

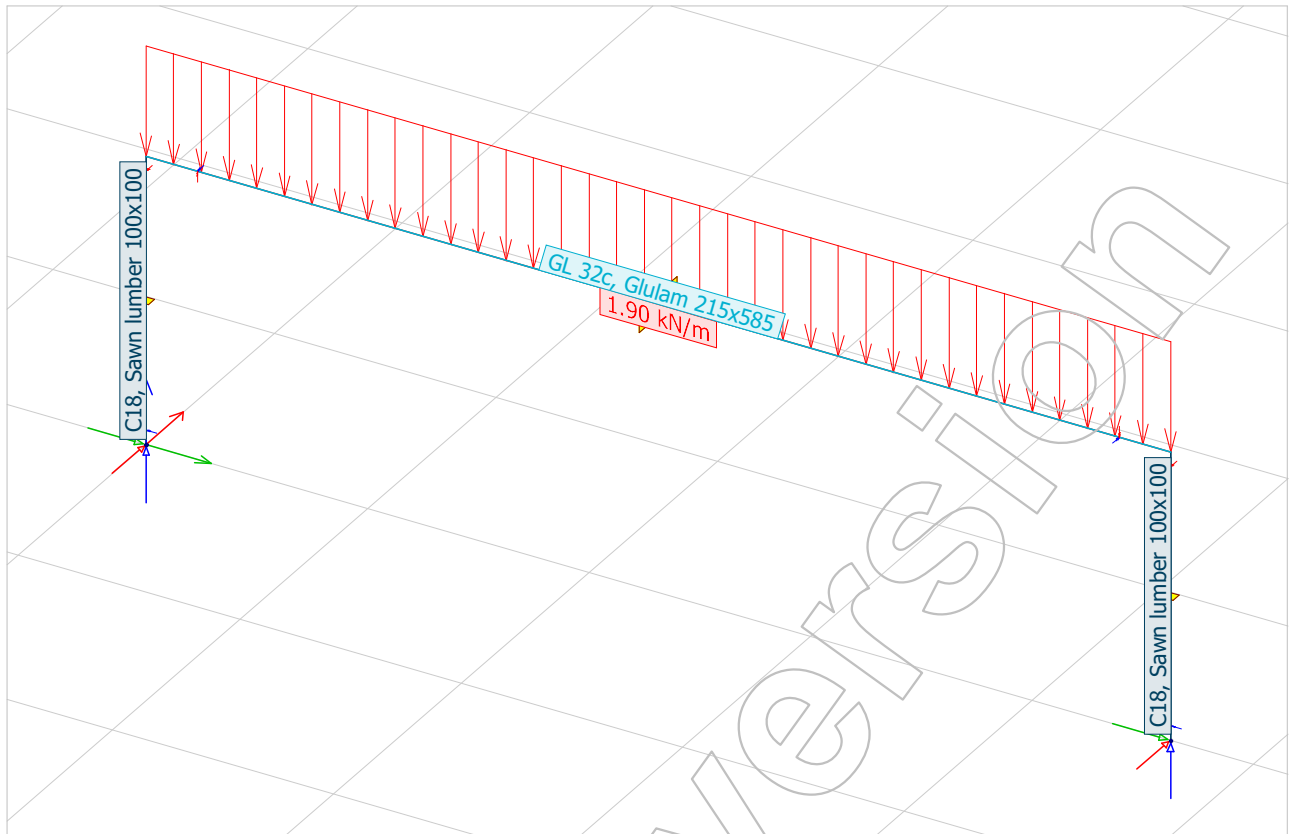


Figure 1: dead load

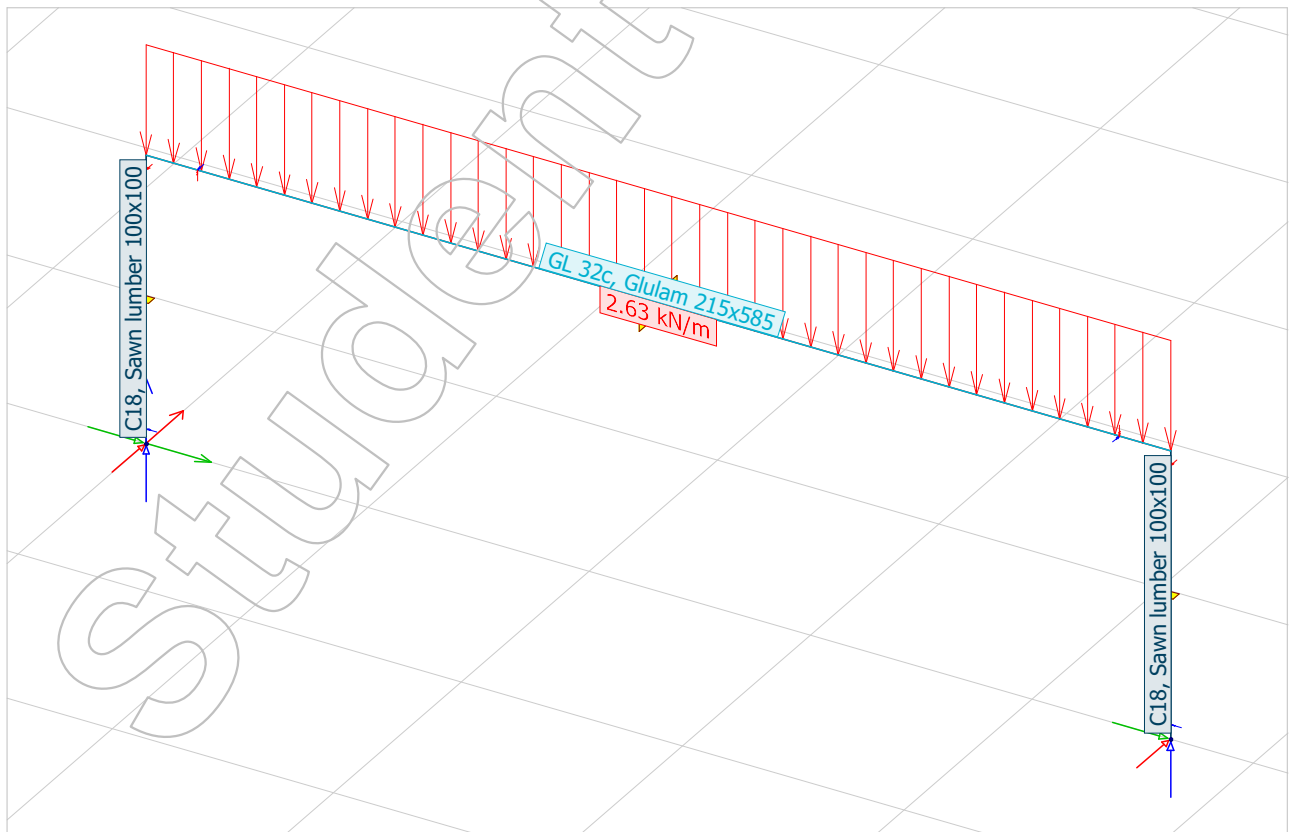


Figure 2: Snow

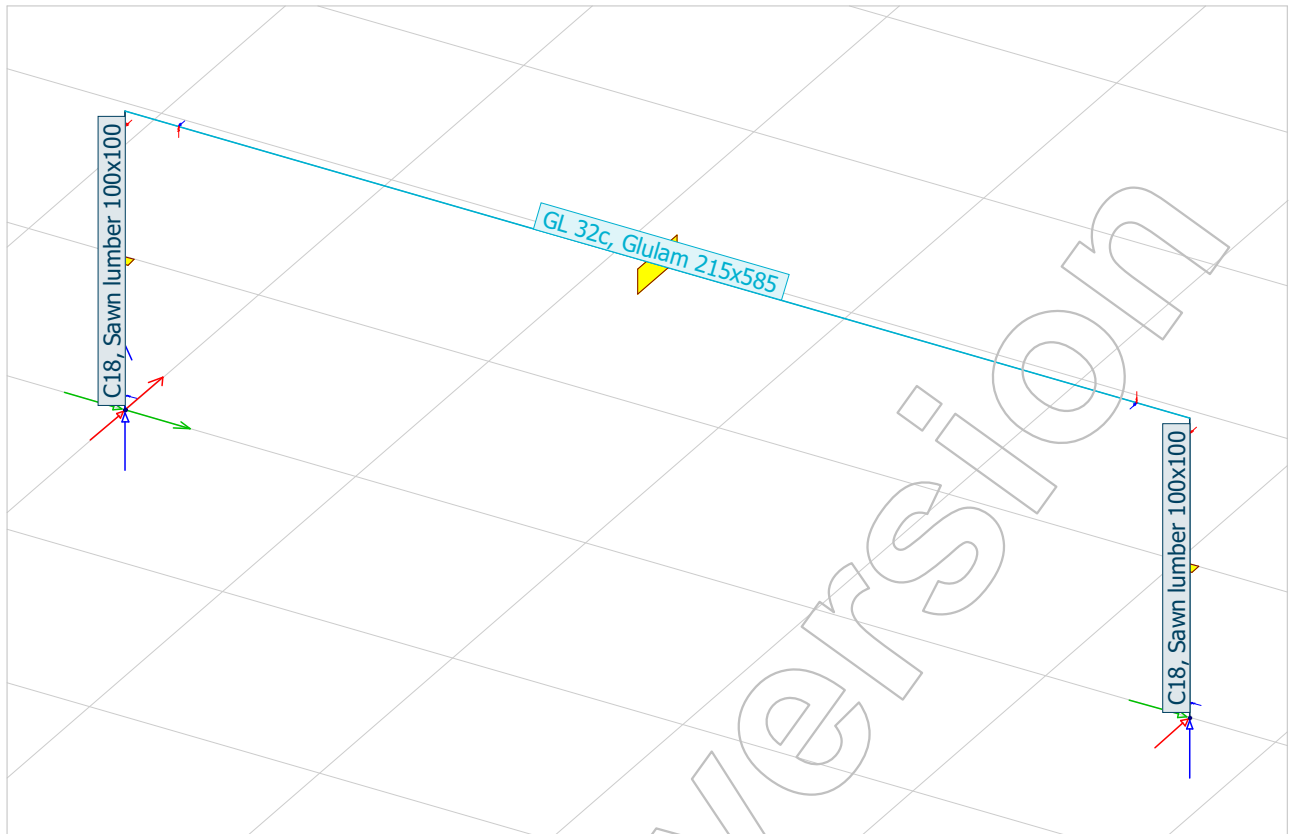


Figure 3: Structure

Cmax, U - Reactions - All components- - [kN, kNm, kN/m, kNm/m, kN/m2]

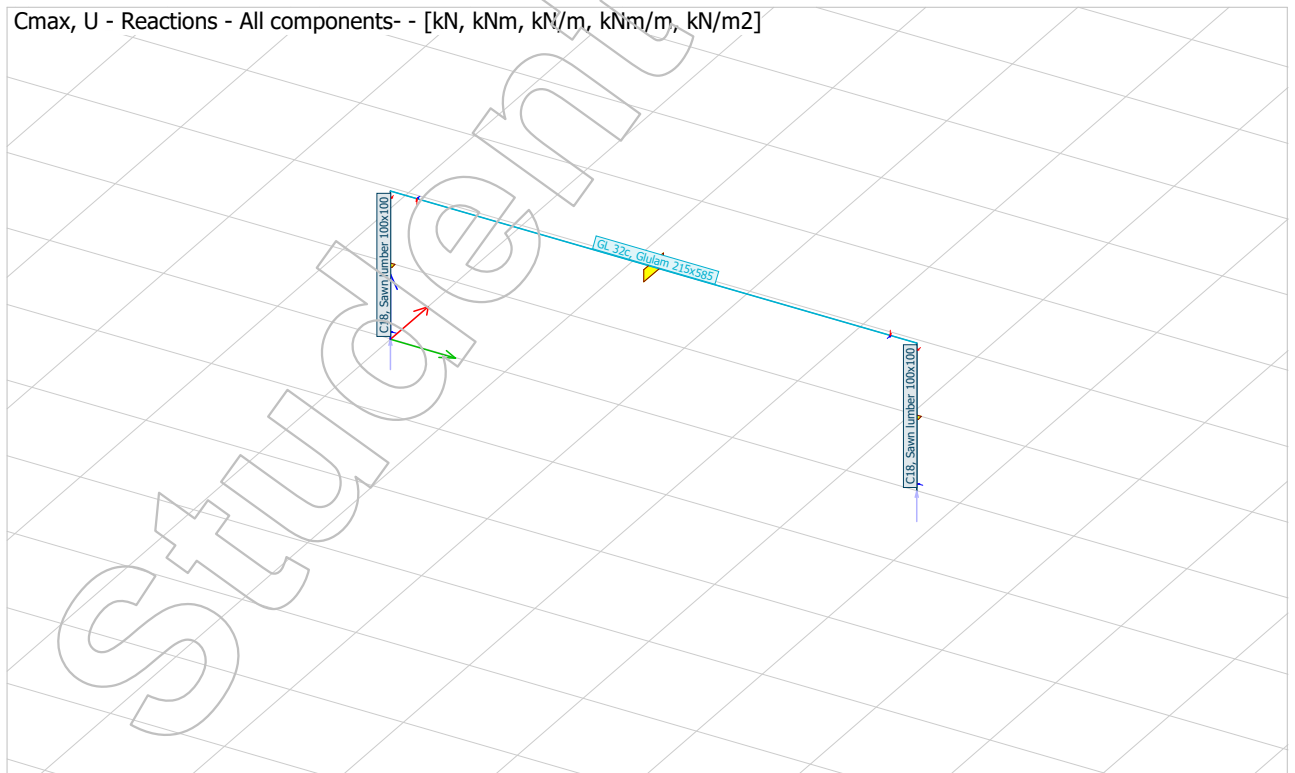


Figure 4

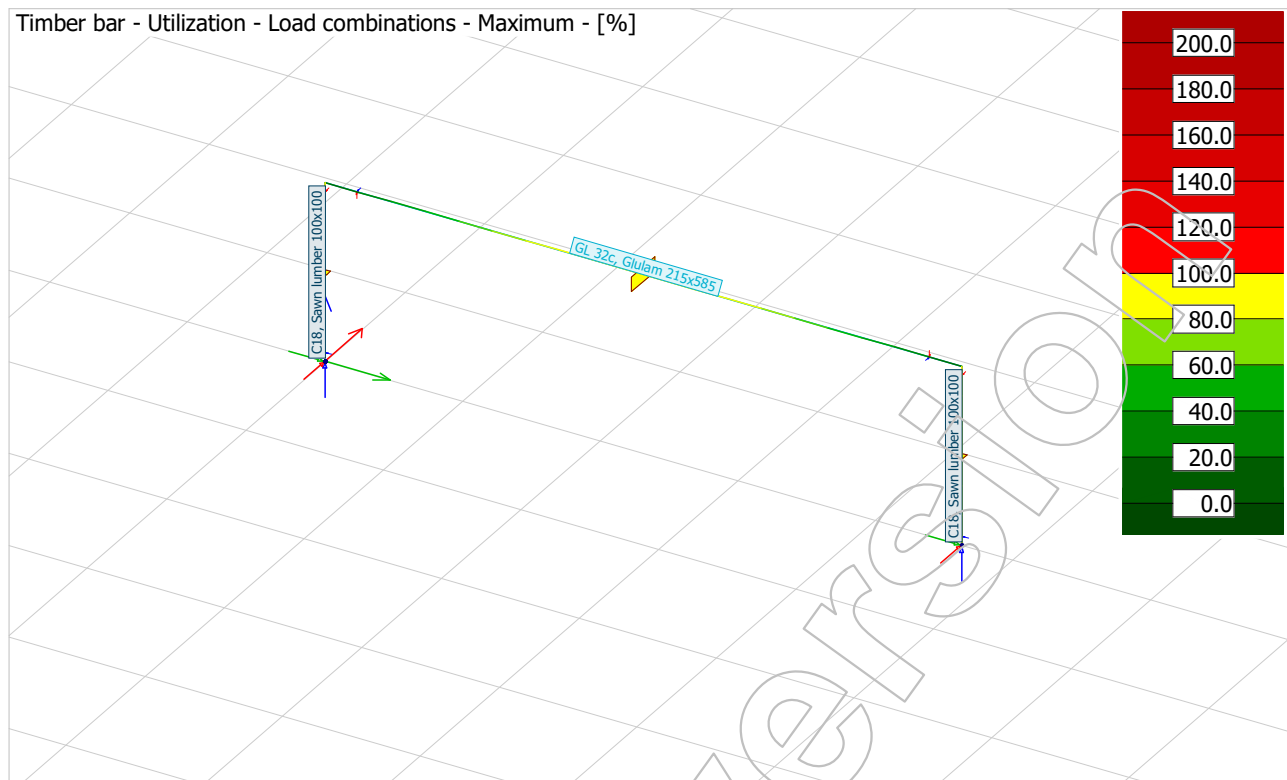


Figure 5

B.1.1 Maximum of load combinations

GL 32c

(Glued laminated), Service class 1

$E_{0,05}$	=	11200 N/mm ²	$f_{t,90,k}$	=	0.50 N/mm ²
$G_{0,05}$	=	540 N/mm ²	$f_{c,0,k}$	=	24.50 N/mm ²
Y_M	=	1.30	$f_{c,90,k}$	=	2.50 N/mm ²
$Y_{M,acc./seis.}$	=	1.00	$f_{v,k}$	=	3.50 N/mm ²
k_{sys}	=	1.00			

Glulam 215x585

	A	=	125775 mm ²	$f_{t,0,k}$	=	19.55 N/mm ²
	W_1	=	1.226e+07 mm ³	$f_{m,1,k}$	=	32.08 N/mm ²
	W_2	=	4.507e+06 mm ³	$f_{m,2,k}$	=	35.20 N/mm ²
	i_1	=	169 mm			
	i_2	=	62 mm			
	I_2	=	4.845e+08 mm ⁴			
	I_t	=	1.489e+09 mm ⁴			

Combined bending and axial tension - 6.2.3

Not relevant

Combined bending and axial compression - 6.1.4, 6.2.4

LC: 'Sne. dom', $k_{\text{mod}} = 0.60$, $x = 4383.47$ mm

$$\frac{\sigma_{c,0,d}}{f_{c,0,d}} = \frac{0.00}{11.31} = 0.00 \leq 1.00 \quad (6.2) - \text{OK}$$

$$\begin{aligned} \left(\frac{\sigma_{c,0,d}}{f_{c,0,d}} \right)^2 + \frac{\sigma_{m,1,d}}{f_{m,1,d}} + k_m \frac{\sigma_{m,2,d}}{f_{m,2,d}} &= \\ = \left(\frac{0.00}{11.31} \right)^2 + \frac{0.00}{14.81} + 0.70 \frac{13.74}{16.25} &= 0.59 \leq 1.00 \quad (6.19) - \text{OK} \end{aligned}$$

$$\begin{aligned} \left(\frac{\sigma_{c,0,d}}{f_{c,0,d}} \right)^2 + k_m \frac{\sigma_{m,1,d}}{f_{m,1,d}} + \frac{\sigma_{m,2,d}}{f_{m,2,d}} &= \\ = \left(\frac{0.00}{11.31} \right)^2 + 0.70 \frac{0.00}{14.81} + \frac{13.74}{16.25} &= 0.85 \leq 1.00 \quad (6.20) - \text{OK} \end{aligned}$$

Combined shear and torsion - 6.1.7, 6.1.8

LC: 'Sne. dom', $k_{\text{mod}} = 0.60$, $x = 0.00$ mm

$$\tau_d = 0.32 \text{ N/mm}^2 \leq f_{v,d} = 1.62 \text{ N/mm}^2 \quad (6.13) - \text{OK}$$

Flexural buckling around axis 1 - 6.3.2

LC: 'Sne. dom', $k_{\text{mod}} = 0.60$, $x = 4383.47$ mm

$$\beta_c = 0.1 \quad (6.29)$$

$$\lambda_1 = \frac{l_0}{i_1} = \frac{9254}{169} = 54.80$$

$$\lambda_{\text{rel},1} = \frac{\lambda_1}{\pi} \sqrt{\frac{f_{c,0,k}}{E_{0,05}}} = \frac{54.80}{\pi} \sqrt{\frac{24.50}{11200}} = 0.816 \quad (6.21)$$

$$\begin{aligned} k_1 &= 0.5 \left(1 + \beta_c (\lambda_{\text{rel},1} - 0.3) + \lambda_{\text{rel},1}^2 \right) = \\ &= 0.5 \left(1 + 0.1 (0.816 - 0.3) + 0.816^2 \right) = 0.859 \quad (6.27) \end{aligned}$$

$$k_{c,1} = \frac{1}{k_1 + \sqrt{k_1^2 - \lambda_{\text{rel},1}^2}} = \frac{1}{0.859 + \sqrt{0.859^2 - 0.816^2}} = 0.888 \quad (6.25)$$

$$\begin{aligned} \frac{\sigma_{c,0,d}}{k_{c,1} \cdot f_{c,0,d}} + \frac{\sigma_{m,1,d}}{f_{m,1,d}} + k_m \cdot \frac{\sigma_{m,2,d}}{f_{m,2,d}} &= \\ = \frac{0.00}{0.888 \cdot 11.31} + \frac{0.00}{14.81} + 0.70 \cdot \frac{13.74}{16.25} &= 0.59 \leq 1.00 \quad (6.23) - \text{OK} \end{aligned}$$

Flexural buckling around axis 2 - 6.3.2

LC: 'Sne. dom', $k_{\text{mod}} = 0.60$, $x = 4383.47 \text{ mm}$

$$\beta_c = 0.1 \quad (6.29)$$

$$\lambda_2 = \frac{l_0}{i_2} = \frac{9254}{62} = 149.10$$

$$\lambda_{\text{rel},2} = \frac{\lambda_2}{\pi} \sqrt{\frac{f_{c,0,k}}{E_{0,05}}} = \frac{149.10}{\pi} \sqrt{\frac{24.50}{11200}} = 2.220 \quad (6.22)$$

$$k_2 = 0.5 \left(1 + \beta_c (\lambda_{\text{rel},2} - 0.3) + \lambda_{\text{rel},2}^2 \right) = 0.5 \left(1 + 0.1 (2.220 - 0.3) + 2.220^2 \right) = 3.060 \quad (6.28)$$

$$k_{c,2} = \frac{1}{k_2 + \sqrt{k_2^2 - \lambda_{\text{rel},2}^2}} = \frac{1}{3.060 + \sqrt{3.060^2 - 2.220^2}} = 0.194 \quad (6.26)$$

$$\frac{\sigma_{c,0,d}}{k_{c,2} \cdot f_{c,0,d}} + k_m \cdot \frac{\sigma_{m,1,d}}{f_{m,1,d}} + \frac{\sigma_{m,2,d}}{f_{m,2,d}} = \frac{0.00}{0.194 \cdot 11.31} + 0.70 \cdot \frac{0.00}{14.81} + \frac{13.74}{16.25} = 0.85 \leq 1.00 \quad (6.24) - \text{OK}$$

Lateral torsional buckling - 6.3.3

Not relevant

Bending at apex - 6.4.3

Not relevant

Tension at apex - 6.4.3

Not relevant

Summary

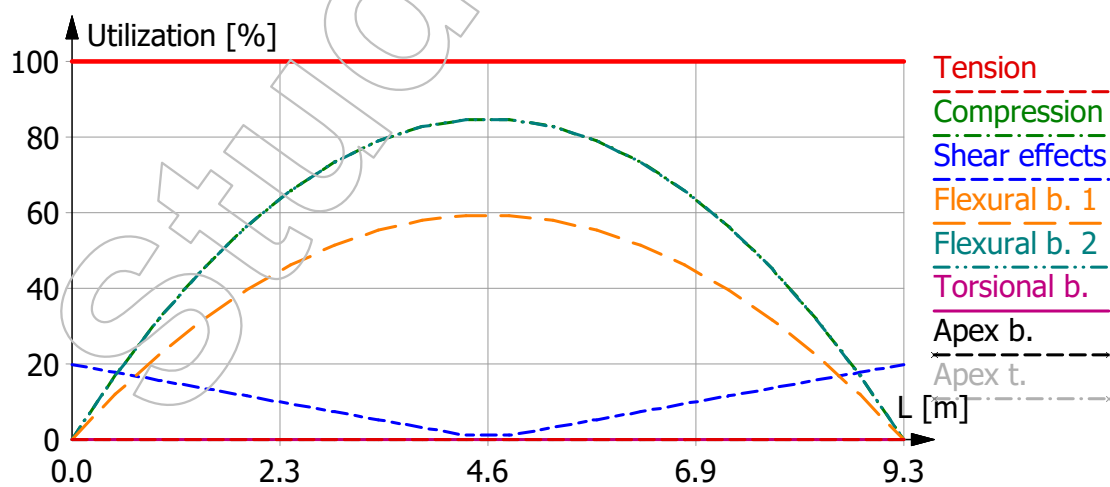


Table 1: Load cases

No.	Name	Type	Duration class
1	Live load	Ordinary	Permanent

No.	Name	Type	Duration class
2	Wind	Ordinary	Permanent

No.	Name	Type	Duration class
3	Snow	Ordinary	Permanent
4	dead load	Ordinary	Permanent

No.	Name	Type	Duration class
5	snow	Ordinary	Permanent

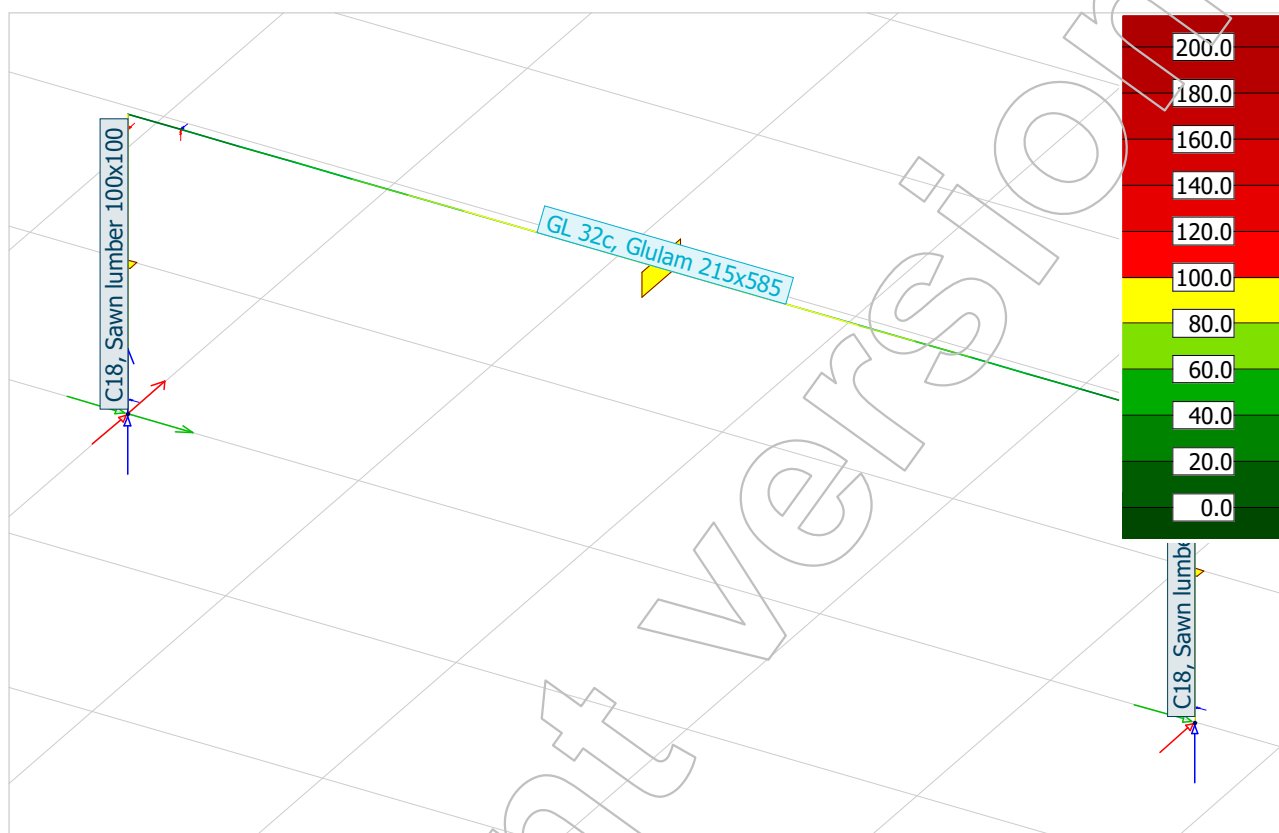


Figure 6: Timber bar - Utilization - Load combinations - Maximum - [%]

Table 2: Load combinations

No.	Name	Type	Factor	Load cases
1	Egenlast. dom	Ultimate	1.200	dead load
2	Nyttelast. dom	Ultimate	1.000	dead load
			1.500	Live load
			0.450	snow
			0.450	Wind
3	Sne. dom	Ultimate	1.500	snow
			1.000	dead load
			0.450	Wind
4	Vind. dom	Ultimate	0.900	Live load
			1.500	Wind
			1.000	dead load
			0.900	Live load
5	Karakteristisk-Andendelse	Characteristic	1.000	dead load
			1.000	Live load
			0.300	snow
			0.300	Wind