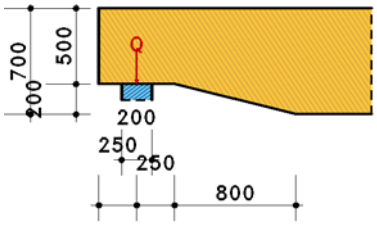
1. Input parameters

1.1. notch at the support bottom inclined acc. to EC5-1-1, 6.5, NA Germany

1.2. beam

beam of glue laminated timber EC, GL24h **200/700 mm**, ρ_k = 385 kg/m³, NKL 1
h_{ef} = 500 mm, x = 250 mm, i = 4.00 (expressions acc. to EC 5, 6.5 figure 6.11)
$f_{m,k}$ = 24.00 N/mm², $f_{t,k}$ = 19.20 N/mm², $f_{c,k}$ = 24.00 N/mm², $f_{v,k}$ = 3.50 N/mm², $f_{t90,k}$ = 0.50 N/mm²

elevation scale 1:500, unit of length [mm]



1.3. support reactions

Nr.	name	V_d kN	KLED	k_{mod} -	γ -
1	V	45.00	med.-term	0.800	1.30

2. results

2.1. shear stresses

k_{cr} = 0.714 ⇒ b_{eff} = 142.857 mm
k_n = 6.5, α = 0.714 ⇒ k_v = 0.454

Nr	V_d kN	$f_{v,d}$ N/mm²	τ_d N/mm²	$\tau_{d,zul}$ N/mm²	$u_{\tau,d}$ N/mm²	u -
1	45.00	2.15	0.945	0.978	0.967	0.967

u_{max} = 0.967 ≤ 1 ⇒ ok.

2.2. bearing stress

bearing width = 200 mm, bearing depth = 200 mm ⇒ A = 40000 mm²

Nr	V_d kN	$f_{c90,d}$ N/mm²	$\sigma_{c90,d}$ N/mm²	u -
1	45.00	1.54	1.125	0.731

u_{max} = 0.731 ≤ 1 ⇒ ok.

2.3. bending at the notch angle

beam width = 200 mm, beam height = 500 mm ⇒ W = 16333333 mm³, e = 1050 mm

Nr	M_d kNm	$f_{m,d}$ N/mm²	$f_{v,d}$ N/mm²	$k_{m,\alpha,t}$ -	$f_{t90,d}$ N/mm²	$\sigma_{m,d}$ N/mm²	u -
1	47.25	14.77	2.15	0.2519	0.308	2.893	0.778

α = 76.0° > 24° ⇒ the condition NCI Zu 6.4.2(NA.3) neglected!
u_{max} = 0.778 ≤ 1 ⇒ ok.

2.4. shear at the reduced cross section

beam width = 200 mm, beam height = 500 mm, k_{cr} = 0.714 ⇒ A_{ef} = 71429 mm²

Nr	V_d kN	$f_{v,d}$ N/mm²	$\tau_{m,d}$ N/mm²	u -
1	45.00	2.15	0.945	0.439

u_{max} = 0.439 ≤ 1 ⇒ ok.

3. Summary

total utilization all verifications $u_{max,Ges}$ = 0.967 ≤ 1 ⇒ ok.