

# Wood Beam Calculator

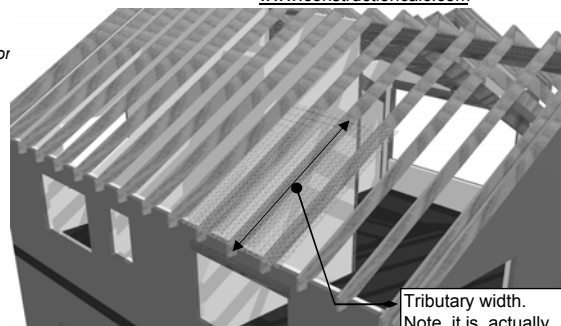


www.constructioncalc.com

**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 perform engineering, and defines the practice of engineering.

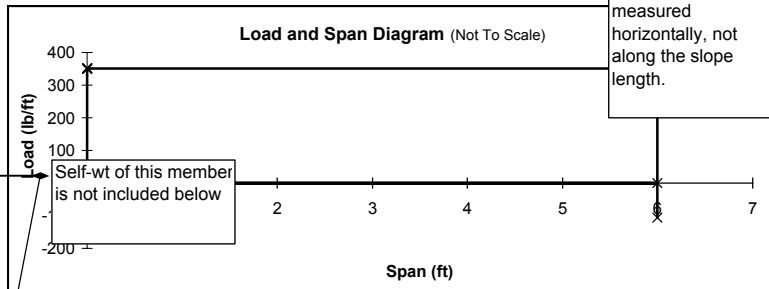
**Job Name:** Two story wood framed example  
**Beam I.D.:** Header B  
**Other Info.:**



Tributary width. Note, it is actually measured horizontally, not along the slope length.

## General Information

Span, L =   
 Max. Allowed Live Deflection, L /  = 0.20 in  
 Max. Allowed Total Deflection, L /  = 0.30 in  
 Load Duration:   
 Add Self Wt.?  Yes  No  
 Loads Other Than Uniform Loads?



## 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 |                     |
|------------------------------------|-----------|-----------|---------------------|------------------------|------------------------|---------------------|
| ing snow                           | 16 psf    | 16 psf    | 6.50 ft             | -                      | -                      |                     |
| ow (only)                          | 38 psf    |           | 6.50 ft             | 247.0 lb/ft            | 247.0 lb/ft            | 104.0 lb/ft         |
| <b>Load Subtotals</b>              |           |           |                     | 247.0 lb/ft            | 247.0 lb/ft            | 104.0 lb/ft         |
| <b>Total Uniform Loads</b>         |           |           |                     | $W_L = 247.0$ lb/ft    |                        | $W_D = 104.0$ lb/ft |
| <b>Combined Total Uniform Load</b> |           |           |                     | $W_U = 351.0$ lb/ft    |                        |                     |

Trib width is half the span plus the overhang.

| 4x And Smaller (Lumber)  |  | 5x And Larger (Timbers)   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
|--|--|---|---------------|-----------------|-----------------|-------------------|-------------|-----------------|---|--|--------------------------------|---|---|-----------------------|---|-----------------------|---|---|---|---|---|
| Lumber Material: <input type="text" value="Douglas Fir-Larch"/>  | Timber Grade: <input type="text" value="Douglas Fir - Larch"/>   | Lumber Grade: <input type="text" value="No. 2"/>  | WCLIB - No. 2 |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| Repetitive Member Use? <input type="text" value="No"/>   | Use any member shown.  | <table border="1"> <tr><td>2 x 10</td><td>3 x 8</td></tr> <tr><td>(2) 2 x 6</td><td>4 x 6</td></tr> <tr><td>(3) 2 x 5</td><td></td></tr> </table> | 2 x 10        | 3 x 8           | (2) 2 x 6       | 4 x 6             | (3) 2 x 5   |                 | <table border="1"> <tr><td>-</td><td>-</td><td>-</td></tr> <tr><td>6 x 6</td><td>-</td><td>-</td></tr> <tr><td>-</td><td>-</td><td>-</td></tr> <tr><td>-</td><td>-</td><td>-</td></tr> </table> | -  | -                              | - | 6 x 6   | -                     | - | -                     | - | - | - | - | - |
| 2 x 10   | 3 x 8  |   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| (2) 2 x 6  | 4 x 6  |   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| (3) 2 x 5  |  |   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| -  | -  | -   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| 6 x 6  | -  | -   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| -  | -  | -   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| -  | -  | -   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| Since this member 'acts alone', this is 'No'.  | <table border="1"> <thead> <tr> <th colspan="2">2.0E Parallam PSL</th> </tr> </thead> <tbody> <tr><td>1-3/4" x 9-1/4"</td><td>5-1/4" x 9-1/4"</td></tr> <tr><td>2-11/16" x 9-1/4"</td><td>7" x 9-1/4"</td></tr> <tr><td>3-1/2" x 9-1/4"</td><td></td></tr> </tbody> </table> | 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" |   | <table border="1"> <thead> <tr> <th colspan="2">Truss-Joist MacMillan I-Joists</th> </tr> </thead> <tbody> <tr><td>-</td><td>11-7/8" TJI / Pro 350</td></tr> <tr><td>-</td><td>11-7/8" TJI / Pro 550</td></tr> </tbody> </table> | Truss-Joist MacMillan I-Joists |   | -   | 11-7/8" TJI / Pro 350 | - | 11-7/8" TJI / Pro 550 |   |   |   |   |   |
| 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   |  |   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| -  | 11-7/8" TJI / Pro 350  |   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| -  | 11-7/8" TJI / Pro 550  |   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| <table border="1"> <thead> <tr> <th colspan="2">Glued Laminated Members</th> </tr> </thead> <tbody> <tr><td>24F-V4</td><td></td></tr> <tr><td>2.5 x 6</td><td>5.125 x 6</td></tr> <tr><td>3 x 6</td><td>6.75 x 7.5</td></tr> <tr><td>3.125 x 6</td><td>8.75 x 9</td></tr> <tr><td>5 x 6</td><td></td></tr> </tbody> </table> | Glued Laminated Members  |   | 24F-V4        |                 | 2.5 x 6         | 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 Beams) |                       |   |                       |   |   |   |   |   |
| Glued Laminated Members  |  |   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| 24F-V4   |  |   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| 2.5 x 6  | 5.125 x 6  |   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| 3 x 6  | 6.75 x 7.5   |   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| 3.125 x 6  | 8.75 x 9   |   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |
| 5 x 6  |  |   |               |                 |                 |                   |             |                 |   |  |                                |   |   |                       |   |                       |   |   |   |   |   |

| <b>Final Member:</b> <input type="text" value="Sawn Wood"/><br><b>Final Size:</b> <input type="text" value="4 x 6"/><br><b>Minimum Bearing Length = 1.50 in</b><br>(Assuming Full-Width Bearing) | <b>Reactions Including Self-Weight</b><br><table border="1"> <thead> <tr> <th></th> <th>R<sub>1</sub></th> <th>R<sub>2</sub></th> </tr> </thead> <tbody> <tr> <td>Live Load:</td> <td>741 lb</td> <td>741 lb</td> </tr> <tr> <td>Dead Load:</td> <td>327 lb</td> <td>327 lb</td> </tr> <tr> <td>Total Load:</td> <td>1,068 lb</td> <td>1,068 lb</td> </tr> </tbody> </table> |                | R <sub>1</sub> | R <sub>2</sub> | Live Load: | 741 lb | 741 lb | Dead Load: | 327 lb | 327 lb | Total Load: | 1,068 lb | 1,068 lb | <b>Add'l Detail - Incl. Self Wt.</b><br>Max Moment: 1,602 ft-lb<br>Member Design Shear: 905 lb<br>Total Deflection: 0.134 in<br>Live Deflection: 0.093 in<br>Req'd EI, no self-weight added 3.601E+07 (in <sup>2</sup> -lb)<br>Approx. Self Weight 4.92 plf<br>Min. Calc'd Bearing Length 0.49 in |
|--|--|----------------|----------------|----------------|------------|--------|--------|------------|--------|--------|-------------|----------|----------|---|
|  | R <sub>1</sub>   | R <sub>2</sub> |                |                |            |        |        |            |        |        |             |          |          |   |
| Live Load:   | 741 lb   | 741 lb         |                |                |            |        |        |            |        |        |             |          |          |   |
| Dead Load:   | 327 lb   | 327 lb         |                |                |            |        |        |            |        |        |             |          |          |   |
| Total Load:  | 1,068 lb   | 1,068 lb       |                |                |            |        |        |            |        |        |             |          |          |   |
| <b>Final Member Selected: 4 x 6, Douglas Fir-Larch, No. 2</b>  |  |                |                |                |            |        |        |            |        |        |             |          |          |   |
| This member makes it by: <b>23.5%</b><br>Controlling criteria is: <b>Bending</b>   |  |                |                |                |            |        |        |            |        |        |             |          |          |   |