

Project: Washington5

Location: Beam #17a alt over great room
Multi-Loaded Multi-Span Beam
[2009 International Building Code(2005 NDS)]
(2) 1.5 IN x 11.25 IN x 18.67 FT
#2 - Douglas-Fir-Larch - Dry Use
Section Adequate By: 7.5%
Controlling Factor: Moment



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CAUTIONS

* Laminations are to be fully connected to provide uniform transfer of loads to all members

DEFLECTIONS

Center

Live Load 0.12 IN L/1802
Dead Load 0.29 in
Total Load 0.41 IN L/544
Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS

A

B

Live Load 463 lb 110 lb
Dead Load 573 lb 316 lb
Total Load 1037 lb 426 lb
Bearing Length 0.55 in 0.23 in

BEAM DATA

Center

Span Length 18.67 ft
Unbraced Length-Top 1.33 ft
Unbraced Length-Bottom 18.67 ft
Live Load Duration Factor 1.00
Notch Depth 0.00

MATERIAL PROPERTIES

#2 - Douglas-Fir-Larch

Base Values

Adjusted

Bending Stress: $F_b = 900$ psi $F_b' = 897$ psi
 $C_d = 1.00$ $C_i = 1.00$ $C_F = 1.00$
Shear Stress: $F_v = 180$ psi $F_v' = 180$ psi
 $C_d = 1.00$
Modulus of Elasticity: $E = 1600$ ksi $E' = 1600$ ksi
Min. Mod. of Elasticity: $E_{min} = 580$ ksi $E_{min}' = 580$ ksi
Comp. $\perp$ to Grain: $F_c \perp = 625$ psi $F_c \perp' = 625$ psi

Controlling Moment:

4404 ft-lb

7.09 Ft from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

Controlling Shear:

1037 lb

At left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

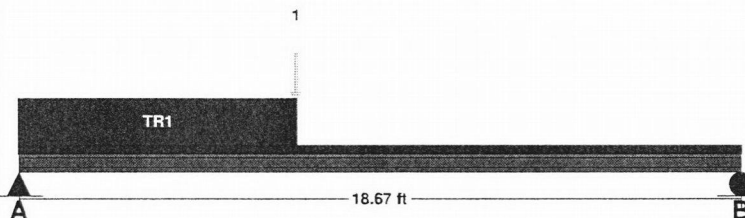
Comparisons with required sections:

Req'd

Provided

Section Modulus: 58.89 in³ 63.28 in³
Area (Shear): 8.64 in² 33.75 in²
Moment of Inertia (deflection): 156.91 in⁴ 355.96 in⁴
Moment: 4404 ft-lb 4733 ft-lb
Shear: 1037 lb 4050 lb

LOADING DIAGRAM



UNIFORM LOADS

Center

Uniform Live Load 0 plf
Uniform Dead Load 0 plf
Beam Self Weight 7 plf
Total Uniform Load 7 plf

POINT LOADS - CENTER SPAN

Load Number One
Live Load 0 lb
Dead Load 538 lb
Location 7.17 ft

TRAPEZOIDAL LOADS - CENTER SPAN

Load Number One
Left Live Load 80 plf
Left Dead Load 30 plf
Right Live Load 80 plf
Right Dead Load 30 plf
Load Start 0 ft
Load End 7.17 ft
Load Length 7.17 ft

NOTES

Permit # 17-180500

Project: Washington5

Location: Beam #16a alt main floor stair beam
Multi-Loaded Multi-Span Beam
[2009 International Building Code(2005 NDS)]
(2) 1.5 IN x 11.25 IN x 8.83 FT (4.8 + 4)
#2 - Douglas-Fir-Larch - Dry Use
Section Adequate By: 40.2%
Controlling Factor: Moment



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CAUTIONS

* Laminations are to be fully connected to provide uniform transfer of loads to all members

DEFLECTIONS

	Center	Right
Live Load	-0.01 IN L/5319	0.08 IN 2L/1262
Dead Load	0.00 in	0.02 in
Total Load	-0.01 IN L/4550	0.10 IN 2L/968
Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240		

REACTIONS

	A	B
Live Load	725 lb	2421 lb
Dead Load	90 lb	955 lb
Total Load	814 lb	3376 lb
Uplift (1.5 F.S)	-437 lb	0 lb
Bearing Length	0.43 in	1.80 in

BEAM DATA

	Center	Right
Span Length	4.83 ft	4 ft
Unbraced Length-Top	1.33 ft	1.33 ft
Unbraced Length-Bottom	4.83 ft	4 ft
Live Load Duration Factor	1.00	
Notch Depth	0.00	

MATERIAL PROPERTIES

#2 - Douglas-Fir-Larch

	Base Values	Adjusted
Bending Stress:	Fb = 900 psi Cd=1.00 Cl=0.99 CF=1.00	Fb' = 890 psi
Shear Stress:	Fv = 180 psi Cd=1.00	Fv' = 180 psi
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi
Min. Mod. of Elasticity:	E_min = 580 ksi	E_min' = 580 ksi
Comp. ⊥ to Grain:	Fc - ⊥ = 625 psi	Fc - ⊥' = 625 psi

Controlling Moment:

-3347 ft-lb

Over right support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 3

Controlling Shear:

-1703 lb

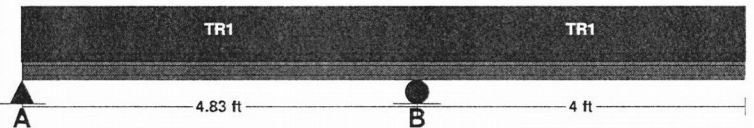
5.0 Ft from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2, 3

Comparisons with required sections:

	Req'd	Provided
Section Modulus:	45.15 in3	63.28 in3
Area (Shear):	14.19 in2	33.75 in2
Moment of Inertia (deflection):	101.48 in4	355.96 in4
Moment:	-3347 ft-lb	4691 ft-lb
Shear:	-1703 lb	4050 lb

LOADING DIAGRAM



UNIFORM LOADS

	Center	Right
Uniform Live Load	0 plf	0 plf
Uniform Dead Load	0 plf	0 plf
Beam Self Weight	7 plf	7 plf
Total Uniform Load	7 plf	7 plf

TRAPEZOIDAL LOADS - CENTER SPAN

Load Number	One
Left Live Load	300 plf
Left Dead Load	111 plf
Right Live Load	300 plf
Right Dead Load	111 plf
Load Start	0 ft
Load End	4.83 ft
Load Length	4.83 ft

RIGHT SPAN

Load Number	One
Left Live Load	300 plf
Left Dead Load	111 plf
Right Live Load	300 plf
Right Dead Load	111 plf
Load Start	0 ft
Load End	4 ft
Load Length	4 ft

NOTES

Permit # 17-180500