



INGLEWOOD MAIN LIBRARY AND INNOVATION CENTER RENOVATION PROJECT

Tenant Improvement and
Interior Renovation
Structural Calculations



EXP. 06/30/25

LPA JOB # 31312

KPFF JOB # 10012300277

April 28, 2025

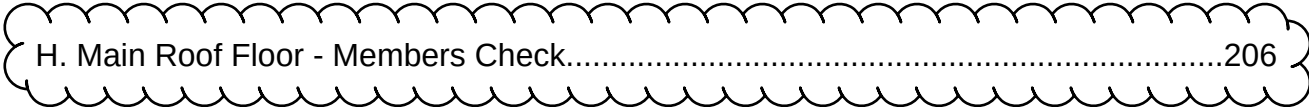


Structural Calculations for City of
Inglewood - Main Library Renovation
100% Construction Documents

February 17, 2025
KPFF Job No. 10012300277

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project:	Inglewood Library Renovation	sheet no.:	1
location:	Inglewood, CA	job no.:	10012300277
client:		date:	02/14/2025

Executive Summary:

This document provide supplemental calculations corresponding to the design of various structural elements that are part of the Renovation project for the Inglewood Main Library. Elements analyzed and designed as part of this report are not part of the primary Lateral Force Resisting System of the building. The seismic upgrade scope was completed as part of a previously reviewed and approved design package.

The previously approved seismic retrofit was designed in accordance with ASCE41-17 and ACI 318 as referenced by both the 2022 CBC and the 2022 CEBC. Additionally, the documented seismic retrofit does not degrade the structures performance or introduce new irregularities.

The following codes where used for the design of the Renovation scope:

- 2022 California Building Code
- ASCE 7-16 – Minimum Design Loads for Buildings and Other Structures
- ACI 318-14 – Building Code Requirements for Structural Concrete
- AISC 360-16 – Specification for Structural Steel Buildings
- AISC 341-16 – Seismic Provisions for Structural Steel Buildings
- Geotechnical Report dated October 30, 2024 by Group Delta Consultants, Inc.



project: Inglewood Library Renovation

sheet no.:

2

location: Inglewood, CA

job no.: 10012300277

client:

date: 02/15/2025

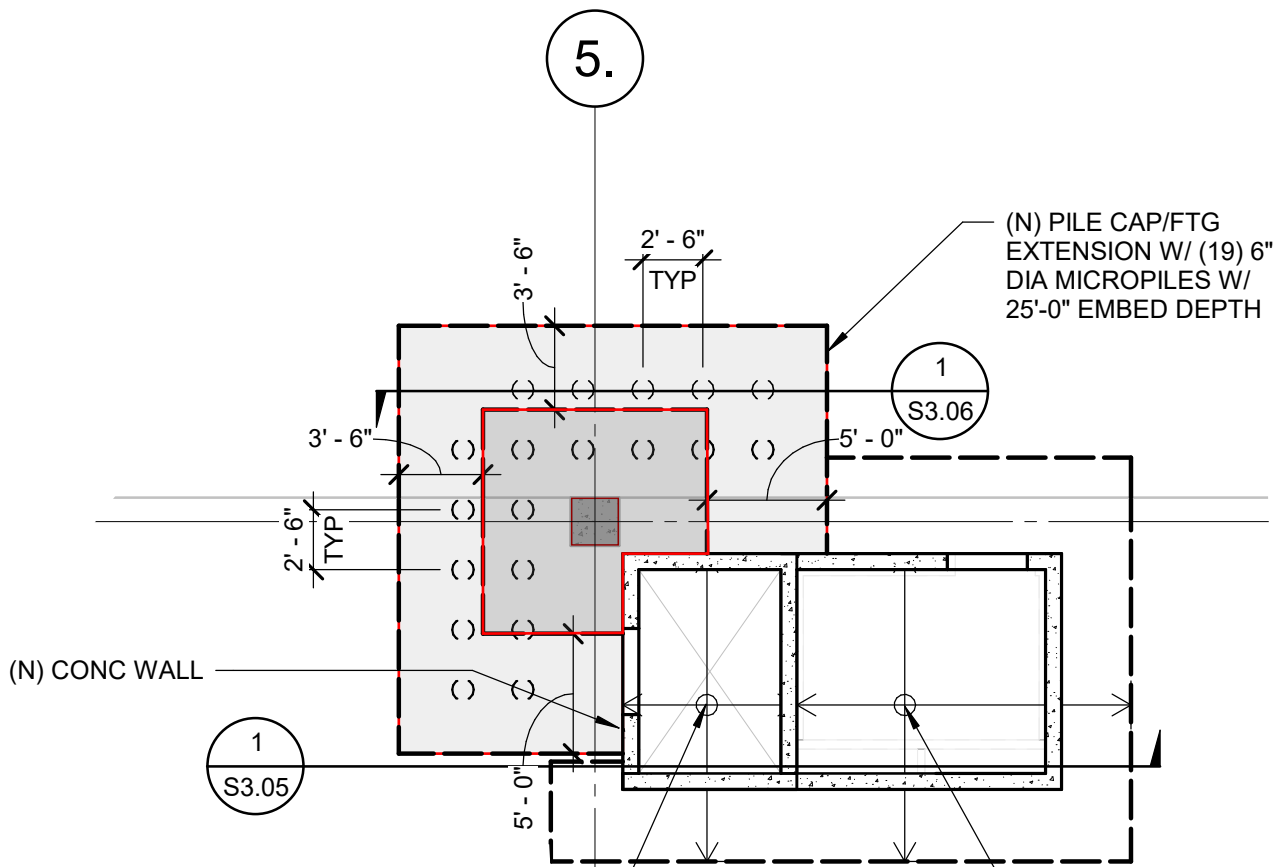
A. Existing Footing Retrofit (Micropiles)

Summary:

As a consequence of building a new elevator structure near Grid 5-A, the (e) gravity column will get one corner of it's footing removed, therefore a retrofit design was made for the new support condition. The design consists of adding 19 micro piles and widen the footing area to approximate 3.5ft around and the addition of tension reinforcement due to the eccentricity of the gravity load. See following calculations for retrofit and micro piles capacity design justification.

The following codes where used for the design:

- 2022 California Building Code.
- AISC 360-16
- ASCE 7-16
- ACI 318-14



Footing Loading Criteria

4

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Project : COIL
Job no. : 10012300277
Date : 2/17/2025
By : MO

Gravity Load to (E) footing

Columns	A (ft2)	L (ft)	LWC (PCF)	WT (kip)
C24x24	4	11	115	5.06
CL8x8.25x2	28.5	40	115	131.1
Footing	85.5	3.33	0	0
			Total (kip)	136.16

Load	A(ft2)	DL (PSF)	DL WT (kip)	LL(PSF)	LL WT (kip)
2nd Level (1)	370	106.75	39.5	100	37.0
2nd Level (2)	434	88.3	38.3	86.67	37.6
Roof Level	605	91.4	55.3	46.25	28.0
		Total (kip)	133.1		102.6

Parameter	Ultimate Factor	Total DL (kip)	269.3
Bearing Value	3.0	Total LL (kip)	102.6
Coefficient of Friction	1.5		
Passive Pressure	1.5		

Micropile Design Allowable Capacity

5.8.2 Micropiles

The following recommendations for pressure-grouted micropiles can be used:

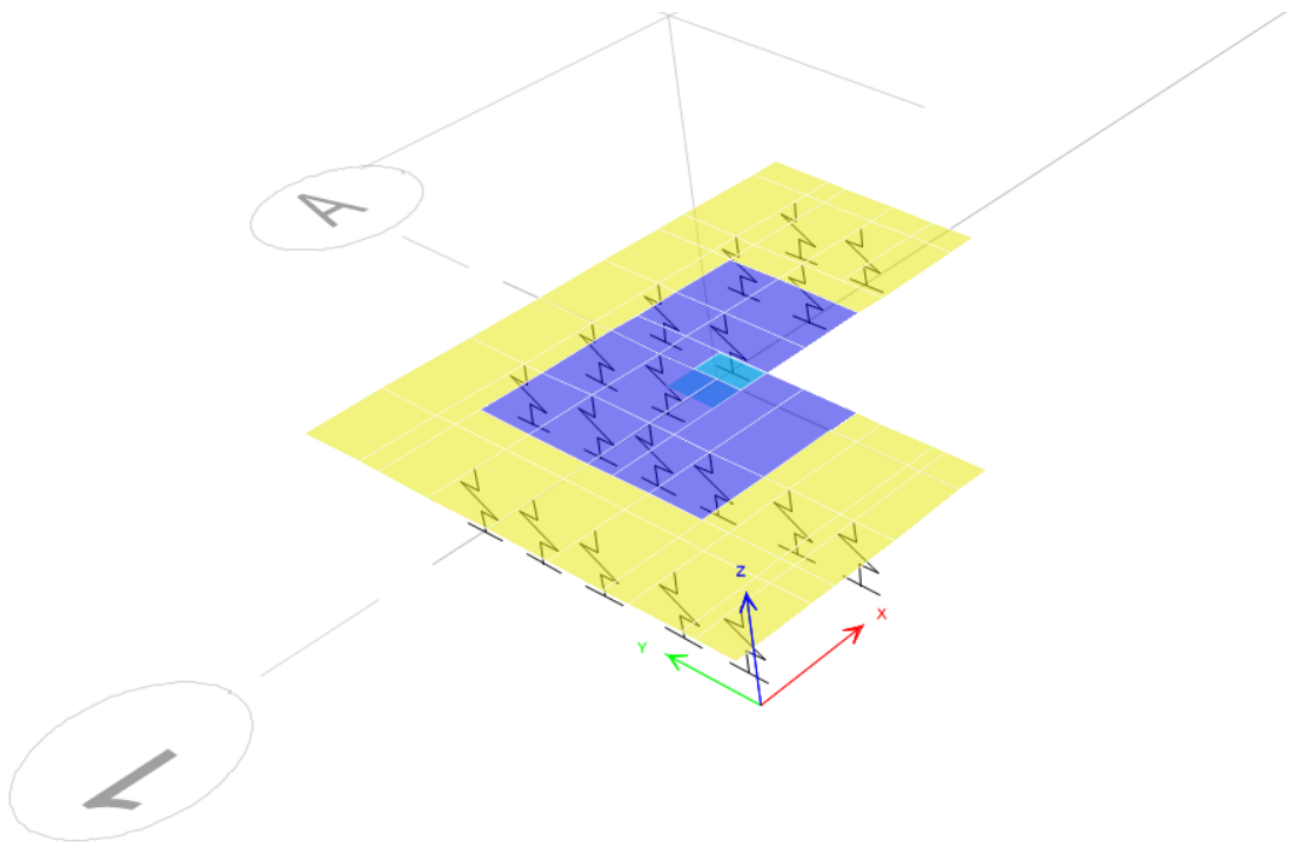
- A single pressure-grouted micropile can use an allowable axial compressive capacity shown in the table below. These values have a minimum factor of safety of 2 for side friction.
- Micropiles should have a minimum design length of 10 feet, but also have tip elevations below the adjacent subgrade elevation for the elevator pit. An additional allowable axial capacity is provided per foot of additional length beyond 10 feet.
- Piles should be installed with a minimum of 30 inches or 3 pile diameters center-to-center spacing (whichever is greater) to use the full axial capacity without reduction.
- The allowable uplift capacity may be taken as 70-percent of the allowable axial capacities provided in the table below.
- Micropiles designed in accordance with these recommendations are anticipated to have minimal settlements under static loading.
- Lateral capacities may be provided, as needed.

PRELIMINARY ALLOWABLE MICROPILE AXIAL CAPACITIES		
Micropile Diameter (inches)	Allowable Axial Capacity (kips) ¹	Allowable Axial Capacity Per Additional Foot of Length (kips/ft)
6	16	1.5
8	21	2
10	26	2.5

Note 1: Allowable axial capacity provided is for 10-foot length.

Micropile Allowable Capacity

Type	Diam (in)	A (in2)	f'c (psi)	E (ksi)	L (ft)	k (kip/in)	Pn (kip)
6" pile	6	28.27	5000	4030.5	25	379.9	38.50
8" pile	8	50.27	5000	4030.5	10	1688.3	21.00
10" pile	10	78.54	5000	4030.5	14	1884.3	36.00



Footing Retrofit Design Grid 5-A

Model File: footing, Revision 0
2/17/2025

1 Structure Data

This chapter provides model geometry information, including items such as story levels, point coordinates, and element connectivity.

1.1 Mass

Table 1.2 - Mass Summary by Group

Group	Self Mass lb-s2/ft	Self Weight kip	Mass X lb-s2/ft	Mass Y lb-s2/ft	Mass Z lb-s2/ft
All	3800.02	0	3800.02	3800.02	3800.02

2 Properties

This chapter provides property information for materials, frame sections, shell sections, and links.

2.1 Materials

Table 2.1 - Material Properties - General

Material	Type	SymType	Grade	Color	Notes
4000Psi	Concrete	Isotropic	f'c 4000 psi	Gray8Dark	
A416Gr270	Tendon	Uniaxial	Grade 270	Red	
A615Gr60	Rebar	Uniaxial	Grade 60	Green	

2.2 Shell Sections

Table 2.2 - Area Section Property Definitions - Summary

Name	Type	Element Type	Material	Total Thickness in	Deck Material	Deck Depth in
Ftg 1	Slab	Shell-Thin	4000Psi	42		
Ftg 2	Slab	Shell-Thin	4000Psi	42		
Stiff1	Slab	Shell-Thin	4000Psi	24		

2.3 Reinforcement Sizes

Table 2.3 - Reinforcing Bar Sizes

Name	Diameter in	Area in2
#4	0.5	0.2
#9	1.128	1
#10	1.27	1.27

2.4 Spring Properties

Table 2.4 - Spring Property Definitions - Point Springs

Name	Stiffness UX kip/in	Stiffness UY kip/in	Stiffness UZ kip/in	Stiffness RX kip-in/rad	Stiffness RY kip-in/rad	Stiffness RZ kip-in/rad	Nonlinear Option	Color	Notes
P6" - L=25ft	0	0	379.9	0	0	0	None (Linear)	Red	Added 7/12/2024 12:51:31 PM

4 Loads

This chapter provides loading information as applied to the model.

4.1 Load Patterns

Table 4.1 - Load Pattern Definitions

Name	Is Auto Load	Type	Self Weight Multiplier
~LLRF	No	Other	0
Dead	No	Dead	1
Live	No	Live	0

4.2 Applied Loads

4.2.1 Point Loads

Table 4.2 - Joint Loads Assignments - Force

UniqueName	Load Pattern	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft	X Dimension in	Y Dimension in
271	Dead	0	0	-270	0	0	0	0	0
271	Live	0	0	-103	0	0	0	0	0

4.3 Load Cases

Table 4.4 - Load Case Definitions - Summary

Name	Type
Dead	Linear Static
Live	Linear Static
Comb1: 1.0D-NL	Nonlinear Static
Comb2: 1.0D+1.0L-NL	Nonlinear Static

4.4 Load Combinations

Table 4.5 - Load Combination Definitions

Name	Type	Is Auto	Load Name	SF	Notes
Comb1: 1.0D	Linear Add	No	Comb1: 1.0D-NL	1	Dead [Strength]
Comb2: 1.0D+1.0L	Linear Add	No	Comb2: 1.0D+1.0L-NL	1	Dead + Live [Strength]
Comb3: 1.1 (1.0D+0.25L)	Linear Add	No	Dead	1.1	
Comb3: 1.1 (1.0D+0.25L)			Live	0.275	

5 Analysis Results

This chapter provides analysis results.

5.1 Structure Results

Table 5.1 - Base Reactions

Output Case	Case Type	Step Type	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft	X ft	Y ft	Z ft
Dead	LinStatic		0	0	392.262	73.9566	73.9566	0	0	0	12
Live	LinStatic		0	0	103	0	0	0	0	0	12
Comb1: 1.0D-NL	NonStatic	Max	0	0	392.262	73.9566	73.9566	0	0	0	12
Comb1: 1.0D-NL	NonStatic	Min	0	0	392.262	73.9566	73.9566	0	0	0	12
Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	495.262	73.9566	73.9566	0	0	0	12
Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	495.262	73.9566	73.9566	0	0	0	12
Comb1: 1.0D	Combination		0	0	392.262	73.9566	73.9566	0	0	0	12
Comb2: 1.0D+1.0L	Combination		0	0	495.262	73.9566	73.9566	0	0	0	12
Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	459.813	81.3523	81.3523	0	0	0	12

5.2 Point Results

Table 5.2 - Joint Reactions

Unique Name	Output Case	Case Type	Step Type	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft
296	Dead	LinStatic		0	0	20.693	0	0	0
296	Live	LinStatic		0	0	5.422	0	0	0
296	Comb1: 1.0D-NL	NonStatic	Max	0	0	20.693	0	0	0
296	Comb1: 1.0D-NL	NonStatic	Min	0	0	20.693	0	0	0
296	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	26.116	0	0	0
296	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	26.116	0	0	0
296	Comb1: 1.0D	Combination		0	0	20.693	0	0	0
296	Comb2: 1.0D+1.0L	Combination		0	0	26.116	0	0	0
296	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	24.254	0	0	0
297	Dead	LinStatic		0	0	16.394	0	0	0
297	Live	LinStatic		0	0	3.788	0	0	0
297	Comb1: 1.0D-NL	NonStatic	Max	0	0	16.394	0	0	0
297	Comb1: 1.0D-NL	NonStatic	Min	0	0	16.394	0	0	0
297	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	20.182	0	0	0
297	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	20.182	0	0	0
297	Comb1: 1.0D	Combination		0	0	16.394	0	0	0
297	Comb2: 1.0D+1.0L	Combination		0	0	20.182	0	0	0
297	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	19.075	0	0	0
298	Dead	LinStatic		0	0	0	0	0	0
298	Live	LinStatic		0	0	0	0	0	0
298	Comb1: 1.0D-NL	NonStatic	Max	0	0	0	0	0	0
298	Comb1: 1.0D-NL	NonStatic	Min	0	0	0	0	0	0
298	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	0	0	0	0
298	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	0	0	0	0
298	Comb1: 1.0D	Combination		0	0	0	0	0	0

Table 5.2 - Joint Reactions (continued)

Unique Name	Output Case	Case Type	Step Type	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft
298	Comb2: 1.0D+1.0L	Combination		0	0	0	0	0	0
298	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	0	0	0	0
299	Dead	LinStatic		0	0	23.471	0	0	0
299	Live	LinStatic		0	0	6.431	0	0	0
299	Comb1: 1.0D-NL	NonStatic	Max	0	0	23.471	0	0	0
299	Comb1: 1.0D-NL	NonStatic	Min	0	0	23.471	0	0	0
299	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	29.902	0	0	0
299	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	29.902	0	0	0
299	Comb1: 1.0D	Combination		0	0	23.471	0	0	0
299	Comb2: 1.0D+1.0L	Combination		0	0	29.902	0	0	0
299	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	27.587	0	0	0
300	Dead	LinStatic		0	0	18.908	0	0	0
300	Live	LinStatic		0	0	4.708	0	0	0
300	Comb1: 1.0D-NL	NonStatic	Max	0	0	18.908	0	0	0
300	Comb1: 1.0D-NL	NonStatic	Min	0	0	18.908	0	0	0
300	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	23.616	0	0	0
300	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	23.616	0	0	0
300	Comb1: 1.0D	Combination		0	0	18.908	0	0	0
300	Comb2: 1.0D+1.0L	Combination		0	0	23.616	0	0	0
300	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	22.093	0	0	0
301	Dead	LinStatic		0	0	0	0	0	0
301	Live	LinStatic		0	0	0	0	0	0
301	Comb1: 1.0D-NL	NonStatic	Max	0	0	0	0	0	0
301	Comb1: 1.0D-NL	NonStatic	Min	0	0	0	0	0	0
301	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	0	0	0	0
301	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	0	0	0	0
301	Comb1: 1.0D	Combination		0	0	0	0	0	0
301	Comb2: 1.0D+1.0L	Combination		0	0	0	0	0	0
301	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	0	0	0	0
302	Dead	LinStatic		0	0	17.462	0	0	0
302	Live	LinStatic		0	0	4.239	0	0	0
302	Comb1: 1.0D-NL	NonStatic	Max	0	0	17.462	0	0	0
302	Comb1: 1.0D-NL	NonStatic	Min	0	0	17.462	0	0	0
302	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	21.701	0	0	0
302	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	21.701	0	0	0
302	Comb1: 1.0D	Combination		0	0	17.462	0	0	0
302	Comb2: 1.0D+1.0L	Combination		0	0	21.701	0	0	0
302	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	20.373	0	0	0
303	Dead	LinStatic		0	0	13.508	0	0	0
303	Live	LinStatic		0	0	2.722	0	0	0
303	Comb1: 1.0D-NL	NonStatic	Max	0	0	13.508	0	0	0
303	Comb1: 1.0D-NL	NonStatic	Min	0	0	13.508	0	0	0
303	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	16.23	0	0	0
303	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	16.23	0	0	0
303	Comb1: 1.0D	Combination		0	0	13.508	0	0	0

Table 5.2 - Joint Reactions (continued)

Unique Name	Output Case	Case Type	Step Type	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft
303	Comb2: 1.0D+1.0L	Combination		0	0	16.23	0	0	0
303	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	15.607	0	0	0
304	Dead	LinStatic		0	0	0	0	0	0
304	Live	LinStatic		0	0	0	0	0	0
304	Comb1: 1.0D-NL	NonStatic	Max	0	0	0	0	0	0
304	Comb1: 1.0D-NL	NonStatic	Min	0	0	0	0	0	0
304	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	0	0	0	0
304	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	0	0	0	0
304	Comb1: 1.0D	Combination		0	0	0	0	0	0
304	Comb2: 1.0D+1.0L	Combination		0	0	0	0	0	0
304	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	0	0	0	0
305	Dead	LinStatic		0	0	0	0	0	0
305	Live	LinStatic		0	0	0	0	0	0
305	Comb1: 1.0D-NL	NonStatic	Max	0	0	0	0	0	0
305	Comb1: 1.0D-NL	NonStatic	Min	0	0	0	0	0	0
305	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	0	0	0	0
305	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	0	0	0	0
305	Comb1: 1.0D	Combination		0	0	0	0	0	0
305	Comb2: 1.0D+1.0L	Combination		0	0	0	0	0	0
305	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	0	0	0	0
306	Dead	LinStatic		0	0	0	0	0	0
306	Live	LinStatic		0	0	0	0	0	0
306	Comb1: 1.0D-NL	NonStatic	Max	0	0	0	0	0	0
306	Comb1: 1.0D-NL	NonStatic	Min	0	0	0	0	0	0
306	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	0	0	0	0
306	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	0	0	0	0
306	Comb1: 1.0D	Combination		0	0	0	0	0	0
306	Comb2: 1.0D+1.0L	Combination		0	0	0	0	0	0
306	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	0	0	0	0
307	Dead	LinStatic		0	0	0	0	0	0
307	Live	LinStatic		0	0	0	0	0	0
307	Comb1: 1.0D-NL	NonStatic	Max	0	0	0	0	0	0
307	Comb1: 1.0D-NL	NonStatic	Min	0	0	0	0	0	0
307	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	0	0	0	0
307	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	0	0	0	0
307	Comb1: 1.0D	Combination		0	0	0	0	0	0
307	Comb2: 1.0D+1.0L	Combination		0	0	0	0	0	0
307	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	0	0	0	0
308	Dead	LinStatic		0	0	0	0	0	0
308	Live	LinStatic		0	0	0	0	0	0
308	Comb1: 1.0D-NL	NonStatic	Max	0	0	0	0	0	0
308	Comb1: 1.0D-NL	NonStatic	Min	0	0	0	0	0	0
308	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	0	0	0	0
308	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	0	0	0	0
308	Comb1: 1.0D	Combination		0	0	0	0	0	0

Table 5.2 - Joint Reactions (continued)

Unique Name	Output Case	Case Type	Step Type	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft
308	Comb2: 1.0D+1.0L	Combination		0	0	0	0	0	0
308	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	0	0	0	0
309	Dead	LinStatic		0	0	0	0	0	0
309	Live	LinStatic		0	0	0	0	0	0
309	Comb1: 1.0D-NL	NonStatic	Max	0	0	0	0	0	0
309	Comb1: 1.0D-NL	NonStatic	Min	0	0	0	0	0	0
309	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	0	0	0	0
309	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	0	0	0	0
309	Comb1: 1.0D	Combination		0	0	0	0	0	0
309	Comb2: 1.0D+1.0L	Combination		0	0	0	0	0	0
309	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	0	0	0	0
310	Dead	LinStatic		0	0	0	0	0	0
310	Live	LinStatic		0	0	0	0	0	0
310	Comb1: 1.0D-NL	NonStatic	Max	0	0	0	0	0	0
310	Comb1: 1.0D-NL	NonStatic	Min	0	0	0	0	0	0
310	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	0	0	0	0
310	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	0	0	0	0
310	Comb1: 1.0D	Combination		0	0	0	0	0	0
310	Comb2: 1.0D+1.0L	Combination		0	0	0	0	0	0
310	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	0	0	0	0
311	Dead	LinStatic		0	0	20.607	0	0	0
311	Live	LinStatic		0	0	5.434	0	0	0
311	Comb1: 1.0D-NL	NonStatic	Max	0	0	20.607	0	0	0
311	Comb1: 1.0D-NL	NonStatic	Min	0	0	20.607	0	0	0
311	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	26.041	0	0	0
311	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	26.041	0	0	0
311	Comb1: 1.0D	Combination		0	0	20.607	0	0	0
311	Comb2: 1.0D+1.0L	Combination		0	0	26.041	0	0	0
311	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	24.162	0	0	0
312	Dead	LinStatic		0	0	0	0	0	0
312	Live	LinStatic		0	0	0	0	0	0
312	Comb1: 1.0D-NL	NonStatic	Max	0	0	0	0	0	0
312	Comb1: 1.0D-NL	NonStatic	Min	0	0	0	0	0	0
312	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	0	0	0	0
312	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	0	0	0	0
312	Comb1: 1.0D	Combination		0	0	0	0	0	0
312	Comb2: 1.0D+1.0L	Combination		0	0	0	0	0	0
312	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	0	0	0	0
313	Dead	LinStatic		0	0	0	0	0	0
313	Live	LinStatic		0	0	0	0	0	0
313	Comb1: 1.0D-NL	NonStatic	Max	0	0	0	0	0	0
313	Comb1: 1.0D-NL	NonStatic	Min	0	0	0	0	0	0
313	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	0	0	0	0
313	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	0	0	0	0
313	Comb1: 1.0D	Combination		0	0	0	0	0	0

Table 5.2 - Joint Reactions (continued)

Unique Name	Output Case	Case Type	Step Type	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft
313	Comb2: 1.0D+1.0L	Combination		0	0	0	0	0	0
313	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	0	0	0	0
314	Dead	LinStatic		0	0	23.328	0	0	0
314	Live	LinStatic		0	0	6.46	0	0	0
314	Comb1: 1.0D-NL	NonStatic	Max	0	0	23.328	0	0	0
314	Comb1: 1.0D-NL	NonStatic	Min	0	0	23.328	0	0	0
314	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	29.788	0	0	0
314	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	29.788	0	0	0
314	Comb1: 1.0D	Combination		0	0	23.328	0	0	0
314	Comb2: 1.0D+1.0L	Combination		0	0	29.788	0	0	0
314	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	27.437	0	0	0
315	Dead	LinStatic		0	0	0	0	0	0
315	Live	LinStatic		0	0	0	0	0	0
315	Comb1: 1.0D-NL	NonStatic	Max	0	0	0	0	0	0
315	Comb1: 1.0D-NL	NonStatic	Min	0	0	0	0	0	0
315	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	0	0	0	0
315	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	0	0	0	0
315	Comb1: 1.0D	Combination		0	0	0	0	0	0
315	Comb2: 1.0D+1.0L	Combination		0	0	0	0	0	0
315	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	0	0	0	0
316	Dead	LinStatic		0	0	0	0	0	0
316	Live	LinStatic		0	0	0	0	0	0
316	Comb1: 1.0D-NL	NonStatic	Max	0	0	0	0	0	0
316	Comb1: 1.0D-NL	NonStatic	Min	0	0	0	0	0	0
316	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	0	0	0	0
316	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	0	0	0	0
316	Comb1: 1.0D	Combination		0	0	0	0	0	0
316	Comb2: 1.0D+1.0L	Combination		0	0	0	0	0	0
316	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	0	0	0	0
385	Dead	LinStatic		0	0	21.566	0	0	0
385	Live	LinStatic		0	0	5.672	0	0	0
385	Comb1: 1.0D-NL	NonStatic	Max	0	0	21.566	0	0	0
385	Comb1: 1.0D-NL	NonStatic	Min	0	0	21.566	0	0	0
385	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	27.239	0	0	0
385	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	27.239	0	0	0
385	Comb1: 1.0D	Combination		0	0	21.566	0	0	0
385	Comb2: 1.0D+1.0L	Combination		0	0	27.239	0	0	0
385	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	25.283	0	0	0
404	Dead	LinStatic		0	0	26.206	0	0	0
404	Live	LinStatic		0	0	7.416	0	0	0
404	Comb1: 1.0D-NL	NonStatic	Max	0	0	26.206	0	0	0
404	Comb1: 1.0D-NL	NonStatic	Min	0	0	26.206	0	0	0
404	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	33.622	0	0	0
404	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	33.622	0	0	0
404	Comb1: 1.0D	Combination		0	0	26.206	0	0	0

Table 5.2 - Joint Reactions (continued)

Unique Name	Output Case	Case Type	Step Type	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft
404	Comb2: 1.0D+1.0L	Combination		0	0	33.622	0	0	0
404	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	30.866	0	0	0
628	Dead	LinStatic		0	0	26.045	0	0	0
628	Live	LinStatic		0	0	7.478	0	0	0
628	Comb1: 1.0D-NL	NonStatic	Max	0	0	26.045	0	0	0
628	Comb1: 1.0D-NL	NonStatic	Min	0	0	26.045	0	0	0
628	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	33.523	0	0	0
628	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	33.523	0	0	0
628	Comb1: 1.0D	Combination		0	0	26.045	0	0	0
628	Comb2: 1.0D+1.0L	Combination		0	0	33.523	0	0	0
628	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	30.706	0	0	0
656	Dead	LinStatic		0	0	27.986	0	0	0
656	Live	LinStatic		0	0	8.202	0	0	0
656	Comb1: 1.0D-NL	NonStatic	Max	0	0	27.986	0	0	0
656	Comb1: 1.0D-NL	NonStatic	Min	0	0	27.986	0	0	0
656	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	36.187	0	0	0
656	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	36.187	0	0	0
656	Comb1: 1.0D	Combination		0	0	27.986	0	0	0
656	Comb2: 1.0D+1.0L	Combination		0	0	36.187	0	0	0
656	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	33.04	0	0	0
663	Dead	LinStatic		0	0	23.473	0	0	0
663	Live	LinStatic		0	0	6.359	0	0	0
663	Comb1: 1.0D-NL	NonStatic	Max	0	0	23.473	0	0	0
663	Comb1: 1.0D-NL	NonStatic	Min	0	0	23.473	0	0	0
663	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	29.832	0	0	0
663	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	29.832	0	0	0
663	Comb1: 1.0D	Combination		0	0	23.473	0	0	0
663	Comb2: 1.0D+1.0L	Combination		0	0	29.832	0	0	0
663	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	27.569	0	0	0
665	Dead	LinStatic		0	0	28.138	0	0	0
665	Live	LinStatic		0	0	8.108	0	0	0
665	Comb1: 1.0D-NL	NonStatic	Max	0	0	28.138	0	0	0
665	Comb1: 1.0D-NL	NonStatic	Min	0	0	28.138	0	0	0
665	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	36.246	0	0	0
665	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	36.246	0	0	0
665	Comb1: 1.0D	Combination		0	0	28.138	0	0	0
665	Comb2: 1.0D+1.0L	Combination		0	0	36.246	0	0	0
665	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	33.181	0	0	0
667	Dead	LinStatic		0	0	11.927	0	0	0
667	Live	LinStatic		0	0	2.203	0	0	0
667	Comb1: 1.0D-NL	NonStatic	Max	0	0	11.927	0	0	0
667	Comb1: 1.0D-NL	NonStatic	Min	0	0	11.927	0	0	0
667	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	14.13	0	0	0
667	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	14.13	0	0	0
667	Comb1: 1.0D	Combination		0	0	11.927	0	0	0

Table 5.2 - Joint Reactions (continued)

Unique Name	Output Case	Case Type	Step Type	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft
667	Comb2: 1.0D+1.0L	Combination		0	0	14.13	0	0	0
667	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	13.725	0	0	0
670	Dead	LinStatic		0	0	14.61	0	0	0
670	Live	LinStatic		0	0	3.243	0	0	0
670	Comb1: 1.0D-NL	NonStatic	Max	0	0	14.61	0	0	0
670	Comb1: 1.0D-NL	NonStatic	Min	0	0	14.61	0	0	0
670	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	17.853	0	0	0
670	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	17.853	0	0	0
670	Comb1: 1.0D	Combination		0	0	14.61	0	0	0
670	Comb2: 1.0D+1.0L	Combination		0	0	17.853	0	0	0
670	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	16.963	0	0	0
668	Dead	LinStatic		0	0	0	0	0	0
668	Live	LinStatic		0	0	0	0	0	0
668	Comb1: 1.0D-NL	NonStatic	Max	0	0	0	0	0	0
668	Comb1: 1.0D-NL	NonStatic	Min	0	0	0	0	0	0
668	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	0	0	0	0
668	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	0	0	0	0
668	Comb1: 1.0D	Combination		0	0	0	0	0	0
668	Comb2: 1.0D+1.0L	Combination		0	0	0	0	0	0
668	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	0	0	0	0
671	Dead	LinStatic		0	0	16.976	0	0	0
671	Live	LinStatic		0	0	4.151	0	0	0
671	Comb1: 1.0D-NL	NonStatic	Max	0	0	16.976	0	0	0
671	Comb1: 1.0D-NL	NonStatic	Min	0	0	16.976	0	0	0
671	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	21.127	0	0	0
671	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	21.127	0	0	0
671	Comb1: 1.0D	Combination		0	0	16.976	0	0	0
671	Comb2: 1.0D+1.0L	Combination		0	0	21.127	0	0	0
671	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	19.815	0	0	0
674	Dead	LinStatic		0	0	19.543	0	0	0
674	Live	LinStatic		0	0	5.128	0	0	0
674	Comb1: 1.0D-NL	NonStatic	Max	0	0	19.543	0	0	0
674	Comb1: 1.0D-NL	NonStatic	Min	0	0	19.543	0	0	0
674	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	24.671	0	0	0
674	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	24.671	0	0	0
674	Comb1: 1.0D	Combination		0	0	19.543	0	0	0
674	Comb2: 1.0D+1.0L	Combination		0	0	24.671	0	0	0
674	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	22.907	0	0	0
678	Dead	LinStatic		0	0	21.422	0	0	0
678	Live	LinStatic		0	0	5.836	0	0	0
678	Comb1: 1.0D-NL	NonStatic	Max	0	0	21.422	0	0	0
678	Comb1: 1.0D-NL	NonStatic	Min	0	0	21.422	0	0	0
678	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	0	27.258	0	0	0
678	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	0	27.258	0	0	0
678	Comb1: 1.0D	Combination		0	0	21.422	0	0	0

Table 5.2 - Joint Reactions (continued)

Unique Name	Output Case	Case Type	Step Type	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft
678	Comb2: 1.0D+1.0L	Combination		0	0	27.258	0	0	0
678	Comb3: 1.1 (1.0D+0.25L)	Combination		0	0	25.169	0	0	0

5.3 Strip Results**Table 5.3 - Strip Forces Summary**

Strip	Span ID	Location	Output Case	Case Type	Step Type	Abs Max P kip	Abs Max V2 kip	Abs Max T kip-ft	Max M3 kip-ft	Min M3 kip-ft
SA11	Cantilever Start	Start	Dead	LinStatic		0	-49.569	137.0352	102.8688	102.8688
SA11	Cantilever Start	Start	Live	LinStatic		0	-19.975	45.0566	37.4849	37.4849
SA11	Cantilever Start	Start	Comb1: 1.0D-NL	NonStatic	Max	0	-49.569	137.0352	102.8688	102.8688
SA11	Cantilever Start	Start	Comb1: 1.0D-NL	NonStatic	Min	0	-49.569	137.0352	102.8688	102.8688
SA11	Cantilever Start	Start	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	-69.545	182.0918	140.3537	140.3537
SA11	Cantilever Start	Start	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	-69.545	182.0918	140.3537	140.3537
SA11	Cantilever Start	Start	Comb1: 1.0D	Combination		0	-49.569	137.0352	102.8688	102.8688
SA11	Cantilever Start	Start	Comb2: 1.0D+1.0L	Combination		0	-69.545	182.0918	140.3537	140.3537
SA11	Cantilever Start	Start	Comb3: 1.1 (1.0D+0.25L)	Combination		0	-60.019	163.1293	123.464	123.464
SA11	Cantilever Start	Middle	Dead	LinStatic		0	-54.399	155.945	170.6193	135.0354
SA11	Cantilever Start	Middle	Live	LinStatic		0	-25.342	52.0259	66.5457	50.6516
SA11	Cantilever Start	Middle	Comb1: 1.0D-NL	NonStatic	Max	0	-54.399	155.945	170.6193	135.0354
SA11	Cantilever Start	Middle	Comb1: 1.0D-NL	NonStatic	Min	0	-54.399	155.945	170.6193	135.0354
SA11	Cantilever Start	Middle	Comb2: 1.0D+1.0L-NL	NonStatic	Max	0	-79.741	207.9709	237.1649	185.687
SA11	Cantilever Start	Middle	Comb2: 1.0D+1.0L-NL	NonStatic	Min	0	-79.741	207.9709	237.1649	185.687
SA11	Cantilever Start	Middle	Comb1: 1.0D	Combination		0	-54.399	155.945	170.6193	135.0354
SA11	Cantilever Start	Middle	Comb2: 1.0D+1.0L	Combination		0	-79.741	207.9709	237.1649	185.687
SA11	Cantilever Start	Middle	Comb3: 1.1 (1.0D+0.25L)	Combination		0	-66.808	185.8466	205.9813	162.4681
SA11	Cantilever Start	End	Dead	LinStatic		0	-54.399	160.2525	205.9798	205.9798
SA11	Cantilever Start	End	Live	LinStatic		0	-25.342	53.6543	83.211	83.211

6 Design Data

This chapter provides design data and results.

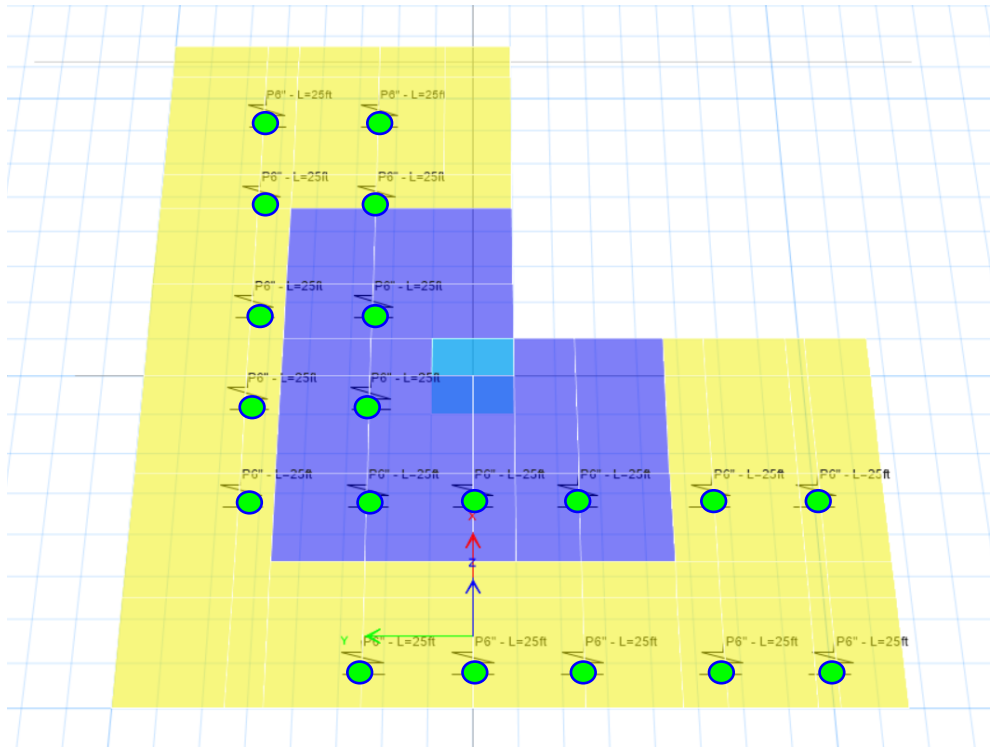
6.1 Concrete Slab Design

Table 6.1 - Concrete Design Preferences - ACI 318-19

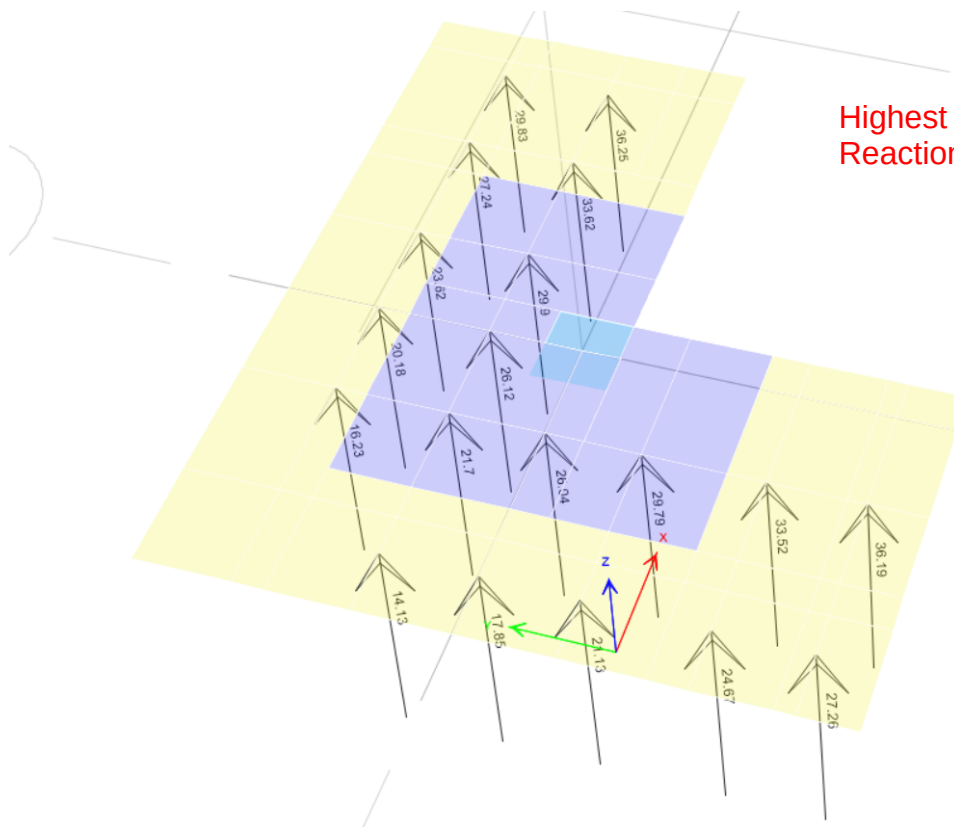
Item	Value
PhiTen	0.9
PhiComp	0.65
PhiShear	0.75
Increase Flexural Rebar?	No
Overwrite Shear Lambdas to One for Mats and Footings?	Yes
Ignore Pu?	Yes
Pattern Live Load Factor	0.75
CoverTop in	2
CoverBot in	3
BarSize	#10
InnerLayer	Layer B
PTCGSTop in	1
PTCGSBotExt in	1.75
PTCGSBotInt in	1
SlabType	Two Way
Cover Beam Top in	1.5
Cover Beam Bottom in	1.5
Bar Size Beam Flexure	#9
Bar Size Beam Shear	#4
PTCGS Beam Top in	2
PTCGS Beam Bottom in	2
UserStress	No
InitConcRat	0.8
LLFraction	0.5

Table 6.2 - Concrete Slab Design Overwrites - Strip Based

Strip Name	Strip Layer	Strip Design Type	Design?	Ignore PT?	Rebar Material	Cover Specification Type	LLRF
SA11	A	Column Strip	Yes	No	A615Gr60	From Preferences	1
SA12	A	Column Strip	Yes	No	A615Gr60	From Preferences	1
SB4	B	Column Strip	Yes	No	A615Gr60	From Preferences	1
CSA1	B	Column Strip	Yes	No	A615Gr60	From Preferences	1
CSA2	A	Column Strip	Yes	No	A615Gr60	From Preferences	1



Plan Distribution for 19 (N)
Micro piles with 6" diameter
and 25.0 ft embed length

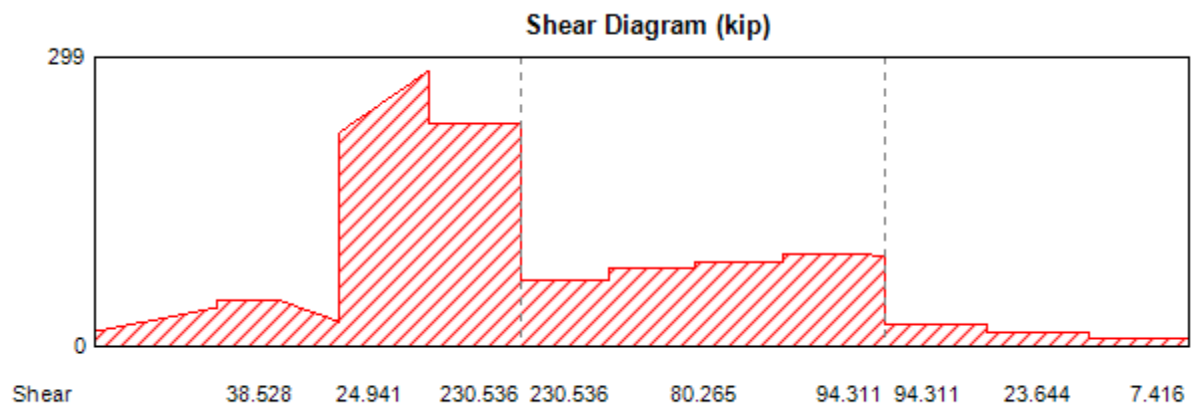
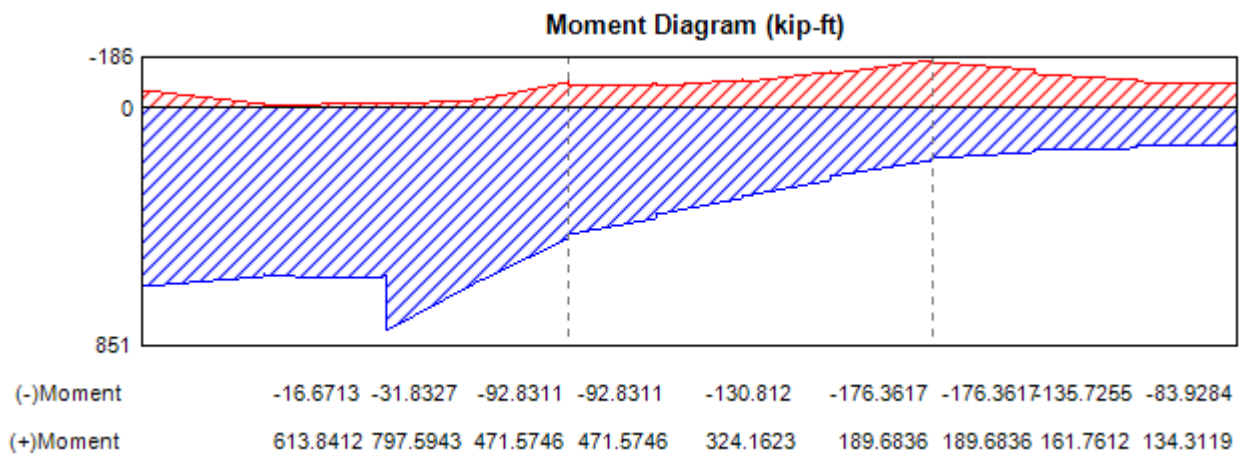
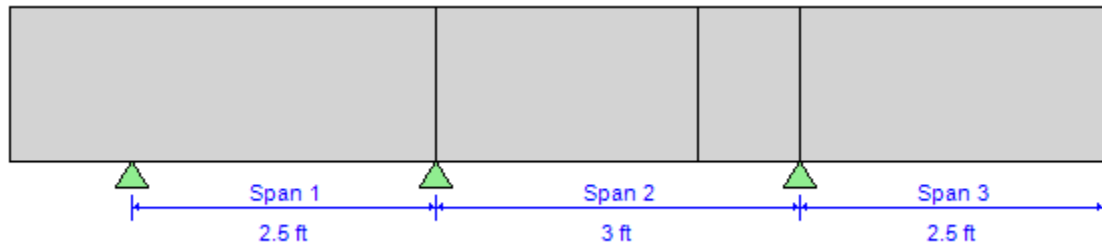


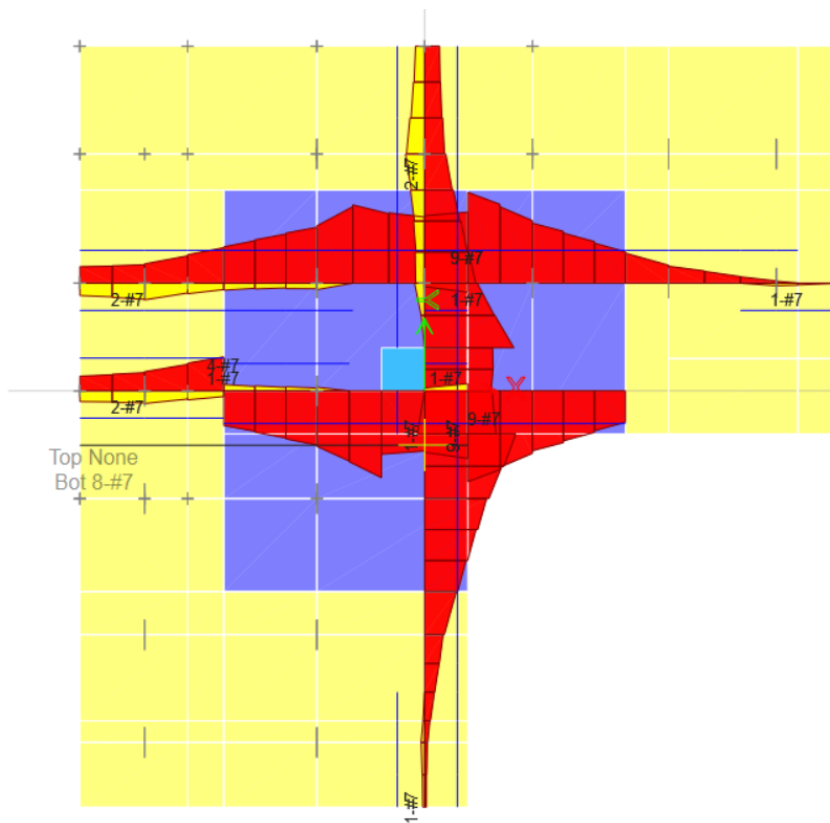
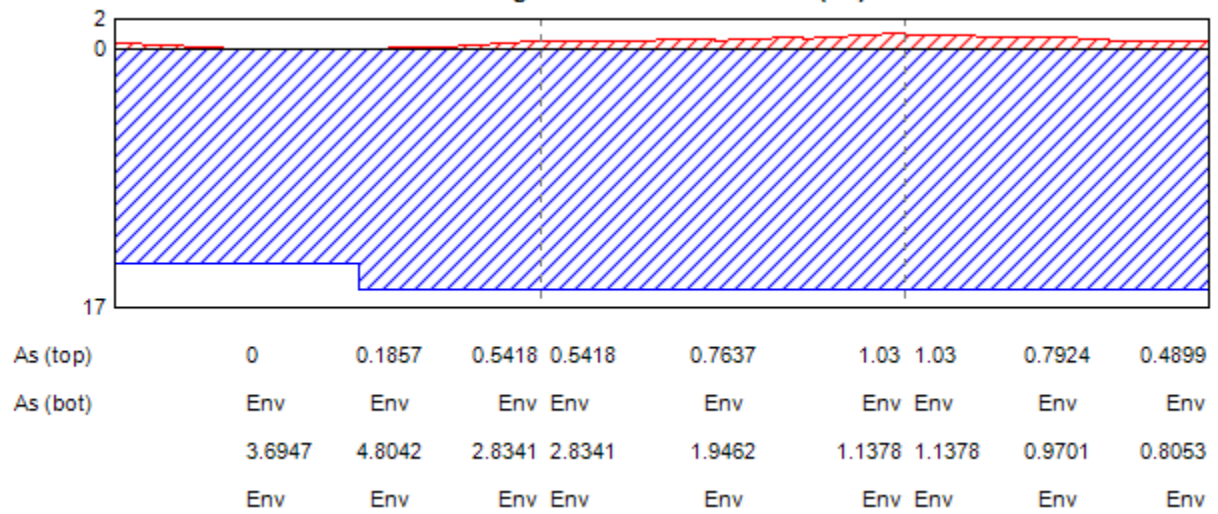
Highest Compression Reaction for a Micropile < Allowable Axial Capacity

36.25 kip < 38.5 kip ok!

Geometric Properties
Combination = Overall Envelope
Strip Label = SB4
Length = 9 ft
Distance to Top Rebar Center = 3.905 in
Distance to Bot Rebar Center = 4.905 in

Material Properties
Concrete Comp. Strength = 4000 lb/in ²
Concrete Modulus = 3604996.5 lb/in ²
Longitudinal Rebar Yield = 60000 lb/in ²



Longitudinal Reinforcement (in²)

Longitudinal
Reinforcement:

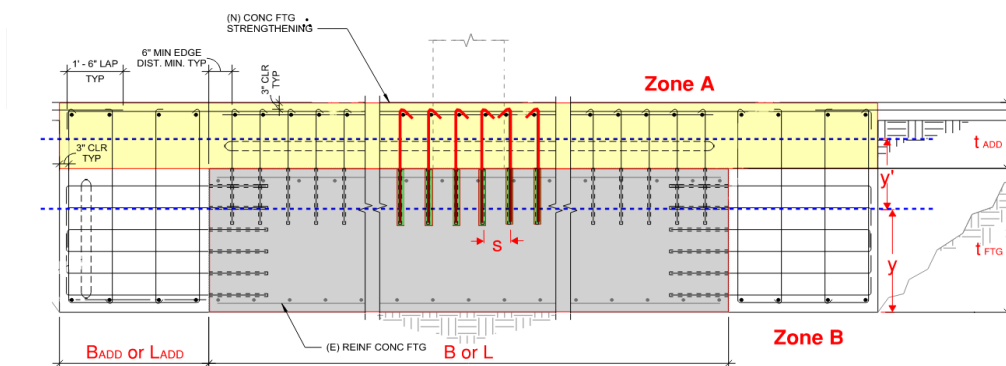
#7 @ 12 OC
Top & Bot

SHEAR FLOW DOWELS DESIGN - ZONE A

												Dowel size	#5	17		
Gridline	B _{E-W} (ft)	L _{N-S} (ft)	t _{FTG} (ft)	t _{ADD} (ft)	Vu (kip)	I _b RETROFIT (in4)	$\bar{y}$ (in)	$\bar{y}^2$ (in)	A' (in ²)	Q _A (in ³)	q _A = V _n * Q _A /I _b (kip/ft)	A _{sreq} (in ² /ft)	#5' req	S (in)	q _n (kip/ft)	DCR
5-A	9.33333	9.3333	2.33	1.17	490	691488	21	14	1568	21952	186.67	3.11	9	10	200.9	0.93

Shear Flow Dowels to be design for max shear in section, V_n
Footings shown will be retrofitted by increasing thickness

Bar size	diam(in)	Area(in ²)	Fy (ksi)	Ld (in)
#3	0.375	0.11	60.00	10
#4	0.500	0.20	60.00	14
#5	0.625	0.31	60.00	17
#6	0.750	0.44	60.00	20
#7	0.875	0.60	60.00	24
#8	1.000	0.79	60.00	33
#9	1.128	1.00	60.00	38
#10	1.270	1.27	60.00	42
#11	1.410	1.56	60.00	47
#14	1.693	2.25	60.00	56
#18	2.257	4.00	60.00	86

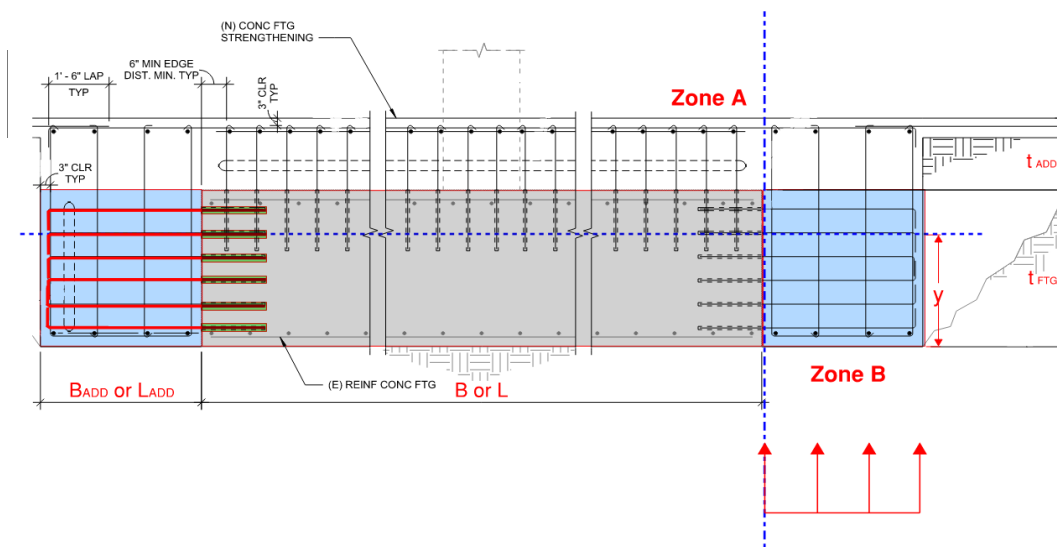


SHEAR FLOW DOWELS DESIGN - ZONE B

										Dowel size	#4	2	14	
Gridline	B _{E-W} (ft)	L _{N-S} (ft)	t _{FTG} (ft)	B _{ADD} (ft)	A _F (ft ²)	P _u (kip)	σ (ksf)	q _B (kip/ft)	A _{Sreq} (in ² /ft)	Rebar(2) #4/ft	S (in)	q _n (kip/ft)		DCR
5-A	9.33	9.33333	3.50	3.50	104.86	490.0	4.67	16.36	0.27	1	16	18		0.91

Shear Flow Dowels to be design for max shear in section, V_n
Footings shown will be retrofitted by increasing thickness

Bar size	diam(in)	Area(in ²)	Fy (ksi)	Ld (in)
#3	0.375	0.11	60.00	10
#4	0.500	0.20	60.00	14
#5	0.625	0.31	60.00	17
#6	0.750	0.44	60.00	20
#7	0.875	0.60	60.00	24
#8	1.000	0.79	60.00	33
#9	1.128	1.00	60.00	38
#10	1.270	1.27	60.00	42
#11	1.410	1.56	60.00	47
#14	1.693	2.25	60.00	56
#18	2.257	4.00	60.00	86





project: Inglewood Library Renovation

sheet no.:

21

location: Inglewood, CA

job no.: 10012300277

client:

date: 02/15/2025

B. Terrace Deflection Check



project: Inglewood Library - Terrace

sheet no.:

22

location: Inglewood, CA

job no.: 2300277

client:

date: 07/05/2024

Summary:

The area referred as Terrace between grid lines A - C and 5 - 7, corresponds to a assembly space for which the use will not change, and also a portion of the slab will be demolish to build a stair access, for which the new condition shows an increase in elements demands higher than 5%, therefore retrofit measures were taken. In addition to that a deflection check was made for the 18 ft cantilever at the end of the terrace. See following calculations for members and deflections for cantilever design justification.

The following codes where used for the design:

- 2022 California Building Code.
- AISC 360-16
- ASCE 7-16
- ACI 318-14

KPFF Consulting Engineers

700 Flower St
Los Angeles, CA 90017
(213) 310 8579

Project : COIL
Job no. : 2300277
Date : Jun-24
By : MO

Project: Inglewood Main Library Renovation and Technology Center
101 W Manchester Blvd, Inglewood, California, 90301

Terrance

5% demand increase check on elements

LRFD: 1.4D

Beam Demands Ratios

Cantilever			Existing			Cantilever			Modified		
Beams	Moment 3-3	Shear 2-2	Beams	Moment 3-3	Shear 2-2	Beams	Moment 3-3	Shear 2-2	Beams	Moment 3-3	Shear 2-2
39	-120.803	-18.445	40	-110.3205	-15.012						
47	-707.873	-56.552	17	-648.0915	-48.012						
55	-677.275	-57.814	11	-786.5524	-64.85						
63	-622.883	-51.951	7	-693.8807	-56.603						
7	-310.813	-29.660	56	-327.0299	-30.94						

Moment 3-3- Shear 2-2	
-8.7%	-18.6%
-8.4%	-15.1%
16.1%	12.2%
11.4%	9.0%
5.2%	4.3%

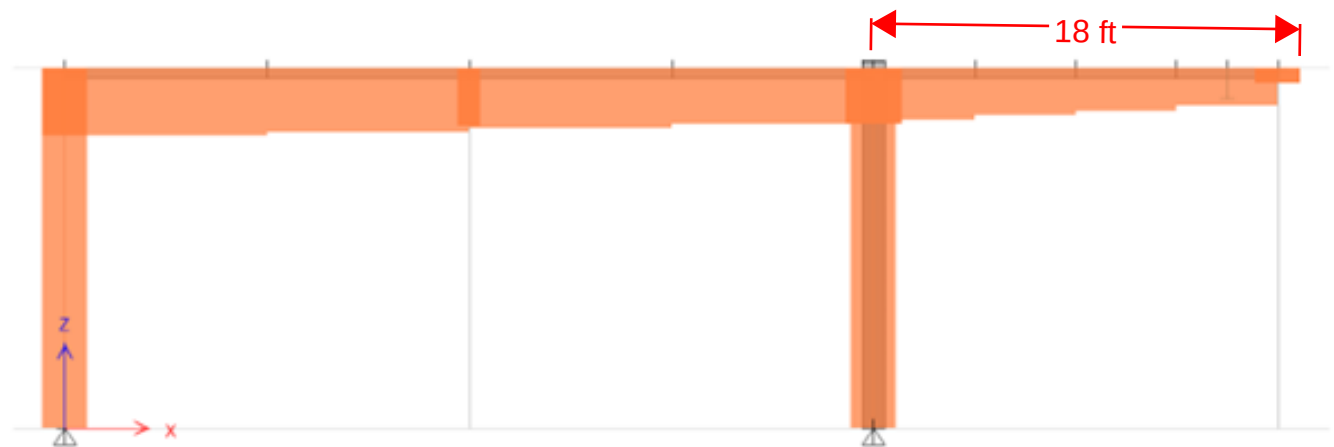
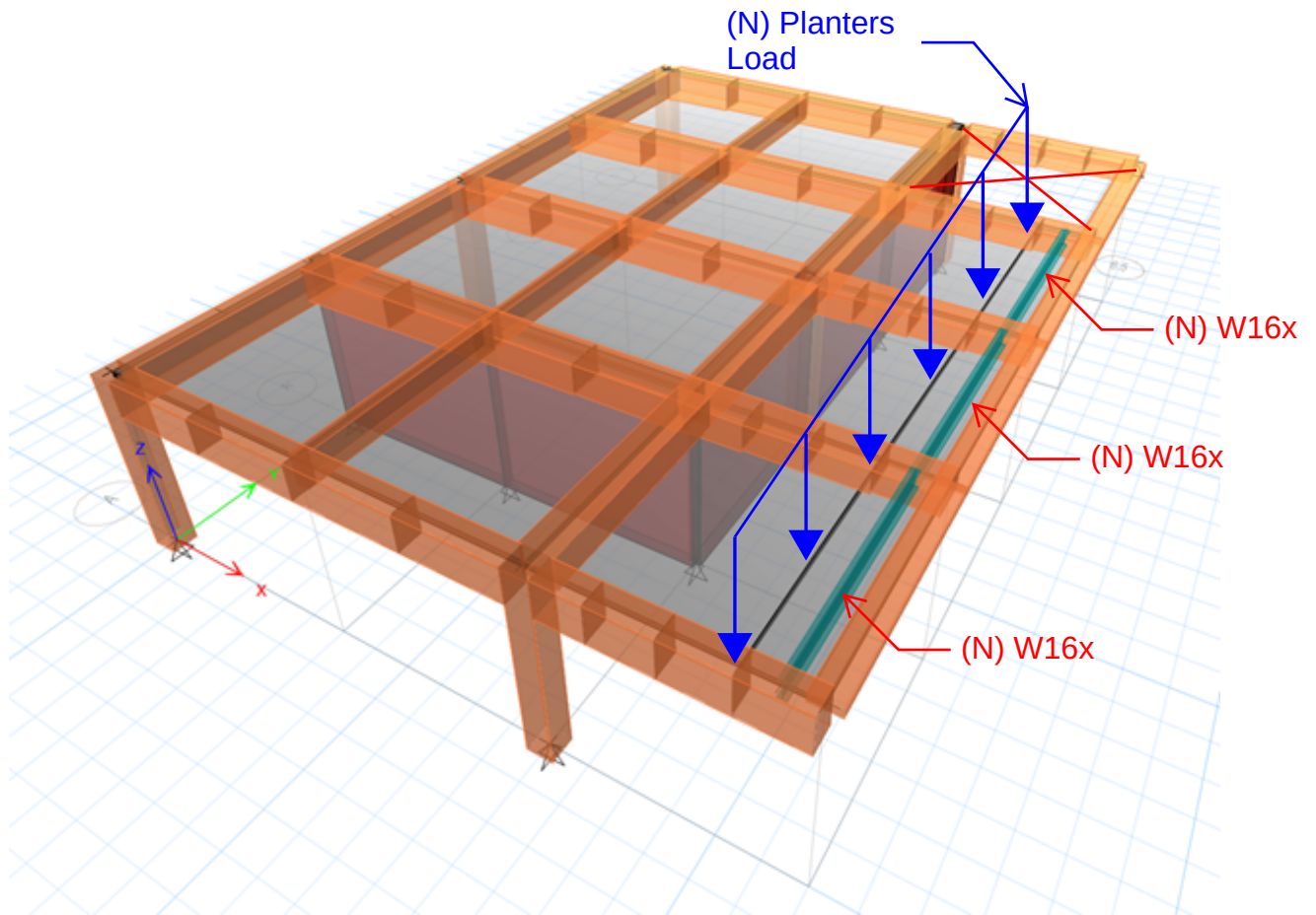
Columns Demands Ratios

Col ID	Rz Exisiting kips	Col ID	Rz Mod kips	Rz Diff %
1	50.2	1	49.9	-0.5%
83	3.2	73	1.1	-66.9%
3	130.2	3	130.1	-0.1%
5	89.7	5	90.6	1.0%
80	13.8	14	6.7	-51.5%
7	106.6	7	108.8	2.1%
77	30.4	32	13.3	-56.3%
9	67.7	9	58.5	-13.5%
84	24.8	80	11.5	-53.9%
11	51.2	11	43.7	-14.6%
21	17.3	21	9.0	-47.8%

Existing concrete elements will increase their demands by more than 5% therefore Deflection checks are required, as shown in the pages below, addition of (N) W16x respond to new demands.

2. Cantilever Deflection at Renovation Condition

24



Deflection limit at Cantiliver:

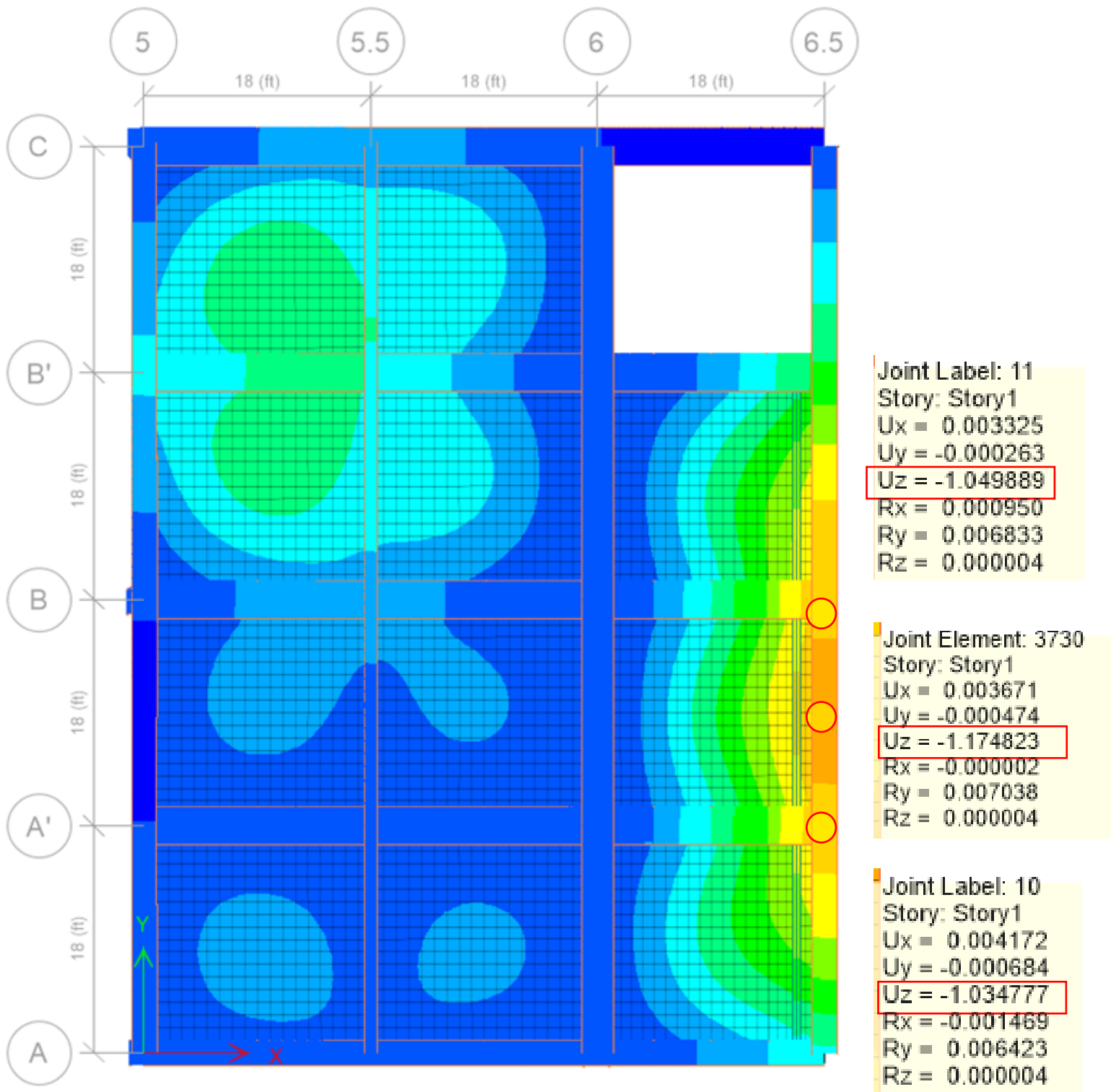
$$L = 18 \text{ ft} = 216 \text{ in}$$

$$\text{Def}_{\text{Limit}} = L / 240 \text{ (Double for Cantilivers)}$$

$$\text{Def}_{\text{Limit}} = 2 * (216 \text{ in} / 240) = \mathbf{1.80 \text{ in}}$$

a) Elastic Deformation = 1.0D+1.0L (Short Term Deflection)

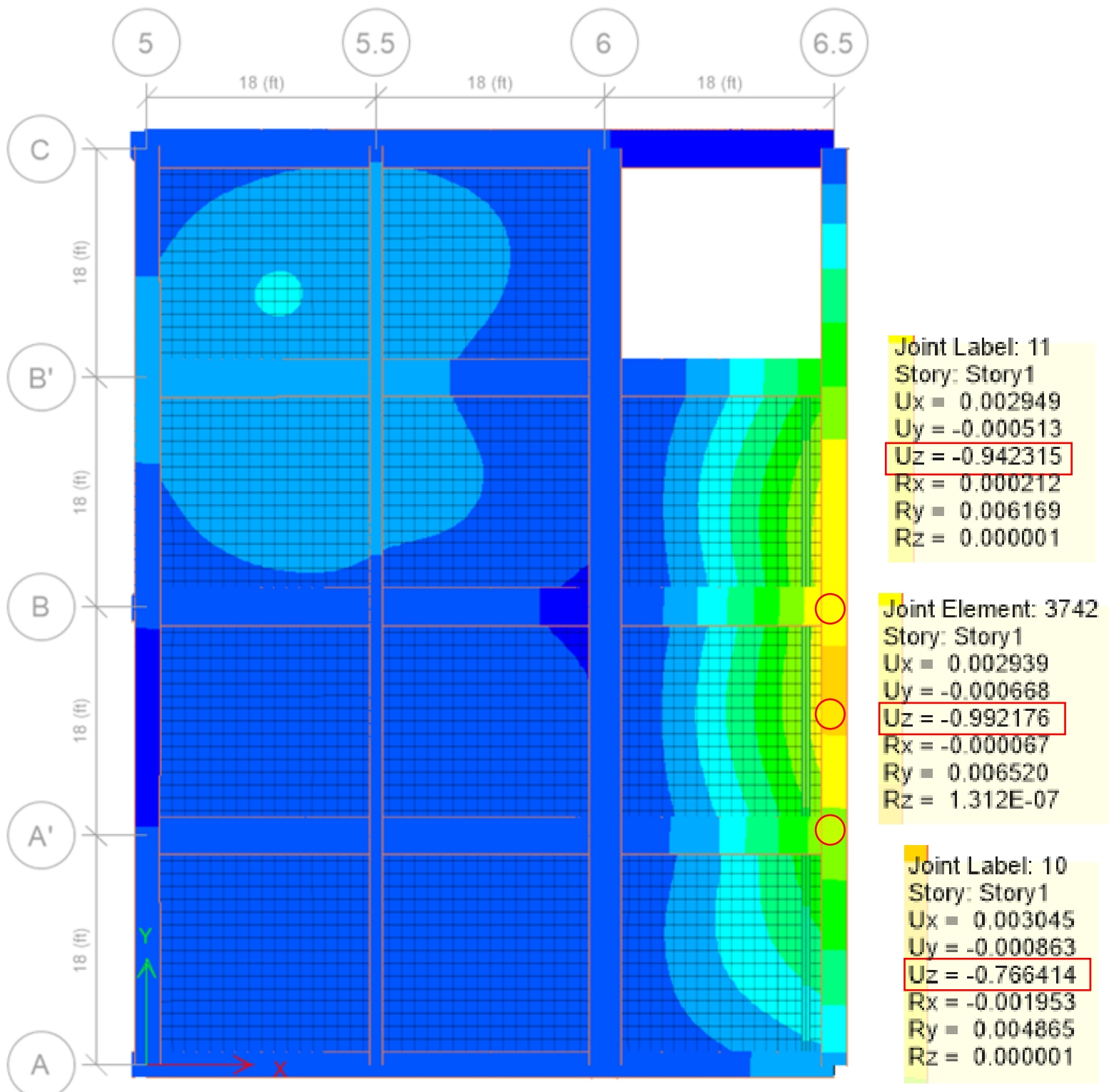
25



Max deflection < 1.80 in ok!

b) Immediate All Dead Load = 1.0 D

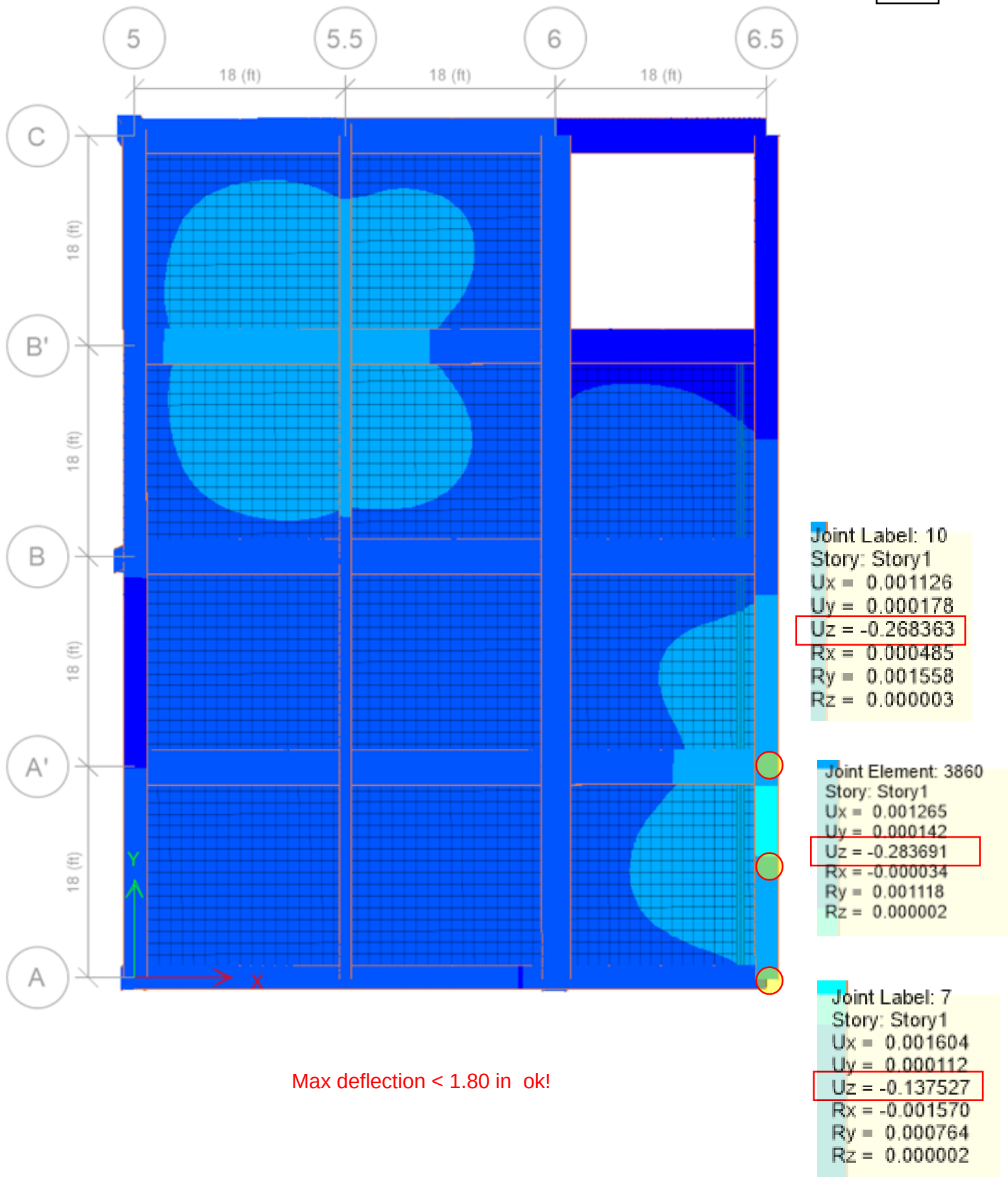
26



Max deflection < 1.80 in ok!

c) Immediate Live Load = 1.0 L

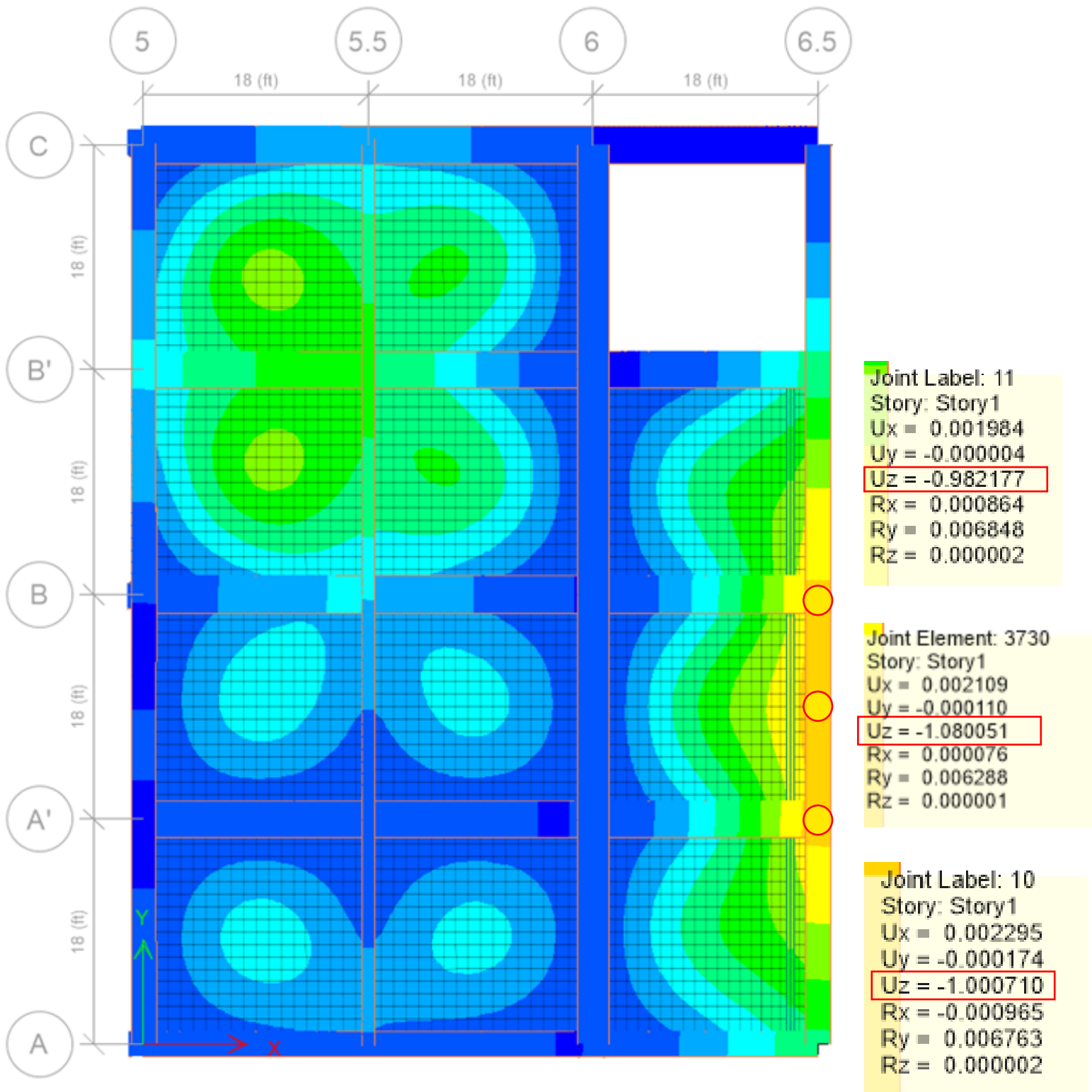
27



d) Long Term Live = Long Term Sustained + Immediate All Loads – Immediate Sustained – Long Term Sustained (Dead Only)

28

Immediate All Loads = 1.0D + 1.0 L (short Term)
Long Term Sustained = 1.0D + 0.25 L (Long term)
Immediate Sustained = 1.0D + 0.25L (short Term)
Long Term Sustained (dead Only) = 1.0D (long term)



Max deflection < 1.80 in ok!



project: Inglewood Library Renovation

sheet no.:

29

location: Inglewood, CA

job no.: 10012300277

client:

date: 02/15/2025

C. Canopy beam design & connection



project: Inglewood Library - Canopy framing

sheet no.:

30

location: Inglewood, CA

job no.: 10012300277

client:

date: 07/05/2024

Summary:

The structure of the Canopy Framing consists in two sections, a HSS beam to support the glazing structure and a HSS beam to support the canopy structure, both connected to the existing concrete walls at the edges. See following calculations for the beams structure and connections design justification.

The following codes where used for the design:

- 2022 California Building Code.
- AISC 360-16
- ASCE 7-16
- ACI 318-14

KPFF Consulting Engineers
 700 Flower St
 Los Angeles, CA 90017
 (213) 310 8579

Project : COIL
 Job no. : 10012300277
 Date : Jun-24
 By : MO

LOADING CRITERIA

10012300277

LOAD TYPE: A - Exterior Wall Canopy Framing

Glezing Beam at framing wall

Glazing	10 psf
Misc	3 psf

Beam framing Total:	13 psf
----------------------------	---------------

Hangover Canopy Beam

2" ACM cover	5.4 psf
Light weight structure	4.92 psf
Library sign letters	6.57 psf
Ceiling and Lights	2 psf
Misc	1.5 psf

Hangover Beam Total:	20.39 psf
-----------------------------	------------------

Seismic Dead Load

Partitions	0 psf
LFRS - explicitly modeled	0

Seismic Total:	0 psf
-----------------------	--------------

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 700 Flower St
 Los Angeles, CA 90017
 (213) 310 8579

Project : COIL
 Job no. : 2300277
 Date : Jun-24
 By : MO

Deep HSS Beam Design

Project: **Inglewood Main Library Renovation and Technology Center**
 101 W Manchester Blvd, Inglewood, California, 90301

Wind design Parameters

Esposure category C
 Risk category II

Vwind	95	mph
Kz	1.13	
Kzt	1.00	
Kd	0.85	
Ke	1.00	
qh	22.2	psf
Height	25	ft
Width	30	ft
Effective Area	750	ft ²

$$p = qh(GC_p - GC_{pi})$$

Wall wind pressure (psf)		
22.2	GC_{pi}	
GC_p	0.18	-0.18
0.7	11.5	19.5
-0.8	-21.7	-13.8

Pwind	21.7	psf
Fwind	8.2	kip
Mwind	51.0	kip-ft
P distributed	0.27	kip/ft
M distributed	1.70	kip-ft / ft

KPFF Consulting Engineers

700 Flower St
 Los Angeles, CA 90017
 (213) 310 8579

Project : COIL
 Job no. : 10012300277
 Date : Jun-24
 By : MO

Project: **Inglewood Main Library Renovation and Technology Center**
 101 W Manchester Blvd, Inglewood, California, 90301

Seismic Parameters for Beam under Glazing

Sds =	1.534	
I =	1.00	
Ch 13 Architectural component		
R =	1.5	
Ω_0 =	1.5	
ap =	2.5	
z	32	ft
h	58	ft
Wp glazing	13	psf
	4.88	kip
	0.16	kip/ft
Fpmax	11.97	kip
Fpmin	2.24	kip
Fp	7.09	kip
M Seismic	88.61	kip-ft
Height	25	ft
Width	30	ft
Effective Area	750	ft ²

Steel structure consist in a HSS16x8x5/8" to support the the glazing at the exterior wall of the entrance. From calculations above, wind forces will govern the design. See beam structure design and connection justification on following calculations:

Steel Column

Project File: Exterior Wall Beams.ec6

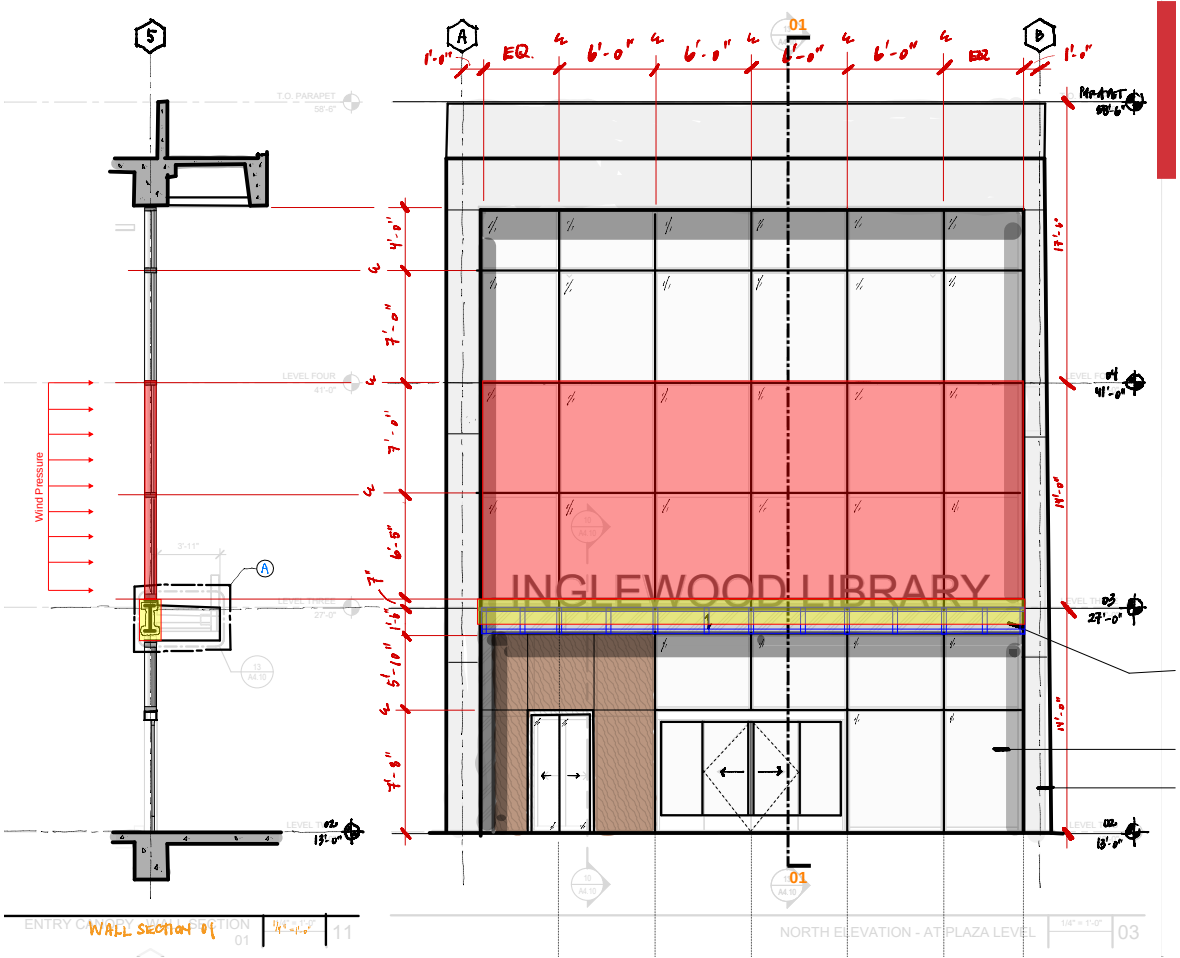
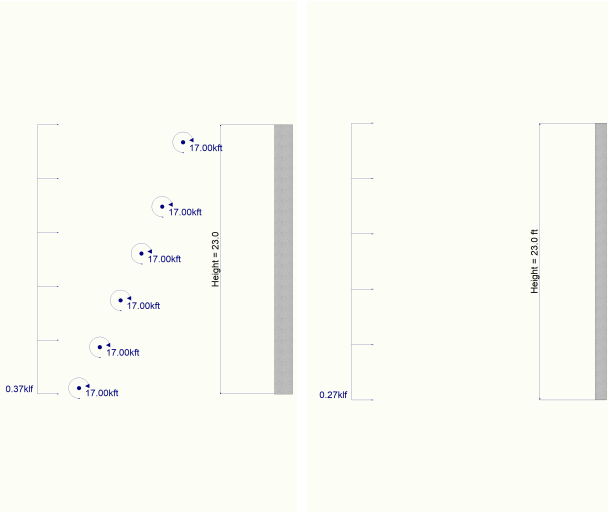
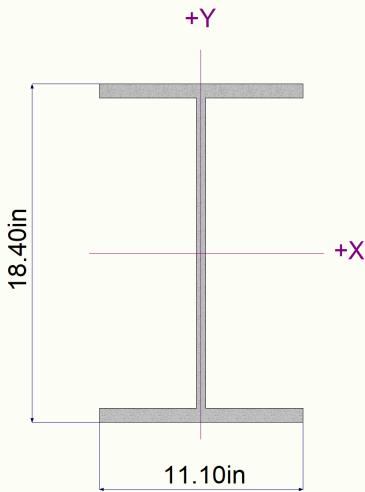
LIC# : KW-06018621, Build:20.23.12.07

KPFF

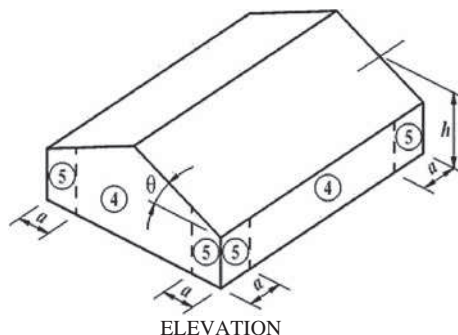
(c) ENERCALC INC 1983-2023

DESCRIPTION: Exterior Wall Beam

Sketches



Diagram

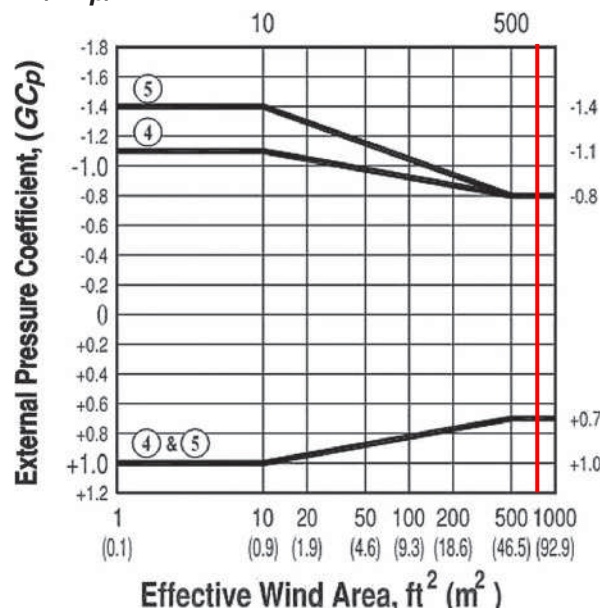
**Notation**

a = 10% of least horizontal dimension or $0.4h$, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).

Exception: For buildings with $\theta = 0^\circ$ to 7° and a least horizontal dimension greater than 300 ft (90 m), dimension a shall be limited to a maximum of $0.8h$.

h = Mean roof height, in ft (m), except that eave height shall be used for $\theta \leq 10^\circ$.

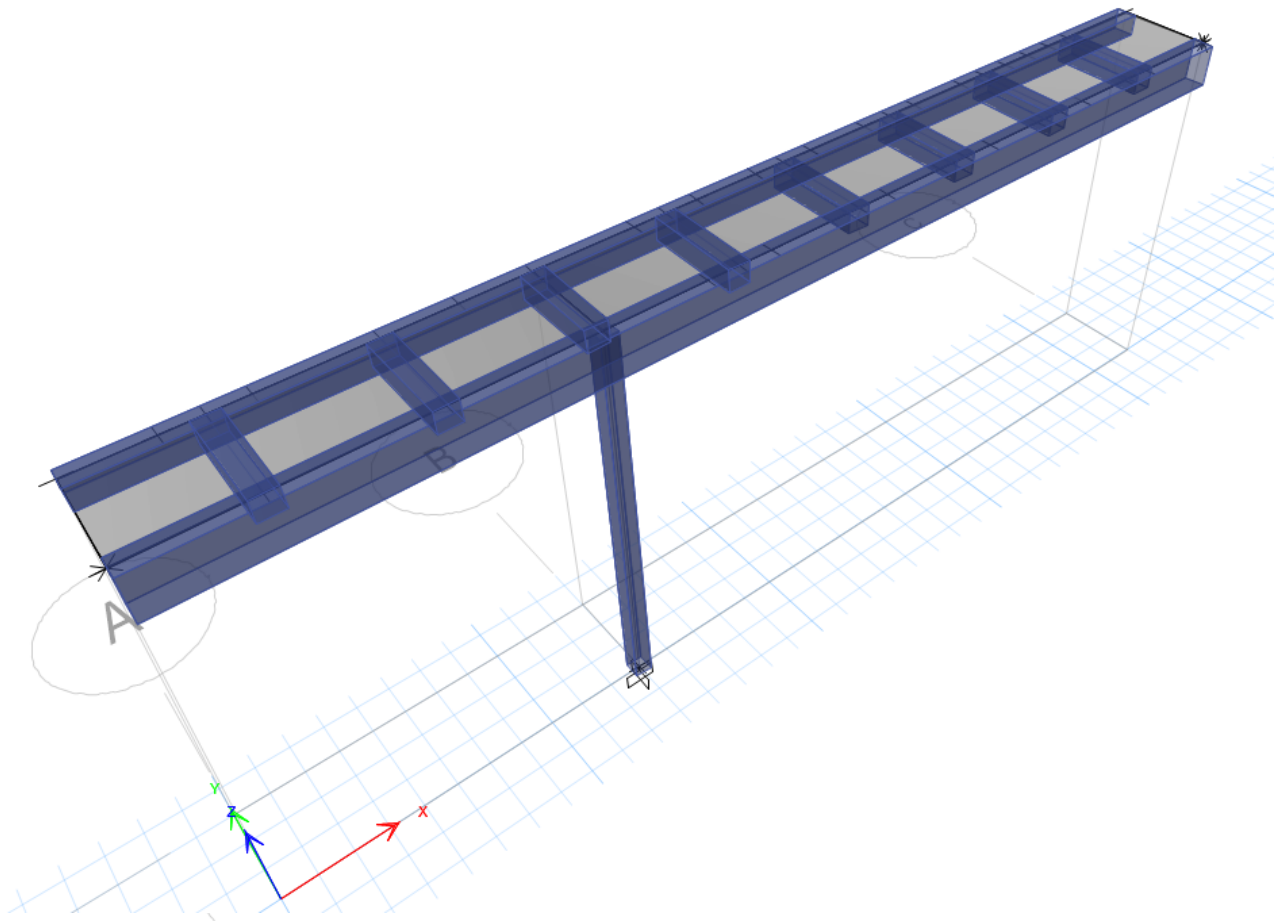
θ = Angle of plane of roof from horizontal, in degrees.

External Pressure Coefficient, (GC_p) - Walls**Notes**

1. Vertical scale denotes (GC_p) to be used with qh .
2. Horizontal scale denotes effective wind area, in ft^2 (m^2).
3. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
4. Each component shall be designed for maximum positive and negative pressures.
5. Values of (GC_p) for walls shall be reduced by 10% when $\theta \leq 10^\circ$.

FIGURE 30.3-1 Components and Cladding [$h \leq 60$ ft ($h \leq 18.3$ m)]: External Pressure Coefficients, (GC_p), for Enclosed and Partially Enclosed Buildings—Walls

ETABS[®]



Entry Canopy Structure

Model File: canopy frame, Revision 0
2/12/2025

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1 Structure Data

This chapter provides model geometry information, including items such as story levels, point coordinates, and element connectivity.

1.1 Story Data

Table 1.1 - Story Definitions

Tower	Name	Height in	Master Story	Similar To	Splice Story	Color
T1	Story1	150	No	None	No	Cyan

1.2 Mass

Table 1.2 - Mass Source Definition

Name	Is Default	Include Lateral Mass?	Include Vertical Mass?	Lump Mass?	Source Self Mass?	Source Added Mass?	Source Load Patterns?	Move Mass Centroid?
MsSrc1	Yes	Yes	No	Yes	Yes	Yes	No	No

Table 1.3 - Mass Summary by Story

Story	UX kip-s2/in	UY kip-s2/in	UZ kip-s2/in
Story1	0.013639	0.013639	0
Base	0.000644	0.000644	0

Table 1.4 - Mass Summary by Group

Group	Self Mass kip-s2/in	Self Weight kip	Mass X kip-s2/in	Mass Y kip-s2/in	Mass Z kip-s2/in
All	0.014284	0	0.014284	0.014284	0

2 Properties

This chapter provides property information for materials, frame sections, shell sections, and links.

2.1 Materials

Table 2.1 - Material Properties - General

Material	Type	SymType	Grade	Color	Notes
A36	Steel	Isotropic	Grade 36	Cyan	
A416Gr270	Tendon	Uniaxial	Grade 270	Gray8Dark	
A615Gr60	Rebar	Uniaxial	Grade 60	Yellow	
A992Fy50	Steel	Isotropic	Grade 50	Red	

2.2 Frame Sections

Table 2.2 - Frame Section Property Definitions - Summary (Part 1 of 3)

Name	Material	Shape	Color	Area in ²	J in ⁴	I33 in ⁴	I22 in ⁴	As2 in ²	As3 in ²	S33Pos in ³	S33Neg in ³
HSS16X8X5/8	A992Fy50	Steel Tube	Red	25.7	681	815	274	18.59	9.3	101.88	101.88
HSS6X6X5/8	A992Fy50	Steel Tube	Blue	11.7	94.9	55.2	55.2	6.97	6.97	18.4	18.4
HSS8X8X3/8	A992Fy50	Steel Tube	Green	10.4	160	100	100	5.58	5.58	25	25

Table 2.2 - Frame Section Property Definitions - Summary (Part 2 of 3)

Name	S22Pos in ³	S22Neg in ³	Z33 in ³	Z22 in ³	R33 in	R22 in	Cw in ⁶	Fillet Radius in	CG Offset 3 in	CG Offset 2 in	PNA Offset 3 in
HSS16X8X5/8	68.5	68.5	129	79.2	5.6313	3.2652			0	0	0
HSS6X6X5/8	18.4	18.4	23.2	23.2	2.1721	2.1721			0	0	0
HSS8X8X3/8	25	25	29.4	29.4	3.1009	3.1009			0	0	0

Table 2.2 - Frame Section Property Definitions - Summary (Part 3 of 3)

Name	Area Modifier	As2 Modifier	As3 Modifier	J Modifier	I33 Modifier	I22 Modifier	Mass Modifier	Weight Modifier
HSS16X8X5/8	1	1	1	1	1	1	1	1
HSS6X6X5/8	1	1	1	1	1	1	1	1
HSS8X8X3/8	1	1	1	1	1	1	1	1

2.3 Shell Sections

Table 2.3 - Area Section Property Definitions - Summary

Name	Type	Element Type	Material	Total Thickness in	Deck Material	Deck Depth in
Plate	Slab	Membrane	A36	0.1		

3.2 Frame Assignments

Table 3.2 - Frame Assignments - Summary

Story	Label	UniqueName	Design Type	Length in	Analysis Section	Design Section	Axis Angle deg	Max Station Spacing in	Min Number Stations	Releases
Story1	B2	3	Beam	408	HSS8X8X3/8	HSS8X8X3/8		24		
Story1	B5	2	Beam	408	HSS16X8X5/8	HSS16X8X5/8		24		
Story1	B12	13	Beam	36	HSS8X8X3/8	HSS8X8X3/8		24		
Story1	B13	14	Beam	36	HSS8X8X3/8	HSS8X8X3/8		24		
Story1	B14	15	Beam	36	HSS8X8X3/8	HSS8X8X3/8		24		
Story1	B15	17	Beam	36	HSS8X8X3/8	HSS8X8X3/8		24		
Story1	B17	18	Beam	36	HSS8X8X3/8	HSS8X8X3/8		24		
Story1	B18	19	Beam	36	HSS8X8X3/8	HSS8X8X3/8		24		
Story1	B19	20	Beam	36	HSS8X8X3/8	HSS8X8X3/8		24		
Story1	B20	21	Beam	36	HSS8X8X3/8	HSS8X8X3/8		24		
Story1	C1	1	Column	150	HSS6X6X5/8	HSS6X6X5/8	90		3	Yes

3.3 Shell Assignments

Table 3.3 - Area Assignments - Summary

Story	Label	UniqueName	Section Property	Property Type
Story1	F1	1	Plate	Slab
Story1	F3	2	Plate	Slab

4 Loads

This chapter provides loading information as applied to the model.

4.1 Load Patterns

Table 4.1 - Load Pattern Definitions

Name	Is Auto Load	Type	Self Weight Multiplier	Auto Load
~LLRF	Yes	Other	0	
Dead	No	Dead	1	
Live	No	Live	0	
Super Dead	No	Dead	0	
Wind	No	Wind	0	None

4.2 Applied Loads

4.2.1 Line Loads

Table 4.2 - Frame Loads Assignments - Distributed (Part 1 of 2)

UniqueName	Load Pattern	Story	Label	Load Type	Direction	Distance Type	Relative Distance A	Relative Distance B	Absolute Distance A in	Absolute Distance B in
2	Live	Story1	B5	Force	Gravity	Relative	0	0.3333	0	136
2	Live	Story1	B5	Force	Gravity	Relative	0.3333	1	136	408
3	Super Dead	Story1	B2	Force	Gravity	Relative	0	1	0	408
2	Super Dead	Story1	B5	Force	Gravity	Relative	0	0.3333	0	136
2	Super Dead	Story1	B5	Force	Gravity	Relative	0.3333	1	136	408
2	Wind	Story1	B5	Moment	Global-X	Relative	0	1	0	408
2	Wind	Story1	B5	Force	Global-Y	Relative	0	1	0	408

Table 4.2 - Frame Loads Assignments - Distributed (Part 2 of 2)

UniqueName	Load Pattern	Force A kip/in	Force B kip/in	Moment A kip-in/in	Moment B kip-in/in
2	Live	0.0017	0.0017		
2	Live	0.0017	0.0017		
3	Super Dead	0.0018	0.0018		
2	Super Dead	0.0142	0.0142		
2	Super Dead	0.0142	0.0142		
2	Wind			1.1	1.1
2	Wind	0.0181	0.0181		

4.2.2 Area Loads

Table 4.3 - Area Load Assignments - Uniform

Story	Label	UniqueName	Load Pattern	Direction	Load kip/in2
Story1	F1	1	Dead	Gravity	0.0001
Story1	F3	2	Dead	Gravity	0.0001
Story1	F1	1	Live	Gravity	0.00014
Story1	F3	2	Live	Gravity	0.00014
Story1	F1	1	Wind	Gravity	-0.00027
Story1	F3	2	Wind	Gravity	-0.00027

4.3 Load Cases

Table 4.4 - Load Case Definitions - Summary

Name	Type
Dead	Linear Static
Live	Linear Static
Modal	Modal - Eigen
Super Dead	Linear Static
Wind	Linear Static

4.4 Load Combinations

Table 4.5 - Load Combination Definitions

Name	Type	Is Auto	Load Name	SF	Notes
DStID1	Linear Add	Yes	Dead	1	Dead [Deflections]
DStID1			Super Dead	1	
DStID2	Linear Add	Yes	Dead	1	Dead + Live [Deflections]
DStID2			Live	1	
DStID2			Super Dead	1	
DStIS1	Linear Add	Yes	Dead	1.4	Dead [Strength]
DStIS1			Super Dead	1.4	
DStIS2	Linear Add	Yes	Dead	1.2	Dead + Live [Strength]
DStIS2			Live	1.6	
DStIS2			Super Dead	1.2	
DStIS3	Linear Add	Yes	Dead	1.2	Dead + Live + Wind + Snow [Strength]
DStIS3			Live	1	
DStIS3			Super Dead	1.2	
DStIS3			Wind	1	
DStIS4	Linear Add	Yes	Dead	1.2	Dead + Live - Wind + Snow [Strength]
DStIS4			Live	1	
DStIS4			Super Dead	1.2	
DStIS4			Wind	-1	
DStIS5	Linear Add	Yes	Dead	0.9	Dead (min) + Wind [Strength]
DStIS5			Super Dead	0.9	
DStIS5			Wind	1	
DStIS6	Linear Add	Yes	Dead	0.9	Dead (min) - Wind [Strength]
DStIS6			Super Dead	0.9	
DStIS6			Wind	-1	

Table 4.5 - Load Combination Definitions (continued)

Name	Type	Is Auto	Load Name	SF	Notes
Envelope	Envelope	No	UDSttS1	1	
Envelope			UDSttS2	1	
Envelope			UDSttS3	1	
Envelope			UDSttS4	1	
Envelope			UDSttS5	1	
Envelope			UDSttS6	1	
Envelope			UDSttD1	1	
Envelope			UDSttD2	1	
UDSttD1	Linear Add	No	Dead	1	Dead [Deflections]
UDSttD1			Super Dead	1	
UDSttD2	Linear Add	No	Dead	1	Dead + Live [Deflections]
UDSttD2			Live	1	
UDSttD2			Super Dead	1	
UDSttS1	Linear Add	No	Dead	1.4	Dead [Strength]
UDSttS1			Super Dead	1.4	
UDSttS2	Linear Add	No	Dead	1.2	Dead + Live [Strength]
UDSttS2			Live	1.6	
UDSttS2			Super Dead	1.2	
UDSttS3	Linear Add	No	Dead	1.2	Dead + Live + Wind + Snow [Strength]
UDSttS3			Live	1	
UDSttS3			Super Dead	1.2	
UDSttS3			Wind	1	
UDSttS4	Linear Add	No	Dead	1.2	Dead + Live - Wind + Snow [Strength]
UDSttS4			Live	1	
UDSttS4			Super Dead	1.2	
UDSttS4			Wind	-1	
UDSttS5	Linear Add	No	Dead	0.9	Dead (min) + Wind [Strength]
UDSttS5			Super Dead	0.9	
UDSttS5			Wind	1	
UDSttS6	Linear Add	No	Dead	0.9	Dead (min) - Wind [Strength]
UDSttS6			Super Dead	0.9	
UDSttS6			Wind	-1	

5 Analysis Results

This chapter provides analysis results.

5.1 Structure Results

Table 5.1 - Base Reactions

Output Case	Case Type	Step Type	FX kip	FY kip	FZ kip	MX kip-in	MY kip-in	MZ kip-in	X in	Y in	Z in
Dead	LinStatic		0	0	6.943	84.295	-1381.119	0	0	0	0
Live	LinStatic		0	0	2.72	36.72	-554.88	0	0	0	0
Super Dead	LinStatic		0	0	6.528	26.928	-1331.712	0	0	0	0
Wind	LinStatic		0	-7.378	-3.927	587.214	801.108	-1505.112	0	0	0
UDStIS1	Combination		0	0	18.859	155.712	-3797.963	0	0	0	0
UDStIS2	Combination		0	0	20.517	192.219	-4143.205	0	0	0	0
UDStIS3	Combination		0	-7.378	14.958	757.401	-3009.169	-1505.112	0	0	0
UDStIS4	Combination		0	7.378	22.812	-417.027	-4611.385	1505.112	0	0	0
UDStIS5	Combination		0	-7.378	8.197	687.314	-1640.44	-1505.112	0	0	0
UDStIS6	Combination		0	7.378	16.051	-487.114	-3242.656	1505.112	0	0	0
UDStID1	Combination		0	0	13.471	111.223	-2712.831	0	0	0	0
UDStID2	Combination		0	0	16.191	147.943	-3267.711	0	0	0	0
Envelope	Combination	Max	0	7.378	22.812	757.401	-1640.44	1505.112	0	0	0
Envelope	Combination	Min	0	-7.378	8.197	-487.114	-4611.385	-1505.112	0	0	0
DStIS1	Combination		0	0	18.859	155.712	-3797.963	0	0	0	0
DStIS2	Combination		0	0	20.517	192.219	-4143.205	0	0	0	0
DStIS3	Combination		0	-7.378	14.958	757.401	-3009.169	-1505.112	0	0	0
DStIS4	Combination		0	7.378	22.812	-417.027	-4611.385	1505.112	0	0	0
DStIS5	Combination		0	-7.378	8.197	687.314	-1640.44	-1505.112	0	0	0
DStIS6	Combination		0	7.378	16.051	-487.114	-3242.656	1505.112	0	0	0
DStID1	Combination		0	0	13.471	111.223	-2712.831	0	0	0	0
DStID2	Combination		0	0	16.191	147.943	-3267.711	0	0	0	0

5.3 Point Results

Table 5.3 - Joint Reactions

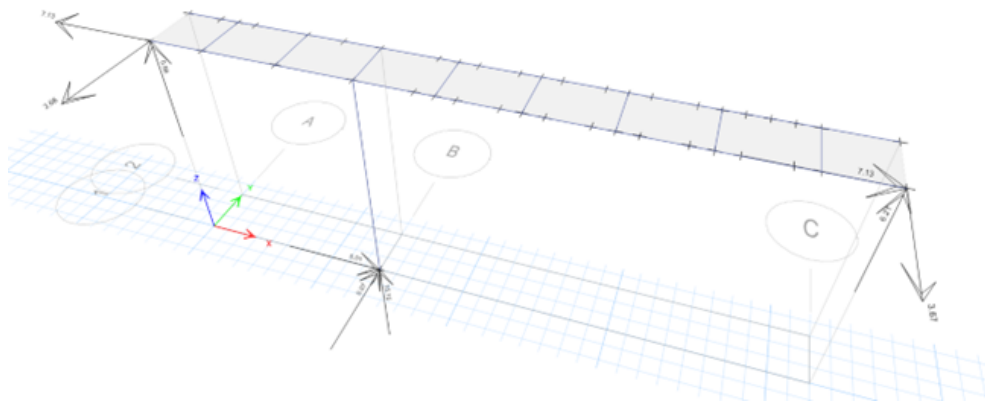
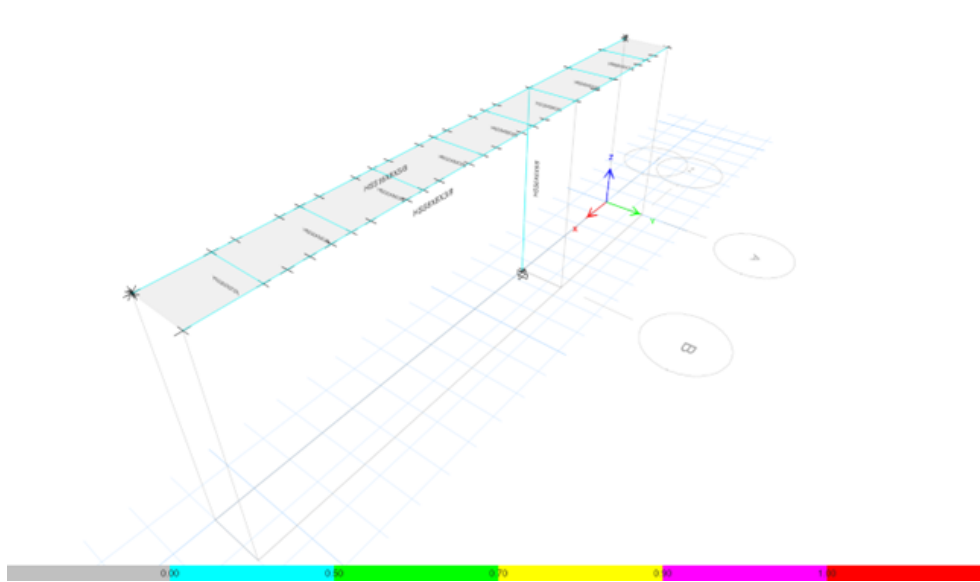
Story	Label	Unique Name	Output Case	Case Type	Step Type	FX kip	FY kip	FZ kip	MX kip-in	MY kip-in	MZ kip-in
Story1	2	3	Dead	LinStatic		-0.008	-0.003	0.215	42.452	0	0
Story1	2	3	Live	LinStatic		-0.003	-0.001	0.102	18.488	0	0
Story1	2	3	Super Dead	LinStatic		-0.004	-0.001	0.233	13.789	0	0
Story1	2	3	Wind	LinStatic		-7.114	-3.649	-0.217	-259.623	0	0
Story1	2	3	UDStIS1	Combination		-0.016	-0.006	0.627	78.737	0	0
Story1	2	3	UDStIS2	Combination		-0.019	-0.008	0.701	97.069	0	0
Story1	2	3	UDStIS3	Combination		-7.131	-3.656	0.423	-173.647	0	0
Story1	2	3	UDStIS4	Combination		7.098	3.642	0.856	345.6	0	0
Story1	2	3	UDStIS5	Combination		-7.124	-3.653	0.187	-209.006	0	0

Table 5.3 - Joint Reactions (continued)

Story	Label	Unique Name	Output Case	Case Type	Step Type	FX kip	FY kip	FZ kip	MX kip-in	MY kip-in	MZ kip-in
Story1	2	3	UDStIS6	Combination		7.104	3.645	0.62	310.24	0	0
Story1	2	3	UDStID1	Combination		-0.011	-0.005	0.448	56.241	0	0
Story1	2	3	UDStID2	Combination		-0.014	-0.006	0.55	74.729	0	0
Story1	2	3	Envelope	Combination	Max	7.104	3.645	0.856	345.6	0	0
Story1	2	3	Envelope	Combination	Min	-7.131	-3.656	0.187	-209.006	0	0
Story1	2	3	DStIS1	Combination		-0.016	-0.006	0.627	78.737	0	0
Story1	2	3	DStIS2	Combination		-0.019	-0.008	0.701	97.069	0	0
Story1	2	3	DStIS3	Combination		-7.131	-3.656	0.423	-173.647	0	0
Story1	2	3	DStIS4	Combination		7.098	3.642	0.856	345.6	0	0
Story1	2	3	DStIS5	Combination		-7.124	-3.653	0.187	-209.006	0	0
Story1	2	3	DStIS6	Combination		7.104	3.645	0.62	310.24	0	0
Story1	2	3	DStID1	Combination		-0.011	-0.005	0.448	56.241	0	0
Story1	2	3	DStID2	Combination		-0.014	-0.006	0.55	74.729	0	0
Story1	27	29	Dead	LinStatic		0.006	-0.002	1.787	41.804	0	0
Story1	27	29	Live	LinStatic		0.002	-0.001	0.758	18.215	0	0
Story1	27	29	Super Dead	LinStatic		0.002	-0.001	1.814	13.125	0	0
Story1	27	29	Wind	LinStatic		7.116	-3.67	-1.128	-259.391	0	0
Story1	27	29	UDStIS1	Combination		0.01	-0.003	5.041	76.899	0	0
Story1	27	29	UDStIS2	Combination		0.013	-0.004	5.534	95.058	0	0
Story1	27	29	UDStIS3	Combination		7.127	-3.673	3.951	-175.261	0	0
Story1	27	29	UDStIS4	Combination		-7.105	3.667	6.207	343.52	0	0
Story1	27	29	UDStIS5	Combination		7.123	-3.672	2.113	-209.955	0	0
Story1	27	29	UDStIS6	Combination		-7.109	3.668	4.369	308.826	0	0
Story1	27	29	UDStID1	Combination		0.007	-0.002	3.601	54.928	0	0
Story1	27	29	UDStID2	Combination		0.01	-0.003	4.359	73.143	0	0
Story1	27	29	Envelope	Combination	Max	7.127	3.668	6.207	343.52	0	0
Story1	27	29	Envelope	Combination	Min	-7.109	-3.673	2.113	-209.955	0	0
Story1	27	29	DStIS1	Combination		0.01	-0.003	5.041	76.899	0	0
Story1	27	29	DStIS2	Combination		0.013	-0.004	5.534	95.058	0	0
Story1	27	29	DStIS3	Combination		7.127	-3.673	3.951	-175.261	0	0
Story1	27	29	DStIS4	Combination		-7.105	3.667	6.207	343.52	0	0
Story1	27	29	DStIS5	Combination		7.123	-3.672	2.113	-209.955	0	0
Story1	27	29	DStIS6	Combination		-7.109	3.668	4.369	308.826	0	0
Story1	27	29	DStID1	Combination		0.007	-0.002	3.601	54.928	0	0
Story1	27	29	DStID2	Combination		0.01	-0.003	4.359	73.143	0	0
Base	1	13	Dead	LinStatic		0.002	0.005	4.941	-0.702	0.268	0
Base	1	13	Live	LinStatic		0.001	0.002	1.859	-0.303	0.112	0
Base	1	13	Super Dead	LinStatic		0.002	0.002	4.481	-0.25	0.27	0
Base	1	13	Wind	LinStatic		-0.002	-0.059	-2.582	8.381	-0.22	0
Base	1	13	UDStIS1	Combination		0.005	0.009	13.191	-1.333	0.753	0
Base	1	13	UDStIS2	Combination		0.006	0.011	14.281	-1.627	0.824	0
Base	1	13	UDStIS3	Combination		0.004	-0.049	10.584	6.936	0.537	0
Base	1	13	UDStIS4	Combination		0.007	0.069	15.748	-9.827	0.977	0
Base	1	13	UDStIS5	Combination		0.002	-0.053	5.897	7.525	0.264	0
Base	1	13	UDStIS6	Combination		0.005	0.065	11.062	-9.238	0.704	0

Table 5.3 - Joint Reactions (continued)

Story	Label	Unique Name	Output Case	Case Type	Step Type	FX kip	FY kip	FZ kip	MX kip-in	MY kip-in	MZ kip-in
Base	1	13	UDStID1	Combination		0.004	0.007	9.422	-0.952	0.538	0
Base	1	13	UDStID2	Combination		0.005	0.009	11.281	-1.255	0.65	0
Base	1	13	Envelope	Combination	Max	0.007	0.069	15.748	7.525	0.977	0
Base	1	13	Envelope	Combination	Min	0.002	-0.053	5.897	-9.827	0.264	0
Base	1	13	DStIS1	Combination		0.005	0.009	13.191	-1.333	0.753	0
Base	1	13	DStIS2	Combination		0.006	0.011	14.281	-1.627	0.824	0
Base	1	13	DStIS3	Combination		0.004	-0.049	10.584	6.936	0.537	0
Base	1	13	DStIS4	Combination		0.007	0.069	15.748	-9.827	0.977	0
Base	1	13	DStIS5	Combination		0.002	-0.053	5.897	7.525	0.264	0
Base	1	13	DStIS6	Combination		0.005	0.065	11.062	-9.238	0.704	0
Base	1	13	DStID1	Combination		0.004	0.007	9.422	-0.952	0.538	0
Base	1	13	DStID2	Combination		0.005	0.009	11.281	-1.255	0.65	0



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Specifier's comments:

1 Input data

Anchor type and diameter:

Kwik Bolt TZ2 - CS 1 (5 3/4) hnom 2

Item number:

2210301 KB-TZ2 1x9

Specification text:

Hilti $\varnothing$ 1 in Kwik Bolt TZ2 - CS with 6.375 in nominal embedment depth per ICC-ES ESR-4266 , Hammer drilled installation per MPII

Effective embedment depth:

 $h_{ef,act} = 5.750$ in., $h_{nom} = 6.375$ in.

Material:

Carbon Steel

Evaluation Service Report:

ESR-4266

Issued | Valid:

12/1/2023 | 12/1/2025

Proof:

Design Method ACI 318-19 / Mech

Shear edge breakout verification:

Row closest to edge (Case 3 only from ACI 318-19 Fig. R.17.7.2.1b)

Stand-off installation:

 $e_b = 0.000$ in. (no stand-off); $t = 0.500$ in.

Anchor plate^R :

 $l_x \times l_y \times t = 24.000$ in. x 12.000 in. x 0.500 in.;

Profile:

Rectangular HSS (AISC), HSS16X8X.625; (L x W x T) = 16.000 in. x 8.000 in. x 0.625 in.

Base material:

cracked concrete, 4000, $f'_c = 4,000$ psi; $h = 12.000$ in.

Installation:

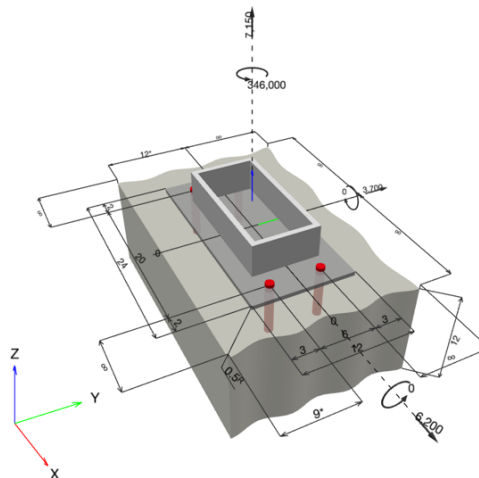
Hammer drilled hole, Installation condition: Dry

Reinforcement:

tension: present, shear: present; no supplemental splitting reinforcement present
edge reinforcement: > No. 4 bar with stirrups

^R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



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1.1 Design results

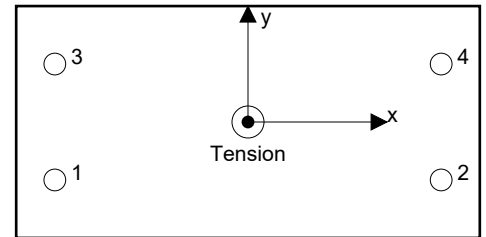
Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 7,150; V _x = 6,200; V _y = 3,700; M _x = 0; M _y = 0; M _z = 346,000;	no	100

2 Load case/Resulting anchor forces

Anchor reactions [lb]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	1,787	8,038	3,931	-7,011
2	1,787	9,694	3,931	8,861
3	1,787	7,060	-831	-7,011
4	1,787	8,900	-831	8,861



Max. concrete compressive strain: - [%]
Max. concrete compressive stress: - [psi]
Resulting tension force in (x/y)=(0.000/0.000): 7,150 [lb]
Resulting compression force in (x/y)=(-/-): 0 [lb]

Anchor forces are calculated based on the assumption of a rigid anchor plate.

3 Tension load

	Load N _{ua} [lb]	Capacity ϕN_n [lb]	Utilization $\beta_N = N_{ua} / \phi N_n$	Status
Steel Strength*	1,787	31,036	6	OK
Pullout Strength*	1,787	9,714	19	OK
Concrete Breakout Failure**	7,150	37,023	20	OK

* highest loaded anchor **anchor group (anchors in tension)

3.1 Steel Strength

N _{sa} [lb]	ϕ	ϕN_{sa} [lb]	N _{ua} [lb]
41,382	0.750	31,036	1,787

3.2 Pullout Strength

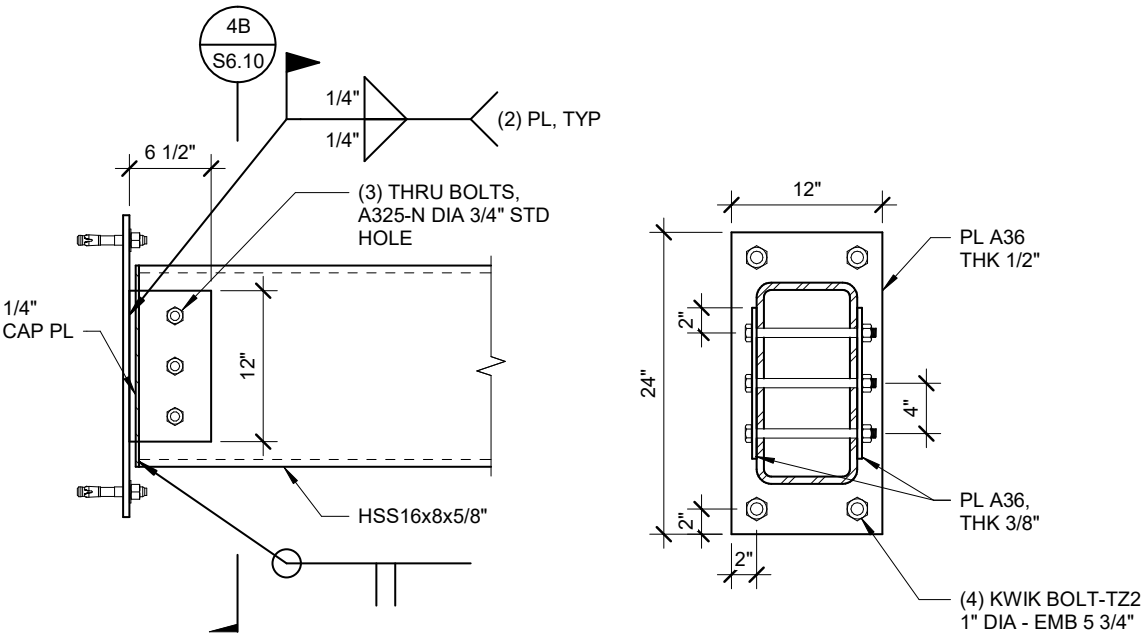
N _p [lb]	(f' _c /2500) ^{0.5}	λ_a	ϕ	$\phi N_{pn,fc}$ [lb]	N _{ua} [lb]
11,815	1.265	1.000	0.650	9,714	1,787

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3.3 Concrete Breakout Failure

A_{Nc} [in. ²]	A_{Nc0} [in. ²]	$c_{a,min}$ [in.]	c_{ac} [in.]	$\psi_{c,N}$		
802.12	297.56	9.000	16.000	1.000		
$e_{c1,N}$ [in.]	$\psi_{ec1,N}$	$e_{c2,N}$ [in.]	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	k_{cr}
0.000	1.000	0.000	1.000	1.000	1.000	21
λ_a	N_b [lb]	ϕ	ϕN_{cbg} [lb]	N_{ua} [lb]		
1.000	18,313	0.750	37,023	7,150		



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4 Shear load

	Load V_{ua} [lb]	Capacity ϕV_n [lb]	Utilization $\beta_V = V_{ua} / \phi V_n$	Status
Steel Strength*	9,694	14,842	66	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength*	9,694	17,278	57	OK
Concrete edge failure in direction y-**	16,075	16,089	100	OK

* highest loaded anchor **anchor group (relevant anchors)

When the input edge distance is set to "infinity", edge breakout verification is not performed in that direction

4.1 Steel Strength

V_{sa} [lb]	ϕ	ϕV_{sa} [lb]	V_{ua} [lb]
22,834	0.650	14,842	9,694

4.2 Pryout Strength

A_{Nc} [in. ²]	A_{Nc0} [in. ²]	$c_{a,min}$ [in.]	k_{cp}	c_{ac} [in.]	$\psi_{c,N}$
200.53	297.56	9.000	2	16.000	1.000
$e_{c1,V}$ [in.]	$\psi_{ec1,V}$	$e_{c2,V}$ [in.]	$\psi_{ec2,V}$	$\psi_{ed,N}$	k_{cr}
0.000	1.000	0.000	1.000	1.000	21
λ_a	N_b [lb]	ϕ	ϕV_{cp} [lb]	V_{ua} [lb]	
1.000	18,313	0.700	17,278	9,694	

4.3 Concrete edge failure in direction y-

l_e [in.]	d_a [in.]	c_{a1} [in.]	A_{Vc} [in. ²]	A_{Vc0} [in. ²]	
5.750	1.000	9.000	564.00	364.50	
$\psi_{ed,V}$	$\psi_{parallel,V}$	$e_{c,V}$ [in.]	$\psi_{ec,V}$	$\psi_{c,V}$	$\psi_{h,V}$
1.000	1.000	8.723	0.607	1.400	1.061
λ_a	V_b [lb]	ϕ	ϕV_{cbg} [lb]	V_{ua} [lb]	
1.000	15,369	0.750	16,089	16,075	

When the input edge distance is set to "infinity", edge breakout verification is not performed in that direction

5 Combined tension and shear loads, per ACI 318-19 section 17.8

β_N	β_V	ζ	Utilization β_{NV} [%]	Status
0.193	0.999	1.000	100	OK

$$\beta_{NV} = (\beta_N + \beta_V) / 1.2 \leq 1$$

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7 Anchor plate and concrete bearing stress check

	Load	Capacity	Utilization [%]	Status
Concentric Compression	N/A	N/A	N/A	N/A
Concrete bearing	N/A	N/A	N/A	N/A
Tension Interface	893.75 [in.lb/in.]	2,812.50 [in.lb/in.]	32	OK
Uniaxial Moment (Strong Axis)	N/A	N/A	N/A	N/A
Uniaxial Moment (Weak Axis)	N/A	N/A	N/A	N/A

7.1 Plate bending, tension (per AISC DG1, sections 3.2, 3.3)

$$m = \frac{N - 0.95d}{2}$$

$$n = \frac{B - 0.95b_f}{2}$$

$$M_{pl} = \frac{T_u \cdot x}{b_{eff}}$$

$$\phi M_n = \phi \cdot F_y \cdot \frac{t_p^2}{4}$$

$$M_{pl} \leq \phi M_n$$

Variables

B [in.]	N [in.]	d [in.]	b _f [in.]	F _y [psi]
12.000	24.000	16.000	8.000	50,000

φ	t _p [in.]	P _u [lb]	M _u [in.lb]
0.900	0.500	7,150	0

Calculations

m [in.]	n [in.]
4.400	2.200

T _u [lb]	x [in.]	b _{eff} [in.]
1,787	0.800	1.600

Results

M _n [in.lb/in.]	φ	φ M _n [in.lb/in.]	M _{pl} [in.lb/in.]
3,125.00	0.900	2,812.50	893.75

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8 Installation data

Profile: Rectangular HSS (AISC), HSS16X8X.625; (L x W x T) = 16.000 in. x 8.000 in. x 0.625 in.
Hole diameter in the fixture: $d_f = 1.125$ in.
Plate thickness (input): 0.500 in.
Drilling method: Hammer drilled
Cleaning: Manual cleaning of the drilled hole according to instructions for use is required.

Anchor type and diameter: Kwik Bolt TZ2 - CS 1 (5 3/4)
hnom 2

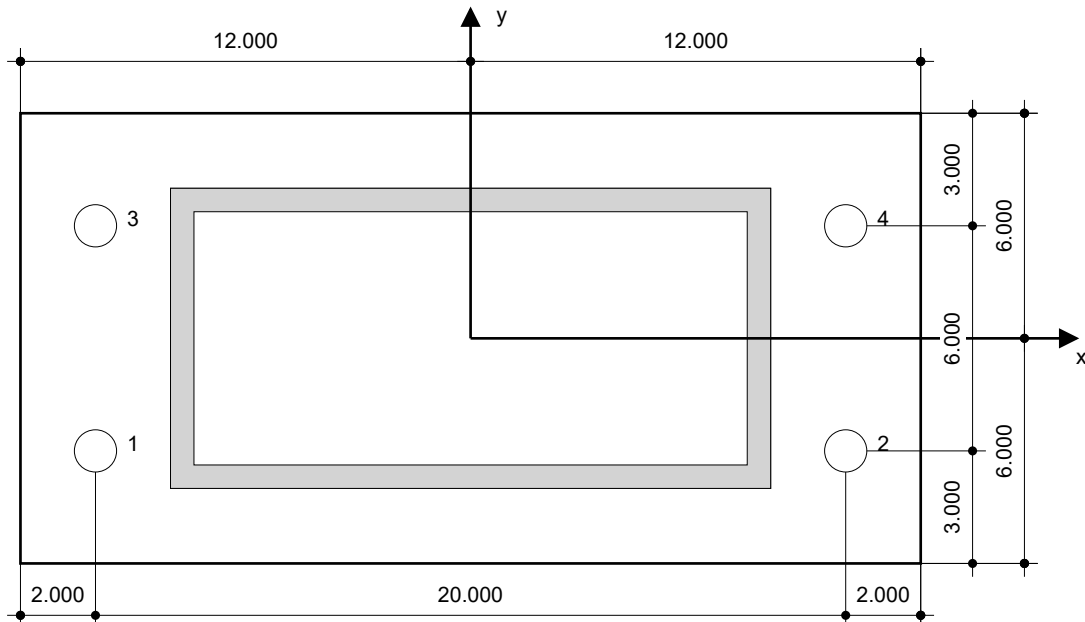
Item number: 2210301 KB-TZ2 1x9

Maximum installation torque: 2,227 in.lb
Hole diameter in the base material: 1.000 in.
Hole depth in the base material: 6.750 in.
Minimum thickness of the base material: 10.000 in.

Hilti $\varnothing 1$ in Kwik Bolt TZ2 - CS with 6.375 in nominal embedment depth per ICC-ES ESR-4266 , Hammer drilled installation per MPII

8.1 Recommended accessories

Drilling	Cleaning	Setting
- Suitable Rotary Hammer - Properly sized drill bit	Manual blow-out pump	- Torque wrench - Hammer



Coordinates Anchor in.

Anchor	x	y	c _{-x}	c _{+x}	c _{-y}	c _{+y}
1	-10.000	-3.000	-	-	9.000	-
2	10.000	-3.000	-	-	9.000	-
3	-10.000	3.000	-	-	15.000	-
4	10.000	3.000	-	-	15.000	-

KPFF Consulting Engineers
 700 Flower St
 Los Angeles, CA 90017
 (213) 310 8579

Project : COIL
 Job no. : 10012300277
 Date : Jun-24
 By : MO

Hangover HSS Beam Design

Project: **Inglewood Main Library Renovation and Technology Center**
 101 W Manchester Blvd, Inglewood, California, 90301

Wind design Parameters for Hangover

Esposure category C
 Risk category II

Vwind	95	mph
Kz	0.90	
Kzt	1.00	
Kd	0.85	
Ke	1.00	
qh	17.7	psf

Hangover properties

Width	3	ft
Length	30	ft
Effective Area	90	ft ²

GCpi Internal Presure Coefficient
 0.18
 -0.18
 GCp External Presure Coefficient
 -2.00
 -1.60

$$p = qh(GCp - GCpi)$$

Wall wind presure (psf)		
17.7	GCpi	
GCp	0.18	-0.18
-2	-38.5	-32.2
-1.6	-31.5	-25.1

Pwind	38.5	psf
--------------	-------------	------------

Steel structure consist in a HSS8x8x3/8" to support the the canopy hangover at the exterior wall of the entrance. From calculations above, wind forces will govern the design. See beam structure design and connection justification on following calculations:

Steel Beam

Project File: Exterior Wall Beams.ec6

LIC# : KW-06018621, Build:20.23.12.07

KPFF

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DESCRIPTION: HSS hangover beam

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

Material Properties

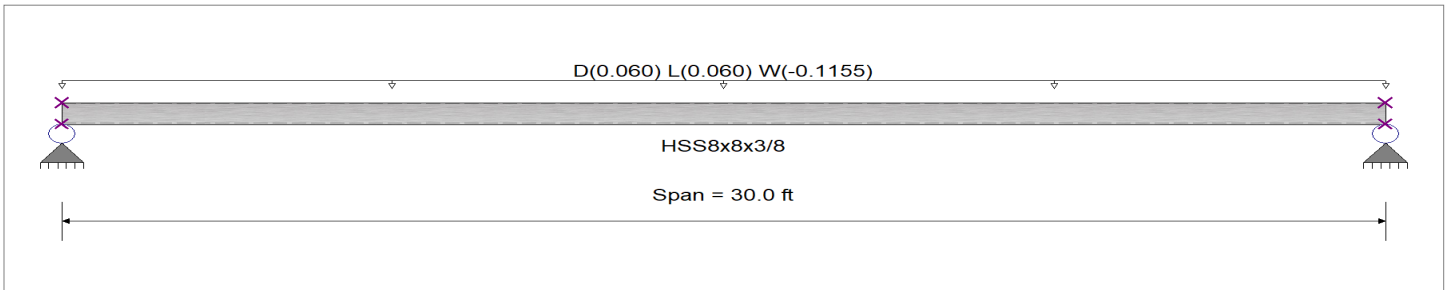
Analysis Method Load Resistance Factor Design

Beam Bracing : Completely Unbraced

Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi

E: Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Uniform Load : D = 0.020, L = 0.020, W = -0.03850 ksf, Tributary Width = 3.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.218 : 1	Maximum Shear Stress Ratio =	0.024 : 1
Section used for this span	HSS8x8x3/8	Section used for this span	HSS8x8x3/8
Mu : Applied	23.988 k-ft	Vu : Applied	3.198 k
Mn * Phi : Allowable	110.250 k-ft	Vn * Phi : Allowable	131.036 k
Load Combination	+1.20D+1.60L	Load Combination	+1.20D+1.60L
Span # where maximum occurs	Span # 1	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	0.379 in Ratio = 950 >=360	Span: 1 : L Only	
Max Upward Transient Deflection	-0.729 in Ratio = 493 >=360	Span: 1 : W Only	
Max Downward Total Deflection	0.996 in Ratio = 362 >=360	Span: 1 : +D+L	
Max Upward Total Deflection	-0.067 in Ratio = 5336 >=360	Span: 1 : +0.60D+0.60W	

Maximum Forces & Stresses for Load Combinations

Load Combination			Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
Segment Length	Span #		M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+1.40D														
Dsgn. L = 30.00 ft	1		0.140	0.016	15.39		15.39	122.50	110.25	1.14	1.00	2.05	145.60	131.04
+1.20D+1.60L														
Dsgn. L = 30.00 ft	1		0.218	0.024	23.99		23.99	122.50	110.25	1.14	1.00	3.20	145.60	131.04
+1.20D+0.50L														
Dsgn. L = 30.00 ft	1		0.150	0.017	16.56		16.56	122.50	110.25	1.14	1.00	2.21	145.60	131.04
+1.20D+0.50W														
Dsgn. L = 30.00 ft	1		0.061	0.007	6.69		6.69	122.50	110.25	1.14	1.00	0.89	145.60	131.04
+1.20D+0.50L+W														
Dsgn. L = 30.00 ft	1		0.032	0.004	3.57		3.57	122.50	110.25	1.14	1.00	0.48	145.60	131.04
+0.90D+W														
Dsgn. L = 30.00 ft	1		0.028	0.003		-3.10	3.10	122.50	110.25	1.14	1.00	0.41	145.60	131.04
+0.90D														
Dsgn. L = 30.00 ft	1		0.090	0.010	9.89		9.89	122.50	110.25	1.14	1.00	1.32	145.60	131.04

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.9955	15.086		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	2.365	2.365 2.413

Steel Beam

Project File: Exterior Wall Beams.ec6

LIC#: KW-06018621, Build:20.23.12.07

KPFF

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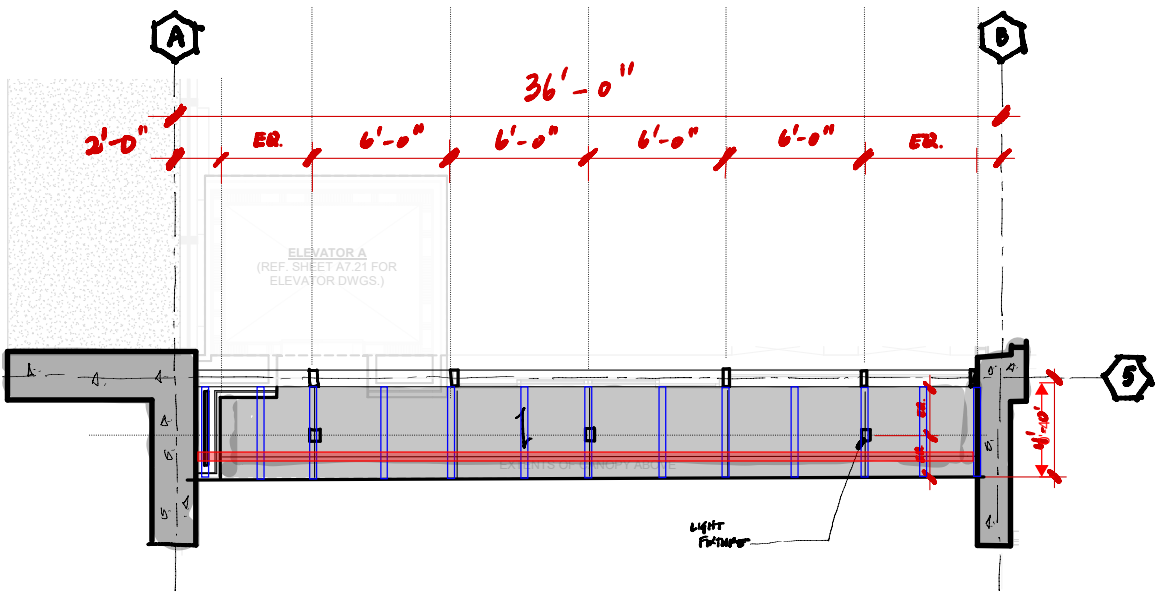
DESCRIPTION: HSS hangover beam

Vertical Reactions

Support notation : Far left is #:

Values in KIPS

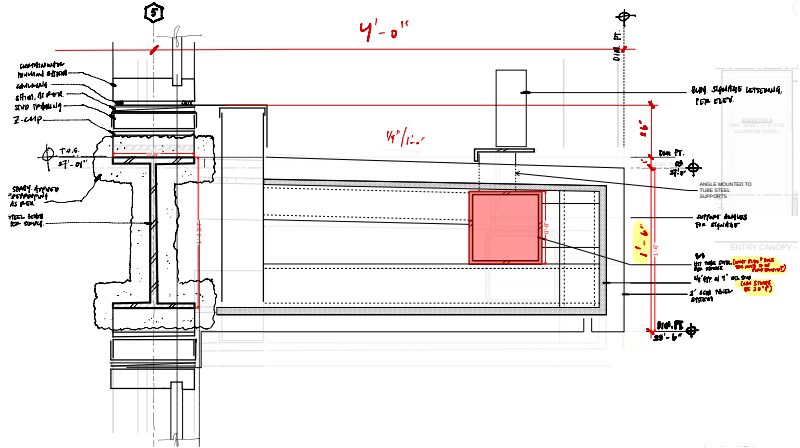
Load Combination	Support 1	Support 2	
Max Upward from Load Combinations	2.365	2.365	2.413
Max Upward from Load Cases	1.465	1.465	2.413
Max Downward from all Load Conditions (Resi	-1.733	-1.733	2.413
Max Downward from Load Combinations (Resi	-0.160	-0.160	2.413
Max Downward from Load Cases (Resisting U	-1.733	-1.733	2.413
D Only	1.465	1.465	2.413
+D+L	2.365	2.365	2.413
+D+0.750L	2.140	2.140	2.413
+D+0.60W	0.426	0.426	2.413
+D+0.750L+0.450W	1.361	1.361	2.413
+0.60D+0.60W	-0.160	-0.160	2.413
+0.60D	0.879	0.879	2.413
L Only	0.900	0.900	2.413
W Only	-1.733	-1.733	2.413

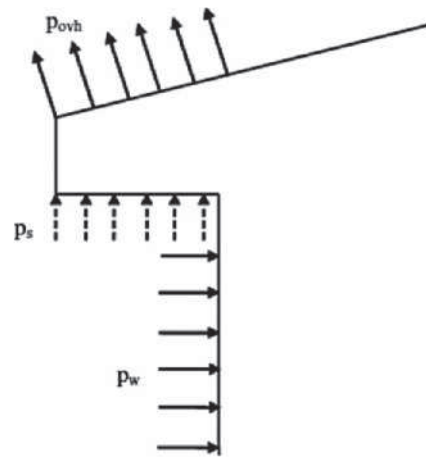


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FLOOR PLAN / 1/4"=1'-0" 02

RCP



Diagram

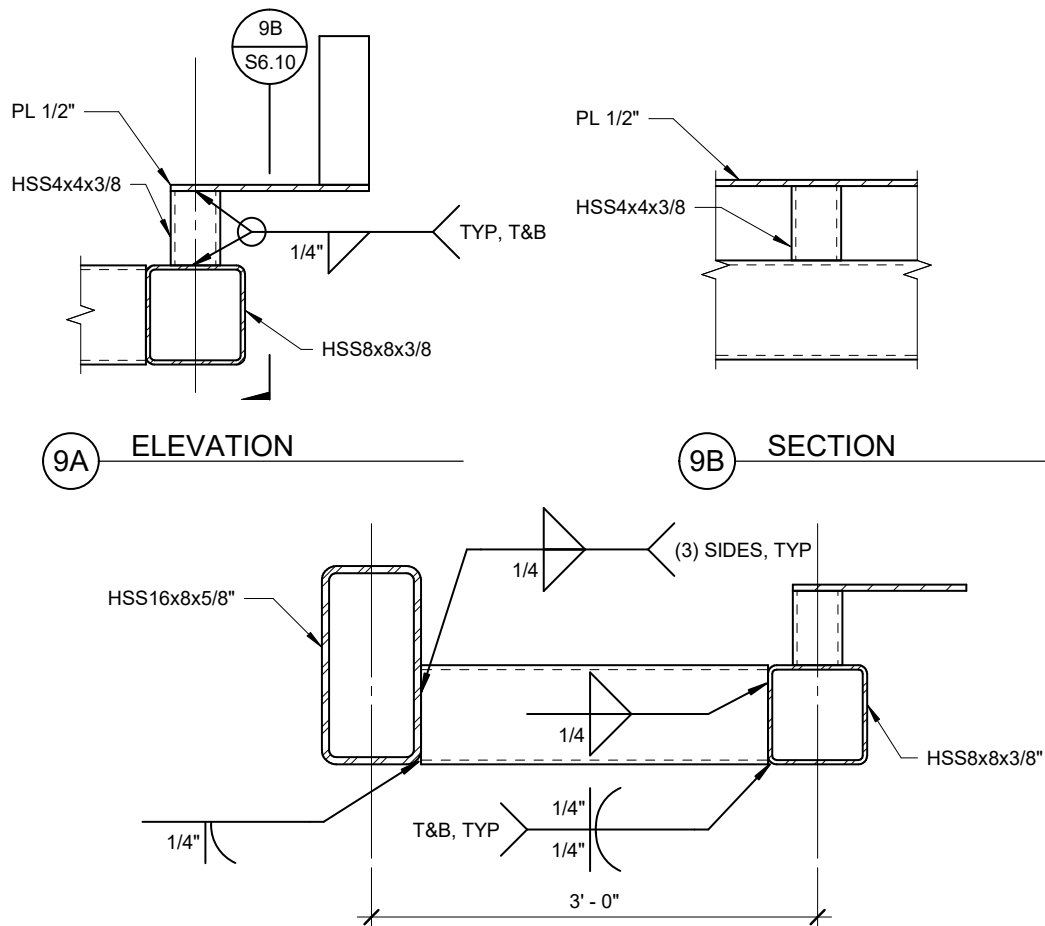
$$p_{ovh} = 1.0 \times \text{roof pressure } p \text{ from tables for edge Zones 1, 2}$$

$$p_{ovh} = 1.15 \times \text{roof pressure } p \text{ from tables for corner Zone 3}$$

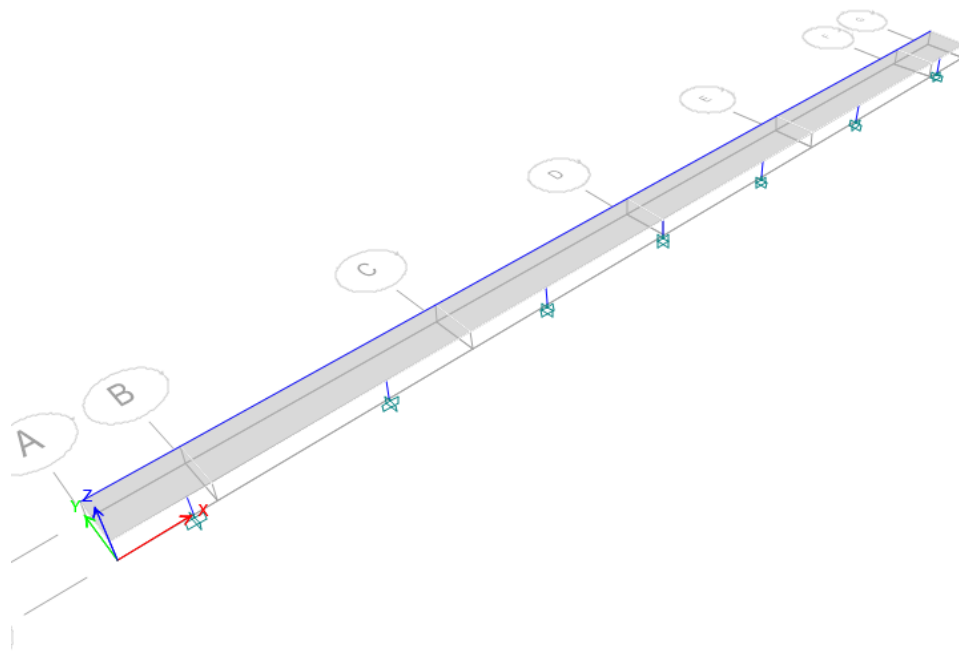
Notes

1. p_{ovh} = Roof pressure at overhang for interior, edge, or corner zone as applicable from figures in roof pressure table.
2. p_{ovh} from figures includes load from top and bottom surface of overhang.
3. Pressure p_s at soffit of overhang shall be taken as equal to the wall pressure p_w .

FIGURE 30.6-2 Components and Cladding, Part 4 [$h \leq 160$ ft ($h \leq 18.3$ m)]: Roof Overhang Wind Loads for Enclosed Simple Diaphragm Buildings—Application of Roof Overhang Wind Loads



ETABS[®]



Library Sign Structure

Model File: sign, Revision 0
2/12/2025

1 Structure Data

This chapter provides model geometry information, including items such as story levels, point coordinates, and element connectivity.

1.1 Story Data

Table 1.1 - Story Definitions

Tower	Name	Height ft	Master Story	Similar To	Splice Story	Color
T1	Story1	0.5	Yes	None	No	Cyan

1.2 Mass

Table 1.2 - Mass Source Definition

Name	Is Default	Include Lateral Mass?	Include Vertical Mass?	Lump Mass?	Source Self Mass?	Source Added Mass?	Source Load Patterns?	Move Mass Centroid?
MsSrc1	Yes	Yes	No	Yes	Yes	Yes	No	No

Table 1.3 - Mass Summary by Story

Story	UX lb-s2/ft	UY lb-s2/ft	UZ lb-s2/ft
Story1	25.42	25.42	0
Base	0.88	0.88	0

Table 1.4 - Mass Summary by Group

Group	Self Mass lb-s2/ft	Self Weight kip	Mass X lb-s2/ft	Mass Y lb-s2/ft	Mass Z lb-s2/ft
All	26.3	0	26.3	26.3	0

2 Properties

This chapter provides property information for materials, frame sections, shell sections, and links.

2.1 Materials

Table 2.1 - Material Properties - General

Material	Type	SymType	Grade	Color	Notes
A36	Steel	Isotropic	Grade 36	Green	
A416Gr270	Tendon	Uniaxial	Grade 270	Gray8Dark	
A615Gr60	Rebar	Uniaxial	Grade 60	Yellow	
A992Fy50	Steel	Isotropic	Grade 50	Red	

2.2 Frame Sections

Table 2.2 - Frame Section Property Definitions - Summary (Part 1 of 3)

Name	Material	Shape	Color	Area in ²	J in ⁴	I33 in ⁴	I22 in ⁴	As2 in ²	As3 in ²
Dummy	A36	Concrete Rectangular	Cyan	0.06	0.0005501	0.0003255	0.0003255	0.05	0.05
HSS4X4X3/8	A992Fy50	Steel Tube	Cyan	4.78	17.5	10.3	10.3	2.79	2.79

Table 2.2 - Frame Section Property Definitions - Summary (Part 2 of 3)

Name	S33Pos in ³	S33Neg in ³	S22Pos in ³	S22Neg in ³	Z33 in ³	Z22 in ³	R33 in	R22 in	Cw in ⁶	Fillet Radius in	CG Offset 3 in	CG Offset 2 in
Dummy	0.002604	0.002604	0.002604	0.002604	0.003906	0.003906	0.0722	0.0722			0	0
HSS4X4X3/8	5.15	5.15	5.15	5.15	6.39	6.39	1.4679	1.4679			0	0

Table 2.2 - Frame Section Property Definitions - Summary (Part 3 of 3)

Name	PNA Offset 2 in	Area Modifier	As2 Modifier	As3 Modifier	J Modifier	I33 Modifier	I22 Modifier	Mass Modifier	Weight Modifier
Dummy	0	0	0	0	0	0	0	0	0
HSS4X4X3/8	0	1	1	1	1	1	1	1	1

2.3 Shell Sections

Table 2.3 - Area Section Property Definitions - Summary

Name	Type	Element Type	Material	Total Thickness in	Deck Material	Deck Depth in
Plate 1/2"	Slab	Shell-Thin	A36	0.5		

3 Assignments

This chapter provides a listing of the assignments applied to the model.

3.1 Frame Assignments

Table 3.1 - Frame Assignments - Summary

Story	Label	UniqueName	Design Type	Length ft	Analysis Section	Design Section	Max Station Spacing ft	Min Number Stations
Story1	B6	8	Beam	2.0038	Dummy	Dummy	2	
Story1	B8	9	Beam	6.25	Dummy	Dummy	2	
Story1	B14	10	Beam	6.25	Dummy	Dummy	2	
Story1	B16	11	Beam	6.25	Dummy	Dummy	2	
Story1	B20	12	Beam	8.25	Dummy	Dummy	2	
Story1	C16	17	Column	0.5	HSS4X4X3/8	HSS4X4X3/8		3
Story1	C1	1	Column	0.5	HSS4X4X3/8	HSS4X4X3/8		3
Story1	C2	2	Column	0.5	HSS4X4X3/8	HSS4X4X3/8		3
Story1	C3	3	Column	0.5	HSS4X4X3/8	HSS4X4X3/8		3
Story1	C4	4	Column	0.5	HSS4X4X3/8	HSS4X4X3/8		3
Story1	C5	5	Column	0.5	HSS4X4X3/8	HSS4X4X3/8		3
Story1	C6	6	Column	0.5	HSS4X4X3/8	HSS4X4X3/8		3

3.2 Shell Assignments

Table 3.2 - Area Assignments - Summary

Story	Label	UniqueName	Section Property	Property Type
Story1	F1	1	Plate 1/2"	Slab
Story1	F2	2	Plate 1/2"	Slab
Story1	F3	3	Plate 1/2"	Slab
Story1	F8	4	Plate 1/2"	Slab
Story1	F9	5	Plate 1/2"	Slab
Story1	F12	6	Plate 1/2"	Slab

4 Loads

This chapter provides loading information as applied to the model.

4.1 Load Patterns

Table 4.1 - Load Pattern Definitions

Name	Is Auto Load	Type	Self Weight Multiplier	Auto Load
~LLRF	Yes	Other	0	
Dead	No	Dead	1	
Live	No	Live	0	
Wind	No	Wind	0	None

4.2 Applied Loads

4.2.1 Line Loads

Table 4.2 - Frame Loads Assignments - Distributed (Part 1 of 2)

UniqueName	Load Pattern	Story	Label	Load Type	Direction	Distance Type	Relative Distance A	Relative Distance B	Absolute Distance A ft	Absolute Distance B ft
8	Dead	Story1	B6	Force	Gravity	Relative	0	1	0	2.0038
9	Dead	Story1	B8	Force	Gravity	Relative	0	1	0	6.25
10	Dead	Story1	B14	Force	Gravity	Relative	0	1	0	6.25
11	Dead	Story1	B16	Force	Gravity	Relative	0	1	0	6.25
12	Dead	Story1	B20	Force	Gravity	Relative	0	1	0	8.25

Table 4.2 - Frame Loads Assignments - Distributed (Part 2 of 2)

UniqueName	Load Pattern	Force A kip/ft	Force B kip/ft
8	Dead	0.022	0.022
9	Dead	0.022	0.022
10	Dead	0.022	0.022
11	Dead	0.022	0.022
12	Dead	0.022	0.022

4.2.2 Area Loads

Table 4.3 - Area Load Assignments - Uniform

Story	Label	UniqueName	Load Pattern	Direction	Load lb/ft2
Story1	F1	1	Live	Gravity	20
Story1	F2	2	Live	Gravity	20
Story1	F3	3	Live	Gravity	20
Story1	F8	4	Live	Gravity	20
Story1	F9	5	Live	Gravity	20
Story1	F12	6	Live	Gravity	20
Story1	F1	1	Wind	Gravity	-22.6

Table 4.3 - Area Load Assignments - Uniform (continued)

Story	Label	UniqueName	Load Pattern	Direction	Load lb/ft2
Story1	F2	2	Wind	Gravity	-22.6
Story1	F3	3	Wind	Gravity	-22.6
Story1	F8	4	Wind	Gravity	-22.6
Story1	F9	5	Wind	Gravity	-22.6
Story1	F12	6	Wind	Gravity	-22.6

4.3 Load Cases

Table 4.4 - Load Case Definitions - Summary

Name	Type
Dead	Linear Static
Live	Linear Static
Modal	Modal - Eigen
Wind	Linear Static

4.4 Load Combinations

Table 4.5 - Load Combination Definitions

Name	Type	Is Auto	Load Name	SF	Notes
Envelope	Envelope	No	UDStIS1	1	
Envelope			UDStIS2	1	
Envelope			UDStID1	1	
Envelope			UDStID2	1	
Envelope			UDStIS5	1	
Envelope			UDStIS6	1	
Envelope			UDStIS7	1	
Envelope			UDStIS8	1	
UDStID1	Linear Add	No	Dead	1	Dead [Deflections]
UDStID2	Linear Add	No	Dead	1	Dead + Live [Deflections]
UDStID2			Live	1	
UDStIS1	Linear Add	No	Dead	1.4	Dead [Strength]
UDStIS2	Linear Add	No	Dead	1.2	Dead + Live [Strength]
UDStIS2			Live	1.6	
UDStIS5	Linear Add	No	Dead	1.2	Dead + Live + Wind + Snow [Strength]
UDStIS5			Live	1	
UDStIS5			Wind	1	
UDStIS6	Linear Add	No	Dead	1.2	Dead + Live - Wind + Snow [Strength]
UDStIS6			Live	1	
UDStIS6			Wind	-1	
UDStIS7	Linear Add	No	Dead	0.9	Dead (min) + Wind [Strength]
UDStIS7			Wind	1	
UDStIS8	Linear Add	No	Dead	0.9	Dead (min) - Wind [Strength]
UDStIS8			Wind	-1	

5 Analysis Results

This chapter provides analysis results.

5.1 Structure Results

Table 5.1 - Base Reactions

Output Case	Case Type	Step Type	FX lb	FY lb	FZ lb	MX lb-ft	MY lb-ft	MZ lb-ft	X ft	Y ft	Z ft
Dead	LinStatic		0	0	1485.154	1377.7382	-21536.313	0	0	0	0
Live	LinStatic		0	0	773.164	515.3069	-11211.2371	0	0	0	0
Wind	LinStatic		0	0	-873.675	-582.2968	12668.698	0	0	0	0
UDStIS1	Combination		0	0	2079.215	1928.8335	-30150.8382	0	0	0	0
UDStIS2	Combination		0	0	3019.246	2477.777	-43781.555	0	0	0	0
UDStID1	Combination		0	0	1485.154	1377.7382	-21536.313	0	0	0	0
UDStID2	Combination		0	0	2258.317	1893.0451	-32747.5501	0	0	0	0
Envelope	Combination	Max	0	0	3429.023	2750.8896	-6713.9838	0	0	0	0
Envelope	Combination	Min	0	0	462.963	657.6675	-49723.5107	0	0	0	0
UDStIS5	Combination		0	0	1681.673	1586.2959	-24386.1148	0	0	0	0
UDStIS6	Combination		0	0	3429.023	2750.8896	-49723.5107	0	0	0	0
UDStIS7	Combination		0	0	462.963	657.6675	-6713.9838	0	0	0	0
UDStIS8	Combination		0	0	2210.313	1822.2612	-32051.3797	0	0	0	0

5.2 Story Results

Table 5.2 - Story Drifts

Story	Output Case	Case Type	Step Type	Direction	Drift	Label	X ft	Y ft	Z ft
Story1	Dead	LinStatic		Y	3.4E-05	2	6	0	0.5
Story1	Live	LinStatic		Y	1.3E-05	2	6	0	0.5
Story1	Wind	LinStatic		Y	1.4E-05	2	6	0	0.5
Story1	UDStIS1	Combination		Y	4.8E-05	2	6	0	0.5
Story1	UDStIS2	Combination		Y	6.1E-05	2	6	0	0.5
Story1	UDStID1	Combination		Y	3.4E-05	2	6	0	0.5
Story1	UDStID2	Combination		Y	4.7E-05	2	6	0	0.5
Story1	Envelope	Combination	Max	Y	6.8E-05	2	6	0	0.5
Story1	Envelope	Combination	Min	X	6E-06	9	27.5	0	0.5
Story1	Envelope	Combination	Min	Y	1.6E-05	2	6	0	0.5
Story1	UDStIS5	Combination		Y	3.9E-05	2	6	0	0.5
Story1	UDStIS6	Combination		Y	6.8E-05	2	6	0	0.5
Story1	UDStIS7	Combination		Y	1.6E-05	2	6	0	0.5
Story1	UDStIS8	Combination		Y	4.5E-05	2	6	0	0.5

Table 5.3 - Story Forces

Story	Output Case	Case Type	Step Type	Location	P lb	VX lb	VY lb	T lb-ft	MX lb-ft	MY lb-ft
Story1	Dead	LinStatic		Top	1428.225	0	0	0	1377.7382	-20710.8502
Story1	Dead	LinStatic		Bottom	1485.154	0	0	0	1377.7382	-21536.313
Story1	Live	LinStatic		Top	773.164	0	0	0	515.3069	-11211.2371
Story1	Live	LinStatic		Bottom	773.164	0	0	0	515.3069	-11211.2371

Table 5.3 - Story Forces (continued)

Story	Output Case	Case Type	Step Type	Location	P lb	VX lb	VY lb	T lb-ft	MX lb-ft	MY lb-ft
Story1	Wind	LinStatic		Top	-873.675	0	0	0	-582.2968	12668.698
Story1	Wind	LinStatic		Bottom	-873.675	0	0	0	-582.2968	12668.698
Story1	UDStIS1	Combination		Top	1999.515	0	0	0	1928.8335	-28995.1902
Story1	UDStIS1	Combination		Bottom	2079.215	0	0	0	1928.8335	-30150.8382
Story1	UDStIS2	Combination		Top	2950.932	0	0	0	2477.777	-42790.9996
Story1	UDStIS2	Combination		Bottom	3019.246	0	0	0	2477.777	-43781.555
Story1	UDStID1	Combination		Top	1428.225	0	0	0	1377.7382	-20710.8502
Story1	UDStID1	Combination		Bottom	1485.154	0	0	0	1377.7382	-21536.313
Story1	UDStID2	Combination		Top	2201.389	0	0	0	1893.0451	-31922.0873
Story1	UDStID2	Combination		Bottom	2258.317	0	0	0	1893.0451	-32747.5501
Story1	Envelope	Combination	Max	Top	3360.709	0	0	0	2750.8896	-5971.0672
Story1	Envelope	Combination	Max	Bottom	3429.023	0	0	0	2750.8896	-6713.9838
Story1	Envelope	Combination	Min	Top	411.728	0	0	0	657.6675	-48732.9553
Story1	Envelope	Combination	Min	Bottom	462.963	0	0	0	657.6675	-49723.5107
Story1	UDStIS5	Combination		Top	1613.359	0	0	0	1586.2959	-23395.5594
Story1	UDStIS5	Combination		Bottom	1681.673	0	0	0	1586.2959	-24386.1148
Story1	UDStIS6	Combination		Top	3360.709	0	0	0	2750.8896	-48732.9553
Story1	UDStIS6	Combination		Bottom	3429.023	0	0	0	2750.8896	-49723.5107
Story1	UDStIS7	Combination		Top	411.728	0	0	0	657.6675	-5971.0672
Story1	UDStIS7	Combination		Bottom	462.963	0	0	0	657.6675	-6713.9838
Story1	UDStIS8	Combination		Top	2159.078	0	0	0	1822.2612	-31308.4631
Story1	UDStIS8	Combination		Bottom	2210.313	0	0	0	1822.2612	-32051.3797

5.3 Point Results**Table 5.4 - Joint Reactions**

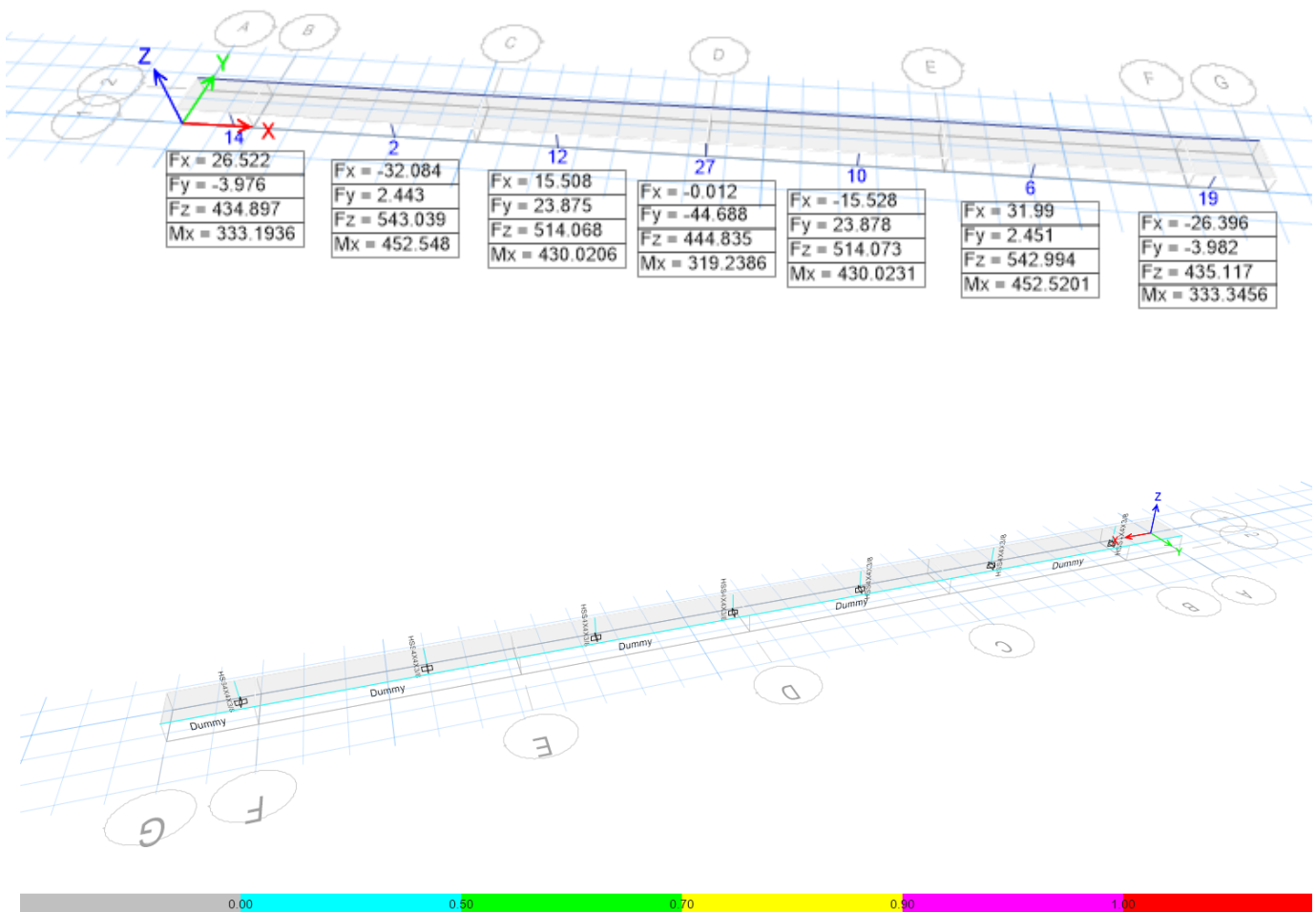
Story	Label	Unique Name	Output Case	Case Type	Step Type	FX lb	FY lb	FZ lb	MX lb-ft	MY lb-ft	MZ lb-ft
Base	6	27	Dead	LinStatic		-0.006	-23.265	191.122	159.841	-0.0027	-0.0001
Base	6	27	Live	LinStatic		-0.002	-7.873	101.168	59.826	-0.0012	-8.693E-06
Base	6	27	Wind	LinStatic		0.003	8.897	-114.32	-67.6034	0.0013	9.823E-06
Base	6	27	UDStIS1	Combination		-0.008	-32.571	267.571	223.7774	-0.0038	-0.0001
Base	6	27	UDStIS2	Combination		-0.011	-40.515	391.216	287.5308	-0.0052	-0.0001
Base	6	27	UDStID1	Combination		-0.006	-23.265	191.122	159.841	-0.0027	-0.0001
Base	6	27	UDStID2	Combination		-0.008	-31.138	292.291	219.667	-0.0039	-0.0001
Base	6	27	Envelope	Combination	Max	-0.002	-12.041	444.835	319.2386	-0.0011	-0.0001
Base	6	27	Envelope	Combination	Min	-0.012	-44.688	57.69	76.2535	-0.0058	-0.0001
Base	6	27	UDStIS5	Combination		-0.007	-26.894	216.195	184.0318	-0.0031	-0.0001
Base	6	27	UDStIS6	Combination		-0.012	-44.688	444.835	319.2386	-0.0058	-0.0001
Base	6	27	UDStIS7	Combination		-0.002	-12.041	57.69	76.2535	-0.0011	-0.0001
Base	6	27	UDStIS8	Combination		-0.008	-29.835	286.33	211.4603	-0.0038	-0.0001
Base	2	2	Dead	LinStatic		-15.582	1.712	235.184	226.079	-0.4724	-0.4267
Base	2	2	Live	LinStatic		-6.284	0.182	122.45	85.0954	-0.3767	-0.119
Base	2	2	Wind	LinStatic		7.101	-0.206	-138.368	-96.1578	0.4256	0.1345
Base	2	2	UDStIS1	Combination		-21.814	2.397	329.257	316.5106	-0.6613	-0.5974
Base	2	2	UDStIS2	Combination		-28.753	2.346	478.14	407.4474	-1.1695	-0.7024

Table 5.4 - Joint Reactions (continued)

Story	Label	Unique Name	Output Case	Case Type	Step Type	FX lb	FY lb	FZ lb	MX lb-ft	MY lb-ft	MZ lb-ft
Base	2	2	UDStID1	Combination		-15.582	1.712	235.184	226.079	-0.4724	-0.4267
Base	2	2	UDStID2	Combination		-21.866	1.894	357.634	311.1744	-0.849	-0.5457
Base	2	2	Envelope	Combination	Max	-6.922	2.443	543.039	452.548	0.0005	-0.2495
Base	2	2	Envelope	Combination	Min	-32.084	1.336	73.297	107.3132	-1.3691	-0.7655
Base	2	2	UDStIS5	Combination		-17.881	2.031	266.302	260.2324	-0.5179	-0.4965
Base	2	2	UDStIS6	Combination		-32.084	2.443	543.039	452.548	-1.3691	-0.7655
Base	2	2	UDStIS7	Combination		-6.922	1.336	73.297	107.3132	0.0005	-0.2495
Base	2	2	UDStIS8	Combination		-21.125	1.747	350.034	299.6289	-0.8508	-0.5185
Base	3	6	Dead	LinStatic		15.531	1.716	235.159	226.0674	0.4654	0.4265
Base	3	6	Live	LinStatic		6.269	0.184	122.443	85.0888	0.3741	0.1193
Base	3	6	Wind	LinStatic		-7.084	-0.208	-138.36	-96.1504	-0.4227	-0.1348
Base	3	6	UDStIS1	Combination		21.743	2.402	329.223	316.4944	0.6516	0.5971
Base	3	6	UDStIS2	Combination		28.668	2.353	478.1	407.423	1.1571	0.7026
Base	3	6	UDStID1	Combination		15.531	1.716	235.159	226.0674	0.4654	0.4265
Base	3	6	UDStID2	Combination		21.8	1.9	357.602	311.1562	0.8396	0.5458
Base	3	6	Envelope	Combination	Max	31.99	2.451	542.994	452.5201	1.3554	0.7659
Base	3	6	Envelope	Combination	Min	6.893	1.336	73.283	107.3103	-0.0038	0.2491
Base	3	6	UDStIS5	Combination		17.822	2.035	266.273	260.2193	0.5099	0.4963
Base	3	6	UDStIS6	Combination		31.99	2.451	542.994	452.5201	1.3554	0.7659
Base	3	6	UDStIS7	Combination		6.893	1.336	73.283	107.3103	-0.0038	0.2491
Base	3	6	UDStIS8	Combination		21.062	1.752	350.004	299.611	0.8416	0.5186
Base	4	10	Dead	LinStatic		-10.294	12.25	223.464	215.7658	-4.6055	-2.1101
Base	4	10	Live	LinStatic		-1.491	4.309	115.453	80.3306	-2.2643	-0.8108
Base	4	10	Wind	LinStatic		1.685	-4.869	-130.462	-90.7736	2.5586	0.9163
Base	4	10	UDStIS1	Combination		-14.412	17.15	312.85	302.0721	-6.4477	-2.9542
Base	4	10	UDStIS2	Combination		-14.738	21.594	452.883	387.4479	-9.1494	-3.8295
Base	4	10	UDStID1	Combination		-10.294	12.25	223.464	215.7658	-4.6055	-2.1101
Base	4	10	UDStID2	Combination		-11.785	16.559	338.918	296.0964	-6.8697	-2.921
Base	4	10	Envelope	Combination	Max	-7.58	23.878	514.073	430.0231	-1.5863	-0.9828
Base	4	10	Envelope	Combination	Min	-15.528	6.156	70.656	103.4156	-10.3494	-4.2592
Base	4	10	UDStIS5	Combination		-12.159	14.14	253.148	248.476	-5.2322	-2.4267
Base	4	10	UDStIS6	Combination		-15.528	23.878	514.073	430.0231	-10.3494	-4.2592
Base	4	10	UDStIS7	Combination		-7.58	6.156	70.656	103.4156	-1.5863	-0.9828
Base	4	10	UDStIS8	Combination		-10.949	15.894	331.58	284.9628	-6.7035	-2.8154
Base	7	12	Dead	LinStatic		10.285	12.248	223.462	215.7641	4.599	2.11
Base	7	12	Live	LinStatic		1.487	4.308	115.452	80.3303	2.2615	0.8109
Base	7	12	Wind	LinStatic		-1.68	-4.868	-130.461	-90.7733	-2.5555	-0.9163
Base	7	12	UDStIS1	Combination		14.398	17.148	312.846	302.0698	6.4386	2.954
Base	7	12	UDStIS2	Combination		14.72	21.591	452.878	387.4455	9.1372	3.8294
Base	7	12	UDStID1	Combination		10.285	12.248	223.462	215.7641	4.599	2.11
Base	7	12	UDStID2	Combination		11.771	16.557	338.914	296.0945	6.8605	2.9209
Base	7	12	Envelope	Combination	Max	15.508	23.875	514.068	430.0206	10.3359	4.2592
Base	7	12	Envelope	Combination	Min	7.576	6.155	70.654	103.4144	1.5835	0.9827
Base	7	12	UDStIS5	Combination		12.148	14.138	253.145	248.474	5.2248	2.4266
Base	7	12	UDStIS6	Combination		15.508	23.875	514.068	430.0206	10.3359	4.2592

Table 5.4 - Joint Reactions (continued)

Story	Label	Unique Name	Output Case	Case Type	Step Type	FX lb	FY lb	FZ lb	MX lb-ft	MY lb-ft	MZ lb-ft
Base	7	12	UDStIS7	Combination		7.576	6.155	70.654	103.4144	1.5835	0.9827
Base	7	12	UDStIS8	Combination		10.936	15.892	331.577	284.961	6.6946	2.8153
Base	8	14	Dead	LinStatic		10.792	-2.33	188.316	167.0604	-17.4978	-1.5618
Base	8	14	Live	LinStatic		6.372	-0.554	98.083	62.3104	-8.4493	-0.6441
Base	8	14	Wind	LinStatic		-7.2	0.626	-110.834	-70.4107	9.5477	0.7278
Base	8	14	UDStIS1	Combination		15.108	-3.261	263.642	233.8846	-24.4969	-2.1866
Base	8	14	UDStIS2	Combination		23.145	-3.682	382.913	300.1691	-34.5162	-2.9047
Base	8	14	UDStID1	Combination		10.792	-2.33	188.316	167.0604	-17.4978	-1.5618
Base	8	14	UDStID2	Combination		17.163	-2.884	286.399	229.3708	-25.9471	-2.2059
Base	8	14	Envelope	Combination	Max	26.522	-1.47	434.897	333.1936	-6.2003	-0.6779
Base	8	14	Envelope	Combination	Min	2.512	-3.976	58.65	79.9436	-38.9944	-3.2461
Base	8	14	UDStIS5	Combination		12.122	-2.723	213.228	192.3721	-19.8989	-1.7905
Base	8	14	UDStIS6	Combination		26.522	-3.976	434.897	333.1936	-38.9944	-3.2461
Base	8	14	UDStIS7	Combination		2.512	-1.47	58.65	79.9436	-6.2003	-0.6779
Base	8	14	UDStIS8	Combination		16.913	-2.723	280.319	220.7651	-25.2957	-2.1335
Base	9	19	Dead	LinStatic		-10.725	-2.332	188.446	167.1605	17.4242	1.5586
Base	9	19	Live	LinStatic		-6.35	-0.556	98.113	62.3254	8.4265	0.6433
Base	9	19	Wind	LinStatic		7.175	0.628	-110.868	-70.4277	-9.5219	-0.7269
Base	9	19	UDStIS1	Combination		-15.015	-3.264	263.825	234.0247	24.3939	2.1821
Base	9	19	UDStIS2	Combination		-23.03	-3.687	383.117	300.3132	34.3914	2.8996
Base	9	19	UDStID1	Combination		-10.725	-2.332	188.446	167.1605	17.4242	1.5586
Base	9	19	UDStID2	Combination		-17.075	-2.887	286.56	229.4859	25.8507	2.2019
Base	9	19	Envelope	Combination	Max	-2.477	-1.471	435.117	333.3456	38.8575	3.2406
Base	9	19	Envelope	Combination	Min	-26.396	-3.982	58.734	80.0168	6.1599	0.6758
Base	9	19	UDStIS5	Combination		-12.045	-2.726	213.381	192.4903	19.8136	1.7867
Base	9	19	UDStIS6	Combination		-26.396	-3.982	435.117	333.3456	38.8575	3.2406
Base	9	19	UDStIS7	Combination		-2.477	-1.471	58.734	80.0168	6.1599	0.6758
Base	9	19	UDStIS8	Combination		-16.828	-2.726	280.47	220.8721	25.2037	2.1297





project: Inglewood Library Renovation

sheet no.:

69

location: Inglewood, CA

job no.: 10012300277

client:

date: 02/15/2025

D. Concrete Elevator Walls & footing design



project: Inglewood Library - Elevator walls

sheet no.:

70

location: Inglewood, CA

job no.: 10012300277

client:

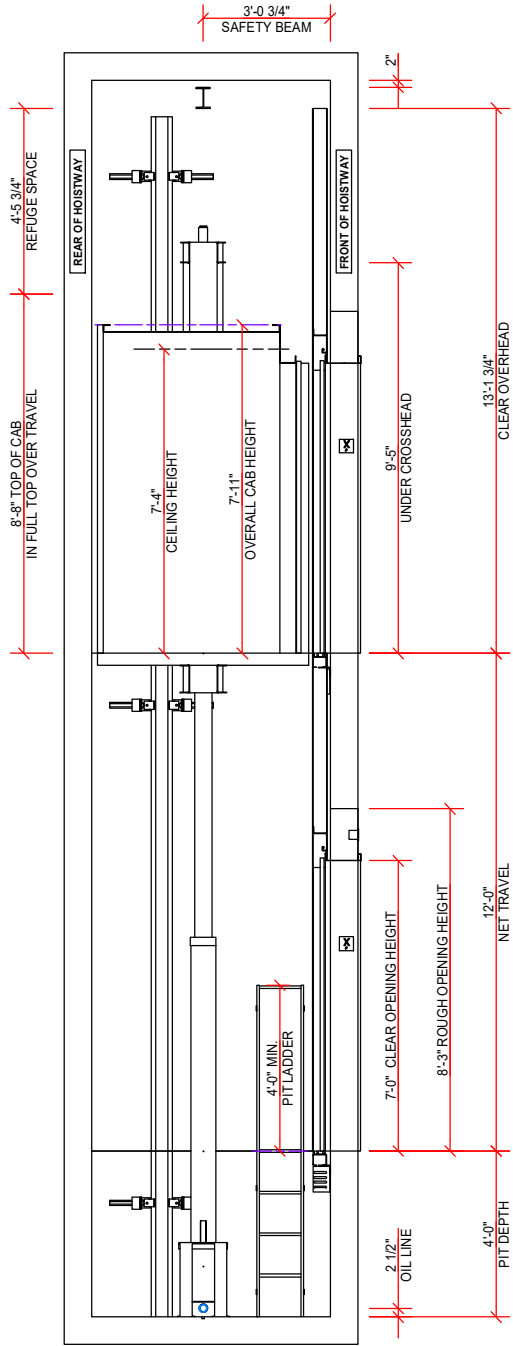
date: 07/05/2024

Summary:

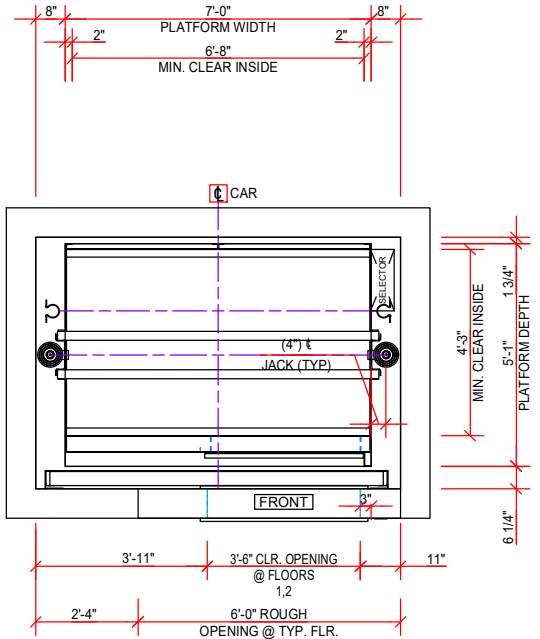
The structure of the Elevator consists in a 8" concrete Wall system, with two level access located at grid 5, the construction of this elevator includes the demolition of an existing footing, for which the geometry of the footing it's adapted to the condition described, the design was based on the Hydraulic elevator cut sheet. See following calculations for the Elevator concrete walls and foundation structure and connections design justification.

The following codes where used for the design:

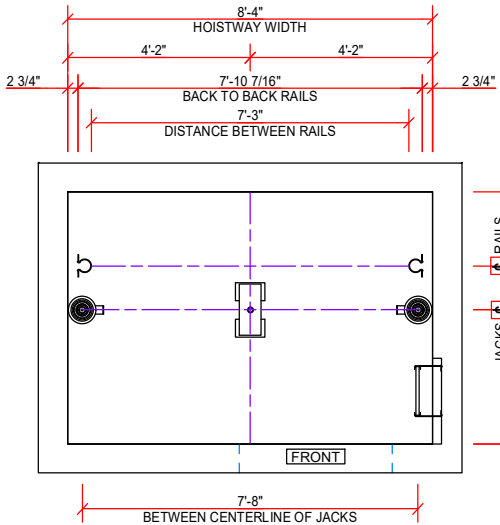
- 2022 California Building Code.
- AISC 360-16
- ASCE 7-16
- ACI 318-14
- Elevator cut sheet



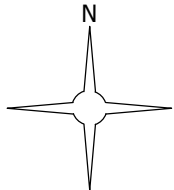
ELEVATION VIEW



HOISTWAY PLAN



PIT PLAN



HYDRAULIC ELEVATOR CONTRACT DATA				
TYPE:	endura 25 A		ELEVATOR DESIGNATION: 1	
SPEED: 110 FPM UP / 135 FPM DOWN			CAPACITY:	2,500 LBS
CAR ENCLOSURE: TKAP			DOOR HAND:	71
PLATFORM THICKNESS: 3 3/8"			FINISHED FLOOR:	RS
CAR WEIGHT:	2,280.00 LBS			
TELEPHONE:	BY ELEVATOR COMPANY		PIT LADDER:	BY OTHERS
POWER UNIT: EP-95, 25 HP			POWER SUPPLY:	460 V 3 Phase 60 Cycles
STARTING: SOLID STATE STARTING			OPERATION:	TAC32
GLOJ: 4,780 LBS			GLOPU:	5,251 LBS
OVER TRAVEL: BOTTOM: 8 1/2"			TOP: 9"	
JACK MODEL: 2.5T TWIN/TELE			PLUNGER WEIGHT:	471.00 LBS
PLUNGER LENGTH: UPPER: 13'-7 5/8"			LOWER: 8'-2 7/16"	
PLUNGER WALL THK: UPPER: 0.375"			LOWER: 0.25"	
PLUNGER O.D: UPPER: 2.5"			LOWER: 3.75"	
CYLINDER LENGTH: 8'-2 7/8"			CYLINDER O.D: 5"	WALL THK: 1/4"
NET AREA: 15.904 SQ.IN.			BETWEEN PIT FLOOR & CAR BOLSTER ON COMPRESSED BUFFER:	2'-3 7/8"
BOTTOM CAR RUNBY: 6"			EST. WORKING PRESS: 363 PSI	CAR BUFFER STROKE: 2 1/2"
(QTY) SPRING(S) #: (1) 780CB1			TOTAL SPRING(S) CAPACITY: 15,223 LBS	
JACK REACTION (EA.): 5,510.00 LBS		CAR BUFFER REACTION: 13,168.00 LBS		
CAR FRAME	S = 3.27	FORMED	S = 5.67	FORMED
	I = 9.82	CROSSHEAD	I = 23.39	BOLSTER
	A = 1.85	7GA x 6" x 2 1/2"	A = 2.40	7GA x 8 1/4" x 2 3/4"
			R = 1.01	10GA
RAIL FORCES		F1	F2	SEISMIC RAIL FORCES ZONE: 4
		405 LBS	231 LBS	F1 = 1,368 LBS F2 = 684 LBS

CAR STATION FEATURES: Traditional Fixtures, T2 Buttons, Alarm Button, Telephone, Position Indicator

PUSH BUTTON MARKINGS: 1, 2

CAR RIDING LANTERN: Strike

NOTE A: OIL PIPE LINES AND FITTINGS SHALL BE PROPERLY SUPPORTED TO RELIEVE STRAIN.

NOTE B: ALL REACTIONS INCLUDE ALLOWANCE FOR IMPACT.

NOTE C: TK ELEVATOR TO BE NOTIFIED OF ANY CHANGE TO ELEVATOR HOISTWAY OR MACHINE ROOM DESIGN.

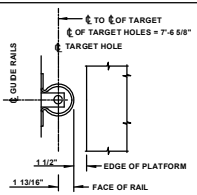
NOTE D: ELEVATOR DESIGN & FABRICATION BASED ON ESTIMATED CAB WEIGHT SHOWN. LAYOUT APPROVAL WILL BE CONSTRUED AS FINAL CAR WEIGHT, UNLESS OTHERWISE NOTIFIED.

BY OTHERS

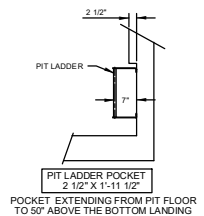
THE FOLLOWING CONDITIONS MUST BE MET BEFORE INSTALLATION IS COMPLETED AND ARE NOT INCLUDED IN THE ELEVATOR CONTRACT

GENERAL DATA

- LIGHTING (MINIMUM 200LUX/19FT. CANDLES) AND SWITCH, CONVENIENCE OUTLETS WITH GFCI PROTECTION PER NEC. LIGHTING IS REQUIRED AT THE PIT LEVEL.
- A LIGHT SWITCH LOCATED 4'-0" ABOVE BOTTOM LANDING NEXT TO THE TOP RUNG OF THE LADDER.
- A PLUMB AND PROPERLY VENTED HOISTWAY BUILT ACCORDING TO CODE AND SIZES SHOWN.
- ADEQUATE SUPPORT FOR JACK, GUIDE RAIL BRACKETS, AND BUFFERS (FOR REACTIONS SHOWN)
- HOISTWAY BARRICADES AND ALL CUTTING AND PATCHING TO INSTALL HOISTWAY ENTRANCES, SILLS, HALL FIXTURES, OIL, AND ELECTRIC LINES.
- ENTRANCE WALL WITH LINTELS MUST BE PROVIDED AFTER ENTRANCE FRAMES ARE SET OR LEAVE A ROUGH OPENING WIDER AND HIGHER THAN THE FRAME OPENING AS SHOWN. SEE INSTALLATION PROCEDURES FOR FRAME-TO-WALL INTERFACE DETAILS TO ENSURE CONFORMANCE WITH THE LABELED ENTRANCE INTERFACE CONSTRUCTION.
- PIT LADDER PER CAR (ACCORDING TO CODE) NOTE: MUST BE CLEAR OF ALL ELEVATOR EQUIPMENT.
- PIT LADDER LOCATION TO BE CONFIRMED BY TK ELEVATOR SUPERINTENDENT.
- POCKETS IN CORRIDOR WALL FOR HALL FIXTURES.
- NOTE: MUST BE LOCATED AS DIRECTED BY ELEVATOR CONTRACTOR
- SMOKE SENSORS (AS REQUIRED)
- ELEVATOR MEETS ASME A17.1 2019 CODE.
- AN 8" X 8" BLOCK OUT IS REQUIRED IN THE HOISTWAY WALL. LOCATION TO BE DETERMINED BY TK ELEVATOR SUPERINTENDENT.
- SUMP PIT OR DRAIN AS REQUIRED BY LOCAL CODE BY GENERAL CONTRACTOR.
- SAFETY BEAM REQUIRED PER OSHA 1926 502 PROVIDED AND INSTALLED BY OTHERS, AS DIRECTED BY TK ELEVATOR FIELD OFFICE DESIGN LOAD = 5,000 LBS (STATIC, NOT IMPACT)



SUMP PIT SIZE TO BE DETERMINED BY GENERAL CONTRACTOR



THIS DRAWING AND ALL INFORMATION THEREON IS THE PROPRIETARY PROPERTY OF TK ELEVATOR AND MUST NOT BE MADE PUBLIC OR COPIED. THIS DRAWING IS LOANED SUBJECT TO RETURN ON DEMAND AND IS NOT TO BE USED DIRECTLY OR INDIRECTLY, IN ANY MANNER DETRIMENTAL TO THE INTEREST OF TK ELEVATOR.

FOR: 1 HY

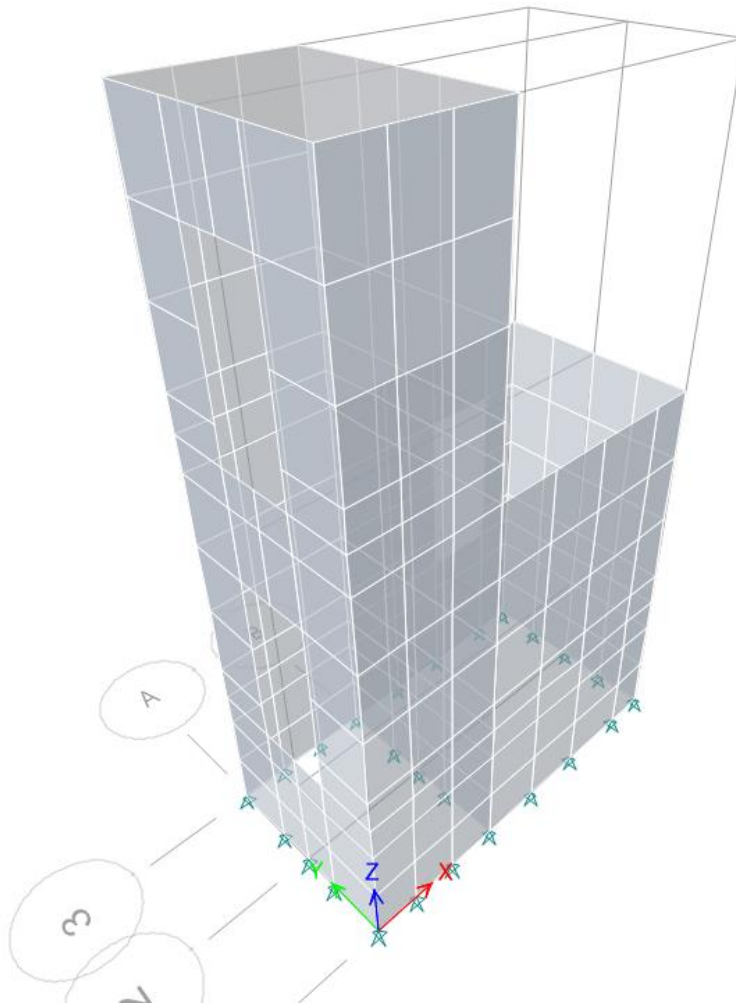
ADDRESS:

CITY:

TK Elevator

DRAWN	REV	JOB NUMBER	DATE	SHEET
SR	A	1712-312-03A	11/12/2024	4 OF 7

ETABS[®]



Concrete Elevator Box

Model File: Elevator box, Revision 0
2/14/2025

1 Structure Data

This chapter provides model geometry information, including items such as story levels, point coordinates, and element connectivity.

1.1 Story Data

Table 1.1 - Story Definitions

Tower	Name	Height ft	Master Story	Similar To	Splice Story	Color
T1	Story3	13	No	None	No	Magenta
T1	Story2	13	No	None	No	Yellow
T1	Story1	5	No	None	No	Gray8Dark

1.2 Mass

Table 1.3 - Mass Summary by Story

Story	UX lb-s2/ft	UY lb-s2/ft	UZ lb-s2/ft
Story3	1442.45	1442.45	0
Story2	2274.48	2274.48	0
Story1	886.29	886.29	0
Base	242.82	242.82	0

2 Properties

This chapter provides property information for materials, frame sections, shell sections, and links.

2.1 Materials

Table 2.1 - Material Properties - General

Material	Type	SymType	Grade	Color	Notes
4000Psi	Concrete	Isotropic	f'c 4000 psi	Magenta	
A416Gr270	Tendon	Uniaxial	Grade 270	Gray8Dark	
A615Gr60	Rebar	Uniaxial	Grade 60	Yellow	

2.2 Shell Sections

Table 2.2 - Area Section Property Definitions - Summary

Name	Type	Element Type	Material	Total Thickness ft	Deck Material	Deck Depth ft
Slab1	Slab	Shell-Thin	4000Psi	0.66667		
Wall THK8"	Wall	Shell-Thin	4000Psi	0.66667		

4 Loads

This chapter provides loading information as applied to the model.

4.1 Load Patterns

Table 4.1 - Load Pattern Definitions

Name	Is Auto Load	Type	Self Weight Multiplier	Auto Load
~LLRF	Yes	Other	0	
Dead	No	Dead	1	
H active X	No	Other	0	
H active Y	No	Other	0	
H passive X	No	Other	0	
H passive Y	No	Other	0	
Live	No	Live	0	
s22	No	Seismic	0	User Coefficient
Seismic X	No	Seismic	0	User Coefficient
Seismic Y	No	Seismic	0	User Coefficient
Super Dead	No	Dead	0	
Surcharge	No	Super Dead	0	

4.2 Auto Seismic Loading

Table 4.2 - Load Pattern Definitions - Auto Seismic - User Coefficient (Part 1 of 2)

Name	Weight Used lb	Base Shear lb	Is Auto Load	X Dir?	X Dir Plus Ecc?	X Dir Minus Ecc?	Y Dir?	Y Dir Plus Ecc?	Y Dir Minus Ecc?	Ecc Ratio	Top Story	Bottom Story
s22	148104.17	45023.67	No	Yes	No	No	No	No	No	0.05	Story3	Base
Seismic X	148104.17	45438.36	No	Yes	No	No	No	No	No	0.05	Story3	Base
Seismic Y	148104.17	45438.36	No	No	No	No	Yes	No	No	0.05	Story3	Base

Table 4.2 - Load Pattern Definitions - Auto Seismic - User Coefficient (Part 2 of 2)

Name	Weight Used lb	Base Shear lb	C	K
s22	148104.17	45023.67	0.304	1
Seismic X	148104.17	45438.36	0.3068	1
Seismic Y	148104.17	45438.36	0.3068	1

User Coefficient Auto Seismic Load Calculation

This calculation presents the automatically generated lateral seismic loads for load pattern Seismic X using the user input coefficients, as calculated by ETABS.

Direction and Eccentricity

Direction = X

Factors and Coefficients

Equivalent Lateral Forces

Base Shear Coefficient, C

C = 0.3068

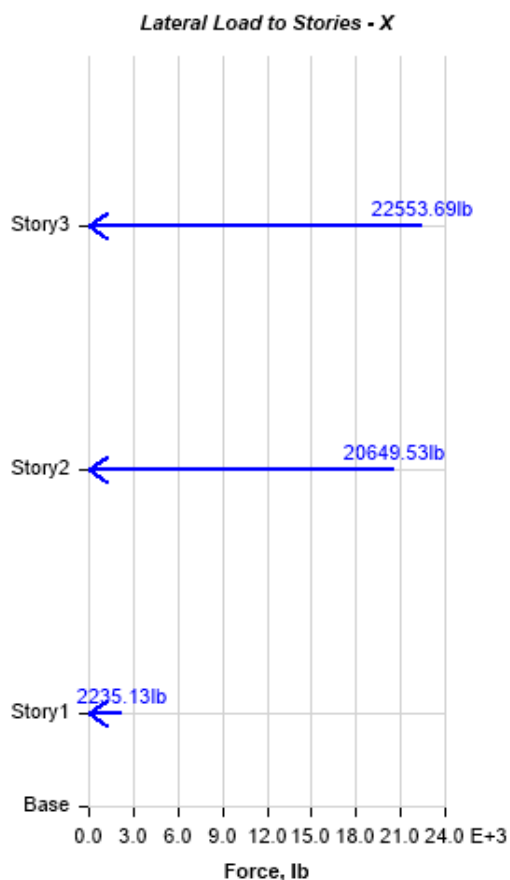
Base Shear, V

$$V = CW$$

Calculated Base Shear

Direction	Period Used (sec)	C	W (lb)	V (lb)
X	0	0	148104.17	45438.36

Applied Story Forces



Story	Elevation	X-Dir	Y-Dir
	ft	lb	lb
Story3	31	22553.69	0
Story2	18	20649.53	0
Story1	5	2235.13	0
Base	0	0	0

User Coefficient Auto Seismic Load Calculation

This calculation presents the automatically generated lateral seismic loads for load pattern Seismic Y using the user input coefficients, as calculated by ETABS.

Direction and Eccentricity

Direction = Y

Factors and Coefficients

Equivalent Lateral Forces

Base Shear Coefficient, C

C = 0.3068

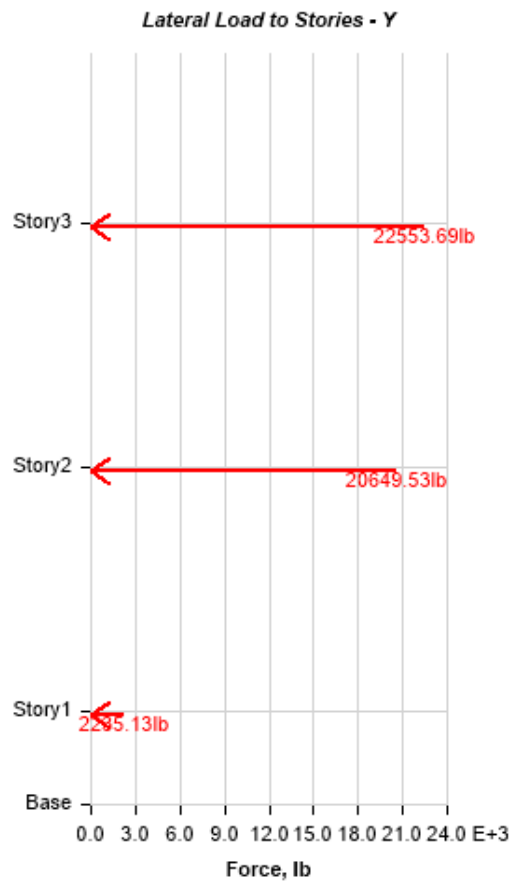
Base Shear, V

$$V = CW$$

Calculated Base Shear

Direction	Period Used (sec)	C	W (lb)	V (lb)
Y	0	0	148104.17	45438.36

Applied Story Forces



Story	Elevation	X-Dir	Y-Dir
	ft	lb	lb
Story3	31	0	22553.69
Story2	18	0	20649.53
Story1	5	0	2235.13
Base	0	0	0

4.3 Applied Loads**4.3.1 Area Loads****Table 4.6 - Area Load Assignments - Uniform**

Story	Label	UniqueName	Load Pattern	Direction	Load lb/ft2
Story3	F3	34	Live	Gravity	30
Story1	W399	142	H active X	Global-X	187.5
Story1	W400	143	H active X	Global-X	187.5
Story1	W401	144	H active X	Global-X	62.5
Story1	W402	145	H active X	Global-X	62.5
Story1	W410	146	H active X	Global-X	187.5
Story1	W411	147	H active X	Global-X	187.5
Story1	W412	148	H active X	Global-X	62.5
Story1	W413	149	H active X	Global-X	62.5
Story1	W3	155	H active X	Global-X	-187.5
Story1	W4	156	H active X	Global-X	-62.5
Story1	W5	157	H active X	Global-X	-187.5
Story1	W6	158	H active X	Global-X	-62.5
Story1	W17	159	H active X	Global-X	-187.5
Story1	W18	160	H active X	Global-X	-62.5
Story1	W19	161	H active X	Global-X	-187.5
Story1	W20	162	H active X	Global-X	-62.5
Story1	W54	94	Surcharge	Global-Y	200
Story1	W55	95	Surcharge	Global-Y	200
Story1	W58	98	Surcharge	Global-Y	200
Story1	W59	99	Surcharge	Global-Y	200
Story1	W224	96	Surcharge	Global-Y	200
Story1	W226	100	Surcharge	Global-Y	200
Story1	W252	134	Surcharge	Global-Y	-285
Story1	W253	135	Surcharge	Global-Y	-285
Story1	W256	138	Surcharge	Global-Y	-285
Story1	W257	139	Surcharge	Global-Y	-285
Story1	W313	136	Surcharge	Global-Y	-285
Story1	W315	140	Surcharge	Global-Y	-285
Story1	W399	142	Surcharge	Global-X	285
Story1	W400	143	Surcharge	Global-X	285
Story1	W401	144	Surcharge	Global-X	285
Story1	W402	145	Surcharge	Global-X	285
Story1	W410	146	Surcharge	Global-X	285
Story1	W411	147	Surcharge	Global-X	285
Story1	W412	148	Surcharge	Global-X	285
Story1	W413	149	Surcharge	Global-X	285
Story1	W493	153	Surcharge	Global-Y	200
Story1	W494	154	Surcharge	Global-Y	200
Story1	W507	151	Surcharge	Global-Y	200
Story1	W508	152	Surcharge	Global-Y	200
Story1	W519	120	Surcharge	Global-Y	200
Story1	W520	124	Surcharge	Global-Y	200
Story1	W521	150	Surcharge	Global-Y	200
Story1	W528	4	Surcharge	Global-Y	200
Story1	W533	47	Surcharge	Global-Y	-285
Story1	W534	49	Surcharge	Global-Y	-285
Story3	F3	34	Super Dead	Gravity	80
Story1	W399	142	H passive X	Global-X	206.25
Story1	W400	143	H passive X	Global-X	206.25
Story1	W401	144	H passive X	Global-X	68.75

Story	Label	UniqueName	Load Pattern	Direction	Load lb/ft2
Story1	W402	145	H passive X	Global-X	68.75
Story1	W410	146	H passive X	Global-X	206.25
Story1	W411	147	H passive X	Global-X	206.25
Story1	W412	148	H passive X	Global-X	68.75
Story1	W413	149	H passive X	Global-X	68.75
Story1	W3	155	H passive X	Global-X	-206.25
Story1	W4	156	H passive X	Global-X	-68.75
Story1	W5	157	H passive X	Global-X	-206.25
Story1	W6	158	H passive X	Global-X	-68.75
Story1	W17	159	H passive X	Global-X	-206.25
Story1	W18	160	H passive X	Global-X	-68.75
Story1	W19	161	H passive X	Global-X	-206.25
Story1	W20	162	H passive X	Global-X	-68.75
Story1	W54	94	H active Y	Global-Y	187.5
Story1	W55	95	H active Y	Global-Y	187.5
Story1	W58	98	H active Y	Global-Y	62.5
Story1	W59	99	H active Y	Global-Y	62.5
Story1	W224	96	H active Y	Global-Y	187.5
Story1	W226	100	H active Y	Global-Y	62.5
Story1	W252	134	H active Y	Global-Y	-187.5
Story1	W253	135	H active Y	Global-Y	-187.5
Story1	W256	138	H active Y	Global-Y	-62.5
Story1	W257	139	H active Y	Global-Y	-62.5
Story1	W313	136	H active Y	Global-Y	-187.5
Story1	W315	140	H active Y	Global-Y	-62.5
Story1	W457	108	H active Y	Global-Y	-187.5
Story1	W461	170	H active Y	Global-Y	-62.5
Story1	W467	67	H active Y	Global-Y	-187.5
Story1	W471	166	H active Y	Global-Y	-62.5
Story1	W493	153	H active Y	Global-Y	187.5
Story1	W494	154	H active Y	Global-Y	62.5
Story1	W507	151	H active Y	Global-Y	187.5
Story1	W508	152	H active Y	Global-Y	62.5
Story1	W519	120	H active Y	Global-Y	187.5
Story1	W520	124	H active Y	Global-Y	187.5
Story1	W521	150	H active Y	Global-Y	62.5
Story1	W528	4	H active Y	Global-Y	62.5
Story1	W533	47	H active Y	Global-Y	-187.5
Story1	W534	49	H active Y	Global-Y	-62.5
Story1	W535	53	H active Y	Global-Y	-187.5
Story1	W536	54	H active Y	Global-Y	-62.5
Story1	W54	94	H passive Y	Global-Y	206.25
Story1	W55	95	H passive Y	Global-Y	206.25
Story1	W58	98	H passive Y	Global-Y	68.75
Story1	W59	99	H passive Y	Global-Y	68.75
Story1	W224	96	H passive Y	Global-Y	206.25
Story1	W226	100	H passive Y	Global-Y	68.75
Story1	W252	134	H passive Y	Global-Y	-206.25
Story1	W253	135	H passive Y	Global-Y	-206.25
Story1	W256	138	H passive Y	Global-Y	-68.75
Story1	W257	139	H passive Y	Global-Y	-68.75
Story1	W313	136	H passive Y	Global-Y	-206.25
Story1	W315	140	H passive Y	Global-Y	-68.75
Story1	W457	108	H passive Y	Global-Y	-206.25
Story1	W461	170	H passive Y	Global-Y	-68.75

Story	Label	UniqueName	Load Pattern	Direction	Load lb/ft2
Story1	W467	67	H passive Y	Global-Y	-206.25
Story1	W471	166	H passive Y	Global-Y	-68.75
Story1	W493	153	H passive Y	Global-Y	206.25
Story1	W494	154	H passive Y	Global-Y	68.75
Story1	W507	151	H passive Y	Global-Y	206.25
Story1	W508	152	H passive Y	Global-Y	68.75
Story1	W519	120	H passive Y	Global-Y	206.25
Story1	W520	124	H passive Y	Global-Y	206.25
Story1	W521	150	H passive Y	Global-Y	68.75
Story1	W528	4	H passive Y	Global-Y	68.75
Story1	W533	47	H passive Y	Global-Y	-206.25
Story1	W534	49	H passive Y	Global-Y	-68.75
Story1	W535	53	H passive Y	Global-Y	-206.25
Story1	W536	54	H passive Y	Global-Y	-68.75

Table 4.7 - Area Load Assignments - Non-uniform

Story	Label	UniqueName	Load Pattern	Direction	A lb/ft3	B lb/ft3	C lb/ft3	D lb/ft2	Restrictions
Story1	W54	94	H active X	Global-Y	0	-1	-35	190	Use All Values
Story1	W55	95	H active X	Global-Y	0	-1	-35	190	Use All Values
Story1	W58	98	H active X	Global-Y	0	-1	-35	190	Use All Values
Story1	W59	99	H active X	Global-Y	0	-1	-35	190	Use All Values
Story1	W224	96	H active X	Global-Y	0	-1	-35	190	Use All Values
Story1	W226	100	H active X	Global-Y	0	-1	-35	190	Use All Values
Story1	W252	134	H active X	Global-Y	0	-1	35	-190	Use All Values
Story1	W253	135	H active X	Global-Y	0	-1	35	-190	Use All Values
Story1	W256	138	H active X	Global-Y	0	-1	35	-190	Use All Values
Story1	W257	139	H active X	Global-Y	0	-1	35	-190	Use All Values
Story1	W313	136	H active X	Global-Y	0	-1	35	-190	Use All Values
Story1	W315	140	H active X	Global-Y	0	-1	35	-190	Use All Values
Story1	W54	94	H passive X	Global-Y	0	-1	-55	275	Use All Values
Story1	W55	95	H passive X	Global-Y	0	-1	-55	275	Use All Values
Story1	W58	98	H passive X	Global-Y	0	-1	-55	275	Use All Values
Story1	W59	99	H passive X	Global-Y	0	-1	-55	275	Use All Values
Story1	W224	96	H passive X	Global-Y	0	-1	-55	275	Use All Values
Story1	W226	100	H passive X	Global-Y	0	-1	-55	275	Use All Values
Story1	W252	134	H passive X	Global-Y	0	-1	55	-275	Use All Values
Story1	W253	135	H passive X	Global-Y	0	-1	55	-275	Use All Values
Story1	W256	138	H passive X	Global-Y	0	-1	55	-275	Use All Values
Story1	W257	139	H passive X	Global-Y	0	-1	55	-275	Use All Values
Story1	W313	136	H passive X	Global-Y	0	-1	55	-275	Use All Values
Story1	W315	140	H passive X	Global-Y	0	-1	55	-275	Use All Values

4.4 Load Cases

Table 4.8 - Load Case Definitions - Summary

Name	Type
Dead	Linear Static
Live	Linear Static
Modal	Modal - Eigen
Seismic X	Linear Static
Seismic Y	Linear Static
H active X	Linear Static
Surcharge	Linear Static

Name	Type
Super Dead	Linear Static
H passive X	Linear Static
s22	Linear Static
H active Y	Linear Static
H passive Y	Linear Static

4.5 Load Combinations

Table 4.9 - Load Combination Definitions (Part 1 of 2)

Name	Type	Is Auto	Load Name	SF
Envelope	Envelope	No	U1: 1.4.D	1
Envelope			U2: 1.2D+1.6L+1.6H	1
Envelope			U3: (1.2+Sds*0.2)*D+1.0L+1.0Ex+0.3Ey	1
Envelope			U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey	1
Envelope			U5: (1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex	1
Envelope			U6: (1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex	1
Envelope			U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H	1
Envelope			U8: (0.9-Sds*0.2)*D-1.0Ex+0.3Ey+1.6H	1
Envelope			U9: (0.9-Sds*0.2)*D+1.0Ey+0.3Ex+1.6H	1
Envelope			U10: (0.9-Sds*0.2)*D-1.0Ey+0.3Ex+1.6H	1
U1: 1.4.D	Linear Add	No	Dead	1.4
U1: 1.4.D			Surcharge	1.4
U1: 1.4.D			Super Dead	1.4
U2: 1.2D+1.6L+1.6H	Linear Add	No	Dead	1.2
U2: 1.2D+1.6L+1.6H			Live	1.6
U2: 1.2D+1.6L+1.6H			Surcharge	1.2
U2: 1.2D+1.6L+1.6H			Super Dead	1.2
U2: 1.2D+1.6L+1.6H			H passive X	1.6
U2: 1.2D+1.6L+1.6H			H passive Y	1.6
U3: (1.2+Sds*0.2)*D+1.0L+1.0Ex+0.3Ey	Linear Add	No	Dead	1.3
U3: (1.2+Sds*0.2)*D+1.0L+1.0Ex+0.3Ey			Live	1
U3: (1.2+Sds*0.2)*D+1.0L+1.0Ex+0.3Ey			Surcharge	1.3
U3: (1.2+Sds*0.2)*D+1.0L+1.0Ex+0.3Ey			Super Dead	1.3
U3: (1.2+Sds*0.2)*D+1.0L+1.0Ex+0.3Ey			Seismic X	1
U3: (1.2+Sds*0.2)*D+1.0L+1.0Ex+0.3Ey			Seismic Y	0.3
U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey	Linear Add	No	Dead	1.3
U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey			Live	1
U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey			Surcharge	1.3
U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey			Super Dead	1.3
U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey			Seismic X	-1
U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey			Seismic Y	0.3
U5: (1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex	Linear Add	No	Dead	1.3
U5: (1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex			Live	1
U5: (1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex			Surcharge	1.3
U5: (1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex			Super Dead	1.3
U5: (1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex			Seismic Y	1
U5: (1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex			Seismic X	0.3
U6: (1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex	Linear Add	No	Dead	1.3
U6: (1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex			Live	1
U6: (1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex			Surcharge	1.3
U6: (1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex			Super Dead	1.3
U6: (1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex			Seismic Y	-1
U6: (1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex			Seismic X	0.3
U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H	Linear Add	No	Dead	0.8
U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H			Surcharge	0.8
U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H			Super Dead	0.8

Name	Type	Is Auto	Load Name	SF
U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H			Seismic X	1
U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H			H active X	1.6
U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H			Seismic Y	0.3
U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H			H active Y	0.48
U8: (0.9-Sds*0.2)*D-1.0Ex+0.3Ey+1.6H	Linear Add	No	Dead	0.8
U8: (0.9-Sds*0.2)*D-1.0Ex+0.3Ey+1.6H			Surcharge	0.8
U8: (0.9-Sds*0.2)*D-1.0Ex+0.3Ey+1.6H			Super Dead	0.8
U8: (0.9-Sds*0.2)*D-1.0Ex+0.3Ey+1.6H			Seismic X	-1
U8: (0.9-Sds*0.2)*D-1.0Ex+0.3Ey+1.6H			H active X	1.6
U8: (0.9-Sds*0.2)*D-1.0Ex+0.3Ey+1.6H			Seismic Y	0.3
U8: (0.9-Sds*0.2)*D-1.0Ex+0.3Ey+1.6H			H active Y	0.48
U9: (0.9-Sds*0.2)*D+1.0Ey+0.3Ex+1.6H	Linear Add	No	Dead	0.8
U9: (0.9-Sds*0.2)*D+1.0Ey+0.3Ex+1.6H			Surcharge	0.8
U9: (0.9-Sds*0.2)*D+1.0Ey+0.3Ex+1.6H			Super Dead	0.8
U9: (0.9-Sds*0.2)*D+1.0Ey+0.3Ex+1.6H			Seismic Y	1
U9: (0.9-Sds*0.2)*D+1.0Ey+0.3Ex+1.6H			H active X	0.48
U9: (0.9-Sds*0.2)*D+1.0Ey+0.3Ex+1.6H			Seismic X	0.3
U9: (0.9-Sds*0.2)*D+1.0Ey+0.3Ex+1.6H			H active Y	1.6
U10: (0.9-Sds*0.2)*D-1.0Ey+0.3Ex+1.6H	Linear Add	No	Dead	0.8
U10: (0.9-Sds*0.2)*D-1.0Ey+0.3Ex+1.6H			Surcharge	0.8
U10: (0.9-Sds*0.2)*D-1.0Ey+0.3Ex+1.6H			Super Dead	0.8
U10: (0.9-Sds*0.2)*D-1.0Ey+0.3Ex+1.6H			Seismic Y	-1
U10: (0.9-Sds*0.2)*D-1.0Ey+0.3Ex+1.6H			H active X	0.48
U10: (0.9-Sds*0.2)*D-1.0Ey+0.3Ex+1.6H			Seismic X	0.3
U10: (0.9-Sds*0.2)*D-1.0Ey+0.3Ex+1.6H			H active Y	1.6

5 Analysis Results

This chapter provides analysis results.

5.1 Structure Results

Table 5.1 - Base Reactions

Output Case	Case Type	Step Type	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft
Dead	LinStatic		0	0	151.089	680.0775	-1065.5921	0
Live	LinStatic		0	0	1.81	8.2977	-5.9593	0
Seismic X	LinStatic		-45.438	0	0	0	-856.9504	204.7564
Seismic Y	LinStatic		0	-45.438	0	856.9504	0	-270.6193
H active X	LinStatic		0	0.302	0	-0.7543	0	0.9932
Surcharge	LinStatic		-13.063	-4.081	0	10.2031	-32.6563	-30.0753
Super Dead	LinStatic		0	0	4.828	22.1273	-15.8914	0
H passive X	LinStatic		0	0.302	0	-0.7543	0	0.9932
s22	LinStatic		-45.024	0	0	0	-849.1295	202.8877
H active Y	LinStatic		0	0	0	0	0	0
H passive Y	LinStatic		0	0	0	0	0	0
U1: 1.4.D	Combination		-18.288	-5.714	218.283	997.3712	-1559.7957	-42.1054
U2: 1.2D+1.6L+1.6H	Combination		-15.675	-4.415	189.997	866.959	-1346.5026	-34.5012
U3: (1.2+Sds*0.2)*D+1.0L+1.0Ex+0.3Ey	Combination		-62.42	-18.937	204.502	1191.5133	-2311.2914	84.4728
U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey	Combination		28.457	-18.937	204.502	1191.5133	-597.3905	-325.0401
U5: (1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex	Combination		-30.613	-50.744	204.502	1791.3786	-1711.4261	-248.2903
U6: (1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex	Combination		-30.613	40.133	204.502	77.4777	-1711.4261	292.9484
U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H	Combination		-55.888	-16.414	124.733	825.8046	-1748.2622	101.0995
U8: (0.9-Sds*0.2)*D-1.0Ex+0.3Ey+1.6H	Combination		34.988	-16.414	124.733	825.8046	-34.3614	-308.4133
U9: (0.9-Sds*0.2)*D+1.0Ey+0.3Ex+1.6H	Combination		-24.082	-48.559	124.733	1426.5147	-1148.3969	-232.7759
U10: (0.9-Sds*0.2)*D-1.0Ey+0.3Ex+1.6H	Combination		-24.082	42.318	124.733	-287.3861	-1148.3969	308.4628
Envelope	Combination	Max	34.988	42.318	218.283	1791.3786	-34.3614	308.4628
Envelope	Combination	Min	-62.42	-50.744	124.733	-287.3861	-2311.2914	-325.0401

5.2 Story Results

Table 5.2 - Story Drifts

Story	Output Case	Step Type	Direction	Drift	Label	X ft	Y ft	Z ft
Story3	U1: 1.4.D		X	2E-05	187	6.5833	9.1667	31
Story3	U2: 1.2D+1.6L+1.6H		X	1.9E-05	187	6.5833	9.1667	31
Story3	U3: (1.2+Sds*0.2)*D+1.0L+1.0Ex+0.3Ey		X	9.5E-05	187	6.5833	9.1667	31
Story3	U3: (1.2+Sds*0.2)*D+1.0L+1.0Ex+0.3Ey		Y	3.8E-05	1	0	0	31
Story3	U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey		X	0.000137	7	6.5833	0	31
Story3	U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey		Y	3.7E-05	7	6.5833	0	31
Story3	U5: (1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex		X	3.6E-05	187	6.5833	9.1667	31
Story3	U5: (1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex		Y	0.000119	292	6.5833	2.8333	31
Story3	U6: (1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex		X	3.6E-05	7	6.5833	0	31
Story3	U6: (1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex		Y	0.00012	244	6.5833	4.5833	31
Story3	U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H		X	0.000102	187	6.5833	9.1667	31
Story3	U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H		Y	3.8E-05	275	0	2.8333	31
Story3	U8: (0.9-Sds*0.2)*D-1.0Ex+0.3Ey+1.6H		X	0.00013	7	6.5833	0	31
Story3	U8: (0.9-Sds*0.2)*D-1.0Ex+0.3Ey+1.6H		Y	3.7E-05	7	6.5833	0	31
Story3	U9: (0.9-Sds*0.2)*D+1.0Ey+0.3Ex+1.6H		X	4.4E-05	187	6.5833	9.1667	31
Story3	U9: (0.9-Sds*0.2)*D+1.0Ey+0.3Ex+1.6H		Y	0.00012	244	6.5833	4.5833	31
Story3	U10: (0.9-Sds*0.2)*D-1.0Ey+0.3Ex+1.6H		X	4.4E-05	7	6.5833	0	31
Story3	U10: (0.9-Sds*0.2)*D-1.0Ey+0.3Ex+1.6H		Y	0.00012	244	6.5833	4.5833	31
Story3	Envelope	Max	X	0.000102	187	6.5833	9.1667	31

Story	Output Case	Step Type	Direction	Drift	Label	X ft	Y ft	Z ft
Story3	Envelope	Max	Y	0.00012	244	6.5833	4.5833	31
Story3	Envelope	Min	X	0.000137	7	6.5833	0	31
Story3	Envelope	Min	Y	0.00012	244	6.5833	4.5833	31
Story2	U1: 1.4.D		X	6.4E-05	259	0	4.5833	18
Story2	U1: 1.4.D		Y	5.6E-05	325	12.25	0	18
Story2	U2: 1.2D+1.6L+1.6H		X	7.3E-05	259	0	4.5833	18
Story2	U2: 1.2D+1.6L+1.6H		Y	7.7E-05	325	12.25	0	18
Story2	U3: (1.2+Sds*0.2)*D+1.0L+1.0Ex+0.3Ey		X	5E-05	244	6.5833	4.5833	18
Story2	U3: (1.2+Sds*0.2)*D+1.0L+1.0Ex+0.3Ey		Y	4.3E-05	193	2.125	9.1667	18
Story2	U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey		X	0.000118	259	0	4.5833	18
Story2	U5: (1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex		X	4.2E-05	259	0	4.5833	18
Story2	U5: (1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex		Y	0.000128	186	0	9.1667	18
Story2	U6: (1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex		X	4.3E-05	259	0	4.5833	18
Story2	U6: (1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex		Y	0.000127	1	0	0	18
Story2	U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H		X	5.2E-05	244	6.5833	4.5833	18
Story2	U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H		Y	4.4E-05	193	2.125	9.1667	18
Story2	U8: (0.9-Sds*0.2)*D-1.0Ex+0.3Ey+1.6H		X	0.000113	259	0	4.5833	18
Story2	U8: (0.9-Sds*0.2)*D-1.0Ex+0.3Ey+1.6H		Y	4E-05	197	4.25	9.1667	18
Story2	U9: (0.9-Sds*0.2)*D+1.0Ey+0.3Ex+1.6H		Y	0.000128	186	0	9.1667	18
Story2	U10: (0.9-Sds*0.2)*D-1.0Ey+0.3Ex+1.6H		Y	0.000127	1	0	0	18
Story2	Envelope	Max	X	5.2E-05	244	6.5833	4.5833	18
Story2	Envelope	Max	Y	0.000128	186	0	9.1667	18
Story2	Envelope	Min	X	0.000118	259	0	4.5833	18
Story2	Envelope	Min	Y	0.000127	1	0	0	18
Story1	U1: 1.4.D		X	0.000137	259	0	4.5833	5
Story1	U1: 1.4.D		Y	0.000153	325	12.25	0	5
Story1	U2: 1.2D+1.6L+1.6H		X	0.000163	259	0	4.5833	5
Story1	U2: 1.2D+1.6L+1.6H		Y	0.000207	325	12.25	0	5
Story1	U3: (1.2+Sds*0.2)*D+1.0L+1.0Ex+0.3Ey		X	0.000168	259	0	4.5833	5
Story1	U3: (1.2+Sds*0.2)*D+1.0L+1.0Ex+0.3Ey		Y	0.000162	325	12.25	0	5
Story1	U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey		X	8.6E-05	259	0	4.5833	5
Story1	U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey		Y	0.00016	325	12.25	0	5
Story1	U5: (1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex		X	0.000139	259	0	4.5833	5
Story1	U5: (1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex		Y	0.000206	325	12.25	0	5
Story1	U6: (1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex		X	0.000139	259	0	4.5833	5
Story1	U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H		X	0.000169	259	0	4.5833	5
Story1	U7: (0.9-Sds*0.2)*D+1.0Ex+0.3Ey+1.6H		Y	0.000118	325	12.25	0	5
Story1	U8: (0.9-Sds*0.2)*D-1.0Ex+0.3Ey+1.6H		Y	0.000115	325	12.25	0	5
Story1	U9: (0.9-Sds*0.2)*D+1.0Ey+0.3Ex+1.6H		X	9.7E-05	259	0	4.5833	5
Story1	U9: (0.9-Sds*0.2)*D+1.0Ey+0.3Ex+1.6H		Y	0.000232	325	12.25	0	5
Story1	U10: (0.9-Sds*0.2)*D-1.0Ey+0.3Ex+1.6H		X	9.7E-05	259	0	4.5833	5
Story1	U10: (0.9-Sds*0.2)*D-1.0Ey+0.3Ex+1.6H		Y	0.000171	307	12.25	9.1667	5
Story1	Envelope	Max	X	0.000169	259	0	4.5833	5
Story1	Envelope	Max	Y	0.000232	325	12.25	0	5
Story1	Envelope	Min	Y	0.000171	307	12.25	9.1667	5

6 Design Data

This chapter provides design data and results.

6.1 Shear Wall Design

Table 6.1 - Shear Wall Design Preferences - ACI 318-14

Item	Value
Multi-Response Design	Step-by-Step - All
Rebar Material	A615Gr60
Rebar Shear Material	A615Gr60
Design System Rho	1
Design System Sds	0.5
Importance Factor	1
System Cd	5.5
Phi (Tension)	0.9
Phi (Compression)	0.65
Phi (Shear and Torsion)	0.75
Phi (Shear Seismic)	0.6
PMax Factor	0.8
# Interaction Curves	24
# Interaction Points	11
Edge Design PT-Max	0.06
Edge Design PC-Max	0.04
Section Design IP-Max	0.04
Section Design IP-Min	0.0025
Utilization Factor Limit	0.95

Table 6.2 - Shear Wall Pier Design Overwrites - ACI 318-19 (Part 1 of 2)

Table 2.2 - Shear Wall Pier Design Overwrites - ACI 318-14 (Part 1 of 2)

Story	Pier	Design?	LLRF	Seismic?	Pier Section Type	End/Corner Bar Size	Edge Bar Size	Edge Bar Spacing ft	Clear Cover ft
Story3	P1	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story3	P2	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story3	P3	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story3	P4	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story3	P5	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story2	P1	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story2	P2	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story2	P3	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story2	P4	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story2	P5	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story2	P6	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story2	P7	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story2	P8	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story2	P9	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story2	P10	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story1	P1	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story1	P2	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story1	P3	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story1	P4	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story1	P5	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story1	P6	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story1	P7	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667

Story	Pier	Design?	LLRF	Seismic?	Pier Section Type	End/Corner Bar Size	Edge Bar Size	Edge Bar Spacing ft	Clear Cover ft
Story1	P8	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story1	P9	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667
Story1	P10	Yes	0	Yes	Uniform Reinforcing Section	#5	#5	1	0.41667

Table 6.3 - Shear Wall Spandrel Design Overwrites - ACI 318-19 (Part 1 of 2)

Story	Spandrel	Design?	LLRF	Seismic?	Length Bottom ft	Thickness Left ft	Depth Left ft	Cover Bottom Left ft	Cover Top Left ft	Slab Width Left ft	Slab Depth Left ft
Story3	S2	Yes	0	Yes	0	0	0	0	0	0	0
Story2	S1	Yes	0	Yes	0	0	0	0	0	0	0
Story2	S3	Yes	0	Yes	0	0	0	0	0	0	0

Table 6.4 - Shear Wall Spandrel Design Overwrites - ACI 318-19 (Part 2 of 2)

Slab Width Left ft	Slab Depth Left ft	Thickness Right ft	Depth Right ft	Cover Bottom Right ft	Cover Top Right ft	Slab Width Right ft	Slab Depth Right ft	Concrete Material	Consider Vc?
0	0	0	0	0	0	0	0	4000 psi	Yes
0	0	0	0	0	0	0	0	4000 psi	Yes
0	0	0	0	0	0	0	0	4000 psi	Yes

Table 2.4 - Shear Wall Pier Design Summary - ACI 318-14 (Part 1 of 3)

Story	Pier Label	Station	Edge Rebar	End Rebar	Rebar Spacing ft	Required Reinf. Percentage %	Current Reinf. Percentage %	Pier Leg	Leg X1 ft	Leg Y1 ft
Story3	P1	Top	#5	#5	1	0.25	0.68	Top Leg 1	0	6.33333
Story3	P1	Bottom	#5	#5	1	0.25	0.68	Bottom Leg 1	0	6.33333
Story2	P1	Top	#5	#5	1	0.25	0.68	Top Leg 1	0	6.33333
Story2	P1	Bottom	#5	#5	1	0.25	0.68	Bottom Leg 1	0	6.33333
Story1	P1	Top	#5	#5	1	0.25	0.68	Top Leg 1	0	6.33333
Story1	P1	Bottom	#5	#5	1	0.25	0.68	Bottom Leg 1	0	6.33333
Story3	P2	Top	#5	#5	1	0.25	0.68	Top Leg 1	0	0
Story3	P2	Bottom	#5	#5	1	0.25	0.68	Bottom Leg 1	0	0
Story2	P2	Top	#5	#5	1	0.25	0.68	Top Leg 1	0	0
Story2	P2	Bottom	#5	#5	1	0.25	0.68	Bottom Leg 1	0	0
Story1	P2	Top	#5	#5	1	0.25	0.68	Top Leg 1	0	0
Story1	P2	Bottom	#5	#5	1	0.25	0.68	Bottom Leg 1	0	0
Story3	P3	Top	#5	#5	1	0.25	0.69	Top Leg 1	0	0
Story3	P3	Bottom	#5	#5	1	0.25	0.69	Bottom Leg 1	0	0
Story2	P3	Top	#5	#5	1	0.25	0.69	Top Leg 1	0	0
Story2	P3	Bottom	#5	#5	1	0.25	0.69	Bottom Leg 1	0	0
Story1	P3	Top	#5	#5	1	0.25	0.69	Top Leg 1	0	0
Story1	P3	Bottom	#5	#5	1	0.25	0.69	Bottom Leg 1	0	0
Story3	P4	Top	#5	#5	1	0.25	0.7	Top Leg 1	6.58333	0

Story	Pier Label	Station	Edge Rebar	End Rebar	Rebar Spacing ft	Required Reinf. Percentage %	Current Reinf. Percentage %	Pier Leg	Leg X1 ft	Leg Y1 ft
Story3	P4	Bottom	#5	#5	1	0.25	0.7	Bottom Leg 1	6.58333	0
Story2	P4	Top	#5	#5	1	0.25	0.7	Top Leg 1	6.58333	0
Story2	P4	Bottom	#5	#5	1	0.25	0.7	Bottom Leg 1	6.58333	0
Story1	P4	Top	#5	#5	1	0.25	0.7	Top Leg 1	6.58333	0
Story1	P4	Bottom	#5	#5	1	0.25	0.7	Bottom Leg 1	6.58333	0
Story3	P5	Top	#5	#5	1	0.25	0.69	Top Leg 1	0	9.16667
Story3	P5	Bottom	#5	#5	1	0.25	0.69	Bottom Leg 1	0	9.16667
Story2	P5	Top	#5	#5	1	0.25	0.69	Top Leg 1	0	9.16667
Story2	P5	Bottom	#5	#5	1	0.25	0.69	Bottom Leg 1	0	9.16667
Story1	P5	Top	#5	#5	1	0.25	0.69	Top Leg 1	0	9.16667
Story1	P5	Bottom	#5	#5	1	0.25	0.69	Bottom Leg 1	0	9.16667
Story2	P6	Top	#5	#5	1	0.25	0.68	Top Leg 1	6.58333	9.16667
Story2	P6	Bottom	#5	#5	1	0.25	0.68	Bottom Leg 1	6.58333	9.16667
Story1	P6	Top	#5	#5	1	0.25	0.68	Top Leg 1	6.58333	9.16667
Story1	P6	Bottom	#5	#5	1	0.25	0.68	Bottom Leg 1	6.58333	9.16667
Story2	P7	Top	#5	#5	1	0.25	0.7	Top Leg 1	17.5	0
Story2	P7	Bottom	#5	#5	1	0.25	0.7	Bottom Leg 1	17.5	0
Story1	P7	Top	#5	#5	1	0.25	0.7	Top Leg 1	17.5	0
Story1	P7	Bottom	#5	#5	1	0.25	0.7	Bottom Leg 1	17.5	0
Story2	P8	Top	#5	#5	1	0.25	0.65	Top Leg 1	6.58333	0
Story2	P8	Bottom	#5	#5	1	0.25	0.65	Bottom Leg 1	6.58333	0
Story1	P8	Top	#5	#5	1	0.25	0.65	Top Leg 1	6.58333	0
Story1	P8	Bottom	#5	#5	1	0.25	0.65	Bottom Leg 1	6.58333	0
Story2	P9	Top	#5	#5	1	0.25	0.67	Top Leg 1	15.58333	9.16667
Story2	P9	Bottom	#5	#5	1	0.25	0.74	Bottom Leg 1	12.25	9.16667
Story1	P9	Top	#5	#5	1	0.25	0.74	Top Leg 1	12.25	9.16667
Story1	P9	Bottom	#5	#5	1	0.25	0.74	Bottom Leg 1	12.25	9.16667
Story2	P10	Top	#5	#5	1	0.25	0.74	Top Leg 1	0	2.83333
Story2	P10	Bottom	#5	#5	1	0.25	0.74	Bottom Leg 1	0	2.83333
Story1	P10	Top	#5	#5	1	0.25	0.74	Top Leg 1	0	2.83333
Story1	P10	Bottom	#5	#5	1	0.25	0.74	Bottom Leg 1	0	2.83333

Table 2.4 - Shear Wall Pier Design Summary - ACI 318-14 (Part 2 of 3)

Story	Pier Label	Station	Leg X2 ft	Leg Y2 ft	Length ft	Thickness ft	Shear Rebar ft/ft	Compressive Stress Left kip/ft2	Compressive Stress Right kip/ft2	Compressive Stress Limit kip/ft2
Story3	P1	Top	0	9.16667	2.83333	0.66667	0.00167	4.57	1.99	115.2
Story3	P1	Bottom	0	9.16667	2.83333	0.66667	0.00167	3.84	9.01	115.2
Story2	P1	Top	0	9.16667	2.83333	0.66667	0.00167	4.6	10.89	115.2
Story2	P1	Bottom	0	9.16667	2.83333	0.66667	0.00167	10	14.48	115.2
Story1	P1	Top	0	9.16667	2.83333	0.66667	0.00167	4.26	19.54	115.2
Story1	P1	Bottom	0	9.16667	2.83333	0.66667	0.00167	12.44	14.58	115.2
Story3	P2	Top	0	2.83333	2.83333	0.66667	0.00167	1.99	4.46	115.2
Story3	P2	Bottom	0	2.83333	2.83333	0.66667	0.00167	9.03	5.44	115.2
Story2	P2	Top	0	2.83333	2.83333	0.66667	0.00167	11.2	3.08	115.2
Story2	P2	Bottom	0	2.83333	2.83333	0.66667	0.00167	8.01	12.73	115.2
Story1	P2	Top	0	2.83333	2.83333	0.66667	0.00167	14.48	3.63	115.2
Story1	P2	Bottom	0	2.83333	2.83333	0.66667	0.00167	18.4	2.52	115.2
Story3	P3	Top	6.58333	0	6.58333	0.66667	0.00167	0.55	1.28	115.2
Story3	P3	Bottom	6.58333	0	6.58333	0.66667	0.00167	1.62	11.27	115.2
Story2	P3	Top	6.58333	0	6.58333	0.66667	0.00167	2.21	9.29	115.2
Story2	P3	Bottom	6.58333	0	6.58333	0.66667	0.00167	13.7	9.96	115.2

Story	Pier Label	Station	Leg X2 ft	Leg Y2 ft	Length ft	Thickness ft	Shear Rebar ft ² /ft	Compressive Stress Left kip/ft ²	Compressive Stress Right kip/ft ²	Compressive Stress Limit kip/ft ²
Story1	P3	Top	6.58333	0	6.58333	0.66667	0.00167	13.44	10.84	115.2
Story1	P3	Bottom	6.58333	0	6.58333	0.66667	0.00167	12.97	13.96	115.2
Story3	P4	Top	6.58333	9.16667	9.16667	0.66667	0.00167	1.21	0.8	115.2
Story3	P4	Bottom	6.58333	9.16667	9.16667	0.66667	0.00167	4.83	8.05	115.2
Story2	P4	Top	6.58333	9.16667	9.16667	0.66667	0.00167	5.07	5.4	115.2
Story2	P4	Bottom	6.58333	9.16667	9.16667	0.66667	0.00167	2.73	7.76	115.2
Story1	P4	Top	6.58333	9.16667	9.16667	0.66667	0.00167	3.67	6.33	115.2
Story1	P4	Bottom	6.58333	9.16667	9.16667	0.66667	0.00167	5.74	17.7	115.2
Story3	P5	Top	6.58333	9.16667	6.58333	0.66667	0.00167	0.41	2.37	115.2
Story3	P5	Bottom	6.58333	9.16667	6.58333	0.66667	0.00167	2.11	10.86	115.2
Story2	P5	Top	6.58333	9.16667	6.58333	0.66667	0.00167	2.66	9.01	115.2
Story2	P5	Bottom	6.58333	9.16667	6.58333	0.66667	0.00167	13.61	10.12	115.2
Story1	P5	Top	6.58333	9.16667	6.58333	0.66667	0.00167	13.12	11.28	115.2
Story1	P5	Bottom	6.58333	9.16667	6.58333	0.66667	0.00167	12.72	14.28	115.2
Story2	P6	Top	12.25	9.16667	5.66667	0.66667	0.00167	10.29	4.73	115.2
Story2	P6	Bottom	12.25	9.16667	5.66667	0.66667	0.00167	9.44	9.22	115.2
Story1	P6	Top	12.25	9.16667	5.66667	0.66667	0.00167	14.8	4.13	115.2
Story1	P6	Bottom	12.25	9.16667	5.66667	0.66667	0.00167	11.36	10.07	115.2
Story2	P7	Top	17.5	9.16667	9.16667	0.66667	0.00167	0.33	0.28	115.2
Story2	P7	Bottom	17.5	9.16667	9.16667	0.66667	0.00167	4.68	5.1	115.2
Story1	P7	Top	17.5	9.16667	9.16667	0.66667	0.00167	6.38	4.06	115.2
Story1	P7	Bottom	17.5	9.16667	9.16667	0.66667	0.00167	6.4	7.4	115.2
Story2	P8	Top	17.5	0	10.91667	0.66667	0.00167	5.71	2.56	115.2
Story2	P8	Bottom	17.5	0	10.91667	0.66667	0.00167	9.78	4.58	115.2
Story1	P8	Top	17.5	0	10.91667	0.66667	0.00167	11.91	3.52	115.2
Story1	P8	Bottom	17.5	0	10.91667	0.66667	0.00167	11.06	7.42	115.2
Story2	P9	Top	17.5	9.16667	1.91667	0.66667	0.00167	2.13	0.27	115.2
Story2	P9	Bottom	17.5	9.16667	5.25	0.66667	0.00167	4.7	2.57	115.2
Story1	P9	Top	17.5	9.16667	5.25	0.66667	0.00167	7.56	2.27	115.2
Story1	P9	Bottom	17.5	9.16667	5.25	0.66667	0.00167	4.79	9.47	115.2
Story2	P10	Top	0	6.33333	3.5	0.66667	0.00167	7.06	1.45	115.2
Story2	P10	Bottom	0	6.33333	3.5	0.66667	0.00167	4.47	4.66	115.2
Story1	P10	Top	0	6.33333	3.5	0.66667	0.00167	8.76	5.31	115.2
Story1	P10	Bottom	0	6.33333	3.5	0.66667	0.00167	7.9	11.06	115.2

Table 2.5 - Shear Wall Spandrel Design Summary - ACI 318-14 (Part 1 of 3)

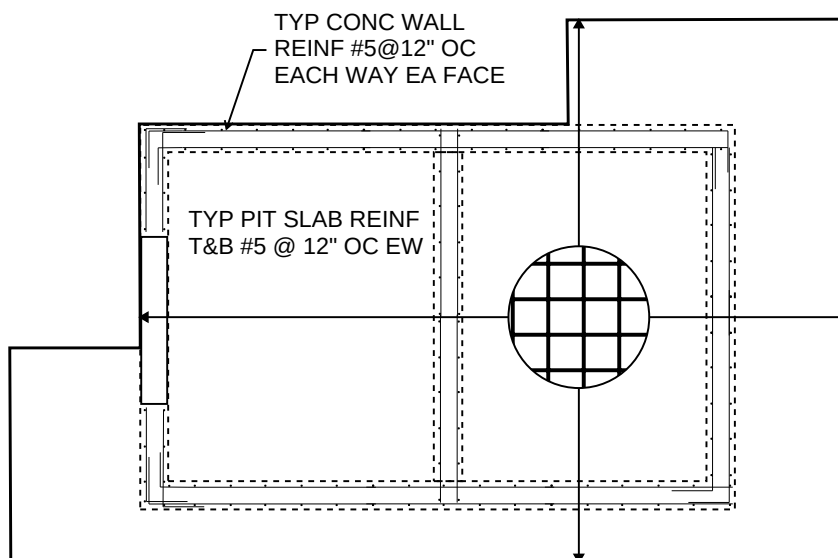
Story	Spandrel	Station	Top Rebar ft ²	Top Rebar Ratio	Top Rebar Combo	Top Design Moment kip-ft	Bottom Rebar ft ²	Bottom Rebar Ratio	Bottom Rebar Combo	Bottom Design Moment kip-ft	Av Vert ft ² /ft	Av Horz ft ² /ft
Story3	S2	Left	0.000175	8.1E-05	Envelope	-2.9758	0.000282	0.00013	Envelope	4.8116	0.00167	0.00167
Story3	S2	Right	0.000191	8.8E-05	Envelope	-3.2595	0.000267	0.000123	Envelope	4.5521	0.00167	0.00167
Story2	S1	Left	0.000852	0.000262	Envelope	-21.7668	0.000916	0.000282	Envelope	23.3828	0.00167	0.00167
Story2	S1	Right	0.000877	0.00027	Envelope	-22.4001	0.000886	0.000272	Envelope	22.6128	0.00167	0.00167
Story2	S3	Left	0.000755	0.000348	Envelope	-12.8444	0.000595	0.000275	Envelope	10.1353	0.00167	0.00167
Story2	S3	Right	0.000197	9.1E-05	Envelope	-3.3596	0.000318	0.000147	Envelope	5.417	0.00167	0.00167

Table 2.5 - Shear Wall Spandrel Design Summary - ACI 318-14 (Part 2 of 3)

Story	Spandrel	Station	Shear Combo	Design Shear kip	Av Diag ft2	Mandatory
Story3	S2	Left	U6: $(1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex$	4.742	0.000541	No
Story3	S2	Right	U5: $(1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex$	4.969	0.000567	No
Story2	S1	Left	U6: $(1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex$	13.739	0.001257	No
Story2	S1	Right	U5: $(1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex$	14.144	0.001294	No
Story2	S3	Left	U4: $(1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey$	6.183	0.000684	No
Story2	S3	Right	U4: $(1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey$	4.774	0.000529	No

Table 2.5 - Shear Wall Spandrel Design Summary - ACI 318-14 (Part 3 of 3)

Story	Spandrel	Station	Diag Shear Combo	Design Shear Diag. kip	Warnings	Errors
Story3	S2	Left	U6: $(1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex$	4.742	No Message	No Message
Story3	S2	Right	U5: $(1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex$	4.969	No Message	No Message
Story2	S1	Left	U6: $(1.2+Sds*0.2)*D+1.0L-1.0Ey+0.3Ex$	13.739	No Message	No Message
Story2	S1	Right	U5: $(1.2+Sds*0.2)*D+1.0L+1.0Ey+0.3Ex$	14.144	No Message	No Message
Story2	S3	Left	U4: $(1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey$	6.183	No Message	No Message
Story2	S3	Right	U4: $(1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey$	4.774	No Message	No Message



5

ELEVATOR REINFORCEMENT

SCALE: 1" = 1'-0"

ETABS Shear Wall Design

ACI 318-14 Pier Design

Pier Details

Story ID	Pier ID	Centroid X (ft)	Centroid Y (ft)	Length (ft)	Thickness (ft)	LLRF
Story1	P1	0	7.75	2.83333	0.66667	1

Material Properties

E_c (kip/ft ²)	f'_c (kip/ft ²)	Lt.Wt Factor (Unitless)	f_y (kip/ft ²)	f_{ys} (kip/ft ²)
519119.5	576	1	8640	8640

Design Code Parameters

ϕ_T	ϕ_C	ϕ_v	ϕ_v (Seismic)	IP_{MAX}	IP_{MIN}	P_{MAX}
0.9	0.65	0.75	0.6	0.04	0.0025	0.8

Pier Leg Location, Length and Thickness

Station Location	ID	Left X ₁ ft	Left Y ₁ ft	Right X ₂ ft	Right Y ₂ ft	Length ft	Thickness ft
Top	Leg 1	0	6.33333	0	9.16667	2.83333	0.66667
Bottom	Leg 1	0	6.33333	0	9.16667	2.83333	0.66667

Flexural Design for P_u , M_{u2} and M_{u3}

Station Location	Required Rebar Area (ft ²)	Required Reinf Ratio	Current Reinf Ratio	Flexural Combo	P_u kip	M_{u2} kip-ft	M_{u3} kip-ft	Pier A_g ft ²
Top	0.004722	0.0025	0.0068	Envelope	22.479	0.046	-1.0951	1.888889
Bottom	0.004722	0.0025	0.0068	Envelope	25.514	-0.1298	-9.0939	1.888889

Shear Design

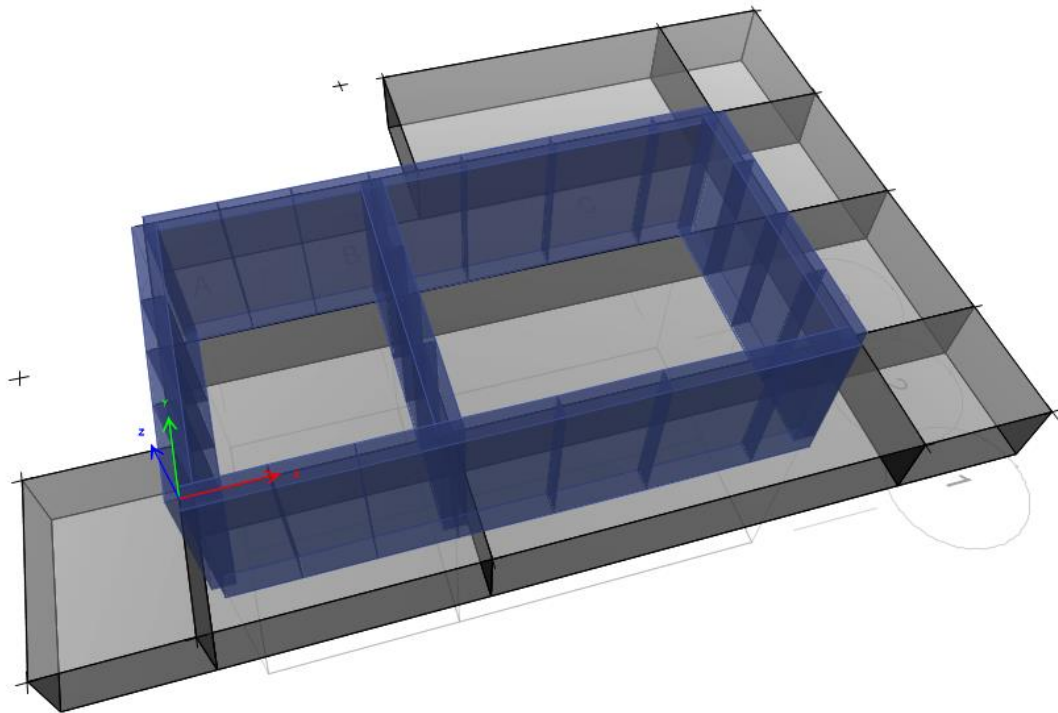
Station Location	ID	Rebar ft ² /ft	Shear Combo	P_u kip	M_u kip-ft	V_u kip	ϕV_c kip	ϕV_n kip
Top	Leg 1	0.00167	Envelope	-3.897	6.8181	2.726	20.643	45.123
Bottom	Leg 1	0.00167	Envelope	-7.534	5.9483	4.636	20.643	45.123

Boundary Element Check (ACI 18.10.6.3, 18.10.6.4) (Part 1 of 2)

Station Location	ID	Edge Length (ft)	Governing Combo	P_u kip	M_u kip-ft	Stress Comp kip/ft ²	Stress Limit kip/ft ²
Top-Left	Leg 1	Not Required	U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey	22.479	6.8181	4.26	115.2
Top-Right	Leg 1	Not Required	U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey	22.479	6.8181	19.54	115.2
Bottom-Left	Leg 1	Not Required	U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey	25.514	0.9549	12.44	115.2
Bottom-Right	Leg 1	Not Required	U4: (1.2+Sds*0.2)*D+1.0L-1.0Ex+0.3Ey	25.514	0.9549	14.58	115.2

Boundary Element Check (ACI 18.10.6.3, 18.10.6.4) (Part 2 of 2)

C Depth ft	C Limit ft



Concrete Elevator Footing Design

Elevator box

Model File: Pit slab ASD v4, Revision
2/14/2025

1 Structure Data

This chapter provides model geometry information, including items such as story levels, point coordinates, and element connectivity.

1.1 Mass

Table 1.2 - Mass Summary by Group

Group	Self Mass lb-s2/ft	Self Weight kip	Mass X lb-s2/ft	Mass Y lb-s2/ft	Mass Z lb-s2/ft
ALL	4160.19	0	4160.19	4160.19	4160.19

2 Properties

This chapter provides property information for materials, frame sections, shell sections, and links.

2.1 Materials

Table 2.1 - Material Properties - General

Material	Type	SymType	Grade	Color	Notes
4000Psi	Concrete	Isotropic	Unknown	Blue	Normalweight f'c = 4 ksi added 12/13/2024 5:02:05 PM
A615Gr60	Rebar	Uniaxial	Unknown	Cyan	ASTM A615 Grade 60 added 12/13/2024 5:02:05 PM
MAT1	Concrete	Isotropic	Unknown	Blue	Normalweight f'c = 4 ksi added 12/13/2024 5:02:05 PM

2.2 Frame Sections

Table 2.2 - Frame Section Property Definitions - Summary (Part 1 of 3)

Name	Material	Shape	Color	Area in2	J in4	I33 in4	I22 in4	As2 in2	As3 in2	S33Pos in3
Wall THK8"-W	MAT1	Concrete Rectangular	Gray8Dark	480	9379.86	144000	2560	400	400	4800

Table 2.2 - Frame Section Property Definitions - Summary (Part 2 of 3)

Name	S33Neg in3	S22Pos in3	S22Neg in3	Z33 in3	Z22 in3	R33 in	R22 in
Wall THK8"-W	4800	640	640	7200	960	17.3205	2.3094

2.3 Shell Sections

Table 2.3 - Area Section Property Definitions - Summary

Name	Type	Element Type	Material	Total Thickness in
SLAB 24" thk	Slab	Shell-Thick	4000Psi	24

2.4 Reinforcement Sizes

Table 2.4 - Reinforcing Bar Sizes

Name	Diameter in	Area in2
#5	0.625	0.31

2.5 Spring Properties

Table 2.5 - Spring Property Definitions - Area Springs

Name	Subgrade Modulus kip/in/in2	Nonlinear Option	Color	Notes
SOIL1	0.083	Compression Only	Cyan	

4 Loads

This chapter provides loading information as applied to the model.

4.1 Load Patterns

Table 4.1 - Load Pattern Definitions

Name	Is Auto Load	Type	Self-Weight Multiplier	Auto Load
Dead _{ABOVE}	No	Dead	0	
H active X _{ABOVE}	No	Other	0	
H active Y _{ABOVE}	No	Other	0	
H passive X _{ABOVE}	No	Other	0	
H passive Y _{ABOVE}	No	Other	0	
Live _{ABOVE}	No	Live	0	
Seismic X _{ABOVE}	No	Seismic	0	None
Seismic Y _{ABOVE}	No	Seismic	0	None
Super Dead _{ABOVE}	No	Dead	0	
Surcharge _{ABOVE}	No	Super Dead	0	

4.2 Applied Loads

4.2.1 Point Loads

Table 4.2 - Joint Loads Assignments - Force

UniqueName	Load Pattern	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft	X Dimension in	Y Dimension in
1	Dead _{ABOVE}	0	0	-8.43	0.4838	-0.9067	0	0	0
2	Dead _{ABOVE}	0	0	-8.493	-0.4746	-0.9101	0	0	0
37	Dead _{ABOVE}	0	0	-4.549	0.0101	-0.0003	0	0	0
115	Dead _{ABOVE}	0	0	-6.569	-0.0001	-0.5821	0	0	0
118	Dead _{ABOVE}	0	0	-6.513	0.008	-0.2739	0	0	0
157	Dead _{ABOVE}	0	0	-6.584	4.742E-05	-0.5729	0	0	0
159	Dead _{ABOVE}	0	0	-6.446	-0.0086	-0.2297	0	0	0
163	Dead _{ABOVE}	0	0	-6.396	-0.056	-0.0017	0	0	0
166	Dead _{ABOVE}	0	0	-6.433	0.0793	-0.0016	0	0	0
11	Dead _{ABOVE}	0	0	-4.002	0.3852	0.4945	0	0	0
104	Dead _{ABOVE}	0	0	-3.55	0.0077	0.0025	0	0	0
105	Dead _{ABOVE}	0	0	-3.625	-0.384	0.3894	0	0	0
106	Dead _{ABOVE}	0	0	-6.221	-0.0061	0.3789	0	0	0
240	Dead _{ABOVE}	0	0	-5.554	-0.0006	0.4582	0	0	0
261	Dead _{ABOVE}	0	0	-4.203	-0.0048	0.3857	0	0	0
265	Dead _{ABOVE}	0	0	-6.798	0.0062	0.2347	0	0	0
267	Dead _{ABOVE}	0	0	-6.374	0.001	0.4616	0	0	0
269	Dead _{ABOVE}	0	0	-4.788	0.0062	0.5299	0	0	0
272	Dead _{ABOVE}	0	0	-3.64	0.1759	0.0078	0	0	0
275	Dead _{ABOVE}	0	0	-3.524	-0.1898	0.0056	0	0	0
9	Dead _{ABOVE}	0	0	-11.063	0.7479	-0.0025	0	0	0
10	Dead _{ABOVE}	0	0	-6.003	0.36	0.0027	0	0	0
289	Dead _{ABOVE}	0	0	-4.608	-0.007	-0.0002	0	0	0
291	Dead _{ABOVE}	0	0	-5.958	-0.3836	0.0038	0	0	0
293	Dead _{ABOVE}	0	0	-10.764	-0.7563	0.126	0	0	0
1	Live _{ABOVE}	0	0	-0.166	0.0093	-0.0169	0	0	0
2	Live _{ABOVE}	0	0	-0.167	-0.009	-0.0165	0	0	0
37	Live _{ABOVE}	0	0	-0.088	0.0003	6.769E-06	0	0	0
115	Live _{ABOVE}	0	0	-0.122	-0.0001	-0.0083	0	0	0
118	Live _{ABOVE}	0	0	-0.108	0.0001	-0.0013	0	0	0

UniqueName	Load Pattern	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft	X Dimension in	Y Dimension in
157	Live ^{ABOVE}	0	0	-0.122	0.0001	-0.0074	0	0	0
159	Live ^{ABOVE}	0	0	-0.107	-0.0001	0.0002	0	0	0
163	Live ^{ABOVE}	0	0	-0.126	-0.002	3.453E-05	0	0	0
166	Live ^{ABOVE}	0	0	-0.126	0.0027	4.466E-05	0	0	0
11	Live ^{ABOVE}	0	0	0.016	-0.0022	0.0004	0	0	0
104	Live ^{ABOVE}	0	0	0.016	0.0003	0.0001	0	0	0
105	Live ^{ABOVE}	0	0	0.01	0.0016	0.0002	0	0	0
106	Live ^{ABOVE}	0	0	-0.067	-0.0001	0.0079	0	0	0
240	Live ^{ABOVE}	0	0	-0.035	-4.962E-06	0.0066	0	0	0
261	Live ^{ABOVE}	0	0	-0.006	-9.62E-06	0.0037	0	0	0
265	Live ^{ABOVE}	0	0	-0.072	0.0001	0.0071	0	0	0
267	Live ^{ABOVE}	0	0	-0.037	7.136E-06	0.0079	0	0	0
269	Live ^{ABOVE}	0	0	-0.002	2.987E-05	0.0056	0	0	0
272	Live ^{ABOVE}	0	0	0.018	-0.0008	0.0001	0	0	0
275	Live ^{ABOVE}	0	0	0.014	0.0011	0.0001	0	0	0
9	Live ^{ABOVE}	0	0	-0.155	0.0108	0.0042	0	0	0
10	Live ^{ABOVE}	0	0	-0.083	0.0051	0.0001	0	0	0
289	Live ^{ABOVE}	0	0	-0.064	-0.0003	1.956E-05	0	0	0
291	Live ^{ABOVE}	0	0	-0.082	-0.0059	0.0001	0	0	0
293	Live ^{ABOVE}	0	0	-0.151	-0.0111	0.006	0	0	0
1	Seismic X ^{ABOVE}	0	0	10.909	-0.4554	1.757	0	0	0
2	Seismic X ^{ABOVE}	0	0	11.014	0.3005	1.6182	0	0	0
37	Seismic X ^{ABOVE}	0	0	4.908	-0.1506	0.0399	0	0	0
115	Seismic X ^{ABOVE}	0	0	5.919	0.0345	2.1864	0	0	0
118	Seismic X ^{ABOVE}	0	0	3.339	-0.0097	2.3155	0	0	0
157	Seismic X ^{ABOVE}	0	0	5.815	-0.0361	1.8064	0	0	0
159	Seismic X ^{ABOVE}	0	0	2.567	0.014	1.7193	0	0	0
163	Seismic X ^{ABOVE}	0	0	7.367	0.2869	0.0091	0	0	0
166	Seismic X ^{ABOVE}	0	0	7.601	-0.5918	0.0047	0	0	0
11	Seismic X ^{ABOVE}	0	0	-9.589	0.495	1.975	0	0	0
104	Seismic X ^{ABOVE}	0	0	-4.744	-0.0783	0.0542	0	0	0
105	Seismic X ^{ABOVE}	0	0	-6.053	-0.248	1.8462	0	0	0
106	Seismic X ^{ABOVE}	0	0	-3.838	-0.0266	3.4725	0	0	0
240	Seismic X ^{ABOVE}	0	0	-5.42	0.0187	4.7303	0	0	0
261	Seismic X ^{ABOVE}	0	0	-4.764	0.0355	4.2703	0	0	0
265	Seismic X ^{ABOVE}	0	0	-1.437	0.0217	3.8844	0	0	0
267	Seismic X ^{ABOVE}	0	0	-4.363	-0.0144	4.5191	0	0	0
269	Seismic X ^{ABOVE}	0	0	-6.731	-0.0423	3.8183	0	0	0
272	Seismic X ^{ABOVE}	0	0	-6.545	-0.2822	0.0178	0	0	0
275	Seismic X ^{ABOVE}	0	0	-4.383	0.1675	0.0279	0	0	0
9	Seismic X ^{ABOVE}	0	0	0.926	0.2017	3.0569	0	0	0
10	Seismic X ^{ABOVE}	0	0	-0.136	0.3015	-0.0047	0	0	0
289	Seismic X ^{ABOVE}	0	0	-0.375	0.1198	0.0362	0	0	0
291	Seismic X ^{ABOVE}	0	0	-0.677	0.0206	-0.0146	0	0	0
293	Seismic X ^{ABOVE}	0	0	-1.309	-0.0823	2.2919	0	0	0
1	Seismic Y ^{ABOVE}	0	0	14.958	-2.5667	1.3736	0	0	0
2	Seismic Y ^{ABOVE}	0	0	-14.916	-2.5509	-1.4017	0	0	0
37	Seismic Y ^{ABOVE}	0	0	0.038	-2.1595	0.0001	0	0	0
115	Seismic Y ^{ABOVE}	0	0	11.288	0.0122	0.6496	0	0	0
118	Seismic Y ^{ABOVE}	0	0	11.6	0.0323	0.5468	0	0	0
157	Seismic Y ^{ABOVE}	0	0	-11.297	0.0111	-0.7156	0	0	0
159	Seismic Y ^{ABOVE}	0	0	-11.674	0.0276	-0.5969	0	0	0
163	Seismic Y ^{ABOVE}	0	0	5.883	-2.4776	-0.0142	0	0	0
166	Seismic Y ^{ABOVE}	0	0	-5.795	-2.4665	0.0147	0	0	0
11	Seismic Y ^{ABOVE}	0	0	5.137	-1.0109	-0.6469	0	0	0

UniqueName	Load Pattern	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft	X Dimension in	Y Dimension in
104	Seismic Y _{ABOVE}	0	0	-0.153	-1.8438	0.0042	0	0	0
105	Seismic Y _{ABOVE}	0	0	-5.102	-1.0889	0.5756	0	0	0
106	Seismic Y _{ABOVE}	0	0	-10.33	-0.0075	2.0032	0	0	0
240	Seismic Y _{ABOVE}	0	0	-7.139	-0.0677	1.6542	0	0	0
261	Seismic Y _{ABOVE}	0	0	-5.01	0.0132	0.9046	0	0	0
265	Seismic Y _{ABOVE}	0	0	10.432	-0.012	-1.8582	0	0	0
267	Seismic Y _{ABOVE}	0	0	7.484	-0.0853	-1.5743	0	0	0
269	Seismic Y _{ABOVE}	0	0	5.258	-0.0005	-0.9725	0	0	0
272	Seismic Y _{ABOVE}	0	0	1.99	-1.6734	0.0536	0	0	0
275	Seismic Y _{ABOVE}	0	0	-2.199	-1.757	-0.0499	0	0	0
9	Seismic Y _{ABOVE}	0	0	22.25	-4.5843	-0.7615	0	0	0
10	Seismic Y _{ABOVE}	0	0	5.274	-5.9983	-0.0264	0	0	0
289	Seismic Y _{ABOVE}	0	0	-0.072	-4.5735	-0.0013	0	0	0
291	Seismic Y _{ABOVE}	0	0	-5.459	-6.0014	0.0235	0	0	0
293	Seismic Y _{ABOVE}	0	0	-22.446	-4.6091	0.8158	0	0	0
1	H active X _{ABOVE}	0	0	0.392	-0.2389	0.2889	0	0	0
2	H active X _{ABOVE}	0	0	0.482	0.271	0.299	0	0	0
37	H active X _{ABOVE}	0	0	-0.094	0.0178	0.7851	0	0	0
115	H active X _{ABOVE}	0	0	-0.142	-0.4708	0.3703	0	0	0
118	H active X _{ABOVE}	0	0	-0.09	-0.6041	0.2037	0	0	0
157	H active X _{ABOVE}	0	0	-0.107	0.5103	0.3805	0	0	0
159	H active X _{ABOVE}	0	0	-0.069	0.6449	0.2166	0	0	0
163	H active X _{ABOVE}	0	0	-0.127	-0.1782	0.7287	0	0	0
166	H active X _{ABOVE}	0	0	-0.11	0.229	0.7218	0	0	0
11	H active X _{ABOVE}	0	0	0.284	-0.0935	-0.1536	0	0	0
104	H active X _{ABOVE}	0	0	-0.01	-0.008	-1.0089	0	0	0
105	H active X _{ABOVE}	0	0	0.31	0.0941	-0.1508	0	0	0
106	H active X _{ABOVE}	0	0	-0.078	-0.0338	-0.047	0	0	0
240	H active X _{ABOVE}	0	0	-0.165	-0.0502	-0.2305	0	0	0
261	H active X _{ABOVE}	0	0	-0.17	-0.153	-0.393	0	0	0
265	H active X _{ABOVE}	0	0	-0.049	0.0306	-0.0363	0	0	0
267	H active X _{ABOVE}	0	0	-0.118	0.0496	-0.2298	0	0	0
269	H active X _{ABOVE}	0	0	-0.166	0.153	-0.4041	0	0	0
272	H active X _{ABOVE}	0	0	0.019	-0.0127	-0.783	0	0	0
275	H active X _{ABOVE}	0	0	0.044	0.0023	-0.7843	0	0	0
9	H active X _{ABOVE}	0	0	0.044	-0.2708	0.0654	0	0	0
10	H active X _{ABOVE}	0	0	-0.085	-0.1638	0.0432	0	0	0
289	H active X _{ABOVE}	0	0	-0.008	0.0241	0.0069	0	0	0
291	H active X _{ABOVE}	0	0	-0.085	0.234	0.0484	0	0	0
293	H active X _{ABOVE}	0	0	0.098	0.3189	0.0628	0	0	0
1	Surcharge _{ABOVE}	0	0	1.195	-0.2718	0.4832	0	0	0
2	Surcharge _{ABOVE}	0	0	1.807	0.5893	0.5094	0	0	0
37	Surcharge _{ABOVE}	0	0	-0.205	0.1989	1.5581	0	0	0
115	Surcharge _{ABOVE}	0	0	-0.202	-0.5041	1.1667	0	0	0
118	Surcharge _{ABOVE}	0	0	-0.073	-0.6608	0.8722	0	0	0
157	Surcharge _{ABOVE}	0	0	-0.063	0.8856	1.1545	0	0	0
159	Surcharge _{ABOVE}	0	0	-0.099	1.1358	0.8802	0	0	0
163	Surcharge _{ABOVE}	0	0	-0.14	-0.1474	1.318	0	0	0
166	Surcharge _{ABOVE}	0	0	-0.086	0.7086	1.243	0	0	0
11	Surcharge _{ABOVE}	0	0	0.739	-0.1986	-0.0708	0	0	0
104	Surcharge _{ABOVE}	0	0	-0.296	-0.785	0.0934	0	0	0
105	Surcharge _{ABOVE}	0	0	-0.971	-0.3721	0.046	0	0	0
106	Surcharge _{ABOVE}	0	0	-0.061	0.6855	0.4877	0	0	0
240	Surcharge _{ABOVE}	0	0	-0.225	0.1999	0.4328	0	0	0
261	Surcharge _{ABOVE}	0	0	-0.452	0.024	0.2567	0	0	0

UniqueName	Load Pattern	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft	X Dimension in	Y Dimension in
265	Surcharge _{ABOVE}	0	0	0.051	-1.2134	0.4218	0	0	0
267	Surcharge _{ABOVE}	0	0	0.01	-1.9444	0.3431	0	0	0
269	Surcharge _{ABOVE}	0	0	0.16	-1.1398	0.2646	0	0	0
272	Surcharge _{ABOVE}	0	0	-0.24	-1.0819	0.3015	0	0	0
275	Surcharge _{ABOVE}	0	0	-0.463	-0.5516	0.0348	0	0	0
9	Surcharge _{ABOVE}	0	0	0.671	-0.6748	0.6664	0	0	0
10	Surcharge _{ABOVE}	0	0	-0.581	-0.9811	-0.1023	0	0	0
289	Surcharge _{ABOVE}	0	0	-0.319	-0.0244	-0.0226	0	0	0
291	Surcharge _{ABOVE}	0	0	-0.672	0.9873	0.0468	0	0	0
293	Surcharge _{ABOVE}	0	0	0.513	1.0551	0.6776	0	0	0
1	Super Dead _{ABOVE}	0	0	-0.443	0.0249	-0.045	0	0	0
2	Super Dead _{ABOVE}	0	0	-0.444	-0.024	-0.0441	0	0	0
37	Super Dead _{ABOVE}	0	0	-0.235	0.0009	1.805E-05	0	0	0
115	Super Dead _{ABOVE}	0	0	-0.325	-0.0002	-0.0222	0	0	0
118	Super Dead _{ABOVE}	0	0	-0.288	0.0003	-0.0034	0	0	0
157	Super Dead _{ABOVE}	0	0	-0.325	0.0002	-0.0197	0	0	0
159	Super Dead _{ABOVE}	0	0	-0.284	-0.0003	0.0005	0	0	0
163	Super Dead _{ABOVE}	0	0	-0.335	-0.0053	0.0001	0	0	0
166	Super Dead _{ABOVE}	0	0	-0.337	0.0071	0.0001	0	0	0
11	Super Dead _{ABOVE}	0	0	0.044	-0.0059	0.0011	0	0	0
104	Super Dead _{ABOVE}	0	0	0.043	0.0007	0.0002	0	0	0
105	Super Dead _{ABOVE}	0	0	0.026	0.0044	0.0006	0	0	0
106	Super Dead _{ABOVE}	0	0	-0.178	-0.0001	0.021	0	0	0
240	Super Dead _{ABOVE}	0	0	-0.092	-1.323E-05	0.0177	0	0	0
261	Super Dead _{ABOVE}	0	0	-0.016	-2.565E-05	0.0099	0	0	0
265	Super Dead _{ABOVE}	0	0	-0.192	0.0002	0.019	0	0	0
267	Super Dead _{ABOVE}	0	0	-0.099	1.903E-05	0.0209	0	0	0
269	Super Dead _{ABOVE}	0	0	-0.006	0.0001	0.0149	0	0	0
272	Super Dead _{ABOVE}	0	0	0.049	-0.0021	0.0003	0	0	0
275	Super Dead _{ABOVE}	0	0	0.037	0.0028	0.0002	0	0	0
9	Super Dead _{ABOVE}	0	0	-0.413	0.0288	0.0111	0	0	0
10	Super Dead _{ABOVE}	0	0	-0.223	0.0137	0.0003	0	0	0
289	Super Dead _{ABOVE}	0	0	-0.17	-0.0007	0.0001	0	0	0
291	Super Dead _{ABOVE}	0	0	-0.22	-0.0157	0.0004	0	0	0
293	Super Dead _{ABOVE}	0	0	-0.402	-0.0297	0.0159	0	0	0
1	H passive X _{ABOVE}	0	0	0.46	-0.3301	0.3244	0	0	0
2	H passive X _{ABOVE}	0	0	0.554	0.3621	0.3354	0	0	0
37	H passive X _{ABOVE}	0	0	-0.108	0.0177	0.8622	0	0	0
115	H passive X _{ABOVE}	0	0	-0.154	-0.6961	0.4097	0	0	0
118	H passive X _{ABOVE}	0	0	-0.098	-0.8488	0.2261	0	0	0
157	H passive X _{ABOVE}	0	0	-0.118	0.7357	0.421	0	0	0
159	H passive X _{ABOVE}	0	0	-0.076	0.8896	0.2398	0	0	0
163	H passive X _{ABOVE}	0	0	-0.163	-0.2414	0.7877	0	0	0
166	H passive X _{ABOVE}	0	0	-0.144	0.2919	0.7808	0	0	0
11	H passive X _{ABOVE}	0	0	0.313	-0.1036	-0.1687	0	0	0
104	H passive X _{ABOVE}	0	0	-0.011	-0.0087	-1.1101	0	0	0
105	H passive X _{ABOVE}	0	0	0.341	0.1044	-0.1655	0	0	0
106	H passive X _{ABOVE}	0	0	-0.083	-0.0454	-0.0536	0	0	0
240	H passive X _{ABOVE}	0	0	-0.181	-0.0564	-0.2536	0	0	0
261	H passive X _{ABOVE}	0	0	-0.186	-0.1683	-0.4324	0	0	0
265	H passive X _{ABOVE}	0	0	-0.051	0.0423	-0.0422	0	0	0
267	H passive X _{ABOVE}	0	0	-0.129	0.0558	-0.2529	0	0	0
269	H passive X _{ABOVE}	0	0	-0.182	0.1683	-0.4447	0	0	0
272	H passive X _{ABOVE}	0	0	0.021	-0.0137	-0.8617	0	0	0
275	H passive X _{ABOVE}	0	0	0.049	0.0023	-0.8632	0	0	0

UniqueName	Load Pattern	FX kip	FY kip	FZ kip	MX kip-ft	MY kip-ft	MZ kip-ft	X Dimension in	Y Dimension in
9	H passive X _{ABOVE}	0	0	0.077	-0.3813	0.0677	0	0	0
10	H passive X _{ABOVE}	0	0	-0.122	-0.2282	0.0575	0	0	0
289	H passive X _{ABOVE}	0	0	-0.016	0.0244	0.0086	0	0	0
291	H passive X _{ABOVE}	0	0	-0.122	0.2992	0.0627	0	0	0
293	H passive X _{ABOVE}	0	0	0.13	0.4302	0.0649	0	0	0
1	H active Y _{ABOVE}	0	0	0.172	-0.241	0.0372	0	0	0
2	H active Y _{ABOVE}	0	0	0.15	0.238	0.0339	0	0	0
37	H active Y _{ABOVE}	0	0	-0.048	-0.0021	-0.0083	0	0	0
115	H active Y _{ABOVE}	0	0	0.024	-0.6928	0.0165	0	0	0
118	H active Y _{ABOVE}	0	0	0.045	-0.6249	0.0353	0	0	0
157	H active Y _{ABOVE}	0	0	0.013	0.6921	0.013	0	0	0
159	H active Y _{ABOVE}	0	0	0.037	0.6213	0.0314	0	0	0
163	H active Y _{ABOVE}	0	0	-0.119	-0.2259	-0.0716	0	0	0
166	H active Y _{ABOVE}	0	0	-0.127	0.2212	-0.071	0	0	0
11	H active Y _{ABOVE}	0	0	0.219	-0.0409	-0.1158	0	0	0
104	H active Y _{ABOVE}	0	0	-0.147	0.0038	0.084	0	0	0
105	H active Y _{ABOVE}	0	0	0.246	0.033	-0.122	0	0	0
106	H active Y _{ABOVE}	0	0	0.046	0.9515	-0.0251	0	0	0
240	H active Y _{ABOVE}	0	0	0.013	1.3984	-0.0289	0	0	0
261	H active Y _{ABOVE}	0	0	0.041	0.9129	-0.0333	0	0	0
265	H active Y _{ABOVE}	0	0	0.048	-0.952	-0.0213	0	0	0
267	H active Y _{ABOVE}	0	0	0.007	-1.39	-0.024	0	0	0
269	H active Y _{ABOVE}	0	0	0.025	-0.9131	-0.0287	0	0	0
272	H active Y _{ABOVE}	0	0	-0.184	-0.2699	0.161	0	0	0
275	H active Y _{ABOVE}	0	0	-0.174	0.276	0.1686	0	0	0
9	H active Y _{ABOVE}	0	0	0.367	-0.5919	0.0323	0	0	0
10	H active Y _{ABOVE}	0	0	-0.403	-0.558	-0.035	0	0	0
289	H active Y _{ABOVE}	0	0	-0.203	0.0025	-0.018	0	0	0
291	H active Y _{ABOVE}	0	0	-0.408	0.5653	-0.0389	0	0	0
293	H active Y _{ABOVE}	0	0	0.361	0.5863	0.0288	0	0	0
1	H passive Y _{ABOVE}	0	0	0.189	-0.2651	0.0409	0	0	0
2	H passive Y _{ABOVE}	0	0	0.165	0.2618	0.0373	0	0	0
37	H passive Y _{ABOVE}	0	0	-0.053	-0.0023	-0.0091	0	0	0
115	H passive Y _{ABOVE}	0	0	0.027	-0.762	0.0181	0	0	0
118	H passive Y _{ABOVE}	0	0	0.05	-0.6874	0.0388	0	0	0
157	H passive Y _{ABOVE}	0	0	0.014	0.7613	0.0143	0	0	0
159	H passive Y _{ABOVE}	0	0	0.041	0.6834	0.0346	0	0	0
163	H passive Y _{ABOVE}	0	0	-0.131	-0.2485	-0.0788	0	0	0
166	H passive Y _{ABOVE}	0	0	-0.14	0.2433	-0.0781	0	0	0
11	H passive Y _{ABOVE}	0	0	0.241	-0.045	-0.1273	0	0	0
104	H passive Y _{ABOVE}	0	0	-0.162	0.0042	0.0924	0	0	0
105	H passive Y _{ABOVE}	0	0	0.271	0.0363	-0.1342	0	0	0
106	H passive Y _{ABOVE}	0	0	0.05	1.0466	-0.0276	0	0	0
240	H passive Y _{ABOVE}	0	0	0.015	1.5382	-0.0318	0	0	0
261	H passive Y _{ABOVE}	0	0	0.045	1.0042	-0.0366	0	0	0
265	H passive Y _{ABOVE}	0	0	0.053	-1.0472	-0.0234	0	0	0
267	H passive Y _{ABOVE}	0	0	0.008	-1.529	-0.0264	0	0	0
269	H passive Y _{ABOVE}	0	0	0.027	-1.0045	-0.0316	0	0	0
272	H passive Y _{ABOVE}	0	0	-0.203	-0.2969	0.1771	0	0	0
275	H passive Y _{ABOVE}	0	0	-0.191	0.3036	0.1855	0	0	0
9	H passive Y _{ABOVE}	0	0	0.403	-0.6511	0.0355	0	0	0
10	H passive Y _{ABOVE}	0	0	-0.443	-0.6138	-0.0385	0	0	0
289	H passive Y _{ABOVE}	0	0	-0.224	0.0027	-0.0198	0	0	0
291	H passive Y _{ABOVE}	0	0	-0.449	0.6219	-0.0428	0	0	0
293	H passive Y _{ABOVE}	0	0	0.397	0.645	0.0317	0	0	0

4.3 Load Cases

Table 4.3 - Load Case Definitions - Summary

Name	Type
Dead	Linear Static
Live	Linear Static
Seismic X	Linear Static
Seismic Y	Linear Static
H active X	Linear Static
Surcharge	Linear Static
Super Dead	Linear Static
H passive X	Linear Static
H active Y	Linear Static
H passive Y	Linear Static
CBC1: 1.0D-NL	Nonlinear Static
CBC2: 1.0D+1.0L-NL	Nonlinear Static
CBC3: 1.0D+1.0L+1.0H-NL	Nonlinear Static
CBC4: 1.0D+1.0L+0.714(Ey+0.3Ex+H)-NL	Nonlinear Static
CBC5+4: 1.0D+1.0L+0.714(Ey+0.3Ex+H)-NL	Nonlinear Static

4.4 Load Combinations

Table 4.4 - Load Combination Definitions (Part 1 of 2)

Name	Type	Is Auto	Load Name	SF
CBC1: 1.0D	Linear Add	No	CBC1: 1.0D-NL	1
CBC2: 1.0D+1.0L	Linear Add	No	CBC2: 1.0D+1.0L-NL	1
CBC3: 1.0D+1.0L+1.0H	Linear Add	No	CBC3: 1.0D+1.0L+1.0H-NL	1
CBC4: 1.0D+1.0L+0.714(Ey+0.3Ex+H)	Linear Add	No	RetHX: 100X + 30Y	0.714
CBC4: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			D+SS+SD	1
CBC4: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Live	1
CBC5: 1.0D+1.0L+0.714(Ey+0.3Ex+H)	Linear Add	No	RetHY: 100Y + 30X	0.714
CBC5: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Live	1
CBC5: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			D+SS+SD	1
CBC5+1: 1.0D+1.0L+0.714(Ey+0.3Ex+H)	Linear Add	No	Live	1
CBC5+1: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Seismic X	0.2142
CBC5+1: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Seismic Y	0.714
CBC5+1: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			H active Y	0.714
CBC5+1: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			H active X	0.2142
CBC5+1: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Dead	1
CBC5+1: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Surcharge	1
CBC5+1: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Super Dead	1
CBC5+2: 1.0D+1.0L+0.714(Ey+0.3Ex+H)	Linear Add	No	Live	1
CBC5+2: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Seismic X	0.2142
CBC5+2: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Seismic Y	-0.714
CBC5+2: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			H active Y	-0.714
CBC5+2: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			H active X	0.2142
CBC5+2: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Dead	1
CBC5+2: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Surcharge	1
CBC5+2: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Super Dead	1
CBC5+3: 1.0D+1.0L+0.714(Ey+0.3Ex+H)	Linear Add	No	Live	1
CBC5+3: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Seismic X	-0.2142
CBC5+3: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Seismic Y	-0.714
CBC5+3: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			H active Y	-0.714
CBC5+3: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			H active X	-0.2142
CBC5+3: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Dead	1
CBC5+3: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Surcharge	1

Name	Type	Is Auto	Load Name	SF
CBC5+3: 1.0D+1.0L+0.714(Ey+0.3Ex+H)			Super Dead	1
CBC5+4: 1.0D+1.0L+0.714(Ey+0.3Ex+H)	Linear Add	No	CBC5+4: 1.0D+1.0L+0.714(Ey+0.3Ex+H)-NL	1
CBC6: 1.0D+1.0L+0.714(Ex+0.3Ey)	Linear Add	No	D+SS+SD	1
CBC6: 1.0D+1.0L+0.714(Ex+0.3Ey)			Ex Range	0.714
CBC6: 1.0D+1.0L+0.714(Ex+0.3Ey)			Live	1
CBC6: 1.0D+1.0L+0.714(Ex+0.3Ey)			Ey Range	0.2142
CBC7: 1.0D+1.0L+0.714(Ey+0.3Ex)	Linear Add	No	D+SS+SD	1
CBC7: 1.0D+1.0L+0.714(Ey+0.3Ex)			Ex Range	0.2142
CBC7: 1.0D+1.0L+0.714(Ey+0.3Ex)			Live	1
CBC7: 1.0D+1.0L+0.714(Ey+0.3Ex)			Ey Range	0.714
CBC8: 0.9D+0.714(Ex+0.3Ey+H)	Linear Add	No	D+SS+SD	0.9
CBC8: 0.9D+0.714(Ex+0.3Ey+H)			RetHX: 100X + 30Y	0.714
CBC8: 0.9D+0.714(Ex+0.3Ey+H)			Live	0.01
CBC9: 0.9D+0.714(Ey+0.3Ex+H)	Linear Add	No	D+SS+SD	0.9
CBC9: 0.9D+0.714(Ey+0.3Ex+H)			RetHY: 100Y + 30X	0.714
CBC9: 0.9D+0.714(Ey+0.3Ex+H)			Live	0.01
CBC10: 0.9D+0.714(Ex+0.3Ey)	Linear Add	No	D+SS+SD	0.9
CBC10: 0.9D+0.714(Ex+0.3Ey)			Ex Range	0.714
CBC10: 0.9D+0.714(Ex+0.3Ey)			Ey Range	0.2142
CBC10: 0.9D+0.714(Ex+0.3Ey)			Live	0.01
CBC11: 0.9D+0.714(Ey+0.3Ex)	Linear Add	No	D+SS+SD	0.9
CBC11: 0.9D+0.714(Ey+0.3Ex)			Ex Range	0.2142
CBC11: 0.9D+0.714(Ey+0.3Ex)			Ey Range	0.714
CBC11: 0.9D+0.714(Ey+0.3Ex)			Live	0.01
Ex + Hx Range	Linear Add	No	Ex Range	1
Ex + Hx Range			Hx Range	1
Ex Range	Range Add	No	Seismic X	1
Ex Range			Seismic X	-1
Ey + Hy Range	Linear Add	No	Ey Range	1
Ey + Hy Range			Hy Range	1
Ey Range	Range Add	No	Seismic Y	1
Ey Range			Seismic Y	-1
Hx Range	Range Add	No	H active X	1
Hx Range			H active X	-1
Hy Range	Range Add	No	H active Y	1
Hy Range			H active Y	-1
RetHX: 100X + 30Y	Linear Add	No	Ex + Hx Range	1
RetHX: 100X + 30Y			Ey + Hy Range	0.3
RetHY: 100Y + 30X	Linear Add	No	Ex + Hx Range	0.3
RetHY: 100Y + 30X			Ey + Hy Range	1

5 Analysis Results

This chapter provides analysis results.

5.1 Soil Pressure Results

Soil pressures and deformation limits were obtained according to the Geotechnical Investigation Report No. LA1653 from October 30, 2024 in which an Allowable Soil Bearing Pressure of 2000 psf is recommended with a third increase for seismic loads, and a total settlement of $\frac{1}{2}$ " and differential settlement of $\frac{1}{4}$ " giving a Soil Spring constant $k=0.083\text{kip/in/in}^2$.

5.7 Foundation Recommendations

New shallow foundations planned as part of the retrofit should be embedded within the undisturbed native alluvial deposits for consistency with the other existing foundations supporting the structures.

5.7.1 Bearing Capacity

New shallow foundations planned as part of the improvements should be embedded within the undisturbed Old Alluvial Valley Deposit soils for consistency with other existing foundations supporting the structures. All new foundations should be at least 24-inches below the lowest adjacent surface grade and have a minimum width of 24 inches.

New footings that are constructed adjacent to (or in close proximity to) existing foundations may use a net allowable bearing capacity of 2,000 pounds per square foot (psf). This value may be increased by a factor of 3 for ultimate bearing capacity. The net allowable bearing capacity may be increased by one-third for short term seismic or wind loading.

Although the allowable bearing capacity is lower than the existing allowable bearing capacity shown in the record drawings, the reduced value is to reduce the potential for additional settlement of the existing foundations from the new loading. Group Delta should review the bearing capacities proposed to be used to design the new footings prior to final design.

5.7.2 Settlement

We estimate that the total and differential settlement of new foundations should be less than $\frac{1}{2}$ -inch and $\frac{1}{4}$ -inch, respectively. Existing footings directly adjacent to new foundations should not experience more than $\frac{1}{4}$ -inch of settlement.



LA1653 LPA_Inglewood Civic Center Renovations_Geotech Report.docx

All Soil pressures are below the allowable bearing capacity as shown in pressure maps:

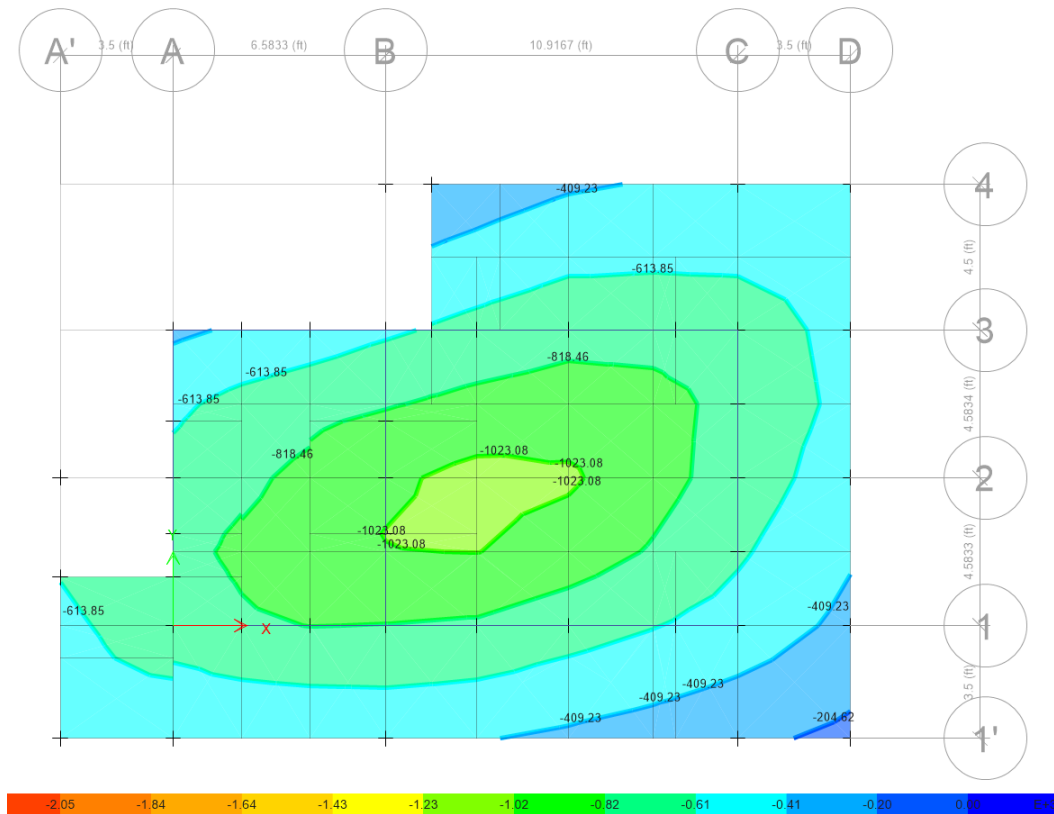
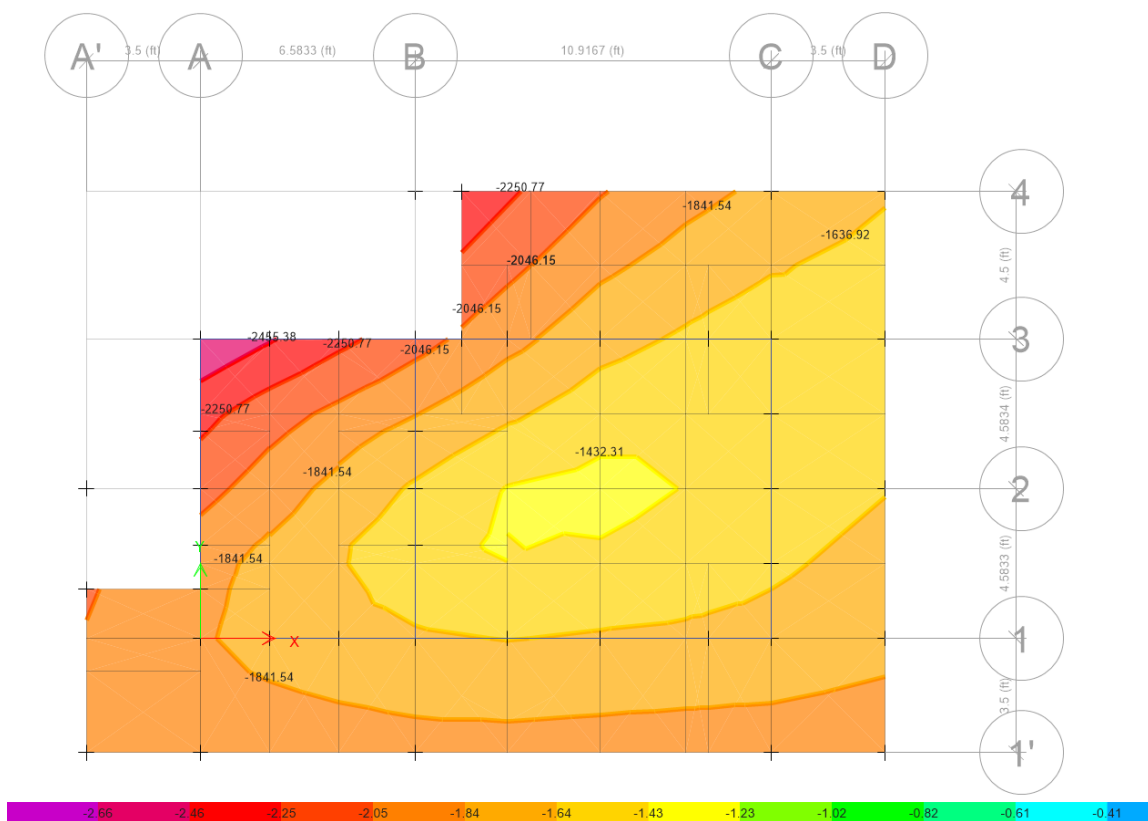
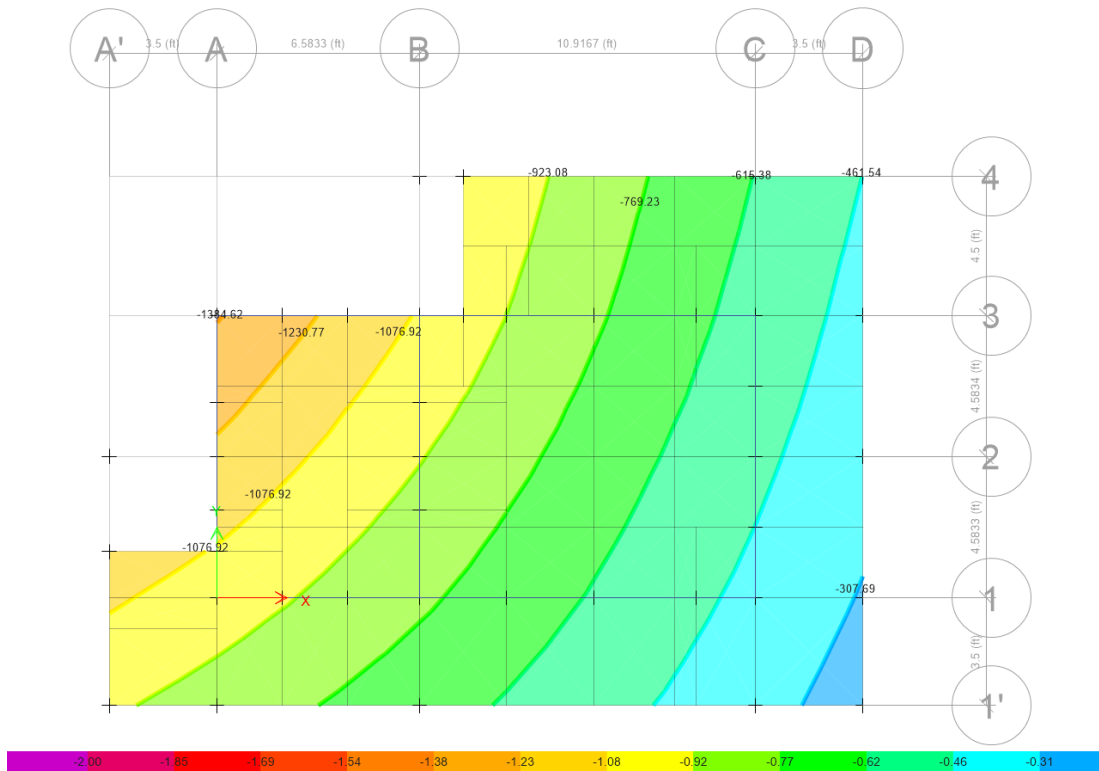
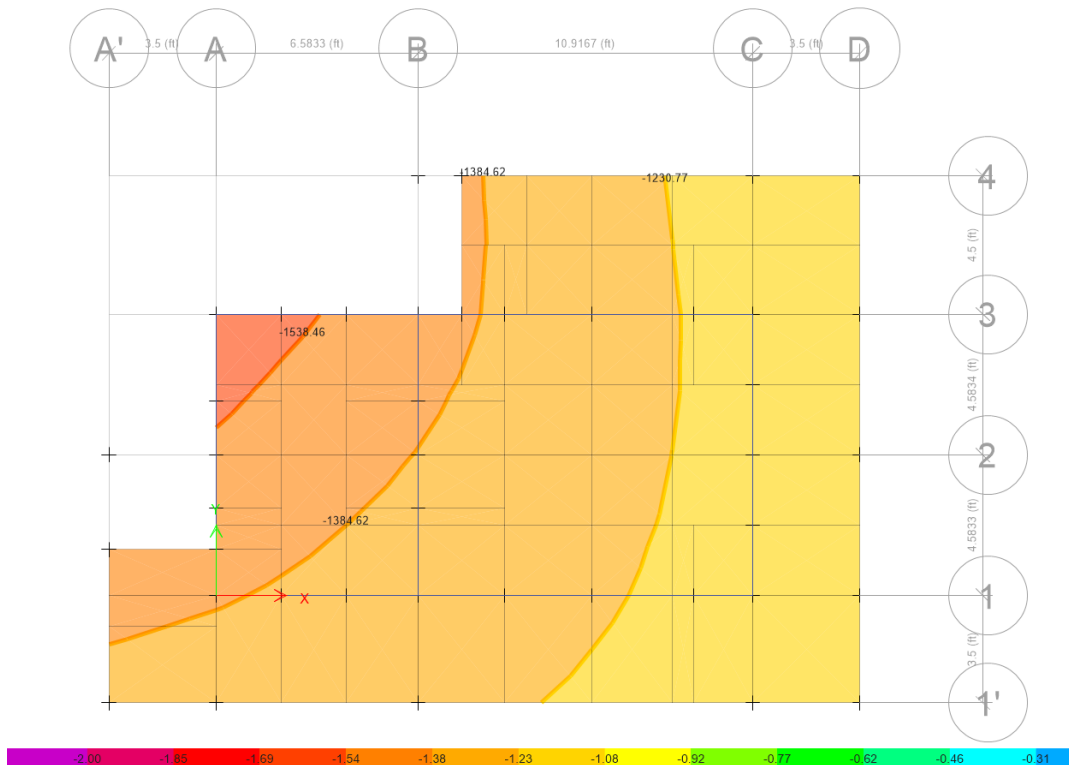
Figure 5.1: Envelope (Max) for Seismic (Net allowable Bearing Capacity = 2,660 psf)**Figure 5.2: Envelope (Min) for Seismic (Net allowable Bearing Capacity = 2,660 psf)**

Figure 5.3: Envelope (Max) for Gravity (Net allowable Bearing Capacity = 2,000 psf)**Figure 5.4: Envelope (Min) for Gravity (Net allowable Bearing Capacity = 2,000 psf)**

ACI 318-14 Concrete Strip A Design**Geometric Properties**

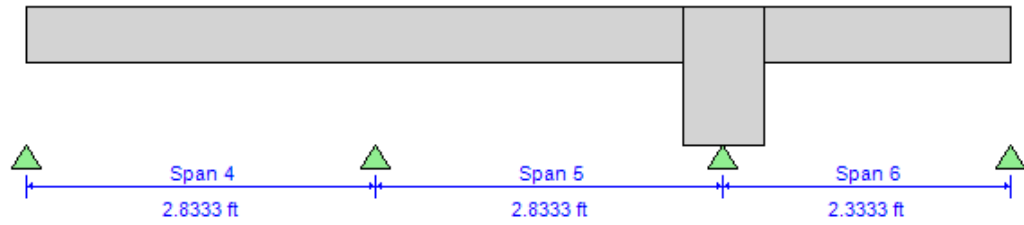
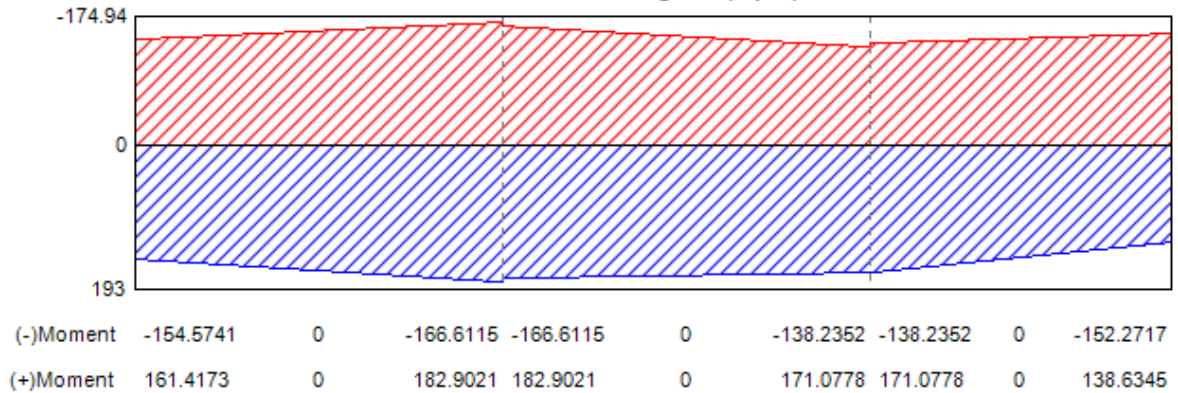
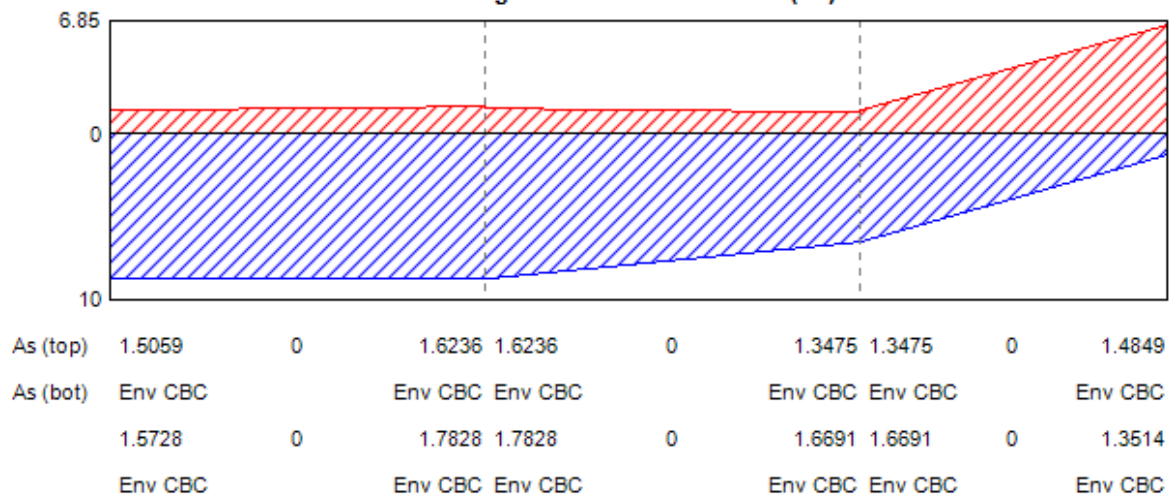
Combination = Env CBC

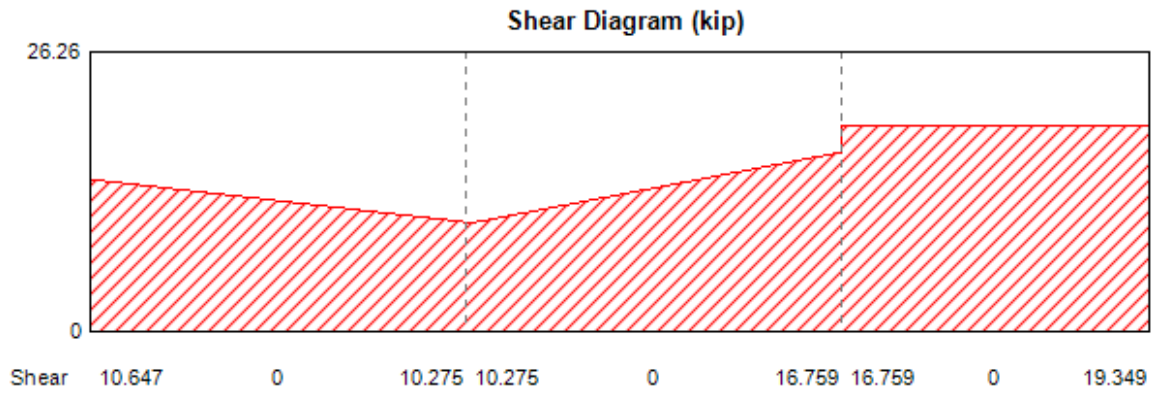
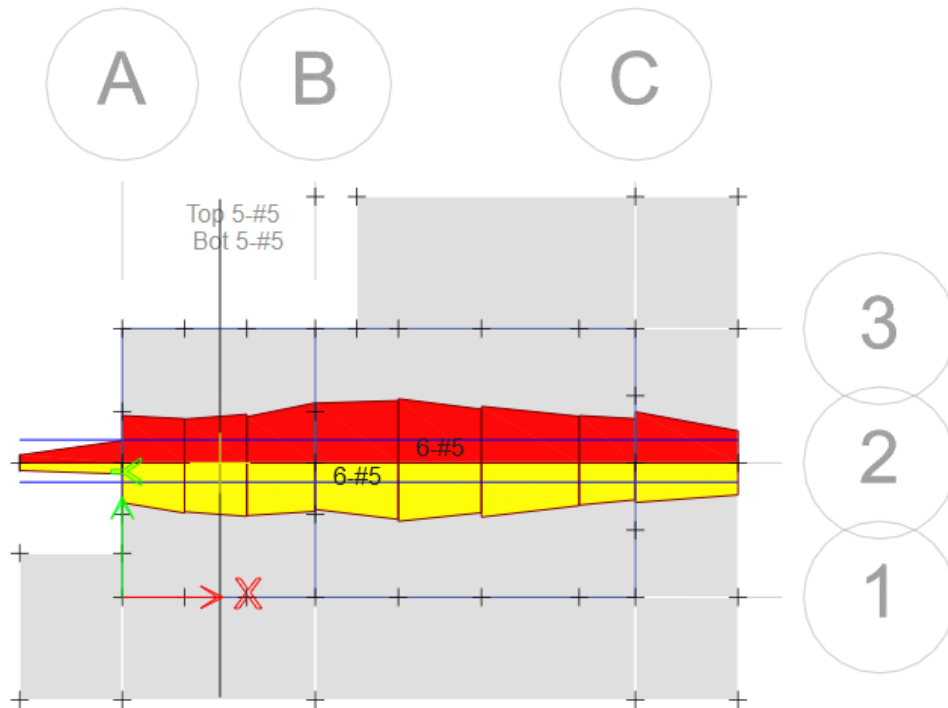
Strip Label = CSA1

Length = 24.5 ft

Distance to Top Rebar Center = 1.125 in

Distance to Bot Rebar Center = 1.125 in

Material PropertiesConcrete Comp. Strength = 4000 lb/in²Concrete Modulus = 3604996.53 lb/in²Longitudinal Rebar Yield = 60000 lb/in²**Moment Diagram (kip-ft)****Longitudinal Reinforcement (in²)**

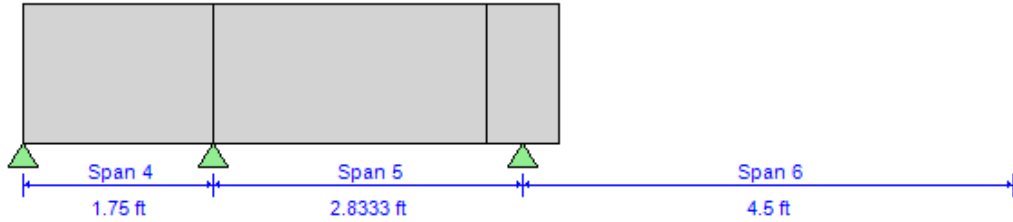
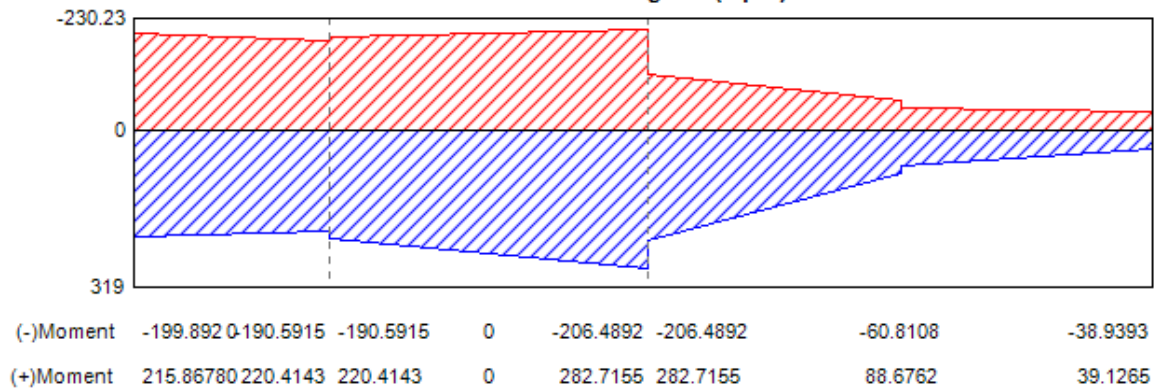
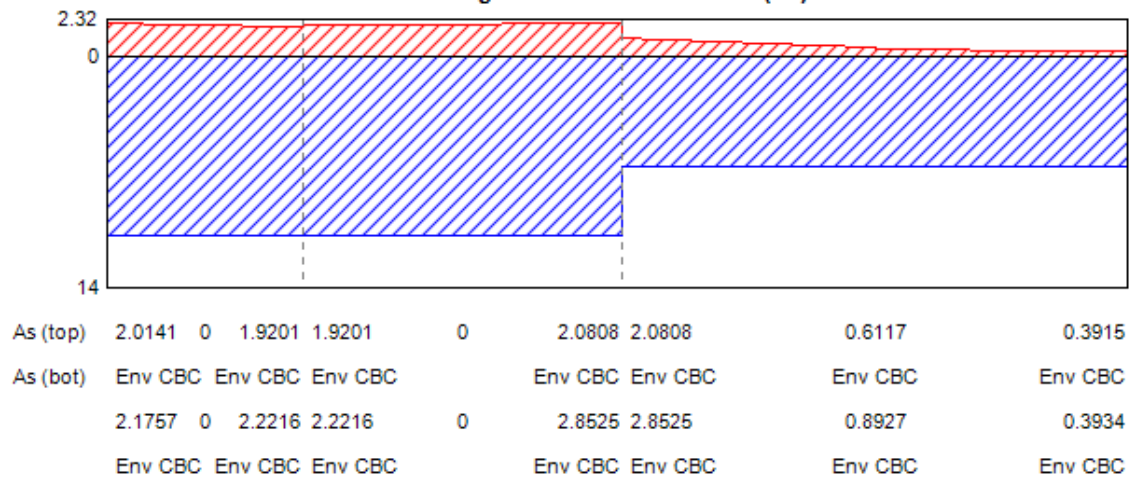
**Rebar distribution on X Direction**

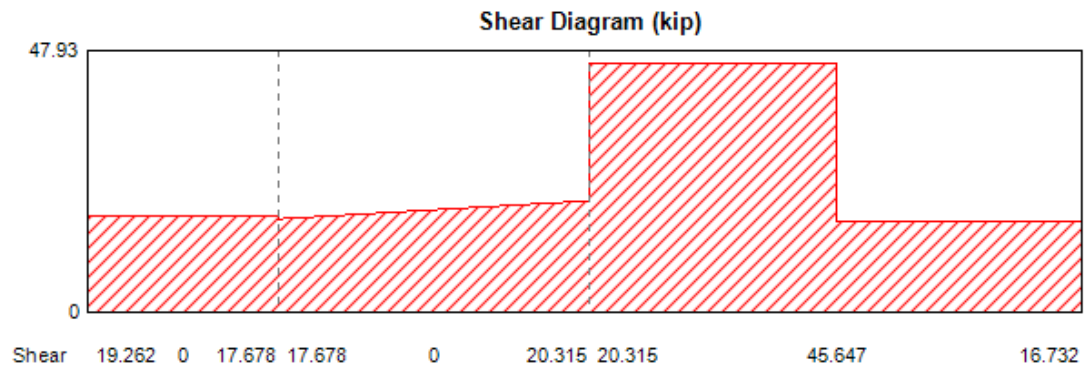
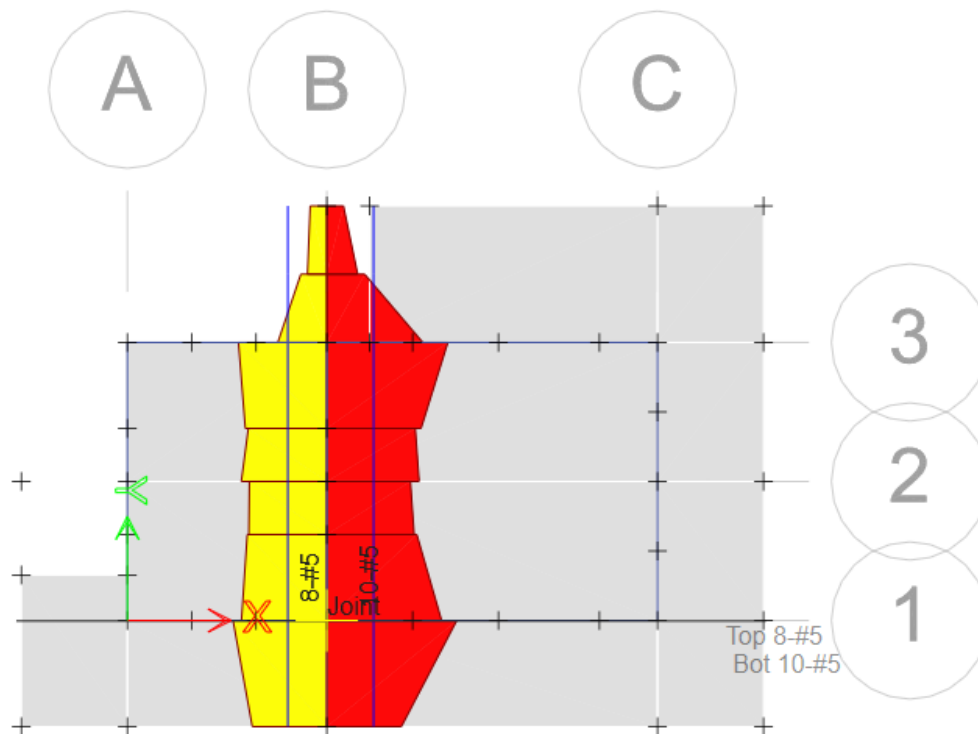
ACI 318-14 Concrete Strip B Design**Geometric Properties**

Combination = Env CBC
Strip Label = CSB1
Length = 17.1667 ft
Distance to Top Rebar Center = 1.875 in
Distance to Bot Rebar Center = 1.875 in

Material Properties

Concrete Comp. Strength = 4000 lb/in ²
Concrete Modulus = 3604996.53 lb/in ²
Longitudinal Rebar Yield = 60000 lb/in ²

**Moment Diagram (kip-ft)****Longitudinal Reinforcement (in²)**

**Rebar distribution on Y Direction**



project: Inglewood Library Renovation

sheet no.:

106

location: Inglewood, CA

job no.: 10012300277

client:

date: 02/15/2025

E. Elevator shaft & hanging pit



project: Inglewood Library - Exterior Elevator

sheet no.:

107

location: Inglewood, CA

job no.: 2300277

client:

date: 02/14/2025

Summary:

The structure of the for the New Elevator located between grid 5C and 5B consists of a steel structure made with HSS6x6 columns and HSS8x4 beams that connect to the existing structure at each level, this design also includes the elevator pit that will be hanging from the second floor and supported by Existing and New concrete beams. See following calculations for members and connections to floor design justification. This report correspond to the Elevator Shaft structure and its connections to the existing structure and the new concrete pit.

The following codes where used for the design:

- 2022 California Building Code.
- AISC 360-16
- ASCE 7-16
- ACI 318-14

HYDRAULIC ELEVATOR CONTRACT DATA			
TYPE:	endura 45 A	ELEVATOR DESIGNATION:	2
SPEED:	125 FPM UP / 150 FPM DOWN	CAPACITY:	1,500 LBS
CAR ENCLOSURE:	TKAP	DOOR HAND:	108
PLATFORM THICKNESS:	4 7/8"	FINISHED FLOOR:	RS
CAR WEIGHT:	3,535.00 LBS		
TELEPHONE:	BY ELEVATOR COMPANY	PIT LADDER:	BY OTHERS
POWER UNIT:	EP-150, 40 HP	POWER SUPPLY:	460 V 3 Phase 60 Cycles
STARTING:	SOLID STATE STARTING	OPERATION:	TAC32
GLOJ:	8,035 LBS	GLOPU:	8,806 LBS
OVER TRAVEL:	BOTTOM: 8 1/2"	TOP:	1'-0"
JACK MODEL:	2.5T III TWIN/TELE	PLUNGER WEIGHT:	771.00 LBS
PLUNGER LENGTH:	UPPER: 14'-8"	MDL: 10'-7 7/16"	LOWER: 10'-5 13/16"
PLUNGER WALL THK:	UPPER: 0.375"	MDL: 0.25"	LOWER: 0.25"
PLUNGER O.D:	UPPER: 2.5"	MDL: 3.75"	LOWER: 5.0"
CYLINDER LENGTH:	10'-5 15/16"	CYLINDER O.D:	7 1/4"
WALL THK:	1/4"		
NET AREA:	23.693 SQ.IN.	BETWEEN PIT FLOOR & CAR BOLSTER ON COMPRESSED BUFFER:	2'-2 3/8"
BOTTOM CAR RUNBY:	6"		
EST. WORKING PRESS:	409 PSI	CAR BUFFER STROKE:	2 1/2"
(QTY) SPRING(S) #:	(2) 780CB1	TOTAL SPRING(S) CAPACITY:	30,446 LBS
JACK REACTION (EA.):	9,464.00 LBS	CAR BUFFER REACTION:	23,556.00 LBS

CAR FRAME	S = 3.27	FORMED	S = 5.67	FORMED	S = 1.38	FORMED
	I = 9.82	CROSSHEAD	I = 23.39	BOLSTER	I = 2.17	STILE
	A = 1.85	7GA x 6" x 2 1/2"	A = 2.40	7GA x 8 1/4" x 2 3/4"	R = 1.01	10GA
RAIL FORCES	F1	F2	SEISMIC RAIL FORCES ZONE: 4			
	619 LBS	715 LBS	F1 = 1,778 LBS	F2 = 889 LBS		

CAR STATION FEATURES: Traditional Fixtures, T2 Buttons, Alarm Button, Telephone, Position Indicator

PUSH BUTTON MARKINGS: 1, 2, 3

CAR RIDING LANTERN: Strike

NOTE A: OIL PIPE LINES AND FITTINGS SHALL BE PROPERLY SUPPORTED TO RELIEVE STRAIN.

NOTE B: ALL REACTIONS INCLUDE ALLOWANCE FOR IMPACT.

NOTE C: TK ELEVATOR TO BE NOTIFIED OF ANY CHANGE TO ELEVATOR HOISTWAY OR MACHINE ROOM DESIGN.

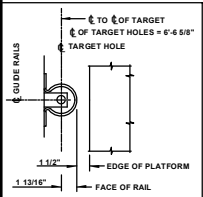
NOTE D: ELEVATOR DESIGN & FABRICATION BASED ON ESTIMATED CAB WEIGHT SHOWN. LAYOUT APPROVAL WILL BE CONSTRUED AS FINAL CAR WEIGHT, UNLESS OTHERWISE NOTIFIED.

BY OTHERS

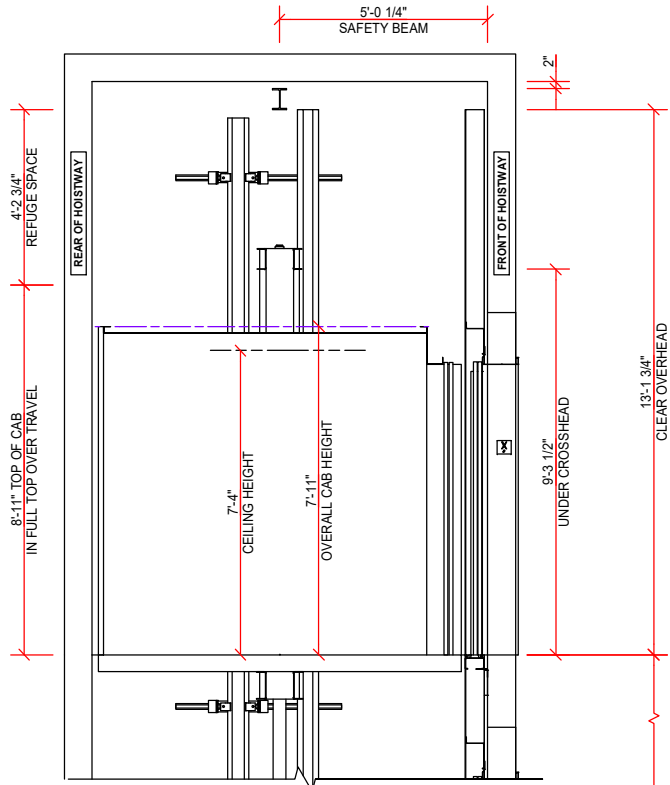
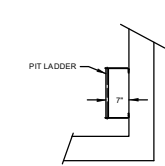
THE FOLLOWING CONDITIONS MUST BE MET BEFORE INSTALLATION IS COMPLETED AND ARE NOT INCLUDED IN THE ELEVATOR CONTRACT

GENERAL DATA

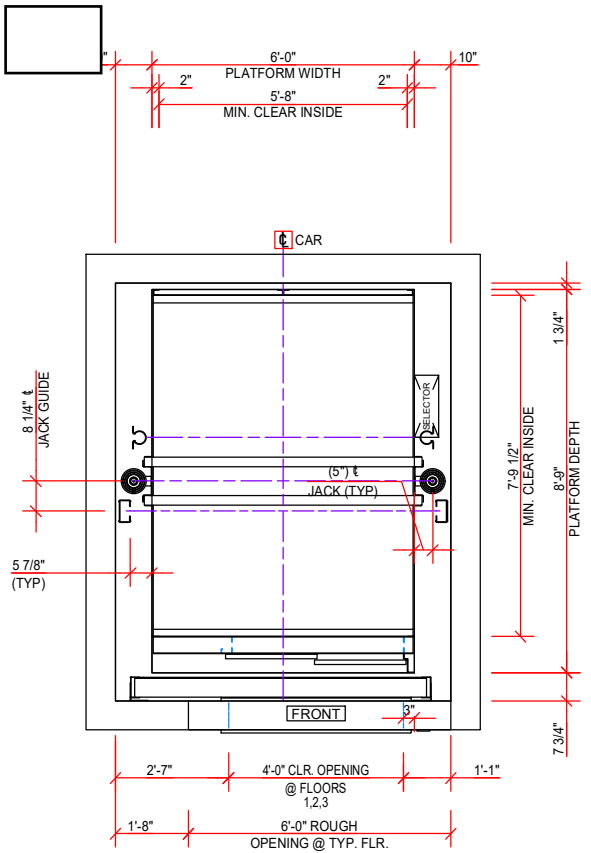
- LIGHTING (MINIMUM 200LUX/19FT. CANDLES) AND SWITCH, CONVENIENCE OUTLETS WITH GFCI PROTECTION PER NEC. LIGHTING IS REQUIRED AT THE PIT LEVEL.
- A LIGHT SWITCH LOCATED 4'-0" ABOVE BOTTOM LANDING NEXT TO THE TOP RUNG OF THE LADDER.
- A PLUMB AND PROPERLY VENTED HOISTWAY BUILT ACCORDING TO CODE AND SIZES SHOWN.
- ADEQUATE SUPPORT FOR JACK, GUIDE RAIL BRACKETS, AND BUFFERS (FOR REACTIONS SHOWN)
- HOISTWAY BARRICADES AND ALL CUTTING AND PATCHING TO INSTALL HOISTWAY ENTRANCES, SILLS, HALL FIXTURES, OIL, AND ELECTRIC LINES.
- ENTRANCE WALL WITH LINTELS MUST BE PROVIDED AFTER ENTRANCE FRAMES ARE SET OR LEAVE A ROUGH OPENING WIDER AND HIGHER THAN THE FRAME OPENING AS SHOWN. SEE INSTALLATION PROCEDURES FOR FRAME-TO-WALL INTERFACE DETAILS TO ENSURE CONFORMANCE WITH THE LABELED ENTRANCE INTERFACE CONSTRUCTION.
- PIT LADDER PER CAR (ACCORDING TO CODE) NOTE: MUST BE CLEAR OF ALL ELEVATOR EQUIPMENT.
- PIT LADDER LOCATION TO BE CONFIRMED BY TK ELEVATOR SUPERINTENDENT.
- POCKETS IN CORRIDOR WALL FOR HALL FIXTURES.
- NOTE:** MUST BE LOCATED AS DIRECTED BY ELEVATOR CONTRACTOR
- SMOKE SENSORS (AS REQUIRED)
- ELEVATOR MEETS ASME A17.1 2019 CODE.
- AN 8" X 8" BLOCK OUT IS REQUIRED IN THE HOISTWAY WALL. LOCATION TO BE DETERMINED BY TK ELEVATOR SUPERINTENDENT.
- SUMP PIT OR DRAIN AS REQUIRED BY LOCAL CODE BY GENERAL CONTRACTOR.
- SAFETY BEAM REQUIRED PER OSHA 1926 502 PROVIDED AND INSTALLED BY OTHERS, AS DIRECTED BY TK ELEVATOR FIELD OFFICE DESIGN LOAD = 5,000 LBS (STATIC, NOT IMPACT)



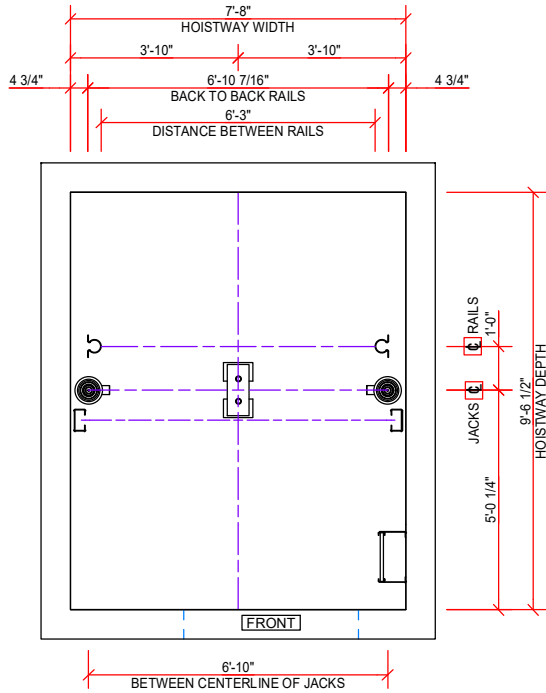
SUMP PIT SIZE TO BE DETERMINED BY GENERAL CONTRACTOR



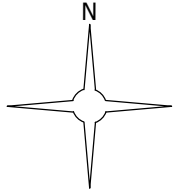
ELEVATION VIEW



HOISTWAY PLAN



PIT PLAN



THIS DRAWING AND ALL INFORMATION THEREON IS THE PROPRIETARY PROPERTY OF TK ELEVATOR AND MUST NOT BE MADE PUBLIC OR COPIED. THIS DRAWING IS LOANED SUBJECT TO RETURN ON DEMAND AND IS NOT TO BE USED DIRECTLY OR INDIRECTLY, IN ANY MANNER DETRIMENTAL TO THE INTEREST OF TK ELEVATOR.

FOR:

ADDRESS:
CITY:

TK Elevator

DRAWN	REV	JOB NUMBER	DATE	SHEET
SR	A	1712-312-04A	11/12/2024	4 OF 7

KPFF Consulting Engineers
700 S. Flower St., Suite 2100
Los Angeles, CA 90017
(213) 418-0201

Project :

Job no. :

Date :

By :

BASE SHEAR & EQUIVALENT LATERAL FORCE PROCEDURE ASCE 7-16 Ch. 11 & 12

SEISMIC PARAMETERS BASED ON MAPPED VALUES, PER SOILS ENGINEER

RISK CATEGORY:	II
DO YOU HAVE A GEOTECHNICAL REPORT?	Yes
SITE CLASS =	C
$I_e =$	1
$S_S =$	1.534
$S_1 =$	0.629
DO YOU NEED A SITE SPECIFIC PER ASCE 7-16 11.4.8?	No
USE MODIFIED RESPONSE SPECTRA PER ASCE 7-16 11.4.8 EXCEPTIONS?	No

2019 CBC Table 1604.5

Per Soils Engineer

ASCE 7-16 Table 1.5-2

Mapped, Per Soils Engineer

Mapped, Per Soils Engineer

SITE COEFFICIENTS:

$F_a =$	1.800
$F_v =$	2.198

ASCE 7-16 Table 11.4-1

ASCE 7-16 Table 11.4-2

ADJUSTED MCE SPECTRAL RESPONSE ACCELERATION PARAMETERS:

$S_{MS} = F_a S_S =$	2.761
$S_{M1} = F_v S_1 =$	1.382

ASCE 7-16 Equation 11.4-1

ASCE 7-16 Equation 11.4-2

DESIGN SPECTRAL ACCELERATION PARAMETERS:

$S_{DS} = 2/3(S_{MS}) =$	1.841
$S_{D1} = 2/3(S_{M1}) =$	0.921

ASCE 7-16 Equation 11.4-3

ASCE 7-16 Equation 11.4-4

SEISMIC DESIGN CATEGORY =	D
----------------------------------	----------

ASCE 7-16 Section 11.6

STRENGTH LEVEL STATIC BASE SHEAR (X-Direction):

LFRS =	SMRF	
$R_x =$	2.5	
Struct Height, $h_n =$	45	ft
$C_t =$	0.028	ASCE 7-16 Tbl 12.8-1
$x =$	0.8	
$T_{X,MODAL} =$	0.24	s
$C_u =$	1.4	
$T_a = C_t h_n^x =$	0.59	s
$C_u T_a =$	0.82	s
Gov T for $C_s, max =$	0.24	s, min{ $T_{modal}, C_u T_a$ }

Steel Ordinary moment Frame

R = 2.5

 $\Omega = 2.0$ $C_d = 2.5$

ASCE 7-16 Equation 12.8-7

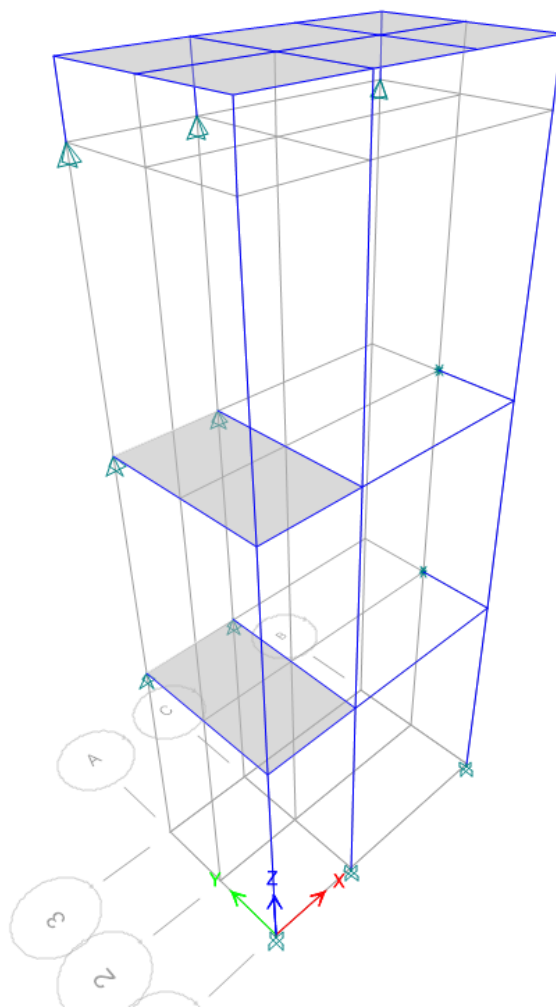
ASCE 7-16 12.8.2

$C_s = S_{DS}/(R/I_e) =$	0.736	Gov
$C_{s,max} = S_{D1}/(T^*R/I_e) =$	1.545	
$C_{s,min} = \max(0.044 S_{DS} I_e, 0.01) =$	0.081	

ASCE 7-16 Equation 12.8-2

ASCE 7-16 Equation 12.8-3

ASCE 7-16 Equation 12.8-5



Elevator Shaft Report

Model File: Elevator Shaft COIL, Revision 0
2/17/2025

1 Structure Data

This chapter provides model geometry information, including items such as story levels, point coordinates, and element connectivity.

1.1 Mass

Table 1.4 - Mass Summary by Story

Story	UX kip-s2/in	UY kip-s2/in	UZ kip-s2/in
Story4	0.077051	0.077051	0
Story3	0.002575	0.002575	0
Story2	0.046993	0.046993	0
Story1	0.046993	0.046993	0
Base	0.001803	0.001803	0

2 Properties

This chapter provides property information for materials, frame sections, shell sections, and links.

2.1 Materials

Table 2.1 - Material Properties - General

Material	Type	SymType	Grade	Color	Notes
4000Psi	Concrete	Isotropic	f'c 4000 psi	Magenta	
A416Gr270	Tendon	Uniaxial	Grade 270	Gray8Dark	
A500GrB46	Steel	Isotropic	Grade B, Fy 46 (HSS Rect.)	Magenta	
A615Gr60	Rebar	Uniaxial	Grade 60	Yellow	
A992Fy50	Steel	Isotropic	Grade 50	Red	

2.2 Frame Sections

Table 2.2 - Frame Section Property Definitions - Summary (Part 1 of 3)

Name	Material	Shape	Color	Area in ²	J in ⁴	I33 in ⁴	I22 in ⁴	As2 in ²	As3 in ²	S33Pos in ³
HSS6X6X1/2	A500GrB46	Steel Tube	Red	9.74	81.1	48.3	48.3	5.58	5.58	16.1
W10X26	A992Fy50	Steel I/Wide Flange	Red	7.61	0.4	144	14.1	2.68	4.23	27.96
W8X31	A992Fy50	Steel I/Wide Flange	Green	9.13	0.54	110	37.1	2.28	5.8	27.5

Table 2.2 - Frame Section Property Definitions - Summary (Part 2 of 3)

Name	S33Neg in ³	S22Pos in ³	S22Neg in ³	Z33 in ³	Z22 in ³	R33 in	R22 in	Cw in ⁶	Fillet Radius in	CG Offset 3 in	CG Offset 2 in	PNA Offset 3 in
HSS6X6X1/2	16.1	16.1	16.1	19.8	19.8	2.2269	2.2269			0	0	0
W10X26	27.96	4.89	4.89	31.3	7.5	4.35	1.3612	342.39	0.3	0	0	0
W8X31	27.5	9.28	9.28	30.4	14.1	3.4711	2.0158	531.09	0.394	0	0	0

2.3 Shell Sections

Table 2.3 - Area Section Property Definitions - Summary

Name	Type	Element Type	Material	Total Thickness in	Deck Material	Deck Depth in
Deck1	Deck	Membrane	4000Psi	5.5	A992Fy50	3

3 Loads

This chapter provides loading information as applied to the model.

3.1 Load Patterns

Table 3.1 - Load Pattern Definitions

Name	Is Auto Load	Type	Self Weight Multiplier	Auto Load
~LLRF	Yes	Other	0	
Dead	No	Dead	1	
Diaph X Mass	No	Seismic	0	User Coefficient
Diaph Y Mass	No	Seismic	0	User Coefficient
Elevator	No	Dead	0	
Facade	No	Dead	0	
Live	No	Live	0	
Mass X	No	Dead	0	
Mass Y	No	Dead	0	
Rail Seismic	No	Seismic	0	None
Super Dead	No	Dead	0	

3.2 Load Cases

Table 3.4 - Load Case Definitions - Summary

Name	Type
Dead	Linear Static
Live	Linear Static
Modal	Modal - Eigen
Facade	Linear Static
Super Dead	Linear Static
Elevator	Linear Static
Mass X	Linear Static
Mass Y	Linear Static
Rail Seismic	Linear Static
Diaph X Mass	Linear Static
Diaph Y Mass	Linear Static

3.3 Auto Seismic Loading

User Coefficient Auto Seismic Load Calculation

This calculation presents the automatically generated lateral seismic loads for load pattern Diaph X Mass using the user input coefficients, as calculated by ETABS.

Direction and Eccentricity

Direction = X

Factors and Coefficients

Equivalent Lateral Forces

Base Shear Coefficient, C

$$C = 1$$

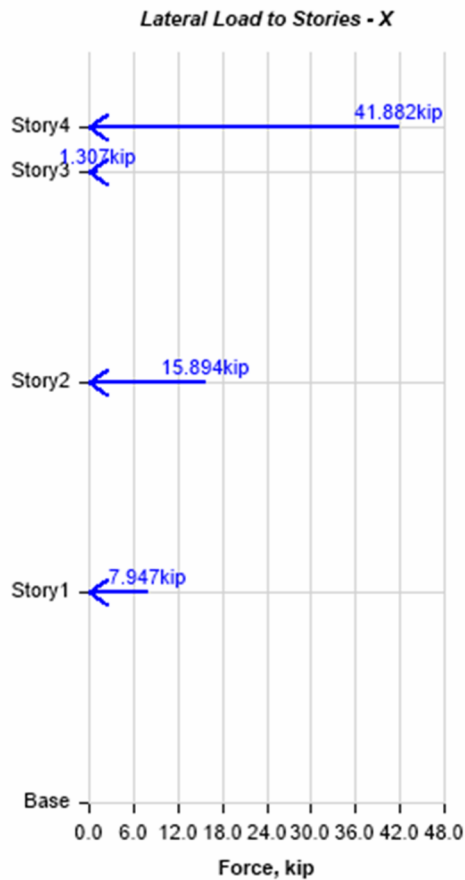
Base Shear, V

$$V = CW$$

Calculated Base Shear

Direction	Period Used (sec)	C	W (kip)	V (kip)
X	0	0	67.0295	67.03

Applied Story Forces



Story	Elevation	X-Dir	Y-Dir
	in	kip	kip
Story4	540	41.882	0
Story3	504	1.307	0
Story2	336	15.894	0
Story1	168	7.947	0
Base	0	0	0

User Coefficient Auto Seismic Load Calculation

This calculation presents the automatically generated lateral seismic loads for load pattern Diaph Y Mass using the user input coefficients, as calculated by ETABS.

Direction and Eccentricity

Direction = Y

Factors and Coefficients

Equivalent Lateral Forces

Base Shear Coefficient, C

C = 1

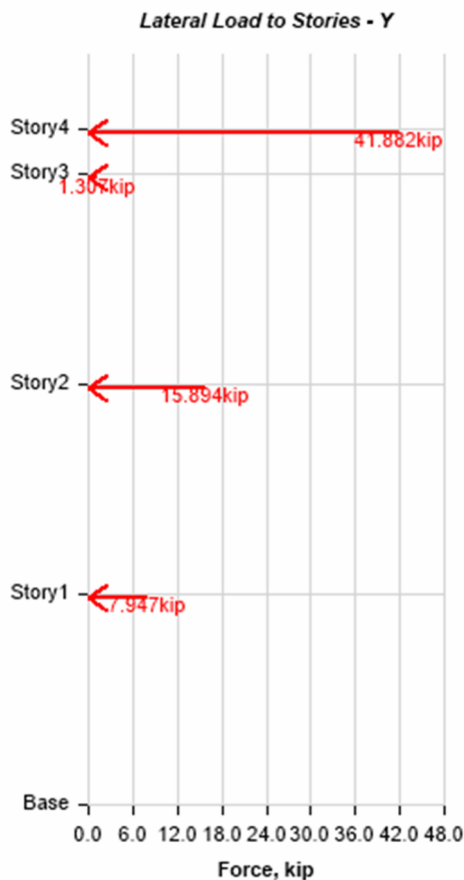
Base Shear, V

$V = CW$

Calculated Base Shear

Direction	Period Used (sec)	C	W (kip)	V (kip)
Y	0	0	67.0295	67.03

Applied Story Forces



Story	Elevation	X-Dir	Y-Dir
	in	kip	kip
Story4	540	0	41.882
Story3	504	0	1.307
Story2	336	0	15.894
Story1	168	0	7.947
Base	0	0	0

4 Analysis Results

This chapter provides analysis results.

4.1 Structure Results

Table 4.2 - Joint Reactions

Story	Label	Unique Name	Output Case	Step Type	FX kip	FY kip	FZ kip
Story3	4	14	Envelope	Max	5.683	6.976	9.142
Story3	4	14	Envelope	Min	-5.598	-7.063	-5.154
Story3	4	14	Envelope-Rail	Max	0.056	-0.021	2.555
Story3	4	14	Envelope-Rail	Min	0.028	-0.079	1.432
Story3	4	14	Envelope Omega	Max	11.311	13.974	15.73
Story3	4	14	Envelope Omega	Min	-11.227	-14.061	-11.743
Story3	5	22	Envelope	Max	8.586	5.663	11.627
Story3	5	22	Envelope	Min	-6.479	-6.892	1.866
Story3	5	22	Envelope-Rail	Max	1.359	-0.41	8.724
Story3	5	22	Envelope-Rail	Min	0.747	-0.856	4.769
Story3	5	22	Envelope Omega	Max	15.814	11.737	14.531
Story3	5	22	Envelope Omega	Min	-13.708	-12.966	-1.038
Story3	6	24	Envelope	Max	3.859	7.22	10.586
Story3	6	24	Envelope	Min	-5.987	-7.23	-0.768
Story3	6	24	Envelope-Rail	Max	-0.757	0.008	6.277
Story3	6	24	Envelope-Rail	Min	-1.371	-0.016	3.54
Story3	6	24	Envelope Omega	Max	8.476	14.441	14.896
Story3	6	24	Envelope Omega	Min	-10.604	-14.451	-5.079
Story2	4	13	Envelope	Max	6.135	13.045	4
Story2	4	13	Envelope	Min	-6.122	-13.345	1.425
Story2	4	13	Envelope-Rail	Max	0.462	1.503	4
Story2	4	13	Envelope-Rail	Min	-0.449	-1.803	1.55
Story2	4	13	Envelope Omega	Max	12.259	26.164	3.817
Story2	4	13	Envelope Omega	Min	-12.246	-26.464	1.299
Story2	5	21	Envelope	Max	5.327	12.661	4.004
Story2	5	21	Envelope	Min	-5.378	-12.976	1.448
Story2	5	21	Envelope-Rail	Max	0.325	3.12	4.004
Story2	5	21	Envelope-Rail	Min	-0.376	-3.435	1.558
Story2	5	21	Envelope Omega	Max	10.667	25.4	3.793
Story2	5	21	Envelope Omega	Min	-10.718	-25.715	1.339
Story2	9	23	Envelope	Max	2.04	4.754	1.453
Story2	9	23	Envelope	Min	-2.046	-4.453	0.301
Story2	9	23	Envelope-Rail	Max	0.095	0.37	1.161
Story2	9	23	Envelope-Rail	Min	-0.1	-0.069	0.663
Story2	9	23	Envelope Omega	Max	4.083	9.318	1.815
Story2	9	23	Envelope Omega	Min	-4.088	-9.016	-0.061
Story1	4	8	Envelope	Max	5.279	10.536	4.014
Story1	4	8	Envelope	Min	-5.334	-10.176	1.542
Story1	4	8	Envelope-Rail	Max	-0.012	0.302	4.014
Story1	4	8	Envelope-Rail	Min	-0.044	0.091	1.564
Story1	4	8	Envelope Omega	Max	10.575	20.814	3.629
Story1	4	8	Envelope Omega	Min	-10.63	-20.454	1.519
Story1	5	10	Envelope	Max	4.767	10.604	4.016
Story1	5	10	Envelope	Min	-4.684	-10.204	1.548
Story1	5	10	Envelope-Rail	Max	0.061	0.32	4.016
Story1	5	10	Envelope-Rail	Min	0.026	0.108	1.569
Story1	5	10	Envelope Omega	Max	9.478	20.927	3.631

Story	Label	Unique Name	Output Case	Step Type	FX kip	FY kip	FZ kip
Story1	5	10	Envelope Omega	Min	-9.395	-20.527	1.527
Story1	9	12	Envelope	Max	2.074	3.95	1.264
Story1	9	12	Envelope	Min	-2.075	-4.008	0.655
Story1	9	12	Envelope-Rail	Max	0.005	-0.021	1.264
Story1	9	12	Envelope-Rail	Min	-0.006	-0.038	0.722
Story1	9	12	Envelope Omega	Max	4.148	7.922	1.331
Story1	9	12	Envelope Omega	Min	-4.149	-7.98	0.588
Base	1	1	Envelope	Max	0.042	0.357	19.194
Base	1	1	Envelope	Min	-0.005	0.118	6.21
Base	1	1	Envelope-Rail	Max	0.024	0.357	17.885
Base	1	1	Envelope-Rail	Min	0.013	0.14	8.428
Base	1	1	Envelope Omega	Max	0.061	0.364	21.414
Base	1	1	Envelope Omega	Min	-0.024	0.096	3.989
Base	2	3	Envelope	Max	0.113	0.336	34.708
Base	2	3	Envelope	Min	0.049	0.113	15.042
Base	2	3	Envelope-Rail	Max	0.108	0.336	32.42
Base	2	3	Envelope-Rail	Min	0.061	0.13	17.472
Base	2	3	Envelope Omega	Max	0.126	0.336	37.14
Base	2	3	Envelope Omega	Min	0.036	0.095	12.61
Base	3	5	Envelope	Max	-0.068	0.042	20.969
Base	3	5	Envelope	Min	-0.179	0.006	8.216
Base	3	5	Envelope-Rail	Max	-0.093	0.032	19.082
Base	3	5	Envelope-Rail	Min	-0.163	0.016	10.903
Base	3	5	Envelope Omega	Max	-0.043	0.053	23.656
Base	3	5	Envelope Omega	Min	-0.204	-0.005	5.529

www.hilti.com

Company:
Address:
Phone | Fax:
Design:
Fastening point:

COIL- Shaft Cnx Base PL

Page:
Specifier:
E-Mail:
Date:

1

2/17/2025

Specifier's comments:

1 Input data

Anchor type and diameter:

Kwik Bolt TZ2 - CS 1/2 (2) hnom2

Item number:

2210254 KB-TZ2 1/2x3 3/4

Specification text:

Hilti $\varnothing$ 1/2 in Kwik Bolt TZ2 - CS with 2.5 in nominal embedment depth per ICC-ES ESR-4266 , Hammer drilled installation per MPII

Effective embedment depth:

$h_{ef,act} = 2.000$ in., $h_{nom} = 2.500$ in.

Material:

Carbon Steel

Evaluation Service Report:

ESR-4266

Issued | Valid:

12/1/2023 | 12/1/2025

Proof:

Design Method ACI 318-19 / Mech

Shear edge breakout verification:

Row closest to edge (Case 3 only from ACI 318-19 Fig. R.17.7.2.1b)

Stand-off installation:

$e_b = 0.000$ in. (no stand-off); $t = 0.500$ in.

Anchor plate^R:

$l_x \times l_y \times t = 12.000$ in. x 8.000 in. x 0.500 in.;

Profile:

Square HSS (AISC), HSS6X6X.500; (L x W x T) = 6.000 in. x 6.000 in. x 0.500 in.

Base material:

cracked concrete, 4000 , $f'_c = 4,000$ psi; $h = 60.000$ in.

Installation:

Hammer drilled hole, Installation condition: Dry

Reinforcement:

tension: not present, shear: not present; no supplemental splitting reinforcement present

edge reinforcement: none or < No. 4 bar

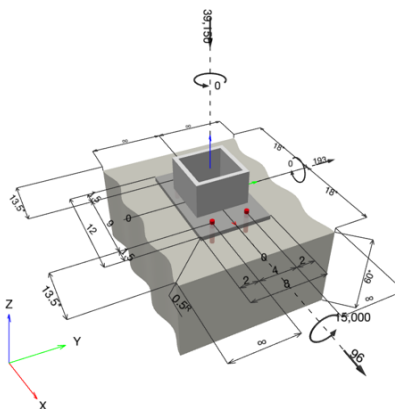
Seismic loads (cat. C, D, E, or F)

Tension load: yes (17.10.5.3 (d))

Shear load: yes (17.10.6.3 (c))

^R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



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Company:		Page:	2
Address:		Specifier:	
Phone Fax:		E-Mail:	
Design:	COIL- Shaft Cnx Base PL	Date:	2/17/2025
Fastening point:			

1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = -39,150; V _x = 96; V _y = 193; M _x = 15,000; M _y = 0; M _z = 0;	yes	3

2 Proof I Utilization (Governing Cases)

Loading	Proof	Design values [lb]		Utilization	Status
		Load	Capacity	β_N / β_V [%]	
Tension	-	-	-	- / -	N/A
Shear	Pryout Strength	216	8,765	- / 3	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	-	-	-	-	N/A

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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Company:
Address:
Phone | Fax: |
Design: COIL- Shaft Cnx to Cantilever
Fastening point:

Page: 1
Specifier:
E-Mail:
Date: 2/17/2025

Specifier's comments:

1 Input data

Anchor type and diameter:	HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 Gr.36) 3/4	
Item number:	2198031 HAS-V-36 3/4"x12" (element) / 2334276 HIT-HY 200-R V3 (adhesive)	
Specification text:	Hilti Ø 3/4 in HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 Gr.36) with 10 in nominal embedment depth per ICC-ES ESR-4868 , Hammer drilled installation per MPII	
Effective embedment depth:	$h_{ef,act} = 10.000$ in. ($h_{ef,limit} = -$ in.)	
Material:	ASTM F1554 Grade 36	
Evaluation Service Report:	ESR-4868	
Issued Valid:	6/1/2023 11/1/2024	
Proof:	Design Method ACI 318-19 / Chem	
Shear edge breakout verification:	Row closest to edge (Case 3 only from ACI 318-19 Fig. R.17.7.2.1b)	
Stand-off installation:	$e_b = 0.000$ in. (no stand-off); $t = 0.500$ in.	
Anchor plate ^R :	$l_x \times l_y \times t = 10.000$ in. x 14.000 in. x 0.500 in.;	
Profile:	Rectangular HSS (AISC), HSS8X4X.375; (L x W x T) = 8.000 in. x 4.000 in. x 0.375 in.	
Base material:	cracked concrete, 3000, $f'_c = 3,000$ psi; $h = 60.000$ in., Temp. short/long: 32/32 °F	
Installation:	Hammer drilled hole, Installation condition: Dry	
Reinforcement:	tension: present, shear: present; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar	
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))	

^R - The anchor calculation is based on a rigid anchor plate assumption.

www.hilti.com			Page:	2
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Phone Fax:			Date:	2/17/2025
Design:				
Fastening point:				

COIL- Shaft Cnx to Cantilever

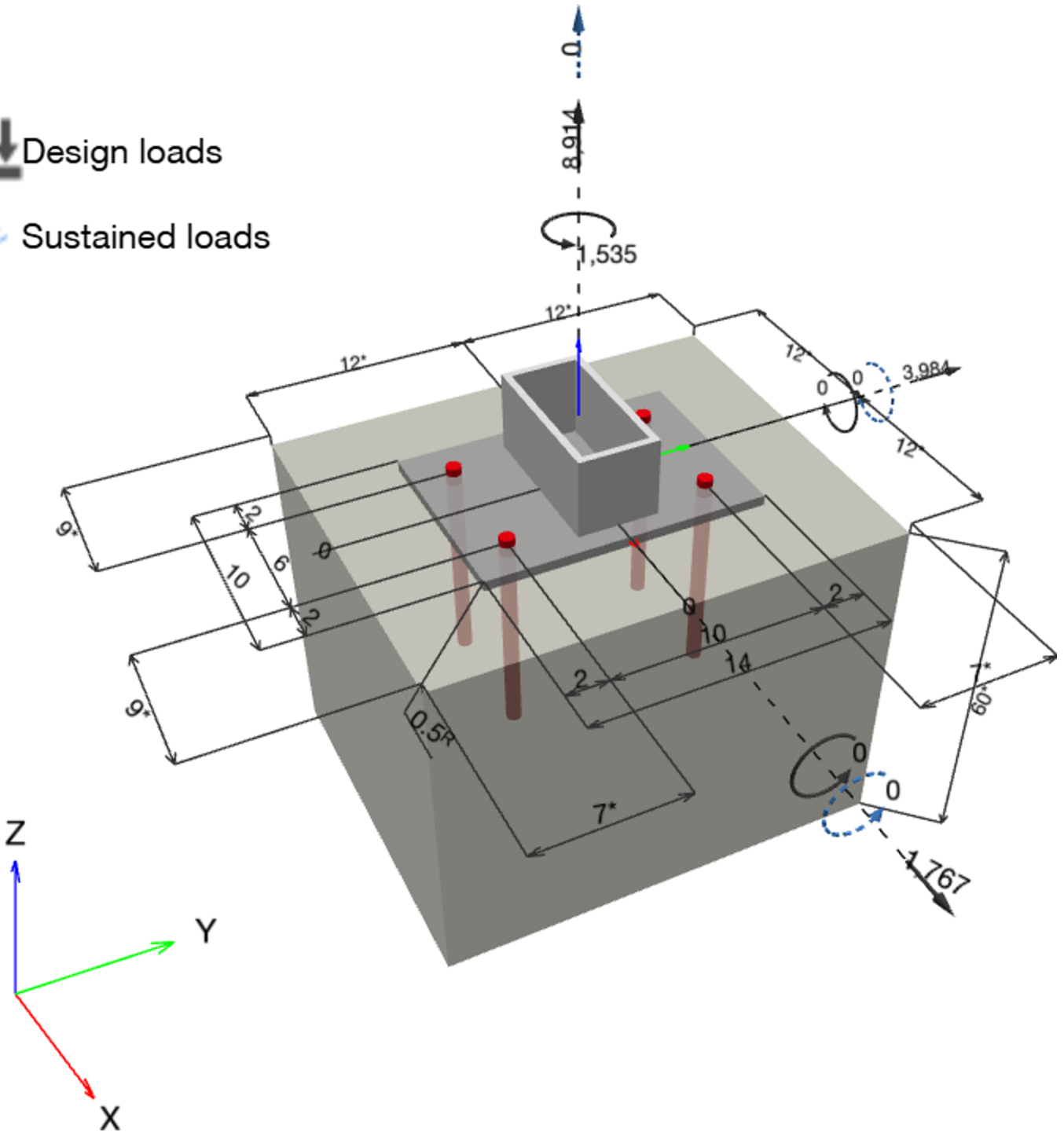
Geometry [in.] & Loading [lb, in.lb]



Design loads



Sustained loads



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Company:
Address:
Phone | Fax: |
Design: COIL- Shaft Cnx to Cantilever
Fastening point:

Page: 3
Specifier:
E-Mail:
Date: 2/17/2025

1.1 Load combination and design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
<u>1</u>	<u>Combination 1</u>	<u>$N = 8,914$; $V_x = 1,767$; $V_y = 3,984$; $M_x = 0$; $M_y = 0$; $M_z = 1,535$; $N_{sus} = 0$; $M_{x,sus} = 0$; $M_{y,sus} = 0$;</u>	<u>yes</u>	<u>97</u>
2	Combination 2	$N = -9,153$; $V_x = 0$; $V_y = -3,988$; $M_x = 0$; $M_y = 0$; $M_z = 525$; $N_{sus} = 0$; $M_{x,sus} = 0$; $M_{y,sus} = 0$;	yes	54

2 Proof I Utilization (Governing Cases)

Loading	Proof	Design values [lb]		Utilization	
		Load	Capacity	β_N / β_V [%]	Status
Tension	Concrete Breakout Failure	8,914	12,772	70 / -	OK
Shear	Concrete edge failure in direction y+	4,358	7,424	- / 59	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.698	0.587	5/3	97	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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Company:

Address:

Phone | Fax:

Design:

Fastening point:

|
COIL- Shaft Cnx at Bm

Page:

Specifier:

E-Mail:

Date:

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2/17/2025

Specifier's comments:

1 Input data

Anchor type and diameter:

HIT-RE 500 V3 + HAS-V-36 HDG (ASTM F1554 Gr.36) 1

Item number:

not available (element) / 2123401 HIT-RE 500 V3
(adhesive)

Specification text:

Hilti $\varnothing$ 1 in HIT-RE 500 V3 + HAS-V-36 HDG
(ASTM F1554 Gr.36) with 12.15 in nominal
embedment depth per ICC-ES ESR-3814 ,
Hammer drilled installation per MPII

Effective embedment depth:

 $h_{ef, opti} = 12.150$ in. ($h_{ef, limit} = 20.000$ in.)

Material:

ASTM F1554 Grade 36

Evaluation Service Report:

ESR-3814

Issued | Valid:

3/1/2023 | 1/1/2025

Proof:

Design Method ACI 318-19 / Chem

Shear edge breakout verification:

Row closest to edge (Case 3 only from ACI 318-19 Fig. R.17.7.2.1b)

Stand-off installation:

 $e_b = 0.000$ in. (no stand-off); $t = 1.000$ in.

Anchor plate^R :

 $l_x \times l_y \times t = 14.000$ in. x 28.000 in. x 1.000 in.;

Profile:

Rectangular HSS (AISC), HSS8X4X.3125; (L x W x T) = 8.000 in. x 4.000 in. x 0.312 in.

Base material:

cracked concrete, 4000, $f'_c = 4,000$ psi; $h = 24.000$ in., Temp. short/long: 32/32 °F

Installation:

Hammer drilled hole, Installation condition: Dry

Reinforcement:

tension: present, shear: not present; no supplemental splitting reinforcement present

edge reinforcement: > No. 4 bar with stirrups

Seismic loads (cat. C, D, E, or F)

Tension load: yes (17.10.5.3 (d))

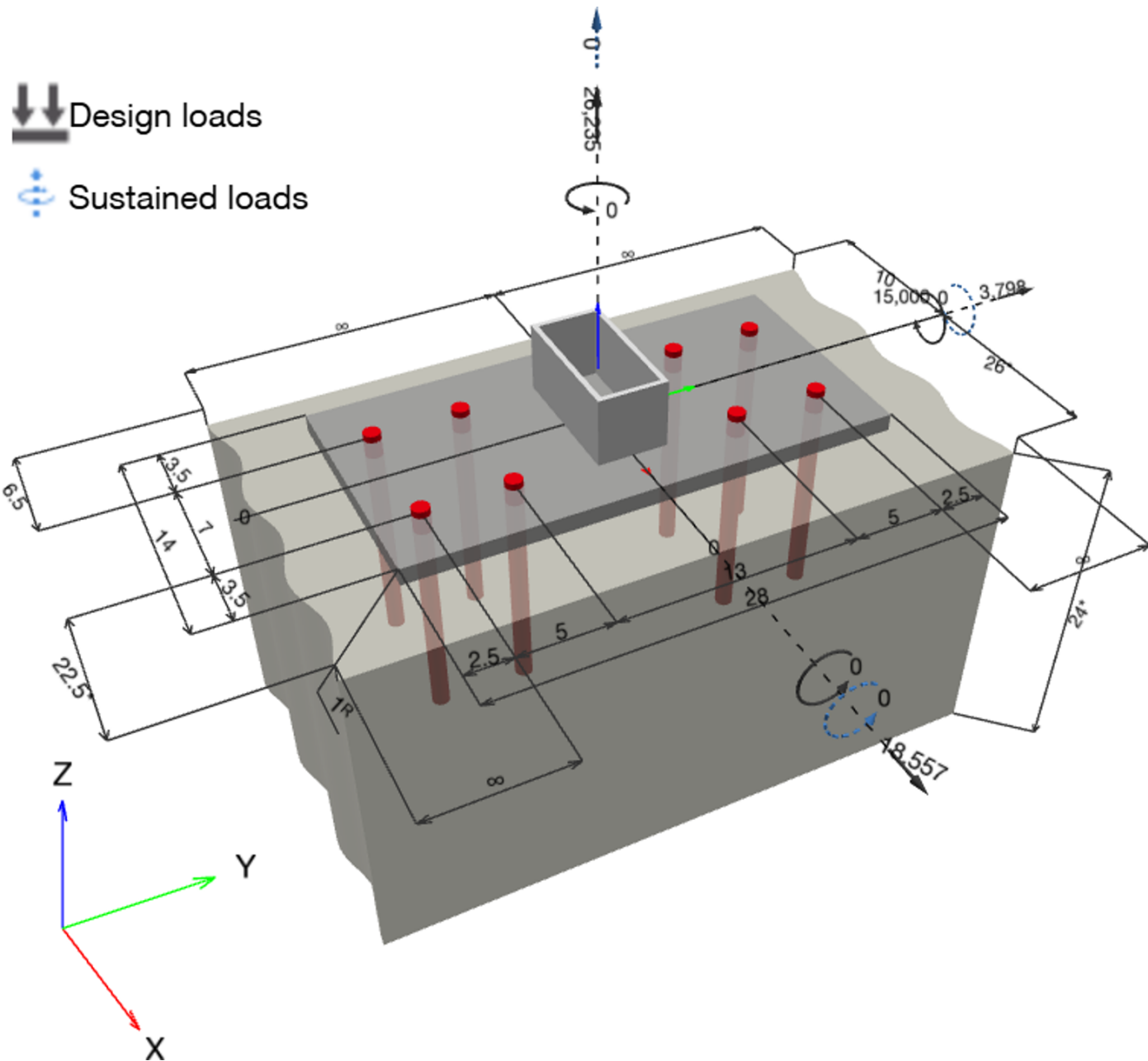
Shear load: yes (17.10.6.3 (c))


^R - The anchor calculation is based on a rigid anchor plate assumption.

www.hilti.com			Page:	2
Company:			Specifier:	
Address:			E-Mail:	
Phone Fax:			Date:	2/17/2025
Design:				
Fastening point:				

COIL- Shaft Cnx at Bm

Geometry [in.] & Loading [lb, in.lb]



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Company:

Address:

Phone | Fax:

Design:

Fastening point:

|
COIL- Shaft Cnx at Bm

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Date:

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2/17/2025

1.1 Load combination and design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
<u>1</u>	<u>Combination 1</u>	<u>$N = 26,235$; $V_x = 18,557$; $V_y = 3,798$; $M_x = 0$; $M_y = 15,000$; $M_z = 0$; $N_{sus} = 0$; $M_{x,sus} = 0$; $M_{y,sus} = 0$;</u>	<u>yes</u>	<u>100</u>
2	Combination 2	$N = -26,667$; $V_x = -18,557$; $V_y = 1,318$; $M_x = 0$; $M_y = 40,000$; $M_z = 0$; $N_{sus} = 0$; $M_{x,sus} = 0$; $M_{y,sus} = 0$;	yes	93

2 Proof I Utilization (Governing Cases)

Loading	Proof	Design values [lb]		Utilization	Status
		Load	Capacity	β_N / β_V [%]	
Tension	Concrete Breakout Failure	26,235	28,449	93 / -	OK
Shear	Concrete edge failure in direction x+	18,604	20,148	- / 93	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.922	0.288	5/3	100	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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Company:

Address:

Phone | Fax:

Design:

Fastening point:

|
COIL- Shaft Cnx at Roof

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Date:

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2/17/2025

Specifier's comments:

1 Input data

Anchor type and diameter:

HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 Gr.36) 3/4

Item number:

2198029 HAS-V-36 3/4"x8" (element) / 2334276 HIT-HY 200-R V3 (adhesive)

Specification text:

Hilti $\varnothing$ 3/4 in HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 Gr.36) with 6 in nominal embedment depth per ICC-ES ESR-4868 , Hammer drilled installation per MPII

Effective embedment depth:

 $h_{ef,act} = 6.000$ in. ($h_{ef,limit} = -$ in.)

Material:

ASTM F1554 Grade 36

Evaluation Service Report:

ESR-4868

Issued | Valid:

6/1/2023 | 11/1/2024

Proof:

Design Method ACI 318-19 / Chem

Shear edge breakout verification:

Row closest to edge (Case 3 only from ACI 318-19 Fig. R.17.7.2.1b)

Stand-off installation:

 $e_b = 0.000$ in. (no stand-off); $t = 0.625$ in.

Anchor plate^R :

 $l_x \times l_y \times t = 8.000$ in. x 22.000 in. x 0.625 in.;

Profile:

Square HSS (AISC), HSS6X6X.500; (L x W x T) = 6.000 in. x 6.000 in. x 0.500 in.

Base material:

cracked concrete, 4000, $f'_c = 4,000$ psi; $h = 34.000$ in., Temp. short/long: 32/32 °F

Installation:

Hammer drilled hole, Installation condition: Dry

Reinforcement:

tension: not present, shear: not present; no supplemental splitting reinforcement present

edge reinforcement: > No. 4 bar with stirrups

Seismic loads (cat. C, D, E, or F)

Tension load: yes (17.10.5.3 (d))

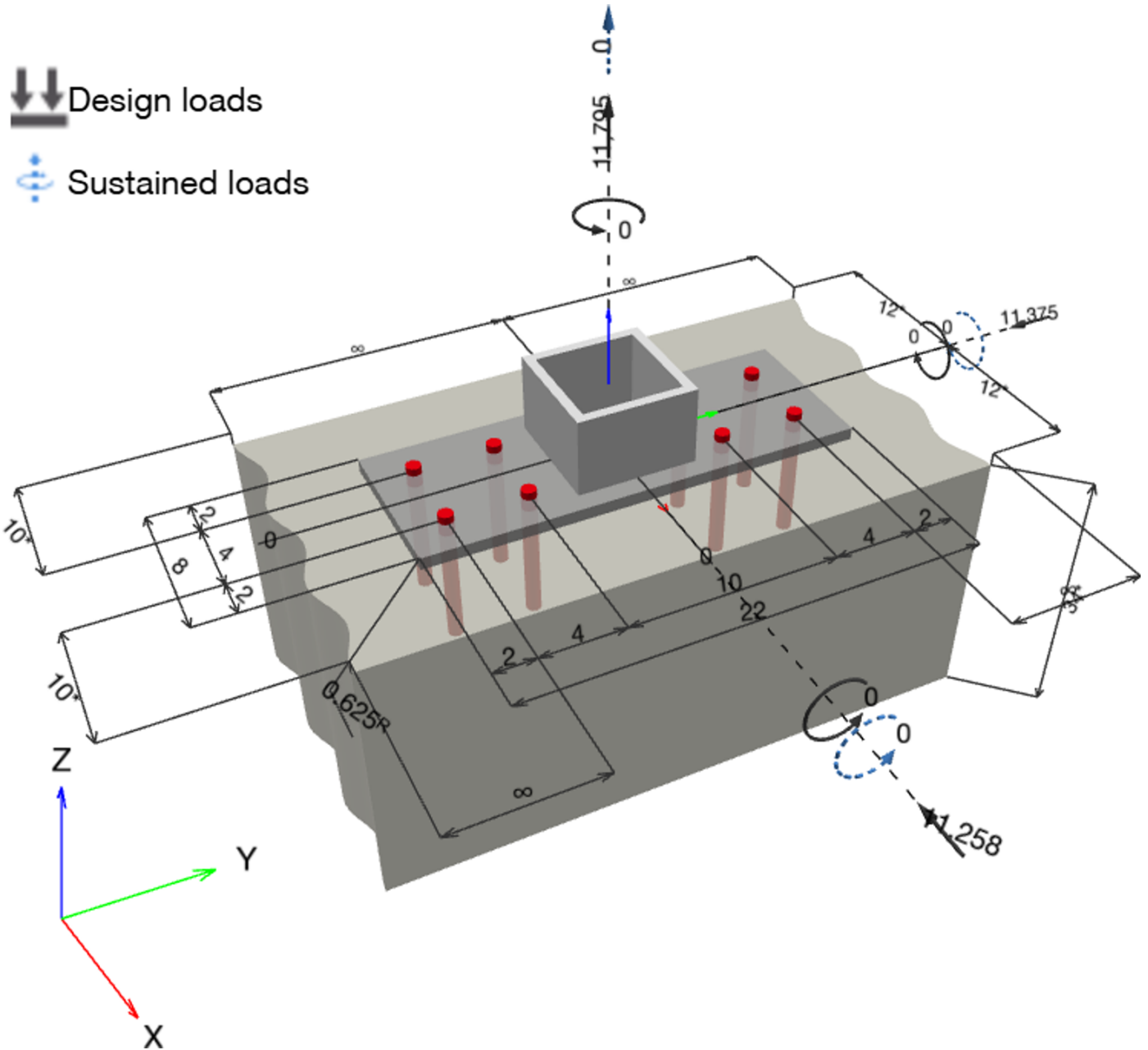
Shear load: yes (17.10.6.3 (c))


^R - The anchor calculation is based on a rigid anchor plate assumption.

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Phone Fax:			Date:	2/17/2025
Design:				
Fastening point:				

COIL- Shaft Cnx at Roof

Geometry [in.] & Loading [lb, in.lb]



www.hilti.com

Company:

Address:

Phone | Fax:

Design:

Fastening point:

|
COIL- Shaft Cnx at Roof

Page:

Specifier:

E-Mail:

Date:

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2/17/2025

1.1 Load combination and design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = -15,764; V _x = 11,344; V _y = 11,486; M _x = 0; M _y = 0; M _z = 0; N _{sus} = 0; M _{x,sus} = 0; M _{y,sus} = 0;	yes	58
<u>2</u>	<u>Combination 2</u>	<u>N = 11,795; V_x = -11,258; V_y = -11,375;</u> <u>M_x = 0; M_y = 0; M_z = 0;</u> <u>N_{sus} = 0; M_{x,sus} = 0; M_{y,sus} = 0;</u>	<u>yes</u>	<u>89</u>
3	Combination 3	N = 6,395; V _x = -3,360; V _y = -14,489; M _x = 0; M _y = 0; M _z = 0; N _{sus} = 0; M _{x,sus} = 0; M _{y,sus} = 0;	yes	53
4	Combination 4	N = -10,595; V _x = 15,222; V _y = 4,328; M _x = 0; M _y = 0; M _z = 0; N _{sus} = 0; M _{x,sus} = 0; M _{y,sus} = 0;	yes	57

2 Proof I Utilization (Governing Cases)

Loading	Proof	Design values [lb]		Utilization	
		Load	Capacity	β_N / β_V [%]	Status
Tension	Bond Strength	11,795	17,958	66 / -	OK
Shear	Concrete edge failure in direction x-	16,144	28,224	- / 58	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.657	0.567	5/3	89	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

(N) Concrete Beam Design

Project Title:
Engineer:
Project ID:
Project Descr:

128

Concrete Beam

Project File: Elevator shaft.ec6

LIC# : KW-06018621, Build:20.24.10.30

KPFF

(c) ENERCALC, LLC 1982-2025

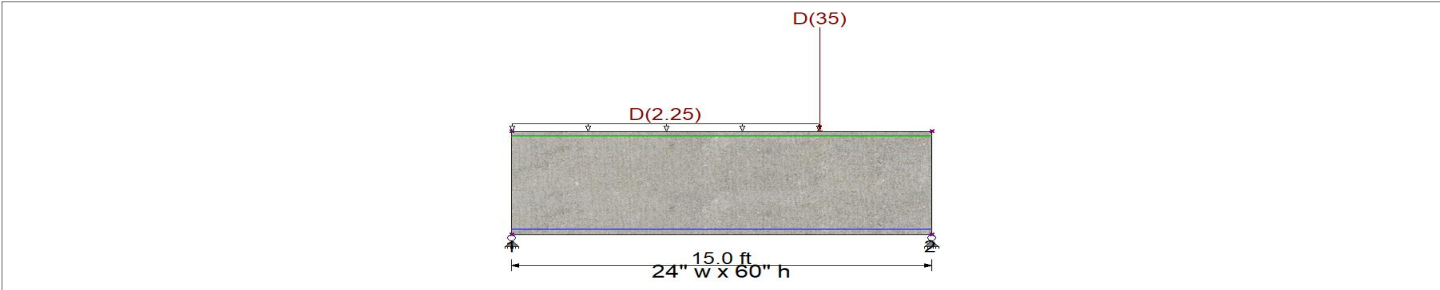
DESCRIPTION: (n) Conc Beam for Pit

CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019
Load Combination Set : ASCE 7-22 / IBC 2024 (L<=100psf)

General Information

f'c =	4.0 ksi	φ Phi Values	Flexure :	0.90
fr =7.5 * λ * f'c ^{1/2} =	474.342 psi		Shear :	0.750
ψ Density =	145.0 pcf	β ₁ =		0.850
λ LtWt Factor =	1.0			
Elastic Modulus =	3,122.0 ksi	Fy - Stirrups		40.0 ksi
fy - Main Rebar =	60.0	E - Stirrups =		29,000.0 ksi
E - Main Rebar =	29,000.0 ksi	Stirrup Bar Size #		3
		Number of Resisting Legs Per Stirrup =		2



Cross Section & Reinforcing Details

Rectangular Section, Width = 24.0 in, Height = 60.0 in
Span #1 Reinforcing....
3-#8 at 3.0 in from Bottom, from 0.0 to 15.0 ft in this span 3-#8 at 3.0 in from Top, from 0.0 to 15.0 ft in this span

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 2.250 k/ft, Extent = 0.0 --> 11.0 ft, Tributary Width = 1.0 ft
Point Load : D = 35.0 k @ 11.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.405	: 1
Section used for this span	Typical Section	
Mu : Applied	243.603	k-ft
Mn * Phi : Allowable	601.37	k-ft
Location of maximum on span	9.699	ft
Span # where maximum occurs	Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.000 in	Ratio =	0	<360.0
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0
Max Downward Total Deflection	0.005 in	Ratio =	35239	>=180.0
Max Upward Total Deflection	0.000 in	Ratio =	0	<180.0

Span: 1 : D Only
Span: 1 : D Only

Cross Section Strength & Inertia

Top & Bottom references are for tension side of sect

Cross Section Bar Layout Description	Phi*Mn (k-ft)		Moment of Inertia (in^4)		
	Bottom	Top	I gross	Icr - Bottom	Icr - Top
Section 1 3- #8 @ d=57",3- #8 @ d=3",	601.37	601.37	432000.00	57,256.87	57,256.87

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	35.883	45.617

Concrete Beam

Project File: Elevator shaft.ec6

LIC# : KW-06018621, Build:20.24.10.30

KPFF

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: (n) Conc Beam for Pit

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from Load Combinations	21.530	27.370
Max Upward from Load Cases	35.883	45.617
D Only	35.883	45.617
+0.60D	21.530	27.370

Shear Stirrup Requirements

Entire Beam Span Length : $V_u < \Phi V_c / 2$, Req'd Vs = Not Req'd per 9.6.3.1, Stirrups are not required.

Detailed Shear Information

Load Combination	Span Number	Distance 'd' (ft)	(in)	Vu (k)	(k)	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in)
				Actual	Design							Req'd
+1.40D	1	0.00	57.00	50.24	50.24	0.00	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	0.16	57.00	49.39	49.39	8.17	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	0.33	57.00	48.54	48.54	16.19	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	0.49	57.00	47.69	47.69	24.08	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	0.66	57.00	46.84	46.84	31.83	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	0.82	57.00	45.99	45.99	39.44	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	0.98	57.00	45.14	45.14	46.91	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	1.15	57.00	44.29	44.29	54.24	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	1.31	57.00	43.44	43.44	61.43	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	1.48	57.00	42.59	42.59	68.48	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	1.64	57.00	41.74	41.74	75.39	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	1.80	57.00	40.90	40.90	82.17	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	1.97	57.00	40.05	40.05	88.80	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	2.13	57.00	39.20	39.20	95.30	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	2.30	57.00	38.35	38.35	101.65	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	2.46	57.00	37.50	37.50	107.87	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	2.62	57.00	36.65	36.65	113.95	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	2.79	57.00	35.80	35.80	119.89	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	2.95	57.00	34.95	34.95	125.69	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	3.11	57.00	34.10	34.10	131.35	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	3.28	57.00	33.25	33.25	136.87	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	3.44	57.00	32.40	32.40	142.25	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	3.61	57.00	31.55	31.55	147.49	1.00	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	3.77	57.00	30.71	30.71	152.60	0.96	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	3.93	57.00	29.86	29.86	157.56	0.90	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	4.10	57.00	29.01	29.01	162.38	0.85	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	4.26	57.00	28.16	28.16	167.07	0.80	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	4.43	57.00	27.31	27.31	171.62	0.76	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	4.59	57.00	26.46	26.46	176.02	0.71	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	4.75	57.00	25.61	25.61	180.29	0.67	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	4.92	57.00	24.76	24.76	184.42	0.64	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	5.08	57.00	23.91	23.91	188.41	0.60	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	5.25	57.00	23.06	23.06	192.26	0.57	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	5.41	57.00	22.21	22.21	195.97	0.54	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	5.57	57.00	21.36	21.36	199.54	0.51	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	5.74	57.00	20.52	20.52	202.98	0.48	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	5.90	57.00	19.67	19.67	206.27	0.45	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	6.07	57.00	18.82	18.82	209.43	0.43	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	6.23	57.00	17.97	17.97	212.44	0.40	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	6.39	57.00	17.12	17.12	215.32	0.38	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	6.56	57.00	16.27	16.27	218.05	0.35	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	6.72	57.00	15.42	15.42	220.65	0.33	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	6.89	57.00	14.57	14.57	223.11	0.31	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	7.05	57.00	13.72	13.72	225.43	0.29	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	7.21	57.00	12.87	12.87	227.61	0.27	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	7.38	57.00	12.02	12.02	229.65	0.25	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	7.54	57.00	11.17	11.17	231.55	0.23	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	7.70	57.00	10.33	10.33	233.31	0.21	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0
+1.40D	1	7.87	57.00	9.48	9.48	234.94	0.19	129.78	$V_u < \Phi V_c / 2$ Not Req'd per 9.6.3.1		129.8	0.0

Concrete Beam

Project File: Elevator shaft.ec6

LIC# : KW-06018621, Build:20.24.10.30

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(c) ENERCALC, LLC 1982-2025

DESCRIPTION: (n) Conc Beam for Pit

Detailed Shear Information

Load Combination	Span Number	Distance 'd' (ft)	(in)	Vu (k)	(k)	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.40D	1	8.03	57.00	8.63	8.63	236.42	0.17	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	8.20	57.00	7.78	7.78	237.76	0.16	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	8.36	57.00	6.93	6.93	238.97	0.14	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	8.52	57.00	6.08	6.08	240.04	0.12	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	8.69	57.00	5.23	5.23	240.96	0.10	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	8.85	57.00	4.38	4.38	241.75	0.09	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	9.02	57.00	3.53	3.53	242.40	0.07	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	9.18	57.00	2.68	2.68	242.91	0.05	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	9.34	57.00	1.83	1.83	243.28	0.04	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	9.51	57.00	0.98	0.98	243.51	0.02	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	9.67	57.00	0.14	0.14	243.60	0.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	9.84	57.00	-0.71	0.71	243.55	0.01	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	10.00	57.00	-1.56	1.56	243.37	0.03	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	10.16	57.00	-2.41	2.41	243.04	0.05	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	10.33	57.00	-3.26	3.26	242.58	0.06	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	10.49	57.00	-4.11	4.11	241.97	0.08	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	10.66	57.00	-4.96	4.96	241.23	0.10	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	10.82	57.00	-5.81	5.81	240.35	0.11	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	10.98	57.00	-6.66	6.66	239.32	0.13	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	11.15	57.00	-56.04	56.04	230.97	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	11.31	57.00	-56.38	56.38	221.75	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	11.48	57.00	-56.71	56.71	212.48	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	11.64	57.00	-57.04	57.04	203.16	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	11.80	57.00	-57.37	57.37	193.78	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	11.97	57.00	-57.71	57.71	184.35	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	12.13	57.00	-58.04	58.04	174.86	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	12.30	57.00	-58.37	58.37	165.32	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	12.46	57.00	-58.71	58.71	155.72	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	12.62	57.00	-59.04	59.04	146.07	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	12.79	57.00	-59.37	59.37	136.37	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	12.95	57.00	-59.70	59.70	126.61	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	13.11	57.00	-60.04	60.04	116.79	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	13.28	57.00	-60.37	60.37	106.92	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	13.44	57.00	-60.70	60.70	97.00	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	13.61	57.00	-61.03	61.03	87.02	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	13.77	57.00	-61.37	61.37	76.99	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	13.93	57.00	-61.70	61.70	66.90	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	14.10	57.00	-62.03	62.03	56.76	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	14.26	57.00	-62.37	62.37	46.56	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	14.43	57.00	-62.70	62.70	36.31	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	14.59	57.00	-63.03	63.03	26.00	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	14.75	57.00	-63.36	63.36	15.64	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0
+1.40D	1	14.92	57.00	-63.70	63.70	5.23	1.00	129.78	Vu < Phi*Vc / 2	129.8	129.8	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination	Span #	Location (ft) along Beam	Bending Stress Results (k-ft)		
Segment			Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	15.000	243.60	601.37	0.41
+1.40D					
Span # 1	1	15.000	243.60	601.37	0.41
+1.20D					
Span # 1	1	15.000	208.80	601.37	0.35
+0.90D					
Span # 1	1	15.000	156.60	601.37	0.26

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
D Only	1	0.0051	7.746		0.0000	0.000

(E) Concrete Beam Check

Project Title:
Engineer:
Project ID:
Project Descr:

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Concrete Beam

Project File: Elevator shaft.ec6

LIC# : KW-06018621, Build:20.24.10.30

KPFF

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DESCRIPTION: (e) Conc Beam check

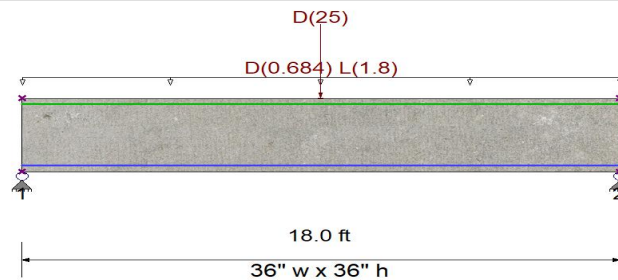
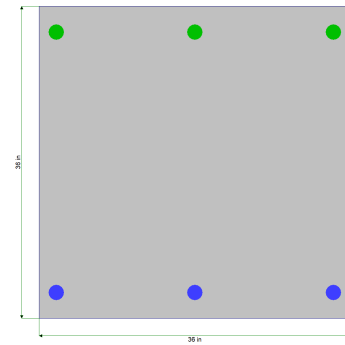
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019

Load Combination Set : ASCE 7-22 / IBC 2024 (L<=100psf)

General Information

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = 7.5 * \lambda * f'_c^{1/2}$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups	=	40.0 ksi
f_y - Main Rebar	=	60.0	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #	=	3
			Number of Resisting Legs Per Stirrup	=	2



Cross Section & Reinforcing Details

Rectangular Section, Width = 36.0 in, Height = 36.0 in

Span #1 Reinforcing....

3-#14 at 3.0 in from Bottom, from 0.0 to 18.0 ft in this span

3-#14 at 3.0 in from Top, from 0.0 to 18.0 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : D = 0.0380, L = 0.10 ksf, Tributary Width = 18.0 ft

Point Load : D = 25.0 k @ 9.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.369 : 1
Section used for this span		Typical Section
Mu : Applied		348.059 k-ft
Mn * Phi : Allowable		942.11 k-ft
Location of maximum on span		8.984 ft
Span # where maximum occurs		Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.010 in	Ratio = 22208	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio = 0	<360.0	L Only
Max Downward Total Deflection	0.032 in	Ratio = 6650	>=180.0	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio = 0	<180.0	Span: 1 : +D+L

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	46.601	46.601
Max Upward from Load Combinations	46.601	46.601
Max Upward from Load Cases	30.401	30.401
D Only	30.401	30.401
+D+L	46.601	46.601
+D+0.750L	42.551	42.551

Concrete Beam

Project File: Elevator shaft.ec6

LIC# : KW-06018621, Build:20.24.10.30

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(c) ENERCALC, LLC 1982-2025

DESCRIPTION: (e) Conc Beam check

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
+0.60D	18.241	18.241
L Only	16.200	16.200

Shear Stirrup Requirements

Between 0.00 to 1.84 ft, $\Phi V_c / 2 < V_u \leq \Phi V_c$, Req'd Vs = Min per 9.6.3.1, use #3 stirrups spaced at 4.000 in
 Between 1.87 to 16.13 ft, $V_u < \Phi V_c / 2$, Req'd Vs = Not Req'd per 9.6.3.1, Stirrups are not required.
 Between 16.16 to 17.97 ft, $\Phi V_c / 2 < V_u \leq \Phi V_c$, Req'd Vs = Min per 9.6.3.1, use #3 stirrups spaced at 4.000 in

Detailed Shear Information

Load Combination	Span Number	Distance 'd' (ft)	(in)	Vu Actual	(k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.20D+1.60L	1	0.00	33.00	62.40	62.40	0.00	1.00	105.38	$\Phi V_c / 2 < V_u$	in per 9.6.3.1	159.8	4.9
+1.20D+1.60L	1	0.20	33.00	61.37	61.37	12.17	1.00	105.38	$\Phi V_c / 2 < V_u$	in per 9.6.3.1	159.8	4.9
+1.20D+1.60L	1	0.39	33.00	60.33	60.33	24.14	1.00	105.38	$\Phi V_c / 2 < V_u$	in per 9.6.3.1	159.8	4.9
+1.20D+1.60L	1	0.59	33.00	59.29	59.29	35.91	1.00	105.38	$\Phi V_c / 2 < V_u$	in per 9.6.3.1	159.8	4.9
+1.20D+1.60L	1	0.79	33.00	58.26	58.26	47.47	1.00	105.38	$\Phi V_c / 2 < V_u$	in per 9.6.3.1	159.8	4.9
+1.20D+1.60L	1	0.98	33.00	57.22	57.22	58.83	1.00	105.38	$\Phi V_c / 2 < V_u$	in per 9.6.3.1	159.8	4.9
+1.20D+1.60L	1	1.18	33.00	56.18	56.18	69.99	1.00	105.38	$\Phi V_c / 2 < V_u$	in per 9.6.3.1	159.8	4.9
+1.20D+1.60L	1	1.38	33.00	55.15	55.15	80.94	1.00	105.38	$\Phi V_c / 2 < V_u$	in per 9.6.3.1	159.8	4.9
+1.20D+1.60L	1	1.57	33.00	54.11	54.11	91.68	1.00	105.38	$\Phi V_c / 2 < V_u$	in per 9.6.3.1	159.8	4.9
+1.20D+1.60L	1	1.77	33.00	53.08	53.08	102.23	1.00	105.38	$\Phi V_c / 2 < V_u$	in per 9.6.3.1	159.8	4.9
+1.20D+1.60L	1	1.97	33.00	52.04	52.04	112.57	1.00	105.38	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	105.4	0.0
+1.20D+1.60L	1	2.16	33.00	51.00	51.00	122.70	1.00	105.38	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	105.4	0.0
+1.20D+1.60L	1	2.36	33.00	49.97	49.97	132.63	1.00	105.38	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	105.4	0.0
+1.20D+1.60L	1	2.56	33.00	48.93	48.93	142.36	0.95	104.69	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	104.7	0.0
+1.20D+1.60L	1	2.75	33.00	47.90	47.90	151.88	0.87	103.70	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	103.7	0.0
+1.20D+1.60L	1	2.95	33.00	46.86	46.86	161.20	0.80	102.84	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	102.8	0.0
+1.20D+1.60L	1	3.15	33.00	45.82	45.82	170.32	0.74	102.09	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	102.1	0.0
+1.20D+1.60L	1	3.34	33.00	44.79	44.79	179.23	0.69	101.42	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	101.4	0.0
+1.20D+1.60L	1	3.54	33.00	43.75	43.75	187.94	0.64	100.83	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	100.8	0.0
+1.20D+1.60L	1	3.74	33.00	42.72	42.72	196.45	0.60	100.29	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	100.3	0.0
+1.20D+1.60L	1	3.93	33.00	41.68	41.68	204.75	0.56	99.81	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	99.8	0.0
+1.20D+1.60L	1	4.13	33.00	40.64	40.64	212.85	0.53	99.37	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	99.4	0.0
+1.20D+1.60L	1	4.33	33.00	39.61	39.61	220.74	0.49	98.97	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	99.0	0.0
+1.20D+1.60L	1	4.52	33.00	38.57	38.57	228.43	0.46	98.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	98.6	0.0
+1.20D+1.60L	1	4.72	33.00	37.53	37.53	235.91	0.44	98.26	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	98.3	0.0
+1.20D+1.60L	1	4.92	33.00	36.50	36.50	243.20	0.41	97.95	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.9	0.0
+1.20D+1.60L	1	5.11	33.00	35.46	35.46	250.28	0.39	97.66	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.7	0.0
+1.20D+1.60L	1	5.31	33.00	34.43	34.43	257.15	0.37	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.20D+1.60L	1	5.51	33.00	33.39	33.39	263.82	0.35	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.20D+1.60L	1	5.70	33.00	32.35	32.35	270.29	0.33	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.20D+1.60L	1	5.90	33.00	31.32	31.32	276.55	0.31	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.20D+1.60L	1	6.10	33.00	30.28	30.28	282.61	0.29	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.20D+1.60L	1	6.30	33.00	29.25	29.25	288.46	0.28	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.20D+1.60L	1	6.49	33.00	28.21	28.21	294.12	0.26	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.20D+1.60L	1	6.69	33.00	27.17	27.17	299.56	0.25	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.20D+1.60L	1	6.89	33.00	26.14	26.14	304.81	0.24	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.20D+1.60L	1	7.08	33.00	25.10	25.10	309.85	0.22	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.20D+1.60L	1	7.28	33.00	24.07	24.07	314.68	0.21	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.20D+1.60L	1	7.48	33.00	23.03	23.03	319.32	0.20	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.20D+1.60L	1	7.67	33.00	21.99	21.99	323.74	0.19	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.20D+1.60L	1	7.87	33.00	20.96	20.96	327.97	0.18	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.40D	1	8.07	33.00	20.10	20.10	252.71	0.22	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.40D	1	8.26	33.00	19.55	19.55	256.61	0.21	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.40D	1	8.46	33.00	19.01	19.01	260.40	0.20	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.40D	1	8.66	33.00	18.46	18.46	264.09	0.19	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.40D	1	8.85	33.00	17.91	17.91	267.66	0.18	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.40D	1	9.05	33.00	-17.64	17.64	269.41	0.18	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.40D	1	9.25	33.00	-18.18	18.18	265.89	0.19	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0
+1.40D	1	9.44	33.00	-18.73	18.73	262.26	0.20	97.60	$V_u < \Phi V_c / 2$	Not Req'd per 9.6.3.1	97.6	0.0

Concrete Beam

Project File: Elevator shaft.ec6

LIC# : KW-06018621, Build:20.24.10.30

KPFF

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: (e) Conc Beam check

Detailed Shear Information

Load Combination	Span Number	Distance 'd' (ft)	(in)	Vu (k)	(k)	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.40D	1	9.64	33.00	-19.28	19.28	258.52	0.21	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.40D	1	9.84	33.00	-19.83	19.83	254.67	0.21	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	10.03	33.00	-20.44	20.44	330.00	0.17	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	10.23	33.00	-21.48	21.48	325.88	0.18	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	10.43	33.00	-22.51	22.51	321.56	0.19	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	10.62	33.00	-23.55	23.55	317.02	0.20	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	10.82	33.00	-24.58	24.58	312.29	0.22	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	11.02	33.00	-25.62	25.62	307.35	0.23	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	11.21	33.00	-26.66	26.66	302.21	0.24	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	11.41	33.00	-27.69	27.69	296.86	0.26	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	11.61	33.00	-28.73	28.73	291.32	0.27	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	11.80	33.00	-29.76	29.76	285.56	0.29	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	12.00	33.00	-30.80	30.80	279.60	0.30	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	12.20	33.00	-31.84	31.84	273.44	0.32	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	12.39	33.00	-32.87	32.87	267.08	0.34	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	12.59	33.00	-33.91	33.91	260.51	0.36	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	12.79	33.00	-34.94	34.94	253.74	0.38	97.60	Vu < Phi*Vc / 2	97.6	97.6	0.0
+1.20D+1.60L	1	12.98	33.00	-35.98	35.98	246.76	0.40	97.80	Vu < Phi*Vc / 2	97.8	97.8	0.0
+1.20D+1.60L	1	13.18	33.00	-37.02	37.02	239.58	0.42	98.10	Vu < Phi*Vc / 2	98.1	98.1	0.0
+1.20D+1.60L	1	13.38	33.00	-38.05	38.05	232.20	0.45	98.43	Vu < Phi*Vc / 2	98.4	98.4	0.0
+1.20D+1.60L	1	13.57	33.00	-39.09	39.09	224.61	0.48	98.78	Vu < Phi*Vc / 2	98.8	98.8	0.0
+1.20D+1.60L	1	13.77	33.00	-40.13	40.13	216.82	0.51	99.17	Vu < Phi*Vc / 2	99.2	99.2	0.0
+1.20D+1.60L	1	13.97	33.00	-41.16	41.16	208.82	0.54	99.58	Vu < Phi*Vc / 2	99.6	99.6	0.0
+1.20D+1.60L	1	14.16	33.00	-42.20	42.20	200.62	0.58	100.04	Vu < Phi*Vc / 2	100.0	100.0	0.0
+1.20D+1.60L	1	14.36	33.00	-43.23	43.23	192.22	0.62	100.55	Vu < Phi*Vc / 2	100.6	100.6	0.0
+1.20D+1.60L	1	14.56	33.00	-44.27	44.27	183.61	0.66	101.12	Vu < Phi*Vc / 2	101.1	101.1	0.0
+1.20D+1.60L	1	14.75	33.00	-45.31	45.31	174.80	0.71	101.74	Vu < Phi*Vc / 2	101.7	101.7	0.0
+1.20D+1.60L	1	14.95	33.00	-46.34	46.34	165.79	0.77	102.45	Vu < Phi*Vc / 2	102.5	102.5	0.0
+1.20D+1.60L	1	15.15	33.00	-47.38	47.38	156.57	0.83	103.26	Vu < Phi*Vc / 2	103.3	103.3	0.0
+1.20D+1.60L	1	15.34	33.00	-48.41	48.41	147.15	0.90	104.18	Vu < Phi*Vc / 2	104.2	104.2	0.0
+1.20D+1.60L	1	15.54	33.00	-49.45	49.45	137.52	0.99	105.24	Vu < Phi*Vc / 2	105.2	105.2	0.0
+1.20D+1.60L	1	15.74	33.00	-50.49	50.49	127.69	1.00	105.38	Vu < Phi*Vc / 2	105.4	105.4	0.0
+1.20D+1.60L	1	15.93	33.00	-51.52	51.52	117.66	1.00	105.38	Vu < Phi*Vc / 2	105.4	105.4	0.0
+1.20D+1.60L	1	16.13	33.00	-52.56	52.56	107.42	1.00	105.38	Vu < Phi*Vc / 2	105.4	105.4	0.0
+1.20D+1.60L	1	16.33	33.00	-53.59	53.59	96.98	1.00	105.38	Phi*Vc / 2 < Vu	159.8	159.8	4.9
+1.20D+1.60L	1	16.52	33.00	-54.63	54.63	86.33	1.00	105.38	Phi*Vc / 2 < Vu	159.8	159.8	4.9
+1.20D+1.60L	1	16.72	33.00	-55.67	55.67	75.49	1.00	105.38	Phi*Vc / 2 < Vu	159.8	159.8	4.9
+1.20D+1.60L	1	16.92	33.00	-56.70	56.70	64.43	1.00	105.38	Phi*Vc / 2 < Vu	159.8	159.8	4.9
+1.20D+1.60L	1	17.11	33.00	-57.74	57.74	53.18	1.00	105.38	Phi*Vc / 2 < Vu	159.8	159.8	4.9
+1.20D+1.60L	1	17.31	33.00	-58.77	58.77	41.72	1.00	105.38	Phi*Vc / 2 < Vu	159.8	159.8	4.9
+1.20D+1.60L	1	17.51	33.00	-59.81	59.81	30.05	1.00	105.38	Phi*Vc / 2 < Vu	159.8	159.8	4.9
+1.20D+1.60L	1	17.70	33.00	-60.85	60.85	18.18	1.00	105.38	Phi*Vc / 2 < Vu	159.8	159.8	4.9
+1.20D+1.60L	1	17.90	33.00	-61.88	61.88	6.11	1.00	105.38	Phi*Vc / 2 < Vu	159.8	159.8	4.9

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft)	Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	MAXimum BENDING Envelope	1	18.000	348.06	942.11	0.37	
Span # 1	+1.40D	1	18.000	269.99	942.11	0.29	
Span # 1	+1.20D+1.60L	1	18.000	348.06	942.11	0.37	
Span # 1	+1.20D+0.50L	1	18.000	267.87	942.11	0.28	
Span # 1	+1.20D	1	18.000	231.42	942.11	0.25	
Span # 1	+0.90D	1	18.000	173.56	942.11	0.18	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+L	1	0.0325	9.000		0.0000	0.000

Elevator Pit Design Check

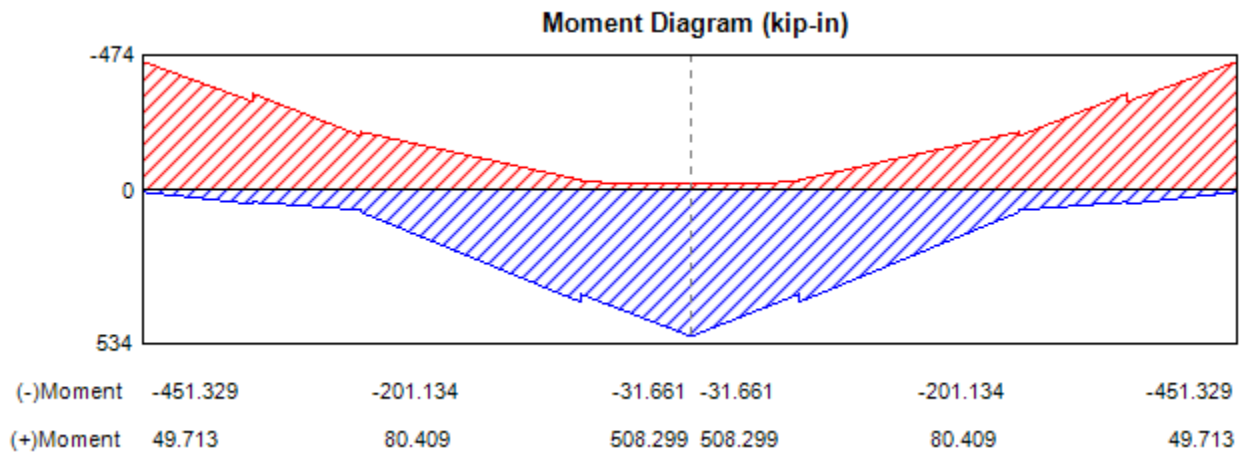
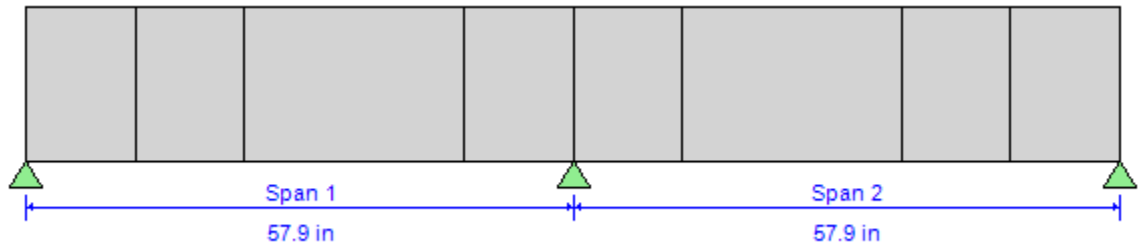
ACI 318-19 Concrete Strip Design

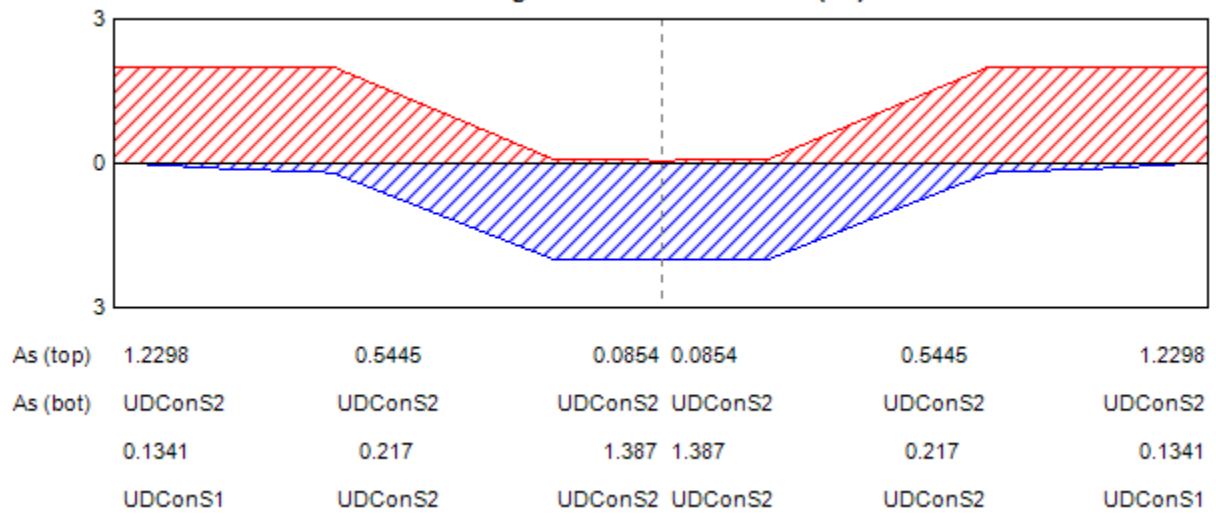
Geometric Properties

Combination = Overall Envelope
Strip Label = CSA1
Length = 115.8 in
Distance to Top Rebar Center = 1.125 in
Distance to Bot Rebar Center = 1.125 in

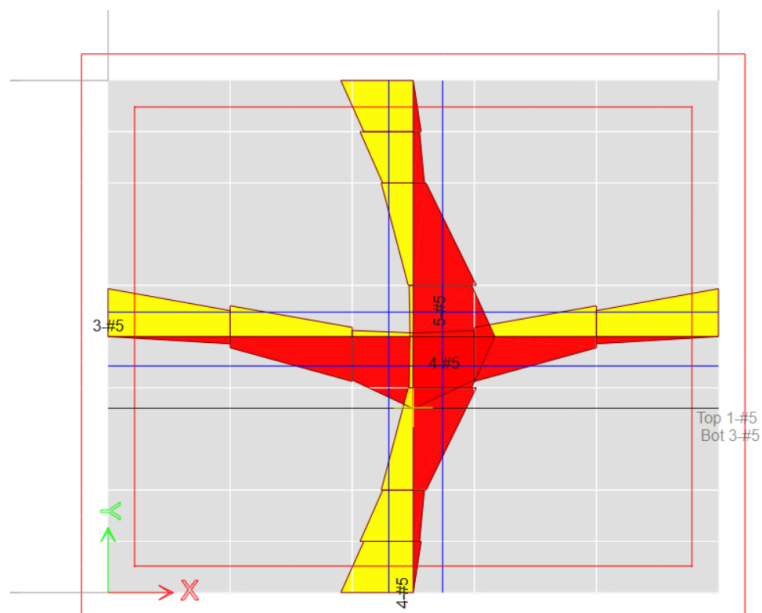
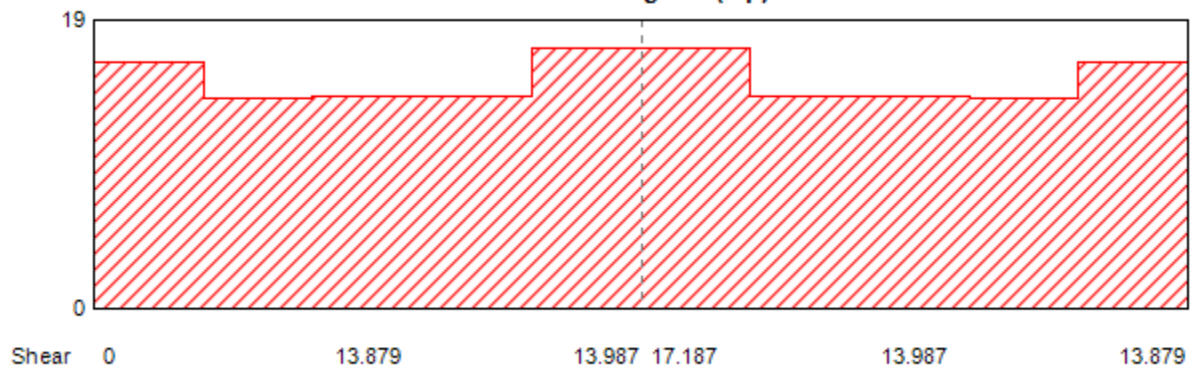
Material Properties

Concrete Comp. Strength = 4 kip/in ²
Concrete Modulus = 3604.997 kip/in ²
Longitudinal Rebar Yield = 60 kip/in ²



Longitudinal Reinforcement (in²)

Shear Diagram (kip)



Longitudinal
Reinforcement:

#5 @ 12 OC
Top & Bot



project: Inglewood Library Renovation

sheet no.:

136

location: Inglewood, CA

job no.: 10012300277

client:

date: 02/15/2025

F. Steel stairs design



project: Inglewood Library - Interior Stairs

sheet no.:

137

location: Inglewood, CA

job no.: 2300277

client:

date: 07/05/2024

Summary:

The structure of the Stairs consist in two stringers of steel CM18x58 with an intermediate landing of supported by two steel C9x21 beams that are connected to the stringers, along with four HSS4x4x5/8" distributed on the stair length that work as a perpendicular lateral system. See following calculations for members and connections to floor design justification. This report correspond to the stairs connection Level Two - Level Three and Level Three - Level Four.

The following codes where used for the design:

- 2022 California Building Code.
- AISC 360-16
- ASCE 7-16
- ACI 318-14

KPFF Consulting Engineers
 700 Flower St
 Los Angeles, CA 90017
 (213) 310 8579

Project : Stairs
 BLD: COIL
 Job no. : 10012300277
 Date : Jul-24
 By : MO

LOADING CRITERIA

LOAD TYPE: Pan Stairs with Concrete

Slab

3" NWC	52	psf
Pan	0	psf
Finishes	0	psf
Ceiling and Lights	4	psf
MEP, Piping, Sprinklers	0	psf
Misc	1	psf
Slab Total:	57	psf

Beam

Gravity Beams	20	psf
Beam Total:	77	psf

Columns

Gravity Columns	0	psf
Column Total:	77	psf

Seismic Dead Load

Partitions and exterior wall	0	psf
LFRS - explicitly modeled	0	psf
Typical Seismic Total:	77	psf

Floor Live Load

100 psf

KPFF Consulting Engineers
700 S. Flower St., Suite 2100
Los Angeles, CA 90017
(213) 418-0201

Project : _____
Job no. : _____
Date : _____
By : _____

Fp Force Calculations-Architectural Components ASCE 7-16 Section 13.3, First Printing With Errata 1-3

A. OVERVIEW

A.1 This spreadsheet calculates the coefficient (F_p/W_p) to be multiplied by the weight of the component (W_p) in order to determine a component's horizontal seismic design force (F_p).

B. INPUT

B.1 Determine Building height (h), and distance of floor from base (z), from building geometry.

B.2 Find S_{DS} (EQ 11.4-3) and determine the Component Importance Factor (I_p , Section 13.1.3)

C. EQUATIONS:

$$F_p/W_p = \frac{0.4 a_p S_{DS}}{(R_p/I_p)} (1+2z/h) \quad \text{EQ (13.3-1)}$$

$$F_p/W_p_{MAX} = 1.6 S_{DS} I_p \quad \text{EQ (13.3-2)}$$

$$F_p/W_p_{MIN} = 0.3 S_{DS} I_p \quad \text{EQ (13.3-3)}$$

Building Height (h) =	69 ft	Level	z	z/h
S_{DS} =	1.534	8	-	-
I_p =	1.25	7	-	-
		6	-	-
		5	-	-
		4	41 ft	0.59
		3	27 ft	0.39
		2	13 ft	0.19

F_p/W_p_{MAX} =	3.068
F_p/W_p_{MIN} =	0.575

ASCE 7-16 TABLE 13.5-1 COEFFICIENTS FOR ARCHITECTURAL COMPONENTS

Architectural Component or Element	a_p	R_p	Ω_o
Interior Nonstructural Walls and Partitions			
Plain (unreinforced) masonry walls	1.0	1.5	1.50
All other walls and partitions	1.0	2.5	2.00
Cantilever Elements (Unbraced or braced to structural frame below its center of mass)			
Parapets and cantilever interior nonstructural walls	2.5	2.5	2.00
Chimneys & stacks laterally braced or supported by the structural frame	2.5	2.5	2.00
Cantilever Elements (Braced to structural frame above its center of mass)			
Parapets	1.0	2.5	2.00
Chimneys and Stacks	1.0	2.5	2.00
Exterior Nonstructural Walls	1.0	2.5	2.00
Exterior Nonstructural Wall Elements and Connections			
Wall Element	1.0	2.5	NA
Body of wall panel connections	1.0	2.5	NA
Fasteners of the connecting system	1.25	1	1.00
Veneer			
Limited deformability elements and attachments	1.0	2.5	2.00
Low deformability elements and attachments	1.0	1.5	2.00
Penthouses (except where framed by an extension of the building frame)	2.5	3.5	2.00
Ceilings			
All	1.0	2.5	2.00
Cabinets			
Permanent floor-supported storage cabinets over 6 feet (1829 mm)	1.0	2.5	2.00
Permanent floor-supported library shelving, book stacks and books	1.0	2.5	2.00
Laboratory Equipment	1.0	2.5	2.00
Access Floors			
Special access floors (designed in accordance with Section 13.5.7.2)	1.0	2.5	2.00
All other	1.0	1.5	1.50
Appendages and Ornamentations	2.5	2.5	2.00
Signs and Billboards	2.5	3.0	2.00
Other Rigid Components			
High deformability elements and attachments	1.0	3.5	2.00
Limited deformability elements and attachments	1.0	2.5	2.00
Low deformability materials and attachments	1.0	1.5	1.50
Other Flexible Components			
High deformability elements and attachments	2.5	3.5	2.50
Limited deformability elements and attachments	2.5	2.5	2.50
Low deformability materials and attachments	2.5	1.5	1.50
Egress Stairways not part of the Building Seismic force-resisting system	1.0	2.5	2.00
Egress Stairs and ramp fasteners and attachments	2.5	2.5	2.50

z/h						
2	3	4	5	6	7	8
0.19	0.39	0.59	-	-	-	-

F_p/W_p						
0.70	0.91	1.12	-	-	-	-
0.58	0.58	0.67	-	-	-	-
1.06	1.37	1.68	-	-	-	-
1.06	1.37	1.68	-	-	-	-
0.58	0.58	0.67	-	-	-	-
0.58	0.58	0.67	-	-	-	-
0.58	0.58	0.67	-	-	-	-
0.58	0.58	0.67	-	-	-	-
0.58	0.58	0.67	-	-	-	-
0.58	0.58	0.67	-	-	-	-
0.58	0.58	0.67	-	-	-	-
0.70	0.91	1.12	-	-	-	-
0.75	0.98	1.20	-	-	-	-
0.58	0.58	0.67	-	-	-	-
0.58	0.58	0.67	-	-	-	-
0.58	0.58	0.67	-	-	-	-
0.58	0.58	0.67	-	-	-	-
0.70	0.91	1.12	-	-	-	-
1.06	1.37	1.68	-	-	-	-
0.88	1.14	1.40	-	-	-	-
0.58	0.58	0.58	-	-	-	-
0.58	0.58	0.67	-	-	-	-
0.70	0.91	1.12	-	-	-	-
0.75	0.98	1.20	-	-	-	-
1.06	1.37	1.68	-	-	-	-
1.76	2.28	2.80	-	-	-	-
0.58	0.58	0.67	-	-	-	-
1.06	1.37	1.68	-	-	-	-

KPFF Consulting Engineers
 700 Flower St
 Los Angeles, CA 90017
 (213) 310 8579

Project : Stairs
 BLD: COIL
 Job no. : 10012300277
 Date : Jul-24
 By : JB

LOADING CRITERIA

Gravity Loads per Member

Stringers

Dead Load	77	psf	
Live Load	100	psf	
Trib Width	3	ft	
Dead Load	0.24	kip/ft	(applied in RISA 3D)
Live Load	0.3	kip/ft	(applied in RISA 3D)

Exterior Wall Beams

Dead Load	15	psf	
Trib Height	0	ft	
Dead Load	0	kip/ft	(applied in RISA 3D)

Seismic Loading

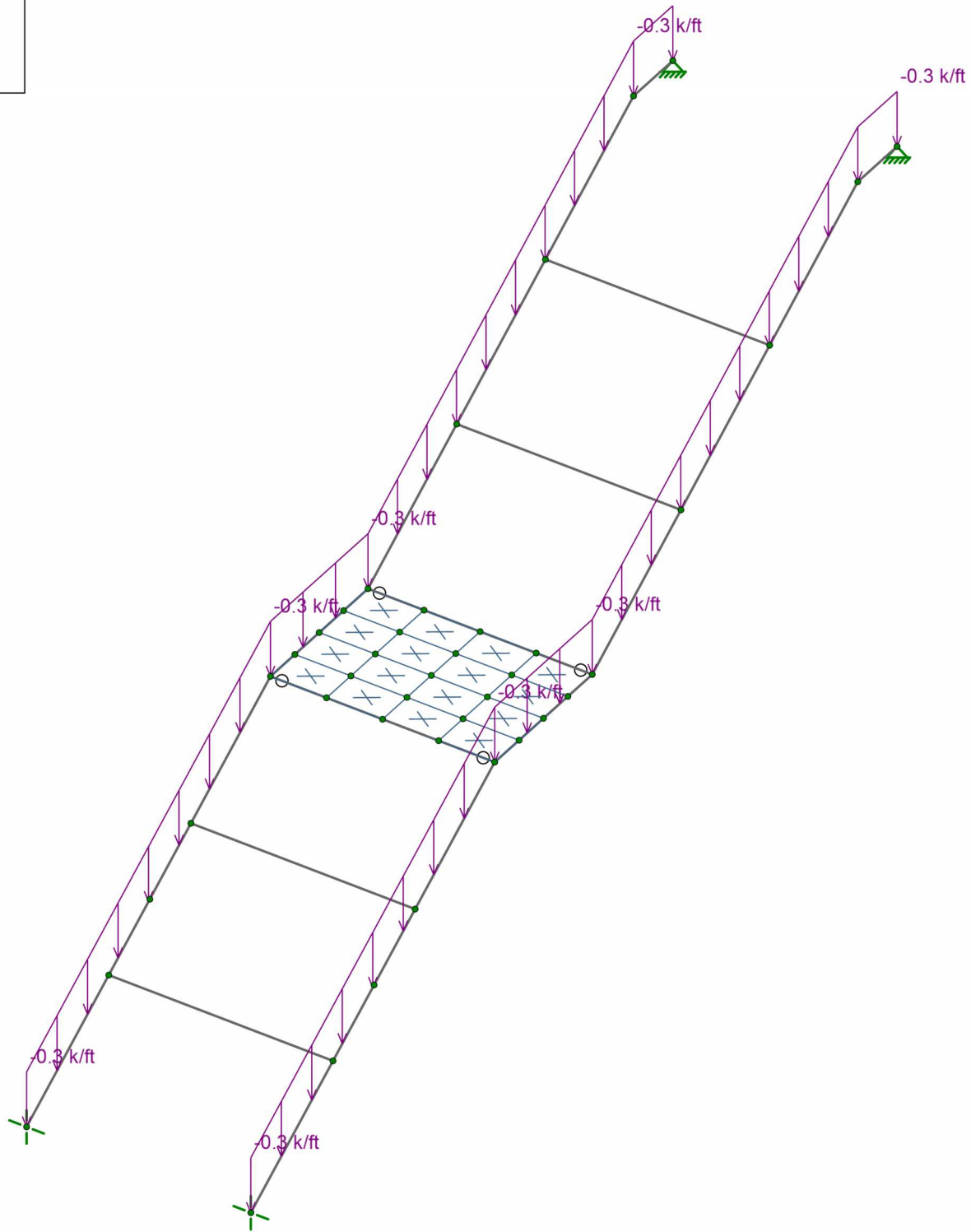
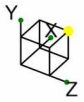
$$F_p/W_p = 0.67$$

Intermediate Landings

Mass	77	psf	
Seismic Load	0.052	ksf	(applied in RISA 3D)

Stringers

Mass	0.24	kip/ft	
Seismic Load	0.161	kip/ft	(applied in RISA 3D)



Loads: BLC 2, Live



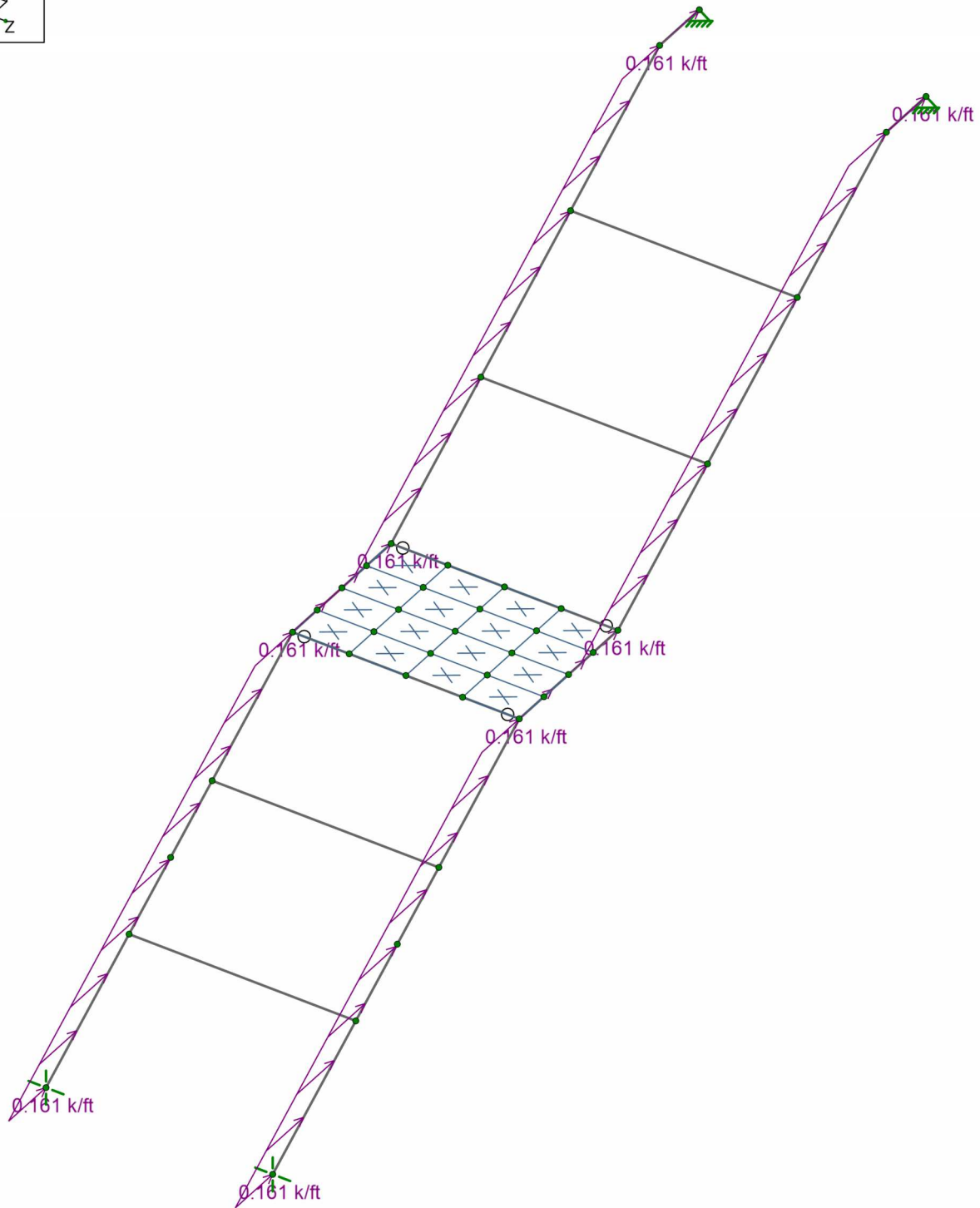
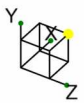
<Licensed Company>

mortiz

SK-4

Jul 08, 2024 at 04:23 PM

Stairs COIL v3.r3d

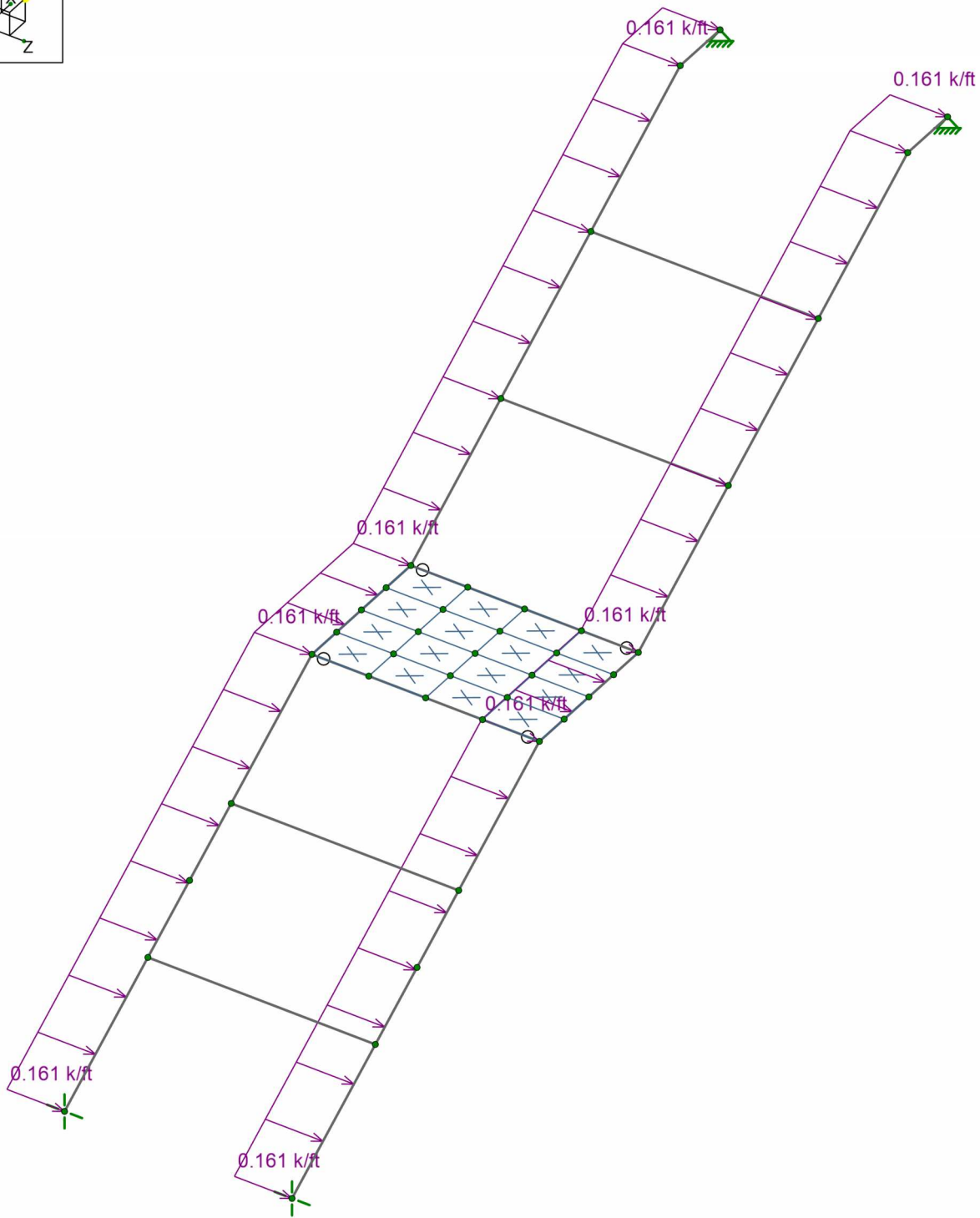


Loads: BLC 3, Seismic X



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mortiz

SK-5
Jul 08, 2024 at 04:24 PM
Stairs COIL v3.r3d



Loads: BLC 4, Seismic Z



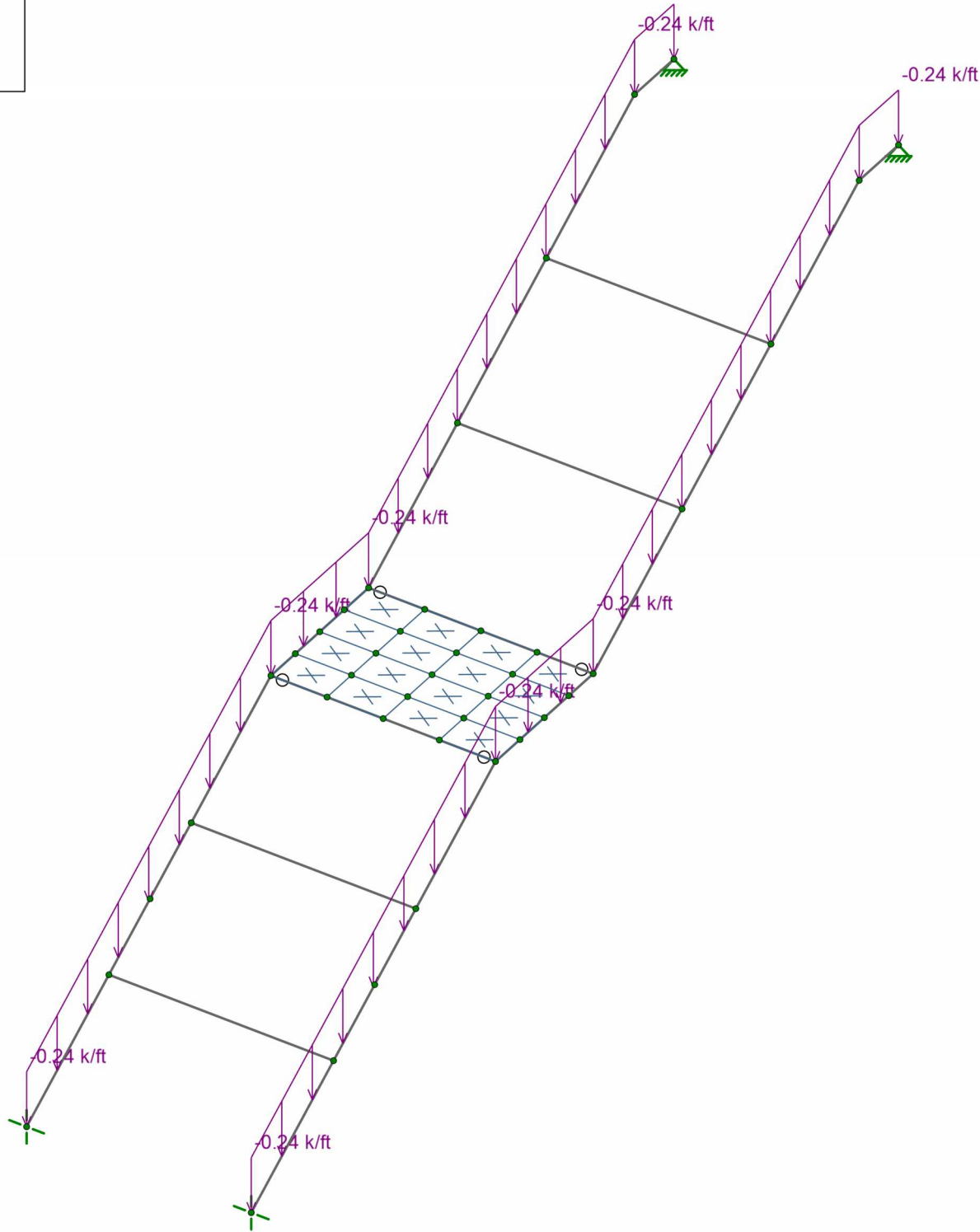
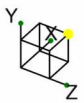
<Licensed Company>

mortiz

SK-6

Jul 08, 2024 at 04:24 PM

Stairs COIL v3.r3d



Loads: BLC 5, Super Dead



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mortiz

SK-7
Jul 08, 2024 at 04:24 PM
Stairs COIL v3.r3d

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e ⁻⁶ /°F]	Density [k/ft ³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B RECT	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A500 Gr.C RND	29000	11154	0.3	0.65	0.527	46	1.4	62	1.3
7	A500 Gr.C RECT	29000	11154	0.3	0.65	0.527	50	1.4	62	1.3
8	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
9	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3
10	A913 Gr.65	29000	11154	0.3	0.65	0.49	65	1.1	80	1.1

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N85		Reaction	Reaction
2	N86		Reaction	Reaction
3	N160	Reaction	Reaction	Reaction
4	N161	Reaction	Reaction	Reaction

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M37	N161	N159		MC18X58	Beam	Channel	A36 Gr.36	Typical
2	M38	N158	N160		MC18X58	Beam	Channel	A36 Gr.36	Typical
3	M39	N85	N88		MC18X58	Beam	Channel	A36 Gr.36	Typical
4	M40	N88	N89		MC18X58	Beam	Channel	A36 Gr.36	Typical
5	M41	N89	N158		MC18X58	Beam	Channel	A36 Gr.36	Typical
6	M42	N86	N87	180	MC18X58	Beam	Channel	A36 Gr.36	Typical
7	M43	N87	N90	180	MC18X58	Beam	Channel	A36 Gr.36	Typical
8	M44	N90	N159	180	MC18X58	Beam	Channel	A36 Gr.36	Typical
9	M9	N88	N87	180	C9X20	Beam	Channel	A36 Gr.36	Typical
10	M10	N89	N90	180	C9X20	Beam	Channel	A36 Gr.36	Typical
11	M11	N32	N33		HSS4X4X5	Beam	Tube	A500 Gr.B RECT	Typical
12	M12	N34	N35		HSS4X4X5	Beam	Tube	A500 Gr.B RECT	Typical
13	M13	N38	N39		HSS4X4X5	Beam	Tube	A500 Gr.B RECT	Typical
14	M14	N42	N43		HSS4X4X5	Beam	Tube	A500 Gr.B RECT	Typical

Member Advanced Data

	Label	I Release	J Release	Physical	Deflection Ratio Options	Analysis Offset [in]	Seismic DR
1	M37			Yes	Default		None
2	M38			Yes	Default		None
3	M39			Yes	Default		None
4	M40			Yes	Default		None
5	M41			Yes	Default		None
6	M42			Yes	Default		None
7	M43			Yes	Default		None
8	M44			Yes	Default		None
9	M9	BenPIN	BenPIN	Yes	Default		None
10	M10	BenPIN	BenPIN	Yes	Default		None
11	M11			Yes	Default	-y+2	None
12	M12			Yes	Default	-y+2	None
13	M13			Yes	Default	-y+2	None
14	M14			Yes	Default	-y+2	None

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lcomp top [ft]	Channel Conn.	a [ft]	Function
1	M37	MC18X58	1.611	Lbyy	N/A	N/A	Lateral
2	M38	MC18X58	1.611	Lbyy	N/A	N/A	Lateral
3	M39	MC18X58	11.873	Lbyy	N/A	N/A	Lateral
4	M40	MC18X58	4	Lbyy	N/A	N/A	Lateral
5	M41	MC18X58	12.96	Lbyy	N/A	N/A	Lateral
6	M42	MC18X58	11.873	Lbyy	N/A	N/A	Lateral
7	M43	MC18X58	4	Lbyy	N/A	N/A	Lateral
8	M44	MC18X58	12.96	Lbyy	N/A	N/A	Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length [ft]	Lcomp top [ft]	Channel Conn.	a [ft]	Function
9	M9	C9X20	6	Lbyy	N/A	N/A	Lateral
10	M10	C9X20	6	Lbyy	N/A	N/A	Lateral
11	M11	HSS4X4X5	6	Lbyy	N/A	N/A	Lateral
12	M12	HSS4X4X5	6	Lbyy	N/A	N/A	Lateral
13	M13	HSS4X4X5	6	Lbyy	N/A	N/A	Lateral
14	M14	HSS4X4X5	6	Lbyy	N/A	N/A	Lateral

Member Distributed Loads (BLC 2 : Live)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M39	Y	-0.3	-0.3	0	%100
2	M42	Y	-0.3	-0.3	0	%100
3	M40	Y	-0.3	-0.3	0	%100
4	M43	Y	-0.3	-0.3	0	%100
5	M44	Y	-0.3	-0.3	0	%100
6	M41	Y	-0.3	-0.3	0	%100
7	M38	Y	-0.3	-0.3	0	%100
8	M37	Y	-0.3	-0.3	0	%100

Member Distributed Loads (BLC 3 : Seismic X)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M42	X	0.161	0.161	0	%100
2	M43	X	0.161	0.161	0	%100
3	M44	X	0.161	0.161	0	%100
4	M41	X	0.161	0.161	0	%100
5	M39	X	0.161	0.161	0	%100
6	M40	X	0.161	0.161	0	%100
7	M38	X	0.161	0.161	0	%100
8	M37	X	0.161	0.161	0	%100

Member Distributed Loads (BLC 4 : Seismic Z)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M39	Z	0.161	0.161	0	%100
2	M42	Z	0.161	0.161	0	%100
3	M40	Z	0.161	0.161	0	%100
4	M43	Z	0.161	0.161	0	%100
5	M41	Z	0.161	0.161	0	%100
6	M44	Z	0.161	0.161	0	%100
7	M38	Z	0.161	0.161	0	%100
8	M37	Z	0.161	0.161	0	%100

Member Distributed Loads (BLC 5 : Super Dead)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M42	Y	-0.24	-0.24	0	%100
2	M43	Y	-0.24	-0.24	0	%100
3	M44	Y	-0.24	-0.24	0	%100
4	M41	Y	-0.24	-0.24	0	%100
5	M39	Y	-0.24	-0.24	0	%100
6	M40	Y	-0.24	-0.24	0	%100
7	M38	Y	-0.24	-0.24	0	%100
8	M37	Y	-0.24	-0.24	0	%100

Basic Load Cases

	BLC Description	Category	Distributed
1	Dead	DL	
2	Live	LL	8
3	Seismic X	ELX	8
4	Seismic Z	ELZ	8
5	Super Dead	DL	8

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1								
2	Deflection 2	Yes	Y	LL	1								
3	Deflection 3	Yes	Y	DL	1	LL	1						
4	ASCE Strength 1	Yes	Y	DL	1.4								
5	ASCE Strength 2 (a)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6				
6	ASCE Strength 6 (a)	Yes	Y	DL	1.2	Sds*DL	0.3	ELX	1	LL	0.5	LLS	1
7	ASCE Strength 6 (b)	Yes	Y	DL	1.2	Sds*DL	0.3	ELZ	1	LL	0.5	LLS	1
8	ASCE Strength 6 (c)	Yes	Y	DL	1.2	Sds*DL	0.3	ELX	-1	LL	0.5	LLS	1
9	ASCE Strength 6 (d)	Yes	Y	DL	1.2	Sds*DL	0.3	ELZ	-1	LL	0.5	LLS	1
10	ASCE Strength 7 (a)	Yes	Y	DL	0.9	Sds*DL	-0.3	ELX	1				
11	ASCE Strength 7 (b)	Yes	Y	DL	0.9	Sds*DL	-0.3	ELZ	1				
12	ASCE Strength 7 (c)	Yes	Y	DL	0.9	Sds*DL	-0.3	ELX	-1				
13	ASCE Strength 7 (d)	Yes	Y	DL	0.9	Sds*DL	-0.3	ELZ	-1				

Load Combination Design

	Description	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	Deflection 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Deflection 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	Deflection 3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	ASCE Strength 1		Yes	Yes		Yes	Yes	Yes	Yes	Yes
5	ASCE Strength 2 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
6	ASCE Strength 6 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
7	ASCE Strength 6 (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
8	ASCE Strength 6 (c)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
9	ASCE Strength 6 (d)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
10	ASCE Strength 7 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
11	ASCE Strength 7 (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
12	ASCE Strength 7 (c)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
13	ASCE Strength 7 (d)		Yes	Yes		Yes	Yes	Yes	Yes	Yes

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
0	M37	MC18X58	0.191	1.611	7	0.047	0	y	5	543.547	554.04	22.778	257.58	1.646	H1-1b
1	M38	MC18X58	0.191	0	9	0.047	1.611	y	5	543.547	554.04	22.778	257.58	1.646	H1-1b
2	M39	MC18X58	0.567	3.958	9	0.041	0	y	5	195.882	554.04	22.778	257.58	1.438	H1-1b
3	M40	MC18X58	0.453	0	9	0.081	1	z	7	492.449	554.04	22.778	257.58	1.073	H1-1b
4	M41	MC18X58	0.565	8.775	9	0.209	8.775	z	7	164.392	554.04	22.778	214.53	1.132	H1-1b
5	M42	MC18X58	0.567	3.958	7	0.041	0	y	5	195.882	554.04	22.778	257.58	1.438	H1-1b
6	M43	MC18X58	0.453	0	7	0.081	1	z	9	492.449	554.04	22.778	257.58	1.073	H1-1b
7	M44	MC18X58	0.565	8.775	7	0.209	8.775	z	9	164.392	554.04	22.778	214.53	1.132	H1-1b
8	M9	C9X20	0.08	1.5	9	0.03	1.5	y	7	97.836	190.188	5.037	45.63	1.408	H1-1b
9	M10	C9X20	0.009	1.5	7	0.011	6	y	5	97.836	190.188	5.037	45.63	1.286	H1-1b
10	M11	HSS4X4X5	0.867	6	7	0.081	6	z	7	145.161	169.74	19.285	19.285	2.272	H1-1b
11	M12	HSS4X4X5	0.472	6	9	0.043	6	z	11	145.161	169.74	19.285	19.285	2.273	H1-1b
12	M13	HSS4X4X5	0.183	0	9	0.017	6	z	9	145.161	169.74	19.285	19.285	2.273	H1-1b
13	M14	HSS4X4X5	0.523	0	9	0.054	6	z	9	145.161	169.74	19.285	19.285	2.267	H1-1b

ALL CHECKS <1.0 OK!

Envelope Member End Reactions

Member	Member End	Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
0	M37	I	max	4.901	10	11.632	5	1.944	7	0	13	0	13
1			min	-4.901	8	0.022	13	-1.998	9	0	1	0	1
2		J	max	4.642	10	10.395	5	1.684	7	0	13	2.923	7
3			min	-4.642	8	-0.21	13	-1.738	9	0	1	-3.01	9
4	M38	I	max	4.642	10	0.21	11	1.738	7	0	13	2.923	9
5			min	-4.642	8	-10.395	5	-1.684	9	0	1	-3.01	7
6		J	max	4.901	10	-0.022	11	-1.998	7	0	13	0	13
7			min	-4.901	8	-11.632	5	-1.944	9	0	1	0	1
8	M39	I	max	6.333	5	9.934	5	2.983	9	0	13	0	13
9			min	0.55	12	0.859	12	-2.982	7	0	1	0	1
10		J	max	6.859	7	2.223	5	1.033	13	0.022	9	5.08	13
11			min	-5.629	13	-0.061	11	-1.04	11	-0.018	11	-5.118	7
12	M40	I	max	5.519	7	4.061	7	4.427	7	0.826	7	4.289	13
13			min	-5.51	9	-2.486	13	-4.396	13	-0.591	13	-4.319	7
14		J	max	6.24	11	3.046	7	0.651	9	0.177	11	0.708	9

Envelope Member End Reactions (Continued)

Member	Member End	Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
15		min	13	-3.015	13	-0.573	7	-0.421	9	-0.632	7	-76.183	5
16	M41	I	max	8.094	11	0.97	13	0.385	13	0.001	11	-3.856	12
17		min	9	-1.278	7	-0.397	11	-0.005	9	-0.751	7	-76.545	5
18		J	max	3.708	11	-0.111	12	1.664	11	2.456	9	0.152	11
19		min	9	-8.703	5	-1.709	13	-1.632	7	-2.529	7	-17.745	5
20	M42	I	max	6.333	5	-0.859	12	2.983	7	0	13	0	13
21		min	12	-9.934	5	-2.982	9	0	1	0	1	0	1
22		J	max	6.859	9	0.061	13	1.033	11	0.018	13	72.168	5
23		min	11	-2.223	5	-1.04	13	-0.022	7	-5.118	9	6.173	13
24	M43	I	max	5.519	9	2.486	11	4.427	9	0.591	11	71.99	5
25		min	7	-4.061	9	-4.396	11	-0.826	9	-4.319	9	6.341	13
26		J	max	6.24	13	3.015	11	0.651	7	0.708	7	76.183	5
27		min	11	-3.046	9	-0.573	9	-0.177	13	-0.632	9	3.926	12
28	M44	I	max	8.094	13	1.278	9	0.385	11	0.005	7	76.545	5
29		min	7	-0.97	11	-0.397	13	-0.001	13	-0.751	9	3.856	12
30		J	max	3.708	13	8.703	5	1.664	13	2.456	7	17.745	5
31		min	7	0.111	12	-1.709	11	-1.585	7	-2.529	9	-0.152	13
32	M9	I	max	2.924	13	1.888	9	0.009	7	-0.002	12	0	13
33		min	7	-1.862	11	-0.009	13	-0.015	5	0	1	0	1
34		J	max	2.924	11	1.862	13	0.009	11	0.015	5	0	13
35		min	9	-1.888	7	-0.009	9	0.002	12	0	1	0	1
36	M10	I	max	0.369	9	0.187	7	0.006	9	0.016	5	0	13
37		min	7	-0.137	13	-0.006	11	0.001	12	0	1	0	1
38		J	max	0.369	7	0.137	11	0.006	13	-0.001	12	0	13
39		min	9	-0.187	9	-0.006	7	-0.016	5	0	1	0	1
40	M11	I	max	-0.001	10	2.18	9	3.394	7	0.091	11	6.547	9
41		min	7	-2.18	7	-3.394	9	-0.091	13	-10.185	7	-6.533	7
42		J	max	-0.001	10	2.18	9	3.394	7	0.091	11	6.547	7
43		min	7	-2.18	7	-3.394	9	-0.091	13	-10.185	9	-6.533	9
44	M12	I	max	0.025	5	1.183	9	1.85	7	0.034	11	3.548	13
45		min	12	-1.183	7	-1.85	9	-0.034	13	-5.552	7	-3.551	7
46		J	max	0.025	5	1.183	9	1.85	7	0.034	11	3.548	11
47		min	12	-1.183	7	-1.85	9	-0.034	13	-5.552	9	-3.551	9
48	M13	I	max	0.001	12	0.439	7	0.735	9	0.004	7	1.317	7
49		min	5	-0.439	9	-0.735	7	-0.004	9	-2.207	9	-1.317	9
50		J	max	0.001	12	0.439	7	0.735	9	0.004	7	1.317	9
51		min	5	-0.439	9	-0.735	7	-0.004	9	-2.207	7	-1.317	7
52	M14	I	max	0.06	9	0.949	11	2.403	9	0.007	7	2.809	11
53		min	12	-0.949	13	-2.403	7	-0.007	9	-7.204	9	-2.884	13
54		J	max	0.06	9	0.949	11	2.403	9	0.007	7	2.809	13
55		min	12	-0.949	13	-2.403	7	-0.007	9	-7.204	7	-2.884	11

Warning Log

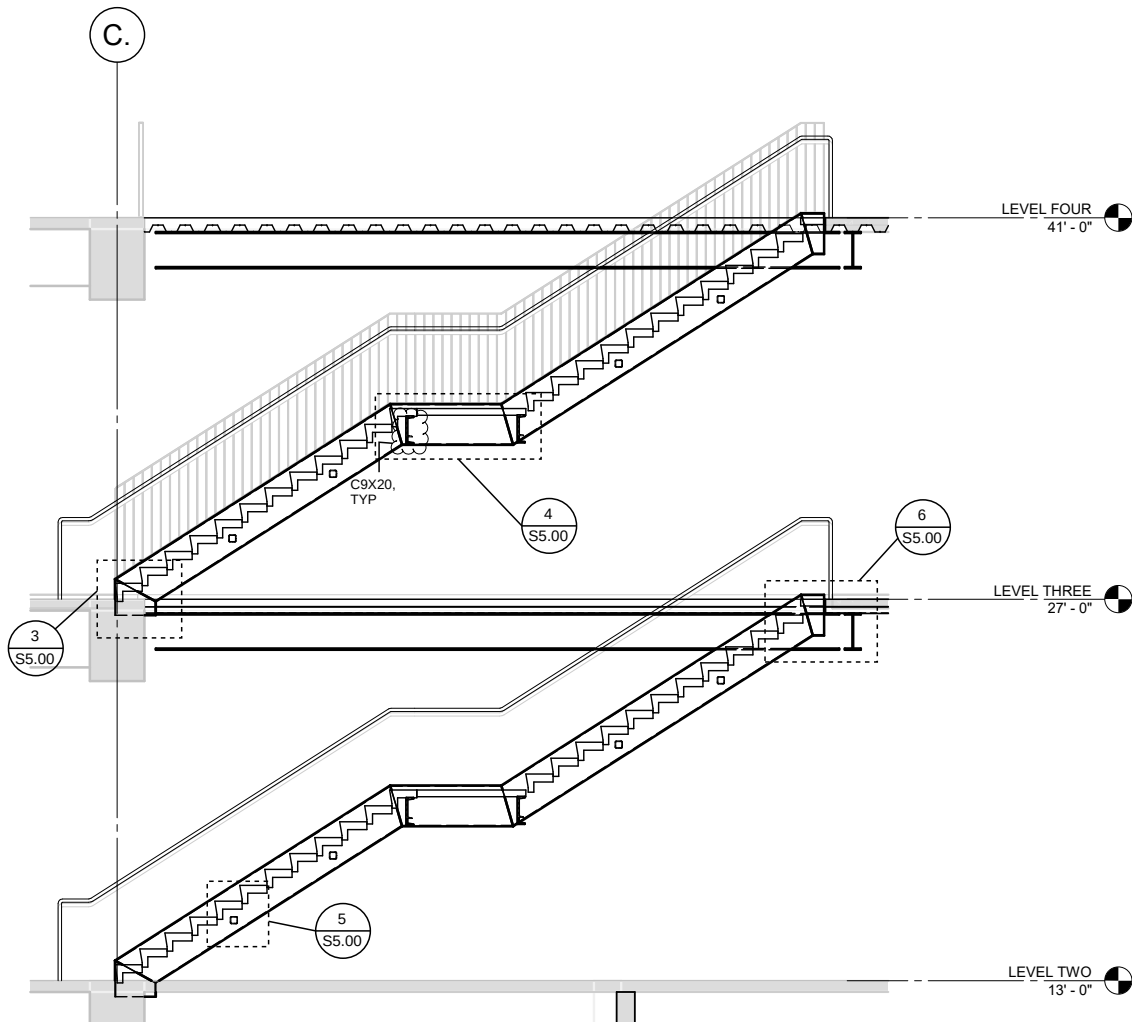
No Data to Print...

Envelope Maximum Member Section Forces

Member			Axial[k]Loc[ft]		LC	y Shear[k]Loc[ft]	LC	z Shear[k]Loc[ft]	LC	Torque[k-ft]Loc[ft]	LC	y-y Moment[k-ft]Loc[ft]	LC	z-z Moment[k-ft]Loc[ft]	LC					
0	M37	max	4.901	0	10	11.632	0	5	1.944	0	7	0	1.611	13	2.923	1.611	7	0.152	1.611	13
1		min	-4.901	0	8	-0.21	1.611	13	-1.998	0	9	0	0	1	-3.01	1.611	9	-17.745	1.611	5
2	M38	max	4.901	1.611	10	0.21	0	11	1.998	1.611	7	0	1.611	13	2.923	0	9	0.152	0	11
3		min	-4.901	1.611	8	-11.632	1.611	5	-1.944	1.611	9	0	0	1	-3.01	0	7	-17.745	0	5
4	M39	max	7.913	8.039	7	9.934	0	5	2.983	0	9	0.022	11.873	9	10.544	3.958	9	0	0	13
5		min	-5.629	11.873	13	-0.061	11.873	11	-2.982	0	7	-0.022	4.081	11	-10.541	3.958	7	-72.168	11.873	5
6	M40	max	6.24	4	11	4.093	1.042	7	4.588	1	7	0.826	1	7	4.289	0	13	-3.926	4	12
7		min	-6.248	3	13	-3.015	4	13	-4.557	1	13	-0.591	0	13	-4.319	0	7	-76.183	4	5
8	M41	max	8.094	0	11	0.97	0	13	1.664	12.96	11	1.585	12.96	9	8.177	8.775	13	0.152	12.96	11
9		min	-9.811	8.64	9	-8.703	12.96	5	-1.709	12.96	13	-1.632	8.775	7	-8.062	8.775	11	-76.545	0	5
10	M42	max	7.913	8.039	9	0.061	11.873	13	2.983	0	7	0.022	5.936	13	10.544	3.958	7	72.168	11.873	5
11		min	-5.629	11.873	11	-9.934	0	5	-2.982	0	9	-0.022	8.039	7	-10.541	3.958	9	0	0	1
12	M43	max	6.24	4	13	3.015	4	11	4.588	1	9	0.591	1	11	4.289	0	11	76.183	4	5
13		min	-6.248	3	11	-4.093	1.042	9	-4.557	1	11	-0.826	0	9	-4.319	0	9	3.926	4	12
14	M44	max	8.094	0	13	8.703	12.96	5	1.664	12.96	13	1.632	12.96	9	8.177	8.775	11	76.545	0	5
15		min	-9.811	8.64	7	-0.97	0	11	-1.709	12.96	11	-1.585	8.775	7	-8.062	8.775	13	-0.152	12.96	13
16	M9	max	2.924	1.5	13	1.888	1.5	9	0.009	1.5	7	0.015	6	5	0.014	4.5	9	2.793	1.5	11
17		min	-2.921	0	7	-1.888	4.5	7	-0.009	4.5	9	-0.015	0	5	-0.014	1.5	13	-2.832	1.5	9
18	M10	max	0.369	1.5	9	0.187	1.5	7	0.006	4.438	7	0.016	1.5	5	0.009	1.5	9	0.206	1.5	13
19		min	-0.297	0	7	-0.187	4.5	9	-0.006	1.563	9	-0.016	4.5	5	-0.008	4.5	13	-0.281	1.5	7

Envelope Maximum Member Section Forces (Continued)

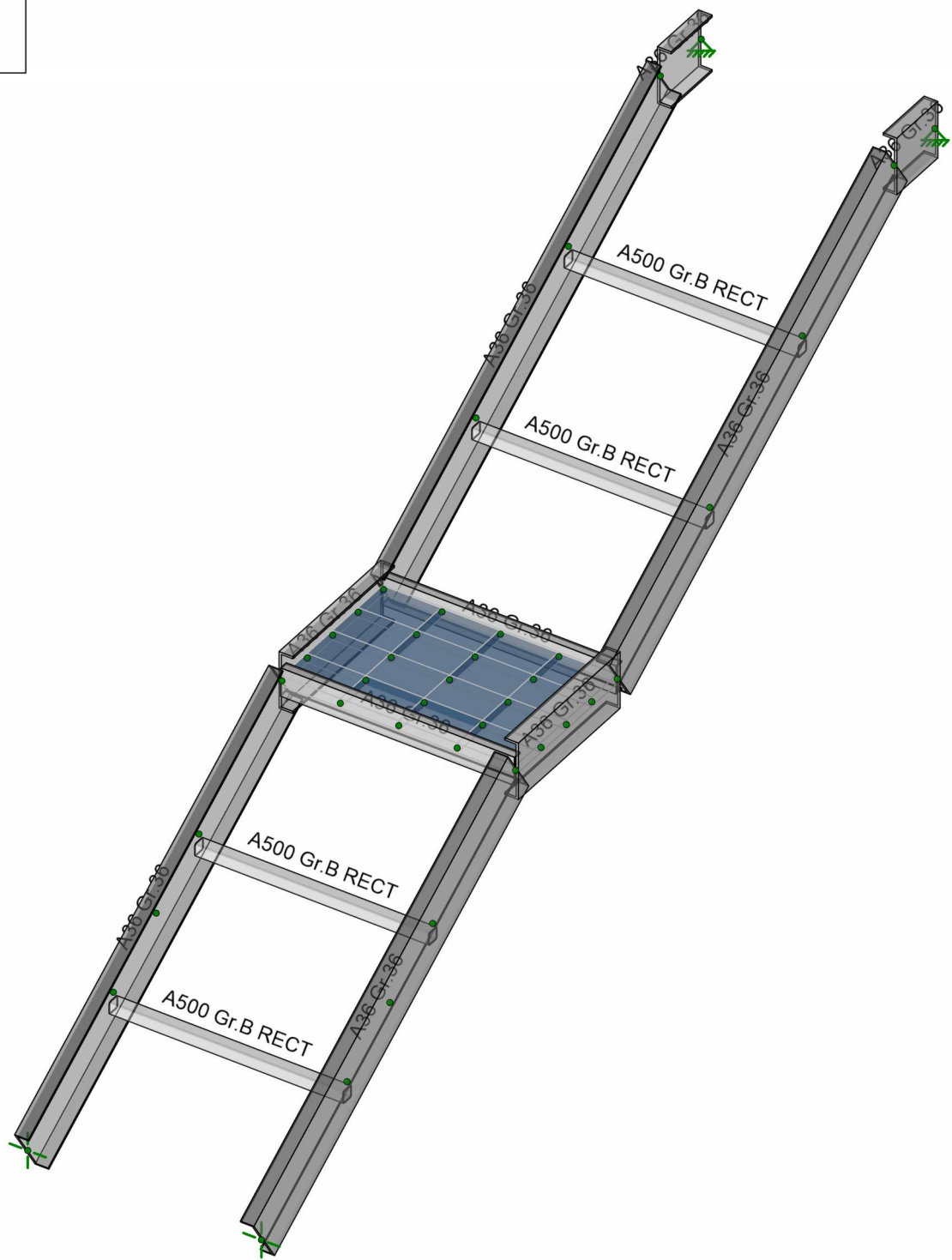
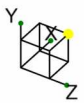
Member			Axial[k]	Loc[ft]	LC	y Shear[k]	Loc[ft]	LC	z Shear[k]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC
20	M11	max	-0.001	6	10	2.18	6	9	3.394	6	7	0.091	6	11	10.177	0	9	6.547	6	7
21		min	-0.034	0	7	-2.18	0	7	-3.394	0	9	-0.091	0	13	-10.185	0	7	-6.533	6	9
22	M12	max	0.025	6	5	1.183	6	9	1.85	6	7	0.034	6	11	5.548	0	13	3.548	6	11
23		min	0.005	0	12	-1.183	0	7	-1.85	0	9	-0.034	0	13	-5.552	0	7	-3.551	6	9
24	M13	max	0.001	6	12	0.439	6	7	0.735	6	9	0.004	6	7	2.205	6	9	1.317	0	7
25		min	-0.022	0	5	-0.439	0	9	-0.735	0	7	-0.004	0	9	-2.207	6	7	-1.317	0	9
26	M14	max	0.06	6	9	0.949	6	11	2.403	6	9	0.007	6	7	7.216	6	9	2.809	0	11
27		min	0	0	12	-0.949	0	13	-2.403	0	7	-0.007	0	9	-7.204	6	7	-2.884	0	13

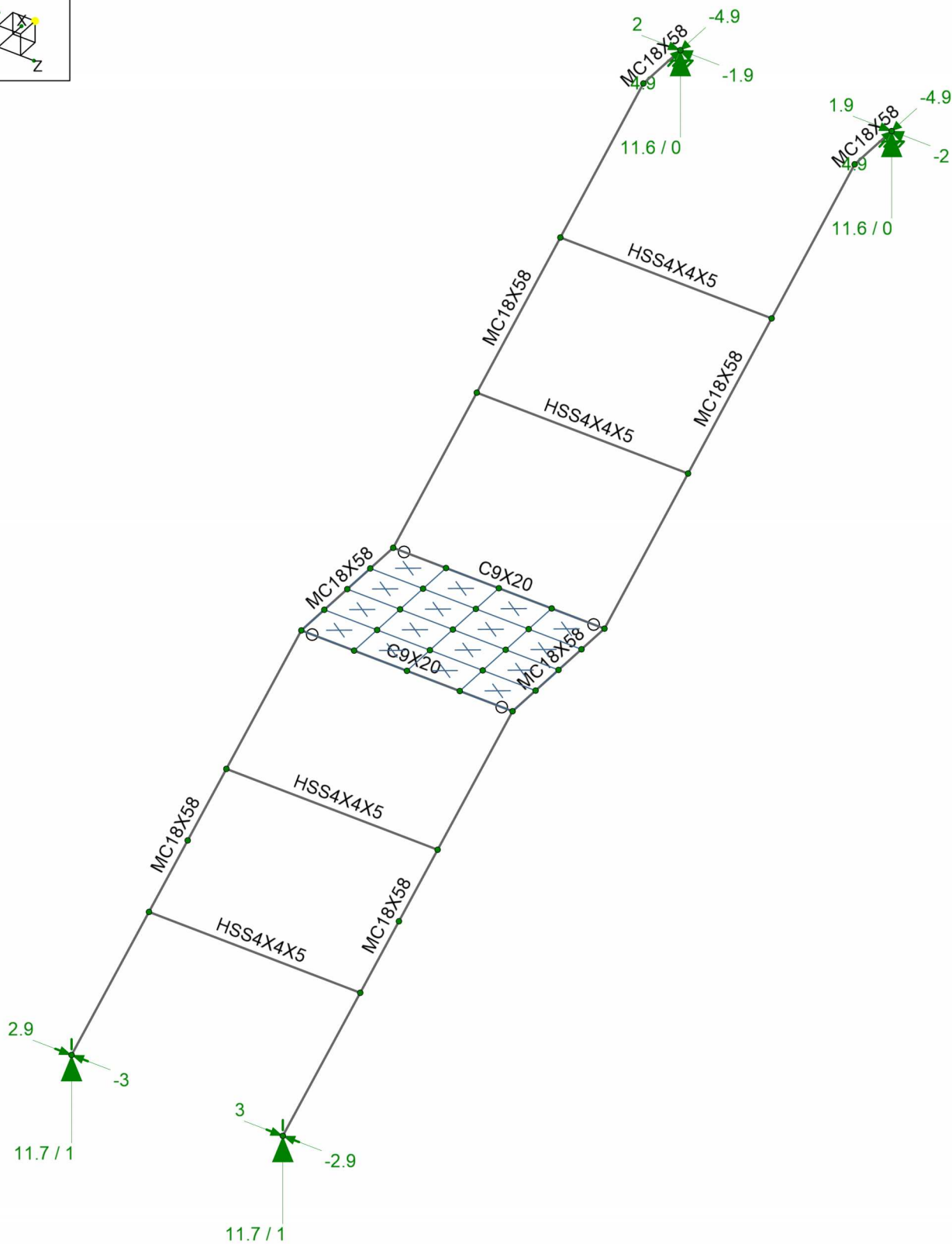


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STAIR SECTION

SCALE : 1/4" = 1'-0"





Reaction and Moment Units are kips and kip-ft (Enveloped)



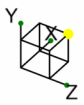
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mortiz

SK-2

Jul 08, 2024 at 04:05 PM

Stairs COIL v3.r3d



Code 152

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No Calc

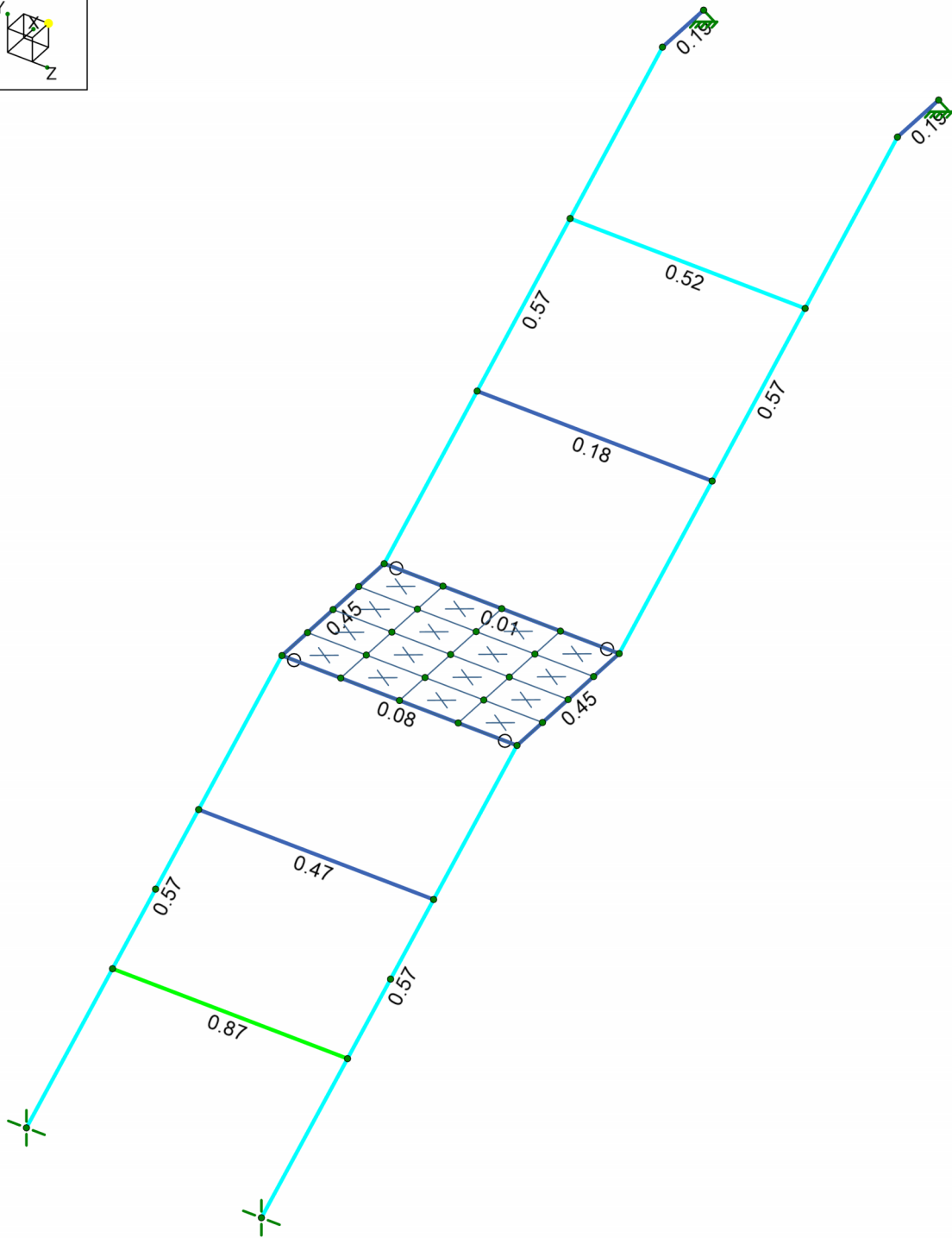
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.90-1.0

.75-.90

.50-.75

0-.50



Member Code Checks Displayed (Enveloped)			SK-1
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	mortiz		Stairs COIL v3.r3d



project: Inglewood Library Renovation

sheet no.:

153

location: Inglewood, CA

job no.: 10012300277

client:

date: 02/15/2025

G. Miscellaneous Design



project: Inglewood Library Renovation

sheet no.:

154

location: Inglewood, CA

job no.: 10012300277

client:

date: 02/15/2025

1. Steel Beam Under Slab



project: Inglewood Library - Support Bm

sheet no.:

155

location: Inglewood, CA

job no.: 10012300277

client:

date: 02/14/2025

Summary:

The support steel beam W16x40 it's connected to the existing concrete beams for gravity load support to the slab. See following calculations for members and connections design justification to the existing structure.

The following codes where used for the design:

- 2022 California Building Code.
- AISC 360-16
- ASCE 7-16
- ACI 318-14

KPFF Consulting Engineers
 700 Flower St
 Los Angeles, CA 90017
 (213) 310 8579

Project : COIL
 Job no. : 2300277
 Date : Jun-24
 By : MO

LOADING CRITERIA

LOAD TYPE: C - Concrete Two-Way Slab

Slab

5" thick slab + 2 1/2" topping	93.75 psf
Floor/Roof Finishes	1 psf
Ceiling and Lights	4 psf
MEP, Piping, Sprinklers	5 psf
Misc	3 psf

Slab Total: 106.75 psf

Beam

Conc Gravity Beams	0 psf
--------------------	-------

Beam Total: 106.75 psf

Columns

Gravity Columns	0 psf
-----------------	-------

Column Total: 106.75 psf

Seismic Dead Load

Partitions	0 psf
LFRS - explicitly modeled	0

Seismic Total: 106.75 psf

Floor Live Load

100 psf

Steel Beam

Project File: Exterior Wall Beams.ec6

LIC# : KW-06018621, Build:20.23.12.07

KPFF

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DESCRIPTION: Slab beam

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

Material Properties

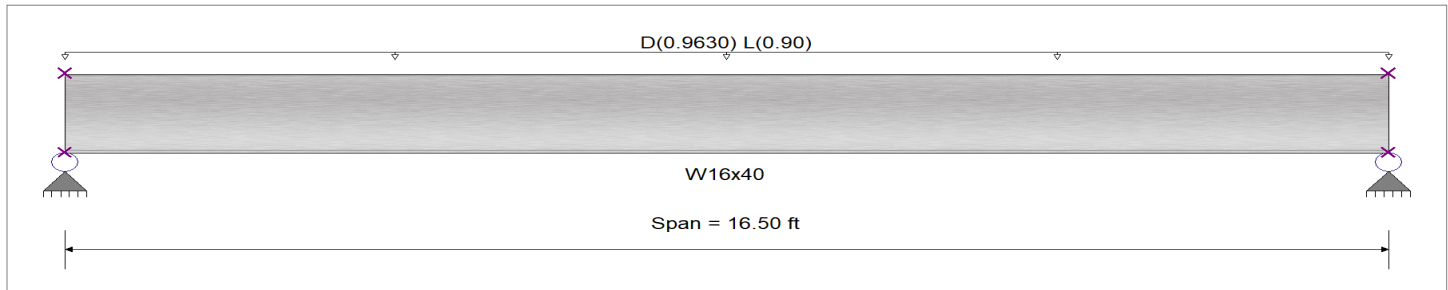
Analysis Method Load Resistance Factor Design

Beam Bracing : Completely Unbraced

Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi

E: Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Uniform Load : D = 0.1070, L = 0.10 ksf, Tributary Width = 9.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.496 : 1	Maximum Shear Stress Ratio =	0.149 : 1
Section used for this span	W16x40	Section used for this span	W16x40
Mu : Applied	89.965 k-ft	Vu : Applied	21.810 k
Mn * Phi : Allowable	181.386 k-ft	Vn * Phi : Allowable	146.40 k
Load Combination	+1.20D+1.60L	Load Combination	+1.20D+1.60L
Span # where maximum occurs	Span # 1	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	0.100 in Ratio = 1,972	>=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in Ratio = 0	<360	n/a
Max Downward Total Deflection	0.212 in Ratio = 933	>=180	Span: 1 : +D+L
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	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+1.40D														
Dsgn. L = 16.50 ft	1		0.263	0.079	47.79		47.79	201.54	181.39	1.14	1.00	11.58	146.40	146.40
+1.20D+1.60L														
Dsgn. L = 16.50 ft	1		0.496	0.149	89.97		89.97	201.54	181.39	1.14	1.00	21.81	146.40	146.40
+1.20D+0.50L														
Dsgn. L = 16.50 ft	1		0.310	0.093	56.27		56.27	201.54	181.39	1.14	1.00	13.64	146.40	146.40
+1.20D														
Dsgn. L = 16.50 ft	1		0.226	0.068	40.96		40.96	201.54	181.39	1.14	1.00	9.93	146.40	146.40
+0.90D														
Dsgn. L = 16.50 ft	1		0.169	0.051	30.72		30.72	201.54	181.39	1.14	1.00	7.45	146.40	146.40

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.2122	8.297		0.0000	0.000

Vertical Reactions

Support notation : Far left is #:

Values in KIPS

Load Combination	Support 1	Support 2	Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	15.700	15.700	+D+0.750L	13.844	13.844
Max Upward from Load Combinations	15.700	15.700	+0.60D	4.965	4.965
Max Upward from Load Cases	8.275	8.275	L Only	7.425	7.425
D Only	8.275	8.275			
+D+L	15.700	15.700			

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Fastening point:

Concrete - Jun 25, 2024

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Specifier:

E-Mail:

Date:

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Specifier's comments:

1 Input data

Anchor type and diameter:
Kwik Bolt TZ2 - CS 5/8 (3 1/4) hnom2

Item number:

2210272 KB-TZ2 5/8x5 1/2

Specification text:

Hilti KB-TZ2 stud anchor with 3.75 in embedment, 5/8 (3 1/4) hnom2, Carbon steel, installation per ESR-4266



Effective embedment depth:

 $h_{ef,act} = 3.250 \text{ in.}$, $h_{nom} = 3.750 \text{ in.}$

Material:

Carbon Steel

Evaluation Service Report:

ESR-4266

Issued | Valid:

12/1/2023 | 12/1/2025

Proof:

Design Method ACI 318-19 / Mech

Stand-off installation:

 $e_b = 0.000 \text{ in.}$ (no stand-off); $t = 0.625 \text{ in.}$

Anchor plate^R:

 $l_x \times l_y \times t = 16.000 \text{ in.} \times 8.000 \text{ in.} \times 0.625 \text{ in.}$;

Profile:

W shape (AISC), W16X40; (L x W x T x FT) = 16.000 in. x 7.000 in. x 0.305 in. x 0.505 in.

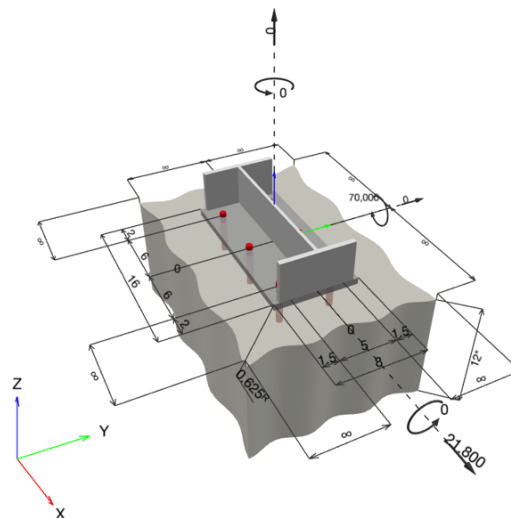
Base material:

cracked concrete, 4000, $f'_c = 4,000 \text{ psi}$; $h = 12.000 \text{ in.}$
Installation:
hammer drilled hole, Installation condition: Dry

Reinforcement:

tension: not present, shear: not present; no supplemental splitting reinforcement present
edge reinforcement: none or < No. 4 bar

^R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]


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1.1 Design results

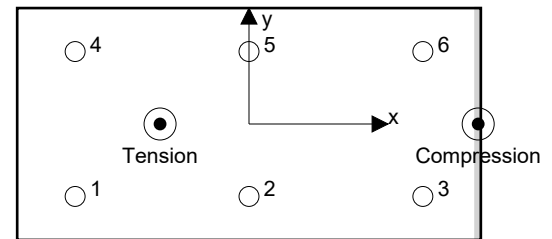
Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 0; $V_x = 21,800$; $V_y = 0$; $M_x = 0$; $M_y = 70,000$; $M_z = 0$;	no	86

2 Load case/Resulting anchor forces

Anchor reactions [lb]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	1,878	3,633	3,633	0
2	1,063	3,633	3,633	0
3	247	3,633	3,633	0
4	1,878	3,633	3,633	0
5	1,063	3,633	3,633	0
6	247	3,633	3,633	0



max. concrete compressive strain: 0.01 [‰]
max. concrete compressive stress: 4,420 [psi]
resulting tension force in (x/y)=(-3.069/0.000): 6,376 [lb]
resulting compression force in (x/y)=(7.910/0.000): 6,377 [lb]

Anchor forces are calculated based on the assumption of a rigid anchor plate.

3 Tension load

	Load N_{ua} [lb]	Capacity ϕN_n [lb]	Utilization $\beta_N = N_{ua} / \phi N_n$	Status
Steel Strength*	1,878	13,157	15	OK
Pullout Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Failure**	6,376	10,475	61	OK

* highest loaded anchor **anchor group (anchors in tension)

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4 Shear load

	Load V_{ua} [lb]	Capacity ϕV_n [lb]	Utilization $\beta_V = V_{ua}/\phi V_n$	Status
Steel Strength*	3,633	6,668	55	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength**	21,800	36,766	60	OK
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

* highest loaded anchor **anchor group (relevant anchors)

5 Combined tension and shear loads, per ACI 318-19 section 17.8

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.609	0.593	5/3	86	OK

$$\beta_{N,V} = \beta_N^\zeta + \beta_V^\zeta \leq 1$$

6 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2021, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- User is responsible for evaluating the hole bearing capacity in case of shear forces.
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- Refer to the manufacturer's product literature for cleaning and installation instructions.
- For additional information about ACI 318 strength design provisions, please go to <https://submittals.us.hilti.com/PROFISAnchorDesignGuide/>
- Hilti post-installed anchors shall be installed in accordance with the Hilti Manufacturer's Printed Installation Instructions (MPII). Reference ACI 318-19, Section 26.7.

Fastening meets the design criteria!

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7 Anchor plate and concrete bearing stress check

	Load	Capacity	Utilization [%]	Status
Concentric Compression	N/A	N/A	N/A	N/A
Concrete bearing	4,420 [psi]	4,420 [psi]	100	OK
Tension Interface	2,988.19 [in.lb/in.]	4,394.53 [in.lb/in.]	68	OK
Uniaxial Moment (Strong Axis)	246.94 [in.lb/in.]	4,394.53 [in.lb/in.]	6	OK
Uniaxial Moment (Weak Axis)	889.54 [in.lb/in.]	4,394.53 [in.lb/in.]	21	OK

8 Installation data

Profile: W shape (AISC), W16X40; (L x W x T x FT) = 16.000 in. x 7.000 in. x 0.305 in. x 0.505 in.

Hole diameter in the fixture: $d_f = 0.687$ in.

Plate thickness (input): 0.625 in.

Drilling method: Hammer drilled

Cleaning: Manual cleaning of the drilled hole according to instructions for use is required.

Anchor type and diameter: Kwik Bolt TZ2 - CS 5/8 (3 1/4) hnom2

Item number: 2210272 KB-TZ2 5/8x5 1/2

Maximum installation torque: 481 in.lb

Hole diameter in the base material: 0.625 in.

Hole depth in the base material: 4.250 in.

Minimum thickness of the base material: 5.500 in.

Hilti KB-TZ2 stud anchor with 3.75 in embedment, 5/8 (3 1/4) hnom2, Carbon steel, installation per ESR-4266

8.1 Recommended accessories

Drilling

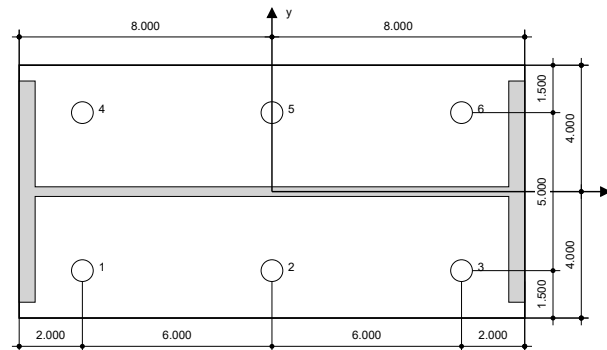
- Suitable Rotary Hammer
- Properly sized drill bit

Cleaning

- Manual blow-out pump

Setting

- Torque controlled cordless impact tool
- Torque wrench
- Hammer



Coordinates Anchor in.

Anchor	x	y	c _{-x}	c _{+x}	c _{-y}	c _{+y}	Anchor	x	y	c _{-x}	c _{+x}	c _{-y}	c _{+y}
1	-6.000	-2.500	-	-	-	-	4	-6.000	2.500	-	-	-	-
2	0.000	-2.500	-	-	-	-	5	0.000	2.500	-	-	-	-
3	6.000	-2.500	-	-	-	-	6	6.000	2.500	-	-	-	-

Input data and results must be checked for conformity with the existing conditions and for plausibility!

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Specifier:

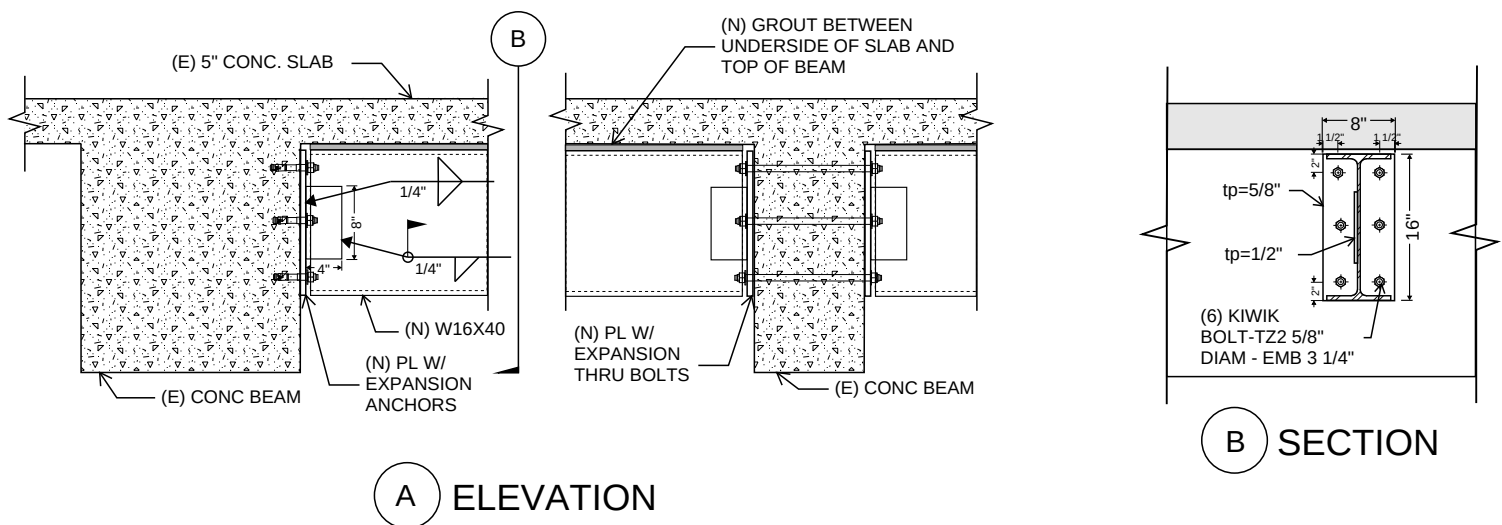
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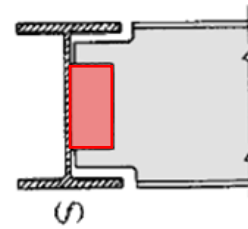
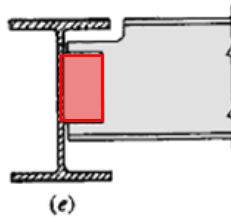
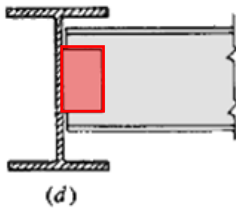
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CNX WELDED SHEAR PLATE TO WEB

Weld properties		Weld centroid and inertia		Weld of shear plate to base plate			
thickness	1 in	x	0.314 in	fv	2.75 kip/in	Plate Check	flexure shear
length	8 in	y	0 in	fb	6.57 kip/in		OK OK
width	1.93 in			fr	7.12 kip/in	Flexure of plate	
fy	70 ksi	Ix	121.15 in4			Mu=Ru*e	70.09 kip.in
		Iy	24.63 in4	LRFD $\phi=0.75$		Flexural yielding	
Area1	A1	J	145.78 in4	Size	0.160 in	$\phi*Mn=\phi*Fy*Sx$	129.60 kip.in
Area2	A2					Flexural rupture	
Shear	Ru			Weld on both sides	3/16 in	$\phi*Mn=\phi*Fu*Znet$	261.00 kip.in
						Shear yielding	
						$\phi*Pn=\phi*0.6*Fy*Ag$	58.32 kip
						Shear rupture	
						$\phi*Pn=\phi*0.6*Fu*An$	93.96 kip
Plate properties		Rn	29.694 kip/in	Weld of shear plate to beam		Shear tab design	
tp	3/8 in	LRFD $\phi=0.75$		HORIZ. FORCES	VERTI. FORCES	Fillet weld E-7018	
Lp	8 in			fh	0.975 kip/in	Weld to Base plate	3/16 in
Bp	3.5 in	$\phi*Rn$	22.271 kip/in	fv	0.077 kip/in	Weld to Beam	3/16 in
fy	36 ksi			fs	1.855 kip/in	Dimension	PL = 8x4x3/8"
fu	58 ksi						
Member properties				fr	2.16 kip/in		
fy	50 ksi						
fu	65 ksi						
Zx	6 in3						
				Size	0.097 in	Size	0.126 in
				Weld of 3/16 in			





project: Inglewood Library - Support Bm

sheet no.:

164

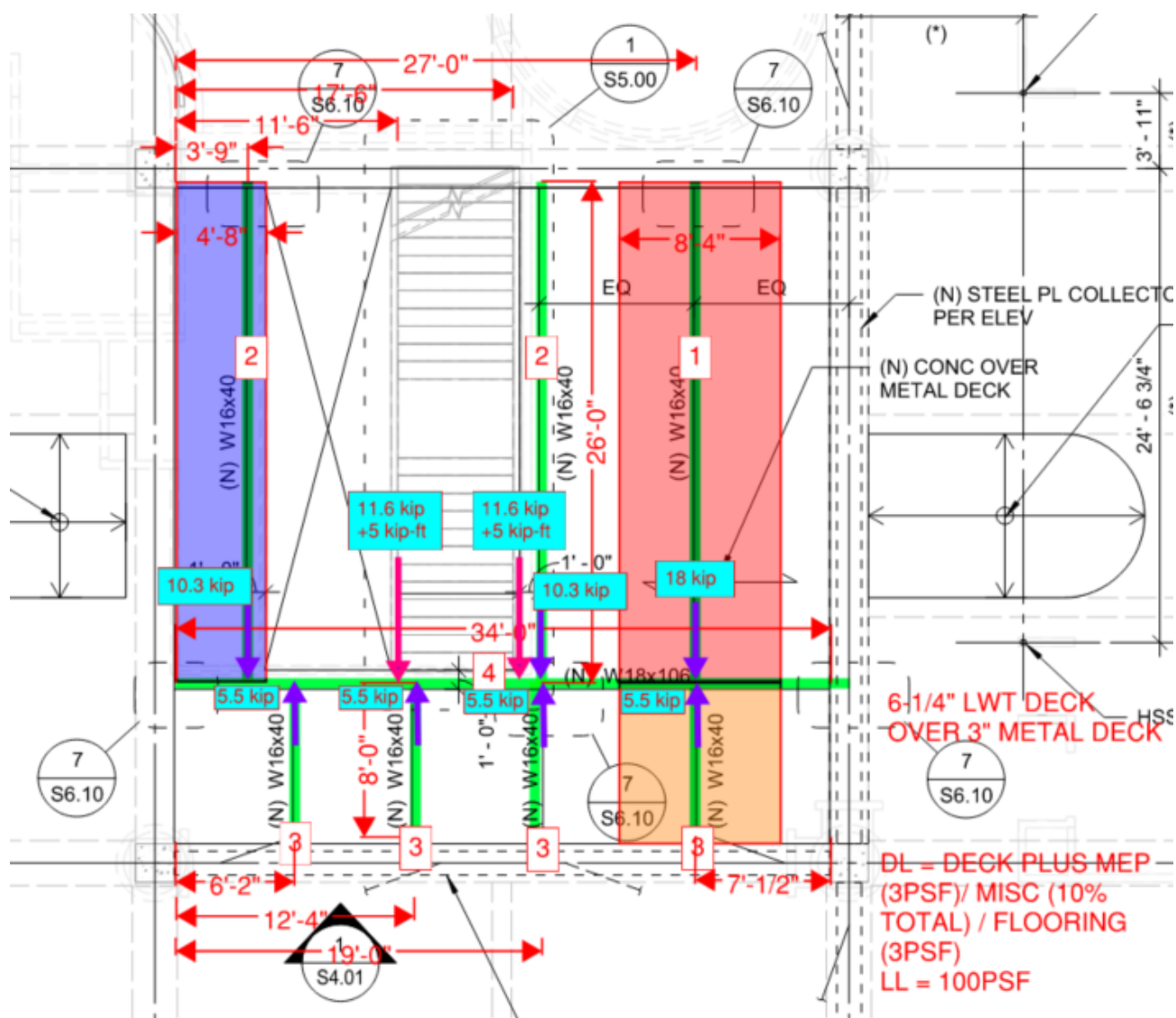
location: Inglewood, CA

job no.: 2300277

client:

date: 07/05/2024

2. Stairs Opening Steel Framing Design



Steel Beam

Project File: Stairs Beams floor.ec6

LIC# : KW-06018621, Build:20.24.10.30

KPFF

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: W16x40 Bm (1)

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021

Load Combination Set : IBC 2021

Material Properties

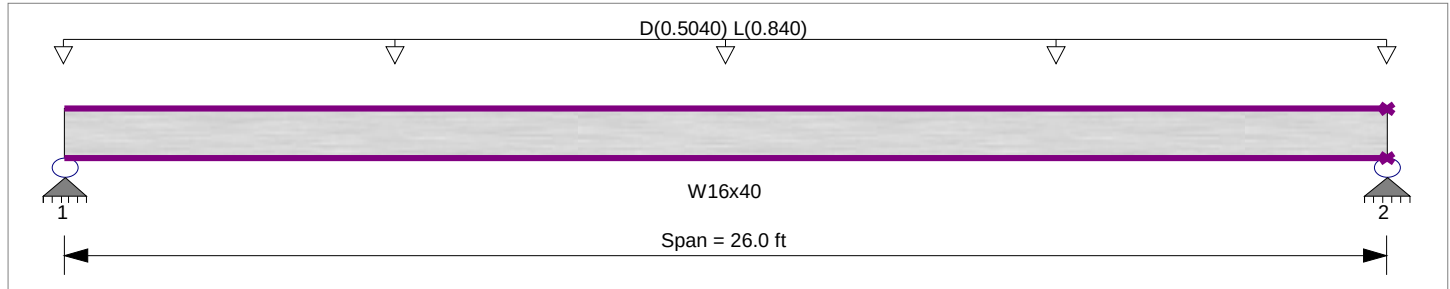
Analysis Method Load Resistance Factor Design

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 calculated and added to loading

Uniform Load : D = 0.060, L = 0.10 ksf, Tributary Width = 8.40 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =		0.616 : 1	Maximum Shear Stress Ratio =		0.177 : 1
Section used for this span		W16x40	Section used for this span		W16x40
Mu : Applied		168.730 k-ft	Vu : Applied		25.958 k
Mn * Phi : Allowable		273.750 k-ft	Vn * Phi : Allowable		146.40 k
Load Combination		+1.20D+1.60L	Load Combination		+1.20D+1.60L
Span # where maximum occurs		Span # 1	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		0.577 in	Ratio =	540	>=360
Max Upward Transient Deflection		0 in	Ratio =	0	<360
Max Downward Total Deflection		0.952 in	Ratio =	328	>=180
Max Upward Total Deflection		0 in	Ratio =	0	<180
					n/a
					n/a
					n/a
					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	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+1.40D													
Dsgn. L = 26.00 ft	1	0.235	0.068	64.36		64.36	304.17	273.75	1.00	1.00	9.90	146.40	146.40
+1.20D+1.60L													
Dsgn. L = 26.00 ft	1	0.616	0.177	168.73		168.73	304.17	273.75	1.00	1.00	25.96	146.40	146.40
+1.20D+0.50L													
Dsgn. L = 26.00 ft	1	0.331	0.095	90.65		90.65	304.17	273.75	1.00	1.00	13.95	146.40	146.40
+1.20D													
Dsgn. L = 26.00 ft	1	0.202	0.058	55.16		55.16	304.17	273.75	1.00	1.00	8.49	146.40	146.40
+0.90D													
Dsgn. L = 26.00 ft	1	0.151	0.043	41.37		41.37	304.17	273.75	1.00	1.00	6.36	146.40	146.40

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.9516	13.074		0.0000	0.000

Vertical Reactions

Support notation : Far left is #:

Values in KIPS

Load Combination	Support 1	Support 2		Support 1	Support 2
Max Upward from all Load Conditions	17.992	17.992	D Only	7.072	7.072
Max Upward from Load Combinations	17.992	17.992	+D+L	17.992	17.992
Max Upward from Load Cases	10.920	10.920	+D+0.750L	15.262	15.262
			+0.60D	4.243	4.243
			L Only	10.920	10.920

Steel Beam

Project File: Stairs Beams floor.ec6

LIC# : KW-06018621, Build:20.24.10.30

KPFF

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: W16x40 Bm (2)

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021

Load Combination Set : IBC 2021

Material Properties

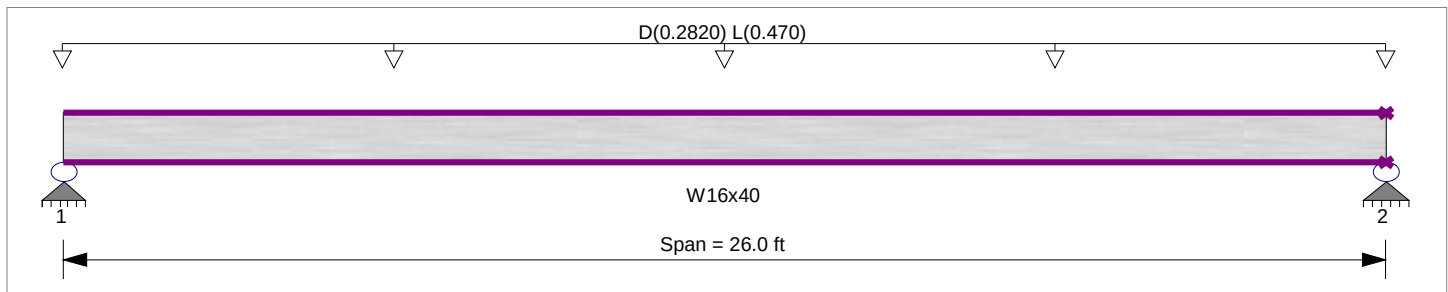
Analysis Method Load Resistance Factor Design

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 calculated and added to loading

Uniform Load : D = 0.060, L = 0.10 ksf, Tributary Width = 4.70 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =		0.351 : 1		Maximum Shear Stress Ratio =		0.101 : 1	
Section used for this span		W16x40		Section used for this span		W16x40	
Mu : Applied		96.195 k-ft		Vu : Applied		14.799 k	
Mn * Phi : Allowable		273.750 k-ft		Vn * Phi : Allowable		146.40 k	
Load Combination		+1.20D+1.60L		Load Combination		+1.20D+1.60L	
Span # where maximum occurs		Span # 1		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		0.323 in Ratio = 965		>=360		Span: 1 : L Only	
Max Upward Transient Deflection		0 in Ratio = 0		<360		n/a	
Max Downward Total Deflection		0.545 in Ratio = 573		>=180		Span: 1 : +D+L	
Max Upward Total Deflection		0 in Ratio = 0		<180		n/a	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.5446	13.074		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	10.296	10.296
Max Upward from Load Combinations	10.296	10.296
Max Upward from Load Cases	6.110	6.110
D Only	4.186	4.186
+D+L	10.296	10.296
+D+0.750L	8.769	8.769
+0.60D	2.512	2.512
L Only	6.110	6.110

Steel Beam

Project File: Stairs Beams floor.ec6

LIC# : KW-06018621, Build:20.24.10.30

KPFF

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: W16x40 Bm (3)

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021

Load Combination Set : IBC 2021

Material Properties

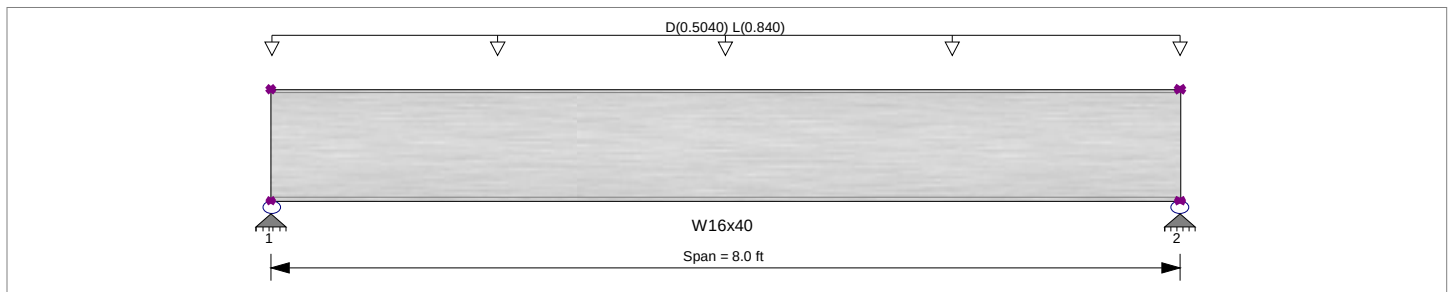
Analysis Method Load Resistance Factor Design

Beam Bracing : Completely Unbraced

Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi

E: Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors will be applied for calculations

Beam self weight calculated and added to loading

Uniform Load : D = 0.060, L = 0.10 ksf, Tributary Width = 8.40 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.058 : 1	Maximum Shear Stress Ratio =	0.055 : 1
Section used for this span	W16x40	Section used for this span	W16x40
Mu : Applied	15.974 k-ft	Vu : Applied	7.987 k
Mn * Phi : Allowable	273.750 k-ft	Vn * Phi : Allowable	146.40 k
Load Combination	+1.20D+1.60L	Load Combination	+1.20D+1.60L
		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	0.005 in	Ratio = 18,543	>=360
Max Upward Transient Deflection	0 in	Ratio = 0	<360
Max Downward Total Deflection	0.009 in	Ratio = 11255	>=180
Max Upward Total Deflection	0 in	Ratio = 0	<180
			Span: 1 : L Only
			n/a
			Span: 1 : +D+L
			n/a

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0085	4.023		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	5.536	5.536
Max Upward from Load Combinations	5.536	5.536
Max Upward from Load Cases	3.360	3.360
D Only	2.176	2.176
+D+L	5.536	5.536
+D+0.750L	4.696	4.696
+0.60D	1.306	1.306
L Only	3.360	3.360

Steel Beam with Torsional Loads

Project File: Stairs Bear

LIC# : KW-06018621, Build:20.24.10.30

KPFF

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: W18x106 Bm (4) w torsion**CODE REFERENCES**

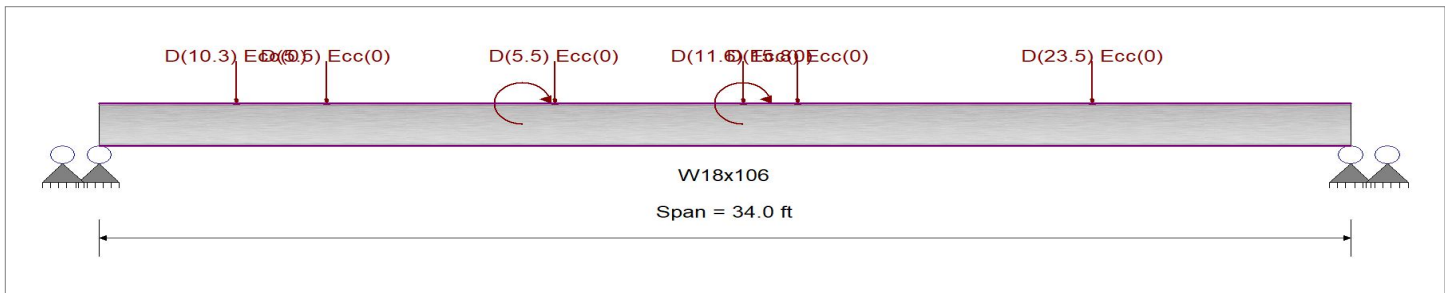
Calculations per AISC 360-16, IBC 2021

Load Combination Set : IBC 2021

Analysis Settings

Analysis Method : Load Resistance Factor Design
 Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
 Bending Axis : Major Axis Bending
 Load Combination IBC 2021

Fy : Steel Yield : 50.0 ksi
 E: Modulus : 29,000.0 ksi

**Applied Loads**

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
 Load(s) for Span Number 0
 Point Load : D = 10.30 k @ 3.750 ft
 Point Load : D = 5.50 k @ 6.20 ft

Moment : D = 5.0 k-ft, Loc = 11.50 ft in span, Torsional Load
 Point Load : D = 5.50 k @ 12.40 ft
 Point Load : D = 11.60 k @ 17.50 ft
 Moment : D = 5.0 k-ft, Loc = 17.50 ft in span, Torsional Load
 Point Load : D = 15.80 k @ 19.0 ft
 Point Load : D = 23.50 k @ 27.0 ft

DESIGN SUMMARY**Design OK**

Max. Flange Normal Stress Ratio =	0.881 : 1	Maximum Shear Stress Ratio =	0.368 : 1
Flange Normal Stress	44.71 ksi	Flange Shear Stress	11.04 ksi
Phi vn : Flange Normal Stress (Phi Mn/Sxx)	50.74 ksi	Web Shear Stress	11.20 ksi
Max Mu : Applied	547.49 k-ft	Vn * Phi : Allowable	30.00 ksi
Section used for this span	W18x106	Section used for this span	W18x106
Load Combination	+1.40D	Load Combination	+1.40D
Maximum Deflection		Maximum Rotation =	4.8069 deg at 15.91 ft
Max Download Transient Load Deflection	0.000 in	Max Downward Total Deflection	1.394 in
Ratio =	0 <360	Ratio =	292
Max Upward Transient Load Deflection	0.000 in	Max Upward Total Deflection	0.000 in
Ratio =	0 <360	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination	Max Stress	Bending Max		Flange Normal (ksi)			Flange Shear (ksi)			Web Shear (ksi)		
	Ratio	Mu (kft)	Vu (k)	Total	Allow	Ratio	Total	Allow	Ratio	Total	Allow	Ratio
+1.40D	0.881	547.49	55.17	44.710	50.735	0.881	11.041	30.000	0.368	11.196	30.000	0.373
+1.20D	0.755	469.27	47.29	38.323	50.735	0.755	9.464	30.000	0.315	9.597	30.000	0.320
+0.90D	0.567	351.96	35.47	28.742	50.735	0.567	7.098	30.000	0.237	7.198	30.000	0.240

Maximum Upward Deflections - Unfactored Loads

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
span_1	1	1.3939	17.408		0.0000	0.000

Vertical Reactions - Unfactored

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Combinations	36.395	39.409
Max Upward from Load Combinations	21.837	23.645
Max Upward from Load Cases	36.395	39.409
D Only	36.395	39.409
+0.60D	21.837	23.645

Steel Beam

Project File: Stairs Beams floor.ec6

LIC# : KW-06018621, Build:20.24.10.30

KPFF

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: W18x106 (4)

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021

Load Combination Set : IBC 2021

Material Properties

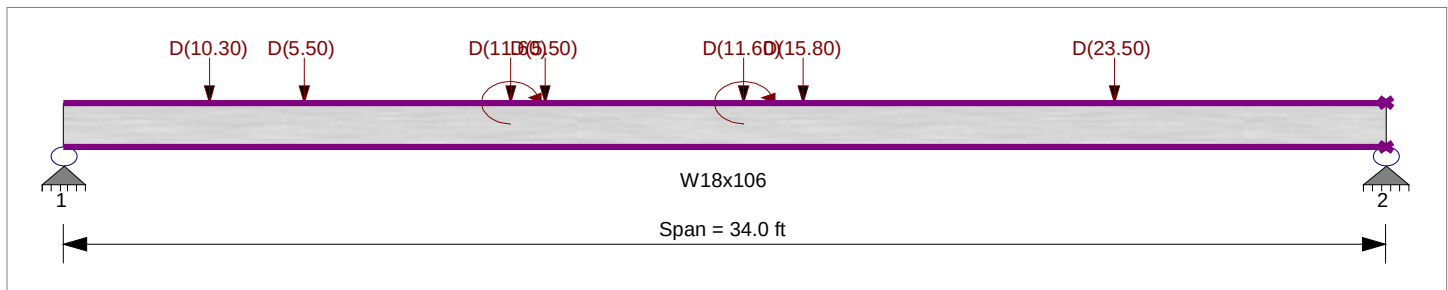
Analysis Method Load Resistance Factor Design

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 calculated and added to loading
 Load(s) for Span Number 1

Point Load : D = 10.30 k @ 3.750 ft

Point Load : D = 5.50 k @ 6.20 ft

Point Load : D = 11.60 k @ 11.50 ft

Moment : D = 5.0 k-ft, Loc = 11.50 ft in span

Point Load : D = 5.50 k @ 12.40 ft

Point Load : D = 11.60 k @ 17.50 ft

Moment : D = 5.0 k-ft, Loc = 17.50 ft in span

Point Load : D = 15.80 k @ 19.0 ft

Point Load : D = 23.50 k @ 27.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =

0.744 : 1

Maximum Shear Stress Ratio =

0.185 : 1

Section used for this span

W18x106

Section used for this span

W18x106

Mu : Applied

641.536 k-ft

Vu : Applied

61.289 k

Mn * Phi : Allowable

862.500 k-ft

Vn * Phi : Allowable

330.990 k

Load Combination

+1.40D

Load Combination

+1.40D

Span # where maximum occurs

Span # 1

Location of maximum on span

0.000 ft

Span # where maximum occurs

Span # 1

Maximum Deflection

Max Downward Transient Deflection

0 in Ratio =

0

<360

n/a

Max Upward Transient Deflection

0 in Ratio =

0

<360

n/a

Max Downward Total Deflection

1.652 in Ratio =

247

>=180

Span: 1 : D Only

Max Upward Total Deflection

0 in Ratio =

0

<180

n/a

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
D Only	1	1.6522	17.194		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	43.778	43.626
Max Upward from Load Combinations	26.267	26.176
Max Upward from Load Cases	43.778	43.626
D Only	43.778	43.626
+0.60D	26.267	26.176

www.hilti.com

Company:

Address:

Phone | Fax:

Design:

Fastening point:

Concrete - Jun 25, 2024

Page:

Specifier:

E-Mail:

Date:

1

2/12/2025

Specifier's comments:

1 Input data

Anchor type and diameter:

Item number:

Specification text:

Effective embedment depth:

Material:

Evaluation Service Report:

Issued | Valid:

Proof:

Shear edge breakout verification:

Stand-off installation:

Anchor plate^R:

Profile:

Base material:

Installation:

Reinforcement:

HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 Gr.36) 3/4

2198029 HAS-V-36 3/4"x8" (element) / 2334276 HIT-HY 200-R V3 (adhesive)

Hilti Ø 3/4 in HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 Gr.36) with 6 in nominal embedment depth per ICC-ES ESR-4868 , SAFEset - automatic cleaning installation per MPII

 $h_{ef,act} = 6.000$ in. ($h_{ef,limit} = -$ in.)

ASTM F1554 Grade 36

ESR-4868

6/1/2023 | 11/1/2024

Design Method ACI 318-19 / Chem

Row closest to edge (Case 3 only from ACI 318-19 Fig. R.17.7.2.1b)

 $e_b = 0.000$ in. (no stand-off); $t = 0.625$ in.

 $l_x \times l_y \times t = 12.000$ in. $\times$ 20.000 in. $\times$ 0.625 in.; (Recommended plate thickness: not calculated)

Rectangular plates and bars (AISC), 10 - 1/2; (L x W x T) = 10.000 in. $\times$ 0.500 in.

uncracked concrete, 4000, $f'_c = 4,000$ psi; $h = 24.000$ in., Temp. short/long: 32/32 °F

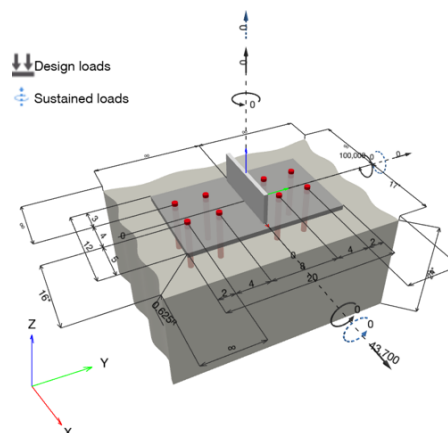
automatic cleaned drilled hole, Installation condition: Dry

tension: present, shear: present; no supplemental splitting reinforcement present

edge reinforcement: > No. 4 bar with stirrups


^R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]





project: Inglewood Library Renovation

sheet no.:

173

location: Inglewood, CA

job no.: 10012300277

client:

date: 02/15/2024

3. Concrete Beam Under Slab



Consulting Engineers

700 South Flower Street, Suite 2100
Los Angeles, CA 90017
(310) 418-0201

project MAIN LIBRARY RENOVATION

location CITY OF INGLEWOOD

client

by BG

date 02/14/20

job no.

10012300277

sheet no.

174 1

EXECUTIVE SUMMARY:

The City of Inglewood Main Library renovation project involves the installation of a new structural beam to enhance the building's load-bearing capacity and accommodate design modifications due to the inclusion of a new elevator shaft. The scope includes the removal of existing structural elements (beam and slab) and the installation of a reinforced concrete beam to ensure stability and compliance with building codes.

TOTAL LIVE LOAD: 100 psf



700 South Flower Street, Suite 2100
Los Angeles, CA 90017
(310) 418-0201

project MAIN LIBRARY RENOVATION

location CITY OF INGLEWOOD

client

by BG

date 02/14/20

job no.

10012300277

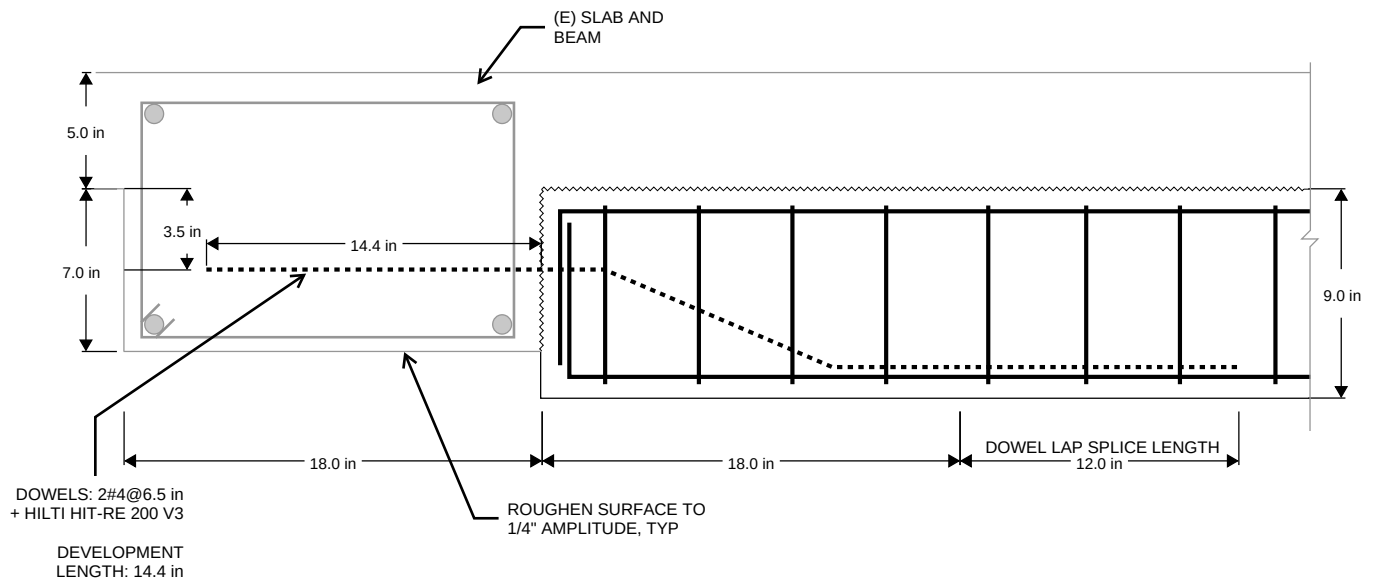
sheet no.

1764

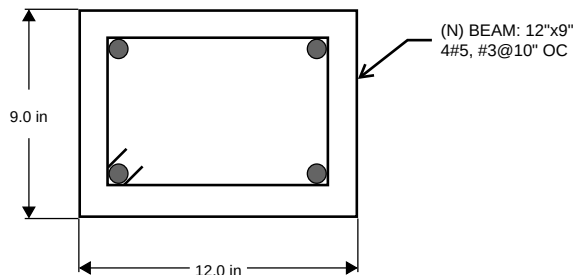
NEW CONCRETE BEAM AND CONNECTION TO EXISTING FRAME DESIGN:

The new concrete beam, part of the second floor framing renovation, was analyzed and designed utilizing ENERCALC, and Hilti PROFIS software for designing its connection/anchorage to existing framing. The frame was analyzed for both strength and deflection. The following pages provide a summary of the material properties, load cases, combinations and design results.

NEW CONCRETE BEAM AND CONNECTION DESIGN RESULTS:



12 NEW BEAM CONNECTION TO EXISTING BEAMS



13 NEW BEAM DETAIL

Concrete Beam

Project File: Inglewood Library - New Concrete Beam.ec6

LIC# : KW-06018621, Build:20.23.12.07

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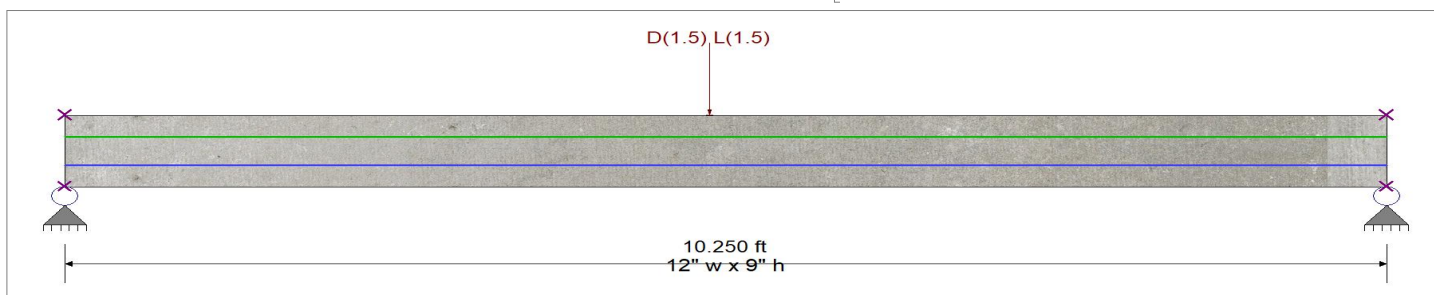
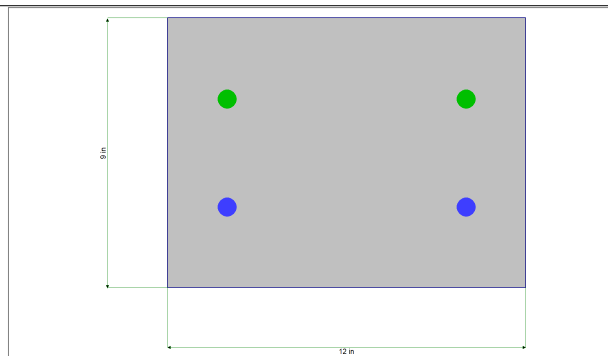
DESCRIPTION: New Concrete Beam - Second Floor (A-B/4-5)**CODE REFERENCES**

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : IBC 2021

General Information

f'_c	=	4.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2} \cdot 7.50$	=	474.342 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,605.0 ksi	Fy - Stirrups	=	40.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #	=	3
			Number of Resisting Legs Per Stirrup	=	2

**Cross Section & Reinforcing Details**

Rectangular Section, Width = 12.0 in, Height = 9.0 in

Span #1 Reinforcing....

2-#5 at 2.70 in from Bottom, from 0.0 to 10.250 ft in this span 2-#5 at 2.70 in from Top, from 0.0 to 10.250 ft in this span

Point Load : D = 1.50, L = 1.50 k @ 5.0 ft, (Existing Beam)

DESIGN SUMMARY**Design OK**

Maximum Bending Stress Ratio	=	0.561	: 1
Section used for this span		Typical Section	
Mu : Applied		10.749	k-ft
Mn * Phi : Allowable		19.170	k-ft
Location of maximum on span		5.004	ft
Span # where maximum occurs		Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.022 in	Ratio =	5565	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	L Only
Max Downward Total Deflection	0.051 in	Ratio =	2401	>=180.0	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio =	0	<180.0	Span: 1 : +D+L

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.537	1.463
Max Upward from Load Combinations	1.537	1.463
Max Upward from Load Cases	0.768	0.732
D Only	0.768	0.732
+D+L	1.537	1.463
+D+0.750L	1.345	1.280
+0.60D	0.461	0.439
L Only	0.768	0.732

Concrete Beam

Project File: Inglewood Library - New Concrete Beam.ec6

LIC# : KW-06018621, Build:20.23.12.07

KPFF

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DESCRIPTION: New Concrete Beam - Second Floor (A-B/4-5)**Shear Stirrup Requirements**Entire Beam Span Length : $V_u < \Phi V_c / 2$, Req'd Vs = Not Req'd per 9.6.3.1, Stirrups are not required.**Detailed Shear Information**

Load Combination	Span Number	Distance 'd' (ft)	(in)	Vu (k) Actual	(k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.20D+1.60L	1	0.00	6.30	2.15	2.15	0.00	1.00	7.98	$V_u < \Phi V_c / 2$ It Req'd per	8.0	8.0	0.0
+1.20D+1.60L	1	0.11	6.30	2.15	2.15	0.24	1.00	7.98	$V_u < \Phi V_c / 2$ It Req'd per	8.0	8.0	0.0
+1.20D+1.60L	1	0.22	6.30	2.15	2.15	0.48	1.00	7.98	$V_u < \Phi V_c / 2$ It Req'd per	8.0	8.0	0.0
+1.20D+1.60L	1	0.34	6.30	2.15	2.15	0.72	1.00	7.98	$V_u < \Phi V_c / 2$ It Req'd per	8.0	8.0	0.0
+1.20D+1.60L	1	0.45	6.30	2.15	2.15	0.96	1.00	7.98	$V_u < \Phi V_c / 2$ It Req'd per	8.0	8.0	0.0
+1.20D+1.60L	1	0.56	6.30	2.15	2.15	1.20	0.94	7.90	$V_u < \Phi V_c / 2$ It Req'd per	7.9	8.0	0.0
+1.20D+1.60L	1	0.67	6.30	2.15	2.15	1.45	0.78	7.72	$V_u < \Phi V_c / 2$ It Req'd per	7.7	8.0	0.0
+1.20D+1.60L	1	0.78	6.30	2.15	2.15	1.69	0.67	7.59	$V_u < \Phi V_c / 2$ It Req'd per	7.6	8.0	0.0
+1.20D+1.60L	1	0.90	6.30	2.15	2.15	1.93	0.59	7.49	$V_u < \Phi V_c / 2$ It Req'd per	7.5	8.0	0.0
+1.20D+1.60L	1	1.01	6.30	2.15	2.15	2.17	0.52	7.42	$V_u < \Phi V_c / 2$ It Req'd per	7.4	8.0	0.0
+1.20D+1.60L	1	1.12	6.30	2.15	2.15	2.41	0.47	7.36	$V_u < \Phi V_c / 2$ It Req'd per	7.4	8.0	0.0
+1.20D+1.60L	1	1.23	6.30	2.15	2.15	2.65	0.43	7.31	$V_u < \Phi V_c / 2$ It Req'd per	7.3	8.0	0.0
+1.20D+1.60L	1	1.34	6.30	2.15	2.15	2.89	0.39	7.27	$V_u < \Phi V_c / 2$ It Req'd per	7.3	8.0	0.0
+1.20D+1.60L	1	1.46	6.30	2.15	2.15	3.13	0.36	7.23	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	1.57	6.30	2.15	2.15	3.37	0.33	7.20	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	1.68	6.30	2.15	2.15	3.61	0.31	7.18	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	1.79	6.30	2.15	2.15	3.86	0.29	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	1.90	6.30	2.15	2.15	4.10	0.28	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	2.02	6.30	2.15	2.15	4.34	0.26	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	2.13	6.30	2.15	2.15	4.58	0.25	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	2.24	6.30	2.15	2.15	4.82	0.23	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	2.35	6.30	2.15	2.15	5.06	0.22	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	2.46	6.30	2.15	2.15	5.30	0.21	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	2.58	6.30	2.15	2.15	5.54	0.20	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	2.69	6.30	2.15	2.15	5.78	0.20	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	2.80	6.30	2.15	2.15	6.02	0.19	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	2.91	6.30	2.15	2.15	6.27	0.18	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	3.02	6.30	2.15	2.15	6.51	0.17	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	3.14	6.30	2.15	2.15	6.75	0.17	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	3.25	6.30	2.15	2.15	6.99	0.16	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	3.36	6.30	2.15	2.15	7.23	0.16	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	3.47	6.30	2.15	2.15	7.47	0.15	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	3.58	6.30	2.15	2.15	7.71	0.15	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	3.70	6.30	2.15	2.15	7.95	0.14	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	3.81	6.30	2.15	2.15	8.19	0.14	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	3.92	6.30	2.15	2.15	8.43	0.13	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	4.03	6.30	2.15	2.15	8.68	0.13	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	4.14	6.30	2.15	2.15	8.92	0.13	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	4.26	6.30	2.15	2.15	9.16	0.12	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	4.37	6.30	2.15	2.15	9.40	0.12	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	4.48	6.30	2.15	2.15	9.64	0.12	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	4.59	6.30	2.15	2.15	9.88	0.11	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	4.70	6.30	2.15	2.15	10.12	0.11	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	4.82	6.30	2.15	2.15	10.36	0.11	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	4.93	6.30	2.15	2.15	10.60	0.11	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	5.04	6.30	-2.05	2.05	10.67	0.10	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	5.15	6.30	-2.05	2.05	10.44	0.10	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	5.27	6.30	-2.05	2.05	10.21	0.11	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	5.38	6.30	-2.05	2.05	9.98	0.11	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	5.49	6.30	-2.05	2.05	9.75	0.11	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	5.60	6.30	-2.05	2.05	9.52	0.11	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	5.71	6.30	-2.05	2.05	9.30	0.12	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	5.83	6.30	-2.05	2.05	9.07	0.12	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	5.94	6.30	-2.05	2.05	8.84	0.12	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0
+1.20D+1.60L	1	6.05	6.30	-2.05	2.05	8.61	0.12	7.17	$V_u < \Phi V_c / 2$ It Req'd per	7.2	8.0	0.0

Concrete Beam

Project File: Inglewood Library - New Concrete Beam.ec6

LIC#: KW-06018621, Build:20.23.12.07

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DESCRIPTION: New Concrete Beam - Second Floor (A-B/4-5)**Detailed Shear Information**

Load Combination	Span Number	Distance 'd' (ft)	(in)	Vu (k) Actual	(k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.20D+1.60L	1	6.16	6.30	-2.05	2.05	8.38	0.13	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	6.27	6.30	-2.05	2.05	8.15	0.13	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	6.39	6.30	-2.05	2.05	7.92	0.14	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	6.50	6.30	-2.05	2.05	7.69	0.14	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	6.61	6.30	-2.05	2.05	7.46	0.14	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	6.72	6.30	-2.05	2.05	7.23	0.15	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	6.83	6.30	-2.05	2.05	7.00	0.15	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	6.95	6.30	-2.05	2.05	6.77	0.16	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	7.06	6.30	-2.05	2.05	6.54	0.16	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	7.17	6.30	-2.05	2.05	6.31	0.17	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	7.28	6.30	-2.05	2.05	6.08	0.18	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	7.39	6.30	-2.05	2.05	5.85	0.18	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	7.51	6.30	-2.05	2.05	5.62	0.19	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	7.62	6.30	-2.05	2.05	5.39	0.20	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	7.73	6.30	-2.05	2.05	5.16	0.21	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	7.84	6.30	-2.05	2.05	4.93	0.22	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	7.95	6.30	-2.05	2.05	4.70	0.23	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	8.07	6.30	-2.05	2.05	4.48	0.24	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	8.18	6.30	-2.05	2.05	4.25	0.25	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	8.29	6.30	-2.05	2.05	4.02	0.27	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	8.40	6.30	-2.05	2.05	3.79	0.28	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	8.51	6.30	-2.05	2.05	3.56	0.30	7.17	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	8.63	6.30	-2.05	2.05	3.33	0.32	7.19	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	8.74	6.30	-2.05	2.05	3.10	0.35	7.22	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	8.85	6.30	-2.05	2.05	2.87	0.37	7.25	Vu < Phi*Vc / 2	7.2	7.2	0.0
+1.20D+1.60L	1	8.96	6.30	-2.05	2.05	2.64	0.41	7.29	Vu < Phi*Vc / 2	7.3	7.3	0.0
+1.20D+1.60L	1	9.07	6.30	-2.05	2.05	2.41	0.45	7.33	Vu < Phi*Vc / 2	7.3	7.3	0.0
+1.20D+1.60L	1	9.19	6.30	-2.05	2.05	2.18	0.49	7.39	Vu < Phi*Vc / 2	7.4	7.4	0.0
+1.20D+1.60L	1	9.30	6.30	-2.05	2.05	1.95	0.55	7.45	Vu < Phi*Vc / 2	7.5	7.5	0.0
+1.20D+1.60L	1	9.41	6.30	-2.05	2.05	1.72	0.62	7.54	Vu < Phi*Vc / 2	7.5	7.5	0.0
+1.20D+1.60L	1	9.52	6.30	-2.05	2.05	1.49	0.72	7.65	Vu < Phi*Vc / 2	7.7	7.7	0.0
+1.20D+1.60L	1	9.63	6.30	-2.05	2.05	1.26	0.85	7.80	Vu < Phi*Vc / 2	7.8	7.8	0.0
+1.20D+1.60L	1	9.75	6.30	-2.05	2.05	1.03	1.00	7.98	Vu < Phi*Vc / 2	8.0	8.0	0.0
+1.20D+1.60L	1	9.86	6.30	-2.05	2.05	0.80	1.00	7.98	Vu < Phi*Vc / 2	8.0	8.0	0.0
+1.20D+1.60L	1	9.97	6.30	-2.05	2.05	0.57	1.00	7.98	Vu < Phi*Vc / 2	8.0	8.0	0.0
+1.20D+1.60L	1	10.08	6.30	-2.05	2.05	0.34	1.00	7.98	Vu < Phi*Vc / 2	8.0	8.0	0.0
+1.20D+1.60L	1	10.19	6.30	-2.05	2.05	0.11	1.00	7.98	Vu < Phi*Vc / 2	8.0	8.0	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination	Span #	Location (ft) along Beam	Bending Stress Results (k-ft)		
Segment			Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	10.250	10.75	19.17	0.56
+1.40D					
Span # 1	1	10.250	5.37	19.17	0.28
+1.20D+1.60L					
Span # 1	1	10.250	10.75	19.17	0.56
+1.20D+0.50L					
Span # 1	1	10.250	6.53	19.17	0.34
+1.20D					
Span # 1	1	10.250	4.61	19.17	0.24
+0.90D					
Span # 1	1	10.250	3.45	19.17	0.18

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+L	1	0.0512	5.125		0.0000	0.000



Consulting Engineers

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Los Angeles, CA 90017
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project MAIN LIBRARY RENOVATION

location CITY OF INGLEWOOD

client

by BG

date 02/14/20

job no.

10012300277

sheet no.

1808

Transverse Reinforcement

Using:

Longitudinal reinforcement: #5 Gr. 60 bars

Transverse reinforcement: #3 Gr. 60 bars

- ACI 318-16 (9.6.3.4)

$A_{v,min}/s = 0.01$

$A_{\#3} = 0.11 \text{ in}^2 \times 2 = 0.22 \text{ in}^2$

$S_{max} = 22 \text{ in}$

- ACI 318-16 (25.7.2.1)

$S_{max} = 10 \text{ in}$

Therefore, $S_{max} = 10 \text{ in}$

Transverse Reinforcement: #3 @ 10"


Hilti PROFIS Engineering 3.1.10
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Company:		Page:	1
Address:		Specifier:	
Phone Fax:		E-Mail:	
Design:	Rebar - Feb 4, 2025 (1)	Date:	12. 02. 2025
Rebar application:			

Specifier's comments:

1. Input data

General

Design standard	ACI 318
Calculation method	ACI 318-19
Post installed rebar approach	Overlay + Development
Loading type	Static


Product

Mortar	HIT-HY 200 V3
Connector	Rebar #4
Item number	2334276 HIT-HY 200-R V3 (adhesive)
Effective embedment depth	Existing concrete: $h_{ef,ex} = 14.400$ in.
Material	ASTM A615 Grade 60
Evaluation Service Report	ESR-4868
Issued	01. 06. 2023
Valid	01. 11. 2024
Proof	Design method ACI 318-19
Epoxy coated reinforcement	no

Material

Concrete material	Cracked concrete, 2500, $f_c' = 2,500$ psi;
Surface contact condition	Option (b)
Reinforcement	tension: not present
Steel strain limit	0.02

Installation and temperature

Temperature	During service: 32 °F / 32 °F (short / long term)
Installation	Hammer Drilling, Installation Condition: Dry Concrete



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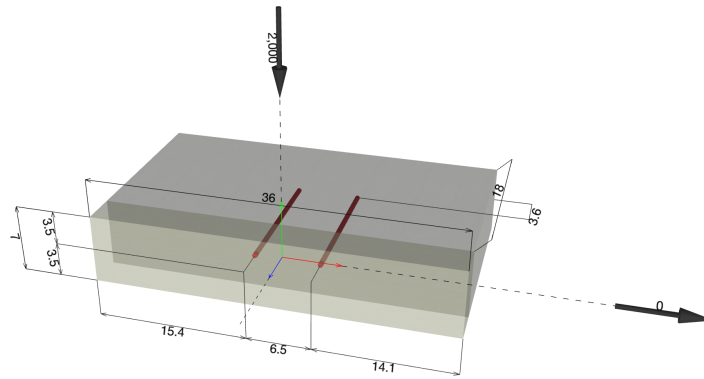
Date:

12. 02. 2025

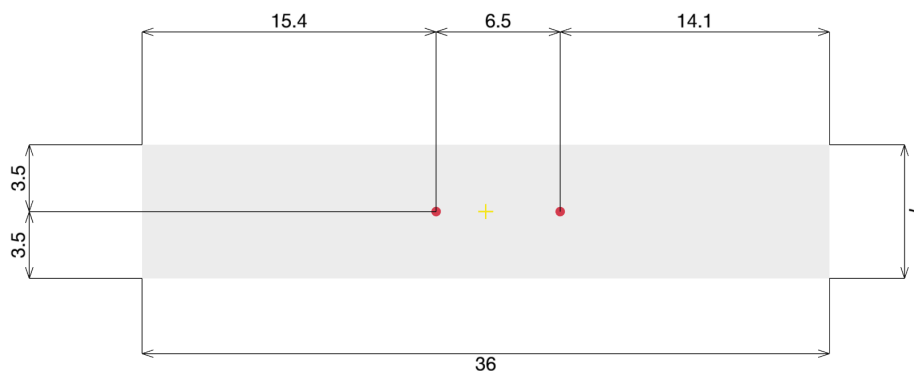
Rebar application:

1.1. Geometry & Loading

Geometrical dimensions in [in]. Loading values in [lb, in-lb]



1.2. Cross section view



Input data and results must be checked for conformity with the existing conditions and for plausibility!

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Design:	Rebar - Feb 4, 2025 (1)	Date:	12. 02. 2025
Rebar application:			

2. Loads and Cross section analysis

2.1. Load combinations

Case	Description	Forces [lb]	Load type	Max. Utilization [%]
1	Combination 1	$V_x = 0; V_y = -2,000;$	Static	12

3. Overview of results

3.1. References

[1] Building Code Requirements for Structural Concrete (ACI 318-19), Commentary on Building Code Requirements for Structural Concrete (ACI318R-19)

3.2. Shear strength verification for shear friction reinforcement ([1] Section 22.9)

User input

Description	Variable	Value
Rebar diameter	d_b	0.500 in
Reinforcement yield strength, post installed	$f_{y,PI}$	60,000 psi
Concrete type influence ([1] Table 19.2.4.1(b))	λ	1.000
Coefficient of friction depending on the surface roughness category ([1] Table 22.9.4.2(b))	$\mu = 1.0 \cdot \lambda$	1.000
Permanent net compression across the shear plane ([1] Section 22.9.4.5)	N_p	0 lb
Note: per [1] 22.9.4.6, net tension across the shear plane (permanent or temporary) requires additional reinforcement to resist the tensile force.		
Concrete compressive strength	f'_c	2,500 psi
Surface area of interface $l=36.000$ in $w=7.000$ in	A_c	252.00 in ²

Calculation of the required area of reinforcement

$$A_{vf,reqd} = \frac{V_u - \phi \cdot \mu \cdot N_p}{\phi \cdot \mu \cdot f_{y,PI}} \quad [1] \text{ Eq. (R22.9.4.2), Section 22.9.4.5}$$

Required area of reinforcement $A_{vf,reqd} = 0.04 \text{ in}^2$

Verification

Shear Strength	Load V_u	Capacity ϕV_n	Utilization $\frac{V_u}{\phi V_n}$	Status
	[lb]	[lb]	[%]	
	2,000	17,671	12	Ok
$\phi V_n \geq V_u$				[1] Eq. (22.9.3.1)
$V_n = \min(\mu \cdot A_{vf} \cdot f_{y,PI} + \mu \cdot N_p; V_{n,max})$				[1] Eq. (22.9.4.2) Section 22.9.4.5
$A_{vf} = n \cdot \frac{\pi \cdot d_b^2}{4}$				
$V_{n,max} = \min(0.2 \cdot f'_c \cdot A_c; (480 + 0.08 \cdot f'_c) \cdot A_c; 1600 \cdot A_c)$				[1] Table 22.9.4.4

Input data and results must be checked for conformity with the existing conditions and for plausibility!

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Rebar application:			

Variables

d_b [in]	$f_{y,PI}$ [psi]	λ	μ	N_p [lb]	f'_c [psi]	A_c [in ²]
0.500	60,000	1.000	1.000	0	2,500	252.00
n [-]						
2						

Calculations

A_{vf} [in ²]	$\mu \cdot A_{vf} \cdot f_{y,PI}$ [lb]	$\mu \cdot N_p$ [lb]
0.39	23,562	-
$0.2 \cdot f'_c \cdot A_c$ [lb]	$(480 + 0.08 \cdot f'_c) \cdot A_c$ [lb]	$1600 \cdot A_c$ [lb]
126,000	171,360	403,200

Results

$V_{n,max}$ [lb]	V_n [lb]	ϕ	ϕV_n [lb]	V_u [lb]
126,000	23,562	0.750	17,671	2,000

3.3. Development length ([1] Section 25.4.2)
User input

Description	Variable	Value
Rebar diameter	d_b	0.500 in
User-defined steel over-strength factor	Ω_{fy}	1.00
Reinforcement yield strength, post installed	$\Omega_{fy} \cdot f_{y,PI}$	60,000 psi
Concrete type influence ([1] Table 25.4.2.5)	λ	1.000
Concrete compressive strength	f'_c	2,500 psi
Transverse reinforcement effect ([1] 25.4.2.4)	K_{tr}	4.400 in
Rebar coating ([1] Table 25.4.2.5)		no
Excess reinforcement ([1] 25.4.10.1)	$\frac{A_{s,req}}{A_{s,prov}}$	1.000
Development length multiplier	ξ	1.000

Input data and results must be checked for conformity with the existing conditions and for plausibility!

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Development length l_d in tension

$$l_{inst} = \xi \cdot l_d$$

$$l_d = \left(\frac{3}{40} \cdot \frac{f_y}{\lambda \cdot \sqrt{f'_c}} \cdot \frac{\psi_t \cdot \psi_e \cdot \psi_s \cdot \psi_g}{\left(\frac{c_b + K_{tr}}{d_b} \right)} \right) \cdot d_b \geq 12 \text{ in} \quad [1] \text{ Eq. (25.4.2.4a)}$$

$$\frac{(c_b + K_{tr})}{d_b} \leq 2.5$$

$$\psi_t \leq 1.7 \quad [1] \text{ Table 25.4.2.5}$$

$$\psi_e \leq 1.7 \quad [1] \text{ Table 25.4.2.5}$$

$$\psi_t \cdot \psi_e \leq 1.7 \quad [1] \text{ footnote Table 25.4.2.5}$$

$$\psi_s \leq 1.7 \quad [1] \text{ Table 25.4.2.5}$$

$$\psi_g \leq 1.7 \quad [1] \text{ Table 25.4.2.5}$$

$$K_{tr} = \frac{40 A_{tr}}{s \cdot n} \quad [1] \text{ Eq. (25.4.2.4b)}$$

Variables

d_b [in]	$f_{y,PI}$ [psi]	f'_c [psi]	λ [-]	c_b [in]	s_b [in]	K_{tr} [in]
0.500	60,000	2,500	1.000	3.250	3.250	4.400
A_{tr} [in ²]						n [-]
0.11						1

Calculations

$\left(\frac{c_b + K_{tr}}{d_b} \right)$ [-]	ψ_t [-]	ψ_e [-]	$\psi_t \cdot \psi_e$ [-]	ψ_s [-]	ψ_g [-]
2.500	1.000	1.000	1.000	0.800	1.000

Results

$l_{d,base}$ [in]	$\frac{A_{s,req}}{A_{s,prov}}$ [-]	$l_{d,base} \cdot \frac{A_{s,req}}{A_{s,prov}}$ [-]	l_d [in]	$\xi \cdot l_d$ [in]	l_{inst} [in]
14.400	1.000	14.400	14.400	14.400	14.400

4. Warnings

This design exclusively considers the local load transfer in the considered interface between new and existing concrete.

The joint surfaces for concreting must be roughened to fulfil the design assumption.

The capacity of the cross-section has to be designed separately.

The installation (drilling, cleaning, setting) must be according to the approval!

Restraint (cracking) forces at the perimeter are not taken into account. The designer should consider alternate measures to counteract possible delaminating of the overlay due to contact shrinkage. EOTA Technical Reports TR066 provides guidance on a method of considering these forces.

Interface meets the design criteria!

Input data and results must be checked for conformity with the existing conditions and for plausibility!

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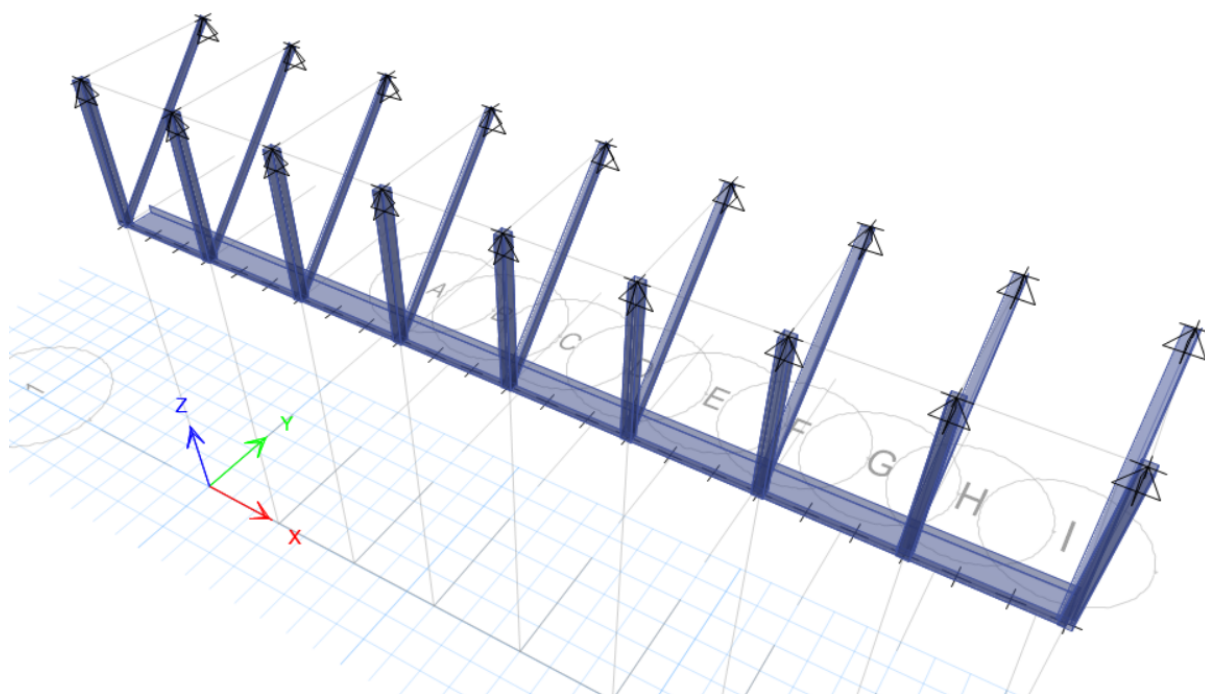
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client:

date: 07/05/2024

4. Wall Partition Hang Connection

ETABS[®]



Summary Report

Model File: Wall Partition, Revision 0
2/14/2025

1 Structure Data

This chapter provides model geometry information, including items such as story levels, point coordinates, and element connectivity.

1.1 Story Data

Table 1.1 - Story Definitions

Tower	Name	Height ft	Master Story	Similar To	Splice Story	Color
T1	Story2	4	Yes	None	No	Red
T1	Story1	10	No	Story2	No	Magenta

2 Loads

This chapter provides loading information as applied to the model.

2.1 Load Patterns

Table 2.1 - Load Pattern Definitions

Name	Is Auto Load	Type	Self Weight Multiplier	Auto Load
~LLRF	Yes	Other	0	
Dead	No	Dead	1	
Live	No	Live	0	
Static X	No	Seismic	0	None
Static Y	No	Seismic	0	None

2.2 Load Cases

Table 2.2 - Load Case Definitions - Summary

Name	Type
Dead	Linear Static
Live	Linear Static
Modal	Modal - Eigen
Static X	Linear Static
Static Y	Linear Static

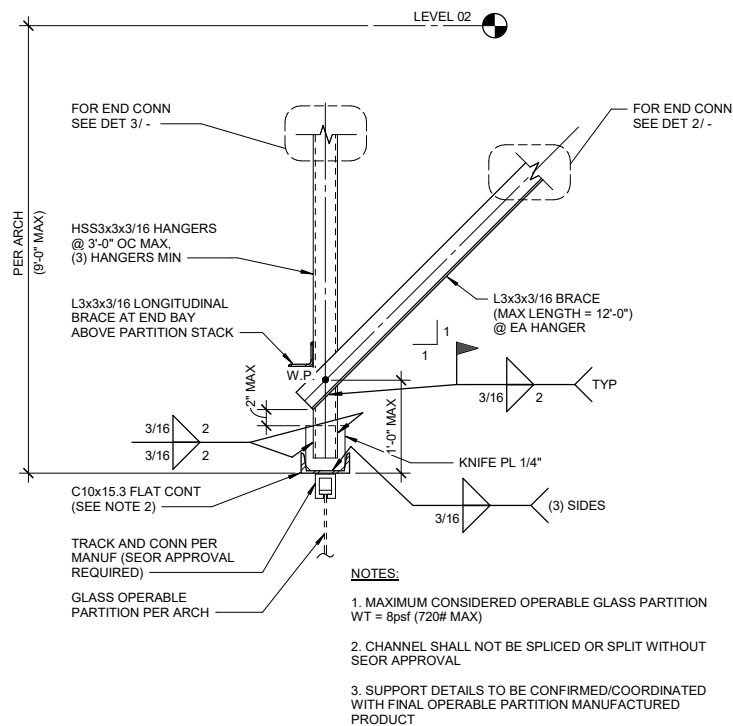
3 Analysis Results

This chapter provides analysis results.

3.1 Structure Results

Table 3.1 - Base Reactions

Output Case	Case Type	Step Type	FX lb	FY lb	FZ lb	MX lb-ft	MY lb-ft	MZ lb-ft	X ft	Y ft	Z ft
Dead	LinStatic		0	0	3906.22	377.67	-12554.69	0	0	0	0
Live	LinStatic		0	0	480	0	-5760	0	0	0	0
Static X	LinStatic		-1810	0	0	0	-18100	0	0	0	0
Static Y	LinStatic		0	-1810	0	18100	0	-1810	0	0	0
UDSttS1	Combination		0	0	5468.71	528.73	-17576.57	0	0	0	0
UDSttS2	Combination		0	0	5455.47	453.2	-24281.63	0	0	0	0
UDSttS3	Combination		-1810	0	5558.09	490.97	-40181.1	0	0	0	0
UDSttS4	Combination		1810	0	5558.09	490.97	-3981.1	0	0	0	0
UDSttS5	Combination		0	-1810	5558.09	18590.97	-22081.1	-1810	0	0	0
UDSttS6	Combination		0	1810	5558.09	-17609.03	-22081.1	1810	0	0	0
UDSttS7	Combination		-1810	0	3124.98	302.13	-28143.76	0	0	0	0
UDSttS8	Combination		1810	0	3124.98	302.13	8056.24	0	0	0	0
UDSttS9	Combination		0	-1810	3124.98	18402.13	-10043.76	-1810	0	0	0
UDSttS10	Combination		0	1810	3124.98	-17797.87	-10043.76	1810	0	0	0
UDSttD1	Combination		0	0	3906.22	377.67	-12554.69	0	0	0	0
UDSttD2	Combination		0	0	4386.22	377.67	-18314.69	0	0	0	0
Envelope	Combination	Max	1810	1810	5558.09	18590.97	8056.24	1810	0	0	0
Envelope	Combination	Min	-1810	-1810	3124.98	-17797.87	-40181.1	-1810	0	0	0



1 GLASS OPERABLE PARTITION

SCALE: 1" = 1'-0"

1 Design Data

This chapter provides design data and results.

1.1 Steel Frame Design

Table 1.1 - Steel Frame Design Preferences - AISC 360-16

Item	Value
Multi-Response Design	Step-by-Step - All
Frame Type	OMF
Seismic Design Category	D
Importance Factor	1
Design System Rho	1
Design System Sds	0.5
Design System R	8
Design System Omega0	3
Design System Cd	5.5
Design Provision	LRFD
Analysis Method	Direct Analysis
Second Order Method	General 2nd Order
Stiffness Reduction Method	Tau-b Fixed
Add Notional Load Case	No
Beta Factor	1.3
Beta Omega Factor	1.6
Phi (Bending)	0.9
Phi (Compression)	0.9
Phi (Tension-Yielding)	0.9
Phi (Tension-Fracture)	0.75
Phi (Shear)	0.9
Phi (Shear-Short Webbed Rolled I)	1
Phi (Torsion)	0.9
Ignore Seismic Code?	No
Ignore Special Seismic Load?	No
Doubler Plate Plug-Welded?	Yes
HSS Welding Type	ERW
Reduced HSS Thickness	No
Consider Deflection?	Yes
DL Ratio	120
SDL+LL Ratio	120
LL Ratio	360
Total Ratio	240
Total Camber Limit	240
Pattern Live Load Factor	0.75
D/C Ratio Limit	0.95
Maximum Iterations	1

Table 1.3 - Steel Column Envelope - AISC 360-16 (Part 1 of 2)

UniqueName	Story	Label	Section	Moment Interaction Check	PMM Combo	V22 Ratio	V33 Ratio	Section Class
6	Story2	C1	HSS3X3X3/16	$0.752 = 0.752 + 0 + 0$	Envelope	0.015	0	Non-Compact
1	Story2	C2	HSS3X3X3/16	$0.481 = 0.481 + 0 + 0$	Envelope	0.014	0	Non-Compact
3	Story2	C3	HSS3X3X3/16	$0.116 = 0.001 + 0.115 + 0$	Envelope	0.009	0	Non-Compact
5	Story2	C5	HSS3X3X3/16	$0.124 = 0.001 + 0.122 + 0$	Envelope	0.01	0	Non-Compact
8	Story2	C6	HSS3X3X3/16	$0.121 = 0.001 + 0.12 + 0$	Envelope	0.01	0	Non-Compact
10	Story2	C14	HSS3X3X3/16	$0.121 = 0.001 + 0.12 + 0$	Envelope	0.01	0	Non-Compact
12	Story2	C15	HSS3X3X3/16	$0.12 = 0.001 + 0.119 + 0$	Envelope	0.009	0	Non-Compact
15	Story2	C16	HSS3X3X3/16	$0.126 = 0.001 + 0.124 + 0$	Envelope	0.01	0	Non-Compact
17	Story2	C17	HSS3X3X3/16	$0.1 = 0.003 + 0.097 + 0$	Envelope	0.008	0	Non-Compact

Table 1.4 - Steel Beam Envelope - AISC 360-16

Story	Label	UniqueName	Section	Moment Interaction Check	PMM Combo	V22 Ratio	V33 Ratio	Section Class	Conn. V I-End lb	Conn. V J-End lb
Story1	B7	19	C10X15.3	$0.57 = 0.247 + 0.043 + 0.28$	Envelope	0.017	0.05	Slender	0	0

Table 1.5 - Steel Brace Envelope - AISC 360-16

Story	Label	UniqueName	Design Section	Moment Interaction Check	PMM Combo	V22 Ratio	V33 Ratio	Section Class	Conn. P I-End lb	Conn. P J-End lb
Story2	D7	13	L3X3X3/16	$0.099 = 0.088 + 0.005 + 0.006$	Envelope	0.001	0	Slender	-1611.77	-1611.77
Story2	D8	2	L3X3X3/16	$0.06 = 0.049 + 0.005 + 0.006$	Envelope	0.001	0	Slender	1008.17	1008.17
Story2	D9	4	L3X3X3/16	$0.025 = 0.014 + 0.005 + 0.006$	Envelope	0.001	0	Slender	-260.45	-260.45
Story2	D11	7	L3X3X3/16	$0.013 = 0.002 + 0.005 + 0.006$	Envelope	0.001	0	Slender	104.73	104.73
Story2	D12	9	L3X3X3/16	$0.013 = 0.002 + 0.005 + 0.006$	Envelope	0.001	0	Slender	60.79	60.79
Story2	D14	11	L3X3X3/16	$0.011 = 3.098E-04 + 0.005 + 0.006$	Envelope	0.001	0	Slender	19.39	19.39
Story2	D15	14	L3X3X3/16	$0.012 = 0.001 + 0.005 + 0.006$	Envelope	0.001	0	Slender	-24.39	-24.39
Story2	D16	16	L3X3X3/16	$0.013 = 0.002 + 0.005 + 0.006$	Envelope	0.001	0	Slender	44.06	44.06
Story2	D17	18	L3X3X3/16	$0.012 = 0.001 + 0.005 + 0.006$	Envelope	0.001	0	Slender	-28.22	-28.22

Table 1.6 - Steel Frame Design Summary - AISC 360-16 (Part 1 of 2)

UniqueName	Story	Label	Design Type	Design Section	Status	PMM Combo	PMM Ratio	P Ratio	M Major Ratio
6	Story2	C1	Column	HSS3X3X3/16	No Message	(T)	0.752	0.752	0
1	Story2	C2	Column	HSS3X3X3/16	No Message	(T)	0.481	0.481	0
3	Story2	C3	Column	HSS3X3X3/16	No Message	Envelope(C)	0.116	0.001	0.115
3	Story2	C3	Column	HSS3X3X3/16	No Message	Envelope(T)	0	0	0
5	Story2	C5	Column	HSS3X3X3/16	No Message	(T)	0.124	0.001	0.122
8	Story2	C6	Column	HSS3X3X3/16	No Message	(T)	0.121	0.001	0.12
10	Story2	C14	Column	HSS3X3X3/16	No Message	(T)	0.121	0.001	0.12
12	Story2	C15	Column	HSS3X3X3/16	No Message	(T)	0.12	0.001	0.119
15	Story2	C16	Column	HSS3X3X3/16	No Message	UDStIS8(C)	0.122	0.0003991	0.121
15	Story2	C16	Column	HSS3X3X3/16	No Message	UDStIS8(T)	0.126	0.001	0.124
17	Story2	C17	Column	HSS3X3X3/16	No Message	UDStIS7(C)	0.088	0.002	0.085
17	Story2	C17	Column	HSS3X3X3/16	No Message	UDStIS7(T)	0.1	0.003	0.097
19	Story1	B7	Beam	C10X15.3	Warning: See Message	Envelope(C)	0.57	0.247	0.043
19	Story1	B7	Beam	C10X15.3	Warning: See Message	Envelope(T)	0.324	0.0004721	0.049
13	Story2	D7	Brace	L3X3X3/16	No Message	Envelope(C)	0.099	0.088	0.005
13	Story2	D7	Brace	L3X3X3/16	No Message	Envelope(T)	0.043	0.032	0.005
2	Story2	D8	Brace	L3X3X3/16	No Message	Envelope(C)	0.06	0.049	0.005
2	Story2	D8	Brace	L3X3X3/16	No Message	Envelope(T)	0.031	0.02	0.005
4	Story2	D9	Brace	L3X3X3/16	No Message	Envelope(C)	0.025	0.014	0.005
4	Story2	D9	Brace	L3X3X3/16	No Message	Envelope(T)	0.011	0.001	0.005
7	Story2	D11	Brace	L3X3X3/16	No Message	Envelope(C)	0.013	0.002	0.005
7	Story2	D11	Brace	L3X3X3/16	No Message	Envelope(T)	0.012	0.002	0.005
9	Story2	D12	Brace	L3X3X3/16	No Message	Envelope(C)	0.013	0.002	0.005
9	Story2	D12	Brace	L3X3X3/16	No Message	Envelope(T)	0.011	0.000258	0.005
11	Story2	D14	Brace	L3X3X3/16	No Message	Envelope(C)	0.011	0.0003098	0.005
11	Story2	D14	Brace	L3X3X3/16	No Message	Envelope(T)	0.011	0	0.005
14	Story2	D15	Brace	L3X3X3/16	No Message	Envelope(C)	0.012	0.001	0.005
14	Story2	D15	Brace	L3X3X3/16	No Message	Envelope(T)	0.011	0.0002493	0.005
16	Story2	D16	Brace	L3X3X3/16	No Message	Envelope(C)	0.013	0.002	0.005
16	Story2	D16	Brace	L3X3X3/16	No Message	Envelope(T)	0.011	0.001	0.005
18	Story2	D17	Brace	L3X3X3/16	No Message	Envelope(C)	0.012	0.001	0.005
18	Story2	D17	Brace	L3X3X3/16	No Message	Envelope(T)	0.011	0.0003258	0.005

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Company:		Specifier:	
Address:		E-Mail:	
Phone Fax:		Date:	10/18/2024
Design:	Concrete - Oct 17, 2024		
Fastening point:			

Specifier's comments:

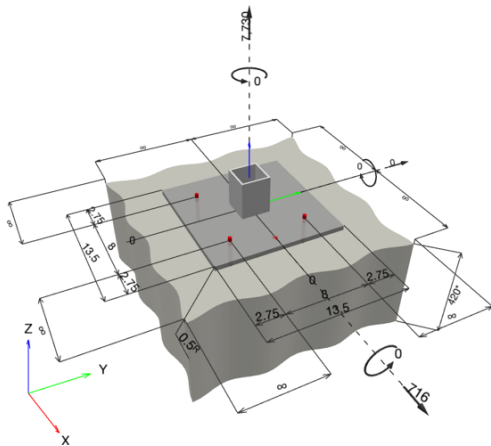
1 Input data

Anchor type and diameter:	Kwik Bolt TZ2 - SS 316 3/8 (2 1/2) hnom3
Item number:	2210251 KB-TZ2 3/8x5 SS316
Specification text:	Hilti KB-TZ2 stud anchor with 3 in embedment, 3/8 (2 1/2) hnom3, Stainless steel, installation per ESR-4266
Effective embedment depth:	$h_{ef,act} = 2.500$ in., $h_{nom} = 3.000$ in.
Material:	AISI 316
Evaluation Service Report:	ESR-4266
Issued Valid:	12/1/2023 12/1/2025
Proof:	Design Method ACI 318-19 / Mech
Stand-off installation:	$e_b = 0.000$ in. (no stand-off); $t = 0.500$ in.
Anchor plate ^R :	$l_x \times l_y \times t = 13.500$ in. x 13.500 in. x 0.500 in.;
Profile:	Square HSS (AISC), HSS3X3X.1875; (L x W x T) = 3.000 in. x 3.000 in. x 0.188 in.
Base material:	cracked concrete, 4000, $f_c' = 4,000$ psi; $h = 420.000$ in.
Installation:	diamond cored hole, Installation condition: Water saturated
Reinforcement:	tension: not present, shear: not present; no supplemental splitting reinforcement present edge reinforcement: > No. 4 bar with stirrups
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))



^R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



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1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 7,730; V _x = 716; V _y = 0; M _x = 0; M _y = 0; M _z = 0;	yes	94

2 Load case/Resulting anchor forces

Anchor reactions [lb]

Tension force: (+Tension, -Compression)

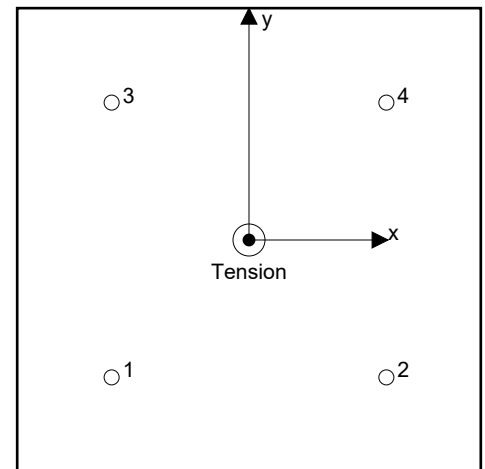
Anchor	Tension force	Shear force	Shear force x	Shear force y
1	1,932	179	179	0
2	1,932	179	179	0
3	1,932	179	179	0
4	1,932	179	179	0

Max. concrete compressive strain: - [%]

Max. concrete compressive stress: - [psi]

Resulting tension force in (x/y)=(0.000/0.000): 7,730 [lb]

Resulting compression force in (x/y)=(-/-): 0 [lb]



Anchor forces are calculated based on the assumption of a rigid anchor plate.

3 Tension load

	Load N _{ua} [lb]	Capacity ϕN_n [lb]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	1,932	4,637	42	OK
Pullout Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Failure**	7,730	8,287	94	OK

* highest loaded anchor **anchor group (anchors in tension)

4 Shear load

	Load V _{ua} [lb]	Capacity ϕV_n [lb]	Utilization $\beta_V = V_{ua}/\phi V_n$	Status
Steel Strength*	179	3,177	6	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength**	716	23,800	4	OK
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

* highest loaded anchor **anchor group (relevant anchors)

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Company:		Page:	6
Address:		Specifier:	
Phone Fax:		E-Mail:	
Design:	Concrete - Oct 17, 2024	Date:	10/18/2024
Fastening point:			

5 Combined tension and shear loads, per ACI 318-19 section 17.8

β_N	β_V	ζ	Utilization β_{NV} [%]	Status
0.933	0.056	1.000	83	OK

$$\beta_{NV} = (\beta_N + \beta_V) / 1.2 \leq 1$$

7 Anchor plate and concrete bearing stress check

	Load	Capacity	Utilization [%]	Status
Concentric Compression	N/A	N/A	N/A	N/A
Concrete bearing	N/A	N/A	N/A	N/A
Tension Interface	966.25 [in.lb/in.]	2,025.00 [in.lb/in.]	48	OK
Uniaxial Moment (Strong Axis)	N/A	N/A	N/A	N/A
Uniaxial Moment (Weak Axis)	N/A	N/A	N/A	N/A

8 Installation data

Profile: Square HSS (AISC), HSS3X3X.1875; (L x W x T) = 3.000 in. x 3.000 in. x 0.188 in.

Hole diameter in the fixture: $d_f = 0.438$ in.

Plate thickness (input): 0.500 in.

Drilling method: Core drilled

Cleaning: Manual cleaning of the drilled hole according to instructions for use is required.

Anchor type and diameter: Kwik Bolt TZ2 - SS 316 3/8 (2 1/2) hnom3

Item number: 2210251 KB-TZ2 3/8x5 SS316

Maximum installation torque: 361 in.lb

Hole diameter in the base material: 0.375 in.

Hole depth in the base material: 3.250 in.

Minimum thickness of the base material: 5.000 in.

Hilti KB-TZ2 stud anchor with 3 in embedment, 3/8 (2 1/2) hnom3, Stainless steel, installation per ESR-4266



project: Inglewood Library Renovation

sheet no.:

196

location: Inglewood, CA

job no.: 10012300277

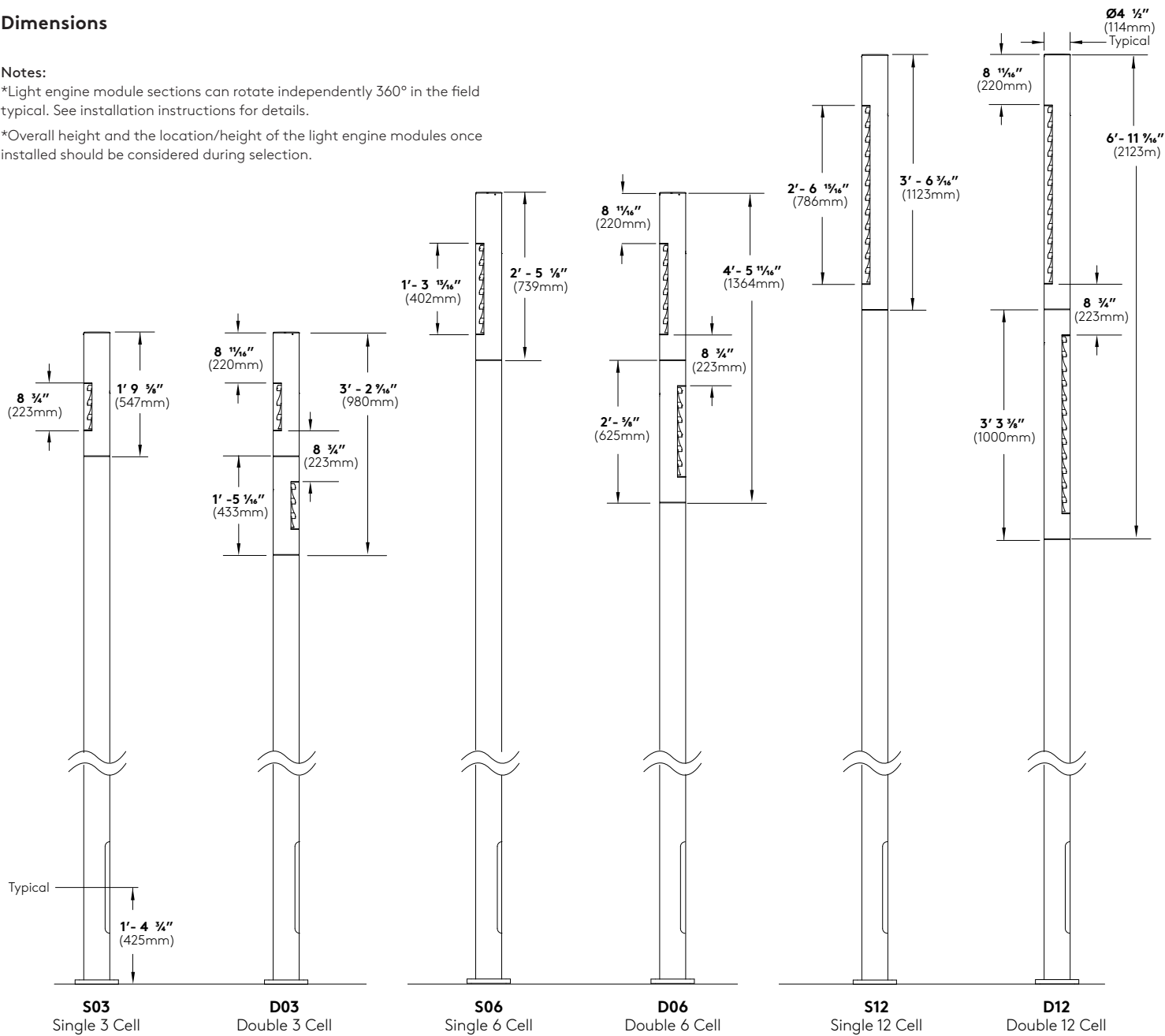
client:

date: 02/15/2025

5. Pedestal Light Pole Connection

Dimensions

Notes:
*Light engine module sections can rotate independently 360° in the field typical. See installation instructions for details.
*Overall height and the location/height of the light engine modules once installed should be considered during selection.



Maximum Wind Speeds

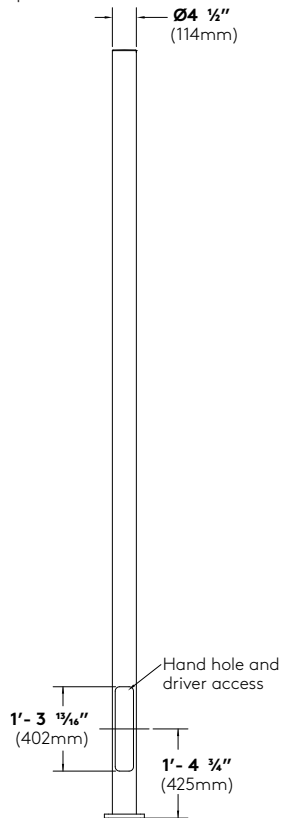
Line Black Round Column - Maximum Basic Wind Speed	
Overall Column Height	AASHTO 2013 Max Basic Wind Speed
10ft	180mph
12ft	180mph
14ft	180mph
16ft	140mph
18ft	100mph

- Notes:
1. Maximum EPA ratings certified in accordance with AASHTO 2013 (LTS-6) for 3-s gust wind speeds based on Allowable Stress Design (ASD) analysis.
 2. Consult factory for equivalent Load and Resistance Factor Design (LRFD) wind speeds.
 3. Rated performance is dependant upon the pole being properly attached to a supporting foundation of adequate design.

Mounting Information

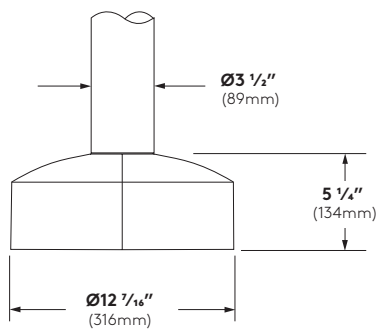
Column Information

Refer to Pages 2 and 3 for column height and wind speed options.



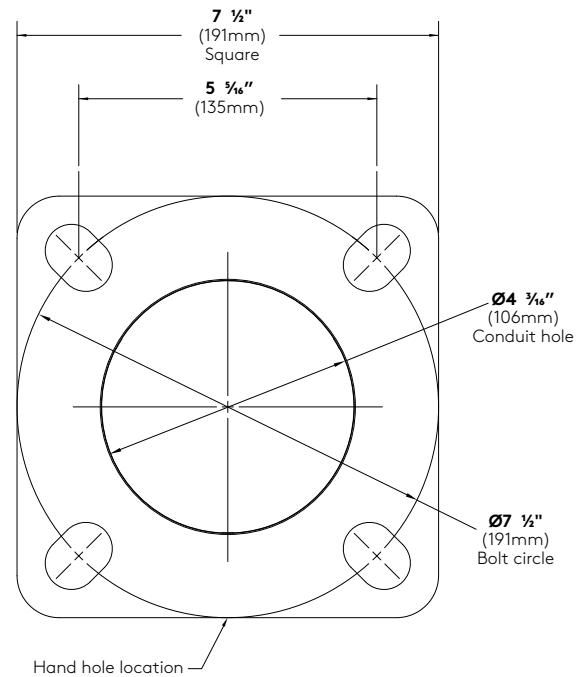
Standard Base Cover (BC)

Die cast aluminum, two piece field installable base cover.



Standard External Base Plate

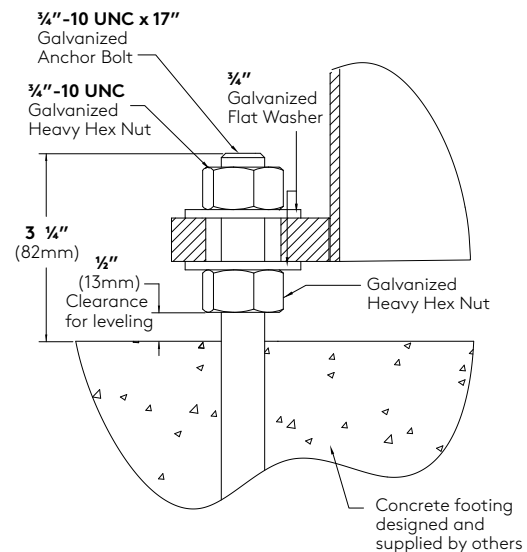
Comes with standard Base Cover (BC) to accessorize external base plate. For options without visible External Base Plate or Base Cover, see page 5.



Bolt Circle Detail (not to scale)

Use caution when setting anchor bolts. Bolt must be vertically straight and centered on dimensions shown.

Adequate drainage must be provide in concrete foundation or grout.



Concrete Column

Project File: Elevator shaft.ec6

LIC# : KW-06018621, Build:20.24.10.30

KPFF

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Light Pole Pedestal

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019
 Load Combinations Used : ASCE 7-22 / IBC 2024 (L<=100psf)

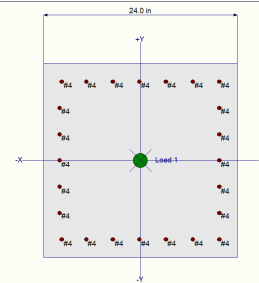
General Information

f'c : Concrete 28 day streng	=	3 ksi	Overall Column Height	=	2.0 ft
E =	=	3122 ksi	End Fixity	=	Top Free, Bottom Fixed
Density	=	150 pcf	Brace condition for deflection (buckling) along color		
β	=	0.850	X-X (width) axis :		
fy - Main Rebar	=	60 ksi	Fully braced against buckling ABOUT Y-Y Axis		
E - Main Rebar	=	29000 ksi	Y-Y (depth) axis :		
Allow. Reinforcing Limits		ASTM A615 Bars Used	Fully braced against buckling ABOUT Y-Y Axis		
Min. Reinf.	=	0.50 %			
Max. Reinf.	=	6.0 %			

Column Cross Section

Column Dimensions : 24.0in Square Column, Column
 Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #4 bars @ corners,, 5 - #4 bars
 top & bottom between corner bars, 5
 - #4 bars left & right between corner



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 1,200.0 lbs * Dead Load Factor
 AXIAL LOADS . . .
 Axial Load at 2.0 ft above base, D = 10.0, L = 5.0, W = 1.70 k

DESIGN SUMMARY

Load Combination	+1.20D+1.60L	Maximum SERVICE Load Reactions .			
Location of max.above base	1.987 ft	Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Maximum Stress Ratio	0.024 : 1	Top along X-X	0.0 k	Bottom along X-X	0.0 k
Ratio = $(P_u^2 + M_u^2)^{.5} / (\Phi P_n^2 + \Phi M_n^2)^{.5}$		Maximum SERVICE Load Deflections . .			
Pu = 21.440 k	$\Phi * P_n = 907.17 k$	Along Y-Y	0.0 in at 0.0 ft above base		
Mu-x = 2.358 k-ft	$\Phi * M_n-x = 98.343 k-ft$	for load combination :			
Mu-y = 0.0 k-ft	$\Phi * M_n-y = 0.1231 k-ft$	Along X-X	0.0 in at 0.0 ft above base		
Mu Angle = 0.0 deg	$\Phi = 0.650$	for load combination :			
Mu at Angle = 2.358 k-ft	$\Phi M_n \text{ at Angle} = 100.549 k-ft$	General Section Information	$\beta = 0.850$	$\theta = 0.80$	
Pn & Mn values located at Pu-Mu vector intersection with capacity curve		ρ : % Reinforcing	0.8333 %	Rebar % Ok	
Column Capacities . .		Reinforcing Area	4.80 in ²		
Pnmax : Nominal Max. Compressive Axial Capac	1,744.56 k	Concrete Area	576.0 in ²		
Pnmin : Nominal Min. Tension Axial Capacity	k				
ΦP_n , max : Usable Compressive Axial Capacity	907.17 k				
ΦP_n , min : Usable Tension Axial Capacity	k				

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k		Bending Analysis k-ft						Utilization	
	X-X	Y-Y		Pu	$\Phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ΦM_n	Ratio
+1.40D	Actual	M2,min	1.99	15.68	907.17	1.000	1.000	1.72	90.000	1.72	100.70	0.017	
+1.40D	M2,min	Actual	1.99	15.68	907.17	1.000	1.72	1.000	0.000	1.72	100.55	0.017	
+1.20D+1.60L	Actual	M2,min	1.99	21.44	907.17	1.000	1.000	2.36	90.000	2.36	100.70	0.023	

Concrete Column

Project File: Elevator shaft.ec6

LIC# : KW-06018621, Build:20.24.10.30

KPFF

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Light Pole Pedestal

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base	ft	Axial Load k			Bending Analysis k-ft						Utilization	
	X-X	Y-Y			Pu	ϕ	* Pn	δx	δx * Mux	δy	δy * Muy	Alpha (deg)	δ Mu	ϕ Mn	Ratio
+1.20D+1.60L	M2,min	Actual	1.99		21.44	907.17	1.000	2.36	1.000			0.000	2.36	100.55	0.024
+1.20D+0.50L	Actual	M2,min	1.99		15.94	907.17	1.000		1.000	1.75		90.000	1.75	100.70	0.017
+1.20D+0.50L	M2,min	Actual	1.99		15.94	907.17	1.000	1.75	1.000			0.000	1.75	100.55	0.017
+1.20D+0.50W	Actual	M2,min	1.99		14.29	907.17	1.000		1.000	1.57		90.000	1.57	100.70	0.016
+1.20D+0.50W	M2,min	Actual	1.99		14.29	907.17	1.000	1.57	1.000			0.000	1.57	100.55	0.016
+1.20D+0.50L+W	Actual	M2,min	1.99		17.64	907.17	1.000		1.000	1.94		90.000	1.94	100.70	0.019
+1.20D+0.50L+W	M2,min	Actual	1.99		17.64	907.17	1.000	1.94	1.000			0.000	1.94	100.55	0.019
+0.90D+W	Actual	M2,min	1.99		11.78	907.17	1.000		1.000	1.30		90.000	1.30	100.70	0.013
+0.90D+W	M2,min	Actual	1.99		11.78	907.17	1.000	1.30	1.000			0.000	1.30	100.55	0.013
+0.90D	Actual	M2,min	1.99		10.08	907.17	1.000		1.000	1.11		90.000	1.11	100.70	0.011
+0.90D	M2,min	Actual	1.99		10.08	907.17	1.000	1.11	1.000			0.000	1.11	100.55	0.011

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction @ Base	Mx - End Moments k-ft		My - End Moments k-ft	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
D Only						11.200				
+D+L						16.200				
+D+0.750L						14.950				
+D+0.60W						12.220				
+D+0.750L+0.450W						15.715				
+0.60D+0.60W						7.740				
+0.60D						6.720				
L Only						5.000				
W Only						1.700				

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis	
	@ Base	@ Top		@ Base	@ Top
D Only			k-ft		k-ft
+D+L			k-ft		k-ft
+D+0.750L			k-ft		k-ft
+D+0.60W			k-ft		k-ft
+D+0.750L+0.450W			k-ft		k-ft
+0.60D+0.60W			k-ft		k-ft
+0.60D			k-ft		k-ft
L Only			k-ft		k-ft
W Only			k-ft		k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance	Max. Y-Y Deflection		Distance
D Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+L	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.750L	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.60W	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.750L+0.450W	0.0000	in	0.000 ft	0.000	in	0.000 ft
+0.60D+0.60W	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
L Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
W Only	0.0000	in	0.000 ft	0.000	in	0.000 ft

Concrete Column

Project File: Elevator shaft.ec6

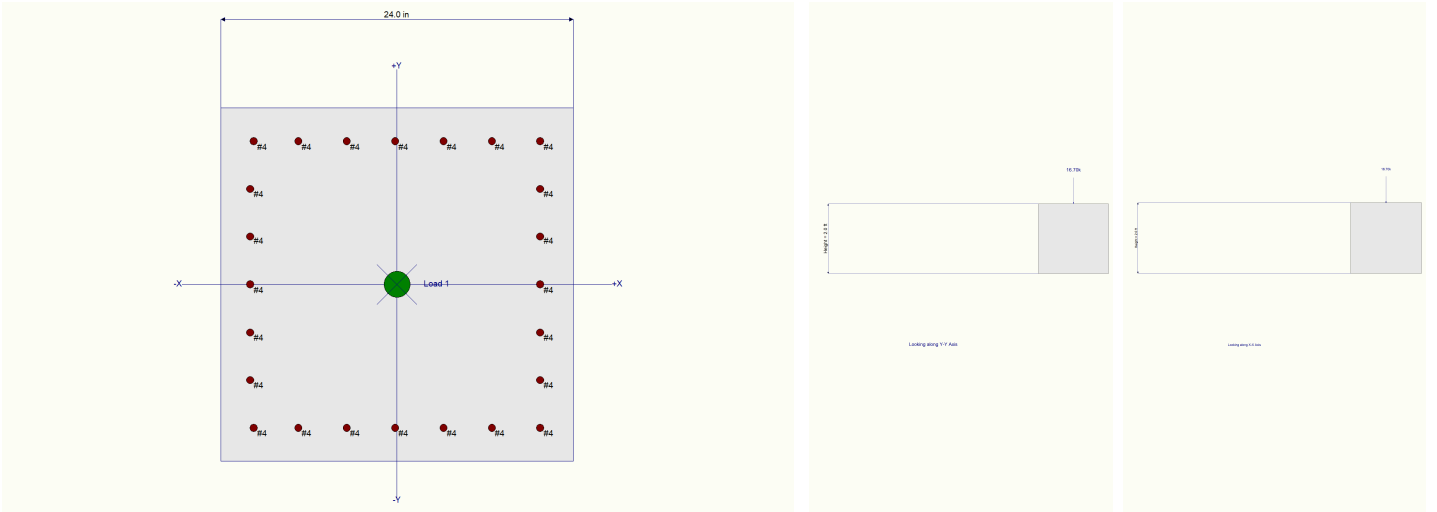
LIC# : KW-06018621, Build:20.24.10.30

KPFF

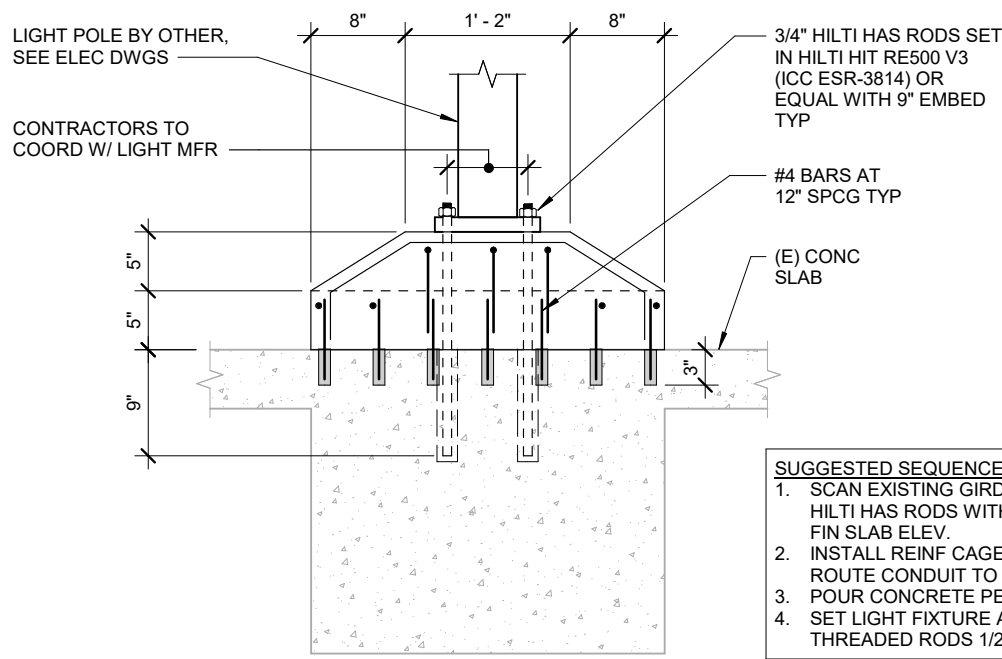
(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Light Pole Pedestal

Sketches



Interaction Diagrams



3

LIGHT FIXTURE PEDESTAL DETAIL

SCALE : 1" = 1'-0"



project: Inglewood Library Renovation

sheet no.:

202

location: Inglewood, CA

job no.: 10012300277

client:

date: 02/15/2025

6. Wayfinding Connection

KPFF Consulting Engineers

700 Flower St
Los Angeles, CA 90017
(213) 310 8579

Project : COIL
Job no. : 2300277
Date : Jun-24
By : MO

Project: Inglewood Main Library Renovation and Technology Center
101 W Manchester Blvd, Inglewood, California, 90301

Wind design Parameters

Exposure category C
Risk category II

Vwind	95	mph
Kz	0.85	
Kzt	1.00	
Kd	0.85	
Ke	1.00	
qh	16.7	psf
Height	11	ft
Width	1	ft
Effective Area	11	ft ²

29.3 Design Wind Loads: Solid Freestanding walls and solid Signs

Cf net force coefficient 1.65
Gust effect factor 0.85

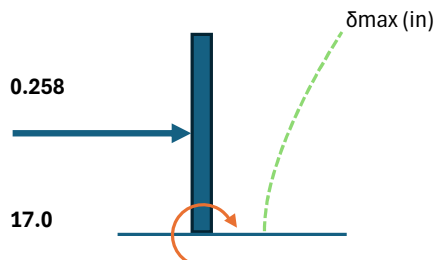
$$F = qh * G * Cf * As$$

Fwind (kip)

0.258

Mwind (kip-in)

17.0



Properties: HSS4x4x5/16"

E	29000	ksi
Ixx	6.21	in ⁴
Fy	46	ksi
Sx	3.1	in ³

Deflection Check

δmax (in)	Limit (in)	Check
$wL^4/8EI$	$2*(L/240)$	
0.41	1.10	TRUE

Flexure Capacity

Mu (1.0W)	ΦMn	Check
kip-in	kip-in	
20.0	128.34	TRUE

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Company:

Address:

Phone | Fax:

Design:

Fastening point:

Concrete - Oct 18, 2024

Page:

Specifier:

E-Mail:

Date:

1

2/13/2025

Specifier's comments:

1 Input data

Anchor type and diameter:

Kwik Bolt TZ2 - CS 1/2 (3 1/4)

Item number:

2210256 KB-TZ2 1/2x5 1/2

Specification text:

Hilti $\varnothing$ 1/2 in Kwik Bolt TZ2 - CS with 3.75 in nominal embedment depth per ICC-ES ESR-4266 , Hammer drilled installation per MPII

Effective embedment depth:

$h_{ef,act} = 3.250$ in., $h_{nom} = 3.750$ in.

Material:

Carbon Steel

Evaluation Service Report:

ESR-4266

Issued | Valid:

12/1/2023 | 12/1/2025

Proof:

Design Method ACI 318-19 / Mech

Shear edge breakout verification:

Row closest to edge (Case 3 only from ACI 318-19 Fig. R.17.7.2.1b)

Stand-off installation:

$e_b = 0.000$ in. (no stand-off); $t = 0.500$ in.

Anchor plate^R:

$l_x \times l_y \times t = 8.000$ in. x 8.000 in. x 0.500 in.;

Profile:

Square HSS (AISC), HSS4X4X.3125; (L x W x T) = 4.000 in. x 4.000 in. x 0.312 in.

Base material:

cracked concrete, 4000, $f'_c = 4,000$ psi; $h = 420.000$ in.

Installation:

Hammer drilled hole, Installation condition: Dry

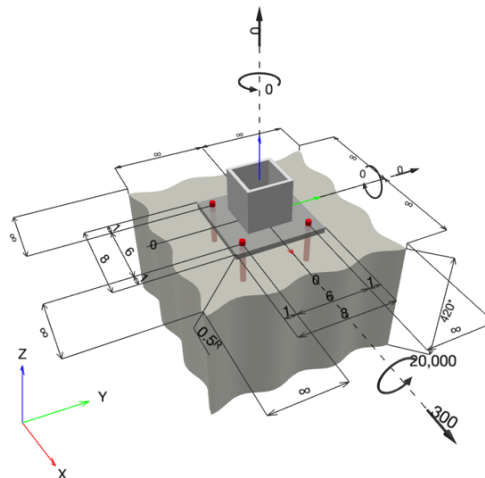
Reinforcement:

tension: not present, shear: not present; no supplemental splitting reinforcement present
edge reinforcement: none or < No. 4 bar



^R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



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Company:

Address:

Phone | Fax:

Design:

Fastening point:

Concrete - Oct 18, 2024

Page:

Specifier:

E-Mail:

Date:

2

2/13/2025

1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 0; V _x = 300; V _y = 0; M _x = 20,000; M _y = 0; M _z = 0;	no	45

2 Proof I Utilization (Governing Cases)

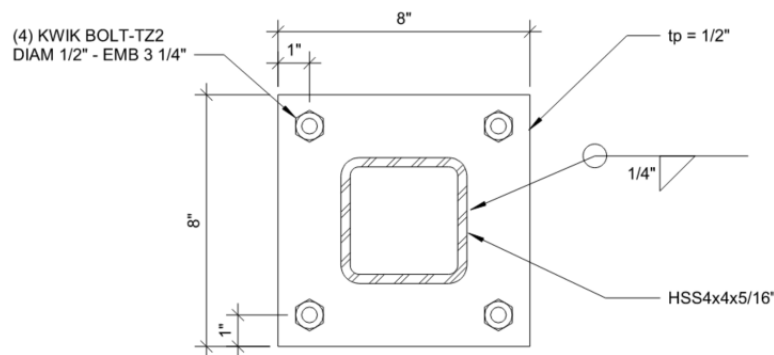
Loading	Proof	Design values [lb]		Utilization	
		Load	Capacity	β_N / β_V [%]	Status
Tension	Concrete Breakout Failure	3,196	7,258	45 / -	OK
Shear	Pryout Strength	300	23,014	- / 2	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.440	0.017	5/3	26	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!



10

WAYFINDING PILLAR CNX

SCALE : 3" = 1'-0"



project: Inglewood Library Renovation

sheet no.:

206

location: Inglewood, CA

job no.: 10012300277

client:

date: 04/10/2025

A

H. Main Roof Floor - Members Check



project: Inglewood Library Renovation

sheet no.:

207

location: Inglewood, CA

job no.: 10012300277

client:

date: 04/10/2025

A

Summary:

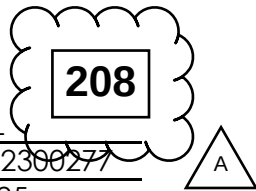
The Main Roof floor corresponds to a mechanical space for which the use will not change but additional load will be added, therefore existing capacity was checked for new load distribution resulting in enough capacity of members including main beams, secondary beams and slab. No retrofit is required. See following calculations for members for design justification.

The following codes were used for the design:

- 2022 California Building Code.
- AISC 360-16
- ASCE 7-16
- ACI 318-14

KPFF Consulting Engineers
700 Flower St
Los Angeles, CA 90017
(213) 310 8579

Project : COIL
Job no. : 10012300277
Date : Apr-25
By : MO



LOADING CRITERIA - MAIN ROOF MECHANICAL

LOAD TYPE: C - Concrete Two-Way Slab

Slab

5" thick slab NWC	62.5 psf
Floor/Roof Finishes	2
Ceiling and Lights	4
MEP, Piping, Sprinklers	5
Misc	4

Slab Total:	77.5 psf
--------------------	-----------------

Beam

Conc Gravity Beams	85 psf
--------------------	--------

Beam Total:	162.5 psf
--------------------	------------------

Columns

Gravity Columns	0 psf
-----------------	-------

Column Total:	162.5 psf
----------------------	------------------

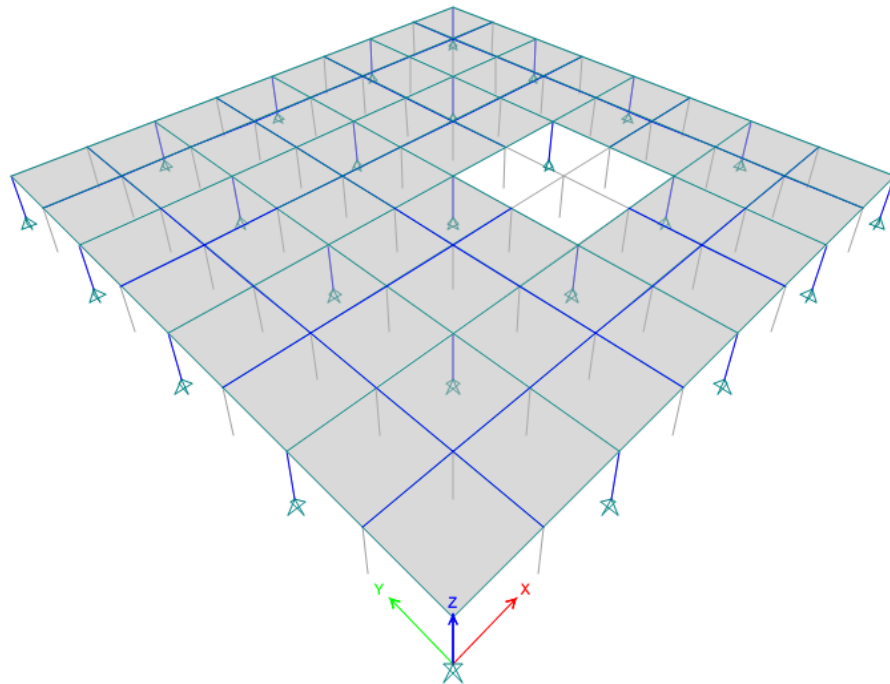
Super Dead Load

Mechanical Equipment	100 psf
LFRS - explicitly modeled	0

Seismic Total:	262.5 psf
-----------------------	------------------

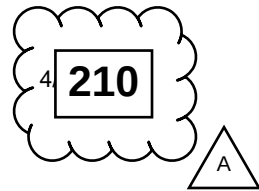
Live Load for Mechanical Roof **40 psf**

SAFE®



Mechanical Roof - Gravity Frames Report

Model File: Roof Mech floor check, Revision 0
4/10/2025



1 Structure Data

This chapter provides model geometry information, including items such as story levels, point coordinates, and element connectivity.

1.1 Grid Data

Table 1.1 - Grid Definitions - General

Name	Type	Ux ft	Uy ft	Rz deg	Datum Name	Story Name Above	Story Name Below	Model Datum ft	Story Height Above ft	Story Height Below ft	Bubble Size in	Color
GLOBAL	Cartesian	0	0	0	Story1	Story2	Base	12	12	12	60	Gray6

Table 1.2 - Grid Definitions - Grid Lines

Name	Grid Line Type	ID	Ordinate ft	Angle deg	X1 ft	Y1 ft	X2 ft	Y2 ft	Bubble Location	Visible
GLOBAL	X (Cartesian)	A	0						End	Yes
GLOBAL	X (Cartesian)	B	18						End	Yes
GLOBAL	X (Cartesian)	C	36						End	Yes
GLOBAL	X (Cartesian)	D	54						End	Yes
GLOBAL	X (Cartesian)	E	72						End	Yes
GLOBAL	X (Cartesian)	F	90						End	Yes
GLOBAL	X (Cartesian)	G	108						End	Yes
GLOBAL	X (Cartesian)	H	126						End	Yes
GLOBAL	X (Cartesian)	I	144						End	Yes
GLOBAL	Y (Cartesian)	1	0						Start	Yes
GLOBAL	Y (Cartesian)	2	18						Start	Yes
GLOBAL	Y (Cartesian)	3	36						Start	Yes
GLOBAL	Y (Cartesian)	4	54						Start	Yes
GLOBAL	Y (Cartesian)	5	72						Start	Yes
GLOBAL	Y (Cartesian)	6	90						Start	Yes
GLOBAL	Y (Cartesian)	7	108						Start	Yes
GLOBAL	Y (Cartesian)	8	126						Start	Yes
GLOBAL	Y (Cartesian)	9	144						Start	Yes

1.2 Mass

Table 1.3 - Mass Source Definition

Name	Is Default	Include Lateral Mass?	Include Vertical Mass?	Lump Mass?	Source Self Mass?	Source Added Mass?	Source Load Patterns?	Move Mass Centroid?	Move Ratio X	Move Ratio Y	Load Pattern	Multiplier
MsSrc1	Yes	No	Yes	Yes	Yes	Yes	No	No				

Table 1.4 - Mass Summary by Group

Group	Self Mass lb-s2/ft	Self Weight kip	Mass X lb-s2/ft	Mass Y lb-s2/ft	Mass Z lb-s2/ft
All	92932.04	0	92932.04	92932.04	92932.04
Equipment	3776.34	0	3776.34	3776.34	3776.34
Slab Mech	33987.02	0	33987.02	33987.02	33987.02

2 Properties

This chapter provides property information for materials, frame sections, shell sections, and links.

2.1 Materials

Table 2.1 - Material Properties - General

Material	Type	SymType	Grade	Color	Notes
4000Psi	Concrete	Isotropic	f _c 4000 psi	Gray8Dark	
A416Gr270	Tendon	Uniaxial	Grade 270	Red	
A615Gr60	Rebar	Uniaxial	Grade 60	Green	

2.2 Frame Sections

Table 2.2 - Frame Section Property Definitions - Summary (Part 1 of 4)

Name	Material	Shape	Color	Area in ²	J in ⁴	I ₃₃ in ⁴	I ₂₂ in ⁴	I ₂₃ in ⁴	IMajor in ⁴	IMinor in ⁴
B-12	4000Psi	Concrete Rectangular	Gray8Dark	360	12934.73	27000	4320			
B-57	4000Psi	Concrete Rectangular	Yellow	840	98604.63	63000	54880			
C24x24 f _c 4ksi	4000Psi	Concrete Rectangular	Magenta	576	46725.12	27648	27648			

Table 2.2 - Frame Section Property Definitions - Summary (Part 2 of 4)

Name	MajorAngle deg	As ₂ in ²	As ₃ in ²	S ₃₃ Pos in ³	S ₃₃ Neg in ³	S ₂₂ Pos in ³	S ₂₂ Neg in ³	Z ₃₃ in ³	Z ₂₂ in ³	R ₃₃ in	R ₂₂ in
B-12		300	300	1800	1800	720	720	2700	1080	8.6603	3.4641
B-57		700	700	4200	4200	3920	3920	6300	5880	8.6603	8.0829
C24x24 f _c 4ksi		480	480	2304	2304	2304	2304	3456	3456	6.9282	6.9282

Table 2.2 - Frame Section Property Definitions - Summary (Part 3 of 4)

Name	Fillet Radius in	CG Offset 3 in	CG Offset 2 in	PNA Offset 3 in	PNA Offset 2 in	SC Offset 3 in	SC Offset 2 in	Area Modifier	As ₂ Modifier	As ₃ Modifier	J Modifier
B-12		0	0	0	0			1	1	1	0.35
B-57		0	0	0	0			1	1	1	0.35
C24x24 f _c 4ksi		0	0	0	0			1	1	1	1

Table 2.2 - Frame Section Property Definitions - Summary (Part 4 of 4)

Name	I ₂₂ Modifier	Mass Modifier	Weight Modifier
B-12	0.35	1	1
B-57	0.35	1	1
C24x24 f _c 4ksi	0.7	1	1

2.3 Shell Sections

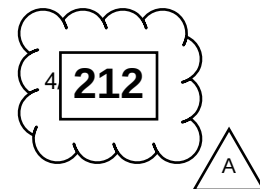


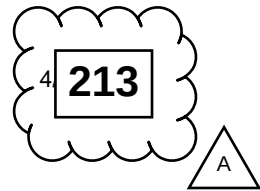
Table 2.3 - Area Section Property Definitions - Summary

Name	Type	Element Type	Material	Total Thickness in	Deck Material	Deck Depth in
Slab 4ksi thk5"	Slab	Shell-Thin	4000Psi	5		

2.4 Reinforcement Sizes

Table 2.4 - Reinforcing Bar Sizes

Name	Diameter in	Area in ²
#4	0.5	0.2
#6	0.75	0.44
#9	1.128	1



3 Loads

This chapter provides loading information as applied to the model.

3.1 Load Patterns

Table 3.1 - Load Pattern Definitions

Name	Is Auto Load	Type	Self Weight Multiplier	Auto Load
~LLRF	No	Other	0	
Dead	No	Dead	1	
Live	No	Live	0	

3.2 Load Sets

Table 3.2 - Shell Uniform Load Sets

Name	Load Pattern	Load Value lb/ft2
Equipment 1	Dead	15
Equipment 1	Dead	55
Equipment 2	Dead	15
Equipment 2	Dead	75
Roof Mech	Dead	15
Roof Mech	Live	40

3.3 Load Cases

Table 3.3 - Load Case Definitions - Summary

Name	Type	Notes
Dead	Linear Static	
Live	Linear Static	

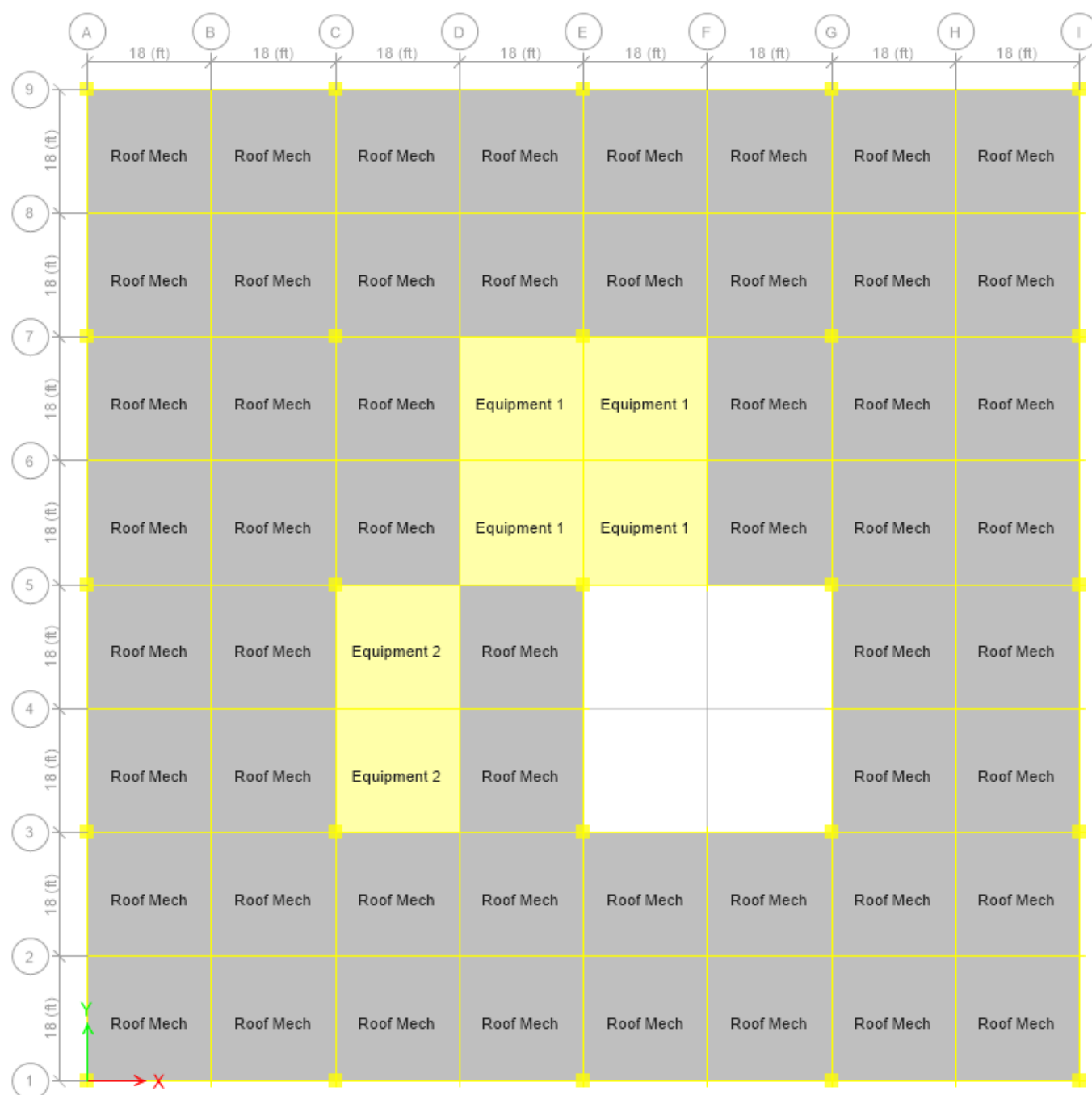
3.4 Load Combinations

Table 3.4 - Load Combination Definitions

Name	Type	Is Auto	Load Name	Mode	SF	Notes
DConS1	Linear Add	Yes	Dead		1.4	Dead [Strength]
DConS2	Linear Add	Yes	Dead		1.2	Dead + Live [Strength]
DConS2			Live		1.6	

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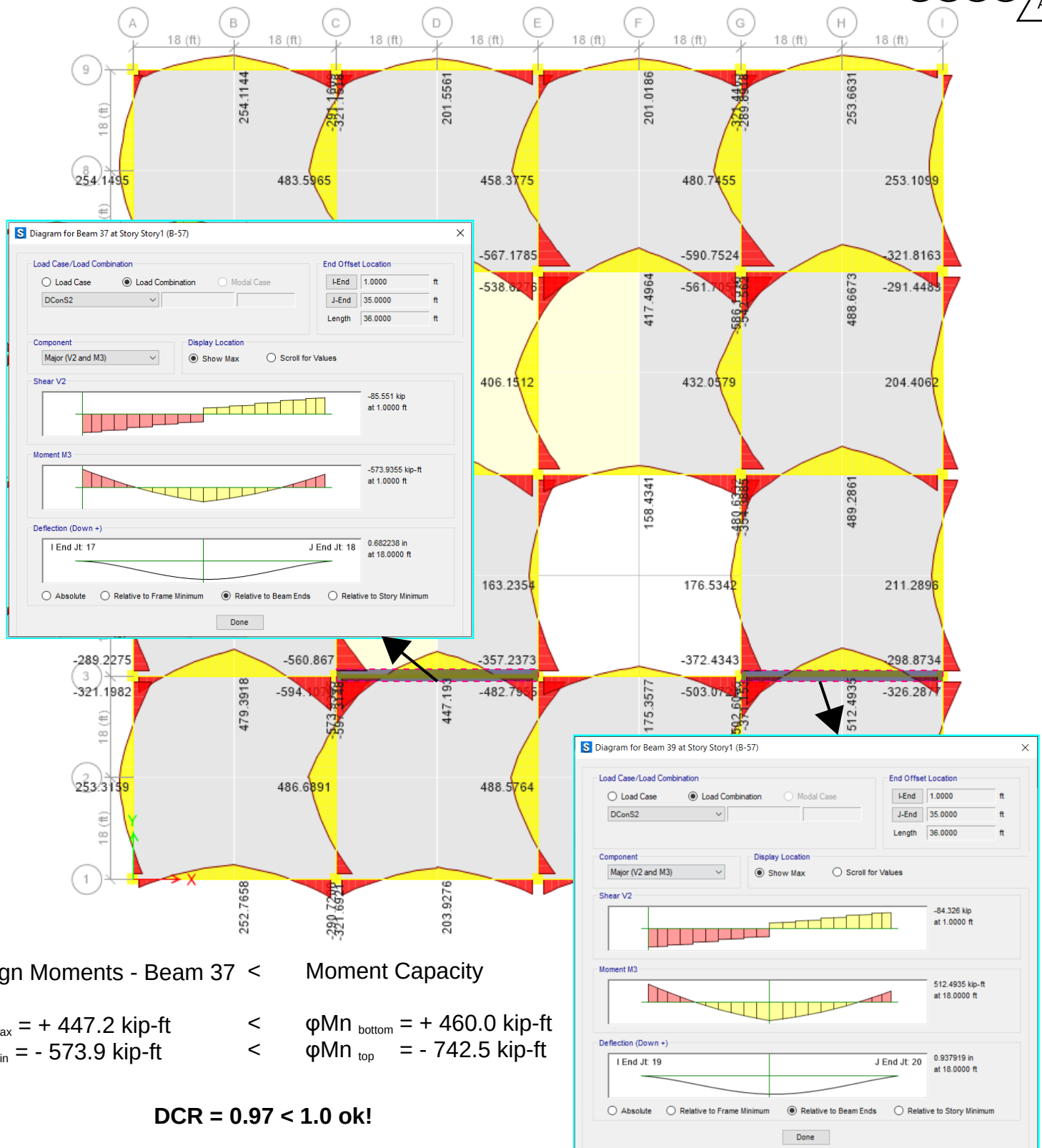
A



Roof Main Beams - Moment Diagrams

215

A



Concrete Beam Capacity - Primary

Project Title:
Engineer:
Project ID:
Project Descr:

216

A

Concrete Beam

Project File: Roof check COIL.ec6

LIC# : KW-06018621, Build:20.24.10.30

KPFF

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: B-57/B-62 Conc Beam moment check

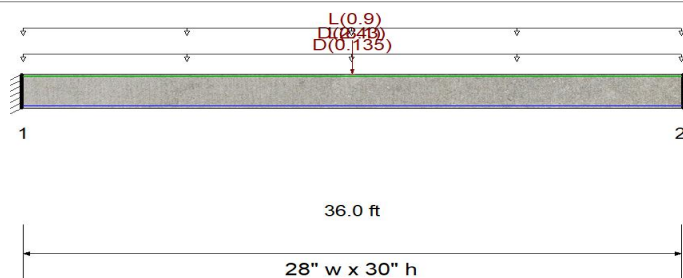
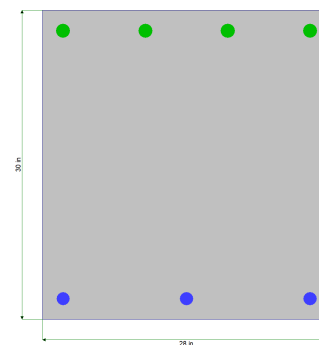
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019

Load Combination Set : ASCE 7-22 / IBC 2024 (L<=100psf)

General Information

f'_c	=	4.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = 7.5 * \lambda * f'_c^{1/2}$	=	474.342 psi		Shear :	0.750
ψ Density	=	150.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,605.0 ksi	Fy - Stirrups	=	40.0 ksi
f_y - Main Rebar	=	60.0	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #	=	3
			Number of Resisting Legs Per Stirrup	=	2



Cross Section & Reinforcing Details

Rectangular Section, Width = 28.0 in, Height = 30.0 in

Span #1 Reinforcing....

3-#10 at 2.0 in from Bottom, from 0.0 to 36.0 ft in this span

4-#11 at 2.0 in from Top, from 0.0 to 36.0 ft in this span

Beam self weight calculated and added to loads

Point Load : D = 2.430 k @ 18.0 ft

Uniform Load : D = 0.1350 k/ft, Tributary Width = 1.0 ft

Point Load : L = 8.10 k @ 18.0 ft

Uniform Load : L = 0.90 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.482 : 1
Section used for this span		Typical Section
Mu : Applied		-357.854 k-ft
Mn * Phi : Allowable		742.56 k-ft
Location of maximum on span		36.000 ft
Span # where maximum occurs		Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.045 in	Ratio = 9621	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio = 0	<360.0	L Only
Max Downward Total Deflection	0.099 in	Ratio = 4373	>=180.0	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio = 0	<180.0	Span: 1 : +D+L

Cross Section Strength & Inertia

Top & Bottom references are for tension side of sect

Cross Section Bar Layout Description		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
		Bottom	Top	I gross	Icr - Bottom	Icr - Top
Section 1	3- #10 @ d=28", 4- #11 @ d=2",	459.99	742.56	63,000.00	17,553.35	25,814.24

Concrete Beam Capacity - Primary

Project Title:
Engineer:
Project ID:
Project Descr:

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Concrete Beam

Project File: Roof check COIL.ec6

LIC# : KW-06018621, Build:20.24.10.30

KPFF

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: B-59/B-60 Conc Beam moment check

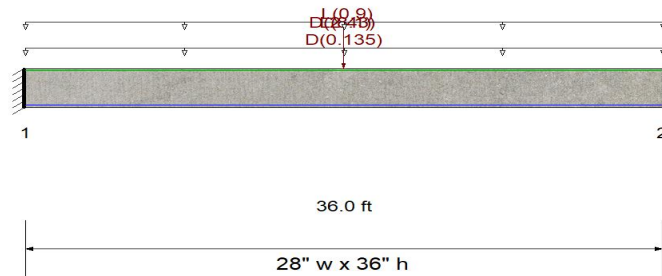
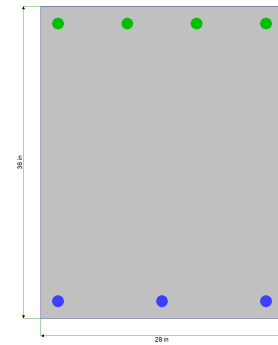
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019

Load Combination Set : ASCE 7-22 / IBC 2024 (L<=100psf)

General Information

f'_c	=	4.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = 7.5 * \lambda * f'_c^{1/2}$	=	474.342 psi		Shear :	0.750
ψ Density	=	150.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,605.0 ksi	Fy - Stirrups	=	40.0 ksi
f_y - Main Rebar	=	60.0	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #	=	3
			Number of Resisting Legs Per Stirrup	=	2



Cross Section & Reinforcing Details

Rectangular Section, Width = 28.0 in, Height = 36.0 in

Span #1 Reinforcing....

3-#11 at 2.0 in from Bottom, from 0.0 to 36.0 ft in this span

4-#11 at 2.0 in from Top, from 0.0 to 36.0 ft in this span

Beam self weight calculated and added to loads

Point Load : D = 2.430 k @ 18.0 ft

Uniform Load : D = 0.1350 k/ft, Tributary Width = 1.0 ft

Point Load : L = 8.10 k @ 18.0 ft

Uniform Load : L = 0.90 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.417 : 1
Section used for this span		Typical Section
Mu : Applied		-380.531 k-ft
Mn * Phi : Allowable		911.69 k-ft
Location of maximum on span		0.000 ft
Span # where maximum occurs		Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.026 in	Ratio = 16624	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio = 0	<360.0	L Only
Max Downward Total Deflection	0.053 in	Ratio = 8198	>=180.0	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio = 0	<180.0	Span: 1 : +D+L

Cross Section Strength & Inertia

Top & Bottom references are for tension side of sect

Cross Section Bar Layout Description		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
		Bottom	Top	I gross	Icr - Bottom	Icr - Top
Section 1	3- #11 @ d=34", 4- #11 @ d=2",	688.19	911.69	108864.00	31,701.87	39,756.17

Concrete Beam Capacity - Primary

Project Title:
Engineer:
Project ID:
Project Descr:

218

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Concrete Beam

Project File: Roof check COIL.ec6

LIC# : KW-06018621, Build:20.24.10.30

KPFF

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: B-58/B-63 Conc Beam moment check

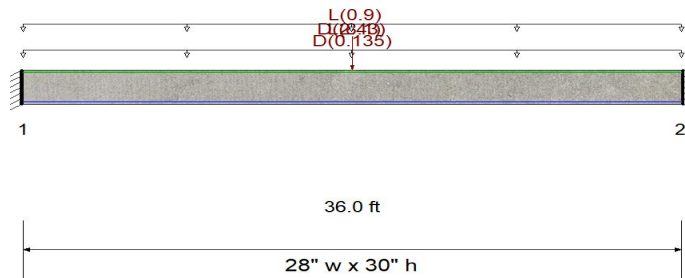
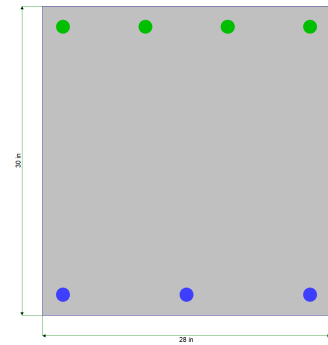
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019

Load Combination Set : ASCE 7-22 / IBC 2024 (L<=100psf)

General Information

f'_c	=	4.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = 7.5 * \lambda * f'_c^{1/2}$	=	474.342 psi		Shear :	0.750
ψ Density	=	150.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,605.0 ksi	Fy - Stirrups	=	40.0 ksi
f_y - Main Rebar	=	60.0	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #	=	3
			Number of Resisting Legs Per Stirrup	=	2



Cross Section & Reinforcing Details

Rectangular Section, Width = 28.0 in, Height = 30.0 in

Span #1 Reinforcing....

3-#11 at 2.0 in from Bottom, from 0.0 to 36.0 ft in this span

4-#11 at 2.0 in from Top, from 0.0 to 36.0 ft in this span

Beam self weight calculated and added to loads

Point Load : D = 2.430 k @ 18.0 ft

Uniform Load : D = 0.1350 k/ft, Tributary Width = 1.0 ft

Point Load : L = 8.10 k @ 18.0 ft

Uniform Load : L = 0.90 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.482	: 1
Section used for this span		Typical Section	
Mu : Applied		-357.854	k-ft
Mn * Phi : Allowable		743.21	k-ft
Location of maximum on span		36.000	ft
Span # where maximum occurs		Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.045 in	Ratio =	9621	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	L Only
Max Downward Total Deflection	0.099 in	Ratio =	4379	>=180.0	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio =	0	<180.0	Span: 1 : +D+L

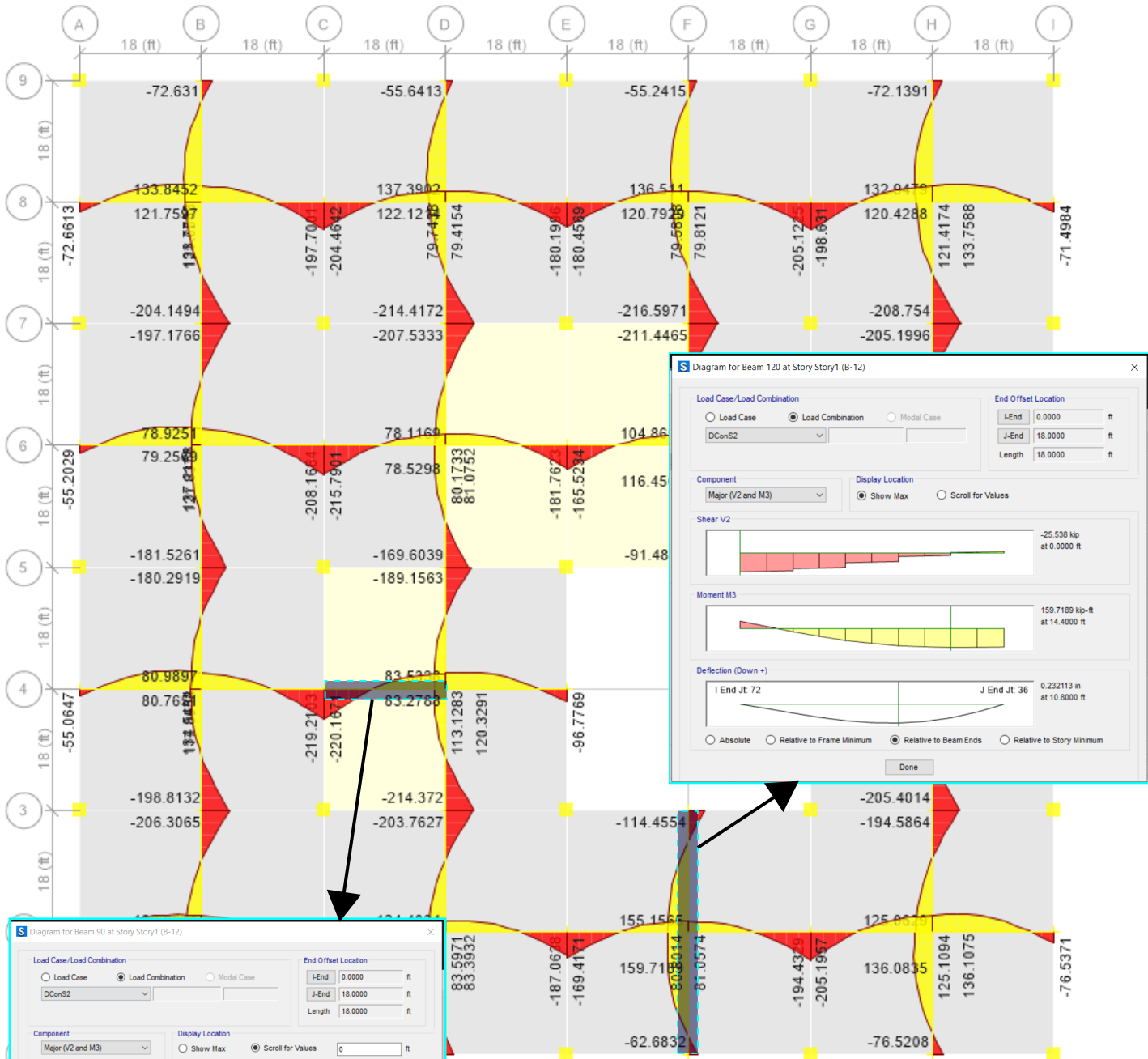
Cross Section Strength & Inertia

Top & Bottom references are for tension side of sect

Cross Section Bar Layout Description		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
		Bottom	Top	I gross	Icr - Bottom	Icr - Top
Section 1	3- #11 @ d=28", 4- #11 @ d=2",	561.83	743.21	63,000.00	20,854.42	26,017.75

Roof Secondary Beams - Moment Diagrams

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Design Moments - Beam 120 < Moment Capacity

$$M_{\max} = + 159.7 \text{ kip-ft} < \phi M n_{\text{bottom}} = + 303.1 \text{ kip-ft}$$

$$\text{DCR} = 0.52 < 1.0 \text{ ok!}$$

Design Moments - Beam 90 < Moment Capacity

$$M_{\min} = - 219.2 \text{ kip-ft} < \phi M n_{\text{top}} = - 356.2 \text{ kip-ft}$$

$$\text{DCR} = 0.61 < 1.0 \text{ ok!}$$

Concrete Beam Capacity - Secondary

Project Title:
Engineer:
Project ID:
Project Descr:

220

A

Concrete Beam

Project File: Roof check COIL.ec6

LIC# : KW-06018621, Build:20.24.10.30

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DESCRIPTION: B-12/B-13 Conc Beam moment check

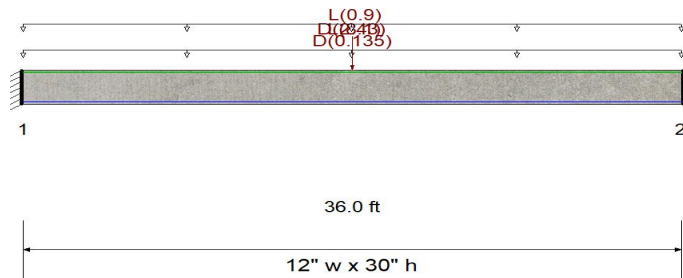
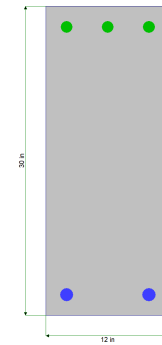
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019

Load Combination Set : ASCE 7-22 / IBC 2024 (L<=100psf)

General Information

f'_c	=	4.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = 7.5 * \lambda * f'_c^{1/2}$	=	474.342 psi		Shear :	0.750
ψ Density	=	150.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,605.0 ksi	Fy - Stirrups	=	40.0 ksi
f_y - Main Rebar	=	60.0	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #	=	3
			Number of Resisting Legs Per Stirrup	=	2



Cross Section & Reinforcing Details

Rectangular Section, Width = 12.0 in, Height = 30.0 in

Span #1 Reinforcing....

2-#10 at 2.0 in from Bottom, from 0.0 to 36.0 ft in this span

3-#9 at 2.0 in from Top, from 0.0 to 36.0 ft in this span

Beam self weight calculated and added to loads

Point Load : D = 2.430 k @ 18.0 ft

Uniform Load : D = 0.1350 k/ft, Tributary Width = 1.0 ft

Point Load : L = 8.10 k @ 18.0 ft

Uniform Load : L = 0.90 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.822	: 1
Section used for this span		Typical Section	
Mu : Applied		-293.057	k-ft
Mn * Phi : Allowable		356.534	k-ft
Location of maximum on span		36.000	ft
Span # where maximum occurs		Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.142 in	Ratio =	3035	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	L Only
Max Downward Total Deflection	0.288 in	Ratio =	1500	>=180.0	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio =	0	<180.0	Span: 1 : +D+L

Cross Section Strength & Inertia

Top & Bottom references are for tension side of sect

Cross Section Bar Layout Description		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
		Bottom	Top	I gross	Icr - Bottom	Icr - Top
Section 1	2- #10 @ d=28", 3- #9 @ d=2",	303.20	356.53	27,000.00	10,904.32	12,344.85