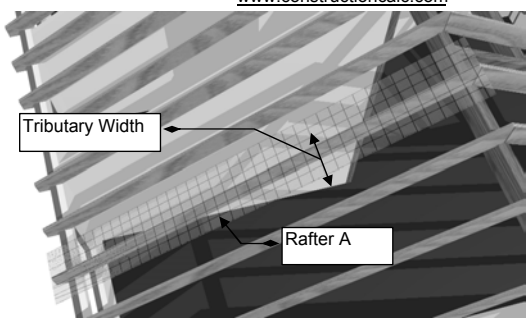
Wood Beam Calculator

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.*

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



Job Name:	Two story wood framed example
Beam I.D.:	Rafter A
Other Info.:	

Inside to inside, measured horizontally, not along slope.

Standard deflection criteria.

General Information

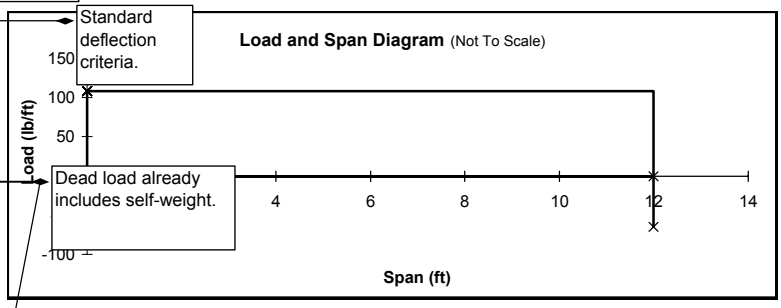
Span, L = 12.00 ft
Max. Allowed Live Deflection, L / 360 = 0.40 in
Max. Allowed Total Deflection, L / 240 = 0.60 in

Load Duration: Two Months (Snow)

Add Self Wt.? ○ Yes ◉ No

Loads Other Than Uniform Loads? No

Load and Span Diagram (Not To Scale)



Dead load already includes self-weight.

Uniform Loads Over Full Length of Member

'psf' loads come from Loads Program. Dead load is for horizontally projected area, and snow load is for the 'unbalanced case'.

	Live, psf	Dead, psf	Tributary width, ft	Uniform Live Load, plf	Reduced Live Load, plf.	Unif. Dead Load, plf
ing snow)	16 psf	16 psf	2.00 ft	-	-	32.0
ow (only)	38 psf		2.00 ft	76.0 lb/ft	76.0 lb/ft	
Load Subtotals				76.0 lb/ft	76.0 lb/ft	32.0 lb/ft
Total Uniform Loads				w_L = 76.0 lb/ft		w_D = 32.0 lb/ft
Combined Total Uniform Load				w_U = 108.0 lb/ft		

Unused loads are hidden.

4x And Smaller (Lumber)

You could choose any species and grade you want.

Lumber Material: Douglas Fir-Larch
Lumber Grade: No. 2

Repetitive Member Use? Yes

2 x 10	3 x 8
(2) 2 x 8	4 x 8
(3) 2 x 6	

Since rafters are spaced 24" or less apart, take advantage of 'repetitive member' stress increase.

5x And Larger (Timbers)

Timber Grade: Douglas Fir - Larch / WCLIB - No. 2

-	-	-
6 x 6	-	-
-	-	-
-	-	

Logical choices for Rafter A. (Ignore the others).

Glued Laminated Members

24F-V4

2.5 x 7.5	5.125 x 6
3 x 6	6.75 x 7.5
3.125 x 6	8.75 x 9
5 x 6	

(Applies Only To Western Species Glued-Laminated Bea

For this example, let's select a DF #2, 2x10 as our final choice.

2.0E Parallam PSL

1-3/4" x 9-1/4"	5-1/4" x 9-1/4"
2-11/16" x 9-1/4"	7" x 9-1/4"
3-1/2" x 9-1/4"	

Truss-Joist MacMillan I-Joists

9-1/2" TJI / Pro 150	11-7/8" TJI / Pro 350
9-1/2" TJI / Pro 250	11-7/8" TJI / Pro 550

Final Member: Sawn Wood
Final Size: 2 x 10
Minimum Bearing Length = 1.50 in
(Assuming Full-Width Bearing)

This member must have at least 1.5" of bearing length at each end.

Final Member Selected: 2 x 10, Douglas Fir-Larch, No. 2

Reactions - Not Incl. Sefl Wt.

	R_1	R_2
Live Load:	456 lb	456 lb
Dead Load:	192 lb	192 lb
Total Load:	**648 lb**	**648 lb**

Efficiency of Member:
Bending Overdesign: 20.1%
Shear Overdesign: 78.9%
Deflection Overdesign: 78.6%

This member makes it by: **20.1%**
Controlling criteria is: **Bending**

Add'l Detail - Not Incl. Self Wt.

Max Moment: 1,944 ft-lb
565 lb
0.318 in
0.224 in
8.865E+07
Approx. Self Weight 0.00 plf
Min. Calc'd Bearing Length 0.69 in

A 2x10 DF #2 exceeds bending, shear, and deflection requirements by 20%, 79%, and 79% respectively.

These are the downward forces at the ends of Rafter A. They are useful if designing a beam or header that this member bears on.