



COMPANY

PROJECT

Mar. 5, 2025 11:06

Load\_Input\_Assignment1.wwbc

## Design Check Calculation Sheet

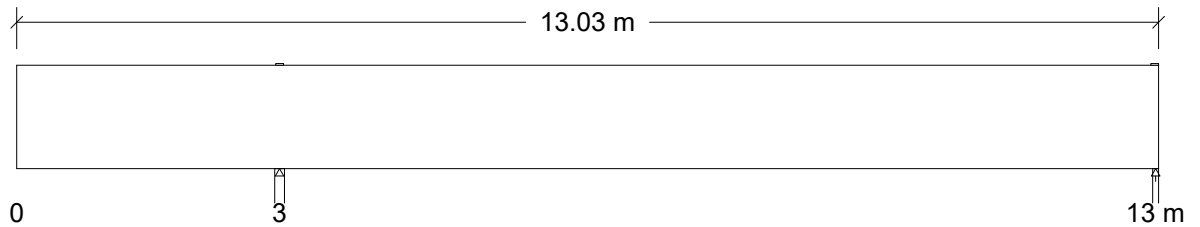
WoodWorks Sizer 11.5

### Loads:

| Load        | Type | Distribution | Pat-tern | Location [m ]<br>Start End | Magnitude<br>Start End | Unit |
|-------------|------|--------------|----------|----------------------------|------------------------|------|
| Load1       | Dead | Full UDL     | No       |                            | 6.00                   | kN/m |
| Load2       | Snow | Full UDL     | Yes      |                            | 10.00                  | kN/m |
| Self-weight | Dead | Full UDL     | No       |                            | 1.50                   | kN/m |

Load magnitude does not include Normal Importance factor from NBC Tables 4.1.6.2, 4.1.7.3, 4.1.8.2 which is applied during analysis.

### Maximum Reactions (kN), Bearing Resistances (kN) and Bearing Lengths (mm) :



|             |  |  |        |  |        |
|-------------|--|--|--------|--|--------|
| Unfactored: |  |  |        |  |        |
| Dead        |  |  | 63.36  |  | 34.32  |
| Snow        |  |  | 84.50  |  | 48.09  |
| Factored:   |  |  |        |  |        |
| Total       |  |  | 205.95 |  | 115.03 |
| Bearing:    |  |  |        |  |        |
| Capacity    |  |  |        |  |        |
| Beam        |  |  | 205.95 |  | 115.03 |
| Support     |  |  | 711.66 |  | 431.54 |
| Des ratio   |  |  |        |  |        |
| Beam        |  |  | 1.00   |  | 1.00   |
| Support     |  |  | 0.29   |  | 0.27   |
| Load comb   |  |  | #2     |  | #5     |
| Length      |  |  | 111    |  | 67     |
| Min req'd   |  |  | 111    |  | 67     |
| KB          |  |  | 1.09   |  | 1.00   |
| KB min      |  |  | 1.09   |  | 1.00   |
| KD          |  |  | 1.00   |  | 1.00   |
| KB support  |  |  | -      |  | -      |
| fc sup      |  |  | 30.20  |  | 30.20  |
| Kzcp sup    |  |  | -      |  | -      |

### Glulam-EX, D. Fir-L, 20f-EX, 265x1178 mm

Supports: All - Glulam-c Column, D. Fir-L 16c-E

Total length: 13.034 m; Clear span: 2.9, 9.9 m; Volume = 4.069 m<sup>3</sup>; 180 mm max lam width

Lateral support: top = at supports, bottom = at supports;

**This section PASSES the design code check.**

**Force vs. Resistance and Deflection using CSA O86-19:**

| Criterion      | Analysis Value | Design Value         | Unit | Analysis/Design |
|----------------|----------------|----------------------|------|-----------------|
| Shear 7.5.7.2b | n/a (volume >  | 2.0 m <sup>3</sup> ) |      |                 |
| Shear 7.5.7.3a | Wf = 316.85    | Wr = 996.27          | kN   | Wf/Wr = 0.32    |
| Moment(+)      | Mf = 267.88    | Mr = 1190.93         | kN-m | Mf/Mr = 0.22    |
| Moment(-)      | Mf = 109.68    | Mr = 1190.93         | kN-m | Mf/Mr = 0.09    |
| Deflection:    |                |                      |      |                 |
| Interior Perm  | 1.7 = < L/999  | 27.8 = L/360         | mm   | 0.06            |
| Live           | 2.3 = < L/999  | 27.8 = L/360         | mm   | 0.08            |
| Total          | 4.0 = < L/999  | 55.6 = L/180         | mm   | 0.07            |
| Cantil. Perm   | -1.2 = < L/999 | 16.7 = L/180         | mm   | 0.07            |
| Live           | -2.0 = < L/999 | 16.7 = L/180         | mm   | 0.12            |
| Total          | -3.1 = L/958   | 33.3 = L/90          | mm   | 0.09            |

**Additional Data:**

|          |          |      |      |       |       |      |      |    |       |     |
|----------|----------|------|------|-------|-------|------|------|----|-------|-----|
| FACTORS: | f/E(MPa) | KD   | KH   | KZ    | KL    | KT   | KS   | KN | Cv    | LC# |
| Fv       | 2.0      | 1.00 | 1.00 | 1.000 | -     | 1.00 | 1.00 | -  | 4.753 | #2  |
| Fb+      | 25.6     | 1.00 | 1.00 | 0.903 | 0.843 | 1.00 | 1.00 | -  | -     | #5  |
| Fb-      | 25.6     | 1.00 | 1.00 | 0.976 | 0.843 | 1.00 | 1.00 | -  | -     | #4  |
| Fcp      | 7.0      | -    | -    | 1.150 | -     | 1.00 | 1.00 | -  | -     | #-  |
| Es       | 12400    | -    | -    | -     | -     | 1.00 | 1.00 | -  | -     | #5  |

**CRITICAL LOAD COMBINATIONS:**

Shear : LC #2 = 1.25D + (1.0)1.5S  
 Moment(+) : LC #5 = 1.25D + (1.0)1.5S (pattern: sS)  
 Moment(-) : LC #4 = 1.25D + (1.0)1.5S (pattern: sS)  
 Deflection: LC #1 = 1.0D (permanent)  
               LC #5 = 1.0D + (0.9)1.0S (pattern: sS) (live)  
               LC #5 = 1.0D + (0.9)1.0S (pattern: sS) (total)  
 Bearing : Support 1 - LC #2 = 1.25D + (1.0)1.5S  
               Support 2 - LC #5 = 1.25D + (1.0)1.5S (pattern: sS)  
 Load Types: D=dead S=snow  
 Load Patterns: s=S/2 L=L+Ls \_=no pattern load in this span  
 Load combinations from NBC 2015; code references and LC's listed in the Analysis report

**CALCULATIONS:**

Shear Wr : O86 7.5.7.3(a)used; Wf = sum of all loads  
 EI = 447633e06 kN-mm<sup>2</sup>  
 "Live" deflection is due to all non-dead loads (live, wind, snow...)  
 Lateral stability(+): Lu = 10.00 m Le = 19.20 m CB = 17.9; Lu based on full span  
 Lateral stability(-): Lu = 10.00 m Le = 19.20 m CB = 17.9; Lu based on full span

**Design Notes:**

1. WoodWorks analysis and design are in accordance with the 2015 National Building Code of Canada (NBC), Division B, Part 4, and the CSA O86 - 19 Engineering Design in Wood standard.
2. Please verify that the default deflection limits are appropriate for your application.
3. EX grades should be considered when negative bending moment exceeds 75% of the negative bending capacity.
4. BEAMS require restraint against lateral displacement and rotation at points of bearing (O86 7.5.6.3.1).