STRUCTURAL CALCULATIONS

COASTAL PACIFIC FOOD DISTRIBUTORS

322 VALLEY AVE. NW
PUYALLUP, WASHINGTON
AWB PROJECT NUMBER: 221205

Prepared For:

THE WHITING-TURNER CONTRACTING COMPANY
5285 MEADOWS ROAD, SUITE 280
LAKE OSWEGO, OREGON 97035

Prepared By:

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28 JUN 2024

Date:

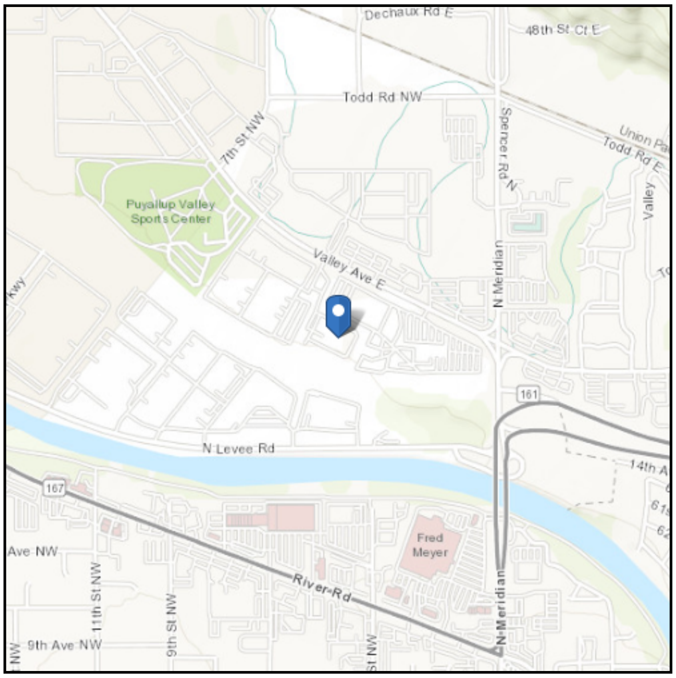
June 27, 2024

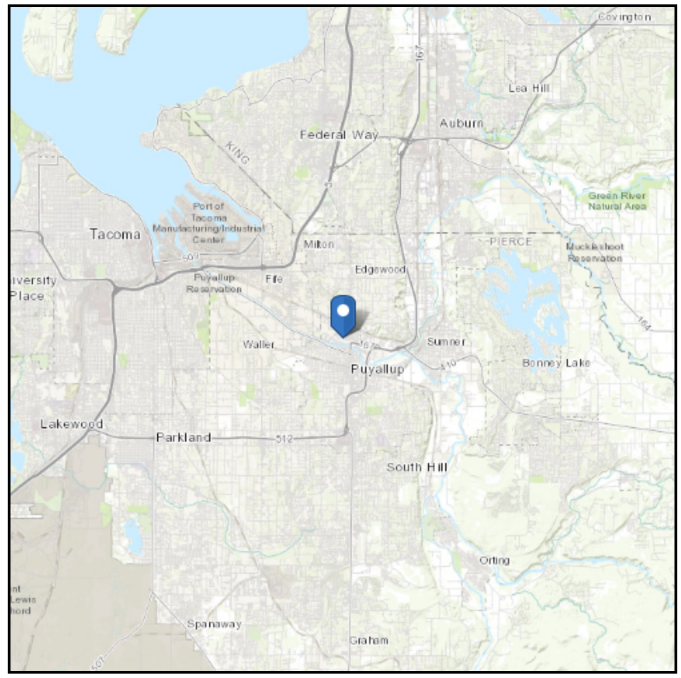
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Latitude: 47.206409
Longitude: -122.299615
Elevation: 40.990616141096 ft (NAVD 88)





Wind

Results:

Wind Speed	98 Vmph
10-year MRI	67 Vmph
25-year MRI	73 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Fri Jul 07 2023

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Snow

Results:

Ground Snow Load, p_g :	18 lb/ft^2
Mapped Elevation:	41.0 ft
Data Source:	
Date Accessed:	Fri Jul 07 2023

Statutory requirements of the Authority Having Jurisdiction are not included.

Snow load values are mapped to a 0.5 mile resolution. This resolution can create a mismatch between the mapped elevation and the site-specific elevation in topographically complex areas. Engineers should consult the local authority having jurisdiction in locations where the reported ‘elevation’ and ‘mapped elevation’ differ significantly from each other.

DESIGN LOADS - 2018 WASHINGTON STATE BUILDING CODE/ASCE 7-16

DEAD LOADS:	
ROOF:	
DEAD:	10 PSF
MECHANICAL:	15 PSF
LIVE LOADS:	
ROOF:	20 PSF
WIND LOADS:	
BASIC WIND SPEED:	98 MPH
EXPOSURE CATEGORY:	C
IMPORTANCE FACTOR:	1.0
JOIST UPLIFT:	10 PSF
SNOW LOADS:	
GROUND SNOW LOAD:	20 PSF
FLAT ROOF SNOW LOAD:	20 PSF
SNOW EXPOSURE FACTOR:	1.0
SNOW IMPORTANCE FACTOR:	1.0
THERMAL FACTOR:	1.3
EARTHQUAKE LOADS:	
RISK CATEGORY:	II
IMPORTANCE FACTOR:	1.0
S/DS =	0.847
S/D1 =	0.820
SITE CLASS:	D
SEISMIC DESIGN CATEGORY:	D

ASCE 7-16 Snow Loads

Project File: cpfd.ec6

DESCRIPTION: CPFD Puyallup, WA Drfiting Snow Load

Flat Roof Snow Loads

Description : **per ASCE 7-16, Chapter 7**

Ground Snow Load, per Fig 7.2	20.00 psf		Roof Slope, Sec .7.3.4	10.00
Terrain Category	C (see ASCE 7-16 Section 26.7)		Roof Configuration	Monoslope
Exposure of Roof	Fully Exposed			
Ce : Exposure Factor, Table 7.3-	0.90			
Ct : Thermal Factor	ctures intentially kept below freez		pm, Minimum required	**20.00** psf
Risk Category, per Table 1.5-	**II**		pf, Calculated Snow Load per Equatio	**16.38** psf
Importance Factor, Is, Table 1.5-2	1.00		pf, Design Snow Load Max(pm min, pf calc	**20.00** psf

Snow Drifts on Lower Roofs

Description : Drift Load @ Low Roof **per ASCE 7-16, Chapter 7**

Balanced Snow Load	20.00 psf	hd : leeward	2.65 ft
Ground Snow Load	20.00 psf	hd : windward	2.55 ft
lu - upper	70.00 ft	hd : Max	2.65 ft
lu-lower	115.00 ft	hd : Design	2.65 ft
Height of Roof Step	10.00 ft	pd : Max Drift Only	43.95 psf
Snow Density	16.60 pcf	pd + Balanced	63.95 psf
hb : Balanced	1.21 ft	W : Drift Width	10.59 ft
hc : Step Height - hb	8.80 ft		
hc / hb	7.30	Total Snow Load @ End of Drift	20.00 psf
Importance Factor	1.00		

Description : Drift @ Dock Roof **per ASCE 7-16, Chapter 7**

Balanced Snow Load	20.00 psf	hd : leeward	4.39 ft
Ground Snow Load	20.00 psf	hd : windward	1.46 ft
lu - upper	200.00 ft	hd : Max	4.39 ft
lu-lower	40.00 ft	hd : Design	4.39 ft
Height of Roof Step	24.00 ft	pd : Max Drift Only	72.79 psf
Snow Density	16.60 pcf	pd + Balanced	92.79 psf
hb : Balanced	1.21 ft	W : Drift Width	17.54 ft
hc : Step Height - hb	22.80 ft		
hc / hb	18.92	Total Snow Load @ End of Drift	20.00 psf
Importance Factor	1.00		

LATERAL ANALYSIS

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221205 - Coastal Pacific Distribution Facility - EQ Analysis

Design Loads

$DL_{roof} := 10\ psf$

$DL_{mech} := 15\ psf$

$LL_{roof} := 20\ psf$

$SL_{roof} := 20\ psf$

Seismic Loads

SDC D	Seismic design category
$S_s := 1.272$	
$S_1 := 0.438$	
$F_a := 1$	
$S_{DS} := 0.848$	Short period spectral acceleration
$T_L := 6$	Long time period
$R_{seis} := 6.0$	Response modification factor
$\Omega := 2.0$	Over strength factor
$C_d := 5.0$	Deflection amplification factor
$C_t := 0.02$	Coefficient from ASCE Table 12.8-1 (All Other Structural Systems)
$x := 0.75$	Coefficient from ASCE Table 12.8-1 (All Other Structural Systems)
$h_n := 45$	Height of story
$T_a := \left(C_t \cdot \left(h_n\right)^x\right) = 0.347$	Approximate building fundamental period
$C_u := 1.4$	Table 12.8-1, Coefficient for Upper Limit On Calculated Period
$T_{max} := C_u \cdot T_a = 0.49$	Maximum Fundamental Period

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Seismic Loads

SDC D Seismic design category

$S_s = 1.272$ USGS Seismic Design Maps

$S_1 = 0.438$ USGS Seismic Design Maps

$F_a = 1$ Table 11.4-1, ASCE 7-16, Pg 84

$F_{v12} := \begin{bmatrix} 1.7 \\ 1.8 \\ 1.9 \end{bmatrix}$ $S_{12} := \begin{bmatrix} 0.6 \\ 0.5 \\ 0.4 \end{bmatrix}$ $S_1 = 0.438$

$F_v := \text{linterp}\left(F_{v12}, S_{12}, S_1\right) = 1.862$ Table 11.4-1, ASCE 7-16, Pg 84

$S_{MS} := F_a \cdot S_s = 1.272$ Eq. 11.4-1, ASCE 7-16, Pg. 84

$S_{M1} := F_v \cdot S_1 = 0.816$ Eq. 11.4-2, ASCE 7-16, Pg. 84

$S_{M1\_1.5} := S_{M1} \cdot 1.5 = 1.223$ ASCE 7-16, Supplement 3

$S_{DS} = 0.848$ Short period spectral acceleration (USGS Seismic Design Maps)

$S_{D1} := \frac{2}{3} \cdot S_{M1\_1.5} = 0.816$ 1s Spectral acceleration

$T_s := \frac{S_{D1}}{S_{DS}} = 0.962$

$T_0 := 0.2 \cdot \frac{S_{D1}}{S_{DS}} = 0.192$

$$S_a := \begin{array}{l} \text{if } T_a \le T_0 \\ \quad \left\| S_{DS} \cdot \left(0.4 + 0.6 \cdot \frac{T_a}{T_0}\right) \right. \\ \text{else if } \left(T_0 \le T_a \le T_s\right) \\ \quad \left\| S_{DS} \right. \\ \text{else if } \left(T_L \ge T_a \ge T_s\right) \\ \quad \left\| \frac{S_{D1}}{T_a} \right. \\ \text{else if } \left(T_a \ge T_L\right) \\ \quad \left\| \frac{S_{D1} \cdot T_L}{T_a^{\ 2}} \right. \end{array} = 0.848$$

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$I_e := 1.0$ Importance Factor for Risk Cat. II Building

$$C_s := \frac{S_a}{\left(\frac{R_{seis}}{I_e}\right)} = 0.141$$

Cs need not exceed the following

$$C_{s\_limit} := \begin{cases} \text{if } T_a \le T_L & \dfrac{S_{D1}}{T_a \cdot \left(\frac{R_{seis}}{I_e}\right)} \\ \text{else if } (T_a \ge T_L) & \dfrac{S_{D1} \cdot T_L}{{T_a}^2 \cdot \left(\frac{R_{seis}}{I_e}\right)} \end{cases} = 0.391$$

$\blacksquare > C_s$ *OK*

Cs shall not be less than

$$C_{s\_limit2} := \max\left(0.044\ S_{DS} \cdot I_e , 0.01\right) = 0.037$$

$\blacksquare < C_s$ *OK*

$$C_{s\_limit3} := \begin{cases} \text{if } S_1 \ge 0.6 & \dfrac{0.5 \cdot S_1}{\left(\frac{R_{seis}}{I_e}\right)} \\ \text{else} & C_s \end{cases} = 0.141$$

$S_1 < 0.6$ *OK*

$C_{s\_FINAL} := 0.141$

ASCE 7-16 Seismic Base Shear

Project File: 221205 - Costal Pacific Distribution Facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Seismic Base Shear Analysis

Specific Description: 221205 - CPFD - EQ Analysis

Risk Category

Calculations per ASCE 7-16

Risk Category of Building or Other Structure :		"II" : All Buildings and other structures except those listed as Category I, III, and IV	*ASCE 7-16, Page 4, Table 1.5-1*
Seismic Importance Factor	=	1	*ASCE 7-16, Page 5, Table 1.5-2*

Gridded Ss & S1values from ASCE 7-16

ASCE 7-16 11.4.2

Max. Ground Motions, 5% Damping :

S_S = 1.285 g, 0.2 sec response

S_1 = 0.4425 g, 1.0 sec response

Location : Puyallup, WA 98371

Latitude = 47.196 deg North

Longitude = 122.316 deg West

For the closest datapoint grid location . . .

Latitude = 47.200 deg North

Longitude = 122.310 deg West

Site Class, Site Coeff. and Design Category

Classification: "D" : Shear Wave Velocity 600 to 1,200 ft/sec		=	**D** (Based on Testing)	*ASCE 7-16 Table 20.3-1*
Site Coefficients Fa & Fv	Fa	=	1.00	*ASCE 7-16 Table 11.4-1 & 11.4-2*
(using straight-line interpolation from table value	Fv	=	2.77	
Maximum Considered Earthquake Acceleratio	S_{MS} = Fa * Ss	=	1.285	*ASCE 7-16 Eq. 11.4-1*
	S_{M1} = Fv * S1	=	1.226	*ASCE 7-16 Eq. 11.4-2*
Design Spectral Acceleration	$S_{DS} = S_{MS}$ * 2/3	=	0.857	*ASCE 7-16 Eq. 11.4-3*
	$S_{D1} = S_{M1}$ * 2/3	=	0.817	*ASCE 7-16 Eq. 11.4-4*
Seismic Design Category		=	**D**	*ASCE 7-16 Table 11.6-1 & -2*

Resisting System

ASCE 7-16 Table 12.2-1

Basic Seismic Force Resisting System . . . **Building Frame Systems**
2.Steel special concentrically braced frames

Response Modification Coefficient " R	=	6.00	Building height Limits :		
System Overstrength Factor " Wo "	=	2.00	Category "A & B" Limit:	No Limit	
Deflection Amplification Factor " Cd "	=	5.00	Category "C" Limit:	No Limit	
			Category "D" Limit:	Limit = 160	
			Category "E" Limit:	Limit = 160	
			Category "F" Limit:	Limit = 100	

NOTE! See ASCE 7-16 for all applicable footnote

Lateral Force Procedure

ASCE 7-16 Section 12.8.2

Equivalent Lateral Force Procedure

The "Equivalent Lateral Force Procedure" is being used according to the provisions of ASCE 7-16 12.8

Determine Building Period

Use ASCE 12.8-7

Structure Type for Building Period CalculatiAll Other Structural Systems

" Ct " value = 0.020 " hn " : Height from base to highest level : 45.0 ft

" x " value = 0.75

" Ta " Approximate fundemental period using Eq. 12.8-7 : Ta = Ct * (hn ^ x) = 0.347 sec

"TL" : Long-period transition period per ASCE 7-16 Maps 22-14 -> 22-17 6.000 sec

Building Period " Ta " Calculated from Approximate Method selecte= 0.347

" Cs " Response Coefficient

ASCE 7-16 Section 12.8.1.1

S_{DS} : Short Period Design Spectral Response	=	0.857	From Eq. 12.8-2, Preliminary Cs	=	0.143
" R " : Response Modification Factor	=	6.00	From Eq. 12.8-3 & 12.8-4 , Cs need not exceed	=	0.392
" I " : Seismic Importance Factor	=	1	From Eq. 12.8-5 & 12.8-6, Cs not be less than	=	0.038

Cs : Seismic Response Coefficient = = **0.1428**

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221205 - Coastal Pacific Distribution Facility - Frame Analysis Along Gridline C.5 & L

Design Loads

$DL_{roof} := 10\ psf$	Roof Dead Load
$DL_{mech} := 15\ psf$	Mechanical Dead Load
$DL_{wall} := 20\ psf$	Wall Dead Load
$LL_{roof} := 20\ psf$	Roof Live Load
$SL_{roof} := 25\ psf$	Snow Load
$SL_{drift} := 70\ psf$	Drift Snow Load
$WL_{wind\_lee} := 25\ psf$	Wind Pressure From Attached Wind Analysis (Windward + Leeward)
$S_{DS} := 0.848$	Short period spectral acceleration
$C_s := 0.1428$	Seismic Response Coefficient (from attached analysis)

Frame Loads Along Gridline C.5 & L

$DL_{C.5\_roof\_lvl1} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 56.5\ ft \cdot 0.5\right) = 0.71\ klf$	Frame Roof Dead Load (UDL) at Higher Elevation
$DL_{C.5\_roof\_lvl2} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 19\ ft \cdot 0.5\right) = 0.24\ klf$	Frame Roof Dead Load (UDL) at Lower Elevation
$LL_{C.5\_roof\_lvl1} := \left(LL_{roof} \cdot 56.5\ ft \cdot 0.5\right) = 0.57\ klf$	Frame Roof Live Load (UDL) at Higher Elevation
$LL_{C.5\_roof\_lvl2} := \left(LL_{roof} \cdot 19\ ft \cdot 0.5\right) = 0.19\ klf$	Frame Roof Live Load (UDL)) at Lower Elevation
$SL_{C.5\_roof\_lvl1} := \left(SL_{roof} \cdot 56.5\ ft \cdot 0.5\right) = 0.71\ klf$	Frame Roof Snow Load (UDL) at Higher Elevation
$SL_{C.5\_roof\_lvl2} := \left(SL_{drift} \cdot 10\ ft \cdot 0.5\right) = 0.35\ klf$	Frame Roof Snow Load (UDL) at Higher Elevation
$DL_{C.5\_seis\_roof\_lvl1} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 205.25\ ft \cdot 66.5\ ft \cdot 0.5\right) = 170.61\ kip$	Seismic Roof Dead Load (Mass) For Frame at Higher Elevation

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$$DL_{C.5\_seis\_wall\_lvl1} := \left(DL_{wall} \cdot 66.5\ ft \cdot 45\ ft \cdot 0.5 + DL_{wall} \cdot 5.5\ ft \cdot 205.25\ ft\right) = 52.5\ kip$$

Seismic Wall Dead Load (Mass) For Frame at Higher Elevation

$$DL_{C.5\_seis\_roof\_lvl2} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 205.25\ ft \cdot 115.5\ ft \cdot 0.5\right) = 296.33\ kip$$

Seismic Roof Dead Load (Mass) For Frame at Lower Elevation

$$DL_{C.5\_seis\_wall\_lvl2} := \left(DL_{wall} \cdot 17\ ft \cdot 115.5\ ft + DL_{wall} \cdot 5.5\ ft \cdot 205.25\ ft + 10\ psf \cdot 205.25\ ft \cdot 17\ ft\right) = 96.74\ kip$$

Seismic Wall Dead Load (Mass) For Frame at Lower Elevation

$$DL_{C.5\_seis\_roof\_lvl1} + DL_{C.5\_seis\_wall\_lvl1} = 223.12\ kip$$

Total seismic weight at lvl 1 @ 45 ft.

$$DL_{C.5\_seis\_roof\_lvl2} + DL_{C.5\_seis\_wall\_lvl2} = 393.07\ kip$$

Total seismic weight at lvl 2 @ 34 ft.

Based on the vertical distribution of shear in attached ENERCALC seismic analysis

$$EQ_{C.5\_H\_lvl1} := \frac{38.5\ kip}{205.25\ ft} = 0.19\ klf$$

Frame Seismic Load (UDL) EW Direction @ higher elevation

$$EQ_{C.5\_V\_lvl1} := 0.2 \cdot S_{DS} \cdot DL_{C.5\_roof\_lvl1} = 0.12\ klf$$

Vertical Seismic Load @ higher elevation

$$EQ_{C.5\_H\_lvl2} := \frac{68\ kip}{205.25\ ft} = 0.33\ klf$$

Frame Seismic Load (UDL) EW Direction @ lower elevation

$$EQ_{C.5\_V\_lvl2} := 0.2 \cdot S_{DS} \cdot \left(DL_{C.5\_roof\_lvl2}\right) = 0.04\ klf$$

Vertical Seismic Load @ lower elevation

$$WL_{C.5\_lvl1} := \frac{WL_{wind\_lee} \cdot 45\ ft \cdot 66.5\ ft \cdot 0.25}{205.25\ ft} = 0.09\ klf$$

Frame Wind Load (UDL) EW Direction For Frame at Higher Level

$$WL_{C.5\_lvl2} := \frac{WL_{wind\_lee} \cdot \left((34\ ft \cdot 115.5\ ft \cdot 0.25) + 10\ ft \cdot 45\ ft \cdot 0.5\right)}{205.25\ ft} = 0.15\ klf$$

Frame Wind Load (UDL) EW Direction For Frame at Higher Level

See attached STAAD analysis for initial elastic analysis of frame and brace design

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Deflection and Story Drift Check

$\Delta_B := 0.343\ in$ Deflection/interstory from initial elastic analysis

$C_d := 5$ Deflection Amplification Factor

$\Delta_{B\_Cd} := \Delta_B \cdot C_d = 1.72\ in$ Amplified deflection/interstory drift

$\Delta_{allow} := 0.02 \cdot 34\ ft = 8.16\ in$ Allowable story Drift

$\Delta_B < \Delta_{allow}$ OK ww

Brace Design

AISC seismic provisions requires that between 30% and 70% of the total horizontal force is resisted by braces in tension unless the available strength of each brace in compression is larger than the required strength resulting from the Overstrength seismic load.

$$EQ_{H\_tot} := \left(EQ_{C.5\_H\_lvl1} \cdot 205.25\ ft\right) + \left(EQ_{C.5\_H\_lvl2} \cdot 205.25\ ft\right) = 106.5\ kip$$

$$F_{brace\_ten1} := \frac{30\ kip \cdot \dfrac{18.5\ ft}{25\ ft}}{\left(EQ_{C.5\_H\_lvl1}\right) \cdot 205.25\ ft} \cdot 100 = 57.66$$ OK EL100 to EL131

$$F_{brace\_ten2} := \frac{\left(\left(70\ kip\right) \cdot \dfrac{18.5\ ft}{22.33\ ft}\right)}{EQ_{H\_tot}} \cdot 100 = 54.45$$ NOT OK EL131 to EL143.5

Width-to-Thickness Limitations

For the HSS 6x6x0.50 And HSS 5x5x0.50 braces

Per AISC Seismic Design Manual, Table 1-5b, for A1085 Grade A material, all braces satisfy width-to-thickness limitations for highly ductile members.

Brace Slenderness Check

Brace slenderness has been checked in the STAAD model

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Analysis for Frame Considering the Expected Strengths of Braces in Tension And Compression

For the HSS 6x6x0.5

$R_y := 1.25$

A1085 material

$F_y := 50\ ksi$

Tensile capacity of braces

HSS 6x6x0.5 $\quad P_{T\_HSS\_6x6x0.5} := R_y \cdot F_y \cdot 9.74\ in^2 = 608.75\ kip$

HSS 5x5x0.50 $\quad P_{T\_HSS\_5x5x0.5} := R_y \cdot F_y \cdot 7.88\ in^2 = 492.5\ kip$

Compression capacity of braces

HSS 6x6x0.5

$$\frac{KL_c}{r} \quad \frac{19\ ft}{2.23\ in} = 102.24 \quad > \quad 4.71 \cdot \sqrt{\frac{29000\ ksi}{R_y \cdot F_y}} = 101.46$$

$$F_e := \left(\frac{\pi^2 \cdot 29000\ ksi}{\left(\frac{19\ ft}{2.23\ in} \right)^2} \right) = 27.38\ ksi$$

$$F_{cr} := 0.877 \cdot F_e = 24.01\ ksi$$

$$P_{c\_HSS\_6x6x0.5} := min\left(R_y \cdot F_y \cdot 9.74\ in^2, \left(\frac{1}{0.877} \right) \cdot F_{cr} \cdot 9.74\ in^2 \right) = 266.68\ kip$$

Maximum post-buckling brace strength (AISC Seismic Provisions F2.3(b))

$$P_{c\_post\_6x6x0.5} := P_{c\_HSS\_6x6x0.5} \cdot 0.3 = 80.01\ kip$$

HSS 5x5x0.5

$$\frac{KL_c}{r} \quad \frac{15\ ft}{1.82\ in} = 98.9 \quad < \quad 4.71 \cdot \sqrt{\frac{29000\ ksi}{R_y \cdot F_y}} = 101.46$$

$$F_e := \left(\frac{\pi^2 \cdot 29000\ ksi}{\left(\frac{15\ ft}{1.82\ in} \right)^2} \right) = 29.26\ ksi$$

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$$F_{cr} := \left(0.658^{\left(\frac{R_y \cdot F_y}{F_e}\right)}\right) \cdot R_y \cdot F_y = 25.56\ ksi$$

$$P_{c\_HSS\_5x5x0.5} := min\left(R_y \cdot F_y \cdot 7.88\ in^2, \left(\frac{1}{0.877}\right) \cdot F_{cr} \cdot 7.88\ in^2\right) = 229.7\ kip$$

Maximum post-buckling brace strength (AISC Seismic Provisions F2.3(b))

$$P_{c\_post\_5x5x0.5} := P_{c\_HSS\_5x5x0.5} \cdot 0.3 = 68.91\ kip$$

Column Design

Design of columns at Gridlines 8 and 9

$$P_{col\_DL} := 33\ kip$$

$$P_{col\_LL} := 20\ kip$$

$$P_{col\_SL} := 25\ kip$$

The axial compressive/tension force on the columns considering expected brace strengths in tension and compression. Analysis considering post-buckled compression strength is not expected to govern.

$$P_{Emh\_C} := \left(P_{c\_HSS\_6x6x0.5} \cdot \frac{16.5\ ft}{24.79\ ft}\right) + \left(P_{c\_HSS\_5x5x0.5} \cdot \frac{12.5\ ft}{22.33\ ft}\right) = 306.08\ kip$$

$$P_{Emh\_T} := \left(P_{T\_HSS\_6x6x0.5} \cdot \frac{16.5\ ft}{24.79\ ft}\right) + \left(P_{T\_HSS\_5x5x0.5} \cdot \frac{12.5\ ft}{22.33\ ft}\right) = 680.87\ kip$$

$P_{a\_Comp} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL} + 0.7 \cdot P_{Emh\_C} = 251.18\ kip$ Total compressive demand on columns

$P_{a\_Ten} := \left(0.6 - 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL} + 0.7 \cdot \left(-P_{Emh\_T}\right) = -460.73\ kip$ Total tensile demand on columns

Use W12x96 column

$P_{cap\_W12x96\_comp} := 626\ kip$ Compressive capacity of column with L_b = 16.5ft

$IR_{col\_comp} := \frac{P_{a\_Comp}}{P_{cap\_W12x96\_comp}} = 0.4$ OK

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$P_{cap\_W12x65\_tension} := \frac{50\ ksi \cdot 28.2\ in^2}{1.67} = 844.31\ kip$ Tensile capacity of column

$IR_{col\_ten} := \frac{-P_{a\_Ten}}{P_{cap\_W12x65\_tension}} = 0.55$ *OK*

Design of Column At Gridline 8.5

$P_{col\_DL\_M} := 28\ kip$

$P_{col\_LL\_M} := 15\ kip$

$P_{col\_SL\_M} := 18\ kip$

The axial compressive/tension force on the columns considering expected brace strengths in tension and compression. Analysis considering post-buckled compression strength of braces is expected to govern.

$$P_{Emh\_M} := 2 \cdot \left(\left(P_{T\_HSS\_6x6x0.5} - P_{c\_post\_6x6x0.5} \right) \cdot \frac{16.5\ ft}{24.79\ ft} \right) + \left(\left(P_{T\_HSS\_5x5x0.5} - P_{c\_post\_5x5x0.5} \right) \cdot \frac{12.5\ ft}{22.33\ ft} \right) = 940.98\ kip$$

$P_{a\_Comp\_M} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL\_M} + 0.7 \cdot P_{Emh\_M} = 690.01\ kip$ Total compressive demand on columns

Use W12x120 column

$P_{cap\_W12x120\_comp} := 787\ kip$ Compressive capacity of column with unbraced Lb = 8ft

$IR_{col\_comp\_M} := \frac{P_{a\_Comp\_M}}{P_{cap\_W12x120\_comp}} = 0.88$ *OK*

Beam/Strut Design

Beams/Struts at Elevation 116'-0" And Between Column Lines 8 And 9

The axial force on the beams considering expected brace strengths in tension and compression is

$P_{x1} := P_{T\_HSS\_6x6x0.5} \cdot \frac{18.5\ ft}{24.79\ ft} = 454.29\ kip$ Elevation 108' To 140' Between Gridlines 8.5 and 9

$P_{x2} := P_{c\_HSS\_6x6x0.5} \cdot \frac{18.5\ ft}{24.79\ ft} = 199.02\ kip$ Elevation 108' To 140' Between Gridlines 9 and 9.5

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$P_D := 0\ kip$ Axial load on all beams due to DL is 0

Considering governing load combination from ASCE 7-16

$P_{a1} := (1 + 0.14 \cdot S_{DS}) \cdot P_D + 0.7 \cdot P_{x1} = 318\ kip$

Beams/struts at these elevations are unbraced with L_b = 18.5 ft.

Consider W12X72 beams/struts

$P_{cap\_W12x72} := 428\ kip$ Compressive strength of member

$$IR := \frac{P_{a1}}{P_{cap\_W12x72}} = 0.74 \qquad OK$$

Beams/Struts at Elevation 132'-0" And Between Column Lines 8 And 9

The axial force on the beams considering expected brace strengths in tension and compression

$$P_{x3} := \left(\left(P_{T\_HSS\_5x5x0.5} + P_{c\_HSS\_5x5x0.5}\right) \cdot \frac{18.5\ ft}{22.5\ ft} \right) - \left(\left(P_{T\_HSS\_6x6x0.5} + P_{c\_HSS\_6x6x0.5}\right) \cdot \frac{18.5\ ft}{25\ ft} \right) = -54.02\ kip$$

The axial force on the beams considering expected brace strengths in tension and post buckling compression

$$P_{x3\_post} := \left(\left(P_{T\_HSS\_5x5x0.5} + P_{c\_post\_5x5x0.5}\right) \cdot \frac{18.5\ ft}{22.5\ ft} \right) - \left(\left(P_{T\_HSS\_6x6x0.5} + P_{c\_post\_6x6x0.5}\right) \cdot \frac{18.5\ ft}{25\ ft} \right) = -48.08\ kip$$

Considering equilibrium about joint at gridline 10

$$P_{x3} := \left(P_{T\_HSS\_5x5x0.5}\right) \cdot \frac{18.5\ ft}{22.5\ ft} + \frac{P_{x3\_post}}{2} = 380.91\ kip$$

Considering governing load combination from ASCE 7-16

$P_{a2} := (1 + 0.14 \cdot S_{DS}) \cdot P_D + 0.7 \cdot P_{x3} = 266.63\ kip$

Consider 24X84 beams/struts

$P_{cap\_W24x84} := 332\ kip$ Compressive strength of member considering an unbraced length of 6 ft.

$$IR := \frac{P_{a2}}{P_{cap\_W24x84}} = 0.8 \qquad OK$$

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$M_{a2} := 2\ kip \cdot ft$ Moment demand on beam

$M_{capW16\_H} := 559\ kip \cdot ft$ Moment capacity of beam

Combined loading

$$\frac{P_{a2}}{P_{cap\_W24x84}} + \frac{8}{9} \cdot \left(\frac{M_{a2}}{M_{capW16\_H}}\right) = 0.81 \qquad OK$$

Beams/Struts at Elevation 143'-6" And Between Column Lines 8 And 9

The axial force on the beams considering expected brace strengths in tension and compression

$$P_{x3} := \left(\left(P_{T\_HSS\_5x5x0.5} + P_{c\_HSS\_5x5x0.5}\right) \cdot \frac{18.5\ ft}{22.5\ ft}\right) = 593.81\ kip$$

The axial force on the beams considering expected brace strengths in tension and post buckling compression

$$P_{x3\_post} := \left(\left(P_{T\_HSS\_5x5x0.5} + P_{c\_post\_5x5x0.5}\right) \cdot \frac{18.5\ ft}{22.5\ ft}\right) = 461.6\ kip$$

Considering governing load combination from ASCE 7-16

$$P_{a2} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_D + 0.7 \cdot P_{x3} = 415.66\ kip$$

Consider 24X94 beams/struts

$P_{cap\_W24x94} := 553\ kip$ Compressive strength of member considering an unbraced length of 6 ft.

$$IR := \frac{P_{a2}}{P_{cap\_W24x94}} = 0.75 \qquad OK$$

$M_{a2} := 55\ kip \cdot ft$ Moment demand on beam

$M_{capW24x94} := 634\ kip \cdot ft$ Moment capacity of beam

Combined loading

$$\frac{P_{a2}}{P_{cap\_W24x94}} + \frac{8}{9} \cdot \left(\frac{M_{a2}}{M_{capW24x94}}\right) = 0.83 \qquad OK$$

ASCE 7-16 Seismic Base Shear

Project File: 221205 - Costal Pacific Distribution Facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Seismic Base Shear Analysis

Specific Description: Frame Analysis Along Gridline C and L

Risk Category

Calculations per ASCE 7-16

Risk Category of Building or Other Structure : "II" : All Buildings and other structures except those listed as Category I, III, and IV — *ASCE 7-16, Page 4, Table 1.5-1*

Seismic Importance Factor = 1 — *ASCE 7-16, Page 5, Table 1.5-2*

Gridded Ss & S1values from ASCE 7-16

ASCE 7-16 11.4.2

Max. Ground Motions, 5% Damping :

S_S = 1.285 g, 0.2 sec response
S_1 = 0.4425 g, 1.0 sec response

Location : Puyallup, WA 98371
Latitude = 47.196 deg North
Longitude = 122.316 deg West

For the closest datapoint grid location . . .

Latitude = 47.200 deg North
Longitude = 122.310 deg West

Site Class, Site Coeff. and Design Category

Classification: "D" : Shear Wave Velocity 600 to 1,200 ft/sec		=	**D** (Based on Testing)	*ASCE 7-16 Table 20.3-1*
Site Coefficients Fa & Fv	Fa	=	1.00	*ASCE 7-16 Table 11.4-1 & 11.4-2*
(using straight-line interpolation from table value	Fv	=	2.77	
Maximum Considered Earthquake Acceleratioı	S_{MS} = Fa * Ss	=	1.285	*ASCE 7-16 Eq. 11.4-1*
	S_{M1} = Fv * S1	=	1.226	*ASCE 7-16 Eq. 11.4-2*
Design Spectral Acceleration	$S_{DS} = S_{MS}$ * 2/3	=	0.857	*ASCE 7-16 Eq. 11.4-3*
	$S_{D1} = S_{M1}$ * 2/3	=	0.817	*ASCE 7-16 Eq. 11.4-4*
Seismic Design Category		=	**D**	*ASCE 7-16 Table 11.6-1 & -2*

Resisting System

ASCE 7-16 Table 12.2-1

Basic Seismic Force Resisting System . . . **Building Frame Systems**
2.Steel special concentrically braced frames

Response Modification Coefficient " R	=	6.00
System Overstrength Factor " Wo "	=	2.00
Deflection Amplification Factor " Cd "	=	5.00

Building height Limits :

Category "A & B" Limit:	No Limit
Category "C" Limit:	No Limit
Category "D" Limit:	Limit = 160
Category "E" Limit:	Limit = 160
Category "F" Limit:	Limit = 100

NOTE! See ASCE 7-16 for all applicable footnote

Lateral Force Procedure

ASCE 7-16 Section 12.8.2

Equivalent Lateral Force Procedure

The "Equivalent Lateral Force Procedure" is being used according to the provisions of ASCE 7-16 12.8

Determine Building Period

Use ASCE 12.8-7

Structure Type for Building Period CalculatiAll Other Structural Systems

" Ct " value = 0.020 " hn " : Height from base to highest level = 45.0 ft

" x " value = 0.75

" Ta " Approximate fundemental period using Eq. 12.8-7 : Ta = Ct * (hn ^ x) = 0.347 sec

"TL" : Long-period transition period per ASCE 7-16 Maps 22-14 -> 22-17 6.000 sec

Building Period " Ta " Calculated from Approximate Method select= 0.347

" Cs " Response Coefficient

ASCE 7-16 Section 12.8.1.1

S_{DS} : Short Period Design Spectral Response	=	0.857	From Eq. 12.8-2, Preliminary Cs	=	0.143
" R " : Response Modification Factor	=	6.00	From Eq. 12.8-3 & 12.8-4 , Cs need not exceed	=	0.392
" I " : Seismic Importance Factor	=	1	From Eq. 12.8-5 & 12.8-6, Cs not be less than	=	0.038

Cs : Seismic Response Coefficient = = **0.1428**

ASCE 7-16 Seismic Base Shear

Project File: 221205 - Costal Pacific Distribution Facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Seismic Base Shear Analysis

Seismic Base Shear

ASCE 7-16 Section 12.8.1

Cs = 0.1428 from 12.8.1.1

W (see Sum Wi below) = 616.00 k

Seismic Base Shear V = Cs * W = 87.95 k

Vertical Distribution of Seismic Forces

ASCE 7-16 Section 12.8.3

" k " : hx exponent based on Ta = 1.00

Table of building Weights by Floor Level...

Level #	Wi : Weight	Hi : Height	(Wi * Hi^k)	Cvx	Fx=Cvx * V	Sum Story Shear	Sum Story Moment
2	223.00	45.00	10,035.00	0.4289	37.72	37.72	0.00
1	393.00	34.00	13,362.00	0.5711	50.23	87.95	414.95

Sum Wi = 616.00 k Sum Wi * Hi = 23,397.00 k-ft Total Base Shear = 87.95 k

Base Moment = 3,405.3 k-ft

Diaphragm Forces : Seismic Design Category "B" to "F"

ASCE 7-16 12.10.1.1

Level #	Wi	Fi	Sum Fi	Sum Wi	Fpx : Calcd	Fpx : Min	Fpx : Max	Fpx	Dsgn. Force
2	223.00	37.72	37.72	223.00	37.72	38.21	76.41	38.21	38.21
1	393.00	50.23	87.95	616.00	56.11	67.33	134.67	67.33	67.33

Wpx . . . . Weight at level of diaphragm and other structure elements attached to it.

Fi . . . . Design Lateral Force applied at the level.

Sum Fi . . . . Sum of "Lat. Force" of current level plus all levels above

MIN Req'd Force @ Level . . . $0.20 * S_{DS} * I * Wpx$

MAX Req'd Force @ Level . . $0.40 * S_{DS} * I * Wpx$

Fpx : Design Force @ Level . Wpx * SUM(x->n) Fi / SUM(x->n) wi, x = Current level, n = Top Level

Job Information

	Engineer	Checked	Approved
Name:			
Date:	3/11/2024		

Project ID	
Project Name	

Structure Type	SPACE FRAME

Number of Nodes	24	Highest Node	24
Number of Elements	37	Highest Beam	37

Number of Basic Load Cases	7
Number of Combination Load Cases	39

Included in this printout are data for:

All	The Whole Structure

Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	DEAD LOAD
Primary	2	ROOF LIVE LOAD
Primary	3	SNOW LOAD
Primary	4	WIND 1
Primary	5	WIND 2
Primary	6	SEISMIC - H
Primary	8	SEISMIC - V
Combination	100	COMB - 1 DEAD
Combination	101	COMB - 1 DEAD + 1 SNOW
Combination	102	COMB - 1 DEAD + 1 ROOF LIVE
Combination	103	COMB - 1 DEAD + 0.75 ROOF LIVE
Combination	104	COMB - 1 DEAD + 0.75 SNOW
Combination	105	COMB - 1 DEAD + 0.6 WIND (1)
Combination	106	COMB - 1 DEAD + 0.6 WIND (2)
Combination	107	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7
Combination	108	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7
Combination	109	COMB - 1 DEAD + 0.75 WIND + 0.75 SN(
Combination	110	COMB - 1 DEAD + 0.75 WIND + 0.75 SN(
Combination	111	COMB - 1 DEAD + 0.75 WIND (1)
Combination	112	COMB - 1 DEAD + 0.75 WIND (2)
Combination	113	COMB - 0.6 DEAD + 0.6 WIND (1)
Combination	114	COMB - 0.6 DEAD + 0.6 WIND (2)
Combination	115	COMB - 1 DEAD + 0.91 SEISMIC-H + 0.7
Combination	116	COMB - 1 DEAD + -0.91 SEISMIC-H + 0.7
Combination	117	COMB - 1 DEAD + 0.91 SEISMIC-H + -0.7

Job Information Cont...

Type	L/C	Name
Combination	118	COMB - 1 DEAD + -0.91 SEISMIC-H + -0.
Combination	119	COMB - 1 DEAD + 0.683 SEISMIC-H + 0.!
Combination	120	COMB - 1 DEAD + -0.683 SEISMIC-H + 0
Combination	121	COMB - 1 DEAD + 0.683 SEISMIC-H + -0
Combination	122	COMB - 1 DEAD + -0.683 SEISMIC-H + -(
Combination	123	COMB - 0.6 DEAD + 0.91 SEISMIC-H + -(
Combination	124	COMB - 0.6 DEAD + -0.91 SEISMIC-H + -
Combination	125	COMB - 0.6 DEAD + 0.91 SEISMIC-H + 0.
Combination	126	COMB - 0.6 DEAD + -0.91 SEISMIC-H + (
Combination	315	COMB - 1 DEAD + 1.4 SEISMIC-H + 0.7 S
Combination	316	COMB - 1 DEAD + -1.4 SEISMIC-H + 0.7
Combination	317	COMB - 1 DEAD + 1.4 SEISMIC-H + -0.7
Combination	318	COMB - 1 DEAD + -1.4 SEISMIC-H + -0.7
Combination	319	COMB - 1 DEAD + 1.05 SEISMIC-H + 0.5:
Combination	320	COMB - 1 DEAD + -1.05 SEISMIC-H + 0.5
Combination	321	COMB - 1 DEAD + 1.05 SEISMIC-H + -0.5
Combination	322	COMB - 1 DEAD + -1.05 SEISMIC-H + -0.
Combination	323	COMB - 0.6 DEAD + 1.4 SEISMIC-H + -0.
Combination	324	COMB - 0.6 DEAD + -1.4 SEISMIC-H + -0
Combination	326	COMB - 0.6 DEAD + 1.4 SEISMIC-H + 0.7
Combination	327	COMB - 0.6 DEAD + -1.4 SEISMIC-H + 0.

Section Properties

Prop	Section	Area (in^2)	I_{yy} (in^4)	I_{zz} (in^4)	J (in^4)	Material
1	W8X10	2.960	2.090	30.800	0.043	STEEL_50_KS
2	HSST5X5X.5_A1085	8.360	27.100	27.100	45.562	STEEL_50_KS
3	HSST6X6X.5_A1085	10.400	50.500	50.500	83.188	STEEL_50_KS
4	W12X65	19.100	174.000	533.000	2.180	STEEL_50_KS
5	W24X84	24.700	94.400	2.37E+3	3.700	STEEL_50_KS
6	W12X120	35.200	345.000	1.07E+3	12.900	STEEL_50_KS
7	W14X68	20.000	121.000	722.000	3.010	STEEL_50_KS
8	W12X96	28.200	270.000	833.000	6.850	STEEL_50_KS
9	W12X72	21.100	195.000	597.000	2.930	STEEL_50_KS
10	W24X94	27.700	109.000	2.7E+3	5.260	STEEL_50_KS

Materials

Mat	Name	E (kip/in^2)	ν	Density (kip/in^3)	α (/°F)
1	STEEL	29E+3	0.300	0.000	6.5E -6
2	CONCRETE	3.15E+3	0.170	8.68e-05	5.5E -6
3	ALUMINUM	10E+3	0.330	9.8e-05	12.8E -6
4	STAINLESSSTEEL	28E+3	0.300	0.000	9.9E -6
5	STEEL_36_KSI	29E+3	0.300	0.000	6.5E -6
6	STEEL_50_KSI	29E+3	0.300	0.000	6.5E -6
7	STEEL_275_NMM2	29.7E+3	0.300	0.000	6.67E -6
8	STEEL_355_NMM2	29.7E+3	0.300	0.000	6.67E -6
9	Q235	29.9E+3	0.300	0.000	6.67E -6
10	Q345	29.9E+3	0.300	0.000	6.67E -6
11	Q355	29.9E+3	0.300	0.000	6.67E -6
12	Q390	29.9E+3	0.300	0.000	6.67E -6
13	Q420	29.9E+3	0.300	0.000	6.67E -6
14	Q460	29.9E+3	0.300	0.000	6.67E -6
15	TIMBER	1.5E+3	0.150	0.000	3E -6

Supports

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip·ft/deg)	rY (kip·ft/deg)	rZ (kip·ft/deg)
1	Fixed	Fixed	Fixed	-	-	-
2	-	-	Fixed	-	-	-
3	Fixed	Fixed	Fixed	-	-	-
4	-	-	Fixed	-	-	-
5	Fixed	Fixed	Fixed	-	-	-
6	-	-	Fixed	-	-	-
7	Fixed	Fixed	Fixed	-	-	-
8	-	-	Fixed	-	-	-
9	Fixed	Fixed	Fixed	-	-	-
10	-	-	Fixed	-	-	-
11	Fixed	Fixed	Fixed	-	-	-
12	-	-	Fixed	-	-	-
13	Fixed	Fixed	Fixed	-	-	-
14	-	-	Fixed	-	-	-
15	-	-	Fixed	-	-	-
16	-	-	Fixed	-	-	-
17	-	-	Fixed	-	-	-
18	-	-	Fixed	-	-	-
19	-	-	Fixed	-	-	-
20	-	-	Fixed	-	-	-
21	-	-	Fixed	-	-	-

Releases

Beam ends not shown in this table are fixed in all directions.

Beam	Node	x	y	z	rx	ry	rz
8	2	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
8	4	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
9	4	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
10	8	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
11	8	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
11	10	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
12	10	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
12	12	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
13	12	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
13	14	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
14	2	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
15	4	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
16	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
17	8	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
18	10	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
19	12	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
20	14	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
21	15	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
21	16	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
22	16	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
22	17	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
23	17	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
23	18	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
24	18	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
24	19	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
25	19	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
25	20	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
26	20	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
26	21	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
30	22	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
30	23	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
31	23	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
31	24	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
32	16	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
32	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
33	18	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
33	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
34	22	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
34	17	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
35	24	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
35	17	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
36	3	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
36	23	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
37	7	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Releases Cont...

Beam	Node	x	y	z	rx	ry	rz
37	23	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Primary Load Cases

Number	Name	Type
1	DEAD LOAD	Dead
2	ROOF LIVE LOAD	Roof Live
3	SNOW LOAD	Snow
4	WIND 1	Wind
5	WIND 2	Wind
6	SEISMIC - H	Seismic-H
8	SEISMIC - V	Seismic-V

Combination Load Cases

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
100	COMB - 1 DEAD	1	DEAD LOAD	1.00
101	COMB - 1 DEAD + 1 SNOW	1	DEAD LOAD	1.00
		3	SNOW LOAD	1.00
102	COMB - 1 DEAD + 1 ROOF LIVE	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	1.00
103	COMB - 1 DEAD + 0.75 ROOF LIVE	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	0.75
104	COMB - 1 DEAD + 0.75 SNOW	1	DEAD LOAD	1.00
		3	SNOW LOAD	0.75
105	COMB - 1 DEAD + 0.6 WIND (1)	1	DEAD LOAD	1.00
		4	WIND 1	0.60
106	COMB - 1 DEAD + 0.6 WIND (2)	1	DEAD LOAD	1.00
		5	WIND 2	0.60
107	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	0.75
		4	WIND 1	0.75
108	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	0.75
		5	WIND 2	0.75
109	COMB - 1 DEAD + 0.75 WIND + 0.75 SN(	1	DEAD LOAD	1.00
		4	WIND 1	0.75
		3	SNOW LOAD	0.75
110	COMB - 1 DEAD + 0.75 WIND + 0.75 SN(	1	DEAD LOAD	1.00
		5	WIND 2	0.75
		3	SNOW LOAD	0.75
111	COMB - 1 DEAD + 0.75 WIND (1)	1	DEAD LOAD	1.00

Combination Load Cases Cont...

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
		4	WIND 1	0.75
112	COMB - 1 DEAD + 0.75 WIND (2)	1	DEAD LOAD	1.00
		5	WIND 2	0.75
113	COMB - 0.6 DEAD + 0.6 WIND (1)	1	DEAD LOAD	0.60
		4	WIND 1	0.60
114	COMB - 0.6 DEAD + 0.6 WIND (2)	1	DEAD LOAD	0.60
		5	WIND 2	0.60
115	COMB - 1 DEAD + 0.91 SEISMIC-H + 0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.91
		8	SEISMIC - V	0.70
116	COMB - 1 DEAD + -0.91 SEISMIC-H + 0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	0.70
117	COMB - 1 DEAD + 0.91 SEISMIC-H + -0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.91
		8	SEISMIC - V	-0.70
118	COMB - 1 DEAD + -0.91 SEISMIC-H + -0.	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	-0.70
119	COMB - 1 DEAD + 0.683 SEISMIC-H + 0.	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.68
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
120	COMB - 1 DEAD + -0.683 SEISMIC-H + 0	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.68
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
121	COMB - 1 DEAD + 0.683 SEISMIC-H + -0	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.68
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
122	COMB - 1 DEAD + -0.683 SEISMIC-H + -(	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.68
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
123	COMB - 0.6 DEAD + 0.91 SEISMIC-H + -(	1	DEAD LOAD	0.60
		6	SEISMIC - H	0.91
		8	SEISMIC - V	-0.70
124	COMB - 0.6 DEAD + -0.91 SEISMIC-H + -	1	DEAD LOAD	0.60
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	-0.70
125	COMB - 0.6 DEAD + 0.91 SEISMIC-H + 0.	1	DEAD LOAD	0.60
		6	SEISMIC - H	0.91
		8	SEISMIC - V	0.70
126	COMB - 0.6 DEAD + -0.91 SEISMIC-H + (	1	DEAD LOAD	0.60

Combination Load Cases Cont...

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	0.70
315	COMB - 1 DEAD + 1.4 SEISMIC-H + 0.7 S	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.40
		8	SEISMIC - V	0.70
316	COMB - 1 DEAD + -1.4 SEISMIC-H + 0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.70
		8	SEISMIC - V	0.70
317	COMB - 1 DEAD + 1.4 SEISMIC-H + -0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.40
		8	SEISMIC - V	-0.70
318	COMB - 1 DEAD + -1.4 SEISMIC-H + -0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	-1.40
		8	SEISMIC - V	-0.70
319	COMB - 1 DEAD + 1.05 SEISMIC-H + 0.5	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.05
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
320	COMB - 1 DEAD + -1.05 SEISMIC-H + 0.5	1	DEAD LOAD	1.00
		6	SEISMIC - H	-1.05
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
321	COMB - 1 DEAD + 1.05 SEISMIC-H + -0.5	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.05
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
322	COMB - 1 DEAD + -1.05 SEISMIC-H + -0.	1	DEAD LOAD	1.00
		6	SEISMIC - H	-1.05
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
323	COMB - 0.6 DEAD + 1.4 SEISMIC-H + -0.	1	DEAD LOAD	0.60
		6	SEISMIC - H	1.40
		8	SEISMIC - V	-0.70
324	COMB - 0.6 DEAD + -1.4 SEISMIC-H + -0	1	DEAD LOAD	0.60
		6	SEISMIC - H	-1.40
		8	SEISMIC - V	-0.70
326	COMB - 0.6 DEAD + 1.4 SEISMIC-H + 0.7	1	DEAD LOAD	0.60
		6	SEISMIC - H	1.40
		8	SEISMIC - V	0.70
327	COMB - 0.6 DEAD + -1.4 SEISMIC-H + 0.	1	DEAD LOAD	0.60
		6	SEISMIC - H	-1.40
		8	SEISMIC - V	0.70

Load Generators

There is no data of this type.

1 DEAD LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
8	UNI	lbf/ft	GY	-710.000	-	-	-	-
9	UNI	lbf/ft	GY	-710.000	-	-	-	-
10	UNI	lbf/ft	GY	-710.000	-	-	-	-
11	UNI	lbf/ft	GY	-710.000	-	-	-	-
12	UNI	lbf/ft	GY	-710.000	-	-	-	-
13	UNI	lbf/ft	GY	-710.000	-	-	-	-
21	UNI	lbf/ft	GY	-240.000	-	-	-	-
22	UNI	lbf/ft	GY	-240.000	-	-	-	-
23	UNI	lbf/ft	GY	-240.000	-	-	-	-
24	UNI	lbf/ft	GY	-240.000	-	-	-	-
25	UNI	lbf/ft	GY	-240.000	-	-	-	-
26	UNI	lbf/ft	GY	-240.000	-	-	-	-

1 DEAD LOAD : Selfweight

Direction	Factor	Assigned Geometry
Y	-1.000	ALL

2 ROOF LIVE LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
8	UNI	lbf/ft	GY	-570.000	-	-	-	-
9	UNI	lbf/ft	GY	-570.000	-	-	-	-
10	UNI	lbf/ft	GY	-570.000	-	-	-	-
11	UNI	lbf/ft	GY	-570.000	-	-	-	-
12	UNI	lbf/ft	GY	-570.000	-	-	-	-
13	UNI	lbf/ft	GY	-570.000	-	-	-	-
21	UNI	lbf/ft	GY	-190.000	-	-	-	-
22	UNI	lbf/ft	GY	-190.000	-	-	-	-
23	UNI	lbf/ft	GY	-190.000	-	-	-	-
24	UNI	lbf/ft	GY	-190.000	-	-	-	-
25	UNI	lbf/ft	GY	-190.000	-	-	-	-
26	UNI	lbf/ft	GY	-190.000	-	-	-	-

3 SNOW LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
8	UNI	lbf/ft	GY	-570.000	-	-	-	-
9	UNI	lbf/ft	GY	-570.000	-	-	-	-
10	UNI	lbf/ft	GY	-570.000	-	-	-	-
11	UNI	lbf/ft	GY	-570.000	-	-	-	-
12	UNI	lbf/ft	GY	-570.000	-	-	-	-
13	UNI	lbf/ft	GY	-570.000	-	-	-	-
21	UNI	lbf/ft	GY	-350.000	-	-	-	-
22	UNI	lbf/ft	GY	-350.000	-	-	-	-
23	UNI	lbf/ft	GY	-350.000	-	-	-	-
24	UNI	lbf/ft	GY	-350.000	-	-	-	-
25	UNI	lbf/ft	GY	-350.000	-	-	-	-
26	UNI	lbf/ft	GY	-350.000	-	-	-	-

4 WIND 1 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
8	UNI	lbf/ft	GX	90.000	-	-	-	-
9	UNI	lbf/ft	GX	90.000	-	-	-	-
10	UNI	lbf/ft	GX	90.000	-	-	-	-
11	UNI	lbf/ft	GX	90.000	-	-	-	-
12	UNI	lbf/ft	GX	90.000	-	-	-	-
13	UNI	lbf/ft	GX	90.000	-	-	-	-
21	UNI	lbf/ft	GX	150.000	-	-	-	-
22	UNI	lbf/ft	GX	150.000	-	-	-	-
23	UNI	lbf/ft	GX	150.000	-	-	-	-
24	UNI	lbf/ft	GX	150.000	-	-	-	-
25	UNI	lbf/ft	GX	150.000	-	-	-	-
26	UNI	lbf/ft	GX	150.000	-	-	-	-

5 WIND 2 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
8	UNI	lbf/ft	GX	-90.000	-	-	-	-
9	UNI	lbf/ft	GX	-90.000	-	-	-	-
10	UNI	lbf/ft	GX	-90.000	-	-	-	-
11	UNI	lbf/ft	GX	-90.000	-	-	-	-
12	UNI	lbf/ft	GX	-90.000	-	-	-	-
13	UNI	lbf/ft	GX	-90.000	-	-	-	-
21	UNI	lbf/ft	GX	-150.000	-	-	-	-
22	UNI	lbf/ft	GX	-150.000	-	-	-	-
23	UNI	lbf/ft	GX	-150.000	-	-	-	-
24	UNI	lbf/ft	GX	-150.000	-	-	-	-
25	UNI	lbf/ft	GX	-150.000	-	-	-	-
26	UNI	lbf/ft	GX	-150.000	-	-	-	-

6 SEISMIC - H : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
8	UNI	lbf/ft	GX	190.000	-	-	-	-
9	UNI	lbf/ft	GX	190.000	-	-	-	-
10	UNI	lbf/ft	GX	190.000	-	-	-	-
11	UNI	lbf/ft	GX	190.000	-	-	-	-
12	UNI	lbf/ft	GX	190.000	-	-	-	-
13	UNI	lbf/ft	GX	190.000	-	-	-	-
21	UNI	lbf/ft	GX	330.000	-	-	-	-
22	UNI	lbf/ft	GX	330.000	-	-	-	-
23	UNI	lbf/ft	GX	330.000	-	-	-	-
24	UNI	lbf/ft	GX	330.000	-	-	-	-
25	UNI	lbf/ft	GX	330.000	-	-	-	-
26	UNI	lbf/ft	GX	330.000	-	-	-	-

8 SEISMIC - V : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
8	UNI	lbf/ft	GY	-80.000	-	-	-	-
9	UNI	lbf/ft	GY	-80.000	-	-	-	-
10	UNI	lbf/ft	GY	-80.000	-	-	-	-
11	UNI	lbf/ft	GY	-80.000	-	-	-	-
12	UNI	lbf/ft	GY	-80.000	-	-	-	-
13	UNI	lbf/ft	GY	-80.000	-	-	-	-
21	UNI	lbf/ft	GY	-40.000	-	-	-	-
22	UNI	lbf/ft	GY	-40.000	-	-	-	-
23	UNI	lbf/ft	GY	-40.000	-	-	-	-
24	UNI	lbf/ft	GY	-40.000	-	-	-	-
25	UNI	lbf/ft	GY	-40.000	-	-	-	-
26	UNI	lbf/ft	GY	-40.000	-	-	-	-

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	21	315:COMB - 1	**0.818**	-0.020	-0.000	0.818	-0.000	0.000	-0.000
Min X	21	324:COMB - 0.	**-0.815**	-0.010	0.000	0.815	-0.000	-0.000	0.000
Max Y	16	6:SEISMIC - H	0.226	**0.018**	0.000	0.226	0.000	0.000	-0.000
Min Y	12	101:COMB - 1	0.000	**-0.080**	0.000	0.080	0.000	-0.000	-0.032
Max Z	23	318:COMB - 1	-0.126	-0.004	**0.000**	0.126	-0.000	-0.000	0.001
Min Z	23	323:COMB - 0.	0.126	-0.003	**-0.000**	0.126	0.000	0.000	-0.001
Max rX	14	102:COMB - 1	-0.003	-0.042	0.000	0.042	**0.000**	0.000	0.011
Min rX	4	319:COMB - 1	0.291	-0.011	-0.000	0.292	**-0.000**	0.000	0.001
Max rY	22	323:COMB - 0.	0.152	0.016	-0.000	0.153	0.000	**0.000**	-0.001
Min rY	22	318:COMB - 1	-0.152	-0.027	0.000	0.155	-0.000	**-0.000**	0.001
Max rZ	14	102:COMB - 1	-0.003	-0.042	0.000	0.042	0.000	0.000	**0.011**
Min rZ	12	102:COMB - 1	0.000	-0.074	0.000	0.074	0.000	-0.000	**-0.032**
Max Rst	21	315:COMB - 1	0.818	-0.020	-0.000	**0.818**	-0.000	0.000	-0.000

Beam Displacement Detail Summary

Displacements shown in italic indicate the presence of an offset

	Beam	L/C	d (ft)	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	20	315:COMB - 1	1.250	**0.820**	-0.021	0	0.820
Min X	20	324:COMB - 0.	1.250	**-0.817**	-0.010	0	0.817
Max Y	8	6:SEISMIC - H	37.000	0.277	**0.018**	0	0.278
Min Y	13	101:COMB - 1	27.000	-0.002	**-271.073**	0	271.073
Max Z	1	1:DEAD LOAD	0	0	0	**0**	0
Min Z	1	1:DEAD LOAD	0	0	0	**0**	0
Max Rst	13	101:COMB - 1	27.000	-0.002	-271.073	0	**271.073**

Beam End Displacement Summary

Displacements shown in italic indicate the presence of an offset

	Beam	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	7	21	315:COMB - 1	**0.818**	-0.020	0	0.818
Min X	7	21	324:COMB - 0.	**-0.814**	-0.010	0	0.815
Max Y	8	4	6:SEISMIC - H	0.277	**0.018**	0	0.278
Min Y	12	12	101:COMB - 1	0.000	**-0.080**	0	0.080
Max Z	1	1	1:DEAD LOAD	0	0	**0**	0
Min Z	1	1	1:DEAD LOAD	0	0	**0**	0
Max Rst	7	21	315:COMB - 1	0.818	-0.020	0	**0.818**

Beam End Force Summary

The signs of the forces at end B of each beam have been reversed. For example: this means that the Min Fx entry gives the largest tension value for an beam.

				Axial	Shear		Torsion	Bending	
	Beam	Node	L/C	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip·in)	My (kip·in)	Mz (kip·in)
Max Fx	4	7	315:COMB - 1	**119.062**	-0.000	-0.058	0.000	-0.412	-0.000
Min Fx	35	17	324:COMB - 0.	**-98.151**	-0.196	-0.000	-0.000	-0.000	0.194
Max Fy	13	12	101:COMB - 1	0.500	**34.858**	0.000	-0.000	-0.000	72.788
Min Fy	13	14	101:COMB - 1	0.500	**-34.805**	0.000	-0.000	-0.000	55.758
Max Fz	28	23	323:COMB - 0.	17.439	-0.000	**0.352**	0.000	-29.394	-0.000
Min Fz	19	20	319:COMB - 1	56.135	0.000	**-0.702**	-0.000	66.876	0.000
Max Mx	27	22	323:COMB - 0.	-5.810	-0.000	0.201	**0.000**	-10.576	0.000
Min Mx	27	22	318:COMB - 1	48.378	0.000	-0.191	**-0.000**	10.224	-0.000
Max My	19	20	315:COMB - 1	36.904	0.000	-0.666	-0.000	**74.695**	0.000
Min My	6	20	327:COMB - 0.	31.464	0.000	-0.164	-0	**-63.885**	-0.000
Max Mz	9	6	101:COMB - 1	0.265	-15.827	0.000	-0.000	0.000	**715.158**
Min Mz	20	21	318:COMB - 1	18.765	-2.165	-0.000	-0.000	0.000	**-296.050**

Beam Force Detail Summary

Sign convention as diagrams:- positive above line, negative below line except Fx where positive is compression. Distance d is given from beam end A.

				Axial	Shear		Torsion	Bending	
	Beam	L/C	d (ft)	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip·in)	My (kip·in)	Mz (kip·in)
Max Fx	4	315:COMB - 1	0	**119.062**	-0.000	-0.058	0.000	-0.412	-0.000
Min Fx	35	324:COMB - 0.	24.789	**-98.151**	-0.196	-0.000	-0.000	-0.000	0.194
Max Fy	13	101:COMB - 1	0	0.500	**34.858**	0.000	-0.000	-0.000	72.788
Min Fy	13	101:COMB - 1	54.000	0.500	**-34.805**	0.000	-0.000	-0.000	55.758
Max Fz	28	323:COMB - 0.	0	17.439	-0.000	**0.352**	0.000	-29.394	-0.000
Min Fz	19	319:COMB - 1	0	56.135	0.000	**-0.702**	-0.000	66.876	0.000
Max Mx	27	323:COMB - 0.	0	-5.810	-0.000	0.201	**0.000**	-10.576	0.000
Min Mx	27	318:COMB - 1	0	48.378	0.000	-0.191	**-0.000**	10.224	-0.000
Max My	19	315:COMB - 1	0	36.904	0.000	-0.666	-0.000	**74.695**	0.000

Beam Force Detail Summary Cont...

	Beam	L/C	d	Axial Fx	Shear Fy	Shear Fz	Torsion Mx	Bending My	Bending Mz
			(ft)	(kip)	(kip)	(kip)	(kip`in)	(kip`in)	(kip`in)
Min My	6	327:COMB - 0.	32.500	31.464	0.000	-0.164	-0	**-63.885**	-0.000
Max Mz	9	101:COMB - 1	18.500	0.265	-15.827	0.000	-0.000	0.000	**715.158**
Min Mz	13	102:COMB - 1	27.000	0.469	0.026	0.000	-0.000	-0.000	**-5.58E+3**

Reaction Summary

	Node	L/C	Horizontal FX	Vertical FY	Horizontal FZ	Moment MX	Moment MY	Moment MZ
			(kip)	(kip)	(kip)	(kip`in)	(kip`in)	(kip`in)
Max FX	3	318:COMB - 1	**75.968**	183.082	-0.000	0	0	0
Min FX	7	315:COMB - 1	**-76.634**	185.824	0.000	0	0	0
Max FY	7	315:COMB - 1	-76.634	**185.824**	0.000	0	0	0
Min FY	3	323:COMB - 0.	-72.158	**-130.804**	0.000	0	0	0
Max FZ	21	315:COMB - 1	0	0	**0.000**	0	0	0
Min FZ	21	324:COMB - 0.	0	0	**-0.000**	0	0	0
Max MX	1	1:DEAD LOAD	0.003	21.017	0.000	**0**	0	0
Min MX	1	1:DEAD LOAD	0.003	21.017	0.000	**0**	0	0
Max MY	1	1:DEAD LOAD	0.003	21.017	0.000	0	**0**	0
Min MY	1	1:DEAD LOAD	0.003	21.017	0.000	0	**0**	0
Max MZ	1	1:DEAD LOAD	0.003	21.017	0.000	0	0	**0**
Min MZ	1	1:DEAD LOAD	0.003	21.017	0.000	0	0	**0**

Utilization Ratio

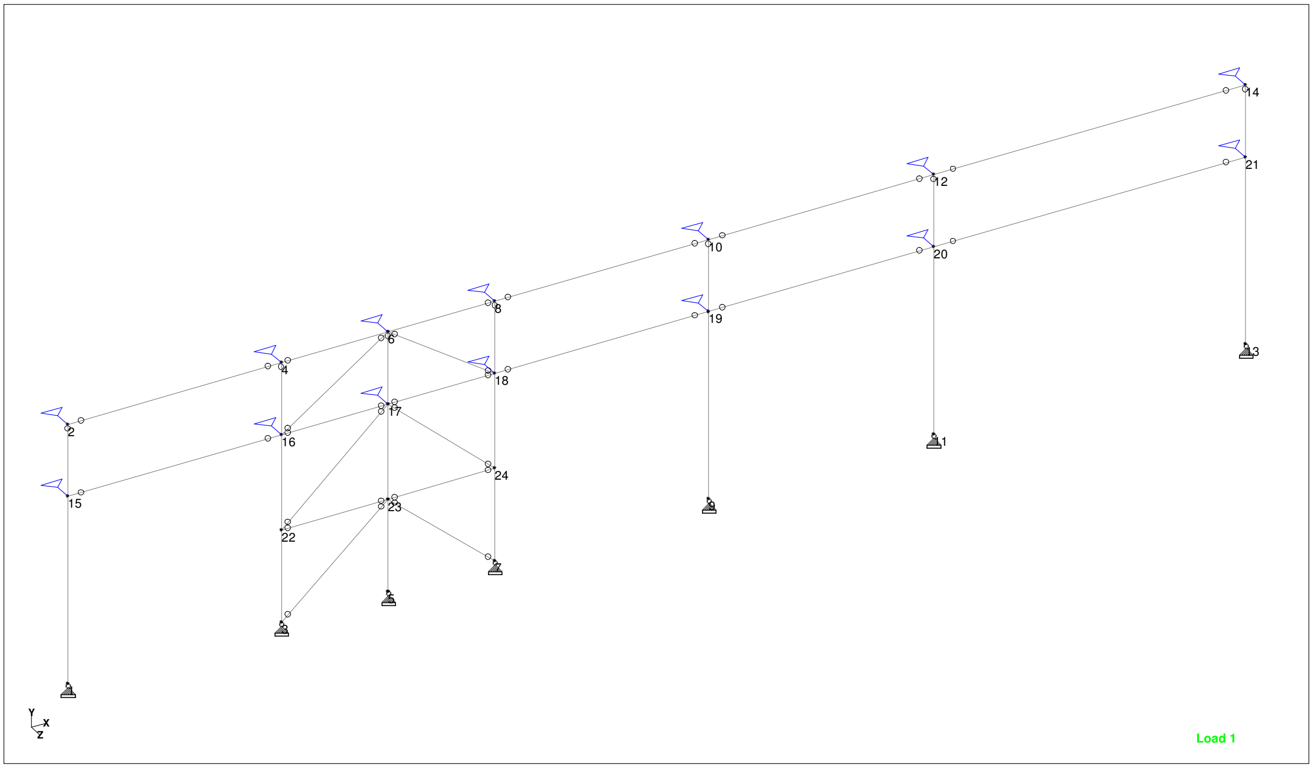
Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
1	W14X68	W14X68	0.089	1.000	0.089	Cl.E3	101	20.000	722.000	121.000	3.010
2	W12X96	W12X96	0.286	1.000	0.286	Eq.H1-1a	320	28.200	833.000	270.000	6.850
3	W12X120	W12X120	0.083	1.000	0.083	Cl.E3	319	35.200	1.07E+3	345.000	12.900
4	W12X96	W12X96	0.292	1.000	0.292	Eq.H1-1a	315	28.200	833.000	270.000	6.850
5	W12X65	W12X65	0.435	1.000	0.435	Cl.E3	101	19.100	533.000	174.000	2.180
6	W12X65	W12X65	0.528	1.000	0.528	Cl.E3	101	19.100	533.000	174.000	2.180
7	W14X68	W14X68	0.126	1.000	0.126	Cl.E3	101	20.000	722.000	121.000	3.010
8	W8X10	N/A						2.960	30.800	2.090	0.043
9	W24X94	W24X94	0.095	1.000	0.095	Eq.H1-1b	320	27.700	2.7E+3	109.000	5.260
10	W24X94	W24X94	0.109	1.000	0.109	Eq.H1-3a(H1-	320	27.700	2.7E+3	109.000	5.260
11	W8X10	N/A						2.960	30.800	2.090	0.043
12	W8X10	N/A						2.960	30.800	2.090	0.043
13	W8X10	N/A						2.960	30.800	2.090	0.043
14	W14X68	W14X68	0.058	1.000	0.058	Cl.E3	101	20.000	722.000	121.000	3.010
15	W12X96	W12X96	0.078	1.000	0.078	Cl.E3	319	28.200	833.000	270.000	6.850
16	W12X120	W12X120	0.068	1.000	0.068	Cl.E3	319	35.200	1.07E+3	345.000	12.900
17	W12X96	W12X96	0.078	1.000	0.078	Cl.E3	319	28.200	833.000	270.000	6.850

Utilization Ratio Cont...

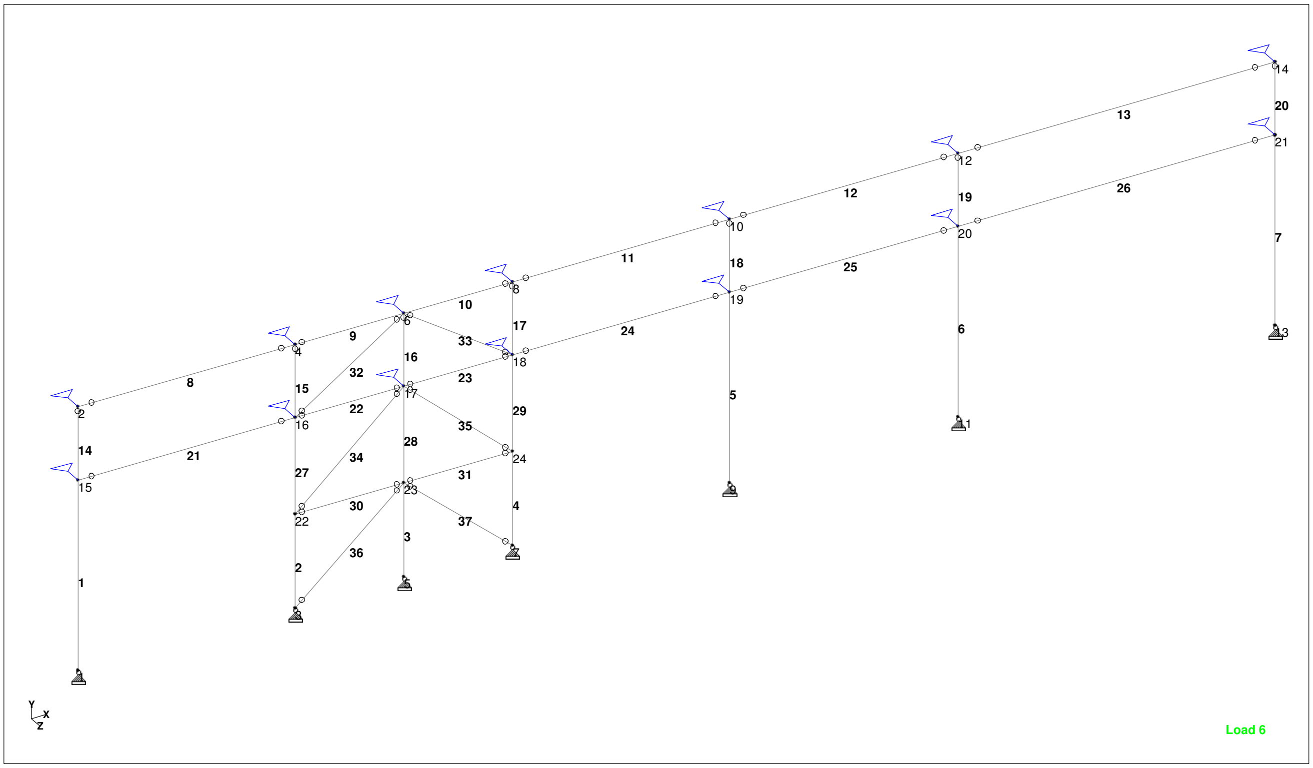
Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
18	W12X65	W12X65	0.294	1.000	0.294	Eq.H1-1a	101	19.100	533.000	174.000	2.180
19	W12X65	W12X65	0.378	1.000	0.378	Eq.H1-1a	101	19.100	533.000	174.000	2.180
20	W14X68	W14X68	0.084	1.000	0.084	Eq.H1-1b	120	20.000	722.000	121.000	3.010
21	W8X10	N/A						2.960	30.800	2.090	0.043
22	W24X84	W24X84	0.089	1.000	0.089	Cl.E3	315	24.700	2.37E+3	94.400	3.700
23	W24X84	W24X84	0.144	1.000	0.144	Cl.E3	318	24.700	2.37E+3	94.400	3.700
24	W8X10	N/A						2.960	30.800	2.090	0.043
25	W8X10	N/A						2.960	30.800	2.090	0.043
26	W8X10	N/A						2.960	30.800	2.090	0.043
27	W12X96	W12X96	0.157	1.000	0.157	Cl.E3	320	28.200	833.000	270.000	6.850
28	W12X120	W12X120	0.088	1.000	0.088	Cl.E3	319	35.200	1.07E+3	345.000	12.900
29	W12X96	W12X96	0.152	1.000	0.152	Cl.E3	319	28.200	833.000	270.000	6.850
30	W12X72	W12X72	0.169	1.000	0.169	Cl.E3	323	21.100	597.000	195.000	2.930
31	W12X72	W12X72	0.172	1.000	0.172	Cl.E3	324	21.100	597.000	195.000	2.930
32	HSST5X5	HSST5X5	0.696	1.000	0.696	Eq.H1-1a	318	8.360	27.100	27.100	46.800
33	HSST5X5	HSST5X5	0.594	1.000	0.594	Eq.H1-1a	317	8.360	27.100	27.100	46.800
34	HSST6X6	HSST6X6	0.792	1.000	0.792	Eq.H1-1a	116	10.400	50.500	50.500	85.600
35	HSST6X6	HSST6X6	0.802	1.000	0.802	Eq.H1-1a	115	10.400	50.500	50.500	85.600
36	HSST6X6	HSST6X6	0.792	1.000	0.792	Eq.H1-1a	116	10.400	50.500	50.500	85.600
37	HSST6X6	HSST6X6	0.796	1.000	0.796	Eq.H1-1a	115	10.400	50.500	50.500	85.600

Failed Members

There is no data of this type.



Whole Structure - Node Labels



Whole Structure - Member Labels

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221205 - Coastal Pacific Distribution Facility - Frame Analysis Along Gridline 7

Design Loads

$DL_{roof} := 10\ psf$	Roof Dead Load
$DL_{mech} := 15\ psf$	Mechanical Dead Load
$DL_{wall} := 20\ psf$	Wall Dead Load
$LL_{roof} := 20\ psf$	Roof Live Load
$SL_{roof} := 25\ psf$	Snow Load
$WL_{wind\_lee} := 25\ psf$	Wind Pressure From Attached Wind Analysis (Windward + Leeward)
$S_{DS} := 0.848$	Short period spectral acceleration
$C_s := 0.1428$	Seismic Response Coefficient (from attached analysis)

Frame Loads Along Gridline 7

$DL_{7\_roof\_lvl1} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 5.5\ ft \cdot 0.5\right) = 0.07\ klf$	Frame Roof Dead Load (UDL) at Higher Elevation
$DL_{7\_roof\_lvl2} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 37\ ft \cdot 0.5\right) = 0.46\ klf$	Frame Roof Dead Load (UDL) at Lower Elevation
$LL_{7\_roof\_lvl1} := \left(LL_{roof} \cdot 5.5\ ft \cdot 0.5\right) = 0.06\ klf$	Frame Roof Live Load (UDL) at Higher Elevation
$LL_{7\_roof\_lvl2} := \left(LL_{roof} \cdot 37\ ft \cdot 0.5\right) = 0.37\ klf$	Frame Roof Live Load (UDL)) at Lower Elevation
$SL_{7\_roof\_lvl1} := \left(SL_{roof} \cdot 5.5\ ft \cdot 0.5\right) = 0.07\ klf$	Frame Roof Snow Load (UDL) at Higher Elevation
$SL_{7\_roof\_lvl2} := \left(SL_{roof} \cdot 37\ ft \cdot 0.5\right) = 0.46\ klf$	Frame Roof Snow Load (UDL) at Higher Elevation

Seismic Roof Dead Load (Mass) For Frame at Higher Elevation @ N

$$DL_{7\_seis\_roof\_lvl1N} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 205.25\ ft \cdot 66.5\ ft \cdot 0.5\right) = 170.61\ kip$$

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Seismic Wall Dead Load (Mass) For Frame at Higher Elevation @ N

$$DL_{7\_seis\_wall\_lvl1N} := \left(DL_{wall} \cdot (2 \cdot 66.5\ ft + 205.25\ ft) \cdot 22.5\ ft + DL_{wall} \cdot 5.5\ ft \cdot 205.25\ ft\right) \cdot 0.5 = 87.4\ kip$$

Seismic Roof Dead Load (Mass) For Frame at Higher Elevation @ S

$$DL_{7\_seis\_roof\_lvl1S} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 205.25\ ft \cdot 56\ ft \cdot 0.5\right) = 143.68\ kip$$

Seismic Wall Dead Load (Mass) For Frame at Higher Elevation @ S

$$DL_{7\_seis\_wall\_lvl1S} := \left(DL_{wall} \cdot (2 \cdot 56\ ft + 205.25\ ft) \cdot 22.5\ ft + DL_{wall} \cdot 5.5\ ft \cdot 205.25\ ft\right) \cdot 0.5 = 82.67\ kip$$

Seismic Roof Dead Load (Mass) For Frame at Lower Elevation

$$DL_{7\_seis\_roof\_lvl2} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 205.25\ ft \cdot 115.5\ ft\right) \cdot 0.5 = 296.33\ kip$$

$$DL_{7\_seis\_wall\_lvl2} := \begin{pmatrix} DL_{wall} \cdot 17\ ft \cdot 115.5\ ft \cdot 2 \\ + DL_{wall} \cdot 5.5\ ft \cdot 205.25\ ft \cdot 2 \\ + 8\ psf \cdot 205.25\ ft \cdot 17\ ft \cdot 2 \end{pmatrix} \cdot 0.5 = 89.76\ kip$$

Seismic Wall Dead Load (Mass) For Frame at Lower Elevation

$$DL_{7\_seis\_roof\_lvl1N} + DL_{7\_seis\_wall\_lvl1N} = 258.01\ kip$$

Total seismic weight at lvl 1 @ 45 ft. @ N

$$DL_{7\_seis\_roof\_lvl1S} + DL_{7\_seis\_wall\_lvl1S} = 226.35\ kip$$

Total seismic weight at lvl 1 @ 45 ft. @ S

$$DL_{7\_seis\_roof\_lvl2} + DL_{7\_seis\_wall\_lvl2} = 386.09\ kip$$

Total seismic weight at lvl 2 @ 34 ft.

Based on the vertical distribution of shear in attached ENERCALC seismic analysis

$$EQ_{7\_H\_lvl1N} := \frac{45\ kip}{66.5\ ft} = 0.68\ klf$$

Frame Seismic Load (UDL) EW Direction
@ higher elevation N

$$EQ_{7\_V\_lvl1N} := 0.2 \cdot S_{DS} \cdot DL_{7\_roof\_lvl1} = 0.01\ klf$$

Vertical Seismic Load @ higher elevation N

$$EQ_{7\_H\_lvl1S} := \frac{39\ kip}{56\ ft} = 0.696\ klf$$

Frame Seismic Load (UDL) EW Direction
@ higher elevation N

$$EQ_{7\_V\_lvl1S} := 0.2 \cdot S_{DS} \cdot DL_{7\_roof\_lvl1} = 0.01\ klf$$

Vertical Seismic Load @ higher elevation N

$$EQ_{7\_H\_lvl2} := \frac{66\ kip}{115.5\ ft} = 0.57\ klf$$

Frame Seismic Load (UDL) EW Direction
@ lower elevation

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$EQ_{7\_V\_lvl2} := 0.2 \cdot S_{DS} \cdot \left(DL_{7\_roof\_lvl2}\right) = 0.08\ klf$ Vertical Seismic Load @ lower elevation

$$EQ_{7\_H\_122} := \left(\frac{25\ psf \cdot (40\ ft \cdot 58\ ft)}{55\ ft} + \frac{(2 \cdot 40\ ft + 58\ ft) \cdot 12\ ft \cdot 20\ psf}{55\ ft}\right) \cdot C_s = 0.24\ klf$$

$EQ_{7\_V\_122} := 0.2 \cdot S_{DS} \cdot (0.05\ klf) = 0.01\ klf$

Wind Loads

$$WL_{15\_lvl1} := \frac{WL_{wind\_lee} \cdot 45\ ft \cdot 205.25\ ft \cdot 0.25}{56.5\ ft} = 1.02\ klf$$ Frame Wind Load (UDL) EW Direction For Frame at Higher Level

$$WL_{15\_lvl2} := \frac{20\ psf \cdot 11\ ft \cdot 205.25\ ft \cdot 0.50 + 5\ psf \cdot 45\ ft \cdot 205.25\ ft \cdot 0.25}{56.5\ ft} = 0.6\ klf$$ Frame Wind Load (UDL) EW Direction For Frame at Higher Level

$$WL_{15\_lvl3} := \frac{17.5\ psf \cdot 24\ ft \cdot 40\ ft \cdot 0.25}{57.5\ ft} = 0.07\ klf$$ Frame Wind Load (UDL) EW Direction For Frame at EL 24 ft.

$$WL_{15\_lvl4} := \frac{WL_{wind\_lee} \cdot 11\ ft \cdot 205.25\ ft \cdot 0.50}{66.5\ ft} = 0.42\ klf$$ Frame Wind Load (UDL) EW Direction For Frame at Higher Level

See attached STAAD analysis for initial elastic analysis of frame and brace design

Deflection and Story Drift Check

$\Delta_{BlvlH} := 0.363\ in$ Max deflection at higher floor from initial elastic analysis

$\Delta_{BlvlL} := 0.203\ in$ Max deflection at lower floor from initial elastic analysis

$I_e := 1$ Importance factor

$C_d := 5$ Deflection amplification factor

$$\Delta_{B\_Cd} := \frac{\left(\Delta_{BlvlH} - \Delta_{BlvlL}\right) \cdot C_d}{I_e} = 0.8\ in$$ Amplified interstory drift

$\Delta_{allow} := 0.02 \cdot 11.5\ ft = 2.76\ in$ Allowable story drift

$\Delta_B < \Delta_{allow}$ OK

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Brace Design

Brace Design

AISC seismic provisions requires that between 30% and 70% of the total horizontal force is resisted by braces in tension unless the available strength of each brace in compression is larger than the required strength resulting from the Overstrength seismic load.

$$F_{brace\_ten1} := \frac{\left(30\ kip \cdot \frac{11.5\ ft}{15.6\ ft}\right) + 25\ kip \cdot \left(\frac{20.5\ ft}{23.5\ ft}\right)}{EQ_{7\_H\_lvl1N} \cdot (56.5\ ft + 66.5\ ft)} \cdot 100 = 52.77 \qquad OK$$

$$F_{brace\_ten2} := \frac{\left((33\ kip) \cdot \frac{19\ ft}{22\ ft} + 31\ kip \cdot \left(\frac{11.5\ ft}{15.6\ ft}\right) + 30\ kip \cdot \left(\frac{12\ ft}{16\ ft}\right)\right)}{45\ kip + 39\ kip + 66\ kip} \cdot 100 = 49.24 \qquad OK$$

Width-to-Thickness Limitations

Per AISC Seismic Design Manual, Table 1-5b, HSS 5x5x5/16, A1085 Grade A satisfy the requirements for highly ductile members.

Brace Slenderness Check

Brace slenderness has been checked in the STAAD model

Analysis for Frame Considering the Expected Strengths of Braces in Tension And Compression

For the HSS 5x5x5/16, HSS4x4x5/16

$R_y := 1.25$

A1085 Grade A Material

$F_y := 50\ ksi$

Tensile capacity of braces

For the HSS5x5x5/16 $\qquad P_{T\_HSS\_5x5x0.31} := R_y \cdot F_y \cdot 5.62\ in^2 = 351.25\ kip$

For the HSS4x4x5/16 $\qquad P_{T\_HSS\_4x4x0.31} := R_y \cdot F_y \cdot 4.36\ in^2 = 272.5\ kip$

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Compression capacity of braces

HSS 5x5x5/16

For the unbraced length of 17 ft

$\dfrac{KL_c}{r}$ $\dfrac{17\ ft}{1.9\ in} = 107.37$ > $4.71 \cdot \sqrt{\dfrac{29000\ ksi}{R_y \cdot F_y}} = 101.46$

$F_e := \left(\dfrac{\pi^2 \cdot 29000\ ksi}{\left(\dfrac{17\ ft}{1.9\ in}\right)^2}\right) = 24.83\ ksi$

$F_{cr} := 0.877 \cdot F_e = 21.77\ ksi$

$P_{c\_HSS\_5x5x31\_17} := min\left(R_y \cdot F_y \cdot 5.62\ in^2, \left(\dfrac{1}{0.877}\right) \cdot F_{cr} \cdot 5.62\ in^2\right) = 139.53\ kip$

Maximum post-buckling brace strength (AISC Seismic Provisions F2.3(b))

$P_{c\_post\_5x5x0.31\_17} := P_{c\_HSS\_5x5x31\_17} \cdot 0.3 = 41.86\ kip$

For the unbraced length of 15 ft.

$\dfrac{KL_c}{r}$ $\dfrac{15\ ft}{1.9\ in} = 94.74$ < $4.71 \cdot \sqrt{\dfrac{29000\ ksi}{R_y \cdot F_y}} = 101.46$

$F_e := \left(\dfrac{\pi^2 \cdot 29000\ ksi}{\left(\dfrac{14\ ft}{1.9\ in}\right)^2}\right) = 36.61\ ksi$

$F_{cr} := \left(0.658^{\left(\frac{R_y \cdot F_y}{F_e}\right)}\right) \cdot R_y \cdot F_y = 30.59\ ksi$

$P_{c\_HSS\_5x5x0.31\_15} := min\left(R_y \cdot F_y \cdot 5.26\ in^2, \left(\dfrac{1}{0.877}\right) \cdot F_{cr} \cdot 5.26\ in^2\right) = 183.46\ kip$

Maximum post-buckling brace strength (AISC Seismic Provisions F2.3(b))

$P_{c\_post\_5x5x0.31\_15} := P_{c\_HSS\_5x5x0.31\_15} \cdot 0.3 = 55.04\ kip$

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For the unbraced length of 10 ft.

$$\frac{KL_c}{r} \quad \frac{10\ ft}{1.9\ in} = 63.16 \qquad < \qquad 4.71 \cdot \sqrt{\frac{29000\ ksi}{R_y \cdot F_y}} = 101.46$$

$$F_e := \left(\frac{\pi^2 \cdot 29000\ ksi}{\left(\frac{10\ ft}{1.9\ in}\right)^2}\right) = 71.75\ ksi$$

$$F_{cr} := \left(0.658^{\left(\frac{R_y \cdot F_y}{F_e}\right)}\right) \cdot R_y \cdot F_y = 43.41\ ksi$$

$$P_{c\_HSS\_5x5x0.31\_10} := min\left(R_y \cdot F_y \cdot 5.26\ in^2, \left(\frac{1}{0.877}\right) \cdot F_{cr} \cdot 5.26\ in^2\right) = 260.34\ kip$$

Maximum post-buckling brace strength (AISC Seismic Provisions F2.3(b))

$$P_{c\_post\_5x5x0.31\_10} := P_{c\_HSS\_5x5x0.31\_10} \cdot 0.3 = 78.1\ kip$$

HSS 4x4x5/16

$$\frac{KL_c}{r} \quad \frac{10\ ft}{1.49\ in} = 80.54 \qquad < \qquad 4.71 \cdot \sqrt{\frac{29000\ ksi}{R_y \cdot F_y}} = 101.46$$

$$F_e := \left(\frac{\pi^2 \cdot 29000\ ksi}{\left(\frac{10\ ft}{1.49\ in}\right)^2}\right) = 44.13\ ksi$$

$$F_{cr} := \left(0.658^{\left(\frac{R_y \cdot F_y}{F_e}\right)}\right) \cdot R_y \cdot F_y = 34.55\ ksi$$

$$P_{c\_HSS\_4x4x31\_10} := min\left(R_y \cdot F_y \cdot 4.36\ in^2, \left(\frac{1}{0.877}\right) \cdot F_{cr} \cdot 4.36\ in^2\right) = 171.76\ kip$$

Maximum post-buckling brace strength (AISC Seismic Provisions F2.3(b))

$$P_{c\_post\_4x4x0.31\_13} := P_{c\_HSS\_4x4x31\_10} \cdot 0.3 = 51.53\ kip$$

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Design of Columns at Gridlines M

$P_{col\_DL} := 11.5\ kip$

$P_{col\_LL} := 3.0\ kip$

$P_{col\_SL} := 4.0\ kip$

The axial compressive/tension force on the columns considering expected brace strengths in tension and compression. Analysis considering post-buckled compression strength is not expected to govern.

$$P_{Emh\_C} := 3\left(P_{c\_HSS\_5x5x31\_17} \cdot \frac{10.5\ ft}{23.03\ ft}\right) + \left(P_{T\_HSS\_5x5x0.31} \cdot \frac{11.5\ ft}{23.03\ ft}\right) = 366.25\ kip$$

$$P_{Emh\_T} := 3\left(P_{T\_HSS\_5x5x0.31} \cdot \frac{10.5\ ft}{23.03\ ft}\right) + \left(P_{c\_HSS\_5x5x31\_17} \cdot \frac{10.5\ ft}{23.03\ ft}\right) = 544.05\ kip$$

$P_{a\_Comp} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL} + 0.7 \cdot P_{Emh\_C} = 269.24\ kip$ Total compressive demand on columns

$P_{a\_Ten} := \left(0.6 - 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL} + 0.7 \cdot \left(-P_{Emh\_T}\right) = -375.3\ kip$ Total tensile demand on columns

Use W14x68 column

$P_{cap\_W12x65\_comp} := 535\ kip$ Compressive capacity of W14X68 column with L_b = 8 ft.

$$IR_{col\_comp} := \frac{P_{a\_Comp}}{P_{cap\_W12x65\_comp}} = 0.5 \qquad OK$$

$$P_{cap\_W12x65\_tension} := \frac{50\ ksi \cdot 20\ in^2}{1.67} = 598.8\ kip$$ Tensile capacity of W14x68 column

$$IR_{col\_ten} := \frac{-P_{a\_Ten}}{P_{cap\_W12x65\_tension}} = 0.63 \qquad OK$$

Design of Columns at Gridlines K.2 and D.8

$P_{col\_DL} := 12.5\ kip$

$P_{col\_LL} := 6.2\ kip$

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$P_{col\_SL} := 16.0\ kip$

The axial compressive/tension force on the columns considering expected brace strengths in tension and compression. Analysis considering post-buckled compression strength is not expected to govern.

$$P_{Emh\_C} := 2\left(P_{c\_HSS\_5x5x0.31\_15} \cdot \frac{10.5\ ft}{23.03\ ft}\right) = 167.29\ kip$$

$$P_{Emh\_T} := 2\left(P_{T\_HSS\_5x5x0.31} \cdot \frac{10.5\ ft}{23.03\ ft}\right) = 320.29\ kip$$

$$P_{a\_Comp} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL} + 0.7 \cdot P_{Emh\_C} = 131.08\ kip$$ Total compressive demand on columns

$$P_{a\_Ten} := \left(0.6 - 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL} + 0.7 \cdot \left(-P_{Emh\_T}\right) = -218.19\ kip$$ Total tensile demand on columns

Use W14x68 column

$P_{cap\_W14x68\_comp} := 475\ kip$ Compressive capacity of W12X65 column with L_b = 10.5 ft.

$$IR_{col\_comp} := \frac{P_{a\_Comp}}{P_{cap\_W14x68\_comp}} = 0.28$$ *OK*

$$P_{cap\_W4x68\_tension} := \frac{50\ ksi \cdot 20\ in^2}{1.67} = 598.8\ kip$$ Tensile capacity of W14x38 column

$$IR_{col\_ten} := \frac{-P_{a\_Ten}}{P_{cap\_W4x68\_tension}} = 0.36$$ *OK*

Design of Column at Gridlines L

$P_{col\_DL\_M} := 23.0\ kip$

$P_{col\_LL\_M} := 21\ kip$

$P_{col\_SL\_M} := 13.0\ kip$

The axial compressive/tension force on the columns considering expected brace strengths in tension and compression. Analysis considering post-buckled compression strength of braces is expected to govern.

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$P_{Emh\_M} := 4 \cdot \left(P_{T\_HSS\_5x5x0.31} \cdot \frac{10.5\ ft}{21.71\ ft}\right) - 2\ \left(P_{c\_post\_5x5x0.31\_17}\right) \cdot \frac{10.5\ ft}{21.71\ ft} = 639.03\ kip$

$P_{a\_Comp\_M} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL\_M} + 0.7 \cdot P_{Emh\_M} = 473.05\ kip$ Total compressive demand on columns

Use W14x74 column

$P_{cap\_W14x68\_comp} := 520\ kip$ Compressive capacity of W14x68 column with unbraced Lb = 10.5ft

$IR_{col\_comp\_M} := \frac{P_{a\_Comp\_M}}{P_{cap\_W14x68\_comp}} = 0.91$ OK

Beam/Strut Design

Beams/Struts at Between Columns K.2 and M from EL110'-6" To 132' - 0"

The axial force on the beams considering expected brace strengths in tension and compression is

$P_{x1} := P_{T\_HSS\_5x5x0.31} \cdot \frac{20.5\ ft}{23.03\ ft} = 312.66\ kip$

$P_{x2} := P_{c\_HSS\_5x5x0.31\_15} \cdot \frac{20.5\ ft}{23.03\ ft} = 163.3\ kip$

$P_D := 0\ kip$ Axial load on all beams due to DL is 0

Considering governing load combination from ASCE 7-16

$P_{a1} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_D + 0.7 \cdot P_{x1} = 218.86\ kip$

Beams/struts at these elevations are unbraced with L_b = 20.5 ft.

Consider W14X68 beams/struts

$P_{cap\_W14x68} := 288\ kip$ Compressive strength of member for Lb = 20.5ft

$IR := \frac{P_{a1}}{P_{cap\_W14x68}} = 0.76$ OK

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Beams/Struts at Elevation 143'-5.5" And Between Column Lines K.2 And M

The axial force on the beams considering expected brace strengths in tension and compression

$$P_{x3} := \left(P_{T\_HSS\_5x5x0.31} \cdot \frac{20.5\ ft}{23.26\ ft}\right) + \left(P_{c\_HSS\_5x5x0.31\_15} \cdot \frac{20.5\ ft}{23.26\ ft}\right) = 471.26\ kip$$

The axial force on the beams considering expected brace strengths in tension and post buckling compression

$$P_{x3\_post} := \left(P_{T\_HSS\_5x5x0.31} \cdot \frac{20.5\ ft}{23.26\ ft}\right) + \left(P_{c\_post\_5x5x0.31\_15} \frac{20.5\ ft}{23.26\ ft}\right) = 358.08\ kip$$

Considering governing load combination from ASCE 7-16

$$P_{a2} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_D + 0.7 \cdot P_{x3} = 329.88\ kip$$

Consider 14X68 beams/struts

$P_{cap\_W14x68} := 426\ kip$ Compressive strength of member for Lb = 5 ft

$$IR := \frac{P_{a2}}{P_{cap\_W14x68}} = 0.77 \qquad OK$$

<u>Design of Columns at Gridlines B.7</u>

$P_{col\_DL} := 17.5\ kip$

$P_{col\_LL} := 8.5\ kip$

$P_{col\_SL} := 29\ kip$

The axial compressive/tension force on the columns considering expected brace strengths in tension and compression. Analysis considering post-buckled compression strength is not expected to govern.

$$P_{Emh\_C} := 2\left(P_{c\_HSS\_4x4x31\_10} \cdot \frac{10.5\ ft}{15.57\ ft}\right) + \left(P_{T\_HSS\_4x4x0.31} \cdot \frac{11\ ft}{15.91\ ft}\right) + \left(P_{c\_HSS\_5x5x0.31\_10} \cdot \frac{11.5\ ft}{16.26\ ft}\right) = 604.18\ kip$$

$$P_{Emh\_T} := 2\left(P_{T\_HSS\_4x4x0.31} \cdot \frac{10.5\ ft}{15.57\ ft}\right) + \left(P_{c\_HSS\_4x4x31\_10} \cdot \frac{11\ ft}{15.91\ ft}\right) + \left(P_{T\_HSS\_5x5x0.31} \cdot \frac{11.5\ ft}{16.26\ ft}\right) = 734.71\ kip$$

$$P_{a\_Comp} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL} + 0.7 \cdot P_{Emh\_C} = 442.51\ kip$$

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$P_{a\_Ten} := (0.6 - 0.14 \cdot S_{DS}) \cdot P_{col\_DL} + 0.7 \cdot (-P_{Emh\_T}) = -505.87 \; kip$

Use W14x68 column

$P_{cap\_W14x68\_comp} := 476 \; kip$ Compressive capacity of W14x68 column with L_b = 10.5 ft.

$IR_{col\_comp} := \frac{P_{a\_Comp}}{P_{cap\_W14x68\_comp}} = 0.93$ *OK*

$P_{cap\_W14x68\_tension} := \frac{50 \; ksi \cdot 20 \; in^2}{1.67} = 598.8 \; kip$ Tensile capacity of W14x68 column

$IR_{col\_ten} := \frac{-P_{a\_Ten}}{P_{cap\_W14x68\_tension}} = 0.84$ *OK*

Design of Columns at Gridlines C.5

$P_{col\_DL} := 18.9 \; kip$

$P_{col\_LL} := 8.5 \; kip$

$P_{col\_SL} := 18.5 \; kip$

The axial compressive/tension force on the columns considering expected brace strengths in tension and compression. Analysis considering post-buckled compression strength is expected to govern.

$$P_{Emh\_C} := 3 \left(P_{T\_HSS\_5x5x0.31} \cdot \frac{10.5 \; ft}{21.71 \; ft} \right) - 3 \left(P_{c\_post\_4x4x0.31\_13} \cdot \frac{10.5 \; ft}{15.57 \; ft} \right) - \left(P_{T\_HSS\_5x5x0.31} \cdot \frac{11.5 \; ft}{16.26 \; ft} \right) - \left(P_{c\_post\_5x5x0.31\_10} \cdot \frac{11.5 \; ft}{16.26 \; ft} \right) = 101.74 \; kip$$

$P_{a\_Comp} := (1 + 0.14 \cdot S_{DS}) \cdot P_{col\_DL} + 0.7 \cdot P_{Emh\_C} = 92.36 \; kip$

Use W14x68 column

$P_{cap\_W14x68\_comp} := 475 \; kip$ Compressive capacity of W14x68 column with L_b = 10.5 ft.

$IR_{col\_comp} := \frac{P_{a\_Comp}}{P_{cap\_W14x68\_comp}} = 0.19$ *OK*

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Beams/Struts Between Columns B.7 and D.8 from EL110'-6" To 132' - 0"

The axial force on the beams considering expected brace strengths in tension and compression is

$$P_{x1} := P_{T\_HSS\_5x5x0.31} \cdot \left(\frac{19\ ft}{21.71\ ft}\right) = 307.4\ kip$$

$$P_{x2} := P_{c\_HSS\_5x5x0.31\_10} \cdot \left(\frac{11.5\ ft}{16.26\ ft}\right) + P_{T\_HSS\_5x5x0.31} \cdot \left(\frac{11.5\ ft}{16.26\ ft}\right) - \left(P_{c\_HSS\_4x4x31\_10} \cdot \left(\frac{11.5\ ft}{15.57\ ft}\right) - P_{T\_HSS\_5x5x0.31} \cdot \left(\frac{19\ ft}{21.71\ ft}\right)\right) = 613.09\ kip$$

$P_D := 0\ kip$ Axial load on all beams due to DL is 0

Considering governing load combination from ASCE 7-16

$$P_{a1} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_D + 0.7 \cdot \max\left(P_{x1}, P_{x2}\right) = 429.17\ kip$$

Beams/struts at these elevations are unbraced with L_b = 20.5 ft.

Consider W14x68 beams/struts

$P_{cap\_W12x65} := 475\ kip$ Compressive strength of member with Lb=10ft

$$IR := \frac{P_{a1}}{P_{cap\_W12x65}} = 0.9 \qquad OK$$

Beams/Struts at Between Columns B.7 and C.5 @ EL143' - 5.5"

The axial force on the beams considering expected brace strengths in tension and compression is

$$P_{x1} := P_{T\_HSS\_5x5x0.31} \cdot \left(\frac{11.5\ ft}{16.26\ ft}\right) + P_{c\_HSS\_5x5x0.31\_10} \cdot \left(\frac{11.5\ ft}{16.26\ ft}\right) = 432.55\ kip$$

$P_D := 0\ kip$ Axial load on all beams due to DL is 0

Considering governing load combination from ASCE 7-16

$$P_{a1} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_D + 0.7 \cdot P_{x1} = 302.78\ kip$$

Beams/struts at these elevations are unbraced with L_b = 20.5 ft.

Consider W12X65 beams/struts

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$P_{cap\_W12x65} := 511\ kip$

Compressive strength of member with Lb=10ft

$IR := \dfrac{P_{a1}}{P_{cap\_W12x65}} = 0.59 \qquad OK$

ASCE 7-16 Seismic Base Shear

Project File: 221205 - Costal Pacific Distribution Facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Seismic Base Shear Analysis

Specific Description: Frame Analysis Along Gridline 7 AND Frames Along Gridline 15

Risk Category

Calculations per ASCE 7-16

Risk Category of Building or Other Structure : "II" : All Buildings and other structures except those listed as Category I, III, and IV — *ASCE 7-16, Page 4, Table 1.5-1*

Seismic Importance Factor = 1 — *ASCE 7-16, Page 5, Table 1.5-2*

Gridded Ss & S1values from ASCE 7-16

ASCE 7-16 11.4.2

Max. Ground Motions, 5% Damping :

S_S = 1.285 g, 0.2 sec response
S_1 = 0.4425 g, 1.0 sec response

Location : Puyallup, WA 98371
Latitude = 47.196 deg North
Longitude = 122.316 deg West

For the closest datapoint grid location . . .
Latitude = 47.200 deg North
Longitude = 122.310 deg West

Site Class, Site Coeff. and Design Category

Classification: "D" : Shear Wave Velocity 600 to 1,200 ft/sec		=	**D** (Based on Testing)	*ASCE 7-16 Table 20.3-1*
Site Coefficients Fa & Fv	Fa	=	1.00	*ASCE 7-16 Table 11.4-1 & 11.4-2*
(using straight-line interpolation from table value	Fv	=	2.77	
Maximum Considered Earthquake Acceleratio	S_{MS} = Fa * Ss	=	1.285	*ASCE 7-16 Eq. 11.4-1*
	S_{M1} = Fv * S1	=	1.226	*ASCE 7-16 Eq. 11.4-2*
Design Spectral Acceleration	S_{DS} = S_{MS} * 2/3	=	0.857	*ASCE 7-16 Eq. 11.4-3*
	S_{D1} = S_{M1} * 2/3	=	0.817	*ASCE 7-16 Eq. 11.4-4*
Seismic Design Category		=	**D**	*ASCE 7-16 Table 11.6-1 & -2*

Resisting System

ASCE 7-16 Table 12.2-1

Basic Seismic Force Resisting System . . . **Building Frame Systems**
2.Steel special concentrically braced frames

Response Modification Coefficient " R = 6.00
System Overstrength Factor " Wo " = 2.00
Deflection Amplification Factor " Cd " = 5.00

NOTE! See ASCE 7-16 for all applicable footnot

Building height Limits :

Category "A & B" Limit:	No Limit
Category "C" Limit:	No Limit
Category "D" Limit:	Limit = 160
Category "E" Limit:	Limit = 160
Category "F" Limit:	Limit = 100

Lateral Force Procedure

ASCE 7-16 Section 12.8.2

Equivalent Lateral Force Procedure

The "Equivalent Lateral Force Procedure" is being used according to the provisions of ASCE 7-16 12.8

Determine Building Period

Use ASCE 12.8-7

Structure Type for Building Period CalculatiAll Other Structural Systems

" Ct " value = 0.020 " hn " : Height from base to highest level = 45.0 ft
" x " value = 0.75
" Ta " Approximate fundemental period using Eq. 12.8-7 : Ta = Ct * (hn ^ x) = 0.347 sec
"TL" : Long-period transition period per ASCE 7-16 Maps 22-14 -> 22-17 6.000 sec

Building Period " Ta " Calculated from Approximate Method select= 0.347

" Cs " Response Coefficient

ASCE 7-16 Section 12.8.1.1

S_{DS} : Short Period Design Spectral Response	=	0.857	From Eq. 12.8-2, Preliminary Cs	=	0.143
" R " : Response Modification Factor	=	6.00	From Eq. 12.8-3 & 12.8-4 , Cs need not exceed	=	0.392
" I " : Seismic Importance Factor	=	1	From Eq. 12.8-5 & 12.8-6, Cs not be less than	=	0.038

Cs : Seismic Response Coefficient = = **0.1428**

ASCE 7-16 Seismic Base Shear

DESCRIPTION: Seismic Base Shear Analysis

Seismic Base Shear

ASCE 7-16 Section 12.8.1

Cs = 0.1428 from 12.8.1.1

W (see Sum Wi below) = 612.00 k

Seismic Base Shear V = Cs * W = 87.38 k

Vertical Distribution of Seismic Forces

ASCE 7-16 Section 12.8.3

" k " : hx exponent based on Ta = 1.00

Table of building Weights by Floor Level...

Level #	Wi : Weight	Hi : Height	(Wi * Hi^k)	Cvx	Fx=Cvx * V	Sum Story Shear	Sum Story Moment
2	226.00	45.00	10,170.00	0.4366	38.15	38.15	0.00
1	386.00	34.00	13,124.00	0.5634	49.23	87.38	419.64

Sum Wi = 612.00 k Sum Wi * Hi = 23,294.00 k-ft Total Base Shear = 87.38 k

Base Moment = 3,390.6 k-ft

Diaphragm Forces : Seismic Design Category "B" to "F"

ASCE 7-16 12.10.1.1

Level #	Wi	Fi	Sum Fi	Sum Wi	Fpx : Calcd	Fpx : Min	Fpx : Max	Fpx	Dsgn. Force
2	226.00	38.15	38.15	226.00	38.15	38.72	77.44	38.72	38.72
1	386.00	49.23	87.38	612.00	55.11	66.13	132.27	66.13	66.13

Wpx . . . . Weight at level of diaphragm and other structure elements attached to it.
Fi . . . . Design Lateral Force applied at the level.
Sum Fi . . . . Sum of "Lat. Force" of current level plus all levels above
MIN Req'd Force @ Level . . . $0.20 * S_{DS} * I * Wpx$
MAX Req'd Force @ Level . . $0.40 * S_{DS} * I * Wpx$
Fpx : Design Force @ Level . Wpx * SUM(x->n) Fi / SUM(x->n) wi, x = Current level, n = Top Level

Job Information

	Engineer	Checked	Approved
Name:			
Date:	3/11/2024		

Project ID	
Project Name	

Structure Type	SPACE FRAME

Number of Nodes	55	Highest Node	72
Number of Elements	92	Highest Beam	116

Number of Basic Load Cases	7
Number of Combination Load Cases	39

Included in this printout are data for:

All	The Whole Structure

Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	DEAD LOAD
Primary	2	ROOF LIVE LOAD
Primary	3	SNOW LOAD
Primary	4	WIND 1
Primary	5	WIND 2
Primary	6	SEISMIC - H
Primary	8	SEISMIC - V
Combination	100	COMB - 1 DEAD
Combination	101	COMB - 1 DEAD + 1 SNOW
Combination	102	COMB - 1 DEAD + 1 ROOF LIVE
Combination	103	COMB - 1 DEAD + 0.75 ROOF LIVE
Combination	104	COMB - 1 DEAD + 0.75 SNOW
Combination	105	COMB - 1 DEAD + 0.6 WIND (1)
Combination	106	COMB - 1 DEAD + 0.6 WIND (2)
Combination	107	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7
Combination	108	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7
Combination	109	COMB - 1 DEAD + 0.75 WIND + 0.75 SNO
Combination	110	COMB - 1 DEAD + 0.75 WIND + 0.75 SNO
Combination	111	COMB - 1 DEAD + 0.75 WIND (1)
Combination	112	COMB - 1 DEAD + 0.75 WIND (2)
Combination	113	COMB - 0.6 DEAD + 0.6 WIND (1)
Combination	114	COMB - 0.6 DEAD + 0.6 WIND (2)
Combination	115	COMB - 1 DEAD + 0.91 SEISMIC-H + 0.7
Combination	116	COMB - 1 DEAD + -0.91 SEISMIC-H + 0.7
Combination	117	COMB - 1 DEAD + 0.91 SEISMIC-H + -0.7

Job Information Cont...

Type	L/C	Name
Combination	118	COMB - 1 DEAD + -0.91 SEISMIC-H + -0.
Combination	119	COMB - 1 DEAD + 0.683 SEISMIC-H + 0.!
Combination	120	COMB - 1 DEAD + -0.683 SEISMIC-H + 0
Combination	121	COMB - 1 DEAD + 0.683 SEISMIC-H + -0
Combination	122	COMB - 1 DEAD + -0.683 SEISMIC-H + -(
Combination	123	COMB - 0.6 DEAD + 0.91 SEISMIC-H + -(
Combination	124	COMB - 0.6 DEAD + -0.91 SEISMIC-H + -
Combination	125	COMB - 0.6 DEAD + 0.91 SEISMIC-H + 0.
Combination	126	COMB - 0.6 DEAD + -0.91 SEISMIC-H + (
Combination	315	COMB - 1 DEAD + 1.4 SEISMIC-H + 0.7 S
Combination	316	COMB - 1 DEAD + -1.4 SEISMIC-H + 0.7
Combination	317	COMB - 1 DEAD + 1.4 SEISMIC-H + -0.7
Combination	318	COMB - 1 DEAD + -1.4 SEISMIC-H + -0.7
Combination	319	COMB - 1 DEAD + 1.05 SEISMIC-H + 0.5!
Combination	320	COMB - 1 DEAD + -1.05 SEISMIC-H + 0.5
Combination	321	COMB - 1 DEAD + 1.05 SEISMIC-H + -0.5
Combination	322	COMB - 1 DEAD + -1.05 SEISMIC-H + -0.
Combination	323	COMB - 0.6 DEAD + 1.4 SEISMIC-H + -0.
Combination	324	COMB - 0.6 DEAD + -1.4 SEISMIC-H + -0
Combination	326	COMB - 0.6 DEAD + 1.4 SEISMIC-H + 0.7
Combination	327	COMB - 0.6 DEAD + -1.4 SEISMIC-H + 0.

Section Properties

Prop	Section	Area (in^2)	I_{yy} (in^4)	I_{zz} (in^4)	J (in^4)	Material
1	W14X53	15.600	57.700	541.000	1.940	STEEL_50_KS
2	W12X26	7.650	17.300	204.000	0.300	STEEL_50_KS
3	HSST4X4X.313_A108	4.360	9.590	9.590	15.688	STEEL_50_KS
4	W24X55	16.200	29.100	1.35E+3	1.180	STEEL_50_KS
5	L60608	5.770	31.688	8.128	0.490	STEEL_36_KS
6	HSST8X8X0.5	13.500	125.000	125.000	198.931	STEEL_36_KS
7	W16X36	10.600	24.500	448.000	0.545	STEEL_50_KS
8	W14X68	20.000	121.000	722.000	3.010	STEEL_50_KS
9	HSST5X5X.313_A108	5.620	20.100	20.100	32.228	STEEL_50_KS
10	W14X68	20.000	121.000	722.000	3.010	STEEL_50_KS
11	W14X74	21.800	134.000	795.000	3.870	STEEL_50_KS

Materials

Mat	Name	E (kip/in^2)	ν	Density (kip/in^3)	α (/°F)
1	STEEL	29E+3	0.300	0.000	6.5E -6
2	CONCRETE	3.15E+3	0.170	8.68e-05	5.5E -6
3	ALUMINUM	10E+3	0.330	9.8e-05	12.8E -6
4	STAINLESSSTEEL	28E+3	0.300	0.000	9.9E -6
5	STEEL_36_KSI	29E+3	0.300	0.000	6.5E -6
6	STEEL_50_KSI	29E+3	0.300	0.000	6.5E -6
7	STEEL_275_NMM2	29.7E+3	0.300	0.000	6.67E -6
8	STEEL_355_NMM2	29.7E+3	0.300	0.000	6.67E -6
9	Q235	29.9E+3	0.300	0.000	6.67E -6
10	Q345	29.9E+3	0.300	0.000	6.67E -6
11	Q355	29.9E+3	0.300	0.000	6.67E -6
12	Q390	29.9E+3	0.300	0.000	6.67E -6
13	Q420	29.9E+3	0.300	0.000	6.67E -6
14	Q460	29.9E+3	0.300	0.000	6.67E -6
15	TIMBER	1.5E+3	0.150	0.000	3E -6

Supports

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip˙ft/deg)	rY (kip˙ft/deg)	rZ (kip˙ft/deg)
1	Fixed	Fixed	Fixed	-	-	-
2	-	-	Fixed	-	-	-
16	Fixed	Fixed	Fixed	-	-	-
17	-	-	Fixed	-	-	-
18	Fixed	Fixed	Fixed	-	-	-
19	-	-	Fixed	-	-	-
20	Fixed	Fixed	Fixed	-	-	-
21	-	-	Fixed	-	-	-
22	Fixed	Fixed	Fixed	-	-	-
23	-	-	Fixed	-	-	-
24	Fixed	Fixed	Fixed	-	-	-
25	-	-	Fixed	-	-	-
26	Fixed	Fixed	Fixed	-	-	-
27	-	-	Fixed	-	-	-
28	Fixed	Fixed	Fixed	-	-	-
29	-	-	Fixed	-	-	-
30	Fixed	Fixed	Fixed	-	-	-
31	-	-	Fixed	-	-	-
32	Fixed	Fixed	Fixed	-	-	-
33	-	-	Fixed	-	-	-
34	Fixed	Fixed	Fixed	-	-	-
35	-	-	Fixed	-	-	-
36	Fixed	Fixed	Fixed	-	-	-
37	-	-	Fixed	-	-	-

Supports Cont...

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip˙ft/deg)	rY (kip˙ft/deg)	rZ (kip˙ft/deg)
38	Fixed	Fixed	Fixed	-	-	-
39	-	-	Fixed	-	-	-
40	Fixed	Fixed	Fixed	-	-	-
41	-	-	Fixed	-	-	-
42	Fixed	Fixed	Fixed	-	-	-
43	-	-	Fixed	-	-	-

Releases

Beam ends not shown in this table are fixed in all directions.

Beam	Node	x	y	z	rx	ry	rz
18	23	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
22	31	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
26	39	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
27	41	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
29	43	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
30	35	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
31	2	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
31	17	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
32	17	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
32	19	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
33	19	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
33	43	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
34	44	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
34	21	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
35	23	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
35	25	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
36	25	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
36	27	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
37	27	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
37	29	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
38	29	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
38	31	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
39	31	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
39	33	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
40	33	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
40	45	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
41	35	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
41	37	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
42	37	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
42	39	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
43	39	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Releases Cont...

Beam	Node	x	y	z	rx	ry	rz
44	21	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
44	23	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
45	2	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
46	17	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
48	46	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
48	47	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
49	47	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
49	48	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
59	21	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
61	25	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
62	27	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
63	29	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
65	33	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
70	19	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
73	37	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
74	45	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
74	72	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
75	68	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
75	66	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
76	67	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
76	57	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
77	69	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
77	44	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
78	66	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
78	58	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
79	57	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
79	49	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
81	60	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
81	61	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
82	61	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
82	62	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
83	51	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
83	52	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
84	52	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
84	53	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
85	64	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
85	65	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
86	65	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
86	71	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
87	55	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
87	56	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
88	56	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
88	70	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
95	69	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
95	43	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Releases Cont...

Beam	Node	x	y	z	rx	ry	rz
96	68	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
96	44	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
97	67	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
97	66	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
98	18	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
98	57	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
99	58	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
99	44	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
100	49	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
100	66	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
101	20	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
101	57	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
102	64	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
102	45	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
103	55	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
103	65	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
104	32	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
104	56	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
105	72	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
105	35	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
106	71	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
106	45	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
107	70	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
107	65	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
108	36	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
108	56	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
109	44	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
109	19	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
110	45	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
110	37	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
111	60	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
111	27	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
112	27	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
112	62	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
113	51	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
113	61	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
114	61	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
114	53	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
115	24	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
115	52	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
116	52	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
116	28	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Primary Load Cases

Number	Name	Type
1	DEAD LOAD	Dead
2	ROOF LIVE LOAD	Roof Live
3	SNOW LOAD	Snow
4	WIND 1	Wind
5	WIND 2	Wind
6	SEISMIC - H	Seismic-H
8	SEISMIC - V	Seismic-V

Combination Load Cases

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
100	COMB - 1 DEAD	1	DEAD LOAD	1.00
101	COMB - 1 DEAD + 1 SNOW	1	DEAD LOAD	1.00
		3	SNOW LOAD	1.00
102	COMB - 1 DEAD + 1 ROOF LIVE	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	1.00
103	COMB - 1 DEAD + 0.75 ROOF LIVE	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	0.75
104	COMB - 1 DEAD + 0.75 SNOW	1	DEAD LOAD	1.00
		3	SNOW LOAD	0.75
105	COMB - 1 DEAD + 0.6 WIND (1)	1	DEAD LOAD	1.00
		4	WIND 1	0.60
106	COMB - 1 DEAD + 0.6 WIND (2)	1	DEAD LOAD	1.00
		5	WIND 2	0.60
107	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	0.75
		4	WIND 1	0.75
108	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	0.75
		5	WIND 2	0.75
109	COMB - 1 DEAD + 0.75 WIND + 0.75 SN(	1	DEAD LOAD	1.00
		4	WIND 1	0.75
		3	SNOW LOAD	0.75
110	COMB - 1 DEAD + 0.75 WIND + 0.75 SN(	1	DEAD LOAD	1.00
		5	WIND 2	0.75
		3	SNOW LOAD	0.75
111	COMB - 1 DEAD + 0.75 WIND (1)	1	DEAD LOAD	1.00
		4	WIND 1	0.75
112	COMB - 1 DEAD + 0.75 WIND (2)	1	DEAD LOAD	1.00
		5	WIND 2	0.75
113	COMB - 0.6 DEAD + 0.6 WIND (1)	1	DEAD LOAD	0.60
		4	WIND 1	0.60
114	COMB - 0.6 DEAD + 0.6 WIND (2)	1	DEAD LOAD	0.60

Combination Load Cases Cont...

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
		5	WIND 2	0.60
115	COMB - 1 DEAD + 0.91 SEISMIC-H + 0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.91
		8	SEISMIC - V	0.70
116	COMB - 1 DEAD + -0.91 SEISMIC-H + 0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	0.70
117	COMB - 1 DEAD + 0.91 SEISMIC-H + -0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.91
		8	SEISMIC - V	-0.70
118	COMB - 1 DEAD + -0.91 SEISMIC-H + -0.	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	-0.70
119	COMB - 1 DEAD + 0.683 SEISMIC-H + 0.!	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.68
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
120	COMB - 1 DEAD + -0.683 SEISMIC-H + 0	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.68
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
121	COMB - 1 DEAD + 0.683 SEISMIC-H + -0	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.68
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
122	COMB - 1 DEAD + -0.683 SEISMIC-H + -(	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.68
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
123	COMB - 0.6 DEAD + 0.91 SEISMIC-H + -(	1	DEAD LOAD	0.60
		6	SEISMIC - H	0.91
		8	SEISMIC - V	-0.70
124	COMB - 0.6 DEAD + -0.91 SEISMIC-H + -	1	DEAD LOAD	0.60
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	-0.70
125	COMB - 0.6 DEAD + 0.91 SEISMIC-H + 0.	1	DEAD LOAD	0.60
		6	SEISMIC - H	0.91
		8	SEISMIC - V	0.70
126	COMB - 0.6 DEAD + -0.91 SEISMIC-H + (	1	DEAD LOAD	0.60
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	0.70
315	COMB - 1 DEAD + 1.4 SEISMIC-H + 0.7 S	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.40
		8	SEISMIC - V	0.70
316	COMB - 1 DEAD + -1.4 SEISMIC-H + 0.7	1	DEAD LOAD	1.00

Combination Load Cases Cont...

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
		6	SEISMIC - H	-0.70
		8	SEISMIC - V	0.70
317	COMB - 1 DEAD + 1.4 SEISMIC-H + -0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.40
		8	SEISMIC - V	-0.70
318	COMB - 1 DEAD + -1.4 SEISMIC-H + -0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	-1.40
		8	SEISMIC - V	-0.70
319	COMB - 1 DEAD + 1.05 SEISMIC-H + 0.5	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.05
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
320	COMB - 1 DEAD + -1.05 SEISMIC-H + 0.5	1	DEAD LOAD	1.00
		6	SEISMIC - H	-1.05
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
321	COMB - 1 DEAD + 1.05 SEISMIC-H + -0.5	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.05
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
322	COMB - 1 DEAD + -1.05 SEISMIC-H + -0.	1	DEAD LOAD	1.00
		6	SEISMIC - H	-1.05
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
323	COMB - 0.6 DEAD + 1.4 SEISMIC-H + -0.	1	DEAD LOAD	0.60
		6	SEISMIC - H	1.40
		8	SEISMIC - V	-0.70
324	COMB - 0.6 DEAD + -1.4 SEISMIC-H + -0	1	DEAD LOAD	0.60
		6	SEISMIC - H	-1.40
		8	SEISMIC - V	-0.70
326	COMB - 0.6 DEAD + 1.4 SEISMIC-H + 0.7	1	DEAD LOAD	0.60
		6	SEISMIC - H	1.40
		8	SEISMIC - V	0.70
327	COMB - 0.6 DEAD + -1.4 SEISMIC-H + 0.	1	DEAD LOAD	0.60
		6	SEISMIC - H	-1.40
		8	SEISMIC - V	0.70

Load Generators

There is no data of this type.

1 DEAD LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip·in)	MY (kip·in)	MZ (kip·in)
2	-	-3.300	-	-	-	-
17	-	-15.500	-	-	-	-
21	-	-4.500	-	-	-	-
33	-	-4.500	-	-	-	-
35	-	-13.000	-	-	-	-
41	-	-6.500	-	-	-	-
43	-	-9.000	-	-	-	-
44	-	-4.500	-	-	-	-
45	-	-4.500	-	-	-	-
48	-	-3.300	-	-	-	-

1 DEAD LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
31	UNI	lbf/ft	GY	-70.000	-	-	-	-
32	UNI	lbf/ft	GY	-70.000	-	-	-	-
33	UNI	lbf/ft	GY	-70.000	-	-	-	-
34	UNI	lbf/ft	GY	-70.000	-	-	-	-
35	UNI	lbf/ft	GY	-500.000	-	-	-	-
36	UNI	lbf/ft	GY	-500.000	-	-	-	-
37	UNI	lbf/ft	GY	-500.000	-	-	-	-
38	UNI	lbf/ft	GY	-500.000	-	-	-	-
40	UNI	lbf/ft	GY	-70.000	-	-	-	-
41	UNI	lbf/ft	GY	-70.000	-	-	-	-
42	UNI	lbf/ft	GY	-70.000	-	-	-	-
43	UNI	lbf/ft	GY	-70.000	-	-	-	-
48	UNI	lbf/ft	GY	-500.000	-	-	-	-
49	UNI	lbf/ft	GY	-500.000	-	-	-	-

1 DEAD LOAD : Selfweight

Direction	Factor	Assigned Geometry
Y	-1.000	ALL

2 ROOF LIVE LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip`in)	MY (kip`in)	MZ (kip`in)
2	-	-2.640	-	-	-	-
17	-	-12.500	-	-	-	-
21	-	-3.500	-	-	-	-
33	-	-3.500	-	-	-	-
35	-	-11.500	-	-	-	-
41	-	-5.500	-	-	-	-
43	-	-7.000	-	-	-	-
44	-	-3.500	-	-	-	-
45	-	-3.500	-	-	-	-
48	-	-2.640	-	-	-	-

2 ROOF LIVE LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
31	UNI	lbf/ft	GY	-60.000	-	-	-	-
32	UNI	lbf/ft	GY	-60.000	-	-	-	-
33	UNI	lbf/ft	GY	-60.000	-	-	-	-
34	UNI	lbf/ft	GY	-60.000	-	-	-	-
35	UNI	lbf/ft	GY	-370.000	-	-	-	-
36	UNI	lbf/ft	GY	-370.000	-	-	-	-
37	UNI	lbf/ft	GY	-370.000	-	-	-	-
38	UNI	lbf/ft	GY	-370.000	-	-	-	-
40	UNI	lbf/ft	GY	-60.000	-	-	-	-
41	UNI	lbf/ft	GY	-60.000	-	-	-	-
42	UNI	lbf/ft	GY	-60.000	-	-	-	-
43	UNI	lbf/ft	GY	-60.000	-	-	-	-
48	UNI	lbf/ft	GY	-400.000	-	-	-	-
49	UNI	lbf/ft	GY	-400.000	-	-	-	-

3 SNOW LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip`in)	MY (kip`in)	MZ (kip`in)
2	-	-3.300	-	-	-	-
17	-	-15.500	-	-	-	-
21	-	-12.300	-	-	-	-
33	-	-12.300	-	-	-	-
35	-	-13.000	-	-	-	-
41	-	-6.500	-	-	-	-
43	-	-9.000	-	-	-	-
44	-	-12.300	-	-	-	-
45	-	-12.300	-	-	-	-
48	-	-3.300	-	-	-	-

3 SNOW LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
31	UNI	lbf/ft	GY	-60.000	-	-	-	-
32	UNI	lbf/ft	GY	-60.000	-	-	-	-
33	UNI	lbf/ft	GY	-60.000	-	-	-	-
34	UNI	lbf/ft	GY	-60.000	-	-	-	-
35	UNI	lbf/ft	GY	-500.000	-	-	-	-
36	UNI	lbf/ft	GY	-500.000	-	-	-	-
37	UNI	lbf/ft	GY	-500.000	-	-	-	-
38	UNI	lbf/ft	GY	-500.000	-	-	-	-
40	UNI	lbf/ft	GY	-60.000	-	-	-	-
41	UNI	lbf/ft	GY	-60.000	-	-	-	-
42	UNI	lbf/ft	GY	-60.000	-	-	-	-
43	UNI	lbf/ft	GY	-60.000	-	-	-	-
48	UNI	lbf/ft	GY	-1.9E+3	-	-	-	-
49	UNI	lbf/ft	GY	-1.9E+3	-	-	-	-

4 WIND 1 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
31	UNI	lbf/ft	GX	1E+3	-	-	-	-
32	UNI	lbf/ft	GX	1E+3	-	-	-	-
33	UNI	lbf/ft	GX	1E+3	-	-	-	-
41	UNI	lbf/ft	GX	600.000	-	-	-	-
42	UNI	lbf/ft	GX	600.000	-	-	-	-
43	UNI	lbf/ft	GX	600.000	-	-	-	-
48	UNI	lbf/ft	GX	100.000	-	-	-	-
49	UNI	lbf/ft	GX	100.000	-	-	-	-

5 WIND 2 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
31	UNI	lbf/ft	GX	-600.000	-	-	-	-
32	UNI	lbf/ft	GX	-600.000	-	-	-	-
33	UNI	lbf/ft	GX	-600.000	-	-	-	-
41	UNI	lbf/ft	GX	-1E+3	-	-	-	-
42	UNI	lbf/ft	GX	-1E+3	-	-	-	-
43	UNI	lbf/ft	GX	-1E+3	-	-	-	-
48	UNI	lbf/ft	GX	-100.000	-	-	-	-
49	UNI	lbf/ft	GX	-100.000	-	-	-	-

6 SEISMIC - H : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
31	UNI	lbf/ft	GX	680.000	-	-	-	-
32	UNI	lbf/ft	GX	680.000	-	-	-	-
33	UNI	lbf/ft	GX	680.000	-	-	-	-
34	UNI	lbf/ft	GX	570.000	-	-	-	-
35	UNI	lbf/ft	GX	570.000	-	-	-	-
36	UNI	lbf/ft	GX	570.000	-	-	-	-
37	UNI	lbf/ft	GX	570.000	-	-	-	-
38	UNI	lbf/ft	GX	570.000	-	-	-	-
39	UNI	lbf/ft	GX	570.000	-	-	-	-
40	UNI	lbf/ft	GX	570.000	-	-	-	-
41	UNI	lbf/ft	GX	680.000	-	-	-	-
42	UNI	lbf/ft	GX	680.000	-	-	-	-
43	UNI	lbf/ft	GX	680.000	-	-	-	-
44	UNI	lbf/ft	GX	570.000	-	-	-	-
48	UNI	lbf/ft	GX	240.000	-	-	-	-
49	UNI	lbf/ft	GX	240.000	-	-	-	-

8 SEISMIC - V : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip·in)	MY (kip·in)	MZ (kip·in)
2	-	-0.560	-	-	-	-
17	-	-2.640	-	-	-	-
21	-	-0.770	-	-	-	-
33	-	-0.770	-	-	-	-
35	-	-2.210	-	-	-	-
41	-	-1.110	-	-	-	-
43	-	-1.530	-	-	-	-
44	-	-0.770	-	-	-	-
45	-	-0.770	-	-	-	-

8 SEISMIC - V : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
31	UNI	lbf/ft	GY	-12.000	-	-	-	-
32	UNI	lbf/ft	GY	-12.000	-	-	-	-
33	UNI	lbf/ft	GY	-12.000	-	-	-	-
34	UNI	lbf/ft	GY	-12.000	-	-	-	-
35	UNI	lbf/ft	GY	-85.000	-	-	-	-
36	UNI	lbf/ft	GY	-85.000	-	-	-	-
37	UNI	lbf/ft	GY	-85.000	-	-	-	-
38	UNI	lbf/ft	GY	-85.000	-	-	-	-
40	UNI	lbf/ft	GY	-12.000	-	-	-	-
41	UNI	lbf/ft	GY	-12.000	-	-	-	-
42	UNI	lbf/ft	GY	-12.000	-	-	-	-
43	UNI	lbf/ft	GY	-12.000	-	-	-	-

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	2	315:COMB - 1	**0.555**	-0.012	0	0.555	0	0	-0.001
Min X	2	324:COMB - 0.	**-0.552**	-0.006	0	0.552	0	0	0.000
Max Y	19	323:COMB - 0.	0.515	**0.056**	0	0.518	0	0	-0.001
Min Y	17	101:COMB - 1	-0.001	**-0.084**	0	0.084	0	0	-0.000
Max Z	1	1:DEAD LOAD	0	0	**0**	0	0	0	0.000
Min Z	1	1:DEAD LOAD	0	0	**0**	0	0	0	0.000
Max rX	1	1:DEAD LOAD	0	0	0	0	**0**	0	0.000
Min rX	1	1:DEAD LOAD	0	0	0	0	**0**	0	0.000
Max rY	1	1:DEAD LOAD	0	0	0	0	0	**0**	0.000
Min rY	1	1:DEAD LOAD	0	0	0	0	0	**0**	0.000
Max rZ	31	101:COMB - 1	-0.001	-0.014	0	0.014	0	0	**0.004**
Min rZ	68	326:COMB - 0.	0.230	0.035	0	0.233	0	0	**-0.003**
Max Rst	2	315:COMB - 1	0.555	-0.012	0	**0.555**	0	0	-0.001

Beam Displacement Detail Summary

Displacements shown in italic indicate the presence of an offset

	Beam	L/C	d (ft)	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	31	315:COMB - 1	0	**0.555**	-0.012	0	0.555
Min X	31	324:COMB - 0.	0	**-0.552**	-0.006	0	0.552
Max Y	32	323:COMB - 0.	26.500	0.515	**0.056**	0	0.518
Min Y	48	101:COMB - 1	14.250	-0.002	**-0.959**	0	0.959
Max Z	1	1:DEAD LOAD	0	0	0	**0**	0
Min Z	1	1:DEAD LOAD	0	0	0	**0**	0
Max Rst	48	101:COMB - 1	14.250	-0.002	-0.959	0	**0.959**

Beam End Displacement Summary

Displacements shown in italic indicate the presence of an offset

	Beam	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	31	2	315:COMB - 1	**0.555**	-0.012	0	0.555
Min X	31	2	324:COMB - 0.	**-0.552**	-0.006	0	0.552
Max Y	32	19	323:COMB - 0.	0.515	**0.056**	0	0.518
Min Y	31	17	101:COMB - 1	-0.001	**-0.084**	0	0.084
Max Z	1	1	1:DEAD LOAD	0	0	**0**	0
Min Z	1	1	1:DEAD LOAD	0	0	**0**	0
Max Rst	31	2	315:COMB - 1	0.555	-0.012	0	**0.555**

Beam End Force Summary

The signs of the forces at end B of each beam have been reversed. For example: this means that the Min Fx entry gives the largest tension value for an beam.

				Axial	Shear		Torsion	Bending	
	Beam	Node	L/C	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip-in)	My (kip-in)	Mz (kip-in)
Max Fx	16	18	318:COMB - 1	**124.306**	0	0.222	0	-0.088	0
Min Fx	16	67	323:COMB - 0.	**-94.244**	-0	-0.217	-0	-27.323	-0
Max Fy	48	46	101:COMB - 1	-0.021	**35.010**	0	0	0	38.479
Min Fy	48	47	101:COMB - 1	-0.021	**-34.957**	-0	-0	-0	29.405
Max Fz	69	68	324:COMB - 0.	71.727	0	**15.667**	0	-154.131	0
Min Fz	69	68	315:COMB - 1	-46.945	0	**-15.709**	0	151.110	0
Max Mx	1	1	1:DEAD LOAD	15.029	-0.017	0	**0**	0	0.000
Min Mx	1	1	1:DEAD LOAD	15.029	-0.017	0	**0**	0	0.000
Max My	69	48	324:COMB - 0.	71.645	-0	15.667	-0	**221.866**	-0
Min My	69	48	315:COMB - 1	-47.081	-0	-15.709	-0	**-225.900**	-0
Max Mz	1	46	109:COMB - 1	37.235	-0.164	-0	-0	-0	**45.196**
Min Mz	45	46	110:COMB - 1	9.014	-0.125	0	0	0	**-28.748**

Beam Force Detail Summary

Sign convention as diagrams:- positive above line, negative below line except Fx where positive is compression. Distance d is given from beam end A.

				Axial	Shear		Torsion	Bending	
	Beam	L/C	d (ft)	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip-in)	My (kip-in)	Mz (kip-in)
Max Fx	16	318:COMB - 1	0	**124.306**	0	0.222	0	-0.088	0
Min Fx	16	323:COMB - 0.	10.500	**-94.244**	-0	-0.217	-0	-27.323	-0
Max Fy	48	101:COMB - 1	0	-0.021	**35.010**	0	0	0	38.479
Min Fy	48	101:COMB - 1	28.500	-0.021	**-34.957**	-0	-0	-0	29.405
Max Fz	69	324:COMB - 0.	0	71.727	0	**15.667**	0	-154.131	0
Min Fz	69	315:COMB - 1	0	-46.945	0	**-15.709**	0	151.110	0
Max Mx	1	1:DEAD LOAD	0	15.029	-0.017	0	**0**	0	0.000
Min Mx	1	1:DEAD LOAD	0	15.029	-0.017	0	**0**	0	0.000
Max My	69	324:COMB - 0.	2.000	71.645	-0	15.667	-0	**221.866**	-0

Beam Force Detail Summary Cont...

	Beam	L/C	d	Axial	Shear		Torsion	Bending	
				Fx	Fy	Fz	Mx	My	Mz
			(ft)	(kip)	(kip)	(kip)	(kip·in)	(kip·in)	(kip·in)
Min My	69	315:COMB - 1	2.000	-47.081	-0	-15.709	-0	**-225.900**	-0
Max Mz	1	109:COMB - 1	23.000	37.235	-0.164	-0	-0	-0	**45.196**
Min Mz	48	101:COMB - 1	14.250	-0.021	0.027	0	0	0	**-2.96E+3**

Reaction Summary

	Node	L/C	Horizontal	Vertical	Horizontal	Moment		
			FX	FY	FZ	MX	MY	MZ
			(kip)	(kip)	(kip)	(kip·in)	(kip·in)	(kip·in)
Max FX	20	324:COMB - 0.	**48.101**	-78.345	0	0	0	0
Min FX	20	315:COMB - 1	**-50.054**	97.239	0	0	0	0
Max FY	18	318:COMB - 1	33.309	**154.631**	0	0	0	0
Min FY	18	323:COMB - 0.	-31.911	**-122.685**	0	0	0	0
Max FZ	1	1:DEAD LOAD	0.017	15.029	**0**	0	0	0
Min FZ	1	1:DEAD LOAD	0.017	15.029	**0**	0	0	0
Max MX	1	1:DEAD LOAD	0.017	15.029	0	**0**	0	0
Min MX	1	1:DEAD LOAD	0.017	15.029	0	**0**	0	0
Max MY	1	1:DEAD LOAD	0.017	15.029	0	0	**0**	0
Min MY	1	1:DEAD LOAD	0.017	15.029	0	0	**0**	0
Max MZ	1	1:DEAD LOAD	0.017	15.029	0	0	0	**0**
Min MZ	1	1:DEAD LOAD	0.017	15.029	0	0	0	**0**

Utilization Ratio

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
1	W14X53	W14X53	0.377	1.000	0.377	Eq.H1-1a	320	15.600	541.000	57.700	1.940
15	W14X53	W14X53	0.826	1.000	0.826	Cl.E3	320	15.600	541.000	57.700	1.940
16	W14X68	W14X68	0.381	1.000	0.381	Eq.H1-1a	318	20.000	722.000	121.000	3.010
17	W14X68	W14X68	0.156	1.000	0.156	Cl.E3	315	20.000	722.000	121.000	3.010
18	HSST8X8	HSST8X8	0.089	1.000	0.089	Cl.E3	319	13.500	125.000	125.000	204.000
19	HSST8X8	HSST8X8	0.522	1.000	0.522	Eq.H1-1a	318	13.500	125.000	125.000	204.000
20	HSST8X8	HSST8X8	0.184	1.000	0.184	Cl.E3	319	13.500	125.000	125.000	204.000
21	HSST8X8	HSST8X8	0.487	1.000	0.487	Eq.H1-1a	315	13.500	125.000	125.000	204.000
22	HSST8X8	HSST8X8	0.107	1.000	0.107	Cl.E3	320	13.500	125.000	125.000	204.000
23	W14X68	W14X68	0.134	1.000	0.134	Cl.E3	320	20.000	722.000	121.000	3.010
24	W14X74	W14X74	0.141	1.000	0.141	Cl.E3	320	21.800	795.000	134.000	3.870
25	W14X68	W14X68	0.228	1.000	0.228	Eq.H1-1a	315	20.000	722.000	121.000	3.010
26	W14X53	W14X53	0.081	1.000	0.081	Cl.E3	319	15.600	541.000	57.700	1.940
27	W14X53	W14X53	0.242	1.000	0.242	Cl.E3	319	15.600	541.000	57.700	1.940
28	W14X74	W14X74	0.187	1.000	0.187	Cl.E3	319	21.800	795.000	134.000	3.870
29	W14X74	W14X74	0.107	1.000	0.107	Cl.E3	315	21.800	795.000	134.000	3.870
30	W14X74	W14X74	0.096	1.000	0.096	Cl.E3	320	21.800	795.000	134.000	3.870

Utilization Ratio Cont...

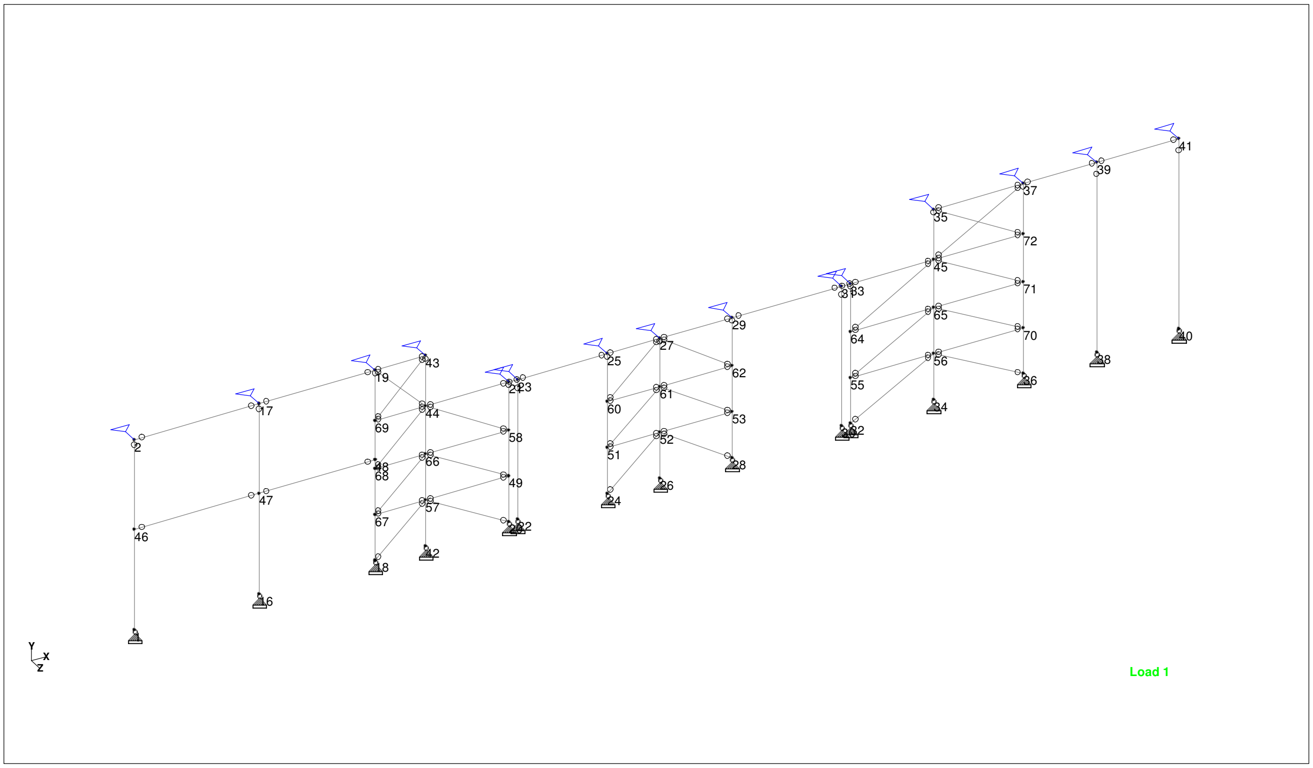
Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
31	W16X36	W16X36	0.133	1.000	0.133	Cl.E3	317	10.600	448.000	24.500	0.545
32	W14X68	W14X68	0.107	1.000	0.107	Cl.E3	317	20.000	722.000	121.000	3.010
33	W14X68	W14X68	0.056	1.000	0.056	Cl.E3	323	20.000	722.000	121.000	3.010
34	W14X68	W14X68	0.035	1.000	0.035	Eq.H1-3a(H1-	319	20.000	722.000	121.000	3.010
35	W16X36	W16X36	0.622	1.000	0.622	Eq.H1-1a	315	10.600	448.000	24.500	0.545
36	W16X36	W16X36	0.298	1.000	0.298	Eq.H1-1a	315	10.600	448.000	24.500	0.545
37	W16X36	W16X36	0.295	1.000	0.295	Eq.H1-1a	318	10.600	448.000	24.500	0.545
38	W16X36	W16X36	0.495	1.000	0.495	Cl.F2.2	319	10.600	448.000	24.500	0.545
39	L60608	L60608	0.189	1.000	0.189	Eq.H2-1	315	5.770	8.034	31.782	0.481
40	W14X68	W14X68	0.050	1.000	0.050	Cl.E3	315	20.000	722.000	121.000	3.010
41	W14X68	W14X68	0.054	1.000	0.054	Cl.E3	324	20.000	722.000	121.000	3.010
42	W14X68	W14X68	0.079	1.000	0.079	Cl.E3	318	20.000	722.000	121.000	3.010
43	W12X26	W12X26	0.194	1.000	0.194	Cl.E3	318	7.650	204.000	17.300	0.300
44	L60608	L60608	0.308	1.000	0.308	Eq.H2-1	326	5.770	8.034	31.782	0.481
45	W14X53	W14X53	0.086	1.000	0.086	Cl.E3	320	15.600	541.000	57.700	1.940
46	W14X53	W14X53	0.319	1.000	0.319	Eq.H1-1a	320	15.600	541.000	57.700	1.940
47	W14X68	W14X68	0.294	1.000	0.294	Eq.H1-1b	318	20.000	722.000	121.000	3.010
48	W24X55	W24X55	0.599	1.000	0.599	Eq.H1-3a(H1-	319	16.200	1.35E+3	29.100	1.180
49	W24X55	W24X55	0.527	1.000	0.527	Eq.H1-3a(H1-	319	16.200	1.35E+3	29.100	1.180
50	W14X68	W14X68	0.092	1.000	0.092	Cl.E3	319	20.000	722.000	121.000	3.010
52	HSST8X8	HSST8X8	0.305	1.000	0.305	Eq.H1-1a	320	13.500	125.000	125.000	204.000
53	HSST8X8	HSST8X8	0.163	1.000	0.163	Cl.E3	319	13.500	125.000	125.000	204.000
54	HSST8X8	HSST8X8	0.314	1.000	0.314	Eq.H1-1a	319	13.500	125.000	125.000	204.000
56	W14X68	W14X68	0.088	1.000	0.088	Cl.E3	320	20.000	722.000	121.000	3.010
57	W14X74	W14X74	0.146	1.000	0.146	Cl.E3	320	21.800	795.000	134.000	3.870
58	W14X74	W14X74	0.184	1.000	0.184	Cl.E3	319	21.800	795.000	134.000	3.870
59	W14X68	W14X68	0.037	1.000	0.037	Cl.E3	320	20.000	722.000	121.000	3.010
61	HSST8X8	HSST8X8	0.126	1.000	0.126	Cl.E3	319	13.500	125.000	125.000	204.000
62	HSST8X8	HSST8X8	0.131	1.000	0.131	Cl.E3	319	13.500	125.000	125.000	204.000
63	HSST8X8	HSST8X8	0.160	1.000	0.160	Cl.E3	319	13.500	125.000	125.000	204.000
65	W14X68	W14X68	0.037	1.000	0.037	Cl.E3	319	20.000	722.000	121.000	3.010
66	W14X74	W14X74	0.155	1.000	0.155	Cl.E3	320	21.800	795.000	134.000	3.870
67	W14X74	W14X74	0.187	1.000	0.187	Cl.E3	319	21.800	795.000	134.000	3.870
68	W14X68	W14X68	0.389	1.000	0.389	Eq.H1-1a	318	20.000	722.000	121.000	3.010
69	W14X68	W14X68	0.403	1.000	0.403	Eq.H1-1a	318	20.000	722.000	121.000	3.010
70	W14X68	W14X68	0.122	1.000	0.122	Eq.H1-1b	318	20.000	722.000	121.000	3.010
71	W14X68	W14X68	0.166	1.000	0.166	Cl.E3	315	20.000	722.000	121.000	3.010
72	W14X68	W14X68	0.103	1.000	0.103	Cl.E3	315	20.000	722.000	121.000	3.010
73	W14X68	W14X68	0.059	1.000	0.059	Cl.E3	315	20.000	722.000	121.000	3.010
74	W14X68	W14X68	0.080	1.000	0.080	Cl.E3	324	20.000	722.000	121.000	3.010
75	W14X68	W14X68	0.068	1.000	0.068	Cl.E3	323	20.000	722.000	121.000	3.010
76	W14X68	W14X68	0.058	1.000	0.058	Cl.E3	323	20.000	722.000	121.000	3.010
77	W14X68	W14X68	0.067	1.000	0.067	Cl.E3	323	20.000	722.000	121.000	3.010
78	W14X68	W14X68	0.153	1.000	0.153	Cl.E3	324	20.000	722.000	121.000	3.010
79	W14X68	W14X68	0.163	1.000	0.163	Cl.E3	324	20.000	722.000	121.000	3.010

Utilization Ratio Cont...

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
81	W12X26	W12X26	0.265	1.000	0.265	Eq.H1-1a	317	7.650	204.000	17.300	0.300
82	W12X26	W12X26	0.568	1.000	0.568	Eq.H1-1a	318	7.650	204.000	17.300	0.300
83	W12X26	W12X26	0.274	1.000	0.274	Eq.H1-1a	317	7.650	204.000	17.300	0.300
84	W12X26	W12X26	0.549	1.000	0.549	Eq.H1-1a	318	7.650	204.000	17.300	0.300
85	W14X68	W14X68	0.133	1.000	0.133	Cl.E3	323	20.000	722.000	121.000	3.010
86	W14X68	W14X68	0.119	1.000	0.119	Cl.E3	324	20.000	722.000	121.000	3.010
87	W14X68	W14X68	0.129	1.000	0.129	Cl.E3	323	20.000	722.000	121.000	3.010
88	W14X68	W14X68	0.126	1.000	0.126	Cl.E3	324	20.000	722.000	121.000	3.010
95	HSST5X5	HSST5X5	0.371	1.000	0.371	Eq.H1-1a	116	5.620	20.100	20.100	33.100
96	HSST4X4	HSST4X4	0.422	1.000	0.422	Eq.H1-1a	116	4.360	9.590	9.590	16.100
97	HSST4X4	HSST4X4	0.685	1.000	0.685	Eq.H1-1a	116	4.360	9.590	9.590	16.100
98	HSST4X4	HSST4X4	0.741	1.000	0.741	Eq.H1-1a	116	4.360	9.590	9.590	16.100
99	HSST5X5	HSST5X5	0.929	1.000	0.929	Eq.H1-1a	115	5.620	20.100	20.100	33.100
100	HSST5X5	HSST5X5	0.937	1.000	0.937	Eq.H1-1a	115	5.620	20.100	20.100	33.100
101	HSST5X5	HSST5X5	0.883	1.000	0.883	Eq.H1-1a	115	5.620	20.100	20.100	33.100
102	HSST5X5	HSST5X5	0.844	1.000	0.844	Eq.H1-1a	116	5.620	20.100	20.100	33.100
103	HSST5X5	HSST5X5	0.774	1.000	0.774	Eq.H1-1a	116	5.620	20.100	20.100	33.100
104	HSST5X5	HSST5X5	0.749	1.000	0.749	Eq.H1-1a	116	5.620	20.100	20.100	33.100
105	HSST5X5	HSST5X5	0.515	1.000	0.515	Eq.H1-1a	115	5.620	20.100	20.100	33.100
106	HSST5X5	HSST5X5	0.778	1.000	0.778	Eq.H1-1a	115	5.620	20.100	20.100	33.100
107	HSST5X5	HSST5X5	0.767	1.000	0.767	Eq.H1-1a	115	5.620	20.100	20.100	33.100
108	HSST5X5	HSST5X5	0.783	1.000	0.783	Eq.H1-1a	115	5.620	20.100	20.100	33.100
109	HSST5X5	HSST5X5	0.517	1.000	0.517	Eq.H1-1a	109	5.620	20.100	20.100	33.100
110	HSST5X5	HSST5X5	0.772	1.000	0.772	Eq.H1-1a	110	5.620	20.100	20.100	33.100
111	HSST5X5	HSST5X5	0.373	1.000	0.373	Eq.H1-1a	116	5.620	20.100	20.100	33.100
112	HSST5X5	HSST5X5	0.569	1.000	0.569	Eq.H1-1a	115	5.620	20.100	20.100	33.100
113	HSST5X5	HSST5X5	0.370	1.000	0.370	Eq.H1-1a	116	5.620	20.100	20.100	33.100
114	HSST5X5	HSST5X5	0.533	1.000	0.533	Eq.H1-1a	115	5.620	20.100	20.100	33.100
115	HSST5X5	HSST5X5	0.381	1.000	0.381	Eq.H1-1a	116	5.620	20.100	20.100	33.100
116	HSST5X5	HSST5X5	0.552	1.000	0.552	Eq.H1-1a	115	5.620	20.100	20.100	33.100

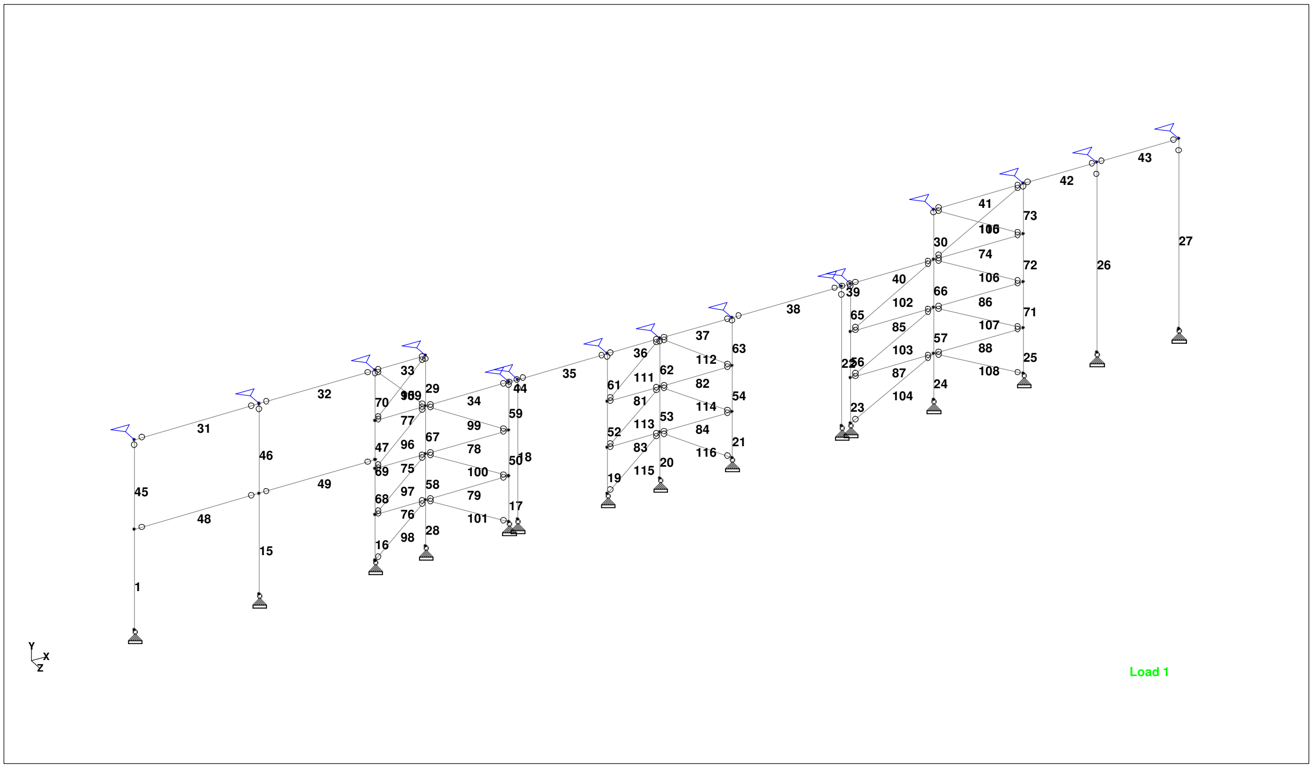
Failed Members

There is no data of this type.



Whole Structure - Node Labels (Input data was modified after picture taken)

Bentley Software licensed to AWB Engineers CONNECTED User: Vivek Kannan	Job No	Sheet No **20**	Rev
	Part		
Job Title 221205 - CPFD - FRAMES ALONG GRIDLINE 7	Ref		
	By	Date 3/11/2024	Chd
Client	File 3. 221205 - CPFD - Frame	Date/Time 11-Mar-2024 02:06	



Whole Structure - Member Labels (Input data was modified after picture taken)

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221205 - Coastal Pacific Distribution Facility - Frame Analysis Along Gridline 15

Design Loads

$DL_{roof} := 10\ psf$	Roof Dead Load
$DL_{mech} := 15\ psf$	Mechanical Dead Load
$DL_{wall} := 20\ psf$	Wall Dead Load
$LL_{roof} := 20\ psf$	Roof Live Load
$SL_{roof} := 25\ psf$	Snow Load
$WL_{wind\_lee} := 25\ psf$	Wind Pressure From Attached Wind Analysis (Windward + Leeward)
$S_{DS} := 0.848$	Short period spectral acceleration
$C_s := 0.1428$	Seismic Response Coefficient (from attached analysis)

Frame Loads Along Gridline 15

$DL_{15\_roof\_lvl1} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 5.5\ ft \cdot 0.5\right) = 0.07\ klf$	Frame Roof Dead Load (UDL) at Higher Elevation
$DL_{15\_roof\_lvl2} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 5.5\ ft \cdot 0.5\right) = 0.07\ klf$	Frame Roof Dead Load (UDL) at Lower Elevation
$LL_{15\_roof\_lvl1} := \left(LL_{roof} \cdot 5.5\ ft \cdot 0.5\right) = 0.06\ klf$	Frame Roof Live Load (UDL) at Higher Elevation
$LL_{15\_roof\_lvl2} := \left(LL_{roof} \cdot 5.5\ ft \cdot 0.5\right) = 0.06\ klf$	Frame Roof Live Load (UDL)) at Lower Elevation
$SL_{15\_roof\_lvl1} := \left(SL_{roof} \cdot 5.5\ ft \cdot 0.5\right) = 0.07\ klf$	Frame Roof Snow Load (UDL) at Higher Elevation
$SL_{15\_roof\_lvl2} := \left(SL_{roof} \cdot 5.5\ ft \cdot 0.5\right) = 0.07\ klf$	Frame Roof Snow Load (UDL) at Higher Elevation

Seismic Roof Dead Load (Mass) For Frame at Higher Elevation @ N

$$DL_{15\_seis\_roof\_lvl1N} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 205.25\ ft \cdot 66.5\ ft \cdot 0.5\right) = 170.61\ kip$$

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Seismic Wall Dead Load (Mass) For Frame at Higher Elevation @ N

$$DL_{15\_seis\_wall\_lvl1N} := \left(DL_{wall} \cdot \left(2 \cdot 66.5\ ft + 205.25\ ft\right) \cdot 22.5\ ft + DL_{wall} \cdot 5.5\ ft \cdot 205.25\ ft\right) \cdot 0.5 = 87.4\ kip$$

Seismic Roof Dead Load (Mass) For Frame at Higher Elevation @ S

$$DL_{15\_seis\_roof\_lvl1S} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 205.25\ ft \cdot 56\ ft \cdot 0.5\right) = 143.68\ kip$$

Seismic Wall Dead Load (Mass) For Frame at Higher Elevation @ S

$$DL_{15\_seis\_wall\_lvl1S} := \left(DL_{wall} \cdot \left(2 \cdot 56\ ft + 205.25\ ft\right) \cdot 22.5\ ft + DL_{wall} \cdot 5.5\ ft \cdot 205.25\ ft\right) \cdot 0.5 = 82.67\ kip$$

Seismic Roof Dead Load (Mass) For Frame at Lower Elevation

$$DL_{15\_seis\_roof\_lvl2} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 205.25\ ft \cdot 115.5\ ft\right) \cdot 0.5 = 296.33\ kip$$

$$DL_{15\_seis\_wall\_lvl2} := \begin{pmatrix} DL_{wall} \cdot 17\ ft \cdot 115.5\ ft \cdot 2 \\ + DL_{wall} \cdot 5.5\ ft \cdot 205.25\ ft \cdot 2 \\ + 8\ psf \cdot 205.25\ ft \cdot 17\ ft \cdot 2 \end{pmatrix} \cdot 0.5 = 89.76\ kip$$

Seismic Wall Dead Load (Mass) For Frame at Lower Elevation

$$DL_{15\_seis\_roof\_lvl1N} + DL_{15\_seis\_wall\_lvl1N} = 258.01\ kip$$

Total seismic weight at lvl 1 @ 45 ft. @ N

$$DL_{15\_seis\_roof\_lvl1S} + DL_{15\_seis\_wall\_lvl1S} = 226.35\ kip$$

$$DL_{15\_seis\_roof\_lvl2} + DL_{15\_seis\_wall\_lvl2} = 386.09\ kip$$

Total seismic weight at lvl 2 @ 34 ft.

Based on the vertical distribution of shear in attached ENERCALC seismic analysis

$$EQ_{15\_H\_lvl1N} := \frac{45\ kip}{66.5\ ft} = 0.68\ klf$$

Frame Seismic Load (UDL) EW Direction @ higher elevation N

$$EQ_{15\_V\_lvl1N} := 0.2 \cdot S_{DS} \cdot DL_{15\_roof\_lvl1} = 0.01\ klf$$

Vertical Seismic Load @ higher elevation N

$$EQ_{15\_H\_lvl1S} := \frac{39\ kip}{56\ ft} = 0.696\ klf$$

Frame Seismic Load (UDL) EW Direction @ higher elevation N

$$EQ_{15\_V\_lvl1S} := 0.2 \cdot S_{DS} \cdot DL_{15\_roof\_lvl1} = 0.01\ klf$$

Vertical Seismic Load @ higher elevation N

$$EQ_{15\_H\_lvl2} := \frac{66\ kip}{115.5\ ft} = 0.57\ klf$$

Frame Seismic Load (UDL) EW Direction @ lower elevation

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$EQ_{C.5\_V\_lvl2} := 0.2 \cdot S_{DS} \cdot \left(DL_{15\_roof\_lvl2}\right) = 0.01\ klf$ Vertical Seismic Load @ lower elevation

$WL_{15\_lvl1} := \dfrac{WL_{wind\_lee} \cdot 45\ ft \cdot 205.25\ ft \cdot 0.25}{56.5\ ft} = 1.02\ klf$ Frame Wind Load (UDL) EW Direction For Frame at Higher Level

$WL_{15\_lvl2} := \dfrac{20\ psf \cdot 11\ ft \cdot 205.25\ ft \cdot 0.50 + 5\ psf \cdot 45\ ft \cdot 205.25\ ft \cdot 0.25}{56.5\ ft} = 0.6\ klf$ Frame Wind Load (UDL) EW Direction For Frame at Higher Level

See attached STAAD analysis for initial elastic analysis of frame and brace design

Deflection and Story Drift Check

$\Delta_{BlvlH} := 0.414\ in$ Max deflection at higher floor from initial elastic analysis

$\Delta_{BlvlL} := 0.309\ in$ Max deflection at lower floor from initial elastic analysis

$I_e := 1$ Importance factor

$C_d := 5$ Deflection amplification factor

$\Delta_{B\_Cd} := \dfrac{\left(\Delta_{BlvlH} - \Delta_{BlvlL}\right) \cdot C_d}{I_e} = 0.53\ in$ Amplified interstory drift

$\Delta_{allow} := 0.02 \cdot 11.5\ ft = 2.76\ in$ Allowable story drift

$\Delta_B < \Delta_{allow}$ OK

Brace Design

AISC seismic provisions requires that between 30% and 70% of the total horizontal force is resisted by braces in tension unless the available strength of each brace in compression is larger than the required strength resulting from the Overstrength seismic load.

$EQ_{H\_tot} := 45\ kip + 39\ kip + 66\ kip = 150\ kip$

$$F_{brace\_ten1} := \frac{\left((30+22)\ kip \cdot \dfrac{23.50\ ft}{23.51\ ft}\right)}{(45\ kip + 39\ kip)} \cdot 100 = 61.88 \qquad OK$$

$$F_{brace\_ten2} := \frac{\left(((39+37)\ kip) \cdot \dfrac{20.5\ ft}{22\ ft}\right)}{(39\ kip + 66\ kip)} \cdot 100 = 67.45 \qquad \text{OK}$$

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Width-to-Thickness Limitations

Per AISC Seismic Design Manual, Table 1-5b, HSS 5x5x5/16 satisfy the requirements for highly ductile members for material A1085 Grade A.

Brace Slenderness Check

Brace slenderness has been checked in the STAAD model

Analysis for Frame Considering the Expected Strengths of Braces in Tension And Compression

For the HSS 5x5x5/16

$R_y := 1.25$ A1085 material

$F_y := 50\ ksi$

Tensile capacity of braces

For the HSS 5x5x5/16 $P_{T\_HSS\_5x5x0.31} := R_y \cdot F_y \cdot 5.26\ in^2 = 328.75\ kip$

Compression capacity of braces

HSS 5x5x5/16

For unbraced length of 13 ft.

$$\frac{KL_c}{r} \quad \frac{13\ ft}{1.9\ in} = 82.11 \quad < \quad 4.71 \cdot \sqrt{\frac{29000\ ksi}{R_y \cdot F_y}} = 101.46$$

$$F_e := \left(\frac{\pi^2 \cdot 29000\ ksi}{\left(\frac{13\ ft}{1.9\ in} \right)^2} \right) = 42.46\ ksi$$

$$F_{cr} := \left(0.658^{\left(\frac{R_y \cdot F_y}{F_e} \right)} \right) \cdot R_y \cdot F_y = 33.75\ ksi$$

$$P_{c\_HSS\_5x5x31\_13} := min\left(R_y \cdot F_y \cdot 5.26\ in^2 , \left(\frac{1}{0.877} \right) \cdot F_{cr} \cdot 5.26\ in^2 \right) = 202.43\ kip$$

Maximum post-buckling brace strength (AISC Seismic Provisions F2.3(b))

$$P_{c\_post\_5x5x0.31\_13} := P_{c\_HSS\_5x5x31\_13} \cdot 0.3 = 60.73\ kip$$

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For unbraced length of 13 ft.

$\frac{KL_c}{r}$ $\frac{15\ ft}{1.9\ in} = 94.74$ $<$ $4.71 \cdot \sqrt{\frac{29000\ ksi}{R_y \cdot F_y}} = 101.46$

$F_e := \left(\frac{\pi^2 \cdot 29000\ ksi}{\left(\frac{15\ ft}{1.9\ in}\right)^2}\right) = 31.89\ ksi$

$F_{cr} := \left(0.658^{\left(\frac{R_y \cdot F_y}{F_e}\right)}\right) \cdot R_y \cdot F_y = 27.52\ ksi$

$P_{c\_HSS\_5x5x0.31\_15} := min\left(R_y \cdot F_y \cdot 5.26\ in^2, \left(\frac{1}{0.877}\right) \cdot F_{cr} \cdot 5.26\ in^2\right) = 165.05\ kip$

Maximum post-buckling brace strength (AISC Seismic Provisions F2.3(b))

$P_{c\_post\_5x5x0.31\_15} := P_{c\_HSS\_5x5x0.31\_15} \cdot 0.3 = 49.52\ kip$

Column Design

Design of columns at Gridlines N, L, C.5, A.3

$P_{col\_DL} := 40\ kip$

$P_{col\_LL} := 20\ kip$

$P_{col\_SL} := 32\ kip$

The axial compressive/tension force on the columns considering expected brace strengths in tension and compression. Analysis considering post-buckled compression strength is not expected to govern.

$P_{Emh\_C} := 4\left(P_{c\_HSS\_5x5x31\_13} \cdot \frac{8\ ft}{16.75\ ft}\right) = 386.74\ kip$

$P_{Emh\_T} := 4\left(P_{T\_HSS\_5x5x0.31} \cdot \frac{8\ ft}{16.75\ ft}\right) = 628.06\ kip$

$P_{a\_Comp} := (1 + 0.14 \cdot S_{DS}) \cdot P_{col\_DL} + 0.7 \cdot P_{Emh\_C} = 315.47\ kip$ Total compressive demand on columns

$P_{a\_Ten} := (0.6 - 0.14 \cdot S_{DS}) \cdot P_{col\_DL} + 0.7 \cdot (-P_{Emh\_T}) = -420.39\ kip$ Total tensile demand on columns

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Use W14x68 column

$P_{cap\_W14x68\_comp} := 535\ kip$ Compressive capacity of W12X65 column with L_b = 8 ft.

$$IR_{col\_comp} := \frac{P_{a\_Comp}}{P_{cap\_W14x68\_comp}} = 0.59 \qquad OK$$

$$P_{cap\_W14x68\_tension} := \frac{50\ ksi \cdot 20\ in^2}{1.67} = 598.8\ kip$$

Tensile capacity of W14x68 column

$$IR_{col\_ten} := \frac{-P_{a\_Ten}}{P_{cap\_W14x68\_tension}} = 0.7 \qquad OK$$

Design of Column At Gridline M and B

$P_{col\_DL\_M} := 17\ kip$

$P_{col\_LL\_M} := 5\ kip$

$P_{col\_SL\_M} := 8\ kip$

The axial compressive/tension force on the columns considering expected brace strengths in tension and compression. Analysis considering post-buckled compression strength of braces is expected to govern.

$$P_{Emh\_M} := 4 \cdot \left(P_{T\_HSS\_5x5x0.31} \cdot \frac{8\ ft}{16.75\ ft} - P_{c\_post\_5x5x0.31\_15} \cdot \frac{8\ ft}{20.5\ ft}\right) + \left(P_{T\_HSS\_5x5x0.31} \cdot \frac{10.25\ ft}{16.75\ ft} - P_{c\_post\_5x5x0.31\_15} \cdot \frac{10.25\ ft}{20.5\ ft}\right) = 727.19\ kip$$

$$P_{a\_Comp\_M} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL\_M} + 0.7 \cdot P_{Emh\_M} = 528.05\ kip$$

Total compressive demand on columns

Use W14x74 column

$P_{cap\_W14x74\_comp} := 585\ kip$ Compressive capacity of W14x74 column with unbraced Lb = 8ft

$$IR_{col\_comp\_M} := \frac{P_{a\_Comp\_M}}{P_{cap\_W14x74\_comp}} = 0.9 \qquad OK$$

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Beam/Strut Design

Beams/Struts at Between Columns N. M and L from EL108'-0" To 132' - 0"

The axial force on the beams considering expected brace strengths in tension and compression is

$$P_{x1} := P_{T\_HSS\_5x5x0.31} \cdot \frac{20.5\ ft}{22.01\ ft} = 306.2\ kip$$

$$P_{x2} := P_{c\_HSS\_5x5x31\_13} \cdot \frac{20.5\ ft}{22.01\ ft} = 188.55\ kip$$

$P_D := 0\ kip$ Axial load on all beams due to DL is 0

Considering governing load combination from ASCE 7-16

$$P_{a1} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_D + 0.7 \cdot P_{x1} = 214.34\ kip$$

Beams/struts at these elevations are unbraced with L_b = 8 ft.

Consider W14X68 beams/struts

$P_{cap\_W12x40} := 288\ kip$ Compressive strength of member

$$IR := \frac{P_{a1}}{P_{cap\_W12x40}} = 0.74 \qquad OK$$

Beams/Struts at Elevation 142'-3.5" And Between Column Lines N And L

The axial force on the beams considering expected brace strengths in tension and compression

$$P_{x3} := \left(P_{T\_HSS\_5x5x0.31} \cdot \frac{20.5\ ft}{22.01\ ft}\right) + \left(P_{c\_HSS\_5x5x31\_13} \cdot \frac{20.5\ ft}{22.01\ ft}\right) = 494.74\ kip$$

The axial force on the beams considering expected brace strengths in tension and post buckling compression

$$P_{x3\_post} := \left(P_{T\_HSS\_5x5x0.31} \cdot \frac{20.5\ ft}{22.01\ ft}\right) + \left(P_{c\_post\_5x5x0.31\_15}\ \frac{20.5\ ft}{22.01\ ft}\right) = 352.31\ kip$$

Considering governing load combination from ASCE 7-16

$$P_{a2} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_D + 0.7 \cdot P_{x3} = 346.32\ kip$$

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Consider 14X68 beams/struts braced at every 8'-0"

$P_{cap\_W14x68} := 425\ kip$

$IR := \dfrac{P_{a2}}{P_{cap\_W14x68}} = 0.81$ $\qquad$ OK

Job Information

	Engineer	Checked	Approved
Name:			
Date:	3/11/2024		

Project ID	
Project Name	

Structure Type	SPACE FRAME

Number of Nodes	62	Highest Node	111
Number of Elements	97	Highest Beam	194

Number of Basic Load Cases	7
Number of Combination Load Cases	39

Included in this printout are data for:

All	The Whole Structure

Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	DEAD LOAD
Primary	2	ROOF LIVE LOAD
Primary	3	SNOW LOAD
Primary	4	WIND 1
Primary	5	WIND 2
Primary	6	SEISMIC - H
Primary	8	SEISMIC - V
Combination	100	COMB - 1 DEAD
Combination	101	COMB - 1 DEAD + 1 SNOW
Combination	102	COMB - 1 DEAD + 1 ROOF LIVE
Combination	103	COMB - 1 DEAD + 0.75 ROOF LIVE
Combination	104	COMB - 1 DEAD + 0.75 SNOW
Combination	105	COMB - 1 DEAD + 0.6 WIND (1)
Combination	106	COMB - 1 DEAD + 0.6 WIND (2)
Combination	107	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7
Combination	108	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7
Combination	109	COMB - 1 DEAD + 0.75 WIND + 0.75 SN(
Combination	110	COMB - 1 DEAD + 0.75 WIND + 0.75 SN(
Combination	111	COMB - 1 DEAD + 0.75 WIND (1)
Combination	112	COMB - 1 DEAD + 0.75 WIND (2)
Combination	113	COMB - 0.6 DEAD + 0.6 WIND (1)
Combination	114	COMB - 0.6 DEAD + 0.6 WIND (2)
Combination	115	COMB - 1 DEAD + 0.91 SEISMIC-H + 0.7
Combination	116	COMB - 1 DEAD + -0.91 SEISMIC-H + 0.7
Combination	117	COMB - 1 DEAD + 0.91 SEISMIC-H + -0.7

Job Information Cont...

Type	L/C	Name
Combination	118	COMB - 1 DEAD + -0.91 SEISMIC-H + -0.
Combination	119	COMB - 1 DEAD + 0.683 SEISMIC-H + 0.!
Combination	120	COMB - 1 DEAD + -0.683 SEISMIC-H + 0
Combination	121	COMB - 1 DEAD + 0.683 SEISMIC-H + -0
Combination	122	COMB - 1 DEAD + -0.683 SEISMIC-H + -(
Combination	123	COMB - 0.6 DEAD + 0.91 SEISMIC-H + -(
Combination	124	COMB - 0.6 DEAD + -0.91 SEISMIC-H + -
Combination	125	COMB - 0.6 DEAD + 0.91 SEISMIC-H + 0.
Combination	126	COMB - 0.6 DEAD + -0.91 SEISMIC-H + (
Combination	315	COMB - 1 DEAD + 1.4 SEISMIC-H + 0.7 S
Combination	316	COMB - 1 DEAD + -1.4 SEISMIC-H + 0.7
Combination	317	COMB - 1 DEAD + 1.4 SEISMIC-H + -0.7
Combination	318	COMB - 1 DEAD + -1.4 SEISMIC-H + -0.7
Combination	319	COMB - 1 DEAD + 1.05 SEISMIC-H + 0.5
Combination	320	COMB - 1 DEAD + -1.05 SEISMIC-H + 0.5
Combination	321	COMB - 1 DEAD + 1.05 SEISMIC-H + -0.5
Combination	322	COMB - 1 DEAD + -1.05 SEISMIC-H + -0.
Combination	323	COMB - 0.6 DEAD + 1.4 SEISMIC-H + -0.
Combination	324	COMB - 0.6 DEAD + -1.4 SEISMIC-H + -0
Combination	325	COMB - 0.6 DEAD + 1.4 SEISMIC-H + 0.7
Combination	326	COMB - 0.6 DEAD + -1.4 SEISMIC-H + 0.

Section Properties

Prop	Section	Area (in^2)	I_{yy} (in^4)	I_{zz} (in^4)	J (in^4)	Material
1	W14X53	15.600	57.700	541.000	1.940	STEEL_50_KS
2	W12X26	7.650	17.300	204.000	0.300	STEEL_50_KS
3	HSST5X5X0.313	5.260	19.000	19.000	30.386	STEEL_50_KS
4	W14X38	11.200	26.700	385.000	0.798	STEEL_50_KS
5	W14X68	20.000	121.000	722.000	3.010	STEEL_50_KS
6	W14X68	20.000	121.000	722.000	3.010	STEEL_50_KS
7	W14X74	21.800	134.000	795.000	3.870	STEEL_50_KS

Materials

Mat	Name	E (kip/in^2)	ν	Density (kip/in^3)	α (/°F)
1	STEEL	29E+3	0.300	0.000	6.5E -6
2	CONCRETE	3.15E+3	0.170	8.68e-05	5.5E -6
3	ALUMINUM	10E+3	0.330	9.8e-05	12.8E -6
4	STAINLESSSTEEL	28E+3	0.300	0.000	9.9E -6
5	STEEL_36_KSI	29E+3	0.300	0.000	6.5E -6
6	STEEL_50_KSI	29E+3	0.300	0.000	6.5E -6
7	STEEL_275_NMM2	29.7E+3	0.300	0.000	6.67E -6
8	STEEL_355_NMM2	29.7E+3	0.300	0.000	6.67E -6
9	Q235	29.9E+3	0.300	0.000	6.67E -6
10	Q345	29.9E+3	0.300	0.000	6.67E -6
11	Q355	29.9E+3	0.300	0.000	6.67E -6
12	Q390	29.9E+3	0.300	0.000	6.67E -6
13	Q420	29.9E+3	0.300	0.000	6.67E -6
14	Q460	29.9E+3	0.300	0.000	6.67E -6
15	TIMBER	1.5E+3	0.150	0.000	3E -6

Supports

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip˙ft/deg)	rY (kip˙ft/deg)	rZ (kip˙ft/deg)
1	Fixed	Fixed	Fixed	-	-	-
2	-	-	Fixed	-	-	-
16	Fixed	Fixed	Fixed	-	-	-
17	-	-	Fixed	-	-	-
18	Fixed	Fixed	Fixed	-	-	-
19	-	-	Fixed	-	-	-
20	Fixed	Fixed	Fixed	-	-	-
21	-	-	Fixed	-	-	-
24	Fixed	Fixed	Fixed	-	-	-
25	-	-	Fixed	-	-	-
26	Fixed	Fixed	Fixed	-	-	-
27	-	-	Fixed	-	-	-
28	Fixed	Fixed	Fixed	-	-	-
29	-	-	Fixed	-	-	-
30	Fixed	Fixed	Fixed	-	-	-
31	-	-	Fixed	-	-	-
32	Fixed	Fixed	Fixed	-	-	-
34	Fixed	Fixed	Fixed	-	-	-
35	-	-	Fixed	-	-	-
36	Fixed	Fixed	Fixed	-	-	-
37	-	-	Fixed	-	-	-
38	Fixed	Fixed	Fixed	-	-	-
39	-	-	Fixed	-	-	-
40	Fixed	Fixed	Fixed	-	-	-

Supports Cont...

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip˙ft/deg)	rY (kip˙ft/deg)	rZ (kip˙ft/deg)
41	-	-	Fixed	-	-	-
42	Fixed	Fixed	Fixed	-	-	-
43	-	-	Fixed	-	-	-
73	Fixed	Fixed	Fixed	-	-	-
74	-	-	Fixed	-	-	-
105	-	-	Fixed	-	-	-
106	Fixed	Fixed	Fixed	-	-	-
109	-	-	Fixed	-	-	-

Releases

Beam ends not shown in this table are fixed in all directions.

Beam	Node	x	y	z	rx	ry	rz
1	2	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
17	21	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
19	25	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
20	27	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
21	29	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
22	31	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
23	105	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
27	41	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
31	2	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
31	74	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
32	17	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
32	19	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
33	19	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
33	43	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
36	25	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
36	27	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
37	27	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
37	29	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
38	29	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
38	31	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
39	31	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
39	105	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
40	105	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
40	109	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
41	35	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
41	37	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
42	37	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
42	39	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
43	39	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Releases Cont...

Beam	Node	x	y	z	rx	ry	rz
111	74	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
111	17	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
113	74	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
119	17	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
128	37	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
129	39	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
140	19	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
142	79	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
142	100	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
143	100	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
143	110	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
145	102	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
145	99	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
146	99	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
146	96	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
147	77	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
147	98	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
148	98	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
148	94	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
149	76	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
149	97	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
150	97	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
150	92	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
151	91	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
151	81	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
152	81	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
152	82	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
153	83	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
153	84	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
154	93	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
154	83	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
155	95	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
155	85	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
156	111	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
156	87	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
157	87	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
157	88	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
158	85	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
158	86	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
159	35	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
162	43	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
164	16	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
164	97	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
165	42	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
165	97	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Releases Cont...

Beam	Node	x	y	z	rx	ry	rz
166	76	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
166	98	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
167	77	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
167	99	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
168	102	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
168	100	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
171	96	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
171	100	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
172	94	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
172	99	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
173	92	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
173	98	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
174	38	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
174	81	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
175	34	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
175	81	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
176	91	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
176	83	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
177	82	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
177	83	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
178	93	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
178	85	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
179	84	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
179	85	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
180	95	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
180	87	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
181	86	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
181	87	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
184	21	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
184	25	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
186	109	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
189	109	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
189	111	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
190	110	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
190	21	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
191	79	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
191	19	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
192	19	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
192	110	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
193	111	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
193	37	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
194	37	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
194	88	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Primary Load Cases

Number	Name	Type
1	DEAD LOAD	Dead
2	ROOF LIVE LOAD	Roof Live
3	SNOW LOAD	Snow
4	WIND 1	Wind
5	WIND 2	Wind
6	SEISMIC - H	Seismic-H
8	SEISMIC - V	Seismic-V

Combination Load Cases

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
100	COMB - 1 DEAD	1	DEAD LOAD	1.00
101	COMB - 1 DEAD + 1 SNOW	1	DEAD LOAD	1.00
		3	SNOW LOAD	1.00
102	COMB - 1 DEAD + 1 ROOF LIVE	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	1.00
103	COMB - 1 DEAD + 0.75 ROOF LIVE	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	0.75
104	COMB - 1 DEAD + 0.75 SNOW	1	DEAD LOAD	1.00
		3	SNOW LOAD	0.75
105	COMB - 1 DEAD + 0.6 WIND (1)	1	DEAD LOAD	1.00
		4	WIND 1	0.60
106	COMB - 1 DEAD + 0.6 WIND (2)	1	DEAD LOAD	1.00
		5	WIND 2	0.60
107	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	0.75
		4	WIND 1	0.75
108	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	0.75
		5	WIND 2	0.75
109	COMB - 1 DEAD + 0.75 WIND + 0.75 SN(	1	DEAD LOAD	1.00
		4	WIND 1	0.75
		3	SNOW LOAD	0.75
110	COMB - 1 DEAD + 0.75 WIND + 0.75 SN(	1	DEAD LOAD	1.00
		5	WIND 2	0.75
		3	SNOW LOAD	0.75
111	COMB - 1 DEAD + 0.75 WIND (1)	1	DEAD LOAD	1.00
		4	WIND 1	0.75
112	COMB - 1 DEAD + 0.75 WIND (2)	1	DEAD LOAD	1.00
		5	WIND 2	0.75
113	COMB - 0.6 DEAD + 0.6 WIND (1)	1	DEAD LOAD	0.60
		4	WIND 1	0.60
114	COMB - 0.6 DEAD + 0.6 WIND (2)	1	DEAD LOAD	0.60

Combination Load Cases Cont...

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
		5	WIND 2	0.60
115	COMB - 1 DEAD + 0.91 SEISMIC-H + 0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.91
		8	SEISMIC - V	0.70
116	COMB - 1 DEAD + -0.91 SEISMIC-H + 0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	0.70
117	COMB - 1 DEAD + 0.91 SEISMIC-H + -0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.91
		8	SEISMIC - V	-0.70
118	COMB - 1 DEAD + -0.91 SEISMIC-H + -0.	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	-0.70
119	COMB - 1 DEAD + 0.683 SEISMIC-H + 0.!	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.68
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
120	COMB - 1 DEAD + -0.683 SEISMIC-H + 0	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.68
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
121	COMB - 1 DEAD + 0.683 SEISMIC-H + -0	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.68
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
122	COMB - 1 DEAD + -0.683 SEISMIC-H + -(	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.68
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
123	COMB - 0.6 DEAD + 0.91 SEISMIC-H + -(	1	DEAD LOAD	0.60
		6	SEISMIC - H	0.91
		8	SEISMIC - V	-0.70
124	COMB - 0.6 DEAD + -0.91 SEISMIC-H + -	1	DEAD LOAD	0.60
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	-0.70
125	COMB - 0.6 DEAD + 0.91 SEISMIC-H + 0.	1	DEAD LOAD	0.60
		6	SEISMIC - H	0.91
		8	SEISMIC - V	0.70
126	COMB - 0.6 DEAD + -0.91 SEISMIC-H + (	1	DEAD LOAD	0.60
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	0.70
315	COMB - 1 DEAD + 1.4 SEISMIC-H + 0.7 S	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.40
		8	SEISMIC - V	0.70
316	COMB - 1 DEAD + -1.4 SEISMIC-H + 0.7	1	DEAD LOAD	1.00

Combination Load Cases Cont...

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
		6	SEISMIC - H	-1.40
		8	SEISMIC - V	0.70
317	COMB - 1 DEAD + 1.4 SEISMIC-H + -0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.40
		8	SEISMIC - V	-0.70
318	COMB - 1 DEAD + -1.4 SEISMIC-H + -0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	-1.40
		8	SEISMIC - V	-0.70
319	COMB - 1 DEAD + 1.05 SEISMIC-H + 0.5	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.05
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
320	COMB - 1 DEAD + -1.05 SEISMIC-H + 0.5	1	DEAD LOAD	1.00
		6	SEISMIC - H	-1.05
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
321	COMB - 1 DEAD + 1.05 SEISMIC-H + -0.5	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.05
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
322	COMB - 1 DEAD + -1.05 SEISMIC-H + -0.	1	DEAD LOAD	1.00
		6	SEISMIC - H	-1.05
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
323	COMB - 0.6 DEAD + 1.4 SEISMIC-H + -0.	1	DEAD LOAD	0.60
		6	SEISMIC - H	1.40
		8	SEISMIC - V	-0.70
324	COMB - 0.6 DEAD + -1.4 SEISMIC-H + -0	1	DEAD LOAD	0.60
		6	SEISMIC - H	-1.40
		8	SEISMIC - V	-0.70
325	COMB - 0.6 DEAD + 1.4 SEISMIC-H + 0.7	1	DEAD LOAD	0.60
		6	SEISMIC - H	1.40
		8	SEISMIC - V	0.70
326	COMB - 0.6 DEAD + -1.4 SEISMIC-H + 0.	1	DEAD LOAD	0.60
		6	SEISMIC - H	-1.40
		8	SEISMIC - V	0.70

Load Generators

There is no data of this type.

1 DEAD LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
2	-	-3.150	-	-	-	-
17	-	-33.000	-	-	-	-
21	-	-12.500	-	-	-	-
25	-	-17.500	-	-	-	-
31	-	-17.500	-	-	-	-
35	-	-18.000	-	-	-	-
41	-	-6.500	-	-	-	-
43	-	-22.000	-	-	-	-
105	-	-6.000	-	-	-	-
109	-	-6.000	-	-	-	-
110	-	-6.000	-	-	-	-
111	-	-6.000	-	-	-	-

1 DEAD LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
31	UNI	lbf/ft	GY	-70.000	-	-	-	-
32	UNI	lbf/ft	GY	-70.000	-	-	-	-
33	UNI	lbf/ft	GY	-70.000	-	-	-	-
36	UNI	lbf/ft	GY	-70.000	-	-	-	-
37	UNI	lbf/ft	GY	-70.000	-	-	-	-
38	UNI	lbf/ft	GY	-70.000	-	-	-	-
39	UNI	lbf/ft	GY	-70.000	-	-	-	-
41	UNI	lbf/ft	GY	-70.000	-	-	-	-
42	UNI	lbf/ft	GY	-70.000	-	-	-	-
43	UNI	lbf/ft	GY	-70.000	-	-	-	-
111	UNI	lbf/ft	GY	-70.000	-	-	-	-
184	UNI	lbf/ft	GY	-70.000	-	-	-	-
189	UNI	lbf/ft	GY	-70.000	-	-	-	-
190	UNI	lbf/ft	GY	-70.000	-	-	-	-

1 DEAD LOAD : Selfweight

Direction	Factor	Assigned Geometry
Y	-1.000	ALL

2 ROOF LIVE LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip`in)	MY (kip`in)	MZ (kip`in)
2	-	-2.520	-	-	-	-
17	-	-18.000	-	-	-	-
21	-	-10.000	-	-	-	-
25	-	-14.000	-	-	-	-
31	-	-14.000	-	-	-	-
35	-	-15.000	-	-	-	-
41	-	-5.000	-	-	-	-
43	-	-10.000	-	-	-	-
105	-	-5.000	-	-	-	-
109	-	-5.000	-	-	-	-
110	-	-5.000	-	-	-	-
111	-	-5.000	-	-	-	-

2 ROOF LIVE LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
31	UNI	lbf/ft	GY	-60.000	-	-	-	-
32	UNI	lbf/ft	GY	-60.000	-	-	-	-
33	UNI	lbf/ft	GY	-60.000	-	-	-	-
36	UNI	lbf/ft	GY	-60.000	-	-	-	-
37	UNI	lbf/ft	GY	-60.000	-	-	-	-
38	UNI	lbf/ft	GY	-60.000	-	-	-	-
39	UNI	lbf/ft	GY	-60.000	-	-	-	-
41	UNI	lbf/ft	GY	-60.000	-	-	-	-
42	UNI	lbf/ft	GY	-60.000	-	-	-	-
43	UNI	lbf/ft	GY	-60.000	-	-	-	-
111	UNI	lbf/ft	GY	-60.000	-	-	-	-
184	UNI	lbf/ft	GY	-60.000	-	-	-	-
189	UNI	lbf/ft	GY	-60.000	-	-	-	-
190	UNI	lbf/ft	GY	-60.000	-	-	-	-

3 SNOW LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip`in)	MY (kip`in)	MZ (kip`in)
2	-	-3.150	-	-	-	-
17	-	-33.000	-	-	-	-
21	-	-12.500	-	-	-	-
	-	-17.000	-	-	-	-
25	-	-17.500	-	-	-	-
31	-	-17.500	-	-	-	-
35	-	-15.000	-	-	-	-
41	-	-5.000	-	-	-	-
43	-	-22.000	-	-	-	-
105	-	-5.000	-	-	-	-
109	-	-17.000	-	-	-	-
110	-	-17.000	-	-	-	-
111	-	-17.000	-	-	-	-

3 SNOW LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
31	UNI	lbf/ft	GY	-70.000	-	-	-	-
32	UNI	lbf/ft	GY	-70.000	-	-	-	-
33	UNI	lbf/ft	GY	-70.000	-	-	-	-
36	UNI	lbf/ft	GY	-70.000	-	-	-	-
37	UNI	lbf/ft	GY	-70.000	-	-	-	-
38	UNI	lbf/ft	GY	-70.000	-	-	-	-
39	UNI	lbf/ft	GY	-70.000	-	-	-	-
41	UNI	lbf/ft	GY	-70.000	-	-	-	-
42	UNI	lbf/ft	GY	-70.000	-	-	-	-
43	UNI	lbf/ft	GY	-70.000	-	-	-	-
111	UNI	lbf/ft	GY	-70.000	-	-	-	-
184	UNI	lbf/ft	GY	-70.000	-	-	-	-
189	UNI	lbf/ft	GY	-70.000	-	-	-	-
190	UNI	lbf/ft	GY	-70.000	-	-	-	-

4 WIND 1 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
31	UNI	lbf/ft	GX	1.02E+3	-	-	-	-
32	UNI	lbf/ft	GX	1.02E+3	-	-	-	-
33	UNI	lbf/ft	GX	1.02E+3	-	-	-	-
41	UNI	lbf/ft	GX	600.000	-	-	-	-
42	UNI	lbf/ft	GX	600.000	-	-	-	-
43	UNI	lbf/ft	GX	600.000	-	-	-	-
111	UNI	lbf/ft	GX	1.02E+3	-	-	-	-

5 WIND 2 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
31	UNI	lbf/ft	GX	-600.000	-	-	-	-
32	UNI	lbf/ft	GX	-600.000	-	-	-	-
33	UNI	lbf/ft	GX	-600.000	-	-	-	-
41	UNI	lbf/ft	GX	-1.02E+3	-	-	-	-
42	UNI	lbf/ft	GX	-1.02E+3	-	-	-	-
43	UNI	lbf/ft	GX	-1.02E+3	-	-	-	-
111	UNI	lbf/ft	GX	-600.000	-	-	-	-

6 SEISMIC - H : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
31	UNI	lbf/ft	GX	696.000	-	-	-	-
32	UNI	lbf/ft	GX	696.000	-	-	-	-
33	UNI	lbf/ft	GX	696.000	-	-	-	-
36	UNI	lbf/ft	GX	570.000	-	-	-	-
37	UNI	lbf/ft	GX	570.000	-	-	-	-
38	UNI	lbf/ft	GX	570.000	-	-	-	-
39	UNI	lbf/ft	GX	570.000	-	-	-	-
40	UNI	lbf/ft	GX	570.000	-	-	-	-
41	UNI	lbf/ft	GX	696.000	-	-	-	-
42	UNI	lbf/ft	GX	696.000	-	-	-	-
43	UNI	lbf/ft	GX	696.000	-	-	-	-
111	UNI	lbf/ft	GX	696.000	-	-	-	-
184	UNI	lbf/ft	GX	570.000	-	-	-	-
189	UNI	lbf/ft	GX	570.000	-	-	-	-
190	UNI	lbf/ft	GX	570.000	-	-	-	-

8 SEISMIC - V : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip in)	MY (kip in)	MZ (kip in)
2	-	-0.600	-	-	-	-
17	-	-5.700	-	-	-	-
21	-	-2.125	-	-	-	-
25	-	-3.000	-	-	-	-
31	-	-3.000	-	-	-	-
35	-	-3.060	-	-	-	-
41	-	-1.100	-	-	-	-
43	-	-3.800	-	-	-	-
105	-	-1.000	-	-	-	-
109	-	-1.000	-	-	-	-
110	-	-1.000	-	-	-	-
111	-	-1.000	-	-	-	-

8 SEISMIC - V : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
31	UNI	lbf/ft	GY	-10.000	-	-	-	-
32	UNI	lbf/ft	GY	-10.000	-	-	-	-
33	UNI	lbf/ft	GY	-10.000	-	-	-	-
36	UNI	lbf/ft	GY	-10.000	-	-	-	-
37	UNI	lbf/ft	GY	-10.000	-	-	-	-
38	UNI	lbf/ft	GY	-10.000	-	-	-	-
39	UNI	lbf/ft	GY	-10.000	-	-	-	-
41	UNI	lbf/ft	GY	-10.000	-	-	-	-
42	UNI	lbf/ft	GY	-10.000	-	-	-	-
43	UNI	lbf/ft	GY	-10.000	-	-	-	-
111	UNI	lbf/ft	GY	-10.000	-	-	-	-
184	UNI	lbf/ft	GY	-10.000	-	-	-	-
189	UNI	lbf/ft	GY	-10.000	-	-	-	-
190	UNI	lbf/ft	GY	-10.000	-	-	-	-

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	2	323:COMB - 0.	**0.637**	-0.003	0	0.637	0	0	-0.001
Min X	2	316:COMB - 1	**-0.640**	-0.006	0	0.640	0	0	0.000
Max Y	88	324:COMB - 0.	-0.481	**0.033**	0	0.482	0	0	0.001
Min Y	17	320:COMB - 1	-0.471	**-0.080**	0	0.478	0	0	0.000
Max Z	1	1:DEAD LOAD	0	0	**0**	0	0	0	0.000
Min Z	1	1:DEAD LOAD	0	0	**0**	0	0	0	0.000
Max rX	1	1:DEAD LOAD	0	0	0	0	**0**	0	0.000
Min rX	1	1:DEAD LOAD	0	0	0	0	**0**	0	0.000
Max rY	1	1:DEAD LOAD	0	0	0	0	0	**0**	0.000
Min rY	1	1:DEAD LOAD	0	0	0	0	0	**0**	0.000
Max rZ	96	316:COMB - 1	-0.389	0.014	0	0.389	0	0	**0.002**
Min rZ	96	323:COMB - 0.	0.386	-0.039	0	0.388	0	0	**-0.002**
Max Rst	2	316:COMB - 1	-0.640	-0.006	0	**0.640**	0	0	0.000

Beam End Displacement Summary

Displacements shown in italic indicate the presence of an offset

	Beam	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	1	2	323:COMB - 0.	**0.637**	-0.003	0	0.637
Min X	1	2	316:COMB - 1	**-0.640**	-0.006	0	0.640
Max Y	125	88	324:COMB - 0.	-0.480	**0.033**	0	0.482
Min Y	32	17	320:COMB - 1	-0.471	**-0.080**	0	0.478
Max Z	1	1	1:DEAD LOAD	0	0	**0**	0
Min Z	1	1	1:DEAD LOAD	0	0	**0**	0
Max Rst	1	2	316:COMB - 1	-0.640	-0.006	0	**0.640**

Beam End Force Summary

The signs of the forces at end B of each beam have been reversed. For example: this means that the Min Fx entry gives the largest tension value for an beam.

				Axial	Shear		Torsion	Bending	
	Beam	Node	L/C	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip⁻in)	My (kip⁻in)	Mz (kip⁻in)
Max Fx	28	42	319:COMB - 1	**127.734**	0	0.016	0	0.205	0
Min Fx	26	82	326:COMB - 0.	**-86.005**	-0	-0.029	-0	-2.806	-0
Max Fy	41	35	101:COMB - 1	0.019	**2.129**	0	0	0	0.776
Min Fy	41	37	101:COMB - 1	0.019	**-2.134**	-0	-0	-0	1.431
Max Fz	39	105	101:COMB - 1	0.528	-0	**1.534**	-0	0.807	-0
Min Fz	39	31	101:COMB - 1	0.528	0	**-1.536**	0	1.041	0
Max Mx	1	1	1:DEAD LOAD	6.070	-0.000	0	**0**	0	0.000
Min Mx	1	1	1:DEAD LOAD	6.070	-0.000	0	**0**	0	0.000
Max My	134	111	324:COMB - 0.	28.934	-0	1.095	-0	**57.004**	-0
Min My	134	111	315:COMB - 1	15.179	-0	-1.101	-0	**-58.074**	-0
Max Mz	146	99	316:COMB - 1	56.398	0.663	0	0	0	**5.590**
Min Mz	158	85	323:COMB - 0.	-51.716	0.299	0	0	0	**-4.670**

Beam Force Detail Summary

Sign convention as diagrams:- positive above line, negative below line except Fx where positive is compression. Distance d is given from beam end A.

				Axial	Shear		Torsion	Bending	
	Beam	L/C	d (ft)	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip⁻in)	My (kip⁻in)	Mz (kip⁻in)
Max Fx	28	319:COMB - 1	0	**127.734**	0	0.016	0	0.205	0
Min Fx	26	326:COMB - 0.	8.000	**-86.005**	-0	-0.029	-0	-2.806	-0
Max Fy	41	101:COMB - 1	0	0.019	**2.129**	0	0	0	0.776
Min Fy	41	101:COMB - 1	20.500	0.019	**-2.134**	-0	-0	-0	1.431
Max Fz	39	101:COMB - 1	18.500	0.528	-0	**1.534**	-0	0.807	-0
Min Fz	39	101:COMB - 1	0	0.528	0	**-1.536**	0	1.041	0
Max Mx	1	1:DEAD LOAD	0	6.070	-0.000	0	**0**	0	0.000
Min Mx	1	1:DEAD LOAD	0	6.070	-0.000	0	**0**	0	0.000
Max My	134	324:COMB - 0.	6.750	28.934	-0	1.095	-0	**57.004**	-0

Beam Force Detail Summary Cont...

				Axial	Shear		Torsion	Bending	
	Beam	L/C	d (ft)	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip-in)	My (kip-in)	Mz (kip-in)
Min My	39	101:COMB - 1	9.250	0.528	0	-0.001	0	**-84.286**	0
Max Mz	146	316:COMB - 1	0	56.398	0.663	0	0	0	**5.590**
Min Mz	41	101:COMB - 1	10.250	0.019	-0.003	0	0	0	**-129.964**

Beam Displacement Detail Summary

Displacements shown in italic indicate the presence of an offset

	Beam	L/C	d (ft)	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	191	317:COMB - 1	13.712	**0.648**	-0.138	0	0.663
Min X	192	316:COMB - 1	8.628	**-0.643**	-0.108	0	0.652
Max Y	125	324:COMB - 0.	6.750	-0.480	**0.033**	0	0.482
Min Y	39	101:COMB - 1	9.250	-0.006	**-0.885**	0	0.885
Max Z	1	1:DEAD LOAD	0	0	0	**0**	0
Min Z	1	1:DEAD LOAD	0	0	0	**0**	0
Max Rst	39	320:COMB - 1	9.250	-0.424	-0.820	0	**0.923**

Reaction Summary

			Horizontal	Vertical	Horizontal	Moment		
	Node	L/C	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
Max FX	42	324:COMB - 0.	**54.446**	-93.102	0	0	0	0
Min FX	42	315:COMB - 1	**-55.236**	147.244	0	0	0	0
Max FY	42	315:COMB - 1	-55.236	**147.244**	0	0	0	0
Min FY	38	324:COMB - 0.	53.201	**-110.988**	0	0	0	0
Max FZ	1	1:DEAD LOAD	0.000	6.070	**0**	0	0	0
Min FZ	1	1:DEAD LOAD	0.000	6.070	**0**	0	0	0
Max MX	1	1:DEAD LOAD	0.000	6.070	0	**0**	0	0
Min MX	1	1:DEAD LOAD	0.000	6.070	0	**0**	0	0
Max MY	1	1:DEAD LOAD	0.000	6.070	0	0	**0**	0
Min MY	1	1:DEAD LOAD	0.000	6.070	0	0	**0**	0
Max MZ	1	1:DEAD LOAD	0.000	6.070	0	0	0	**0**
Min MZ	1	1:DEAD LOAD	0.000	6.070	0	0	0	**0**

Utilization Ratio

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
1	W14X53	W14X53	0.036	1.000	0.036	Cl.E3	101	15.600	541.000	57.700	1.940
15	W14X68	W14X68	0.356	1.000	0.356	Eq.H1-1a	320	20.000	722.000	121.000	3.010
16	W14X74	W14X74	0.076	1.000	0.076	Cl.E3	320	21.800	795.000	134.000	3.870
17	W14X38	W14X38	0.185	1.000	0.185	Cl.E3	101	11.200	385.000	26.700	0.798
19	W14X38	W14X38	0.155	1.000	0.155	Cl.E3	101	11.200	385.000	26.700	0.798
20	W14X38	W14X38	0.013	1.000	0.013	Cl.E3	101	11.200	385.000	26.700	0.798
21	W14X38	W14X38	0.013	1.000	0.013	Cl.E3	101	11.200	385.000	26.700	0.798
22	W14X38	W14X38	0.154	1.000	0.154	Cl.E3	101	11.200	385.000	26.700	0.798
23	W14X38	W14X38	0.055	1.000	0.055	Cl.E3	101	11.200	385.000	26.700	0.798
24	W14X68	W14X68	0.314	1.000	0.314	Eq.H1-1a	320	20.000	722.000	121.000	3.010
25	W14X74	W14X74	0.100	1.000	0.100	Cl.E3	316	21.800	795.000	134.000	3.870
26	W14X68	W14X68	0.276	1.000	0.276	Eq.H1-1a	317	20.000	722.000	121.000	3.010
27	W14X53	W14X53	0.058	1.000	0.058	Cl.E3	101	15.600	541.000	57.700	1.940
28	W14X68	W14X68	0.359	1.000	0.359	Eq.H1-1a	319	20.000	722.000	121.000	3.010
29	W14X68	W14X68	0.121	1.000	0.121	Cl.E3	319	20.000	722.000	121.000	3.010
30	W14X68	W14X68	0.095	1.000	0.095	Cl.E3	320	20.000	722.000	121.000	3.010
31	W12X26	W12X26	0.119	1.000	0.119	Cl.E3	109	7.650	204.000	17.300	0.300
32	W14X68	W14X68	0.111	1.000	0.111	Cl.E3	315	20.000	722.000	121.000	3.010
33	W14X68	W14X68	0.043	1.000	0.043	Cl.E3	316	20.000	722.000	121.000	3.010
36	W12X26	W12X26	0.089	1.000	0.089	Cl.E3	109	7.650	204.000	17.300	0.300
37	W12X26	W12X26	0.089	1.000	0.089	Cl.E3	109	7.650	204.000	17.300	0.300
38	W12X26	W12X26	0.124	1.000	0.124	Cl.E3	115	7.650	204.000	17.300	0.300
39	W12X26	W12X26	0.387	1.000	0.387	Eq.H1-1b	119	7.650	204.000	17.300	0.300
40	W12X26	W12X26	0.103	1.000	0.103	Cl.E3	115	7.650	204.000	17.300	0.300
41	W14X68	W14X68	0.048	1.000	0.048	Cl.E3	315	20.000	722.000	121.000	3.010
42	W14X68	W14X68	0.082	1.000	0.082	Cl.E3	324	20.000	722.000	121.000	3.010
43	W14X68	W14X68	0.043	1.000	0.043	Cl.E3	316	20.000	722.000	121.000	3.010
46	W14X68	W14X68	0.262	1.000	0.262	Eq.H1-1a	320	20.000	722.000	121.000	3.010
111	W14X68	W14X68	0.065	1.000	0.065	Cl.E3	315	20.000	722.000	121.000	3.010
113	W14X53	W14X53	0.018	1.000	0.018	Cl.E3	101	15.600	541.000	57.700	1.940
115	W14X68	W14X68	0.311	1.000	0.311	Eq.H1-1a	320	20.000	722.000	121.000	3.010
118	W14X68	W14X68	0.182	1.000	0.182	Cl.E3	319	20.000	722.000	121.000	3.010
119	W14X68	W14X68	0.180	1.000	0.180	Cl.E3	319	20.000	722.000	121.000	3.010
120	W14X74	W14X74	0.080	1.000	0.080	Cl.E3	316	21.800	795.000	134.000	3.870
121	W14X68	W14X68	0.205	1.000	0.205	Eq.H1-1a	317	20.000	722.000	121.000	3.010
122	W14X74	W14X74	0.060	1.000	0.060	Cl.E3	316	21.800	795.000	134.000	3.870
123	W14X68	W14X68	0.127	1.000	0.127	Cl.E3	315	20.000	722.000	121.000	3.010
124	W14X74	W14X74	0.057	1.000	0.057	Eq.H1-1b	316	21.800	795.000	134.000	3.870
125	W14X68	W14X68	0.066	1.000	0.066	Cl.E3	315	20.000	722.000	121.000	3.010
126	W14X74	W14X74	0.043	1.000	0.043	Eq.H1-1b	316	21.800	795.000	134.000	3.870
127	W14X68	W14X68	0.031	1.000	0.031	Eq.H1-1b	315	20.000	722.000	121.000	3.010
128	W14X74	W14X74	0.025	1.000	0.025	Cl.E3	320	21.800	795.000	134.000	3.870
129	W14X68	W14X68	0.010	1.000	0.010	Cl.E3	320	20.000	722.000	121.000	3.010
130	W14X68	W14X68	0.273	1.000	0.273	Eq.H1-1a	320	20.000	722.000	121.000	3.010
131	W14X68	W14X68	0.310	1.000	0.310	Eq.H1-1a	319	20.000	722.000	121.000	3.010

Utilization Ratio Cont...

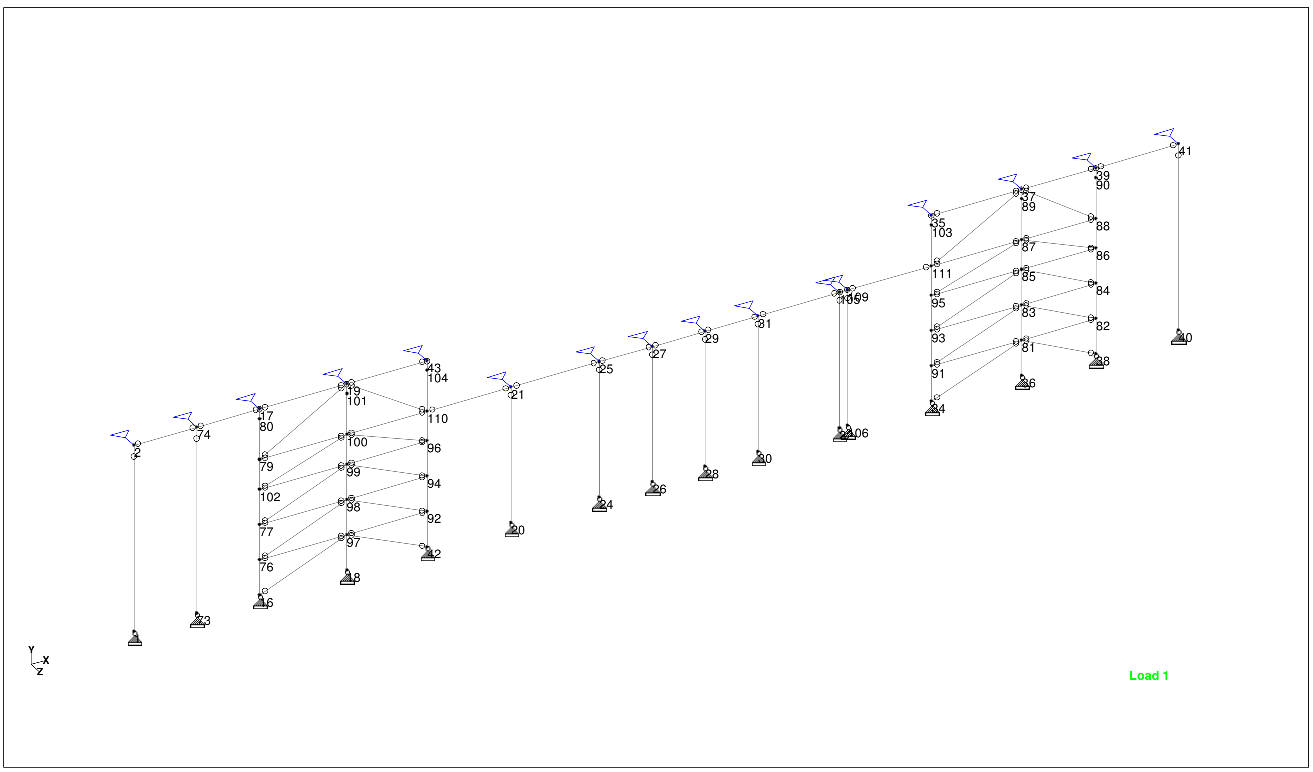
Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
132	W14X68	W14X68	0.237	1.000	0.237	Eq.H1-1a	320	20.000	722.000	121.000	3.010
133	W14X68	W14X68	0.266	1.000	0.266	Eq.H1-1a	319	20.000	722.000	121.000	3.010
134	W14X68	W14X68	0.186	1.000	0.186	Cl.E3	320	20.000	722.000	121.000	3.010
135	W14X68	W14X68	0.241	1.000	0.241	Eq.H1-1a	319	20.000	722.000	121.000	3.010
136	W14X74	W14X74	0.067	1.000	0.067	Cl.E3	320	21.800	795.000	134.000	3.870
137	W14X74	W14X74	0.055	1.000	0.055	Cl.E3	320	21.800	795.000	134.000	3.870
138	W14X74	W14X74	0.051	1.000	0.051	Eq.H1-1b	315	21.800	795.000	134.000	3.870
139	W14X74	W14X74	0.044	1.000	0.044	Eq.H1-1b	315	21.800	795.000	134.000	3.870
140	W14X74	W14X74	0.033	1.000	0.033	Cl.E3	319	21.800	795.000	134.000	3.870
142	W14X68	W14X68	0.126	1.000	0.126	Cl.E3	315	20.000	722.000	121.000	3.010
143	W14X68	W14X68	0.231	1.000	0.231	Eq.H1-1a	316	20.000	722.000	121.000	3.010
144	W14X68	W14X68	0.239	1.000	0.239	Eq.H1-1a	320	20.000	722.000	121.000	3.010
145	W14X68	W14X68	0.178	1.000	0.178	Cl.E3	315	20.000	722.000	121.000	3.010
146	W14X68	W14X68	0.168	1.000	0.168	Cl.E3	316	20.000	722.000	121.000	3.010
147	W14X68	W14X68	0.178	1.000	0.178	Cl.E3	315	20.000	722.000	121.000	3.010
148	W14X68	W14X68	0.165	1.000	0.165	Cl.E3	316	20.000	722.000	121.000	3.010
149	W14X68	W14X68	0.174	1.000	0.174	Cl.E3	315	20.000	722.000	121.000	3.010
150	W14X68	W14X68	0.163	1.000	0.163	Cl.E3	316	20.000	722.000	121.000	3.010
151	W14X68	W14X68	0.174	1.000	0.174	Cl.E3	325	20.000	722.000	121.000	3.010
152	W14X68	W14X68	0.143	1.000	0.143	Cl.E3	326	20.000	722.000	121.000	3.010
153	W14X68	W14X68	0.142	1.000	0.142	Cl.E3	316	20.000	722.000	121.000	3.010
154	W14X68	W14X68	0.178	1.000	0.178	Cl.E3	315	20.000	722.000	121.000	3.010
155	W14X68	W14X68	0.178	1.000	0.178	Cl.E3	315	20.000	722.000	121.000	3.010
156	W14X68	W14X68	0.276	1.000	0.276	Eq.H1-1a	315	20.000	722.000	121.000	3.010
157	W14X68	W14X68	0.077	1.000	0.077	Cl.E3	316	20.000	722.000	121.000	3.010
158	W14X68	W14X68	0.142	1.000	0.142	Cl.E3	316	20.000	722.000	121.000	3.010
159	W14X68	W14X68	0.093	1.000	0.093	Cl.E3	320	20.000	722.000	121.000	3.010
162	W14X68	W14X68	0.119	1.000	0.119	Cl.E3	319	20.000	722.000	121.000	3.010
164	HSST5X5	HSST5X5	0.903	1.000	0.903	Eq.H1-1a	116	5.260	19.000	19.000	31.200
165	HSST5X5	HSST5X5	0.820	1.000	0.820	Eq.H1-1a	115	5.260	19.000	19.000	31.200
166	HSST5X5	HSST5X5	0.880	1.000	0.880	Eq.H1-1a	118	5.260	19.000	19.000	31.200
167	HSST5X5	HSST5X5	0.876	1.000	0.876	Eq.H1-1a	118	5.260	19.000	19.000	31.200
168	HSST5X5	HSST5X5	0.788	1.000	0.788	Eq.H1-1a	118	5.260	19.000	19.000	31.200
171	HSST5X5	HSST5X5	0.709	1.000	0.709	Eq.H1-1a	123	5.260	19.000	19.000	31.200
172	HSST5X5	HSST5X5	0.790	1.000	0.790	Eq.H1-1a	117	5.260	19.000	19.000	31.200
173	HSST5X5	HSST5X5	0.798	1.000	0.798	Eq.H1-1a	117	5.260	19.000	19.000	31.200
174	HSST5X5	HSST5X5	0.708	1.000	0.708	Eq.H1-1a	115	5.260	19.000	19.000	31.200
175	HSST5X5	HSST5X5	0.897	1.000	0.897	Eq.H1-1a	116	5.260	19.000	19.000	31.200
176	HSST5X5	HSST5X5	0.892	1.000	0.892	Eq.H1-1a	118	5.260	19.000	19.000	31.200
177	HSST5X5	HSST5X5	0.689	1.000	0.689	Eq.H1-1a	117	5.260	19.000	19.000	31.200
178	HSST5X5	HSST5X5	0.909	1.000	0.909	Eq.H1-1a	118	5.260	19.000	19.000	31.200
179	HSST5X5	HSST5X5	0.682	1.000	0.682	Eq.H1-1a	117	5.260	19.000	19.000	31.200
180	HSST5X5	HSST5X5	0.822	1.000	0.822	Eq.H1-1a	118	5.260	19.000	19.000	31.200
181	HSST5X5	HSST5X5	0.612	1.000	0.612	Eq.H1-1a	117	5.260	19.000	19.000	31.200
184	W12X26	W12X26	0.196	1.000	0.196	Cl.E3	116	7.650	204.000	17.300	0.300

Utilization Ratio Cont...

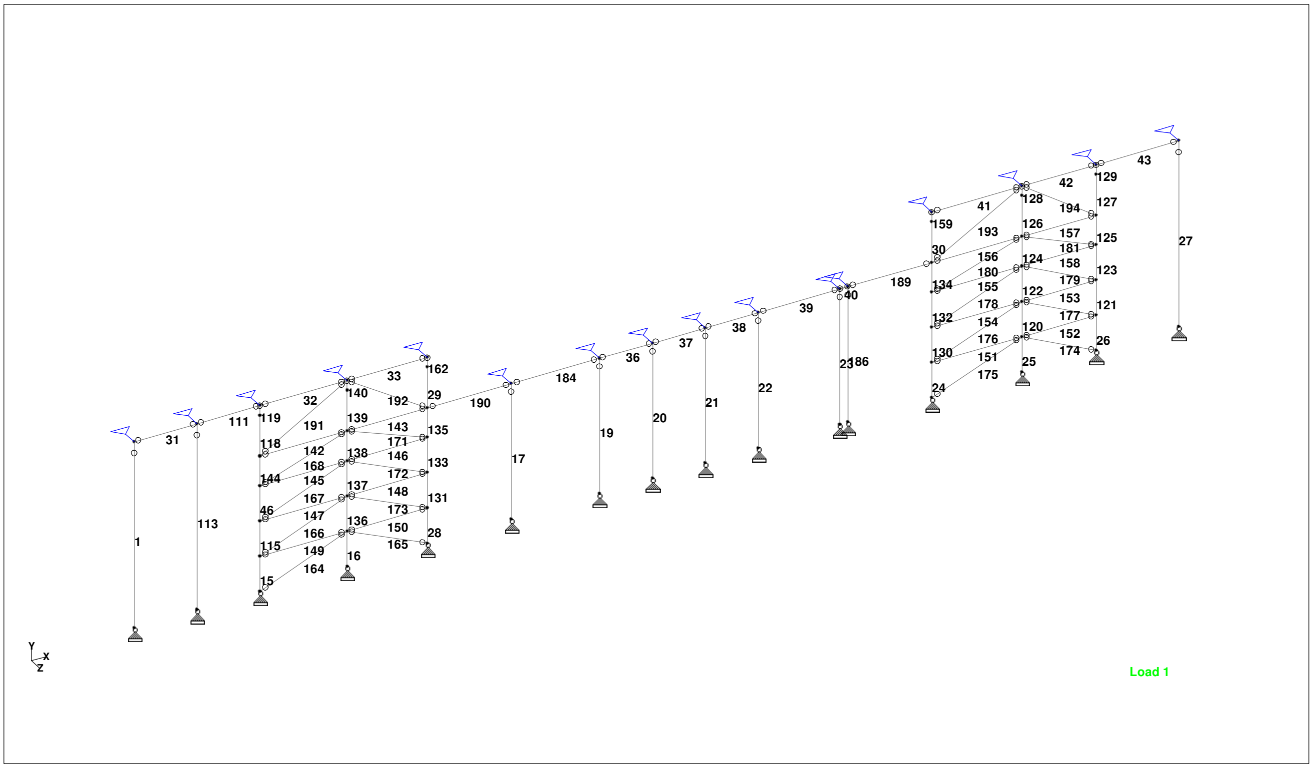
Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
186	W14X53	W14X53	0.075	1.000	0.075	Cl.E3	101	15.600	541.000	57.700	1.940
189	W12X26	W12X26	0.538	1.000	0.538	Eq.H1-1a	315	7.650	204.000	17.300	0.300
190	W12X26	W12X26	0.474	1.000	0.474	Eq.H1-1a	316	7.650	204.000	17.300	0.300
191	HSST5X5	HSST5X5	0.698	1.000	0.698	Eq.H1-1a	124	5.260	19.000	19.000	31.200
192	HSST5X5	HSST5X5	0.668	1.000	0.668	Eq.H1-1a	111	5.260	19.000	19.000	31.200
193	HSST5X5	HSST5X5	0.740	1.000	0.740	Eq.H1-1a	112	5.260	19.000	19.000	31.200
194	HSST5X5	HSST5X5	0.475	1.000	0.475	Eq.H1-1a	117	5.260	19.000	19.000	31.200

Failed Members

There is no data of this type.



Whole Structure - Node Labels



Whole Structure - Member Labels

AWB Engineers
Engineers/Architects
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221205 - Coastal Pacific Distribution Facility - Frame Analysis for K.2 and B.7

The STAAD model is developed for frame along gridline K.2. The frame and bracing analysis for Frame along gridline K.2 is expected to govern over the analysis of frame along gridline B.7.

Design Loads

$DL_{roof} := 10\ psf$	Roof Dead Load
$DL_{mech} := 15\ psf$	Mechanical Dead Load
$LL_{roof} := 20\ psf$	Roof Live Load
$SL_{roof} := 20\ psf$	Snow Load
$SL_{roof\_drift} := 75\ psf$	Snow Load
$DL_{wall} := 10\ psf$	Curtain Wall Dead Load
$WL_{wind\_lee} := 20\ psf$	Wind Pressure From Attached Wind Analysis (Windward + Leeward)
$S_{DS} := 0.848$	Short period spectral acceleration
$C_s := 0.2636$	Seismic Response Coefficient (from attached analysis)

Frame Loads Along Gridline K.2 and B.7

$DL_{B.7\_roof} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 4.5\ ft \cdot 0.5\right) = 0.06\ klf$	Frame Roof Dead Load (UDL)
$LL_{B.7\_roof} := \left(LL_{roof} \cdot 4.5\ ft \cdot 0.5\right) = 0.05\ klf$	Frame Roof Live Load (UDL)
$SL_{B.7\_roof} := \left(SL_{roof\_drift} \cdot 4.5\ ft \cdot 0.5\right) + \left(SL_{roof\_drift} \cdot 0.5 \cdot 4.5\ ft \cdot 0.7\right) = 0.29\ klf$	Frame Roof Snow Load (UDL)
$WL_{B.7\_roof} := \dfrac{WL_{wind\_lee} \cdot 24\ ft \cdot 77.5\ ft \cdot 0.25}{40.5\ ft} = 0.23\ klf$	Frame Wind Load (UDL) EW Direction
$DL_{B.7\_seis\_roof} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 77.5\ ft \cdot 40.5\ ft\right) = 78.47\ kip$	Seismic Roof Dead Load (Mass) For Frame
$DL_{B.7\_seis\_wall} := \left(DL_{wall} \cdot \left(\left(77.5\ ft + 40.5\ ft\right) \cdot 2\right) \cdot 24\ ft \cdot 0.5\right) = 28.32\ kip$	Seismic Wall Dead Load (Mass) For Frame
$DL_{B.7\_seis\_tot} := DL_{B.7\_seis\_roof} + DL_{B.7\_seis\_wall} = 106.79\ kip$	Total Seismic Weight

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$$EQ_{TL\_H} := \frac{\left(DL_{B.7\_seis\_roof} + DL_{B.7\_seis\_wall}\right) \cdot C_s}{2 \cdot 40.5\ ft} = 0.35\ klf$$ Seismic load on frame

$$EQ_{TL\_V} := 0.2 \cdot S_{DS} \cdot \left(DL_{B.7\_roof}\right) = 0.01\ klf$$ Seismic load on frame

Column Loads

Column Load at K.2/7

$$C_{DL\_K.2\_7} := \left(DL_{roof} + DL_{mech}\right) \cdot (19\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) = 4.81\ kip$$

$$C_{LL\_K.2\_7} := \left(LL_{roof}\right) \cdot (19\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) = 3.85\ kip$$

$$C_{SL\_K.2\_7} := \left(SL_{roof}\right) \cdot (19\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) + \left(0.5 \cdot 18\ ft \cdot SL_{roof\_drift}\right) \cdot (19\ ft \cdot 0.5) = 10.26\ kip$$

Column Load at B.7/7

$$C_{DL\_B.7\_7} := \left(DL_{roof} + DL_{mech}\right) \cdot (26.5\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) = 6.71\ kip$$

$$C_{LL\_B.7\_7} := \left(LL_{roof}\right) \cdot (26.5\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) = 5.37\ kip$$

$$C_{SL\_B.7\_7} := \left(SL_{roof}\right) \cdot (26.5\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) + \left(0.5 \cdot 18\ ft \cdot SL_{roof\_drift}\right) \cdot (26.5\ ft \cdot 0.5) = 14.31\ kip$$

Column Load at K.2/5

$$C_{DL\_K.2\_5} := \left(DL_{roof} + DL_{mech}\right) \cdot (24.5\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) = 6.2\ kip$$

$$C_{LL\_K.2\_5} := \left(LL_{roof}\right) \cdot (24.5\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) = 4.96\ kip$$

$$C_{SL\_K.2\_5} := \left(SL_{roof}\right) \cdot (24.5\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) + \left(0.5 \cdot 18\ ft \cdot SL_{roof\_drift}\right) \cdot (24.5\ ft \cdot 0.5) = 13.23\ kip$$

ASCE 7-16 Seismic Base Shear

Project File: 221205 - Costal Pacific Distribution Facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Seismic Base Shear Analysis

Specific Description: Frames Along Gridlines B.7, K.2, Along 6 between P & K, Along P Between 5 & 6, Along 5 Betwe

Risk Category

Calculations per ASCE 7-16

Risk Category of Building or Other Structure : "II" : All Buildings and other structures except those listed as Category I, III, and IV — *ASCE 7-16, Page 4, Table 1.5-1*

Seismic Importance Factor = 1 — *ASCE 7-16, Page 5, Table 1.5-2*

Gridded Ss & S1values from ASCE 7-16

ASCE 7-16 11.4.2

Max. Ground Motions, 5% Damping :

S_S = 1.285 g, 0.2 sec response

S_1 = 0.4425 g, 1.0 sec response

Location : Puyallup, WA 98371

Latitude = 47.196 deg North

Longitude = 122.316 deg West

For the closest datapoint grid location . . .

Latitude = 47.200 deg North

Longitude = 122.310 deg West

Site Class, Site Coeff. and Design Category

Classification: "D" : Shear Wave Velocity 600 to 1,200 ft/sec = **D** (Based on Testing) — *ASCE 7-16 Table 20.3-1*

Site Coefficients Fa & Fv — *ASCE 7-16 Table 11.4-1 & 11.4-2*
(using straight-line interpolation from table value
Fa = 1.00
Fv = 2.77

Maximum Considered Earthquake Acceleratio
S_{MS} = Fa * Ss = 1.285 — *ASCE 7-16 Eq. 11.4-1*
S_{M1} = Fv * S1 = 1.226 — *ASCE 7-16 Eq. 11.4-2*

Design Spectral Acceleration
$S_{DS} = S_{MS} * 2/3$ = 0.857 — *ASCE 7-16 Eq. 11.4-3*
$S_{D1} = S_{M1} * 2/3$ = 0.817 — *ASCE 7-16 Eq. 11.4-4*

Seismic Design Category = **D** — *ASCE 7-16 Table 11.6-1 & -2*

Resisting System

ASCE 7-16 Table 12.2-1

Basic Seismic Force Resisting System . . . **Building Frame Systems**
3.Steel ordinary concentrically braced frames

Response Modification Coefficient " R = 3.25
System Overstrength Factor " Wo " = 2.00
Deflection Amplification Factor " Cd " = 3.25

NOTE! See ASCE 7-16 for all applicable footnot

Building height Limits :

Category "A & B" Limit:	No Limit
Category "C" Limit:	No Limit
Category "D" Limit:	Limit = 35j
Category "E" Limit:	Limit = 35j
Category "F" Limit:	Limit = 35j

Lateral Force Procedure

ASCE 7-16 Section 12.8.2

Equivalent Lateral Force Procedure

The "Equivalent Lateral Force Procedure" is being used according to the provisions of ASCE 7-16 12.8

Determine Building Period

Use ASCE 12.8-7

Structure Type for Building Period CalculatiAll Other Structural Systems

" Ct " value = 0.020 " hn " : Height from base to highest level : 24.0 ft

" x " value = 0.75

" Ta " Approximate fundemental period using Eq. 12.8-7 : Ta = Ct * (hn ^ x) = 0.217 sec

"TL" : Long-period transition period per ASCE 7-16 Maps 22-14 -> 22-17 6.000 sec

Building Period " Ta " Calculated from Approximate Method select= 0.217

" Cs " Response Coefficient

ASCE 7-16 Section 12.8.1.1

S_{DS} : Short Period Design Spectral Response	= 0.857	From Eq. 12.8-2, Preliminary Cs	=	0.264
" R " : Response Modification Factor	= 3.25	From Eq. 12.8-3 & 12.8-4 , Cs need not exceed	=	1.159
" I " : Seismic Importance Factor	= 1	From Eq. 12.8-5 & 12.8-6, Cs not be less than	=	0.038

Cs : Seismic Response Coefficient = = **0.2636**

ASCE 7-16 Seismic Base Shear

DESCRIPTION: Seismic Base Shear Analysis

Seismic Base Shear

ASCE 7-16 Section 12.8.1

Cs = 0.2636 from 12.8.1.1

W (see Sum Wi below) = 107.00 k

Seismic Base Shear V = Cs * W = 28.20 k

Vertical Distribution of Seismic Forces

ASCE 7-16 Section 12.8.3

" k " : hx exponent based on Ta = 1.00

Table of building Weights by Floor Level...

Level #	Wi : Weight	Hi : Height	(Wi * Hi^k)	Cvx	Fx=Cvx * V	Sum Story Shear	Sum Story Moment
1	107.00	24.00	2,568.00	1.0000	28.20	28.20	0.00

Sum Wi = 107.00 k Sum Wi * Hi = 2,568.00 k-ft Total Base Shear = 28.20 k

Base Moment = 676.9 k-ft

Diaphragm Forces : Seismic Design Category "B" to "F"

ASCE 7-16 12.10.1.1

Level #	Wi	Fi	Sum Fi	Sum Wi	Fpx : Calcd	Fpx : Min	Fpx : Max	Fpx	Dsgn. Force
1	107.00	28.20	28.20	107.00	28.20	18.33	36.67	28.20	28.20

Wpx . . . . Weight at level of diaphragm and other structure elements attached to it.
Fi . . . . Design Lateral Force applied at the level.
Sum Fi . . . . Sum of "Lat. Force" of current level plus all levels above
MIN Req'd Force @ Level . . . $0.20 * S_{DS} * I * Wpx$
MAX Req'd Force @ Level . . $0.40 * S_{DS} * I * Wpx$
Fpx : Design Force @ Level . Wpx * SUM(x->n) Fi / SUM(x->n) wi, x = Current level, n = Top Level

Job Information

	Engineer	Checked	Approved
Name:			
Date:	3/11/2024		

Project ID	
Project Name	

Structure Type	SPACE FRAME

Number of Nodes	8	Highest Node	9
Number of Elements	12	Highest Beam	12

Number of Basic Load Cases	46
Number of Combination Load Cases	0

Included in this printout are data for:

All	The Whole Structure

Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	DEAD LOAD
Primary	2	ROOF LIVE LOAD
Primary	3	SNOW LOAD
Primary	4	WIND 1
Primary	5	WIND 2
Primary	6	SEISMIC - H
Primary	8	SEISMIC - V
Primary	100	GENERATED ASCE7-16 ALLOWABLEST
Primary	101	GENERATED ASCE7-16 ALLOWABLEST
Primary	102	GENERATED ASCE7-16 ALLOWABLEST
Primary	103	GENERATED ASCE7-16 ALLOWABLEST
Primary	104	GENERATED ASCE7-16 ALLOWABLEST
Primary	105	GENERATED ASCE7-16 ALLOWABLEST
Primary	106	GENERATED ASCE7-16 ALLOWABLEST
Primary	107	GENERATED ASCE7-16 ALLOWABLEST
Primary	108	GENERATED ASCE7-16 ALLOWABLEST
Primary	109	GENERATED ASCE7-16 ALLOWABLEST
Primary	110	GENERATED ASCE7-16 ALLOWABLEST
Primary	111	GENERATED ASCE7-16 ALLOWABLEST
Primary	112	GENERATED ASCE7-16 ALLOWABLEST
Primary	113	GENERATED ASCE7-16 ALLOWABLEST
Primary	114	GENERATED ASCE7-16 ALLOWABLEST
Primary	115	GENERATED ASCE7-16 ALLOWABLEST
Primary	116	GENERATED ASCE7-16 ALLOWABLEST
Primary	117	GENERATED ASCE7-16 ALLOWABLEST

Job Information Cont...

Type	L/C	Name
Primary	118	GENERATED ASCE7-16 ALLOWABLEST
Primary	119	GENERATED ASCE7-16 ALLOWABLEST
Primary	120	GENERATED ASCE7-16 ALLOWABLEST
Primary	121	GENERATED ASCE7-16 ALLOWABLEST
Primary	122	GENERATED ASCE7-16 ALLOWABLEST
Primary	123	GENERATED ASCE7-16 ALLOWABLEST
Primary	124	GENERATED ASCE7-16 ALLOWABLEST
Primary	125	GENERATED ASCE7-16 ALLOWABLEST
Primary	126	GENERATED ASCE7-16 ALLOWABLEST
Primary	300	GENERATED ASCE7-16 ALLOWABLEST
Primary	301	GENERATED ASCE7-16 ALLOWABLEST
Primary	302	GENERATED ASCE7-16 ALLOWABLEST
Primary	303	GENERATED ASCE7-16 ALLOWABLEST
Primary	304	GENERATED ASCE7-16 ALLOWABLEST
Primary	305	GENERATED ASCE7-16 ALLOWABLEST
Primary	306	GENERATED ASCE7-16 ALLOWABLEST
Primary	307	GENERATED ASCE7-16 ALLOWABLEST
Primary	308	GENERATED ASCE7-16 ALLOWABLEST
Primary	309	GENERATED ASCE7-16 ALLOWABLEST
Primary	310	GENERATED ASCE7-16 ALLOWABLEST
Primary	311	GENERATED ASCE7-16 ALLOWABLEST

Section Properties

Prop	Section	Area (in^2)	I_{yy} (in^4)	I_{zz} (in^4)	J (in^4)	Material
1	W12X26	7.650	17.300	204.000	0.300	STEEL_50_KS
2	L25256	1.730	1.559	0.409	0.085	STEEL_36_KS

Materials

Mat	Name	E (kip/in^2)	ν	Density (kip/in^3)	α (/°F)
1	STEEL	29E+3	0.300	0.000	6.5E -6
2	CONCRETE	3.15E+3	0.170	8.68e-05	5.5E -6
3	ALUMINUM	10E+3	0.330	9.8e-05	12.8E -6
4	STAINLESSSTEEL	28E+3	0.300	0.000	9.9E -6
5	STEEL_36_KSI	29E+3	0.300	0.000	6.5E -6
6	STEEL_50_KSI	29E+3	0.300	0.000	6.5E -6
7	STEEL_275_NMM2	29.7E+3	0.300	0.000	6.67E -6
8	STEEL_355_NMM2	29.7E+3	0.300	0.000	6.67E -6
9	Q235	29.9E+3	0.300	0.000	6.67E -6
10	Q345	29.9E+3	0.300	0.000	6.67E -6
11	Q355	29.9E+3	0.300	0.000	6.67E -6

Materials Cont...

Mat	Name	E (kip/in²)	ν	Density (kip/in³)	α (/°F)
1	STEEL	29E+3	0.300	0.000	6.5E -6
2	CONCRETE	3.15E+3	0.170	8.68e-05	5.5E -6
3	ALUMINUM	10E+3	0.330	9.8e-05	12.8E -6
4	STAINLESSSTEEL	28E+3	0.300	0.000	9.9E -6

Supports

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip˙ft/deg)	rY (kip˙ft/deg)	rZ (kip˙ft/deg)
1	Fixed	Fixed	Fixed	-	-	-
3	-	-	Fixed	-	-	-
4	Fixed	Fixed	Fixed	-	-	-
6	-	-	Fixed	-	-	-
7	Fixed	Fixed	Fixed	-	-	-
9	-	-	Fixed	-	-	-

Releases

Beam ends not shown in this table are fixed in all directions.

Beam	Node	x	y	z	rx	ry	rz
2	3	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
4	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
5	9	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
6	3	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
6	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
7	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
7	9	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
8	2	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
8	5	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Primary Load Cases

Number	Name	Type
1	DEAD LOAD	Dead
2	ROOF LIVE LOAD	Roof Live
3	SNOW LOAD	Snow
4	WIND 1	Wind
5	WIND 2	Wind
6	SEISMIC - H	Seismic-H
8	SEISMIC - V	Seismic-V
100	GENERATED ASCE7-16 ALLOWABLEST	None
101	GENERATED ASCE7-16 ALLOWABLEST	None
102	GENERATED ASCE7-16 ALLOWABLEST	None
103	GENERATED ASCE7-16 ALLOWABLEST	None
104	GENERATED ASCE7-16 ALLOWABLEST	None
105	GENERATED ASCE7-16 ALLOWABLEST	None
106	GENERATED ASCE7-16 ALLOWABLEST	None
107	GENERATED ASCE7-16 ALLOWABLEST	None
108	GENERATED ASCE7-16 ALLOWABLEST	None
109	GENERATED ASCE7-16 ALLOWABLEST	None
110	GENERATED ASCE7-16 ALLOWABLEST	None
111	GENERATED ASCE7-16 ALLOWABLEST	None
112	GENERATED ASCE7-16 ALLOWABLEST	None
113	GENERATED ASCE7-16 ALLOWABLEST	None
114	GENERATED ASCE7-16 ALLOWABLEST	None
115	GENERATED ASCE7-16 ALLOWABLEST	None
116	GENERATED ASCE7-16 ALLOWABLEST	None
117	GENERATED ASCE7-16 ALLOWABLEST	None
118	GENERATED ASCE7-16 ALLOWABLEST	None
119	GENERATED ASCE7-16 ALLOWABLEST	None
120	GENERATED ASCE7-16 ALLOWABLEST	None
121	GENERATED ASCE7-16 ALLOWABLEST	None
122	GENERATED ASCE7-16 ALLOWABLEST	None
123	GENERATED ASCE7-16 ALLOWABLEST	None
124	GENERATED ASCE7-16 ALLOWABLEST	None
125	GENERATED ASCE7-16 ALLOWABLEST	None
126	GENERATED ASCE7-16 ALLOWABLEST	None
300	GENERATED ASCE7-16 ALLOWABLEST	None
301	GENERATED ASCE7-16 ALLOWABLEST	None
302	GENERATED ASCE7-16 ALLOWABLEST	None
303	GENERATED ASCE7-16 ALLOWABLEST	None
304	GENERATED ASCE7-16 ALLOWABLEST	None
305	GENERATED ASCE7-16 ALLOWABLEST	None
306	GENERATED ASCE7-16 ALLOWABLEST	None
307	GENERATED ASCE7-16 ALLOWABLEST	None
308	GENERATED ASCE7-16 ALLOWABLEST	None
309	GENERATED ASCE7-16 ALLOWABLEST	None
310	GENERATED ASCE7-16 ALLOWABLEST	None

Primary Load Cases Cont...

Number	Name	Type
311	GENERATED ASCE7-16 ALLOWABLEST	None

Combination Load Cases

There is no data of this type.

Load Generators

There is no data of this type.

1 DEAD LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip·in)	MY (kip·in)	MZ (kip·in)
3	-	-5.000	-	-	-	-
9	-	-6.500	-	-	-	-

1 DEAD LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-60.000	-	-	-	-
7	UNI	lbf/ft	GY	-60.000	-	-	-	-

1 DEAD LOAD : Selfweight

Direction	Factor	Assigned Geometry
Y	-1.000	ALL

2 ROOF LIVE LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip·in)	MY (kip·in)	MZ (kip·in)
3	-	-4.000	-	-	-	-
9	-	-5.000	-	-	-	-

2 ROOF LIVE LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-50.000	-	-	-	-
7	UNI	lbf/ft	GY	-50.000	-	-	-	-

3 SNOW LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip`in)	MY (kip`in)	MZ (kip`in)
3	-	-10.000	-	-	-	-
9	-	-13.000	-	-	-	-

3 SNOW LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-60.000	-	-	-	-
7	UNI	lbf/ft	GY	-60.000	-	-	-	-

4 WIND 1 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GX	230.000	-	-	-	-
7	UNI	lbf/ft	GX	230.000	-	-	-	-

5 WIND 2 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GX	-230.000	-	-	-	-
7	UNI	lbf/ft	GX	-230.000	-	-	-	-

6 SEISMIC - H : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GX	350.000	-	-	-	-
7	UNI	lbf/ft	GX	350.000	-	-	-	-

8 SEISMIC - V : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-10.000	-	-	-	-
7	UNI	lbf/ft	GY	-10.000	-	-	-	-

100 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 1 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000

101 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 2 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	1.000

102 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 3 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	1.000

103 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 4 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750

104 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 5 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750

105 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 6 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
4	WIND 1	0.600

106 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 7 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
5	WIND 2	0.600

107 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 8 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750
4	WIND 1	0.750

108 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 9 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750
5	WIND 2	0.750

109 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 10 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
4	WIND 1	0.750

110 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 11 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
5	WIND 2	0.750

111 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 12 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
4	WIND 1	0.750

112 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 13 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
5	WIND 2	0.750

113 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 14 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
4	WIND 1	0.600

114 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 15 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
5	WIND 2	0.600

115 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 16 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	0.910
8	SEISMIC - V	0.700

116 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 17 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-0.910
8	SEISMIC - V	0.700

117 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 18 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	0.910
8	SEISMIC - V	-0.700

118 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 19 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-0.910
8	SEISMIC - V	-0.700

119 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 20 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	0.683
8	SEISMIC - V	0.525

120 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 21 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-0.683
8	SEISMIC - V	0.525

121 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 22 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	0.683
8	SEISMIC - V	-0.525

122 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 23 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-0.683
8	SEISMIC - V	-0.525

123 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 24 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	0.910
8	SEISMIC - V	-0.700

124 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 25 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-0.910
8	SEISMIC - V	-0.700

125 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 26 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	0.910
8	SEISMIC - V	0.700

126 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 27 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-0.910
8	SEISMIC - V	0.700

300 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 28 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	2.100
8	SEISMIC - V	0.700

301 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 29 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-2.100
8	SEISMIC - V	0.700

302 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 30 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	2.100
8	SEISMIC - V	-0.700

303 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 31 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-2.100
8	SEISMIC - V	-0.700

304 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 32 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	1.580
8	SEISMIC - V	0.525

305 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 33 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-1.580
8	SEISMIC - V	0.525

306 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 34 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	1.580
8	SEISMIC - V	-0.525

307 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 35 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-1.580
8	SEISMIC - V	-0.525

308 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 36 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	2.100
8	SEISMIC - V	-0.700

309 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 37 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-2.100
8	SEISMIC - V	-0.700

310 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 38 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	2.100
8	SEISMIC - V	0.700

311 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 39 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-2.100
8	SEISMIC - V	0.700

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	3	300:GENERAT	**0.533**	0.002	-0.000	0.533	0.000	-0.000	-0.001
Min X	9	301:GENERAT	**-0.562**	-0.010	0.000	0.562	-0.000	0.000	0.001
Max Y	5	309:GENERAT	-0.259	**0.010**	0.000	0.259	-0.000	-0.000	0.002
Min Y	3	305:GENERAT	-0.409	**-0.043**	-0.000	0.411	-0.000	-0.000	0.001
Max Z	5	310:GENERAT	0.224	-0.021	**0.000**	0.224	0.000	-0.000	-0.002
Min Z	5	110:GENERAT	-0.065	0.000	**-0.000**	0.065	-0.000	0.000	0.000
Max rX	6	310:GENERAT	0.524	-0.034	-0.000	0.525	**0.000**	-0.000	-0.000
Min rX	6	301:GENERAT	-0.555	0.008	0.000	0.555	**-0.000**	-0.000	0.000
Max rY	1	110:GENERAT	0	0	0	0	0.000	**0.000**	0.000
Min rY	1	310:GENERAT	0	0	0	0	0.000	**-0.000**	-0.002
Max rZ	4	301:GENERAT	0	0	0	0	0.000	-0.000	**0.002**
Min rZ	1	300:GENERAT	0	0	0	0	0.000	-0.000	**-0.002**
Max Rst	9	301:GENERAT	-0.562	-0.010	0.000	**0.562**	-0.000	0.000	0.001

Beam Displacement Detail Summary

Displacements shown in italic indicate the presence of an offset

	Beam	L/C	d (ft)	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	2	300:GENERAT	13.000	**0.533**	0.002	0	0.533
Min X	5	301:GENERAT	24.000	**-0.562**	-0.010	0	0.562
Max Y	3	309:GENERAT	11.000	-0.259	**0.010**	0	0.259
Min Y	6	101:GENERAT	10.625	-0.007	**-0.125**	0	0.125
Max Z	1	1:DEAD LOAD	0	0	0	**0**	0
Min Z	1	1:DEAD LOAD	0	0	0	**0**	0
Max Rst	5	301:GENERAT	24.000	-0.562	-0.010	0	**0.562**

Beam End Displacement Summary

Displacements shown in italic indicate the presence of an offset

	Beam	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	2	3	300:GENERAT	**0.533**	0.002	0	0.533
Min X	5	9	301:GENERAT	**-0.562**	-0.010	0	0.562
Max Y	3	5	309:GENERAT	-0.259	**0.010**	0	0.259
Min Y	2	3	305:GENERAT	-0.409	**-0.043**	0	0.411
Max Z	1	1	1:DEAD LOAD	0	0	**0**	0
Min Z	1	1	1:DEAD LOAD	0	0	**0**	0
Max Rst	5	9	301:GENERAT	-0.562	-0.010	0	**0.562**

Beam End Force Summary

The signs of the forces at end B of each beam have been reversed. For example: this means that the Min Fx entry gives the largest tension value for an beam.

				Axial	Shear		Torsion	Bending	
	Beam	Node	L/C	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip-in)	My (kip-in)	Mz (kip-in)
Max Fx	1	1	301:GENERAT	**40.303**	0.102	-0.000	0	-0.000	-0.000
Min Fx	9	6	300:GENERAT	**-34.557**	-0.062	-0	-0	-0	-0
Max Fy	6	3	101:GENERAT	0.005	**1.550**	0.000	0.000	-0.000	0.753
Min Fy	6	6	101:GENERAT	0.005	**-1.552**	0.000	0.000	0.000	1.051
Max Fz	4	5	300:GENERAT	20.285	0.000	**0.014**	-0.000	-1.873	0.000
Min Fz	3	4	311:GENERAT	-16.087	-0.000	**-0.007**	0	-0.000	0
Max Mx	7	6	310:GENERAT	-13.778	0.546	0.000	**0.000**	-0.000	0.135
Min Mx	4	5	310:GENERAT	19.431	0.000	0.013	**-0.000**	-1.862	0.000
Max My	4	6	310:GENERAT	19.228	0.000	0.013	-0.000	**0.242**	-0.000
Min My	4	5	300:GENERAT	20.285	0.000	0.014	-0.000	**-1.873**	0.000
Max Mz	8	2	301:GENERAT	29.284	0.287	-0.000	0.000	0.000	**1.758**
Min Mz	2	2	301:GENERAT	24.320	-0.107	0.000	-0.000	-0.000	**-15.193**

Beam Force Detail Summary

Sign convention as diagrams:- positive above line, negative below line except Fx where positive is compression. Distance d is given from beam end A.

				Axial	Shear		Torsion	Bending	
	Beam	L/C	d (ft)	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip-in)	My (kip-in)	Mz (kip-in)
Max Fx	1	301:GENERAT	0	**40.303**	0.102	-0.000	0	-0.000	-0.000
Min Fx	9	300:GENERAT	24.911	**-34.557**	-0.062	-0	-0	-0	-0
Max Fy	6	101:GENERAT	0	0.005	**1.550**	0.000	0.000	-0.000	0.753
Min Fy	6	101:GENERAT	21.250	0.005	**-1.552**	0.000	0.000	0.000	1.051
Max Fz	4	300:GENERAT	0	20.285	0.000	**0.014**	-0.000	-1.873	0.000
Min Fz	3	311:GENERAT	0	-16.087	-0.000	**-0.007**	0	-0.000	0
Max Mx	7	310:GENERAT	0	-13.778	0.546	0.000	**0.000**	-0.000	0.135
Min Mx	4	310:GENERAT	0	19.431	0.000	0.013	**-0.000**	-1.862	0.000
Max My	4	310:GENERAT	13.000	19.228	0.000	0.013	-0.000	**0.242**	-0.000

Beam Force Detail Summary Cont...

				Axial	Shear		Torsion	Bending	
	Beam	L/C	d (ft)	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip`in)	My (kip`in)	Mz (kip`in)
Min My	4	300:GENERAT	0	20.285	0.000	0.014	-0.000	**-1.873**	0.000
Max Mz	8	301:GENERAT	0	29.284	0.287	-0.000	0.000	0.000	**1.758**
Min Mz	6	101:GENERAT	10.625	0.005	-0.001	0.000	0.000	-0.000	**-97.976**

Reaction Summary

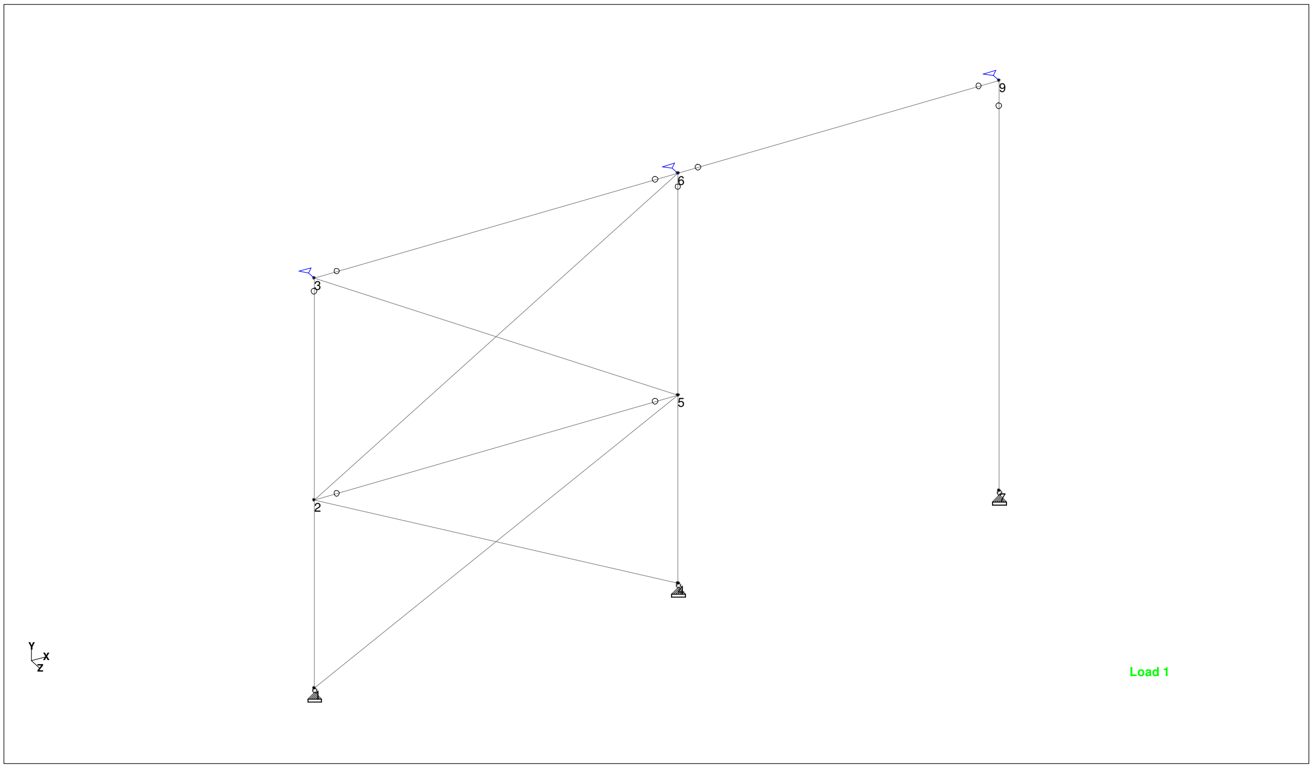
			Horizontal	Vertical	Horizontal	Moment		
	Node	L/C	FX (kip)	FY (kip)	FZ (kip)	MX (kip`in)	MY (kip`in)	MZ (kip`in)
Max FX	4	301:GENERAT	**29.500**	-30.147	0.000	0	0	0
Min FX	1	308:GENERAT	**-29.402**	-29.016	-0.000	0	0	0
Max FY	1	301:GENERAT	-0.102	**40.373**	-0.000	0	0	0
Min FY	4	309:GENERAT	29.498	**-31.591**	0.000	0	0	0
Max FZ	4	310:GENERAT	0.005	35.082	**0.000**	0	0	0
Min FZ	1	310:GENERAT	-29.401	-28.867	**-0.000**	0	0	0
Max MX	1	1:DEAD LOAD	0.001	7.098	-0.000	**0**	0	0
Min MX	1	1:DEAD LOAD	0.001	7.098	-0.000	**0**	0	0
Max MY	1	1:DEAD LOAD	0.001	7.098	-0.000	0	**0**	0
Min MY	1	1:DEAD LOAD	0.001	7.098	-0.000	0	**0**	0
Max MZ	1	1:DEAD LOAD	0.001	7.098	-0.000	0	0	**0**
Min MZ	1	1:DEAD LOAD	0.001	7.098	-0.000	0	0	**0**

Utilization Ratio

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
1	W12X26	W12X26	0.602	1.000	0.602	Eq.H1-1a	301	7.650	204.000	17.300	0.300
2	W12X26	W12X26	0.428	1.000	0.428	Eq.H1-1a	305	7.650	204.000	17.300	0.300
3	W12X26	W12X26	0.347	1.000	0.347	Cl.E3	300	7.650	204.000	17.300	0.300
4	W12X26	W12X26	0.195	1.000	0.195	Cl.E3	300	7.650	204.000	17.300	0.300
5	W12X26	W12X26	0.685	1.000	0.685	Cl.E3	101	7.650	204.000	17.300	0.300
6	W12X26	W12X26	0.208	1.000	0.208	Eq.H1-1a	301	7.650	204.000	17.300	0.300
7	W12X26	W12X26	0.097	1.000	0.097	Cl.E3	301	7.650	204.000	17.300	0.300
8	W12X26	W12X26	0.771	1.000	0.771	Eq.H1-1a	302	7.650	204.000	17.300	0.300
9	L25256	L25256	0.402	1.000	0.402	Cl.D2	115	1.730	0.400	1.568	0.081
10	L25256	L25256	0.400	1.000	0.400	Cl.D2	118	1.730	0.400	1.568	0.081
11	L25256	L25256	0.384	1.000	0.384	Cl.D2	117	1.730	0.400	1.568	0.081
12	L25256	L25256	0.387	1.000	0.387	Cl.D2	116	1.730	0.400	1.568	0.081

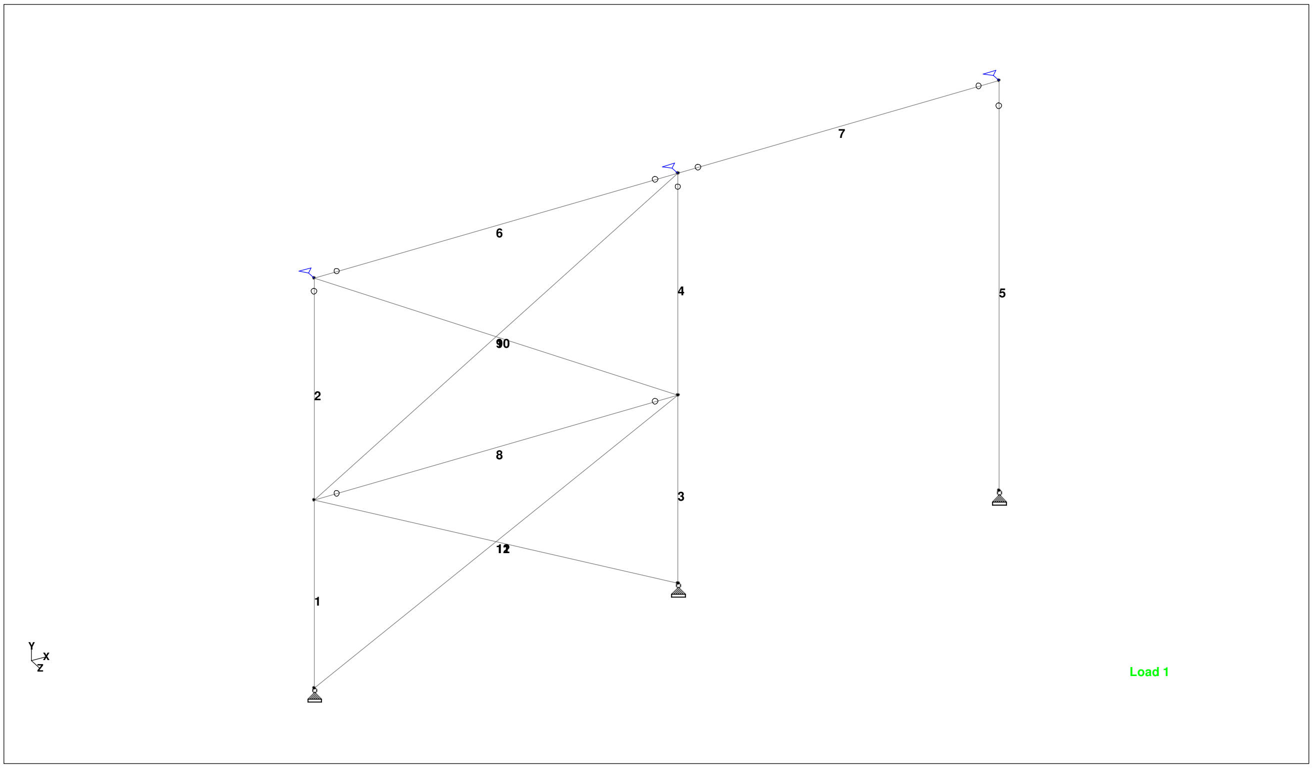
Failed Members

There is no data of this type.



Whole Structure - Node Labels

Software licensed to AWB Engineers CONNECTED User: Vivek Kannan	Job No	Sheet No **18**	Rev
	Part		
Job Title Frames Along Gridline B.7 & K.2	Ref		
	By	Date 3/11/2024	Chd
Client	File 5. 221205 - CPDF - Frame	Date/Time 11-Mar-2024 02:11	



Whole Structure - Member Labels

AWB Engineers
Engineers/Architects
1942 Northwood Drive
Salisbury, MD 21801-7824
(410)-742-7299, Fax - (410) 742 - 0273

221205 - Coastal Pacific Distribution Facility - Frame Analysis Along Gridline 6

The STAAD model is developed for frames along gridline 6.

Design Loads

$DL_{roof} := 10\ psf$ Roof Dead Load

$DL_{mech} := 15\ psf$ Mechanical Dead Load

$LL_{roof} := 20\ psf$ Roof Live Load

$SL_{roof} := 20\ psf$ Snow Load

$SL_{roof\_drift} := 75\ psf$ Snow Drift Load

$DL_{wall} := 10\ psf$ Curtain Wall Dead Load

$WL_{wind\_lee} := 20\ psf$ Wind Pressure From Attached Wind Analysis (Windward + Leeward)

$S_{DS} := 0.848$ Short period spectral acceleration

$C_s := 0.2636$ Seismic Response Coefficient (from attached analysis)

Frame Loads Along Gridline 6

$DL_{6\_roof} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 40.5\ ft \cdot 0.5\right) = 0.51\ klf$ Frame Roof Dead Load (UDL)

$LL_{6\_roof} := \left(LL_{roof} \cdot 40.5\ ft \cdot 0.5\right) = 0.41\ klf$ Frame Roof Live Load (UDL)

$SL_{6\_roof} := \left(SL_{roof} \cdot 40.5\ ft \cdot 0.5\right) + \left(SL_{roof\_drift} \cdot 0.5 \cdot 18\ ft \cdot 0.7\right) = 0.88\ klf$ Frame Roof Snow Load (UDL)

$WL_{6\_roof} := \dfrac{WL_{wind\_lee} \cdot \left(24\ ft \cdot 40.5\ ft\right) \cdot 0.25}{77.5\ ft} = 0.06\ klf$ Frame Wind Load (UDL) EW Direction

$DL_{6\_seis\_roof} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 77.5\ ft \cdot 40.5\ ft\right) = 78.47\ kip$ Seismic Roof Dead Load (Mass) For Frame

$DL_{6\_seis\_wall} := \left(DL_{wall} \cdot \left(\left(77.5\ ft + 40.5\ ft\right) \cdot 2\right) \cdot 24\ ft \cdot 0.5\right) = 28.32\ kip$ Seismic Wall Dead Load (Mass) For Frame

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$DL_{6\_seis\_tot} := DL_{6\_seis\_roof} + DL_{6\_seis\_wall} = 106.79\ kip$ Total Seismic Weight

$EQ_{TL\_H} := \frac{(DL_{6\_seis\_tot}) \cdot C_s}{2 \cdot 77.5\ ft} = 0.18\ klf$ Horizontal Seismic load on frame

$EQ_{TL\_V} := 0.2 \cdot S_{DS} \cdot (DL_{6\_roof}) = 0.09\ klf$ Vertical Seismic load on frame

Job Information

	Engineer	Checked	Approved
Name:			
Date:	3/11/2024		

Project ID	
Project Name	

Structure Type	SPACE FRAME

Number of Nodes	12	Highest Node	15
Number of Elements	16	Highest Beam	23

Number of Basic Load Cases	46
Number of Combination Load Cases	0

Included in this printout are data for:

All	The Whole Structure

Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	DEAD LOAD
Primary	2	ROOF LIVE LOAD
Primary	3	SNOW LOAD
Primary	4	WIND 1
Primary	5	WIND 2
Primary	6	SEISMIC - H
Primary	8	SEISMIC - V
Primary	100	GENERATED ASCE7-16 ALLOWABLEST
Primary	101	GENERATED ASCE7-16 ALLOWABLEST
Primary	102	GENERATED ASCE7-16 ALLOWABLEST
Primary	103	GENERATED ASCE7-16 ALLOWABLEST
Primary	104	GENERATED ASCE7-16 ALLOWABLEST
Primary	105	GENERATED ASCE7-16 ALLOWABLEST
Primary	106	GENERATED ASCE7-16 ALLOWABLEST
Primary	107	GENERATED ASCE7-16 ALLOWABLEST
Primary	108	GENERATED ASCE7-16 ALLOWABLEST
Primary	109	GENERATED ASCE7-16 ALLOWABLEST
Primary	110	GENERATED ASCE7-16 ALLOWABLEST
Primary	111	GENERATED ASCE7-16 ALLOWABLEST
Primary	112	GENERATED ASCE7-16 ALLOWABLEST
Primary	113	GENERATED ASCE7-16 ALLOWABLEST
Primary	114	GENERATED ASCE7-16 ALLOWABLEST
Primary	115	GENERATED ASCE7-16 ALLOWABLEST
Primary	116	GENERATED ASCE7-16 ALLOWABLEST
Primary	117	GENERATED ASCE7-16 ALLOWABLEST

Job Information Cont...

Type	L/C	Name
Primary	118	GENERATED ASCE7-16 ALLOWABLEST
Primary	119	GENERATED ASCE7-16 ALLOWABLEST
Primary	120	GENERATED ASCE7-16 ALLOWABLEST
Primary	121	GENERATED ASCE7-16 ALLOWABLEST
Primary	122	GENERATED ASCE7-16 ALLOWABLEST
Primary	123	GENERATED ASCE7-16 ALLOWABLEST
Primary	124	GENERATED ASCE7-16 ALLOWABLEST
Primary	125	GENERATED ASCE7-16 ALLOWABLEST
Primary	126	GENERATED ASCE7-16 ALLOWABLEST
Primary	300	GENERATED ASCE7-16 ALLOWABLEST
Primary	301	GENERATED ASCE7-16 ALLOWABLEST
Primary	302	GENERATED ASCE7-16 ALLOWABLEST
Primary	303	GENERATED ASCE7-16 ALLOWABLEST
Primary	304	GENERATED ASCE7-16 ALLOWABLEST
Primary	305	GENERATED ASCE7-16 ALLOWABLEST
Primary	306	GENERATED ASCE7-16 ALLOWABLEST
Primary	307	GENERATED ASCE7-16 ALLOWABLEST
Primary	308	GENERATED ASCE7-16 ALLOWABLEST
Primary	309	GENERATED ASCE7-16 ALLOWABLEST
Primary	310	GENERATED ASCE7-16 ALLOWABLEST
Primary	311	GENERATED ASCE7-16 ALLOWABLEST

Section Properties

Prop	Section	Area (in^2)	I_{yy} (in^4)	I_{zz} (in^4)	J (in^4)	Material
1	W12X26	7.650	17.300	204.000	0.300	STEEL_50_KS
2	W16X36	10.600	24.500	448.000	0.545	STEEL_50_KS
3	L25256	1.730	1.559	0.409	0.085	STEEL_36_KS
4	W16X31	9.130	12.400	375.000	0.461	STEEL_50_KS

Materials

Mat	Name	E (kip/in^2)	ν	Density (kip/in^3)	α (/°F)
1	STEEL	29E+3	0.300	0.000	6.5E -6
2	CONCRETE	3.15E+3	0.170	8.68e-05	5.5E -6
3	ALUMINUM	10E+3	0.330	9.8e-05	12.8E -6
4	STAINLESSSTEEL	28E+3	0.300	0.000	9.9E -6
5	STEEL_36_KSI	29E+3	0.300	0.000	6.5E -6
6	STEEL_50_KSI	29E+3	0.300	0.000	6.5E -6
7	STEEL_275_NMM2	29.7E+3	0.300	0.000	6.67E -6
8	STEEL_355_NMM2	29.7E+3	0.300	0.000	6.67E -6
9	Q235	29.9E+3	0.300	0.000	6.67E -6
10	Q345	29.9E+3	0.300	0.000	6.67E -6
11	Q355	29.9E+3	0.300	0.000	6.67E -6
12	Q390	29.9E+3	0.300	0.000	6.67E -6
13	Q420	29.9E+3	0.300	0.000	6.67E -6
14	Q460	29.9E+3	0.300	0.000	6.67E -6
15	TIMBER	1.5E+3	0.150	0.000	3E -6

Supports

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip˙ft/deg)	rY (kip˙ft/deg)	rZ (kip˙ft/deg)
1	Fixed	Fixed	Fixed	-	-	-
3	-	-	Fixed	-	-	-
4	Fixed	Fixed	Fixed	-	-	-
6	-	-	Fixed	-	-	-
7	Fixed	Fixed	Fixed	-	-	-
9	-	-	Fixed	-	-	-
10	Fixed	Fixed	Fixed	-	-	-
11	-	-	Fixed	-	-	-
12	Fixed	Fixed	Fixed	-	-	-
13	-	-	Fixed	-	-	-

Releases

Beam ends not shown in this table are fixed in all directions.

Beam	Node	x	y	z	rx	ry	rz
5	9	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
6	3	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
6	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
7	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
7	9	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
13	9	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
13	11	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
14	11	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
14	13	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
15	13	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
16	11	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
17	3	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
18	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
19	14	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
19	15	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Primary Load Cases

Number	Name	Type
1	DEAD LOAD	Dead
2	ROOF LIVE LOAD	Roof Live
3	SNOW LOAD	Snow
4	WIND 1	Wind
5	WIND 2	Wind
6	SEISMIC - H	Seismic-H
8	SEISMIC - V	Seismic-V
100	GENERATED ASCE7-16 ALLOWABLEST	None
101	GENERATED ASCE7-16 ALLOWABLEST	None
102	GENERATED ASCE7-16 ALLOWABLEST	None
103	GENERATED ASCE7-16 ALLOWABLEST	None
104	GENERATED ASCE7-16 ALLOWABLEST	None
105	GENERATED ASCE7-16 ALLOWABLEST	None
106	GENERATED ASCE7-16 ALLOWABLEST	None
107	GENERATED ASCE7-16 ALLOWABLEST	None
108	GENERATED ASCE7-16 ALLOWABLEST	None
109	GENERATED ASCE7-16 ALLOWABLEST	None
110	GENERATED ASCE7-16 ALLOWABLEST	None
111	GENERATED ASCE7-16 ALLOWABLEST	None
112	GENERATED ASCE7-16 ALLOWABLEST	None
113	GENERATED ASCE7-16 ALLOWABLEST	None
114	GENERATED ASCE7-16 ALLOWABLEST	None
115	GENERATED ASCE7-16 ALLOWABLEST	None

Primary Load Cases Cont...

Number	Name	Type
116	GENERATED ASCE7-16 ALLOWABLEST	None
117	GENERATED ASCE7-16 ALLOWABLEST	None
118	GENERATED ASCE7-16 ALLOWABLEST	None
119	GENERATED ASCE7-16 ALLOWABLEST	None
120	GENERATED ASCE7-16 ALLOWABLEST	None
121	GENERATED ASCE7-16 ALLOWABLEST	None
122	GENERATED ASCE7-16 ALLOWABLEST	None
123	GENERATED ASCE7-16 ALLOWABLEST	None
124	GENERATED ASCE7-16 ALLOWABLEST	None
125	GENERATED ASCE7-16 ALLOWABLEST	None
126	GENERATED ASCE7-16 ALLOWABLEST	None
300	GENERATED ASCE7-16 ALLOWABLEST	None
301	GENERATED ASCE7-16 ALLOWABLEST	None
302	GENERATED ASCE7-16 ALLOWABLEST	None
303	GENERATED ASCE7-16 ALLOWABLEST	None
304	GENERATED ASCE7-16 ALLOWABLEST	None
305	GENERATED ASCE7-16 ALLOWABLEST	None
306	GENERATED ASCE7-16 ALLOWABLEST	None
307	GENERATED ASCE7-16 ALLOWABLEST	None
308	GENERATED ASCE7-16 ALLOWABLEST	None
309	GENERATED ASCE7-16 ALLOWABLEST	None
310	GENERATED ASCE7-16 ALLOWABLEST	None
311	GENERATED ASCE7-16 ALLOWABLEST	None

Combination Load Cases

There is no data of this type.

Load Generators

There is no data of this type.

1 DEAD LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-510.000	-	-	-	-
7	UNI	lbf/ft	GY	-510.000	-	-	-	-
13	UNI	lbf/ft	GY	-510.000	-	-	-	-
14	UNI	lbf/ft	GY	-510.000	-	-	-	-

1 DEAD LOAD : Selfweight

Direction	Factor	Assigned Geometry
Y	-1.000	ALL

2 ROOF LIVE LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-410.000	-	-	-	-
7	UNI	lbf/ft	GY	-410.000	-	-	-	-
13	UNI	lbf/ft	GY	-410.000	-	-	-	-
14	UNI	lbf/ft	GY	-410.000	-	-	-	-

3 SNOW LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-840.000	-	-	-	-
7	UNI	lbf/ft	GY	-840.000	-	-	-	-
13	UNI	lbf/ft	GY	-840.000	-	-	-	-
14	UNI	lbf/ft	GY	-840.000	-	-	-	-

4 WIND 1 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GX	60.000	-	-	-	-
7	UNI	lbf/ft	GX	60.000	-	-	-	-
13	UNI	lbf/ft	GX	60.000	-	-	-	-
14	UNI	lbf/ft	GX	60.000	-	-	-	-

5 WIND 2 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GX	-60.000	-	-	-	-
7	UNI	lbf/ft	GX	-60.000	-	-	-	-
13	UNI	lbf/ft	GX	-60.000	-	-	-	-
14	UNI	lbf/ft	GX	-60.000	-	-	-	-

6 SEISMIC - H : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GX	180.000	-	-	-	-
7	UNI	lbf/ft	GX	180.000	-	-	-	-
13	UNI	lbf/ft	GX	180.000	-	-	-	-
14	UNI	lbf/ft	GX	180.000	-	-	-	-

8 SEISMIC - V : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-90.000	-	-	-	-
7	UNI	lbf/ft	GY	-90.000	-	-	-	-
13	UNI	lbf/ft	GY	-90.000	-	-	-	-
14	UNI	lbf/ft	GY	-90.000	-	-	-	-

100 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 1 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000

101 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 2 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	1.000

102 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 3 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	1.000

103 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 4 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750

104 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 5 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750

105 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 6 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
4	WIND 1	0.600

106 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 7 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
5	WIND 2	0.600

107 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 8 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750
4	WIND 1	0.750

108 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 9 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750
5	WIND 2	0.750

109 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 10 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
4	WIND 1	0.750

110 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 11 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
5	WIND 2	0.750

111 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 12 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
4	WIND 1	0.750

112 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 13 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
5	WIND 2	0.750

113 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 14 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
4	WIND 1	0.600

114 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 15 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
5	WIND 2	0.600

115 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 16 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	0.910
8	SEISMIC - V	0.700

116 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 17 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-0.910
8	SEISMIC - V	0.700

117 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 18 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	0.910
8	SEISMIC - V	-0.700

118 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 19 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-0.910
8	SEISMIC - V	-0.700

119 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 20 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	0.683
8	SEISMIC - V	0.525

120 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 21 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-0.683
8	SEISMIC - V	0.525

121 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 22 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	0.683
8	SEISMIC - V	-0.525

122 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 23 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-0.683
8	SEISMIC - V	-0.525

123 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 24 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	0.910
8	SEISMIC - V	-0.700

124 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 25 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-0.910
8	SEISMIC - V	-0.700

125 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 26 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	0.910
8	SEISMIC - V	0.700

126 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 27 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-0.910
8	SEISMIC - V	0.700

300 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 28 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	2.100
8	SEISMIC - V	0.700

301 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 29 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-2.100
8	SEISMIC - V	0.700

302 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 30 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	2.100
8	SEISMIC - V	-0.700

303 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 31 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-2.100
8	SEISMIC - V	-0.700

304 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 32 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	1.580
8	SEISMIC - V	0.525

305 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 33 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-1.580
8	SEISMIC - V	0.525

306 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 34 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	1.580
8	SEISMIC - V	-0.525

307 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 35 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-1.580
8	SEISMIC - V	-0.525

308 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 36 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	2.100
8	SEISMIC - V	-0.700

309 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 37 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-2.100
8	SEISMIC - V	-0.700

310 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 38 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	2.100
8	SEISMIC - V	0.700

311 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 39 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-2.100
8	SEISMIC - V	0.700

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	13	300:GENERAT	**0.537**	-0.008	0	0.537	0	0	0.001
Min X	13	301:GENERAT	**-0.547**	-0.008	0	0.548	0	0	0.002
Max Y	14	308:GENERAT	0.259	**0.010**	0	0.259	0	0	-0.002
Min Y	6	304:GENERAT	0.401	**-0.058**	0	0.405	0	0	-0.001
Max Z	1	1:DEAD LOAD	0	0	**0**	0	0	0	-0.000
Min Z	1	1:DEAD LOAD	0	0	**0**	0	0	0	-0.000
Max rX	1	1:DEAD LOAD	0	0	0	0	**0**	0	-0.000
Min rX	1	1:DEAD LOAD	0	0	0	0	**0**	0	-0.000
Max rY	1	1:DEAD LOAD	0	0	0	0	0	**0**	-0.000
Min rY	1	1:DEAD LOAD	0	0	0	0	0	**0**	-0.000
Max rZ	13	305:GENERAT	-0.415	-0.015	0	0.415	0	0	**0.003**
Min rZ	3	304:GENERAT	0.403	-0.007	0	0.403	0	0	**-0.003**
Max Rst	13	301:GENERAT	-0.547	-0.008	0	**0.548**	0	0	0.002

Beam Displacement Detail Summary

Displacements shown in italic indicate the presence of an offset

	Beam	L/C	d (ft)	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	14	300:GENERAT	18.750	**0.537**	-0.008	0	0.537
Min X	14	301:GENERAT	18.750	**-0.547**	-0.008	0	0.548
Max Y	1	308:GENERAT	12.000	0.259	**0.010**	0	0.259
Min Y	7	101:GENERAT	10.250	0.029	**-0.452**	0	0.453
Max Z	1	1:DEAD LOAD	0	0	0	**0**	0
Min Z	1	1:DEAD LOAD	0	0	0	**0**	0
Max Rst	7	304:GENERAT	10.250	0.406	-0.412	0	**0.578**

Beam End Displacement Summary

Displacements shown in italic indicate the presence of an offset

	Beam	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	14	13	300:GENERAT	**0.537**	-0.008	0	0.537
Min X	14	13	301:GENERAT	**-0.547**	-0.008	0	0.548
Max Y	1	14	308:GENERAT	0.259	**0.010**	0	0.259
Min Y	6	6	304:GENERAT	0.401	**-0.058**	0	0.405
Max Z	1	1	1:DEAD LOAD	0	0	**0**	0
Min Z	1	1	1:DEAD LOAD	0	0	**0**	0
Max Rst	14	13	301:GENERAT	-0.547	-0.008	0	**0.548**

Beam End Force Summary

The signs of the forces at end B of each beam have been reversed. For example: this means that the Min Fx entry gives the largest tension value for an beam.

				Axial	Shear		Torsion	Bending	
	Beam	Node	L/C	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip¨in)	My (kip¨in)	Mz (kip¨in)
Max Fx	3	4	304:GENERAT	**52.143**	0	0.006	0	-0.000	0
Min Fx	21	14	303:GENERAT	**-33.694**	-0.056	-0	-0	-0	-0
Max Fy	7	6	101:GENERAT	0.009	**14.210**	0	0	0	8.936
Min Fy	7	9	101:GENERAT	0.009	**-14.203**	-0	-0	-0	8.071
Max Fz	3	4	310:GENERAT	44.137	0	**0.007**	0	0.000	0
Min Fz	18	15	300:GENERAT	30.275	0	**-0.018**	0	2.399	0
Max Mx	1	1	1:DEAD LOAD	6.197	-0.004	0	**0**	0	0.000
Min Mx	1	1	1:DEAD LOAD	6.197	-0.004	0	**0**	0	0.000
Max My	18	15	300:GENERAT	30.275	0	-0.018	0	**2.399**	0
Min My	18	15	309:GENERAT	5.424	0	0.007	0	**-0.787**	0
Max Mz	7	6	101:GENERAT	0.009	14.210	0	0	0	**8.936**
Min Mz	17	14	309:GENERAT	20.523	-0.142	0	0	0	**-18.187**

Beam Force Detail Summary

Sign convention as diagrams:- positive above line, negative below line except Fx where positive is compression. Distance d is given from beam end A.

				Axial	Shear		Torsion	Bending	
	Beam	**L/C**	**d** (ft)	**Fx** (kip)	**Fy** (kip)	**Fz** (kip)	**Mx** (kip-in)	**My** (kip-in)	**Mz** (kip-in)
Max Fx	3	304:GENERAT	0	**52.143**	0	0.006	0	-0.000	0
Min Fx	21	303:GENERAT	22.472	**-33.694**	-0.056	-0	-0	-0	-0
Max Fy	7	101:GENERAT	0	0.009	**14.210**	0	0	0	8.936
Min Fy	7	101:GENERAT	20.500	0.009	**-14.203**	-0	-0	-0	8.071
Max Fz	3	310:GENERAT	0	44.137	0	**0.007**	0	0.000	0
Min Fz	18	300:GENERAT	0	30.275	0	**-0.018**	0	2.399	0
Max Mx	1	1:DEAD LOAD	0	6.197	-0.004	0	**0**	0	0.000
Min Mx	1	1:DEAD LOAD	0	6.197	-0.004	0	**0**	0	0.000
Max My	18	300:GENERAT	0	30.275	0	-0.018	0	**2.399**	0
Min My	18	309:GENERAT	0	5.424	0	0.007	0	**-0.787**	0
Max Mz	7	101:GENERAT	0	0.009	14.210	0	0	0	**8.936**
Min Mz	7	101:GENERAT	10.250	0.009	0.004	0	0	0	**-865.195**

Reaction Summary

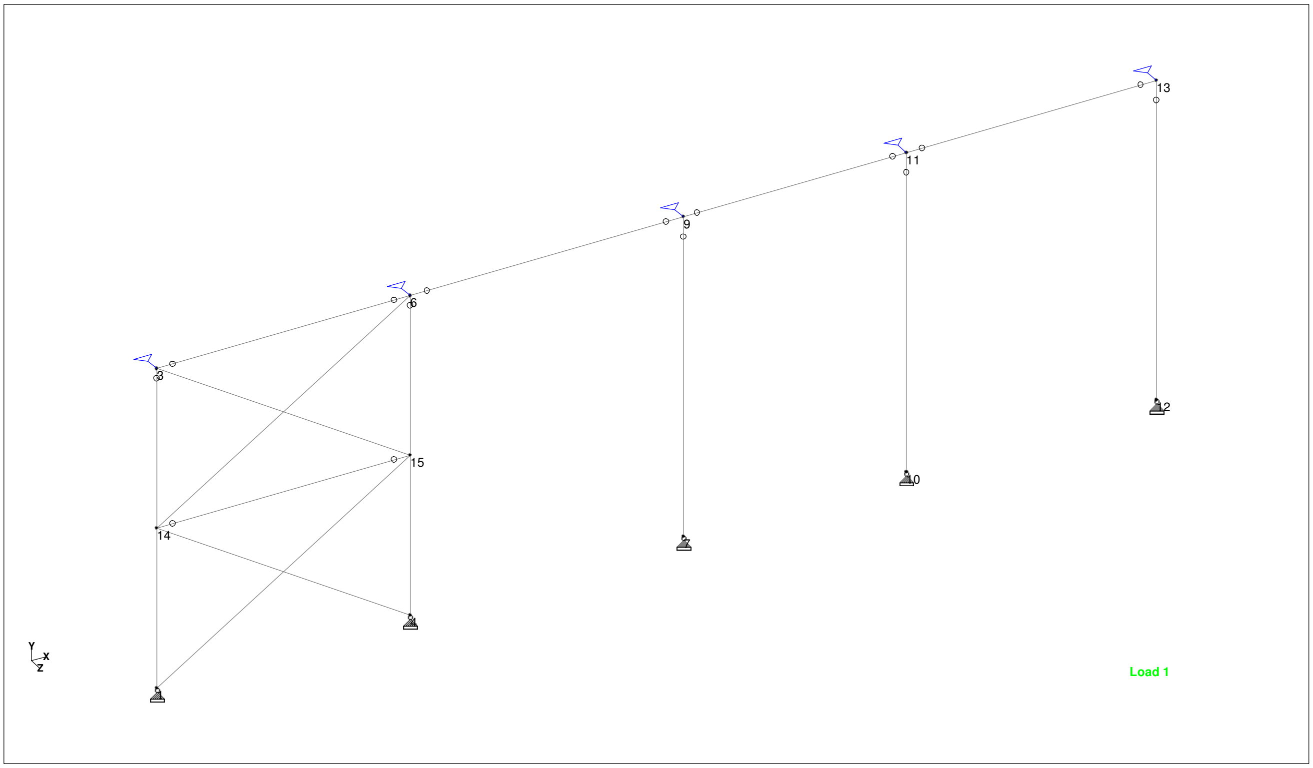
			Horizontal	Vertical	Horizontal	Moment		
	Node	**L/C**	**FX** (kip)	**FY** (kip)	**FZ** (kip)	**MX** (kip-in)	**MY** (kip-in)	**MZ** (kip-in)
Max FX	4	309:GENERAT	**28.462**	-29.918	0	0	0	0
Min FX	1	308:GENERAT	**-28.351**	-32.643	0	0	0	0
Max FY	4	304:GENERAT	0.006	**52.209**	0	0	0	0
Min FY	1	308:GENERAT	-28.351	**-32.643**	0	0	0	0
Max FZ	1	1:DEAD LOAD	0.004	6.263	**0**	0	0	0
Min FZ	1	1:DEAD LOAD	0.004	6.263	**0**	0	0	0
Max MX	1	1:DEAD LOAD	0.004	6.263	0	**0**	0	0
Min MX	1	1:DEAD LOAD	0.004	6.263	0	**0**	0	0
Max MY	1	1:DEAD LOAD	0.004	6.263	0	0	**0**	0
Min MY	1	1:DEAD LOAD	0.004	6.263	0	0	**0**	0
Max MZ	1	1:DEAD LOAD	0.004	6.263	0	0	0	**0**
Min MZ	1	1:DEAD LOAD	0.004	6.263	0	0	0	**0**

Utilization Ratio

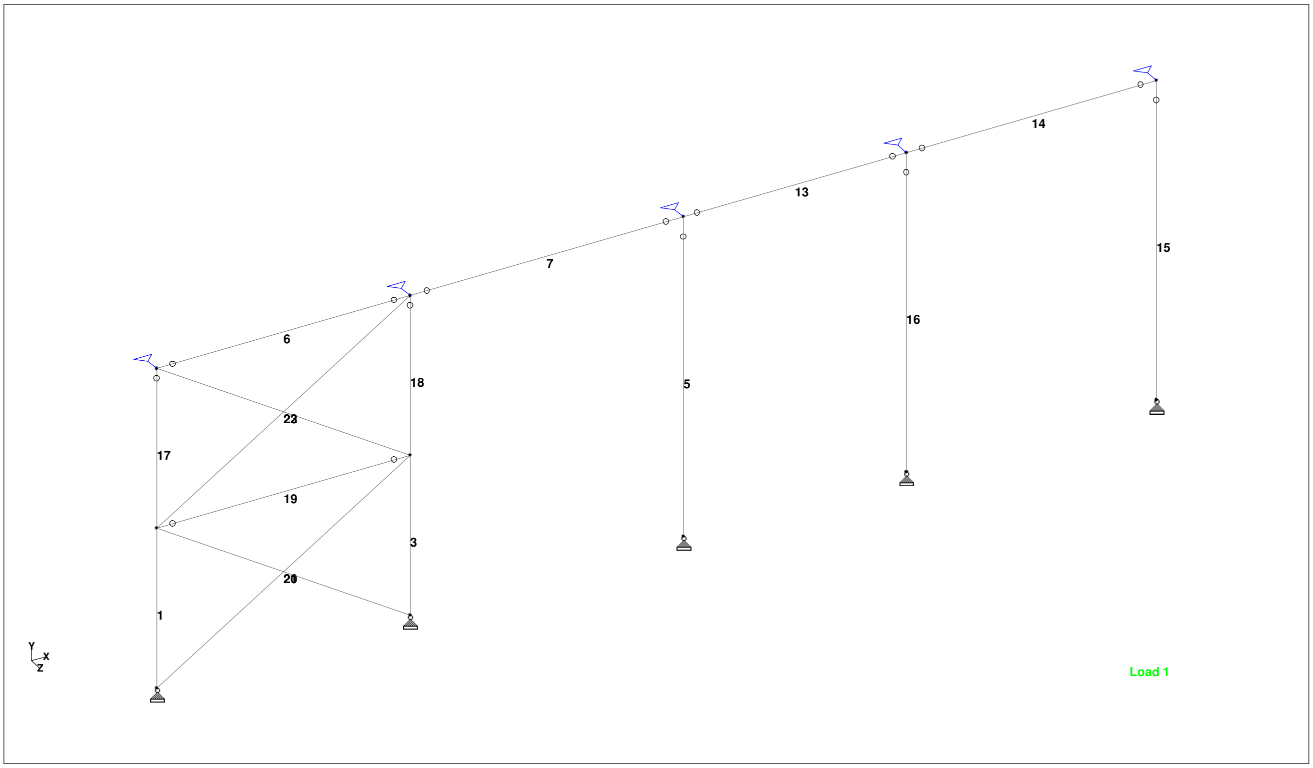
Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
1	W12X26	W12X26	0.638	1.000	0.638	Eq.H1-1a	301	7.650	204.000	17.300	0.300
3	W12X26	W12X26	0.446	1.000	0.446	Eq.H1-1a	304	7.650	204.000	17.300	0.300
5	W12X26	W12X26	0.842	1.000	0.842	Cl.E3	101	7.650	204.000	17.300	0.300
6	W16X31	W16X31	0.859	1.000	0.859	Eq.H1-3b	301	9.130	375.000	12.400	0.461
7	W16X36	W16X36	0.458	1.000	0.458	Eq.H1-3b	305	10.600	448.000	24.500	0.545
13	W16X31	W16X31	0.359	1.000	0.359	Eq.H1-1a	301	9.130	375.000	12.400	0.461
14	W16X31	W16X31	0.447	1.000	0.447	Eq.H1-3a(H1-	101	9.130	375.000	12.400	0.461
15	W12X26	W12X26	0.192	1.000	0.192	Cl.E3	101	7.650	204.000	17.300	0.300
16	W12X26	W12X26	0.802	1.000	0.802	Cl.E3	101	7.650	204.000	17.300	0.300
17	W12X26	W12X26	0.389	1.000	0.389	Eq.H1-1a	305	7.650	204.000	17.300	0.300
18	W12X26	W12X26	0.331	1.000	0.331	Eq.H1-1a	304	7.650	204.000	17.300	0.300
19	W12X26	W12X26	0.592	1.000	0.592	Eq.H1-1a	300	7.650	204.000	17.300	0.300
20	L25256	L25256	0.390	1.000	0.390	Cl.D2	115	1.730	0.400	1.568	0.081
21	L25256	L25256	0.392	1.000	0.392	Cl.D2	118	1.730	0.400	1.568	0.081
22	L25256	L25256	0.391	1.000	0.391	Cl.D2	115	1.730	0.400	1.568	0.081
23	L25256	L25256	0.388	1.000	0.388	Cl.D2	118	1.730	0.400	1.568	0.081

Failed Members

There is no data of this type.



Whole Structure - Node Lables



Whole Structure - Member Labels

221205 - Coastal Pacific Distribution Facility - Frame Analysis Along Gridline P And Between Gridlines 5 & 6

The STAAD model is developed for frame along Frame Analysis Along Gridline P Between Gridlines 5 & 6

Design Loads

$DL_{roof} := 10\ psf$ Roof Dead Load

$DL_{mech} := 15\ psf$ Mechanical Dead Load

$LL_{roof} := 20\ psf$ Roof Live Load

$SL_{roof} := 20\ psf$ Snow Load

$SL_{roof\_drift} := 75\ psf$ Snow Load

$DL_{wall} := 10\ psf$ Curtain Wall Dead Load

$WL_{wind\_lee} := 20\ psf$ Wind Pressure From Attached Wind Analysis (Windward + Leeward)

$S_{DS} := 0.848$ Short period spectral acceleration

$C_s := 0.2636$ Seismic Response Coefficient (from attached analysis)

Frame Loads Along Gridline P and Between Gridlines 5 & 6

$DL_{P\_roof} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 4.5\ ft \cdot 0.5\right) = 0.06\ klf$ Frame Roof Dead Load (UDL)

$LL_{P\_roof} := \left(LL_{roof} \cdot 4.5\ ft \cdot 0.5\right) = 0.05\ klf$ Frame Roof Live Load (UDL)

$SL_{6\_roof} := \left(SL_{roof} \cdot 4.5\ ft \cdot 0.5\right) = 0.05\ klf$ Frame Roof Snow Load (UDL)

$WL_{P\_roof} := \dfrac{WL_{wind\_lee} \cdot (77.5\ ft \cdot 24\ ft) \cdot 0.25}{40.5\ ft} = 0.23\ klf$ Frame Wind Load (UDL) EW Direction

$DL_{P\_seis\_roof} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 77.5\ ft \cdot 40.5\ ft\right) = 78.47\ kip$ Seismic Roof Dead Load (Mass) For Frame

$DL_{P\_seis\_wall} := \left(DL_{wall} \cdot \left((77.5\ ft + 40.5\ ft) \cdot 2\right) \cdot 24\ ft \cdot 0.5\right) = 28.32\ kip$ Seismic Wall Dead Load (Mass) For Frame

$DL_{P\_seis\_tot} := DL_{P\_seis\_roof} + DL_{P\_seis\_wall} = 106.79\ kip$ Total Seismic Weight

$EQ_{TL\_H} := \dfrac{\left(DL_{P\_seis\_roof} + DL_{P\_seis\_wall}\right) \cdot C_s}{2 \cdot 40.5\ ft} = 0.35\ klf$ Seismic load on frame

$EQ_{TL\_V} := 0.2 \cdot S_{DS} \cdot \left(DL_{P\_roof}\right) = 0.01\ klf$ Seismic load on frame

<u>Column Loads</u>

Column Load at P/5

$C_{DL\_P\_5} := \left(DL_{roof} + DL_{mech}\right) \cdot (20.6\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) = 5.21\ kip$

$C_{LL\_P\_5} := \left(LL_{roof}\right) \cdot (20.6\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) = 4.17\ kip$

$C_{SL\_P\_5} := \left(SL_{roof}\right) \cdot (20.6\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) = 4.17\ kip$

Column Load at P/7

$C_{DL\_P\_7} := \left(DL_{roof} + DL_{mech}\right) \cdot (18.75\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) = 4.75\ kip$

$C_{LL\_P\_7} := \left(LL_{roof}\right) \cdot (18.75\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) = 3.8\ kip$

$C_{SL\_P\_7} := \left(SL_{roof}\right) \cdot (18.75\ ft \cdot 0.5) \cdot (40.5\ ft \cdot 0.5) + \left(0.5 \cdot 18\ ft \cdot SL_{roof\_drift}\right) \cdot (18.75\ ft \cdot 0.5) = 10.13\ kip$

Job Information

	Engineer	Checked	Approved
Name:			
Date:	3/11/2024		

Project ID	
Project Name	

Structure Type	SPACE FRAME

Number of Nodes	10	Highest Node	11
Number of Elements	17	Highest Beam	19

Number of Basic Load Cases	46
Number of Combination Load Cases	0

Included in this printout are data for:

All	The Whole Structure

Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	DEAD LOAD
Primary	2	ROOF LIVE LOAD
Primary	3	SNOW LOAD
Primary	4	WIND 1
Primary	5	WIND 2
Primary	6	SEISMIC - H
Primary	8	SEISMIC - V
Primary	100	GENERATED ASCE7-16 ALLOWABLEST
Primary	101	GENERATED ASCE7-16 ALLOWABLEST
Primary	102	GENERATED ASCE7-16 ALLOWABLEST
Primary	103	GENERATED ASCE7-16 ALLOWABLEST
Primary	104	GENERATED ASCE7-16 ALLOWABLEST
Primary	105	GENERATED ASCE7-16 ALLOWABLEST
Primary	106	GENERATED ASCE7-16 ALLOWABLEST
Primary	107	GENERATED ASCE7-16 ALLOWABLEST
Primary	108	GENERATED ASCE7-16 ALLOWABLEST
Primary	109	GENERATED ASCE7-16 ALLOWABLEST
Primary	110	GENERATED ASCE7-16 ALLOWABLEST
Primary	111	GENERATED ASCE7-16 ALLOWABLEST
Primary	112	GENERATED ASCE7-16 ALLOWABLEST
Primary	113	GENERATED ASCE7-16 ALLOWABLEST
Primary	114	GENERATED ASCE7-16 ALLOWABLEST
Primary	115	GENERATED ASCE7-16 ALLOWABLEST
Primary	116	GENERATED ASCE7-16 ALLOWABLEST
Primary	117	GENERATED ASCE7-16 ALLOWABLEST

Job Information Cont...

Type	L/C	Name
Primary	118	GENERATED ASCE7-16 ALLOWABLEST
Primary	119	GENERATED ASCE7-16 ALLOWABLEST
Primary	120	GENERATED ASCE7-16 ALLOWABLEST
Primary	121	GENERATED ASCE7-16 ALLOWABLEST
Primary	122	GENERATED ASCE7-16 ALLOWABLEST
Primary	123	GENERATED ASCE7-16 ALLOWABLEST
Primary	124	GENERATED ASCE7-16 ALLOWABLEST
Primary	125	GENERATED ASCE7-16 ALLOWABLEST
Primary	126	GENERATED ASCE7-16 ALLOWABLEST
Primary	300	GENERATED ASCE7-16 ALLOWABLEST
Primary	301	GENERATED ASCE7-16 ALLOWABLEST
Primary	302	GENERATED ASCE7-16 ALLOWABLEST
Primary	303	GENERATED ASCE7-16 ALLOWABLEST
Primary	304	GENERATED ASCE7-16 ALLOWABLEST
Primary	305	GENERATED ASCE7-16 ALLOWABLEST
Primary	306	GENERATED ASCE7-16 ALLOWABLEST
Primary	307	GENERATED ASCE7-16 ALLOWABLEST
Primary	308	GENERATED ASCE7-16 ALLOWABLEST
Primary	309	GENERATED ASCE7-16 ALLOWABLEST
Primary	310	GENERATED ASCE7-16 ALLOWABLEST
Primary	311	GENERATED ASCE7-16 ALLOWABLEST

Section Properties

Prop	Section	Area (in^2)	I_{yy} (in^4)	I_{zz} (in^4)	J (in^4)	Material
1	W12X26	7.650	17.300	204.000	0.300	STEEL_50_KS
2	L25255	1.460	1.353	0.347	0.050	STEEL_36_KS
3	W12X40	11.700	44.100	307.000	0.906	STEEL_50_KS

Materials

Mat	Name	E (kip/in^2)	ν	Density (kip/in^3)	α (/°F)
1	STEEL	29E+3	0.300	0.000	6.5E -6
2	CONCRETE	3.15E+3	0.170	8.68e-05	5.5E -6
3	ALUMINUM	10E+3	0.330	9.8e-05	12.8E -6
4	STAINLESSSTEEL	28E+3	0.300	0.000	9.9E -6
5	STEEL_36_KSI	29E+3	0.300	0.000	6.5E -6
6	STEEL_50_KSI	29E+3	0.300	0.000	6.5E -6
7	STEEL_275_NMM2	29.7E+3	0.300	0.000	6.67E -6
8	STEEL_355_NMM2	29.7E+3	0.300	0.000	6.67E -6
9	Q235	29.9E+3	0.300	0.000	6.67E -6
10	Q345	29.9E+3	0.300	0.000	6.67E -6
11	Q355	29.9E+3	0.300	0.000	6.67E -6
12	Q390	29.9E+3	0.300	0.000	6.67E -6
13	Q420	29.9E+3	0.300	0.000	6.67E -6
14	Q460	29.9E+3	0.300	0.000	6.67E -6
15	TIMBER	1.5E+3	0.150	0.000	3E -6

Supports

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip ft/deg)	rY (kip ft/deg)	rZ (kip ft/deg)
1	Fixed	Fixed	Fixed	-	-	-
2	-	-	Fixed	-	-	-
3	-	-	Fixed	-	-	-
4	Fixed	Fixed	Fixed	-	-	-
6	-	-	Fixed	-	-	-
7	Fixed	Fixed	Fixed	-	-	-
9	-	-	Fixed	-	-	-
10	-	-	Fixed	-	-	-

Releases

Beam ends not shown in this table are fixed in all directions.

Beam	Node	x	y	z	rx	ry	rz
5	9	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
6	3	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
6	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
7	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
7	9	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
8	2	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
8	5	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
13	3	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
14	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Releases Cont...

Beam	Node	x	y	z	rx	ry	rz
15	11	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Primary Load Cases

Number	Name	Type
1	DEAD LOAD	Dead
2	ROOF LIVE LOAD	Roof Live
3	SNOW LOAD	Snow
4	WIND 1	Wind
5	WIND 2	Wind
6	SEISMIC - H	Seismic-H
8	SEISMIC - V	Seismic-V
100	GENERATED ASCE7-16 ALLOWABLEST	None
101	GENERATED ASCE7-16 ALLOWABLEST	None
102	GENERATED ASCE7-16 ALLOWABLEST	None
103	GENERATED ASCE7-16 ALLOWABLEST	None
104	GENERATED ASCE7-16 ALLOWABLEST	None
105	GENERATED ASCE7-16 ALLOWABLEST	None
106	GENERATED ASCE7-16 ALLOWABLEST	None
107	GENERATED ASCE7-16 ALLOWABLEST	None
108	GENERATED ASCE7-16 ALLOWABLEST	None
109	GENERATED ASCE7-16 ALLOWABLEST	None
110	GENERATED ASCE7-16 ALLOWABLEST	None
111	GENERATED ASCE7-16 ALLOWABLEST	None
112	GENERATED ASCE7-16 ALLOWABLEST	None
113	GENERATED ASCE7-16 ALLOWABLEST	None
114	GENERATED ASCE7-16 ALLOWABLEST	None
115	GENERATED ASCE7-16 ALLOWABLEST	None
116	GENERATED ASCE7-16 ALLOWABLEST	None
117	GENERATED ASCE7-16 ALLOWABLEST	None
118	GENERATED ASCE7-16 ALLOWABLEST	None
119	GENERATED ASCE7-16 ALLOWABLEST	None
120	GENERATED ASCE7-16 ALLOWABLEST	None
121	GENERATED ASCE7-16 ALLOWABLEST	None
122	GENERATED ASCE7-16 ALLOWABLEST	None
123	GENERATED ASCE7-16 ALLOWABLEST	None
124	GENERATED ASCE7-16 ALLOWABLEST	None
125	GENERATED ASCE7-16 ALLOWABLEST	None
126	GENERATED ASCE7-16 ALLOWABLEST	None
300	GENERATED ASCE7-16 ALLOWABLEST	None
301	GENERATED ASCE7-16 ALLOWABLEST	None
302	GENERATED ASCE7-16 ALLOWABLEST	None
303	GENERATED ASCE7-16 ALLOWABLEST	None

Primary Load Cases Cont...

Number	Name	Type
304	GENERATED ASCE7-16 ALLOWABLEST	None
305	GENERATED ASCE7-16 ALLOWABLEST	None
306	GENERATED ASCE7-16 ALLOWABLEST	None
307	GENERATED ASCE7-16 ALLOWABLEST	None
308	GENERATED ASCE7-16 ALLOWABLEST	None
309	GENERATED ASCE7-16 ALLOWABLEST	None
310	GENERATED ASCE7-16 ALLOWABLEST	None
311	GENERATED ASCE7-16 ALLOWABLEST	None

Combination Load Cases

There is no data of this type.

Load Generators

There is no data of this type.

1 DEAD LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip`in)	MY (kip`in)	MZ (kip`in)
3	-	-5.500	-	-	-	-
9	-	-5.000	-	-	-	-

1 DEAD LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-60.000	-	-	-	-
7	UNI	lbf/ft	GY	-60.000	-	-	-	-

1 DEAD LOAD : Selfweight

Direction	Factor	Assigned Geometry
Y	-1.000	ALL

2 ROOF LIVE LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip`in)	MY (kip`in)	MZ (kip`in)
3	-	-4.500	-	-	-	-
9	-	-3.800	-	-	-	-

2 ROOF LIVE LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-50.000	-	-	-	-
7	UNI	lbf/ft	GY	-50.000	-	-	-	-

3 SNOW LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip in)	MY (kip in)	MZ (kip in)
3	-	-4.000	-	-	-	-
9	-	-9.750	-	-	-	-

3 SNOW LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-40.000	-	-	-	-
7	UNI	lbf/ft	GY	-40.000	-	-	-	-

4 WIND 1 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GX	230.000	-	-	-	-
7	UNI	lbf/ft	GX	230.000	-	-	-	-

5 WIND 2 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GX	-230.000	-	-	-	-
7	UNI	lbf/ft	GX	-230.000	-	-	-	-

6 SEISMIC - H : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GX	350.000	-	-	-	-
7	UNI	lbf/ft	GX	350.000	-	-	-	-

8 SEISMIC - V : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-10.000	-	-	-	-
7	UNI	lbf/ft	GY	-10.000	-	-	-	-

100 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 1 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000

101 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 2 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	1.000

102 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 3 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	1.000

103 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 4 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750

104 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 5 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750

105 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 6 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
4	WIND 1	0.600

106 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 7 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
5	WIND 2	0.600

107 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 8 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750
4	WIND 1	0.750

108 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 9 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750
5	WIND 2	0.750

109 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 10 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
4	WIND 1	0.750

110 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 11 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
5	WIND 2	0.750

111 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 12 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
4	WIND 1	0.750

112 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 13 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
5	WIND 2	0.750

113 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 14 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
4	WIND 1	0.600

114 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 15 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
5	WIND 2	0.600

115 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 16 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	0.910
8	SEISMIC - V	0.700

116 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 17 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-0.910
8	SEISMIC - V	0.700

117 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 18 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	0.910
8	SEISMIC - V	-0.700

118 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 19 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-0.910
8	SEISMIC - V	-0.700

119 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 20 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	0.683
8	SEISMIC - V	0.525

120 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 21 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-0.683
8	SEISMIC - V	0.525

121 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 22 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	0.683
8	SEISMIC - V	-0.525

122 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 23 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-0.683
8	SEISMIC - V	-0.525

123 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 24 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	0.910
8	SEISMIC - V	-0.700

124 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 25 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-0.910
8	SEISMIC - V	-0.700

125 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 26 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	0.910
8	SEISMIC - V	0.700

126 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 27 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-0.910
8	SEISMIC - V	0.700

300 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 28 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	2.100
8	SEISMIC - V	0.700

301 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 29 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-2.100
8	SEISMIC - V	0.700

302 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 30 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	2.100
8	SEISMIC - V	-0.700

303 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 31 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-2.100
8	SEISMIC - V	-0.700

304 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 32 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	1.580
8	SEISMIC - V	0.525

305 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 33 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-1.580
8	SEISMIC - V	0.525

306 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 34 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	1.580
8	SEISMIC - V	-0.525

307 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 35 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-1.580
8	SEISMIC - V	-0.525

308 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 36 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	2.100
8	SEISMIC - V	-0.700

309 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 37 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-2.100
8	SEISMIC - V	-0.700

310 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 38 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	2.100
8	SEISMIC - V	0.700

311 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 39 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-2.100
8	SEISMIC - V	0.700

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	9	310:GENERAT	**0.609**	-0.005	0	0.609	0	0	0.001
Min X	9	303:GENERAT	**-0.632**	-0.008	0	0.632	0	0	0.001
Max Y	11	309:GENERAT	-0.408	**0.013**	0	0.408	0	0	0.002
Min Y	3	301:GENERAT	-0.603	**-0.033**	0	0.604	0	0	0.002
Max Z	1	1:DEAD LOAD	0	0	**0**	0	0	0	0.000
Min Z	1	1:DEAD LOAD	0	0	**0**	0	0	0	0.000
Max rX	1	1:DEAD LOAD	0	0	0	0	**0**	0	0.000
Min rX	1	1:DEAD LOAD	0	0	0	0	**0**	0	0.000
Max rY	1	1:DEAD LOAD	0	0	0	0	0	**0**	0.000
Min rY	1	1:DEAD LOAD	0	0	0	0	0	**0**	0.000
Max rZ	10	303:GENERAT	-0.388	-0.027	0	0.389	0	0	**0.002**
Min rZ	11	310:GENERAT	0.384	-0.024	0	0.385	0	0	**-0.002**
Max Rst	9	303:GENERAT	-0.632	-0.008	0	**0.632**	0	0	0.001

Beam Displacement Detail Summary

Displacements shown in italic indicate the presence of an offset

	Beam	L/C	d (ft)	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	5	310:GENERAT	24.000	**0.609**	-0.005	0	0.609
Min X	5	303:GENERAT	24.000	**-0.632**	-0.008	0	0.632
Max Y	4	309:GENERAT	8.000	-0.408	**0.013**	0	0.408
Min Y	7	102:GENERAT	12.000	-0.006	**-0.178**	0	0.178
Max Z	1	1:DEAD LOAD	0	0	0	**0**	0
Min Z	1	1:DEAD LOAD	0	0	0	**0**	0
Max Rst	7	301:GENERAT	14.400	-0.628	-0.110	0	**0.637**

Beam End Displacement Summary

Displacements shown in italic indicate the presence of an offset

	Beam	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	5	9	310:GENERAT	**0.609**	-0.005	0	0.609
Min X	5	9	303:GENERAT	**-0.632**	-0.008	0	0.632
Max Y	4	11	309:GENERAT	-0.408	**0.013**	0	0.408
Min Y	6	3	301:GENERAT	-0.603	**-0.033**	0	0.604
Max Z	1	1	1:DEAD LOAD	0	0	**0**	0
Min Z	1	1	1:DEAD LOAD	0	0	**0**	0
Max Rst	5	9	303:GENERAT	-0.632	-0.008	0	**0.632**

Beam End Force Summary

The signs of the forces at end B of each beam have been reversed. For example: this means that the Min Fx entry gives the largest tension value for an beam.

				Axial	Shear		Torsion	Bending	
	Beam	Node	L/C	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip`in)	My (kip`in)	Mz (kip`in)
Max Fx	1	1	301:GENERAT	**55.540**	0.363	0	0	0	0.000
Min Fx	12	2	303:GENERAT	**-32.612**	-0.035	-0	-0	-0	-0
Max Fy	7	6	102:GENERAT	0.000	**1.635**	0	0	0	1.182
Min Fy	7	9	102:GENERAT	0.000	**-1.628**	-0	-0	-0	0.114
Max Fz	3	4	310:GENERAT	49.901	0	**0.052**	0	-0.000	0
Min Fz	4	5	300:GENERAT	34.509	0	**-0.084**	0	6.947	0
Max Mx	1	1	1:DEAD LOAD	7.615	-0.000	0	**0**	0	-0.000
Min Mx	1	1	1:DEAD LOAD	7.615	-0.000	0	**0**	0	-0.000
Max My	4	5	310:GENERAT	33.476	0	-0.084	0	**6.973**	0
Min My	4	5	303:GENERAT	-13.501	0	0.031	0	**-2.457**	0
Max Mz	2	2	310:GENERAT	-11.788	0.301	0	0	0	**12.905**
Min Mz	2	2	303:GENERAT	38.665	-0.368	0	0	0	**-37.460**

Beam Force Detail Summary

Sign convention as diagrams:- positive above line, negative below line except Fx where positive is compression. Distance d is given from beam end A.

				Axial	Shear		Torsion	Bending	
	Beam	L/C	d (ft)	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip`in)	My (kip`in)	Mz (kip`in)
Max Fx	1	301:GENERAT	0	**55.540**	0.363	0	0	0	0.000
Min Fx	12	303:GENERAT	16.125	**-32.612**	-0.035	-0	-0	-0	-0
Max Fy	7	102:GENERAT	0	0.000	**1.635**	0	0	0	1.182
Min Fy	7	102:GENERAT	24.000	0.000	**-1.628**	-0	-0	-0	0.114
Max Fz	3	310:GENERAT	0	49.901	0	**0.052**	0	-0.000	0
Min Fz	4	300:GENERAT	0	34.509	0	**-0.084**	0	6.947	0
Max Mx	1	1:DEAD LOAD	0	7.615	-0.000	0	**0**	0	-0.000
Min Mx	1	1:DEAD LOAD	0	7.615	-0.000	0	**0**	0	-0.000
Max My	4	310:GENERAT	0	33.476	0	-0.084	0	**6.973**	0

Beam Force Detail Summary Cont...

				Axial	Shear		Torsion	Bending	
	Beam	L/C	d (ft)	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip-in)	My (kip-in)	Mz (kip-in)
Min My	4	303:GENERAT	0	-13.501	0	0.031	0	**-2.457**	0
Max Mz	2	310:GENERAT	0	-11.788	0.301	0	0	0	**12.905**
Min Mz	7	102:GENERAT	12.000	0.000	0.004	0	0	0	**-116.838**

Reaction Summary

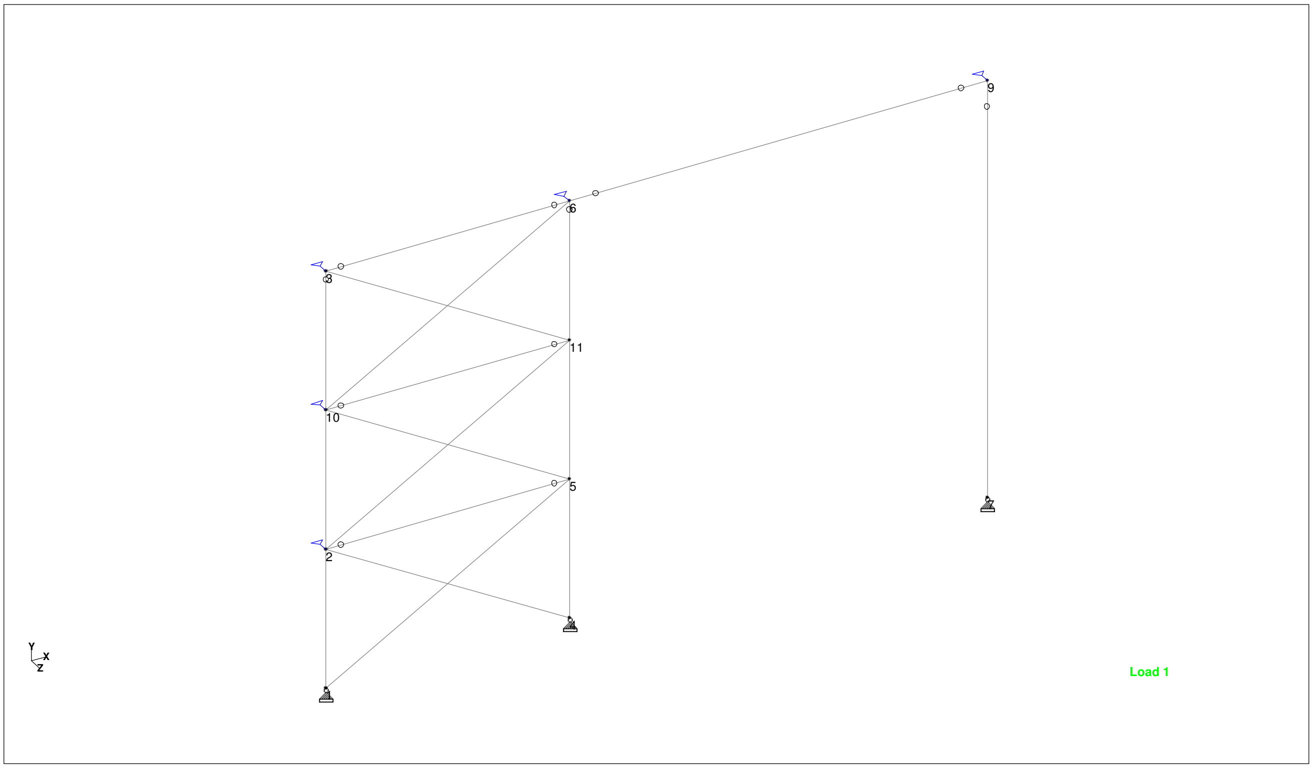
			Horizontal	Vertical	Horizontal	Moment		
	Node	L/C	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
Max FX	4	303:GENERAT	**28.293**	-44.810	0	0	0	0
Min FX	1	310:GENERAT	**-27.981**	-43.234	0	0	0	0
Max FY	1	301:GENERAT	-0.363	**55.580**	0	0	0	0
Min FY	4	309:GENERAT	28.290	**-46.089**	0	0	0	0
Max FZ	1	1:DEAD LOAD	0.000	7.655	**0**	0	0	0
Min FZ	1	1:DEAD LOAD	0.000	7.655	**0**	0	0	0
Max MX	1	1:DEAD LOAD	0.000	7.655	0	**0**	0	0
Min MX	1	1:DEAD LOAD	0.000	7.655	0	**0**	0	0
Max MY	1	1:DEAD LOAD	0.000	7.655	0	0	**0**	0
Min MY	1	1:DEAD LOAD	0.000	7.655	0	0	**0**	0
Max MZ	1	1:DEAD LOAD	0.000	7.655	0	0	0	**0**
Min MZ	1	1:DEAD LOAD	0.000	7.655	0	0	0	**0**

Utilization Ratio

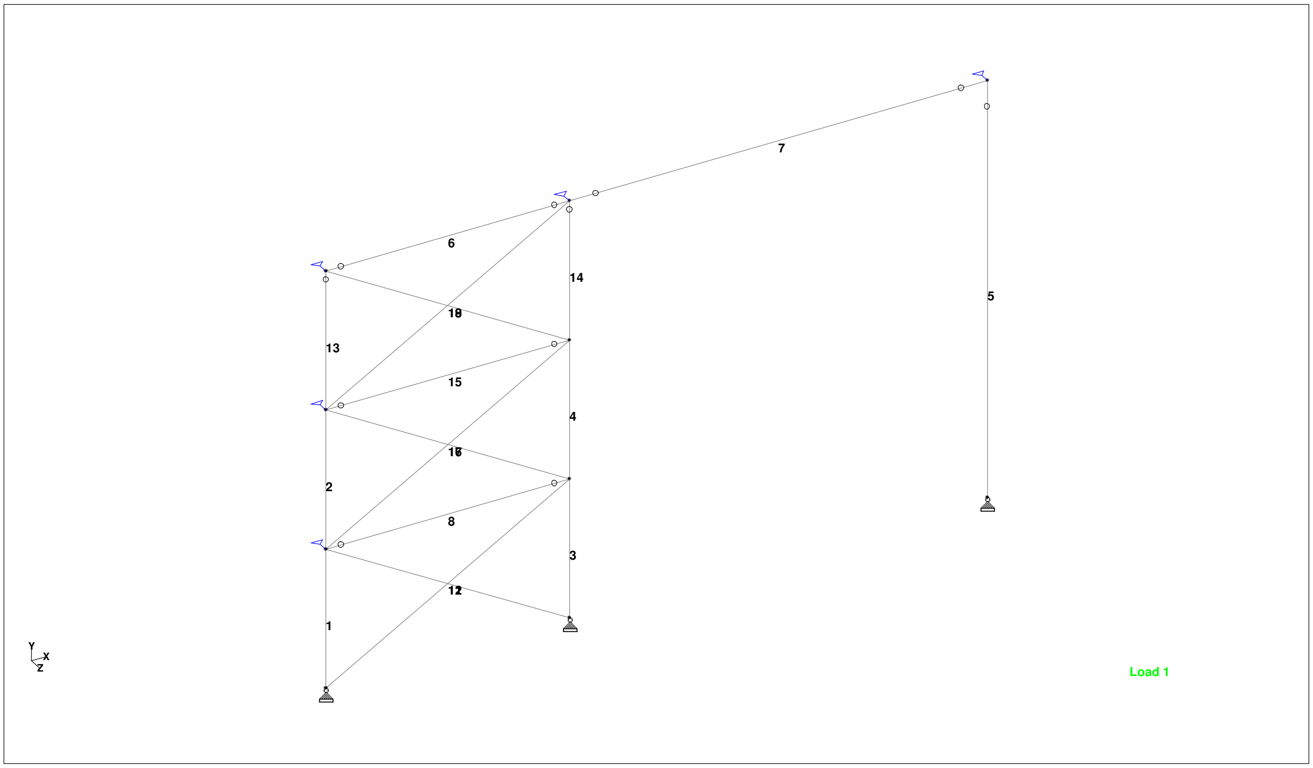
Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
1	W12X40	W12X40	0.200	1.000	0.200	Cl.E3	301	11.700	307.000	44.100	0.906
2	W12X40	W12X40	0.139	1.000	0.139	Cl.E3	301	11.700	307.000	44.100	0.906
3	W12X40	W12X40	0.184	1.000	0.184	Cl.E3	300	11.700	307.000	44.100	0.906
4	W12X40	W12X40	0.124	1.000	0.124	Cl.E3	300	11.700	307.000	44.100	0.906
5	W12X26	W12X26	0.538	1.000	0.538	Cl.E3	101	7.650	204.000	17.300	0.300
6	W12X26	W12X26	0.196	1.000	0.196	Cl.E3	309	7.650	204.000	17.300	0.300
7	W12X26	W12X26	0.128	1.000	0.128	Cl.F2.2	102	7.650	204.000	17.300	0.300
8	W12X26	W12X26	0.314	1.000	0.314	Eq.H1-1a	300	7.650	204.000	17.300	0.300
11	L25255	L25255	0.446	1.000	0.446	Cl.D2	115	1.460	0.338	1.362	0.048
12	L25255	L25255	0.450	1.000	0.450	Eq.H2-1	118	1.460	0.338	1.362	0.048
13	W12X40	W12X40	0.081	1.000	0.081	Cl.E3	301	11.700	307.000	44.100	0.906
14	W12X40	W12X40	0.065	1.000	0.065	Cl.E3	300	11.700	307.000	44.100	0.906
15	W12X26	W12X26	0.312	1.000	0.312	Eq.H1-1a	301	7.650	204.000	17.300	0.300
16	L25255	L25255	0.437	1.000	0.437	Cl.D2	116	1.460	0.338	1.362	0.048
17	L25255	L25255	0.437	1.000	0.437	Cl.D2	117	1.460	0.338	1.362	0.048
18	L25255	L25255	0.442	1.000	0.442	Cl.D2	118	1.460	0.338	1.362	0.048
19	L25255	L25255	0.446	1.000	0.446	Cl.D2	115	1.460	0.338	1.362	0.048

Failed Members

There is no data of this type.



Whole Structure - Node Labels (Input data was modified after picture taken)



Whole Structure - Member Labels (Input data was modified after picture taken)

AWB Engineers
Engineers/Architects
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Salisbury, MD 21801-7824
(410)-742-7299, Fax - (410) 742 - 0273

221205 - Coastal Pacific Distribution Facility - Frame Analysis Along Gridline 5 Between P & K.2

The STAAD model is developed for frames along gridline 5 Between P and K.2.

Design Loads

$DL_{roof} := 10\ psf$ Roof Dead Load

$DL_{mech} := 15\ psf$ Mechanical Dead Load

$LL_{roof} := 20\ psf$ Roof Live Load

$SL_{roof} := 20\ psf$ Snow Load

$SL_{roof\_drift} := 75\ psf$ Snow Drift Load

$DL_{wall} := 10\ psf$ Curtain Wall Dead Load

$WL_{wind\_lee} := 20\ psf$ Wind Pressure From Attached Wind Analysis (Windward + Leeward)

$S_{DS} := 0.848$ Short period spectral acceleration

$C_s := 0.2448$ Seismic Response Coefficient

Frame Loads

$DL_{6\_roof} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 40.5\ ft \cdot 0.5\right) = 0.51\ klf$ Frame Roof Dead Load (UDL)

$LL_{6\_roof} := \left(LL_{roof} \cdot 40.5\ ft \cdot 0.5\right) = 0.41\ klf$ Frame Roof Live Load (UDL)

$SL_{6\_roof} := \left(SL_{roof} \cdot 40.5\ ft \cdot 0.5\right) + \left(SL_{roof\_drift} \cdot 0.5 \cdot 18\ ft \cdot 0.7\right) = 0.88\ klf$ Frame Roof Snow Load (UDL)

$WL_{6\_roof} := \dfrac{WL_{wind\_lee} \cdot \left(24\ ft \cdot 40.5\ ft\right) \cdot 0.25}{77.5\ ft} = 0.06\ klf$ Frame Wind Load (UDL) EW Direction

$DL_{6\_seis\_roof} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 77.5\ ft \cdot 40.5\ ft\right) = 78.47\ kip$ Seismic Roof Dead Load (Mass) For Frame

$DL_{6\_seis\_wall} := \left(DL_{wall} \cdot \left(\left(77.5\ ft + 40.5\ ft\right) \cdot 2\right) \cdot 24\ ft \cdot 0.5\right) = 28.32\ kip$ Seismic Wall Dead Load (Mass) For Frame

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$DL_{6\_seis\_tot} := DL_{6\_seis\_roof} + DL_{6\_seis\_wall} = 106.79\ kip$ Total Seismic Weight

$EQ_{TL\_H} := \dfrac{\left(DL_{6\_seis\_tot}\right) \cdot C_s \cdot 2.5}{2 \cdot 77.5\ ft} = 0.42\ klf$ Horizontal Seismic load on frame

$EQ_{TL\_V} := 0.2 \cdot S_{DS} \cdot \left(DL_{6\_roof}\right) = 0.09\ klf$ Vertical Seismic load on frame

Project Title: 221205 - CPFD - Puyallup, WA
Engineer:
Project ID:
Project Descr:

ASCE 7-16 Seismic Base Shear

Project File: 221205 - Costal Pacific Distribution Facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Seismic Base Shear Analysis

Specific Description: Along 5 Between K.2 and P

Risk Category

Calculations per ASCE 7-16

Risk Category of Building or Other Structure : "II" : All Buildings and other structures except those listed as Category I, III, and IV — *ASCE 7-16, Page 4, Table 1.5-1*

Seismic Importance Factor = 1 — *ASCE 7-16, Page 5, Table 1.5-2*

Gridded Ss & S1values from ASCE 7-16

ASCE 7-16 11.4.2

Max. Ground Motions, 5% Damping :

S_S = 1.285 g, 0.2 sec response
S_1 = 0.4425 g, 1.0 sec response

Location : Puyallup, WA 98371
Latitude = 47.196 deg North
Longitude = 122.316 deg West

For the closest datapoint grid location . . .
Latitude = 47.200 deg North
Longitude = 122.310 deg West

Site Class, Site Coeff. and Design Category

Classification: "D" : Shear Wave Velocity 600 to 1,200 ft/sec		=	**D** (Based on Testing)	*ASCE 7-16 Table 20.3-1*
Site Coefficients Fa & Fv	Fa	=	1.00	*ASCE 7-16 Table 11.4-1 & 11.4-2*
(using straight-line interpolation from table value	Fv	=	2.77	
Maximum Considered Earthquake Acceleratio	S_{MS} = Fa * Ss	=	1.285	*ASCE 7-16 Eq. 11.4-1*
	S_{M1} = Fv * S1	=	1.226	*ASCE 7-16 Eq. 11.4-2*
Design Spectral Acceleration	S_{DS} = S_{MS} * 2/3	=	0.857	*ASCE 7-16 Eq. 11.4-3*
	S_{D1} = S_{M1} * 2/3	=	0.817	*ASCE 7-16 Eq. 11.4-4*
Seismic Design Category		=	**D**	*ASCE 7-16 Table 11.6-1 & -2*

Resisting System

ASCE 7-16 Table 12.2-1

Basic Seismic Force Resisting System . . . **Moment Resisting Frame Systems**
4.Steel ordinary moment frames

Response Modification Coefficient " R = 3.50
System Overstrength Factor " Wo " = 2.50
Deflection Amplification Factor " Cd " = 3.00

NOTE! See ASCE 7-16 for all applicable footnot

Building height Limits :

Category "A & B" Limit:	No Limit
Category "C" Limit:	No Limit
Category "D" Limit:	Not Permitted h
Category "E" Limit:	Not Permitted h
Category "F" Limit:	Not Permitted i

Lateral Force Procedure

ASCE 7-16 Section 12.8.2

Equivalent Lateral Force Procedure

The "Equivalent Lateral Force Procedure" is being used according to the provisions of ASCE 7-16 12.8

Determine Building Period

Use ASCE 12.8-7

Structure Type for Building Period CalculatiAll Other Structural Systems

" Ct " value = 0.020 " hn " : Height from base to highest level : 24.0 ft
" x " value = 0.75

" Ta " Approximate fundemental period using Eq. 12.8-7 : Ta = Ct * (hn ^ x) = 0.217 sec
"TL" : Long-period transition period per ASCE 7-16 Maps 22-14 -> 22-17 6.000 sec

Building Period " Ta " Calculated from Approximate Method select= 0.217

" Cs " Response Coefficient

ASCE 7-16 Section 12.8.1.1

S_{DS} : Short Period Design Spectral Response	=	0.857	From Eq. 12.8-2, Preliminary Cs	=	0.245
" R " : Response Modification Factor	=	3.50	From Eq. 12.8-3 & 12.8-4 , Cs need not exceed	=	1.077
" I " : Seismic Importance Factor	=	1	From Eq. 12.8-5 & 12.8-6, Cs not be less than	=	0.038

Cs : Seismic Response Coefficient = = **0.2448**

ASCE 7-16 Seismic Base Shear

DESCRIPTION: Seismic Base Shear Analysis

Seismic Base Shear

ASCE 7-16 Section 12.8.1

Cs = 0.2448 from 12.8.1.1

W (see Sum Wi below) = 107.00 k

Seismic Base Shear V = Cs * W = 26.19 k

Vertical Distribution of Seismic Forces

ASCE 7-16 Section 12.8.3

" k " : hx exponent based on Ta = 1.00

Table of building Weights by Floor Level...

Level #	Wi : Weight	Hi : Height	(Wi * Hi^k)	Cvx	Fx=Cvx * V	Sum Story Shear	Sum Story Moment
1	107.00	24.00	2,568.00	1.0000	26.19	26.19	0.00

Sum Wi = 107.00 k Sum Wi * Hi = 2,568.00 k-ft Total Base Shear = 26.19 k

Base Moment = 628.5 k-ft

Diaphragm Forces : Seismic Design Category "B" to "F"

ASCE 7-16 12.10.1.1

Level #	Wi	Fi	Sum Fi	Sum Wi	Fpx : Calcd	Fpx : Min	Fpx : Max	Fpx	Dsgn. Force
1	107.00	26.19	26.19	107.00	26.19	18.33	36.67	26.19	26.19

Wpx . . . . Weight at level of diaphragm and other structure elements attached to it.

Fi . . . . Design Lateral Force applied at the level.

Sum Fi . . . . Sum of "Lat. Force" of current level plus all levels above

MIN Req'd Force @ Level . . . $0.20 * S_{DS} * I * Wpx$

MAX Req'd Force @ Level . . $0.40 * S_{DS} * I * Wpx$

Fpx : Design Force @ Level . Wpx * SUM(x->n) Fi / SUM(x->n) wi, x = Current level, n = Top Level

Job Information

	Engineer	Checked	Approved
Name:			
Date:	3/11/2024		

Project ID	
Project Name	

Structure Type	SPACE FRAME

Number of Nodes	10	Highest Node	13
Number of Elements	9	Highest Beam	16

Number of Basic Load Cases	34
Number of Combination Load Cases	0

Included in this printout are data for:

All	The Whole Structure

Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	DEAD LOAD
Primary	2	ROOF LIVE LOAD
Primary	3	SNOW LOAD
Primary	4	WIND 1
Primary	5	WIND 2
Primary	6	SEISMIC - H
Primary	8	SEISMIC - V
Primary	100	GENERATED ASCE7-16 ALLOWABLEST
Primary	101	GENERATED ASCE7-16 ALLOWABLEST
Primary	102	GENERATED ASCE7-16 ALLOWABLEST
Primary	103	GENERATED ASCE7-16 ALLOWABLEST
Primary	104	GENERATED ASCE7-16 ALLOWABLEST
Primary	105	GENERATED ASCE7-16 ALLOWABLEST
Primary	106	GENERATED ASCE7-16 ALLOWABLEST
Primary	107	GENERATED ASCE7-16 ALLOWABLEST
Primary	108	GENERATED ASCE7-16 ALLOWABLEST
Primary	109	GENERATED ASCE7-16 ALLOWABLEST
Primary	110	GENERATED ASCE7-16 ALLOWABLEST
Primary	111	GENERATED ASCE7-16 ALLOWABLEST
Primary	112	GENERATED ASCE7-16 ALLOWABLEST
Primary	113	GENERATED ASCE7-16 ALLOWABLEST
Primary	114	GENERATED ASCE7-16 ALLOWABLEST
Primary	115	GENERATED ASCE7-16 ALLOWABLEST
Primary	116	GENERATED ASCE7-16 ALLOWABLEST
Primary	117	GENERATED ASCE7-16 ALLOWABLEST

Job Information Cont...

Type	L/C	Name
Primary	118	GENERATED ASCE7-16 ALLOWABLEST
Primary	119	GENERATED ASCE7-16 ALLOWABLEST
Primary	120	GENERATED ASCE7-16 ALLOWABLEST
Primary	121	GENERATED ASCE7-16 ALLOWABLEST
Primary	122	GENERATED ASCE7-16 ALLOWABLEST
Primary	123	GENERATED ASCE7-16 ALLOWABLEST
Primary	124	GENERATED ASCE7-16 ALLOWABLEST
Primary	125	GENERATED ASCE7-16 ALLOWABLEST
Primary	126	GENERATED ASCE7-16 ALLOWABLEST

Section Properties

Prop	Section	Area (in^2)	I_{yy} (in^4)	I_{zz} (in^4)	J (in^4)	Material
1	W12X26	7.650	17.300	204.000	0.300	STEEL_50_KS
2	W24X76	22.400	82.500	2.1E+3	2.680	STEEL_50_KS
3	W18X40	11.800	19.100	612.000	0.810	STEEL_50_KS
4	W18X86	25.300	175.000	1.53E+3	4.100	STEEL_50_KS

Materials

Mat	Name	E (kip/in^2)	ν	Density (kip/in^3)	α (/°F)
1	STEEL	29E+3	0.300	0.000	6.5E -6
2	CONCRETE	3.15E+3	0.170	8.68e-05	5.5E -6
3	ALUMINUM	10E+3	0.330	9.8e-05	12.8E -6
4	STAINLESSSTEEL	28E+3	0.300	0.000	9.9E -6
5	STEEL_36_KSI	29E+3	0.300	0.000	6.5E -6
6	STEEL_50_KSI	29E+3	0.300	0.000	6.5E -6
7	STEEL_275_NMM2	29.7E+3	0.300	0.000	6.67E -6
8	STEEL_355_NMM2	29.7E+3	0.300	0.000	6.67E -6
9	Q235	29.9E+3	0.300	0.000	6.67E -6
10	Q345	29.9E+3	0.300	0.000	6.67E -6
11	Q355	29.9E+3	0.300	0.000	6.67E -6
12	Q390	29.9E+3	0.300	0.000	6.67E -6
13	Q420	29.9E+3	0.300	0.000	6.67E -6
14	Q460	29.9E+3	0.300	0.000	6.67E -6
15	TIMBER	1.5E+3	0.150	0.000	3E -6

Supports

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip`ft/deg)	rY (kip`ft/deg)	rZ (kip`ft/deg)
1	Fixed	Fixed	Fixed	-	-	-
3	-	-	Fixed	-	-	-
4	Fixed	Fixed	Fixed	-	-	-
6	-	-	Fixed	-	-	-
7	Fixed	Fixed	Fixed	-	-	-
9	-	-	Fixed	-	-	-
10	Fixed	Fixed	Fixed	-	-	-
11	-	-	Fixed	-	-	-
12	Fixed	Fixed	Fixed	-	-	-
13	-	-	Fixed	-	-	-

Releases

There is no data of this type.

Primary Load Cases

Number	Name	Type
1	DEAD LOAD	Dead
2	ROOF LIVE LOAD	Roof Live
3	SNOW LOAD	Snow
4	WIND 1	Wind
5	WIND 2	Wind
6	SEISMIC - H	Seismic-H
8	SEISMIC - V	Seismic-V
100	GENERATED ASCE7-16 ALLOWABLEST	None
101	GENERATED ASCE7-16 ALLOWABLEST	None
102	GENERATED ASCE7-16 ALLOWABLEST	None
103	GENERATED ASCE7-16 ALLOWABLEST	None
104	GENERATED ASCE7-16 ALLOWABLEST	None
105	GENERATED ASCE7-16 ALLOWABLEST	None
106	GENERATED ASCE7-16 ALLOWABLEST	None
107	GENERATED ASCE7-16 ALLOWABLEST	None
108	GENERATED ASCE7-16 ALLOWABLEST	None
109	GENERATED ASCE7-16 ALLOWABLEST	None
110	GENERATED ASCE7-16 ALLOWABLEST	None
111	GENERATED ASCE7-16 ALLOWABLEST	None
112	GENERATED ASCE7-16 ALLOWABLEST	None
113	GENERATED ASCE7-16 ALLOWABLEST	None
114	GENERATED ASCE7-16 ALLOWABLEST	None
115	GENERATED ASCE7-16 ALLOWABLEST	None
116	GENERATED ASCE7-16 ALLOWABLEST	None

Primary Load Cases Cont...

Number	Name	Type
118	GENERATED ASCE7-16 ALLOWABLEST	None
119	GENERATED ASCE7-16 ALLOWABLEST	None
120	GENERATED ASCE7-16 ALLOWABLEST	None
121	GENERATED ASCE7-16 ALLOWABLEST	None
122	GENERATED ASCE7-16 ALLOWABLEST	None
123	GENERATED ASCE7-16 ALLOWABLEST	None
124	GENERATED ASCE7-16 ALLOWABLEST	None
125	GENERATED ASCE7-16 ALLOWABLEST	None
126	GENERATED ASCE7-16 ALLOWABLEST	None

Combination Load Cases

There is no data of this type.

Load Generators

There is no data of this type.

1 DEAD LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-510.000	-	-	-	-
7	UNI	lbf/ft	GY	-510.000	-	-	-	-
13	UNI	lbf/ft	GY	-510.000	-	-	-	-
14	UNI	lbf/ft	GY	-510.000	-	-	-	-

1 DEAD LOAD : Selfweight

Direction	Factor	Assigned Geometry
Y	-1.000	ALL

2 ROOF LIVE LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-410.000	-	-	-	-
7	UNI	lbf/ft	GY	-410.000	-	-	-	-
13	UNI	lbf/ft	GY	-410.000	-	-	-	-
14	UNI	lbf/ft	GY	-410.000	-	-	-	-

3 SNOW LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-360.000	-	-	-	-
7	UNI	lbf/ft	GY	-360.000	-	-	-	-
13	UNI	lbf/ft	GY	-360.000	-	-	-	-
14	UNI	lbf/ft	GY	-360.000	-	-	-	-

4 WIND 1 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GZ	-200.000	-	-	-	-
3	UNI	lbf/ft	GZ	-400.000	-	-	-	-
5	UNI	lbf/ft	GZ	-400.000	-	-	-	-
6	UNI	lbf/ft	GX	60.000	-	-	-	-
7	UNI	lbf/ft	GX	60.000	-	-	-	-
13	UNI	lbf/ft	GX	60.000	-	-	-	-
14	UNI	lbf/ft	GX	60.000	-	-	-	-
15	UNI	lbf/ft	GZ	-200.000	-	-	-	-
16	UNI	lbf/ft	GZ	-400.000	-	-	-	-

5 WIND 2 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GX	-60.000	-	-	-	-
7	UNI	lbf/ft	GX	-60.000	-	-	-	-
13	UNI	lbf/ft	GX	-60.000	-	-	-	-
14	UNI	lbf/ft	GX	-60.000	-	-	-	-

6 SEISMIC - H : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GX	450.000	-	-	-	-
7	UNI	lbf/ft	GX	450.000	-	-	-	-
13	UNI	lbf/ft	GX	450.000	-	-	-	-
14	UNI	lbf/ft	GX	450.000	-	-	-	-

8 SEISMIC - V : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-90.000	-	-	-	-
7	UNI	lbf/ft	GY	-90.000	-	-	-	-
13	UNI	lbf/ft	GY	-90.000	-	-	-	-
14	UNI	lbf/ft	GY	-90.000	-	-	-	-

100 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 1 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000

101 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 2 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	1.000

102 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 3 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	1.000

103 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 4 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750

104 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 5 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750

105 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 6 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
4	WIND 1	0.600

106 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 7 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
5	WIND 2	0.600

107 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 8 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750
4	WIND 1	0.750

108 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 9 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750
5	WIND 2	0.750

109 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 10 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
4	WIND 1	0.750

110 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 11 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
5	WIND 2	0.750

111 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 12 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
4	WIND 1	0.750

112 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 13 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
5	WIND 2	0.750

113 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 14 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
4	WIND 1	0.600

114 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 15 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
5	WIND 2	0.600

115 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 16 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	0.910
8	SEISMIC - V	0.700

116 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 17 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-0.910
8	SEISMIC - V	0.700

117 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 18 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	0.910
8	SEISMIC - V	-0.700

118 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 19 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-0.910
8	SEISMIC - V	-0.700

119 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 20 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	0.683
8	SEISMIC - V	0.525

120 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 21 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-0.683
8	SEISMIC - V	0.525

121 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 22 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	0.683
8	SEISMIC - V	-0.525

122 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 23 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-0.683
8	SEISMIC - V	-0.525

123 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 24 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	0.910
8	SEISMIC - V	-0.700

124 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 25 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-0.910
8	SEISMIC - V	-0.700

125 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 26 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	0.910
8	SEISMIC - V	0.700

126 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 27 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-0.910
8	SEISMIC - V	0.700

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	9	6:SEISMIC - H	**4.227**	-0.000	0	4.227	0	0	-0.001
Min X	9	116:GENERAT	**-4.020**	-0.009	0	4.020	0	0	0.001
Max Y	11	6:SEISMIC - H	4.224	**0.029**	0	4.224	0	0	0.003
Min Y	11	116:GENERAT	-4.017	**-0.041**	0	4.018	0	0	-0.003
Max Z	1	1:DEAD LOAD	0	0	**0**	0	0	0	0.000
Min Z	6	4:WIND 1	0.564	-0.003	**-0.000**	0.564	0.005	0.000	0.000
Max rX	13	4:WIND 1	0.563	-0.001	-0.000	0.563	**0.006**	-0.000	-0.001
Min rX	12	4:WIND 1	0	0	0	0	**-0.006**	-0.000	-0.003
Max rY	1	4:WIND 1	0	0	0	0	-0.003	**0.000**	-0.003
Min rY	12	4:WIND 1	0	0	0	0	-0.006	**-0.000**	-0.003
Max rZ	10	116:GENERAT	0	0	0	0	0	0	**0.031**
Min rZ	4	115:GENERAT	0	0	0	0	0	0	**-0.030**
Max Rst	9	6:SEISMIC - H	4.227	-0.000	0	**4.227**	0	0	-0.001

Beam Displacement Detail Summary

Displacements shown in italic indicate the presence of an offset

	Beam	L/C	d (ft)	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	16	6:SEISMIC - H	19.350	**4.322**	0.026	0	4.322
Min X	5	116:GENERAT	21.500	**-4.020**	-0.009	0	4.020
Max Y	14	6:SEISMIC - H	12.300	4.221	**0.335**	0	4.234
Min Y	6	115:GENERAT	9.800	4.060	**-0.418**	0	4.081
Max Z	1	1:DEAD LOAD	0	0	0	**0**	0
Min Z	15	4:WIND 1	10.750	0.335	-0.001	**-0.504**	0.606
Max Rst	16	6:SEISMIC - H	19.350	4.322	0.026	0	**4.322**

Beam End Displacement Summary

Displacements shown in italic indicate the presence of an offset

	Beam	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	5	9	6:SEISMIC - H	**4.227**	-0.000	0	4.227
Min X	5	9	116:GENERAT	**-4.020**	-0.009	0	4.020
Max Y	13	11	6:SEISMIC - H	4.224	**0.029**	0	4.224
Min Y	13	11	116:GENERAT	-4.017	**-0.041**	0	4.018
Max Z	1	1	1:DEAD LOAD	0	0	**0**	0
Min Z	1	1	1:DEAD LOAD	0	0	**0**	0
Max Rst	5	9	6:SEISMIC - H	4.227	-0.000	0	**4.227**

Beam End Force Summary

The signs of the forces at end B of each beam have been reversed. For example: this means that the Min Fx entry gives the largest tension value for an beam.

				Axial	Shear		Torsion	Bending	
	Beam	Node	L/C	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip·in)	My (kip·in)	Mz (kip·in)
Max Fx	16	10	116:GENERAT	**35.661**	0	-0.793	0	0.000	0
Min Fx	16	10	6:SEISMIC - H	**-24.543**	0	-1.122	0	-0.000	0
Max Fy	14	11	116:GENERAT	-8.712	**27.253**	0	0	0	739.386
Min Fy	14	13	115:GENERAT	17.490	**-27.458**	-0	-0	-0	4.7E+3
Max Fz	1	1	4:WIND 1	-1.955	1.935	**2.151**	0	-0.000	-0.000
Min Fz	15	13	4:WIND 1	2.903	2.434	**-2.151**	-0	-0.158	-630.488
Max Mx	7	6	107:GENERAT	0.654	7.743	-0.000	**0.003**	0.000	393.098
Min Mx	6	3	4:WIND 1	-1.935	-1.955	0.000	**-0.217**	0.000	-497.362
Max My	3	6	124:GENERAT	-10.044	-0	0.604	-0	**93.717**	-0
Min My	16	11	6:SEISMIC - H	-24.543	-0	-1.122	-0	**-123.725**	-0
Max Mz	14	13	6:SEISMIC - H	17.729	-21.830	-0	-0	-0	**4.72E+3**
Min Mz	15	13	6:SEISMIC - H	21.830	17.729	-0	-0	-0	**-4.72E+3**

Beam Force Detail Summary

Sign convention as diagrams:- positive above line, negative below line except Fx where positive is compression. Distance d is given from beam end A.

				Axial	Shear		Torsion	Bending	
	Beam	L/C	d (ft)	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip·in)	My (kip·in)	Mz (kip·in)
Max Fx	16	116:GENERAT	0	**35.661**	0	-0.793	0	0.000	0
Min Fx	16	6:SEISMIC - H	0	**-24.543**	0	-1.122	0	-0.000	0
Max Fy	14	116:GENERAT	0	-8.712	**27.253**	0	0	0	739.386
Min Fy	14	115:GENERAT	20.500	17.490	**-27.458**	-0	-0	-0	4.7E+3
Max Fz	1	4:WIND 1	0	-1.955	1.935	**2.151**	0	-0.000	-0.000
Min Fz	15	4:WIND 1	21.500	2.903	2.434	**-2.151**	-0	-0.158	-630.488
Max Mx	7	107:GENERAT	0	0.654	7.743	-0.000	**0.003**	0.000	393.098
Min Mx	6	4:WIND 1	0	-1.935	-1.955	0.000	**-0.217**	0.000	-497.362
Max My	15	4:WIND 1	10.750	2.903	2.434	-0.001	0	**140.060**	-315.437
Min My	16	6:SEISMIC - H	21.500	-24.543	-0	-1.122	-0	**-123.725**	-0
Max Mz	14	6:SEISMIC - H	20.500	17.729	-21.830	-0	-0	-0	**4.72E+3**
Min Mz	15	6:SEISMIC - H	21.500	21.830	17.729	-0	-0	-0	**-4.72E+3**

Reaction Summary

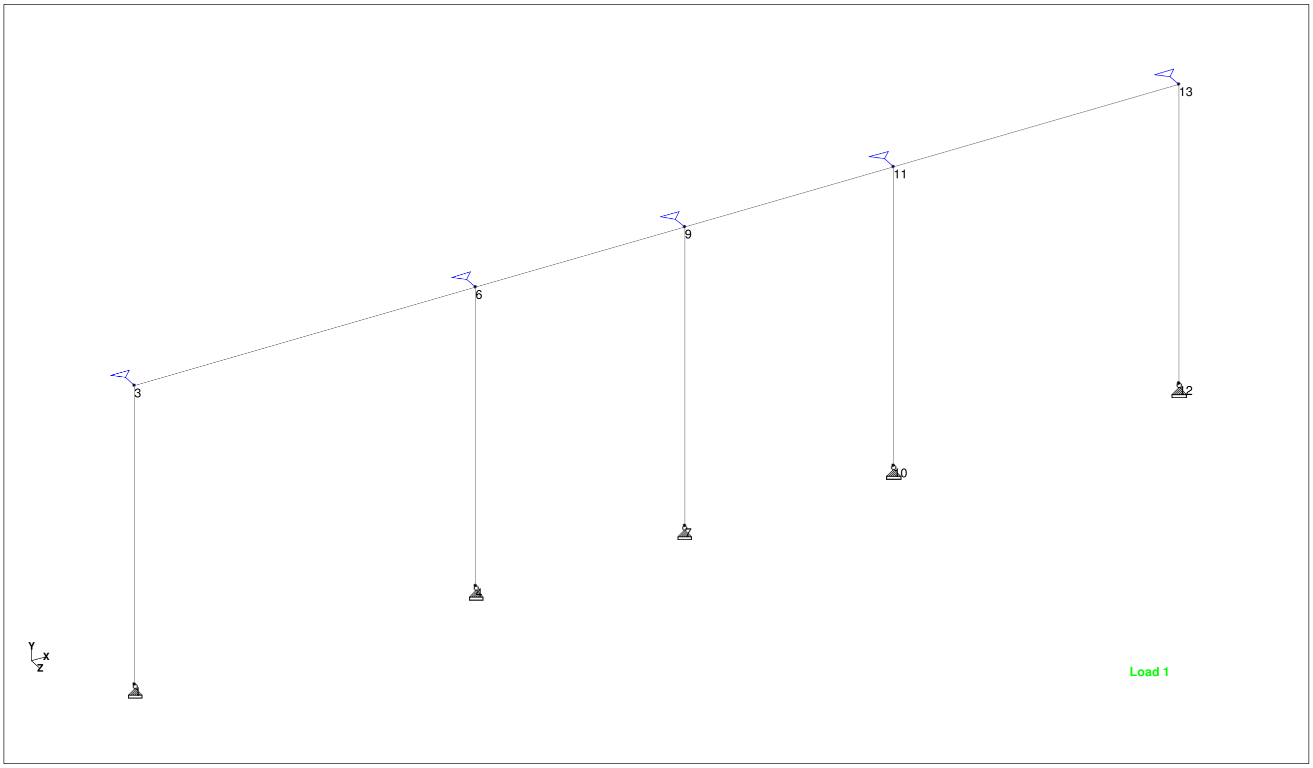
			Horizontal	Vertical	Horizontal	Moment		
	Node	L/C	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
Max FX	12	124:GENERAT	**17.148**	-16.180	0	0	0	0
Min FX	12	6:SEISMIC - H	**-17.729**	21.830	0	0	0	0
Max FY	10	116:GENERAT	-0.793	**35.661**	0	0	0	0
Min FY	10	6:SEISMIC - H	-1.122	**-24.543**	0	0	0	0
Max FZ	6	4:WIND 1	0	0	**4.301**	0	0	0
Min FZ	1	1:DEAD LOAD	0.679	8.867	**0**	0	0	0
Max MX	1	1:DEAD LOAD	0.679	8.867	0	**0**	0	0
Min MX	1	1:DEAD LOAD	0.679	8.867	0	**0**	0	0
Max MY	1	1:DEAD LOAD	0.679	8.867	0	0	**0**	0
Min MY	1	1:DEAD LOAD	0.679	8.867	0	0	**0**	0
Max MZ	1	1:DEAD LOAD	0.679	8.867	0	0	0	**0**
Min MZ	1	1:DEAD LOAD	0.679	8.867	0	0	0	**0**

Utilization Ratio

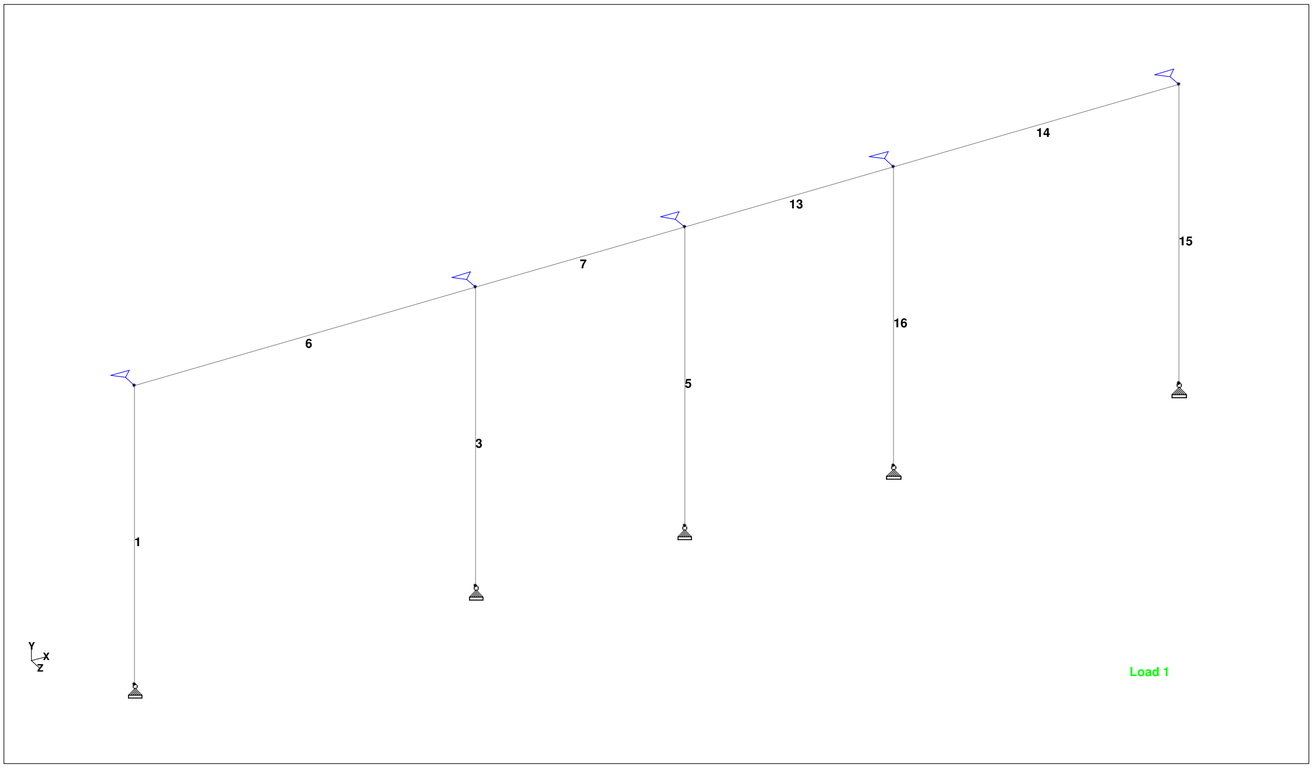
Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
1	W18X86	W18X86	0.883	1.000	0.883	Cl.F2.2	116	25.300	1.53E+3	175.000	4.100
3	W12X26	W12X26	0.574	1.000	0.574	Cl.F2.2	107	7.650	204.000	17.300	0.300
5	W12X26	W12X26	0.567	1.000	0.567	Cl.F2.2	107	7.650	204.000	17.300	0.300
6	W24X76	W24X76	0.639	1.000	0.639	Eq.H1-1b	116	22.400	2.1E+3	82.500	2.680
7	W18X40	W18X40	0.317	1.000	0.317	Eq.H1-1b	115	11.800	612.000	19.100	0.810
13	W18X40	W18X40	0.317	1.000	0.317	Eq.H1-1b	116	11.800	612.000	19.100	0.810
14	W24X76	W24X76	0.799	1.000	0.799	Eq.H1-1b	115	22.400	2.1E+3	82.500	2.680
15	W24X76	W24X76	0.814	1.000	0.814	Cl.F2.2	115	22.400	2.1E+3	82.500	2.680
16	W12X26	W12X26	0.569	1.000	0.569	Cl.F2.2	107	7.650	204.000	17.300	0.300

Failed Members

There is no data of this type.



Whole Structure - Node Labels



Whole Structure - Member Labels

AWB Engineers
Engineers/Architects
1942 Northwood Drive
Salisbury, MD 21801-7824
(410)-742-7299, Fax - (410) 742 - 0273

221205 - Coastal Pacific Distribution Facility - Frame Analysis Along Gridline 5.1

The STAAD model is developed for frames along gridline 5.1.

Design Loads

$DL_{roof} := 10\ psf$	Roof Dead Load
$DL_{mech} := 15\ psf$	Mechanical Dead Load
$LL_{roof} := 20\ psf$	Roof Live Load
$SL_{roof} := 20\ psf$	Snow Load
$DL_{wall} := 10\ psf$	Curtain Wall Dead Load
$WL_{wind\_lee} := 20\ psf$	Wind Pressure From Attached Wind Analysis (Windward + Leeward)
$S_{DS} := 0.848$	Short period spectral acceleration
$C_s := 0.2636$	Seismic Response Coefficient (from attached analysis)

Frame Loads

$DL_{5.1\_roof} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 40\ ft \cdot 0.5\right) = 0.5\ klf$	Frame Roof Dead Load (UDL)
$LL_{5.1\_roof} := \left(LL_{roof} \cdot 40\ ft \cdot 0.5\right) = 0.4\ klf$	Frame Roof Live Load (UDL)
$SL_{5.1\_roof} := \left(SL_{roof} \cdot 40\ ft \cdot 0.5\right) = 0.4\ klf$	Frame Roof Snow Load (UDL)
$WL_{6\_roof} := \dfrac{WL_{wind\_lee} \cdot \left(24\ ft \cdot 40\ ft\right) \cdot 0.25}{57.5\ ft} = 0.08\ klf$	Frame Wind Load (UDL) EW Direction
$DL_{5.1\_seis\_roof} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 57.5\ ft \cdot 40\ ft\right) = 57.5\ kip$	Seismic Roof Dead Load (Mass) For Frame
$DL_{5.1\_seis\_wall} := \left(DL_{wall} \cdot \left(\left(57.5\ ft + 40\ ft\right) \cdot 2\right) \cdot 24\ ft \cdot 0.5\right) = 23.4\ kip$	Seismic Wall Dead Load (Mass) For Frame
$DL_{5.1\_seis\_tot} := DL_{5.1\_seis\_roof} + DL_{5.1\_seis\_wall} = 80.9\ kip$	Total Seismic Weight

AWB Engineers
Engineers/Architects
1942 Northwood Drive
Salisbury, MD 21801-7824
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$$EQ_{TL\_H} := \frac{\left(DL_{5.1\_seis\_tot}\right) \cdot C_s}{2 \cdot 57.5\ ft} = 0.19\ klf$$

Horizontal Seismic Load on Frame

$$EQ_{TL\_V} := 0.2 \cdot S_{DS} \cdot \left(DL_{5.1\_roof}\right) = 0.08\ klf$$

Vertical Seismic Load on Frame

Job Information

	Engineer	Checked	Approved
Name:			
Date:	3/11/2024		

Project ID	
Project Name	

Structure Type	SPACE FRAME

Number of Nodes	14	Highest Node	15
Number of Elements	23	Highest Beam	29

Number of Basic Load Cases	46
Number of Combination Load Cases	0

Included in this printout are data for:

All	The Whole Structure

Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	DEAD LOAD
Primary	2	ROOF LIVE LOAD
Primary	3	SNOW LOAD
Primary	4	WIND 1
Primary	5	WIND 2
Primary	6	SEISMIC - H
Primary	8	SEISMIC - V
Primary	100	GENERATED ASCE7-16 ALLOWABLEST
Primary	101	GENERATED ASCE7-16 ALLOWABLEST
Primary	102	GENERATED ASCE7-16 ALLOWABLEST
Primary	103	GENERATED ASCE7-16 ALLOWABLEST
Primary	104	GENERATED ASCE7-16 ALLOWABLEST
Primary	105	GENERATED ASCE7-16 ALLOWABLEST
Primary	106	GENERATED ASCE7-16 ALLOWABLEST
Primary	107	GENERATED ASCE7-16 ALLOWABLEST
Primary	108	GENERATED ASCE7-16 ALLOWABLEST
Primary	109	GENERATED ASCE7-16 ALLOWABLEST
Primary	110	GENERATED ASCE7-16 ALLOWABLEST
Primary	111	GENERATED ASCE7-16 ALLOWABLEST
Primary	112	GENERATED ASCE7-16 ALLOWABLEST
Primary	113	GENERATED ASCE7-16 ALLOWABLEST
Primary	114	GENERATED ASCE7-16 ALLOWABLEST
Primary	115	GENERATED ASCE7-16 ALLOWABLEST
Primary	116	GENERATED ASCE7-16 ALLOWABLEST
Primary	117	GENERATED ASCE7-16 ALLOWABLEST

Job Information Cont...

Type	L/C	Name
Primary	118	GENERATED ASCE7-16 ALLOWABLEST
Primary	119	GENERATED ASCE7-16 ALLOWABLEST
Primary	120	GENERATED ASCE7-16 ALLOWABLEST
Primary	121	GENERATED ASCE7-16 ALLOWABLEST
Primary	122	GENERATED ASCE7-16 ALLOWABLEST
Primary	123	GENERATED ASCE7-16 ALLOWABLEST
Primary	124	GENERATED ASCE7-16 ALLOWABLEST
Primary	125	GENERATED ASCE7-16 ALLOWABLEST
Primary	126	GENERATED ASCE7-16 ALLOWABLEST
Primary	300	GENERATED ASCE7-16 ALLOWABLEST
Primary	301	GENERATED ASCE7-16 ALLOWABLEST
Primary	302	GENERATED ASCE7-16 ALLOWABLEST
Primary	303	GENERATED ASCE7-16 ALLOWABLEST
Primary	304	GENERATED ASCE7-16 ALLOWABLEST
Primary	305	GENERATED ASCE7-16 ALLOWABLEST
Primary	306	GENERATED ASCE7-16 ALLOWABLEST
Primary	307	GENERATED ASCE7-16 ALLOWABLEST
Primary	308	GENERATED ASCE7-16 ALLOWABLEST
Primary	309	GENERATED ASCE7-16 ALLOWABLEST
Primary	310	GENERATED ASCE7-16 ALLOWABLEST
Primary	311	GENERATED ASCE7-16 ALLOWABLEST

Section Properties

Prop	Section	Area (in^2)	I_{yy} (in^4)	I_{zz} (in^4)	J (in^4)	Material
1	W12X40	11.700	44.100	307.000	0.906	STEEL_50_KS
2	W16X26	7.680	9.590	301.000	0.262	STEEL_50_KS
3	W12X26	7.650	17.300	204.000	0.300	STEEL_50_KS
4	HSST3X3X.25_A1085	2.590	3.160	3.160	5.199	STEEL_50_KS
5	W18X40	11.800	19.100	612.000	0.810	STEEL_50_KS

Materials

Mat	Name	E (kip/in^2)	ν	Density (kip/in^3)	α (/°F)
1	STEEL	29E+3	0.300	0.000	6.5E -6
2	CONCRETE	3.15E+3	0.170	8.68e-05	5.5E -6
3	ALUMINUM	10E+3	0.330	9.8e-05	12.8E -6
4	STAINLESSSTEEL	28E+3	0.300	0.000	9.9E -6
5	STEEL_36_KSI	29E+3	0.300	0.000	6.5E -6
6	STEEL_50_KSI	29E+3	0.300	0.000	6.5E -6
7	STEEL_275_NMM2	29.7E+3	0.300	0.000	6.67E -6
8	STEEL_355_NMM2	29.7E+3	0.300	0.000	6.67E -6
9	Q235	29.9E+3	0.300	0.000	6.67E -6
10	Q345	29.9E+3	0.300	0.000	6.67E -6
11	Q355	29.9E+3	0.300	0.000	6.67E -6
12	Q390	29.9E+3	0.300	0.000	6.67E -6
13	Q420	29.9E+3	0.300	0.000	6.67E -6
14	Q460	29.9E+3	0.300	0.000	6.67E -6
15	TIMBER	1.5E+3	0.150	0.000	3E -6

Supports

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip`ft/deg)	rY (kip`ft/deg)	rZ (kip`ft/deg)
1	Fixed	Fixed	Fixed	-	-	-
2	-	-	Fixed	-	-	-
3	-	-	Fixed	-	-	-
4	Fixed	Fixed	Fixed	-	-	-
6	-	-	Fixed	-	-	-
7	Fixed	Fixed	Fixed	-	-	-
9	-	-	Fixed	-	-	-
10	Fixed	Fixed	Fixed	-	-	-
11	-	-	Fixed	-	-	-
12	-	-	Fixed	-	-	-

Releases

Beam ends not shown in this table are fixed in all directions.

Beam	Node	x	y	z	rx	ry	rz
6	3	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
6	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
7	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
7	9	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
8	2	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
8	5	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
13	9	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
13	11	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
16	11	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
17	3	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
18	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
19	12	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
19	13	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
21	9	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
22	13	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
22	15	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
23	5	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
23	14	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
24	12	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
24	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
25	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
25	15	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
26	2	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
26	13	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
27	13	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
27	14	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
28	1	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
28	5	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
29	5	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
29	7	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Primary Load Cases

Number	Name	Type
1	DEAD LOAD	Dead
2	ROOF LIVE LOAD	Roof Live
3	SNOW LOAD	Snow
4	WIND 1	Wind
5	WIND 2	Wind
6	SEISMIC - H	Seismic-H
8	SEISMIC - V	Seismic-V
100	GENERATED ASCE7-16 ALLOWABLEST	None
101	GENERATED ASCE7-16 ALLOWABLEST	None
102	GENERATED ASCE7-16 ALLOWABLEST	None
103	GENERATED ASCE7-16 ALLOWABLEST	None
104	GENERATED ASCE7-16 ALLOWABLEST	None
105	GENERATED ASCE7-16 ALLOWABLEST	None
106	GENERATED ASCE7-16 ALLOWABLEST	None
107	GENERATED ASCE7-16 ALLOWABLEST	None
108	GENERATED ASCE7-16 ALLOWABLEST	None
109	GENERATED ASCE7-16 ALLOWABLEST	None
110	GENERATED ASCE7-16 ALLOWABLEST	None
111	GENERATED ASCE7-16 ALLOWABLEST	None
112	GENERATED ASCE7-16 ALLOWABLEST	None
113	GENERATED ASCE7-16 ALLOWABLEST	None
114	GENERATED ASCE7-16 ALLOWABLEST	None
115	GENERATED ASCE7-16 ALLOWABLEST	None
116	GENERATED ASCE7-16 ALLOWABLEST	None
117	GENERATED ASCE7-16 ALLOWABLEST	None
118	GENERATED ASCE7-16 ALLOWABLEST	None
119	GENERATED ASCE7-16 ALLOWABLEST	None
120	GENERATED ASCE7-16 ALLOWABLEST	None
121	GENERATED ASCE7-16 ALLOWABLEST	None
122	GENERATED ASCE7-16 ALLOWABLEST	None
123	GENERATED ASCE7-16 ALLOWABLEST	None
124	GENERATED ASCE7-16 ALLOWABLEST	None
125	GENERATED ASCE7-16 ALLOWABLEST	None
126	GENERATED ASCE7-16 ALLOWABLEST	None
300	GENERATED ASCE7-16 ALLOWABLEST	None
301	GENERATED ASCE7-16 ALLOWABLEST	None
302	GENERATED ASCE7-16 ALLOWABLEST	None
303	GENERATED ASCE7-16 ALLOWABLEST	None
304	GENERATED ASCE7-16 ALLOWABLEST	None
305	GENERATED ASCE7-16 ALLOWABLEST	None
306	GENERATED ASCE7-16 ALLOWABLEST	None
307	GENERATED ASCE7-16 ALLOWABLEST	None
308	GENERATED ASCE7-16 ALLOWABLEST	None
309	GENERATED ASCE7-16 ALLOWABLEST	None
310	GENERATED ASCE7-16 ALLOWABLEST	None

Primary Load Cases Cont...

Number	Name	Type
311	GENERATED ASCE7-16 ALLOWABLEST	None

Combination Load Cases

There is no data of this type.

Load Generators

There is no data of this type.

1 DEAD LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-500.000	-	-	-	-
7	UNI	lbf/ft	GY	-500.000	-	-	-	-
13	UNI	lbf/ft	GY	-500.000	-	-	-	-

1 DEAD LOAD : Selfweight

Direction	Factor	Assigned Geometry
Y	-1.000	ALL

2 ROOF LIVE LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-400.000	-	-	-	-
7	UNI	lbf/ft	GY	-400.000	-	-	-	-
13	UNI	lbf/ft	GY	-400.000	-	-	-	-

3 SNOW LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-360.000	-	-	-	-
7	UNI	lbf/ft	GY	-360.000	-	-	-	-
13	UNI	lbf/ft	GY	-360.000	-	-	-	-

4 WIND 1 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GX	80.000	-	-	-	-
7	UNI	lbf/ft	GX	80.000	-	-	-	-
13	UNI	lbf/ft	GX	80.000	-	-	-	-

5 WIND 2 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GX	-80.000	-	-	-	-
7	UNI	lbf/ft	GX	-80.000	-	-	-	-
13	UNI	lbf/ft	GX	-80.000	-	-	-	-

6 SEISMIC - H : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GX	190.000	-	-	-	-
7	UNI	lbf/ft	GX	190.000	-	-	-	-
13	UNI	lbf/ft	GX	190.000	-	-	-	-

8 SEISMIC - V : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
6	UNI	lbf/ft	GY	-80.000	-	-	-	-
7	UNI	lbf/ft	GY	-80.000	-	-	-	-
13	UNI	lbf/ft	GY	-80.000	-	-	-	-

100 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 1 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000

101 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 2 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	1.000

102 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 3 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	1.000

103 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 4 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750

104 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 5 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750

105 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 6 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
4	WIND 1	0.600

106 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 7 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
5	WIND 2	0.600

107 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 8 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750
4	WIND 1	0.750

108 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 9 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
2	ROOF LIVE LOAD	0.750
5	WIND 2	0.750

109 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 10 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
4	WIND 1	0.750

110 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 11 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
5	WIND 2	0.750

111 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 12 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
4	WIND 1	0.750

112 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 13 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
5	WIND 2	0.750

113 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 14 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
4	WIND 1	0.600

114 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 15 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
5	WIND 2	0.600

115 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 16 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	0.910
8	SEISMIC - V	0.700

116 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 17 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-0.910
8	SEISMIC - V	0.700

117 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 18 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	0.910
8	SEISMIC - V	-0.700

118 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 19 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-0.910
8	SEISMIC - V	-0.700

119 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 20 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	0.683
8	SEISMIC - V	0.525

120 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 21 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-0.683
8	SEISMIC - V	0.525

121 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 22 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	0.683
8	SEISMIC - V	-0.525

122 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 23 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-0.683
8	SEISMIC - V	-0.525

123 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 24 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	0.910
8	SEISMIC - V	-0.700

124 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 25 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-0.910
8	SEISMIC - V	-0.700

125 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 26 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	0.910
8	SEISMIC - V	0.700

126 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 27 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-0.910
8	SEISMIC - V	0.700

300 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 28 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	2.100
8	SEISMIC - V	0.700

301 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 29 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-2.100
8	SEISMIC - V	0.700

302 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 30 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	2.100
8	SEISMIC - V	-0.700

303 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 31 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
6	SEISMIC - H	-2.100
8	SEISMIC - V	-0.700

304 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 32 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	1.580
8	SEISMIC - V	0.525

305 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 33 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-1.580
8	SEISMIC - V	0.525

306 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 34 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	1.580
8	SEISMIC - V	-0.525

307 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 35 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	1.000
3	SNOW LOAD	0.750
6	SEISMIC - H	-1.580
8	SEISMIC - V	-0.525

308 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 36 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	2.100
8	SEISMIC - V	-0.700

309 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 37 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-2.100
8	SEISMIC - V	-0.700

310 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 38 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	2.100
8	SEISMIC - V	0.700

311 GENERATED ASCE7-16 ALLOWABLESTRESSDESIGN 39 : Repeat Loads

Ref	Name	Factor
1	DEAD LOAD	0.600
6	SEISMIC - H	-2.100
8	SEISMIC - V	0.700

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	11	300:GENERAT	**0.152**	-0.011	0	0.152	0	0	0.004
Min X	11	309:GENERAT	**-0.149**	-0.005	0	0.149	0	0	0.002
Max Y	12	308:GENERAT	0.094	**0.004**	0	0.094	0	0	-0.000
Min Y	9	304:GENERAT	0.112	**-0.019**	0	0.114	0	0	-0.002
Max Z	1	1:DEAD LOAD	0	0	**0**	0	0	0	0.000
Min Z	1	1:DEAD LOAD	0	0	**0**	0	0	0	0.000
Max rX	1	1:DEAD LOAD	0	0	0	0	**0**	0	0.000
Min rX	1	1:DEAD LOAD	0	0	0	0	**0**	0	0.000
Max rY	1	1:DEAD LOAD	0	0	0	0	0	**0**	0.000
Min rY	1	1:DEAD LOAD	0	0	0	0	0	**0**	0.000
Max rZ	11	102:GENERAT	0.003	-0.017	0	0.017	0	0	**0.006**
Min rZ	9	102:GENERAT	0.003	-0.017	0	0.017	0	0	**-0.002**
Max Rst	11	300:GENERAT	0.152	-0.011	0	**0.152**	0	0	0.004

Beam Displacement Detail Summary

Displacements shown in italic indicate the presence of an offset

	Beam	L/C	d (ft)	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	24	300:GENERAT	9.805	**0.181**	-0.112	0	0.213
Min X	25	303:GENERAT	6.537	**-0.178**	-0.113	0	0.211
Max Y	2	308:GENERAT	8.000	0.094	**0.004**	0	0.094
Min Y	13	102:GENERAT	13.250	0.003	**-0.598**	0	0.598
Max Z	1	1:DEAD LOAD	0	0	0	**0**	0
Min Z	1	1:DEAD LOAD	0	0	0	**0**	0
Max Rst	13	102:GENERAT	13.250	0.003	-0.598	0	**0.598**

Beam End Displacement Summary

Displacements shown in italic indicate the presence of an offset

	Beam	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	13	11	300:GENERAT	**0.152**	-0.011	0	0.152
Min X	13	11	309:GENERAT	**-0.149**	-0.005	0	0.149
Max Y	2	12	308:GENERAT	0.094	**0.004**	0	0.094
Min Y	7	9	304:GENERAT	0.112	**-0.019**	0	0.114
Max Z	1	1	1:DEAD LOAD	0	0	**0**	0
Min Z	1	1	1:DEAD LOAD	0	0	**0**	0
Max Rst	13	11	300:GENERAT	0.152	-0.011	0	**0.152**

Beam End Force Summary

The signs of the forces at end B of each beam have been reversed. For example: this means that the Min Fx entry gives the largest tension value for an beam.

				Axial	Shear		Torsion	Bending	
	Beam	**Node**	**L/C**	**Fx** (kip)	**Fy** (kip)	**Fz** (kip)	**Mx** (kip`in)	**My** (kip`in)	**Mz** (kip`in)
Max Fx	5	7	304:GENERAT	**28.488**	0	0.001	0	0.035	0
Min Fx	7	6	300:GENERAT	**-16.257**	4.134	0	0	0	1.855
Max Fy	13	9	102:GENERAT	0.001	**12.479**	0	0	0	7.592
Min Fy	13	11	102:GENERAT	0.001	**-12.433**	-0	-0	-0	0.393
Max Fz	4	5	301:GENERAT	8.923	0	**0.040**	0	-2.777	0
Min Fz	4	5	308:GENERAT	4.167	0	**-0.040**	0	2.887	0
Max Mx	1	1	1:DEAD LOAD	5.509	0	0.003	**0**	-0.041	0
Min Mx	1	1	1:DEAD LOAD	5.509	0	0.003	**0**	-0.041	0
Max My	4	5	300:GENERAT	8.925	0	-0.040	0	**2.934**	0
Min My	4	5	309:GENERAT	4.164	0	0.040	0	**-2.823**	0
Max Mz	13	9	102:GENERAT	0.001	12.479	0	0	0	**7.592**
Min Mz	22	13	308:GENERAT	-11.101	0.105	0	0	0	**-0.567**

Beam Force Detail Summary

Sign convention as diagrams:- positive above line, negative below line except Fx where positive is compression. Distance d is given from beam end A.

				Axial	Shear		Torsion	Bending	
	Beam	**L/C**	**d** (ft)	**Fx** (kip)	**Fy** (kip)	**Fz** (kip)	**Mx** (kip`in)	**My** (kip`in)	**Mz** (kip`in)
Max Fx	5	304:GENERAT	0	**28.488**	0	0.001	0	0.035	0
Min Fx	7	300:GENERAT	0	**-16.257**	4.134	0	0	0	1.855
Max Fy	13	102:GENERAT	0	0.001	**12.479**	0	0	0	7.592
Min Fy	13	102:GENERAT	26.500	0.001	**-12.433**	-0	-0	-0	0.393
Max Fz	4	301:GENERAT	0	8.923	0	**0.040**	0	-2.777	0
Min Fz	4	308:GENERAT	0	4.167	0	**-0.040**	0	2.887	0
Max Mx	1	1:DEAD LOAD	0	5.509	0	0.003	**0**	-0.041	0
Min Mx	1	1:DEAD LOAD	0	5.509	0	0.003	**0**	-0.041	0
Max My	4	300:GENERAT	0	8.925	0	-0.040	0	**2.934**	0
Min My	4	309:GENERAT	0	4.164	0	0.040	0	**-2.823**	0
Max Mz	13	102:GENERAT	0	0.001	12.479	0	0	0	**7.592**
Min Mz	13	102:GENERAT	13.250	0.001	0.023	0	0	0	**-986.257**

Reaction Summary

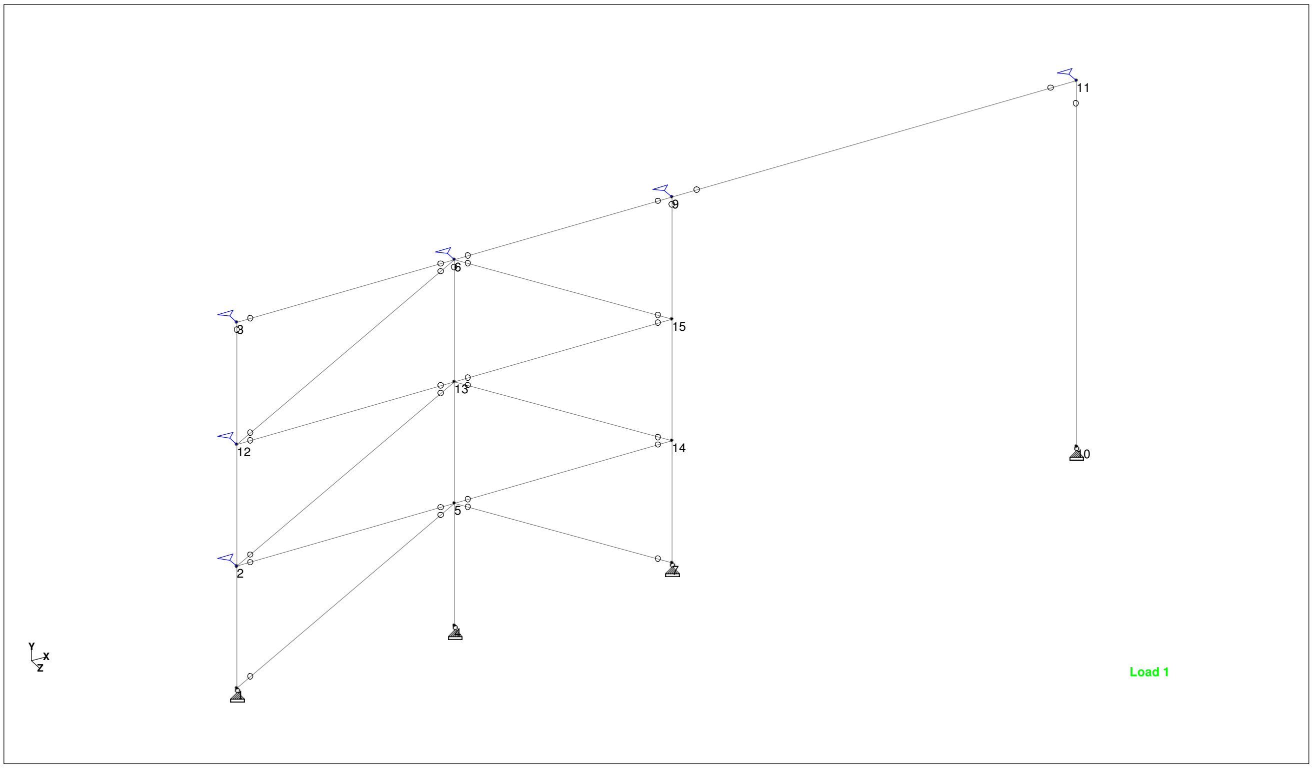
			Horizontal	Vertical	Horizontal	Moment		
	Node	L/C	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
Max FX	1	301:GENERAT	**11.403**	24.722	0	0	0	0
Min FX	7	300:GENERAT	**-11.408**	32.659	0	0	0	0
Max FY	7	304:GENERAT	-8.837	**33.521**	0	0	0	0
Min FY	1	308:GENERAT	-10.779	**-15.444**	0	0	0	0
Max FZ	1	1:DEAD LOAD	0.390	5.799	**0**	0	0	0
Min FZ	1	1:DEAD LOAD	0.390	5.799	**0**	0	0	0
Max MX	1	1:DEAD LOAD	0.390	5.799	0	**0**	0	0
Min MX	1	1:DEAD LOAD	0.390	5.799	0	**0**	0	0
Max MY	1	1:DEAD LOAD	0.390	5.799	0	0	**0**	0
Min MY	1	1:DEAD LOAD	0.390	5.799	0	0	**0**	0
Max MZ	1	1:DEAD LOAD	0.390	5.799	0	0	0	**0**
Min MZ	1	1:DEAD LOAD	0.390	5.799	0	0	0	**0**

Utilization Ratio

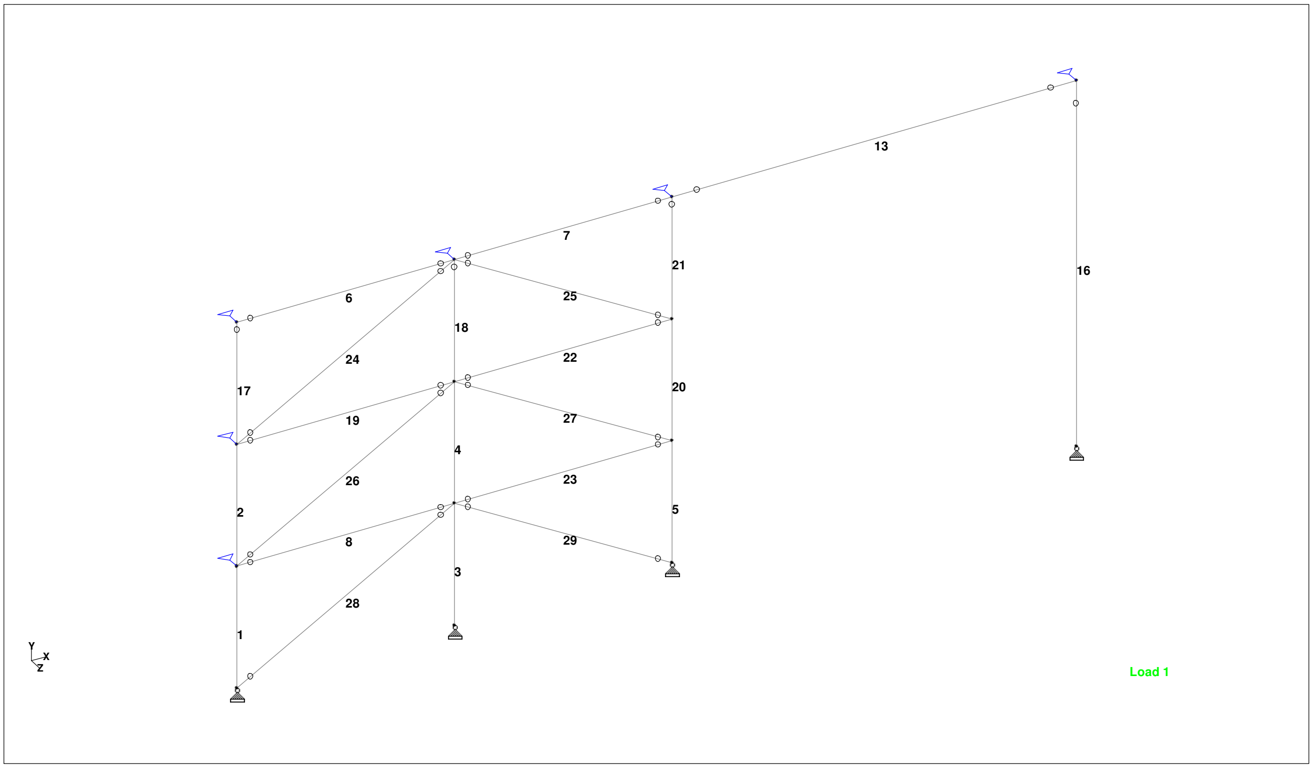
Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
1	W12X40	W12X40	0.066	1.000	0.066	Cl.E3	301	11.700	307.000	44.100	0.906
2	W12X40	W12X40	0.042	1.000	0.042	Cl.E3	305	11.700	307.000	44.100	0.906
3	W12X40	W12X40	0.049	1.000	0.049	Cl.E3	102	11.700	307.000	44.100	0.906
4	W12X40	W12X40	0.049	1.000	0.049	Cl.E3	102	11.700	307.000	44.100	0.906
5	W12X40	W12X40	0.102	1.000	0.102	Cl.E3	304	11.700	307.000	44.100	0.906
6	W16X26	W16X26	0.212	1.000	0.212	Cl.F2.2	102	7.680	301.000	9.590	0.262
7	W16X26	W16X26	0.396	1.000	0.396	Eq.H1-1a	301	7.680	301.000	9.590	0.262
8	W12X26	W12X26	0.122	1.000	0.122	Cl.E3	308	7.650	204.000	17.300	0.300
13	W18X40	W18X40	0.420	1.000	0.420	Eq.H1-3a(H1-	102	11.800	612.000	19.100	0.810
16	W12X26	W12X26	0.416	1.000	0.416	Cl.E3	102	7.650	204.000	17.300	0.300
17	W12X40	W12X40	0.025	1.000	0.025	Cl.E3	102	11.700	307.000	44.100	0.906
18	W12X40	W12X40	0.047	1.000	0.047	Cl.E3	102	11.700	307.000	44.100	0.906
19	W12X26	W12X26	0.122	1.000	0.122	Cl.E3	308	7.650	204.000	17.300	0.300
20	W12X40	W12X40	0.083	1.000	0.083	Cl.E3	304	11.700	307.000	44.100	0.906
21	W12X40	W12X40	0.070	1.000	0.070	Cl.E3	102	11.700	307.000	44.100	0.906
22	W12X26	W12X26	0.122	1.000	0.122	Cl.E3	309	7.650	204.000	17.300	0.300
23	W12X26	W12X26	0.121	1.000	0.121	Cl.E3	309	7.650	204.000	17.300	0.300
24	HSST3X3	HSST3X3	0.502	1.000	0.502	Eq.H1-1a	116	2.590	3.160	3.160	5.350
25	HSST3X3	HSST3X3	0.503	1.000	0.503	Eq.H1-1a	115	2.590	3.160	3.160	5.350
26	HSST3X3	HSST3X3	0.504	1.000	0.504	Eq.H1-1a	116	2.590	3.160	3.160	5.350
27	HSST3X3	HSST3X3	0.503	1.000	0.503	Eq.H1-1a	115	2.590	3.160	3.160	5.350
28	HSST3X3	HSST3X3	0.516	1.000	0.516	Eq.H1-1a	116	2.590	3.160	3.160	5.350
29	HSST3X3	HSST3X3	0.516	1.000	0.516	Eq.H1-1a	115	2.590	3.160	3.160	5.350

Failed Members

There is no data of this type.



Whole Structure - Joint Labels



Whole Structure - Member Labels

AWB Engineers
Engineers/Architects
1942 Northwood Drive
Salisbury, MD 21801-7824
(410)-742-7299, Fax - (410) 742 - 0273

221205 - Coastal Pacific Distribution Facility - Frame Analysis Along Gridline B' & P

Since Frames along gridlines B' and P have the same braced frame arrangement and since the seismic demands are expected to be lower on frame along Gridline P due to lower effective roof plan area, evaluation is performed for frame along Gridline B' and is considered to be applicable for frame along gridline P as well

Design Loads

$DL_{roof} := 10\ psf$	Roof Dead Load
$DL_{mech} := 15\ psf$	Mechanical Dead Load
$LL_{roof} := 20\ psf$	Roof Live Load
$SL_{roof} := 25\ psf$	Snow Load + Rain Surcharge
$DL_{wall} := 20\ psf$	Curtain Wall Dead Load
$WL_{wind\_lee} := 25\ psf$	Wind Pressure From Attached Wind Analysis (Windward + Leeward)
$S_{DS} := 0.848$	Short period spectral acceleration
$C_s := 0.1428$	Seismic Response Coefficient (from attached analysis)

Frame Loads Along Gridline B'

$$DL_{B\_roof} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 56.5\ ft \cdot 0.5\right) = 0.71\ klf$$

Frame Roof Dead Load (UDL)

$$LL_{B\_roof} := \frac{\left(LL_{roof} \cdot 207\ ft \cdot 56.5\ ft \cdot 0.5\right)}{205.25\ ft} = 0.57\ klf$$

Frame Roof Live Load (UDL)

$$SL_{B\_roof} := \frac{\left(SL_{roof} \cdot 207\ ft \cdot 56.5\ ft \cdot 0.5\right)}{205.25\ ft} = 0.71\ klf$$

Frame Roof Snow Load (UDL)

$$DL_{B\_seis\_roof} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 205.25\ ft \cdot 66.5\ ft \cdot 0.5 + 10\ kip\right) = 180.61\ kip$$

Seismic Roof Dead Load (Mass) For Frame

$$DL_{B\_seis\_wall} := \left(DL_{wall} \cdot \left(66.5\ ft + 205.25\ ft\right) \cdot 45\ ft \cdot 0.5\right) = 122.29\ kip$$

Seismic Wall Dead Load (Mass) For Frame

$$EQ_{H\_gridline\_B'} := \frac{\left(DL_{B\_seis\_roof} + DL_{B\_seis\_wall}\right)}{205.25\ ft} \cdot C_s = 0.21\ klf$$

Frame Seismic Load (UDL) EW Direction

AWB Engineers
Engineers/Architects
1942 Northwood Drive
Salisbury, MD 21801-7824
(410)-742-7299, Fax - (410) 742 - 0273

$EQ_{V\_gridline\_B'} := 0.2 \cdot S_{DS} \cdot \left(DL_{B\_roof}\right) = 0.12\ klf$ — Vertical Seismic Load Along Gridline B'

$WL_{gridline\_B'} := \dfrac{WL_{wind\_lee} \cdot 45\ ft \cdot 66.5\ ft \cdot 0.25}{205.25\ ft} = 0.09\ klf$ — Frame Wind Load (UDL) EW Direction

Frame Loads for Lower Roof Along Gridline B'

$DL_{B\_roof\_lvl1} := \left(\left(DL_{roof} + DL_{mech}\right) \cdot 4.5\ ft \cdot 0.5\right) = 0.06\ klf$ — Frame Roof Dead Load (UDL) For Lower Roof

$LL_{B\_roof\_lvl1} := \left(LL_{roof} \cdot 4.5\ ft \cdot 0.5\right) = 0.05\ klf$ — Frame Roof Live Load (UDL) For Lower Roof

$SL_{B\_roof\_lvl1} := \left(SL_{roof} \cdot 4.5\ ft \cdot 0.5\right) = 0.06\ klf$ — Frame Roof Snow Load (UDL) For Lower Roof

$DL_{B\_seis\_roof\_lvl1} := \left(DL_{roof} + DL_{mech}\right) \cdot 56\ ft \cdot 40\ ft \cdot 0.5 = 28\ kip$ — Seismic Roof Dead Load (Mass) For Frame for lower roof

$DL_{B\_seis\_wall\_lvl1} := \left(DL_{wall} \cdot \left(56\ ft \cdot 0.5 + 40\ ft\right) \cdot 24\ ft \cdot 0.5\right) = 16.32\ kip$ — Seismic Wall Dead Load (Mass) For Frame for lower roof

$EQ_{H\_gridline\_B'\_lvl1} := \dfrac{DL_{B\_seis\_roof\_lvl1} + DL_{B\_seis\_wall\_lvl1}}{40\ ft} \cdot C_s = 0.16\ klf$ — Frame Seismic Load (UDL) EW Direction For Lower Roof

$EQ_{V\_gridline\_B'\_lvl1} := 0.2 \cdot S_{DS} \cdot \left(DL_{B\_roof\_lvl1}\right) = 0.01\ klf$ — Vertical Seismic Load For Lower Roof Along Gridline B'

$WL_{gridline\_B'\_lvl1} := \dfrac{WL_{wind\_lee} \cdot 25\ ft \cdot 56\ ft \cdot 0.25}{40\ ft} = 0.22\ klf$ — Frame Wind Load (UDL) EW Direction For Lower Roof

See attached STAAD analysis for initial elastic analysis of frame and brace design

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Brace Design

$\Delta_B := 0.325\ in$ — Deflection/interstory from initial elastic analysis

$C_d := 5$ — Deflection Amplification Factor

$\Delta_{B\_Cd} := \Delta_B \cdot C_d = 1.63\ in$ — Amplified deflection/interstory drift

$\Delta_{allow} := 0.02 \cdot 45\ ft = 10.8\ in$ — Allowable story Drift

$\Delta_B < \Delta_{allow}$ $\qquad OK$

AISC seismic provisions requires that between 30% and 70% of the total horizontal force is resisted by braces in tension unless the available strength of each brace in compression is larger than the required strength resulting from the Overstrength seismic load.

$$EQ_{H\_tot} := \left(EQ_{H\_gridline\_B'} \cdot 205.25\ ft\right) + \left(EQ_{H\_gridline\_B'\_lvl1} \cdot 40\ ft\right) = 49.58\ kip$$

$$F_{brace\_ten1} := \frac{\left(22\ kip \cdot \frac{18.5\ ft}{19.16\ ft}\right)}{EQ_{H\_tot}} \cdot 100 = 42.84 \qquad OK$$

$$F_{brace\_ten2} := \frac{\left((23\ kip) \cdot \frac{18.5\ ft}{20.16\ ft}\right)}{EQ_{H\_tot}} \cdot 100 = 42.57 \qquad OK$$

Width-to-Thickness Limitations

HSS 4x4x0.50 braces & HSS 4x4x0.25

Per AISC Seismic Design Manual, Table 1-5b, for A1085 Grade A material, all braces satisfy width-to-thickness limitations for highly ductile members.

Brace Slenderness Check

Brace slenderness has been checked in the STAAD model

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Analysis for frame considering the Expected Strengths of Braces in Tension And Compression

For the HSS 4x4x0.50 braces & HSS 4x4x0.25

$R_y := 1.25$

$F_y := 50\ ksi$

Tensile capacity of braces

HSS 4x4x0.50 $\quad P_{T\_HSS4x4x0.50} := R_y \cdot F_y \cdot 6.020\ in^2 = 376.25\ kip$

HSS 4x4x0.25 $\quad P_{T\_HSS4x4x0.25} := R_y \cdot F_y \cdot 3.37\ in^2 = 210.63\ kip$

Compression capacity of braces

HSS 4x4x0.50

$$\frac{KL_c}{r} \quad \frac{14.5\ ft}{1.41\ in} = 123.4 \quad > \quad 4.71 \cdot \sqrt{\frac{29000\ ksi}{R_y \cdot F_y}} = 101.46$$

$$F_e := \left(\frac{\pi^2 \cdot 29000\ ksi}{\left(\frac{14.5\ ft}{1.41\ in}\right)^2}\right) = 18.79\ ksi$$

$$F_{cr} := 0.877 \cdot F_e = 16.48\ ksi$$

$$P_{c\_HSS4x4x0.5} := min\left(R_y \cdot F_y \cdot 6.020\ in^2, \left(\frac{1}{0.877}\right) \cdot F_{cr} \cdot 6.020\ in^2\right) = 113.14\ kip$$

Maximum post-buckling brace strength (AISC Seismic Provisions F2.3(b))

$$P_{c\_post\_4x4x0.5} := P_{c\_HSS4x4x0.5} \cdot 0.3 = 33.94\ kip$$

HSS 4x4x0.25

$$\frac{KL_c}{r} \quad \frac{10.5\ ft}{1.52\ in} = 82.89 \quad < \quad 4.71 \cdot \sqrt{\frac{29000\ ksi}{R_y \cdot F_y}} = 101.46$$

$$F_e := \left(\frac{\pi^2 \cdot 29000\ ksi}{\left(\frac{10\ ft}{1.52\ in}\right)^2}\right) = 45.92\ ksi$$

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$$F_{cr} := \left(0.658^{\left(\frac{R_y \cdot F_y}{F_e}\right)}\right) \cdot R_y \cdot F_y = 35.36\ ksi$$

$$P_{c\_HSS\_4x4x0.25} := min\left(R_y \cdot F_y \cdot 3.37\ in^2 , \left(\frac{1}{0.877}\right) \cdot F_{cr} \cdot 3.37\ in^2\right) = 135.87\ kip$$

Maximum post-buckling brace strength (AISC Seismic Provisions F2.3(b))

$$P_{c\_post\_4\_0.25} := P_{c\_HSS\_4x4x0.25} \cdot 0.3 = 40.76\ kip$$

Column Design

Design of columns on either end @ Gridlines 9.5 and 8.5

$$P_{col\_DL} := 23\ kip$$

$$P_{col\_LL} := 11\ kip$$

$$P_{col\_SL} := 11\ kip$$

The axial compressive/tension force on the columns considering expected brace strengths

$$P_{Emh} := \left(4 \cdot P_{c\_HSS4x4x0.5} \cdot \frac{8\ ft}{20.16\ ft}\right) + \left(P_{c\_HSS\_4x4x0.25} \cdot \frac{5\ ft}{19.16\ ft}\right) = 215.05\ kip$$

$$P_{Emh\_T} := \left(4 \cdot P_{T\_HSS4x4x0.50} \cdot \frac{8\ ft}{20.16\ ft}\right) + \left(P_{T\_HSS4x4x0.50} \cdot \frac{5\ ft}{19.16\ ft}\right) = 695.41\ kip$$

$$P_{a\_Comp} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL} + 0.7 \cdot P_{Emh} = 176.27\ kip$$ Total compressive demand on columns

$$P_{a\_Ten} := \left(0.6 - 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL} + 0.7 \cdot \left(-P_{Emh\_T}\right) = -475.72\ kip$$ Total tensile demand on columns

Use W14x68 column

$$P_{cap\_W14x68\_comp} := 536\ kip$$ Compressive capacity of W14x68 column with Lb = 8ft

$$IR_{col\_comp} := \frac{P_{a\_Comp}}{P_{cap\_W14x68\_comp}} = 0.33$$ *OK*

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$P_{cap\_W14x61\_tension} := \frac{50\ ksi \cdot 20\ in^2}{1.67} = 598.8\ kip$ Tensile capacity of W14x53 column

$IR_{col\_ten} := \frac{-P_{a\_Ten}}{P_{cap\_W14x61\_tension}} = 0.79$ OK

Design of Columns at Middle of SFRS @ Gridlines 9

$P_{col\_DL\_M} := 24\ kip$

$P_{col\_LL\_M} := 10\ kip$

$P_{col\_SL\_M} := 10\ kip$

The axial compressive/tension force on the columns considering expected brace strengths

$$P_{Emh\_M} := 5 \cdot \left(\left(P_{T\_HSS4x4x0.50} - P_{c\_post\_4x4x0.5}\right) \cdot \frac{8\ ft}{20.16\ ft} \right) + \left(\left(P_{T\_HSS4x4x0.25} - P_{c\_post\_4\_0.25}\right) \cdot \frac{5\ ft}{19.16\ ft} \right) = 723.51\ kip$$

$P_{a\_Comp\_M} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL\_M} + 0.7 \cdot P_{Emh\_M} = 533.3\ kip$ Total compressive demand on columns

Use W14x74 column

$P_{cap\_W14x74\_comp} := 585\ kip$ Compressive capacity of W14x74 column with unbraced Lb = 8ft

$IR_{col\_comp\_M} := \frac{P_{a\_Comp\_M}}{P_{cap\_W14x74\_comp}} = 0.91$ OK

Beam Design

Beams at Elevation 108' - 0" To 140'-0" Between Gridlines 8.5 and 9.5

The axial force on the beams considering expected brace strengths in tension and compression is

$P_{x1} := \left(P_{T\_HSS4x4x0.50}\right) \cdot \frac{18.5\ ft}{20.16\ ft} = 345.27\ kip$ Elevation 108' To 140' Between Gridlines 8.5 and 9

$P_{x2} := \left(P_{c\_HSS4x4x0.5}\right) \cdot \frac{18.5\ ft}{20.16\ ft} = 103.83\ kip$ Elevation 108' To 140' Between Gridlines 9 and 9.5

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$P_D := 0\ kip$ — Axial load on all beams due to DL is 0

Considering governing load combination from ASCE 7-16

$P_{a1} := (1 + 0.14 \cdot S_{DS}) \cdot P_D + 0.7 \cdot P_{x1} = 241.69\ kip$

Beams/struts at these elevations are unbraced with L_b = 18.5 ft.

Consider W12X58 beams/struts

$P_{cap\_W12x58} := 287\ kip$ — Compressive strength of member

$IR := \frac{P_{a1}}{P_{cap\_W12x58}} = 0.84$ $\quad OK$

Beams at Elevation 142'-3 1/2" Between Gridlines 8.5 and 9.5

$P_{x3} := (P_{T\_HSS4x4x0.25} + P_{c\_HSS\_4x4x0.25}) \cdot \frac{18.5\ ft}{19.16\ ft} = 334.56\ kip$

Considering governing load combination from ASCE 7-16

$P_{a2} := (1 + 0.14 \cdot S_{DS}) \cdot P_D + 0.7 \cdot P_{x3} = 234.19\ kip$

Consider W16X57 beams/struts

$P_{cap\_W16} := 411\ kip$ — Compressive strength of member considering an unbraced length of 6 ft

$IR := \frac{P_{a2}}{P_{cap\_W16}} = 0.57$ $\quad OK$

$M_{DL} := 0.5\ kip \cdot ft$ — Moment demand on beam

$M_{capW16} := 251\ kip \cdot ft$ — Moment capacity of beam

Combined loading

$\frac{P_{a2}}{P_{cap\_W16}} + \frac{8}{9} \cdot \left(\frac{M_{DL}}{M_{capW16}}\right) = 0.57$ $\quad OK$

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The axial force on the beams considering expected brace strengths in tension strength and post buckling compression strength is

$P_{x4} := \left(P_{T\_HSS4x4x0.25}\right) \cdot \dfrac{18.5\ ft}{20.16\ ft} = 193.28\ kip$ Elevation 108' To 140' Between Gridlines 8.5 and 9

$P_{x5} := \left(P_{c\_post\_4\_0.25}\right) \cdot \dfrac{18.5\ ft}{20.16\ ft} = 37.4\ kip$ Elevation 108' To 140' Between Gridlines 9 and 9.5

$P_{x6} := \left(P_{T\_HSS4x4x0.25} + P_{c\_post\_4\_0.25}\right) \cdot \dfrac{18.5\ ft}{19.16\ ft} = 242.73\ kip$ Elevation 142'-3 1/2" Between Gridlines 8.5 and 9.5

The forces on the frame members considering the expected brace strengths in tension and in compression governs over the forces on the frame members considering the expected brace strengths in tension and post buckling strength in compression .

Analysis of Lower Frame Between 7 and 5.1 @ Elevation 122' - 7"

Column Design

Design of columns on either end of SFRS

$P_{col\_DL} := 20\ kip$

$P_{col\_LL} := 13\ kip$

$P_{col\_SL} := 12\ kip$

The axial compressive/tension force on the columns considering expected brace strengths

$$P_{Emh} := \left(2 \cdot \left(P_{c\_HSS\_4x4x0.25} + P_{T\_HSS4x4x0.25}\right) \cdot \frac{8\ ft}{22.71\ ft}\right) = 244.12\ kip$$

$$P_{Emh\_T} := \left(2 \cdot \left(P_{c\_HSS\_4x4x0.25} + P_{T\_HSS4x4x0.25}\right) \cdot \frac{8\ ft}{22.71\ ft}\right) = 244.12\ kip$$

$P_{a\_Comp} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL} + 0.7 \cdot P_{Emh} = 193.26\ kip$ Total compressive demand on columns

$P_{a\_Ten} := \left(0.6 - 0.14 \cdot S_{DS}\right) \cdot P_{col\_DL} + 0.7 \cdot \left(-P_{Emh\_T}\right) = -161.26\ kip$ Total tensile demand on columns

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Use W14x53 column & W12x45 Column

$P_{cap\_W14x53\_comp} := 389.27\ kip$ Compressive capacity of W14x53 column with Lb = 8ft

$P_{cap\_W12x45\_comp} := 293\ kip$ Compressive capacity of W12x45 column with Lb = 8ft

$$IR_{col\_comp\_L} := \frac{P_{a\_Comp}}{min\left(P_{cap\_W14x53\_comp}, P_{cap\_W12x45\_comp}\right)} = 0.66 \qquad OK$$

$$P_{cap\_W14x53\_tension} := \frac{50\ ksi \cdot 15.6\ in^2}{1.67} = 467.07\ kip$$ Tensile capacity of W14x53 column

$$P_{cap\_W12x35\_tension} := \frac{50\ ksi \cdot 11.7\ in^2}{1.67} = 350.3\ kip$$ Tensile capacity of W12x35 column

$$IR_{col\_ten\_L} := \frac{-P_{a\_Ten}}{min\left(P_{cap\_W14x53\_tension}, P_{cap\_W12x45\_comp}\right)} = 0.55 \qquad OK$$

Beam Design

Beams at Elevation 108' To 116' Between Gridlines 5.5 and 7

The axial force on the beams considering expected brace strengths in tension and compression is

$$P_{xT} := \left(P_{T\_HSS4x4x0.25}\right) \cdot \frac{21.25\ ft}{22.71\ ft} = 197.08\ kip$$

$$P_{xC} := \left(P_{c\_HSS\_4x4x0.25}\right) \cdot \frac{21.25\ ft}{22.71\ ft} = 127.13\ kip$$

$P_D := 0\ kip$ Axial load on all beams due to DL is 0

Considering governing load combination from ASCE 7-16

$$P_{a1} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_D + 0.7 \cdot P_{xT} = 137.96\ kip$$

Beams/struts at these elevations are unbraced with L_b = 21.25 ft.

Consider W12X58 beams/struts

$P_{cap\_W12x58\_L} := 287\ kip$ Compressive strength of member with Lb = 21.25 ft

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$IR := \frac{P_{a1}}{P_{cap\_W12x58\_L}} = 0.48$ OK

Beams at Elevation 122'-7" Between Gridlines 5.5 and 7.0

$P_{x2} := \left(P_{T\_HSS4x4x0.25} + P_{c\_HSS\_4x4x0.25}\right) \cdot \frac{21.25\ ft}{22.71\ ft} = 324.22\ kip$

Considering governing load combination from ASCE 7-16

$P_{a2} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_D + 0.7 \cdot P_{x2} = 226.95\ kip$

Consider W16X57 beams/struts

$P_{cap\_W16x57} := 411\ kip$ — Compressive strength of member considering an unbraced length of 10 ft.

$IR := \frac{P_{a2}}{P_{cap\_W16x57}} = 0.55$ OK

$M_{a2} := 11\ kip \cdot ft$ — Moment demand on beam

$M_{capW16x57} := 251\ kip \cdot ft$ — Moment capacity of beam

Combined loading

$\frac{P_{a2}}{P_{cap\_W16x57}} + \frac{8}{9} \cdot \left(\frac{M_{a2}}{M_{capW16x57}}\right) = 0.59$ OK

The axial force on the beams considering expected brace strengths in tension strength and post buckling compression strength

$P_{x1} := \left(P_{T\_HSS4x4x0.25} + P_{c\_post\_4\_0.25}\right) \cdot \frac{21.25\ ft}{22.71\ ft} = 235.22\ kip$ — Elevation 108' To 116' Between Gridlines 5.5 and 7

$P_D := 0\ kip$ — Axial load on all beams due to DL is 0

Considering governing load combination from ASCE 7-16

$P_{a1} := \left(1 + 0.14 \cdot S_{DS}\right) \cdot P_D + 0.7 \cdot P_{x1} = 164.66\ kip$

Beams/struts at these elevations are unbraced with L_b = 21.25 ft.

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Consider W12X58 beams/struts

$P_{cap\_W12x58\_L} := 287\ kip$ Compressive strength of member

$IR := \frac{P_{a1}}{P_{cap\_W12x58\_L}} = 0.57 \quad OK$

The forces on the frame members considering the expected brace strengths in tension and in compression governs over the forces on the frame members considering the expected brace strengths in tension and post buckling strength in compression .

Job Information

	Engineer	Checked	Approved
Name:			
Date:	3/10/2024		

Project ID	
Project Name	

Structure Type	SPACE FRAME

Number of Nodes	88	Highest Node	93
Number of Elements	117	Highest Beam	169

Number of Basic Load Cases	7
Number of Combination Load Cases	39

Included in this printout are data for:

All	The Whole Structure

Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	DEAD LOAD
Primary	2	ROOF LIVE LOAD
Primary	3	SNOW LOAD
Primary	4	WIND 1
Primary	5	WIND 2
Primary	6	SEISMIC - H
Primary	8	SEISMIC - V
Combination	100	COMB - 1 DEAD
Combination	101	COMB - 1 DEAD + 1 SNOW
Combination	102	COMB - 1 DEAD + 1 ROOF LIVE
Combination	103	COMB - 1 DEAD + 0.75 ROOF LIVE
Combination	104	COMB - 1 DEAD + 0.75 SNOW
Combination	105	COMB - 1 DEAD + 0.6 WIND (1)
Combination	106	COMB - 1 DEAD + 0.6 WIND (2)
Combination	107	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7
Combination	108	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7
Combination	109	COMB - 1 DEAD + 0.75 WIND + 0.75 SN(
Combination	110	COMB - 1 DEAD + 0.75 WIND + 0.75 SN(
Combination	111	COMB - 1 DEAD + 0.75 WIND (1)
Combination	112	COMB - 1 DEAD + 0.75 WIND (2)
Combination	113	COMB - 0.6 DEAD + 0.6 WIND (1)
Combination	114	COMB - 0.6 DEAD + 0.6 WIND (2)
Combination	115	COMB - 1 DEAD + 0.91 SEISMIC-H + 0.7
Combination	116	COMB - 1 DEAD + -0.91 SEISMIC-H + 0.7
Combination	117	COMB - 1 DEAD + 0.91 SEISMIC-H + -0.7

Job Information Cont...

Type	L/C	Name
Combination	118	COMB - 1 DEAD + -0.91 SEISMIC-H + -0.
Combination	119	COMB - 1 DEAD + 0.683 SEISMIC-H + 0.!
Combination	120	COMB - 1 DEAD + -0.683 SEISMIC-H + 0
Combination	121	COMB - 1 DEAD + 0.683 SEISMIC-H + -0
Combination	122	COMB - 1 DEAD + -0.683 SEISMIC-H + -(
Combination	123	COMB - 0.6 DEAD + 0.91 SEISMIC-H + -(
Combination	124	COMB - 0.6 DEAD + -0.91 SEISMIC-H + -
Combination	125	COMB - 0.6 DEAD + 0.91 SEISMIC-H + 0.
Combination	126	COMB - 0.6 DEAD + -0.91 SEISMIC-H + (
Combination	315	COMB - 1 DEAD + 1.4 SEISMIC-H + 0.7 S
Combination	316	COMB - 1 DEAD + -1.4 SEISMIC-H + 0.7
Combination	317	COMB - 1 DEAD + 1.4 SEISMIC-H + -0.7
Combination	318	COMB - 1 DEAD + -1.4 SEISMIC-H + -0.7
Combination	319	COMB - 1 DEAD + 1.05 SEISMIC-H + 0.5
Combination	320	COMB - 1 DEAD + -1.05 SEISMIC-H + 0.5
Combination	321	COMB - 1 DEAD + 1.05 SEISMIC-H + -0.5
Combination	322	COMB - 1 DEAD + -1.05 SEISMIC-H + -0.
Combination	323	COMB - 0.6 DEAD + 1.4 SEISMIC-H + -0.
Combination	324	COMB - 0.6 DEAD + -1.4 SEISMIC-H + -0
Combination	326	COMB - 0.6 DEAD + 1.4 SEISMIC-H + 0.7
Combination	327	COMB - 0.6 DEAD + -1.4 SEISMIC-H + 0.

Section Properties

Prop	Section	Area (in^2)	I_{yy} (in^4)	I_{zz} (in^4)	J (in^4)	Material
1	W14X53	15.600	57.700	541.000	1.940	STEEL_50_KS
2	W16X26	7.680	9.590	301.000	0.262	STEEL_50_KS
3	W12X40	11.700	44.100	307.000	0.906	STEEL_50_KS
4	HSST4X4X.5_A1085	6.360	12.300	12.300	21.438	STEEL_50_KS
5	HSST4X4X0.25_A108	3.590	8.220	8.220	13.184	STEEL_50_KS
6	W12X45	13.100	50.000	348.000	1.260	STEEL_50_KS
7	W14X68	20.000	121.000	722.000	3.010	STEEL_50_KS
8	W16X57	16.800	43.100	758.000	2.220	STEEL_50_KS
9	W12X58	17.000	107.000	475.000	2.100	STEEL_50_KS
10	W14X74	21.800	134.000	795.000	3.870	STEEL_50_KS

Materials

Mat	Name	E (kip/in^2)	ν	Density (kip/in^3)	α (/°F)
1	STEEL	29E+3	0.300	0.000	6.5E -6
2	CONCRETE	3.15E+3	0.170	8.68e-05	5.5E -6
3	ALUMINUM	10E+3	0.330	9.8e-05	12.8E -6
4	STAINLESSSTEEL	28E+3	0.300	0.000	9.9E -6
5	STEEL_36_KSI	29E+3	0.300	0.000	6.5E -6
6	STEEL_50_KSI	29E+3	0.300	0.000	6.5E -6
7	STEEL_275_NMM2	29.7E+3	0.300	0.000	6.67E -6
8	STEEL_355_NMM2	29.7E+3	0.300	0.000	6.67E -6
9	Q235	29.9E+3	0.300	0.000	6.67E -6
10	Q345	29.9E+3	0.300	0.000	6.67E -6
11	Q355	29.9E+3	0.300	0.000	6.67E -6
12	Q390	29.9E+3	0.300	0.000	6.67E -6
13	Q420	29.9E+3	0.300	0.000	6.67E -6
14	Q460	29.9E+3	0.300	0.000	6.67E -6
15	TIMBER	1.5E+3	0.150	0.000	3E -6

Supports

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip-ft/deg)	rY (kip-ft/deg)	rZ (kip-ft/deg)
1	Fixed	Fixed	Fixed	-	-	-
2	-	-	Fixed	-	-	-
3	Fixed	Fixed	Fixed	-	-	-
4	-	-	Fixed	-	-	-
5	Fixed	Fixed	Fixed	-	-	-
6	-	-	Fixed	-	-	-
7	Fixed	Fixed	Fixed	-	-	-
8	-	-	Fixed	-	-	-
9	Fixed	Fixed	Fixed	-	-	-
10	-	-	Fixed	-	-	-
11	Fixed	Fixed	Fixed	-	-	-
12	-	-	Fixed	-	-	-
13	Fixed	Fixed	Fixed	-	-	-
14	-	-	Fixed	-	-	-
15	Fixed	Fixed	Fixed	-	-	-
16	-	-	Fixed	-	-	-
17	Fixed	Fixed	Fixed	-	-	-
18	-	-	Fixed	-	-	-
19	Fixed	Fixed	Fixed	-	-	-
20	-	-	Fixed	-	-	-
21	Fixed	Fixed	Fixed	-	-	-
22	-	-	Fixed	-	-	-
23	Fixed	Fixed	Fixed	-	-	-
24	-	-	Fixed	-	-	-

Supports Cont...

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip˙ft/deg)	rY (kip˙ft/deg)	rZ (kip˙ft/deg)
25	Fixed	Fixed	Fixed	-	-	-
26	Fixed	Fixed	Fixed	-	-	-
27	-	-	Fixed	-	-	-
28	-	-	Fixed	-	-	-
29	-	-	Fixed	-	-	-

Releases

Beam ends not shown in this table are fixed in all directions.

Beam	Node	x	y	z	rx	ry	rz
2	4	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
9	2	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
9	4	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
10	4	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
10	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
11	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
11	8	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
12	8	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
12	10	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
13	10	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
13	12	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
14	12	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
14	14	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
15	14	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
15	16	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
20	16	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
20	18	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
21	18	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
21	20	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
22	20	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
22	22	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
23	22	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
23	24	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
27	28	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
27	27	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
28	27	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
28	29	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
74	6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
75	8	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
76	10	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
77	12	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
78	14	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Releases Cont...

Beam	Node	x	y	z	rx	ry	rz
80	18	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
81	20	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
82	22	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
83	24	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
88	27	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
89	28	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
92	2	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
95	86	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
95	85	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
96	89	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
96	88	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
124	33	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
124	34	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
125	44	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
125	45	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
126	66	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
126	67	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
127	77	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
127	78	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
128	55	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
128	56	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
129	76	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
129	77	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
130	65	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
130	66	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
131	54	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
131	55	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
132	43	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
132	44	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
133	32	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
133	33	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
152	76	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
152	10	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
153	65	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
153	77	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
154	10	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
154	78	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
155	77	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
155	67	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
156	54	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
156	66	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
157	66	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
157	56	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
158	43	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
158	55	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Releases Cont...

Beam	Node	x	y	z	rx	ry	rz
159	55	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
159	45	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
160	32	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
160	44	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
161	44	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
161	34	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
162	7	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
162	33	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
163	33	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
163	11	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
164	89	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
164	29	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
165	86	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
165	88	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
166	25	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
166	85	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
167	88	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
167	27	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
168	85	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
168	89	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
169	1	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
169	86	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Primary Load Cases

Number	Name	Type
1	DEAD LOAD	Dead
2	ROOF LIVE LOAD	Roof Live
3	SNOW LOAD	Snow
4	WIND 1	Wind
5	WIND 2	Wind
6	SEISMIC - H	Seismic-H
8	SEISMIC - V	Seismic-V

Combination Load Cases

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
100	COMB - 1 DEAD	1	DEAD LOAD	1.00
101	COMB - 1 DEAD + 1 SNOW	1	DEAD LOAD	1.00
		3	SNOW LOAD	1.00
102	COMB - 1 DEAD + 1 ROOF LIVE	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	1.00
103	COMB - 1 DEAD + 0.75 ROOF LIVE	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	0.75
104	COMB - 1 DEAD + 0.75 SNOW	1	DEAD LOAD	1.00
		3	SNOW LOAD	0.75
105	COMB - 1 DEAD + 0.6 WIND (1)	1	DEAD LOAD	1.00
		4	WIND 1	0.60
106	COMB - 1 DEAD + 0.6 WIND (2)	1	DEAD LOAD	1.00
		5	WIND 2	0.60
107	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	0.75
		4	WIND 1	0.75
108	COMB - 1 DEAD + 0.75 ROOF LIVE + 0.7	1	DEAD LOAD	1.00
		2	ROOF LIVE LOAD	0.75
		5	WIND 2	0.75
109	COMB - 1 DEAD + 0.75 WIND + 0.75 SN(	1	DEAD LOAD	1.00
		4	WIND 1	0.75
		3	SNOW LOAD	0.75
110	COMB - 1 DEAD + 0.75 WIND + 0.75 SN(	1	DEAD LOAD	1.00
		5	WIND 2	0.75
		3	SNOW LOAD	0.75
111	COMB - 1 DEAD + 0.75 WIND (1)	1	DEAD LOAD	1.00
		4	WIND 1	0.75
112	COMB - 1 DEAD + 0.75 WIND (2)	1	DEAD LOAD	1.00
		5	WIND 2	0.75
113	COMB - 0.6 DEAD + 0.6 WIND (1)	1	DEAD LOAD	0.60
		4	WIND 1	0.60
114	COMB - 0.6 DEAD + 0.6 WIND (2)	1	DEAD LOAD	0.60
		5	WIND 2	0.60
115	COMB - 1 DEAD + 0.91 SEISMIC-H + 0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.91
		8	SEISMIC - V	0.70
116	COMB - 1 DEAD + -0.91 SEISMIC-H + 0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	0.70
117	COMB - 1 DEAD + 0.91 SEISMIC-H + -0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.91
		8	SEISMIC - V	-0.70
118	COMB - 1 DEAD + -0.91 SEISMIC-H + -0.	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	-0.70

Combination Load Cases Cont...

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
119	COMB - 1 DEAD + 0.683 SEISMIC-H + 0.	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.68
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
120	COMB - 1 DEAD + -0.683 SEISMIC-H + 0	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.68
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
121	COMB - 1 DEAD + 0.683 SEISMIC-H + -0	1	DEAD LOAD	1.00
		6	SEISMIC - H	0.68
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
122	COMB - 1 DEAD + -0.683 SEISMIC-H + -(	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.68
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
123	COMB - 0.6 DEAD + 0.91 SEISMIC-H + -(	1	DEAD LOAD	0.60
		6	SEISMIC - H	0.91
		8	SEISMIC - V	-0.70
124	COMB - 0.6 DEAD + -0.91 SEISMIC-H + -	1	DEAD LOAD	0.60
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	-0.70
125	COMB - 0.6 DEAD + 0.91 SEISMIC-H + 0.	1	DEAD LOAD	0.60
		6	SEISMIC - H	0.91
		8	SEISMIC - V	0.70
126	COMB - 0.6 DEAD + -0.91 SEISMIC-H + (	1	DEAD LOAD	0.60
		6	SEISMIC - H	-0.91
		8	SEISMIC - V	0.70
315	COMB - 1 DEAD + 1.4 SEISMIC-H + 0.7 S	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.40
		8	SEISMIC - V	0.70
316	COMB - 1 DEAD + -1.4 SEISMIC-H + 0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	-0.70
		8	SEISMIC - V	0.70
317	COMB - 1 DEAD + 1.4 SEISMIC-H + -0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.40
		8	SEISMIC - V	-0.70
318	COMB - 1 DEAD + -1.4 SEISMIC-H + -0.7	1	DEAD LOAD	1.00
		6	SEISMIC - H	-1.40
		8	SEISMIC - V	-0.70
319	COMB - 1 DEAD + 1.05 SEISMIC-H + 0.5	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.05
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
320	COMB - 1 DEAD + -1.05 SEISMIC-H + 0.5	1	DEAD LOAD	1.00

Combination Load Cases Cont...

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
		6	SEISMIC - H	-1.05
		8	SEISMIC - V	0.52
		3	SNOW LOAD	0.75
321	COMB - 1 DEAD + 1.05 SEISMIC-H + -0.5	1	DEAD LOAD	1.00
		6	SEISMIC - H	1.05
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
322	COMB - 1 DEAD + -1.05 SEISMIC-H + -0.	1	DEAD LOAD	1.00
		6	SEISMIC - H	-1.05
		8	SEISMIC - V	-0.52
		3	SNOW LOAD	0.75
323	COMB - 0.6 DEAD + 1.4 SEISMIC-H + -0.	1	DEAD LOAD	0.60
		6	SEISMIC - H	1.40
		8	SEISMIC - V	-0.70
324	COMB - 0.6 DEAD + -1.4 SEISMIC-H + -0	1	DEAD LOAD	0.60
		6	SEISMIC - H	-1.40
		8	SEISMIC - V	-0.70
326	COMB - 0.6 DEAD + 1.4 SEISMIC-H + 0.7	1	DEAD LOAD	0.60
		6	SEISMIC - H	1.40
		8	SEISMIC - V	0.70
327	COMB - 0.6 DEAD + -1.4 SEISMIC-H + 0.	1	DEAD LOAD	0.60
		6	SEISMIC - H	-1.40
		8	SEISMIC - V	0.70

Load Generators

There is no data of this type.

1 DEAD LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip`in)	MY (kip`in)	MZ (kip`in)
28	-	-3.750	-	-	-	-
29	-	-7.500	-	-	-	-

1 DEAD LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
9	UNI	lbf/ft	GY	-710.000	-	-	-	-
10	UNI	lbf/ft	GY	-710.000	-	-	-	-
11	UNI	lbf/ft	GY	-710.000	-	-	-	-
12	UNI	lbf/ft	GY	-710.000	-	-	-	-
13	UNI	lbf/ft	GY	-710.000	-	-	-	-
14	UNI	lbf/ft	GY	-710.000	-	-	-	-
15	UNI	lbf/ft	GY	-710.000	-	-	-	-
20	UNI	lbf/ft	GY	-710.000	-	-	-	-
21	UNI	lbf/ft	GY	-710.000	-	-	-	-
22	UNI	lbf/ft	GY	-710.000	-	-	-	-
23	UNI	lbf/ft	GY	-710.000	-	-	-	-
27	UNI	lbf/ft	GY	-60.000	-	-	-	-
28	UNI	lbf/ft	GY	-60.000	-	-	-	-

1 DEAD LOAD : Selfweight

Direction	Factor	Assigned Geometry
Y	-1.000	ALL

2 ROOF LIVE LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip`in)	MY (kip`in)	MZ (kip`in)
28	-	-3.000	-	-	-	-
29	-	-7.500	-	-	-	-

2 ROOF LIVE LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
9	UNI	lbf/ft	GY	-570.000	-	-	-	-
10	UNI	lbf/ft	GY	-570.000	-	-	-	-
11	UNI	lbf/ft	GY	-570.000	-	-	-	-
12	UNI	lbf/ft	GY	-570.000	-	-	-	-
13	UNI	lbf/ft	GY	-570.000	-	-	-	-
14	UNI	lbf/ft	GY	-570.000	-	-	-	-
15	UNI	lbf/ft	GY	-570.000	-	-	-	-
20	UNI	lbf/ft	GY	-570.000	-	-	-	-
21	UNI	lbf/ft	GY	-570.000	-	-	-	-
22	UNI	lbf/ft	GY	-570.000	-	-	-	-
23	UNI	lbf/ft	GY	-570.000	-	-	-	-
27	UNI	lbf/ft	GY	-50.000	-	-	-	-

2 ROOF LIVE LOAD : Beam Loads Cont...

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
28	UNI	lbf/ft	GY	-50.000	-	-	-	-

3 SNOW LOAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip`in)	MY (kip`in)	MZ (kip`in)
28	-	-3.750	-	-	-	-
29	-	-7.500	-	-	-	-

3 SNOW LOAD : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
9	UNI	lbf/ft	GY	-710.000	-	-	-	-
10	UNI	lbf/ft	GY	-710.000	-	-	-	-
11	UNI	lbf/ft	GY	-710.000	-	-	-	-
12	UNI	lbf/ft	GY	-710.000	-	-	-	-
13	UNI	lbf/ft	GY	-710.000	-	-	-	-
14	UNI	lbf/ft	GY	-710.000	-	-	-	-
15	UNI	lbf/ft	GY	-710.000	-	-	-	-
20	UNI	lbf/ft	GY	-710.000	-	-	-	-
21	UNI	lbf/ft	GY	-710.000	-	-	-	-
22	UNI	lbf/ft	GY	-710.000	-	-	-	-
23	UNI	lbf/ft	GY	-710.000	-	-	-	-
27	UNI	lbf/ft	GY	-60.000	-	-	-	-
28	UNI	lbf/ft	GY	-60.000	-	-	-	-

4 WIND 1 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
9	UNI	lbf/ft	GX	90.000	-	-	-	-
10	UNI	lbf/ft	GX	90.000	-	-	-	-
11	UNI	lbf/ft	GX	90.000	-	-	-	-
12	UNI	lbf/ft	GX	90.000	-	-	-	-
13	UNI	lbf/ft	GX	90.000	-	-	-	-
14	UNI	lbf/ft	GX	90.000	-	-	-	-
15	UNI	lbf/ft	GX	90.000	-	-	-	-
20	UNI	lbf/ft	GX	90.000	-	-	-	-
21	UNI	lbf/ft	GX	90.000	-	-	-	-
22	UNI	lbf/ft	GX	90.000	-	-	-	-
23	UNI	lbf/ft	GX	90.000	-	-	-	-
27	UNI	lbf/ft	GX	220.000	-	-	-	-

4 WIND 1 : Beam Loads Cont...

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
28	UNI	lbf/ft	GX	220.000	-	-	-	-

5 WIND 2 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
9	UNI	lbf/ft	GX	-90.000	-	-	-	-
10	UNI	lbf/ft	GX	-90.000	-	-	-	-
11	UNI	lbf/ft	GX	-90.000	-	-	-	-
12	UNI	lbf/ft	GX	-90.000	-	-	-	-
13	UNI	lbf/ft	GX	-90.000	-	-	-	-
14	UNI	lbf/ft	GX	-90.000	-	-	-	-
15	UNI	lbf/ft	GX	-90.000	-	-	-	-
20	UNI	lbf/ft	GX	-90.000	-	-	-	-
21	UNI	lbf/ft	GX	-90.000	-	-	-	-
22	UNI	lbf/ft	GX	-90.000	-	-	-	-
23	UNI	lbf/ft	GX	-90.000	-	-	-	-
27	UNI	lbf/ft	GX	-220.000	-	-	-	-
28	UNI	lbf/ft	GX	-220.000	-	-	-	-

6 SEISMIC - H : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
9	UNI	lbf/ft	GX	210.000	-	-	-	-
10	UNI	lbf/ft	GX	210.000	-	-	-	-
11	UNI	lbf/ft	GX	210.000	-	-	-	-
12	UNI	lbf/ft	GX	210.000	-	-	-	-
13	UNI	lbf/ft	GX	210.000	-	-	-	-
14	UNI	lbf/ft	GX	210.000	-	-	-	-
15	UNI	lbf/ft	GX	210.000	-	-	-	-
20	UNI	lbf/ft	GX	210.000	-	-	-	-
21	UNI	lbf/ft	GX	210.000	-	-	-	-
22	UNI	lbf/ft	GX	210.000	-	-	-	-
23	UNI	lbf/ft	GX	210.000	-	-	-	-
27	UNI	lbf/ft	GX	210.000	-	-	-	-
28	UNI	lbf/ft	GX	210.000	-	-	-	-

8 SEISMIC - V : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
9	UNI	lbf/ft	GY	-120.000	-	-	-	-
10	UNI	lbf/ft	GY	-120.000	-	-	-	-
11	UNI	lbf/ft	GY	-120.000	-	-	-	-
12	UNI	lbf/ft	GY	-120.000	-	-	-	-
13	UNI	lbf/ft	GY	-120.000	-	-	-	-
14	UNI	lbf/ft	GY	-120.000	-	-	-	-
15	UNI	lbf/ft	GY	-120.000	-	-	-	-
20	UNI	lbf/ft	GY	-120.000	-	-	-	-
21	UNI	lbf/ft	GY	-120.000	-	-	-	-
22	UNI	lbf/ft	GY	-120.000	-	-	-	-
23	UNI	lbf/ft	GY	-120.000	-	-	-	-
27	UNI	lbf/ft	GY	-10.000	-	-	-	-
28	UNI	lbf/ft	GY	-10.000	-	-	-	-

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	24	315:COMB - 1	**0.510**	-0.010	-0.000	0.510	0.000	0.000	-0.000
Min X	24	324:COMB - 0.	**-0.510**	-0.005	0.000	0.510	0.000	-0.000	0.001
Max Y	76	323:COMB - 0.	0.336	**0.020**	-0.000	0.336	0.000	0.000	-0.001
Min Y	12	319:COMB - 1	0.320	**-0.048**	-0.000	0.324	0.000	0.000	-0.001
Max Z	66	324:COMB - 0.	-0.249	-0.006	**0.000**	0.249	0.000	-0.000	0.001
Min Z	62	319:COMB - 1	0.211	-0.009	**-0.000**	0.212	-0.000	0.000	-0.001
Max rX	24	319:COMB - 1	0.382	-0.016	-0.000	0.383	**0.000**	0.000	0.000
Min rX	91	326:COMB - 0.	0.065	-0.012	-0.000	0.066	**-0.000**	-0.000	-0.001
Max rY	89	318:COMB - 1	-0.037	-0.007	0.000	0.038	0.000	**0.000**	0.000
Min rY	32	318:COMB - 1	-0.061	-0.013	0.000	0.062	0.000	**-0.000**	0.001
Max rZ	93	318:COMB - 1	-0.323	-0.010	0.000	0.323	-0.000	0.000	**0.002**
Min rZ	2	319:COMB - 1	0.328	-0.029	0.000	0.329	0.000	-0.000	**-0.004**
Max Rst	24	315:COMB - 1	0.510	-0.010	-0.000	**0.510**	0.000	0.000	-0.000

Beam Displacement Detail Summary

Displacements shown in italic indicate the presence of an offset

	Beam	L/C	d (ft)	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	23	315:COMB - 1	18.167	**0.510**	-0.010	0	0.510
Min X	23	318:COMB - 1	18.167	**-0.510**	-0.008	0	0.510
Max Y	53	323:COMB - 0.	8.000	0.262	**0.020**	0	0.263
Min Y	20	101:COMB - 1	10.165	0.000	**-0.660**	0	0.660
Max Z	1	1:DEAD LOAD	0	0	0	**0**	0
Min Z	1	1:DEAD LOAD	0	0	0	**0**	0
Max Rst	20	319:COMB - 1	10.165	0.357	-0.608	0	**0.705**

Beam End Displacement Summary

Displacements shown in italic indicate the presence of an offset

	Beam	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)
Max X	23	24	315:COMB - 1	**0.510**	-0.010	0	0.510
Min X	23	24	318:COMB - 1	**-0.510**	-0.008	0	0.510
Max Y	53	65	323:COMB - 0.	0.262	**0.020**	0	0.263
Min Y	13	12	319:COMB - 1	0.320	**-0.048**	0	0.324
Max Z	1	1	1:DEAD LOAD	0	0	**0**	0
Min Z	1	1	1:DEAD LOAD	0	0	**0**	0
Max Rst	23	24	315:COMB - 1	0.510	-0.010	0	**0.510**

Beam End Force Summary

The signs of the forces at end B of each beam have been reversed. For example: this means that the Min Fx entry gives the largest tension value for an beam.

				Axial	Shear		Torsion	Bending	
	Beam	Node	L/C	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip-in)	My (kip-in)	Mz (kip-in)
Max Fx	6	11	315:COMB - 1	**83.387**	0.000	-0.016	0.000	-0.145	-0.000
Min Fx	4	32	323:COMB - 0.	**-48.752**	0.000	-0.024	-0.000	-2.238	-0.000
Max Fy	20	16	101:COMB - 1	0.009	**14.703**	0.000	0.000	-0.000	9.856
Min Fy	20	18	101:COMB - 1	0.009	**-14.696**	0.000	0.000	0.000	8.934
Max Fz	76	77	323:COMB - 0.	7.308	-0.000	**1.001**	0.000	-57.553	-0.000
Min Fz	76	77	318:COMB - 1	13.188	0.000	**-1.010**	-0.000	57.678	0.000
Max Mx	87	88	318:COMB - 1	14.209	-0.000	0.289	**0.000**	-5.335	0.000
Min Mx	87	88	323:COMB - 0.	11.503	0.000	-0.239	**-0.000**	3.892	-0.000
Max My	76	77	318:COMB - 1	13.188	0.000	-1.010	-0.000	**57.678**	0.000
Min My	76	77	323:COMB - 0.	7.308	-0.000	1.001	0.000	**-57.553**	-0.000
Max Mz	24	29	323:COMB - 0.	3.973	0.076	0.000	-0.000	-0.000	**19.272**
Min Mz	24	29	318:COMB - 1	7.154	-0.094	-0.000	0.000	0.000	**-21.177**

Beam Force Detail Summary

Sign convention as diagrams:- positive above line, negative below line except Fx where positive is compression. Distance d is given from beam end A.

				Axial	Shear		Torsion	Bending	
	Beam	L/C	d (ft)	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip-in)	My (kip-in)	Mz (kip-in)
Max Fx	6	315:COMB - 1	0	**83.387**	0.000	-0.016	0.000	-0.145	-0.000
Min Fx	4	323:COMB - 0.	8.000	**-48.752**	0.000	-0.024	-0.000	-2.238	-0.000
Max Fy	20	101:COMB - 1	0	0.009	**14.703**	0.000	0.000	-0.000	9.856
Min Fy	20	101:COMB - 1	20.330	0.009	**-14.696**	0.000	0.000	0.000	8.934
Max Fz	76	323:COMB - 0.	0	7.308	-0.000	**1.001**	0.000	-57.553	-0.000
Min Fz	76	318:COMB - 1	0	13.188	0.000	**-1.010**	-0.000	57.678	0.000
Max Mx	87	318:COMB - 1	0	14.209	-0.000	0.289	**0.000**	-5.335	0.000
Min Mx	87	323:COMB - 0.	0	11.503	0.000	-0.239	**-0.000**	3.892	-0.000
Max My	76	318:COMB - 1	0	13.188	0.000	-1.010	-0.000	**57.678**	0.000

Beam Force Detail Summary Cont...

				Axial	Shear		Torsion	Bending	
	Beam	L/C	d (ft)	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip-in)	My (kip-in)	Mz (kip-in)
Min My	76	323:COMB - 0.	0	7.308	-0.000	1.001	0.000	**-57.553**	-0.000
Max Mz	24	323:COMB - 0.	0	3.973	0.076	0.000	-0.000	-0.000	**19.272**
Min Mz	20	101:COMB - 1	10.165	0.009	0.004	0.000	0.000	-0.000	**-887.122**

Reaction Summary

			Horizontal	Vertical	Horizontal	Moment		
	Node	L/C	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
Max FX	7	318:COMB - 1	**30.930**	93.768	-0.000	0	0	0
Min FX	11	315:COMB - 1	**-31.060**	97.043	0.000	0	0	0
Max FY	11	315:COMB - 1	-31.060	**97.043**	0.000	0	0	0
Min FY	7	323:COMB - 0.	-29.544	**-61.082**	0.000	0	0	0
Max FZ	29	323:COMB - 0.	0	0	**0.000**	0	0	0
Min FZ	29	318:COMB - 1	0	0	**-0.000**	0	0	0
Max MX	1	1:DEAD LOAD	-0.295	19.946	0.000	**0**	0	0
Min MX	1	1:DEAD LOAD	-0.295	19.946	0.000	**0**	0	0
Max MY	1	1:DEAD LOAD	-0.295	19.946	0.000	0	**0**	0
Min MY	1	1:DEAD LOAD	-0.295	19.946	0.000	0	**0**	0
Max MZ	1	1:DEAD LOAD	-0.295	19.946	0.000	0	0	**0**
Min MZ	1	1:DEAD LOAD	-0.295	19.946	0.000	0	0	**0**

Utilization Ratio

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
1	W14X53	W14X53	0.157	1.000	0.157	Cl.E3	319	15.600	541.000	57.700	1.940
2	W14X53	W14X53	0.115	1.000	0.115	Cl.E3	101	15.600	541.000	57.700	1.940
3	W14X53	W14X53	0.116	1.000	0.116	Cl.E3	101	15.600	541.000	57.700	1.940
4	W14X68	W14X68	0.242	1.000	0.242	Eq.H1-1a	318	20.000	722.000	121.000	3.010
5	W14X74	W14X74	0.090	1.000	0.090	Cl.E3	320	21.800	795.000	134.000	3.870
6	W14X68	W14X68	0.251	1.000	0.251	Eq.H1-1a	315	20.000	722.000	121.000	3.010
7	W14X53	W14X53	0.116	1.000	0.116	Cl.E3	101	15.600	541.000	57.700	1.940
8	W14X53	W14X53	0.121	1.000	0.121	Cl.E3	101	15.600	541.000	57.700	1.940
9	W16X26	W16X26	0.614	1.000	0.614	Cl.F2.2	319	7.680	301.000	9.590	0.262
10	W16X26	W16X26	0.665	1.000	0.665	Cl.F2.2	101	7.680	301.000	9.590	0.262
11	W16X57	W16X57	0.239	1.000	0.239	Eq.H1-1b	320	16.800	758.000	43.100	2.220
12	W16X57	W16X57	0.242	1.000	0.242	Eq.H1-1b	320	16.800	758.000	43.100	2.220
13	W16X57	W16X57	0.410	1.000	0.410	Eq.H1-3b	320	16.800	758.000	43.100	2.220
14	W16X57	W16X57	0.250	1.000	0.250	Eq.H1-1b	319	16.800	758.000	43.100	2.220
15	W16X26	W16X26	0.664	1.000	0.664	Cl.F2.2	101	7.680	301.000	9.590	0.262
16	W14X53	W14X53	0.120	1.000	0.120	Cl.E3	101	15.600	541.000	57.700	1.940
17	W14X53	W14X53	0.113	1.000	0.113	Cl.E3	101	15.600	541.000	57.700	1.940

Utilization Ratio Cont...

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
18	W14X53	W14X53	0.113	1.000	0.113	Cl.E3	101	15.600	541.000	57.700	1.940
19	W14X53	W14X53	0.061	1.000	0.061	Cl.E3	101	15.600	541.000	57.700	1.940
20	W16X26	W16X26	0.803	1.000	0.803	Cl.F2.2	101	7.680	301.000	9.590	0.262
21	W16X26	W16X26	0.640	1.000	0.640	Cl.F2.2	101	7.680	301.000	9.590	0.262
22	W16X26	W16X26	0.641	1.000	0.641	Cl.F2.2	101	7.680	301.000	9.590	0.262
23	W16X26	W16X26	0.641	1.000	0.641	Cl.F2.2	101	7.680	301.000	9.590	0.262
24	W16X26	N/A						7.680	301.000	9.590	0.262
25	W12X40	W12X40	0.036	1.000	0.036	Cl.E3	101	11.700	307.000	44.100	0.906
26	W12X45	W12X45	0.052	1.000	0.052	Cl.E3	318	13.100	348.000	50.000	1.260
27	W16X57	W16X57	0.032	1.000	0.032	Eq.H1-1b	320	16.800	758.000	43.100	2.220
28	W16X57	W16X57	0.039	1.000	0.039	Eq.H1-1b	320	16.800	758.000	43.100	2.220
30	W14X53	W14X53	0.115	1.000	0.115	Cl.E3	101	15.600	541.000	57.700	1.940
31	W14X68	W14X68	0.203	1.000	0.203	Eq.H1-1a	320	20.000	722.000	121.000	3.010
32	W14X74	W14X74	0.087	1.000	0.087	Cl.E3	320	21.800	795.000	134.000	3.870
33	W14X68	W14X68	0.209	1.000	0.209	Eq.H1-1a	315	20.000	722.000	121.000	3.010
34	W14X53	W14X53	0.115	1.000	0.115	Cl.E3	101	15.600	541.000	57.700	1.940
35	W14X53	W14X53	0.119	1.000	0.119	Cl.E3	101	15.600	541.000	57.700	1.940
36	W14X53	W14X53	0.118	1.000	0.118	Cl.E3	101	15.600	541.000	57.700	1.940
37	W14X53	W14X53	0.112	1.000	0.112	Cl.E3	101	15.600	541.000	57.700	1.940
38	W14X53	W14X53	0.112	1.000	0.112	Cl.E3	101	15.600	541.000	57.700	1.940
39	W14X53	W14X53	0.060	1.000	0.060	Cl.E3	101	15.600	541.000	57.700	1.940
41	W14X53	W14X53	0.113	1.000	0.113	Cl.E3	101	15.600	541.000	57.700	1.940
42	W14X68	W14X68	0.167	1.000	0.167	Cl.E3	320	20.000	722.000	121.000	3.010
43	W14X74	W14X74	0.083	1.000	0.083	Cl.E3	320	21.800	795.000	134.000	3.870
44	W14X68	W14X68	0.167	1.000	0.167	Cl.E3	319	20.000	722.000	121.000	3.010
45	W14X53	W14X53	0.113	1.000	0.113	Cl.E3	101	15.600	541.000	57.700	1.940
46	W14X53	W14X53	0.117	1.000	0.117	Cl.E3	101	15.600	541.000	57.700	1.940
47	W14X53	W14X53	0.116	1.000	0.116	Cl.E3	101	15.600	541.000	57.700	1.940
48	W14X53	W14X53	0.110	1.000	0.110	Cl.E3	101	15.600	541.000	57.700	1.940
49	W14X53	W14X53	0.110	1.000	0.110	Cl.E3	101	15.600	541.000	57.700	1.940
50	W14X53	W14X53	0.058	1.000	0.058	Cl.E3	101	15.600	541.000	57.700	1.940
52	W14X53	W14X53	0.111	1.000	0.111	Cl.E3	101	15.600	541.000	57.700	1.940
53	W14X68	W14X68	0.133	1.000	0.133	Cl.E3	320	20.000	722.000	121.000	3.010
54	W14X74	W14X74	0.080	1.000	0.080	Cl.E3	319	21.800	795.000	134.000	3.870
55	W14X68	W14X68	0.133	1.000	0.133	Cl.E3	319	20.000	722.000	121.000	3.010
56	W14X53	W14X53	0.111	1.000	0.111	Cl.E3	101	15.600	541.000	57.700	1.940
57	W14X53	W14X53	0.116	1.000	0.116	Cl.E3	101	15.600	541.000	57.700	1.940
58	W14X53	W14X53	0.115	1.000	0.115	Cl.E3	101	15.600	541.000	57.700	1.940
59	W14X53	W14X53	0.108	1.000	0.108	Cl.E3	101	15.600	541.000	57.700	1.940
60	W14X53	W14X53	0.108	1.000	0.108	Cl.E3	101	15.600	541.000	57.700	1.940
61	W14X53	W14X53	0.056	1.000	0.056	Cl.E3	101	15.600	541.000	57.700	1.940
63	W14X53	W14X53	0.110	1.000	0.110	Cl.E3	101	15.600	541.000	57.700	1.940
64	W14X68	W14X68	0.098	1.000	0.098	Cl.E3	320	20.000	722.000	121.000	3.010
65	W14X74	W14X74	0.075	1.000	0.075	Cl.E3	320	21.800	795.000	134.000	3.870
66	W14X68	W14X68	0.098	1.000	0.098	Cl.E3	319	20.000	722.000	121.000	3.010

Utilization Ratio Cont...

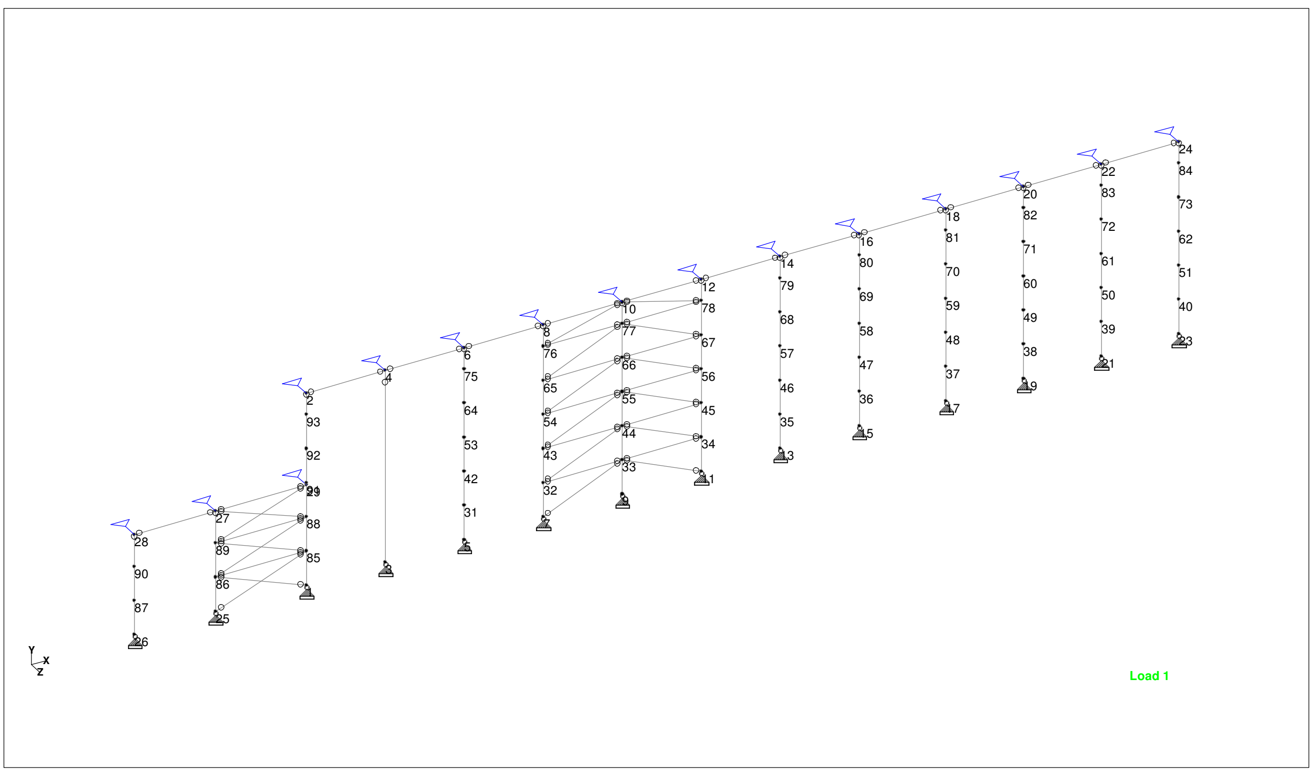
Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
67	W14X53	W14X53	0.110	1.000	0.110	Cl.E3	101	15.600	541.000	57.700	1.940
68	W14X53	W14X53	0.114	1.000	0.114	Cl.E3	101	15.600	541.000	57.700	1.940
69	W14X53	W14X53	0.113	1.000	0.113	Cl.E3	101	15.600	541.000	57.700	1.940
70	W14X53	W14X53	0.107	1.000	0.107	Cl.E3	101	15.600	541.000	57.700	1.940
71	W14X53	W14X53	0.107	1.000	0.107	Cl.E3	101	15.600	541.000	57.700	1.940
72	W14X53	W14X53	0.055	1.000	0.055	Cl.E3	101	15.600	541.000	57.700	1.940
74	W14X53	W14X53	0.108	1.000	0.108	Cl.E3	101	15.600	541.000	57.700	1.940
75	W14X68	W14X68	0.077	1.000	0.077	Cl.E3	319	20.000	722.000	121.000	3.010
76	W14X74	W14X74	0.071	1.000	0.071	Eq.H1-1b	320	21.800	795.000	134.000	3.870
77	W14X68	W14X68	0.077	1.000	0.077	Cl.E3	320	20.000	722.000	121.000	3.010
78	W14X53	W14X53	0.108	1.000	0.108	Cl.E3	101	15.600	541.000	57.700	1.940
79	W14X53	W14X53	0.112	1.000	0.112	Cl.E3	101	15.600	541.000	57.700	1.940
80	W14X53	W14X53	0.111	1.000	0.111	Cl.E3	101	15.600	541.000	57.700	1.940
81	W14X53	W14X53	0.105	1.000	0.105	Cl.E3	101	15.600	541.000	57.700	1.940
82	W14X53	W14X53	0.105	1.000	0.105	Cl.E3	101	15.600	541.000	57.700	1.940
83	W14X53	W14X53	0.053	1.000	0.053	Cl.E3	101	15.600	541.000	57.700	1.940
84	W14X53	W14X53	0.138	1.000	0.138	Cl.E3	319	15.600	541.000	57.700	1.940
85	W12X45	W12X45	0.033	1.000	0.033	Cl.E3	318	13.100	348.000	50.000	1.260
86	W12X40	W12X40	0.035	1.000	0.035	Cl.E3	101	11.700	307.000	44.100	0.906
87	W14X53	W14X53	0.120	1.000	0.120	Cl.E3	319	15.600	541.000	57.700	1.940
88	W12X45	W12X45	0.017	1.000	0.017	Cl.E3	320	13.100	348.000	50.000	1.260
89	W12X40	W12X40	0.034	1.000	0.034	Cl.E3	101	11.700	307.000	44.100	0.906
90	W14X53	W14X53	0.053	1.000	0.053	Cl.E3	320	15.600	541.000	57.700	1.940
91	W14X53	W14X53	0.051	1.000	0.051	Cl.E3	320	15.600	541.000	57.700	1.940
92	W14X53	W14X53	0.050	1.000	0.050	Cl.E3	320	15.600	541.000	57.700	1.940
95	W12X58	W12X58	0.040	1.000	0.040	Eq.H1-1b	319	17.000	475.000	107.000	2.100
96	W12X58	W12X58	0.040	1.000	0.040	Eq.H1-1b	319	17.000	475.000	107.000	2.100
124	W12X58	W12X58	0.103	1.000	0.103	Cl.E3	324	17.000	475.000	107.000	2.100
125	W12X58	W12X58	0.103	1.000	0.103	Cl.E3	324	17.000	475.000	107.000	2.100
126	W12X58	W12X58	0.104	1.000	0.104	Cl.E3	324	17.000	475.000	107.000	2.100
127	W12X58	W12X58	0.105	1.000	0.105	Cl.E3	327	17.000	475.000	107.000	2.100
128	W12X58	W12X58	0.103	1.000	0.103	Cl.E3	324	17.000	475.000	107.000	2.100
129	W12X58	W12X58	0.104	1.000	0.104	Cl.E3	326	17.000	475.000	107.000	2.100
130	W12X58	W12X58	0.105	1.000	0.105	Cl.E3	323	17.000	475.000	107.000	2.100
131	W12X58	W12X58	0.103	1.000	0.103	Cl.E3	323	17.000	475.000	107.000	2.100
132	W12X58	W12X58	0.103	1.000	0.103	Cl.E3	323	17.000	475.000	107.000	2.100
133	W12X58	W12X58	0.103	1.000	0.103	Cl.E3	323	17.000	475.000	107.000	2.100
152	HSST4X4	HSST4X4	0.867	1.000	0.867	Eq.H1-1a	118	3.590	8.220	8.220	13.500
153	HSST4X4	HSST4X4	0.753	1.000	0.753	Eq.H1-1a	116	6.360	12.300	12.300	21.800
154	HSST4X4	HSST4X4	0.866	1.000	0.866	Eq.H1-1a	117	3.590	8.220	8.220	13.500
155	HSST4X4	HSST4X4	0.755	1.000	0.755	Eq.H1-1a	115	6.360	12.300	12.300	21.800
156	HSST4X4	HSST4X4	0.729	1.000	0.729	Eq.H1-1a	116	6.360	12.300	12.300	21.800
157	HSST4X4	HSST4X4	0.729	1.000	0.729	Eq.H1-1a	115	6.360	12.300	12.300	21.800
158	HSST4X4	HSST4X4	0.738	1.000	0.738	Eq.H1-1a	116	6.360	12.300	12.300	21.800
159	HSST4X4	HSST4X4	0.739	1.000	0.739	Eq.H1-1a	115	6.360	12.300	12.300	21.800

Utilization Ratio Cont...

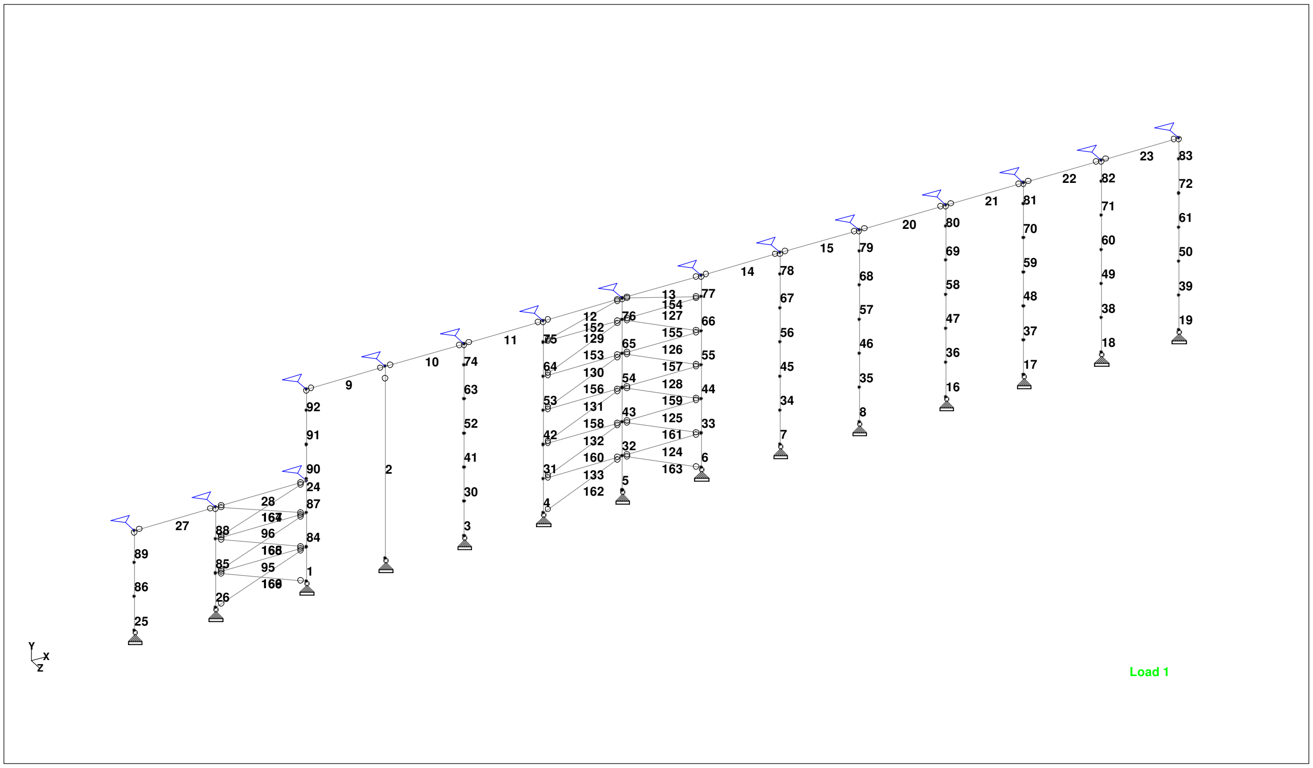
Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
160	HSST4X4	HSST4X4	0.738	1.000	0.738	Eq.H1-1a	116	6.360	12.300	12.300	21.800
161	HSST4X4	HSST4X4	0.738	1.000	0.738	Eq.H1-1a	115	6.360	12.300	12.300	21.800
162	HSST4X4	HSST4X4	0.753	1.000	0.753	Eq.H1-1a	116	6.360	12.300	12.300	21.800
163	HSST4X4	HSST4X4	0.753	1.000	0.753	Eq.H1-1a	115	6.360	12.300	12.300	21.800
164	HSST4X4	HSST4X4	0.306	1.000	0.306	Eq.H1-1a	116	3.590	8.220	8.220	13.500
165	HSST4X4	HSST4X4	0.316	1.000	0.316	Eq.H1-1a	116	3.590	8.220	8.220	13.500
166	HSST4X4	HSST4X4	0.323	1.000	0.323	Eq.H1-1a	116	3.590	8.220	8.220	13.500
167	HSST4X4	HSST4X4	0.320	1.000	0.320	Eq.H1-1a	115	3.590	8.220	8.220	13.500
168	HSST4X4	HSST4X4	0.314	1.000	0.314	Eq.H1-1a	115	3.590	8.220	8.220	13.500
169	HSST4X4	HSST4X4	0.320	1.000	0.320	Eq.H1-1a	115	3.590	8.220	8.220	13.500

Failed Members

There is no data of this type.



Whole Structure - Node Labels



Whole Structure - Member Labels

ROOF FRAMING

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 3 JAN 2024, 6:45PM

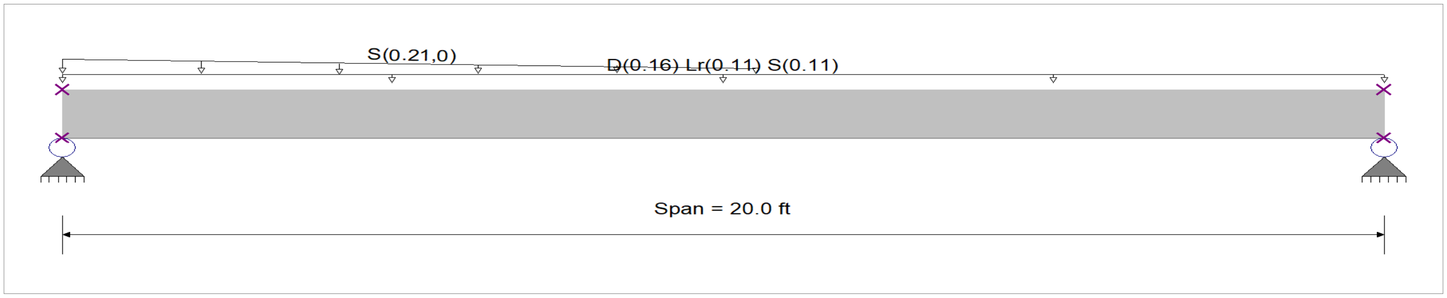
General Beam Analysis

Project File: cpfd.ec6

DESCRIPTION: Moment applied to Roof Joist Due to Drifting Snow

General Beam Properties

Elastic Modulus	29,000.0 ksi			
Span #1	Span Length = 20.0 ft	Area = 10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.160, Lr = 0.110, S = 0.110 k/ft, Tributary Width = 1.0 ft

Varying Uniform Load : S= 0.210->0.0 k/ft, Extent = 0.0 -->> 10.50 ft, Trib Width = 1.0 ft, (Snow Drift)

DESIGN SUMMARY

Maximum Bending =	15.493 k-ft	Maximum Shear =	3.610 k
Load Combination	+D+S	Load Combination	+D+S
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	9.300 ft	Location of maximum on span	0.000 ft

Maximum Deflection

Max Downward Transient Deflection	0.189 in	1266
Max Upward Transient Deflection	0.002 in	109848
Max Downward Total Deflection	0.390 in	616
Max Upward Total Deflection	0.002 in	125868

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values (k-ft)							Shear Values (k)	
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	VnxVnx/Omega
Overall MAXimum Envelope												
Dsgn. L = 20.00 ft	1			15.49		15.49					3.61	
D Only												
Dsgn. L = 20.00 ft	1			8.00		8.00					1.60	
+D+Lr												
Dsgn. L = 20.00 ft	1			13.50		13.50					2.70	
+D+S												
Dsgn. L = 20.00 ft	1			15.49		15.49					3.61	
+D+0.750Lr												
Dsgn. L = 20.00 ft	1			12.13		12.13					2.43	
+D+0.750S												
Dsgn. L = 20.00 ft	1			13.61		13.61					3.11	
+0.60D												
Dsgn. L = 20.00 ft	1			4.80		4.80					0.96	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.3896	9.900		0.0000	0.000

Vertical Reactions

Support notation : Far left is #: Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.610	2.893
Overall MINimum		
D Only	1.600	1.600
+D+Lr	2.700	2.700
+D+S	3.610	2.893
+D+0.750Lr	2.425	2.425
+D+0.750S	3.107	2.570
+0.60D	0.960	0.960

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: cpfd.ec6

DESCRIPTION: Moment applied to Roof Joist Due to Drifting Snow

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Lr Only	1.100	1.100
S Only	2.010	1.293

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 20 FEB 2024, 3:54PM

General Beam Analysis

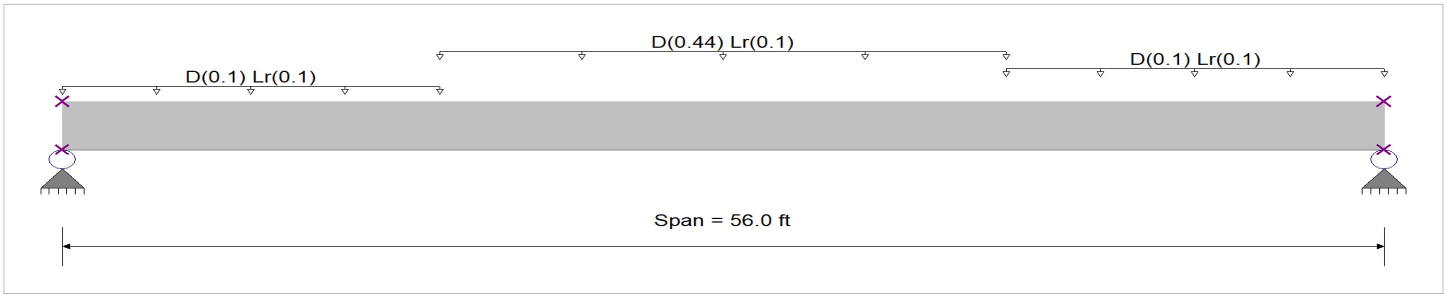
Project File: cpfd.ec6

DESCRIPTION: Moment applied to Joists from Penthouse

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1 Span Length = 56.0 ft Area = 10.0 in^2 Moment of Inertia = 100.0 in^4



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Load for Span Number 1

Uniform Load : D = 0.10, Lr = 0.10 k/ft, Extent = 0.0 -->> 16.0 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.10, Lr = 0.10 k/ft, Extent = 40.0 -->> 56.0 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.440, Lr = 0.10 k/ft, Extent = 16.0 -->> 40.0 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending =	168.160 k-ft	Maximum Shear =	9.680 k
Load Combination	+D+Lr	Load Combination	+D+Lr
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	28.000 ft	Location of maximum on span	56.000 ft

Maximum Deflection		
Max Downward Transient Deflection	7.691 in	87
Max Upward Transient Deflection	0.122 in	5504
Max Downward Total Deflection	31.838 in	21
Max Upward Total Deflection	0.224 in	3006

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values (k-ft)							Shear Values (k)	
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	VnxVnx/Omega
Overall MAXimum Envelope												
Dsgn. L = 56.00 ft	1			168.16		168.16					9.68	
D Only												
Dsgn. L = 56.00 ft	1			128.96		128.96					6.88	
+D+Lr												
Dsgn. L = 56.00 ft	1			168.16		168.16					9.68	
+D+0.750Lr												
Dsgn. L = 56.00 ft	1			158.36		158.36					8.98	
+0.60D												
Dsgn. L = 56.00 ft	1			77.38		77.38					4.13	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	31.8381	28.280		0.0000	0.000

Vertical Reactions

Support notation : Far left is #: Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	9.680	9.680
Overall MINimum		
D Only	6.880	6.880
+D+Lr	9.680	9.680
+D+0.750Lr	8.980	8.980
+0.60D	4.128	4.128
Lr Only	2.800	2.800

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

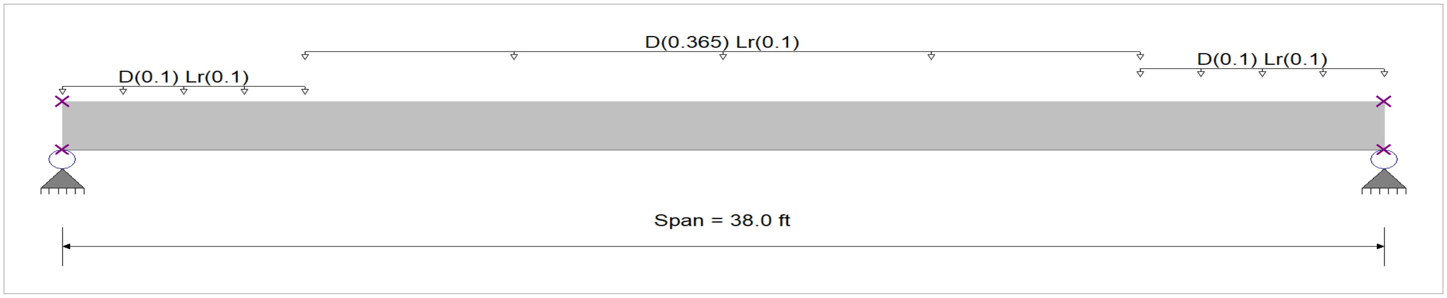
Project File: cpfd.ec6

DESCRIPTION: Moment applied to Joists from Penthouse (38 ft Span)

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1 Span Length = 38.0 ft Area = 10.0 in^2 Moment of Inertia = 100.0 in^4



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Load for Span Number 1

Uniform Load : D = 0.10, Lr = 0.10 k/ft, Extent = 0.0 -->> 7.0 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.10, Lr = 0.10 k/ft, Extent = 31.0 -->> 38.0 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.3650, Lr = 0.10 k/ft, Extent = 7.0 -->> 31.0 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending =	77.440 k-ft	Maximum Shear =	6.980 k
Load Combination	+D+Lr	Load Combination	+D+Lr
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	19.000 ft	Location of maximum on span	0.000 ft

Maximum Deflection		
Max Downward Transient Deflection	1.631 in	279
Max Upward Transient Deflection	0.026 in	17616
Max Downward Total Deflection	6.894 in	66
Max Upward Total Deflection	0.049 in	9242

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Overall MAXimum Envelope													
Dsgn. L = 38.00 ft	1			77.44		77.44					6.98		
D Only													
Dsgn. L = 38.00 ft	1			59.39		59.39					5.08		
+D+Lr													
Dsgn. L = 38.00 ft	1			77.44		77.44					6.98		
+D+0.750Lr													
Dsgn. L = 38.00 ft	1			72.93		72.93					6.51		
+0.60D													
Dsgn. L = 38.00 ft	1			35.63		35.63					3.05		

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	6.8942	19.190		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	6.980	6.980
Overall MINimum		
D Only	5.080	5.080
+D+Lr	6.980	6.980
+D+0.750Lr	6.505	6.505
+0.60D	3.048	3.048
Lr Only	1.900	1.900

Multiple Simple Beam

Description :

Steel Beam Design : Existing W12x35 Roof Beam

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

STEEL Section : **W12x35, Braced @ 1/3 Points**

Using Allowable Strength Design with ASCE 7-16 Load Combinations, Major Axis Bending

Fy = 50.0 ksi E = 29,000.0 ksi

Applied Loads

Unif Load: D = 0.10, Lr = 0.140 k/ft, Trib= 1.0 ft

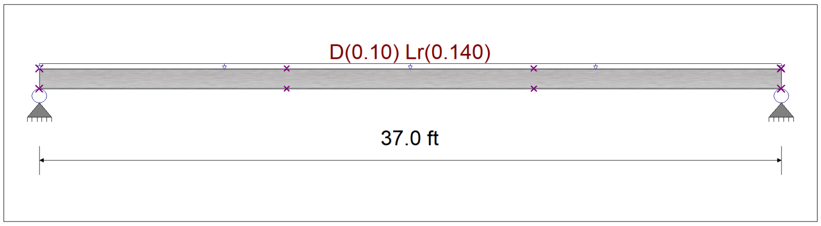
Design Summary

Max fb/Fb Ratio = **0.412** : 1

Mu : Applied	41.070 k-ft	at	18.500 ft	in Span # 1
Mn / Omega : Allow	99.646 k-ft			
Load Comb :	+D+Lr			

Max fv/FvRatio = **0.059** : 1

Vu : Applied	4.440 k	at	0.000 ft	in Span # 1
Vn / Omega : Allow	75.0 k			
Load Comb :	+D+Lr			



Max Reactions (k)	D	Lr	L	S	W	E	H
Left Support	1.85	2.59					
Right Support	1.85	2.59					

Max Deflections

Transient Downward	0.718 in	Total Downward	1.231	in
Ratio	618		360	
	LC: Lr Only		LC: +D+Lr	
Transient Upward	0.000 in	Total Upward	0.000	in
Ratio	9999	Ratio	9999	
	LC:		LC:	

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: cpfd.ec6

DESCRIPTION: Evaporator Support Angle

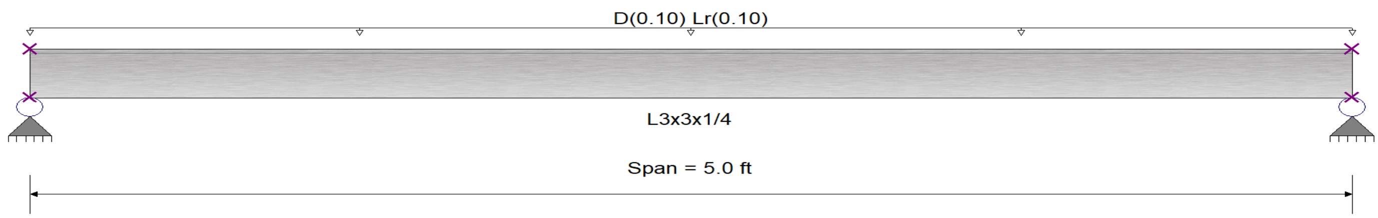
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	36.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		

Vertical Leg Down



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.10, Lr = 0.10 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.536** : 1	Maximum Shear Stress Ratio =	**0.052** : 1
Section used for this span	**L3x3x1/4**	Section used for this span	**L3x3x1/4**
Ma : Applied	0.625 k-ft	Va : Applied	0.50 k
Mn / Omega : Allowable	1.166 k-ft	Vn/Omega : Allowable	9.701 k
Load Combination	+D+Lr	Load Combination	+D+Lr
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.040 in	Ratio =	1,514	>=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.079 in	Ratio =	757	>=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 5.00 ft	1	0.268	0.026	0.31		0.31	1.95	1.17	1.14	1.00	0.25	16.20	9.70
+D+Lr													
Dsgn. L = 5.00 ft	1	0.536	0.052	0.63		0.63	1.95	1.17	1.14	1.00	0.50	16.20	9.70
+D+0.750Lr													
Dsgn. L = 5.00 ft	1	0.469	0.045	0.55		0.55	1.95	1.17	1.14	1.00	0.44	16.20	9.70
+0.60D													
Dsgn. L = 5.00 ft	1	0.161	0.015	0.19		0.19	1.95	1.17	1.14	1.00	0.15	16.20	9.70

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.0792	2.514		0.0000	0.000

Vertical Reactions

Support notation : Far left is #: Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.500	0.500
Max Upward from Load Combinations	0.500	0.500
Max Upward from Load Cases	0.250	0.250
D Only	0.250	0.250
+D+Lr	0.500	0.500
+D+0.750Lr	0.438	0.438
+0.60D	0.150	0.150

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: cpfd.ec6

DESCRIPTION: Evaporator Support Angle

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Lr Only	0.250	0.250

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 4 JAN 2024, 7:33AM

General Beam Analysis

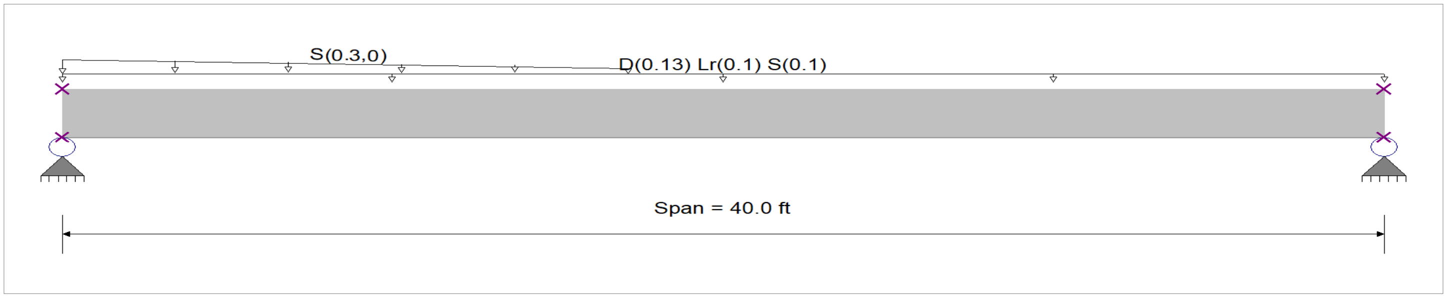
Project File: cpfd.ec6

DESCRIPTION: Moment applied to DOCK Roof Joist Due to Drifting Snow

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1 Span Length = 40.0 ft Area = 10.0 in^2 Moment of Inertia = 100.0 in^4



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.130, Lr = 0.10, S = 0.10 k/ft, Tributary Width = 1.0 ft

Varying Uniform Load : S= 0.30->0.0 k/ft, Extent = 0.0 -->> 17.140 ft, Trib Width = 1.0 ft, (Snow Drift)

DESIGN SUMMARY

Maximum Bending =	53.638 k-ft	Maximum Shear =	6.804 k
Load Combination	+D+S	Load Combination	+D+S
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	18.400 ft	Location of maximum on span	0.000 ft

Maximum Deflection

Max Downward Transient Deflection	2.825 in	169
Max Upward Transient Deflection	0.032 in	15104
Max Downward Total Deflection	5.426 in	88
Max Upward Total Deflection	0.025 in	19364

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Overall MAXimum Envelope													
Dsgn. L = 40.00 ft	1			53.64		53.64					6.80		
D Only													
Dsgn. L = 40.00 ft	1			26.00		26.00					2.60		
+D+Lr													
Dsgn. L = 40.00 ft	1			46.00		46.00					4.60		
+D+S													
Dsgn. L = 40.00 ft	1			53.64		53.64					6.80		
+D+0.750Lr													
Dsgn. L = 40.00 ft	1			41.00		41.00					4.10		
+D+0.750S													
Dsgn. L = 40.00 ft	1			46.69		46.69					5.75		
+0.60D													
Dsgn. L = 40.00 ft	1			15.60		15.60					1.56		

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	5.4262	19.800		0.0000	0.000

Vertical Reactions

Support notation : Far left is #: Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	6.804	4.967
Overall MINimum		
D Only	2.600	2.600
+D+Lr	4.600	4.600
+D+S	6.804	4.967
+D+0.750Lr	4.100	4.100
+D+0.750S	5.753	4.375
+0.60D	1.560	1.560

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: cpfd.ec6

DESCRIPTION: Moment applied to DOCK Roof Joist Due to Drifting Snow

Vertical Reactions

Support notation : Far left is #: Values in KIPS

Load Combination	Support 1	Support 2
Lr Only	2.000	2.000
S Only	4.204	2.367

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

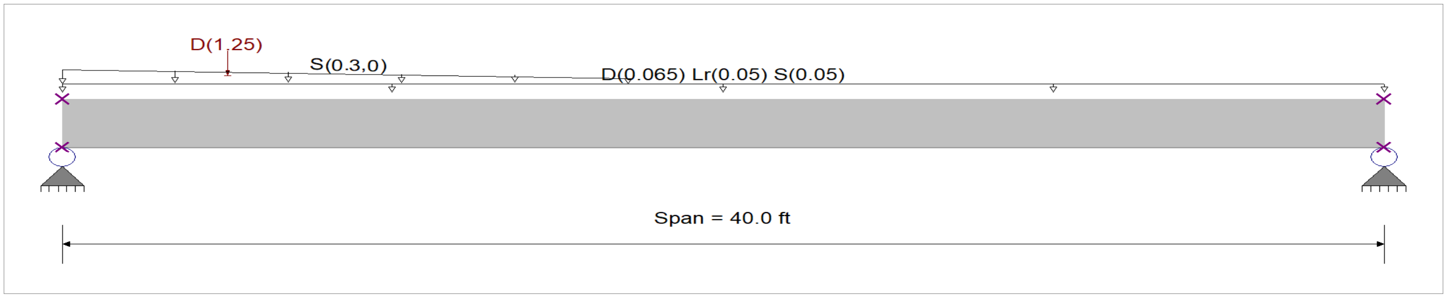
General Beam Analysis

Project File: cpfd.ec6

DESCRIPTION: Moment applied to DOCK Roof Joist Due to Drifting Snow with Evaporator Loading

General Beam Properties

Elastic Modulus	29,000.0 ksi			
Span #1	Span Length = 40.0 ft	Area = 10.0 in^2	Moment of Inertia = 100.0 in^4	



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.0650, Lr = 0.050, S = 0.050 k/ft, Tributary Width = 1.0 ft

Varying Uniform Load : S= 0.30->0.0 k/ft, Extent = 0.0 -->> 17.140 ft, Trib Width = 1.0 ft, (Snow Drift)

Point Load : D = 1.250 k @ 5.0 ft

DESIGN SUMMARY

Maximum Bending =	34.649 k-ft	Maximum Shear =	5.598 k
Load Combination	+D+S	Load Combination	+D+S
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	15.600 ft	Location of maximum on span	0.000 ft

Maximum Deflection

Max Downward Transient Deflection	1.827 in	262
Max Upward Transient Deflection	0.016 in	30208
Max Downward Total Deflection	3.498 in	137
Max Upward Total Deflection	0.016 in	29329

Maximum Forces & Stresses for Load Combinations

Load Combination			Max Stress Ratios		Summary of Moment Values (k-ft)							Shear Values (k)		
Segment Length		Span #	M	V	Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Overall MAXimum Envelope														
Dsgn. L =	40.00 ft	1			34.65		34.65					5.60		
D Only														
Dsgn. L =	40.00 ft	1			16.31		16.31					2.39		
+D+Lr														
Dsgn. L =	40.00 ft	1			26.23		26.23					3.39		
+D+S														
Dsgn. L =	40.00 ft	1			34.65		34.65					5.60		
+D+0.750Lr														
Dsgn. L =	40.00 ft	1			23.74		23.74					3.14		
+D+0.750S														
Dsgn. L =	40.00 ft	1			30.04		30.04					4.80		
+0.60D														
Dsgn. L =	40.00 ft	1			9.79		9.79					1.44		

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	3.4979	19.200		0.0000	0.000

Vertical Reactions

Support notation : Far left is #: Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	5.598	2.823
Overall MINimum		
D Only	2.394	1.456
+D+Lr	3.394	2.456
+D+S	5.598	2.823
+D+0.750Lr	3.144	2.206

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: cpfd.ec6

DESCRIPTION: Moment applied to DOCK Roof Joist Due to Drifting Snow with Evaporator Loading

Vertical Reactions

Support notation : Far left is #: Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750S	4.797	2.482
+0.60D	1.436	0.874
Lr Only	1.000	1.000
S Only	3.204	1.367

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

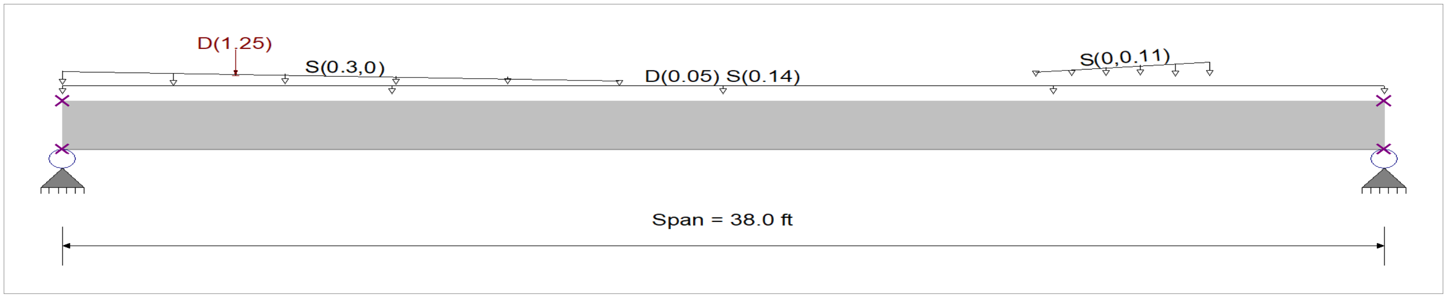
Project File: cpfd.ec6

DESCRIPTION: Moment applied to EXISTING DOCK Roof Joist Due to Drifting Snow with Evaporator Loading

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1 Span Length = 38.0 ft Area = 10.0 in^2 Moment of Inertia = 100.0 in^4



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.050, S = 0.140 k/ft, Tributary Width = 1.0 ft

Varying Uniform Load : S= 0.30->0.0 k/ft, Extent = 0.0 -->> 16.0 ft, Trib Width = 1.0 ft, (Snow Drift)

Varying Uniform Load : S= 0.0->0.110 k/ft, Extent = 28.0 -->> 33.0 ft, Trib Width = 1.0 ft

Point Load : D = 1.250 k @ 5.0 ft

DESIGN SUMMARY

Maximum Bending =	45.276 k-ft	Maximum Shear =	6.807 k
Load Combination	+D+S	Load Combination	+D+S
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	16.530 ft	Location of maximum on span	0.000 ft

Maximum Deflection

Max Downward Transient Deflection	3.026 in	150
Max Upward Transient Deflection	0.049 in	9297
Max Downward Total Deflection	4.175 in	109
Max Upward Total Deflection	0.011 in	40127

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Overall MAXimum Envelope													
Dsgn. L = 38.00 ft	1			45.28		45.28					6.81		
D Only													
Dsgn. L = 38.00 ft	1			12.42		12.42					2.04		
+D+S													
Dsgn. L = 38.00 ft	1			45.28		45.28					6.81		
+D+0.750S													
Dsgn. L = 38.00 ft	1			37.06		37.06					5.61		
+0.60D													
Dsgn. L = 38.00 ft	1			7.45		7.45					1.22		

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	4.1748	18.620		0.0000	0.000

Vertical Reactions

Support notation : Far left is #: Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	6.807	4.338
Overall MINimum		
D Only	2.036	1.114
+D+S	6.807	4.338
+D+0.750S	5.614	3.532
+0.60D	1.221	0.669
S Only	4.771	3.224

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Multiple Simple Beam

Project File: cpfd.ec6

Description :

Steel Beam Design : Wind Girts

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

STEEL Section : **W27x84, Fully Braced**

Using Allowable Strength Design with ASCE 7-16 Load Combinations, Major Axis Bending

Fy = 50.0 ksi E = 29,000.0 ksi

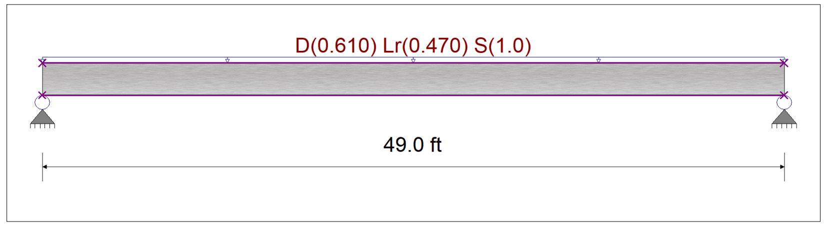
Applied Loads

Unif Load: D = 0.610, Lr = 0.470, S = 1.0 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.794** : 1
Mu : Applied 483.201 k-ft at 24.500 ft in Span # 1
Mn / Omega : Allow 608.782 k-ft
Load Comb : +D+S

Max fv/FvRatio = **0.161** : 1
Vu : Applied 39.445 k at 0.000 ft in Span # 1
Vn / Omega : Allow 245.640 k
Load Comb : +D+S



Max Reactions (k)	D	Lr	L	S	W	E	H
Left Support	14.95	11.52		24.50			
Right Support	14.95	11.52		24.50			

Max Deflections

Transient Downward	1.578 in	Total Downward	2.540 in
Ratio	372		231 <240
	LC: S Only		LC: +D+S
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Steel Beam Design : Beam at K-Line

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

STEEL Section : **W27x84, Fully Braced**

Using Allowable Strength Design with ASCE 7-16 Load Combinations, Major Axis Bending

Fy = 50.0 ksi E = 29,000.0 ksi

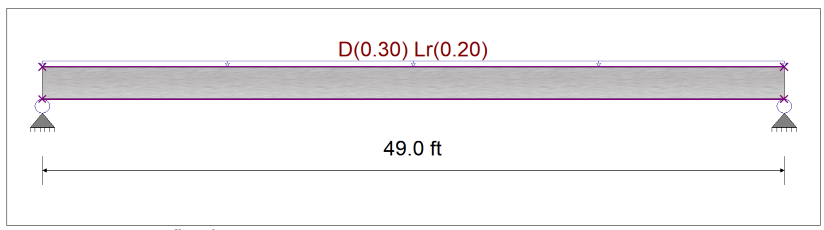
Applied Loads

Unif Load: D = 0.30, Lr = 0.20 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.246** : 1
Mu : Applied 150.063 k-ft at 24.500 ft in Span # 1
Mn / Omega : Allow 608.782 k-ft
Load Comb : +D+Lr

Max fv/FvRatio = **0.050** : 1
Vu : Applied 12.250 k at 0.000 ft in Span # 1
Vn / Omega : Allow 245.640 k
Load Comb : +D+Lr



Max Reactions (k)	D	Lr	L	S	W	E	H
Left Support	7.35	4.90					
Right Support	7.35	4.90					

Max Deflections

Transient Downward	0.316 in	Total Downward	0.789 in
Ratio	1863		745
	LC: Lr Only		LC: +D+Lr
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Multiple Simple Beam

Steel Beam Design : Beams at F.7 and J.3 Lines

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

STEEL Section : **W30x99, Fully Braced**
Using Allowable Strength Design with ASCE 7-16 Load Combinations, Major Axis Bending Fy = 50.0 ksi E = 29,000.0 ksi

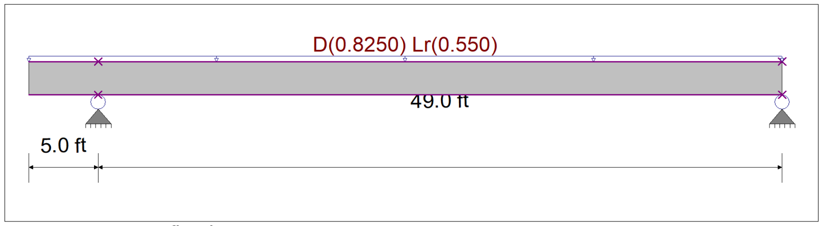
Applied Loads

Unif Load: D = 0.8250, Lr = 0.550 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.519** : 1
Mu : Applied 404.123 k-ft at 24.745 ft in Span # 2
Mn / Omega : Allow 778.443 k-ft
Load Comb : +D+Lr

Max fv/FvRatio = **0.110** : 1
Vu : Applied 34.038 k at 5.000 ft in Span # 1
Vn / Omega : Allow 308.880 k
Load Comb : +D+Lr



Max Reactions (k)	D	Lr	L	S	W	E	H
Left Support	24.55	16.37					
Right Support	20.00	13.33					

Max Deflections			
Transient Downward	0.606 in	Total Downward	1.515 in
Ratio	970		388
	LC: Lr Only		LC: +D+Lr
Transient Upward	-0.192 in	Total Upward	-0.481 in
Ratio	624	Ratio	248
	LC: Lr Only		LC: +D+Lr

Steel Beam Design : Roof Beams @ B' & P Lines

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

STEEL Section : **W16x26, Fully Braced**
Using Allowable Strength Design with ASCE 7-16 Load Combinations, Major Axis Bending Fy = 50.0 ksi E = 29,000.0 ksi

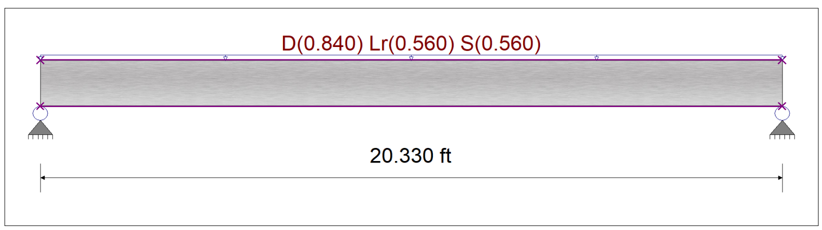
Applied Loads

Unif Load: D = 0.840, Lr = 0.560, S = 0.560 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.656** : 1
Mu : Applied 72.329 k-ft at 10.165 ft in Span # 1
Mn / Omega : Allow 110.279 k-ft
Load Comb : +D+Lr

Max fv/FvRatio = **0.202** : 1
Vu : Applied 14.231 k at 0.000 ft in Span # 1
Vn / Omega : Allow 70.509 k
Load Comb : +D+Lr



Max Reactions (k)	D	Lr	L	S	W	E	H
Left Support	8.54	5.69		5.69			
Right Support	8.54	5.69		5.69			

Max Deflections			
Transient Downward	0.248 in	Total Downward	0.620 in
Ratio	984		393
	LC: Lr Only		LC: +D+Lr
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Steel Beam Design : Roof Beams @ 5 Line

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

STEEL Section : **W18x40, Fully Braced**
Using Allowable Strength Design with ASCE 7-16 Load Combinations, Major Axis Bending Fy = 50.0 ksi E = 29,000.0 ksi

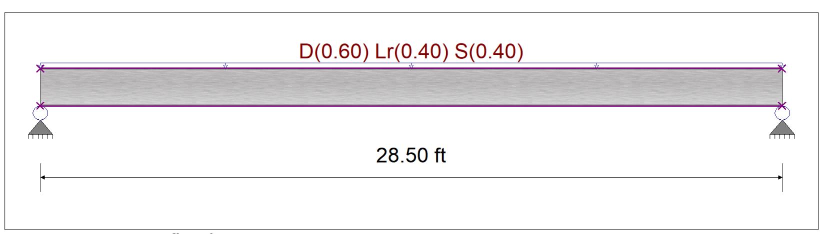
Applied Loads

Unif Load: D = 0.60, Lr = 0.40, S = 0.40 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.519** : 1
Mu : Applied 101.531 k-ft at 14.250 ft in Span # 1
Mn / Omega : Allow 195.609 k-ft
Load Comb : +D+Lr

Max fv/FvRatio = **0.126** : 1
Vu : Applied 14.250 k at 0.000 ft in Span # 1
Vn / Omega : Allow 112.770 k
Load Comb : +D+Lr



Max Reactions (k)	D	Lr	L	S	W	E	H
Left Support	8.55	5.70		5.70			
Right Support	8.55	5.70		5.70			

Max Deflections			
Transient Downward	0.336 in	Total Downward	0.841 in
Ratio	1016		406
	LC: Lr Only		LC: +D+Lr
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Multiple Simple Beam

Project File: cpfd.ec6

Steel Beam Design : Roof Beams @ 6 Line

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

STEEL Section : **W16x31, Fully Braced**

Using Allowable Strength Design with ASCE 7-16 Load Combinations, Major Axis Bending Fy = 50.0 ksi E = 29,000.0 ksi

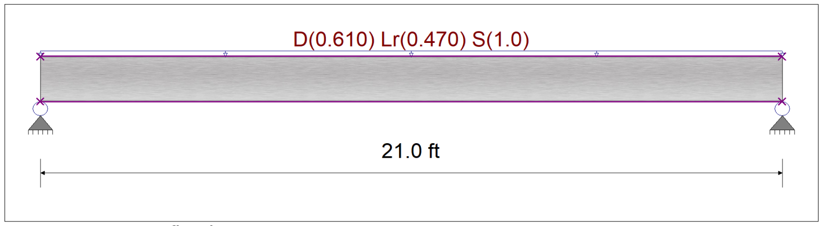
Applied Loads

Unif Load: D = 0.610, Lr = 0.470, S = 1.0 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.659** : 1
Mu : Applied 88.751 k-ft at 10.500 ft in Span # 1
Mn / Omega : Allow 134.731 k-ft
Load Comb : +D+S

Max fv/FvRatio = **0.193** : 1
Vu : Applied 16.905 k at 0.000 ft in Span # 1
Vn / Omega : Allow 87.450 k
Load Comb : +D+S



Max Reactions (k)	D	Lr	L	S	W	E	H
Left Support	6.41	4.94		10.50			
Right Support	6.41	4.94		10.50			

Max Deflections

Transient Downward	0.405 in	Total Downward	0.651 in
Ratio	622		386
	LC: S Only		LC: +D+S
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Steel Beam Design : Roof Beams (low) @ 7 Line

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

STEEL Section : **W24x55, Fully Braced**

Using Allowable Strength Design with ASCE 7-16 Load Combinations, Major Axis Bending Fy = 50.0 ksi E = 29,000.0 ksi

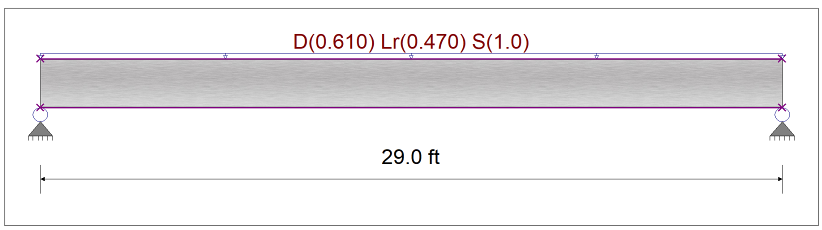
Applied Loads

Unif Load: D = 0.610, Lr = 0.470, S = 1.0 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.506** : 1
Mu : Applied 169.251 k-ft at 14.500 ft in Span # 1
Mn / Omega : Allow 334.331 k-ft
Load Comb : +D+S

Max fv/FvRatio = **0.139** : 1
Vu : Applied 23.345 k at 0.000 ft in Span # 1
Vn / Omega : Allow 167.461 k
Load Comb : +D+S



Max Reactions (k)	D	Lr	L	S	W	E	H
Left Support	8.85	6.82		14.50			
Right Support	8.85	6.82		14.50			

Max Deflections

Transient Downward	0.409 in	Total Downward	0.658 in
Ratio	851		528
	LC: S Only		LC: +D+S
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: cpfd.ec6

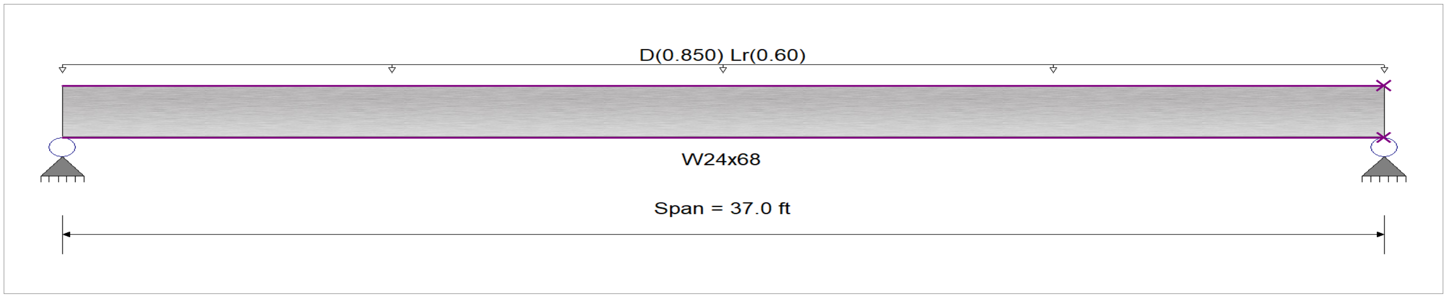
DESCRIPTION: High Beam at C.5 and L Lines @ Braced Frame Bays

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.850, Lr = 0.60 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.562** : 1	Maximum Shear Stress Ratio =	**0.136** : 1
Section used for this span	**W24x68**	Section used for this span	**W24x68**
Ma : Applied	248.131 k-ft	Va : Applied	26.825 k
Mn / Omega : Allowable	441.617 k-ft	Vn/Omega : Allowable	196.710 k
Load Combination	+D+Lr	Load Combination	+D+Lr
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.479 in	Ratio =	927	>=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	1.157 in	Ratio =	384	>=360.	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0	<360.0	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 37.00 ft	1	0.329	0.080	145.46		145.46	737.50	441.62	1.00	1.00	15.73	295.07	196.71
+D+Lr													
Dsgn. L = 37.00 ft	1	0.562	0.136	248.13		248.13	737.50	441.62	1.00	1.00	26.83	295.07	196.71
+D+0.750Lr													
Dsgn. L = 37.00 ft	1	0.504	0.122	222.46		222.46	737.50	441.62	1.00	1.00	24.05	295.07	196.71
+0.60D													
Dsgn. L = 37.00 ft	1	0.198	0.048	87.27		87.27	737.50	441.62	1.00	1.00	9.44	295.07	196.71

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.1574	18.606		0.0000	0.000

Vertical Reactions

Support notation : Far left is #: Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	26.825	26.825
Max Upward from Load Combinations	26.825	26.825
Max Upward from Load Cases	15.725	15.725
D Only	15.725	15.725
+D+Lr	26.825	26.825
+D+0.750Lr	24.050	24.050
+0.60D	9.435	9.435

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: cpfd.ec6

DESCRIPTION: High Beam at C.5 and L Lines @ Braced Frame Bays

Vertical Reactions

Support notation : Far left is #: Values in KIPS

Load Combination	Support 1	Support 2
Lr Only	11.100	11.100

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: cpfd.ec6

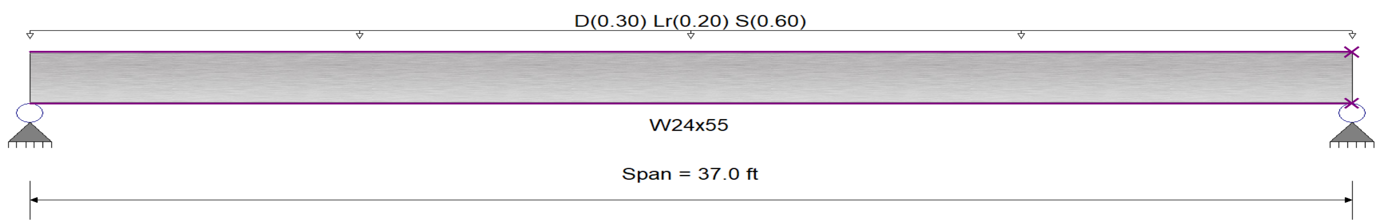
DESCRIPTION: Low Beam at C.5 and L Lines @ Braced Frame Bays

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.30, Lr = 0.20, S = 0.60 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.461** : 1	Maximum Shear Stress Ratio =	**0.099** : 1
Section used for this span	**W24x55**	Section used for this span	**W24x55**
Ma : Applied	154.013 k-ft	Va : Applied	16.650 k
Mn / Omega : Allowable	334.331 k-ft	Vn/Omega : Allowable	167.461 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.649 in	Ratio =	683	>=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.974 in	Ratio =	456	>=360.	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0	<360.0	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 37.00 ft	1	0.154	0.033	51.34		51.34	558.33	334.33	1.00	1.00	5.55	279.66	167.46
+D+Lr													
Dsgn. L = 37.00 ft	1	0.256	0.055	85.56		85.56	558.33	334.33	1.00	1.00	9.25	279.66	167.46
+D+S													
Dsgn. L = 37.00 ft	1	0.461	0.099	154.01		154.01	558.33	334.33	1.00	1.00	16.65	279.66	167.46
+D+0.750Lr													
Dsgn. L = 37.00 ft	1	0.230	0.050	77.01		77.01	558.33	334.33	1.00	1.00	8.33	279.66	167.46
+D+0.750S													
Dsgn. L = 37.00 ft	1	0.384	0.083	128.34		128.34	558.33	334.33	1.00	1.00	13.88	279.66	167.46
+0.60D													
Dsgn. L = 37.00 ft	1	0.092	0.020	30.80		30.80	558.33	334.33	1.00	1.00	3.33	279.66	167.46

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.9738	18.606		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	16.650	16.650
Max Upward from Load Combinations	16.650	16.650
Max Upward from Load Cases	11.100	11.100

AWB Engineers
1942 Northwood Drive

410-742-7299

Steel Beam

DESCRIPTION: Low Beam at C.5 and L Lines @ Braced Frame Bays

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
D Only	5.550	5.550
+D+Lr	9.250	9.250
+D+S	16.650	16.650
+D+0.750Lr	8.325	8.325
+D+0.750S	13.875	13.875
+0.60D	3.330	3.330
Lr Only	3.700	3.700
S Only	11.100	11.100

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

Project File: cpfd.ec6

DESCRIPTION: Exterior Columns Along B' & P Lines

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name : **W14x53**
Analysis Method : Allowable Strength
Steel Stress Grade A-992, High Strength, Low Alloy, Fy = 50 ksi
Fy : Steel Yield 50.0 ksi
E : Elastic Bending Modulus 29,000.0 ksi

Overall Column Height 45.0 ft
Top & Bottom Fixity Top & Bottom Pinned
Brace condition :
Unbraced Length for buckling ABOUT X-X Axis = 10 ft, K = 1.0
Unbraced Length for buckling ABOUT Y-Y Axis = 45.0 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 2,385.0 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 45.0 ft, D = 17.0, LR = 12.0, S = 12.0 k
BENDING LOADS . . .
Lat. Point Load at 7.50 ft creating Mx-x, W = 3.0 k
Lat. Point Load at 15.0 ft creating Mx-x, W = 3.0 k
Lat. Point Load at 22.50 ft creating Mx-x, W = 3.0 k
Lat. Point Load at 30.0 ft creating Mx-x, W = 3.0 k
Lat. Point Load at 37.50 ft creating Mx-x, W = 3.0 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	**0.9368**	: 1
	Load Combination	+D+0.60W	
	Location of max.above base	22.651	ft
	At maximum location values are . . .		
	Pa : Axial	19.385	k
	Pn / Omega : Allowable	252.622	k
	Ma-x : Applied	60.614	k-ft
	Mn-x / Omega : Allowable	67.469	k-ft
	Ma-y : Applied	0.0	k-ft
	Mn-y / Omega : Allowable	54.890	k-ft
PASS	Maximum Shear Stress Ratio	**0.04375**	: 1
	Load Combination	+D+0.60W	
	Location of max.above base	0.0	ft
	At maximum location values are . . .		
	Va : Applied	4.50	k
	Vn / Omega : Allowable	102.860	k

Maximum Load Reactions . .

Top along X-X	0.0 k
Bottom along X-X	0.0 k
Top along Y-Y	7.50 k
Bottom along Y-Y	7.50 k

Maximum Load Deflections . . .

Along Y-Y 2.325 in at 22.651 ft above base
for load combination : W Only

Along X-X 0.0 in at 0.0 ft above base
for load combination :

Kx Lx / Rx > 200

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Cbx	Cby	KxLx/Ry	KyLy/Rx	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.077	PASS	0.00 ft	1.16	1.00	91.68	46.88	0.000	PASS	0.00 ft
+D+Lr	0.124	PASS	0.00 ft	1.16	1.00	91.68	46.88	0.000	PASS	0.00 ft
+D+S	0.124	PASS	0.00 ft	1.16	1.00	91.68	46.88	0.000	PASS	0.00 ft
+D+0.750Lr	0.112	PASS	0.00 ft	1.16	1.00	91.68	46.88	0.000	PASS	0.00 ft
+D+0.750S	0.112	PASS	0.00 ft	1.16	1.00	91.68	46.88	0.000	PASS	0.00 ft
+D+0.60W	0.937	PASS	22.65 ft	1.16	1.00	91.68	46.88	0.044	PASS	0.00 ft
+D+0.750Lr+0.450W	0.730	PASS	22.65 ft	1.16	1.00	91.68	46.88	0.033	PASS	0.00 ft
+D+0.750S+0.450W	0.730	PASS	22.65 ft	1.16	1.00	91.68	46.88	0.033	PASS	0.00 ft
+0.60D+0.60W	0.921	PASS	22.65 ft	1.16	1.00	91.68	46.88	0.044	PASS	0.00 ft
+0.60D	0.046	PASS	0.00 ft	1.16	1.00	91.68	46.88	0.000	PASS	0.00 ft

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 3 JAN 2024, 6:11PM

Steel Column

Project File: cpfd.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Exterior Columns Along B' & P Lines

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base	X-X Axis Reaction k @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments @ Base	Mx - End Moments k-ft @ Top	My - End Moments @ Base	My - End Moments @ Top
D Only	19.385								
+D+Lr	31.385								
+D+S	31.385								
+D+0.750Lr	28.385								
+D+0.750S	28.385								
+D+0.60W	19.385			4.500	4.500				
+D+0.750Lr+0.450W	28.385			3.375	3.375				
+D+0.750S+0.450W	28.385			3.375	3.375				
+0.60D+0.60W	11.631			4.500	4.500				
+0.60D	11.631								
Lr Only	12.000								
S Only	12.000								
W Only				7.500	7.500				

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base	X-X Axis Reaction k @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments @ Base	Mx - End Moments k-ft @ Top	My - End Moments @ Base	My - End Moments @ Top
Axial @ Base	Maximum	31.385								
"	Minimum				7.500	7.500				
Reaction, X-X Axis Base	Maximum	19.385								
"	Minimum	19.385								
Reaction, Y-Y Axis Base	Maximum				7.500	7.500				
"	Minimum	19.385								
Reaction, X-X Axis Top	Maximum	19.385								
"	Minimum	19.385								
Reaction, Y-Y Axis Top	Maximum	19.385								
"	Minimum	19.385								
Moment, X-X Axis Base	Maximum	19.385								
"	Minimum	19.385								
Moment, Y-Y Axis Base	Maximum	19.385								
"	Minimum	19.385								
Moment, X-X Axis Top	Maximum	19.385								
"	Minimum	19.385								
Moment, Y-Y Axis Top	Maximum	19.385								
"	Minimum	19.385								

Maximum Deflections for Load Combinations

Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.60W	0.0000 in	0.000 ft	1.395 in	22.651 ft
+D+0.750Lr+0.450W	0.0000 in	0.000 ft	1.046 in	22.651 ft
+D+0.750S+0.450W	0.0000 in	0.000 ft	1.046 in	22.651 ft
+0.60D+0.60W	0.0000 in	0.000 ft	1.395 in	22.651 ft
+0.60D	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.0000 in	0.000 ft	2.325 in	22.651 ft

Steel Section Properties : W14x53

Steel Section Properties : W14x53

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

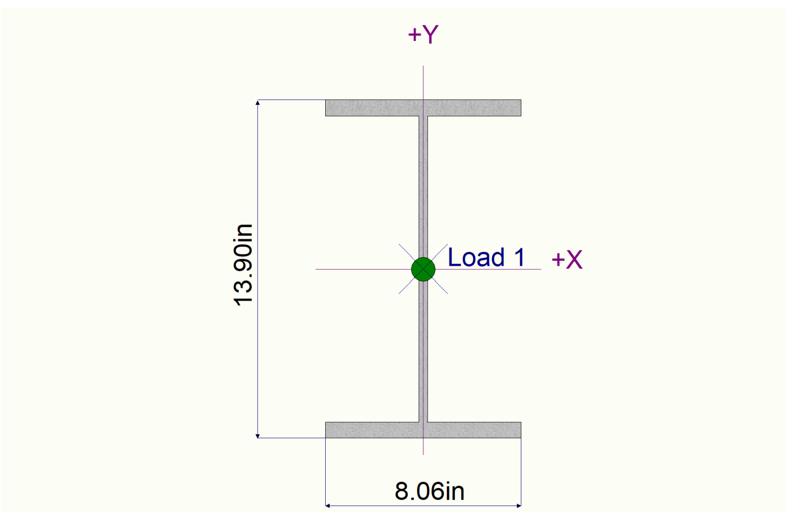
Project File: cpfd.ec6

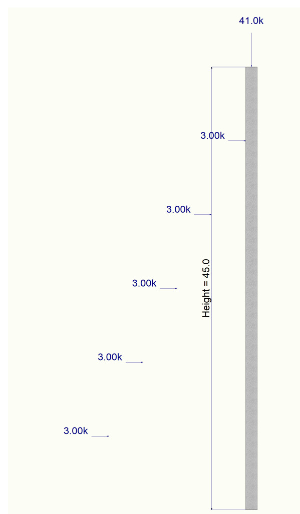
LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

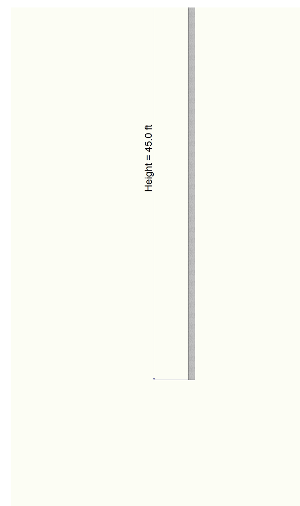
DESCRIPTION: Exterior Columns Along B' & P Lines

Depth	=	13.900 in	I xx	=	541.00 in^4	J	=	1.940 in^4
Web Thick	=	0.370 in	S xx	=	77.80 in^3	Cw	=	2,540.00 in^6
Flange Width	=	8.060 in	R xx	=	5.890 in			
Flange Thick	=	0.660 in	Zx	=	87.100 in^3			
Area	=	15.600 in^2	I yy	=	57.700 in^4			
Weight	=	53.000 plf	S yy	=	14.300 in^3	Wno	=	26.700 in^2
Kdesign	=	1.250 in	R yy	=	1.920 in	Sw	=	35.500 in^4
K1	=	1.000 in	Zy	=	22.000 in^3	Qf	=	16.800 in^3
rts	=	2.220 in				Qw	=	42.500 in^3
Ycg	=	0.000 in						

Sketches







AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

Project File: cpfd.ec6

DESCRIPTION: Exterior Column @ L-15

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name : **W14x53**
Analysis Method : Allowable Strength
Steel Stress Grade A-992, High Strength, Low Alloy, Fy = 50 ksi
Fy : Steel Yield 50.0 ksi
E : Elastic Bending Modulus 29,000.0 ksi

Overall Column Height 42.0 ft
Top & Bottom Fixity Top & Bottom Pinned
Brace condition :
Unbraced Length for buckling ABOUT X-X Axis = 30 ft, K = 1.0
Unbraced Length for buckling ABOUT Y-Y Axis = 7.5 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 2,226.0 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 42.0 ft, Yecc = 8.950 in, D = 22.820, LR = 15.210, S = 15.210 k
Axial Load at 30.0 ft, Yecc = 8.950 in, D = 8.150, LR = 5.430, S = 9.860 k
BENDING LOADS . . .
Lat. Point Load at 7.50 ft creating Mx-x, W = 3.0 k
Lat. Point Load at 15.0 ft creating Mx-x, W = 3.0 k
Lat. Point Load at 22.50 ft creating Mx-x, W = 3.0 k
Lat. Point Load at 30.0 ft creating Mx-x, W = 3.0 k
Lat. Point Load at 37.50 ft creating Mx-x, W = 3.0 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.4588** : 1
Load Combination +0.60D+0.60W
Location of max.above base 22.268 ft
At maximum location values are . . .
Pa : Axial 19.918 k
Pn / Omega : Allowabl 355.429 k
Ma-x : Applied 46.036 k-ft
Mn-x / Omega : Allowable 106.872 k-ft
Ma-y : Applied 0.0 k-ft
Mn-y / Omega : Allowable 54.890 k-ft

PASS Maximum Shear Stress Rati **0.05222** : 1
Load Combination +D+0.60W
Location of max.above base 37.772 ft
At maximum location values are . . .
Va : Applied 5.371 k
Vn / Omega : Allowable 102.860 k

Maximum Load Reactions . .
Top along X-X 0.0 k
Bottom along X-X 0.0 k
Top along Y-Y 8.036 k
Bottom along Y-Y 6.964 k

Maximum Load Deflections . . .
Along Y-Y 1.791 in at 21.141 ft above base
for load combination : W Only
Along X-X 0.0 in at 0.0 ft above base
for load combination :

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Cbx	Cby	KxLx/Ry	KyLy/Rx	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.200	PASS	29.88 ft	1.15	1.00	61.12	46.88	0.005	PASS	0.00 ft
+D+Lr	0.332	PASS	29.88 ft	1.15	1.00	61.12	46.88	0.009	PASS	0.00 ft
+D+S	0.360	PASS	29.88 ft	1.15	1.00	61.12	46.88	0.010	PASS	0.00 ft
+D+0.750Lr	0.299	PASS	29.88 ft	1.15	1.00	61.12	46.88	0.008	PASS	0.00 ft
+D+0.750S	0.320	PASS	29.88 ft	1.15	1.00	61.12	46.88	0.009	PASS	0.00 ft
+D+0.60W	0.432	PASS	22.27 ft	1.15	1.00	61.12	46.88	0.052	PASS	37.77 ft
+D+0.750Lr+0.450W	0.297	PASS	14.94 ft	1.15	1.00	61.12	46.88	0.043	PASS	37.77 ft
+D+0.750S+0.450W	0.294	PASS	14.94 ft	1.15	1.00	61.12	46.88	0.044	PASS	37.77 ft
+0.60D+0.60W	0.459	PASS	22.27 ft	1.15	1.00	61.12	46.88	0.050	PASS	37.77 ft
+0.60D	0.120	PASS	29.88 ft	1.15	1.00	61.12	46.88	0.003	PASS	0.00 ft

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

Project File: cpfd.ec6

DESCRIPTION: Exterior Column @ L-15

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction k @ Base	X-X Axis Reaction k @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments k-ft @ Top	My - End Moments @ Base	My - End Moments @ Top
D Only	33.196			-0.550	0.550				
+D+Lr	53.836			-0.916	0.916				
+D+S	58.266			-0.995	0.995				
+D+0.750Lr	48.676			-0.825	0.825				
+D+0.750S	51.999			-0.884	0.884				
+D+0.60W	33.196			3.629	5.371				
+D+0.750Lr+0.450W	48.676			2.309	4.441				
+D+0.750S+0.450W	51.999			2.250	4.500				
+0.60D+0.60W	19.918			3.849	5.151				
+0.60D	19.918			-0.330	0.330				
Lr Only	20.640			-0.367	0.367				
S Only	25.070			-0.445	0.445				
W Only				6.964	8.036				

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction k @ Base	X-X Axis Reaction k @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments k-ft @ Top	My - End Moments @ Base	My - End Moments @ Top
Axial @ Base	Maximum	58.266			-0.995	0.995		-28.364		
"	Minimum				6.964	8.036				
Reaction, X-X Axis Base	Maximum	33.196			-0.550	0.550		-17.020		
"	Minimum	33.196			-0.550	0.550		-17.020		
Reaction, Y-Y Axis Base	Maximum				6.964	8.036				
"	Minimum	58.266			-0.995	0.995		-28.364		
Reaction, X-X Axis Top	Maximum	33.196			-0.550	0.550		-17.020		
"	Minimum	33.196			-0.550	0.550		-17.020		
Reaction, Y-Y Axis Top	Maximum	33.196			-0.550	0.550		-17.020		
"	Minimum				6.964	8.036				
Moment, X-X Axis Base	Maximum	33.196			-0.550	0.550		-17.020		
"	Minimum	33.196			-0.550	0.550		-17.020		
Moment, Y-Y Axis Base	Maximum	33.196			-0.550	0.550				-17.020
"	Minimum	33.196			-0.550	0.550				-17.020
Moment, X-X Axis Top	Maximum				6.964	8.036				
"	Minimum	53.836			-0.916	0.916		-28.364		
Moment, Y-Y Axis Top	Maximum	33.196			-0.550	0.550		-17.020		
"	Minimum	33.196			-0.550	0.550		-17.020		

Maximum Deflections for Load Combinations

Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	-0.263 in	23.678 ft
+D+Lr	0.0000 in	0.000 ft	-0.438 in	23.678 ft
+D+S	0.0000 in	0.000 ft	-0.465 in	23.396 ft
+D+0.750Lr	0.0000 in	0.000 ft	-0.394 in	23.678 ft
+D+0.750S	0.0000 in	0.000 ft	-0.414 in	23.396 ft
+D+0.60W	0.0000 in	0.000 ft	0.817 in	20.577 ft
+D+0.750Lr+0.450W	0.0000 in	0.000 ft	0.422 in	19.168 ft
+D+0.750S+0.450W	0.0000 in	0.000 ft	0.402 in	19.168 ft
+0.60D+0.60W	0.0000 in	0.000 ft	0.920 in	20.859 ft
+0.60D	0.0000 in	0.000 ft	-0.158 in	23.678 ft
Lr Only	0.0000 in	0.000 ft	-0.175 in	23.678 ft
S Only	0.0000 in	0.000 ft	-0.202 in	23.114 ft
W Only	0.0000 in	0.000 ft	1.791 in	21.141 ft

Steel Section Properties : W14x53

Steel Section Properties : W14x53

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 3 JAN 2024, 6:25PM

Steel Column

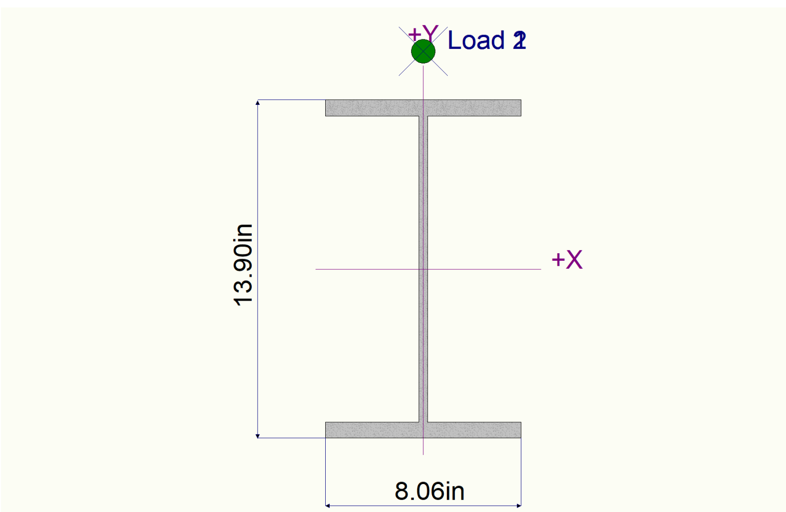
Project File: cpfd.ec6

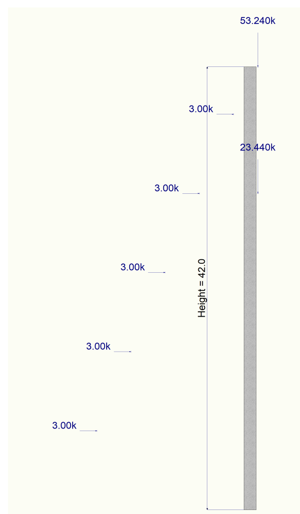
LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

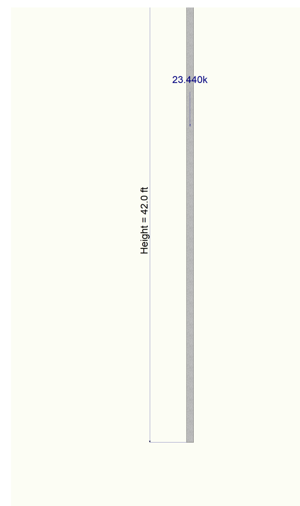
DESCRIPTION: Exterior Column @ L-15

Depth	=	13.900 in	I xx	=	541.00 in^4	J	=	1.940 in^4
Web Thick	=	0.370 in	S xx	=	77.80 in^3	Cw	=	2,540.00 in^6
Flange Width	=	8.060 in	R xx	=	5.890 in			
Flange Thick	=	0.660 in	Zx	=	87.100 in^3			
Area	=	15.600 in^2	I yy	=	57.700 in^4			
Weight	=	53.000 plf	S yy	=	14.300 in^3	Wno	=	26.700 in^2
Kdesign	=	1.250 in	R yy	=	1.920 in	Sw	=	35.500 in^4
K1	=	1.000 in	Zy	=	22.000 in^3	Qf	=	16.800 in^3
rts	=	2.220 in				Qw	=	42.500 in^3
Ycg	=	0.000 in						

Sketches







AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

Project File: cpfd.ec6

DESCRIPTION: Exterior Columns @ J.3-15 & F.7-15

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name : **W14x38**
Analysis Method : Allowable Strength
Steel Stress Grade A-992, High Strength, Low Alloy, Fy = 50 ksi
Fy : Steel Yield 50.0 ksi
E : Elastic Bending Modulus 29,000.0 ksi

Overall Column Height 30 ft
Top & Bottom Fixity Top & Bottom Pinned
Brace condition :
Unbraced Length for buckling ABOUT X-X Axis = 30 ft, K = 1.0
Unbraced Length for buckling ABOUT Y-Y Axis = 30 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 1,140.0 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 30.0 ft, Yecc = 9.050 in, D = 20.210, LR = 13.480, S = 13.480 k
BENDING LOADS . . .
Lat. Point Load at 7.50 ft creating Mx-x, W = 3.0 k
Lat. Point Load at 15.0 ft creating Mx-x, W = 3.0 k
Lat. Point Load at 22.50 ft creating Mx-x, W = 3.0 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.5789** : 1
Load Combination +D+Lr
Location of max.above base 30.0 ft
At maximum location values are . . .
Pa : Axial 34.830 k
Pn / Omega : Allowabl 254.704 k
Ma-x : Applied -25.408 k-ft
Mn-x / Omega : Allowable 49.767 k-ft
Ma-y : Applied 0.0 k-ft
Mn-y / Omega : Allowable 30.190 k-ft

PASS Maximum Shear Stress Rati **0.03670** : 1
Load Combination +D+0.60W
Location of max.above base 22.550 ft
At maximum location values are . . .
Va : Applied 3.208 k
Vn / Omega : Allowable 87.420 k

Maximum Load Reactions . .
Top along X-X 0.0 k
Bottom along X-X 0.0 k
Top along Y-Y 4.50 k
Bottom along Y-Y 4.50 k

Maximum Load Deflections . . .
Along Y-Y 0.6269 in at 15.101 ft above base
for load combination : W Only
Along X-X 0.0 in at 0.0 ft above base
for load combination :

Kx Lx / Rx > 200

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Cbx	Cby	KxLx/Ry	KyLy/Rx	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.348	PASS	30.00 ft	1.21	1.00	61.33	58.06	0.006	PASS	0.00 ft
+D+Lr	0.579	PASS	30.00 ft	1.21	1.00	61.33	58.06	0.010	PASS	0.00 ft
+D+S	0.579	PASS	30.00 ft	1.21	1.00	61.33	58.06	0.010	PASS	0.00 ft
+D+0.750Lr	0.521	PASS	30.00 ft	1.21	1.00	61.33	58.06	0.009	PASS	0.00 ft
+D+0.750S	0.521	PASS	30.00 ft	1.21	1.00	61.33	58.06	0.009	PASS	0.00 ft
+D+0.60W	0.431	PASS	14.90 ft	1.21	1.00	61.33	58.06	0.037	PASS	22.55 ft
+D+0.750Lr+0.450W	0.521	PASS	30.00 ft	1.21	1.00	61.33	58.06	0.032	PASS	22.55 ft
+D+0.750S+0.450W	0.521	PASS	30.00 ft	1.21	1.00	61.33	58.06	0.032	PASS	22.55 ft
+0.60D+0.60W	0.475	PASS	14.90 ft	1.21	1.00	61.33	58.06	0.034	PASS	22.55 ft
+0.60D	0.209	PASS	30.00 ft	1.21	1.00	61.33	58.06	0.003	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction k @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments @ Top	My - End Moments @ Base	My - End Moments @ Top
D Only	21.350			-0.508	0.508				
+D+Lr	34.830			-0.847	0.847				

AWB Engineers
1942 Northwood Drive

410-742-7299

Steel Column

DESCRIPTION: Exterior Columns @ J.3-15 & F.7-15

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction k @ Base	X-X Axis Reaction k @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments k-ft @ Top	My - End Moments @ Base	My - End Moments @ Top
+D+S	34.830			-0.847	0.847				
+D+0.750Lr	31.460			-0.762	0.762				
+D+0.750S	31.460			-0.762	0.762				
+D+0.60W	21.350			2.192	3.208				
+D+0.750Lr+0.450W	31.460			1.263	2.787				
+D+0.750S+0.450W	31.460			1.263	2.787				
+0.60D+0.60W	12.810			2.395	3.005				
+0.60D	12.810			-0.305	0.305				
Lr Only	13.480			-0.339	0.339				
S Only	13.480			-0.339	0.339				
W Only				4.500	4.500				

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction k @ Base	X-X Axis Reaction k @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments k-ft @ Top	My - End Moments @ Base	My - End Moments @ Top
Axial @ Base	Maximum	34.830			-0.847	0.847		-25.408		
"	Minimum				4.500	4.500				
Reaction, X-X Axis Base	Maximum	21.350			-0.508	0.508		-15.242		
"	Minimum	21.350			-0.508	0.508		-15.242		
Reaction, Y-Y Axis Base	Maximum				4.500	4.500				
"	Minimum	34.830			-0.847	0.847		-25.408		
Reaction, X-X Axis Top	Maximum	21.350			-0.508	0.508		-15.242		
"	Minimum	21.350			-0.508	0.508		-15.242		
Reaction, Y-Y Axis Top	Maximum	21.350			-0.508	0.508		-15.242		
"	Minimum				4.500	4.500				
Moment, X-X Axis Base	Maximum	21.350			-0.508	0.508		-15.242		
"	Minimum	21.350			-0.508	0.508		-15.242		
Moment, Y-Y Axis Base	Maximum	21.350			-0.508	0.508				-15.242
"	Minimum	21.350			-0.508	0.508				-15.242
Moment, X-X Axis Top	Maximum				4.500	4.500				
"	Minimum	34.830			-0.847	0.847		-25.408		
Moment, Y-Y Axis Top	Maximum	21.350			-0.508	0.508		-15.242		
"	Minimum	21.350			-0.508	0.508		-15.242		

Maximum Deflections for Load Combinations

Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	-0.137 in	17.517 ft
+D+Lr	0.0000 in	0.000 ft	-0.229 in	17.517 ft
+D+S	0.0000 in	0.000 ft	-0.229 in	17.517 ft
+D+0.750Lr	0.0000 in	0.000 ft	-0.206 in	17.517 ft
+D+0.750S	0.0000 in	0.000 ft	-0.206 in	17.517 ft
+D+0.60W	0.0000 in	0.000 ft	0.244 in	14.094 ft
+D+0.750Lr+0.450W	0.0000 in	0.000 ft	0.088 in	11.879 ft
+D+0.750S+0.450W	0.0000 in	0.000 ft	0.088 in	11.879 ft
+0.60D+0.60W	0.0000 in	0.000 ft	0.296 in	14.497 ft
+0.60D	0.0000 in	0.000 ft	-0.082 in	17.517 ft
Lr Only	0.0000 in	0.000 ft	-0.092 in	17.517 ft
S Only	0.0000 in	0.000 ft	-0.092 in	17.517 ft
W Only	0.0000 in	0.000 ft	0.627 in	15.101 ft

Steel Section Properties : W14x38

Steel Section Properties : W14x38

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

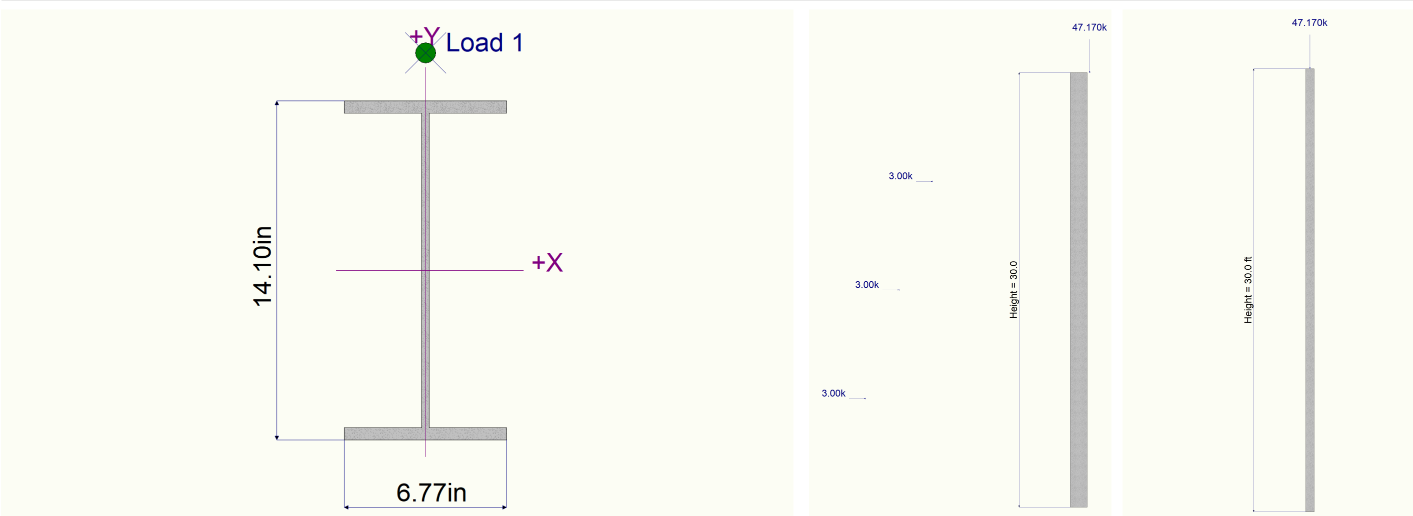
Steel Column

Project File: cpfd.ec6

DESCRIPTION: Exterior Columns @ J.3-15 & F.7-15

Depth	=	14.100	in	I xx	=	385.00	in^4	J	=	0.798	in^4
Web Thick	=	0.310	in	S xx	=	54.60	in^3	Cw	=	1,230.00	in^6
Flange Width	=	6.770	in	R xx	=	5.870	in				
Flange Thick	=	0.515	in	Zx	=	61.500	in^3				
Area	=	11.200	in^2	I yy	=	26.700	in^4				
Weight	=	38.000	plf	S yy	=	7.880	in^3	Wno	=	23.000	in^2
Kdesign	=	0.915	in	R yy	=	1.550	in	Sw	=	20.000	in^4
K1	=	0.813	in	Zy	=	12.100	in^3	Qf	=	11.300	in^3
rts	=	1.820	in					Qw	=	30.300	in^3
Ycg	=	0.000	in								

Sketches



AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

Project File: cpfd.ec6

DESCRIPTION: Exterior Column @ 5 Line

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name : **W12x26**

Analysis Method :	Allowable Strength
Steel Stress Grade	A-992, High Strength, Low Alloy, Fy = 50 ksi
Fy : Steel Yield	50.0 ksi
E : Elastic Bending Modulus	29,000.0 ksi

Overall Column Height 23 ft
Top & Bottom Fixity Top & Bottom Pinned
Brace condition :
Unbraced Length for buckling ABOUT X-X Axis = 30 ft, K = 1.0
Unbraced Length for buckling ABOUT Y-Y Axis = 23 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 598.0 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 23.0 ft, D = 12.50, LR = 8.50, S = 8.50 k
BENDING LOADS . . .
Lat. Point Load at 7.50 ft creating Mx-x, W = 3.0 k
Lat. Point Load at 15.0 ft creating Mx-x, W = 3.0 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	**0.4431**	: 1
Load Combination	+D+0.60W	
Location of max.above base	14.973	ft
At maximum location values are . . .		
Pa : Axial	13.098	k
Pn / Omega : Allowabl	169.286	k
Ma-x : Applied	14.086	k-ft
Mn-x / Omega : Allowable	34.827	k-ft
Ma-y : Applied	0.0	k-ft
Mn-y / Omega : Allowable	20.384	k-ft
PASS Maximum Shear Stress Rati	**0.03277**	: 1
Load Combination	+D+0.60W	
Location of max.above base	0.0	ft
At maximum location values are . . .		
Va : Applied	1.839	k
Vn / Omega : Allowable	56.120	k

Maximum Load Reactions . .

Top along X-X	0.0 k
Bottom along X-X	0.0 k
Top along Y-Y	2.935 k
Bottom along Y-Y	3.065 k

Maximum Load Deflections . . .

Along Y-Y 0.3849 in at 11.577ft above base
for load combination : W Only

Along X-X 0.0 in at 0.0ft above base
for load combination :

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Cbx	Cby	KxLx/Ry	KyLy/Rx	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.077	PASS	0.00 ft	1.15	1.00	53.38	59.60	0.000	PASS	0.00 ft
+D+Lr	0.128	PASS	0.00 ft	1.15	1.00	53.38	59.60	0.000	PASS	0.00 ft
+D+S	0.128	PASS	0.00 ft	1.15	1.00	53.38	59.60	0.000	PASS	0.00 ft
+D+0.750Lr	0.115	PASS	0.00 ft	1.15	1.00	53.38	59.60	0.000	PASS	0.00 ft
+D+0.750S	0.115	PASS	0.00 ft	1.15	1.00	53.38	59.60	0.000	PASS	0.00 ft
+D+0.60W	0.443	PASS	14.97 ft	1.15	1.00	53.38	59.60	0.033	PASS	0.00 ft
+D+0.750Lr+0.450W	0.361	PASS	14.97 ft	1.15	1.00	53.38	59.60	0.025	PASS	0.00 ft
+D+0.750S+0.450W	0.361	PASS	14.97 ft	1.15	1.00	53.38	59.60	0.025	PASS	0.00 ft
+0.60D+0.60W	0.428	PASS	14.97 ft	1.15	1.00	53.38	59.60	0.033	PASS	0.00 ft
+0.60D	0.046	PASS	0.00 ft	1.15	1.00	53.38	59.60	0.000	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction k @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments @ Top	My - End Moments @ Base	My - End Moments @ Top
D Only	13.098								
+D+Lr	21.598								
+D+S	21.598								

Steel Column

Project File: cpfd.ec6

DESCRIPTION: Exterior Column @ 5 Line

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction k @ Base	X-X Axis Reaction k @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments k-ft @ Top	My - End Moments @ Base	My - End Moments @ Top
+D+0.750Lr	19.473								
+D+0.750S	19.473								
+D+0.60W	13.098			1.839	1.761				
+D+0.750Lr+0.450W	19.473			1.379	1.321				
+D+0.750S+0.450W	19.473			1.379	1.321				
+0.60D+0.60W	7.859			1.839	1.761				
+0.60D	7.859								
Lr Only	8.500								
S Only	8.500								
W Only				3.065	2.935				

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction k @ Base	X-X Axis Reaction k @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments k-ft @ Top	My - End Moments @ Base	My - End Moments @ Top
Axial @ Base	Maximum	21.598								
"	Minimum				3.065	2.935				
Reaction, X-X Axis Base	Maximum	13.098								
"	Minimum	13.098								
Reaction, Y-Y Axis Base	Maximum				3.065	2.935				
"	Minimum	13.098								
Reaction, X-X Axis Top	Maximum	13.098								
"	Minimum	13.098								
Reaction, Y-Y Axis Top	Maximum	13.098								
"	Minimum	13.098								
Moment, X-X Axis Base	Maximum	13.098								
"	Minimum	13.098								
Moment, Y-Y Axis Base	Maximum	13.098								
"	Minimum	13.098								
Moment, X-X Axis Top	Maximum	13.098								
"	Minimum	13.098								
Moment, Y-Y Axis Top	Maximum	13.098								
"	Minimum	13.098								

Maximum Deflections for Load Combinations

Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.60W	0.0000 in	0.000 ft	0.231 in	11.577 ft
+D+0.750Lr+0.450W	0.0000 in	0.000 ft	0.173 in	11.577 ft
+D+0.750S+0.450W	0.0000 in	0.000 ft	0.173 in	11.577 ft
+0.60D+0.60W	0.0000 in	0.000 ft	0.231 in	11.577 ft
+0.60D	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.0000 in	0.000 ft	0.385 in	11.577 ft

Steel Section Properties : W12x26

Steel Section Properties : W12x26

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 3 JAN 2024, 7:39PM

Steel Column

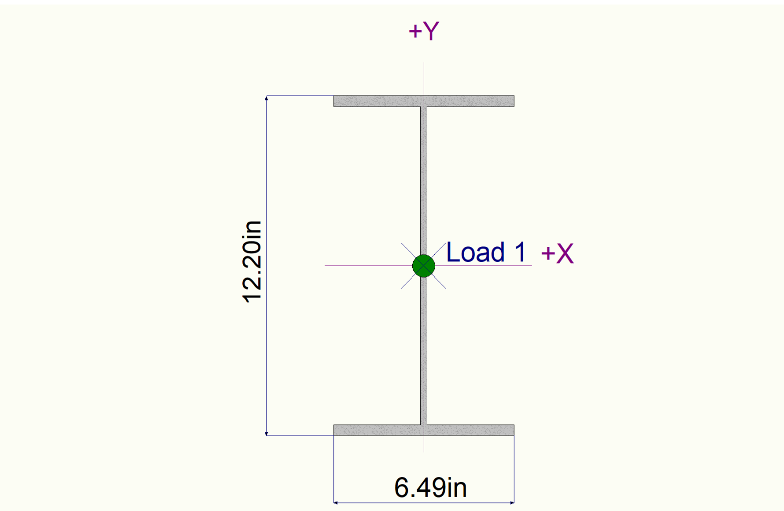
Project File: cpfd.ec6

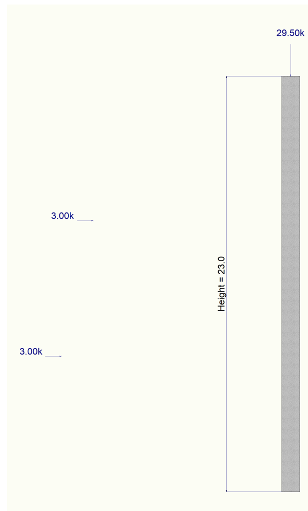
LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

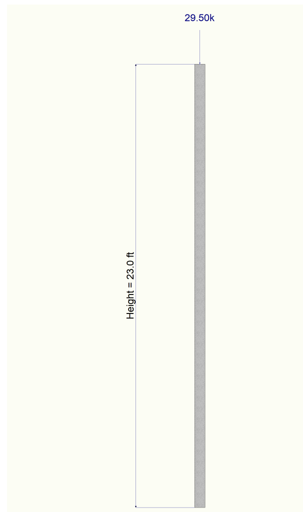
DESCRIPTION: Exterior Column @ 5 Line

Depth	=	12.200 in	I xx	=	204.00 in^4	J	=	0.300 in^4
Web Thick	=	0.230 in	S xx	=	33.40 in^3	Cw	=	607.00 in^6
Flange Width	=	6.490 in	R xx	=	5.170 in			
Flange Thick	=	0.380 in	Zx	=	37.200 in^3			
Area	=	7.650 in^2	I yy	=	17.300 in^4			
Weight	=	26.000 plf	S yy	=	5.340 in^3	Wno	=	19.200 in^2
Kdesign	=	0.680 in	R yy	=	1.510 in	Sw	=	11.800 in^4
K1	=	0.750 in	Zy	=	8.170 in^3	Qf	=	7.030 in^3
rts	=	1.750 in				Qw	=	18.300 in^3
Ycg	=	0.000 in						

Sketches







AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

Project File: cpfd.ec6

DESCRIPTION: Interior Steel Columns Along A.3 Line

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name : **HSS10x10x1/4**

Analysis Method :	Allowable Strength	Overall Column Height	45.0 ft
Steel Stress Grade		Top & Bottom Fixity	Top & Bottom Pinned
Fy : Steel Yield	36.0 ksi	Brace condition :	
E : Elastic Bending Modulus	29,000.0 ksi		

Unbraced Length for buckling ABOUT X-X Axis = 45.0 ft, K = 1.0
Unbraced Length for buckling ABOUT Y-Y Axis = 45.0 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 1,468.35 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 45.0 ft, D = 40.0, LR = 25.0, S = 25.0 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	**0.9131**	: 1
Load Combination	+D+Lr	
Location of max.above base	0.0	ft
At maximum location values are . . .		
Pa : Axial	66.468	k
Pn / Omega : Allowabl	72.792	k
Ma-x : Applied	0.0	k-ft
Mn-x / Omega : Allowable	50.707	k-ft
Ma-y : Applied	0.0	k-ft
Mn-y / Omega : Allowable	50.707	k-ft
PASS Maximum Shear Stress Rati	**0.0**	: 1
Load Combination	0.0	
Location of max.above base	0.0	ft
At maximum location values are . . .		
Va : Applied	0.0	k
Vn / Omega : Allowable	0.0	k

Maximum Load Reactions . .

Top along X-X	0.0 k
Bottom along X-X	0.0 k
Top along Y-Y	0.0 k
Bottom along Y-Y	0.0 k

Maximum Load Deflections . . .

Along Y-Y	0.0 in	at	0.0ft	above base
for load combination :				
Along X-X	0.0 in	at	0.0ft	above base
for load combination :				

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Cbx	Cby	KxLx/Ry	KyLy/Rx	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.570	PASS	0.00 ft	1.00	1.00	136.02	136.02	0.000	PASS	0.00 ft
+D+Lr	0.913	PASS	0.00 ft	1.00	1.00	136.02	136.02	0.000	PASS	0.00 ft
+D+S	0.913	PASS	0.00 ft	1.00	1.00	136.02	136.02	0.000	PASS	0.00 ft
+D+0.750Lr	0.827	PASS	0.00 ft	1.00	1.00	136.02	136.02	0.000	PASS	0.00 ft
+D+0.750S	0.827	PASS	0.00 ft	1.00	1.00	136.02	136.02	0.000	PASS	0.00 ft
+0.60D	0.342	PASS	0.00 ft	1.00	1.00	136.02	136.02	0.000	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction k @ Base	X-X Axis Reaction k @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments k-ft @ Top	My - End Moments @ Base	My - End Moments @ Top
D Only	41.468								
+D+Lr	66.468								
+D+S	66.468								
+D+0.750Lr	60.218								
+D+0.750S	60.218								
+0.60D	24.881								
Lr Only	25.000								
S Only	25.000								

Steel Column

Project File: cpfd.ec6

DESCRIPTION: Interior Steel Columns Along A.3 Line

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base	k @ Top	Y-Y Axis Reaction @ Base	@ Top	Mx - End Moments @ Base	k-ft @ Top	My - End Moments @ Base	@ Top
Axial @ Base	Maximum	66.468								
"	Minimum	24.881								
Reaction, X-X Axis Base	Maximum	41.468								
"	Minimum	41.468								
Reaction, Y-Y Axis Base	Maximum	41.468								
"	Minimum	41.468								
Reaction, X-X Axis Top	Maximum	41.468								
"	Minimum	41.468								
Reaction, Y-Y Axis Top	Maximum	41.468								
"	Minimum	41.468								
Moment, X-X Axis Base	Maximum	41.468								
"	Minimum	41.468								
Moment, Y-Y Axis Base	Maximum	41.468								
"	Minimum	41.468								
Moment, X-X Axis Top	Maximum	41.468								
"	Minimum	41.468								
Moment, Y-Y Axis Top	Maximum	41.468								
"	Minimum	41.468								

Maximum Deflections for Load Combinations

Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Steel Section Properties : HSS10x10x1/4

Depth	=	10.000 in	I xx	=	141.00 in^4	J	=	220.000 in^4
Design Thick	=	0.233 in	S xx	=	28.30 in^3			
Width	=	10.000 in	R xx	=	3.970 in			
Wall Thick	=	0.250 in	Zx	=	32.700 in^3			
Area	=	8.960 in^2	I yy	=	141.000 in^4	C	=	44.400 in^3
Weight	=	32.630 plf	S yy	=	28.300 in^3			
			R yy	=	3.970 in			
Ycg	=	0.000 in						

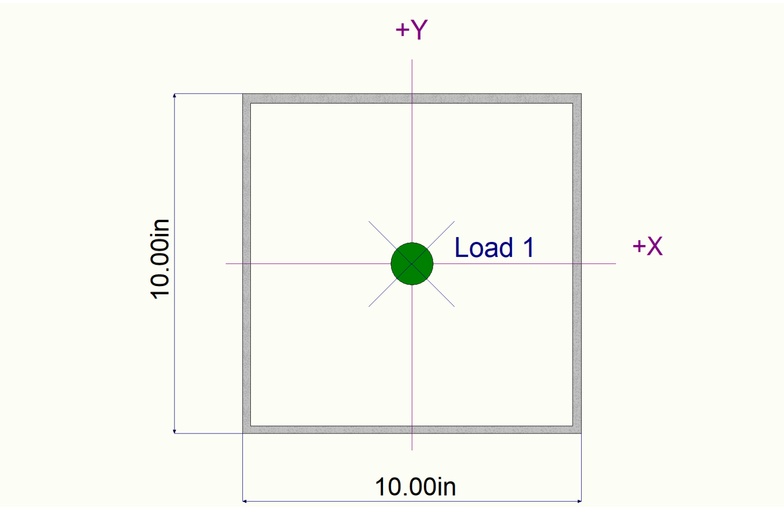
AWB Engineers
1942 Northwood Drive

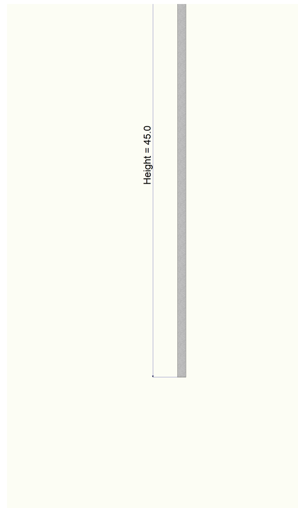
410-742-7299

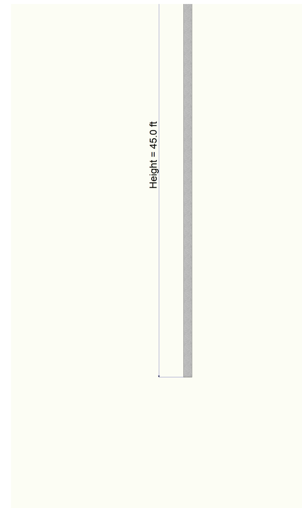
Steel Column

DESCRIPTION: Interior Steel Columns Along A.3 Line

Sketches







AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

Project File: cpfd.ec6

DESCRIPTION: Interior Steel Columns F.7/12.3 & J.3/12.3

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name : **HSS8x8x1/4**
Analysis Method : Allowable Strength
Steel Stress Grade
Fy : Steel Yield 36.0 ksi
E : Elastic Bending Modulus 29,000.0 ksi

Overall Column Height 31.0 ft
Top & Bottom Fixity Top & Bottom Pinned
Brace condition :
Unbraced Length for buckling ABOUT X-X Axis = 31.0 ft, K = 1.0
Unbraced Length for buckling ABOUT Y-Y Axis = 31.0 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 800.42 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 31.0 ft, D = 20.210, LR = 13.50, S = 13.50 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	**0.4699** : 1	
Load Combination	+D+Lr	
Location of max.above base	0.0	ft
At maximum location values are . . .		
Pa : Axial	34.510	k
Pn / Omega : Allowabl	73.449	k
Ma-x : Applied	0.0	k-ft
Mn-x / Omega : Allowable	36.826	k-ft
Ma-y : Applied	0.0	k-ft
Mn-y / Omega : Allowable	36.826	k-ft
PASS Maximum Shear Stress Rati	**0.0** : 1	
Load Combination	0.0	
Location of max.above base	0.0	ft
At maximum location values are . . .		
Va : Applied	0.0	k
Vn / Omega : Allowable	0.0	k

Maximum Load Reactions . .

Top along X-X	0.0 k
Bottom along X-X	0.0 k
Top along Y-Y	0.0 k
Bottom along Y-Y	0.0 k

Maximum Load Deflections . . .

Along Y-Y 0.0 in at 0.0ft above base
for load combination :

Along X-X 0.0 in at 0.0ft above base
for load combination :

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Cbx	Cby	KxLx/Ry	KyLy/Rx	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.286	PASS	0.00 ft	1.00	1.00	118.10	118.10	0.000	PASS	0.00 ft
+D+Lr	0.470	PASS	0.00 ft	1.00	1.00	118.10	118.10	0.000	PASS	0.00 ft
+D+S	0.470	PASS	0.00 ft	1.00	1.00	118.10	118.10	0.000	PASS	0.00 ft
+D+0.750Lr	0.424	PASS	0.00 ft	1.00	1.00	118.10	118.10	0.000	PASS	0.00 ft
+D+0.750S	0.424	PASS	0.00 ft	1.00	1.00	118.10	118.10	0.000	PASS	0.00 ft
+0.60D	0.172	PASS	0.00 ft	1.00	1.00	118.10	118.10	0.000	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction k @ Base	X-X Axis Reaction k @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments k-ft @ Top	My - End Moments @ Base	My - End Moments @ Top
D Only	21.010								
+D+Lr	34.510								
+D+S	34.510								
+D+0.750Lr	31.135								
+D+0.750S	31.135								
+0.60D	12.606								
Lr Only	13.500								
S Only	13.500								

Steel Column

DESCRIPTION: Interior Steel Columns F.7/12.3 & J.3/12.3

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base	k @ Top	Y-Y Axis Reaction @ Base	@ Top	Mx - End Moments @ Base	k-ft @ Top	My - End Moments @ Base	@ Top
Axial @ Base	Maximum	34.510								
"	Minimum	12.606								
Reaction, X-X Axis Base	Maximum	21.010								
"	Minimum	21.010								
Reaction, Y-Y Axis Base	Maximum	21.010								
"	Minimum	21.010								
Reaction, X-X Axis Top	Maximum	21.010								
"	Minimum	21.010								
Reaction, Y-Y Axis Top	Maximum	21.010								
"	Minimum	21.010								
Moment, X-X Axis Base	Maximum	21.010								
"	Minimum	21.010								
Moment, Y-Y Axis Base	Maximum	21.010								
"	Minimum	21.010								
Moment, X-X Axis Top	Maximum	21.010								
"	Minimum	21.010								
Moment, Y-Y Axis Top	Maximum	21.010								
"	Minimum	21.010								

Maximum Deflections for Load Combinations

Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Steel Section Properties : HSS8x8x1/4

Depth	=	8.000 in	I xx	=	70.70 in^4	J	=	111.000 in^4
Design Thick	=	0.233 in	S xx	=	17.70 in^3			
Width	=	8.000 in	R xx	=	3.150 in			
Wall Thick	=	0.250 in	Zx	=	20.500 in^3			
Area	=	7.100 in^2	I yy	=	70.700 in^4	C	=	28.100 in^3
Weight	=	25.820 plf	S yy	=	17.700 in^3			
			R yy	=	3.150 in			

Ycg	=	0.000 in

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1942 Northwood Drive

410-742-7299

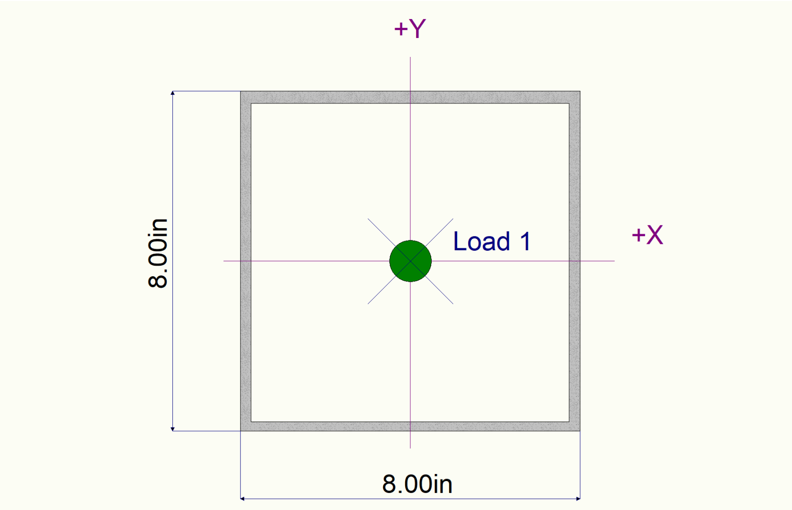
Project Title:
Engineer:
Project ID:
Project Descr:

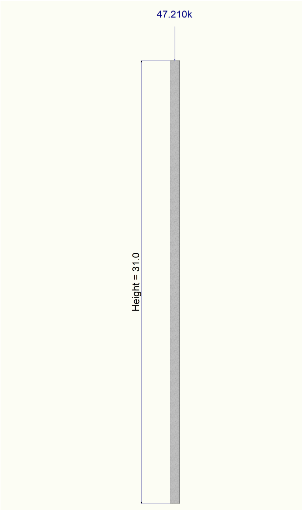
Steel Column

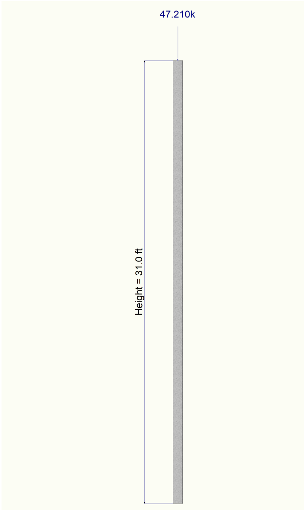
Project File: cpfd.ec6

DESCRIPTION: Interior Steel Columns F.7/12.3 & J.3/12.3

Sketches







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410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

Project File: cpfd.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Interior Steel Columns Along K.2 and D.8 Lines

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name : **HSS8x8x1/4**
Analysis Method : Allowable Strength
Steel Stress Grade
Fy : Steel Yield 36.0 ksi
E : Elastic Bending Modulus 29,000.0 ksi

Overall Column Height 33.0 ft
Top & Bottom Fixity Top & Bottom Pinned
Brace condition :
Unbraced Length for buckling ABOUT X-X Axis = 33.0 ft, K = 1.0
Unbraced Length for buckling ABOUT Y-Y Axis = 33.0 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 852.06 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 33.0 ft, D = 21.50, LR = 15.0, S = 15.0 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.5608** : 1
Load Combination +D+Lr
Location of max.above base 0.0 ft
At maximum location values are . . .
Pa : Axial 37.352 k
Pn / Omega : Allowabl 66.606 k
Ma-x : Applied 0.0 k-ft
Mn-x / Omega : Allowable 36.826 k-ft
Ma-y : Applied 0.0 k-ft
Mn-y / Omega : Allowable 36.826 k-ft

PASS Maximum Shear Stress Rati **0.0** : 1
Load Combination 0.0
Location of max.above base 0.0 ft
At maximum location values are . . .
Va : Applied 0.0 k
Vn / Omega : Allowable 0.0 k

Maximum Load Reactions . .
Top along X-X 0.0 k
Bottom along X-X 0.0 k
Top along Y-Y 0.0 k
Bottom along Y-Y 0.0 k

Maximum Load Deflections . . .
Along Y-Y 0.0 in at 0.0ft above base
for load combination :
Along X-X 0.0 in at 0.0ft above base
for load combination :

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios			Cbx	Cby	KxLx/Ry	KyLy/Rx	Maximum Shear Ratios		
	Stress Ratio	Status	Location					Stress Ratio	Status	Location
D Only	0.336	PASS	0.00 ft	1.00	1.00	125.71	125.71	0.000	PASS	0.00 ft
+D+Lr	0.561	PASS	0.00 ft	1.00	1.00	125.71	125.71	0.000	PASS	0.00 ft
+D+S	0.561	PASS	0.00 ft	1.00	1.00	125.71	125.71	0.000	PASS	0.00 ft
+D+0.750Lr	0.504	PASS	0.00 ft	1.00	1.00	125.71	125.71	0.000	PASS	0.00 ft
+D+0.750S	0.504	PASS	0.00 ft	1.00	1.00	125.71	125.71	0.000	PASS	0.00 ft
+0.60D	0.201	PASS	0.00 ft	1.00	1.00	125.71	125.71	0.000	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Mx - End Moments k-ft @ Base	@ Top	My - End Moments @ Base	@ Top
D Only	22.352								
+D+Lr	37.352								
+D+S	37.352								
+D+0.750Lr	33.602								
+D+0.750S	33.602								
+0.60D	13.411								
Lr Only	15.000								
S Only	15.000								

Steel Column

DESCRIPTION: Interior Steel Columns Along K.2 and D.8 Lines

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base	**k** @ Top	Y-Y Axis Reaction @ Base	@ Top	Mx - End Moments @ Base	**k-ft** @ Top	My - End Moments @ Base	@ Top
Axial @ Base	Maximum	37.352								
"	Minimum	13.411								
Reaction, X-X Axis Base	Maximum	22.352								
"	Minimum	22.352								
Reaction, Y-Y Axis Base	Maximum	22.352								
"	Minimum	22.352								
Reaction, X-X Axis Top	Maximum	22.352								
"	Minimum	22.352								
Reaction, Y-Y Axis Top	Maximum	22.352								
"	Minimum	22.352								
Moment, X-X Axis Base	Maximum	22.352								
"	Minimum	22.352								
Moment, Y-Y Axis Base	Maximum	22.352								
"	Minimum	22.352								
Moment, X-X Axis Top	Maximum	22.352								
"	Minimum	22.352								
Moment, Y-Y Axis Top	Maximum	22.352								
"	Minimum	22.352								

Maximum Deflections for Load Combinations

Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Steel Section Properties : **HSS8x8x1/4**

Depth	=	8.000 in	I xx	=	70.70 in^4	J	=	111.000 in^4
Design Thick	=	0.233 in	S xx	=	17.70 in^3			
Width	=	8.000 in	R xx	=	3.150 in			
Wall Thick	=	0.250 in	Zx	=	20.500 in^3			
Area	=	7.100 in^2	I yy	=	70.700 in^4	C	=	28.100 in^3
Weight	=	25.820 plf	S yy	=	17.700 in^3			
			R yy	=	3.150 in			
Ycg	=	0.000 in						

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1942 Northwood Drive

410-742-7299

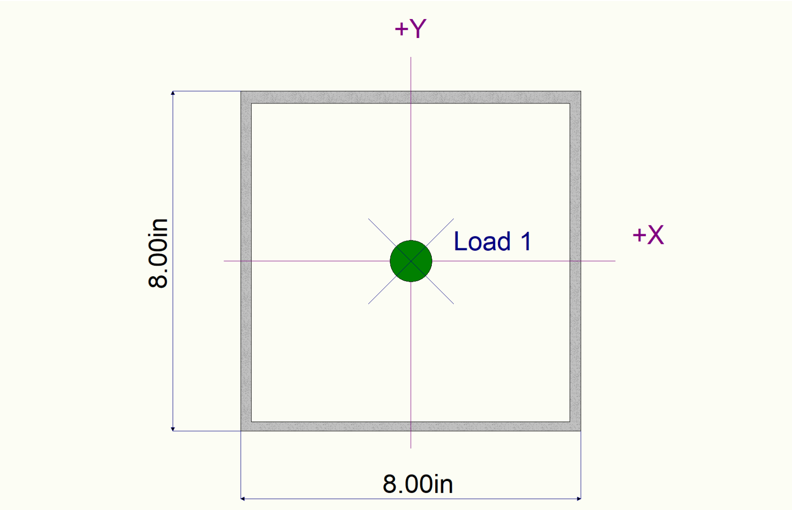
Project Title:
Engineer:
Project ID:
Project Descr:

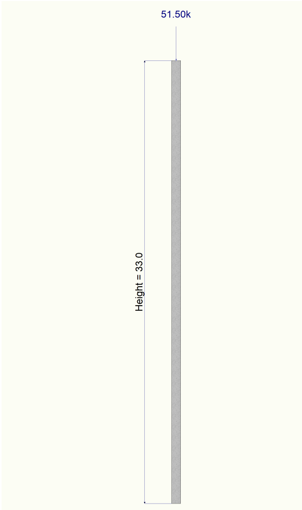
Steel Column

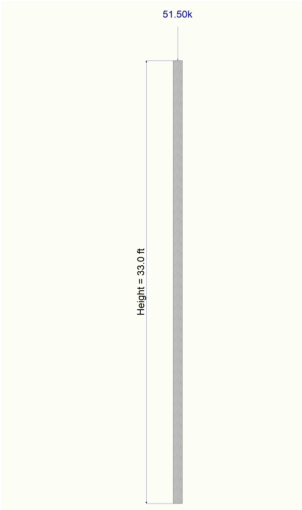
Project File: cpfd.ec6

DESCRIPTION: Interior Steel Columns Along K.2 and D.8 Lines

Sketches







Steel Column

DESCRIPTION: Interior Steel Columns Along C.5 & L Lines

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name : **W12x65**

Analysis Method : Allowable Strength
Steel Stress Grade
Fy : Steel Yield 36.0 ksi
E : Elastic Bending Modulus 29,000.0 ksi

Overall Column Height 45.0 ft
Top & Bottom Fixity Top & Bottom Pinned
Brace condition :
Unbraced Length for buckling ABOUT X-X Axis = 10 ft, K = 1.0
Unbraced Length for buckling ABOUT Y-Y Axis = 45.0 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 2,925.0 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 45.0 ft, D = 40.0, LR = 27.0, S = 27.0 k
Axial Load at 33.0 ft, D = 14.0, LR = 10.0, S = 17.0 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	0.6060	: 1
Load Combination	+D+S	
Location of max.above base	0.0	ft
At maximum location values are . . .		
Pa : Axial	100.925	k
Pn / Omega : Allowabl	166.537	k
Ma-x : Applied	0.0	k-ft
Mn-x / Omega : Allowable	112.252	k-ft
Ma-y : Applied	0.0	k-ft
Mn-y / Omega : Allowable	79.222	k-ft
PASS Maximum Shear Stress Rati	0.0	: 1
Load Combination	0.0	
Location of max.above base	0.0	ft
At maximum location values are . . .		
Va : Applied	0.0	k
Vn / Omega : Allowable	0.0	k

Maximum Load Reactions . .

Top along X-X	0.0 k
Bottom along X-X	0.0 k
Top along Y-Y	0.0 k
Bottom along Y-Y	0.0 k

Maximum Load Deflections . . .

Along Y-Y 0.0 in at 0.0ft above base
for load combination :
Along X-X 0.0 in at 0.0ft above base
for load combination :

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Cbx	Cby	KxLx/Ry	KyLy/Rx	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.342	PASS	0.00 ft	1.00	1.00	102.27	131.13	0.000	PASS	0.00 ft
+D+Lr	0.564	PASS	0.00 ft	1.00	1.00	102.27	131.13	0.000	PASS	0.00 ft
+D+S	0.606	PASS	0.00 ft	1.00	1.00	102.27	131.13	0.000	PASS	0.00 ft
+D+0.750Lr	0.508	PASS	0.00 ft	1.00	1.00	102.27	131.13	0.000	PASS	0.00 ft
+D+0.750S	0.540	PASS	0.00 ft	1.00	1.00	102.27	131.13	0.000	PASS	0.00 ft
+0.60D	0.205	PASS	0.00 ft	1.00	1.00	102.27	131.13	0.000	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction k @ Base	X-X @ Top	Y-Y Axis Reaction @ Base	Y-Y @ Top	Mx - End Moments k-ft @ Base	Mx @ Top	My - End Moments @ Base	My @ Top
D Only	56.925								
+D+Lr	93.925								
+D+S	100.925								
+D+0.750Lr	84.675								
+D+0.750S	89.925								
+0.60D	34.155								
Lr Only	37.000								
S Only	44.000								

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Steel Column

DESCRIPTION: Interior Steel Columns Along C.5 & L Lines

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base	**k** @ Top	Y-Y Axis Reaction @ Base	@ Top	Mx - End Moments @ Base	**k-ft** @ Top	My - End Moments @ Base	@ Top
Axial @ Base	Maximum	100.925								
"	Minimum	34.155								
Reaction, X-X Axis Base	Maximum	56.925								
"	Minimum	56.925								
Reaction, Y-Y Axis Base	Maximum	56.925								
"	Minimum	56.925								
Reaction, X-X Axis Top	Maximum	56.925								
"	Minimum	56.925								
Reaction, Y-Y Axis Top	Maximum	56.925								
"	Minimum	56.925								
Moment, X-X Axis Base	Maximum	56.925								
"	Minimum	56.925								
Moment, Y-Y Axis Base	Maximum	56.925								
"	Minimum	56.925								
Moment, X-X Axis Top	Maximum	56.925								
"	Minimum	56.925								
Moment, Y-Y Axis Top	Maximum	56.925								
"	Minimum	56.925								

Maximum Deflections for Load Combinations

Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Steel Section Properties : W12x65

Depth	=	12.100 in	I xx	=	533.00 in^4	J	=	2.180 in^4
Web Thick	=	0.390 in	S xx	=	87.90 in^3	Cw	=	5,780.00 in^6
Flange Width	=	12.000 in	R xx	=	5.280 in			
Flange Thick	=	0.605 in	Zx	=	96.800 in^3			
Area	=	19.100 in^2	I yy	=	174.000 in^4			
Weight	=	65.000 plf	S yy	=	29.100 in^3	Wno	=	34.500 in^2
Kdesign	=	1.200 in	R yy	=	3.020 in	Sw	=	62.600 in^4
K1	=	1.000 in	Zy	=	44.100 in^3	Qf	=	20.200 in^3
rts	=	3.380 in				Qw	=	47.500 in^3
Ycg	=	0.000 in						

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 4 JAN 2024, 1:32PM

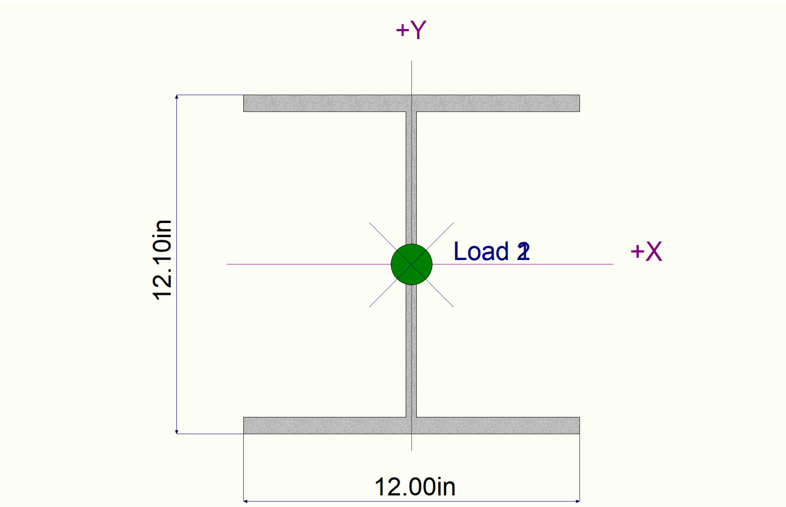
Steel Column

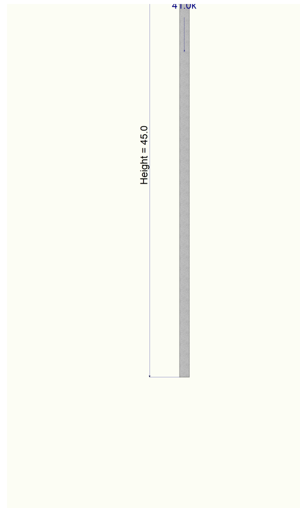
Project File: cpfd.ec6

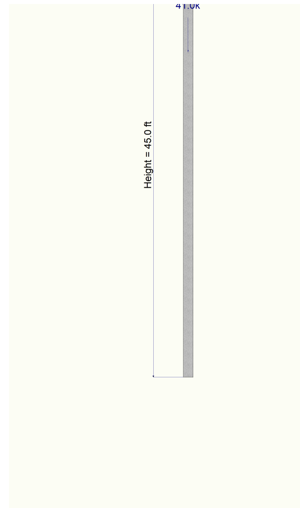
LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Interior Steel Columns Along C.5 & L Lines

Sketches







FOUNDATIONS

AWB Engineers
1942 Northwood Drive

410-742-7299

General Footing

DESCRIPTION: B FOOTING

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.850	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.50 : 1
Min. Sliding Safety Factor	=	1.50 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	3.0	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=		ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

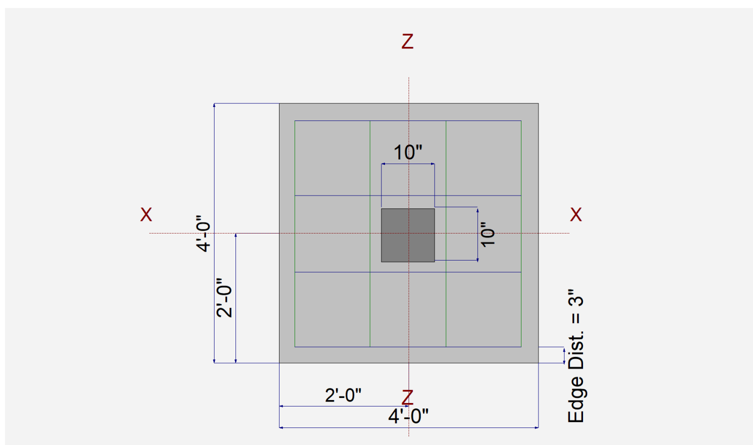
Width parallel to X-X Axis	=	4.0 ft
Length parallel to Z-Z Axis	=	4.0 ft
Footing Thickness	=	12.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	10.0 in
pz : parallel to Z-Z Axis	=	10.0 in
Height	=	12.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis

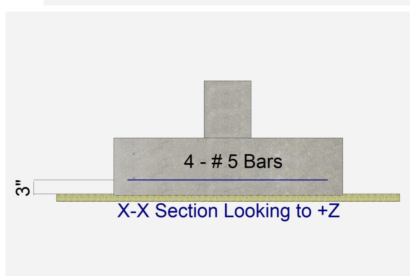
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	5

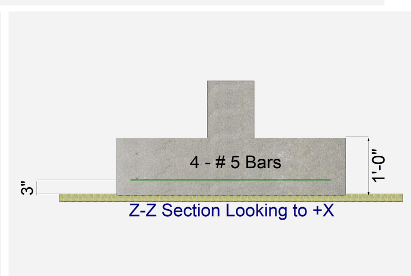
Bars parallel to Z-Z Axis

Number of Bars	=		4
Reinforcing Bar Size	=	#	5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation — n/a
Bars required within zone — n/a
Bars required on each side of zone — n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	20.0		15.0	15.0				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: cpfd.ec6

DESCRIPTION: B FOOTING

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9337	Soil Bearing	2.801 ksf	3.0 ksf	+D+0.750L+0.750S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.4068	Z Flexure (+X)	4.935 k-ft/ft	12.131 k-ft/ft	+1.20D+L+1.60S
PASS	0.4068	Z Flexure (-X)	4.935 k-ft/ft	12.131 k-ft/ft	+1.20D+L+1.60S
PASS	0.4068	X Flexure (+Z)	4.935 k-ft/ft	12.131 k-ft/ft	+1.20D+L+1.60S
PASS	0.4068	X Flexure (-Z)	4.935 k-ft/ft	12.131 k-ft/ft	+1.20D+L+1.60S
PASS	0.3289	1-way Shear (+X)	30.625 psi	93.113 psi	+1.20D+L+1.60S
PASS	0.3289	1-way Shear (-X)	30.625 psi	93.113 psi	+1.20D+L+1.60S
PASS	0.3289	1-way Shear (+Z)	30.625 psi	93.113 psi	+1.20D+L+1.60S
PASS	0.3289	1-way Shear (-Z)	30.625 psi	93.113 psi	+1.20D+L+1.60S
PASS	0.4155	2-way Punching	77.368 psi	186.226 psi	+1.20D+L+1.60S

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	1.395	1.395	n/a	n/a	0.465
X-X, +D+L	3.0	n/a	0.0	2.333	2.333	n/a	n/a	0.778
X-X, +D+S	3.0	n/a	0.0	2.333	2.333	n/a	n/a	0.778
X-X, +D+0.750L	3.0	n/a	0.0	2.098	2.098	n/a	n/a	0.699
X-X, +D+0.750L+0.750S	3.0	n/a	0.0	2.801	2.801	n/a	n/a	0.934
X-X, +0.60D	3.0	n/a	0.0	0.8370	0.8370	n/a	n/a	0.279
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	1.395	1.395	0.465
Z-Z, +D+L	3.0	0.0	n/a	n/a	n/a	2.333	2.333	0.778
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	2.333	2.333	0.778
Z-Z, +D+0.750L	3.0	0.0	n/a	n/a	n/a	2.098	2.098	0.699
Z-Z, +D+0.750L+0.750S	3.0	0.0	n/a	n/a	n/a	2.801	2.801	0.934
Z-Z, +0.60D	3.0	0.0	n/a	n/a	n/a	0.8370	0.8370	0.279

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	2.193	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.40D	2.193	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+1.60L	3.760	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+1.60L	3.760	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+1.60L+0.50S	4.348	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+1.60L+0.50S	4.348	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L	3.055	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L	3.055	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D	1.880	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D	1.880	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L+1.60S	4.935	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L+1.60S	4.935	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+1.60S	3.760	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: cpfd.ec6

DESCRIPTION: B FOOTING

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.20D+1.60S	3.760	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L+0.50S	3.643	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L+0.50S	3.643	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +0.90D	1.410	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +0.90D	1.410	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L+0.20S	3.290	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L+0.20S	3.290	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.40D	2.193	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.40D	2.193	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+1.60L	3.760	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+1.60L	3.760	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+1.60L+0.50S	4.348	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+1.60L+0.50S	4.348	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L	3.055	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L	3.055	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D	1.880	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D	1.880	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L+1.60S	4.935	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L+1.60S	4.935	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+1.60S	3.760	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+1.60S	3.760	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L+0.50S	3.643	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L+0.50S	3.643	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +0.90D	1.410	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +0.90D	1.410	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L+0.20S	3.290	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L+0.20S	3.290	+X	Bottom	0.2592	AsMin	0.310	12.131	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	13.61 psi	13.61 psi	13.61 psi	13.61 psi	13.61 psi	93.11 psi	0.15	OK
+1.20D+1.60L	23.33 psi	23.33 psi	23.33 psi	23.33 psi	23.33 psi	93.11 psi	0.25	OK
+1.20D+1.60L+0.50S	26.98 psi	26.98 psi	26.98 psi	26.98 psi	26.98 psi	93.11 psi	0.29	OK
+1.20D+L	18.96 psi	18.96 psi	18.96 psi	18.96 psi	18.96 psi	93.11 psi	0.20	OK
+1.20D	11.67 psi	11.67 psi	11.67 psi	11.67 psi	11.67 psi	93.11 psi	0.13	OK
+1.20D+L+1.60S	30.63 psi	30.63 psi	30.63 psi	30.63 psi	30.63 psi	93.11 psi	0.33	OK
+1.20D+1.60S	23.33 psi	23.33 psi	23.33 psi	23.33 psi	23.33 psi	93.11 psi	0.25	OK
+1.20D+L+0.50S	22.60 psi	22.60 psi	22.60 psi	22.60 psi	22.60 psi	93.11 psi	0.24	OK
+0.90D	8.75 psi	8.75 psi	8.75 psi	8.75 psi	8.75 psi	93.11 psi	0.09	OK
+1.20D+L+0.20S	20.42 psi	20.42 psi	20.42 psi	20.42 psi	20.42 psi	93.11 psi	0.22	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	34.39 psi	186.23psi	0.1846	OK
+1.20D+1.60L	58.95 psi	186.23psi	0.3165	OK
+1.20D+1.60L+0.50S	68.16 psi	186.23psi	0.366	OK
+1.20D+L	47.90 psi	186.23psi	0.2572	OK
+1.20D	29.47 psi	186.23psi	0.1583	OK
+1.20D+L+1.60S	77.37 psi	186.23psi	0.4155	OK
+1.20D+1.60S	58.95 psi	186.23psi	0.3165	OK
+1.20D+L+0.50S	57.11 psi	186.23psi	0.3066	OK
+0.90D	22.11 psi	186.23psi	0.1187	OK
+1.20D+L+0.20S	51.58 psi	186.23psi	0.277	OK

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: cpfd.ec6

DESCRIPTION: C FOOTING

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.850

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.50 : 1
Min. Sliding Safety Factor	=	1.50 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

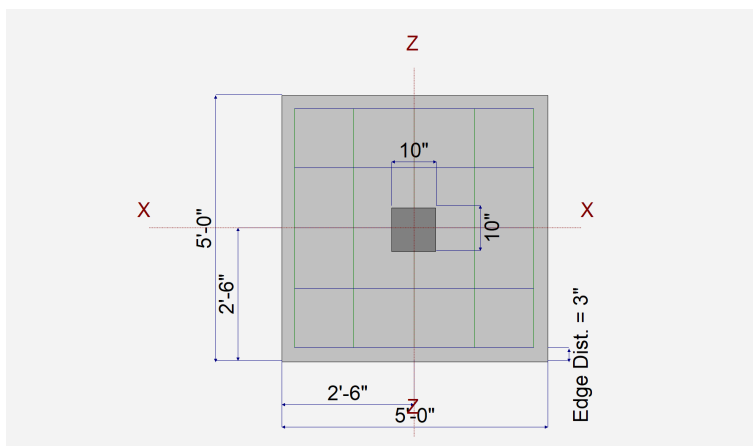
Width parallel to X-X Axis	=	5.0 ft
Length parallel to Z-Z Axis	=	5.0 ft
Footing Thickness	=	12.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	10.0 in
pz : parallel to Z-Z Axis	=	10.0 in
Height	=	12.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis

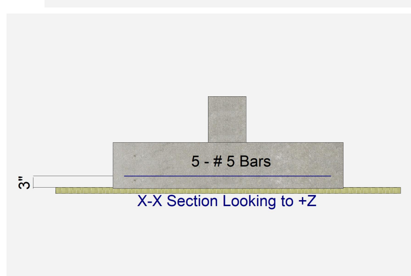
Number of Bars	=	5
Reinforcing Bar Size	=	# 5

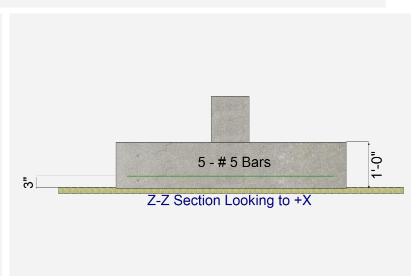
Bars parallel to Z-Z Axis

Number of Bars	=	5
Reinforcing Bar Size	=	# 5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	33.0		20.0	30.0				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

AWB Engineers
1942 Northwood Drive

410-742-7299

General Footing

DESCRIPTION: C FOOTING

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9883	Soil Bearing	2.965 ksf	3.0 ksf	+D+0.750L+0.750S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.7699	Z Flexure (+X)	9.340 k-ft/ft	12.131 k-ft/ft	+1.20D+L+1.60S
PASS	0.7699	Z Flexure (-X)	9.340 k-ft/ft	12.131 k-ft/ft	+1.20D+L+1.60S
PASS	0.7699	X Flexure (+Z)	9.340 k-ft/ft	12.131 k-ft/ft	+1.20D+L+1.60S
PASS	0.7699	X Flexure (-Z)	9.340 k-ft/ft	12.131 k-ft/ft	+1.20D+L+1.60S
PASS	0.5778	1-way Shear (+X)	53.80 psi	93.113 psi	+1.20D+L+1.60S
PASS	0.5778	1-way Shear (-X)	53.80 psi	93.113 psi	+1.20D+L+1.60S
PASS	0.5778	1-way Shear (+Z)	53.80 psi	93.113 psi	+1.20D+L+1.60S
PASS	0.5778	1-way Shear (-Z)	53.80 psi	93.113 psi	+1.20D+L+1.60S
PASS	0.7582	2-way Punching	141.201 psi	186.226 psi	+1.20D+L+1.60S

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	1.465	1.465	n/a	n/a	0.488
X-X, +D+L	3.0	n/a	0.0	2.265	2.265	n/a	n/a	0.755
X-X, +D+S	3.0	n/a	0.0	2.665	2.665	n/a	n/a	0.888
X-X, +D+0.750L	3.0	n/a	0.0	2.065	2.065	n/a	n/a	0.688
X-X, +D+0.750L+0.750S	3.0	n/a	0.0	2.965	2.965	n/a	n/a	0.988
X-X, +0.60D	3.0	n/a	0.0	0.8790	0.8790	n/a	n/a	0.293
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	1.465	1.465	0.488
Z-Z, +D+L	3.0	0.0	n/a	n/a	n/a	2.265	2.265	0.755
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	2.665	2.665	0.888
Z-Z, +D+0.750L	3.0	0.0	n/a	n/a	n/a	2.065	2.065	0.688
Z-Z, +D+0.750L+0.750S	3.0	0.0	n/a	n/a	n/a	2.965	2.965	0.988
Z-Z, +0.60D	3.0	0.0	n/a	n/a	n/a	0.8790	0.8790	0.293

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	4.010	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.40D	4.010	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+1.60L	6.215	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+1.60L	6.215	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+1.60L+0.50S	7.517	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+1.60L+0.50S	7.517	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L	5.173	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L	5.173	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D	3.437	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D	3.437	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L+1.60S	9.340	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L+1.60S	9.340	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+1.60S	7.604	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK

General Footing

DESCRIPTION: C FOOTING

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.20D+1.60S	7.604	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L+0.50S	6.475	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L+0.50S	6.475	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +0.90D	2.578	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +0.90D	2.578	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L+0.20S	5.694	+Z	Bottom	0.2592	AsMin	0.310	12.131	OK
X-X, +1.20D+L+0.20S	5.694	-Z	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.40D	4.010	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.40D	4.010	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+1.60L	6.215	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+1.60L	6.215	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+1.60L+0.50S	7.517	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+1.60L+0.50S	7.517	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L	5.173	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L	5.173	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D	3.437	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D	3.437	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L+1.60S	9.340	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L+1.60S	9.340	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+1.60S	7.604	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+1.60S	7.604	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L+0.50S	6.475	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L+0.50S	6.475	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +0.90D	2.578	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +0.90D	2.578	+X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L+0.20S	5.694	-X	Bottom	0.2592	AsMin	0.310	12.131	OK
Z-Z, +1.20D+L+0.20S	5.694	+X	Bottom	0.2592	AsMin	0.310	12.131	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	23.10 psi	23.10 psi	23.10 psi	23.10 psi	23.10 psi	93.11 psi	0.25	OK
+1.20D+1.60L	35.80 psi	35.80 psi	35.80 psi	35.80 psi	35.80 psi	93.11 psi	0.38	OK
+1.20D+1.60L+0.50S	43.30 psi	43.30 psi	43.30 psi	43.30 psi	43.30 psi	93.11 psi	0.47	OK
+1.20D+L	29.80 psi	29.80 psi	29.80 psi	29.80 psi	29.80 psi	93.11 psi	0.32	OK
+1.20D	19.80 psi	19.80 psi	19.80 psi	19.80 psi	19.80 psi	93.11 psi	0.21	OK
+1.20D+L+1.60S	53.80 psi	53.80 psi	53.80 psi	53.80 psi	53.80 psi	93.11 psi	0.58	OK
+1.20D+1.60S	43.80 psi	43.80 psi	43.80 psi	43.80 psi	43.80 psi	93.11 psi	0.47	OK
+1.20D+L+0.50S	37.30 psi	37.30 psi	37.30 psi	37.30 psi	37.30 psi	93.11 psi	0.40	OK
+0.90D	14.85 psi	14.85 psi	14.85 psi	14.85 psi	14.85 psi	93.11 psi	0.16	OK
+1.20D+L+0.20S	32.80 psi	32.80 psi	32.80 psi	32.80 psi	32.80 psi	93.11 psi	0.35	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	60.63 psi	186.23 psi	0.3256	OK
+1.20D+1.60L	93.96 psi	186.23 psi	0.5045	OK
+1.20D+1.60L+0.50S	113.64 psi	186.23 psi	0.6102	OK
+1.20D+L	78.21 psi	186.23 psi	0.42	OK
+1.20D	51.97 psi	186.23 psi	0.2791	OK
+1.20D+L+1.60S	141.20 psi	186.23 psi	0.7582	OK
+1.20D+1.60S	114.96 psi	186.23 psi	0.6173	OK
+1.20D+L+0.50S	97.90 psi	186.23 psi	0.5257	OK
+0.90D	38.98 psi	186.23 psi	0.2093	OK
+1.20D+L+0.20S	86.09 psi	186.23 psi	0.4623	OK

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: cpfd.ec6

DESCRIPTION: D FOOTING

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.850

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.50 : 1
Min. Sliding Safety Factor	=	1.50 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

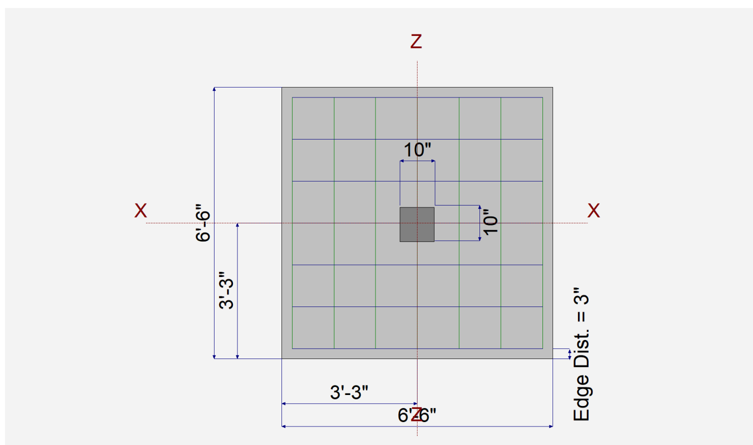
Width parallel to X-X Axis	=	6.50 ft
Length parallel to Z-Z Axis	=	6.50 ft
Footing Thickness	=	14.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	10.0 in
pz : parallel to Z-Z Axis	=	10.0 in
Height	=	12.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis

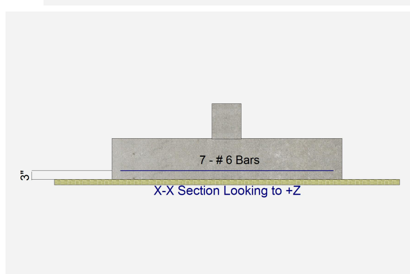
Number of Bars	=	7
Reinforcing Bar Size	=	# 6

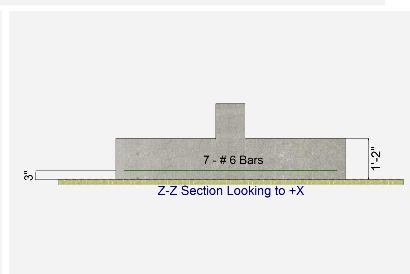
Bars parallel to Z-Z Axis

Number of Bars	=	7
Reinforcing Bar Size	=	# 6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation n/a
Bars required within zone n/a
Bars required on each side of zone n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	55.0		37.0	44.0				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

AWB Engineers
1942 Northwood Drive

410-742-7299

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: cpfd.ec6

DESCRIPTION: D FOOTING

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9697	Soil Bearing	2.909 ksf	3.0 ksf	+D+0.750L+0.750S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.7332	Z Flexure (+X)	16.472 k-ft/ft	22.465 k-ft/ft	+1.20D+L+1.60S
PASS	0.7332	Z Flexure (-X)	16.472 k-ft/ft	22.465 k-ft/ft	+1.20D+L+1.60S
PASS	0.7332	X Flexure (+Z)	16.472 k-ft/ft	22.465 k-ft/ft	+1.20D+L+1.60S
PASS	0.7332	X Flexure (-Z)	16.472 k-ft/ft	22.465 k-ft/ft	+1.20D+L+1.60S
PASS	0.6294	1-way Shear (+X)	58.608 psi	93.113 psi	+1.20D+L+1.60S
PASS	0.6294	1-way Shear (-X)	58.608 psi	93.113 psi	+1.20D+L+1.60S
PASS	0.6294	1-way Shear (+Z)	58.608 psi	93.113 psi	+1.20D+L+1.60S
PASS	0.6294	1-way Shear (-Z)	58.608 psi	93.113 psi	+1.20D+L+1.60S
PASS	0.9396	2-way Punching	174.976 psi	186.226 psi	+1.20D+L+1.60S

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	1.471	1.471	n/a	n/a	0.490
X-X, +D+L	3.0	n/a	0.0	2.347	2.347	n/a	n/a	0.782
X-X, +D+S	3.0	n/a	0.0	2.512	2.512	n/a	n/a	0.837
X-X, +D+0.750L	3.0	n/a	0.0	2.128	2.128	n/a	n/a	0.709
X-X, +D+0.750L+0.750S	3.0	n/a	0.0	2.909	2.909	n/a	n/a	0.970
X-X, +0.60D	3.0	n/a	0.0	0.8826	0.8826	n/a	n/a	0.294
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	1.471	1.471	0.490
Z-Z, +D+L	3.0	0.0	n/a	n/a	n/a	2.347	2.347	0.782
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	2.512	2.512	0.837
Z-Z, +D+0.750L	3.0	0.0	n/a	n/a	n/a	2.128	2.128	0.709
Z-Z, +D+0.750L+0.750S	3.0	0.0	n/a	n/a	n/a	2.909	2.909	0.970
Z-Z, +0.60D	3.0	0.0	n/a	n/a	n/a	0.8826	0.8826	0.294

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	7.315	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.40D	7.315	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60L	11.893	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60L	11.893	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60L+0.50S	13.983	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60L+0.50S	13.983	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+L	9.784	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+L	9.784	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D	6.270	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D	6.270	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+L+1.60S	16.472	+Z	Bottom	0.3433	Min for Bending	0.4738	22.465	OK
X-X, +1.20D+L+1.60S	16.472	-Z	Bottom	0.3433	Min for Bending	0.4738	22.465	OK
X-X, +1.20D+1.60S	12.957	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK

AWB Engineers
1942 Northwood Drive

410-742-7299

General Footing

DESCRIPTION: D FOOTING

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.20D+1.60S	12.957	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+L+0.50S	11.874	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+L+0.50S	11.874	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D	4.702	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D	4.702	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+L+0.20S	10.620	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+L+0.20S	10.620	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.40D	7.315	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.40D	7.315	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60L	11.893	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60L	11.893	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60L+0.50S	13.983	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60L+0.50S	13.983	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+L	9.784	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+L	9.784	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D	6.270	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D	6.270	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+L+1.60S	16.472	-X	Bottom	0.3433	Min for Bending	0.4738	22.465	OK
Z-Z, +1.20D+L+1.60S	16.472	+X	Bottom	0.3433	Min for Bending	0.4738	22.465	OK
Z-Z, +1.20D+1.60S	12.957	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S	12.957	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+L+0.50S	11.874	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+L+0.50S	11.874	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D	4.702	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D	4.702	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+L+0.20S	10.620	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+L+0.20S	10.620	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK

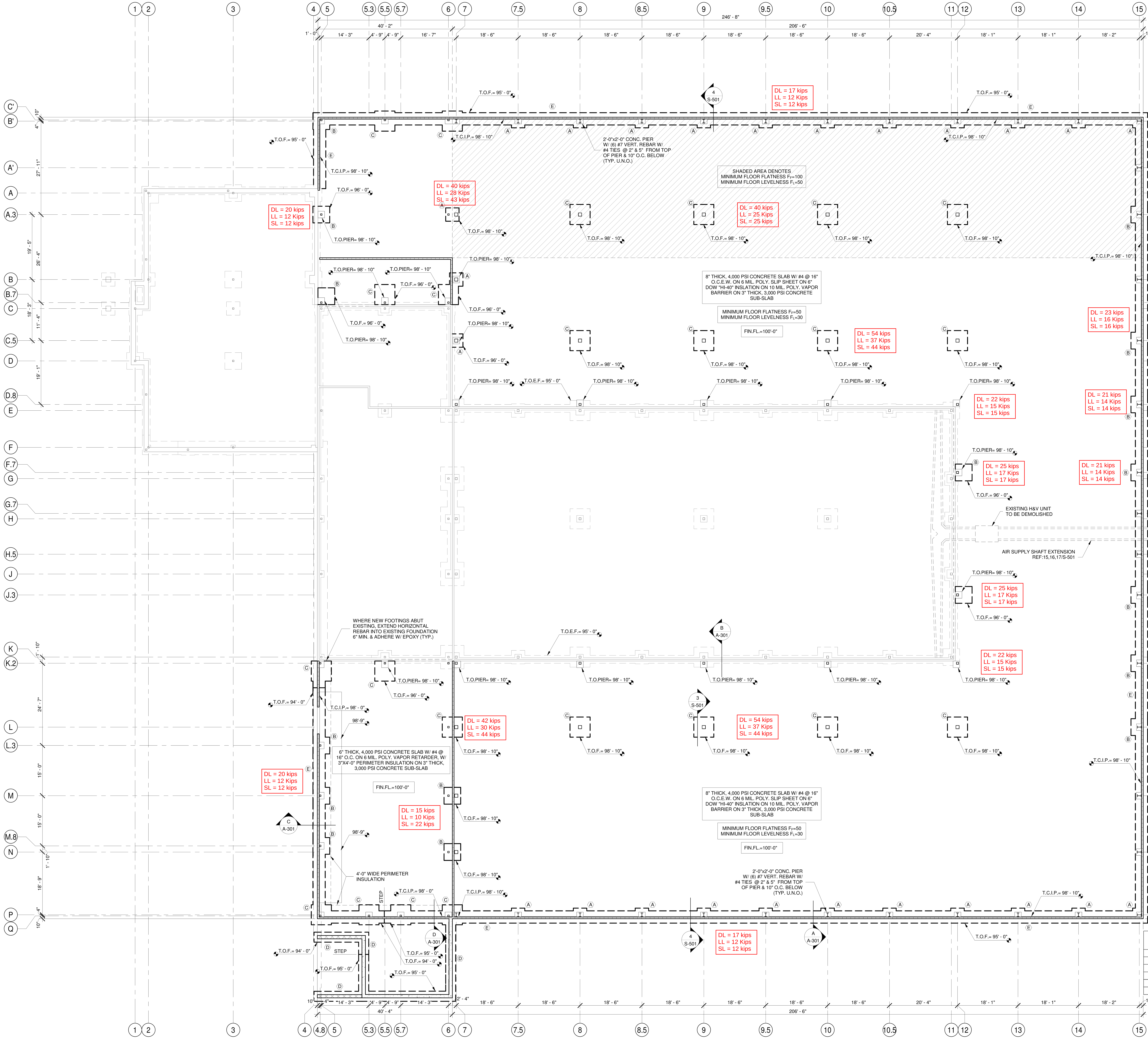
One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	26.03 psi	26.03 psi	26.03 psi	26.03 psi	26.03 psi	93.11 psi	0.28	OK
+1.20D+1.60L	42.32 psi	42.32 psi	42.32 psi	42.32 psi	42.32 psi	93.11 psi	0.45	OK
+1.20D+1.60L+0.50S	49.75 psi	49.75 psi	49.75 psi	49.75 psi	49.75 psi	93.11 psi	0.53	OK
+1.20D+L	34.81 psi	34.81 psi	34.81 psi	34.81 psi	34.81 psi	93.11 psi	0.37	OK
+1.20D	22.31 psi	22.31 psi	22.31 psi	22.31 psi	22.31 psi	93.11 psi	0.24	OK
+1.20D+L+1.60S	58.61 psi	58.61 psi	58.61 psi	58.61 psi	58.61 psi	93.11 psi	0.63	OK
+1.20D+1.60S	46.10 psi	46.10 psi	46.10 psi	46.10 psi	46.10 psi	93.11 psi	0.50	OK
+1.20D+L+0.50S	42.25 psi	42.25 psi	42.25 psi	42.25 psi	42.25 psi	93.11 psi	0.45	OK
+0.90D	16.73 psi	16.73 psi	16.73 psi	16.73 psi	16.73 psi	93.11 psi	0.18	OK
+1.20D+L+0.20S	37.79 psi	37.79 psi	37.79 psi	37.79 psi	37.79 psi	93.11 psi	0.41	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	77.70 psi	186.23 psi	0.4172	OK
+1.20D+1.60L	126.34 psi	186.23 psi	0.6784	OK
+1.20D+1.60L+0.50S	148.54 psi	186.23 psi	0.7976	OK
+1.20D+L	103.94 psi	186.23 psi	0.5581	OK
+1.20D	66.60 psi	186.23 psi	0.3576	OK
+1.20D+L+1.60S	174.98 psi	186.23 psi	0.9396	OK
+1.20D+1.60S	137.64 psi	186.23 psi	0.7391	OK
+1.20D+L+0.50S	126.14 psi	186.23 psi	0.6773	OK
+0.90D	49.95 psi	186.23 psi	0.2682	OK
+1.20D+L+0.20S	112.82 psi	186.23 psi	0.6058	OK



FOOTING SCHEDULE

TYPE	SIZE	FOOTING REBAR
A	3'-0"x3'-0"x1'-0"	(3) #5 BAR E.W.
B	4'-0"x4'-0"x1'-0"	(5) #5 BAR E.W.
C	5'-0"x5'-0"x1'-0	(6) #5 BAR E.W.
D	6'-6"x6'-6"x1'-2"	(7) #6 BAR E.W.
F	2'-6"x1'-0"xCONT.	(3) #5xCONT.

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DATE	BY	DESCRIPTION	REV
21 JUL 23	GTB	OWNER REVIEW	
28 JUL 23	GTB	30% PRICING SET	

PROJECT NORTH

ENGINEERS / ARCHITECTS
1942 NORTHWOOD DRIVE SALISBURY, MARYLAND 21801-7824
PH. (410) 742-7299 FAX. (410) 742-0273

AWB ENGINEERS

WHITING-TURNER

FOUNDATION / SLAB PLAN

FREEZER EXPANSION

PUYALLUP, WASHINGTON

SCALE	3/32" = 1'-0"
DRAWN	GTB
PROJ.MGR.	MRS
JOB	221205
SHEET	S-101

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28-Jul-23 10:39:03

Project Title:	221205 - CPFD - Puyallup, WA
Engineer:	
Project ID:	
Project Descr:	

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline C.5 and L

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16

Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.10 : 1
Min. Sliding Safety Factor	=	1.10 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

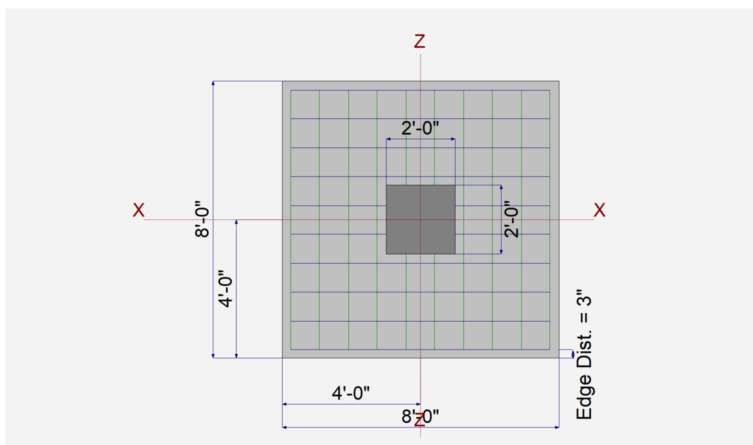
Footing base depth below soil surface	=	4.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

Width parallel to X-X Axis	=	8.0 ft
Length parallel to Z-Z Axis	=	8.0 ft
Footing Thickness	=	12.0 in



Pedestal dimensions...

px : parallel to X-X Axis	=	24.0 in
pz : parallel to Z-Z Axis	=	24.0 in
Height	=	36.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in

Reinforcing

Bars parallel to X-X Axis

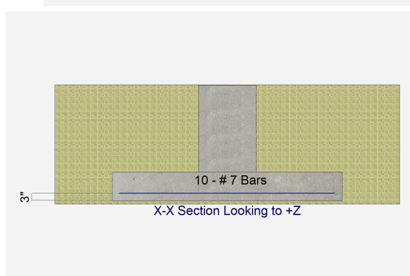
Number of Bars	=	10.0
Reinforcing Bar Size	=	# 7

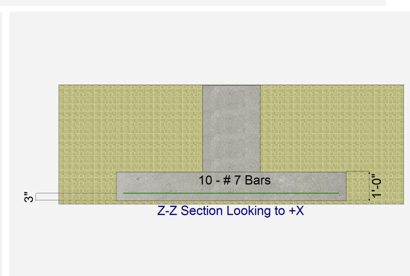
Bars parallel to Z-Z Axis

Number of Bars	=	10.0
Reinforcing Bar Size	=	# 7

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	37.0	22.0		27.0	-50.0	-65.0		k
OB : Overburden	=	0.150							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline C.5 and L

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.5407	Soil Bearing	1.622 ksf	3.0 ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	1.013	Uplift	-45.50 k	46.092 k	+0.60D+0.70E
PASS	0.2202	Z Flexure (+X)	6.143 k-ft/ft	27.893 k-ft/ft	+1.20D+1.60S
PASS	0.2202	Z Flexure (-X)	6.143 k-ft/ft	27.893 k-ft/ft	+1.20D+1.60S
PASS	0.2202	X Flexure (+Z)	6.143 k-ft/ft	27.893 k-ft/ft	+1.20D+1.60S
PASS	0.2202	X Flexure (-Z)	6.143 k-ft/ft	27.893 k-ft/ft	+1.20D+1.60S
PASS	0.3447	1-way Shear (+X)	28.319 psi	82.158 psi	+1.20D+1.60S
PASS	0.3447	1-way Shear (-X)	28.319 psi	82.158 psi	+1.20D+1.60S
PASS	0.3447	1-way Shear (+Z)	28.319 psi	82.158 psi	+1.20D+1.60S
PASS	0.3447	1-way Shear (-Z)	28.319 psi	82.158 psi	+1.20D+1.60S
PASS	0.3959	2-way Punching	65.053 psi	164.317 psi	+1.20D+1.60S

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	1.20	1.20	n/a	n/a	0.400
X-X, +D+Lr	3.0	n/a	0.0	1.544	1.544	n/a	n/a	0.515
X-X, +D+S	3.0	n/a	0.0	1.622	1.622	n/a	n/a	0.541
X-X, +D+0.750Lr	3.0	n/a	0.0	1.458	1.458	n/a	n/a	0.486
X-X, +D+0.750S	3.0	n/a	0.0	1.517	1.517	n/a	n/a	0.506
X-X, +D+0.60W	3.0	n/a	0.0	0.7316	0.7316	n/a	n/a	0.244
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	1.107	1.107	n/a	n/a	0.369
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	1.165	1.165	n/a	n/a	0.388
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.2514	0.2514	n/a	n/a	0.084
X-X, +D+0.70E	3.0	n/a	0.0	0.4894	0.4894	n/a	n/a	0.163
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	0.9835	0.9835	n/a	n/a	0.328
X-X, +0.60D+0.70E	3.0	n/a	0.0	0.009250	0.009250	n/a	n/a	0.003
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	1.20	1.20	0.400
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	1.544	1.544	0.515
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	1.622	1.622	0.541
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	1.458	1.458	0.486
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	1.517	1.517	0.506
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	0.7316	0.7316	0.244
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	1.107	1.107	0.369
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	1.165	1.165	0.388
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	0.2514	0.2514	0.084
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	0.4894	0.4894	0.163
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	0.9835	0.9835	0.328
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	0.009250	0.009250	0.003

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

General Footing

DESCRIPTION: Gridline C.5 and L

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	3.624	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.40D	3.624	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50Lr	3.879	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50Lr	3.879	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50S	4.055	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50S	4.055	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60Lr	5.581	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60Lr	5.581	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60Lr+0.50W	3.823	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60Lr+0.50W	3.823	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60S	6.143	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60S	6.143	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60S+0.50W	4.386	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60S+0.50W	4.386	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50Lr+W	0.3644	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50Lr+W	0.3644	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50S+W	0.5402	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50S+W	0.5402	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +0.90D+W	1.185	+Z	Top	0.2592	AsMin	0.750	27.893	OK
X-X, +0.90D+W	1.185	-Z	Top	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.20S+E	1.084	+Z	Top	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.20S+E	1.084	-Z	Top	0.2592	AsMin	0.750	27.893	OK
X-X, +0.90D+E	2.240	+Z	Top	0.2592	AsMin	0.750	27.893	OK
X-X, +0.90D+E	2.240	-Z	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.40D	3.624	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.40D	3.624	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50Lr	3.879	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50Lr	3.879	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50S	4.055	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50S	4.055	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60Lr	5.581	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60Lr	5.581	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60Lr+0.50W	3.823	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60Lr+0.50W	3.823	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60S	6.143	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60S	6.143	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60S+0.50W	4.386	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60S+0.50W	4.386	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50Lr+W	0.3644	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50Lr+W	0.3644	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50S+W	0.5402	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50S+W	0.5402	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +0.90D+W	1.185	-X	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +0.90D+W	1.185	+X	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.20S+E	1.084	-X	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.20S+E	1.084	+X	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +0.90D+E	2.240	-X	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +0.90D+E	2.240	+X	Top	0.2592	AsMin	0.750	27.893	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	16.71 psi	16.71 psi	16.71 psi	16.71 psi	16.71 psi	82.16 psi	0.20	OK
+1.20D+0.50Lr	17.88 psi	17.88 psi	17.88 psi	17.88 psi	17.88 psi	82.16 psi	0.22	OK
+1.20D+0.50S	18.69 psi	18.69 psi	18.69 psi	18.69 psi	18.69 psi	82.16 psi	0.23	OK
+1.20D+1.60Lr	25.73 psi	25.73 psi	25.73 psi	25.73 psi	25.73 psi	82.16 psi	0.31	OK
+1.20D+1.60Lr+0.50W	17.62 psi	17.62 psi	17.62 psi	17.62 psi	17.62 psi	82.16 psi	0.21	OK
+1.20D+1.60S	28.32 psi	28.32 psi	28.32 psi	28.32 psi	28.32 psi	82.16 psi	0.34	OK
+1.20D+1.60S+0.50W	20.22 psi	20.22 psi	20.22 psi	20.22 psi	20.22 psi	82.16 psi	0.25	OK
+1.20D+0.50Lr+W	1.68 psi	1.68 psi	1.68 psi	1.68 psi	1.68 psi	82.16 psi	0.02	OK
+1.20D+0.50S+W	2.49 psi	2.49 psi	2.49 psi	2.49 psi	2.49 psi	82.16 psi	0.03	OK
+0.90D+W	5.47 psi	5.47 psi	5.47 psi	5.47 psi	5.47 psi	82.16 psi	0.07	OK
+1.20D+0.20S+E	5.00 psi	5.00 psi	5.00 psi	5.00 psi	5.00 psi	82.16 psi	0.06	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline C.5 and L

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E	10.33 psi	10.33 psi	10.33 psi	10.33 psi	10.33 psi	82.16 psi	0.13	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	38.38 psi	164.32 psi	0.2335	OK
+1.20D+0.50Lr	41.08 psi	164.32 psi	0.25	OK
+1.20D+0.50S	42.94 psi	164.32 psi	0.2613	OK
+1.20D+1.60Lr	59.10 psi	164.32 psi	0.3597	OK
+1.20D+1.60Lr+0.50W	40.49 psi	164.32 psi	0.2464	OK
+1.20D+1.60S	65.05 psi	164.32 psi	0.3959	OK
+1.20D+1.60S+0.50W	46.44 psi	164.32 psi	0.2826	OK
+1.20D+0.50Lr+W	3.86 psi	164.32 psi	0.02349	OK
+1.20D+0.50S+W	5.72 psi	164.32 psi	0.03481	OK
+0.90D+W	12.55 psi	164.32 psi	0.07639	OK
+1.20D+0.20S+E	11.48 psi	164.32 psi	0.06984	OK
+0.90D+E	23.72 psi	164.32 psi	0.1444	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline B' and P

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.10 : 1
Min. Sliding Safety Factor	=	1.10 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

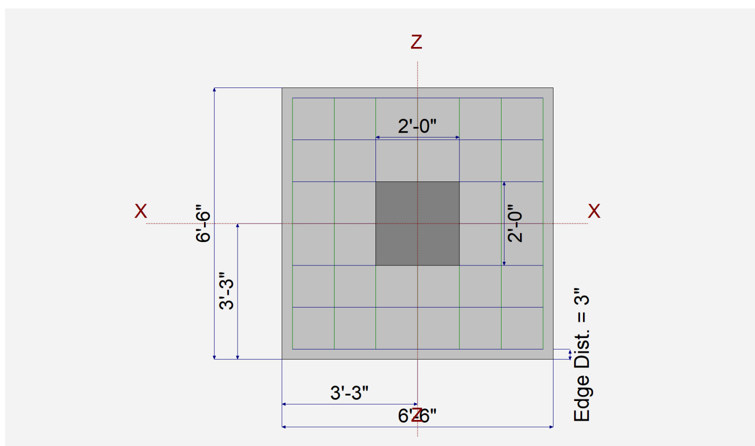
Footing base depth below soil surface	=	6.50 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

Width parallel to X-X Axis	=	6.50 ft
Length parallel to Z-Z Axis	=	6.50 ft
Footing Thickness	=	14.0 in



Pedestal dimensions...

px : parallel to X-X Axis	=	24.0 in
pz : parallel to Z-Z Axis	=	24.0 in
Height	=	48.0 in

Rebar Centerline to Edge of Concrete...

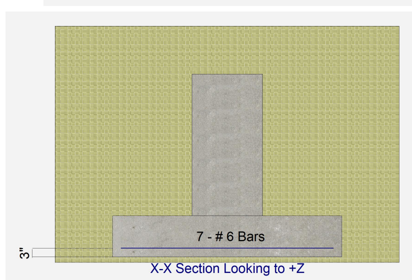
at Bottom of footing	=	3.0 in

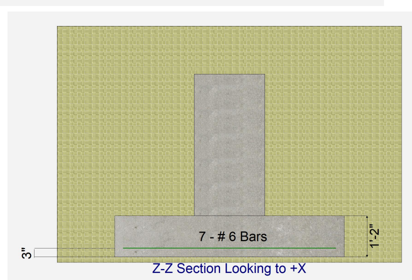
Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	7.0
Reinforcing Bar Size	=	# 6
Bars parallel to Z-Z Axis		
Number of Bars	=	7.0
Reinforcing Bar Size	=	# 6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	22.50	11.0		14.0	-22.0	-53.0		k
OB : Overburden	=	0.20							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline B' and P

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.60	Soil Bearing	1.80 ksf	3.0 ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	1.004	Uplift	-37.10 k	37.234 k	+0.60D+0.70E
PASS	0.2181	Z Flexure (+X)	4.901 k-ft/ft	22.465 k-ft/ft	+1.20D+0.20S-E
PASS	0.2181	Z Flexure (-X)	4.901 k-ft/ft	22.465 k-ft/ft	+1.20D+0.20S-E
PASS	0.2181	X Flexure (+Z)	4.901 k-ft/ft	22.465 k-ft/ft	+1.20D+0.20S-E
PASS	0.2181	X Flexure (-Z)	4.901 k-ft/ft	22.465 k-ft/ft	+1.20D+0.20S-E
PASS	0.2437	1-way Shear (+X)	20.023 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.2437	1-way Shear (-X)	20.023 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.2437	1-way Shear (+Z)	20.023 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.2437	1-way Shear (-Z)	20.023 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.2607	2-way Punching	42.838 psi	164.317 psi	+1.20D+0.20S-E

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	1.469	1.469	n/a	n/a	0.490
X-X, +D+Lr	3.0	n/a	0.0	1.729	1.729	n/a	n/a	0.576
X-X, +D+S	3.0	n/a	0.0	1.80	1.80	n/a	n/a	0.600
X-X, +D+0.750Lr	3.0	n/a	0.0	1.664	1.664	n/a	n/a	0.555
X-X, +D+0.750S	3.0	n/a	0.0	1.717	1.717	n/a	n/a	0.572
X-X, +D+0.60W	3.0	n/a	0.0	1.156	1.156	n/a	n/a	0.385
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	1.430	1.430	n/a	n/a	0.477
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	1.483	1.483	n/a	n/a	0.494
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.5689	0.5689	n/a	n/a	0.190
X-X, +D+0.70E	3.0	n/a	0.0	0.5907	0.5907	n/a	n/a	0.197
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	1.059	1.059	n/a	n/a	0.353
X-X, +0.60D+0.70E	3.0	n/a	0.0	0.003180	0.003180	n/a	n/a	0.001
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	1.469	1.469	0.490
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	1.729	1.729	0.576
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	1.80	1.80	0.600
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	1.664	1.664	0.555
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	1.717	1.717	0.572
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	1.156	1.156	0.385
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	1.430	1.430	0.477
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	1.483	1.483	0.494
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	0.5689	0.5689	0.190
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	0.5907	0.5907	0.197
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	1.059	1.059	0.353
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	0.003180	0.003180	0.001

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline B' and P

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	1.818	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.40D	1.818	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr	1.887	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr	1.887	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S	1.977	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S	1.977	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr	2.612	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr	2.612	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr+0.50W	1.953	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr+0.50W	1.953	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr-0.50W	3.271	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr-0.50W	3.271	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S	2.90	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S	2.90	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S+0.50W	2.241	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S+0.50W	2.241	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S-0.50W	3.559	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S-0.50W	3.559	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr+W	0.5696	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr+W	0.5696	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr-W	3.205	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr-W	3.205	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S+W	0.6594	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S+W	0.6594	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S-W	3.295	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S-W	3.295	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+W	0.1494	+Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+W	0.1494	-Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-W	2.486	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-W	2.486	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S+E	1.449	+Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S+E	1.449	-Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S-E	4.901	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S-E	4.901	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+E	2.006	+Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+E	2.006	-Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-E	4.343	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-E	4.343	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.40D	1.818	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.40D	1.818	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr	1.887	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr	1.887	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S	1.977	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S	1.977	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr	2.612	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr	2.612	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr+0.50W	1.953	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr+0.50W	1.953	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr-0.50W	3.271	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr-0.50W	3.271	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S	2.90	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S	2.90	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S+0.50W	2.241	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S+0.50W	2.241	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S-0.50W	3.559	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S-0.50W	3.559	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr+W	0.5696	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr+W	0.5696	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr-W	3.205	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr-W	3.205	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S+W	0.6594	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S+W	0.6594	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S-W	3.295	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline B' and P

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+0.50S-W	3.295	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+W	0.1494	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+W	0.1494	+X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-W	2.486	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-W	2.486	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S+E	1.449	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S+E	1.449	+X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S-E	4.901	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S-E	4.901	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+E	2.006	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+E	2.006	+X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-E	4.343	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-E	4.343	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	7.43 psi	7.43 psi	7.43 psi	7.43 psi	7.43 psi	82.16 psi	0.09	OK
+1.20D+0.50Lr	7.71 psi	7.71 psi	7.71 psi	7.71 psi	7.71 psi	82.16 psi	0.09	OK
+1.20D+0.50S	8.08 psi	8.08 psi	8.08 psi	8.08 psi	8.08 psi	82.16 psi	0.10	OK
+1.20D+1.60Lr	10.67 psi	10.67 psi	10.67 psi	10.67 psi	10.67 psi	82.16 psi	0.13	OK
+1.20D+1.60Lr+0.50W	7.98 psi	7.98 psi	7.98 psi	7.98 psi	7.98 psi	82.16 psi	0.10	OK
+1.20D+1.60Lr-0.50W	13.37 psi	13.37 psi	13.37 psi	13.37 psi	13.37 psi	82.16 psi	0.16	OK
+1.20D+1.60S	11.85 psi	11.85 psi	11.85 psi	11.85 psi	11.85 psi	82.16 psi	0.14	OK
+1.20D+1.60S+0.50W	9.16 psi	9.16 psi	9.16 psi	9.16 psi	9.16 psi	82.16 psi	0.11	OK
+1.20D+1.60S-0.50W	14.54 psi	14.54 psi	14.54 psi	14.54 psi	14.54 psi	82.16 psi	0.18	OK
+1.20D+0.50Lr+W	2.33 psi	2.33 psi	2.33 psi	2.33 psi	2.33 psi	82.16 psi	0.03	OK
+1.20D+0.50Lr-W	13.10 psi	13.10 psi	13.10 psi	13.10 psi	13.10 psi	82.16 psi	0.16	OK
+1.20D+0.50S+W	2.69 psi	2.69 psi	2.69 psi	2.69 psi	2.69 psi	82.16 psi	0.03	OK
+1.20D+0.50S-W	13.46 psi	13.46 psi	13.46 psi	13.46 psi	13.46 psi	82.16 psi	0.16	OK
+0.90D+W	0.61 psi	0.61 psi	0.61 psi	0.61 psi	0.61 psi	82.16 psi	0.01	OK
+0.90D-W	10.16 psi	10.16 psi	10.16 psi	10.16 psi	10.16 psi	82.16 psi	0.12	OK
+1.20D+0.20S+E	5.92 psi	5.92 psi	5.92 psi	5.92 psi	5.92 psi	82.16 psi	0.07	OK
+1.20D+0.20S-E	20.02 psi	20.02 psi	20.02 psi	20.02 psi	20.02 psi	82.16 psi	0.24	OK
+0.90D+E	8.20 psi	8.20 psi	8.20 psi	8.20 psi	8.20 psi	82.16 psi	0.10	OK
+0.90D-E	17.75 psi	17.75 psi	17.75 psi	17.75 psi	17.75 psi	82.16 psi	0.22	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	15.89 psi	164.32psi	0.09669	OK
+1.20D+0.50Lr	16.50 psi	164.32psi	0.1004	OK
+1.20D+0.50S	17.28 psi	164.32psi	0.1052	OK
+1.20D+1.60Lr	22.84 psi	164.32psi	0.139	OK
+1.20D+1.60Lr+0.50W	17.08 psi	164.32psi	0.1039	OK
+1.20D+1.60Lr-0.50W	28.60 psi	164.32psi	0.174	OK
+1.20D+1.60S	25.35 psi	164.32psi	0.1543	OK
+1.20D+1.60S+0.50W	19.59 psi	164.32psi	0.1192	OK
+1.20D+1.60S-0.50W	31.11 psi	164.32psi	0.1893	OK
+1.20D+0.50Lr+W	4.98 psi	164.32psi	0.0303	OK
+1.20D+0.50Lr-W	28.02 psi	164.32psi	0.1705	OK
+1.20D+0.50S+W	5.76 psi	164.32psi	0.03508	OK
+1.20D+0.50S-W	28.80 psi	164.32psi	0.1753	OK
+0.90D+W	1.31 psi	164.32psi	0.007948	OK
+0.90D-W	21.73 psi	164.32psi	0.1323	OK
+1.20D+0.20S+E	12.67 psi	164.32psi	0.07709	OK
+1.20D+0.20S-E	42.84 psi	164.32psi	0.2607	OK
+0.90D+E	17.54 psi	164.32psi	0.1067	OK
+0.90D-E	37.97 psi	164.32psi	0.2311	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline 7 and B.7

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.10 : 1
Min. Sliding Safety Factor	=	1.10 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	5.0	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

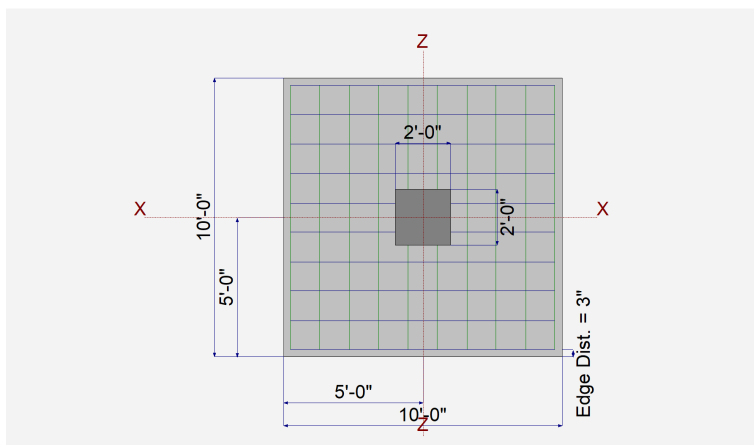
Width parallel to X-X Axis	=	10.0	ft
Length parallel to Z-Z Axis	=	10.0	ft
Footing Thickness	=	12.0	in

Pedestal dimensions...

px : parallel to X-X Axis	=	24.0	in
pz : parallel to Z-Z Axis	=	24.0	in
Height	=	36.0	in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0	in



Reinforcing

Bars parallel to X-X Axis

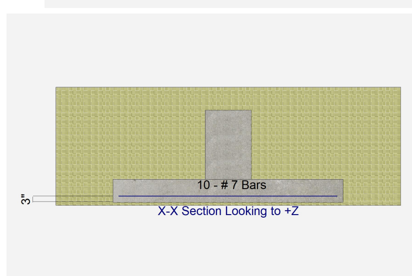
Number of Bars	=	10.0
Reinforcing Bar Size	=	# 7

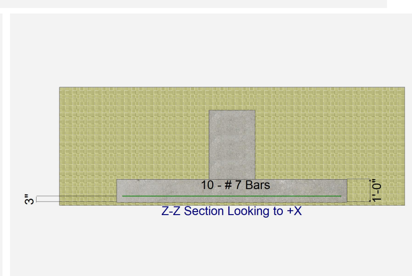
Bars parallel to Z-Z Axis

Number of Bars	=	10.0
Reinforcing Bar Size	=	# 7

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	21.0	11.0		32.0	-96.0	-105.0		k
OB : Overburden	=	0.150							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline 7 and B.7

DESIGN SUMMARY

Design N.G. OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.4197	Soil Bearing	1.259 ksf	3.0 ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
FAIL	0.7664	Uplift	-73.50 k	56.328 k	+0.60D+0.70E
PASS	0.3052	Z Flexure (+X)	6.933 k-ft/ft	22.712 k-ft/ft	+0.90D+E
PASS	0.3052	Z Flexure (-X)	6.933 k-ft/ft	22.712 k-ft/ft	+0.90D+E
PASS	0.3052	X Flexure (+Z)	6.933 k-ft/ft	22.712 k-ft/ft	+0.90D+E
PASS	0.3052	X Flexure (-Z)	6.933 k-ft/ft	22.712 k-ft/ft	+0.90D+E
PASS	0.3223	1-way Shear (+X)	26.479 psi	82.158 psi	+0.90D+E
PASS	0.3223	1-way Shear (-X)	26.479 psi	82.158 psi	+0.90D+E
PASS	0.3223	1-way Shear (+Z)	26.479 psi	82.158 psi	+0.90D+E
PASS	0.3223	1-way Shear (-Z)	26.479 psi	82.158 psi	+0.90D+E
PASS	0.4091	2-way Punching	67.226 psi	164.317 psi	+0.90D+E

Considering that the footing is doweled into adjacent existing foundations and strip footing. OK

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	0.9388	0.9388	n/a	n/a	0.313
X-X, +D+Lr	3.0	n/a	0.0	1.049	1.049	n/a	n/a	0.350
X-X, +D+S	3.0	n/a	0.0	1.259	1.259	n/a	n/a	0.420
X-X, +D+0.750Lr	3.0	n/a	0.0	1.021	1.021	n/a	n/a	0.340
X-X, +D+0.750S	3.0	n/a	0.0	1.179	1.179	n/a	n/a	0.393
X-X, +D+0.60W	3.0	n/a	0.0	0.3628	0.3628	n/a	n/a	0.121
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	0.5893	0.5893	n/a	n/a	0.196
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	0.7468	0.7468	n/a	n/a	0.249
X-X, +0.60D+0.60W	3.0	n/a	0.0	-0.01272	-0.01272	n/a	n/a	0.004
X-X, +D+0.70E	3.0	n/a	0.0	0.2038	0.2038	n/a	n/a	0.068
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	0.6276	0.6276	n/a	n/a	0.209
X-X, +0.60D+0.70E	3.0	n/a	0.0	-0.1717	-0.1717	n/a	n/a	0.057
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	0.9388	0.9388	0.313
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	1.049	1.049	0.350
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	1.259	1.259	0.420
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	1.021	1.021	0.340
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	1.179	1.179	0.393
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	0.3628	0.3628	0.121
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	0.5893	0.5893	0.196
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	0.7468	0.7468	0.249
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	-0.01272	-0.01272	0.004
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	0.2038	0.2038	0.068
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	0.6276	0.6276	0.209
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	-0.1717	-0.1717	0.057

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status

Footing Has NO Overturning

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status

Footing Has NO Sliding

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline 7 and B.7

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	2.283	+Z	Bottom	0.2592	AsMin	0.60	22.712	OK
X-X, +1.40D	2.283	-Z	Bottom	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+0.50Lr	2.396	+Z	Bottom	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+0.50Lr	2.396	-Z	Bottom	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+0.50S	3.236	+Z	Bottom	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+0.50S	3.236	-Z	Bottom	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+1.60Lr	3.364	+Z	Bottom	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+1.60Lr	3.364	-Z	Bottom	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+1.60Lr+0.50W	0.4755	+Z	Top	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+1.60Lr+0.50W	0.4755	-Z	Top	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+1.60S	6.052	+Z	Bottom	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+1.60S	6.052	-Z	Bottom	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+1.60S+0.50W	2.212	+Z	Bottom	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+1.60S+0.50W	2.212	-Z	Bottom	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+0.50Lr+W	5.284	+Z	Top	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+0.50Lr+W	5.284	-Z	Top	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+0.50S+W	4.444	+Z	Top	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+0.50S+W	4.444	-Z	Top	0.2592	AsMin	0.60	22.712	OK
X-X, +0.90D+W	6.213	+Z	Top	0.2592	AsMin	0.60	22.712	OK
X-X, +0.90D+W	6.213	-Z	Top	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+0.20S+E	5.932	+Z	Top	0.2592	AsMin	0.60	22.712	OK
X-X, +1.20D+0.20S+E	5.932	-Z	Top	0.2592	AsMin	0.60	22.712	OK
X-X, +0.90D+E	6.933	+Z	Top	0.2592	AsMin	0.60	22.712	OK
X-X, +0.90D+E	6.933	-Z	Top	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.40D	2.283	-X	Bottom	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.40D	2.283	+X	Bottom	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+0.50Lr	2.396	-X	Bottom	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+0.50Lr	2.396	+X	Bottom	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+0.50S	3.236	-X	Bottom	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+0.50S	3.236	+X	Bottom	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+1.60Lr	3.364	-X	Bottom	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+1.60Lr	3.364	+X	Bottom	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+1.60Lr+0.50W	0.4755	-X	Top	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+1.60Lr+0.50W	0.4755	+X	Top	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+1.60S	6.052	-X	Bottom	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+1.60S	6.052	+X	Bottom	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+1.60S+0.50W	2.212	-X	Bottom	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+1.60S+0.50W	2.212	+X	Bottom	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+0.50Lr+W	5.284	-X	Top	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+0.50Lr+W	5.284	+X	Top	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+0.50S+W	4.444	-X	Top	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+0.50S+W	4.444	+X	Top	0.2592	AsMin	0.60	22.712	OK
Z-Z, +0.90D+W	6.213	-X	Top	0.2592	AsMin	0.60	22.712	OK
Z-Z, +0.90D+W	6.213	+X	Top	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+0.20S+E	5.932	-X	Top	0.2592	AsMin	0.60	22.712	OK
Z-Z, +1.20D+0.20S+E	5.932	+X	Top	0.2592	AsMin	0.60	22.712	OK
Z-Z, +0.90D+E	6.933	-X	Top	0.2592	AsMin	0.60	22.712	OK
Z-Z, +0.90D+E	6.933	+X	Top	0.2592	AsMin	0.60	22.712	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	8.72 psi	8.72 psi	8.72 psi	8.72 psi	8.72 psi	82.16 psi	0.11	OK
+1.20D+0.50Lr	9.15 psi	9.15 psi	9.15 psi	9.15 psi	9.15 psi	82.16 psi	0.11	OK
+1.20D+0.50S	12.36 psi	12.36 psi	12.36 psi	12.36 psi	12.36 psi	82.16 psi	0.15	OK
+1.20D+1.60Lr	12.85 psi	12.85 psi	12.85 psi	12.85 psi	12.85 psi	82.16 psi	0.16	OK
+1.20D+1.60Lr+0.50W	1.82 psi	1.82 psi	1.82 psi	1.82 psi	1.82 psi	82.16 psi	0.02	OK
+1.20D+1.60S	23.12 psi	23.12 psi	23.12 psi	23.12 psi	23.12 psi	82.16 psi	0.28	OK
+1.20D+1.60S+0.50W	8.45 psi	8.45 psi	8.45 psi	8.45 psi	8.45 psi	82.16 psi	0.10	OK
+1.20D+0.50Lr+W	20.18 psi	20.18 psi	20.18 psi	20.18 psi	20.18 psi	82.16 psi	0.25	OK
+1.20D+0.50S+W	16.97 psi	16.97 psi	16.97 psi	16.97 psi	16.97 psi	82.16 psi	0.21	OK
+0.90D+W	23.73 psi	23.73 psi	23.73 psi	23.73 psi	23.73 psi	82.16 psi	0.29	OK
+1.20D+0.20S+E	22.66 psi	22.66 psi	22.66 psi	22.66 psi	22.66 psi	82.16 psi	0.28	OK

General Footing

DESCRIPTION: Gridline 7 and B.7

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E	26.48 psi	26.48 psi	26.48 psi	26.48 psi	26.48 psi	82.16 psi	0.32	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	22.13 psi	164.32 psi	0.1347	OK
+1.20D+0.50Lr	23.24 psi	164.32 psi	0.1414	OK
+1.20D+0.50S	31.38 psi	164.32 psi	0.191	OK
+1.20D+1.60Lr	32.63 psi	164.32 psi	0.1986	OK
+1.20D+1.60Lr+0.50W	4.61 psi	164.32 psi	0.02806	OK
+1.20D+1.60S	58.69 psi	164.32 psi	0.3572	OK
+1.20D+1.60S+0.50W	21.45 psi	164.32 psi	0.1306	OK
+1.20D+0.50Lr+W	51.23 psi	164.32 psi	0.3118	OK
+1.20D+0.50S+W	43.09 psi	164.32 psi	0.2622	OK
+0.90D+W	60.24 psi	164.32 psi	0.3666	OK
+1.20D+0.20S+E	57.52 psi	164.32 psi	0.35	OK
+0.90D+E	67.23 psi	164.32 psi	0.4091	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline 7 and C.5

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.10 : 1
Min. Sliding Safety Factor	=	1.10 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	4.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

Width parallel to X-X Axis	=	8.0 ft
Length parallel to Z-Z Axis	=	8.0 ft
Footing Thickness	=	12.0 in

Load location offset from footing center...

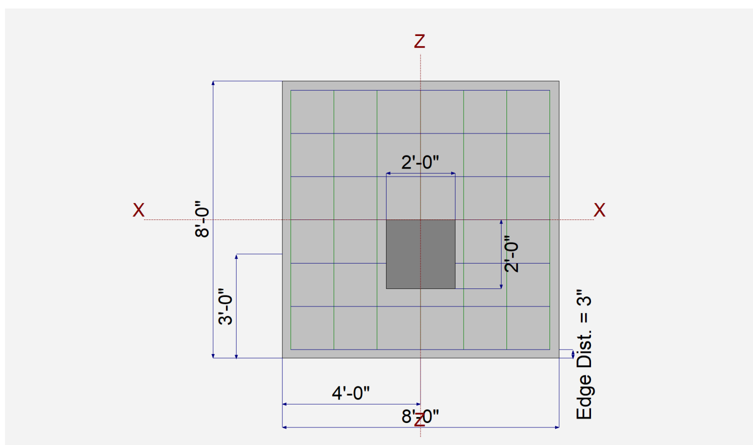
ez : Prll to Z-Z Axis	=	-12 in
	=	in

Pedestal dimensions...

px : parallel to X-X Axis	=	24.0 in
pz : parallel to Z-Z Axis	=	24.0 in
Height	=	34.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis

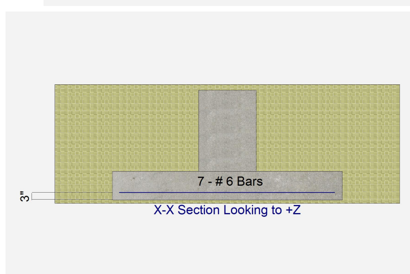
Number of Bars	=	7.0
Reinforcing Bar Size	=	# 6

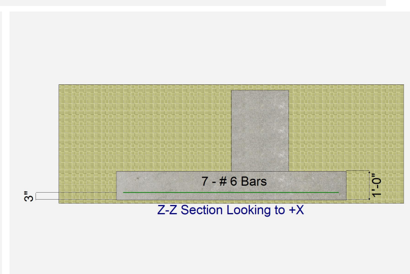
Bars parallel to Z-Z Axis

Number of Bars	=	7.0
Reinforcing Bar Size	=	# 6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	18.0	9.0		19.0	-45.0	-36.0		k
OB : Overburden	=	0.150							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline 7 and C.5

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.5417	Soil Bearing	1.625 ksf	3.0 ksf	+D+S about X-X axis
PASS	1.577	Overturning - X-X	81.0 k-ft	127.736 k-ft	+0.60D+0.60W
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	1.283	Uplift	-27.0 k	34.634 k	+0.60D+0.60W
PASS	0.2431	Z Flexure (+X)	3.632 k-ft/ft	14.939 k-ft/ft	+1.20D+1.60S
PASS	0.2431	Z Flexure (-X)	3.632 k-ft/ft	14.939 k-ft/ft	+1.20D+1.60S
PASS	0.3012	X Flexure (+Z)	4.50 k-ft/ft	14.939 k-ft/ft	+0.90D+W
PASS	0.1752	X Flexure (-Z)	2.617 k-ft/ft	14.939 k-ft/ft	+1.20D+1.60S
PASS	0.2038	1-way Shear (+X)	16.744 psi	82.158 psi	+1.20D+1.60S
PASS	0.2038	1-way Shear (-X)	16.744 psi	82.158 psi	+1.20D+1.60S
PASS	0.2079	1-way Shear (+Z)	17.083 psi	82.158 psi	+0.90D+W
PASS	0.1894	1-way Shear (-Z)	15.558 psi	82.158 psi	+1.20D+1.60S
PASS	0.2332	2-way Punching	38.316 psi	164.317 psi	+1.20D+1.60S

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	-3.684	1.108	0.6963	n/a	n/a	0.369
X-X, +D+Lr	3.0	n/a	-4.806	1.353	0.7325	n/a	n/a	0.451
X-X, +D+S	3.0	n/a	-5.744	1.625	0.7728	n/a	n/a	0.542
X-X, +D+0.750Lr	3.0	n/a	-4.555	1.291	0.7235	n/a	n/a	0.430
X-X, +D+0.750S	3.0	n/a	-5.331	1.496	0.7536	n/a	n/a	0.499
X-X, +D+0.60W	3.0	n/a	3.623	0.3724	0.5877	n/a	n/a	0.196
X-X, +D+0.750Lr+0.450W	3.0	n/a	-1.146	0.740	0.6420	n/a	n/a	0.247
X-X, +D+0.750S+0.450W	3.0	n/a	-2.720	0.9442	0.6722	n/a	n/a	0.315
X-X, +0.60D+0.60W	3.0	n/a	24.693	0.0	0.3253	n/a	n/a	0.108
X-X, +D+0.70E	3.0	n/a	2.759	0.4214	0.5949	n/a	n/a	0.198
X-X, +D+0.750S+0.5250E	3.0	n/a	-2.956	0.9809	0.6776	n/a	n/a	0.327
X-X, +0.60D+0.70E	3.0	n/a	17.692	0.0	0.3096	n/a	n/a	0.103
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	0.9019	0.9019	0.301
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	1.043	1.043	0.348
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	1.199	1.199	0.400
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	1.007	1.007	0.336
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	1.125	1.125	0.375
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	0.4801	0.4801	0.160
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	0.6910	0.6910	0.230
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	0.8082	0.8082	0.269
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	0.1193	0.1193	0.040
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	0.5082	0.5082	0.169
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	0.8293	0.8293	0.276
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	0.1474	0.1474	0.049

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, D Only	None	212.893 k-ft	Infinity	OK
X-X, +D+Lr	None	239.893 k-ft	Infinity	OK
X-X, +D+S	None	269.893 k-ft	Infinity	OK
X-X, +D+0.750Lr	None	233.143 k-ft	Infinity	OK
X-X, +D+0.750S	None	255.643 k-ft	Infinity	OK
X-X, +D+0.60W	81.0 k-ft	212.893 k-ft	2.628	OK
X-X, +D+0.750Lr+0.450W	60.750 k-ft	233.143 k-ft	3.838	OK
X-X, +D+0.750S+0.450W	60.750 k-ft	255.643 k-ft	4.208	OK

General Footing

DESCRIPTION: Gridline 7 and C.5

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, +0.60D+0.60W	81.0 k-ft	127.736 k-ft	1.577	OK
X-X, +D+0.70E	56.70 k-ft	212.893 k-ft	3.755	OK
X-X, +D+0.750S+0.5250E	42.525 k-ft	255.643 k-ft	6.012	OK
X-X, +0.60D+0.70E	56.70 k-ft	127.736 k-ft	2.253	OK
Z-Z, D Only	None	0.0 k-ft	Infinity	OK
Z-Z, +D+Lr	None	0.0 k-ft	Infinity	OK
Z-Z, +D+S	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750Lr	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750S	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.60W	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750Lr+0.450W	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750S+0.450W	None	0.0 k-ft	Infinity	OK
Z-Z, +0.60D+0.60W	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.70E	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750S+0.5250E	None	0.0 k-ft	Infinity	OK
Z-Z, +0.60D+0.70E	None	0.0 k-ft	Infinity	OK

All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	1.592	+Z	Bottom	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.40D	1.247	-Z	Bottom	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+0.50Lr	1.631	+Z	Bottom	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+0.50Lr	1.302	-Z	Bottom	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+0.50S	1.944	+Z	Bottom	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+0.50S	1.556	-Z	Bottom	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+1.60Lr	2.250	+Z	Bottom	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+1.60Lr	1.805	-Z	Bottom	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+1.60Lr+0.50W	0.8436	+Z	Bottom	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+1.60Lr+0.50W	0.6622	-Z	Bottom	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+1.60S	3.250	+Z	Bottom	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+1.60S	2.617	-Z	Bottom	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+1.60S+0.50W	1.844	+Z	Bottom	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+1.60S+0.50W	1.475	-Z	Bottom	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+0.50Lr+W	1.182	+Z	Top	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+0.50Lr+W	0.9830	-Z	Top	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+0.50S+W	0.8690	+Z	Top	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+0.50S+W	0.7291	-Z	Top	0.2592	AsMin	0.3850	14.939	OK
X-X, +0.90D+W	4.50	+Z	Top	0.2592	AsMin	0.3850	14.939	OK
X-X, +0.90D+W	1.125	-Z	Top	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+0.20S+E	0.6628	+Z	Top	0.2592	AsMin	0.3850	14.939	OK
X-X, +1.20D+0.20S+E	0.5615	-Z	Top	0.2592	AsMin	0.3850	14.939	OK
X-X, +0.90D+E	1.263	+Z	Top	0.2592	AsMin	0.3850	14.939	OK
X-X, +0.90D+E	1.015	-Z	Top	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.40D	1.744	-X	Bottom	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.40D	1.744	+X	Bottom	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+0.50Lr	1.811	-X	Bottom	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+0.50Lr	1.811	+X	Bottom	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+0.50S	2.163	-X	Bottom	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+0.50S	2.163	+X	Bottom	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+1.60Lr	2.507	-X	Bottom	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+1.60Lr	2.507	+X	Bottom	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+1.60Lr+0.50W	0.9257	-X	Bottom	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+1.60Lr+0.50W	0.9257	+X	Bottom	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+1.60S	3.632	-X	Bottom	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+1.60S	3.632	+X	Bottom	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+1.60S+0.50W	2.051	-X	Bottom	0.2592	AsMin	0.3850	14.939	OK

DESCRIPTION: Gridline 7 and C.5

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+1.60S+0.50W	2.051	+X	Bottom	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+0.50Lr+W	1.352	-X	Top	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+0.50Lr+W	1.352	+X	Top	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+0.50S+W	1.001	-X	Top	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+0.50S+W	1.001	+X	Top	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +0.90D+W	2.042	-X	Top	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +0.90D+W	2.042	+X	Top	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+0.20S+E	0.7685	-X	Top	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +1.20D+0.20S+E	0.7685	+X	Top	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +0.90D+E	1.409	-X	Top	0.2592	AsMin	0.3850	14.939	OK
Z-Z, +0.90D+E	1.409	+X	Top	0.2592	AsMin	0.3850	14.939	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	8.04 psi	8.04 psi	7.41 psi	6.70 psi	8.04 psi	82.16 psi	0.10	OK
+1.20D+0.50Lr	8.35 psi	8.35 psi	7.74 psi	6.89 psi	8.35 psi	82.16 psi	0.10	OK
+1.20D+0.50S	9.97 psi	9.97 psi	9.25 psi	8.21 psi	9.97 psi	82.16 psi	0.12	OK
+1.20D+1.60Lr	11.56 psi	11.56 psi	10.73 psi	9.51 psi	11.56 psi	82.16 psi	0.14	OK
+1.20D+1.60Lr+0.50W	4.27 psi	4.27 psi	3.94 psi	3.55 psi	4.27 psi	82.16 psi	0.05	OK
+1.20D+1.60S	16.74 psi	16.74 psi	15.56 psi	13.74 psi	16.74 psi	82.16 psi	0.20	OK
+1.20D+1.60S+0.50W	9.45 psi	9.45 psi	8.77 psi	7.79 psi	9.45 psi	82.16 psi	0.12	OK
+1.20D+0.50Lr+W	6.23 psi	6.23 psi	5.84 psi	5.02 psi	6.23 psi	82.16 psi	0.08	OK
+1.20D+0.50S+W	4.61 psi	4.61 psi	4.33 psi	3.70 psi	4.61 psi	82.16 psi	0.06	OK
+0.90D+W	9.41 psi	9.41 psi	6.67 psi	17.08 psi	17.08 psi	82.16 psi	0.21	OK
+1.20D+0.20S+E	3.54 psi	3.54 psi	3.34 psi	2.82 psi	3.54 psi	82.16 psi	0.04	OK
+0.90D+E	6.50 psi	6.50 psi	6.03 psi	5.34 psi	6.50 psi	82.16 psi	0.08	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	18.40 psi	164.32psi	0.112	OK
+1.20D+0.50Lr	19.11 psi	164.32psi	0.1163	OK
+1.20D+0.50S	22.82 psi	164.32psi	0.1389	OK
+1.20D+1.60Lr	26.45 psi	164.32psi	0.161	OK
+1.20D+1.60Lr+0.50W	9.77 psi	164.32psi	0.05943	OK
+1.20D+1.60S	38.32 psi	164.32psi	0.2332	OK
+1.20D+1.60S+0.50W	21.63 psi	164.32psi	0.1316	OK
+1.20D+0.50Lr+W	14.26 psi	164.32psi	0.0868	OK
+1.20D+0.50S+W	10.55 psi	164.32psi	0.06423	OK
+0.90D+W	26.70 psi	164.32psi	0.1625	OK
+1.20D+0.20S+E	8.11 psi	164.32psi	0.04934	OK
+0.90D+E	14.87 psi	164.32psi	0.09048	OK

General Footing

DESCRIPTION: Gridline 7 and D.8

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.10 : 1
Min. Sliding Safety Factor	=	1.10 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	5.0	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

Width parallel to X-X Axis	=	8.0	ft
Length parallel to Z-Z Axis	=	8.0	ft
Footing Thickness	=	12.0	in

Load location offset from footing center...

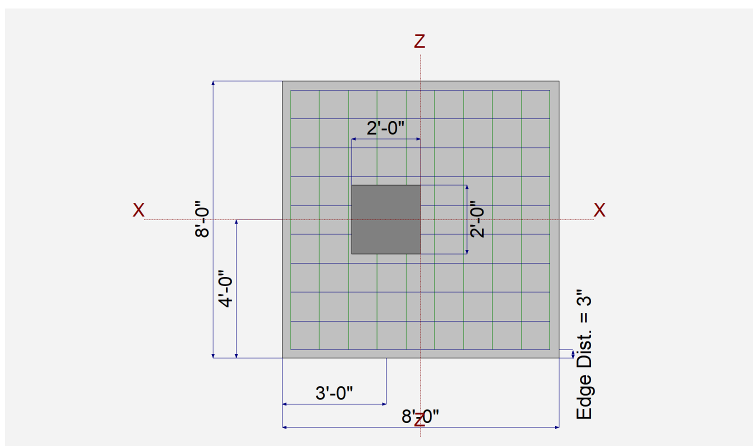
ex : Prll to X-X Axis	=	-12	in
	=		in

Pedestal dimensions...

px : parallel to X-X Axis	=	24.0	in
pz : parallel to Z-Z Axis	=	24.0	in
Height	=	48.0	in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0	in



Reinforcing

Bars parallel to X-X Axis

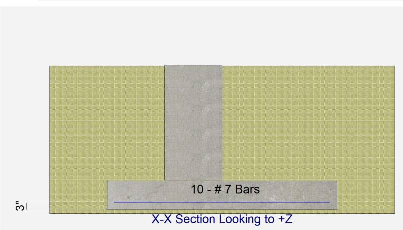
Number of Bars	=		10.0
Reinforcing Bar Size	=	#	7

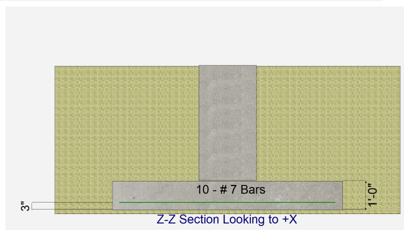
Bars parallel to Z-Z Axis

Number of Bars	=		10.0
Reinforcing Bar Size	=	#	7

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	19.0	9.0		20.50	-50.0	-70.0		k
OB : Overburden	=	0.150							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline 7 and D.8

DESIGN SUMMARY

Design N.G. OK

Considering that the footing is doweled into adjacent existing foundations and strip footings. OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6030	Soil Bearing	1.809 ksf	3.0 ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	1.333	Overturning - Z-Z	110.250 k-ft	147.0 k-ft	+0.60D+0.70E
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
FAIL	0.8082	Uplift	-49.0 k	39.60 k	+0.60D+0.70E
PASS	0.1897	Z Flexure (+X)	5.292 k-ft/ft	27.893 k-ft/ft	+0.90D+E
PASS	0.1008	Z Flexure (-X)	2.812 k-ft/ft	27.893 k-ft/ft	+1.20D+1.60S
PASS	0.140	X Flexure (+Z)	3.905 k-ft/ft	27.893 k-ft/ft	+1.20D+1.60S
PASS	0.140	X Flexure (-Z)	3.905 k-ft/ft	27.893 k-ft/ft	+1.20D+1.60S
PASS	0.2445	1-way Shear (+X)	20.090 psi	82.158 psi	+0.90D+E
PASS	0.2034	1-way Shear (-X)	16.714 psi	82.158 psi	+1.20D+1.60S
PASS	0.2191	1-way Shear (+Z)	18.003 psi	82.158 psi	+1.20D+1.60S
PASS	0.2191	1-way Shear (-Z)	18.003 psi	82.158 psi	+1.20D+1.60S
PASS	0.2507	2-way Punching	41.196 psi	164.317 psi	+1.20D+1.60S

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	1.031	1.031	n/a	n/a	0.344
X-X, +D+Lr	3.0	n/a	0.0	1.172	1.172	n/a	n/a	0.391
X-X, +D+S	3.0	n/a	0.0	1.352	1.352	n/a	n/a	0.451
X-X, +D+0.750Lr	3.0	n/a	0.0	1.137	1.137	n/a	n/a	0.379
X-X, +D+0.750S	3.0	n/a	0.0	1.271	1.271	n/a	n/a	0.424
X-X, +D+0.60W	3.0	n/a	0.0	0.5625	0.5625	n/a	n/a	0.188
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	0.7852	0.7852	n/a	n/a	0.262
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	0.9199	0.9199	n/a	n/a	0.307
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.150	0.150	n/a	n/a	0.050
X-X, +D+0.70E	3.0	n/a	0.0	0.2656	0.2656	n/a	n/a	0.089
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	0.6973	0.6973	n/a	n/a	0.232
X-X, +0.60D+0.70E	3.0	n/a	0.0	-0.1469	-0.1469	n/a	n/a	0.049
Z-Z, D Only	3.0	-3.447	n/a	n/a	n/a	1.251	0.8113	0.417
Z-Z, +D+Lr	3.0	-4.474	n/a	n/a	n/a	1.496	0.8475	0.499
Z-Z, +D+S	3.0	-5.474	n/a	n/a	n/a	1.809	0.8938	0.603
Z-Z, +D+0.750Lr	3.0	-4.241	n/a	n/a	n/a	1.435	0.8384	0.478
Z-Z, +D+0.750S	3.0	-5.063	n/a	n/a	n/a	1.670	0.8731	0.557
Z-Z, +D+0.60W	3.0	3.680	n/a	n/a	n/a	0.4344	0.6906	0.230
Z-Z, +D+0.750Lr+0.450W	3.0	-0.7666	n/a	n/a	n/a	0.8224	0.7479	0.274
Z-Z, +D+0.750S+0.450W	3.0	-2.412	n/a	n/a	n/a	1.057	0.7826	0.352
Z-Z, +0.60D+0.60W	3.0	22.120	n/a	n/a	n/a	0.0	0.3687	0.123
Z-Z, +D+0.70E	3.0	21.205	n/a	n/a	n/a	0.0	0.6307	0.210
Z-Z, +D+0.750S+0.5250E	3.0	0.6494	n/a	n/a	n/a	0.6692	0.7253	0.242
Z-Z, +0.60D+0.70E	3.0	-46.846	n/a	n/a	n/a	-7.016	0.0	0.000

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, D Only	None	0.0 k-ft	Infinity	OK
X-X, +D+Lr	None	0.0 k-ft	Infinity	OK
X-X, +D+S	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750Lr	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750S	None	0.0 k-ft	Infinity	OK
X-X, +D+0.60W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750Lr+0.450W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750S+0.450W	None	0.0 k-ft	Infinity	OK

General Footing

DESCRIPTION: Gridline 7 and D.8

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, +0.60D+0.60W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.70E	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750S+0.5250E	None	0.0 k-ft	Infinity	OK
X-X, +0.60D+0.70E	None	0.0 k-ft	Infinity	OK
Z-Z, D Only	None	245.0 k-ft	Infinity	OK
Z-Z, +D+Lr	None	272.0 k-ft	Infinity	OK
Z-Z, +D+S	None	306.50 k-ft	Infinity	OK
Z-Z, +D+0.750Lr	None	265.250 k-ft	Infinity	OK
Z-Z, +D+0.750S	None	291.125 k-ft	Infinity	OK
Z-Z, +D+0.60W	90.0 k-ft	245.0 k-ft	2.722	OK
Z-Z, +D+0.750Lr+0.450W	67.50 k-ft	265.250 k-ft	3.930	OK
Z-Z, +D+0.750S+0.450W	67.50 k-ft	291.125 k-ft	4.313	OK
Z-Z, +0.60D+0.60W	90.0 k-ft	147.0 k-ft	1.633	OK
Z-Z, +D+0.70E	110.250 k-ft	245.0 k-ft	2.222	OK
Z-Z, +D+0.750S+0.5250E	82.688 k-ft	291.125 k-ft	3.521	OK
Z-Z, +0.60D+0.70E	110.250 k-ft	147.0 k-ft	1.333	OK

All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	1.866	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.40D	1.866	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50Lr	1.916	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50Lr	1.916	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50S	2.320	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50S	2.320	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60Lr	2.612	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60Lr	2.612	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60Lr+0.50W	0.8543	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60Lr+0.50W	0.8543	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60S	3.905	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60S	3.905	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60S+0.50W	2.148	+Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+1.60S+0.50W	2.148	-Z	Bottom	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50Lr+W	1.599	+Z	Top	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50Lr+W	1.599	-Z	Top	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50S+W	1.195	+Z	Top	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.50S+W	1.195	-Z	Top	0.2592	AsMin	0.750	27.893	OK
X-X, +0.90D+W	2.315	+Z	Top	0.2592	AsMin	0.750	27.893	OK
X-X, +0.90D+W	2.315	-Z	Top	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.20S+E	3.033	+Z	Top	0.2592	AsMin	0.750	27.893	OK
X-X, +1.20D+0.20S+E	3.033	-Z	Top	0.2592	AsMin	0.750	27.893	OK
X-X, +0.90D+E	3.721	+Z	Top	0.2592	AsMin	0.750	27.893	OK
X-X, +0.90D+E	3.721	-Z	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.40D	1.330	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.40D	1.717	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50Lr	1.375	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50Lr	1.732	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50S	1.667	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50S	2.092	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60Lr	1.877	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60Lr	2.351	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60Lr+0.50W	0.6080	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60Lr+0.50W	0.7886	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60S	2.812	-X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60S	3.501	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+1.60S+0.50W	1.542	-X	Bottom	0.2592	AsMin	0.750	27.893	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline 7 and D.8

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+1.60S+0.50W	1.939	+X	Bottom	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50Lr+W	1.164	-X	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50Lr+W	1.393	+X	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50S+W	0.8722	-X	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.50S+W	1.033	+X	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +0.90D+W	1.323	-X	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +0.90D+W	1.206	+X	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.20S+E	1.764	-X	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +1.20D+0.20S+E	1.605	+X	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +0.90D+E	1.323	-X	Top	0.2592	AsMin	0.750	27.893	OK
Z-Z, +0.90D+E	5.292	+X	Top	0.2592	AsMin	0.750	27.893	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	7.90 psi	7.22 psi	8.60 psi	8.60 psi	8.60 psi	82.16 psi	0.10	OK
+1.20D+0.50Lr	8.17 psi	7.31 psi	8.83 psi	8.83 psi	8.83 psi	82.16 psi	0.11	OK
+1.20D+0.50S	9.91 psi	8.83 psi	10.70 psi	10.70 psi	10.70 psi	82.16 psi	0.13	OK
+1.20D+1.60Lr	11.16 psi	9.93 psi	12.04 psi	12.04 psi	12.04 psi	82.16 psi	0.15	OK
+1.20D+1.60Lr+0.50W	3.61 psi	3.31 psi	3.94 psi	3.94 psi	3.94 psi	82.16 psi	0.05	OK
+1.20D+1.60S	16.71 psi	14.79 psi	18.00 psi	18.00 psi	18.00 psi	82.16 psi	0.22	OK
+1.20D+1.60S+0.50W	9.17 psi	8.18 psi	9.90 psi	9.90 psi	9.90 psi	82.16 psi	0.12	OK
+1.20D+0.50Lr+W	6.92 psi	5.92 psi	7.37 psi	7.37 psi	7.37 psi	82.16 psi	0.09	OK
+1.20D+0.50S+W	5.19 psi	4.40 psi	5.51 psi	5.51 psi	5.51 psi	82.16 psi	0.07	OK
+0.90D+W	7.84 psi	9.22 psi	10.67 psi	10.67 psi	10.67 psi	82.16 psi	0.13	OK
+1.20D+0.20S+E	10.45 psi	11.39 psi	13.98 psi	13.98 psi	13.98 psi	82.16 psi	0.17	OK
+0.90D+E	7.84 psi	20.09 psi	17.16 psi	17.16 psi	20.09 psi	82.16 psi	0.24	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	19.69 psi	164.32psi	0.1198	OK
+1.20D+0.50Lr	20.21 psi	164.32psi	0.123	OK
+1.20D+0.50S	24.47 psi	164.32psi	0.1489	OK
+1.20D+1.60Lr	27.55 psi	164.32psi	0.1677	OK
+1.20D+1.60Lr+0.50W	9.01 psi	164.32psi	0.05484	OK
+1.20D+1.60S	41.20 psi	164.32psi	0.2507	OK
+1.20D+1.60S+0.50W	22.66 psi	164.32psi	0.1379	OK
+1.20D+0.50Lr+W	16.87 psi	164.32psi	0.1027	OK
+1.20D+0.50S+W	12.61 psi	164.32psi	0.07671	OK
+0.90D+W	24.43 psi	164.32psi	0.1486	OK
+1.20D+0.20S+E	32.00 psi	164.32psi	0.1947	OK
+0.90D+E	39.26 psi	164.32psi	0.2389	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 | AWB ENGINEERS | (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline 7 and M

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.10 : 1
Min. Sliding Safety Factor	=	1.10 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	6.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

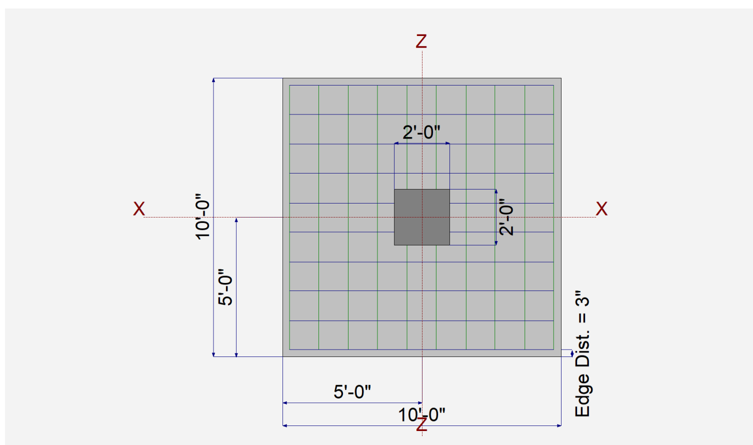
Width parallel to X-X Axis	=	10.0 ft
Length parallel to Z-Z Axis	=	10.0 ft
Footing Thickness	=	12.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	24.0 in
pz : parallel to Z-Z Axis	=	24.0 in
Height	=	60.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis

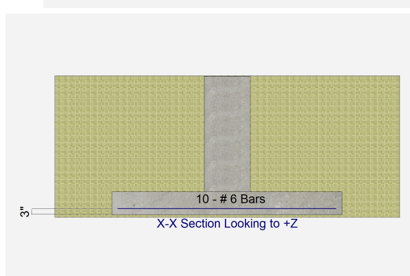
Number of Bars	=	10.0
Reinforcing Bar Size	=	# 6

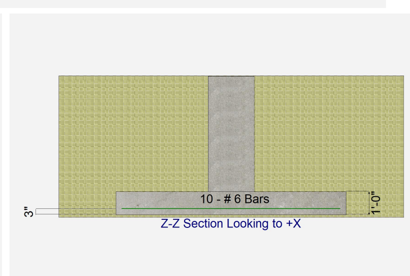
Bars parallel to Z-Z Axis

Number of Bars	=	10.0
Reinforcing Bar Size	=	# 6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	38.0	11.0		20.0	-43.0	-82.0		k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

DESCRIPTION: Gridline 7 and M

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.4273	Soil Bearing	1.282 ksf	3.0 ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	1.131	Uplift	-57.40 k	64.920 k	+0.60D+0.70E
PASS	0.3699	Z Flexure (+X)	6.275 k-ft/ft	16.966 k-ft/ft	+1.20D+1.60S
PASS	0.3699	Z Flexure (-X)	6.275 k-ft/ft	16.966 k-ft/ft	+1.20D+1.60S
PASS	0.3699	X Flexure (+Z)	6.275 k-ft/ft	16.966 k-ft/ft	+1.20D+1.60S
PASS	0.3699	X Flexure (-Z)	6.275 k-ft/ft	16.966 k-ft/ft	+1.20D+1.60S
PASS	0.2917	1-way Shear (+X)	23.968 psi	82.158 psi	+1.20D+1.60S
PASS	0.2917	1-way Shear (-X)	23.968 psi	82.158 psi	+1.20D+1.60S
PASS	0.2917	1-way Shear (+Z)	23.968 psi	82.158 psi	+1.20D+1.60S
PASS	0.2917	1-way Shear (-Z)	23.968 psi	82.158 psi	+1.20D+1.60S
PASS	0.3703	2-way Punching	60.850 psi	164.317 psi	+1.20D+1.60S

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	1.082	1.082	n/a	n/a	0.361
X-X, +D+Lr	3.0	n/a	0.0	1.192	1.192	n/a	n/a	0.397
X-X, +D+S	3.0	n/a	0.0	1.282	1.282	n/a	n/a	0.427
X-X, +D+0.750Lr	3.0	n/a	0.0	1.165	1.165	n/a	n/a	0.388
X-X, +D+0.750S	3.0	n/a	0.0	1.232	1.232	n/a	n/a	0.411
X-X, +D+0.60W	3.0	n/a	0.0	0.8240	0.8240	n/a	n/a	0.275
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	0.9710	0.9710	n/a	n/a	0.324
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	1.039	1.039	n/a	n/a	0.346
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.3912	0.3912	n/a	n/a	0.130
X-X, +D+0.70E	3.0	n/a	0.0	0.5080	0.5080	n/a	n/a	0.169
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	0.8015	0.8015	n/a	n/a	0.267
X-X, +0.60D+0.70E	3.0	n/a	0.0	0.07520	0.07520	n/a	n/a	0.025
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	1.082	1.082	0.361
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	1.192	1.192	0.397
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	1.282	1.282	0.427
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	1.165	1.165	0.388
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	1.232	1.232	0.411
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	0.8240	0.8240	0.275
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	0.9710	0.9710	0.324
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	1.039	1.039	0.346
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	0.3912	0.3912	0.130
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	0.5080	0.5080	0.169
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	0.8015	0.8015	0.267
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	0.07520	0.07520	0.025

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline 7 and M

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	4.334	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.40D	4.334	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr	4.155	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr	4.155	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S	4.515	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S	4.515	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr	5.123	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr	5.123	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr+0.50W	3.403	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr+0.50W	3.403	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S	6.275	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S	6.275	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S+0.50W	4.555	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S+0.50W	4.555	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr+W	0.7152	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr+W	0.7152	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S+W	1.075	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S+W	1.075	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+W	0.6536	+Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+W	0.6536	-Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.20S+E	2.525	+Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.20S+E	2.525	-Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+E	3.774	+Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+E	3.774	-Z	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.40D	4.334	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.40D	4.334	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr	4.155	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr	4.155	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S	4.515	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S	4.515	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr	5.123	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr	5.123	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr+0.50W	3.403	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr+0.50W	3.403	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S	6.275	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S	6.275	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S+0.50W	4.555	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S+0.50W	4.555	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr+W	0.7152	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr+W	0.7152	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S+W	1.075	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S+W	1.075	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+W	0.6536	-X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+W	0.6536	+X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.20S+E	2.525	-X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.20S+E	2.525	+X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+E	3.774	-X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+E	3.774	+X	Top	0.2592	AsMin	0.440	16.966	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	16.56 psi	16.56 psi	16.56 psi	16.56 psi	16.56 psi	82.16 psi	0.20	OK
+1.20D+0.50Lr	15.87 psi	15.87 psi	15.87 psi	15.87 psi	15.87 psi	82.16 psi	0.19	OK
+1.20D+0.50S	17.25 psi	17.25 psi	17.25 psi	17.25 psi	17.25 psi	82.16 psi	0.21	OK
+1.20D+1.60Lr	19.57 psi	19.57 psi	19.57 psi	19.57 psi	19.57 psi	82.16 psi	0.24	OK
+1.20D+1.60Lr+0.50W	13.00 psi	13.00 psi	13.00 psi	13.00 psi	13.00 psi	82.16 psi	0.16	OK
+1.20D+1.60S	23.97 psi	23.97 psi	23.97 psi	23.97 psi	23.97 psi	82.16 psi	0.29	OK
+1.20D+1.60S+0.50W	17.40 psi	17.40 psi	17.40 psi	17.40 psi	17.40 psi	82.16 psi	0.21	OK
+1.20D+0.50Lr+W	2.73 psi	2.73 psi	2.73 psi	2.73 psi	2.73 psi	82.16 psi	0.03	OK
+1.20D+0.50S+W	4.11 psi	4.11 psi	4.11 psi	4.11 psi	4.11 psi	82.16 psi	0.05	OK
+0.90D+W	2.50 psi	2.50 psi	2.50 psi	2.50 psi	2.50 psi	82.16 psi	0.03	OK
+1.20D+0.20S+E	9.64 psi	9.64 psi	9.64 psi	9.64 psi	9.64 psi	82.16 psi	0.12	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline 7 and M

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E	14.41 psi	14.41 psi	14.41 psi	14.41 psi	14.41 psi	82.16 psi	0.18	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	42.03 psi	164.32psi	0.2558	OK
+1.20D+0.50Lr	40.29 psi	164.32psi	0.2452	OK
+1.20D+0.50S	43.78 psi	164.32psi	0.2665	OK
+1.20D+1.60Lr	49.68 psi	164.32psi	0.3023	OK
+1.20D+1.60Lr+0.50W	33.00 psi	164.32psi	0.2008	OK
+1.20D+1.60S	60.85 psi	164.32psi	0.3703	OK
+1.20D+1.60S+0.50W	44.17 psi	164.32psi	0.2688	OK
+1.20D+0.50Lr+W	6.94 psi	164.32psi	0.04221	OK
+1.20D+0.50S+W	10.43 psi	164.32psi	0.06345	OK
+0.90D+W	6.34 psi	164.32psi	0.03857	OK
+1.20D+0.20S+E	24.48 psi	164.32psi	0.149	OK
+0.90D+E	36.59 psi	164.32psi	0.2227	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline 7 and L

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.10 : 1
Min. Sliding Safety Factor	=	1.10 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

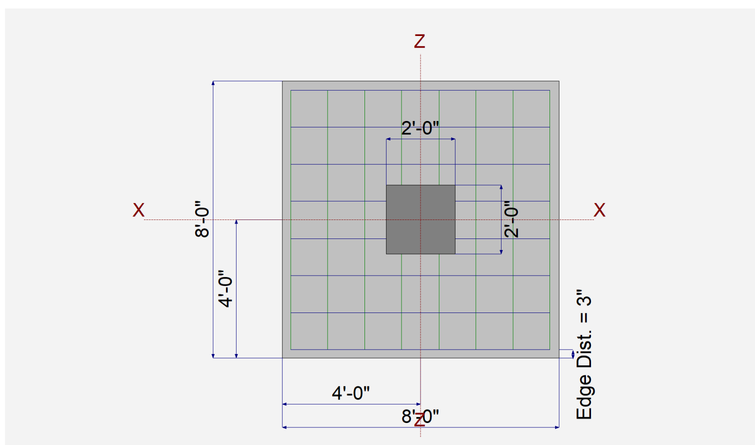
Footing base depth below soil surface	=	2.330 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

Width parallel to X-X Axis	=	8.0 ft
Length parallel to Z-Z Axis	=	8.0 ft
Footing Thickness	=	14.0 in



Pedestal dimensions...

px : parallel to X-X Axis	=	24.0 in
pz : parallel to Z-Z Axis	=	24.0 in
Height	=	14.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in

Reinforcing

Bars parallel to X-X Axis =

Number of Bars			8
Reinforcing Bar Size	=	#	6

Bars parallel to Z-Z Axis

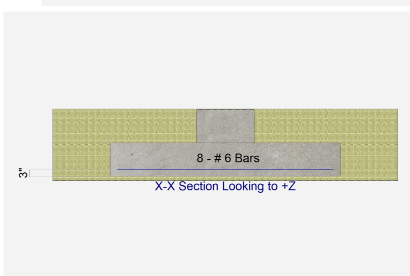
Number of Bars	=		8
Reinforcing Bar Size	=	#	6

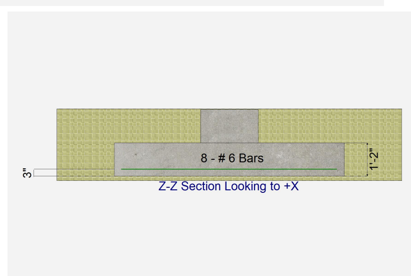
Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation n/a

Bars required within zone n/a

Bars required on each side of zone n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	25.0	13.0		22.0	20.0	11.0		k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline 7 and L

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.3630	Soil Bearing	1.089 ksf	3.0 ksf	+D+0.750S+0.450W about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.2533	Z Flexure (+X)	5.30 k-ft/ft	20.926 k-ft/ft	+1.20D+1.60S+0.50W
PASS	0.2533	Z Flexure (-X)	5.30 k-ft/ft	20.926 k-ft/ft	+1.20D+1.60S+0.50W
PASS	0.2533	X Flexure (+Z)	5.30 k-ft/ft	20.926 k-ft/ft	+1.20D+1.60S+0.50W
PASS	0.2533	X Flexure (-Z)	5.30 k-ft/ft	20.926 k-ft/ft	+1.20D+1.60S+0.50W
PASS	0.2260	1-way Shear (+X)	18.564 psi	82.158 psi	+1.20D+1.60S+0.50W
PASS	0.2260	1-way Shear (-X)	18.564 psi	82.158 psi	+1.20D+1.60S+0.50W
PASS	0.2260	1-way Shear (+Z)	18.564 psi	82.158 psi	+1.20D+1.60S+0.50W
PASS	0.2260	1-way Shear (-Z)	18.564 psi	82.158 psi	+1.20D+1.60S+0.50W
PASS	0.2593	2-way Punching	42.614 psi	164.317 psi	+1.20D+1.60S+0.50W

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	0.6903	0.6903	n/a	n/a	0.230
X-X, +D+Lr	3.0	n/a	0.0	0.8935	0.8935	n/a	n/a	0.298
X-X, +D+S	3.0	n/a	0.0	1.034	1.034	n/a	n/a	0.345
X-X, +D+0.750Lr	3.0	n/a	0.0	0.8427	0.8427	n/a	n/a	0.281
X-X, +D+0.750S	3.0	n/a	0.0	0.9481	0.9481	n/a	n/a	0.316
X-X, +D+0.60W	3.0	n/a	0.0	0.8778	0.8778	n/a	n/a	0.293
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	0.9833	0.9833	n/a	n/a	0.328
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	1.089	1.089	n/a	n/a	0.363
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.6017	0.6017	n/a	n/a	0.201
X-X, +D+0.70E	3.0	n/a	0.0	0.8106	0.8106	n/a	n/a	0.270
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	1.038	1.038	n/a	n/a	0.346
X-X, +0.60D+0.70E	3.0	n/a	0.0	0.5345	0.5345	n/a	n/a	0.178
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	0.6903	0.6903	0.230
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	0.8935	0.8935	0.298
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	1.034	1.034	0.345
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	0.8427	0.8427	0.281
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	0.9481	0.9481	0.316
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	0.8778	0.8778	0.293
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	0.9833	0.9833	0.328
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	1.089	1.089	0.363
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	0.6017	0.6017	0.201
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	0.8106	0.8106	0.270
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	1.038	1.038	0.346
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	0.5345	0.5345	0.178

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	2.477	+Z	Bottom	0.3024	AsMin	0.440	20.926	OK

General Footing

DESCRIPTION: Gridline 7 and L

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	2.477	-Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+0.50Lr	2.580	+Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+0.50Lr	2.580	-Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+0.50S	2.896	+Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+0.50S	2.896	-Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+1.60Lr	3.585	+Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+1.60Lr	3.585	-Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+1.60Lr+0.50W	4.288	+Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+1.60Lr+0.50W	4.288	-Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+1.60S	4.597	+Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+1.60S	4.597	-Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+1.60S+0.50W	5.30	+Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+1.60S+0.50W	5.30	-Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+0.50Lr+W	3.986	+Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+0.50Lr+W	3.986	-Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+0.50S+W	4.302	+Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+0.50S+W	4.302	-Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +0.90D+W	2.998	+Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +0.90D+W	2.998	-Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+0.20S+E	3.206	+Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +1.20D+0.20S+E	3.206	-Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +0.90D+E	2.365	+Z	Bottom	0.3024	AsMin	0.440	20.926	OK
X-X, +0.90D+E	2.365	-Z	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.40D	2.477	-X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.40D	2.477	+X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+0.50Lr	2.580	-X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+0.50Lr	2.580	+X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+0.50S	2.896	-X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+0.50S	2.896	+X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+1.60Lr	3.585	-X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+1.60Lr	3.585	+X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+1.60Lr+0.50W	4.288	-X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+1.60Lr+0.50W	4.288	+X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+1.60S	4.597	-X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+1.60S	4.597	+X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+1.60S+0.50W	5.30	-X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+1.60S+0.50W	5.30	+X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+0.50Lr+W	3.986	-X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+0.50Lr+W	3.986	+X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+0.50S+W	4.302	-X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+0.50S+W	4.302	+X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +0.90D+W	2.998	-X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +0.90D+W	2.998	+X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+0.20S+E	3.206	-X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +1.20D+0.20S+E	3.206	+X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +0.90D+E	2.365	-X	Bottom	0.3024	AsMin	0.440	20.926	OK
Z-Z, +0.90D+E	2.365	+X	Bottom	0.3024	AsMin	0.440	20.926	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	8.67 psi	8.67 psi	8.67 psi	8.67 psi	8.67 psi	82.16 psi	0.11	OK
+1.20D+0.50Lr	9.04 psi	9.04 psi	9.04 psi	9.04 psi	9.04 psi	82.16 psi	0.11	OK
+1.20D+0.50S	10.14 psi	10.14 psi	10.14 psi	10.14 psi	10.14 psi	82.16 psi	0.12	OK
+1.20D+1.60Lr	12.56 psi	12.56 psi	12.56 psi	12.56 psi	12.56 psi	82.16 psi	0.15	OK
+1.20D+1.60Lr+0.50W	15.02 psi	15.02 psi	15.02 psi	15.02 psi	15.02 psi	82.16 psi	0.18	OK
+1.20D+1.60S	16.10 psi	16.10 psi	16.10 psi	16.10 psi	16.10 psi	82.16 psi	0.20	OK
+1.20D+1.60S+0.50W	18.56 psi	18.56 psi	18.56 psi	18.56 psi	18.56 psi	82.16 psi	0.23	OK
+1.20D+0.50Lr+W	13.96 psi	13.96 psi	13.96 psi	13.96 psi	13.96 psi	82.16 psi	0.17	OK
+1.20D+0.50S+W	15.07 psi	15.07 psi	15.07 psi	15.07 psi	15.07 psi	82.16 psi	0.18	OK
+0.90D+W	10.50 psi	10.50 psi	10.50 psi	10.50 psi	10.50 psi	82.16 psi	0.13	OK
+1.20D+0.20S+E	11.23 psi	11.23 psi	11.23 psi	11.23 psi	11.23 psi	82.16 psi	0.14	OK
+0.90D+E	8.29 psi	8.29 psi	8.29 psi	8.29 psi	8.29 psi	82.16 psi	0.10	OK

General Footing

DESCRIPTION: Gridline 7 and L

Two-Way "Punching" Shear All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	19.91 psi	164.32 psi	0.1212	OK
+1.20D+0.50Lr	20.74 psi	164.32 psi	0.1262	OK
+1.20D+0.50S	23.29 psi	164.32 psi	0.1417	OK
+1.20D+1.60Lr	28.82 psi	164.32 psi	0.1754	OK
+1.20D+1.60Lr+0.50W	34.48 psi	164.32 psi	0.2098	OK
+1.20D+1.60S	36.96 psi	164.32 psi	0.2249	OK
+1.20D+1.60S+0.50W	42.61 psi	164.32 psi	0.2593	OK
+1.20D+0.50Lr+W	32.05 psi	164.32 psi	0.195	OK
+1.20D+0.50S+W	34.59 psi	164.32 psi	0.2105	OK
+0.90D+W	24.11 psi	164.32 psi	0.1467	OK
+1.20D+0.20S+E	25.77 psi	164.32 psi	0.1568	OK
+0.90D+E	19.02 psi	164.32 psi	0.1157	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline K.2 and 7

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.10 : 1
Min. Sliding Safety Factor	=	1.10 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

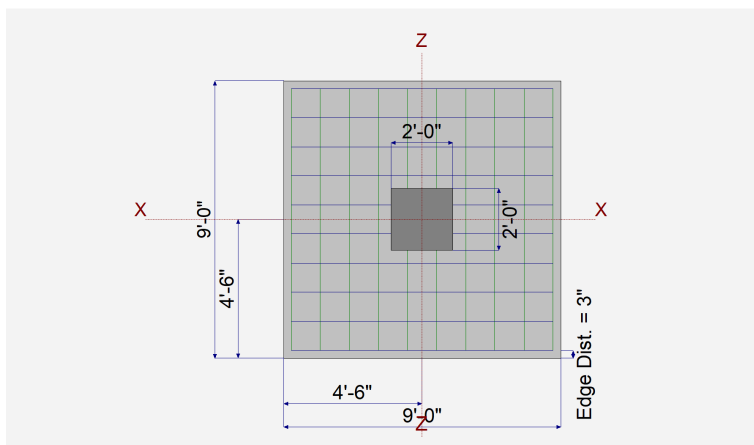
Footing base depth below soil surface	=	6.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

Width parallel to X-X Axis	=	9.0 ft
Length parallel to Z-Z Axis	=	9.0 ft
Footing Thickness	=	12.0 in



Pedestal dimensions...

px : parallel to X-X Axis	=	24.0 in
pz : parallel to Z-Z Axis	=	24.0 in
Height	=	48.0 in

Rebar Centerline to Edge of Concrete...

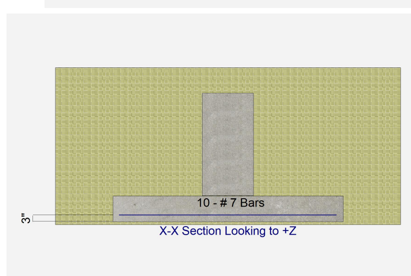
at Bottom of footing	=	3.0 in

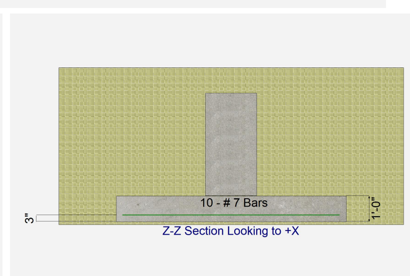
Reinforcing

Bars parallel to X-X Axis	=	
Number of Bars		10.0
Reinforcing Bar Size	=	# 7
Bars parallel to Z-Z Axis		
Number of Bars	=	10.0
Reinforcing Bar Size	=	# 7

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	35.0	19.50		35.0	45.0	-85.0		k
OB : Overburden	=	0.150							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

DESCRIPTION: Gridline K.2 and 7

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6150	Soil Bearing	1.845 ksf	3.0 ksf	+D+0.750S+0.450W about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	1.038	Uplift	-59.50 k	61.779 k	+0.60D+0.70E
PASS	0.3622	Z Flexure (+X)	9.068 k-ft/ft	25.039 k-ft/ft	+1.20D+1.60S+0.50W
PASS	0.3622	Z Flexure (-X)	9.068 k-ft/ft	25.039 k-ft/ft	+1.20D+1.60S+0.50W
PASS	0.3622	X Flexure (+Z)	9.068 k-ft/ft	25.039 k-ft/ft	+1.20D+1.60S+0.50W
PASS	0.3622	X Flexure (-Z)	9.068 k-ft/ft	25.039 k-ft/ft	+1.20D+1.60S+0.50W
PASS	0.4655	1-way Shear (+X)	38.247 psi	82.158 psi	+1.20D+1.60S+0.50W
PASS	0.4655	1-way Shear (-X)	38.247 psi	82.158 psi	+1.20D+1.60S+0.50W
PASS	0.4655	1-way Shear (+Z)	38.247 psi	82.158 psi	+1.20D+1.60S+0.50W
PASS	0.4655	1-way Shear (-Z)	38.247 psi	82.158 psi	+1.20D+1.60S+0.50W
PASS	0.5590	2-way Punching	91.861 psi	164.317 psi	+1.20D+1.60S+0.50W

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	1.271	1.271	n/a	n/a	0.424
X-X, +D+Lr	3.0	n/a	0.0	1.512	1.512	n/a	n/a	0.504
X-X, +D+S	3.0	n/a	0.0	1.703	1.703	n/a	n/a	0.568
X-X, +D+0.750Lr	3.0	n/a	0.0	1.452	1.452	n/a	n/a	0.484
X-X, +D+0.750S	3.0	n/a	0.0	1.595	1.595	n/a	n/a	0.532
X-X, +D+0.60W	3.0	n/a	0.0	1.605	1.605	n/a	n/a	0.535
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	1.702	1.702	n/a	n/a	0.567
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	1.845	1.845	n/a	n/a	0.615
X-X, +0.60D+0.60W	3.0	n/a	0.0	1.096	1.096	n/a	n/a	0.365
X-X, +D+0.70E	3.0	n/a	0.0	0.5366	0.5366	n/a	n/a	0.179
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	1.044	1.044	n/a	n/a	0.348
X-X, +0.60D+0.70E	3.0	n/a	0.0	0.02814	0.02814	n/a	n/a	0.009
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	1.271	1.271	0.424
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	1.512	1.512	0.504
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	1.703	1.703	0.568
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	1.452	1.452	0.484
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	1.595	1.595	0.532
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	1.605	1.605	0.535
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	1.702	1.702	0.567
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	1.845	1.845	0.615
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	1.096	1.096	0.365
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	0.5366	0.5366	0.179
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	1.044	1.044	0.348
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	0.02814	0.02814	0.009

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline K.2 and 7

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	3.654	+Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.40D	3.654	-Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+0.50Lr	3.870	+Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+0.50Lr	3.870	-Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+0.50S	4.456	+Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+0.50S	4.456	-Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+1.60Lr	5.492	+Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+1.60Lr	5.492	-Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+1.60Lr+0.50W	7.193	+Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+1.60Lr+0.50W	7.193	-Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+1.60S	7.367	+Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+1.60S	7.367	-Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+1.60S+0.50W	9.068	+Z	Bottom	0.3062	Min ACI 10.5	0.6667	25.039	OK
X-X, +1.20D+1.60S+0.50W	9.068	-Z	Bottom	0.3062	Min ACI 10.5	0.6667	25.039	OK
X-X, +1.20D+0.50Lr+W	7.272	+Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+0.50Lr+W	7.272	-Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+0.50S+W	7.858	+Z	Bottom	0.2644	Min ACI 10.5	0.6667	25.039	OK
X-X, +1.20D+0.50S+W	7.858	-Z	Bottom	0.2644	Min ACI 10.5	0.6667	25.039	OK
X-X, +0.90D+W	5.752	+Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +0.90D+W	5.752	-Z	Bottom	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+0.20S+E	2.766	+Z	Top	0.2592	AsMin	0.6667	25.039	OK
X-X, +1.20D+0.20S+E	2.766	-Z	Top	0.2592	AsMin	0.6667	25.039	OK
X-X, +0.90D+E	4.078	+Z	Top	0.2592	AsMin	0.6667	25.039	OK
X-X, +0.90D+E	4.078	-Z	Top	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.40D	3.654	-X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.40D	3.654	+X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+0.50Lr	3.870	-X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+0.50Lr	3.870	+X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+0.50S	4.456	-X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+0.50S	4.456	+X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+1.60Lr	5.492	-X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+1.60Lr	5.492	+X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+1.60Lr+0.50W	7.193	-X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+1.60Lr+0.50W	7.193	+X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+1.60S	7.367	-X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+1.60S	7.367	+X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+1.60S+0.50W	9.068	-X	Bottom	0.3062	Min ACI 10.5	0.6667	25.039	OK
Z-Z, +1.20D+1.60S+0.50W	9.068	+X	Bottom	0.3062	Min ACI 10.5	0.6667	25.039	OK
Z-Z, +1.20D+0.50Lr+W	7.272	-X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+0.50Lr+W	7.272	+X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+0.50S+W	7.858	-X	Bottom	0.2644	Min ACI 10.5	0.6667	25.039	OK
Z-Z, +1.20D+0.50S+W	7.858	+X	Bottom	0.2644	Min ACI 10.5	0.6667	25.039	OK
Z-Z, +0.90D+W	5.752	-X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +0.90D+W	5.752	+X	Bottom	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+0.20S+E	2.766	-X	Top	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +1.20D+0.20S+E	2.766	+X	Top	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +0.90D+E	4.078	-X	Top	0.2592	AsMin	0.6667	25.039	OK
Z-Z, +0.90D+E	4.078	+X	Top	0.2592	AsMin	0.6667	25.039	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	15.41 psi	15.41 psi	15.41 psi	15.41 psi	15.41 psi	82.16 psi	0.19	OK
+1.20D+0.50Lr	16.32 psi	16.32 psi	16.32 psi	16.32 psi	16.32 psi	82.16 psi	0.20	OK
+1.20D+0.50S	18.79 psi	18.79 psi	18.79 psi	18.79 psi	18.79 psi	82.16 psi	0.23	OK
+1.20D+1.60Lr	23.16 psi	23.16 psi	23.16 psi	23.16 psi	23.16 psi	82.16 psi	0.28	OK
+1.20D+1.60Lr+0.50W	30.34 psi	30.34 psi	30.34 psi	30.34 psi	30.34 psi	82.16 psi	0.37	OK
+1.20D+1.60S	31.07 psi	31.07 psi	31.07 psi	31.07 psi	31.07 psi	82.16 psi	0.38	OK
+1.20D+1.60S+0.50W	38.25 psi	38.25 psi	38.25 psi	38.25 psi	38.25 psi	82.16 psi	0.47	OK
+1.20D+0.50Lr+W	30.67 psi	30.67 psi	30.67 psi	30.67 psi	30.67 psi	82.16 psi	0.37	OK
+1.20D+0.50S+W	33.14 psi	33.14 psi	33.14 psi	33.14 psi	33.14 psi	82.16 psi	0.40	OK
+0.90D+W	24.26 psi	24.26 psi	24.26 psi	24.26 psi	24.26 psi	82.16 psi	0.30	OK
+1.20D+0.20S+E	11.67 psi	11.67 psi	11.67 psi	11.67 psi	11.67 psi	82.16 psi	0.14	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline K.2 and 7

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E	17.20 psi	17.20 psi	17.20 psi	17.20 psi	17.20 psi	82.16 psi	0.21	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	37.02 psi	164.32 psi	0.2253	OK
+1.20D+0.50Lr	39.20 psi	164.32 psi	0.2386	OK
+1.20D+0.50S	45.14 psi	164.32 psi	0.2747	OK
+1.20D+1.60Lr	55.63 psi	164.32 psi	0.3386	OK
+1.20D+1.60Lr+0.50W	72.86 psi	164.32 psi	0.4434	OK
+1.20D+1.60S	74.63 psi	164.32 psi	0.4542	OK
+1.20D+1.60S+0.50W	91.86 psi	164.32 psi	0.559	OK
+1.20D+0.50Lr+W	73.67 psi	164.32 psi	0.4483	OK
+1.20D+0.50S+W	79.61 psi	164.32 psi	0.4845	OK
+0.90D+W	58.27 psi	164.32 psi	0.3546	OK
+1.20D+0.20S+E	28.02 psi	164.32 psi	0.1705	OK
+0.90D+E	41.31 psi	164.32 psi	0.2514	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline 15 and A.3

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.10 : 1
Min. Sliding Safety Factor	=	1.10 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

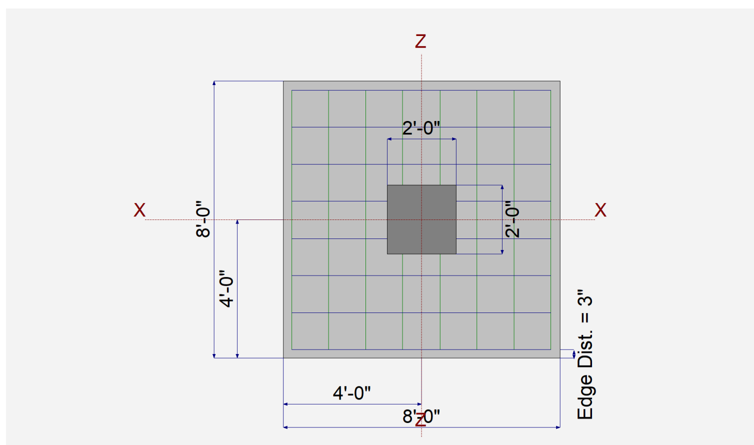
Footing base depth below soil surface	=	6.0	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

Width parallel to X-X Axis	=	8.0	ft
Length parallel to Z-Z Axis	=	8.0	ft
Footing Thickness	=	12.0	in



Pedestal dimensions...

px : parallel to X-X Axis	=	24.0	in
pz : parallel to Z-Z Axis	=	24.0	in
Height	=	48.0	in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0	in

Reinforcing

Bars parallel to X-X Axis

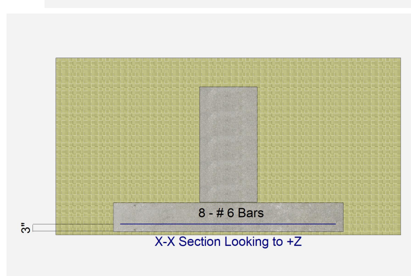
Number of Bars	=	8
Reinforcing Bar Size	=	# 6

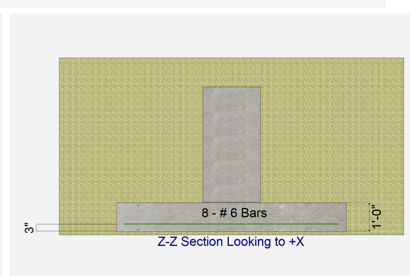
Bars parallel to Z-Z Axis

Number of Bars	=	8
Reinforcing Bar Size	=	# 6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	40.0	18.0		32.0	-65.0	-75.0		k
OB : Overburden	=	0.150							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

DESCRIPTION: Gridline 15 and A.3

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6543	Soil Bearing	1.963 ksf	3.0 ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	1.070	Uplift	-52.50 k	56.160 k	+0.60D+0.70E
PASS	0.4087	Z Flexure (+X)	6.933 k-ft/ft	16.966 k-ft/ft	+1.20D+1.60S
PASS	0.4087	Z Flexure (-X)	6.933 k-ft/ft	16.966 k-ft/ft	+1.20D+1.60S
PASS	0.4087	X Flexure (+Z)	6.933 k-ft/ft	16.966 k-ft/ft	+1.20D+1.60S
PASS	0.4087	X Flexure (-Z)	6.933 k-ft/ft	16.966 k-ft/ft	+1.20D+1.60S
PASS	0.3890	1-way Shear (+X)	31.961 psi	82.158 psi	+1.20D+1.60S
PASS	0.3890	1-way Shear (-X)	31.961 psi	82.158 psi	+1.20D+1.60S
PASS	0.3890	1-way Shear (+Z)	31.961 psi	82.158 psi	+1.20D+1.60S
PASS	0.3890	1-way Shear (-Z)	31.961 psi	82.158 psi	+1.20D+1.60S
PASS	0.4468	2-way Punching	73.420 psi	164.317 psi	+1.20D+1.60S

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	1.463	1.463	n/a	n/a	0.488
X-X, +D+Lr	3.0	n/a	0.0	1.744	1.744	n/a	n/a	0.581
X-X, +D+S	3.0	n/a	0.0	1.963	1.963	n/a	n/a	0.654
X-X, +D+0.750Lr	3.0	n/a	0.0	1.673	1.673	n/a	n/a	0.558
X-X, +D+0.750S	3.0	n/a	0.0	1.838	1.838	n/a	n/a	0.613
X-X, +D+0.60W	3.0	n/a	0.0	0.8531	0.8531	n/a	n/a	0.284
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	1.216	1.216	n/a	n/a	0.405
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	1.380	1.380	n/a	n/a	0.460
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.2681	0.2681	n/a	n/a	0.089
X-X, +D+0.70E	3.0	n/a	0.0	0.6422	0.6422	n/a	n/a	0.214
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	1.222	1.222	n/a	n/a	0.407
X-X, +0.60D+0.70E	3.0	n/a	0.0	0.05719	0.05719	n/a	n/a	0.019
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	1.463	1.463	0.488
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	1.744	1.744	0.581
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	1.963	1.963	0.654
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	1.673	1.673	0.558
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	1.838	1.838	0.613
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	0.8531	0.8531	0.284
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	1.216	1.216	0.405
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	1.380	1.380	0.460
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	0.2681	0.2681	0.089
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	0.6422	0.6422	0.214
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	1.222	1.222	0.407
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	0.05719	0.05719	0.019

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline 15 and A.3

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	3.890	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.40D	3.890	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr	3.967	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr	3.967	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S	4.459	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S	4.459	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr	5.359	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr	5.359	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr+0.50W	3.074	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr+0.50W	3.074	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S	6.933	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S	6.933	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S+0.50W	4.649	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S+0.50W	4.649	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr+W	0.6029	+Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr+W	0.6029	-Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S+W	0.1108	+Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S+W	0.1108	-Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+W	2.069	+Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+W	2.069	-Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.20S+E	1.489	+Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.20S+E	1.489	-Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+E	2.772	+Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+E	2.772	-Z	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.40D	3.890	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.40D	3.890	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr	3.967	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr	3.967	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S	4.459	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S	4.459	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr	5.359	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr	5.359	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr+0.50W	3.074	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr+0.50W	3.074	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S	6.933	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S	6.933	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S+0.50W	4.649	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S+0.50W	4.649	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr+W	0.6029	-X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr+W	0.6029	+X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S+W	0.1108	-X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S+W	0.1108	+X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+W	2.069	-X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+W	2.069	+X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.20S+E	1.489	-X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.20S+E	1.489	+X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+E	2.772	-X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+E	2.772	+X	Top	0.2592	AsMin	0.440	16.966	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	17.93 psi	17.93 psi	17.93 psi	17.93 psi	17.93 psi	82.16 psi	0.22	OK
+1.20D+0.50Lr	18.29 psi	18.29 psi	18.29 psi	18.29 psi	18.29 psi	82.16 psi	0.22	OK
+1.20D+0.50S	20.55 psi	20.55 psi	20.55 psi	20.55 psi	20.55 psi	82.16 psi	0.25	OK
+1.20D+1.60Lr	24.70 psi	24.70 psi	24.70 psi	24.70 psi	24.70 psi	82.16 psi	0.30	OK
+1.20D+1.60Lr+0.50W	14.17 psi	14.17 psi	14.17 psi	14.17 psi	14.17 psi	82.16 psi	0.17	OK
+1.20D+1.60S	31.96 psi	31.96 psi	31.96 psi	31.96 psi	31.96 psi	82.16 psi	0.39	OK
+1.20D+1.60S+0.50W	21.43 psi	21.43 psi	21.43 psi	21.43 psi	21.43 psi	82.16 psi	0.26	OK
+1.20D+0.50Lr+W	2.78 psi	2.78 psi	2.78 psi	2.78 psi	2.78 psi	82.16 psi	0.03	OK
+1.20D+0.50S+W	0.51 psi	0.51 psi	0.51 psi	0.51 psi	0.51 psi	82.16 psi	0.01	OK
+0.90D+W	9.54 psi	9.54 psi	9.54 psi	9.54 psi	9.54 psi	82.16 psi	0.12	OK
+1.20D+0.20S+E	6.86 psi	6.86 psi	6.86 psi	6.86 psi	6.86 psi	82.16 psi	0.08	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline 15 and A.3

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E	12.78 psi	12.78 psi	12.78 psi	12.78 psi	12.78 psi	82.16 psi	0.16	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	41.19 psi	164.32 psi	0.2507	OK
+1.20D+0.50Lr	42.01 psi	164.32 psi	0.2556	OK
+1.20D+0.50S	47.22 psi	164.32 psi	0.2873	OK
+1.20D+1.60Lr	56.75 psi	164.32 psi	0.3453	OK
+1.20D+1.60Lr+0.50W	32.55 psi	164.32 psi	0.1981	OK
+1.20D+1.60S	73.42 psi	164.32 psi	0.4468	OK
+1.20D+1.60S+0.50W	49.23 psi	164.32 psi	0.2996	OK
+1.20D+0.50Lr+W	6.38 psi	164.32 psi	0.03885	OK
+1.20D+0.50S+W	1.17 psi	164.32 psi	0.00714	OK
+0.90D+W	21.91 psi	164.32 psi	0.1333	OK
+1.20D+0.20S+E	15.76 psi	164.32 psi	0.09594	OK
+0.90D+E	29.36 psi	164.32 psi	0.1786	OK

Project Title: 221205 - CPFD - Puyallup, WA
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline 15 and B

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.10 : 1
Min. Sliding Safety Factor	=	1.10 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	6.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

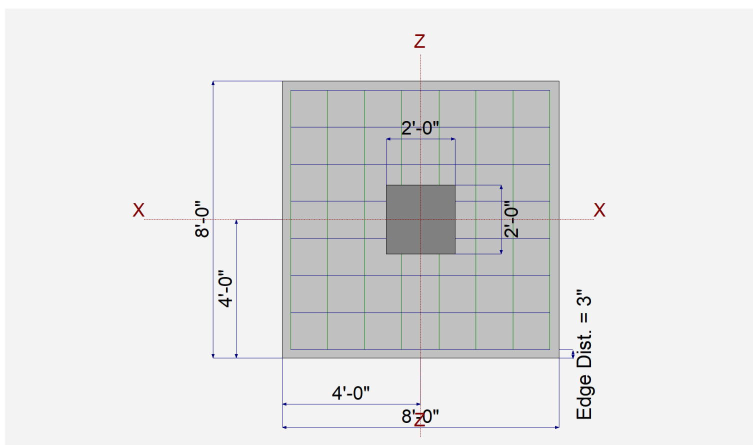
Width parallel to X-X Axis	=	8.0 ft
Length parallel to Z-Z Axis	=	8.0 ft
Footing Thickness	=	12.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	24.0 in
pz : parallel to Z-Z Axis	=	24.0 in
Height		48.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis

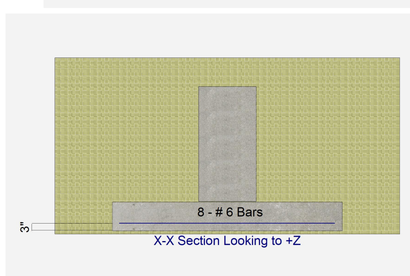
Number of Bars	=	8.0
Reinforcing Bar Size	=	# 6

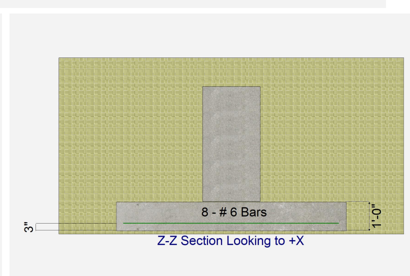
Bars parallel to Z-Z Axis

Number of Bars	=	8.0
Reinforcing Bar Size	=	# 6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	18.0	4.50		8.50	-6.50	-6.0		k
OB : Overburden	=	0.150							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline 15 and B

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.4173	Soil Bearing	1.252 ksf	3.0 ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	10.229	Uplift	-4.20 k	42.960 k	+0.60D+0.70E
PASS	0.1435	Z Flexure (+X)	2.434 k-ft/ft	16.966 k-ft/ft	+1.20D+1.60S
PASS	0.1435	Z Flexure (-X)	2.434 k-ft/ft	16.966 k-ft/ft	+1.20D+1.60S
PASS	0.1435	X Flexure (+Z)	2.434 k-ft/ft	16.966 k-ft/ft	+1.20D+1.60S
PASS	0.1435	X Flexure (-Z)	2.434 k-ft/ft	16.966 k-ft/ft	+1.20D+1.60S
PASS	0.1366	1-way Shear (+X)	11.221 psi	82.158 psi	+1.20D+1.60S
PASS	0.1366	1-way Shear (-X)	11.221 psi	82.158 psi	+1.20D+1.60S
PASS	0.1366	1-way Shear (+Z)	11.221 psi	82.158 psi	+1.20D+1.60S
PASS	0.1366	1-way Shear (-Z)	11.221 psi	82.158 psi	+1.20D+1.60S
PASS	0.1569	2-way Punching	25.776 psi	164.317 psi	+1.20D+1.60S

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	1.119	1.119	n/a	n/a	0.373
X-X, +D+Lr	3.0	n/a	0.0	1.189	1.189	n/a	n/a	0.396
X-X, +D+S	3.0	n/a	0.0	1.252	1.252	n/a	n/a	0.417
X-X, +D+0.750Lr	3.0	n/a	0.0	1.171	1.171	n/a	n/a	0.390
X-X, +D+0.750S	3.0	n/a	0.0	1.218	1.218	n/a	n/a	0.406
X-X, +D+0.60W	3.0	n/a	0.0	1.058	1.058	n/a	n/a	0.353
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	1.126	1.126	n/a	n/a	0.375
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	1.173	1.173	n/a	n/a	0.391
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.6103	0.6103	n/a	n/a	0.203
X-X, +D+0.70E	3.0	n/a	0.0	1.053	1.053	n/a	n/a	0.351
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	1.169	1.169	n/a	n/a	0.390
X-X, +0.60D+0.70E	3.0	n/a	0.0	0.6056	0.6056	n/a	n/a	0.202
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	1.119	1.119	0.373
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	1.189	1.189	0.396
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	1.252	1.252	0.417
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	1.171	1.171	0.390
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	1.218	1.218	0.406
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	1.058	1.058	0.353
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	1.126	1.126	0.375
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	1.173	1.173	0.391
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	0.6103	0.6103	0.203
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	1.053	1.053	0.351
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	1.169	1.169	0.390
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	0.6056	0.6056	0.202

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	1.724	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline 15 and B

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	1.724	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr	1.636	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr	1.636	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S	1.777	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S	1.777	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr	1.984	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr	1.984	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr+0.50W	1.756	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr+0.50W	1.756	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S	2.434	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S	2.434	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S+0.50W	2.206	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S+0.50W	2.206	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr+W	1.179	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr+W	1.179	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S+W	1.320	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S+W	1.320	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+W	0.6515	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+W	0.6515	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.20S+E	1.176	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.20S+E	1.176	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+E	0.6867	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+E	0.6867	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.40D	1.724	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.40D	1.724	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr	1.636	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr	1.636	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S	1.777	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S	1.777	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr	1.984	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr	1.984	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr+0.50W	1.756	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr+0.50W	1.756	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S	2.434	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S	2.434	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S+0.50W	2.206	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S+0.50W	2.206	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr+W	1.179	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr+W	1.179	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S+W	1.320	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S+W	1.320	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+W	0.6515	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+W	0.6515	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.20S+E	1.176	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.20S+E	1.176	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+E	0.6867	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+E	0.6867	+X	Bottom	0.2592	AsMin	0.440	16.966	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	7.95 psi	7.95 psi	7.95 psi	7.95 psi	7.95 psi	82.16 psi	0.10	OK
+1.20D+0.50Lr	7.54 psi	7.54 psi	7.54 psi	7.54 psi	7.54 psi	82.16 psi	0.09	OK
+1.20D+0.50S	8.19 psi	8.19 psi	8.19 psi	8.19 psi	8.19 psi	82.16 psi	0.10	OK
+1.20D+1.60Lr	9.15 psi	9.15 psi	9.15 psi	9.15 psi	9.15 psi	82.16 psi	0.11	OK
+1.20D+1.60Lr+0.50W	8.09 psi	8.09 psi	8.09 psi	8.09 psi	8.09 psi	82.16 psi	0.10	OK
+1.20D+1.60S	11.22 psi	11.22 psi	11.22 psi	11.22 psi	11.22 psi	82.16 psi	0.14	OK
+1.20D+1.60S+0.50W	10.17 psi	10.17 psi	10.17 psi	10.17 psi	10.17 psi	82.16 psi	0.12	OK
+1.20D+0.50Lr+W	5.44 psi	5.44 psi	5.44 psi	5.44 psi	5.44 psi	82.16 psi	0.07	OK
+1.20D+0.50S+W	6.08 psi	6.08 psi	6.08 psi	6.08 psi	6.08 psi	82.16 psi	0.07	OK
+0.90D+W	3.00 psi	3.00 psi	3.00 psi	3.00 psi	3.00 psi	82.16 psi	0.04	OK
+1.20D+0.20S+E	5.42 psi	5.42 psi	5.42 psi	5.42 psi	5.42 psi	82.16 psi	0.07	OK
+0.90D+E	3.17 psi	3.17 psi	3.17 psi	3.17 psi	3.17 psi	82.16 psi	0.04	OK

DESCRIPTION: Gridline 15 and B

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	18.26 psi	164.32 psi	0.1111	OK
+1.20D+0.50Lr	17.33 psi	164.32 psi	0.1054	OK
+1.20D+0.50S	18.82 psi	164.32 psi	0.1145	OK
+1.20D+1.60Lr	21.01 psi	164.32 psi	0.1279	OK
+1.20D+1.60Lr+0.50W	18.59 psi	164.32 psi	0.1131	OK
+1.20D+1.60S	25.78 psi	164.32 psi	0.1569	OK
+1.20D+1.60S+0.50W	23.36 psi	164.32 psi	0.1421	OK
+1.20D+0.50Lr+W	12.49 psi	164.32 psi	0.076	OK
+1.20D+0.50S+W	13.98 psi	164.32 psi	0.08506	OK
+0.90D+W	6.90 psi	164.32 psi	0.04199	OK
+1.20D+0.20S+E	12.45 psi	164.32 psi	0.07577	OK
+0.90D+E	7.27 psi	164.32 psi	0.04425	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline 15 and C.5

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=		
Min Allow % Temp Reinf.	=	0.00180	
Min. Overturning Safety Factor	=	1.10	: 1
Min. Sliding Safety Factor	=	1.10	: 1
Add Ftg Wt for Soil Pressure	:	Yes	
Use ftg wt for stability, moments & shears	:	Yes	
Add Pedestal Wt for Soil Pressure	:	Yes	
Use Pedestal wt for stability, mom & shear	:	Yes	

Soil Design Values

Allowable Soil Bearing	=	3.0	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	6.0	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

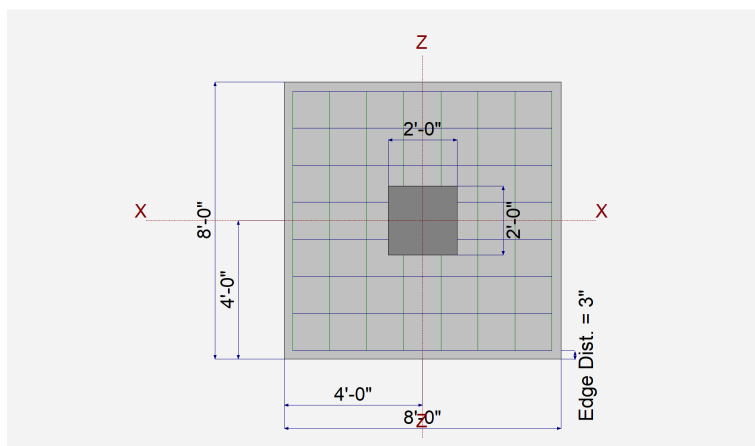
Width parallel to X-X Axis	=	8.0	ft
Length parallel to Z-Z Axis	=	8.0	ft
Footing Thickness	=	12.0	in

Pedestal dimensions...

px : parallel to X-X Axis	=	24.0	in
pz : parallel to Z-Z Axis	=	24.0	in
Height	=	48.0	in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0	in



Reinforcing

Bars parallel to X-X Axis

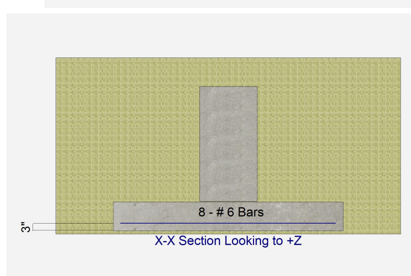
Number of Bars	=		8.0
Reinforcing Bar Size	=	#	6

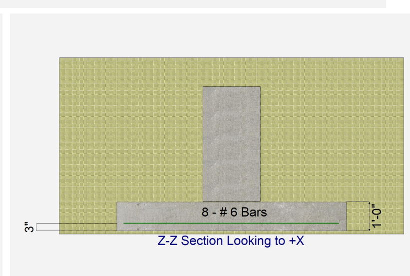
Bars parallel to Z-Z Axis

Number of Bars	=		8.0
Reinforcing Bar Size	=	#	6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	34.0	15.0		37.0	-50.0	-78.0		k
OB : Overburden	=	0.150							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline 15 and C.5

DESIGN SUMMARY

Design N.G. OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6490	Soil Bearing	1.947 ksf	3.0 ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
FAIL	0.9626	Uplift	-54.60 k	52.560 k	+0.60D+0.70E
PASS	0.5205	Z Flexure (+X)	8.831 k-ft/ft	16.966 k-ft/ft	+1.20D+0.20S-E
PASS	0.5205	Z Flexure (-X)	8.831 k-ft/ft	16.966 k-ft/ft	+1.20D+0.20S-E
PASS	0.5205	X Flexure (+Z)	8.831 k-ft/ft	16.966 k-ft/ft	+1.20D+0.20S-E
PASS	0.5205	X Flexure (-Z)	8.831 k-ft/ft	16.966 k-ft/ft	+1.20D+0.20S-E
PASS	0.4955	1-way Shear (+X)	40.711 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.4955	1-way Shear (-X)	40.711 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.4955	1-way Shear (+Z)	40.711 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.4955	1-way Shear (-Z)	40.711 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.5691	2-way Punching	93.520 psi	164.317 psi	+1.20D+0.20S-E

Considering that the footing is connected to adjacent strip footing. OK

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	1.369	1.369	n/a	n/a	0.456
X-X, +D+Lr	3.0	n/a	0.0	1.603	1.603	n/a	n/a	0.534
X-X, +D+S	3.0	n/a	0.0	1.947	1.947	n/a	n/a	0.649
X-X, +D+0.750Lr	3.0	n/a	0.0	1.545	1.545	n/a	n/a	0.515
X-X, +D+0.750S	3.0	n/a	0.0	1.802	1.802	n/a	n/a	0.601
X-X, +D+0.60W	3.0	n/a	0.0	0.90	0.90	n/a	n/a	0.300
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	1.193	1.193	n/a	n/a	0.398
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	1.451	1.451	n/a	n/a	0.484
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.3525	0.3525	n/a	n/a	0.118
X-X, +D+0.70E	3.0	n/a	0.0	0.5156	0.5156	n/a	n/a	0.172
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	1.163	1.163	n/a	n/a	0.388
X-X, +0.60D+0.70E	3.0	n/a	0.0	-0.03188	-0.03188	n/a	n/a	0.011
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	1.369	1.369	0.456
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	1.603	1.603	0.534
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	1.947	1.947	0.649
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	1.545	1.545	0.515
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	1.802	1.802	0.601
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	0.90	0.90	0.300
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	1.193	1.193	0.398
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	1.451	1.451	0.484
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	0.3525	0.3525	0.118
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	0.5156	0.5156	0.172
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	1.163	1.163	0.388
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	-0.03188	-0.03188	0.011

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

General Footing

DESCRIPTION: Gridline 15 and C.5

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	3.299	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.40D	3.299	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr	3.355	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr	3.355	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S	4.128	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S	4.128	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr	4.515	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr	4.515	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr+0.50W	2.757	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr+0.50W	2.757	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr-0.50W	6.272	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60Lr-0.50W	6.272	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S	6.990	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S	6.990	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S+0.50W	5.232	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S+0.50W	5.232	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+1.60S-0.50W	8.747	+Z	Bottom	0.2951	Min ACI 10.5	0.440	16.966	OK
X-X, +1.20D+1.60S-0.50W	8.747	-Z	Bottom	0.2951	Min ACI 10.5	0.440	16.966	OK
X-X, +1.20D+0.50Lr+W	0.160	+Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr+W	0.160	-Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr-W	6.870	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50Lr-W	6.870	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S+W	0.6133	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S+W	0.6133	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S-W	7.643	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.50S-W	7.643	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+W	1.394	+Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+W	1.394	-Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D-W	5.636	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D-W	5.636	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.20S+E	2.135	+Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.20S+E	2.135	-Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +1.20D+0.20S-E	8.831	+Z	Bottom	0.2980	Min ACI 10.5	0.440	16.966	OK
X-X, +1.20D+0.20S-E	8.831	-Z	Bottom	0.2980	Min ACI 10.5	0.440	16.966	OK
X-X, +0.90D+E	3.363	+Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D+E	3.363	-Z	Top	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D-E	7.604	+Z	Bottom	0.2592	AsMin	0.440	16.966	OK
X-X, +0.90D-E	7.604	-Z	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.40D	3.299	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.40D	3.299	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr	3.355	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr	3.355	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S	4.128	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S	4.128	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr	4.515	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr	4.515	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr+0.50W	2.757	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr+0.50W	2.757	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr-0.50W	6.272	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60Lr-0.50W	6.272	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S	6.990	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S	6.990	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S+0.50W	5.232	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S+0.50W	5.232	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+1.60S-0.50W	8.747	-X	Bottom	0.2951	Min ACI 10.5	0.440	16.966	OK
Z-Z, +1.20D+1.60S-0.50W	8.747	+X	Bottom	0.2951	Min ACI 10.5	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr+W	0.160	-X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr+W	0.160	+X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr-W	6.870	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50Lr-W	6.870	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S+W	0.6133	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S+W	0.6133	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.50S-W	7.643	-X	Bottom	0.2592	AsMin	0.440	16.966	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline 15 and C.5

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+0.50S-W	7.643	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+W	1.394	-X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+W	1.394	+X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D-W	5.636	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D-W	5.636	+X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.20S+E	2.135	-X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.20S+E	2.135	+X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +1.20D+0.20S-E	8.831	-X	Bottom	0.2980	Min ACI 10.5	0.440	16.966	OK
Z-Z, +1.20D+0.20S-E	8.831	+X	Bottom	0.2980	Min ACI 10.5	0.440	16.966	OK
Z-Z, +0.90D+E	3.363	-X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D+E	3.363	+X	Top	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D-E	7.604	-X	Bottom	0.2592	AsMin	0.440	16.966	OK
Z-Z, +0.90D-E	7.604	+X	Bottom	0.2592	AsMin	0.440	16.966	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	15.21 psi	15.21 psi	15.21 psi	15.21 psi	15.21 psi	82.16 psi	0.19	OK
+1.20D+0.50Lr	15.47 psi	15.47 psi	15.47 psi	15.47 psi	15.47 psi	82.16 psi	0.19	OK
+1.20D+0.50S	19.03 psi	19.03 psi	19.03 psi	19.03 psi	19.03 psi	82.16 psi	0.23	OK
+1.20D+1.60Lr	20.81 psi	20.81 psi	20.81 psi	20.81 psi	20.81 psi	82.16 psi	0.25	OK
+1.20D+1.60Lr+0.50W	12.71 psi	12.71 psi	12.71 psi	12.71 psi	12.71 psi	82.16 psi	0.15	OK
+1.20D+1.60Lr-0.50W	28.92 psi	28.92 psi	28.92 psi	28.92 psi	28.92 psi	82.16 psi	0.35	OK
+1.20D+1.60S	32.22 psi	32.22 psi	32.22 psi	32.22 psi	32.22 psi	82.16 psi	0.39	OK
+1.20D+1.60S+0.50W	24.12 psi	24.12 psi	24.12 psi	24.12 psi	24.12 psi	82.16 psi	0.29	OK
+1.20D+1.60S-0.50W	40.32 psi	40.32 psi	40.32 psi	40.32 psi	40.32 psi	82.16 psi	0.49	OK
+1.20D+0.50Lr+W	0.74 psi	0.74 psi	0.74 psi	0.74 psi	0.74 psi	82.16 psi	0.01	OK
+1.20D+0.50Lr-W	31.67 psi	31.67 psi	31.67 psi	31.67 psi	31.67 psi	82.16 psi	0.39	OK
+1.20D+0.50S+W	2.83 psi	2.83 psi	2.83 psi	2.83 psi	2.83 psi	82.16 psi	0.03	OK
+1.20D+0.50S-W	35.24 psi	35.24 psi	35.24 psi	35.24 psi	35.24 psi	82.16 psi	0.43	OK
+0.90D+W	6.43 psi	6.43 psi	6.43 psi	6.43 psi	6.43 psi	82.16 psi	0.08	OK
+0.90D-W	25.98 psi	25.98 psi	25.98 psi	25.98 psi	25.98 psi	82.16 psi	0.32	OK
+1.20D+0.20S+E	9.84 psi	9.84 psi	9.84 psi	9.84 psi	9.84 psi	82.16 psi	0.12	OK
+1.20D+0.20S-E	40.71 psi	40.71 psi	40.71 psi	40.71 psi	40.71 psi	82.16 psi	0.50	OK
+0.90D+E	15.50 psi	15.50 psi	15.50 psi	15.50 psi	15.50 psi	82.16 psi	0.19	OK
+0.90D-E	35.05 psi	35.05 psi	35.05 psi	35.05 psi	35.05 psi	82.16 psi	0.43	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	34.94 psi	164.32 psi	0.2126	OK
+1.20D+0.50Lr	35.53 psi	164.32 psi	0.2162	OK
+1.20D+0.50S	43.72 psi	164.32 psi	0.2661	OK
+1.20D+1.60Lr	47.81 psi	164.32 psi	0.291	OK
+1.20D+1.60Lr+0.50W	29.20 psi	164.32 psi	0.1777	OK
+1.20D+1.60Lr-0.50W	66.42 psi	164.32 psi	0.4042	OK
+1.20D+1.60S	74.02 psi	164.32 psi	0.4504	OK
+1.20D+1.60S+0.50W	55.41 psi	164.32 psi	0.3372	OK
+1.20D+1.60S-0.50W	92.63 psi	164.32 psi	0.5637	OK
+1.20D+0.50Lr+W	1.69 psi	164.32 psi	0.01031	OK
+1.20D+0.50Lr-W	72.75 psi	164.32 psi	0.4427	OK
+1.20D+0.50S+W	6.50 psi	164.32 psi	0.03952	OK
+1.20D+0.50S-W	80.94 psi	164.32 psi	0.4926	OK
+0.90D+W	14.76 psi	164.32 psi	0.08985	OK
+0.90D-W	59.68 psi	164.32 psi	0.3632	OK
+1.20D+0.20S+E	22.61 psi	164.32 psi	0.1376	OK
+1.20D+0.20S-E	93.52 psi	164.32 psi	0.5691	OK
+0.90D+E	35.61 psi	164.32 psi	0.2167	OK
+0.90D-E	80.53 psi	164.32 psi	0.4901	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline 15 and N

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.10 : 1
Min. Sliding Safety Factor	=	1.10 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

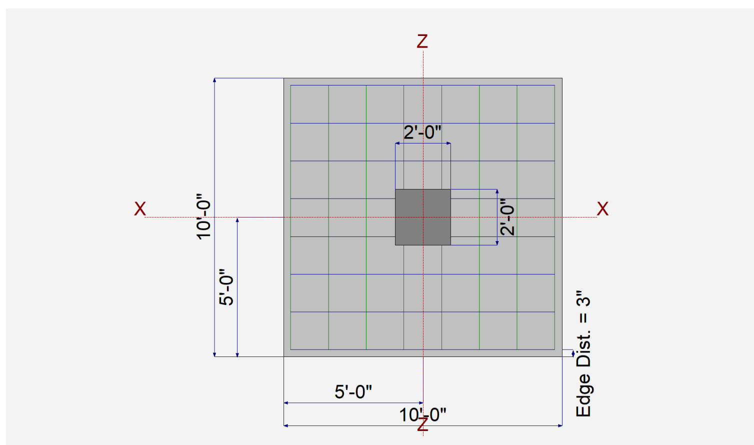
Footing base depth below soil surface	=	6.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

Width parallel to X-X Axis	=	10.0 ft
Length parallel to Z-Z Axis	=	10.0 ft
Footing Thickness	=	12.0 in



Pedestal dimensions...

px : parallel to X-X Axis	=	24.0 in
pz : parallel to Z-Z Axis	=	24.0 in
Height	=	60.0 in

Rebar Centerline to Edge of Concrete...

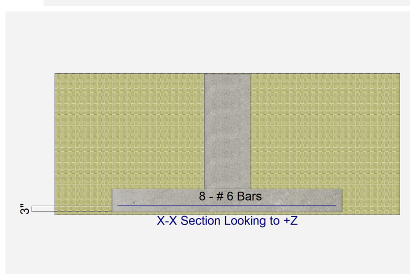
at Bottom of footing	=	3.0 in

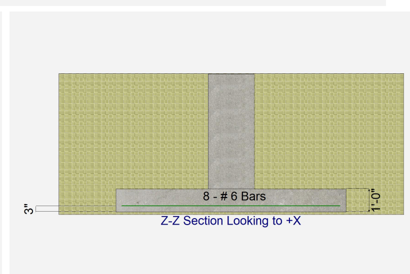
Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	8.0
Reinforcing Bar Size	=	# 6
Bars parallel to Z-Z Axis		
Number of Bars	=	8.0
Reinforcing Bar Size	=	# 6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	9.0	1.0		9.0	-52.0	-83.0		k
OB : Overburden	=	0.150							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline 15 and N

DESIGN SUMMARY

Design N.G. OK

Considering that the footing is connected to adjacent strip footing. OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.3420	Soil Bearing	1.026 ksf	3.0 ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
FAIL	0.9666	Uplift	-58.10 k	56.160 k	+0.60D+0.70E
PASS	0.5586	Z Flexure (+X)	7.658 k-ft/ft	13.709 k-ft/ft	+1.20D+0.20S-E
PASS	0.5586	Z Flexure (-X)	7.658 k-ft/ft	13.709 k-ft/ft	+1.20D+0.20S-E
PASS	0.5586	X Flexure (+Z)	7.658 k-ft/ft	13.709 k-ft/ft	+1.20D+0.20S-E
PASS	0.5586	X Flexure (-Z)	7.658 k-ft/ft	13.709 k-ft/ft	+1.20D+0.20S-E
PASS	0.3560	1-way Shear (+X)	29.248 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.3560	1-way Shear (-X)	29.248 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.3560	1-way Shear (+Z)	29.248 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.3560	1-way Shear (-Z)	29.248 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.4519	2-way Punching	74.256 psi	164.317 psi	+1.20D+0.20S-E

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	0.9360	0.9360	n/a	n/a	0.312
X-X, +D+Lr	3.0	n/a	0.0	0.9460	0.9460	n/a	n/a	0.315
X-X, +D+S	3.0	n/a	0.0	1.026	1.026	n/a	n/a	0.342
X-X, +D+0.750Lr	3.0	n/a	0.0	0.9435	0.9435	n/a	n/a	0.315
X-X, +D+0.750S	3.0	n/a	0.0	1.004	1.004	n/a	n/a	0.335
X-X, +D+0.60W	3.0	n/a	0.0	0.6240	0.6240	n/a	n/a	0.208
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	0.7095	0.7095	n/a	n/a	0.237
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	0.7695	0.7695	n/a	n/a	0.257
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.2496	0.2496	n/a	n/a	0.083
X-X, +D+0.70E	3.0	n/a	0.0	0.3550	0.3550	n/a	n/a	0.118
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	0.5678	0.5678	n/a	n/a	0.189
X-X, +0.60D+0.70E	3.0	n/a	0.0	-0.01940	-0.01940	n/a	n/a	0.006
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	0.9360	0.9360	0.312
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	0.9460	0.9460	0.315
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	1.026	1.026	0.342
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	0.9435	0.9435	0.315
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	1.004	1.004	0.335
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	0.6240	0.6240	0.208
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	0.7095	0.7095	0.237
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	0.7695	0.7695	0.257
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	0.2496	0.2496	0.083
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	0.3550	0.3550	0.118
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	0.5678	0.5678	0.189
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	-0.01940	-0.01940	0.006

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

General Footing

DESCRIPTION: Gridline 15 and N

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	1.019	+Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.40D	1.019	-Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.50Lr	0.9136	+Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.50Lr	0.9136	-Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.50S	1.234	+Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.50S	1.234	-Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+1.60Lr	1.002	+Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+1.60Lr	1.002	-Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+1.60Lr+0.50W	1.078	+Z	Top	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+1.60Lr+0.50W	1.078	-Z	Top	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+1.60Lr-0.50W	3.082	+Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+1.60Lr-0.50W	3.082	-Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+1.60S	2.026	+Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+1.60S	2.026	-Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+1.60S+0.50W	0.05440	+Z	Top	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+1.60S+0.50W	0.05440	-Z	Top	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+1.60S-0.50W	4.106	+Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+1.60S-0.50W	4.106	-Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.50Lr+W	3.246	+Z	Top	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.50Lr+W	3.246	-Z	Top	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.50Lr-W	5.074	+Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.50Lr-W	5.074	-Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.50S+W	2.926	+Z	Top	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.50S+W	2.926	-Z	Top	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.50S-W	5.394	+Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.50S-W	5.394	-Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +0.90D+W	3.505	+Z	Top	0.2592	AsMin	0.3520	13.709	OK
X-X, +0.90D+W	3.505	-Z	Top	0.2592	AsMin	0.3520	13.709	OK
X-X, +0.90D-W	4.815	+Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +0.90D-W	4.815	-Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.20S+E	5.622	+Z	Top	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.20S+E	5.622	-Z	Top	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.20S-E	7.658	+Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +1.20D+0.20S-E	7.658	-Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +0.90D+E	5.985	+Z	Top	0.2592	AsMin	0.3520	13.709	OK
X-X, +0.90D+E	5.985	-Z	Top	0.2592	AsMin	0.3520	13.709	OK
X-X, +0.90D-E	7.295	+Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
X-X, +0.90D-E	7.295	-Z	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.40D	1.019	-X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.40D	1.019	+X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.50Lr	0.9136	-X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.50Lr	0.9136	+X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.50S	1.234	-X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.50S	1.234	+X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+1.60Lr	1.002	-X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+1.60Lr	1.002	+X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+1.60Lr+0.50W	1.078	-X	Top	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+1.60Lr+0.50W	1.078	+X	Top	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+1.60Lr-0.50W	3.082	-X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+1.60Lr-0.50W	3.082	+X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+1.60S	2.026	-X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+1.60S	2.026	+X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+1.60S+0.50W	0.05440	-X	Top	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+1.60S+0.50W	0.05440	+X	Top	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+1.60S-0.50W	4.106	-X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+1.60S-0.50W	4.106	+X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.50Lr+W	3.246	-X	Top	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.50Lr+W	3.246	+X	Top	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.50Lr-W	5.074	-X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.50Lr-W	5.074	+X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.50S+W	2.926	-X	Top	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.50S+W	2.926	+X	Top	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.50S-W	5.394	-X	Bottom	0.2592	AsMin	0.3520	13.709	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline 15 and N

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+0.50S-W	5.394	+X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +0.90D+W	3.505	-X	Top	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +0.90D+W	3.505	+X	Top	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +0.90D-W	4.815	-X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +0.90D-W	4.815	+X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.20S+E	5.622	-X	Top	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.20S+E	5.622	+X	Top	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.20S-E	7.658	-X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +1.20D+0.20S-E	7.658	+X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +0.90D+E	5.985	-X	Top	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +0.90D+E	5.985	+X	Top	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +0.90D-E	7.295	-X	Bottom	0.2592	AsMin	0.3520	13.709	OK
Z-Z, +0.90D-E	7.295	+X	Bottom	0.2592	AsMin	0.3520	13.709	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	3.89 psi	3.89 psi	3.89 psi	3.89 psi	3.89 psi	82.16 psi	0.05	OK
+1.20D+0.50Lr	3.49 psi	3.49 psi	3.49 psi	3.49 psi	3.49 psi	82.16 psi	0.04	OK
+1.20D+0.50S	4.71 psi	4.71 psi	4.71 psi	4.71 psi	4.71 psi	82.16 psi	0.06	OK
+1.20D+1.60Lr	3.83 psi	3.83 psi	3.83 psi	3.83 psi	3.83 psi	82.16 psi	0.05	OK
+1.20D+1.60Lr+0.50W	4.12 psi	4.12 psi	4.12 psi	4.12 psi	4.12 psi	82.16 psi	0.05	OK
+1.20D+1.60Lr-0.50W	11.77 psi	11.77 psi	11.77 psi	11.77 psi	11.77 psi	82.16 psi	0.14	OK
+1.20D+1.60S	7.74 psi	7.74 psi	7.74 psi	7.74 psi	7.74 psi	82.16 psi	0.09	OK
+1.20D+1.60S+0.50W	0.21 psi	0.21 psi	0.21 psi	0.21 psi	0.21 psi	82.16 psi	0.00	OK
+1.20D+1.60S-0.50W	15.68 psi	15.68 psi	15.68 psi	15.68 psi	15.68 psi	82.16 psi	0.19	OK
+1.20D+0.50Lr+W	12.40 psi	12.40 psi	12.40 psi	12.40 psi	12.40 psi	82.16 psi	0.15	OK
+1.20D+0.50Lr-W	19.38 psi	19.38 psi	19.38 psi	19.38 psi	19.38 psi	82.16 psi	0.24	OK
+1.20D+0.50S+W	11.18 psi	11.18 psi	11.18 psi	11.18 psi	11.18 psi	82.16 psi	0.14	OK
+1.20D+0.50S-W	20.60 psi	20.60 psi	20.60 psi	20.60 psi	20.60 psi	82.16 psi	0.25	OK
+0.90D+W	13.39 psi	13.39 psi	13.39 psi	13.39 psi	13.39 psi	82.16 psi	0.16	OK
+0.90D-W	18.39 psi	18.39 psi	18.39 psi	18.39 psi	18.39 psi	82.16 psi	0.22	OK
+1.20D+0.20S+E	21.47 psi	21.47 psi	21.47 psi	21.47 psi	21.47 psi	82.16 psi	0.26	OK
+1.20D+0.20S-E	29.25 psi	29.25 psi	29.25 psi	29.25 psi	29.25 psi	82.16 psi	0.36	OK
+0.90D+E	22.86 psi	22.86 psi	22.86 psi	22.86 psi	22.86 psi	82.16 psi	0.28	OK
+0.90D-E	27.86 psi	27.86 psi	27.86 psi	27.86 psi	27.86 psi	82.16 psi	0.34	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	9.88 psi	164.32 psi	0.06015	OK
+1.20D+0.50Lr	8.86 psi	164.32 psi	0.05392	OK
+1.20D+0.50S	11.96 psi	164.32 psi	0.0728	OK
+1.20D+1.60Lr	9.71 psi	164.32 psi	0.05911	OK
+1.20D+1.60Lr+0.50W	10.46 psi	164.32 psi	0.06364	OK
+1.20D+1.60Lr-0.50W	29.88 psi	164.32 psi	0.1819	OK
+1.20D+1.60S	19.64 psi	164.32 psi	0.1195	OK
+1.20D+1.60S+0.50W	0.53 psi	164.32 psi	0.00321	OK
+1.20D+1.60S-0.50W	39.81 psi	164.32 psi	0.2423	OK
+1.20D+0.50Lr+W	31.48 psi	164.32 psi	0.1916	OK
+1.20D+0.50Lr-W	49.20 psi	164.32 psi	0.2994	OK
+1.20D+0.50S+W	28.38 psi	164.32 psi	0.1727	OK
+1.20D+0.50S-W	52.30 psi	164.32 psi	0.3183	OK
+0.90D+W	33.99 psi	164.32 psi	0.2068	OK
+0.90D-W	46.69 psi	164.32 psi	0.2842	OK
+1.20D+0.20S+E	54.52 psi	164.32 psi	0.3318	OK
+1.20D+0.20S-E	74.26 psi	164.32 psi	0.4519	OK
+0.90D+E	58.03 psi	164.32 psi	0.3532	OK
+0.90D-E	70.74 psi	164.32 psi	0.4305	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline 15 and M

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=		
Min Allow % Temp Reinf.	=	0.00180	
Min. Overturning Safety Factor	=	1.10	: 1
Min. Sliding Safety Factor	=	1.10	: 1
Add Ftg Wt for Soil Pressure	:	Yes	
Use ftg wt for stability, moments & shears	:	Yes	
Add Pedestal Wt for Soil Pressure	:	Yes	
Use Pedestal wt for stability, mom & shear	:	Yes	

Soil Design Values

Allowable Soil Bearing	=	3.0	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	6.0	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

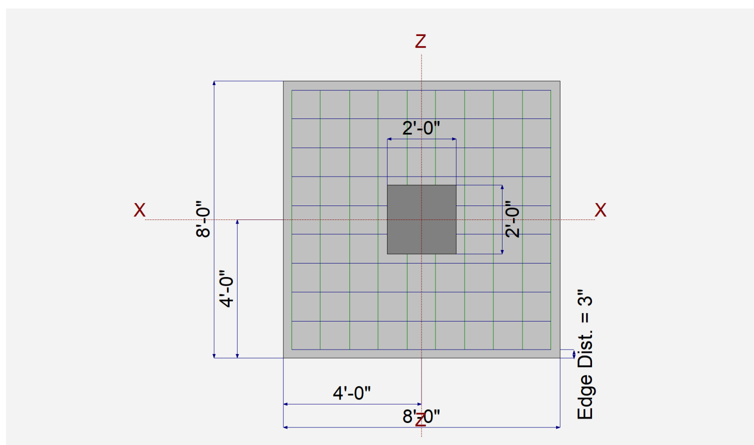
Width parallel to X-X Axis	=	8.0	ft
Length parallel to Z-Z Axis	=	8.0	ft
Footing Thickness	=	12.0	in

Pedestal dimensions...

px : parallel to X-X Axis	=	24.0	in
pz : parallel to Z-Z Axis	=	24.0	in
Height	=	60.0	in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0	in



Reinforcing

Bars parallel to X-X Axis

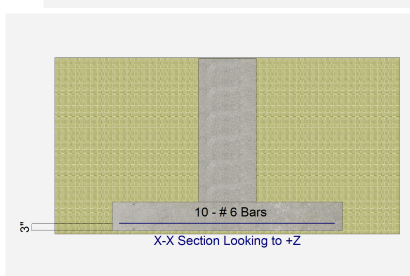
Number of Bars	=	10.0
Reinforcing Bar Size	= #	6

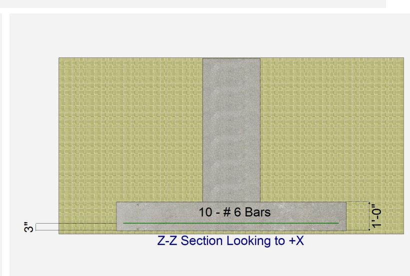
Bars parallel to Z-Z Axis

Number of Bars	=	10.0
Reinforcing Bar Size	= #	6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	15.0	3.0		4.0	11.0	-18.0		k
OB : Overburden	=	0.150							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

DESCRIPTION: Gridline 15 and M

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.4017	Soil Bearing	1.205 ksf	3.0 ksf	+D+0.750S+0.450W about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	3.294	Uplift	-12.60 k	41.508 k	+0.60D+0.70E
PASS	0.1239	Z Flexure (+X)	2.595 k-ft/ft	20.940 k-ft/ft	+1.20D+0.20S-E
PASS	0.1239	Z Flexure (-X)	2.595 k-ft/ft	20.940 k-ft/ft	+1.20D+0.20S-E
PASS	0.1239	X Flexure (+Z)	2.595 k-ft/ft	20.940 k-ft/ft	+1.20D+0.20S-E
PASS	0.1239	X Flexure (-Z)	2.595 k-ft/ft	20.940 k-ft/ft	+1.20D+0.20S-E
PASS	0.1456	1-way Shear (+X)	11.965 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.1456	1-way Shear (-X)	11.965 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.1456	1-way Shear (+Z)	11.965 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.1456	1-way Shear (-Z)	11.965 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.1673	2-way Punching	27.485 psi	164.317 psi	+1.20D+0.20S-E

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	1.081	1.081	n/a	n/a	0.360
X-X, +D+Lr	3.0	n/a	0.0	1.128	1.128	n/a	n/a	0.376
X-X, +D+S	3.0	n/a	0.0	1.143	1.143	n/a	n/a	0.381
X-X, +D+0.750Lr	3.0	n/a	0.0	1.116	1.116	n/a	n/a	0.372
X-X, +D+0.750S	3.0	n/a	0.0	1.128	1.128	n/a	n/a	0.376
X-X, +D+0.60W	3.0	n/a	0.0	1.184	1.184	n/a	n/a	0.395
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	1.193	1.193	n/a	n/a	0.398
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	1.205	1.205	n/a	n/a	0.402
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.7517	0.7517	n/a	n/a	0.251
X-X, +D+0.70E	3.0	n/a	0.0	0.8841	0.8841	n/a	n/a	0.295
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	0.9802	0.9802	n/a	n/a	0.327
X-X, +0.60D+0.70E	3.0	n/a	0.0	0.4517	0.4517	n/a	n/a	0.151
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	1.081	1.081	0.360
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	1.128	1.128	0.376
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	1.143	1.143	0.381
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	1.116	1.116	0.372
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	1.128	1.128	0.376
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	1.184	1.184	0.395
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	1.193	1.193	0.398
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	1.205	1.205	0.402
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	0.7517	0.7517	0.251
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	0.8841	0.8841	0.295
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	0.9802	0.9802	0.327
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	0.4517	0.4517	0.151

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

General Footing

DESCRIPTION: Gridline 15 and M

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	1.486	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.40D	1.486	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50Lr	1.379	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50Lr	1.379	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50S	1.414	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50S	1.414	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60Lr	1.611	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60Lr	1.611	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60Lr+0.50W	1.998	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60Lr+0.50W	1.998	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60Lr-0.50W	1.225	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60Lr-0.50W	1.225	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60S	1.724	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60S	1.724	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60S+0.50W	2.110	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60S+0.50W	2.110	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60S-0.50W	1.337	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60S-0.50W	1.337	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50Lr+W	2.153	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50Lr+W	2.153	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50Lr-W	0.6060	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50Lr-W	0.6060	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50S+W	2.188	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50S+W	2.188	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50S-W	0.6411	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50S-W	0.6411	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D+W	1.729	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D+W	1.729	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D-W	0.1821	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D-W	0.1821	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.20S+E	0.06468	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.20S+E	0.06468	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.20S-E	2.595	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.20S-E	2.595	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D+E	0.310	+Z	Top	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D+E	0.310	-Z	Top	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D-E	2.221	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D-E	2.221	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.40D	1.486	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.40D	1.486	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50Lr	1.379	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50Lr	1.379	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50S	1.414	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50S	1.414	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60Lr	1.611	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60Lr	1.611	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60Lr+0.50W	1.998	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60Lr+0.50W	1.998	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60Lr-0.50W	1.225	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60Lr-0.50W	1.225	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60S	1.724	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60S	1.724	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60S+0.50W	2.110	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60S+0.50W	2.110	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60S-0.50W	1.337	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60S-0.50W	1.337	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50Lr+W	2.153	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50Lr+W	2.153	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50Lr-W	0.6060	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50Lr-W	0.6060	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50S+W	2.188	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50S+W	2.188	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50S-W	0.6411	-X	Bottom	0.2592	AsMin	0.550	20.940	OK

General Footing

DESCRIPTION: Gridline 15 and M

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+0.50S-W	0.6411	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D+W	1.729	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D+W	1.729	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D-W	0.1821	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D-W	0.1821	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.20S+E	0.06468	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.20S+E	0.06468	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.20S-E	2.595	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.20S-E	2.595	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D+E	0.310	-X	Top	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D+E	0.310	+X	Top	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D-E	2.221	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D-E	2.221	+X	Bottom	0.2592	AsMin	0.550	20.940	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	6.85 psi	6.85 psi	6.85 psi	6.85 psi	6.85 psi	82.16 psi	0.08	OK
+1.20D+0.50Lr	6.36 psi	6.36 psi	6.36 psi	6.36 psi	6.36 psi	82.16 psi	0.08	OK
+1.20D+0.50S	6.52 psi	6.52 psi	6.52 psi	6.52 psi	6.52 psi	82.16 psi	0.08	OK
+1.20D+1.60Lr	7.43 psi	7.43 psi	7.43 psi	7.43 psi	7.43 psi	82.16 psi	0.09	OK
+1.20D+1.60Lr+0.50W	9.21 psi	9.21 psi	9.21 psi	9.21 psi	9.21 psi	82.16 psi	0.11	OK
+1.20D+1.60Lr-0.50W	5.65 psi	5.65 psi	5.65 psi	5.65 psi	5.65 psi	82.16 psi	0.07	OK
+1.20D+1.60S	7.95 psi	7.95 psi	7.95 psi	7.95 psi	7.95 psi	82.16 psi	0.10	OK
+1.20D+1.60S+0.50W	9.73 psi	9.73 psi	9.73 psi	9.73 psi	9.73 psi	82.16 psi	0.12	OK
+1.20D+1.60S-0.50W	6.16 psi	6.16 psi	6.16 psi	6.16 psi	6.16 psi	82.16 psi	0.08	OK
+1.20D+0.50Lr+W	9.92 psi	9.92 psi	9.92 psi	9.92 psi	9.92 psi	82.16 psi	0.12	OK
+1.20D+0.50Lr-W	2.79 psi	2.79 psi	2.79 psi	2.79 psi	2.79 psi	82.16 psi	0.03	OK
+1.20D+0.50S+W	10.09 psi	10.09 psi	10.09 psi	10.09 psi	10.09 psi	82.16 psi	0.12	OK
+1.20D+0.50S-W	2.96 psi	2.96 psi	2.96 psi	2.96 psi	2.96 psi	82.16 psi	0.04	OK
+0.90D+W	7.97 psi	7.97 psi	7.97 psi	7.97 psi	7.97 psi	82.16 psi	0.10	OK
+0.90D-W	0.84 psi	0.84 psi	0.84 psi	0.84 psi	0.84 psi	82.16 psi	0.01	OK
+1.20D+0.20S+E	0.30 psi	0.30 psi	0.30 psi	0.30 psi	0.30 psi	82.16 psi	0.00	OK
+1.20D+0.20S-E	11.97 psi	11.97 psi	11.97 psi	11.97 psi	11.97 psi	82.16 psi	0.15	OK
+0.90D+E	1.43 psi	1.43 psi	1.43 psi	1.43 psi	1.43 psi	82.16 psi	0.02	OK
+0.90D-E	10.24 psi	10.24 psi	10.24 psi	10.24 psi	10.24 psi	82.16 psi	0.12	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	15.74 psi	164.32 psi	0.09578	OK
+1.20D+0.50Lr	14.61 psi	164.32 psi	0.08889	OK
+1.20D+0.50S	14.98 psi	164.32 psi	0.09116	OK
+1.20D+1.60Lr	17.06 psi	164.32 psi	0.1038	OK
+1.20D+1.60Lr+0.50W	21.16 psi	164.32 psi	0.1288	OK
+1.20D+1.60Lr-0.50W	12.97 psi	164.32 psi	0.07892	OK
+1.20D+1.60S	18.25 psi	164.32 psi	0.1111	OK
+1.20D+1.60S+0.50W	22.35 psi	164.32 psi	0.136	OK
+1.20D+1.60S-0.50W	14.16 psi	164.32 psi	0.08617	OK
+1.20D+0.50Lr+W	22.80 psi	164.32 psi	0.1387	OK
+1.20D+0.50Lr-W	6.42 psi	164.32 psi	0.03905	OK
+1.20D+0.50S+W	23.17 psi	164.32 psi	0.141	OK
+1.20D+0.50S-W	6.79 psi	164.32 psi	0.04132	OK
+0.90D+W	18.31 psi	164.32 psi	0.1114	OK
+0.90D-W	1.93 psi	164.32 psi	0.01173	OK
+1.20D+0.20S+E	0.68 psi	164.32 psi	0.004168	OK
+1.20D+0.20S-E	27.49 psi	164.32 psi	0.1673	OK
+0.90D+E	3.28 psi	164.32 psi	0.01998	OK
+0.90D-E	23.52 psi	164.32 psi	0.1431	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline 15 and L

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.10 : 1
Min. Sliding Safety Factor	=	1.10 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

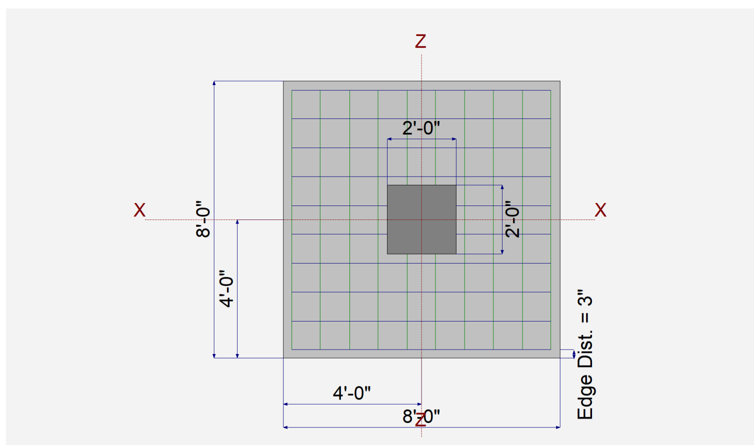
Footing base depth below soil surface	=	6.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

Width parallel to X-X Axis	=	8.0 ft
Length parallel to Z-Z Axis	=	8.0 ft
Footing Thickness	=	12.0 in



Pedestal dimensions...

px : parallel to X-X Axis	=	24.0 in
pz : parallel to Z-Z Axis	=	24.0 in
Height	=	60.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in

Reinforcing

Bars parallel to X-X Axis

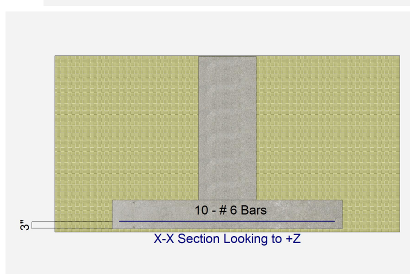
Number of Bars	=	10.0
Reinforcing Bar Size	=	# 6

Bars parallel to Z-Z Axis

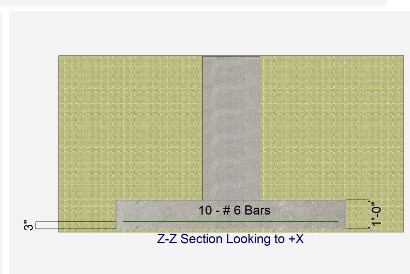
Number of Bars	=	10.0
Reinforcing Bar Size	=	# 6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a



X-X Section Looking to +Z



Z-Z Section Looking to +X

Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	33.0	21.0		33.0	-41.0	-65.0		k
OB : Overburden	=	0.150							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline 15 and L

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6260	Soil Bearing	1.878 ksf	3.0 ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	1.150	Uplift	-45.50 k	52.308 k	+0.60D+0.70E
PASS	0.3794	Z Flexure (+X)	7.945 k-ft/ft	20.940 k-ft/ft	+1.20D+1.60S-0.50W
PASS	0.3794	Z Flexure (-X)	7.945 k-ft/ft	20.940 k-ft/ft	+1.20D+1.60S-0.50W
PASS	0.3794	X Flexure (+Z)	7.945 k-ft/ft	20.940 k-ft/ft	+1.20D+1.60S-0.50W
PASS	0.3794	X Flexure (-Z)	7.945 k-ft/ft	20.940 k-ft/ft	+1.20D+1.60S-0.50W
PASS	0.4458	1-way Shear (+X)	36.627 psi	82.158 psi	+1.20D+1.60S-0.50W
PASS	0.4458	1-way Shear (-X)	36.627 psi	82.158 psi	+1.20D+1.60S-0.50W
PASS	0.4458	1-way Shear (+Z)	36.627 psi	82.158 psi	+1.20D+1.60S-0.50W
PASS	0.4458	1-way Shear (-Z)	36.627 psi	82.158 psi	+1.20D+1.60S-0.50W
PASS	0.5120	2-way Punching	84.137 psi	164.317 psi	+1.20D+1.60S-0.50W

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	1.362	1.362	n/a	n/a	0.454
X-X, +D+Lr	3.0	n/a	0.0	1.690	1.690	n/a	n/a	0.563
X-X, +D+S	3.0	n/a	0.0	1.878	1.878	n/a	n/a	0.626
X-X, +D+0.750Lr	3.0	n/a	0.0	1.608	1.608	n/a	n/a	0.536
X-X, +D+0.750S	3.0	n/a	0.0	1.749	1.749	n/a	n/a	0.583
X-X, +D+0.60W	3.0	n/a	0.0	0.9778	0.9778	n/a	n/a	0.326
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	1.320	1.320	n/a	n/a	0.440
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	1.461	1.461	n/a	n/a	0.487
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.4329	0.4329	n/a	n/a	0.144
X-X, +D+0.70E	3.0	n/a	0.0	0.6513	0.6513	n/a	n/a	0.217
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	1.216	1.216	n/a	n/a	0.405
X-X, +0.60D+0.70E	3.0	n/a	0.0	0.1064	0.1064	n/a	n/a	0.035
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	1.362	1.362	0.454
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	1.690	1.690	0.563
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	1.878	1.878	0.626
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	1.608	1.608	0.536
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	1.749	1.749	0.583
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	0.9778	0.9778	0.326
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	1.320	1.320	0.440
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	1.461	1.461	0.487
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	0.4329	0.4329	0.144
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	0.6513	0.6513	0.217
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	1.216	1.216	0.405
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	0.1064	0.1064	0.035

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

General Footing

DESCRIPTION: Gridline 15 and L

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	3.258	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.40D	3.258	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50Lr	3.530	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50Lr	3.530	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50S	3.952	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50S	3.952	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60Lr	5.154	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60Lr	5.154	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60Lr+0.50W	3.713	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60Lr+0.50W	3.713	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60Lr-0.50W	6.596	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60Lr-0.50W	6.596	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60S	6.504	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60S	6.504	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60S+0.50W	5.063	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60S+0.50W	5.063	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+1.60S-0.50W	7.945	+Z	Bottom	0.2674	Min ACI 10.5	0.550	20.940	OK
X-X, +1.20D+1.60S-0.50W	7.945	-Z	Bottom	0.2674	Min ACI 10.5	0.550	20.940	OK
X-X, +1.20D+0.50Lr+W	0.6482	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50Lr+W	0.6482	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50Lr-W	6.413	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50Lr-W	6.413	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50S+W	1.070	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50S+W	1.070	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50S-W	6.835	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.50S-W	6.835	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D+W	0.7881	+Z	Top	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D+W	0.7881	-Z	Top	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D-W	4.977	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D-W	4.977	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.20S+E	1.313	+Z	Top	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.20S+E	1.313	-Z	Top	0.2592	AsMin	0.550	20.940	OK
X-X, +1.20D+0.20S-E	7.826	+Z	Bottom	0.2633	Min ACI 10.5	0.550	20.940	OK
X-X, +1.20D+0.20S-E	7.826	-Z	Bottom	0.2633	Min ACI 10.5	0.550	20.940	OK
X-X, +0.90D+E	2.475	+Z	Top	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D+E	2.475	-Z	Top	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D-E	6.664	+Z	Bottom	0.2592	AsMin	0.550	20.940	OK
X-X, +0.90D-E	6.664	-Z	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.40D	3.258	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.40D	3.258	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50Lr	3.530	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50Lr	3.530	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50S	3.952	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50S	3.952	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60Lr	5.154	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60Lr	5.154	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60Lr+0.50W	3.713	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60Lr+0.50W	3.713	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60Lr-0.50W	6.596	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60Lr-0.50W	6.596	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60S	6.504	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60S	6.504	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60S+0.50W	5.063	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60S+0.50W	5.063	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+1.60S-0.50W	7.945	-X	Bottom	0.2674	Min ACI 10.5	0.550	20.940	OK
Z-Z, +1.20D+1.60S-0.50W	7.945	+X	Bottom	0.2674	Min ACI 10.5	0.550	20.940	OK
Z-Z, +1.20D+0.50Lr+W	0.6482	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50Lr+W	0.6482	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50Lr-W	6.413	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50Lr-W	6.413	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50S+W	1.070	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50S+W	1.070	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.50S-W	6.835	-X	Bottom	0.2592	AsMin	0.550	20.940	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline 15 and L

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+0.50S-W	6.835	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D+W	0.7881	-X	Top	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D+W	0.7881	+X	Top	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D-W	4.977	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D-W	4.977	+X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.20S+E	1.313	-X	Top	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.20S+E	1.313	+X	Top	0.2592	AsMin	0.550	20.940	OK
Z-Z, +1.20D+0.20S-E	7.826	-X	Bottom	0.2633	Min ACI 10.5	0.550	20.940	OK
Z-Z, +1.20D+0.20S-E	7.826	+X	Bottom	0.2633	Min ACI 10.5	0.550	20.940	OK
Z-Z, +0.90D+E	2.475	-X	Top	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D+E	2.475	+X	Top	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D-E	6.664	-X	Bottom	0.2592	AsMin	0.550	20.940	OK
Z-Z, +0.90D-E	6.664	+X	Bottom	0.2592	AsMin	0.550	20.940	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	15.02 psi	15.02 psi	15.02 psi	15.02 psi	15.02 psi	82.16 psi	0.18	OK
+1.20D+0.50Lr	16.28 psi	16.28 psi	16.28 psi	16.28 psi	16.28 psi	82.16 psi	0.20	OK
+1.20D+0.50S	18.22 psi	18.22 psi	18.22 psi	18.22 psi	18.22 psi	82.16 psi	0.22	OK
+1.20D+1.60Lr	23.76 psi	23.76 psi	23.76 psi	23.76 psi	23.76 psi	82.16 psi	0.29	OK
+1.20D+1.60Lr+0.50W	17.12 psi	17.12 psi	17.12 psi	17.12 psi	17.12 psi	82.16 psi	0.21	OK
+1.20D+1.60Lr-0.50W	30.41 psi	30.41 psi	30.41 psi	30.41 psi	30.41 psi	82.16 psi	0.37	OK
+1.20D+1.60S	29.98 psi	29.98 psi	29.98 psi	29.98 psi	29.98 psi	82.16 psi	0.36	OK
+1.20D+1.60S+0.50W	23.34 psi	23.34 psi	23.34 psi	23.34 psi	23.34 psi	82.16 psi	0.28	OK
+1.20D+1.60S-0.50W	36.63 psi	36.63 psi	36.63 psi	36.63 psi	36.63 psi	82.16 psi	0.45	OK
+1.20D+0.50Lr+W	2.99 psi	2.99 psi	2.99 psi	2.99 psi	2.99 psi	82.16 psi	0.04	OK
+1.20D+0.50Lr-W	29.56 psi	29.56 psi	29.56 psi	29.56 psi	29.56 psi	82.16 psi	0.36	OK
+1.20D+0.50S+W	4.93 psi	4.93 psi	4.93 psi	4.93 psi	4.93 psi	82.16 psi	0.06	OK
+1.20D+0.50S-W	31.51 psi	31.51 psi	31.51 psi	31.51 psi	31.51 psi	82.16 psi	0.38	OK
+0.90D+W	3.63 psi	3.63 psi	3.63 psi	3.63 psi	3.63 psi	82.16 psi	0.04	OK
+0.90D-W	22.94 psi	22.94 psi	22.94 psi	22.94 psi	22.94 psi	82.16 psi	0.28	OK
+1.20D+0.20S+E	6.05 psi	6.05 psi	6.05 psi	6.05 psi	6.05 psi	82.16 psi	0.07	OK
+1.20D+0.20S-E	36.08 psi	36.08 psi	36.08 psi	36.08 psi	36.08 psi	82.16 psi	0.44	OK
+0.90D+E	11.41 psi	11.41 psi	11.41 psi	11.41 psi	11.41 psi	82.16 psi	0.14	OK
+0.90D-E	30.72 psi	30.72 psi	30.72 psi	30.72 psi	30.72 psi	82.16 psi	0.37	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	34.50 psi	164.32 psi	0.2099	OK
+1.20D+0.50Lr	37.39 psi	164.32 psi	0.2275	OK
+1.20D+0.50S	41.85 psi	164.32 psi	0.2547	OK
+1.20D+1.60Lr	54.58 psi	164.32 psi	0.3322	OK
+1.20D+1.60Lr+0.50W	39.32 psi	164.32 psi	0.2393	OK
+1.20D+1.60Lr-0.50W	69.84 psi	164.32 psi	0.4251	OK
+1.20D+1.60S	68.88 psi	164.32 psi	0.4192	OK
+1.20D+1.60S+0.50W	53.62 psi	164.32 psi	0.3263	OK
+1.20D+1.60S-0.50W	84.14 psi	164.32 psi	0.512	OK
+1.20D+0.50Lr+W	6.86 psi	164.32 psi	0.04177	OK
+1.20D+0.50Lr-W	67.91 psi	164.32 psi	0.4133	OK
+1.20D+0.50S+W	11.33 psi	164.32 psi	0.06896	OK
+1.20D+0.50S-W	72.38 psi	164.32 psi	0.4405	OK
+0.90D+W	8.35 psi	164.32 psi	0.05079	OK
+0.90D-W	52.70 psi	164.32 psi	0.3207	OK
+1.20D+0.20S+E	13.91 psi	164.32 psi	0.08463	OK
+1.20D+0.20S-E	82.87 psi	164.32 psi	0.5043	OK
+0.90D+E	26.21 psi	164.32 psi	0.1595	OK
+0.90D-E	70.57 psi	164.32 psi	0.4295	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline B.7 and K.2

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=		
Min Allow % Temp Reinf.	=	0.00180	
Min. Overturning Safety Factor	=	1.10	: 1
Min. Sliding Safety Factor	=	1.10	: 1
Add Ftg Wt for Soil Pressure	:	Yes	
Use ftg wt for stability, moments & shears	:	Yes	
Add Pedestal Wt for Soil Pressure	:	Yes	
Use Pedestal wt for stability, mom & shear	:	Yes	

Soil Design Values

Allowable Soil Bearing	=	3.0	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	5.0	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

Width parallel to X-X Axis	=	6.50	ft
Length parallel to Z-Z Axis	=	6.50	ft
Footing Thickness	=	14.0	in

Load location offset from footing center...

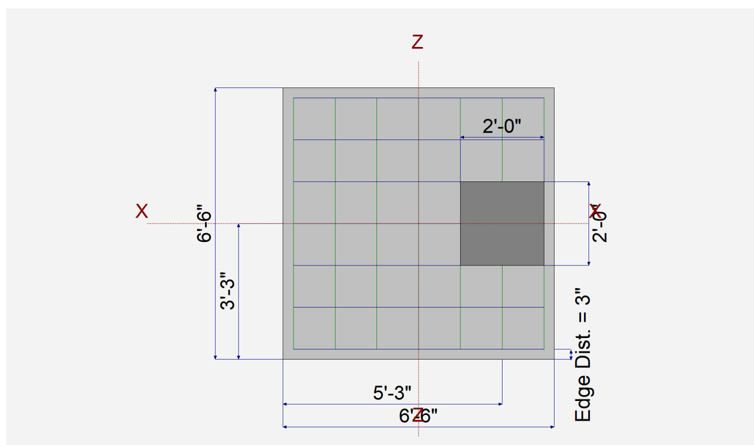
ex : Prll to X-X Axis	=	24	in
	=		in

Pedestal dimensions...

px : parallel to X-X Axis	=	24.0	in
pz : parallel to Z-Z Axis	=	24.0	in
Height	=	60.0	in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0	in



Reinforcing

Bars parallel to X-X Axis

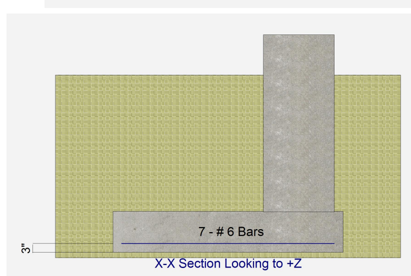
Number of Bars	=		7.0
Reinforcing Bar Size	=	#	6

Bars parallel to Z-Z Axis

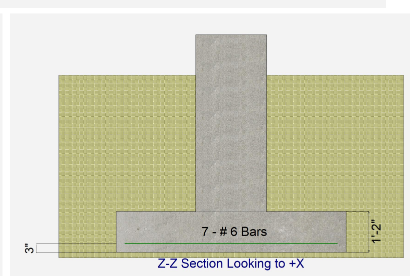
Number of Bars	=		7.0
Reinforcing Bar Size	=	#	6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a



X-X Section Looking to +Z



Z-Z Section Looking to +X

Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	8.0	5.0		11.0	-11.0	-16.0		k
OB : Overburden	=	0.0							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline B.7 and K.2

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied		Capacity		Governing Load Combination
PASS	0.6480	Soil Bearing	1.944	ksf	3.0	ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0	k-ft	0.0	k-ft	No Overturning
PASS	1.729	Overturning - Z-Z	44.10	k-ft	76.243	k-ft	+0.60D+0.70E
PASS	n/a	Sliding - X-X	0.0	k	0.0	k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0	k	0.0	k	No Sliding
PASS	1.831	Uplift	-11.20	k	20.506	k	+0.60D+0.70E
PASS	0.003106	Z Flexure (+X)	0.06979	k-ft/ft	22.465	k-ft/ft	+1.20D+1.60S-0.50W
PASS	0.01244	Z Flexure (-X)	0.2794	k-ft/ft	22.465	k-ft/ft	+0.90D-E
PASS	0.09108	X Flexure (+Z)	2.046	k-ft/ft	22.465	k-ft/ft	+1.20D+1.60S-0.50W
PASS	0.09108	X Flexure (-Z)	2.046	k-ft/ft	22.465	k-ft/ft	+1.20D+1.60S-0.50W
PASS	n/a	1-way Shear (+X)	0.0	psi	82.158	psi	n/a
PASS	0.02737	1-way Shear (-X)	2.248	psi	82.158	psi	+1.20D+1.60S-0.50W
PASS	0.1018	1-way Shear (+Z)	8.360	psi	82.158	psi	+1.20D+1.60S-0.50W
PASS	0.1018	1-way Shear (-Z)	8.360	psi	82.158	psi	+1.20D+1.60S-0.50W
PASS	0.08987	2-way Punching	14.768	psi	164.317	psi	+1.40D

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	0.8089	0.8089	n/a	n/a	0.270
X-X, +D+Lr	3.0	n/a	0.0	0.9272	0.9272	n/a	n/a	0.309
X-X, +D+S	3.0	n/a	0.0	1.069	1.069	n/a	n/a	0.356
X-X, +D+0.750Lr	3.0	n/a	0.0	0.8977	0.8977	n/a	n/a	0.299
X-X, +D+0.750S	3.0	n/a	0.0	1.004	1.004	n/a	n/a	0.335
X-X, +D+0.60W	3.0	n/a	0.0	0.6527	0.6527	n/a	n/a	0.218
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	0.7805	0.7805	n/a	n/a	0.260
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	0.8870	0.8870	n/a	n/a	0.296
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.3291	0.3291	n/a	n/a	0.110
X-X, +D+0.70E	3.0	n/a	0.0	0.5438	0.5438	n/a	n/a	0.181
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	0.8054	0.8054	n/a	n/a	0.269
X-X, +0.60D+0.70E	3.0	n/a	0.0	0.2203	0.2203	n/a	n/a	0.073
Z-Z, D Only	3.0	6.470	n/a	n/a	n/a	0.4103	1.207	0.402
Z-Z, +D+Lr	3.0	8.707	n/a	n/a	n/a	0.3124	1.542	0.514
Z-Z, +D+S	3.0	10.738	n/a	n/a	n/a	0.1948	1.944	0.648
Z-Z, +D+0.750Lr	3.0	8.203	n/a	n/a	n/a	0.3369	1.458	0.486
Z-Z, +D+0.750S	3.0	9.879	n/a	n/a	n/a	0.2487	1.760	0.587
Z-Z, +D+0.60W	3.0	2.274	n/a	n/a	n/a	0.5396	0.7657	0.255
Z-Z, +D+0.750Lr+0.450W	3.0	5.832	n/a	n/a	n/a	0.4338	1.127	0.376
Z-Z, +D+0.750S+0.450W	3.0	8.014	n/a	n/a	n/a	0.3457	1.428	0.476
Z-Z, +0.60D+0.60W	3.0	0.1519	n/a	n/a	n/a	0.3253	0.3329	0.111
Z-Z, +D+0.70E	3.0	-2.075	n/a	n/a	n/a	0.6298	0.4579	0.210
Z-Z, +D+0.750S+0.5250E	3.0	6.393	n/a	n/a	n/a	0.4133	1.197	0.399
Z-Z, +0.60D+0.70E	3.0	-11.637	n/a	n/a	n/a	0.4154	0.02507	0.139

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, D Only	None	0.0 k-ft	Infinity	OK
X-X, +D+Lr	None	0.0 k-ft	Infinity	OK
X-X, +D+S	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750Lr	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750S	None	0.0 k-ft	Infinity	OK
X-X, +D+0.60W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750Lr+0.450W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750S+0.450W	None	0.0 k-ft	Infinity	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline B.7 and K.2

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, +0.60D+0.60W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.70E	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750S+0.5250E	None	0.0 k-ft	Infinity	OK
X-X, +0.60D+0.70E	None	0.0 k-ft	Infinity	OK
Z-Z, D Only	None	127.072 k-ft	Infinity	OK
Z-Z, +D+Lr	None	153.322 k-ft	Infinity	OK
Z-Z, +D+S	None	184.822 k-ft	Infinity	OK
Z-Z, +D+0.750Lr	None	146.760 k-ft	Infinity	OK
Z-Z, +D+0.750S	None	170.385 k-ft	Infinity	OK
Z-Z, +D+0.60W	34.650 k-ft	127.072 k-ft	3.667	OK
Z-Z, +D+0.750Lr+0.450W	25.988 k-ft	146.760 k-ft	5.647	OK
Z-Z, +D+0.750S+0.450W	25.988 k-ft	170.385 k-ft	6.556	OK
Z-Z, +0.60D+0.60W	34.650 k-ft	76.243 k-ft	2.20	OK
Z-Z, +D+0.70E	44.10 k-ft	127.072 k-ft	2.881	OK
Z-Z, +D+0.750S+0.5250E	33.075 k-ft	170.385 k-ft	5.151	OK
Z-Z, +0.60D+0.70E	44.10 k-ft	76.243 k-ft	1.729	OK

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.7727	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.40D	0.7727	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr	0.8121	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr	0.8121	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S	0.9918	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S	0.9918	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr	1.142	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr	1.142	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr+0.50W	0.8121	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr+0.50W	0.8121	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr-0.50W	1.471	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr-0.50W	1.471	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S	1.717	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S	1.717	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S+0.50W	1.387	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S+0.50W	1.387	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S-0.50W	2.046	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S-0.50W	2.046	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr+W	0.1531	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr+W	0.1531	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr-W	1.471	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr-W	1.471	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S+W	0.3328	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S+W	0.3328	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S-W	1.651	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S-W	1.651	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+W	0.1622	+Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+W	0.1622	-Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-W	1.156	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-W	1.156	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S+E	0.1644	+Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S+E	0.1644	-Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S-E	1.753	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S-E	1.753	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+E	0.4617	+Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+E	0.4617	-Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-E	1.455	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline B.7 and K.2

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +0.90D-E	1.455	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.40D	0.1441	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.40D	0.02511	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr	0.009197	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr	0.02723	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S	0.01734	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S	0.03343	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr	0.03945	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr	0.03859	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr+0.50W	0.009197	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr+0.50W	0.02723	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr-0.50W	0.08810	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr-0.50W	0.04996	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S	0.1244	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S	0.05843	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S+0.50W	0.07572	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S+0.50W	0.04706	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S-0.50W	0.1730	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S-0.50W	0.06979	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr+W	0.1065	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr+W	0.004510	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr-W	0.08810	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr-W	0.04996	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S+W	0.07996	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S+W	0.01071	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S-W	0.1146	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S-W	0.05615	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+W	0.04060	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+W	0.005209	+X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-W	0.2352	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-W	0.04024	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S+E	0.1534	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S+E	0.006438	+X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S-E	0.1297	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S-E	0.05966	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+E	0.003628	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+E	0.01554	+X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-E	0.2794	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-E	0.05057	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	1.36 psi	0.00 psi	3.16 psi	3.16 psi	3.16 psi	82.16 psi	0.04	OK
+1.20D+0.50Lr	1.08 psi	0.00 psi	3.32 psi	3.32 psi	3.32 psi	82.16 psi	0.04	OK
+1.20D+0.50S	1.25 psi	0.00 psi	4.05 psi	4.05 psi	4.05 psi	82.16 psi	0.05	OK
+1.20D+1.60Lr	1.39 psi	0.00 psi	4.66 psi	4.66 psi	4.66 psi	82.16 psi	0.06	OK
+1.20D+1.60Lr+0.50W	1.08 psi	0.00 psi	3.32 psi	3.32 psi	3.32 psi	82.16 psi	0.04	OK
+1.20D+1.60Lr-0.50W	1.70 psi	0.00 psi	6.01 psi	6.01 psi	6.01 psi	82.16 psi	0.07	OK
+1.20D+1.60S	1.94 psi	0.00 psi	7.01 psi	7.01 psi	7.01 psi	82.16 psi	0.09	OK
+1.20D+1.60S+0.50W	1.63 psi	0.00 psi	5.67 psi	5.67 psi	5.67 psi	82.16 psi	0.07	OK
+1.20D+1.60S-0.50W	2.25 psi	0.00 psi	8.36 psi	8.36 psi	8.36 psi	82.16 psi	0.10	OK
+1.20D+0.50Lr+W	0.46 psi	0.00 psi	0.63 psi	0.63 psi	0.63 psi	82.16 psi	0.01	OK
+1.20D+0.50Lr-W	1.70 psi	0.00 psi	6.01 psi	6.01 psi	6.01 psi	82.16 psi	0.07	OK
+1.20D+0.50S+W	0.63 psi	0.00 psi	1.36 psi	1.36 psi	1.36 psi	82.16 psi	0.02	OK
+1.20D+0.50S-W	1.87 psi	0.00 psi	6.74 psi	6.74 psi	6.74 psi	82.16 psi	0.08	OK
+0.90D+W	0.31 psi	0.00 psi	0.66 psi	0.66 psi	0.66 psi	82.16 psi	0.01	OK
+0.90D-W	0.94 psi	0.00 psi	4.72 psi	4.72 psi	4.72 psi	82.16 psi	0.06	OK
+1.20D+0.20S+E	0.16 psi	0.00 psi	0.67 psi	0.67 psi	0.67 psi	82.16 psi	0.01	OK
+1.20D+0.20S-E	1.97 psi	0.00 psi	7.16 psi	7.16 psi	7.16 psi	82.16 psi	0.09	OK
+0.90D+E	0.59 psi	0.00 psi	1.89 psi	1.89 psi	1.89 psi	82.16 psi	0.02	OK
+0.90D-E	1.22 psi	0.00 psi	5.95 psi	5.95 psi	5.95 psi	82.16 psi	0.07	OK

General Footing

DESCRIPTION: Gridline B.7 and K.2

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	14.77 psi	164.32 psi	0.08987	OK
+1.20D+0.50Lr	14.77 psi	164.32 psi	0.08987	OK
+1.20D+0.50S	14.77 psi	164.32 psi	0.08987	OK
+1.20D+1.60Lr	14.77 psi	164.32 psi	0.08987	OK
+1.20D+1.60Lr+0.50W	14.77 psi	164.32 psi	0.08987	OK
+1.20D+1.60Lr-0.50W	14.77 psi	164.32 psi	0.08987	OK
+1.20D+1.60S	14.77 psi	164.32 psi	0.08987	OK
+1.20D+1.60S+0.50W	14.77 psi	164.32 psi	0.08987	OK
+1.20D+1.60S-0.50W	14.77 psi	164.32 psi	0.08987	OK
+1.20D+0.50Lr+W	14.77 psi	164.32 psi	0.08987	OK
+1.20D+0.50Lr-W	14.77 psi	164.32 psi	0.08987	OK
+1.20D+0.50S+W	14.77 psi	164.32 psi	0.08987	OK
+1.20D+0.50S-W	14.77 psi	164.32 psi	0.08987	OK
+0.90D+W	14.77 psi	164.32 psi	0.08987	OK
+0.90D-W	14.77 psi	164.32 psi	0.08987	OK
+1.20D+0.20S+E	14.77 psi	164.32 psi	0.08987	OK
+1.20D+0.20S-E	14.77 psi	164.32 psi	0.08987	OK
+0.90D+E	14.77 psi	164.32 psi	0.08987	OK
+0.90D-E	14.77 psi	164.32 psi	0.08987	OK

General Footing

DESCRIPTION: Gridline P Between 5 & 6

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.10 : 1
Min. Sliding Safety Factor	=	1.10 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	5.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

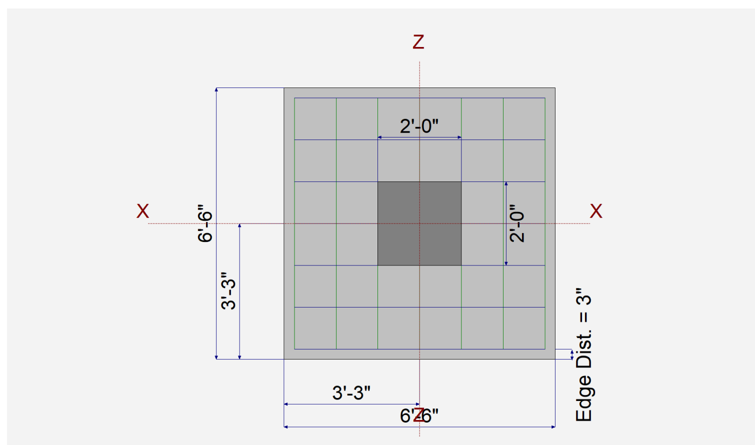
Width parallel to X-X Axis	=	6.50 ft
Length parallel to Z-Z Axis	=	6.50 ft
Footing Thickness	=	14.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	24.0 in
pz : parallel to Z-Z Axis	=	24.0 in
Height	=	60.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in

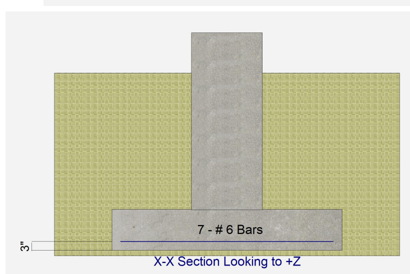


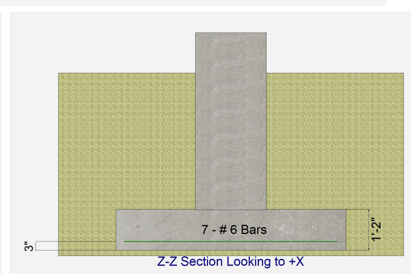
Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	7.0
Reinforcing Bar Size	=	# 6
Bars parallel to Z-Z Axis		
Number of Bars	=	7.0
Reinforcing Bar Size	=	# 6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	8.50	5.0		5.0	-15.0	-20.0		k
OB : Overburden	=	0.0							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline P Between 5 & 6

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.3130	Soil Bearing	0.9391 ksf	3.0 ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	1.486	Uplift	-14.0 k	20.806 k	+0.60D+0.70E
PASS	0.08708	Z Flexure (+X)	1.956 k-ft/ft	22.465 k-ft/ft	+1.20D+0.20S-E
PASS	0.08708	Z Flexure (-X)	1.956 k-ft/ft	22.465 k-ft/ft	+1.20D+0.20S-E
PASS	0.08708	X Flexure (+Z)	1.956 k-ft/ft	22.465 k-ft/ft	+1.20D+0.20S-E
PASS	0.08708	X Flexure (-Z)	1.956 k-ft/ft	22.465 k-ft/ft	+1.20D+0.20S-E
PASS	0.09728	1-way Shear (+X)	7.993 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.09728	1-way Shear (-X)	7.993 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.09728	1-way Shear (+Z)	7.993 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.09728	1-way Shear (-Z)	7.993 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.1041	2-way Punching	17.10 psi	164.317 psi	+1.20D+0.20S-E

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	0.8207	0.8207	n/a	n/a	0.274
X-X, +D+Lr	3.0	n/a	0.0	0.9391	0.9391	n/a	n/a	0.313
X-X, +D+S	3.0	n/a	0.0	0.9391	0.9391	n/a	n/a	0.313
X-X, +D+0.750Lr	3.0	n/a	0.0	0.9095	0.9095	n/a	n/a	0.303
X-X, +D+0.750S	3.0	n/a	0.0	0.9095	0.9095	n/a	n/a	0.303
X-X, +D+0.60W	3.0	n/a	0.0	0.6077	0.6077	n/a	n/a	0.203
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	0.7497	0.7497	n/a	n/a	0.250
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	0.7497	0.7497	n/a	n/a	0.250
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.2794	0.2794	n/a	n/a	0.093
X-X, +D+0.70E	3.0	n/a	0.0	0.4894	0.4894	n/a	n/a	0.163
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	0.6610	0.6610	n/a	n/a	0.220
X-X, +0.60D+0.70E	3.0	n/a	0.0	0.1611	0.1611	n/a	n/a	0.054
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	0.8207	0.8207	0.274
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	0.9391	0.9391	0.313
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	0.9391	0.9391	0.313
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	0.9095	0.9095	0.303
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	0.9095	0.9095	0.303
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	0.6077	0.6077	0.203
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	0.7497	0.7497	0.250
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	0.7497	0.7497	0.250
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	0.2794	0.2794	0.093
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	0.4894	0.4894	0.163
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	0.6610	0.6610	0.220
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	0.1611	0.1611	0.054

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

General Footing

DESCRIPTION: Gridline P Between 5 & 6

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.8146	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.40D	0.8146	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr	0.8480	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr	0.8480	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S	0.8480	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S	0.8480	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr	1.177	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr	1.177	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr+0.50W	0.7282	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr+0.50W	0.7282	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr-0.50W	1.627	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr-0.50W	1.627	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S	1.177	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S	1.177	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S+0.50W	0.7282	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S+0.50W	0.7282	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S-0.50W	1.627	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S-0.50W	1.627	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr+W	0.05056	+Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr+W	0.05056	-Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr-W	1.747	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr-W	1.747	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S+W	0.05056	+Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S+W	0.05056	-Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S-W	1.747	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S-W	1.747	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+W	0.3749	+Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+W	0.3749	-Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-W	1.422	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-W	1.422	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S+E	0.4399	+Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S+E	0.4399	-Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S-E	1.956	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S-E	1.956	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+E	0.6744	+Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+E	0.6744	-Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-E	1.722	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-E	1.722	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.40D	0.8146	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.40D	0.8146	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr	0.8480	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr	0.8480	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S	0.8480	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S	0.8480	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr	1.177	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr	1.177	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr+0.50W	0.7282	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr+0.50W	0.7282	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr-0.50W	1.627	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr-0.50W	1.627	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S	1.177	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S	1.177	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S+0.50W	0.7282	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S+0.50W	0.7282	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S-0.50W	1.627	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S-0.50W	1.627	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr+W	0.05056	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr+W	0.05056	+X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr-W	1.747	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr-W	1.747	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S+W	0.05056	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S+W	0.05056	+X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S-W	1.747	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS

DESCRIPTION: Gridline P Between 5 & 6

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+0.50S-W	1.747	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+W	0.3749	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+W	0.3749	+X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-W	1.422	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-W	1.422	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S+E	0.4399	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S+E	0.4399	+X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S-E	1.956	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S-E	1.956	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+E	0.6744	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+E	0.6744	+X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-E	1.722	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-E	1.722	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	3.33 psi	3.33 psi	3.33 psi	3.33 psi	3.33 psi	82.16 psi	0.04	OK
+1.20D+0.50Lr	3.47 psi	3.47 psi	3.47 psi	3.47 psi	3.47 psi	82.16 psi	0.04	OK
+1.20D+0.50S	3.47 psi	3.47 psi	3.47 psi	3.47 psi	3.47 psi	82.16 psi	0.04	OK
+1.20D+1.60Lr	4.81 psi	4.81 psi	4.81 psi	4.81 psi	4.81 psi	82.16 psi	0.06	OK
+1.20D+1.60Lr+0.50W	2.98 psi	2.98 psi	2.98 psi	2.98 psi	2.98 psi	82.16 psi	0.04	OK
+1.20D+1.60Lr-0.50W	6.65 psi	6.65 psi	6.65 psi	6.65 psi	6.65 psi	82.16 psi	0.08	OK
+1.20D+1.60S	4.81 psi	4.81 psi	4.81 psi	4.81 psi	4.81 psi	82.16 psi	0.06	OK
+1.20D+1.60S+0.50W	2.98 psi	2.98 psi	2.98 psi	2.98 psi	2.98 psi	82.16 psi	0.04	OK
+1.20D+1.60S-0.50W	6.65 psi	6.65 psi	6.65 psi	6.65 psi	6.65 psi	82.16 psi	0.08	OK
+1.20D+0.50Lr+W	0.21 psi	0.21 psi	0.21 psi	0.21 psi	0.21 psi	82.16 psi	0.00	OK
+1.20D+0.50Lr-W	7.14 psi	7.14 psi	7.14 psi	7.14 psi	7.14 psi	82.16 psi	0.09	OK
+1.20D+0.50S+W	0.21 psi	0.21 psi	0.21 psi	0.21 psi	0.21 psi	82.16 psi	0.00	OK
+1.20D+0.50S-W	7.14 psi	7.14 psi	7.14 psi	7.14 psi	7.14 psi	82.16 psi	0.09	OK
+0.90D+W	1.53 psi	1.53 psi	1.53 psi	1.53 psi	1.53 psi	82.16 psi	0.02	OK
+0.90D-W	5.81 psi	5.81 psi	5.81 psi	5.81 psi	5.81 psi	82.16 psi	0.07	OK
+1.20D+0.20S+E	1.80 psi	1.80 psi	1.80 psi	1.80 psi	1.80 psi	82.16 psi	0.02	OK
+1.20D+0.20S-E	7.99 psi	7.99 psi	7.99 psi	7.99 psi	7.99 psi	82.16 psi	0.10	OK
+0.90D+E	2.76 psi	2.76 psi	2.76 psi	2.76 psi	2.76 psi	82.16 psi	0.03	OK
+0.90D-E	7.04 psi	7.04 psi	7.04 psi	7.04 psi	7.04 psi	82.16 psi	0.09	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	7.12 psi	164.32 psi	0.04334	OK
+1.20D+0.50Lr	7.41 psi	164.32 psi	0.04511	OK
+1.20D+0.50S	7.41 psi	164.32 psi	0.04511	OK
+1.20D+1.60Lr	10.29 psi	164.32 psi	0.06264	OK
+1.20D+1.60Lr+0.50W	6.37 psi	164.32 psi	0.03874	OK
+1.20D+1.60Lr-0.50W	14.22 psi	164.32 psi	0.08654	OK
+1.20D+1.60S	10.29 psi	164.32 psi	0.06264	OK
+1.20D+1.60S+0.50W	6.37 psi	164.32 psi	0.03874	OK
+1.20D+1.60S-0.50W	14.22 psi	164.32 psi	0.08654	OK
+1.20D+0.50Lr+W	0.44 psi	164.32 psi	0.00269	OK
+1.20D+0.50Lr-W	15.27 psi	164.32 psi	0.09291	OK
+1.20D+0.50S+W	0.44 psi	164.32 psi	0.00269	OK
+1.20D+0.50S-W	15.27 psi	164.32 psi	0.09291	OK
+0.90D+W	3.28 psi	164.32 psi	0.01994	OK
+0.90D-W	12.43 psi	164.32 psi	0.07566	OK
+1.20D+0.20S+E	3.85 psi	164.32 psi	0.0234	OK
+1.20D+0.20S-E	17.10 psi	164.32 psi	0.1041	OK
+0.90D+E	5.90 psi	164.32 psi	0.03588	OK
+0.90D-E	15.05 psi	164.32 psi	0.09159	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

LIC# : KW-06016382, Build:20.23.08.30 AWB ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Gridline 5 Between P and K.2

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.10 : 1
Min. Sliding Safety Factor	=	1.10 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

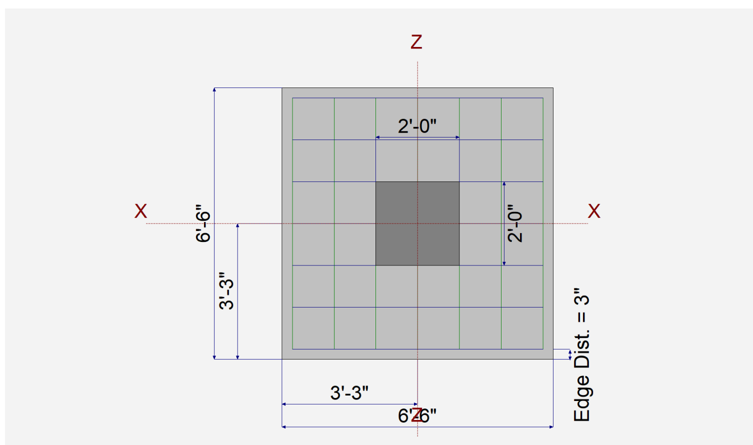
Footing base depth below soil surface	=	5.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

Width parallel to X-X Axis	=	6.50 ft
Length parallel to Z-Z Axis	=	6.50 ft
Footing Thickness	=	14.0 in



Pedestal dimensions...

px : parallel to X-X Axis	=	24.0 in
pz : parallel to Z-Z Axis	=	24.0 in
Height	=	48.0 in

Rebar Centerline to Edge of Concrete...

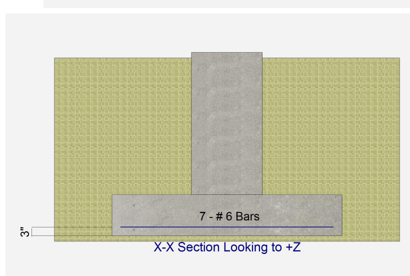
at Bottom of footing	=	3.0 in

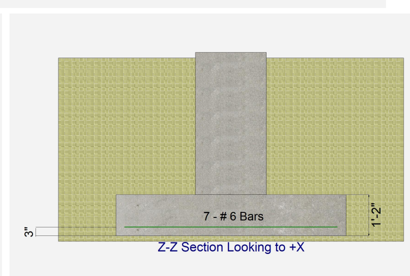
Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	7.0
Reinforcing Bar Size	=	# 6
Bars parallel to Z-Z Axis		
Number of Bars	=	7.0
Reinforcing Bar Size	=	# 6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	10.0	6.0		5.0	-2.0	-15.0		k
OB : Overburden	=	0.0							ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline 5 Between P and K.2

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.3282	Soil Bearing	0.9845 ksf	3.0 ksf	+D+Lr about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	2.034	Uplift	-10.50 k	21.358 k	+0.60D+0.70E
PASS	0.07669	Z Flexure (+X)	1.723 k-ft/ft	22.465 k-ft/ft	+1.20D+0.20S-E
PASS	0.07669	Z Flexure (-X)	1.723 k-ft/ft	22.465 k-ft/ft	+1.20D+0.20S-E
PASS	0.07669	X Flexure (+Z)	1.723 k-ft/ft	22.465 k-ft/ft	+1.20D+0.20S-E
PASS	0.07669	X Flexure (-Z)	1.723 k-ft/ft	22.465 k-ft/ft	+1.20D+0.20S-E
PASS	0.08568	1-way Shear (+X)	7.039 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.08568	1-way Shear (-X)	7.039 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.08568	1-way Shear (+Z)	7.039 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.08568	1-way Shear (-Z)	7.039 psi	82.158 psi	+1.20D+0.20S-E
PASS	0.09165	2-way Punching	15.060 psi	164.317 psi	+1.20D+0.20S-E

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	3.0	n/a	0.0	0.8425	0.8425	n/a	n/a	0.281
X-X, +D+Lr	3.0	n/a	0.0	0.9845	0.9845	n/a	n/a	0.328
X-X, +D+S	3.0	n/a	0.0	0.9609	0.9609	n/a	n/a	0.320
X-X, +D+0.750Lr	3.0	n/a	0.0	0.9490	0.9490	n/a	n/a	0.316
X-X, +D+0.750S	3.0	n/a	0.0	0.9313	0.9313	n/a	n/a	0.310
X-X, +D+0.60W	3.0	n/a	0.0	0.8141	0.8141	n/a	n/a	0.271
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	0.9277	0.9277	n/a	n/a	0.309
X-X, +D+0.750S+0.450W	3.0	n/a	0.0	0.910	0.910	n/a	n/a	0.303
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.4771	0.4771	n/a	n/a	0.159
X-X, +D+0.70E	3.0	n/a	0.0	0.5940	0.5940	n/a	n/a	0.198
X-X, +D+0.750S+0.5250E	3.0	n/a	0.0	0.7449	0.7449	n/a	n/a	0.248
X-X, +0.60D+0.70E	3.0	n/a	0.0	0.2570	0.2570	n/a	n/a	0.086
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	0.8425	0.8425	0.281
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	0.9845	0.9845	0.328
Z-Z, +D+S	3.0	0.0	n/a	n/a	n/a	0.9609	0.9609	0.320
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	0.9490	0.9490	0.316
Z-Z, +D+0.750S	3.0	0.0	n/a	n/a	n/a	0.9313	0.9313	0.310
Z-Z, +D+0.60W	3.0	0.0	n/a	n/a	n/a	0.8141	0.8141	0.271
Z-Z, +D+0.750Lr+0.450W	3.0	0.0	n/a	n/a	n/a	0.9277	0.9277	0.309
Z-Z, +D+0.750S+0.450W	3.0	0.0	n/a	n/a	n/a	0.910	0.910	0.303
Z-Z, +0.60D+0.60W	3.0	0.0	n/a	n/a	n/a	0.4771	0.4771	0.159
Z-Z, +D+0.70E	3.0	0.0	n/a	n/a	n/a	0.5940	0.5940	0.198
Z-Z, +D+0.750S+0.5250E	3.0	0.0	n/a	n/a	n/a	0.7449	0.7449	0.248
Z-Z, +0.60D+0.70E	3.0	0.0	n/a	n/a	n/a	0.2570	0.2570	0.086

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

General Footing

DESCRIPTION: Gridline 5 Between P and K.2

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.8918	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.40D	0.8918	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr	0.9441	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr	0.9441	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S	0.9141	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S	0.9141	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr	1.339	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr	1.339	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr+0.50W	1.280	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr+0.50W	1.280	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr-0.50W	1.399	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60Lr-0.50W	1.399	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S	1.244	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S	1.244	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S+0.50W	1.184	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S+0.50W	1.184	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S-0.50W	1.304	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+1.60S-0.50W	1.304	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr+W	0.8243	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr+W	0.8243	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr-W	1.064	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50Lr-W	1.064	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S+W	0.7943	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S+W	0.7943	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S-W	1.034	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.50S-W	1.034	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+W	0.4535	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+W	0.4535	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-W	0.6931	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-W	0.6931	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S+E	0.07428	+Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S+E	0.07428	-Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S-E	1.723	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +1.20D+0.20S-E	1.723	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+E	0.3253	+Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D+E	0.3253	-Z	Top	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-E	1.472	+Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
X-X, +0.90D-E	1.472	-Z	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.40D	0.8918	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.40D	0.8918	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr	0.9441	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr	0.9441	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S	0.9141	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S	0.9141	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr	1.339	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr	1.339	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr+0.50W	1.280	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr+0.50W	1.280	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr-0.50W	1.399	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60Lr-0.50W	1.399	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S	1.244	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S	1.244	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S+0.50W	1.184	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S+0.50W	1.184	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S-0.50W	1.304	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+1.60S-0.50W	1.304	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr+W	0.8243	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr+W	0.8243	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr-W	1.064	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50Lr-W	1.064	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S+W	0.7943	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S+W	0.7943	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.50S-W	1.034	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK

General Footing

Project File: 221205 - costal pacific distribution facility.ec6

DESCRIPTION: Gridline 5 Between P and K.2

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+0.50S-W	1.034	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+W	0.4535	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+W	0.4535	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-W	0.6931	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-W	0.6931	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S+E	0.07428	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S+E	0.07428	+X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S-E	1.723	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +1.20D+0.20S-E	1.723	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+E	0.3253	-X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D+E	0.3253	+X	Top	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-E	1.472	-X	Bottom	0.3024	AsMin	0.4738	22.465	OK
Z-Z, +0.90D-E	1.472	+X	Bottom	0.3024	AsMin	0.4738	22.465	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	3.64 psi	3.64 psi	3.64 psi	3.64 psi	3.64 psi	82.16 psi	0.04	OK
+1.20D+0.50Lr	3.86 psi	3.86 psi	3.86 psi	3.86 psi	3.86 psi	82.16 psi	0.05	OK
+1.20D+0.50S	3.74 psi	3.74 psi	3.74 psi	3.74 psi	3.74 psi	82.16 psi	0.05	OK
+1.20D+1.60Lr	5.47 psi	5.47 psi	5.47 psi	5.47 psi	5.47 psi	82.16 psi	0.07	OK
+1.20D+1.60Lr+0.50W	5.23 psi	5.23 psi	5.23 psi	5.23 psi	5.23 psi	82.16 psi	0.06	OK
+1.20D+1.60Lr-0.50W	5.72 psi	5.72 psi	5.72 psi	5.72 psi	5.72 psi	82.16 psi	0.07	OK
+1.20D+1.60S	5.08 psi	5.08 psi	5.08 psi	5.08 psi	5.08 psi	82.16 psi	0.06	OK
+1.20D+1.60S+0.50W	4.84 psi	4.84 psi	4.84 psi	4.84 psi	4.84 psi	82.16 psi	0.06	OK
+1.20D+1.60S-0.50W	5.33 psi	5.33 psi	5.33 psi	5.33 psi	5.33 psi	82.16 psi	0.06	OK
+1.20D+0.50Lr+W	3.37 psi	3.37 psi	3.37 psi	3.37 psi	3.37 psi	82.16 psi	0.04	OK
+1.20D+0.50Lr-W	4.35 psi	4.35 psi	4.35 psi	4.35 psi	4.35 psi	82.16 psi	0.05	OK
+1.20D+0.50S+W	3.25 psi	3.25 psi	3.25 psi	3.25 psi	3.25 psi	82.16 psi	0.04	OK
+1.20D+0.50S-W	4.22 psi	4.22 psi	4.22 psi	4.22 psi	4.22 psi	82.16 psi	0.05	OK
+0.90D+W	1.85 psi	1.85 psi	1.85 psi	1.85 psi	1.85 psi	82.16 psi	0.02	OK
+0.90D-W	2.83 psi	2.83 psi	2.83 psi	2.83 psi	2.83 psi	82.16 psi	0.03	OK
+1.20D+0.20S+E	0.30 psi	0.30 psi	0.30 psi	0.30 psi	0.30 psi	82.16 psi	0.00	OK
+1.20D+0.20S-E	7.04 psi	7.04 psi	7.04 psi	7.04 psi	7.04 psi	82.16 psi	0.09	OK
+0.90D+E	1.33 psi	1.33 psi	1.33 psi	1.33 psi	1.33 psi	82.16 psi	0.02	OK
+0.90D-E	6.01 psi	6.01 psi	6.01 psi	6.01 psi	6.01 psi	82.16 psi	0.07	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	7.80 psi	164.32 psi	0.04744	OK
+1.20D+0.50Lr	8.25 psi	164.32 psi	0.05022	OK
+1.20D+0.50S	7.99 psi	164.32 psi	0.04863	OK
+1.20D+1.60Lr	11.71 psi	164.32 psi	0.07126	OK
+1.20D+1.60Lr+0.50W	11.19 psi	164.32 psi	0.06807	OK
+1.20D+1.60Lr-0.50W	12.23 psi	164.32 psi	0.07444	OK
+1.20D+1.60S	10.87 psi	164.32 psi	0.06616	OK
+1.20D+1.60S+0.50W	10.35 psi	164.32 psi	0.06297	OK
+1.20D+1.60S-0.50W	11.39 psi	164.32 psi	0.06934	OK
+1.20D+0.50Lr+W	7.21 psi	164.32 psi	0.04385	OK
+1.20D+0.50Lr-W	9.30 psi	164.32 psi	0.0566	OK
+1.20D+0.50S+W	6.94 psi	164.32 psi	0.04226	OK
+1.20D+0.50S-W	9.04 psi	164.32 psi	0.055	OK
+0.90D+W	3.96 psi	164.32 psi	0.02412	OK
+0.90D-W	6.06 psi	164.32 psi	0.03687	OK
+1.20D+0.20S+E	0.65 psi	164.32 psi	0.003952	OK
+1.20D+0.20S-E	15.06 psi	164.32 psi	0.09165	OK
+0.90D+E	2.84 psi	164.32 psi	0.0173	OK
+0.90D-E	12.87 psi	164.32 psi	0.0783	OK