Structural Calculations

Chase Bank
890 E. Langsford Road
Lee's Summit, MO 64063

1/5/2020

David Balma, P.E.
MO Lic. No. 2015003007

Prepared By:
Core States Group
201 S. Maple Ave. Suite 300, Ambler, PA 19002
January 5, 2021

Loading and Design

Design Method.....	2018 International Building Code
Earthquake.....	Seismic per ASCE 7-16
Ss/S1	0.100 / 0.068
Fa/Fv	1.3 / 1.5
Occupancy Category	II
Seismic Importance Factor	1.0
Seismic Design Category	B
Site Class	C
Wind.....	Wind Load per ASCE 7-16 Wind Speed: 110 mph Exposure: B
Snow.....	Ground Snow Load = 20 psf Roof Snow Load = 20 psf
Reinforcing Steel.....	ASTM A615, Grade 60
Concrete.....	Minimum 28-day Compressive Strength (psi) f'c = 4000 psi
Assumed Loads.....	Loads per IBC 2018
First Floor:	
Live Load (psf)	100 psf
Dead Load (psf)	25 psf
Roof:	
Live Load (psf)	20 psf
Dead Load (psf)	25 psf
Soil Parameters.....	
Report By:	Professional Service Industries, Inc.
Report #	03382096
Report Dated	July 16, 2020
Soil Bearing Capacity	1900 psf continuous footings / 2300 psf Cols.
Minimum Footing Depth	36"
Modulus of Subgrade Reaction	140 PCI
Vapor Barrier	N/A
Servicability (IBC Table 1604.3)	
Roof Members:	
Dead Load + Live Load	L/180
Live Load	L/240
Wind Load / Seismic Load	L/240

Core States Group
201 S. Maple Ave. Ste. 300
Ambler, PA 19002

890 NE Elangsford Rd
Lee's Summit, MO 64063

Chase OVP #38200P368999
Date: 12/17/2020
Calculations By: JAP

Wall Members:

Secondary Wall Members	L/120

Floor Memmbers:

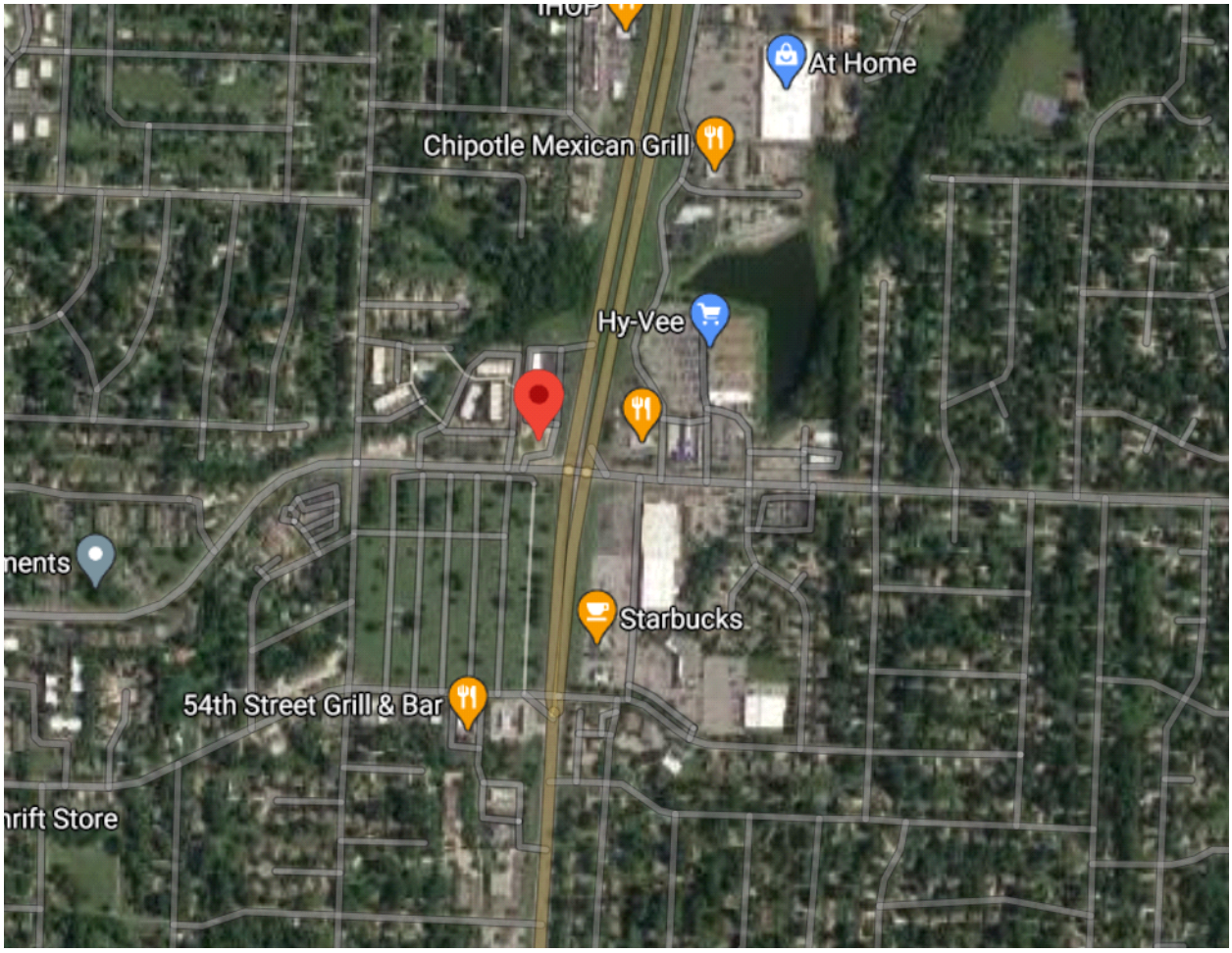
Dead Load + Live Load	L/240
Live Load	L/360

Building Dimensions:

Length (transverse) (ft)	45' - 11 3/4"
Length (Longitudinal) (ft)	79' - 3 1/4"
Joist Spacing (ft)	5' - 0"
Building Height (ft)	19' - 4"
Diaphragm Height (ft)	15' - 7 1/2"
Mean Roof Height (ft)	17' - 4 1/2"

Site Location:

890 E. Langsford Rd., Lee's Summit, MO 64063



Core States Group
201 S. Maple Ave. Ste. 300
Ambler, PA 19002

890 NE Elangsford Rd
Lee's Summit, MO 64063

Chase OVP #38200P368999
Date: 12/17/2020
Calculations By: JAP

LOAD ANALYSIS:

Conversion Factors:

$k := 1000lbf$ $plf := \frac{lbf}{ft}$ $psf := \frac{lbf}{ft^2}$ $pcf := \frac{lbf}{ft^3}$ $ksi := \frac{k}{in^2}$ $ksf := \frac{k}{ft^2}$

Building Dimensions/Parameters:

$Lu_t := 45.97ft$ $Lu_L := 79.27ft$ $H_b := 20ft$ $S_j := 5ft$ $w_{thk} := 1.25ft$ Wall Thickness

Joist clear span

$L_j := Lu_t - 2w_{thk}$ $L_j = 43.47 \cdot ft$

Foundation Values:

$\sigma_{brg} := 2300psf$ Soil Bearing Pressure

$w_{conc} := 145pcf$ Weight of Concrete

$\gamma_{soil} := 100pcf$ Soil Unit Weight

Roof Dead Loading:

$DLr := 25psf$ Roof Dead Load

$DLs := 10psf$ Future Dead Load

Roof Live Loading:

$Lo := 20psf$ Unreduced Design Roof Live Load (Table 4-1)

$A_T := Lu_t \cdot S_j$ $A_T = 229.85 \cdot ft^2$ Tributary

$$R_1 := \begin{cases} 1.0 & \text{if } A_T \le 200ft^2 \\ \left(1.2 - 0.001 \cdot \frac{A_T}{ft^2}\right) & \text{if } 200ft^2 < A_T < 600ft^2 \\ 0.6 & \text{if } A_T \ge 600ft^2 \end{cases}$$

$R_1 = 0.97$

$F := \frac{1}{4}$ Slope of roof, number of inches of rise per foot

$$R_2 := \begin{cases} 1.0 & \text{if } F \le 4 \\ (1.2 - 0.05F) & \text{if } 4 < F < 12 \\ 0.6 & \text{if } F \ge 12 \end{cases}$$

$R_2 = 1$

$LLr := Lo \cdot R_1 \cdot R_2$ $LLr = 19.403 \cdot psf$ Eq. 4.8-1

Use unreduced LL $LLr := 20psf$

Snow Loading:

Core States Group
201 S. Maple Ave. Ste. 300
Ambler, PA 19002

890 NE Elangsford Rd
Lee's Summit, MO 64063

Chase OVP #38200P368999
Date: 12/17/2020
Calculations By: JAP

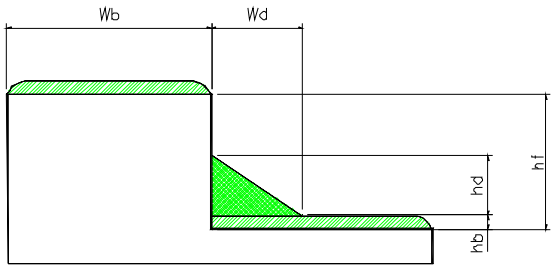
$P_g := 20psf$ Ground Snow Load - Figure 7-1

$C_e := 1.0$ Exposure Factor - Table - 7-2

$C_t := 1.0$ Thermal Factor - Table - 7-3

$I_s := 1.0$ Snow Impotance Factor - Table 1.5-1

$h_f := 3.913ft$ Finished roof to top of parapet height



$Pf := 0.7 \cdot C_e \cdot C_t I_s \cdot P_g$ $Pf = 14 \cdot psf$

$$Pf_{min} := \begin{cases} (I_s \cdot P_g) & \text{if } P_g \le 20psf \\ (Pf \cdot I_s) & \text{if } P_g > 20psf \end{cases} \qquad Pf_{min} = 20 \cdot psf$$

$Pf_{min} = 20 \cdot psf$ $P_f := Pf_{min} = 20 \cdot psf$

$\gamma_a := \frac{0.13}{ft} \cdot P_g + 14pcf$ $\gamma_a = 16.6 \cdot pcf$

$\gamma := \min(\gamma_a, 30pcf)$ $\gamma = 16.6 \cdot pcf$ Snow density

$h_b := \frac{P_f}{\gamma}$ $h_b = 1.2 \cdot ft$ Height of balanced snow for flat roof snow load

$h_c := h_f - h_b$ $h_c = 2.71 \cdot ft$

$check := if\left(\frac{h_c}{h_b} < 0.2, \text{"Drift Load not required to be applied"}, \text{"Drift load needs to be applied"}\right)$

$check = \text{"Drift load needs to be applied"}$

Snow Drift - Transverse Direction:

$h_{dta} := 0.75\left(0.43ft \cdot \sqrt[3]{\frac{Lu_t}{ft}} \cdot \sqrt[4]{\frac{P_g}{psf} + 10} - 1.5ft\right)$ $h_{dta} = 1.579 \cdot ft$

$h_{dt} := if(h_{dta} \le h_c, h_{dta}, h_c)$ $h_{dt} = 1.58 \cdot ft$

$W_{dta} := if\left(h_{dta} \le h_c, 4 \cdot h_{dta}, 4 \cdot \frac{h_{dta}^2}{h_c}\right)$ $W_{dta} = 6.32 \cdot ft$

$W_{dt} := \min(W_{dta}, 8 \cdot h_c)$ $W_{dt} = 6.32 \cdot ft$ Drift Width

$P_{dt} := \gamma \cdot h_{dt}$ $P_{dt} = 26.21 \cdot psf$ Drift Magnitude

$P_{mt} := (h_{dt} + h_b) \cdot \gamma$ $P_{mt} = 46.21 \cdot psf$ Total Magnitude

Snow Drift - Longitudinal Direction:

$h_{dLa} := 0.75\left(0.43ft \cdot \sqrt[3]{\frac{Lu_L}{ft}} \cdot \sqrt[4]{\frac{P_g}{psf} + 10} - 1.5ft\right)$ $h_{dLa} = 2.117 \cdot ft$

$h_{dL} := if(h_{dLa} \le h_c, h_{dLa}, h_c)$ $h_{dL} = 2.12 \cdot ft$

$W_{dLa} := if\left(h_{dLa} \le h_c, 4 \cdot h_{dLa}, 4 \cdot \frac{h_{dLa}^2}{h_c}\right)$ $W_{dLa} = 8.47 \cdot ft$

$W_{dL} := \min(W_{dLa}, 8 \cdot h_c)$ $W_{dL} = 8.47 \cdot ft$ Drift Width

$P_{dL} := \gamma \cdot h_{dL}$ $P_{dL} = 35.15 \cdot psf$ Drift Magnitude

$P_{mL} := (h_{dL} + h_b) \cdot \gamma$ $P_{mL} = 55.15 \cdot psf$ Total Magnitude

Wind Loading:

Core States Group
201 S. Maple Ave. Ste. 300
Ambler, PA 19002

890 NE Elangsford Rd
Lee's Summit, MO 64063

Chase OVP #38200P368999
Date: 12/17/2020
Calculations By: JAP

Basic Wind Velocity of 110 ***MPH*** *(Ultimate 3- Second Gust),* ***Exposure B***

Main WIndforce Resisting System: Chapter 28 (Directonal Simplified Procedure)

Wind Pressures:

$\lambda := 1.0$ Exposure Adjustment Factor

$P_{MWFRSA} := 19.2psf \cdot \lambda$
$P_{MWFRSA} = 19.2 \cdot psf$

$P_{MWFRSB} := -10.0psf \cdot \lambda$
$P_{MWFRSB} = -10 \cdot psf$

$P_{MWFRSC} := 12.7 \cdot psf \cdot \lambda$
$P_{MWFRSC} = 12.7 \cdot psf$

$P_{MWFRSD} := -5.9psf \cdot \lambda$
$P_{MWFRSD} = -5.9 \cdot psf$

$P_{MWFRSE} := -23.10psf \cdot \lambda$
$P_{MWFRSE} = -23.1 \cdot psf$

$P_{MWFRSF} := -13.1psf \cdot \lambda$
$P_{MWFRSF} = -13.1 \cdot psf$

$P_{MWFRSG} := -16.0psf \cdot \lambda$
$P_{MWFRSG} = -16 \cdot psf$

$P_{MWFRSH} := -10.1psf \cdot \lambda$
$P_{MWFRSH} = -10.1 \cdot psf$

$P_{MWFRSEoh} := -32.30psf \cdot \lambda$
$P_{MWFRSEoh} = -32.3 \cdot psf$

$P_{MWFRSGoh} := -25.3psf \cdot \lambda$
$P_{MWFRSGoh} = -25.3 \cdot psf$

Tributary areas for each zone:

$h_w := 15.21ft$ Joist bearing height

$h_p := 4.12ft$ Height of parapet

$h_t := 6.29ft$ Tower height

$l_t := 19.75ft$ Length of tower

$l_w := 13.75ft$ Width of tower

$Pressure_A := P_{MWFRSA}$

$Parapet_P := Pressure_A \cdot 2.25$

$Parapet_{Load} := Parapet_P \cdot h_p = 177.984 \cdot plf$

$Wall_P := P_{MWFRSA} \cdot \frac{h_w}{2} = 146.016 \cdot plf$

$W_{lul} := Lu_L \cdot Wall_P = 11574.688 \cdot lbf$

$W_{lut} := Lu_t \cdot Wall_P = 6712.356 \cdot lbf$

$P_{lul} := Lu_L \cdot Parapet_{Load} = 14108.792 \cdot lbf$

$P_{lut} := Lu_t \cdot Parapet_{Load} = 8181.924 \cdot lbf$

$Tower_P := P_{MWFRSA} \cdot 2.25$

$Tower_{Load} := Tower_P \cdot h_t = 271.728 \cdot plf$

$Pt_{lul} := l_t \cdot Tower_{Load} = 5.367 \cdot k$

$Pt_{lut} := l_w \cdot Tower_{Load} = 3.736 \cdot k$

$V_{1WL} := \frac{(P_{lul} + W_{lul})}{2} = 12841.74 \cdot lbf$

$V_{2WT} := \frac{P_{lut} + W_{lut}}{2} = 7447.14 \cdot lbf$

Components and Cladding: Chapter 30 (Components and Cladding)

$\lambda := 0.692$ Exposure Adjustment Factor (Table 30.7-2)

Vertical Pressures:

$$A_{eff.v} := \begin{cases} \frac{Lu_t^2}{3} & \text{if } S_j \cdot Lu_t \le \frac{Lu_t^2}{3} \\ S_j \cdot Lu_t & \text{if } S_j \cdot Lu_t > \frac{Lu_t^2}{3} \end{cases} \qquad A_{eff.v} = 704.414 \cdot ft^2$$

Horizontal Pressures:

$$A_{eff.h} := \begin{cases} \frac{(h_w)^2}{3} & \text{if } 16in \cdot H_b \le \frac{(h_w)^2}{3} \\ 16in \cdot (h_w) & \text{if } 16in \cdot H_b > \frac{(h_w)^2}{3} \end{cases} \qquad A_{eff.h} = 77.115 \cdot ft^2$$

$Pw_{CC1} := -37.5psf \cdot \lambda$ $\quad Pw_{CC1} = -25.95 \cdot psf$

$Pw_{CC2} := -58.9psf \cdot \lambda$ $\quad Pw_{CC2} = -40.76 \cdot psf$

$Pw_{CC3} := -80.3psf \cdot \lambda$ $\quad Pw_{CC3} = -55.57 \cdot psf$

$Pw_{CC4p} := 25.6psf \cdot \lambda$ $\quad Pw_{CC4p} = 17.72 \cdot psf$

$Pw_{CC4n} := -25.6psf \cdot \lambda$ $\quad Pw_{CC4n} = -17.72 \cdot psf$

$Pw_{CC5p} := 25.6psf \cdot \lambda$ $\quad Pw_{CC5p} = 17.72 \cdot psf$

$Pw_{CC5n} := -47.0psf \cdot \lambda$ $\quad Pw_{CC5n} = -32.52 \cdot psf$

Critical Components & Cladding Pressures:

$Pw_{CCu} := \min(Pw_{CC1}, Pw_{CC2})$ $\quad Pw_{CCu} = -40.76 \cdot psf$ Wind Load - Maximum Uplift

$Pw_{CCd} := 16psf$ $\quad Pw_{CCd} = 16 \cdot psf$ Wind Load - Minimum Vertical Load in ANY Direction

$Pp_{ww} := Pw_{CC4p} + |Pw_{CC2}|$ $\quad Pp_{ww} = 58.47 \cdot psf$ Wind Load - Windward Parapet Pressure

$Pp_{lw} := Pw_{CC4p} + |Pw_{CC4n}|$ $\quad Pp_{lw} = 35.43 \cdot psf$ Wind Load - Leeward Parapet Pressure

Seismic Loading:

Longitudinal Building Dimension

$Lu_L = 79.27 \cdot ft$

Transverse Building Dimension

$Lu_t = 45.97 \cdot ft$

$I_E := 1.0$

$w_m := 8psf + 4psf$ Weight of Exterior Light Gauge Metal Studs W/ Sheathing

$w_{st} := 0psf$ Weight of Interior Light Gauge Metal Studs

$w_{br} := 10psf$ Weight of finishes

$W_w := w_m + w_{st} + w_{br}$ $\quad W_w = 22 \cdot psf$ Total Weight of Wall

Seismic Design Parameters:

$S_s := 0.100$ $\quad F_a := 1.30$ $\quad S_1 := 0.068$ $\quad F_v := 1.50$ $\quad T_L := 12$

$C_t := 0.02$ $\quad x := 0.75$ $\quad C_u := 1.5$

$S_{ms} := F_a \cdot S_s$ $\quad S_{ms} = 0.13$ $\quad S_{ds} := \frac{2}{3} \cdot S_{ms}$ $\quad S_{ds} = 0.087$

$S_{m1} := F_v \cdot S_1$ $\quad S_{m1} = 0.1$ $\quad S_{d1} := \frac{2}{3} \cdot S_{m1}$ $\quad S_{d1} = 0.068$

$T_a := C_t \cdot \left(\frac{h_w}{ft}\right)^x$ $\quad T_a = 0.154$

$T := C_u \cdot T_a$ $\quad T = 0.231$

$$SDC_s := \begin{cases} \text{"A"} & \text{if } S_{ds} < 0.167 \\ \text{"B"} & \text{if } 0.167 \le S_{ds} < 0.33 \\ \text{"C"} & \text{if } 0.33 \le S_{ds} < 0.50 \\ \text{"D"} & \text{if } 0.5 \le S_{ds} \end{cases} \qquad SDC_s = \text{"A"}$$

$$SDC_1 := \begin{cases} \text{"A"} & \text{if } S_{d1} < 0.067 \\ \text{"B"} & \text{if } 0.067 \le S_{d1} < 0.133 \\ \text{"C"} & \text{if } 0.133 \le S_{d1} < 0.20 \\ \text{"D"} & \text{if } 0.2 \le S_{d1} \end{cases} \qquad SDC_1 = \text{"B"}$$

$SDC := \max(SDC_s, SDC_1)$

$Result := if(S_1 \ge 75\%, \text{"E"}, SDC)$ $\quad Result = \text{"B"}$ *Seismic Design Category B*

$R_1 := 3.5$ $\quad \Omega_{o1} := 3$ $\quad C_{d1} := 3$ Ordinary Moment Frames (ASCE 7-10)

$\rho := 1.0$ *Redundancy For Seismic Design Category B*

$$C_{s1} := \frac{S_{ds}}{\frac{R_1}{I_E}} \qquad C_{s1} = 0.025$$

$$Cs_{max1} := \begin{cases} \dfrac{S_{d1}}{T \cdot \left(\frac{R_1}{I_E}\right)} & \text{if } T \le T_L \\ \dfrac{S_{d1} \cdot T_L}{T^2 \cdot \left(\frac{R_1}{I_E}\right)} & \text{if } T > T_L \end{cases} \qquad Cs_{max1} = 0.084$$

$$Cs_{min1} := \begin{cases} 0.01 & \text{if } S_1 < 60\% \\ \dfrac{0.5 \cdot S_1}{\left(\frac{R_1}{I_E}\right)} & \text{if } S_1 \ge 60\% \end{cases} \qquad Cs_{min1} = 0.01$$

$$Cs_1 := \begin{cases} C_{s1} & \text{if } Cs_{min1} < C_{s1} < Cs_{max1} \\ Cs_{min1} & \text{if } C_{s1} < Cs_{min1} \\ Cs_{max1} & \text{if } Cs_{max1} \le C_{s1} \end{cases} \qquad Cs_1 = 0.025$$

Effective Roof Seismic Weight

$W_{roof} := DLr \cdot \left[\left(Lu_L - 2w_{thk}\right) \cdot \left(Lu_t - 2w_{thk}\right)\right]$ $\quad W_{roof} = 83.43 \cdot k$

Effective Longitudinal Wall Seismic Weight

$W_{dlt} := W_w \cdot \left[\left(2 \cdot Lu_L\right) \cdot \left(h_b\right)\right]$ $\quad W_{dlt} = 4.2 \cdot k$

Effective Transverse Wall Seismic Weight

$W_{dlL} := W_w \cdot \left[\left(2 \cdot Lu_t\right) \cdot \left(h_b\right)\right]$ $\quad W_{dlL} = 2.44 \cdot k$

Total Mech. Unit Weight

$W_{mech} := 1100lbf + 750lbf + 70lbf + 200lbf$

$$W_m := \begin{cases} W_{mech} & \text{if } P_f \le 30psf \\ W_{mech} + \left(0.2 \cdot P_f \cdot Lu_L \cdot Lu_t\right) & \text{if } P_f > 30psf \end{cases}$$

$W_{mech} = 2.12 \cdot k$

$W_m = 2.12 \cdot k$

Total Weight of Building

$W_{bldg} := W_m + W_{roof} + W_w \cdot \left[\left(2 \cdot Lu_L + 2 \cdot Lu_t\right) \cdot \left(H_b\right)\right]$ $W_{bldg} = 195.76 \cdot k$

Controlling Lateral Loading:

Transverse Lateral Loading:

$W_t := W_{roof} + W_{dlt} + W_m = 89.752 \cdot k$ Seismic Wt.

$Q_{Et} := C_{s1} \cdot W_t$ $Q_{Et} = 2.22 \cdot k$

$E_{ht} := Q_{Et} \cdot \rho$ $E_{ht} = 2.22 \cdot k$

$V_{st.ASD} := 0.7E_{ht}$ $V_{st.ASD} = 1.56 \cdot k$ (Seismic - ASD)

$V_{st.LRFD} := E_{ht}$ $V_{st.LRFD} = 2.22 \cdot k$ (Seismic - LRFD)

$V_{Wt.ASD} := .6 \cdot \left(2.V_{2WT}\right)$ $V_{Wt.ASD} = 8.94 \cdot k$ (Wind - ASD)

$V_{Wt.LRFD} := \left(2.V_{2WT}\right)$ $V_{Wt.LRFD} = 14.89 \cdot k$ (Wind - LRFD)

$V_{Lut.ASD} := \max\left(V_{st.ASD}, V_{Wt.ASD}\right)$ $V_{Lut.ASD} = 8.94 \cdot k$

$V_{Lut.LRFD} := \max\left(V_{st.LRFD}, V_{Wt.LRFD}\right)$ $V_{Lut.LRFD} = 14.89 \cdot k$

Longitudinal Lateral Loading:

$W_L := W_{roof} + W_{dlL} + W_m = 87.987 \cdot k$ Seismic Wt.

$Q_{EL} := C_{s1} \cdot W_L$ $Q_{EL} = 2.18 \cdot k$

$E_{hL} := Q_{EL} \cdot \rho$ $E_{hL} = 2.18 \cdot k$

$V_{sL.ASD} := .7E_{hL}$ $V_{sL.ASD} = 1.53 \cdot k$ (Seismic - ASD)

$V_{sL.LRFD} := E_{hL}$ $V_{sL.LRFD} = 2.18 \cdot k$ (Seismic - LRFD)

$V_{WL.ASD} := .6 \cdot \left(2.V_{1WL}\right)$ $V_{WL.ASD} = 15.41 \cdot k$ (Wind - ASD)

$V_{WL.LRFD} := 2.V_{1WL}$ $V_{WL.LRFD} = 25.68 \cdot k$ (Wind - LRFD)

$V_{LuL.ASD} := \max\left(V_{sL.ASD}, V_{WL.ASD}\right)$ $V_{LuL.ASD} = 15.41 \cdot k$

$V_{LuL.LRFD} := \max\left(V_{sL.LRFD}, V_{WL.LRFD}\right)$ $V_{LuL.LRFD} = 25.68 \cdot k$

Controlling Vertical Loading:

Strength Design Load Combinations (LRFD):

$LC1_S := 1.4DLr$	$LC1_S = 35 \cdot psf$	§2.3.2 - LRFD Load Combination 1
$LC2_S := 1.2 \cdot DLr + 0.5P_f$	$LC2_S = 40 \cdot psf$	§2.3.2 - LRFD Load Combination 2
$LC2a_S := 1.2 \cdot DLr + 0.5 \cdot LLr$	$LC2a_S = 40 \cdot psf$	§2.3.2 - LRFD Load Combination 2
$LC3_S := 1.2 \cdot DLr + 1.6 \cdot LLr + 0.5Pw_{CCd}$	$LC3_S = 70 \cdot psf$	§2.3.2 - LRFD Load Combination 3

$LC3a_S := 1.2 \cdot DLr + 1.6 \cdot P_f + 0.5 \cdot Pw_{CCd}$	$LC3a_S = 70 \cdot psf$	§2.3.2 - LRFD Load Combination 3	Controls (Downward)
$LC4_S := 1.2 \cdot DLr + 1.0 \cdot Pw_{CCd} + 0.5 \cdot P_f$	$LC4_S = 56 \cdot psf$	§2.3.2 - LRFD Load Combination 4	
$LC4a_S := 1.2 \cdot DLr + 1.0 \cdot Pw_{CCd} + 0.5 \cdot LLr$	$LC4a_S = 56 \cdot psf$	§2.3.2 - LRFD Load Combination 4	
$LC5_S := (1.2 + 0.2 \cdot S_{ds}) \cdot DLr + 0.2 \cdot P_f$	$LC5_S = 34.43 \cdot psf$	§2.3.2 - LRFD Load Combination 5	
$LC6_S := 0.9 \cdot DLr + 1.0 \cdot Pw_{CCu}$	$LC6_S = -18.259 \cdot psf$	§2.3.2 - LRFD Load Combination 6	Controls (Uplift)
$LC7_S := (0.9 - 0.2 \cdot S_{ds}) \cdot DLr$	$LC7_S = 22.067 \cdot psf$	§2.3.2 - LRFD Load Combination 7	

Allowable Stress Design Load Combinations (ASD):

$LC1_A := 1.0DLr$	$LC1_A = 25 \cdot psf$	§2.4.1 - ASD Load Combination 1	
$LC2_A := 1.0 \cdot DLr$	$LC2_A = 25 \cdot psf$	§2.4.1 - ASD Load Combination 2	
$LC3_A := 1.0 \cdot DLr + 1.0 \cdot LLr$	$LC3_A = 45 \cdot psf$	§2.4.1 - ASD Load Combination 3	
$LC3a_A := 1.0 \cdot DLr + 1.0 \cdot P_f$	$LC3a_A = 45 \cdot psf$	§2.4.1 - ASD Load Combination 3	
$LC4_A := 1.0 \cdot DLr + 0.75 \cdot LLr$	$LC4_A = 40 \cdot psf$	§2.4.1 - ASD Load Combination 4	
$LC4a_A := 1.0 \cdot DLr + 0.75 \cdot P_f$	$LC4a_A = 40 \cdot psf$	§2.4.1 - ASD Load Combination 4	
$LC5_A := 1.0 \cdot DLr + 0.6 \cdot Pw_{CCd}$	$LC5_A = 34.6 \cdot psf$	§2.4.1 - ASD Load Combination 5	
$LC5a_A := (1.0 + 0.14 \cdot S_{ds}) \cdot DLr$	$LC5a_A = 25.3 \cdot psf$	§2.4.1 - ASD Load Combination 5	
$LC6a_A := 1.0 \cdot DLr + 0.45 \cdot Pw_{CCd} + 0.75 \cdot LLr$	$LC6a_A = 47.2 \cdot psf$	§2.4.1 - ASD Load Combination 6a	
$LC6a_{1A} := 1.0 \cdot DLr + 0.45 \cdot Pw_{CCd} + 0.75 \cdot P_f$	$LC6a_{1A} = 47.2 \cdot psf$	§2.4.1 - ASD Load Combination 6a	Controls (Downward)
$LC6b_A := (1.0 + 0.10 \cdot S_{ds}) \cdot DLr + 0.75 \cdot P_f$	$LC6b_A = 40.22 \cdot psf$	§2.4.1 - ASD Load Combination 6b	
$LC7_A := 0.6 \cdot DLr + 0.6 \cdot Pw_{CCu}$	$LC7_A = -9.46 \cdot psf$	§2.4.1 - ASD Load Combination 7	Controls (Uplift)
$LC8_A := (0.6 - 0.14 \cdot S_{ds}) \cdot DLr$	$LC8_A = 14.7 \cdot psf$	§2.4.1 - ASD Load Combination 8	

Critical Vertical Loads:

$$TL := \max(LC1_S, LC2_S, LC2a_S, LC3_S, LC3a_S, LC4_S, LC4a_S, LC5_S, LC6_S, LC7_S)$$

$TL = 70 \cdot psf$ (LRFD)

$$TL_{serv} := \max(LC1_A, LC2_A, LC3_A, LC3a_A, LC4_A, LC4a_A, LC5_A, LC5a_A, LC6a_A, LC6a_{1A}, LC6b_A, LC7_A, LC8_A)$$

$TL_{serv} = 47.2 \cdot psf$ (ASD)

$$TL_{userv} := \min(LC1_A, LC2_A, LC3_A, LC3a_A, LC4_A, LC4a_A, LC5_A, LC5a_A, LC6a_A, LC6a_{1A}, LC6b_A, LC7_A, LC8_A)$$

$TL_{userv} = -9.5 \cdot psf$ (ASD)

LATERAL LOAD DISTRIBUTION:

Critical Allowable Design Loads (ASD):

$V_{Lut.ASD} = 8.94 \cdot k$ ***Governing Transverse Load (ASD)***

$V_{LuL.ASD} = 15.41 \cdot k$ ***Governing Longitudinal Load (ASD)***

Critical Strength Design Loads (LRFD):

$V_{Lut.LRFD} = 14.89 \cdot k$ ***Governing Transverse Load (LRFD)***

$V_{LuL.LRFD} = 25.68 \cdot k$ ***Governing Longitudinal Load (LRFD)***

$$V1_{ASD} := \frac{V_{Lut.ASD}}{2} = 4.468 \cdot k \qquad V1_{LRFD} := \frac{V_{Lut.LRFD}}{2} = 7.447 \cdot k$$

$$V2_{ASD} := \frac{V_{LuL.ASD}}{2} = 7.705 \cdot k \qquad V2_{LRFD} := \frac{V_{LuL.LRFD}}{2} = 12.842 \cdot k$$

See RISA 3D model results

DIAPHRAGM & COMPONENT DESIGN / ANALYSIS:

Roof Deck Check:

Use 1.5B 22 Gauge Metal Deck, Over 3 spans

VERTICAL LOADS:

$w_{allow} := 218psf$ $w_{allow} = 218 \cdot psf$ Allowable Uniform Deck Load in Accordance with SDI

$check := if\left[w_{allow} \geq \left(TL_{serv}\right), "OK", "Not OK"\right]$ check = "OK"

LATERAL LOAD @ NEW MOMENT FRAME HORIZONTAL LOAD COLLECTOR BEAM (Diaphragm Check):

Main Building Diaphragm:

$v_{unit} := \frac{V2_{ASD}}{Lu_t}$ $v_{unit} = 167.6 \cdot plf$ Maximum unit shear @ diaphragm boundary

$v_{allow} := 275plf$ $v_{allow} = 275 \cdot plf$ Allowable Diaphragm Shear Strength in Accordance with SDI for 36/4 Pattern (36" Coverage) with #10 Tek screws @ 12" o.c. (36/4 Pattern) and fastened at sidelaps using (1) - #10 TEK screws

$check := if\left(v_{allow} \geq v_{unit}, "OK", "Not OK"\right)$ check = "OK"

Roof diaphragm to be 1.5" Type B, 22 gauge metal deck continuous over 3 spans minimum, Deck shall be fastened at supports using 5/8" Puddle Welds (36/4 Pattern) and fastened at sidelaps using (1) - #10 TEK screws between truss bays (ea. span) unless otherwise noted on framing plan.

ROOF TRUSS AND TRUSS GIRDER DESIGN:

Allowable Loads and Physical Properties from Vulcraft Steel Joists and Joist Girders Catalogue
http://www.vulcraft.com/joists-joist-girders/joist-catalog *Total Dead Load Applied to Joist J1*

Typical Joist: J1

$Joist1_{Length} := 30.25ft$

$S_{j2} := 6.08ft$

$Spacing_{Joists} := S_{j2} = 6.08 \cdot ft$

$Roof_{LL} := LLr = 20 \cdot psf$

$Roof_{DL} := DLr = 25 \cdot psf$

$Roof_{DLsolar} := DLs = 10 \cdot psf$

$Roof_{SL} := Pf_{min} = 20 \cdot psf$

$Roof_{drift} := P_{dt} = 26.207 \cdot psf$

Load Capacities:
Try 24K9 joists with length = 31 ft

$Allow_{TL} := 510plf$

$Allow_{LL} := 379plf$

$DL := Spacing_{Joists} \cdot Roof_{DL} = 152 \cdot plf$ *Total Dead Load Applied to Joist J1*

$DLs := Spacing_{Joists} \cdot Roof_{DLsolar} = 60.8 \cdot plf$ *Total Future Dead Load Applied to Joist J1*

$SL := Spacing_{Joists} \cdot Roof_{SL} = 121.6 \cdot plf$ *Total Live Load Applied to Joist J1*

$Drift := Spacing_{Joists} \cdot Roof_{drift} = 159.341 \cdot plf$ *Total Live Load Applied to Joist J1*

$Total := DL + DLs + SL + Drift = 493.741 \cdot plf$ *Total Load Applied to Joist J1*

$Check_{J1} := if\left[Total < Allow_{TL}, if\left[(SL + Drift) < Allow_{LL}, "Joist\ OK", "Redesign"\right], "Redesign"\right]$

$Check_{J1} = "Joist\ OK"$

Typical Joist: J2

$Joist4_{Length} := 15.5ft$

$Spacing_{Joists} := S_j = 5 \cdot ft$

$Roof_{LL} := LLr = 20 \cdot psf$

$Roof_{DL} := DLr = 25 \cdot psf$

$Roof_{SL} := Pf_{min} = 20 \cdot psf$

$Roof_{drift1} := P_{dL} = 35.146 \cdot psf$

Load Capacities:
(From Vulcraft Steel Joists and Joist Girders Catalogue)
Try 14KCS3 joists with length = 16 ft

$Allow_{TL} := 550plf$

$Allow_{LL} := 467plf$

$DL := Spacing_{Joists} \cdot Roof_{DL} = 125 \cdot plf$ *Total Dead Load Applied to Joist J2*

$SL := Spacing_{Joists} \cdot Roof_{SL} = 100 \cdot plf$ *Total Live Load Applied to Joist J2*

$Drift1 := Spacing_{Joists} \cdot Roof_{drift1} = 175.732 \cdot plf$ *Total Live Load Applied to Joist J2*

$Total := DL + SL + Drift1 = 400.732 \cdot plf$ *Total Load Applied to Joist J2*

$Check_{J2} := if\left[Total < Allow_{TL}, if\left[(SL + Drift1) < Allow_{LL}, "Joist\ OK", "Redesign"\right], "Redesign"\right]$

$Check_{J2} = "Joist\ OK"$

Check joists for mechanical unit loads:

$Max_{Load} := 1100lbf$ $Length_{Unit} := 7.33ft$ $Width_{unit} := 5ft$

$Num_{Joists} := 2$

$Load_{Joists} := \frac{Max_{Load}}{Num_{Joists}} = 550 \cdot lbf$ $Linear_{Load} := \frac{Load_{Joists}}{Length_{Unit}} = 75.034 \cdot plf$

$Total_{Mech} := Total + Linear_{Load} = 475.766 \cdot plf$

$check_{mech} := if(Total_{Mech} < Allow_{TL}, "Joist OK", "Redesign for Mech Loads")$

$check_{mech} = "Joist OK"$

Typical Joist: J3

Load Capacities:
(From Vulcraft Steel Joists and Joist Girders Catalogue)
Try 14K3 joists with length = 16 ft

$Joist4_{Length} := 15.5ft$

$Spacing_{Joists} := S_j = 5 \cdot ft$

$Roof_{LL} := LLr = 20 \cdot psf$

$Roof_{DL} := DLr = 25 \cdot psf$

$Roof_{SL} := Pf_{min} = 20 \cdot psf$

$Roof_{drift1} := P_{dL} = 35.146 \cdot psf$

$Allow_{TL} := 550plf$

$Allow_{LL} := 467plf$

$DL := Spacing_{Joists} \cdot Roof_{DL} = 125 \cdot plf$ *Total Dead Load Applied to Joist J3*

$SL := Spacing_{Joists} \cdot Roof_{SL} = 100 \cdot plf$ *Total Live Load Applied to Joist J3*

$Drift1 := Spacing_{Joists} \cdot Roof_{drift1} = 175.732 \cdot plf$ *Total Live Load Applied to Joist J3*

$Total := DL + SL + Drift = 384.341 \cdot plf$ *Total Load Applied to Joist J3*

$Check_{J3} := if[Total < Allow_{TL}, if[(SL + Drift1) < Allow_{LL}, "Joist OK", "Redesign"], "Redesign"]$

$Check_{J3} = "Joist OK"$

Typical Joist: J4

Load Capacities:
(From Vulcraft Steel Joists and Joist Girders Catalogue)
Try 24LH07 joists with length = 40 ft

$Joist4_{Length} := 40ft$

$S_{j1} := 4.67ft$

$Spacing_{Joists} := S_{j1} = 4.67 \cdot ft$

$Roof_{LL} := LLr = 20 \cdot psf$

$Roof_{DL} := DLr = 25 \cdot psf$

$Roof_{SL} := Pf_{min} = 20 \cdot psf$

$Roof_{drift} := P_{dt} = 26.207 \cdot psf$

$Allow_{TL} := 516plf$

$Allow_{LL} := 297plf$

$DL := Spacing_{Joists} \cdot Roof_{DL} = 116.75 \cdot plf$ *Total Dead Load Applied to Joist J4*

$DLs := Spacing_{Joists} \cdot Roof_{DLsolar} = 46.7 \cdot plf$ *Total Future Dead Load Applied to Joist J4*

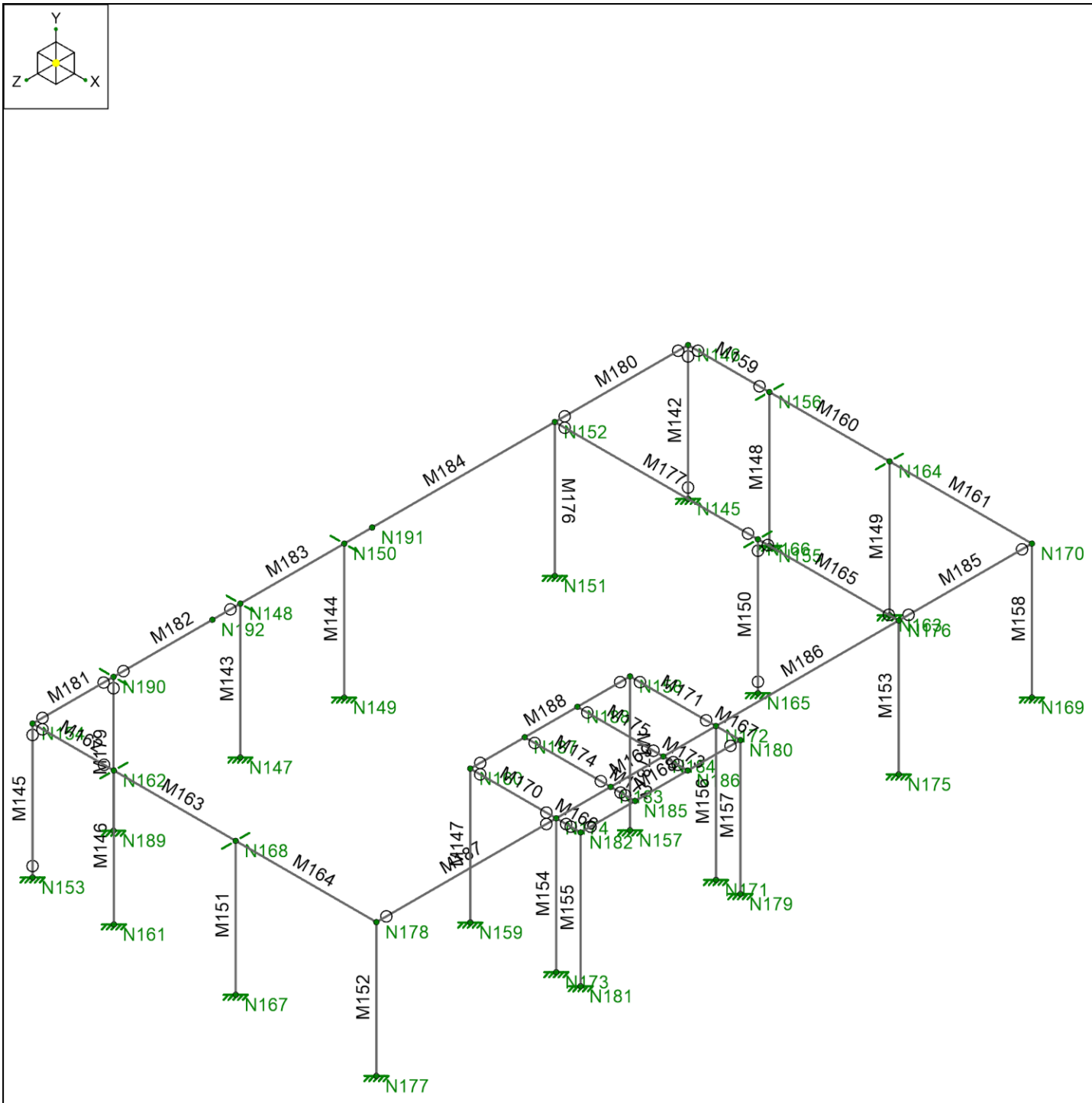
$SL := Spacing_{Joists} \cdot Roof_{SL} = 93.4 \cdot plf$ *Total Live Load Applied to Joist J4*

$Drift := Spacing_{Joists} \cdot Roof_{drift} = 122.389 \cdot plf$ *Total Live Load Applied to Joist J4*

$Total := DL + DLs + SL + Drift = 379.239 \cdot plf$ *Total Load Applied to Joist J4*

$Check_{J4} := if\left[Total < Allow_{TL}, if\left[(SL + Drift) < Allow_{LL}, "Joist\ OK", "Redesign"\right], "Redesign"\right]$

$Check_{J4} = "Joist\ OK"$



Core States Group	Lee's Summit	SK-1
J. Perez		Dec 17, 2020
JPM.27135.001		JPM-27135.001 Lee's Summit, M…

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M142	N145	N146	180	Gravity Col	Column	Tube	A500 Gr.B Rect	Typical
2	M143	N147	N148	270	Moment Col	Column	Tube	A500 Gr.B Rect	Typical
3	M144	N149	N150	270	Moment Col	Column	Tube	A500 Gr.B Rect	Typical
4	M145	N153	N154	180	Pipe Col	Column	Pipe	A500 Gr.B RND	Typical
5	M146	N161	N162	180	Moment Col	Column	Tube	A500 Gr.B Rect	Typical
6	M147	N159	N160	180	Gravity Col	Column	Tube	A500 Gr.B Rect	Typical
7	M148	N155	N156	180	Moment Col	Column	Tube	A500 Gr.B Rect	Typical
8	M149	N163	N164	180	Moment Col	Column	Tube	A500 Gr.B Rect	Typical
9	M150	N165	N166	180	Gravity Col	Column	Tube	A500 Gr.B Rect	Typical
10	M151	N167	N168	180	HSS6x6 Moment Col	Column	SquareTube	A500 Gr.B Rect	Typical
11	M152	N177	N178	180	Moment Col	Column	Tube	A500 Gr.B Rect	Typical
12	M153	N175	N176	270	Moment Col	Column	Tube	A500 Gr.B Rect	Typical
13	M154	N173	N174	270	Moment Col	Column	Tube	A500 Gr.B Rect	Typical
14	M155	N181	N182	180	Gravity Col	Column	Tube	A500 Gr.B Rect	Typical
15	M156	N171	N172	270	Moment Col	Column	Tube	A500 Gr.B Rect	Typical
16	M157	N179	N180	180	Gravity Col	Column	Tube	A500 Gr.B Rect	Typical
17	M158	N169	N170	180	Moment Col	Column	Tube	A500 Gr.B Rect	Typical
18	M159	N146	N156		W14	Beam	Wide Flange	A992	Typical
19	M160	N156	N164		W16	Beam	Wide Flange	A992	Typical
20	M161	N164	N170		W16	Beam	Wide Flange	A992	Typical
21	M162	N154	N162		W14	Beam	Wide Flange	A992	Typical
22	M163	N162	N168		W16	Beam	Wide Flange	A992	Typical
23	M164	N168	N178		W16	Beam	Wide Flange	A992	Typical
24	M165	N166	N176		W24	Beam	Wide Flange	A992	Typical
25	M166	N182	N174		W12	Beam	Wide Flange	A992	Typical
26	M167	N172	N180		W12	Beam	Wide Flange	A992	Typical
27	M168	N182	N180		W12	Beam	Wide Flange	A992	Typical
28	M169	N174	N172		W16	Beam	Wide Flange	A992	Typical
29	M170	N160	N174		W8X18	Beam	Wide Flange	A992	Typical
30	M171	N158	N172		W8X18	Beam	Wide Flange	A992	Typical
31	M172	N183	N185		W8X18	Beam	Wide Flange	A992	Typical
32	M173	N184	N186		W8X18	Beam	Wide Flange	A992	Typical
33	M174	N187	N183		W8X18	Beam	Wide Flange	A992	Typical
34	M175	N188	N184		W8X18	Beam	Wide Flange	A992	Typical
35	M176	N152	N151	270	Moment Col	Column	Tube	A500 Gr.B Rect	Typical
36	M177	N152	N166		W24	Beam	Wide Flange	A992	Typical
37	M178	N158	N157	180	Gravity Col	Column	Tube	A500 Gr.B Rect	Typical
38	M179	N189	N190	180	Gravity Col	Column	Tube	A500 Gr.B Rect	Typical
39	M180	N146	N152		W14	Beam	Wide Flange	A992	Typical
40	M181	N154	N190		W14	Beam	Wide Flange	A992	Typical
41	M182	N190	N148		W14	Beam	Wide Flange	A992	Typical
42	M183	N148	N150		W16	Beam	Wide Flange	A992	Typical
43	M184	N150	N152		W18x46	Beam	Wide Flange	A992	Typical
44	M185	N170	N176		W14	Beam	Wide Flange	A992	Typical
45	M186	N176	N172		W16	Beam	Wide Flange	A992	Typical
46	M187	N174	N178		W16	Beam	Wide Flange	A992	Typical
47	M188	N158	N160		W16	Beam	Wide Flange	A992	Typical

Load Combinations

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Wind Deflection X	Yes	Y	DL	0.9	WLX	0.42								
2	Wind Deflection Z	Yes	Y	DL	0.9	WLZ	0.42								
3	IBC 16-1 (a)	Yes	Y	DL	1.4	NLX	1								
4	IBC 16-1 (b)	Yes	Y	DL	1.4	NLZ	1								
5	IBC 16-1 (c)	Yes	Y	DL	1.4	NLX	-1								
6	IBC 16-1 (d)	Yes	Y	DL	1.4	NLZ	-1								
7	IBC 16-2 (a) (a)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	RLL	0.5	NLX	1		
8	IBC 16-2 (a) (b)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	RLL	0.5	NLZ	1		

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
9	IBC 16-2 (a) (c)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	RLL	0.5	NLX	-1		
10	IBC 16-2 (a) (d)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	RLL	0.5	NLZ	-1		
11	IBC 16-2 (b) (a)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	SL	0.5	SLN	0.5	NLX	1
12	IBC 16-2 (b) (b)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	SL	0.5	SLN	0.5	NLZ	1
13	IBC 16-2 (b) (c)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	SL	0.5	SLN	0.5	NLX	-1
14	IBC 16-2 (b) (d)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	SL	0.5	SLN	0.5	NLZ	-1
15	IBC 16-2 (c) (a)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	NLX	1				
16	IBC 16-2 (c) (b)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	NLZ	1				
17	IBC 16-2 (c) (c)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	NLX	-1				
18	IBC 16-2 (c) (d)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	NLZ	-1				
19	IBC 16-3 (a) (a)	Yes	Y	DL	1.2	RLL	1.6	LL	0.5	LLS	1	NLX	1		
20	IBC 16-3 (a) (b)	Yes	Y	DL	1.2	RLL	1.6	LL	0.5	LLS	1	NLZ	1		
21	IBC 16-3 (a) (c)	Yes	Y	DL	1.2	RLL	1.6	LL	0.5	LLS	1	NLX	-1		
22	IBC 16-3 (a) (d)	Yes	Y	DL	1.2	RLL	1.6	LL	0.5	LLS	1	NLZ	-1		
23	IBC 16-3 (c) (a)	Yes	Y	DL	1.2	SL	1.6	SLN	1.6	LL	0.5	LLS	1	NLX	1
24	IBC 16-3 (c) (b)	Yes	Y	DL	1.2	SL	1.6	SLN	1.6	LL	0.5	LLS	1	NLZ	1
25	IBC 16-3 (c) (c)	Yes	Y	DL	1.2	SL	1.6	SLN	1.6	LL	0.5	LLS	1	NLX	-1
26	IBC 16-3 (c) (d)	Yes	Y	DL	1.2	SL	1.6	SLN	1.6	LL	0.5	LLS	1	NLZ	-1
27	ASCE Strength 3 (b) (a)	Yes	Y	DL	1.2	RLL	1.6	WLX	0.5						
28	ASCE Strength 3 (b) (b)	Yes	Y	DL	1.2	RLL	1.6	WLZ	0.5						
29	ASCE Strength 3 (b) (c)	Yes	Y	DL	1.2	RLL	1.6	WLX	-0.5						
30	ASCE Strength 3 (b) (d)	Yes	Y	DL	1.2	RLL	1.6	WLZ	-0.5						
31	ASCE Strength 3 (d) (a)	Yes	Y	DL	1.2	SL	1.6	SLN	1.6	WLX	0.5				
32	ASCE Strength 3 (d) (b)	Yes	Y	DL	1.2	SL	1.6	SLN	1.6	WLZ	0.5				
33	ASCE Strength 3 (d) (c)	Yes	Y	DL	1.2	SL	1.6	SLN	1.6	WLX	-0.5				
34	ASCE Strength 3 (d) (d)	Yes	Y	DL	1.2	SL	1.6	SLN	1.6	WLZ	-0.5				
35	ASCE Strength 3 (f) (a)	Yes	Y	DL	1.2	WLX	0.5								
36	ASCE Strength 3 (f) (b)	Yes	Y	DL	1.2	WLZ	0.5								
37	ASCE Strength 3 (f) (c)	Yes	Y	DL	1.2	WLX	-0.5								
38	ASCE Strength 3 (f) (d)	Yes	Y	DL	1.2	WLZ	-0.5								
39	ASCE Strength 4 (a) (a)	Yes	Y	DL	1.2	WLX	1	LL	0.5	LLS	1	RLL	0.5		
40	ASCE Strength 4 (a) (b)	Yes	Y	DL	1.2	WLZ	1	LL	0.5	LLS	1	RLL	0.5		
41	ASCE Strength 4 (a) (c)	Yes	Y	DL	1.2	WLX	-1	LL	0.5	LLS	1	RLL	0.5		
42	ASCE Strength 4 (a) (d)	Yes	Y	DL	1.2	WLZ	-1	LL	0.5	LLS	1	RLL	0.5		
43	ASCE Strength 4 (b) (a)	Yes	Y	DL	1.2	WLX	1	LL	0.5	LLS	1	SL	0.5	SLN	0.5
44	ASCE Strength 4 (b) (b)	Yes	Y	DL	1.2	WLZ	1	LL	0.5	LLS	1	SL	0.5	SLN	0.5
45	ASCE Strength 4 (b) (c)	Yes	Y	DL	1.2	WLX	-1	LL	0.5	LLS	1	SL	0.5	SLN	0.5
46	ASCE Strength 4 (b) (d)	Yes	Y	DL	1.2	WLZ	-1	LL	0.5	LLS	1	SL	0.5	SLN	0.5
47	ASCE Strength 4 (c) (a)	Yes	Y	DL	1.2	WLX	1	LL	0.5	LLS	1				
48	ASCE Strength 4 (c) (b)	Yes	Y	DL	1.2	WLZ	1	LL	0.5	LLS	1				
49	ASCE Strength 4 (c) (c)	Yes	Y	DL	1.2	WLX	-1	LL	0.5	LLS	1				
50	ASCE Strength 4 (c) (d)	Yes	Y	DL	1.2	WLZ	-1	LL	0.5	LLS	1				
51	ASCE Strength 5 (a)	Yes	Y	DL	0.9	WLX	1								
52	ASCE Strength 5 (b)	Yes	Y	DL	0.9	WLZ	1								
53	ASCE Strength 5 (c)	Yes	Y	DL	0.9	WLX	-1								
54	ASCE Strength 5 (d)	Yes	Y	DL	0.9	WLZ	-1								

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N145	max	0.01	31	4.424	32	0.008	34	0	54	0	46	0	54
2		min	-0.011	33	0.834	54	-0.005	44	0	1	0	52	0	1
3	N147	max	0	52	14.925	34	2.249	52	18.567	52	0.002	46	0	46
4		min	0	46	3.043	52	-2.518	46	-21.268	46	0	52	0	52
5	N148	max	0	52	0	54	0	54	0	54	0	54	0	54
6		min	0	46	0	1	0	1	0	1	0	1	0	1
7	N149	max	0	52	33.034	32	2.003	52	17.383	52	0.003	52	0	46
8		min	0	46	11.446	54	-3.835	46	-28.098	46	-0.009	46	0	52
9	N150	max	0.002	46	0	54	0	54	0	54	0	54	0	54

Envelope Node Reactions (Continued)

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
10		min	0	52	0	1	0	1	0	1	0	1	0	1
11	N151	max	0.006	46	27.465	32	3.643	44	25.56	44	0.005	52	0.036	52
12		min	-0.002	52	7.75	54	-1.54	54	-15.744	54	-0.014	46	-0.103	46
13	N153	max	0.037	43	8.624	31	0.015	46	0	54	0	54	0	54
14		min	-0.037	45	2.933	53	-0.013	44	0	1	0	1	0	1
15	N155	max	4.276	45	9.108	33	0	46	0	46	0.114	52	33.929	51
16		min	-4.059	51	-1.671	51	0	52	0	52	-0.136	46	-35.399	45
17	N156	max	0	54	0	54	0.041	46	0	54	0	54	0	54
18		min	0	1	0	1	-0.034	52	0	1	0	1	0	1
19	N157	max	0.009	30	15.577	32	0	52	0.002	32	0	54	-0.071	52
20		min	0.004	52	5.433	52	0	34	0	54	0	1	-0.185	34
21	N159	max	0.003	40	15.589	32	0	34	0.004	32	0	54	0.036	54
22		min	-0.002	54	5.438	54	0	52	0	54	0	1	-0.061	44
23	N161	max	5.747	45	4.082	33	0	46	0	46	0.165	52	48.812	39
24		min	-5.77	39	-3.283	39	0	52	0	52	-0.195	46	-48.957	45
25	N162	max	0	54	0	54	0.058	46	0	54	0	54	0	54
26		min	0	1	0	1	-0.049	52	0	1	0	1	0	1
27	N163	max	4.838	45	13.245	31	0.002	46	0.01	46	0.603	46	37.341	51
28		min	-4.72	51	2.436	53	-0.002	52	-0.009	52	-0.504	52	-38.143	45
29	N164	max	0	54	0	54	0.136	52	0	54	0	54	0	54
30		min	0	1	0	1	-0.162	46	0	1	0	1	0	1
31	N165	max	0	44	14.356	34	0	32	0	54	0	54	0	54
32		min	0	34	3.485	53	0	46	0	1	0	1	0	1
33	N166	max	0	54	0	54	0	46	0	54	0	54	0	54
34		min	0	1	0	1	0	32	0	1	0	1	0	1
35	N167	max	1.66	41	4.542	31	0.002	46	0.011	46	0.287	46	12.543	39
36		min	-1.653	39	-0.429	53	-0.002	52	-0.009	52	-0.242	52	-12.588	45
37	N168	max	0	54	0	54	0.145	52	0	54	0	54	0	54
38		min	0	1	0	1	-0.171	46	0	1	0	1	0	1
39	N169	max	3.866	53	7.442	31	0.272	52	4.244	52	0.929	46	34.685	43
40		min	-4.204	43	-1.546	53	-0.321	42	-5.071	46	-0.778	52	-32.843	53
41	N171	max	-0.004	54	26.079	32	1.687	52	15.106	52	0.233	52	-0.063	52
42		min	-0.015	28	9.22	54	-3.618	46	-26.305	46	-0.318	46	-0.236	34
43	N173	max	0.008	40	20.696	34	1.991	52	16.704	52	0.003	54	0.078	54
44		min	-0.005	54	5.847	52	-2.132	42	-18.716	46	-0.067	28	-0.132	44
45	N175	max	0.006	46	23.03	32	3.381	44	23.537	44	0.08	42	0.037	52
46		min	-0.002	52	6.481	54	-1.112	54	-12.931	54	-0.015	52	-0.103	46
47	N177	max	5.518	53	20.084	31	0.266	52	4.339	52	0.905	46	47.885	43
48		min	-5.499	43	3.881	53	-0.302	42	-5.137	46	-0.765	52	-47.66	41
49	N179	max	-0.002	54	2.553	32	0.138	52	1.946	52	0.21	52	-0.023	52
50		min	-0.009	32	0.373	54	-0.195	46	-2.465	46	-0.275	46	-0.089	30
51	N181	max	0.004	40	2.355	32	0.12	52	1.85	52	0	54	0.036	54
52		min	-0.002	54	0.296	54	-0.139	42	-2.176	46	0	1	-0.061	44
53	N189	max	0	33	19.222	34	0.123	52	2.186	52	0	54	0	31
54		min	0	31	7.518	52	-0.137	54	-2.558	46	0	1	0	33
55	N190	max	0	33	0	54	0	54	0	54	0	54	0	54
56		min	0	31	0	1	0	1	0	1	0	1	0	1
57	Totals:	max	25.68	45	276.027	32	14.9	40						
58		min	-25.68	51	90.008	51	-14.9	54						

Envelope AISC 14th (360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M142	HSS6X6X4	0.031	15.5	32	0	15.5	y	54	141.63	216.936	38.64	38.64	1	H1-1b*
2	M143	HSS10X6X6	0.202	0	46	0.016	15.5	y	46	291.038	430.56	81.765	116.61	2.244	H1-1b
3	M144	HSS10X6X6	0.312	15.5	46	0.025	15.5	y	46	291.038	430.56	81.765	116.61	2.246	H1-1b
4	M145	HSS6.000X0.250	0.09	15.5	31	0	15.5		54	95.839	159.516	24.413	24.413	1	H1-1b*
5	M146	HSS10X6X6	0.427	0	45	0.037	15.5	y	45	291.038	430.56	81.765	116.61	2.238	H1-1b
6	M147	HSS6X6X4	0.11	15.5	32	0	15.5	y	44	141.63	216.936	38.64	38.64	1.656	H1-1b*

Envelope AISC 14th (360-10): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
7	M148	HSS10X6X6	0.316	0	45	0.028	15.5	y	45	291.038	430.56	81.765	116.61	2.25	H1-1b
8	M149	HSS10X6X6	0.338	0	45	0.032	15.5	y	45	291.038	430.56	81.765	116.61	2.268	H1-1b
9	M150	HSS6X6X4	0.101	15.5	34	0	15.5	y	54	141.63	216.936	38.64	38.64	1	H1-1b*
10	M151	HSS6X6X4	0.346	15.5	43	0.028	15.5	y	45	141.63	216.936	38.64	38.64	2.264	H1-1b
11	M152	HSS10X6X6	0.442	0	43	0.037	15.5	y	43	291.038	430.56	81.765	116.61	2.235	H1-1b
12	M153	HSS10X6X6	0.298	15.5	32	0.022	15.5	y	44	291.038	430.56	81.765	116.61	2.195	H1-1b
13	M154	HSS10X6X6	0.186	0	46	0.014	15.5	y	42	291.038	430.56	81.765	116.61	2.231	H1-1b
14	M155	HSS6X6X4	0.061	0	46	0.002	15.5	z	46	141.63	216.936	38.64	38.64	1.683	H1-1b
15	M156	HSS10X6X6	0.292	15.5	46	0.028	15.5	y	46	291.038	430.56	81.765	116.61	2.245	H1-1b
16	M157	HSS6X6X4	0.069	0	46	0.012	15.5	z	46	141.63	216.936	38.64	38.64	1.272	H1-1b
17	M158	HSS10X6X6	0.313	0	43	0.028	15.5	y	43	291.038	430.56	81.765	116.61	2.25	H1-1b
18	M159	W14X22	0.07	4.73	31	0.036	9.46	y	34	172.522	292.05	16.462	115.001	1	H1-1b
19	M160	W16X31	0.186	13.98	43	0.06	13.98	y	31	207.753	410.85	26.363	174.514	1.842	H1-1b
20	M161	W16X31	0.227	0	45	0.062	0	y	33	184.527	410.85	26.363	129.283	1.775	H1-1b
21	M162	W14X22	0.025	4.73	31	0.012	9.46	y	34	174.266	292.05	16.462	107.867	1	H1-1b
22	M163	W16X31	0.244	0	41	0.03	14.168	y	43	206.996	410.85	26.363	170.549	1.839	H1-1b
23	M164	W16X31	0.291	16.372	39	0.028	0	y	33	186.799	410.85	26.363	140.386	1.894	H1-1b
24	M165	W24X55	0.048	8.186	34	0.024	16.372	y	34	345.608	729	49.815	496.613	1	H1-1b
25	M166	W12X22	0.004	1.418	32	0.014	2.836	y	46	248.006	291.6	13.725	109.875	1.136	H1-1b
26	M167	W12X22	0.169	0	46	0.057	1.418	z	46	248.006	291.6	13.725	109.875	1.248	H1-1b
27	M168	W12X22	0.102	9.292	34	0.019	18.583	y	34	131.256	291.6	13.725	88.817	1	H1-1b
28	M169	W16X31	0.276	18.583	32	0.04	12.582	y	32	170.573	410.85	26.363	169.334	2.758	H1-1b
29	M170	W8X18	0.097	5	32	0.04	10	y	34	118.145	236.7	17.475	55.724	1.136	H1-1b
30	M171	W8X18	0.096	5	34	0.041	10	y	32	118.145	236.7	17.475	55.724	1.136	H1-1b
31	M172	W8X18	0.006	1.418	28	0.015	2.836	y	32	223.834	236.7	17.475	63.75	1.136	H1-1b
32	M173	W8X18	0.006	1.418	28	0.014	2.836	y	34	223.834	236.7	17.475	63.75	1.136	H1-1b
33	M174	W8X18	0.087	5	28	0.038	10	y	32	118.145	236.7	17.475	55.724	1.136	H1-1b
34	M175	W8X18	0.085	5	28	0.037	10	y	34	118.145	236.7	17.475	55.724	1.136	H1-1b
35	M176	HSS10X6X6	0.306	0	32	0.024	15.5	y	44	291.038	430.56	81.765	116.61	2.198	H1-1b
36	M177	W24X55	0.101	11.814	34	0.034	23.628	y	34	249.386	729	49.815	496.613	1	H1-1b
37	M178	HSS6X6X4	0.11	15.5	32	0	15.5	y	34	141.63	216.936	38.64	38.64	1.669	H1-1b*
38	M179	HSS6X6X4	0.136	15.5	34	0.003	15.5	z	46	141.63	216.936	38.64	38.64	1	H1-1b*
39	M180	W14X22	0.036	7.75	34	0.011	15.5	y	34	119.691	292.05	16.462	107.867	1	H1-1b
40	M181	W14X22	0.15	4.807	34	0.079	9.417	y	34	173.011	292.05	16.462	115.001	1	H1-1b
41	M182	W14X22	0.369	7.221	34	0.124	0	y	34	124.243	292.05	16.462	115.001	1	H1-1b
42	M183	W16X31	0.305	12.083	32	0.101	12.083	y	32	228.799	410.85	26.363	202.5	2.816	H1-1b
43	M184	W18X46	0.667	0	34	0.107	0	y	34	270.09	607.5	43.875	116.747	1.298	H1-1b
44	M185	W14X22	0.037	7.75	32	0.012	15.5	y	33	119.691	292.05	16.462	107.867	1	H1-1b
45	M186	W16X31	0.863	21.25	34	0.148	21.25	y	34	155.038	410.85	26.363	72.846	1.435	H1-1b
46	M187	W16X31	0.459	10.458	34	0.131	20.917	y	33	156.702	410.85	26.363	193.54	1	H1-1b
47	M188	W16X31	0.358	9.292	34	0.103	0	y	34	170.573	410.85	26.363	183.4	1	H1-1b

Envelope Member Section Forces

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
1	M142	1	max	4.424	32	0	54	0	54	0	54	0	54	0	54
2			min	0.834	54	0	1	0	1	0	1	0	1	0	1
3		2	max	4.424	32	0	54	0	54	0	54	0	54	0	54
4			min	0.834	54	0	1	0	1	0	1	0	1	0	1
5		3	max	4.424	32	0	54	0	54	0	54	0	54	0	54
6			min	0.834	54	0	1	0	1	0	1	0	1	0	1
7		4	max	4.424	32	0	54	0	54	0	54	0	54	0	54
8			min	0.834	54	0	1	0	1	0	1	0	1	0	1
9		5	max	4.424	32	0	54	0	54	0	54	0	54	0	54
10			min	0.834	54	0	1	0	1	0	1	0	1	0	1
11	M143	1	max	14.925	34	2.551	46	0	46	0.002	46	0	52	21.268	46
12			min	3.043	52	-2.257	52	0	52	0	52	0	46	-18.567	52
13		2	max	14.925	34	2.551	46	0	46	0.002	46	0	52	11.382	46
14			min	3.043	52	-2.257	52	0	52	0	52	0	46	-9.822	52

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
15		3	max	14.925	34	2.551	46	0	46	0.002	46	0	46	1.496	46
16			min	3.043	52	-2.257	52	0	52	0	52	0	52	-1.078	52
17		4	max	14.925	34	2.551	46	0	46	0.002	46	0	46	7.667	52
18			min	3.043	52	-2.257	52	0	52	0	52	0	52	-8.39	46
19		5	max	14.925	34	2.551	46	0	46	0.002	46	0	46	16.412	52
20			min	3.043	52	-2.257	52	0	52	0	52	0	52	-18.277	46
21	M144	1	max	33.034	32	3.893	46	0	46	0.003	52	0	52	28.098	46
22			min	11.446	54	-2.036	52	0	52	-0.009	46	0	46	-17.383	52
23		2	max	33.034	32	3.893	46	0	46	0.003	52	0	52	13.011	46
24			min	11.446	54	-2.036	52	0	52	-0.009	46	0	46	-9.493	52
25		3	max	33.034	32	3.893	46	0	46	0.003	52	0	46	-1.11	54
26			min	11.446	54	-2.036	52	0	52	-0.009	46	0	52	-3.588	32
27		4	max	33.034	32	3.893	46	0	46	0.003	52	0	46	6.288	52
28			min	11.446	54	-2.036	52	0	52	-0.009	46	0	52	-17.163	46
29		5	max	33.034	32	3.893	46	0	46	0.003	52	0	46	14.178	52
30			min	11.446	54	-2.036	52	0	52	-0.009	46	0	52	-32.25	46
31	M145	1	max	8.624	31	0	54	0	54	0	54	0	54	0	54
32			min	2.933	53	0	1	0	1	0	1	0	1	0	1
33		2	max	8.624	31	0	54	0	54	0	54	0	54	0	54
34			min	2.933	53	0	1	0	1	0	1	0	1	0	1
35		3	max	8.624	31	0	54	0	54	0	54	0	54	0	54
36			min	2.933	53	0	1	0	1	0	1	0	1	0	1
37		4	max	8.624	31	0	54	0	54	0	54	0	54	0	54
38			min	2.933	53	0	1	0	1	0	1	0	1	0	1
39		5	max	8.624	31	0	54	0	54	0	54	0	54	0	54
40			min	2.933	53	0	1	0	1	0	1	0	1	0	1
41	M146	1	max	4.082	33	5.774	45	0	52	0.165	52	0	46	48.957	45
42			min	-3.283	39	-5.748	39	0	46	-0.195	46	0	52	-48.812	39
43		2	max	4.082	33	5.774	45	0	52	0.165	52	0	46	26.581	45
44			min	-3.283	39	-5.748	39	0	46	-0.195	46	0	52	-26.538	39
45		3	max	4.082	33	5.774	45	0	52	0.165	52	0	52	4.273	41
46			min	-3.283	39	-5.748	39	0	46	-0.195	46	0	46	-4.35	43
47		4	max	4.082	33	5.774	45	0	52	0.165	52	0	52	18.008	39
48			min	-3.283	39	-5.748	39	0	46	-0.195	46	0	46	-18.172	45
49		5	max	4.082	33	5.774	45	0	52	0.165	52	0	52	40.281	39
50			min	-3.283	39	-5.748	39	0	46	-0.195	46	0	46	-40.548	45
51	M147	1	max	15.589	32	0.004	44	0	52	0	54	0.004	32	0.061	44
52			min	5.438	54	-0.002	54	0	34	0	1	0	54	-0.036	54
53		2	max	15.589	32	0.004	44	0	52	0	54	0.003	32	0.046	44
54			min	5.438	54	-0.002	54	0	34	0	1	0	54	-0.027	54
55		3	max	15.589	32	0.004	44	0	52	0	54	0.002	32	0.031	44
56			min	5.438	54	-0.002	54	0	34	0	1	0	54	-0.018	54
57		4	max	15.589	32	0.004	44	0	52	0	54	0.001	44	0.016	44
58			min	5.438	54	-0.002	54	0	34	0	1	-0.001	54	-0.009	54
59		5	max	15.589	32	0.004	44	0	52	0	54	0.001	52	0	34
60			min	5.438	54	-0.002	54	0	34	0	1	-0.002	46	0	52
61	M148	1	max	9.108	33	4.311	45	0	52	0.114	52	0	46	35.399	45
62			min	-1.671	51	-4.051	51	0	46	-0.136	46	0	52	-33.929	51
63		2	max	9.108	33	4.311	45	0	52	0.114	52	0	46	18.695	45
64			min	-1.671	51	-4.051	51	0	46	-0.136	46	0	52	-18.23	51
65		3	max	9.108	33	4.311	45	0	52	0.114	52	0	52	2.187	53
66			min	-1.671	51	-4.051	51	0	46	-0.136	46	0	46	-2.742	43
67		4	max	9.108	33	4.311	45	0	52	0.114	52	0	52	13.168	51
68			min	-1.671	51	-4.051	51	0	46	-0.136	46	0	46	-14.714	45
69		5	max	9.108	33	4.311	45	0	52	0.114	52	0	52	28.867	51
70			min	-1.671	51	-4.051	51	0	46	-0.136	46	0	46	-31.418	45
71	M149	1	max	13.245	31	4.866	45	0.002	52	0.603	46	0.01	46	38.143	45
72			min	2.436	53	-4.738	51	-0.002	46	-0.504	52	-0.009	52	-37.341	51

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
73		2	max	13.245	31	4.866	45	0.002	52	0.603	46	0.003	46	19.286	45
74			min	2.436	53	-4.738	51	-0.002	46	-0.504	52	-0.002	52	-18.983	51
75		3	max	13.245	31	4.866	45	0.002	52	0.603	46	0.004	52	0.504	53
76			min	2.436	53	-4.738	51	-0.002	46	-0.504	52	-0.005	46	-0.703	43
77		4	max	13.245	31	4.866	45	0.002	52	0.603	46	0.011	52	17.734	51
78			min	2.436	53	-4.738	51	-0.002	46	-0.504	52	-0.013	46	-18.428	45
79		5	max	13.245	31	4.866	45	0.002	52	0.603	46	0.017	52	36.092	51
80			min	2.436	53	-4.738	51	-0.002	46	-0.504	52	-0.021	46	-37.285	45
81	M150	1	max	14.356	34	0	54	0	54	0	54	0	54	0	54
82			min	3.485	53	0	1	0	1	0	1	0	1	0	1
83		2	max	14.356	34	0	54	0	54	0	54	0	54	0	54
84			min	3.485	53	0	1	0	1	0	1	0	1	0	1
85		3	max	14.356	34	0	54	0	54	0	54	0	54	0	54
86			min	3.485	53	0	1	0	1	0	1	0	1	0	1
87		4	max	14.356	34	0	54	0	54	0	54	0	54	0	54
88			min	3.485	53	0	1	0	1	0	1	0	1	0	1
89		5	max	14.356	34	0	54	0	54	0	54	0	54	0	54
90			min	3.485	53	0	1	0	1	0	1	0	1	0	1
91	M151	1	max	4.542	31	1.665	45	0.002	52	0.287	46	0.011	46	12.588	45
92			min	-0.429	53	-1.657	39	-0.002	46	-0.242	52	-0.009	52	-12.543	39
93		2	max	4.542	31	1.665	45	0.002	52	0.287	46	0.003	46	6.136	45
94			min	-0.429	53	-1.657	39	-0.002	46	-0.242	52	-0.002	52	-6.123	39
95		3	max	4.542	31	1.665	45	0.002	52	0.287	46	0.005	52	0.298	51
96			min	-0.429	53	-1.657	39	-0.002	46	-0.242	52	-0.005	46	-0.317	45
97		4	max	4.542	31	1.665	45	0.002	52	0.287	46	0.011	52	6.716	39
98			min	-0.429	53	-1.657	39	-0.002	46	-0.242	52	-0.013	46	-6.769	45
99		5	max	4.542	31	1.665	45	0.002	52	0.287	46	0.018	52	13.136	39
100			min	-0.429	53	-1.657	39	-0.002	46	-0.242	52	-0.021	46	-13.221	45
101	M152	1	max	20.084	31	5.567	41	0.333	46	0.905	46	4.339	52	47.66	41
102			min	3.881	53	-5.598	43	-0.281	52	-0.765	52	-5.137	46	-47.885	43
103		2	max	20.084	31	5.567	41	0.333	46	0.905	46	3.25	52	26.112	45
104			min	3.881	53	-5.598	43	-0.281	52	-0.765	52	-3.848	46	-26.193	43
105		3	max	20.084	31	5.567	41	0.333	46	0.905	46	2.161	52	4.675	45
106			min	3.881	53	-5.598	43	-0.281	52	-0.765	52	-2.558	46	-4.639	39
107		4	max	20.084	31	5.567	41	0.333	46	0.905	46	1.071	52	17.191	43
108			min	3.881	53	-5.598	43	-0.281	52	-0.765	52	-1.268	46	-17.051	41
109		5	max	20.084	31	5.567	41	0.333	46	0.905	46	0.021	46	38.883	43
110			min	3.881	53	-5.598	43	-0.281	52	-0.765	52	-0.018	52	-38.622	41
111	M153	1	max	23.03	32	1.129	54	0.002	52	0.08	42	0.103	46	12.931	54
112			min	6.481	54	-3.413	44	-0.007	46	-0.015	52	-0.037	52	-23.537	44
113		2	max	23.03	32	1.129	54	0.002	52	0.08	42	0.077	46	8.558	54
114			min	6.481	54	-3.413	44	-0.007	46	-0.015	52	-0.027	52	-10.313	44
115		3	max	23.03	32	1.129	54	0.002	52	0.08	42	0.052	34	7.47	34
116			min	6.481	54	-3.413	44	-0.007	46	-0.015	52	-0.018	52	1.059	52
117		4	max	23.03	32	1.129	54	0.002	52	0.08	42	0.027	34	17.992	32
118			min	6.481	54	-3.413	44	-0.007	46	-0.015	52	-0.008	52	-0.188	54
119		5	max	23.03	32	1.129	54	0.002	52	0.08	42	0.003	45	30.111	32
120			min	6.481	54	-3.413	44	-0.007	46	-0.015	52	-0.001	51	-4.561	54
121	M154	1	max	20.696	34	2.167	42	0.005	54	0.003	54	0.132	44	18.716	46
122			min	5.847	52	-2.004	52	-0.009	40	-0.067	28	-0.078	54	-16.704	52
123		2	max	20.696	34	2.167	42	0.005	54	0.003	54	0.1	44	10.322	46
124			min	5.847	52	-2.004	52	-0.009	40	-0.067	28	-0.059	54	-8.937	52
125		3	max	20.696	34	2.167	42	0.005	54	0.003	54	0.067	44	1.928	46
126			min	5.847	52	-2.004	52	-0.009	40	-0.067	28	-0.039	54	-1.17	52
127		4	max	20.696	34	2.167	42	0.005	54	0.003	54	0.034	44	6.661	44
128			min	5.847	52	-2.004	52	-0.009	40	-0.067	28	-0.019	54	-6.515	42
129		5	max	20.696	34	2.167	42	0.005	54	0.003	54	0.007	45	14.377	48
130			min	5.847	52	-2.004	52	-0.009	40	-0.067	28	-0.005	51	-14.912	42

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
131	M155	1	max	2.355	32	0.004	44	0.142	46	0	54	1.85	52	0.061	44
132			min	0.296	54	-0.002	54	-0.121	52	0	1	-2.176	46	-0.036	54
133		2	max	2.355	32	0.004	44	0.142	46	0	54	1.383	52	0.046	44
134			min	0.296	54	-0.002	54	-0.121	52	0	1	-1.627	46	-0.027	54
135		3	max	2.355	32	0.004	44	0.142	46	0	54	0.916	52	0.031	44
136			min	0.296	54	-0.002	54	-0.121	52	0	1	-1.079	46	-0.018	54
137		4	max	2.355	32	0.004	44	0.142	46	0	54	0.449	52	0.016	44
138			min	0.296	54	-0.002	54	-0.121	52	0	1	-0.53	46	-0.009	54
139		5	max	2.355	32	0.004	44	0.142	46	0	54	0.018	42	0	34
140			min	0.296	54	-0.002	54	-0.121	52	0	1	-0.018	44	0	52
141	M156	1	max	26.079	32	3.662	46	0.01	28	0.233	52	0.236	34	26.305	46
142			min	9.22	54	-1.709	52	0.003	54	-0.318	46	0.063	52	-15.106	52
143		2	max	26.079	32	3.662	46	0.01	28	0.233	52	0.26	34	12.115	46
144			min	9.22	54	-1.709	52	0.003	54	-0.318	46	0.093	52	-8.485	52
145		3	max	26.079	32	3.662	46	0.01	28	0.233	52	0.289	28	-1.054	54
146			min	9.22	54	-1.709	52	0.003	54	-0.318	46	0.118	54	-3.878	32
147		4	max	26.079	32	3.662	46	0.01	28	0.233	52	0.329	28	4.758	52
148			min	9.22	54	-1.709	52	0.003	54	-0.318	46	0.128	54	-16.265	46
149		5	max	26.079	32	3.662	46	0.01	28	0.233	52	0.37	28	11.379	52
150			min	9.22	54	-1.709	52	0.003	54	-0.318	46	0.139	54	-30.455	46
151	M157	1	max	2.553	32	-0.002	54	0.198	46	0.21	52	1.946	52	0.089	30
152			min	0.373	54	-0.008	32	-0.139	52	-0.275	46	-2.465	46	0.023	52
153		2	max	2.553	32	-0.002	54	0.198	46	0.21	52	1.407	52	0.114	34
154			min	0.373	54	-0.008	32	-0.139	52	-0.275	46	-1.699	46	0.041	52
155		3	max	2.553	32	-0.002	54	0.198	46	0.21	52	0.868	52	0.144	32
156			min	0.373	54	-0.008	32	-0.139	52	-0.275	46	-0.933	46	0.057	54
157		4	max	2.553	32	-0.002	54	0.198	46	0.21	52	0.374	44	0.177	32
158			min	0.373	54	-0.008	32	-0.139	52	-0.275	46	-0.207	54	0.066	54
159		5	max	2.553	32	-0.002	54	0.198	46	0.21	52	0.599	46	0.209	32
160			min	0.373	54	-0.008	32	-0.139	52	-0.275	46	-0.21	52	0.075	54
161	M158	1	max	7.442	31	3.859	53	0.329	46	0.929	46	4.244	52	32.843	53
162			min	-1.546	53	-4.23	43	-0.275	52	-0.778	52	-5.071	46	-34.685	43
163		2	max	7.442	31	3.859	53	0.329	46	0.929	46	3.179	52	17.89	53
164			min	-1.546	53	-4.23	43	-0.275	52	-0.778	52	-3.798	46	-18.292	43
165		3	max	7.442	31	3.859	53	0.329	46	0.929	46	2.113	52	3.337	45
166			min	-1.546	53	-4.23	43	-0.275	52	-0.778	52	-2.525	46	-2.284	51
167		4	max	7.442	31	3.859	53	0.329	46	0.929	46	1.048	52	14.493	43
168			min	-1.546	53	-4.23	43	-0.275	52	-0.778	52	-1.252	46	-12.017	53
169		5	max	7.442	31	3.859	53	0.329	46	0.929	46	0.021	46	30.885	43
170			min	-1.546	53	-4.23	43	-0.275	52	-0.778	52	-0.017	52	-26.971	53
171	M159	1	max	0.01	31	3.422	34	0	54	0	54	0	54	0	54
172			min	-0.011	33	0.834	1	0	1	0	1	0	1	0	1
173		2	max	0.01	31	1.712	34	0	54	0	54	0	54	-1.48	54
174			min	-0.011	33	0.417	1	0	1	0	1	0	1	-6.071	23
175		3	max	0.01	31	0.003	34	0	54	0	54	0	54	-1.975	54
176			min	-0.011	33	0	1	0	1	0	1	0	1	-8.099	23
177		4	max	0.01	31	-0.417	54	0	54	0	54	0	54	-1.483	54
178			min	-0.011	33	-1.711	23	0	1	0	1	0	1	-6.081	23
179		5	max	0.01	31	-0.838	54	0	54	0	54	0	54	0	54
180			min	-0.011	33	-3.434	23	0	1	0	1	0	1	0	1
181	M160	1	max	8.879	43	5.674	33	0.041	46	0	52	0.114	52	31.418	45
182			min	-8.662	53	-2.509	51	-0.034	52	0	46	-0.136	46	-28.867	51
183		2	max	8.879	43	4.281	45	0.041	46	0	52	0.008	46	15.915	53
184			min	-8.662	53	-3.089	51	-0.034	52	0	46	-0.007	52	-21.152	43
185		3	max	8.879	43	3.203	53	0.041	46	0	52	0.152	46	3.662	53
186			min	-8.662	53	-4.041	43	-0.034	52	0	46	-0.127	52	-9.989	31
187		4	max	8.879	43	2.57	53	0.041	46	0	52	0.296	46	7.102	43
188			min	-8.662	53	-5.426	43	-0.034	52	0	46	-0.248	52	-6.47	53

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
189		5	max	8.879	43	1.976	53	0.041	46	0	52	0.44	46	28.513	43
190			min	-8.662	53	-7.851	31	-0.034	52	0	46	-0.368	52	-14.332	53
191	M161	1	max	4.204	43	8.186	33	0.1	52	0.017	52	1.042	46	28.448	33
192			min	-3.866	53	-1.124	51	-0.119	46	-0.021	46	-0.872	52	-12.935	51
193		2	max	4.204	43	5.24	33	0.1	52	0.017	52	0.55	46	5.627	53
194			min	-3.866	53	-1.836	51	-0.119	46	-0.021	46	-0.46	52	-7.557	43
195		3	max	4.204	43	3.253	45	0.1	52	0.017	52	0.057	46	2.273	51
196			min	-3.866	53	-2.552	51	-0.119	46	-0.021	46	-0.047	52	-14.925	33
197		4	max	4.204	43	2.266	53	0.1	52	0.017	52	0.365	52	14.325	51
198			min	-3.866	53	-3.887	43	-0.119	46	-0.021	46	-0.436	46	-22.005	45
199		5	max	4.204	43	1.546	53	0.1	52	0.017	52	0.778	52	30.884	43
200			min	-3.866	53	-6.44	31	-0.119	46	-0.021	46	-0.929	46	-26.969	53
201	M162	1	max	0.037	43	1.124	34	0	54	0	54	0	54	0	54
202			min	-0.037	45	0	1	0	1	0	1	0	1	0	1
203		2	max	0.037	43	0.562	34	0	54	0	54	0	54	0	54
204			min	-0.037	45	0	1	0	1	0	1	0	1	-1.993	23
205		3	max	0.037	43	0	54	0	54	0	54	0	54	0	54
206			min	-0.037	45	0	1	0	1	0	1	0	1	-2.658	23
207		4	max	0.037	43	0	54	0	54	0	54	0	54	0	54
208			min	-0.037	45	-0.562	23	0	1	0	1	0	1	-1.993	23
209		5	max	0.037	43	0	54	0	54	0	54	0	54	0	54
210			min	-0.037	45	-1.124	23	0	1	0	1	0	1	0	1
211	M163	1	max	7.141	43	3.656	45	0.058	46	0	52	0.165	52	40.548	45
212			min	-7.172	53	-3.283	39	-0.049	52	0	46	-0.195	46	-40.281	39
213		2	max	7.141	43	3.393	45	0.058	46	0	52	0.011	46	28.657	41
214			min	-7.172	53	-3.283	39	-0.049	52	0	46	-0.009	52	-29.354	43
215		3	max	7.141	43	3.227	53	0.058	46	0	52	0.217	46	17.229	41
216			min	-7.172	53	-3.391	43	-0.049	52	0	46	-0.183	52	-17.807	43
217		4	max	7.141	43	3.227	53	0.058	46	0	52	0.423	46	5.89	45
218			min	-7.172	53	-3.654	43	-0.049	52	0	46	-0.358	52	-5.458	51
219		5	max	7.141	43	3.227	53	0.058	46	0	52	0.63	46	9.305	31
220			min	-7.172	53	-3.917	43	-0.049	52	0	46	-0.532	52	-5.727	53
221	M164	1	max	5.499	43	3.665	33	0.094	52	0.018	52	0.916	46	10.112	33
222			min	-5.517	53	-2.764	51	-0.111	46	-0.021	46	-0.774	52	-7.003	51
223		2	max	5.499	43	3.212	45	0.094	52	0.018	52	0.461	46	4.399	39
224			min	-5.517	53	-2.764	51	-0.111	46	-0.021	46	-0.389	52	-4.348	45
225		3	max	5.499	43	2.908	45	0.094	52	0.018	52	0.005	46	15.702	39
226			min	-5.517	53	-2.764	51	-0.111	46	-0.021	46	-0.005	52	-16.874	45
227		4	max	5.499	43	2.818	41	0.094	52	0.018	52	0.38	52	27.006	39
228			min	-5.517	53	-2.986	43	-0.111	46	-0.021	46	-0.45	46	-28.156	45
229		5	max	5.499	43	2.818	41	0.094	52	0.018	52	0.765	52	38.878	43
230			min	-5.517	53	-3.29	43	-0.111	46	-0.021	46	-0.905	46	-38.616	41
231	M165	1	max	0.007	42	5.861	34	0	54	0	52	0	54	0	54
232			min	-0.002	52	1.421	1	0	1	-0.001	46	0	1	0	1
233		2	max	0.007	42	2.939	34	0	54	0	52	0	54	-4.371	54
234			min	-0.002	52	0.714	1	0	1	-0.001	46	0	1	-18.015	23
235		3	max	0.007	42	0.005	30	0	54	0	52	0	54	-5.836	54
236			min	-0.002	52	0.002	1	0	1	-0.001	46	0	1	-24.043	23
237		4	max	0.007	42	-0.713	54	0	54	0	52	0	54	-4.382	54
238			min	-0.002	52	-2.937	23	0	1	-0.001	46	0	1	-18.046	23
239		5	max	0.007	42	-1.429	54	0	54	0	52	0	54	0	54
240			min	-0.002	52	-5.882	23	0	1	-0.001	46	0	1	0	1
241	M166	1	max	0.001	54	0.615	34	0	54	0.018	44	0	54	0	54
242			min	-0.004	40	0.101	54	0	1	-0.018	42	0	1	0	1
243		2	max	0.001	54	0.308	34	0	54	0.018	44	0	54	-0.054	54
244			min	-0.004	40	0.051	54	0	1	-0.018	42	0	1	-0.327	23
245		3	max	0.001	54	0	54	0	54	0.018	44	0	54	-0.072	54
246			min	-0.004	40	0	1	0	1	-0.018	42	0	1	-0.436	23

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
247		4	max	0.001	54	-0.051	52	0	54	0.018	44	0	54	-0.054	54
248			min	-0.004	40	-0.308	23	0	1	-0.018	42	0	1	-0.327	23
249		5	max	0.001	54	-0.101	52	0	54	0.018	44	0	54	0	54
250			min	-0.004	40	-0.615	23	0	1	-0.018	42	0	1	0	1
251	M167	1	max	0.012	44	0.418	34	0.334	46	0.21	52	0.522	52	-0.14	54
252			min	-0.002	54	0	52	-0.258	52	-0.599	46	-0.672	46	-0.373	28
253		2	max	0.012	44	0.115	34	0.334	46	0.21	52	0.339	52	-0.138	54
254			min	-0.002	54	-0.068	28	-0.258	52	-0.599	46	-0.435	46	-0.534	32
255		3	max	0.012	44	-0.076	54	0.334	46	0.21	52	0.156	52	-0.102	54
256			min	-0.002	54	-0.202	28	-0.258	52	-0.599	46	-0.199	46	-0.501	32
257		4	max	0.012	44	-0.125	54	0.334	46	0.21	52	0.038	46	-0.025	52
258			min	-0.002	54	-0.501	32	-0.258	52	-0.599	46	-0.027	52	-0.255	34
259		5	max	0.012	44	-0.174	54	0.334	46	0.21	52	0.275	46	0.21	32
260			min	-0.002	54	-0.804	32	-0.258	52	-0.599	46	-0.21	52	0.075	54
261	M168	1	max	0.139	42	1.74	34	0	52	0	34	0	54	0	54
262			min	-0.12	52	0.195	54	-0.001	46	0	52	0	1	0	1
263		2	max	0.139	42	1.139	34	0	52	0	34	0.002	52	-0.908	54
264			min	-0.12	52	0.195	54	-0.001	46	0	52	-0.006	46	-6.688	34
265		3	max	0.139	42	-0.003	52	0.005	40	0	34	0.015	52	-1.226	54
266			min	-0.12	52	-0.009	34	-0.003	54	0	52	-0.016	46	-8.958	34
267		4	max	0.139	42	-0.199	52	0.004	54	0	34	0.023	40	-0.922	52
268			min	-0.12	52	-1.148	34	-0.005	40	0	52	-0.02	54	-6.73	34
269		5	max	0.139	42	-0.199	52	0.004	54	0	34	0	54	0	54
270			min	-0.12	52	-1.749	34	-0.005	40	0	52	0	1	0	1
271	M169	1	max	5.165	40	1.529	42	0.015	40	0.002	30	0.003	54	14.929	42
272			min	-4.962	54	-1.23	52	-0.005	54	0	52	-0.067	28	-14.394	48
273		2	max	5.165	40	1.529	42	0.015	40	0.002	30	0.011	52	8.205	54
274			min	-4.962	54	-1.23	52	-0.005	54	0	52	-0.026	46	-9.159	40
275		3	max	5.165	40	0.469	54	0.002	54	0.002	30	0.027	52	5.936	34
276			min	-4.962	54	-2.803	32	-0.002	40	0	52	-0.027	46	-0.282	52
277		4	max	5.165	40	-0.417	54	0.033	40	0.002	30	0.068	40	20.135	32
278			min	-4.962	54	-5.237	32	-0.026	54	0	52	-0.059	54	3.633	54
279		5	max	5.165	40	-0.417	54	0.033	40	0.002	30	0.221	40	44.463	32
280			min	-4.962	54	-5.237	32	-0.026	54	0	52	-0.179	54	5.571	54
281	M170	1	max	0.004	28	2.17	34	0	54	0.001	52	0	54	0	54
282			min	0	54	0.356	1	0	1	-0.002	46	0	1	0	1
283		2	max	0.004	28	1.085	34	0	54	0.001	52	0	54	-0.668	54
284			min	0	54	0.178	1	0	1	-0.002	46	0	1	-4.068	23
285		3	max	0.004	28	0	54	0	54	0.001	52	0	54	-0.891	54
286			min	0	54	0	1	0	1	-0.002	46	0	1	-5.424	23
287		4	max	0.004	28	-0.178	54	0	54	0.001	52	0	54	-0.668	54
288			min	0	54	-1.085	23	0	1	-0.002	46	0	1	-4.068	23
289		5	max	0.004	28	-0.356	54	0	54	0.001	52	0	54	0	54
290			min	0	54	-2.17	23	0	1	-0.002	46	0	1	0	1
291	M171	1	max	0.018	42	2.137	34	0	54	0.004	32	0	54	0	54
292			min	-0.009	52	0.345	1	0	1	0	54	0	1	0	1
293		2	max	0.018	42	1.069	34	0	54	0.004	32	0	54	-0.646	54
294			min	-0.009	52	0.172	1	0	1	0	54	0	1	-4.008	23
295		3	max	0.018	42	0	54	0	54	0.004	32	0	54	-0.861	54
296			min	-0.009	52	0	1	0	1	0	54	0	1	-5.343	23
297		4	max	0.018	42	-0.172	54	0	54	0.004	32	0	54	-0.646	54
298			min	-0.009	52	-1.069	23	0	1	0	54	0	1	-4.008	23
299		5	max	0.018	42	-0.345	54	0	54	0.004	32	0	54	0	54
300			min	-0.009	52	-2.137	23	0	1	0	54	0	1	0	1
301	M172	1	max	0.005	40	0.548	34	0	54	0.007	32	0	54	0	54
302			min	-0.002	54	0.199	1	0	1	0.001	54	0	1	0	1
303		2	max	0.005	40	0.274	34	0	54	0.007	32	0	54	-0.106	54
304			min	-0.002	54	0.099	1	0	1	0.001	54	0	1	-0.291	19

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
305		3	max	0.005	40	0	54	0	54	0.007	32	0	54	-0.141	54
306			min	-0.002	54	0	1	0	1	0.001	54	0	1	-0.388	19
307		4	max	0.005	40	-0.099	54	0	54	0.007	32	0	54	-0.106	54
308			min	-0.002	54	-0.274	19	0	1	0.001	54	0	1	-0.291	19
309		5	max	0.005	40	-0.199	54	0	54	0.007	32	0	54	0	54
310			min	-0.002	54	-0.548	19	0	1	0.001	54	0	1	0	1
311	M173	1	max	0.007	54	0.538	34	0	54	0	52	0	54	0	54
312			min	-0.01	40	0.195	1	0	1	-0.006	34	0	1	0	1
313		2	max	0.007	54	0.269	34	0	54	0	52	0	54	-0.104	54
314			min	-0.01	40	0.098	1	0	1	-0.006	34	0	1	-0.286	19
315		3	max	0.007	54	0	54	0	54	0	52	0	54	-0.139	54
316			min	-0.01	40	0	1	0	1	-0.006	34	0	1	-0.382	19
317		4	max	0.007	54	-0.098	54	0	54	0	52	0	54	-0.104	54
318			min	-0.01	40	-0.269	19	0	1	-0.006	34	0	1	-0.286	19
319		5	max	0.007	54	-0.195	54	0	54	0	52	0	54	0	54
320			min	-0.01	40	-0.538	19	0	1	-0.006	34	0	1	0	1
321	M174	1	max	0.005	54	1.931	34	0	54	-0.002	54	0	54	0	54
322			min	-0.013	40	0.701	1	0	1	-0.005	32	0	1	0	1
323		2	max	0.005	54	0.965	34	0	54	-0.002	54	0	54	-1.314	54
324			min	-0.013	40	0.35	1	0	1	-0.005	32	0	1	-3.621	19
325		3	max	0.005	54	0	54	0	54	-0.002	54	0	54	-1.752	54
326			min	-0.013	40	0	1	0	1	-0.005	32	0	1	-4.827	19
327		4	max	0.005	54	-0.35	54	0	54	-0.002	54	0	54	-1.314	54
328			min	-0.013	40	-0.965	19	0	1	-0.005	32	0	1	-3.621	19
329		5	max	0.005	54	-0.701	54	0	54	-0.002	54	0	54	0	54
330			min	-0.013	40	-1.931	19	0	1	-0.005	32	0	1	0	1
331	M175	1	max	0.026	40	1.899	34	0	54	0.005	34	0	54	0	54
332			min	-0.019	54	0.689	1	0	1	0.001	52	0	1	0	1
333		2	max	0.026	40	0.949	34	0	54	0.005	34	0	54	-1.292	54
334			min	-0.019	54	0.345	1	0	1	0.001	52	0	1	-3.56	19
335		3	max	0.026	40	0	54	0	54	0.005	34	0	54	-1.723	54
336			min	-0.019	54	0	1	0	1	0.001	52	0	1	-4.747	19
337		4	max	0.026	40	-0.345	54	0	54	0.005	34	0	54	-1.292	54
338			min	-0.019	54	-0.949	19	0	1	0.001	52	0	1	-3.56	19
339		5	max	0.026	40	-0.689	54	0	54	0.005	34	0	54	0	54
340			min	-0.019	54	-1.899	19	0	1	0.001	52	0	1	0	1
341	M176	1	max	27.465	32	1.561	54	0.007	46	0.005	52	0	52	8.446	54
342			min	7.75	54	-3.684	44	-0.002	52	-0.014	46	0	46	-31.545	44
343		2	max	27.465	32	1.561	54	0.007	46	0.005	52	0.025	46	2.399	54
344			min	7.75	54	-3.684	44	-0.002	52	-0.014	46	-0.009	52	-17.901	32
345		3	max	27.465	32	1.561	54	0.007	46	0.005	52	0.051	46	-1.255	52
346			min	7.75	54	-3.684	44	-0.002	52	-0.014	46	-0.018	52	-6.865	34
347		4	max	27.465	32	1.561	54	0.007	46	0.005	52	0.077	46	11.284	44
348			min	7.75	54	-3.684	44	-0.002	52	-0.014	46	-0.027	52	-9.696	54
349		5	max	27.465	32	1.561	54	0.007	46	0.005	52	0.103	46	25.56	44
350			min	7.75	54	-3.684	44	-0.002	52	-0.014	46	-0.036	52	-15.744	54
351	M177	1	max	0.007	46	8.486	34	0	54	0	52	0	54	0	54
352			min	-0.003	52	2.061	1	0	1	-0.001	46	0	1	0	1
353		2	max	0.007	46	4.214	34	0	54	0	52	0	54	-9.263	54
354			min	-0.003	52	1.02	1	0	1	-0.001	46	0	1	-37.962	23
355		3	max	0.007	46	0.044	34	0	54	0	52	0	54	-12.197	54
356			min	-0.003	52	0.016	1	0	1	-0.001	46	0	1	-50.191	23
357		4	max	0.007	46	-1.05	54	0	54	0	52	0	54	-9.29	54
358			min	-0.003	52	-4.296	23	0	1	-0.001	46	0	1	-38.034	23
359		5	max	0.007	46	-2.064	54	0	54	0	52	0	54	0	54
360			min	-0.003	52	-8.495	23	0	1	-0.001	46	0	1	0	1
361	M178	1	max	15.577	32	-0.005	52	0	34	0	54	0	54	0	52
362			min	5.433	52	-0.012	34	0	52	0	1	-0.004	32	0	34

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
363		2	max	15.577	32	-0.005	52	0	34	0	54	0	54	0.046	34
364			min	5.433	52	-0.012	34	0	52	0	1	-0.003	32	0.018	52
365		3	max	15.577	32	-0.005	52	0	34	0	54	0	54	0.092	34
366			min	5.433	52	-0.012	34	0	52	0	1	-0.003	32	0.035	52
367		4	max	15.577	32	-0.005	52	0	34	0	54	0	54	0.139	34
368			min	5.433	52	-0.012	34	0	52	0	1	-0.002	32	0.053	52
369		5	max	15.577	32	-0.005	52	0	34	0	54	0	54	0.185	34
370			min	5.433	52	-0.012	34	0	52	0	1	-0.002	32	0.071	52
371	M179	1	max	19.222	34	0	54	0.165	46	0	54	2.186	52	0	54
372			min	7.518	52	0	1	-0.141	52	0	1	-2.558	46	0	1
373		2	max	19.222	34	0	54	0.165	46	0	54	1.639	52	0	54
374			min	7.518	52	0	1	-0.141	52	0	1	-1.919	46	0	1
375		3	max	19.222	34	0	54	0.165	46	0	54	1.093	52	0	54
376			min	7.518	52	0	1	-0.141	52	0	1	-1.279	46	0	1
377		4	max	19.222	34	0	54	0.165	46	0	54	0.546	52	0	54
378			min	7.518	52	0	1	-0.141	52	0	1	-0.64	46	0	1
379		5	max	19.222	34	0	54	0.165	46	0	54	0	54	0	54
380			min	7.518	52	0	1	-0.141	52	0	1	0	1	0	1
381	M180	1	max	0.008	34	1.002	34	0	54	0	54	0	54	0	54
382			min	-0.005	44	0	1	0	1	0	1	0	1	0	1
383		2	max	0.008	34	0.501	34	0	54	0	54	0	54	0	54
384			min	-0.005	44	0	1	0	1	0	1	0	1	-2.912	23
385		3	max	0.008	34	0	54	0	54	0	54	0	54	0	54
386			min	-0.005	44	0	1	0	1	0	1	0	1	-3.882	23
387		4	max	0.008	34	0	54	0	54	0	54	0	54	0	54
388			min	-0.005	44	-0.501	23	0	1	0	1	0	1	-2.912	23
389		5	max	0.008	34	0	54	0	54	0	54	0	54	0	54
390			min	-0.005	44	-1.002	23	0	1	0	1	0	1	0	1
391	M181	1	max	0.013	44	7.5	34	0	54	0	54	0	54	0	54
392			min	-0.015	46	2.933	1	0	1	0	1	0	1	0	1
393		2	max	0.013	44	3.605	34	0	54	0	54	0	54	-5.04	54
394			min	-0.015	46	1.405	1	0	1	0	1	0	1	-12.915	23
395		3	max	0.013	44	0.092	34	0	54	0	54	0	54	-6.739	54
396			min	-0.015	46	0.039	1	0	1	0	1	0	1	-17.264	23
397		4	max	0.013	44	-1.423	54	0	54	0	54	0	54	-5.129	54
398			min	-0.015	46	-3.647	23	0	1	0	1	0	1	-13.124	23
399		5	max	0.013	44	-2.936	54	0	54	0	54	0	54	0	54
400			min	-0.015	46	-7.505	23	0	1	0	1	0	1	0	1
401	M182	1	max	0.129	54	11.717	34	0	54	0	54	0	54	0	54
402			min	-0.115	52	4.582	52	0	1	0	1	0	1	0	1
403		2	max	0.129	54	5.778	34	0	54	0	54	0	54	-12.493	52
404			min	-0.115	52	2.257	52	0	1	0	1	0	1	-31.986	34
405		3	max	0.129	54	-0.088	54	0	54	0	54	0	54	-16.55	52
406			min	-0.115	52	-0.208	28	0	1	0	1	0	1	-42.397	34
407		4	max	0.129	54	-2.317	54	0	54	0	54	0	54	-12.088	52
408			min	-0.115	52	-5.919	32	0	1	0	1	0	1	-31.036	34
409		5	max	0.129	54	-4.173	52	0	54	0	54	0	54	0	54
410			min	-0.115	52	-10.757	34	0	1	0	1	0	1	0	1
411	M183	1	max	5.166	44	4.235	46	0	52	0	46	0.002	46	18.277	46
412			min	-4.889	54	-1.13	52	0	46	0	52	0	52	-16.412	52
413		2	max	5.166	44	1.945	54	0	52	0	46	0	52	9.621	54
414			min	-4.889	54	-2.764	44	0	46	0	52	0	46	-11.47	44
415		3	max	5.166	44	0.533	54	0	52	0	46	0	52	7.66	34
416			min	-4.889	54	-5.557	32	0	46	0	52	-0.003	46	-1.031	52
417		4	max	5.166	44	-0.909	54	0	52	0	46	0.002	52	26.6	32
418			min	-4.889	54	-9.334	32	0	46	0	52	-0.005	46	6.434	54
419		5	max	5.166	44	-2.383	54	0	52	0	46	0.003	52	60.597	32
420			min	-4.889	54	-13.188	32	0	46	0	52	-0.007	46	11.398	54

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
421	M184	1	max	3.638	44	20.999	34	0.001	46	0	46	0.006	52	77.676	34
422			min	-1.537	54	6.819	52	0	52	0	52	-0.016	46	17.448	52
423		2	max	3.638	44	12.533	34	0.001	46	0	46	0.003	52	-7.444	54
424			min	-1.537	54	3.549	52	0	52	0	52	-0.009	46	-30.446	32
425		3	max	3.638	44	2.747	34	0.001	46	0	46	0	52	-24.98	52
426			min	-1.537	54	-0.28	52	0	52	0	52	-0.001	34	-73.372	34
427		4	max	3.638	44	-1.86	54	0.001	46	0	46	0.007	46	-11.539	52
428			min	-1.537	54	-8.192	32	0	52	0	52	-0.002	52	-60.226	34
429		5	max	3.638	44	-5.689	54	0.001	46	0	46	0.014	46	31.545	44
430			min	-1.537	54	-17.978	32	0	52	0	52	-0.005	52	-8.447	54
431	M185	1	max	0.372	52	1.002	34	0	54	0.002	45	0	54	0	54
432			min	-0.439	46	0	1	0	1	-0.002	51	0	1	0	1
433		2	max	0.372	52	0.501	34	0	54	0.002	45	0	54	0	54
434			min	-0.439	46	0	1	0	1	-0.002	51	0	1	-2.912	23
435		3	max	0.372	52	0	54	0	54	0.002	45	0	54	0	54
436			min	-0.439	46	0	1	0	1	-0.002	51	0	1	-3.882	23
437		4	max	0.372	52	0	54	0	54	0.002	45	0	54	0	54
438			min	-0.439	46	-0.501	23	0	1	-0.002	51	0	1	-2.912	23
439		5	max	0.372	52	0	54	0	54	0.002	45	0	54	0	54
440			min	-0.439	46	-1.002	23	0	1	-0.002	51	0	1	0	1
441	M186	1	max	3.734	44	16.147	32	0.005	52	0	54	0.08	42	30.111	32
442			min	-1.535	54	5.052	54	-0.013	46	-0.001	28	-0.015	52	-4.56	54
443		2	max	3.734	44	7.537	32	0.005	52	0	54	0.021	32	-6.467	52
444			min	-1.535	54	1.679	54	-0.013	46	-0.001	28	0.008	54	-40.957	34
445		3	max	3.734	44	0.443	52	0.005	52	0	54	0.033	52	-17.781	52
446			min	-1.535	54	-2.165	34	-0.013	46	-0.001	28	-0.054	46	-52.325	34
447		4	max	3.734	44	-2.93	52	0.005	52	0	54	0.057	52	-4.449	54
448			min	-1.535	54	-10.775	34	-0.013	46	-0.001	28	-0.12	46	-21.392	32
449		5	max	3.734	44	-6.302	52	0.005	52	0	54	0.081	52	62.162	34
450			min	-1.535	54	-19.386	34	-0.013	46	-0.001	28	-0.187	46	13.345	52
451	M187	1	max	0.412	42	16.907	34	0	54	0.006	39	0	54	0	54
452			min	-0.36	52	6.621	1	0	1	-0.006	45	0	1	0	1
453		2	max	0.412	42	8.49	34	0	54	0.006	39	0	54	-26.014	54
454			min	-0.36	52	3.326	1	0	1	-0.006	45	0	1	-66.416	23
455		3	max	0.412	42	0.036	34	0	54	0.006	39	0	54	-34.761	54
456			min	-0.36	52	0.016	1	0	1	-0.006	45	0	1	-88.732	23
457		4	max	0.412	42	-3.32	54	0	54	0.006	39	0	54	-26.133	54
458			min	-0.36	52	-8.475	23	0	1	-0.006	45	0	1	-66.694	23
459		5	max	0.412	42	-6.679	54	0	54	0.006	39	0	54	0	54
460			min	-0.36	52	-17.042	23	0	1	-0.006	45	0	1	0	1
461	M188	1	max	0	2	13.44	32	0.011	54	0	34	0	54	0	54
462			min	0	46	5.089	52	-0.013	40	0	52	0	1	0	1
463		2	max	0	2	7.688	32	0.011	54	0	34	0.052	54	-18.546	52
464			min	0	46	2.896	52	-0.013	40	0	52	-0.061	40	-49.078	32
465		3	max	0	52	0.036	30	0.013	40	0	34	0.044	46	-24.722	54
466			min	0	34	0.013	52	-0.008	54	0	52	-0.041	52	-65.416	32
467		4	max	0	52	-2.884	54	0.001	52	0	34	0.017	46	-18.502	54
468			min	0	34	-7.655	32	-0.004	46	0	52	-0.005	52	-48.952	32
469		5	max	0	52	-5.082	54	0.001	52	0	34	0	54	0	54
470			min	0	34	-13.419	32	-0.004	46	0	52	0	1	0	1

Envelope Beam Deflection Checks

	Beam	Design Rule	Span	Defl [in]	Ratio	LC	Defl [in]	Ratio	LC	Defl [in]	Ratio	LC
1	M159	Typical	1	0	NC	1(DL+WLX)	0	NC	2(DL+WLZ)	0	NC	3(DL+NLX)
2	M160	Typical	1	-0.02	8435	1(DL+WLX)	0	NC	2(DL+WLZ)	0	NC	3(DL+NLX)
3	M161	Typical	1	0	NC	1(DL+WLX)	0	NC	2(DL+WLZ)	-0.021	9340	3(DL+NLX)
4	M162	Typical	1	4.337e-19	NC	1(DL+WLX)	-1.965e-19	NC	2(DL+WLZ)	7.183e-19	NC	3(DL+NLX)
5	M163	Typical	1	-0.037	4579	1(DL+WLX)	-6.776e-21	NC	2(DL+WLZ)	0	NC	3(DL+NLX)

Envelope Beam Deflection Checks (Continued)

	Beam	Design Rule	Span	Defl [in]	Ratio	LC	Defl [in]	Ratio	LC	Defl [in]	Ratio	LC
6	M164	Typical	1	0.046	4261	1(DL+WLX)	0	NC	2(DL+WLZ)	0	NC	3(DL+NLX)
7	M165	Typical	1	0	NC	1(DL+WLX)	0	NC	2(DL+WLZ)	0	NC	3(DL+NLX)
8	M166	Typical	1	-8.674e-19	NC	1(DL+WLX)	0	NC	2(DL+WLZ)	0	NC	3(DL+NLX)
9	M167	Typical	1	-3.253e-19	NC	1(DL+WLX)	0	NC	2(DL+WLZ)	8.674e-19	NC	3(DL+NLX)
10	M168	Typical	1	0	NC	1(DL+WLX)	0	NC	2(DL+WLZ)	-0.034	6536	3(DL+NLX)
11	M169	Typical	1	0.028	7872	1(DL+WLX)	0.027	8381	2(DL+WLZ)	0.044	5060	3(DL+NLX)
12	M170	Typical	1	0	NC	1(DL+WLX)	0	NC	2(DL+WLZ)	-0.017	6910	3(DL+NLX)
13	M171	Typical	1	0	NC	1(DL+WLX)	0	NC	2(DL+WLZ)	-0.017	7145	3(DL+NLX)
14	M172	Typical	1	0	NC	1(DL+WLX)	0	NC	2(DL+WLZ)	6.939e-18	NC	3(DL+NLX)
15	M173	Typical	1	-3.469e-18	NC	1(DL+WLX)	-1.041e-17	NC	2(DL+WLZ)	6.939e-18	NC	3(DL+NLX)
16	M174	Typical	1	-0.022	5464	1(DL+WLX)	-0.022	5464	2(DL+WLZ)	-0.034	3513	3(DL+NLX)
17	M175	Typical	1	-0.022	5557	1(DL+WLX)	-0.022	5557	2(DL+WLZ)	-0.034	3572	3(DL+NLX)
18	M177	Typical	1	-0.039	7201	1(DL+WLX)	-0.039	7201	2(DL+WLZ)	-0.061	4629	3(DL+NLX)
19	M180	Typical	1	0	NC	1(DL+WLX)	8.674e-19	NC	2(DL+WLZ)	0	NC	3(DL+NLX)
20	M181	Typical	1	-0.023	4836	1(DL+WLX)	-0.023	4836	2(DL+WLZ)	-0.036	3108	3(DL+NLX)
21	M182	Typical	1	-0.143	1240	1(DL+WLX)	-0.143	1240	2(DL+WLZ)	-0.222	797	3(DL+NLX)
22	M183	Typical	1	0.017	8686	1(DL+WLX)	0.015	9783	2(DL+WLZ)	0.026	5583	3(DL+NLX)
23	M184	Typical	1	-0.162	1814	1(DL+WLX)	-0.151	1944	2(DL+WLZ)	-0.252	1166	3(DL+NLX)
24	M185	Typical	1	0	NC	1(DL+WLX)	0	NC	2(DL+WLZ)	-1.735e-18	NC	3(DL+NLX)
25	M186	Typical	1	-0.159	1604	1(DL+WLX)	-0.147	1729	2(DL+WLZ)	-0.247	1031	3(DL+NLX)
26	M187	Typical	1	-0.315	797	1(DL+WLX)	-0.315	797	2(DL+WLZ)	-0.49	512	3(DL+NLX)
27	M188	Typical	1	-0.184	1214	1(DL+WLX)	-0.184	1214	2(DL+WLZ)	-0.286	780	3(DL+NLX)