

POSITION 43: GÖGGE S. 330 ECKE

1. Input parameters

2. General statements

double shear plane connection, exact verification acc. to DIN EN 1995, 8.2.2
crossing angle $\delta = 93.9^\circ$

3. materials

3.1. outer timber members

NKL 1, glue laminated timber DIN GL24h (BS11), $\rho_k = 380 \text{ kg/m}^3$, $t/b = 100.0/600.0 \text{ mm}$
angle between force and the grain direction $\alpha = -3.9^\circ$
bar on one side left with overhang $\bar{u}_{\text{right}} = 380.0 \text{ mm}$ (measured from the node)

3.2. central timber member

NKL 1, glue laminated timber DIN GL24h (BS11), $\rho_k = 380 \text{ kg/m}^3$, $t/b = 160.0/600.0 \text{ mm}$
bar on one side right with overhang $\bar{u}_{\text{left}} = 450.0 \text{ mm}$ (measured from the node)

4. fasteners Kreis 1

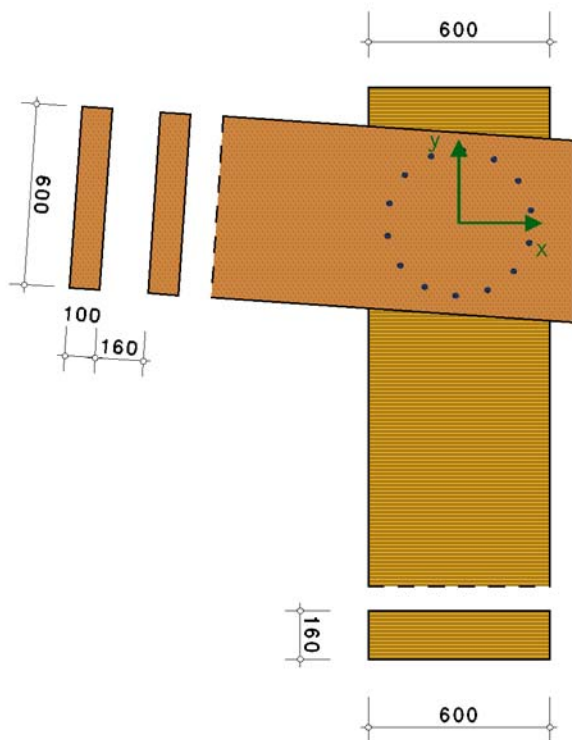
dowel 20 mm, S235 (1052)

4.1. load combinations (design internal forces)

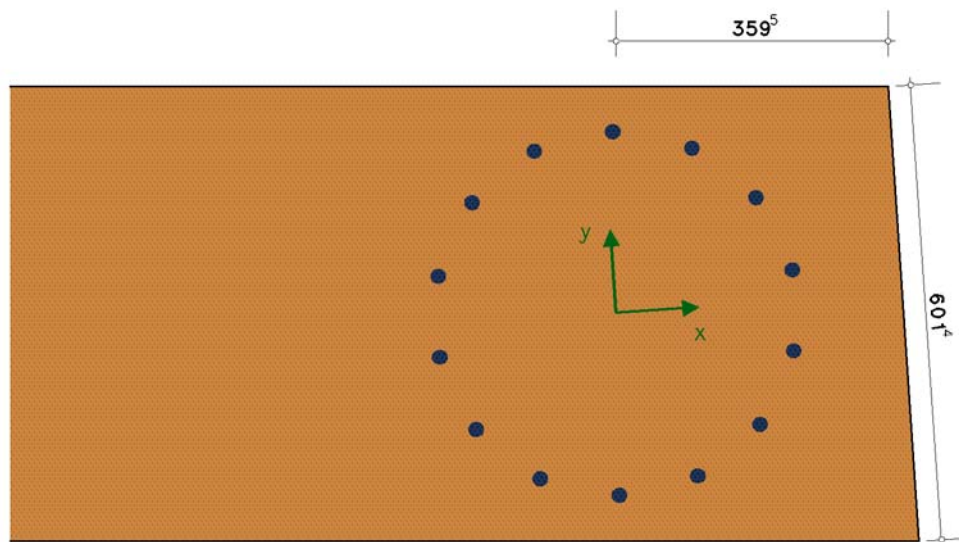
4.1.1. load, KLED: short-term

Nr	bar	N_d kN	M_d kNm	V_d kN	k_{mod} -	γ -
1	outer t.memb. left	-36.100	37.680	-8.620	0.900	1.30
2	ctr. t.mem. right	-11.000	-37.680	35.400	0.900	1.30
3	$\Sigma H, \Sigma M, \Sigma V$	-0.055	0.000	0.030	---	---

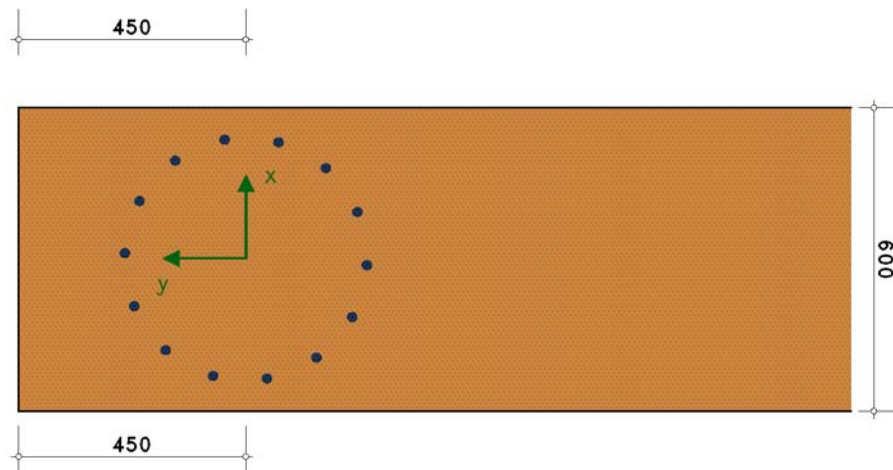
5. view



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

$N_d = -11.055 \text{ kN}$, $V_d = 35.430 \text{ kN}$, $M_{v,d} = 37.680 \text{ KNm}$

forces per connection centre point, case = decisive failure case acc. to DIN EN 1995-1-1, 8.2.2

Nr	F_{M1} kN	F_{MH1} kN	F_{MV1} kN	F_{totH1} kN	F_{totV1} kN	F_{tot1} kN	α_{tot1} °	$f_{h,\alpha,k}$ N/mm ²	case	$F_{v,Rd}$ kN	$U_{n,ef}$ -	$U_{F,v}$ -
1	11.214	1.947	11.044	1.158	13.575	13.624	85.1	24.92	G1.(k)	25.6691	0.53	0.53
2	11.214	6.546	9.105	5.757	11.636	12.982	63.7	22.77	G1.(k)	24.5375	0.49	0.53
3	11.214	9.849	5.363	9.059	7.894	12.016	41.1	18.81	G1.(j)	21.8409	0.41	0.55
4	11.214	11.200	0.559	10.411	3.090	10.859	16.5	15.87	G1.(j)	18.9627	0.55	0.57
5	11.214	10.334	-4.356	9.544	-1.825	9.717	-10.8	15.19	G1.(j)	18.3005	0.52	0.53
6	11.214	7.420	-8.408	6.631	-5.878	8.861	-41.6	17.71	G1.(j)	20.7678	0.33	0.43
7	11.214	3.037	-10.795	2.248	-8.264	8.565	-74.8	23.30	G1.(k)	24.8211	0.34	0.35
8	11.214	-1.947	-11.044	-2.737	-8.513	8.942	-107.8	24.02	G1.(k)	25.2017	0.34	0.35
9	11.214	-6.546	-9.105	-7.336	-6.575	9.851	-138.1	18.94	G1.(j)	21.9674	0.34	0.45
10	11.214	-9.849	-5.363	-10.638	-2.833	11.009	-165.1	15.75	G1.(j)	18.8483	0.56	0.58
11	11.214	-11.200	-0.559	-11.990	1.972	12.151	170.7	15.16	G1.(j)	18.2677	0.66	0.67
12	11.214	-10.334	4.356	-11.123	6.887	13.083	148.2	16.53	G1.(j)	19.6104	0.57	0.67
13	11.214	-7.420	8.408	-8.210	10.939	13.677	126.9	19.51	G1.(j)	22.5311	0.51	0.61
14	11.214	-3.037	10.795	-3.827	13.326	13.864	106.0	23.18	G1.(k)	24.7543	0.55	0.56

maximum utilisation of the fasteners $U_{\max} = 0.67 \leq 1 \Rightarrow$ **verification fulfilled**

8.3. results bars

8.3.1. outer timber member mit $A_n = 112000 \text{ mm}^2$, $W_n = 11922471 \text{ mm}^3$, $I_n = 3576741340 \text{ mm}^4$, $k_h = 1.000$

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	11.42	16.62	2.42	-36.100	37.680	-0.32	3.16	3.16	45.665	1.07	0.19	0.44

maximum utilisation of the bar $U_{\max} = 0.44 \leq 1 \Rightarrow$ **verification fulfilled**

8.3.2. central timber member mit $A_n = 86400 \text{ mm}^2$, $W_n = 9363325 \text{ mm}^3$, $I_n = 2808997501 \text{ mm}^4$, $k_h = 1.000$

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	11.42	16.62	2.42	-11.000	-37.680	-0.13	-4.02	-4.02	35.400	1.08	0.24	0.44

maximum utilisation of the bar $U_{\max} = 0.44 \leq 1 \Rightarrow$ **verification fulfilled**