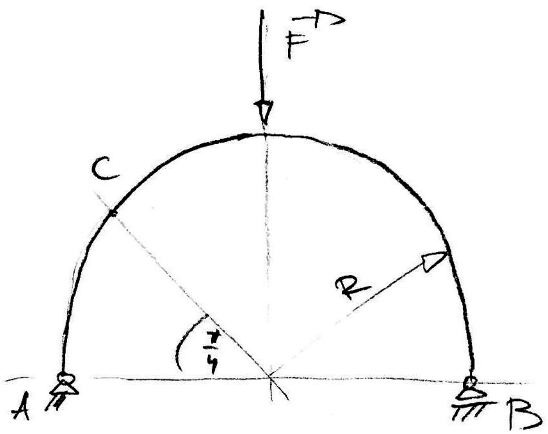
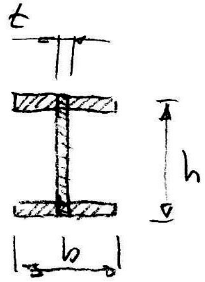
Př: Stanovte míru bezpečnosti vzhledem k MS pružnosti v místě A a C

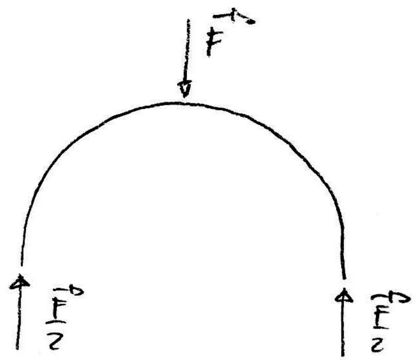




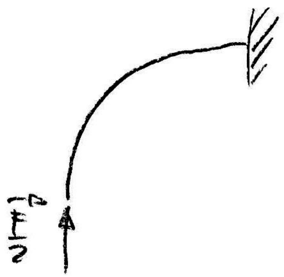
$t \ll h, b$

Dáno: F, R, b, h, t, σ_k

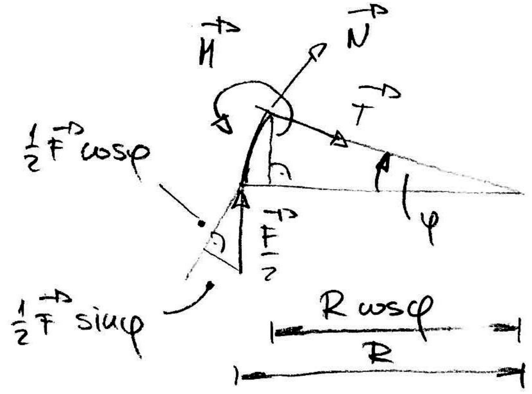
1. Úplné uvolnění



2. Využití symetrie



3. VVÚ



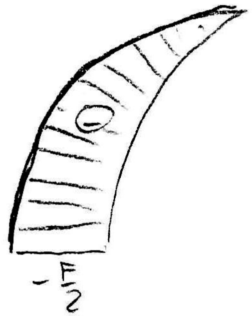
$\varphi \in (0, \frac{\pi}{2})$

$N = -\frac{F}{2}\cos\varphi$

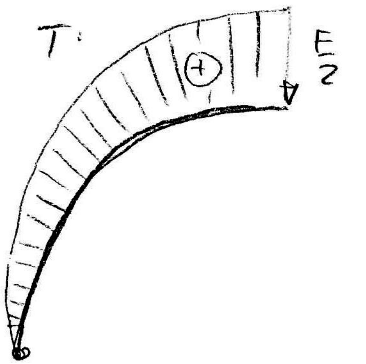
$T = \frac{F}{2}\sin\varphi$

$M = \frac{F}{2}\cdot R(1-\cos\varphi)$

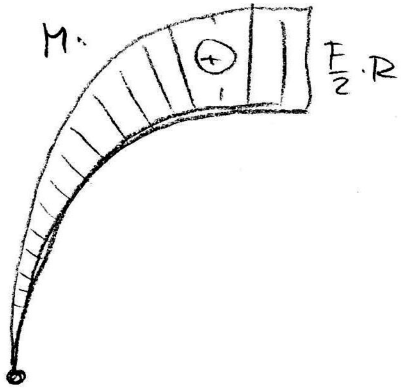
N:

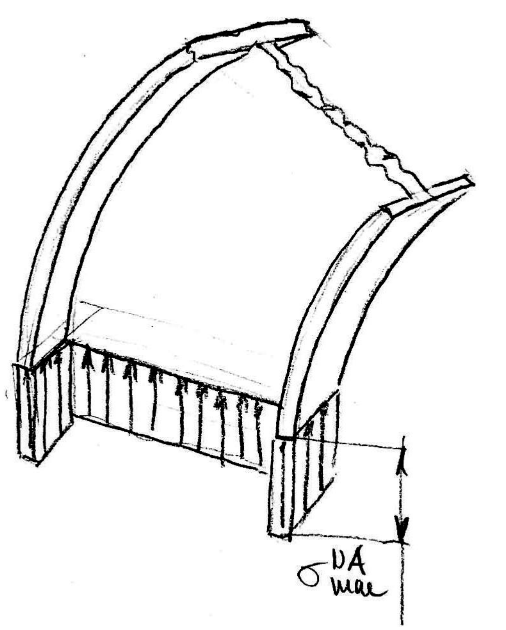


T:

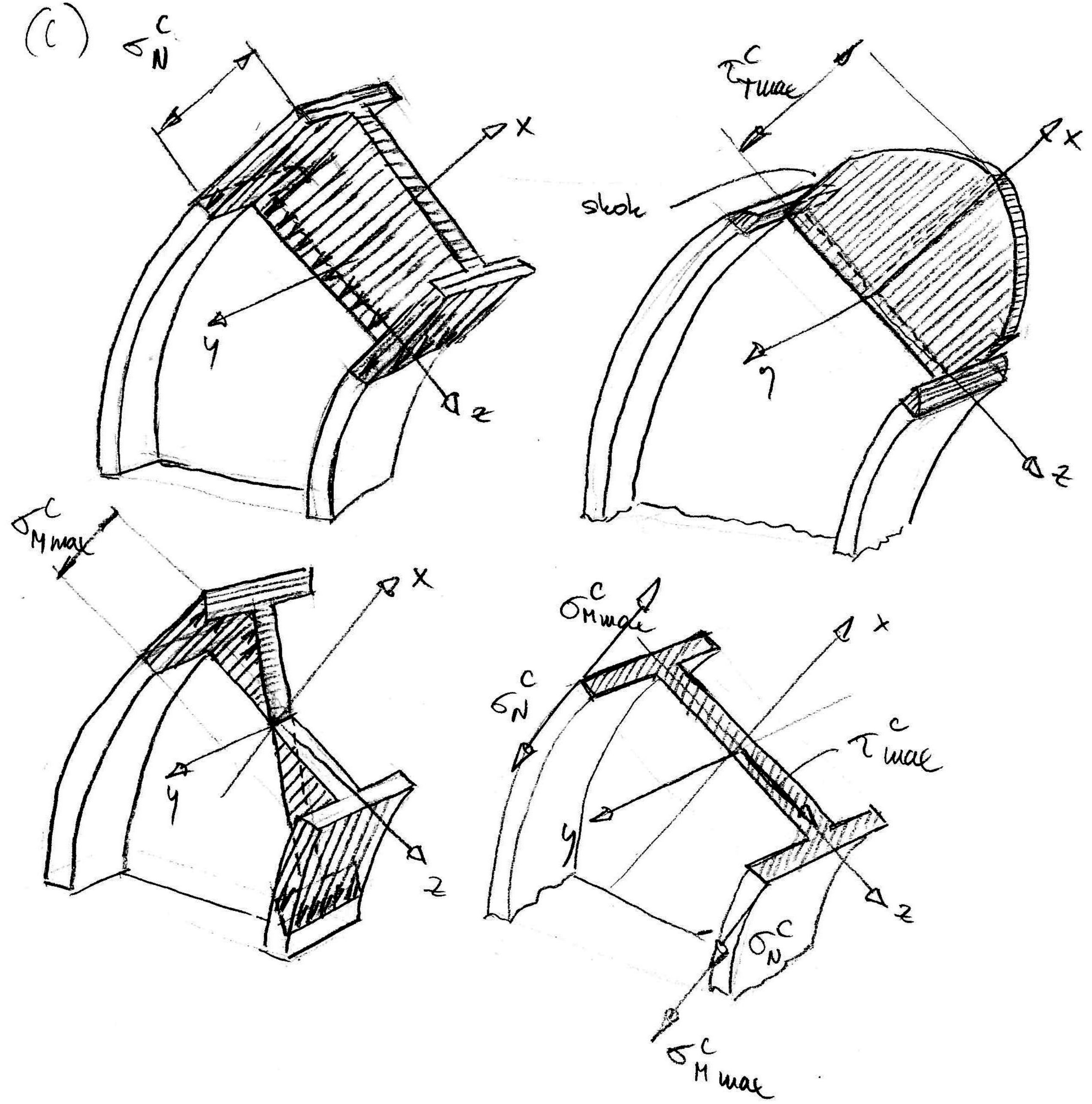


M:





$$\sigma^{NA}_{max} = \frac{N}{S} = \frac{\frac{F}{2}}{2b\cdot t + ht} = \frac{F}{2t(2b+h)}$$



$$\sigma^{C}_{max\,N} = \frac{N}{S} = \frac{\frac{F}{2}\cdot\frac{\sqrt{2}}{2}}{2bt + ht} = \frac{\sqrt{2}F}{4t(2b+h)}$$

$$\tau^{C}_{max\,T} = \frac{T\,U_y^{\varphi}}{t\cdot J_y} \approx \frac{\frac{F}{2}\frac{\sqrt{2}}{2}\cdot\left(b\cdot t\cdot\frac{h}{2} + t\cdot\frac{h}{2}\cdot\frac{h}{4}\right)}{t\cdot\left[2\left(\frac{1}{12}b\cdot t^3 + \left(\frac{h}{2}\right)^2 b\cdot t\right) + \frac{1}{12}t\cdot h^3\right]} = \frac{3\sqrt{2}\cdot F\,(4b\cdot h + th)\cdot h}{8t^2\left[2bt^2 + 6h^2b + h^3\right]} \approx \frac{3}{2}\,\frac{\frac{F}{2}\frac{\sqrt{2}}{2}}{t\cdot h} = \frac{3\sqrt{2}F}{8t\cdot h}$$

$$\sigma^{C}_{max\,M} = \frac{M}{W_o} = \frac{M}{J_y}\cdot\frac{h}{2} = \frac{F\cdot R\left(1-\frac{\sqrt{2}}{2}\right)}{2\left(\frac{1}{12}b\cdot t^3+\left(\frac{h}{2}\right)^2 bt\right)+\frac{1}{12}t\cdot h^3}\cdot\frac{h}{2} = \frac{3F\cdot R\,(2-\sqrt{2})\,h}{\left[2bt^2+6h^2b+h^3\right]\cdot t}$$

$$k^{A} = \frac{\sigma_k}{\sigma^{A}_{max\,N}}\,, \qquad k^{C} = \min\left\{\frac{\sigma_k}{\sigma^{C}_{max\,N}+\sigma^{C}_{max\,M}}\,,\ \frac{\sigma_k}{2\tau^{C}_{max\,T}}\right\}$$