



COMPANY

PROJECT

Mar. 18, 2025 06:18

Column_Stability_Assignment1.wvcc

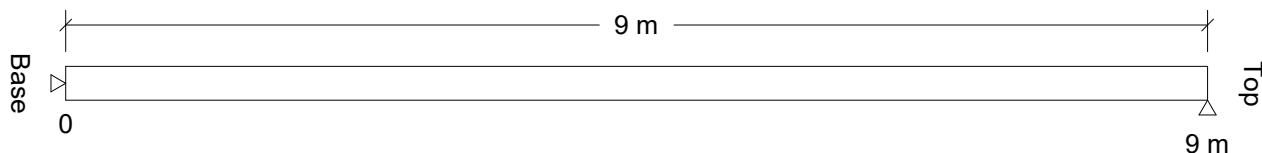
Design Check Calculation Sheet

WoodWorks Sizer 11.5

Loads:

Load	Type	Distribution	Location [m] Start End	Magnitude Start End	Unit
Load1	Dead	Axial	(Ecc. = 44 mm)	50.00	kN
Load2	Live	Axial	(Ecc. = 44 mm)	75.00	kN

Reactions (kN):



Unfactored:			
Lateral:			
Dead	0.25		-0.25
Live	0.37		-0.37
Axial:			
Dead	50.00		50.00
Live	75.00		75.00
Factored:			
R->L			0.86
Load comb			#2
L->R	0.86		
Load comb	#2		#1

Glulam-c, Spruce-Pine, 12c-E, 175x266 mm

Support: Non-wood

Total length: 9.0 m; Volume = 0.419 m³; 175 mm max lam width

Pinned base; Load face = width(b); Ke x Lb: 1.0 x 3.0 = 3.0 m ; Ke x Ld: 1.0 x 4.5 = 4.5 m ;

This section PASSES the design code check.

Force vs. Resistance and Deflection using CSA O86-14:

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear 7.5.7.2b	Vf = 0.86	Vr = 31.77	kN	Vf/Vr = 0.03
Moment (+)	Mf = 7.77	Mr = 18.20	kN-m	Mf/Mr = 0.43
Axial b	Pf = 175.00	Pr = 538.36	kN	Pf/Pr = 0.33
Axial d	Pf = 175.00	Pr = 543.59	kN	
Combined		(Pf/Pr) ^2 + (Mf/Mr) *1 / (1-Pf/Pe) =		0.61
Perm. Defl'n	4.3 = < L/999	25.0 = L/360	mm	0.17
Live Defl'n	6.5 = < L/999	50.0 = L/180	mm	0.13
Total Defl'n	10.8 = L/830	50.0 = L/180	mm	0.22

Additional Data:

FACTORS:	f/E (MPa)	KD	KH	KZ	Kc	KL	KT	KS	Cv	LC#
Fb+	9.8	1.00	1.00	1.056	-	1.000	1.00	1.00	-	#2
Es	9700	-	-	-	-	-	1.00	1.00	-	#2
E05	8439	-	-	-	-	-	1.00	1.00	-	#2
Fcb	25.2	1.00	1.00	0.761	0.753	-	1.00	1.00	-	#2
Fcd	25.2	1.00	1.00	0.761	0.761	-	1.00	1.00	-	#2
Comb'd Fc	25.2	1.00	1.00	0.761	0.753	-	1.00	1.00	-	#2
Comb'd Fb	9.8	1.00	1.00	1.056	-	1.000	1.00	1.00	-	#2

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = 1.25D + 1.5L
 Moment(+) : LC #2 = 1.25D + 1.5L
 Deflection: LC #1 = 1.0D (permanent)
 LC #2 = 1.0D + 1.0L (live)
 LC #2 = 1.0D + 1.0L (total)
 Axial : LC #2 = 1.25D + 1.5L
 Combined : LC #2 = 1.25D + 1.5L
 Load Types: D=dead L=live(use,occupancy)
 Load combinations from NBC 2015; code references and LC's listed in the Analysis report

CALCULATIONS:

Shear Vr: 086 7.5.7.2(b) used
 EI = 2662e06 kN-mm²
 "Live" deflection is due to all non-dead loads (live, wind, snow...)
 Axial b used; CCb = 17.1; CCd = 16.9
 $1/(1-Pf/Pe) = 1.18$

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 O86-14 Engineering Design in Wood standard, Update No. 2 (June 2017).
2. Please verify that the default deflection limits are appropriate for your application.
3. Axial load eccentricity applied in direction of load face only. It is the designers responsibility to check for effect of eccentricity in the other direction.