BURT ENGINEERING

18530 MERIDIAN AVE N.
SHORELINE, WA 98133

Structural Calculations

For

VISHY AND MADHURI REMODEL
8203 AVALON DRIVE,
MERCER ISLAND, WA 98040
April 28, 2025

2021 International Building Code
Wind: 110 MPH, Exposure C, Kzt= 1.0
Seismic: Design Category D

PROJECT NAME	
ADDRESS	8203 AVALON DRIVE, MERCER ISLAND, WA 98040
PROJECT #	
DATE	4/12/2025

BUILDING CODE

2021 International Residential Code
2021 International Building Code

WIND DESIGN

Vult =	110	MPH
Vasd =	85	MPH
Exposure =	C	
K_{ZT} =	1.00	
Importance Factor =	1.0	

SEISMIC DESIGN

Ss(g) =	1.46	S_{MS}(g) =	1.46	S_{DS}(g) =	0.974
S_1(g) =	0.503				
Seismic Design Category =	D				
Site Class =	D				
Importance Factor =	1.0				

DESIGN LOADING

Roof Snow Load =	25	PSF	
Floor Live Load =	40	PSF	
Bedroom Live Load =	30	PSF	
Deck & Balcony Live Load =	60	PSF	
Roof Dead Load =	15	PSF	
Floor Dead Load =	15	PSF	(For framing gravity design)
Exterior Wall Dead Load =	10	PSF	
Partition Wall Seismic Weight =	10	PSF	
Floor Seismic Weight =	10	PSF	

SCOPE OF WORK

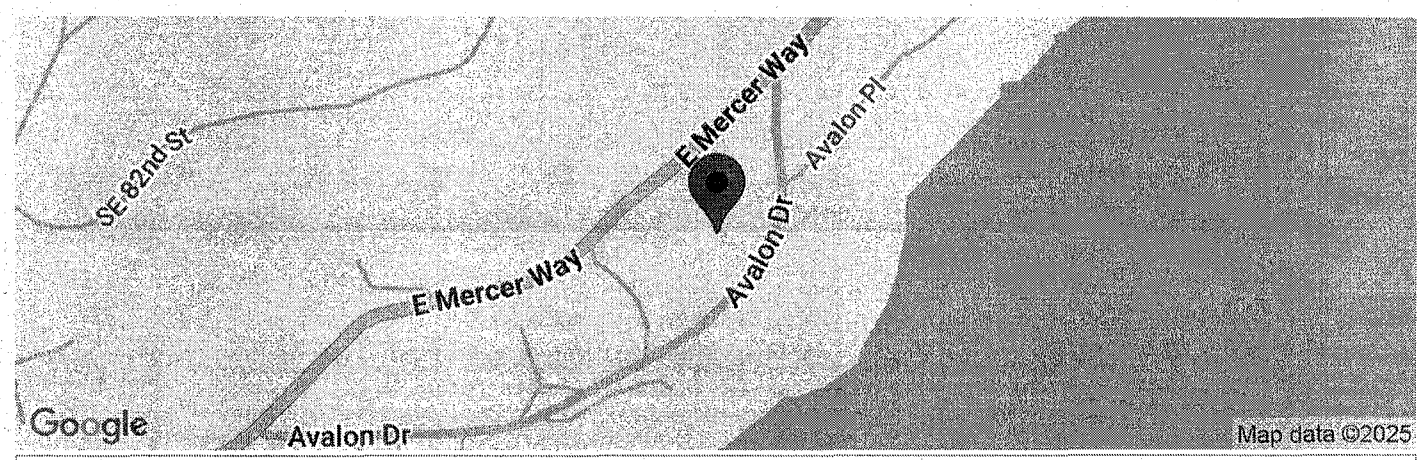
Existing residence upper building addition design, with new main floor framing and existing basement foundation wall. New pin pile deep foundation design for existing basement.

USGS web services were down for some period of time and as a result this tool wasn't operational, resulting in *timeout* error.
USGS web services are now operational so this tool should work as expected.

OSHPD

8203 Avalon Dr, Mercer Island, WA 98040, USA

Latitude, Longitude: 47.5295735, -122.2207676



Date	4/28/2025, 4:02:30 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.46	MCE_R ground motion. (for 0.2 second period)
S_1	0.503	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.46	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	0.974	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.624	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.687	Site modified peak ground acceleration
T_L	6	Long-period transition period in seconds
SsRT	1.46	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.619	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	4.323	Factored deterministic acceleration value. (0.2 second)
S1RT	0.503	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.561	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	1.635	Factored deterministic acceleration value. (1.0 second)

Type	Value	Description
PGAd	1.423	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA_{UH}	0.624	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.902	Mapped value of the risk coefficient at short periods
C_{R1}	0.898	Mapped value of the risk coefficient at a period of 1 s
C_V	1.392	Vertical coefficient

BUILDING LATERAL DESIGN CHECK

ROOF WT: 2490 ft². (15 PSF + (10 PSF/2) = 49.8 kip.

2nd FLOOR WT: 1752 ft². (10 PSF + 10 PSF) = 35.1 kip.

ROOF HT: 9'6 (20'6)

2nd FLOOR HT: 11'

DESCRIPTION: Seismic Base Shear Analysis

Specific Description:

Risk Category — Calculations per ASCE 7-16

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

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

USER DEFINED Ground Motion — ASCE 7-16 11.4.2

Max. Ground Motions, 5% Damping

S_S = 1.460 g, 0.2 sec response
S_1 = 0.5030 g, 1.0 sec response

For the closest datapoint grid location . . .

Latitude = 0.000 deg North
Longitude = 0.000 deg West

Conforms to ASCE 7 Section 12.8.1.3: Regular structure with period of 0.5 s or less, SDS limited to max of 0.7*SDS or 1.0 for calculatior

Site Class, Site Coeff. and Design Category

Classification: "D" : Shear Wave Velocity 600 to 1,200 ft/sec		=	**D** (Based on Testing)	*ASCE 7-16 Table 20.3-1*
Site Coefficients Fa & Fv	Fa	=	1.00	*ASCE 7-16 Table 11.4-1 & 11.4-2*
(using straight-line interpolation from table val	Fv	=	1.80	
Maximum Considered Earthquake Accelerat	S_{MS} = Fa * Ss	=	1.460	*ASCE 7-16 Eq. 11.4-1*
	S_{M1} = Fv * S1	=	0.904	*ASCE 7-16 Eq. 11.4-2*
Design Spectral Acceleration	S_{DS} = S_{MS} * 2/3	=	0.973	*ASCE 7-16 Eq. 11.4-3*
	S_{D1} = S_{M1} * 2/3	=	0.603	*ASCE 7-16 Eq. 11.4-4*
Seismic Design Category		=	**D**	*ASCE 7-16 Table 11.6-1 & -2*

Resisting System — *ASCE 7-16 Table 12.2-1*

Basic Seismic Force Resisting System . . . **Bearing Wall Systems**
15.Light-frame (wood) walls sheathed w/wood structural panels rated for shear resistance.

Response Modification Coefficient " I " = 6.50
System Overstrength Factor " Wo " = 2.50
Deflection Amplification Factor " Cd " = 4.00

NOTE! See ASCE 7-16 for all applicable footnc

Building height Limits :

Category "A & B" Limit:	No Limit
Category "C" Limit:	No Limit
Category "D" Limit:	Limit = 65
Category "E" Limit:	Limit = 65
Category "F" Limit:	Limit = 65

Lateral Force Procedure — *ASCE 7-16 Section 12.8.2*

Equivalent Lateral Force Procedure

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

Determine Building Period — *Use ASCE 12.8-7*

Structure Type for Building Period Calcul: All Other Structural Systems

" Ct " value = 0.020 " hn " : Height from base to highest leve 20.50 ft
" x " value = 0.75
" Ta " Approximate fundemental period using Eq. 12.8-7 : Ta = Ct * (hn ^ x) = 0.193 sec
"TL" : Long-period transition period per ASCE 7-16 Maps 22-14 -> 22-17 6.000 sec

Building Period " Ta " Calculated from Approximate Method sel= 0.193

DESCRIPTION: Seismic Base Shear Analysis

" Cs " Response Coefficient

ASCE 7-16 Section 12.8.1.1

S_{DS} : Short Period Design Spectral Response	=	0.973	From Eq. 12.8-2, Preliminary Cs	=	0.150
" R " : Response Modification Factor	=	6.50	From Eq. 12.8-3 & 12.8-4 , Cs need not excee	=	0.481
" I " : Seismic Importance Factor	=	1	From Eq. 12.8-5 & 12.8-6, Cs not be less than	=	0.043

User has selected ASCE 12.8.1.3 : Regular structure, Less than 5 Stories and with T <<= 0.5 sec, SO Ss <= 1.5 for Cs calcul

Cs : Seismic Response Coefficient = = 0.1497

Seismic Base Shear

ASCE 7-16 Section 12.8.1

Cs = 0.1497 from 12.8.1.1

W (see Sum Wi below) = 84.90 k

Seismic Base Shear V = Cs * W = 12.71 k

Vertical Distribution of Seismic Forces

ASCE 7-16 Section 12.8.3

" k " : hx exponent based on Ta = 1.00

Table of building Weights by Floor Level...

Level #	Wi : Weight	Hi : Height	(Wi * Hi^k)	Cvx	Fx=Cvx * V	Sum Story Shear	Sum Story Moment
2	49.80	20.50	1,020.90	0.7256	9.22	9.22	0.00
1	35.10	11.00	386.10	0.2744	3.49	12.71	87.63

Sum Wi = 84.90 k Sum Wi * Hi = 1,407.00 k-ft Total Base Shear = 12.71 k

Base Moment = 227.5 k-ft

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

ASCE 7-16 12.10.1.1

Level #	Wi	Fi	Sum Fi	Sum Wi	Fpx : Calcd	Fpx : Min	Fpx : Max	Fpx	Dsgn. Force
2	49.80	9.22	9.22	49.80	9.22	9.69	19.39	9.69	9.69
1	35.10	3.49	12.71	84.90	5.26	6.83	13.67	6.83	6.83

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

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

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

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

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

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

ASCE 7

Wind Loads per ASCE 7 Chapter 28 MWFRS (Envelope Procedure)- Low-Rise Buildings

Input Cells =
Project Number:
Project Name: WISHWAS MOHAN RESIDENCE
Location:
Design By:

Program Limitations: 1. Mean roof height *h* less than or equal to 60 ft.
2. Mean roof height *h* does not exceed least horizontal dimension.

BUILDING AND SITE INFORMATION

INPUT

Building width, B =	34	ft (perpendicular to ridge)
Building length, L =	55	ft (parallel to ridge)
Building eave height, h_e =	20.5	ft
Building ridge height, h_r =	26.5	ft
Height of parapet, h_p =	20.5	ft
Roof slope, s =	4.00 in./ft.	= 18.43 degrees
Is roof a gable or hip =	Gable	
Risk Category =	II	
Wind velocity, V =	110	mi/hr = 85 mi/hr (ASD)
Exposure =	C	
Topographic factor, K_{zt} =	1	
Wind directionality factor, K_d =	0.85	
Bldg internal pressure condition =	Enclosed	

OUTPUT

Mean roof height, h =	23.5	ft
2a =	6.8	ft
h/L =	0.43	
h/B =	0.69	
Internal Pressure Coeff's, GC_{pi} =	0.18	
	-0.18	
Pressure exposure coeff, K_h =	0.93	
Velocity pressure, q_h =	24.49	psf

Design Wind Pressure (LRFD)
23.1 PSF

Bldg. Info.	Height(ft)	Roof	First	
		9.5	11	
	E-W Width	55	ft	
	N-S Width	34	ft	

E-W Vw (kip)	Roof	6.1	Sum (kip)	6.1
	First	13.1		19.2
N-S Vw (kip)	Roof	3.8	Sum (kip)	3.8
	First	8.1		11.9

MAIN WIND-FORCE RESISTING SYSTEM (MWFRS)

Wind Pressures for Low-Rise Buildings

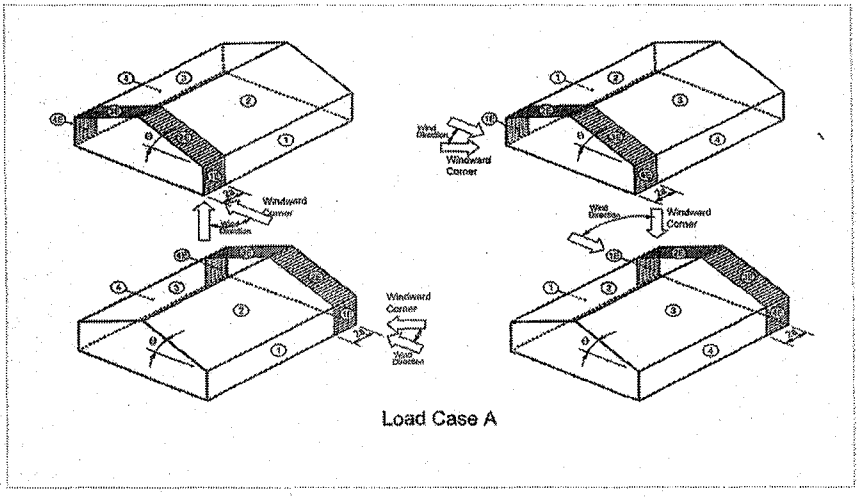
$$p = q_h[(GC_{pf}) - (GC_{pi})] \ (lb/ft^2)$$

Load Case A: Winds Perpendicular to Ridge

Bldg Surface	GC_{pf}	Wind Pressure (lb/ft^2)	
		LRFD	ASD
1	0.52	12.8	7.7
2	-0.69	-16.9	-10.1
3	-0.47	-11.6	-7
4	-0.42	-10.3	-6.2
1E	0.78	19.2	11.5
2E	-1.07	-26.3	-15.8
3E	-0.67	-16.5	-9.9
4E	-0.62	-15.2	-9.1

Internal pressure = +/- 4.4 psf (LRFD)
+/- 2.6 psf (ASD)

Note: 1. Sign Convention
positive numbers denote forces toward the surface
negative numbers denote forces away from the surface
2. Minimum wind design loads shall not be less than 16 psf (LRFD) multiplied by wall area of building and 8 psf (LRFD) multiplied by the roof area of the building projected onto a vertical plane normal to the assumed wind direction (see Sect. C27.4.7 & Figure C27.4-1)
3. Internal pressure cancels when Zones 1 & 4 and 1E & 4E are combined, but adds or subtracts at Zones 2 & 3 and 2E & 3E that do not have directly opposing loads.



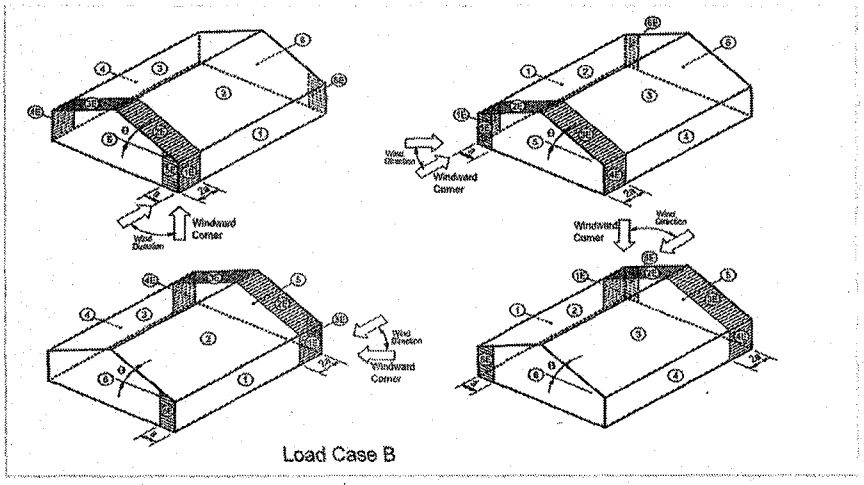
Load Case A

Load Case B: Winds Parallel to Ridge

Bldg Surface	GC_{pf}	Wind Pressure (lb/ft^2)	
		LRFD	ASD
1	-0.45	-11.1	-6.7
2	-0.69	-16.9	-10.1
3	-0.37	-9.1	-5.5
4	-0.45	-11.1	-6.7
5	0.4	9.8	5.9
6	-0.29	-7.2	-4.3
1E	-0.48	-11.8	-7.1
2E	-1.07	-26.3	-15.8
3E	-0.53	-13	-7.8
4E	-0.48	-11.8	-7.1
5E	0.61	15	9
6E	-0.43	-10.6	-6.4

Internal pressure = +/- 4.4 psf (LRFD)
+/- 2.6 psf (ASD)

Note: 1. Sign Convention
positive numbers denote forces toward the surface
negative numbers denote forces away from the surface
2. Minimum wind design loads shall not be less than 16 psf (LRFD) multiplied by wall area of building (see Sect. C27.4.7 & Figure C27.4-1).
3. Internal pressure cancels when Zones 1 & 4 and 1E & 4E are combined, but adds or subtracts at Zones 2 & 3 and 2E & 3E that do not have directly opposing loads.



Load Case B

MAIN WIND-FORCE RESISTING SYSTEM (MWFRS)

Wind Pressures for Parapets

Pressure exposure coeff, K_z = 0.91
Velocity pressure, q_p = 23.96 psf (LRFD)

$p_p = q_p(GC_{pn})$ (lb/ft^2)

Windward parapets, p_{p_wind} = 35.9 psf (LRFD)
Leeward parapets, p_{p_lee} = -24 psf (LRFD)

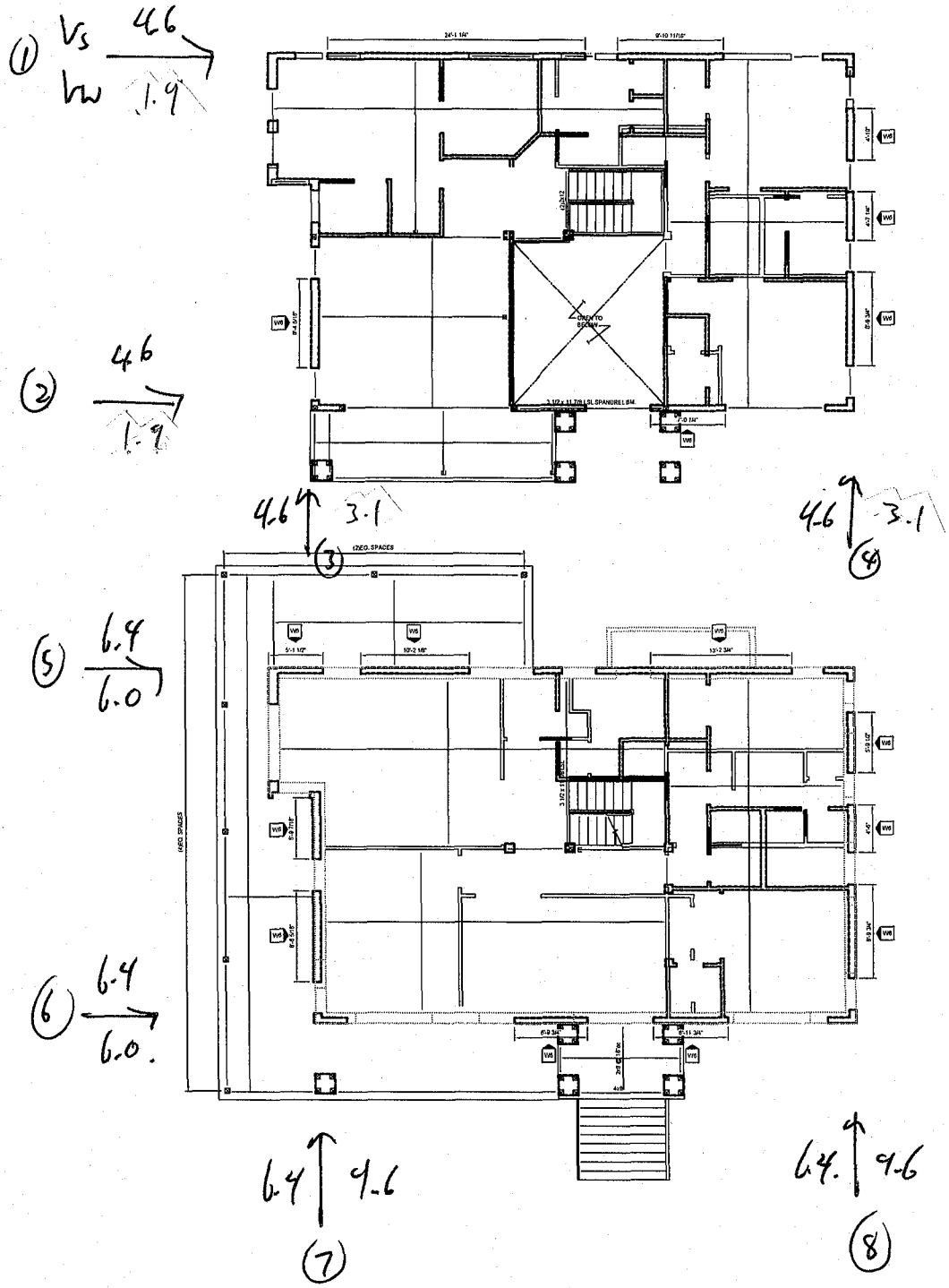
positive numbers signify net pressure acting toward the exterior side of the parapet
negative numbers signify net pressure acting away from the exterior side of the parapet

Wind Pressures for Roof Uplift

Roof uplift load up to 6.8 feet from exterior walls, p = -25.1 psf (LRFD)

Roof uplift load more than 6.8 feet from exterior walls, p = -16.2 psf (LRFD)

BUILDING SHEAR WALL DESIGN CHECK



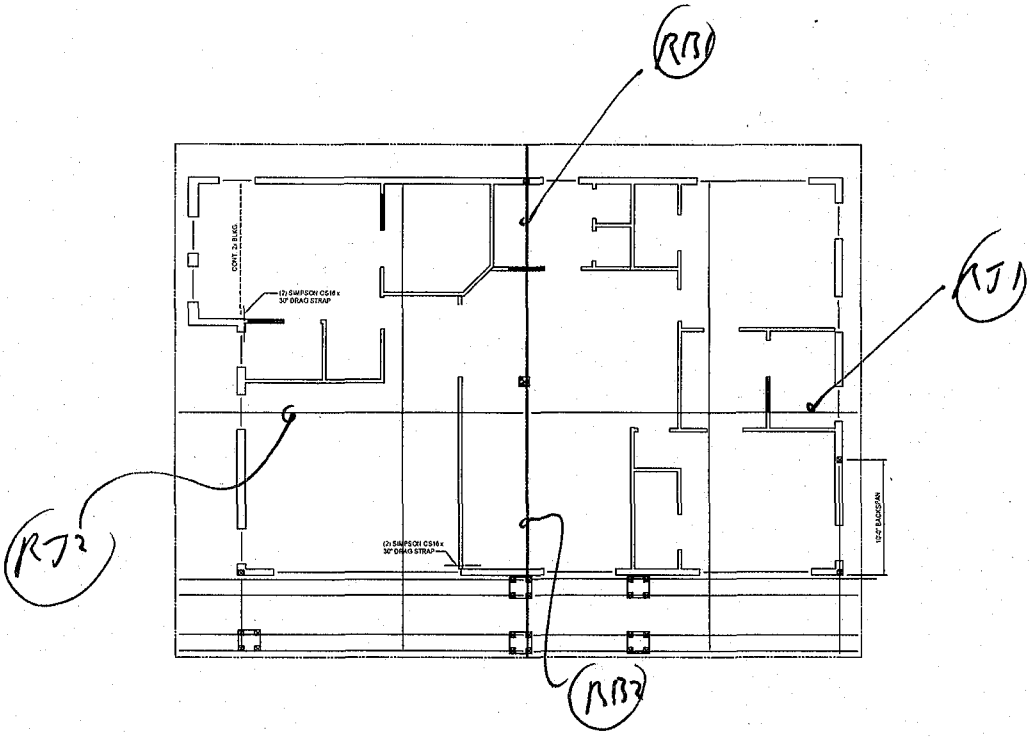
Wood Shear Wall Design 2021 IBC

	SW#	Length b(ft)	Height h(ft)	Vseismic (LRFD)(kips)	Vwind (LRFD)(kips)	Aspect Ratio h/b	h/b>2?	Total Design V (ASD)		SW Design	SW Uplift (ASD)	Wall Holdown	Foundation Holdown
Seisc.	SW1	33.92'	9.50'	4.60 k	1.90 k	0.28	N	3.22 k	0.09 klf	W6	-.06 k		
		WALL											
Seisc.	SW2	7.0'	9.50'	4.60 k	1.90 k	1.36	N	3.22 k	0.46 klf	W3	4.17 k	MSTC52	
		WALL											
Seisc.	SW3	8.33'	9.50'	4.60 k	3.10 k	1.14	N	3.22 k	0.39 klf	W3	3.43 k	MSTC52	
		WALL											
Seisc.	SW4	18.17'	9.50'	4.60 k	3.10 k	0.52	N	3.22 k	0.18 klf	W6	1.17 k	MSTC28	
		WALL											
Seisc.	SW5	28.42'	11.0'	6.40 k	6.0 k	0.39	N	4.48 k	0.16 klf	W6	.80 k		Not Reqd'
Seisc.	SW6	13.67'	11.0'	6.40 k	6.0 k	0.80	N	4.48 k	0.33 klf	W4	3.15 k		HDU4(9")
Wind	SW7	14.25'	11.0'	6.40 k	9.60 k	0.77	N	5.76 k	0.40 klf	W4	3.98 k		HDU4(9")
Wind	SW8	19.0'	11.0'	6.40 k	9.60 k	0.58	N	5.76 k	0.30 klf	W6	2.71 k		HDU4(9")

SW #	Vs,all (ASD) (kip/ft)	Vw,all (ASD) (kip/ft)	Wall HD	Tall (ASD)(kips)	FTG HD	Tall (ASD) (kips)
W6	0.26	0.37	MSTC28	1.54	STHD10	3.40
W4	0.38	0.53	MSTC40	3.08	STHD14	3.82
W3	0.49	0.69	MSTC52	4.62	HDU4	4.57
2W6	0.52	0.73	MSTC66	5.86	HDU5	5.65
2W4	0.76	1.07	MST72	6.73	HDU8	6.97
2W3	0.98	1.37	CMST12x84"	9.215	HDU11	9.34
2W2	1.28	1.79	2xMSTC66	11.72	HDU14	10.77
			2xMST72	13.46	HD12	12.67
			2xCMST12x84"	18.43	HDU14(SPC.)	14.44
			HD19(SPC.)	19.07	HD12(SPC.)	15.51
					HD19	16.77
					HD19(SPC.)	19.07

*Holdown not required for uplift less than 1 Kips(ASD)

ROOF FRAMING PLAN.



RB1, = RB2, L= 16'9 MAX. TL= 27'. 6.75 X 13.5 GLB.

RJ1 = RJ2, L: 27'4" MAX.

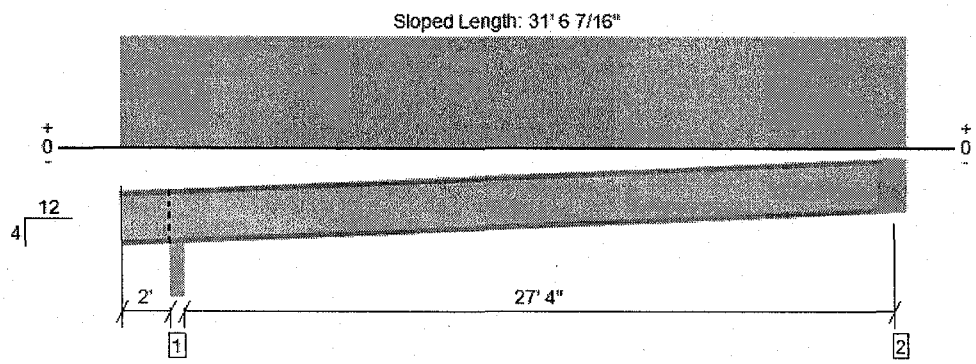
FORTEWEB

MEMBER REPORT

PASSED

Level, Roof: Joist

1 piece(s) 11 7/8" TJI® 360 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	649 @ 29' 7 1/2"	1242 (1.75")	Passed (52%)	1.15	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	649 @ 29' 7 1/2"	1961	Passed (33%)	1.15	1.0 D + 1.0 S (Alt Spans)
Moment (Ft-lbs)	4438 @ 15' 11 1/4"	7107	Passed (62%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	1.182 @ 15' 10 13/16"	1.448	Passed (L/294)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	1.677 @ 15' 10 13/16"	1.931	Passed (L/207)	--	1.0 D + 1.0 S (Alt Spans)

Member Length : 31' 6 11/16"
System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 4/12

- 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories	Details
	Total	Available	Required	Dead	Snow	Factored		
1 - Beveled Plate - SPF	3.50"	3.50"	3.50"	224	532	757	Blocking	R1
2 - Hanger on 13.50" GLB beam	3.50"	Hanger[1]	1.75" / - [2]	196	466	662	See note [1]	H5S

- 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' 5" 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.
- Dimensions for lateral bracing intervals are measured along the length of the member for sloped conditions.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LSSR2.37Z	1.88"	N/A	14-10dx2.5	12-10dx1.5	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 29' 11"	16"	10.0	25.0	Default Load

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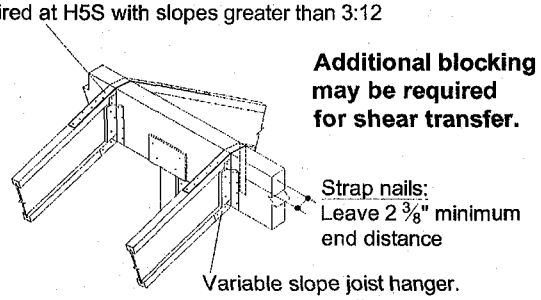
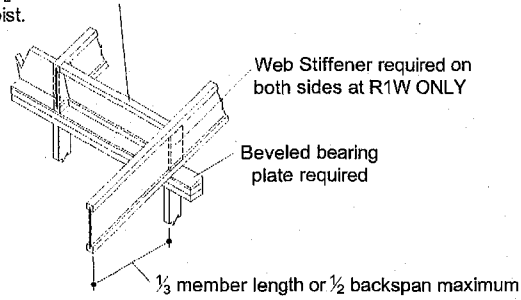
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

LSTA24 (Simpson Strong-Tie or USP Structural Connectors) strap with twelve 10d (0.148 x 1 ½") nails required at H5S with slopes greater than 3:12



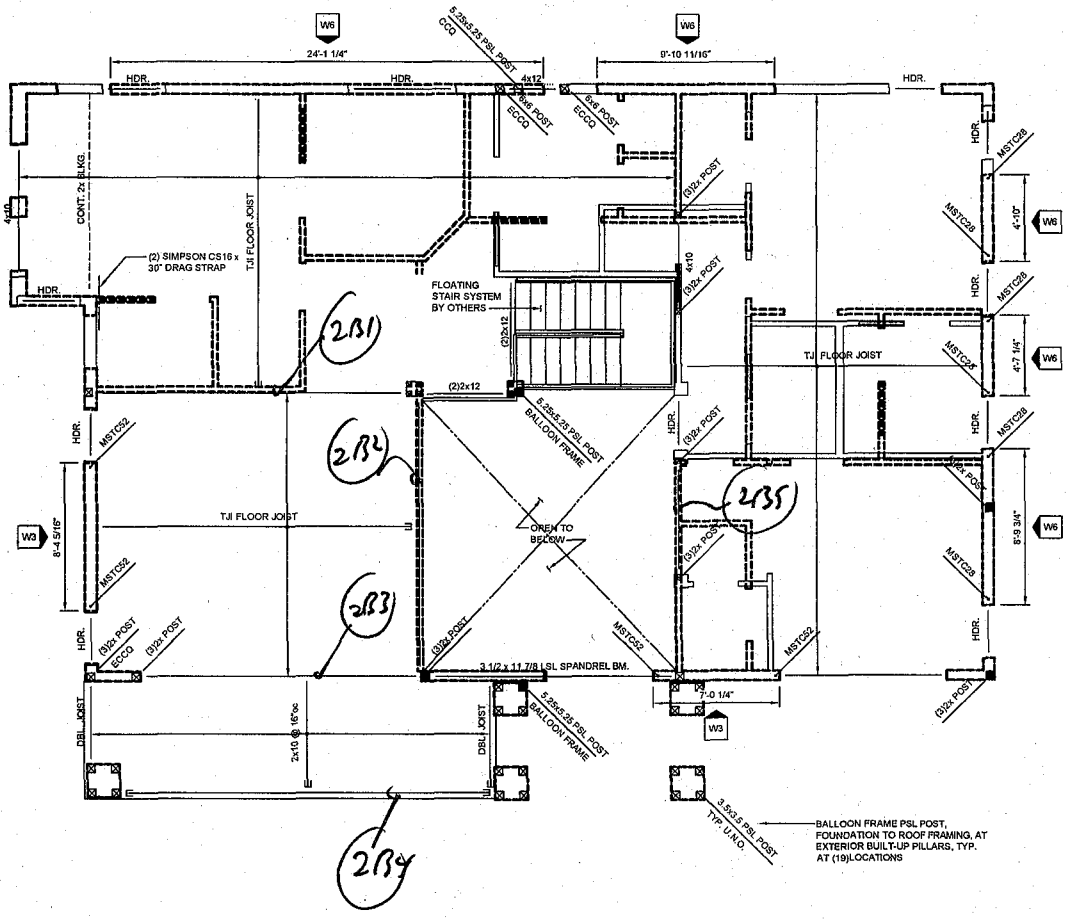
H5 H5S

Shear blocking:
1 ⅛" TJ® Rim Board (with depths ≤ 16"), 1 ¼"or 1 ½" TimberStrand® LSL or TJI® joist.



R1 R1W

SECOND FLOOR FRAMING PLAN.



2B1, L= 17'6, TL= 8'6 FLOOR. 5 1/2 x 11 7/8 GLB.

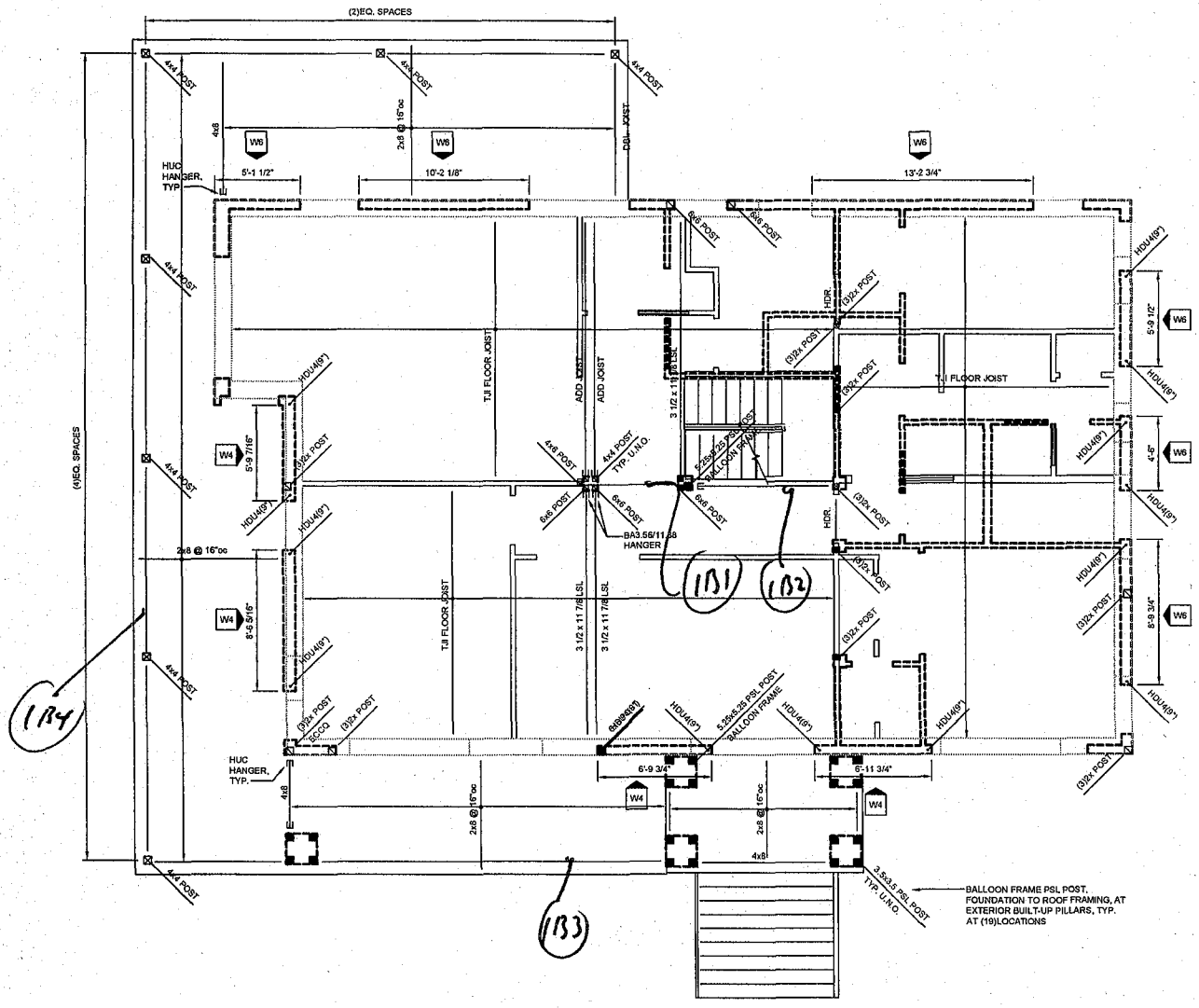
2B2, L= 15'10, TL= 9' FLOOR. 5 1/2 x 11 7/8 GLB

2B3, L= 15'8, TL= 2' FLOOR, 4' DECK. 5 1/2 x 10 1/2 GLB.

2B4, L= 20'11, TL= 4' DECK. 5 1/2 x 11 7/8 GLB

2B5, L= 6'3, TL= 9' FLOOR. 4x10.

1ST FLOOR FRAMING PLAN.



1B1, L= 5'10, TL= 16' Floor. PLC 1' DL 1.239 1.181 5 1/2 x 16 1/2 GLB.
LL 2.475 2.844

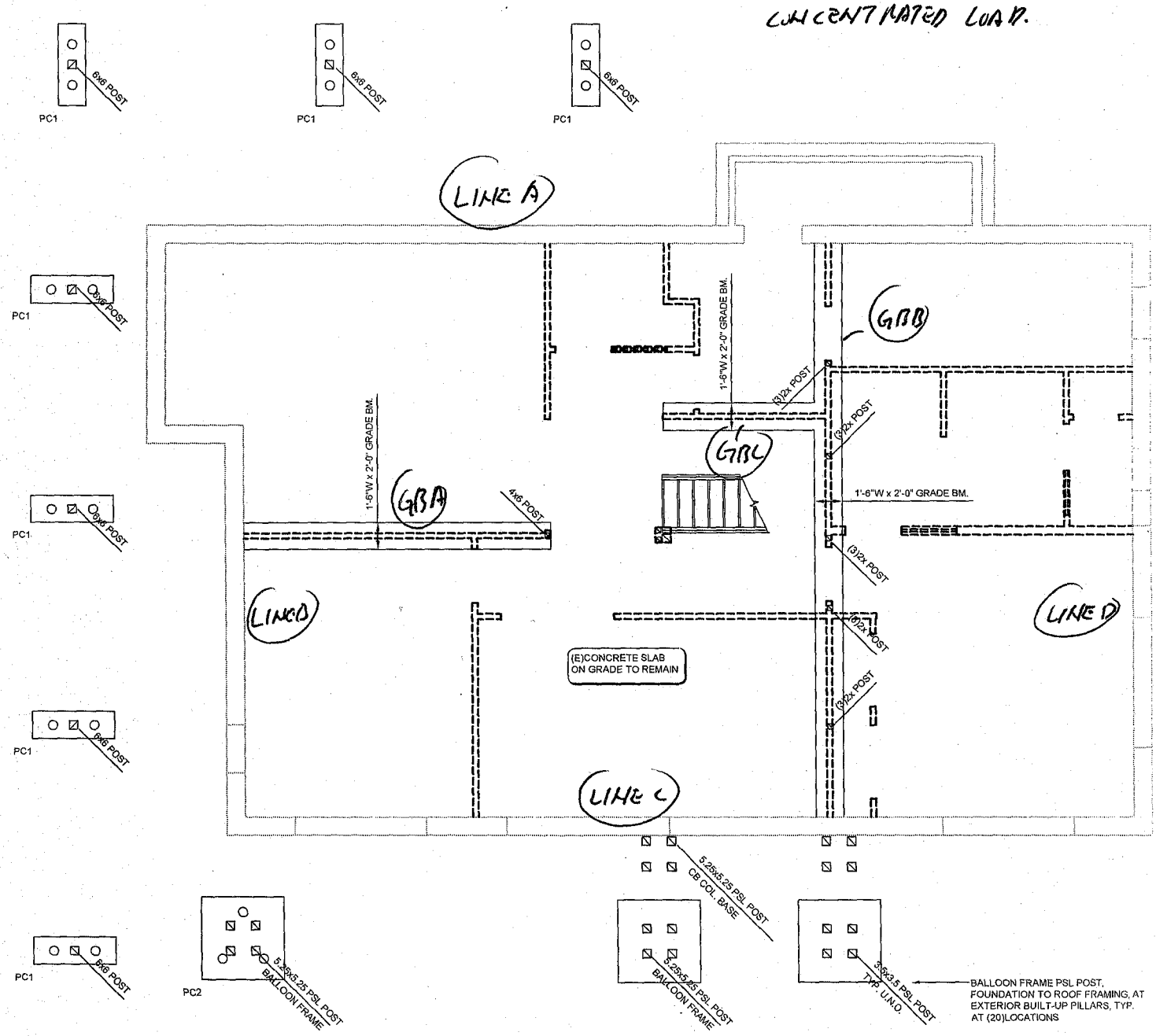
1B2, L= 8'6, TL= 11' Floor. 6x12.

1B3, L= 21', TL= 3'6 Deck. 5 1/2 x 12 GLB.

1B4, L= 11'6, TL= 4'6 Deck. 6x10.

BASEMENT CONC. WT: 8". 9'. 150 PCF + 4' x 1'6" x 150 PCF = 1800 #/FT.
WALL FTG.

→ ADD 3" MIN PLCE @ HIGH CONCENTRATED LOAD.



LINE A, TL: 8' FLOOR, 5' DECK, 9' FLOOR, 5' ROOF

= 1510 #/FT. → 4' oc. 3" ϕ.
6'8 oc. 4" ϕ.

LINE B, TL: 4' DECK, 2' FLOOR, 9' FLOOR, 15' ROOF.

= 1505 #/FT. → 4' oc. 3" ϕ.
6'8 oc. 4" ϕ.

LINE C, TL: 8' FLOOR, 4' DECK, 2' FLOOR, 4' DECK, 2' ROOF.

= 1230 #/FT. → 4'4 oc. 3" ϕ.
7' oc. 4" ϕ.

LINE D, TL: 9' FLOOR, 9' FLOOR, 13' ROOF.

= 1510 #/FT. → 4' oc. 3" ϕ
6'8 oc. 4" ϕ

GIRA, TL: 16' FLOOR, GIRDER BM. 18" x 18" → 337 #/LF.

= 880 #/FT. → 5' oc. 2" ϕ.

GIRB, TL: 8' FLOOR, 8' FLOOR → 5' oc. 2" ϕ.

= 880 #/FT

GIRC, TL: 9' FLOOR, 7' FLOOR

= 990 #/FT. → 4'6 oc. 2" ϕ.

Wood Beam

Project File: WISHWAS MOHAN RESIDENCE.ec6

DESCRIPTION: RB1,RB2

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

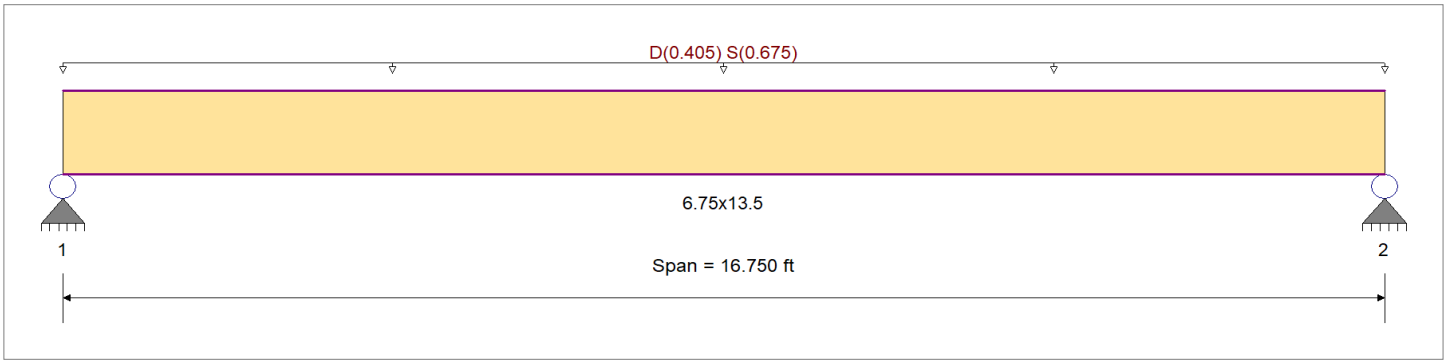
Material Properties

Analysis Method :	Allowable Stress Design
Load Combination	IBC 2021
Wood Species :	DF/DF
Wood Grade :	24F-V4
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 27.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.832 : 1	Maximum Shear Stress Ratio	=	0.432 : 1
Section used for this span		6.75x13.5	Section used for this span		6.75x13.5
fb: Actual	=	2,257.33 psi	fv: Actual	=	131.69 psi
F'b	=	2,714.27 psi	F'v	=	304.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	8.375 ft	Location of maximum on span	=	15.650 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.483 in	Ratio =	0 >=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	416 <360	n/a
Max Downward Total Deflection	0.786 in	Ratio =	255 >=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 16.750 ft	1	0.410	0.213	0.90	1.00	1.00	1.00	0.983	1.00	1.00	1.00	14.90	871.8	2,124.2	3.09	50.9	238.5
+D+S					1.00	1.00	1.00	0.983	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.750 ft	1	0.832	0.432	1.15	1.00	1.00	1.00	0.983	1.00	1.00	1.00	38.57	2,257.3	2,714.3	8.00	131.7	304.8
+D+0.750S					1.00	1.00	1.00	0.983	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.750 ft	1	0.704	0.366	1.15	1.00	1.00	1.00	0.983	1.00	1.00	1.00	32.65	1,911.0	2,714.3	6.77	111.5	304.8
+0.60D					1.00	1.00	1.00	0.983	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.750 ft	1	0.139	0.072	1.60	1.00	1.00	1.00	0.983	1.00	1.00	1.00	8.94	523.1	3,776.4	1.85	30.5	424.0

DESCRIPTION: RB1,RB2

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.7864	8.436		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	9.210	9.210
Max Upward from Load Combinations	9.210	9.210
Max Upward from Load Cases	5.653	5.653
D Only	3.557	3.557
+D+S	9.210	9.210
+D+0.750S	7.797	7.797
+0.60D	2.134	2.134
S Only	5.653	5.653

Wood Beam

Project File: WISHWAS MOHAN RESIDENCE.ec6

DESCRIPTION: 2B1

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

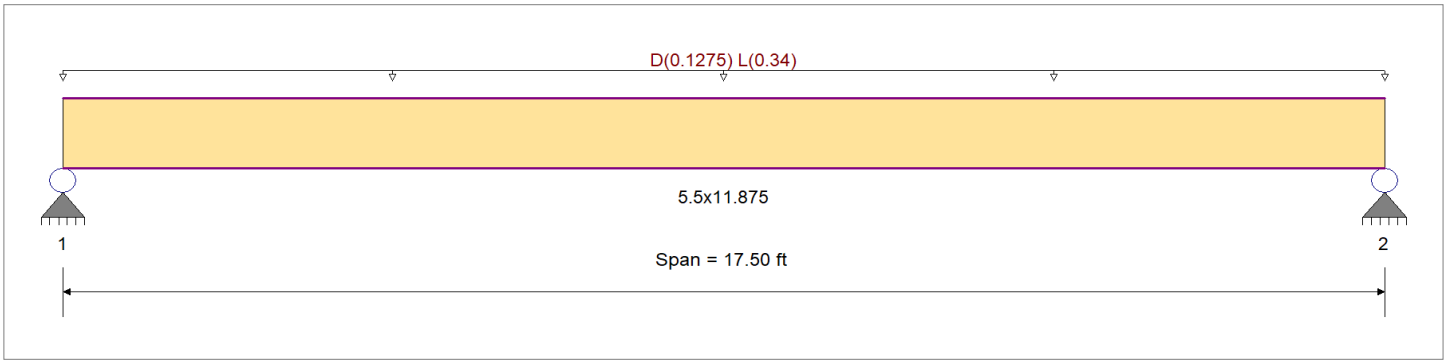
Material Properties

Analysis Method :	Allowable Stress Design
Load Combination	IBC 2021
Wood Species :	DF/DF
Wood Grade :	24F-V4
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 8.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.713 : 1	Maximum Shear Stress Ratio	=	0.325 : 1
Section used for this span		5.5x11.875	Section used for this span		5.5x11.875
fb: Actual	=	1,711.69 psi	fv: Actual	=	86.19 psi
F'b	=	2,400.00 psi	F'v	=	265.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	8.750 ft	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	0.522 in	Ratio =	0 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	402 <360	n/a
Max Downward Total Deflection	0.740 in	Ratio =	283 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.233	0.106	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	5.42	503.4	2,160.0	1.10	25.3	238.5
+D+L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.713	0.325	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	18.44	1,711.7	2,400.0	3.75	86.2	265.0
+D+0.750L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.470	0.214	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	15.18	1,409.6	3,000.0	3.09	71.0	331.3
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.50 ft	1	0.079	0.036	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.25	302.0	3,840.0	0.66	15.2	424.0

DESCRIPTION: 2B1

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.7400	8.814		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	4.214	4.214
Max Upward from Load Combinations	4.214	4.214
Max Upward from Load Cases	2.975	2.975
D Only	1.239	1.239
+D+L	4.214	4.214
+D+0.750L	3.471	3.471
+0.60D	0.744	0.744
L Only	2.975	2.975

Wood Beam

Project File: WISHWAS MOHAN RESIDENCE.ec6

DESCRIPTION: 2B2

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination IBC 2021

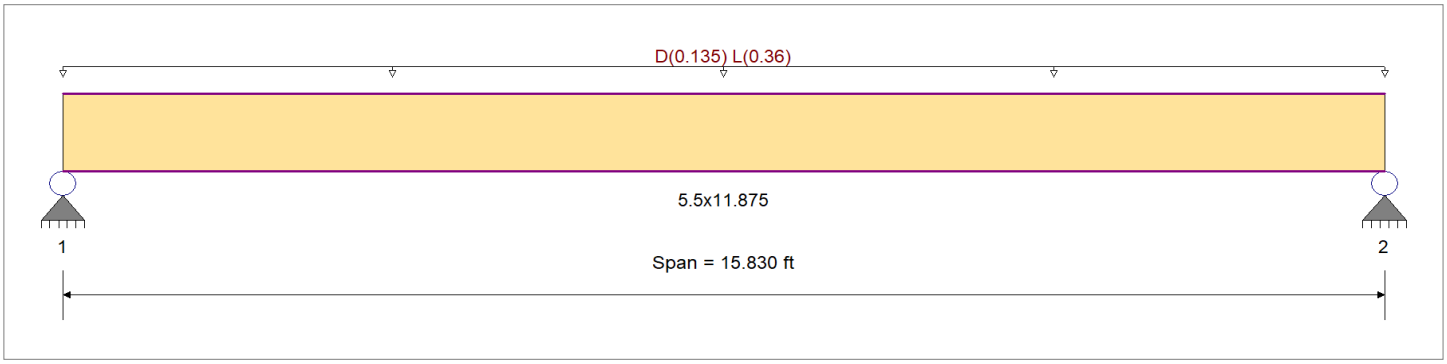
Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,400.0 psi
Fb -	1,850.0 psi
Fc - Prll	1,650.0 psi
Fc - Perp	650.0 psi
Fv	265.0 psi
Ft	1,100.0 psi

E : Modulus of Elasticity

Ebend- xx	1,800.0 ksi
Eminbend - xx	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - yy	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 9.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.617 : 1	Maximum Shear Stress Ratio	=	0.306 : 1
Section used for this span		5.5x11.875	Section used for this span		5.5x11.875
fb: Actual	=	1,480.56 psi	fv: Actual	=	81.07 psi
F'b	=	2,400.00 psi	F'v	=	265.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	7.915 ft	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	0.370 in	Ratio =	0 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	512 <360	n/a
Max Downward Total Deflection	0.524 in	Ratio =	362 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 15.830 ft	1	0.201	0.100	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.67	433.7	2,160.0	1.03	23.7	238.5
+D+L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 15.830 ft	1	0.617	0.306	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	15.95	1,480.6	2,400.0	3.53	81.1	265.0
+D+0.750L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 15.830 ft	1	0.406	0.201	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	13.13	1,218.8	3,000.0	2.91	66.7	331.3
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 15.830 ft	1	0.068	0.034	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.80	260.2	3,840.0	0.62	14.2	424.0

DESCRIPTION: 2B2

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.5238	7.973		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	4.030	4.030
Max Upward from Load Combinations	4.030	4.030
Max Upward from Load Cases	2.849	2.849
D Only	1.181	1.181
+D+L	4.030	4.030
+D+0.750L	3.318	3.318
+0.60D	0.708	0.708
L Only	2.849	2.849

Wood Beam

Project File: WISHWAS MOHAN RESIDENCE.ec6

DESCRIPTION: 2B3

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination IBC 2021

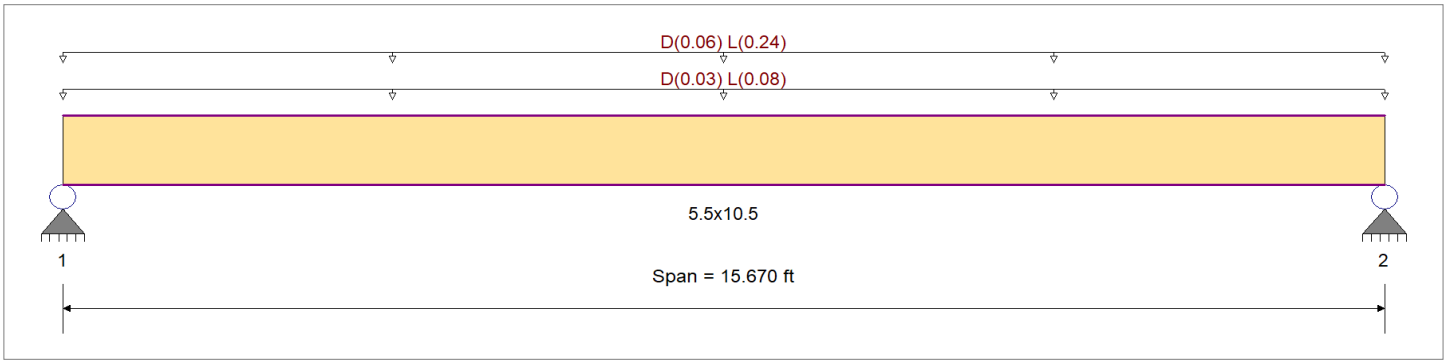
Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,400.0 psi
Fb -	1,850.0 psi
Fc - Prll	1,650.0 psi
Fc - Perp	650.0 psi
Fv	265.0 psi
Ft	1,100.0 psi

E : Modulus of Elasticity

Ebend- xx	1,800.0 ksi
Eminbend - xx	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - yy	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 2.0 ft
Uniform Load : D = 0.0150, L = 0.060 ksf, Tributary Width = 4.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.642 : 1	Maximum Shear Stress Ratio	=	0.289 : 1
Section used for this span		5.5x10.5	Section used for this span		5.5x10.5
fb: Actual	=	1,539.87 psi	fv: Actual	=	76.57 psi
F'b	=	2,400.00 psi	F'v	=	265.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	7.835 ft	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	0.457 in	Ratio =	0 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	411 <360	n/a
Max Downward Total Deflection	0.604 in	Ratio =	311 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 15.670 ft	1	0.173	0.078	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.15	373.6	2,160.0	0.72	18.6	238.5
+D+L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 15.670 ft	1	0.642	0.289	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	12.97	1,539.9	2,400.0	2.95	76.6	265.0
+D+0.750L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 15.670 ft	1	0.416	0.187	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	10.51	1,248.3	3,000.0	2.39	62.1	331.3
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 15.670 ft	1	0.058	0.026	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.89	224.2	3,840.0	0.43	11.1	424.0

DESCRIPTION: 2B3

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.6037	7.892		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	3.310	3.310
Max Upward from Load Combinations	3.310	3.310
Max Upward from Load Cases	2.507	2.507
D Only	0.803	0.803
+D+L	3.310	3.310
+D+0.750L	2.684	2.684
+0.60D	0.482	0.482
L Only	2.507	2.507

Wood Beam

Project File: WISHWAS MOHAN RESIDENCE.ec6

DESCRIPTION: 2B4

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination IBC 2021

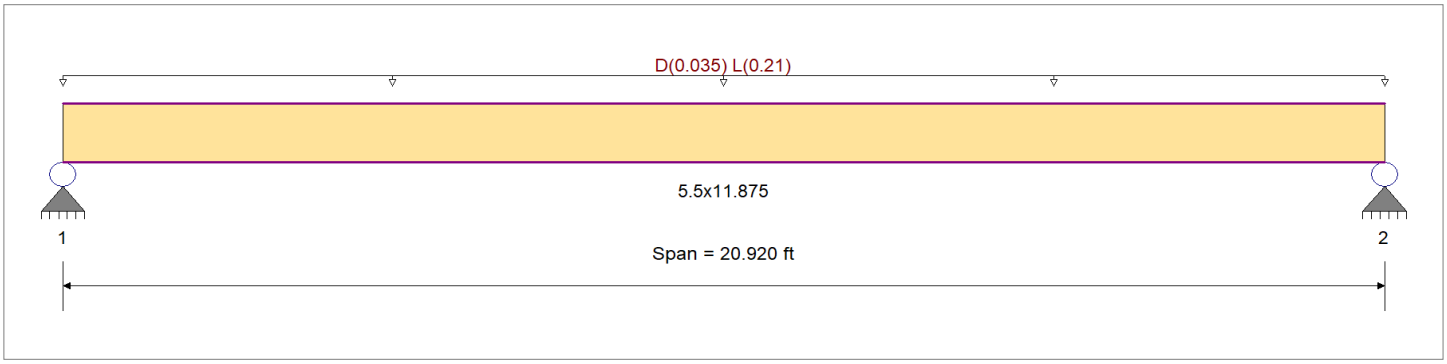
Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.010, L = 0.060 ksf, Tributary Width = 3.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.551 : 1	Maximum Shear Stress Ratio	=	0.214 : 1
Section used for this span		5.5x11.875	Section used for this span		5.5x11.875
fb: Actual	=	1,316.12 psi	fv: Actual	=	56.80 psi
F'b	=	2,386.52 psi	F'v	=	265.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	10.460 ft	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	0.659 in	Ratio =	0 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	380 <360	n/a
Max Downward Total Deflection	0.813 in	Ratio =	308 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 20.920 ft	1	0.116	0.045	0.90	1.00	1.00	1.00	0.994	1.00	1.00	1.00	2.69	249.6	2,147.9	0.47	10.8	238.5
+D+L					1.00	1.00	1.00	0.994	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.920 ft	1	0.551	0.214	1.00	1.00	1.00	1.00	0.994	1.00	1.00	1.00	14.18	1,316.1	2,386.5	2.47	56.8	265.0
+D+0.750L					1.00	1.00	1.00	0.994	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.920 ft	1	0.352	0.137	1.25	1.00	1.00	1.00	0.994	1.00	1.00	1.00	11.31	1,049.5	2,983.1	1.97	45.3	331.3
+0.60D					1.00	1.00	1.00	0.994	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.920 ft	1	0.039	0.015	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	1.61	149.8	3,818.4	0.28	6.5	424.0

DESCRIPTION: 2B4

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.8131	10.536		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	2.711	2.711
Max Upward from Load Combinations	2.711	2.711
Max Upward from Load Cases	2.197	2.197
D Only	0.514	0.514
+D+L	2.711	2.711
+D+0.750L	2.162	2.162
+0.60D	0.309	0.309
L Only	2.197	2.197

Wood Beam

Project File: WISHWAS MOHAN RESIDENCE.ec6

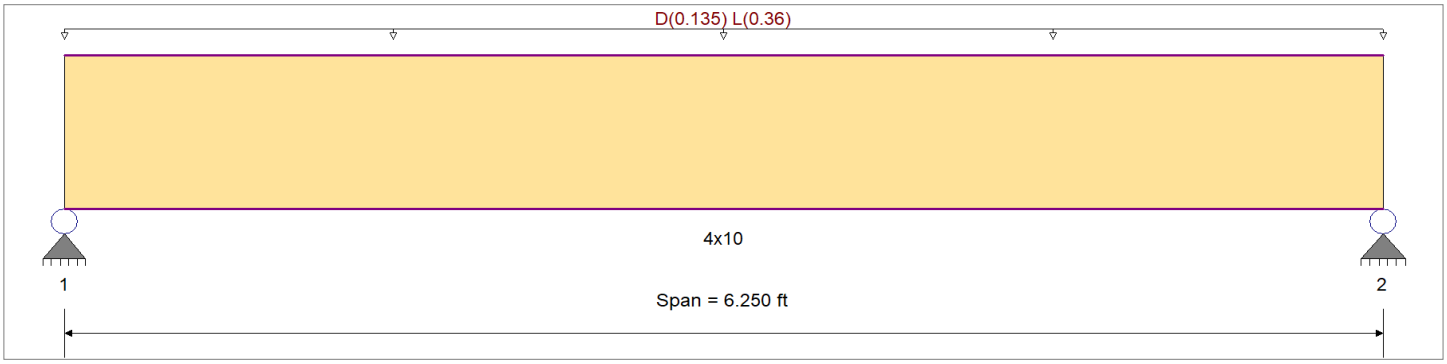
DESCRIPTION: 2B5

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	875 psi	*E : Modulus of Elasticity*	
Load Combination	IBC 2021	Fb -	875 psi	Ebend- xx	1300 ksi
		Fc - Prll	600 psi	Eminbend - xx	470 ksi
Wood Species :	Douglas Fir-Larch	Fc - Perp	625 psi		
Wood Grade :	No.2	Fv	170 psi		
		Ft	425 psi	Density	31.21 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 9.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.561 : 1	Maximum Shear Stress Ratio	=	0.325 : 1
Section used for this span		**4x10**	Section used for this span		**4x10**
fb: Actual	=	589.34 psi	fv: Actual	=	55.18 psi
F'b	=	1,050.00 psi	F'v	=	170.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	3.125 ft	Location of maximum on span	=	5.497 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.041 in	Ratio =	0 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	1810 <360	n/a
Max Downward Total Deflection	0.058 in	Ratio =	1298 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 6.250 ft	1	0.176	0.102	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.69	166.7	945.0	0.34	15.6	153.0
+D+L					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.250 ft	1	0.561	0.325	1.00	1.00	1.00	1.00	1.200	1.00	1.00	1.00	2.45	589.3	1,050.0	1.19	55.2	170.0
+D+0.750L					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.250 ft	1	0.369	0.213	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	2.01	483.7	1,312.5	0.98	45.3	212.5
+0.60D					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.250 ft	1	0.060	0.034	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.42	100.0	1,680.0	0.20	9.4	272.0

DESCRIPTION: 2B5

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0578	3.148		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	1.569	1.569
Max Upward from Load Combinations	1.569	1.569
Max Upward from Load Cases	1.125	1.125
D Only	0.444	0.444
+D+L	1.569	1.569
+D+0.750L	1.288	1.288
+0.60D	0.266	0.266
L Only	1.125	1.125

Wood Beam

Project File: WISHWAS MOHAN RESIDENCE.ec6

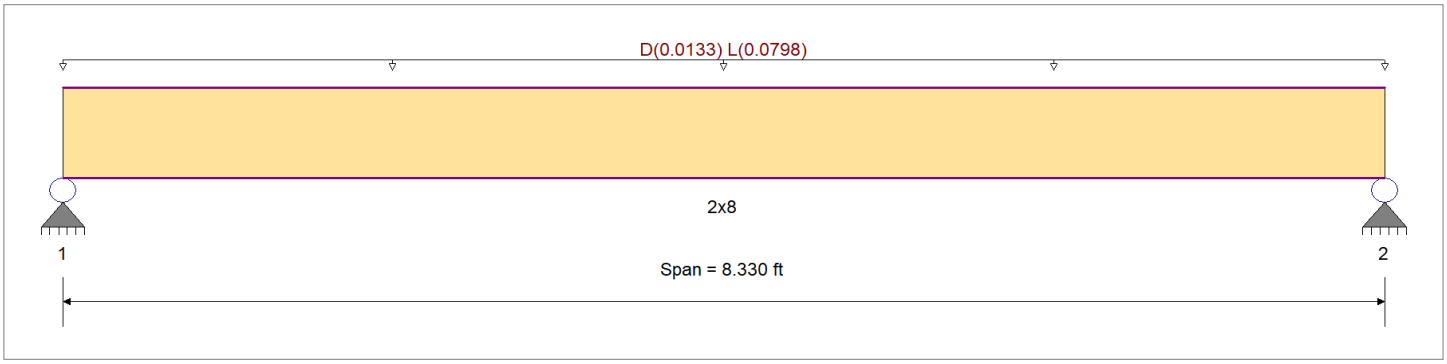
DESCRIPTION: EXTERIOR DECK JOIST

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	875 psi	*E : Modulus of Elasticity*	
Load Combination	IBC 2021	Fb -	875 psi	Ebend- xx	1300 ksi
		Fc - Prll	600 psi	Eminbend - xx	470 ksi
Wood Species :	Douglas Fir-Larch	Fc - Perp	625 psi		
Wood Grade :	No.2	Fv	170 psi		
		Ft	425 psi	Density	31.21 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.010, L = 0.060 ksf, Tributary Width = 1.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.720 : 1	Maximum Shear Stress Ratio	=	0.278 : 1
Section used for this span		2x8	Section used for this span		2x8
fb: Actual	=	756.09 psi	fv: Actual	=	47.23 psi
F'b	=	1,050.00 psi	F'v	=	170.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	4.165 ft	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	0.140 in	Ratio =	0 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	711 <360	n/a
Max Downward Total Deflection	0.168 in	Ratio =	595 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 8.330 ft	1	0.131	0.051	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.14	124.0	945.0	0.06	7.7	153.0
+D+L					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 8.330 ft	1	0.720	0.278	1.00	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.83	756.1	1,050.0	0.34	47.2	170.0
+D+0.750L					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 8.330 ft	1	0.456	0.176	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.65	598.1	1,312.5	0.27	37.4	212.5
+0.60D					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 8.330 ft	1	0.044	0.017	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.08	74.4	1,680.0	0.03	4.6	272.0

DESCRIPTION: EXTERIOR DECK JOIST

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.1680	4.195		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	0.398	0.398
Max Upward from Load Combinations	0.398	0.398
Max Upward from Load Cases	0.332	0.332
D Only	0.065	0.065
+D+L	0.398	0.398
+D+0.750L	0.314	0.314
+0.60D	0.039	0.039
L Only	0.332	0.332

Wood Beam

Project File: WISHWAS MOHAN RESIDENCE.ec6

LIC# : KW-06014812, Build:20.24.06.04 BURT ENGINEERING PLLC (c) ENERCALC INC 1983-2023

DESCRIPTION: 1B1

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination IBC 2021

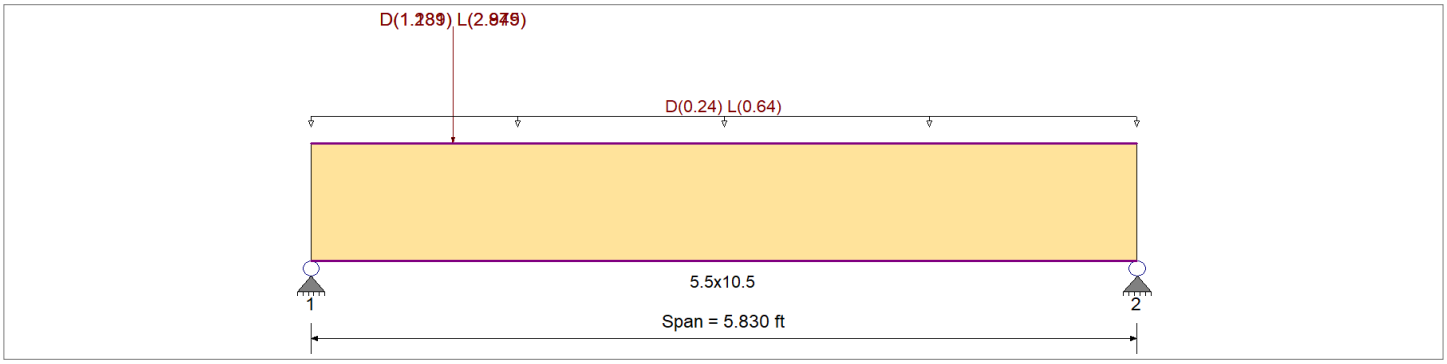
Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,400.0 psi
Fb -	1,850.0 psi
Fc - Prll	1,650.0 psi
Fc - Perp	650.0 psi
Fv	265.0 psi
Ft	1,100.0 psi

E : Modulus of Elasticity

Ebend- xx	1,800.0 ksi
Eminbend - xx	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - yy	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 16.0 ft
Point Load : D = 1.239, L = 2.975 k @ 1.0 ft
Point Load : D = 1.181, L = 2.849 k @ 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.447 : 1	Maximum Shear Stress Ratio	=	0.848 : 1
Section used for this span		5.5x10.5	Section used for this span		5.5x10.5
fb: Actual	=	1,072.70 psi	fv: Actual	=	224.75 psi
F'b	=	2,400.00 psi	F'v	=	265.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	1.340 ft	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	0.039 in	Ratio =	0 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	1773 <360	n/a
Max Downward Total Deflection	0.055 in	Ratio =	1261 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 5.830 ft	1	0.144	0.275	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.62	311.6	2,160.0	2.52	65.5	238.5
+D+L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.830 ft	1	0.447	0.848	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	9.03	1,072.7	2,400.0	8.65	224.8	265.0
+D+0.750L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.830 ft	1	0.294	0.558	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.43	882.4	3,000.0	7.12	184.9	331.3
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.830 ft	1	0.049	0.093	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.57	186.9	3,840.0	1.51	39.3	424.0

DESCRIPTION: 1B1

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0555	2.702		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	9.432	4.016
Max Upward from Load Combinations	9.432	4.016
Max Upward from Load Cases	6.691	2.865
D Only	2.741	1.151
+D+L	9.432	4.016
+D+0.750L	7.759	3.300
+0.60D	1.645	0.691
L Only	6.691	2.865

Wood Beam

Project File: WISHWAS MOHAN RESIDENCE.ec6

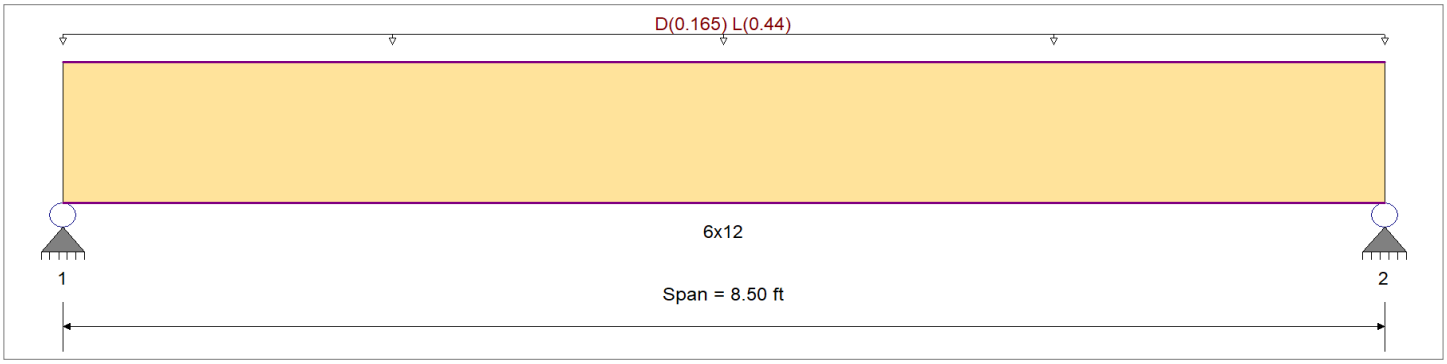
DESCRIPTION: 1B2

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	875 psi	*E : Modulus of Elasticity*	
Load Combination	IBC 2021	Fb -	875 psi	Ebend- xx	1300 ksi
		Fc - Prll	600 psi	Eminbend - xx	470 ksi
Wood Species :	Douglas Fir-Larch	Fc - Perp	625 psi		
Wood Grade :	No.2	Fv	170 psi		
		Ft	425 psi	Density	31.21 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 11.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.632 : 1	Maximum Shear Stress Ratio	=	0.286 : 1
Section used for this span		6x12	Section used for this span		6x12
fb: Actual	=	553.11 psi	fv: Actual	=	48.70 psi
F'b	=	875.00 psi	F'v	=	170.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	4.250 ft	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	0.057 in	Ratio =	0 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	1778 <360	n/a
Max Downward Total Deflection	0.081 in	Ratio =	1264 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 8.50 ft	1	0.203	0.092	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.61	159.8	787.5	0.59	14.1	153.0
+D+L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 8.50 ft	1	0.632	0.286	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	5.59	553.1	875.0	2.05	48.7	170.0
+D+0.750L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 8.50 ft	1	0.416	0.188	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.59	454.8	1,093.8	1.69	40.0	212.5
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 8.50 ft	1	0.068	0.031	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.97	95.9	1,400.0	0.36	8.4	272.0

DESCRIPTION: 1B2

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0807	4.281		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	2.630	2.630
Max Upward from Load Combinations	2.630	2.630
Max Upward from Load Cases	1.870	1.870
D Only	0.760	0.760
+D+L	2.630	2.630
+D+0.750L	2.162	2.162
+0.60D	0.456	0.456
L Only	1.870	1.870

Wood Beam

Project File: WISHWAS MOHAN RESIDENCE.ec6

DESCRIPTION: 1B3

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination IBC 2021

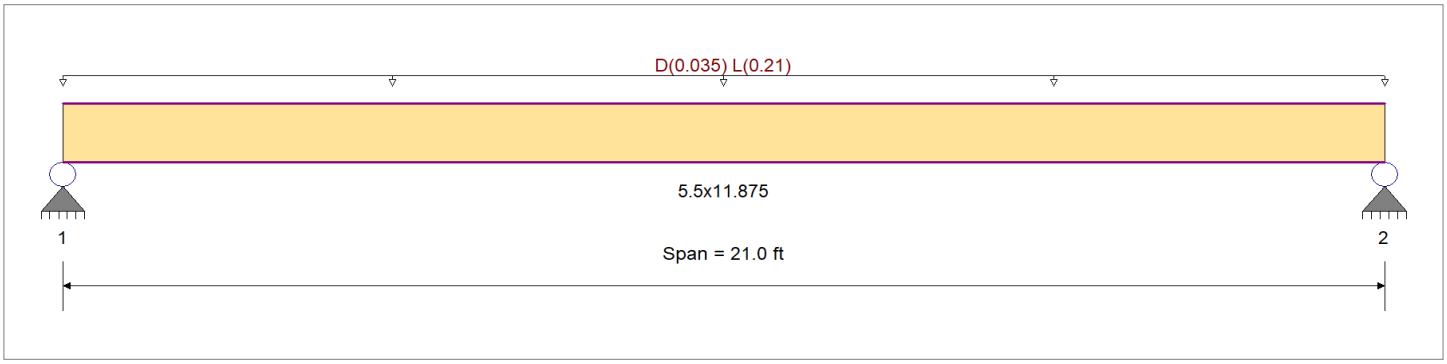
Wood Species : DF/DF
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.010, L = 0.060 ksf, Tributary Width = 3.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.556 : 1	Maximum Shear Stress Ratio	=	0.215 : 1
Section used for this span		5.5x11.875	Section used for this span		5.5x11.875
fb: Actual	=	1,326.21 psi	fv: Actual	=	57.02 psi
F'b	=	2,385.61 psi	F'v	=	265.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	10.500 ft	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	0.669 in	Ratio =	0 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	376 <360	n/a
Max Downward Total Deflection	0.826 in	Ratio =	305 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 21.0 ft	1	0.117	0.045	0.90	1.00	1.00	1.00	0.994	1.00	1.00	1.00	2.71	251.5	2,147.0	0.47	10.8	238.5
+D+L					1.00	1.00	1.00	0.994	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 21.0 ft	1	0.556	0.215	1.00	1.00	1.00	1.00	0.994	1.00	1.00	1.00	14.29	1,326.2	2,385.6	2.48	57.0	265.0
+D+0.750L					1.00	1.00	1.00	0.994	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 21.0 ft	1	0.355	0.137	1.25	1.00	1.00	1.00	0.994	1.00	1.00	1.00	11.39	1,057.5	2,982.0	1.98	45.5	331.3
+0.60D					1.00	1.00	1.00	0.994	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 21.0 ft	1	0.040	0.015	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	1.63	150.9	3,817.0	0.28	6.5	424.0

DESCRIPTION: 1B3

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.8256	10.577		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	2.721	2.721
Max Upward from Load Combinations	2.721	2.721
Max Upward from Load Cases	2.205	2.205
D Only	0.516	0.516
+D+L	2.721	2.721
+D+0.750L	2.170	2.170
+0.60D	0.310	0.310
L Only	2.205	2.205

Wood Beam

Project File: WISHWAS MOHAN RESIDENCE.ec6

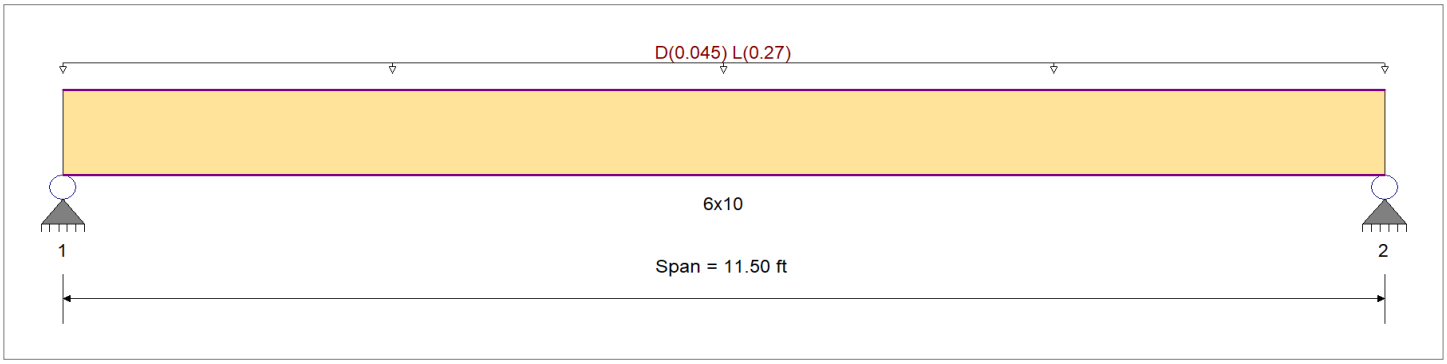
DESCRIPTION: 1B4

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	875 psi	*E : Modulus of Elasticity*	
Load Combination	IBC 2021	Fb -	875 psi	Ebend- xx	1300 ksi
		Fc - Prll	600 psi	Eminbend - xx	470 ksi
Wood Species :	Douglas Fir-Larch	Fc - Perp	625 psi		
Wood Grade :	No.2	Fv	170 psi		
		Ft	425 psi	Density	31.21 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.010, L = 0.060 ksf, Tributary Width = 4.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.894 : 1	Maximum Shear Stress Ratio	=	0.275 : 1
Section used for this span		6x10	Section used for this span		6x10
fb: Actual	=	782.49 psi	fv: Actual	=	46.79 psi
F'b	=	875.00 psi	F'v	=	170.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	5.750 ft	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	0.209 in	Ratio =	0 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	659 <360	n/a
Max Downward Total Deflection	0.253 in	Ratio =	545 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 11.50 ft	1	0.172	0.053	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.93	135.1	787.5	0.28	8.1	153.0
+D+L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.50 ft	1	0.894	0.275	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	5.39	782.5	875.0	1.63	46.8	170.0
+D+0.750L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.50 ft	1	0.567	0.175	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.28	620.6	1,093.8	1.29	37.1	212.5
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.50 ft	1	0.058	0.018	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	81.0	1,400.0	0.17	4.8	272.0

DESCRIPTION: 1B4

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.2528	5.792		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	1.876	1.876
Max Upward from Load Combinations	1.876	1.876
Max Upward from Load Cases	1.553	1.553
D Only	0.324	0.324
+D+L	1.876	1.876
+D+0.750L	1.488	1.488
+0.60D	0.194	0.194
L Only	1.553	1.553

Wood Beam

Project File: WISHWAS MOHAN RESIDENCE.ec6

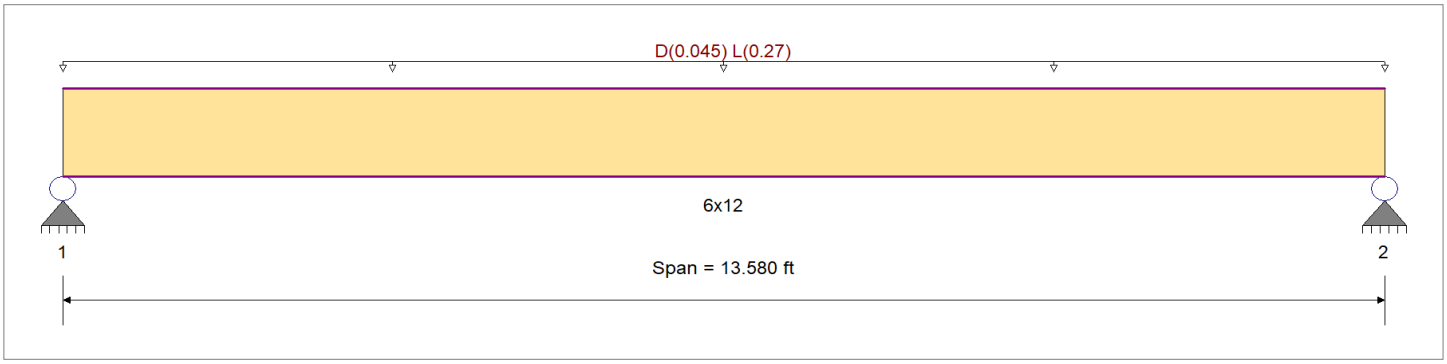
DESCRIPTION: 1B5

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	875.0 psi	*E : Modulus of Elasticity*	
Load Combination	IBC 2021	Fb -	875.0 psi	Ebend- xx	1,300.0 ksi
		Fc - Prll	600.0 psi	Eminbend - xx	470.0 ksi
Wood Species :	Douglas Fir-Larch	Fc - Perp	625.0 psi		
Wood Grade :	No.2	Fv	170.0 psi		
		Ft	425.0 psi	Density	31.210 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.010, L = 0.060 ksf, Tributary Width = 4.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.857 : 1	Maximum Shear Stress Ratio	=	0.268 : 1
Section used for this span		6x12	Section used for this span		6x12
fb: Actual	=	750.06 psi	fv: Actual	=	45.59 psi
F'b	=	875.00 psi	F'v	=	170.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	6.790 ft	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	0.229 in	Ratio =	0 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	710 <360	n/a
Max Downward Total Deflection	0.279 in	Ratio =	583 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 13.580 ft	1	0.170	0.053	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.35	134.0	787.5	0.34	8.1	153.0
+D+L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 13.580 ft	1	0.857	0.268	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.58	750.1	875.0	1.92	45.6	170.0
+D+0.750L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 13.580 ft	1	0.545	0.170	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.02	596.0	1,093.8	1.53	36.2	212.5
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 13.580 ft	1	0.057	0.018	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.81	80.4	1,400.0	0.21	4.9	272.0

DESCRIPTION: 1B5

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.2792	6.840		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	2.232	2.232
Max Upward from Load Combinations	2.232	2.232
Max Upward from Load Cases	1.833	1.833
D Only	0.399	0.399
+D+L	2.232	2.232
+D+0.750L	1.774	1.774
+0.60D	0.239	0.239
L Only	1.833	1.833

Concrete Beam

Project File: WISHWAS MOHAN RESIDENCE.ec6

DESCRIPTION: TYPICAL GRADE BEAM CHECK

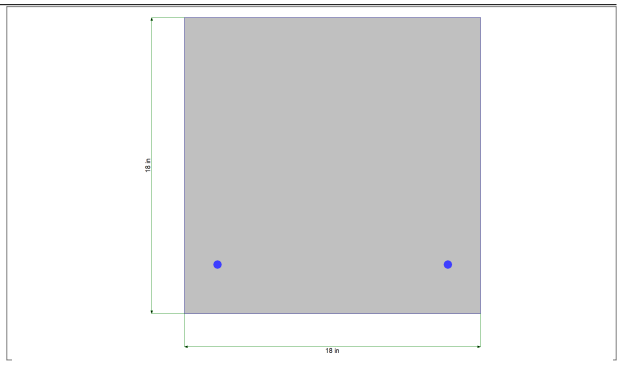
CODE REFERENCES

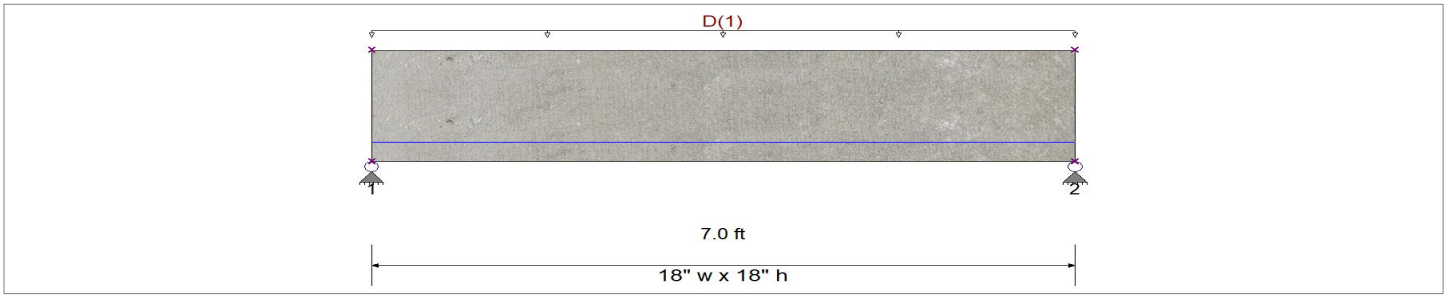
Calculations per ACI 318-19, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

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

Seismic Design Category = A





Cross Section & Reinforcing Details

Rectangular Section, Width = 18.0 in, Height = 18.0 in
Span #1 Reinforcing....
2-#4 at 3.0 in from Bottom, from 0.0 to 7.0 ft in this span

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

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.430**	: 1
Section used for this span	**Typical Section**	
Mu : Applied	11.373	k-ft
Mn * Phi : Allowable	26.435	k-ft
Location of maximum on span	3.506	ft
Span # where maximum occurs	Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.000 in	Ratio =	0 <360.0	
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360.0	
Max Downward Total Deflection	0.003 in	Ratio =	32030 >=180.0	Span: 1 : D Only
Max Upward Total Deflection	0.000 in	Ratio =	0 <180.0	Span: 1 : D Only

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	4.642	4.642
Max Upward from Load Combinations	2.785	2.785
Max Upward from Load Cases	4.642	4.642
D Only	4.642	4.642
+0.60D	2.785	2.785

Shear Stirrup Requirements

Entire Beam Span Length : Vu <= Phi*lambda*sqrt(f'c)*bw*d, Req'd Vs = Not Reqd per 9.3.6.1, Stirrups are not required.

DESCRIPTION: TYPICAL GRADE BEAM CHECK

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
+1.40D	1	0.00	15.00	6.50	6.50	0.00	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	0.08	15.00	6.36	6.36	0.49	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	0.15	15.00	6.21	6.21	0.97	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	0.23	15.00	6.07	6.07	1.44	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	0.31	15.00	5.93	5.93	1.90	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	0.38	15.00	5.79	5.79	2.35	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	0.46	15.00	5.65	5.65	2.79	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	0.54	15.00	5.50	5.50	3.21	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	0.61	15.00	5.36	5.36	3.63	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	0.69	15.00	5.22	5.22	4.03	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	0.77	15.00	5.08	5.08	4.43	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	0.84	15.00	4.94	4.94	4.81	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	0.92	15.00	4.79	4.79	5.18	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	0.99	15.00	4.65	4.65	5.54	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	1.07	15.00	4.51	4.51	5.90	0.96	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	1.15	15.00	4.37	4.37	6.23	0.88	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	1.22	15.00	4.23	4.23	6.56	0.80	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	1.30	15.00	4.08	4.08	6.88	0.74	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	1.38	15.00	3.94	3.94	7.19	0.69	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	1.45	15.00	3.80	3.80	7.48	0.63	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	1.53	15.00	3.66	3.66	7.77	0.59	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	1.61	15.00	3.52	3.52	8.04	0.55	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	1.68	15.00	3.37	3.37	8.31	0.51	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	1.76	15.00	3.23	3.23	8.56	0.47	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	1.84	15.00	3.09	3.09	8.80	0.44	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	1.91	15.00	2.95	2.95	9.03	0.41	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	1.99	15.00	2.81	2.81	9.25	0.38	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	2.07	15.00	2.66	2.66	9.46	0.35	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	2.14	15.00	2.52	2.52	9.66	0.33	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	2.22	15.00	2.38	2.38	9.85	0.30	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	2.30	15.00	2.24	2.24	10.02	0.28	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	2.37	15.00	2.10	2.10	10.19	0.26	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	2.45	15.00	1.95	1.95	10.35	0.24	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	2.52	15.00	1.81	1.81	10.49	0.22	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	2.60	15.00	1.67	1.67	10.62	0.20	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	2.68	15.00	1.53	1.53	10.74	0.18	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	2.75	15.00	1.38	1.38	10.86	0.16	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	2.83	15.00	1.24	1.24	10.96	0.14	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	2.91	15.00	1.10	1.10	11.05	0.12	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	2.98	15.00	0.96	0.96	11.13	0.11	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	3.06	15.00	0.82	0.82	11.19	0.09	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	3.14	15.00	0.67	0.67	11.25	0.07	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	3.21	15.00	0.53	0.53	11.30	0.06	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	3.29	15.00	0.39	0.39	11.33	0.04	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	3.37	15.00	0.25	0.25	11.36	0.03	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	3.44	15.00	0.11	0.11	11.37	0.01	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	3.52	15.00	-0.04	0.04	11.37	0.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	3.60	15.00	-0.18	0.18	11.36	0.02	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	3.67	15.00	-0.32	0.32	11.35	0.04	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	3.75	15.00	-0.46	0.46	11.32	0.05	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	3.83	15.00	-0.60	0.60	11.27	0.07	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	3.90	15.00	-0.75	0.75	11.22	0.08	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	3.98	15.00	-0.89	0.89	11.16	0.10	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	4.05	15.00	-1.03	1.03	11.09	0.12	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	4.13	15.00	-1.17	1.17	11.00	0.13	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	4.21	15.00	-1.31	1.31	10.91	0.15	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	4.28	15.00	-1.46	1.46	10.80	0.17	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0

DESCRIPTION: TYPICAL GRADE BEAM CHECK

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
+1.40D	1	4.36	15.00	-1.60	1.60	10.68	0.19	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	4.44	15.00	-1.74	1.74	10.56	0.21	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	4.51	15.00	-1.88	1.88	10.42	0.23	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	4.59	15.00	-2.02	2.02	10.27	0.25	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	4.67	15.00	-2.17	2.17	10.11	0.27	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	4.74	15.00	-2.31	2.31	9.94	0.29	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	4.82	15.00	-2.45	2.45	9.76	0.31	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	4.90	15.00	-2.59	2.59	9.56	0.34	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	4.97	15.00	-2.73	2.73	9.36	0.37	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	5.05	15.00	-2.88	2.88	9.14	0.39	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	5.13	15.00	-3.02	3.02	8.92	0.42	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	5.20	15.00	-3.16	3.16	8.68	0.46	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	5.28	15.00	-3.30	3.30	8.44	0.49	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	5.36	15.00	-3.44	3.44	8.18	0.53	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	5.43	15.00	-3.59	3.59	7.91	0.57	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	5.51	15.00	-3.73	3.73	7.63	0.61	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	5.58	15.00	-3.87	3.87	7.34	0.66	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	5.66	15.00	-4.01	4.01	7.04	0.71	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	5.74	15.00	-4.15	4.15	6.72	0.77	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	5.81	15.00	-4.30	4.30	6.40	0.84	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	5.89	15.00	-4.44	4.44	6.07	0.91	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	5.97	15.00	-4.58	4.58	5.72	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	6.04	15.00	-4.72	4.72	5.37	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	6.12	15.00	-4.87	4.87	5.00	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	6.20	15.00	-5.01	5.01	4.62	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	6.27	15.00	-5.15	5.15	4.23	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	6.35	15.00	-5.29	5.29	3.83	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	6.43	15.00	-5.43	5.43	3.42	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	6.50	15.00	-5.58	5.58	3.00	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	6.58	15.00	-5.72	5.72	2.57	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	6.66	15.00	-5.86	5.86	2.13	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	6.73	15.00	-6.00	6.00	1.67	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	6.81	15.00	-6.14	6.14	1.21	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	6.89	15.00	-6.29	6.29	0.73	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	0.0
+1.40D	1	6.96	15.00	-6.43	6.43	0.25	1.00	8.26	Vu <= Phi*lambd	t Reqd pe	8.3	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	7.000	11.37	26.44	0.43
+1.40D					
Span # 1	1	7.000	11.37	26.44	0.43
+1.20D					
Span # 1	1	7.000	9.75	26.44	0.37
+0.90D					
Span # 1	1	7.000	7.31	26.44	0.28

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft	Load Combination	Max. "+" Defl (in)	Location in Span (ft
D Only	1	0.0026	3.500		0.0000	0.000