

POSITION 66: HECO TOPIX PLUS

1. Input parameters

2. General statements

single shear plane connection, exact verification acc. to DIN EN 1995, 8.2.2
crossing angle $\delta = 90.0^\circ$

3. materials

3.1. outer timber member 1

NKL 1, solid coniferous timber C24, $\rho_k = 350 \text{ kg/m}^3$, $t/b = 60.0/260.0 \text{ mm}$
angle between force and the grain direction $\alpha = 0.0^\circ$
bar on one side right with overhang $\bar{u}_{\text{left}} = 195.0 \text{ mm}$ (measured from the node)

3.2. outer timber member 2

NKL 1, solid coniferous timber C24, $\rho_k = 350 \text{ kg/m}^3$, $t/b = 120.0/330.0 \text{ mm}$
bar on one side right with overhang $\bar{u}_{\text{left}} = 195.0 \text{ mm}$ (measured from the node)

4. fasteners

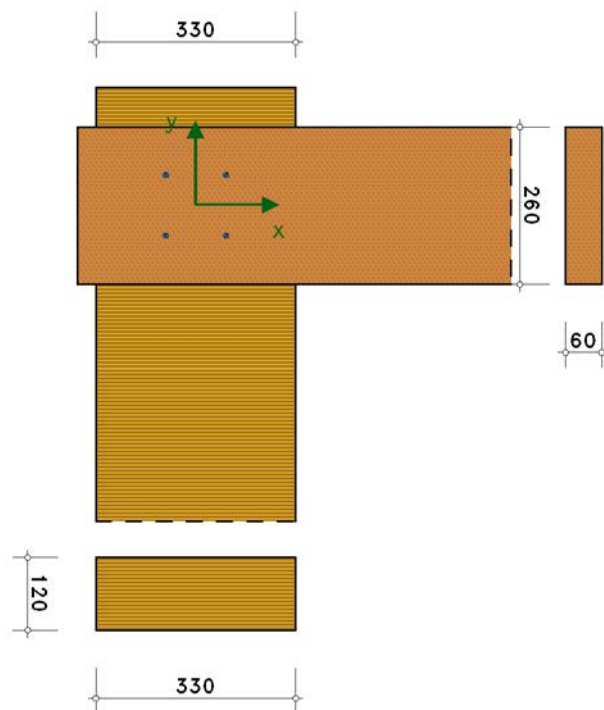
HECO Topix plus Senkkopf Fräst. Teilgewinde, $10.0 \times 180.0 \text{ mm}$, $d_k = 18.5 \text{ mm}$, $l_{\text{ef}} = 100.0 \text{ mm}$
screwing angle $\beta = 90.0^\circ$
made of carbon steel, predrilled
arrangement one-sided from the front
 $F_{v,Rk}$ increased acc. to DIN EN 1995, 8.2.2(2)

4.1. load combinations (design internal forces)

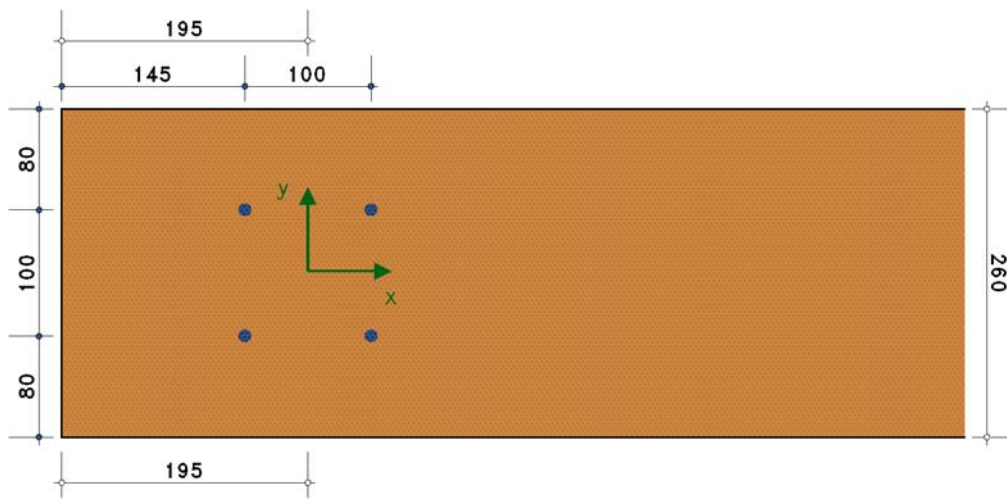
4.1.1. load, KLED: short-term

Nr	bar	N_d kN	M_d kNm	V_d kN	k_{mod} -	γ -
1	out.t.memb 1 right	0.000	1.000	0.000	0.900	1.30
2	out.t.memb 2 right	0.000	-1.000	0.000	0.900	1.30
3	$\Sigma H, \Sigma M, \Sigma V$	0.000	0.000	0.000	---	---

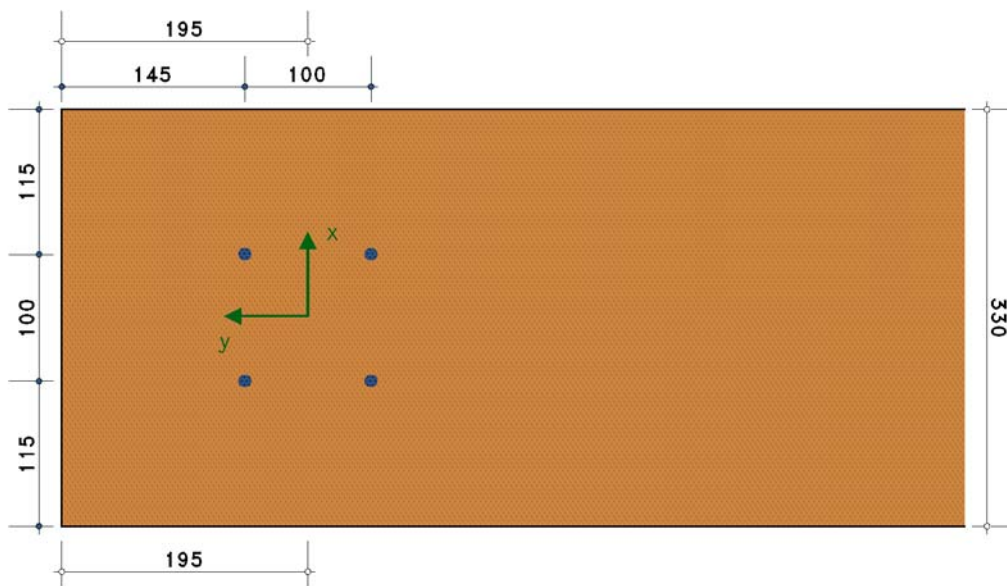
5. view



6. view outer timber member 1



7. view outer timber member 2



8. Results only decisive load case combination

8.1. Results fasteners

8.2. fasteners

8.2.1. load

$N_d = 0.000$ kN, $V_d = 0.000$ kN, $M_{v,d} = -1.000$ kNm

Nr	F_{Mi} kN	F_{MH_i} kN	F_{MV_i} kN	F_{totHi} kN	F_{totVi} kN	F_{toti} kN	α_{toti} °	$F_{v,Rd}$ kN	$U_{n,ef}$ -	$U_{F,v}$ -
1	-3.536	-2.500	-2.500	-2.500	-2.500	3.536	-135.0	3.9002	0.71	0.91
2	-3.536	-2.500	2.500	-2.500	2.500	3.536	135.0	3.9002	0.71	0.91
3	-3.536	2.500	-2.500	2.500	-2.500	3.536	-45.0	3.9002	0.71	0.91
4	-3.536	2.500	2.500	2.500	2.500	3.536	45.0	3.9002	0.71	0.91

maximum utilisation of the fasteners $U_{max} = 0.91 \leq 1 \Rightarrow$ verification fulfilled

8.3. results bars

8.3.1. outer timber member 1 mit $A_n = 14400$ mm², $W_n = 652830$ mm³, $I_n = 84867900$ mm⁴, $k_h = 1.000$

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	16.62	10.04	14.54	2.77	0.000	1.000	0.00	1.53	1.53	5.000	1.04	0.09	0.38

maximum utilisation of the bar $U_{max} = 0.38 \leq 1 \Rightarrow$ verification fulfilled

8.3.2. outer timber member 2 mit $A_n = 37200 \text{ mm}^2$, $W_n = 2141490 \text{ mm}^3$, $I_n = 353345800 \text{ mm}^4$, $k_h = 1.000$

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	16.62	10.04	14.54	2.77	0.000	-1.000	0.00	-0.47	-0.47	5.000	0.40	0.03	0.15

maximum utilisation of the bar $U_{\max} = 0.15 \leq 1 \Rightarrow$ **verification fulfilled**