

Wood Beam Calculator

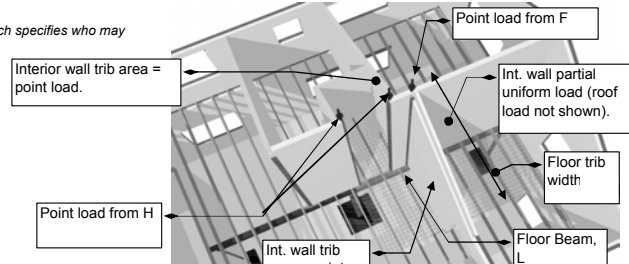
Assumptions: Beams are simple span (no overhangs, etc.). Full length of top of beam is laterally supported. No shear stress modifications. Bending in strong axis only. No wet use or high moisture content. No high temperature use. Dynamic loading not considered. Design values from 1997 National Design Specification for Wood Construction.



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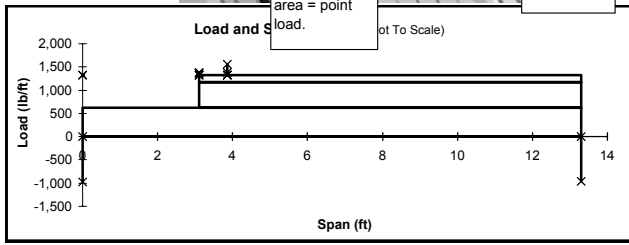
Disclaimer: All users of this software shall comply with State Engineering Law, which specifies who may perform engineering, and defines the practice of engineering.

Job Name: Two story wood framed example
Beam I.D.: Floor Beam L
Other Info.:



General Information

Span, L =
 Max. Allowed Live Deflection, L / = 0.44 in
 Max. Allowed Total Deflection, L / = 0.67 in
 Load Duration:
 Add Self Wt.? Yes No
 Loads Other Than Uniform Loads?



Uniform Loads Over Full Length of Member

	Live, psf	Dead, psf	Tributary width, ft	Uniform Live Load, plf	Reduced Live Load, plf	Unif. Dead Load, plf
Floor Loads	40 psf	12 psf	12.00 ft	480.0 lb/ft	476.3 lb/ft	144.0 lb/ft
Load Subtotals				480.0 lb/ft	476.3 lb/ft	144.0 lb/ft
Total Uniform Loads				$w_L = 476.3$ lb/ft		$w_D = 144.0$ lb/ft
Combined Total Uniform Load				$w_U = 620.3$ lb/ft		

Note the loads from a wall and the left support of H are so close to this beam's left support, we can leave them out. But when we size the footing and post below, we must remember to add them.

	Live Load, psf	Dead Load, psf	Trib. Width, ft	Trib. Length, ft	Live, lbs	Dead, lbs	Location, ft
A	7 psf	6.00 ft	13.00 ft	-	546 lb	$x_A = 3.10$ ft	
B	7 psf	6.00 ft	13.00 ft	-	546 lb	$x_B = 3.85$ ft	
C	Descrip'n, opt'l:		From H	289 lb	158 lb	$x_C = 3.10$ ft	
D	Descrip'n, opt'l:		From F	1,559 lb	807 lb	$x_D = 3.85$ ft	

Note: Location Measured From Left Support

Partial Uniform Loads

	Live Load, psf	Dead Load, psf	Tributary width, ft	Live Load, plf	Dead Load, plf	Comb'd Load, plf	Start Point, ft	End Point, ft
Partial Load A	30 psf	16 psf	12.00 ft	360.0 lb/ft	192.0 lb/ft	552.0 lb/ft	3.10 ft	13.30 ft
Partial Load B	0 psf	10 psf	15.00 ft	-	150.0 lb/ft	150.0 lb/ft	3.10 ft	13.30 ft

Note: Start and End Points Measured From Left Support

4x And Smaller (Lumber)

Lumber Material:
 Lumber Grade:
 Repetitive Member Use?

5x And Larger (Timbers)

Timber Material:
 Timber Grade:

-	12 x 18	-
-	14 x 18	-
8 x 20	16 x 16	-
10 x 18	18 x 18	-

Glued Laminated Members

Glulam Grade:

-	5.125 x 13.5
3 x 21	6.75 x 12
3.125 x 19.5	8.75 x 12
5 x 15	-

 (Applies Only To Western Species Glued-Laminated Beams)

2.0E Parallam PSL

-	5-1/4" x 14"
2-11/16" x 18"	7" x 11-7/8"
3-1/2" x 16"	-

Truss-Joist MacMillan I-Joists

-	-
-	-

Final Member:
Final Size:
Minimum Bearing Length = 2.89 in
 (Assuming Full-Width Bearing)

Reactions Including Self-Weight

	R ₁	R ₂
Live Load:	5,905 lb	5,950 lb
Dead Load:	<u>3,949 lb</u>	<u>3,817 lb</u>
Total Load:	<u>9,854 lb</u>	<u>9,767 lb</u>

Add'l Detail - Incl. Self Wt.

Max Moment: 35,458 ft-lb
 Member Design Shear: 9,104 lb
 Total Deflection: 0.471 in
 Live Deflection: 0.285 in
 Req'd EI, no self-weight addcd 1,675E+09 (in²-lb)
 Approx. Self Weight 23.00 plf
 Min. Calc'd Bearing Length 2.89 in

Efficiency of Member:

Bending Overdesign: 32.1%
 Shear Overdesign: 79.5%
 Deflection Overdesign: 41.2%

Final Member Selected: 5-1/4" x 14", Parallam 2.0E PSL

This member makes it by: **32.1%**
 Controlling criteria is: **Bending**