Structural Calculations

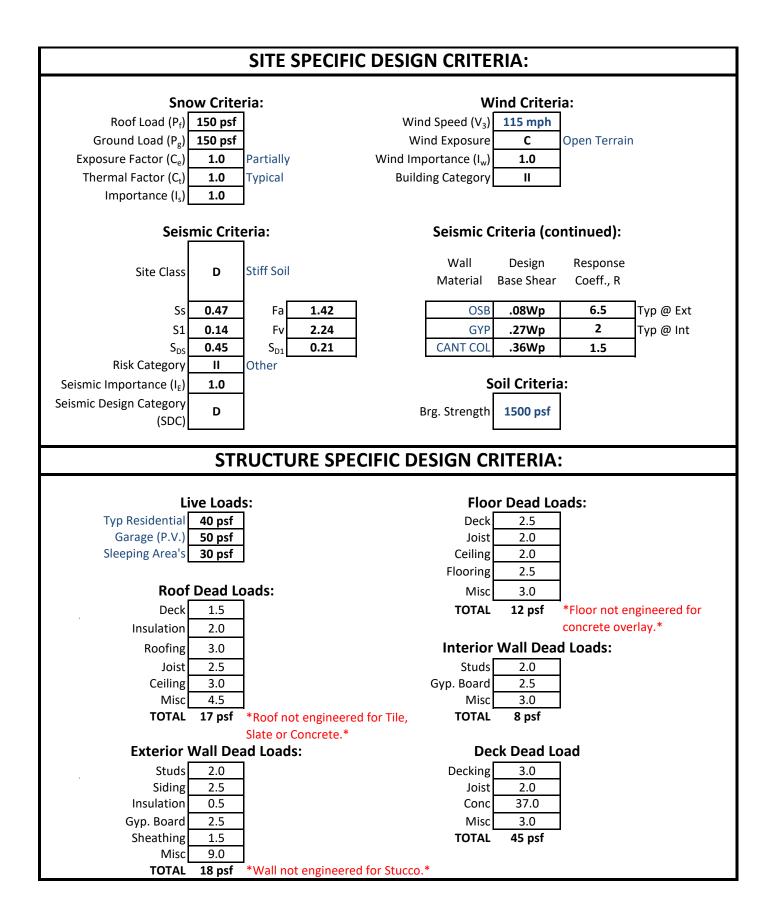
Project Title: Chambers Residence

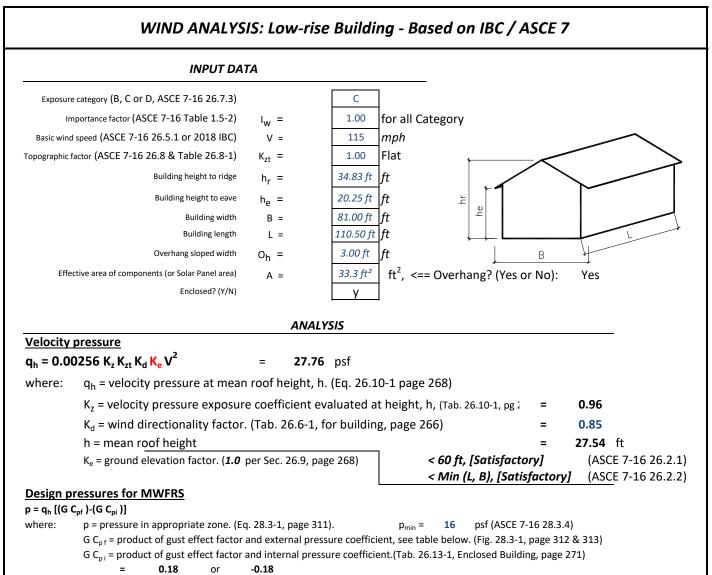
Location: McCall (150), Idaho

Job #: 2023-6431



Prepared in accordance with 2018 IBC. Calculations expire by: 01/23/2025





a = width of edge strips, Fig 28.3-1, page 312, MAX[MIN(0.1B, 0.1L, 0.4h), MIN(0.04B, 0.04L), 3] =

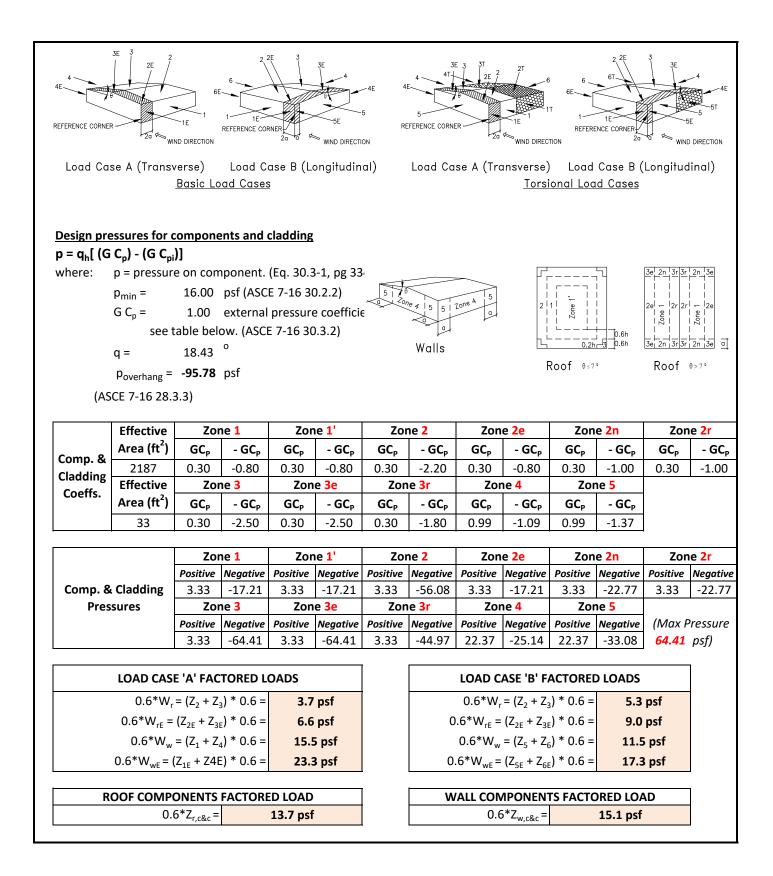
8.10 ft

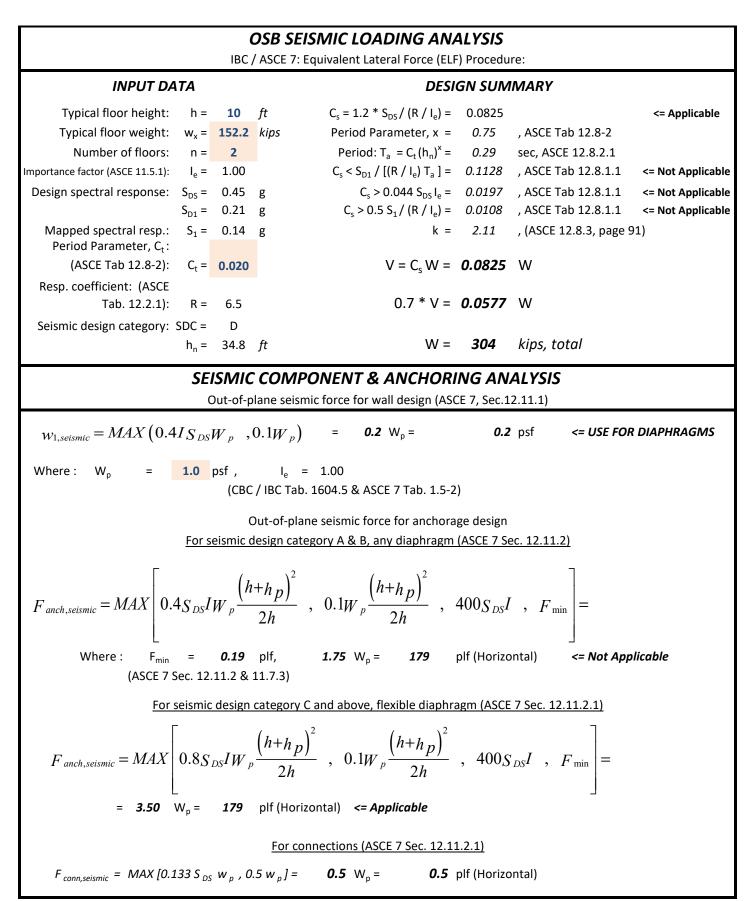
Net Pressu	ires (psf), B	asic Loac	l Cases				Net Pres	รเ
	Roof ang	le q =	18.43	Roof ar	ngle q =	18.43		
Surface	<u> </u>	Net Pre	ess. W/	<u> </u>	Net Pre	ess. W/	Surface	
	G C _{p f}	$(+GC_{pi})$	(-GC _{pi})	G C _{p f}	$(+GC_{pi})$	(-GC _{p i})		
1	0.52	9.34	19.33	-0.45	-17.49	-7.50	1T	
2	-0.69	-24.15	-14.16	-0.69	-24.15	-14.16	2T	
3	-0.47	-18.00	-8.01	-0.37	-15.27	-5.27	3T	
4	-0.42	-16.53	-6.54	-0.45	-17.49	-7.50	4T	
5				0.40	6.11	16.10		
6				-0.29	-13.05	-3.05	Surface	
1E	0.78	16.66	26.66	-0.48	-18.32	-8.33		
2E	-1.07	-34.70	-24.71	-1.07	-34.70	-24.71	5T	
3E	-0.67	-23.69	-13.70	-0.53	-19.71	-9.72	6T	
4E	-0.62	-22.16	-12.16	-0.48	-18.32	-8.33		
5E				0.61	11.94	21.93		+
6E				-0.43	-16.93	-6.94		

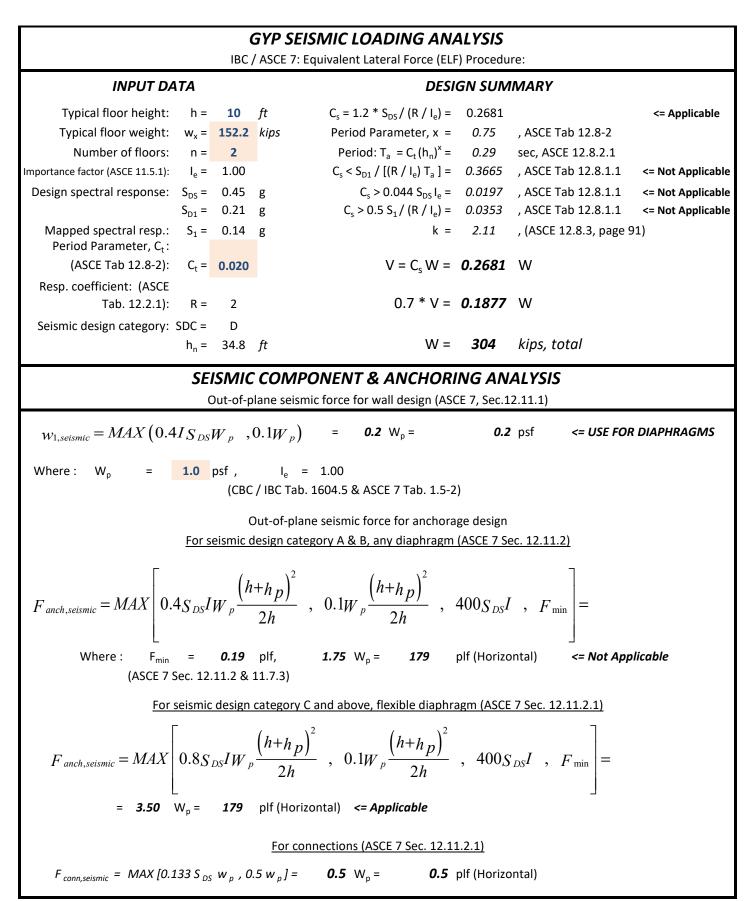
Nat Drassuras (nof) Dasis Load Cases

d Cases

Net Pressures (psf), Torsional Loa									
	Roof ar	ngle q =	18.43						
Surface	6.6	Net Pre	ess. W/						
	G C _{p f}	$(+GC_{pi})$	(-GC _{pi})						
1T	0.52	2.34	4.83						
2T	-0.69	-6.04	-3.54						
3T	-0.47	-4.50	-2.00						
4T	0.00	-4.13	-1.63						
	Roof ar	ngle q =	0.00						
Surface	<u> </u>	Net Pre	ess. W/						
	G C _{p f}	$(+GC_{pi})$	(-GC _{pi})						
5T	0.40	1.53	4.03						
6T	-0.29	-3.26	-0.76						
+ / - Wind Pressure 64%									







- 1) FOUNDATIONS & SLAB ON GRADE:
 - a) INSTALL FOUNDATION AND PREPARE SOILS FOR SLABS & FOUNDATIONS ACCORDING TO IBC CHAPTER 18. PROVIDE POSITIVE DRAINAGE AWAY FROM STRUCTURE AND AVOID EXCESSIVE WETTING & DRYING DURING EXCAVATIONS.
 - b) ALL FOOTING AND FOUNDATION DESIGNS ARE BASED ON AN ALLOWABLE SOIL BEARING CAPACITY (SEE DESIGN CRITERIA) OF COMPETENT NATIVE SOIL. IF THE SITE HAS A LOWER BEARING CAPACITY THAN ASSUMED THE FOUNDATION PLAN WILL NEED TO BE REDESIGNED. IF SOIL IS DISTURBED, COMPACT SOIL IN 8" LIFTS TO 95% MAXIMUM DRY DENSITY PER ASTM D1557 OR IN ACCORDANCE WITH GEOTECHNICAL REPORT ASSOCIATED WITH PROJECT.
 - c) REPLACE ANY ENCOUNTERED EXISTING FILL WITH COMPACTED FILL, SEE NOTE 1.A. ABOVE FOR MORE INFORMATION.
 - d) MINIMUM FROST DEPTH (SEE DESIGN CRITERIA) FROM LOWEST ADJACENT FINISH GRADE TO BOTTOM OF FOOTING SHALL BE MAINTAINED FOR ALL EXTERIOR FOOTINGS.
 - e) CONTRACTOR TO VERIFY LOCATIONS FOR STEP FOOTINGS AND FOUNDATION WALLS BASED ON SITE RELATED FINISHED GRADE, IF NECESSARY. FOOTING STEPS ARE TO BE A MAXIMUM OF (2) VERTICALLY TO (1) HORIZONTALLY.
 - f) ALL SLABS SHALL HAVE REINFORCING PER PLANS & CONTROL JOINTS AT 10'-0" SPACING MAXIMUM.
 - g) ALL STRUCTURAL FILL BELOW FOOTINGS SHALL EXTEND OUT PAST FOOTINGS AT A SLOPE OF 1 VERTICAL TO 2 HORIZONTAL UNITS TO COMPETENT SOILS.
 - h) PROVIDE ADEQUATE DRAINAGE BEHIND ALL WALLS TO ALLEVIATE ANY STANDING WATER.
 - i) ALL CONCRETE PAD & APRON LOCATIONS TO BE SECURED TO FOUNDATION WITH #4 DOWELS AT 24" O.C. EXTEND EXPOSED SIDES A MINIMUM OF 8" BELOW FINISHED GRADE.
 - j) MINIMUM CONCRETE SLAB DEPTH IS 4".
- 2) CONCRETE:
 - a) ALL CONCRETE WORK TO BE DONE IN ACCORDANCE WITH THE CURRENT ACI "STANDARD SPECIFICATION FOR STRUCTURAL CONCRETE" UNLESS NOTED.
 - b) USE ASTM C150 COMPLIANT TYPE I/II CEMENT, MINIMUM OF 450#/YARD.
 - c) ALLOW 5% (WITHIN 1.5%) ENTRAINED AIR IN EXPOSED CONCRETE.
 - d) ALLOW 4" MAXIMUM SLUMP (WITHOUT SUPERPLASTICIZER).
 - e) USE ¾" MAXIMUM NORMAL WEIGHT AGGREGATE. USE OF CHLORIDE ADMIXTURES IS PROHIBITED.
 - f) THE MINIMUM COMPRESSIVE STRENGTHS FOR CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS
- 3) (DESIGNED USING 2,500 PSI):
 - i) ALL FOOTINGS, FOUNDATIONS, AND STEM WALLS F'C = 3,000 PSI.
 - ii) SLABS ON GRADE F'C = 3,500 PSI.
 - b) MINIMUM CLEAR PROTECTION FOR REINFORCEMENT SHALL BE AS FOLLOWS:
 - i) PLACED DIRECTLY AGAINST EARTH: 3".
 - ii) FORMED SURFACES #5 BARS OR SMALLER: 1-1/2".
 - iii) STRUCTURAL SLABS & INTERIOR WALLS: 1".
 - c) ALL EMBEDDED ANCHOR BOLTS SHALL BE A36 OR A307 OR F1554 GR. 36 STEEL W/ 7" MIN. EMBEDMENT. ANCHOR BOLTS TO BE WITHIN 1'-0" OF SILL PLATE ENDS, WITH A MIN. OF TWO PER WALL AND NO CLOSER THAN 6" FROM CONCRETE WALL CORNERS.
 - d) SAWN CONTROL & CONSTRUCTION JOINTS SHALL BE MADE AS SOON AS POSSIBLE WITHOUT DAMAGE TO THE SURFACE. FILLING OF SAWN JOINTS WHERE REQUIRED SHALL BE DELAYED AS LONG AS POSSIBLE TO ALLOW MAXIMUM SHRINKAGE TO OCCUR IN SLABS.
 - e) PROTECT ALL CONCRETE FROM FREEZING.
 - f) WET SETTING OF REINFORCING BARS IN FOOTINGS AND WALLS IS NOT ALLOWED.
 - g) BLOCK-OUT ALL STEM WALLS AT ENTRIES AS REQUIRED.
 - h) CONCRETE FORM WORK TO BE OF ADEQUATE STRENGTH AND BRACED TO PREVENT DEFORMATION.
 - i) ALL LOWER LEVEL AND RETAINING WALLS WHICH HAVE FILL HIGHER THAN AN INTERIOR FLOOR LEVEL SHALL HAVE AN APPROVED WATERPROOFING MEMBRANE APPLIED TO WITHIN 3" OF FINISHED GRADE HEIGHT.

- 4) PROVIDE ADEQUATE TEMPORARY BRACING OF CONCRETE AND/OR CMU RETAINING WALLS DURING BACKFILL PRIOR TO INSTALLATION OF MAIN FLOOR FRAMING AND BASEMENT CONCRETE SLAB ON GRADES. WALL DESIGNS ARE BASED ON TOP OF WALL RESTRAINED BY FINISHED FLOOR SYSTEM AND RESISTING SLIDING BY HAVING BASEMENT CONCRETE SLAB ON GRADE FLOOR INSTALLED.
 - a) REQUIRE THAT ALL GRADING, EXCAVATION, AND INSTALLATION OF FOUNDATIONS BE PERFORMED UNDER THE INSPECTION AND TESTING OF A QUALIFIED GEOTECHNICAL CONSULTANT DURING THE CRITICAL STAGES OF CONSTRUCTION.
 - b) STAIN & TEXTURE OF EXPOSED CONCRETE SURFACES PER OWNER'S DIRECTION.
 - c) USE SIMPSON 'SET' OR EQUIVALENT FOR FASTENING POST-INSTALLED ANCHORS TO EXISTING CONCRETE.
 - d) USE 6x6-W4.0xW4.0 WELDED WIRE FABRIC (WWF) FOR SLABS REQUIRING REINFORCEMENT (UNLESS NOTED). PLACE 1-1/2" FROM BOTTOM OF SLAB USING APPROVED METAL DEVICES. LAP ONE FULL MESH AT SPLICES.
 - e) USE ASTM C827 COMPLIANT NON-METALLIC, NON-SHRINK, 3-DAY 4000 PSI GROUT FOR BASEPLATES.
 - f) USE ASTM C1116 COMPLIANT FIBRILLATED POLYPROPYLENE TO REINFORCE SLABS (IF USING FIBER REINFORCEMENT IN LIEU OF WWF).

5) REINFORCING STEEL:

- a) PLACE REBAR ACCORDING TO CURRENT ACI DETAILING MANUAL.
- b) USE ASTM A615 COMPLIANT GRADE 60 BARS; IF INTENDED TO BE WELDED, USE ASTM A706 COMPLIANT GRADE 60 BARS (WELDING OF REBAR NOT PERMITTED UNLESS SPECIFICALLY NOTED OR DETAILED).
- c) MINIMUM LENGTH OF LAPPED SPLICES SHALL BE 48 TIMES BAR DIAMETER UNLESS NOTED. SPLICE TOP BARS NEAR MID-SPAN, BOTTOM BARS NEAR SUPPORTS.
- d) OTHERWISE. STAGGER SPLICES IN WALLS SO THAT NO TWO ADJACENT BARS ARE SPLICED IN THE SAME LOCATION.
- e) WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185, FY = 75,000 PSI.
- f) REINFORCING SHALL BE CONTINUOUS THROUGH ALL COLD JOINTS.
- g) PROVIDE CORNER BARS W/ 18" LEGS AT CORNERS AND INTERSECTING WALLS AND FOOTINGS, SIZE AND PLACEMENT TO MATCH HORIZONTAL REINFORCEMENT.
- h) PROVIDE #4 CONTINOUS HORIZONTALS AT TOP OF WALL, (2) #4 CONTINUOUS IN FOOTINGS, AND (2) #4 CONTINUOUS ABOVE ALL OPENINGS U.N.O. PROVIDE #4 HORIZONTALS AT ALL INTERSECTING FLOORS AND ROOF LEVELS, BOTTOM OF ALL WINDOWS AND AT 10'-0" O.C. MAXIMUM OR PER PLANS.
- i) PROVIDE #4 VERTICALS AT 24" O.C. AT EACH SIDE OF WALL OPENINGS AND AT EACH END OF WALLS W/ STANDARD HOOK EXTENDING INTO FOOTING.
- j) PROVIDE FOUNDATION HOLDOWNS AT ALL SHEAR WALL LOCATIONS PER PLAN, IF APPLICABLE.

6) WOOD FRAMING:

- a) STRUCTURAL LUMBER SHALL BE DOUGLAS FIR-LARCH (DF-L) #2 OR BETTER.
- b) WOOD INSTALLED WITHIN 1" OF CONCRETE OR MASONRY SHALL BE REDWOOD OR PRESSURE TREATED.
- c) PROVIDE WET USE ADHESIVES.
- d) MAXIMUM LUMBER MOISTURE CONTENTS SHALL BE 15%.
- e) ALL FRAMING SHALL BE IN ACCORDANCE WITH THE ADOPTED CODE.
- f) PROVIDE SOLID BLOCKING BELOW ALL BEARING WALLS AND POSTS. PROVIDE BLOCKING AT 24" O.C. AT JOISTS PARALLEL WITH BEARING WALLS ABOVE.
- g) MINIMUM HEADER AT BEARING WALL TO BE 4x8 WITH 2x6 TRIMMER STUD PLUS 2x6 KING STUD EACH SIDE. HEADERS WITH LARGER LOADING OR DIFFERENT BEARING/KING STUD CONDITIONS WILL BE CALLED OUT IN PLANS.
- h) BLOCK AND NAIL ALL HORIZONTAL PANEL EDGES AT SHEAR WALLS & AS NOTED ON THE PLAN.
 - (1) ROOF SHEATHING IN AREAS W/ SNOW LOAD < 50 PSF: 7/16" CDX MINIMUM, 24/16 SPAN RATING WITH 8D AT 6" O.C. EDGE AND 12" O.C. FIELD U.N.O.

- (2) ROOF SHEATHING IN AREAS W/ SNOW LOAD > 50 PSF: 19/32" CDX MINIMUM, 32/16 SPAN RATING WITH 8D AT 6" O.C. EDGE AND 12" O.C. FIELD U.N.O.
- (3) FLOOR SHEATHING: 3/4" CDX MINIMUM, 48/24 SPAN RATING WITH 10D AT 6" O.C. EDGE AND 12" O.C. FIELD U.N.O.
- (4) EXT. WALL SHEATHING: 7/16" CDX MINIMUM, 24/16 SPAN RATING WITH AT 6" O.C. EDGE AND 12" O.C. FIELD U.N.O.
- (5) ALL SPAN RATINGS TO MEET LOCAL CODES.
- i) ORIENTED STRAND BOARD (OSB) WITH THE SAME SPAN RATING MAY BE SUBSTITUTED FOR PLYWOOD NOTED ABOVE. SHEATHING SHALL BE APA RATED EXPOSURE 1. STAGGER SHEATHING END JOINTS 4'-0". PROVIDE 1/8" MINIMUM SPACE AT ALL PANEL EDGES FOR EXPANSION.
- j) ALL EXTERIOR WALLS TO BE 2x6 AT 16" O.C. AND INTERIOR NON-LOAD BEARING PARTITIONS TO BE 2x4 AT 16" O.C. STUD WALLS (U.N.O. ON PLAN).
- k) PROVIDE STEEL STRAPS AT PIPES IN STUD WALLS AS REQUIRED BY THE ADOPTED CODE.
- I) OVER-FRAMING SHALL BE DONE SUCH THAT VERTICAL LOADS ARE TRANSFERRED TO MAIN STRUCTURE BELOW BY DIRECT BEARING AT SPACING NOT TO EXCEED 24" O.C. FOR RAFTERS AND 48" FOR POSTS WHEN SNOW LOAD LESS THAN 50 PSF.
- m) METAL HANGERS AND CONNECTIONS ARE 'SIMPSON' AND SHALL BE INSTALLED PER 'SIMPSON' RECOMMENDATIONS.
- n) ENGINEERED "I" JOISTS TO CONFORM TO ASTM D2559 AND BE DESIGNED, CERTIFIED, ERECTED, INSTALLED, AND BRACED PER MANUFACTURER'S SPECS. ALL REFERENCES ON PLANS ARE FOR WEYERHAEUSER PRODUCTS. USE THESE PRODUCTS OR AN APPROVED EQUIVALENT.
- o) ALL MICROLLAM LVL PRODUCTIONS SHALL CONFORM TO ASTM D2559 AND HAVE THE MINIMUM SECTION PROPERTIES OF Fb = 2600 PSI, Fv = 285 PSI, E = 2,000,000 PSI.
- p) ALL ROOF OPENINGS GREATER THAN 12"x12" SHALL BE FRAMED IN OPENINGS.
- q) GLUE-LAM BEAMS SHALL CONFORM TO ANSI/AITC A190.1 AND BE DOUGLAS FIR COMBINATION 24F-V4 FOR SIMPLY SUPPORTED AND 24F-V8 FOR CANTILEVERED AND/OR DOUBLE SPAN BEAMS, Fb = 2400 PSI, Fv = 165 PSI, E = 1,600,000 PSI. PROVIDE WET USE GLUE ON ALL EXTERIOR LOCATIONS.
- r) ALL NAILS SPECIFIED TO BE COMMON WIRE NAILS U.N.O.
- 7) PRE-MANUFACTURED METAL PLATED TRUSSES:
 - i) TRUSS MANUFACTURER TO PROVIDE PROOF OF 3RD PARTY INSPECTION PER IBC 2303.4.
 - ii) PRE-MANUFACTURED TRUSS PROVIDER TO VERIFY ALL LOADING PATTERNS TO FOOTINGS BELOW.
 - b) PRE-MANUFACTURED TRUSS PROVIDER TO PROVIDE SUPPORT AT TRUSSES FOR LOADING SHOWN ON ALL PLANS, SECTIONS AND DETAILS. VERIFY SECOND FLOOR LOADING AND SPECIAL CASE POINT LOADING FROM FRAMED ROOF SYSTEMS.
 - c) ALL PRE-MANUFACTURED ROOF TRUSSES SHALL BE DESIGNATED AS A DEFERRED SUBMITTAL AND DESIGNED FOR THE ROOF LOADS SHOWN AND ACCOUNT FOR ANY REQUIRED ADDITIONAL DRIFT, VALLEY, OR EAVE LOADS PER CODE.
 - d) IN ADDITION TO 7 PSF DEAD LOAD ON TOP CHORD, DESIGN BOTTOM CHORD FOR 10 PSF LIVE LOAD AND 10 PSF DEAD LOAD.
 - e) TRUSS SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD (E.O.R.) FOR REVIEW AND COMPLIANCE.

8) GENERAL STRUCTURAL NOTES:

a) CONTRACTOR TO VERIFY ALL OPENINGS, BUILDING DIMENSIONS, COLUMN LOCATIONS AND DIMENSIONS WITH OWNER, ENGINEER, DRAFTER, AND/OR COMPONENT MANUFACTURERS PRIOR TO POURING OF ANY CONCRETE FOUNDATIONS OR CONSTRUCTION.

- b) THE ENGINEER OF RECORD IS NOT RESPONSIBLE FOR ANY DEVIATIONS FROM THESE PLANS UNLESS SUCH CHANGES ARE AUTHORIZED IN WRITING TO THE ENGINEER OF RECORD.
- c) THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING SAFE AND ADEQUATE SHORING AND/OR TEMPORARY STRUCTURAL STABILITY FOR ALL PARTS OF THE STRUCTURE DURING CONSTRUCTION. THE STRUCTURE SHOWN ON THE DRAWINGS HAS BEEN DESIGNED FOR FINAL CONFIGURATION.
- d) NOTCHING AND/OR CUTTING OF ANY STRUCTURAL MEMBER IN THE FIELD IS PROHIBITED, UNLESS PRIOR CONSENT IS GIVEN BY THE ENGINEER OF RECORD.
- e) DIMENSIONS SHOWN DO NOT INCLUDE THE THICKNESS OF ANY APPLIED FINISH MATERIALS. DIMENSIONS ARE EITHER TO FACE OF STUD, FACE OF MASONRY, OR CENTERLINE OF OPENINGS/STRUCTURE.
- f) ALL WORK TO CONFORM TO ALL LOCAL, STATE, AND NATIONAL CODES.
- g) CONTRACTOR IS RESPONSIBLE FOR ALL FEES, PERMITS, AND INSPECTIONS AS REQUIRED BY GOVERNING AGENCY.
- h) ALL ELEVATION REFERENCES ARE FROM THE MAIN FLOOR ELEVATION, SET AT 0'-0".
- i) ALL SHOP DRAWINGS FOR STRUCTURAL SYSTEMS TO BE REVIEWED AND STAMPED BY THE ENGINEER OF RECORD.

9) SPECIAL INSPECTIONS & STRUCTURAL OBSERVATIONS:

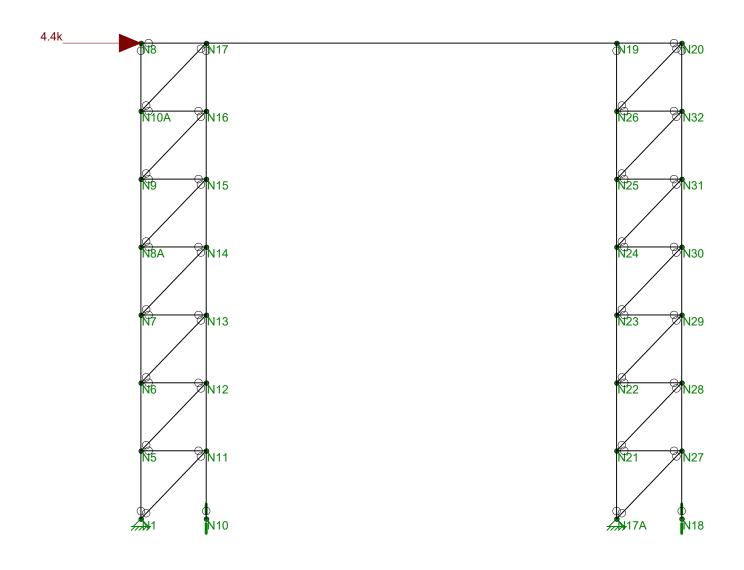
- a) PER IBC SECTION 1704, WHEN SPECIFICALLY REQUIRED BY THE LOCAL JURISDICTION, A REPRESENTATIVE FROM THE ENGINEER OF RECORD'S OFFICE SHALL BE PRESENT TO PERFORM ON-SITE STRUCTURAL OBSERVATION VISITS. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL SIGNIFICANT TIMES OF CONSTRUCTION WITH THE ENGINEER OF RECORDS OFFICE PRIOR TO THE DAY OF CONSTRUCTION AND/OR PLACEMENT (MINIMUM OF 7 DAYS). SIGNIFICANT TIMES OF CONSTRUCTION ARE AS FOLLOWS:
 - i) PLACEMENT OF STRUCTURALLY RELATED REINFORCED CONCRETE FOUNDATIONS, INCLUDING REBAR.
 - ii) PLACEMENT OF PERIMETER LOAD BEARING WALLS, LOAD SUPPORTING BEAMS AND/OR HEADERS AND LATERAL RESISTING CONNECTION ELEMENTS.
 - iii) COMPLETION OF STRUCTURAL SYSTEMS AS REQUIRED AND/OR DEFINED BY THE LOCAL JURISDICTION.
- b) STRUCTURAL OBSERVATIONS DO NOT INCLUDE OR WAIVE THE RESPONSIBILITY FOR THE SPECIAL INSPECTIONS REQUIRED BY THE IBC SECTION 1705 OR OTHER SECTIONS OF THE CODE AS REQUIRED BY THE LOCAL BUILDING JURISDICTION.
- c) ALL SPECIAL INSPECTIONS SHALL BE PERFORMED TO MEET THE REQUIRMENTS OF THE LATEST IBC AND THE LOCAL BUILDING JURISDICTION.
 - i) ALL SPECIAL INSPECTIONS SHALL BE PERFORMED BY A QUALIFIED PERSON WHO SHALL SHOW COMPETANCE TO THE SATISFACTION OF THE BUILDING OFFICIAL, OWNER, ARCHITECT AND ENGINEER OF RECORD FOR THE PARTICULAR OPERATION. ALL SPECIAL INSPECTION REPORTS SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT AND ENGINEER OF RECORD WITH THE PROJECT INFORMATION AND ADDRESS.

	WIND / SEISMIC SHEAR FORCE CALCULATIONS:																
	From ASCE 7-16 Wind & Seismic Loading Analysis																
		Rc	of / Flo	or				Wall	T		Load	above				Loadin	g
Wall Line	Wind Force (psf)	Diaph. Weight	Wr, We truss trib (ft)	Area W (ft)	Area L (ft)	Wind Force (psf)	Wall DL (psf)	Wall ht (ft)	wall line dist (ft)	Upr. Flr Wall ht (ft)	Wind (#)	Seismic (#)	*C _s (Wp)	11	Wind Force (kips)	Seismic Force (kips)	Lateral Control
X1-1	9.6	55	14.6	47.0	43.0	18.2	18.0	10.0	47.0				0.06	=	5.43	3.67	Wind
X2-1	9.6 9.6	55 55	14.6 14.6	47.0 34.0	43.0 43.0	18.2 19.2	18.0 18.0	10.0 10.0	47.0 34.0				0.06 0.06	=	7.99	5.36	Wind
X3-1	9.6	55	14.6	34.0	43.0	19.2	18.0	10.0	34.0				0.06	=	2.56	1.70	Wind
X4-1	9.6	55	14.6	36.0	71.5	19.0	18.0	10.0	36.0				0.06	=	2.70	2.83	Seismic
X5-1	9.6	55	14.6	36.0	71.5	19.0	18.0	10.0	36.0				0.06	=	2.70	2.83	Seismic
	1																1
Y1-1	9.6	55	14.6	34.0	81.0	19.2	18.0	10.0	34.0				0.06	=	4.01	4.69	Seismic
Y2-1	9.6 9.6	55 55	14.6 14.6	34.0 47.3	81.0 81.0	19.2 18.2	18.0 18.0	10.0 10.0	34.0 47.3				0.06 0.06	=	9.47	11.20	Seismic
Y3-1	9.6 9.6	55 55	14.6 11.0	47.3 29.3	28.0 28.0	18.2 19.8	18.0 18.0	10.0 10.0	47.3 29.3				0.06 0.06	=	8.45	4.17	Wind
Y4-1	9.6	55	11.0	29.3	28.0	19.8	18.0	10.0	29.3				0.06	=	2.99	1.59	Wind
X1-0	0.0	18	0.0	25.5	25.5	20.5	18.0	9.0	25.5	6.0	1.35	1.41	0.06	=	4.09	1.99	Wind
X2-0	0.0	18	0.0	40.0	25.5	18.7	18.0	9.0	40.0	6.0	0.85	0.56	0.06	=	4.77	1.46	Wind
	9.6	55	1.0	37.0	32.8	18.9	18.0	9.0	37.0	0	0	0	0.06				
Y1-0	9.0 0.0	55 18	0.0	37.0 14.0	32.8	23.3	18.0	9.0 9.0	37.0 14.0	6	2.84	0 3.36	0.06	=	4.03	3.82	Wind

	HEAR WAL	X2-1	X3-1	X4-1	X4-1	X5-1
			X3-1	X4-1	X4-1	X2-1
Number of Decels		r Wall Forces	1	1	1	1
Number of Panels	1 34.00 ft	1 24 50 ft	1 27.00.ft	1 20 50 ft	1 27 50 ft	1
Total length of wall Total length of shear wall		24.50 ft	37.00 ft	29.50 ft	27.50 ft	30.00
	0.100.10	24.50 ft	23.00 ft	11.00 ft	14.50 ft	27.00
Total length of full ht seg. L _w height of shear wall H		21.50 ft	14.75 ft	9.00 ft	8.00 ft	11.50
	110010	10.00 ft	10.00 ft	10.00 ft	12.00 ft	10.00
	0.0010	0.00 ft	10.00 ft	5.00 ft	0.00 ft	10.00
Total force at top of wall V_1		7992 lbs	2565 lbs	1414 lbs	1414 lbs	2827
Self weight W _{DL self}		180 plf	180 plf	180 plf	216 plf	180 p
Applied dead load W _{DL above}		51 plf	55 plf	163 plf	40 plf	240 p
	n 7/16	7/16	7/16	7/16	7/16	7/16
· · · · · / · · · · · · /	n <u>1/2</u>	1/2	1/2	1/2	1/2	1/2
Wall Connected to Concrete y/n		Y	Y	Y	Y	Y
		Wall Segment				
	4.00	15.00	3.00	4.00	4.00	5.00
	4.00	6.50	4.00	5.00	4.00	3.25
	4.00		3.25			3.25
	4.00		4.50			
	Shear Tra	nsfer to Conc	rete			
T	= Not Req'd	1783 lbs	455 lbs	330 lbs	104 lbs	Not Re
1/2 Anchor Bolts @		36 '' O.C.	72 '' O.C.	72 '' O.C.	72 '' O.C.	72 '' 0
Provide:	Code Min.	A3	Code Min.	Code Min.	Code Min.	Code N
Min # of 1/2 Anchor Bolt		(8) Min	(3) Min	(2) Min	(2) Min	(3) M
Load From Abov		0.00	0.00	0.00	0.00	0.00
		HD1	Perp. Wall	Perp. Wall	Perp. Wall	
	Shear R	esisting Syste				
Force Calculated	339.23	371.74	298.61	171.34	176.70	528.1
	OSB	OSB	OSB	OSB	OSB	OSB
Min Shear Wall Segmen		2.86 ft	2.86 ft	2.86 ft	3.43 ft	2.86
Provide: Va		SW2	SW1	SW1	SW1	SW2
Min Shear Wall Segment	+• 				1	
Provide: Va						
	locking / Nailii	ng Framing A	ttachment			
Blocking Unit Shear	160 plf	326 plf	69 plf	48 plf	51 plf	94 pl
Blocking	NONE	B1	NONE	NONE	NONE	
Nailing	T1	T2	See SCHED	See SCHED	See SCHED	NON See SCI
ivaliilik		Base Shear	See SCHED	See SCHED	See SCHED	266 201
% of full height segments % fh = L_w/L			0.641	0.010	0.552	0.42
0 0		0.878	0.641	0.818	0.552	0.42
% of maximum opening height %oh = H'/H Shear cap adj factor SCAF		0.000	1.000 0.58	0.500 0.92	0.000 1.00	1.00 0.47
Unit base shear vbase V_1/L_w		372 plf	0.58 174 plf	0.92 157 plf	1.00 177 plf	246 p
Effective unit base shear vreq= v_{base} /SCAF		372 plf 372 plf	299 plf	157 plf	177 plf	528 p
Ovrtrn. mo. Ttl. length of wall OTM		79.9 k-ft	44.0 k-ft	15.4 k-ft	177 pii 17.0 k-ft	60.7 k
	70:0 10 10	adjustment f		20.1 K I	27.0 K I	00.7 K
					1	
Resist moment total L. of wall RM :	= 168.6 k-ft	69.3 k-ft	62.2 k-ft	20.8 k-ft	26.9 k-ft	1579k
Resist moment total L. of wall RM :	= <u>168.6 k-ft</u> r= 0.9999	69.3 k-ft 1.0000	62.2 k-ft 0.6413	20.8 k-ft 0.9000	26.9 k-ft 0.9999	152.9 k 0.425

51	HEAR WAL			V2.4	V2 4	
	Y1-1	Y1-1	Y2-1	Y2-1	Y2-1	Y3-
N		r Wall Forces	1	1	4	1
Number of Panels	1	10.00 ft	10.00 ft	1	1	22.75
Total length of wall	14.50 ft	18.00 ft	18.00 ft	24.50 ft	14.00 ft	23.75
Total length of shear wall		18.00 ft	18.00 ft	24.50 ft	14.00 ft	23.75
Total length of full ht seg. L _w height of shear wall H		6.00 ft	18.00 ft	21.08 ft	14.00 ft	23.75
	1010011	16.00 ft	16.00 ft	12.00 ft	10.00 ft	10.00
	0.001.0	14.00 ft	0.00 ft	12.00 ft	0.00 ft	0.00
Total force at top of wall V ₁		2343 lbs	3798 lbs	4448 lbs	2954 lbs	8449
Self weight W _{DL self}		288 plf	288 plf	216 plf	180 plf	180
Applied dead load W _{DL above}		51 plf	55 plf	163 plf	40 plf	40 p
	n <u>7/16</u>	7/16	7/16	7/16	7/16	7/1
	n <u>1/2</u>	1/2	1/2	1/2	1/2	1/2
Wall Connected to Concrete y/n		Y	Y	Y	Ν	Y
		Wall Segment				
	4.00	3.00	18.00	9.50	14.00	23.7
	4.00	3.00		11.58		
		nsfer to Conc				
T	== .,	3500 lbs	1523 lbs	1 lbs	1187 lbs	1992
1/2 Anchor Bolts @			72 " O.C.	72 " O.C.		36 " 0
Provide:	Code Min.		Code Min.	Code Min.		A3
Min # of 1/2 Anchor Bolt		0.00	(4) Min	(5) Min	0.00	(9) N
Load From Abov	0.00	0.00	0.00	0.00	0.00	0.0
Holdow	HDE	HD3	HD1	Perp. Wall	S2	HD
		esisting Syste	1			
Force Calculated	397.97	813.68	211.00	269.91	211.00	355.
	<u>OSB</u>	<u>B.F.</u>	<u>OSB</u>	OSB	OSB	<u>OS</u>
Min Shear Wall Segmen		1.33 ft	4.57 ft	3.43 ft	2.86 ft	2.86
Provide: Va	= SW3	4400	SW1	SW2	SW1	SW
Min Shear Wall Segment						
Provide: Va						
В	locking / Naili		1			
	102	130 plf	211 plf	182 plf	211 plf	356
Blocking Unit Shear	162 plf					
	NONE	NONE	B1	NONE	B1	
Blocking Unit Shear	NONE T1	NONE See SCHED		NONE T1	B1 T1	
Blocking Unit Shear Blocking Nailing	NONE T1 Unit	NONE See SCHED Base Shear	B1		T1	
Blocking Unit Shear Blocking Nailing % of full height segments %fh = L _w /L	NONE T1 Unit = 0.552	NONE See SCHED Base Shear 0.333	B1 T1 1.000	T1 0.860	T1 1.000	T2
Blocking Unit Shear Blocking Nailing % of full height segments %fh = L _w /L % of maximum opening height %oh = H'/H	NONE T1 Unit = 0.552 = 0.600	NONE See SCHED Base Shear 0.333 0.875	B1 T1 1.000 0.000	T1 0.860 1.000	T1 1.000 0.000	1.00
Blocking Unit Shear Blocking Nailing % of full height segments %fh = L _w /L % of maximum opening height %oh = H'/H Shear cap adj factor SCAF	NONE T1 Unit = 0.552 = 0.600 = 0.74	NONE See SCHED Base Shear 0.333 0.875 0.48	B1 T1 1.000 0.000 1.00	T1 0.860 1.000 0.78	T1 1.000 0.000 1.00	1.00 0.00 1.00
Blocking Unit Shear Blocking Nailing % of full height segments % of maximum opening height Shear cap adj factor Unit base shear Vbase V ₁ /L _w	NONE T1 Unit = 0.552 = 0.600 = 0.74 = 293 plf	NONE See SCHED Base Shear 0.333 0.875 0.48 391 plf	B1 T1 1.000 0.000 1.00 211 plf	T1 0.860 1.000 0.78 211 plf	T1 1.000 0.000 1.00 211 plf	1.00 0.00 1.0 356
Blocking Unit Shear Blocking Nailing % of full height segments %fh = L _w /L % of maximum opening height %oh = H'/H Shear cap adj factor SCAF Unit base shear vbase V ₁ /L _w Effective unit base shear vreq=v _{base} /SCAF	NONE T1 Unit = 0.552 = 0.600 = 0.74 = 293 plf = 398 plf	NONE See SCHED Base Shear 0.333 0.875 0.48 391 plf 814 plf	B1 T1 1.000 0.000 1.00 211 plf 211 plf	T1 0.860 1.000 0.78 211 plf 270 plf	T1 1.000 0.000 1.00 211 plf 211 plf	1.00 0.00 1.0 356 356
Blocking Unit Shear Blocking Nailing % of full height segments % of maximum opening height Shear cap adj factor Unit base shear Vbase V ₁ /L _w	NONE T1 Unit = 0.552 = 0.600 = 0.74 = 293 plf = 398 plf = 31.8 k-ft	NONE See SCHED Base Shear 0.333 0.875 0.48 391 plf 814 plf 18.7 k-ft	B1 T1 1.000 0.000 1.00 211 plf 211 plf 60.8 k-ft	T1 0.860 1.000 0.78 211 plf	T1 1.000 0.000 1.00 211 plf	1.00 0.00 1.00 356 356
Blocking Unit Shear Blocking Nailing % of full height segments % of maximum opening height % of maximum opening height % oh = H'/H Shear cap adj factor Unit base shear Effective unit base shear Ovrtrn. mo. Ttl. length of wall OTM	NONE T1 Unit = 0.552 = 0.600 = 0.74 = 293 plf = 398 plf = 31.8 k-ft Shear wall	NONE See SCHED Base Shear 0.333 0.875 0.48 391 plf 814 plf 18.7 k-ft adjustment f	B1 T1 1.000 0.000 1.00 211 plf 211 plf 60.8 k-ft actor	T1 0.860 1.000 0.78 211 plf 270 plf 68.3 k-ft	T1 1.000 0.000 1.00 211 plf 211 plf 29.5 k-ft	1.00 0.00 1.00 356 84.5 k
Blocking Unit Shear Blocking Nailing % of full height segments % of full height segments % of maximum opening height % of maximum opening height % oh = H'/H Shear cap adj factor Unit base shear Effective unit base shear Ovrtrn. mo. Ttl. length of wall Resist moment total L. of wall RM	NONE T1 Unit = 0.552 = 0.600 = 0.74 = 293 plf = 398 plf = 31.8 k-ft Shear wall	NONE See SCHED Base Shear 0.333 0.875 0.48 391 plf 814 plf 18.7 k-ft	B1 T1 1.000 0.000 1.00 211 plf 211 plf 60.8 k-ft	T1 0.860 1.000 0.78 211 plf 270 plf	T1 1.000 0.000 1.00 211 plf 211 plf	B1 T2 1.00 0.00 1.00 356 p 356 p 84.5 k 62.0 k 1.000

511		L CALCUL		1	
	Y4-1		X2-0	X1-0	Y1-0
		r Wall Forces			_
Number of Panels	1		2	1	1
Total length of wall	16.00 ft		14.00 ft	37.00 ft	14.00 ft
Total length of shear wall L =	16.00 ft		2.25 ft	10.67 ft	14.00 ft
Total length of full ht seg. $L_w =$	13.50 ft		2.25 ft	10.67 ft	14.00 ft
height of shear wall H =	10.00 ft		7.00 ft	9.00 ft	9.00 ft
Maximum opening height H' =	5.00 ft		0.00 ft	0.00 ft	0.00 ft
Total force at top of wall $V_1 =$	2994 lbs		2383 lbs	4091 lbs	4029 lbs
Self weight W _{DL self} =	180 plf		126 plf	162 plf	162 plf
Applied dead load W _{DL above} =	40 plf		55 plf	163 plf	40 plf
Prefered OSB thickness in	7/16		7/16	7/16	7/16
Prefered Gyp thickness in	1/2		1/2	1/2	1/2
Wall Connected to Concrete $y/n =$	Y		Y	Y	Y
		Nall Segment			· · · · ·
ļ	6.75		2.25	10.67	14.00
ļ	6.75				
ļ					
ļ					
		nsfer to Conc			,
Τ =	1141 lbs		3500 lbs	2410 lbs	2930 lbs
1/2 Anchor Bolts @	72 " O.C.			36 '' O.C.	48 '' O.C.
Provide:	Code Min.			A3	A4
Min # of 1/2 Anchor Bolts	(3) Min			(4) Min	(4) Min
Load From Above	0.00		0.00	0.00	1186.96
Holdown	HD1		HD3	HD2	HD2
		esisting Syste		1	
Force Calculated	239.11		1059.27	383.37	287.80
	<u>OSB</u>		<u>P.F.</u>	OSB	<u>OSB</u>
Min Shear Wall Segment:	2.86 ft		1.33 ft	2.57 ft	2.57 ft
Provide: Va=	SW1		2778	SW2	SW1
Min Shear Wall Segment:					
Provide: Va=					
		ng Framing At			
Blocking Unit Shear	187 plf		340 plf	111 plf	288 plf
Blocking	B1		B1	NONE	B1
Nailing	T1		T2	See SCHED	T1
		Base Shear		0	•
% of full height segments % fh = L_w/L =	0.844		1.000	1.000	1.000
6 of maximum opening height %oh = H'/H =	0.500		0.000	0.000	0.000
Shear cap adj factor SCAF =	0.93		1.00	1.00	1.00
Unit base shear vbase $V_1/L_w =$	222 plf		1059 plf	383 plf	288 plf
Effective unit base shear vreq=v _{base} /SCAF= Ovrtrn mo Ttl length of wall OTM =	239 plf 32.3 k-ft		1059 plf	383 plf	288 plf
Ovrtrn. mo. Ttl. length of wall OTM =		adjustment f	16.7 k-ft	36.8 k-ft	36.3 k-ft
Resist moment total L. of wall RM =	28.1 k-ft	aujustinent h	0.5 k-ft	18.5 k-ft	19.8 k-ft
r=	0.9153		1.0000	18.5 K-IL	1.0000
C _o =	0.9155		1.0000	1.0000	1.0000



Loads: BLC 1, Wind Load Envelope Only Solution

KccX[·]GYWFjcb[·]GYhg

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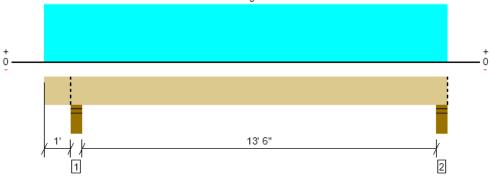
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Roof, RB1 1 piece(s) 6 3/4" x 13 1/2" 24F-V4 DF Glulam

Overall Length: 15' 5"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	16293 @ 1' 2 3/4"	23203 (5.50")	Passed (70%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	11205 @ 13' 10"	18514	Passed (61%)	1.15	1.0 D + 1.0 S (Alt Spans)
Pos Moment (Ft-Ibs)	47194 @ 8' 2 1/4"	47157	Passed (100%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-Ibs)	-1499 @ 1' 2 3/4"	36350	Passed (4%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.581 @ 8' 2"	0.693	Passed (L/286)		1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.653 @ 8' 2"	0.924	Passed (L/254)		1.0 D + 1.0 S (Alt Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

PASSED

• Deflection criteria: LL (L/240) and TL (L/180).

• Overhang deflection criteria: LL (2L/240) and TL (2L/180).

· Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 13' 9 1/2".

• Critical negative moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 1' 4 1/16".

• The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer

· Applicable calculations are based on NDS.

В	earing Leng	th	Loads	to Supports	s (lbs)	
Total	Available	Required	Dead	Snow	Factored	Accessories
5.50"	5.50"	3.86"	1822	14471	16293	Blocking
5.50"	5.50"	3.40"	1599	12748	14347	Blocking
	Total 5.50"	TotalAvailable5.50"5.50"	5.50" 5.50" 3.86"	TotalAvailableRequiredDead5.50°5.50°3.86°1822	TotalAvailableRequiredDeadSnow5.50"5.50"3.86"182214471	TotalAvailableRequiredDeadSnowFactored5.50"5.50"3.86"18221447116293

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments						
Top Edge (Lu)	6" o/c							
Bottom Edge (Lu)	15' 5" o/c							
•Maximum allowable bracing intervals based on applied load								

ium allowable bracing intervals based on applied load.

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 15' 5"	N/A	22.1		
1 - Uniform (PSF)	0 to 15' 5" (Front)	11' 9"	17.0	150.0	Default Load

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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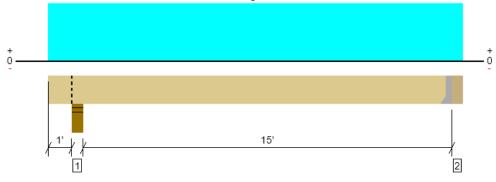






Roof, RB2 1 piece(s) 6 3/4" x 13 1/2" 24F-V4 DF Glulam

Overall Length: 16' 11"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	11888 @ 16' 5 1/2"	11888 (2.71")	Passed (100%)		1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	10125 @ 15' 4"	18514	Passed (55%)	1.15	1.0 D + 1.0 S (Alt Spans)
Pos Moment (Ft-lbs)	45097 @ 8' 10 7/16"	46836	Passed (96%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-Ibs)	-1184 @ 1' 2 3/4"	36350	Passed (3%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.669 @ 8' 10 1/4"	0.761	Passed (L/273)		1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.755 @ 8' 10 1/4"	1.015	Passed (L/242)		1.0 D + 1.0 S (Alt Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

PASSED

Deflection criteria: LL (L/240) and TL (L/180).
Overhang deflection criteria: LL (2L/240) and TL (2L/180).

Allowed moment does not reflect the adjustment for the beam stability factor.

Critical positive moment adjusted by a volume/size factor of 0.99 that was calculated using length L = 15' 2 1/16".

Critical negative moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 1' 3 15/16".

• The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.

• Applicable calculations are based on NDS.

	Bearing Length			Loads	to Supports		
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Stud wall - DF	5.50"	5.50"	3.30"	1595	12340	13935	Blocking
2 - Hanger on 13 1/2" DF beam	5.50"	Hanger ¹	2.71"	1429	11167	12596	See note 1

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments			
Top Edge (Lu)	16' 6" o/c				
Bottom Edge (Lu)	16' 6" o/c				
Maximum allowable bracing intervals based on applied load					

Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie							
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories	
2 - Face Mount Hanger	HGUS6.88/12	4.00"	N/A	56-16d	20-16d		

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 16' 5 1/2"	N/A	22.1		
1 - Uniform (PSF)	0 to 16' 11" (Front)	9' 3"	17.0	150.0	Default Load

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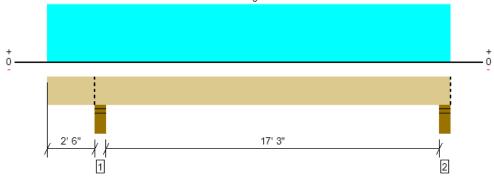
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Roof, RB3 1 piece(s) 6 3/4" x 15" 24F-V4 DF Glulam

Overall Length: 20' 8"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	15487 @ 2' 8 3/4"	23203 (5.50")	Passed (67%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	9937 @ 4' 2 1/2"	20571	Passed (48%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-Ibs)	49726 @ 11' 7 13/16"	56449	Passed (88%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-Ibs)	-4912 @ 2' 8 3/4"	44877	Passed (11%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.714 @ 11' 6 13/16"	0.880	Passed (L/296)		1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.807 @ 11' 6 7/8"	1.174	Passed (L/262)		1.0 D + 1.0 S (Alt Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

PASSED

Deflection criteria: LL (L/240) and TL (L/180).

• Overhang deflection criteria: LL (2L/240) and TL (2L/180).

• Upward deflection on left cantilever exceeds overhang deflection criteria.

• Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 0.97 that was calculated using length L = 17' 4 7/16".

• Critical negative moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 3' 1 13/16".

• The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.

Applicable calculations are based on NDS.

	Bearing Length			Loads	to Supports		
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Stud wall - DF	5.50"	5.50"	3.67"	1836	13651	15487	Blocking
2 - Stud wall - DF	5.50"	5.50"	2.82"	1395	10497	11892	Blocking
Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.							

Lateral Bracing	Bracing Intervals	Comments				
Top Edge (Lu)	20' 8" o/c					
Bottom Edge (Lu)	20' 8" o/c					

Maximum allowable bracing intervals based on applied load.

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 20' 8"	N/A	24.6		
1 - Uniform (PSF)	0 to 20' 8" (Front)	7' 9"	17.0	150.0	Default Load

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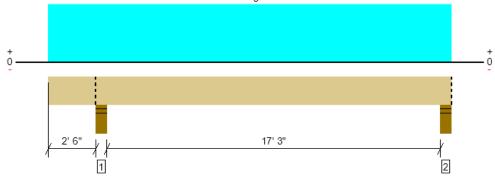
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Roof, RB4 1 piece(s) 8 3/4" x 15" 24F-V4 DF Glulam

Overall Length: 20' 8"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	20720 @ 2' 8 3/4"	30078 (5.50")	Passed (69%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	13295 @ 4' 2 1/2"	26666	Passed (50%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-Ibs)	66530 @ 11' 7 13/16"	71301	Passed (93%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-Ibs)	-6571 @ 2' 8 3/4"	58174	Passed (11%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.737 @ 11' 6 13/16"	0.880	Passed (L/287)		1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.833 @ 11' 6 7/8"	1.174	Passed (L/254)		1.0 D + 1.0 S (Alt Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

PASSED

Deflection criteria: LL (L/240) and TL (L/180).

• Overhang deflection criteria: LL (2L/240) and TL (2L/180)

· Upward deflection on left cantilever exceeds overhang deflection criteria.

· Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 0.94 that was calculated using length L = 17' 4 7/16".

• Critical negative moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 3' 1 13/16".

· Upward deflection on left cantilever exceeds 0.4".

• The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.

• Applicable calculations are based on NDS.

	Bearing Length			Loads	to Supports		
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Stud wall - DF	5.50"	5.50"	3.79"	2446	18275	20720	Blocking
2 - Stud wall - DF	5.50"	5.50"	2.91"	1859	14052	15911	Blocking

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments				
Top Edge (Lu)	20' 8" o/c					
Bottom Edge (Lu)	20' 8" o/c					
Maximum allowable burging internal based on anglied land						

Maximum allowable bracing intervals based on applied load.

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 20' 8"	N/A	31.9		
1 - Uniform (PSF)	0 to 20' 8" (Front)	10' 4 1/2"	17.0	150.0	Default Load

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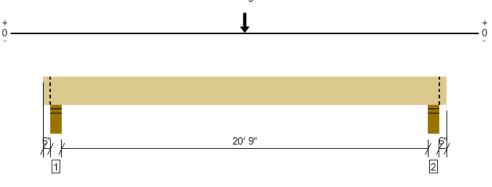




Roof, RB10

1 piece(s) 8 3/4" x 19 1/2" 24F-V4 DF Glulam

Overall Length: 22' 8"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	10831 @ 8 3/4"	30078 (5.50")	Passed (36%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	10723 @ 2' 7"	34665	Passed (31%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	112185 @ 11' 4"	115057	Passed (98%)	1.15	1.0 D + 1.0 S (All Spans)
Neg Moment (Ft-Ibs)	-11 @ 8 3/4"	76941	Passed (0%)	0.90	1.0 D (All Spans)
Live Load Defl. (in)	0.645 @ 11' 4"	1.060	Passed (L/395)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.750 @ 11' 4"	1.414	Passed (L/339)		1.0 D + 1.0 S (All Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

PASSED

Deflection criteria: LL (L/240) and TL (L/180).
Overhang deflection criteria: LL (2L/240) and TL (2L/180).

Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 0.90 that was calculated using length L = 21' 2 1/2".

• Critical negative moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 8 13/16".

• The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.

· Applicable calculations are based on NDS.

	Bearing Length		Loads to Supports (lbs)					
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories	
1 - Stud wall - DF	5.50"	5.50"	1.98"	1693	9138	10831	Blocking	
2 - Stud wall - DF	5.50"	5.50"	1.98"	1693	9138	10831	Blocking	
Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed								

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments			
Top Edge (Lu)	22' 8" o/c				
Bottom Edge (Lu)	22' 8" o/c				
Maximum allowable bracing intervals based on applied load					

•Maximum allowable bracing intervals based on applied load.

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 22' 8"	N/A	41.5		
1 - Point (Ib)	11' 4" (Front)	N/A	2446	18275	Linked from: RB4, Support 1

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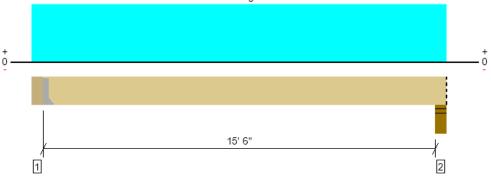
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Roof, RB12 1 piece(s) 6 3/4" x 13 1/2" 24F-V4 DF Glulam





All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	9469 @ 5 1/2"	9469 (2.16")	Passed (100%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	8105 @ 1' 7"	18514	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-Ibs)	36988 @ 8' 3 1/4"	46699	Passed (79%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.575 @ 8' 3 1/4"	0.781	Passed (L/326)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.652 @ 8' 3 1/4"	1.042	Passed (L/287)		1.0 D + 1.0 S (All Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

• Deflection criteria: LL (L/240) and TL (L/180).

• Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 0.99 that was calculated using length L = 15' 7 1/2".

• The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.

Applicable calculations are based on NDS.

	Bearing Length			Loads	to Supports		
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Hanger on 13 1/2" DF beam	5.50"	Hanger ¹	2.16"	1175	8839	10014	See note 1
2 - Stud wall - DF	5.50"	5.50"	2.34"	1167	8706	9873	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments				
Top Edge (Lu)	16' o/c					
Bottom Edge (Lu)	16' o/c					
Maximum alloughle brasing intervale based on applied land						

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie								
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories		
1 - Face Mount Hanger	HGUS6.88/12	4.00"	N/A	56-10d	20-10d			

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	5 1/2" to 16' 5"	N/A	22.1		
1 - Uniform (PSF)	0 to 16' 5" (Front)	7' 1 1/2"	17.0	150.0	Default Load

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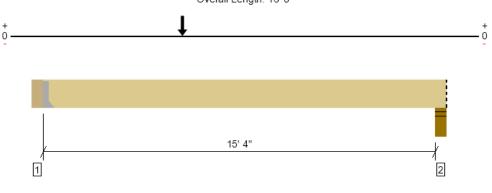


Roof, RB13

1 piece(s) 5 1/8" x 13 1/2" 24F-V4 DF Glulam







All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6716 @ 5 1/2"	6716 (2.02")	Passed (100%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	6697 @ 1' 7"	14057	Passed (48%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-Ibs)	35303 @ 5' 9"	35805	Passed (99%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.543 @ 7' 6 1/2"	0.773	Passed (L/341)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.627 @ 7' 6 5/8"	1.031	Passed (L/296)		1.0 D + 1.0 S (All Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

• Deflection criteria: LL (L/240) and TL (L/180).

• Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 15' 5 1/2".

• The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.

Applicable calculations are based on NDS.

	Bearing Length		Loads	to Supports			
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Hanger on 13 1/2" DF beam	5.50"	Hanger ¹	2.02"	903	5813	6716	See note 1
2 - Stud wall - DF	5.50"	5.50"	1.50"	538	3026	3564	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• 1 See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments			
Top Edge (Lu)	7' 3" o/c				
Bottom Edge (Lu)	15' 10" o/c				
-Maximum allowable brasing intervals based on applied land					

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie							
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories	
1 - Face Mount Hanger	HGUS5.25/10	4.00"	N/A	46-10d	16-10d		

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	5 1/2" to 16' 3"	N/A	16.8		
1 - Point (Ib)	5' 9" (Front)	N/A	1175	8839	Linked from: RB12, Support 1

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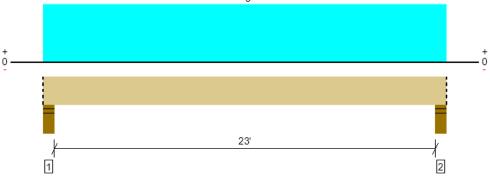
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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Roof, RB6 1 piece(s) 8 3/4" x 22 1/2" 24F-V4 DF Glulam

Overall Length: 23' 11"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	24537 @ 4"	30078 (5.50")	Passed (82%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	19749 @ 2' 4"	39998	Passed (49%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-Ibs)	138644 @ 11' 11 1/2"	149623	Passed (93%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.792 @ 11' 11 1/2"	1.163	Passed (L/352)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.902 @ 11' 11 1/2"	1.550	Passed (L/309)		1.0 D + 1.0 S (All Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

PASSED

· Deflection criteria: LL (L/240) and TL (L/180).

· Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 0.88 that was calculated using length L = 23' 3".

The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer

Applicable calculations are based on NDS.

	Bearing Length		Loads to Supports (lbs)				
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Stud wall - DF	5.50"	5.50"	4.49"	3012	21525	24537	Blocking
2 - Stud wall - DF	5.50"	5.50"	4.49"	3012	21525	24537	Blocking

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments			
Top Edge (Lu)	23' 11" o/c				
Bottom Edge (Lu)	23' 11" o/c				
Maximum allowable bracing intervals based on applied load					

m allowable bracing intervals based on applied load

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 23' 11"	N/A	47.8		
1 - Uniform (PSF)	0 to 23' 11" (Front)	12'	17.0	150.0	Default Load

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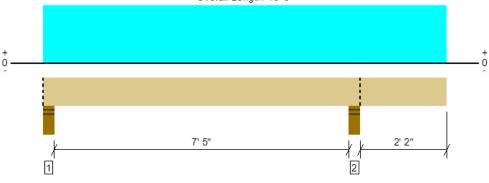
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Roof, RB7 1 piece(s) 6 3/4" x 7 1/2" 24F-V4 DF Glulam

Overall Length: 10' 6"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	8645 @ 8' 1 1/4"	23203 (5.50")	Passed (37%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	4420 @ 7' 3"	10285	Passed (43%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-Ibs)	8804 @ 4' 3/16"	14555	Passed (60%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-Ibs)	-3731 @ 8' 1 1/4"	11219	Passed (33%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.197 @ 4' 1 7/8"	0.389	Passed (L/474)		1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.218 @ 4' 1 13/16"	0.518	Passed (L/427)		1.0 D + 1.0 S (Alt Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

PASSED

• Deflection criteria: LL (L/240) and TL (L/180).

• Overhang deflection criteria: LL (2L/240) and TL (2L/180).

· Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 7' 4 5/16".

• Critical negative moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 3' 1 5/8".

• The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer

· Applicable calculations are based on NDS.

	Bearing Length		Loads to Supports (lbs)				
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Stud wall - DF	5.50"	5.50"	1.50"	552	4665	5217	Blocking
2 - Stud wall - DF	5.50"	5.50"	2.05"	954	7691	8645	Blocking

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments			
Top Edge (Lu)	10' 6" o/c				
Bottom Edge (Lu)	10' 6" o/c				
Maximum allowable bracing intervals based on applied load.					

ium allowable bracing intervals based on applied load.

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 10' 6"	N/A	12.3		
1 - Uniform (PSF)	0 to 10' 6" (Front)	7' 8 1/2"	17.0	150.0	Default Load

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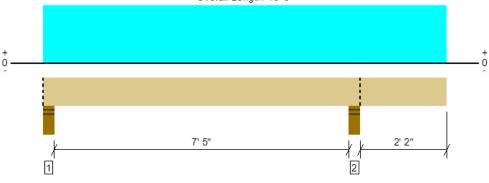






Roof, RB8 1 piece(s) 8 3/4" x 9" 24F-V4 DF Glulam

Overall Length: 10' 6"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Design Results	Actual @ Location	Alloweu	Result	LDF	Load. Complitation (Pattern)
Member Reaction (lbs)	11650 @ 8' 1 1/4"	30078 (5.50")	Passed (39%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	5738 @ 7' 1 1/2"	15999	Passed (36%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	11862 @ 4' 3/16"	27169	Passed (44%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-Ibs)	-5028 @ 8' 1 1/4"	20943	Passed (24%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.118 @ 4' 1 7/8"	0.389	Passed (L/788)		1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.131 @ 4' 1 13/16"	0.518	Passed (L/711)		1.0 D + 1.0 S (Alt Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

• Deflection criteria: LL (L/240) and TL (L/180).

• Overhang deflection criteria: LL (2L/240) and TL (2L/180).

· Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 7' 4 5/16".

• Critical negative moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 3' 1 5/8".

• The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer

· Applicable calculations are based on NDS.

Bearing Length		Loads to Supports (lbs)				
Total	Available	Required	Dead	Snow	Factored	Accessories
5.50"	5.50"	1.50"	753	6278	7031	Blocking
5.50"	5.50"	2.13"	1300	10350	11650	Blocking
	Total 5.50"	TotalAvailable5.50"5.50"	TotalAvailableRequired5.50"5.50"1.50"	Total Available Required Dead 5.50" 5.50" 1.50" 753	Total Available Required Dead Snow 5.50" 5.50" 1.50" 753 6278	TotalAvailableRequiredDeadSnowFactored5.50"5.50"1.50"75362787031

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments			
Top Edge (Lu)	10' 6" o/c				
Bottom Edge (Lu)	10' 6" o/c				
•Maximum allowable bracing intervals based on applied load.					

ium allowable bracing intervals based on applied load.

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 10' 6"	N/A	19.1		
1 - Uniform (PSF)	0 to 10' 6" (Front)	10' 4 1/2"	17.0	150.0	Default Load

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Job Notes

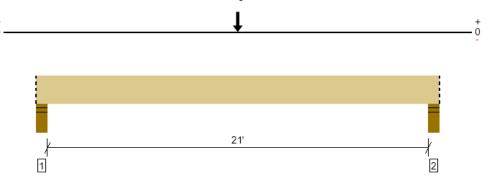




Roof, RB11

1 piece(s) 8 3/4" x 15" 24F-V4 DF Glulam

Overall Length: 21' 11"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6175 @ 4"	30078 (5.50")	Passed (21%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	6120 @ 1' 8 1/2"	26666	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-Ibs)	63691 @ 10' 11 1/2"	69876	Passed (91%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.807 @ 10' 11 1/2"	1.063	Passed (L/316)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.942 @ 10' 11 1/2"	1.417	Passed (L/271)		1.0 D + 1.0 S (All Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

PASSED

· Deflection criteria: LL (L/240) and TL (L/180).

• Allowed moment does not reflect the adjustment for the beam stability factor.

0

• Critical positive moment adjusted by a volume/size factor of 0.93 that was calculated using length L = 21' 3".

The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.

Applicable calculations are based on NDS.

	Bearing Length		Loads to Supports (lbs)				
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Stud wall - DF	5.50"	5.50"	1.50"	1000	5175	6175	Blocking
2 - Stud wall - DF	5.50"	5.50"	1.50"	1000	5175	6175	Blocking

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments				
Top Edge (Lu)	21' 11" o/c					
Bottom Edge (Lu)	21' 11" o/c					
•Maximum allowable bracing intervals based on applied load.						

m allowable bracing intervals based on applied load

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 21' 11"	N/A	31.9		
1 - Point (Ib)	10' 11 1/2" (Front)	N/A	1300	10350	Linked from: RB8, Support 2

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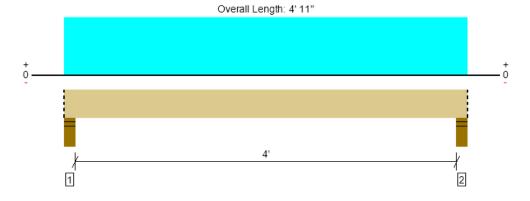
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Job Notes





Roof, RB14 2 piece(s) 1 3/4" x 7 1/4" 2.0E Microllam® LVL



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	9050 @ 4"	12031 (5.50")	Passed (75%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	5139 @ 1' 3/4"	5544	Passed (93%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	8312 @ 2' 5 1/2"	8182	Passed (102%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.143 @ 2' 5 1/2"	0.213	Passed (L/357)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.159 @ 2' 5 1/2"	0.283	Passed (L/320)		1.0 D + 1.0 S (All Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

• Deflection criteria: LL (L/240) and TL (L/180).

• Allowed moment does not reflect the adjustment for the beam stability factor.

	Bearing Length			Loads	to Supports			
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories	
1 - Stud wall - DF	5.50"	5.50"	4.14"	938	8113	9050	Blocking	
2 - Stud wall - DF	5.50"	5.50"	4.14"	938	8113	9050	Blocking	
Blocking Danels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed								

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6" o/c	
Bottom Edge (Lu)	4' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4' 11"	N/A	7.4		
1 - Uniform (PSF)	0 to 4' 11" (Front)	22'	17.0	150.0	Default Load

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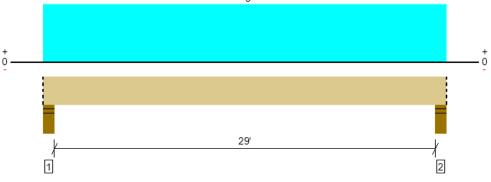
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Roof, RB15 1 piece(s) 8 3/4" x 25 1/2" 24F-V4 DF Glulam

Overall Length: 29' 11"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

					1
Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	25792 @ 4"	30078 (5.50")	Passed (86%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	21337 @ 2' 7"	45332	Passed (47%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-Ibs)	184399 @ 14' 11 1/2"	185484	Passed (99%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	1.135 @ 14' 11 1/2"	1.462	Passed (L/309)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	1.305 @ 14' 11 1/2"	1.950	Passed (L/269)		1.0 D + 1.0 S (All Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

PASSED

• Deflection criteria: LL (L/240) and TL (L/180).

· Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 0.85 that was calculated using length L = 29' 3".

The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.

Applicable calculations are based on NDS.

	Bearing Length		Loads to Supports (lbs)				
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Stud wall - DF	5.50"	5.50"	4.72"	3354	22437	25792	Blocking
2 - Stud wall - DF	5.50"	5.50"	4.72"	3354	22437	25792	Blocking

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments			
Top Edge (Lu)	5' 4" o/c				
Bottom Edge (Lu)	29' 11" o/c				
•Maximum allowable bracing intervals based on applied load					

m allowable bracing intervals based on applied load

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 29' 11"	N/A	54.2		
1 - Uniform (PSF)	0 to 29' 11" (Front)	10'	17.0	150.0	Default Load

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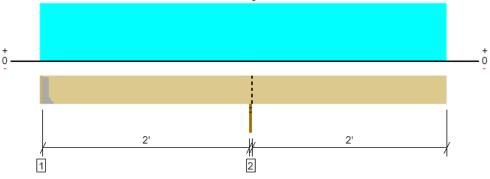


Roof, OUTLOOKERS

1 piece(s) 2 x 6 DF No.2 @ 16" OC



Overall Length: 4' 3"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)	
Member Reaction (lbs)	918 @ 2' 2 1/4"	1406 (1.50")	Passed (65%)		1.0 D + 1.0 S (All Spans)	
Shear (lbs)	343 @ 1' 8"	1139	Passed (30%)	1.15	1.0 D + 1.0 S (All Spans)	
Moment (Ft-lbs)	-474 @ 2' 2 1/4"	975	Passed (49%)	1.15	1.0 D + 1.0 S (All Spans)	
Live Load Defl. (in)	0.051 @ 4' 3"	0.206	Passed (2L/972)		1.0 D + 1.0 S (Alt Spans)	
Total Load Defl. (in)	0.056 @ 4' 3"	0.275	Passed (2L/880)		1.0 D + 1.0 S (Alt Spans)	

System : Roof Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

• Deflection criteria: LL (L/240) and TL (L/180)

• Overhang deflection criteria: LL (2L/240) and TL (2L/180).

• Right cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.

· Allowed moment does not reflect the adjustment for the beam stability factor.

• A 15% increase in the moment capacity has been added to account for repetitive member usage.

Applicable calculations are based on NDS.

	Bearing Length			Loads	to Supports		
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Hanger on 5 1/2" DF beam	1.50"	Hanger ¹	1.50"	3	128/-78	131/-75	See note 1
2 - Stud wall - DF	1.50"	1.50"	1.50"	94	825	918	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments						
Top Edge (Lu)	4' 2" o/c							
Bottom Edge (Lu)	4' 2" o/c							
Maximum allowable brasing inter								

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-T	Гie					
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LU26	1.50"	N/A	6-10dx1.5	4-10dx1.5	

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 4' 3"	16"	17.0	150.0	Default Load

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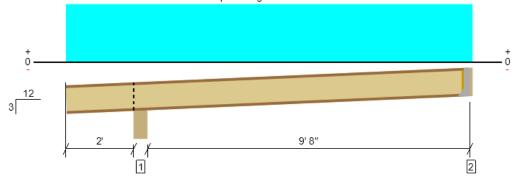
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Roof, RF1 1 piece(s) 11 7/8" TJI ® 110 @ 16" OC

Sloped Length: 12' 8 13/16"



Member Length : 12' 10 1/4"

System : Roof Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 3/12

Design Results Actual @ Location Allowed Result LDF Load: Combination (Pattern)

All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Member Reaction (lbs)	1079 @ 12' 2 3/4"	1079 (1.86")	Passed (100%)	1.15	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	1079 @ 12' 2 3/4"	1794	Passed (60%)	1.15	1.0 D + 1.0 S (Alt Spans)
Moment (Ft-lbs)	2605 @ 7' 4 13/16"	3634	Passed (72%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.209 @ 7' 3 5/8"	0.513	Passed (L/589)		1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.232 @ 7' 3 11/16"	0.684	Passed (L/531)		1.0 D + 1.0 S (Alt Spans)

• Deflection criteria: LL (L/240) and TL (L/180).

• Overhang deflection criteria: LL (2L/240) and TL (2L/180).

• Allowed moment does not reflect the adjustment for the beam stability factor.

	Bearing Length			Loads	to Supports		
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Beveled Plate - DF	6.75"	6.75"	3.50"	176	1503	1679	Blocking
2 - Hanger on 11 7/8" DF beam	1.50"	Hanger ¹	1.86" / - 2	113	994	1107	See note 1

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

1 See Connector grid below for additional information and/or requirements.
 2 Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 5" o/c	
Bottom Edge (Lu)	7' 4" o/c	
TH inite and and and making during	Maximum Allowable brasing colutions	

•TJI joists are only analyzed using Maximum Allowable bracing solutions. •Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie									
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories			
2 - Face Mount Hanger	U14X SLD14	2.00"	N/A	14-10dx1.5	6-10dx1.5	Web Stiffeners			
- Defer to monufacturer notes and instructi	and for proper installation and use	of all compositors							

Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Snow	
Vertical Load	Location	Spacing	(0.90)	(1.15)	Comments
1 - Uniform (PSF)	0 to 12' 4 1/4"	16"	17.0	150.0	Default Load

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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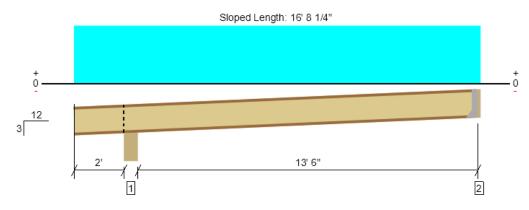
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Roof, RF2 1 piece(s) 11 7/8" TJI ® 360 @ 24" OC

Support 2 failed reaction check due to insufficient bearing capacity.



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results Actual @ Location Allowed Result Load: Combination (Pattern) LDF Member Reaction (lbs) 2274 @ 16' 3/4' 1731 (3 Failed (131%) 1.15 1.0 D + 1.0 S (Alt Spans) 50 Shear (lbs) 2274 @ 16' 3/4" 1961 Failed (116%) 1.15 1.0 D + 1.0 S (Alt Spans) 1.0 D + 1.0 S (Alt Spans) Moment (Ft-lbs) 7715 @ 9' 3 5/16' 7107 Failed (109%) 1.15 Live Load Defl. (in) 0.725 @ 9' 2 7/16" 0.710 Passed (L/235) 1.0 D + 1.0 S (Alt Spans) ---0.947 1.0 D + 1.0 S (Alt Spans) Total Load Defl. (in) 0.807 @ 9' 2 1/2" Passed (L/211) ---

Deflection criteria: LL (L/240) and TL (L/180).

Overhang deflection criteria: LL (2L/240) and TL (2L/180).

Upward deflection on left cantilever exceeds overhang deflection criteria.

• Allowed moment does not reflect the adjustment for the beam stability factor.

	Bearing Length			Loads to Supports (lbs)			
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Beveled Plate - DF	6.75"	6.75"	4.37"	328	2808	3136	Blocking
2 - Hanger on 11 7/8" DF beam	1.50"	Hanger ¹	- / - 2	239	2076	2315	See note 1

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

• ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments			
Top Edge (Lu)	6" o/c				
Bottom Edge (Lu)	9' 7" o/c				
The state and and and and a state Manimum Allowable busine adultion.					

•TJI joists are only analyzed using Maximum Allowable bracing solutions.

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie									
Support Model Seat Length Top Fasteners Face Fasteners Member Fasteners A						Accessories			
2 - Face Mount Hanger	Connector not found	N/A	N/A	N/A	N/A				

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Snow	
Vertical Load	Location	Spacing	(0.90)	(1.15)	Comments
1 - Uniform (PSF)	0 to 16' 2 1/4"	24"	17.0	150.0	Default Load

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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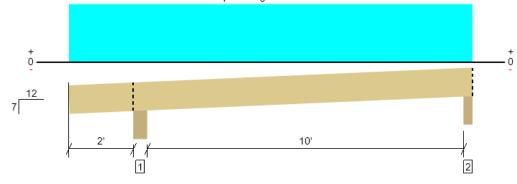
Member Length : 16' 9 5/8"

System : Roof Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 3/12



Roof, RF3 1 piece(s) 2 x 12 DF No.2 @ 16" OC

Sloped Length: 14' 11 9/16"



Member Length : 15' 6 1/8"

All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1204 @ 12' 7 3/4"	4102 (4.38")	Passed (29%)		1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	982 @ 3' 4 7/16"	2329	Passed (42%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2876 @ 7' 7 1/4"	3138	Passed (92%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.230 @ 7' 6 1/16"	0.600	Passed (L/625)		1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.259 @ 7' 6 1/8"	0.800	Passed (L/557)		1.0 D + 1.0 S (Alt Spans)

System : Roof Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 7/12

• Deflection criteria: LL (L/240) and TL (L/180).

• Overhang deflection criteria: LL (2L/240) and TL (2L/180).

• Allowed moment does not reflect the adjustment for the beam stability factor.

• A 15% increase in the moment capacity has been added to account for repetitive member usage.

Applicable calculations are based on NDS.

	Bearing Length			Loads to Supports (lbs)			
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Beveled Plate - DF	6.75"	6.75"	1.61"	202	1543	1745	Blocking
2 - Beveled Plate - DF	4.38"	4.38"	1.50"	137	1068	1204	Blocking

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 4" o/c	
Bottom Edge (Lu)	15' o/c	

•Maximum allowable bracing intervals based on applied load.

			Dead	Snow	
Vertical Load	Location (Side)	Spacing	(0.90)	(1.15)	Comments
1 - Uniform (PSF)	0 to 12' 11 1/8"	16"	17.0	150.0	Default Load

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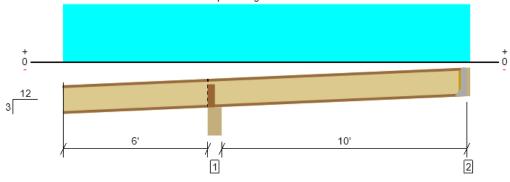
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Roof, RF4 1 piece(s) 11 7/8" TJI ® 560 @ 24" OC

Sloped Length: 17' 2 11/16"



LDF

1.15

1.15

1.15

Load: Combination (Pattern)

1.0 D + 1.0 S (All Spans)

1.0 D + 1.0 S (All Spans)

1.0 D + 1.0 S (All Spans)

1.0 D + 1.0 S (Alt Spans)

1.0 D + 1.0 S (Alt Spans)

Member Length : 17' 3 13/16"

System : Roof Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 3/12

 Total Load Defl. (in)
 0

 • Deflection criteria: LL (L/240) and TL (L/180)

Design Results

Shear (lbs)

Moment (Ft-lbs)

Live Load Defl. (in)

Member Reaction (lbs)

• Overhang deflection criteria: LL (2L/240) and TL (2L/180).

• Left cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.

Actual @ Location

4470 @ 6' 3 3/8"

2010 @ 6'

-6609 @ 6' 3 3/8"

0.504 @ 0

0.549 @ 0

• Allowed moment does not reflect the adjustment for the beam stability factor.

	Bearing Length			Loads to Supports (lbs)			
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Beveled Plate - DF	6.75"	6.75"	5.08"	468	4002	4470	Blocking, Web Stiffeners
2 - Hanger on 11 7/8" DF beam	1.75"	Hanger ¹	1.75" / - 2	118	1298	1416	See note 1

Allowed

4659 (5.25")

2358

10925

0.647

0.863

Result

Passed (96%)

Passed (85%)

Passed (60%)

Passed (2L/308)

Passed (2L/284)

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

• ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	10' 9" o/c	
Bottom Edge (Lu)	6' 9" o/c	

•TJI joists are only analyzed using Maximum Allowable bracing solutions.

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie								
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories		
2 - Face Mount Hanger	U410X SLD14	2.00"	N/A	14-10dx1.5	6-10d	Web Stiffeners		

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Snow	
Vertical Load	Location	Spacing	(0.90)	(1.15)	Comments
1 - Uniform (PSF)	0 to 16' 8 1/2"	24"	17.0	150.0	Default Load

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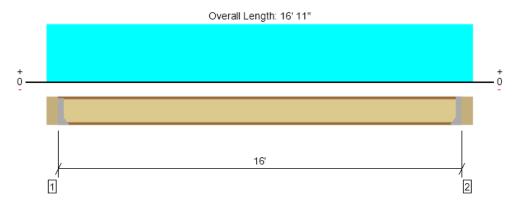
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Floor, Floor: Joist 1 1 piece(s) 11 7/8" TJI ® 210 @ 16" OC





All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	555 @ 5 1/2"	1005 (1.75")	Passed (55%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	555 @ 5 1/2"	1655	Passed (34%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2219 @ 8' 5 1/2"	3795	Passed (58%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.234 @ 8' 5 1/2"	0.400	Passed (L/821)		1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.304 @ 8' 5 1/2"	0.800	Passed (L/632)		1.0 D + 1.0 L (All Spans)
TJ-Pro [™] Rating	42	40	Passed		

System : Floor Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

• Deflection criteria: LL (L/480) and TL (L/240).

· Allowed moment does not reflect the adjustment for the beam stability factor.

· A structural analysis of the deck has not been performed.

• Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.

Additional considerations for the TJ-Pro[™] Rating include: None.

	Bearing Length			Loads	to Supports		
Supports	Total	Available	Required	Dead	Floor Live	Factored	Accessories
1 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	1.75" / - 2	135	451	586	See note 1
2 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	1.75" / - 2	135	451	586	See note 1

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

• ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments				
Top Edge (Lu)	4' 11" o/c					
Bottom Edge (Lu)	16' o/c					
TTI joints are only analyzed using Maximum Allowable bracing solutions						

ts are only analyzed using Maximum Allowable bracing s

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie Support Model Seat Length Top Fasteners Face Fasteners Member Fasteners Accessories 1 - Face Mount Hanger IUS2.06/11.88 2.00" N/A 10-10dx1.5 2-Strong-Grip 2 - Face Mount Hanger IUS2.06/11.88 2.00' N/A 10-10dx1.5 2-Strong-Grip

· Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Floor Live	
Vertical Load	Location	Spacing	(0.90)	(1.00)	Comments
1 - Uniform (PSF)	0 to 16' 11"	16"	12.0	40.0	Default Load

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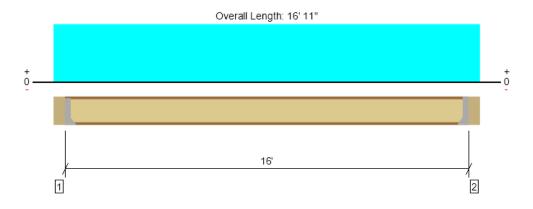
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Floor, Floor: Joist 1 560 1 piece(s) 11 7/8" TJI ® 560 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	555 @ 5 1/2"	1265 (1.75")	Passed (44%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	555 @ 5 1/2"	2050	Passed (27%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2219 @ 8' 5 1/2"	9500	Passed (23%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.135 @ 8' 5 1/2"	0.400	Passed (L/999+)		1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.176 @ 8' 5 1/2"	0.800	Passed (L/999+)		1.0 D + 1.0 L (All Spans)
TJ-Pro [™] Rating	52	40	Passed		

System : Floor Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

Deflection criteria: LL (L/480) and TL (L/240).

Allowed moment does not reflect the adjustment for the beam stability factor.

· A structural analysis of the deck has not been performed.

• Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.

• Additional considerations for the TJ-Pro[™] Rating include: None.

	Bearing Length			Loads to Supports (lbs)			
Supports	Total	Available	Required	Dead	Floor Live	Factored	Accessories
1 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	1.75" / - 2	135	451	586	See note 1
2 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	1.75" / - 2	135	451	586	See note 1

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

• ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments			
Top Edge (Lu)	12' 1" o/c				
Bottom Edge (Lu)	16' o/c				
TIL joists are only analyzed using Maximum Allowable bracing colutions					

•TJI joists are only analyzed using Maximum Allowable bracing solutio

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie Support Model Seat Length Top Fasteners Face Fasteners Member Fasteners Accessories 1 - Face Mount Hanger IUS3.56/11.88 2.00" N/A 12-10dx1.5 2-Strong-Grip 2 - Face Mount Hanger 2.00' N/A 12-10dx1.5 IUS3.56/11.88 2-Strong-Grip

Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Floor Live	
Vertical Load	Location	Spacing	(0.90)	(1.00)	Comments
1 - Uniform (PSF)	0 to 16' 11"	16"	12.0	40.0	Default Load

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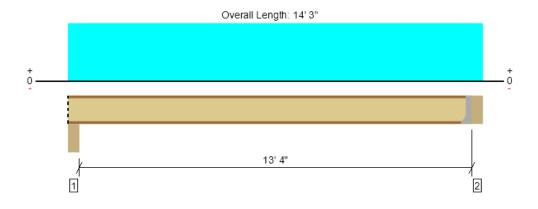
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ForteWEB Software Operator	Job Notes
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Floor, Floor: Joist 2 1 piece(s) 11 7/8" TJI ® 210 @ 24" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	698 @ 13' 9 1/2"	1005 (1.75")	Passed (69%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	698 @ 13' 9 1/2"	1655	Passed (42%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2340 @ 7' 1"	3795	Passed (62%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.175 @ 7' 1"	0.335	Passed (L/919)		1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.228 @ 7' 1"	0.671	Passed (L/707)		1.0 D + 1.0 L (All Spans)
TJ-Pro [™] Rating	42	40	Passed		

System : Floor Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

• Deflection criteria: LL (L/480) and TL (L/240).

Allowed moment does not reflect the adjustment for the beam stability factor.

A structural analysis of the deck has not been performed.

• Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.

• Additional considerations for the TJ-Pro[™] Rating include: None.

	Bearing Length			Loads to Supports (lbs)			
Supports	Total	Available	Required	Dead	Floor Live	Factored	Accessories
1 - Beam - DF	5.50"	5.50"	1.75"	170	567	737	Blocking
2 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	1.75" / - 2	172	573	745	See note 1

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

¹ See Connector grid below for additional information and/or requirements.

• ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Bracing Intervals	Comments
4' 9" o/c	
13' 10" o/c	
	4' 9" o/c

•TJI joists are only analyzed using Maximum Allowable bracing solutions.

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie								
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories		
2 - Face Mount Hanger	IUS2.06/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip			
Defer to manufacturer notes and instruction	Defer to manufacturer notes and instructions for proper installation and use of all connectors							

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Floor Live	
Vertical Load	Location	Spacing	(0.90)	(1.00)	Comments
1 - Uniform (PSF)	0 to 14' 3"	24"	12.0	40.0	Default Load

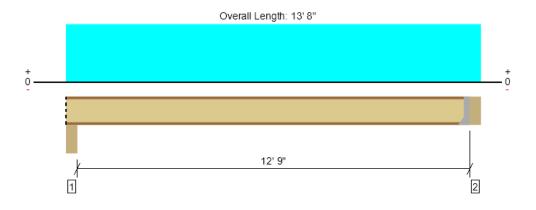
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ForteWEB Software Operator	Job Notes	
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Floor, Floor: Joist 3 1 piece(s) 11 7/8" TJI ® 110 @ 24" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	667 @ 13' 2 1/2"	910 (1.75")	Passed (73%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	667 @ 13' 2 1/2"	1560	Passed (43%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2141 @ 6' 9 1/2"	3160	Passed (68%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.167 @ 6' 9 1/2"	0.321	Passed (L/921)		1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.217 @ 6' 9 1/2"	0.642	Passed (L/708)		1.0 D + 1.0 L (All Spans)
TJ-Pro [™] Rating	42	40	Passed		

System : Floor Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

Deflection criteria: LL (L/480) and TL (L/240).

Allowed moment does not reflect the adjustment for the beam stability factor.

A structural analysis of the deck has not been performed.

• Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser EdgeTM Panel (24" Span Rating) that is glued and nailed down.

• Additional considerations for the TJ-Pro[™] Rating include: None.

	Bearing Length			Loads to Supports (lbs)			
Supports	Total	Available	Required	Dead	Floor Live	Factored	Accessories
1 - Beam - DF	5.50"	5.50"	1.75"	163	543	706	Blocking
2 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	1.75" / - 2	165	550	715	See note 1

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

¹ See Connector grid below for additional information and/or requirements.

• ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Bracing Intervals	Comments
3' 10" o/c	
13' 3" o/c	
	3' 10" o/c

•TJI joists are only analyzed using Maximum Allowable bracing solutions.

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie							
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories	
2 - Face Mount Hanger	IUS1.81/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip		

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Floor Live	
Vertical Load	Location	Spacing	(0.90)	(1.00)	Comments
1 - Uniform (PSF)	0 to 13' 8"	24"	12.0	40.0	Default Load

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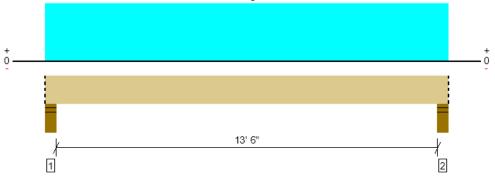
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Floor, FB16 1 piece(s) 5 1/8" x 12" 24F-V4 DF Glulam

Overall Length: 14' 5"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	8109 @ 4"	17617 (5.50")	Passed (46%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	6468 @ 1' 5 1/2"	12495	Passed (52%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-Ibs)	26586 @ 7' 2 1/2"	28290	Passed (94%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.420 @ 7' 2 1/2"	0.688	Passed (L/393)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.681 @ 7' 2 1/2"	0.917	Passed (L/242)		1.0 D + 1.0 S (All Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

• Deflection criteria: LL (L/240) and TL (L/180).

· Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 13' 9".

The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer

Applicable calculations are based on NDS.

	Bearing Length		Loads to Supports (lbs)				
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Stud wall - DF	5.50"	5.50"	2.53"	3108	5001	8109	Blocking
2 - Stud wall - DF	5.50"	5.50"	2.53"	3108	5001	8109	Blocking

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments				
Top Edge (Lu)	14' 5" o/c					
Bottom Edge (Lu)	14' 5" o/c					
Maximum allowable bracing intervals based on applied load						

m allowable bracing intervals based on applied load

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 14' 5"	N/A	14.9		
1 - Uniform (PSF)	0 to 14' 5" (Front)	9' 3"	45.0	75.0	Default Load

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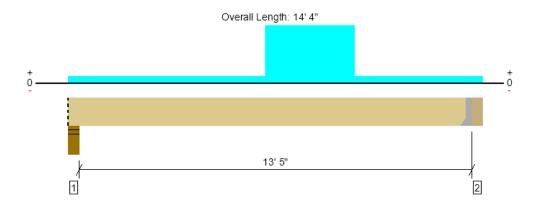
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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2 piece(s) 1 3/4" x 11 7/8" 2.0E Microllam® LVL



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2523 @ 13' 10 1/2"	3938 (1.50")	Passed (64%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	2392 @ 12' 10 5/8"	9081	Passed (26%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-Ibs)	10743 @ 8' 5/8"	20525	Passed (52%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.218 @ 7' 4 1/4"	0.677	Passed (L/744)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.360 @ 7' 4 3/16"	0.903	Passed (L/452)		1.0 D + 1.0 S (All Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

• Deflection criteria: LL (L/240) and TL (L/180).

• Allowed moment does not reflect the adjustment for the beam stability factor.

	Bearing Length			Loads	to Supports		
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Stud wall - DF	5.50"	5.50"	1.50"	808	1203	2010	Blocking
2 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	1.50"	1018	1560	2578	See note 1

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments				
Top Edge (Lu)	13' 7" o/c					
Bottom Edge (Lu)	13' 11" o/c					
Maximum allowable bracing intervals based on applied load.						

Maximum allowable bracing intervals based on applied loa

Connector: Simpson Strong-Tie

1 5									
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories			
2 - Face Mount Hanger	LUS414	2.00"	N/A	10-SD9112	6-SD9212				

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 13' 10 1/2"	N/A	12.1		
1 - Uniform (PSF)	0 to 14' 4" (Front)	1'	45.0	75.0	Default Load
2 - Uniform (PSF)	7' to 10' (Front)	7' 6"	45.0	75.0	Default Load

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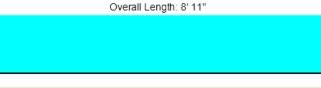
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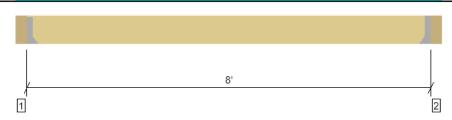


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Floor, FB17 2 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL





All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4966 @ 5 1/2"	4966 (1.89")	Passed (100%)		1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	3196 @ 1' 7 1/2"	9310	Passed (34%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	9024 @ 4' 5 1/2"	24258	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.021 @ 4' 5 1/2"	0.400	Passed (L/999+)		1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.095 @ 4' 5 1/2"	0.533	Passed (L/999+)		1.0 D + 0.75 L + 0.75 S (All Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

0

• Deflection criteria: LL (L/240) and TL (L/180).

• Allowed moment does not reflect the adjustment for the beam stability factor.

0

	Bearing Length			Loads to Supports (lbs)				
Supports	Total	Available	Required	Dead	Floor Live	Snow	Factored	Accessories
1 - Hanger on 14" DF beam	5.50"	Hanger ¹	1.89"	4287	736	920	5528	See note 1
2 - Hanger on 14" DF beam	5.50"	Hanger ¹	1.89"	4287	736	920	5528	See note 1

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments					
Top Edge (Lu)	8' o/c						
Bottom Edge (Lu)	8' o/c						
Maximum allowable bracing inten	Maximum alloughlo bracing intervals based on applied load						

Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model Seat Length Top F		Top Fasteners	Face Fasteners	Member Fasteners	Accessories				
1 - Face Mount Hanger	HGUS412	4.00"	N/A	56-10d	20-10d					
2 - Face Mount Hanger	HHUS410	3.00"	N/A	30-10d	10-10d					
		3.00	10/70	30 100	10 100					

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

		Dead	Floor Live	Snow	
Location (Side)	Tributary Width	(0.90)	(1.00)	(1.15)	Comments
5 1/2" to 8' 5 1/2"	N/A	14.3			
0 to 8' 11" (Front)	2' 9"	45.0	-	75.0	Default Load
0 to 8' 11" (Front)	4' 1 1/2"	200.0	40.0	-	Default Load
	5 1/2" to 8' 5 1/2" 0 to 8' 11" (Front)	5 1/2" to 8' 5 1/2" N/A 0 to 8' 11" (Front) 2' 9"	Location (Side) Tributary Width (0.90) 5 1/2" to 8' 5 1/2" N/A 14.3 0 to 8' 11" (Front) 2' 9" 45.0	Location (Side) Tributary Width (0.90) (1.00) 5 1/2" to 8' 5 1/2" N/A 14.3 0 to 8' 11" (Front) 2' 9" 45.0 -	Location (Side) Tributary Width (0.90) (1.00) (1.15) 5 1/2" to 8' 5 1/2" N/A 14.3 0 to 8' 11" (Front) 2' 9" 45.0 - 75.0

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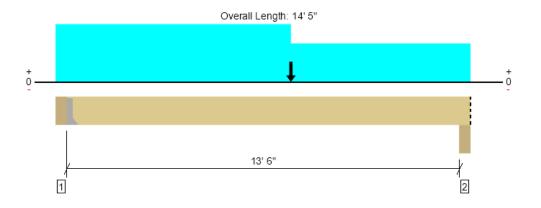
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All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4648 @ 5 1/2"	4648 (1.77")	Passed (100%)		1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	4526 @ 12' 9 1/2"	10707	Passed (42%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	25225 @ 8'	27897	Passed (90%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.131 @ 7' 5"	0.681	Passed (L/999+)		1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.507 @ 7' 4 1/2"	0.908	Passed (L/322)		1.0 D + 0.75 L + 0.75 S (All Spans)

System : Roof Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD Member Pitch : 0/12

· Deflection criteria: LL (L/240) and TL (L/180).

· Allowed moment does not reflect the adjustment for the beam stability factor.

	Bearing Length			Loads to Supports (lbs)				
Supports	Total	Available	Required	Dead	Floor Live	Snow	Factored	Accessories
1 - Hanger on 14" DF beam	5.50"	Hanger ¹	1.77"	3582	565	1058	4800	See note 1
2 - Beam - DF	5.50"	5.50"	2.23"	3442	491	1425	4878	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments				
Top Edge (Lu)	4' 4" o/c					
Bottom Edge (Lu)	14' o/c					
•Maximum allowable bracing intervals based on applied load.						

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HGUS412	4.00"	N/A	56-10d	20-10d	

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Floor Live	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.00)	(1.15)	Comments
0 - Self Weight (PLF)	5 1/2" to 14' 5"	N/A	14.3			
1 - Uniform (PSF)	0 to 8' (Front)	1'	45.0	-	75.0	Default Load
2 - Uniform (PSF)	8' to 14' 5" (Front)	2'	45.0	-	75.0	Default Load
3 - Uniform (PSF)	0 to 8' (Front)	1'	200.0	40.0	-	Default Load
4 - Point (Ib)	8' (Front)	N/A	4287	736	920	Linked from: FB17, Support 1

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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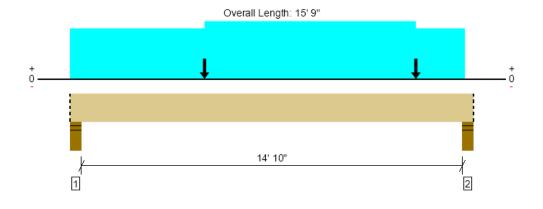


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Floor, FB20 1 piece(s) 5 1/8" x 15" 24F-V4 DF Glulam

PASSED



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	12291 @ 15' 5"	17617 (5.50")	Passed (70%)		1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	10219 @ 14' 1/2"	13581	Passed (75%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-Ibs)	37587 @ 7' 5 3/4"	38438	Passed (98%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.158 @ 7' 8"	0.377	Passed (L/999+)		1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.672 @ 7' 9 15/16"	0.754	Passed (L/269)		1.0 D + 0.75 L + 0.75 S (All Spans)

System : Floor Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

• Deflection criteria: LL (L/480) and TL (L/240).

· Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 15' 1".

The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.

Applicable calculations are based on NDS.

	Bearing Length			Loads to Supports (lbs)				
Supports	Total	Available	Required	Dead	Floor Live	Snow	Factored	Accessories
1 - Stud wall - DF	5.50"	5.50"	3.23"	7100	981	3247	10347	Blocking
2 - Stud wall - DF	5.50"	5.50" 5.50" 3.84"			1469	Blocking		

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments				
Top Edge (Lu)	11' 3" o/c					
Bottom Edge (Lu)	15' 9" o/c					
•Maximum allowable bracing intervals based on applied load.						

app

			Dead	Floor Live	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.00)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 15' 9"	N/A	18.7			
1 - Uniform (PSF)	0 to 5' 3" (Front)	7'	45.0	-	75.0	Default Load
2 - Uniform (PSF)	5' 3" to 13' 6" (Front)	4'	200.0	40.0	-	Default Load
3 - Uniform (PSF)	13' 6" to 15' 5" (Front)	7'	45.0	-	75.0	Default Load
4 - Point (lb)	5' 3" (Front)	N/A	3582	565	1058	Linked from: FB18, Support 1
5 - Point (lb)	13' 6" (Front)	N/A	3582	565	1058	Linked from: FB18, Support 1

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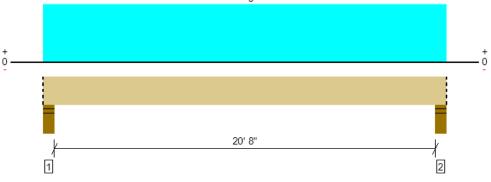
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Floor, FB21 1 piece(s) 5 1/8" x 19 1/2" 24F-V4 DF Glulam

PASSED





All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	11917 @ 4"	17617 (5.50")	Passed (68%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	9617 @ 2' 1"	20304	Passed (47%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-Ibs)	60392 @ 10' 9 1/2"	71191	Passed (85%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.510 @ 10' 9 1/2"	0.523	Passed (L/492)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.834 @ 10' 9 1/2"	1.046	Passed (L/301)		1.0 D + 1.0 S (All Spans)

System : Floor Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

• Deflection criteria: LL (L/480) and TL (L/240).

· Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 0.95 that was calculated using length L = 20' 11".

The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.

Applicable calculations are based on NDS.

	Bearing Length			Loads	to Supports		
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Stud wall - DF	5.50"	5.50"	3.72"	4633	7284	11917	Blocking
2 - Stud wall - DF	5.50"	5.50" 5.50"		4633 7284		11917	Blocking

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments			
Top Edge (Lu)	21' 7" o/c				
Bottom Edge (Lu)	21' 7" o/c				
•Maximum allowable bracing intervals based on applied load					

m allowable bracing intervals based on applied load

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 21' 7"	N/A	24.3		
1 - Uniform (PSF)	0 to 21' 7" (Front)	9'	45.0	75.0	Default Load

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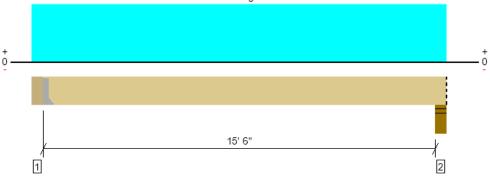
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Floor, FB22 1 piece(s) 5 1/8" x 12" 24F-V4 DF Glulam





All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4804 @ 5 1/2"	4997 (1.50")	Passed (96%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	4189 @ 1' 5 1/2"	12495	Passed (34%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-Ibs)	18767 @ 8' 3 1/4"	28290	Passed (66%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.379 @ 8' 3 1/4"	0.391	Passed (L/495)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.621 @ 8' 3 1/4"	0.781	Passed (L/302)		1.0 D + 1.0 S (All Spans)

System : Floor Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

• Deflection criteria: LL (L/480) and TL (L/240).

• Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 15' 7 1/2".

• The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.

Applicable calculations are based on NDS.

	Bearing Length			Loads to Supports (lbs)			
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Hanger on 12" DF beam	5.50"	Hanger ¹	1.50"	1978	3102	5079	See note 1
2 - Stud wall - DF	5.50"	5.50"	1.56"	1955	3055	5009	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments				
Top Edge (Lu)	16' o/c					
Bottom Edge (Lu)	16' o/c					

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie								
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories		
1 - Face Mount Hanger	HGUS5.25/10	4.00"	N/A	46-10d	16-10d			

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	5 1/2" to 16' 5"	N/A	14.9		
1 - Uniform (PSF)	0 to 16' 5" (Front)	5'	45.0	75.0	Default Load

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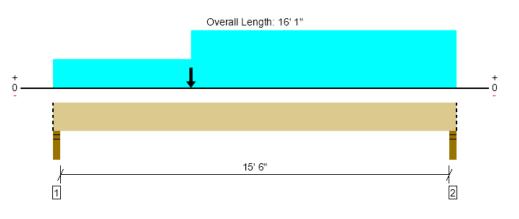
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Floor, FB23 1 piece(s) 5 1/8" x 13 1/2" 24F-V8 DF Glulam

PASSED



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4873 @ 2"	11211 (3.50")	Passed (43%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	4680 @ 1' 5"	14057	Passed (33%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-Ibs)	23924 @ 5' 6"	35805	Passed (67%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.295 @ 7' 7 11/16"	0.394	Passed (L/640)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.492 @ 7' 7 3/4"	0.788	Passed (L/384)		1.0 D + 1.0 S (All Spans)

System : Floor Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

• Deflection criteria: LL (L/480) and TL (L/240).

• Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 15' 9".

• The effects of positive or negative camber have not been accounted for when calculating deflection.

Applicable calculations are based on NDS.

	Bearing Length		Loads to Supports (lbs)				
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Stud wall - DF	3.50"	3.50"	1.52"	1960	2913	4873	Blocking
2 - Stud wall - DF	3.50"	3.50"	1.50"	1488	2189	3677	Blocking
 Blocking Panels are assumed to carry no load 	annlied dire	ctly above the	m and the ful	Lload is appli	ad to the mer	nhor boing d	esigned

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	16' 1" o/c	
Bottom Edge (Lu)	16' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

			Dead	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 16' 1"	N/A	16.8		
1 - Uniform (PSF)	0 to 5' 6" (Front)	1'	45.0	75.0	Default Load
2 - Uniform (PSF)	5' 6" to 16' 1" (Front)	2'	45.0	75.0	Default Load
3 - Point (lb)	5' 6" (Front)	N/A	1978	3102	Linked from: FB22, Support 1

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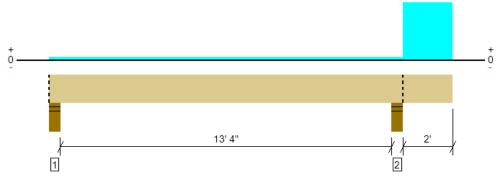


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Floor, FB27 3 piece(s) 1 3/4" x 11 7/8" 2.0E Microllam® LVL

Overall Length: 16' 3"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

					-
Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4838 @ 14' 1/4"	18047 (5.50")	Passed (27%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	2104 @ 15' 2 7/8"	13622	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-5121 @ 14' 1/4"	30788	Passed (17%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.065 @ 16' 3"	0.200	Passed (2L/824)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.067 @ 16' 3"	0.223	Passed (2L/804)		1.0 D + 1.0 S (All Spans)

System : Floor Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

Deflection criteria: LL (L/480) and TL (L/240).

• Overhang deflection criteria: LL (0.2") and TL (2L/240).

• Allowed moment does not reflect the adjustment for the beam stability factor.

	Bearing Length				Loads to Sup			
Supports	Total	Available	Required	Dead	Floor Live	Snow	Factored	Accessories
1 - Stud wall - DF	5.50"	5.50"	1.50"	238	574/-15	-310	813/-71	Blocking
2 - Stud wall - DF	5.50"	5.50"	1.50"	1078	740	3760	4838	Blocking
Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.								

Bracing Intervals	Comments
16' 3" o/c	
16' 3" o/c	
	16' 3" o/c

•Maximum allowable bracing intervals based on applied load.

			Dead	Floor Live	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.00)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 16' 3"	N/A	18.2			
1 - Uniform (PSF)	0 to 16' 3" (Front)	2'	12.0	40.0		Default Load
2 - Uniform (PSF)	14' 3" to 16' 3" (Front)	10'	12.0	-	-	Default Load
3 - Uniform (PSF)	14' 3" to 16' 3" (Front)	11' 6"	17.0	-	150.0	Default Load

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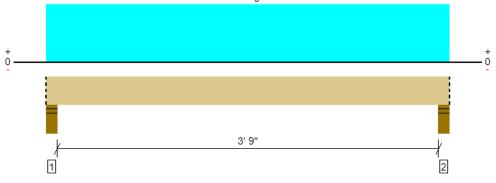
Job Notes





Floor, FB25 3 piece(s) 1 3/4" x 11 7/8" 2.0E Microllam® LVL

Overall Length: 4' 8"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	8720 @ 4"	18047 (5.50")	Passed (48%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	3309 @ 1' 5 3/8"	13622	Passed (24%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-Ibs)	7474 @ 2' 4"	30788	Passed (24%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.025 @ 2' 4"	0.100	Passed (L/999+)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.029 @ 2' 4"	0.200	Passed (L/999+)		1.0 D + 1.0 S (All Spans)

System : Floor Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

• Deflection criteria: LL (L/480) and TL (L/240).

• Allowed moment does not reflect the adjustment for the beam stability factor.

	Bearing Length				Loads to Su			
Supports	Total	Available	Required	Dead	Floor Live	Snow	Factored	Accessories
1 - Stud wall - DF	5.50"	5.50"	2.66"	1020	350	7700	8720	Blocking
2 - Stud wall - DF	5.50"	5.50"	2.66"	1020	350	7700	8720	Blocking
Blocking Panels are assumed to carry no load	s annlied dire	ctly above the	m and the ful	l load is annli	ed to the mer	nher heina de	signed	

ied directly above them and the full load is a

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 8" o/c	
Bottom Edge (Lu)	4' 8" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4' 8"	N/A	18.2			
1 - Uniform (PSF)	0 to 4' 8" (Front)	3' 9"	12.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 4' 8" (Front)	22'	17.0	-	150.0	Default Load

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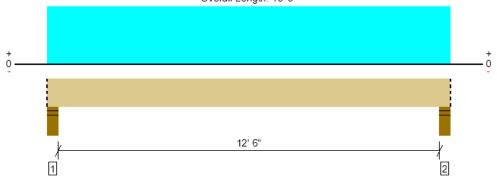
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Overall Length: 13' 5"



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5354 @ 4"	18047 (5.50")	Passed (30%)		1.0 D + 1.0 L (All Spans)
Shear (lbs)	4199 @ 1' 5 3/8"	11845	Passed (35%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	16219 @ 6' 8 1/2"	26772	Passed (61%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.266 @ 6' 8 1/2"	0.319	Passed (L/575)		1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.354 @ 6' 8 1/2"	0.637	Passed (L/432)		1.0 D + 1.0 L (All Spans)

System : Floor Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

• Deflection criteria: LL (L/480) and TL (L/240).

• Allowed moment does not reflect the adjustment for the beam stability factor.

	Bearing Length			Loads	to Supports				
Supports	Total	Available	Required	Dead	Floor Live	Factored	Accessories		
1 - Stud wall - DF	5.50"	5.50"	1.63"	1329	4025	5354	Blocking		
2 - Stud wall - DF	5.50"	5.50"	1.63"	1329	4025	5354	Blocking		
Blocking Papels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed									

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	13' 5" o/c	
Bottom Edge (Lu)	13' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

			Dead	Floor Live	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.00)	Comments
0 - Self Weight (PLF)	0 to 13' 5"	N/A	18.2		
1 - Uniform (PSF)	0 to 13' 5" (Front)	15'	12.0	40.0	Default Load

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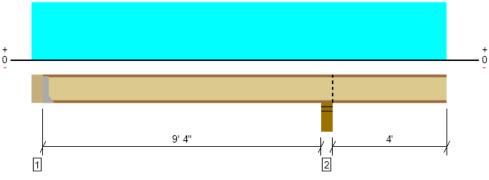
ForteWEB Software Operator	Job Notes
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Floor, Deck Joists 1 1 piece(s) 11 7/8" TJI ® 360 @ 24" OC





All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	993 @ 5 1/2"	1242 (1.75")	Passed (80%)	1.15	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	1132 @ 9' 9 1/2"	2157	Passed (52%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-2146 @ 10' 1/4"	7107	Passed (30%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.066 @ 14' 3"	0.211	Passed (2L/999+)		1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.108 @ 4' 11 3/8"	0.478	Passed (L/999+)		1.0 D + 1.0 S (Alt Spans)
TJ-Pro [™] Rating	55	40	Passed		

System : Floor Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

Deflection criteria: LL (L/480) and TL (L/240).

Overhang deflection criteria: LL (2L/480) and TL (2L/240).
Allowed moment does not reflect the adjustment for the beam stability factor.

• A structural analysis of the deck has not been performed.

• Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.

• Additional considerations for the TJ-Pro[™] Rating include: None.

	Bearing Length			Loads to Supports (lbs)			
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	1.75" / - 2	387	716	1103	See note 1
2 - Stud wall - DF	5.50"	5.50"	3.50"	895	1492	2387	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

 \bullet $\ensuremath{^1}$ See Connector grid below for additional information and/or requirements.

• ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 8" o/c	
Bottom Edge (Lu)	6' 6" o/c	

•TJI joists are only analyzed using Maximum Allowable bracing solutions.

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie								
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories		
1 - Face Mount Hanger	IUS2.37/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip			
Defende as a feet and reter and instance!	and for many or trackelletters and track	- f - II						

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Snow	
Vertical Load	Location	Spacing	(0.90)	(1.15)	Comments
1 - Uniform (PSF)	0 to 14' 3"	24"	45.0	75.0	Default Load

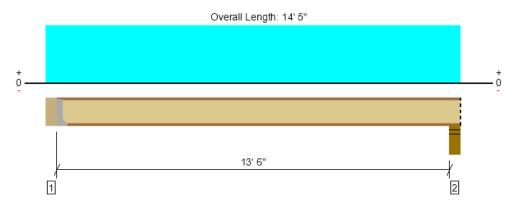
ForteWEB Software Operator Trevor Steelsmitt**01/23/24** Snake River Engineering (208) 453-6512 trevor@snakeriverengineering.com

Job Notes





Floor, Deck Joists 2 1 piece(s) 11 7/8" TJI ® 560 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1087 @ 5 1/2"	1455 (1.75")	Passed (75%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1087 @ 5 1/2"	2358	Passed (46%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3690 @ 7' 3"	10925	Passed (34%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.142 @ 7' 3"	0.340	Passed (L/999+)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.227 @ 7' 3"	0.679	Passed (L/719)		1.0 D + 1.0 S (All Spans)
TJ-Pro [™] Rating	58	40	Passed		

System : Floor Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

Deflection criteria: LL (L/480) and TL (L/240).

Allowed moment does not reflect the adjustment for the beam stability factor.

· A structural analysis of the deck has not been performed.

• Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.

• Additional considerations for the TJ-Pro[™] Rating include: None.

	Bearing Length		Loads to Supports (lbs)				
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	1.75" / - 2	435	725	1160	See note 1
2 - Stud wall - DF	5.50"	5.50"	1.75"	430	717	1147	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

• ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Bracing Intervals	Comments
9' 3" o/c	
14' o/c	
	9' 3" o/c

•TJI joists are only analyzed using Maximum Allowable bracing solutions.

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie								
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories		
1 - Face Mount Hanger	IUS3.56/11.88	2.00"	N/A	12-10dx1.5	2-Strong-Grip			

Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Snow	
Vertical Load	Location	Spacing	(0.90)	(1.15)	Comments
1 - Uniform (PSF)	0 to 14' 5"	16"	45.0	75.0	Default Load

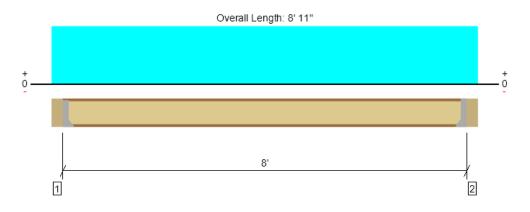
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Floor, Deck Joists 3 1 piece(s) 11 7/8" TJI ® 360 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1280 @ 5 1/2"	1280 (2.57")	Passed (100%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1280 @ 5 1/2"	1705	Passed (75%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2560 @ 4' 5 1/2"	6180	Passed (41%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.018 @ 4' 5 1/2"	0.200	Passed (L/999+)		1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.105 @ 4' 5 1/2"	0.400	Passed (L/911)		1.0 D + 1.0 L (All Spans)
TJ-Pro [™] Rating	65	40	Passed		

System : Floor Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

Deflection criteria: LL (L/480) and TL (L/240).

Allowed moment does not reflect the adjustment for the beam stability factor.

A structural analysis of the deck has not been performed.

• Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.

• Additional considerations for the TJ-Pro[™] Rating include: None.

	Bearing Length			Loads to Supports (lbs)			
Supports	Total	Available	Required	Dead	Floor Live	Factored	Accessories
1 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	2.57" / - 2	1189	238	1427	See note 1
2 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	2.57" / - 2	1189	238	1427	See note 1

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

• ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments			
Top Edge (Lu)	5' 11" o/c				
Bottom Edge (Lu)	8' o/c				
-TH jeiste are only analyzed using Maximum Alleurable brasing solutions					

•TJI joists are only analyzed using Maximum Allowable bracing solutions.

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie Support Member Fasteners Model Seat Length Top Fasteners Face Fasteners Accessories 1 - Face Mount Hanger N/A N/A N/A N/A Connector not found 2 - Face Mount Hanger N/A N/A N/A N/A Connector not found

Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Floor Live	
Vertical Load	Location	Spacing	(0.90)	(1.00)	Comments
1 - Uniform (PSF)	0 to 8' 11"	16"	200.0	40.0	Default Load

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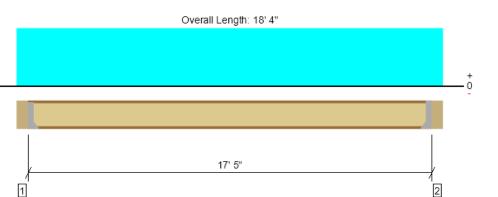
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Floor, Deck Joists 4 1 piece(s) 11 7/8" TJI ® 560 @ 12" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1045 @ 5 1/2"	1455 (1.75")	Passed (72%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1045 @ 5 1/2"	2358	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	4550 @ 9' 2"	10925	Passed (42%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.265 @ 9' 2"	0.435	Passed (L/790)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.423 @ 9' 2"	0.871	Passed (L/494)		1.0 D + 1.0 S (All Spans)
TJ-Pro [™] Rating	55	40	Passed		

System : Floor Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

Deflection criteria: LL (L/480) and TL (L/240).

Allowed moment does not reflect the adjustment for the beam stability factor.

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A structural analysis of the deck has not been performed.

• Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser EdgeTM Panel (24" Span Rating) that is glued and nailed down.

• Additional considerations for the TJ-Pro[™] Rating include: None.

	Bearing Length			Loads to Supports (lbs)			
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	1.75" / - 2	413	688	1100	See note 1
2 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	1.75" / - 2	413	688	1100	See note 1

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

• ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments			
Top Edge (Lu)	8' 4" o/c				
Bottom Edge (Lu)	17' 5" o/c				
TIL joists are only analyzed using Maximum Allowable bracing solutions					

•TJI joists are only analyzed using Maximum Allowable bracing solutions.

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Face Fasteners Member Fasteners Acces			
1 - Face Mount Hanger	IUS3.56/11.88	2.00"	N/A	12-10dx1.5	2-Strong-Grip			
2 - Face Mount Hanger	IUS3.56/11.88	2.00"	N/A	12-10dx1.5	2-Strong-Grip			
Defer to manufacturer notes and instructions for proper installation and use of all connectors								

Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Snow	
Vertical Load	Location	Spacing	(0.90)	(1.15)	Comments
1 - Uniform (PSF)	0 to 18' 4"	12"	45.0	75.0	Default Load

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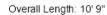


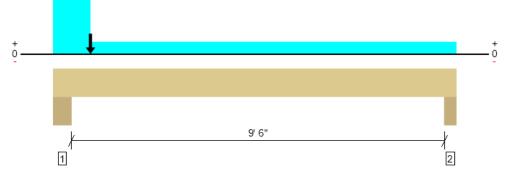


Floor, HDR1

PASSED

3 piece(s) 1 3/4" x 11 7/8" 2.0E Microllam® LVL





All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	31373 @ 7 1/2"	7 1/2" 35438 (9.00") Passed (89%) 1.0 D + 1.0 S (All Spans)		1.0 D + 1.0 S (All Spans)	
Shear (lbs)	8633 @ 1' 8 7/8"	13622	Passed (63%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	14342 @ 4' 7 1/2"	30788	Passed (47%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.135 @ 5' 2 15/16"	0.325	Passed (L/869)		1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.199 @ 5' 3 1/2"	0.488	Passed (L/589)		1.0 D + 0.75 L + 0.75 S (All Spans)

System : Wall Member Type : Header Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

• Deflection criteria: LL (L/360) and TL (L/240).

• Allowed moment does not reflect the adjustment for the beam stability factor.

	Bearing Length				Loads to Sup			
Supports	Total	Available	Required	Dead	Floor Live	Snow	Factored	Accessories
1 - Trimmer - DF	9.00"	9.00"	7.97"	5197	1797	26176	31373	None
2 - Trimmer - DF	6.00"	6.00"	1.50"	1911	1715	2821	5313	None

Bracing Intervals	Comments
10' 9" o/c	
10' 9" o/c	
	10' 9" o/c

•Maximum allowable bracing intervals based on applied load.

			Dead	Floor Live	Snow	
Vertical Loads	Location	Tributary Width	(0.90)	(1.00)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 10' 9"	N/A	18.2			
1 - Uniform (PSF)	0 to 10' 9"	5'	45.0	-	75.0	Default Load
2 - Uniform (PSF)	0 to 10' 9"	8' 2"	12.0	40.0		Default Load
3 - Point (lb)	1'	N/A	3050	-	21516	
4 - Uniform (PSF)	0 to 1'	23'	17.0	-	150.0	Default Load

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Notes

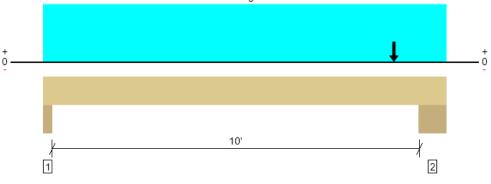
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Roof, HDR2* 1 piece(s) 5 1/2" x 18" 24F-V4 DF Glulam





All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	16202 @ 3"	16088 (4.50")	Passed (101%)		1.0 D + 1.0 S (All Spans)
Shear (lbs)	13986 @ 8' 10 1/2"	20114	Passed (70%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-Ibs)	41884 @ 5' 7 15/16"	68310	Passed (61%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.148 @ 5' 5 1/2"	0.342	Passed (L/832)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.167 @ 5' 5 9/16"	0.512	Passed (L/735)		1.0 D + 1.0 S (All Spans)

System : Wall Member Type : Header Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

• Deflection criteria: LL (L/360) and TL (L/240).

• Allowed moment does not reflect the adjustment for the beam stability factor.

• Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 10' 3".

• The effects of positive or negative camber have not been accounted for when calculating deflection.

• The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.

Applicable calculations are based on NDS.

	Bearing Length			Loads	to Supports		
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Trimmer - DF	4.50"	4.50"	4.53"	1822	14380	16202	None
2 - Trimmer - DF	13.50"	13.50"	9.34"	4631	28767	33398	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	11' 6" o/c	
Bottom Edge (Lu)	11' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

			Dead	Snow	
Vertical Loads	Location	Tributary Width	(0.90)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 11' 6"	N/A	24.1		
1 - Uniform (PSF)	0 to 11' 6"	17'	17.0	150.0	Default Load
2 - Point (Ib)	10'	N/A	2853	13822	Linked from: GRD2, Support 2

Weyerhaeuser Notes

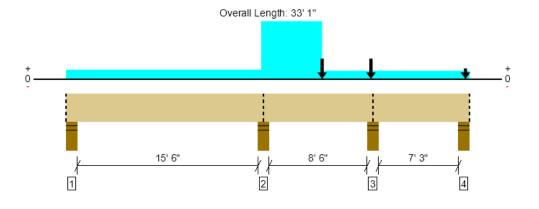
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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4 piece(s) 1 3/4" x 11 7/8" 2.0E Microllam® LVL



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	22459 @ 16' 2 1/4"	24063 (5.50")	Passed (93%)		1.0 D + 0.75 L + 0.75 S (Adj Spans)
Shear (lbs)	13028 @ 17' 4 7/8"	18163	Passed (72%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	26197 @ 20' 10"	41051	Passed (64%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.190 @ 20' 4 15/16"	0.224	Passed (L/566)		1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.205 @ 20' 5 7/16"	0.448	Passed (L/524)		1.0 D + 1.0 S (Alt Spans)

System : Floor Member Type : Drop Beam Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

Deflection criteria: LL (L/480) and TL (L/240).

Allowed moment does not reflect the adjustment for the beam stability factor.

• Member should be side-loaded from both sides of the member or braced to prevent rotation.

	Bearing Length				Loads to Su			
Supports	Total	Available	Required	Dead	Floor Live	Snow	Factored	Accessories
1 - Stud wall - DF	5.50"	5.50"	1.50"	1134	3529/-66	-611	4663	Blocking
2 - Stud wall - DF	5.50"	5.50"	5.13"	4492	7779	16176	22459	Blocking
3 - Stud wall - DF	5.50"	5.50"	5.06"	3047	4334	19096	22143	Blocking
4 - Stud wall - DF	5.50"	5.50"	1.50"	1813	2035/-245	-1813	3848	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 3" o/c	
Bottom Edge (Lu)	22' o/c	
Bottom Euge (Eu)		

•Maximum allowable bracing intervals based on applied load.

			Dead	Floor Live	Snow	
Vertical Loads	Location (Side)	Tributary Width	(0.90)	(1.00)	(1.15)	Comments
0 - Self Weight (PLF)	0 to 33' 1"	N/A	24.2			
1 - Uniform (PSF)	0 to 16' (Front)	12' 8"	12.0	40.0	-	Default Load
2 - Uniform (PSF)	16' to 21' (Front)	8' 6"	12.0	40.0	-	Default Load
3 - Uniform (PSF)	21' to 33' 1" (Front)	11' 3"	12.0	40.0	-	Default Load
4 - Uniform (PSF)	16' to 21' (Front)	22'	17.0	-	150.0	Default Load
5 - Point (Ib)	21' (Front)	N/A	926	-	8173	Default Load
6 - Point (Ib)	25' (Front)	N/A	926	-	8173	Default Load
7 - Point (Ib)	32' 9" (Front)	N/A	1389	-	-	

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

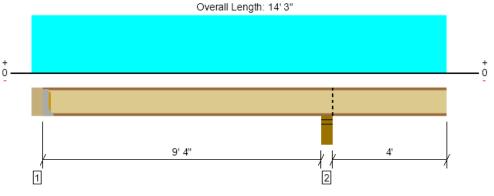
ForteWEB Software Operator	Job Notes
Trevor Steelsmitt 01/23/24 Snake River Engineering (208) 453-6512 trevor@snakeriverengineering.com	

1/23/2024 6:42:49 PM UTC Page 63 of 178 ForteWEB v3.6, Engine: V8.3.1.5, Data: V8.1.4.1 File Name: 2023-6431 Chambers Residence Page 3 / 6



Floor, Copy of Deck Joists 1 (210)* 1 piece(s) 11 7/8" TJI ® 210 @ 24" OC





All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	993 @ 5 1/2"	1156 (1.75")	Passed (86%)	1.15	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	1126 @ 9' 9 1/2"	2094	Passed (54%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-2146 @ 10' 1/4"	4364	Passed (49%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.077 @ 14' 3"	0.211	Passed (2L/999+)		1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.124 @ 4' 11 3/8"	0.478	Passed (L/923)		1.0 D + 1.0 S (Alt Spans)
TJ-Pro [™] Rating	53	40	Passed		

System : Floor Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

Deflection criteria: LL (L/480) and TL (L/240).

• Overhang deflection criteria: LL (2L/480) and TL (2L/240).

Allowed moment does not reflect the adjustment for the beam stability factor.

A structural analysis of the deck has not been performed.

• Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.

• Additional considerations for the TJ-Pro[™] Rating include: None.

	Bearing Length			Loads to Supports (lbs)			
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	1.75" / - 2	387	716	1103	See note 1
2 - Stud wall - DF	5.50"	5.50"	3.50"	895	1492	2387	Blocking

Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

 \bullet $\ensuremath{^1}$ See Connector grid below for additional information and/or requirements.

• ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 2" o/c	
Bottom Edge (Lu)	5' o/c	

 $\bullet \mbox{TJI}$ joists are only analyzed using Maximum Allowable bracing solutions.

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie									
Support	Top Fasteners	Face Fasteners	Member Fasteners	Accessories					
1 - Face Mount Hanger	HU2.1/9	2.50"	N/A	14-10dx1.5	6-10dx1.5	Web Stiffeners			
Defende an enderstande etca and instance!									

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Snow	
Vertical Load	Location	Spacing	(0.90)	(1.15)	Comments
1 - Uniform (PSF)	0 to 14' 3"	24"	45.0	75.0	Default Load

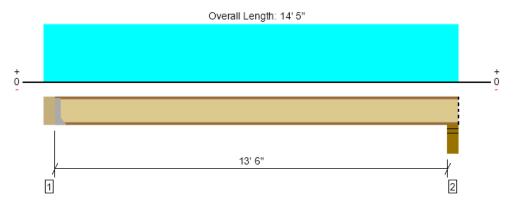
Job Notes

ForteWEB Software Operator Trevor Steelsmitt**01/23/24** Snake River Engineering (208) 453-6512 trevor@snakeriverengineering.com

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Floor, Copy of Deck Joists 2 (110)* 1 piece(s) 11 7/8" TJI ® 110 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1087 @ 5 1/2"	1087 (1.88")	Passed (100%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1087 @ 5 1/2"	1794	Passed (61%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3690 @ 7' 3"	3634	Passed (102%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.270 @ 7' 3"	0.340	Passed (L/605)		1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.431 @ 7' 3"	0.679	Passed (L/378)		1.0 D + 1.0 S (All Spans)
TJ-Pro [™] Rating	47	40	Passed		

System : Floor Member Type : Joist Building Use : Residential Building Code : IBC 2018 Design Methodology : ASD

Deflection criteria: LL (L/480) and TL (L/240).

Allowed moment does not reflect the adjustment for the beam stability factor.

A structural analysis of the deck has not been performed.

• Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.

• Additional considerations for the TJ-Pro[™] Rating include: None.

	Bearing Length			Loads to Supports (lbs)			
Supports	Total	Available	Required	Dead	Snow	Factored	Accessories
1 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	1.88" / - 2	435	725	1160	See note 1
2 - Stud wall - DF	5.50"	5.50"	2.08"	430	717	1147	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

• ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 9" o/c	
Bottom Edge (Lu)	14' o/c	

•TJI joists are only analyzed using Maximum Allowable bracing solutions.

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie								
Support	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories			
1 - Face Mount Hanger	IUS1.81/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip			

Refer to manufacturer notes and instructions for proper installation and use of all connectors.

			Dead	Snow	
Vertical Load	Location	Spacing	(0.90)	(1.15)	Comments
1 - Uniform (PSF)	0 to 14' 5"	16"	45.0	75.0	Default Load

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ForteWEB Software Operator	Job Notes	
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WOOD HEADER ALLOWABLE LOADS (kips/ft)

Load Duration Factor: 1.15 LVL Grade: 2.0E Top Chord Bracing:2'-0" O.C.Max TL Deflection:L/240, 0.75inRepetitive Stress Increase:No

	-											
		Header Span										
Header Type	2'	3'	4'	5'	6'	8'	10'	12'	14'	16'	18'	
(2) 2x4 DF Stud	1.15	0.69	0.29	0.22	0.12	NA	NA	NA	NA	NA	NA	
(3) 2x4 DF Stud	1.84	1.04	0.46	0.35	0.18	NA	NA	NA	NA	NA	NA	
(2) 2x6 DF #2	3.34	1.44	0.83	0.48	0.36	0.20	0.12	NA	NA	NA	NA	
(3) 2x6 DF #2	5.06	2.19	1.27	0.72	0.55	0.30	0.18	0.13	NA	NA	NA	
(2) 2x8 DF #2	5.41	2.30	1.27	0.80	0.59	0.32	0.20	0.14	0.09	NA	NA	
(3) 2x8 DF #2	8.74	3.39	2.19	1.18	0.97	0.53	0.33	0.23	0.16	0.12	NA	
(2) 2x10 DF #2	8.05	3.39	1.96	1.18	0.89	0.48	0.31	0.21	0.15	0.10	NA	
(3) 2x10 DF #2	13.23	5.18	3.22	1.80	1.38	0.82	0.52	0.36	0.25	0.20	0.15	
(2) 2x12 DF #2	10.81	4.83	2.65	1.60	1.15	0.67	0.41	0.29	0.21	0.15	0.12	
(3) 2x12 DF #2	17.94	7.02	4.49	2.40	1.96	1.10	0.70	0.48	0.35	0.26	0.21	
(2) 1-3/4x7-1/4 LVL	13.80	6.79	3.80	2.40	1.61	0.94	0.52	0.30	0.18	0.12	NA	
(3) 1-3/4x7-1/4 LVL	20.70	10.47	5.64	3.50	2.53	1.38	0.79	0.45	0.28	0.17	NA	
(2) 1-3/4x9-1/2 LVL	24.73	10.47	5.64	3.75	2.65	1.50	0.92	0.63	0.39	0.24	0.15	
(3) 1-3/4x9-1/2 LVL	37.15	17.25	8.51	6.00	4.03	2.30	1.38	0.95	0.60	0.37	0.22	
(2) 1-3/4x11-7/8 LVL	40.71	17.25	8.86	6.00	4.49	2.53	1.61	1.12	0.82	0.53	0.32	
(3) 1-3/4x11-7/8 LVL	61.30	24.15	13.23	8.75	6.67	3.80	2.42	1.61	1.15	0.79	0.48	
(2) 1-3/4x14 LVL	56.47	24.15	12.54	8.00	5.75	3.45	2.19	1.50	1.13	0.86	0.54	
(3) 1-3/4x14 LVL	85.10	28.75	18.86	12.00	8.63	5.29	3.34	2.30	1.61	1.27	0.81	

	-				1			
	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Tota	Load
Trib	0.0	3	7	9	3.33	1	10(a	2000
-							2.670	0.9 plf
Dead Load	-	51.0	84.0	405.0	59.9	599.9 plf	2,073	
Live / Snow Load	0	450.0	280.0	1350.0	-	2,080.0 plf		
Description:	3.0 ft Opening	3.8 ft Opening						
•	, , , , , , , , , , , , , , , , , , ,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,						
	(2)2x12	(2)9-1/2"						
Header Callout	DF-L No. 2	LVL 2.0E						
[(2) 2x6	(2) 2x6						
Trimmers	DF-L No. 2	DF-L No. 2						
King Studs	(1) 2x6	(1) 2x6						
King Studs	DF-L No. 2	DF-L No. 2						
Wood Design								
Species	DF-L	LVL						
Grade	No. 2	2.0E						
Width	3.00 in	3.50 in						
Depth	11.25 in	9.50 in						
Poaction								
Reaction Dead Load	900 lbs	1,125 lbs						
Live Load	3,120 lbs	3,900 lbs						
<u>-</u>	-,	-,	•	+	+	+	+	
Load								
lu	3.0 ft	3.8 ft						
le	6.2 ft	7.7 ft						
-					-	•		
Adjustment Factors								
Cd	1.15	1.15						
CF	1	1.1						
Material Properties Fb	900 psi	2,900 psi						
Fv	180 psi	285 psi						
	1,600,000 psi	2,000,000 psi						
F	_)***)***							
Emin	580.000 psi	1.016.535 DSI						
Emin	580,000 psi	1,016,535 psi				1		
	580,000 psi	1,016,535 psi						
Emin Calculated Prop.	580,000 psi 33.75 in^2		 					
Calculated Prop.		1,016,535 psi 33.25 in^2 250.07 in^4						
Calculated Prop.	33.75 in^2 355.96 in^4 63.28 in^3	33.25 in^2 250.07 in^4 52.65 in^3						
Calculated Prop. A I S RB	33.75 in^2 355.96 in^4 63.28 in^3 9.63	33.25 in^2 250.07 in^4 52.65 in^3 8.48						
Calculated Prop. A I S RB Emin'	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi						
Calculated Prop. A I S RB Emin [†] FbE	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi						
Calculated Prop. A I S RB Emin' FbE FbF	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016;535 psi 16,968 psi 3,669 psi						
Calculated Prop. A I S RB Emin [†] FbE	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi						
Calculated Prop. A I S RB Emin' FbE Fb [*] CL	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016;535 psi 16,968 psi 3,669 psi						
Calculated Prop. A I S RB Emin' FbE Fb [*] CL	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016;535 psi 16,968 psi 3,669 psi						
Calculated Prop. A I S RB Emin' FbE Fb* CL Shear and Moment	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi 3,669 psi 1						
Calculated Prop. A I S RB Emin' FbE Fb* CL Shear and Moment M V	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1 36,179 lb-in	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi 3,669 psi 1 56,530 lb-in						
Calculated Prop. Calculated Prop. I I S RB Emin' FbE Fb* CL Shear and Moment M V Stress	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1 36,179 lb-in 4,020 lbs	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi 3,669 psi 1 56,530 lb-in 5,025 lbs						
Calculated Prop. Calculated Prop. Calculated Prop. A I I S RB Emin' FbE Fb* CL Shear and Moment M V Stress fb	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1 36,179 lb-in 4,020 lbs 572 psi	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi 3,669 psi 1 56,530 lb-in 5,025 lbs						
Calculated Prop. Calculated Prop. Calculated Prop. A I I S R B Emin' FbE Fb* C C Shear and Moment M V Stress fb Fb' Fb' Fb' Fb' Fb' Fb' Fb' Fb' Fb' Fb	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1 36,179 lb-in 4,020 lbs 572 psi 1,027 psi	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi 3,669 psi 1 56,530 lb-in 5,025 lbs 1,074 psi 3,619 psi						
Calculated Prop. Calculated Prop. Calculated Prop. A I I S RB Emin' FbE Fb* CL Shear and Moment M V Stress fb	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1 36,179 lb-in 4,020 lbs 572 psi 1,027 psi 0.56	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi 3,669 psi 1 56,530 lb-in 5,025 lbs 1,074 psi 3,619 psi 0.30						
Calculated Prop.	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1 36,179 lb-in 4,020 lbs 572 psi 1,027 psi	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi 3,669 psi 1 56,530 lb-in 5,025 lbs 1,074 psi 3,619 psi						
Calculated Prop. A I S RB Emin' FbE Fb* CL Shear and Moment M V Stress Fb' fb/Fb' fb/Fb' fb/Fb' fv	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1 36,179 lb-in 4,020 lbs 572 psi 1,027 psi 0.56 179 psi	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi 3,669 psi 1 56,530 lb-in 5,025 lbs 1,074 psi 3,619 psi 0.30 227 psi						
Calculated Prop. Calculated Prop. Calculated Prop. A I I S R B Emin' FbE Fb* CL Shear and Moment M V Stress fb fb/Fb' fb/Fb' Fv Fv Fv	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1 36,179 lb-in 4,020 lbs 572 psi 1,027 psi 0.56 179 psi 207 psi 0.86 0.86	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi 3,669 psi 1 56,530 lb-in 5,025 lbs 1,074 psi 3,619 psi 0.30 227 psi 328 psi 0.69 0.69						
Calculated Prop. Calculated Prop. Calculated Prop. Calculated Prop. Stress Calculated Prop. A Calculated Prop. Calculated Prop. Stress Calculated Prop. Calculated	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1 36,179 lb-in 4,020 lbs 572 psi 1,027 psi 0.56 179 psi 207 psi 0.86	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi 3,669 psi 1 56,530 lb-in 5,025 lbs 1,074 psi 3,619 psi 0.30 227 psi 328 psi 0.69						
Calculated Prop.	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1 36,179 lb-in 4,020 lbs 572 psi 1,027 psi 0.56 179 psi 207 psi 0.86 0.86	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi 3,669 psi 1 56,530 lb-in 5,025 lbs 1,074 psi 3,619 psi 0.30 227 psi 328 psi 0.69 0.69						
Calculated Prop. Calculated Prop. A I S RB Emin' FbE Fb* CL Shear and Moment Stress fb Fb' fb/Fb' fv/Ev Fv' fv/Fv' Max Ratio Deflection	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1 36,179 lb-in 4,020 lbs 572 psi 1,027 psi 0.56 179 psi 207 psi 0.86 0.86 Pass	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi 3,669 psi 1 56,530 lb-in 5,025 lbs 1,074 psi 3,619 psi 0.30 227 psi 328 psi 0.69 0.69 Pass						
Calculated Prop. Calculated Prop. A I I S R B Emin' FbE Fb* CL Shear and Moment M V Stress fb fb/Fb' fb/Fb' fb/Fb' fb/Fb' fb/Fb' Max Ratio	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1 36,179 lb-in 4,020 lbs 572 psi 1,027 psi 0.56 179 psi 207 psi 0.86 0.86 Pass 0.01 in	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi 3,669 psi 1 56,530 lb-in 5,025 lbs 1,074 psi 3,619 psi 0.30 227 psi 328 psi 0.69 0.69 Pass 0.02 in						
Calculated Prop. A I S RB Emin' FbE Fb* CL Shear and Moment M V Stress fb Fb' fb/Fb' fv/Fb' fv/Fb' fv/Fv' Max Ratio Deflection	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1 36,179 lb-in 4,020 lbs 572 psi 1,027 psi 0.56 179 psi 207 psi 0.86 0.86 Pass	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16,968 psi 3,669 psi 1 56,530 lb-in 5,025 lbs 1,074 psi 3,619 psi 0.30 227 psi 328 psi 0.69 0.69 Pass						
Calculated Prop. Calculated Prop. A I I S RB Emin' FbE Fb* CL Shear and Moment M V Stress fb Fb' fb/Fb' fv/Fv' Max Ratio Deflection Δτι	33.75 in^2 355.96 in^4 63.28 in^3 9.63 580,000 psi 7,508 psi 1,035 psi 1 36,179 lb-in 4,020 lbs 572 psi 1,027 psi 0.56 179 psi 207 psi 0.86 Pass 0.01 in L/4,198	33.25 in^2 250.07 in^4 52.65 in^3 8.48 1,016,535 psi 16.968 psi 3,669 psi 1 56,530 lb-in 5,025 lbs 1,074 psi 3,619 psi 0.30 227 psi 328 psi 0.69 Pass 0.69 Pass						

Beam Calculation	IS							
	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Tota	Load
Trib	0.0	3	8.5	5	3.33		1014	Loud
Dead Load	-	51.0	102.0	225.0	59.9	437.9 plf	1,97	7.9 plf
Live / Snow Load	0	450.0	340.0	750.0	-	1,540.0 plf		
·								
Description:	3.0 ft Opening							
	(2)2 6							
Header Callout	(3)2x6 DF-L No. 2							
Trimmers	(1) 2x6							
	DF-L No. 2 (1) 2x6							
King Studs	DF-L No. 2							
Wood Design								
Species	DF-L							
Grade	No. 2			+				
Width Depth	4.50 in 5.50 in		<u> </u>			<u> </u>		
-	5.50 m		1		1	1		
<i>Reaction</i> Dead Load	657 lbs		I		T	I		
Live Load	2,310 lbs		1			1		
Load								
LOGG lu	3.0 ft							
le	6.2 ft							
Adjustment Factors Cd	1.15		1	1		1		
CF	1.3							
			•	-		•		•
Material Properties Fb	900 psi							
Fv	180 psi							
E	1,600,000 psi							
Emin	580,000 psi							
Calculated Prop.								
А	24.75 in^2							
1	62.39 in^4							
S RB	22.69 in^3 4.49							
Emin'	580,000 psi		1		<u> </u>	1	<u> </u>	
FbE	34,554 psi							
Fb* CL	1,346 psi 1							
	1		1		I	1	L	I
Shear and Moment	26 702 "		1		1	1		
M V	26,702 lb-in 2,967 lbs				+		-	
	_,				1	1		
Stress fb	1,177 psi							
Fb'	1,343 psi		1		<u> </u>	1	<u> </u>	
fb/Fb'	0.88							
fv Fv'	180 psi							
fv/Fv'	207 psi 0.87		+			+		
Max Ratio	0.88		1			1		
	Pass							
Deflection								
Δτι	0.04 in							
	L/997							
Διι	0.03 in							
	L/1,280 Pass							
L								

M 128,734 lb-in Image: Constraint of the state of th	Beam Calculation	is							
Image base in the second sec		Additional Drift	Roof	Floor	Deck	Wall	Total Load	Tota	Load
Use / Some loss 0 000 <	Trib					3.33		TOLA	LOAU
Use / Some loss 0 000 <	Dood Lood		51.0	00.0	0.0	50.0	200.0 plf	950.	9 plf
Pachpilon: 5.0 Opening Image Image <td>Live / Snow Load</td> <td></td> <td>450.0</td> <td></td> <td></td> <td>- 59.9</td> <td>750.0 plf</td> <td></td> <td></td>	Live / Snow Load		450.0			- 59.9	750.0 plf		
Header Callow Callow <thcallow< th=""> <thca< td=""><td>_</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></thca<></thcallow<>	_								
Header Callow Callow <thcallow< th=""> <thca< td=""><td>Description:</td><td>9.5 ft Opening</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></thca<></thcallow<>	Description:	9.5 ft Opening							
Name U.2.02 Image Image <th< td=""><td></td><td>5.5 J. 5 P. 5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>		5.5 J. 5 P. 5							
Image: Base of the second se	Header Callout								
Hintmite Dis (bo. 2 Dis (bo. 2 Dis (bo. 2 Dis (bo. 2 Wind Dis (bb. 2 Dis (bb. 2 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
King Stode (1) 2.56 (1) 2.56 (1) 2.56 (1) 2.57 Word Design Sector (1) 2.56 (1) 2.57 Sector (1) 2.57 (1) 2.57 (1) 2.57 Desite 2.50 (1) 2.57 (1) 2.57 Desite 3.50 (1) 2.57 (1) 2.57 Desite 3.57 (1) 2.57 (1) 2.57 Desite 3.57 (1) 2.57 (1) 2.57 Desite 3.57 (1) 2.57 (1) 2.57 Adjutment Factor (2) 2.57 (1) 2.57 (1) 2.57 Calculated Properties (2) 2.500 (2) 2.500 (2) 2.55 Calculated Properties (2) 2.500 (2) 2.55 (2) 2.55 Calculated Properties (2) 2.500 (2) 2.55 (2) 2.55 (2) 2.55 Calculated Properties (2) 2.500 (2) 2.55 (2) 2.55 (2) 2.55 (2) 2.55 Calculated Properties (2) 2.500 (2) 2.55 (2) 2.55 (2) 2.55 (2) 2.55 Calculated Properties (2) 2.55 (2) 2.55 (2) 2.55 (2) 2.55 <td>Trimmers</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Trimmers								
United 2 United 2 Special Watch Design Watch 2.50/m UNIT UNIT Special Watch 2.50/m UNIT UNIT UNIT Bart Control UNIT UNIT UNIT UNIT Bart Control UNIT UNIT UNIT UNIT UNIT Bart Control UNIT UNIT UNIT UNIT UNIT UNIT Bart Control UNIT UNIT <t< td=""><td>King Stude</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	King Stude								
Species 4V Image: constraint of the spectrum of the s	King Studs	DF-L No. 2							
Grade 2.06 1<	Wood Design								
Wath 3.50 /n I <thi< th=""> I I <thi<< td=""><td>Species</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></thi<<></thi<>	Species								
Depth 9.50 m Image: constraint of the second secon	-								
Dead Load 954 hs Image: constraint of the second s									
Dead Load 954 hs Image: constraint of the second s	Reaction								
Live Load 3.563 hs Image: constraint of the second		954 lbs							
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		3,563 lbs							
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	load								
Image: boot state of the state of		9.5 ft							
C6 1.1 Image: constraint of the second sec									
C6 1.1 Image: constraint of the second sec									
Atterial Properties Image: Control of the second seco	Adjustment Factors	1 15		-				1	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $									
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	-								
Fv 285 pi <th< th=""> <th< th=""> <</th<></th<>		2,900 psi							
Emin 1,016,535 psi Image: constraint of the state of									
Calculated Prop. 33.25 in 2 Image: constraint of the second seco	-								
A 33.25 in/2 Image: constraint of the second secon	Emin	1,016,535 psi							
A 33.25 in/2 Image: constraint of the second secon	Calculated Prop.								
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		33.25 in^2							
RB 12.89 Image: constraint of the second se	I								
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$						-			
Fb* 3,669 psi Image: constraint of the straint of the									
Cl 1 Image: constraint of the state of									
Shear and Moment M 128,734 lb-in Image: Constraint of the state of the st									
M 128,734 lb-in Image: Constraint of the state of th	E				I	I	I	I	I
V 4,517 lbs Image: Constraint of the state of the st	Shear and Moment	420 72 1 1							
Stress fb 2,445 psi Fb' 3,508 psi									
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	L			•	•		•		
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		2 445 pci							
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Fb'	3,508 psi		<u> </u>	<u> </u>				
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		0.70							
fv/Fv' 0.62 Image: Constraint of the state of the st		204 psi 328 psi							
Pass Image: Constraint of the system of the s	fv/Fv'								
Deflection Δπ 0.35 in Image: Constraint of the state of the	Max Ratio								
Δπ 0.35 in L/327		Pass							
L/327 Image: Constraint of the second	Deflection	0.25 1-				1		1	
Δu 0.27 in L/415	Δτι			+					
	Διι			<u> </u>	<u> </u>				
Pass									
	L	Pass							

Beam Calculation	IS							
	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Tota	l Load
Trib	0.0	6.25	0	0	3.33			12000
Dead Load	-	106.3	0.0	0.0	59.9	166.2 plf	1,10	3.7 plf
Live / Snow Load	0	937.5	0.0	0.0	-	937.5 plf		
·								•
Description:	10.0 ft Opening							
	(2) (2)							
Header Callout	(2)11-7/8" LVL 2.0E							
Trimmers	(2) 2x6 DF-L No. 2							
King Studs	(1) 2x6 DF-L No. 2							
								•
Wood Design Species	LVL				1		1	
Grade	2.0E							
Width	3.50 in							
Depth	11.88 in							
Reaction			1		1	1	1	1
Dead Load	831 lbs							
Live Load	4,688 lbs		ļ	<u>ļ</u>	ļ	ļ	ļ	ļ
Load								
lu	10.0 ft							
le	19.3 ft							
Adjustment Factors	1.15			1	1		1	1
CF	1.15							
E								
Material Properties	2.000		T	T		T		1
Fb Fv	2,900 psi							
FV	285 psi 2,000,000 psi							
Emin	1,016,535 psi							
L	,,		1		1	1	1	1
Calculated Prop.								
A	41.56 in^2							
1	488.41 in^4							
S	82.26 in^3							
RB Emin'	14.97 1,016,535 psi		+			+	<u> </u>	
FbE	5,442 psi		1	1	1	1	1	1
Fb*	3,335 psi						1	
CL	1							
Shoar and Mamont								
Shear and Moment	165,554 lb-in							
v	5,518 lbs				1		1	
L								
<u>Stress</u> fb	2 012 mc							
Fb'	2,013 psi 3,124 psi			1			1	
fb/Fb'	0.64			1	1		1	
fv	199 psi		1		1	1	1	
Fv'	328 psi							
fv/Fv'	0.61			+			l	
Max Ratio	0.64 Pass							
L	PdSS							
Deflection				-				
Δτι	0.25 in							
,	L/472							
Διι	0.22 in L/556		+	+	1	+	ł	
-	Pass							
L							1	

Γ	Additional Drift	Roof	Floor	Deck	Wall	Total Load		
T-:!-						i Utai LUdu	Tota	l Load
Trib	0.0	12	0	0	3.33		-	2 0 m/f
Dead Load	-	204.0	0.0	0.0	59.9	263.9 plf	2,063	3.9 plf
Live / Snow Load	0	1800.0	0.0	0.0	-	1,800.0 plf		
scription:	2.5 ft Opening							
 _	(2)2.0							
Header Callout	(2)2x8 DF-L No. 2							
Trimmers	(1) 2x6 DF-L No. 2							
King Studs	(1) 2x6 DF-L No. 2							
ood Design						•	-	
Species Grade	DF-L No. 2							
Width	3.00 in							1
Depth	7.25 in							
action				-	•	•		
Dead Load	330 lbs							
Live Load	2,250 lbs		Į	ļ	<u> </u>	ļ	. <u>I</u>	I
ad			1		1	-	1	1
lu	2.5 ft							
le	5.2 ft		1	I	I	1	I	
ljustment Factors								
Cd	1.15							
CF	1.2			I				
aterial Properties			1	I	ſ	1	I	1
Fb Fv	900 psi 180 psi							
FV	1,600,000 psi							
Emin	580,000 psi							
lculated Prop.								
A	21.75 in^2							
1	95.27 in^4							
s	26.28 in^3							
RB Emin'	7.06							
FbE	580,000 psi 13,981 psi							
Fb*	1,242 psi		1	1	1	1	1	
CL	1		Ì		Ī			
ear and Moment								
м	19,349 lb-in							
v	2,580 lbs		<u> </u>	1				
ress								
fb	736 psi							
Fb'	1,236 psi							
fb/Fb'	0.60			}	+			
fv Fv'	178 psi 207 psi							
fv/Fv'	0.86							
Max Ratio	0.86		1	1	1	1	1	
	Pass							
_								
flection								
flection Δτι	0.01 in							
Δτι	L/2,521							
eflection Δτι Διι								

Beam Calculation	S							
	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Tota	Load
Trib	0.0	10	0	0	3.33		1010	2000
Dead Load	-	170.0	0.0	0.0	59.9	229.9 plf	1,729	9.9 plf
Live / Snow Load	0	1500.0	0.0	0.0	-	1,500.0 plf		
Description:	6.3 ft Opening							
 Г								
Header Callout	(2)9-1/2" LVL 2.0E							
Trimmers	(2) 2x6 DF-L No. 2							
King Studs	(1) 2x6 DF-L No. 2							
Wood Decign								
Wood Design Species	LVL							
Grade	2.0E							
Width Depth	3.50 in 9.50 in							
	3.30 III			1				1
Reaction Dead Load	719 lbs							
Live Load	4,688 lbs			1				
Load Iu	6.3 ft		1	[Γ	Γ	Γ	
le	12.6 ft							
Adjustment Factors			1	1	1	1	1	1
Cd CF	1.15							
Material Properties Fb	2.000 msi						-	
FU	2,900 psi 285 psi							
E	2,000,000 psi							
Emin	1,016,535 psi							
Calculated Prop.	33.25 in^2		1					
	250.07 in^4							
s	52.65 in^3							
RB	10.81							
Emin'	1,016,535 psi							
FbE Fb*	10,434 psi 3,669 psi			1		1		
CL	1							
Chann and Marriet								
Shear and Moment	101,364 lb-in							
v	5,406 lbs							
Street								
Stress fb	1,925 psi							
Fb'	3,575 psi			1				
fb/Fb'	0.54			· · · · · · · · · · · · · · · · · · ·				
fv Fv'	244 psi 328 psi							
fv/Fv'	0.74		1	1	1	1	1	
, Max Ratio	0.74							
Γ	Pass							
Deflection								
Δτι	0.12 in							
. [L/632			ļ				
Διι	0.10 in L/728							
-	Pass							
L								

	Additional Drift	Roof	Floor	Deck	Wall	Total Load		
Trib	0.0	3	0	0	3.33	. Star Loud	Tota	l Load
1115	0.0	3	0	0	3.33		-	0 -16
Dead Load	-	51.0	0.0	0.0	59.9	110.9 plf	560	9 plf
Live / Snow Load	0	450.0	0.0	0.0	-	450.0 plf	l	
Description:	9.5 ft Opening	6.3 ft Opening	12.0 ft Opening					
r								
Header Callout	(3)2x12 DF-L No. 2	(3)2x8 DF-L No. 2	(2)11-7/8" LVL 2.0E					
	(1) 2x6	(1) 2x6	(2) 2x6					
Trimmers	DF-L No. 2	DF-L No. 2	DF-L No. 2					
King Studs	(1) 2x6	(1) 2x6	(2) 2x6					
ining ottation	DF-L No. 2	DF-L No. 2	DF-L No. 2					
Vood Design								
Species	DF-L	DF-L	LVL					
Grade Width	No. 2 4.50 in	No. 2 4.50 in	2.0E 3.50 in			1	1	
Depth	4.50 m 11.25 in	4.30 m 7.25 in	11.88 in					
L	-		· ·		-	÷	•	•
Reaction Dead Load	527 lbs	347 lbs	666 lbs			Ι	Ι	
Live Load	2,138 lbs	1,406 lbs	2,700 lbs					
F					-	·	•	
Load								
lu	9.5 ft	6.3 ft	12.0 ft					
le	18.3 ft	12.0 ft	22.5 ft					
Adjustment Factors								
Cd	1.15	1.15	1.15					
CF	1	1.2	1					
<i>Material Properties</i> Fb	900 psi	900 psi	2,900 psi					
Fv	180 psi	180 psi	285 psi					
E	1,600,000 psi	1,600,000 psi	2,000,000 psi					
Emin	580,000 psi	580,000 psi	1,016,535 psi					
Calculated Prop.		1	1 1		1	1	1	1
A	50.63 in^2	32.63 in^2 142.90 in^4	41.56 in^2					
			488.41 in^4			-		
'. S	533.94 in^4 94.92 in^3		82.26 in^3					
S	94.92 in^3 11.04	39.42 in^3 7.18	82.26 in^3 16.19					
-	94.92 in^3	39.42 in^3						
RB Emin' FbE	94.92 in^3 11.04 580,000 psi 5,706 psi	39.42 in^3 7.18 580,000 psi 13,500 psi	16.19 1,016,535 psi 4,655 psi					
RB Emin' FbE Fb*	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi	16.19 1,016,535 psi 4,655 psi 3,335 psi					
RB Emin' FbE	94.92 in^3 11.04 580,000 psi 5,706 psi	39.42 in^3 7.18 580,000 psi 13,500 psi	16.19 1,016,535 psi 4,655 psi					
RB Emin' FbE Fb*	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi	16.19 1,016,535 psi 4,655 psi 3,335 psi					
RB Emin' FbE Fb* CL Shear and Moment M	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi 1 75,937 lb-in	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi 1 32,868 lb-in	16.19 1,016,535 psi 4,655 psi 3,335 psi 1 121,163 lb-in					
RB Emin' FbE Fb* CL Shear and Moment	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi 1	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi 1	16.19 1,016,535 psi 4,655 psi 3,335 psi 1					
RB Emin' FbE Fb* CL Shear and Moment M V	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi 1 75,937 lb-in	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi 1 32,868 lb-in	16.19 1,016,535 psi 4,655 psi 3,335 psi 1 121,163 lb-in					
RB Emin' FbE Fb* CL Shear and Moment M V Stress fb	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi 1 75,937 lb-in 2,664 lbs 800 psi	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi 1 32,868 lb-in 1,753 lbs 834 psi	16.19 1,016,535 psi 4,655 psi 3,335 psi 1 121,163 lb-in					
RB Emin' FbE Fb* CL Shear and Moment M V Stress fb Fb'	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi 1 75,937 lb-in 2,664 lbs 800 psi 1,024 psi	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi 1 32,868 lb-in 1,753 lbs 834 psi 1,236 psi	16.19 1,016,535 psi 4,655 psi 3,335 psi 1 121,163 lb-in 3,366 lbs 1,473 psi 3,046 psi					
RB Emin' FbE Fb* CL Shear and Moment M V Stress fb/Fb' fb/Fb'	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi 1 75,937 lb-in 2,664 lbs 800 psi 1,024 psi 0.78	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi 1 32,868 lb-in 1,753 lbs 834 psi 1,236 psi 0.67	16.19 1,016,535 psi 4,655 psi 3,335 psi 1 121,163 lb-in 3,366 lbs 1,473 psi 3,046 psi 0.48					
RB Emin' FbE Fb* CL Shear and Moment M V Stress fb Fb'	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi 1 75,937 lb-in 2,664 lbs 800 psi 1,024 psi 0.78 79 psi	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi 1 32,868 lb-in 1,753 lbs 834 psi 1,236 psi 0.67 81 psi	16.19 1,016,535 psi 4,655 psi 3,335 psi 1 121,163 lb-in 3,366 lbs 1,473 psi 3,046 psi 0.48 121 psi					
RB Emin' FbE Fb* CL Shear and Moment M V Stress fb Fb' fb/Fb' fb/Fb' fb/Fb'	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi 1 75,937 lb-in 2,664 lbs 800 psi 1,024 psi 0.78	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi 1 32,868 lb-in 1,753 lbs 834 psi 1,236 psi 0.67	16.19 1,016,535 psi 4,655 psi 3,335 psi 1 121,163 lb-in 3,366 lbs 1,473 psi 3,046 psi 0.48					
RB Emin' FbE Fb* CL Shear and Moment M V Stress fb Fb' fb/Fb' fb/Fb' fv Fv'	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi 1 75,937 lb-in 2,664 lbs 800 psi 1,024 psi 0.78 79 psi 207 psi 0.38 0.78	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi 1 32,868 lb-in 1,753 lbs 834 psi 1,236 psi 0.67 81 psi 0.39 0.67	16.19 1,016,535 psi 4,655 psi 3,335 psi 1 121,163 lb-in 3,366 lbs 1,473 psi 3,046 psi 0.48 121 psi 328 psi 0.37 0.48					
RB Emin' FbE Fb* CL Shear and Moment M V Stress fb Fb' fb/Fb' fv/ Fv' Fv' Fv' Fv' Fv'	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi 1 75,937 lb-in 2,664 lbs 800 psi 1,024 psi 0.78 79 psi 207 psi 0.38	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi 1 32,868 lb-in 1,753 lbs 834 psi 1,236 psi 0.67 81 psi 207 psi 0.39	16.19 1,016,535 psi 4,655 psi 3,335 psi 1 121,163 lb-in 3,366 lbs 1,473 psi 3,046 psi 0.48 121 psi 328 psi 0.37					
RB Emin' FbE Fb* CL Shear and Moment M V Stress fb Fb' fb/Fb' fb/Fb' fv/Fv' Fv' fv/Fv' Max Ratio	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi 1 75,937 lb-in 2,664 lbs 800 psi 1,024 psi 0.78 79 psi 207 psi 0.38 0.78	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi 1 32,868 lb-in 1,753 lbs 834 psi 1,236 psi 0.67 81 psi 0.39 0.67	16.19 1,016,535 psi 4,655 psi 3,335 psi 1 121,163 lb-in 3,366 lbs 1,473 psi 3,046 psi 0.48 121 psi 328 psi 0.37 0.48					
RB Emin' FbE Fb* CL Shear and Moment M V Stress fb Fb' fb/Fb' fb/Fb' fv/Fv' Fv' fv/Fv' Max Ratio	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi 1 75,937 lb-in 2,664 lbs 800 psi 1,024 psi 0.78 79 psi 207 psi 0.38 0.78	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi 1 32,868 lb-in 1,753 lbs 834 psi 1,236 psi 0.67 81 psi 0.39 0.67	16.19 1,016,535 psi 4,655 psi 3,335 psi 1 121,163 lb-in 3,366 lbs 1,473 psi 3,046 psi 0.48 121 psi 328 psi 0.37 0.48					
RB Emin' FbE Fb* CL Shear and Moment M V Stress fb/Fb' fb/Fb' fv/Fv' Max Ratio Deflection Δτι	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi 1 75,937 lb-in 2,664 lbs 800 psi 1,024 psi 0.78 79 psi 207 psi 0.38 0.78 Pass 0.12 in L/947	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi 1 32,868 lb-in 1,753 lbs 834 psi 1,753 lbs 834 psi 0.67 81 psi 0.67 81 psi 0.39 0.67 Pass	16.19 1,016,535 psi 4,655 psi 3,335 psi 1 121,163 lb-in 3,366 lbs 1,473 psi 3,046 psi 0.48 121 psi 328 psi 0.37 0.48 Pass 0.27 in L/537					
RB Emin' FbE Fb* CL Shear and Moment M V Stress fb Fb' fb/Fb' fv/ Fv' fv/Fv' Max Ratio Deflection	94.92 in^3 11.04 580,000 psi 5,706 psi 1,035 psi 1 75,937 lb-in 2,664 lbs 800 psi 1,024 psi 0.78 79 psi 207 psi 0.38 0.78 Pass 0.12 in	39.42 in^3 7.18 580,000 psi 13,500 psi 1,242 psi 1 32,868 lb-in 1,753 lbs 834 psi 1,236 psi 0.67 81 psi 0.39 0.67 Pass	16.19 1,016,535 psi 4,655 psi 3,335 psi 1 121,163 lb-in 3,366 lbs 1,473 psi 3,046 psi 0.48 121 psi 328 psi 0.37 0.48 Pass 0.27 in					

Beam Calculation	IS							
	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Tota	Load
Trib	0.0	20.165	0	0	5.33			
Dead Load	-	342.8	0.0	0.0	95.9	438.7 plf	- 3,463	8.5 plf
Live / Snow Load	0	3024.8	0.0	0.0	-	3,024.8 plf	1	
Description:	2.5 ft Opening							
Г	(2)2.0						1	
Header Callout	(3)2x8 DF-L No. 2							
Trimmers	(2) 2x6							
-	DF-L No. 2 (1) 2x6							
King Studs	DF-L No. 2							
Wood Design								
Species	DF-L						<u> </u>	
Grade	No. 2							
Width Depth	4.50 in 7.25 in						+	
			•		•		<u>.</u>	
Reaction Dead Load	548 lbs						1	
Live Load	3,781 lbs				1			
Logd								
Load	2.5 ft						1	
le	5.2 ft							
-								
Adjustment Factors Cd	4.45		T		1	Г		1
CC	1.15							
							1	
Material Properties Fb	900 psi						T	
Fv	180 psi							
E	1,600,000 psi						1	
Emin	580,000 psi							
Calculated Dream								
Calculated Prop.	32.63 in^2						1	
1	142.90 in^4						1	
S	39.42 in^3						ļ	
RB Emin'	4.70							
Emin' FbE	580,000 psi 31,456 psi							
Fb*	1,242 psi						<u>† </u>	
CL	1							
Shear and Moment								
М	32,470 lb-in							
v	4,329 lbs						<u> </u>	
Stress								
fb	824 psi							
Fb'	1,239 psi		<u></u>	<u>_</u>	<u>_</u>	<u></u>	<u> </u>	<u>_</u>
fb/Fb' fv	0.66 199 psi						+	
Fv'	207 psi		<u> </u>				<u>† </u>	<u> </u>
fv/Fv'	0.96							
Max Ratio	0.96							
L	Pass							
Deflection	0.01 :			1				
Δτι	0.01 in L/2,253						+	
Διι	0.01 in				1	1	+	
	L/2,580							
	Pass							

Beam Calculation	าร							
	Additional Drift	Roof	Floor	Deck	Wall	Total Load		
Trib	0.0	22.5	0	0	5.33	Total Loda	Total	Load
מחו	0.0	22.5	0	0	5.55		-	
Dead Load	-	382.5	0.0	0.0	95.9	478.4 plf	3,853	.4 plf
Live / Snow Load	0	3375.0	0.0	0.0	-	3,375.0 plf		
Description:	12.8 ft Opening	3.0 ft Opening						
Description.	12.0 Jt Opening	5.0 Jt Opening						
	5.25x24	(3)9-1/2"						
Header Callout	DF/DF 24F - V4	LVL 2.0E						
	(5) 2x6	(2) 2x6			1	1		
Trimmers	DF-L No. 2	DF-L No. 2						
King Church	(2) 2x6	(1) 2x6						2
King Studs	DF-L No. 2	DF-L No. 2						
Weed Destant								
Wood Design Species	DF/DF	LVL						
Grade	24F - V4	2.0E		1	1	1	1	
Width	5.25 in	5.25 in		T	T	I		
Depth	24.00 in	9.50 in						
Reaction								
Dead Load	3,050 lbs	718 lbs						
Live Load	21,516 lbs	5,063 lbs		1	1	1	1	
		• • • • •	•	•	•	•	• · · ·	
Load								
lu	12.8 ft	3.0 ft						
le	26.3 ft	6.2 ft						
Adjustment Factors		I	1	1	1	1		
Cd	1.15	1.15						
CF	1	1.1						
Material Properties								
Fb	2,400 psi	2,900 psi						
Fv	265 psi	285 psi						
E	1,850,000 psi	2,000,000 psi						
Emin	950,000 psi	1,016,535 psi						
Calculated Prop.			r	1	Т	r	1	
A	126.00 in^2 6,048.00 in^4	49.88 in^2						
- -	504.00 in^3	375.10 in^4 78.97 in^3						
RB	16.57	5.06		1				
Emin'	950,000 psi	1,016,535 psi		1	1	1	1	
FbE	4,154 psi	47,723 psi						
Fb*	2,760 psi	3,669 psi						
CL	1	1						
Shear and Moment								
Shear and Moment M	939,637 lb-in	52,021 lb-in						
v	24,566 lbs	5,780 lbs		1	1	ł	1	
L			·		·	·	·	
Stress							1	
fb Fb'	1,864 psi	659 psi		+	+			
fb/Fb'	2,556 psi 0.73	3,653 psi 0.18		+	+	+	1	
fv	292 psi	174 psi		1		1		
Fv'	305 psi	328 psi		1			1	
fv/Fv'	0.96	0.53						
Max Ratio	0.96	0.53						
	Pass	Pass						
1								
1	0.20 in	0.01 in						
Deflection Δτι	L/747	L/3,846						
Deflection	L/747 0.18 in	L/3,846 0.01 in						
Deflection Δτι	L/747	L/3,846						

Beam Calculation	IS							
ſ	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Tota	l Load
Trib	0.0	13	0	0	5.33		1014	12080
Dead Load	-	221.0	0.0	0.0	95.9	316.9 plf	2,260	5.9 plf
Live / Snow Load	0	1950.0	0.0	0.0	-	1,950.0 plf		
Description:	3.0 ft Opening							
Header Callout	(2)2x10 DF-L No. 2							
Trimmers	(2) 2x6 DF-L No. 2							
King Studs	(1) 2x6 DF-L No. 2							
Wood Design								
Species	DF-L							
Grade	No. 2							
Width Depth	3.00 in 9.25 in							
	J.25 III		1		1	1		L
<i>Reaction</i> Dead Load	475 lbs							
Live Load	2,925 lbs							
								· · · · · · · · · · · · · · · · · · ·
Load	2.0 (1		1	Т	T	
lule	3.0 ft 6.2 ft							<u> </u>
ie	0.2 Jt							I
Adjustment Factors								
Cd	1.15							
CF	1.1							
Material Properties				-				-
Fb	900 psi							
Fv	180 psi 1,600,000 psi							
Emin	580,000 psi							
L				1		1		1
Calculated Prop.								
A	27.75 in^2 197.86 in^4							
s	42.78 in^3							
RB	8.73							
Emin'	580,000 psi							
FbE Fb*	9,131 psi 1,139 psi							
CL	1,139 psi		1		1	1	1	1
Shear and Moment	30,604 lb-in							
v	3,400 lbs							
Ctures								
<u>Stress</u> fb	715 psi							
Fb'	1,131 psi							
fb/Fb'	0.63							<u>_</u>
fv Fv'	184 psi 207 psi							
fv/Fv'	0.89		1	1	1		1	1
Max Ratio	0.89							
L	Pass							
Deflection			1		1	1	1	1
Δτι	0.01 in						-	
Διι	L/2,759 0.01 in							
	L/3,207							
	Pass							

Beam Calculation	าร							
	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total	Load
Trib	0.0	16.665	0	0	5.33		1000	2000
Dead Load	-	283.3	0.0	0.0	95.9	379.2 plf	2,879	0.0 plf
Live / Snow Load	0	2499.8	0.0	0.0	-	2,499.8 plf		
Description:	6.5 ft Opening	2.0 ft Opening	6.3 ft Opening	3.0 ft Opening	10.0 ft Opening			
				,				
Header Callout	(2)14"	(2)2x8	(2)11-7/8"	(2)2x12	5.25x13.5			
Header Callout	LVL 2.0E	DF-L No. 2	LVL 2.0E	DF-L No. 2	DF/DF 24F - V4			
Trimmers	(3) 2x6	(2) 2x6	(3) 2x6	(2) 2x6	(3) 2x6			
	DF-L No. 2 (2) 2x6	DF-L No. 2 (1) 2x6	DF-L No. 2 (2) 2x6	DF-L No. 2 (1) 2x6	DF-L No. 2 (2) 2x6			
King Studs	DF-L No. 2	DF-L No. 2	DF-L No. 2	DF-L No. 2	DF-L No. 2			
Wood Design								
Species	LVL	DF-L	LVL	DF-L	DF/DF			
Grade	2.0E	No. 2	2.0E	No. 2	24F - V4			
Width Depth	3.50 in 14.00 in	3.00 in 7.25 in	3.50 in 11.88 in	3.00 in 11.25 in	5.25 in			
Depth	14.00 III	7.23 111	11.00 111	11.23 111	13.50 in			
Reaction	4 222 "	270 "	4.405.1	F.C.C. !!	1.000 "			
Dead Load Live Load	1,233 lbs 8,124 lbs	379 lbs 2,500 lbs	1,185 lbs 7,812 lbs	569 lbs 3,750 lbs	1,896 lbs 12,499 lbs			
2.10 2000	0,224 100	2,000 105	.,522 103	5,50155	12, 135 105			
Load								
lu	6.5 ft	2.0 ft	6.3 ft	3.0 ft	10.0 ft			
le	13.4 ft	4.1 ft	12.9 ft	6.2 ft	19.7 ft			
Adjustment Factors								
Cd	1.15	1.15	1.15	1.15	1.15			
CF	1	1.2	1	1	1			
Material Properties								
Fb	2,900 psi	900 psi	2,900 psi	900 psi	2,400 psi			
Fv	285 psi	180 psi	285 psi	180 psi	265 psi			
E	2,000,000 psi	1,600,000 psi	2,000,000 psi	1,600,000 psi	1,850,000 psi			
Emin	1,016,535 psi	580,000 psi	1,016,535 psi	580,000 psi	950,000 psi			
Calculated Prop.								
A	49.00 in^2	21.75 in^2	41.56 in^2	33.75 in^2	70.88 in^2			
I	800.33 in^4	95.27 in^4	488.41 in^4	355.96 in^4	1,076.41 in^4			
S	114.33 in^3	26.28 in^3	82.26 in^3	63.28 in^3	159.47 in^3			
RB Emin'	13.55 1,016,535 psi	6.31 580,000 psi	12.24 1,016,535 psi	9.63 580,000 psi	10.75 950,000 psi			
FbE	6,643 psi	17,476 psi	8,145 psi	7,508 psi	9,858 psi			
Fb*	3,335 psi	1,242 psi	3,335 psi	1,035 psi	2,760 psi			
CL	1	1	1	1	1			
Shear and Moment								
M	- /	17,274 lb-in	168,691 lb-in	38,866 lb-in	431,849 lb-in			
v	9,357 lbs	2,879 lbs	8,997 lbs	4,318 lbs	14,395 lbs			
Stress								
fb	1,596 psi	657 psi	2,051 psi	614 psi	2,708 psi			
Fb' fb/Fb'	3,188 psi 0.50	1,237 psi 0.53	3,229 psi 0.64	1,027 psi 0.60	2,709 psi 1.00			
fv	286 psi	199 psi	325 psi	192 psi	305 psi			
Fv'	328 psi	207 psi	328 psi	207 psi	305 psi			
fv/Fv'	0.87	0.96	0.99	0.93	1.00			
Max Ratio	0.87 Pass	0.96 Pass	0.99 Pass	0.93 Pass	1.00 Pass			
	1 035	1 000	1 000	1 000	1 435			
Deflection Δτι	0.07 in	0.01 in	0.10 in	0.01 in	0.33 in			
	L/1,080	L/3,530	L/741	L/3,908	L/369			
Διι	0.06 in	0.01 in	0.09 in	0.01 in	0.28 in			
	L/1,244	L/4,065	L/854	L/4,500	L/425			
	Pass	Pass	Pass	Pass	Pass			

Beam Calculation	IS							
	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Tota	l Load
Trib	0.0	21.5	0	0	3.33		1010	
Dead Load	-	365.5	0.0	0.0	59.9	425.4 plf	3,650	0.4 plf
Live / Snow Load	0	3225.0	0.0	0.0	-	3,225.0 plf		
Description:	9.5 ft Opening							
ļI				-				
Header Callout	5.25x16.5 DF/DF 24F - V4							
Trimmers	(4) 2x6 DF-L No. 2							
King Studs	(1) 2x6 DF-L No. 2							
Wood Design Species	DF/DF							
Grade	24F - V4							
Width Depth	5.25 in						+	
	16.50 in		I	I	I	I	I	I
Reaction	2 021 "			1				
Dead Load Live Load	2,021 lbs 15,319 lbs							
Live Load	15,513 105		<u>I</u>	!	Į	Ļ	I	ł
Load			-					•
lu	9.5 ft							
le	19.6 ft							
Adjustment Factors								
Cd	1.15							
CF	1							
Material Properties								
Fb	2,400 psi							
Fv	265 psi							
E	1,850,000 psi							
Emin	950,000 psi							
Calculated Prop.								
A	86.63 in^2							
I	1,965.30 in^4							
S	238.22 in^3							
RB Emin'	11.86 950,000 psi							
FbE	8,109 psi		1		1	1	1	1
Fb*	2,760 psi					L		
CL	1							
Shear and Moment								
M	494,178 lb-in							
v	17,340 lbs							
Stress								
fb	2,074 psi							
Fb'	2,693 psi							
fb/Fb' fv	0.77 300 psi							
Fv'	300 psi 305 psi							
fv/Fv'	0.99							
Max Ratio	0.99							
L	Pass							
Deflection			1	1			1	I
Δτι	0.18 in		-				-	
Διι	L/620 0.16 in							
	L/701		1		1	1	1	1
	Pass							
-								

Trib Dead Load Live / Snow Load	Additional Drift 0.0	Roof	Floor	Deck	Wall	Total Load		
Dead Load	0.0				vvali	i otal Ludu	Tota	Load
		10.165	0	0	3.33		1018	Load
		172.8	0.0	0.0	59.9	232.7 plf	1,757	7.5 plf
	0	1524.8	0.0	0.0	-	1,524.8 plf		
Description: 2	2.0 ft Opening							
Header Callout	(2)2x6 DF-L No. 2							
Trimmers	(1) 2x6 DF-L No. 2							
King Studs	(1) 2x6 DF-L No. 2							
Wood Design								
Species	DF-L							
Grade	No. 2							
Width	3.00 in							
Depth	5.50 in		I	I	I	I	l	
Reaction	222 "			1		1		
Dead Load Live Load	233 lbs 1,525 lbs							
	1,525 105				!			
Load				1		1		
lu	2.0 ft		ļ					
le	4.1 ft							
Adjustment Factors								
Cd	1.15							
CF	1.3							
Material Properties								
Fb	900 psi							
Fv	180 psi							
	1,600,000 psi							
Emin	580,000 psi							
Calculated Prop.								
A	16.50 in^2							
·	41.59 in^4							
s	15.13 in^3							
RB Emin'	5.50 580,000 psi							
FbE	23,036 psi							
Fb*	1,346 psi							
CL	1							
Shear and Moment								
м	10,545 lb-in							
V	1,757 lbs							
Stress								
fb	697 psi							
Fb'	1,341 psi		<u>_</u>		 _		<u>_</u>	
fb/Fb' fv	0.52 160 psi							
Fv'	207 psi		<u> </u>		<u> </u>			
fv/Fv'	0.77							
Max Ratio	0.77							
	Pass							
Deflection	0.01 in							
Δτι	0.01 in L/2,524							
Διι	0.01 in							
	L/2,910			<u> </u>		<u> </u>		
	Pass							

Image: state in the s	Beam Calculation	10							
Image: state in the s		Additional Drift	Roof	Floor	Deck	Wall	Total Load		
Description 1712.5 0.0 0.0 0.0 777.5g1 1282.5g1 Description: 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.00	Trib							Iotal	Load
Use / Services 0 1992 3 0.0 0.0 1992 1 1992 1 Decorption: 2.0 //. Opening 4.5 //. Opening 1	110	0.0	12.75	0	0	5.55		2.400	2 -16
Description: 2.0 // Opening 4.5 // Opening Description: Bearder Callon Or 4, No. 2 Description: Control (2)265 Or 4, No. 2 Description: Description: Trainest Neg Station Opening Opening Description: Description: Weat Callon Opening Opening Opening Description: Description: Weat Callon Opening Opening Opening Description: Description: Weat Callon Opening Opening Opening Description: Description: Description: Weat Callon Opening Description: Description: Description: Description: Weat Callon Opening Description: Description: Description: Description: Restrict Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description:<							276.7 plf	2,189	.2 pij
Header Callow IDPA (0)	Live / Snow Load	0	1912.5	0.0	0.0	-	1,912.5 plf		
Header Callow DDM (P1-No.2 (P)PM (P1-No.2 (P)PM (P1									
Header Callow Trimmont C/200 (FL No. 2 (P/94/17) (VL 2.6	Description:	2.0 ft Openina	4.5 ft Opening						
Neger Link Pi No. 2 UV. 26 O O O Trimmet 0.10.26 07.36 0	2 comption	210 je opening	no je opening						
Negle Calor No.2 UV.26 No.2		(2)2x6	(2)9-1/2"						
Trimes 0(1)3.6 0(2).6 0 0 0 0 013.05 012.06 07.00 07.00 0 0 0 012.05 07.00 07.00 07.00 0 0 0 000 002.0 07.00 07.00 0	Header Callout								
immed 0-14 hb. 2 0-14 hb. 2<									
King Stok (1) 2.6	Trimmers								
Unit 100 d Unit 1	King Church								
Species $Dr.4$ $1/4$ $ $	King Studs	DF-L No. 2	DF-L No. 2						
Species DF-1 U/1 I <									
Grade No.2 2.0% Image: Constraint of the state o		DF-I	IVI						
Weth Beth 3.00 m 3.90 m M									
Dayle 5.50 m 9.50 m 0 0 0 0 Bead coal Uve load 277 lbs 623 lbs 0 0 0 Coal 1,513 lbs 4,303 lbs 0 0 0 0 Load 2.0 ft 4.5 ft 0 0 0 0 Adjustment Factors C 115 0 0 0 0 0 Moterial Properties Fil 900 psi 2.500 psi 2.500 psi 0 <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td>1</td> <td></td> <td></td>						1	1		
Dead Load 277 lbs 6.23 lbs 4.303 lbs					1	1	1		
Dead Load 277 lbs 6.23 lbs 4.303 lbs	Departies								
Live Load 1.913 lbs 4.303 lbs Image: constraint of the second		277 lbs	623 lbs						
Lood Loop Loop <thloop< th=""> Loop Loop <thl< td=""><td></td><td></td><td></td><td></td><td>+</td><td></td><td>1</td><td></td><td></td></thl<></thloop<>					+		1		
bit 2.0 ft 4.5 ft		,	, ,		•	+	•	·	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Load								
Adjustment Factors 4.1 ft 9.3 ft 0 0 0 Adjustment Factors Gl 1.15 0 0 0 Gd 1.15 0 0 0 0 0 Material Properties F0 900 psi 2.900 psi 0 0 0 0 Fiv 180 psi 2.85 psi 0 0 0 0 0 0 E 1.600.000 psi 0.000.000 psi 0 <td< td=""><td></td><td>2.0 ft</td><td>4.5 ft</td><td></td><td></td><td></td><td></td><td></td><td></td></td<>		2.0 ft	4.5 ft						
Gd 1.15 1.15 1.1 Material Properties Fb 900 pil 2,900 pil 2 Fb 900 pil 2,800 pil 1 1 Fb 180 pil 285 pil 1 1 Fb 180 pil 285 pil 1 1 1 Et 1.600.000 pil 2000.000 pil 1 1 1 Ethio 33.25 in^2 1 1 1 1 Ethio 33.25 in^2 1 1 1 1 Calculated Prop. A 16.50 in^2 33.25 in^3 1 1 1 Calculated Prop. A 16.50 in^2 33.25 in^3 1 1 1 RB S.50 9.29 1 1 1 1 1 RB S.50 9.29 1 1 1 1 Step 1.346 pil 1.440 pil 1 1 1 1 To 1 1 </td <td>le</td> <td>4.1 ft</td> <td>9.3 ft</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	le	4.1 ft	9.3 ft						
Gd 1.15 1.15 1.1 Material Properties Fb 900 pil 2,900 pil 2 Fb 900 pil 2,800 pil 1 1 Fb 180 pil 285 pil 1 1 Fb 180 pil 285 pil 1 1 1 Et 1.600.000 pil 2000.000 pil 1 1 1 Ethio 33.25 in^2 1 1 1 1 Ethio 33.25 in^2 1 1 1 1 Calculated Prop. A 16.50 in^2 33.25 in^3 1 1 1 Calculated Prop. A 16.50 in^2 33.25 in^3 1 1 1 RB S.50 9.29 1 1 1 1 1 RB S.50 9.29 1 1 1 1 Step 1.346 pil 1.440 pil 1 1 1 1 To 1 1 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td>•</td> <td>•</td> <td></td> <td></td>						•	•		
Atterial Properties Image: marked state stat									
Material Properties Fb 900 psi 2,900 psi 225 psi Image: constraint of the state									
Fb 900 psi 2,900 psi 285 psi 0 0 0 Fv 180 psi 2285 psi 0 0 0 0 0 E 1,600,000 psi 1,016,535 psi 0 0 0 0 0 0 Colubred Prop. 1 1,016,535 psi 0	CF	1.3	1.1						
Fb 900 psi 2,900 psi 0 0 Fv 180 psi 285 psi 0 0 0 E 1,600,000 psi 1,016,535 psi 0 0 0 0 Colulated Prop. 1 1 1 0 0 0 0 A 16.50 ln^2 33.25 in^2 0 0 0 0 0 S 15.31 an 3 52.65 ln 3 0 0 0 0 0 B 5.50 9.29 0 0 0 0 0 0 Fb 1.3.66 psi 1,016,535 psi 0 0 0 0 0 0 Fb 1.3.66 psi 1,016,535 psi 0	Material Properties								
Fv 180 psi 285 psi		900 psi	2.900 psi						
Emin 1,600,000 psi 2,000,000 psi 1.016,535 psi 1 Colculated Prop. Calculated Prop. 4.159 in ^2 33.25 in ^2 1 1 1 4 4.159 in ^4 250.07 in ^4 1 1 1 1 5 15.13 in ^3 52.65 in ^3 1									
Emin 580,000 psi 1,016,535 psi Image: constraint of the system of th	E								
Calculated Prop. A 16.50 in^2 33.25 in^2 Image: Calculated Prop. A 14.159 in/4 250.07 in/4 Image: Calculated Prop. Image: Calculated Prop. B 5.50 9.29 Image: Calculated Prop. Image: Calculated Prop. Image: Calculated Prop. RB 5.50 9.29 Image: Calculated Prop. Image: Calculated Prop. Image: Calculated Prop. FbE 23.036 psi 1.016.535 psi Image: Calculated Prop. Image: Calculated Prop. Image: Calculated Prop. FbE 23.036 psi 1.016.535 psi Image: Calculated Prop. Image: Calculated Prop. Image: Calculated Prop. FbE 23.036 psi 1.016.535 psi Image: Calculated Prop. Image: Calculated Prop. Image: Calculated Prop. Shear and Moment 1 1 Image: Calculated Prop. Image: Calculated Prop. Image: Calculated Prop. Shear and Moment 1 1.3.135 Ib.in 66.497 Ib.in Image: Calculated Prop. Image: Calculated Prop. Shear and Moment 1 1.3.135 Ib.in 66.497 Ib.in Image: Calculated Prop. Image: Calculat	Emin								
A 16.50 in?2 33.25 in?2 Image: constraint of the second secon	•								
state 41.59 in/4 250.07 in/4 <th< td=""><td>Calculated Prop.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	Calculated Prop.								
S 15.13 in^3 52.65 in^3 Image: Solution of the solut	A	16.50 in^2	33.25 in^2						
R8 5.50 9.29 Image: constraint of the second se	1								
Emin' 580,000 psi 1,016,535 psi Image: constraint of the state of the stat	-								
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$									
Fb* 1,346 psi 3,669 psi Image: constraint of the state of th					+	1	+		
Cl 1 1 Shear and Moment 31,315 lb-in 66,497 lb-in V 2,189 lbs 4,926 lbs Stress 5 3,607 psi					+		1		
Shear and Moment M 13,135 lb-in 66,497 lb-in V 2,189 lbs 4,926 lbs Stress Stress fb 868 psi 1,263 psi fb/Fb' 0.65 0.35 fb/Fb' 0.65 0.35 fv/Fv' 0.95 0.68 fv/Fv' 0.96 0.68 Max Ratio 0.96 0.68 pass pass pass Deflection L/2,027 L/1,337 Doli in 0.04 in					1	1	1		
M 13,135 lb-in 66,497 lb-in Image: constraint of the state o	[
V 2,189 lbs 4,926 lbs Image: constraint of the state of the									
Stress fb 1,263 psi Fb' 1,341 psi 3,607 psi <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	v	2,189 lbs	4,926 lbs		1	1	1		
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Stress								
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		868 psi	1.263 psi						
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $									
Fv' 207 psi 328 psi									
fv/Fv' 0.96 0.68 Image: Constraint of the state									
Max Ratio 0.96 0.68 Image: Constraint of the system o									
Pass Pass Image: Constraint of the system									
Deflection Δπ. 0.01 in 0.04 in Δμ. L/2,027 L/1,337 Δμ. 0.01 in 0.04 in L/2,320 L/1,531	IVIAX NALIO								
Δπ 0.01 in 0.04 in L/2,027 L/1,337 Διι 0.01 in 0.04 in L/2,320 L/1,531		1 0 3 3	1 0 3 3						
L/2,027 L/1,337									
Δu 0.01 in 0.04 in L/2,320 L/1,531	Δτι								
L/2,320 L/1,531	۸								
	Διι					+			
		L/2,32U	L/ 1,331						

Beam Calculation	IS							
	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Tota	Load
Trib	0.0	2	0	0	3.33		1014	Loud
Dead Load	-	34.0	0.0	0.0	59.9	93.9 plf	393.	9 plf
Live / Snow Load	0	300.0	0.0	0.0	-	300.0 plf		
·				<u>.</u>				
Description:	8.0 ft Opening							
	(2)2.40							
Header Callout	(2)2x10 DF-L No. 2							
Trimmers	(1) 2x6 DF-L No. 2							
King Stude	(1) 2x6							
King Studs	DF-L No. 2							
Wood Design								
Species	DF-L							
Grade Width	No. 2 3.00 in					1	1	
Depth	9.25 in		<u> </u>		<u> </u>	<u> </u>	<u> </u>	
Reaction								
Dead Load	376 lbs							
Live Load	1,200 lbs							
Load								
lu	8.0 ft							
le	15.4 ft							
Adjustment Factors Cd	1.15		-					
CF	1.15							
. –							1	
<i>Material Properties</i> Fb	900 psi		Γ				I	
Fv	180 psi							
E	1,600,000 psi							
Emin	580,000 psi							
Calculated Prop.								
Culculated Frop.	27.75 in^2							
1	197.86 in^4							
S	42.78 in^3							
RB Emin'	13.76		-					
Emin' FbE	580,000 psi 3,676 psi							
Fb*	1,139 psi			<u> </u>				
CL	1							
Shear and Moment								
M	37,818 lb-in							
v	1,576 lbs							
Stress								
fb	884 psi							
Fb'	1,114 psi							
fb/Fb' fv	0.79							
TV Fv'	85 psi 207 psi				1	1	1	
fv/Fv'	0.41							
Max Ratio	0.79							
L	Pass							
Deflection				1				1
Δτι	0.11 in		+					
Διι	L/837 0.09 in							
	L/1,099			1	1	1	1	
	Pass							
-								

Steel Beam			Project File: 05 Beams.ec6
LIC# : KW-06013353, Build:20.23.08.30 DESCRIPTION: STEEL HDR	SNAKE RIVER ENGINEERING		(c) ENERCALC INC 1983-202
ODE REFERENCES			
Calculations per AISC 360-16, IBC 2018 Load Combination Set : IBC 2018	, CBC 2019, ASCE 7-16		
laterial Properties			
Analysis Method Allowable Strength Desig Beam Bracing : Beam is Fully Braced Bending Axis : Major Axis Bending	•	Fy : Steel Yield : E: Modulus :	36.0 ksi 29,000.0 ksi
	D(1.859) S(14.052)		
♦ ♦	D(0.0340) S(0.30)	÷	\$
	+ MC12x35 Span = 16.0 ft		, in the second se
	·		tors will be applied for calculations

Applied Loads

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

Beam self weight calculated and added to loading Uniform Load : D = 0.0170, S = 0.150 ksf, Tributary Width = 2.0 ft

Point Load : D = 1.859, S = 14.052 k @ 8.0 ft

DESIGN SUMMARY

SIGN SUMMARY				Design OK
Maximum Bending Stress Ratio =	0.972 : 1	Maximum	Shear Stress Ratio =	0.151 : 1
Section used for this span	MC12x35	Sec	tion used for this span	MC12x35
Ma : Applied	75.452 k-ft		Va : Applied	10.908 k
Mn / Omega : Allowable	77.605 k-ft		Vn/Omega : Allowable	72.172 k
Load Combination	+D+S		d Combination ation of maximum on span	+D+S 0.000 ft
Span # where maximum occurs	Span # 1	Spa	n # where maximum occurs	Span # 1
Maximum Deflection				
Max Downward Transient Deflection	0.403 in Ratio =	476 >=360	Span: 1 : S Only	
Max Upward Transient Deflection	0 in Ratio =	0 <360	n/a	
Max Downward Total Deflection	0.463 in Ratio =	414 >=240.	Span: 1 : +D+S	
Max Upward Total Deflection	0 in Ratio =	0 <240.0	n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress	s Ratios		Su	mmary of Mo	ment Values	3		Summar	y of Shear	Values
Segment Length	Span #	М	V	Mmax +	Mmax -	Ma Max	Mnx Mnx/	Omega Cb	Rm	Va Max	VnxVnx/C)mega
D Only												
Dsgn. L = 16.00 ft	1	0.124	0.021	9.64		9.64	129.60	77.60 1.00	1.00	1.48	120.53	72.17
+D+S												
Dsgn. L = 16.00 ft	1	0.972	0.151	75.45		75.45	129.60	77.60 1.00	1.00	10.91	120.53	72.17
+D+0.750S												
Dsgn. L = 16.00 ft	1	0.760	0.118	59.00		59.00	129.60	77.60 1.00	1.00	8.55	120.53	72.17
+0.60D												
Dsgn. L = 16.00 ft	1	0.075	0.012	5.79		5.79	129.60	77.60 1.00	1.00	0.89	120.53	72.17
Overall Maximum E	Deflectio	ns										
Load Combination		Span Ma	ax. "-" De	efl Locatior	n in Span	Load Corr	nbination		Max	. "+" Defl L	ocation in S	Span
+D+S		1	0.463	34	8.046					0.0000	0.0	00
Vertical Reactions					Suppo	rt notation : F	ar left is #′		Values	in KIPS		
Load Combination			Supp	ort 1 Supp	ort 2							
Max Upward from all	Load Conc	litions	10	.908 10	0.908							
Max Upward from Loa	ad Combin	ations	10	.908 10).908					Page 82	2 of 179	
Max Upward from Loa			9	.426 9	.426					Fage 02	2 01 170	
D Only			1	.482 1	.482							
+D+S			10	.908 10).908							

Steel Beam			Project File: 05 Beams.ec6
LIC# : KW-06013353, Build:20.23.08.30 DESCRIPTION: STEEL HDR		SNAKE RIVER ENGINEERING	(c) ENERCALC INC 1983-2023
Vertical Reactions		Support notation : Fa	ar left is #′ Values in KIPS
Load Combination	Support 1	Support 2	
+D+0.750S	8.551	8.551	
+0.60D	0.889	0.889	
S Only	9.426	9.426	

Steel Beam			Project File: 05 Beams.ec
LIC# : KW-06013353, Build:20.23.08.30	SNAKE RIVER ENGINEERING		(c) ENERCALC INC 1983-2
DESCRIPTION: STEEL HDR WIND			
CODE REFERENCES			
Calculations per AISC 360-16, IBC 2018, CBC	2019, ASCE 7-16		
Load Combination Set : IBC 2018			
laterial Properties			
Analysis Method Allowable Strength Design		Fy : Steel Yield :	36.0 ksi
Beam Bracing: Completely Unbraced		E: Modulus :	29,000.0 ksi
Bending Axis : Minor Axis Bending			
	W(0.2514)		
* * *	VV(0.2314)	¢	*****
×	MC12x35		×
	WIC 12x35		
	Span = 16.0 ft		
•			•
Applied Loads	Service lo	ads entered. Load Fac	tors will be applied for calculation

Beam self weight NOT internally calculated and added Uniform Load : W = 0.02514 ksf, Tributary Width = 10.0 ft

ESIGN SUMMARY			Design OK
Maximum Bending Stress Ratio =	0.362 : 1	Maximum Shear Stress Ratio =	0.018 : 1
Section used for this span	MC12x35	Section used for this span	MC12x35
Ma : Applied	4.827 k-ft	Va : Applied	1.207 k
Mn / Omega : Allowable	13.337 k-ft	Vn/Omega : Allowable	68.266 k
Load Combination	+0.60W	Load Combination Location of maximum on span	+0.60W 0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection Max Downward Transient Deflection Max Upward Transient Deflection Max Downward Total Deflection	1.016 in Ratio = 0 in Ratio = 0.611 in Ratio =	188 >=180. Span: 1 : W Only 0 <180.0 n/a 314 >=180. Span: 1 : +0.60W	
Max Upward Total Deflection	0 in Ratio =	0 <180.0 n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stre	ess Ratios		Su	mmary of Mo	ment Value	S		Summar	y of Shear	Values
Segment Length	Span #	М	V	Mmax +	Mmax -	Ma Max	Mny Mny	/Omega Cb	Rm	Va Max	VnyVny/0	Omega
Dsgn. L = 16.00 ft +0.60W	1		0.000				22.27	13.34 1.0	0 1.00	-0.00	114.00	68.27
Dsgn. L = 16.00 ft +0.450W	1	0.362	0.018	4.83		4.83	22.27	13.34 1.14	4 1.00	1.21	114.00	68.27
Dsgn. L = 16.00 ft	1	0.271	0.013	3.62		3.62	22.27	13.34 1.14	4 1.00	0.91	114.00	68.27
Overall Maximum D	Deflectio	ns										
Load Combination		Span M	Max. "-" De	fl Location	n in Span	Load Com	nbination		Мах	. "+" Defl L	ocation in	Span
W Only		1	1.019	2	8.046					0.0000	0.	000
Vertical Reactions					Suppo	rt notation : F	ar left is #′		Values	s in KIPS		
Load Combination			Suppo	rt 1 Supp	ort 2							
Max Upward from all	Load Cond	ditions	2.	011 2	2.011							
Max Upward from Loa	ad Combin	ations	1.	207 [^]	1.207							
Max Upward from Loa	ad Cases		2.	011 2	2.011							
+0.60W			1.	207 [^]	1.207							
+0.450W			0.	905 ().905							
W Only			2.	011 2	2.011							
01/23/24										Page 84	4 of 178	

Concrete Beam

LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

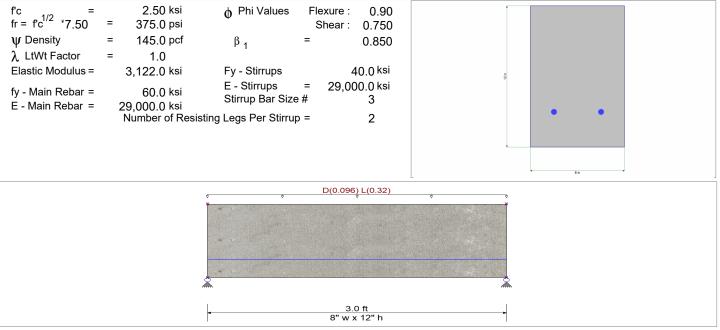
Project File: 05 Beams.ec6 (c) ENERCALC INC 1983-2023

DESCRIPTION: LINTEL

CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16 Load Combination Set : IBC 2018

General Information



Cross Section & Reinforcing Details

Rectangular Section, Width = 8.0 in, Height = 12.0 in Span #1 Reinforcing....

2-#4 at 3.0 in from Bottom, from 0.0 to 3.0 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : D = 0.0120, L = 0.040 ksf, Tributary Width = 8.0 ft

	DESIGN SUMMARY					Design OK
Mu : Applied Mn * Phi : Allowable0.8361 k-ft 14.929 k-ftLocation of maximum on span1.503 ftSpan # where maximum occursSpan # 1Maximum Deflection0.000 in 0.000 in Max Downward Transient Deflection0.000 in 0.000 in Ratio =0 <360.0 0 L Only L OnlyMax Downward Transient Deflection0.000 in 0.000 in Ratio =0 <360.0 0 L OnlyMax Upward Transient Deflection0.000 in 0.000 in Ratio =0 <180.0 0 Span: 1 : +D+LMax Upward Total Deflection0.000 in 0.000 in Ratio =0 <180.0 0 Span: 1 : +D+LVertical ReactionsSupport notation : Far left is #1Load Combination0.769 0.7690.769 0.769Max Upward from all Load Conditions0.769 0.7690.769 0.769Max Upward from Load Combinations0.769 0.7690.789 0.789D Only0.289 0.2890.289 4.480Page 85 of 178 4.50L		0	.056 : 1			
Mn * Phi : Allowable 14.929 k-ft Location of maximum on span 1.503 ft Span # where maximum occurs Span # 1 Maximum Deflection Span # 1 Max Downward Transient Deflection 0.000 in Ratio = 0 <360.0	Section used for this span	Typical Sec	tion			
Location of maximum on span 1.503 ft Span # where maximum occurs Span # 1 Maximum Deflection Span # 1 Maximum Deflection 0.000 in Ratio = 0 <360.0	Mu : Applied	0.8	3361 k-ft			
Span # where maximum occurs Span # 1 Maximum Deflection Maximum Deflection 0.000 in Ratio = 0 <360.0 L Only Max Downward Transient Deflection 0.000 in Ratio = 0 <360.0	Mn * Phi : Allowable	14	.929 k-ft			
Maximum Deflection 0.000 in Ratio = 0.360.0 L Only Max Upward Transient Deflection 0.000 in Ratio = 0.360.0 L Only Max Downward Total Deflection 0.000 in Ratio = 0.4360.0 L Only Max Downward Total Deflection 0.000 in Ratio = 0.4360.0 L Only Max Upward Total Deflection 0.000 in Ratio = 0.4180.0 Span: 1 : +D+L Vertical Reactions Support notation : Far left is #1 Load Combination Support 1 Support 2 Max Upward from all Load Conditions 0.769 0.769 Max Upward from Load Cases 0.480 0.480 D Only 0.289 0.289 +D+L 01/23/24 0.769 Page 85 of 178 +D+0.750L 0.649 0.649 0.649	Location of maximum on span		1.503 ft			
Max Downward Transient Deflection 0.000 in Ratio = 0 <360.0	Span # where maximum occurs	Spa	n # 1			
Max Upward Transient Deflection 0.000 in Ratio = 0 <360.0 L Only Max Downward Total Deflection 0.000 in Ratio = 0 <180.0	Maximum Deflection					
Max Downward Total Deflection Max Upward Total Deflection 0.000 in 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 0.769 0.769 Max Upward from Load Combinations 0.769 0.769 Max Upward from Load Combinations 0.769 0.769 Max Upward from Load Cases 0.480 0.480 D Only 0.289 0.289 +D+L 01/23/24 0.769 0.769 +D+0.750L 0.649 0.649 0.649	Max Downward Transient Deflection	0.000 in	Ratio =	<mark>0</mark> <360.0	L Only	
Max Upward Total Deflection 0.000 in Ratio = 0 <	Max Upward Transient Deflection	0.000 in	Ratio =	<mark>0</mark> <360.0	L Only	
Vertical Reactions Support notation : Far left is #1 Load Combination Support 1 Support 2 Max Upward from all Load Conditions 0.769 0.769 Max Upward from Load Combinations 0.769 0.769 Max Upward from Load Combinations 0.769 0.769 Max Upward from Load Cases 0.480 0.480 D Only 0.289 0.289 +D+L 01/23/24 0.769 0.769 +D+0.750L 0.649 0.649	Max Downward Total Deflection	0.000 in	Ratio =	<mark>0</mark> <180.0	Span: 1 : +D+L	
Load Combination Support 1 Support 2 Max Upward from all Load Conditions 0.769 0.769 Max Upward from Load Combinations 0.769 0.769 Max Upward from Load Combinations 0.769 0.769 Max Upward from Load Cases 0.480 0.480 D Only 0.289 0.289 +D+L 01/23/24 0.769 0.769 +D+0.750L 0.649 0.649	Max Upward Total Deflection	0.000 in	Ratio =	<mark>0</mark> <180.0	Span: 1 : +D+L	
Max Upward from all Load Conditions 0.769 0.769 Max Upward from Load Combinations 0.769 0.769 Max Upward from Load Cases 0.480 0.480 D Only 0.289 0.289 +D+L 01/23/24 0.769 0.769 +D+0.750L 0.649 0.649	Vertical Reactions			Support notation	n : Far left is #1	
Max Upward from Load Combinations 0.769 0.769 Max Upward from Load Cases 0.480 0.480 D Only 0.289 0.289 +D+L 01/23/24 0.769 0.769 +D+0.750L 0.649 0.649	Load Combination		Support 1 S	upport 2		
Max Upward from Load Cases 0.480 0.480 D Only 0.289 0.289 +D+L 01/23/24 0.769 0.769 +D+0.750L 0.649 0.649	Max Upward from all Load Conditions		0.769	0.769		
D Only 0.289 0.289 +D+L 01/23/24 0.769 0.769 Page 85 of 178 +D+0.750L 0.649 0.649 Page 85 of 178	Max Upward from Load Combinations		0.769	0.769		
+D+L 01/23/24 0.769 0.769 Page 85 of 178 +D+0.750L 0.649 0.649	Max Upward from Load Cases		0.480	0.480		
+D+0.750L 0.649 0.649			0.289	0.289		
	+D+L 01/23/24		0.769	0.769		Page 85 of 178
+0.60D 0.173 0.173	+D+0.750L		0.649	0.649		
	+0.60D		0.173	0.173		

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

Concrete Beam

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: LINTEL

Vertical Reactions	Support notation : Far left is #1
Load Combination	Support 1 Support 2
L Only	0.480 0.480

SNAKE RIVER ENGINEERING

Shear Stirrup RequirementsEntire Beam Span Length : Vu < Phi*Vc / 2, Req'd Vs = Not Reqd per 9.6.3.1, Stirrups are not required.</td>

Detailed Shear Information

	Crear I			\ <i>\</i>	(14)	N 4	d*Vu/Mu	Dh:*\/-	Commont		DI=:*\/	
Load Combination	Number	Distance		Vu Actual	(k) Design	Mu (k-ft)	a vu/iviu		Comment			Spacing (in) Reg'd
+1.20D+1.60L		• •	(in)			. ,	1 00	(k)		(k)	(k)	•
	1	0.00	9.00	1.11	1.11	0.00			Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.03	9.00	1.09	1.09	0.04			Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.07	9.00	1.07	1.07	0.07			Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.10	9.00	1.04	1.04	0.11			Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.13	9.00	1.02	1.02	0.14			Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.16	9.00	0.99	0.99	0.17			Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.20	9.00	0.97	0.97	0.20			Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.23	9.00	0.94	0.94	0.24			Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.26	9.00	0.92	0.92	0.27			Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.30	9.00	0.90	0.90	0.30			Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.33	9.00	0.87	0.87	0.33			Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.36	9.00	0.85	0.85	0.35			Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.39	9.00	0.82	0.82	0.38			Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.43	9.00	0.80	0.80	0.41			Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.46	9.00	0.77	0.77	0.43	1.00		Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.49	9.00	0.75	0.75	0.46	1.00		Vu < Phi*Vc / 2		5.9	0.0
+1.20D+1.60L	1	0.52	9.00	0.72	0.72	0.48	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.56	9.00	0.70	0.70	0.51	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.59	9.00	0.68	0.68	0.53	0.96	5.85	Vu < Phi*Vc / 2	ot Reqd per	5.8	0.0
+1.20D+1.60L	1	0.62	9.00	0.65	0.65	0.55	0.89	5.80	Vu < Phi*Vc / 2	ot Reqd per	5.8	0.0
+1.20D+1.60L	1	0.66	9.00	0.63	0.63	0.57	0.82	5.75	Vu < Phi*Vc / 2	ot Reqd per	5.7	0.0
+1.20D+1.60L	1	0.69	9.00	0.60	0.60	0.59	0.76		Vu < Phi*Vc / 2		5.7	0.0
+1.20D+1.60L	1	0.72	9.00	0.58	0.58	0.61	0.71		Vu < Phi*Vc / 2		5.7	0.0
+1.20D+1.60L	1	0.75	9.00	0.55	0.55	0.63	0.66		Vu < Phi*Vc / 2		5.6	0.0
+1.20D+1.60L	1	0.79	9.00	0.53	0.53	0.65	0.61		Vu < Phi*Vc / 2		5.6	0.0
+1.20D+1.60L	1	0.82	9.00	0.51	0.51	0.66			Vu < Phi*Vc / 2		5.6	0.0
+1.20D+1.60L	1	0.85	9.00	0.48	0.48	0.68			Vu < Phi*Vc / 2		5.5	0.0
+1.20D+1.60L	1	0.89	9.00	0.46	0.46	0.70			Vu < Phi*Vc / 2		5.5	0.0
+1.20D+1.60L	1	0.92	9.00	0.43	0.43	0.71			Vu < Phi*Vc / 2		5.5	0.0
+1.20D+1.60L	1	0.95	9.00	0.41	0.41	0.72			Vu < Phi*Vc / 2		5.4	0.0
+1.20D+1.60L	1	0.98	9.00	0.38	0.38	0.74			$Vu < Phi^Vc / 2$		5.4	0.0
+1.20D+1.60L	1	1.02	9.00	0.36	0.36	0.75			$Vu < Phi^Vc / 2$		5.4	0.0
+1.20D+1.60L	1	1.05	9.00	0.34	0.34	0.76			Vu < Phi Vc / 2		5.4	0.0
+1.20D+1.60L	1	1.08	9.00	0.31	0.31	0.77		5.40			5.4	0.0
+1.20D+1.60L	1	1.11	9.00	0.29	0.29	0.78			Vu < Phi VC / 2 Vu < Phi*Vc / 2		5.4	0.0
+1.20D+1.60L	1	1.15	9.00	0.26	0.26	0.79			Vu < Phi VC / 2 Vu < Phi*Vc / 2		5.4	0.0
+1.20D+1.60L	1	1.18	9.00	0.20	0.20	0.80			Vu < Phi Vc / 2 Vu < Phi*Vc / 2		5.4	0.0
+1.20D+1.60L	1	1.21	9.00	0.24	0.24	0.81			Vu < Phi Vc / 2 Vu < Phi*Vc / 2		5.4	0.0
+1.20D+1.60L	1	1.25	9.00	0.21	0.21	0.81			Vu < Phi Vc / 2 Vu < Phi*Vc / 2		5.4	0.0
+1.20D+1.60L	1	1.23	9.00	0.15	0.16	0.82			$Vu < Phi^Vc / 2$ $Vu < Phi^Vc / 2$		5.4	0.0
+1.20D+1.60L	1	1.20	9.00	0.10	0.10	0.82					5.4	0.0
+1.20D+1.60L	1	1.34	9.00	0.14	0.14	0.82			Vu < Phi*Vc / 2		5.4	0.0
+1.20D+1.60L +1.20D+1.60L	1								Vu < Phi*Vc / 2			
		1.38	9.00	0.09	0.09	0.83			Vu < Phi*Vc / 2		5.4	0.0
+1.20D+1.60L	1	1.41	9.00	0.07	0.07	0.83			Vu < Phi*Vc / 2		5.4	0.0
+1.20D+1.60L	1	1.44	9.00	0.04	0.04	0.83			Vu < Phi*Vc / 2		5.4	0.0
+1.20D+1.60L	1	1.48	9.00	0.02	0.02	0.84			Vu < Phi*Vc / 2		5.4	0.0
+1.20D+1.60L	1	1.51	9.00	-0.01	0.01	0.84			Vu < Phi*Vc / 2		5.4	0.0
+1.20D+1.60L	1	1.54	9.00	-0.03	0.03	0.84			Vu < Phi*Vc / 2		5.4	0.0
+1.20D+1.60L	1	1.57	9.00	-0.05	0.05	0.83		5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.6613/24	1	1.61	9.00	-0.08	0.08	0.83		5.40	Vu < Phi*Vc / 2	ot Reqd per		0.0
+1.20D+1.60L	1	1.64	9.00	-0.10	0.10	0.83			Vu < Phi*Vc / 2		5.4	0.0
+1.20D+1.60L	1	1.67	9.00	-0.13	0.13	0.83	0.12	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0

Concrete Beam

LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

DESCRIPTION: LINTEL

Detailed Shear Information

	Span [Distance	e 'd'	Vu	(k)	Mu	d*Vu/Mu	Phi*Vc	Comment	Phi*Vs	Phi*Vn	Spacing (in)
Load Combination	Number	(ft)	(in)	Actual	Design	(k-ft)		(k)		(k)	(k)	Req'd
+1.20D+1.60L	1	1.70	9.00	-0.15	0.15	0.82	0.14	5.40	Vu < Phi*Vc / 2	ot Reqd pe	5.4	0.0
+1.20D+1.60L	1	1.74	9.00	-0.18	0.18	0.82	0.16	5.40	Vu < Phi*Vc / 2	ot Reqd pe	5.4	0.0
+1.20D+1.60L	1	1.77	9.00	-0.20	0.20	0.81	0.19	5.40	Vu < Phi*Vc / 2	ot Reqd pe	5.4	0.0
+1.20D+1.60L	1	1.80	9.00	-0.23	0.23	0.80	0.21	5.40	Vu < Phi*Vc / 2	ot Reqd pe	5.4	0.0
+1.20D+1.60L	1	1.84	9.00	-0.25	0.25	0.79	0.24	5.40	Vu < Phi*Vc / 2	ot Reqd pe	5.4	0.0
+1.20D+1.60L	1	1.87	9.00	-0.27	0.27	0.79	0.26	5.40	Vu < Phi*Vc / 2	ot Reqd pe	5.4	0.0
+1.20D+1.60L	1	1.90	9.00	-0.30	0.30	0.78	0.29	5.40	Vu < Phi*Vc / 2	ot Reqd pe	5.4	0.0
+1.20D+1.60L	1	1.93	9.00	-0.32	0.32	0.77	0.32	5.40	Vu < Phi*Vc / 2	ot Reqd pe	5.4	0.0
+1.20D+1.60L	1	1.97	9.00	-0.35	0.35	0.75	0.34	5.40	Vu < Phi*Vc / 2	ot Reqd pe	5.4	0.0
+1.20D+1.60L	1	2.00	9.00	-0.37	0.37	0.74	0.37	5.41	Vu < Phi*Vc / 2	ot Reqd pe	5.4	0.0
+1.20D+1.60L	1	2.03	9.00	-0.40	0.40	0.73	0.41	5.43	Vu < Phi*Vc / 2	ot Reqd pe	5.4	0.0
+1.20D+1.60L	1	2.07	9.00	-0.42	0.42	0.72	0.44		Vu < Phi*Vc / 2			0.0
+1.20D+1.60L	1	2.10	9.00	-0.44	0.44	0.70	0.47	5.49	Vu < Phi*Vc / 2	ot Reqd pe	5.5	0.0
+1.20D+1.60L	1	2.13	9.00	-0.47	0.47	0.69	0.51	5.51	Vu < Phi*Vc / 2	ot Reqd pe	5.5	0.0
+1.20D+1.60L	1	2.16	9.00	-0.49	0.49	0.67	0.55	5.54	Vu < Phi*Vc / 2	ot Reqd pe	5.5	0.0
+1.20D+1.60L	1	2.20	9.00	-0.52	0.52	0.66	0.59	5.57	Vu < Phi*Vc / 2	ot Reqd pe	5.6	0.0
+1.20D+1.60L	1	2.23	9.00	-0.54	0.54	0.64	0.64	5.61	Vu < Phi*Vc / 2	ot Reqd pe	5.6	0.0
+1.20D+1.60L	1	2.26	9.00	-0.57	0.57	0.62	0.69		Vu < Phi*Vc / 2			0.0
+1.20D+1.60L	1	2.30	9.00	-0.59	0.59	0.60	0.74		Vu < Phi*Vc / 2			0.0
+1.20D+1.60L	1	2.33	9.00	-0.62	0.62	0.58	0.79	5.73	Vu < Phi*Vc / 2	ot Reqd pe	5.7	0.0
+1.20D+1.60L	1	2.36	9.00	-0.64	0.64	0.56	0.86		Vu < Phi*Vc / 2			0.0
+1.20D+1.60L	1	2.39	9.00	-0.66	0.66	0.54	0.92	5.82	Vu < Phi*Vc / 2	ot Reqd pe	5.8	0.0
+1.20D+1.60L	1	2.43	9.00	-0.69	0.69	0.52	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd pe	5.9	0.0
+1.20D+1.60L	1	2.46	9.00	-0.71	0.71	0.49	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd pe	5.9	0.0
+1.20D+1.60L	1	2.49	9.00	-0.74	0.74	0.47	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd pe	5.9	0.0
+1.20D+1.60L	1	2.52	9.00	-0.76	0.76	0.45	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd pe	5.9	0.0
+1.20D+1.60L	1	2.56	9.00	-0.79	0.79	0.42	1.00		Vu < Phi*Vc / 2			0.0
+1.20D+1.60L	1	2.59	9.00	-0.81	0.81	0.39	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd pe	5.9	0.0
+1.20D+1.60L	1	2.62	9.00	-0.83	0.83	0.37	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd pe	5.9	0.0
+1.20D+1.60L	1	2.66	9.00	-0.86	0.86	0.34	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd pe	5.9	0.0
+1.20D+1.60L	1	2.69	9.00	-0.88	0.88	0.31	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd pe	5.9	0.0
+1.20D+1.60L	1	2.72	9.00	-0.91	0.91	0.28	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd pe	5.9	0.0
+1.20D+1.60L	1	2.75	9.00	-0.93	0.93	0.25	1.00		Vu < Phi*Vc / 2			0.0
+1.20D+1.60L	1	2.79	9.00	-0.96	0.96	0.22	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd pe	5.9	0.0
+1.20D+1.60L	1	2.82	9.00	-0.98	0.98	0.19	1.00		Vu < Phi*Vc / 2			0.0
+1.20D+1.60L	1	2.85	9.00	-1.01	1.01	0.16	1.00		Vu < Phi*Vc / 2			0.0
+1.20D+1.60L	1	2.89	9.00	-1.03	1.03	0.12	1.00		Vu < Phi*Vc / 2			0.0
+1.20D+1.60L	1	2.92	9.00	-1.05	1.05	0.09	1.00		$Vu < Phi^Vc / 2$			0.0
+1.20D+1.60L	1	2.95	9.00	-1.08	1.08	0.05			$Vu < Phi^Vc / 2$			0.0
+1.20D+1.60L	1	2.98	9.00	-1.10	1.10	0.02			$Vu < Phi^Vc / 2$			0.0

Maximum Forces & Stresses for Load Combinations

Load Combination			Location (ft)	Bending S	tress Results	(k-ft)	
Segment		Span #	along Beam	Mu : Max	Phi*Mnx	Stress Ratio	
MAXimum BENDING Envelope							
Span # 1		1	3.000	0.84	14.93	0.06	
+1.40D							
Span # 1		1	3.000	0.30	14.93	0.02	
+1.20D+1.60L							
Span # 1		1	3.000	0.84	14.93	0.06	
+1.20D+0.50L							
Span # 1		1	3.000	0.44	14.93	0.03	
+1.20D							
Span # 1		1	3.000	0.26	14.93	0.02	
+0.90D							
Span # 1		1	3.000	0.20	14.93	0.01	
Overall Maximum Deflection	IS					Page 87 of	178
Load Combination	Span	Max. "-" Defl (in) .ocati	on in Span (ft_Lo	oad Combination	Max.	. "+" Defl (in,ocati	
+D+L	1	0.0003	1.500			0.0000	0.000

WOOD TALL WALL & KING STUD ALLOWABLE LOADS (plf):

		ion Factor: 1.6 Max Deflection: L/180 Vert. Load: 50 lbs									
				Height							
King Stud	12'	14'	16'	18'	20'	22'	24'				
(1) 2x4 Stud	12.8	NA	NA	NA	NA	NA	NA				
(2) 2x4 Stud	25.6	NA	NA	NA	NA	NA	NA				
(3) 2x4 Stud	38.4	NA	NA	NA	NA	NA	NA				
(1) 2x6 DF #2	57.0	35.8	24.1	16.9	NA	NA	NA				
(2) 2x6 DF #2	114.0	71.6	48.2	33.8	NA	NA	NA				
(3) 2x6 DF #2	171.0	107.4	72.3	50.7	NA	NA	NA				
(1) 2x8 DF #2	130.0	81.7	55.0	38.7	28.2	21.2	16.3				
(2) 2x8 DF #2	260.0	163.4	110.0	77.4	56.4	42.4	32.6				
(3) 2x8 DF #2	390.0	245.1	165.0	116.1	84.6	63.6	48.9				
(1) 2x6 LSL	67.8	42.7	28.5	20.0	14.7	NA	NA				
(2) 2x6 LSL	135.6	85.4	57.0	40.0	29.4	NA	NA				
(3) 2x6 LSL	203.4	128.1	85.5	60.0	44.1	NA	NA				
(1) 2x8 LSL	155.0	98.3	65.5	46.0	33.5	25.2	19.5				
(2) 2x8 LSL	310.0	196.6	131.0	92.0	67.0	50.4	39.0				
(3) 2x8 LSL	465.0	294.9	196.5	138.0	100.5	75.6	58.5				

*NOTE 1: this table combined with trimmer table to determine combined stress on each common wall stud. *NOTE 2: allowable loads are interpolated at heights not in 2' increments.

WOOD TRIMMER ALLOWABLE LOADS (kips):

Load Duration Factor: 1.0 Eccentricity: 0"

Weak Axis Braced: Y

	Height											
Trimmer Type	8'	10'	12'	14'	16'	18'	20'					
(1) 2x4 Stud	2.4	1.7	1.2	NA	NA	NA	NA					
(2) 2x4 Stud	4.9	3.4	2.4	NA	NA	NA	NA					
(3) 2x4 Stud	7.1	5.0	3.6	NA	NA	NA	NA					
(1) 2x6 DF #2	5.1	5.1	5.0	3.8	3.0	NA	NA					
(2) 2x6 DF #2	10.3	10.3	10.1	7.7	6.0	NA	NA					
(3) 2x6 DF #2	15.4	15.4	15.1	11.6	9.1	NA	NA					
(1) 2x8 DF #2	6.7	6.7	6.7	6.7	6.4	5.3	4.4					
(2) 2x8 DF #2	13.5	13.5	13.5	13.5	12.9	10.6	8.8					
(3) 2x8 DF #2	20.3	20.3	20.3	20.3	19.4	15.9	13.2					

*NOTE 1: this table combined with king stud table to determine combined stress on each common wall stud. *NOTE 2: allowable loads are interpolated at heights not in 2' increments.

		TALL WALL (-							
	This sprea	dsheet is used for desig	gning a stud wall accord	ing to the NDS.							
escription:	11' Tall Wall	11' Tall Wall	10' Tali Wali	King Stud (9.5' Max Opening)	King Stud (3.5' Max Opening)	King Stud (10' Max Opening)					
T	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")					
Type: Species:	DF-L	DF-L	DF-L	DF-L	DF-L	DF-L					
Grade:	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2					
	(1) -	(1) •		(1) -	(1) =	(1) -					
Nominal width, t = Actual width =	<i>(1) 2</i> 1.50 in	(1) 2 1.50 in	(1) 2 1.50 in	(1) 2 1.50 in	(1) 2 1.50 in	(2) 2 3.00 in					
Nominal depth, d =	6	6	6	6	6	6					
Actual depth =	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in					
Span, L =	11.000 ft	11.000 ft	10.000 ft	10.000 ft	12.000 ft	13.000 ft					
w/o Plates Stud spacing, s =	10.750 ft 16 in	10.750 ft <i>8 in</i>	9.750 ft 16 in	9.750 ft 67 in	11.750 ft <i>31 in</i>	12.750 ft 70 in					
Lat. Pressure, w _{wind} =	5.00 psf	15.09 psf	15.09 psf	15.09 psf	15.09 psf	15.09 psf					
Axial load, P =	4899 lbs	2579 lbs	5344 lbs	50 lbs	50 lbs	50 lbs					
Eccentricity, e =	0 in	0 in	0 in	0 in	0 in	0 in					
K _{cE} =	0.3	0.3	0.3	0.3	0.3	0.3					
c = w =	0.8 6.7 plf	0.8 10.1 plf	0.8 20.1 plf	0.8 84.5 plf	0.8 39.3 plf	0.8 88.3 plf					
w =	0.7 pii	10.1 hii	20.1 pii	04.3 µII	22.3 hii	00.5 µII					
Fb	900 psi	900 psi	900 psi	900 psi	900 psi	900 psi					
Fv	180 psi	180 psi	180 psi	180 psi	180 psi	180 psi					
Fc-prll	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi					
Fc-perp C d	625 psi 1.60	625 psi 1.60	625 psi 1.60	625 psi 1.60	625 psi 1.60	625 psi 1.60					
C _d C _{F,Fb}	1.30	1.30	1.30	1.30	1.30	1.30					
	1.10	1.10	1.10	1.10	1.10	1.10					
C _{F,FcprII}	1.15	1.15	1.15	1.00	1.00	1.00					
C, C,	0.33	0.33	0.39	0.39	0.28	0.25					
С _Р С _Н	1.00	1.00	1.00	1.00	1.00	6.00					
C _b	1.07	1.07	1.07	1.07	1.07	1.07					
E	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi					
Emin	580,000 psi	580,000 psi	580,000 psi	580,000 psi	580,000 psi	580,000 psi					
Allowable Stress:											
$F'_b = F_b C_d C_F C_r =$	2153 psi	2153 psi	2153 psi	1872 psi	1872 psi	1872 psi					
$F'_{v} = F'_{v} C_{d} C_{H} =$	288 psi	288 psi	288 psi	288 psi	288 psi	1728 psi					
$F_c^* = F_c C_d C_F =$	2376 psi	2376 psi	2376 psi	2376 psi	2376 psi	2376 psi					
$F_{cE} = (K_{cE} E')/(I_e/d)2 =$	873 psi	873 psi	1061 psi	1061 psi	730 psi	620 psi					
$F'_c = F_c C_d C_F C_p =$	793 psi	793 psi	938 psi	938 psi	676 psi	582 psi					
F' _{c perp} = F _{c perp} Cb =	668 psi	668 psi	668 psi	668 psi	668 psi	668 psi					
		1600000 psi		1600000 psi	1600000 psi	1600000 psi					
E' = E =	1600000 psi		1600000 psi								
E' = E = F _{bE} =	2207 psi	2207 psi	2434 psi	2434 psi	2019 psi	7444 psi					
E' = E = F _{bE} = Slenderness Ratio:	2207 psi <u>< 50 OK</u>	2207 psi <u>< 50 OK</u>	2434 psi < <u>< 50 OK</u>	2434 psi <u>< 50 OK</u>	2019 psi <u>< 50 OK</u>	<u>< 50 OK</u>					
$E' = E = F_{bE} = F_{bE}$ Slenderness Ratio: $R_{B} = R_{B}$	2207 psi <u>< 50 OK</u> 18	2207 psi <u>< 50 OK</u> 18	2434 psi <u>< 50 OK</u> 17	2434 psi <u>< 50 OK</u> 17	2019 psi <u>< 50 OK</u> 19	<u>< 50 OK</u> 10					
E' = E = F _{bE} = Slenderness Ratio:	2207 psi <u>< 50 OK</u>	2207 psi <u>< 50 OK</u>	2434 psi < <u>< 50 OK</u>	2434 psi <u>< 50 OK</u>	2019 psi <u>< 50 OK</u>	<u>< 50 OK</u>					
$E' = E = F_{bE} = F_{bE}$ Slenderness Ratio: $R_8 = Bending:$	2207 psi <u>< 50 OK</u> 18 <u>< F'b OK</u>	2207 psi <u>< 50 OK</u> 18 <u>< F'b OK</u>	2434 psi <u>< 50 OK</u> 17 <u>< F'b OK</u>	2434 psi <u>< 50 OK</u> 17 <u>< F'b OK</u>	2019 psi <u>< 50 OK</u> 19 <u>< F'b OK</u>	<u>< 50 ОК</u> 10 <u>< F'b ОК</u>					
$E' = E = F_{bc} =$ Slenderness Ratio: $R_{\theta} =$ Bending: $M = w L^2/8 + P e/12 =$	2207 psi <u>< 50 OK</u> 18 <u>< F'b OK</u> 96 ft-lbs	2207 psi < <u> 50 OK</u> 18 < <u> F'b OK</u> 145 ft-lbs	2434 psi < <u>50 OK</u> 17 < <u><f'b ok<="" u=""> 239 ft-lbs</f'b></u>	2434 psi <u><50 OK</u> 17 <u><f'b ok<="" u=""> 1005 ft-lbs</f'b></u>	2019 psi < <u>< 50 OK</u> 19 < <u>< F'b OK</u> 678 ft-lbs	≤ 50 OK 10 ≤ F'b OK 1795 ft-lbs					
$\begin{array}{ccc} E' = & E = & & \\ F_{bE} = & & \\ \textbf{Slenderness Ratio:} & & \\ R_{B} = & & \\ \textbf{Bending} & & \\ \textbf{M} = & w \ L^{2}/8 + P \ e/12 = & \\ f_{b} = & M/S = & \\ S = & \\ \textbf{Shear:} \end{array}$	2207 psi < <u><50 OK</u> 18 < <u><f'b ok<="" u=""> 96 ft-lbs 153 psi 8 in³ <<u><f'v ok<="" u=""></f'v></u></f'b></u>	2207 psi < <u><50 OK</u> 18 < <u><f'b ok<="" u=""> 145 ft-lbs 231 psi 8 in³ <<u><f'v ok<="" u=""></f'v></u></f'b></u>	2434 psi < <u><50 OK</u> 17 < <u><f'b ok<="" u=""> 239 ft-lbs 379 psi 8 in³ <<u><f'v ok<="" u=""></f'v></u></f'b></u>	2434 psi < <u><50 OK</u> 17 < <u><f'b ok<="" u=""> 1005 ft-lbs 1594 psi 8 in³ <<u><f'v ok<="" u=""></f'v></u></f'b></u>	2019 psi < <u>50 OK</u> 19 < <u>F'b OK</u> 678 ft-lbs 1076 psi 8 in ³ < <u>F'v OK</u>	≤ 50 OK 10 ≤ F'b OK 1795 ft-lbs 1424 psi 15 in ³ ≤ F'v OK					
$\begin{array}{cccc} {\sf E}' = & {\sf E} = & & \\ {\sf F}_{{\sf b}{\sf E}} = & & \\ {\sf Slenderness Ratio:} & & \\ {\sf R}_{{\sf B}} = & & \\ {\sf Bending:} & & \\ {\sf M} = & {\sf w} \ {\sf L}^2/8 + {\sf P} \ {\sf e}/2 = & \\ {\sf f}_{{\sf b}} = & {\sf M}/S = & \\ {\sf S} = & & \\ {\sf Shear:} & \\ {\sf V} = & {\sf w} \ {\sf L}/2 = & \\ \end{array}$	2207 psi a https://www.science.org" https://www.science.org" a https://www.science.org" a <a href="https://www.scien</td><td>2207 psi
 https://www.science.org" https://www.science.org https://wwww.science.org https://www.science.org https://wwww.science.org<!--</td--><td>2434 psi ≤ 50 OK 17 ≤ F^b OK 239 ft-lbs 379 psi 8 in³ ≤ F^b OK 98 lbs</td><td>2434 psi ≤ 50 OK 17 ≤ F^b OK 1005 fr.lbs 1594 psi 8 in³ ≤ F^v OK 412 lbs</td><td>2019 psi a https://www.science.org" https://www.science.org https://wwww.science.org<</td><td>≤ 50 OK 10 ≤ F¹ b OK 1795 ft-lbs 1424 psi 15 in³ < F¹ v OK 96 lbs</td>	2434 psi ≤ 50 OK 17 ≤ F ^b OK 239 ft-lbs 379 psi 8 in ³ ≤ F ^b OK 98 lbs	2434 psi ≤ 50 OK 17 ≤ F ^b OK 1005 fr.lbs 1594 psi 8 in ³ ≤ F ^v OK 412 lbs	2019 psi a https://www.science.org" https://www.science.org https://wwww.science.org<	≤ 50 OK 10 ≤ F ¹ b OK 1795 ft-lbs 1424 psi 15 in ³ < F ¹ v OK 96 lbs						
$\begin{array}{ccc} {\sf E}' = & {\sf E} = \\ {\sf F}_{{\sf b}{\sf E}} = \\ {\sf Slenderness Ratio:} \\ {\sf R}_{{\sf B}} = \\ {\sf Bending:} \\ {\sf M} = & {\sf w}{\sf L}^2/8 + {\sf P}{\sf e}/12 = \\ {\sf f}_{{\sf b}} = & {\sf M}/{\sf S} = \\ {\sf S} = \\ {\sf Shear:} \\ {\sf V} = & {\sf w}{\sf L}/2 = \\ {\sf f}_{{\sf v}} = & 1.5{\sf V}/{\sf A} = \end{array}$	2207 psi	2207 psi 2207 psi 18 18 145 ft-lbs 231 psi 8 in ³ <	2434 psi 2434 psi 17 239 ft-lbs 379 psi 8 in ³ 8 lbs 18 psi	2434 psi 2434 psi 17 <fbok< td=""> 1005 ft-lbs 1594 psi 8 in³ <fv ok<="" td=""> 412 lbs 75 psi</fv></fbok<>	2019 psi < <u><50 OK</u> 19 < <u><f'b ok<="" u=""> 678 ft-lbs 1076 psi 8 in³ <<u><f'v ok<="" u=""> 231 lbs 42 psi</f'v></u></f'b></u>	≤ 50 OK 10 ≤ F ^b OK 1795 ft-lbs 1424 psi 15 in ³ ≤ F ⁱ V OK 96 lbs 9 psi					
$\begin{array}{ccc} E' = & E = & & \\ F_{bE} = & & \\ F_{bE} = & & \\ Slenderness Ratio: & & \\ R_{B} = & & \\ Bending: & & \\ M = & w \ L^{2} / 8 + P \ e / 12 = & \\ f_{b} = & & M/S = & \\ S = & & \\ Shear: & & \\ V = & w \ L/2 = & \\ f_{v} = & 1.5 \ V/A = & \\ A = & \\ \end{array}$	2207 psi < <u>< 50 OK</u> 18 < <u>< F'b OK</u> 9 of ft-lbs 153 psi 8 in ³ < <u>< F'v OK</u> 36 lbs 7 psi 8 in ²	2207 psi 2207 psi 18 18 145 ft-lbs 231 psi 8 in ³ </td <td>2434 psi ≤ 50 OK 17 <<u><f'b ok<="" u=""> 239 ft-lbs 379 psi 8 in³ <<u><f'v ok<="" u=""> 98 lbs 18 psi 8 in²</f'v></u></f'b></u></td> <td>2434 psi 2434 psi < 50 OK</td> 17 < F'b OK	2434 psi ≤ 50 OK 17 < <u><f'b ok<="" u=""> 239 ft-lbs 379 psi 8 in³ <<u><f'v ok<="" u=""> 98 lbs 18 psi 8 in²</f'v></u></f'b></u>	2434 psi 2434 psi < 50 OK	2019 psi < <u><50 OK</u> 19 < <u><f'b ok<="" u=""> 678 ft-lbs 1076 psi 8 in³ <<u><f'v ok<="" u=""> 231 lbs 42 psi 8 in²</f'v></u></f'b></u>	≤ 50 OK 10 ≤ F ^b OK 1795 ft-lbs 1424 psi 15 in ³ ≤ F ⁱ v OK 96 lbs 9 psi 17 in ²					
$\begin{array}{ccc} E' = & E = & & \\ F_{bE} = & & \\ F_{bE} = & & \\ Slenderness Ratio: & & \\ R_{B} = & & \\ Bending: & \\ M = & w L^{2}/8 + P e/12 = & \\ f_{b} = & & M/S = & \\ M/S = & & \\ M = & & \\ Shear: & \\ F_{v} = & 1.5 V/A = & \\ A = & \\ Compression: & \\ \end{array}$	2207 psi 2207 psi < 50 OK 18 < F ¹ b OK 96 ft-lbs 153 psi 8 in ³ < F ¹ v OK 36 lbs 7 psi 8 in ² < F ¹ c OK	2207 psi 2207 psi 250 OK 18 < F'b OK	2434 psi ≤50 OK 17 < <u>< F^b OK</u> 239 ft-lbs 379 psi 8 in ³ < <u>< F^v VOK</u> 98 lbs 18 psi 8 in ² < <u>< F^c OK</u>	2434 psi ≤ 50 OK 17 ≤ F'b OK 1005 ft-lbs 1594 psi 8 in ³ ≤ F'v OK 412 lbs 75 psi 8 in ² ≤ F'c OK	2019 psi a https://www.science.org" a https://www.science.org" a https://www.science.org" a a a <a block"="" href="https://w</td><td>≤ 50 OK 10 ≤ F'b OK 1795 ft-lbs 1424 psi 15 in³ ≤ F'v OK 96 lbs 9 psi 17 in² ≤ F'c OK</td></tr><tr><td><math display=">\begin{array}{ccc} E' = & E = & & \\ F_{bE} = & & \\ F_{bE} = & & \\ Slenderness Ratio: & & \\ R_{B} = & & \\ Bending: & & \\ M = & w \ L^{2} / 8 + P \ e / 12 = & \\ f_{b} = & & M/S = & \\ S = & & \\ Shear: & & \\ V = & w \ L/2 = & \\ f_{v} = & 1.5 \ V/A = & \\ A = & \\ \end{array}	2207 psi < <u>< 50 OK</u> 18 < <u>< F'b OK</u> 9 of ft-lbs 153 psi 8 in ³ < <u>< F'v OK</u> 36 lbs 7 psi 8 in ²	2207 psi 2207 psi 18 18 145 ft-lbs 231 psi 8 in ³ </td <td>2434 psi ≤ 50 OK 17 <<u><f'b ok<="" u=""> 239 ft-lbs 379 psi 8 in³ <<u><f'v ok<="" u=""> 98 lbs 18 psi 8 in²</f'v></u></f'b></u></td> <td>2434 psi 2434 psi < 50 OK</td> 17 < F'b OK	2434 psi ≤ 50 OK 17 < <u><f'b ok<="" u=""> 239 ft-lbs 379 psi 8 in³ <<u><f'v ok<="" u=""> 98 lbs 18 psi 8 in²</f'v></u></f'b></u>	2434 psi 2434 psi < 50 OK	2019 psi < <u><50 OK</u> 19 < <u><f'b ok<="" u=""> 678 ft-lbs 1076 psi 8 in³ <<u><f'v ok<="" u=""> 231 lbs 42 psi 8 in²</f'v></u></f'b></u>	≤ 50 OK 10 ≤ F ^b OK 1795 ft-lbs 1424 psi 15 in ³ ≤ F ⁱ v OK 96 lbs 9 psi 17 in ²
$\begin{array}{ccc} {\sf E}' = & {\sf E} = \\ & {\sf F}_{{\sf b}{\sf E}} = \\ & {\sf Slenderness Ratio:} \\ & {\sf R}_{{\sf g}} = \\ & {\sf Bending:} \\ & {\sf M} = & {\sf w1}^2/8 + {\sf Pe}/12 = \\ & {\sf f}_{{\sf b}} = & {\sf M}/{\sf S} = \\ & {\sf Shear:} \\ & {\sf V} = & {\sf w1}/2 = \\ & {\sf f}_{{\sf v}} = & {\sf 1.5} \; {\sf V}/{\sf A} = \\ & {\sf Compression:} \\ & {\sf f}_{{\sf c}} = & {\sf P}/{\sf A} = \end{array}$	2207 psi 2207 psi 18 6 ft-lbs 153 psi 8 in ³ < F'v OK 36 lbs 7 psi 8 in ² < F'c OK 594 psi	2207 psi 2207 psi < 50 OK 18 < F ¹ b OK 145 ft-lbs 231 psi 8 in ³ < F ¹ V OK 54 lbs 10 psi 8 in ² < F ¹ C OK 313 psi	2434 psi ≤ 50 OK 17 ≤ F ¹ b OK 239 ft-lbs 379 psi 8 in ³ ≤ F ¹ v OK 98 lbs 18 psi 8 in ² ≤ F ¹ c OK 648 psi	2434 psi ≤ 50 OK 17 ≤ F ^b OK 1005 ft-lbs 1594 psi 8 in ³ ≤ F ^v OK 412 lbs 75 psi 8 in ² ≤ F ^c OK 6 psi	2019 psi ≤ 50 OK 19 ≤ F ^b OK 678 ft-lbs 1076 psi 8 in ³ ≤ F ^v OK 231 lbs 42 psi 8 in ² ≤ F ^c OK 6 psi	≤ 50 OK 10 ≤ F'b OK 1795 ft-lbs 1424 psi 15 in³ ≤ F'v OK 96 lbs 9 psi 17 in² ≤ F'c OK 3 psi					
$E' = E = F_{bE} = F$	2207 psi 2207 psi 18 6 ft-lbs 153 psi 8 in ³ < F'v OK 36 lbs 7 psi 8 in ² < F'c OK 594 psi < < F'c OK	2207 psi ≤ 50 OK 18 < F'b OK 145 ft-lbs 231 psi 8 in ³ < F'v OK 54 lbs 10 psi 8 in ² < F'c OK 313 psi < ≤ F'c OK	2434 psi ≤ 50 OK 17 239 ft-lbs 379 psi 8 in ³ < F'v OK 98 lbs 18 psi 8 in ² < F'c OK 648 psi < < F'c OK	2434 psi ≤ 50 OK 17 ≤ F ¹ OK 1005 ft-lbs 1594 psi 8 in ³ ≤ F ¹ OK 412 lbs 75 psi 8 in ² ≤ F ¹ COK 6 psi ≤ F ¹ COK	2019 psi < <u><50 OK</u> 19 < <u><f'b ok<="" u=""> 678 ft-lbs 1076 psi 8 in³ <<u><f'v ok<="" u=""> 231 lbs 42 psi 8 in² <<u><f'c ok<="" u=""> 6 psi <<u><f'c ok<="" u=""></f'c></u></f'c></u></f'v></u></f'b></u>	≤ 50 OK 10 ≤ F'b OK 1795 ft-lbs 1424 psi 15 in³ ≤ F'v OK 96 lbs 9 psi 17 in² ≤ F'c OK 3 psi ≤ F'c OK					
$\begin{array}{ccc} {\sf E}' = & {\sf E} = \\ & {\sf F}_{b{\sf E}} = \\ & {\sf Slenderness Ratio:} \\ & {\sf R}_{{\sf B}} = \\ & {\sf Bending} \\ & {\sf M} = & {\sf w} L^2/8 + P e/12 = \\ & {\sf f}_{{\sf b}} = & {\sf M}/S = \\ & {\sf Slear:} \\ & {\sf V} = & {\sf w} L/2 = \\ & {\sf f}_{{\sf v}} = & {\sf 1.5} {\sf V}/{\sf A} = \\ & {\sf A} = \\ & {\sf Compression:} \\ & {\sf f}_{{\sf c}} = & {\sf P}/{\sf A} = \\ & {\sf Compression}({\sf perp.}): \\ & {\sf f}_{{\sf c}{\sf perp}} = & {\sf P}/{\sf A} = \end{array}$	2207 psi 2207 psi 18 6 ft-lbs 96 ft-lbs 153 psi 8 in ³ < F'v OK 36 lbs 7 psi 8 in ² < F'c OK 594 psi < < F'c OK 594 psi	2207 psi ≤ 50 OK 18 ≤ F ¹ b OK 145 ft-lbs 231 psi 8 in ³ ≤ F ¹ v OK 54 lbs 10 psi 8 in ² ≤ F ¹ c OK 313 psi ≤ F ¹ c OK 313 psi	2434 psi ≤ 50 OK 17 ≤ Fb OK 239 ft-lbs 379 psi 8 in³ ≤ F'v OK 98 lbs 18 psi 8 in² ≤ F'v OK 648 psi ≤ F'c OK 648 psi	2434 psi ≤ 50 OK 17 ≤ F ¹ OK 1005 ft-lbs 1594 psi 8 in ³ ≤ F ¹ OK 412 lbs 75 psi 8 in ² ≤ F ¹ COK 6 psi ≤ F ¹ COK	2019 psi < <u><50 OK</u> 19 < <u><f'b ok<="" u=""> 678 ft-lbs 1076 psi 8 in³ <<u><f'v ok<="" u=""> 231 lbs 42 psi 8 in² <<u><f'c ok<="" u=""> 6 psi <<u><f'c ok<="" u=""></f'c></u></f'c></u></f'v></u></f'b></u>	≤ 50 OK 10 ≤ F'b OK 1795 ft-lbs 1424 psi 15 in³ ≤ F'v OK 96 lbs 9 psi 17 in² ≤ F'c OK 3 psi ≤ F'c OK					
$\begin{array}{llllllllllllllllllllllllllllllllllll$	2207 psi 2207 psi 2207 psi 250 OK 18 26 ft-lbs 153 psi 28 in³ 2 F¹ OK 36 lbs 7 psi 8 in² 2 F¹ OK 594 psi 2 F¹ OK 594 psi 2 (1.0 OK 0.78	2207 psi 2207 psi 18 18 145 ft-lbs 231 psi 8 in ³ < <u>F'v OK</u> 54 lbs 10 psi 8 in ² < <u><f'c ok<="" u=""> 313 psi <<u><f'c ok<="" u=""> 313 psi <<u><f'c ok<="" u=""> 313 psi <<u><iok< u=""> 0.32</iok<></u></f'c></u></f'c></u></f'c></u>	2434 psi ≤ 50 OK 17 ≤ F ¹ b OK 239 ft-lbs 379 psi 8 in³ ≤ F ¹ V OK 98 lbs 18 psi 8 in² ≤ F ¹ C OK 648 psi ≤ F ¹ C OK 648 psi ≤ I.0 OK 0.93	2434 psi	2019 psi ≤ 50 OK 19 < F ¹ b OK 678 ft-lbs 1076 psi 8 in ³ < F ¹ V OK 231 lbs 42 psi 8 in ² < <u>F¹C OK</u> 6 psi < <u>6 psi</u>	≤ 50 OK 10 ≤ F ^b OK 1795 ft-lbs 1424 psi 15 in ³ ≤ F ⁱ V OK 96 lbs 9 psi 17 in ² ≤ F ⁱ COK 3 psi ≤ F ⁱ COK 3 psi					
$\begin{array}{cccc} {\sf E}' = & {\sf E} = \\ {\sf F}_{{\sf b}{\sf E}} = \\ {\sf Slenderness Ratio:} \\ {\sf R}_{{\sf B}} = \\ {\sf Bending:} \\ {\sf M} = & {\sf w1}^2/{\sf 8} + {\sf P}e/12 = \\ {\sf f}_{{\sf b}} = & {\sf M}/{\sf S} = \\ {\sf Shear:} \\ {\sf V} = & {\sf w1}/{\sf 2} = \\ {\sf Shear:} \\ {\sf V} = & {\sf w1}/{\sf 2} = \\ {\sf Shear:} \\ {\sf V} = & {\sf w1}/{\sf 2} = \\ {\sf Ghear:} \\ {\sf A} = \\ {\sf Compression:} \\ {\sf f}_{{\sf c}} = & {\sf P}/{\sf A} = \\ {\sf Compression:} \\ {\sf f}_{{\sf c},{\sf perp}} = & {\sf P}/{\sf A} = \\ {\sf Compression:} \\ {\sf f}_{{\sf c},{\sf perp}} = & {\sf P}/{\sf A} = \\ {\sf Combined:} \\ ({\sf fc}/{\sf Fc})2 + \{{\sf fb}/[{\sf Fb}(1-({\sf fc}/{\sf Fc})]] = \\ {\sf Deflection:} \end{array}$	2207 psi ≤ 50 OK 18 ≤ F ¹ b OK 9 of ft-lbs 153 psi 8 in ³ ≤ F ¹ v OK 3 of lbs 7 psi 8 in ² ≤ F ¹ c OK 594 psi ≤ F ² c OK 594 psi ≤ 10 OK 0.78	2207 psi	2434 psi ≤ 50 OK 17 ≤ F ¹ OK 239 ft-lbs 379 psi 8 in³ ≤ F ¹ OK 98 lbs 18 psi 8 in² ≤ F ¹ COK 648 psi ≤ F ¹ COK 648 psi ≤ IO OK 0.93	2434 psi	2019 psi ≤ 50 OK 19 ≤ F ¹ b OK 678 ft-lbs 1076 psi 8 in ³ ≤ F ¹ OK 231 lbs 42 psi 8 in ² ≤ F ¹ OK 6 psi ≤ F ² OK 6 psi ≤ F ² OK	≤ 50 OK 10 ≤ F ^b OK 1795 ft-lbs 1424 psi 15 in ³ ≤ F ⁱ V OK 96 lbs 9 psi 17 in ² ≤ F ⁱ COK 3 psi < ≤ F ⁱ COK 3 psi > 280 OK					
$\begin{array}{llllllllllllllllllllllllllllllllllll$	2207 psi 2207 psi 2207 psi 250 OK 18 26 ft-lbs 153 psi 28 in³ 2 F¹ OK 36 lbs 7 psi 8 in² 2 F¹ OK 594 psi 2 F¹ OK 594 psi 2 (1.0 OK 0.78	2207 psi 2207 psi 18 18 145 ft-lbs 231 psi 8 in ³ < <u>F'v OK</u> 54 lbs 10 psi 8 in ² < <u><f'c ok<="" u=""> 313 psi <<u><f'c ok<="" u=""> 313 psi <<u><f'c ok<="" u=""> 313 psi <<u><1.0 OK</u> 0.32</f'c></u></f'c></u></f'c></u>	2434 psi ≤ 50 OK 17 ≤ F ¹ b OK 239 ft-lbs 379 psi 8 in³ ≤ F ¹ V OK 98 lbs 18 psi 8 in² ≤ F ¹ C OK 648 psi ≤ F ¹ C OK 648 psi ≤ I.0 OK 0.93	2434 psi	2019 psi ≤ 50 OK 19 < F ¹ b OK 678 ft-lbs 1076 psi 8 in ³ < F ¹ V OK 231 lbs 42 psi 8 in ² < <u>F¹C OK</u> 6 psi < <u>6 psi</u>	≤ 50 OK 10 ≤ F ^b OK 1795 ft-lbs 1424 psi 15 in ³ ≤ F ⁱ v OK 96 lbs 9 psi 17 in ² ≤ F ⁱ c OK 3 psi ≤ F ⁱ c OK 3 psi					

escription:	King Stud (12.75' Max Opening)	16' Tall Wall	13' Tall Wall	13' Tall Wall	12' Tall Wall					
	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")					
Type:										
Species: Grade:	DF-L No. 2	DF-L No. 2	DF-L No. 2	DF-L No. 2	DF-L No. 2					
			-		-					
Nominal width, t =	(2) 2	(1) 2	(1) 2	(1) 2	(1) 2					
Actual width =	3.00 in	1.50 in	1.50 in	1.50 in	1.50 in					
Nominal depth, d =	6 5.50 in	6 5.50 in	6 5.50 in	6 5.50 in	6 5.50 in					
Actual depth = Span, L =	12.000 ft	16.000 ft	13.000 ft	13.000 ft	12.000 ft					
w/o Plates	11.750 ft	15.750 ft	12.750 ft	12.750 ft	11.750 ft					
Stud spacing, s =	87 in	8 in	12 in	16 in	16 in					
Lat. Pressure, w _{wind} =	15.09 psf	15.09 psf	15.09 psf	15.09 psf	15.09 psf					
Axial load, P =	50 lbs	1225 lbs	2783 lbs	2152 lbs	3284 lbs					
Eccentricity, e =	0 in	0 in	0 in	0 in	0 in					
K _{cE} =	0.3	0.3	0.3	0.3	0.3					
C =	0.8	0.8	0.8	0.8	0.8					
w =	109.1 plf	10.1 plf	15.1 plf	20.1 plf	20.1 plf					
Fb	900 psi	900 psi	900 psi	900 psi	900 psi					
Fv Fr	180 psi	180 psi	180 psi	180 psi	180 psi					
Fc-prll	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi					
Fc-perp	625 psi	625 psi	625 psi	625 psi	625 psi					
C _d	1.60	1.60	1.60	1.60	1.60					
C _{F,Fb}	1.30	1.30	1.30	1.30	1.30					
C _{F,FcprII}	1.10	1.10	1.10	1.10	1.10					
C,	1.00	1.15	1.15	1.15	1.15					
C _p	0.28	0.16	0.25	0.25	0.28					
C _H	1.00	1.00	1.00	1.00	6.00					
C _b	1.07	1.07	1.07	1.07	1.07					
E	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi					
Emin	580,000 psi	580,000 psi	580,000 psi	580,000 psi	580,000 psi					
Allowable Stress:										
$F'_b = F_b C_d C_F C_r =$	1872 psi	2153 psi	2153 psi	2153 psi	2153 psi					
$F'_v = F'_v C_d C_H =$	288 psi	288 psi	288 psi	288 psi	1728 psi					
	2376 psi	2376 psi	2376 psi	2376 psi	2376 psi					
$F_c^* = F_c C_d C_F =$			-							
	730 psi	406 psi	620 psi	620 psi	730 psi					
$F_{cE} = (K_{cE} E')/(l_e/d)2 =$			EQ3 nci	582 psi	676 psi					
$F_{cE} = (K_{cE} E')/(I_{e}/d)2 =$ $F'_{c} = F_{c} C_{d} C_{F} C_{p} =$	676 psi	391 psi	582 psi							
		391 psi 668 psi	668 psi	668 psi	668 psi					
$F'_c = F_c C_d C_F C_p =$	676 psi			668 psi 1600000 psi	668 psi 1600000 psi					
$F'_{c} = F_{c} C_{d} C_{F} C_{p} =$ $F'_{c perp} = F_{c perp} Cb =$	676 psi 668 psi	668 psi	668 psi	•						
$\begin{array}{ll} F_c' = & F_c C_d C_F C_p = \\ F_{c perp}' = & F_{c perp} Cb = \\ E' = & E = \\ F_{bc} = \\ \end{array}$	676 psi 668 psi 1600000 psi 8077 psi <u>< 50 OK</u>	668 psi 1600000 psi 1506 psi <u>< 50 OK</u>	668 psi 1600000 psi 1861 psi <u>< 50 OK</u>	1600000 psi 1861 psi <u>< 50 OK</u>	1600000 psi 2019 psi <u>< 50 OK</u>					
$\begin{array}{ll} F_c' = & F_c C_d C_F C_p = \\ F_c'_{perp} = & F_c perp Cb = \\ E' = & E = \\ F_{bE} = \\ \hline \end{array}$	676 psi 668 psi 1600000 psi 8077 psi < <u>< 50 OK</u> 9	668 psi 1600000 psi 1506 psi <u>< 50 OK</u> 21	668 psi 1600000 psi 1861 psi <u>< 50 OK</u> 19	1600000 psi 1861 psi <u>< 50 OK</u> 19	1600000 psi 2019 psi <u>< 50 OK</u> 19					
$\begin{array}{ll} F_c' = & F_c C_d C_F C_p = \\ F_{c perp}' = & F_{c perp} Cb = \\ E' = & E = \\ F_{bE} = \\ \end{array}$	676 psi 668 psi 1600000 psi 8077 psi < <u>< 50 OK</u> 9 < <u>< 5⁶ b OK</u>	668 psi 1600000 psi 1506 psi <u>< 50 OK</u> 21 <u>< F'b OK</u>	668 psi 1600000 psi 1861 psi <u>< 50 OK</u> 19 <u>< F'b OK</u>	1600000 psi 1861 psi <u>< 50 OK</u> 19 <u>< F'b OK</u>	1600000 psi 2019 psi <u>< 50 OK</u> 19 <u>< F'b OK</u>					
$\begin{array}{lll} F_c' = & F_c \ C_d \ C_F \ C_p = \\ F_c' \ perp \ E' = & F_c \ perp \ Cb = \\ F_b = \\ \end{array}$	676 psi 668 psi 1600000 psi 8077 psi < <u><50 OK</u> 9 < <u>< 5⁶ b OK</u> 1882 ft-lbs	668 psi 1600000 psi 1506 psi ≤ <u>50 OK</u> 21 ≤ <u>F'b OK</u> 312 ft-lbs	668 psi 1600000 psi 1861 psi ≤ 50 OK 19 <a>F'b OK 307 ft-lbs	1600000 psi 1861 psi < <u>< 50 OK</u> 19 < <u>< F'b OK</u> 409 ft-lbs	1600000 psi 2019 psi <u>≤50 OK</u> 19 <u>≤ F'b OK</u> 347 ft-lbs					
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$\begin{array}{rcl} F_c' &= & F_c C_d C_F C_p = \\ F_c _{operp} &= & F_c _{perp} Cb = \\ E' &= & E = \\ & & F_{bc} = \\ \hline \end{array}$	676 psi 668 psi 1600000 psi 8077 psi <u>< 50 OK</u> 9 <u>< F'b OK</u> 1882 ft-lbs 1493 psi 15 in ³	668 psi 1600000 psi 1506 psi ≤ 50 OK 21 ≤ <u>F'b OK</u> 312 ft-lbs 495 psi 8 in ³	668 psi 1600000 psi 1861 psi si <td>160000 psi 1861 psi <u>50 OK</u> 19 <u>67 b OK</u> 409 ft-lbs 649 psi 8 in³</td><td>160000 psi 2019 psi <u>< 50 OK</u> 19 <u>< 6⁺b OK</u> 347 ft-lbs 551 psi 8 in³</td></a<>	160000 psi 1861 psi <u>50 OK</u> 19 <u>67 b OK</u> 409 ft-lbs 649 psi 8 in ³	160000 psi 2019 psi <u>< 50 OK</u> 19 <u>< 6⁺b OK</u> 347 ft-lbs 551 psi 8 in ³					
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$\begin{array}{rcl} F_{c}' = & F_{c} C_{d} C_{F} C_{p} = \\ F_{cperp}' = & F_{cperp}' Cb = \\ E' = & E = \\ & F_{bc} = \\ \end{array}$ $\begin{array}{rcl} Slenderness Ratio: \\ R_{b} = \\ \end{array}$ $\begin{array}{rcl} Bending: \\ M = & w L^{2}/8 + P e/12 = \\ f_{b} = & M/S = \\ & S = \\ \end{array}$ $\begin{array}{rcl} M = & w L^{2}/8 + P e/12 = \\ f_{b} = & M/S = \\ & S = \\ \end{array}$ $\begin{array}{rcl} Shear: \\ V = & w L/2 = \\ f_{v} = & 1.5 V/A = \\ \end{array}$	676 psi 668 psi 1600000 psi 8077 psi < <u><50 OK</u> 9 < <u><f'b ok<="" u=""> 1882 ft-lbs 1493 psi 15 in³ <<u><f'v ok<="" u=""> 641 lbs 58 psi</f'v></u></f'b></u>	668 psi 1600000 psi 1506 psi ≤ 50 OK 21 ≤ F'b OK 312 ft-lbs 495 psi 8 in ³ ≤ F'v OK 79 lbs 14 psi	668 psi 1600000 psi 1861 psi < <u><50 OK</u> 19 < <u><f'b ok<="" u=""> 307 ft-lbs 486 psi 8 in³ <<u><f'v ok<="" u=""> 96 lbs 17 psi</f'v></u></f'b></u>	1600000 psi 1861 psi < <u><50 OK</u> 19 < <u><f'b ok<="" u=""> 409 ft-lbs 649 psi 8 in³ <<u><f'v ok<="" u=""> 128 lbs 23 psi</f'v></u></f'b></u>	160000 psi 2019 psi 2019 psi 2019 psi 19 347 ft-lbs 551 psi 8 in ³ 8 in ³ https://www.sci.org 8					
$\begin{array}{rcl} F_{c}^{*} & = & F_{c} C_{d} C_{F} C_{p} = \\ F_{c perp}^{*} & F_{c perp} Cb = \\ E^{*} & E = \\ & F_{bc} = \\ \end{array}$	676 psi 668 psi 1600000 psi 8077 psi ≤ 50 OK 9 < F'b OK	668 psi 1600000 psi 1506 psi <50 OK	668 psi 1600000 psi 1861 psi < <u><50 OK</u> 19 < <u><f'b ok<="" u=""> 307 ft-lbs 486 psi 8 in³ <<u><f'v ok<="" u=""> 96 lbs 17 psi 8 in²</f'v></u></f'b></u>	1600000 psi 1861 psi ≤ <u>50 OK</u> 19 < <u><f'b ok<="" u=""> 409 ft-lbs 649 psi 8 in³ <<u><f'v ok<="" u=""> 128 lbs 23 psi 8 in²</f'v></u></f'b></u>	160000 psi 2019 psi <a block"="" href="https://www.sciencescommunication-communicati-communication-communication-communication-communication-communication-communication-communication-communication-communication-communication-communication-communication-communication-communication-communication-communication-communication-communication-commu communicatio-communicatio-communicatio-communicati-communi</td></tr><tr><td><math display=">\begin{array}{rcl} F_c' &= & F_c C_d C_F C_p = \\ F_c' _{perp} &= & F_c _{perp} Cb = \\ E' &= & E = \\ & & F_{bc} = \\ \end{array}	676 psi 668 psi 1600000 psi 8077 psi < 50 OK	668 psi 1600000 psi 1506 psi ≤ 50 OK 21 ≤ F'b OK 312 ft-lbs 495 psi 8 in³ ≤ F'v OK 79 lbs 14 psi 8 in² ≤ F'c OK	668 psi 1600000 psi 1861 psi ≤50 OK 19 ≤F'b OK 307 ft-lbs 486 psi 8 in ³ <f'v ok<br="">96 lbs 17 psi 8 in² ≤F'C OK</f'v>	1600000 psi 1861 psi ≤ <u>50 OK</u> 19 < <u>< F'b OK</u> 409 ft-lbs 649 psi 8 in ³ < <u>< F'v OK</u> 128 lbs 23 psi 8 in ² < <u>< F'c OK</u>	160000 psi 2019 psi ≤ 50 OK 19 ≤ F'b OK 347 ft-lbs 551 psi 8 in³ ≤ F'v OK 89 lbs 16 psi 8 in² ≤ F'c OK
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$\begin{array}{rcl} {F'_c} &=& {F_c}{C_d}{C_F}{C_p} \\ {F'_{cperp}} &=& {F_{cperp}}{Cb} \\ {E'} &=& {E} \\ &=& {F_{bc}} \\ \end{array} \\ \begin{array}{rcl} {SlendernessRatio:} \\ {R_g} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \\ {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \\ {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \\ {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	676 psi 668 psi 1600000 psi 8077 psi < 50 OK 9 < <u>F'b OK</u> 1882 ft-lbs 1493 psi 15 in ³ < <u>F'v OK</u> 641 lbs 58 psi 17 in ² < <u>F'c OK</u> 3 psi < <u>F'c OK</u> 3 psi	668 psi 1600000 psi 1506 psi ≤ 50 0K 21 ≤ F'b 0K 312 ft-lbs 495 psi 8 in³ ≤ F'v 0K 79 lbs 14 psi 8 in² ≤ F'c 0K 148 psi ≤ F'c 0K 148 psi ≤ F'c 0K 148 psi ≤ I.0 0K 0.51	668 psi 1600000 psi 1861 psi ≤50.0K 19 ≤ <u>F'b.0K</u> 307 ft-lbs 486 psi 8 in ³ < <u>CF'v.0K</u> 96 lbs 17 psi 8 in ² ≤ <u>F'c.0K</u> 337 psi <u><f'c.0k< u=""> 337 psi <u><1.0.0K</u> 0.83</f'c.0k<></u>	160000 psi 1861 psi ≤ 50 OK 19 ≤ F'b OK 409 ft-lbs 649 psi 8 in³ ≤ F'v OK 128 lbs 23 psi 8 in² ≤ F'c OK 261 psi ≤ F'c OK 261 psi ≤ F'c OK 261 psi ≤ I.0 OK 0.72	1600000 psi 2019 psi 2019 psi 2019 psi 19 <fb ok<="" td=""> 347 ft-lbs 551 psi 8 in³ <fv ok<="" td=""> 89 lbs 16 psi 8 in² <fv ok<="" td=""> 398 psi <fr cok<="" td=""> 398 psi <1.0 OK</fr></fv></fv></fb>					
$\begin{array}{rcl} {F'_c} &= & {F_c} C_d C_F C_p = \\ {E' = } & {E_{=}} \\ {F_{c, perp}} &= & {F_{c, perp}} Cb = \\ {E' = } & {E_{=}} \\ {F_{bc} = } \\ \end{array} \\ \begin{array}{rcl} {Slenderness Ratio:} \\ {R_g} = & \\ {Bending:} \\ \\ {M = } & w L^2 / 8 + P e / 12 = \\ {f_b} = & M / S = \\ \\ {f_b} = & M / S = \\ \\ {Shear:} \\ {V = } & w L / 2 = \\ {f_c} = & P / A = \\ \\ \hline {Compression:} \\ {f_c} = & P / A = \\ \\ \hline {Compression(perp.):} \\ {f_{c, perp}} = & P / A = \\ \\ \hline {Combined:} \\ (fc / Fc) 2 + (fb / [Fb (1 - (fc / FcE])] = \\ \hline \end{array} \end{array}$	676 psi 668 psi 1600000 psi 8077 psi < <u><50 OK</u> 9 < <u>F'b OK</u> 1882 ft-lbs 1493 psi 15 in ³ < <u>F'v OK</u> 641 lbs 58 psi 17 in ² < <u>F'c OK</u> 3 psi < <u><f'c ok<="" u=""> 3 psi</f'c></u>	668 psi 1600000 psi 1506 psi ≤50 QK 21 ≤ F'b OK 312 ft-lbs 495 psi 8 in ³ ≤ Fv OK 79 lbs 14 psi 8 in ² ≤ F'c OK 148 psi ≤ F'c OK 148 psi ≤ F'c OK 148 psi ≤ F'c OK 148 psi ≤ F'c OK 148 psi ≤ Si 0.51	668 psi 1600000 psi 1861 psi < <u><50 OK</u> 19 < <u><fb ok<="" u=""> 307 ft-lbs 486 psi 8 in³ <<u><fv ok<="" u=""> 96 lbs 17 psi 8 in² <<u><fc ok<="" u=""> 337 psi <u><fc ok<="" u=""> 337 psi <u><1.0 OK</u> 0.83</fc></u></fc></u></fv></u></fb></u>	160000 psi 1861 psi ≤ 50 OK 19 < F'b OK	160000 psi 2019 psi 2019 psi 2019 psi 319 2F'b OK 347 ft-lbs 551 psi 8 in ³ 2F'v OK 89 lbs 16 psi 8 in ² 2F'C OK 398 psi 2F'C OK 398 psi 2F'C OK 398 psi 2F'OK 0.91					
$\begin{array}{rcl} {F'_c} &=& {F_c}{C_d}{C_F}{C_p} \\ {F'_{cperp}} &=& {F_{cperp}}{Cb} \\ {E'} &=& {E} \\ &=& {F_{bc}} \\ \end{array} \\ \begin{array}{rcl} {SlendernessRatio:} \\ {R_g} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \\ {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \\ {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \\ {Bg} \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \\ \begin{array}{rcl} {Bg} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	676 psi 668 psi 1600000 psi 8077 psi < 50 OK 9 < <u>F'b OK</u> 1882 ft-lbs 1493 psi 15 in ³ < <u>F'v OK</u> 641 lbs 58 psi 17 in ² < <u>F'c OK</u> 3 psi < <u>F'c OK</u> 3 psi	668 psi 1600000 psi 1506 psi ≤ 50 0K 21 ≤ F'b 0K 312 ft-lbs 495 psi 8 in³ ≤ F'v 0K 79 lbs 14 psi 8 in² ≤ F'c 0K 148 psi ≤ F'c 0K 148 psi ≤ F'c 0K 148 psi ≤ I.0 0K 0.51	668 psi 1600000 psi 1861 psi ≤50.0K 19 ≤ <u>F'b.0K</u> 307 ft-lbs 486 psi 8 in ³ < <u>CF'v.0K</u> 96 lbs 17 psi 8 in ² ≤ <u>F'c.0K</u> 337 psi <u><f'c.0k< u=""> 337 psi <u><1.0.0K</u> 0.83</f'c.0k<></u>	160000 psi 1861 psi ≤ 50 OK 19 ≤ F'b OK 409 ft-lbs 649 psi 8 in³ ≤ F'v OK 128 lbs 23 psi 8 in² ≤ F'c OK 261 psi ≤ F'c OK 261 psi ≤ I.0 OK 0.72	160000 psi 2019 psi 2019 psi 2019 psi 19 <fb ok<="" td=""> 347 ft-lbs 551 psi 8 in³ <f'v ok<="" td=""> 89 lbs 16 psi 8 in² <f'v ok<="" td=""> 398 psi <f'c ok<="" td=""> 398 psi <1.0 OK</f'c></f'v></f'v></fb>					

	This sprea		CALCULATIONS	-		
	1113 50166					
Description:	16.25' Tall Wall	King Stud (16' Max Opening)	King Stud (7.75' Max Opening)	King Stud (7.75' Max Opening)	16.67' Tall Wall	King Stud (4' Max Opening)
Туре:	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")
Species:	DF-L	DF-L	DF-L	DF-L	DF-L	DF-L
Grade:	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2
Nominal width, t =	(1) 2	(6) 2	(5) 2	(5) 2	(1) 2	(3) 2
Actual width =	1.50 in	9.00 in	7.50 in	7.50 in	1.50 in	4.50 in
Nominal depth, d =	6	6	6	6	6	6
Actual depth =	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in
Span, L =	16.250 ft	16.250 ft	19.750 ft	19.000 ft	16.670 ft	16.670 ft
w/o Plates	16.000 ft	16.000 ft	19.500 ft	18.750 ft	16.420 ft	16.420 ft
Stud spacing, s =	16 in	106 in	49 in	49 in	16 in	34 in
Lat. Pressure, w _{wind} =	15.09 psf	15.09 psf	15.09 psf	15.09 psf	15.09 psf	15.09 psf
Axial load, P = Eccentricity, e =	223 lbs 0 in	50 lbs 0 in	50 lbs 0 in	50 lbs 0 in	223 lbs 0 in	50 lbs 0 in
K _{cE} =	0.3	0.3	0.3	0.3	0.3	0.3
C =	0.8	0.8	0.8	0.8	0.8	0.8
w =	20.1 plf	133.6 plf	61.3 plf	61.3 plf	20.1 plf	43.1 plf
Fb	900 psi	900 psi	900 psi	900 psi	900 psi	900 psi
FD FV	180 psi	180 psi	180 psi	180 psi	180 psi	180 psi
Fc-prll	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi
Fc-perp	625 psi	625 psi	625 psi	625 psi	625 psi	625 psi
C _d	1.60	1.60	1.60	1.60	1.60	1.60
C _{F,Fb}	1.30	1.30	1.30	1.30	1.30	1.30
C _{F,FcprII}	1.10	1.10	1.10	1.10	1.10	1.10
C r	1.15	1.00	1.00	1.00	1.15	1.00
	0.16	0.16	0.11	0.12	0.15	0.15
<i>C</i> _p						
С _н	<u>1.00</u> 1.07	1.00 1.07	1.00 1.07	1.00 1.07	1.00	6.00 1.07
C _b						
E Emin	1,600,000 psi 580,000 psi	1,600,000 psi 580,000 psi	1,600,000 psi 580,000 psi	1,600,000 psi 580,000 psi	1,600,000 psi 580,000 psi	1,600,000 psi 580,000 psi
Allowable Stress:	500,000 p31	500,000 p31	500,000 p3	566,666 psi	500,000 p31	500,000 p31
$F'_b = F_b C_d C_F C_r =$	2153 psi	1872 psi	1872 psi	1872 psi	2153 psi	1872 psi
$F'_v = F'_v C_d C_H =$	288 psi	288 psi	288 psi	288 psi	288 psi	1728 psi
$F_c^* = F_c C_d C_F =$	2376 psi	2376 psi	2376 psi	2376 psi	2376 psi	2376 psi
	394 psi	394 psi	265 psi	287 psi	374 psi	374 psi
$F_{cE} = (K_{cE} E')/(l_e/d)2 =$	379 psi	379 psi	259 psi	279 psi	361 psi	361 psi
$F'_c = F_c C_d C_F C_p =$				-		-
$F'_{c perp} = F_{c perp} Cb = E' = E =$	668 psi 1600000 psi	668 psi 1600000 psi	668 psi 1600000 psi	668 psi 1600000 psi	668 psi 1600000 psi	668 psi 1600000 psi
F _{bE} =	1483 psi	53386 psi	30420 psi	31636 psi	1445 psi	13005 psi
Slenderness Ratio:	< 50 OK	< 50 OK	< 50 OK	< 50 OK	<u>< 50 OK</u>	<u>< 50 OK</u>
R _B =	22	4	5	5	22	7
Bending:	<u>< F'b OK</u>	<u>< F'b OK</u>	<u>< F'b OK</u>	<u>< F'b OK</u>	<u>< F'b OK</u>	<u>< F'b OK</u>
M = w L ² /8 + P e/12 =	644 ft-lbs	4275 ft-lbs	2913 ft-lbs	2693 ft-lbs	678 ft-lbs	1451 ft-lbs
f _b = M/S =	1021 psi	1130 psi	925 psi	855 psi	1076 psi	768 psi
S =	8 in ³	45 in ³	38 in ³	38 in ³	8 in ³	23 in ³
Shear:	<u>< F'v OK</u>	<u>< F'v OK</u>	<u>< F'v OK</u>	<u>< F'v OK</u>	<u>< F'v OK</u>	<u>< F'v OK</u>
V = w L/2 =	161 lbs	1069 lbs	598 lbs	575 lbs	165 lbs	124 lbs
f _v = 1.5 V/A =	29 psi	32 psi	22 psi	21 psi	30 psi	8 psi
A =	8 in ²	50 in ²	41 in ²	41 in ²	8 in ²	25 in ²
Compression:	<u>< F'c OK</u>	<u>< F'c OK</u>	<u>< F'c OK</u>	<u>< F'c OK</u>	<u>< F'c OK</u>	< F'c OK 2 mai
f _c = P/A = Compression (perp.):	27 psi <u>< F'c OK</u>	1 psi <u>< F'c OK</u>	1 psi <u>< F'c OK</u>	1 psi < <u>< F'c OK</u>	27 psi < <u>< F'c OK</u>	2 psi <u> < F'c OK</u>
	27 psi	1 psi	1 psi	1 psi	27 psi	2 psi
f _{c perp} = P/A = Combined:	<u>< 1.0 OK</u>	- h9i	T b3i	1 / 31	<u>< 1.0 OK</u>	- poi
(fc/Fc)2 + {fb/[Fb(1-(fc/FcE)]} =	0.51				0.54	
	0.51	I	I	I	0.34	L
		<u>> 180 OK</u>	<u>> 180 OK</u>	<u>> 180 OK</u>	<u>> 180 OK</u>	<u>> 180 OK</u>
Deflection:	<u>> 180 OK</u>	<u>> 180 OK</u>	<u>- 100 OK</u>			
Deflection: D = 22.5 w L ⁴ /E' I =	<u>> 180 OK</u> 0.89 in	0.99 in	1.20 in	1.02 in	0.99 in	0.71 in

		TALL WALL (CALCULATIONS	:		
	This sprea	dsheet is used for desig	gning a stud wall accordi	ng to the NDS.		
	King Stud		King Stud			
escription:	(12' Max Opening)	12' Tall Wall	(13' Max Opening)	9' Tall Wall	9' Tall Wall	9' Tall Wall
1						
Type:	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")
Species:	DF-L	DF-L	DF-L	DF-L	DF-L	DF-L
Grade:	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2
Neminal width t	(5) 2	(1) 2	(1) 2	(1) 2	(1) 2	(1) 2
Nominal width, t = Actual width =	<i>(5) 2</i> 7.50 in	(1) 2 1.50 in	(1) 2 1.50 in	(1) 2 1.50 in	(1) 2 1.50 in	(1) 2 1.50 in
Nominal depth, d =	6	6	6	6	6	6
Actual depth =	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in
Span, L =	16.000 ft	12.000 ft	9.000 ft	9.000 ft	9.000 ft	9.000 ft
w/o Plates	15.750 ft	11.750 ft	8.750 ft	8.750 ft	8.750 ft	8.750 ft
Stud spacing, s =	82 in	16 in	88 in	16 in	12 in	16 in
Lat. Pressure, w _{wind} =	15.09 psf	15.09 psf	15.09 psf	15.09 psf	15.09 psf	15.09 psf
Axial load, P =	50 lbs 0 in	2616 lbs 0 in	50 lbs 0 in	4303 lbs 0 in	5061 lbs 0 in	2198 lbs 0 in
Eccentricity, e =						
K _{cE} =	0.3	0.3 0.8	0.3 0.8	0.3	0.3 0.8	0.3 0.8
c = w =	103.4 plf	20.1 plf	0.8 111.0 plf	20.1 plf	0.8 15.1 plf	20.1 plf
w -	70014 bii	2012 bii	222.0 pii	2012 pi	10.1 pi	2011 bit
Fb	900 psi	900 psi	900 psi	900 psi	900 psi	900 psi
Fv	180 psi	180 psi	180 psi	180 psi	180 psi	180 psi
Fc-prll	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi
Fc-perp	625 psi	625 psi	625 psi	625 psi	625 psi	625 psi
C _d	1.60	1.60	1.60	1.60	1.60	1.60
C _{F,Fb}	1.30	1.30	1.30	1.30	1.30	1.30
C _{F,FcprII}	1.10	1.10	1.10	1.10	1.10	1.10
с,	1.00	1.15	1.00	1.15	1.15	1.15
C _p	0.16	0.28	0.47	0.47	0.47	0.47
С _Р С _Н	1.00	1.00	1.00	1.00	1.00	6.00
C _H	1.07	1.07	1.07	1.07	1.07	1.07
E	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi
Emin	580,000 psi	580,000 psi	580,000 psi	580,000 psi	580,000 psi	580,000 psi
Allowable Stress:	222,200 psi	,500 ps.				
$F'_b = F_b C_d C_F C_r =$	1872 psi	2153 psi	1872 psi	2153 psi	2153 psi	2153 psi
$F'_{v} = F'_{v}C_{d}C_{H} =$	288 psi	288 psi	288 psi	288 psi	288 psi	1728 psi
	2376 psi	2376 psi	2376 psi	2376 psi	2376 psi	2376 psi
$F_c^* = F_c C_d C_F =$	-			-	-	
$F_{cE} = (K_{cE} E')/(l_e/d)2 =$	406 psi	730 psi	1317 psi	1317 psi	1317 psi	1317 psi
$F'_c = F_c C_d C_F C_p =$	391 psi	676 psi	1118 psi	1118 psi	1118 psi	1118 psi
$F'_{c perp} = F_{c perp} Cb =$	668 psi	668 psi	668 psi	668 psi	668 psi	668 psi
E' = E =	1600000 psi	1600000 psi	1600000 psi	1600000 psi	1600000 psi	1600000 psi
F _{bE} =	37662 psi	2019 psi	2712 psi	2712 psi	2712 psi	2712 psi
Slenderness Ratio:	<u>< 50 OK</u>	<u>< 50 OK</u>	<u>< 50 OK</u>	<u>< 50 OK</u>	<u>< 50 OK</u>	<u>< 50 OK</u>
R _B =	4	19	16	16	16	16
Bending:	<u>< F'b OK</u>	<u>< F'b OK</u>	<u>< F'b OK</u>	<u>< F'b OK</u>	<u>< F'b OK</u>	<u>< F'b OK</u>
M = w L ² /8 + P e/12 =	3206 ft-lbs	347 ft-lbs	1062 ft-lbs	193 ft-lbs	144 ft-lbs	193 ft-lbs
f _b = M/S =	1018 psi	551 psi	1685 psi	305 psi	229 psi	305 psi
S =	38 in ³	8 in ³	8 in ³	8 in ³	8 in ³	8 in ³
Shear:	<u>< F'v OK</u>	<u>< F'v OK</u>	<u>< F'v OK</u>	<u>< F'v OK</u>	<u>< F'v OK</u>	<u>< F'v OK</u>
V = w L/2 =	814 lbs	118 lbs	485 lbs	88 lbs	66 lbs	66 lbs
f _v = 1.5 V/A =	30 psi	21 psi	88 psi	16 psi	12 psi	12 psi
A =	41 in ²	8 in ²	8 in ²	8 in ²	8 in ²	8 in ²
Compression:	<u>< F'c OK</u>	<u>< F'c OK</u>	<u>< F'c OK</u>	<u>< F'c OK</u>	<u>< F'c OK</u>	<u>< F'c OK</u>
$f_c = P/A =$	1 psi	317 psi	6 psi	522 psi	613 psi	266 psi
Compression (perp.):	<u>< F'c OK</u>	<u>< F'c OK</u>	<u>< F'c OK</u>	<u>< F'c OK</u>	<u>< F'c OK</u>	<u>< F'c OK</u>
f _{c perp} = P/A =	1 psi	317 psi	6 psi	522 psi	613 psi	266 psi
Combined:		<u>< 1.0 OK</u>		<u>< 1.0 OK</u>	<u>< 1.0 OK</u>	<u>< 1.0 OK</u>
(fc/Fc)2 + {fb/[Fb(1-(fc/FcE)]} =		0.67		0.45	0.50	0.23
-		> 180 OK	<u>> 180 OK</u>	100.0%	> 100 OV	100.01
Deflection				> 180 OK	<u>> 180 OK</u>	<u>> 180 OK</u>
Deflection:	> 180 OK			0.02.1	0.021	0.001
D = 22.5 w L ⁴ /E' I =	0.86 in	0.26 in	0.44 in	0.08 in	0.06 in	0.08 in
				0.08 in 21 in^4 1317	0.06 in 21 in^4 1756	0.08 in 21 in^4 1317

		TALL WALL C	ALCULATIONS:	
	This sprea	adsheet is used for desig	ing a stud wall according to the NDS	
-				
	9' Tall Wall	9' Tall Wall		
Description:				
]	24 Lumber (2" 4")	24 Lumber (2" 4")		
Туре:	2x Lumber (2"-4")	2x Lumber (2"-4")		
Species: Grade:	DF-L No. 2	DF-L No. 2		
orade.	1012	11012		
Nominal width, t =	(1) 2	(1) 2		
Actual width = Nominal depth, d =	1.50 in 6	1.50 in 6		
Actual depth =	5.50 in	5.50 in		
Span, L =	9.000 ft	9.000 ft		
w/o Plates Stud spacing, s =	8.750 ft 16 in	8.750 ft 12 in		
Lat. Pressure, w _{wind} =	15.09 psf	15.09 psf		
Axial load, P =	2917 lbs	5160 lbs		
Eccentricity, e =	0 in	0 in		
K _{cE} =	0.3	0.3		 <u> </u>
c = w =	0.8 20.1 plf	0.8 15.1 plf		 +
w -	20.1 pil	19.1 pi	L	
Fb	900 psi	900 psi		
Fv Fc-prll	180 psi 1,350 psi	180 psi		
Fc-prii Fc-perp	1,350 psi 625 psi	1,350 psi 625 psi		 +
C _d	1.60	1.60		
C _{F,Fb}	1.30	1.30		
C _{F,FcprII}	1.10	1.10		
C _r	1.15	1.15		
Cp	0.47	0.47		
C _H	1.00	1.00		
C _b	1.07	1.07		
E	1,600,000 psi	1,600,000 psi		
Emin Allowable Stress:	580,000 psi	580,000 psi		
$F'_b = F_b C_d C_F C_r =$	2153 psi	2153 psi		
$F'_{v} = F'_{v}C_{d}C_{H} =$	288 psi	288 psi		
$F_c^* = F_c C_d C_F =$	2376 psi	2376 psi		
$F_{cE} = (K_{cE} E')/(l_e/d)2 =$	1317 psi	1317 psi		
$F'_c = F_c C_d C_F C_p =$	1118 psi	1118 psi		
F' _{c perp} = F _{c perp} Cb =	668 psi	668 psi		
E' = E =	1600000 psi	1600000 psi		
F _{bE} =	2712 psi	2712 psi		
Slenderness Ratio:	<u>< 50 OK</u>	<u>< 50 OK</u>		 <u> </u>
R _B =	16	16		 +
Bending: M = w L ² /8 + P e/12 =	<u>< F'b ОК</u> 193 ft-lbs	<u>< F'b OK</u> 144 ft-lbs		 +
$f_b = M/S =$	305 psi	229 psi		1
S =	8 in ³	8 in ³		
Shear:	<u>< F'v OK</u>	<u>< F'v OK</u>		
V = w L/2 =	88 lbs	66 lbs		
f _v = 1.5 V/A =	16 psi	12 psi		
A =	8 in ²	8 in ²		 +
f _c = P/A =	<u>< F'c OK</u> 354 psi	<u>< F'c OK</u> 625 psi		 +
Compression (perp.):	<u>< F'c OK</u>	625 psi < F'c OK		
f _{c perp} = P/A =	354 psi	625 psi		
Combined:	<u>< 1.0 OK</u>	<u>< 1.0 OK</u>		
(fc/Fc)2 + {fb/[Fb(1-(fc/FcE)]} =	0.29	0.52		
1				
Deflection:	<u>> 180 OK</u>	<u>> 180 OK</u>		╡
D = 22.5 w L ⁴ /E' I =	0.08 in 21 in^4	0.06 in	 	
I = SPAN /	1317	21 in^4 1756		+
,			1	

UN	IBRACEL	WOOL) COLUI	MN ALL	OWABL	E LOAD	S (kips)
								Compression
		-	Un	braced Heig	ght	-		Perp. To
Column Type	8'	10'	12'	14'	16'	18'	20'	Grain
(2) 2x4 DF #2	4.50	3.00	2.10	SR	SR	SR	SR	6.50
(3) 2x4 DF #2	8.80	5.90	4.20	3.20	SR	SR	SR	9.80
4x4 DF #2	7.00	4.60	3.30	2.40	SR	SR	SR	7.60
(2) 2x6 DF #2	7.20	4.70	3.30	SR	SR	SR	SR	10.30
(3) 2x6 DF #2	20.40	14.70	10.70	8.00	6.20	4.90	SR	15.40
6x6 DF #2	18.00	15.70	13.00	10.50	8.50	6.90	5.70	18.90
6x8 DF #2	24.50	21.40	17.80	14.30	11.60	9.40	7.80	25.70
6x10 DF #2	31.40	27.10	22.50	18.20	14.70	12.00	9.90	32.60
8x8 DF #2	36.60	34.60	31.90	28.50	24.90	21.30	18.20	35.20
8x10 DF #2	46.30	43.90	40.40	36.20	31.50	27.00	23.10	44.50
8x12 DF #2	56.20	53.10	49.00	43.80	38.10	32.70	28.00	53.40
10x10 DF #2	60.50	58.80	56.50	53.40	49.60	45.20	40.50	56.40

LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

DESCRIPTION: RB1 BRG

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design		Wood Section Na	me 8x	x8	
End Fixities	Top & Bott	om Pinned		Wood Grading/Ma	anuf. Gra	Graded Lumber	
Overall Column H	leight		10 ft	Wood Member Ty	vpe Sa	awn	
(Used for not	n-slender calculat	ions)		Exact Width	7.50	n in Allow Stress Modification Factors	
Wood Species	Douglas Fir-La	arch		Exact Depth	7.50		1.0
Wood Grade	No.2	_		Area	56.250	50 in^2 Cf or Cv for Compression	1.0
Fb +	750 psi	Fv	170 psi	lx	263.672	72 in^4 Cf or Cv for Tension	1.0
Fb -	750 psi	Ft	475 psi	ly	263.672	72 in^4 Cm : Wet Use Factor	1.0
Fc - Prll	700 psi	Density	31.21 pcf	,			1.0
Fc - Perp	625 psi					Cfu : Flat Use Factor	1.0
E : Modulus of El	asticity	x-x Bending	y-y Bending	Axial			1.0
	Basic	1300	1300	1300 ksi		I I	No
	Minimum	470	470	Column Buckling Condition	on:	·	
				U		x = 10 ft, Kx = 1.0	

ABOUT Y-Y Axis: Luy = 10 ft, Ky = 1.0

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

Applied Loads

Column self weight included : 121.914 lbs * Dead Load Factor AXIAL LOADS . . . Axial Load at 10.0 ft, D = 1.822, S = 14.471 k

DESIGN SUMMARY

Bending & Shear Check Results PASS Max. Axial+Bending Stress Ration	0 = 0.4234 ; 1	Maximum SERVICE Lateral Load Reactions
Load Combination	+D+S	Top along Y-Y 0.0 k Bottom along Y-Y 0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X 0.0 k Bottom along X-X 0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE Load Lateral Deflections
At maximum location values are . Applied Axial Applied Mx	16.415 k 0.0 k-ft	Along Y-Y 0.0 in at 0.0 ft above base for load combination : n/a
Applied My Fc : Allowable	0.0 k-ft 689.16 psi	Along X-X 0.0 in at 0.0 ft above base for load combination : n/a
	F	Other Factors used to calculate allowable stresses
PASS Maximum Shear Stress Ratio = Load Combination	0.0 : 1 +0.60D	Bending Compression Tension
Location of max.above base	10.0 ft	
Applied Design Shear	0.0 psi	
Allowable Shear	272.0 psi	

Load Combination	CD	С _Р	<u>I</u>	<u>Maximum Axial</u> Stress Ratio		~	<u>s Maxim</u> Stress Ratio	num Shea Statu		<u>os</u> ocation
D Only	0.900	0.894		0.06138	PASS	0.0 ft	0.0	PAS	s	10.0 ft
+D+S	1.150	0.856		0.4234	PASS	0.0 ft		PAS		10.0 ft
+D+0.750S	1.150	0.856		0.3301	PASS	0.0 ft	0.0	PAS	S	10.0 ft
+0.60D	1.600	0.783		0.02365	PASS	0.0 ft	0.0	PAS	S	10.0 ft
Maximum Reactions							Note: Only non	-zero read	ctions	are listed.
	X-X Axis R	eaction	k	Y-Y Axis Rea	ction Axi	al Reaction	My - End Moments	k-ft M>	- End	d Moments
Load Combination	@ Base	@ Top		@ Base @	Тор	@ Base	@ Base @ To	р @	Base	@ Top
D Only						1.944				
+D+S						16.415				
+D+0.750S						12.797				
01/23/24								Page 9	5 of 17	78

LIC# : KW-06013353, Build:20.23.08.30 DESCRIPTION: RB1 BRG Aaximum Reactions Load Combination +0.60D S Only Maximum Deflections for Load Load Combination Ma D Only +D+S +D+0.750S +0.60D S Only Sketches	X-X Axis Reaction @ Base @ Top Combinations ax. X-X Deflection 0.0000 in 0.0000 in 0.0000 in 0.0000 in 0.0000 in	n k o Dista C C C C C C	@ Base ance 0.000ft 0.000ft 0.000ft 0.000ft	Reaction @ Top	Axial Reacti @ Base 1.166 14.47 Deflection 0.000 in 0.000 in	on My - End @ Base	Only non-zero	RCALC INC 1983- reactions are lis Mx - End Mom @ Base @
Load Combination +0.60D S Only Aaximum Deflections for Load Load Combination Ma D Only +D+S +D+0.750S +0.60D S Only	@ Base @ Top Combinations ax. X-X Deflection 0.0000 in 0.0000 in 0.0000 in 0.0000 in	Dista	@ Base ance 0.000ft 0.000ft 0.000ft 0.000ft	@ Top	@ Base 1.166 14.471 Deflection 0.000 in 0.000 in	on My - End @ Base I Distance 0.000 ft	Moments k-ft	Mx - End Mom
+0.60D S Only Aaximum Deflections for Load Load Combination Ma D Only +D+S +D+0.750S +0.60D S Only	@ Base @ Top Combinations ax. X-X Deflection 0.0000 in 0.0000 in 0.0000 in 0.0000 in	Dista	@ Base ance 0.000ft 0.000ft 0.000ft 0.000ft	@ Top	@ Base 1.166 14.471 Deflection 0.000 in 0.000 in	@ Base		
+0.60D S Only Aaximum Deflections for Load Load Combination Ma D Only +D+S +D+0.750S +0.60D S Only	Combinations ax. X-X Deflection 0.0000 in 0.0000 in 0.0000 in 0.0000 in	Dista C C C C C	ance 0.000ft 0.000ft 0.000ft 0.000ft		1.166 14.47 ⁷ Deflection 0.000 in 0.000 in	Distance 0.000 ft		
S Only Aximum Deflections for Load Load Combination Ma D Only +D+S +D+0.750S +0.60D S Only	ax. X-X Deflection 0.0000 in 0.0000 in 0.0000 in 0.0000 in	Dista C C C	0.000ft 0.000ft 0.000ft 0.000ft	Max. Y-Y	14.471 Deflection 0.000 in 0.000 in	I Distance 0.000 ft		
Aximum Deflections for Load Load Combination Ma D Only +D+S +D+0.750S +0.60D S Only	ax. X-X Deflection 0.0000 in 0.0000 in 0.0000 in 0.0000 in	Dista C C C	0.000ft 0.000ft 0.000ft 0.000ft	Max. Y-Y	0.000 in 0.000 in	0.000 ft		
Load CombinationMaD Only+D+S+D+0.750S+0.60DS Only	ax. X-X Deflection 0.0000 in 0.0000 in 0.0000 in 0.0000 in	Dista C C C	0.000ft 0.000ft 0.000ft 0.000ft	Max. Y-Y	0.000 in 0.000 in	0.000 ft		
+D+S +D+0.750S +0.60D S Only	0.0000 in 0.0000 in 0.0000 in	C C C	0.000ft 0.000ft 0.000ft		0.000 in			
+D+0.750S +0.60D S Only	0.0000 in 0.0000 in	C	0.000ft 0.000ft			0.000ft		
+0.60D S Only	0.0000 in	C	0.000ft		0 000 in	0.000 ft		
S Only					0.000 in 0.000 in	0.000 ft		
Sketches			0.000ft		0.000 in	0.000 ft		
7.50 in	Loa ty 8x8	d 1		+X	Height = 10.0 ft	16.293k		16.293k

LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

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DESCRIPTION: RB1 BRG 2

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design		Wood Section Name	e 4-2x6
End Fixities	Top & Bot	tom Pinned		Wood Grading/Manu	uf. Graded Lumber
Overall Column H	leight		10 ft	Wood Member Type	Sawn
(Used for no	n-slender calculat	ions)		Exact Width	6.0 in Allow Stress Modification Factors
Wood Species	Douglas Fir-La	arch		Exact Depth	5.50 in Cf or Cv for Bending 1.3
Wood Grade	No.2	_		Area	33.0 in^2 Cf or Cv for Compression 1.1
Fb +	750.0 psi		170.0 psi	Ix	83.188 in^4 Cf or Cv for Tension 1.3
Fb -	750.0 psi	Ft	475.0 psi	ly	99.0 in^4 Cm : Wet Use Factor 1
Fc - Prll	700.0 psi	Density	31.210 pcf	.,	Ct : Temperature Fact 1
Fc - Perp	625.0 psi				Cfu : Flat Use Factor 1
E : Modulus of El	asticity	x-x Bending	y-y Bending	Axial	Kf : Built-up columns 1
	Basic	1,300.0	1,300.0	1,300.0 ksi	Use Cr : Repetitive ?
	Minimum	470.0	470.0	Column Buckling Condition:	I
				0	ainst buckling ABOLIT X-X Axis

Fully braced against buckling ABOUT X-X Axis ABOUT Y-Y Axis: Luy = 10 ft, Ky = 1.0

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

Applied Loads

Column self weight included : 71.523 lbs * Dead Load Factor AXIAL LOADS . . .

Axial Load at 10.0 ft, D = 1.599, S = 12.748 k

DESIGN SUMMARY

Bending & Shear Check Results PASS Max. Axial+Bending Stress Ratio		Maximum SERVICE					
Load Combination	+D+S	Top along Y-Y	0.0 k		ottom alo	0	0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X	0.0 k	E	ottom ald	ong X-X	0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE	Load Late	ral Defle	ctions .		
At maximum location values are .		Along Y-Y	0.0 in	at	0.0	t above base	
Applied Axial	14.419 k	for load combina	ation · n/a				
Applied Mx	0.0 k-ft			- 4	0.0		
Applied My	0.0 k-ft	Along X-X	0.0 in	at	0.0	ft above base	
Fc : Allowable	637.68 psi	for load combination	ation : n/a				
		Other Factors used	to calculat	e allowa	able stre	sses	
PASS Maximum Shear Stress Ratio =	0.0 : 1			Ben	ding (<u>Compression</u>	Tension
Load Combination	+0.60D						
Location of max.above base	10.0 ft						
Applied Design Shear	0.0 psi						
Allowable Shear	272.0 psi						

	_	_	ſ	Maximum Axial	+ Ben	nding S	Stress Ratios	<u> </u>	Maximu	n Shear F	Ratios	
Load Combination	CD	С _Р		Stress Ratio	Sta	atus	Location	Stre	ss Ratio	Status	Loca	ation
D Only	0.900	0.792		0.09226	PAS	SS	0.0 ft		0.0	PASS		10.0 ft
+D+S	1.150	0.720		0.6852	PAS	SS	0.0 ft		0.0	PASS		10.0 ft
+D+0.750S	1.150	0.720		0.5337	PAS	SS	0.0 ft		0.0	PASS		10.0 ft
+0.60D	1.600	0.602		0.04096	PAS	SS	0.0 ft		0.0	PASS		10.0 ft
Maximum Reactions								Note: C	nly non-ze	ero reactio	ons are	e listed.
	X-X Axis R	eaction	k	Y-Y Axis Rea	ction	Axial I	Reaction	My - End M	oments	∽ft Mx-	End M	Ioments
Load Combination	@ Base	@ Top		@ Base @ .	Тор	@	Base	@ Base	@ Top	@ B	ase	@ Top
D Only							1.671					
+D+S							14.419					
+D+0.750S							11.232					
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Wood Colum										Project F	ile: 05 Be	ams.ec6
LIC# : KW-06013353, Bu				SNA	AKE RIVER	ENGINEE	RING			(c) ENE	RCALC INC	1983-2023
Maximum Reaction									Noto: C)nly non-zero	roactions	ara liatad
	0115	X-X Axis	Depation	Ŀ		Deastion	Axial Read	otion				
Load Combination		@ Base		ĸ		@ Top	@ Bas		@ Base	loments k-ft @ Top		@ Top
+0.60D S Only							1.0 12.7					
Maximum Deflect	ions for Load	d Combin	ations									
Load Combination	Ν	/lax. X-X De	flection [Dista	nce	Max. Y-Y	' Deflection	Dist	tance			
D Only +D+S +D+0.750S +0.60D		0.00 0.00	000 in 000 in 000 in 000 in	0	0.000ft 0.000ft 0.000ft 0.000ft		0.000 in 0.000 in 0.000 in 0.000 in		0.000 ft 0.000 ft 0.000 ft 0.000 ft			
S Only		0.00	00 in	0	.000ft		0.000 in		0.000 ft			
Sketches												
5.50 in		+Y 4-2x	Load	1		+X		HeipH = 10.0 ft			Height = 10 0ft	
		6.0 i	'n									

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: RB3 BRG 1 TOP PORTION

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design		Woo	d Section Name	10x10		
End Fixities	Top & Bott	tom Pinned		Woo	d Grading/Manuf	Graded L	umber	
Overall Column H	leight		12 ft	Woo	d Member Type	Sawn		
(Used for not	n-slender calculat	ions)		Fxa	ct Width	9.50 in A	llow Stress Modification Facto	ors
Wood Species	Douglas Fir-La	arch			ct Depth	9.50 in	Cf or Cv for Bending	1.0
Wood Grade	No.2	_	(=0.0.1		Area	90.250 in^2	Cf or Cv for Compression	1.0
Fb +	750.0 psi	Fv	170.0 psi		lx	678.76 in^4	Cf or Cv for Tension	1.0
Fb -	750.0 psi	Ft	475.0 psi		ly	678.76 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	700.0 psi	Density	31.210 pcf		,		Ct : Temperature Fact	1.0
Fc - Perp	625.0 psi						Cfu : Flat Use Factor	1.0
E : Modulus of El	asticity	x-x Bending	y-y Bending	Axial			Kf : Built-up columns	1.0
	Basic	1,300.0	1,300.0	1,300.0 ksi			Use Cr : Repetitive ?	No
	Minimum	470.0	470.0	Column Bu	ckling Condition:		•	
					ABOUT X-X Axis	s: Lux = 10 ft	, Kx = 1.0	

SNAKE RIVER ENGINEERING

ABOUT Y-Y Axis: Lux = 10 ft, Ky = 1.0ABOUT Y-Y Axis: Luy = 10 ft, Ky = 1.0

```
Aboot 1-1 Axis. Edy = 10 h, ky = 1.0
```

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

Applied Loads

Column self weight included : 234.725 lbs * Dead Load Factor AXIAL LOADS . . . Axial Load at 12.0 ft, D = 38.50 k

DESIGN SUMMARY

Bending & Shear Check Results PASS Max. Axial+Bending Stress Ration Load Combination	0 = 0.7253 : 1 D Only	Maximum SERVICE Top along Y-Y	Lateral Lo 0.0 k		t ions ottom alor	ng Y-Y	0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X	0.0 k	Bo	ottom alor	ng X-X	0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE	Load Late	ral Defle	ctions		
At maximum location values are . Applied Axial Applied Mx	38.735 k 0.0 k-ft	Along Y-Y for load combina	0.0 in ation : n/a	at	0.0 ft	above base	
Applied My Fc : Allowable	0.0 k-ft 591.73 psi	Along X-X for load combina	0.0 in ation : n/a	at	0.0 ft	above base	
	00 0 poi	Other Factors used	to calculat	e allowa	ble stres	ses	
PASS Maximum Shear Stress Ratio = Load Combination	0.0 : 1 +0.60D			<u>Benc</u>	<u>ding C</u>	ompression	<u>Tension</u>
Location of max.above base Applied Design Shear Allowable Shear	12.0 ft 0.0 psi 272.0 psi						

Load Combination Results

	_	_	Ν	Aaximum Axial	+ Bending	g Stress Ratio	<u>s</u>	Maximum	n Shear F	Ratios	
Load Combination	CD	С _Р		Stress Ratio	Status	Location	Stre	ess Ratio	Status	Loc	ation
D Only +0.60D	0.900 1.600	0.939 0.879		0.7253 0.2615	PASS PASS	0.0 ft 0.0 ft		0.0 0.0	PASS PASS		12.0 ft 12.0 ft
Maximum Reactions							Note: C	Only non-ze	ro reactio	ons ar	e listed.
	X-X Axis R	leaction	k	Y-Y Axis Read	ction Axia	al Reaction	My - End M	loments k	-ft Mx-	End I	Noments
Load Combination	@ Base	@ Top		@ Base @]	Гор	@ Base	@ Base	@ Top	@ Ba	ase	@ Тор
D Only						38.735					
+0.60D						23.241					

Project File: 05 Beams.ec6

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Wood Column		Project File: 05 Beams.ec6
LIC# : KW-06013353, Build:20.23.08.30	SNAKE RIVER ENGINEERING	(c) ENERCALC INC 1983-2023
DESCRIPTION: RB3 BRG 1 TOP PORTION		

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000ft	0.000 in	0.000 ft
+0.60D	0.0000 in	0.000ft	0.000 in	0.000 ft
Skotchos				



LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

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DESCRIPTION: RB3 BRG 2

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design	1	Wood Section Nam	e 6x8
End Fixities	Top & Bot	tom Pinned		Wood Grading/Man	uf. Graded Lumber
Overall Column H	leight		12 ft	Wood Member Type	e Sawn
(Used for not	n-slender calculat	tions)		Exact Width	5.50 in Allow Stress Modification Factors
Wood Species Wood Grade	Douglas Fir-La No.2	arch		Exact Depth	7.50 in Cf or Cv for Bending
		F	170.0	Area	41.250 in^2 Cf or Cv for Compression
Fb +	750.0 psi		170.0 psi	IX	193.359 in^4 Cf or Cv for Tension
Fb -	750.0 psi	Ft	475.0 psi	ly	103.984 in^4 Cm : Wet Use Factor
Fc - Prll	700.0 psi	Density	31.210 pcf	.,	Ct : Temperature Fact
Fc - Perp	625.0 psi				Cfu : Flat Use Factor
E : Modulus of El	lasticity	x-x Bending	y-y Bending	Axial	Kf : Built-up columns
	Basic	1,300.0	1,300.0	1,300.0 ksi	Use Cr : Repetitive ?
	Minimum	470.0	470.0	Column Buckling Conditior	I
				= ,, , , , , , , , , , , , , , , , , ,	

Fully braced against buckling ABOUT X-X Axis ABOUT Y-Y Axis: Luy = 12 ft, Ky = 1.0

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

Applied Loads

Column self weight included : 107.284 lbs * Dead Load Factor AXIAL LOADS . . .

Axial Load at 12.0 ft, D = 1.395, S = 10.497 k

DESIGN SUMMARY

Bending & Shear Check Results						
PASS Max. Axial+Bending Stress Ration	o = 0.6468 : 1	Maximum SERVICE	Lateral Load	Reactions		
Load Combination	+D+S	Top along Y-Y	0.0 k	Bottom alo	ong Y-Y	0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X	0.0 k	Bottom ald	ong X-X	0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE	Load Lateral	Deflections .		
At maximum location values are .		Alona Y-Y	0.0 in at	0.01	t above base	
Applied Axial	11.999 k	for load combina		0.0		
Applied Mx	0.0 k-ft					
Applied My	0.0 k-ft	Along X-X	0.0 in at	0.0	t above base	
Fc : Allowable	449.734 psi	for load combin	ation : n/a			
		Other Factors used	to calculate a	llowable stres	sses	
PASS Maximum Shear Stress Ratio =	0.0:1			Bending (<u>Compression</u>	Tension
Load Combination	+0.60D					
Location of max.above base	12.0 ft					
Applied Design Shear	0.0 psi					
Allowable Shear	272.0 psi					

	0	0	<u>I</u>	Maximum Axial				um She		<u>itios</u>
Load Combination	CD	С _Р		Stress Ratio	Statu	s Location	Stress Ratio	Stat	JS	Location
D Only	0.900	0.651		0.08876	PASS	0.0 ft	0.0	PA	SS	12.0 ft
+D+S	1.150	0.559		0.6468	PASS	0.0 ft	0.0	PA	SS	12.0 ft
+D+0.750S	1.150	0.559		0.5054	PASS	0.0 ft	0.0	PA	SS	12.0 ft
+0.60D	1.600	0.436		0.04476	PASS	0.0 ft	0.0	PA	SS	12.0 ft
Maximum Reactions							Note: Only non-	-zero rea	action	is are listed.
	X-X Axis R	eaction	k	Y-Y Axis Rea	ction Ax	kial Reaction	My - End Moments	k-ft №	lx - E	nd Moments
Load Combination	@ Base	@ Top		@ Base @	Тор	@ Base	@ Base @ To	р () Bas	se @ Top
D Only						1.502				
+D+S						11.999				
+D+0.750S						9.375				
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Wood Column								ile: 05 Bea	
LIC# : KW-06013353, Build:20.23.08.30	S	NAKE RIVER	ENGINEER	RING			(c) ENE	RCALC INC	1983-2023
DESCRIPTION: RB3 BRG 2									
Aaximum Reactions							nly non-zero		
Load Combination	X-X Axis Reaction @ Base @ Top	k Y-Y Axis	Reaction @ Top	Axial Read @ Bas		My - End M @ Base	oments k-ft @ Top	Mx - End @ Base	
+0.60D	@ base @ top	@ Dase	@ TOP	0.9		@ Dase	(@ TOP	@ Dase	@ TOP
S Only				10.49					
Maximum Deflections for Load									
	Max. X-X Deflection Dis		Max. Y-Y	Deflection	Dista				
D Only +D+S	0.0000 in 0.0000 in	0.000ft 0.000ft		0.000 in 0.000 in		0.000 ft 0.000 ft			
+D+0.750S	0.0000 in	0.000ft		0.000 in		0.000 ft			
+0.60D	0.0000 in	0.000ft		0.000 in		0.000 ft			
S Only	0.0000 in	0.000ft		0.000 in	(0.000 ft			
iketches									
7.50 in	Load 1 +Y 6x8		+X		Height = 12.0 ft			Heght= 12.0 ft	

5.50 in

LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

DESCRIPTION: RB4 BRG 1

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design		Wood Section Name	6x6				
End Fixities	Top & Bott	tom Pinned		Wood Grading/Manuf	. Graded	Graded Lumber			
Overall Column H	leight		10.25 ft	Wood Member Type	Sawn				
(Used for nor	n-slender calculat	ions)		Exact Width	5.50 in	Allow Stress Modification Factor	ors		
Wood Species	Douglas Fir-La	arch		Exact Depth	5.50 in	Cf or Cv for Bending	1.0		
Wood Grade	No.2	_		Area	30.250 in^2	Cf or Cv for Compression	1.0		
Fb +	750.0 psi	Fv	170.0 psi	lx	76.255 in^4	Cf or Cv for Tension	1.0		
Fb -	750.0 psi	Ft	475.0 psi	ly	76.255 in^4	• • • • • • •	1.0		
Fc - Prll	700.0 psi	Density	31.210 pcf		70.200 111 4	Ct : Temperature Fact	1.0		
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0		
E : Modulus of El	asticity	x-x Bending	y-y Bending	Axial		Kf : Built-up columns	1.0		
	Basic	1,300.0	1,300.0	1,300.0 ksi		Use Cr : Repetitive ?	No		
	Minimum 470.0	470.0	Column Buckling Condition:		·				
				F					

Fully braced against buckling ABOUT X-X Axis ABOUT Y-Y Axis: Luy = 7.50 ft, Ky = 1.0

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

ABOUT 1-1 AXIS. LUY

Applied Loads

Column self weight included : 67.202 lbs * Dead Load Factor AXIAL LOADS . . . Axial Load at 10.250 ft, D = 2.611, S = 16.452 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio	o = 0.9266 : 1	Maximum SERVIC	E Lateral Load I	Reactions	
Load Combination	+D+S	Top along Y-Y	0.0 k	Bottom along Y-	Y 0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X	0.0 k	Bottom along X-X	X 0.0 k
Location of max.above base	0.0 ft	Maximum SERVIC	E Load Lateral I	Deflections	
At maximum location values are .		Along Y-Y	0.0 in at	0.0 ft abo	ove base
Applied Axial Applied Mx	19.130 k 0.0 k-ft	for load combin			
Applied My	0.0 k-ft	Along X-X	0.0 in at	0.0 ft abo	ove base
Fc : Allowable	682.48 psi	for load combir	nation : n/a		
		Other Factors used	d to calculate al	lowable stresses .	
PASS Maximum Shear Stress Ratio =	0.0:1			Bending Compre	ession Tension
Load Combination	+0.60D				
Location of max.above base	10.250 ft				
Applied Design Shear	0.0 psi				
Allowable Shear	272.0 psi				

Load Combination	CD	Ср	<u>1</u>	<u>Maximum Axial</u> Stress Ratio			<u>s Maxim</u> Stress Ratio	<u>um Shear</u> Status	
D Only	0.900	0.888		0.1583	PASS	0.0 ft	•••	PASS	
+D+S	1.150	0.848		0.9266	PASS	0.0 ft	0.0	PASS	6 10.250 ft
+D+0.750S	1.150	0.848		0.7274	PASS	0.0 ft	0.0	PASS	6 10.250 ft
+0.60D	1.600	0.771		0.06155	PASS	0.0 ft	0.0	PASS	6 10.250 ft
Maximum Reactions							Note: Only non-	zero reac	tions are listed.
	X-X Axis R	eaction	k	Y-Y Axis Rea	ction Ax	ial Reaction	My - End Moments	k-ft Mx	- End Moments
Load Combination	@ Base	@ Top		@ Base @	Тор	@ Base	@ Base @ To	p @	Base @ Top
D Only						2.678			
+D+S						19.130			
+D+0.750S						15.017			
01/23/24								Page 103	3 of 178

Wood Colum									-	ile: 05 Be	
LIC# : KW-06013353, Bu				SNAK	E RIVER ENGINEE	RING			(c) ENE	RCALC INC	1983-2023
Maximum Reaction	ons)nly non-zero		
Load Combination		X-X Axis I @ Base	Reaction @ Top		Y-Y Axis Reaction @ Base @ Top	Axial Rea @ Bas		My - End M @ Base	oments k-ft @ Top	Mx - End @ Base	Moments @ Top
+0.60D S Only						1.6 16.4					
Maximum Deflect	ions for Load	l Combin	ations								
Load Combination		lax. X-X De		Distanc	ce Max. Y-`	Y Deflection	Dista	ance			
D Only +D+S +D+0.750S +0.60D S Only		0.00 0.00 0.00	00 in 00 in 00 in 00 in 00 in	0.0 0.0 0.0	000ft 000ft 000ft 000ft 000ft	0.000 in 0.000 in 0.000 in 0.000 in 0.000 in		0.000 ft 0.000 ft 0.000 ft 0.000 ft 0.000 ft			
Sketches											
5.50 in		+Y 6x6	Load	d 1	+X		Height = 10,250 ft			Height = 10250 ft	
		5.50	in								

LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

DESCRIPTION: RB6 BRG 1

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design		Wood Section Nam	ne 6x16				
End Fixities	Top & Bot	tom Pinned		Wood Grading/Mar	nuf. Graded Lumber				
Overall Column H	Height		12 ft	Wood Member Typ	e Sawn				
(Used for not	n-slender calculat	ions)		Exact Width	5.50 in Al	low Stress Modification Fa	actors		
Wood Species Wood Grade	Douglas Fir-La No.2	arch		Exact Depth	15.50 in	Cf or Cv for Bending Cf or Cv for Compression	0.9720		
Fb +	750.0 psi	Fv	170.0 psi	Area Ix	85.250 in^2 1.706.78 in^4	Cf or Cv for Tension	0.9720		
Fb - Fc - Prll	750.0 psi 700.0 psi	Ft Densitv	475.0 psi 31.210 pcf	ly	214.901 in^4	Cm : Wet Use Factor	1.0		
Fc - Perp	625.0 psi	Density	51.210 pci			Ct : Temperature Fact	1.0		
E : Modulus of El		x-x Bending	y-y Bending	Axial		Cfu : Flat Use Factor Kf : Built-up columns	1.0 1.0		
	Basic	1,300.0	1,300.0	1,300.0 ksi		Use Cr : Repetitive ?	No		
	Minimum 470.0	470.0	Column Buckling Condition	n:					

Fully braced against buckling ABOUT X-X Axis ABOUT Y-Y Axis: Luy = 12 ft, Ky = 1.0

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

Applied Loads

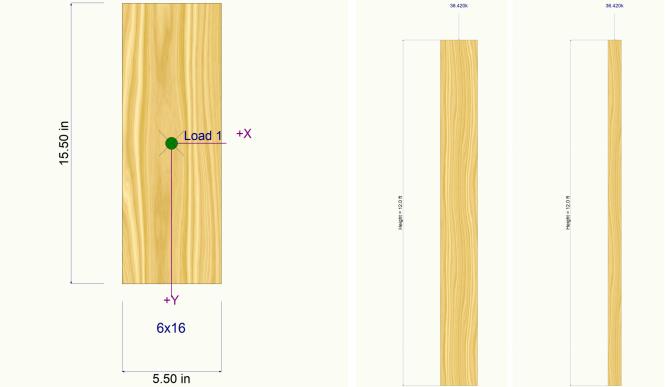
Column self weight included : 221.721 lbs * Dead Load Factor AXIAL LOADS . . . Axial Load at 12.0 ft, D = 4.420, S = 32.0 k

DESIGN SUMMARY

Bending & Shear Check Results PASS Max. Axial+Bending Stress Ratic Load Combination	0 = 0.9645 : 1 +D+S	Maximum SERVICE L Top along Y-Y	L ateral Lo 0.0 k		actions Bottom alo	na Y-Y	0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X			Bottom alo	0	0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE L				0	
At maximum location values are . Applied Axial	36.642 k 0.0 k-ft	Along Y-Y for load combinat	0.0 in ion : n/a	at	0.0 f	above base	
Applied Mx Applied My Fc : Allowable	0.0 k-ft 0.0 k-ft 445.653 psi	Along X-X for load combinat	0.0 in tion : n/a	at	0.0 f	above base	
	440.000 psi	Other Factors used to	o calculat	e allov	vable stres	ses	
PASS Maximum Shear Stress Ratio = Load Combination Location of max.above base Applied Design Shear Allowable Shear	0.0 : 1 +0.60D 12.0 ft 0.0 psi 272.0 psj			<u>Be</u>	<u>ending (</u>	Compression	<u>Tension</u>

			I	Maximum Axial	g Stress Ratio	<u>s</u> <u>Maxim</u>	Maximum Shear Ratios				
Load Combination	CD	CP		Stress Ratio	Status	Location	Stress Ratio	o Sta	tus	Location	
D Only	0.900	0.662		0.1344	PASS	0.0 ft	0.0	PA	SS	12.0 ft	
+D+S	1.150	0.570		0.9645	PASS	0.0 ft	0.0	PA	SS	12.0 ft	
+D+0.750S	1.150	0.570		0.7539	PASS	0.0 ft	0.0	PA	SS	12.0 ft	
+0.60D	1.600	0.446		0.06730	PASS	0.0 ft	0.0	PA	SS	12.0 ft	
Maximum Reactions							Note: Only non-	-zero re	eactio	ns are listed.	
	X-X Axis R	eaction	k	Y-Y Axis Rea	ction Axi	al Reaction	My - End Moments	k-ft	Mx - E	End Moments	
Load Combination	@ Base	@ Top		@ Base @	Тор	@ Base	@ Base @ To	р	@ Ba	ise @ Top	
D Only						4.642					
+D+S						36.642					
+D+0.750S						28.642					
01/23/24								Page	105 o	f 178	

Wood Column							110,0001	ile: 05 Bea	1113.000
LIC# : KW-06013353, Build:20.23.	08.30	5	SNAKE RIVER	ENGINEEF	RING		(c) ENE	RCALC INC	1983-202
DESCRIPTION: RB6	BRG 1								
laximum Reactions						Note:	Only non-zero	reactions a	are listed
	X-X Axis Re	action	k Y-Y Axis	Reaction	Axial Read	tion My - End M	Noments k-ft	Mx - End	Moment
Load Combination	@ Base (🕑 Тор	@ Base	@ Top	@ Bas	e @ Base	@ Top	@ Base	@ Top
+0.60D					2.78	35			
S Only					32.00	00			
Aximum Deflections for	or Load Combinat	ions							
Load Combination	Max. X-X Defle	ction Dis	stance	Max. Y-Y	Deflection	Distance			
D Only	0.0000	in	0.000ft		0.000 in	0.000 ft			
+D+S	0.0000	in	0.000ft		0.000 in	0.000 ft			
+D+0.750S	0.0000	in	0.000ft		0.000 in	0.000 ft			
+0.60D	0.0000	in	0.000ft		0.000 in	0.000 ft			
S Only	0.0000	in	0.000ft		0.000 in	0.000 ft			
Sketches									



LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

DESCRIPTION: RB6 BRG 2

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design		Wood Section Na	me 6x14		
End Fixities	Top & Bot	tom Pinned		Wood Grading/Ma	anuf. Graded	Lumber	
Overall Column H	leight		12 ft	Wood Member Ty	/pe Sawn		
(Used for no	n-slender calculat	tions)		Exact Width	5.50 in	Allow Stress Modification Fa	actors
Wood Species Wood Grade	Douglas Fir-L No.2	arch		Exact Depth	13.50 in	Cf or Cv for Bending	0.9870
Fb +	750.0 psi	Fv	170.0 psi	Area Ix	74.250 in^2 1.127.67 in^2		0.9870
Fb-	750.0 psi		475.0 psi	lv	187.172 in^2		1.0
Fc - Prll Fc - Perp	700.0 psi	,	31.210 pcf			Ct : Temperature Fact	1.0
•	625.0 psi			Avial		Cfu : Flat Use Factor	1.0
E : Modulus of El	lasticity	x-x Bending	y-y Bending	Axial		Kf : Built-up columns	1.0
	Basic	1,300.0	1,300.0	1,300.0 ksi		Use Cr : Repetitive ?	No
	Minimum 470.0	470.0	Column Buckling Conditi	ion:			

Fully braced against buckling ABOUT X-X Axis ABOUT Y-Y Axis: Luy = 12 ft, Ky = 1.0

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

Applied Loads

Column self weight included : 193.112 lbs * Dead Load Factor AXIAL LOADS . . .

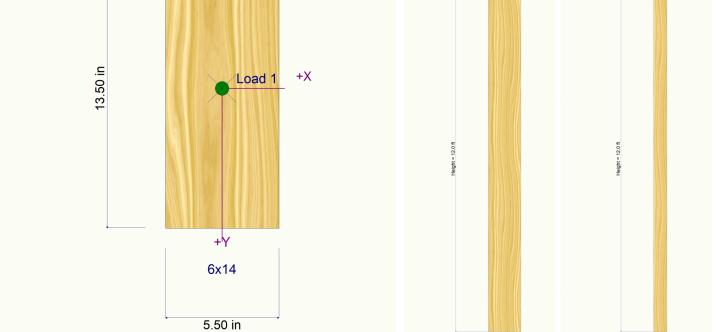
Axial Load at 12.0 ft, D = 3.564, S = 26.190 k

DESIGN SUMMARY

Bending & Shear Check Results PASS Max. Axial+Bending Stress Ratio	0 = 0.9005 ; 1	Maximum SERVICE	l ateral I oa	d Reactions		
Load Combination	+D+S	Top along Y-Y	0.0 k		along Y-Y	0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X	0.0 k		along X-X	0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE	Load Latera	al Deflections		
At maximum location values are .	00.0471	Along Y-Y	0.0 in	at 0.0) ft above base	
Applied Axial Applied Mx	29.947 k 0.0 k-ft	for load combination	ation:n/a			
Applied MX Applied My	0.0 k-ft	Along X-X	0.0 in	at 0.0) ft above base	
Fc : Allowable	447.872 psi	for load combination	ation : n/a			
		Other Factors used	to calculate	allowable st	esses	
PASS Maximum Shear Stress Ratio =	0.0:1			<u>Bending</u>	Compression	<u>Tension</u>
Load Combination	+0.60D					
Location of max.above base	12.0 ft					
Applied Design Shear	0.0 psi					
Allowable Shear	272.0 psi					

	-	-	<u> </u>	<u>Maximum Axial</u>	<u>s</u> <u>Maxim</u>	Maximum Shear Ratios				
Load Combination	CD	С _Р		Stress Ratio	Status	Location	Stress Ratio	Stat	us	Location
D Only	0.900	0.656		0.1240	PASS	0.0 ft	0.0	PA	SS	12.0 ft
+D+S	1.150	0.564		0.9005	PASS	0.0 ft	0.0	PA	SS	12.0 ft
+D+0.750S	1.150	0.564		0.7037	PASS	0.0 ft	0.0	PA	SS	12.0 ft
+0.60D	1.600	0.440		0.06235	PASS	0.0 ft	0.0	PA	SS	12.0 ft
Maximum Reactions							Note: Only non-	zero re	actior	ns are listed.
	X-X Axis R	eaction	k	Y-Y Axis Rea	ction Axi	al Reaction	My - End Moments	k-ft ≬	Лх - E	nd Moments
Load Combination	@ Base	@ Top		@ Base @	Тор	@ Base	@ Base @ To	р (@ Ba	se @ Top
D Only						3.757				
+D+S						29.947				
+D+0.750S						23.400				
01/23/24								Page 1	07 of	178

Wood Column									Project F	ile: 05 Bea	ms.ec6
LIC# : KW-06013353, Build:20.23.08.	30		SNA	KE RIVER	ENGINEEF	RING			(c) ENE	RCALC INC	1983-2023
DESCRIPTION: RB6 BR	RG 2										
Maximum Reactions								Note: C	Only non-zero	reactions a	re listed.
	X-X Axis F	Reaction	k	Y-Y Axis	Reaction	Axial Read	ction	My - End M	loments k-ft	Mx - End	Moments
Load Combination	@ Base	@ Top		@ Base	@ Top	@ Bas	е	@ Base	@ Top	@ Base	@ Top
+0.60D						2.2	54				
S Only						26.19	90				
Maximum Deflections for	Load Combina	ations									
Load Combination	Max. X-X Def	lection [Distar	nce	Max. Y-Y	' Deflection	Dista	nce			
D Only	0.000	00 in	0.	.000ft		0.000 in	0	.000 ft			
+D+S	0.000	00 in	0.	.000ft		0.000 in	0	.000 ft			
+D+0.750S	0.000	00 in	0.	.000ft		0.000 in	0	.000 ft			
+0.60D	0.000	00 in	0.	.000ft		0.000 in	0	.000 ft			
S Only	0.000	00 in	0.	.000ft		0.000 in	0	.000 ft			
Sketches											
· · · · · · · · · · · · · · · · · · ·								29.754k		29.754	łk
		1865 K 1									
								HENE V. N			
								W Kerki			
<u> </u>											



LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

DESCRIPTION: RB8 BRG 1

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design		Wood Section Nam	ne 6x8		
End Fixities	Top & Bot	tom Pinned		Wood Grading/Mar	nuf. Graded L	umber	
Overall Column H	leight		19.75 ft	Wood Member Typ	e Sawn		
(Used for not	n-slender calcula	tions)		Exact Width	5.50 in A	Allow Stress Modification Facto	ors
Wood Species Wood Grade	Douglas Fir-L No.2	arch		Exact Depth	7.50 in	Cf or Cv for Bending	1.0
		_	170.0	Area	41.250 in^2	Cf or Cv for Compressio	1.0
Fb +	750.0 psi		170.0 psi	IX	193.359 in^4	Cf or Cv for Tension	1.0
Fb -	750.0 psi		475.0 psi	IV	103.984 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	700.0 psi	Density	31.210 pcf	· y		Ct : Temperature Fact	1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0
E : Modulus of El	lasticity	x-x Bending	y-y Bending	Axial		Kf : Built-up columns	1.0
	Basic	1,300.0	1,300.0	1,300.0 ksi		Use Cr : Repetitive ?	No
	Minimum	470.0	470.0	Column Buckling Condition	n:		

Fully braced against buckling ABOUT X-X Axis ABOUT Y-Y Axis: Luy = 19.75 ft, Ky = 1.0

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

Applied Loads

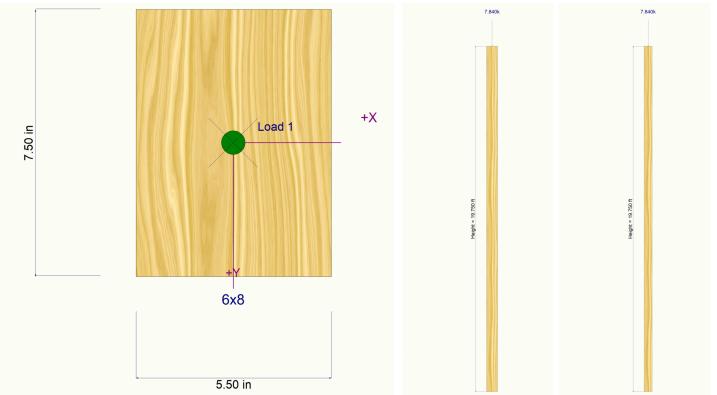
Column self weight included : 176.572 lbs * Dead Load Factor AXIAL LOADS . . . Axial Load at 19.750 ft, D = 0.840, S = 7.0 k

DESIGN SUMMARY

Bending & Shear Check Results						
PASS Max. Axial+Bending Stress Ration	o = 0.9940 : 1	Maximum SERVICE	E Lateral Load	d Reactions .		
Load Combination	+D+S	Top along Y-Y	0.0 k	Bottom	along Y-Y	0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X	0.0 k	Bottom	along X-X	0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE	E Load Latera	I Deflections		
At maximum location values are .		Along Y-Y	0.0 in a	at 0.) ft above base	
Applied Axial	8.017 k	for load combin				
Applied Mx	0.0 k-ft					
Applied My	0.0 k-ft	Along X-X	0.0 in a	at 0.0) ft above base	
Fc : Allowable	195.520 psi	for load combin	ation : n/a			
		Other Factors used	to calculate	allowable st	resses	
PASS Maximum Shear Stress Ratio =	0.0 : 1			Bending	Compression	Tension
Load Combination	+0.60D					
Location of max.above base	19.750 ft					
Applied Design Shear	0.0 psi					
Allowable Shear	272.0 psi					

Load Combination	CD	Ср	<u>I</u>	<u>Maximum Axial</u> Stress Ratio		4	<u>s Maxim</u> Stress Ratio	<u>um Shea</u> Statu		1
	0.900	0.304		0.1288	PASS	0.0 ft		PAS		
D Only +D+S	1.150	0.243		0.9940	PASS	0.0 ft	•••	PAS		
+D+0.750S	1.150	0.243		0.7770	PASS	0.0 ft	•••	PAS		
+0.60D	1.600	0.178		0.07415	PASS	0.0 ft	•••	PAS		
Maximum Reactions							Note: Only non-	zero read	tions are liste	ed.
	X-X Axis R	eaction	k	Y-Y Axis Rea	ction Ax	ial Reaction	My - End Moments	k-ft M>	- End Mome	ents
Load Combination	@ Base	@ Top		@ Base @	Тор	@ Base	@ Base @ Top	o @	Base @ T	ор
D Only						1.017				
+D+S						8.017				
+D+0.750S						6.267				
01/23/24								Page 10	9 of 178	

Wood Column							Project F	ile: 05 Beam	s.ec6
LIC# : KW-06013353, Build:20.23.08.30 DESCRIPTION: RB8 BRG	1	SN	IAKE RIVER	ENGINEEF	RING		(c) ENE	RCALC INC 19	83-2023
Maximum Reactions						Note:	Only non-zero	reactions are	listed.
Load Combination	X-X Axis React @ Base @ T			Reaction @ Top	Axial Read @ Base	,	Moments k-ft @ Top	Mx - End Mo @ Base (
+0.60D S Only					0.6 ⁷ 7.00				
Maximum Deflections for Lo	oad Combination	ıs							
Load Combination	Max. X-X Deflection	n Dista	ance	Max. Y-Y	Deflection	Distance			
D Only	0.0000 in		0.000ft		0.000 in	0.000 ft			
+D+S	0.0000 in		0.000ft		0.000 in	0.000 ft			
+D+0.750S	0.0000 in		0.000ft		0.000 in	0.000 ft			
+0.60D	0.0000 in		0.000ft		0.000 in	0.000 ft			
S Only	0.0000 in		0.000ft		0.000 in	0.000 ft			
Sketches									
						7.840k		7.840k	



LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

DESCRIPTION: RB7 BRG 1

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design		Wood Section	Name 6x10		
End Fixities	Top & Bot	tom Pinned		Wood Grading	/Manuf. Graded Lu	mber	
Overall Column H	leight		13 ft	Wood Membe	r Type Sawn		
(Used for not	n-slender calculat	tions)		Exact Width	5.50 in Alle	ow Stress Modification Facto	ors
Wood Species	Douglas Fir-La	arch		Exact Depth	9.50 in	Cf or Cv for Bending	1.0
Wood Grade	No.2			Area	52.250 in^2	Cf or Cv for Compression	1.0
Fb +	750.0 psi	Fv	170.0 psi	Ix	392.964 in^4	Cf or Cv for Tension	1.0
Fb -	750.0 psi	Ft	475.0 psi		131.714 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	700.0 psi	Density	31.210 pcf	.,		Ct : Temperature Fact	1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0
E : Modulus of El	lasticity	x-x Bending	y-y Bending	Axial		Kf : Built-up columns	1.0
	Basic	1,300.0	1,300.0	1,300.0 ksi		Use Cr : Repetitive ?	No
	Minimum	470.0	470.0	Column Buckling Cor	dition:		
				ABOUT	X-X Axis: Lux = 13 ft k	4x = 1.0	

ABOUT X-X Axis: Lux = 13 ft, Kx = 1.0 ABOUT Y-Y Axis: Luy = 13 ft, Ky = 1.0

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

ABOUT 1-1 AXIS. LUY - 13 II, KY - 1

Applied Loads

Column self weight included : 147.218 lbs * Dead Load Factor AXIAL LOADS . . . Axial Load at 13.0 ft, D = 1.954, S = 12.866 k

DESIGN SUMMARY

Bending & Shear Check Results PASS Max. Axial+Bending Stress Ratio	V.1 1 TO	Maximum SERVICE I		ad R			
Load Combination	+D+S	Top along Y-Y	0.0 k		Bottom along	g Y-Y	0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X	0.0 k		Bottom along	g X-X	0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE I	_oad Late	ral D	eflections		
At maximum location values are .	44.0071	Along Y-Y	0.0 in	at	0.0 ft	above base	
Applied Axial	14.967 k	for load combinat	ion : n/a				
Applied Mx	0.0 k-ft	Along X-X	0.0 in	at	0.0 ft	above base	
Applied My	0.0 k-ft	for load combinat	••••	aı	0.0 11	above base	
Fc : Allowable	400.763 psi						
		Other Factors used t	o calculat	e allo	owable stress	es	
PASS Maximum Shear Stress Ratio =	0.0:1			E	Bending Co	<u>mpression</u>	<u>Tension</u>
Load Combination	+0.60D						
Location of max.above base	13.0 ft						
Applied Design Shear	0.0 psi						
Allowable Shear	272.0 psi						

	Maximum Axial + Bending Stress Rat						Maximum Shear Ratios				
Load Combination	CD	С _Р		Stress Ratio	Statu	s Location	Stress Ratio	o Sta	atus	Location	
D Only	0.900	0.591		0.1080	PASS	0.0 ft	0.0	P	ASS	13.0 ft	
+D+S	1.150	0.498		0.7148	PASS	0.0 ft	0.0	P	ASS	13.0 ft	
+D+0.750S	1.150	0.498		0.5612	PASS	0.0 ft	0.0	P	ASS	13.0 ft	
+0.60D	1.600	0.382		0.05645	PASS	0.0 ft	0.0	P	ASS	13.0 ft	
Maximum Reactions							Note: Only non-	-zero re	eactio	ns are listed.	
	X-X Axis R	eaction	k	Y-Y Axis Rea	ction Ax	kial Reaction	My - End Moments	k-ft	Mx - E	End Moments	
Load Combination	@ Base	@ Top		@ Base @	Тор	@ Base	@ Base @ To	р	@ Ba	ise @ Top	
D Only						2.101					
+D+S						14.967					
+D+0.750S						11.751					
01/23/24								Page	111 o	f 178	

Wood Column							Project F	ile: 05 Bea	ams.ec6
LIC# : KW-06013353, Build:20.23.08.30		SNAKE RIVER	RENGINEEF	RING			(c) ENE	RCALC INC	1983-2023
DESCRIPTION: RB7 BRG	1								
Maximum Reactions							Only non-zero		
	X-X Axis Reaction			Axial Rea	ction		loments k-ft		
Load Combination	@ Base @ Top	@ Base	e @ Top	@ Bas	se	@ Base	@ Top	@ Base	@ Top
+0.60D				1.2	61				
S Only				12.8	66				
Maximum Deflections for Lo	ad Combinations								
Load Combination	Max. X-X Deflection	Distance	Max. Y-Y	Deflection	Dista	nce			
D Only	0.0000 in	0.000ft		0.000 in		.000 ft			
+D+S	0.0000 in	0.000ft		0.000 in		.000 ft			
+D+0.750S	0.0000 in	0.000ft		0.000 in		.000 ft			
+0.60D	0.0000 in	0.000ft		0.000 in		.000 ft			
S Only	0.0000 in	0.000ft		0.000 in	0	.000 ft			
Sketches									
					1	4.820k		14.820k	
7.1.11									
_		+X				W/			
.= 0	Load 1								
9.50 in									
0,									
	NA MILINA PANA PANA PANA								
					13.0 ft			Height = 13.0 ft	
					Height =			ght =	

+Y 6x10

5.50 in

LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

DESCRIPTION: RB15 BRG 1

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design		Wood Section Na	me 6x14		
End Fixities	Top & Bot	tom Pinned		Wood Grading/Ma	anuf. Graded	Lumber	
Overall Column H	Height		14 ft	Wood Member Ty	vpe Sawn		
(Used for not	n-slender calculat	tions)		Exact Width	5.50 in	Allow Stress Modification Fa	actors
Wood Species Wood Grade	Douglas Fir-L No.2	arch		Exact Depth	13.50 in	Cf or Cv for Bending	0.9870
Fb +	750.0 psi	Fv	170.0 psi	Area Ix	74.250 in^2 1.127.67 in^4		0.9870
Fb - Fc - Prll	750.0 psi		475.0 psi	IV	187.172 in^4	· · · · · · · · ·	1.0
Fc - Perp	700.0 psi 625.0 psi	,	31.210 pcf			Ct : Temperature Fact	1.0
E : Modulus of El	•	x-x Bending	y-y Bending	Axial		Cfu : Flat Use Factor Kf : Built-up columns	1.0 1.0
	Basic	1,300.0	1,300.0	1,300.0 ksi		Use Cr : Repetitive ?	No
	Minimum	470.0	470.0	Column Buckling Conditi	on:		

Fully braced against buckling ABOUT X-X Axis ABOUT Y-Y Axis: Luy = 14 ft, Ky = 1.0

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

Applied Loads

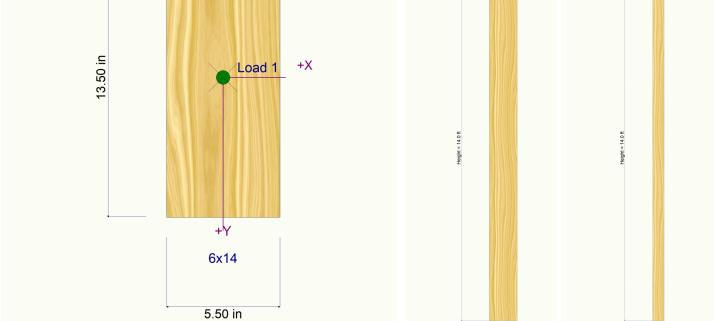
Column self weight included : 225.297 lbs * Dead Load Factor AXIAL LOADS . . . Axial Load at 14.0 ft, D = 3.354, S = 22.437 k

DESIGN SUMMARY

Bending & Shear Check Results PASS Max. Axial+Bending Stress Ratio	••••••	Maximum SERVICE				
Load Combination	+D+S	Top along Y-Y	0.0 k		n along Y-Y	0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X	0.0 k	Bottom	n along X-X	0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE	Load Late	ral Deflection	IS	
At maximum location values are .		Along Y-Y	0.0 in	at 0	.0 ft above base	
Applied Axial	26.016 k	for load combination	ation : n/a			
Applied Mx	0.0 k-ft	Along X-X	0.0 in	at 0	.0 ft above base	
Applied My	0.0 k-ft	0		at 0		
Fc : Allowable	356.187 psi	for load combination				
		Other Factors used	to calculat	e allowable s	tresses	
PASS Maximum Shear Stress Ratio =	0.0 : 1			<u>Bending</u>	<u>Compression</u>	<u>Tension</u>
Load Combination	+0.60D					
Location of max.above base	14.0 ft					
Applied Design Shear	0.0 psi					
Allowable Shear	272.0 psi					

			I	Maximum Axial	g Stress Ratio	<u>s</u> <u>Maxim</u>	atios			
Load Combination	CD	С _Р		Stress Ratio	Status	Location	Stress Ratio	Sta	tus	Location
D Only	0.900	0.540		0.1437	PASS	0.0 ft	0.0	PA	SS	14.0 ft
+D+S	1.150	0.448		0.9837	PASS	0.0 ft	0.0	PA	SS	14.0 ft
+D+0.750S	1.150	0.448		0.7716	PASS	0.0 ft	0.0	PA	SS	14.0 ft
+0.60D	1.600	0.340		0.07704	PASS	0.0 ft	0.0	PA	SS	14.0 ft
Maximum Reactions							Note: Only non-	-zero re	actio	ns are listed.
	X-X Axis R	eaction	k	Y-Y Axis Rea	ction Ax	ial Reaction	My - End Moments	k-ft I	Mx - E	End Moments
Load Combination	@ Base	@ Top		@ Base @	Тор	@ Base	@ Base @ To	р	@ Ba	ise @ Top
D Only						3.579				
+D+S						26.016				
+D+0.750S						20.407				
01/23/24								Page	113 o	f 178

Wood Column							Project I	File: 05 Bea	ams.ec6
LIC# : KW-06013353, Build:20.23.08	.30	SN	IAKE RIVER	ENGINEEF	RING		(c) ENE	RCALC INC	1983-2023
DESCRIPTION: RB15 E	BRG 1								
Maximum Reactions						Note	: Only non-zero	reactions a	are listed.
	X-X Axis Read	tion k	Y-Y Axis	Reaction	Axial Read	tion My - End	d Moments k-ft	Mx - End	Moments
Load Combination	@ Base @	Гор	@ Base	@ Top	@ Bas	e @ Bas	е @ Тор	@ Base	@ Top
+0.60D					2.14	48			
S Only					22.43	37			
Maximum Deflections for	Load Combinatio	ns							
Load Combination	Max. X-X Deflecti	on Dista	ance	Max. Y-Y	Deflection	Distance			
D Only	0.0000 in		0.000ft		0.000 in	0.000 ft			
+D+S	0.0000 in		0.000ft		0.000 in	0.000 ft			
+D+0.750S	0.0000 in		0.000ft		0.000 in	0.000 ft			
+0.60D	0.0000 in		0.000ft		0.000 in	0.000 ft			
S Only	0.0000 in		0.000ft		0.000 in	0.000 ft			
Sketches									
1						25.791k		25.791	¢
c									



LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: GRD1 BRG 2

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design	l	Wood Section Na	me 6x14		
End Fixities	Top & Bot	tom Pinned		Wood Grading/Ma	anuf. Graded I	_umber	
Overall Column H	Height		10 ft	Wood Member Ty	/pe Sawn		
(Used for not	n-slender calculat	tions)		Exact Width	5.50 in A	Allow Stress Modification Fa	actors
Wood Species Wood Grade	Douglas Fir-L No.2	arch		Exact Depth	13.50 in	Cf or Cv for Bending	0.9870
Fb +	750.0 psi	Fv	170.0 psi	Area Ix	74.250 in^2 1.127.67 in^4	ого г т	0.9870 וכ 0.9870
Fb -	750.0 psi	Ft	475.0 psi	lv	187.172 in^4		1.0
Fc - Prll Fc - Perp	700.0 psi 625.0 psi	Density	31.210 pcf			Ct : Temperature Fact	1.0
E : Modulus of El	•	x-x Bending	y-y Bending	Axial		Cfu : Flat Use Factor Kf : Built-up columns	1.0 1.0
	Basic	1,300.0	1,300.0	1,300.0 ksi		Use Cr : Repetitive ?	No
	Minimum	im 470.0 470.0		Column Buckling Condition			

SNAKE RIVER ENGINEERING

Fully braced against buckling ABOUT X-X Axis ABOUT Y-Y Axis: Luy = 10 ft, Ky = 1.0

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

Applied Loads

Column self weight included : 160.927 lbs * Dead Load Factor AXIAL LOADS ... Axial Load at 10.0 ft, D = 4.841, S = 33.018 k

DESIGN SUMMARY

Bending & Shear Check Results PASS Max. Axial+Bending Stress Ration	o = 0.9230 : 1	Maximum SERVICE I	Lateral Loa	ad Reaction	s		
Load Combination	+D+S	Top along Y-Y	0.0 k	Botto	m alon	g Y-Y	0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X	0.0 k	Botto	m alon	g X-X	0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE I	Load Later	al Deflectio	ns	-	
At maximum location values are . Applied Axial Applied Mx	38.020 k 0.0 k-ft	Along Y-Y for load combinat	0.0 in tion : n/a	at	0.0 ft	above base	
Applied My Fc : Allowable	0.0 k-ft 554.80 psi	Along X-X for load combinat	0.0 in tion : n/a	at	0.0 ft	above base	
		Other Factors used to	o calculate	allowable	stress	es	
PASS Maximum Shear Stress Ratio = Load Combination Location of max.above base Applied Design Shear Allowable Shear	0.0 : 1 +0.60D 10.0 ft 0.0 psi 272.0 psi			<u>Bending</u>	<u>Cc</u>	ompression	<u>Tension</u>

Load Combination Results

	Maximum Axial + Bending Stress Ratios Maximum Shear Ratios										
Load Combination	CD	CP		Stress Ratio	Status	Location	Stress Ratio	Sta	itus	Loca	ation
D Only	0.900	0.774		0.1399	PASS	0.0 ft	0.0	PA	ASS		10.0 ft
+D+S	1.150	0.698		0.9230	PASS	0.0 ft	0.0	P/	ASS		10.0 ft
+D+0.750S	1.150	0.698		0.7226	PASS	0.0 ft	0.0	P/	ASS		10.0 ft
+0.60D	1.600	0.577		0.06338	PASS	0.0 ft	0.0	P/	ASS		10.0 ft
Maximum Reactions							Note: Only non-	-zero re	eactior	ns ar	e listed.
	X-X Axis R	eaction	k	Y-Y Axis Rea	ction Axia	al Reaction	My - End Moments	k-ft	Mx - E	Ind N	/loments
Load Combination	@ Base	@ Top		@ Base @	Тор	@ Base	@ Base @ To	р	@ Ba	se	@ Top
D Only						5.002					
+D+S						38.020					
+D+0.750S						29.765					
01/23/24								Page	115 of	f 178	

Project File: 05 Beams.ec6

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+0.60D S Only 3.001 33.018 Maximum Deflections for Load Combinations Image: Combination of the second s	Wood Column						Project F	File: 05 Bea	ms.ec6
Maximum Reactions X-X Axis Reaction @ Base k Y-Y Axis Reaction @ Base Axial Reaction @ Base My-End Moments k.ft Mx + End Moments K.ft Mx + Zoologitt K.ft Mx + Zoologitt K.ft Mx + Zoologitt K.ft Mx + Zoologitt Mx +			SNAKE RIVEF	RENGINEEF	RING		(c) ENE	RCALC INC	1983-2023
Load Combination X-X Axis Reaction k Y-Y Axis Reaction Axial Reaction My - End Moments k-ft Mx - End Moments +0.60D 3.001 3.001 3.001 3.011 4.001 4.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001		DRG 2							
Load Combination @ Base @ Top @ Top @ Top @ Top @ Top @ Top	Maximum Reactions								
+0.60D S Only 3.001 33.018 Maximum Deflections for Load Combinations Max. X-X Deflection Distance Max. Y-Y Deflection Distance Donly 0.0000 in 0.0000 in 0.0000 in +0.750S 0.0000 in 0.0000 in 0.0000 in +0.60D 0.0000 in 0.000 in 0.000 in +0-750S 0.0000 in 0.0000 in 0.0000 in +0.60D 0.0000 in 0.0000 in 0.0000 in \$ Sonly 0.0000 in 0.0000 in 0.000 in \$ Sonly 0.0000 in 0.000 in 0.000 in \$ Sonly 0.0000 in 0.000 in 0.000 in \$ Sonly 0.000 in 0.000 in 0.000 in \$ Sonly \$ Sonly \$ Sonly \$ Sonly \$ Sonly \$ Sonly \$ Load 1 +X \$ Sonly \$ Sonly	Load Combination								
S Only 33.018 Maximum Deflections for Load Combinations Load Combination Max. X-X Deflection Distance Distance D Only 0.0000 in 0.0000 ft 0.0000 ft 0.0000 ft +D+S 0.0000 in 0.0000 ft 0.0000 ft 0.0000 ft 0.0000 ft +D+S 0.0000 in 0.0000 ft 0.0000 ft 0.0000 ft 0.0000 ft +D+O.750S 0.0000 in 0.0000 ft 0.0000 in 0.0000 ft 0.0000 ft +0.60D 0.0000 in 0.0000 ft 0.0000 in 0.0000 ft 0.0000 ft S Only 0.0000 in 0.0000 in 0.0000 in 0.0000 ft 0.000 ft S Only 0.0000 in 0.0000 in 0.000 ft 0.000 ft 0.000 ft Stetches		@ base @ top	@ Dase	e @ iop	-	-	@ TOP	@ Dase	@ TOP
Maximum Deflections for Load Combinations Load Combination Max. X-X Deflection Distance D Only 0.0000 in 0.0001 th 0.000 in 0.0001 th +D+S 0.0000 in 0.0001 th 0.000 in 0.0001 th +D+O.750S 0.0000 in 0.0001 th 0.000 in 0.0001 th +0.60D 0.0000 in 0.0001 th 0.000 in 0.0001 th S Only 0.0000 in 0.0001 th 0.000 in 0.0001 th S Only 0.0000 in 0.0001 th 0.000 in 0.0001 th									
Load Combination Max. X-X Deflection Distance Max. Y-Y Deflection Distance D Only 0.0000 in 0.000ft 0.000 in 0.000 ft +D+S 0.0000 in 0.000 ft 0.000 in 0.000 ft +D+0.750S 0.0000 in 0.000 ft 0.000 in 0.000 ft +0.60D 0.0000 in 0.000 ft 0.000 in 0.000 ft S Only 0.0000 in 0.000 ft 0.000 in 0.000 ft S Only 0.0000 in 0.000 ft 0.000 in 0.000 ft S Only 0.0000 in 0.000 ft 0.000 in 0.000 ft	-	r Load Combinations							
+D+S 0.000 in 0.000 ft 0.000 in 0.000 ft +D+0.750S 0.0000 in 0.000 ft 0.000 in 0.000 ft S Only 0.0000 in 0.000 ft 0.000 in 0.000 ft S Only 0.0000 in 0.000 ft 0.000 in 0.000 ft 0.000 f				Max. Y-Y	Deflection	Distance			
+D+0.750S +0.60D S Only S Only 5 Vertices 5ketches	D Only	0.0000 in	0.000ft		0.000 in	0.000 ft			
+0.60D S Only Sketches									
S Only 0.000 in 0.000 ft 0.000 in 0.000 ft Sketches									
Sketches									
97.85% 37.85%	-	0.0000 in	0.000ft		0.000 in	0.000ft			
13.50 in the second sec	Sketches								
не и соор на на соор на соор	13.50 in	Load 1	+X		Heght = 10.0 ft			HOUT HERE	

+Y

6x14

5.50 in

LIC# : KW-06013353, Build:20.23.08.30

3.30 SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

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DESCRIPTION: GRD1 BRG 1

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design		Wood Section Name	6x6		
End Fixities	Top & Bot	tom Pinned		Wood Grading/Manut	. Graded Lumbe	er	
Overall Column H	Height		10 ft	Wood Member Type	Sawn		
(Used for no	n-slender calculat	tions)		Exact Width	5.50 in Allow	Stress Modification Facto	hre
Wood Species Wood Grade	Douglas Fir-La No.2	arch		Exact Depth	5.50 in Ci	f or Cv for Bending	1.0
Fb +	750.0 psi	Fv	170.0 psi	Area	00.200 2	f or Cv for Compressio	1.0
	•		•	IX	76.255 in^4 Ci	f or Cv for Tension	1.0
Fb -	750.0 psi		475.0 psi	IV	76.255 in^4 Ci	m : Wet Use Factor	1.0
Fc - Prll	700.0 psi	,	31.210 pcf		C	t : Temperature Fact	1.0
Fc - Perp	625.0 psi				C	fu : Flat Use Factor	1.0
E : Modulus of El	lasticity	x-x Bending	y-y Bending	Axial	K	f : Built-up columns	1.0
	Basic	1,300.0	1,300.0	1,300.0 ksi		se Cr : Repetitive ?	No
	Minimum	470.0	470.0	Column Buckling Condition:		·	
				Evilly bread and			

Fully braced against buckling ABOUT X-X Axis ABOUT Y-Y Axis: Luy = 10 ft, Ky = 1.0

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

Applied Loads

Column self weight included : 65.563 lbs * Dead Load Factor AXIAL LOADS ...

Axial Load at 10.0 ft, D = 1.927, S = 13.479 k

DESIGN SUMMARY

Bending & Shear Check Results PASS Max. Axial+Bending Stress Ratio		Maximum SERVICE		ad Reactions		
Load Combination	+D+S	Top along Y-Y	0.0 k	Bottom	along Y-Y	0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X	0.0 k	Bottom	along X-X	0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE	Load Later	ral Deflection	s	
At maximum location values are .	15.472 k	Along Y-Y	0.0 in	at 0	.0 ft above base	
Applied Axial Applied Mx	15.472 K 0.0 k-ft	for load combina	ation : n/a			
Applied My	0.0 k-ft	Along X-X	0.0 in	at 0	.0 ft above base	
Fc : Allowable	558.50 psi	for load combination	ation : n/a			
	000.00 poi	Other Factors used	to calculate	e allowable s	tresses	
PASS Maximum Shear Stress Ratio =	0.0 : 1			Bending	Compression	Tension
Load Combination	+0.60D					
Location of max.above base	10.0 ft					
Applied Design Shear	0.0 psi					
Allowable Shear	272.0 psi					

	Maximum Axial + Bending Stress Ratios Maximum Shear Ratios									<u>atios</u>
Load Combination	CD	С _Р		Stress Ratio	Status	s Location	Stress Ratio	Sta	tus	Location
D Only	0.900	0.771		0.1357	PASS	0.0 ft	0.0	PA	SS	10.0 ft
+D+S	1.150	0.694		0.9158	PASS	0.0 ft	0.0	PA	SS	10.0 ft
+D+0.750S	1.150	0.694		0.7163	PASS	0.0 ft	0.0	PA	SS	10.0 ft
+0.60D	1.600	0.572		0.06171	PASS	0.0 ft	0.0	PA	SS	10.0 ft
Maximum Reactions							Note: Only non-	-zero re	actio	ns are listed.
	X-X Axis R	eaction	k	Y-Y Axis Rea	ction Ax	ial Reaction	My - End Moments	k-ft	Mx - E	End Moments
Load Combination	@ Base	@ Top		@ Base @ .	Тор	@ Base	@ Base @ To	р	@ Ba	se @ Top
D Only						1.993				
+D+S						15.472				
+D+0.750S						12.102				
01/23/24								Page	117 o	f 178

Wood Colum										Project F	ile: 05 Bea	ms.ec6
LIC# : KW-06013353, Bu		1		SNA	KE RIVER	ENGINEEF	RING			(c) ENEI	RCALC INC	1983-2023
									Nato			un linka d
Maximum Reaction	ons	V V Asis D	4!	1.		Desetter	Asial Data	4		nly non-zero		
Load Combination		X-X Axis R @ Base		K		@ Top	Axial Read @ Bas		My - End M @ Base	oments k-ft @ Top	Mx - End @ Base	
+0.60D S Only							1.19 13.4					
Maximum Deflect	ions for Load	Combina	tions									
Load Combination		lax. X-X Defle		istar	nce	Max. Y-Y	Deflection	Dist	ance			
D Only +D+S +D+0.750S +0.60D S Only Sketches		0.000 0.000 0.000 0.000 0.000	0in 0in 0in	0 0 0	.000ft .000ft .000ft .000ft .000ft		0.000 in 0.000 in 0.000 in 0.000 in 0.000 in		0.000 ft 0.000 ft 0.000 ft 0.000 ft 0.000 ft			
5.50 in		+Y 6x6	Load	11		+X		Height = 10.0 ft	15.406k		е оср 2 рание Н	

LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

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DESCRIPTION: GRD2 BRG 1

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design	1	Wood Section Nam	ne 6x10				
End Fixities	Top & Bot	tom Pinned		Wood Grading/Mar	nuf. Graded L	umber			
Overall Column H	leight		12 ft	Wood Member Typ	be Sawn				
(Used for no	n-slender calculat	tions)		Exact Width	5.50 in A	llow Stress Modification Facto	hre		
Wood Species Wood Grade	Douglas Fir-L No.2	arch		Exact Depth	9.50 in	Cf or Cv for Bending	1.0		
		_	170.0	Area	52.250 in^2	Cf or Cv for Compressio	1.0		
Fb +	750.0 psi		170.0 psi	lx	392.964 in^4	Cf or Cv for Tension	1.0		
Fb -	750.0 psi	Ft	475.0 psi	ly	131.714 in^4	Cm : Wet Use Factor	1.0		
Fc - Prll	700.0 psi	Density	31.210 pcf	- 5		Ct : Temperature Fact	1.0		
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0		
E : Modulus of El	lasticity	x-x Bending	y-y Bending	Axial		Kf : Built-up columns	1.0		
	Basic	1,300.0	1,300.0	1,300.0 ksi		Use Cr : Repetitive ?	No		
	Minimum	470.0	470.0	Column Buckling Condition	n:				

Fully braced against buckling ABOUT X-X Axis ABOUT Y-Y Axis: Luy = 12 ft, Ky = 1.0

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

Applied Loads

Column self weight included : 135.894 lbs * Dead Load Factor AXIAL LOADS . . . Axial Load at 12.0 ft, D = 3.105, S = 17.50 k

DESIGN SUMMARY

Bending & Shear Check Results PASS Max. Axial+Bending Stress Ratio Load Combination	0 = 0.8826 : 1 +D+S	Maximum SERVICE L Top along Y-Y	_ateral Loa 0.0 k		ons ttom alon	ng Y-Y	0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X			ttom alon	0	0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE L				0	0.0 1
At maximum location values are . Applied Axial Applied Mx	20.741 k 0.0 k-ft	Along Y-Y for load combinati	0.0 in ion : n/a	at	0.0 ft	above base	
Applied My Fc : Allowable	0.0 k-ft 449.734 psi	Along X-X for load combinat	0.0 in ion : n/a	at	0.0 ft	above base	
	440.104 poi	Other Factors used to	o calculat	e allowab	le stress	ses	
PASS Maximum Shear Stress Ratio = Load Combination Location of max.above base Applied Design Shear Allowable Shear	0.0 : 1 +0.60D 12.0 ft 0.0 psi 272.0 psi			<u>Bendi</u>	ing <u>Co</u>	ompression	<u>Tension</u>

	Maximum Axial + Bending Stress Ratios Maximum Shear Ratios								
Load Combination	CD	С _Р		Stress Ratio	Statu	s Location	Stress Ratio	Status	Location
D Only	0.900	0.651		0.1512	PASS	0.0 ft	0.0	PASS	12.0 ft
+D+S	1.150	0.559		0.8826	PASS	0.0 ft	0.0	PASS	12.0 ft
+D+0.750S	1.150	0.559		0.6965	PASS	0.0 ft	0.0	PASS	12.0 ft
+0.60D	1.600	0.436		0.07624	PASS	0.0 ft	0.0	PASS	12.0 ft
Maximum Reactions							Note: Only non-z	ero reactio	ons are listed.
	X-X Axis F	leaction	k	Y-Y Axis Rea	ction A:	xial Reaction	My - End Moments	k-ft Mx-	End Moments
Load Combination	@ Base	@ Top		@ Base @	Тор	@ Base	@ Base @ Top	@ Ba	ase @ Top
D Only						3.241			
+D+S						20.741			
+D+0.750S						16.366			
01/23/24								Page 119 d	of 178

Wood Column						Project F	ile: 05 Bea	ms.ec6
LIC# : KW-06013353, Build:20.23.08.30		SNAKE RIVE	R ENGINEER	RING		(c) ENE	RCALC INC	1983-2023
DESCRIPTION: GRD2 BRG 1	1							
Maximum Reactions					Note:	Only non-zero	reactions a	are listed.
				Axial Read	tion My - End M	Noments k-ft	Mx - End	Moments
Load Combination	@ Base @ Top	@ Bas	е @ Тор	@ Bas	-	@ Top	@ Base	@ Top
+0.60D S Only				1.94 17.50				
Maximum Deflections for Load	Combinations			17.50	50			
	ax. X-X Deflection Dis	stance	Max Y-Y	/ Deflection	Distance			
D Only	0.0000 in	0.000ft		0.000 in	0.000 ft			
+D+S	0.0000 in	0.000ft		0.000 in	0.000 ft			
+D+0.750S	0.0000 in	0.000ft		0.000 in	0.000 ft			
+0.60D	0.0000 in	0.000ft		0.000 in	0.000 ft			
S Only	0.0000 in	0.000ft		0.000 in	0.000 ft			
Sketches								
9.50 in	Load 1 +Y	+X			20.605k		20.605k	
	6x10							

5.50 in

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: GRD1 FB27 BRG

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design		Wood Section Nan	ne 6x8		
End Fixities	Top & Bot	tom Pinned		Wood Grading/Ma	nuf. Graded Lu	Imber	
Overall Column H	leight		9 ft	Wood Member Typ	pe Sawn		
(Used for noi	n-slender calculai	tions)		Exact Width	5.50 in All	low Stress Modification Facto	hre
Wood Species Wood Grade	Douglas Fir-L No.2	arch		Exact Depth	7.50 in	Cf or Cv for Bending	1.0
		_	170.0	Area	41.250 in^2	Cf or Cv for Compressio	1.0
Fb +	750.0 psi		170.0 psi	IX	193.359 in^4	Cf or Cv for Tension	1.0
Fb -	750.0 psi	Ft	475.0 psi	ly	103.984 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	700.0 psi	Density	31.210 pcf	.,	100.001 111 1	Ct : Temperature Fact	1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0
E : Modulus of El	asticity	x-x Bending	y-y Bending	Axial		Kf : Built-up columns	1.0
	Basic	1,300.0	1,300.0	1,300.0 ksi		Use Cr : Repetitive ?	No
	Minimum	470.0	470.0	Column Buckling Conditio	on:		

SNAKE RIVER ENGINEERING

Fully braced against buckling ABOUT X-X Axis ABOUT Y-Y Axis: Luy = 9 ft, Ky = 1.0

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

Applied Loads

Column self weight included : 80.463 lbs * Dead Load Factor AXIAL LOADS ... Axial Load at 9.0 ft, D = 3.005, S = 17.239 k

DESIGN SUMMARY

Bending & Shear Check Results PASS Max. Axial+Bending Stress Ratio	0 = 0.8045 : 1	Maximum SERVICE Lateral Load Reactions
Load Combination	+D+S	Top along Y-Y 0.0 k Bottom along Y-Y 0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X 0.0 k Bottom along X-X 0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE Load Lateral Deflections
At maximum location values are . Applied Axial Applied Mx	20.324 k 0.0 k-ft	Along Y-Y 0.0 in at 0.0 ft above base for load combination : n/a
Applied My Fc : Allowable	0.0 k-ft 612.43 psi	Along X-X 0.0 in at 0.0 ft above base for load combination : n/a
	01 <u>1</u> 10 poi	Other Factors used to calculate allowable stresses
PASS Maximum Shear Stress Ratio = Load Combination	0.0 : 1 +0.60D	Bending Compression Tensior
Location of max.above base Applied Design Shear Allowable Shear	9.0 ft 0.0 psi 272.0 psi	

Load Combination Results

	-	-	1	Maximum Axial	+ Bendin	<u>g Stress Ratio</u>	<u>s</u> <u>Maxim</u> u	um Shear	Ratio	<u>s</u>
Load Combination	CD	С _Р		Stress Ratio	Status	Location	Stress Ratio	Status	Loc	cation
D Only	0.900	0.823		0.1442	PASS	0.0 ft	0.0	PASS		9.0 ft
+D+S	1.150	0.761		0.8045	PASS	0.0 ft	0.0	PASS		9.0 ft
+D+0.750S	1.150	0.761		0.6339	PASS	0.0 ft	0.0	PASS		9.0 ft
+0.60D	1.600	0.651		0.06152	PASS	0.0 ft	0.0	PASS		9.0 ft
Maximum Reactions							Note: Only non-	zero react	ions a	re listed.
	X-X Axis R	leaction	k	Y-Y Axis Rea	ction Ax	ial Reaction	My - End Moments	k-ft Mx	- End	Moments
Load Combination	@ Base	@ Top		@ Base @ .	Тор	@ Base	@ Base @ Top) @E	Base	@ Top
D Only						3.085				
+D+S						20.324				
+D+0.750S						16.015				
01/23/24								Page 121	of 17	8

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

Wood Column						-	
		SNAKE R	VER ENGINEER	RING		(c) ENE	RCALC INC 1983-20
	FDZ7 DKG						
Maximum Reactions						-	
Wood Column Project File: 05 Beams.ed LCR: WV6013335, Build2023.08.30 SNAKE RIVER ENGINEERING (c) ENERCALCINC 1983-2023 DESCRIPTION: GRD1 FB27 BRG Image: Column and the second of							
	@ Base @ Top	@ E	Base @Top	0	0	@ Top	@ Base @ To
-				17.23	9		
	0.0000111	0.0001	L	0.000 11	0.00011		
Ketches							
7.50 in	Load	1	+X _	n oe = Meet			Heght = 90 ft
	6x8						
	5 50 in						

5.50 in

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: GRD2 BRG 2

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design	l	Wood Section Na	ame 6x14		
End Fixities	Top & Bot	tom Pinned		Wood Grading/M	anuf. Graded	Lumber	
Overall Column H	leight		12 ft	Wood Member T	ype Sawn		
(Used for no	n-slender calculat	tions)		Exact Width	5.50 in	Allow Stress Modification Fa	actors
Wood Species Wood Grade	Douglas Fir-L No.2	arch		Exact Depth	13.50 in	Cf or Cv for Bending	0.9870
Fb +	750.0 psi	Fv	170.0 psi	Area Ix	74.250 in^2 1.127.67 in^4	O(O (T)	0.9870 וס 0.9870
Fb-	750.0 psi		475.0 psi	lv	187.172 in^4		1.0
Fc - Prll Fc - Perp	700.0 psi 625.0 psi	,	31.210 pcf			Ct : Temperature Fact	1.0
E : Modulus of El		x-x Bending	y-y Bending	Axial		Cfu : Flat Use Factor Kf : Built-up columns	1.0 1.0
	Basic	1,300.0	1,300.0	1,300.0 ksi		Use Cr : Repetitive ?	No
	Minimum	470.0	470.0	Column Buckling Condit	ion:		
				E alla a la serie a serie	I a statistic statistic statistics.		

SNAKE RIVER ENGINEERING

Fully braced against buckling ABOUT X-X Axis ABOUT Y-Y Axis: Luy = 12 ft, Ky = 1.0

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

Project File: 05 Beams.ec6 (c) ENERCALC INC 1983-2023

Applied Loads

Column self weight included : 193.112 lbs * Dead Load Factor AXIAL LOADS ... Axial Load at 12.0 ft, D = 5.0, S = 26.30 k

DESIGN SUMMARY

Bending & Shear Check Results PASS Max. Axial+Bending Stress Ration Load Combination	0 = 0.9470 : 1 +D+S	Maximum SERVICE L Top along Y-Y	_ateral Lo 0.0 k		actions Bottom alor	ng Y-Y	0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X	0.0 k		Bottom alor	ng X-X	0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE L	_oad Late	al Def	lections		
At maximum location values are . Applied Axial Applied Mx	31.493 k 0.0 k-ft	Along Y-Y for load combinati	0.0 in ion : n/a	at	0.0 ft	above base	
Applied My Fc : Allowable	0.0 k-ft 447.872 psi	Along X-X for load combinat	0.0 in ion : n/a	at	0.0 ft	above base	
		Other Factors used to	o calculat	e allov	vable stres	ses	
PASS Maximum Shear Stress Ratio = Load Combination Location of max.above base Applied Design Shear Allowable Shear	0.0 : 1 +0.60D 12.0 ft 0.0 psi 272.0 psi			<u>Be</u>	<u>nding C</u>	ompression	<u>Tension</u>

	0	C	1			ing Stress Ratio		um Shear F	
Load Combination	CD	С _Р		Stress Ratio	Stat	us Location	Stress Ratio	Status	Location
D Only	0.900	0.656		0.1714	PASS	6 0.0 ft	0.0	PASS	12.0 ft
+D+S	1.150	0.564		0.9470	PASS	6 0.0 ft	0.0	PASS	12.0 ft
+D+0.750S	1.150	0.564		0.7493	PASS	6 0.0 ft	0.0	PASS	12.0 ft
+0.60D	1.600	0.440		0.08618	PASS	6 0.0 ft	0.0	PASS	12.0 ft
Maximum Reactions							Note: Only non-z	zero reactio	ons are listed.
	X-X Axis F	Reaction	k	Y-Y Axis Rea	ction A	xial Reaction	My - End Moments	k-ft Mx -	End Moments
Load Combination	@ Base	@ Top		@ Base @ .	Тор	@ Base	@ Base @ Top	@ Ba	ase @ Top
D Only						5.193			
+D+S						31.493			
+D+0.750S						24.918			
01/23/24								Page 123 o	of 178

Wood Column						Project F	ile: 05 Beam	ns.ec6
LIC# : KW-06013353, Build:20.23.08.30		SNAKE RIVER	ENGINEEF	RING		(c) ENE	RCALC INC 1	983-2023
Maximum Reactions						Only non-zero		
Load Combination	X-X Axis Reaction @ Base @ Top	k Y-Y Axis @ Base	Reaction @ Top	Axial Read @ Bas		loments k-ft @ Top		loment: @ Top
+0.60D S Only				3.1 26.3				
laximum Deflections for L	oad Combinations							
Load Combination	Max. X-X Deflection D		Max. Y-Y	Deflection	Distance			
D Only +D+S +D+0.750S +0.60D S Only	0.0000 in 0.0000 in 0.0000 in 0.0000 in 0.0000 in	0.000ft 0.000ft 0.000ft 0.000ft 0.000ft		0.000 in 0.000 in 0.000 in 0.000 in 0.000 in	0.000 ft 0.000 ft 0.000 ft 0.000 ft 0.000 ft			
Sketches	0.0000111	0.00011		0.000 111	0.00011			
13.50 in	Load 1	+X		Hegn= 120 ft			Height = 12.0 ft	
	6x14							

5.50 in

Γ

LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

DESCRIPTION: FB24 BRG

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design		Wood Section Nam	e 6x8		
End Fixities	Top & Bot	tom Pinned		Wood Grading/Man	uf. Graded Lumb	er	
Overall Column H	Height		9 ft	Wood Member Typ	e Sawn		
(Used for no	n-slender calculat	tions)		Exact Width	5.50 in Allow	Stress Modification Factor	ore
Wood Species Wood Grade	Douglas Fir-La No.2	arch		Exact Depth	0.00	of or Cv for Bending	1.0
		_	170.0	Area	41.250 in^2 C	or Cv for Compression	1.0
Fb +	750.0 psi		170.0 psi	lx	193.359 in^4 C	or Cv for Tension	1.0
Fb -	750.0 psi	Ft	475.0 psi	ly		m : Wet Use Factor	1.0
Fc - Prll	700.0 psi	Density	31.210 pcf	.,		t : Temperature Fact	1.0
Fc - Perp	625.0 psi					fu : Flat Use Factor	1.0
E : Modulus of El	lasticity	x-x Bending	y-y Bending	Axial	-	f : Built-up columns	1.0
	Basic	1,300.0	1,300.0	1,300.0 ksi		Jse Cr : Repetitive ?	No
	Minimum	470.0	470.0	Column Buckling Condition	ו:		
				F			

Fully braced against buckling ABOUT X-X Axis ABOUT Y-Y Axis: Luy = 9 ft, Ky = 1.0

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

ABOUT I-I AXIS. EU

Applied Loads

Column self weight included : 80.463 lbs * Dead Load Factor AXIAL LOADS . . . Axial Load at 9.0 ft, D = 4.50, L = 7.80, S = 16.20 k

DESIGN SUMMARY

Bending & Shear Check Results PASS Max. Axial+Bending Stress Ra Load Combination	+D+0.750L+0.750S	Maximum SERVICE Top along Y-Y	0.0 k	Bottom	along Y-Y	0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X	0.0 k	Bollon	along X-X	0.0 k
Location of max above base	0.0 ft	Maximum SERVICE	Load Late	ral Deflection	S	
At maximum location values are . Applied Axial Applied Mx	22.580 k 0.0 k-ft	Along Y-Y for load combina	0.0 in ation : n/a	at 0	.0 ft above base	e
Applied My Fc : Allowable	0.0 k-ft 612.43 psi	Along X-X for load combin	0.0 in ation : n/a	at 0	.0 ft above base	e
		Other Factors used	to calculat	e allowable s	tresses	
PASS Maximum Shear Stress Ratio = Load Combination Location of max.above base Applied Design Shear Allowable Shear	= 0.0 : 1 +0.60D 9.0 ft 0.0 psi 272.0 psi			<u>Bending</u>	<u>Compression</u>	<u>Tension</u>

			Maximum Axial	+ Bending	Stress Ratios	Maximu	m Shear F	Ratios
Load Combination	CD	С _Р	Stress Ratio	Status	Location	Stress Ratio	Status	Location
D Only	0.900	0.823	0.2141	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+L	1.000	0.799	0.5370	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+S	1.150	0.761	0.8226	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.750L	1.250	0.736	0.3928	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.750L+0.750S	1.150	0.761	0.8938	PASS	0.0 ft	0.0	PASS	9.0 ft
+0.60D	1.600	0.651	0.09134	PASS	0.0 ft	0.0	PASS	9.0 ft
Maximum Reactions						Note: Only non-z	ero reactio	ons are listed.
	X-X Axis R	leaction	k Y-Y Axis Read	ction Axia	I Reaction	My - End Moments	k-ft Mx-	End Moments
Load Combination	@ Base	@ Top	@ Base @ 1	Гор (@ Base	@ Base @ Top	@ Ba	ase @ Top
D Only					4.580			

Project File: 05 Beams.ec6 Wood Column LIC# : KW-06013353, Build:20.23.08.30 SNAKE RIVER ENGINEERING (c) ENERCALC INC 1983-2023 **DESCRIPTION:** FB24 BRG **Maximum Reactions** Note: Only non-zero reactions are listed. My - End Moments k-ft Mx - End Moments X-X Axis Reaction k Y-Y Axis Reaction Axial Reaction @ Base @ Top Load Combination @ Base @ Top @ Base @ Base @ Top @ Base @ Top +D+L 12.380 +D+S 20.780 10.430 +D+0.750L +D+0.750L+0.750S 22.580 +0.60D 2.748 7.800 L Only S Only 16.200 **Maximum Deflections for Load Combinations** Load Combination Max. X-X Deflection Distance Max. Y-Y Deflection Distance D Only 0.0000 in 0.000ft 0.000 in 0.000ft +D+L 0.0000 in 0.000ft 0.000 in 0.000ft +D+S 0.0000 in 0.000ft 0.000 in 0.000ft +D+0.750L 0.0000 in 0.000ft 0.000 in 0.000ft +D+0.750L+0.750S 0.0000 in 0.000ft 0.000 in 0.000 ft 0.000ft 0.000 in 0.000 ft +0.60D 0.0000 in L Only 0.0000 in 0.000ft 0.000 in 0.000 ft S Only 0.000ft 0.0000 in 0.000ft 0.000 in Sketches 28.50k 28.50k +X Load 1 .⊑ 20 ~ 9.0 ft : 9.0 ft leight leight 6x8

5.50 in

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: FBA FB16 RB1 BRG

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable	Stress Design		Wood Section Nam	ne 5-2x6	
End Fixities	Top & Bot	tom Pinned		Wood Grading/Mar	nuf. Graded Lumber	
Overall Column H	leight		9 ft	Wood Member Typ	be Sawn	
(Used for no	n-slender calculat	tions)		Exact Width	7.50 in Allow Stress Modification Factor	ors
Wood Species Wood Grade	Douglas Fir-La No.2	arch		Exact Depth	5.50 in Cf or Cv for Bending	1.30
		-	170.0	Area	41.250 in^2 Cf or Cv for Compression	1.10
Fb +	750.0 psi	Fv	170.0 psi	IX	103.984 in^4 Cf or Cv for Tension	1.30
Fb -	750.0 psi	Ft	475.0 psi	ly	193.359 in^4 Cm : Wet Use Factor	1.0
Fc - Prll	700.0 psi	Density	31.210 pcf	- ,	Ct : Temperature Fact	1.0
Fc - Perp	625.0 psi				Cfu : Flat Use Factor	1.0
E : Modulus of El	asticity	x-x Bending	y-y Bending	Axial	Kf : Built-up columns	1.0
	Basic	1,300.0	1,300.0	1,300.0 ksi	Use Cr : Repetitive ?	No
	Minimum	470.0	470.0	Column Buckling Conditio	n:	
				E di stan e di s		

Fully braced against buckling ABOUT X-X Axis ABOUT Y-Y Axis: Luy = 9 ft, Ky = 1.0

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

ABOUT 1-1 AXIS

Applied Loads

Column self weight included : 80.463 lbs * Dead Load Factor AXIAL LOADS . . . Axial Load at 9.0 ft, D = 5.70, S = 19.40 k

Axial Eodd at 9.0 it, D = 5.70, 3

DESIGN SUMMARY

Bending & Shear Check Results PASS Max. Axial+Bending Stress Ratio		Maximum SERVICE					
Load Combination	+D+S	Top along Y-Y	0.0 k		om along	,	0.0 k
Governing NDS Forumla	Comp Only, fc/Fc'	Top along X-X	0.0 k	Botto	om along	g X-X	0.0 k
Location of max.above base	0.0 ft	Maximum SERVICE	Load Late	ral Deflecti	ons		
At maximum location values are . Applied Axial	25.180 k	Along Y-Y for load combina	0.0 in ation : n/a	at	0.0 ft	above base	
Applied Mx Applied My Fc : Allowable	0.0 k-ft 0.0 k-ft 775.08 psi	Along X-X for load combina	0.0 in ation : n/a	at	0.0 ft	above base	
T C . Allowable	775.00 psi	Other Factors used	to calculat	e allowable	e stresse	es	
PASS Maximum Shear Stress Ratio = Load Combination	0.0 : 1 +0.60D			Bendin	<u>g</u> <u>Cor</u>	mpression	<u>Tension</u>
Location of max.above base	9.0 ft						
Applied Design Shear	0.0 psi						
Allowable Shear	272.0 psi						

	_	_	1	Maximum Axial	+ Bending	Stress Ratio	<u>IS</u>	Maximu	m Shear R	<u>atios</u>	
Load Combination	CD	С _Р		Stress Ratio	Status	Location	Stres	s Ratio	Status	Locatio	n
D Only	0.900	0.908		0.2228	PASS	0.0 f	t	0.0	PASS	9.0	0 ft
+D+S	1.150	0.875		0.7876	PASS	0.0 ft	t	0.0	PASS	9.0	0 ft
+D+0.750S	1.150	0.875		0.6359	PASS	0.0 ft	t	0.0	PASS	9.0	0 ft
+0.60D	1.600	0.812		0.08407	PASS	0.0 fi	t	0.0	PASS	9.0	0 ft
Maximum Reactions							Note: Or	nly non-ze	ero reactio	ns are lis	sted.
	X-X Axis R	Reaction	k	Y-Y Axis Read	ction Axia	al Reaction	My - End Mo	ments	k-ft Mx-E	End Mom	nents
Load Combination	@ Base	@ Top		@ Base @ -	Тор	@ Base	@ Base	@ Top	@ Ba	se @	Тор
D Only						5.780					
+D+S						25.180					
+D+0.750S						20.330					
01/22/24									Dago 127 o	f 170	

Nood Column						Project F	ile: 05 Bea	ms.ec6
IC# : KW-06013353, Build:20.23.08.30		SNAKE RIVE	R ENGINEEF	RING		(c) ENE	RCALC INC	1983-2023
DESCRIPTION: FBA FB1	O RETERG							
aximum Reactions						Only non-zero		
Load Combination	X-X Axis Reaction @ Base @ Top		is Reaction e @ Top	Axial Reaction @ Base	My - End N @ Base	loments k-ft @ Top	Mx - End @ Base	Moments @ Top
+0.60D S Only				3.468 19.400				
aximum Deflections for L	oad Combinations							
Load Combination	Max. X-X Deflection E	Distance	Max. Y-Y	Deflection Dis	stance			
D Only	0.0000 in	0.000ft		0.000 in	0.000 ft			
+D+S	0.0000 in	0.000ft		0.000 in	0.000 ft			
+D+0.750S	0.0000 in	0.000ft		0.000 in	0.000 ft			
+0.60D	0.0000 in	0.000ft		0.000 in	0.000 ft			
S Only	0.0000 in	0.000ft		0.000 in	0.000 ft			
ketches								
					25.10k		25.10k	
							SHAN	
		AN AN AR AVAILA						
. <u> </u>	Load 1		+X					
			-					
2.4								
				¥			e d	
				Height = 9.0 ft			Height = 9.0 ft	
	+Y			Heigh			Heigh	
•	5-2x6							
	0 2/0							
·								
	7.50 in							

Concrete Column

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: --None--

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

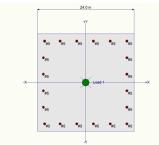
General Information

f'c : Concrete 28 day stren E =	g = =	2.50 ksi 3,122.0 ksi	Overall Column Height End Fixity	= 15.50 ft Top & Bottom Pinned
Density β fy - Main Rebar E - Main Rebar	= = =	150.0 pcf 0.850 60.0 ksi 29,000.0 ksi	Brace condition for deflection X-X (width) axis : Unbraced Length for b Y-Y (depth) axis :	on (buckling) along colun ouckling ABOUT X-X Axis = 15.50 ft, K = 1.0
Allow. Reinforcing Limits Min. Reinf. Max. Reinf.	= =	STM A615 Bars Used 1.0 % 8.0 %		ouckling ABOUT Y-Y Axis = 15.50 ft, K = 1.0

SNAKE RIVER ENGINEERING

Column Cross Section

Column Dimensions :	24.0in Square Column, Column Edge to Rebar Edge Cover = 1.50in
Column Reinforcing :	4 - #5 bars @ corners,, 4 - #5 bars top & bottom between corner bars, 4 - #5 bars left & right between corner



Entered loads are factored per load combinations specified by user.

Column self weight included : 9,300.0 lbs * Dead Load Factor AXIAL LOADS . . . Axial Load at 15.50 ft above base, D = 62.80 k

DESIGN SUMMARY

Applied Loads

Load Combir	nation		+1.40D	Maximum SERVICE Loa	ad Reaction	ns.	
Location of m	nax.above base		15.396 ft	Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Maximum Stress Ratio Ratio = (Pu^2+Mu^2)^.5 / (PhiPn^2+PhiMn^2)^.5			0.123 : 1	Top along X-X	0.0 k	Bottom along X-X	0.0 k
Pu =	100.940 k	φ* Pn =	823.07 k				
Mu-x = Mu-y = Mu Angle = Mu at Angle =	11.103 k-ft 0.0 k-ft 0.0 deg 11.103 k-ft	φ* Mn-x = φ* Mn-y = φ = φ =	88.175 k-ft 0.1991 k-ft 0.650 90.308 k-ft	Maximum SERVICE Los Along Y-Y for load combination Along X-X for load combination	0.0 in at : 0.0 in at	ons… 0.0 ft above base 0.0 ft above base	
Column Capaci Pnmax : Nomi Pnmin : Nomi φ Pn, max : I	i ties inal Max. Compre nal Min. Tension /	ive Axial Capacity	with capacity curve 1,582.83 k k 823.07 k k	General Section Inform ρ : % Reinforcing Reinforcing Area Concrete Area			θ = 0.80

Governing Load Combination Results

Governing Factored	Moment	Dist. fror	n Axial Load k		Bending Analy	vsis k-ft	Utilization
Load Combination	X-X Y-Y	base ft	Pu φ*Pn	δx δx*Mux	δ ^y δy * Muy	Alpha (deg) δ Mu	ϕ Mn Ratio
+1.40D	Actual M2,mir	15.40	100.94 823.07	1.000	1.000 11.10	90.000 11.10	90.61 0.123
+1.40D	M2,min Actual	15.40	100.94 823.07	1.000 11.10	1.000	0.000 11.10	90.31 0.123
+1.20D	Actual M2,mir	15.40	86.52 823.07	1.000	1.000 9.52	90.000 9.52	90.61 0.105
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Project File: 05 Beams.ec6

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Concrete Column

LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

DESCRIPTION: --None--

Governing Load Combination Results

Governing Factored			Мо	ment		Dist. from	Axia k	al Load				Ben	ding Analy	/sis	k-ft			Ut	ilization
Load Combination			X-X	Y-	Y k	oase ft		φ*Pn	δ×	δx * M	ux	δу	δy * Muy	Alpł	ha (de	eg)δ	Mu	ϕ Mn	Ratio
+1.20D			M2,m	n Act	ual	15.40	86.52	823.0	7 1.000	9.	52 1	1.000		C	0.000	9	.52	90.31	0.10
+0.90D			Actua	I M2,	min	15.40	64.89	823.07	7 1.000			1.000	7.14	90	0.000	7	.14	90.61	0.07
+0.90D			M2,m	n Act	ual	15.40	64.89	823.07	7 1.000	7.	14 '	1.000		C	0.000	7	.14	90.31	0.07
Maximum Reaction	ons																	ions are	
						leaction			eaction										loments
Load Combination				@ Ba	ase	@ Тор	@	Base	@ Тор	-	Bas		@ Ba	ise	@ T	ор	@ I	Base	@ Тор
D Only +0.60D											72.1 43.2								
Maximum Momei	nt Rea	actio	ns										No	te: O	nly no	n-zero	react	ions are	e listed.
						Mome	nt Abou	t X-X Ax	tis				Mor	nent	About	Y-Y A	xis		
Load Combination						@ Bas	е	@ T	ор				@	Base		@ Toj	р		
D Only +0.60D									k-ft k-ft									k-ft k-ft	
Maximum Deflect	tions	for L	oad (Com	bina	ations													
Load Combination						Deflectior			Ma	ax. Y-Y									
D Only)0 in		000 ft				0 in		0.000					
+0.60D					0.000	00 in	0.0	000 ft			0.00	0 in	C	0.000	ft				
Sketches																			
	·		24.0	in		•							62.80x						6.00
										r									
	•#5	•#5	•#5	•#5	•#5	•#5													
	•#5					•#5													
	•#5			_		• _{#5}				10 (1) = 10 (0 II						NAME OF A			
-X	•#5			Load 1		•#5	+X												
	#5																		
	#5					•#5													
		•#5	•#5	•#5	•#5	•#5													
		•#5	•#5	• #5	● _{#5}	• ₂₅													

Interaction Diagrams

Program: Continuous Footing

Soil Bearing Pressure: 1500psf

Roof				
Roof Dead	(17psf)	(9.5ft)	=	162plf
Snow Live	(150psf)	(9.5ft)	=	1425plf

Upper Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Floor Live	(40psf)	(.0ft)	=	plf

Main Floor			
Floor Dead	(12psf)	(.0ft)	= plf
Floor Live	(40psf)	(.0ft)	= plf

Deck Floor				
Floor Dead	(45psf)	(.Oft)	=	plf
Snow Live	(75psf)	(.0ft)	=	plf

Misc				
Wall Load:	(18psf)	(12.0ft)	=	216plf
Conc Stem:	(145pcf)	(2 x .5ft)	=	145plf
Misc Load:	(.0ft)	(.0ft) (.0ft)	=	plf

Use Footing Width:	18	Х	8	in
W/		(2)	#4	Cont.

Program: Continuous Footing

Soil Bearing Pressure: 1500psf

Roof				
Roof Dead	(17psf)	(21.5ft)	=	366plf
Snow Live	(150psf)	(21.5ft)	=	3225plf

Upper Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Floor Live	(40psf)	(.0ft)	=	plf

Main Floor				
Floor Dead	(12psf)	(4.5ft)	=	54plf
Floor Live	(40psf)	(4.5ft)	=	180plf

Deck Floor				
Floor Dead	(45psf)	(7.0ft)	=	315plf
Snow Live	(75psf)	(7.0ft)	=	525plf

Misc				
Wall Load:	(18psf)	(12.0ft)	=	216plf
Conc Stem:	(145pcf)	(4 x .5ft)	=	290plf
Misc Load:	(.0ft)	(.Oft) (.Oft)	=	plf

Use Footing Width:	48	Х	10	in
W/		(4)	#4	Cont.

Program: Continuous Footing

Soil Bearing Pressure: 1500psf

Roof				
Roof Dead	(17psf)	(10.0ft)	=	170plf
Snow Live	(150psf)	(10.0ft)	=	1500plf

Upper Floor			
Floor Dead	(12psf)	(.0ft)	= plf
Floor Live	(40psf)	(.0ft)	= plf

Main Floor				
Floor Dead	(12psf)	(4.0ft)	=	48plf
Floor Live	(40psf)	(4.0ft)	=	160plf

Deck Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Snow Live	(150psf)	(.0ft)	=	plf

Misc				
Wall Load:	(18psf)	(12.0ft)	=	216plf
Conc Stem:	(145pcf)	(2 x .5ft)	=	145plf
Misc Load:	(.0ft)	(.Oft) (.Oft)	=	plf

Use Footing Width:	18	Х	8	in
W/		(2)	#4	Cont.

Program: Continuous Footing

Soil Bearing Pressure: 1500psf

Roof				
Roof Dead	(17psf)	(23.0ft)	=	391plf
Snow Live	(150psf)	(23.0ft)	=	3450plf

Upper Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Floor Live	(40psf)	(.0ft)	=	plf

Main Floor				
Floor Dead	(12psf)	(8.0ft)	=	96plf
Floor Live	(40psf)	(8.0ft)	=	320plf

Deck Floor				
Floor Dead	(45psf)	(5.0ft)	=	225plf
Snow Live	(75psf)	(5.0ft)	=	375plf

Misc				
Wall Load:	(18psf)	(12.0ft)	=	216plf
Conc Stem:	(145pcf)	(4 x .5ft)	=	290plf
Misc Load:	(.0ft)	(.0ft) (.0ft)	=	plf

Use Footing Width:	48	Х	10	in
W/		(4)	#4	Cont.

Program: Continuous Footing

Soil Bearing Pressure: 1500psf

Roof				
Roof Dead	(17psf)	(9.0ft)	=	153plf
Snow Live	(150psf)	(9.0ft)	=	1350plf

Upper Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Floor Live	(40psf)	(.0ft)	=	plf

Main Floor				
Floor Dead	(12psf)	(6.0ft)	=	72plf
Floor Live	(40psf)	(6.0ft)	=	240plf

Deck Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Snow Live	(150psf)	(.0ft)	=	plf

Misc				
Wall Load:	(18psf)	(12.0ft)	=	216plf
Conc Stem:	(145pcf)	(2 x .5ft)	=	145plf
Misc Load:	(.0ft)	(.0ft) (.0ft)	=	plf

Use Footing Width:	18	Х	8	in
W/		(2)	#4	Cont.

Program: Continuous Footing

Soil Bearing Pressure: 1500psf

Roof				
Roof Dead	(17psf)	(13.0ft)	=	221plf
Snow Live	(150psf)	(13.0ft)	=	1950plf

Upper Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Floor Live	(40psf)	(.0ft)	=	plf

Main Floor				
Floor Dead	(12psf)	(4.0ft)	=	48plf
Floor Live	(40psf)	(4.0ft)	=	160plf

Deck Floor				
Floor Dead	(45psf)	(5.0ft)	=	225plf
Snow Live	(75psf)	(5.0ft)	=	375plf

Misc				
Wall Load:	(18psf)	(12.0ft)	=	216plf
Conc Stem:	(145pcf)	(4 x .5ft)	=	290plf
Misc Load:	(.0ft)	(.Oft) (.Oft)	=	plf

Use Footing Width:	30	Х	10	in
W/		(3)	#4	Cont.

Program: Continuous Footing

Soil Bearing Pressure: 1500psf

Roof				
Roof Dead	(17psf)	(20.0ft)	=	340plf
Snow Live	(150psf)	(20.0ft)	=	3000plf

Upper Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Floor Live	(40psf)	(.0ft)	=	plf

Main Floor				
Floor Dead	(12psf)	(4.5ft)	=	54plf
Floor Live	(40psf)	(4.5ft)	=	180plf

Deck Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Snow Live	(150psf)	(.0ft)	=	plf

Misc				
Wall Load:	(18psf)	(12.0ft)	=	216plf
Conc Stem:	(145pcf)	(2 x .5ft)	=	145plf
Misc Load:	(.0ft)	(.Oft) (.Oft)	=	plf

Use Footing Width:	36	Х	10	in
W/		(3)	#4	Cont.

Program: Continuous Footing

Soil Bearing Pressure: 1500psf

Roof			
Roof Dead (17psf)	(17.2ft)	=	292plf
Snow Live (150psf)	(17.2ft)	=	2574plf

Upper Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Floor Live	(40psf)	(.0ft)	=	plf

Main Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Floor Live	(40psf)	(.0ft)	=	plf

Deck Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Snow Live	(150psf)	(.0ft)	=	plf

Misc				
Wall Load:	(18psf)	(12.0ft)	=	216plf
Conc Stem:	(145pcf)	(2 x .5ft)	=	145plf
Misc Load:	(.0ft)	(.0ft) (.0ft)	=	plf

Use Footing Width:	30	Х	10	in
W/		(3)	#4	Cont.

Program: Continuous Footing

Soil Bearing Pressure: 1500psf

Roof				
Roof Dead	(17psf)	(16.8ft)	=	285plf
Snow Live	(150psf)	(16.8ft)	=	2513plf

Upper Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Floor Live	(40psf)	(.0ft)	=	plf

Main Floor				
Floor Dead	(12psf)	(5.5ft)	=	66plf
Floor Live	(40psf)	(5.5ft)	=	220plf

Deck Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Snow Live	(150psf)	(.0ft)	=	plf

Misc				
Wall Load:	(18psf)	(12.0ft)	=	216plf
Conc Stem:	(145pcf)	(2 x .5ft)	=	145plf
Misc Load:	(.0ft)	(.Oft) (.Oft)	=	plf

Use Footing Width:	30	Х	10	in
W/		(3)	#4	Cont.

Program: Continuous Footing

Soil Bearing Pressure: 1500psf

Roof				
Roof Dead	(17psf)	(22.5ft)	=	383plf
Snow Live	(150psf)	(22.5ft)	=	3375plf

Upper Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Floor Live	(40psf)	(.0ft)	=	plf

Main Floor				
Floor Dead	(12psf)	(2.0ft)	=	24plf
Floor Live	(40psf)	(2.0ft)	=	80plf

Deck Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Snow Live	(150psf)	(.0ft)	=	plf

Misc				
Wall Load:	(18psf)	(12.0ft)	=	216plf
Conc Stem:	(145pcf)	(2 x .5ft)	=	145plf
Misc Load:	(.0ft)	(.Oft) (.Oft)	=	plf

Use Footing Width:	42	Х	10	in
W/		(4)	#4	Cont.

Program: Continuous Footing

Soil Bearing Pressure: 1500psf

Roof				
Roof Dead	(17psf)	(15.3ft)	=	259plf
Snow Live	(150psf)	(15.3ft)	=	2288plf

Upper Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Floor Live	(40psf)	(.0ft)	=	plf

Main Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Floor Live	(40psf)	(.0ft)	=	plf

Deck Floor				
Floor Dead	(12psf)	(.0ft)	=	plf
Snow Live	(150psf)	(.0ft)	=	plf

Misc				
Wall Load:	(18psf)	(12.0ft)	=	216plf
Conc Stem:	(145pcf)	(2 x .5ft)	=	145plf
Misc Load:	(.0ft)	(.Oft) (.Oft)	=	plf

Use Footing Width:	30	Х	10	in
W/		(3)	#4	Cont.

PAD FOOTING DESIGN CAPACITIES:

Soil Bearing (1500 psf)								
Dimensions (Inches) Capacity # of Bars Min. Col. Size								
72 x 72 x 12	47,500 lbs	10	3.5 sq.					
66 x 66 x 12	39,750 lbs	8	3.5 sq.					
60 x 60 x 10	33,450 lbs	6	3.5 sq.					
54 x 54 x 10	27,000 lbs	5	3.5 sq.					
48 x 48 x 8	21,500 lbs	4	3.5 sq.					
42 x 42 x 8	16,500 lbs	4	3.5 sq.					
36 x 36 x 8	12,000 lbs	4	3.5 sq.					
30 x 30 x 8	8,350 lbs	3	3.5 sq.					
24 x 24 x 8	5,300 lbs	2	3.5 sq.					
18 x 18 x 8	2,900 lbs	2	3.5 sq.					

Bars to be 3 1/2" from bottom of pad. Evenly space in both directions.

CONT. FOOTING DESIGN CAPACITIES:

	Soil Bearing (1500 psf)							
Dimen	sion	s (Inches)	Capacity	# of Bars				
60	х	10	6,850 plf	6				
54	х	10	6,200 plf	5				
48	х	10	5,500 plf	4				
42	х	10	4,750 plf	4				
36	х	10	4,000 plf	3				
30	х	10	3,400 plf	3				
24	х	8	2,800 plf	2				
18	х	8	2,100 plf	2				
16	х	8	1,850 plf	2				
12	х	8	1,350 plf	2				
Bars to	be 3	1/2" from	bottom of fo	ooting.				

SNAKE RIVER ENGINEERING

General Footing

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: 71.8 K

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

Material Properties			
f'c : Concrete 28 day strength	=	2.5	50 ksi
fy : Rebar Yield	=	60	.0 ksi
Ec : Concrete Elastic Modulus	=	3,122	.0 ksi
Concrete Density	=	145	.0 pcf
$_{m{\Phi}}$ Values Flexure	=	0.9	0
' Shear	=	0.75	50
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 & she	ears	:	Yes
Add Pedestal Wt for Soil Pressure		:	No
Use Pedestal wt for stability, mom & s	shear	:	No

Soil Design Values Allowable Soil Bearing Soil Density Increase Bearing By Footing Weight Soil Passive Resistance (for Sliding) Soil/Concrete Friction Coeff.	= 1.50 = 110.0 = No = 250.0 = 0.30) pcf
Increases based on footing Depth Footing base depth below soil surface Allow press. increase per foot of depth when footing base is below	= = =	ft ksf ft
Increases based on footing plan dimension Allowable pressure increase per foot of depth		l. f
when max. length or width is greater than	=	ksf
	=	ft

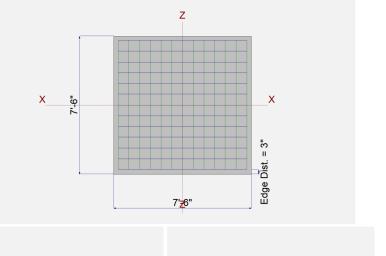
Dimensions

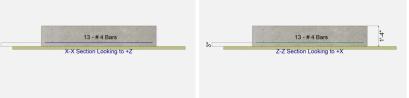
Width parallel to X-X Axis	=	7.50 ft
Length parallel to Z-Z Axis	=	7.50 ft
Footing Thickness	=	16.0 in

Pedestal dimensions		
px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	-	in
Rebar Centerline to Edge of	Concrete	
at Bottom of footing	=	3.0 in



Bars parallel to X-X Axis Number of Bars Reinforcing Bar Size	= =	#	13 4
Bars parallel to Z-Z Axis Number of Bars Reinforcing Bar Size Bandwidth Distribution Che Direction Requiring Closer S	•	# 5.4.4.2)	13 4
# Bars required within zone # Bars required on each side	of zone		n/a n/a n/a





Applied Loads

		D	Lr	L	S	w	E	н
P : Column Load	=	71.80						k
OB : Overburden	=							ksf
M-xx	=							k-ft
M-zz	=							k-ft
V-x	=							k
V-z	=							k
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Project File: 05 Beams.ec6

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General Footing

LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

DESCRIPTION: 71.8 K

DESIGN SUMMARY

SIGN SUN	MARY				Design OK
ľ	Vin. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.980	Soil Bearing	1.470 ksf	1.50 ksf	D Only 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	0.6396	Z Flexure (+X)	12.565 k-ft/ft	19.644 k-ft/ft	+1.40D
PASS	0.6396	Z Flexure (-X)	12.565 k-ft/ft	19.644 k-ft/ft	+1.40D
PASS	0.6396	X Flexure (+Z)	12.565 k-ft/ft	19.644 k-ft/ft	+1.40D
PASS	0.6396	X Flexure (-Z)	12.565 k-ft/ft	19.644 k-ft/ft	+1.40D
PASS	0.4124	1-way Shear (+X)	30.929 psi	75.0 psi	+1.40D
PASS	0.4124	1-way Shear (-X)	30.929 psi	75.0 psi	+1.40D
PASS	0.4124	1-way Shear (+Z)	30.929 psi	75.0 psi	+1.40D
PASS	0.4124	1-way Shear (-Z)	30.929 psi	75.0 psi	+1.40D
PASS	0.9719	2-way Punching	145.784 psi	150.0 psi	+1.40D
tailod Ros	ulte				

Detailed Results

Soil Bearing								
Rotation Axis &		Xecc	Zecc	Actual	Soil Bearing	Stress @ Loc	ation	Actual / Allow
Load Combination	Gross Allowable	(in	ı)	Bottom, -Z	Top, +Z	Left, -X	Right, +X	Ratio
X-X, D Only	1.50	n/a	0.0	1.470	1.470	n/a	n/a	0.980
X-X, +0.60D	1.50	n/a	0.0	0.8819	0.8819	n/a	n/a	0.588
Z-Z, D Only	1.50	0.0	n/a	n/a	n/a	1.470	1.470	0.980
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.8819	0.8819	0.588

Overturning Stability

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

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. A in^2	As Actual As in^2	s Phi* k-t		Status
X-X, +1.40D	12.565	+Z	Bottom	0.3456	AsMin	0.3467	19	9.644	ок
X-X, +1.40D	12.565	-Z	Bottom	0.3456	AsMin	0.3467	19	9.644	OK
X-X, +1.20D	10.770	+Z	Bottom	0.3456	AsMin	0.3467	19	9.644	OK
X-X, +1.20D	10.770	-Z	Bottom	0.3456	AsMin	0.3467	19	9.644	OK
X-X, +0.90D	8.078	+Z	Bottom	0.3456	AsMin	0.3467	19	9.644	OK
X-X, +0.90D	8.078	-Z	Bottom	0.3456	AsMin	0.3467	19	9.644	OK
Z-Z, +1.40D	12.565	-X	Bottom	0.3456	AsMin	0.3467	19	9.644	OK
Z-Z, +1.40D	12.565	+X	Bottom	0.3456	AsMin	0.3467	19	9.644	OK
Z-Z, +1.20D	10.770	-X	Bottom	0.3456	AsMin	0.3467	19	9.644	OK
Z-Z, +1.20D	10.770	+X	Bottom	0.3456	AsMin	0.3467	19	9.644	OK
Z-Z, +0.90D	8.078	-X	Bottom	0.3456	AsMin	0.3467	19	9.644	OK
Z-Z, +0.90D	8.078	+X	Bottom	0.3456	AsMin	0.3467	19	9.644	OK
One Way Shear									
Load Combination V	′u @ -X	Vu @ +	X Vu	@ -Z Vu	@ +Z	Vu:Max Pl	hiVn Vu	ı / Phi*Vn	Status
+1.40D	30.93 p	si 3	30.93 psi	30.93 psi	30.93 psi	30.93 psi	75.00 psi	0.41	OK
+1.20D	26.51 p		26.51 psi	26.51 psi	26.51 psi		75.00 psi	0.35	OK
+0.90D	19.88 p		9.88 psi	19.88 psi	19.88 psi		75.00 psi	0.27	OK

General Footing Project File: 05 Beams.ec6 LIC# : KW-06013353, Build:20.23.08.30 SNAKE RIVER ENGINEERING (c) ENERCALC INC 1983-2023 **DESCRIPTION: 71.8 K** Two-Way "Punching" Shear All units k Load Combination... Vu Phi*Vn Vu / Phi*Vn Status 145.78 psi 124.96 psi 93.72 psi 150.00psi 150.00psi 150.00psi OK OK OK +1.40D 0.9719 +1.20D 0.8331 0.6248 +0.90D

SNAKE RIVER ENGINEERING

General Footing

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: 58.5 K

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16 Load Combinations Used : IBC 2018

General Information

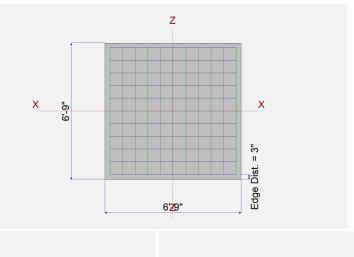
Material Properties			
f'c : Concrete 28 day strength	=	2	2.50 ksi
fy : Rebar Yield	=	6	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,12	22.0 ksi
Concrete Density	=	14	45.0 pcf
$_{m{\Phi}}$ Values Flexure	=	(0.90
Shear	=	0.	750
Analysis Settings			
Min Steel % Bending Reinf.		=	
Min Allow % Temp Reinf.		=	0.00180
Min. Overturning Safety Factor		=	1.0 :
Min. Sliding Safety Factor		=	1.0:
Add Ftg Wt for Soil Pressure		:	Yes
Use ftg wt for stability, moments	s & shears	:	Yes
Add Pedestal Wt for Soil Press	ure	:	No
Use Pedestal wt for stability, mo	om & shear	:	No

	Soil Design Values Allowable Soil Bearing Soil Density Increase Bearing By Footing Weight Soil Passive Resistance (for Sliding) Soil/Concrete Friction Coeff.	= = = =	1.50 110.0 No 250.0 0.30	pcf
: 1	Increases based on footing Depth Footing base depth below soil surface Allow press. increase per foot of depth when footing base is below	= = =		ft ksf ft
: 1	Increases based on footing plan dimension Allowable pressure increase per foot of dept	h		
	when max. length or width is greater than	=		ksf
		=		ft

Dimensions

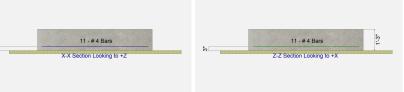
Width parallel to X-X Axis	=	6.750 ft
Length parallel to Z-Z Axis	=	6.750 ft
Footing Thickness	=	15.0 in

Pedestal dimensions		
px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	-	in
Rebar Centerline to Edge of	Concrete	
at Bottom of footing	=	3.0 in





Bars parallel to X-X Axis Number of Bars Reinforcing Bar Size	=	#	11 4
Bars parallel to Z-Z Axis Number of Bars Reinforcing Bar Size	=	#	11 4
Bandwidth Distribution Check Direction Requiring Closer Sep		2)	
# Bars required within zone # Bars required on each side of	zone		n/a n/a n/a



Applied Loads

		D	Lr	L	S	w	E	н
P : Column Load	=	58.50						k
OB : Overburden	=							ksf
M-xx	=							k-ft
M-zz	=							k-ft
V-x	=							k
V-z	=							k
01/23/24							Page	146 of 178

Project File: 05 Beams.ec6

General Footing

LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

DESCRIPTION: 58.5 K

DESIGN SUMMARY

SIGN SU	MMARY				Design OK
	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9767	Soil Bearing	1.465 ksf	1.50 ksf	D Only 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	0.6009	Z Flexure (+X)	10.238 k-ft/ft	17.038 k-ft/ft	+1.40D
PASS	0.6009	Z Flexure (-X)	10.238 k-ft/ft	17.038 k-ft/ft	+1.40D
PASS	0.6009	X Flexure (+Z)	10.238 k-ft/ft	17.038 k-ft/ft	+1.40D
PASS	0.6009	X Flexure (-Z)	10.238 k-ft/ft	17.038 k-ft/ft	+1.40D
PASS	0.3932	1-way Shear (+X)	29.491 psi	75.0 psi	+1.40D
PASS	0.3932	1-way Shear (-X)	29.491 psi	75.0 psi	+1.40D
PASS	0.3932	1-way Shear (+Z)	29.491 psi	75.0 psi	+1.40D
PASS	0.3932	1-way Shear (-Z)	29.491 psi	75.0 psi	+1.40D
PASS	0.9293	2-way Punching	139.401 psi	150.0 psi	+1.40D
ailod Ros	sulte				

Detailed Results

Soil Bearing Rotation Axis &		Xecc	Zecc	Actual	Soil Bearing	Stress @ Loc	ation	Actual / Allow
Load Combination	Gross Allowable	(in	ı)	Bottom, -Z	Top, +Z	Left, -X	Right, +X	Ratio
X-X, D Only	1.50	n/a	0.0	1.465	1.465	n/a	n/a	0.977
X-X, +0.60D	1.50	n/a	0.0	0.8791	0.8791	n/a	n/a	0.586
Z-Z, D Only	1.50	0.0	n/a	n/a	n/a	1.465	1.465	0.977
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.8791	0.8791	0.586

Overturning Stability

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

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. A in^2	Actual As in^2	Phi*N k-ft		Status
X-X, +1.40D	10.238	+Z	Bottom	0.3240	AsMin	0.3259	17.	038	ок
X-X, +1.40D	10.238	-Z	Bottom	0.3240	AsMin	0.3259	17.	038	OK
X-X, +1.20D	8.775	+Z	Bottom	0.3240	AsMin	0.3259	17.	038	OK
X-X, +1.20D	8.775	-Z	Bottom	0.3240	AsMin	0.3259	17.	038	OK
X-X, +0.90D	6.581	+Z	Bottom	0.3240	AsMin	0.3259	17.	038	OK
X-X, +0.90D	6.581	-Z	Bottom	0.3240	AsMin	0.3259	17.	038	OK
Z-Z, +1.40D	10.238	-X	Bottom	0.3240	AsMin	0.3259	17.	038	OK
Z-Z, +1.40D	10.238	+X	Bottom	0.3240	AsMin	0.3259	17.	038	OK
Z-Z, +1.20D	8.775	-X	Bottom	0.3240	AsMin	0.3259	17.	038	OK
Z-Z, +1.20D	8.775	+X	Bottom	0.3240	AsMin	0.3259	17.	038	OK
Z-Z, +0.90D	6.581	-X	Bottom	0.3240	AsMin	0.3259	17.	038	OK
Z-Z, +0.90D	6.581	+X	Bottom	0.3240	AsMin	0.3259	17.	038	OK
One Way Shear									
Load Combination	/u @ -X	Vu @ -	+X Vu	@-Z Vu	@ +Z	Vu:Max Ph	iVn Vu	/ Phi*Vn	Status
+1.40D	29.49 p	si 2	29.49 psi	29.49 psi	29.49 psi	29.49 psi	75.00 psi	0.39	OK
+1.20D	25.28 p		25.28 psi	25.28 psi	25.28 psi		, 75.00 psi	0.34	OK
+0.90D	18.96 p		18.96 psi	18.96 psi	18.96 psi		75.00 psi	0.25	OK

General Footing Project File: 05 Beams.ec6 LIC# : KW-06013353, Build:20.23.08.30 SNAKE RIVER ENGINEERING (c) ENERCALC INC 1983-2023 DESCRIPTION: 58.5 K Two-Way "Punching" Shear All units k Load Combination... Vu Phi*Vn Vu / Phi*Vn Status 139.40 psi 119.49 psi 89.62 psi 150.00psi 150.00psi 150.00psi OK OK OK +1.40D 0.9293 +1.20D 0.7966 0.5974 +0.90D

Cantilevered Retaining Wall

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F1

Code Reference:

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	7.33 ft
Wall height above soil	=	0.67 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water table above bottom of footing	=	0.0 ft

Surcharge Loads

Surcharge Over Heel Used To Resist Sliding Surcharge Over Toe Used for Sliding & Ove	=	0.0			
Axial Load Applied to Stem					
Axial Dead Load	=	371.0 lbs			

Axial Deau Luau	=	371.0105
Axial Live Load	=	1,688.0 lbs
Axial Load Eccentricity	=	0.0 in

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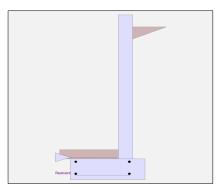
Project File: 05 Beams.ec6 (c) ENERCALC INC 1983-2023

Soil Data

Allow Soil Bearing	=	1,500.0	psf
Equivalent Fluid Pressure	Meth	od	
Active Heel Pressure	=	35.0	psf/ft
	=		
Passive Pressure	=	250.0	psf/ft
Soil Density, Heel	=	110.00	pcf
Soil Density, Toe	=	110.00	pcf
Footing Soil Friction	=	0.400	
Soil height to ignore for passive pressure	=	12.00	in

Lateral Load Applied to Stem

Lateral Load Height to Top Height to Bottom	= = =	0.0 #/ft 0.00 ft 0.00 ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf



Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Footing Type Base Above/Below Soil at Back of Wall	=	Spread Footing 0.0 ft

Cantilevered Retaining Wall

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F1

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

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Design Summary

=	1.61 OK	
ts All	Sliding !	
=	1.51	
=	4,066 lbs	
=	1.73 in	
in mic	dle third	
=	1,449 psf	
=	874 psf	OK
=	1,500 psf	
s Thar	n Allowable	
=	2,029 psf	
=	1,224 psf	
=	17.2 psi	OK
=	4.8 psi	ΟK
=	75.0 psi	
=	1,263.4 lbs	
	= = = = s Thar = = = = =	ts All Sliding ! = 1.51 = 4,066 lbs = 1.73 in in middle third = 1,449 psf = 874 psf = 1,500 psf s Than Allowable = 2,029 psf = 1,224 psf = 17.2 psi = 4.8 psi = 75.0 psi

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

· · · - · · · · · · · · · · · · · · · ·	
Load Factors	
Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction		Bottom			
Design Usinht Abarra Etca		Stem OK			
Design Height Above Ftg		0.00			
Wall Material Above "Ht"		Concrete	0.5	0.5	
Design Method	=	SD	SD	SE)
Thickness Rebar Size	=	8.00 # 5			
Rebar Spacing	=	# 5 18.00			
Rebar Placed at	=				
Design Data		Edge			
fb/FB + fa/Fa	=	0.664			
Total Force @ Section					
Service Level	lbs =				
Strength Level	lbs =	1,504.4			
MomentActual					
Service Level	ft-# =				
Strength Level	ft-# =	3,675.8			
MomentAllowable	=	5,527.6			
ShearActual					
Service Level	psi =				
Strength Level	psi =	20.3			
ShearAllowable	psi =	75.0			
Anet (Masonry)	in2 =				
Wall Weight	psf =	100.0			
Rebar Depth 'd'	in =	6.19			
Masonry Data					
fm	psi =				
Fs	psi =				
Solid Grouting	=				
Modular Ratio 'n'	=				
Equiv. Solid Thick.	=				
Masonry Block Type	=				
Masonry Design Method	=	ASD			
Concrete Data					
fc	psi =	2,500.0			
Fy	psi =	60,000.0			

Cantilevered Retaining Wall

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F1

Concrete Stem Rebar Area Details

Bottom Stem As (based on applied moment) : (4/3) * As : 200bd/fy: 200(12)(6.1875)/60000: 0.0018bh : 0.0018(12)(8) :

Required Area : Provided Area : Maximum Area :

Footing Data

Toe Width		=	2	.25 ft
Heel Width		=	1	.25
Total Footing Wid	lth	=	3	.50
Footing Thickness	3	=	14	.00 in
Key Width		=	0.	.00 in
Key Depth		=	0.	.00 in
Key Distance from	n Toe	=	0	.00 ft
f'c = 2,500 Footing Concrete Min. As %		y = = =		000 psi .00 pcf 018
Cover @ Top	2.00	@ Bt	tm.=	3.00 in

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Vertical Reinforcing

0.1392 in2/ft

0.1856 in2/ft

0.2475 in2/ft

0.1728 in2/ft

0.1856 in2/ft

0.2067 in2/ft

0.8382 in2/ft

============

Horizontal Reinforcing

Min Stem T&S Reinf Area 1.536 in2 Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft Horizontal Reinforcing Options : One layer of : Two layers of : #4@ 12.50 in #4@ 25.00 in #5@ 19.38 in #5@ 38.75 in #6@ 27.50 in #6@ 55.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	2,029	1,224 psf	
Mu' : Upward	=	4,699	0 ft-#	
Mu' : Downward	=	699	200 ft-#	
Mu: Design	=	4,000 OK	200 ft-#	OK
phiMn	=	21,219	3,600 ft-#	
Actual 1-Way Shear	=	17.16	4.77 psi	
Allow 1-Way Shear	=	75.00	40.00 psi	
Toe Reinforcing	=	# 5 @ 8.00 in		
Heel Reinforcing	=	None Spec'd		
Key Reinforcing	=	None Spec'd		
Footing Torsion, Tu		=	0.00 ft-lbs	
Footing Allow. Torsio	n, p	ohi Tu =	0.00 ft-lbs	

If torsion exceeds allowable, provide

supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 7.93 in, #5@ 12.30 in, #6@ 17.46 in, #7@ 23.80 in, #8@ 31.34 in, #9@ 39.68 in, #10@ 50.39 in

Heel: phiMn = phi*5*lambda*sqrt(fc)*Sm

Key: No key defined

Min footing T&S reinf Area	1.06	in2
Min footing T&S reinf Area per foot	0.30	in2 /ft
If one layer of horizontal bars:	<u>If two lay</u>	ers of horizontal bars:
#4@ 7.94 in	#4@ 1	5.87 in
#5@ 12.30 in	#5@ 2	4.60 in
#6@ 17.46 in	#6@ 3	4.92 in

Project File: 05 Beams.ec6

Cantilevered Retaining Wall

LIC# : KW-06013353, Build:20.23.08.30

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

(c) ENERCALC INC 1983-2023

DESCRIPTION: F1

Summary of Overturning & Resisting Forces & Moments

	OV	ERTURNING			RE	SISTING	
Item	Force Ibs	Distance ft	Moment ft-#		Force Ibs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	1,263.4	2.83	3,578.2	Soil Over HL (ab. water tbl)	470.3	3.21	1,509.0
HL Act Pres (be water tbl) Hydrostatic Force	,		-,	Soil Over HL (bel. water tbl) Water Table		3.21	1,509.0
Buoyant Force =				Sloped Soil Over Heel =			
Surcharge over Heel =				Surcharge Over Heel =			
Surcharge Over Toe =				Adjacent Footing Load =			
Adjacent Footing Load =				Axial Dead Load on Stem =	371.0	2.58	958.4
Added Lateral Load =				* Axial Live Load on Stem =	1,688.0	2.58	4,360.7
Load @ Stem Above Soil =				Soil Over Toe =	123.8	1.13	139.2
=				Surcharge Over Toe =			
_				Stem Weight(s) =	800.0	2.58	2,066.7
				Earth @ Stem Transitions =			
Total =	1,263.4	O.T.M. =	3,578.2	Footing Weight =	612.5	1.75	1,071.9
				Key Weight =			
Resisting/Overturning Ra	itio	=	1.61	Vert. Component =			
Vertical Loads used for Se	oil Pressure	= 4,065.0	6 lbs	Total =	2,377.6	bs R.M.=	5,745.2
				* Axial live load NOT included ir	n total display	ed, or used fo	r overturning

resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

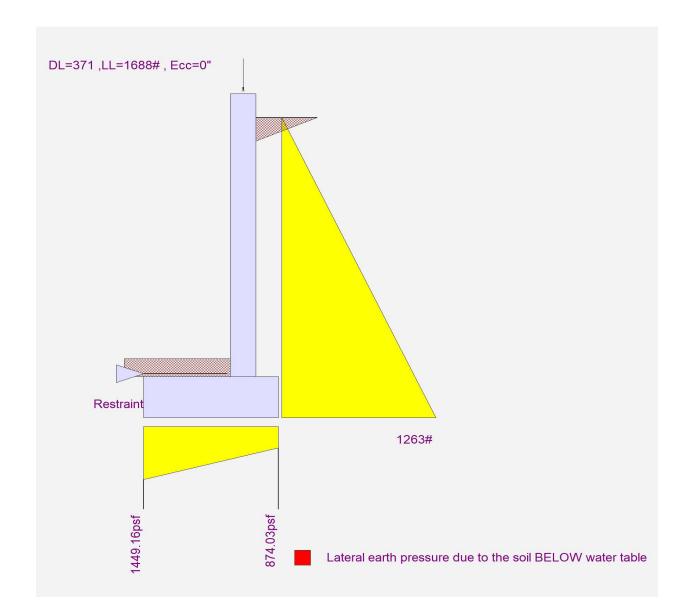
Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.092	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe,

because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall		Project File: 05 Beams.e	
LIC# : KW-06013353, Build:20.23.08.30	SNAKE RIVER ENGINEERING	(c) ENERCALC INC 1983-	
DESCRIPTION: F1			
Rebar Lap & Embedment Lengths Inf	ormation		
Stem Design Segment: Bottom			
Stem Design Height: 0.00 ft above top of foo	ting		
Lap Splice length for #5 bar specified in this ster	n design segment (25.4.2.3a) =	23.40 in	
Development length for #5 bar specified in this s	18.00 in		
Hooked embedment length into footing for #5 ba	r specified in this stem design segment =	10.50 in	
As Provided =		0.2067 in2/ft	
As Required =	0.1856 in2/ft		

Cantilevered Retaining Wall		Project File: 05 Beams.ec6
LIC# : KW-06013353, Build:20.23.08.30	SNAKE RIVER ENGINEERING	(c) ENERCALC INC 1983-2023
DESCRIPTION: F1		



Cantilevered Retaining Wall

LIC# : KW-06013353, Build:20.23.08.30 DESCRIPTION: F13 CANT. SNAKE RIVER ENGINEERING

Project Title: Engineer: Project ID: Project Descr:

> Project File: 05 Beams.ec6 (c) ENERCALC INC 1983-2023

Code Reference:

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	4.00 ft
Wall height above soil	=	0.75 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water table above		
bottom of footing	=	0.0 ft

Surcharge Loads

Surcharge Over Heel = 0.0 psf Used To Resist Sliding & Overturning Surcharge Over Toe = 0.0 Used for Sliding & Overturning				
Axial Load Applied to Stem				
Axial Dead Load Axial Live Load	=	279.0 lbs 490.0 lbs		

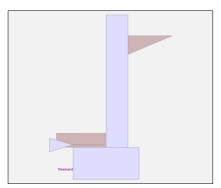
Axial Live Load		490.0 lbs
Axial Load Eccentricity	=	0.0 in

Soil Data

Allow Soil Bearing Equivalent Fluid Pressure	= Meth	1,500.0 psf
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in

Lateral Load Applied to Stem

Lateral Load Height to Top Height to Bottom	= = =	0.0 #/ft 0.00 ft 0.00 ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf



Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Footing Type Base Above/Below Soil at Back of Wall	=	Spread Footing 0.0 ft

SNAKE RIVER ENGINEERING

Cantilevered Retaining Wall

LIC# : KW-06013353, Build:20.23.08.30 DESCRIPTION: F13 CANT.

Design Summary

Wall Stability Ratios Overturning Slab Resis	= sts All	2.05 OK Sliding !
Global Stability	=	2.44
Total Bearing Load resultant ecc. Eccentricity with Soil Pressure @ Toe Soil Pressure @ Heel Allowable Soil Pressure Less	= = =	1,341 psf OK 455 psf OK 1,500 psf
ACI Factored @ Toe ACI Factored @ Heel	=	1,877 psf 637 psf
Footing Shear @ Toe Footing Shear @ Heel Allowable	= = =	1.3 psi OK 1.7 psi OK 75.0 psi
Sliding Calcs Lateral Sliding Force	=	467.2 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Lood Footoro	
Load Factors	
Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Strength Level I MomentActual Service Level fi	ft = = = = = = = lbs =	Bottom Stem OK 0.00 Concrete SD 8.00 # 5 18.00 Edge 0.108	S	D	SD	
Wall Material Above "Ht" Design Method Thickness Rebar Size Rebar Spacing Rebar Placed at Design Data fb/FB + fa/Fa Total Force @ Section Service Level I Strength Level I MomentActual Service Level ff Strength Level f	= = = = = =	Concrete SD 8.00 # 5 18.00 Edge	S	D	SD	
Design Method Thickness Rebar Size Rebar Spacing Rebar Placed at Design Data fb/FB + fa/Fa Total Force @ Section Service Level I Strength Level I MomentActual Service Level ff Strength Level f	= = = = = lbs =	SD 8.00 # 5 18.00 Edge	S	D	SD	
Thickness Rebar Size Rebar Spacing Rebar Placed at Design Data fb/FB + fa/Fa Total Force @ Section Service Level I Strength Level I MomentActual Service Level ff Strength Level f	= = = = !bs =	8.00 # 5 18.00 Edge	S	D	SD	
Rebar Size Rebar Spacing Rebar Placed at Design Data fb/FB + fa/Fa Total Force @ Section Service Level I Strength Level I MomentActual Service Level ff Strength Level f	= = = = Ibs =	# 5 18.00 Edge				
Rebar Spacing Rebar Placed at Design Data fb/FB + fa/Fa Total Force @ Section Service Level I Strength Level I MomentActual Service Level ff Strength Level f	= = = Ibs =	18.00 Edge				
Rebar Placed at Design Data fb/FB + fa/Fa Total Force @ Section Service Level I Strength Level I MomentActual Service Level ff Strength Level f	= = Ibs =	Edge				
Design Data fb/FB + fa/Fa Total Force @ Section Service Level I Strength Level I MomentActual Service Level ff Strength Level ff	= lbs =					
fb/FB + fa/Fa Total Force @ Section Service Level I Strength Level I MomentActual Service Level ff Strength Level f	lbs =	0.108				
Total Force @ Section Service Level I Strength Level I MomentActual Service Level ff Strength Level f	lbs =	0.108				
Service Level I Strength Level I MomentActual Service Level ff Strength Level f						
Strength Level I MomentActual Service Level fi Strength Level f						
MomentActual Service Level fi Strength Level f	lbs =					
Service Level fi Strength Level f		448.0				
Strength Level f						
•	t-# =					
MomentAllowable	ft-# =	597.3				
	=	5,527.6				
ShearActual						
Service Level	psi =					
· · · · · ·	psi =	6.0				
	psi =	75.0				
1		75.0				
())	in2 =					
0	psf =	100.0				
Rebar Depth 'd'	in =	6.19				
Masonry Data						
	psi =					
- '	psi =					
Solid Grouting	psi = =					
Modular Ratio 'n'	=					
Equiv. Solid Thick.	=					
Masonry Block Type	_					
Masonry Design Method		ASD				
Concrete Data	-					
	psi =	2,500.0				
1	psi =	60,000.0				

Project File: 05 Beams.ec6

Cantilevered Retaining Wall

LIC# : KW-06013353, Build:20.23.08.30 DESCRIPTION: F13 CANT.

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing
As (based on applied moment) :	0.0226 in2/ft	
(4/3) * As :	0.0302 in2/ft	Min Stem T&S Reinf Area 0.912 in2
200bd/fy : 200(12)(6.1875)/60000 :	0.2475 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :
	===========	One layer of : Two layers of :
Required Area :	0.1728 in2/ft	#4@ 12.50 in #4@ 25.00 in
Provided Area :	0.2067 in2/ft	#5@ 19.38 in #5@ 38.75 in
Maximum Area :	0.8382 in2/ft	#6@ 27.50 in #6@ 55.00 in

Footing Data

Toe Width		=	1	.00 ft
Heel Width		= _	1	.00
Total Footing Wid	th	=	2	.00
Footing Thickness	3	=	14	.00 in
Key Width		=	0.	.00 in
Key Depth		=	0.	.00 in
Key Distance from	n Toe	=	0.	.00 ft
f'c = 2,500 p Footing Concrete Min. As %	osi F Density	y = = =	60,0 150 0.00	000 psi .00 pcf 018
Cover @ Top	2.00	@ B	tm.=	3.00 in

Footing Design Results

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		Toe	Heel	
Factored Pressure	=	1,877	637 psf	
Mu' : Upward	=	835	0 ft-#	
Mu' : Downward	=	138	41 ft-#	
Mu: Design	=	697 OK	41 ft-#	OK
phiMn	=	3,600	3,600 ft-#	
Actual 1-Way Shear	=	1.34	1.71 psi	
Allow 1-Way Shear	=	40.00	40.00 psi	
Toe Reinforcing	=	None Spec'd		
Heel Reinforcing	=	None Spec'd		
Key Reinforcing	=	None Spec'd		
Footing Torsion, Tu		=	0.00 ft-lbs	
Footing Allow. Torsion	п, p	hiTu =	0.00 ft-lbs	
			-	

If torsion exceeds allowable, provide

supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: phiMn = phi*5*lambda*sqrt(fc)*Sm

Heel: phiMn = phi*5*lambda*sqrt(fc)*Sm

Key: No key defined

Min footing T&S reinf Area Min footing T&S reinf Area per foot	0.60 in2 0.30 in2 /ft	
If one layer of horizontal bars:	If two layers of horizontal bars	
#4@ 7.94 in	#4@ 15.87 in	
#5@ 12.30 in	#5@ 24.60 in	
#6@ 17.46 in	#6@ 34.92 in	

Project File: 05 Beams.ec6

01/23/24

Project Title: Engineer: Project ID: Project Descr:

Cantilevered Retaining Wall

LIC# : KW-06013353, Build:20.23.08.30 DESCRIPTION: F13 CANT.

Summary of Overturning & Resisting Forces & Moments

OVERTURNING						RESISTING		
Item	Force lbs	Distanc ft		oment ft-#		Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	467.2	2 1.72	2	804.5	Soil Over HL (ab. water tbl)	146.7	1.83	268.9
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		1.83	268.9
-lydrostatic Force					Water Table			
	=				Sloped Soil Over Heel =			
	=				Surcharge Over Heel =			
	=				Adjacent Footing Load =			
	=				Axial Dead Load on Stem =	279.0	1.33	372.0
	=				* Axial Live Load on Stem =	490.0	1.33	653.3
Load @ Stem Above Soil :	=				Soil Over Toe =	55.0	0.50	27.5
0	=				Surcharge Over Toe =			
					Stem Weight(s) =	475.0	1.33	633.3
_					Earth @ Stem Transitions =			
Total :	= 467.2	2 O.T.M .	=	804.5	Footing Weight =	350.0	1.00	350.0
					Key Weight =			
Resisting/Overturning I	Ratio	=	2.05		Vert. Component =			
Vertical Loads used for	Soil Pressure	e = 1,7	795.7 lbs	S	Total =	1,305.7	lbs R.M.=	1,651.7
					* Axial live load NOT included in	n total displa	wed, or used t	or overturning

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Axial live load NOT included in total displayed, or used for over resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus250.0pciHorizontal Defl @ Top of Wall (approximate only)0.088in

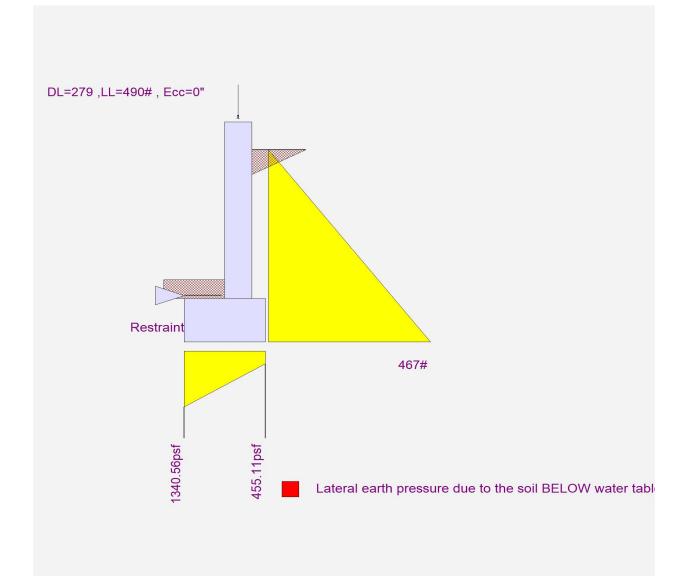
The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe,

because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall		Project File: 05 Beams	ec6.
LIC# : KW-06013353, Build:20.23.08.30	SNAKE RIVER ENGINEERING	(c) ENERCALC INC 198	33-2023
DESCRIPTION: F13 CANT.			
Rebar Lap & Embedment Lengths Infor	mation		
Stem Design Segment: Bottom			
Stem Design Height: 0.00 ft above top of footing	9		
Lap Splice length for #5 bar specified in this stem d	esign segment (25.4.2.3a) =	23.40 in	
Development length for #5 bar specified in this ster	n design segment =	18.00 in	
Hooked embedment length into footing for #5 bar s	pecified in this stem design segment =	10.50 in	
As Provided =		0.2067 in2/ft	
As Required =		0.1728 in2/ft	



DESCRIPTION: F13 CANT.



LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F13

Code Reference:

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

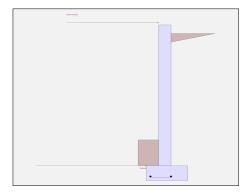
Criteria

_	So	il D	ata

Retained Height Wall height above soil Total Wall Height	=	10.250 ft 0.670 ft 10.920 ft
Top Support Height	=	10.92 ft
Slope Behind Wall Height of Soil over Toe	= =	0 24.0 in

= Metho	1,500.0 psf od
=	32.0 psf/ft
=	0.0 psf/ft
=	250.0 psf/ft
=	110 pcf
=	0.4 psf
=	12 in
	_

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Surcharge Loads

Surcharge Over Heel >>>Used To Resist Sli Surcharge Over Toe Used for Sliding & Ove Axial Load Applied to	= rturr	psf ning
Axial Dead Load	=	279.0 lbs
Axial Live Load	=	490.0 lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Design Summary

Total Bearing Load resultant ecc.	=	3,609.33 lbs 0.0 in
Soil Pressure @ Toe	=	1,443.73 psf OK
Soil Pressure @ Heel	=	1,443.73 psf OK
Allowable	=	psf
Soil Pressure Less	Thai	n Allowable
ACI Factored @ Toe	=	1,810.88 psf
ACI Factored @ Heel	=	1,810.88 psf
Footing Shear @ Toe	=	0.1567 psi OK
Footing Shear @ Heel	=	1.796 psi OK
Allowable	=	75.0 psi
Reaction at Top	=	299.750 lbs
Reaction at Bottom	=	1,784.70 lbs
Sliding Calcs Lateral Sliding Force	=	1,784.70 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors -

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W0/1/23/24	1.000
Seismic, E	1.000

Uniform Lateral Load Applied to Stem							
Late	ral Load	=	#/ft				
	eight to Top eight to Bottom	= =	ft ft				
Loa	d Type	=	Wind (W)				
Win	d on Exposed Sten	n =	(Strength Leve 0.00 psf (Strength Leve	,			
Win	d acts left-to-right t	owa	rd retention side	e.			
К _h	Soil Density Multip	olier	= 0.2 g	Add			

Κ_h Soil Density Multiplier =

Concrete Stem Construction

Thickness = 8.00 in Wall Weight = 100.0 psf Stem is FIXED to top of footing

	@ Top Support		Mmax Between Top & Base	@ Base of Wall	
		Stem OK	Stem OK	Stem OK	
Design Height Above Ftg	=	10.92 ft	0.04386 ft	0.00 ft	
Rebar Size	=	# 5	# 5	# 5	
Rebar Spacing	=	16.00 in	16.00 in	16.00 in	
Rebar Placed at	=	Edge	Edge	Edge	
Rebar Depth 'd'	=	5.50 in	6.0 in	5.50 in	
Design Data fb/FB + fa/Fa	=		0.657	0.720	
MomentActual	=	0.0 ft-#	3,934.77 ft-#	3,934.77 ft-#	
MomentAllowable	=	5,467.34 ft-#	5,990.46 ft-#	5,467.34 ft-#	
Shear Force @ this height	=	481.199 lbs		2,208.40 lbs	
ShearActual	=	7.291 psi		33.461 psi	
ShearAllowable	=	75.0 psi		75.0 psi	

Project File: 05 Beams.ec6 (c) ENERCALC INC 1983-2023

lbs

Adjacent Footing Load	
Adjacent Footing Load	=
Footing Width	=

Footing Width Eccentricity	= =	ft in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3
led seismic per unit area	=	0.0 psf

Restrained Retaining Wall

Footing Strengths & Dimensions

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F13

Toe Width

Heel Width

Key Width

Key Depth

Min. As %

Cover @ Top =

f'c =

Total Footing Width

Key Distance from Toe

2,500.0 psi

Footing Concrete Density

Fy

2 in

Footing Thickness

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Project File: 05 Beams.ec6

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Footing Design Results

=	.83333333 ft			Toe	Heel	
=	.66666666	Factored Pressure	=	1,810.88	1,810.88 psf	
=	2.50	Mu' : Upward	=	628.78	ft-#	
=	14.0 in	Mu' : Downward	=	164.583	ft-#	
=	in	Mu: Design	=	464	-124 ft-#	
=	in	Actual 1-Way Shear	=	0.1567	psi	
=	ft	Allow 1-Way Shear	=	75.0	75.0 psi	
Fy = = @	= 60000 psi 150 pcf 0.0018 9 Btm.= 3 in	Other Acceptable Size Toe: # 7 @ 18.00 in Heel:None Spec'd Key: # 0 @ 0.00 in	es 8		phiMn = phi * 5 * lambda * sqrt(f phiMn = phi * 5 * lambda * sqrt(f	,
		Min footing T&S reinf Min footing T&S reinf If one layer of horizor #4@ 7.94 in #5@ 12.30 in #6@ 17.46 in	Are	a per foot pars: If t	0.76 in2 0.30 in2 /ft two layers of horizontal bars: #4@ 15.87 in #5@ 24.60 in #6@ 34.92 in	

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on foot Load & Moment Summ		•	Soil Pressure Calcs		Sliding Forces are restrained by the adjacent slab
Moment @ Top of Footin	ng App	lied from Stem	=	-2,459.23 ft-#	_
Surcharge Over Heel	=	0.0 lbs	0.0 ft	0.0 ft-#	
Adjacent Footing Load	=	0.0 lbs	0.0 ft	0.0 ft-#	
Axial Dead Load on Ste	m =	769.0 lbs	1.167 ft	897.17 ft-#	
Soil Over Toe	=	183.333 lbs	0.4167 ft	76.389 ft-#	
Surcharge Over Toe	=	0.0 lbs	0.0 ft	0.0 ft-#	
Stem Weight	=	1,092.0 lbs	1.167 ft	1,274.0 ft-#	
Soil Over Heel	=	1,127.50 lbs	2.0 ft	2,255.0 ft-#	
Footing Weight	=	437.50 lbs	1.250 ft	546.88 ft-#	
Total Vertical Force	=	3,609.33 lbs	Base Moment =	2,590.20 ft-#	

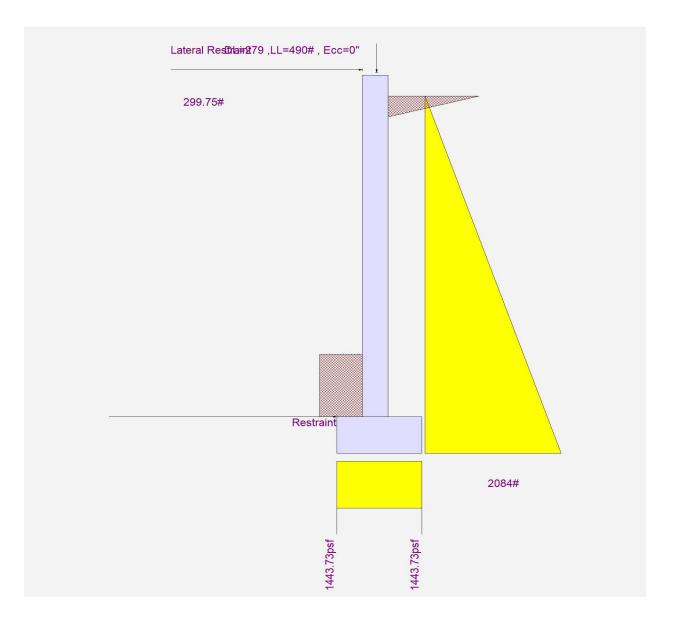
Stem is specified to be fixed to footing, and top restraint is assumed to react out any tendency for moment at the footing/soil

interface, so uniform soil pressure is assumed.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Restrained Retaining Wall Project File: 05 Beams.ec6 LIC# : KW-06013353, Build:20.23.08.30 SNAKE RIVER ENGINEERING (c) ENERCALC INC 1983-2023

DESCRIPTION: F13



LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F14

Code Reference:

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

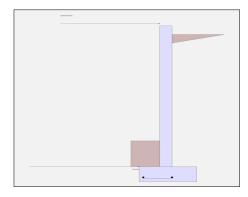
Criteria

_	So	il D	ata

Retained Height Wall height above soil Total Wall Height	=	10.250 ft 0.670 ft 10.920 ft
Top Support Height	=	10.92 ft
Slope Behind Wall Height of Soil over Toe	= =	0 24.0 in

= Metho	1,500.0 psf od
=	32.0 psf/ft
=	0.0 psf/ft
=	250.0 psf/ft
=	110 pcf
=	0.4 psf
=	12 in
	_

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Surcharge Loads

Surcharge Over Heel = psf >>>Used To Resist Sliding & Overturning Surcharge Over Toe = psf Used for Sliding & Overturning				
Axial Load Applied to Stem				
Axial Dead Load Axial Live Load Axial Load Eccentricity	= = =	346.0 lbs 1,018.0 lbs in		

Earth Pressure Seismic Load

Design Summary

Total Bearing Loadresultant ecc.	= =	5,053.08 lbs 0.0 in
Soil Pressure @ Toe	=	1,443.74 psf OK
Soil Pressure @ Heel	=	1,443.74 psf OK
Allowable	=	psf
Soil Pressure Less	Tha	n Allowable
ACI Factored @ Toe	=	1,848.83 psf
ACI Factored @ Heel	=	1,848.83 psf
Footing Shear @ Toe	=	5.001 psi OK
Footing Shear @ Heel	=	3.107 psi OK
Allowable	=	75.0 psi
Reaction at Top	=	299.750 lbs
Reaction at Bottom	=	1,784.70 lbs
Sliding Calcs Lateral Sliding Force	=	1,784.70 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors -

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W0/1/23/24	1.000
Seismic, E	1.000

Uniform Lateral Load Applied to Stem					
Lateral Load	=	#/ft			
Height to Top Height to Bottom	= =	ft ft			
Load Type	=	Wind (W)			
Wind on Exposed	Stem =	(Strength Le 0.00 psf (Strength Le	,		
Wind acts left-to-ri	ght towa	rd retention si	de.		
K _h Soil Density N	Aultiplier	= 0.2 g	Add		

Soil Density Multiplier =

Concrete Stem Construction

Thickness = 8.00 in Wall Weight = 100.0 psf Stem is FIXED to top of footing

	a) Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	10.92 ft	0.04386 ft	0.00 ft
Rebar Size	=	# 5	# 5	# 5
Rebar Spacing	=	16.00 in	16.00 in	16.00 in
Rebar Placed at	=	Edge	Edge	Edge
Rebar Depth 'd'	=	5.50 in	6.0 in	5.50 in
Design Data fb/FB + fa/Fa	=		0.657	0.720
MomentActual	=	0.0 ft-#	3,934.77 ft-#	3,934.77 ft-#
MomentAllowable	=	5,467.34 ft-#	5,990.46 ft-#	5,467.34 ft-#
Shear Force @ this height	=	481.199 lbs		2,208.40 lbs
ShearActual	=	7.291 psi		33.461 psi
ShearAllowable	=	75.0 psi		75.0 psi

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lbs

Adjacent Footing Load	
Adjacent Footing Load	=
Footing Width	=

Footing Width Eccentricity Well to Etg CL Dist	= =	ft in ft
Wall to Ftg CL Dist Footing Type Base Above/Below Soil	-	Line Load
at Back of Wall	=	ft
Poisson's Ratio	=	0.3
led seismic per unit area	=	0.0 psf

Restrained Retaining Wall

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F14

Footing	Design	Regulte

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Footing Strengths & Di	mensions	Footing Design	Re	sults	
Toe Width Heel Width	= .333333333 ft = '.16666666	Factored Pressure	=	<u>Toe</u> 1,848.83	Heel 1,848.83 psf
Total Footing Width	= 3.50	Mu' : Upward	=	1,643.40	ft-#
Footing Thickness	= 14.0 in	Mu' : Downward	=	421.333	ft-#
Key Width	= in	Mu: Design	=	1,222	-322 ft-#
Key Depth	= in	Actual 1-Way Shear	=	5.001	psi
Key Distance from Toe	= ft	Allow 1-Way Shear	=	75.0	75.0 psi
	Fy = 60000 psi	Other Acceptable Siz	es 8	& Spacings	:
Footing Concrete Density		Toe: # 7 @ 18.00 in		-or-	phiMn = phi * 5 * lambda * sqrt(fc) * Sm
Min. As %	= 0.0018 @ Btm.= 3 in	Heel: None Spec'd		-or-	phiMn = phi * 5 * lambda * sqrt(fc) * Sm
Cover @ Top = 2 in	n @ Btm.= 3 in	Key: # 0 @ 0.00 in		-or-	No key defined
		Min footing T&S rein Min footing T&S rein	f Are	a per foot	1.06 in2 0.30 in2 /ft
		If one layer of horizon	ntai		two layers of horizontal bars:
		#4@ 7.94 in			#4@ 15.87 in
		#5@ 12.30 in			#5@ 24.60 in
[#6@ 17.46 in			#6@ 34.92 in

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on footi		•		>>>	
Load & Moment Summa	ry Fo	r Footing : For S	Soil Pressure Calcs		
Moment @ Top of Footing Applied from Stem = -2,459.23 f					
Surcharge Over Heel	=	0.0 lbs	0.0 ft	0.0 ft-#	
Adjacent Footing Load	=	0.0 lbs	0.0 ft	0.0 ft-#	
Axial Dead Load on Sten	า =	1,364.0 lbs	1.667 ft	2,273.33 ft-#	
Soil Over Toe	=	293.333 lbs	0.6667 ft	195.556 ft-#	
Surcharge Over Toe	=	0.0 lbs	0.0 ft	0.0 ft-#	
Stem Weight	=	1,092.0 lbs	1.667 ft	1,820.0 ft-#	
Soil Over Heel	=	1,691.25 lbs	2.750 ft	4,650.94 ft-#	
Footing Weight	=	612.50 lbs	1.750 ft	1,071.88 ft-#	
Total Vertical Force	=	5,053.08 lbs	Base Moment =	7,552.47 ft-#	

Stem is specified to be fixed to footing, and top restraint is assumed to react out any tendency for moment at the footing/soil

interface, so uniform soil pressure is assumed.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

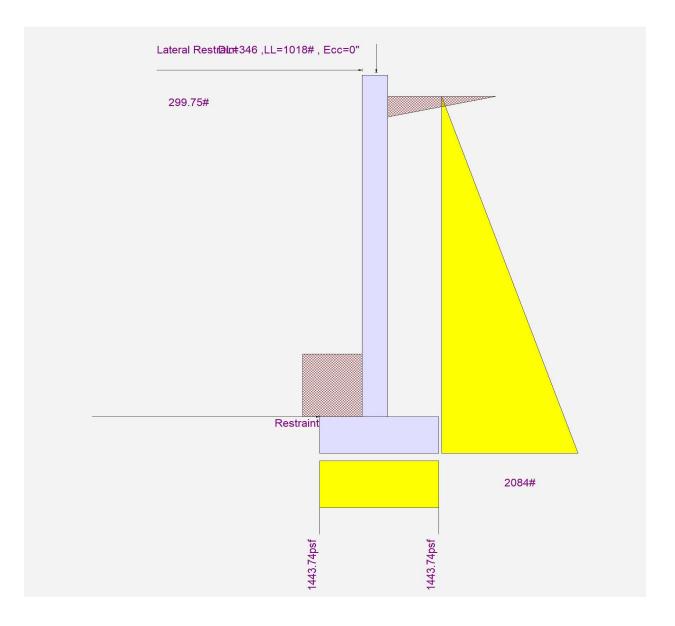
>>> Sliding Forces are restrained by the adjacent slab

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Project File: 05 Beams.ec6

Restrained Retaining Wall Project File: 05 Beams.ec6 LIC# : KW-06013353, Build:20.23.08.30 SNAKE RIVER ENGINEERING (c) ENERCALC INC 1983-2023

DESCRIPTION: F14



LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F8

Code Reference:

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

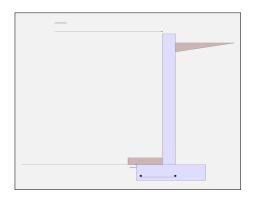
Criteria

Retained Height	=	9.0 ft
Wall height above soil	=	0.670 ft
Total Wall Height	=	9.670 ft
Top Support Height	=	9.67 ft
Slope Behind Wall	=	0
Height of Soil over Toe	=	6.0 in

Allow Soil Bearing Equivalent Fluid Pressure	= Metho	1,500.0 od	psf
At-Rest Heel Pressure	=	32.0	psf/ft
	=	0.0	psf/ft
Passive Pressure	=	250.0	psf/ft
Soil Density	=	110	pcf
Footing Soil Frictior	=	0.4	psf
Soil height to ignore for passive pressure	=	12	in

Soil Data

SNAKE RIVER ENGINEERING



Surcharge Loads

Surcharge Over Heel >>>Used To Resist Surcharge Over Toe Used for Sliding & O Axial Load Applied f	Sliding & = verturning	psf
Axial Dead Load Axial Live Load		434.0 lbs 660.0 lbs

in

Earth Pressure Seismic Load

Axial Load Eccentricity =

Design Summary

Total Bearing Loadresultant ecc.	= =	5,580.58 lbs 0.0 in
Soil Pressure @ Toe Soil Pressure @ Heel Allowable Soil Pressure Less ACI Factored @ Toe ACI Factored @ Heel	= = Thai = =	1,395.15 psf OK 1,395.15 psf OK psf Allowable 1,840.18 psf 1,840.18 psf
Footing Shear @ Toe Footing Shear @ Heel Allowable Reaction at Top Reaction at Bottom	- - - - -	8.793 psi OK 5.607 psi OK 75.0 psi 227.412 lbs 1,425.37 lbs
Sliding Calcs Lateral Sliding Force	=	1,425.37 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors -

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W0/1/23/24	1.000
Seismic, E	1.000

Unit	form Lateral Load	d App	olied to Stem	
Late	ral Load	=	#/ft	
	ight to Top ight to Bottom	= =	ft ft	
Load	d Type	=	Wind (W)	
Win	d on Exposed Ste	m =	(Strength Lev 0.00 psf (Strength Lev	,
Win	d acts left-to-right	towa	rd retention sid	de.
К _h	Soil Density Mult	iplier	= 0.2 g	Add

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width Eccentricity	= =	ft in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3
ded seismic per unit area	=	0.0 psf

Concrete Stem Construction

Thickness = 8.00 in Wall Weight = 100.0 psf Stem is FIXED to top of footing

	a) Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	9.67 ft	0.03884 ft	0.00 ft
Rebar Size	=	# 5	# 5	# 5
Rebar Spacing	=	16.00 in	16.00 in	16.00 in
Rebar Placed at	=	Edge	Edge	Edge
Rebar Depth 'd'	=	5.50 in	6.0 in	5.50 in
besign Data fb/FB + fa/Fa	=		0.449	0.491
MomentActual	=	0.0 ft-#	2,686.81 ft-#	2,686.81 ft-#
MomentAllowable	=	5,467.34 ft-#	5,990.46 ft-#	5,467.34 ft-#
Shear Force @ this height	=	365.459 lbs		1,708.14 lbs
ShearActual	=	5.537 psi		25.881 psi
ShearAllowable	=	75.0 psi		75.0 psi

Project File: 05 Beams.ec6 (c) ENERCALC INC 1983-2023

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F8

Footing Strengths & Dimensions

Toe Width Heel Width Total Footing Width Footing Thickness	= .58333 = <u>!.41666</u> = =	
Key Width Key Depth Key Distance from Toe	= = =	in in ft
fc = 2,500.0 psi F Footing Concrete Density Min. As % Cover @ Top = 2 in	=	000 psi 150 pcf 018 3 in

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

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Footing Design Results

		Toe	<u>Heel</u>	
Factored Pressure	=	1,840.18	1,840.18 ps	f
Mu' : Upward	=	2,306.61	ft-:	#
Mu' : Downward	=	345.958	ft-i	#
Mu: Design	=	1,961	-677 ft-:	#
Actual 1-Way Shear	=	8.793	ps	i
Allow 1-Way Shear	=	75.0	75.0 ps	i
Other Acceptable Siz	es 8	Spacings	:	
Toe: # 7 @ 18.00 in		-or-	phiMn = phi	* 5 * lambda * sqrt(fc) * Sm
Heel: None Spec'd		-or-	phiMn = phi	* 5 * lambda * sqrt(fc) * Sm
Key: # 0 @ 0.00 in		-or-	No key defir	ned
Min footing T&S reinf	Are	a	1.21 in	2
Min footing T&S reinf			0.30 in	2 /ft
If one layer of horizor	ntal I	oars: If	two layers of	horizontal bars:
#4@ 7.94 in			#4@ 15.87 ir	1
#5@ 12.30 in			#5@ 24.60 ir	
#6@ 17.46 in			#6@ 34.92 ir	1
DECICTO alidina				

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on foot Load & Moment Summ			Soil Pressure Calcs		Sliding Forces are restrained by the adjacent slab
Moment @ Top of Footir	ng App	lied from Stem	=	-1,679.26 ft-#	
Surcharge Over Heel	=	0.0 lbs	0.0 ft	0.0 ft-#	
Adjacent Footing Load	=	0.0 lbs	0.0 ft	0.0 ft-#	
Axial Dead Load on Ster	m =	2,094.0 lbs	1.917 ft	4,013.50 ft-#	
Soil Over Toe	=	87.083 lbs	0.7917 ft	68.941 ft-#	
Surcharge Over Toe	=	0.0 lbs	0.0 ft	0.0 ft-#	
Stem Weight	=	967.0 lbs	1.917 ft	1,853.42 ft-#	
Soil Over Heel	=	1,732.50 lbs	3.125 ft	5,414.06 ft-#	
Footing Weight	=	700.0 lbs	2.0 ft	1,400.0 ft-#	
Total Vertical Force	=	5,580.58 lbs	Base Moment =	11,070.7 ft-#	

Stem is specified to be fixed to footing, and top restraint is assumed to react out any tendency for moment at the footing/soil

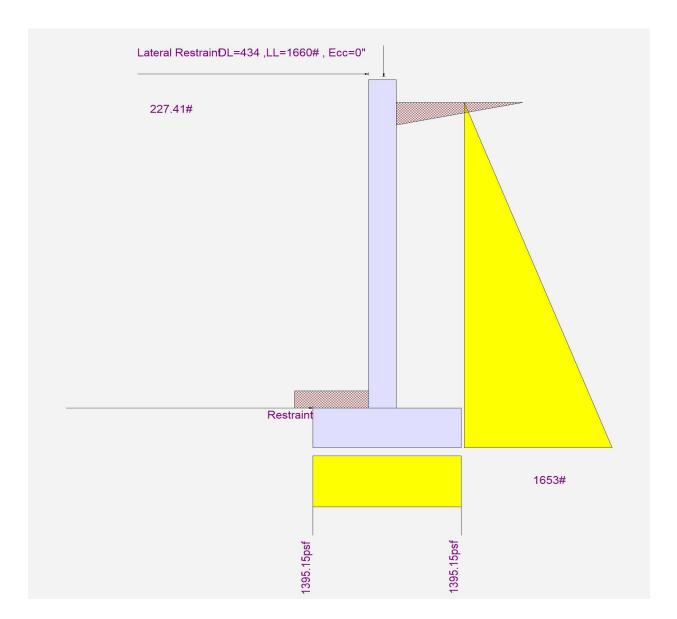
interface, so uniform soil pressure is assumed.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Restrained Retaining Wall Project File: 05 Beams.ec6 LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F8

SNAKE RIVER ENGINEERING



LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F15

Code Reference:

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

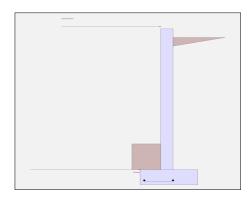
Soil	Data

...

Retained Height Wall height above soil Total Wall Height	=	10.250 ft 0.670 ft 10.920 ft
Top Support Height	=	10.92 ft
Slope Behind Wall Height of Soil over Toe	= =	0 24.0 in

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure	e Metho	d .
At-Rest Heel Pressure	=	32.0 psf/ft
	=	0.0 psf/ft
Passive Pressure	=	250.0 psf/ft
Soil Density	=	110 pcf
Footing Soil Frictior	=	0.4 psf
Soil height to ignore for passive pressure	=	12 in

SNAKE RIVER ENGINEERING



Surcharge Loads

Surcharge Over Heel >>>Used To Resist Sli Surcharge Over Toe Used for Sliding & Ove Axial Load Applied to	= rturr	psf ning
Axial Dead Load Axial Live Load Axial Load Eccentricity	= =	406.0 lbs 820.0 lbs in

Earth Pressure Seismic Load

Design Summary

Total Bearing Loadresultant ecc.	= =	4,915.08 lbs 0.0 in
Soil Pressure @ Toe	=	1,404.31 psf OK
Soil Pressure @ Heel	=	1,404.31 psf OK
Allowable	=	psf
Soil Pressure Less	Tha	n Allowable
ACI Factored @ Toe	=	1,778.89 psf
ACI Factored @ Heel	=	1,778.89 psf
Footing Shear @ Toe	=	4.747 psi OK
Footing Shear @ Heel	=	2.347 psi OK
Allowable	=	75.0 psi
Reaction at Top Reaction at Bottom	=	299.750 lbs 1,784.70 lbs
Sliding Calcs Lateral Sliding Force	=	1,784.70 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors -

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, 10/1/23/24	1.000
Seismic, E	1.000

Uniform Lateral Load	App	blied to Stem	
Lateral Load	=	#/ft	
Height to Top Height to Bottom	= =	ft ft	
Load Type	=	Wind (W)	
Wind on Exposed Sten		(Strength Leve 0.00 psf (Strength Leve	el)
Wind acts left-to-right t	owa	rd retention sid	e.
K _h Soil Density Multip	olier	= 0.2 g	Adde

alle al ta Otam

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width Eccentricity	= =	ft in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3
ded seismic per unit area	=	0.0 psf

Concrete Stem Construction

Thickness = 8.00 in Wall Weight = 100.0 psf Stem is FIXED to top of footing

	@	Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	10.92 ft	0.04386 ft	0.00 ft
Rebar Size	=	# 5	# 5	# 5
Rebar Spacing	=	16.00 in	16.00 in	16.00 in
Rebar Placed at	=	Edge	Edge	Edge
Rebar Depth 'd'	=	5.50 in	6.0 in	5.50 in
Design Data fb/FB + fa/Fa	=		0.657	0.720
MomentActual	=	0.0 ft-#	3,934.77 ft-#	3,934.77 ft-#
MomentAllowable	=	5,467.34 ft-#	5,990.46 ft-#	5,467.34 ft-#
Shear Force @ this height	=	481.199 lbs		2,208.40 lbs
ShearActual	=	7.291 psi		33.461 psi
ShearAllowable	=	75.0 psi		75.0 psi

Project File: 05 Beams.ec6 (c) ENERCALC INC 1983-2023

Footing Strengths & Dimensions

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F15

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

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Footing Design Results

Toe Width Heel Width	= .33333333 ft = <u>.166666666</u>	Toe <u>Heel</u> Factored Pressure = 1,778.89 1,778.89 psf	
Total Footing Width	= 3.50	Mu' : Upward = 1,581.23 ft-#	
Footing Thickness	= 14.0 in	Mu' : Downward = 421.333 ft-#	
Key Width	= in	Mu: Design = 1,160 -243 ft-#	
Key Depth	= in	Actual 1-Way Shear = 4.747 psi	
Key Distance from Toe	= ft	Allow 1-Way Shear = 75.0 75.0 psi	
	⁻ y = 60000 psi	Other Acceptable Sizes & Spacings:	
Footing Concrete Density Min. As % Cover @ Top = 2 in	= 0.0018	Toe: # 7 @ 18.00 in -or- phiMn = phi * 5 * lar Heel: None Spec'd -or- phiMn = phi * 5 * lar Key: # 0 @ 0.00 in -or- No key defined	
		Min footing T&S reinf Area1.06in2Min footing T&S reinf Area per foot0.30in2 /ftIf one layer of horizontal bars:If two layers of horizont#4@ 7.94 in#4@ 15.87 in#5@ 12.30 in#5@ 24.60 in#6@ 17.46 in#6@ 34.92 in	al bars:

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on foot Load & Moment Summ			Soil Pressure Calcs		Sliding Forces are restrained by the adjacent slab
Moment @ Top of Footir	ng App	lied from Stem	=	-2,459.23 ft-#	_
Surcharge Over Heel	=	0.0 lbs	0.0 ft	0.0 ft-#	
Adjacent Footing Load	=	0.0 lbs	0.0 ft	0.0 ft-#	
Axial Dead Load on Ster	m =	1,226.0 lbs	1.667 ft	2,043.33 ft-#	
Soil Over Toe	=	293.333 lbs	0.6667 ft	195.556 ft-#	
Surcharge Over Toe	=	0.0 lbs	0.0 ft	0.0 ft-#	
Stem Weight	=	1,092.0 lbs	1.667 ft	1,820.0 ft-#	
Soil Over Heel	=	1,691.25 lbs	2.750 ft	4,650.94 ft-#	
Footing Weight	=	612.50 lbs	1.750 ft	1,071.88 ft-#	
Total Vertical Force	=	4,915.08 lbs	Base Moment =	7,322.47 ft-#	

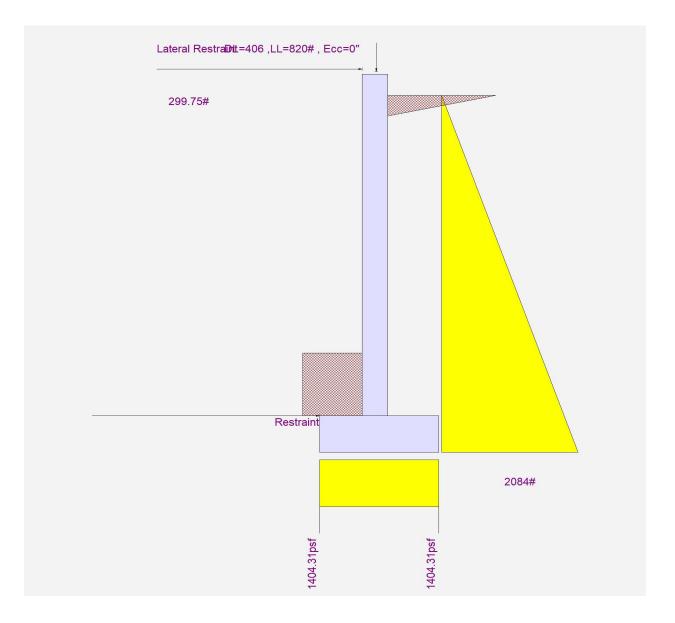
Stem is specified to be fixed to footing, and top restraint is assumed to react out any tendency for moment at the footing/soil

interface, so uniform soil pressure is assumed.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Restrained Retaining Wall Project File: 05 Beams.ec6 LIC# : KW-06013353, Build:20.23.08.30 SNAKE RIVER ENGINEERING (c) ENERCALC INC 1983-2023

DESCRIPTION: F15



LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F4

Code Reference:

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Soil Data	

in

Retained Height	=	10.250 ft
Wall height above soil	=	0.670 ft
Total Wall Height	=	10.920 ft
Top Support Height	=	10.92 ft
Slope Behind Wall	=	0
Height of Soil over Toe	=	24.0 in

Allow Soil Bearing	_	1,500.0 psf
Equivalent Fluid Pressure	e Metho	
At-Rest Heel Pressure	=	32.0 psf/ft
	=	0.0 psf/ft
Passive Pressure	=	250.0 psf/ft
Soil Density	=	110 pcf
Footing Soil Frictior	=	0.4 psf
Soil height to ignore for passive pressure	=	12 in

SNAKE RIVER ENGINEERING

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Surcharge Loads

Surcharge Over Hee >>>Used To Resist		psf Overturning
Surcharge Over Toe Used for Sliding & C	= Verturning	psf
Axial Load Applied	to Stem	
Axial Dead Load	= 6	622.0 lbs
Axial Live Load	= 34	155 0 lbs

Axial Load Eccentricity =

Earth Pressure Seismic Load

Design Summary

Total Bearing Load	=	7,299.83 lbs
resultant ecc.	=	0.0 in
Soil Pressure @ Toe	=	1,459.97 psf OK
Soil Pressure @ Heel	=	1,459.97 psf OK
Allowable	=	psf
Soil Pressure Less ACI Factored @ Toe ACI Factored @ Heel	Tha = =	
Footing Shear @ Toe	=	38.551 psi OK
Footing Shear @ Heel	=	1.124 psi OK
Allowable	=	75.0 psi
Reaction at Top Reaction at Bottom	=	299.750 lbs 1,784.70 lbs
Sliding Calcs Lateral Sliding Force	=	1,784.70 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors -

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W0/1/23/24	1.000
Seismic, E	1.000

Uniform	Lateral Load	l App	lied to Stem	<u> </u>
Lateral Lo	bad	=	#/ft	1
Height t Height t		= =	ft ft	I
Load Typ	e	=	Wind (W)	
Wind on	Exposed Ster	m =	(Strength Le 0.00 psf (Strength Le	ΎΙ
Wind act	s left-to-right	towa	rd retention s	ide. I
K _h Soil	Density Multi	plier	= 0.2 g	Addeo

Concrete Stem Construction

Thickness = 8.00 in Wall Weight = 100.0 psf Stem is FIXED to top of footing

	a	Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	10.92 ft	0.04386 ft	0.00 ft
Rebar Size	=	# 5	# 5	# 5
Rebar Spacing	=	16.00 in	16.00 in	16.00 in
Rebar Placed at	=	Edge	Edge	Edge
Rebar Depth 'd'	=	5.50 in	6.0 in	5.50 in
b/FB + fa/Fa	=		0.657	0.720
MomentActual	=	0.0 ft-#	3,934.77 ft-#	3,934.77 ft-#
MomentAllowable	=	5,467.34 ft-#	5,990.46 ft-#	5,467.34 ft-#
Shear Force @ this height	=	481.199 lbs		2,208.40 lbs
ShearActual	=	7.291 psi		33.461 psi
ShearAllowable	=	75.0 psi		75.0 psi

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width Eccentricity	= =	ft in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3
ed seismic per unit area	=	0.0 psf

Project File: 05 Beams.ec6

LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F4

Footing Strengths & Dimensions

Toe Width Heel Width Total Footing Width Footing Thickness	= = =	4.0 ft <u>1.0</u> 5.0 14.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Too	e =	ft
fc = 2,500.0 psi	Fy =	60000 psi
Footing Concrete Den	sity =	150 pcf
Min. As %	=	0.0018
Cover @ Top =	2 in @ B ⁱ	tm.= 3 in

SNAKE RIVER ENGINEERING

Project File: 05 Beams.ec6

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Footing Design Results

		Toe	Heel
Factored Pressure	=	2,028.36	2,028.36 psf
Mu' : Upward	=	16,226.9	ft-#
Mu' : Downward	=	3,792.0	ft-#
Mu: Design	=	12,435	-26 ft-#
Actual 1-Way Shear	=	38.551	psi
Allow 1-Way Shear	=	75.0	75.0 psi
Other Acceptable Siz	es 8	& Spacings	3:
Toe: # 5 @ 8.00 in		-or-	#4@ 6.63 in, #5@ 10.27 in, #6@ 14.59 in, #7@ 19.{
Heel: None Spec'd		-or-	phiMn = phi * 5 * lambda * sqrt(fc) * Sm
Key: # 0 @ 0.00 in		-or-	No key defined
Min footing T&S rein	f Are	ea	1.51 in2
Min footing T&S reinf	Are	a per foot	0.30 in2 /ft
If one layer of horizor	ntal I	bars: If	two layers of horizontal bars:
#4@ 7.94 in			#4@ 15.87 in
#5@ 12.30 in			#5@ 24.60 in
#6@ 17.46 in			#6@ 34.92 in
RESISTS eliding	eto	m is FIXE	ED at footing

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on footin	g fo	r soil pressure		>>>	Sliding Forces are restrained by the adjacent slab
Load & Moment Summar	y Fo	r Footing : For	Soil Pressure Calcs		· · · · · · · · · · · · · · · · · · ·
Moment @ Top of Footing	App	lied from Stem	=	-2,459.23 ft-#	
Surcharge Over Heel	=	0.0 lbs	0.0 ft	0.0 ft-#	
Adjacent Footing Load	=	0.0 lbs	0.0 ft	0.0 ft-#	
Axial Dead Load on Stem	=	4,077.0 lbs	4.333 ft	17,667.0 ft-#	
Soil Over Toe	=	880.0 lbs	2.0 ft	1,760.0 ft-#	
Surcharge Over Toe	=	0.0 lbs	0.0 ft	0.0 ft-#	
Stem Weight	=	1,092.0 lbs	4.333 ft	4,732.0 ft-#	
Soil Over Heel	=	375.833 lbs	4.833 ft	1,816.53 ft-#	
Footing Weight	=	875.0 lbs	2.50 ft	2,187.50 ft-#	
Total Vertical Force	=	7,299.83 lbs	Base Moment =	25,703.8 ft-#	

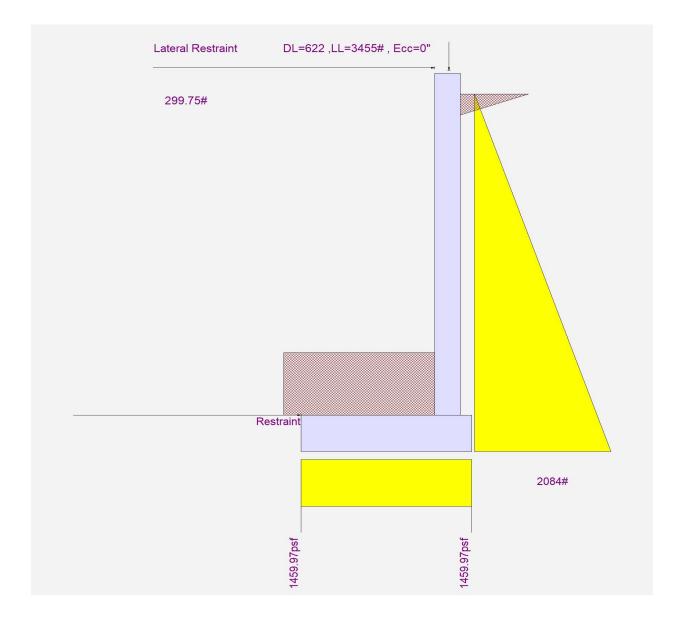
Stem is specified to be fixed to footing, and top restraint is assumed to react out any tendency for moment at the footing/soil

interface, so uniform soil pressure is assumed.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Restrained Retaining Wall Project File: 05 Beams.ec6 LIC# : KW-06013353, Build:20.23.08.30 SNAKE RIVER ENGINEERING (c) ENERCALC INC 1983-2023

DESCRIPTION: F4



LIC# : KW-06013353, Build:20.23.08.30

DESCRIPTION: F16

Code Reference:

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

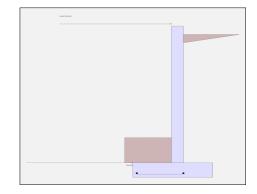
Criteria

_	Soil	Data

Retained Height	=	10.250 ft
Wall height above soil	=	0.670 ft
Total Wall Height	=	10.920 ft
Top Support Height	=	10.92 ft
Slope Behind Wall	=	0
Height of Soil over Toe	=	24.0 in

Allow Soil Bearing Equivalent Fluid Pressure	= Metho	1,500.0 d	psf
At-Rest Heel Pressure	=		psf/ft
	=	0.0	psf/ft
Passive Pressure	=	250.0	psf/ft
Soil Density	=	110	pcf
Footing Soil Frictior	=	0.4	psf
Soil height to ignore for passive pressure	=	12	in

SNAKE RIVER ENGINEERING



Surcharge Loads

Surcharge Over Heel >>>Used To Resist Sli Surcharge Over Toe Used for Sliding & Ove Axial Load Applied to	= rturi	psf ning
Axial Dead Load	=	501.0 lbs
Axial Live Load	=	2,290.0 lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Design Summary

Total Bearing Loadresultant ecc.	= =	7,375.08 lbs 0.0 in
Soil Pressure @ Toe	=	1,475.02 psf OK
Soil Pressure @ Heel	=	1,475.02 psf OK
Allowable	=	psf
Soil Pressure Less	Thai	n Allowable
ACI Factored @ Toe	=	1,953.22 psf
ACI Factored @ Heel	=	1,953.22 psf
Footing Shear @ Toe	=	19.077 psi OK
Footing Shear @ Heel	=	5.184 psi OK
Allowable	=	75.0 psi
Reaction at Top	=	299.750 lbs
Reaction at Bottom	=	1,784.70 lbs
Sliding Calcs Lateral Sliding Force	=	1,784.70 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors -

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W/1/23/24	1.000
Seismic, E	1.000

Uniform	Lateral Load	Арр	olied to Stem	
Lateral Lo	bad	=	#/ft	
Height t Height t		= =	ft ft	
Load Typ	e	=	Wind (W)	
Wind on	Exposed Ster	n =	(Strength Le 0.00 psf (Strength Le	,
Wind act	s left-to-right t	owa	rd retention s	de.
K _h Soil	Density Multip	olier	= 0.2 g	Add

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width Eccentricity	= =	ft in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3
ded seismic per unit area	=	0.0 psf

Concrete Stem Construction

Thickness = 8.00 in Wall Weight = 100.0 psf Stem is FIXED to top of footing

@) Top Support	Mmax Between Top & Base	@ Base of Wall
	Stem OK	Stem OK	Stem OK
=	10.92 ft	0.04386 ft	0.00 ft
=	# 5	# 5	# 5
=	16.00 in	16.00 in	16.00 in
=	Edge	Edge	Edge
=	5.50 in	6.0 in	5.50 in
=		0.657	0.720
=	0.0 ft-#	3,934.77 ft-#	3,934.77 ft-#
=	5,467.34 ft-#	5,990.46 ft-#	5,467.34 ft-#
=	481.199 lbs		2,208.40 lbs
=	7.291 psi		33.461 psi
=	75.0 psi		75.0 psi
		= 10.92 ft = # 5 = 16.00 in = Edge = 5.50 in = = 0.0 ft-# = 481.199 lbs = 7.291 psi	@ Top Support Top & Base Stem OK Stem OK = 10.92 ft 0.04386 ft = # 5 # 5 = 16.00 in 16.00 in = Edge Edge = 5.50 in 6.0 in = 0.0657 = 0.0 ft-# 3,934.77 ft-# = 5,467.34 ft-# 5,990.46 ft-# = 7.291 psi 5.291 psi

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DESCRIPTION: F16

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Footing Strengths & Dimensions

Toe Width Heel Width	=	2.50 ft 2.50
Total Footing Width	=	5.0
Footing Thickness	=	14.0 in
Key Width Key Depth Key Distance from Toe	= = =	in in ft
fc = 2,500.0 psi Footing Concrete Dens Min. As % Cover @ Top = 2	ity = =	60000 psi 150 pcf 0.0018 tm.= 3 in

Footing Design Results

		Toe	Heel				
Factored Pressure	=	1,953.22	1,953.22 psf				
Mu' : Upward	=	6,103.81	ft-#				
Mu' : Downward	=	1,481.25	ft-#				
Mu: Design	=	4,623	-656 ft-#				
Actual 1-Way Shear	=	19.077	psi				
Allow 1-Way Shear	=	75.0	75.0 psi				
Other Acceptable Sizes & Spacings:							
Toe: # 5 @ 8.00 in		-or-	#4@ 7.93 in, #5@ 12.30 in, #6@ 17.46 in, #7@ 23.{				
Heel: None Spec'd		-or-	phiMn = phi * 5 * lambda * sqrt(fc) * Sm				
Key: # 0 @ 0.00 in		-or-	No key defined				
Min footing T&S reinf	Are	a	1.51 in2				
Min footing T&S reinf	Are	a per foot	0.30 in2 /ft				
If one layer of horizor	ntal	bars: If	two layers of horizontal bars:				
#4@ 7.94 in			#4@ 15.87 in				
#5@ 12.30 in			#5@ 24.60 in				
#6@ 17.46 in			#6@ 34.92 in				
RESISTS sliding, stem is FIXED at footing							

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on footin	g fo	r soil pressure		>>>	Sliding Forces are restrained by the adjacent slab
Load & Moment Summar	y Fo	or Footing : For S	Soil Pressure Calcs		3 • • • • • • • • • • • • • • • • • • •
Moment @ Top of Footing	App	lied from Stem	=	-2,459.23 ft-#	
Surcharge Over Heel	=	0.0 lbs	0.0 ft	0.0 ft-#	
Adjacent Footing Load	=	0.0 lbs	0.0 ft	0.0 ft-#	
Axial Dead Load on Stem	=	2,791.0 lbs	2.833 ft	7,907.83 ft-#	
Soil Over Toe	=	550.0 lbs	1.250 ft	687.50 ft-#	
Surcharge Over Toe	=	0.0 lbs	0.0 ft	0.0 ft-#	
Stem Weight	=	1,092.0 lbs	2.833 ft	3,094.0 ft-#	
Soil Over Heel	=	2,067.08 lbs	4.083 ft	8,440.59 ft-#	
Footing Weight	=	875.0 lbs	2.50 ft	2,187.50 ft-#	
Total Vertical Force	=	7,375.08 lbs	Base Moment =	19,858.2 ft-#	

Stem is specified to be fixed to footing, and top restraint is assumed to react out any tendency for moment at the footing/soil

interface, so uniform soil pressure is assumed.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Restrained Retaining Wall Project File: 05 Beams.ec6 LIC# : KW-06013353, Build:20.23.08.30 SNAKE RIVER ENGINEERING (c) ENERCALC INC 1983-2023

DESCRIPTION: F16

