

1. Input parameters

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

1.2. beam

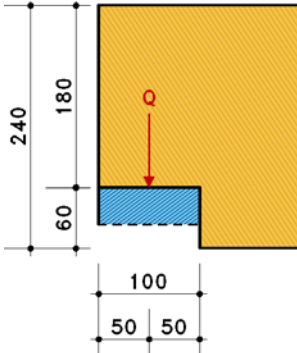
beam of glue laminated timber DIN, GL28c (BS14) 120/240 mm, $\rho_k = 380 \text{ kg/m}^3$, NKL 1

$h_{ef} = 180 \text{ mm}$, $x = 50 \text{ mm}$ (expressions acc. to EC 5, 6.5 figure 6.11)

$f_{m,k} = 30.69 \text{ N/mm}^2$, $f_{t,k} = 18.08 \text{ N/mm}^2$, $f_{c,k} = 24.00 \text{ N/mm}^2$, $f_{v,k} = 3.50 \text{ N/mm}^2$, $f_{t90,k} = 0.50 \text{ N/mm}^2$

$f_{m,k}$ increased with $k_h = 1.096$

elevation scale 1:75, unit of length [mm]



1.3. support reactions

Nr.	name	V_d kN	KLED	k_{mod} -	γ -
1	V	16.00	med.-term	0.800	1.30

2. results

2.1. shear stresses

$k_{cr} = 0.714 \Rightarrow b_{eff} = 85.714 \text{ mm}$

$k_n = 6.5$, $\alpha = 0.750 \Rightarrow k_v = 0.724$

Nr	V_d kN	$f_{v,d}$ N/mm ²	τ_d N/mm ²	$\tau_{d,zul}$ N/mm ²	$u_{\tau,d}$ N/mm ²	u -
1	16.00	2.15	1.556	1.560	0.997	0.997

$U_{max} = 0.997 \leq 1 \Rightarrow \text{ok.}$

2.2. bearing stress

bearing width = 100 mm, bearing depth = 120 mm $\Rightarrow A = 12000 \text{ mm}^2$

Nr	V_d kN	$f_{c90,d}$ N/mm ²	$\sigma_{c90,d}$ N/mm ²	u -
1	16.00	1.66	1.333	0.802

$U_{max} = 0.802 \leq 1 \Rightarrow \text{ok.}$

2.3. bending at the notch angle

beam width = 120 mm, beam height = 180 mm $\Rightarrow W = 648000 \text{ mm}^3$, $e = 50 \text{ mm}$

Nr	M_d kNm	$f_{m,d}$ N/mm ²	$\sigma_{m,d}$ N/mm ²	u -
1	0.80	18.88	1.235	0.065

$U_{max} = 0.065 \leq 1 \Rightarrow \text{ok.}$

2.4. shear at the reduced cross section

beam width = 120 mm, beam height = 180 mm, $k_{cr} = 0.714 \Rightarrow A_{ef} = 15429 \text{ mm}^2$

Nr	V_d kN	$f_{v,d}$ N/mm ²	$\tau_{m,d}$ N/mm ²	u -
1	16.00	2.15	1.556	0.722

$U_{max} = 0.722 \leq 1 \Rightarrow \text{ok.}$

3. Summary

total utilization all verifications $U_{max,Ges} = 0.997 \leq 1 \Rightarrow \text{ok.}$