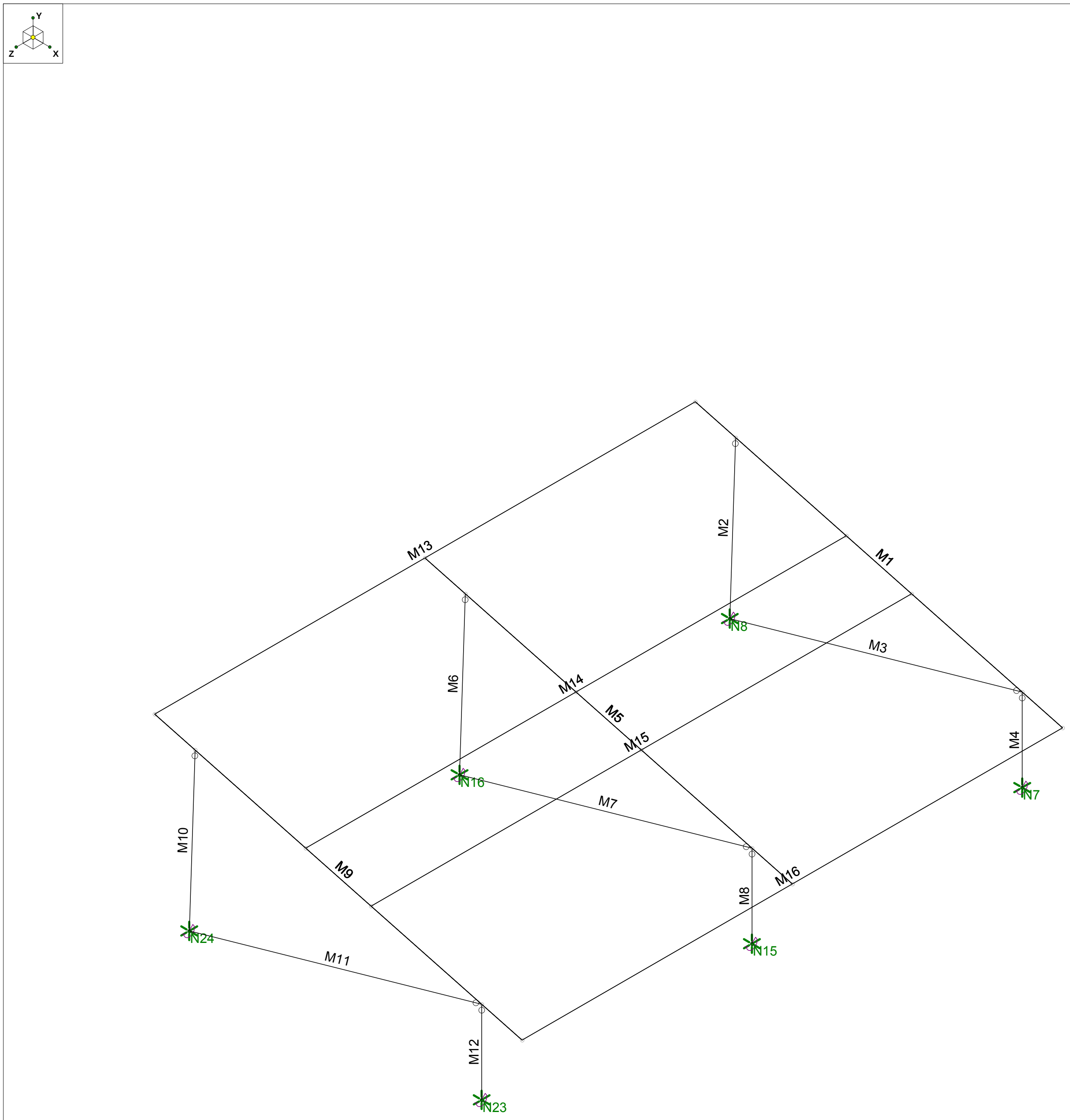


Schletter, Inc.		15° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-05	

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.

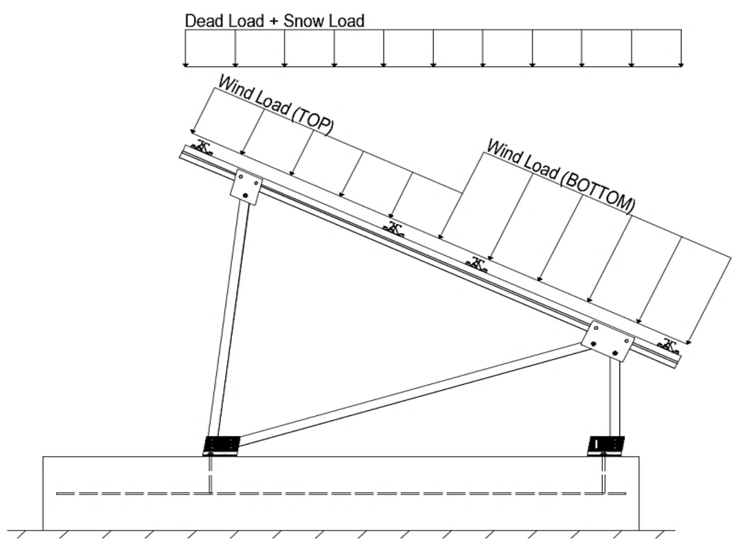
1.2 Construction

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 = 90 mph — Exposure Category = C
Height < 15 ft — Importance Category = II

Peak Velocity Pressure, q_z = 12.72 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

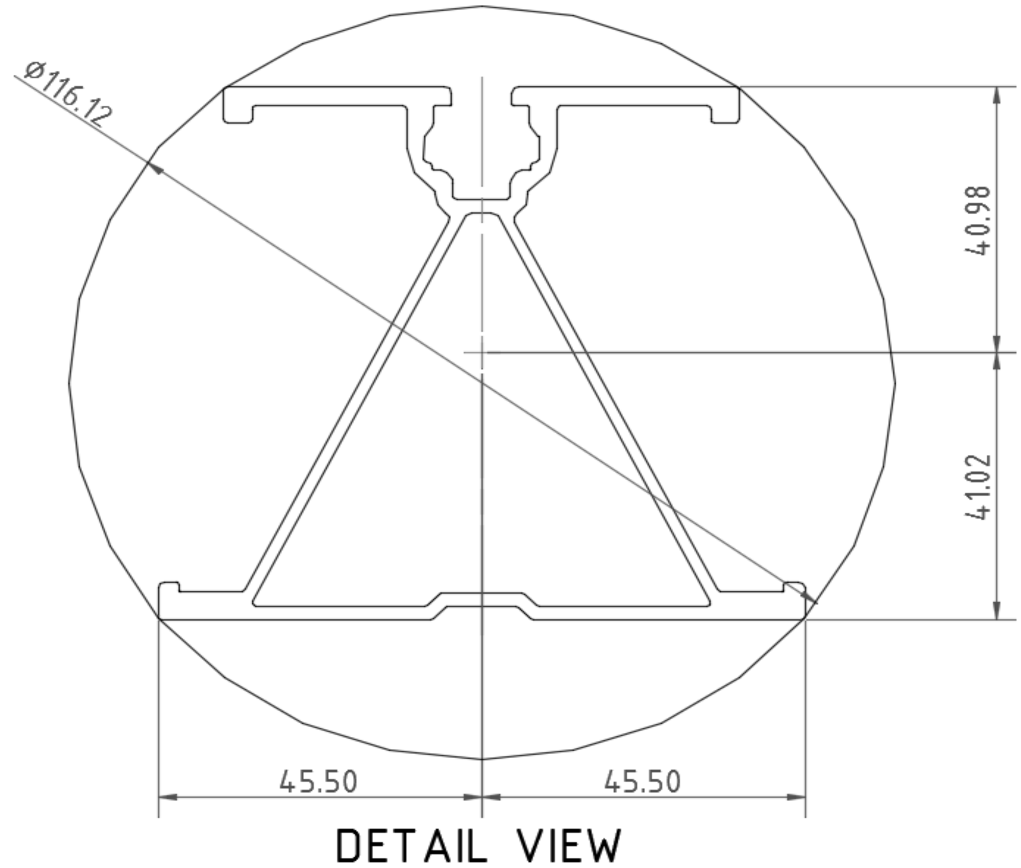
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

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).

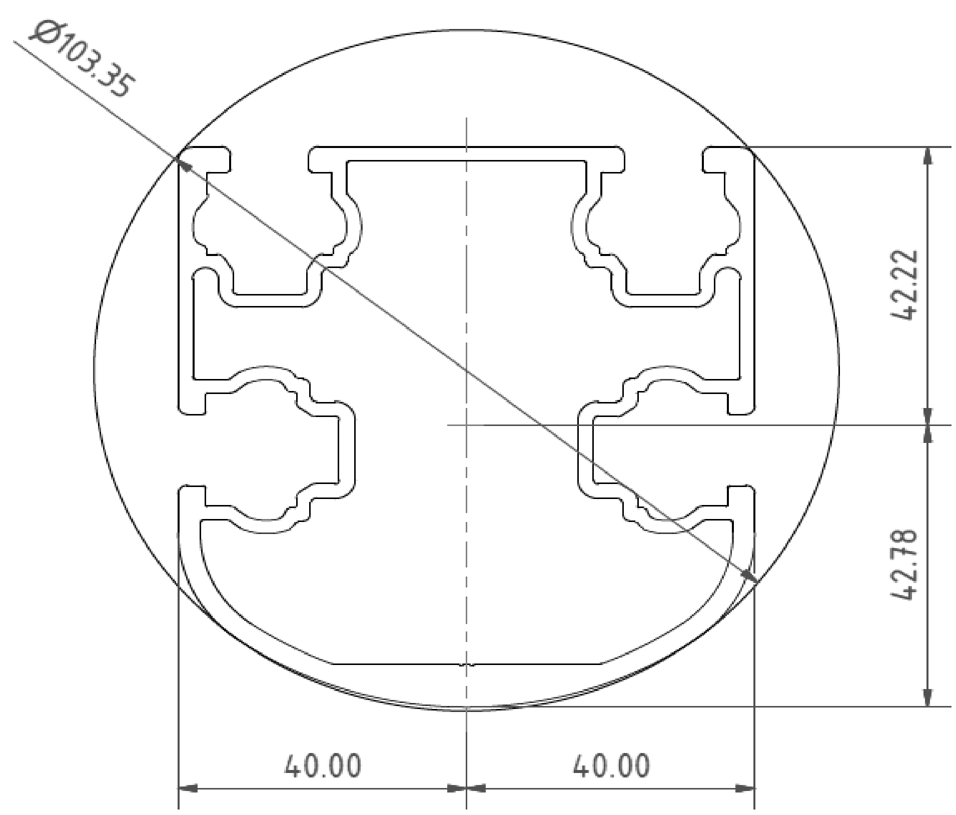
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	123	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	2.038	k-ft
M_z =	0.267	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	96%	



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).

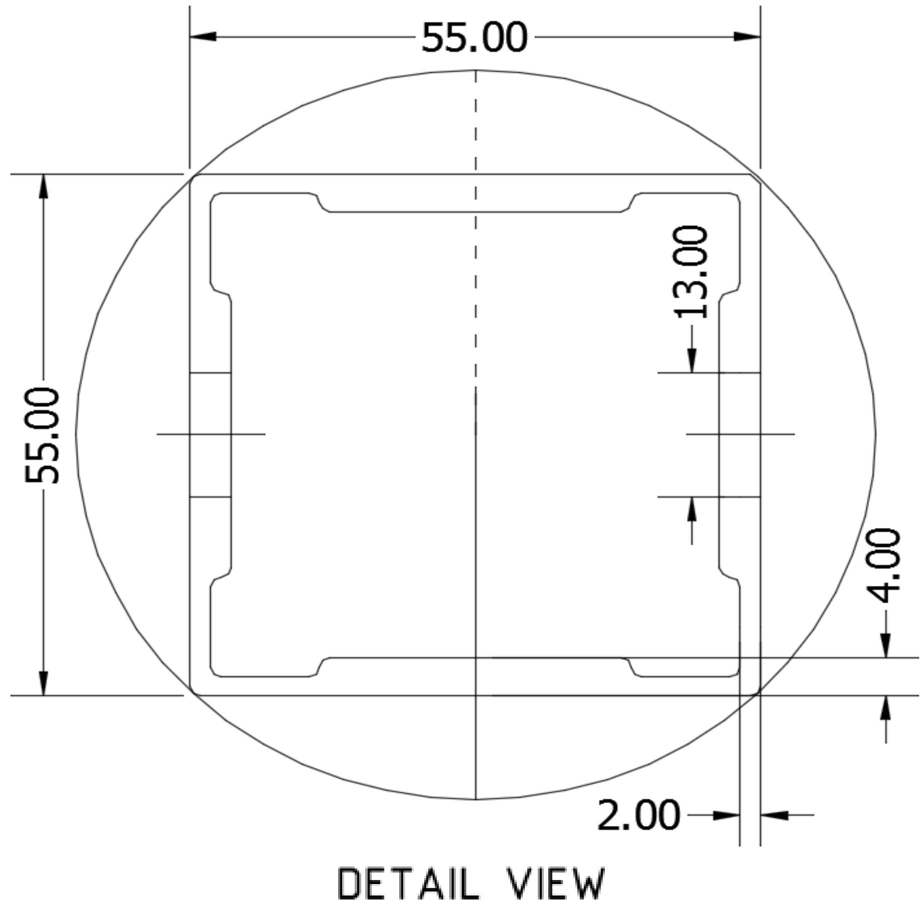
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.168	k-ft
M_z =	0.000	k-ft
P_n =	-0.197	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	92%	



4.3 Front Strut Design

The front aluminum strut connects a portion of the girder to the foundation. Vertical girder forces are then transferred down through the strut into the foundation. The strut is attached with single M12 bolts at each end. See Appendix A.3 for detailed member calculations. Section units are in (mm).

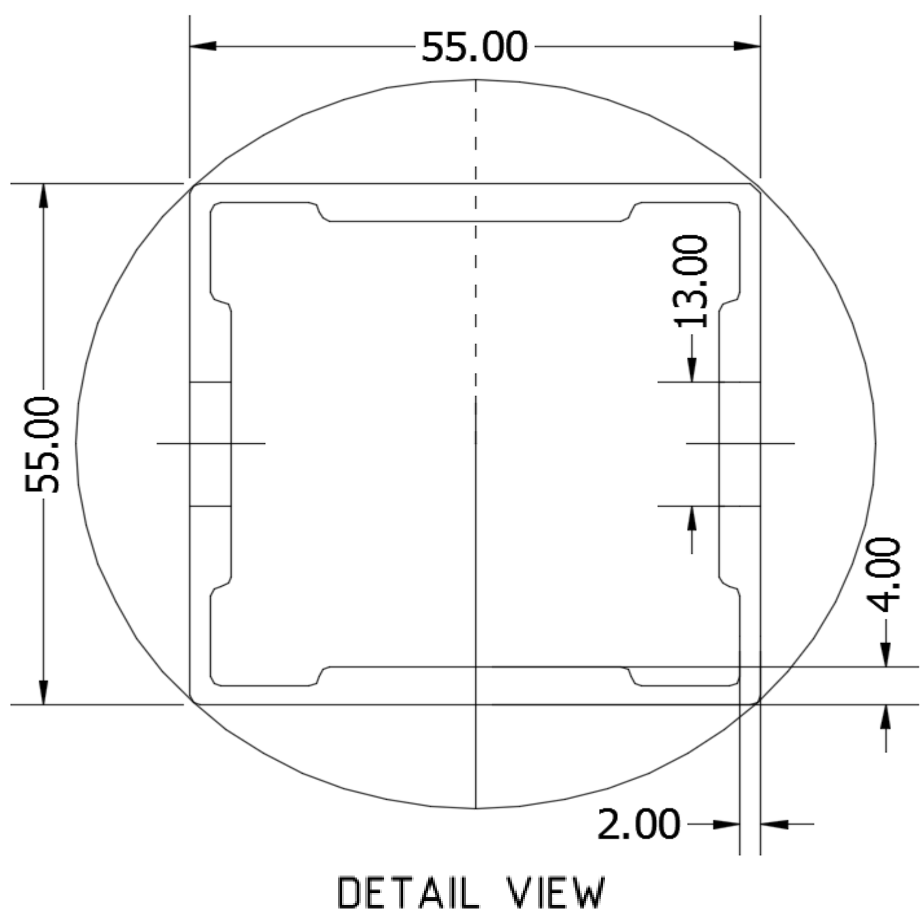
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.480	k-ft
P_n =	0.704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



4.4 Diagonal Strut Design

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

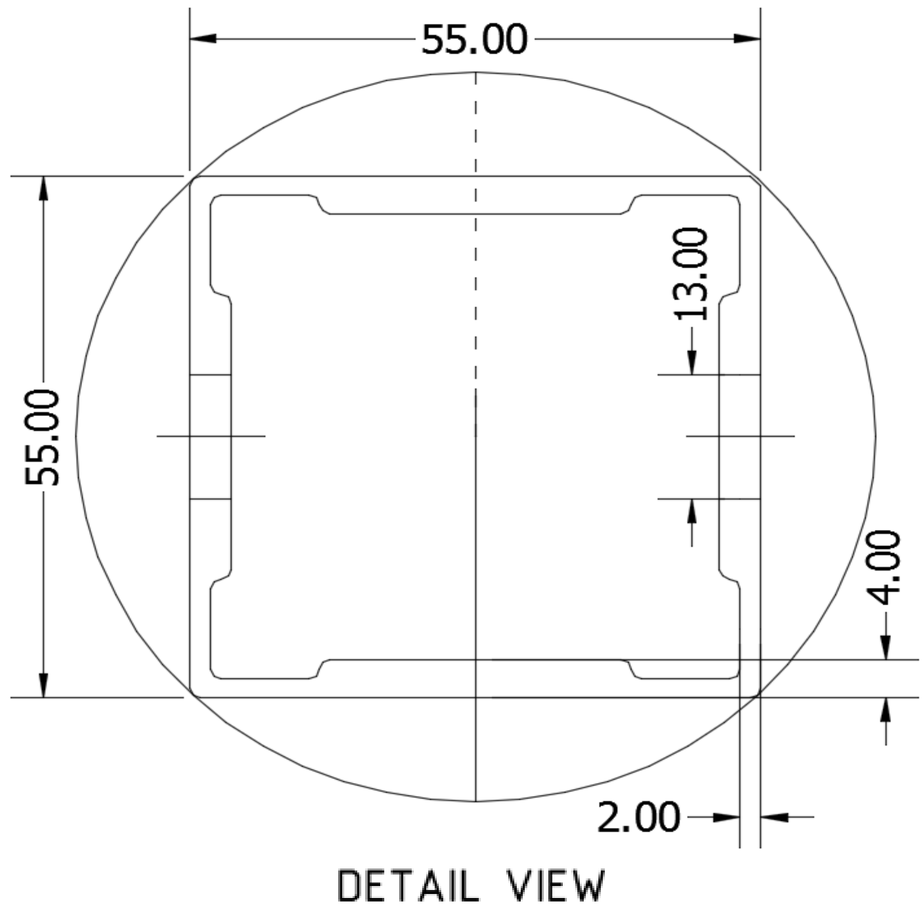
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.010	k-ft
M_z =	0.000	k-ft
P_n =	1.003	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	7.371	k
Utilization =	14%	



4.5 Rear Strut Design

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

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



5. FOUNDATION DESIGN CALCULATIONS

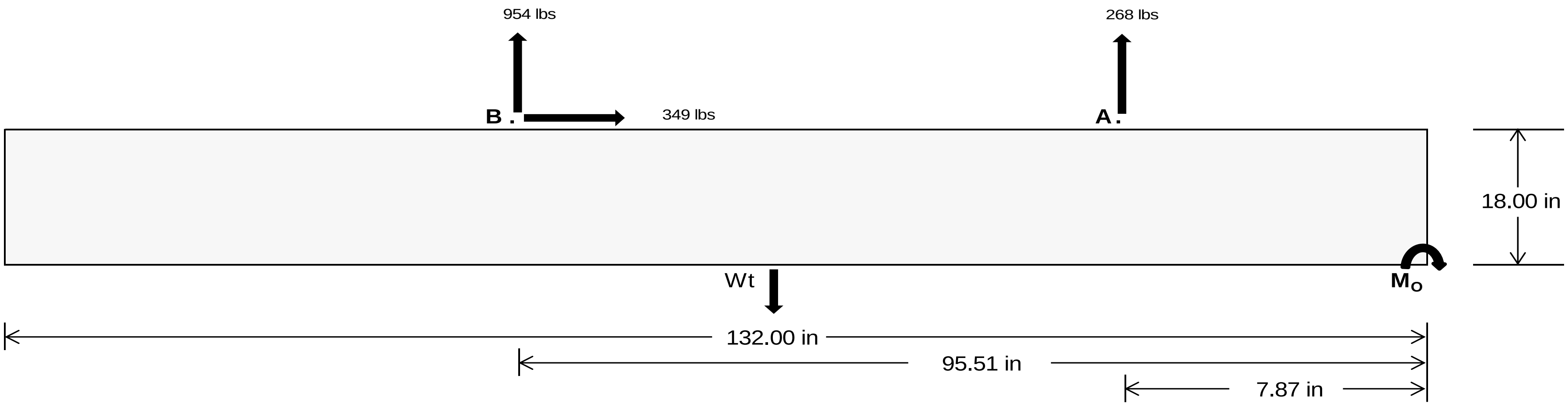
5.1 Helical Pile Foundations

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

Maximum	Front	Rear	
Tensile Load =	1127.32	3983.64	k
Compressive Load =	4691.21	4868.46	k
Lateral Load =	313.75	1454.67	k
Moment (Weak Axis) =	0.64	0.43	k

5.2 Design of Ballast Foundations

Ballast foundations are used to secure the racking structure in place. The foundations are checked for potential overturning and sliding. Bearing pressures applied by the racking and ballast foundations are checked against the allowable bearing pressures provided by the IBC 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 (1) #5 rebar.

Overturning Check

M_O = 99562.1 in-lbs
Resisting Force Required = 1508.52 lbs
S.F. = 1.67
Weight Required = 2514.19 lbs
Minimum Width = 23 in in
Weight Provided = 4585.63 lbs

A minimum 132in long x 23in wide x 18in tall ballast foundation is required to resist overturning.

Sliding

Force = 349.48 lbs
Friction = 0.4
Weight Required = 873.71 lbs
Resisting Weight = 4585.63 lbs
Additional Weight Required = 0 lbs

Use a 132in long x 23in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

Cohesion

Sliding Force = 349.48 lbs
Cohesion = 130 psf
Area = 21.08 ft^2
Resisting = 2292.81 lbs
Additional Weight Required = 0 lbs

Use a 132in long x 23in 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			
	23 in	24 in	25 in	26 in
P_{ftg} = (145 pcf)(11 ft)(1.5 ft)(1.92 ft) =	4586 lbs	4785 lbs	4984 lbs	5184 lbs

ASD LC	1.0D + 1.0S				1.0D + 1.0W			
Width	23 in	24 in	25 in	26 in	23 in	24 in	25 in	26 in
F_A	1767 lbs	1767 lbs	1767 lbs	1767 lbs	1372 lbs	1372 lbs	1372 lbs	1372 lbs
F_B	1831 lbs	1831 lbs	1831 lbs	1831 lbs	1423 lbs	1423 lbs	1423 lbs	1423 lbs
F_V	157 lbs	157 lbs	157 lbs	157 lbs	626 lbs	626 lbs	626 lbs	626 lbs
P_{total}	8184 lbs	8384 lbs	8583 lbs	8782 lbs	7380 lbs	7580 lbs	7779 lbs	7979 lbs
M	4292 lbs-ft	4292 lbs-ft	4292 lbs-ft	4292 lbs-ft	4084 lbs-ft	4084 lbs-ft	4084 lbs-ft	4084 lbs-ft
e	0.52 ft	0.51 ft	0.50 ft	0.49 ft	0.55 ft	0.54 ft	0.53 ft	0.51 ft
L/6	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft
f_{min}	277.2 psf	274.7 psf	272.4 psf	270.3 psf	244.4 psf	243.3 psf	242.2 psf	241.3 psf
f_{max}	499.2 psf	487.5 psf	476.7 psf	466.7 psf	455.7 psf	445.8 psf	436.7 psf	428.2 psf

ASD LC	1.0D + 0.75L + 0.75W + 0.75S				0.6D + 1.0W			
Width	23 in	24 in	25 in	26 in	23 in	24 in	25 in	26 in
F_A	2223 lbs	2223 lbs	2223 lbs	2223 lbs	-536 lbs	-536 lbs	-536 lbs	-536 lbs
F_B	2305 lbs	2305 lbs	2305 lbs	2305 lbs	-1909 lbs	-1909 lbs	-1909 lbs	-1909 lbs
F_V	577 lbs	577 lbs	577 lbs	577 lbs	-699 lbs	-699 lbs	-699 lbs	-699 lbs
P_{total}	9114 lbs	9313 lbs	9513 lbs	9712 lbs	307 lbs	426 lbs	546 lbs	666 lbs
M	5964 lbs-ft	5964 lbs-ft	5964 lbs-ft	5964 lbs-ft	1051 lbs-ft	1051 lbs-ft	1051 lbs-ft	1051 lbs-ft
e	0.65 ft	0.64 ft	0.63 ft	0.61 ft	3.43 ft	2.47 ft	1.93 ft	1.58 ft
L/6	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft
f_{min}	278.0 psf	275.5 psf	273.1 psf	271.0 psf	0.0 psf	0.0 psf	0.0 psf	3.9 psf
f_{max}	586.6 psf	571.2 psf	557.1 psf	544.0 psf	51.5 psf	46.8 psf	48.9 psf	52.0 psf

Maximum Bearing Pressure = 587 psf
Allowable Bearing Pressure = 1500 psf

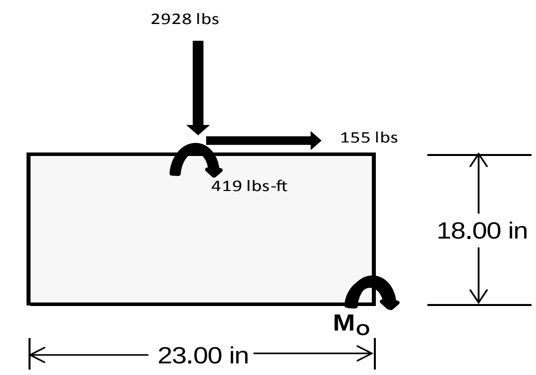
Use a 132in long x 23in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O =	2154.2 ft-lbs
Resisting Force Required =	2247.90 lbs
S.F. =	1.67
Weight Required =	3746.50 lbs
Minimum Width =	23 in in
Weight Provided =	4585.63 lbs

A minimum 132in long x 23in 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	23 in			23 in			23 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	256 lbs	661 lbs	228 lbs	971 lbs	2928 lbs	949 lbs	85 lbs	193 lbs	57 lbs
F_V	216 lbs	213 lbs	218 lbs	161 lbs	155 lbs	169 lbs	216 lbs	214 lbs	217 lbs
P_{total}	5933 lbs	6338 lbs	5905 lbs	6375 lbs	8332 lbs	6353 lbs	1745 lbs	1853 lbs	1717 lbs
M	866 lbs-ft	859 lbs-ft	871 lbs-ft	657 lbs-ft	652 lbs-ft	681 lbs-ft	862 lbs-ft	856 lbs-ft	864 lbs-ft
e	0.15 ft	0.14 ft	0.15 ft	0.10 ft	0.08 ft	0.11 ft	0.49 ft	0.46 ft	0.50 ft
L/6	0.32 ft	0.32 ft	0.32 ft	0.32 ft	0.32 ft	0.32 ft	0.32 ft	0.32 ft	0.32 ft
f_{min}	152.8 psf	173.0 psf	150.7 psf	204.8 psf	298.4 psf	200.2 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	410.1 psf	428.2 psf	409.4 psf	399.9 psf	491.9 psf	402.5 psf	227.9 psf	226.2 psf	228.7 psf

Maximum Bearing Pressure = 492 psf
Allowable Bearing Pressure = 1500 psf

Use a 132in long x 23in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 132in long x 23in wide x 18in tall ballast foundation and fiber reinforcing with (1) #5 rebar.

5.3 Foundation Anchors

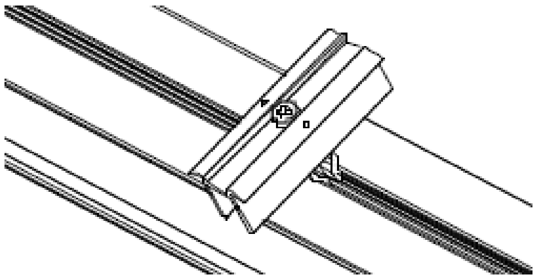
Threaded rods are anchored to the the ballast foundations using the Simpson AT-XP epoxy solution. LRFD load results are compared to the allowable strengths of the epoxy solution. Please see the supplementary calculations provided by the Simpson Anchor Designer software.

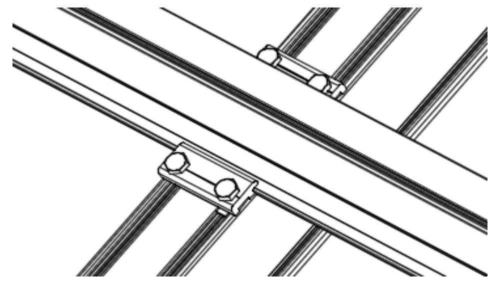
6. DESIGN OF JOINTS AND CONNECTIONS

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

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

Fastening of Modules to Purlins		Fastening of Purlins to Girders	
Maximum Uplifting Force =	0.434 k	Maximum Uplifting Force =	1.564 k
Allowable Uplift =	1.214 k	Allowable Uplift =	4.357 k
Utilization =	36%	Utilization =	36%





6.2 Strut Connections

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

Front Strut		Rear Strut	
Maximum Axial Load =	3.609 k	Maximum Axial Load =	3.572 k
M12 Bolt Capacity =	12.808 k	M12 Bolt Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k	Strut Bearing Capacity =	7.421 k
Utilization =	49%	Utilization =	48%

Diagonal Strut	
Maximum Axial Load =	1.059 k
M12 Bolt Shear Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	14%

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

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

7. SEISMIC DESIGN

7.1 Seismic Drift

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

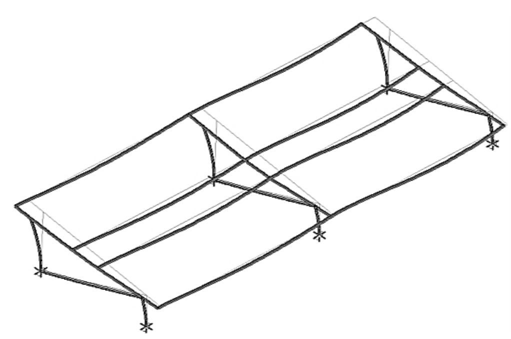
Mean Height, h_{sx} = 36.30 in

Allowable Story Drift for All Other Structures, Δ = { $0.020h_{sx}$; 0.726 in

Max Drift, Δ_{MAX} = 0.466 in

$0.466 \le 0.726$, OK.

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



APPENDIX A

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

Purlin = **S1.5**

Strong Axis:

3.4.14

L_b = 123 in

J = 0.432

340.276

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 27.3 ksi

3.4.16

b/t = 32.195

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 25.1 ksi

3.4.16.1 Not Used

Rb/t =

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 37.0588

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

S1 = 36.9

m = 0.65

C_0 = 40.985

Cc = 41.015

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

S2 = 77.2

φF_L= φb[Bbr-mDbr*h/t]

φF_L= 43.2 ksi

φF_LSt= 25.1 ksi

Ix = 897074 mm^4

2.155 in^4

y = 41.015 mm

Sx = 1.335 in³

M_{max}St = 2.788 k-ft

Weak Axis:

3.4.14

L_b = 123

J = 0.432

216.395

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 28.6

3.4.16

b/t = 37.0588

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 23.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 32.195

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

S1 = 36.9

m = 0.65

C_0 = 45.5

Cc = 45.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 23.1 ksi

Iy = 446476 mm^4

1.073 in^4

x = 45.5 mm

Sy = 0.599 in³

M_{max}Wk = 1.152 k-ft

Compression

3.4.9

b/t = 32.195
S1 = 12.21 (See 3.4.16 above for formula)
S2 = 32.70 (See 3.4.16 above for formula)
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

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

$\varphi F_L =$ 31.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18 (Strong)

h/t = 7.4

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

S1 = 35.2

m = 0.68

C_0 = 41.067

Cc = 43.717

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

S2 = 73.8

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 29.4 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

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

3.4.18

h/t = 16.2

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

S1 = 36.9

m = 0.65

C_0 = 40

Cc = 40

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 in^3

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

Compression

3.4.9

b/t = 16.2

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

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

$\varphi F_L =$ 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.3 ksi

3.4.10

Rb/t = 18.1

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

S1 = 6.87

S2 = 131.3

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

$\varphi F_L =$ 31.09 ksi

$\varphi F_L =$ 31.09 ksi

A = 1215.13 mm^2

1.88 in^2

P_{max} = 58.55 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 24.8 in

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 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

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

$\varphi F_L =$ 28.2 ksi

3.4.16 (weak direction)

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

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

$\varphi F_L =$ 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

$\varphi F_L = 1.17\varphi yFcy$

$\varphi F_L =$ 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

$C_0 =$ 27.5

Cc = 27.5

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

$C_0 =$ 27.5

Cc = 27.5

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

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

$\varphi F_L Wk =$ 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

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

Compression

3.4.7

λ = 2.00335

r = 0.81 in

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

$S1^* =$ 0.33515

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

$S2^* =$ 1.23671

φcc = 0.86047

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

$\varphi F_L =$ 7.50396 ksi

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

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

Strong Axis:

3.4.14

L_b = 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	-35.466	-35.466	0	0
2	M14	y	-35.466	-35.466	0	0
3	M15	y	-56.746	-56.746	0	0
4	M16	y	-56.746	-56.746	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	81.572	81.572	0	0
2	M14	y	63.13	63.13	0	0
3	M15	y	35.466	35.466	0	0
4	M16	y	35.466	35.466	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	252.457	2	1113.758	1	1.115	1	.005	1	0	1	0	1
2		min	-355.612	3	-930.437	3	-85.106	5	-.328	4	0	1	0	1
3	N7	max	.048	1	1232.573	1	-.319	12	0	12	0	1	0	1
4		min	-.055	2	-248.22	3	-241.348	4	-.491	4	0	1	0	1
5	N15	max	.024	9	3608.624	1	0	11	0	11	0	1	0	1
6		min	-.825	2	-867.169	3	-232.674	5	-.48	4	0	1	0	1
7	N16	max	1061.645	2	3744.972	1	0	3	0	3	0	1	0	1
8		min	-1118.974	3	-3064.338	3	-84.828	5	-.331	4	0	1	0	1
9	N23	max	.048	1	1232.573	1	8.091	1	.017	1	0	1	0	1
10		min	-.055	2	-248.22	3	-236.504	4	-.482	4	0	1	0	1
11	N24	max	252.457	2	1113.758	1	-.05	12	0	12	0	1	0	1
12		min	-355.612	3	-930.437	3	-85.599	4	-.331	4	0	1	0	1
13	Totals:	max	1565.624	2	12046.259	1	0	11						
14		min	-1830.574	3	-6288.823	3	-961.413	4						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M13	1	max	88.776	1	510.677	1	-4.862	12	0	3	.211	1	0	1
2			min	3.51	12	-481.648	3	-139.852	1	-.013	1	.008	12	0	3
3		2	max	88.776	1	357.801	1	-3.809	12	0	3	.073	4	.467	3
4			min	3.51	12	-338.9	3	-107.548	1	-.013	1	.003	12	-.495	1
5		3	max	88.776	1	204.926	1	-2.755	12	0	3	.038	5	.772	3
6			min	3.51	12	-196.153	3	-75.243	1	-.013	1	-.034	1	-.815	1
7		4	max	88.776	1	52.05	1	-1.702	12	0	3	.02	5	.914	3
8			min	3.51	12	-53.406	3	-42.939	1	-.013	1	-.101	1	-.961	1
9		5	max	88.776	1	89.341	3	-.649	12	0	3	.003	5	.894	3
10			min	3.51	12	-100.826	1	-16.042	4	-.013	1	-.132	1	-.934	1
11		6	max	88.776	1	232.089	3	21.67	1	0	3	-.004	12	.711	3
12			min	3.51	12	-253.701	1	-11.938	5	-.013	1	-.125	1	-.732	1
13		7	max	88.776	1	374.836	3	53.975	1	0	3	-.003	12	.365	3
14			min	-4.006	5	-406.577	1	-10.308	5	-.013	1	-.082	1	-.356	1
15		8	max	88.776	1	517.583	3	86.28	1	0	3	0	10	.194	1
16			min	-15.697	5	-559.452	1	-8.679	5	-.013	1	-.036	4	-.143	3
17		9	max	88.776	1	660.33	3	118.584	1	0	3	.114	1	.919	1
18			min	-27.388	5	-712.328	1	-7.05	5	-.013	1	-.044	5	-.814	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
19		10	max	88.776	1	865.204	1	-4.616	12	.005	14	.268	1	1.817	1
20			min	3.51	12	-803.078	3	-150.889	1	-.013	1	.007	12	-1.647	3
21		11	max	88.776	1	712.328	1	-3.563	12	.013	1	.114	1	.919	1
22			min	3.51	12	-660.33	3	-118.584	1	0	3	.002	12	-.814	3
23		12	max	88.776	1	559.452	1	-2.51	12	.013	1	.035	4	.194	1
24			min	3.51	12	-517.583	3	-86.28	1	0	3	-.003	1	-.143	3
25		13	max	88.776	1	406.577	1	-1.457	12	.013	1	.016	5	.365	3
26			min	3.51	12	-374.836	3	-53.975	1	0	3	-.082	1	-.356	1
27		14	max	88.776	1	253.701	1	-.404	12	.013	1	0	15	.711	3
28			min	.768	15	-232.089	3	-21.67	1	0	3	-.125	1	-.732	1
29		15	max	88.776	1	100.826	1	10.634	1	.013	1	-.004	12	.894	3
30			min	-10.431	5	-89.341	3	-12.477	5	0	3	-.132	1	-.934	1
31		16	max	88.776	1	53.406	3	42.939	1	.013	1	-.003	12	.914	3
32			min	-22.122	5	-52.05	1	-10.848	5	0	3	-.101	1	-.961	1
33		17	max	88.776	1	196.153	3	75.243	1	.013	1	0	12	.772	3
34			min	-33.813	5	-204.926	1	-9.219	5	0	3	-.049	4	-.815	1
35		18	max	88.776	1	338.9	3	107.548	1	.013	1	.07	1	.467	3
36			min	-45.504	5	-357.801	1	-7.59	5	0	3	-.051	5	-.495	1
37		19	max	88.776	1	481.648	3	139.852	1	.013	1	.211	1	0	1
38			min	-57.195	5	-510.677	1	-5.96	5	0	3	-.058	5	0	3
39	M14	1	max	63.36	4	538.389	1	-4.996	12	.006	3	.24	1	0	1
40			min	1.51	12	-378.414	3	-144.09	1	-.011	1	.009	12	0	3
41		2	max	51.669	4	385.514	1	-3.942	12	.006	3	.104	4	.369	3
42			min	1.51	12	-269.272	3	-111.786	1	-.011	1	.004	12	-.526	1
43		3	max	40.777	1	232.638	1	-2.889	12	.006	3	.056	5	.613	3
44			min	1.51	12	-160.13	3	-79.481	1	-.011	1	-.015	1	-.878	1
45		4	max	40.777	1	79.762	1	-1.836	12	.006	3	.03	5	.734	3
46			min	1.51	12	-50.989	3	-47.177	1	-.011	1	-.087	1	-1.056	1
47		5	max	40.777	1	58.153	3	-.783	12	.006	3	.006	5	.729	3
48			min	1.51	12	-73.113	1	-23.778	4	-.011	1	-.122	1	-1.06	1
49		6	max	40.777	1	167.295	3	17.432	1	.006	3	-.004	12	.601	3
50			min	-3.427	5	-225.989	1	-18.655	5	-.011	1	-.121	1	-.889	1
51		7	max	40.777	1	276.437	3	49.737	1	.006	3	-.003	12	.348	3
52			min	-15.118	5	-378.864	1	-17.026	5	-.011	1	-.082	1	-.545	1
53		8	max	40.777	1	385.579	3	82.041	1	.006	3	0	10	0	15
54			min	-26.808	5	-531.74	1	-15.397	5	-.011	1	-.058	4	-.032	2
55		9	max	40.777	1	494.721	3	114.346	1	.006	3	.104	1	.666	1
56			min	-38.499	5	-684.616	1	-13.767	5	-.011	1	-.072	5	-.53	3
57		10	max	62.173	4	837.491	1	-4.482	12	.006	3	.253	1	1.533	1
58			min	1.51	12	-603.862	3	-146.65	1	-.011	1	.007	12	-1.155	3
59		11	max	50.482	4	684.616	1	-3.429	12	.011	1	.105	4	.666	1
60			min	1.51	12	-494.721	3	-114.346	1	-.006	3	.002	12	-.53	3
61		12	max	40.777	1	531.74	1	-2.376	12	.011	1	.054	5	0	15
62			min	1.51	12	-385.579	3	-82.041	1	-.006	3	-.007	1	-.032	2
63		13	max	40.777	1	378.864	1	-1.323	12	.011	1	.028	5	.348	3
64			min	1.51	12	-276.437	3	-49.737	1	-.006	3	-.082	1	-.545	1
65		14	max	40.777	1	225.989	1	-.27	12	.011	1	.004	5	.601	3
66			min	1.51	12	-167.295	3	-24.335	4	-.006	3	-.121	1	-.889	1
67		15	max	40.777	1	73.113	1	14.872	1	.011	1	-.004	12	.729	3
68			min	-4.325	5	-58.153	3	-18.768	5	-.006	3	-.122	1	-1.06	1
69		16	max	40.777	1	50.989	3	47.177	1	.011	1	-.002	12	.734	3
70			min	-16.016	5	-79.762	1	-17.139	5	-.006	3	-.087	1	-1.056	1
71		17	max	40.777	1	160.13	3	79.481	1	.011	1	0	3	.613	3
72			min	-27.707	5	-232.638	1	-15.509	5	-.006	3	-.061	4	-.878	1
73		18	max	40.777	1	269.272	3	111.786	1	.011	1	.094	1	.369	3
74			min	-39.397	5	-385.514	1	-13.88	5	-.006	3	-.074	5	-.526	1
75		19	max	40.777	1	378.414	3	144.09	1	.011	1	.24	1	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
76			min	-51.088	5	-538.389	1	-12.251	5	-.006	3	-.089	5	0	3
77	M15	1	max	80.277	5	603.816	1	-4.972	12	.011	1	.24	1	0	2
78			min	-42.856	1	-208.447	3	-144.07	1	-.005	3	.009	12	0	3
79		2	max	68.586	5	431.552	1	-3.919	12	.011	1	.14	4	.204	3
80			min	-42.856	1	-149.715	3	-111.766	1	-.005	3	.004	12	-.59	1
81		3	max	56.895	5	259.288	1	-2.866	12	.011	1	.081	5	.341	3
82			min	-42.856	1	-90.983	3	-79.461	1	-.005	3	-.015	1	-.983	1
83		4	max	45.204	5	87.024	1	-1.813	12	.011	1	.045	5	.411	3
84			min	-42.856	1	-32.251	3	-47.157	1	-.005	3	-.087	1	-1.18	1
85		5	max	33.513	5	26.481	3	-.76	12	.011	1	.011	5	.414	3
86			min	-42.856	1	-85.24	1	-32.517	4	-.005	3	-.122	1	-1.181	1
87		6	max	21.822	5	85.213	3	17.453	1	.011	1	-.004	12	.351	3
88			min	-42.856	1	-257.504	1	-27.392	5	-.005	3	-.121	1	-.986	1
89		7	max	10.131	5	143.945	3	49.757	1	.011	1	-.003	12	.22	3
90			min	-42.856	1	-429.768	1	-25.763	5	-.005	3	-.082	1	-.595	1
91		8	max	-1.007	15	202.677	3	82.062	1	.011	1	0	10	.023	3
92			min	-42.856	1	-602.032	1	-24.133	5	-.005	3	-.082	4	-.009	9
93		9	max	-1.731	12	261.409	3	114.366	1	.011	1	.104	1	.777	1
94			min	-42.856	1	-774.296	1	-22.504	5	-.005	3	-.106	5	-.241	3
95		10	max	-1.731	12	946.56	1	-4.505	12	.011	1	.253	1	1.757	1
96			min	-42.856	1	-320.14	3	-146.671	1	-.005	3	.007	12	-.572	3
97		11	max	8.747	5	774.296	1	-3.452	12	.005	3	.139	4	.777	1
98			min	-42.856	1	-261.409	3	-114.366	1	-.011	1	.002	12	-.241	3
99		12	max	-1.731	12	602.032	1	-2.399	12	.005	3	.079	5	.023	3
100			min	-42.856	1	-202.677	3	-82.062	1	-.011	1	-.007	1	-.009	9
101		13	max	-1.731	12	429.768	1	-1.346	12	.005	3	.043	5	.22	3
102			min	-42.856	1	-143.945	3	-49.757	1	-.011	1	-.082	1	-.595	1
103		14	max	-1.731	12	257.504	1	-.293	12	.005	3	.009	5	.351	3
104			min	-42.856	1	-85.213	3	-33.087	4	-.011	1	-.121	1	-.986	1
105		15	max	-1.731	12	85.24	1	14.852	1	.005	3	-.004	12	.414	3
106			min	-47.149	4	-26.481	3	-27.506	5	-.011	1	-.122	1	-1.181	1
107		16	max	-1.731	12	32.251	3	47.157	1	.005	3	-.002	12	.411	3
108			min	-58.84	4	-87.024	1	-25.876	5	-.011	1	-.087	1	-1.18	1
109		17	max	-1.731	12	90.983	3	79.461	1	.005	3	0	3	.341	3
110			min	-70.531	4	-259.288	1	-24.247	5	-.011	1	-.087	4	-.983	1
111		18	max	-1.731	12	149.715	3	111.766	1	.005	3	.094	1	.204	3
112			min	-82.222	4	-431.552	1	-22.618	5	-.011	1	-.109	5	-.59	1
113		19	max	-1.731	12	208.447	3	144.07	1	.005	3	.24	1	0	2
114			min	-93.913	4	-603.816	1	-20.989	5	-.011	1	-.134	5	0	5
115	M16	1	max	80.103	5	576.355	1	-4.786	12	.012	1	.212	1	0	1
116			min	-93.673	1	-195.379	3	-140.023	1	-.007	3	.008	12	0	3
117		2	max	68.412	5	404.091	1	-3.733	12	.012	1	.104	4	.189	3
118			min	-93.673	1	-136.647	3	-107.719	1	-.007	3	.003	12	-.558	1
119		3	max	56.721	5	231.827	1	-2.68	12	.012	1	.06	5	.311	3
120			min	-93.673	1	-77.916	3	-75.414	1	-.007	3	-.033	1	-.92	1
121		4	max	45.03	5	59.563	1	-1.627	12	.012	1	.033	5	.367	3
122			min	-93.673	1	-19.184	3	-43.11	1	-.007	3	-.101	1	-1.086	1
123		5	max	33.339	5	39.548	3	-.574	12	.012	1	.008	5	.355	3
124			min	-93.673	1	-112.701	1	-23.357	4	-.007	3	-.131	1	-1.056	1
125		6	max	21.648	5	98.28	3	21.499	1	.012	1	-.004	12	.276	3
126			min	-93.673	1	-284.965	1	-19.185	5	-.007	3	-.125	1	-.83	1
127		7	max	9.958	5	157.012	3	53.804	1	.012	1	-.003	12	.131	3
128			min	-93.673	1	-457.229	1	-17.556	5	-.007	3	-.083	1	-.407	1
129		8	max	-1.1	15	215.744	3	86.108	1	.012	1	0	10	.212	1
130			min	-93.673	1	-629.493	1	-15.927	5	-.007	3	-.056	4	-.081	3
131		9	max	-3.559	12	274.476	3	118.413	1	.012	1	.114	1	1.027	1
132			min	-93.673	1	-801.757	1	-14.297	5	-.007	3	-.072	5	-.36	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	-3.559	12	974.021	1	-4.691	12	.012	1	.267	1	2.038	1
134			min	-93.673	1	-333.208	3	-150.717	1	-.007	3	.008	12	-.706	3
135		11	max	4.006	5	801.757	1	-3.638	12	.007	3	.114	1	1.027	1
136			min	-93.673	1	-274.476	3	-118.413	1	-.012	1	.003	12	-.36	3
137		12	max	-3.559	12	629.493	1	-2.585	12	.007	3	.054	4	.212	1
138			min	-93.673	1	-215.744	3	-86.108	1	-.012	1	-.003	1	-.081	3
139		13	max	-3.559	12	457.229	1	-1.532	12	.007	3	.027	5	.131	3
140			min	-93.673	1	-157.012	3	-53.804	1	-.012	1	-.083	1	-.407	1
141		14	max	-3.559	12	284.965	1	-.479	12	.007	3	.002	5	.276	3
142			min	-93.673	1	-98.28	3	-25.97	4	-.012	1	-.125	1	-.83	1
143		15	max	-3.559	12	112.701	1	10.805	1	.007	3	-.004	12	.355	3
144			min	-93.673	1	-39.548	3	-19.715	5	-.012	1	-.131	1	-1.056	1
145		16	max	-3.559	12	19.184	3	43.11	1	.007	3	-.003	12	.367	3
146			min	-93.673	1	-59.563	1	-18.086	5	-.012	1	-.101	1	-1.086	1
147		17	max	-3.559	12	77.916	3	75.414	1	.007	3	0	12	.311	3
148			min	-93.673	1	-231.827	1	-16.457	5	-.012	1	-.071	4	-.92	1
149		18	max	-3.559	12	136.647	3	107.719	1	.007	3	.071	1	.189	3
150			min	-97.478	4	-404.091	1	-14.827	5	-.012	1	-.081	5	-.558	1
151		19	max	-3.559	12	195.379	3	140.023	1	.007	3	.212	1	0	1
152			min	-109.169	4	-576.355	1	-13.198	5	-.012	1	-.097	5	0	5
153	M2	1	max	1105.913	1	2.332	4	1.261	1	0	3	0	3	0	1
154			min	-847.91	3	.571	15	-80.663	4	0	4	0	1	0	1
155		2	max	1106.241	1	2.316	4	1.261	1	0	3	0	1	0	15
156			min	-847.664	3	.568	15	-80.948	4	0	4	-.018	4	0	4
157		3	max	1106.57	1	2.301	4	1.261	1	0	3	0	1	0	15
158			min	-847.418	3	.564	15	-81.233	4	0	4	-.036	4	-.001	4
159		4	max	1106.898	1	2.286	4	1.261	1	0	3	0	1	0	15
160			min	-847.171	3	.561	15	-81.518	4	0	4	-.054	4	-.002	4
161		5	max	1107.226	1	2.271	4	1.261	1	0	3	.001	1	0	15
162			min	-846.925	3	.557	15	-81.803	4	0	4	-.072	4	-.002	4
163		6	max	1107.555	1	2.255	4	1.261	1	0	3	.001	1	0	15
164			min	-846.679	3	.553	15	-82.087	4	0	4	-.09	4	-.003	4
165		7	max	1107.883	1	2.24	4	1.261	1	0	3	.002	1	0	15
166			min	-846.433	3	.55	15	-82.372	4	0	4	-.108	4	-.003	4
167		8	max	1108.212	1	2.225	4	1.261	1	0	3	.002	1	0	15
168			min	-846.186	3	.546	15	-82.657	4	0	4	-.127	4	-.004	4
169		9	max	1108.54	1	2.21	4	1.261	1	0	3	.002	1	0	15
170			min	-845.94	3	.543	15	-82.942	4	0	4	-.145	4	-.004	4
171		10	max	1108.869	1	2.194	4	1.261	1	0	3	.002	1	-.001	15
172			min	-845.694	3	.539	15	-83.227	4	0	4	-.163	4	-.005	4
173		11	max	1109.197	1	2.179	4	1.261	1	0	3	.003	1	-.001	15
174			min	-845.447	3	.536	15	-83.511	4	0	4	-.182	4	-.005	4
175		12	max	1109.526	1	2.164	4	1.261	1	0	3	.003	1	-.001	15
176			min	-845.201	3	.532	15	-83.796	4	0	4	-.2	4	-.005	4
177		13	max	1109.854	1	2.149	4	1.261	1	0	3	.003	1	-.001	15
178			min	-844.955	3	.528	15	-84.081	4	0	4	-.219	4	-.006	4
179		14	max	1110.182	1	2.133	4	1.261	1	0	3	.004	1	-.002	15
180			min	-844.708	3	.525	15	-84.366	4	0	4	-.238	4	-.006	4
181		15	max	1110.511	1	2.118	4	1.261	1	0	3	.004	1	-.002	15
182			min	-844.462	3	.521	15	-84.651	4	0	4	-.256	4	-.007	4
183		16	max	1110.839	1	2.103	4	1.261	1	0	3	.004	1	-.002	15
184			min	-844.216	3	.518	15	-84.936	4	0	4	-.275	4	-.007	4
185		17	max	1111.168	1	2.087	4	1.261	1	0	3	.004	1	-.002	15
186			min	-843.969	3	.514	15	-85.22	4	0	4	-.294	4	-.008	4
187		18	max	1111.496	1	2.072	4	1.261	1	0	3	.005	1	-.002	15
188			min	-843.723	3	.51	15	-85.505	4	0	4	-.313	4	-.008	4
189		19	max	1111.825	1	2.057	4	1.261	1	0	3	.005	1	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-843.477	3	.507	15	-85.79	4	0	4	-.332	4	-.009	4
191	M3	1	max	230.979	2	8.105	4	.012	1	0	3	0	1	.009	4
192			min	-337.413	3	1.917	15	-1.215	5	0	4	-.012	4	.002	15
193		2	max	230.808	2	7.332	4	.012	1	0	3	0	1	.005	4
194			min	-337.541	3	1.736	15	-.673	5	0	4	-.013	4	.001	15
195		3	max	230.638	2	6.56	4	.012	1	0	3	0	1	.003	2
196			min	-337.669	3	1.554	15	-.131	5	0	4	-.013	4	0	12
197		4	max	230.468	2	5.787	4	.465	4	0	3	0	1	0	2
198			min	-337.796	3	1.373	15	0	12	0	4	-.013	4	-.001	3
199		5	max	230.297	2	5.015	4	1.007	4	0	3	0	1	0	15
200			min	-337.924	3	1.191	15	0	12	0	4	-.013	4	-.002	6
201		6	max	230.127	2	4.243	4	1.549	4	0	3	0	1	0	15
202			min	-338.052	3	1.01	15	0	12	0	4	-.012	4	-.004	6
203		7	max	229.957	2	3.47	4	2.091	4	0	3	0	1	-.001	15
204			min	-338.18	3	.828	15	0	12	0	4	-.011	4	-.006	6
205		8	max	229.786	2	2.698	4	2.633	4	0	3	0	1	-.002	15
206			min	-338.307	3	.646	15	0	12	0	4	-.01	4	-.007	6
207		9	max	229.616	2	1.925	4	3.175	4	0	3	0	1	-.002	15
208			min	-338.435	3	.465	15	0	12	0	4	-.009	4	-.008	6
209		10	max	229.446	2	1.153	4	3.718	4	0	3	0	1	-.002	15
210			min	-338.563	3	.283	15	0	12	0	4	-.008	5	-.009	6
211		11	max	229.275	2	.381	2	4.26	4	0	3	0	1	-.002	15
212			min	-338.691	3	.046	12	0	12	0	4	-.006	5	-.009	6
213		12	max	229.105	2	-.08	15	4.802	4	0	3	0	1	-.002	15
214			min	-338.819	3	-.393	6	0	12	0	4	-.004	5	-.009	6
215		13	max	228.934	2	-.261	15	5.344	4	0	3	0	1	-.002	15
216			min	-338.946	3	-1.165	6	0	12	0	4	-.002	5	-.009	6
217		14	max	228.764	2	-.443	15	5.886	4	0	3	0	4	-.002	15
218			min	-339.074	3	-1.938	6	0	12	0	4	0	12	-.008	6
219		15	max	228.594	2	-.625	15	6.428	4	0	3	.003	4	-.002	15
220			min	-339.202	3	-2.71	6	0	12	0	4	0	12	-.007	6
221		16	max	228.423	2	-.806	15	6.97	4	0	3	.006	4	-.001	15
222			min	-339.33	3	-3.483	6	0	12	0	4	0	12	-.006	6
223		17	max	228.253	2	-.988	15	7.512	4	0	3	.009	4	0	15
224			min	-339.457	3	-4.255	6	0	12	0	4	0	12	-.004	6
225		18	max	228.083	2	-1.169	15	8.055	4	0	3	.012	4	0	15
226			min	-339.585	3	-5.028	6	0	12	0	4	0	12	-.002	6
227		19	max	227.912	2	-1.351	15	8.597	4	0	3	.016	4	0	1
228			min	-339.713	3	-5.8	6	0	12	0	4	0	12	0	1
229	M4	1	max	1229.507	1	0	1	-.318	12	0	1	.008	4	0	1
230			min	-250.52	3	0	1	-240.299	4	0	1	0	10	0	1
231		2	max	1229.677	1	0	1	-.318	12	0	1	0	12	0	1
232			min	-250.392	3	0	1	-240.447	4	0	1	-.019	4	0	1
233		3	max	1229.848	1	0	1	-.318	12	0	1	0	12	0	1
234			min	-250.265	3	0	1	-240.594	4	0	1	-.047	4	0	1
235		4	max	1230.018	1	0	1	-.318	12	0	1	0	12	0	1
236			min	-250.137	3	0	1	-240.742	4	0	1	-.075	4	0	1
237		5	max	1230.188	1	0	1	-.318	12	0	1	0	12	0	1
238			min	-250.009	3	0	1	-240.89	4	0	1	-.102	4	0	1
239		6	max	1230.359	1	0	1	-.318	12	0	1	0	12	0	1
240			min	-249.881	3	0	1	-241.037	4	0	1	-.13	4	0	1
241		7	max	1230.529	1	0	1	-.318	12	0	1	0	12	0	1
242			min	-249.754	3	0	1	-241.185	4	0	1	-.158	4	0	1
243		8	max	1230.699	1	0	1	-.318	12	0	1	0	12	0	1
244			min	-249.626	3	0	1	-241.333	4	0	1	-.185	4	0	1
245		9	max	1230.87	1	0	1	-.318	12	0	1	0	12	0	1
246			min	-249.498	3	0	1	-241.48	4	0	1	-.213	4	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
247		10	max	1231.04	1	0	1	-.318	12	0	1	0	12	0	1
248			min	-249.37	3	0	1	-241.628	4	0	1	-.241	4	0	1
249		11	max	1231.21	1	0	1	-.318	12	0	1	0	12	0	1
250			min	-249.242	3	0	1	-241.775	4	0	1	-.268	4	0	1
251		12	max	1231.381	1	0	1	-.318	12	0	1	0	12	0	1
252			min	-249.115	3	0	1	-241.923	4	0	1	-.296	4	0	1
253		13	max	1231.551	1	0	1	-.318	12	0	1	0	12	0	1
254			min	-248.987	3	0	1	-242.071	4	0	1	-.324	4	0	1
255		14	max	1231.721	1	0	1	-.318	12	0	1	0	12	0	1
256			min	-248.859	3	0	1	-242.218	4	0	1	-.352	4	0	1
257		15	max	1231.892	1	0	1	-.318	12	0	1	0	12	0	1
258			min	-248.731	3	0	1	-242.366	4	0	1	-.38	4	0	1
259		16	max	1232.062	1	0	1	-.318	12	0	1	0	12	0	1
260			min	-248.604	3	0	1	-242.514	4	0	1	-.407	4	0	1
261		17	max	1232.232	1	0	1	-.318	12	0	1	0	12	0	1
262			min	-248.476	3	0	1	-242.661	4	0	1	-.435	4	0	1
263		18	max	1232.403	1	0	1	-.318	12	0	1	0	12	0	1
264			min	-248.348	3	0	1	-242.809	4	0	1	-.463	4	0	1
265		19	max	1232.573	1	0	1	-.318	12	0	1	0	12	0	1
266			min	-248.22	3	0	1	-242.956	4	0	1	-.491	4	0	1
267	M6	1	max	3566.039	1	2.569	2	0	1	0	1	0	4	0	1
268			min	-2786.996	3	.326	12	-81.388	4	0	4	0	1	0	1
269		2	max	3566.368	1	2.557	2	0	1	0	1	0	1	0	12
270			min	-2786.75	3	.32	12	-81.673	4	0	4	-.018	4	0	2
271		3	max	3566.696	1	2.545	2	0	1	0	1	0	1	0	12
272			min	-2786.504	3	.314	12	-81.957	4	0	4	-.036	4	-.001	2
273		4	max	3567.024	1	2.534	2	0	1	0	1	0	1	0	12
274			min	-2786.258	3	.308	12	-82.242	4	0	4	-.054	4	-.002	2
275		5	max	3567.353	1	2.522	2	0	1	0	1	0	1	0	12
276			min	-2786.011	3	.302	12	-82.527	4	0	4	-.073	4	-.002	2
277		6	max	3567.681	1	2.51	2	0	1	0	1	0	1	0	12
278			min	-2785.765	3	.297	12	-82.812	4	0	4	-.091	4	-.003	2
279		7	max	3568.01	1	2.498	2	0	1	0	1	0	1	0	12
280			min	-2785.519	3	.291	12	-83.097	4	0	4	-.109	4	-.003	2
281		8	max	3568.338	1	2.486	2	0	1	0	1	0	1	0	12
282			min	-2785.272	3	.285	12	-83.382	4	0	4	-.128	4	-.004	2
283		9	max	3568.667	1	2.474	2	0	1	0	1	0	1	0	12
284			min	-2785.026	3	.279	12	-83.666	4	0	4	-.146	4	-.004	2
285		10	max	3568.995	1	2.462	2	0	1	0	1	0	1	0	12
286			min	-2784.78	3	.273	12	-83.951	4	0	4	-.165	4	-.005	2
287		11	max	3569.323	1	2.45	2	0	1	0	1	0	1	0	12
288			min	-2784.533	3	.267	12	-84.236	4	0	4	-.183	4	-.006	2
289		12	max	3569.652	1	2.438	2	0	1	0	1	0	1	0	12
290			min	-2784.287	3	.261	12	-84.521	4	0	4	-.202	4	-.006	2
291		13	max	3569.98	1	2.427	2	0	1	0	1	0	1	0	12
292			min	-2784.041	3	.255	12	-84.806	4	0	4	-.221	4	-.007	2
293		14	max	3570.309	1	2.415	2	0	1	0	1	0	1	0	12
294			min	-2783.794	3	.249	12	-85.091	4	0	4	-.24	4	-.007	2
295		15	max	3570.637	1	2.403	2	0	1	0	1	0	1	0	12
296			min	-2783.548	3	.243	12	-85.375	4	0	4	-.259	4	-.008	2
297		16	max	3570.966	1	2.391	2	0	1	0	1	0	1	0	12
298			min	-2783.302	3	.237	12	-85.66	4	0	4	-.278	4	-.008	2
299		17	max	3571.294	1	2.379	2	0	1	0	1	0	1	0	12
300			min	-2783.055	3	.231	12	-85.945	4	0	4	-.297	4	-.009	2
301		18	max	3571.623	1	2.367	2	0	1	0	1	0	1	-.001	12
302			min	-2782.809	3	.225	12	-86.23	4	0	4	-.316	4	-.009	2
303		19	max	3571.951	1	2.355	2	0	1	0	1	0	1	-.001	12

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
304			min	-2782.563	3	.219	12	-86.515	4	0	4	-.335	4	-.01	2
305	M7	1	max	1002.926	2	8.119	6	0	1	0	1	0	1	.01	2
306			min	-1056.506	3	1.905	15	-1.285	5	0	4	-.013	4	.001	12
307		2	max	1002.756	2	7.346	6	0	1	0	1	0	1	.007	2
308			min	-1056.634	3	1.723	15	-.743	5	0	4	-.013	4	0	3
309		3	max	1002.585	2	6.574	6	0	1	0	1	0	1	.005	2
310			min	-1056.761	3	1.542	15	-.201	5	0	4	-.013	4	-.002	3
311		4	max	1002.415	2	5.801	6	.387	4	0	1	0	1	.002	2
312			min	-1056.889	3	1.36	15	0	1	0	4	-.013	4	-.003	3
313		5	max	1002.244	2	5.029	6	.929	4	0	1	0	1	0	2
314			min	-1057.017	3	1.178	15	0	1	0	4	-.013	4	-.004	3
315		6	max	1002.074	2	4.257	6	1.471	4	0	1	0	1	-.001	15
316			min	-1057.145	3	.997	15	0	1	0	4	-.012	4	-.005	3
317		7	max	1001.904	2	3.484	6	2.013	4	0	1	0	1	-.001	15
318			min	-1057.273	3	.815	15	0	1	0	4	-.012	4	-.006	3
319		8	max	1001.733	2	2.712	6	2.556	4	0	1	0	1	-.002	15
320			min	-1057.4	3	.634	15	0	1	0	4	-.011	4	-.007	4
321		9	max	1001.563	2	1.939	6	3.098	4	0	1	0	1	-.002	15
322			min	-1057.528	3	.444	12	0	1	0	4	-.009	4	-.008	4
323		10	max	1001.393	2	1.294	2	3.64	4	0	1	0	1	-.002	15
324			min	-1057.656	3	.143	12	0	1	0	4	-.008	4	-.009	4
325		11	max	1001.222	2	.692	2	4.182	4	0	1	0	1	-.002	15
326			min	-1057.784	3	-.267	3	0	1	0	4	-.006	4	-.009	4
327		12	max	1001.052	2	.09	2	4.724	4	0	1	0	1	-.002	15
328			min	-1057.911	3	-.718	3	0	1	0	4	-.005	4	-.009	4
329		13	max	1000.882	2	-.274	15	5.266	4	0	1	0	1	-.002	15
330			min	-1058.039	3	-1.169	3	0	1	0	4	-.002	4	-.009	4
331		14	max	1000.711	2	-.456	15	5.808	4	0	1	0	1	-.002	15
332			min	-1058.167	3	-1.923	4	0	1	0	4	0	5	-.008	4
333		15	max	1000.541	2	-.637	15	6.35	4	0	1	.002	4	-.002	15
334			min	-1058.295	3	-2.695	4	0	1	0	4	0	1	-.007	4
335		16	max	1000.371	2	-.819	15	6.893	4	0	1	.005	4	-.001	15
336			min	-1058.422	3	-3.468	4	0	1	0	4	0	1	-.006	4
337		17	max	1000.2	2	-1	15	7.435	4	0	1	.008	4	0	15
338			min	-1058.55	3	-4.24	4	0	1	0	4	0	1	-.004	4
339		18	max	1000.03	2	-1.182	15	7.977	4	0	1	.012	4	0	15
340			min	-1058.678	3	-5.012	4	0	1	0	4	0	1	-.002	4
341		19	max	999.86	2	-1.363	15	8.519	4	0	1	.015	4	0	1
342			min	-1058.806	3	-5.785	4	0	1	0	4	0	1	0	1
343	M8	1	max	3605.558	1	0	1	0	1	0	1	.008	4	0	1
344			min	-869.469	3	0	1	-234.915	4	0	1	0	1	0	1
345		2	max	3605.729	1	0	1	0	1	0	1	0	1	0	1
346			min	-869.341	3	0	1	-235.062	4	0	1	-.019	4	0	1
347		3	max	3605.899	1	0	1	0	1	0	1	0	1	0	1
348			min	-869.214	3	0	1	-235.21	4	0	1	-.046	4	0	1
349		4	max	3606.069	1	0	1	0	1	0	1	0	1	0	1
350			min	-869.086	3	0	1	-235.358	4	0	1	-.073	4	0	1
351		5	max	3606.24	1	0	1	0	1	0	1	0	1	0	1
352			min	-868.958	3	0	1	-235.505	4	0	1	-.1	4	0	1
353		6	max	3606.41	1	0	1	0	1	0	1	0	1	0	1
354			min	-868.83	3	0	1	-235.653	4	0	1	-.127	4	0	1
355		7	max	3606.58	1	0	1	0	1	0	1	0	1	0	1
356			min	-868.703	3	0	1	-235.801	4	0	1	-.154	4	0	1
357		8	max	3606.751	1	0	1	0	1	0	1	0	1	0	1
358			min	-868.575	3	0	1	-235.948	4	0	1	-.181	4	0	1
359		9	max	3606.921	1	0	1	0	1	0	1	0	1	0	1
360			min	-868.447	3	0	1	-236.096	4	0	1	-.208	4	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
361		10	max	3607.091	1	0	1	0	1	0	1	0	1	0	1
362			min	-868.319	3	0	1	-236.243	4	0	1	-.235	4	0	1
363		11	max	3607.262	1	0	1	0	1	0	1	0	1	0	1
364			min	-868.191	3	0	1	-236.391	4	0	1	-.263	4	0	1
365		12	max	3607.432	1	0	1	0	1	0	1	0	1	0	1
366			min	-868.064	3	0	1	-236.539	4	0	1	-.29	4	0	1
367		13	max	3607.602	1	0	1	0	1	0	1	0	1	0	1
368			min	-867.936	3	0	1	-236.686	4	0	1	-.317	4	0	1
369		14	max	3607.773	1	0	1	0	1	0	1	0	1	0	1
370			min	-867.808	3	0	1	-236.834	4	0	1	-.344	4	0	1
371		15	max	3607.943	1	0	1	0	1	0	1	0	1	0	1
372			min	-867.68	3	0	1	-236.982	4	0	1	-.371	4	0	1
373		16	max	3608.113	1	0	1	0	1	0	1	0	1	0	1
374			min	-867.553	3	0	1	-237.129	4	0	1	-.399	4	0	1
375		17	max	3608.284	1	0	1	0	1	0	1	0	1	0	1
376			min	-867.425	3	0	1	-237.277	4	0	1	-.426	4	0	1
377		18	max	3608.454	1	0	1	0	1	0	1	0	1	0	1
378			min	-867.297	3	0	1	-237.425	4	0	1	-.453	4	0	1
379		19	max	3608.624	1	0	1	0	1	0	1	0	1	0	1
380			min	-867.169	3	0	1	-237.572	4	0	1	-.48	4	0	1
381	M10	1	max	1105.913	1	2.229	6	-.046	12	0	1	0	1	0	1
382			min	-847.91	3	.503	15	-81.296	4	0	5	0	3	0	1
383		2	max	1106.241	1	2.214	6	-.046	12	0	1	0	10	0	15
384			min	-847.664	3	.499	15	-81.581	4	0	5	-.018	4	0	6
385		3	max	1106.57	1	2.199	6	-.046	12	0	1	0	12	0	15
386			min	-847.418	3	.496	15	-81.865	4	0	5	-.036	4	0	6
387		4	max	1106.898	1	2.184	6	-.046	12	0	1	0	12	0	15
388			min	-847.171	3	.492	15	-82.15	4	0	5	-.054	4	-.001	6
389		5	max	1107.226	1	2.168	6	-.046	12	0	1	0	12	0	15
390			min	-846.925	3	.489	15	-82.435	4	0	5	-.073	4	-.002	6
391		6	max	1107.555	1	2.153	6	-.046	12	0	1	0	12	0	15
392			min	-846.679	3	.485	15	-82.72	4	0	5	-.091	4	-.002	6
393		7	max	1107.883	1	2.138	6	-.046	12	0	1	0	12	0	15
394			min	-846.433	3	.481	15	-83.005	4	0	5	-.109	4	-.003	6
395		8	max	1108.212	1	2.123	6	-.046	12	0	1	0	12	0	15
396			min	-846.186	3	.478	15	-83.29	4	0	5	-.128	4	-.003	6
397		9	max	1108.54	1	2.107	6	-.046	12	0	1	0	12	0	15
398			min	-845.94	3	.474	15	-83.574	4	0	5	-.146	4	-.004	6
399		10	max	1108.869	1	2.092	6	-.046	12	0	1	0	12	0	15
400			min	-845.694	3	.471	15	-83.859	4	0	5	-.165	4	-.004	6
401		11	max	1109.197	1	2.077	6	-.046	12	0	1	0	12	-.001	15
402			min	-845.447	3	.467	15	-84.144	4	0	5	-.183	4	-.005	6
403		12	max	1109.526	1	2.062	6	-.046	12	0	1	0	12	-.001	15
404			min	-845.201	3	.463	15	-84.429	4	0	5	-.202	4	-.005	6
405		13	max	1109.854	1	2.046	6	-.046	12	0	1	0	12	-.001	15
406			min	-844.955	3	.46	15	-84.714	4	0	5	-.221	4	-.006	6
407		14	max	1110.182	1	2.031	6	-.046	12	0	1	0	12	-.001	15
408			min	-844.708	3	.456	15	-84.999	4	0	5	-.239	4	-.006	6
409		15	max	1110.511	1	2.016	6	-.046	12	0	1	0	12	-.001	15
410			min	-844.462	3	.453	15	-85.283	4	0	5	-.258	4	-.007	6
411		16	max	1110.839	1	2.001	6	-.046	12	0	1	0	12	-.002	15
412			min	-844.216	3	.449	15	-85.568	4	0	5	-.277	4	-.007	6
413		17	max	1111.168	1	1.985	6	-.046	12	0	1	0	12	-.002	15
414			min	-843.969	3	.445	15	-85.853	4	0	5	-.296	4	-.007	6
415		18	max	1111.496	1	1.97	6	-.046	12	0	1	0	12	-.002	15
416			min	-843.723	3	.442	15	-86.138	4	0	5	-.315	4	-.008	6
417		19	max	1111.825	1	1.955	6	-.046	12	0	1	0	12	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
418			min	-843.477	3	.438	15	-86.423	4	0	5	-.334	4	-.008	6
419	M11	1	max	230.979	2	8.051	6	0	12	0	1	0	12	.008	6
420			min	-337.413	3	1.881	15	-1.216	5	0	4	-.013	4	.002	15
421		2	max	230.808	2	7.279	6	0	12	0	1	0	12	.005	6
422			min	-337.541	3	1.7	15	-.674	5	0	4	-.013	4	.001	15
423		3	max	230.638	2	6.506	6	0	12	0	1	0	12	.003	2
424			min	-337.669	3	1.518	15	-.132	5	0	4	-.013	4	0	12
425		4	max	230.468	2	5.734	6	.459	4	0	1	0	12	0	2
426			min	-337.796	3	1.337	15	-.012	1	0	4	-.013	4	-.001	3
427		5	max	230.297	2	4.961	6	1.001	4	0	1	0	12	0	15
428			min	-337.924	3	1.155	15	-.012	1	0	4	-.013	4	-.003	4
429		6	max	230.127	2	4.189	6	1.543	4	0	1	0	12	-.001	15
430			min	-338.052	3	.974	15	-.012	1	0	4	-.012	4	-.005	4
431		7	max	229.957	2	3.416	6	2.085	4	0	1	0	12	-.002	15
432			min	-338.18	3	.792	15	-.012	1	0	4	-.011	4	-.006	4
433		8	max	229.786	2	2.644	6	2.628	4	0	1	0	12	-.002	15
434			min	-338.307	3	.61	15	-.012	1	0	4	-.01	4	-.007	4
435		9	max	229.616	2	1.872	6	3.17	4	0	1	0	12	-.002	15
436			min	-338.435	3	.429	15	-.012	1	0	4	-.009	4	-.008	4
437		10	max	229.446	2	1.099	6	3.712	4	0	1	0	12	-.002	15
438			min	-338.563	3	.247	15	-.012	1	0	4	-.008	4	-.009	4
439		11	max	229.275	2	.381	2	4.254	4	0	1	0	12	-.002	15
440			min	-338.691	3	.046	12	-.012	1	0	4	-.006	4	-.009	4
441		12	max	229.105	2	-.116	15	4.796	4	0	1	0	12	-.002	15
442			min	-338.819	3	-.447	4	-.012	1	0	4	-.004	4	-.009	4
443		13	max	228.934	2	-.297	15	5.338	4	0	1	0	12	-.002	15
444			min	-338.946	3	-1.219	4	-.012	1	0	4	-.002	4	-.009	4
445		14	max	228.764	2	-.479	15	5.88	4	0	1	0	5	-.002	15
446			min	-339.074	3	-1.992	4	-.012	1	0	4	0	1	-.008	4
447		15	max	228.594	2	-.661	15	6.422	4	0	1	.003	4	-.002	15
448			min	-339.202	3	-2.764	4	-.012	1	0	4	0	1	-.007	4
449		16	max	228.423	2	-.842	15	6.965	4	0	1	.006	4	-.001	15
450			min	-339.33	3	-3.536	4	-.012	1	0	4	0	1	-.006	4
451		17	max	228.253	2	-1.024	15	7.507	4	0	1	.009	4	-.001	15
452			min	-339.457	3	-4.309	4	-.012	1	0	4	0	1	-.004	4
453		18	max	228.083	2	-1.205	15	8.049	4	0	1	.012	4	0	15
454			min	-339.585	3	-5.081	4	-.012	1	0	4	0	1	-.002	4
455		19	max	227.912	2	-1.387	15	8.591	4	0	1	.016	4	0	1
456			min	-339.713	3	-5.854	4	-.012	1	0	4	0	1	0	1
457	M12	1	max	1229.507	1	0	1	8.414	1	0	1	.008	4	0	1
458			min	-250.52	3	0	1	-236.067	4	0	1	0	1	0	1
459		2	max	1229.677	1	0	1	8.414	1	0	1	0	1	0	1
460			min	-250.392	3	0	1	-236.214	4	0	1	-.019	4	0	1
461		3	max	1229.848	1	0	1	8.414	1	0	1	.002	1	0	1
462			min	-250.265	3	0	1	-236.362	4	0	1	-.046	4	0	1
463		4	max	1230.018	1	0	1	8.414	1	0	1	.003	1	0	1
464			min	-250.137	3	0	1	-236.509	4	0	1	-.073	4	0	1
465		5	max	1230.188	1	0	1	8.414	1	0	1	.004	1	0	1
466			min	-250.009	3	0	1	-236.657	4	0	1	-.1	4	0	1
467		6	max	1230.359	1	0	1	8.414	1	0	1	.005	1	0	1
468			min	-249.881	3	0	1	-236.805	4	0	1	-.127	4	0	1
469		7	max	1230.529	1	0	1	8.414	1	0	1	.006	1	0	1
470			min	-249.754	3	0	1	-236.952	4	0	1	-.155	4	0	1
471		8	max	1230.699	1	0	1	8.414	1	0	1	.007	1	0	1
472			min	-249.626	3	0	1	-237.1	4	0	1	-.182	4	0	1
473		9	max	1230.87	1	0	1	8.414	1	0	1	.008	1	0	1
474			min	-249.498	3	0	1	-237.248	4	0	1	-.209	4	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
475		10	max	1231.04	1	0	1	8.414	1	0	1	.009	1	0	1
476			min	-249.37	3	0	1	-237.395	4	0	1	-.236	4	0	1
477		11	max	1231.21	1	0	1	8.414	1	0	1	.01	1	0	1
478			min	-249.242	3	0	1	-237.543	4	0	1	-.264	4	0	1
479		12	max	1231.381	1	0	1	8.414	1	0	1	.01	1	0	1
480			min	-249.115	3	0	1	-237.691	4	0	1	-.291	4	0	1
481		13	max	1231.551	1	0	1	8.414	1	0	1	.011	1	0	1
482			min	-248.987	3	0	1	-237.838	4	0	1	-.318	4	0	1
483		14	max	1231.721	1	0	1	8.414	1	0	1	.012	1	0	1
484			min	-248.859	3	0	1	-237.986	4	0	1	-.346	4	0	1
485		15	max	1231.892	1	0	1	8.414	1	0	1	.013	1	0	1
486			min	-248.731	3	0	1	-238.133	4	0	1	-.373	4	0	1
487		16	max	1232.062	1	0	1	8.414	1	0	1	.014	1	0	1
488			min	-248.604	3	0	1	-238.281	4	0	1	-.4	4	0	1
489		17	max	1232.232	1	0	1	8.414	1	0	1	.015	1	0	1
490			min	-248.476	3	0	1	-238.429	4	0	1	-.428	4	0	1
491		18	max	1232.403	1	0	1	8.414	1	0	1	.016	1	0	1
492			min	-248.348	3	0	1	-238.576	4	0	1	-.455	4	0	1
493		19	max	1232.573	1	0	1	8.414	1	0	1	.017	1	0	1
494			min	-248.22	3	0	1	-238.724	4	0	1	-.482	4	0	1
495	M1	1	max	139.855	1	481.636	3	57.184	5	0	1	.211	1	0	3
496			min	-5.96	5	-509.49	1	-88.69	1	0	3	-.058	5	-.013	1
497		2	max	140.225	1	480.599	3	58.426	5	0	1	.164	1	.256	1
498			min	-5.787	5	-510.874	1	-88.69	1	0	3	-.028	5	-.253	3
499		3	max	198.505	3	563.671	1	-3.461	12	0	3	.117	1	.513	1
500			min	-129.094	2	-347.455	3	-87.65	1	0	1	.001	15	-.497	3
501		4	max	198.783	3	562.287	1	-3.461	12	0	3	.071	1	.216	1
502			min	-128.723	2	-348.493	3	-87.65	1	0	1	-.008	5	-.313	3
503		5	max	199.061	3	560.904	1	-3.461	12	0	3	.025	1	-.004	15
504			min	-128.353	2	-349.53	3	-87.65	1	0	1	-.017	5	-.129	3
505		6	max	199.339	3	559.52	1	-3.461	12	0	3	0	12	.056	3
506			min	-127.982	2	-350.568	3	-87.65	1	0	1	-.029	4	-.376	1
507		7	max	199.617	3	558.136	1	-3.461	12	0	3	-.003	12	.241	3
508			min	-127.611	2	-351.606	3	-87.65	1	0	1	-.068	1	-.671	1
509		8	max	199.895	3	556.753	1	-3.461	12	0	3	-.004	12	.427	3
510			min	-127.24	2	-352.643	3	-87.65	1	0	1	-.114	1	-.965	1
511		9	max	207.695	3	33.4	2	39.23	5	0	9	.067	1	.499	3
512			min	-71.404	2	.418	15	-128.447	1	0	3	-.119	5	-1.1	1
513		10	max	207.974	3	32.016	2	40.472	5	0	9	0	12	.486	3
514			min	-71.033	2	0	5	-128.447	1	0	3	-.099	4	-1.109	1
515		11	max	208.252	3	30.632	2	41.713	5	0	9	-.003	12	.473	3
516			min	-70.662	2	-1.732	4	-128.447	1	0	3	-.09	4	-1.117	1
517		12	max	216.015	3	231.829	3	127.621	5	0	1	.112	1	.412	3
518			min	-47.296	5	-591.87	1	-85.631	1	0	3	-.171	5	-.986	1
519		13	max	216.293	3	230.791	3	128.862	5	0	1	.067	1	.29	3
520			min	-47.123	5	-593.253	1	-85.631	1	0	3	-.103	5	-.673	1
521		14	max	216.571	3	229.753	3	130.103	5	0	1	.022	1	.168	3
522			min	-46.95	5	-594.637	1	-85.631	1	0	3	-.035	5	-.36	1
523		15	max	216.849	3	228.716	3	131.345	5	0	1	.034	5	.047	3
524			min	-46.777	5	-596.02	1	-85.631	1	0	3	-.023	1	-.046	1
525		16	max	217.127	3	227.678	3	132.586	5	0	1	.104	5	.269	1
526			min	-46.604	5	-597.404	1	-85.631	1	0	3	-.068	1	-.073	3
527		17	max	217.405	3	226.64	3	133.828	5	0	1	.174	5	.585	1
528			min	-46.431	5	-598.788	1	-85.631	1	0	3	-.114	1	-.193	3
529		18	max	13.025	5	578.863	1	-3.559	12	0	5	.144	5	.293	1
530			min	-140.392	1	-194.368	3	-110.459	4	0	1	-.163	1	-.096	3
531		19	max	13.198	5	577.48	1	-3.559	12	0	5	.097	5	.007	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
532			min	-140.022	1	-195.406	3	-109.217	4	0	1	-.212	1	-.012	1
533	M5	1	max	301.772	1	1606.112	3	87.128	5	0	1	0	1	.027	1
534			min	9.232	12	-1723.345	1	0	1	0	4	-.132	4	0	3
535		2	max	302.143	1	1605.075	3	88.369	5	0	1	0	1	.937	1
536			min	9.417	12	-1724.728	1	0	1	0	4	-.086	4	-.848	3
537		3	max	637.407	3	1729.138	1	13.693	4	0	4	0	1	1.805	1
538			min	-493.3	1	-1120.083	3	0	1	0	1	-.04	4	-1.662	3
539		4	max	637.685	3	1727.755	1	14.935	4	0	4	0	1	.893	1
540			min	-492.929	1	-1121.121	3	0	1	0	1	-.033	4	-1.071	3
541		5	max	637.963	3	1726.371	1	16.176	4	0	4	0	1	.013	9
542			min	-492.559	1	-1122.158	3	0	1	0	1	-.025	4	-.479	3
543		6	max	638.241	3	1724.988	1	17.418	4	0	4	0	1	.113	3
544			min	-492.188	1	-1123.196	3	0	1	0	1	-.016	5	-.929	1
545		7	max	638.519	3	1723.604	1	18.659	4	0	4	0	1	.706	3
546			min	-491.817	1	-1124.234	3	0	1	0	1	-.008	5	-1.838	1
547		8	max	638.798	3	1722.22	1	19.901	4	0	4	.004	4	1.3	3
548			min	-491.446	1	-1125.271	3	0	1	0	1	0	1	-2.747	1
549		9	max	652.464	3	110.481	2	125.337	4	0	1	0	1	1.497	3
550			min	-360.033	2	.418	15	0	1	0	1	-.156	4	-3.106	1
551		10	max	652.742	3	109.097	2	126.579	4	0	1	0	1	1.45	3
552			min	-359.662	2	0	15	0	1	0	1	-.09	5	-3.138	1
553		11	max	653.02	3	107.714	2	127.82	4	0	1	0	1	1.404	3
554			min	-359.291	2	-1.587	6	0	1	0	1	-.024	5	-3.168	1
555		12	max	666.759	3	734.753	3	173.729	4	0	1	0	1	1.232	3
556			min	-244.948	2	-1840.175	1	0	1	0	4	-.237	4	-2.821	1
557		13	max	667.037	3	733.716	3	174.971	4	0	1	0	1	.845	3
558			min	-244.577	2	-1841.559	1	0	1	0	4	-.145	4	-1.85	1
559		14	max	667.315	3	732.678	3	176.212	4	0	1	0	1	.458	3
560			min	-244.206	2	-1842.942	1	0	1	0	4	-.052	4	-.878	1
561		15	max	667.593	3	731.64	3	177.454	4	0	1	.041	4	.141	2
562			min	-243.835	2	-1844.326	1	0	1	0	4	0	1	-.004	13
563		16	max	667.871	3	730.603	3	178.695	4	0	1	.135	4	1.069	1
564			min	-243.465	2	-1845.71	1	0	1	0	4	0	1	-.314	3
565		17	max	668.149	3	729.565	3	179.937	4	0	1	.229	4	2.043	1
566			min	-243.094	2	-1847.093	1	0	1	0	4	0	1	-.7	3
567		18	max	-9.568	12	1956.054	1	0	1	0	4	.225	4	1.056	1
568			min	-301.809	1	-665.541	3	-42.097	5	0	1	0	1	-.366	3
569		19	max	-9.382	12	1954.67	1	0	1	0	4	.204	4	.024	1
570			min	-301.439	1	-666.579	3	-40.855	5	0	1	0	1	-.014	3
571	M9	1	max	139.855	1	481.636	3	88.69	1	0	3	-.008	12	0	3
572			min	4.861	12	-509.49	1	3.51	12	0	1	-.211	1	-.013	1
573		2	max	140.225	1	480.599	3	88.69	1	0	3	-.007	12	.256	1
574			min	5.047	12	-510.874	1	3.51	12	0	1	-.164	1	-.253	3
575		3	max	198.505	3	563.671	1	87.65	1	0	1	-.005	12	.513	1
576			min	-129.094	2	-347.455	3	-10.388	5	0	3	-.117	1	-.497	3
577		4	max	198.783	3	562.287	1	87.65	1	0	1	-.003	12	.216	1
578			min	-128.723	2	-348.493	3	-9.146	5	0	3	-.071	1	-.313	3
579		5	max	199.061	3	560.904	1	87.65	1	0	1	-.001	12	-.004	15
580			min	-128.353	2	-349.53	3	-7.905	5	0	3	-.025	1	-.129	3
581		6	max	199.339	3	559.52	1	87.65	1	0	1	.021	1	.056	3
582			min	-127.982	2	-350.568	3	-6.663	5	0	3	-.023	5	-.376	1
583		7	max	199.617	3	558.136	1	87.65	1	0	1	.068	1	.241	3
584			min	-127.611	2	-351.606	3	-5.422	5	0	3	-.026	5	-.671	1
585		8	max	199.895	3	556.753	1	87.65	1	0	1	.114	1	.427	3
586			min	-127.24	2	-352.643	3	-4.181	5	0	3	-.029	5	-.965	1
587		9	max	207.695	3	33.4	2	128.447	1	0	3	-.003	12	.499	3
588			min	-71.404	2	.422	15	4.971	12	0	9	-.141	4	-1.1	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	207.974	3	32.016	2	128.447	1	0	3	0	1	.486	3
590			min	-71.033	2	.005	15	4.971	12	0	9	-.099	4	-1.109	1
591		11	max	208.252	3	30.632	2	128.447	1	0	3	.069	1	.473	3
592			min	-70.662	2	-1.693	6	4.971	12	0	9	-.07	5	-1.117	1
593		12	max	216.015	3	231.829	3	155.213	4	0	3	-.004	12	.412	3
594			min	-44.799	10	-591.87	1	3.241	12	0	1	-.206	4	-.986	1
595		13	max	216.293	3	230.791	3	156.455	4	0	3	-.003	12	.29	3
596			min	-44.49	10	-593.253	1	3.241	12	0	1	-.124	4	-.673	1
597		14	max	216.571	3	229.753	3	157.696	4	0	3	0	12	.168	3
598			min	-44.181	10	-594.637	1	3.241	12	0	1	-.041	4	-.36	1
599		15	max	216.849	3	228.716	3	158.938	4	0	3	.042	4	.047	3
600			min	-43.872	10	-596.02	1	3.241	12	0	1	0	12	-.046	1
601		16	max	217.127	3	227.678	3	160.179	4	0	3	.126	4	.269	1
602			min	-43.563	10	-597.404	1	3.241	12	0	1	.003	12	-.073	3
603		17	max	217.405	3	226.64	3	161.421	4	0	3	.211	4	.585	1
604			min	-43.254	10	-598.788	1	3.241	12	0	1	.004	12	-.193	3
605		18	max	-4.972	12	578.863	1	93.756	1	0	1	.196	4	.293	1
606			min	-140.392	1	-194.368	3	-81.428	5	0	3	.006	12	-.096	3
607		19	max	-4.786	12	577.48	1	93.756	1	0	1	.212	1	.007	3
608			min	-140.022	1	-195.406	3	-80.186	5	0	3	.008	12	-.012	1

Envelope Member Section Deflections

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
1	M13	1	max	0	1	.111	1	.004	3	8.819e-3	1	NC	1	NC	1
2			min	-.484	4	-.014	3	-.001	10	-1.079e-3	3	NC	1	NC	1
3		2	max	0	1	.23	3	.035	1	1.016e-2	1	NC	5	NC	2
4			min	-.484	4	-.126	1	-.014	5	-1.126e-3	3	1006.698	3	7360.682	1
5		3	max	0	1	.428	3	.084	1	1.151e-2	1	NC	5	NC	3
6			min	-.484	4	-.314	1	-.016	5	-1.173e-3	3	556.526	3	3000.503	1
7		4	max	0	1	.547	3	.126	1	1.285e-2	1	NC	5	NC	3
8			min	-.484	4	-.42	1	-.011	5	-1.221e-3	3	438.008	3	1981.172	1
9		5	max	0	1	.574	3	.148	1	1.42e-2	1	NC	5	NC	3
10			min	-.484	4	-.428	1	-.002	5	-1.268e-3	3	417.975	3	1684.348	1
11		6	max	0	1	.511	3	.143	1	1.554e-2	1	NC	5	NC	3
12			min	-.484	4	-.341	1	.005	15	-1.315e-3	3	468.668	3	1740.707	1
13		7	max	0	1	.375	3	.113	1	1.689e-2	1	NC	5	NC	3
14			min	-.484	4	-.181	1	.007	10	-1.362e-3	3	631.594	3	2210.589	1
15		8	max	0	1	.204	3	.067	1	1.823e-2	1	NC	4	NC	2
16			min	-.484	4	-.003	9	.002	10	-1.409e-3	3	1128.844	3	3793.866	1
17		9	max	0	1	.188	1	.02	1	1.958e-2	1	NC	4	NC	1
18			min	-.484	4	.005	15	-.002	10	-1.456e-3	3	3189.08	1	NC	1
19		10	max	0	1	.266	1	.011	3	2.092e-2	1	NC	3	NC	1
20			min	-.484	4	-.022	3	-.007	2	-1.504e-3	3	1587.09	1	NC	1
21		11	max	0	12	.188	1	.02	1	1.958e-2	1	NC	4	NC	1
22			min	-.484	4	.005	15	-.011	5	-1.456e-3	3	3189.08	1	NC	1
23		12	max	0	12	.204	3	.067	1	1.823e-2	1	NC	4	NC	2
24			min	-.484	4	-.003	9	-.011	5	-1.409e-3	3	1128.844	3	3793.866	1
25		13	max	0	12	.375	3	.113	1	1.689e-2	1	NC	5	NC	3
26			min	-.484	4	-.181	1	-.004	5	-1.362e-3	3	631.594	3	2210.589	1
27		14	max	0	12	.511	3	.143	1	1.554e-2	1	NC	5	NC	3
28			min	-.484	4	-.341	1	.004	15	-1.315e-3	3	468.668	3	1740.707	1
29		15	max	0	12	.574	3	.148	1	1.42e-2	1	NC	5	NC	3
30			min	-.485	4	-.428	1	.009	12	-1.268e-3	3	417.975	3	1684.348	1
31		16	max	0	12	.547	3	.126	1	1.285e-2	1	NC	5	NC	3
32			min	-.485	4	-.42	1	.008	12	-1.221e-3	3	438.008	3	1981.172	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	.428	3	.084	1	1.151e-2	1	NC	5	NC	3
34			min	-.485	4	-.314	1	.006	12	-1.173e-3	3	556.526	3	3000.503	1
35		18	max	0	12	.23	3	.035	1	1.016e-2	1	NC	5	NC	2
36			min	-.485	4	-.126	1	.002	10	-1.126e-3	3	1006.698	3	7360.682	1
37		19	max	0	12	.111	1	.004	3	8.819e-3	1	NC	1	NC	1
38			min	-.485	4	-.014	3	-.001	10	-1.079e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.147	3	.003	3	5.552e-3	1	NC	1	NC	1
40			min	-.387	4	-.36	1	-.001	10	-2.663e-3	3	NC	1	NC	1
41		2	max	0	1	.381	3	.025	1	6.679e-3	1	NC	5	NC	1
42			min	-.387	4	-.728	1	-.02	5	-3.249e-3	3	667.623	1	NC	1
43		3	max	0	1	.579	3	.068	1	7.805e-3	1	NC	15	NC	3
44			min	-.387	4	-1.044	1	-.024	5	-3.836e-3	3	359.499	1	3733.123	1
45		4	max	0	1	.715	3	.109	1	8.932e-3	1	NC	15	NC	3
46			min	-.387	4	-1.271	1	-.016	5	-4.422e-3	3	269.971	1	2309.742	1
47		5	max	0	1	.777	3	.132	1	1.006e-2	1	9468.875	15	NC	3
48			min	-.387	4	-1.391	1	-.002	5	-5.009e-3	3	238.619	1	1895.28	1
49		6	max	0	1	.764	3	.131	1	1.119e-2	1	9394.133	15	NC	3
50			min	-.387	4	-1.403	1	.009	15	-5.595e-3	3	235.843	1	1914.977	1
51		7	max	0	1	.691	3	.105	1	1.231e-2	1	NC	15	NC	3
52			min	-.387	4	-1.325	1	.006	10	-6.182e-3	3	254.884	1	2392.954	1
53		8	max	0	1	.583	3	.063	1	1.344e-2	1	NC	15	NC	2
54			min	-.387	4	-1.192	1	.002	10	-6.768e-3	3	295.454	1	4050.796	1
55		9	max	0	1	.479	3	.027	4	1.457e-2	1	NC	15	NC	1
56			min	-.387	4	-1.058	1	-.002	10	-7.355e-3	3	352.006	1	8946.295	4
57		10	max	0	1	.43	3	.01	3	1.569e-2	1	NC	5	NC	1
58			min	-.387	4	-.995	1	-.006	2	-7.941e-3	3	387.312	1	NC	1
59		11	max	0	12	.479	3	.02	1	1.457e-2	1	NC	15	NC	1
60			min	-.387	4	-1.058	1	-.02	5	-7.355e-3	3	352.006	1	NC	1
61		12	max	0	12	.583	3	.063	1	1.344e-2	1	NC	15	NC	2
62			min	-.387	4	-1.192	1	-.023	5	-6.768e-3	3	295.454	1	4050.796	1
63		13	max	0	12	.691	3	.105	1	1.231e-2	1	NC	15	NC	3
64			min	-.387	4	-1.325	1	-.014	5	-6.182e-3	3	254.884	1	2392.954	1
65		14	max	0	12	.764	3	.131	1	1.119e-2	1	9393.797	15	NC	3
66			min	-.387	4	-1.403	1	0	15	-5.595e-3	3	235.843	1	1914.977	1
67		15	max	0	12	.777	3	.132	1	1.006e-2	1	9468.447	15	NC	3
68			min	-.387	4	-1.391	1	.008	12	-5.009e-3	3	238.619	1	1895.28	1
69		16	max	0	12	.715	3	.109	1	8.932e-3	1	NC	15	NC	3
70			min	-.387	4	-1.271	1	.007	12	-4.422e-3	3	269.971	1	2309.742	1
71		17	max	0	12	.579	3	.068	1	7.805e-3	1	NC	15	NC	3
72			min	-.387	4	-1.044	1	.005	10	-3.836e-3	3	359.499	1	3733.123	1
73		18	max	0	12	.381	3	.028	4	6.679e-3	1	NC	5	NC	1
74			min	-.387	4	-.728	1	0	10	-3.249e-3	3	667.623	1	8652.582	4
75		19	max	0	12	.147	3	.003	3	5.552e-3	1	NC	1	NC	1
76			min	-.387	4	-.36	1	-.001	10	-2.663e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.15	3	.003	3	2.244e-3	3	NC	1	NC	1
78			min	-.326	4	-.359	1	0	10	-5.645e-3	1	NC	1	NC	1
79		2	max	0	12	.299	3	.025	1	2.74e-3	3	NC	5	NC	1
80			min	-.326	4	-.761	1	-.03	5	-6.795e-3	1	612.399	1	7921.174	5
81		3	max	0	12	.428	3	.068	1	3.236e-3	3	NC	15	NC	3
82			min	-.326	4	-1.104	1	-.037	5	-7.945e-3	1	330.469	1	3722.999	1
83		4	max	0	12	.522	3	.109	1	3.732e-3	3	NC	15	NC	3
84			min	-.326	4	-1.347	1	-.026	5	-9.095e-3	1	249.089	1	2304.805	1
85		5	max	0	12	.575	3	.132	1	4.229e-3	3	9476.982	15	NC	3
86			min	-.326	4	-1.47	1	-.007	5	-1.024e-2	1	221.42	1	1891.544	1
87		6	max	0	12	.585	3	.131	1	4.725e-3	3	9403.738	15	NC	3
88			min	-.326	4	-1.474	1	.009	12	-1.139e-2	1	220.721	1	1910.98	1
89		7	max	0	12	.56	3	.105	1	5.221e-3	3	NC	15	NC	3

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
90			min	-.326	4	-1.377	1	.006	10	-1.254e-2	1	241.594	1	2386.688	1
91		8	max	0	12	.513	3	.063	1	5.717e-3	3	NC	15	NC	2
92			min	-.326	4	-1.222	1	.002	10	-1.37e-2	1	285.243	1	4033.209	1
93		9	max	0	12	.464	3	.036	4	6.214e-3	3	NC	15	NC	1
94			min	-.326	4	-1.067	1	-.002	10	-1.485e-2	1	347.674	1	6741.695	4
95		10	max	0	1	.44	3	.009	3	6.71e-3	3	NC	5	NC	1
96			min	-.326	4	-.994	1	-.006	2	-1.6e-2	1	387.819	1	NC	1
97		11	max	0	1	.464	3	.02	1	6.214e-3	3	NC	15	NC	1
98			min	-.326	4	-1.067	1	-.029	5	-1.485e-2	1	347.674	1	8513.987	5
99		12	max	0	1	.513	3	.063	1	5.717e-3	3	NC	15	NC	2
100			min	-.326	4	-1.222	1	-.034	5	-1.37e-2	1	285.243	1	4033.209	1
101		13	max	0	1	.56	3	.105	1	5.221e-3	3	NC	15	NC	3
102			min	-.326	4	-1.377	1	-.022	5	-1.254e-2	1	241.594	1	2386.688	1
103		14	max	0	1	.585	3	.131	1	4.725e-3	3	9403.492	15	NC	3
104			min	-.326	4	-1.474	1	-.002	5	-1.139e-2	1	220.721	1	1910.98	1
105		15	max	0	1	.575	3	.132	1	4.229e-3	3	9476.671	15	NC	3
106			min	-.326	4	-1.47	1	.008	12	-1.024e-2	1	221.42	1	1891.544	1
107		16	max	0	1	.522	3	.109	1	3.732e-3	3	NC	15	NC	3
108			min	-.326	4	-1.347	1	.006	12	-9.095e-3	1	249.089	1	2304.805	1
109		17	max	0	1	.428	3	.068	1	3.236e-3	3	NC	15	NC	3
110			min	-.326	4	-1.104	1	.005	10	-7.945e-3	1	330.469	1	3722.999	1
111		18	max	0	1	.299	3	.039	4	2.74e-3	3	NC	5	NC	1
112			min	-.326	4	-.761	1	0	10	-6.795e-3	1	612.399	1	6360.204	4
113		19	max	0	1	.15	3	.003	3	2.244e-3	3	NC	1	NC	1
114			min	-.326	4	-.359	1	0	10	-5.645e-3	1	NC	1	NC	1
115	M16	1	max	0	12	.108	1	.003	3	3.896e-3	3	NC	1	NC	1
116			min	-.143	4	-.049	3	0	10	-8.307e-3	1	NC	1	NC	1
117		2	max	0	12	.038	3	.035	1	4.6e-3	3	NC	5	NC	2
118			min	-.144	4	-.164	1	-.023	5	-9.527e-3	1	905.148	1	7404.104	1
119		3	max	0	12	.106	3	.084	1	5.304e-3	3	NC	5	NC	3
120			min	-.144	4	-.38	1	-.028	5	-1.075e-2	1	504.33	1	3008.497	1
121		4	max	0	12	.143	3	.126	1	6.008e-3	3	NC	5	NC	3
122			min	-.144	4	-.503	1	-.021	5	-1.197e-2	1	402.805	1	1982.863	1
123		5	max	0	12	.143	3	.148	1	6.712e-3	3	NC	5	NC	3
124			min	-.144	4	-.516	1	-.007	5	-1.319e-2	1	394.53	1	1683.201	1
125		6	max	0	12	.107	3	.143	1	7.417e-3	3	NC	5	NC	3
126			min	-.144	4	-.422	1	.005	15	-1.441e-2	1	464.751	1	1736.307	1
127		7	max	0	12	.043	3	.114	1	8.121e-3	3	NC	5	NC	3
128			min	-.144	4	-.244	1	.007	10	-1.563e-2	1	700.068	1	2198.153	1
129		8	max	0	12	.004	4	.067	1	8.825e-3	3	NC	3	NC	2
130			min	-.144	4	-.051	2	.003	10	-1.685e-2	1	1835.44	2	3743.435	1
131		9	max	0	12	.169	1	.026	4	9.529e-3	3	NC	4	NC	1
132			min	-.144	4	-.102	3	-.001	10	-1.807e-2	1	4007.657	1	9457.215	4
133		10	max	0	1	.256	1	.008	3	1.023e-2	3	NC	5	NC	1
134			min	-.144	4	-.132	3	-.005	2	-1.929e-2	1	1654.85	1	NC	1
135		11	max	0	1	.169	1	.021	1	9.529e-3	3	NC	4	NC	1
136			min	-.144	4	-.102	3	-.018	5	-1.807e-2	1	4007.657	1	NC	1
137		12	max	0	1	.004	6	.067	1	8.825e-3	3	NC	3	NC	2
138			min	-.143	4	-.051	2	-.019	5	-1.685e-2	1	1835.44	2	3743.435	1
139		13	max	0	1	.043	3	.114	1	8.121e-3	3	NC	5	NC	3
140			min	-.143	4	-.244	1	-.009	5	-1.563e-2	1	700.068	1	2198.153	1
141		14	max	0	1	.107	3	.143	1	7.417e-3	3	NC	5	NC	3
142			min	-.143	4	-.422	1	.004	15	-1.441e-2	1	464.751	1	1736.307	1
143		15	max	0	1	.143	3	.148	1	6.712e-3	3	NC	5	NC	3
144			min	-.143	4	-.516	1	.008	12	-1.319e-2	1	394.53	1	1683.201	1
145		16	max	0	1	.143	3	.126	1	6.008e-3	3	NC	5	NC	3
146			min	-.143	4	-.503	1	.007	12	-1.197e-2	1	402.805	1	1982.863	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	.106	3	.084	1	5.304e-3	3	NC	5	NC	3
148			min	-.143	4	-.38	1	.005	12	-1.075e-2	1	504.33	1	3008.497	1
149		18	max	0	1	.038	3	.035	1	4.6e-3	3	NC	5	NC	2
150			min	-.143	4	-.164	1	.002	10	-9.527e-3	1	905.148	1	7224.676	4
151		19	max	0	1	.108	1	.003	3	3.896e-3	3	NC	1	NC	1
152			min	-.143	4	-.049	3	0	10	-8.307e-3	1	NC	1	NC	1
153	M2	1	max	.005	1	.002	2	.007	1	1.213e-3	5	NC	1	NC	2
154			min	-.004	3	-.005	3	-.459	4	-1.756e-4	1	NC	1	104.32	4
155		2	max	.005	1	.002	2	.006	1	1.3e-3	5	NC	1	NC	2
156			min	-.004	3	-.005	3	-.421	4	-1.627e-4	1	NC	1	113.67	4
157		3	max	.005	1	.001	2	.006	1	1.387e-3	5	NC	1	NC	2
158			min	-.003	3	-.004	3	-.383	4	-1.498e-4	1	NC	1	124.789	4
159		4	max	.004	1	0	2	.005	1	1.473e-3	5	NC	1	NC	2
160			min	-.003	3	-.004	3	-.346	4	-1.369e-4	1	NC	1	138.138	4
161		5	max	.004	1	0	2	.005	1	1.56e-3	5	NC	1	NC	1
162			min	-.003	3	-.004	3	-.31	4	-1.24e-4	1	NC	1	154.349	4
163		6	max	.004	1	0	2	.004	1	1.647e-3	5	NC	1	NC	1
164			min	-.003	3	-.004	3	-.275	4	-1.112e-4	1	NC	1	174.296	4
165		7	max	.003	1	0	15	.004	1	1.733e-3	5	NC	1	NC	1
166			min	-.003	3	-.004	3	-.24	4	-9.826e-5	1	NC	1	199.222	4
167		8	max	.003	1	0	15	.003	1	1.82e-3	4	NC	1	NC	1
168			min	-.002	3	-.004	3	-.207	4	-8.537e-5	1	NC	1	230.944	4
169		9	max	.003	1	0	15	.003	1	1.911e-3	4	NC	1	NC	1
170			min	-.002	3	-.004	3	-.176	4	-7.248e-5	1	NC	1	272.202	4
171		10	max	.003	1	0	15	.002	1	2.003e-3	4	NC	1	NC	1
172			min	-.002	3	-.003	3	-.146	4	-5.959e-5	1	NC	1	327.288	4
173		11	max	.002	1	0	15	.002	1	2.094e-3	4	NC	1	NC	1
174			min	-.002	3	-.003	3	-.119	4	-4.67e-5	1	NC	1	403.247	4
175		12	max	.002	1	0	15	.001	1	2.186e-3	4	NC	1	NC	1
176			min	-.002	3	-.003	3	-.093	4	-3.38e-5	1	NC	1	512.307	4
177		13	max	.002	1	0	15	.001	1	2.277e-3	4	NC	1	NC	1
178			min	-.001	3	-.003	3	-.071	4	-2.091e-5	1	NC	1	677.265	4
179		14	max	.001	1	0	15	0	1	2.368e-3	4	NC	1	NC	1
180			min	-.001	3	-.002	3	-.051	4	-8.022e-6	1	NC	1	944.776	4
181		15	max	.001	1	0	15	0	1	2.46e-3	4	NC	1	NC	1
182			min	0	3	-.002	3	-.034	4	0	3	NC	1	1423.249	4
183		16	max	0	1	0	15	0	1	2.551e-3	4	NC	1	NC	1
184			min	0	3	-.001	6	-.02	4	5.06e-7	12	NC	1	2415.887	4
185		17	max	0	1	0	15	0	1	2.643e-3	4	NC	1	NC	1
186			min	0	3	-.001	6	-.009	4	1.019e-6	12	NC	1	5068.432	4
187		18	max	0	1	0	15	0	1	2.734e-3	4	NC	1	NC	1
188			min	0	3	0	6	-.003	4	1.532e-6	12	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.825e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	2.046e-6	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-6.397e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-6.299e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.014	4	4.24e-6	1	NC	1	NC	1
194			min	0	2	-.001	6	0	12	-4.581e-6	5	NC	1	NC	1
195		3	max	0	3	0	15	.027	4	6.251e-4	4	NC	1	NC	1
196			min	0	2	-.003	6	0	12	9.69e-7	12	NC	1	NC	1
197		4	max	0	3	-.001	15	.039	4	1.253e-3	4	NC	1	NC	1
198			min	0	2	-.005	6	0	12	1.773e-6	12	NC	1	NC	1
199		5	max	0	3	-.001	15	.051	4	1.88e-3	4	NC	1	NC	1
200			min	0	2	-.007	6	0	12	2.578e-6	12	NC	1	8714.412	4
201		6	max	0	3	-.002	15	.063	4	2.508e-3	4	NC	1	NC	1
202			min	0	2	-.008	6	0	12	3.382e-6	12	NC	1	7842.706	4
203		7	max	0	3	-.002	15	.073	4	3.135e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
204			min	0	2	-.01	6	0	12	4.186e-6	12	9458.294	6	7448.54	4
205		8	max	.001	3	-.002	15	.084	4	3.763e-3	4	NC	1	NC	1
206			min	0	2	-.011	6	0	12	4.991e-6	12	8418.843	6	7386.754	4
207		9	max	.001	3	-.003	15	.094	4	4.39e-3	4	NC	1	NC	1
208			min	0	2	-.012	6	0	12	5.795e-6	12	7796.615	6	7607.453	5
209		10	max	.001	3	-.003	15	.103	4	5.018e-3	4	NC	2	NC	1
210			min	-.001	2	-.012	6	0	12	6.599e-6	12	7480.521	6	8124.71	5
211		11	max	.002	3	-.003	15	.112	4	5.645e-3	4	NC	2	NC	1
212			min	-.001	2	-.013	6	0	12	7.404e-6	12	7422.962	6	9016.007	5
213		12	max	.002	3	-.003	15	.121	4	6.273e-3	4	NC	2	NC	1
214			min	-.001	2	-.012	6	0	12	8.208e-6	12	7621.395	6	NC	1
215		13	max	.002	3	-.002	15	.13	4	6.9e-3	4	NC	1	NC	1
216			min	-.001	2	-.012	6	0	12	9.012e-6	12	8119.561	6	NC	1
217		14	max	.002	3	-.002	15	.138	4	7.528e-3	4	NC	1	NC	1
218			min	-.001	2	-.01	6	0	12	9.817e-6	12	9030.954	6	NC	1
219		15	max	.002	3	-.002	15	.147	4	8.155e-3	4	NC	1	NC	1
220			min	-.002	2	-.009	1	0	12	1.062e-5	12	NC	1	NC	1
221		16	max	.002	3	-.001	15	.155	4	8.783e-3	4	NC	1	NC	1
222			min	-.002	2	-.008	1	0	12	1.143e-5	12	NC	1	NC	1
223		17	max	.003	3	0	15	.164	4	9.411e-3	4	NC	1	NC	1
224			min	-.002	2	-.006	1	0	12	1.223e-5	12	NC	1	NC	1
225		18	max	.003	3	0	15	.174	4	1.004e-2	4	NC	1	NC	1
226			min	-.002	2	-.005	1	0	12	1.303e-5	12	NC	1	NC	1
227		19	max	.003	3	0	5	.184	4	1.067e-2	4	NC	1	NC	1
228			min	-.002	2	-.003	1	0	12	1.384e-5	12	NC	1	NC	1
229	M4	1	max	.003	1	.001	2	0	12	-3.986e-7	12	NC	1	NC	3
230			min	0	3	-.003	3	-.184	4	-9.493e-4	4	NC	1	134.945	4
231		2	max	.003	1	.001	2	0	12	-3.986e-7	12	NC	1	NC	2
232			min	0	3	-.003	3	-.169	4	-9.493e-4	4	NC	1	146.926	4
233		3	max	.003	1	.001	2	0	12	-3.986e-7	12	NC	1	NC	2
234			min	0	3	-.003	3	-.154	4	-9.493e-4	4	NC	1	161.173	4
235		4	max	.002	1	.001	2	0	12	-3.986e-7	12	NC	1	NC	2
236			min	0	3	-.002	3	-.139	4	-9.493e-4	4	NC	1	178.278	4
237		5	max	.002	1	.001	2	0	12	-3.986e-7	12	NC	1	NC	2
238			min	0	3	-.002	3	-.125	4	-9.493e-4	4	NC	1	199.043	4
239		6	max	.002	1	.001	2	0	12	-3.986e-7	12	NC	1	NC	2
240			min	0	3	-.002	3	-.11	4	-9.493e-4	4	NC	1	224.581	4
241		7	max	.002	1	0	2	0	12	-3.986e-7	12	NC	1	NC	2
242			min	0	3	-.002	3	-.097	4	-9.493e-4	4	NC	1	256.473	4
243		8	max	.002	1	0	2	0	12	-3.986e-7	12	NC	1	NC	2
244			min	0	3	-.002	3	-.084	4	-9.493e-4	4	NC	1	297.022	4
245		9	max	.002	1	0	2	0	12	-3.986e-7	12	NC	1	NC	2
246			min	0	3	-.002	3	-.071	4	-9.493e-4	4	NC	1	349.699	4
247		10	max	.001	1	0	2	0	12	-3.986e-7	12	NC	1	NC	1
248			min	0	3	-.001	3	-.059	4	-9.493e-4	4	NC	1	419.93	4
249		11	max	.001	1	0	2	0	12	-3.986e-7	12	NC	1	NC	1
250			min	0	3	-.001	3	-.048	4	-9.493e-4	4	NC	1	516.589	4
251		12	max	.001	1	0	2	0	12	-3.986e-7	12	NC	1	NC	1
252			min	0	3	-.001	3	-.038	4	-9.493e-4	4	NC	1	655.032	4
253		13	max	0	1	0	2	0	12	-3.986e-7	12	NC	1	NC	1
254			min	0	3	0	3	-.029	4	-9.493e-4	4	NC	1	863.768	4
255		14	max	0	1	0	2	0	12	-3.986e-7	12	NC	1	NC	1
256			min	0	3	0	3	-.021	4	-9.493e-4	4	NC	1	1200.803	4
257		15	max	0	1	0	2	0	12	-3.986e-7	12	NC	1	NC	1
258			min	0	3	0	3	-.014	4	-9.493e-4	4	NC	1	1799.882	4
259		16	max	0	1	0	2	0	12	-3.986e-7	12	NC	1	NC	1
260			min	0	3	0	3	-.008	4	-9.493e-4	4	NC	1	3030.836	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
261		17	max	0	1	0	2	0	12	-3.986e-7	12	NC	1	NC	1
262			min	0	3	0	3	-.004	4	-9.493e-4	4	NC	1	6265.463	4
263		18	max	0	1	0	2	0	12	-3.986e-7	12	NC	1	NC	1
264			min	0	3	0	3	-.001	4	-9.493e-4	4	NC	1	NC	1
265		19	max	0	1	0	1	0	1	-3.986e-7	12	NC	1	NC	1
266			min	0	1	0	1	0	1	-9.493e-4	4	NC	1	NC	1
267	M6	1	max	.016	1	.01	2	0	1	1.267e-3	4	NC	3	NC	1
268			min	-.013	3	-.014	3	-.463	4	0	1	4842.218	2	103.432	4
269		2	max	.016	1	.009	2	0	1	1.352e-3	4	NC	3	NC	1
270			min	-.012	3	-.014	3	-.425	4	0	1	5342.275	2	112.703	4
271		3	max	.015	1	.008	2	0	1	1.438e-3	4	NC	1	NC	1
272			min	-.011	3	-.013	3	-.387	4	0	1	5952.237	2	123.728	4
273		4	max	.014	1	.007	2	0	1	1.523e-3	4	NC	1	NC	1
274			min	-.011	3	-.012	3	-.349	4	0	1	6706.069	2	136.965	4
275		5	max	.013	1	.006	2	0	1	1.609e-3	4	NC	1	NC	1
276			min	-.01	3	-.011	3	-.313	4	0	1	7652.437	2	153.04	4
277		6	max	.012	1	.005	2	0	1	1.694e-3	4	NC	1	NC	1
278			min	-.009	3	-.011	3	-.277	4	0	1	8863.148	2	172.82	4
279		7	max	.011	1	.005	2	0	1	1.78e-3	4	NC	1	NC	1
280			min	-.009	3	-.01	3	-.242	4	0	1	NC	1	197.538	4
281		8	max	.01	1	.004	2	0	1	1.865e-3	4	NC	1	NC	1
282			min	-.008	3	-.009	3	-.209	4	0	1	NC	1	228.996	4
283		9	max	.009	1	.003	2	0	1	1.951e-3	4	NC	1	NC	1
284			min	-.007	3	-.008	3	-.177	4	0	1	NC	1	269.911	4
285		10	max	.008	1	.002	2	0	1	2.036e-3	4	NC	1	NC	1
286			min	-.006	3	-.008	3	-.147	4	0	1	NC	1	324.541	4
287		11	max	.007	1	.002	2	0	1	2.121e-3	4	NC	1	NC	1
288			min	-.006	3	-.007	3	-.12	4	0	1	NC	1	399.874	4
289		12	max	.006	1	.001	2	0	1	2.207e-3	4	NC	1	NC	1
290			min	-.005	3	-.006	3	-.094	4	0	1	NC	1	508.039	4
291		13	max	.005	1	0	2	0	1	2.292e-3	4	NC	1	NC	1
292			min	-.004	3	-.005	3	-.071	4	0	1	NC	1	671.655	4
293		14	max	.005	1	0	2	0	1	2.378e-3	4	NC	1	NC	1
294			min	-.004	3	-.004	3	-.051	4	0	1	NC	1	937.009	4
295		15	max	.004	1	0	2	0	1	2.463e-3	4	NC	1	NC	1
296			min	-.003	3	-.004	3	-.034	4	0	1	NC	1	1411.678	4
297		16	max	.003	1	0	2	0	1	2.549e-3	4	NC	1	NC	1
298			min	-.002	3	-.003	3	-.02	4	0	1	NC	1	2396.591	4
299		17	max	.002	1	0	2	0	1	2.634e-3	4	NC	1	NC	1
300			min	-.001	3	-.002	3	-.01	4	0	1	NC	1	5029.276	4
301		18	max	0	1	0	2	0	1	2.72e-3	4	NC	1	NC	1
302			min	0	3	0	3	-.003	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	2.805e-3	4	NC	1	NC	1
304			min	0	1	0	1	0	1	0	1	NC	1	NC	1
305	M7	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	-6.231e-4	4	NC	1	NC	1
307		2	max	0	3	0	15	.014	4	0	1	NC	1	NC	1
308			min	0	2	-.002	3	0	1	-9.191e-6	5	NC	1	NC	1
309		3	max	.001	3	0	15	.027	4	6.069e-4	4	NC	1	NC	1
310			min	0	2	-.004	3	0	1	0	1	NC	1	NC	1
311		4	max	.002	3	-.001	15	.039	4	1.222e-3	4	NC	1	NC	1
312			min	-.001	2	-.005	3	0	1	0	1	NC	1	NC	1
313		5	max	.002	3	-.002	15	.051	4	1.837e-3	4	NC	1	NC	1
314			min	-.002	2	-.007	4	0	1	0	1	NC	1	8359.493	4
315		6	max	.003	3	-.002	15	.062	4	2.452e-3	4	NC	1	NC	1
316			min	-.002	2	-.009	4	0	1	0	1	NC	1	7499.671	4
317		7	max	.003	3	-.002	15	.073	4	3.067e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
318			min	-.003	2	-.01	4	0	1	0	1	9561.6	4	7096.68	4
319		8	max	.004	3	-.003	15	.083	4	3.682e-3	4	NC	1	NC	1
320			min	-.003	2	-.011	4	0	1	0	1	8503.383	4	7007.413	4
321		9	max	.004	3	-.003	15	.093	4	4.297e-3	4	NC	1	NC	1
322			min	-.004	2	-.012	4	0	1	0	1	7869.295	4	7183.674	4
323		10	max	.005	3	-.003	15	.102	4	4.912e-3	4	NC	1	NC	1
324			min	-.004	2	-.013	4	0	1	0	1	7545.805	4	7633.547	4
325		11	max	.005	3	-.003	15	.111	4	5.527e-3	4	NC	1	NC	1
326			min	-.005	2	-.013	4	0	1	0	1	7484.071	4	8417.327	4
327		12	max	.006	3	-.003	15	.119	4	6.142e-3	4	NC	1	NC	1
328			min	-.005	2	-.013	4	0	1	0	1	7680.99	4	9668.169	4
329		13	max	.006	3	-.003	15	.128	4	6.757e-3	4	NC	1	NC	1
330			min	-.006	2	-.012	4	0	1	0	1	8180.259	4	NC	1
331		14	max	.007	3	-.003	15	.136	4	7.372e-3	4	NC	1	NC	1
332			min	-.006	2	-.012	1	0	1	0	1	9095.899	4	NC	1
333		15	max	.007	3	-.002	15	.144	4	7.987e-3	4	NC	1	NC	1
334			min	-.007	2	-.011	1	0	1	0	1	NC	1	NC	1
335		16	max	.008	3	-.002	15	.153	4	8.602e-3	4	NC	1	NC	1
336			min	-.007	2	-.011	1	0	1	0	1	NC	1	NC	1
337		17	max	.008	3	-.001	15	.161	4	9.217e-3	4	NC	1	NC	1
338			min	-.008	2	-.01	1	0	1	0	1	NC	1	NC	1
339		18	max	.009	3	0	15	.17	4	9.832e-3	4	NC	1	NC	1
340			min	-.008	2	-.009	1	0	1	0	1	NC	1	NC	1
341		19	max	.009	3	0	15	.18	4	1.045e-2	4	NC	1	NC	1
342			min	-.009	2	-.007	1	0	1	0	1	NC	1	NC	1
343	M8	1	max	.009	1	.007	2	0	1	0	1	NC	1	NC	1
344			min	-.002	3	-.009	3	-.18	4	-9.711e-4	4	NC	1	137.948	4
345		2	max	.008	1	.007	2	0	1	0	1	NC	1	NC	1
346			min	-.002	3	-.009	3	-.165	4	-9.711e-4	4	NC	1	150.197	4
347		3	max	.008	1	.006	2	0	1	0	1	NC	1	NC	1
348			min	-.002	3	-.008	3	-.151	4	-9.711e-4	4	NC	1	164.764	4
349		4	max	.007	1	.006	2	0	1	0	1	NC	1	NC	1
350			min	-.002	3	-.008	3	-.136	4	-9.711e-4	4	NC	1	182.252	4
351		5	max	.007	1	.006	2	0	1	0	1	NC	1	NC	1
352			min	-.002	3	-.007	3	-.122	4	-9.711e-4	4	NC	1	203.482	4
353		6	max	.006	1	.005	2	0	1	0	1	NC	1	NC	1
354			min	-.001	3	-.007	3	-.108	4	-9.711e-4	4	NC	1	229.593	4
355		7	max	.006	1	.005	2	0	1	0	1	NC	1	NC	1
356			min	-.001	3	-.006	3	-.095	4	-9.711e-4	4	NC	1	262.199	4
357		8	max	.005	1	.004	2	0	1	0	1	NC	1	NC	1
358			min	-.001	3	-.006	3	-.082	4	-9.711e-4	4	NC	1	303.656	4
359		9	max	.005	1	.004	2	0	1	0	1	NC	1	NC	1
360			min	-.001	3	-.005	3	-.069	4	-9.711e-4	4	NC	1	357.514	4
361		10	max	.004	1	.004	2	0	1	0	1	NC	1	NC	1
362			min	-.001	3	-.005	3	-.058	4	-9.711e-4	4	NC	1	429.317	4
363		11	max	.004	1	.003	2	0	1	0	1	NC	1	NC	1
364			min	0	3	-.004	3	-.047	4	-9.711e-4	4	NC	1	528.141	4
365		12	max	.003	1	.003	2	0	1	0	1	NC	1	NC	1
366			min	0	3	-.004	3	-.037	4	-9.711e-4	4	NC	1	669.687	4
367		13	max	.003	1	.002	2	0	1	0	1	NC	1	NC	1
368			min	0	3	-.003	3	-.028	4	-9.711e-4	4	NC	1	883.099	4
369		14	max	.002	1	.002	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.003	3	-.02	4	-9.711e-4	4	NC	1	1227.686	4
371		15	max	.002	1	.002	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.002	3	-.013	4	-9.711e-4	4	NC	1	1840.191	4
373		16	max	.001	1	.001	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.002	3	-.008	4	-9.711e-4	4	NC	1	3098.739	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
375		17	max	0	1	0	2	0	1	0	1	NC	1	NC	1
376			min	0	3	-.001	3	-.004	4	-9.711e-4	4	NC	1	6405.897	4
377		18	max	0	1	0	2	0	1	0	1	NC	1	NC	1
378			min	0	3	0	3	-.001	4	-9.711e-4	4	NC	1	NC	1
379		19	max	0	1	0	1	0	1	0	1	NC	1	NC	1
380			min	0	1	0	1	0	1	-9.711e-4	4	NC	1	NC	1
381	M10	1	max	.005	1	.002	2	0	12	1.268e-3	4	NC	1	NC	2
382			min	-.004	3	-.005	3	-.462	4	7.192e-6	12	NC	1	103.55	4
383		2	max	.005	1	.002	2	0	12	1.353e-3	4	NC	1	NC	2
384			min	-.004	3	-.005	3	-.424	4	6.679e-6	12	NC	1	112.832	4
385		3	max	.005	1	.001	2	0	12	1.438e-3	4	NC	1	NC	2
386			min	-.003	3	-.004	3	-.386	4	6.165e-6	12	NC	1	123.869	4
387		4	max	.004	1	0	2	0	12	1.523e-3	4	NC	1	NC	2
388			min	-.003	3	-.004	3	-.349	4	5.652e-6	12	NC	1	137.121	4
389		5	max	.004	1	0	2	0	12	1.608e-3	4	NC	1	NC	1
390			min	-.003	3	-.004	3	-.312	4	5.139e-6	12	NC	1	153.215	4
391		6	max	.004	1	0	2	0	12	1.693e-3	4	NC	1	NC	1
392			min	-.003	3	-.004	3	-.277	4	4.626e-6	12	NC	1	173.017	4
393		7	max	.003	1	0	2	0	12	1.778e-3	4	NC	1	NC	1
394			min	-.003	3	-.004	3	-.242	4	4.113e-6	12	NC	1	197.764	4
395		8	max	.003	1	0	10	0	12	1.863e-3	4	NC	1	NC	1
396			min	-.002	3	-.004	3	-.209	4	3.599e-6	12	NC	1	229.257	4
397		9	max	.003	1	0	10	0	12	1.948e-3	4	NC	1	NC	1
398			min	-.002	3	-.004	3	-.177	4	3.086e-6	12	NC	1	270.219	4
399		10	max	.003	1	0	10	0	12	2.033e-3	4	NC	1	NC	1
400			min	-.002	3	-.003	3	-.147	4	2.573e-6	12	NC	1	324.912	4
401		11	max	.002	1	0	15	0	12	2.118e-3	4	NC	1	NC	1
402			min	-.002	3	-.003	3	-.12	4	2.06e-6	12	NC	1	400.332	4
403		12	max	.002	1	0	15	0	12	2.202e-3	4	NC	1	NC	1
404			min	-.002	3	-.003	3	-.094	4	1.547e-6	12	NC	1	508.623	4
405		13	max	.002	1	0	15	0	12	2.287e-3	4	NC	1	NC	1
406			min	-.001	3	-.003	4	-.071	4	1.034e-6	12	NC	1	672.429	4
407		14	max	.001	1	0	15	0	12	2.372e-3	4	NC	1	NC	1
408			min	-.001	3	-.002	4	-.051	4	5.204e-7	12	NC	1	938.094	4
409		15	max	.001	1	0	15	0	12	2.457e-3	4	NC	1	NC	1
410			min	0	3	-.002	4	-.034	4	-4.869e-6	1	NC	1	1413.325	4
411		16	max	0	1	0	15	0	12	2.542e-3	4	NC	1	NC	1
412			min	0	3	-.002	4	-.02	4	-1.776e-5	1	NC	1	2399.421	4
413		17	max	0	1	0	15	0	12	2.627e-3	4	NC	1	NC	1
414			min	0	3	-.001	4	-.01	4	-3.065e-5	1	NC	1	5035.356	4
415		18	max	0	1	0	15	0	12	2.712e-3	4	NC	1	NC	1
416			min	0	3	0	4	-.003	4	-4.354e-5	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.797e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-5.643e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	1.749e-5	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-6.211e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.014	4	-1.646e-7	12	NC	1	NC	1
422			min	0	2	-.002	4	0	1	-4.992e-6	5	NC	1	NC	1
423		3	max	0	3	0	15	.027	4	6.121e-4	4	NC	1	NC	1
424			min	0	2	-.003	4	0	1	-2.597e-5	1	NC	1	NC	1
425		4	max	0	3	-.001	15	.039	4	1.229e-3	4	NC	1	NC	1
426			min	0	2	-.005	4	0	1	-4.77e-5	1	NC	1	NC	1
427		5	max	0	3	-.002	15	.051	4	1.845e-3	4	NC	1	NC	1
428			min	0	2	-.007	4	-.001	1	-6.944e-5	1	NC	1	8596.943	4
429		6	max	0	3	-.002	15	.062	4	2.462e-3	4	NC	1	NC	1
430			min	0	2	-.009	4	-.001	1	-9.117e-5	1	NC	1	7731.557	4
431		7	max	0	3	-.003	15	.073	4	3.078e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
432			min	0	2	-.01	4	-.002	1	-1.129e-4	1	9108.365	4	7336.789	4
433		8	max	.001	3	-.003	15	.083	4	3.695e-3	4	NC	1	NC	1
434			min	0	2	-.012	4	-.002	1	-1.346e-4	1	8131.383	4	7268.506	4
435		9	max	.001	3	-.003	15	.092	4	4.312e-3	4	NC	1	NC	1
436			min	0	2	-.013	4	-.002	1	-1.564e-4	1	7548.702	4	7480.733	4
437		10	max	.001	3	-.003	15	.102	4	4.928e-3	4	NC	2	NC	1
438			min	-.001	2	-.013	4	-.003	1	-1.781e-4	1	7257.253	4	7987.263	4
439		11	max	.002	3	-.003	15	.111	4	5.545e-3	4	NC	2	NC	1
440			min	-.001	2	-.013	4	-.003	1	-1.998e-4	1	7213.522	4	8859.68	4
441		12	max	.002	3	-.003	15	.119	4	6.161e-3	4	NC	2	NC	1
442			min	-.001	2	-.013	4	-.004	1	-2.216e-4	1	7416.773	4	NC	1
443		13	max	.002	3	-.003	15	.128	4	6.778e-3	4	NC	1	NC	1
444			min	-.001	2	-.012	4	-.004	1	-2.433e-4	1	7910.838	4	NC	1
445		14	max	.002	3	-.003	15	.136	4	7.395e-3	4	NC	1	NC	1
446			min	-.001	2	-.011	4	-.004	1	-2.65e-4	1	8807.343	4	NC	1
447		15	max	.002	3	-.002	15	.144	4	8.011e-3	4	NC	1	NC	1
448			min	-.002	2	-.01	4	-.005	1	-2.868e-4	1	NC	1	NC	1
449		16	max	.002	3	-.002	15	.153	4	8.628e-3	4	NC	1	NC	1
450			min	-.002	2	-.008	4	-.005	1	-3.085e-4	1	NC	1	NC	1
451		17	max	.003	3	-.001	15	.162	4	9.244e-3	4	NC	1	NC	1
452			min	-.002	2	-.006	1	-.006	1	-3.302e-4	1	NC	1	NC	1
453		18	max	.003	3	0	15	.171	4	9.861e-3	4	NC	1	NC	1
454			min	-.002	2	-.005	1	-.006	1	-3.52e-4	1	NC	1	NC	1
455		19	max	.003	3	0	12	.181	4	1.048e-2	4	NC	1	NC	1
456			min	-.002	2	-.003	1	-.006	1	-3.737e-4	1	NC	1	NC	1
457	M12	1	max	.003	1	.001	2	.006	1	1.369e-5	1	NC	1	NC	3
458			min	0	3	-.003	3	-.181	4	-9.423e-4	4	NC	1	137.388	4
459		2	max	.003	1	.001	2	.006	1	1.369e-5	1	NC	1	NC	2
460			min	0	3	-.003	3	-.166	4	-9.423e-4	4	NC	1	149.585	4
461		3	max	.003	1	.001	2	.005	1	1.369e-5	1	NC	1	NC	2
462			min	0	3	-.003	3	-.151	4	-9.423e-4	4	NC	1	164.089	4
463		4	max	.002	1	.001	2	.005	1	1.369e-5	1	NC	1	NC	2
464			min	0	3	-.002	3	-.137	4	-9.423e-4	4	NC	1	181.502	4
465		5	max	.002	1	.001	2	.004	1	1.369e-5	1	NC	1	NC	2
466			min	0	3	-.002	3	-.122	4	-9.423e-4	4	NC	1	202.641	4
467		6	max	.002	1	.001	2	.004	1	1.369e-5	1	NC	1	NC	2
468			min	0	3	-.002	3	-.108	4	-9.423e-4	4	NC	1	228.639	4
469		7	max	.002	1	0	2	.003	1	1.369e-5	1	NC	1	NC	2
470			min	0	3	-.002	3	-.095	4	-9.423e-4	4	NC	1	261.105	4
471		8	max	.002	1	0	2	.003	1	1.369e-5	1	NC	1	NC	2
472			min	0	3	-.002	3	-.082	4	-9.423e-4	4	NC	1	302.385	4
473		9	max	.002	1	0	2	.003	1	1.369e-5	1	NC	1	NC	2
474			min	0	3	-.002	3	-.07	4	-9.423e-4	4	NC	1	356.011	4
475		10	max	.001	1	0	2	.002	1	1.369e-5	1	NC	1	NC	1
476			min	0	3	-.001	3	-.058	4	-9.423e-4	4	NC	1	427.506	4
477		11	max	.001	1	0	2	.002	1	1.369e-5	1	NC	1	NC	1
478			min	0	3	-.001	3	-.047	4	-9.423e-4	4	NC	1	525.906	4
479		12	max	.001	1	0	2	.001	1	1.369e-5	1	NC	1	NC	1
480			min	0	3	-.001	3	-.037	4	-9.423e-4	4	NC	1	666.843	4
481		13	max	0	1	0	2	.001	1	1.369e-5	1	NC	1	NC	1
482			min	0	3	0	3	-.028	4	-9.423e-4	4	NC	1	879.337	4
483		14	max	0	1	0	2	0	1	1.369e-5	1	NC	1	NC	1
484			min	0	3	0	3	-.02	4	-9.423e-4	4	NC	1	1222.439	4
485		15	max	0	1	0	2	0	1	1.369e-5	1	NC	1	NC	1
486			min	0	3	0	3	-.014	4	-9.423e-4	4	NC	1	1832.301	4
487		16	max	0	1	0	2	0	1	1.369e-5	1	NC	1	NC	1
488			min	0	3	0	3	-.008	4	-9.423e-4	4	NC	1	3085.409	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
489		17	max	0	1	0	2	0	1	1.369e-5	1	NC	1	NC	1
490			min	0	3	0	3	-.004	4	-9.423e-4	4	NC	1	6378.232	4
491		18	max	0	1	0	2	0	1	1.369e-5	1	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-9.423e-4	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	1.369e-5	1	NC	1	NC	1
494			min	0	1	0	1	0	1	-9.423e-4	4	NC	1	NC	1
495	M1	1	max	.004	3	.111	1	.485	4	1.808e-2	1	NC	1	NC	1
496			min	-.001	10	-.014	3	0	12	-1.855e-2	3	NC	1	NC	1
497		2	max	.004	3	.055	1	.471	4	8.905e-3	4	NC	3	NC	1
498			min	-.001	10	-.007	3	-.005	1	-9.177e-3	3	2036.645	1	NC	1
499		3	max	.004	3	.005	3	.458	4	1.405e-2	4	NC	5	NC	1
500			min	-.001	10	-.006	1	-.007	1	-1.285e-4	1	973.648	1	8625.032	5
501		4	max	.004	3	.027	3	.446	4	1.245e-2	4	NC	5	NC	1
502			min	-.001	10	-.077	1	-.006	1	-3.354e-3	3	607.679	1	5845.637	5
503		5	max	.004	3	.055	3	.433	4	1.084e-2	4	NC	15	NC	1
504			min	-.001	10	-.152	1	-.004	1	-6.618e-3	3	434.407	1	4448.941	5
505		6	max	.003	3	.085	3	.421	4	1.534e-2	1	NC	15	NC	1
506			min	-.001	10	-.225	1	-.002	1	-9.882e-3	3	339.645	1	3632.01	5
507		7	max	.003	3	.114	3	.407	4	2.05e-2	1	9557.39	15	NC	1
508			min	-.001	10	-.291	1	0	12	-1.315e-2	3	284.044	1	3108.69	4
509		8	max	.003	3	.139	3	.393	4	2.565e-2	1	8489.959	15	NC	1
510			min	-.001	10	-.344	1	0	12	-1.641e-2	3	251.3	1	2758.45	4
511		9	max	.003	3	.155	3	.377	4	2.818e-2	1	7933.583	15	NC	1
512			min	-.001	10	-.377	1	0	1	-1.649e-2	3	234.308	1	2563.227	4
513		10	max	.003	3	.161	3	.359	4	2.897e-2	1	7764.188	15	NC	1
514			min	-.001	10	-.388	1	0	12	-1.446e-2	3	229.215	1	2511.656	4
515		11	max	.003	3	.157	3	.339	4	2.976e-2	1	7933.432	15	NC	1
516			min	0	10	-.377	1	0	12	-1.243e-2	3	234.564	1	2580.533	4
517		12	max	.003	3	.144	3	.317	4	2.803e-2	1	8489.611	15	NC	1
518			min	0	10	-.343	1	0	1	-1.038e-2	3	252.096	1	2787.893	5
519		13	max	.003	3	.122	3	.292	4	2.252e-2	1	9556.721	15	NC	1
520			min	0	10	-.29	1	0	1	-8.307e-3	3	286.012	1	3291.407	4
521		14	max	.003	3	.095	3	.264	4	1.702e-2	1	NC	15	NC	1
522			min	0	10	-.223	1	0	12	-6.237e-3	3	343.886	1	4305.05	4
523		15	max	.003	3	.064	3	.237	4	1.151e-2	1	NC	15	NC	1
524			min	0	10	-.149	1	0	12	-4.167e-3	3	443.179	1	6449.133	4
525		16	max	.003	3	.032	3	.209	4	9.293e-3	4	NC	5	NC	1
526			min	0	10	-.074	1	0	12	-2.097e-3	3	626.226	1	NC	1
527		17	max	.003	3	.002	3	.184	4	1.018e-2	4	NC	5	NC	1
528			min	0	10	-.004	1	0	12	-2.651e-5	3	1015.758	1	NC	1
529		18	max	.003	3	.055	1	.162	4	1.041e-2	1	NC	5	NC	1
530			min	0	10	-.025	3	0	12	-3.283e-3	3	2143.851	1	NC	1
531		19	max	.003	3	.108	1	.143	4	2.069e-2	1	NC	1	NC	1
532			min	0	10	-.049	3	0	1	-6.664e-3	3	NC	1	NC	1
533	M5	1	max	.011	3	.266	1	.484	4	0	1	NC	1	NC	1
534			min	-.007	2	-.022	3	0	1	-2.163e-6	4	NC	1	NC	1
535		2	max	.011	3	.132	1	.474	4	7.196e-3	4	NC	5	NC	1
536			min	-.007	2	-.011	3	0	1	0	1	852.394	1	NC	1
537		3	max	.011	3	.017	3	.462	4	1.417e-2	4	NC	15	NC	1
538			min	-.007	2	-.021	1	0	1	0	1	398.217	1	7211.62	4
539		4	max	.011	3	.076	3	.449	4	1.154e-2	4	9110.921	15	NC	1
540			min	-.007	2	-.208	1	0	1	0	1	241.433	1	5216.18	4
541		5	max	.011	3	.156	3	.436	4	8.92e-3	4	6377.323	15	NC	1
542			min	-.007	2	-.412	1	0	1	0	1	168.652	1	4191.448	4
543		6	max	.011	3	.246	3	.422	4	6.296e-3	4	4910.763	15	NC	1
544			min	-.006	2	-.616	1	0	1	0	1	129.64	1	3560.891	4
545		7	max	.01	3	.334	3	.407	4	3.671e-3	4	4063.65	15	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
546			min	-.006	2	-.801	1	0	1	0	1	107.121	1	3123.835	4
547		8	max	.01	3	.407	3	.393	4	1.046e-3	4	3571.019	15	NC	1
548			min	-.006	2	-.95	1	0	1	0	1	94.033	1	2791.369	4
549		9	max	.01	3	.455	3	.377	4	0	1	3318.355	15	NC	1
550			min	-.006	2	-1.043	1	0	1	-1.238e-6	5	87.327	1	2563.742	4
551		10	max	.01	3	.472	3	.359	4	0	1	3242.219	15	NC	1
552			min	-.006	2	-1.074	1	0	1	-1.171e-6	5	85.328	1	2529.548	4
553		11	max	.01	3	.46	3	.339	4	0	1	3318.407	15	NC	1
554			min	-.006	2	-1.043	1	0	1	-1.104e-6	5	87.429	1	2605.833	4
555		12	max	.009	3	.421	3	.318	4	7.33e-4	4	3571.146	15	NC	1
556			min	-.006	2	-.948	1	0	1	0	1	94.371	1	2751.208	4
557		13	max	.009	3	.356	3	.292	4	2.572e-3	4	4063.911	15	NC	1
558			min	-.006	2	-.796	1	0	1	0	1	107.999	1	3242.152	4
559		14	max	.009	3	.275	3	.264	4	4.411e-3	4	4911.28	15	NC	1
560			min	-.005	2	-.607	1	0	1	0	1	131.616	1	4423.371	4
561		15	max	.009	3	.184	3	.235	4	6.25e-3	4	6378.354	15	NC	1
562			min	-.005	2	-.401	1	0	1	0	1	172.933	1	7463.8	5
563		16	max	.008	3	.092	3	.206	4	8.089e-3	4	9113.089	15	NC	1
564			min	-.005	2	-.196	1	0	1	0	1	251.007	1	NC	1
565		17	max	.008	3	.006	3	.18	4	9.929e-3	4	NC	15	NC	1
566			min	-.005	2	-.013	1	0	1	0	1	421.459	1	NC	1
567		18	max	.008	3	.132	1	.16	4	5.042e-3	4	NC	5	NC	1
568			min	-.005	2	-.067	3	0	1	0	1	914.571	1	NC	1
569		19	max	.008	3	.256	1	.144	4	0	1	NC	1	NC	1
570			min	-.005	2	-.132	3	0	1	-8.907e-7	4	NC	1	NC	1
571	M9	1	max	.004	3	.111	1	.484	4	1.855e-2	3	NC	1	NC	1
572			min	-.001	10	-.014	3	0	1	-1.808e-2	1	NC	1	NC	1
573		2	max	.004	3	.055	1	.474	4	9.177e-3	3	NC	3	NC	1
574			min	-.001	10	-.007	3	0	12	-8.812e-3	1	2036.645	1	NC	1
575		3	max	.004	3	.005	3	.462	4	1.413e-2	4	NC	5	NC	1
576			min	-.001	10	-.006	1	0	12	-2.005e-5	10	973.648	1	7322.467	4
577		4	max	.004	3	.027	3	.449	4	1.108e-2	5	NC	5	NC	1
578			min	-.001	10	-.077	1	0	12	-5.027e-3	1	607.679	1	5254.076	4
579		5	max	.004	3	.055	3	.436	4	8.312e-3	5	NC	15	NC	1
580			min	-.001	10	-.152	1	0	12	-1.018e-2	1	434.407	1	4192.938	4
581		6	max	.003	3	.085	3	.422	4	9.882e-3	3	NC	15	NC	1
582			min	-.001	10	-.225	1	0	12	-1.534e-2	1	339.645	1	3545.417	4
583		7	max	.003	3	.114	3	.407	4	1.315e-2	3	9545.597	15	NC	1
584			min	-.001	10	-.291	1	0	1	-2.05e-2	1	284.044	1	3104.633	4
585		8	max	.003	3	.139	3	.393	4	1.641e-2	3	8479.716	15	NC	1
586			min	-.001	10	-.344	1	0	1	-2.565e-2	1	251.3	1	2776.477	5
587		9	max	.003	3	.155	3	.377	4	1.649e-2	3	7924.129	15	NC	1
588			min	-.001	10	-.377	1	0	12	-2.818e-2	1	234.308	1	2557.446	4
589		10	max	.003	3	.161	3	.359	4	1.446e-2	3	7754.964	15	NC	1
590			min	-.001	10	-.388	1	0	1	-2.897e-2	1	229.215	1	2512.515	4
591		11	max	.003	3	.157	3	.339	4	1.243e-2	3	7923.982	15	NC	1
592			min	0	10	-.377	1	0	1	-2.976e-2	1	234.564	1	2587.764	4
593		12	max	.003	3	.144	3	.317	4	1.038e-2	3	8479.439	15	NC	1
594			min	0	10	-.343	1	0	12	-2.803e-2	1	252.096	1	2769.971	4
595		13	max	.003	3	.122	3	.292	4	8.307e-3	3	9545.164	15	NC	1
596			min	0	10	-.29	1	0	12	-2.252e-2	1	286.012	1	3292.108	4
597		14	max	.003	3	.095	3	.264	4	6.237e-3	3	NC	15	NC	1
598			min	0	10	-.223	1	-.002	1	-1.702e-2	1	343.886	1	4405.941	5
599		15	max	.003	3	.064	3	.235	4	5.818e-3	5	NC	15	NC	1
600			min	0	10	-.149	1	-.004	1	-1.151e-2	1	443.179	1	6965.446	5
601		16	max	.003	3	.032	3	.206	4	7.849e-3	5	NC	5	NC	1
602			min	0	10	-.074	1	-.006	1	-6.001e-3	1	626.226	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
603		17	max	.003	3	.002	3	.181	4	9.952e-3	4	NC	5	NC	1
604			min	0	10	-.004	1	-.007	1	-4.934e-4	1	1015.758	1	NC	1
605		18	max	.003	3	.055	1	.16	4	4.663e-3	5	NC	5	NC	1
606			min	0	10	-.025	3	-.005	1	-1.041e-2	1	2143.851	1	NC	1
607		19	max	.003	3	.108	1	.143	4	6.664e-3	3	NC	1	NC	1
608			min	0	10	-.049	3	0	12	-2.069e-2	1	NC	1	NC	1

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

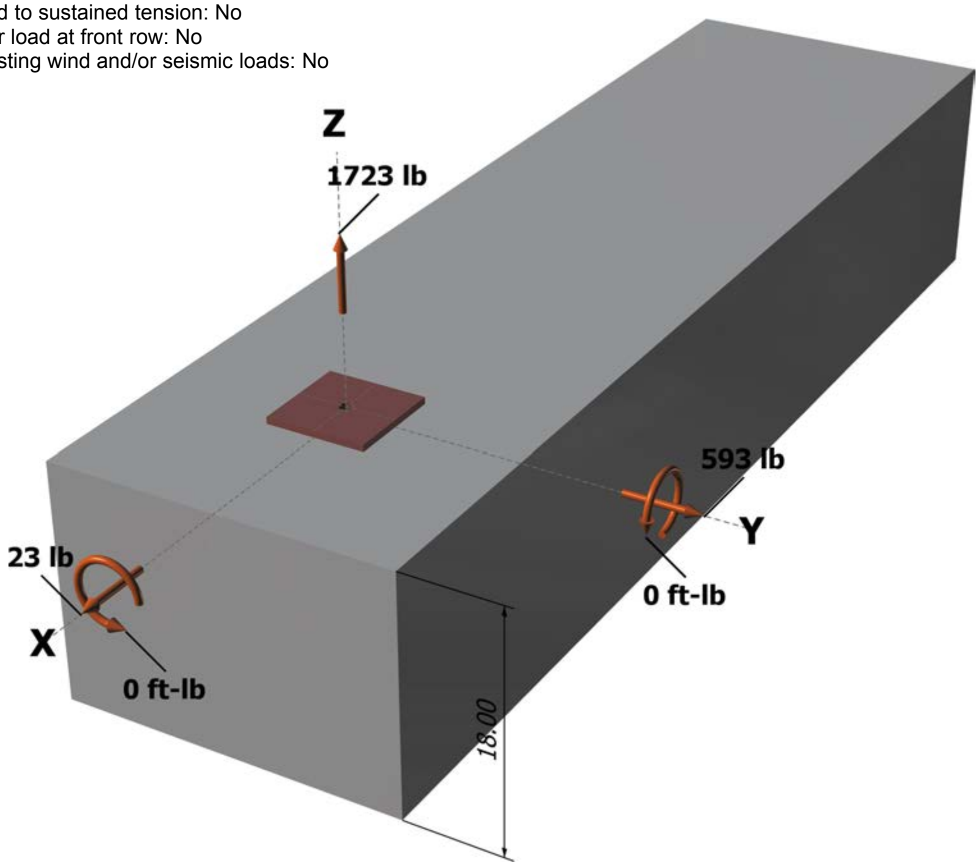
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

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

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

<Figure 1>



<Figure 2>

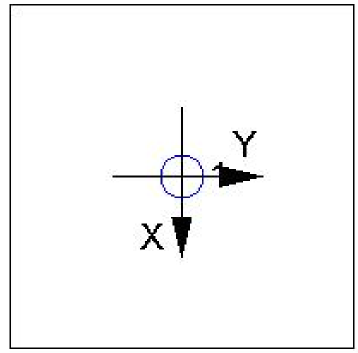
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

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

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

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in y-direction:

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

Shear parallel to edge in y-direction:

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

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

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

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

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

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

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

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

11. Results

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

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

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

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

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

12. Warnings

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

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

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

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

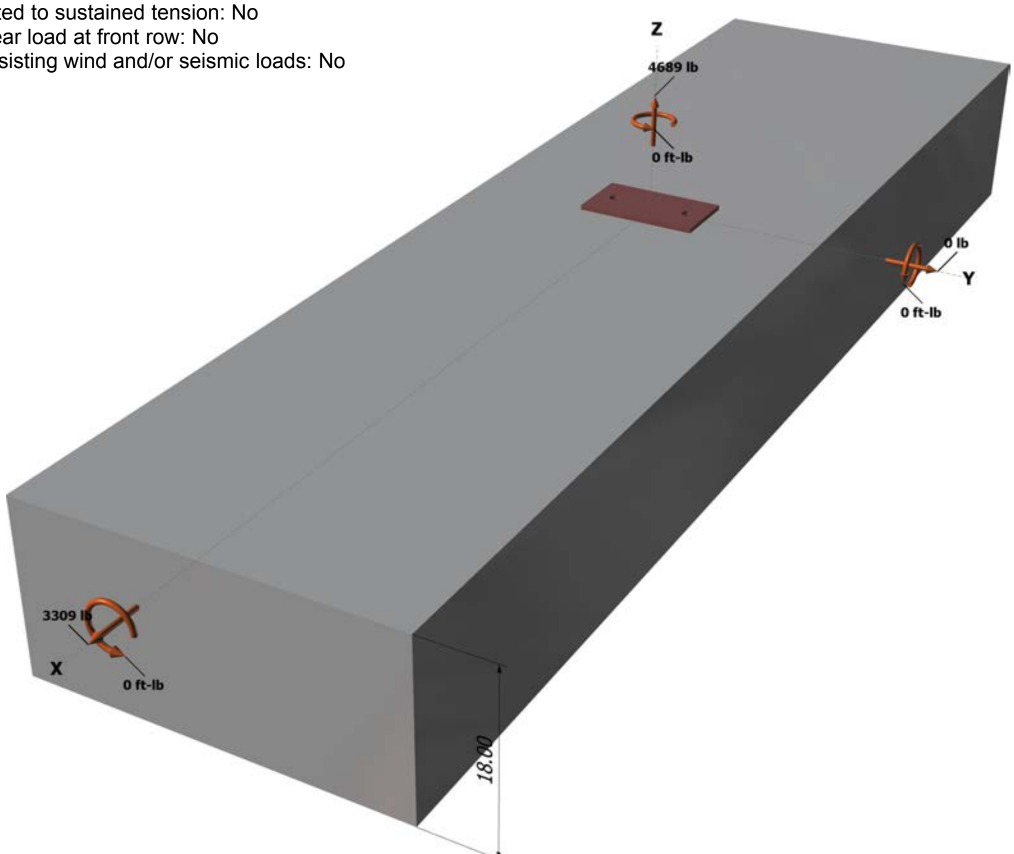
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

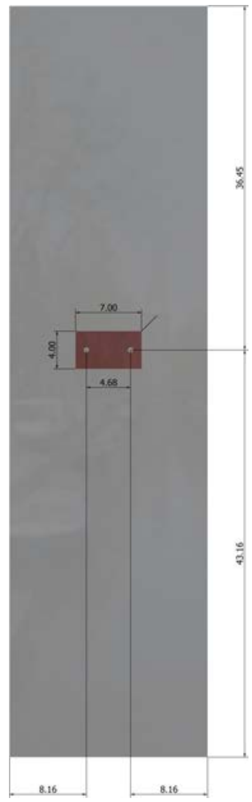
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout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

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

<Figure 1>



<Figure 2>



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

SIMPSON Strong-Tie

Anchor Designer™
Software
Version 2.4.5673.0

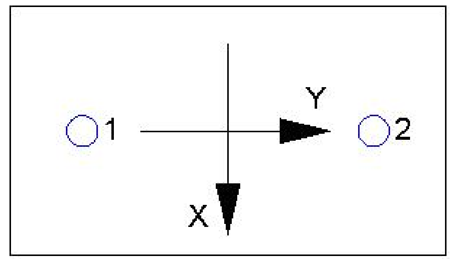
Company:	Schletter, Inc.	Date:	11/17/2015
Engineer:	HCV	Page:	3/5
Project:	Standard PVMax - Worst Case, 21-30 Inch Width		
Address:			
Phone:			
E-mail:			

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	2344.5	1654.5	0.0	1654.5
2	2344.5	1654.5	0.0	1654.5
Sum	4689.0	3309.0	0.0	3309.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 4689
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



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

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

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

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

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

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

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
378.00	324.00	1.000	0.972	1.00	1.000	12492	0.65	9208

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgx} (lb)
378.00	648.00	1.000	0.836	1.000	1.000	15593	0.70	5323

Shear parallel to edge in x-direction:

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

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
4.00	0.50	1.00	2500	8.16	8744

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

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbx} (lb)
299.64	299.64	1.000	1.000	1.000	8744	0.70	12241

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

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

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

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ
378.00	324.00	1.000	0.972	1.000	1.000	12492	14166	0.70

ϕV_{cpg} (lb)
19833

11. Results

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

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

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

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

Sec. D.7.3	0.58	0.62	120.1 %	1.2	Pass

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

12. Warnings

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

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

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