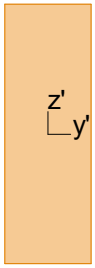
B.8.1
Maximum of load combinations

GL 32c
(Glued laminated), Service class 1

$E_{0,05}$	=	11200 N/mm²	$f_{t,90,k}$	=	0.50 N/mm²
$G_{0,05}$	=	540 N/mm²	$f_{c,0,k}$	=	24.50 N/mm²
γ_M	=	1.15	$f_{c,90,k}$	=	2.50 N/mm²
$\gamma_{M,acc./seis.}$	=	1.00	$f_{v,k}$	=	3.50 N/mm²
k_{sys}	=	1.00			

Glulam 90x270



A	=	24300 mm²	$f_{t,0,k}$	=	21.12 N/mm²
W_1	=	1.094e+06 mm³	$f_{m,1,k}$	=	34.66 N/mm²
W_2	=	3.645e+05 mm³	$f_{m,2,k}$	=	35.20 N/mm²
i_1	=	78 mm			
i_2	=	26 mm			
I_2	=	1.640e+07 mm⁴			
I_t	=	5.183e+07 mm⁴			

Combined bending and axial tension - 6.2.3
LC: 'LC5ULS', k_{mod} = 0.90, x = 7905.98 mm

$$\frac{\sigma_{t,0,d}}{f_{t,0,d}} + \frac{\sigma_{m,1,d}}{f_{m,1,d}} + k_m \frac{\sigma_{m,2,d}}{f_{m,2,d}} = \frac{0.06}{16.53} + \frac{23.30}{27.13} + 0.70 \frac{0.01}{27.55} = 0.86 \leq 1.00 \quad (6.17) \text{ - OK}$$

$$\frac{\sigma_{t,0,d}}{f_{t,0,d}} + k_m \frac{\sigma_{m,1,d}}{f_{m,1,d}} + \frac{\sigma_{m,2,d}}{f_{m,2,d}} = \frac{0.06}{16.53} + 0.70 \frac{23.30}{27.13} + \frac{0.01}{27.55} = 0.61 \leq 1.00 \quad (6.18) \text{ - OK}$$

Combined bending and axial compression - 6.1.4, 6.2.4
Not relevant

Combined shear and torsion - 6.1.7, 6.1.8
LC: 'LC5ULS', k_{mod} = 0.90, x = 7905.98 mm

τ_d = 1.38 N/mm² $\leq f_{v,d}$ = 2.74 N/mm² (6.13) - OK

Flexural buckling around axis 1 - 6.3.2
Not relevant

Flexural buckling around axis 2 - 6.3.2
Not relevant

Lateral torsional buckling - 6.3.3

LC: 'LC5ULS', k_{mod} = 0.90, x = 7905.98 mm

$$l_{ef} = l / \frac{12.5 \cdot M_{max}}{2.5 \cdot M_{max} + 3 \cdot M_2 + 4 \cdot M_3 + 3 \cdot M_4} + 2 \cdot h =$$

$$= 7906 / \frac{12.5 \cdot 25.47}{2.5 \cdot 25.47 + 3 \cdot 11.45 + 4 \cdot 15.17 + 3 \cdot 2.84} + 2 \cdot 270 = 4692 \text{ mm}$$

$$\sigma_{m,crit} = \frac{\pi \sqrt{E_{0,05} \cdot I_2 \cdot G_{0,05} \cdot I_t}}{l_{ef} \cdot W_1} = \frac{\pi \sqrt{11200 \cdot 1.640e+07 \cdot 540 \cdot 5.183e+07}}{4692 \cdot 1.094e+06} = 43.90 \text{ N/mm}^2 \quad (6.31)$$

$$\lambda_{rel,m} = \sqrt{\frac{f_{m,1,k}}{\sigma_{m,crit}}} = \sqrt{\frac{32.00}{43.90}} = 0.854 \quad (6.30)$$

$$0.75 \leq \lambda_{rel,m} = 0.854 < 1.40 \rightarrow k_{crit} = 1.56 - 0.75 \cdot \lambda_{rel,m} = 1.56 - 0.75 \cdot 0.854 = 0.920 \quad (6.34)$$

$$\frac{\sigma_{m,1,d}}{k_{crit} \cdot f_{m,1,d}} = \frac{23.30}{0.920 \cdot 27.13} = 0.93 \leq 1.00 \quad (6.33) \text{ - OK}$$

Bending at apex - 6.4.3

Not relevant

Tension at apex - 6.4.3

Not relevant

Summary