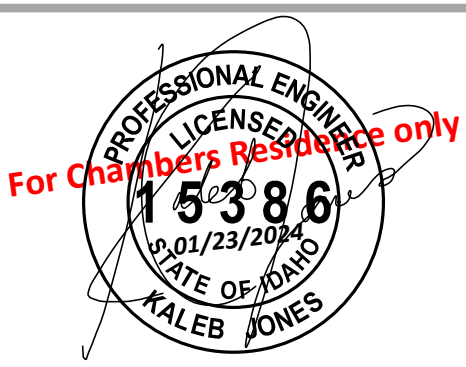
Structural Calculations

Project Title: Chambers Residence

Location: McCall (150), Idaho

Job #: 2023-6431

SNAKE RIVER
ENGINEERING



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

SITE SPECIFIC DESIGN CRITERIA:

Snow Criteria:

Roof Load (P_f)	**150 psf**	
Ground Load (P_g)	**150 psf**	
Exposure Factor (C_e)	**1.0**	Partially
Thermal Factor (C_t)	**1.0**	Typical
Importance (I_s)	**1.0**	

Wind Criteria:

Wind Speed (V_3)	**115 mph**	
Wind Exposure	**C**	Open Terrain
Wind Importance (I_w)	**1.0**	
Building Category	**II**	

Seismic Criteria:

Site Class	**D**		Stiff Soil
Ss	**0.47**	Fa	**1.42**
S1	**0.14**	Fv	**2.24**
S_{DS}	**0.45**	S_{D1}	**0.21**
Risk Category	**II**		Other
Seismic Importance (I_E)	**1.0**		
Seismic Design Category (SDC)	**D**		

Seismic Criteria (continued):

Wall Material	Design Base Shear	Response Coeff., R	
OSB	**.08Wp**	**6.5**	Typ @ Ext
GYP	**.27Wp**	**2**	Typ @ Int
CANT COL	**.36Wp**	**1.5**	

Soil Criteria:

Brg. Strength	**1500 psf**

STRUCTURE SPECIFIC DESIGN CRITERIA:

Live Loads:

Typ Residential	**40 psf**
Garage (P.V.)	**50 psf**
Sleeping Area's	**30 psf**

Floor Dead Loads:

Deck	2.5
Joist	2.0
Ceiling	2.0
Flooring	2.5
Misc	3.0
TOTAL	**12 psf**

Floor not engineered for concrete overlay.

Roof Dead Loads:

Deck	1.5
Insulation	2.0
Roofing	3.0
Joist	2.5
Ceiling	3.0
Misc	4.5
TOTAL	**17 psf**

Roof not engineered for Tile, Slate or Concrete.

Interior Wall Dead Loads:

Studs	2.0
Gyp. Board	2.5
Misc	3.0
TOTAL	**8 psf**

Exterior Wall Dead Loads:

Studs	2.0
Siding	2.5
Insulation	0.5
Gyp. Board	2.5
Sheathing	1.5
Misc	9.0
TOTAL	**18 psf**

Wall not engineered for Stucco.

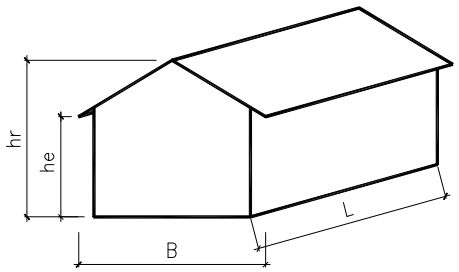
Deck Dead Load

Decking	3.0
Joist	2.0
Conc	37.0
Misc	3.0
TOTAL	**45 psf**

WIND ANALYSIS: Low-rise Building - Based on IBC / ASCE 7

INPUT DATA

Exposure category (B, C or D, ASCE 7-16 26.7.3)		C	
Importance factor (ASCE 7-16 Table 1.5-2)	I_w =	1.00	for all Category
Basic wind speed (ASCE 7-16 26.5.1 or 2018 IBC)	V =	115	*mph*
Topographic factor (ASCE 7-16 26.8 & Table 26.8-1)	K_{zt} =	1.00	Flat
Building height to ridge	h_r =	*34.83 ft*	*ft*
Building height to eave	h_e =	*20.25 ft*	*ft*
Building width	B =	*81.00 ft*	*ft*
Building length	L =	*110.50 ft*	*ft*
Overhang sloped width	O_h =	*3.00 ft*	*ft*
Effective area of components (or Solar Panel area)	A =	*33.3 ft²*	ft^2, <== Overhang? (Yes or No): Yes
Enclosed? (Y/N)		y	



ANALYSIS

Velocity pressure

$q_h = 0.00256\ K_z\ K_{zt}\ K_d\ K_e\ V^2$ = **27.76** psf

where: q_h = velocity pressure at mean roof height, h. (Eq. 26.10-1 page 268)

K_z = velocity pressure exposure coefficient evaluated at height, h, (Tab. 26.10-1, pg 2 = **0.96**

K_d = wind directionality factor. (Tab. 26.6-1, for building, page 266) = **0.85**

h = mean roof height = **27.54** ft

K_e = ground elevation factor. (***1.0*** per Sec. 26.9, page 268)

< 60 ft, [Satisfactory] (ASCE 7-16 26.2.1)

< Min (L, B), [Satisfactory] (ASCE 7-16 26.2.2)

Design pressures for MWFRS

$p = q_h\ [(G\ C_{pf})-(G\ C_{pi})]$

where: p = pressure in appropriate zone. (Eq. 28.3-1, page 311). p_{min} = **16** psf (ASCE 7-16 28.3.4)

$G\ C_{pf}$ = product of gust effect factor and external pressure coefficient, see table below. (Fig. 28.3-1, page 312 & 313)

$G\ C_{pi}$ = product of gust effect factor and internal pressure coefficient.(Tab. 26.13-1, Enclosed Building, page 271)

= **0.18** or **-0.18**

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**

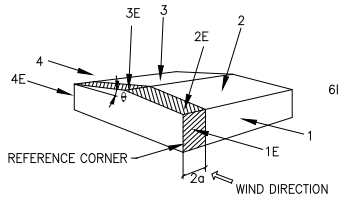
Net Pressures (psf), Basic Load Cases

Surface	Roof angle q = 18.43			Roof angle q = 18.43		
	$G\ C_{pf}$	Net Press. W/		$G\ C_{pf}$	Net Press. W/	
		$(+GC_{pi})$	$(-GC_{pi})$		$(+GC_{pi})$	$(-GC_{pi})$
1	0.52	9.34	19.33	-0.45	-17.49	-7.50
2	-0.69	-24.15	-14.16	-0.69	-24.15	-14.16
3	-0.47	-18.00	-8.01	-0.37	-15.27	-5.27
4	-0.42	-16.53	-6.54	-0.45	-17.49	-7.50
5				0.40	6.11	16.10
6				-0.29	-13.05	-3.05
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
3E	-0.67	-23.69	-13.70	-0.53	-19.71	-9.72
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

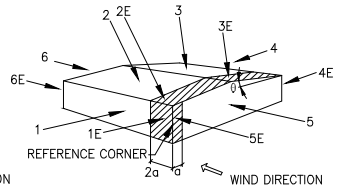
Net Pressures (psf), Torsional Load Cases

Surface	Roof angle q = 18.43		
	$G\ C_{pf}$	Net Press. W/	
		$(+GC_{pi})$	$(-GC_{pi})$
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
Surface	Roof angle q = 0.00		
	$G\ C_{pf}$	Net Press. W/	
		$(+GC_{pi})$	$(-GC_{pi})$
5T	0.40	1.53	4.03
6T	-0.29	-3.26	-0.76

+ / - Wind Pressure	64%

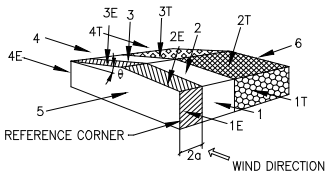


Load Case A (Transverse)

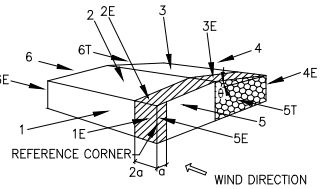


Load Case B (Longitudinal)

Basic Load Cases



Load Case A (Transverse)



Load Case B (Longitudinal)

Torsional Load Cases

Design pressures for components and cladding

$p = q_h[(G C_p) - (G C_{pi})]$

where: p = pressure on component. (Eq. 30.3-1, pg 33

p_{min} = 16.00 psf (ASCE 7-16 30.2.2)

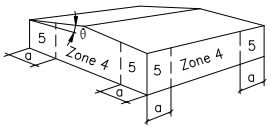
G C_p = 1.00 external pressure coefficie

see table below. (ASCE 7-16 30.3.2)

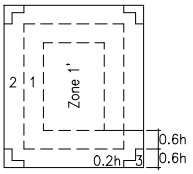
q = 18.43 °

$p_{overhang}$ = **-95.78** psf

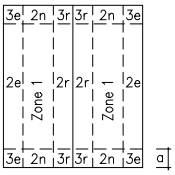
(ASCE 7-16 28.3.3)



Walls



Roof θ≤7°



Roof θ>7°

Comp. & Cladding Coeffs.	Effective Area (ft^2)	Zone 1		Zone 1'		Zone 2		Zone 2e		Zone 2n		Zone 2r	
		GC_p	- GC_p	GC_p	- GC_p	GC_p	- GC_p	GC_p	- GC_p	GC_p	- GC_p	GC_p	- GC_p
	2187	0.30	-0.80	0.30	-0.80	0.30	-2.20	0.30	-0.80	0.30	-1.00	0.30	-1.00
	Effective Area (ft^2)	**Zone 3**		**Zone 3e**		**Zone 3r**		**Zone 4**		**Zone 5**			
		GC_p	- GC_p	GC_p	- GC_p	GC_p	- GC_p	GC_p	- GC_p	GC_p	- GC_p		
	33	0.30	-2.50	0.30	-2.50	0.30	-1.80	0.99	-1.09	0.99	-1.37		

Comp. & Cladding Pressures	Zone 1		Zone 1'		Zone 2		Zone 2e		Zone 2n		Zone 2r	
	Positive	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*
	3.33	-17.21	3.33	-17.21	3.33	-56.08	3.33	-17.21	3.33	-22.77	3.33	-22.77
	Zone 3		**Zone 3e**		**Zone 3r**		**Zone 4**		**Zone 5**			
	Positive	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*		
	3.33	-64.41	3.33	-64.41	3.33	-44.97	22.37	-25.14	22.37	-33.08		

*(Max Pressure **64.41** psf)*

LOAD CASE 'A' FACTORED LOADS	
$0.6*W_r = (Z_2 + Z_3) * 0.6 =$	**3.7 psf**
$0.6*W_{rE} = (Z_{2E} + Z_{3E}) * 0.6 =$	**6.6 psf**
$0.6*W_w = (Z_1 + Z_4) * 0.6 =$	**15.5 psf**
$0.6*W_{wE} = (Z_{1E} + Z4E) * 0.6 =$	**23.3 psf**

LOAD CASE 'B' FACTORED LOADS	
$0.6*W_r = (Z_2 + Z_3) * 0.6 =$	**5.3 psf**
$0.6*W_{rE} = (Z_{2E} + Z_{3E}) * 0.6 =$	**9.0 psf**
$0.6*W_w = (Z_5 + Z_6) * 0.6 =$	**11.5 psf**
$0.6*W_{wE} = (Z_{5E} + Z_{6E}) * 0.6 =$	**17.3 psf**

ROOF COMPONENTS FACTORED LOAD	
$0.6*Z_{r,c\&c} =$	**13.7 psf**

WALL COMPONENTS FACTORED LOAD	
$0.6*Z_{w,c\&c} =$	**15.1 psf**

OSB SEISMIC LOADING ANALYSIS

IBC / ASCE 7: Equivalent Lateral Force (ELF) Procedure:

INPUT DATA

Typical floor height:	h =	**10**	*ft*
Typical floor weight:	w_x =	**152.2**	*kips*
Number of floors:	n =	**2**	
Importance factor (ASCE 11.5.1):	I_e =	1.00	
Design spectral response:	S_{DS} =	0.45	g
	S_{D1} =	0.21	g
Mapped spectral resp.:	S_1 =	0.14	g
Period Parameter, C_t: (ASCE Tab 12.8-2):	C_t =	**0.020**	
Resp. coefficient: (ASCE Tab. 12.2.1):	R =	6.5	
Seismic design category:	SDC =	D	
	h_n =	34.8	*ft*

DESIGN SUMMARY

$C_s = 1.2 * S_{DS} / (R / I_e)$ =	0.0825		**<= Applicable**
Period Parameter, x =	*0.75*	, ASCE Tab 12.8-2	
Period: $T_a = C_t (h_n)^x$ =	*0.29*	sec, ASCE 12.8.2.1	
$C_s < S_{D1} / [(R / I_e) T_a]$ =	*0.1128*	, ASCE Tab 12.8.1.1	**<= Not Applicable**
$C_s > 0.044 S_{DS} I_e$ =	*0.0197*	, ASCE Tab 12.8.1.1	**<= Not Applicable**
$C_s > 0.5 S_1 / (R / I_e)$ =	*0.0108*	, ASCE Tab 12.8.1.1	**<= Not Applicable**
k =	*2.11*	, (ASCE 12.8.3, page 91)	
$V = C_s W$ =	***0.0825***	W	
0.7 * V =	***0.0577***	W	
W =	***304***	*kips, total*	

SEISMIC COMPONENT & ANCHORING ANALYSIS

Out-of-plane seismic force for wall design (ASCE 7, Sec.12.11.1)

$$w_{1,seismic} = MAX\left(0.4 I S_{DS} W_p \;, 0.1 W_p\right)$$ = ***0.2*** W_p = ***0.2*** psf ***<= USE FOR DIAPHRAGMS***

Where : W_p = **1.0** psf , I_e = 1.00

(CBC / IBC Tab. 1604.5 & ASCE 7 Tab. 1.5-2)

Out-of-plane seismic force for anchorage design

For seismic design category A & B, any diaphragm (ASCE 7 Sec. 12.11.2)

$$F_{anch,seismic} = MAX\left[0.4 S_{DS} I W_p \frac{\left(h+h_p\right)^2}{2h} \;,\; 0.1 W_p \frac{\left(h+h_p\right)^2}{2h} \;,\; 400 S_{DS} I \;,\; F_{\min}\right] =$$

Where : F_{min} = ***0.19*** plf, ***1.75*** W_p = ***179*** plf (Horizontal) ***<= Not Applicable***

(ASCE 7 Sec. 12.11.2 & 11.7.3)

For seismic design category C and above, flexible diaphragm (ASCE 7 Sec. 12.11.2.1)

$$F_{anch,seismic} = MAX\left[0.8 S_{DS} I W_p \frac{\left(h+h_p\right)^2}{2h} \;,\; 0.1 W_p \frac{\left(h+h_p\right)^2}{2h} \;,\; 400 S_{DS} I \;,\; F_{\min}\right] =$$

= ***3.50*** W_p = ***179*** plf (Horizontal) ***<= Applicable***

For connections (ASCE 7 Sec. 12.11.2.1)

$F_{conn,seismic}$ = *MAX [0.133 S_{DS} w_p , 0.5 w_p]* = ***0.5*** W_p = ***0.5*** plf (Horizontal)

GYP SEISMIC LOADING ANALYSIS

IBC / ASCE 7: Equivalent Lateral Force (ELF) Procedure:

INPUT DATA

Typical floor height:	h =	10	*ft*
Typical floor weight:	w_x =	152.2	*kips*
Number of floors:	n =	2	
Importance factor (ASCE 11.5.1):	I_e =	1.00	
Design spectral response:	S_{DS} =	0.45	g
	S_{D1} =	0.21	g
Mapped spectral resp.:	S_1 =	0.14	g
Period Parameter, C_t: (ASCE Tab 12.8-2):	C_t =	0.020	
Resp. coefficient: (ASCE Tab. 12.2.1):	R =	2	
Seismic design category:	SDC =	D	
	h_n =	34.8	*ft*

DESIGN SUMMARY

$C_s = 1.2 * S_{DS} / (R / I_e)$ =	0.2681		**<= Applicable**
Period Parameter, x =	*0.75*	, ASCE Tab 12.8-2	
Period: $T_a = C_t (h_n)^x$ =	*0.29*	sec, ASCE 12.8.2.1	
$C_s < S_{D1} / [(R / I_e) T_a]$ =	*0.3665*	, ASCE Tab 12.8.1.1	**<= Not Applicable**
$C_s > 0.044 S_{DS} I_e$ =	*0.0197*	, ASCE Tab 12.8.1.1	**<= Not Applicable**
$C_s > 0.5 S_1 / (R / I_e)$ =	*0.0353*	, ASCE Tab 12.8.1.1	**<= Not Applicable**
k =	*2.11*	, (ASCE 12.8.3, page 91)	
$V = C_s W$ =	***0.2681***	W	
0.7 * V =	***0.1877***	W	
W =	***304***	*kips, total*	

SEISMIC COMPONENT & ANCHORING ANALYSIS

Out-of-plane seismic force for wall design (ASCE 7, Sec.12.11.1)

$$w_{1,seismic} = MAX\left(0.4 I S_{DS} W_p \ , 0.1 W_p\right)$$ = ***0.2*** W_p = ***0.2*** psf ***<= USE FOR DIAPHRAGMS***

Where : W_p = 1.0 psf , I_e = 1.00

(CBC / IBC Tab. 1604.5 & ASCE 7 Tab. 1.5-2)

Out-of-plane seismic force for anchorage design

For seismic design category A & B, any diaphragm (ASCE 7 Sec. 12.11.2)

$$F_{anch,seismic} = MAX\left[0.4 S_{DS} I W_p \frac{\left(h+h_p\right)^2}{2h} \ , \ 0.1 W_p \frac{\left(h+h_p\right)^2}{2h} \ , \ 400 S_{DS} I \ , \ F_{\min}\right] =$$

Where : F_{min} = ***0.19*** plf, ***1.75*** W_p = ***179*** plf (Horizontal) ***<= Not Applicable***

(ASCE 7 Sec. 12.11.2 & 11.7.3)

For seismic design category C and above, flexible diaphragm (ASCE 7 Sec. 12.11.2.1)

$$F_{anch,seismic} = MAX\left[0.8 S_{DS} I W_p \frac{\left(h+h_p\right)^2}{2h} \ , \ 0.1 W_p \frac{\left(h+h_p\right)^2}{2h} \ , \ 400 S_{DS} I \ , \ F_{\min}\right] =$$

= ***3.50*** W_p = ***179*** plf (Horizontal) ***<= Applicable***

For connections (ASCE 7 Sec. 12.11.2.1)

$F_{conn,seismic}$ = *MAX [0.133 S_{DS} w_p , 0.5 w_p]* = ***0.5*** W_p = ***0.5*** plf (Horizontal)

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.
l) 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

Wall Line	Roof / Floor					Wall					Load above				Loading		
	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)	=	**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	55	14.6	47.0	43.0	18.2	18.0	10.0	47.0				0.06	=	**7.99**	**5.36**	**Wind**
	9.6	55	14.6	34.0	43.0	19.2	18.0	10.0	34.0				0.06	=			
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**
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	55	14.6	34.0	81.0	19.2	18.0	10.0	34.0				0.06	=	**9.47**	**11.20**	**Seismic**
	9.6	55	14.6	47.3	81.0	18.2	18.0	10.0	47.3				0.06	=			
Y3-1	9.6	55	14.6	47.3	28.0	18.2	18.0	10.0	47.3				0.06	=	**8.45**	**4.17**	**Wind**
	9.6	55	11.0	29.3	28.0	19.8	18.0	10.0	29.3				0.06	=			
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**
Y1-0	9.6	55	1.0	37.0	32.8	18.9	18.0	9.0	37.0	0	0	0	0.06	=	**4.03**	**3.82**	**Wind**
	0.0	18	0.0	14.0	32.8	23.3	18.0	9.0	14.0	6	2.84	3.36	0.06	=			

SHEAR WALL CALCULATIONS:

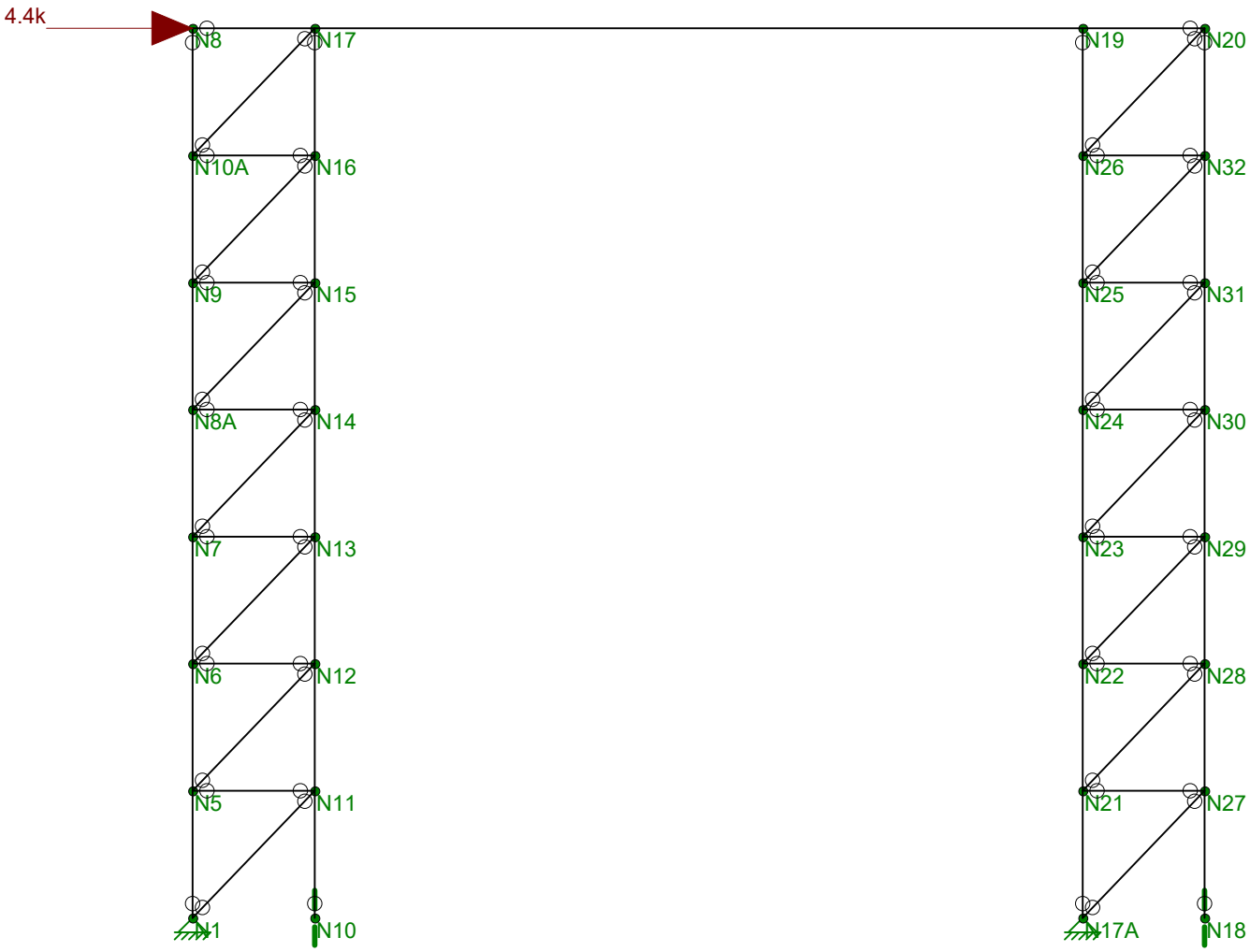
		X1-1	X2-1	X3-1	X4-1	X4-1	X5-1
Shear Wall Forces							
Number of Panels		1	1	1	1	1	1
Total length of wall		34.00 ft	24.50 ft	37.00 ft	29.50 ft	27.50 ft	30.00 ft
Total length of shear wall	L =	34.00 ft	24.50 ft	23.00 ft	11.00 ft	14.50 ft	27.00 ft
Total length of full ht seg.	L_w =	16.00 ft	21.50 ft	14.75 ft	9.00 ft	8.00 ft	11.50 ft
height of shear wall	H =	14.00 ft	10.00 ft	10.00 ft	10.00 ft	12.00 ft	10.00 ft
Maximum opening height	H' =	0.00 ft	0.00 ft	10.00 ft	5.00 ft	0.00 ft	10.00 ft
Total force at top of wall	V_1 =	5428 lbs	7992 lbs	2565 lbs	1414 lbs	1414 lbs	2827 lbs
Self weight	$w_{DL\ self}$ =	252 plf	180 plf	180 plf	180 plf	216 plf	180 plf
Applied dead load	$w_{DL\ above}$ =	40 plf	51 plf	55 plf	163 plf	40 plf	240 plf
Prefered OSB thickness	in	7/16	7/16	7/16	7/16	7/16	7/16
Prefered Gyp thickness	in	1/2	1/2	1/2	1/2	1/2	1/2
Wall Connected to Concrete	y/n =	Y	Y	Y	Y	Y	Y
Shear Wall Segments							
		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 Transfer to Concrete							
	T =	Not Req'd	1783 lbs	455 lbs	330 lbs	104 lbs	Not Req'd
	1/2 Anchor Bolts @	72 '' O.C.	36 '' O.C.	72 '' O.C.	72 '' O.C.	72 '' O.C.	72 '' O.C.
	Provide:	Code Min.	A3	Code Min.	Code Min.	Code Min.	Code Min.
	Min # of 1/2 Anchor Bolts	(6) Min	(8) Min	(3) Min	(2) Min	(2) Min	(3) Min
	Load From Above	0.00	0.00	0.00	0.00	0.00	0.00
			HD1	**Perp. Wall**	**Perp. Wall**	**Perp. Wall**	
Shear Resisting System							
Force Calculated		339.23	371.74	298.61	171.34	176.70	528.10
		OSB	**OSB**	**OSB**	**OSB**	**OSB**	**OSB**
	Min Shear Wall Segment:	4.00 ft	2.86 ft	2.86 ft	2.86 ft	3.43 ft	2.86 ft
	Provide: Va=	**SW1**	**SW2**	**SW1**	**SW1**	**SW1**	**SW2**
	Min Shear Wall Segment:						
	Provide: Va=						
Blocking / Nailing Framing Attachment							
Blocking Unit Shear		160 plf	326 plf	69 plf	48 plf	51 plf	94 plf
Blocking		**NONE**	**B1**	**NONE**	**NONE**	**NONE**	**NONE**
Nailing		**T1**	**T2**	**See SCHED**	**See SCHED**	**See SCHED**	**See SCHED**
Unit Base Shear							
% of full height segments	%fh = L_w/L =	0.471	0.878	0.641	0.818	0.552	0.426
% of maximum opening height	%oh = H'/H =	0.000	0.000	1.000	0.500	0.000	1.000
Shear cap adj factor	SCAF =	1.00	1.00	0.58	0.92	1.00	0.47
Unit base shear	vbase V_1/L_w =	339 plf	372 plf	174 plf	157 plf	177 plf	246 plf
Effective unit base shear	vreq=v_{base}/SCAF=	339 plf	372 plf	299 plf	171 plf	177 plf	528 plf
Ovrtrn. mo. Ttl. length of wall	OTM =	76.0 k-ft	79.9 k-ft	44.0 k-ft	15.4 k-ft	17.0 k-ft	60.7 k-ft
Shear wall adjustment factor							
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	152.9 k-ft
	r=	0.9999	1.0000	0.6413	0.9000	0.9999	0.4259
	C_O=	2.1245	1.1395	0.5823	0.9167	1.8121	0.4655

SHEAR WALL CALCULATIONS:

		Y1-1	Y1-1	Y2-1	Y2-1	Y2-1	Y3-1
Shear Wall Forces							
Number of Panels		1	1	1	1	1	1
Total length of wall		14.50 ft	18.00 ft	18.00 ft	24.50 ft	14.00 ft	23.75 ft
Total length of shear wall	L =	14.50 ft	18.00 ft	18.00 ft	24.50 ft	14.00 ft	23.75 ft
Total length of full ht seg.	L_w =	8.00 ft	6.00 ft	18.00 ft	21.08 ft	14.00 ft	23.75 ft
height of shear wall	H =	10.00 ft	16.00 ft	16.00 ft	12.00 ft	10.00 ft	10.00 ft
Maximum opening height	H' =	6.00 ft	14.00 ft	0.00 ft	12.00 ft	0.00 ft	0.00 ft
Total force at top of wall	V_1 =	2343 lbs	2343 lbs	3798 lbs	4448 lbs	2954 lbs	8449 lbs
Self weight	$w_{DL\ self}$ =	180 plf	288 plf	288 plf	216 plf	180 plf	180 plf
Applied dead load	$w_{DL\ above}$ =	40 plf	51 plf	55 plf	163 plf	40 plf	40 plf
Prefered OSB thickness	in	7/16	7/16	7/16	7/16	7/16	7/16
Prefered Gyp thickness	in	1/2	1/2	1/2	1/2	1/2	1/2
Wall Connected to Concrete	y/n =	Y	Y	Y	Y	N	Y
Shear Wall Segments							
		4.00	3.00	18.00	9.50	14.00	23.75
		4.00	3.00		11.58		
Shear Transfer to Concrete							
	T =	2247 lbs	3500 lbs	1523 lbs	1 lbs	1187 lbs	1992 lbs
	1/2 Anchor Bolts @	72 '' O.C.		72 '' O.C.	72 '' O.C.		36 '' O.C.
	Provide:	Code Min.		Code Min.	Code Min.		A3
	Min # of 1/2 Anchor Bolts	(3) Min		(4) Min	(5) Min		(9) Min
	Load From Above	0.00	0.00	0.00	0.00	0.00	0.00
	Holdown	**HD2**	**HD3**	**HD1**	**Perp. Wall**	**S2**	**HD1**
Shear Resisting System							
Force Calculated		397.97	813.68	211.00	269.91	211.00	355.75
		OSB	**B.F.**	**OSB**	**OSB**	**OSB**	**OSB**
	Min Shear Wall Segment:	2.86 ft	1.33 ft	4.57 ft	3.43 ft	2.86 ft	2.86 ft
	Provide: Va=	**SW3**	**4400**	**SW1**	**SW2**	**SW1**	**SW2**
	Min Shear Wall Segment:						
	Provide: Va=						
Blocking / Nailing Framing Attachment							
Blocking Unit Shear		162 plf	130 plf	211 plf	182 plf	211 plf	356 plf
Blocking		**NONE**	**NONE**	**B1**	**NONE**	**B1**	**B1**
Nailing		**T1**	**See SCHED**	**T1**	**T1**	**T1**	**T2**
Unit Base Shear							
% of full height segments	%fh = L_w/L =	0.552	0.333	1.000	0.860	1.000	1.000
% of maximum opening height	%oh = H'/H =	0.600	0.875	0.000	1.000	0.000	0.000
Shear cap adj factor	SCAF =	0.74	0.48	1.00	0.78	1.00	1.00
Unit base shear	vbase V_1/L_w =	293 plf	391 plf	211 plf	211 plf	211 plf	356 plf
Effective unit base shear	vreq=v_{base}/SCAF=	398 plf	814 plf	211 plf	270 plf	211 plf	356 plf
Ovrtrn. mo. Ttl. length of wall	OTM =	31.8 k-ft	18.7 k-ft	60.8 k-ft	68.3 k-ft	29.5 k-ft	84.5 k-ft
Shear wall adjustment factor							
Resist moment total L. of wall	RM =	23.1 k-ft	1.5 k-ft	55.6 k-ft	113.8 k-ft	21.5 k-ft	62.0 k-ft
	r=	0.6723	0.3636	1.0000	0.8604	1.0000	1.0000
	C_O=	0.7360	0.4800	1.0000	0.7817	1.0000	1.0000

SHEAR WALL CALCULATIONS:

		Y4-1		X2-0	X1-0	Y1-0	
Shear 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	
Shear Wall Segments							
		6.75		2.25	10.67	14.00	
		6.75					
Shear Transfer to Concrete							
	T =	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**	
Shear Resisting System							
Force Calculated		239.11		1059.27	383.37	287.80	
		OSB		**P.F.**	**OSB**	**OSB**	
	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=						
Blocking / Nailing Framing Attachment							
Blocking Unit Shear		187 plf		340 plf	111 plf	288 plf	
Blocking		**B1**		**B1**	**NONE**	**B1**	
Nailing		**T1**		**T2**	**See SCHED**	**T1**	
Unit Base Shear							
% of full height segments	%fh = L_w/L =	0.844		1.000	1.000	1.000	
% 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=	239 plf		1059 plf	383 plf	288 plf	
Ovrtrn. mo. Ttl. length of wall	OTM =	32.3 k-ft		16.7 k-ft	36.8 k-ft	36.3 k-ft	
Shear wall adjustment factor							
Resist moment total L. of wall	RM =	28.1 k-ft		0.5 k-ft	18.5 k-ft	19.8 k-ft	
	r=	0.9153		1.0000	1.0000	1.0000	
	C_O=	0.9275		1.0000	1.0000	1.0000	



Loads: BLC 1, Wind Load
Envelope Only Solution

Wood Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	I (90,270) ...	I (0,180) [i...
1	Chord	4.5X5.5FS	Column	Rectangular	DF/L #2	Typical	24.75	41.766	62.391
2	Web	2X6	Beam	None	DF/L #2	Typical	8.25	1.547	20.797
3	Beam	4X12	Beam	None	24F-1.8E DF Balanced	Typical	39.375	40.195	415.283

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Temp [F]
1	N1	0	0	0
2	N8	0	14	0
3	N10	1.92	0	0
4	N17	1.92	14	0
5	N5	0	2	0
6	N6	0	4	0
7	N7	0	6	0
8	N8A	0	8	0
9	N9	0	10	0
10	N10A	0	12	0
11	N11	1.92	2	0
12	N12	1.92	4	0
13	N13	1.92	6	0
14	N14	1.92	8	0
15	N15	1.92	10	0
16	N16	1.92	12	0
17	N17A	14	0	0
18	N18	15.92	0	0
19	N19	14	14	0
20	N20	15.92	14	0
21	N21	14	2	0
22	N22	14	4	0
23	N23	14	6	0
24	N24	14	8	0
25	N25	14	10	0
26	N26	14	12	0
27	N27	15.92	2	0
28	N28	15.92	4	0
29	N29	15.92	6	0
30	N30	15.92	8	0
31	N31	15.92	10	0
32	N32	15.92	12	0

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Rotation[k-ft/rad]
1	N1	Reaction	Reaction	
2	N18		Reaction	
3	N10		Reaction	
4	N17A	Reaction	Reaction	

Wood Design Parameters

	Label	Shape	Length[...	Le-out[ft]	Le-in[ft]	le-bend to...	le-bend bo...	K-out	K-in	CV	Cr	Out sw...	In sway
1	M1	Chord	14	2	2	Lb out							
2	M2	Chord	14	2	2								
3	M4	Web	2.772			Lb out							
4	M5	Web	1.92			Lb out							
5	M6	Web	2.772			Lb out							
6	M7	Web	1.92			Lb out							
7	M8	Web	2.772			Lb out							
8	M9	Web	1.92			Lb out							
9	M10	Web	2.772			Lb out							
10	M11	Web	1.92			Lb out							
11	M12	Web	2.772			Lb out							
12	M13	Web	1.92			Lb out							
13	M14	Web	2.772			Lb out							
14	M15	Web	1.92			Lb out							
15	M16	Web	2.772			Lb out							
16	M17	Chord	14	2	2								
17	M18	Chord	14	2	2								
18	M19	Web	2.772			Lb out							
19	M20	Web	1.92			Lb out							
20	M21	Web	2.772			Lb out							
21	M22	Web	1.92			Lb out							
22	M23	Web	2.772			Lb out							
23	M24	Web	1.92			Lb out							
24	M25	Web	2.772			Lb out							
25	M26	Web	1.92			Lb out							
26	M27	Web	2.772			Lb out							
27	M28	Web	1.92			Lb out							
28	M29	Web	2.772			Lb out							
29	M30	Web	1.92			Lb out							
30	M31	Web	2.772			Lb out							
31	M31A	Beam	15.92	0	0	Lb out							

Joint Loads and Enforced Displacements (BLC 1 : Wind Load)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	N8	L	X	4.4

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Joint	Point	Distributed
1	Wind Load	WL			1		
2	Dead Load	DL					1

Envelope Maximum Member Section Forces

	Member		Axial[k]	Loc[ft]	LC	Shear[k]	Loc[ft]	LC	Moment[k-ft]	Loc[ft]	LC
1	M1	max	1.391	12.104	17	.031	2.042	17	.143	2.042	17
2		min	-6.633	0	17	-.072	0	17	-.026	11.958	17
3	M2	max	7.869	0	9	.023	4.083	17	.111	4.083	9

Envelope Maximum Member Section Forces (Continued)

	Member		Axial[k]	Loc[ft]	LC	Shear[k]	Loc[ft]	LC	Moment[k-ft]	Loc[ft]	LC
4		min	-.265	12.104	17	-.065	2.042	9	-.016	1.896	9
5	M4	max	.107	0	16	0	0	1	0	0	1
6		min	-1.891	0	17	0	0	1	0	0	1
7	M5	max	1.27	0	17	0	0	1	0	0	1
8		min	-.068	0	1	0	0	1	0	0	1
9	M6	max	.091	0	16	0	0	1	0	0	1
10		min	-1.815	0	17	0	0	1	0	0	1
11	M7	max	1.273	0	17	0	0	1	0	0	1
12		min	-.065	0	1	0	0	1	0	0	1
13	M8	max	.094	0	16	0	0	1	0	0	1
14		min	-1.837	0	17	0	0	1	0	0	1
15	M9	max	1.268	0	17	0	0	1	0	0	1
16		min	-.065	0	1	0	0	1	0	0	1
17	M10	max	.094	0	16	0	0	1	0	0	1
18		min	-1.835	0	17	0	0	1	0	0	1
19	M11	max	1.28	0	17	0	0	1	0	0	1
20		min	-.065	0	1	0	0	1	0	0	1
21	M12	max	.094	0	16	0	0	1	0	0	1
22		min	-1.829	0	17	0	0	1	0	0	1
23	M13	max	1.242	0	17	0	0	1	0	0	1
24		min	-.065	0	1	0	0	1	0	0	1
25	M14	max	.094	0	16	0	0	1	0	0	1
26		min	-1.918	0	17	0	0	1	0	0	1
27	M15	max	1.434	0	17	0	0	1	0	0	1
28		min	-.066	0	1	0	0	1	0	0	1
29	M16	max	.096	0	16	0	0	1	0	0	1
30		min	-1.967	0	17	0	0	1	0	0	1
31	M17	max	2.598	12.104	9	.033	10.063	9	.14	2.042	9
32		min	-5.997	0	17	-.071	0	9	-.046	11.958	9
33	M18	max	8.303	0	9	.024	4.083	9	.107	4.083	17
34		min	-.251	12.104	9	-.063	2.042	9	-.017	1.896	9
35	M19	max	-.058	0	18	0	0	1	0	0	1
36		min	-2.076	0	9	0	0	1	0	0	1
37	M20	max	1.509	0	9	0	0	1	0	0	1
38		min	.04	0	18	0	0	1	0	0	1
39	M21	max	-.056	0	18	0	0	1	0	0	1
40		min	-2.029	0	9	0	0	1	0	0	1
41	M22	max	1.319	0	9	0	0	1	0	0	1
42		min	.039	0	18	0	0	1	0	0	1
43	M23	max	-.056	0	18	0	0	1	0	0	1
44		min	-1.94	0	9	0	0	1	0	0	1
45	M24	max	1.357	0	9	0	0	1	0	0	1
46		min	.039	0	18	0	0	1	0	0	1
47	M25	max	-.056	0	18	0	0	1	0	0	1
48		min	-1.946	0	9	0	0	1	0	0	1
49	M26	max	1.345	0	9	0	0	1	0	0	1
50		min	.039	0	18	0	0	1	0	0	1
51	M27	max	-.057	0	18	0	0	1	0	0	1
52		min	-1.95	0	9	0	0	1	0	0	1
53	M28	max	1.352	0	9	0	0	1	0	0	1
54		min	.039	0	18	0	0	1	0	0	1
55	M29	max	-.055	0	18	0	0	1	0	0	1

Envelope Maximum Member Section Forces (Continued)

	Member		Axial[k]	Loc[ft]	LC	Shear[k]	Loc[ft]	LC	Moment[k-ft]	Loc[ft]	LC
56		min	-1.918	0	9	0	0	1	0	0	1
57	M30	max	1.348	0	9	0	0	1	0	0	1
58		min	.041	0	18	0	0	1	0	0	1
59	M31	max	-.064	0	18	0	0	1	0	0	1
60		min	-2.027	0	9	0	0	1	0	0	1
61	M31A	max	2.656	0	17	1.807	14.096	9	3.329	13.93	9
62		min	-.004	0	1	-.785	13.93	9	-2.6	1.99	17

Envelope Member End Reactions

	Member	Membe...		Axial[k]	LC	Shear[k]	LC	Moment[k-ft]	LC
1	M1	I	max	.204	16	0	1	0	1
2			min	-6.633	17	-.072	17	0	1
3		J	max	1.391	17	.004	1	0	1
4			min	-.211	1	-.013	17	0	1
5	M2	I	max	7.869	9	.008	9	0	1
6			min	.08	18	0	1	0	1
7		J	max	.54	16	.003	1	0	1
8			min	-.265	17	-.002	17	0	1
9	M4	I	max	.107	16	0	1	0	1
10			min	-1.891	17	0	1	0	1
11		J	max	.107	16	0	1	0	1
12			min	-1.891	17	0	1	0	1
13	M5	I	max	1.27	17	0	1	0	1
14			min	-.068	1	0	1	0	1
15		J	max	1.27	17	0	1	0	1
16			min	-.068	1	0	1	0	1
17	M6	I	max	.091	16	0	1	0	1
18			min	-1.815	17	0	1	0	1
19		J	max	.091	16	0	1	0	1
20			min	-1.815	17	0	1	0	1
21	M7	I	max	1.273	17	0	1	0	1
22			min	-.065	1	0	1	0	1
23		J	max	1.273	17	0	1	0	1
24			min	-.065	1	0	1	0	1
25	M8	I	max	.094	16	0	1	0	1
26			min	-1.837	17	0	1	0	1
27		J	max	.094	16	0	1	0	1
28			min	-1.837	17	0	1	0	1
29	M9	I	max	1.268	17	0	1	0	1
30			min	-.065	1	0	1	0	1
31		J	max	1.268	17	0	1	0	1
32			min	-.065	1	0	1	0	1
33	M10	I	max	.094	16	0	1	0	1
34			min	-1.835	17	0	1	0	1
35		J	max	.094	16	0	1	0	1
36			min	-1.835	17	0	1	0	1
37	M11	I	max	1.28	17	0	1	0	1
38			min	-.065	1	0	1	0	1
39		J	max	1.28	17	0	1	0	1
40			min	-.065	1	0	1	0	1

Envelope Member End Reactions (Continued)

	Member	Membe...		Axial[k]	LC	Shear[k]	LC	Moment[k-ft]	LC
41	M12	I	max	.094	16	0	1	0	1
42			min	-1.829	17	0	1	0	1
43		J	max	.094	16	0	1	0	1
44			min	-1.829	17	0	1	0	1
45	M13	I	max	1.242	17	0	1	0	1
46			min	-.065	1	0	1	0	1
47		J	max	1.242	17	0	1	0	1
48			min	-.065	1	0	1	0	1
49	M14	I	max	.094	16	0	1	0	1
50			min	-1.918	17	0	1	0	1
51		J	max	.094	16	0	1	0	1
52			min	-1.918	17	0	1	0	1
53	M15	I	max	1.434	17	0	1	0	1
54			min	-.066	1	0	1	0	1
55		J	max	1.434	17	0	1	0	1
56			min	-.066	1	0	1	0	1
57	M16	I	max	.096	16	0	1	0	1
58			min	-1.967	17	0	1	0	1
59		J	max	.096	16	0	1	0	1
60			min	-1.967	17	0	1	0	1
61	M17	I	max	.198	16	0	18	0	1
62			min	-5.997	17	-.071	9	0	1
63		J	max	2.598	9	-.003	18	0	1
64			min	.368	18	-.024	9	0	1
65	M18	I	max	8.303	9	.009	9	0	1
66			min	.166	18	0	18	0	1
67		J	max	-.078	18	-.002	18	0	1
68			min	-.251	9	-.007	9	0	1
69	M19	I	max	-.058	18	0	1	0	1
70			min	-2.076	9	0	1	0	1
71		J	max	-.058	18	0	1	0	1
72			min	-2.076	9	0	1	0	1
73	M20	I	max	1.509	9	0	1	0	1
74			min	.04	18	0	1	0	1
75		J	max	1.509	9	0	1	0	1
76			min	.04	18	0	1	0	1
77	M21	I	max	-.056	18	0	1	0	1
78			min	-2.029	9	0	1	0	1
79		J	max	-.056	18	0	1	0	1
80			min	-2.029	9	0	1	0	1
81	M22	I	max	1.319	9	0	1	0	1
82			min	.039	18	0	1	0	1
83		J	max	1.319	9	0	1	0	1
84			min	.039	18	0	1	0	1
85	M23	I	max	-.056	18	0	1	0	1
86			min	-1.94	9	0	1	0	1
87		J	max	-.056	18	0	1	0	1
88			min	-1.94	9	0	1	0	1
89	M24	I	max	1.357	9	0	1	0	1
90			min	.039	18	0	1	0	1
91		J	max	1.357	9	0	1	0	1
92			min	.039	18	0	1	0	1

Envelope Member End Reactions (Continued)

	Member	Membe...		Axial[k]	LC	Shear[k]	LC	Moment[k-ft]	LC
93	M25	I	max	-.056	18	0	1	0	1
94			min	-1.946	9	0	1	0	1
95		J	max	-.056	18	0	1	0	1
96			min	-1.946	9	0	1	0	1
97	M26	I	max	1.345	9	0	1	0	1
98			min	.039	18	0	1	0	1
99		J	max	1.345	9	0	1	0	1
100			min	.039	18	0	1	0	1
101	M27	I	max	-.057	18	0	1	0	1
102			min	-1.95	9	0	1	0	1
103		J	max	-.057	18	0	1	0	1
104			min	-1.95	9	0	1	0	1
105	M28	I	max	1.352	9	0	1	0	1
106			min	.039	18	0	1	0	1
107		J	max	1.352	9	0	1	0	1
108			min	.039	18	0	1	0	1
109	M29	I	max	-.055	18	0	1	0	1
110			min	-1.918	9	0	1	0	1
111		J	max	-.055	18	0	1	0	1
112			min	-1.918	9	0	1	0	1
113	M30	I	max	1.348	9	0	1	0	1
114			min	.041	18	0	1	0	1
115		J	max	1.348	9	0	1	0	1
116			min	.041	18	0	1	0	1
117	M31	I	max	-.064	18	0	1	0	1
118			min	-2.027	9	0	1	0	1
119		J	max	-.064	18	0	1	0	1
120			min	-2.027	9	0	1	0	1
121	M31A	I	max	2.656	17	1.395	17	0	1
122			min	-.004	1	-.211	1	0	1
123		J	max	1.4	9	1.714	9	0	1
124			min	.042	18	.125	18	0	1

Envelope Wood Code Checks

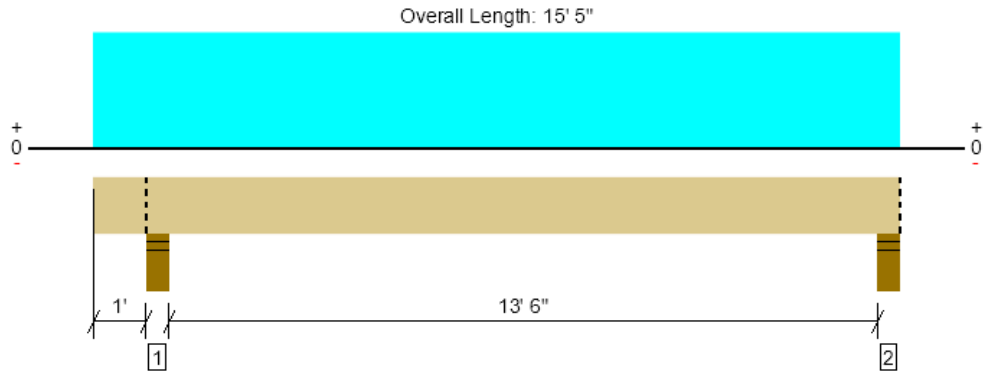
	Member	Shape	Code Check	Loc[...	LC	Shear...	Loc[...	LC	Fc' [k...	Ft' [ksi]	Fb' [k...	Fv' [k...	RB	CL	CP	Eqn
1	M1	4.5X5....	.415	1.896	17	.016	0	17	1.101	.756	1.194	.272	6.755	.995	.983	3.9-1
2	M2	4.5X5....	.289	0	9	.014	2.042	9	1.101	.756	1.194	.272	6.755	.995	.983	3.6.3
3	M4	2X6	.194	0	17	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
4	M5	2X6	.102	0	17	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
5	M6	2X6	.186	0	17	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
6	M7	2X6	.102	0	17	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
7	M8	2X6	.189	0	17	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
8	M9	2X6	.102	0	17	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
9	M10	2X6	.188	0	17	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
10	M11	2X6	.103	0	17	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
11	M12	2X6	.188	0	17	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
12	M13	2X6	.100	0	17	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
13	M14	2X6	.197	0	17	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
14	M15	2X6	.115	0	17	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
15	M16	2X6	.202	0	17	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1

Envelope Wood Code Checks (Continued)

	Member	Shape	Code Check	Loc[...]	LC	Shear...	Loc[...]	LC	Fc' [k...	Ft' [ksi]	Fb' [k...	Fv' [k...	RB	CL	CP	Eqn
16	M17	4.5X5....	.380	1.896	17	.016	0	9	1.101	.756	1.194	.272	6.755	.995	.983	3.9-1
17	M18	4.5X5....	.305	0	9	.014	2.042	9	1.101	.756	1.194	.272	6.755	.995	.983	3.6.3
18	M19	2X6	.213	0	9	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
19	M20	2X6	.121	0	9	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
20	M21	2X6	.208	0	9	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
21	M22	2X6	.106	0	9	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
22	M23	2X6	.199	0	9	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
23	M24	2X6	.109	0	9	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
24	M25	2X6	.200	0	9	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
25	M26	2X6	.108	0	9	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
26	M27	2X6	.200	0	9	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
27	M28	2X6	.109	0	9	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
28	M29	2X6	.197	0	9	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
29	M30	2X6	.108	0	9	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
30	M31	2X6	.208	0	9	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
31	M31A	4X12	.149	13.93	9	.162	14.0...	9	2.56	1.76	3.646	.424	11.97	.95	1	3.9-3

Roof, RB1

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)	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-lbs)	47194 @ 8' 2 1/4"	47157	Passed (100%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-lbs)	-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

- 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - DF	5.50"	5.50"	3.86"	1822	14471	16293	Blocking
2 - Stud wall - DF	5.50"	5.50"	3.40"	1599	12748	14347	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)	6" o/c	
Bottom Edge (Lu)	15' 5" 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 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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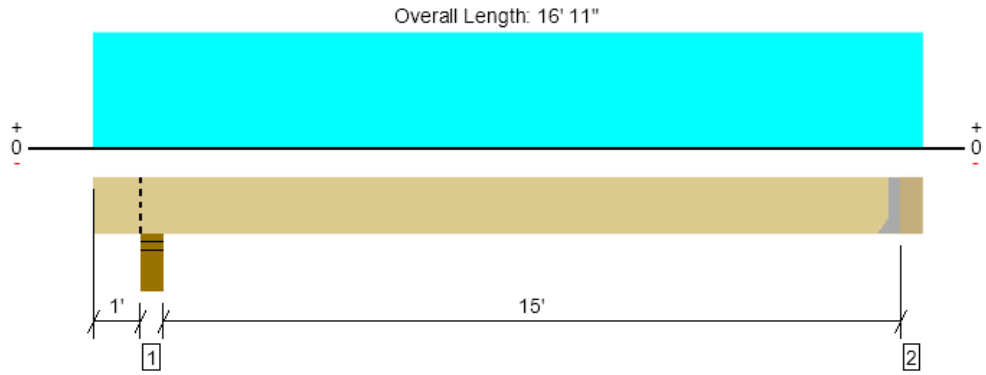
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, RB2

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)	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-lbs)	-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

- 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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.

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.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (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

ForteWEB Software Operator	Job Notes
Trevor Steelsmith01/23/24 Snake River Engineering (208) 453-6512 trevor@snakeriverengineering.com	

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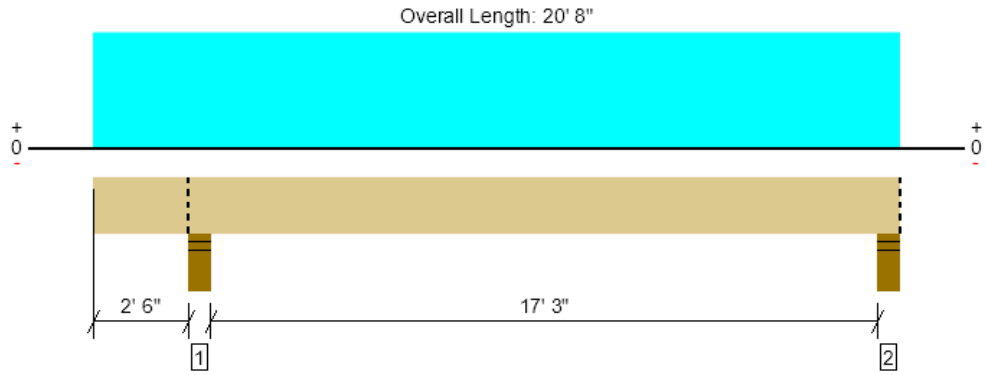
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, RB3

1 piece(s) 6 3/4" x 15" 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)	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-lbs)	49726 @ 11' 7 13/16"	56449	Passed (88%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-lbs)	-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

- 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (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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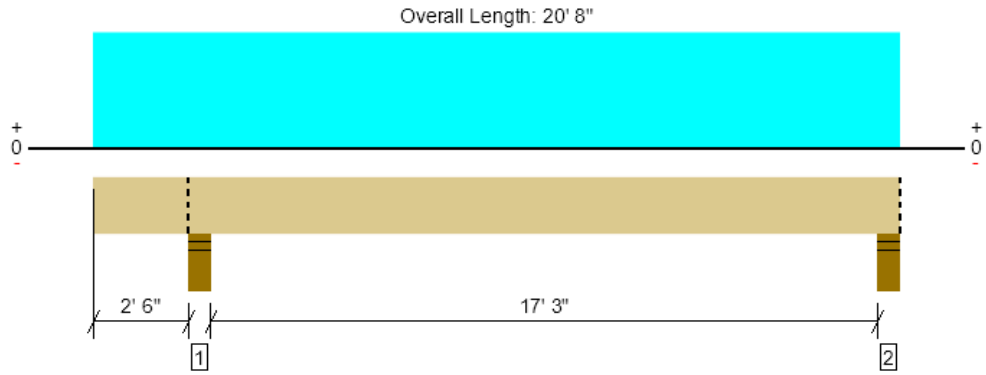
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, RB4

1 piece(s) 8 3/4" x 15" 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)	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-lbs)	66530 @ 11' 7 13/16"	71301	Passed (93%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-lbs)	-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

- 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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 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 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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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

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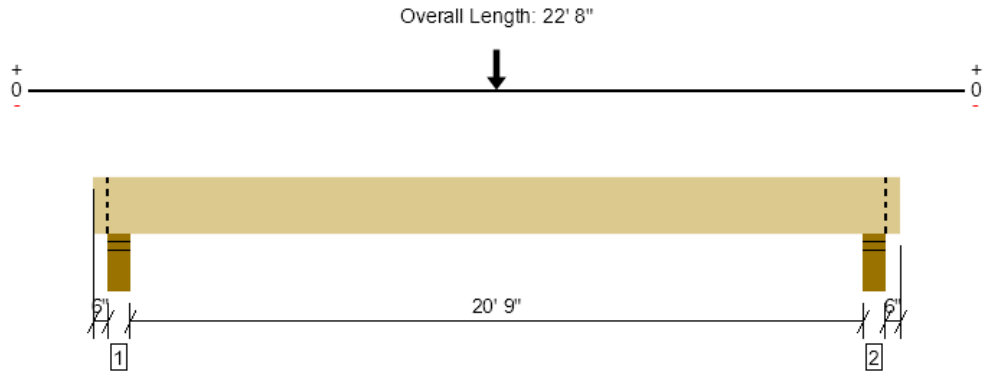
Roof, RB10

1 piece(s) 8 3/4" x 19 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)	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-lbs)	-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

- 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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.

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.

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

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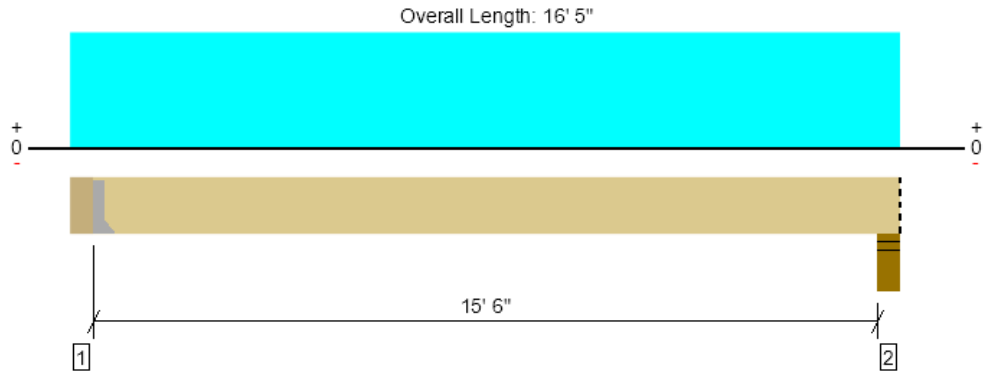
Roof, RB12

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-lbs)	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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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 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.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (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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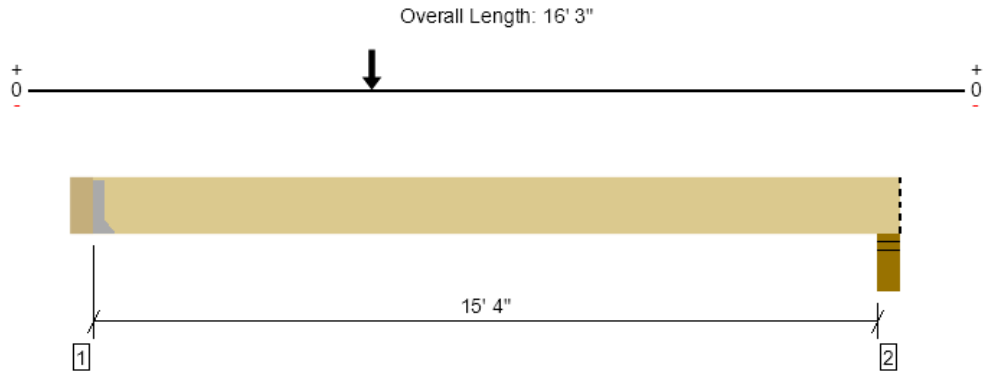
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

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-lbs)	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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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 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 (lb)	5' 9" (Front)	N/A	1175	8839	Linked from: RB12, Support 1

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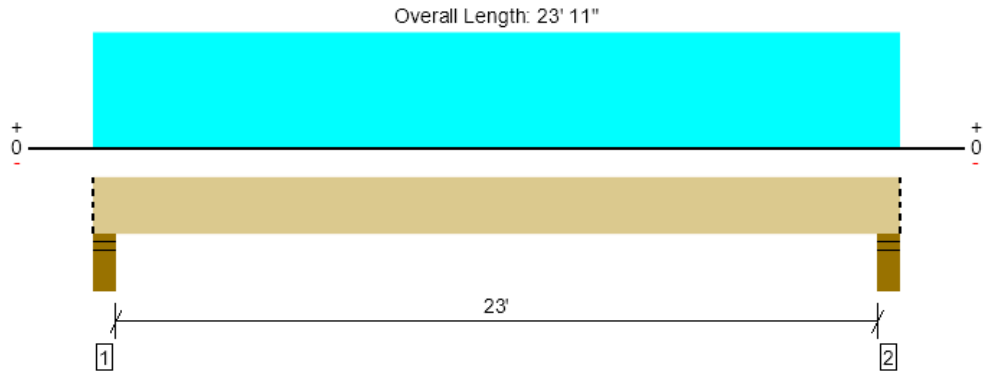
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Roof, RB6

1 piece(s) 8 3/4" x 22 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)	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-lbs)	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

- 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (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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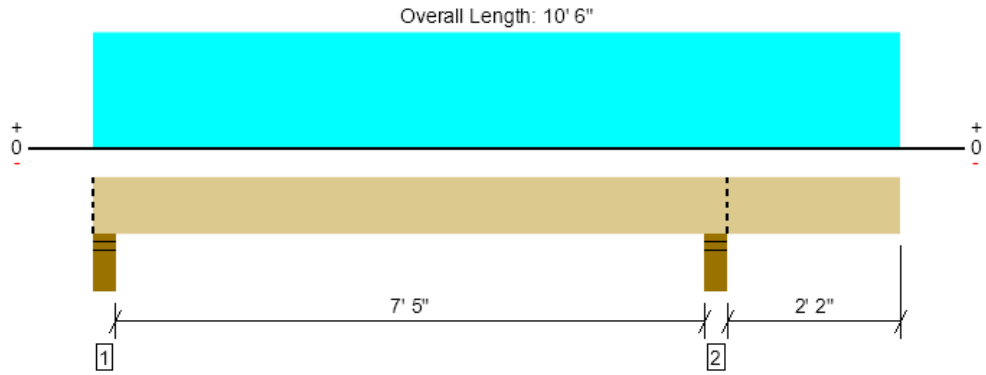
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, RB7

1 piece(s) 6 3/4" x 7 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)	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-lbs)	8804 @ 4' 3/16"	14555	Passed (60%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-lbs)	-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

- 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (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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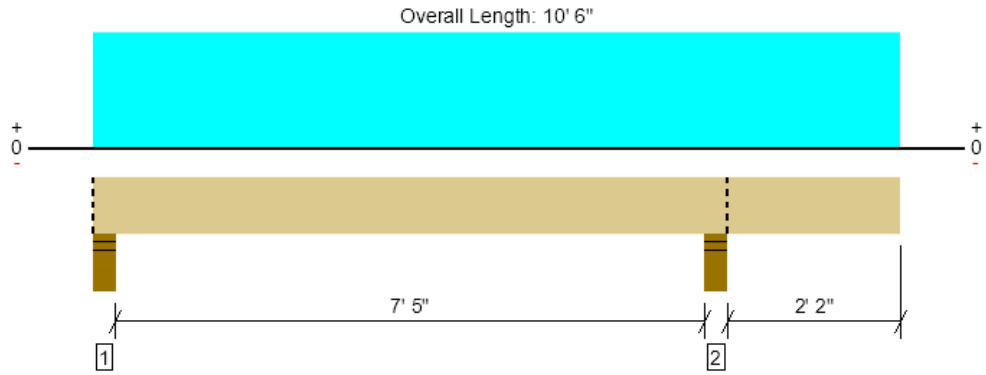
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, RB8

1 piece(s) 8 3/4" x 9" 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)	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-lbs)	-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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - DF	5.50"	5.50"	1.50"	753	6278	7031	Blocking
2 - Stud wall - DF	5.50"	5.50"	2.13"	1300	10350	11650	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.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (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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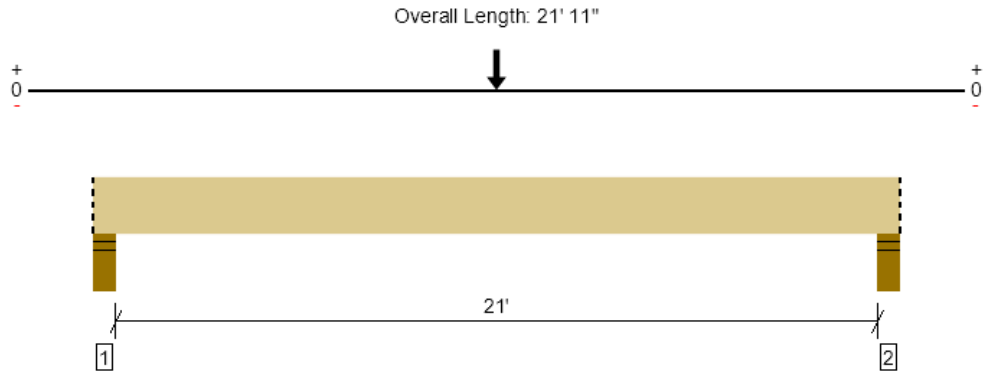
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, RB11

1 piece(s) 8 3/4" x 15" 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)	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-lbs)	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

- 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 0.93 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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.

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

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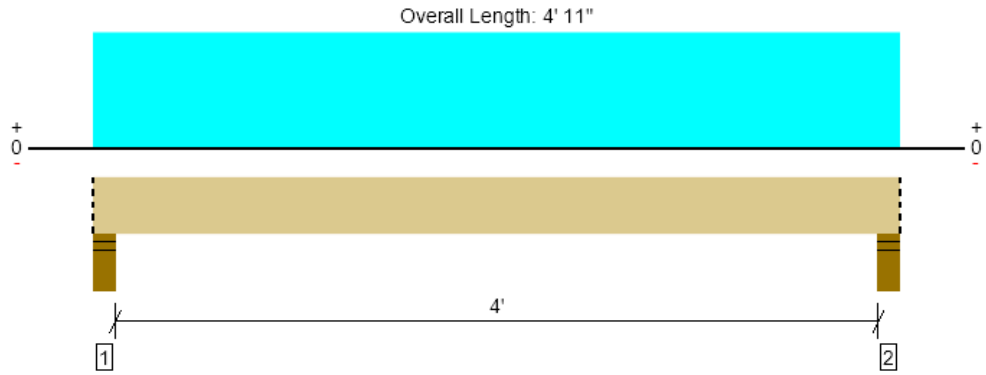
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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 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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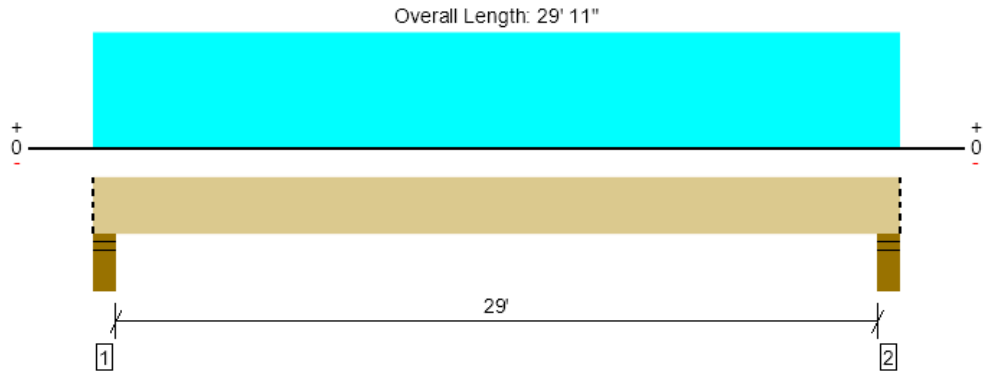
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, RB15

1 piece(s) 8 3/4" x 25 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)	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-lbs)	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

- 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (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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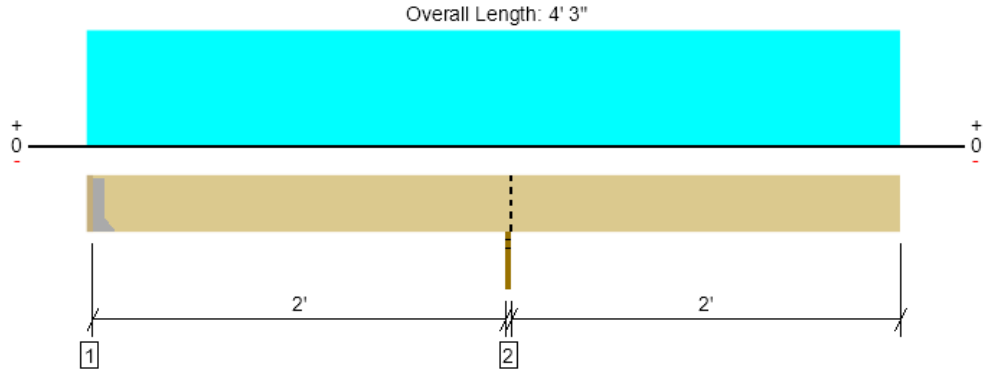
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Roof, OUTLOOKERS

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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 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	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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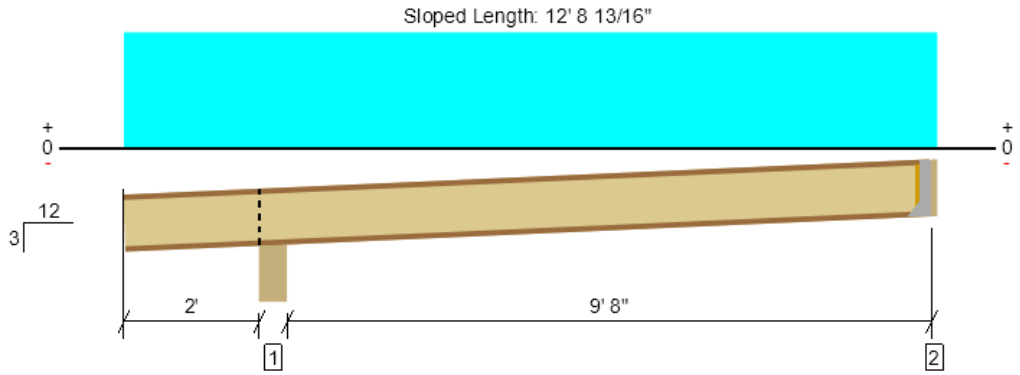
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Roof, RF1

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.

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)
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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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	

- 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

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

Vertical Load	Location	Spacing	Dead (0.90)	Snow (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

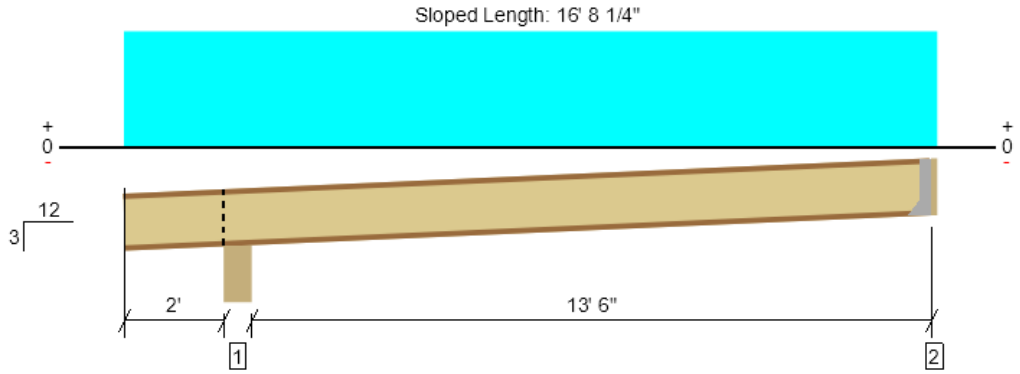
ForteWEB Software Operator	Job Notes
Trevor Steelsmith 01/23/24 Snake River Engineering (208) 453-6512 trevor@snakeriverengineering.com	

Weyerhaeuser

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.

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2274 @ 16' 3/4"	1731 (3.50")	Failed (131%)	1.15	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	2274 @ 16' 3/4"	1961	Failed (116%)	1.15	1.0 D + 1.0 S (Alt Spans)
Moment (Ft-lbs)	7715 @ 9' 3 5/16"	7107	Failed (109%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.725 @ 9' 2 7/16"	0.710	Passed (L/235)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.807 @ 9' 2 1/2"	0.947	Passed (L/211)	--	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).
- Upward deflection on left cantilever exceeds overhang deflection criteria.
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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	

- 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	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.

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

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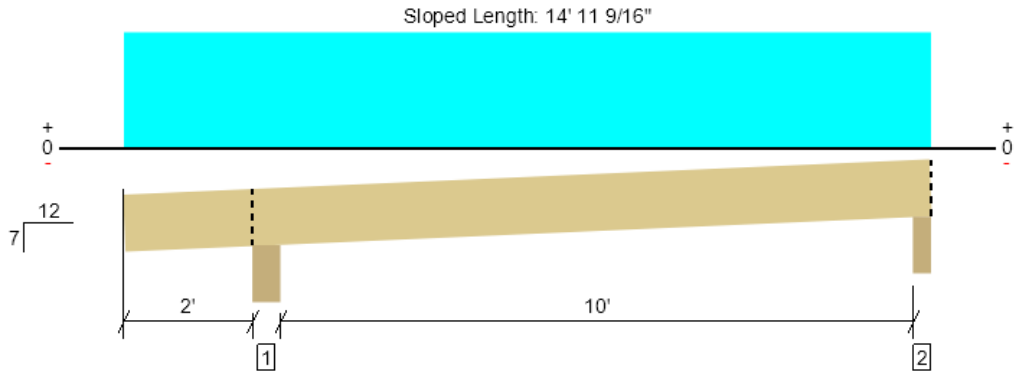
ForteWEB Software Operator	Job Notes
Trevor Steelsmith 01/23/24 Snake River Engineering (208) 453-6512 trevor@snakeriverengineering.com	

Weyerhaeuser

Roof, RF3

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



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

Member Length : 15' 6 1/8"

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

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)

- 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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.

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

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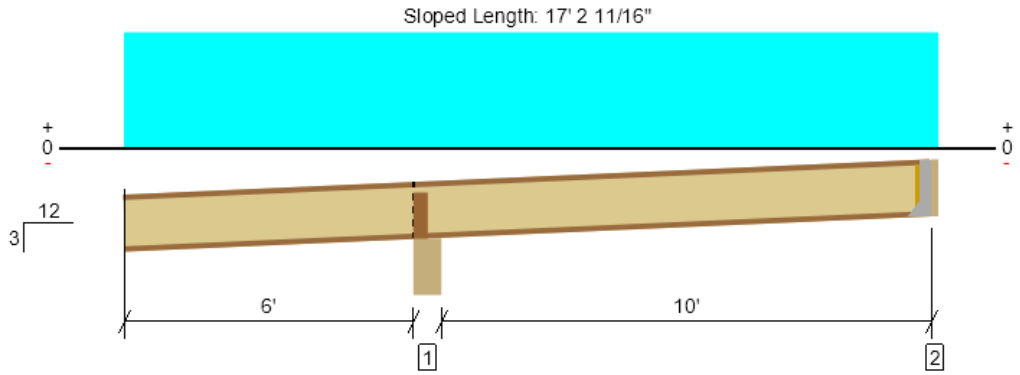
Roof, RF4

1 piece(s) 11 7/8" TJI® 560 @ 24" OC



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

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4470 @ 6' 3 3/8"	4659 (5.25")	Passed (96%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2010 @ 6'	2358	Passed (85%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-6609 @ 6' 3 3/8"	10925	Passed (60%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.504 @ 0	0.647	Passed (2L/308)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.549 @ 0	0.863	Passed (2L/284)	--	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).
- Left 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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]

- 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)	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.

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

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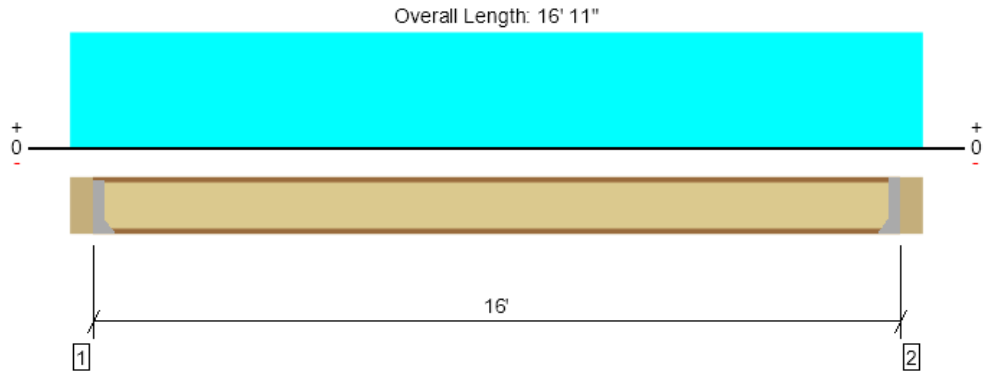
ForteWEB Software Operator	Job Notes
Trevor Steelsmith 01/23/24 Snake River Engineering (208) 453-6512 trevor@snakeriverengineering.com	

Weyerhaeuser

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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
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	

- 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	IUS2.06/11.88	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.

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

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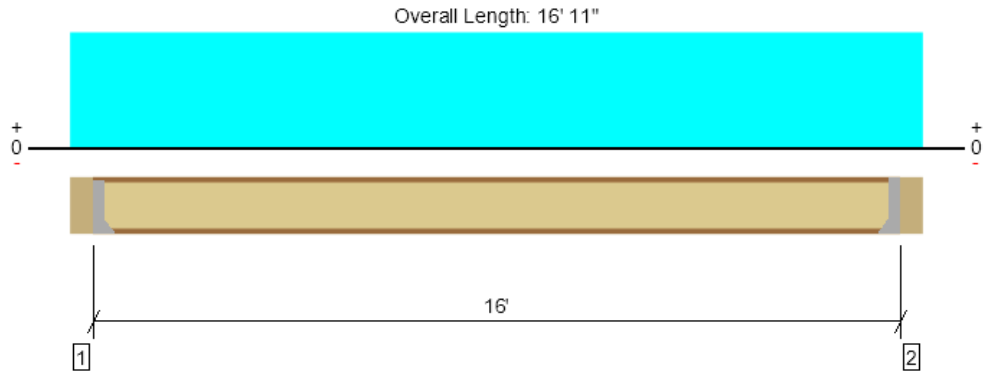
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
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	

- 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	
2 - 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.

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

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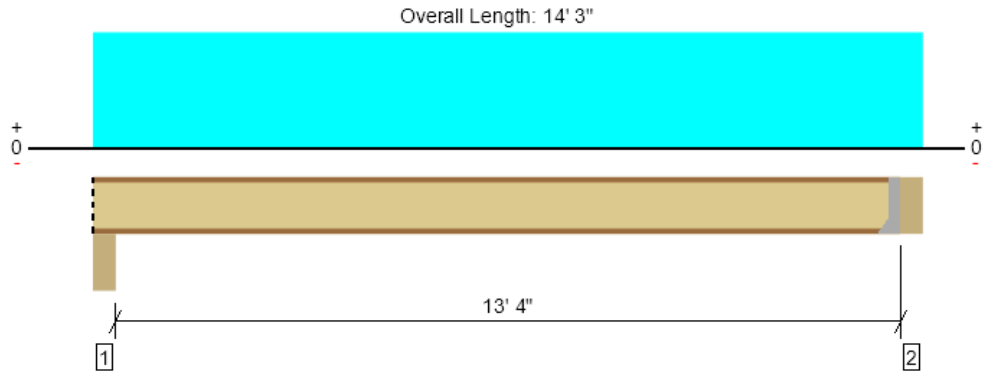
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 9" o/c	
Bottom Edge (Lu)	13' 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	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.

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

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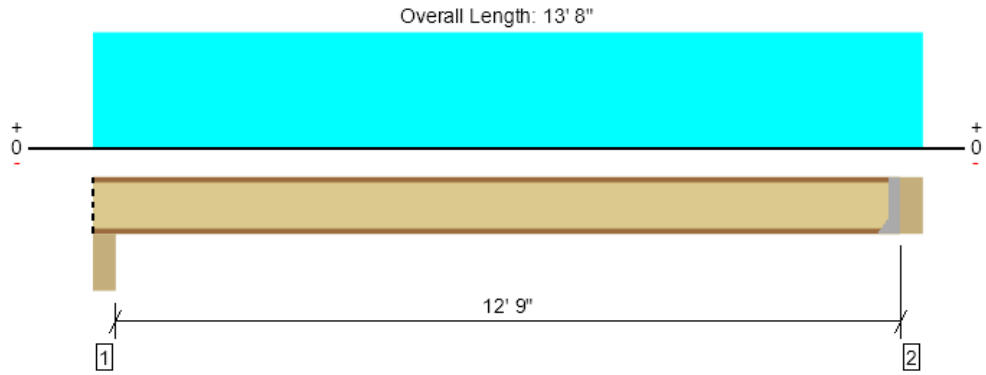
ForteWEB Software Operator	Job Notes
Trevor Steelsmith 01/23/24 Snake River Engineering (208) 453-6512 trevor@snakeriverengineering.com	

Weyerhaeuser

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 Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 10" o/c	
Bottom Edge (Lu)	13' 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
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.

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

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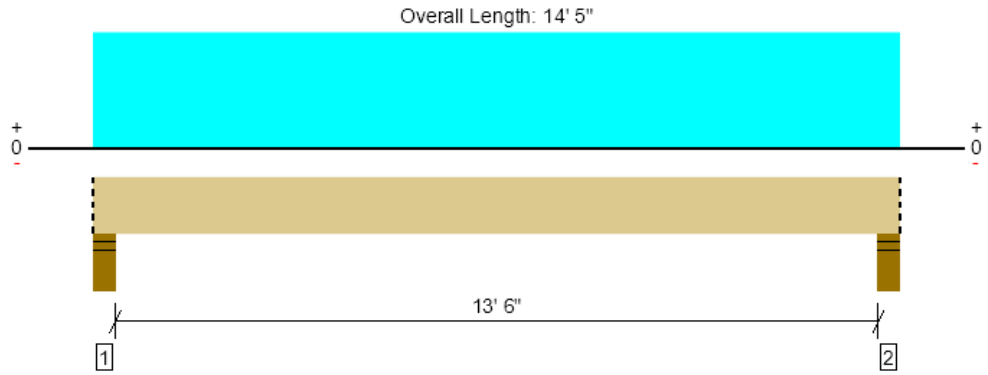
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Floor, FB16

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)	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-lbs)	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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (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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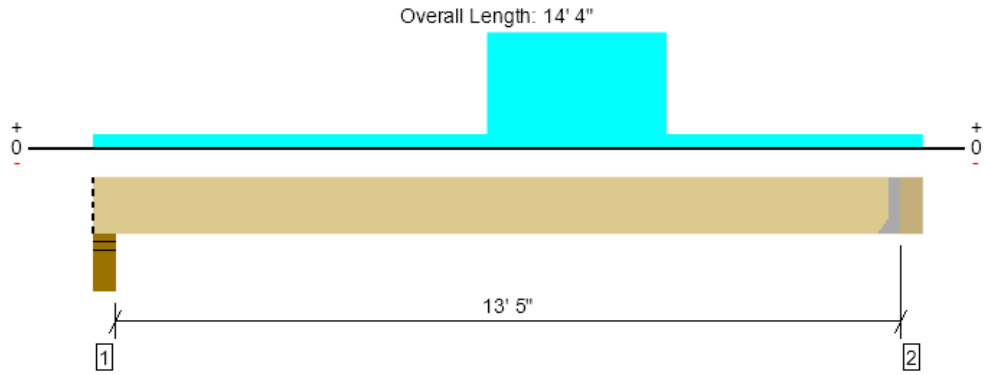
Floor, FBA

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-lbs)	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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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.

Connector: Simpson Strong-Tie						
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.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (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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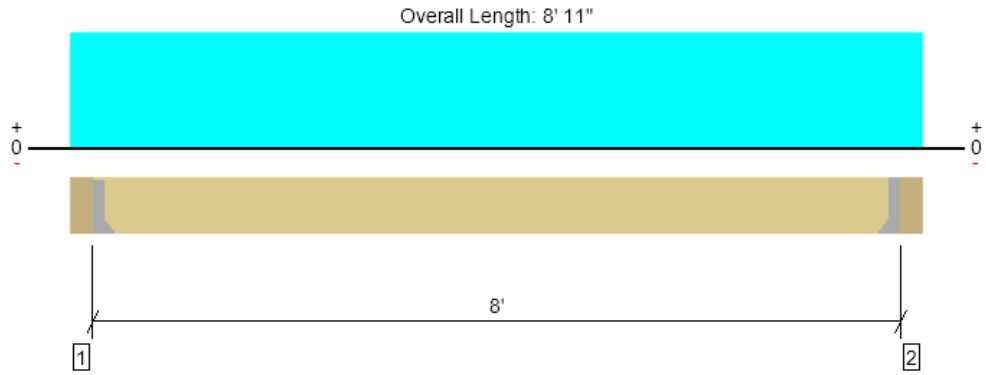
ForteWEB Software Operator	Job Notes
Trevor Steelsmith 01/23/24 Snake River Engineering (208) 453-6512 trevor@snakeriverengineering.com	

Weyerhaeuser

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

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
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 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	
2 - Face Mount Hanger	HHUS410	3.00"	N/A	30-10d	10-10d	

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

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

Weyerhaeuser Notes

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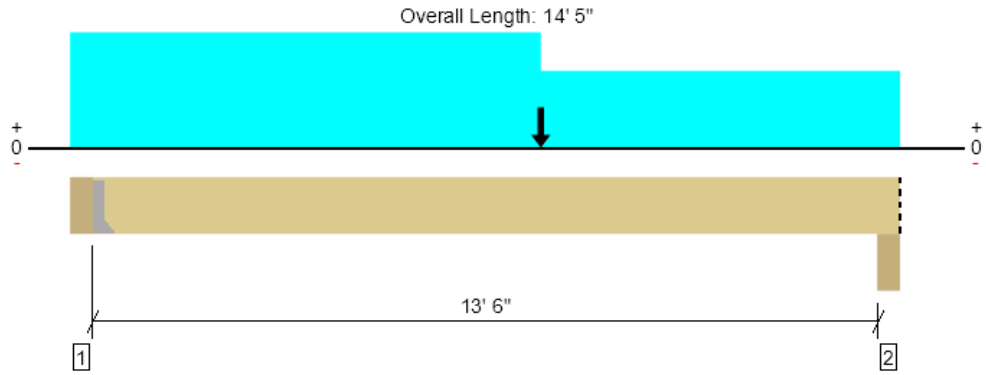
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Floor, FB18

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)	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.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
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.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (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 (lb)	8' (Front)	N/A	4287	736	920	Linked from: FB17, Support 1

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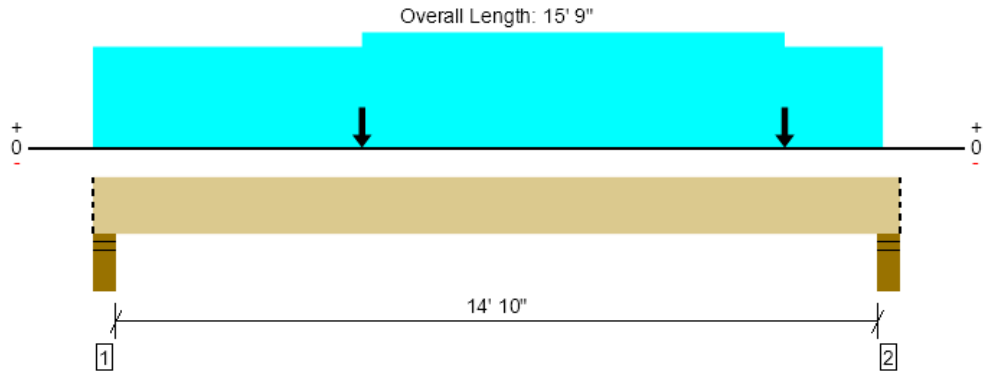
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Floor, FB20

1 piece(s) 5 1/8" x 15" 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)	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-lbs)	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.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - DF	5.50"	5.50"	3.23"	7100	981	3247	10347	Blocking
2 - Stud wall - DF	5.50"	5.50"	3.84"	9216	1469	2631	12291	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.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (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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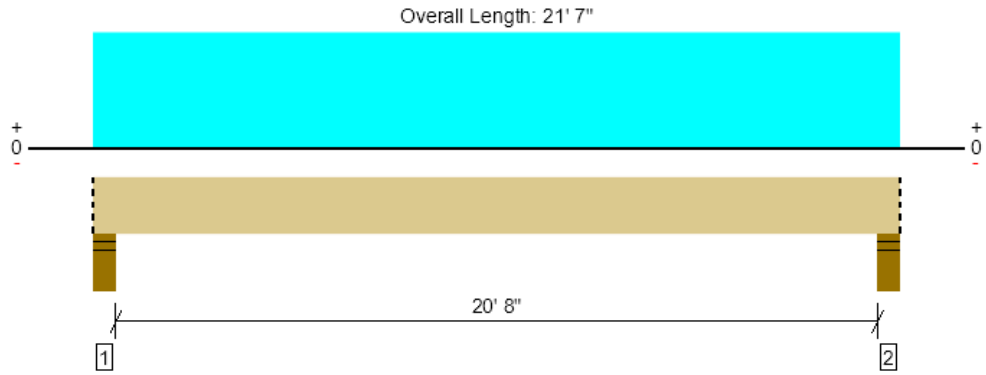
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Floor, FB21

1 piece(s) 5 1/8" x 19 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)	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-lbs)	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.

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (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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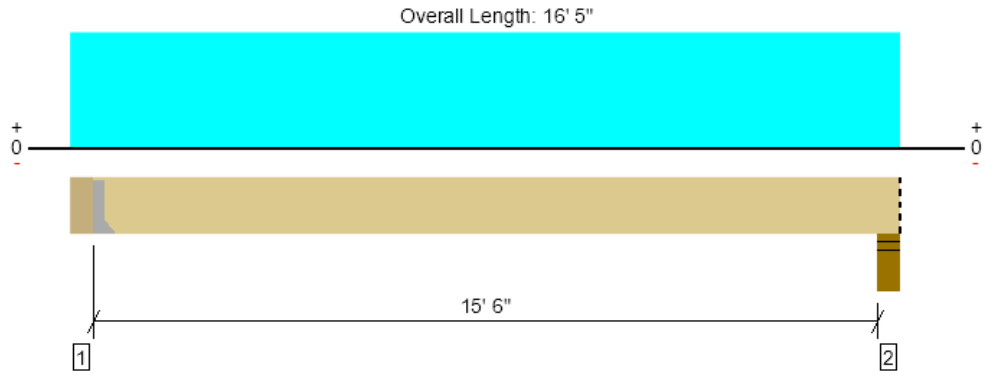
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

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-lbs)	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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (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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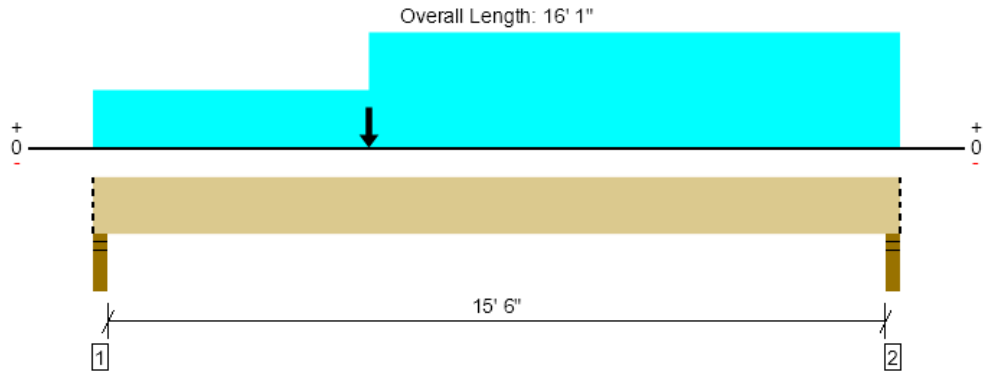
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Floor, FB23

1 piece(s) 5 1/8" x 13 1/2" 24F-V8 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)	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-lbs)	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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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 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.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (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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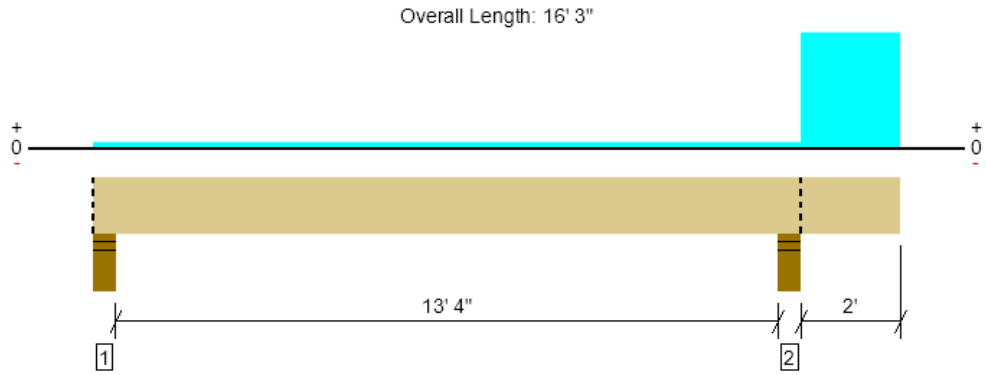
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Floor, FB27

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)	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.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
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.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	16' 3" o/c	
Bottom Edge (Lu)	16' 3" 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 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

Weyerhaeuser Notes

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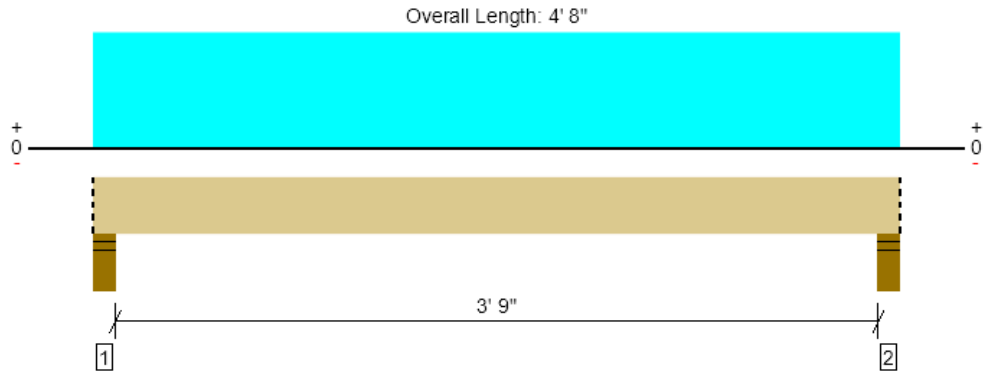
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Floor, FB25

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)	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-lbs)	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.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
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 loads applied directly above them and the full load is applied to the member being designed.

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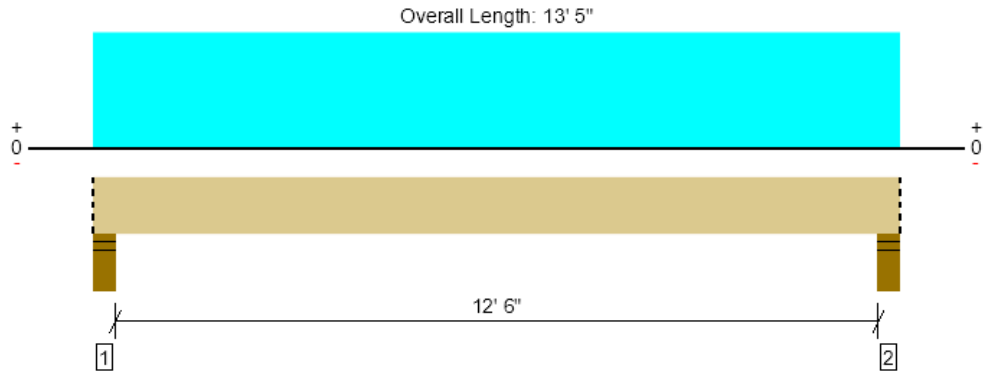
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Floor, FB26

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)	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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
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 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.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (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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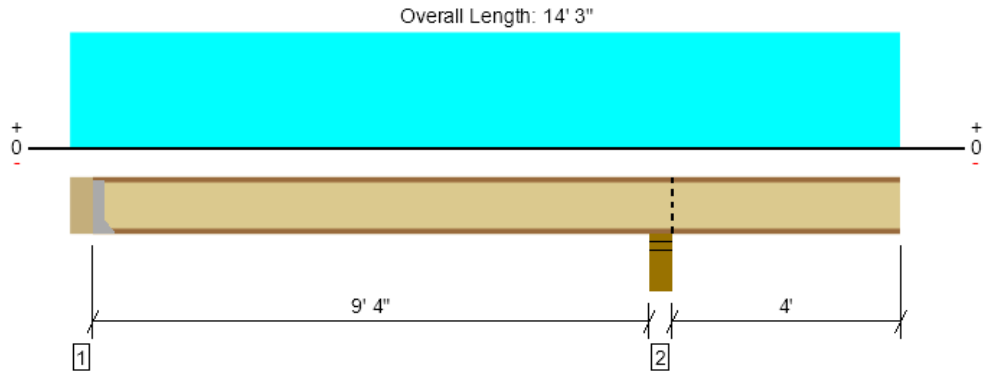
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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
- [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	

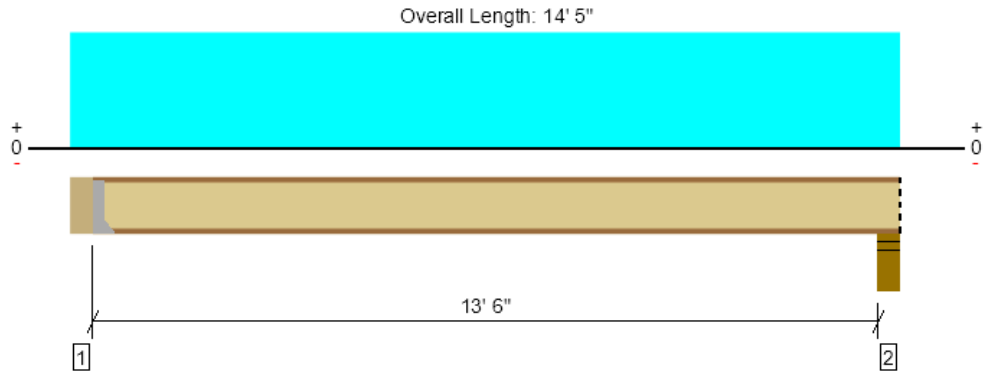
- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

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	

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

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

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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 3" 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	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.

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

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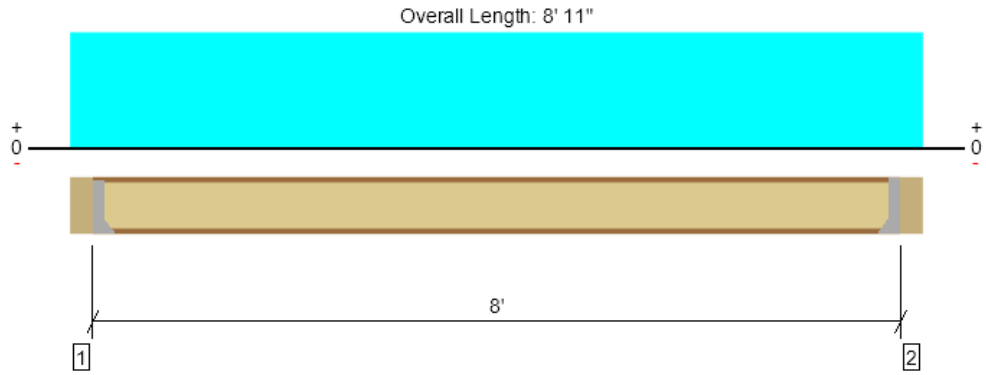
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
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	

- 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	Connector not found	N/A	N/A	N/A	N/A	
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.

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

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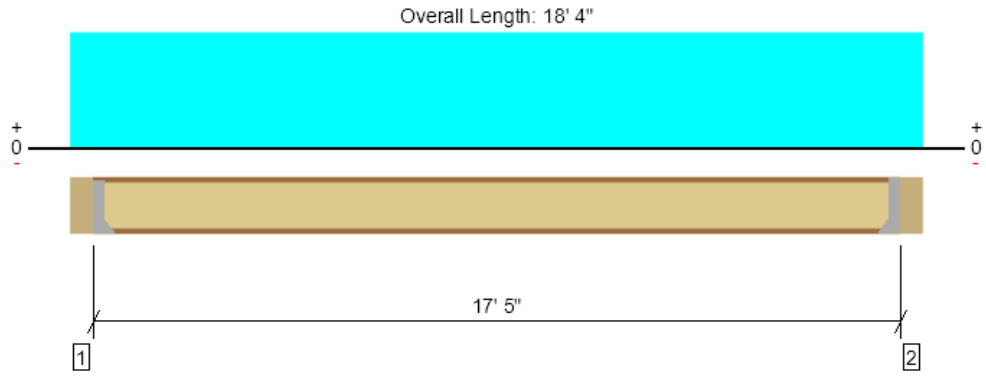
ForteWEB Software Operator	Job Notes
Trevor Steelsmith 01/23/24 Snake River Engineering (208) 453-6512 trevor@snakeriverengineering.com	

Weyerhaeuser

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.
- 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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	

- 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	
2 - 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.

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

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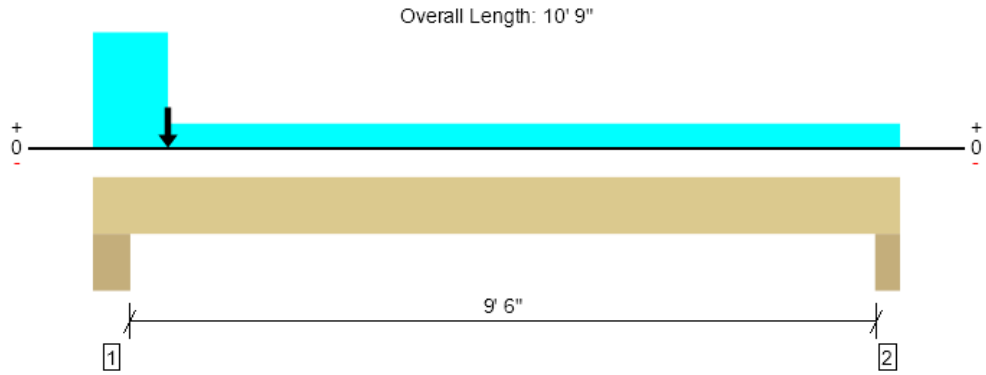
ForteWEB Software Operator	Job Notes
Trevor Steelsmith 01/23/24 Snake River Engineering (208) 453-6512 trevor@snakeriverengineering.com	

Weyerhaeuser

Floor, HDR1

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"	35438 (9.00")	Passed (89%)	--	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.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (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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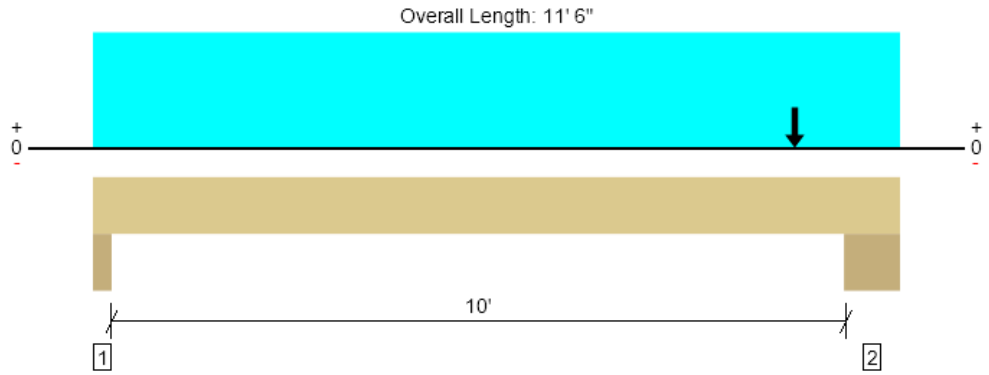
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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-lbs)	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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (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 (lb)	10'	N/A	2853	13822	Linked from: GRD2, Support 2

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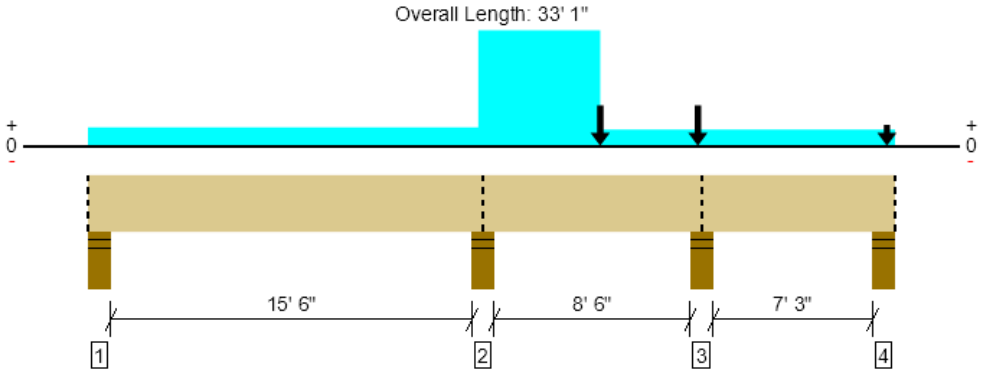
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Floor, FB24*

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.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
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	

•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 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 (lb)	21' (Front)	N/A	926	-	8173	Default Load
6 - Point (lb)	25' (Front)	N/A	926	-	8173	Default Load
7 - Point (lb)	32' 9" (Front)	N/A	1389	-	-	

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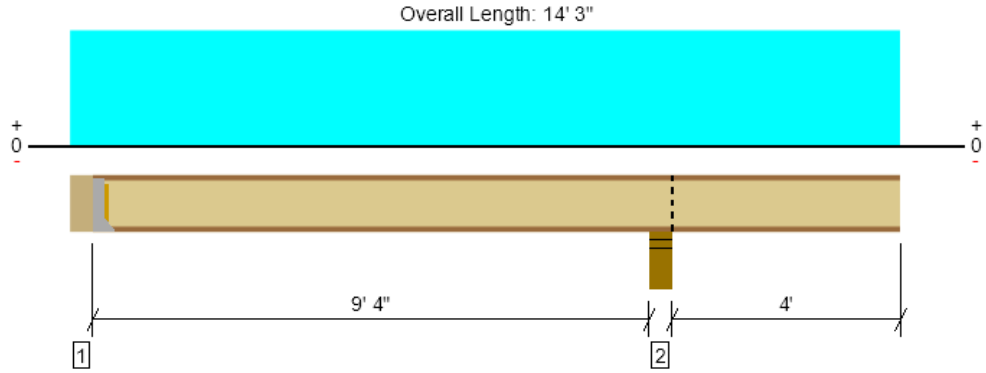
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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
- [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	

- 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	HU2.1/9	2.50"	N/A	14-10dx1.5	6-10dx1.5	Web Stiffeners

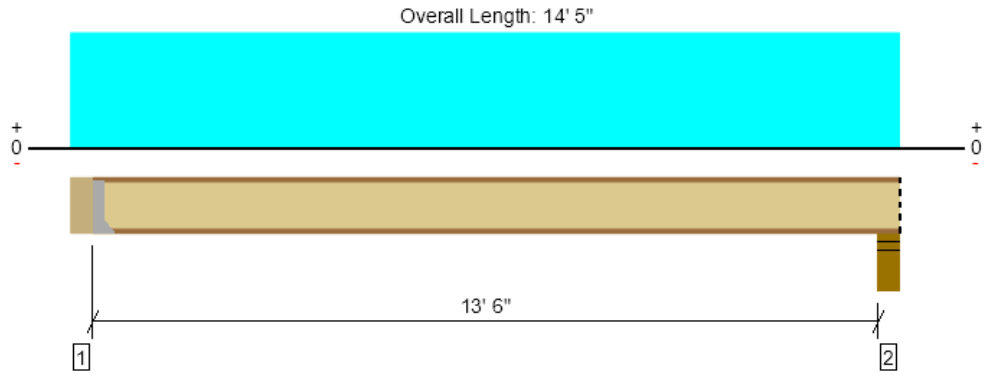
- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

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

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

Weyerhaeuser

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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
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	Model	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.

Vertical Load	Location	Spacing	Dead (0.90)	Snow (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
Trevor Steelsmith 01/23/24 Snake River Engineering (208) 453-6512 trevor@snakeriverengineering.com	

Weyerhaeuser

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, 0.75in
Repetitive 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

Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	3	7	9	3.33		
							2,679.9 plf
Dead Load	-	*51.0*	84.0	405.0	59.9	*599.9 plf*	
Live / Snow Load	0	*450.0*	280.0	1350.0	-	*2,080.0 plf*	

Description:	*3.0 ft Opening*	*3.8 ft Opening*						
Header Callout	(2)2x12 DF-L No. 2	(2)9-1/2" LVL 2.0E						
Trimmers	(2) 2x6 DF-L No. 2	(2) 2x6 DF-L No. 2						
King Studs	(1) 2x6 DF-L No. 2	(1) 2x6 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*						
Reaction								
Dead Load	900 lbs	1,125 lbs						
Live Load	3,120 lbs	3,900 lbs						
Load								
l_u	*3.0 ft*	*3.8 ft*						
l_e	*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						
E	1,600,000 psi	2,000,000 psi						
Emin	580,000 psi	1,016,535 psi						
Calculated Prop.								
A	33.75 in^2	33.25 in^2						
I	355.96 in^4	250.07 in^4						
S	63.28 in^3	52.65 in^3						
RB	9.63	8.48						
Emin'	580,000 psi	1,016,535 psi						
FbE	7,508 psi	16,968 psi						
Fb*	1,035 psi	3,669 psi						
CL	1	1						
Shear and Moment								
M	36,179 lb-in	56,530 lb-in						
V	4,020 lbs	5,025 lbs						
Stress								
fb	572 psi	1,074 psi						
Fb'	1,027 psi	3,619 psi						
fb/Fb'	0.56	0.30						
fv	179 psi	227 psi						
Fv'	207 psi	328 psi						
fv/Fv'	0.86	0.69						
Max Ratio	0.86	0.69						
	Pass	Pass						
Deflection								
Δ_{TL}	0.01 in	0.02 in						
	L/4,198	L/1,887						
Δ_{LL}	0.01 in	0.02 in						
	L/5,409	L/2,432						
	Pass	Pass						

Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	3	8.5	5	3.33		
							1,977.9 plf
Dead Load	-	*51.0*	102.0	225.0	59.9	*437.9 plf*	
Live / Snow Load	0	*450.0*	340.0	750.0	-	*1,540.0 plf*	

Description:	*3.0 ft Opening*								
Header Callout	(3)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	*4.50 in*								
Depth	*5.50 in*								
Reaction									
Dead Load	657 lbs								
Live Load	2,310 lbs								
Load									
l_u	*3.0 ft*								
l_e	*6.2 ft*								
Adjustment Factors									
Cd	1.15								
CF	1.3								
Material Properties									
Fb	900 psi								
Fv	180 psi								
E	1,600,000 psi								
Emin	580,000 psi								
Calculated Prop.									
A	24.75 in^2								
I	62.39 in^4								
S	22.69 in^3								
RB	4.49								
Emin'	580,000 psi								
FbE	34,554 psi								
Fb*	1,346 psi								
CL	1								
Shear and Moment									
M	26,702 lb-in								
V	2,967 lbs								
Stress									
fb	1,177 psi								
Fb'	1,343 psi								
fb/Fb'	0.88								
fv	180 psi								
Fv'	207 psi								
fv/Fv'	0.87								
Max Ratio	0.88								
	Pass								
Deflection									
Δ_{TL}	0.04 in								
	L/997								
Δ_{LL}	0.03 in								
	L/1,280								
	Pass								

Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	3	7.5	0	3.33		*950.9 plf*
Dead Load	-	*51.0*	90.0	0.0	59.9	*200.9 plf*	
Live / Snow Load	0	*450.0*	300.0	0.0	-	*750.0 plf*	

Description:	*9.5 ft Opening*								
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 Design									
Species	*LVL*								
Grade	*2.0E*								
Width	*3.50 in*								
Depth	*9.50 in*								
Reaction									
Dead Load	954 lbs								
Live Load	3,563 lbs								
Load									
l_u	*9.5 ft*								
l_e	*17.9 ft*								
Adjustment Factors									
Cd	1.15								
CF	1.1								
Material Properties									
Fb	2,900 psi								
Fv	285 psi								
E	2,000,000 psi								
Emin	1,016,535 psi								
Calculated Prop.									
A	33.25 in^2								
I	250.07 in^4								
S	52.65 in^3								
RB	12.89								
Emin'	1,016,535 psi								
FbE	7,339 psi								
Fb*	3,669 psi								
CL	1								
Shear and Moment									
M	128,734 lb-in								
V	4,517 lbs								
Stress									
fb	2,445 psi								
Fb'	3,508 psi								
fb/Fb'	0.70								
fv	204 psi								
Fv'	328 psi								
fv/Fv'	0.62								
Max Ratio	0.70								
	Pass								
Deflection									
Δ_{TL}	0.35 in								
	L/327								
Δ_{LL}	0.27 in								
	L/415								
	Pass								

Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	6.25	0	0	3.33		*1,103.7 plf*
Dead Load	-	*106.3*	0.0	0.0	59.9	*166.2 plf*	
Live / Snow Load	0	*937.5*	0.0	0.0	-	*937.5 plf*	

Description:	*10.0 ft Opening*								
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*								
Grade	*2.0E*								
Width	*3.50 in*								
Depth	*11.88 in*								
Reaction									
Dead Load	831 lbs								
Live Load	4,688 lbs								
Load									
l_u	*10.0 ft*								
l_e	*19.3 ft*								
Adjustment Factors									
Cd	1.15								
CF	1								
Material Properties									
Fb	2,900 psi								
Fv	285 psi								
E	2,000,000 psi								
Emin	1,016,535 psi								
Calculated Prop.									
A	41.56 in^2								
I	488.41 in^4								
S	82.26 in^3								
RB	14.97								
Emin'	1,016,535 psi								
FbE	5,442 psi								
Fb*	3,335 psi								
CL	1								
Shear and Moment									
M	165,554 lb-in								
V	5,518 lbs								
Stress									
fb	2,013 psi								
Fb'	3,124 psi								
fb/Fb'	0.64								
fv	199 psi								
Fv'	328 psi								
fv/Fv'	0.61								
Max Ratio	0.64								
	Pass								
Deflection									
Δ_{TL}	0.25 in								
	L/472								
Δ_{LL}	0.22 in								
	L/556								
	Pass								

Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	12	0	0	3.33		
							2,063.9 plf
Dead Load	-	*204.0*	0.0	0.0	59.9	*263.9 plf*	
Live / Snow Load	0	*1800.0*	0.0	0.0	-	*1,800.0 plf*	

Description:	*2.5 ft Opening*							
Header Callout	(2)2x8 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	*7.25 in*							
Reaction								
Dead Load	330 lbs							
Live Load	2,250 lbs							
Load								
l_u	*2.5 ft*							
l_e	*5.2 ft*							
Adjustment Factors								
Cd	1.15							
CF	1.2							
Material Properties								
Fb	900 psi							
Fv	180 psi							
E	1,600,000 psi							
Emin	580,000 psi							
Calculated Prop.								
A	21.75 in^2							
I	95.27 in^4							
S	26.28 in^3							
RB	7.06							
Emin'	580,000 psi							
FbE	13,981 psi							
Fb*	1,242 psi							
CL	1							
Shear and Moment								
M	19,349 lb-in							
V	2,580 lbs							
Stress								
fb	736 psi							
Fb'	1,236 psi							
fb/Fb'	0.60							
fv	178 psi							
Fv'	207 psi							
fv/Fv'	0.86							
Max Ratio	0.86							
	Pass							
Deflection								
Δ_{TL}	0.01 in							
	L/2,521							
Δ_{LL}	0.01 in							
	L/2,891							
	Pass							

Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	10	0	0	3.33		*1,729.9 plf*
Dead Load	-	*170.0*	0.0	0.0	59.9	*229.9 plf*	
Live / Snow Load	0	*1500.0*	0.0	0.0	-	*1,500.0 plf*	

Description:	*6.3 ft Opening*							
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 Design								
Species	*LVL*							
Grade	*2.0E*							
Width	*3.50 in*							
Depth	*9.50 in*							
Reaction								
Dead Load	719 lbs							
Live Load	4,688 lbs							
Load								
l_u	*6.3 ft*							
l_e	*12.6 ft*							
Adjustment Factors								
Cd	1.15							
CF	1.1							
Material Properties								
Fb	2,900 psi							
Fv	285 psi							
E	2,000,000 psi							
Emin	1,016,535 psi							
Calculated Prop.								
A	33.25 in^2							
I	250.07 in^4							
S	52.65 in^3							
RB	10.81							
Emin'	1,016,535 psi							
FbE	10,434 psi							
Fb*	3,669 psi							
CL	1							
Shear and Moment								
M	101,364 lb-in							
V	5,406 lbs							
Stress								
fb	1,925 psi							
Fb'	3,575 psi							
fb/Fb'	0.54							
fv	244 psi							
Fv'	328 psi							
fv/Fv'	0.74							
Max Ratio	0.74							
	Pass							
Deflection								
Δ_{TL}	0.12 in							
	L/632							
Δ_{LL}	0.10 in							
	L/728							
	Pass							

Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	3	0	0	3.33		*560.9 plf*
Dead Load	-	*51.0*	0.0	0.0	59.9	*110.9 plf*	
Live / Snow Load	0	*450.0*	0.0	0.0	-	*450.0 plf*	

Description:	*9.5 ft Opening*	*6.3 ft Opening*	*12.0 ft Opening*					
Header Callout	(3)2x12 DF-L No. 2	(3)2x8 DF-L No. 2	(2)11-7/8" LVL 2.0E					
Trimmers	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(2) 2x6 DF-L No. 2					
King Studs	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(2) 2x6 DF-L No. 2					
Wood Design								
Species	*DF-L*	*DF-L*	*LVL*					
Grade	*No. 2*	*No. 2*	*2.0E*					
Width	*4.50 in*	*4.50 in*	*3.50 in*					
Depth	*11.25 in*	*7.25 in*	*11.88 in*					
Reaction								
Dead Load	527 lbs	347 lbs	666 lbs					
Live Load	2,138 lbs	1,406 lbs	2,700 lbs					
Load								
l_u	*9.5 ft*	*6.3 ft*	*12.0 ft*					
l_e	*18.3 ft*	*12.0 ft*	*22.5 ft*					
Adjustment Factors								
Cd	1.15	1.15	1.15					
CF	1	1.2	1					
Material Properties								
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.								
A	50.63 in^2	32.63 in^2	41.56 in^2					
I	533.94 in^4	142.90 in^4	488.41 in^4					
S	94.92 in^3	39.42 in^3	82.26 in^3					
RB	11.04	7.18	16.19					
Emin'	580,000 psi	580,000 psi	1,016,535 psi					
FbE	5,706 psi	13,500 psi	4,655 psi					
Fb*	1,035 psi	1,242 psi	3,335 psi					
CL	1	1	1					
Shear and Moment								
M	75,937 lb-in	32,868 lb-in	121,163 lb-in					
V	2,664 lbs	1,753 lbs	3,366 lbs					
Stress								
fb	800 psi	834 psi	1,473 psi					
Fb'	1,024 psi	1,236 psi	3,046 psi					
fb/Fb'	0.78	0.67	0.48					
fv	79 psi	81 psi	121 psi					
Fv'	207 psi	207 psi	328 psi					
fv/Fv'	0.38	0.39	0.37					
Max Ratio	0.78	0.67	0.48					
	Pass	Pass	Pass					
Deflection								
Δ_{TL}	0.12 in	0.08 in	0.27 in					
	L/947	L/890	L/537					
Δ_{LL}	0.10 in	0.07 in	0.21 in					
	L/1,181	L/1,110	L/670					
	Pass	Pass	Pass					

Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	20.165	0	0	5.33		*3,463.5 plf*
Dead Load	-	*342.8*	0.0	0.0	95.9	*438.7 plf*	
Live / Snow Load	0	*3024.8*	0.0	0.0	-	*3,024.8 plf*	

Description:	*2.5 ft Opening*							
Header Callout	(3)2x8 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	*4.50 in*							
Depth	*7.25 in*							
Reaction								
Dead Load	548 lbs							
Live Load	3,781 lbs							
Load								
l_u	*2.5 ft*							
l_e	*5.2 ft*							
Adjustment Factors								
Cd	1.15							
CF	1.2							
Material Properties								
Fb	900 psi							
Fv	180 psi							
E	1,600,000 psi							
Emin	580,000 psi							
Calculated Prop.								
A	32.63 in^2							
I	142.90 in^4							
S	39.42 in^3							
RB	4.70							
Emin'	580,000 psi							
FbE	31,456 psi							
Fb*	1,242 psi							
CL	1							
Shear and Moment								
M	32,470 lb-in							
V	4,329 lbs							
Stress								
fb	824 psi							
Fb'	1,239 psi							
fb/Fb'	0.66							
fv	199 psi							
Fv'	207 psi							
fv/Fv'	0.96							
Max Ratio	0.96							
	Pass							
Deflection								
Δ_{TL}	0.01 in							
	L/2,253							
Δ_{LL}	0.01 in							
	L/2,580							
	Pass							

Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	22.5	0	0	5.33		*3,853.4 plf*
Dead Load	-	*382.5*	0.0	0.0	95.9	*478.4 plf*	
Live / Snow Load	0	*3375.0*	0.0	0.0	-	*3,375.0 plf*	

Description:	*12.8 ft Opening*	*3.0 ft Opening*						
Header Callout	5.25x24 DF/DF 24F - V4	(3)9-1/2" LVL 2.0E						
Trimmers	(5) 2x6 DF-L No. 2	(2) 2x6 DF-L No. 2						
King Studs	(2) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2						
Wood Design								
Species	*DF/DF*	*LVL*						
Grade	*24F - V4*	*2.0E*						
Width	*5.25 in*	*5.25 in*						
Depth	*24.00 in*	*9.50 in*						
Reaction								
Dead Load	3,050 lbs	718 lbs						
Live Load	21,516 lbs	5,063 lbs						
Load								
l_u	*12.8 ft*	*3.0 ft*						
l_e	*26.3 ft*	*6.2 ft*						
Adjustment Factors								
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.								
A	126.00 in^2	49.88 in^2						
I	6,048.00 in^4	375.10 in^4						
S	504.00 in^3	78.97 in^3						
RB	16.57	5.06						
Emin'	950,000 psi	1,016,535 psi						
FbE	4,154 psi	47,723 psi						
Fb*	2,760 psi	3,669 psi						
CL	1	1						
Shear and Moment								
M	939,637 lb-in	52,021 lb-in						
V	24,566 lbs	5,780 lbs						
Stress								
fb	1,864 psi	659 psi						
Fb'	2,556 psi	3,653 psi						
fb/Fb'	0.73	0.18						
fv	292 psi	174 psi						
Fv'	305 psi	328 psi						
fv/Fv'	0.96	0.53						
Max Ratio	0.96	0.53						
	Pass	Pass						
Deflection								
Δ_{TL}	0.20 in	0.01 in						
	L/747	L/3,846						
Δ_{LL}	0.18 in	0.01 in						
	L/853	L/4,391						
	Pass	Pass						

Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	13	0	0	5.33		
							2,266.9 plf
Dead Load	-	*221.0*	0.0	0.0	95.9	*316.9 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	*3.00 in*								
Depth	*9.25 in*								
Reaction									
Dead Load	475 lbs								
Live Load	2,925 lbs								
Load									
l_u	*3.0 ft*								
l_e	*6.2 ft*								
Adjustment Factors									
Cd	1.15								
CF	1.1								
Material Properties									
Fb	900 psi								
Fv	180 psi								
E	1,600,000 psi								
Emin	580,000 psi								
Calculated Prop.									
A	27.75 in^2								
I	197.86 in^4								
S	42.78 in^3								
RB	8.73								
Emin'	580,000 psi								
FbE	9,131 psi								
Fb*	1,139 psi								
CL	1								
Shear and Moment									
M	30,604 lb-in								
V	3,400 lbs								
Stress									
fb	715 psi								
Fb'	1,131 psi								
fb/Fb'	0.63								
fv	184 psi								
Fv'	207 psi								
fv/Fv'	0.89								
Max Ratio	0.89								
	Pass								
Deflection									
Δ_{TL}	0.01 in								
	L/2,759								
Δ_{LL}	0.01 in								
	L/3,207								
	Pass								

Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	16.665	0	0	5.33		*2,879.0 plf*
Dead Load	-	*283.3*	0.0	0.0	95.9	*379.2 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" LVL 2.0E	(2)2x8 DF-L No. 2	(2)11-7/8" LVL 2.0E	(2)2x12 DF-L No. 2	5.25x13.5 DF/DF 24F - V4			
Trimmers	(3) 2x6 DF-L No. 2	(2) 2x6 DF-L No. 2	(3) 2x6 DF-L No. 2	(2) 2x6 DF-L No. 2	(3) 2x6 DF-L No. 2			
King Studs	(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 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	*3.50 in*	*3.00 in*	*3.50 in*	*3.00 in*	*5.25 in*			
Depth	*14.00 in*	*7.25 in*	*11.88 in*	*11.25 in*	*13.50 in*			
Reaction								
Dead Load	1,233 lbs	379 lbs	1,185 lbs	569 lbs	1,896 lbs			
Live Load	8,124 lbs	2,500 lbs	7,812 lbs	3,750 lbs	12,499 lbs			
Load								
l_u	*6.5 ft*	*2.0 ft*	*6.3 ft*	*3.0 ft*	*10.0 ft*			
l_e	*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	13.55	6.31	12.24	9.63	10.75			
Emin'	1,016,535 psi	580,000 psi	1,016,535 psi	580,000 psi	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	182,456 lb-in	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'	3,188 psi	1,237 psi	3,229 psi	1,027 psi	2,709 psi			
fb/Fb'	0.50	0.53	0.64	0.60	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	0.96	0.99	0.93	1.00			
	Pass	Pass	Pass	Pass	Pass			
Deflection								
Δ_{TL}	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			
Δ_{LL}	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 Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	21.5	0	0	3.33		*3,650.4 plf*
Dead Load	-	*365.5*	0.0	0.0	59.9	*425.4 plf*	
Live / Snow Load	0	*3225.0*	0.0	0.0	-	*3,225.0 plf*	

Description:	*9.5 ft Opening*								
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	*5.25 in*								
Depth	*16.50 in*								
Reaction									
Dead Load	2,021 lbs								
Live Load	15,319 lbs								
Load									
l_u	*9.5 ft*								
l_e	*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	11.86								
Emin'	950,000 psi								
FbE	8,109 psi								
Fb*	2,760 psi								
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'	0.77								
fv	300 psi								
Fv'	305 psi								
fv/Fv'	0.99								
Max Ratio	0.99								
	Pass								
Deflection									
Δ_{TL}	0.18 in								
	L/620								
Δ_{LL}	0.16 in								
	L/701								
	Pass								

Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	10.165	0	0	3.33		*1,757.5 plf*
Dead Load	-	*172.8*	0.0	0.0	59.9	*232.7 plf*	
Live / Snow Load	0	*1524.8*	0.0	0.0	-	*1,524.8 plf*	

Description:	*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*							
Reaction								
Dead Load	233 lbs							
Live Load	1,525 lbs							
Load								
l_u	*2.0 ft*							
l_e	*4.1 ft*							
Adjustment Factors								
Cd	1.15							
CF	1.3							
Material Properties								
Fb	900 psi							
Fv	180 psi							
E	1,600,000 psi							
Emin	580,000 psi							
Calculated Prop.								
A	16.50 in^2							
I	41.59 in^4							
S	15.13 in^3							
RB	5.50							
Emin'	580,000 psi							
FbE	23,036 psi							
Fb*	1,346 psi							
CL	1							
Shear and Moment								
M	10,545 lb-in							
V	1,757 lbs							
Stress								
fb	697 psi							
Fb'	1,341 psi							
fb/Fb'	0.52							
fv	160 psi							
Fv'	207 psi							
fv/Fv'	0.77							
Max Ratio	0.77							
	Pass							
Deflection								
Δ_{TL}	0.01 in							
	L/2,524							
Δ_{LL}	0.01 in							
	L/2,910							
	Pass							

Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	12.75	0	0	3.33		*2,189.2 plf*
Dead Load	-	*216.8*	0.0	0.0	59.9	*276.7 plf*	
Live / Snow Load	0	*1912.5*	0.0	0.0	-	*1,912.5 plf*	

Description:	*2.0 ft Opening*	*4.5 ft Opening*						
Header Callout	(2)2x6 DF-L No. 2	(2)9-1/2" LVL 2.0E						
Trimmers	(1) 2x6 DF-L No. 2	(2) 2x6 DF-L No. 2						
King Studs	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2						
Wood Design								
Species	*DF-L*	*LVL*						
Grade	*No. 2*	*2.0E*						
Width	*3.00 in*	*3.50 in*						
Depth	*5.50 in*	*9.50 in*						
Reaction								
Dead Load	277 lbs	623 lbs						
Live Load	1,913 lbs	4,303 lbs						
Load								
l_u	*2.0 ft*	*4.5 ft*						
l_e	*4.1 ft*	*9.3 ft*						
Adjustment Factors								
Cd	1.15	1.15						
CF	1.3	1.1						
Material Properties								
Fb	900 psi	2,900 psi						
Fv	180 psi	285 psi						
E	1,600,000 psi	2,000,000 psi						
Emin	580,000 psi	1,016,535 psi						
Calculated Prop.								
A	16.50 in^2	33.25 in^2						
I	41.59 in^4	250.07 in^4						
S	15.13 in^3	52.65 in^3						
RB	5.50	9.29						
Emin'	580,000 psi	1,016,535 psi						
FbE	23,036 psi	14,140 psi						
Fb*	1,346 psi	3,669 psi						
CL	1	1						
Shear and Moment								
M	13,135 lb-in	66,497 lb-in						
V	2,189 lbs	4,926 lbs						
Stress								
fb	868 psi	1,263 psi						
Fb'	1,341 psi	3,607 psi						
fb/Fb'	0.65	0.35						
fv	199 psi	222 psi						
Fv'	207 psi	328 psi						
fv/Fv'	0.96	0.68						
Max Ratio	0.96	0.68						
	Pass	Pass						
Deflection								
Δ_{TL}	0.01 in	0.04 in						
	L/2,027	L/1,337						
Δ_{LL}	0.01 in	0.04 in						
	L/2,320	L/1,531						
	Pass	Pass						

Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	2	0	0	3.33		*393.9 plf*
Dead Load	-	*34.0*	0.0	0.0	59.9	*93.9 plf*	
Live / Snow Load	0	*300.0*	0.0	0.0	-	*300.0 plf*	

Description:	*8.0 ft Opening*							
Header Callout	(2)2x10 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	*9.25 in*							
Reaction								
Dead Load	376 lbs							
Live Load	1,200 lbs							
Load								
l_u	*8.0 ft*							
l_e	*15.4 ft*							
Adjustment Factors								
Cd	1.15							
CF	1.1							
Material Properties								
Fb	900 psi							
Fv	180 psi							
E	1,600,000 psi							
Emin	580,000 psi							
Calculated Prop.								
A	27.75 in^2							
I	197.86 in^4							
S	42.78 in^3							
RB	13.76							
Emin'	580,000 psi							
FbE	3,676 psi							
Fb*	1,139 psi							
CL	1							
Shear and Moment								
M	37,818 lb-in							
V	1,576 lbs							
Stress								
fb	884 psi							
Fb'	1,114 psi							
fb/Fb'	0.79							
fv	85 psi							
Fv'	207 psi							
fv/Fv'	0.41							
Max Ratio	0.79							
	Pass							
Deflection								
Δ_{TL}	0.11 in							
	L/837							
Δ_{LL}	0.09 in							
	L/1,099							
	Pass							

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: 05 Beams.ec6

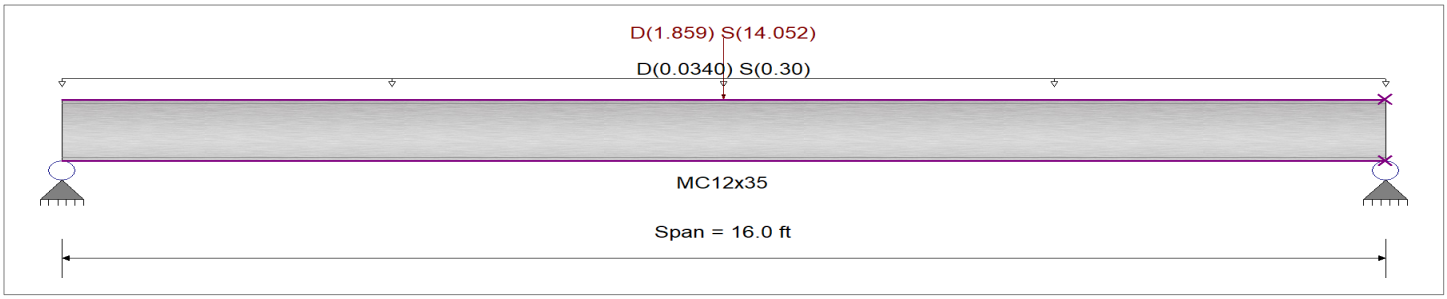
DESCRIPTION: STEEL HDR

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2018

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	36.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

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

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

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.972 : 1	Maximum Shear Stress Ratio =	0.151 : 1
Section used for this span	MC12x35	Section 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	Load Combination	+D+S
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.403 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 / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
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 Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.4634	8.046		0.0000	0.000

Vertical Reactions

Support notation : Far left is #' Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	10.908	10.908
Max Upward from Load Combinations	10.908	10.908
Max Upward from Load Cases	9.426	9.426
D Only	1.482	1.482
+D+S	10.908	10.908

Steel Beam

DESCRIPTION: STEEL HDR

Vertical Reactions

Support notation : Far left is #1 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

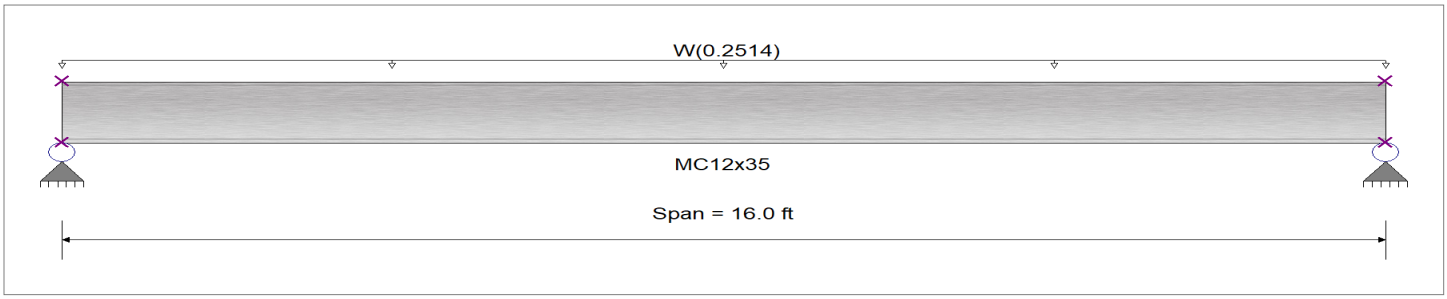
DESCRIPTION: STEEL HDR WIND

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2018

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	36.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Minor Axis Bending		



Applied Loads

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

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

DESIGN 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	+0.60W
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	1.016 in	Ratio =	188	>=180.	Span: 1 : W Only
Max Upward Transient Deflection	0 in	Ratio =	0	<180.0	n/a
Max Downward Total Deflection	0.611 in	Ratio =	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 / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mny	Mny/Omega	Cb	Rm	Summary of Shear Values Va Max	Vny	Vny/Omega
Dsgn. L = 16.00 ft +0.60W	1		0.000				22.27	13.34	1.00	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	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	1.00	0.91	114.00	68.27

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
W Only	1	1.0192	8.046		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	2.011	2.011
Max Upward from Load Combinations	1.207	1.207
Max Upward from Load Cases	2.011	2.011
+0.60W	1.207	1.207
+0.450W	0.905	0.905
W Only	2.011	2.011

Concrete Beam

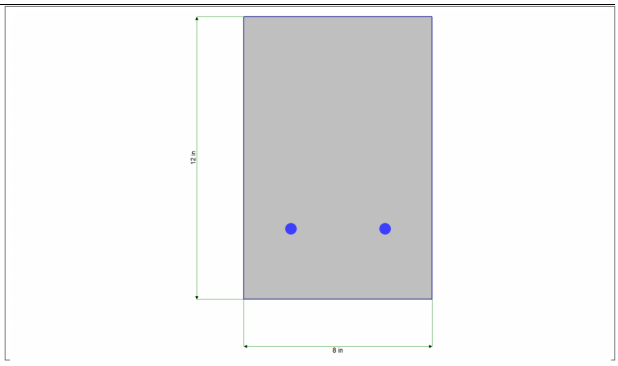
DESCRIPTION: LINTEL

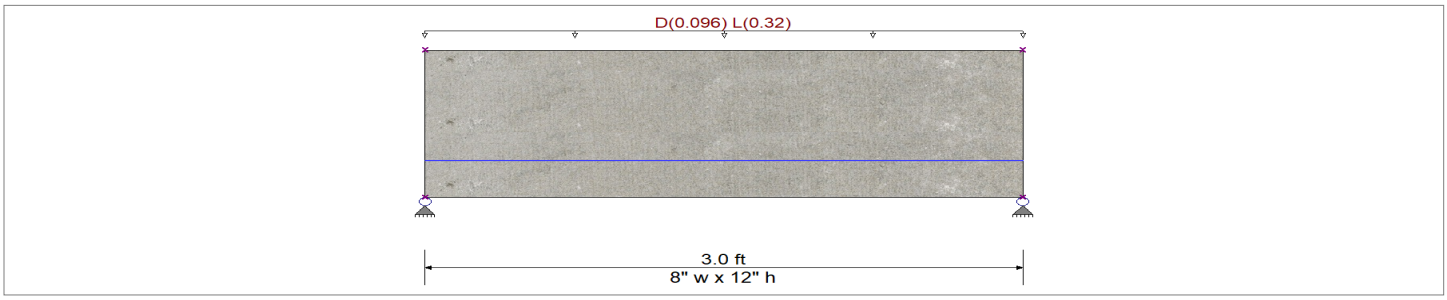
CODE REFERENCES

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

General Information

f'c	=	2.50 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c^1/2 *7.50	=	375.0 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β 1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		40.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		3
			Number of Resisting Legs Per Stirrup	=	2





Cross Section & Reinforcing Details

Rectangular Section, Width = 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

Maximum Bending Stress Ratio =	**0.056**	: 1
Section used for this span	**Typical Section**	
Mu : Applied	0.8361	k-ft
Mn * Phi : Allowable	14.929	k-ft
Location of maximum on span	1.503	ft
Span # where maximum occurs	Span # 1	

Maximum Deflection

Max Downward Transient 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 <180.0	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio =	0 <180.0	Span: 1 : +D+L

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	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
+0.60D	0.173	0.173

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

Project File: 05 Beams.ec6

DESCRIPTION: LINTEL

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
L Only	0.480	0.480

Shear Stirrup Requirements

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

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.20D+1.60L	1	0.00	9.00	1.11	1.11	0.00	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.03	9.00	1.09	1.09	0.04	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.07	9.00	1.07	1.07	0.07	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.10	9.00	1.04	1.04	0.11	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.13	9.00	1.02	1.02	0.14	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.16	9.00	0.99	0.99	0.17	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.20	9.00	0.97	0.97	0.20	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.23	9.00	0.94	0.94	0.24	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.26	9.00	0.92	0.92	0.27	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.30	9.00	0.90	0.90	0.30	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.33	9.00	0.87	0.87	0.33	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.36	9.00	0.85	0.85	0.35	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.39	9.00	0.82	0.82	0.38	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.43	9.00	0.80	0.80	0.41	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.46	9.00	0.77	0.77	0.43	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	0.49	9.00	0.75	0.75	0.46	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	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	5.70	Vu < Phi*Vc / 2	ot Reqd per	5.7	0.0
+1.20D+1.60L	1	0.72	9.00	0.58	0.58	0.61	0.71	5.66	Vu < Phi*Vc / 2	ot Reqd per	5.7	0.0
+1.20D+1.60L	1	0.75	9.00	0.55	0.55	0.63	0.66	5.63	Vu < Phi*Vc / 2	ot Reqd per	5.6	0.0
+1.20D+1.60L	1	0.79	9.00	0.53	0.53	0.65	0.61	5.59	Vu < Phi*Vc / 2	ot Reqd per	5.6	0.0
+1.20D+1.60L	1	0.82	9.00	0.51	0.51	0.66	0.57	5.56	Vu < Phi*Vc / 2	ot Reqd per	5.6	0.0
+1.20D+1.60L	1	0.85	9.00	0.48	0.48	0.68	0.53	5.53	Vu < Phi*Vc / 2	ot Reqd per	5.5	0.0
+1.20D+1.60L	1	0.89	9.00	0.46	0.46	0.70	0.49	5.50	Vu < Phi*Vc / 2	ot Reqd per	5.5	0.0
+1.20D+1.60L	1	0.92	9.00	0.43	0.43	0.71	0.46	5.47	Vu < Phi*Vc / 2	ot Reqd per	5.5	0.0
+1.20D+1.60L	1	0.95	9.00	0.41	0.41	0.72	0.42	5.45	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	0.98	9.00	0.38	0.38	0.74	0.39	5.42	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.02	9.00	0.36	0.36	0.75	0.36	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.05	9.00	0.34	0.34	0.76	0.33	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.08	9.00	0.31	0.31	0.77	0.30	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.11	9.00	0.29	0.29	0.78	0.27	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.15	9.00	0.26	0.26	0.79	0.25	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.18	9.00	0.24	0.24	0.80	0.22	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.21	9.00	0.21	0.21	0.81	0.20	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.25	9.00	0.19	0.19	0.81	0.17	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.28	9.00	0.16	0.16	0.82	0.15	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.31	9.00	0.14	0.14	0.82	0.13	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.34	9.00	0.12	0.12	0.83	0.10	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.38	9.00	0.09	0.09	0.83	0.08	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.41	9.00	0.07	0.07	0.83	0.06	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.44	9.00	0.04	0.04	0.83	0.04	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.48	9.00	0.02	0.02	0.84	0.02	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.51	9.00	-0.01	0.01	0.84	0.01	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.54	9.00	-0.03	0.03	0.84	0.03	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.57	9.00	-0.05	0.05	0.83	0.05	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.61	9.00	-0.08	0.08	0.83	0.07	5.40	Vu < Phi*Vc / 2	ot Reqd per	5.4	0.0
+1.20D+1.60L	1	1.64	9.00	-0.10	0.10	0.83	0.09	5.40	Vu < Phi*Vc / 2	ot Reqd per	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

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

Project File: 05 Beams.ec6

DESCRIPTION: LINTEL

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu Actual	(k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.20D+1.60L	1	1.70	9.00	-0.15	0.15	0.82	0.14	5.40	Vu < Phi*Vc / 2	ot Reqd per	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 per	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 per	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 per	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 per	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 per	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 per	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 per	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 per	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 per	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 per	5.4	0.0
+1.20D+1.60L	1	2.07	9.00	-0.42	0.42	0.72	0.44	5.46	Vu < Phi*Vc / 2	ot Reqd per	5.5	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 per	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 per	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 per	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 per	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 per	5.6	0.0
+1.20D+1.60L	1	2.26	9.00	-0.57	0.57	0.62	0.69	5.64	Vu < Phi*Vc / 2	ot Reqd per	5.6	0.0
+1.20D+1.60L	1	2.30	9.00	-0.59	0.59	0.60	0.74	5.68	Vu < Phi*Vc / 2	ot Reqd per	5.7	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 per	5.7	0.0
+1.20D+1.60L	1	2.36	9.00	-0.64	0.64	0.56	0.86	5.77	Vu < Phi*Vc / 2	ot Reqd per	5.8	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 per	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 per	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 per	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 per	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 per	5.9	0.0
+1.20D+1.60L	1	2.56	9.00	-0.79	0.79	0.42	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	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 per	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 per	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 per	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 per	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 per	5.9	0.0
+1.20D+1.60L	1	2.75	9.00	-0.93	0.93	0.25	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	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 per	5.9	0.0
+1.20D+1.60L	1	2.82	9.00	-0.98	0.98	0.19	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	2.85	9.00	-1.01	1.01	0.16	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	2.89	9.00	-1.03	1.03	0.12	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	2.92	9.00	-1.05	1.05	0.09	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	2.95	9.00	-1.08	1.08	0.05	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0
+1.20D+1.60L	1	2.98	9.00	-1.10	1.10	0.02	1.00	5.88	Vu < Phi*Vc / 2	ot Reqd per	5.9	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	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 Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft	Load Combination	Max. "+" Defl (in)	Location in Span (ft
+D+L	1	0.0003	1.500		0.0000	0.000

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

Load Duration Factor: *1.6* Max Deflection: *L/180*
Max 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* Weak Axis Braced: *Y*
Eccentricity: *0"*

	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 CALCULATIONS:

This spreadsheet is used for designing a stud wall according to the NDS.

Description:	**11' Tall Wall**	**11' Tall Wall**	**10' Tall Wall**	**King Stud (9.5' Max Opening)**	**King Stud (3.5' Max Opening)**	**King Stud (10' Max Opening)**
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*
Nominal width, t =	*(1) 2*	*(1) 2*	*(1) 2*	*(1) 2*	*(1) 2*	*(2) 2*
Actual width =	1.50 in	1.50 in	1.50 in	1.50 in	1.50 in	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	10.750 ft	10.750 ft	9.750 ft	9.750 ft	11.750 ft	12.750 ft
Stud spacing, s =	*16 in*	*8 in*	*16 in*	*67 in*	*31 in*	*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 =	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*
w =	6.7 plf	10.1 plf	20.1 plf	84.5 plf	39.3 plf	88.3 plf
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*
$C_{F,Fcprll}$	*1.10*	*1.10*	*1.10*	*1.10*	*1.10*	*1.10*
C_r	*1.15*	*1.15*	*1.15*	*1.00*	*1.00*	*1.00*
C_p	0.33	0.33	0.39	0.39	0.28	0.25
C_H	*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} = $(K_{cE} E')/(l_e/d)2$ =	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**
E' = E =	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**
F_{bE} =	**2207 psi**	**2207 psi**	**2434 psi**	**2434 psi**	**2019 psi**	**7444 psi**
Slenderness Ratio:	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**
R_B =	**18**	**18**	**17**	**17**	**19**	**10**
Bending:	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**
M = w L^2/8 + P e/12 =	96 ft-lbs	145 ft-lbs	239 ft-lbs	1005 ft-lbs	678 ft-lbs	1795 ft-lbs
f_b = M/S =	**153 psi**	**231 psi**	**379 psi**	**1594 psi**	**1076 psi**	**1424 psi**
S =	8 in^3	8 in^3	8 in^3	8 in^3	8 in^3	15 in^3
Shear:	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**
V = w L/2 =	36 lbs	54 lbs	98 lbs	412 lbs	231 lbs	96 lbs
f_v = 1.5 V/A =	**7 psi**	**10 psi**	**18 psi**	**75 psi**	**42 psi**	**9 psi**
A =	8 in^2	8 in^2	8 in^2	8 in^2	8 in^2	17 in^2
Compression:	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**
f_c = P/A =	**594 psi**	**313 psi**	**648 psi**	**6 psi**	**6 psi**	**3 psi**
Compression (perp.):	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**
$f_{c\,perp}$ = P/A =	**594 psi**	**313 psi**	**648 psi**	**6 psi**	**6 psi**	**3 psi**
Combined:	**≤ 1.0 OK**	**≤ 1.0 OK**	**≤ 1.0 OK**			
(fc/Fc)2 + {fb/[Fb(1-(fc/FcE))]} =	0.78	0.32	0.93			
Deflection:	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**
D = 22.5 w L^4/E' I =	**0.06 in**	**0.09 in**	**0.12 in**	**0.52 in**	**0.51 in**	**0.79 in**
I =	21 in^4	21 in^4	21 in^4	21 in^4	21 in^4	42 in^4
SPAN /	**2143**	**1420**	**952**	**226**	**278**	**194**

TALL WALL CALCULATIONS:

This spreadsheet is used for designing a stud wall according to the NDS.

Description:	**King Stud (12.75' Max Opening)**		**16' Tall Wall**	**13' Tall Wall**	**13' Tall Wall**	**12' Tall Wall**
Type:	*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*
Grade:	*No. 2*		*No. 2*	*No. 2*	*No. 2*	*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*		*6*	*6*	*6*	*6*
Actual depth =	5.50 in		5.50 in	5.50 in	5.50 in	5.50 in
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	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*
$C_{F,Fcprll}$	*1.10*		*1.10*	*1.10*	*1.10*	*1.10*
C_r	*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**
F^*_c = $F_c C_d C_F$ =	2376 psi		2376 psi	2376 psi	2376 psi	2376 psi
F_{cE} = $(K_{cE} E')/(l_e/d)2$ =	730 psi		406 psi	620 psi	620 psi	730 psi
F'_c = $F_c C_d C_F C_p$ =	**676 psi**		**391 psi**	**582 psi**	**582 psi**	**676 psi**
$F'_{c\,perp}$ = $F_{c\,perp} Cb$ =	**668 psi**		**668 psi**	**668 psi**	**668 psi**	**668 psi**
E' = E =	**1600000 psi**		**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**
F_{bE} =	**8077 psi**		**1506 psi**	**1861 psi**	**1861 psi**	**2019 psi**
Slenderness Ratio:	**≤ 50 OK**		**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**
R_B =	**9**		**21**	**19**	**19**	**19**
Bending:	**≤ F'b OK**		**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**
M = $w L^2/8 + P e/12$ =	1882 ft-lbs		312 ft-lbs	307 ft-lbs	409 ft-lbs	347 ft-lbs
f_b = M/S =	**1493 psi**		**495 psi**	**486 psi**	**649 psi**	**551 psi**
S =	15 in^3		8 in^3	8 in^3	8 in^3	8 in^3
Shear:	**≤ F'v OK**		**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**
V = w L/2 =	641 lbs		79 lbs	96 lbs	128 lbs	89 lbs
f_v = 1.5 V/A =	**58 psi**		**14 psi**	**17 psi**	**23 psi**	**16 psi**
A =	17 in^2		8 in^2	8 in^2	8 in^2	8 in^2
Compression:	**≤ F'c OK**		**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**
f_c = P/A =	**3 psi**		**148 psi**	**337 psi**	**261 psi**	**398 psi**
Compression (perp.):	**≤ F'c OK**		**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**
$f_{c\,perp}$ = P/A =	**3 psi**		**148 psi**	**337 psi**	**261 psi**	**398 psi**
Combined:			**≤ 1.0 OK**	**≤ 1.0 OK**	**≤ 1.0 OK**	**≤ 1.0 OK**
$(fc/Fc)2 + \{fb/[Fb(1-(fc/FcE)]\}$ =			0.51	0.83	0.72	0.91
Deflection:	**≥ 180 OK**		**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**
D = 22.5 w L^4/E' I =	**0.70 in**		**0.42 in**	**0.27 in**	**0.36 in**	**0.26 in**
I =	42 in^4		21 in^4	21 in^4	21 in^4	21 in^4
SPAN /	**201**		**452**	**568**	**426**	**544**

TALL WALL CALCULATIONS:

This spreadsheet is used for designing a stud wall according to the NDS.

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)**
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*
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 =	*223 lbs*	*50 lbs*	*50 lbs*	*50 lbs*	*223 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 =	*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
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*
$C_{F,Fcprll}$	*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*
C_p	0.16	0.16	0.11	0.12	0.15	0.15
C_H	*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**	**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
F_{cE} = $(K_{cE} E')/(l_e/d)2$ =	394 psi	394 psi	265 psi	287 psi	374 psi	374 psi
F'_c = $F_c C_d C_F C_p$ =	**379 psi**	**379 psi**	**259 psi**	**279 psi**	**361 psi**	**361 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} =	**1483 psi**	**53386 psi**	**30420 psi**	**31636 psi**	**1445 psi**	**13005 psi**
Slenderness Ratio:	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**
R_B =	**22**	**4**	**5**	**5**	**22**	**7**
Bending:	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**
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:	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**
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:	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**
f_c = P/A =	**27 psi**	**1 psi**	**1 psi**	**1 psi**	**27 psi**	**2 psi**
Compression (perp.):	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**
$f_{c\,perp}$ = P/A =	**27 psi**	**1 psi**	**1 psi**	**1 psi**	**27 psi**	**2 psi**
Combined:	**≤ 1.0 OK**				**≤ 1.0 OK**	
$(fc/Fc)2 + \{fb/[Fb(1-(fc/FcE)]\}$ =	0.51				0.54	
Deflection:	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**
D = 22.5 w $L^4/E' I$ =	**0.89 in**	**0.99 in**	**1.20 in**	**1.02 in**	**0.99 in**	**0.71 in**
I =	21 in^4	125 in^4	104 in^4	104 in^4	21 in^4	62 in^4
SPAN /	**215**	**195**	**195**	**220**	**199**	**279**

TALL WALL CALCULATIONS:

This spreadsheet is used for designing a stud wall according to the NDS.

Description:	**King Stud (12' Max Opening)**	**12' Tall Wall**	**King Stud (13' Max Opening)**	**9' Tall Wall**	**9' Tall Wall**	**9' Tall Wall**
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*
Nominal width, t =	*(5) 2*	*(1) 2*	*(1) 2*	*(1) 2*	*(1) 2*	*(1) 2*
Actual width =	7.50 in	1.50 in	1.50 in	1.50 in	1.50 in	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*	*2616 lbs*	*50 lbs*	*4303 lbs*	*5061 lbs*	*2198 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 =	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*
w =	103.4 plf	20.1 plf	111.0 plf	20.1 plf	15.1 plf	20.1 plf
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*
$C_{F,Fcprll}$	*1.10*	*1.10*	*1.10*	*1.10*	*1.10*	*1.10*
C_r	*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
C_H	*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 = $F_b C_d C_F C_r$ =	**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**
F^*_c = $F_c C_d C_F$ =	2376 psi	2376 psi	2376 psi	2376 psi	2376 psi	2376 psi
F_{cE} = $(K_{cE} E')/(l_e/d)2$ =	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:	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**
R_B =	**4**	**19**	**16**	**16**	**16**	**16**
Bending:	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**
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:	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**
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:	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**
f_c = P/A =	**1 psi**	**317 psi**	**6 psi**	**522 psi**	**613 psi**	**266 psi**
Compression (perp.):	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**
$f_{c\,perp}$ = P/A =	**1 psi**	**317 psi**	**6 psi**	**522 psi**	**613 psi**	**266 psi**
Combined:		**≤ 1.0 OK**		**≤ 1.0 OK**	**≤ 1.0 OK**	**≤ 1.0 OK**
$(fc/Fc)2 + \{fb/[Fb(1-(fc/FcE)]\}$ =		0.67		0.45	0.50	0.23
Deflection:	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**
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**
I =	104 in^4	21 in^4	21 in^4	21 in^4	21 in^4	21 in^4
SPAN /	**220**	**544**	**239**	**1317**	**1756**	**1317**

TALL WALL CALCULATIONS:

This spreadsheet is used for designing a stud wall according to the NDS.

Description:	**9' Tall Wall**	**9' Tall Wall**				
Type:	*2x Lumber (2"-4")*	*2x Lumber (2"-4")*				
Species:	*DF-L*	*DF-L*				
Grade:	*No. 2*	*No. 2*				
Nominal width, t =	*(1) 2*	*(1) 2*				
Actual width =	1.50 in	1.50 in				
Nominal depth, d =	*6*	*6*				
Actual depth =	5.50 in	5.50 in				
Span, L =	*9.000 ft*	*9.000 ft*				
w/o Plates	8.750 ft	8.750 ft				
Stud spacing, s =	*16 in*	*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*				
c =	*0.8*	*0.8*				
w =	20.1 plf	15.1 plf				
Fb	900 psi	900 psi				
Fv	180 psi	180 psi				
Fc-prll	1,350 psi	1,350 psi				
Fc-perp	625 psi	625 psi				
C_d	*1.60*	*1.60*				
$C_{F,Fb}$	*1.30*	*1.30*				
$C_{F,Fcprll}$	*1.10*	*1.10*				
C_r	*1.15*	*1.15*				
C_p	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	580,000 psi	580,000 psi				
Allowable Stress:						
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:	**≤ 50 OK**	**≤ 50 OK**				
R_B =	**16**	**16**				
Bending:	**≤ F'b OK**	**≤ F'b OK**				
M = $w L^2/8 + P e/12$ =	193 ft-lbs	144 ft-lbs				
f_b = M/S =	**305 psi**	**229 psi**				
S =	8 in^3	8 in^3				
Shear:	**≤ F'v OK**	**≤ F'v OK**				
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				
Compression:	**≤ F'c OK**	**≤ F'c OK**				
f_c = P/A =	**354 psi**	**625 psi**				
Compression (perp.):	**≤ F'c OK**	**≤ F'c OK**				
$f_{c\,perp}$ = P/A =	**354 psi**	**625 psi**				
Combined:	**≤ 1.0 OK**	**≤ 1.0 OK**				
(fc/Fc)2 + {fb/[Fb(1-(fc/FcE))]} =	0.29	0.52				
Deflection:	**≥ 180 OK**	**≥ 180 OK**				
D = 22.5 w L^4/E' I =	**0.08 in**	**0.06 in**				
I =	21 in^4	21 in^4				
SPAN /	**1317**	**1756**				

UNBRACED WOOD COLUMN ALLOWABLE LOADS (kips)

Column Type	Unbraced Height							Compression Perp. To Grain
	8'	10'	12'	14'	16'	18'	20'	
(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

Wood Column

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 Name	**8x8**
End Fixities	Top & Bottom Pinned	Wood Grading/Manuf.	Graded Lumber
Overall Column Height	10 ft	Wood Member Type	Sawn
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch	Exact Width	**7.50** in
Wood Grade	No.2	Exact Depth	**7.50** in
Fb +	750 psi	Fv	170 psi
Fb -	750 psi	Ft	475 psi
Fc - Prll	700 psi	Density	31.21 pcf
Fc - Perp	625 psi		

Area	56.250 in^2	Allow Stress Modification Factors	
Ix	263.672 in^4	Cf or Cv for Bending	1.0
Iy	263.672 in^4	Cf or Cv for Compressio	1.0
		Cf or Cv for Tension	1.0
		Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0
		Use Cr : Repetitive ?	No

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1300	1300	1300 ksi
Minimum	470	470	

Column Buckling Condition:
ABOUT X-X Axis: Lux = 10 ft, Kx = 1.0
ABOUT Y-Y Axis: Luy = 10 ft, Ky = 1.0

Applied Loads

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

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 Ratio = **0.4234 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	16.415 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	689.16 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	10.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.894	0.06138	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+S	1.150	0.856	0.4234	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750S	1.150	0.856	0.3301	PASS	0.0 ft	0.0	PASS	10.0 ft
+0.60D	1.600	0.783	0.02365	PASS	0.0 ft	0.0	PASS	10.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					1.944				
+D+S					16.415				
+D+0.750S					12.797				

Wood Column

DESCRIPTION: RB1 BRG

Maximum Reactions

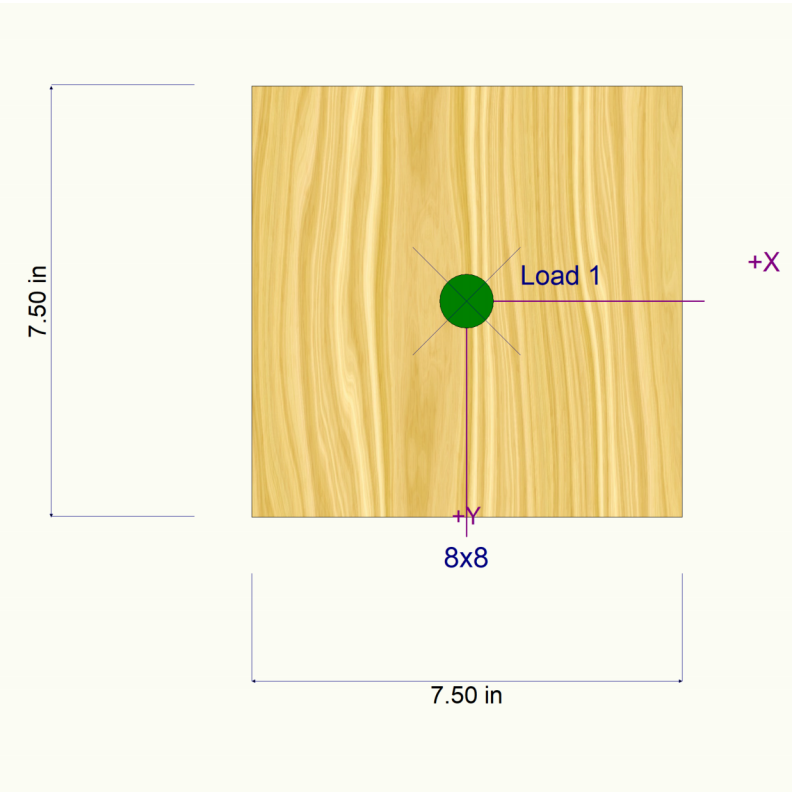
Note: Only non-zero reactions are listed.

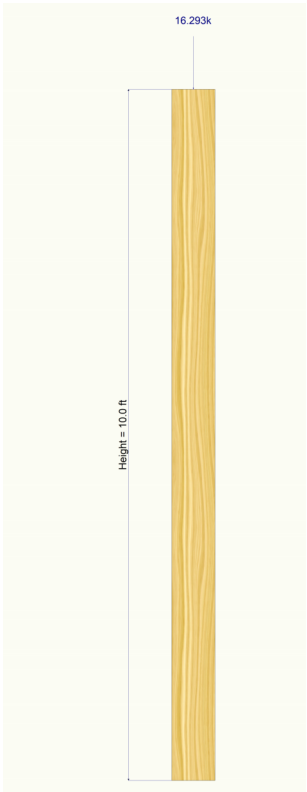
Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						1.166					
S Only						14.471					

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
+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





Wood Column

Project File: 05 Beams.ec6

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		
End Fixities	Top & Bottom Pinned		
Overall Column Height	10 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Wood Section Name	**4-2x6**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**6.0** in	Allow Stress Modification Factors	
Exact Depth	**5.50** in	Cf or Cv for Bending	1.30
Area	33.0 in^2	Cf or Cv for Compressio	1.10
Ix	83.188 in^4	Cf or Cv for Tension	1.30
Iy	99.0 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0
		Use Cr : Repetitive ?	No

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

Applied Loads

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

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 = **0.6852 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	14.419 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	637.68 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	10.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.792	0.09226	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+S	1.150	0.720	0.6852	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750S	1.150	0.720	0.5337	PASS	0.0 ft	0.0	PASS	10.0 ft
+0.60D	1.600	0.602	0.04096	PASS	0.0 ft	0.0	PASS	10.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					1.671				
+D+S					14.419				
+D+0.750S					11.232				

Wood Column

DESCRIPTION: RB1 BRG 2

Maximum Reactions

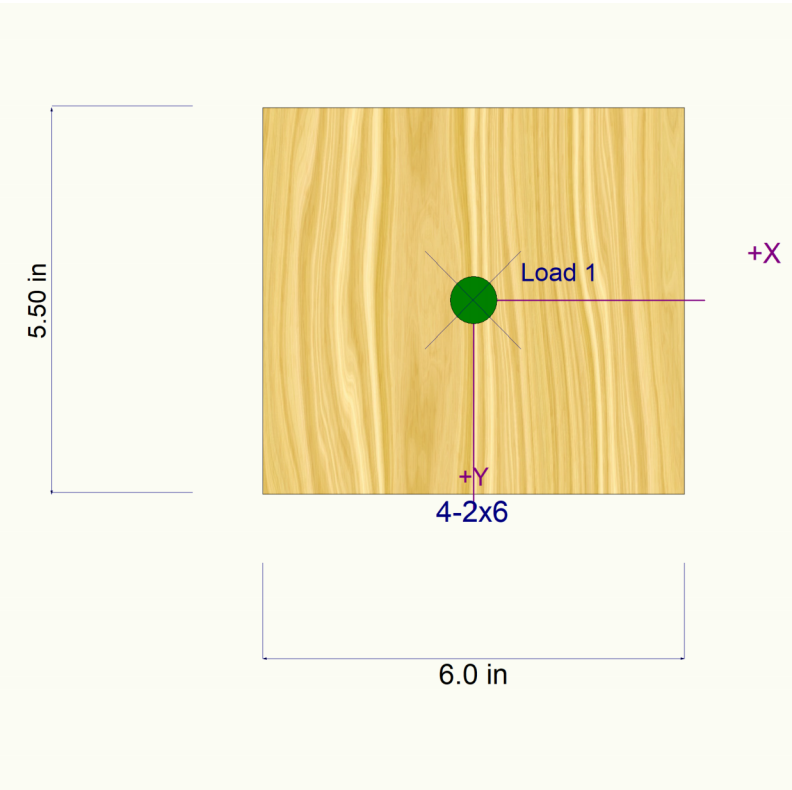
Note: Only non-zero reactions are listed.

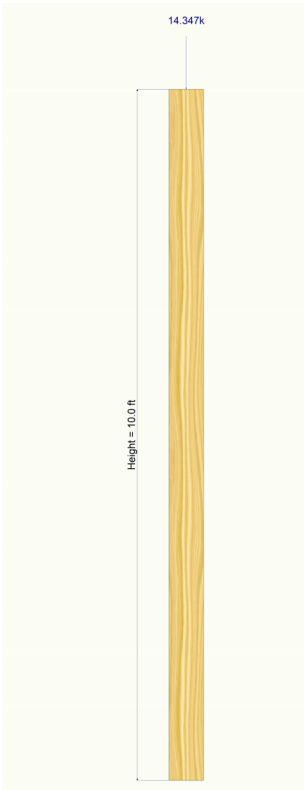
Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						1.002					
S Only						12.748					

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
+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





Wood Column

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	Wood Section Name	**10x10**
End Fixities	Top & Bottom Pinned	Wood Grading/Manuf.	Graded Lumber
Overall Column Height	12 ft	Wood Member Type	Sawn
(Used for non-slender calculations)		Exact Width	**9.50** in
Wood Species	Douglas Fir-Larch	Exact Depth	**9.50** in
Wood Grade	No.2	Area	90.250 in^2
Fb +	750.0 psi	Fv	170.0 psi	Ix	678.76 in^4
Fb -	750.0 psi	Ft	475.0 psi	Iy	678.76 in^4
Fc - Prll	700.0 psi	Density	31.210 pcf		
Fc - Perp	625.0 psi				

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Allow Stress Modification Factors

Cf or Cv for Bending	1.0
Cf or Cv for Compressio	1.0
Cf or Cv for Tension	1.0
Cm : Wet Use Factor	1.0
Ct : Temperature Fact	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0
Use Cr : Repetitive ?	No

Column Buckling Condition:
ABOUT X-X Axis: Lux = 10 ft, Kx = 1.0
ABOUT Y-Y Axis: Luy = 10 ft, Ky = 1.0

Applied Loads

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

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 Ratio = **0.7253 : 1**

Load Combination	D Only
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	38.735 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	591.73 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	12.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.939	0.7253	PASS	0.0 ft	0.0	PASS	12.0 ft
+0.60D	1.600	0.879	0.2615	PASS	0.0 ft	0.0	PASS	12.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					38.735				
+0.60D					23.241				

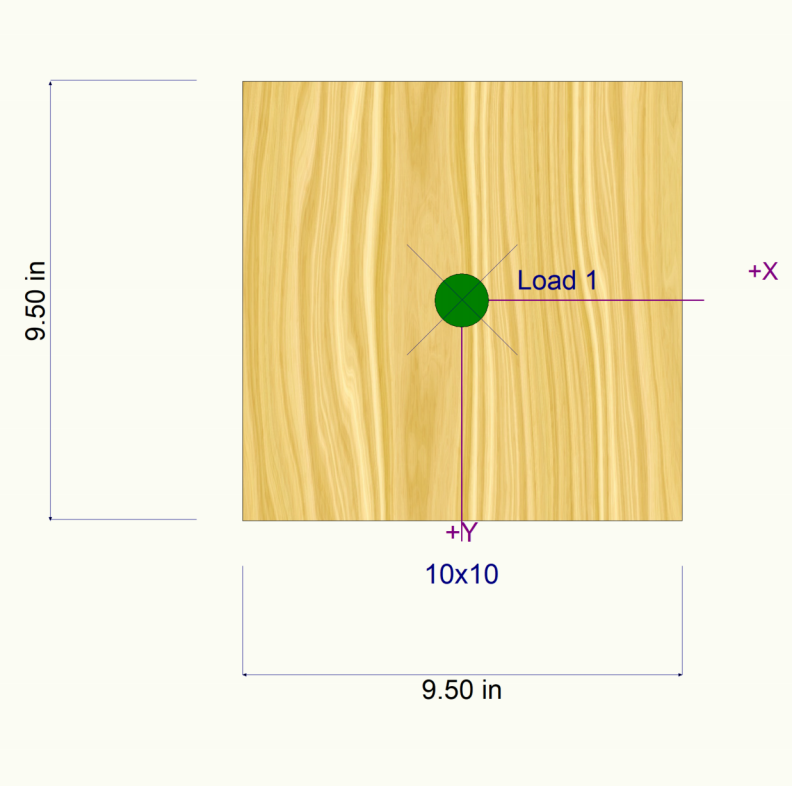
Wood Column

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

Sketches



Project Title:
Engineer:
Project ID:
Project Descr:

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 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	**6x8**
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber
Overall Column Height	12 ft			Wood Member Type	Sawn
(Used for non-slender calculations)					
Wood Species	Douglas Fir-Larch			Exact Width	**5.50** in
Wood Grade	No.2			Exact Depth	**7.50** in
Fb +	750.0 psi	Fv	170.0 psi	Area	41.250 in^2
Fb -	750.0 psi	Ft	475.0 psi	Ix	193.359 in^4
Fc - Prll	700.0 psi	Density	31.210 pcf	Iy	103.984 in^4
Fc - Perp	625.0 psi				

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Allow Stress Modification Factors	
Cf or Cv for Bending	1.0
Cf or Cv for Compressio	1.0
Cf or Cv for Tension	1.0
Cm : Wet Use Factor	1.0
Ct : Temperature Fact	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0
Use Cr : Repetitive ?	No

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

Applied Loads

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

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 Ratio = **0.6468 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	11.999 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	449.734 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	12.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.651	0.08876	PASS	0.0 ft	0.0	PASS	12.0 ft
+D+S	1.150	0.559	0.6468	PASS	0.0 ft	0.0	PASS	12.0 ft
+D+0.750S	1.150	0.559	0.5054	PASS	0.0 ft	0.0	PASS	12.0 ft
+0.60D	1.600	0.436	0.04476	PASS	0.0 ft	0.0	PASS	12.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					1.502				
+D+S					11.999				
+D+0.750S					9.375				

Wood Column

DESCRIPTION: RB3 BRG 2

Maximum Reactions

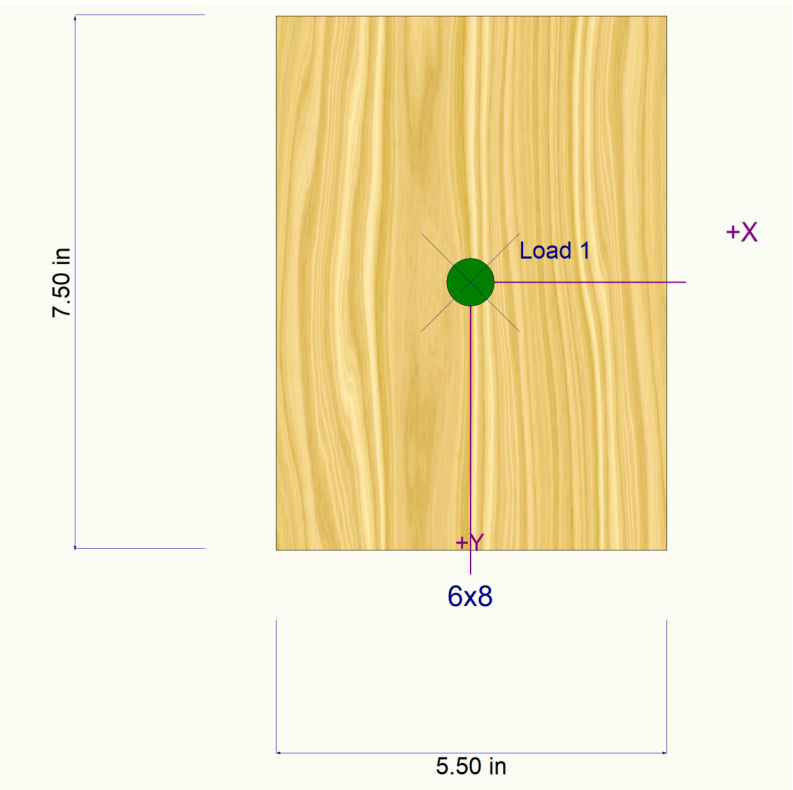
Note: Only non-zero reactions are listed.

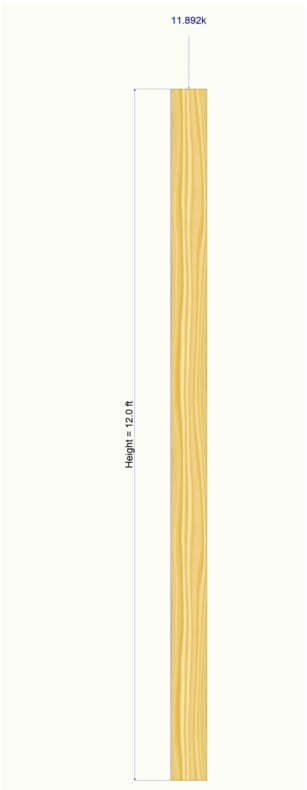
Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						0.901					
S Only						10.497					

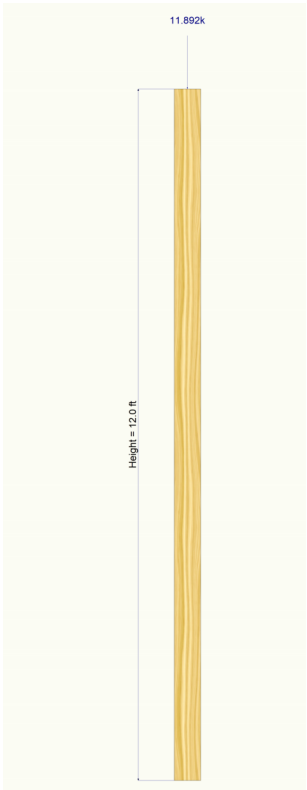
Maximum Deflections for Load Combinations

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
+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







Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 05 Beams.ec6

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		
End Fixities	Top & Bottom Pinned		
Overall Column Height	10.25 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Wood Section Name	**6x6**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**5.50** in	Allow Stress Modification Factors	
Exact Depth	**5.50** in	Cf or Cv for Bending	1.0
Area	30.250 in^2	Cf or Cv for Compressio	1.0
Ix	76.255 in^4	Cf or Cv for Tension	1.0
Iy	76.255 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0
		Use Cr : Repetitive ?	No

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

Applied Loads

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

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 = **0.9266 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	19.130 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	682.48 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	10.250 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.888	0.1583	PASS	0.0 ft	0.0	PASS	10.250 ft
+D+S	1.150	0.848	0.9266	PASS	0.0 ft	0.0	PASS	10.250 ft
+D+0.750S	1.150	0.848	0.7274	PASS	0.0 ft	0.0	PASS	10.250 ft
+0.60D	1.600	0.771	0.06155	PASS	0.0 ft	0.0	PASS	10.250 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					2.678				
+D+S					19.130				
+D+0.750S					15.017				

Wood Column

DESCRIPTION: RB4 BRG 1

Maximum Reactions

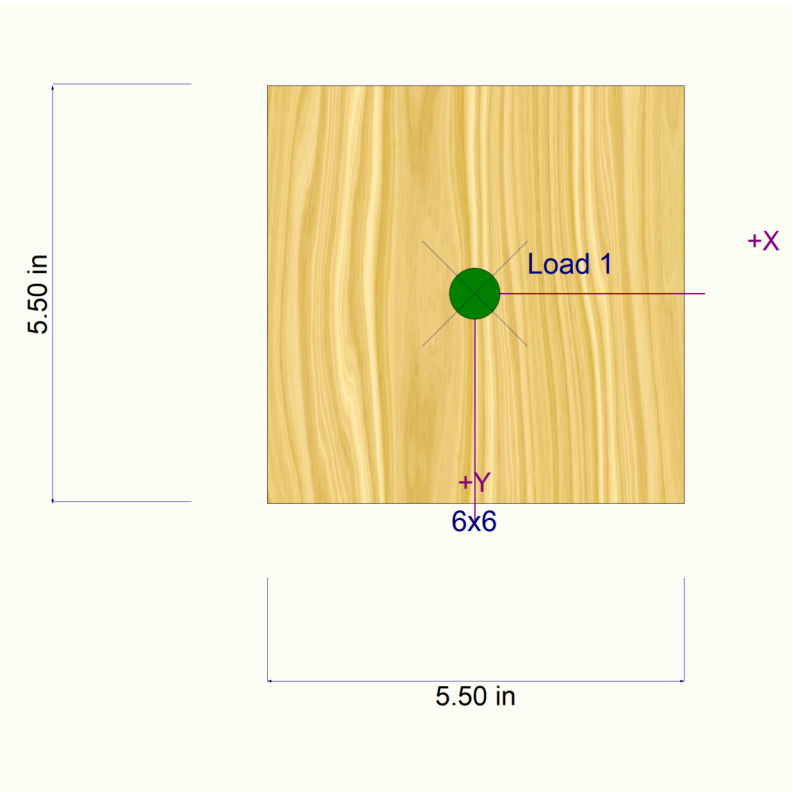
Note: Only non-zero reactions are listed.

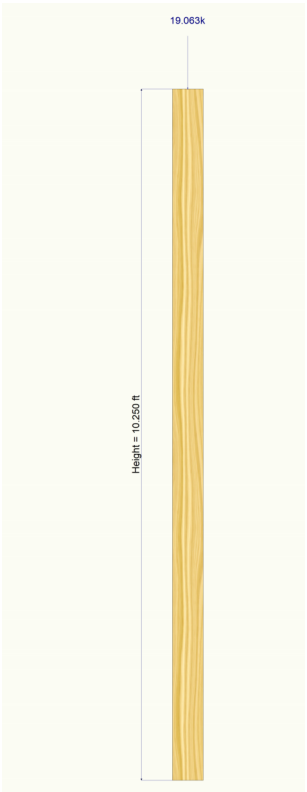
Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						1.607					
S Only						16.452					

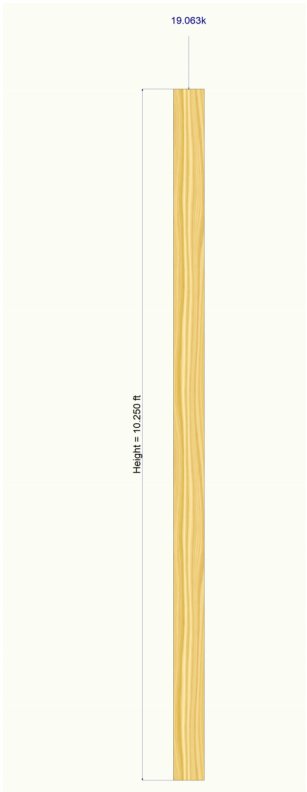
Maximum Deflections for Load Combinations

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
+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







Wood Column

Project File: 05 Beams.ec6

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		
End Fixities	Top & Bottom Pinned		
Overall Column Height	12 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Wood Section Name	**6x16**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**5.50** in	Allow Stress Modification Factors	
Exact Depth	**15.50** in	Cf or Cv for Bending	0.9720
Area	85.250 in^2	Cf or Cv for Compressio	0.9720
Ix	1,706.78 in^4	Cf or Cv for Tension	0.9720
Iy	214.901 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0
		Use Cr : Repetitive ?	No

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

Applied Loads

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

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 Ratio = **0.9645 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	36.642 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	445.653 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	12.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.662	0.1344	PASS	0.0 ft	0.0	PASS	12.0 ft
+D+S	1.150	0.570	0.9645	PASS	0.0 ft	0.0	PASS	12.0 ft
+D+0.750S	1.150	0.570	0.7539	PASS	0.0 ft	0.0	PASS	12.0 ft
+0.60D	1.600	0.446	0.06730	PASS	0.0 ft	0.0	PASS	12.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					4.642				
+D+S					36.642				
+D+0.750S					28.642				

Wood Column

DESCRIPTION: RB6 BRG 1

Maximum Reactions

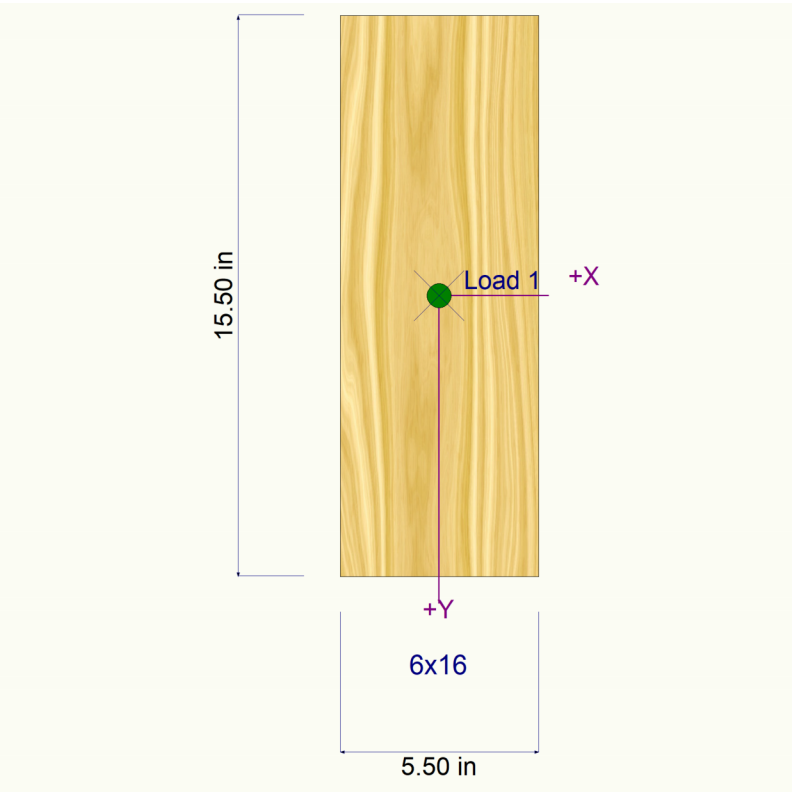
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						2.785					
S Only						32.000					

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
+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



Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 05 Beams.ec6

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		
End Fixities	Top & Bottom Pinned		
Overall Column Height	12 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Wood Section Name	**6x14**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**5.50** in	Allow Stress Modification Factors	
Exact Depth	**13.50** in	Cf or Cv for Bending	0.9870
Area	74.250 in^2	Cf or Cv for Compressio	0.9870
Ix	1,127.67 in^4	Cf or Cv for Tension	0.9870
Iy	187.172 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0
		Use Cr : Repetitive ?	No

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

Applied Loads

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

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 = **0.9005 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	29.947 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	447.872 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	12.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.656	0.1240	PASS	0.0 ft	0.0	PASS	12.0 ft
+D+S	1.150	0.564	0.9005	PASS	0.0 ft	0.0	PASS	12.0 ft
+D+0.750S	1.150	0.564	0.7037	PASS	0.0 ft	0.0	PASS	12.0 ft
+0.60D	1.600	0.440	0.06235	PASS	0.0 ft	0.0	PASS	12.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					3.757				
+D+S					29.947				
+D+0.750S					23.400				

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 05 Beams.ec6

LIC# : KW-06013353, Build:20.23.08.30 SNAKE RIVER ENGINEERING (c) ENERCALC INC 1983-2023

DESCRIPTION: RB6 BRG 2

Maximum Reactions

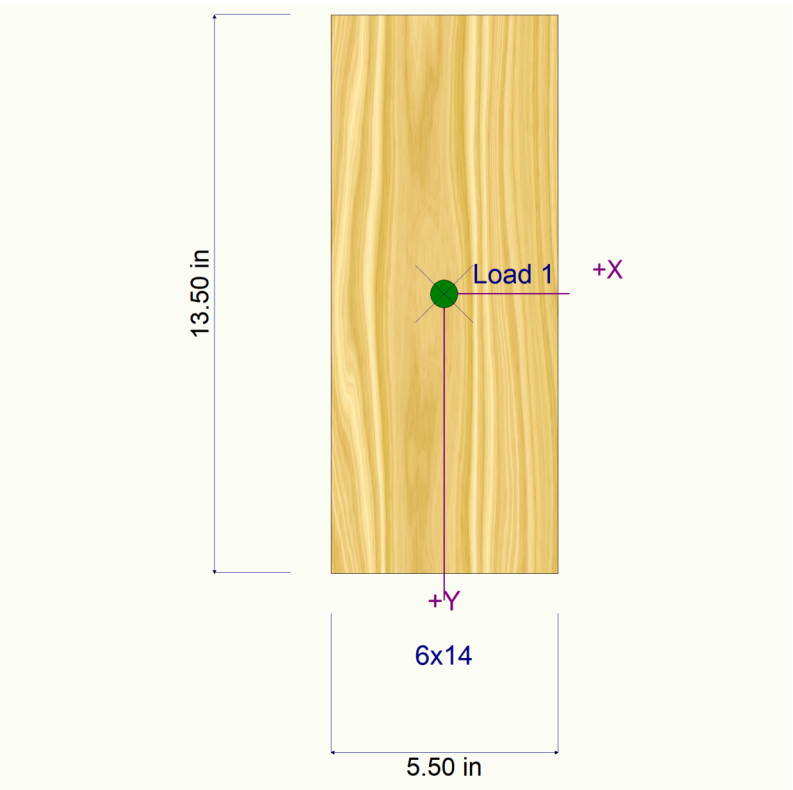
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						2.254					
S Only						26.190					

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
+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



Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 05 Beams.ec6

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		
End Fixities	Top & Bottom Pinned		
Overall Column Height	19.75 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

Wood Section Name	**6x8**	
Wood Grading/Manuf.	Graded Lumber	
Wood Member Type	Sawn	
Exact Width	**5.50** in	Allow Stress Modification Factors
Exact Depth	**7.50** in	Cf or Cv for Bending 1.0
Area	41.250 in^2	Cf or Cv for Compressio 1.0
Ix	193.359 in^4	Cf or Cv for Tension 1.0
Iy	103.984 in^4	Cm : Wet Use Factor 1.0
		Ct : Temperature Fact 1.0
		Cfu : Flat Use Factor 1.0
		Kf : Built-up columns 1.0
		Use Cr : Repetitive ? No

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

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

Applied Loads

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

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 Ratio = **0.9940 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	8.017 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	195.520 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	19.750 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.304	0.1288	PASS	0.0 ft	0.0	PASS	19.750 ft
+D+S	1.150	0.243	0.9940	PASS	0.0 ft	0.0	PASS	19.750 ft
+D+0.750S	1.150	0.243	0.7770	PASS	0.0 ft	0.0	PASS	19.750 ft
+0.60D	1.600	0.178	0.07415	PASS	0.0 ft	0.0	PASS	19.750 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					1.017				
+D+S					8.017				
+D+0.750S					6.267				

Wood Column

DESCRIPTION: RB8 BRG 1

Maximum Reactions

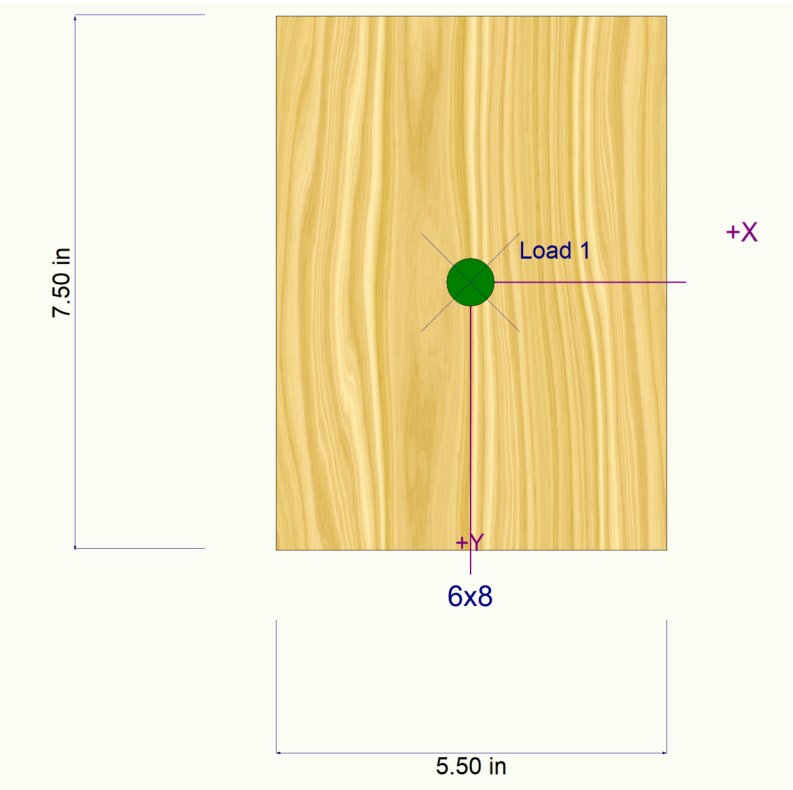
Note: Only non-zero reactions are listed.

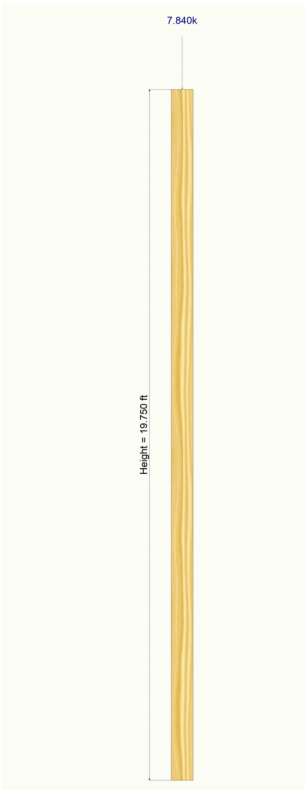
Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						0.610					
S Only						7.000					

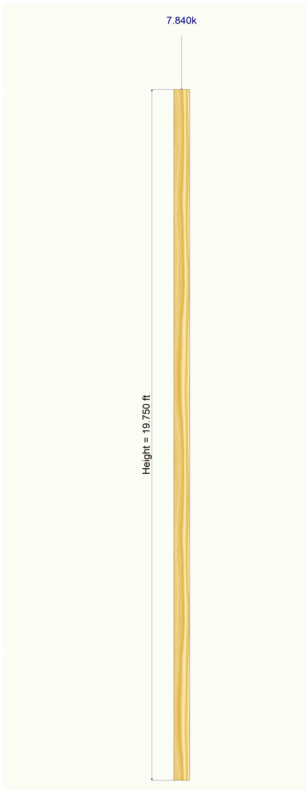
Maximum Deflections for Load Combinations

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
+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







Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 05 Beams.ec6

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		
End Fixities	Top & Bottom Pinned		
Overall Column Height	13 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Wood Section Name	**6x10**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**5.50** in	Allow Stress Modification Factors	
Exact Depth	**9.50** in	Cf or Cv for Bending	1.0
Area	52.250 in^2	Cf or Cv for Compressio	1.0
Ix	392.964 in^4	Cf or Cv for Tension	1.0
Iy	131.714 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0
		Use Cr : Repetitive ?	No

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

Applied Loads

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

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 = **0.7148 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	14.967 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	400.763 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	13.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.591	0.1080	PASS	0.0 ft	0.0	PASS	13.0 ft
+D+S	1.150	0.498	0.7148	PASS	0.0 ft	0.0	PASS	13.0 ft
+D+0.750S	1.150	0.498	0.5612	PASS	0.0 ft	0.0	PASS	13.0 ft
+0.60D	1.600	0.382	0.05645	PASS	0.0 ft	0.0	PASS	13.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					2.101				
+D+S					14.967				
+D+0.750S					11.751				

Wood Column

DESCRIPTION: RB7 BRG 1

Maximum Reactions

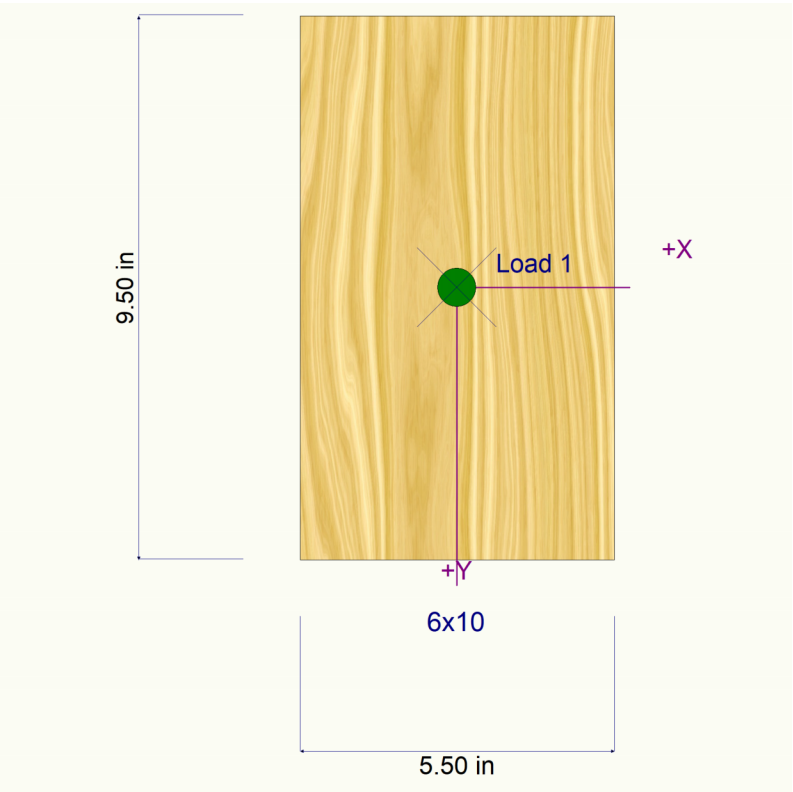
Note: Only non-zero reactions are listed.

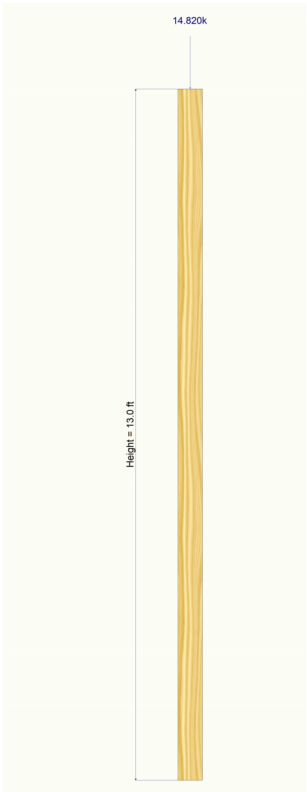
Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						1.261					
S Only						12.866					

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
+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





Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 05 Beams.ec6

LIC# : KW-06013353, Build:20.23.08.30 SNAKE RIVER ENGINEERING (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		
End Fixities	Top & Bottom Pinned		
Overall Column Height	14 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Wood Section Name	**6x14**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**5.50** in	Allow Stress Modification Factors	
Exact Depth	**13.50** in	Cf or Cv for Bending	0.9870
Area	74.250 in^2	Cf or Cv for Compressio	0.9870
Ix	1,127.67 in^4	Cf or Cv for Tension	0.9870
Iy	187.172 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0
		Use Cr : Repetitive ?	No

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

Applied Loads

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

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 = **0.9837 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	26.016 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	356.187 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	14.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.540	0.1437	PASS	0.0 ft	0.0	PASS	14.0 ft
+D+S	1.150	0.448	0.9837	PASS	0.0 ft	0.0	PASS	14.0 ft
+D+0.750S	1.150	0.448	0.7716	PASS	0.0 ft	0.0	PASS	14.0 ft
+0.60D	1.600	0.340	0.07704	PASS	0.0 ft	0.0	PASS	14.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					3.579				
+D+S					26.016				
+D+0.750S					20.407				

Wood Column

DESCRIPTION: RB15 BRG 1

Maximum Reactions

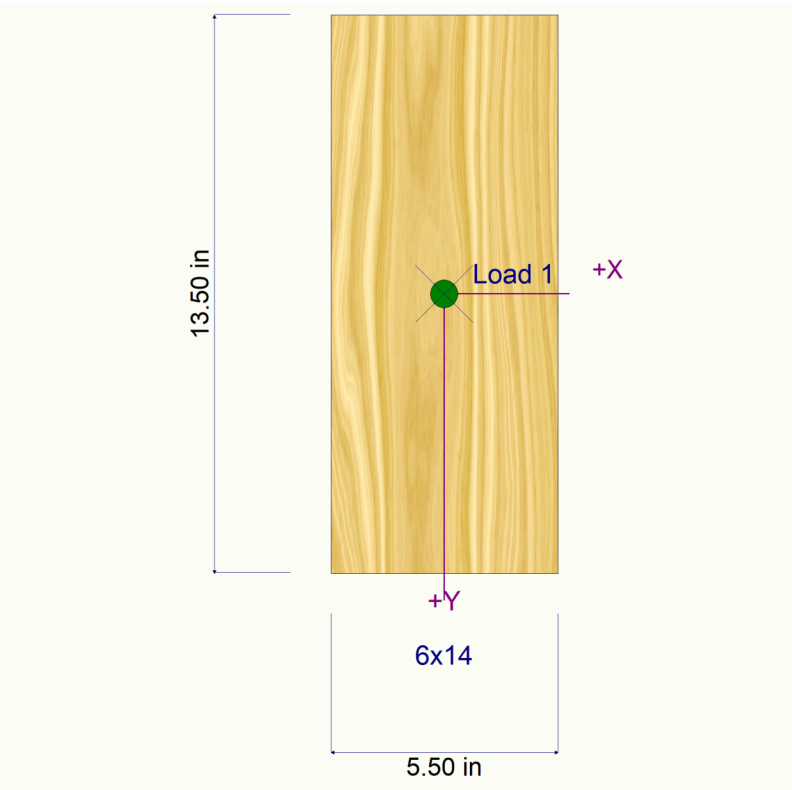
Note: Only non-zero reactions are listed.

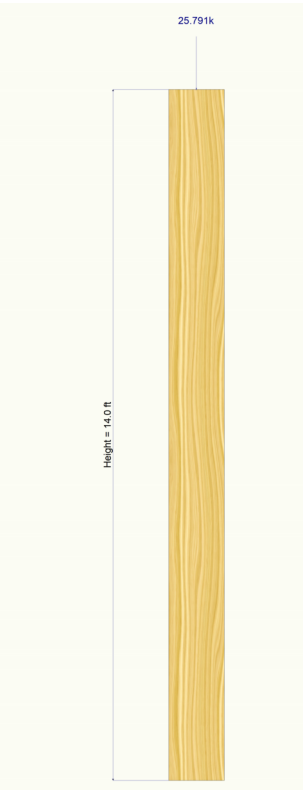
Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						2.148					
S Only						22.437					

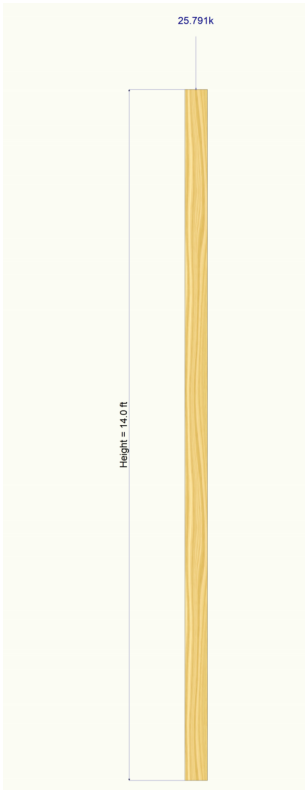
Maximum Deflections for Load Combinations

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
+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







Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 05 Beams.ec6

LIC# : KW-06013353, Build:20.23.08.30 SNAKE RIVER ENGINEERING (c) ENERCALC INC 1983-2023

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		
End Fixities	Top & Bottom Pinned		
Overall Column Height	10 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Wood Section Name	**6x14**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**5.50** in	Allow Stress Modification Factors	
Exact Depth	**13.50** in	Cf or Cv for Bending	0.9870
Area	74.250 in^2	Cf or Cv for Compressio	0.9870
Ix	1,127.67 in^4	Cf or Cv for Tension	0.9870
Iy	187.172 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0
		Use Cr : Repetitive ?	No

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

Applied Loads

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

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 Ratio = **0.9230 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	38.020 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	554.80 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	10.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.774	0.1399	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+S	1.150	0.698	0.9230	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750S	1.150	0.698	0.7226	PASS	0.0 ft	0.0	PASS	10.0 ft
+0.60D	1.600	0.577	0.06338	PASS	0.0 ft	0.0	PASS	10.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					5.002				
+D+S					38.020				
+D+0.750S					29.765				

Wood Column

DESCRIPTION: GRD1 BRG 2

Maximum Reactions

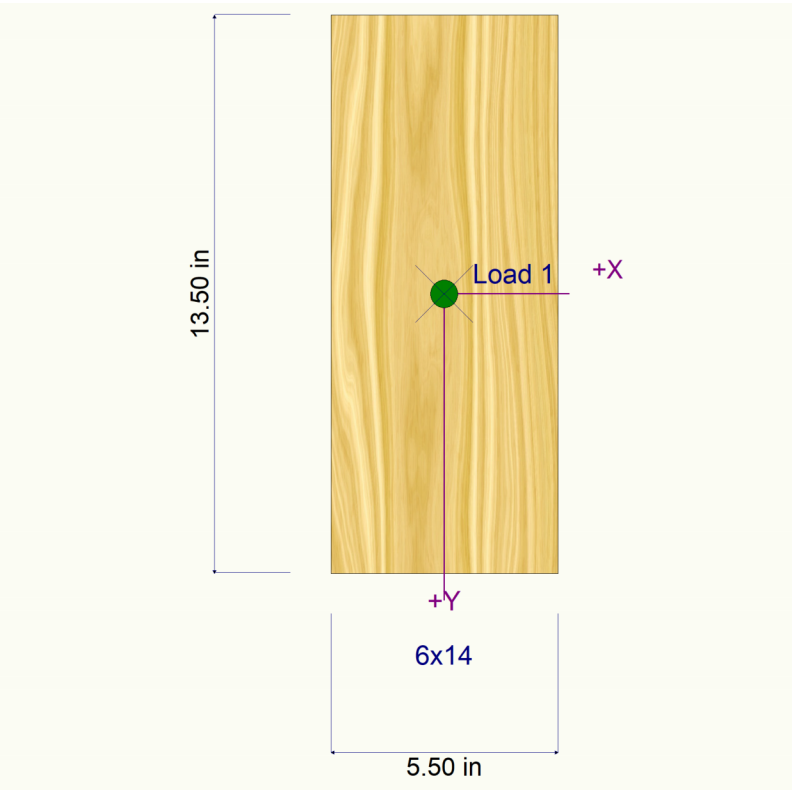
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						3.001					
S Only						33.018					

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
+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



Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 05 Beams.ec6

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		
End Fixities	Top & Bottom Pinned		
Overall Column Height	10 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Wood Section Name	**6x6**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**5.50** in	Allow Stress Modification Factors	
Exact Depth	**5.50** in	Cf or Cv for Bending	1.0
Area	30.250 in^2	Cf or Cv for Compressio	1.0
Ix	76.255 in^4	Cf or Cv for Tension	1.0
Iy	76.255 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0
		Use Cr : Repetitive ?	No

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

Applied Loads

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

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 = **0.9158 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	15.472 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	558.50 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	10.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.771	0.1357	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+S	1.150	0.694	0.9158	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750S	1.150	0.694	0.7163	PASS	0.0 ft	0.0	PASS	10.0 ft
+0.60D	1.600	0.572	0.06171	PASS	0.0 ft	0.0	PASS	10.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					1.993				
+D+S					15.472				
+D+0.750S					12.102				

Wood Column

DESCRIPTION: GRD1 BRG 1

Maximum Reactions

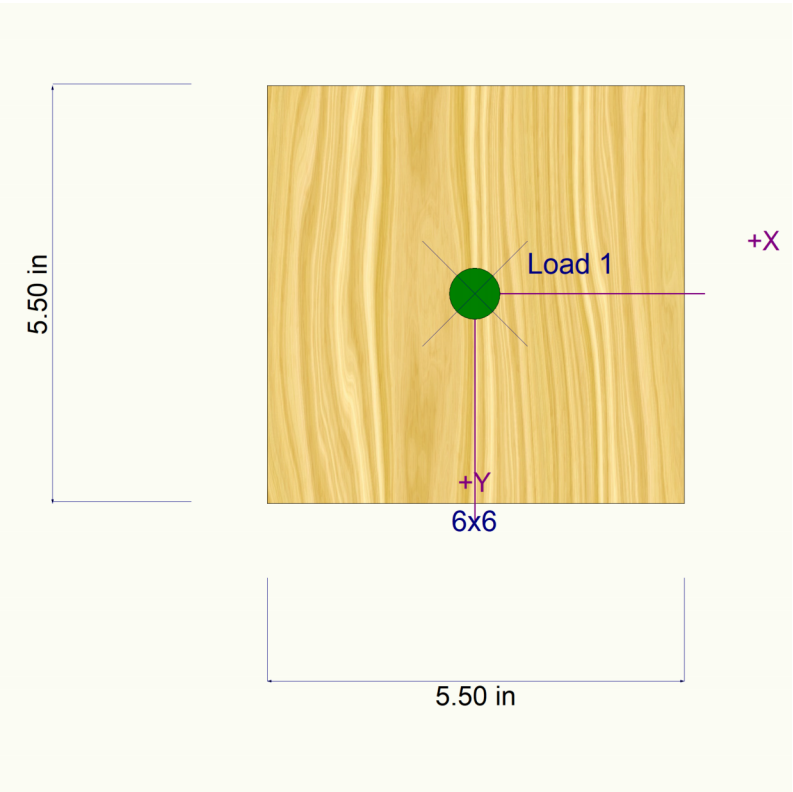
Note: Only non-zero reactions are listed.

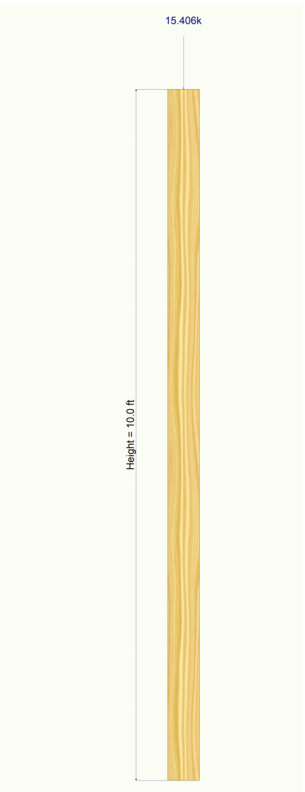
Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						1.196					
S Only						13.479					

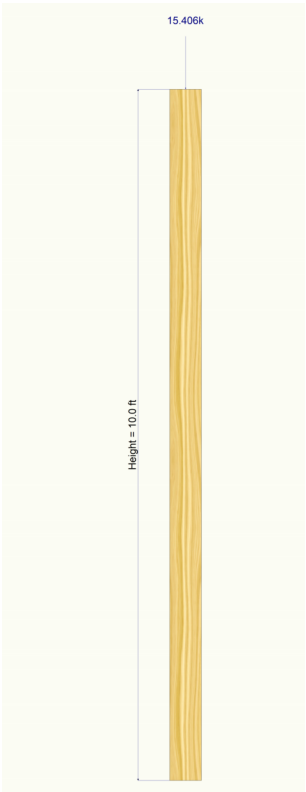
Maximum Deflections for Load Combinations

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
+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







Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 05 Beams.ec6

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		
End Fixities	Top & Bottom Pinned		
Overall Column Height	12 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Wood Section Name	**6x10**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**5.50** in	Allow Stress Modification Factors	
Exact Depth	**9.50** in	Cf or Cv for Bending	1.0
Area	52.250 in^2	Cf or Cv for Compressio	1.0
Ix	392.964 in^4	Cf or Cv for Tension	1.0
Iy	131.714 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0
		Use Cr : Repetitive ?	No

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

Applied Loads

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

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 = **0.8826 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	20.741 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	449.734 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	12.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: 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-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					3.241				
+D+S					20.741				
+D+0.750S					16.366				

Wood Column

DESCRIPTION: GRD2 BRG 1

Maximum Reactions

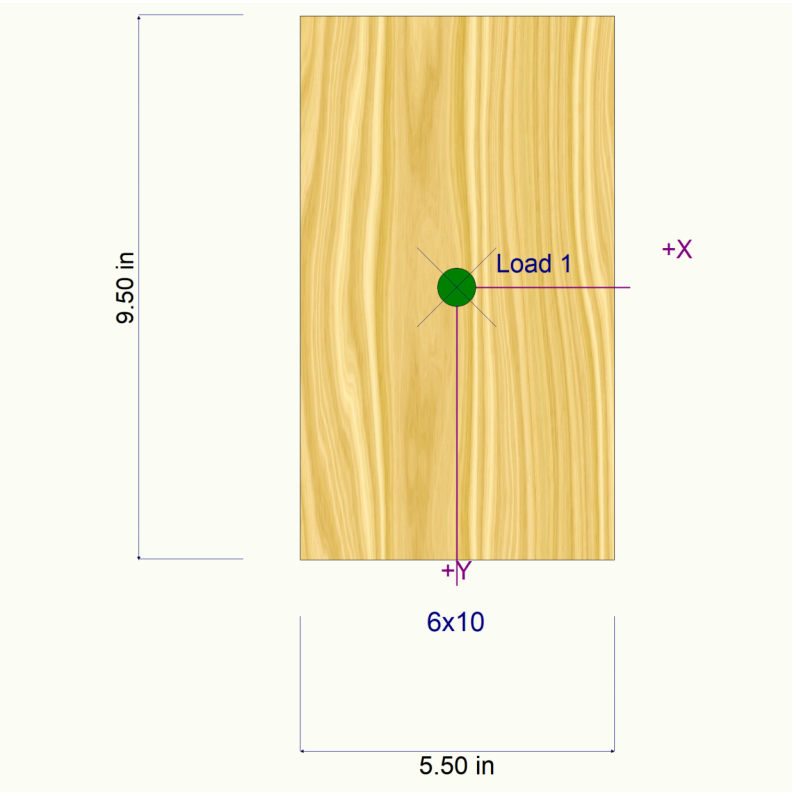
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						1.945					
S Only						17.500					

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
+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



Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 05 Beams.ec6

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		
End Fixities	Top & Bottom Pinned		
Overall Column Height	9 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Wood Section Name	**6x8**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**5.50** in	Allow Stress Modification Factors	
Exact Depth	**7.50** in	Cf or Cv for Bending	1.0
Area	41.250 in^2	Cf or Cv for Compressio	1.0
Ix	193.359 in^4	Cf or Cv for Tension	1.0
Iy	103.984 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0
		Use Cr : Repetitive ?	No

Column Buckling Condition:
Fully braced against buckling ABOUT X-X Axis
ABOUT Y-Y Axis: Luy = 9 ft, Ky = 1.0

Applied Loads

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

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 = **0.8045 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	20.324 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	612.43 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	9.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
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 reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					3.085				
+D+S					20.324				
+D+0.750S					16.015				

Wood Column

DESCRIPTION: GRD1 FB27 BRG

Maximum Reactions

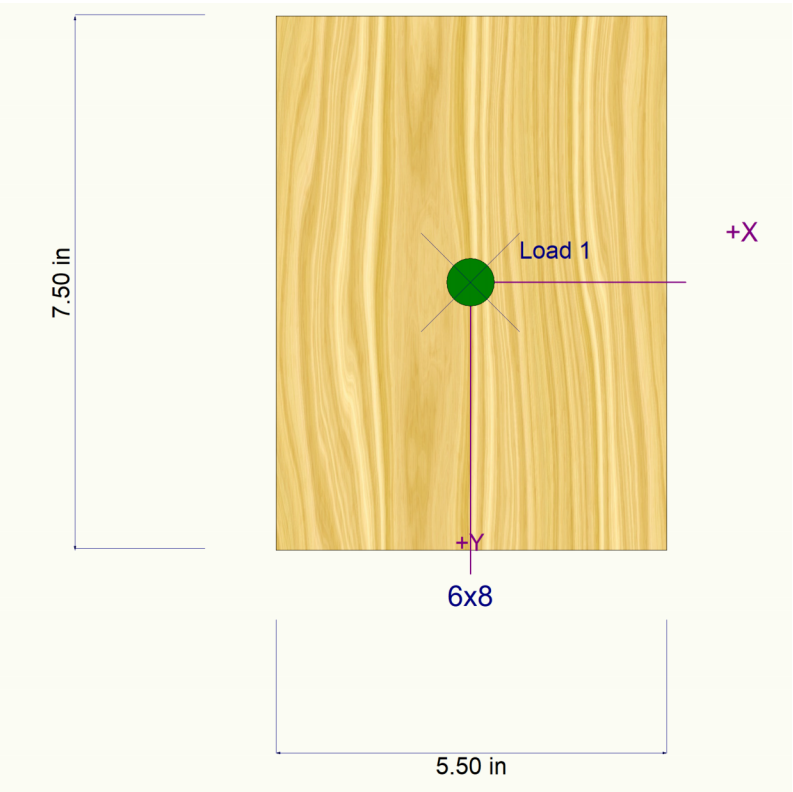
Note: Only non-zero reactions are listed.

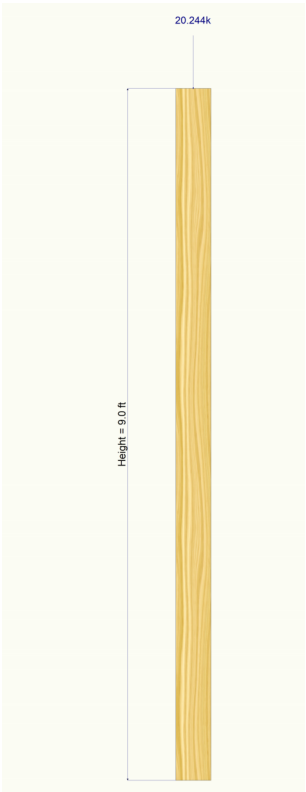
Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						1.851					
S Only						17.239					

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
+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





Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 05 Beams.ec6

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		
End Fixities	Top & Bottom Pinned		
Overall Column Height	12 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

Wood Section Name	**6x14**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**5.50** in	Allow Stress Modification Factors	
Exact Depth	**13.50** in	Cf or Cv for Bending	0.9870
Area	74.250 in^2	Cf or Cv for Compressio	0.9870
Ix	1,127.67 in^4	Cf or Cv for Tension	0.9870
Iy	187.172 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0
		Use Cr : Repetitive ?	No

E : Modulus of Elasticity . . .

	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

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

Applied Loads

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

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 Ratio = **0.9470 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	31.493 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	447.872 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	12.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.656	0.1714	PASS	0.0 ft	0.0	PASS	12.0 ft
+D+S	1.150	0.564	0.9470	PASS	0.0 ft	0.0	PASS	12.0 ft
+D+0.750S	1.150	0.564	0.7493	PASS	0.0 ft	0.0	PASS	12.0 ft
+0.60D	1.600	0.440	0.08618	PASS	0.0 ft	0.0	PASS	12.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					5.193				
+D+S					31.493				
+D+0.750S					24.918				

Wood Column

DESCRIPTION: GRD2 BRG 2

Maximum Reactions

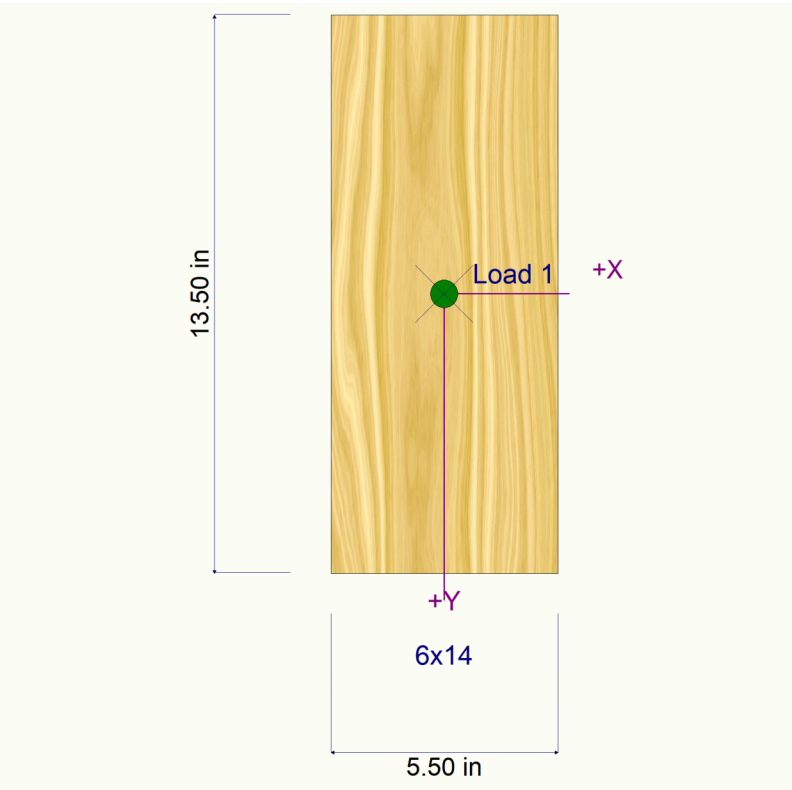
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						3.116					
S Only						26.300					

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
+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



Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 05 Beams.ec6

LIC# : KW-06013353, Build:20.23.08.30 SNAKE RIVER ENGINEERING (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 Name	**6x8**
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber
Overall Column Height	9 ft			Wood Member Type	Sawn
(Used for non-slender calculations)					
Wood Species	Douglas Fir-Larch			Exact Width	**5.50** in
Wood Grade	No.2			Exact Depth	**7.50** in
Fb +	750.0 psi	Fv	170.0 psi	Area	41.250 in^2
Fb -	750.0 psi	Ft	475.0 psi	Ix	193.359 in^4
Fc - Prll	700.0 psi	Density	31.210 pcf	Iy	103.984 in^4
Fc - Perp	625.0 psi				

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Allow Stress Modification Factors	
Cf or Cv for Bending	1.0
Cf or Cv for Compressio	1.0
Cf or Cv for Tension	1.0
Cm : Wet Use Factor	1.0
Ct : Temperature Fact	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0
Use Cr : Repetitive ?	No

Column Buckling Condition:
Fully braced against buckling ABOUT X-X Axis
ABOUT Y-Y Axis: Luy = 9 ft, Ky = 1.0

Applied Loads

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

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 Ratio = **0.8938 : 1**

Load Combination	+D+0.750L+0.750S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	22.580 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	612.43 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	9.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: 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-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					4.580				

Wood Column

DESCRIPTION: FB24 BRG

Maximum Reactions

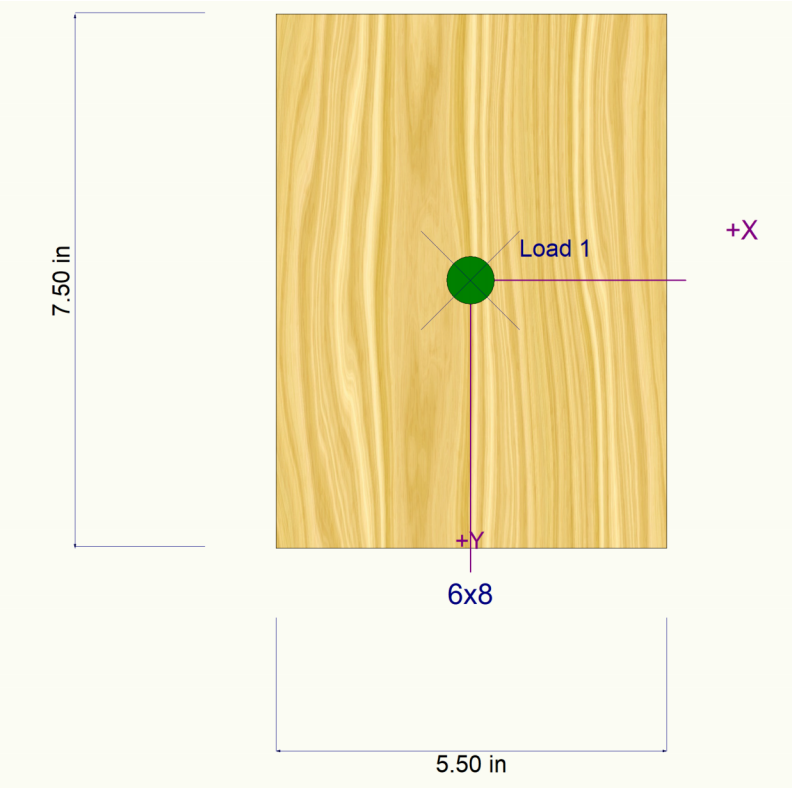
Note: Only non-zero reactions are listed.

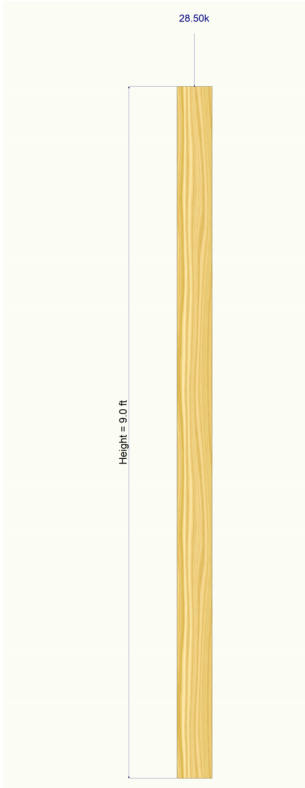
Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+D+L						12.380					
+D+S						20.780					
+D+0.750L						10.430					
+D+0.750L+0.750S						22.580					
+0.60D						2.748					
L Only						7.800					
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	0.000 ft
+D+L	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+0.750L	0.0000 in	0.000ft	0.000 in	0.000 ft
+D+0.750L+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
L Only	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





Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 05 Beams.ec6

DESCRIPTION: FBA FB16 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		
End Fixities	Top & Bottom Pinned		
Overall Column Height	9 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Wood Section Name	**5-2x6**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**7.50** in	Allow Stress Modification Factors	
Exact Depth	**5.50** in	Cf or Cv for Bending	1.30
Area	41.250 in^2	Cf or Cv for Compressio	1.10
Ix	103.984 in^4	Cf or Cv for Tension	1.30
Iy	193.359 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0
		Use Cr : Repetitive ?	No

Column Buckling Condition:
Fully braced against buckling ABOUT X-X Axis
ABOUT Y-Y Axis: Luy = 9 ft, Ky = 1.0

Applied Loads

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

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

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.7876 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	25.180 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	775.08 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	9.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.908	0.2228	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+S	1.150	0.875	0.7876	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.750S	1.150	0.875	0.6359	PASS	0.0 ft	0.0	PASS	9.0 ft
+0.60D	1.600	0.812	0.08407	PASS	0.0 ft	0.0	PASS	9.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					5.780				
+D+S					25.180				
+D+0.750S					20.330				

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 05 Beams.ec6

LIC# : KW-06013353, Build:20.23.08.30 SNAKE RIVER ENGINEERING (c) ENERCALC INC 1983-2023

DESCRIPTION: FBA FB16 RB1 BRG

Maximum Reactions

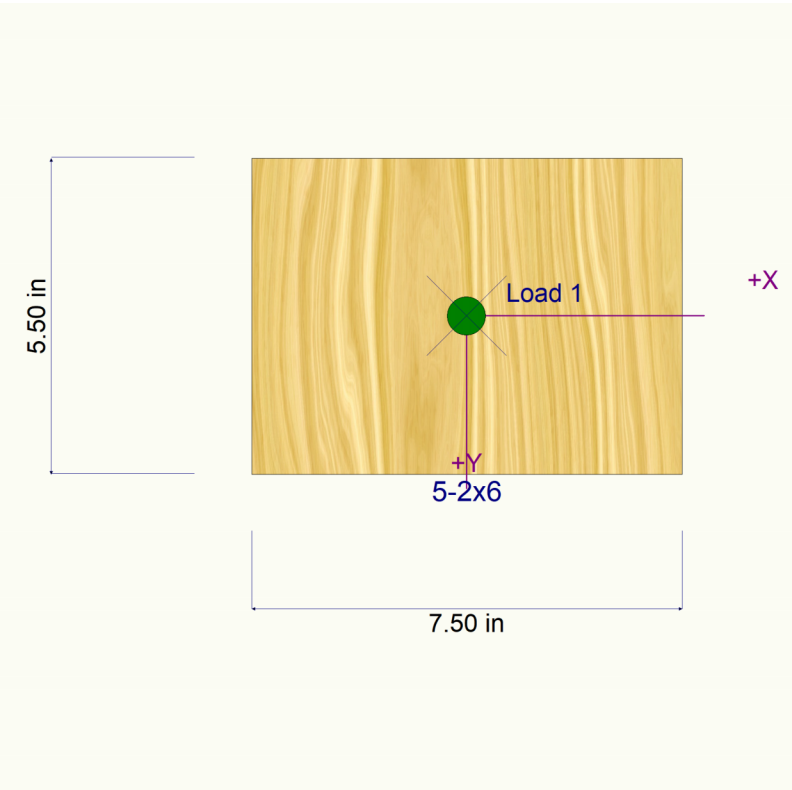
Note: Only non-zero reactions are listed.

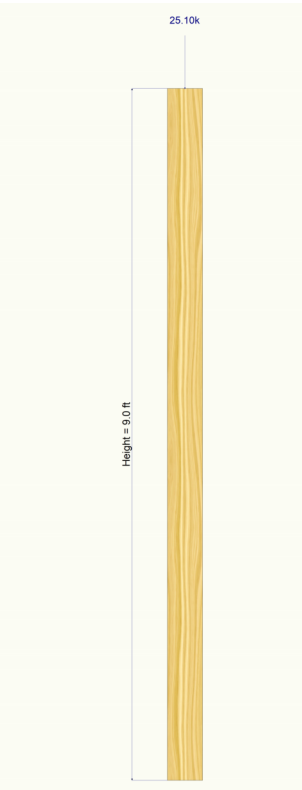
Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.60D						3.468					
S Only						19.400					

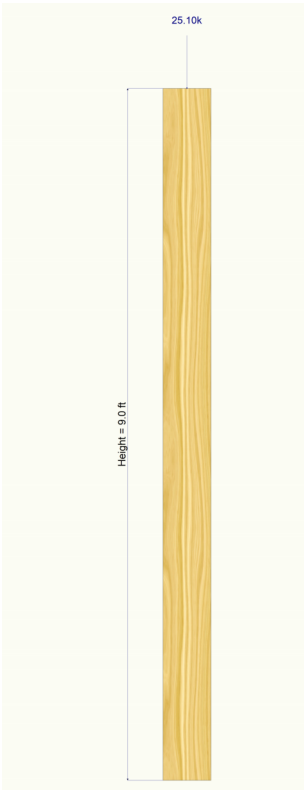
Maximum Deflections for Load Combinations

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
+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







Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Column

Project File: 05 Beams.ec6

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 streng	=	2.50 ksi
E =	=	3,122.0 ksi
Density	=	150.0 pcf
β	=	0.850
fy - Main Rebar	=	60.0 ksi
E - Main Rebar	=	29,000.0 ksi
Allow. Reinforcing Limits		*ASTM A615 Bars Used*
Min. Reinf.	=	1.0 %
Max. Reinf.	=	8.0 %

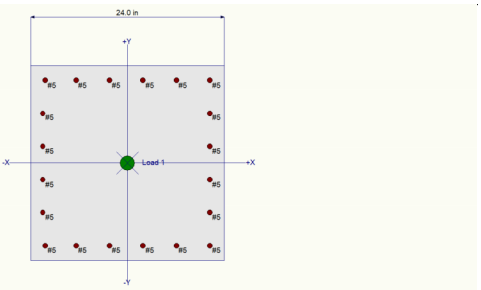
Overall Column Height = 15.50 ft
End Fixity Top & Bottom Pinned

Brace condition for deflection (buckling) along colum
X-X (width) axis :
Unbraced Length for buckling ABOUT X-X Axis = 15.50 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 15.50 ft, K = 1.0

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



Applied Loads

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

Load Combination	+1.40D
Location of max.above base	15.396 ft
Maximum Stress Ratio	**0.123 : 1**

Ratio = (Pu^2+Mu^2)^.5 / (PhiPn^2+PhiMn^2)^.5

Pu =	100.940 k	φ * Pn =	823.07 k
Mu-x =	11.103 k-ft	φ * Mn-x =	88.175 k-ft
Mu-y =	0.0 k-ft	φ * Mn-y =	0.1991 k-ft
Mu Angle =	0.0 deg	φ =	0.650
Mu at Angle =	11.103 k-ft	φMn at Angle =	90.308 k-ft

Pn & Mn values located at Pu-Mu vector intersection with capacity curve

Column Capacities . .

Pnmax : Nominal Max. Compressive Axial Capaci	1,582.83 k
Pnmin : Nominal Min. Tension Axial Capacity	k
φ Pn, max : Usable Compressive Axial Capacity	823.07 k
φ Pn, min : Usable Tension Axial Capacity	k

Maximum SERVICE Load Reactions .

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

Maximum SERVICE Load Deflections . .

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

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

General Section Informatio β = 0.850 θ = 0.80

ρ : % Reinforcing	1.076 %	Rebar % Ok
Reinforcing Area	6.20 in^2	
Concrete Area	576.0 in^2	

Governing Load Combination Results

Governing Factored Load Combination	Moment X-X	Moment Y-Y	Dist. from base ft	Axial Load k Pu	φ * Pn	Bending Analysis k-ft δx	δx * Mux	δy	δy * Muy	Alpha (deg)	δ Mu	φ Mn	Utilization Ratio
+1.40D	Actual	M2,min	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,min	15.40	86.52	823.07	1.000		1.000	9.52	90.000	9.52	90.61	**0.105**

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Column

Project File: 05 Beams.ec6

DESCRIPTION: --None--

Governing Load Combination Results

Governing Factored Load Combination	Moment X-X	Moment Y-Y	Dist. from base ft	Axial Load k Pu	φ * Pn	Bending Analysis k-ft δx	δx * Mux	δy	δy * Muy	Alpha (deg)	δ Mu	φ Mn	Utilization Ratio
+1.20D	M2,min	Actual	15.40	86.52	823.07	1.000	9.52	1.000		0.000	9.52	90.31	**0.105**
+0.90D	Actual	M2,min	15.40	64.89	823.07	1.000		1.000	7.14	90.000	7.14	90.61	**0.079**
+0.90D	M2,min	Actual	15.40	64.89	823.07	1.000	7.14	1.000		0.000	7.14	90.31	**0.079**

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	Mx - End Moments k-ft @ Base	@ Top	My - End Moments @ Base	@ Top
D Only					72.100				
+0.60D					43.260				

Maximum Moment Reactions

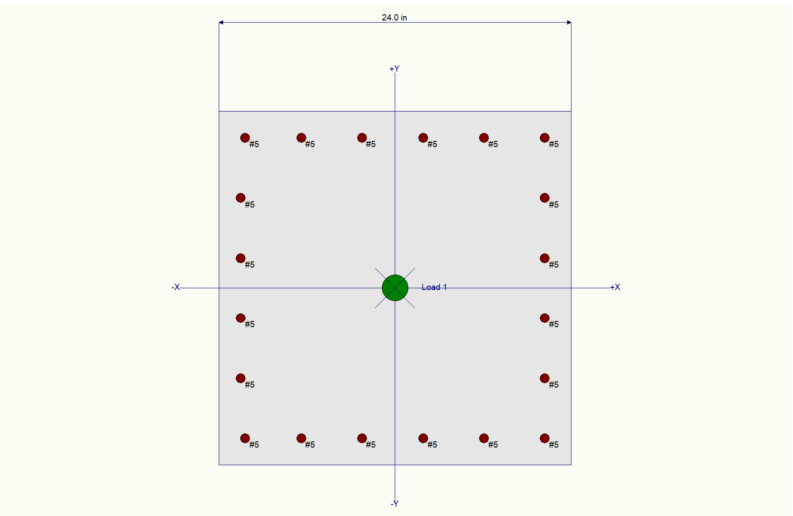
Note: Only non-zero reactions are listed.

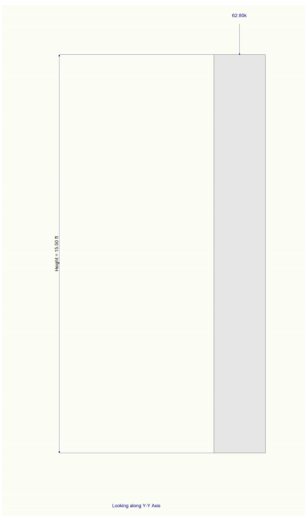
Load Combination	Moment About X-X Axis @ Base	@ Top	Moment About Y-Y Axis @ Base	@ Top
D Only	k-ft		k-ft	
+0.60D	k-ft		k-ft	

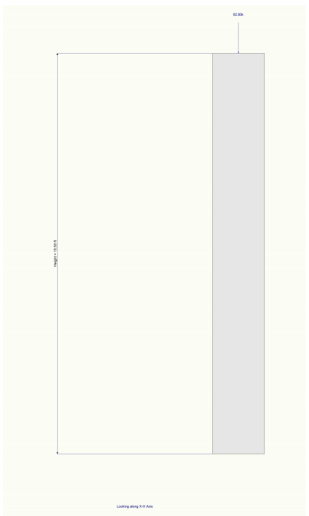
Maximum Deflections for Load Combinations

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

Sketches







Interaction Diagrams

Individual Footing Design

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)*	*(.0ft)*	=	**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**

1947plf

Use Footing Width:	**18**	**x**	**8**	**in**
W/		**(2)**	**#4**	**Cont.**

Individual Footing Design

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)*	*(.0ft)*	*(.0ft)*	=	**plf**

4990plf

Use Footing Width:	**48**	**x**	**10**	**in**
W/		**(4)**	**#4**	**Cont.**

Individual Footing Design

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)*	*(.0ft)*	*(.0ft)*	=	**plf**

2079plf

Use Footing Width:	**18**	**x**	**8**	**in**
W/		**(2)**	**#4**	**Cont.**

Individual Footing Design

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**

5043plf

Use Footing Width:	**48**	**x**	**10**	**in**
W/		**(4)**	**#4**	**Cont.**

Individual Footing Design

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**

1936plf

Use Footing Width:	**18**	**x**	**8**	**in**
W/		**(2)**	**#4**	**Cont.**

Individual Footing Design

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)*	*(.0ft)* *(.0ft)*	=	**plf**

3325plf

Use Footing Width:	**30**	**x**	**10**	**in**
W/		**(3)**	**#4**	**Cont.**

Individual Footing Design

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)*	*(.0ft)*	*(.0ft)*	=	**plf**

3755plf

Use Footing Width:	**36**	**x**	**10**	**in**
W/		**(3)**	**#4**	**Cont.**

Individual Footing Design

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**

3226plf

Use Footing Width:	**30**	**x**	**10**	**in**
W/		**(3)**	**#4**	**Cont.**

Individual Footing Design

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)*	*(.0ft)*	*(.0ft)*	=	**plf**

3224plf

Use Footing Width:	**30**	**x**	**10**	**in**
W/		**(3)**	**#4**	**Cont.**

Individual Footing Design

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)*	*(.0ft)*	*(.0ft)*	=	**plf**

4142plf

Use Footing Width:	**42**	**x**	**10**	**in**
W/		**(4)**	**#4**	**Cont.**

Individual Footing Design

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)*	*(.0ft)*	*(.0ft)*	=	**plf**

2908plf

Use Footing Width:	**30**	**x**	**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)				
Dimensions (Inches)			Capacity	# of Bars
60	x	10	6,850 plf	6
54	x	10	6,200 plf	5
48	x	10	5,500 plf	4
42	x	10	4,750 plf	4
36	x	10	4,000 plf	3
30	x	10	3,400 plf	3
24	x	8	2,800 plf	2
18	x	8	2,100 plf	2
16	x	8	1,850 plf	2
12	x	8	1,350 plf	2

Bars to be 3 1/2" from bottom of footing.

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 05 Beams.ec6

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	=	2.50	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

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

Soil Design Values

Allowable Soil Bearing	=	1.50	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

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

Increases based on footing plan dimension

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

Dimensions

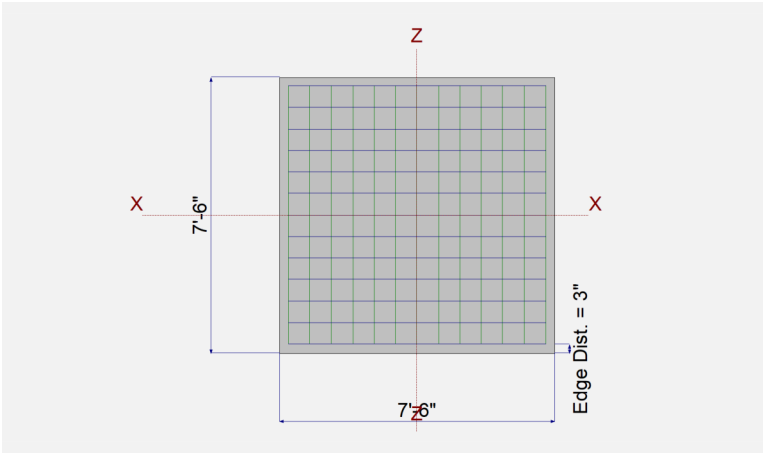
Width parallel to X-X Axis	=	7.50 ft
Length parallel to Z-Z Axis	=	7.50 ft
Footing Thickness	=	16.0 in

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



Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		13
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		13
Reinforcing Bar Size	=	#	4

Bandwidth Distribution Check (ACI 15.4.4.2)

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

Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	71.80							k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

DESCRIPTION: 71.8 K

DESIGN SUMMARY

Design OK

	Min. 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

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	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				

All units k

Sliding Stability

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

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	12.565	+Z	Bottom	0.3456	AsMin	0.3467	19.644	OK
X-X, +1.40D	12.565	-Z	Bottom	0.3456	AsMin	0.3467	19.644	OK
X-X, +1.20D	10.770	+Z	Bottom	0.3456	AsMin	0.3467	19.644	OK
X-X, +1.20D	10.770	-Z	Bottom	0.3456	AsMin	0.3467	19.644	OK
X-X, +0.90D	8.078	+Z	Bottom	0.3456	AsMin	0.3467	19.644	OK
X-X, +0.90D	8.078	-Z	Bottom	0.3456	AsMin	0.3467	19.644	OK
Z-Z, +1.40D	12.565	-X	Bottom	0.3456	AsMin	0.3467	19.644	OK
Z-Z, +1.40D	12.565	+X	Bottom	0.3456	AsMin	0.3467	19.644	OK
Z-Z, +1.20D	10.770	-X	Bottom	0.3456	AsMin	0.3467	19.644	OK
Z-Z, +1.20D	10.770	+X	Bottom	0.3456	AsMin	0.3467	19.644	OK
Z-Z, +0.90D	8.078	-X	Bottom	0.3456	AsMin	0.3467	19.644	OK
Z-Z, +0.90D	8.078	+X	Bottom	0.3456	AsMin	0.3467	19.644	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	30.93 psi	30.93 psi	30.93 psi	30.93 psi	30.93 psi	75.00 psi	0.41	OK
+1.20D	26.51 psi	26.51 psi	26.51 psi	26.51 psi	26.51 psi	75.00 psi	0.35	OK
+0.90D	19.88 psi	19.88 psi	19.88 psi	19.88 psi	19.88 psi	75.00 psi	0.27	OK

General Footing

DESCRIPTION: 71.8 K

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	145.78 psi	150.00 psi	0.9719	OK
+1.20D	124.96 psi	150.00 psi	0.8331	OK
+0.90D	93.72 psi	150.00 psi	0.6248	OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 05 Beams.ec6

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	=	2.50	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

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

Soil Design Values

Allowable Soil Bearing	=	1.50	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

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

Increases based on footing plan dimension

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

Dimensions

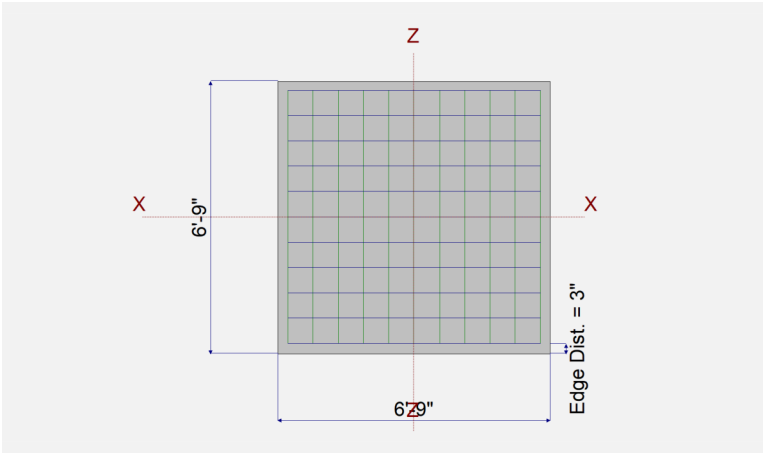
Width parallel to X-X Axis	=	6.750 ft
Length parallel to Z-Z Axis	=	6.750 ft
Footing Thickness	=	15.0 in

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

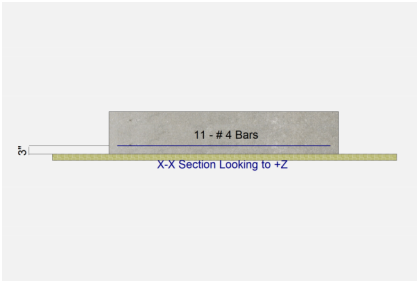


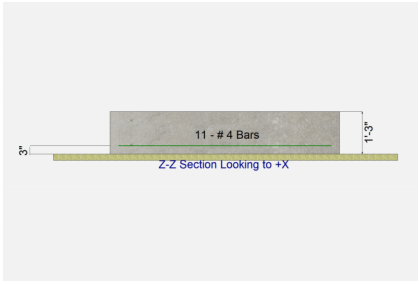
Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		11
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		11
Reinforcing Bar Size	=	#	4

Bandwidth Distribution Check (ACI 15.4.4.2)

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





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	58.50							k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 05 Beams.ec6

DESCRIPTION: 58.5 K

DESIGN SUMMARY

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

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	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				

All units k

Sliding Stability

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

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	10.238	+Z	Bottom	0.3240	AsMin	0.3259	17.038	OK
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...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	29.49 psi	29.49 psi	29.49 psi	29.49 psi	29.49 psi	75.00 psi	0.39	OK
+1.20D	25.28 psi	25.28 psi	25.28 psi	25.28 psi	25.28 psi	75.00 psi	0.34	OK
+0.90D	18.96 psi	18.96 psi	18.96 psi	18.96 psi	18.96 psi	75.00 psi	0.25	OK

General Footing

DESCRIPTION: 58.5 K

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	139.40 psi	150.00 psi	0.9293	OK
+1.20D	119.49 psi	150.00 psi	0.7966	OK
+0.90D	89.62 psi	150.00 psi	0.5974	OK

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 05 Beams.ec6

DESCRIPTION: F1

Code Reference

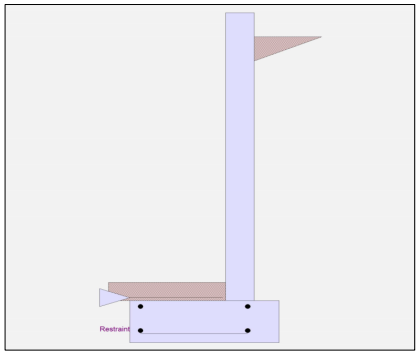
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

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

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
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



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	=	371.0 lbs
Axial Live Load	=	1,688.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	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
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Cantilevered Retaining Wall

DESCRIPTION: F1

Design Summary

Wall Stability Ratios

Overturning	=	1.61	OK
Slab Resists All Sliding !			
Global Stability	=	1.51	

Total Bearing Load	=	4,066	lbs
...resultant ecc.	=	1.73	in
Eccentricity within middle third			
Soil Pressure @ Toe	=	1,449	psf OK
Soil Pressure @ Heel	=	874	psf OK
Allowable	=	1,500	psf
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	2,029	psf
ACI Factored @ Heel	=	1,224	psf
Footing Shear @ Toe	=	17.2	psi OK
Footing Shear @ Heel	=	4.8	psi OK
Allowable	=	75.0	psi

Sliding Calcs

Lateral Sliding Force	=	1,263.4	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	1.600
Seismic, E	1.000

Stem Construction

		Bottom		
		Stem OK		
Design Height Above Ftg	ft =	0.00		
Wall Material Above "Ht"	=	Concrete		
Design Method	=	SD	SD	SD
Thickness	=	8.00		
Rebar Size	=	# 5		
Rebar Spacing	=	18.00		
Rebar Placed at	=	Edge		
Design Data				
fb/FB + fa/Fa	=	**0.664**		
Total Force @ Section				
Service Level	lbs =			
Strength Level	lbs =	1,504.4		
Moment....Actual				
Service Level	ft-# =			
Strength Level	ft-# =	3,675.8		
Moment.....Allowable	=	5,527.6		
Shear.....Actual				
Service Level	psi =			
Strength Level	psi =	20.3		
Shear.....Allowable	psi =	75.0		
Anet (Masonry)	in2 =			
Wall Weight	psf =	100.0		
Rebar Depth 'd'	in =	6.19		

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	2,500.0
Fy	psi =	60,000.0

Cantilevered Retaining Wall

DESCRIPTION: F1

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.1392 in2/ft		
(4/3) * As :	0.1856 in2/ft	Min Stem T&S Reinf Area 1.536 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 :	0.1856 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	=	2.25 ft
Heel Width	=	1.25
Total Footing Width	=	3.50
Footing Thickness	=	14.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 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. Torsion, phi 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:	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

Cantilevered Retaining Wall

DESCRIPTION: F1

Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	1,263.4	2.83	3,578.2			
HL Act Pres (be water tbl)						
Hydrostatic Force						
Buoyant Force =						
Surcharge over Heel =						
Surcharge Over Toe =						
Adjacent Footing Load =						
Added Lateral Load =						
Load @ Stem Above Soil =						
=						
Soil Over HL (ab. water tbl)				470.3	3.21	1,509.0
Soil Over HL (bel. water tbl)					3.21	1,509.0
Water Table						
Sloped Soil Over Heel =						
Surcharge Over Heel =						
Adjacent Footing Load =						
Axial Dead Load on Stem =				371.0	2.58	958.4
* Axial Live Load on Stem =				1,688.0	2.58	4,360.7
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 =						
Footing Weight =				612.5	1.75	1,071.9
Key Weight =						
Vert. Component =						
Total =	1,263.4	**O.T.M.** =	3,578.2	**Total =** 2,377.6 lbs	**R.M.=**	5,745.2

Resisting/Overturning Ratio = **1.61**

Vertical Loads used for Soil Pressure = 4,065.6 lbs

* Axial live load NOT included in total displayed, or used for 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.

DESCRIPTION: F1

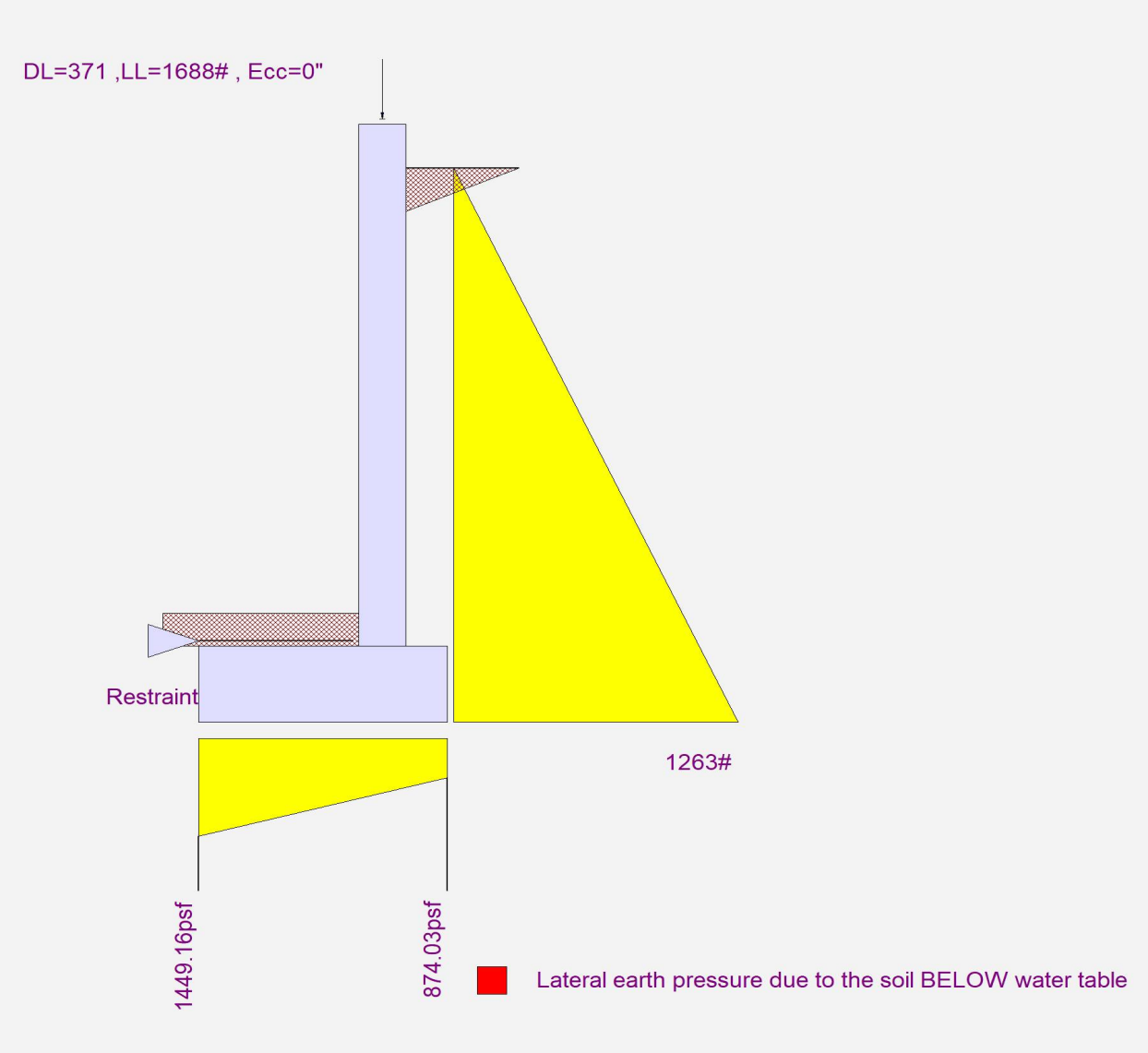
Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	23.40 in
Development length for #5 bar specified in this stem design segment =	18.00 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	10.50 in
As Provided =	0.2067 in2/ft
As Required =	0.1856 in2/ft

Cantilevered Retaining Wall

DESCRIPTION: F1



Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 05 Beams.ec6

DESCRIPTION: F13 CANT.

Code Reference

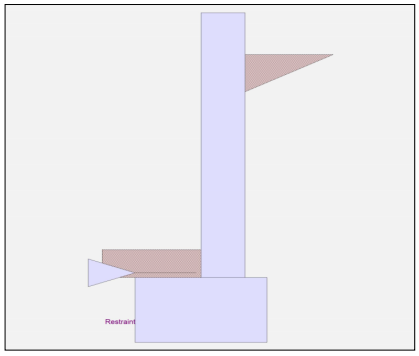
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

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

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
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



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	=	279.0 lbs
Axial Live Load	=	490.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	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
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Cantilevered Retaining Wall

DESCRIPTION: F13 CANT.

Design Summary

Wall Stability Ratios

Overturning	=	2.05	OK
Slab Resists All Sliding !			
Global Stability	=	2.44	
Total Bearing Load	=	1,796 lbs	
...resultant ecc.	=	1.97 in	
Eccentricity within middle third			
Soil Pressure @ Toe	=	1,341 psf	OK
Soil Pressure @ Heel	=	455 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,877 psf	
ACI Factored @ Heel	=	637 psf	
Footing Shear @ Toe	=	1.3 psi	OK
Footing Shear @ Heel	=	1.7 psi	OK
Allowable	=	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

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		
		Stem OK		
Design Height Above Ftg	ft =	0.00		
Wall Material Above "Ht"	=	Concrete		
Design Method	=	SD	SD	SD
Thickness	=	8.00		
Rebar Size	=	# 5		
Rebar Spacing	=	18.00		
Rebar Placed at	=	Edge		
Design Data				
fb/FB + fa/Fa	=	**0.108**		
Total Force @ Section				
Service Level	lbs =			
Strength Level	lbs =	448.0		
Moment....Actual				
Service Level	ft-# =			
Strength Level	ft-# =	597.3		
Moment.....Allowable	=	5,527.6		
Shear.....Actual				
Service Level	psi =			
Strength Level	psi =	6.0		
Shear.....Allowable	psi =	75.0		
Anet (Masonry)	in2 =			
Wall Weight	psf =	100.0		
Rebar Depth 'd'	in =	6.19		

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	2,500.0
Fy	psi =	60,000.0

Cantilevered Retaining Wall

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 Width	=	2.00
Footing Thickness	=	14.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		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, phi Tu	=	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	0.60	in2
Min footing T&S reinf Area per foot	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

Cantilevered Retaining Wall

DESCRIPTION: F13 CANT.

Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	467.2	1.72	804.5			
HL Act Pres (be water tbl)						
Hydrostatic Force						
Buoyant Force =						
Surcharge over Heel =						
Surcharge Over Toe =						
Adjacent Footing Load =						
Added Lateral Load =						
Load @ Stem Above Soil =						
=						
				Soil Over HL (ab. water tbl)	146.7	1.83	268.9
				Soil Over HL (bel. water tbl)		1.83	268.9
				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
				Soil Over Toe =	55.0	0.50	27.5
				Surcharge Over Toe =			
				Stem Weight(s) =	475.0	1.33	633.3
				Earth @ Stem Transitions =			
				Footing Weight =	350.0	1.00	350.0
				Key Weight =			
				Vert. Component =			
Total =	467.2	**O.T.M.** =	804.5	**Total =**	1,305.7 lbs	**R.M.=**	1,651.7

Resisting/Overturning Ratio = **2.05**

Vertical Loads used for Soil Pressure = 1,795.7 lbs

* Axial live load NOT included in total displayed, or used for 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)	0.088	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.

DESCRIPTION: F13 CANT.

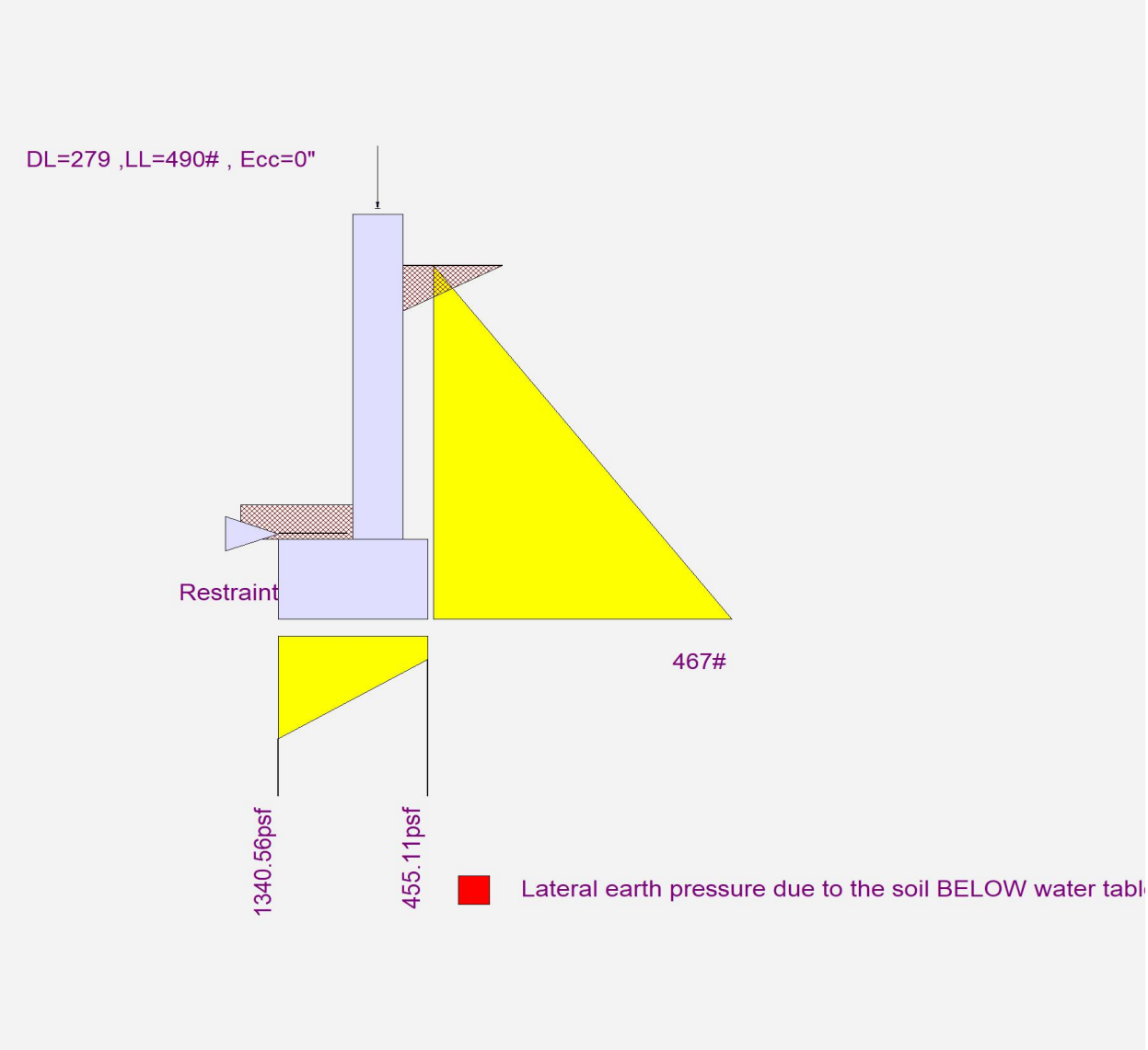
Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	23.40 in
Development length for #5 bar specified in this stem design segment =	18.00 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	10.50 in
As Provided =	0.2067 in2/ft
As Required =	0.1728 in2/ft

Cantilevered Retaining Wall

DESCRIPTION: F13 CANT.



Project Title:
Engineer:
Project ID:
Project Descr:

Restrained Retaining Wall

Project File: 05 Beams.ec6

DESCRIPTION: F13

Code Reference

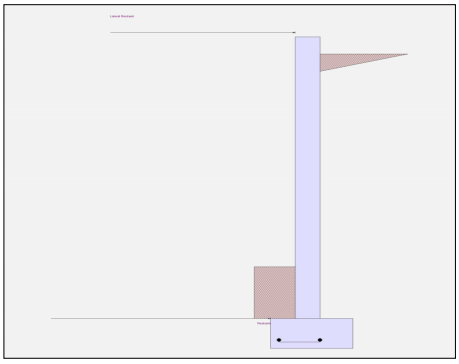
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

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

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
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



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	=	279.0 lbs
Axial Live Load	=	490.0 lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	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

K_h Soil Density Multiplier = 0.2 g Added seismic per unit area = 0.0 psf

Design Summary

Total Bearing Load	=	3,609.33 lbs	
...resultant ecc.	=	0.0 in	
Soil Pressure @ Toe	=	1,443.73 psf	OK
Soil Pressure @ Heel	=	1,443.73 psf	OK
Allowable	=	psf	
Soil Pressure Less Than 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, W	1.000
Seismic, E	1.000

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
Moment....Actual	=	0.0 ft-#	3,934.77 ft-#	3,934.77 ft-#
Moment.....Allowable	=	5,467.34 ft-#	5,990.46 ft-#	5,467.34 ft-#
Shear Force @ this height	=	481.199 lbs		2,208.40 lbs
Shear.....Actual	=	7.291 psi		33.461 psi
Shear.....Allowable	=	75.0 psi		75.0 psi

Restrained Retaining Wall

DESCRIPTION: F13

Footing Strengths & Dimensions

Toe Width	=	.83333333 ft
Heel Width	=	.66666666
Total Footing Width	=	2.50
Footing Thickness	=	14.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 2,500.0 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,810.88	1,810.88	psf
Mu' : Upward	=	628.78		ft-#
Mu' : Downward	=	164.583		ft-#
Mu: Design	=	464	-124	ft-#
Actual 1-Way Shear	=	0.1567		psi
Allow 1-Way Shear	=	75.0	75.0	psi

Other Acceptable Sizes & 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 defined

Min footing T&S reinf Area 0.76 in2
Min footing T&S reinf Area per foot 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

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on footing for soil pressure

>>> Sliding Forces are restrained by the adjacent slab

Load & Moment Summary For Footing : For Soil Pressure Calcs

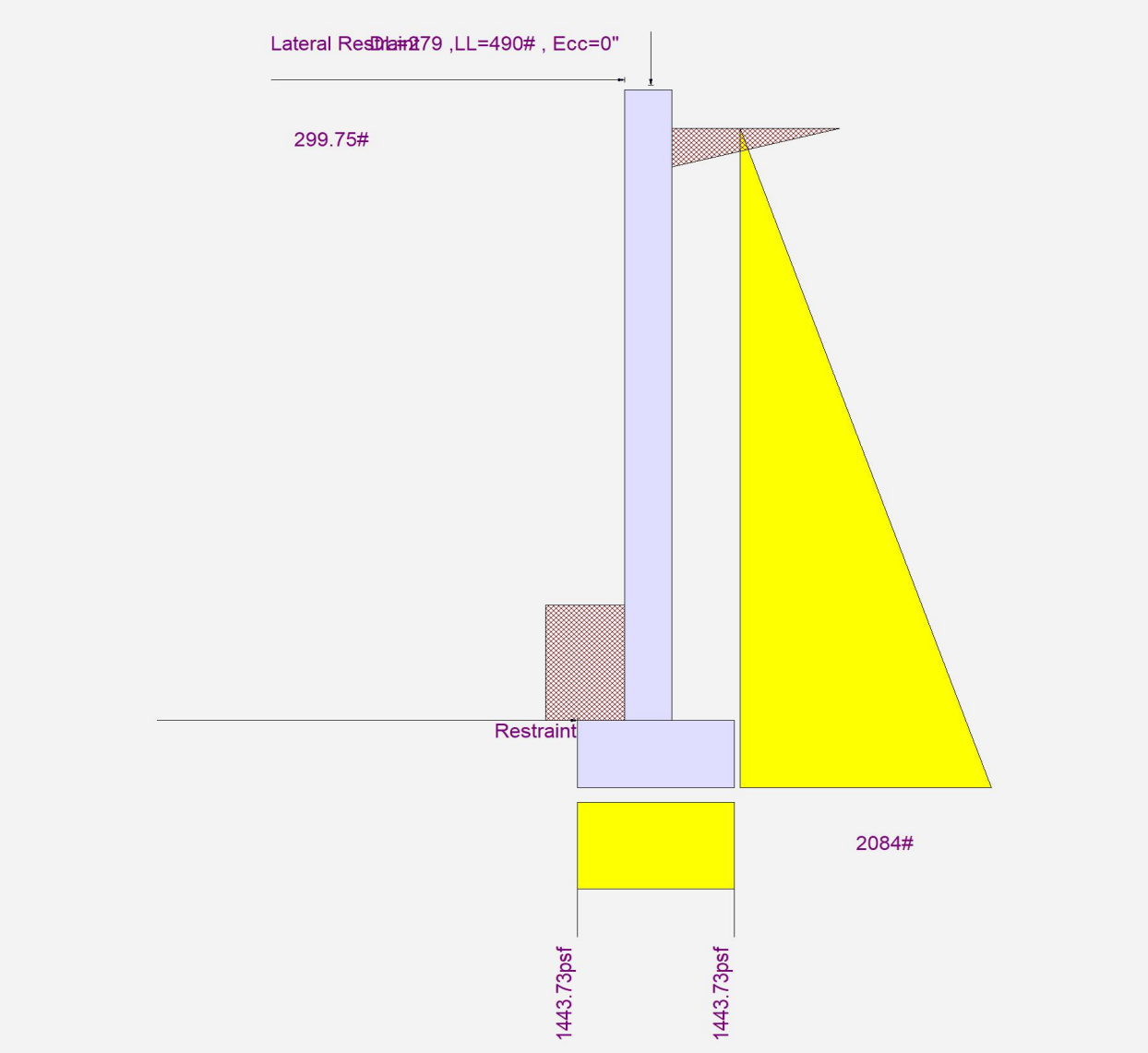
Moment @ Top of Footing Applied from Stem			=		-2,459.23 ft-#
Surcharge Over Heel	=	0.0 lbs	0.0 ft		0.0 ft-#
Adjacent Footing Load	=	0.0 lbs	0.0 ft		0.0 ft-#
Axial Dead Load on Stem	=	769.0 lbs	1.167 ft		897.17 ft-#
Soil Over Toe	=	183.333 lbs	0.4167 ft		76.389 ft-#
Surcharge Over Toe	=	0.0 lbs	0.0 ft		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

DESCRIPTION: F13



Project Title:
Engineer:
Project ID:
Project Descr:

Restrained Retaining Wall

Project File: 05 Beams.ec6

DESCRIPTION: F14

Code References

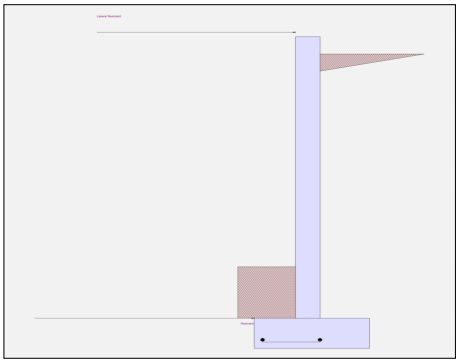
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

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

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
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



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	=	346.0 lbs
Axial Live Load	=	1,018.0 lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	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

K_h Soil Density Multiplier = 0.2 g Added seismic per unit area = 0.0 psf

Design Summary

Total Bearing Load	=	5,053.08 lbs	
...resultant ecc.	=	0.0 in	
Soil Pressure @ Toe	=	1,443.74 psf	OK
Soil Pressure @ Heel	=	1,443.74 psf	OK
Allowable	=	psf	
Soil Pressure Less Than 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, W	1.000
Seismic, E	1.000

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
Moment....Actual	=	0.0 ft-#	3,934.77 ft-#	3,934.77 ft-#
Moment.....Allowable	=	5,467.34 ft-#	5,990.46 ft-#	5,467.34 ft-#
Shear Force @ this height	=	481.199 lbs		2,208.40 lbs
Shear.....Actual	=	7.291 psi		33.461 psi
Shear.....Allowable	=	75.0 psi		75.0 psi

Restrained Retaining Wall

DESCRIPTION: F14

Footing Strengths & Dimensions

Toe Width	=	.33333333 ft
Heel Width	=	.16666666
Total Footing Width	=	3.50
Footing Thickness	=	14.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 2,500.0 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,848.83	1,848.83	psf
Mu' : Upward	=	1,643.40		ft-#
Mu' : Downward	=	421.333		ft-#
Mu: Design	=	1,222	-322	ft-#
Actual 1-Way Shear	=	5.001		psi
Allow 1-Way Shear	=	75.0	75.0	psi

Other Acceptable Sizes & 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 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:	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

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on footing for soil pressure

>>> Sliding Forces are restrained by the adjacent slab

Load & Moment Summary For Footing : For Soil Pressure Calcs

Moment @ Top of Footing Applied 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	=	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-#

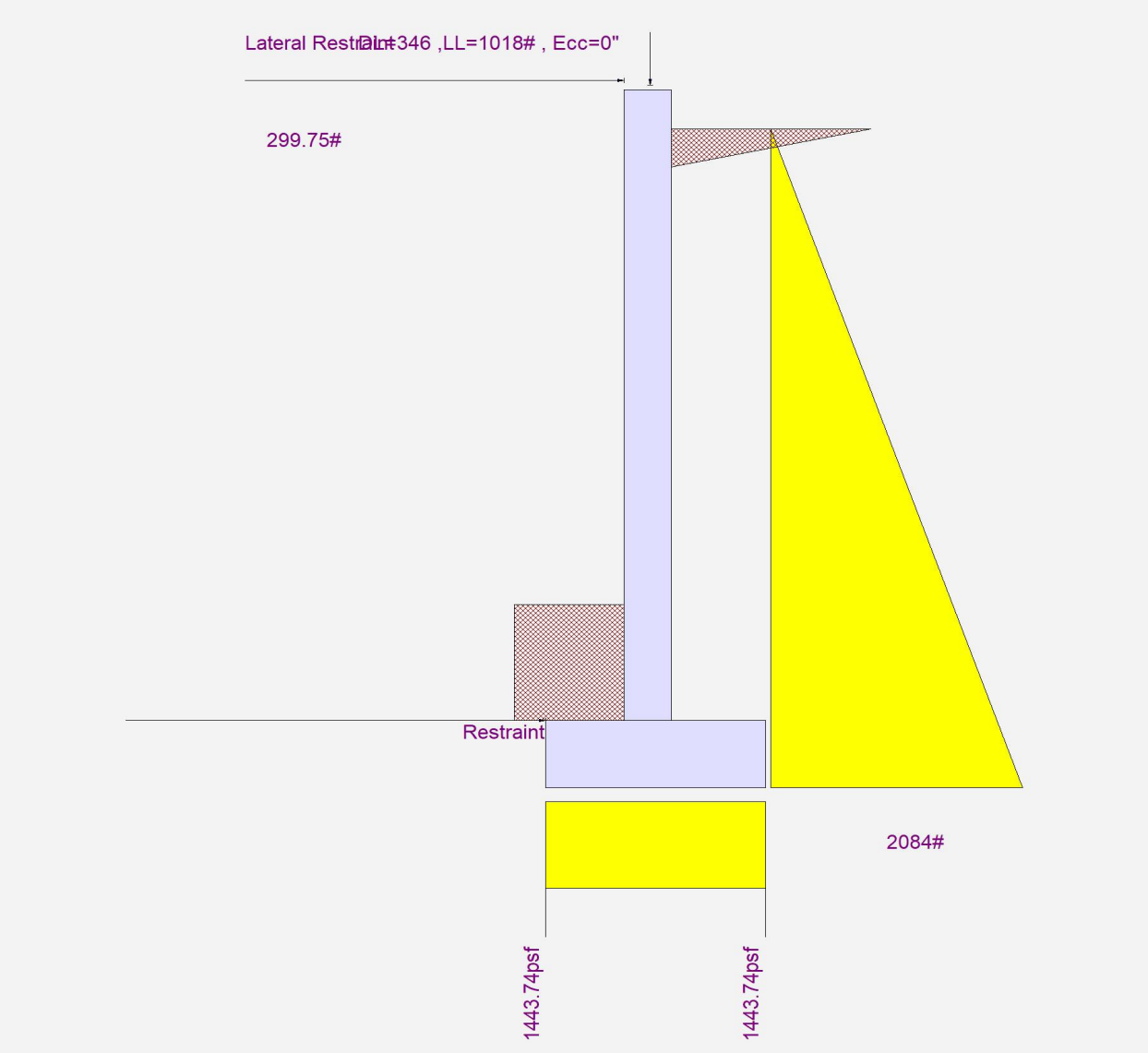
Stem is specified to be fixed to footing, and top restraint is assumed to react out any tendency for moment at the footing/soil interface, so uniform soil pressure is assumed.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Restrained Retaining Wall

LIC# : KW-06013353, Build:20.23.08.30 SNAKE RIVER ENGINEERING (c) ENERCALC INC 1983-2023

DESCRIPTION: F14



Project Title:
Engineer:
Project ID:
Project Descr:

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: F8

Code Reference

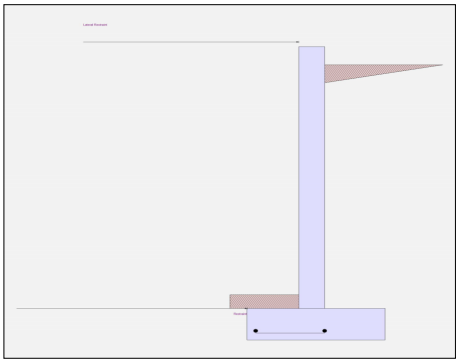
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

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

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
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



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	=	434.0 lbs
Axial Live Load	=	1,660.0 lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	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

K_h Soil Density Multiplier = 0.2 g Added seismic per unit area = 0.0 psf

Design Summary

Total Bearing Load	=	5,580.58 lbs	
...resultant ecc.	=	0.0 in	
Soil Pressure @ Toe	=	1,395.15 psf	OK
Soil Pressure @ Heel	=	1,395.15 psf	OK
Allowable	=	psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,840.18 psf	
ACI Factored @ Heel	=	1,840.18 psf	
Footing Shear @ Toe	=	8.793 psi	OK
Footing Shear @ Heel	=	5.607 psi	OK
Allowable	=	75.0 psi	
Reaction at Top	=	227.412 lbs	
Reaction at Bottom	=	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, W	1.000
Seismic, E	1.000

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	=	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
Design Data				
fb/FB + fa/Fa	=		0.449	0.491
Moment....Actual	=	0.0 ft-#	2,686.81 ft-#	2,686.81 ft-#
Moment.....Allowable	=	5,467.34 ft-#	5,990.46 ft-#	5,467.34 ft-#
Shear Force @ this height	=	365.459 lbs		1,708.14 lbs
Shear.....Actual	=	5.537 psi		25.881 psi
Shear.....Allowable	=	75.0 psi		75.0 psi

Restrained Retaining Wall

DESCRIPTION: F8

Footing Strengths & Dimensions

Toe Width	=	.58333333 ft
Heel Width	=	3.41666666
Total Footing Width	=	4.0
Footing Thickness	=	14.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 2,500.0 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,840.18	1,840.18	psf
Mu' : Upward	=	2,306.61		ft-#
Mu' : Downward	=	345.958		ft-#
Mu: Design	=	1,961	-677	ft-#
Actual 1-Way Shear	=	8.793		psi
Allow 1-Way Shear	=	75.0	75.0	psi

Other Acceptable Sizes & 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 defined

Min footing T&S reinf Area 1.21 in2
Min footing T&S reinf Area per foot 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

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on footing for soil pressure

>>> Sliding Forces are restrained by the adjacent slab

Load & Moment Summary For Footing : For Soil Pressure Calcs

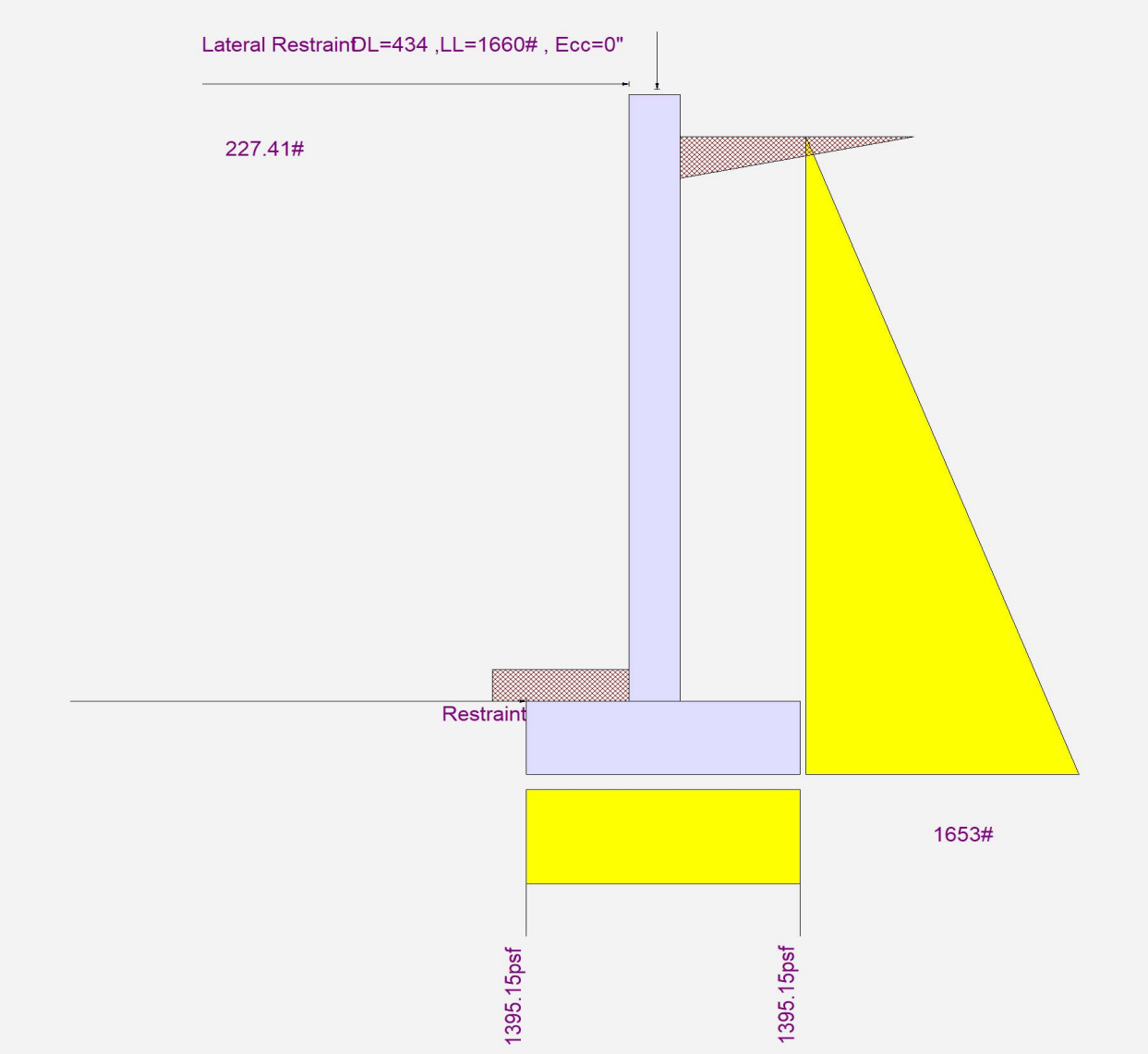
Moment @ Top of Footing Applied from Stem			=	-1,679.26	ft-#
Surcharge Over Heel	=	0.0 lbs	0.0 ft	0.0	ft-#
Adjacent Footing Load	=	0.0 lbs	0.0 ft	0.0	ft-#
Axial Dead Load on Stem	=	2,094.0 lbs	1.917 ft	4,013.50	ft-#
Soil Over Toe	=	87.083 lbs	0.7917 ft	68.941	ft-#
Surcharge Over Toe	=	0.0 lbs	0.0 ft	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

DESCRIPTION: F8



Project Title:
Engineer:
Project ID:
Project Descr:

Restrained Retaining Wall

Project File: 05 Beams.ec6

DESCRIPTION: F15

Code Reference

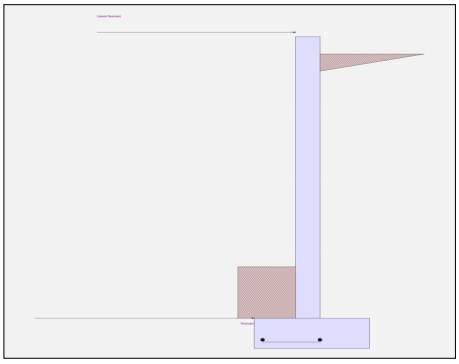
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

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

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
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



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	=	406.0 lbs
Axial Live Load	=	820.0 lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	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

K_h Soil Density Multiplier = 0.2 g Added seismic per unit area = 0.0 psf

Design Summary

Total Bearing Load	=	4,915.08 lbs	
...resultant ecc.	=	0.0 in	
Soil Pressure @ Toe	=	1,404.31 psf	OK
Soil Pressure @ Heel	=	1,404.31 psf	OK
Allowable	=	psf	
Soil Pressure Less Than 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	=	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	1.000
Seismic, E	1.000

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
Moment....Actual	=	0.0 ft-#	3,934.77 ft-#	3,934.77 ft-#
Moment.....Allowable	=	5,467.34 ft-#	5,990.46 ft-#	5,467.34 ft-#
Shear Force @ this height	=	481.199 lbs		2,208.40 lbs
Shear.....Actual	=	7.291 psi		33.461 psi
Shear.....Allowable	=	75.0 psi		75.0 psi

Restrained Retaining Wall

DESCRIPTION: F15

Footing Strengths & Dimensions

Toe Width	=	.33333333 ft
Heel Width	=	.16666666
Total Footing Width	=	3.50
Footing Thickness	=	14.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 2,500.0 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,778.89	1,778.89	psf
Mu' : Upward	=	1,581.23		ft-#
Mu' : Downward	=	421.333		ft-#
Mu: Design	=	1,160	-243	ft-#
Actual 1-Way Shear	=	4.747		psi
Allow 1-Way Shear	=	75.0	75.0	psi

Other Acceptable Sizes & 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 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:	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

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on footing for soil pressure

>>> Sliding Forces are restrained by the adjacent slab

Load & Moment Summary For Footing : For Soil Pressure Calcs

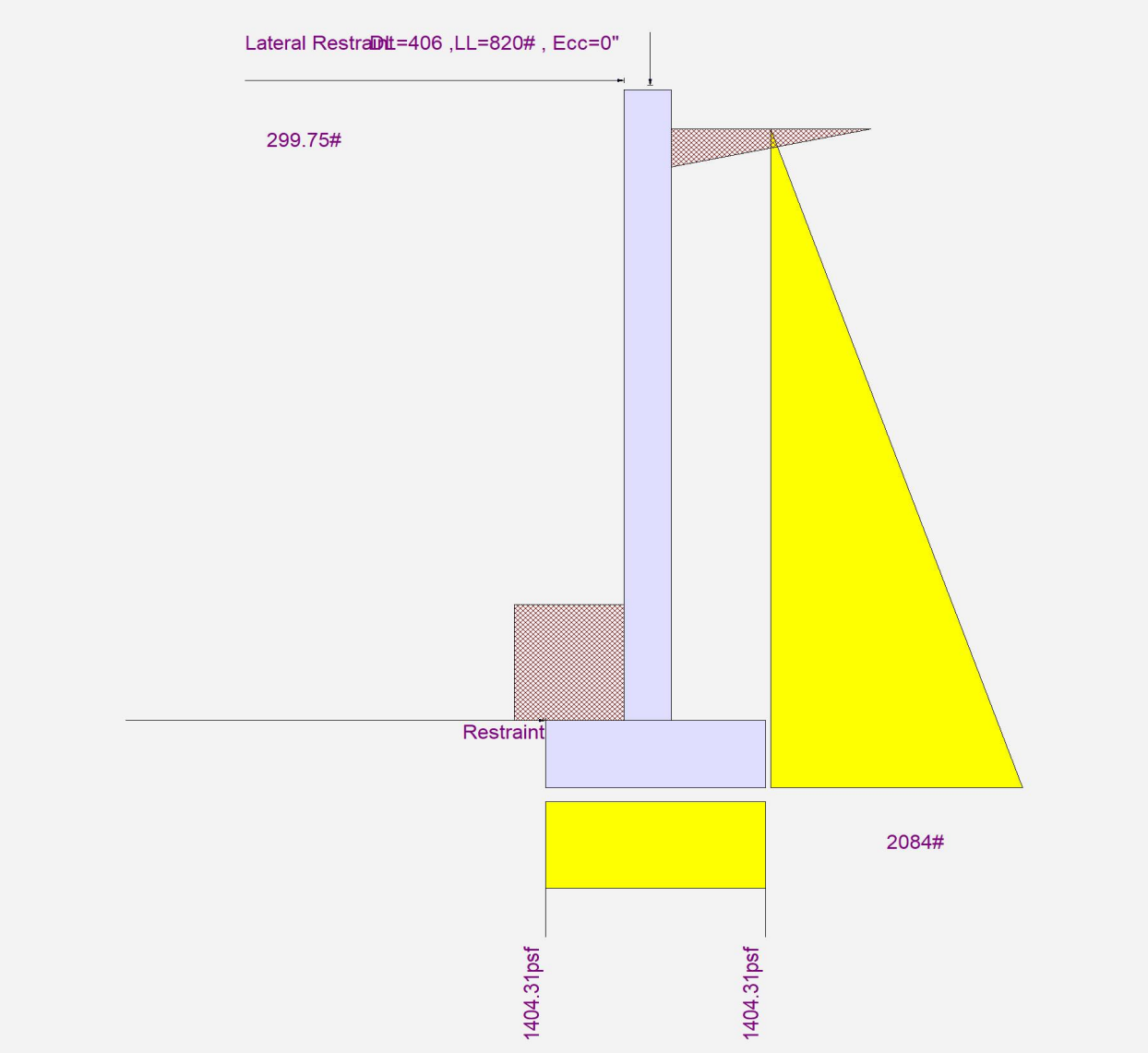
Moment @ Top of Footing Applied from Stem			=	-2,459.23	ft-#
Surcharge Over Heel	=	0.0 lbs	0.0 ft	0.0	ft-#
Adjacent Footing Load	=	0.0 lbs	0.0 ft	0.0	ft-#
Axial Dead Load on Stem	=	1,226.0 lbs	1.667 ft	2,043.33	ft-#
Soil Over Toe	=	293.333 lbs	0.6667 ft	195.556	ft-#
Surcharge Over Toe	=	0.0 lbs	0.0 ft	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

DESCRIPTION: F15



Project Title:
Engineer:
Project ID:
Project Descr:

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

Code Reference

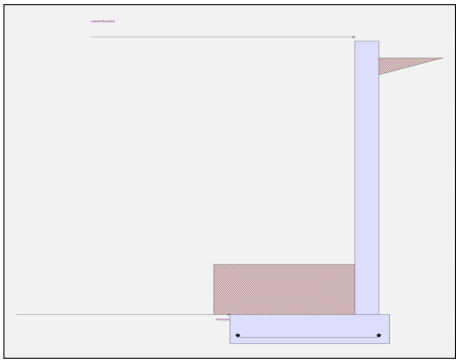
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

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

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
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



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	=	622.0 lbs
Axial Live Load	=	3,455.0 lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	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

K_h Soil Density Multiplier = 0.2 g Added seismic per unit area = 0.0 psf

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 Than Allowable			
ACI Factored @ Toe	=	2,028.36 psf	
ACI Factored @ Heel	=	2,028.36 psf	
Footing Shear @ Toe	=	38.551 psi	OK
Footing Shear @ Heel	=	1.124 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	1.000
Seismic, E	1.000

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
Moment....Actual	=	0.0 ft-#	3,934.77 ft-#	3,934.77 ft-#
Moment.....Allowable	=	5,467.34 ft-#	5,990.46 ft-#	5,467.34 ft-#
Shear Force @ this height	=	481.199 lbs		2,208.40 lbs
Shear.....Actual	=	7.291 psi		33.461 psi
Shear.....Allowable	=	75.0 psi		75.0 psi

Restrained Retaining Wall

DESCRIPTION: F4

Footing Strengths & Dimensions

Toe Width	=	4.0 ft
Heel Width	=	1.0
Total Footing Width	=	5.0
Footing Thickness	=	14.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 2,500.0 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

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 Sizes & Spacings:

Toe: # 5 @ 8.00 in -or- #4@ 6.63 in, #5@ 10.27 in, #6@ 14.59 in, #7@ 19.8
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 Area 1.51 in2
Min footing T&S reinf Area per foot 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

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on footing for soil pressure

>>> Sliding Forces are restrained by the adjacent slab

Load & Moment Summary For Footing : For Soil Pressure Calcs

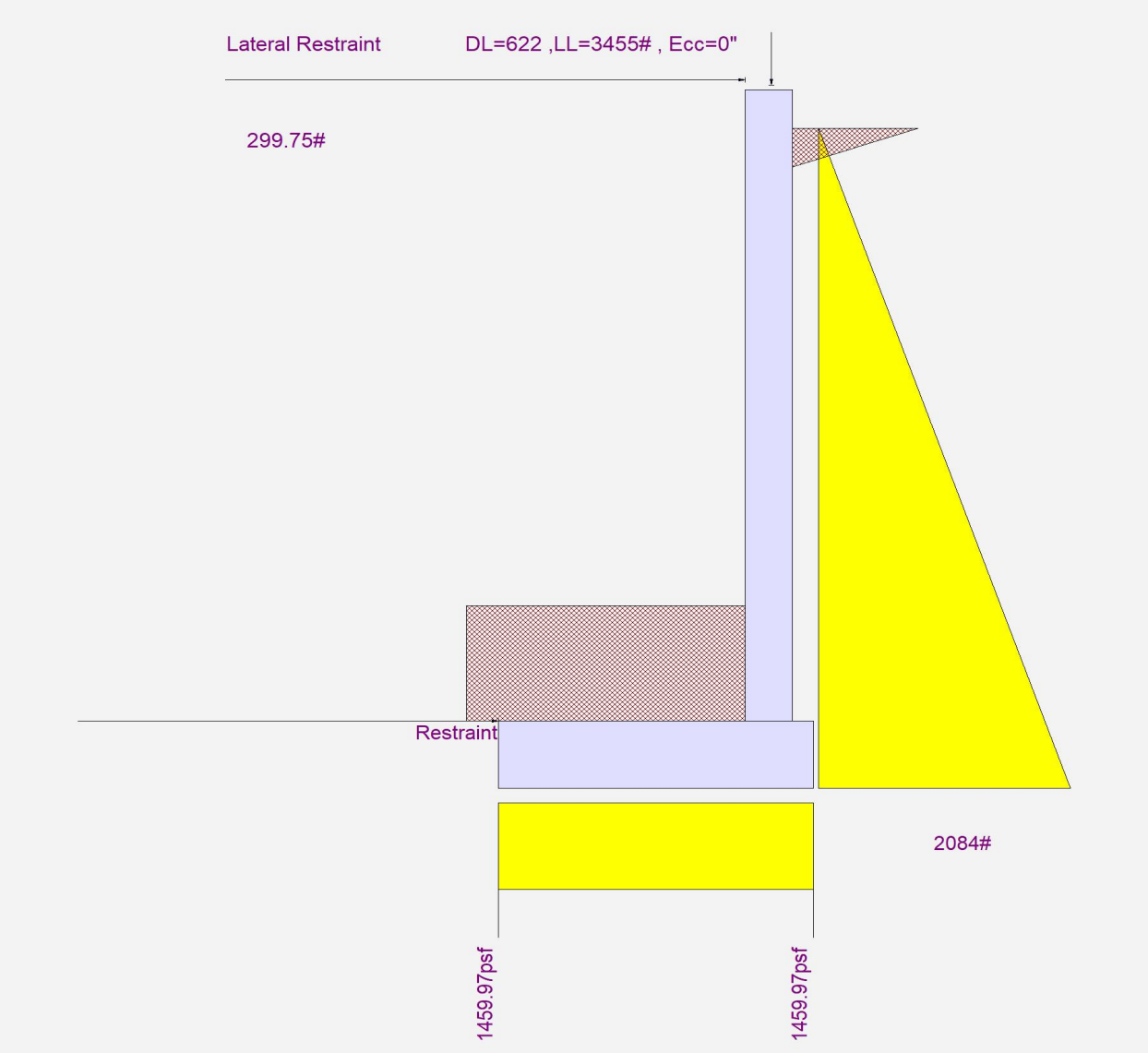
Moment @ Top of Footing Applied from Stem			=		-2,459.23 ft-#
Surcharge Over Heel	=	0.0 lbs	0.0 ft		0.0 ft-#
Adjacent Footing Load	=	0.0 lbs	0.0 ft		0.0 ft-#
Axial Dead Load on Stem	=	4,077.0 lbs	4.333 ft		17,667.0 ft-#
Soil Over Toe	=	880.0 lbs	2.0 ft		1,760.0 ft-#
Surcharge Over Toe	=	0.0 lbs	0.0 ft		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

DESCRIPTION: F4



Project Title:
Engineer:
Project ID:
Project Descr:

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

Code Reference

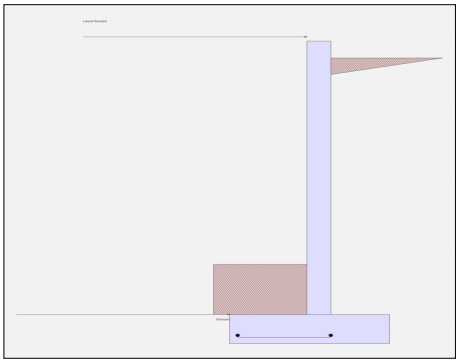
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

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

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
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



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	=	501.0 lbs
Axial Live Load	=	2,290.0 lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	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

K_h Soil Density Multiplier = 0.2 g Added seismic per unit area = 0.0 psf

Design Summary

Total Bearing Load	=	7,375.08 lbs	
...resultant ecc.	=	0.0 in	
Soil Pressure @ Toe	=	1,475.02 psf	OK
Soil Pressure @ Heel	=	1,475.02 psf	OK
Allowable	=	psf	
Soil Pressure Less Than 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	1.000
Seismic, E	1.000

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
Moment....Actual	=	0.0 ft-#	3,934.77 ft-#	3,934.77 ft-#
Moment.....Allowable	=	5,467.34 ft-#	5,990.46 ft-#	5,467.34 ft-#
Shear Force @ this height	=	481.199 lbs		2,208.40 lbs
Shear.....Actual	=	7.291 psi		33.461 psi
Shear.....Allowable	=	75.0 psi		75.0 psi

Restrained Retaining Wall

DESCRIPTION: F16

Footing Strengths & Dimensions

Toe Width	=	2.50 ft
Heel Width	=	2.50
Total Footing Width	=	5.0
Footing Thickness	=	14.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 2,500.0 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 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@ 23.8
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 Area 1.51 in2
Min footing T&S reinf Area per foot 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

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on footing for soil pressure

>>> Sliding Forces are restrained by the adjacent slab

Load & Moment Summary For Footing : For Soil Pressure Calcs

Moment @ Top of Footing Applied 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

DESCRIPTION: F16