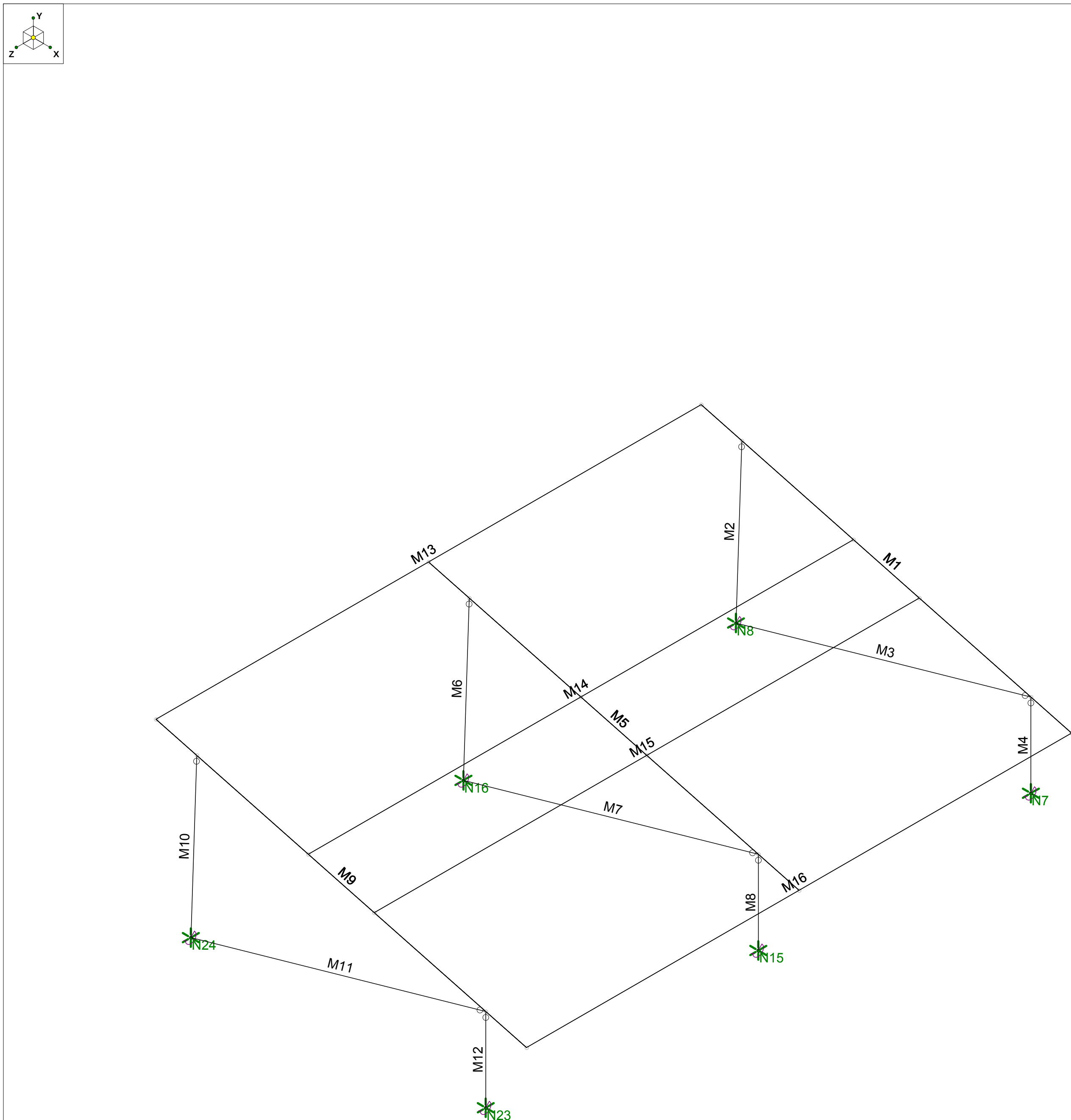


Schletter, Inc.		15° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-05	

1. INTRODUCTION

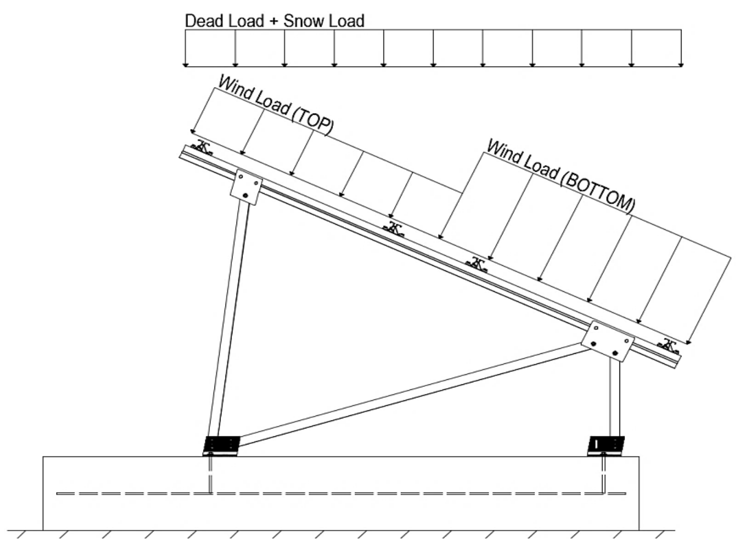
1.1 Project Description
The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. PVMax ground mount system.

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 7-05 - Chapter 6, Wind Loads
- ASCE 7-05 - Chapter 7, Snow Loads
- ASCE 7-05 - Chapter 2, Combination of Loads
- International Building Code, IBC, 2003, 2006, 2009
- 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 7-05, Eq. 7-2)*
I_s = 1.00
C_s = 1.00
C_e = 0.90
C_t = 1.20

2.3 Wind Loads
Design Wind Speed, V = 120 mph — Exposure Category = C
Height < 15 ft — Importance Category = II

Peak Velocity Pressure, q_z = 22.61 psf *Including the gust factor, G=0.85. (ASCE 7-05, Eq. 6-15)*

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 + 0.8W
1.2D + 1.6W + 0.5S
0.9D + 1.6W [M]
1.54D + 1.3E + 0.2S [R]
0.56D + 1.3E [R]
1.54D + 1.25E + 0.2S [O]
0.56D + 1.25E [O]

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

Allowable Stress Design, ASD

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

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

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

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

3. STRUCTURAL ANALYSIS

3.1 RISA Results

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

3.2 RISA Components

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

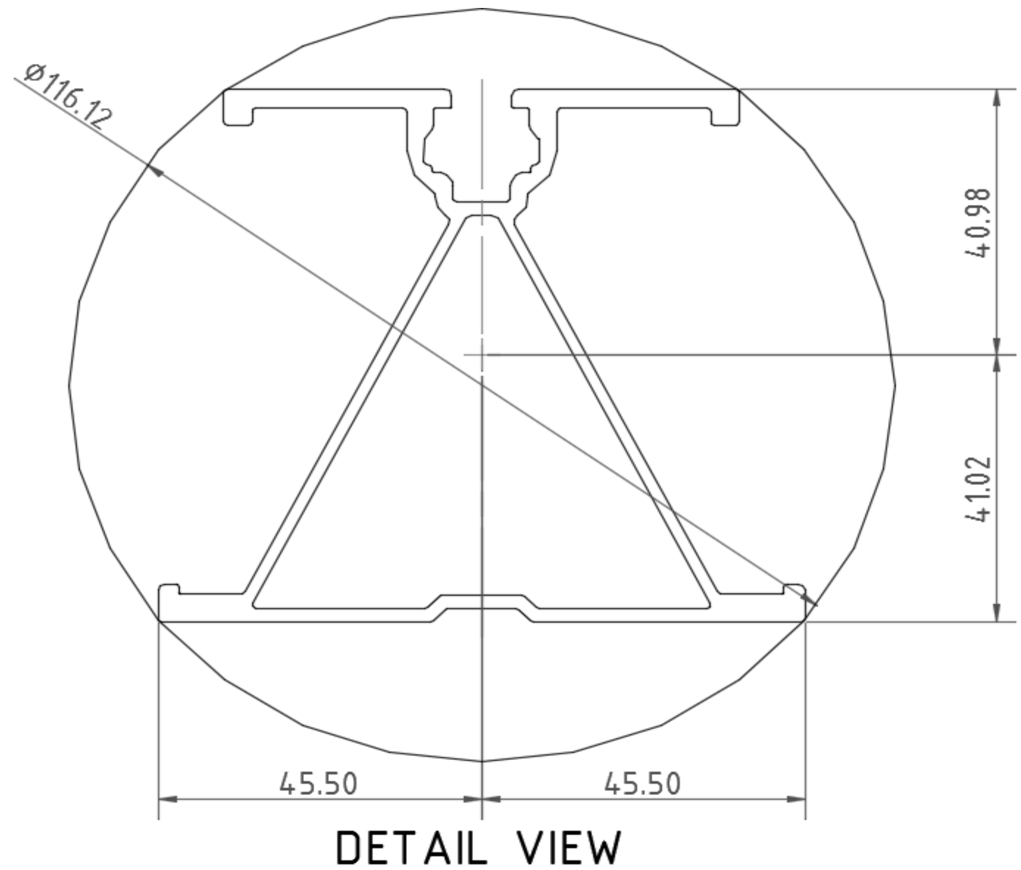
Purlins	Location	**Diagonal Struts**	Location	**Front Reactions**	Location
M13	Top	M3	Outer	N7	Outer
M14	Mid-Top	M7	Inner	N15	Inner
M15	Mid-Bottom	M11	Outer	N23	Outer
M16	Bottom				
Girders	Location	**Rear Struts**	Location	**Rear Reactions**	Location
M1	Outer	M2	Outer	N8	Outer
M5	Inner	M6	Inner	N16	Inner
M9	Outer	M10	Outer	N24	Outer
Front Struts	Location				
M4	Outer				
M8	Inner				
M12	Outer				

4. MEMBER DESIGN CALCULATIONS

4.1 Purlin Design

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

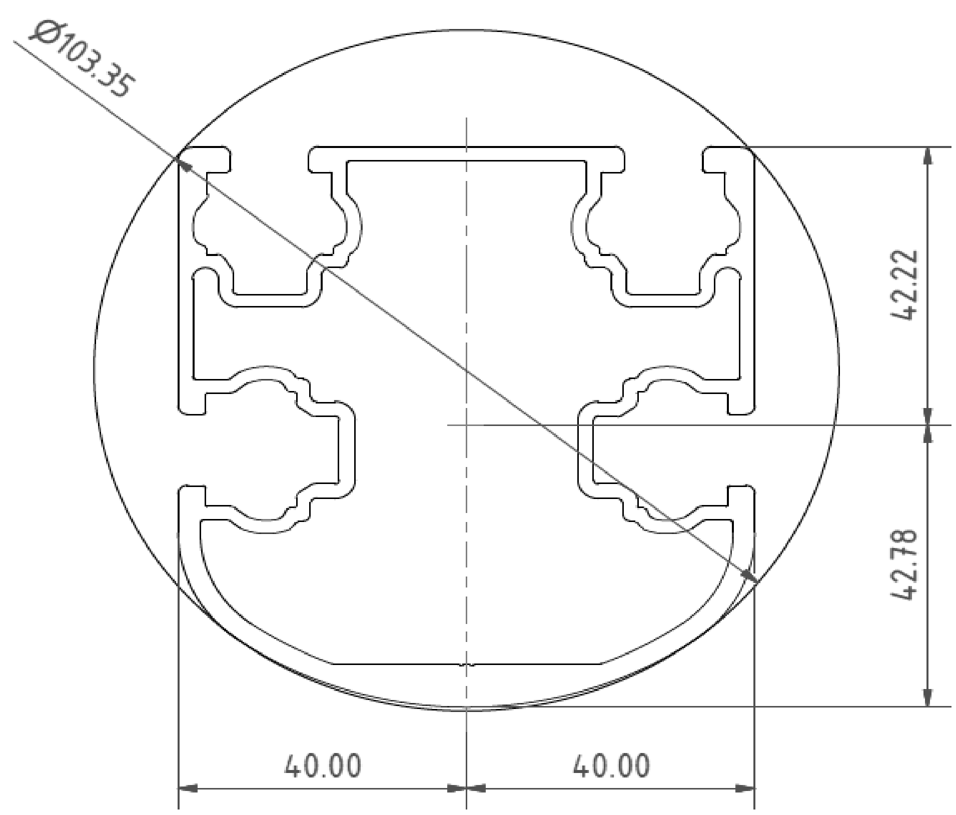
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	111	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	2.057	k-ft
M_z =	0.219	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	93%	



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).

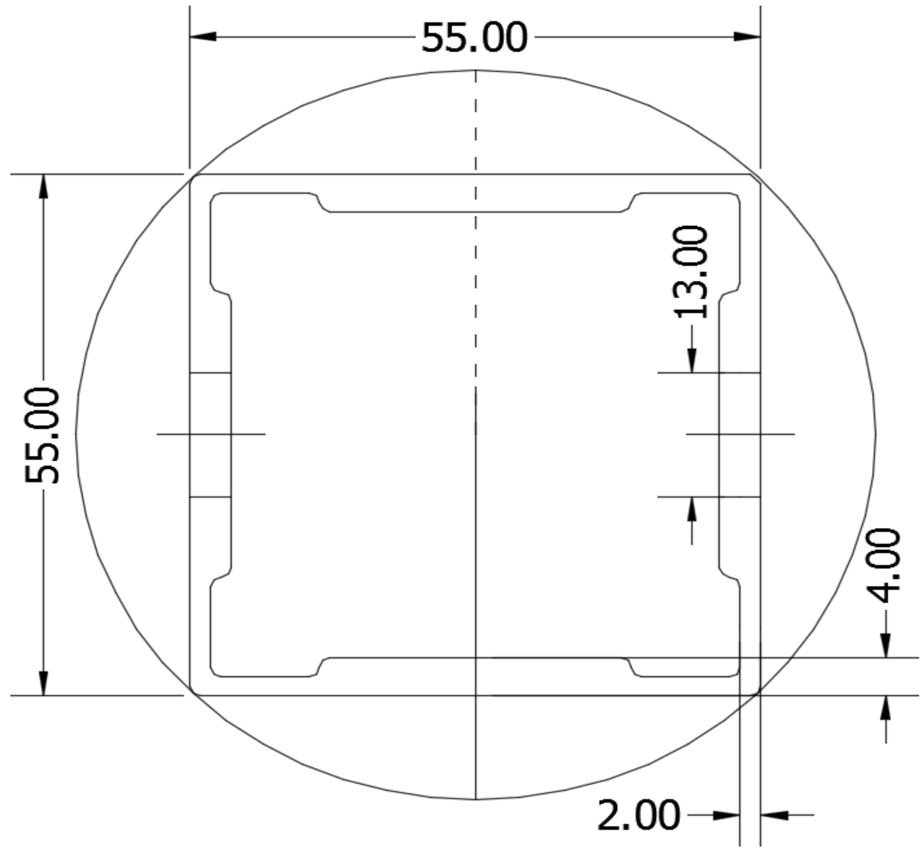
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.427	k-ft
M_z =	0.000	k-ft
P_n =	-0.569	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	100%	



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 =	-0.440	k-ft
P_n =	0.637	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	34%	

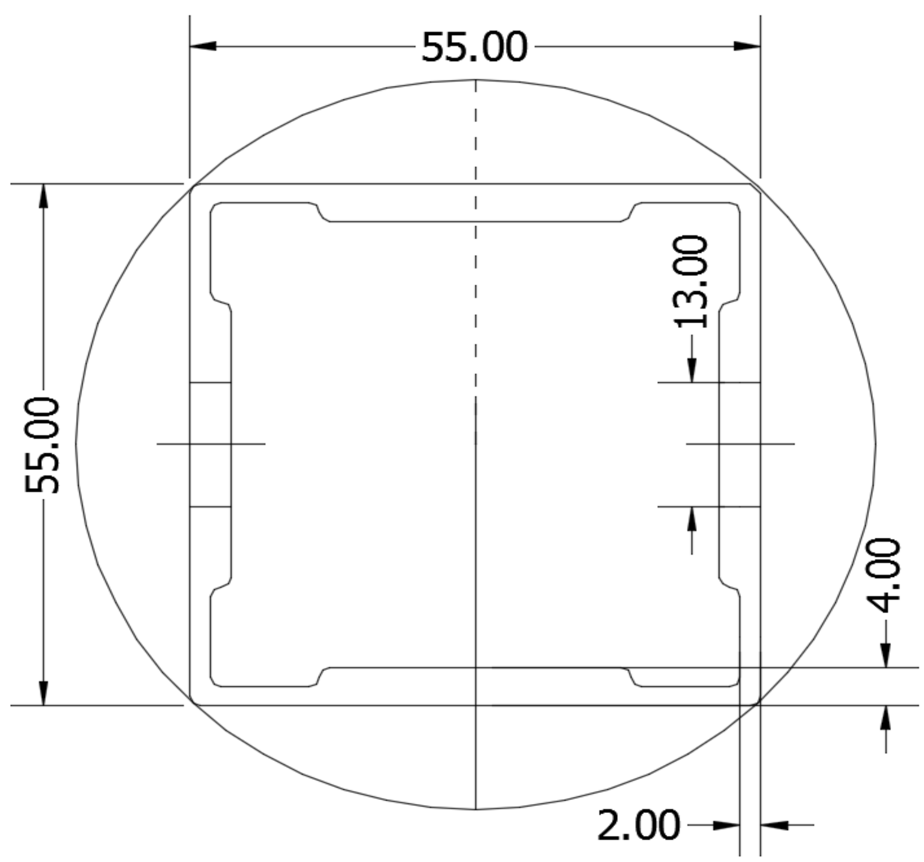


DETAIL VIEW

4.4 Diagonal Strut Design

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

Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.011	k-ft
M_z =	0.000	k-ft
P_n =	1.562	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	7.371	k
Utilization =	22%	

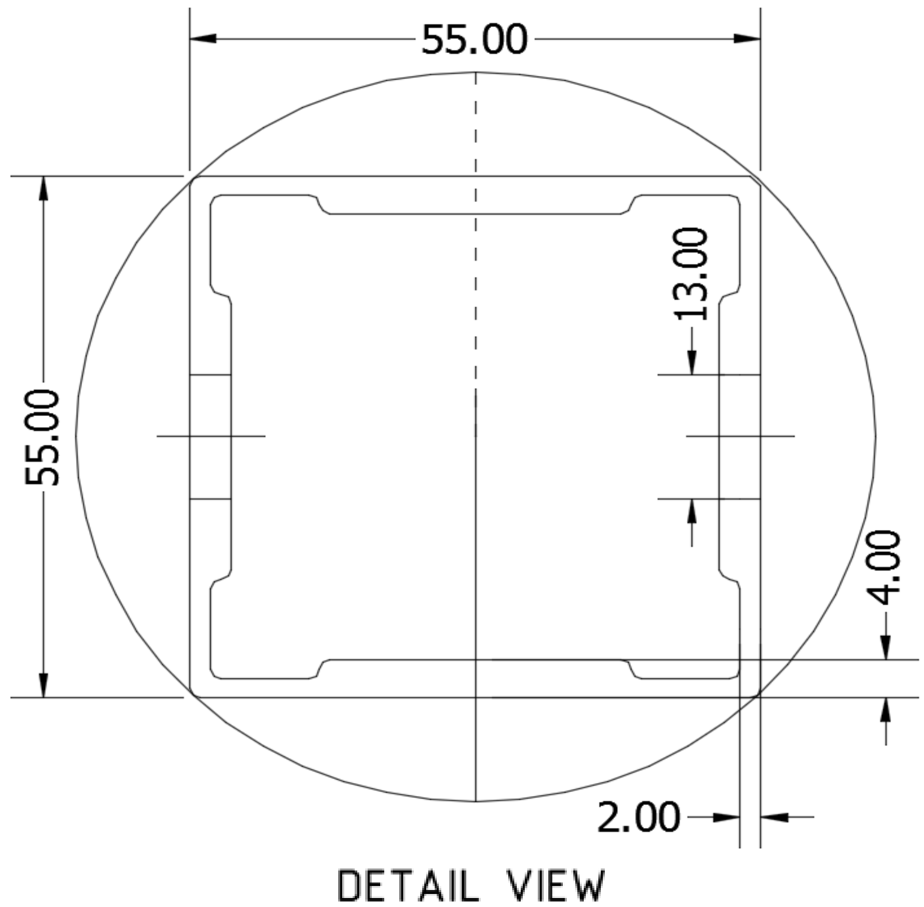


DETAIL VIEW

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 =	-0.297	k-ft
P_n =	0.644	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	18.592	k
Utilization =	25%	



5. FOUNDATION DESIGN CALCULATIONS

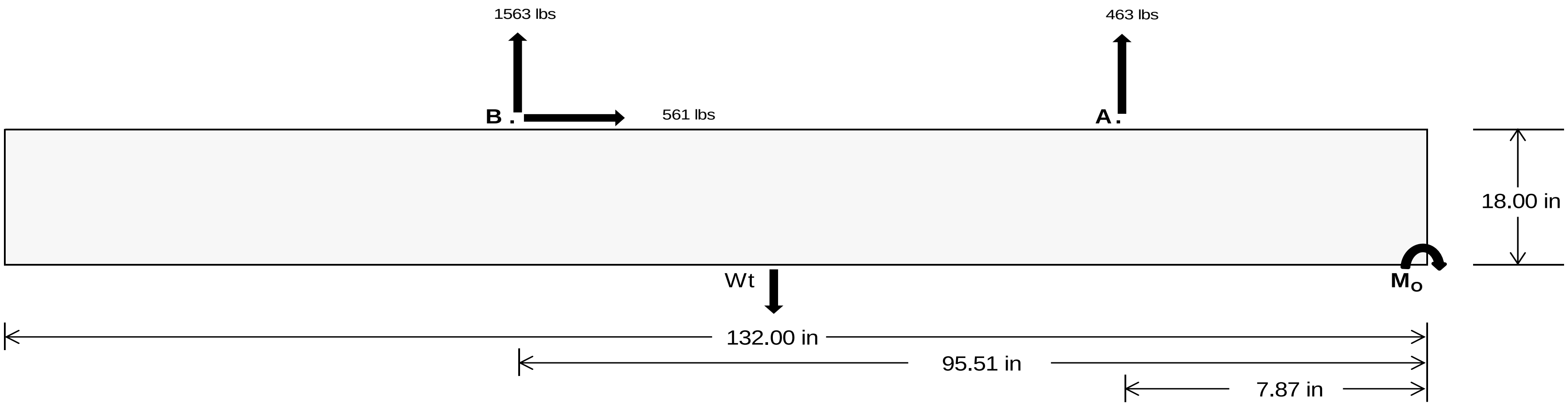
5.1 Helical Pile Foundations

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

Maximum	Front	Rear	
Tensile Load =	1937.15	6511.33	k
Compressive Load =	5035.69	5218.74	k
Lateral Load =	288.78	2335.42	k
Moment (Weak Axis) =	0.59	0.38	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 tables 1804.2 (2003, 2006) & 1806.2 (2009).



Concrete Properties

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

Footing Reinforcement

Use fiber reinforcing with (3) #5 rebar.

Overturning Check

M_O =	162988.5 in-lbs
Resisting Force Required =	2469.52 lbs
S.F. =	1.67
Weight Required =	4115.87 lbs
Minimum Width =	37 in in
Weight Provided =	7376.88 lbs

A minimum 132in long x 37in wide x 18in tall ballast foundation is required to resist overturning.

Sliding

Force =	561.34 lbs
Friction =	0.4
Weight Required =	1403.34 lbs
Resisting Weight =	7376.88 lbs
Additional Weight Required =	0 lbs

Use a 132in long x 37in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

Cohesion

Sliding Force =	561.34 lbs
Cohesion =	130 psf
Area =	33.92 ft^2
Resisting =	3688.44 lbs
Additional Weight Required =	0 lbs

Use a 132in long x 37in wide x 18in tall ballast foundation. Cohesion is OK.

Shear Key

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

Shear key is not required.

Bearing Pressure

	Ballast Width			
	37 in	38 in	39 in	40 in
P_{ftg} = (145 pcf)(11 ft)(1.5 ft)(3.08 ft) =	7377 lbs	7576 lbs	7776 lbs	7975 lbs

ASD LC	1.0D + 1.0S				1.0D + 1.0W				1.0D + 0.75L + 0.75W + 0.75S				0.6D + 1.0W			
Width	37 in	38 in	39 in	40 in	37 in	38 in	39 in	40 in	37 in	38 in	39 in	40 in	37 in	38 in	39 in	40 in
F_A	1594 lbs	1594 lbs	1594 lbs	1594 lbs	2014 lbs	2014 lbs	2014 lbs	2014 lbs	2586 lbs	2586 lbs	2586 lbs	2586 lbs	-926 lbs	-926 lbs	-926 lbs	-926 lbs
F_B	1649 lbs	1649 lbs	1649 lbs	1649 lbs	2087 lbs	2087 lbs	2087 lbs	2087 lbs	2679 lbs	2679 lbs	2679 lbs	2679 lbs	-3125 lbs	-3125 lbs	-3125 lbs	-3125 lbs
F_V	138 lbs	138 lbs	138 lbs	138 lbs	986 lbs	986 lbs	986 lbs	986 lbs	833 lbs	833 lbs	833 lbs	833 lbs	-1123 lbs	-1123 lbs	-1123 lbs	-1123 lbs
P_{total}	10619 lbs	10819 lbs	11018 lbs	11217 lbs	11478 lbs	11677 lbs	11877 lbs	12076 lbs	12642 lbs	12842 lbs	13041 lbs	13241 lbs	375 lbs	495 lbs	615 lbs	734 lbs
M	3873 lbs-ft	3873 lbs-ft	3873 lbs-ft	3873 lbs-ft	6101 lbs-ft	6101 lbs-ft	6101 lbs-ft	6101 lbs-ft	7189 lbs-ft	7189 lbs-ft	7189 lbs-ft	7189 lbs-ft	1518 lbs-ft	1518 lbs-ft	1518 lbs-ft	1518 lbs-ft
e	0.36 ft	0.36 ft	0.35 ft	0.35 ft	0.53 ft	0.52 ft	0.51 ft	0.51 ft	0.57 ft	0.56 ft	0.55 ft	0.54 ft	4.04 ft	3.07 ft	2.47 ft	2.07 ft
L/6	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft
f_{min}	250.8 psf	249.9 psf	249.1 psf	248.3 psf	240.3 psf	239.7 psf	239.1 psf	238.6 psf	257.1 psf	256.1 psf	255.1 psf	254.2 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	375.4 psf	371.2 psf	367.3 psf	363.5 psf	436.5 psf	430.8 psf	425.3 psf	420.1 psf	488.4 psf	481.2 psf	474.5 psf	468.1 psf	55.7 psf	42.8 psf	41.6 psf	42.8 psf

Maximum Bearing Pressure = 488 psf
Allowable Bearing Pressure = 1500 psf

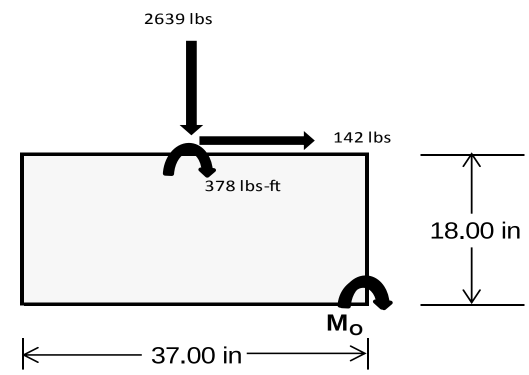
Use a 132in long x 37in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 3477.3 ft-lbs
Resisting Force Required = 2255.56 lbs
S.F. = 1.67
Weight Required = 3759.27 lbs
Minimum Width = 37 in in
Weight Provided = 7376.88 lbs

A minimum 132in long x 37in 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	37 in			37 in			37 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	239 lbs	599 lbs	209 lbs	886 lbs	2639 lbs	863 lbs	80 lbs	175 lbs	51 lbs
F_V	198 lbs	195 lbs	199 lbs	148 lbs	142 lbs	154 lbs	198 lbs	196 lbs	198 lbs
P_{total}	9371 lbs	9732 lbs	9342 lbs	9579 lbs	11333 lbs	9556 lbs	2751 lbs	2846 lbs	2721 lbs
M	788 lbs-ft	780 lbs-ft	792 lbs-ft	596 lbs-ft	592 lbs-ft	616 lbs-ft	785 lbs-ft	780 lbs-ft	786 lbs-ft
e	0.08 ft	0.08 ft	0.08 ft	0.06 ft	0.05 ft	0.06 ft	0.29 ft	0.27 ft	0.29 ft
L/6	0.51 ft	0.51 ft	0.51 ft	0.51 ft	0.51 ft	0.51 ft	0.51 ft	0.51 ft	0.51 ft
f_{min}	231.1 psf	242.2 psf	230.0 psf	248.2 psf	300.2 psf	246.4 psf	36.1 psf	39.2 psf	35.1 psf
f_{max}	321.5 psf	331.7 psf	320.9 psf	316.6 psf	368.1 psf	317.1 psf	126.1 psf	128.6 psf	125.4 psf

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

Use a 132in long x 37in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 132in long x 37in wide x 18in tall ballast foundation and fiber reinforcing with (3) #5 rebar.

5.3 Foundation Anchors

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

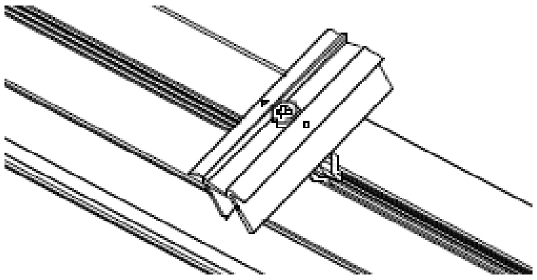
6. DESIGN OF JOINTS AND CONNECTIONS

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

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

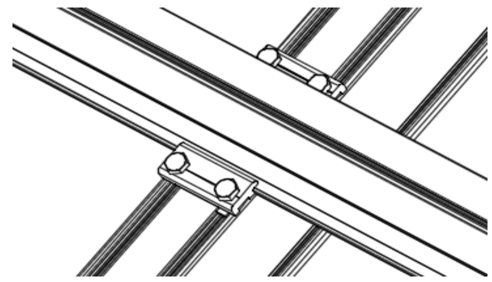
<u>Fastening of Modules to Purlins</u>

Maximum Uplifting Force =	0.784	k
Allowable Uplift =	1.214	k
Utilization =	<u>65%</u>	



<u>Fastening of Purlins to Girders</u>

Maximum Uplifting Force =	2.585	k
Allowable Uplift =	4.357	k
Utilization =	<u>59%</u>	



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.

<u>Front Strut</u>

Maximum Axial Load =	3.874	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	<u>52%</u>	

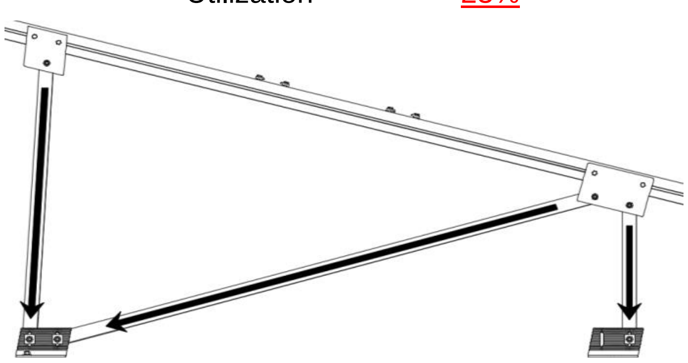
<u>Rear Strut</u>

Maximum Axial Load =	4.559	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	<u>61%</u>	

<u>Diagonal Strut</u>

Maximum Axial Load =	1.694	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	<u>23%</u>	

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

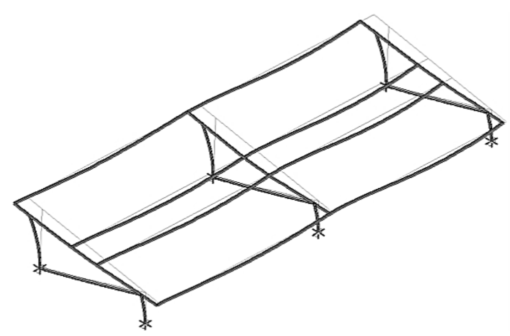
7.1 Seismic Drift

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} =	0.412	in

<u>*0.412 ≤ 0.726, OK.*</u>

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 = 111 in

J = 0.432

307.078

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

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= 27.6 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 = 111

J = 0.432

195.283

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

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= 28.8

3.4.16

b/t = 37.0588

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 23.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 32.195

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

S1 = 36.9

m = 0.65

C_0 = 45.5

Cc = 45.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 23.1 ksi

Iy = 446476 mm^4

1.073 in^4

x = 45.5 mm

Sy = 0.599 in³

M_{max}Wk = 1.152 k-ft

Compression

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

Girder = **BF0**

Strong Axis:

3.4.14

L_b = 88.9 in
J = 1.08
152.913

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

S1 = 0.51461

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

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

3.4.16

b/t = 16.2

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

S1 = 12.2

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

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

Weak Axis:

3.4.14

L_b = 88.9
J = 1.08
161.829

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

S1 = 0.51461

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

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

3.4.16

b/t = 7.4

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

S1 = 12.2

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

S2 = 46.7
φF_L= φyFcy
φF_L= 33.3 ksi

3.4.16.1 Used

Rb/t = 18.1

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

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

$\varphi F_L =$ 31.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 7.4

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

S1 = 35.2

m = 0.68

$C_0 =$ 41.067

Cc = 43.717

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

S2 = 73.8

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 29.4 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

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

3.4.18

h/t = 16.2

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

S1 = 36.9

m = 0.65

$C_0 =$ 40

Cc = 40

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 in^3

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

Compression

3.4.9

b/t = 16.2

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

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

$\varphi F_L =$ 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.3 ksi

3.4.10

Rb/t = 18.1

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

S1 = 6.87

S2 = 131.3

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

$\varphi F_L =$ 31.09 ksi

$\varphi F_L =$ 31.09 ksi

A = 1215.13 mm^2

1.88 in^2

$P_{max} =$ 58.55 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 24.8 in

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

Weak Axis:

3.4.14

L_b = 24.8

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 0.57371

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.87952

φF_L= φcc(Bc-Dc*λ)

φF_L= 28.0279 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

φF_L= φyFcy

φF_L= 33.25 ksi

φF_L= 28.03 ksi

A = 663.99 mm^2

1.03 in^2

P_{max} = 28.85 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 86.60 in

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.6 ksi

Weak Axis:

3.4.14

L_b = 86.6

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.6

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L = φb[Bp-1.6Dp*b/t]

φF_L = 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L = 1.17φyFcy

φF_L = 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L = 1.3φyFcy

φF_L = 43.2 ksi

φF_LSt = 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 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)/(λ^2)

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	-63.051	-63.051	0	0
2	M14	y	-63.051	-63.051	0	0
3	M15	y	-100.882	-100.882	0	0
4	M16	y	-100.882	-100.882	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	145.018	145.018	0	0
2	M14	y	112.231	112.231	0	0
3	M15	y	63.051	63.051	0	0
4	M16	y	63.051	63.051	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 + 0.8W	Yes	Y		1	1.2	3	1.6	4	.8														
2	LRFD 1.2D + 1.6W + 0.5S	Yes	Y		1	1.2	3	.5	4	1.6														
3	LRFD 0.9D + 1.6W	Yes	Y		2	.9					5	1.6												
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 + 1.0W	Yes	Y		1	1			4	1														
11	ASD 1.0D + 0.75L + 0.75W + 0....	Yes	Y		1	1	3	.75	4	.75														
12	ASD 0.6D + 1.0W	Yes	Y		2	.6					5	1												
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	442.163	2	1223.79	2	.899	1	.004	1	0	1	0	1
2		min	-569.679	3	-1538.197	3	-75.981	5	-.291	4	0	1	0	1
3	N7	max	.028	9	1309.401	1	-.307	12	0	12	0	1	0	1
4		min	-.146	2	-442.612	3	-222.142	4	-.45	4	0	1	0	1
5	N15	max	.022	9	3873.604	1	0	11	0	11	0	1	0	1
6		min	-1.785	2	-1490.112	3	-214.611	5	-.44	4	0	1	0	1
7	N16	max	1629.547	2	4014.415	1	0	3	0	3	0	1	0	1
8		min	-1796.478	3	-5008.713	3	-75.838	5	-.293	4	0	1	0	1
9	N23	max	.028	14	1309.401	1	6.512	1	.014	1	0	1	0	1
10		min	-.146	2	-442.612	3	-218.123	4	-.443	4	0	1	0	1
11	N24	max	442.163	2	1223.79	2	-.051	12	0	12	0	1	0	1
12		min	-569.679	3	-1538.197	3	-76.39	5	-.293	4	0	1	0	1
13	Totals:	max	2511.796	2	12935.09	1	0	11						
14		min	-2936.869	3	-10460.441	3	-879.291	5						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M13	1	max	73.916	4	534.841	1	-4.741	12	0	3	.168	1	0	4
2			min	3.496	12	-786.641	3	-125.575	1	-.016	2	.008	12	0	3
3		2	max	70.928	1	374.199	1	-3.79	12	0	3	.065	4	.689	3
4			min	3.496	12	-553.487	3	-96.422	1	-.016	2	.004	10	-.467	1
5		3	max	70.928	1	213.557	1	-2.84	12	0	3	.035	5	1.138	3
6			min	3.496	12	-320.333	3	-67.269	1	-.016	2	-.03	1	-.769	1
7		4	max	70.928	1	52.915	1	-1.89	12	0	3	.019	5	1.347	3
8			min	3.496	12	-87.179	3	-38.116	1	-.016	2	-.084	1	-.906	1
9		5	max	70.928	1	145.975	3	-.399	10	0	3	.004	5	1.317	3
10			min	3.496	12	-107.727	1	-15.88	4	-.016	2	-.108	1	-.878	1
11		6	max	70.928	1	379.129	3	20.19	1	0	3	-.004	12	1.047	3
12			min	3.496	12	-268.369	1	-12.263	5	-.016	2	-.102	1	-.685	1
13		7	max	70.928	1	612.283	3	49.343	1	0	3	-.003	12	.538	3
14			min	-4.162	5	-429.011	1	-10.792	5	-.016	2	-.067	1	-.326	1
15		8	max	70.928	1	845.438	3	78.495	1	0	3	.001	2	.197	1
16			min	-14.712	5	-589.653	1	-9.322	5	-.016	2	-.033	4	-.212	3
17		9	max	70.928	1	1078.592	3	107.648	1	0	3	.095	1	.886	1
18			min	-25.263	5	-750.295	1	-7.852	5	-.016	2	-.041	5	-1.2	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	70.928	1	1311.746	3	136.801	1	.005	14	.22	1	1.739	1
20			min	3.496	12	-910.936	1	-78.565	14	-.016	2	.004	12	-2.429	3
21		11	max	70.928	1	750.295	1	-2.862	12	.016	2	.095	1	.886	1
22			min	3.496	12	-1078.592	3	-107.648	1	0	3	0	12	-1.2	3
23		12	max	70.928	1	589.653	1	-1.912	12	.016	2	.032	4	.197	1
24			min	3.496	12	-845.438	3	-78.495	1	0	3	-.003	3	-.212	3
25		13	max	70.928	1	429.011	1	-.961	12	.016	2	.015	5	.538	3
26			min	3.496	12	-612.283	3	-49.343	1	0	3	-.067	1	-.326	1
27		14	max	70.928	1	268.369	1	.046	3	.016	2	0	15	1.047	3
28			min	.47	15	-379.129	3	-20.19	1	0	3	-.102	1	-.685	1
29		15	max	70.928	1	107.727	1	8.963	1	.016	2	-.003	12	1.317	3
30			min	-9.757	5	-145.975	3	-12.793	5	0	3	-.108	1	-.878	1
31		16	max	70.928	1	87.179	3	38.116	1	.016	2	-.002	12	1.347	3
32			min	-20.307	5	-52.915	1	-11.323	5	0	3	-.084	1	-.906	1
33		17	max	70.928	1	320.333	3	67.269	1	.016	2	0	3	1.138	3
34			min	-30.858	5	-213.557	1	-9.852	5	0	3	-.045	4	-.769	1
35		18	max	70.928	1	553.487	3	96.422	1	.016	2	.054	1	.689	3
36			min	-41.408	5	-374.199	1	-8.382	5	0	3	-.047	5	-.467	1
37		19	max	70.928	1	786.641	3	125.575	1	.016	2	.168	1	0	1
38			min	-51.958	5	-534.841	1	-6.912	5	0	3	-.055	5	0	3
39	M14	1	max	55.314	4	573.838	1	-4.872	12	.011	3	.194	1	0	1
40			min	1.504	12	-627.108	3	-129.718	1	-.013	1	.009	12	0	3
41		2	max	44.764	4	413.196	1	-3.922	12	.011	3	.095	4	.552	3
42			min	1.504	12	-447.871	3	-100.565	1	-.013	1	.005	12	-.507	1
43		3	max	34.692	1	252.555	1	-2.972	12	.011	3	.052	5	.921	3
44			min	1.504	12	-268.633	3	-71.412	1	-.013	1	-.013	1	-.849	1
45		4	max	34.692	1	91.913	1	-2.021	12	.011	3	.028	5	1.105	3
46			min	1.504	12	-89.395	3	-42.259	1	-.013	1	-.071	1	-1.026	1
47		5	max	34.692	1	89.843	3	-.764	10	.011	3	.006	5	1.104	3
48			min	1.504	12	-68.729	1	-24.146	4	-.013	1	-.1	1	-1.038	1
49		6	max	34.692	1	269.08	3	16.046	1	.011	3	-.004	12	.92	3
50			min	-4.518	5	-229.371	1	-19.535	5	-.013	1	-.098	1	-.885	1
51		7	max	34.692	1	448.318	3	45.199	1	.011	3	-.003	12	.551	3
52			min	-15.068	5	-390.013	1	-18.065	5	-.013	1	-.067	1	-.567	1
53		8	max	34.692	1	627.556	3	74.352	1	.011	3	0	10	-.001	15
54			min	-25.619	5	-550.655	1	-16.595	5	-.013	1	-.054	4	-.096	2
55		9	max	34.692	1	806.793	3	103.505	1	.011	3	.086	1	.565	1
56			min	-36.169	5	-711.297	1	-15.124	5	-.013	1	-.068	5	-.739	3
57		10	max	56.983	4	986.031	3	132.658	1	.011	3	.207	1	1.379	1
58			min	1.504	12	-871.939	1	-80.15	14	-.013	1	.004	12	-1.66	3
59		11	max	46.432	4	711.297	1	-2.73	12	.013	1	.095	4	.565	1
60			min	1.504	12	-806.793	3	-103.505	1	-.011	3	0	12	-.739	3
61		12	max	35.882	4	550.655	1	-1.78	12	.013	1	.051	5	-.001	15
62			min	1.504	12	-627.556	3	-74.352	1	-.011	3	-.005	1	-.096	2
63		13	max	34.692	1	390.013	1	-.83	12	.013	1	.027	5	.551	3
64			min	1.504	12	-448.318	3	-45.199	1	-.011	3	-.067	1	-.567	1
65		14	max	34.692	1	229.371	1	.243	3	.013	1	.005	5	.92	3
66			min	1.504	12	-269.08	3	-24.702	4	-.011	3	-.098	1	-.885	1
67		15	max	34.692	1	68.729	1	13.106	1	.013	1	-.003	12	1.104	3
68			min	-2.676	5	-89.843	3	-19.648	5	-.011	3	-.1	1	-1.038	1
69		16	max	34.692	1	89.395	3	42.259	1	.013	1	-.001	12	1.105	3
70			min	-13.226	5	-91.913	1	-18.177	5	-.011	3	-.071	1	-1.026	1
71		17	max	34.692	1	268.633	3	71.412	1	.013	1	.002	3	.921	3
72			min	-23.776	5	-252.555	1	-16.707	5	-.011	3	-.057	4	-.849	1
73		18	max	34.692	1	447.871	3	100.565	1	.013	1	.075	1	.552	3
74			min	-34.327	5	-413.196	1	-15.237	5	-.011	3	-.07	5	-.507	1
75		19	max	34.692	1	627.108	3	129.718	1	.013	1	.194	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	-44.877	5	-573.838	1	-13.767	5	-.011	3	-.085	5	0	3
77	M15	1	max	73.517	5	733.531	2	-4.823	12	.013	2	.194	1	0	2
78			min	-36.243	1	-354.52	3	-129.712	1	-.009	3	.009	12	0	3
79		2	max	62.967	5	525.552	2	-3.873	12	.013	2	.13	4	.314	3
80			min	-36.243	1	-256.156	3	-100.559	1	-.009	3	.005	12	-.647	2
81		3	max	52.416	5	317.573	2	-2.923	12	.013	2	.078	5	.527	3
82			min	-36.243	1	-157.792	3	-71.406	1	-.009	3	-.013	1	-1.08	2
83		4	max	41.866	5	109.595	2	-1.972	12	.013	2	.044	5	.638	3
84			min	-36.243	1	-59.428	3	-42.253	1	-.009	3	-.071	1	-1.3	2
85		5	max	31.316	5	38.936	3	-.787	10	.013	2	.012	5	.649	3
86			min	-36.243	1	-98.384	2	-33.676	4	-.009	3	-.1	1	-1.306	2
87		6	max	20.765	5	137.3	3	16.052	1	.013	2	-.004	12	.558	3
88			min	-36.243	1	-306.363	2	-29.062	5	-.009	3	-.098	1	-1.098	2
89		7	max	10.215	5	235.664	3	45.205	1	.013	2	-.003	12	.366	3
90			min	-36.243	1	-514.341	2	-27.592	5	-.009	3	-.067	1	-.676	2
91		8	max	-.186	15	334.028	3	74.358	1	.013	2	0	10	.074	3
92			min	-36.243	1	-722.32	2	-26.121	5	-.009	3	-.078	4	-.056	1
93		9	max	-1.849	12	432.392	3	103.511	1	.013	2	.086	1	.809	2
94			min	-36.243	1	-930.299	2	-24.651	5	-.009	3	-.102	5	-.32	3
95		10	max	-1.849	12	530.756	3	132.664	1	.013	2	.207	1	1.872	2
96			min	-36.243	1	-1138.278	2	-84.981	14	-.009	3	.004	12	-.815	3
97		11	max	7.032	5	930.299	2	-2.779	12	.009	3	.129	4	.809	2
98			min	-36.243	1	-432.392	3	-103.511	1	-.013	2	0	12	-.32	3
99		12	max	-1.849	12	722.32	2	-1.829	12	.009	3	.075	5	.074	3
100			min	-36.243	1	-334.028	3	-74.358	1	-.013	2	-.005	1	-.056	1
101		13	max	-1.849	12	514.341	2	-.879	12	.009	3	.041	5	.366	3
102			min	-36.243	1	-235.664	3	-45.205	1	-.013	2	-.067	1	-.676	2
103		14	max	-1.849	12	306.363	2	.165	3	.009	3	.009	5	.558	3
104			min	-36.243	1	-137.3	3	-34.244	4	-.013	2	-.098	1	-1.098	2
105		15	max	-1.849	12	98.384	2	13.1	1	.009	3	-.003	12	.649	3
106			min	-42.939	4	-38.936	3	-29.175	5	-.013	2	-.1	1	-1.306	2
107		16	max	-1.849	12	59.428	3	42.253	1	.009	3	-.001	12	.638	3
108			min	-53.49	4	-109.595	2	-27.705	5	-.013	2	-.071	1	-1.3	2
109		17	max	-1.849	12	157.792	3	71.406	1	.009	3	.002	3	.527	3
110			min	-64.04	4	-317.573	2	-26.235	5	-.013	2	-.082	4	-1.08	2
111		18	max	-1.849	12	256.156	3	100.559	1	.009	3	.075	1	.314	3
112			min	-74.59	4	-525.552	2	-24.764	5	-.013	2	-.105	5	-.647	2
113		19	max	-1.849	12	354.52	3	129.712	1	.009	3	.194	1	0	2
114			min	-85.141	4	-733.531	2	-23.294	5	-.013	2	-.13	5	0	5
115	M16	1	max	73.198	5	695.928	2	-4.575	12	.013	1	.169	1	0	2
116			min	-74.989	1	-325.856	3	-125.787	1	-.012	3	.008	12	0	3
117		2	max	62.648	5	487.949	2	-3.624	12	.013	1	.095	4	.284	3
118			min	-74.989	1	-227.492	3	-96.634	1	-.012	3	.003	12	-.608	2
119		3	max	52.097	5	279.97	2	-2.674	12	.013	1	.056	5	.468	3
120			min	-74.989	1	-129.128	3	-67.481	1	-.012	3	-.029	1	-1.003	2
121		4	max	41.547	5	71.991	2	-1.724	12	.013	1	.032	5	.55	3
122			min	-74.989	1	-30.764	3	-38.328	1	-.012	3	-.084	1	-1.184	2
123		5	max	30.996	5	67.6	3	-.503	10	.013	1	.009	5	.531	3
124			min	-74.989	1	-135.987	2	-23.786	4	-.012	3	-.108	1	-1.151	2
125		6	max	20.446	5	165.964	3	19.977	1	.013	1	-.004	12	.411	3
126			min	-74.989	1	-343.966	2	-20.099	5	-.012	3	-.102	1	-.904	2
127		7	max	9.896	5	264.328	3	49.13	1	.013	1	-.003	12	.19	3
128			min	-74.989	1	-551.945	2	-18.629	5	-.012	3	-.067	1	-.444	2
129		8	max	-.388	15	362.692	3	78.283	1	.013	1	0	10	.23	2
130			min	-74.989	1	-759.924	2	-17.159	5	-.012	3	-.052	4	-.133	3
131		9	max	-3.407	12	461.056	3	107.436	1	.013	1	.094	1	1.118	2
132			min	-74.989	1	-967.902	2	-15.688	5	-.012	3	-.068	5	-.556	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	-3.407	12	559.42	3	136.589	1	.013	1	.219	1	2.22	2
134			min	-74.989	1	-1175.881	2	-82.493	14	-.012	3	.005	12	-1.08	3
135		11	max	3.634	5	967.902	2	-3.028	12	.012	3	.097	4	1.118	2
136			min	-74.989	1	-461.056	3	-107.436	1	-.013	1	.001	12	-.556	3
137		12	max	-3.407	12	759.924	2	-2.078	12	.012	3	.051	4	.23	2
138			min	-74.989	1	-362.692	3	-78.283	1	-.013	1	-.002	3	-.133	3
139		13	max	-3.407	12	551.945	2	-1.127	12	.012	3	.025	5	.19	3
140			min	-74.989	1	-264.328	3	-49.13	1	-.013	1	-.067	1	-.444	2
141		14	max	-3.407	12	343.966	2	-.177	12	.012	3	.002	5	.411	3
142			min	-74.989	1	-165.964	3	-26.351	4	-.013	1	-.102	1	-.904	2
143		15	max	-3.407	12	135.987	2	9.176	1	.012	3	-.003	12	.531	3
144			min	-74.989	1	-67.6	3	-20.62	5	-.013	1	-.108	1	-1.151	2
145		16	max	-3.407	12	30.764	3	38.328	1	.012	3	-.002	12	.55	3
146			min	-74.989	1	-71.991	2	-19.15	5	-.013	1	-.084	1	-1.184	2
147		17	max	-3.407	12	129.128	3	67.481	1	.012	3	0	3	.468	3
148			min	-75.481	4	-279.97	2	-17.679	5	-.013	1	-.066	4	-1.003	2
149		18	max	-3.407	12	227.492	3	96.634	1	.012	3	.055	1	.284	3
150			min	-86.031	4	-487.949	2	-16.209	5	-.013	1	-.077	5	-.608	2
151		19	max	-3.407	12	325.856	3	125.787	1	.012	3	.169	1	0	2
152			min	-96.581	4	-695.928	2	-14.739	5	-.013	1	-.093	5	0	3
153	M2	1	max	1176.816	1	2.335	4	1.012	1	0	3	0	3	0	1
154			min	-1401.115	3	.573	15	-71.214	4	0	4	0	1	0	1
155		2	max	1177.144	1	2.32	4	1.012	1	0	3	0	1	0	15
156			min	-1400.869	3	.569	15	-71.499	4	0	4	-.016	4	0	4
157		3	max	1177.473	1	2.305	4	1.012	1	0	3	0	1	0	15
158			min	-1400.622	3	.566	15	-71.784	4	0	4	-.032	4	-.001	4
159		4	max	1177.801	1	2.29	4	1.012	1	0	3	0	1	0	15
160			min	-1400.376	3	.562	15	-72.068	4	0	4	-.048	4	-.002	4
161		5	max	1178.129	1	2.274	4	1.012	1	0	3	0	1	0	15
162			min	-1400.13	3	.559	15	-72.353	4	0	4	-.064	4	-.002	4
163		6	max	1178.458	1	2.259	4	1.012	1	0	3	.001	1	0	15
164			min	-1399.883	3	.555	15	-72.638	4	0	4	-.08	4	-.003	4
165		7	max	1178.786	1	2.244	4	1.012	1	0	3	.001	1	0	15
166			min	-1399.637	3	.552	15	-72.923	4	0	4	-.096	4	-.003	4
167		8	max	1179.115	1	2.229	4	1.012	1	0	3	.002	1	0	15
168			min	-1399.391	3	.548	15	-73.208	4	0	4	-.112	4	-.004	4
169		9	max	1179.443	1	2.213	4	1.012	1	0	3	.002	1	0	15
170			min	-1399.144	3	.544	15	-73.493	4	0	4	-.128	4	-.004	4
171		10	max	1179.772	1	2.198	4	1.012	1	0	3	.002	1	-.001	15
172			min	-1398.898	3	.541	15	-73.777	4	0	4	-.145	4	-.005	4
173		11	max	1180.1	1	2.183	4	1.012	1	0	3	.002	1	-.001	15
174			min	-1398.652	3	.537	15	-74.062	4	0	4	-.161	4	-.005	4
175		12	max	1180.429	1	2.168	4	1.012	1	0	3	.002	1	-.001	15
176			min	-1398.405	3	.534	15	-74.347	4	0	4	-.177	4	-.005	4
177		13	max	1180.757	1	2.152	4	1.012	1	0	3	.003	1	-.001	15
178			min	-1398.159	3	.53	15	-74.632	4	0	4	-.194	4	-.006	4
179		14	max	1181.085	1	2.137	4	1.012	1	0	3	.003	1	-.002	15
180			min	-1397.913	3	.526	15	-74.917	4	0	4	-.21	4	-.006	4
181		15	max	1181.414	1	2.122	4	1.012	1	0	3	.003	1	-.002	15
182			min	-1397.666	3	.522	12	-75.202	4	0	4	-.227	4	-.007	4
183		16	max	1181.742	1	2.107	4	1.012	1	0	3	.003	1	-.002	15
184			min	-1397.42	3	.516	12	-75.486	4	0	4	-.244	4	-.007	4
185		17	max	1182.071	1	2.091	4	1.012	1	0	3	.004	1	-.002	15
186			min	-1397.174	3	.51	12	-75.771	4	0	4	-.26	4	-.008	4
187		18	max	1182.399	1	2.076	4	1.012	1	0	3	.004	1	-.002	15
188			min	-1396.927	3	.504	12	-76.056	4	0	4	-.277	4	-.008	4
189		19	max	1182.728	1	2.061	4	1.012	1	0	3	.004	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	-1396.681	3	.498	12	-76.341	4	0	4	-.294	4	-.009	4
191	M3	1	max	417.956	2	8.107	4	.017	1	0	3	0	1	.009	4
192			min	-538.795	3	1.918	15	-1.165	5	0	4	-.011	4	.002	15
193		2	max	417.786	2	7.334	4	.017	1	0	3	0	1	.006	4
194			min	-538.922	3	1.737	15	-.623	5	0	4	-.011	4	0	12
195		3	max	417.616	2	6.562	4	.024	14	0	3	0	1	.003	2
196			min	-539.05	3	1.555	15	-.081	5	0	4	-.012	4	0	3
197		4	max	417.445	2	5.789	4	.513	4	0	3	0	1	0	2
198			min	-539.178	3	1.374	15	.001	12	0	4	-.011	4	-.002	3
199		5	max	417.275	2	5.017	4	1.055	4	0	3	0	1	0	15
200			min	-539.306	3	1.192	15	.001	12	0	4	-.011	4	-.003	3
201		6	max	417.105	2	4.245	4	1.597	4	0	3	0	1	0	15
202			min	-539.433	3	1.01	15	.001	12	0	4	-.011	4	-.004	6
203		7	max	416.934	2	3.472	4	2.139	4	0	3	0	1	-.001	15
204			min	-539.561	3	.829	15	.001	12	0	4	-.01	4	-.006	6
205		8	max	416.764	2	2.7	4	2.681	4	0	3	0	1	-.002	15
206			min	-539.689	3	.647	15	.001	12	0	4	-.009	5	-.007	6
207		9	max	416.594	2	1.927	4	3.224	4	0	3	0	1	-.002	15
208			min	-539.817	3	.466	15	.001	12	0	4	-.008	5	-.008	6
209		10	max	416.423	2	1.155	4	3.766	4	0	3	0	1	-.002	15
210			min	-539.944	3	.284	15	.001	12	0	4	-.006	5	-.009	6
211		11	max	416.253	2	.45	2	4.308	4	0	3	0	1	-.002	15
212			min	-540.072	3	-.032	3	.001	12	0	4	-.004	5	-.009	6
213		12	max	416.082	2	-.079	15	4.85	4	0	3	0	1	-.002	15
214			min	-540.2	3	-.483	3	.001	12	0	4	-.002	5	-.009	6
215		13	max	415.912	2	-.261	15	5.392	4	0	3	0	1	-.002	15
216			min	-540.328	3	-1.164	6	.001	12	0	4	0	5	-.009	6
217		14	max	415.742	2	-.442	15	5.934	4	0	3	.002	4	-.002	15
218			min	-540.456	3	-1.936	6	.001	12	0	4	0	12	-.008	6
219		15	max	415.571	2	-.624	15	6.476	4	0	3	.005	4	-.002	15
220			min	-540.583	3	-2.708	6	.001	12	0	4	0	12	-.007	6
221		16	max	415.401	2	-.805	15	7.018	4	0	3	.008	4	-.001	15
222			min	-540.711	3	-3.481	6	.001	12	0	4	0	12	-.006	6
223		17	max	415.231	2	-.987	15	7.561	4	0	3	.011	4	0	15
224			min	-540.839	3	-4.253	6	.001	12	0	4	0	12	-.004	6
225		18	max	415.06	2	-1.168	15	8.103	4	0	3	.014	4	0	15
226			min	-540.967	3	-5.026	6	.001	12	0	4	0	12	-.002	6
227		19	max	414.89	2	-1.35	15	8.645	4	0	3	.018	4	0	1
228			min	-541.094	3	-5.798	6	.001	12	0	4	0	12	0	1
229	M4	1	max	1306.335	1	0	1	-.304	12	0	1	.009	4	0	1
230			min	-444.911	3	0	1	-220.792	4	0	1	0	10	0	1
231		2	max	1306.505	1	0	1	-.304	12	0	1	0	12	0	1
232			min	-444.784	3	0	1	-220.939	4	0	1	-.016	4	0	1
233		3	max	1306.676	1	0	1	-.304	12	0	1	0	12	0	1
234			min	-444.656	3	0	1	-221.087	4	0	1	-.041	4	0	1
235		4	max	1306.846	1	0	1	-.304	12	0	1	0	12	0	1
236			min	-444.528	3	0	1	-221.234	4	0	1	-.067	4	0	1
237		5	max	1307.016	1	0	1	-.304	12	0	1	0	12	0	1
238			min	-444.4	3	0	1	-221.382	4	0	1	-.092	4	0	1
239		6	max	1307.187	1	0	1	-.304	12	0	1	0	12	0	1
240			min	-444.273	3	0	1	-221.53	4	0	1	-.118	4	0	1
241		7	max	1307.357	1	0	1	-.304	12	0	1	0	12	0	1
242			min	-444.145	3	0	1	-221.677	4	0	1	-.143	4	0	1
243		8	max	1307.527	1	0	1	-.304	12	0	1	0	12	0	1
244			min	-444.017	3	0	1	-221.825	4	0	1	-.169	4	0	1
245		9	max	1307.698	1	0	1	-.304	12	0	1	0	12	0	1
246			min	-443.889	3	0	1	-221.973	4	0	1	-.194	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	1307.868	1	0	1	-.304	12	0	1	0	12	0	1
248			min	-443.762	3	0	1	-222.12	4	0	1	-.22	4	0	1
249		11	max	1308.038	1	0	1	-.304	12	0	1	0	12	0	1
250			min	-443.634	3	0	1	-222.268	4	0	1	-.245	4	0	1
251		12	max	1308.209	1	0	1	-.304	12	0	1	0	12	0	1
252			min	-443.506	3	0	1	-222.415	4	0	1	-.271	4	0	1
253		13	max	1308.379	1	0	1	-.304	12	0	1	0	12	0	1
254			min	-443.378	3	0	1	-222.563	4	0	1	-.296	4	0	1
255		14	max	1308.549	1	0	1	-.304	12	0	1	0	12	0	1
256			min	-443.25	3	0	1	-222.711	4	0	1	-.322	4	0	1
257		15	max	1308.72	1	0	1	-.304	12	0	1	0	12	0	1
258			min	-443.123	3	0	1	-222.858	4	0	1	-.347	4	0	1
259		16	max	1308.89	1	0	1	-.304	12	0	1	0	12	0	1
260			min	-442.995	3	0	1	-223.006	4	0	1	-.373	4	0	1
261		17	max	1309.06	1	0	1	-.304	12	0	1	0	12	0	1
262			min	-442.867	3	0	1	-223.154	4	0	1	-.399	4	0	1
263		18	max	1309.231	1	0	1	-.304	12	0	1	0	12	0	1
264			min	-442.739	3	0	1	-223.301	4	0	1	-.424	4	0	1
265		19	max	1309.401	1	0	1	-.304	12	0	1	0	12	0	1
266			min	-442.612	3	0	1	-223.449	4	0	1	-.45	4	0	1
267	M6	1	max	3763.968	1	2.965	2	0	1	0	1	0	4	0	1
268			min	-4559.244	3	-.119	3	-71.83	4	0	4	0	1	0	1
269		2	max	3764.296	1	2.953	2	0	1	0	1	0	1	0	3
270			min	-4558.998	3	-.128	3	-72.115	4	0	4	-.016	4	0	2
271		3	max	3764.625	1	2.941	2	0	1	0	1	0	1	0	3
272			min	-4558.752	3	-.137	3	-72.4	4	0	4	-.032	4	-.001	2
273		4	max	3764.953	1	2.929	2	0	1	0	1	0	1	0	3
274			min	-4558.505	3	-.146	3	-72.685	4	0	4	-.048	4	-.002	2
275		5	max	3765.282	1	2.917	2	0	1	0	1	0	1	0	3
276			min	-4558.259	3	-.155	3	-72.97	4	0	4	-.064	4	-.003	2
277		6	max	3765.61	1	2.906	2	0	1	0	1	0	1	0	3
278			min	-4558.013	3	-.164	3	-73.255	4	0	4	-.08	4	-.003	2
279		7	max	3765.938	1	2.894	2	0	1	0	1	0	1	0	3
280			min	-4557.766	3	-.173	3	-73.539	4	0	4	-.097	4	-.004	2
281		8	max	3766.267	1	2.882	2	0	1	0	1	0	1	0	3
282			min	-4557.52	3	-.182	3	-73.824	4	0	4	-.113	4	-.005	2
283		9	max	3766.595	1	2.87	2	0	1	0	1	0	1	0	3
284			min	-4557.274	3	-.191	3	-74.109	4	0	4	-.129	4	-.005	2
285		10	max	3766.924	1	2.858	2	0	1	0	1	0	1	0	3
286			min	-4557.027	3	-.199	3	-74.394	4	0	4	-.146	4	-.006	2
287		11	max	3767.252	1	2.846	2	0	1	0	1	0	1	0	3
288			min	-4556.781	3	-.208	3	-74.679	4	0	4	-.162	4	-.006	2
289		12	max	3767.581	1	2.834	2	0	1	0	1	0	1	0	3
290			min	-4556.535	3	-.217	3	-74.964	4	0	4	-.179	4	-.007	2
291		13	max	3767.909	1	2.822	2	0	1	0	1	0	1	0	3
292			min	-4556.289	3	-.226	3	-75.248	4	0	4	-.195	4	-.008	2
293		14	max	3768.237	1	2.81	2	0	1	0	1	0	1	0	3
294			min	-4556.042	3	-.235	3	-75.533	4	0	4	-.212	4	-.008	2
295		15	max	3768.566	1	2.799	2	0	1	0	1	0	1	0	3
296			min	-4555.796	3	-.244	3	-75.818	4	0	4	-.229	4	-.009	2
297		16	max	3768.894	1	2.787	2	0	1	0	1	0	1	0	3
298			min	-4555.55	3	-.253	3	-76.103	4	0	4	-.246	4	-.01	2
299		17	max	3769.223	1	2.775	2	0	1	0	1	0	1	0	3
300			min	-4555.303	3	-.262	3	-76.388	4	0	4	-.263	4	-.01	2
301		18	max	3769.551	1	2.763	2	0	1	0	1	0	1	0	3
302			min	-4555.057	3	-.271	3	-76.673	4	0	4	-.28	4	-.011	2
303		19	max	3769.88	1	2.751	2	0	1	0	1	0	1	0	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
304			min	-4554.811	3	-.28	3	-76.957	4	0	4	-.297	4	-.011	2
305	M7	1	max	1561.693	2	8.115	6	0	1	0	1	0	1	.011	2
306			min	-1692.079	3	1.904	15	-1.235	5	0	4	-.011	4	0	3
307		2	max	1561.523	2	7.342	6	0	1	0	1	0	1	.009	2
308			min	-1692.207	3	1.723	15	-.693	5	0	4	-.012	4	-.002	3
309		3	max	1561.353	2	6.57	6	0	1	0	1	0	1	.006	2
310			min	-1692.335	3	1.541	15	-.151	5	0	4	-.012	4	-.004	3
311		4	max	1561.182	2	5.798	6	.435	4	0	1	0	1	.004	2
312			min	-1692.463	3	1.36	15	0	1	0	4	-.012	4	-.005	3
313		5	max	1561.012	2	5.025	6	.977	4	0	1	0	1	.002	2
314			min	-1692.59	3	1.178	15	0	1	0	4	-.011	4	-.006	3
315		6	max	1560.842	2	4.253	6	1.519	4	0	1	0	1	0	2
316			min	-1692.718	3	.996	15	0	1	0	4	-.011	4	-.007	3
317		7	max	1560.671	2	3.48	6	2.061	4	0	1	0	1	-.001	15
318			min	-1692.846	3	.815	15	0	1	0	4	-.01	4	-.007	3
319		8	max	1560.501	2	2.708	6	2.603	4	0	1	0	1	-.002	15
320			min	-1692.974	3	.564	12	0	1	0	4	-.009	4	-.008	3
321		9	max	1560.33	2	2.103	2	3.145	4	0	1	0	1	-.002	15
322			min	-1693.101	3	.263	12	0	1	0	4	-.008	4	-.008	4
323		10	max	1560.16	2	1.502	2	3.687	4	0	1	0	1	-.002	15
324			min	-1693.229	3	-.105	3	0	1	0	4	-.006	4	-.009	4
325		11	max	1559.99	2	.9	2	4.229	4	0	1	0	1	-.002	15
326			min	-1693.357	3	-.556	3	0	1	0	4	-.005	4	-.009	4
327		12	max	1559.819	2	.298	2	4.772	4	0	1	0	1	-.002	15
328			min	-1693.485	3	-1.008	3	0	1	0	4	-.003	5	-.009	4
329		13	max	1559.649	2	-.275	15	5.314	4	0	1	0	1	-.002	15
330			min	-1693.613	3	-1.459	3	0	1	0	4	0	5	-.009	4
331		14	max	1559.479	2	-.456	15	5.856	4	0	1	.002	4	-.002	15
332			min	-1693.74	3	-1.927	4	0	1	0	4	0	1	-.008	4
333		15	max	1559.308	2	-.638	15	6.398	4	0	1	.004	4	-.002	15
334			min	-1693.868	3	-2.699	4	0	1	0	4	0	1	-.007	4
335		16	max	1559.138	2	-.819	15	6.94	4	0	1	.007	4	-.001	15
336			min	-1693.996	3	-3.472	4	0	1	0	4	0	1	-.006	4
337		17	max	1558.968	2	-1.001	15	7.482	4	0	1	.01	4	0	15
338			min	-1694.124	3	-4.244	4	0	1	0	4	0	1	-.004	4
339		18	max	1558.797	2	-1.182	15	8.024	4	0	1	.013	4	0	15
340			min	-1694.251	3	-5.016	4	0	1	0	4	0	1	-.002	4
341		19	max	1558.627	2	-1.364	15	8.566	4	0	1	.017	4	0	1
342			min	-1694.379	3	-5.789	4	0	1	0	4	0	1	0	1
343	M8	1	max	3870.537	1	0	1	0	1	0	1	.009	4	0	1
344			min	-1492.411	3	0	1	-216.015	4	0	1	0	1	0	1
345		2	max	3870.708	1	0	1	0	1	0	1	0	1	0	1
346			min	-1492.284	3	0	1	-216.162	4	0	1	-.016	4	0	1
347		3	max	3870.878	1	0	1	0	1	0	1	0	1	0	1
348			min	-1492.156	3	0	1	-216.31	4	0	1	-.041	4	0	1
349		4	max	3871.048	1	0	1	0	1	0	1	0	1	0	1
350			min	-1492.028	3	0	1	-216.457	4	0	1	-.066	4	0	1
351		5	max	3871.219	1	0	1	0	1	0	1	0	1	0	1
352			min	-1491.9	3	0	1	-216.605	4	0	1	-.09	4	0	1
353		6	max	3871.389	1	0	1	0	1	0	1	0	1	0	1
354			min	-1491.773	3	0	1	-216.753	4	0	1	-.115	4	0	1
355		7	max	3871.56	1	0	1	0	1	0	1	0	1	0	1
356			min	-1491.645	3	0	1	-216.9	4	0	1	-.14	4	0	1
357		8	max	3871.73	1	0	1	0	1	0	1	0	1	0	1
358			min	-1491.517	3	0	1	-217.048	4	0	1	-.165	4	0	1
359		9	max	3871.9	1	0	1	0	1	0	1	0	1	0	1
360			min	-1491.389	3	0	1	-217.196	4	0	1	-.19	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	3872.071	1	0	1	0	1	0	1	0	1	0	1
362			min	-1491.261	3	0	1	-217.343	4	0	1	-.215	4	0	1
363		11	max	3872.241	1	0	1	0	1	0	1	0	1	0	1
364			min	-1491.134	3	0	1	-217.491	4	0	1	-.24	4	0	1
365		12	max	3872.411	1	0	1	0	1	0	1	0	1	0	1
366			min	-1491.006	3	0	1	-217.639	4	0	1	-.265	4	0	1
367		13	max	3872.582	1	0	1	0	1	0	1	0	1	0	1
368			min	-1490.878	3	0	1	-217.786	4	0	1	-.29	4	0	1
369		14	max	3872.752	1	0	1	0	1	0	1	0	1	0	1
370			min	-1490.75	3	0	1	-217.934	4	0	1	-.315	4	0	1
371		15	max	3872.922	1	0	1	0	1	0	1	0	1	0	1
372			min	-1490.623	3	0	1	-218.081	4	0	1	-.34	4	0	1
373		16	max	3873.093	1	0	1	0	1	0	1	0	1	0	1
374			min	-1490.495	3	0	1	-218.229	4	0	1	-.365	4	0	1
375		17	max	3873.263	1	0	1	0	1	0	1	0	1	0	1
376			min	-1490.367	3	0	1	-218.377	4	0	1	-.39	4	0	1
377		18	max	3873.433	1	0	1	0	1	0	1	0	1	0	1
378			min	-1490.239	3	0	1	-218.524	4	0	1	-.415	4	0	1
379		19	max	3873.604	1	0	1	0	1	0	1	0	1	0	1
380			min	-1490.112	3	0	1	-218.672	4	0	1	-.44	4	0	1
381	M10	1	max	1176.816	1	2.229	6	-.046	12	0	1	0	1	0	1
382			min	-1401.115	3	.502	15	-71.724	4	0	5	0	3	0	1
383		2	max	1177.144	1	2.214	6	-.046	12	0	1	0	10	0	15
384			min	-1400.869	3	.498	15	-72.009	4	0	5	-.016	4	0	6
385		3	max	1177.473	1	2.199	6	-.046	12	0	1	0	10	0	15
386			min	-1400.622	3	.494	15	-72.293	4	0	5	-.032	4	0	6
387		4	max	1177.801	1	2.183	6	-.046	12	0	1	0	12	0	15
388			min	-1400.376	3	.491	15	-72.578	4	0	5	-.048	4	-.001	6
389		5	max	1178.129	1	2.168	6	-.046	12	0	1	0	12	0	15
390			min	-1400.13	3	.487	15	-72.863	4	0	5	-.064	4	-.002	6
391		6	max	1178.458	1	2.153	6	-.046	12	0	1	0	12	0	15
392			min	-1399.883	3	.484	15	-73.148	4	0	5	-.08	4	-.002	6
393		7	max	1178.786	1	2.138	6	-.046	12	0	1	0	12	0	15
394			min	-1399.637	3	.48	15	-73.433	4	0	5	-.096	4	-.003	6
395		8	max	1179.115	1	2.122	6	-.046	12	0	1	0	12	0	15
396			min	-1399.391	3	.477	15	-73.718	4	0	5	-.113	4	-.003	6
397		9	max	1179.443	1	2.107	6	-.046	12	0	1	0	12	0	15
398			min	-1399.144	3	.473	15	-74.002	4	0	5	-.129	4	-.004	6
399		10	max	1179.772	1	2.092	6	-.046	12	0	1	0	12	0	15
400			min	-1398.898	3	.469	15	-74.287	4	0	5	-.146	4	-.004	6
401		11	max	1180.1	1	2.077	6	-.046	12	0	1	0	12	-.001	15
402			min	-1398.652	3	.466	15	-74.572	4	0	5	-.162	4	-.005	6
403		12	max	1180.429	1	2.061	6	-.046	12	0	1	0	12	-.001	15
404			min	-1398.405	3	.462	15	-74.857	4	0	5	-.179	4	-.005	6
405		13	max	1180.757	1	2.046	6	-.046	12	0	1	0	12	-.001	15
406			min	-1398.159	3	.459	15	-75.142	4	0	5	-.195	4	-.006	6
407		14	max	1181.085	1	2.031	6	-.046	12	0	1	0	12	-.001	15
408			min	-1397.913	3	.455	15	-75.427	4	0	5	-.212	4	-.006	6
409		15	max	1181.414	1	2.016	6	-.046	12	0	1	0	12	-.001	15
410			min	-1397.666	3	.451	15	-75.711	4	0	5	-.229	4	-.007	6
411		16	max	1181.742	1	2	6	-.046	12	0	1	0	12	-.002	15
412			min	-1397.42	3	.448	15	-75.996	4	0	5	-.245	4	-.007	6
413		17	max	1182.071	1	1.985	6	-.046	12	0	1	0	12	-.002	15
414			min	-1397.174	3	.444	15	-76.281	4	0	5	-.262	4	-.007	6
415		18	max	1182.399	1	1.97	6	-.046	12	0	1	0	12	-.002	15
416			min	-1396.927	3	.441	15	-76.566	4	0	5	-.279	4	-.008	6
417		19	max	1182.728	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	-1396.681	3	.437	15	-76.851	4	0	5	-.296	4	-.008	6
419	M11	1	max	417.956	2	8.051	6	-.001	12	0	1	0	12	.008	6
420			min	-538.795	3	1.881	15	-1.166	5	0	4	-.011	4	.002	15
421		2	max	417.786	2	7.278	6	-.001	12	0	1	0	12	.005	2
422			min	-538.922	3	1.699	15	-.624	5	0	4	-.011	4	0	12
423		3	max	417.616	2	6.506	6	.006	14	0	1	0	12	.003	2
424			min	-539.05	3	1.518	15	-.082	5	0	4	-.012	4	0	3
425		4	max	417.445	2	5.734	6	.505	4	0	1	0	12	0	2
426			min	-539.178	3	1.336	15	-.017	1	0	4	-.012	4	-.002	3
427		5	max	417.275	2	4.961	6	1.047	4	0	1	0	12	0	15
428			min	-539.306	3	1.154	15	-.017	1	0	4	-.011	4	-.003	3
429		6	max	417.105	2	4.189	6	1.589	4	0	1	0	12	-.001	15
430			min	-539.433	3	.973	15	-.017	1	0	4	-.011	4	-.005	4
431		7	max	416.934	2	3.416	6	2.131	4	0	1	0	12	-.002	15
432			min	-539.561	3	.791	15	-.017	1	0	4	-.01	4	-.006	4
433		8	max	416.764	2	2.644	6	2.673	4	0	1	0	12	-.002	15
434			min	-539.689	3	.61	15	-.017	1	0	4	-.009	4	-.007	4
435		9	max	416.594	2	1.872	6	3.215	4	0	1	0	12	-.002	15
436			min	-539.817	3	.428	15	-.017	1	0	4	-.008	4	-.008	4
437		10	max	416.423	2	1.099	6	3.758	4	0	1	0	12	-.002	15
438			min	-539.944	3	.247	15	-.017	1	0	4	-.006	4	-.009	4
439		11	max	416.253	2	.45	2	4.3	4	0	1	0	12	-.002	15
440			min	-540.072	3	-.032	3	-.017	1	0	4	-.004	4	-.009	4
441		12	max	416.082	2	-.117	15	4.842	4	0	1	0	12	-.002	15
442			min	-540.2	3	-.483	3	-.017	1	0	4	-.003	4	-.009	4
443		13	max	415.912	2	-.298	15	5.384	4	0	1	0	12	-.002	15
444			min	-540.328	3	-1.219	4	-.017	1	0	4	0	5	-.009	4
445		14	max	415.742	2	-.48	15	5.926	4	0	1	.002	4	-.002	15
446			min	-540.456	3	-1.992	4	-.017	1	0	4	0	1	-.008	4
447		15	max	415.571	2	-.661	15	6.468	4	0	1	.005	4	-.002	15
448			min	-540.583	3	-2.764	4	-.017	1	0	4	0	1	-.007	4
449		16	max	415.401	2	-.843	15	7.01	4	0	1	.007	4	-.001	15
450			min	-540.711	3	-3.537	4	-.017	1	0	4	0	1	-.006	4
451		17	max	415.231	2	-1.024	15	7.552	4	0	1	.011	4	-.001	15
452			min	-540.839	3	-4.309	4	-.017	1	0	4	0	1	-.004	4
453		18	max	415.06	2	-1.206	15	8.095	4	0	1	.014	4	0	15
454			min	-540.967	3	-5.081	4	-.017	1	0	4	0	1	-.002	4
455		19	max	414.89	2	-1.388	15	8.637	4	0	1	.017	4	0	1
456			min	-541.094	3	-5.854	4	-.017	1	0	4	0	1	0	1
457	M12	1	max	1306.335	1	0	1	6.787	1	0	1	.009	4	0	1
458			min	-444.911	3	0	1	-217.362	4	0	1	0	1	0	1
459		2	max	1306.505	1	0	1	6.787	1	0	1	0	1	0	1
460			min	-444.784	3	0	1	-217.51	4	0	1	-.016	4	0	1
461		3	max	1306.676	1	0	1	6.787	1	0	1	.001	1	0	1
462			min	-444.656	3	0	1	-217.657	4	0	1	-.041	4	0	1
463		4	max	1306.846	1	0	1	6.787	1	0	1	.002	1	0	1
464			min	-444.528	3	0	1	-217.805	4	0	1	-.066	4	0	1
465		5	max	1307.016	1	0	1	6.787	1	0	1	.003	1	0	1
466			min	-444.4	3	0	1	-217.952	4	0	1	-.091	4	0	1
467		6	max	1307.187	1	0	1	6.787	1	0	1	.004	1	0	1
468			min	-444.273	3	0	1	-218.1	4	0	1	-.116	4	0	1
469		7	max	1307.357	1	0	1	6.787	1	0	1	.005	1	0	1
470			min	-444.145	3	0	1	-218.248	4	0	1	-.141	4	0	1
471		8	max	1307.527	1	0	1	6.787	1	0	1	.005	1	0	1
472			min	-444.017	3	0	1	-218.395	4	0	1	-.166	4	0	1
473		9	max	1307.698	1	0	1	6.787	1	0	1	.006	1	0	1
474			min	-443.889	3	0	1	-218.543	4	0	1	-.191	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	1307.868	1	0	1	6.787	1	0	1	.007	1	0	1
476			min	-443.762	3	0	1	-218.691	4	0	1	-.216	4	0	1
477		11	max	1308.038	1	0	1	6.787	1	0	1	.008	1	0	1
478			min	-443.634	3	0	1	-218.838	4	0	1	-.241	4	0	1
479		12	max	1308.209	1	0	1	6.787	1	0	1	.008	1	0	1
480			min	-443.506	3	0	1	-218.986	4	0	1	-.266	4	0	1
481		13	max	1308.379	1	0	1	6.787	1	0	1	.009	1	0	1
482			min	-443.378	3	0	1	-219.134	4	0	1	-.292	4	0	1
483		14	max	1308.549	1	0	1	6.787	1	0	1	.01	1	0	1
484			min	-443.25	3	0	1	-219.281	4	0	1	-.317	4	0	1
485		15	max	1308.72	1	0	1	6.787	1	0	1	.011	1	0	1
486			min	-443.123	3	0	1	-219.429	4	0	1	-.342	4	0	1
487		16	max	1308.89	1	0	1	6.787	1	0	1	.012	1	0	1
488			min	-442.995	3	0	1	-219.576	4	0	1	-.367	4	0	1
489		17	max	1309.06	1	0	1	6.787	1	0	1	.012	1	0	1
490			min	-442.867	3	0	1	-219.724	4	0	1	-.392	4	0	1
491		18	max	1309.231	1	0	1	6.787	1	0	1	.013	1	0	1
492			min	-442.739	3	0	1	-219.872	4	0	1	-.418	4	0	1
493		19	max	1309.401	1	0	1	6.787	1	0	1	.014	1	0	1
494			min	-442.612	3	0	1	-220.019	4	0	1	-.443	4	0	1
495	M1	1	max	125.578	1	786.619	3	51.948	5	0	1	.168	1	0	3
496			min	-6.912	5	-533.625	1	-70.867	1	0	3	-.055	5	-.016	2
497		2	max	125.949	1	785.582	3	53.189	5	0	1	.131	1	.267	1
498			min	-6.739	5	-535.009	1	-70.867	1	0	3	-.027	5	-.414	3
499		3	max	321.81	3	608.177	1	-3.447	12	0	3	.094	1	.536	1
500			min	-195.055	2	-583.208	3	-70.029	1	0	1	0	15	-.812	3
501		4	max	322.088	3	606.793	1	-3.447	12	0	3	.057	1	.215	1
502			min	-194.685	2	-584.246	3	-70.029	1	0	1	-.008	5	-.504	3
503		5	max	322.367	3	605.409	1	-3.447	12	0	3	.02	1	-.004	15
504			min	-194.314	2	-585.283	3	-70.029	1	0	1	-.015	5	-.195	3
505		6	max	322.645	3	604.026	1	-3.447	12	0	3	0	12	.114	3
506			min	-193.943	2	-586.321	3	-70.029	1	0	1	-.025	4	-.435	2
507		7	max	322.923	3	602.642	1	-3.447	12	0	3	-.003	12	.423	3
508			min	-193.572	2	-587.359	3	-70.029	1	0	1	-.054	1	-.742	1
509		8	max	323.201	3	601.259	1	-3.447	12	0	3	-.004	12	.734	3
510			min	-193.202	2	-588.397	3	-70.029	1	0	1	-.091	1	-1.06	1
511		9	max	330.849	3	52.512	2	36.868	5	0	9	.055	1	.855	3
512			min	-143.236	2	.417	15	-104.743	1	0	3	-.108	5	-1.208	1
513		10	max	331.127	3	51.128	2	38.109	5	0	9	0	10	.835	3
514			min	-142.865	2	0	5	-104.743	1	0	3	-.088	4	-1.222	1
515		11	max	331.405	3	49.745	2	39.351	5	0	9	-.003	12	.814	3
516			min	-142.494	2	-1.74	4	-104.743	1	0	3	-.079	4	-1.248	2
517		12	max	338.975	3	393.951	3	117.851	5	0	2	.09	1	.711	3
518			min	-92.499	2	-684.201	2	-68.52	1	0	3	-.16	5	-1.106	2
519		13	max	339.253	3	392.913	3	119.092	5	0	2	.054	1	.503	3
520			min	-92.128	2	-685.585	2	-68.52	1	0	3	-.097	5	-.745	1
521		14	max	339.531	3	391.875	3	120.334	5	0	2	.018	1	.296	3
522			min	-91.757	2	-686.969	2	-68.52	1	0	3	-.034	5	-.398	1
523		15	max	339.81	3	390.837	3	121.575	5	0	2	.03	5	.089	3
524			min	-91.386	2	-688.352	2	-68.52	1	0	3	-.018	1	-.049	1
525		16	max	340.088	3	389.8	3	122.817	5	0	2	.094	5	.344	2
526			min	-91.016	2	-689.736	2	-68.52	1	0	3	-.054	1	-.117	3
527		17	max	340.366	3	388.762	3	124.058	5	0	2	.159	5	.708	2
528			min	-90.645	2	-691.12	2	-68.52	1	0	3	-.091	1	-.322	3
529		18	max	14.565	5	697.729	2	-3.407	12	0	3	.136	5	.356	2
530			min	-126.155	1	-324.863	3	-97.853	4	0	2	-.13	1	-.159	3
531		19	max	14.738	5	696.345	2	-3.407	12	0	3	.093	5	.012	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
532			min	-125.785	1	-325.901	3	-96.611	4	0	2	-.169	1	-.013	1
533	M5	1	max	273.596	1	2623.428	3	78.828	5	0	1	0	1	.032	2
534			min	7.625	12	-1815.062	1	0	1	0	4	-.12	4	-.001	3
535		2	max	273.967	1	2622.39	3	80.069	5	0	1	0	1	.988	1
536			min	7.81	12	-1816.445	1	0	1	0	4	-.079	4	-1.385	3
537		3	max	1029.525	3	1827.483	1	13.865	4	0	4	0	1	1.903	1
538			min	-675.268	2	-1843.481	3	0	1	0	1	-.037	4	-2.715	3
539		4	max	1029.803	3	1826.099	1	15.107	4	0	4	0	1	.939	1
540			min	-674.897	2	-1844.518	3	0	1	0	1	-.03	4	-1.742	3
541		5	max	1030.081	3	1824.716	1	16.348	4	0	4	0	1	.019	9
542			min	-674.526	2	-1845.556	3	0	1	0	1	-.021	4	-.769	3
543		6	max	1030.359	3	1823.332	1	17.59	4	0	4	0	1	.205	3
544			min	-674.156	2	-1846.594	3	0	1	0	1	-.013	5	-1.016	2
545		7	max	1030.638	3	1821.948	1	18.831	4	0	4	0	1	1.18	3
546			min	-673.785	2	-1847.631	3	0	1	0	1	-.004	5	-1.948	1
547		8	max	1030.916	3	1820.565	1	20.072	4	0	4	.007	4	2.155	3
548			min	-673.414	2	-1848.669	3	0	1	0	1	0	1	-2.909	1
549		9	max	1042.112	3	176.099	2	118.063	4	0	1	0	1	2.478	3
550			min	-569.26	2	.417	15	0	1	0	1	-.142	4	-3.296	1
551		10	max	1042.39	3	174.715	2	119.304	4	0	1	0	1	2.404	3
552			min	-568.889	2	0	15	0	1	0	1	-.079	5	-3.344	1
553		11	max	1042.668	3	173.332	2	120.546	4	0	1	0	1	2.329	3
554			min	-568.518	2	-1.628	6	0	1	0	1	-.017	5	-3.427	2
555		12	max	1054.02	3	1223.629	3	160.184	4	0	1	0	1	2.045	3
556			min	-464.423	2	-2090.378	2	0	1	0	4	-.221	4	-3.069	2
557		13	max	1054.298	3	1222.591	3	161.425	4	0	1	0	1	1.4	3
558			min	-464.052	2	-2091.761	2	0	1	0	4	-.136	4	-1.966	1
559		14	max	1054.576	3	1221.554	3	162.667	4	0	1	0	1	.755	3
560			min	-463.681	2	-2093.145	2	0	1	0	4	-.051	4	-.907	1
561		15	max	1054.854	3	1220.516	3	163.908	4	0	1	.035	4	.244	2
562			min	-463.311	2	-2094.529	2	0	1	0	4	0	1	-.003	13
563		16	max	1055.132	3	1219.478	3	165.15	4	0	1	.122	4	1.349	2
564			min	-462.94	2	-2095.912	2	0	1	0	4	0	1	-.533	3
565		17	max	1055.41	3	1218.441	3	166.391	4	0	1	.21	4	2.455	2
566			min	-462.569	2	-2097.296	2	0	1	0	4	0	1	-1.176	3
567		18	max	-8.142	12	2355.396	2	0	1	0	4	.21	4	1.266	2
568			min	-273.553	1	-1118.032	3	-37.215	5	0	1	0	1	-.615	3
569		19	max	-7.956	12	2354.012	2	0	1	0	4	.191	4	.026	1
570			min	-273.182	1	-1119.07	3	-35.974	5	0	1	0	1	-.025	3
571	M9	1	max	125.578	1	786.619	3	73.984	4	0	3	-.008	12	0	3
572			min	4.74	12	-533.625	1	3.496	12	0	4	-.168	1	-.016	2
573		2	max	125.949	1	785.582	3	75.226	4	0	3	-.006	12	.267	1
574			min	4.926	12	-535.009	1	3.496	12	0	4	-.131	1	-.414	3
575		3	max	321.81	3	608.177	1	70.029	1	0	1	-.005	12	.536	1
576			min	-195.055	2	-583.208	3	-8.287	5	0	3	-.094	1	-.812	3
577		4	max	322.088	3	606.793	1	70.029	1	0	1	-.003	12	.215	1
578			min	-194.685	2	-584.246	3	-7.045	5	0	3	-.057	1	-.504	3
579		5	max	322.367	3	605.409	1	70.029	1	0	1	-.001	12	-.004	15
580			min	-194.314	2	-585.283	3	-5.804	5	0	3	-.021	4	-.195	3
581		6	max	322.645	3	604.026	1	70.029	1	0	1	.017	1	.114	3
582			min	-193.943	2	-586.321	3	-4.562	5	0	3	-.02	5	-.435	2
583		7	max	322.923	3	602.642	1	70.029	1	0	1	.054	1	.423	3
584			min	-193.572	2	-587.359	3	-3.321	5	0	3	-.022	5	-.742	1
585		8	max	323.201	3	601.259	1	70.029	1	0	1	.091	1	.734	3
586			min	-193.202	2	-588.397	3	-2.08	5	0	3	-.023	5	-1.06	1
587		9	max	330.849	3	52.512	2	104.743	1	0	3	-.003	12	.855	3
588			min	-143.236	2	.422	15	4.949	12	0	9	-.125	4	-1.208	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	331.127	3	51.128	2	104.743	1	0	3	0	1	.835	3
590			min	-142.865	2	.005	15	4.949	12	0	9	-.088	4	-1.222	1
591		11	max	331.405	3	49.745	2	104.743	1	0	3	.056	1	.814	3
592			min	-142.494	2	-1.701	6	4.949	12	0	9	-.062	5	-1.248	2
593		12	max	338.975	3	393.951	3	140.056	4	0	3	-.004	12	.711	3
594			min	-92.499	2	-684.201	2	3.102	12	0	2	-.189	4	-1.106	2
595		13	max	339.253	3	392.913	3	141.297	4	0	3	-.002	12	.503	3
596			min	-92.128	2	-685.585	2	3.102	12	0	2	-.114	4	-.745	1
597		14	max	339.531	3	391.875	3	142.539	4	0	3	0	12	.296	3
598			min	-91.757	2	-686.969	2	3.102	12	0	2	-.04	4	-.398	1
599		15	max	339.81	3	390.837	3	143.78	4	0	3	.036	4	.089	3
600			min	-91.386	2	-688.352	2	3.102	12	0	2	0	12	-.049	1
601		16	max	340.088	3	389.8	3	145.022	4	0	3	.112	4	.344	2
602			min	-91.016	2	-689.736	2	3.102	12	0	2	.002	12	-.117	3
603		17	max	340.366	3	388.762	3	146.263	4	0	3	.189	4	.708	2
604			min	-90.645	2	-691.12	2	3.102	12	0	2	.004	12	-.322	3
605		18	max	-4.76	12	697.729	2	75.048	1	0	2	.177	4	.356	2
606			min	-126.155	1	-324.863	3	-74.512	5	0	3	.006	12	-.159	3
607		19	max	-4.575	12	696.345	2	75.048	1	0	2	.169	1	.012	3
608			min	-125.785	1	-325.901	3	-73.27	5	0	3	.008	12	-.013	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	.129	2	.006	3	1.039e-2	2	NC	1	NC	1
2			min	-.428	4	-.03	3	-.003	2	-2.311e-3	3	NC	1	NC	1
3		2	max	0	1	.263	3	.024	1	1.184e-2	2	NC	5	NC	2
4			min	-.428	4	-.052	1	-.01	5	-2.377e-3	3	757.593	3	9738.951	1
5		3	max	0	1	.5	3	.056	1	1.329e-2	2	NC	5	NC	2
6			min	-.428	4	-.191	1	-.013	5	-2.443e-3	3	418.857	3	4025.417	1
7		4	max	0	1	.643	3	.084	1	1.475e-2	2	NC	5	NC	3
8			min	-.428	4	-.266	1	-.009	5	-2.509e-3	3	329.719	3	2678.077	1
9		5	max	0	1	.675	3	.098	1	1.62e-2	2	NC	5	NC	3
10			min	-.428	4	-.267	1	-.002	5	-2.575e-3	3	314.743	3	2290.768	1
11		6	max	0	1	.598	3	.094	1	1.765e-2	2	NC	5	NC	3
12			min	-.428	4	-.196	1	.003	10	-2.64e-3	3	353.132	3	2383.998	1
13		7	max	0	1	.436	3	.073	1	1.911e-2	2	NC	5	NC	3
14			min	-.428	4	-.068	1	0	10	-2.706e-3	3	476.511	3	3062.173	1
15		8	max	0	1	.229	3	.042	1	2.056e-2	2	NC	2	NC	2
16			min	-.428	4	.002	15	-.003	10	-2.772e-3	3	854.756	3	5406.859	1
17		9	max	0	1	.24	2	.018	3	2.201e-2	2	NC	4	NC	1
18			min	-.428	4	.005	15	-.006	10	-2.838e-3	3	2011.508	2	NC	1
19		10	max	0	1	.295	2	.018	3	2.347e-2	2	NC	3	NC	1
20			min	-.428	4	-.042	3	-.011	2	-2.904e-3	3	1337.132	2	NC	1
21		11	max	0	12	.24	2	.018	3	2.201e-2	2	NC	4	NC	1
22			min	-.428	4	.005	15	-.008	5	-2.838e-3	3	2011.508	2	NC	1
23		12	max	0	12	.229	3	.042	1	2.056e-2	2	NC	2	NC	2
24			min	-.428	4	.002	15	-.008	5	-2.772e-3	3	854.756	3	5406.859	1
25		13	max	0	12	.436	3	.073	1	1.911e-2	2	NC	5	NC	3
26			min	-.428	4	-.068	1	-.003	5	-2.706e-3	3	476.511	3	3062.173	1
27		14	max	0	12	.598	3	.094	1	1.765e-2	2	NC	5	NC	3
28			min	-.428	4	-.196	1	.003	15	-2.64e-3	3	353.132	3	2383.998	1
29		15	max	0	12	.675	3	.098	1	1.62e-2	2	NC	5	NC	3
30			min	-.428	4	-.267	1	.004	10	-2.575e-3	3	314.743	3	2290.768	1
31		16	max	0	12	.643	3	.084	1	1.475e-2	2	NC	5	NC	3
32			min	-.428	4	-.266	1	.004	10	-2.509e-3	3	329.719	3	2678.077	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	.5	3	.056	1	1.329e-2	2	NC	5	NC	2
34			min	-.428	4	-.191	1	.002	10	-2.443e-3	3	418.857	3	4025.417	1
35		18	max	0	12	.263	3	.024	1	1.184e-2	2	NC	5	NC	2
36			min	-.428	4	-.052	1	0	10	-2.377e-3	3	757.593	3	9738.951	1
37		19	max	0	12	.129	2	.006	3	1.039e-2	2	NC	1	NC	1
38			min	-.428	4	-.03	3	-.003	2	-2.311e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.254	3	.005	3	6.11e-3	1	NC	1	NC	1
40			min	-.345	4	-.398	1	-.002	2	-4.556e-3	3	NC	1	NC	1
41		2	max	0	1	.558	3	.016	1	7.286e-3	1	NC	5	NC	1
42			min	-.345	4	-.71	1	-.015	5	-5.507e-3	3	710.064	1	NC	1
43		3	max	0	1	.816	3	.045	1	8.463e-3	1	NC	5	NC	2
44			min	-.345	4	-.982	1	-.018	5	-6.458e-3	3	380.182	1	5081.625	1
45		4	max	0	1	.998	3	.071	1	9.639e-3	1	NC	15	NC	3
46			min	-.345	4	-1.183	1	-.013	5	-7.41e-3	3	282.74	1	3156.03	1
47		5	max	0	1	1.089	3	.086	1	1.081e-2	1	NC	15	NC	3
48			min	-.345	4	-1.299	1	-.002	5	-8.361e-3	3	246.247	1	2599.434	1
49		6	max	0	1	1.088	3	.085	1	1.199e-2	1	NC	15	NC	3
50			min	-.345	4	-1.33	1	.003	10	-9.313e-3	3	238.194	1	2640.352	1
51		7	max	0	1	1.012	3	.068	1	1.317e-2	1	NC	15	NC	2
52			min	-.345	4	-1.287	1	0	10	-1.026e-2	3	249.591	1	3332.058	1
53		8	max	0	1	.891	3	.039	1	1.434e-2	1	NC	15	NC	2
54			min	-.345	4	-1.198	1	-.002	10	-1.122e-2	3	277.314	1	5790.048	1
55		9	max	0	1	.771	3	.021	4	1.552e-2	1	NC	15	NC	1
56			min	-.345	4	-1.103	1	-.005	10	-1.217e-2	3	314.544	1	NC	1
57		10	max	0	1	.715	3	.016	3	1.67e-2	1	NC	5	NC	1
58			min	-.345	4	-1.057	1	-.01	2	-1.312e-2	3	336.591	1	NC	1
59		11	max	0	12	.771	3	.016	3	1.552e-2	1	NC	15	NC	1
60			min	-.345	4	-1.103	1	-.015	5	-1.217e-2	3	314.544	1	NC	1
61		12	max	0	12	.891	3	.039	1	1.434e-2	1	NC	15	NC	2
62			min	-.345	4	-1.198	1	-.018	5	-1.122e-2	3	277.314	1	5790.048	1
63		13	max	0	12	1.012	3	.068	1	1.317e-2	1	NC	15	NC	2
64			min	-.345	4	-1.287	1	-.011	5	-1.026e-2	3	249.591	1	3332.058	1
65		14	max	0	12	1.088	3	.085	1	1.199e-2	1	NC	15	NC	3
66			min	-.345	4	-1.33	1	0	5	-9.313e-3	3	238.194	1	2640.352	1
67		15	max	0	12	1.089	3	.086	1	1.081e-2	1	NC	15	NC	3
68			min	-.345	4	-1.299	1	.004	10	-8.361e-3	3	246.247	1	2599.434	1
69		16	max	0	12	.998	3	.071	1	9.639e-3	1	NC	15	NC	3
70			min	-.345	4	-1.183	1	.003	10	-7.41e-3	3	282.74	1	3156.03	1
71		17	max	0	12	.816	3	.045	1	8.463e-3	1	NC	5	NC	2
72			min	-.345	4	-.982	1	.001	10	-6.458e-3	3	380.182	1	5081.625	1
73		18	max	0	12	.558	3	.021	4	7.286e-3	1	NC	5	NC	1
74			min	-.345	4	-.71	1	0	10	-5.507e-3	3	710.064	1	NC	1
75		19	max	0	12	.254	3	.005	3	6.11e-3	1	NC	1	NC	1
76			min	-.345	4	-.398	1	-.002	2	-4.556e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.26	3	.005	3	3.876e-3	3	NC	1	NC	1
78			min	-.293	4	-.397	1	-.002	2	-6.264e-3	2	NC	1	NC	1
79		2	max	0	12	.463	3	.016	1	4.686e-3	3	NC	5	NC	1
80			min	-.293	4	-.769	2	-.023	5	-7.47e-3	2	596.647	2	9124.15	5
81		3	max	0	12	.639	3	.045	1	5.495e-3	3	NC	5	NC	2
82			min	-.293	4	-1.088	2	-.029	5	-8.675e-3	2	321.081	2	5065.253	1
83		4	max	0	12	.773	3	.072	1	6.305e-3	3	NC	15	NC	3
84			min	-.293	4	-1.319	2	-.021	5	-9.881e-3	2	240.862	2	3147.375	1
85		5	max	0	12	.853	3	.087	1	7.114e-3	3	NC	15	NC	3
86			min	-.293	4	-1.442	2	-.006	5	-1.109e-2	2	212.542	2	2592.307	1
87		6	max	0	12	.88	3	.085	1	7.923e-3	3	NC	15	NC	3
88			min	-.293	4	-1.456	2	.003	10	-1.229e-2	2	209.559	2	2632.015	1
89		7	max	0	12	.861	3	.068	1	8.733e-3	3	NC	15	NC	2

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
90			min	-.293	4	-1.381	2	.001	10	-1.35e-2	2	225.674	2	3317.666	1
91		8	max	0	12	.812	3	.04	4	9.542e-3	3	NC	15	NC	2
92			min	-.293	4	-1.25	2	-.002	10	-1.47e-2	2	260.283	2	5490.237	4
93		9	max	0	12	.757	3	.028	4	1.035e-2	3	NC	15	NC	1
94			min	-.293	4	-1.117	2	-.005	10	-1.591e-2	2	308.236	2	7966.672	4
95		10	max	0	1	.73	3	.015	3	1.116e-2	3	NC	5	NC	1
96			min	-.293	4	-1.056	1	-.01	2	-1.711e-2	2	336.867	1	NC	1
97		11	max	0	1	.757	3	.015	3	1.035e-2	3	NC	15	NC	1
98			min	-.293	4	-1.117	2	-.022	5	-1.591e-2	2	308.236	2	9890.99	5
99		12	max	0	1	.812	3	.04	1	9.542e-3	3	NC	15	NC	2
100			min	-.293	4	-1.25	2	-.026	5	-1.47e-2	2	260.283	2	5744.508	1
101		13	max	0	1	.861	3	.068	1	8.733e-3	3	NC	15	NC	2
102			min	-.293	4	-1.381	2	-.018	5	-1.35e-2	2	225.674	2	3317.666	1
103		14	max	0	1	.88	3	.085	1	7.923e-3	3	NC	15	NC	3
104			min	-.293	4	-1.456	2	-.002	5	-1.229e-2	2	209.559	2	2632.015	1
105		15	max	0	1	.853	3	.087	1	7.114e-3	3	NC	15	NC	3
106			min	-.293	4	-1.442	2	.004	10	-1.109e-2	2	212.542	2	2592.307	1
107		16	max	0	1	.773	3	.072	1	6.305e-3	3	NC	15	NC	3
108			min	-.293	4	-1.319	2	.003	10	-9.881e-3	2	240.862	2	3147.375	1
109		17	max	0	1	.639	3	.045	1	5.495e-3	3	NC	5	NC	2
110			min	-.293	4	-1.088	2	.002	10	-8.675e-3	2	321.081	2	5065.253	1
111		18	max	0	1	.463	3	.029	4	4.686e-3	3	NC	5	NC	1
112			min	-.293	4	-.769	2	0	10	-7.47e-3	2	596.647	2	7527.385	4
113		19	max	0	1	.26	3	.005	3	3.876e-3	3	NC	1	NC	1
114			min	-.293	4	-.397	1	-.002	2	-6.264e-3	2	NC	1	NC	1
115	M16	1	max	0	12	.119	1	.004	3	6.864e-3	3	NC	1	NC	1
116			min	-.133	4	-.087	3	-.002	2	-9.152e-3	1	NC	1	NC	1
117		2	max	0	12	.016	3	.024	1	7.974e-3	3	NC	5	NC	2
118			min	-.133	4	-.129	2	-.017	5	-1.032e-2	1	919.966	2	9783.22	1
119		3	max	0	12	.095	3	.056	1	9.084e-3	3	NC	5	NC	2
120			min	-.133	4	-.32	2	-.022	5	-1.149e-2	1	512.556	2	4029.537	1
121		4	max	0	12	.136	3	.084	1	1.019e-2	3	NC	5	NC	3
122			min	-.133	4	-.43	2	-.017	5	-1.266e-2	1	409.329	2	2674.737	1
123		5	max	0	12	.132	3	.098	1	1.13e-2	3	NC	5	NC	3
124			min	-.133	4	-.441	2	-.007	5	-1.383e-2	1	400.841	2	2282.764	1
125		6	max	0	12	.084	3	.095	1	1.241e-2	3	NC	5	NC	3
126			min	-.133	4	-.358	2	.003	15	-1.5e-2	1	472.007	2	2368.339	1
127		7	max	0	12	.003	12	.074	1	1.352e-2	3	NC	5	NC	3
128			min	-.133	4	-.2	2	.002	10	-1.617e-2	1	710.362	2	3024.857	1
129		8	max	0	12	.03	1	.043	1	1.463e-2	3	NC	3	NC	2
130			min	-.133	4	-.095	3	-.001	10	-1.734e-2	1	1865.829	2	5260.903	1
131		9	max	0	12	.191	1	.019	4	1.574e-2	3	NC	4	NC	1
132			min	-.133	4	-.18	3	-.004	10	-1.85e-2	1	2386.258	3	NC	1
133		10	max	0	1	.263	1	.013	3	1.685e-2	3	NC	5	NC	1
134			min	-.133	4	-.218	3	-.009	2	-1.967e-2	1	1540.818	1	NC	1
135		11	max	0	1	.191	1	.013	3	1.574e-2	3	NC	4	NC	1
136			min	-.133	4	-.18	3	-.014	5	-1.85e-2	1	2386.258	3	NC	1
137		12	max	0	1	.03	1	.043	1	1.463e-2	3	NC	3	NC	2
138			min	-.133	4	-.095	3	-.015	5	-1.734e-2	1	1865.829	2	5260.903	1
139		13	max	0	1	.003	12	.074	1	1.352e-2	3	NC	5	NC	3
140			min	-.133	4	-.2	2	-.007	5	-1.617e-2	1	710.362	2	3024.857	1
141		14	max	0	1	.084	3	.095	1	1.241e-2	3	NC	5	NC	3
142			min	-.133	4	-.358	2	.003	15	-1.5e-2	1	472.007	2	2368.339	1
143		15	max	0	1	.132	3	.098	1	1.13e-2	3	NC	5	NC	3
144			min	-.133	4	-.441	2	.005	10	-1.383e-2	1	400.841	2	2282.764	1
145		16	max	0	1	.136	3	.084	1	1.019e-2	3	NC	5	NC	3
146			min	-.133	4	-.43	2	.005	10	-1.266e-2	1	409.329	2	2674.737	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	.095	3	.056	1	9.084e-3	3	NC	5	NC	2
148			min	-.133	4	-.32	2	.003	10	-1.149e-2	1	512.556	2	4029.537	1
149		18	max	0	1	.016	3	.025	4	7.974e-3	3	NC	5	NC	2
150			min	-.133	4	-.129	2	0	10	-1.032e-2	1	919.966	2	8677.498	4
151		19	max	0	1	.119	1	.004	3	6.864e-3	3	NC	1	NC	1
152			min	-.133	4	-.087	3	-.002	2	-9.152e-3	1	NC	1	NC	1
153	M2	1	max	.005	1	.004	2	.005	1	1.148e-3	5	NC	1	NC	2
154			min	-.006	3	-.007	3	-.406	4	-1.376e-4	1	NC	1	117.787	4
155		2	max	.005	1	.003	2	.005	1	1.222e-3	5	NC	1	NC	2
156			min	-.006	3	-.007	3	-.373	4	-1.275e-4	1	NC	1	128.34	4
157		3	max	.005	1	.003	2	.005	1	1.296e-3	5	NC	1	NC	1
158			min	-.006	3	-.007	3	-.34	4	-1.174e-4	1	NC	1	140.887	4
159		4	max	.005	1	.002	2	.004	1	1.37e-3	5	NC	1	NC	1
160			min	-.005	3	-.007	3	-.307	4	-1.073e-4	1	NC	1	155.953	4
161		5	max	.004	1	.002	2	.004	1	1.444e-3	5	NC	1	NC	1
162			min	-.005	3	-.006	3	-.275	4	-9.721e-5	1	NC	1	174.246	4
163		6	max	.004	1	.001	2	.003	1	1.518e-3	5	NC	1	NC	1
164			min	-.005	3	-.006	3	-.243	4	-8.713e-5	1	NC	1	196.755	4
165		7	max	.004	1	.001	2	.003	1	1.592e-3	5	NC	1	NC	1
166			min	-.004	3	-.006	3	-.213	4	-7.704e-5	1	NC	1	224.881	4
167		8	max	.003	1	0	2	.002	1	1.667e-3	4	NC	1	NC	1
168			min	-.004	3	-.005	3	-.184	4	-6.696e-5	1	NC	1	260.674	4
169		9	max	.003	1	0	2	.002	1	1.745e-3	4	NC	1	NC	1
170			min	-.004	3	-.005	3	-.156	4	-5.687e-5	1	NC	1	307.224	4
171		10	max	.003	1	0	2	.002	1	1.823e-3	4	NC	1	NC	1
172			min	-.003	3	-.005	3	-.13	4	-4.679e-5	1	NC	1	369.374	4
173		11	max	.002	1	0	15	.001	1	1.9e-3	4	NC	1	NC	1
174			min	-.003	3	-.004	3	-.105	4	-3.671e-5	1	NC	1	455.069	4
175		12	max	.002	1	0	15	.001	1	1.978e-3	4	NC	1	NC	1
176			min	-.003	3	-.004	3	-.083	4	-2.662e-5	1	NC	1	578.1	4
177		13	max	.002	1	0	15	0	1	2.056e-3	4	NC	1	NC	1
178			min	-.002	3	-.003	3	-.063	4	-1.654e-5	1	NC	1	764.182	4
179		14	max	.002	1	0	15	0	1	2.133e-3	4	NC	1	NC	1
180			min	-.002	3	-.003	3	-.045	4	-6.452e-6	1	NC	1	1065.927	4
181		15	max	.001	1	0	15	0	1	2.211e-3	4	NC	1	NC	1
182			min	-.001	3	-.002	3	-.03	4	-3.287e-7	3	NC	1	1605.59	4
183		16	max	0	1	0	15	0	1	2.289e-3	4	NC	1	NC	1
184			min	-.001	3	-.002	3	-.018	4	3.039e-7	12	NC	1	2725.05	4
185		17	max	0	1	0	15	0	1	2.367e-3	4	NC	1	NC	1
186			min	0	3	-.001	3	-.008	4	8.066e-7	12	NC	1	5716.003	4
187		18	max	0	1	0	15	0	1	2.444e-3	4	NC	1	NC	1
188			min	0	3	0	3	-.002	4	1.309e-6	12	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.522e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	1.812e-6	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-5.762e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-5.631e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.012	4	6.631e-6	4	NC	1	NC	1
194			min	0	2	-.001	6	0	12	1.795e-7	12	NC	1	NC	1
195		3	max	0	3	0	15	.024	4	5.764e-4	4	NC	1	NC	1
196			min	0	2	-.003	6	0	12	9.351e-7	12	NC	1	NC	1
197		4	max	0	3	-.001	15	.035	4	1.146e-3	4	NC	1	NC	1
198			min	0	2	-.005	6	0	12	1.691e-6	12	NC	1	NC	1
199		5	max	.001	3	-.001	15	.046	4	1.716e-3	4	NC	1	NC	1
200			min	0	2	-.007	6	0	12	2.446e-6	12	NC	1	NC	1
201		6	max	.001	3	-.002	15	.056	4	2.286e-3	4	NC	1	NC	1
202			min	-.001	2	-.008	6	0	12	3.202e-6	12	NC	1	9775.437	5
203		7	max	.002	3	-.002	15	.066	4	2.855e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
204			min	-.001	2	-.01	6	0	12	3.958e-6	12	9471.44	6	9403.952	5
205		8	max	.002	3	-.002	15	.075	4	3.425e-3	4	NC	1	NC	1
206			min	-.001	2	-.011	6	0	12	4.713e-6	12	8429.61	6	9475.827	5
207		9	max	.002	3	-.003	15	.084	4	3.995e-3	4	NC	1	NC	1
208			min	-.002	2	-.012	6	0	12	5.469e-6	12	7805.877	6	9962.811	5
209		10	max	.002	3	-.003	15	.092	4	4.565e-3	4	NC	2	NC	1
210			min	-.002	2	-.012	6	0	12	6.224e-6	12	7488.844	6	NC	1
211		11	max	.003	3	-.003	15	.101	4	5.135e-3	4	NC	2	NC	1
212			min	-.002	2	-.012	6	0	12	6.98e-6	12	7430.757	6	NC	1
213		12	max	.003	3	-.003	15	.109	4	5.704e-3	4	NC	1	NC	1
214			min	-.002	2	-.012	6	0	12	7.736e-6	12	7628.999	6	NC	1
215		13	max	.003	3	-.002	15	.116	4	6.274e-3	4	NC	1	NC	1
216			min	-.002	2	-.011	6	0	12	8.491e-6	12	8127.308	6	NC	1
217		14	max	.003	3	-.002	15	.124	4	6.844e-3	4	NC	1	NC	1
218			min	-.003	2	-.01	6	0	12	9.247e-6	12	9039.245	6	NC	1
219		15	max	.004	3	-.002	15	.132	4	7.414e-3	4	NC	1	NC	1
220			min	-.003	2	-.009	6	0	12	1.e-5	12	NC	1	NC	1
221		16	max	.004	3	-.001	15	.141	4	7.983e-3	4	NC	1	NC	1
222			min	-.003	2	-.008	1	0	12	1.076e-5	12	NC	1	NC	1
223		17	max	.004	3	0	15	.149	4	8.553e-3	4	NC	1	NC	1
224			min	-.003	2	-.006	1	0	12	1.151e-5	12	NC	1	NC	1
225		18	max	.004	3	0	15	.158	4	9.123e-3	4	NC	1	NC	1
226			min	-.003	2	-.005	1	0	12	1.227e-5	12	NC	1	NC	1
227		19	max	.005	3	0	5	.168	4	9.693e-3	4	NC	1	NC	1
228			min	-.004	2	-.003	1	0	12	1.303e-5	12	NC	1	NC	1
229	M4	1	max	.003	1	.003	2	0	12	-1.358e-7	12	NC	1	NC	2
230			min	-.001	3	-.005	3	-.168	4	-7.218e-4	4	NC	1	147.601	4
231		2	max	.003	1	.003	2	0	12	-1.358e-7	12	NC	1	NC	2
232			min	-.001	3	-.004	3	-.154	4	-7.218e-4	4	NC	1	160.681	4
233		3	max	.003	1	.003	2	0	12	-1.358e-7	12	NC	1	NC	2
234			min	0	3	-.004	3	-.141	4	-7.218e-4	4	NC	1	176.237	4
235		4	max	.003	1	.002	2	0	12	-1.358e-7	12	NC	1	NC	2
236			min	0	3	-.004	3	-.127	4	-7.218e-4	4	NC	1	194.913	4
237		5	max	.002	1	.002	2	0	12	-1.358e-7	12	NC	1	NC	2
238			min	0	3	-.004	3	-.114	4	-7.218e-4	4	NC	1	217.587	4
239		6	max	.002	1	.002	2	0	12	-1.358e-7	12	NC	1	NC	2
240			min	0	3	-.003	3	-.101	4	-7.218e-4	4	NC	1	245.473	4
241		7	max	.002	1	.002	2	0	12	-1.358e-7	12	NC	1	NC	2
242			min	0	3	-.003	3	-.088	4	-7.218e-4	4	NC	1	280.297	4
243		8	max	.002	1	.002	2	0	12	-1.358e-7	12	NC	1	NC	1
244			min	0	3	-.003	3	-.076	4	-7.218e-4	4	NC	1	324.576	4
245		9	max	.002	1	.002	2	0	12	-1.358e-7	12	NC	1	NC	1
246			min	0	3	-.003	3	-.065	4	-7.218e-4	4	NC	1	382.097	4
247		10	max	.002	1	.001	2	0	12	-1.358e-7	12	NC	1	NC	1
248			min	0	3	-.002	3	-.054	4	-7.218e-4	4	NC	1	458.783	4
249		11	max	.001	1	.001	2	0	12	-1.358e-7	12	NC	1	NC	1
250			min	0	3	-.002	3	-.044	4	-7.218e-4	4	NC	1	564.325	4
251		12	max	.001	1	.001	2	0	12	-1.358e-7	12	NC	1	NC	1
252			min	0	3	-.002	3	-.035	4	-7.218e-4	4	NC	1	715.488	4
253		13	max	.001	1	0	2	0	12	-1.358e-7	12	NC	1	NC	1
254			min	0	3	-.002	3	-.026	4	-7.218e-4	4	NC	1	943.393	4
255		14	max	0	1	0	2	0	12	-1.358e-7	12	NC	1	NC	1
256			min	0	3	-.001	3	-.019	4	-7.218e-4	4	NC	1	1311.364	4
257		15	max	0	1	0	2	0	12	-1.358e-7	12	NC	1	NC	1
258			min	0	3	-.001	3	-.013	4	-7.218e-4	4	NC	1	1965.401	4
259		16	max	0	1	0	2	0	12	-1.358e-7	12	NC	1	NC	1
260			min	0	3	0	3	-.007	4	-7.218e-4	4	NC	1	3309.201	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
261		17	max	0	1	0	2	0	12	-1.358e-7	12	NC	1	NC	1
262			min	0	3	0	3	-.004	4	-7.218e-4	4	NC	1	6840.067	4
263		18	max	0	1	0	2	0	12	-1.358e-7	12	NC	1	NC	1
264			min	0	3	0	3	-.001	4	-7.218e-4	4	NC	1	NC	1
265		19	max	0	1	0	1	0	1	-1.358e-7	12	NC	1	NC	1
266			min	0	1	0	1	0	1	-7.218e-4	4	NC	1	NC	1
267	M6	1	max	.017	1	.016	2	0	1	1.194e-3	4	NC	4	NC	1
268			min	-.021	3	-.023	3	-.41	4	0	1	2066.386	3	116.822	4
269		2	max	.016	1	.014	2	0	1	1.267e-3	4	NC	4	NC	1
270			min	-.02	3	-.022	3	-.376	4	0	1	2190.325	3	127.29	4
271		3	max	.015	1	.013	2	0	1	1.34e-3	4	NC	4	NC	1
272			min	-.019	3	-.021	3	-.342	4	0	1	2330.041	3	139.736	4
273		4	max	.014	1	.012	2	0	1	1.413e-3	4	NC	4	NC	1
274			min	-.017	3	-.019	3	-.309	4	0	1	2488.703	3	154.68	4
275		5	max	.013	1	.01	2	0	1	1.486e-3	4	NC	4	NC	1
276			min	-.016	3	-.018	3	-.277	4	0	1	2670.388	3	172.826	4
277		6	max	.013	1	.009	2	0	1	1.559e-3	4	NC	1	NC	1
278			min	-.015	3	-.017	3	-.245	4	0	1	2880.425	3	195.153	4
279		7	max	.012	1	.008	2	0	1	1.631e-3	4	NC	1	NC	1
280			min	-.014	3	-.015	3	-.215	4	0	1	3125.921	3	223.053	4
281		8	max	.011	1	.007	2	0	1	1.704e-3	4	NC	1	NC	1
282			min	-.013	3	-.014	3	-.185	4	0	1	3416.569	3	258.56	4
283		9	max	.01	1	.006	2	0	1	1.777e-3	4	NC	1	NC	1
284			min	-.012	3	-.013	3	-.157	4	0	1	3765.939	3	304.738	4
285		10	max	.009	1	.005	2	0	1	1.85e-3	4	NC	1	NC	1
286			min	-.01	3	-.011	3	-.131	4	0	1	4193.633	3	366.393	4
287		11	max	.008	1	.004	2	0	1	1.923e-3	4	NC	1	NC	1
288			min	-.009	3	-.01	3	-.106	4	0	1	4729.058	3	451.408	4
289		12	max	.007	1	.003	2	0	1	1.996e-3	4	NC	1	NC	1
290			min	-.008	3	-.009	3	-.083	4	0	1	5418.42	3	573.47	4
291		13	max	.006	1	.002	2	0	1	2.069e-3	4	NC	1	NC	1
292			min	-.007	3	-.008	3	-.063	4	0	1	6338.738	3	758.094	4
293		14	max	.005	1	.002	2	0	1	2.141e-3	4	NC	1	NC	1
294			min	-.006	3	-.006	3	-.045	4	0	1	7628.645	3	1057.499	4
295		15	max	.004	1	.001	2	0	1	2.214e-3	4	NC	1	NC	1
296			min	-.005	3	-.005	3	-.03	4	0	1	9565.411	3	1593.032	4
297		16	max	.003	1	0	2	0	1	2.287e-3	4	NC	1	NC	1
298			min	-.003	3	-.004	3	-.018	4	0	1	NC	1	2704.102	4
299		17	max	.002	1	0	2	0	1	2.36e-3	4	NC	1	NC	1
300			min	-.002	3	-.002	3	-.008	4	0	1	NC	1	5673.464	4
301		18	max	0	1	0	2	0	1	2.433e-3	4	NC	1	NC	1
302			min	-.001	3	-.001	3	-.002	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	2.506e-3	4	NC	1	NC	1
304			min	0	1	0	1	0	1	0	1	NC	1	NC	1
305	M7	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	-5.577e-4	4	NC	1	NC	1
307		2	max	0	3	0	2	.012	4	1.369e-6	14	NC	1	NC	1
308			min	0	2	-.002	3	0	1	-1.173e-7	15	NC	1	NC	1
309		3	max	.002	3	0	15	.024	4	5.6e-4	4	NC	1	NC	1
310			min	-.002	2	-.005	3	0	1	0	1	NC	1	NC	1
311		4	max	.002	3	-.001	15	.035	4	1.119e-3	4	NC	1	NC	1
312			min	-.002	2	-.007	3	0	1	0	1	NC	1	NC	1
313		5	max	.003	3	-.002	15	.045	4	1.678e-3	4	NC	1	NC	1
314			min	-.003	2	-.008	3	0	1	0	1	NC	1	NC	1
315		6	max	.004	3	-.002	15	.056	4	2.236e-3	4	NC	1	NC	1
316			min	-.004	2	-.01	3	0	1	0	1	9313.885	3	9290.565	4
317		7	max	.005	3	-.002	15	.065	4	2.795e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
318			min	-.005	2	-.011	3	0	1	0	1	8287.928	3	8903.138	4
319		8	max	.006	3	-.003	15	.074	4	3.354e-3	4	NC	1	NC	1
320			min	-.005	2	-.012	3	0	1	0	1	7676.02	3	8928.465	4
321		9	max	.007	3	-.003	15	.083	4	3.913e-3	4	NC	1	NC	1
322			min	-.006	2	-.013	3	0	1	0	1	7352.581	3	9330.935	4
323		10	max	.007	3	-.003	15	.091	4	4.472e-3	4	NC	1	NC	1
324			min	-.007	2	-.013	4	0	1	0	1	7260.604	3	NC	1
325		11	max	.008	3	-.003	15	.099	4	5.031e-3	4	NC	1	NC	1
326			min	-.008	2	-.013	4	0	1	0	1	7384.478	3	NC	1
327		12	max	.009	3	-.003	15	.107	4	5.589e-3	4	NC	1	NC	1
328			min	-.008	2	-.013	4	0	1	0	1	7665.245	4	NC	1
329		13	max	.01	3	-.003	15	.115	4	6.148e-3	4	NC	1	NC	1
330			min	-.009	2	-.012	4	0	1	0	1	8164.226	4	NC	1
331		14	max	.011	3	-.003	15	.122	4	6.707e-3	4	NC	1	NC	1
332			min	-.01	2	-.011	1	0	1	0	1	9078.748	4	NC	1
333		15	max	.012	3	-.002	15	.13	4	7.266e-3	4	NC	1	NC	1
334			min	-.011	2	-.011	1	0	1	0	1	NC	1	NC	1
335		16	max	.012	3	-.002	15	.138	4	7.825e-3	4	NC	1	NC	1
336			min	-.011	2	-.01	1	0	1	0	1	NC	1	NC	1
337		17	max	.013	3	-.001	15	.146	4	8.384e-3	4	NC	1	NC	1
338			min	-.012	2	-.009	1	0	1	0	1	NC	1	NC	1
339		18	max	.014	3	0	15	.155	4	8.942e-3	4	NC	1	NC	1
340			min	-.013	2	-.008	1	0	1	0	1	NC	1	NC	1
341		19	max	.015	3	0	15	.165	4	9.501e-3	4	NC	1	NC	1
342			min	-.014	2	-.007	1	0	1	0	1	NC	1	NC	1
343	M8	1	max	.009	1	.012	2	0	1	0	1	NC	1	NC	1
344			min	-.004	3	-.014	3	-.165	4	-7.45e-4	4	NC	1	150.768	4
345		2	max	.009	1	.011	2	0	1	0	1	NC	1	NC	1
346			min	-.003	3	-.014	3	-.151	4	-7.45e-4	4	NC	1	164.13	4
347		3	max	.008	1	.01	2	0	1	0	1	NC	1	NC	1
348			min	-.003	3	-.013	3	-.138	4	-7.45e-4	4	NC	1	180.022	4
349		4	max	.008	1	.01	2	0	1	0	1	NC	1	NC	1
350			min	-.003	3	-.012	3	-.125	4	-7.45e-4	4	NC	1	199.103	4
351		5	max	.007	1	.009	2	0	1	0	1	NC	1	NC	1
352			min	-.003	3	-.011	3	-.112	4	-7.45e-4	4	NC	1	222.266	4
353		6	max	.007	1	.008	2	0	1	0	1	NC	1	NC	1
354			min	-.003	3	-.01	3	-.099	4	-7.45e-4	4	NC	1	250.755	4
355		7	max	.006	1	.008	2	0	1	0	1	NC	1	NC	1
356			min	-.002	3	-.01	3	-.087	4	-7.45e-4	4	NC	1	286.331	4
357		8	max	.006	1	.007	2	0	1	0	1	NC	1	NC	1
358			min	-.002	3	-.009	3	-.075	4	-7.45e-4	4	NC	1	331.566	4
359		9	max	.005	1	.006	2	0	1	0	1	NC	1	NC	1
360			min	-.002	3	-.008	3	-.064	4	-7.45e-4	4	NC	1	390.329	4
361		10	max	.005	1	.006	2	0	1	0	1	NC	1	NC	1
362			min	-.002	3	-.007	3	-.053	4	-7.45e-4	4	NC	1	468.672	4
363		11	max	.004	1	.005	2	0	1	0	1	NC	1	NC	1
364			min	-.002	3	-.006	3	-.043	4	-7.45e-4	4	NC	1	576.493	4
365		12	max	.004	1	.005	2	0	1	0	1	NC	1	NC	1
366			min	-.001	3	-.006	3	-.034	4	-7.45e-4	4	NC	1	730.922	4
367		13	max	.003	1	.004	2	0	1	0	1	NC	1	NC	1
368			min	-.001	3	-.005	3	-.026	4	-7.45e-4	4	NC	1	963.75	4
369		14	max	.003	1	.003	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.004	3	-.019	4	-7.45e-4	4	NC	1	1339.671	4
371		15	max	.002	1	.003	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.003	3	-.012	4	-7.45e-4	4	NC	1	2007.841	4
373		16	max	.002	1	.002	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.002	3	-.007	4	-7.45e-4	4	NC	1	3380.684	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
375		17	max	.001	1	.001	2	0	1	0	1	NC	1	NC	1
376			min	0	3	-.002	3	-.004	4	-7.45e-4	4	NC	1	6987.888	4
377		18	max	0	1	0	2	0	1	0	1	NC	1	NC	1
378			min	0	3	0	3	-.001	4	-7.45e-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	-7.45e-4	4	NC	1	NC	1
381	M10	1	max	.005	1	.004	2	0	12	1.193e-3	4	NC	1	NC	2
382			min	-.006	3	-.007	3	-.409	4	7.237e-6	12	NC	1	116.994	4
383		2	max	.005	1	.003	2	0	12	1.265e-3	4	NC	1	NC	2
384			min	-.006	3	-.007	3	-.375	4	6.735e-6	12	NC	1	127.477	4
385		3	max	.005	1	.003	2	0	12	1.338e-3	4	NC	1	NC	1
386			min	-.006	3	-.007	3	-.342	4	6.232e-6	12	NC	1	139.941	4
387		4	max	.005	1	.002	2	0	12	1.41e-3	4	NC	1	NC	1
388			min	-.005	3	-.007	3	-.309	4	5.729e-6	12	NC	1	154.907	4
389		5	max	.004	1	.002	2	0	12	1.483e-3	4	NC	1	NC	1
390			min	-.005	3	-.006	3	-.276	4	5.226e-6	12	NC	1	173.08	4
391		6	max	.004	1	.001	2	0	12	1.556e-3	4	NC	1	NC	1
392			min	-.005	3	-.006	3	-.245	4	4.724e-6	12	NC	1	195.44	4
393		7	max	.004	1	.001	2	0	12	1.628e-3	4	NC	1	NC	1
394			min	-.004	3	-.006	3	-.214	4	4.221e-6	12	NC	1	223.381	4
395		8	max	.003	1	0	2	0	12	1.701e-3	4	NC	1	NC	1
396			min	-.004	3	-.005	3	-.185	4	3.718e-6	12	NC	1	258.939	4
397		9	max	.003	1	0	2	0	12	1.774e-3	4	NC	1	NC	1
398			min	-.004	3	-.005	3	-.157	4	3.215e-6	12	NC	1	305.185	4
399		10	max	.003	1	0	2	0	12	1.846e-3	4	NC	1	NC	1
400			min	-.003	3	-.005	3	-.13	4	2.713e-6	12	NC	1	366.931	4
401		11	max	.002	1	0	2	0	12	1.919e-3	4	NC	1	NC	1
402			min	-.003	3	-.004	3	-.106	4	2.21e-6	12	NC	1	452.072	4
403		12	max	.002	1	0	2	0	12	1.991e-3	4	NC	1	NC	1
404			min	-.003	3	-.004	3	-.083	4	1.707e-6	12	NC	1	574.314	4
405		13	max	.002	1	0	2	0	12	2.064e-3	4	NC	1	NC	1
406			min	-.002	3	-.003	3	-.063	4	1.131e-6	10	NC	1	759.211	4
407		14	max	.002	1	0	15	0	12	2.137e-3	4	NC	1	NC	1
408			min	-.002	3	-.003	3	-.045	4	3.348e-7	10	NC	1	1059.06	4
409		15	max	.001	1	0	15	0	12	2.209e-3	4	NC	1	NC	1
410			min	-.001	3	-.002	3	-.03	4	-3.633e-6	1	NC	1	1595.389	4
411		16	max	0	1	0	15	0	12	2.282e-3	4	NC	1	NC	1
412			min	-.001	3	-.002	3	-.018	4	-1.372e-5	1	NC	1	2708.123	4
413		17	max	0	1	0	15	0	12	2.354e-3	4	NC	1	NC	1
414			min	0	3	-.001	4	-.008	4	-2.38e-5	1	NC	1	5681.985	4
415		18	max	0	1	0	15	0	12	2.427e-3	4	NC	1	NC	1
416			min	0	3	0	4	-.002	4	-3.389e-5	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.5e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-4.397e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	1.368e-5	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-5.562e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.012	4	4.766e-6	4	NC	1	NC	1
422			min	0	2	-.002	4	0	1	-3.725e-6	1	NC	1	NC	1
423		3	max	0	3	0	15	.024	4	5.657e-4	4	NC	1	NC	1
424			min	0	2	-.003	4	0	1	-2.113e-5	1	NC	1	NC	1
425		4	max	0	3	-.001	15	.035	4	1.127e-3	4	NC	1	NC	1
426			min	0	2	-.005	4	0	1	-3.853e-5	1	NC	1	NC	1
427		5	max	.001	3	-.002	15	.045	4	1.688e-3	4	NC	1	NC	1
428			min	0	2	-.007	4	0	1	-5.593e-5	1	NC	1	NC	1
429		6	max	.001	3	-.002	15	.055	4	2.249e-3	4	NC	1	NC	1
430			min	-.001	2	-.009	4	-.001	1	-7.333e-5	1	NC	1	9643.446	4
431		7	max	.002	3	-.003	15	.065	4	2.81e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
432			min	-.001	2	-.01	4	-.001	1	-9.073e-5	1	9107.415	4	9278.164	4
433		8	max	.002	3	-.003	15	.074	4	3.371e-3	4	NC	1	NC	1
434			min	-.001	2	-.012	4	-.002	1	-1.081e-4	1	8130.599	4	9349.586	4
435		9	max	.002	3	-.003	15	.083	4	3.932e-3	4	NC	1	NC	1
436			min	-.002	2	-.013	4	-.002	1	-1.255e-4	1	7548.025	4	9829.718	4
437		10	max	.002	3	-.003	15	.091	4	4.493e-3	4	NC	2	NC	1
438			min	-.002	2	-.013	4	-.002	1	-1.429e-4	1	7256.642	4	NC	1
439		11	max	.003	3	-.003	15	.099	4	5.054e-3	4	NC	2	NC	1
440			min	-.002	2	-.013	4	-.003	1	-1.603e-4	1	7212.947	4	NC	1
441		12	max	.003	3	-.003	15	.107	4	5.615e-3	4	NC	1	NC	1
442			min	-.002	2	-.013	4	-.003	1	-1.777e-4	1	7416.211	4	NC	1
443		13	max	.003	3	-.003	15	.115	4	6.176e-3	4	NC	1	NC	1
444			min	-.002	2	-.012	4	-.003	1	-1.951e-4	1	7910.264	4	NC	1
445		14	max	.003	3	-.003	15	.123	4	6.736e-3	4	NC	1	NC	1
446			min	-.003	2	-.011	4	-.003	1	-2.125e-4	1	8806.728	4	NC	1
447		15	max	.004	3	-.002	15	.131	4	7.297e-3	4	NC	1	NC	1
448			min	-.003	2	-.01	4	-.004	1	-2.299e-4	1	NC	1	NC	1
449		16	max	.004	3	-.002	15	.139	4	7.858e-3	4	NC	1	NC	1
450			min	-.003	2	-.008	4	-.004	1	-2.474e-4	1	NC	1	NC	1
451		17	max	.004	3	-.001	15	.147	4	8.419e-3	4	NC	1	NC	1
452			min	-.003	2	-.006	1	-.004	1	-2.648e-4	1	NC	1	NC	1
453		18	max	.004	3	0	15	.156	4	8.98e-3	4	NC	1	NC	1
454			min	-.003	2	-.005	1	-.005	1	-2.822e-4	1	NC	1	NC	1
455		19	max	.005	3	0	12	.165	4	9.541e-3	4	NC	1	NC	1
456			min	-.004	2	-.003	1	-.005	1	-2.996e-4	1	NC	1	NC	1
457	M12	1	max	.003	1	.003	2	.005	1	8.021e-6	1	NC	1	NC	2
458			min	-.001	3	-.005	3	-.165	4	-7.177e-4	4	NC	1	149.957	4
459		2	max	.003	1	.003	2	.005	1	8.021e-6	1	NC	1	NC	2
460			min	-.001	3	-.004	3	-.152	4	-7.177e-4	4	NC	1	163.245	4
461		3	max	.003	1	.003	2	.004	1	8.021e-6	1	NC	1	NC	2
462			min	0	3	-.004	3	-.139	4	-7.177e-4	4	NC	1	179.047	4
463		4	max	.003	1	.002	2	.004	1	8.021e-6	1	NC	1	NC	2
464			min	0	3	-.004	3	-.125	4	-7.177e-4	4	NC	1	198.02	4
465		5	max	.002	1	.002	2	.004	1	8.021e-6	1	NC	1	NC	2
466			min	0	3	-.004	3	-.112	4	-7.177e-4	4	NC	1	221.054	4
467		6	max	.002	1	.002	2	.003	1	8.021e-6	1	NC	1	NC	2
468			min	0	3	-.003	3	-.099	4	-7.177e-4	4	NC	1	249.383	4
469		7	max	.002	1	.002	2	.003	1	8.021e-6	1	NC	1	NC	2
470			min	0	3	-.003	3	-.087	4	-7.177e-4	4	NC	1	284.76	4
471		8	max	.002	1	.002	2	.002	1	8.021e-6	1	NC	1	NC	1
472			min	0	3	-.003	3	-.075	4	-7.177e-4	4	NC	1	329.741	4
473		9	max	.002	1	.002	2	.002	1	8.021e-6	1	NC	1	NC	1
474			min	0	3	-.003	3	-.064	4	-7.177e-4	4	NC	1	388.174	4
475		10	max	.002	1	.001	2	.002	1	8.021e-6	1	NC	1	NC	1
476			min	0	3	-.002	3	-.053	4	-7.177e-4	4	NC	1	466.078	4
477		11	max	.001	1	.001	2	.001	1	8.021e-6	1	NC	1	NC	1
478			min	0	3	-.002	3	-.043	4	-7.177e-4	4	NC	1	573.294	4
479		12	max	.001	1	.001	2	.001	1	8.021e-6	1	NC	1	NC	1
480			min	0	3	-.002	3	-.034	4	-7.177e-4	4	NC	1	726.856	4
481		13	max	.001	1	0	2	0	1	8.021e-6	1	NC	1	NC	1
482			min	0	3	-.002	3	-.026	4	-7.177e-4	4	NC	1	958.376	4
483		14	max	0	1	0	2	0	1	8.021e-6	1	NC	1	NC	1
484			min	0	3	-.001	3	-.019	4	-7.177e-4	4	NC	1	1332.183	4
485		15	max	0	1	0	2	0	1	8.021e-6	1	NC	1	NC	1
486			min	0	3	-.001	3	-.012	4	-7.177e-4	4	NC	1	1996.591	4
487		16	max	0	1	0	2	0	1	8.021e-6	1	NC	1	NC	1
488			min	0	3	0	3	-.007	4	-7.177e-4	4	NC	1	3361.695	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	8.021e-6	1	NC	1	NC	1
490			min	0	3	0	3	-.004	4	-7.177e-4	4	NC	1	6948.522	4
491		18	max	0	1	0	2	0	1	8.021e-6	1	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-7.177e-4	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	8.021e-6	1	NC	1	NC	1
494			min	0	1	0	1	0	1	-7.177e-4	4	NC	1	NC	1
495	M1	1	max	.006	3	.129	2	.428	4	1.497e-2	1	NC	1	NC	1
496			min	-.003	2	-.03	3	0	12	-2.466e-2	3	NC	1	NC	1
497		2	max	.006	3	.063	2	.417	4	7.594e-3	4	NC	4	NC	1
498			min	-.003	2	-.015	3	-.004	1	-1.22e-2	3	1750.347	2	NC	1
499		3	max	.006	3	.009	3	.406	4	1.246e-2	4	NC	5	NC	1
500			min	-.003	2	-.008	2	-.005	1	-1.22e-4	3	843.995	2	9547.713	5
501		4	max	.006	3	.047	3	.395	4	1.094e-2	4	NC	5	NC	1
502			min	-.003	2	-.087	2	-.005	1	-4.784e-3	3	533.137	2	6494.483	5
503		5	max	.006	3	.096	3	.385	4	9.578e-3	1	NC	15	NC	1
504			min	-.003	2	-.17	2	-.004	1	-9.445e-3	3	384.989	2	4956.033	5
505		6	max	.005	3	.149	3	.374	4	1.441e-2	1	NC	15	NC	1
506			min	-.003	2	-.251	2	-.001	1	-1.411e-2	3	303.348	2	4052.109	5
507		7	max	.005	3	.199	3	.362	4	1.924e-2	1	NC	15	NC	1
508			min	-.003	2	-.323	2	0	12	-1.877e-2	3	255.142	2	3468.989	4
509		8	max	.005	3	.241	3	.35	4	2.407e-2	1	9018.998	15	NC	1
510			min	-.002	2	-.38	1	0	12	-2.343e-2	3	226.607	1	3075.374	4
511		9	max	.005	3	.269	3	.337	4	2.662e-2	1	8432.713	15	NC	1
512			min	-.002	2	-.417	1	0	1	-2.37e-2	3	211.46	1	2849.154	4
513		10	max	.005	3	.279	3	.321	4	2.769e-2	2	8254.034	15	NC	1
514			min	-.002	2	-.429	1	0	12	-2.105e-2	3	206.941	1	2784.819	4
515		11	max	.005	3	.272	3	.304	4	2.976e-2	2	8432.524	15	NC	1
516			min	-.002	2	-.416	1	0	12	-1.84e-2	3	211.806	1	2852.453	4
517		12	max	.005	3	.249	3	.285	4	2.873e-2	2	9018.562	15	NC	1
518			min	-.002	2	-.379	1	0	1	-1.557e-2	3	227.667	1	3068.463	5
519		13	max	.005	3	.212	3	.263	4	2.303e-2	2	NC	15	NC	1
520			min	-.002	2	-.32	1	0	1	-1.247e-2	3	258.344	1	3611.415	4
521		14	max	.005	3	.164	3	.239	4	1.734e-2	2	NC	15	NC	1
522			min	-.002	2	-.246	1	0	12	-9.365e-3	3	310.692	1	4723.335	4
523		15	max	.004	3	.111	3	.215	4	1.164e-2	2	NC	15	NC	1
524			min	-.002	2	-.164	1	0	12	-6.26e-3	3	400.52	1	7102.538	4
525		16	max	.004	3	.056	3	.191	4	8.391e-3	4	NC	5	NC	1
526			min	-.002	2	-.082	1	0	12	-3.156e-3	3	566.163	1	NC	1
527		17	max	.004	3	.003	3	.169	4	9.325e-3	4	NC	5	NC	1
528			min	-.002	2	-.005	2	0	12	-5.096e-5	3	918.754	1	NC	1
529		18	max	.004	3	.06	1	.149	4	1.012e-2	2	NC	4	NC	1
530			min	-.002	2	-.043	3	0	12	-4.291e-3	3	1939.834	1	NC	1
531		19	max	.004	3	.119	1	.133	4	2.037e-2	2	NC	1	NC	1
532			min	-.002	2	-.087	3	0	1	-8.703e-3	3	NC	1	NC	1
533	M5	1	max	.018	3	.295	2	.428	4	0	1	NC	1	NC	1
534			min	-.011	2	-.042	3	0	1	-2.477e-6	4	NC	1	NC	1
535		2	max	.018	3	.145	2	.419	4	6.377e-3	4	NC	5	NC	1
536			min	-.012	2	-.021	3	0	1	0	1	772.772	2	NC	1
537		3	max	.018	3	.027	3	.409	4	1.256e-2	4	NC	5	NC	1
538			min	-.012	2	-.023	2	0	1	0	1	363.991	2	8025.488	4
539		4	max	.018	3	.127	3	.398	4	1.023e-2	4	NC	15	NC	1
540			min	-.011	2	-.224	2	0	1	0	1	223.13	2	5817.073	4
541		5	max	.017	3	.261	3	.387	4	7.905e-3	4	7140.443	15	NC	1
542			min	-.011	2	-.441	2	0	1	0	1	157.243	2	4681.437	4
543		6	max	.017	3	.41	3	.375	4	5.579e-3	4	5494.436	15	NC	1
544			min	-.011	2	-.656	2	0	1	0	1	121.653	2	3979.642	4
545		7	max	.016	3	.555	3	.362	4	3.253e-3	4	4544.471	15	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
546			min	-.011	2	-.851	1	0	1	0	1	100.985	2	3489.202	4
547		8	max	.016	3	.677	3	.35	4	9.269e-4	4	3992.379	15	NC	1
548			min	-.01	2	-1.009	1	0	1	0	1	88.726	1	3111.588	4
549		9	max	.016	3	.755	3	.337	4	0	1	3709.351	15	NC	1
550			min	-.01	2	-1.109	1	0	1	-1.435e-6	5	82.407	1	2849.551	4
551		10	max	.015	3	.784	3	.321	4	0	1	3624.083	15	NC	1
552			min	-.01	2	-1.142	1	0	1	-1.358e-6	5	80.532	1	2805.541	4
553		11	max	.015	3	.764	3	.304	4	0	1	3709.426	15	NC	1
554			min	-.01	2	-1.109	1	0	1	-1.28e-6	5	82.55	1	2881.504	4
555		12	max	.015	3	.698	3	.286	4	6.719e-4	4	3992.555	15	NC	1
556			min	-.01	2	-1.007	1	0	1	0	1	89.197	1	3026.698	4
557		13	max	.014	3	.59	3	.264	4	2.358e-3	4	4544.827	15	NC	1
558			min	-.01	2	-.845	1	0	1	0	1	102.283	1	3552.584	4
559		14	max	.014	3	.455	3	.239	4	4.044e-3	4	5495.128	15	NC	1
560			min	-.009	2	-.643	1	0	1	0	1	125.032	1	4833.285	4
561		15	max	.014	3	.305	3	.213	4	5.731e-3	4	7141.804	15	NC	1
562			min	-.009	2	-.423	1	0	1	0	1	165.013	1	8145.11	5
563		16	max	.013	3	.152	3	.188	4	7.417e-3	4	NC	15	NC	1
564			min	-.009	2	-.207	1	0	1	0	1	241.024	1	NC	1
565		17	max	.013	3	.01	3	.165	4	9.103e-3	4	NC	5	NC	1
566			min	-.009	2	-.016	2	0	1	0	1	408.073	1	NC	1
567		18	max	.013	3	.136	1	.147	4	4.623e-3	4	NC	5	NC	1
568			min	-.009	2	-.11	3	0	1	0	1	891.353	1	NC	1
569		19	max	.013	3	.263	1	.133	4	0	1	NC	1	NC	1
570			min	-.009	2	-.218	3	0	1	-1.018e-6	4	NC	1	NC	1
571	M9	1	max	.006	3	.129	2	.428	4	2.466e-2	3	NC	1	NC	1
572			min	-.003	2	-.03	3	0	1	-1.497e-2	1	NC	1	NC	1
573		2	max	.006	3	.063	2	.419	4	1.22e-2	3	NC	4	NC	1
574			min	-.003	2	-.015	3	0	12	-7.299e-3	1	1750.347	2	NC	1
575		3	max	.006	3	.009	3	.409	4	1.252e-2	4	NC	5	NC	1
576			min	-.003	2	-.008	2	0	12	-3.808e-5	10	843.995	2	8248.466	4
577		4	max	.006	3	.047	3	.398	4	9.856e-3	5	NC	5	NC	1
578			min	-.003	2	-.087	2	0	12	-4.746e-3	1	533.137	2	5904.595	4
579		5	max	.006	3	.096	3	.386	4	9.445e-3	3	NC	15	NC	1
580			min	-.003	2	-.17	2	0	12	-9.578e-3	1	384.989	2	4701.388	4
581		6	max	.005	3	.149	3	.375	4	1.411e-2	3	NC	15	NC	1
582			min	-.003	2	-.251	2	0	12	-1.441e-2	1	303.348	2	3966.649	4
583		7	max	.005	3	.199	3	.362	4	1.877e-2	3	NC	15	NC	1
584			min	-.003	2	-.323	2	0	1	-1.924e-2	1	255.142	2	3466.124	4
585		8	max	.005	3	.241	3	.35	4	2.343e-2	3	9007.442	15	NC	1
586			min	-.002	2	-.38	1	0	1	-2.407e-2	1	226.607	1	3093.65	5
587		9	max	.005	3	.269	3	.337	4	2.37e-2	3	8422.029	15	NC	1
588			min	-.002	2	-.417	1	0	12	-2.662e-2	1	211.46	1	2843.131	4
589		10	max	.005	3	.279	3	.321	4	2.105e-2	3	8243.6	15	NC	1
590			min	-.002	2	-.429	1	0	1	-2.769e-2	2	206.941	1	2785.625	4
591		11	max	.005	3	.272	3	.304	4	1.84e-2	3	8421.832	15	NC	1
592			min	-.002	2	-.416	1	0	1	-2.976e-2	2	211.806	1	2859.761	4
593		12	max	.005	3	.249	3	.285	4	1.557e-2	3	9007.059	15	NC	1
594			min	-.002	2	-.379	1	0	12	-2.873e-2	2	227.667	1	3050.032	4
595		13	max	.005	3	.212	3	.263	4	1.247e-2	3	NC	15	NC	1
596			min	-.002	2	-.32	1	0	10	-2.303e-2	2	258.344	1	3610.862	4
597		14	max	.005	3	.164	3	.238	4	9.365e-3	3	NC	15	NC	1
598			min	-.002	2	-.246	1	-.001	1	-1.734e-2	2	310.692	1	4820.835	5
599		15	max	.004	3	.111	3	.213	4	6.26e-3	3	NC	15	NC	1
600			min	-.002	2	-.164	1	-.003	1	-1.164e-2	2	400.52	1	7600.237	5
601		16	max	.004	3	.056	3	.188	4	7.237e-3	5	NC	5	NC	1
602			min	-.002	2	-.082	1	-.005	1	-5.939e-3	2	566.163	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	.004	3	.003	3	.166	4	9.14e-3	4	NC	5	NC	1
604			min	-.002	2	-.005	2	-.005	1	-4.184e-4	1	918.754	1	NC	1
605		18	max	.004	3	.06	1	.148	4	4.357e-3	5	NC	4	NC	1
606			min	-.002	2	-.043	3	-.004	1	-1.012e-2	2	1939.834	1	NC	1
607		19	max	.004	3	.119	1	.133	4	8.703e-3	3	NC	1	NC	1
608			min	-.002	2	-.087	3	0	12	-2.037e-2	2	NC	1	NC	1

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

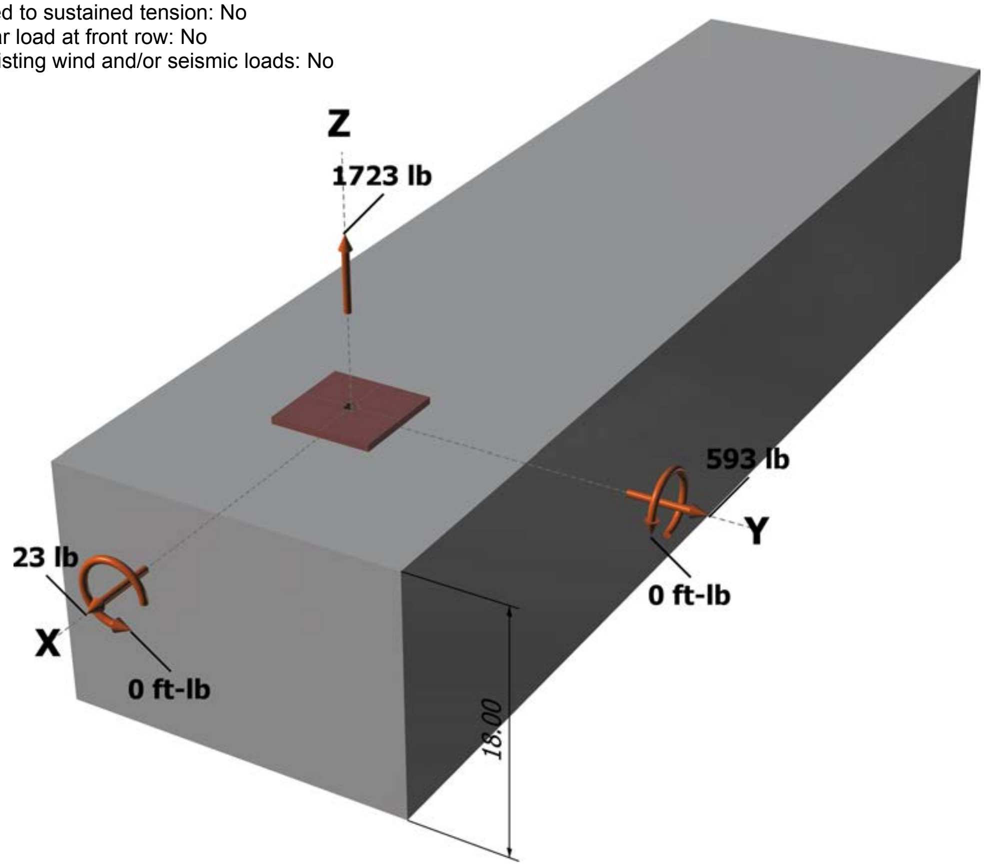
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

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

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

<Figure 1>



<Figure 2>

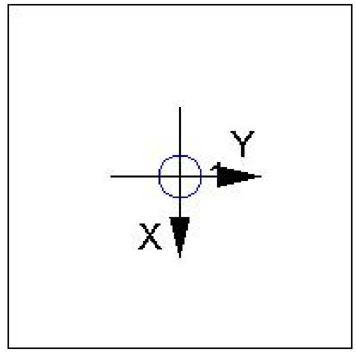
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

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

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

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in y-direction:

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

Shear parallel to edge in y-direction:

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

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

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

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

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

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

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

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

11. Results

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

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

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

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

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

12. Warnings

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

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

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

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

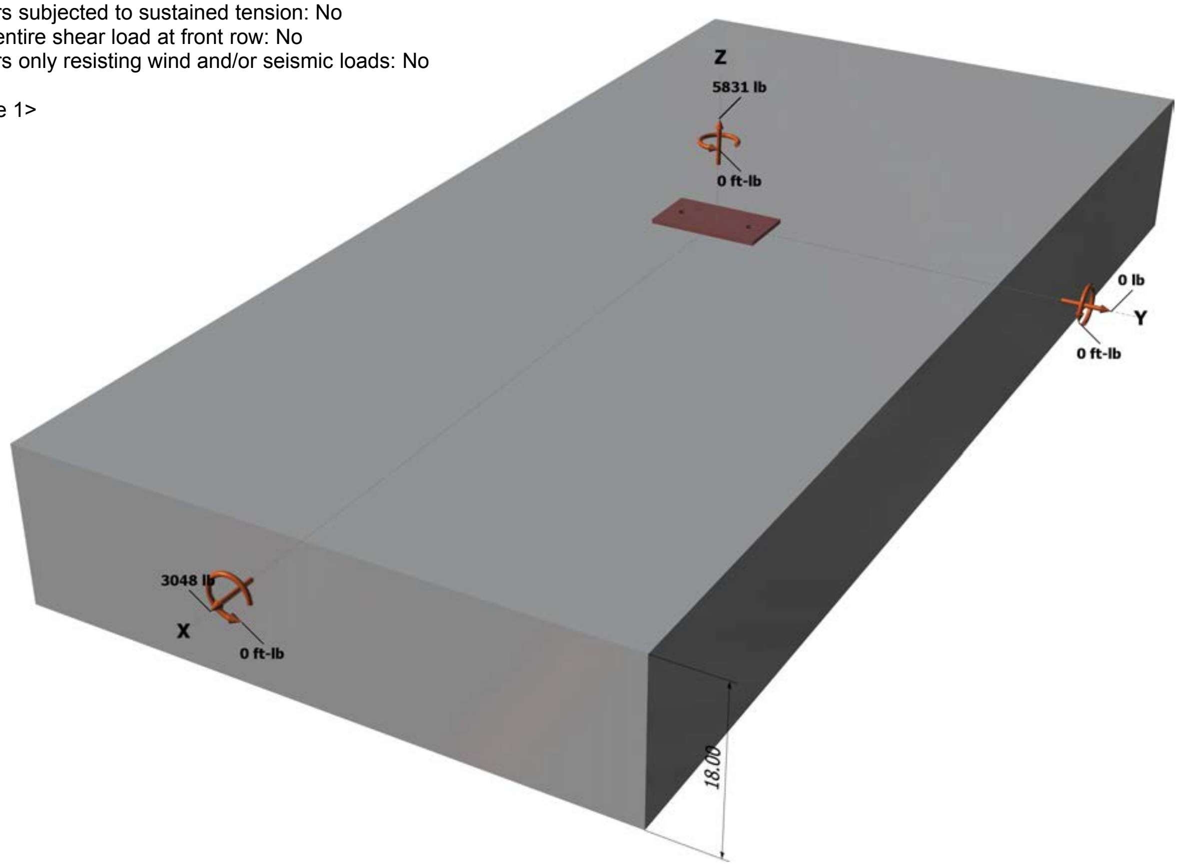
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

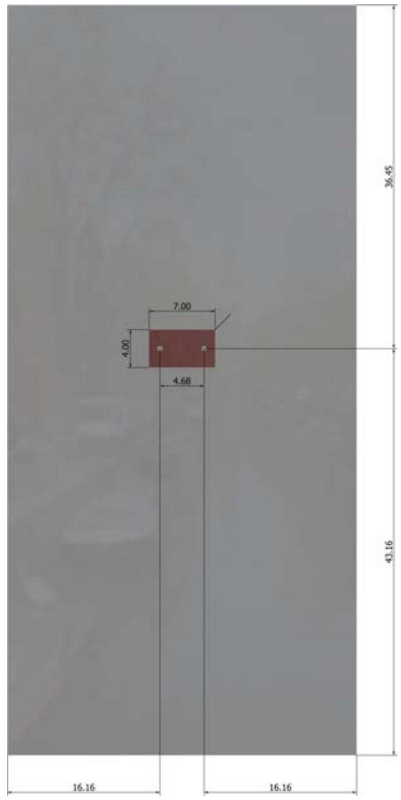


SIMPSON Strong-Tie

Anchor Designer™
Software
Version 2.4.5673.0

Company:	Schletter, Inc.	Date:	11/17/2015
Engineer:	HCV	Page:	2/5
Project:	Standard PVMax - Worst Case, 37-42 Inch Width		
Address:			
Phone:			
E-mail:			

<Figure 2>



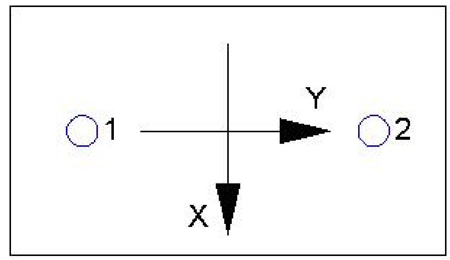
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	2915.5	1524.0	0.0	1524.0
2	2915.5	1524.0	0.0	1524.0
Sum	5831.0	3048.0	0.0	3048.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 5831
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgx} (lb)
666.00	648.00	1.000	0.969	1.000	1.000	15593	0.70	10875

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	16.16	24369

$\phi V_{cbx} = \phi\,(2)(A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (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)
872.64	1175.16	1.000	1.000	1.000	24369	0.70	25334

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

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

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

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

ϕV_{cpg} (lb)
20601

11. Results

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

Tension	Factored Load, N_{ua} (lb)	Design Strength, $øN_n$ (lb)	Ratio	Status
Steel	2916	6071	0.48	Pass
Concrete breakout	5831	10231	0.57	Pass
Adhesive	**5831**	**8093**	**0.72**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, $øV_n$ (lb)	Ratio	Status
Steel	**1524**	**3156**	**0.48**	**Pass (Governs)**
T Concrete breakout x+	3048	10875	0.28	Pass
|| Concrete breakout y-	1524	25334	0.06	Pass
Pryout	3048	20601	0.15	Pass

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

Sec. D.7.3	0.72	0.48	120.3 %	1.2	Pass

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

12. Warnings

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

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

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