	.193	3
150			min	-97.478	4	-406.581	1	-14.827	5	-.012	1	-.081	5	-.562	1
151		19	max	-3.549	12	199.775	3	140.021	1	.007	3	.212	1	0	1
152			min	-109.169	4	-579.902	1	-13.198	5	-.012	1	-.097	5	0	5
153	M2	1	max	1110.913	1	2.332	4	1.261	1	0	3	0	3	0	1
154			min	-866.293	3	.571	15	-80.663	4	0	4	0	1	0	1
155		2	max	1111.242	1	2.316	4	1.261	1	0	3	0	1	0	15
156			min	-866.047	3	.568	15	-80.948	4	0	4	-.018	4	0	4
157		3	max	1111.57	1	2.301	4	1.261	1	0	3	0	1	0	15
158			min	-865.8	3	.564	15	-81.233	4	0	4	-.036	4	-.001	4
159		4	max	1111.898	1	2.286	4	1.261	1	0	3	0	1	0	15
160			min	-865.554	3	.561	15	-81.518	4	0	4	-.054	4	-.002	4
161		5	max	1112.227	1	2.271	4	1.261	1	0	3	.001	1	0	15
162			min	-865.308	3	.557	15	-81.803	4	0	4	-.072	4	-.002	4
163		6	max	1112.555	1	2.255	4	1.261	1	0	3	.001	1	0	15
164			min	-865.061	3	.553	15	-82.087	4	0	4	-.09	4	-.003	4
165		7	max	1112.884	1	2.24	4	1.261	1	0	3	.002	1	0	15
166			min	-864.815	3	.55	15	-82.372	4	0	4	-.108	4	-.003	4
167		8	max	1113.212	1	2.225	4	1.261	1	0	3	.002	1	0	15
168			min	-864.569	3	.546	15	-82.657	4	0	4	-.127	4	-.004	4
169		9	max	1113.541	1	2.21	4	1.261	1	0	3	.002	1	0	15
170			min	-864.322	3	.543	15	-82.942	4	0	4	-.145	4	-.004	4
171		10	max	1113.869	1	2.194	4	1.261	1	0	3	.002	1	-.001	15
172			min	-864.076	3	.539	15	-83.227	4	0	4	-.163	4	-.005	4
173		11	max	1114.198	1	2.179	4	1.261	1	0	3	.003	1	-.001	15
174			min	-863.83	3	.536	15	-83.511	4	0	4	-.182	4	-.005	4
175		12	max	1114.526	1	2.164	4	1.261	1	0	3	.003	1	-.001	15
176			min	-863.583	3	.532	15	-83.796	4	0	4	-.2	4	-.005	4
177		13	max	1114.854	1	2.149	4	1.261	1	0	3	.003	1	-.001	15
178			min	-863.337	3	.528	15	-84.081	4	0	4	-.219	4	-.006	4
179		14	max	1115.183	1	2.133	4	1.261	1	0	3	.004	1	-.002	15
180			min	-863.091	3	.525	15	-84.366	4	0	4	-.238	4	-.006	4
181		15	max	1115.511	1	2.118	4	1.261	1	0	3	.004	1	-.002	15
182			min	-862.844	3	.521	15	-84.651	4	0	4	-.256	4	-.007	4
183		16	max	1115.84	1	2.103	4	1.261	1	0	3	.004	1	-.002	15
184			min	-862.598	3	.518	15	-84.936	4	0	4	-.275	4	-.007	4
185		17	max	1116.168	1	2.087	4	1.261	1	0	3	.004	1	-.002	15
186			min	-862.352	3	.514	15	-85.22	4	0	4	-.294	4	-.008	4
187		18	max	1116.497	1	2.072	4	1.261	1	0	3	.005	1	-.002	15
188			min	-862.105	3	.51	15	-85.505	4	0	4	-.313	4	-.008	4
189		19	max	1116.825	1	2.057	4	1.261	1	0	3	.005	1	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-861.859	3	.507	15	-85.79	4	0	4	-.332	4	-.009	4
191	M3	1	max	236.964	2	8.105	4	.012	1	0	3	0	1	.009	4
192			min	-344.146	3	1.917	15	-1.215	5	0	4	-.012	4	.002	15
193		2	max	236.793	2	7.332	4	.012	1	0	3	0	1	.005	4
194			min	-344.274	3	1.736	15	-.673	5	0	4	-.013	4	.001	15
195		3	max	236.623	2	6.56	4	.012	1	0	3	0	1	.003	2
196			min	-344.401	3	1.554	15	-.131	5	0	4	-.013	4	0	12
197		4	max	236.453	2	5.787	4	.465	4	0	3	0	1	0	2
198			min	-344.529	3	1.373	15	0	12	0	4	-.013	4	-.001	3
199		5	max	236.282	2	5.015	4	1.007	4	0	3	0	1	0	15
200			min	-344.657	3	1.191	15	0	12	0	4	-.013	4	-.002	3
201		6	max	236.112	2	4.243	4	1.549	4	0	3	0	1	0	15
202			min	-344.785	3	1.01	15	0	12	0	4	-.012	4	-.004	6
203		7	max	235.941	2	3.47	4	2.091	4	0	3	0	1	-.001	15
204			min	-344.912	3	.828	15	0	12	0	4	-.011	4	-.006	6
205		8	max	235.771	2	2.698	4	2.633	4	0	3	0	1	-.002	15
206			min	-345.04	3	.646	15	0	12	0	4	-.01	4	-.007	6
207		9	max	235.601	2	1.925	4	3.175	4	0	3	0	1	-.002	15
208			min	-345.168	3	.465	15	0	12	0	4	-.009	4	-.008	6
209		10	max	235.43	2	1.153	4	3.718	4	0	3	0	1	-.002	15
210			min	-345.296	3	.283	15	0	12	0	4	-.008	5	-.009	6
211		11	max	235.26	2	.383	2	4.26	4	0	3	0	1	-.002	15
212			min	-345.423	3	.048	12	0	12	0	4	-.006	5	-.009	6
213		12	max	235.09	2	-.08	15	4.802	4	0	3	0	1	-.002	15
214			min	-345.551	3	-.395	3	0	12	0	4	-.004	5	-.009	6
215		13	max	234.919	2	-.261	15	5.344	4	0	3	0	1	-.002	15
216			min	-345.679	3	-1.165	6	0	12	0	4	-.002	5	-.009	6
217		14	max	234.749	2	-.443	15	5.886	4	0	3	0	4	-.002	15
218			min	-345.807	3	-1.938	6	0	12	0	4	0	12	-.008	6
219		15	max	234.579	2	-.625	15	6.428	4	0	3	.003	4	-.002	15
220			min	-345.934	3	-2.71	6	0	12	0	4	0	12	-.007	6
221		16	max	234.408	2	-.806	15	6.97	4	0	3	.006	4	-.001	15
222			min	-346.062	3	-3.483	6	0	12	0	4	0	12	-.006	6
223		17	max	234.238	2	-.988	15	7.512	4	0	3	.009	4	0	15
224			min	-346.19	3	-4.255	6	0	12	0	4	0	12	-.004	6
225		18	max	234.068	2	-1.169	15	8.055	4	0	3	.012	4	0	15
226			min	-346.318	3	-5.028	6	0	12	0	4	0	12	-.002	6
227		19	max	233.897	2	-1.351	15	8.597	4	0	3	.016	4	0	1
228			min	-346.445	3	-5.8	6	0	12	0	4	0	12	0	1
229	M4	1	max	1235.065	1	0	1	-.317	12	0	1	.008	4	0	1
230			min	-256.873	3	0	1	-240.299	4	0	1	0	10	0	1
231		2	max	1235.236	1	0	1	-.317	12	0	1	0	12	0	1
232			min	-256.745	3	0	1	-240.447	4	0	1	-.019	4	0	1
233		3	max	1235.406	1	0	1	-.317	12	0	1	0	12	0	1
234			min	-256.617	3	0	1	-240.594	4	0	1	-.047	4	0	1
235		4	max	1235.576	1	0	1	-.317	12	0	1	0	12	0	1
236			min	-256.49	3	0	1	-240.742	4	0	1	-.075	4	0	1
237		5	max	1235.747	1	0	1	-.317	12	0	1	0	12	0	1
238			min	-256.362	3	0	1	-240.89	4	0	1	-.102	4	0	1
239		6	max	1235.917	1	0	1	-.317	12	0	1	0	12	0	1
240			min	-256.234	3	0	1	-241.037	4	0	1	-.13	4	0	1
241		7	max	1236.087	1	0	1	-.317	12	0	1	0	12	0	1
242			min	-256.106	3	0	1	-241.185	4	0	1	-.158	4	0	1
243		8	max	1236.258	1	0	1	-.317	12	0	1	0	12	0	1
244			min	-255.979	3	0	1	-241.333	4	0	1	-.185	4	0	1
245		9	max	1236.428	1	0	1	-.317	12	0	1	0	12	0	1
246			min	-255.851	3	0	1	-241.48	4	0	1	-.213	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	1236.599	1	0	1	-.317	12	0	1	0	12	0	1
248			min	-255.723	3	0	1	-241.628	4	0	1	-.241	4	0	1
249		11	max	1236.769	1	0	1	-.317	12	0	1	0	12	0	1
250			min	-255.595	3	0	1	-241.775	4	0	1	-.268	4	0	1
251		12	max	1236.939	1	0	1	-.317	12	0	1	0	12	0	1
252			min	-255.467	3	0	1	-241.923	4	0	1	-.296	4	0	1
253		13	max	1237.11	1	0	1	-.317	12	0	1	0	12	0	1
254			min	-255.34	3	0	1	-242.071	4	0	1	-.324	4	0	1
255		14	max	1237.28	1	0	1	-.317	12	0	1	0	12	0	1
256			min	-255.212	3	0	1	-242.218	4	0	1	-.352	4	0	1
257		15	max	1237.45	1	0	1	-.317	12	0	1	0	12	0	1
258			min	-255.084	3	0	1	-242.366	4	0	1	-.38	4	0	1
259		16	max	1237.621	1	0	1	-.317	12	0	1	0	12	0	1
260			min	-254.956	3	0	1	-242.514	4	0	1	-.407	4	0	1
261		17	max	1237.791	1	0	1	-.317	12	0	1	0	12	0	1
262			min	-254.829	3	0	1	-242.661	4	0	1	-.435	4	0	1
263		18	max	1237.961	1	0	1	-.317	12	0	1	0	12	0	1
264			min	-254.701	3	0	1	-242.809	4	0	1	-.463	4	0	1
265		19	max	1238.132	1	0	1	-.317	12	0	1	0	12	0	1
266			min	-254.573	3	0	1	-242.956	4	0	1	-.491	4	0	1
267	M6	1	max	3582.273	1	2.583	2	0	1	0	1	0	4	0	1
268			min	-2846.935	3	.338	12	-81.388	4	0	4	0	1	0	1
269		2	max	3582.601	1	2.571	2	0	1	0	1	0	1	0	12
270			min	-2846.688	3	.332	12	-81.673	4	0	4	-.018	4	0	2
271		3	max	3582.93	1	2.559	2	0	1	0	1	0	1	0	12
272			min	-2846.442	3	.326	12	-81.957	4	0	4	-.036	4	-.001	2
273		4	max	3583.258	1	2.547	2	0	1	0	1	0	1	0	12
274			min	-2846.196	3	.32	12	-82.242	4	0	4	-.054	4	-.002	2
275		5	max	3583.586	1	2.536	2	0	1	0	1	0	1	0	12
276			min	-2845.949	3	.314	12	-82.527	4	0	4	-.073	4	-.002	2
277		6	max	3583.915	1	2.524	2	0	1	0	1	0	1	0	12
278			min	-2845.703	3	.308	12	-82.812	4	0	4	-.091	4	-.003	2
279		7	max	3584.243	1	2.512	2	0	1	0	1	0	1	0	12
280			min	-2845.457	3	.302	12	-83.097	4	0	4	-.109	4	-.003	2
281		8	max	3584.572	1	2.5	2	0	1	0	1	0	1	0	12
282			min	-2845.21	3	.296	12	-83.382	4	0	4	-.128	4	-.004	2
283		9	max	3584.9	1	2.488	2	0	1	0	1	0	1	0	12
284			min	-2844.964	3	.29	12	-83.666	4	0	4	-.146	4	-.004	2
285		10	max	3585.229	1	2.476	2	0	1	0	1	0	1	0	12
286			min	-2844.718	3	.284	12	-83.951	4	0	4	-.165	4	-.005	2
287		11	max	3585.557	1	2.464	2	0	1	0	1	0	1	0	12
288			min	-2844.471	3	.278	12	-84.236	4	0	4	-.183	4	-.006	2
289		12	max	3585.885	1	2.452	2	0	1	0	1	0	1	0	12
290			min	-2844.225	3	.273	12	-84.521	4	0	4	-.202	4	-.006	2
291		13	max	3586.214	1	2.44	2	0	1	0	1	0	1	0	12
292			min	-2843.979	3	.267	12	-84.806	4	0	4	-.221	4	-.007	2
293		14	max	3586.542	1	2.429	2	0	1	0	1	0	1	0	12
294			min	-2843.732	3	.261	12	-85.091	4	0	4	-.24	4	-.007	2
295		15	max	3586.871	1	2.417	2	0	1	0	1	0	1	0	12
296			min	-2843.486	3	.255	12	-85.375	4	0	4	-.259	4	-.008	2
297		16	max	3587.199	1	2.405	2	0	1	0	1	0	1	0	12
298			min	-2843.24	3	.249	12	-85.66	4	0	4	-.278	4	-.008	2
299		17	max	3587.528	1	2.393	2	0	1	0	1	0	1	-.001	12
300			min	-2842.993	3	.243	12	-85.945	4	0	4	-.297	4	-.009	2
301		18	max	3587.856	1	2.381	2	0	1	0	1	0	1	-.001	12
302			min	-2842.747	3	.237	12	-86.23	4	0	4	-.316	4	-.009	2
303		19	max	3588.185	1	2.369	2	0	1	0	1	0	1	-.001	12

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
304			min	-2842.501	3	.231	12	-86.515	4	0	4	-.335	4	-.01	2
305	M7	1	max	1022.291	2	8.119	6	0	1	0	1	0	1	.01	2
306			min	-1078.222	3	1.905	15	-1.285	5	0	4	-.013	4	.001	12
307		2	max	1022.12	2	7.346	6	0	1	0	1	0	1	.007	2
308			min	-1078.35	3	1.723	15	-.743	5	0	4	-.013	4	0	3
309		3	max	1021.95	2	6.574	6	0	1	0	1	0	1	.005	2
310			min	-1078.477	3	1.542	15	-.201	5	0	4	-.013	4	-.002	3
311		4	max	1021.78	2	5.801	6	.387	4	0	1	0	1	.003	2
312			min	-1078.605	3	1.36	15	0	1	0	4	-.013	4	-.003	3
313		5	max	1021.609	2	5.029	6	.929	4	0	1	0	1	0	2
314			min	-1078.733	3	1.178	15	0	1	0	4	-.013	4	-.004	3
315		6	max	1021.439	2	4.257	6	1.471	4	0	1	0	1	-.001	15
316			min	-1078.861	3	.997	15	0	1	0	4	-.012	4	-.005	3
317		7	max	1021.268	2	3.484	6	2.013	4	0	1	0	1	-.001	15
318			min	-1078.988	3	.815	15	0	1	0	4	-.012	4	-.006	3
319		8	max	1021.098	2	2.712	6	2.556	4	0	1	0	1	-.002	15
320			min	-1079.116	3	.634	15	0	1	0	4	-.011	4	-.007	4
321		9	max	1020.928	2	1.939	6	3.098	4	0	1	0	1	-.002	15
322			min	-1079.244	3	.45	12	0	1	0	4	-.009	4	-.008	4
323		10	max	1020.757	2	1.301	2	3.64	4	0	1	0	1	-.002	15
324			min	-1079.372	3	.149	12	0	1	0	4	-.008	4	-.009	4
325		11	max	1020.587	2	.699	2	4.182	4	0	1	0	1	-.002	15
326			min	-1079.499	3	-.276	3	0	1	0	4	-.006	4	-.009	4
327		12	max	1020.417	2	.097	2	4.724	4	0	1	0	1	-.002	15
328			min	-1079.627	3	-.728	3	0	1	0	4	-.005	4	-.009	4
329		13	max	1020.246	2	-.274	15	5.266	4	0	1	0	1	-.002	15
330			min	-1079.755	3	-1.179	3	0	1	0	4	-.002	4	-.009	4
331		14	max	1020.076	2	-.456	15	5.808	4	0	1	0	1	-.002	15
332			min	-1079.883	3	-1.923	4	0	1	0	4	0	5	-.008	4
333		15	max	1019.906	2	-.637	15	6.35	4	0	1	.002	4	-.002	15
334			min	-1080.01	3	-2.695	4	0	1	0	4	0	1	-.007	4
335		16	max	1019.735	2	-.819	15	6.893	4	0	1	.005	4	-.001	15
336			min	-1080.138	3	-3.468	4	0	1	0	4	0	1	-.006	4
337		17	max	1019.565	2	-1	15	7.435	4	0	1	.008	4	0	15
338			min	-1080.266	3	-4.24	4	0	1	0	4	0	1	-.004	4
339		18	max	1019.395	2	-1.182	15	7.977	4	0	1	.012	4	0	15
340			min	-1080.394	3	-5.012	4	0	1	0	4	0	1	-.002	4
341		19	max	1019.224	2	-1.363	15	8.519	4	0	1	.015	4	0	1
342			min	-1080.522	3	-5.785	4	0	1	0	4	0	1	0	1
343	M8	1	max	3623.69	1	0	1	0	1	0	1	.008	4	0	1
344			min	-890.242	3	0	1	-234.915	4	0	1	0	1	0	1
345		2	max	3623.861	1	0	1	0	1	0	1	0	1	0	1
346			min	-890.114	3	0	1	-235.062	4	0	1	-.019	4	0	1
347		3	max	3624.031	1	0	1	0	1	0	1	0	1	0	1
348			min	-889.987	3	0	1	-235.21	4	0	1	-.046	4	0	1
349		4	max	3624.201	1	0	1	0	1	0	1	0	1	0	1
350			min	-889.859	3	0	1	-235.358	4	0	1	-.073	4	0	1
351		5	max	3624.372	1	0	1	0	1	0	1	0	1	0	1
352			min	-889.731	3	0	1	-235.505	4	0	1	-.1	4	0	1
353		6	max	3624.542	1	0	1	0	1	0	1	0	1	0	1
354			min	-889.603	3	0	1	-235.653	4	0	1	-.127	4	0	1
355		7	max	3624.712	1	0	1	0	1	0	1	0	1	0	1
356			min	-889.476	3	0	1	-235.801	4	0	1	-.154	4	0	1
357		8	max	3624.883	1	0	1	0	1	0	1	0	1	0	1
358			min	-889.348	3	0	1	-235.948	4	0	1	-.181	4	0	1
359		9	max	3625.053	1	0	1	0	1	0	1	0	1	0	1
360			min	-889.22	3	0	1	-236.096	4	0	1	-.208	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	3625.224	1	0	1	0	1	0	1	0	1	0	1
362			min	-889.092	3	0	1	-236.243	4	0	1	-.235	4	0	1
363		11	max	3625.394	1	0	1	0	1	0	1	0	1	0	1
364			min	-888.964	3	0	1	-236.391	4	0	1	-.263	4	0	1
365		12	max	3625.564	1	0	1	0	1	0	1	0	1	0	1
366			min	-888.837	3	0	1	-236.539	4	0	1	-.29	4	0	1
367		13	max	3625.735	1	0	1	0	1	0	1	0	1	0	1
368			min	-888.709	3	0	1	-236.686	4	0	1	-.317	4	0	1
369		14	max	3625.905	1	0	1	0	1	0	1	0	1	0	1
370			min	-888.581	3	0	1	-236.834	4	0	1	-.344	4	0	1
371		15	max	3626.075	1	0	1	0	1	0	1	0	1	0	1
372			min	-888.453	3	0	1	-236.982	4	0	1	-.371	4	0	1
373		16	max	3626.246	1	0	1	0	1	0	1	0	1	0	1
374			min	-888.326	3	0	1	-237.129	4	0	1	-.399	4	0	1
375		17	max	3626.416	1	0	1	0	1	0	1	0	1	0	1
376			min	-888.198	3	0	1	-237.277	4	0	1	-.426	4	0	1
377		18	max	3626.586	1	0	1	0	1	0	1	0	1	0	1
378			min	-888.07	3	0	1	-237.425	4	0	1	-.453	4	0	1
379		19	max	3626.757	1	0	1	0	1	0	1	0	1	0	1
380			min	-887.942	3	0	1	-237.572	4	0	1	-.48	4	0	1
381	M10	1	max	1110.913	1	2.229	6	-.046	12	0	1	0	1	0	1
382			min	-866.293	3	.503	15	-81.296	4	0	5	0	3	0	1
383		2	max	1111.242	1	2.214	6	-.046	12	0	1	0	10	0	15
384			min	-866.047	3	.499	15	-81.581	4	0	5	-.018	4	0	6
385		3	max	1111.57	1	2.199	6	-.046	12	0	1	0	12	0	15
386			min	-865.8	3	.496	15	-81.865	4	0	5	-.036	4	0	6
387		4	max	1111.898	1	2.184	6	-.046	12	0	1	0	12	0	15
388			min	-865.554	3	.492	15	-82.15	4	0	5	-.054	4	-.001	6
389		5	max	1112.227	1	2.168	6	-.046	12	0	1	0	12	0	15
390			min	-865.308	3	.489	15	-82.435	4	0	5	-.073	4	-.002	6
391		6	max	1112.555	1	2.153	6	-.046	12	0	1	0	12	0	15
392			min	-865.061	3	.485	15	-82.72	4	0	5	-.091	4	-.002	6
393		7	max	1112.884	1	2.138	6	-.046	12	0	1	0	12	0	15
394			min	-864.815	3	.481	15	-83.005	4	0	5	-.109	4	-.003	6
395		8	max	1113.212	1	2.123	6	-.046	12	0	1	0	12	0	15
396			min	-864.569	3	.478	15	-83.29	4	0	5	-.128	4	-.003	6
397		9	max	1113.541	1	2.107	6	-.046	12	0	1	0	12	0	15
398			min	-864.322	3	.474	15	-83.574	4	0	5	-.146	4	-.004	6
399		10	max	1113.869	1	2.092	6	-.046	12	0	1	0	12	0	15
400			min	-864.076	3	.471	15	-83.859	4	0	5	-.165	4	-.004	6
401		11	max	1114.198	1	2.077	6	-.046	12	0	1	0	12	-.001	15
402			min	-863.83	3	.467	15	-84.144	4	0	5	-.183	4	-.005	6
403		12	max	1114.526	1	2.062	6	-.046	12	0	1	0	12	-.001	15
404			min	-863.583	3	.463	15	-84.429	4	0	5	-.202	4	-.005	6
405		13	max	1114.854	1	2.046	6	-.046	12	0	1	0	12	-.001	15
406			min	-863.337	3	.46	15	-84.714	4	0	5	-.221	4	-.006	6
407		14	max	1115.183	1	2.031	6	-.046	12	0	1	0	12	-.001	15
408			min	-863.091	3	.456	15	-84.999	4	0	5	-.239	4	-.006	6
409		15	max	1115.511	1	2.016	6	-.046	12	0	1	0	12	-.001	15
410			min	-862.844	3	.453	15	-85.283	4	0	5	-.258	4	-.007	6
411		16	max	1115.84	1	2.001	6	-.046	12	0	1	0	12	-.002	15
412			min	-862.598	3	.449	15	-85.568	4	0	5	-.277	4	-.007	6
413		17	max	1116.168	1	1.985	6	-.046	12	0	1	0	12	-.002	15
414			min	-862.352	3	.445	15	-85.853	4	0	5	-.296	4	-.007	6
415		18	max	1116.497	1	1.97	6	-.046	12	0	1	0	12	-.002	15
416			min	-862.105	3	.442	15	-86.138	4	0	5	-.315	4	-.008	6
417		19	max	1116.825	1	1.955	6	-.046	12	0	1	0	12	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
418			min	-861.859	3	.438	15	-86.423	4	0	5	-.334	4	-.008	6
419	M11	1	max	236.964	2	8.051	6	0	12	0	1	0	12	.008	6
420			min	-344.146	3	1.881	15	-1.216	5	0	4	-.013	4	.002	15
421		2	max	236.793	2	7.279	6	0	12	0	1	0	12	.005	6
422			min	-344.274	3	1.7	15	-.674	5	0	4	-.013	4	.001	15
423		3	max	236.623	2	6.506	6	0	12	0	1	0	12	.003	2
424			min	-344.401	3	1.518	15	-.132	5	0	4	-.013	4	0	12
425		4	max	236.453	2	5.734	6	.459	4	0	1	0	12	0	2
426			min	-344.529	3	1.337	15	-.012	1	0	4	-.013	4	-.001	3
427		5	max	236.282	2	4.961	6	1.001	4	0	1	0	12	0	15
428			min	-344.657	3	1.155	15	-.012	1	0	4	-.013	4	-.003	4
429		6	max	236.112	2	4.189	6	1.543	4	0	1	0	12	-.001	15
430			min	-344.785	3	.974	15	-.012	1	0	4	-.012	4	-.005	4
431		7	max	235.941	2	3.416	6	2.085	4	0	1	0	12	-.002	15
432			min	-344.912	3	.792	15	-.012	1	0	4	-.011	4	-.006	4
433		8	max	235.771	2	2.644	6	2.628	4	0	1	0	12	-.002	15
434			min	-345.04	3	.61	15	-.012	1	0	4	-.01	4	-.007	4
435		9	max	235.601	2	1.872	6	3.17	4	0	1	0	12	-.002	15
436			min	-345.168	3	.429	15	-.012	1	0	4	-.009	4	-.008	4
437		10	max	235.43	2	1.099	6	3.712	4	0	1	0	12	-.002	15
438			min	-345.296	3	.247	15	-.012	1	0	4	-.008	4	-.009	4
439		11	max	235.26	2	.383	2	4.254	4	0	1	0	12	-.002	15
440			min	-345.423	3	.048	12	-.012	1	0	4	-.006	4	-.009	4
441		12	max	235.09	2	-.116	15	4.796	4	0	1	0	12	-.002	15
442			min	-345.551	3	-.447	4	-.012	1	0	4	-.004	4	-.009	4
443		13	max	234.919	2	-.297	15	5.338	4	0	1	0	12	-.002	15
444			min	-345.679	3	-1.219	4	-.012	1	0	4	-.002	4	-.009	4
445		14	max	234.749	2	-.479	15	5.88	4	0	1	0	5	-.002	15
446			min	-345.807	3	-1.992	4	-.012	1	0	4	0	1	-.008	4
447		15	max	234.579	2	-.661	15	6.422	4	0	1	.003	4	-.002	15
448			min	-345.934	3	-2.764	4	-.012	1	0	4	0	1	-.007	4
449		16	max	234.408	2	-.842	15	6.965	4	0	1	.006	4	-.001	15
450			min	-346.062	3	-3.536	4	-.012	1	0	4	0	1	-.006	4
451		17	max	234.238	2	-1.024	15	7.507	4	0	1	.009	4	-.001	15
452			min	-346.19	3	-4.309	4	-.012	1	0	4	0	1	-.004	4
453		18	max	234.068	2	-1.205	15	8.049	4	0	1	.012	4	0	15
454			min	-346.318	3	-5.081	4	-.012	1	0	4	0	1	-.002	4
455		19	max	233.897	2	-1.387	15	8.591	4	0	1	.016	4	0	1
456			min	-346.445	3	-5.854	4	-.012	1	0	4	0	1	0	1
457	M12	1	max	1235.065	1	0	1	8.413	1	0	1	.008	4	0	1
458			min	-256.873	3	0	1	-236.067	4	0	1	0	1	0	1
459		2	max	1235.236	1	0	1	8.413	1	0	1	0	1	0	1
460			min	-256.745	3	0	1	-236.214	4	0	1	-.019	4	0	1
461		3	max	1235.406	1	0	1	8.413	1	0	1	.002	1	0	1
462			min	-256.617	3	0	1	-236.362	4	0	1	-.046	4	0	1
463		4	max	1235.576	1	0	1	8.413	1	0	1	.003	1	0	1
464			min	-256.49	3	0	1	-236.509	4	0	1	-.073	4	0	1
465		5	max	1235.747	1	0	1	8.413	1	0	1	.004	1	0	1
466			min	-256.362	3	0	1	-236.657	4	0	1	-.1	4	0	1
467		6	max	1235.917	1	0	1	8.413	1	0	1	.005	1	0	1
468			min	-256.234	3	0	1	-236.805	4	0	1	-.127	4	0	1
469		7	max	1236.087	1	0	1	8.413	1	0	1	.006	1	0	1
470			min	-256.106	3	0	1	-236.952	4	0	1	-.155	4	0	1
471		8	max	1236.258	1	0	1	8.413	1	0	1	.007	1	0	1
472			min	-255.979	3	0	1	-237.1	4	0	1	-.182	4	0	1
473		9	max	1236.428	1	0	1	8.413	1	0	1	.008	1	0	1
474			min	-255.851	3	0	1	-237.248	4	0	1	-.209	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	1236.599	1	0	1	8.413	1	0	1	.009	1	0	1
476			min	-255.723	3	0	1	-237.395	4	0	1	-.236	4	0	1
477		11	max	1236.769	1	0	1	8.413	1	0	1	.01	1	0	1
478			min	-255.595	3	0	1	-237.543	4	0	1	-.264	4	0	1
479		12	max	1236.939	1	0	1	8.413	1	0	1	.01	1	0	1
480			min	-255.467	3	0	1	-237.691	4	0	1	-.291	4	0	1
481		13	max	1237.11	1	0	1	8.413	1	0	1	.011	1	0	1
482			min	-255.34	3	0	1	-237.838	4	0	1	-.318	4	0	1
483		14	max	1237.28	1	0	1	8.413	1	0	1	.012	1	0	1
484			min	-255.212	3	0	1	-237.986	4	0	1	-.346	4	0	1
485		15	max	1237.45	1	0	1	8.413	1	0	1	.013	1	0	1
486			min	-255.084	3	0	1	-238.133	4	0	1	-.373	4	0	1
487		16	max	1237.621	1	0	1	8.413	1	0	1	.014	1	0	1
488			min	-254.956	3	0	1	-238.281	4	0	1	-.4	4	0	1
489		17	max	1237.791	1	0	1	8.413	1	0	1	.015	1	0	1
490			min	-254.829	3	0	1	-238.429	4	0	1	-.428	4	0	1
491		18	max	1237.961	1	0	1	8.413	1	0	1	.016	1	0	1
492			min	-254.701	3	0	1	-238.576	4	0	1	-.455	4	0	1
493		19	max	1238.132	1	0	1	8.413	1	0	1	.017	1	0	1
494			min	-254.573	3	0	1	-238.724	4	0	1	-.482	4	0	1
495	M1	1	max	139.851	1	491.89	3	57.184	5	0	1	.211	1	0	3
496			min	-5.96	5	-511.684	1	-88.683	1	0	3	-.058	5	-.013	1
497		2	max	140.222	1	490.852	3	58.426	5	0	1	.164	1	.257	1
498			min	-5.787	5	-513.068	1	-88.683	1	0	3	-.028	5	-.259	3
499		3	max	202.618	3	566.327	1	-3.449	12	0	3	.117	1	.515	1
500			min	-131.334	2	-355.156	3	-87.644	1	0	1	.001	15	-.507	3
501		4	max	202.896	3	564.944	1	-3.449	12	0	3	.071	1	.216	1
502			min	-130.963	2	-356.194	3	-87.644	1	0	1	-.008	5	-.32	3
503		5	max	203.174	3	563.56	1	-3.449	12	0	3	.025	1	-.004	15
504			min	-130.593	2	-357.232	3	-87.644	1	0	1	-.017	5	-.131	3
505		6	max	203.452	3	562.176	1	-3.449	12	0	3	0	12	.057	3
506			min	-130.222	2	-358.27	3	-87.644	1	0	1	-.029	4	-.378	1
507		7	max	203.73	3	560.793	1	-3.449	12	0	3	-.003	12	.247	3
508			min	-129.851	2	-359.307	3	-87.644	1	0	1	-.068	1	-.675	1
509		8	max	204.008	3	559.409	1	-3.449	12	0	3	-.004	12	.437	3
510			min	-129.48	2	-360.345	3	-87.644	1	0	1	-.114	1	-.97	1
511		9	max	211.818	3	34.051	2	39.23	5	0	9	.067	1	.51	3
512			min	-73.651	2	.418	15	-128.438	1	0	3	-.119	5	-1.105	1
513		10	max	212.096	3	32.668	2	40.472	5	0	9	0	12	.497	3
514			min	-73.28	2	0	5	-128.438	1	0	3	-.099	4	-1.115	1
515		11	max	212.374	3	31.284	2	41.713	5	0	9	-.003	12	.484	3
516			min	-72.909	2	-1.732	4	-128.438	1	0	3	-.09	4	-1.123	1
517		12	max	220.146	3	237.06	3	127.621	5	0	1	.112	1	.421	3
518			min	-47.296	5	-595.224	1	-85.626	1	0	3	-.171	5	-.991	1
519		13	max	220.425	3	236.022	3	128.862	5	0	1	.067	1	.296	3
520			min	-47.123	5	-596.608	1	-85.626	1	0	3	-.103	5	-.677	1
521		14	max	220.703	3	234.984	3	130.103	5	0	1	.022	1	.172	3
522			min	-46.95	5	-597.991	1	-85.626	1	0	3	-.035	5	-.362	1
523		15	max	220.981	3	233.947	3	131.345	5	0	1	.034	5	.048	3
524			min	-46.777	5	-599.375	1	-85.626	1	0	3	-.023	1	-.046	1
525		16	max	221.259	3	232.909	3	132.586	5	0	1	.104	5	.271	1
526			min	-46.604	5	-600.758	1	-85.626	1	0	3	-.068	1	-.075	3
527		17	max	221.537	3	231.871	3	133.828	5	0	1	.174	5	.588	1
528			min	-46.431	5	-602.142	1	-85.626	1	0	3	-.114	1	-.197	3
529		18	max	13.025	5	582.415	1	-3.549	12	0	5	.144	5	.295	1
530			min	-140.39	1	-198.765	3	-110.459	4	0	1	-.163	1	-.098	3
531		19	max	13.198	5	581.031	1	-3.549	12	0	5	.097	5	.007	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	-140.019	1	-199.803	3	-109.217	4	0	1	-.212	1	-.012	1
533	M5	1	max	301.779	1	1640.335	3	87.128	5	0	1	0	1	.027	1
534			min	9.244	12	-1730.799	1	0	1	0	4	-.132	4	0	3
535		2	max	302.15	1	1639.297	3	88.369	5	0	1	0	1	.941	1
536			min	9.429	12	-1732.183	1	0	1	0	4	-.086	4	-.866	3
537		3	max	650.743	3	1737.291	1	13.693	4	0	4	0	1	1.813	1
538			min	-496.927	1	-1144.631	3	0	1	0	1	-.04	4	-1.698	3
539		4	max	651.021	3	1735.907	1	14.935	4	0	4	0	1	.897	1
540			min	-496.556	1	-1145.669	3	0	1	0	1	-.033	4	-1.093	3
541		5	max	651.299	3	1734.524	1	16.176	4	0	4	0	1	.013	9
542			min	-496.186	1	-1146.706	3	0	1	0	1	-.025	4	-.488	3
543		6	max	651.577	3	1733.14	1	17.418	4	0	4	0	1	.117	3
544			min	-495.815	1	-1147.744	3	0	1	0	1	-.016	5	-.934	1
545		7	max	651.855	3	1731.757	1	18.659	4	0	4	0	1	.723	3
546			min	-495.444	1	-1148.782	3	0	1	0	1	-.008	5	-1.848	1
547		8	max	652.133	3	1730.373	1	19.901	4	0	4	.004	4	1.329	3
548			min	-495.073	1	-1149.82	3	0	1	0	1	0	1	-2.761	1
549		9	max	665.78	3	112.702	2	125.337	4	0	1	0	1	1.531	3
550			min	-367.266	2	.418	15	0	1	0	1	-.156	4	-3.122	1
551		10	max	666.058	3	111.318	2	126.579	4	0	1	0	1	1.483	3
552			min	-366.895	2	0	15	0	1	0	1	-.09	5	-3.154	1
553		11	max	666.336	3	109.934	2	127.82	4	0	1	0	1	1.436	3
554			min	-366.524	2	-1.587	6	0	1	0	1	-.024	5	-3.185	1
555		12	max	680.058	3	751.32	3	173.729	4	0	1	0	1	1.26	3
556			min	-252.168	2	-1850.62	1	0	1	0	4	-.237	4	-2.836	1
557		13	max	680.336	3	750.282	3	174.971	4	0	1	0	1	.864	3
558			min	-251.797	2	-1852.003	1	0	1	0	4	-.145	4	-1.859	1
559		14	max	680.614	3	749.244	3	176.212	4	0	1	0	1	.468	3
560			min	-251.426	2	-1853.387	1	0	1	0	4	-.052	4	-.882	1
561		15	max	680.892	3	748.206	3	177.454	4	0	1	.041	4	.143	2
562			min	-251.056	2	-1854.771	1	0	1	0	4	0	1	-.004	13
563		16	max	681.17	3	747.169	3	178.695	4	0	1	.135	4	1.076	1
564			min	-250.685	2	-1856.154	1	0	1	0	4	0	1	-.321	3
565		17	max	681.448	3	746.131	3	179.937	4	0	1	.229	4	2.055	1
566			min	-250.314	2	-1857.538	1	0	1	0	4	0	1	-.715	3
567		18	max	-9.576	12	1968.019	1	0	1	0	4	.225	4	1.063	1
568			min	-301.815	1	-680.541	3	-42.097	5	0	1	0	1	-.374	3
569		19	max	-9.391	12	1966.636	1	0	1	0	4	.204	4	.024	1
570			min	-301.444	1	-681.579	3	-40.855	5	0	1	0	1	-.014	3
571	M9	1	max	139.851	1	491.89	3	88.683	1	0	3	-.008	12	0	3
572			min	4.855	12	-511.684	1	3.497	12	0	1	-.211	1	-.013	1
573		2	max	140.222	1	490.852	3	88.683	1	0	3	-.006	12	.257	1
574			min	5.041	12	-513.068	1	3.497	12	0	1	-.164	1	-.259	3
575		3	max	202.618	3	566.327	1	87.644	1	0	1	-.005	12	.515	1
576			min	-131.334	2	-355.156	3	-10.388	5	0	3	-.117	1	-.507	3
577		4	max	202.896	3	564.944	1	87.644	1	0	1	-.003	12	.216	1
578			min	-130.963	2	-356.194	3	-9.146	5	0	3	-.071	1	-.32	3
579		5	max	203.174	3	563.56	1	87.644	1	0	1	-.001	12	-.004	15
580			min	-130.593	2	-357.232	3	-7.905	5	0	3	-.025	1	-.131	3
581		6	max	203.452	3	562.176	1	87.644	1	0	1	.021	1	.057	3
582			min	-130.222	2	-358.27	3	-6.663	5	0	3	-.023	5	-.378	1
583		7	max	203.73	3	560.793	1	87.644	1	0	1	.068	1	.247	3
584			min	-129.851	2	-359.307	3	-5.422	5	0	3	-.026	5	-.675	1
585		8	max	204.008	3	559.409	1	87.644	1	0	1	.114	1	.437	3
586			min	-129.48	2	-360.345	3	-4.181	5	0	3	-.029	5	-.97	1
587		9	max	211.818	3	34.051	2	128.438	1	0	3	-.003	12	.51	3
588			min	-73.651	2	.422	15	4.955	12	0	9	-.141	4	-1.105	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
589		10	max	212.096	3	32.668	2	128.438	1	0	3	0	1	.497	3
590			min	-73.28	2	.005	15	4.955	12	0	9	-.099	4	-1.115	1
591		11	max	212.374	3	31.284	2	128.438	1	0	3	.069	1	.484	3
592			min	-72.909	2	-1.693	6	4.955	12	0	9	-.07	5	-1.123	1
593		12	max	220.146	3	237.06	3	155.213	4	0	3	-.004	12	.421	3
594			min	-43.397	10	-595.224	1	3.232	12	0	1	-.206	4	-.991	1
595		13	max	220.425	3	236.022	3	156.455	4	0	3	-.003	12	.296	3
596			min	-43.088	10	-596.608	1	3.232	12	0	1	-.124	4	-.677	1
597		14	max	220.703	3	234.984	3	157.696	4	0	3	0	12	.172	3
598			min	-42.779	10	-597.991	1	3.232	12	0	1	-.041	4	-.362	1
599		15	max	220.981	3	233.947	3	158.938	4	0	3	.042	4	.048	3
600			min	-42.47	10	-599.375	1	3.232	12	0	1	0	12	-.046	1
601		16	max	221.259	3	232.909	3	160.179	4	0	3	.126	4	.271	1
602			min	-42.161	10	-600.758	1	3.232	12	0	1	.003	12	-.075	3
603		17	max	221.537	3	231.871	3	161.421	4	0	3	.211	4	.588	1
604			min	-41.852	10	-602.142	1	3.232	12	0	1	.004	12	-.197	3
605		18	max	-4.967	12	582.415	1	93.749	1	0	1	.196	4	.295	1
606			min	-140.39	1	-198.765	3	-81.428	5	0	3	.006	12	-.098	3
607		19	max	-4.782	12	581.031	1	93.749	1	0	1	.212	1	.007	3
608			min	-140.019	1	-199.803	3	-80.186	5	0	3	.008	12	-.012	1

Envelope Member Section Deflections

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
1	M13	1	max	0	1	.112	1	.004	3	8.868e-3	1	NC	1	NC	1
2			min	-.484	4	-.015	3	-.001	2	-1.112e-3	3	NC	1	NC	1
3		2	max	0	1	.235	3	.035	1	1.022e-2	1	NC	5	NC	2
4			min	-.484	4	-.127	1	-.014	5	-1.161e-3	3	985.812	3	7361.326	1
5		3	max	0	1	.437	3	.084	1	1.157e-2	1	NC	5	NC	3
6			min	-.484	4	-.315	1	-.016	5	-1.211e-3	3	544.985	3	3000.814	1
7		4	max	0	1	.559	3	.126	1	1.293e-2	1	NC	5	NC	3
8			min	-.484	4	-.421	1	-.011	5	-1.261e-3	3	428.933	3	1981.426	1
9		5	max	0	1	.586	3	.148	1	1.428e-2	1	NC	5	NC	3
10			min	-.484	4	-.429	1	-.002	5	-1.31e-3	3	409.328	3	1684.629	1
11		6	max	0	1	.521	3	.143	1	1.563e-2	1	NC	5	NC	3
12			min	-.484	4	-.343	1	.005	15	-1.36e-3	3	459.001	3	1741.115	1
13		7	max	0	1	.383	3	.113	1	1.698e-2	1	NC	5	NC	3
14			min	-.484	4	-.182	1	.007	10	-1.41e-3	3	618.644	3	2211.409	1
15		8	max	0	1	.208	3	.067	1	1.834e-2	1	NC	4	NC	2
16			min	-.484	4	-.003	9	.002	10	-1.459e-3	3	1106.078	3	3796.684	1
17		9	max	0	1	.189	1	.02	1	1.969e-2	1	NC	4	NC	1
18			min	-.484	4	.005	15	-.002	10	-1.509e-3	3	3166.82	1	NC	1
19		10	max	0	1	.268	1	.011	3	2.104e-2	1	NC	3	NC	1
20			min	-.484	4	-.023	3	-.007	2	-1.559e-3	3	1578.104	1	NC	1
21		11	max	0	12	.189	1	.02	1	1.969e-2	1	NC	4	NC	1
22			min	-.484	4	.005	15	-.011	5	-1.509e-3	3	3166.82	1	NC	1
23		12	max	0	12	.208	3	.067	1	1.834e-2	1	NC	4	NC	2
24			min	-.484	4	-.003	9	-.011	5	-1.459e-3	3	1106.078	3	3796.684	1
25		13	max	0	12	.383	3	.113	1	1.698e-2	1	NC	5	NC	3
26			min	-.484	4	-.182	1	-.004	5	-1.41e-3	3	618.644	3	2211.409	1
27		14	max	0	12	.521	3	.143	1	1.563e-2	1	NC	5	NC	3
28			min	-.484	4	-.343	1	.004	15	-1.36e-3	3	459.001	3	1741.115	1
29		15	max	0	12	.586	3	.148	1	1.428e-2	1	NC	5	NC	3
30			min	-.485	4	-.429	1	.009	12	-1.31e-3	3	409.328	3	1684.629	1
31		16	max	0	12	.559	3	.126	1	1.293e-2	1	NC	5	NC	3
32			min	-.485	4	-.421	1	.008	12	-1.261e-3	3	428.933	3	1981.426	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	.437	3	.084	1	1.157e-2	1	NC	5	NC	3
34			min	-.485	4	-.315	1	.006	12	-1.211e-3	3	544.985	3	3000.814	1
35		18	max	0	12	.235	3	.035	1	1.022e-2	1	NC	5	NC	2
36			min	-.485	4	-.127	1	.002	10	-1.161e-3	3	985.812	3	7361.326	1
37		19	max	0	12	.112	1	.004	3	8.868e-3	1	NC	1	NC	1
38			min	-.485	4	-.015	3	-.001	2	-1.112e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.15	3	.003	3	5.58e-3	1	NC	1	NC	1
40			min	-.387	4	-.361	1	-.001	10	-2.723e-3	3	NC	1	NC	1
41		2	max	0	1	.39	3	.025	1	6.713e-3	1	NC	5	NC	1
42			min	-.387	4	-.732	1	-.02	5	-3.323e-3	3	664.592	1	NC	1
43		3	max	0	1	.592	3	.068	1	7.845e-3	1	NC	15	NC	3
44			min	-.387	4	-1.049	1	-.024	5	-3.922e-3	3	357.862	1	3733.497	1
45		4	max	0	1	.731	3	.109	1	8.978e-3	1	NC	15	NC	3
46			min	-.387	4	-1.277	1	-.016	5	-4.522e-3	3	268.734	1	2310.03	1
47		5	max	0	1	.794	3	.132	1	1.011e-2	1	9468.875	15	NC	3
48			min	-.387	4	-1.397	1	-.002	5	-5.121e-3	3	237.516	1	1895.589	1
49		6	max	0	1	.781	3	.13	1	1.124e-2	1	9394.133	15	NC	3
50			min	-.387	4	-1.409	1	.009	12	-5.721e-3	3	234.739	1	1915.415	1
51		7	max	0	1	.706	3	.105	1	1.238e-2	1	NC	15	NC	3
52			min	-.387	4	-1.331	1	.006	10	-6.32e-3	3	253.669	1	2393.821	1
53		8	max	0	1	.596	3	.063	1	1.351e-2	1	NC	15	NC	2
54			min	-.387	4	-1.198	1	.002	10	-6.92e-3	3	294.009	1	4053.719	1
55		9	max	0	1	.49	3	.027	4	1.464e-2	1	NC	15	NC	1
56			min	-.387	4	-1.064	1	-.002	10	-7.52e-3	3	350.232	1	8946.295	4
57		10	max	0	1	.44	3	.01	3	1.577e-2	1	NC	5	NC	1
58			min	-.387	4	-1	1	-.006	2	-8.119e-3	3	385.325	1	NC	1
59		11	max	0	12	.49	3	.02	1	1.464e-2	1	NC	15	NC	1
60			min	-.387	4	-1.064	1	-.02	5	-7.52e-3	3	350.232	1	NC	1
61		12	max	0	12	.596	3	.063	1	1.351e-2	1	NC	15	NC	2
62			min	-.387	4	-1.198	1	-.023	5	-6.92e-3	3	294.009	1	4053.719	1
63		13	max	0	12	.706	3	.105	1	1.238e-2	1	NC	15	NC	3
64			min	-.387	4	-1.331	1	-.014	5	-6.32e-3	3	253.669	1	2393.821	1
65		14	max	0	12	.781	3	.13	1	1.124e-2	1	9393.797	15	NC	3
66			min	-.387	4	-1.409	1	0	15	-5.721e-3	3	234.739	1	1915.415	1
67		15	max	0	12	.794	3	.132	1	1.011e-2	1	9468.447	15	NC	3
68			min	-.387	4	-1.397	1	.008	12	-5.121e-3	3	237.516	1	1895.589	1
69		16	max	0	12	.731	3	.109	1	8.978e-3	1	NC	15	NC	3
70			min	-.387	4	-1.277	1	.007	12	-4.522e-3	3	268.734	1	2310.03	1
71		17	max	0	12	.592	3	.068	1	7.845e-3	1	NC	15	NC	3
72			min	-.387	4	-1.049	1	.005	10	-3.922e-3	3	357.862	1	3733.497	1
73		18	max	0	12	.39	3	.028	4	6.713e-3	1	NC	5	NC	1
74			min	-.387	4	-.732	1	0	10	-3.323e-3	3	664.592	1	8652.582	4
75		19	max	0	12	.15	3	.003	3	5.58e-3	1	NC	1	NC	1
76			min	-.387	4	-.361	1	-.001	10	-2.723e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.154	3	.003	3	2.295e-3	3	NC	1	NC	1
78			min	-.326	4	-.361	1	0	10	-5.674e-3	1	NC	1	NC	1
79		2	max	0	12	.306	3	.025	1	2.803e-3	3	NC	5	NC	1
80			min	-.326	4	-.765	1	-.03	5	-6.83e-3	1	608.817	1	7921.174	5
81		3	max	0	12	.438	3	.068	1	3.31e-3	3	NC	15	NC	3
82			min	-.326	4	-1.11	1	-.037	5	-7.986e-3	1	328.542	1	3723.356	1
83		4	max	0	12	.534	3	.109	1	3.818e-3	3	NC	15	NC	3
84			min	-.326	4	-1.354	1	-.026	5	-9.142e-3	1	247.643	1	2305.079	1
85		5	max	0	12	.588	3	.132	1	4.325e-3	3	9476.982	15	NC	3
86			min	-.326	4	-1.479	1	-.007	5	-1.03e-2	1	220.144	1	1891.837	1
87		6	max	0	12	.598	3	.131	1	4.833e-3	3	9403.738	15	NC	3
88			min	-.326	4	-1.482	1	.008	12	-1.145e-2	1	219.465	1	1911.394	1
89		7	max	0	12	.573	3	.105	1	5.34e-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	-.326	4	-1.385	1	.006	10	-1.261e-2	1	240.243	1	2387.505	1
91		8	max	0	12	.524	3	.063	1	5.848e-3	3	NC	15	NC	2
92			min	-.326	4	-1.228	1	.002	10	-1.377e-2	1	283.69	1	4035.954	1
93		9	max	0	12	.474	3	.036	4	6.355e-3	3	NC	15	NC	1
94			min	-.326	4	-1.072	1	-.002	10	-1.492e-2	1	345.846	1	6741.695	4
95		10	max	0	1	.45	3	.01	3	6.863e-3	3	NC	5	NC	1
96			min	-.326	4	-.999	1	-.006	2	-1.608e-2	1	385.824	1	NC	1
97		11	max	0	1	.474	3	.02	1	6.355e-3	3	NC	15	NC	1
98			min	-.326	4	-1.072	1	-.029	5	-1.492e-2	1	345.846	1	8513.987	5
99		12	max	0	1	.524	3	.063	1	5.848e-3	3	NC	15	NC	2
100			min	-.326	4	-1.228	1	-.034	5	-1.377e-2	1	283.69	1	4035.954	1
101		13	max	0	1	.573	3	.105	1	5.34e-3	3	NC	15	NC	3
102			min	-.326	4	-1.385	1	-.022	5	-1.261e-2	1	240.243	1	2387.505	1
103		14	max	0	1	.598	3	.131	1	4.833e-3	3	9403.492	15	NC	3
104			min	-.326	4	-1.482	1	-.002	5	-1.145e-2	1	219.465	1	1911.394	1
105		15	max	0	1	.588	3	.132	1	4.325e-3	3	9476.671	15	NC	3
106			min	-.326	4	-1.479	1	.008	12	-1.03e-2	1	220.144	1	1891.837	1
107		16	max	0	1	.534	3	.109	1	3.818e-3	3	NC	15	NC	3
108			min	-.326	4	-1.354	1	.006	12	-9.142e-3	1	247.643	1	2305.079	1
109		17	max	0	1	.438	3	.068	1	3.31e-3	3	NC	15	NC	3
110			min	-.326	4	-1.11	1	.005	12	-7.986e-3	1	328.542	1	3723.356	1
111		18	max	0	1	.306	3	.039	4	2.803e-3	3	NC	5	NC	1
112			min	-.326	4	-.765	1	.001	10	-6.83e-3	1	608.817	1	6360.204	4
113		19	max	0	1	.154	3	.003	3	2.295e-3	3	NC	1	NC	1
114			min	-.326	4	-.361	1	0	10	-5.674e-3	1	NC	1	NC	1
115	M16	1	max	0	12	.108	1	.003	3	3.986e-3	3	NC	1	NC	1
116			min	-.143	4	-.051	3	0	10	-8.345e-3	1	NC	1	NC	1
117		2	max	0	12	.039	3	.035	1	4.706e-3	3	NC	5	NC	2
118			min	-.144	4	-.165	1	-.023	5	-9.57e-3	1	899.48	1	7404.597	1
119		3	max	0	12	.109	3	.084	1	5.426e-3	3	NC	5	NC	3
120			min	-.144	4	-.383	1	-.028	5	-1.08e-2	1	501.164	1	3008.738	1
121		4	max	0	12	.147	3	.126	1	6.147e-3	3	NC	5	NC	3
122			min	-.144	4	-.506	1	-.021	5	-1.202e-2	1	400.264	1	1983.06	1
123		5	max	0	12	.146	3	.148	1	6.867e-3	3	NC	5	NC	3
124			min	-.144	4	-.519	1	-.007	5	-1.325e-2	1	392.019	1	1683.42	1
125		6	max	0	12	.109	3	.143	1	7.587e-3	3	NC	5	NC	3
126			min	-.144	4	-.425	1	.005	15	-1.447e-2	1	461.742	1	1736.625	1
127		7	max	0	12	.044	3	.114	1	8.307e-3	3	NC	5	NC	3
128			min	-.144	4	-.246	1	.007	10	-1.57e-2	1	695.349	1	2198.789	1
129		8	max	0	12	.004	4	.067	1	9.027e-3	3	NC	3	NC	2
130			min	-.144	4	-.053	2	.003	10	-1.692e-2	1	1806.671	2	3745.588	1
131		9	max	0	12	.17	1	.026	4	9.747e-3	3	NC	4	NC	1
132			min	-.144	4	-.104	3	-.001	10	-1.815e-2	1	4000.287	1	9457.215	4
133		10	max	0	1	.258	1	.008	3	1.047e-2	3	NC	5	NC	1
134			min	-.144	4	-.135	3	-.005	2	-1.937e-2	1	1647.714	1	NC	1
135		11	max	0	1	.17	1	.021	1	9.747e-3	3	NC	4	NC	1
136			min	-.144	4	-.104	3	-.018	5	-1.815e-2	1	4000.287	1	NC	1
137		12	max	0	1	.004	6	.067	1	9.027e-3	3	NC	3	NC	2
138			min	-.143	4	-.053	2	-.019	5	-1.692e-2	1	1806.671	2	3745.588	1
139		13	max	0	1	.044	3	.114	1	8.307e-3	3	NC	5	NC	3
140			min	-.143	4	-.246	1	-.009	5	-1.57e-2	1	695.349	1	2198.789	1
141		14	max	0	1	.109	3	.143	1	7.587e-3	3	NC	5	NC	3
142			min	-.143	4	-.425	1	.004	15	-1.447e-2	1	461.742	1	1736.625	1
143		15	max	0	1	.146	3	.148	1	6.867e-3	3	NC	5	NC	3
144			min	-.143	4	-.519	1	.008	12	-1.325e-2	1	392.019	1	1683.42	1
145		16	max	0	1	.147	3	.126	1	6.147e-3	3	NC	5	NC	3
146			min	-.143	4	-.506	1	.007	12	-1.202e-2	1	400.264	1	1983.06	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
147		17	max	0	1	.109	3	.084	1	5.426e-3	3	NC	5	NC	3
148			min	-.143	4	-.383	1	.005	12	-1.08e-2	1	501.164	1	3008.738	1
149		18	max	0	1	.039	3	.035	1	4.706e-3	3	NC	5	NC	2
150			min	-.143	4	-.165	1	.002	10	-9.57e-3	1	899.48	1	7224.676	4
151		19	max	0	1	.108	1	.003	3	3.986e-3	3	NC	1	NC	1
152			min	-.143	4	-.051	3	0	10	-8.345e-3	1	NC	1	NC	1
153	M2	1	max	.005	1	.002	2	.007	1	1.213e-3	5	NC	1	NC	2
154			min	-.004	3	-.005	3	-.459	4	-1.756e-4	1	NC	1	104.32	4
155		2	max	.005	1	.002	2	.006	1	1.3e-3	5	NC	1	NC	2
156			min	-.004	3	-.005	3	-.421	4	-1.627e-4	1	NC	1	113.67	4
157		3	max	.005	1	.001	2	.006	1	1.387e-3	5	NC	1	NC	2
158			min	-.004	3	-.004	3	-.383	4	-1.498e-4	1	NC	1	124.789	4
159		4	max	.004	1	0	2	.005	1	1.473e-3	5	NC	1	NC	2
160			min	-.003	3	-.004	3	-.346	4	-1.369e-4	1	NC	1	138.138	4
161		5	max	.004	1	0	2	.005	1	1.56e-3	5	NC	1	NC	1
162			min	-.003	3	-.004	3	-.31	4	-1.24e-4	1	NC	1	154.349	4
163		6	max	.004	1	0	2	.004	1	1.647e-3	5	NC	1	NC	1
164			min	-.003	3	-.004	3	-.275	4	-1.111e-4	1	NC	1	174.296	4
165		7	max	.003	1	0	15	.004	1	1.733e-3	5	NC	1	NC	1
166			min	-.003	3	-.004	3	-.24	4	-9.825e-5	1	NC	1	199.222	4
167		8	max	.003	1	0	15	.003	1	1.82e-3	4	NC	1	NC	1
168			min	-.002	3	-.004	3	-.207	4	-8.536e-5	1	NC	1	230.944	4
169		9	max	.003	1	0	15	.003	1	1.911e-3	4	NC	1	NC	1
170			min	-.002	3	-.004	3	-.176	4	-7.247e-5	1	NC	1	272.202	4
171		10	max	.003	1	0	15	.002	1	2.003e-3	4	NC	1	NC	1
172			min	-.002	3	-.003	3	-.146	4	-5.958e-5	1	NC	1	327.288	4
173		11	max	.002	1	0	15	.002	1	2.094e-3	4	NC	1	NC	1
174			min	-.002	3	-.003	3	-.119	4	-4.669e-5	1	NC	1	403.247	4
175		12	max	.002	1	0	15	.001	1	2.186e-3	4	NC	1	NC	1
176			min	-.002	3	-.003	3	-.093	4	-3.38e-5	1	NC	1	512.307	4
177		13	max	.002	1	0	15	.001	1	2.277e-3	4	NC	1	NC	1
178			min	-.001	3	-.003	3	-.071	4	-2.091e-5	1	NC	1	677.265	4
179		14	max	.001	1	0	15	0	1	2.368e-3	4	NC	1	NC	1
180			min	-.001	3	-.002	3	-.051	4	-8.02e-6	1	NC	1	944.776	4
181		15	max	.001	1	0	15	0	1	2.46e-3	4	NC	1	NC	1
182			min	0	3	-.002	3	-.034	4	-3.208e-8	3	NC	1	1423.249	4
183		16	max	0	1	0	15	0	1	2.551e-3	4	NC	1	NC	1
184			min	0	3	-.001	6	-.02	4	5.074e-7	12	NC	1	2415.887	4
185		17	max	0	1	0	15	0	1	2.643e-3	4	NC	1	NC	1
186			min	0	3	-.001	6	-.009	4	1.019e-6	12	NC	1	5068.432	4
187		18	max	0	1	0	15	0	1	2.734e-3	4	NC	1	NC	1
188			min	0	3	0	6	-.003	4	1.53e-6	12	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.825e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	2.041e-6	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-6.383e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-6.299e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.014	4	4.239e-6	1	NC	1	NC	1
194			min	0	2	-.001	6	0	12	-4.581e-6	5	NC	1	NC	1
195		3	max	0	3	0	15	.027	4	6.251e-4	4	NC	1	NC	1
196			min	0	2	-.003	6	0	12	9.665e-7	12	NC	1	NC	1
197		4	max	0	3	-.001	15	.039	4	1.253e-3	4	NC	1	NC	1
198			min	0	2	-.005	6	0	12	1.769e-6	12	NC	1	NC	1
199		5	max	0	3	-.001	15	.051	4	1.88e-3	4	NC	1	NC	1
200			min	0	2	-.007	6	0	12	2.571e-6	12	NC	1	8714.412	4
201		6	max	0	3	-.002	15	.063	4	2.508e-3	4	NC	1	NC	1
202			min	0	2	-.008	6	0	12	3.374e-6	12	NC	1	7842.706	4
203		7	max	.001	3	-.002	15	.073	4	3.135e-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	0	2	-.01	6	0	12	4.176e-6	12	9458.294	6	7448.54	4
205		8	max	.001	3	-.002	15	.084	4	3.763e-3	4	NC	1	NC	1
206			min	0	2	-.011	6	0	12	4.978e-6	12	8418.843	6	7386.754	4
207		9	max	.001	3	-.003	15	.094	4	4.39e-3	4	NC	1	NC	1
208			min	0	2	-.012	6	0	12	5.781e-6	12	7796.615	6	7607.453	5
209		10	max	.002	3	-.003	15	.103	4	5.018e-3	4	NC	2	NC	1
210			min	-.001	2	-.012	6	0	12	6.583e-6	12	7480.521	6	8124.71	5
211		11	max	.002	3	-.003	15	.112	4	5.645e-3	4	NC	2	NC	1
212			min	-.001	2	-.013	6	0	12	7.386e-6	12	7422.962	6	9016.007	5
213		12	max	.002	3	-.003	15	.121	4	6.273e-3	4	NC	2	NC	1
214			min	-.001	2	-.012	6	0	12	8.188e-6	12	7621.395	6	NC	1
215		13	max	.002	3	-.002	15	.13	4	6.9e-3	4	NC	1	NC	1
216			min	-.001	2	-.012	6	0	12	8.99e-6	12	8119.561	6	NC	1
217		14	max	.002	3	-.002	15	.138	4	7.528e-3	4	NC	1	NC	1
218			min	-.001	2	-.01	6	0	12	9.793e-6	12	9030.954	6	NC	1
219		15	max	.002	3	-.002	15	.147	4	8.155e-3	4	NC	1	NC	1
220			min	-.002	2	-.009	1	0	12	1.06e-5	12	NC	1	NC	1
221		16	max	.003	3	-.001	15	.155	4	8.783e-3	4	NC	1	NC	1
222			min	-.002	2	-.008	1	0	12	1.14e-5	12	NC	1	NC	1
223		17	max	.003	3	0	15	.164	4	9.411e-3	4	NC	1	NC	1
224			min	-.002	2	-.006	1	0	12	1.22e-5	12	NC	1	NC	1
225		18	max	.003	3	0	15	.174	4	1.004e-2	4	NC	1	NC	1
226			min	-.002	2	-.005	1	0	12	1.3e-5	12	NC	1	NC	1
227		19	max	.003	3	0	5	.184	4	1.067e-2	4	NC	1	NC	1
228			min	-.002	2	-.003	1	0	12	1.38e-5	12	NC	1	NC	1
229	M4	1	max	.003	1	.002	2	0	12	-3.995e-7	12	NC	1	NC	3
230			min	0	3	-.003	3	-.184	4	-9.493e-4	4	NC	1	134.945	4
231		2	max	.003	1	.001	2	0	12	-3.995e-7	12	NC	1	NC	2
232			min	0	3	-.003	3	-.169	4	-9.493e-4	4	NC	1	146.926	4
233		3	max	.003	1	.001	2	0	12	-3.995e-7	12	NC	1	NC	2
234			min	0	3	-.003	3	-.154	4	-9.493e-4	4	NC	1	161.173	4
235		4	max	.002	1	.001	2	0	12	-3.995e-7	12	NC	1	NC	2
236			min	0	3	-.002	3	-.139	4	-9.493e-4	4	NC	1	178.278	4
237		5	max	.002	1	.001	2	0	12	-3.995e-7	12	NC	1	NC	2
238			min	0	3	-.002	3	-.125	4	-9.493e-4	4	NC	1	199.043	4
239		6	max	.002	1	.001	2	0	12	-3.995e-7	12	NC	1	NC	2
240			min	0	3	-.002	3	-.11	4	-9.493e-4	4	NC	1	224.581	4
241		7	max	.002	1	.001	2	0	12	-3.995e-7	12	NC	1	NC	2
242			min	0	3	-.002	3	-.097	4	-9.493e-4	4	NC	1	256.473	4
243		8	max	.002	1	0	2	0	12	-3.995e-7	12	NC	1	NC	2
244			min	0	3	-.002	3	-.084	4	-9.493e-4	4	NC	1	297.022	4
245		9	max	.002	1	0	2	0	12	-3.995e-7	12	NC	1	NC	2
246			min	0	3	-.002	3	-.071	4	-9.493e-4	4	NC	1	349.699	4
247		10	max	.001	1	0	2	0	12	-3.995e-7	12	NC	1	NC	1
248			min	0	3	-.001	3	-.059	4	-9.493e-4	4	NC	1	419.93	4
249		11	max	.001	1	0	2	0	12	-3.995e-7	12	NC	1	NC	1
250			min	0	3	-.001	3	-.048	4	-9.493e-4	4	NC	1	516.589	4
251		12	max	.001	1	0	2	0	12	-3.995e-7	12	NC	1	NC	1
252			min	0	3	-.001	3	-.038	4	-9.493e-4	4	NC	1	655.032	4
253		13	max	0	1	0	2	0	12	-3.995e-7	12	NC	1	NC	1
254			min	0	3	0	3	-.029	4	-9.493e-4	4	NC	1	863.768	4
255		14	max	0	1	0	2	0	12	-3.995e-7	12	NC	1	NC	1
256			min	0	3	0	3	-.021	4	-9.493e-4	4	NC	1	1200.803	4
257		15	max	0	1	0	2	0	12	-3.995e-7	12	NC	1	NC	1
258			min	0	3	0	3	-.014	4	-9.493e-4	4	NC	1	1799.882	4
259		16	max	0	1	0	2	0	12	-3.995e-7	12	NC	1	NC	1
260			min	0	3	0	3	-.008	4	-9.493e-4	4	NC	1	3030.836	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	-3.995e-7	12	NC	1	NC	1
262			min	0	3	0	3	-.004	4	-9.493e-4	4	NC	1	6265.463	4
263		18	max	0	1	0	2	0	12	-3.995e-7	12	NC	1	NC	1
264			min	0	3	0	3	-.001	4	-9.493e-4	4	NC	1	NC	1
265		19	max	0	1	0	1	0	1	-3.995e-7	12	NC	1	NC	1
266			min	0	1	0	1	0	1	-9.493e-4	4	NC	1	NC	1
267	M6	1	max	.017	1	.01	2	0	1	1.267e-3	4	NC	3	NC	1
268			min	-.013	3	-.015	3	-.463	4	0	1	4747.821	2	103.432	4
269		2	max	.016	1	.009	2	0	1	1.352e-3	4	NC	3	NC	1
270			min	-.012	3	-.014	3	-.425	4	0	1	5235.039	2	112.703	4
271		3	max	.015	1	.008	2	0	1	1.438e-3	4	NC	1	NC	1
272			min	-.012	3	-.013	3	-.387	4	0	1	5828.606	2	123.728	4
273		4	max	.014	1	.007	2	0	1	1.523e-3	4	NC	1	NC	1
274			min	-.011	3	-.012	3	-.349	4	0	1	6561.119	2	136.965	4
275		5	max	.013	1	.006	2	0	1	1.609e-3	4	NC	1	NC	1
276			min	-.01	3	-.012	3	-.313	4	0	1	7479.156	2	153.04	4
277		6	max	.012	1	.006	2	0	1	1.694e-3	4	NC	1	NC	1
278			min	-.009	3	-.011	3	-.277	4	0	1	8651.209	2	172.82	4
279		7	max	.011	1	.005	2	0	1	1.78e-3	4	NC	1	NC	1
280			min	-.009	3	-.01	3	-.242	4	0	1	NC	1	197.538	4
281		8	max	.01	1	.004	2	0	1	1.865e-3	4	NC	1	NC	1
282			min	-.008	3	-.009	3	-.209	4	0	1	NC	1	228.996	4
283		9	max	.009	1	.003	2	0	1	1.951e-3	4	NC	1	NC	1
284			min	-.007	3	-.009	3	-.177	4	0	1	NC	1	269.911	4
285		10	max	.008	1	.002	2	0	1	2.036e-3	4	NC	1	NC	1
286			min	-.007	3	-.008	3	-.147	4	0	1	NC	1	324.541	4
287		11	max	.007	1	.002	2	0	1	2.121e-3	4	NC	1	NC	1
288			min	-.006	3	-.007	3	-.12	4	0	1	NC	1	399.874	4
289		12	max	.006	1	.001	2	0	1	2.207e-3	4	NC	1	NC	1
290			min	-.005	3	-.006	3	-.094	4	0	1	NC	1	508.039	4
291		13	max	.006	1	0	2	0	1	2.292e-3	4	NC	1	NC	1
292			min	-.004	3	-.005	3	-.071	4	0	1	NC	1	671.655	4
293		14	max	.005	1	0	2	0	1	2.378e-3	4	NC	1	NC	1
294			min	-.004	3	-.004	3	-.051	4	0	1	NC	1	937.009	4
295		15	max	.004	1	0	2	0	1	2.463e-3	4	NC	1	NC	1
296			min	-.003	3	-.004	3	-.034	4	0	1	NC	1	1411.678	4
297		16	max	.003	1	0	2	0	1	2.549e-3	4	NC	1	NC	1
298			min	-.002	3	-.003	3	-.02	4	0	1	NC	1	2396.591	4
299		17	max	.002	1	0	2	0	1	2.634e-3	4	NC	1	NC	1
300			min	-.001	3	-.002	3	-.01	4	0	1	NC	1	5029.276	4
301		18	max	0	1	0	2	0	1	2.72e-3	4	NC	1	NC	1
302			min	0	3	0	3	-.003	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	2.805e-3	4	NC	1	NC	1
304			min	0	1	0	1	0	1	0	1	NC	1	NC	1
305	M7	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	-6.231e-4	4	NC	1	NC	1
307		2	max	0	3	0	15	.014	4	0	1	NC	1	NC	1
308			min	0	2	-.002	3	0	1	-9.191e-6	5	NC	1	NC	1
309		3	max	.001	3	0	15	.027	4	6.069e-4	4	NC	1	NC	1
310			min	0	2	-.004	3	0	1	0	1	NC	1	NC	1
311		4	max	.002	3	-.001	15	.039	4	1.222e-3	4	NC	1	NC	1
312			min	-.001	2	-.005	3	0	1	0	1	NC	1	NC	1
313		5	max	.002	3	-.002	15	.051	4	1.837e-3	4	NC	1	NC	1
314			min	-.002	2	-.007	4	0	1	0	1	NC	1	8359.493	4
315		6	max	.003	3	-.002	15	.062	4	2.452e-3	4	NC	1	NC	1
316			min	-.002	2	-.009	4	0	1	0	1	NC	1	7499.671	4
317		7	max	.003	3	-.002	15	.073	4	3.067e-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	-.003	2	-.01	4	0	1	0	1	9561.6	4	7096.68	4
319		8	max	.004	3	-.003	15	.083	4	3.682e-3	4	NC	1	NC	1
320			min	-.003	2	-.011	4	0	1	0	1	8503.383	4	7007.413	4
321		9	max	.004	3	-.003	15	.093	4	4.297e-3	4	NC	1	NC	1
322			min	-.004	2	-.012	4	0	1	0	1	7869.295	4	7183.674	4
323		10	max	.005	3	-.003	15	.102	4	4.912e-3	4	NC	1	NC	1
324			min	-.004	2	-.013	4	0	1	0	1	7545.805	4	7633.547	4
325		11	max	.005	3	-.003	15	.111	4	5.527e-3	4	NC	1	NC	1
326			min	-.005	2	-.013	4	0	1	0	1	7484.071	4	8417.327	4
327		12	max	.006	3	-.003	15	.119	4	6.142e-3	4	NC	1	NC	1
328			min	-.005	2	-.013	4	0	1	0	1	7680.99	4	9668.169	4
329		13	max	.006	3	-.003	15	.128	4	6.757e-3	4	NC	1	NC	1
330			min	-.006	2	-.012	4	0	1	0	1	8180.259	4	NC	1
331		14	max	.007	3	-.003	15	.136	4	7.372e-3	4	NC	1	NC	1
332			min	-.006	2	-.012	1	0	1	0	1	9095.899	4	NC	1
333		15	max	.007	3	-.002	15	.144	4	7.987e-3	4	NC	1	NC	1
334			min	-.007	2	-.011	1	0	1	0	1	NC	1	NC	1
335		16	max	.008	3	-.002	15	.153	4	8.602e-3	4	NC	1	NC	1
336			min	-.007	2	-.011	1	0	1	0	1	NC	1	NC	1
337		17	max	.008	3	-.001	15	.161	4	9.217e-3	4	NC	1	NC	1
338			min	-.008	2	-.01	1	0	1	0	1	NC	1	NC	1
339		18	max	.009	3	0	15	.17	4	9.832e-3	4	NC	1	NC	1
340			min	-.008	2	-.009	1	0	1	0	1	NC	1	NC	1
341		19	max	.009	3	0	15	.18	4	1.045e-2	4	NC	1	NC	1
342			min	-.009	2	-.007	1	0	1	0	1	NC	1	NC	1
343	M8	1	max	.009	1	.007	2	0	1	0	1	NC	1	NC	1
344			min	-.002	3	-.009	3	-.18	4	-9.711e-4	4	NC	1	137.948	4
345		2	max	.008	1	.007	2	0	1	0	1	NC	1	NC	1
346			min	-.002	3	-.009	3	-.165	4	-9.711e-4	4	NC	1	150.197	4
347		3	max	.008	1	.007	2	0	1	0	1	NC	1	NC	1
348			min	-.002	3	-.008	3	-.151	4	-9.711e-4	4	NC	1	164.764	4
349		4	max	.007	1	.006	2	0	1	0	1	NC	1	NC	1
350			min	-.002	3	-.008	3	-.136	4	-9.711e-4	4	NC	1	182.252	4
351		5	max	.007	1	.006	2	0	1	0	1	NC	1	NC	1
352			min	-.002	3	-.007	3	-.122	4	-9.711e-4	4	NC	1	203.482	4
353		6	max	.006	1	.005	2	0	1	0	1	NC	1	NC	1
354			min	-.002	3	-.007	3	-.108	4	-9.711e-4	4	NC	1	229.593	4
355		7	max	.006	1	.005	2	0	1	0	1	NC	1	NC	1
356			min	-.001	3	-.006	3	-.095	4	-9.711e-4	4	NC	1	262.199	4
357		8	max	.005	1	.004	2	0	1	0	1	NC	1	NC	1
358			min	-.001	3	-.006	3	-.082	4	-9.711e-4	4	NC	1	303.656	4
359		9	max	.005	1	.004	2	0	1	0	1	NC	1	NC	1
360			min	-.001	3	-.005	3	-.069	4	-9.711e-4	4	NC	1	357.514	4
361		10	max	.004	1	.004	2	0	1	0	1	NC	1	NC	1
362			min	-.001	3	-.005	3	-.058	4	-9.711e-4	4	NC	1	429.317	4
363		11	max	.004	1	.003	2	0	1	0	1	NC	1	NC	1
364			min	0	3	-.004	3	-.047	4	-9.711e-4	4	NC	1	528.141	4
365		12	max	.003	1	.003	2	0	1	0	1	NC	1	NC	1
366			min	0	3	-.004	3	-.037	4	-9.711e-4	4	NC	1	669.687	4
367		13	max	.003	1	.002	2	0	1	0	1	NC	1	NC	1
368			min	0	3	-.003	3	-.028	4	-9.711e-4	4	NC	1	883.099	4
369		14	max	.002	1	.002	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.003	3	-.02	4	-9.711e-4	4	NC	1	1227.686	4
371		15	max	.002	1	.002	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.002	3	-.013	4	-9.711e-4	4	NC	1	1840.191	4
373		16	max	.001	1	.001	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.002	3	-.008	4	-9.711e-4	4	NC	1	3098.739	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	0	2	0	1	0	1	NC	1	NC	1
376			min	0	3	-.001	3	-.004	4	-9.711e-4	4	NC	1	6405.897	4
377		18	max	0	1	0	2	0	1	0	1	NC	1	NC	1
378			min	0	3	0	3	-.001	4	-9.711e-4	4	NC	1	NC	1
379		19	max	0	1	0	1	0	1	0	1	NC	1	NC	1
380			min	0	1	0	1	0	1	-9.711e-4	4	NC	1	NC	1
381	M10	1	max	.005	1	.002	2	0	12	1.268e-3	4	NC	1	NC	2
382			min	-.004	3	-.005	3	-.462	4	7.162e-6	12	NC	1	103.55	4
383		2	max	.005	1	.002	2	0	12	1.353e-3	4	NC	1	NC	2
384			min	-.004	3	-.005	3	-.424	4	6.651e-6	12	NC	1	112.832	4
385		3	max	.005	1	.001	2	0	12	1.438e-3	4	NC	1	NC	2
386			min	-.004	3	-.004	3	-.386	4	6.139e-6	12	NC	1	123.869	4
387		4	max	.004	1	0	2	0	12	1.523e-3	4	NC	1	NC	2
388			min	-.003	3	-.004	3	-.349	4	5.628e-6	12	NC	1	137.121	4
389		5	max	.004	1	0	2	0	12	1.608e-3	4	NC	1	NC	1
390			min	-.003	3	-.004	3	-.312	4	5.117e-6	12	NC	1	153.215	4
391		6	max	.004	1	0	2	0	12	1.693e-3	4	NC	1	NC	1
392			min	-.003	3	-.004	3	-.277	4	4.606e-6	12	NC	1	173.017	4
393		7	max	.003	1	0	2	0	12	1.778e-3	4	NC	1	NC	1
394			min	-.003	3	-.004	3	-.242	4	4.094e-6	12	NC	1	197.764	4
395		8	max	.003	1	0	2	0	12	1.863e-3	4	NC	1	NC	1
396			min	-.002	3	-.004	3	-.209	4	3.583e-6	12	NC	1	229.257	4
397		9	max	.003	1	0	10	0	12	1.948e-3	4	NC	1	NC	1
398			min	-.002	3	-.004	3	-.177	4	3.072e-6	12	NC	1	270.219	4
399		10	max	.003	1	0	10	0	12	2.033e-3	4	NC	1	NC	1
400			min	-.002	3	-.003	3	-.147	4	2.56e-6	12	NC	1	324.912	4
401		11	max	.002	1	0	15	0	12	2.118e-3	4	NC	1	NC	1
402			min	-.002	3	-.003	3	-.12	4	2.049e-6	12	NC	1	400.332	4
403		12	max	.002	1	0	15	0	12	2.202e-3	4	NC	1	NC	1
404			min	-.002	3	-.003	3	-.094	4	1.538e-6	12	NC	1	508.623	4
405		13	max	.002	1	0	15	0	12	2.287e-3	4	NC	1	NC	1
406			min	-.001	3	-.003	4	-.071	4	1.026e-6	12	NC	1	672.429	4
407		14	max	.001	1	0	15	0	12	2.372e-3	4	NC	1	NC	1
408			min	-.001	3	-.002	4	-.051	4	5.152e-7	12	NC	1	938.094	4
409		15	max	.001	1	0	15	0	12	2.457e-3	4	NC	1	NC	1
410			min	0	3	-.002	4	-.034	4	-4.871e-6	1	NC	1	1413.325	4
411		16	max	0	1	0	15	0	12	2.542e-3	4	NC	1	NC	1
412			min	0	3	-.002	4	-.02	4	-1.776e-5	1	NC	1	2399.421	4
413		17	max	0	1	0	15	0	12	2.627e-3	4	NC	1	NC	1
414			min	0	3	-.001	4	-.01	4	-3.065e-5	1	NC	1	5035.356	4
415		18	max	0	1	0	15	0	12	2.712e-3	4	NC	1	NC	1
416			min	0	3	0	4	-.003	4	-4.354e-5	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.797e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-5.643e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	1.749e-5	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-6.211e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.014	4	-1.641e-7	12	NC	1	NC	1
422			min	0	2	-.002	4	0	1	-4.992e-6	5	NC	1	NC	1
423		3	max	0	3	0	15	.027	4	6.121e-4	4	NC	1	NC	1
424			min	0	2	-.003	4	0	1	-2.597e-5	1	NC	1	NC	1
425		4	max	0	3	-.001	15	.039	4	1.229e-3	4	NC	1	NC	1
426			min	0	2	-.005	4	0	1	-4.77e-5	1	NC	1	NC	1
427		5	max	0	3	-.002	15	.051	4	1.845e-3	4	NC	1	NC	1
428			min	0	2	-.007	4	-.001	1	-6.943e-5	1	NC	1	8596.943	4
429		6	max	0	3	-.002	15	.062	4	2.462e-3	4	NC	1	NC	1
430			min	0	2	-.009	4	-.001	1	-9.116e-5	1	NC	1	7731.557	4
431		7	max	.001	3	-.003	15	.073	4	3.078e-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	0	2	-.01	4	-.002	1	-1.129e-4	1	9108.365	4	7336.789	4
433		8	max	.001	3	-.003	15	.083	4	3.695e-3	4	NC	1	NC	1
434			min	0	2	-.012	4	-.002	1	-1.346e-4	1	8131.383	4	7268.506	4
435		9	max	.001	3	-.003	15	.092	4	4.312e-3	4	NC	1	NC	1
436			min	0	2	-.013	4	-.002	1	-1.564e-4	1	7548.702	4	7480.733	4
437		10	max	.002	3	-.003	15	.102	4	4.928e-3	4	NC	2	NC	1
438			min	-.001	2	-.013	4	-.003	1	-1.781e-4	1	7257.253	4	7987.263	4
439		11	max	.002	3	-.003	15	.111	4	5.545e-3	4	NC	2	NC	1
440			min	-.001	2	-.013	4	-.003	1	-1.998e-4	1	7213.522	4	8859.68	4
441		12	max	.002	3	-.003	15	.119	4	6.161e-3	4	NC	2	NC	1
442			min	-.001	2	-.013	4	-.004	1	-2.216e-4	1	7416.773	4	NC	1
443		13	max	.002	3	-.003	15	.128	4	6.778e-3	4	NC	1	NC	1
444			min	-.001	2	-.012	4	-.004	1	-2.433e-4	1	7910.838	4	NC	1
445		14	max	.002	3	-.003	15	.136	4	7.395e-3	4	NC	1	NC	1
446			min	-.001	2	-.011	4	-.004	1	-2.65e-4	1	8807.343	4	NC	1
447		15	max	.002	3	-.002	15	.144	4	8.011e-3	4	NC	1	NC	1
448			min	-.002	2	-.01	4	-.005	1	-2.867e-4	1	NC	1	NC	1
449		16	max	.003	3	-.002	15	.153	4	8.628e-3	4	NC	1	NC	1
450			min	-.002	2	-.008	4	-.005	1	-3.085e-4	1	NC	1	NC	1
451		17	max	.003	3	-.001	15	.162	4	9.244e-3	4	NC	1	NC	1
452			min	-.002	2	-.006	1	-.006	1	-3.302e-4	1	NC	1	NC	1
453		18	max	.003	3	0	15	.171	4	9.861e-3	4	NC	1	NC	1
454			min	-.002	2	-.005	1	-.006	1	-3.519e-4	1	NC	1	NC	1
455		19	max	.003	3	0	12	.181	4	1.048e-2	4	NC	1	NC	1
456			min	-.002	2	-.003	1	-.006	1	-3.737e-4	1	NC	1	NC	1
457	M12	1	max	.003	1	.002	2	.006	1	1.369e-5	1	NC	1	NC	3
458			min	0	3	-.003	3	-.181	4	-9.423e-4	4	NC	1	137.388	4
459		2	max	.003	1	.001	2	.006	1	1.369e-5	1	NC	1	NC	2
460			min	0	3	-.003	3	-.166	4	-9.423e-4	4	NC	1	149.585	4
461		3	max	.003	1	.001	2	.005	1	1.369e-5	1	NC	1	NC	2
462			min	0	3	-.003	3	-.151	4	-9.423e-4	4	NC	1	164.089	4
463		4	max	.002	1	.001	2	.005	1	1.369e-5	1	NC	1	NC	2
464			min	0	3	-.002	3	-.137	4	-9.423e-4	4	NC	1	181.502	4
465		5	max	.002	1	.001	2	.004	1	1.369e-5	1	NC	1	NC	2
466			min	0	3	-.002	3	-.122	4	-9.423e-4	4	NC	1	202.641	4
467		6	max	.002	1	.001	2	.004	1	1.369e-5	1	NC	1	NC	2
468			min	0	3	-.002	3	-.108	4	-9.423e-4	4	NC	1	228.639	4
469		7	max	.002	1	.001	2	.003	1	1.369e-5	1	NC	1	NC	2
470			min	0	3	-.002	3	-.095	4	-9.423e-4	4	NC	1	261.105	4
471		8	max	.002	1	0	2	.003	1	1.369e-5	1	NC	1	NC	2
472			min	0	3	-.002	3	-.082	4	-9.423e-4	4	NC	1	302.385	4
473		9	max	.002	1	0	2	.002	1	1.369e-5	1	NC	1	NC	2
474			min	0	3	-.002	3	-.07	4	-9.423e-4	4	NC	1	356.011	4
475		10	max	.001	1	0	2	.002	1	1.369e-5	1	NC	1	NC	1
476			min	0	3	-.001	3	-.058	4	-9.423e-4	4	NC	1	427.506	4
477		11	max	.001	1	0	2	.002	1	1.369e-5	1	NC	1	NC	1
478			min	0	3	-.001	3	-.047	4	-9.423e-4	4	NC	1	525.906	4
479		12	max	.001	1	0	2	.001	1	1.369e-5	1	NC	1	NC	1
480			min	0	3	-.001	3	-.037	4	-9.423e-4	4	NC	1	666.843	4
481		13	max	0	1	0	2	.001	1	1.369e-5	1	NC	1	NC	1
482			min	0	3	0	3	-.028	4	-9.423e-4	4	NC	1	879.337	4
483		14	max	0	1	0	2	0	1	1.369e-5	1	NC	1	NC	1
484			min	0	3	0	3	-.02	4	-9.423e-4	4	NC	1	1222.439	4
485		15	max	0	1	0	2	0	1	1.369e-5	1	NC	1	NC	1
486			min	0	3	0	3	-.014	4	-9.423e-4	4	NC	1	1832.301	4
487		16	max	0	1	0	2	0	1	1.369e-5	1	NC	1	NC	1
488			min	0	3	0	3	-.008	4	-9.423e-4	4	NC	1	3085.409	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
489		17	max	0	1	0	2	0	1	1.369e-5	1	NC	1	NC	1
490			min	0	3	0	3	-.004	4	-9.423e-4	4	NC	1	6378.232	4
491		18	max	0	1	0	2	0	1	1.369e-5	1	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-9.423e-4	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	1.369e-5	1	NC	1	NC	1
494			min	0	1	0	1	0	1	-9.423e-4	4	NC	1	NC	1
495	M1	1	max	.004	3	.112	1	.485	4	1.816e-2	1	NC	1	NC	1
496			min	-.001	2	-.015	3	0	12	-1.894e-2	3	NC	1	NC	1
497		2	max	.004	3	.055	1	.471	4	8.905e-3	4	NC	3	NC	1
498			min	-.001	2	-.007	3	-.005	1	-9.371e-3	3	2025.627	1	NC	1
499		3	max	.004	3	.005	3	.458	4	1.405e-2	4	NC	5	NC	1
500			min	-.001	2	-.006	1	-.007	1	-1.279e-4	1	968.432	1	8625.032	5
501		4	max	.004	3	.027	3	.446	4	1.245e-2	4	NC	5	NC	1
502			min	-.001	2	-.077	1	-.006	1	-3.427e-3	3	604.468	1	5845.637	5
503		5	max	.004	3	.056	3	.433	4	1.084e-2	4	NC	15	NC	1
504			min	-.001	2	-.153	1	-.004	1	-6.762e-3	3	432.138	1	4448.941	5
505		6	max	.004	3	.087	3	.421	4	1.541e-2	1	NC	15	NC	1
506			min	-.001	2	-.227	1	-.002	1	-1.01e-2	3	337.887	1	3632.01	5
507		7	max	.003	3	.117	3	.407	4	2.059e-2	1	9557.39	15	NC	1
508			min	-.001	10	-.293	1	0	12	-1.343e-2	3	282.583	1	3108.69	4
509		8	max	.003	3	.142	3	.393	4	2.577e-2	1	8489.959	15	NC	1
510			min	-.001	10	-.346	1	0	12	-1.677e-2	3	250.013	1	2758.45	4
511		9	max	.003	3	.158	3	.377	4	2.832e-2	1	7933.583	15	NC	1
512			min	-.001	10	-.379	1	0	1	-1.685e-2	3	233.111	1	2563.227	4
513		10	max	.003	3	.164	3	.359	4	2.912e-2	1	7764.188	15	NC	1
514			min	0	10	-.39	1	0	12	-1.478e-2	3	228.046	1	2511.656	4
515		11	max	.003	3	.161	3	.339	4	2.993e-2	1	7933.432	15	NC	1
516			min	0	10	-.379	1	0	12	-1.27e-2	3	233.369	1	2580.533	4
517		12	max	.003	3	.147	3	.317	4	2.82e-2	1	8489.611	15	NC	1
518			min	0	10	-.345	1	0	1	-1.061e-2	3	250.817	1	2787.893	5
519		13	max	.003	3	.125	3	.292	4	2.266e-2	1	9556.721	15	NC	1
520			min	0	10	-.291	1	0	1	-8.495e-3	3	284.571	1	3291.407	4
521		14	max	.003	3	.097	3	.264	4	1.712e-2	1	NC	15	NC	1
522			min	0	10	-.224	1	0	12	-6.378e-3	3	342.17	1	4305.05	4
523		15	max	.003	3	.065	3	.237	4	1.158e-2	1	NC	15	NC	1
524			min	0	10	-.149	1	0	12	-4.261e-3	3	440.996	1	6449.133	4
525		16	max	.003	3	.033	3	.209	4	9.293e-3	4	NC	5	NC	1
526			min	0	10	-.074	1	0	12	-2.144e-3	3	623.198	1	NC	1
527		17	max	.003	3	.002	3	.184	4	1.018e-2	4	NC	5	NC	1
528			min	0	10	-.004	1	0	12	-2.752e-5	3	1010.956	1	NC	1
529		18	max	.003	3	.055	1	.162	4	1.048e-2	1	NC	5	NC	1
530			min	0	10	-.025	3	0	12	-3.357e-3	3	2133.891	1	NC	1
531		19	max	.003	3	.108	1	.143	4	2.082e-2	1	NC	1	NC	1
532			min	0	10	-.051	3	0	1	-6.814e-3	3	NC	1	NC	1
533	M5	1	max	.011	3	.268	1	.484	4	0	1	NC	1	NC	1
534			min	-.007	2	-.023	3	0	1	-2.163e-6	4	NC	1	NC	1
535		2	max	.011	3	.133	1	.474	4	7.196e-3	4	NC	5	NC	1
536			min	-.007	2	-.012	3	0	1	0	1	847.693	1	NC	1
537		3	max	.011	3	.017	3	.462	4	1.417e-2	4	NC	15	NC	1
538			min	-.007	2	-.021	1	0	1	0	1	396.051	1	7211.62	4
539		4	max	.011	3	.078	3	.449	4	1.154e-2	4	9110.921	15	NC	1
540			min	-.007	2	-.209	1	0	1	0	1	240.144	1	5216.18	4
541		5	max	.011	3	.16	3	.436	4	8.92e-3	4	6377.323	15	NC	1
542			min	-.007	2	-.414	1	0	1	0	1	167.765	1	4191.448	4
543		6	max	.011	3	.252	3	.422	4	6.296e-3	4	4910.763	15	NC	1
544			min	-.007	2	-.619	1	0	1	0	1	128.966	1	3560.891	4
545		7	max	.011	3	.341	3	.407	4	3.671e-3	4	4063.65	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	-.006	2	-.805	1	0	1	0	1	106.569	1	3123.835	4
547		8	max	.01	3	.417	3	.393	4	1.046e-3	4	3571.019	15	NC	1
548			min	-.006	2	-.955	1	0	1	0	1	93.55	1	2791.369	4
549		9	max	.01	3	.465	3	.377	4	0	1	3318.355	15	NC	1
550			min	-.006	2	-1.049	1	0	1	-1.238e-6	5	86.88	1	2563.742	4
551		10	max	.01	3	.483	3	.359	4	0	1	3242.219	15	NC	1
552			min	-.006	2	-1.08	1	0	1	-1.171e-6	5	84.892	1	2529.548	4
553		11	max	.01	3	.471	3	.339	4	0	1	3318.407	15	NC	1
554			min	-.006	2	-1.048	1	0	1	-1.104e-6	5	86.984	1	2605.833	4
555		12	max	.01	3	.43	3	.318	4	7.33e-4	4	3571.146	15	NC	1
556			min	-.006	2	-.952	1	0	1	0	1	93.891	1	2751.208	4
557		13	max	.009	3	.364	3	.292	4	2.572e-3	4	4063.911	15	NC	1
558			min	-.006	2	-.8	1	0	1	0	1	107.455	1	3242.152	4
559		14	max	.009	3	.281	3	.264	4	4.411e-3	4	4911.28	15	NC	1
560			min	-.006	2	-.61	1	0	1	0	1	130.96	1	4423.371	4
561		15	max	.009	3	.188	3	.235	4	6.25e-3	4	6378.354	15	NC	1
562			min	-.005	2	-.403	1	0	1	0	1	172.086	1	7463.8	5
563		16	max	.009	3	.094	3	.206	4	8.089e-3	4	9113.089	15	NC	1
564			min	-.005	2	-.197	1	0	1	0	1	249.808	1	NC	1
565		17	max	.008	3	.006	3	.18	4	9.929e-3	4	NC	15	NC	1
566			min	-.005	2	-.013	1	0	1	0	1	419.509	1	NC	1
567		18	max	.008	3	.133	1	.16	4	5.042e-3	4	NC	5	NC	1
568			min	-.005	2	-.068	3	0	1	0	1	910.45	1	NC	1
569		19	max	.008	3	.258	1	.144	4	0	1	NC	1	NC	1
570			min	-.005	2	-.135	3	0	1	-8.907e-7	4	NC	1	NC	1
571	M9	1	max	.004	3	.112	1	.484	4	1.894e-2	3	NC	1	NC	1
572			min	-.001	2	-.015	3	0	1	-1.816e-2	1	NC	1	NC	1
573		2	max	.004	3	.055	1	.474	4	9.371e-3	3	NC	3	NC	1
574			min	-.001	2	-.007	3	0	12	-8.849e-3	1	2025.627	1	NC	1
575		3	max	.004	3	.005	3	.462	4	1.413e-2	4	NC	5	NC	1
576			min	-.001	2	-.006	1	0	12	-1.935e-5	10	968.432	1	7322.467	4
577		4	max	.004	3	.027	3	.449	4	1.108e-2	5	NC	5	NC	1
578			min	-.001	2	-.077	1	0	12	-5.051e-3	1	604.468	1	5254.076	4
579		5	max	.004	3	.056	3	.436	4	8.312e-3	5	NC	15	NC	1
580			min	-.001	2	-.153	1	0	12	-1.023e-2	1	432.138	1	4192.938	4
581		6	max	.004	3	.087	3	.422	4	1.01e-2	3	NC	15	NC	1
582			min	-.001	2	-.227	1	0	12	-1.541e-2	1	337.887	1	3545.417	4
583		7	max	.003	3	.117	3	.407	4	1.343e-2	3	9545.597	15	NC	1
584			min	-.001	10	-.293	1	0	1	-2.059e-2	1	282.583	1	3104.633	4
585		8	max	.003	3	.142	3	.393	4	1.677e-2	3	8479.716	15	NC	1
586			min	-.001	10	-.346	1	0	1	-2.577e-2	1	250.013	1	2776.477	5
587		9	max	.003	3	.158	3	.377	4	1.685e-2	3	7924.129	15	NC	1
588			min	-.001	10	-.379	1	0	12	-2.832e-2	1	233.111	1	2557.446	4
589		10	max	.003	3	.164	3	.359	4	1.478e-2	3	7754.964	15	NC	1
590			min	0	10	-.39	1	0	1	-2.912e-2	1	228.046	1	2512.515	4
591		11	max	.003	3	.161	3	.339	4	1.27e-2	3	7923.982	15	NC	1
592			min	0	10	-.379	1	0	1	-2.993e-2	1	233.369	1	2587.764	4
593		12	max	.003	3	.147	3	.317	4	1.061e-2	3	8479.439	15	NC	1
594			min	0	10	-.345	1	0	12	-2.82e-2	1	250.817	1	2769.971	4
595		13	max	.003	3	.125	3	.292	4	8.495e-3	3	9545.164	15	NC	1
596			min	0	10	-.291	1	0	12	-2.266e-2	1	284.571	1	3292.108	4
597		14	max	.003	3	.097	3	.264	4	6.378e-3	3	NC	15	NC	1
598			min	0	10	-.224	1	-.002	1	-1.712e-2	1	342.17	1	4405.941	5
599		15	max	.003	3	.065	3	.235	4	5.818e-3	5	NC	15	NC	1
600			min	0	10	-.149	1	-.004	1	-1.158e-2	1	440.996	1	6965.446	5
601		16	max	.003	3	.033	3	.206	4	7.849e-3	5	NC	5	NC	1
602			min	0	10	-.074	1	-.006	1	-6.035e-3	1	623.198	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
603		17	max	.003	3	.002	3	.181	4	9.952e-3	4	NC	5	NC	1
604			min	0	10	-.004	1	-.007	1	-4.941e-4	1	1010.956	1	NC	1
605		18	max	.003	3	.055	1	.16	4	4.663e-3	5	NC	5	NC	1
606			min	0	10	-.025	3	-.005	1	-1.048e-2	1	2133.891	1	NC	1
607		19	max	.003	3	.108	1	.143	4	6.814e-3	3	NC	1	NC	1
608			min	0	10	-.051	3	0	12	-2.082e-2	1	NC	1	NC	1

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, 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

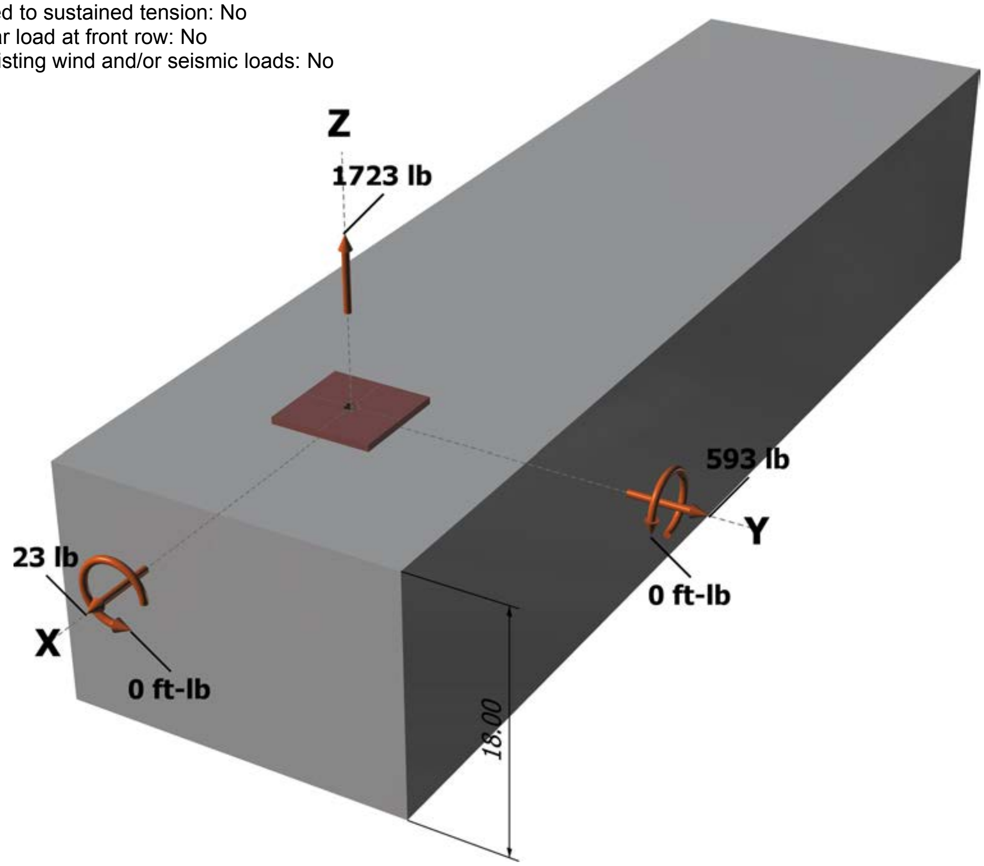
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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



<Figure 2>

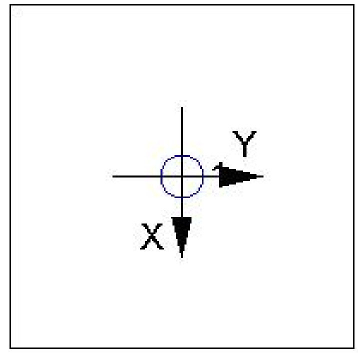
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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.

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

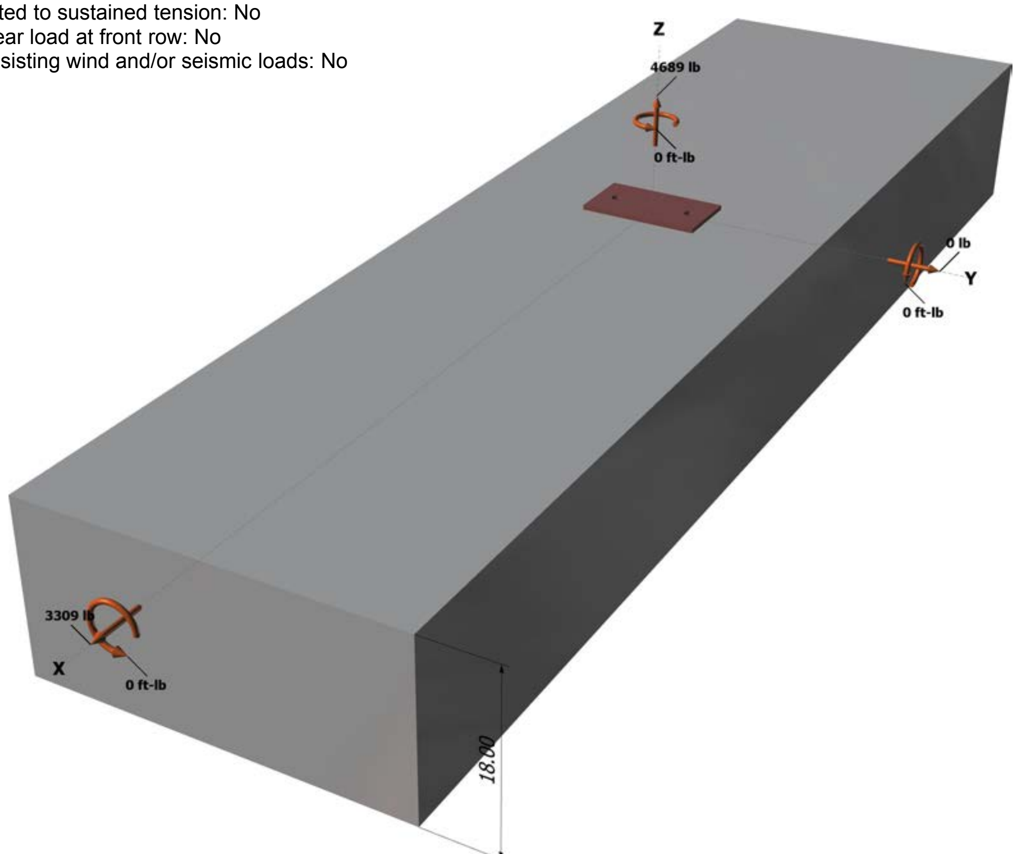
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

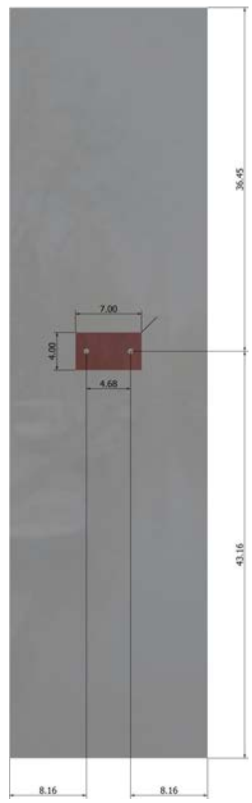
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout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



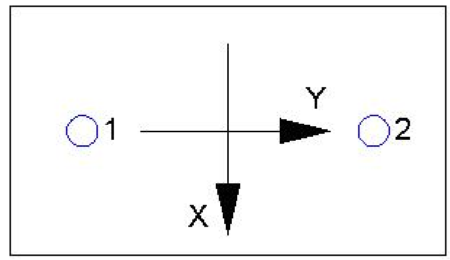
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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	2344.5	1654.5	0.0	1654.5
2	2344.5	1654.5	0.0	1654.5
Sum	4689.0	3309.0	0.0	3309.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 4689
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)
378.00	324.00	1.000	0.972	1.00	1.000	12492	0.65	9208

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)
378.00	648.00	1.000	0.836	1.000	1.000	15593	0.70	5323

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	8.16	8744

$\phi V_{cbx} = \phi\,(2)(A_{Vc} / A_{Vco})\,\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (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)
299.64	299.64	1.000	1.000	1.000	8744	0.70	12241

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
378.00	324.00	1.000	0.972	1.000	1.000	12492	14166	0.70

ϕV_{cpg} (lb)
19833

11. Results

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

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	2345	6071	0.39	Pass
Concrete breakout	4689	9208	0.51	Pass
Adhesive	**4689**	**8093**	**0.58**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	1655	3156	0.52	Pass
T Concrete breakout x+	**3309**	**5323**	**0.62**	**Pass (Governs)**
|| Concrete breakout y-	**1655**	**12241**	**0.14**	**Pass (Governs)**
Pryout	3309	19833	0.17	Pass

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

Sec. D.7.3	0.58	0.62	120.1 %	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.