

POSITION 38: RAUTENSTRAUCH S. 335

1. Input parameters

2. General statements

double shear plane connection, simplified verification acc. to NA.8.2.4
crossing angle $\delta = 180.0^\circ$

3. materials

3.1. outer timber members

NKL 1, solid coniferous timber C30, $\rho_k = 380 \text{ kg/m}^3$, $t/b = 40.0/160.0 \text{ mm}$
angle between force and the grain direction $\alpha = 0.0^\circ$
bar on one side left with overhang $\bar{u}_{\text{right}} = 190.0 \text{ mm}$ (measured from the node)

3.2. central timber member

NKL 1, solid coniferous timber C30, $\rho_k = 380 \text{ kg/m}^3$, $t/b = 80.0/160.0 \text{ mm}$
bar on one side right with overhang $\bar{u}_{\text{left}} = 120.0 \text{ mm}$ (measured from the node)

4. fasteners

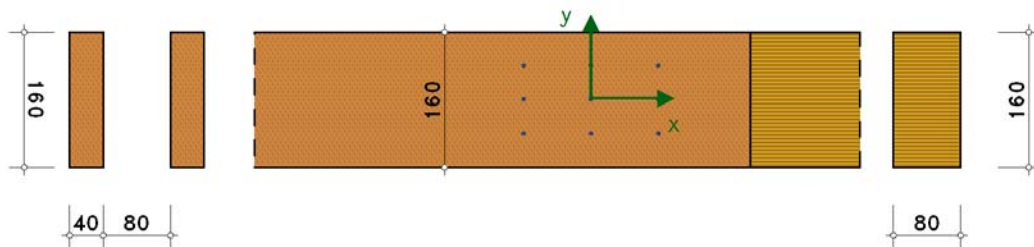
screw 2A, $5.0 \times 80 \text{ mm}$, $d_k = 8.0 \text{ mm}$, $l_{\text{ef}} = 48.0$, predrilled, M_{y_k} reduced to 50% in the threaded part
FK 4.8
double-sided arrangement

4.1. load combinations (design internal forces)

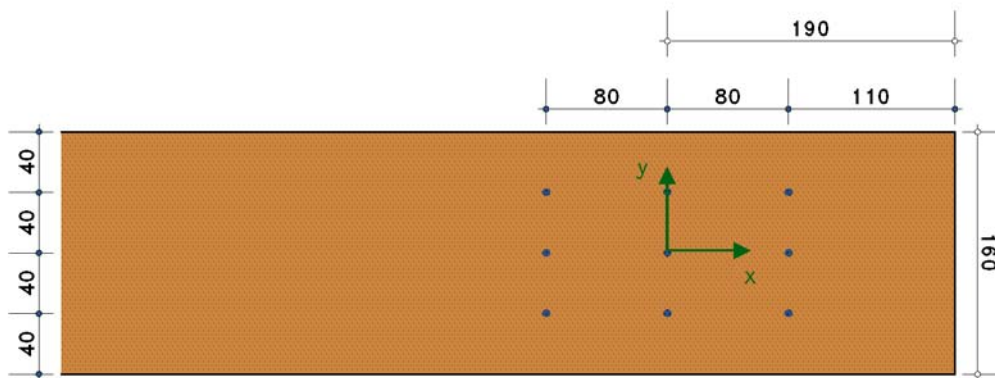
4.1.1. load, KLED: short-term

Nr	bar	N_d kN	M_d kNm	V_d kN	k_{mod} -	γ -
1	outer t.mem. left	11.000	0.000	0.000	0.900	1.30
2	ctr. t.mem. right	11.000	0.000	0.000	0.900	1.30
3	$\Sigma H, \Sigma M, \Sigma V$	0.000	0.000	0.000	---	---

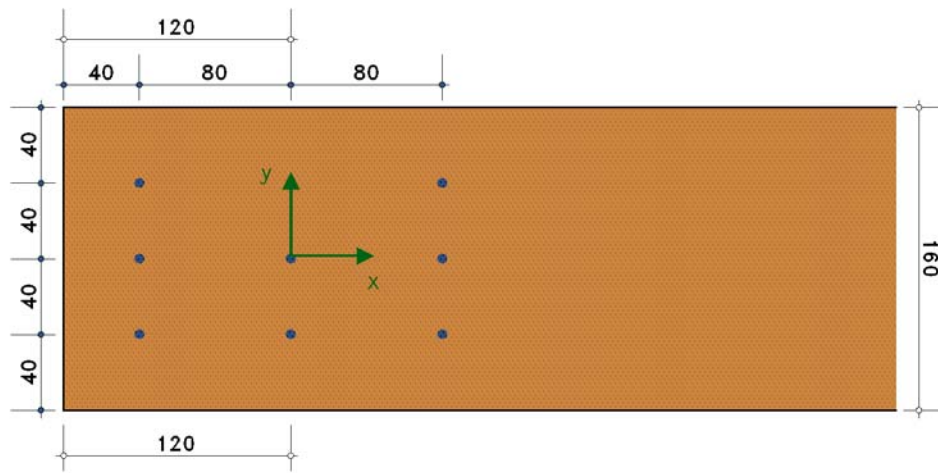
5. view



6. view outer timber members



7. view central timber member



8. Results only decisive load case combination

8.1. Results fasteners

8.2. fasteners

8.2.1. load

$N_d = 11.000 \text{ kN}$, $V_d = 0.000 \text{ kN}$, $M_{v,d} = 0.000 \text{ kNm}$

Nr	F_{M1} kN	F_{MH1} kN	F_{MV1} kN	F_{totH1} kN	F_{totV1} kN	F_{tot1} kN	α_{tot1} °	$F_{v,Rd}$ kN	$U_{n,ef}$ -	$U_{F,v}$ -
1	0.000	0.000	-0.000	1.222	0.000	1.222	0.0	1.4242	0.86	0.86
2	0.000	0.000	-0.000	1.222	0.000	1.222	0.0	1.4242	0.86	0.86
3	0.000	-0.000	-0.000	1.222	0.000	1.222	0.0	1.4242	0.86	0.86
4	0.000	0.000	0.000	1.222	0.000	1.222	0.0	1.4242	0.86	0.86
5	0.000	0.000	0.000	1.222	0.000	1.222	0.0	1.4242	0.86	0.86
6	0.000	-0.000	0.000	1.222	0.000	1.222	0.0	1.4242	0.86	0.86
7	0.000	0.000	0.000	1.222	0.000	1.222	0.0	1.4242	0.86	0.86
8	0.000	0.000	0.000	1.222	0.000	1.222	0.0	1.4242	0.86	0.86
9	0.000	-0.000	0.000	1.222	0.000	1.222	0.0	1.4242	0.86	0.86

maximum utilisation of the fasteners $U_{max} = 0.86 \leq 1 \Rightarrow$ **verification fulfilled**

8.3. results bars

8.3.1. outer timber member mit $A_n = 11600 \text{ mm}^2$, $W_n = 325288 \text{ mm}^3$, $I_n = 26023067 \text{ mm}^4$, $k_h = 1.000$
dimensioning as tension joint acc. to NCI NA.8.1.6 (NA.1) (red. of tensile load-bear. cap. by one third)

load	$f_{m,d}$ N/mm ²	$f_{t,d}$ N/mm ²	$f_{c,d}$ N/mm ²	$f_{v,d}$ N/mm ²	N_d kN	M_d kNm	$\sigma_{0,d}$ N/mm ²	$\sigma_{m0,d}$ N/mm ²	$\sigma_{mu,d}$ N/mm ²	V_d kN	τ_d N/mm ²	U_σ -	U_τ -
1	20.77	8.77	16.62	2.77	11.000	0.000	0.95	0.00	0.00	0.000	0.00	0.11	0.00

maximum utilisation of the bar $U_{max} = 0.11 \leq 1 \Rightarrow$ **verification fulfilled**

8.3.2. central timber member mit $A_n = 11600 \text{ mm}^2$, $W_n = 325288 \text{ mm}^3$, $I_n = 26023067 \text{ mm}^4$, $k_h = 1.000$

load	$f_{m,d}$ N/mm ²	$f_{t,d}$ N/mm ²	$f_{c,d}$ N/mm ²	$f_{v,d}$ N/mm ²	N_d kN	M_d kNm	$\sigma_{0,d}$ N/mm ²	$\sigma_{m0,d}$ N/mm ²	$\sigma_{mu,d}$ N/mm ²	V_d kN	τ_d N/mm ²	U_σ -	U_τ -
1	20.77	8.77	16.62	2.77	11.000	0.000	0.95	0.00	0.00	0.000	0.00	0.11	0.00

maximum utilisation of the bar $U_{max} = 0.11 \leq 1 \Rightarrow$ **verification fulfilled**