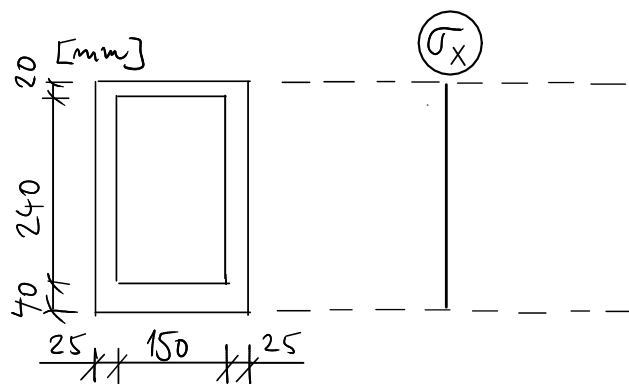
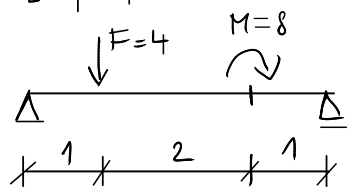


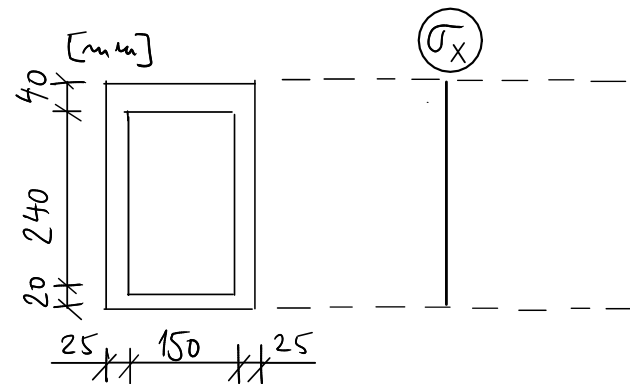
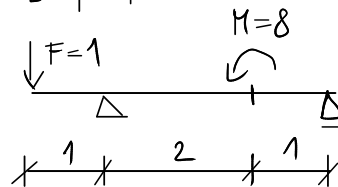
Ⓐ

[mm | kN | kNm]



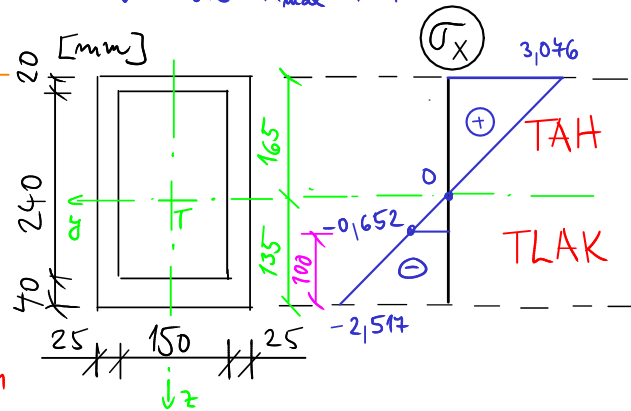
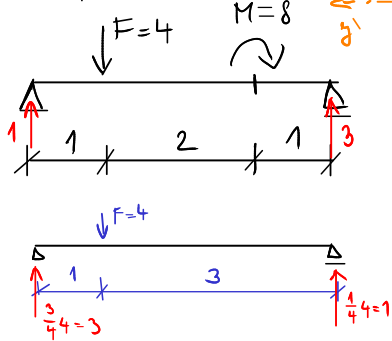
Ⓑ

[mm | kN | kNm]



(A) $\sigma_{xd}, \sigma_{xh}, \sigma_{xt}, \sigma_x$ ve yüksek 100mm od spodnich vláken =?
v místě $M_{max} = 1M$

[mN, kN, kNm]



$$z_T = \frac{200 \cdot 300 \cdot 150 - 150 \cdot 240 \cdot (120 + 20)}{200 \cdot 300 - 150 \cdot 240} = 165 \text{ mm}$$

$$I_y = \sum \left(\frac{1}{12} b h^3 + A c^2 \right) = \frac{1}{12} \cdot 200 \cdot 300^3 + 200 \cdot 300 \cdot (165 - 150)^2 - \left[\frac{1}{12} \cdot 150 \cdot 240^3 + 150 \cdot 240 \cdot (165 - 140)^2 \right] = 268,2 \cdot 10^6 \text{ mm}^4$$

otvor

$$I_y = 268,2 \cdot 10^6 \text{ mm}^4$$

$$\sigma_{xh}(z = -165 \text{ mm}) = \frac{M}{I_y} z = \frac{-5 \cdot 10^3}{268,2 \cdot 10^6} \cdot (-0,165) = 3,046 \text{ MPa}$$

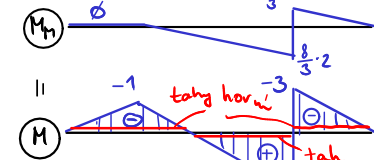
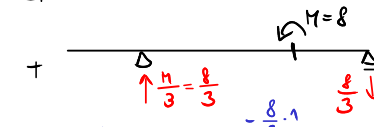
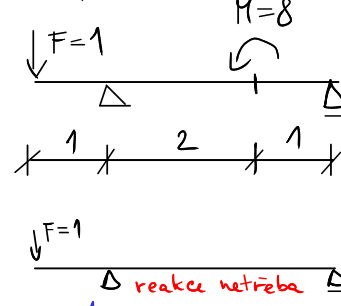
$$\sigma_{xd}(z = 135 \text{ mm}) = \frac{-5 \cdot 10^3}{268,2 \cdot 10^6} \cdot (0,135) = -2,517 \text{ MPa}$$

$$\sigma_{xt}(z = 0) = 0 \text{ MPa}$$

$$\sigma_x(z = 135 - 100 \text{ mm}) = \frac{-5 \cdot 10^3}{268,2 \cdot 10^6} \cdot (0,035) = -0,652 \text{ MPa}$$

(B) $\sigma_{xd}, \sigma_{xh}, \sigma_{xt}, \sigma_x$ ve yüksek 100mm od spodnich vláken

[mN, kN, kNm]



$M_{max} = 5 \text{ kNm}$

$$z_T, I_y = \text{viz (A)}$$

$$\sigma_{xh}(z = -135 \text{ mm}) = \frac{5 \cdot 10^3}{268,2 \cdot 10^6} \cdot (-0,135) = -2,517 \text{ MPa}$$

$$\sigma_{xd}(z = 165 \text{ mm}) = \frac{5 \cdot 10^3}{268,2 \cdot 10^6} \cdot (0,165) = 3,046 \text{ MPa}$$

$$\sigma_{xt}(z = 0) = 0 \text{ MPa}$$

$$\sigma_x(z = 165 - 100 \text{ mm}) = \frac{5 \cdot 10^3}{268,2 \cdot 10^6} \cdot (0,065) = 1,212 \text{ MPa}$$