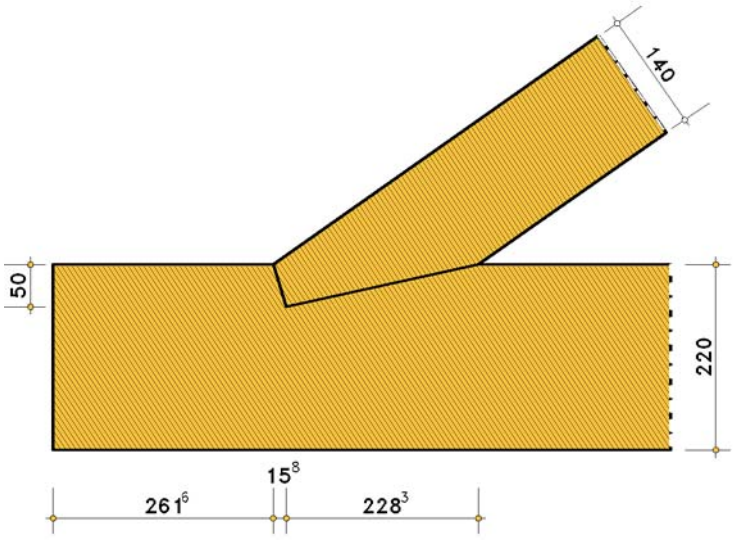
1. Input parameters

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) , ρ_k = 350 kg/m³, NKL 1
$f_{m,k}$ = 24.00 N/mm², $f_{t,k}$ = 14.00 N/mm², $f_{c,k}$ = 21.00 N/mm², $f_{v,k}$ = 4.00 N/mm², $f_{c90,k}$ = 2.50 N/mm²
sole plate **120/220 mm**, strut **120/140 mm**, γ = 35.0 °
anchoring by bolt Ø 12 mm

elevation scale 1:90, unit of length [mm]



1.3. internal forces and moments

Nr.	name	N_d kN	KLED	k_{mod} -	γ -
1	FD	50.00	med.-term	0.800	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, $\alpha = \gamma/2$ = 17.5 °, min l_v = 277 mm

Nr	$f_{v,d}$ N/mm²	$f_{c0,d}$ N/mm²	$f_{c90,d}$ N/mm²	$f_{c\alpha,d}$ N/mm²	$S_{1R,d}$ kN	l_v mm	u_{lv} -	$u_{SE,d1}$ -	u -
1	2.46	12.92	1.54	10.42	68.73	277	**0.693**	**0.727**	**0.727**

u_{max} = 0.727 ≤ 1 ⇒ ok.

2.2. sole plate bending and normal force

b_n = 107 mm, h_n = 170 mm ⇒ A_n = 18190 mm², W_n = 515383 mm³, e_z = 25 mm

Nr	$f_{m,d}$ N/mm²	$f_{t,d}$ N/mm²	$f_{c,d}$ N/mm²	left edge N_d kN	left edge σ_{Nd} N/mm²	left edge M_d kNm	left edge $\sigma_{m,d}$ N/mm²	left edge u_σ -	right edge N_d kN	right edge σ_{Nd} N/mm²	right edge M_d kNm	right edge $\sigma_{m,d}$ N/mm²	right edge u_σ -	u -
1	14.77	8.62	12.92	-40.96	-2.252	1.024	1.987	0.165	0.000	0.000	0.000	0.000	0.000	**0.165**

u_{max} = 0.165 ≤ 1 ⇒ ok.

2.3. sole plate shear force

b_n = 107 mm, h_n = 170 mm ⇒ A_n = 18190 mm²

Nr	$f_{v,d}$ N/mm²	left edge V_d kN	left edge τ_d N/mm²	left edge u_τ -	right edge V_d kN	right edge τ_d N/mm²	right edge u_τ -	u -
1	2.46	28.679	2.365	0.961	0.000	0.000	**0.000**	**0.961**

u_{max} = 0.961 ≤ 1 ⇒ ok.

2.4. strut stability check

l_{eff} = 120 mm, $E_{0,05}$ = 7333 N/mm², $G_{0,05}$ = 460 N/mm², A = 16800 mm², W_y = 392000 mm³
I_t = 39034481 mm⁴, β_c = 0.200, i_y = 40 mm, i_z = 35 mm, $k_{c,y}$ = 1.000, $k_{c,z}$ = 1.000, $\sigma_{m,krit}$ = 3441 mm³
λ_y = 2.969, λ_z = 3.464, $\lambda_{rel,y}$ = 0.051, $\lambda_{rel,z}$ = 0.059, $\lambda_{rel,m}$ = 0.084, k_{krit} = 1.000
offset at both ends of the strut on the opposite side ⇒ e_z = 45 mm at the ends of beam

Nr	$f_{m,d}$ N/mm²	$f_{t,d}$ N/mm²	$f_{c,d}$ N/mm²	$F_{c,d}$ kN	$M_{y,d}$ kNm	$\sigma_{c,d}$ N/mm²	$\sigma_{m,d}$ N/mm²	u_σ -	$u_{\sigma yr}$ -	$u_{\sigma zr}$ -	u -
1	14.77	8.62	12.92	50.000	2.250	2.976	5.740	**0.442**	**0.230**	**0.230**	**0.442**

u_{max} = 0.442 ≤ 1 ⇒ ok.

3. Summary

total utilization all verifications $u_{max,Ges}$ = 0.961 ≤ 1 ⇒ ok.