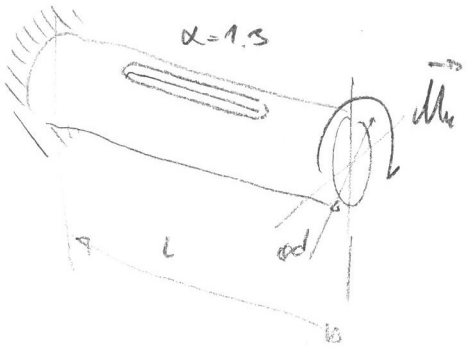
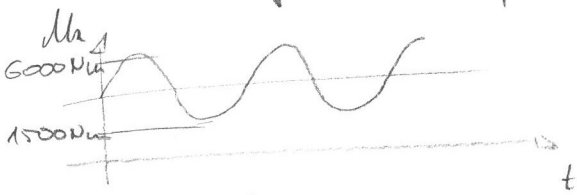
Př:



Dano: ocel $\tau_p = 600\,MPa$, $\tau_{ar} = 160\,MPa$



bezpečnost k τ_p: $k_1 = 3$

bezpečnost k τ_{ra}: $k_2 = 4$

$$\tau_{max} = \alpha \cdot \frac{M_k^{max}}{W_k} = 1.3 \cdot \frac{6000 \cdot 10^3}{\frac{\pi \cdot d^3}{16}} = \frac{40 \cdot 10^4}{d^3}$$

$$\tau_{min} = \alpha \cdot \frac{M_k^{min}}{W_k} = 1.3 \cdot \frac{1500 \cdot 10^3}{\frac{\pi \cdot d^3}{16}} = \frac{10 \cdot 10^4}{d^3}$$

$$\tau_m = \frac{1}{2}(\tau_{max} + \tau_{min}) = \frac{1}{2} \cdot \left(\frac{4.0 \cdot 10^4}{d^3} + \frac{1.0 \cdot 10^4}{d^3}\right) = \frac{2.5 \cdot 10^4}{d^3}$$

$$\tau_a = \frac{1}{2}(\tau_{max} - \tau_{min}) = \frac{1}{2}\left(\frac{4.0 \cdot 10^4}{d^3} - \frac{1.0 \cdot 10^4}{d^3}\right) = \frac{1.5 \cdot 10^4}{d^3}$$

$$\frac{\frac{\tau_a}{k_2}}{\frac{\tau_{ar}}{k_1}} + \frac{\tau_m}{\tau_p} = 1 \Rightarrow \frac{\frac{1.5 \cdot 10^4}{d^3}}{\frac{160}{4}} + \frac{\frac{2.5 \cdot 10^4}{d^3}}{\frac{600}{3}} = 1 \Rightarrow \frac{5 \cdot 10^5}{d^3} = 1 \Rightarrow$$

$$\Rightarrow d = 79\,mm$$