

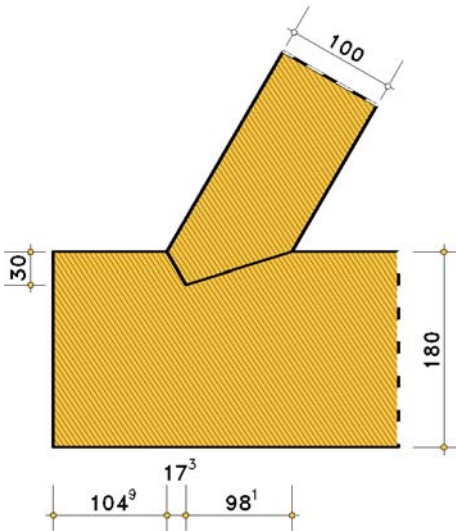
1. Input parameters

1.1. frontal offset acc. to DIN EN 1995-1-1/NA:2013-08, NCI NA.12.1

1.2. material and dimensions

both beams from solid coniferous timber, C24 (S10) , $\rho_k = 350 \text{ kg/m}^3$, NKL 1
 $f_{m,k} = 24.00 \text{ N/mm}^2$, $f_{t,k} = 14.00 \text{ N/mm}^2$, $f_{c,k} = 21.00 \text{ N/mm}^2$, $f_{v,k} = 4.00 \text{ N/mm}^2$, $f_{c90,k} = 2.50 \text{ N/mm}^2$
 sole plate 120/180 mm, strut 120/100 mm, $\gamma = 60.0^\circ$
 anchoring by bolt $\varnothing 16 \text{ mm}$

elevation scale 1:70, unit of length [mm]



1.3. internal forces and moments

Nr.	name	N_d kN	KLED	k_{mod} -	γ -
1	A	40.60	sh.-term	0.900	1.30

2. results

2.1. compression in contact surfaces acc. to DIN EN 1995-1-1/NA, NCI NA.12.1

$k_{cr} = 0.500$, $\alpha = \gamma/2 = 30.0^\circ$, $\min l_v = 122 \text{ mm}$

Nr	$f_{v,d}$ N/mm ²	$f_{c0,d}$ N/mm ²	$f_{c90,d}$ N/mm ²	$f_{c\alpha,d}$ N/mm ²	$S_{1R,d}$ kN	l_v mm	u_{1v} -	$u_{SE,d1}$ -	u -
1	2.77	14.54	1.73	8.45	40.58	122	0.509	1.000	1.000

$u_{max} = 1.000 \leq 1 \Rightarrow \text{ok.}$

2.2. sole plate bending and normal force

$b_n = 120 \text{ mm}$, $h_n = 150 \text{ mm} \Rightarrow A_n = 18000 \text{ mm}^2$, $W_n = 450000 \text{ mm}^3$, $e_z = 15 \text{ mm}$

Nr	left edge								right edge				u	
	$f_{m,d}$ N/mm ²	$f_{t,d}$ N/mm ²	$f_{c,d}$ N/mm ²	N_d kN	σ_{Nd} N/mm ²	M_d kNm	$\sigma_{m,d}$ N/mm ²	u_σ -	N_d kN	σ_{Nd} N/mm ²	M_d kNm	$\sigma_{m,d}$ N/mm ²		u_σ -
1	16.62	9.69	14.54	0.000	0.000	0.000	0.000	0.000	20.300	1.128	-0.305	-0.677	0.157	0.157

$u_{max} = 0.157 \leq 1 \Rightarrow \text{ok.}$

2.3. strut stability check

$l_{eff} = 2600 \text{ mm}$, $E_{0,05} = 7333 \text{ N/mm}^2$, $G_{0,05} = 460 \text{ N/mm}^2$, $A = 12000 \text{ mm}^2$, $W_y = 200000 \text{ mm}^3$

$I_t = 19835905 \text{ mm}^4$, $\beta_c = 0.200$, $i_y = 29 \text{ mm}$, $i_z = 35 \text{ mm}$, $k_{c,y} = 0.365$, $k_{c,z} = 0.495$, $\sigma_{m,krit} = 188 \text{ mm}^3$

$\lambda_y = 90.067$, $\lambda_z = 75.056$, $\lambda_{rel,y} = 1.534$, $\lambda_{rel,z} = 1.278$, $\lambda_{rel,m} = 0.358$, $k_{krit} = 1.000$

offset at both ends of the strut on the opposite side $\Rightarrow e_z = 35 \text{ mm}$ at the ends of beam

Nr	$f_{m,d}$ N/mm ²	$f_{t,d}$ N/mm ²	$f_{c,d}$ N/mm ²	$F_{c,d}$ kN	$M_{y,d}$ kNm	$\sigma_{c,d}$ N/mm ²	$\sigma_{m,d}$ N/mm ²	u_σ -	$u_{\sigma yr}$ -	$u_{\sigma zr}$ -	u
1	16.62	9.69	14.54	40.600	1.421	3.383	7.105	0.482	0.638	0.470	0.638

$u_{max} = 0.638 \leq 1 \Rightarrow \text{ok.}$

3. Summary

total utilization all verifications $u_{\max, \text{Ges}} = 1.000 \leq 1 \Rightarrow \text{ok.}$