

designengineering & supply, Inc.

2799 NW Boca Raton Blvd. #111

Boca Raton, FL 33431

Phone: 561-705-2930 Fax: 561-431-3211

Email: yemeniciler@netzero.net , desupply@aol.com

June 11, 2025

City Of Pinecrest Building Department
Pinecrest, Florida

Re: Bhagwansing Residence Calculations
8100 SW 120th Street
Pinecrest, FI

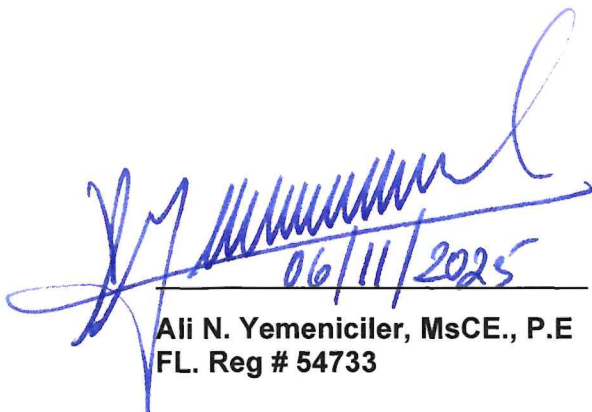
Dear Sir/Madam:

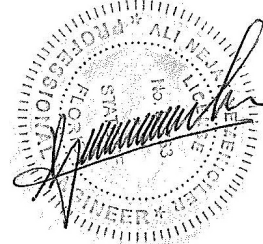
Please find the attached calculations for the above-mentioned project.

- Wind load calculations 1-10
- Roof Truss Up-lift calculations 11-12
- Concrete Beam & Lintel Calculations 13-53
- Steel Column & Base plate Calculations 54-58
- Masonry Wall Calculations 59-61
- Foundation calculations 62-80
- Diaphragm Calculations 81-84

If you have any questions, please do not hesitate to call.

Best Regards,


06/11/2025
Ali N. Yemeniciler, MsCE., P.E
FL. Reg # 54733



Ali
Yemeniciler

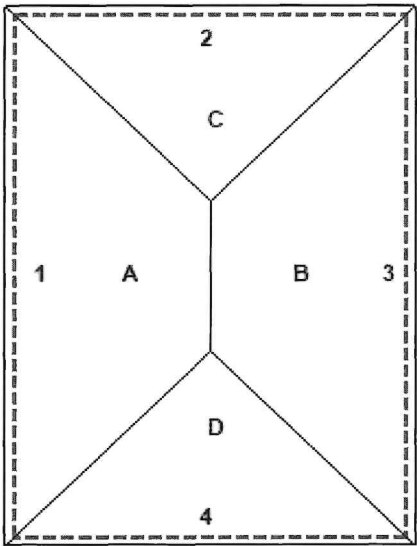
Digitally signed by
Ali Yemeniciler
Date: 2025.06.11
15:20:36 -04'00'

"The Pressure's On Us."

Bhagwansingh family residence

June 02, 2025

Address: 8100 SW 120th Street, Pinecrest, FL 33156



Disclaimer/Copyright

These calculations are based on the ASCE 7-98, ASCE 7-02, ASCE 7-05, ASCE 7-10, and ASCE7-16 Standard Practices for determining the minimum wind loads, and intended performance goals, for buildings, other structures and their nonstructural components that are subject to building code requirements. While the information presented by this program is believed to be correct, SDG, Inc. neither intends for this program to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such a professional in interpreting and applying the results of the report provided by the WLS 2019 program.

SDG, Inc. disclaims any responsibility for any particular results relating to the use of the WLS 2019 Program. SDG, Inc. disclaims any liability for any personal injury or any loss or damage of any kind, including all indirect, special, or consequential damages and lost profits, arising out of or relating to the use of the WLS 2019 program. Any individual who relies on the WLS2019 program assumes all liability arising from its use.

This program contains terminology and figures from ASCE Standard 7, Minimum Design Loads for Buildings and Other Structures Copyright © by the American Society of Civil Engineers (ASCE) [in conjunction with the Structural Engineering Institute (SEI)], 1801 Alexander Bell Drive, Reston, VA 20191-4400. ASCE permitted the use of this material under a copyright release dated February 2, 2000. SDG, Inc. gratefully acknowledges ASCE's cooperation in permitting the use of this material.

Signature / Stamp

Site Information

Wind Dir.	Exposure
1	C
2	C
3	C
4	C

Basic Wind Speed: 175 mph
Topography: Flat

Optional Factors

This project uses load combinations from ASCE 7.

Structure Information

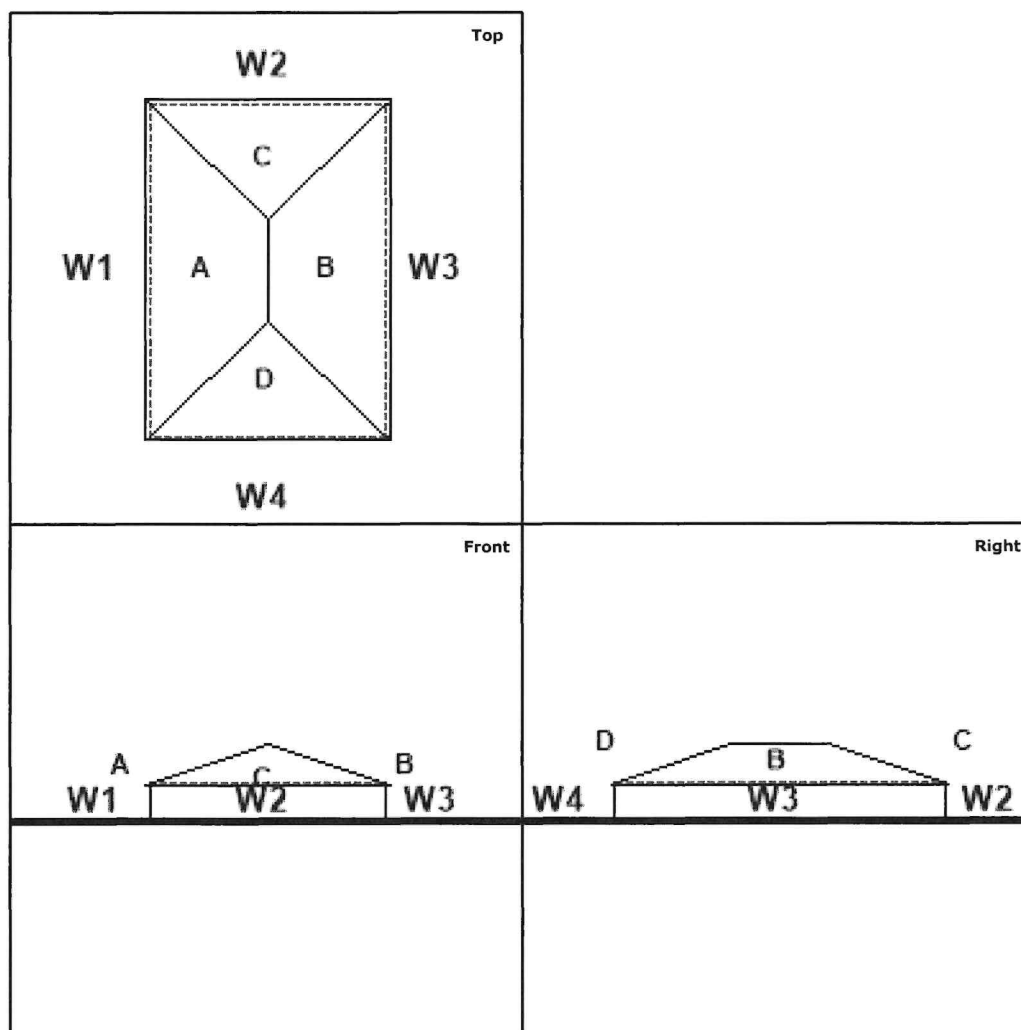
Structure Type: Building
 Structure Category: II
 Enclosure Classification: Enclosed

Main Section

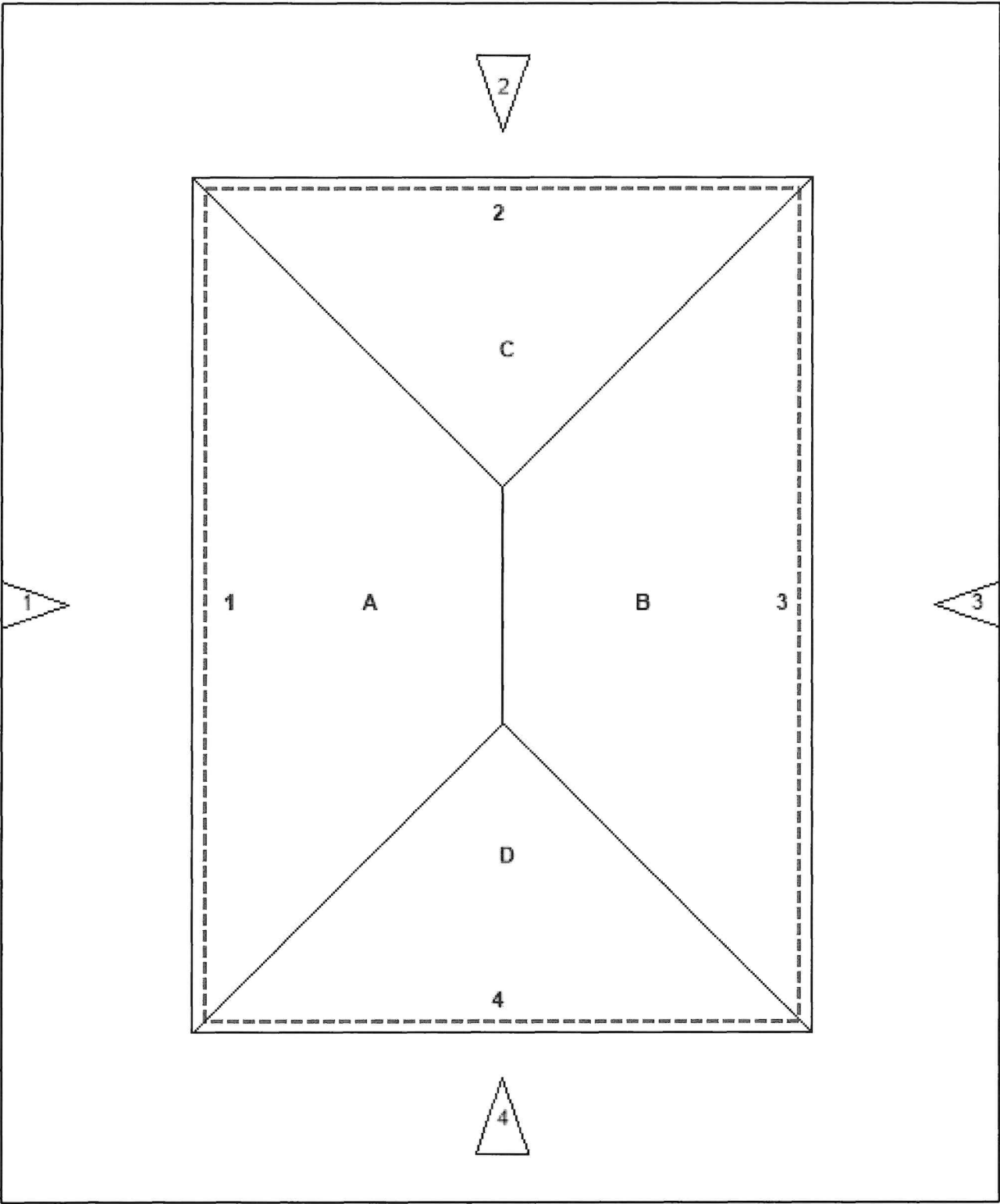
Wall	Length (ft)	Overhang (ft)
1	140	2.00
2	100.0	2.00
3	140	2.00
4	100.0	2.00

Eave Height: 16.0 ft
 Parapet Height: 0.00 ft
 Parapet Enclosure: Enclosed
 Roof Shape: Hipped

Roof	Slope (X:12)
A & B	4.00
C & D	4.00



Composite Drawing



Components & Cladding

<u>Description</u>	<u>Wall/Roof</u>	<u>Surface</u>	<u>Zone</u>	<u>Span</u>	<u>Width</u>	<u>Area</u>
10.	Wall	1	4	0.00 ft	0.00 ft	10.0 ft ²
15.	Wall	1	4	0.00 ft	0.00 ft	15.0 ft ²
20.	Wall	1	4	0.00 ft	0.00 ft	20.0 ft ²
30.	Wall	1	4	0.00 ft	0.00 ft	30.0 ft ²
50.	Wall	1	4	0.00 ft	0.00 ft	50.0 ft ²
80.	Wall	1	4	0.00 ft	0.00 ft	80.0 ft ²
32	Roof	A	1	0.00 ft	0.00 ft	32.0 ft ²
10.	Roof	A	1	0.00 ft	0.00 ft	10.0 ft ²
120.	Wall	1	4	0.00 ft	0.00 ft	120 ft ²

Bhagwansingh family residence

ASCE 7-16 Wind Load Report

June 02, 2025

This data was calculated using the components and cladding method.

Component Description	Surface	Zone	z (ft)	q (psf)	GCp	GCpi	Ext Pres (psf)	Net w/ +GCpi (psf)	Net w/ -GCpi (psf)
10.	1	4	24.3	62.6	1.00	0.180	62.6	51.3	73.9
			24.3	62.6	-1.10		-68.9	-80.1	-57.6
15.	1	4	24.3	62.6	0.969	0.180	60.7	49.4	71.9
			24.3	62.6	-1.07		-66.9	-78.2	-55.6
20.	1	4	24.3	62.6	0.947	0.180	59.3	48.0	70.5
			24.3	62.6	-1.05		-65.5	-76.8	-54.3
30.	1	4	24.3	62.6	0.916	0.180	57.3	46.1	68.6
			24.3	62.6	-1.02		-63.6	-74.9	-52.3
50.	1	4	24.3	62.6	0.877	0.180	54.9	43.6	66.1
			24.3	62.6	-0.977		-61.1	-72.4	-49.9
80.	1	4	24.3	62.6	0.841	0.180	52.6	41.4	63.9
			24.3	62.6	-0.941		-58.9	-70.1	-47.6
32	A	1	24.3	62.6	0.498	0.180	31.2	19.9	42.4
			24.3	62.6	-1.21		-75.9	-87.2	-64.6
			24.3	62.6	-1.90		-119		
10.	A	1	24.3	62.6	0.700	0.180	43.8	32.6	55.1
			24.3	62.6	-1.30		-81.4	-92.6	-70.1
			24.3	62.6	-1.80		-113		
120.	1	4	24.3	62.6	0.809	0.180	50.7	39.4	61.9
			24.3	62.6	-0.909		-56.9	-68.2	-45.7

Bhagwansingh family residence

ASCE 7-16 Wind Load Report - Wind Direction 1

June 02, 2025

This data was calculated using the building of all heights method.

#	Surface	z (ft)	q (psf)	G	Cp	GCpi	Ext Pres (psf)	Net w/ +GCpi (psf)	Net w/ -GCpi (psf)
1	Windward Wall	15.0	56.5	0.853	0.800	0.180	38.6	27.3	49.8
		16.0	57.3				39.1	27.8	50.4
	Overhang Top	24.3	62.6		0.137		7.33		
		24.3	62.6		-0.363		-19.4		
	Overhang Bot	16.0	57.3		0.800		39.1		
2	Side Wall	24.3	62.6	0.853	-0.700	0.180	-37.4	-48.6	-26.1
3	Leeward Wall	24.3	62.6	0.853	-0.500	0.180	-26.7	-38.0	-15.4
4	Side Wall	24.3	62.6	0.853	-0.700	0.180	-37.4	-48.6	-26.1
A	Windward Roof	24.3	62.6	0.853	0.137	0.180	7.32	-3.95	18.6
		24.3	62.6		-0.363		-19.4	-30.6	-8.10
B	Leeward Roof	24.3	62.6	0.853	-0.569	0.180	-30.3	-41.6	-19.1
C&D	Roof	0.00 - 12.2*	62.6	0.853	-0.900	0.180	-48.0	-59.3	-36.8
		12.2 - 24.3*	62.6				-48.0	-59.3	-36.8
		24.3 - 48.7*	62.6		-0.500		-26.7	-38.0	-15.4
		48.7 - 100.0*	62.6		-0.300		-16.0	-27.3	-4.74
		0.00 - 100.0*	62.6		-0.180		-9.61	-20.9	1.66

This is load case 1 in ASCE 7-16 Figure 27.3-8. See Figure 27.3-8 for other cases.

* Distance from windward edge.

Bhagwansingh family residence

ASCE 7-16 Wind Load Report - Wind Direction 2

June 02, 2025

This data was calculated using the building of all heights method.

#	Surface	z (ft)	q (psf)	G	Cp	GCpi	Ext Pres (psf)	Net w/ +GCpi (psf)	Net w/ -GCpi (psf)
1	Side Wall	24.3	62.6	0.862	-0.700	0.180	-37.8	-49.1	-26.5
2	Windward Wall	15.0	56.5	0.862	0.800	0.180	39.0	27.7	50.3
		16.0	57.3				39.5	28.3	50.8
	Overhang Top	24.3	62.6		0.137		7.42		
		24.3	62.6		-0.363		-19.6		
	Overhang Bot	16.0	57.3		0.800		39.5		
3	Side Wall	24.3	62.6	0.862	-0.700	0.180	-37.8	-49.1	-26.5
4	Leeward Wall	24.3	62.6	0.862	-0.420	0.180	-22.7	-33.9	-11.4
C	Windward Roof	24.3	62.6	0.862	0.137	0.180	7.41	-3.86	18.7
		24.3	62.6		-0.363		-19.6	-30.9	-8.31
D	Leeward Roof	24.3	62.6	0.862	-0.569	0.180	-30.7	-42.0	-19.4
A&B	Roof	0.00 - 12.2*	62.6	0.862	-0.900	0.180	-48.6	-59.8	-37.3
		12.2 - 24.3*	62.6				-48.6	-59.8	-37.3
		24.3 - 48.7*	62.6		-0.500		-27.0	-38.3	-15.7
		48.7 - 140*	62.6		-0.300		-16.2	-27.5	-4.93
		0.00 - 140*	62.6		-0.180		-9.72	-21.0	1.55

This is load case 1 in ASCE 7-16 Figure 27.3-8. See Figure 27.3-8 for other cases.

* Distance from windward edge.

Bhagwansingh family residence

ASCE 7-16 Wind Load Report - Wind Direction 3

June 02, 2025

This data was calculated using the building of all heights method.

#	Surface	z (ft)	q (psf)	G	Cp	GCpi	Ext Pres (psf)	Net w/ +GCpi (psf)	Net w/ -GCpi (psf)
1	Leeward Wall	24.3	62.6	0.853	-0.500	0.180	-26.7	-38.0	-15.4
2	Side Wall	24.3	62.6	0.853	-0.700	0.180	-37.4	-48.6	-26.1
3	Windward Wall	15.0	56.5	0.853	0.800	0.180	38.6	27.3	49.8
		16.0	57.3				39.1	27.8	50.4
	Overhang Top	24.3	62.6		0.137		7.33		
		24.3	62.6		-0.363		-19.4		
	Overhang Bot	16.0	57.3		0.800		39.1		
4	Side Wall	24.3	62.6	0.853	-0.700	0.180	-37.4	-48.6	-26.1
B	Windward Roof	24.3	62.6	0.853	0.137	0.180	7.32	-3.95	18.6
		24.3	62.6		-0.363		-19.4	-30.6	-8.10
A	Leeward Roof	24.3	62.6	0.853	-0.569	0.180	-30.3	-41.6	-19.1
C&D	Roof	0.00 - 12.2*	62.6	0.853	-0.900	0.180	-48.0	-59.3	-36.8
		12.2 - 24.3*	62.6				-48.0	-59.3	-36.8
		24.3 - 48.7*	62.6		-0.500		-26.7	-38.0	-15.4
		48.7 - 100.0*	62.6		-0.300		-16.0	-27.3	-4.74
		0.00 - 100.0*	62.6		-0.180		-9.61	-20.9	1.66

This is load case 1 in ASCE 7-16 Figure 27.3-8. See Figure 27.3-8 for other cases.

* Distance from windward edge.

Bhagwansingh family residence

ASCE 7-16 Wind Load Report - Wind Direction 4

June 02, 2025

This data was calculated using the building of all heights method.

#	Surface	z (ft)	q (psf)	G	Cp	GCpi	Ext Pres (psf)	Net w/ +GCpi (psf)	Net w/ -GCpi (psf)
1	Side Wall	24.3	62.6	0.862	-0.700	0.180	-37.8	-49.1	-26.5
2	Leeward Wall	24.3	62.6	0.862	-0.420	0.180	-22.7	-33.9	-11.4
3	Side Wall	24.3	62.6	0.862	-0.700	0.180	-37.8	-49.1	-26.5
4	Windward Wall	15.0	56.5	0.862	0.800	0.180	39.0	27.7	50.3
		16.0	57.3				39.5	28.3	50.8
	Overhang Top	24.3	62.6		0.137		7.42		
		24.3	62.6		-0.363		-19.6		
	Overhang Bot	16.0	57.3		0.800		39.5		
D	Windward Roof	24.3	62.6	0.862	0.137	0.180	7.41	-3.86	18.7
		24.3	62.6		-0.363		-19.6	-30.9	-8.31
C	Leeward Roof	24.3	62.6	0.862	-0.569	0.180	-30.7	-42.0	-19.4
A&B	Roof	0.00 - 12.2*	62.6	0.862	-0.900	0.180	-48.6	-59.8	-37.3
		12.2 - 24.3*	62.6				-48.6	-59.8	-37.3
		24.3 - 48.7*	62.6		-0.500		-27.0	-38.3	-15.7
		48.7 - 140*	62.6		-0.300		-16.2	-27.5	-4.93
		0.00 - 140*	62.6		-0.180		-9.72	-21.0	1.55

This is load case 1 in ASCE 7-16 Figure 27.3-8. See Figure 27.3-8 for other cases.

* Distance from windward edge.

designengineering & supply, Inc.

2799 NW Boca Raton Blvd. #111

Boca Raton, FL 33431

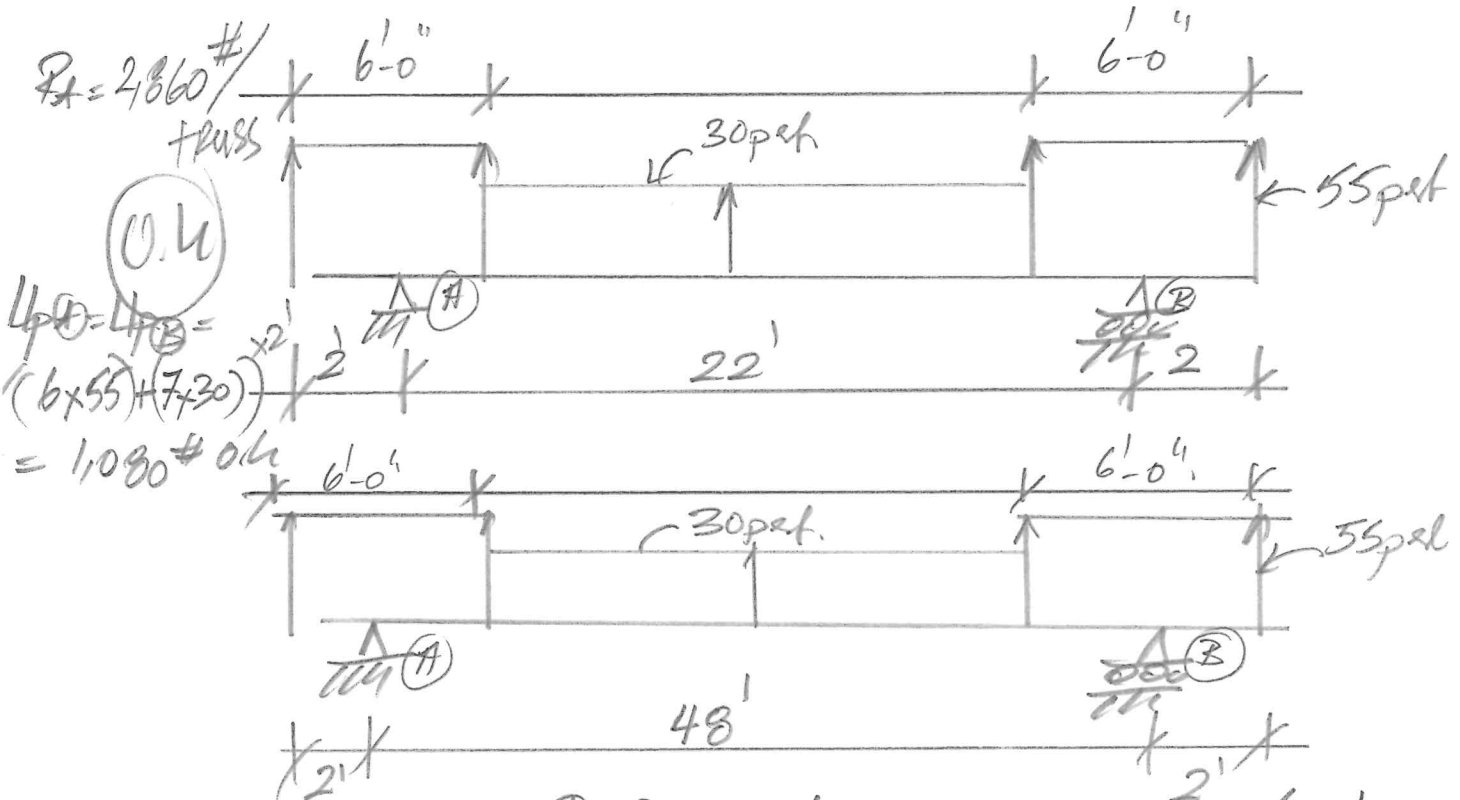
P: 561-705-2930 F: 561-431-3211

Email: yemeniciler@netzero.net

desupply@aol.com

Re: Bhagwansingh house
Fire Crest, FL

Roof Uplift & Reaction Calculations



Best Regards,

Ali N. Yemeniciler, MsCE., P.E
FL. Reg # 54733

"The Pressure's On Us."

Truss

0.4

designengineering & supply, Inc.

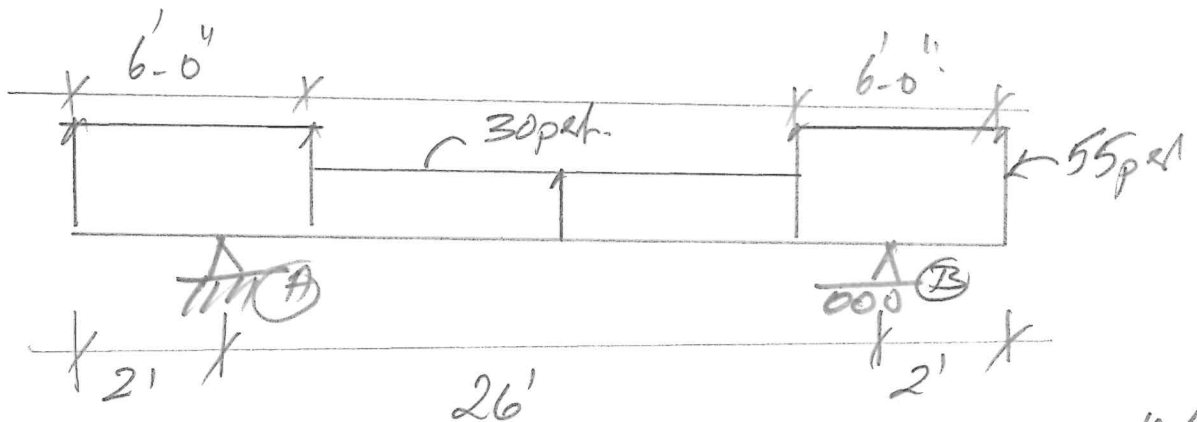
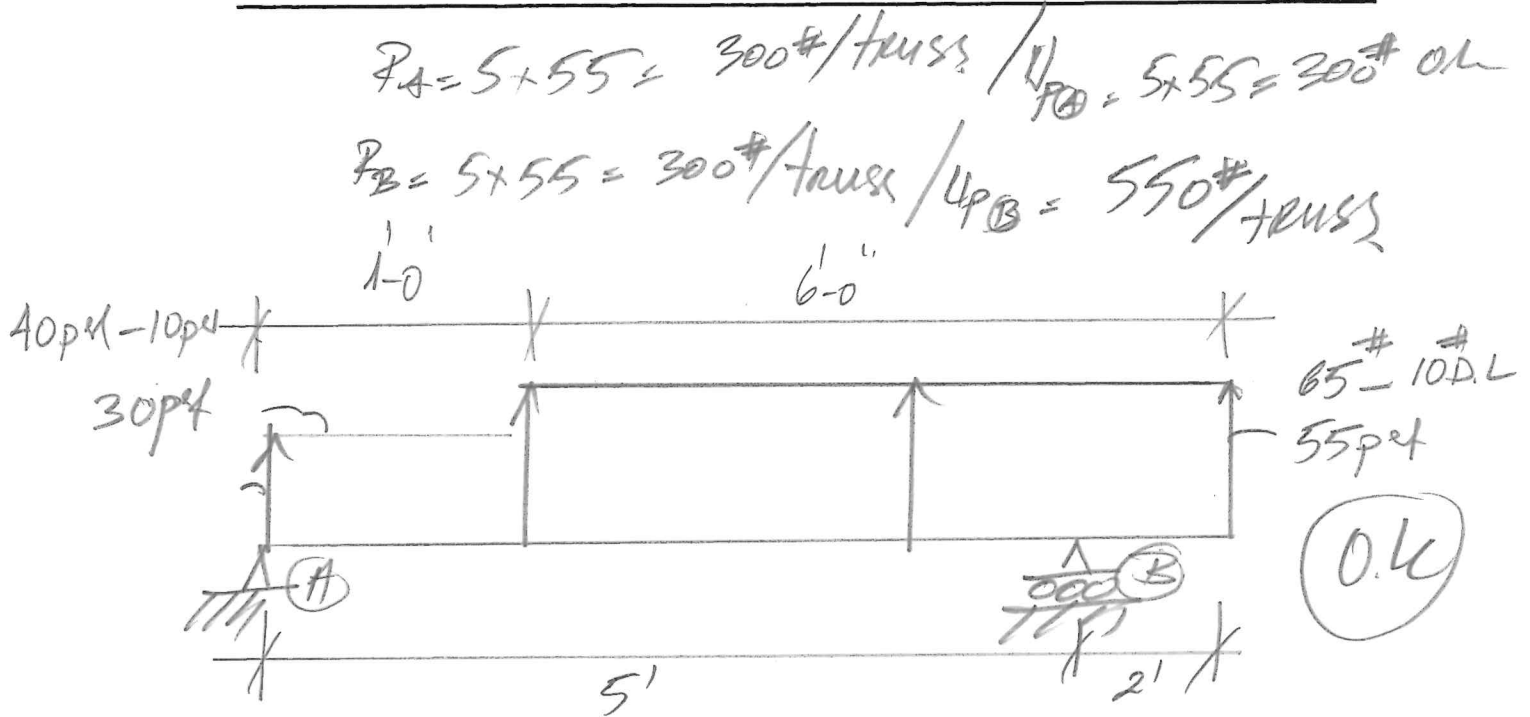
2799 NW Boca Raton Blvd. #111

Boca Raton, FL 33431

P: 561-705-2930 F: 561-431-3211

Email: yemeniciler@netzero.net

desupply@aol.com



Best Regards,

$$P_A = P_B = 15' \times 55 \# / \text{ft} \times 2' = 1,650 \# / \text{truss}$$

$$U_{P(A)} = U_{P(B)} = \frac{(6 \times 55) + (9 \times 30)}{12} \times 2' = 1,200 \#$$

Ali N. Yemeniciler, MsCE., P.E
FL. Reg # 54733

"The Pressure's On Us."

$P_{00} \text{ truss}$
O.K.

designengineering & supply, Inc.

2799 NW Boca Raton Blvd. #111

Boca Raton, FL 33431

P: 561-705-2930 F: 561-431-3211

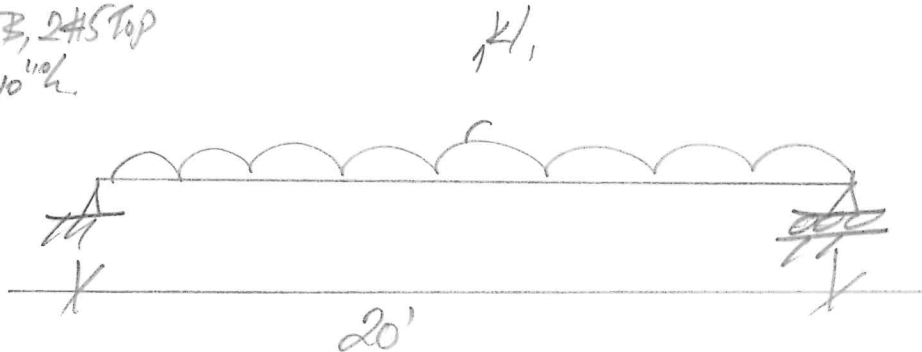
Email: yemeniciler@netzero.net

desupply@aol.com

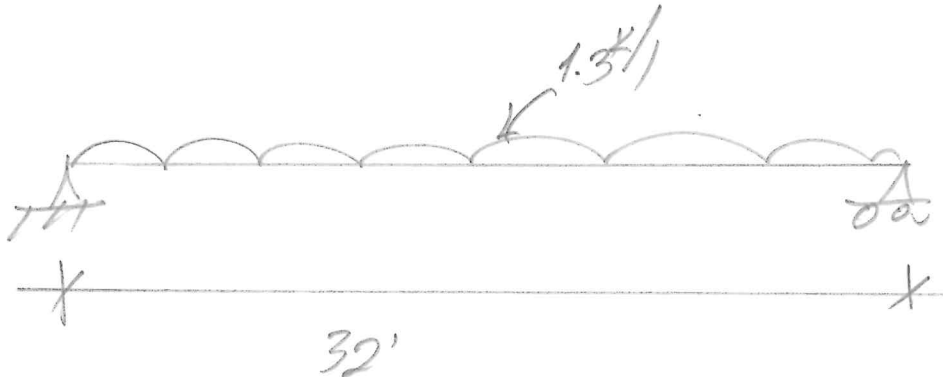
Re: Bhagwansingh house
Time cast, FL

Concrete Beam / Lintel calculation

8' x 40"
B1-11 2#6_T, 2#5_{Top}
#3 @ 10" o.c.



B1-7 8' x 48"
2#8_T, 2
(2) 2#8
#3 @ 8" o.c.



Best Regards,

Ali N. Yemeniciler, MsCE., P.E.
FL. Reg # 54733

13

"The Pressure's On Us."

designengineering & supply, Inc.

2799 NW Boca Raton Blvd. #111

Boca Raton, FL 33431

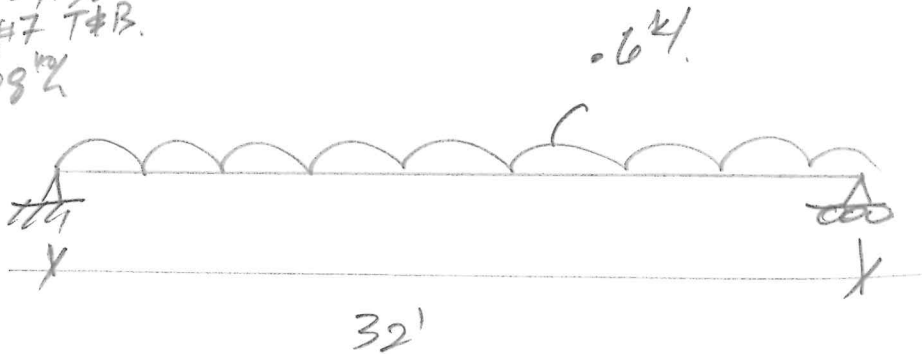
P: 561-705-2930 F: 561-431-3211

Email: yemeniciler@netzero.net

desupply@aol.com

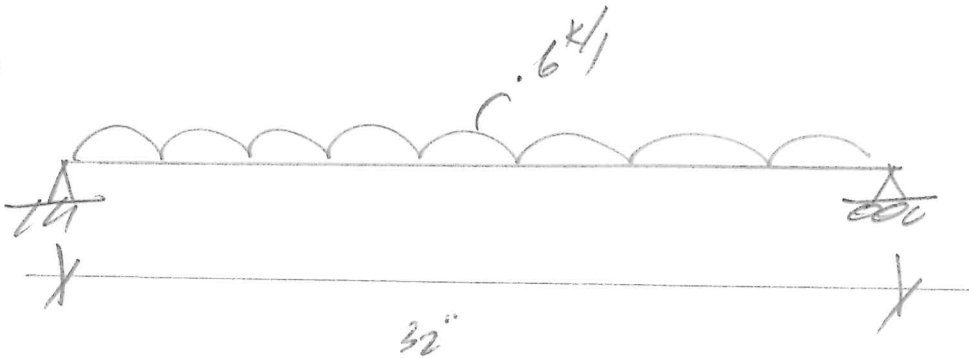
B1-8

18" x 30"
5#7 T&B.
#308^{1/2}



B1-3

18" x 24"
5#7 T&B.
#308^{1/2}



Best Regards,

Ali N. Yemeniciler, MsCE., P.E.
FL. Reg # 54733

14

"The Pressure's On Us."

designengineering & supply, Inc.

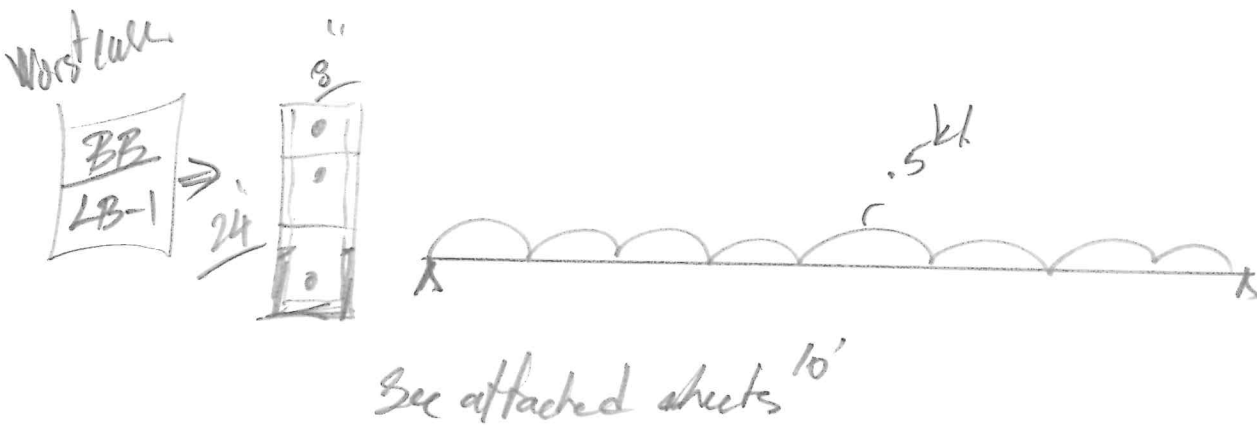
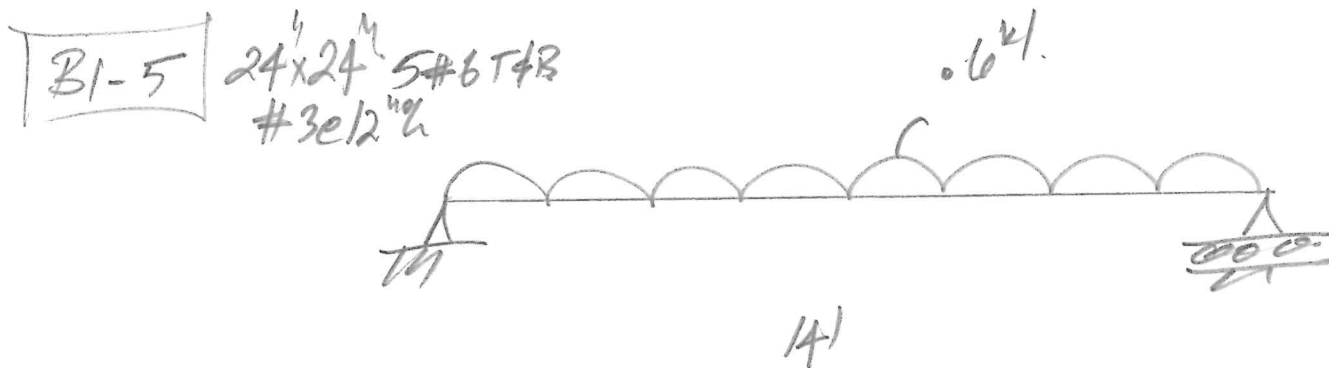
2799 NW Boca Raton Blvd. #111

Boca Raton, FL 33431

P: 561-705-2930 F: 561-431-3211

Email: yemeniciler@netzero.net

desupply@aol.com



Best Regards,

Ali N. Yemeniciler, MsCE., P.E
FL. Reg # 54733

"The Pressure's On Us."

ENGINEERING SPECIFICATIONS

PRODUCT DESCRIPTION

High strength precast and prestressed concrete lintels designed to be used unfilled or filled with grout to form a composite reinforced beam using concrete masonry units.

MATERIALS

- f'c 8" precast lintels = 3500 psi
- f'c 8" prestressed, 6" and 12" precast lintels = 6000 psi
- f'c 4" precast lintels = 3000 psi
- Grout per ASTM C476 f'g = 3000 psi w/maximum 3/8 inch aggregate and 8 to 11 inch slump.
- Concrete masonry units (CMU) per ASTM C90 with minimum net area compressive strength = 1900 psi
- Rebar per ASTM A615 Grade 60
- Prestressing strand per ASTM A416 Grade 270 low relaxation
- 7/32 inch wire per ASTM A510
- Mortar per ASTM C270 Type M or S

GENERAL NOTES

1. Provide full mortar head and bed joints.
2. Shore filled lintels as required.
3. Installation of lintel must comply with architectural and/or structural drawings.
4. U-Lintels are manufactured with 5-1/2 inch long notches at ends to accommodate vertical cell reinforcing and grouting.
5. All lintels meet or exceed L/360 vertical deflection, except lintels 17'-4" and longer with a nominal height of 8" meet or exceed L/180.
6. Bottom field added rebar to be located at the bottom of lintel cavity.
7. 7/32 inch diameter wire stirrups are welded to the bottom steel for mechanical anchorage.
8. Cast-in-place concrete may be provided in composite lintel in lieu of concrete masonry units.
9. Safe load ratings based on rational design analysis per ACI 318 and ACI 530
10. Product Approvals: Miami-Dade County, Florida Nos. 03-0605.05 and 03-0605.04. Florida Certificate of Product Approval No. FL158.
11. The exterior surface of lintels installed in exterior concrete masonry walls shall have a coating of stucco applied in accordance with ASTM C-926 or other approved coating.
12. Lintels loaded simultaneously with vertical (gravity or uplift) and horizontal (lateral) loads should be checked for the combined loading with the following equation:
$$\frac{\text{Applied vertical load}}{\text{Safe vertical load}} + \frac{\text{Applied horizontal load}}{\text{Safe horizontal load}} \leq 1.0$$

SAFE LOAD TABLE NOTES

1. All values based on minimum 4 inch nominal bearing. Exception: Safe loads for unfilled lintels must be reduced by 20% if bearing length is less than 6-1/2 inches.
2. N.R. = Not Rated.
3. Safe loads are superimposed allowable load.
4. Safe loads based on Grade 40 or Grade 60 field rebar.
5. Additional lateral load capacity can be obtained by the designer by providing additional reinforced masonry above the precast lintel. See Reinforced CMU on Page 4.
6. One #7 rebar may be substituted for two #5 rebars in 8" lintels only.
7. The designer may evaluate concentrated loads from the safe load tables by calculating the maximum resisting moment and shear at 1/4 span from the face of support.
8. For composite lintel heights not shown, use safe load from next lower height.
9. For lintel lengths not shown, use safe load from the next longest length shown.
10. All safe loads in units of pounds per linear foot.
11. All safe loads based on simply supported span.
12. The number in the parenthesis indicates the percent reduction for grade 40 field added rebar.
Example: 7'6" lintel Type 8F32-1B safe gravity load = 6472 (15) w/15% reduction => 6472 (.85) = 5501 plf

8 INCH LINTEL

(LBS/FT) SAFE LOADS

CAST-IN-PLACE		UPLIFT						LATERAL			
LENGTH*	TYPE	8F8-1T	8F12-1T	8F16-1T	8F20-1T	8F24-1T	8F28-1T	8F32-1T	8U8	8F8	REINFC. CMU**
		8F8-2T	8F12-2T	8F16-2T	8F20-2T	8F24-2T	8F28-2T	8F32-2T			
2'-10" (34")	PRECAST	1972	3173	4460	5747	7034	8321	9608	1293	1642	2135
		1972	3173	4460	5747	7034	8321	9608			
3'-6" (42")	PRECAST	1569	2524	3547	4569	5591	6613	7636	1025	1024	1830
		1569	2524	3547	4569	5591	6613	7636			
4'-0" (48")	PRECAST	1363	2192	3079	3966	4853	5740	6627	765	763	1365
		1363	2192	3079	3966	4853	5740	6627			
4'-6" (54")	PRECAST	1207	1940	2724	3508	4292	5077	5861	592	591	1057
		1207	1940	2724	3508	4292	5077	5861			
5'-4" (64")	PRECAST	1016	1632	2290	2949	3607	4265	4924	411	411	734
		1016	1632	2290	2949	3607	4265	4924			
5'-10" (70")	PRECAST	909	1492	2093	2694	3295	3897	4498	340	339	607
		929	1492	2093	2694	3295	3897	4498			
6'-6" (78")	PRECAST	835 (12)	1340	1880	2419	2959	3498	4038	507	721	483
		835	1340	1880	2419	2959	3498	4038			
7'-6" (90")	PRECAST	727 (23)	1021	1634 (12)	2102 (11)	2571 (10)	3039 (10)	3508 (9)	424	534	357
		727	1166	1634	2102	2571	3039	3508			
9'-4" (112")	PRECAST	591	680	1133 (15)	1471 (15)	1811 (15)	2152 (16)	2494 (15)	326	512	227
		591	851	1326	1705	2084	2463	2842			
10'-6" (126")	PRECAST	530	552	914 (15)	1185 (15)	1458 (15)	1732 (15)	2007 (15)	284	401	178
		530	686	1183	1526	1865	2204	2544			
11'-4" (136")	PRECAST	474	485	798 (15)	1034 (15)	1272 (15)	1510 (15)	1749 (15)	260	452	152
		494	599	1028	1422	1738	2053	2369			
12'-0" (144")	PRECAST	470 (9)	441	723 (14)	936 (14)	1151 (15)	1366 (15)	1582 (15)	244	402	135
		470	543	928	1349	1649	1948	2247			
13'-4" (160")	PRECAST	418 (15)	373	606 (14)	783 (14)	962 (14)	1141 (14)	1321 (14)	217	324	109
		428	455	770	1145	1444	1718	1993			
14'-0" (168")	PRECAST	384 (15)	346	559 (14)	723 (14)	887 (14)	1052 (14)	1218 (14)	205	293	98
		410	420	709	1050	1434 (8)	1694 (8)	1954 (7)			
14'-8" (176")	PRESTRESSED	239	323	519 (13)	671 (13)	823 (13)	976 (14)	1129 (14)	N.R.	284	89
		246	390	655	968	1324 (8)	1625 (11)	1874 (11)			
15'-4" (184")	PRESTRESSED	224	302	485 (13)	626 (13)	767 (13)	909 (13)	1052 (13)	N.R.	259	82
		230	364	609	897	1224 (8)	1562 (14)	1801 (14)			
17'-4" (208")	PRESTRESSED	187	255	404 (12)	520 (12)	637 (12)	754 (12)	872 (12)	N.R.	194	63
		192	303	500	732	993 (8)	1268 (14)	1470 (14)			
19'-4" (232")	PRESTRESSED	162	222	347 (11)	446 (11)	546 (12)	646 (12)	746 (12)	N.R.	148	51
		166	261	424	616	831 (8)	1057 (14)	1225 (14)			
21'-4" (256")	PRESTRESSED	142	198	306 (11)	393 (11)	480 (11)	567 (11)	654 (11)	N.R.	125	42
		142	230	369	531	713 (7)	903 (13)	1046 (13)			
22'-0" (264")	PRESTRESSED	137	192	295 (10)	378 (11)	461 (10)	545 (11)	629 (11)	N.R.	116	39
		137	221	354	508	681 (7)	861 (13)	997 (13)			
24'-0" (288")	PRESTRESSED	124	175	267 (10)	341 (10)	416 (10)	491 (10)	566 (10)	N.R.	91	33
		124	200	316	450	600 (7)	756 (12)	875 (13)			

* LENGTH = OVERALL LENGTH OF LINTEL

12

(X) = SEE SAFE LOAD TABLE NOTES #12

** = SEE SAFE LOAD TABLE NOTES #5

PAGE 6

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC#: KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

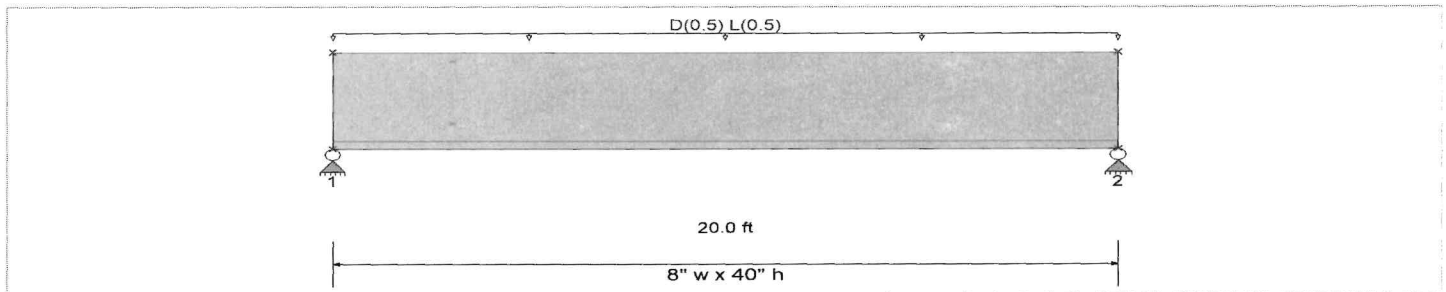
DESCRIPTION: --None--

CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019
Load Combination Set : ASCE 7-22 / IBC 2024

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
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 = 8.0 in, Height = 40.0 in

Span #1 Reinforcing....

2-#6 at 3.0 in from Bottom, from 0.0 to 20.0 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : D = 0.50, L = 0.50 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.632 : 1
Section used for this span		Typical Section
Mu : Applied		89.333 k-ft
Mn * Phi : Allowable		141.395 k-ft
Location of maximum on span		10.018 ft
Span # where maximum occurs		Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.014 in	Ratio = 17766	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio = 0	<360.0	L Only
Max Downward Total Deflection	0.036 in	Ratio = 6718	>=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	13.222	13.222
Max Upward from Load Combinations	13.222	13.222
Max Upward from Load Cases	8.222	8.222
D Only	8.222	8.222
+D+L	13.222	13.222
+D+0.750L	11.972	11.972
+0.60D	4.933	4.933

-19 -

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
L Only	5.000	5.000

Shear Stirrup Requirements

Between 0.00 to 3.17 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 18.000 in
 Between 3.21 to 16.79 ft, $V_u < \Phi^*V_c / 2$, Req'd Vs = Not Req'd per 9.6.3.1, Stirrups are not required.
 Between 16.83 to 19.96 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 18.000 in

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Φ^*V_c (k)	Comment Φ^*V_s (k)	Φ^*V_n (k) Spacing (in) Req'd
1	+1.20D+1.60L	0.00 37.00	17.87 17.87	0.00 1.00	24.32	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	37.9 18.5
1	+1.20D+1.60L	0.22 37.00	17.48 17.48	3.86 1.00	24.75	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	0.44 37.00	17.09 17.09	7.64 1.00	24.75	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	0.66 37.00	16.70 16.70	11.33 1.00	24.75	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	0.87 37.00	16.30 16.30	14.94 1.00	24.75	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	1.09 37.00	15.91 15.91	18.46 1.00	24.75	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	1.31 37.00	15.52 15.52	21.90 1.00	24.75	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	1.53 37.00	15.13 15.13	25.25 1.00	24.75	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	1.75 37.00	14.74 14.74	28.51 1.00	24.75	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	1.97 37.00	14.35 14.35	31.69 1.00	24.75	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	2.19 37.00	13.96 13.96	34.78 1.00	24.75	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	2.40 37.00	13.57 13.57	37.79 1.00	24.75	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	2.62 37.00	13.18 13.18	40.72 1.00	24.75	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	2.84 37.00	12.79 12.79	43.56 0.91	24.60	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	38.2 18.5
1	+1.20D+1.60L	3.06 37.00	12.40 12.40	46.31 0.83	24.47	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	38.0 18.5
1	+1.20D+1.60L	3.28 37.00	12.01 12.01	48.98 0.76	24.35	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	24.4 0.0
1	+1.20D+1.60L	3.50 37.00	11.62 11.62	51.56 0.69	24.32	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	3.72 37.00	11.23 11.23	54.06 0.64	24.32	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	3.93 37.00	10.84 10.84	56.47 0.59	24.32	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	4.15 37.00	10.45 10.45	58.79 0.55	24.32	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	4.37 37.00	10.06 10.06	61.03 0.51	24.32	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	4.59 37.00	9.67 9.67	63.19 0.47	24.32	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	4.81 37.00	9.28 9.28	65.26 0.44	24.32	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	5.03 37.00	8.88 8.88	67.24 0.41	24.32	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	5.25 37.00	8.49 8.49	69.14 0.38	24.32	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	5.46 37.00	8.10 8.10	70.96 0.35	24.32	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	5.68 37.00	7.71 7.71	72.69 0.33	24.32	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	24.3 0.0

—20—

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC#: KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	5.90 37.00	7.32 7.32	74.33 0.30	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	6.12 37.00	6.93 6.93	75.89 0.28	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	6.34 37.00	6.54 6.54	77.36 0.26	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	6.56 37.00	6.15 6.15	78.75 0.24	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	6.78 37.00	5.76 5.76	80.05 0.22	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	6.99 37.00	5.37 5.37	81.26 0.20	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	7.21 37.00	4.98 4.98	82.40 0.19	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	7.43 37.00	4.59 4.59	83.44 0.17	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	7.65 37.00	4.20 4.20	84.40 0.15	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	7.87 37.00	3.81 3.81	85.28 0.14	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	8.09 37.00	3.42 3.42	86.07 0.12	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	8.31 37.00	3.03 3.03	86.77 0.11	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	8.52 37.00	2.64 2.64	87.39 0.09	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	8.74 37.00	2.25 2.25	87.92 0.08	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	8.96 37.00	1.86 1.86	88.37 0.06	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	9.18 37.00	1.46 1.46	88.73 0.05	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	9.40 37.00	1.07 1.07	89.01 0.04	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	9.62 37.00	0.68 0.68	89.20 0.02	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	9.84 37.00	0.29 0.29	89.31 0.01	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	10.05 37.00	-0.10 0.10	89.33 0.00	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	10.27 37.00	-0.49 0.49	89.27 0.02	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	10.49 37.00	-0.88 0.88	89.12 0.03	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	10.71 37.00	-1.27 1.27	88.88 0.04	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	10.93 37.00	-1.66 1.66	88.56 0.06	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	11.15 37.00	-2.05 2.05	88.16 0.07	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	11.37 37.00	-2.44 2.44	87.67 0.09	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	11.58 37.00	-2.83 2.83	87.09 0.10	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	11.80 37.00	-3.22 3.22	86.43 0.11	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	12.02 37.00	-3.61 3.61	85.68 0.13	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	12.24 37.00	-4.00 4.00	84.85 0.15	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	12.46 37.00	-4.39 4.39	83.93 0.16	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0

-21-

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC#: KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	12.68 37.00	-4.78 4.78	82.93 0.18	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	12.90 37.00	-5.17 5.17	81.84 0.19	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	13.11 37.00	-5.57 5.57	80.67 0.21	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	13.33 37.00	-5.96 5.96	79.41 0.23	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	13.55 37.00	-6.35 6.35	78.06 0.25	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	13.77 37.00	-6.74 6.74	76.63 0.27	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	13.99 37.00	-7.13 7.13	75.12 0.29	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	14.21 37.00	-7.52 7.52	73.52 0.32	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	14.43 37.00	-7.91 7.91	71.83 0.34	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	14.64 37.00	-8.30 8.30	70.06 0.37	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	14.86 37.00	-8.69 8.69	68.20 0.39	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	15.08 37.00	-9.08 9.08	66.26 0.42	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	15.30 37.00	-9.47 9.47	64.23 0.45	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	15.52 37.00	-9.86 9.86	62.12 0.49	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	15.74 37.00	-10.25 10.25	59.92 0.53	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	15.96 37.00	-10.64 10.64	57.64 0.57	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	16.17 37.00	-11.03 11.03	55.27 0.62	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	16.39 37.00	-11.42 11.42	52.82 0.67	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	16.61 37.00	-11.81 11.81	50.28 0.72	24.32	Vu < Phi*Vc / 2 Not Req'd per 9	24.3 0.0
1	+1.20D+1.60L	16.83 37.00	-12.20 12.20	47.65 0.79	24.41	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.0 18.5
1	+1.20D+1.60L	17.05 37.00	-12.59 12.59	44.94 0.86	24.53	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.1 18.5
1	+1.20D+1.60L	17.27 37.00	-12.99 12.99	42.15 0.95	24.67	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.2 18.5
1	+1.20D+1.60L	17.49 37.00	-13.38 13.38	39.27 1.00	24.75	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	17.70 37.00	-13.77 13.77	36.30 1.00	24.75	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	17.92 37.00	-14.16 14.16	33.25 1.00	24.75	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	18.14 37.00	-14.55 14.55	30.11 1.00	24.75	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	18.36 37.00	-14.94 14.94	26.89 1.00	24.75	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	18.58 37.00	-15.33 15.33	23.58 1.00	24.75	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	18.80 37.00	-15.72 15.72	20.19 1.00	24.75	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	19.02 37.00	-16.11 16.11	16.71 1.00	24.75	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	19.23 37.00	-16.50 16.50	13.15 1.00	24.75	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.3 18.5

— 22 —

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	19.45 37.00	-16.89 16.89	9.50 1.00	24.75	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	19.67 37.00	-17.28 17.28	5.76 1.00	24.75	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.3 18.5
1	+1.20D+1.60L	19.89 37.00	-17.67 17.67	1.94 1.00	24.75	Phi*Vc / 2 < Vu <= Min per 9.6.3.	38.3 18.5

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
MAXimum BENDING Envelope					
Span # 1	1	20.000	89.33	141.40	0.63
+1.40D					
Span # 1	1	20.000	57.56	141.40	0.41
+1.20D+1.60L					
Span # 1	1	20.000	89.33	141.40	0.63
+1.20D+L					
Span # 1	1	20.000	74.33	141.40	0.53
+1.20D					
Span # 1	1	20.000	49.33	141.40	0.35
+0.90D					
Span # 1	1	20.000	37.00	141.40	0.26

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl (in) in Span (ft)	Location	Load Combination	Max. "+" Defl (in) in Span (ft)
1	+D+L	0.0357	10.000		0.0000 0.000

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

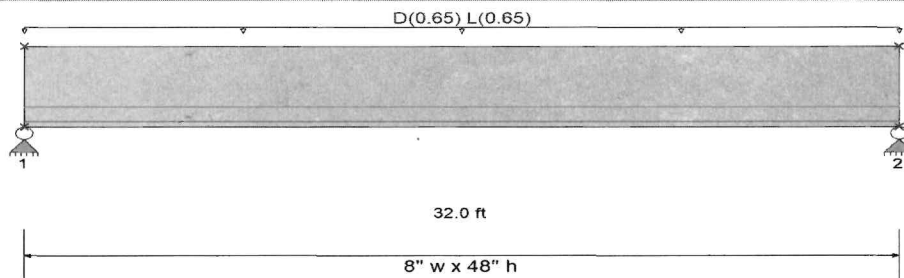
DESCRIPTION: --None--

CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019
Load Combination Set : ASCE 7-22 / IBC 2024

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
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 = 8.0 in, Height = 48.0 in

Span #1 Reinforcing....

2-#8 at 3.0 in from Bottom, from 0.0 to 32.0 ft in this span

2-#8 at 12.0 in from Bottom, from 0.0 to 32.0 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : D = 0.650, L = 0.650 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.573 : 1
Section used for this span		Typical Section
Mu : Applied		292.351 k-ft
Mn * Phi : Allowable		509.83 k-ft
Location of maximum on span		15.971 ft
Span # where maximum occurs		Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.067 in	Ratio =	5765	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	L Only
Max Downward Total Deflection	0.377 in	Ratio =	1019	>=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	26.987	26.987
Max Upward from Load Combinations	26.987	26.987
Max Upward from Load Cases	16.587	16.587
D Only	16.587	16.587
+D+L	26.987	26.987
+D+0.750L	24.387	24.387
+0.60D	9.952	9.952

— 24 —

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
L Only	10.400	10.400

Shear Stirrup Requirements

Between 0.00 to 10.14 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 20.000 in
Between 10.20 to 21.80 ft, $V_u < \Phi^*V_c / 2$, Req'd Vs = Not Req'd per 9.6.3.1, Stirrups are not required.
Between 21.86 to 31.94 ft, $\Phi^*V_c < V_u$, Req'd Vs = 5.331, use #3 stirrups spaced at 20.000 in

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	0.00 40.50	36.54 36.54	0.00 1.00	31.21	Phi*Vc < Vu 5.331	44.6 20.3
1	+1.20D+1.60L	0.35 40.50	35.75 35.75	12.64 1.00	31.21	Phi*Vc < Vu 4.532	44.6 20.3
1	+1.20D+1.60L	0.70 40.50	34.95 34.95	25.00 1.00	31.21	Phi*Vc < Vu 3.733	44.6 20.3
1	+1.20D+1.60L	1.05 40.50	34.15 34.15	37.08 1.00	31.21	Phi*Vc < Vu 2.934	44.6 20.3
1	+1.20D+1.60L	1.40 40.50	33.35 33.35	48.89 1.00	31.21	Phi*Vc < Vu 2.136	44.6 20.3
1	+1.20D+1.60L	1.75 40.50	32.55 32.55	60.41 1.00	31.21	Phi*Vc < Vu 1.337	44.6 20.3
1	+1.20D+1.60L	2.10 40.50	31.75 31.75	71.65 1.00	31.21	Phi*Vc < Vu 0.5380	44.6 20.3
1	+1.20D+1.60L	2.45 40.50	30.95 30.95	82.62 1.00	31.21	Phi*Vc / 2 < Vu <= Min per 9.6.3.	44.6 20.3
1	+1.20D+1.60L	2.80 40.50	30.15 30.15	93.30 1.00	31.21	Phi*Vc / 2 < Vu <= Min per 9.6.3.	44.6 20.3
1	+1.20D+1.60L	3.15 40.50	29.36 29.36	103.71 0.96	30.95	Phi*Vc / 2 < Vu <= Min per 9.6.3.	44.3 20.3
1	+1.20D+1.60L	3.50 40.50	28.56 28.56	113.84 0.85	30.30	Phi*Vc / 2 < Vu <= Min per 9.6.3.	43.7 20.3
1	+1.20D+1.60L	3.85 40.50	27.76 27.76	123.68 0.76	29.78	Phi*Vc / 2 < Vu <= Min per 9.6.3.	43.1 20.3
1	+1.20D+1.60L	4.20 40.50	26.96 26.96	133.25 0.68	29.33	Phi*Vc / 2 < Vu <= Min per 9.6.3.	42.7 20.3
1	+1.20D+1.60L	4.55 40.50	26.16 26.16	142.54 0.62	28.96	Phi*Vc / 2 < Vu <= Min per 9.6.3.	42.3 20.3
1	+1.20D+1.60L	4.90 40.50	25.36 25.36	151.55 0.56	28.63	Phi*Vc / 2 < Vu <= Min per 9.6.3.	42.0 20.3
1	+1.20D+1.60L	5.25 40.50	24.56 24.56	160.28 0.52	28.35	Phi*Vc / 2 < Vu <= Min per 9.6.3.	41.7 20.3
1	+1.20D+1.60L	5.60 40.50	23.76 23.76	168.73 0.48	28.10	Phi*Vc / 2 < Vu <= Min per 9.6.3.	41.5 20.3
1	+1.20D+1.60L	5.95 40.50	22.96 22.96	176.90 0.44	27.88	Phi*Vc / 2 < Vu <= Min per 9.6.3.	41.2 20.3
1	+1.20D+1.60L	6.30 40.50	22.17 22.17	184.79 0.40	27.69	Phi*Vc / 2 < Vu <= Min per 9.6.3.	41.1 20.3
1	+1.20D+1.60L	6.64 40.50	21.37 21.37	192.40 0.37	27.51	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.9 20.3
1	+1.20D+1.60L	6.99 40.50	20.57 20.57	199.74 0.35	27.35	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.7 20.3
1	+1.20D+1.60L	7.34 40.50	19.77 19.77	206.79 0.32	27.20	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.6 20.3
1	+1.20D+1.60L	7.69 40.50	18.97 18.97	213.57 0.30	27.06	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.4 20.3
1	+1.20D+1.60L	8.04 40.50	18.17 18.17	220.06 0.28	26.94	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.3 20.3
1	+1.20D+1.60L	8.39 40.50	17.37 17.37	226.28 0.26	26.82	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.2 20.3
1	+1.20D+1.60L	8.74 40.50	16.57 16.57	232.21 0.24	26.72	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.1 20.3
1	+1.20D+1.60L	9.09 40.50	15.78 15.78	237.87 0.22	26.62	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.0 20.3

25

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	9.44 40.50	14.98 14.98	243.25 0.21	26.62	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.0 20.3
1	+1.20D+1.60L	9.79 40.50	14.18 14.18	248.35 0.19	26.62	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.0 20.3
1	+1.20D+1.60L	10.14 40.50	13.38 13.38	253.16 0.18	26.62	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.0 20.3
1	+1.20D+1.60L	10.49 40.50	12.58 12.58	257.70 0.16	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	10.84 40.50	11.78 11.78	261.96 0.15	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	11.19 40.50	10.98 10.98	265.94 0.14	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	11.54 40.50	10.18 10.18	269.65 0.13	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	11.89 40.50	9.39 9.39	273.07 0.12	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	12.24 40.50	8.59 8.59	276.21 0.10	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	12.59 40.50	7.79 7.79	279.07 0.09	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	12.94 40.50	6.99 6.99	281.66 0.08	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	13.29 40.50	6.19 6.19	283.96 0.07	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	13.64 40.50	5.39 5.39	285.99 0.06	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	13.99 40.50	4.59 4.59	287.73 0.05	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	14.34 40.50	3.79 3.79	289.20 0.04	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	14.69 40.50	3.00 3.00	290.39 0.03	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	15.04 40.50	2.20 2.20	291.30 0.03	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	15.39 40.50	1.40 1.40	291.92 0.02	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	15.74 40.50	0.60 0.60	292.27 0.01	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	16.09 40.50	-0.20 0.20	292.34 0.00	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	16.44 40.50	-1.00 1.00	292.13 0.01	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	16.79 40.50	-1.80 1.80	291.64 0.02	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	17.14 40.50	-2.60 2.60	290.88 0.03	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	17.49 40.50	-3.39 3.39	289.83 0.04	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	17.84 40.50	-4.19 4.19	288.50 0.05	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	18.19 40.50	-4.99 4.99	286.90 0.06	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	18.54 40.50	-5.79 5.79	285.01 0.07	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	18.89 40.50	-6.59 6.59	282.85 0.08	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	19.23 40.50	-7.39 7.39	280.40 0.09	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	19.58 40.50	-8.19 8.19	277.68 0.10	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	19.93 40.50	-8.99 8.99	274.67 0.11	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC#: KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	20.28 40.50	-9.79 9.79	271.39 0.12	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	20.63 40.50	-10.58 10.58	267.83 0.13	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	20.98 40.50	-11.38 11.38	263.99 0.15	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	21.33 40.50	-12.18 12.18	259.87 0.16	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	21.68 40.50	-12.98 12.98	255.47 0.17	26.62	Vu < Phi*Vc / 2 Not Req'd per 9	26.6 0.0
1	+1.20D+1.60L	22.03 40.50	-13.78 13.78	250.79 0.19	26.62	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.0 20.3
1	+1.20D+1.60L	22.38 40.50	-14.58 14.58	245.83 0.20	26.62	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.0 20.3
1	+1.20D+1.60L	22.73 40.50	-15.38 15.38	240.59 0.22	26.62	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.0 20.3
1	+1.20D+1.60L	23.08 40.50	-16.18 16.18	235.08 0.23	26.66	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.0 20.3
1	+1.20D+1.60L	23.43 40.50	-16.97 16.97	229.28 0.25	26.77	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.1 20.3
1	+1.20D+1.60L	23.78 40.50	-17.77 17.77	223.20 0.27	26.88	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.2 20.3
1	+1.20D+1.60L	24.13 40.50	-18.57 18.57	216.85 0.29	27.00	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.4 20.3
1	+1.20D+1.60L	24.48 40.50	-19.37 19.37	210.21 0.31	27.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.5 20.3
1	+1.20D+1.60L	24.83 40.50	-20.17 20.17	203.30 0.33	27.27	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.6 20.3
1	+1.20D+1.60L	25.18 40.50	-20.97 20.97	196.11 0.36	27.43	Phi*Vc / 2 < Vu <= Min per 9.6.3.	40.8 20.3
1	+1.20D+1.60L	25.53 40.50	-21.77 21.77	188.63 0.39	27.60	Phi*Vc / 2 < Vu <= Min per 9.6.3.	41.0 20.3
1	+1.20D+1.60L	25.88 40.50	-22.57 22.57	180.88 0.42	27.78	Phi*Vc / 2 < Vu <= Min per 9.6.3.	41.1 20.3
1	+1.20D+1.60L	26.23 40.50	-23.36 23.36	172.85 0.46	27.99	Phi*Vc / 2 < Vu <= Min per 9.6.3.	41.4 20.3
1	+1.20D+1.60L	26.58 40.50	-24.16 24.16	164.54 0.50	28.22	Phi*Vc / 2 < Vu <= Min per 9.6.3.	41.6 20.3
1	+1.20D+1.60L	26.93 40.50	-24.96 24.96	155.95 0.54	28.49	Phi*Vc / 2 < Vu <= Min per 9.6.3.	41.9 20.3
1	+1.20D+1.60L	27.28 40.50	-25.76 25.76	147.08 0.59	28.79	Phi*Vc / 2 < Vu <= Min per 9.6.3.	42.2 20.3
1	+1.20D+1.60L	27.63 40.50	-26.56 26.56	137.93 0.65	29.14	Phi*Vc / 2 < Vu <= Min per 9.6.3.	42.5 20.3
1	+1.20D+1.60L	27.98 40.50	-27.36 27.36	128.50 0.72	29.55	Phi*Vc / 2 < Vu <= Min per 9.6.3.	42.9 20.3
1	+1.20D+1.60L	28.33 40.50	-28.16 28.16	118.80 0.80	30.03	Phi*Vc / 2 < Vu <= Min per 9.6.3.	43.4 20.3
1	+1.20D+1.60L	28.68 40.50	-28.96 28.96	108.81 0.90	30.61	Phi*Vc / 2 < Vu <= Min per 9.6.3.	44.0 20.3
1	+1.20D+1.60L	29.03 40.50	-29.75 29.75	98.54 1.00	31.21	Phi*Vc / 2 < Vu <= Min per 9.6.3.	44.6 20.3
1	+1.20D+1.60L	29.38 40.50	-30.55 30.55	88.00 1.00	31.21	Phi*Vc / 2 < Vu <= Min per 9.6.3.	44.6 20.3
1	+1.20D+1.60L	29.73 40.50	-31.35 31.35	77.17 1.00	31.21	Phi*Vc < Vu 0.1386	44.6 20.3
1	+1.20D+1.60L	30.08 40.50	-32.15 32.15	66.07 1.00	31.21	Phi*Vc < Vu 0.9374	44.6 20.3
1	+1.20D+1.60L	30.43 40.50	-32.95 32.95	54.68 1.00	31.21	Phi*Vc < Vu 1.736	44.6 20.3
1	+1.20D+1.60L	30.78 40.50	-33.75 33.75	43.02 1.00	31.21	Phi*Vc < Vu 2.535	44.6 20.3

27

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	31.13 40.50	-34.55 34.55	31.08 1.00	31.21	Phi*Vc < Vu 3.334	44.6 20.3
1	+1.20D+1.60L	31.48 40.50	-35.35 35.35	18.86 1.00	31.21	Phi*Vc < Vu 4.132	44.6 20.3
1	+1.20D+1.60L	31.83 40.50	-36.14 36.14	6.36 1.00	31.21	Phi*Vc < Vu 4.931	44.6 20.3

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
MAXimum BENDING Envelope					
Span # 1	1	32.000	292.35	509.83	0.57
+1.40D					
Span # 1	1	32.000	185.77	509.83	0.36
+1.20D+1.60L					
Span # 1	1	32.000	292.35	509.83	0.57
+1.20D+L					
Span # 1	1	32.000	242.43	509.83	0.48
+1.20D					
Span # 1	1	32.000	159.23	509.83	0.31
+0.90D					
Span # 1	1	32.000	119.42	509.83	0.23

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl (in) in Span (ft)	Location	Load Combination	Max. "+" Defl (in) in Span (ft)	Location
1	+D+L	0.3767	16.000		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

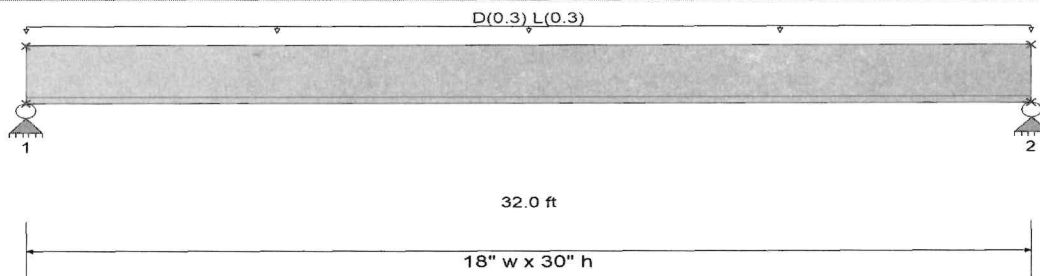
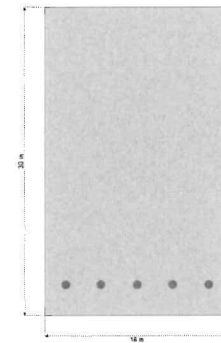
CODE REFERENCES

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

Load Combination Set : ASCE 7-22 / IBC 2024

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 = 18.0 in, Height = 30.0 in

Span #1 Reinforcing....

5-#7 at 3.0 in from Bottom, from 0.0 to 32.0 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : D = 0.30, L = 0.30 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.565 : 1
Section used for this span		Typical Section
Mu : Applied		191.039 k-ft
Mn * Phi : Allowable		338.029 k-ft
Location of maximum on span		15.971 ft
Span # where maximum occurs		Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.056 in	Ratio =	6862	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	L Only
Max Downward Total Deflection	0.421 in	Ratio =	911	>=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	18.300	18.300
Max Upward from Load Combinations	18.300	18.300
Max Upward from Load Cases	13.500	13.500
D Only	13.500	13.500
+D+L	18.300	18.300
+D+0.750L	17.100	17.100
+0.60D	8.100	8.100

29

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
L Only	4.800	4.800

Shear Stirrup Requirements

Between 0.00 to 1.40 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 9.000 in
 Between 1.46 to 30.54 ft, $V_u < \Phi^*V_c / 2$, Req'd Vs = Not Req'd per 9.6.3.1, Stirrups are not required.
 Between 30.60 to 31.94 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 9.000 in

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Φ^*V_c (k)	Comment Φ^*V_s (k)	Φ^*V_n (k) Spacing (in) Req'd
1	+1.20D+1.60L	0.00 27.00	23.88 23.88	0.00 1.00	39.93	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	59.7 9.8
1	+1.20D+1.60L	0.35 27.00	23.36 23.36	8.26 1.00	43.56	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	63.4 9.8
1	+1.20D+1.60L	0.70 27.00	22.84 22.84	16.34 1.00	43.56	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	63.4 9.8
1	+1.20D+1.60L	1.05 27.00	22.31 22.31	24.23 1.00	43.56	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	63.4 9.8
1	+1.20D+1.60L	1.40 27.00	21.79 21.79	31.95 1.00	43.56	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	63.4 9.8
1	+1.20D+1.60L	1.75 27.00	21.27 21.27	39.48 1.00	43.56	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.6 0.0
1	+1.20D+1.60L	2.10 27.00	20.75 20.75	46.82 1.00	43.54	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	2.45 27.00	20.23 20.23	53.99 0.84	42.67	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	42.7 0.0
1	+1.20D+1.60L	2.80 27.00	19.70 19.70	60.97 0.73	42.02	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	42.0 0.0
1	+1.20D+1.60L	3.15 27.00	19.18 19.18	67.77 0.64	41.51	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.5 0.0
1	+1.20D+1.60L	3.50 27.00	18.66 18.66	74.39 0.56	41.11	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.1 0.0
1	+1.20D+1.60L	3.85 27.00	18.14 18.14	80.82 0.50	40.77	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	40.8 0.0
1	+1.20D+1.60L	4.20 27.00	17.62 17.62	87.07 0.46	40.49	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	40.5 0.0
1	+1.20D+1.60L	4.55 27.00	17.09 17.09	93.14 0.41	40.26	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	40.3 0.0
1	+1.20D+1.60L	4.90 27.00	16.57 16.57	99.03 0.38	40.05	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	40.1 0.0
1	+1.20D+1.60L	5.25 27.00	16.05 16.05	104.74 0.34	39.93	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	5.60 27.00	15.53 15.53	110.26 0.32	39.93	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	5.95 27.00	15.01 15.01	115.60 0.29	39.93	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	6.30 27.00	14.48 14.48	120.75 0.27	39.93	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	6.64 27.00	13.96 13.96	125.73 0.25	39.93	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	6.99 27.00	13.44 13.44	130.52 0.23	39.93	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	7.34 27.00	12.92 12.92	135.13 0.22	39.93	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	7.69 27.00	12.40 12.40	139.56 0.20	39.93	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	8.04 27.00	11.87 11.87	143.80 0.19	39.93	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	8.39 27.00	11.35 11.35	147.86 0.17	39.93	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	8.74 27.00	10.83 10.83	151.74 0.16	39.93	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	9.09 27.00	10.31 10.31	155.44 0.15	39.93	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	39.9 0.0

30

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	9.44 27.00	9.79 9.79	158.95 0.14	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	9.79 27.00	9.26 9.26	162.28 0.13	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	10.14 27.00	8.74 8.74	165.43 0.12	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	10.49 27.00	8.22 8.22	168.40 0.11	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	10.84 27.00	7.70 7.70	171.18 0.10	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	11.19 27.00	7.18 7.18	173.78 0.09	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	11.54 27.00	6.66 6.66	176.20 0.08	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	11.89 27.00	6.13 6.13	178.44 0.08	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	12.24 27.00	5.61 5.61	180.49 0.07	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	12.59 27.00	5.09 5.09	182.36 0.06	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	12.94 27.00	4.57 4.57	184.05 0.06	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	13.29 27.00	4.05 4.05	185.56 0.05	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	13.64 27.00	3.52 3.52	186.88 0.04	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	13.99 27.00	3.00 3.00	188.02 0.04	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	14.34 27.00	2.48 2.48	188.98 0.03	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	14.69 27.00	1.96 1.96	189.76 0.02	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	15.04 27.00	1.44 1.44	190.35 0.02	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	15.39 27.00	0.91 0.91	190.76 0.01	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	15.74 27.00	0.39 0.39	190.99 0.00	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	16.09 27.00	-0.13 0.13	191.03 0.00	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	16.44 27.00	-0.65 0.65	190.90 0.01	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	16.79 27.00	-1.17 1.17	190.58 0.01	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	17.14 27.00	-1.70 1.70	190.08 0.02	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	17.49 27.00	-2.22 2.22	189.39 0.03	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	17.84 27.00	-2.74 2.74	188.52 0.03	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	18.19 27.00	-3.26 3.26	187.47 0.04	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	18.54 27.00	-3.78 3.78	186.24 0.05	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	18.89 27.00	-4.31 4.31	184.83 0.05	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	19.23 27.00	-4.83 4.83	183.23 0.06	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	19.58 27.00	-5.35 5.35	181.45 0.07	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	19.93 27.00	-5.87 5.87	179.49 0.07	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0

31

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	20.28 27.00	-6.39 6.39	177.34 0.08	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	20.63 27.00	-6.92 6.92	175.02 0.09	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	20.98 27.00	-7.44 7.44	172.51 0.10	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	21.33 27.00	-7.96 7.96	169.81 0.11	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	21.68 27.00	-8.48 8.48	166.94 0.11	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	22.03 27.00	-9.00 9.00	163.88 0.12	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	22.38 27.00	-9.53 9.53	160.64 0.13	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	22.73 27.00	-10.05 10.05	157.22 0.14	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	23.08 27.00	-10.57 10.57	153.61 0.15	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	23.43 27.00	-11.09 11.09	149.82 0.17	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	23.78 27.00	-11.61 11.61	145.85 0.18	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	24.13 27.00	-12.14 12.14	141.70 0.19	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	24.48 27.00	-12.66 12.66	137.37 0.21	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	24.83 27.00	-13.18 13.18	132.85 0.22	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	25.18 27.00	-13.70 13.70	128.15 0.24	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	25.53 27.00	-14.22 14.22	123.26 0.26	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	25.88 27.00	-14.75 14.75	118.20 0.28	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	26.23 27.00	-15.27 15.27	112.95 0.30	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	26.58 27.00	-15.79 15.79	107.52 0.33	39.93	Vu < Phi*Vc / 2 Not Req'd per 9	39.9 0.0
1	+1.20D+1.60L	26.93 27.00	-16.31 16.31	101.91 0.36	39.96	Vu < Phi*Vc / 2 Not Req'd per 9	40.0 0.0
1	+1.20D+1.60L	27.28 27.00	-16.83 16.83	96.11 0.39	40.15	Vu < Phi*Vc / 2 Not Req'd per 9	40.1 0.0
1	+1.20D+1.60L	27.63 27.00	-17.36 17.36	90.13 0.43	40.37	Vu < Phi*Vc / 2 Not Req'd per 9	40.4 0.0
1	+1.20D+1.60L	27.98 27.00	-17.88 17.88	83.97 0.48	40.63	Vu < Phi*Vc / 2 Not Req'd per 9	40.6 0.0
1	+1.20D+1.60L	28.33 27.00	-18.40 18.40	77.63 0.53	40.93	Vu < Phi*Vc / 2 Not Req'd per 9	40.9 0.0
1	+1.20D+1.60L	28.68 27.00	-18.92 18.92	71.10 0.60	41.30	Vu < Phi*Vc / 2 Not Req'd per 9	41.3 0.0
1	+1.20D+1.60L	29.03 27.00	-19.44 19.44	64.39 0.68	41.75	Vu < Phi*Vc / 2 Not Req'd per 9	41.8 0.0
1	+1.20D+1.60L	29.38 27.00	-19.97 19.97	57.50 0.78	42.33	Vu < Phi*Vc / 2 Not Req'd per 9	42.3 0.0
1	+1.20D+1.60L	29.73 27.00	-20.49 20.49	50.43 0.91	43.07	Vu < Phi*Vc / 2 Not Req'd per 9	43.1 0.0
1	+1.20D+1.60L	30.08 27.00	-21.01 21.01	43.17 1.00	43.56	Vu < Phi*Vc / 2 Not Req'd per 9	43.6 0.0
1	+1.20D+1.60L	30.43 27.00	-21.53 21.53	35.73 1.00	43.56	Vu < Phi*Vc / 2 Not Req'd per 9	43.6 0.0
1	+1.20D+1.60L	30.78 27.00	-22.05 22.05	28.11 1.00	43.56	Phi*Vc / 2 < Vu <= Min per 9.6.3.	63.4 9.8

32

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	31.13 27.00	-22.58 22.58	20.31 1.00	43.56	Phi*Vc / 2 < Vu <= Min per 9.6.3.	63.4 9.8
1	+1.20D+1.60L	31.48 27.00	-23.10 23.10	12.32 1.00	43.56	Phi*Vc / 2 < Vu <= Min per 9.6.3.	63.4 9.8
1	+1.20D+1.60L	31.83 27.00	-23.62 23.62	4.15 1.00	43.56	Phi*Vc / 2 < Vu <= Min per 9.6.3.	63.4 9.8

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
MAXimum BENDING Envelope					
Span # 1	1	32.000	191.04	338.03	0.57
+1.40D					
Span # 1	1	32.000	151.20	338.03	0.45
+1.20D+1.60L					
Span # 1	1	32.000	191.04	338.03	0.57
+1.20D+L					
Span # 1	1	32.000	168.00	338.03	0.50
+1.20D					
Span # 1	1	32.000	129.60	338.03	0.38
+0.90D					
Span # 1	1	32.000	97.20	338.03	0.29

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl (in) in Span (ft)	Location	Load Combination	Max. "+" Defl (in) in Span (ft)
1	+D+L	0.4213	16.000		0.0000 0.000

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

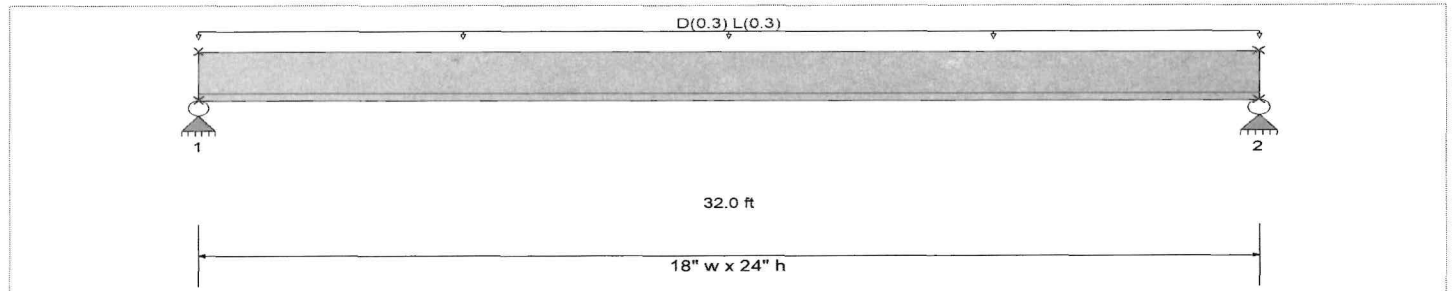
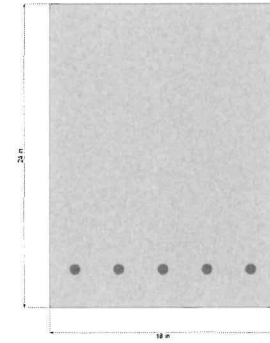
CODE REFERENCES

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

Load Combination Set : ASCE 7-22 / IBC 2024

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
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 = 18.0 in, Height = 24.0 in

Span #1 Reinforcing....

5-#7 at 3.0 in from Bottom, from 0.0 to 32.0 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : D = 0.30, L = 0.30 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.678 : 1
Section used for this span		Typical Section
Mu : Applied		174.335 k-ft
Mn * Phi : Allowable		257.029 k-ft
Location of maximum on span		15.971 ft
Span # where maximum occurs		Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.109 in	Ratio =	3513	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	L Only
Max Downward Total Deflection	0.904 in	Ratio =	425	>=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	16.560	16.560
Max Upward from Load Combinations	16.560	16.560
Max Upward from Load Cases	11.760	11.760
D Only	11.760	11.760
+D+L	16.560	16.560
+D+0.750L	15.360	15.360
+0.60D	7.056	7.056

34

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
L Only	4.800	4.800

Shear Stirrup Requirements

Between 0.00 to 4.49 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 9.000 in
 Between 4.55 to 27.45 ft, $V_u < \Phi^*V_c / 2$, Req'd Vs = Not Req'd per 9.6.3.1, Stirrups are not required.
 Between 27.51 to 31.94 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 9.000 in

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	0.00 21.00	21.79 21.79	0.00 1.00	31.06	Phi*Vc / 2 < Vu <= Min per 9.6.3.	46.5 9.8
1	+1.20D+1.60L	0.35 21.00	21.32 21.32	7.54 1.00	35.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.5 9.8
1	+1.20D+1.60L	0.70 21.00	20.84 20.84	14.91 1.00	35.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.5 9.8
1	+1.20D+1.60L	1.05 21.00	20.36 20.36	22.11 1.00	35.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.5 9.8
1	+1.20D+1.60L	1.40 21.00	19.89 19.89	29.15 1.00	35.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.5 9.8
1	+1.20D+1.60L	1.75 21.00	19.41 19.41	36.02 0.94	34.81	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.2 9.8
1	+1.20D+1.60L	2.10 21.00	18.93 18.93	42.73 0.78	33.87	Phi*Vc / 2 < Vu <= Min per 9.6.3.	49.3 9.8
1	+1.20D+1.60L	2.45 21.00	18.46 18.46	49.27 0.66	33.19	Phi*Vc / 2 < Vu <= Min per 9.6.3.	48.6 9.8
1	+1.20D+1.60L	2.80 21.00	17.98 17.98	55.64 0.57	32.68	Phi*Vc / 2 < Vu <= Min per 9.6.3.	48.1 9.8
1	+1.20D+1.60L	3.15 21.00	17.51 17.51	61.84 0.50	32.29	Phi*Vc / 2 < Vu <= Min per 9.6.3.	47.7 9.8
1	+1.20D+1.60L	3.50 21.00	17.03 17.03	67.88 0.44	31.97	Phi*Vc / 2 < Vu <= Min per 9.6.3.	47.4 9.8
1	+1.20D+1.60L	3.85 21.00	16.55 16.55	73.76 0.39	31.71	Phi*Vc / 2 < Vu <= Min per 9.6.3.	47.1 9.8
1	+1.20D+1.60L	4.20 21.00	16.08 16.08	79.46 0.35	31.49	Phi*Vc / 2 < Vu <= Min per 9.6.3.	46.9 9.8
1	+1.20D+1.60L	4.55 21.00	15.60 15.60	85.00 0.32	31.31	Vu < Phi*Vc / 2 Not Req'd per 9	31.3 0.0
1	+1.20D+1.60L	4.90 21.00	15.12 15.12	90.37 0.29	31.15	Vu < Phi*Vc / 2 Not Req'd per 9	31.2 0.0
1	+1.20D+1.60L	5.25 21.00	14.65 14.65	95.58 0.27	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	5.60 21.00	14.17 14.17	100.62 0.25	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	5.95 21.00	13.69 13.69	105.49 0.23	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	6.30 21.00	13.22 13.22	110.20 0.21	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	6.64 21.00	12.74 12.74	114.74 0.19	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	6.99 21.00	12.27 12.27	119.11 0.18	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	7.34 21.00	11.79 11.79	123.31 0.17	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	7.69 21.00	11.31 11.31	127.35 0.16	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	8.04 21.00	10.84 10.84	131.23 0.14	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	8.39 21.00	10.36 10.36	134.93 0.13	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	8.74 21.00	9.88 9.88	138.47 0.12	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	9.09 21.00	9.41 9.41	141.85 0.12	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0

35

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	9.44 21.00	8.93 8.93	145.05 0.11	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	9.79 21.00	8.45 8.45	148.09 0.10	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	10.14 21.00	7.98 7.98	150.97 0.09	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	10.49 21.00	7.50 7.50	153.67 0.09	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	10.84 21.00	7.03 7.03	156.21 0.08	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	11.19 21.00	6.55 6.55	158.59 0.07	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	11.54 21.00	6.07 6.07	160.80 0.07	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	11.89 21.00	5.60 5.60	162.84 0.06	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	12.24 21.00	5.12 5.12	164.71 0.05	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	12.59 21.00	4.64 4.64	166.42 0.05	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	12.94 21.00	4.17 4.17	167.96 0.04	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	13.29 21.00	3.69 3.69	169.33 0.04	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	13.64 21.00	3.22 3.22	170.54 0.03	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	13.99 21.00	2.74 2.74	171.58 0.03	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	14.34 21.00	2.26 2.26	172.46 0.02	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	14.69 21.00	1.79 1.79	173.16 0.02	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	15.04 21.00	1.31 1.31	173.71 0.01	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	15.39 21.00	0.83 0.83	174.08 0.01	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	15.74 21.00	0.36 0.36	174.29 0.00	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	16.09 21.00	-0.12 0.12	174.33 0.00	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	16.44 21.00	-0.60 0.60	174.21 0.01	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	16.79 21.00	-1.07 1.07	173.91 0.01	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	17.14 21.00	-1.55 1.55	173.46 0.02	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	17.49 21.00	-2.02 2.02	172.83 0.02	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	17.84 21.00	-2.50 2.50	172.04 0.03	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	18.19 21.00	-2.98 2.98	171.08 0.03	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	18.54 21.00	-3.45 3.45	169.96 0.04	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	18.89 21.00	-3.93 3.93	168.67 0.04	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	19.23 21.00	-4.41 4.41	167.21 0.05	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	19.58 21.00	-4.88 4.88	165.59 0.05	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	19.93 21.00	-5.36 5.36	163.79 0.06	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0

36

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	20.28 21.00	-5.84 5.84	161.84 0.06	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	20.63 21.00	-6.31 6.31	159.71 0.07	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	20.98 21.00	-6.79 6.79	157.42 0.08	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.33 21.00	-7.26 7.26	154.97 0.08	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.68 21.00	-7.74 7.74	152.34 0.09	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	22.03 21.00	-8.22 8.22	149.55 0.10	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	22.38 21.00	-8.69 8.69	146.59 0.10	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	22.73 21.00	-9.17 9.17	143.47 0.11	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	23.08 21.00	-9.65 9.65	140.18 0.12	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	23.43 21.00	-10.12 10.12	136.72 0.13	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	23.78 21.00	-10.60 10.60	133.10 0.14	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	24.13 21.00	-11.07 11.07	129.31 0.15	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	24.48 21.00	-11.55 11.55	125.35 0.16	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	24.83 21.00	-12.03 12.03	121.23 0.17	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	25.18 21.00	-12.50 12.50	116.94 0.19	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	25.53 21.00	-12.98 12.98	112.49 0.20	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	25.88 21.00	-13.46 13.46	107.86 0.22	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	26.23 21.00	-13.93 13.93	103.07 0.24	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	26.58 21.00	-14.41 14.41	98.12 0.26	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	26.93 21.00	-14.89 14.89	93.00 0.28	31.08	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	27.28 21.00	-15.36 15.36	87.71 0.31	31.23	Vu < Phi*Vc / 2 Not Req'd per 9	31.2 0.0
1	+1.20D+1.60L	27.63 21.00	-15.84 15.84	82.25 0.34	31.40	Phi*Vc / 2 < Vu <= Min per 9.6.3.	46.8 9.8
1	+1.20D+1.60L	27.98 21.00	-16.31 16.31	76.63 0.37	31.60	Phi*Vc / 2 < Vu <= Min per 9.6.3.	47.0 9.8
1	+1.20D+1.60L	28.33 21.00	-16.79 16.79	70.84 0.41	31.84	Phi*Vc / 2 < Vu <= Min per 9.6.3.	47.2 9.8
1	+1.20D+1.60L	28.68 21.00	-17.27 17.27	64.88 0.47	32.12	Phi*Vc / 2 < Vu <= Min per 9.6.3.	47.5 9.8
1	+1.20D+1.60L	29.03 21.00	-17.74 17.74	58.76 0.53	32.48	Phi*Vc / 2 < Vu <= Min per 9.6.3.	47.9 9.8
1	+1.20D+1.60L	29.38 21.00	-18.22 18.22	52.47 0.61	32.92	Phi*Vc / 2 < Vu <= Min per 9.6.3.	48.3 9.8
1	+1.20D+1.60L	29.73 21.00	-18.70 18.70	46.02 0.71	33.50	Phi*Vc / 2 < Vu <= Min per 9.6.3.	48.9 9.8
1	+1.20D+1.60L	30.08 21.00	-19.17 19.17	39.40 0.85	34.29	Phi*Vc / 2 < Vu <= Min per 9.6.3.	49.7 9.8
1	+1.20D+1.60L	30.43 21.00	-19.65 19.65	32.61 1.00	35.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.5 9.8
1	+1.20D+1.60L	30.78 21.00	-20.12 20.12	25.65 1.00	35.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.5 9.8

37

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	31.13 21.00	-20.60 20.60	18.53 1.00	35.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.5 9.8
1	+1.20D+1.60L	31.48 21.00	-21.08 21.08	11.24 1.00	35.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.5 9.8
1	+1.20D+1.60L	31.83 21.00	-21.55 21.55	3.79 1.00	35.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.5 9.8

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
MAXimum BENDING Envelope					
Span # 1	1	32.000	174.34	257.03	0.68
+1.40D					
Span # 1	1	32.000	131.71	257.03	0.51
+1.20D+1.60L					
Span # 1	1	32.000	174.34	257.03	0.68
+1.20D+L					
Span # 1	1	32.000	151.30	257.03	0.59
+1.20D					
Span # 1	1	32.000	112.90	257.03	0.44
+0.90D					
Span # 1	1	32.000	84.67	257.03	0.33

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl (in) in Span	Location (ft) in Span	Load Combination	Max. "+" Defl (in) in Span	Location (ft) in Span
1	+D+L	0.9035	16.000		0.0000	0.000

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

LIC#: KW-06015041, Build:20.25.04.16

Project File: ENERCALC_20

DESCRIPTION: --None--

Design Engineering & Supply Inc

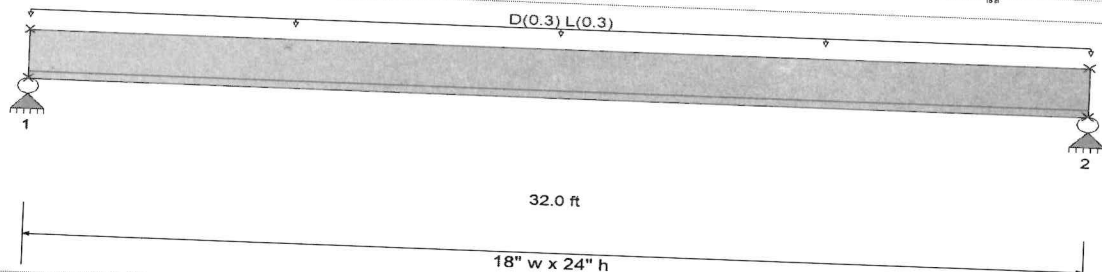
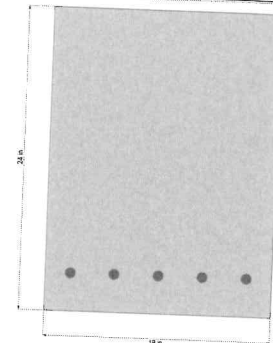
(c) ENERCALC, LLC 1982-2025

CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019
 Load Combination Set : ASCE 7-22 / IBC 2024

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	F_y - 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 = 18.0 in, Height = 24.0 in
 Span #1 Reinforcing....

5-#7 at 3.0 in from Bottom, from 0.0 to 32.0 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : $D = 0.30$, $L = 0.30$ k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending Stress Ratio	=	0.678 : 1
Section used for this span		Typical Section
M_u : Applied		174.335 k-ft
$M_n * \phi$: Allowable		257.029 k-ft
Location of maximum on span		15.971 ft
Span # where maximum occurs		Span # 1

Design OK

Maximum Deflection

Max Downward Transient Deflection	0.109 in	Ratio =	3513 >= 360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0 < 360.0	L Only
Max Downward Total Deflection	0.904 in	Ratio =	425 >= 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	16.560	16.560
Max Upward from Load Combinations	16.560	16.560
Max Upward from Load Cases	11.760	11.760
D Only	11.760	11.760
+D+L	16.560	16.560
+D+0.750L	15.360	15.360
+0.60D	7.056	7.056

39

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

LIC#: KW-06015041, Build:20.25.04.16

Project File: ENERCALC_20

DESCRIPTION: --None--

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

Vertical Reactions

Load Combination

Support notation : Far left is #1

L Only

Support 1 Support 2

4.800 4.800

Shear Stirrup Requirements

Between 0.00 to 4.49 ft, $\Phi^i V_c / 2 < V_u \leq \Phi^i V_c$, Req'd Vs = Min per 9.6.3.1, use #3 stirrups spaced at 9.000 in

Between 4.55 to 27.45 ft, $V_u < \Phi^i V_c / 2$, Req'd Vs = Not Req'd per 9.6.3.1, Stirrups are not required.

Between 27.51 to 31.94 ft, $\Phi^i V_c / 2 < V_u \leq \Phi^i V_c$, Req'd Vs = Min per 9.6.3.1, use #3 stirrups spaced at 9.000 in

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	$\Phi^i V_c$ (k)	Comment $\Phi^i V_s$ (k)	$\Phi^i V_n$ (k) Spacing (in) Req'd
1	+1.20D+1.60L	0.00	21.79	0.00	31.06	$\Phi^i V_c / 2 < V_u \leq$ Min per 9.6.3.	46.5 9.8
1	+1.20D+1.60L	21.00	21.79	1.00			
		0.35	21.32	7.54	35.13	$\Phi^i V_c / 2 < V_u \leq$ Min per 9.6.3.	50.5 9.8
1	+1.20D+1.60L	21.00	21.32	1.00			
		0.70	20.84	14.91	35.13	$\Phi^i V_c / 2 < V_u \leq$ Min per 9.6.3.	50.5 9.8
1	+1.20D+1.60L	21.00	20.84	1.00			
		1.05	20.36	22.11	35.13	$\Phi^i V_c / 2 < V_u \leq$ Min per 9.6.3.	50.5 9.8
1	+1.20D+1.60L	21.00	20.36	1.00			
		1.40	19.89	29.15	35.13	$\Phi^i V_c / 2 < V_u \leq$ Min per 9.6.3.	50.5 9.8
1	+1.20D+1.60L	21.00	19.89	1.00			
		1.75	19.41	36.02	34.81	$\Phi^i V_c / 2 < V_u \leq$ Min per 9.6.3.	50.2 9.8
1	+1.20D+1.60L	21.00	19.41	0.94			
		2.10	18.93	42.73	33.87	$\Phi^i V_c / 2 < V_u \leq$ Min per 9.6.3.	49.3 9.8
1	+1.20D+1.60L	21.00	18.93	0.78			
		2.45	18.46	49.27	33.19	$\Phi^i V_c / 2 < V_u \leq$ Min per 9.6.3.	48.6 9.8
1	+1.20D+1.60L	21.00	18.46	0.66			
		2.80	17.98	55.64	32.68	$\Phi^i V_c / 2 < V_u \leq$ Min per 9.6.3.	48.1 9.8
1	+1.20D+1.60L	21.00	17.98	0.57			
		3.15	17.51	61.84	32.29	$\Phi^i V_c / 2 < V_u \leq$ Min per 9.6.3.	47.7 9.8
1	+1.20D+1.60L	21.00	17.51	0.50			
		3.50	17.03	67.88	31.97	$\Phi^i V_c / 2 < V_u \leq$ Min per 9.6.3.	47.4 9.8
1	+1.20D+1.60L	21.00	17.03	0.44			
		3.85	16.55	73.76	31.71	$\Phi^i V_c / 2 < V_u \leq$ Min per 9.6.3.	47.1 9.8
1	+1.20D+1.60L	21.00	16.55	0.39			
		4.20	16.08	79.46	31.49	$\Phi^i V_c / 2 < V_u \leq$ Min per 9.6.3.	46.9 9.8
1	+1.20D+1.60L	21.00	16.08	0.35			
		4.55	15.60	85.00	31.31	$V_u < \Phi^i V_c / 2$ Not Req'd per 9	31.3 0.0
1	+1.20D+1.60L	21.00	15.60	0.32			
		4.90	15.12	90.37	31.15	$V_u < \Phi^i V_c / 2$ Not Req'd per 9	31.2 0.0
1	+1.20D+1.60L	21.00	15.12	0.29			
		5.25	14.65	95.58	31.06	$V_u < \Phi^i V_c / 2$ Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.00	14.65	0.27			
		5.60	14.17	100.62	31.06	$V_u < \Phi^i V_c / 2$ Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.00	14.17	0.25			
		5.95	13.69	105.49	31.06	$V_u < \Phi^i V_c / 2$ Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.00	13.69	0.23			
		6.30	13.22	110.20	31.06	$V_u < \Phi^i V_c / 2$ Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.00	13.22	0.21			
		6.64	12.74	114.74	31.06	$V_u < \Phi^i V_c / 2$ Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.00	12.74	0.19			
		6.99	12.27	119.11	31.06	$V_u < \Phi^i V_c / 2$ Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.00	12.27	0.18			
		7.34	11.79	123.31	31.06	$V_u < \Phi^i V_c / 2$ Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.00	11.79	0.17			
		7.69	11.31	127.35	31.06	$V_u < \Phi^i V_c / 2$ Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.00	11.31	0.16			
		8.04	10.84	131.23	31.06	$V_u < \Phi^i V_c / 2$ Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.00	10.84	0.14			
		8.39	10.36	134.93	31.06	$V_u < \Phi^i V_c / 2$ Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.00	10.36	0.13			
		8.74	9.88	138.47	31.06	$V_u < \Phi^i V_c / 2$ Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.00	9.88	0.12			
		9.09	9.41	141.85	31.06	$V_u < \Phi^i V_c / 2$ Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.00	9.41	0.12			

40

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	9.44 21.00	8.93 8.93	145.05 0.11	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	9.79 21.00	8.45 8.45	148.09 0.10	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	10.14 21.00	7.98 7.98	150.97 0.09	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	10.49 21.00	7.50 7.50	153.67 0.09	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	10.84 21.00	7.03 7.03	156.21 0.08	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	11.19 21.00	6.55 6.55	158.59 0.07	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	11.54 21.00	6.07 6.07	160.80 0.07	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	11.89 21.00	5.60 5.60	162.84 0.06	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	12.24 21.00	5.12 5.12	164.71 0.05	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	12.59 21.00	4.64 4.64	166.42 0.05	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	12.94 21.00	4.17 4.17	167.96 0.04	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	13.29 21.00	3.69 3.69	169.33 0.04	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	13.64 21.00	3.22 3.22	170.54 0.03	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	13.99 21.00	2.74 2.74	171.58 0.03	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	14.34 21.00	2.26 2.26	172.46 0.02	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	14.69 21.00	1.79 1.79	173.16 0.02	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	15.04 21.00	1.31 1.31	173.71 0.01	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	15.39 21.00	0.83 0.83	174.08 0.01	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	15.74 21.00	0.36 0.36	174.29 0.00	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	16.09 21.00	-0.12 0.12	174.33 0.00	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	16.44 21.00	-0.60 0.60	174.21 0.01	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	16.79 21.00	-1.07 1.07	173.91 0.01	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	17.14 21.00	-1.55 1.55	173.46 0.02	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	17.49 21.00	-2.02 2.02	172.83 0.02	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	17.84 21.00	-2.50 2.50	172.04 0.03	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	18.19 21.00	-2.98 2.98	171.08 0.03	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	18.54 21.00	-3.45 3.45	169.96 0.04	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	18.89 21.00	-3.93 3.93	168.67 0.04	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	19.23 21.00	-4.41 4.41	167.21 0.05	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	19.58 21.00	-4.88 4.88	165.59 0.05	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	19.93 21.00	-5.36 5.36	163.79 0.06	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0

41

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	20.28 21.00	-5.84 5.84	161.84 0.06	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	20.63 21.00	-6.31 6.31	159.71 0.07	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	20.98 21.00	-6.79 6.79	157.42 0.08	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.33 21.00	-7.26 7.26	154.97 0.08	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	21.68 21.00	-7.74 7.74	152.34 0.09	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	22.03 21.00	-8.22 8.22	149.55 0.10	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	22.38 21.00	-8.69 8.69	146.59 0.10	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	22.73 21.00	-9.17 9.17	143.47 0.11	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	23.08 21.00	-9.65 9.65	140.18 0.12	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	23.43 21.00	-10.12 10.12	136.72 0.13	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	23.78 21.00	-10.60 10.60	133.10 0.14	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	24.13 21.00	-11.07 11.07	129.31 0.15	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	24.48 21.00	-11.55 11.55	125.35 0.16	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	24.83 21.00	-12.03 12.03	121.23 0.17	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	25.18 21.00	-12.50 12.50	116.94 0.19	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	25.53 21.00	-12.98 12.98	112.49 0.20	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	25.88 21.00	-13.46 13.46	107.86 0.22	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	26.23 21.00	-13.93 13.93	103.07 0.24	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	26.58 21.00	-14.41 14.41	98.12 0.26	31.06	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	26.93 21.00	-14.89 14.89	93.00 0.28	31.08	Vu < Phi*Vc / 2 Not Req'd per 9	31.1 0.0
1	+1.20D+1.60L	27.28 21.00	-15.36 15.36	87.71 0.31	31.23	Vu < Phi*Vc / 2 Not Req'd per 9	31.2 0.0
1	+1.20D+1.60L	27.63 21.00	-15.84 15.84	82.25 0.34	31.40	Phi*Vc / 2 < Vu <= Min per 9.6.3.	46.8 9.8
1	+1.20D+1.60L	27.98 21.00	-16.31 16.31	76.63 0.37	31.60	Phi*Vc / 2 < Vu <= Min per 9.6.3.	47.0 9.8
1	+1.20D+1.60L	28.33 21.00	-16.79 16.79	70.84 0.41	31.84	Phi*Vc / 2 < Vu <= Min per 9.6.3.	47.2 9.8
1	+1.20D+1.60L	28.68 21.00	-17.27 17.27	64.88 0.47	32.12	Phi*Vc / 2 < Vu <= Min per 9.6.3.	47.5 9.8
1	+1.20D+1.60L	29.03 21.00	-17.74 17.74	58.76 0.53	32.48	Phi*Vc / 2 < Vu <= Min per 9.6.3.	47.9 9.8
1	+1.20D+1.60L	29.38 21.00	-18.22 18.22	52.47 0.61	32.92	Phi*Vc / 2 < Vu <= Min per 9.6.3.	48.3 9.8
1	+1.20D+1.60L	29.73 21.00	-18.70 18.70	46.02 0.71	33.50	Phi*Vc / 2 < Vu <= Min per 9.6.3.	48.9 9.8
1	+1.20D+1.60L	30.08 21.00	-19.17 19.17	39.40 0.85	34.29	Phi*Vc / 2 < Vu <= Min per 9.6.3.	49.7 9.8
1	+1.20D+1.60L	30.43 21.00	-19.65 19.65	32.61 1.00	35.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.5 9.8
1	+1.20D+1.60L	30.78 21.00	-20.12 20.12	25.65 1.00	35.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.5 9.8

42

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	31.13 21.00	-20.60 20.60	18.53 1.00	35.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.5 9.8
1	+1.20D+1.60L	31.48 21.00	-21.08 21.08	11.24 1.00	35.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.5 9.8
1	+1.20D+1.60L	31.83 21.00	-21.55 21.55	3.79 1.00	35.13	Phi*Vc / 2 < Vu <= Min per 9.6.3.	50.5 9.8

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
MAXimum BENDING Envelope					
Span # 1	1	32.000	174.34	257.03	0.68
+1.40D	1	32.000	131.71	257.03	0.51
+1.20D+1.60L	1	32.000	174.34	257.03	0.68
+1.20D+L	1	32.000	151.30	257.03	0.59
+1.20D	1	32.000	112.90	257.03	0.44
+0.90D	1	32.000	84.67	257.03	0.33

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl (in) in Span	Location (ft)	Load Combination	Max. "+" Defl (in) in Span	Location (ft)
1	+D+L	0.9035	16.000		0.0000	0.000

43

Concrete Beam

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

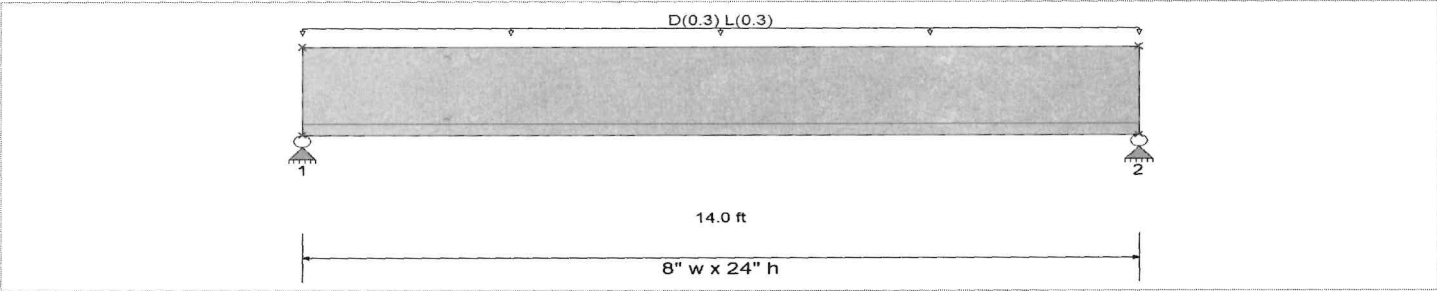
DESCRIPTION: --None--

CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019
Load Combination Set : ASCE 7-22 / IBC 2024

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 = 8.0 in, Height = 24.0 in
Span #1 Reinforcing....
2-#5 at 3.0 in from Bottom, from 0.0 to 14.0 ft in this span

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.30, L = 0.30 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

				Design OK
Maximum Bending Stress Ratio	=	0.469	: 1	
Section used for this span		Typical Section		
Mu : Applied		26.264	k-ft	
Mn * Phi : Allowable		56.046	k-ft	
Location of maximum on span		6.987	ft	
Span # where maximum occurs		Span # 1		
Maximum Deflection				
Max Downward Transient Deflection	0.009 in	Ratio =	18646	>=360.0 L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0 L Only
Max Downward Total Deflection	0.024 in	Ratio =	7051	>=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		5.553	5.553
Max Upward from Load Combinations		5.553	5.553
Max Upward from Load Cases		3.453	3.453
D Only		3.453	3.453
+D+L		5.553	5.553
+D+0.750L		5.028	5.028
+0.60D		2.072	2.072

74

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

LIC#: KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Vertical Reactions

Load Combination

Support notation : Far left is #1

L Only

Support 1 Support 2

2.100 2.100

Shear Stirrup Requirements

Between 0.00 to 0.33 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 10.000 in
Between 0.36 to 13.64 ft, $V_u < \Phi^*V_c / 2$, Req'd Vs = Not Req'd per 9.6.3.1, Stirrups are not required.
Between 13.67 to 13.97 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 10.000 in

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	V_u Actual V_u (k) Design	M_u (k-ft) d^*V_u/M_u	Φ^*V_c (k)	Comment Φ^*V_s (k)	Φ^*V_n (k) Spacing (in) Req'd
1	+1.20D+1.60L	0.00					
1	+1.20D+1.60L	21.00	7.50	0.00	14.27	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	28.1 10.5
1	+1.20D+1.60L	0.15	7.34	1.14	14.27	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	28.1 10.5
1	+1.20D+1.60L	21.00	7.34	1.00	14.27	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	28.1 10.5
1	+1.20D+1.60L	0.31	7.18	2.25	14.27	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	28.1 10.5
1	+1.20D+1.60L	21.00	7.18	1.00	14.27	$\Phi^*V_c / 2 < V_u \leq$ Min per 9.6.3.	28.1 10.5
1	+1.20D+1.60L	0.46	7.01	3.33	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	21.00	7.01	1.00	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	0.61	6.85	4.39	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	21.00	6.85	1.00	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	0.77	6.68	5.43	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	21.00	6.68	1.00	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	0.92	6.52	6.44	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	21.00	6.52	1.00	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	1.07	6.36	7.42	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	21.00	6.36	1.00	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	1.22	6.19	8.38	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	21.00	6.19	1.00	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	1.38	6.03	9.32	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	21.00	6.03	1.00	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	1.53	5.86	10.23	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	21.00	5.86	1.00	14.27	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	1.68	5.70	11.11	14.16	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.2 0.0
1	+1.20D+1.60L	21.00	5.70	0.90	14.05	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.1 0.0
1	+1.20D+1.60L	1.84	5.54	11.97	13.97	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	14.0 0.0
1	+1.20D+1.60L	21.00	5.54	0.81	13.89	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.9 0.0
1	+1.20D+1.60L	1.99	5.37	12.81	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	21.00	5.37	0.73	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	2.14	5.21	13.61	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	21.00	5.21	0.67	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	2.30	5.04	14.40	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	21.00	5.04	0.61	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	2.45	4.88	15.16	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	21.00	4.88	0.56	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	2.60	4.72	15.89	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	21.00	4.72	0.52	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	2.75	4.55	16.60	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	21.00	4.55	0.48	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	2.91	4.39	17.29	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	21.00	4.39	0.44	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	3.06	4.22	17.94	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	21.00	4.22	0.41	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	3.21	4.06	18.58	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	21.00	4.06	0.38	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	3.37	3.90	19.19	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	21.00	3.90	0.36	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	3.52	3.73	19.77	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	21.00	3.73	0.33	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	3.67	3.57	20.33	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	21.00	3.57	0.31	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	3.83	3.40	20.86	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	21.00	3.40	0.29	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	3.98	3.24	21.37	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	21.00	3.24	0.27	13.80	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	13.8 0.0

45

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

LIC# : KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	4.13	3.08	21.85	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	3.08	0.25	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	4.28	2.91	22.31	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	2.91	0.23	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	4.44	2.75	22.74	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	2.75	0.21	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	4.59	2.58	23.15	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	2.58	0.20	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	4.74	2.42	23.53	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	2.42	0.18	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	4.90	2.26	23.89	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	2.26	0.17	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	5.05	2.09	24.22	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	2.09	0.15	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	5.20	1.93	24.53	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	1.93	0.14	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	5.36	1.76	24.81	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	1.76	0.12	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	5.51	1.60	25.07	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	1.60	0.11	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	5.66	1.44	25.30	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	1.44	0.10	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	5.81	1.27	25.51	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	1.27	0.09	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	5.97	1.11	25.69	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	1.11	0.08	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	6.12	0.94	25.85	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	0.94	0.06	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	6.27	0.78	25.98	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	0.78	0.05	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	6.43	0.62	26.09	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	0.62	0.04	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	6.58	0.45	26.17	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	0.45	0.03	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	6.73	0.29	26.23	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	0.29	0.02	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	6.89	0.12	26.26	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	0.12	0.01	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	7.04	-0.04	26.26	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	0.04	0.00	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	7.19	-0.21	26.24	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	0.21	0.01	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	7.34	-0.37	26.20	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	0.37	0.02	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	7.50	-0.53	26.13	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	0.53	0.04	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	7.65	-0.70	26.04	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	0.70	0.05	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	7.80	-0.86	25.92	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	0.86	0.06	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	7.96	-1.03	25.77	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	1.03	0.07	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	8.11	-1.19	25.60	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	1.19	0.08	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	8.26	-1.35	25.41	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	1.35	0.09	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	8.42	-1.52	25.19	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	1.52	0.11	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	8.57	-1.68	24.95	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	1.68	0.12	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
1	+1.20D+1.60L	8.72	-1.85	24.68	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8
1	+1.20D+1.60L	21.00	1.85	0.13	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	0.0

-46-

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

LIC#: KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	8.87	-2.01	24.38			
		21.00	2.01	0.14	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	9.03	-2.17	24.06			
		21.00	2.17	0.16	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	9.18	-2.34	23.72			
		21.00	2.34	0.17	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	9.33	-2.50	23.35			
		21.00	2.50	0.19	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	9.49	-2.67	22.95			
		21.00	2.67	0.20	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	9.64	-2.83	22.53			
		21.00	2.83	0.22	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	9.79	-2.99	22.08			
		21.00	2.99	0.24	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	9.95	-3.16	21.61			
		21.00	3.16	0.26	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	10.10	-3.32	21.12			
		21.00	3.32	0.28	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	10.25	-3.49	20.60			
		21.00	3.49	0.30	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	10.40	-3.65	20.05			
		21.00	3.65	0.32	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	10.56	-3.81	19.48			
		21.00	3.81	0.34	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	10.71	-3.98	18.88			
		21.00	3.98	0.37	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	10.86	-4.14	18.26			
		21.00	4.14	0.40	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	11.02	-4.31	17.62			
		21.00	4.31	0.43	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	11.17	-4.47	16.95			
		21.00	4.47	0.46	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	11.32	-4.63	16.25			
		21.00	4.63	0.50	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	11.48	-4.80	15.53			
		21.00	4.80	0.54	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	11.63	-4.96	14.78			
		21.00	4.96	0.59	13.80	Vu < Phi*Vc / 2 Not Req'd per 9	13.8 0.0
1	+1.20D+1.60L	11.78	-5.13	14.01			
		21.00	5.13	0.64	13.86	Vu < Phi*Vc / 2 Not Req'd per 9	13.9 0.0
1	+1.20D+1.60L	11.93	-5.29	13.21			
		21.00	5.29	0.70	13.93	Vu < Phi*Vc / 2 Not Req'd per 9	13.9 0.0
1	+1.20D+1.60L	12.09	-5.45	12.39			
		21.00	5.45	0.77	14.01	Vu < Phi*Vc / 2 Not Req'd per 9	14.0 0.0
1	+1.20D+1.60L	12.24	-5.62	11.54			
		21.00	5.62	0.85	14.10	Vu < Phi*Vc / 2 Not Req'd per 9	14.1 0.0
1	+1.20D+1.60L	12.39	-5.78	10.67			
		21.00	5.78	0.95	14.21	Vu < Phi*Vc / 2 Not Req'd per 9	14.2 0.0
1	+1.20D+1.60L	12.55	-5.95	9.77			
		21.00	5.95	1.00	14.27	Vu < Phi*Vc / 2 Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	12.70	-6.11	8.85			
		21.00	6.11	1.00	14.27	Vu < Phi*Vc / 2 Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	12.85	-6.27	7.91			
		21.00	6.27	1.00	14.27	Vu < Phi*Vc / 2 Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	13.01	-6.44	6.93			
		21.00	6.44	1.00	14.27	Vu < Phi*Vc / 2 Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	13.16	-6.60	5.94			
		21.00	6.60	1.00	14.27	Vu < Phi*Vc / 2 Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	13.31	-6.77	4.91			
		21.00	6.77	1.00	14.27	Vu < Phi*Vc / 2 Not Req'd per 9	14.3 0.0
1	+1.20D+1.60L	13.46	-6.93	3.86			
		21.00	6.93	1.00	14.27	Vu < Phi*Vc / 2 Not Req'd per 9	14.3 0.0

- 47 -

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

LIC# : KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	13.62	-7.09	2.79	14.27	Vu < Phi*Vc / 2 Not Req'd per 9	14.3
1	+1.20D+1.60L	21.00	7.09	1.00	14.27	Phi*Vc / 2 < Vu <= Min per 9.6.3.	0.0
1	+1.20D+1.60L	13.77	-7.26	1.69	14.27	Phi*Vc / 2 < Vu <= Min per 9.6.3.	28.1
		21.00	7.26	1.00	14.27	Phi*Vc / 2 < Vu <= Min per 9.6.3.	10.5
		13.92	-7.42	0.57	14.27	Phi*Vc / 2 < Vu <= Min per 9.6.3.	28.1
		21.00	7.42	1.00	14.27	Phi*Vc / 2 < Vu <= Min per 9.6.3.	10.5

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
MAXimum BENDING Envelope						
+1.40D	Span # 1	1	14.000	26.26	56.05	0.47
+1.20D+1.60L	Span # 1	1	14.000	16.92	56.05	0.30
+1.20D+L	Span # 1	1	14.000	26.26	56.05	0.47
+1.20D	Span # 1	1	14.000	21.85	56.05	0.39
+0.90D	Span # 1	1	14.000	14.50	56.05	0.26
	Span # 1	1	14.000	10.88	56.05	0.19

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl (in) in Span (ft)	Location	Load Combination	Max. "+" Defl (in) in Span (ft)	Location
1	+D+L	0.0238	7.000		0.0000	0.000

- 48 -

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

LIC# : KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

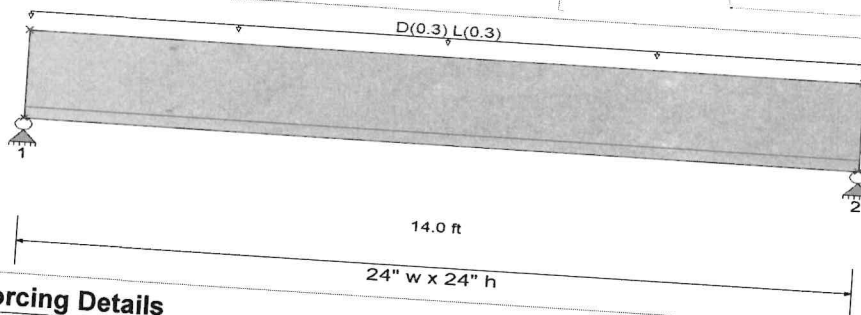
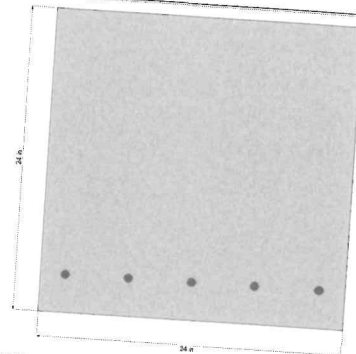
(c) ENERCALC, LLC 1982-2025

CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019
 Load Combination Set : ASCE 7-22 / IBC 2024

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 = 24.0 in, Height = 24.0 in
 Span #1 Reinforcing....

5-#6 at 3.0 in from Bottom, from 0.0 to 14.0 ft in this span

Beam self weight calculated and added to loads
 Load for Span Number 1

Uniform Load : D = 0.30, L = 0.30 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending Stress Ratio =	0.191 : 1
Section used for this span	Typical Section
Mu : Applied	37.632 k-ft
Mn * Phi : Allowable	197.224 k-ft
Location of maximum on span	6.987 ft
Span # where maximum occurs	Span # 1

Design OK

Maximum Deflection

Max Downward Transient Deflection	0.003 in	Ratio =	55940	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	L Only
Max Downward Total Deflection	0.012 in	Ratio =	14222	>=180.0	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio =	0	<180.0	Span: 1 : +D+L

Vertical Reactions

Load Combination	Support notation : Far left is #1	
	Support 1	Support 2
Max Upward from all Load Conditions	8.260	8.260
Max Upward from Load Combinations	8.260	8.260
Max Upward from Load Cases	6.160	6.160
Only	6.160	6.160
+L	6.160	6.160
+0.750L	8.260	8.260
.60D	7.735	7.735
	3.696	3.696

49

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

LIC#: KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Vertical Reactions

Load Combination

Support notation : Far left is #1

L Only

Support 1 Support 2

2.100 2.100

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

Span Number	Load Combination	Distance (ft) 'd' (in)	V_u Actual V_u (k) Design	μ (k-ft) d^*V_u/μ	Φ^*V_c (k)	Comment Φ^*V_s (k)	Φ^*V_n (k) Req'd Spacing (in)
1	+1.20D+1.60L	0.00	10.75	0.00			
1	+1.20D+1.60L	21.00	10.75	1.00	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	0.15	10.52	1.63	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	21.00	10.52	1.00	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	0.31	10.28	3.22	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	21.00	10.28	1.00	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	0.46	10.05	4.77	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	21.00	10.05	1.00	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	0.61	9.81	6.29	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	21.00	9.81	1.00	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	0.77	9.58	7.78	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	21.00	9.58	1.00	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	0.92	9.34	9.22	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	21.00	9.34	1.00	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	1.07	9.11	10.63	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	21.00	9.11	1.00	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	1.22	8.87	12.01	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	21.00	8.87	1.00	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	1.38	8.64	13.35	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	21.00	8.64	1.00	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	1.53	8.40	14.65	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	21.00	8.40	1.00	43.46	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.5 0.0
1	+1.20D+1.60L	1.68	8.17	15.92	43.04	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	43.0 0.0
1	+1.20D+1.60L	21.00	8.17	0.90	42.68	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	42.7 0.0
1	+1.20D+1.60L	1.84	7.93	17.15	42.37	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	42.4 0.0
1	+1.20D+1.60L	21.00	7.93	0.81	42.10	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	42.1 0.0
1	+1.20D+1.60L	1.99	7.70	18.35	41.87	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.9 0.0
1	+1.20D+1.60L	21.00	7.70	0.73	41.66	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.7 0.0
1	+1.20D+1.60L	2.14	7.46	19.51	41.48	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.5 0.0
1	+1.20D+1.60L	21.00	7.46	0.67	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	2.30	7.23	20.63	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	21.00	7.23	0.61	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	2.45	6.99	21.72	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	21.00	6.99	0.56	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	2.60	6.76	22.77	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	21.00	6.76	0.52	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	2.75	6.52	23.79	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	21.00	6.52	0.48	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	2.91	6.29	24.77	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	21.00	6.29	0.44	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	3.06	6.05	25.71	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	21.00	6.05	0.41	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	3.21	5.82	26.62	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	21.00	5.82	0.38	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	3.37	5.58	27.49	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	21.00	5.58	0.36	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	3.52	5.35	28.33	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	21.00	5.35	0.33	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	3.67	5.11	29.13	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	21.00	5.11	0.31	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	3.83	4.88	29.89	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	21.00	4.88	0.29	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	3.98	4.64	30.62	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	21.00	4.64	0.27	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	4.13	4.41	31.31	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	21.00	4.41	0.25	41.41	$V_u < \Phi^*V_c / 2$ Not Req'd per 9	41.4 0.0

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

LIC# : KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	4.28	4.17	31.97			
1	+1.20D+1.60L	21.00	4.17	0.23	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	4.44	3.94	32.59			
1	+1.20D+1.60L	21.00	3.94	0.21	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	4.59	3.70	33.17			
1	+1.20D+1.60L	21.00	3.70	0.20	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	4.74	3.47	33.72			
1	+1.20D+1.60L	21.00	3.47	0.18	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	4.90	3.23	34.23			
1	+1.20D+1.60L	21.00	3.23	0.17	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	5.05	3.00	34.71			
1	+1.20D+1.60L	21.00	3.00	0.15	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	5.20	2.76	35.15			
1	+1.20D+1.60L	21.00	2.76	0.14	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	5.36	2.53	35.55			
1	+1.20D+1.60L	21.00	2.53	0.12	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	5.51	2.29	35.92			
1	+1.20D+1.60L	21.00	2.29	0.11	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	5.66	2.06	36.26			
1	+1.20D+1.60L	21.00	2.06	0.10	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	5.81	1.82	36.55			
1	+1.20D+1.60L	21.00	1.82	0.09	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	5.97	1.59	36.81			
1	+1.20D+1.60L	21.00	1.59	0.08	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	6.12	1.35	37.04			
1	+1.20D+1.60L	21.00	1.35	0.06	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	6.27	1.12	37.23			
1	+1.20D+1.60L	21.00	1.12	0.05	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	6.43	0.88	37.38			
1	+1.20D+1.60L	21.00	0.88	0.04	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	6.58	0.65	37.50			
1	+1.20D+1.60L	21.00	0.65	0.03	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	6.73	0.41	37.58			
1	+1.20D+1.60L	21.00	0.41	0.02	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	6.89	0.18	37.62			
1	+1.20D+1.60L	21.00	0.18	0.01	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	7.04	-0.06	37.63			
1	+1.20D+1.60L	21.00	0.06	0.00	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	7.19	-0.29	37.60			
1	+1.20D+1.60L	21.00	0.29	0.01	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	7.34	-0.53	37.54			
1	+1.20D+1.60L	21.00	0.53	0.02	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	7.50	-0.76	37.44			
1	+1.20D+1.60L	21.00	0.76	0.04	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	7.65	-1.00	37.31			
1	+1.20D+1.60L	21.00	1.00	0.05	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	7.80	-1.23	37.14			
1	+1.20D+1.60L	21.00	1.23	0.06	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	7.96	-1.47	36.93			
1	+1.20D+1.60L	21.00	1.47	0.07	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	8.11	-1.70	36.69			
1	+1.20D+1.60L	21.00	1.70	0.08	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	8.26	-1.94	36.41			
1	+1.20D+1.60L	21.00	1.94	0.09	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	8.42	-2.17	36.09			
1	+1.20D+1.60L	21.00	2.17	0.11	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	8.57	-2.41	35.74			
1	+1.20D+1.60L	21.00	2.41	0.12	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	8.72	-2.64	35.36			
1	+1.20D+1.60L	21.00	2.64	0.13	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0
1	+1.20D+1.60L	8.87	-2.88	34.93			
1	+1.20D+1.60L	21.00	2.88	0.14	41.41	Vu < Phi*Vc / 2 Not Req'd per 9	41.4 0.0

-51-

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

LIC# : KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	9.03	-3.11	34.48	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	3.11	0.16		Not Req'd per 9	0.0
1	+1.20D+1.60L	9.18	-3.35	33.98	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	3.35	0.17		Not Req'd per 9	0.0
1	+1.20D+1.60L	9.33	-3.58	33.45	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	3.58	0.19		Not Req'd per 9	0.0
1	+1.20D+1.60L	9.49	-3.82	32.88	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	3.82	0.20		Not Req'd per 9	0.0
1	+1.20D+1.60L	9.64	-4.05	32.28	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	4.05	0.22		Not Req'd per 9	0.0
1	+1.20D+1.60L	9.79	-4.29	31.64	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	4.29	0.24		Not Req'd per 9	0.0
1	+1.20D+1.60L	9.95	-4.52	30.97	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	4.52	0.26		Not Req'd per 9	0.0
1	+1.20D+1.60L	10.10	-4.76	30.26	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	4.76	0.28		Not Req'd per 9	0.0
1	+1.20D+1.60L	10.25	-4.99	29.51	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	4.99	0.30		Not Req'd per 9	0.0
1	+1.20D+1.60L	10.40	-5.23	28.73	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	5.23	0.32		Not Req'd per 9	0.0
1	+1.20D+1.60L	10.56	-5.46	27.91	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	5.46	0.34		Not Req'd per 9	0.0
1	+1.20D+1.60L	10.71	-5.70	27.06	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	5.70	0.37		Not Req'd per 9	0.0
1	+1.20D+1.60L	10.86	-5.93	26.17	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	5.93	0.40		Not Req'd per 9	0.0
1	+1.20D+1.60L	11.02	-6.17	25.24	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	6.17	0.43		Not Req'd per 9	0.0
1	+1.20D+1.60L	11.17	-6.40	24.28	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	6.40	0.46		Not Req'd per 9	0.0
1	+1.20D+1.60L	11.32	-6.64	23.28	41.41	Vu < Phi*Vc / 2	41.4
1	+1.20D+1.60L	21.00	6.64	0.50		Not Req'd per 9	0.0
1	+1.20D+1.60L	11.48	-6.87	22.25	41.57	Vu < Phi*Vc / 2	41.6
1	+1.20D+1.60L	21.00	6.87	0.54		Not Req'd per 9	0.0
1	+1.20D+1.60L	11.63	-7.11	21.18	41.76	Vu < Phi*Vc / 2	41.8
1	+1.20D+1.60L	21.00	7.11	0.59		Not Req'd per 9	0.0
1	+1.20D+1.60L	11.78	-7.34	20.07	41.98	Vu < Phi*Vc / 2	42.0
1	+1.20D+1.60L	21.00	7.34	0.64		Not Req'd per 9	0.0
1	+1.20D+1.60L	11.93	-7.58	18.93	42.23	Vu < Phi*Vc / 2	42.2
1	+1.20D+1.60L	21.00	7.58	0.70		Not Req'd per 9	0.0
1	+1.20D+1.60L	12.09	-7.81	17.75	42.51	Vu < Phi*Vc / 2	42.5
1	+1.20D+1.60L	21.00	7.81	0.77		Not Req'd per 9	0.0
1	+1.20D+1.60L	12.24	-8.05	16.54	42.85	Vu < Phi*Vc / 2	42.9
1	+1.20D+1.60L	21.00	8.05	0.85		Not Req'd per 9	0.0
1	+1.20D+1.60L	12.39	-8.28	15.29	43.25	Vu < Phi*Vc / 2	43.2
1	+1.20D+1.60L	21.00	8.28	0.95		Not Req'd per 9	0.0
1	+1.20D+1.60L	12.55	-8.52	14.01	43.46	Vu < Phi*Vc / 2	43.5
1	+1.20D+1.60L	21.00	8.52	1.00		Not Req'd per 9	0.0
1	+1.20D+1.60L	12.70	-8.75	12.68	43.46	Vu < Phi*Vc / 2	43.5
1	+1.20D+1.60L	21.00	8.75	1.00		Not Req'd per 9	0.0
1	+1.20D+1.60L	12.85	-8.99	11.33	43.46	Vu < Phi*Vc / 2	43.5
1	+1.20D+1.60L	21.00	8.99	1.00		Not Req'd per 9	0.0
1	+1.20D+1.60L	13.01	-9.22	9.93	43.46	Vu < Phi*Vc / 2	43.5
1	+1.20D+1.60L	21.00	9.22	1.00		Not Req'd per 9	0.0
1	+1.20D+1.60L	13.16	-9.46	8.50	43.46	Vu < Phi*Vc / 2	43.5
1	+1.20D+1.60L	21.00	9.46	1.00		Not Req'd per 9	0.0
1	+1.20D+1.60L	13.31	-9.69	7.04	43.46	Vu < Phi*Vc / 2	43.5
1	+1.20D+1.60L	21.00	9.69	1.00		Not Req'd per 9	0.0
1	+1.20D+1.60L	13.46	-9.93	5.54	43.46	Vu < Phi*Vc / 2	43.5
1	+1.20D+1.60L	21.00	9.93	1.00		Not Req'd per 9	0.0
1	+1.20D+1.60L	13.62	-10.16	4.00	43.46	Vu < Phi*Vc / 2	43.5
1	+1.20D+1.60L	21.00	10.16	1.00		Not Req'd per 9	0.0

-52-

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

LIC# : KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Detailed Shear Information

Span Number	Load Combination	Distance (ft) 'd' (in)	Vu Actual Vu (k) Design	Mu (k-ft) d*Vu/Mu	Phi*Vc (k)	Comment Phi*Vs (k)	Phi*Vn (k) Spacing (in) Req'd
1	+1.20D+1.60L	13.77	-10.40	2.43	43.46	Vu < Phi*Vc / 2 Not Req'd per 9	43.5
1	+1.20D+1.60L	21.00	10.40	1.00	43.46	Vu < Phi*Vc / 2 Not Req'd per 9	0.0
		13.92	-10.63	0.82	43.46	Vu < Phi*Vc / 2 Not Req'd per 9	43.5
		21.00	10.63	1.00			0.0

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
MAXimum BENDING Envelope						
Span # 1		1	14.000	37.63	197.22	0.19
+1.40D		1	14.000	30.18	197.22	0.15
Span # 1		1	14.000	37.63	197.22	0.19
+1.20D+1.60L		1	14.000	33.22	197.22	0.17
Span # 1		1	14.000	25.87	197.22	0.13
+1.20D+L		1	14.000	19.40	197.22	0.10
Span # 1		1	14.000			
+1.20D		1	14.000			
Span # 1		1	14.000			
+0.90D		1	14.000			
Span # 1		1	14.000			

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl (in) in Span	Location (ft)	Load Combination	Max. "+" Defl (in) in Span	Location (ft)
1	+D+L	0.0118	7.000		0.0000	0.000

designengineering & supply, Inc.

2799 NW Boca Raton Blvd. #111

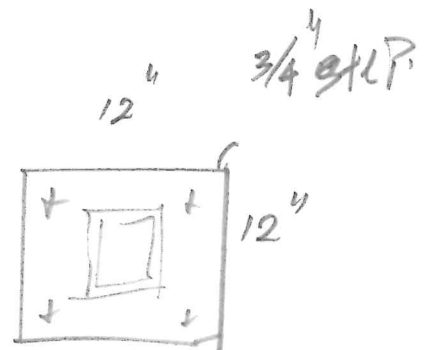
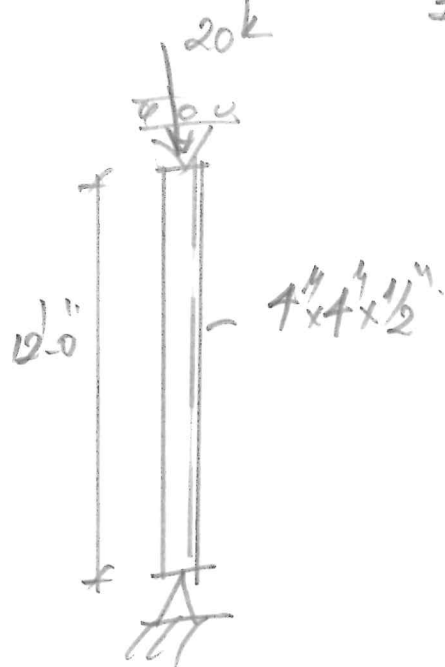
Boca Raton, FL 33431

P: 561-705-2930 F: 561-431-3211

Email: yemeniciler@netzero.net
desupply@aol.com

Re: Bhagwansingh house
Pinecrest, FL

Steel Column Calculations #
Bottom Plate Calculations



Best Regards,

54/A

Ali N. Yemeniciler, MsCE., P.E
FL. Reg # 54733

"The Pressure's On Us."

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

Project File: ENERCALC_20

LIC#: KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019

Load Combinations Used : ASCE 7-22 / IBC 2024

General Information

Steel Section Name : HSS4x4x1/2
Analysis Method : Allowable Strength
Steel Stress Grade
Fy : Steel Yield 36.0 ksi
E : Elastic Bending Modulus 29,000.0 ksi

Overall Column Height 12. ft
Top & Bottom Fixity Top & Bottom Pinned
Brace condition :
Fully braced against buckling ABOUT X-X Axis
Fully braced against buckling ABOUT Y-Y Axis

Applied Loads

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

Column self weight included : 259.560 lbs * Dead Load Factor

AXIAL LOADS . . .

Axial Load at 12.0 ft, D = 15.0, L = 15.0 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = 0.2332 : 1
Load Combination +D+L
Location of max. above base 0.0 ft
At maximum location values are . . .
Pa : Axial 30.260 k
Pn / Omega : Allowable 129.772 k
Ma-x : Applied 0.0 k-ft
Mn-x / Omega : Allowable 13.832 k-ft
Ma-y : Applied 0.0 k-ft
Mn-y / Omega : Allowable 13.832 k-ft

PASS Maximum Shear Stress Ratio 0.0 : 1
Load Combination 0.0
Location of max. above base 0.0 ft
At maximum location values are . . .
Va : Applied 0.0 k
Vn / Omega : Allowable 0.0 k

Maximum Load Reactions . .

Top along X-X 0.0 k
Bottom along X-X 0.0 k
Top along Y-Y 0.0 k
Bottom along Y-Y 0.0 k

Maximum Load Deflections . . .

Along Y-Y 0.0 in at 0.0ft above base
for load combination :
Along X-X 0.0 in at 0.0ft above base
for load combination :

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios				Cbx	Cby	KxLx/Rx	KyLy/Ry	Maximum Shear Ratios		
	Stress Ratio	Status	Location						Stress Ratio	Status	Location
D Only	0.118	PASS	0.00 ft		1.00	1.00	0.00	0.00	0.000	PASS	0.00 ft
+D+L	0.233	PASS	0.00 ft		1.00	1.00	0.00	0.00	0.000	PASS	0.00 ft
+D+0.750L	0.204	PASS	0.00 ft		1.00	1.00	0.00	0.00	0.000	PASS	0.00 ft
+0.60D	0.071	PASS	0.00 ft		1.00	1.00	0.00	0.00	0.000	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments k-ft		My - End Moments	
		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
D Only	15.260									
+D+L	30.260									
+D+0.750L	26.510									
+0.60D	9.156									
L Only	15.000									

Extreme Reactions

Item	Extreme Value	Axial Reaction		k	Y-Y Axis Reaction		Mx - End Moments k-ft		My - End Moments	
		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
Axial @ Base	Maximum	30.260								
"	Minimum	9.156								
Reaction, X-X Axis Base	Maximum	15.260								
"	Minimum	15.260								

— 54 —

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Steel Column

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Extreme Reactions

Item	Extreme Value	Axial Reaction	X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		k-ft	My - End Moments	
		@ Base	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top		@ Base	@ Top
Reaction, Y-Y Axis Base	Maximum	15.260										
"	Minimum	15.260										
Reaction, X-X Axis Top	Maximum	15.260										
"	Minimum	15.260										
Reaction, Y-Y Axis Top	Maximum	15.260										
"	Minimum	15.260										
Moment, X-X Axis Base	Maximum	15.260										
"	Minimum	15.260										
Moment, Y-Y Axis Base	Maximum	15.260										
"	Minimum	15.260										
Moment, X-X Axis Top	Maximum	15.260										
"	Minimum	15.260										
Moment, Y-Y Axis Top	Maximum	15.260										
"	Minimum	15.260										

Maximum Deflections for Load Combinations

Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+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
+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

Steel Section Properties : HSS4x4x1/2

Depth	=	4.000 in	I xx	=	11.90 in^4	J	=	21.000 in^4
Design Thick	=	0.465 in	S xx	=	5.97 in^3			
Width	=	4.000 in	R xx	=	1.410 in			
Wall Thick	=	0.500 in	Zx	=	7.700 in^3			
Area	=	6.020 in^2	I yy	=	11.900 in^4	C	=	11.200 in^3
Weight	=	21.630 plf	S yy	=	5.970 in^3			
			R yy	=	1.410 in			
Ycg	=	0.000 in						

- 55 -

Steel Column

Project File: ENERCALC_20

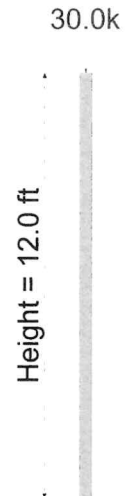
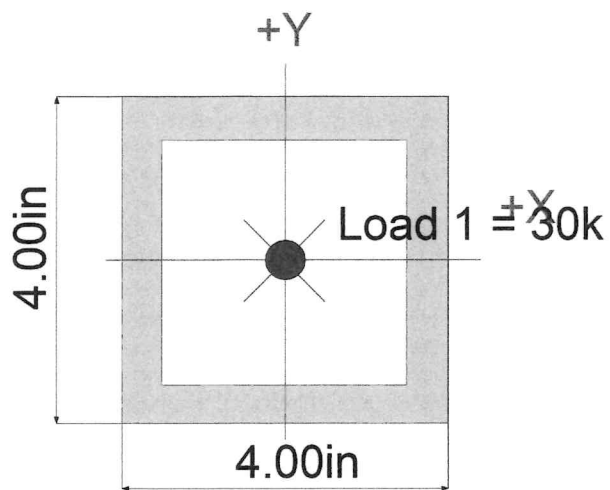
LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Sketches



Steel Base Plate

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Code Reference:

Calculations per AISC Design Guide # 1, IBC 2018, CBC 2019

Load Combination Set : ASCE 7-22 / IBC 2024

General Information

Material Properties

AISC Design Method	Load Resistance Factor Design	ϕ_c : LRFD Resistance Factor	0.65
Steel Plate Fy	= 36 ksi		
Concrete Support f'c	= 3 ksi		
Assumed Bearing Area	Full Bearing	Nominal Bearing Fp per J8	0.0 ksi

Column & Plate

Column Properties

Steel Section		Area	in^2
Depth	in	Ixx	in^4
Width	in	Iyy	in^4
Flange Thickness	in		
Web Thickness	in		

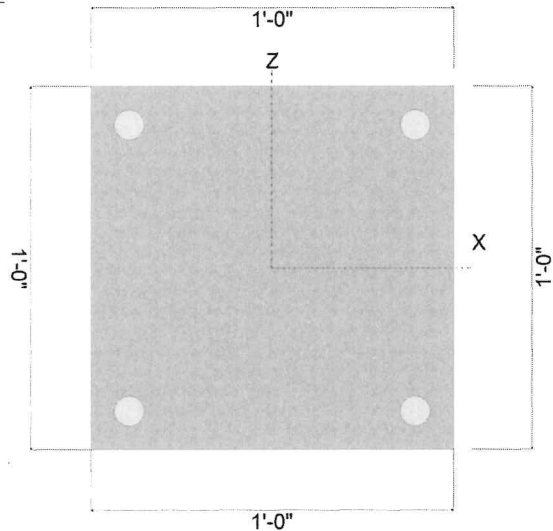
Plate Dimensions

N : Length	12 in
B : Width	12 in
Thickness	0.750 in

Column assumed welded to base plate

Support Dimensions

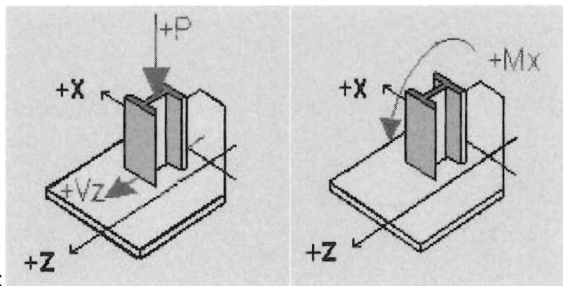
Width along "X"	12 in
Length along "Z"	12 in



Applied Loads

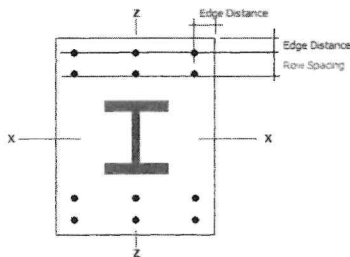
	P-Y	V-Z	M-X
D : Dead Load	20.0 k	k	k-ft
L : Live	10.0 k	k	k-ft
Lr : Roof Live	k	k	k-ft
S : Snow	k	k	k-ft
W : Wind	k	k	k-ft
E : Earthquake	k	k	k-ft
H : Lateral Earth	k	k	k-ft

"P" = Gravity load, "+" sign is downward
"V" Shears push plate towards +Z edge
"M" Moments create higher soil pressure at +Z edge



Anchor Bolts

Anchor Bolt or Rod Description	1 1/2"
Max of Tension or Pullout Capacity.....	k
Shear Capacity.....	k
Edge distance : bolt to plate.....	1.25 in
Number of Bolts in each Row.....	2
Number of Bolt Rows.....	1



Project Title:
Engineer:
Project ID:
Project Descr:

Steel Base Plate

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

GOVERNING DESIGN LOAD CASE SUMMARY

Plate Design Summary

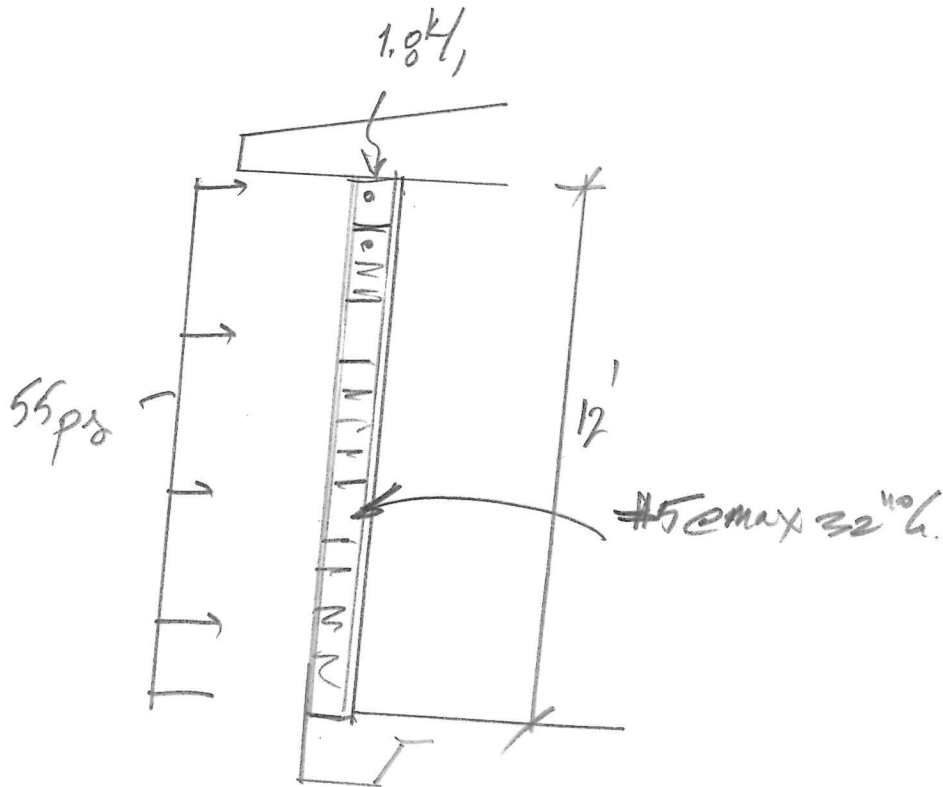
Design Method Load Resistance Factor Design
Governing Load Combinat
Governing Load Case Typ
Governing STRESS RATIO 0.0
Design Plate Size 1'-0" x 1'-0" x 0 -3/4"
Pu : Axial 0.000 k
Mu : Moment 0.000 k-ft

Mu : Max. Moment 0.000 k-in
fb : Max. Bending Stress 0.000 ksi
Fb : Allowable : $F_y * \phi$ 0.000 ksi
Bending Stress Ratio 0.000
Bending Stress OK
fu : Max. Plate Bearing Stress 0.000 ksi
Fp : Allowable : 0.000 ksi
Bearing Stress Ratio 0.000
Bearing Stress OK

designengineering & supply, Inc.
2799 NW Boca Raton Blvd. #111
Boca Raton, FL 33431
P: 561-705-2930 F: 561-431-3211
Email: yemeniciler@netzero.net
desupply@aol.com

Re: Bhagwansingh house
The crest, FL

Masonry Wall Calculations



Best Regards,

59/A

Ali N. Yemeniciler, MsCE., P.E.
FL. Reg # 54733

"The Pressure's On Us."

Masonry Slender Wall

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Code References

Calculations per TMS 402-16, IBC 2018, CBC 2019
Load Combinations Used : ASCE 7-22 / IBC 2024

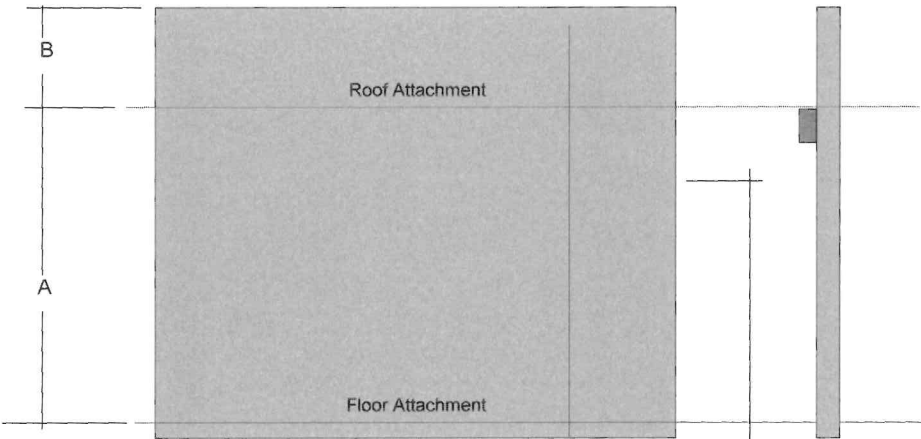
General Information

Calculations per TMS 402-16, IBC 2018, CBC 2019

Construction Type : Grouted Hollow Concrete Masonry							
F'm	=	1.50 ksi	Nom. Wall Thickness	8 in	Temp Diff across thickness	=	deg F
Fy - Yield	=	60.0 ksi	Actual Thickness	7.625 in	Min Allow Out-of-plane Defl R ₂	=	0.0
Fr - Rupture	=	61.0 psi	Rebar "d" distance	3.750 in			
Em = f'm *	=	900.0	Lower Level Rebar . . .		Minimum Vertical Steel %	=	0.0020
Max % of ρ bal.	=	0.006809	Bar Size	# 5			
Grout Density	=	140 pcf	Bar Spacing	32 in			
Block Weight	Normal Weight						
Wall Weight	=	51.0 psf					
Wall is grouted at rebar cells only							

One-Story Wall Dimensions

A Clear Height	=	12.25 ft
B Parapet height	=	ft
Wall Support ConditionTop & Bottom Pinned		



Vertical Loads

Vertical Uniform Loads . . . Applied per foot of Strip Width		DL : Dead	Lr : Roof Live	Lf : Floor Live	S : Snow	W : Wind
Ledger Load	Eccentricity					k/ft
Concentric Load	6.750 in	1.0		1.0		k/ft

Lateral Loads

Wind Loads :		Seismic Loads :	
Full area WIND load	55. psf	Wall Weight Seismic Load Input Method : Direct entry of Lateral Wall Weight	
		Seismic Wall Lateral Load	
		0. psf	
		Fp	1.0 = 0.0 psf

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Masonry Slender Wall

LIC#: KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

DESIGN SUMMARY

Governing Load Combination . . .		Results reported for "Strip Width" of 12.0 in			
		Actual Values . . .		Allowable Values . . .	
PASS	Moment Capacity Check +0.90D+W	Maximum Bending Stress Ratio.5304			
		Max Mu	1.075 k-ft	Phi * Mn	2.026 k-ft
PASS	Service Deflection Check W Only	Actual Defl. Ratio L/	272	Allowable Defl. Ratio	150.0
		Max. Deflection	0.5401 in		
PASS	Axial Load Check +1.20D+L+W	Max Pu / Ag	56.567 psi	Max. Allow. Defl.	0.980 in
		Location	5.921 ft	0.2 * f'm	300.0 psi
	Reinforcing Limit Check	Actual As/bd	0.00250	Max Allow As/bd	0.006810
Maximum Reactions for Load Combination...					
	Top Horizontal W Only				0.3369 k
	Base Horizontal W Only				0.3369 k
	Vertical Reaction +D+L				2.625 k

Design Maximum Combinations - Moments

Load Combination	Axial Load		Results reported for "Strip Width" = 12 in.							
	Pu k	0.2*fm*b*t k	Mcr k-ft	Mu k-ft	Phi	Phi Mn k-ft	As in^2	As Ratio	0.6 * rho bal	Bar 'd'
	0.000	0.000	0.00	0.00	0.00	0.00	0.000	0.0000	0.0000	0.00
	0.000	0.000	0.00	0.00	0.00	0.00	0.000	0.0000	0.0000	0.00
	0.000	0.000	0.00	0.00	0.00	0.00	0.000	0.0000	0.0000	0.00
+1.20D+0.50W at 5.72 to 6.13	1.600	13.788	0.46	0.52	0.90	2.13	0.116	0.0025	0.0066	0.00
+1.20D+L+W at 5.72 to 6.13	2.600	13.788	0.46	1.13	0.90	2.37	0.116	0.0025	0.0062	0.00
+0.90D+W at 5.72 to 6.13	1.200	13.788	0.46	1.07	0.90	2.03	0.116	0.0025	0.0067	0.00
	0.000	0.000	0.00	0.00	0.00	0.00	0.000	0.0000	0.0000	0.00
	0.000	0.000	0.00	0.00	0.00	0.00	0.000	0.0000	0.0000	0.00

Design Maximum Combinations - Deflections

Load Combination	Axial Load Pu k	Moment Values			Stiffness			Deflections	
		Mcr k-ft	Mactual k-ft	I gross in^4	I cracked in^4	I effective in^4	Deflection in	Defl. Ratio	
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0	
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0	
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0	
+D+0.60W at 6.13 to 6.53	1.312	0.46	0.63	342.40	28.11	32.190	0.147	1,000.5	
+D+0.750L+0.450W at 5.72 to 6.13	2.083	0.46	0.47	342.40	30.12	74.186	0.030	4,902.1	
+0.60D+0.60W at 6.13 to 6.53	0.787	0.46	0.63	342.40	26.71	30.790	0.148	993.3	
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0	
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0	
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0	
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0	
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0	
W Only at 6.13 to 6.53	0.000	0.46	1.03	342.40	24.55	25.100	0.540	272.1	
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0	

Reactions - Vertical & Horizontal

Load Combination	Base Horizontal		Top Horizontal		Vertical @ Wall Base	
D Only	0.0 k		0.00 k		1.625 k	
+D+L	0.0 k		0.00 k		2.625 k	
+D+0.750L	0.0 k		0.00 k		2.375 k	
+D+0.60W	0.2 k		0.20 k		1.625 k	

- 60 -

Project Title:
Engineer:
Project ID:
Project Descr:

Masonry Slender Wall

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

+D+0.750L+0.450W	0.2 k	0.15 k	2.375 k
+0.60D+0.60W	0.2 k	0.20 k	0.975 k
+D+0.70E	0.0 k	0.00 k	1.625 k
+D+0.750L+0.5250E	0.0 k	0.00 k	2.375 k

Reactions - Vertical & Horizontal

Load Combination	Base Horizontal	Top Horizontal	Vertical @ Wall Base
+0.60D+0.70E	0.0 k	0.00 k	0.975 k
L Only	0.0 k	0.00 k	1.000 k
W Only	0.3 k	0.34 k	0.000 k
E Only	0.0 k	0.00 k	0.000 k

- 61 -

designengineering & supply, Inc.

2799 NW Boca Raton Blvd. #111

Boca Raton, FL 33431

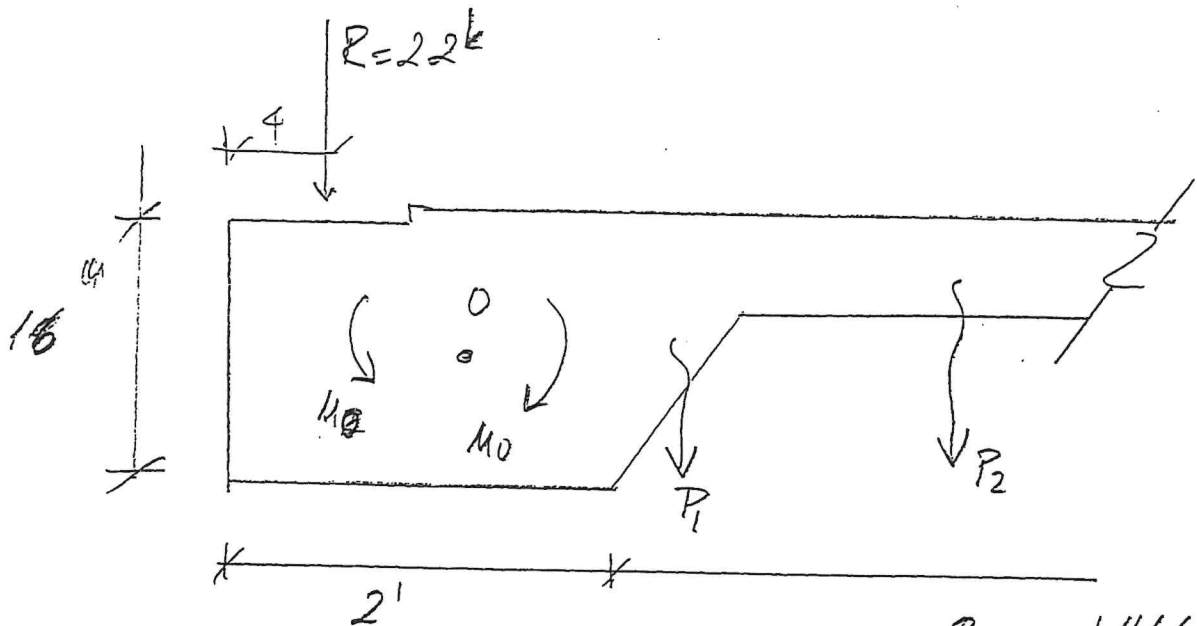
Phone: 561-705-2930 Fax: 561-431-3211

Email: yemeniciler@netzero.net

desupply@aol.com

Re: Bhagnansing Residence
8100 SW 120th Street
Pine Crest, FL

FOUNDATION CALCULATION



Best Regards,

$$M_S = M_0 - M_R \geq$$

$$M_0 = 2,200 \times \frac{8}{12} = 1,466 \text{ # ft.}$$

$$M_R = (100 \times 1) + (240 \times 2.5) = 700 \text{ # ft.}$$

$$M_S = 766 \text{ # ft.}$$

Ali N. Yemeniciler, MsCE., P.E.
FL. Reg # 54733

"The Pressure's On Us"

designengineering & supply, Inc.

2799 NW Boca Raton Blvd. #111

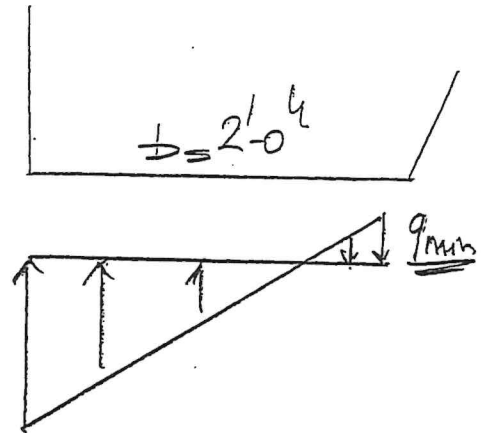
Boca Raton, FL 33431

Phone: 561-705-2930 Fax: 561-431-3211

Email: yemeniciler@netzero.net

desupply@aol.com

$$q_{max, min} = \frac{2,200}{2} \mp \frac{(6)M_x}{4}$$
$$= 1,100 \mp \frac{(6)(766)}{4} \quad \underline{\underline{q_{max}}}$$



$$q_{max} = 1,100 \mp 1,149$$

min.

$$q_{max} = 2,249 \text{ \#}/\text{ft}^2 < 2,500 \text{ o.k.}$$

$$q_{min} = -49 \text{ \#}/\text{ft}^2 \text{ o.k.}$$

Best Regards,

Ali N. Yemeniciler, MsCE., P.E.
FL. Reg # 54733

"The Pressure's On Us."

-63-

designengineering & supply, Inc.

2799 NW Boca Raton Blvd. #111

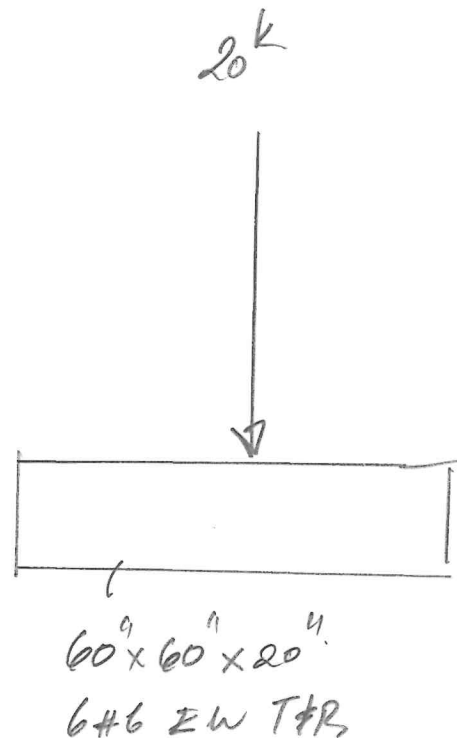
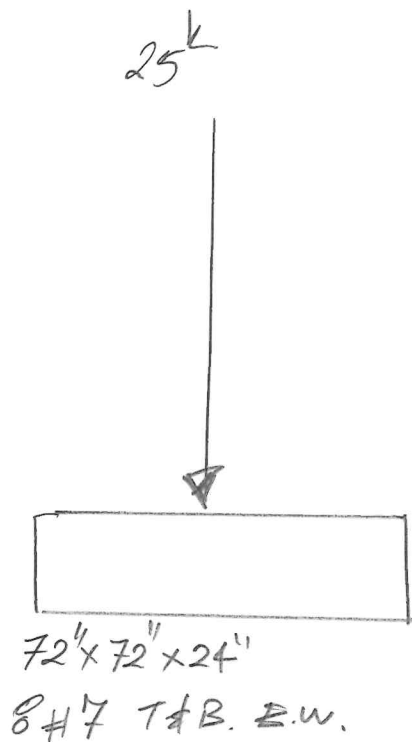
Boca Raton, FL 33431

P: 561-705-2930 F: 561-431-3211

Email: yemeniciler@netzero.net
desupply@aol.com

Re: Phajransigh House
The crest, FL.

Foundation, Interior T&B calculations



Best Regards,

Ali N. Yemeniciler, MsCE., P.E
FL. Reg # 54733

64

"The Pressure's On Us."

designengineering & supply, Inc.

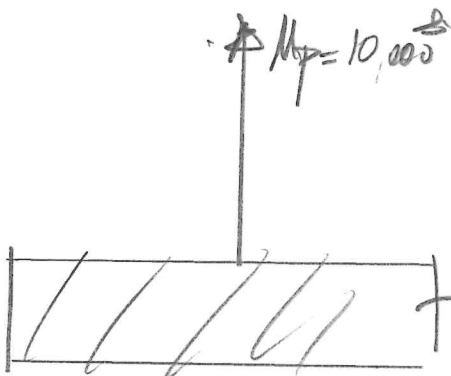
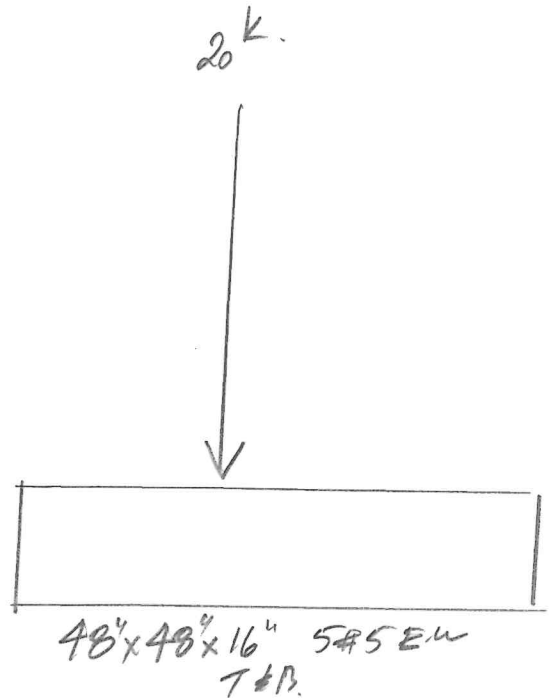
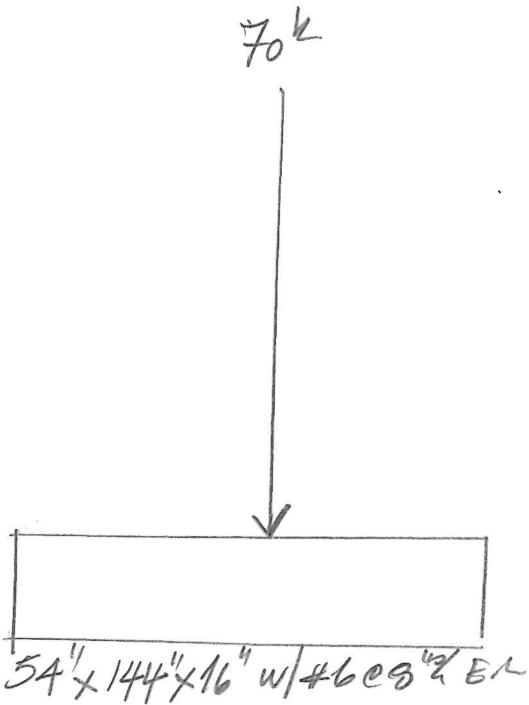
2799 NW Boca Raton Blvd. #111

Boca Raton, FL 33431

P: 561-705-2930 F: 561-431-3211

Email: yemeniciler@netzero.net

desupply@aol.com



4' lift stl column calculation

Best Regards,

$$6' \times 6' \times 2' \times 150 \frac{\#}{ft^3} = 10,800 \frac{\#}{ft^3} > 10,000 \text{ Ok } \checkmark$$

65

Ali N. Yemeniciler, MsCE., P.E
FL. Reg # 54733

"The Pressure's On Us."

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Code References

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

Load Combinations Used : ASCE 7-22 / IBC 2024

General Information

Material Properties

f _c : Concrete 28 day strength	=	3.0 ksi
f _y : Rebar Yield	=	60.0 ksi
E _c : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	2.50 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	ft
Allow press. increase per foot of depth when footing base is below	=	ksf

Increases based on footing plan dimension

Allowable pressure increase per foot of depth when max. length or width is greater than	=	ksf
---	---	-----

Dimensions

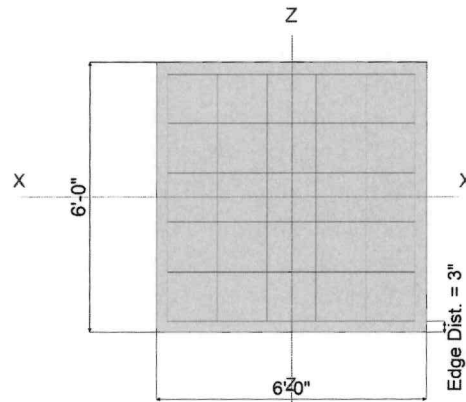
Width parallel to X-X Axis	=	6.0 ft
Length parallel to Z-Z Axis	=	6.0 ft
Footing Thickness	=	24.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a



Bottom Reinforcing

Bars parallel to X-X Axis	=	
Number of Bars	=	6
Reinforcing Bar Size	=	# 7
Bars parallel to Z-Z Axis	=	
Number of Bars	=	6
Reinforcing Bar Size	=	# 7
Rebar Centerline to Edge of Concrete... at Bottom of footing	=	3.0 in



Top Reinforcing

Bars parallel to X-X Axis	=	
Number of Bars	=	6
Reinforcing Bar Size	=	7
Bars parallel to Z-Z Axis	=	
Number of Bars	=	6
Reinforcing Bar Size	=	7
Rebar Centerline to Edge of Concrete... at Top of footing	=	3.0 in

— 66 —

Project Title:
 Engineer:
 Project ID:
 Project Descr:

General Footing

Project File: ENERCALC_20

LIC# : KW-06015041, Build:20.25.04.16

Design Engineering & Supply Inc

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: --None--

Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	13.0		13.0					k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.4048	Soil Bearing	1.012 ksf	2.50 ksf	+D+L about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.08256	Z Flexure (+X) Bot Tens	4.550 k-ft/ft	55.112 k-ft/ft	+1.20D+1.60L
PASS	0.08256	Z Flexure (-X) Bot Tens	4.550 k-ft/ft	55.112 k-ft/ft	+1.20D+1.60L
PASS	0.08256	X Flexure (+Z) Bot Tens	4.550 k-ft/ft	55.112 k-ft/ft	+1.20D+1.60L
PASS	0.08256	X Flexure (-Z) Bot Tens	4.550 k-ft/ft	55.112 k-ft/ft	+1.20D+1.60L
PASS	0.0	Z Flexure (+X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.0	Z Flexure (-X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.0	X Flexure (+Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.0	X Flexure (-Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.06153	1-way Shear (+X)	5.056 psi	82.158 psi	+1.20D+1.60L
PASS	0.06153	1-way Shear (-X)	5.056 psi	82.158 psi	+1.20D+1.60L
PASS	0.06153	1-way Shear (+Z)	5.056 psi	82.158 psi	+1.20D+1.60L
PASS	0.06153	1-way Shear (-Z)	5.056 psi	82.158 psi	+1.20D+1.60L
PASS	0.1143	2-way Punching	18.778 psi	164.317 psi	+1.20D+1.60L

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc		Zecc		Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
			(in)			Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only	2.50	n/a	0.0	0.6511	0.6511	n/a	n/a	n/a	n/a	0.260
X-X, +D+L	2.50	n/a	0.0	1.012	1.012	n/a	n/a	n/a	n/a	0.405
X-X, +D+0.750L	2.50	n/a	0.0	0.9219	0.9219	n/a	n/a	n/a	n/a	0.369
X-X, +0.60D	2.50	n/a	0.0	0.3907	0.3907	n/a	n/a	n/a	n/a	0.156
Z-Z, D Only	2.50	0.0	n/a	n/a	n/a	0.6511	0.6511	0.6511	0.6511	0.260
Z-Z, +D+L	2.50	0.0	n/a	n/a	n/a	1.012	1.012	1.012	1.012	0.405
Z-Z, +D+0.750L	2.50	0.0	n/a	n/a	n/a	0.9219	0.9219	0.9219	0.9219	0.369
Z-Z, +0.60D	2.50	0.0	n/a	n/a	n/a	0.3907	0.3907	0.3907	0.3907	0.156

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				
All units k				

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Tension on Bottom

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	2.275	+Z	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK

— 67 —

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

LIC# : KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Footing Tension on Bottom

[illegible]

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
One Way Shear X								
Load Combination...			Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D								
+1.20D+1.60L			2.53 psi	2.53 psi	2.53 psi	82.16 psi	0.03	OK
+1.20D+L			5.06 psi	5.06 psi	5.06 psi	82.16 psi	0.06	OK
+1.20D			3.97 psi	3.97 psi	3.97 psi	82.16 psi	0.05	OK
+0.90D			2.17 psi	2.17 psi	2.17 psi	82.16 psi	0.03	OK
			1.63 psi	1.63 psi	1.63 psi	82.16 psi	0.02	OK
One Way Shear Z								
Load Combination...			Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D								
+1.20D+1.60L			2.53 psi	2.53 psi	2.53 psi	82.16 psi	0.03	OK
+1.20D+L			5.06 psi	5.06 psi	5.06 psi	82.16 psi	0.06	OK
+1.20D			3.97 psi	3.97 psi	3.97 psi	82.16 psi	0.05	OK
+0.90D			2.17 psi	2.17 psi	2.17 psi	82.16 psi	0.03	OK
			1.63 psi	1.63 psi	1.63 psi	82.16 psi	0.02	OK
All units k								
Two-Way "Punching" Shear								
Load Combination...					Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D					9.39 psi	164.32 psi	0.06	OK
+1.20D+1.60L					18.78 psi	164.32 psi	0.11	OK
+1.20D+L					14.75 psi	164.32 psi	0.09	OK
+1.20D					8.05 psi	164.32 psi	0.05	OK
+0.90D					6.04 psi	164.32 psi	0.04	OK

- 68 -

Project Title:
 Engineer:
 Project ID:
 Project Descr:

General Footing

LIC# : KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Applied Loads

	D	Lr	L	S	W	E	H	
P : Column Load								k
OB : Overburden	13.0		13.0					ksf
M-xx								k-ft
M-zz								k-ft
V-x								k
V-z								k

DESIGN SUMMARY

Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS 0.4048	Soil Bearing	1.012 ksf	2.50 ksf	+D+L about Z-Z axis
PASS n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS 0.08256	Uplift	0.0 k	0.0 k	No Uplift
PASS 0.08256	Z Flexure (+X) Bot Tens	4.550 k-ft/ft	55.112 k-ft/ft	+1.20D+1.60L
PASS 0.08256	Z Flexure (-X) Bot Tens	4.550 k-ft/ft	55.112 k-ft/ft	+1.20D+1.60L
PASS 0.08256	X Flexure (+Z) Bot Tens	4.550 k-ft/ft	55.112 k-ft/ft	+1.20D+1.60L
PASS 0.0	X Flexure (-Z) Bot Tens	4.550 k-ft/ft	55.112 k-ft/ft	+1.20D+1.60L
PASS 0.0	Z Flexure (+X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS 0.0	Z Flexure (-X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS 0.0	X Flexure (+Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS 0.0	X Flexure (-Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS 0.06153	1-way Shear (+X)	5.056 psi	82.158 psi	+1.20D+1.60L
PASS 0.06153	1-way Shear (-X)	5.056 psi	82.158 psi	+1.20D+1.60L
PASS 0.06153	1-way Shear (+Z)	5.056 psi	82.158 psi	+1.20D+1.60L
PASS 0.06153	1-way Shear (-Z)	5.056 psi	82.158 psi	+1.20D+1.60L
PASS 0.1143	2-way Punching	18.778 psi	164.317 psi	+1.20D+1.60L

Design OK

Detailed Results

Soil Bearing		164.317 psi +1.20D+1.60L						
Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
			(in)	Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only	2.50	n/a	0.0	0.6511	0.6511	n/a	n/a	0.260
X-X, +D+L	2.50	n/a	0.0	1.012	1.012	n/a	n/a	0.405
X-X, +D+0.750L	2.50	n/a	0.0	0.9219	0.9219	n/a	n/a	0.369
X-X, +0.60D	2.50	n/a	0.0	0.3907	0.3907	n/a	n/a	0.156
Z-Z, D Only	2.50	0.0	n/a	n/a	n/a	0.6511	0.6511	0.260
Z-Z, +D+L	2.50	0.0	n/a	n/a	n/a	1.012	1.012	0.405
Z-Z, +D+0.750L	2.50	0.0	n/a	n/a	n/a	0.9219	0.9219	0.369
Z-Z, +0.60D	2.50	0.0	n/a	n/a	n/a	0.3907	0.3907	0.156
Overturning Stability								
Rotation Axis & Load Combination...								

Overturning Stability

Rotation Axis & Load Combination...

Footing Has NO Overturning

Overturning Moment

Resisting Moment

Stability Ratio

Status

All units k

Sliding Stability

Force Application Axis

Load Combination...

Footing Has NO Sliding

Sliding Force

Resisting Force

Stability Ratio

Status

Footing Tension on Bottom

Flexure Axis & Load Combination

X-X, +1.40D

Mu k-ft

Side

Tension Surface

As Req'd in^2

Gvrn. As in^2

Actual As in^2

Phi*Mn k-ft

Status

-70-

OK

Project Title:
 Engineer:
 Project ID:
 Project Descr:

General Footing

LIC# : KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Footing Tension on Bottom

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	2.275	-Z	Bottom	0.5184	ACI 7.6.1.1			
X-X, +1.20D+1.60L	4.550	+Z	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
X-X, +1.20D+1.60L	4.550	-Z	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
X-X, +1.20D+L	3.575	+Z	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
X-X, +1.20D+L	3.575	-Z	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
X-X, +1.20D	1.950	+Z	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
X-X, +0.90D	1.950	-Z	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
X-X, +0.90D	1.463	+Z	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
Z-Z, +1.40D	1.463	-Z	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
Z-Z, +1.40D	2.275	-X	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
Z-Z, +1.20D+1.60L	2.275	+X	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
Z-Z, +1.20D+1.60L	4.550	-X	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
Z-Z, +1.20D+L	4.550	+X	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
Z-Z, +1.20D+L	3.575	-X	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
Z-Z, +1.20D	3.575	+X	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
Z-Z, +1.20D	1.950	-X	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
Z-Z, +0.90D	1.950	+X	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
Z-Z, +0.90D	1.463	-X	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK
Z-Z, +0.90D	1.463	+X	Bottom	0.5184	ACI 7.6.1.1	0.60	55.112	OK

Footing Tension on Top

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
One Way Shear X								
Load Combination...								
+1.40D			Vu @ -X		Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn Status
+1.20D+1.60L			2.53 psi		2.53 psi	2.53 psi	82.16 psi	0.03 OK
+1.20D+L			5.06 psi		5.06 psi	5.06 psi	82.16 psi	0.06 OK
+1.20D			3.97 psi		3.97 psi	3.97 psi	82.16 psi	0.05 OK
+0.90D			2.17 psi		2.17 psi	2.17 psi	82.16 psi	0.03 OK
One Way Shear Z			1.63 psi		1.63 psi	1.63 psi	82.16 psi	0.02 OK

One Way Shear Z

Load Combination...								
+1.40D			Vu @ -Z		Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn Status
+1.20D+1.60L			2.53 psi		2.53 psi	2.53 psi	82.16 psi	0.03 OK
+1.20D+L			5.06 psi		5.06 psi	5.06 psi	82.16 psi	0.06 OK
+1.20D			3.97 psi		3.97 psi	3.97 psi	82.16 psi	0.05 OK
+0.90D			2.17 psi		2.17 psi	2.17 psi	82.16 psi	0.03 OK
			1.63 psi		1.63 psi	1.63 psi	82.16 psi	0.02 OK

Two-Way "Punching" Shear

Load Combination...								
+1.40D			Vu		Phi*Vn	Vu / Phi*Vn	Status	
+1.20D+1.60L			9.39 psi		164.32 psi	0.06	OK	
+1.20D+L			18.78 psi		164.32 psi	0.11	OK	
+1.20D			14.75 psi		164.32 psi	0.09	OK	
+0.90D			8.05 psi		164.32 psi	0.05	OK	
			6.04 psi		164.32 psi	0.04	OK	

All units k

-7-

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

LIC#: KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Code References

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

Load Combinations Used : ASCE 7-22 / IBC 2024

General Information

Material Properties

f'_c : Concrete 28 day strength	=	3.0 ksi
f_y : Rebar Yield	=	60.0 ksi
E_c : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
ϕ Values Flexure	=	0.90
Shear	=	0.750

Soil Design Values

Allowable Soil Bearing	=	2.50 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Increases based on footing Depth

Footing base depth below soil surface	=	ft
Allow press. increase per foot of depth when footing base is below	=	ksf
	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth when max. length or width is greater than	=	ksf
	=	ft

Dimensions

Width parallel to X-X Axis	=	5.0 ft
Length parallel to Z-Z Axis	=	5.0 ft
Footing Thickness	=	20.0 in

Pedestal dimensions...

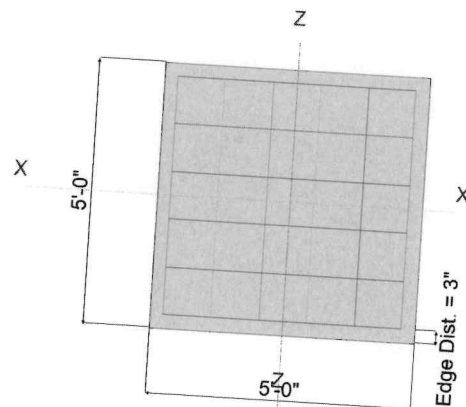
px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation

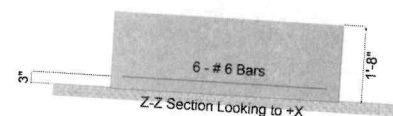
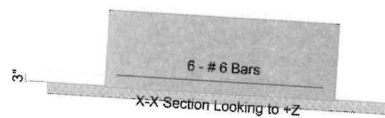
Bars required within zone n/a

Bars required on each side of zone n/a



Bottom Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	6
Reinforcing Bar Size	=	# 6
Bars parallel to Z-Z Axis		
Number of Bars	=	6
Reinforcing Bar Size	=	# 6
Rebar Centerline to Edge of Concrete... at Bottom of footing	=	3.0 in



Top Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	6
Reinforcing Bar Size	=	# 6
Bars parallel to Z-Z Axis		
Number of Bars	=	6
Reinforcing Bar Size	=	# 6
Rebar Centerline to Edge of Concrete... at Top of footing	=	3.0 in

- 72 -

Project Title:
 Engineer:
 Project ID:
 Project Descr:

General Footing

LIC# : KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Applied Loads

P : Column Load	=	D	Lr	L	S	W	E	H	
OB : Overburden	=	13.0		13.0					
M-xx	=								k
M-zz	=								ksf
V-x	=								k-ft
V-z	=								k-ft
									k
									k

DESIGN SUMMARY

Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS 0.5128	Soil Bearing	1.282 ksf	2.50 ksf	+D+L about Z-Z axis
PASS n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS 0.1162	Uplift	0.0 k	0.0 k	No Uplift
PASS 0.1162	Z Flexure (+X) Bot Tens	4.550 k-ft/ft	39.162 k-ft/ft	+1.20D+1.60L
PASS 0.1162	Z Flexure (-X) Bot Tens	4.550 k-ft/ft	39.162 k-ft/ft	+1.20D+1.60L
PASS 0.1162	X Flexure (+Z) Bot Tens	4.550 k-ft/ft	39.162 k-ft/ft	+1.20D+1.60L
PASS 0.0	X Flexure (-Z) Bot Tens	4.550 k-ft/ft	39.162 k-ft/ft	+1.20D+1.60L
PASS 0.0	Z Flexure (+X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	+1.20D+1.60L
PASS 0.0	Z Flexure (-X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS 0.0	X Flexure (+Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS 0.0	X Flexure (-Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS 0.09556	1-way Shear (+X)	7.851 psi	82.158 psi	+1.20D+1.60L
PASS 0.09556	1-way Shear (-X)	7.851 psi	82.158 psi	+1.20D+1.60L
PASS 0.09556	1-way Shear (+Z)	7.851 psi	82.158 psi	+1.20D+1.60L
PASS 0.09556	1-way Shear (-Z)	7.851 psi	82.158 psi	+1.20D+1.60L
PASS 0.1766	2-way Punching	29.019 psi	164.317 psi	+1.20D+1.60L

Design OK

Detailed Results

Soil Bearing		Rotation Axis & Load Combination...		Gross Allowable	Xecc	Zecc	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
						(in)	Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only				2.50	n/a	0.0	0.7617	0.7617	n/a	n/a	0.305
X-X, +D+L				2.50	n/a	0.0	1.282	1.282	n/a	n/a	0.513
X-X, +D+0.750L				2.50	n/a	0.0	1.152	1.152	n/a	n/a	0.461
X-X, +0.60D				2.50	n/a	0.0	0.4570	0.4570	n/a	n/a	0.183
Z-Z, D Only				2.50	0.0	n/a	n/a	n/a	0.7617	0.7617	0.305
Z-Z, +D+L				2.50	0.0	n/a	n/a	n/a	1.282	1.282	0.513
Z-Z, +D+0.750L				2.50	0.0	n/a	n/a	n/a	1.152	1.152	0.461
Z-Z, +0.60D				2.50	0.0	n/a	n/a	n/a	0.4570	0.4570	0.183

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				
Footing Tension on Bottom				

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	2.275	+Z	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK

73

Project Title:
 Engineer:
 Project ID:
 Project Descr:

General Footing

LIC# : KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Footing Tension on Bottom

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	2.275	-Z	Bottom	0.4320	ACI 7.6.1.1			
X-X, +1.20D+1.60L	4.550	+Z	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
X-X, +1.20D+1.60L	4.550	-Z	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
X-X, +1.20D+L	3.575	+Z	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
X-X, +1.20D+L	3.575	-Z	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
X-X, +1.20D	1.950	+Z	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
X-X, +1.20D	1.950	-Z	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
X-X, +0.90D	1.463	+Z	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
X-X, +0.90D	1.463	-Z	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
Z-Z, +1.40D	2.275	-X	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
Z-Z, +1.20D+1.60L	2.275	+X	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
Z-Z, +1.20D+1.60L	4.550	-X	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
Z-Z, +1.20D+L	4.550	+X	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
Z-Z, +1.20D+L	3.575	-X	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
Z-Z, +1.20D	3.575	+X	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
Z-Z, +1.20D	1.950	-X	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
Z-Z, +0.90D	1.950	+X	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
Z-Z, +0.90D	1.463	-X	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK
Z-Z, +0.90D	1.463	+X	Bottom	0.4320	ACI 7.6.1.1	0.5280	39.162	OK

Footing Tension on Top

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D						
+1.20D+1.60L	3.93 psi	3.93 psi	3.93 psi	82.16 psi	0.05	OK
+1.20D+L	7.85 psi	7.85 psi	7.85 psi	82.16 psi	0.10	OK
+1.20D	6.17 psi	6.17 psi	6.17 psi	82.16 psi	0.08	OK
+0.90D	3.37 psi	3.37 psi	3.37 psi	82.16 psi	0.04	OK
	2.52 psi	2.52 psi	2.52 psi	82.16 psi	0.03	OK

One Way Shear Z

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D						
+1.20D+1.60L	3.93 psi	3.93 psi	3.93 psi	82.16 psi	0.05	OK
+1.20D+L	7.85 psi	7.85 psi	7.85 psi	82.16 psi	0.10	OK
+1.20D	6.17 psi	6.17 psi	6.17 psi	82.16 psi	0.08	OK
+0.90D	3.37 psi	3.37 psi	3.37 psi	82.16 psi	0.04	OK
	2.52 psi	2.52 psi	2.52 psi	82.16 psi	0.03	OK

All units k

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D				
+1.20D+1.60L	14.51 psi	164.32 psi	0.09	OK
+1.20D+L	29.02 psi	164.32 psi	0.18	OK
+1.20D	22.80 psi	164.32 psi	0.14	OK
+0.90D	12.44 psi	164.32 psi	0.08	OK
	9.33 psi	164.32 psi	0.06	OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

LIC#: KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Code References

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

Load Combinations Used : ASCE 7-22 / IBC 2024

General Information

Material Properties

f'_c : Concrete 28 day strength	=	3.0 ksi
f_y : Rebar Yield	=	60.0 ksi
E_c : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
ϕ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	2.50 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

Width parallel to X-X Axis	=	4.50 ft
Length parallel to Z-Z Axis	=	12.0 ft
Footing Thickness	=	16.0 in

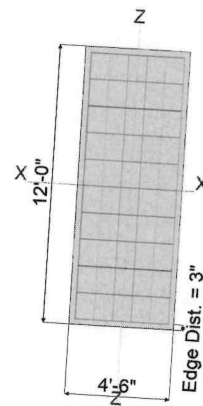
Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in

Bandwidth Distribution Check (ACI 15.4.4.2)

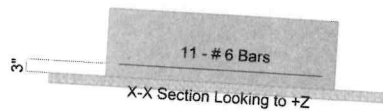
Direction Requiring Closer Separation Bars along X-X Axis

# Bars required within zone	54.5 %
# Bars required on each side of zone	45.5 %



Bottom Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	11
Reinforcing Bar Size	=	# 6
Bars parallel to Z-Z Axis		
Number of Bars	=	6
Reinforcing Bar Size	=	# 6
Rebar Centerline to Edge of Concrete... at Bottom of footing	=	3.0 in



Top Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	11
Reinforcing Bar Size	=	# 6
Bars parallel to Z-Z Axis		
Number of Bars	=	6
Reinforcing Bar Size	=	# 6
Rebar Centerline to Edge of Concrete... at Top of footing	=	3.0 in

75

Project Title:
 Engineer:
 Project ID:
 Project Descr:

General Footing

LIC#: KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Applied Loads

	D	Lr	L	S	W	E	H
P : Column Load	=						
OB : Overburden	=	35.0		35.0			
M-xx	=						k
M-zz	=						ksf
V-x	=						k-ft
V-z	=						k-ft
							k
							k

DESIGN SUMMARY

Min. Ratio	Item	Applied	Capacity	Design OK	Governing Load Combination
PASS 0.5960	Soil Bearing	1.490 ksf	2.50 ksf		+D+L about Z-Z axis
PASS n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft		No Overturning
PASS n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft		No Overturning
PASS n/a	Sliding - X-X	0.0 k	0.0 k		No Sliding
PASS n/a	Sliding - Z-Z	0.0 k	0.0 k		No Sliding
PASS n/a	Uplift	0.0 k	0.0 k		No Uplift
PASS 0.2008	Z Flexure (+X) Bot Tens	4.594 k-ft/ft	22.877 k-ft/ft		+1.20D+1.60L
PASS 0.2008	Z Flexure (-X) Bot Tens	4.594 k-ft/ft	22.877 k-ft/ft		+1.20D+1.60L
PASS 0.9959	X Flexure (+Z) Bot Tens	32.667 k-ft/ft	32.802 k-ft/ft		+1.20D+1.60L
PASS 0.9959	X Flexure (-Z) Bot Tens	32.667 k-ft/ft	32.802 k-ft/ft		+1.20D+1.60L
PASS 0.0	Z Flexure (+X) Top Tens	0 k-ft/ft	0.0 k-ft/ft		+1.20D+1.60L
PASS 0.0	Z Flexure (-X) Top Tens	0 k-ft/ft	0.0 k-ft/ft		
PASS 0.0	X Flexure (+Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft		
PASS 0.0	X Flexure (-Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft		
PASS 0.1657	1-way Shear (+X)	13.611 psi	82.158 psi		+1.20D+1.60L
PASS 0.1657	1-way Shear (-X)	13.611 psi	82.158 psi		+1.20D+1.60L
PASS 0.6967	1-way Shear (+Z)	57.236 psi	82.158 psi		+1.20D+1.60L
PASS 0.6967	1-way Shear (-Z)	57.236 psi	82.158 psi		+1.20D+1.60L
PASS 0.8611	2-way Punching	141.491 psi	164.317 psi		+1.20D+1.60L

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
				Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only	2.50	n/a	0.0	0.8415	0.8415	n/a	n/a	0.337
X-X, +D+L	2.50	n/a	0.0	1.490	1.490	n/a	n/a	0.596
X-X, +D+0.750L	2.50	n/a	0.0	1.328	1.328	n/a	n/a	0.531
Z-Z, D Only	2.50	0.0	n/a	0.5049	0.5049	n/a	n/a	0.202
Z-Z, +D+L	2.50	0.0	n/a	n/a	n/a	0.8415	0.8415	0.337
Z-Z, +D+0.750L	2.50	0.0	n/a	n/a	n/a	1.490	1.490	0.596
Z-Z, +0.60D	2.50	0.0	n/a	n/a	n/a	1.328	1.328	0.531
				n/a	n/a	0.5049	0.5049	0.202

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				
Footing Tension on Bottom				

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	16.333	+Z	Bottom	0.3456	ACI 7.6.1.1	0.5867	32.802	OK

-76-

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

LIC# : KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Footing Tension on Bottom

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D								
X-X, +1.20D+1.60L	16.333	-Z	Bottom	0.3456	ACI 7.6.1.1	0.5867		
X-X, +1.20D+1.60L	32.667	+Z	Bottom	0.5841	Applied Mu	0.5867	32.802	OK
X-X, +1.20D+L	32.667	-Z	Bottom	0.5841	Applied Mu	0.5867	32.802	OK
X-X, +1.20D+L	25.667	+Z	Bottom	0.4543	Applied Mu	0.5867	32.802	OK
X-X, +1.20D	25.667	-Z	Bottom	0.4543	Applied Mu	0.5867	32.802	OK
X-X, +1.20D	14.0	+Z	Bottom	0.3456	ACI 7.6.1.1	0.5867	32.802	OK
X-X, +0.90D	14.0	-Z	Bottom	0.3456	ACI 7.6.1.1	0.5867	32.802	OK
X-X, +0.90D	10.50	+Z	Bottom	0.3456	ACI 7.6.1.1	0.5867	32.802	OK
Z-Z, +1.40D	10.50	-Z	Bottom	0.3456	ACI 7.6.1.1	0.5867	32.802	OK
Z-Z, +1.40D	2.297	-X	Bottom	0.3456	ACI 7.6.1.1	0.5867	32.802	OK
Z-Z, +1.20D+1.60L	2.297	+X	Bottom	0.3456	ACI 7.6.1.1	0.4033	22.877	OK
Z-Z, +1.20D+1.60L	4.594	-X	Bottom	0.3456	ACI 7.6.1.1	0.4033	22.877	OK
Z-Z, +1.20D+L	4.594	+X	Bottom	0.3456	ACI 7.6.1.1	0.4033	22.877	OK
Z-Z, +1.20D+L	3.609	-X	Bottom	0.3456	ACI 7.6.1.1	0.4033	22.877	OK
Z-Z, +1.20D	3.609	+X	Bottom	0.3456	ACI 7.6.1.1	0.4033	22.877	OK
Z-Z, +1.20D	1.969	-X	Bottom	0.3456	ACI 7.6.1.1	0.4033	22.877	OK
Z-Z, +0.90D	1.969	+X	Bottom	0.3456	ACI 7.6.1.1	0.4033	22.877	OK
Z-Z, +0.90D	1.477	-X	Bottom	0.3456	ACI 7.6.1.1	0.4033	22.877	OK
Z-Z, +0.90D	1.477	+X	Bottom	0.3456	ACI 7.6.1.1	0.4033	22.877	OK
Footing Tension on Top								
Flexure Axis & Load Combination	Mu	Side	Tension	As	Gvrn. As	Actual As	Phi*Mn	Status

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
One Way Shear X								
Load Combination...			Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D			6.81 psi	6.81 psi	28.62 psi	82.16 psi	0.35	OK
+1.20D+1.60L			13.61 psi	13.61 psi	57.24 psi	82.16 psi	0.70	OK
+1.20D+L			10.69 psi	10.69 psi	44.97 psi	82.16 psi	0.55	OK
+1.20D			5.83 psi	5.83 psi	24.53 psi	82.16 psi	0.30	OK
+0.90D			4.38 psi	4.38 psi	18.40 psi	82.16 psi	0.22	OK
One Way Shear Z								
Load Combination...			Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D			6.81 psi	6.81 psi	28.62 psi	82.16 psi	0.35	OK
+1.20D+1.60L			13.61 psi	13.61 psi	57.24 psi	82.16 psi	0.70	OK
+1.20D+L			10.69 psi	10.69 psi	44.97 psi	82.16 psi	0.55	OK
+1.20D			5.83 psi	5.83 psi	24.53 psi	82.16 psi	0.30	OK
+0.90D			4.38 psi	4.38 psi	18.40 psi	82.16 psi	0.22	OK

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	28.62 psi	28.62 psi	28.62 psi	82.16 psi	0.35	OK
+1.20D+1.60L	57.24 psi	57.24 psi	57.24 psi	82.16 psi	0.70	OK
+1.20D+L	44.97 psi	44.97 psi	44.97 psi	82.16 psi	0.55	OK
+1.20D	24.53 psi	24.53 psi	24.53 psi	82.16 psi	0.30	OK
+0.90D	18.40 psi	18.40 psi	18.40 psi	82.16 psi	0.22	OK
Two-Way "Punching" Shear						
Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D						All units k
+1.20D+1.60L						
+1.20D+L						
+1.20D						
+0.90D						

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	70.75 psi	164.32 psi	0.43	OK
+1.20D+1.60L	141.49 psi	164.32 psi	0.86	OK
+1.20D+L	111.17 psi	164.32 psi	0.68	OK
+1.20D	60.64 psi	164.32 psi	0.37	OK
+0.90D	45.48 psi	164.32 psi	0.28	OK

— 77 —

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

LIC#: KW-06015041, Build: 20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Code References

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

Load Combinations Used : ASCE 7-22 / IBC 2024

General Information

Material Properties

f _c : Concrete 28 day strength	=	3.0 ksi
f _y : Rebar Yield	=	60.0 ksi
E _c : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	2.50 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

Width parallel to X-X Axis	=	4.0 ft
Length parallel to Z-Z Axis	=	4.0 ft
Footing Thickness	=	16.0 in

Pedestal dimensions...

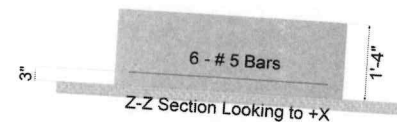
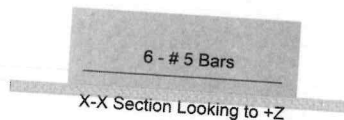
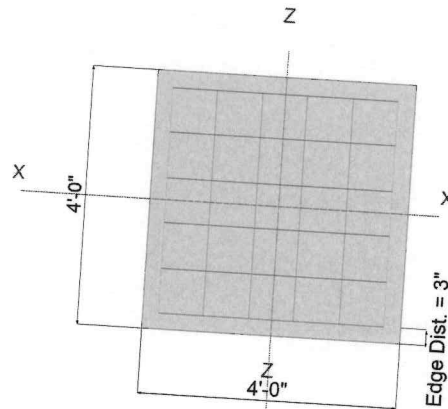
px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a

Bottom Reinforcing

Bars parallel to X-X Axis	=	
Number of Bars	=	6
Reinforcing Bar Size	=	# 5
Bars parallel to Z-Z Axis	=	
Number of Bars	=	6
Reinforcing Bar Size	=	# 5
Rebar Centerline to Edge of Concrete... at Bottom of footing	=	3.0 in



Top Reinforcing

Bars parallel to X-X Axis	=	
Number of Bars	=	6
Reinforcing Bar Size	=	5
Bars parallel to Z-Z Axis	=	
Number of Bars	=	6
Reinforcing Bar Size	=	5
Rebar Centerline to Edge of Concrete... at Top of footing	=	3.0 in

- 78 -

Project Title:
 Engineer:
 Project ID:
 Project Descr:

General Footing

LIC# : KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Applied Loads

	D	Lr	L	S	W	E	H
P : Column Load	=						
OB : Overburden	=	15.0		20.0			
M-xx	=						k
M-zz	=						ksf
V-x	=						k-ft
V-z	=						k-ft
							k
							k

DESIGN SUMMARY

Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS 0.9524	Soil Bearing	2.381 ksf	2.50 ksf	+D+L about Z-Z axis
PASS n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS 0.2381	Z Flexure (+X) Bot Tens	6.250 k-ft/ft	26.249 k-ft/ft	+1.20D+1.60L
PASS 0.2381	Z Flexure (-X) Bot Tens	6.250 k-ft/ft	26.249 k-ft/ft	+1.20D+1.60L
PASS 0.2381	X Flexure (+Z) Bot Tens	6.250 k-ft/ft	26.249 k-ft/ft	+1.20D+1.60L
PASS 0.2381	X Flexure (-Z) Bot Tens	6.250 k-ft/ft	26.249 k-ft/ft	+1.20D+1.60L
PASS 0.0	Z Flexure (+X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	+1.20D+1.60L
PASS 0.0	Z Flexure (-X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS 0.0	X Flexure (+Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS 0.0	X Flexure (-Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS 0.2243	1-way Shear (+X)	18.429 psi	82.158 psi	+1.20D+1.60L
PASS 0.2243	1-way Shear (-X)	18.429 psi	82.158 psi	+1.20D+1.60L
PASS 0.2243	1-way Shear (+Z)	18.429 psi	82.158 psi	+1.20D+1.60L
PASS 0.2243	1-way Shear (-Z)	18.429 psi	82.158 psi	+1.20D+1.60L
PASS 0.4148	2-way Punching	68.166 psi	164.317 psi	+1.20D+1.60L

Design OK

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
X-X, D Only	2.50	n/a	0.0	Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, +D+L	2.50	n/a	0.0	1.131	1.131	n/a	n/a	0.452
X-X, +D+0.750L	2.50	n/a	0.0	2.381	2.381	n/a	n/a	0.952
X-X, +0.60D	2.50	n/a	0.0	2.068	2.068	n/a	n/a	0.827
Z-Z, D Only	2.50	0.0	n/a	0.6785	0.6785	n/a	n/a	0.271
Z-Z, +D+L	2.50	0.0	n/a	n/a	n/a	1.131	1.131	0.452
Z-Z, +D+0.750L	2.50	0.0	n/a	n/a	n/a	2.381	2.381	0.952
Z-Z, +0.60D	2.50	0.0	n/a	n/a	n/a	2.068	2.068	0.827
				n/a	n/a	0.6785	0.6785	0.271

Overturning Stability

Rotation Axis & Load Combination...

Footing Has NO Overturning

Overturning Moment

Resisting Moment

Stability Ratio

Status

All units k

Sliding Stability

Force Application Axis Load Combination...

Footing Has NO Sliding

Sliding Force

Resisting Force

Stability Ratio

Status

Footing Tension on Bottom

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	2.625	+Z	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK

79

Project Title:
 Engineer:
 Project ID:
 Project Descr:

General Footing

LIC#: KW-06015041, Build:20.25.04.16

DESCRIPTION: --None--

Design Engineering & Supply Inc

Project File: ENERCALC_20

(c) ENERCALC, LLC 1982-2025

Footing Tension on Bottom

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	2.625	-Z	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
X-X, +1.20D+1.60L	6.250	+Z	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
X-X, +1.20D+1.60L	6.250	-Z	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
X-X, +1.20D+L	4.750	+Z	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
X-X, +1.20D+L	4.750	-Z	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
X-X, +1.20D	2.250	+Z	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
X-X, +0.90D	2.250	-Z	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
X-X, +0.90D	1.688	+Z	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
Z-Z, +1.40D	1.688	-Z	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
Z-Z, +1.40D	2.625	-X	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
Z-Z, +1.20D+1.60L	2.625	+X	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
Z-Z, +1.20D+1.60L	6.250	-X	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
Z-Z, +1.20D+L	6.250	+X	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
Z-Z, +1.20D+L	4.750	-X	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
Z-Z, +1.20D	4.750	+X	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
Z-Z, +1.20D	2.250	-X	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
Z-Z, +0.90D	2.250	+X	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
Z-Z, +0.90D	1.688	-X	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK
Z-Z, +0.90D	1.688	+X	Bottom	0.3456	ACI 7.6.1.1	0.4650	26.249	OK

Footing Tension on Top

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
One Way Shear X								
Load Combination...								
+1.40D			Vu @ -X		Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn
+1.20D+1.60L			7.74 psi		7.74 psi	7.74 psi	82.16 psi	0.09
+1.20D+L			18.43 psi		18.43 psi	18.43 psi	82.16 psi	0.22
+1.20D			14.01 psi		14.01 psi	14.01 psi	82.16 psi	0.17
+0.90D			6.64 psi		6.64 psi	6.64 psi	82.16 psi	0.08
			4.98 psi		4.98 psi	4.98 psi	82.16 psi	0.06
One Way Shear Z								
Load Combination...								
+1.40D			Vu @ -Z		Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn
+1.20D+1.60L			7.74 psi		7.74 psi	7.74 psi	82.16 psi	0.09
+1.20D+L			18.43 psi		18.43 psi	18.43 psi	82.16 psi	0.22
+1.20D			14.01 psi		14.01 psi	14.01 psi	82.16 psi	0.17
+0.90D			6.64 psi		6.64 psi	6.64 psi	82.16 psi	0.08
			4.98 psi		4.98 psi	4.98 psi	82.16 psi	0.06

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	28.63 psi	164.32 psi	0.17	OK
+1.20D+1.60L	68.17 psi	164.32 psi	0.41	OK
+1.20D+L	51.81 psi	164.32 psi	0.32	OK
+1.20D	24.54 psi	164.32 psi	0.15	OK
+0.90D	18.41 psi	164.32 psi	0.11	OK

All units k

designengineering & supply, Inc.

2799 NW Boca Raton Blvd. #111

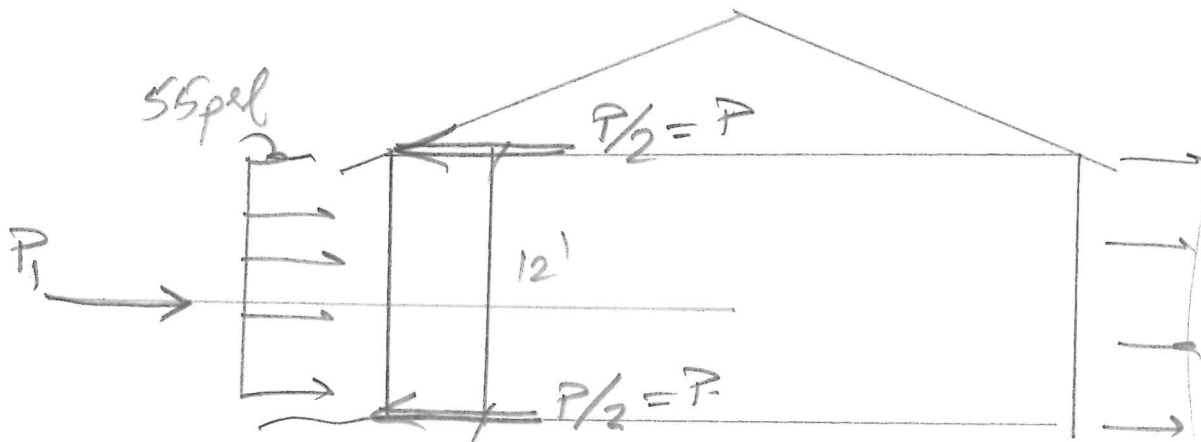
Boca Raton, FL 33431

P: 561-705-2930 F: 561-431-3211

Email: yemeniciler@netzero.net

desupply@aol.com

Roof Sheathing Diagram Calculations



$$P/2 = 55 \text{ psf} \times 6' \Rightarrow 330 \# = P.$$

Best Regards,

Ali N. Yemeniciler, MsCE., P.E
FL. Reg # 54733

81

"The Pressure's On Us."

designengineering & supply, Inc.

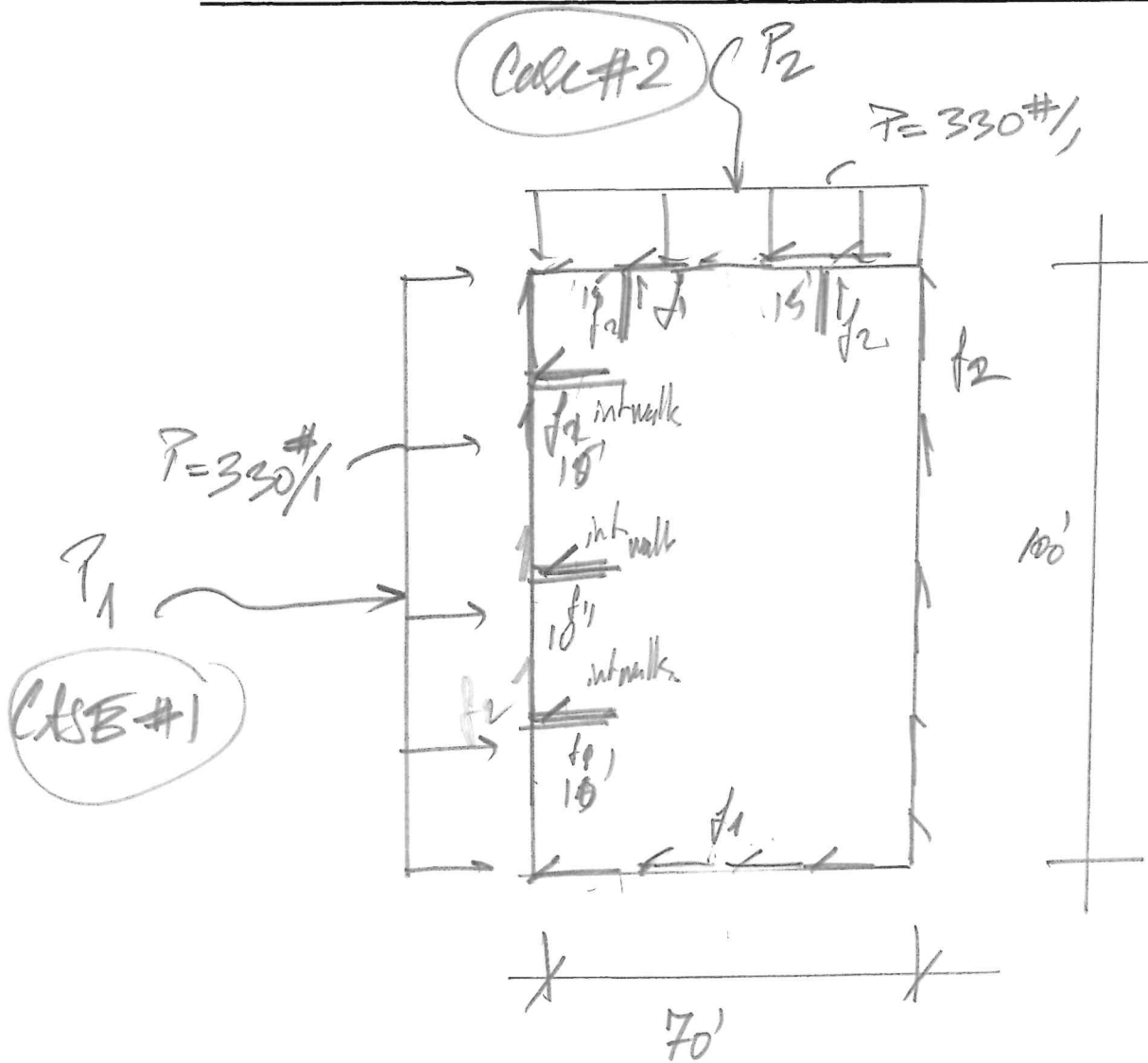
2799 NW Boca Raton Blvd. #111

Boca Raton, FL 33431

P: 561-705-2930 F: 561-431-3211

Email: yemeniciler@netzero.net

desupply@aol.com



Best Regards,

Ali N. Yemeniciler, MsCE., P.E
FL. Reg # 54733

82

"The Pressure's On Us."

designengineering & supply, Inc.

2799 NW Boca Raton Blvd. #111
Boca Raton, FL 33431

P: 561-705-2930 F: 561-431-3211

Email: yemeniciler@netzero.net
desupply@aol.com

$$P_1 = 330 \times 100' = 33,000\#$$

$$P_2 = 340 \times 70' = 23,800\#$$

CASE 1 $\Rightarrow$ a. Using no inter wall. (Worst case not true also)

$$d_{1a} = \frac{33,000\#}{2} = \frac{16,500}{70'} = 235\#/\text{ft}, \text{ ok}$$

b. Using Block walls also =

$$d_{1b} = \frac{33,000}{5} = \frac{6,600}{170'} = 38\#/\text{ft}, \text{ ok}$$

Best Regards,

Ali N. Yemeniciler, MsCE., P.E.
FL. Reg # 54733

83

"The Pressure's On Us."

designengineering & supply, Inc.

2799 NW Boca Raton Blvd. #111

Boca Raton, FL 33431

P: 561-705-2930 F: 561-431-3211

Email: yemeniciler@netzero.net

desupply@aol.com

CASE #2

a). No Block wall supports worst case

$$P_2 = \frac{P_2}{C_2} / 200' = \frac{23,100}{400} = 57\#, \text{ O.K.}$$

Support

$$b) \frac{P_2}{4} = 15\#, \text{ O.K.}$$

Best Regards,

Ali N. Yemeniciler, MsCE., P.E.
FL. Reg # 54733

84

"The Pressure's On Us."