

# 1. Input parameters

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

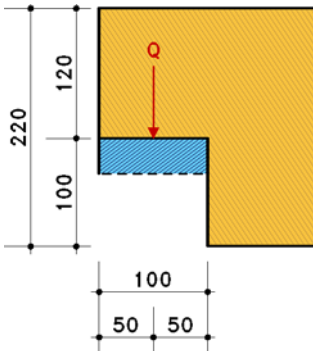
### 1.2. beam

beam from solid coniferous timber, C24 (S10) 100/220 mm,  $\rho_k = 350 \text{ kg/m}^3$ , NKL 2

$h_{ef} = 120 \text{ mm}$ ,  $x = 50 \text{ mm}$  (expressions acc. to EC 5, 6.5 figure 6.11)

$f_{m,k} = 24.00 \text{ N/mm}^2$ ,  $f_{t,k} = 14.00 \text{ N/mm}^2$ ,  $f_{c,k} = 21.00 \text{ N/mm}^2$ ,  $f_{v,k} = 4.00 \text{ N/mm}^2$ ,  $f_{t90,k} = 0.40 \text{ N/mm}^2$

elevation scale 1:70, unit of length [mm]



### 1.3. support reactions

Nr.	name	$V_d$ kN	KLED	$k_{mod}$ -	$\gamma$ -
1	V	11.08	sh.-term	0.900	1.30

## 2. results

### 2.1. shear stresses

$k_{cr} = 0.500 \Rightarrow b_{eff} = 50.000 \text{ mm}$

$k_N = 5.0$ ,  $\alpha = 0.545 \Rightarrow k_v = 0.466$

Nr	$V_d$ kN	$f_{v,d}$ N/mm <sup>2</sup>	$\tau_d$ N/mm <sup>2</sup>	$\tau_{d,zu1}$ N/mm <sup>2</sup>	$u_{\tau,d}$ N/mm <sup>2</sup>	u -
1	11.08	2.77	2.770	1.291	2.146	2.146

$U_{max} = 2.146 > 1 \Rightarrow$  **not ok. !!**

### 2.2. bearing stress

bearing width = 100 mm, bearing depth = 100 mm  $\Rightarrow A = 10000 \text{ mm}^2$

Nr	$V_d$ kN	$f_{c90,d}$ N/mm <sup>2</sup>	$\sigma_{c90,d}$ N/mm <sup>2</sup>	u -
1	11.08	1.73	1.108	0.640

$U_{max} = 0.640 \leq 1 \Rightarrow$  **ok.**

### 2.3. bending at the notch angle

beam width = 100 mm, beam height = 120 mm  $\Rightarrow W = 240000 \text{ mm}^3$ ,  $e = 50 \text{ mm}$

Nr	$M_d$ kNm	$f_{m,d}$ N/mm <sup>2</sup>	$\sigma_{m,d}$ N/mm <sup>2</sup>	u -
1	0.55	16.62	2.308	0.139

$U_{max} = 0.139 \leq 1 \Rightarrow$  **ok.**

### 2.4. shear at the reduced cross section

beam width = 100 mm, beam height = 120 mm,  $k_{cr} = 0.500 \Rightarrow A_{ef} = 6000 \text{ mm}^2$

Nr	$V_d$ kN	$f_{v,d}$ N/mm <sup>2</sup>	$\tau_{m,d}$ N/mm <sup>2</sup>	u -
1	11.08	2.77	2.770	1.000

$U_{max} = 1.000 \leq 1 \Rightarrow$  **ok.**

## 3. Summary

total utilization all verifications  $U_{max,Ges} = 2.146 > 1 \Rightarrow$  **not ok. !!**