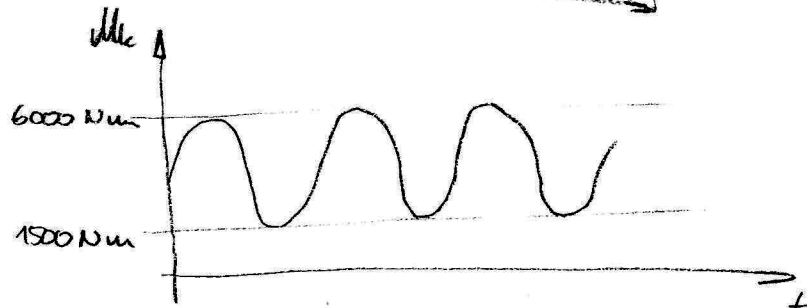
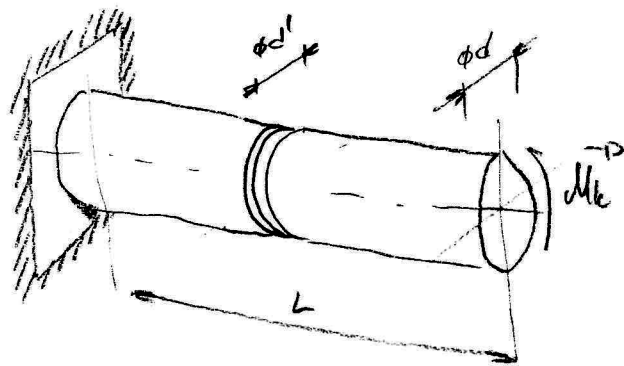


Pč:



V punktu stanovte bezpečnost k MS neomezené životnosti.

materiál ocel, leštěný povrch, kaleno

$$\alpha = 3$$

$$\sigma_{pt} = 600 \text{ MPa}$$

$$\sigma_c = 300 \text{ MPa}$$

$$\tau_c = 160 \text{ MPa}$$

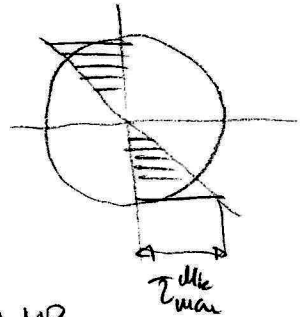
$$h_1 = 10 \text{ mm}$$

$$d = 80 \text{ mm}, d' = 49 \text{ mm}$$

$$r = 3 \text{ mm}$$

1. VVV

$$M_k = -M_k, x \in (0, L)$$



2. Řešení

$$\tau_{max} = \frac{M_{kmax}}{W_k} = \frac{6 \cdot 10^6}{\frac{\pi \cdot 49^3}{16}} = 62 \text{ MPa}$$

$$\tau_{min} = \frac{M_{kmin}}{W_k} = \frac{1.5 \cdot 10^6}{\frac{\pi \cdot 49^3}{16}} = 15 \text{ MPa}$$

$$\tau_m = \frac{1}{2} (\tau_{max} + \tau_{min}) = \frac{1}{2} (62 + 15) = 39 \text{ MPa}$$

$$\tau_a = \frac{1}{2} (\tau_{max} - \tau_{min}) = \frac{1}{2} (62 - 15) = 24 \text{ MPa}$$

$$\tau_{c*} = \frac{\beta \tau \eta \tau}{\beta \tau} \sigma_c = \frac{0.43 \cdot 2.85}{2.44} \cdot 300 = 260 \text{ MPa}$$

součinatel veličnosti

$$\eta_{\tau} = \eta_1 \cdot \eta_{2\tau} = 0.84 \cdot 0.84 = 0.43$$

$$\eta_1 = 1 - \sqrt{k \cdot \log \frac{h}{h_1}} = 1 - \sqrt{2 \cdot 10^{-2} \cdot \log \frac{80}{10}} = 0.84$$

$$\eta_{2\tau} = 1 + \left(\frac{\tau_c}{\sigma_c} - 1 \right) \sqrt{\frac{h_1}{h}} = 1 + \left(\frac{160}{300} - 1 \right) \sqrt{\frac{10}{80}} = 0.84$$

součinatel umbru

$$\beta = \frac{\alpha}{1 + \frac{\alpha-1}{\alpha} \frac{k}{1/r}} = \frac{3}{1 + \frac{3-1}{3} \frac{0.6}{1/3}} = 2.44$$

$$k = \frac{\beta \sigma_{pt}}{\sigma_{pt}} = \frac{360}{600} = 0.6$$

souciul de pondere

$$\eta_1 = \eta_1 \eta_2 = 0.95 \cdot 3 = 2.85$$

$$\eta_1 = 0.95$$

$$\eta_2 = 3$$

Goodman :

$$\frac{\tau_a}{\tau_c^*} + \frac{\tau_m}{\sigma_{pt}} = \frac{1}{k} \Rightarrow k = \frac{\tau_c^*}{\tau_m \frac{\tau_c^*}{\sigma_{pt}} + \tau_a} = \frac{260}{39 \cdot \frac{260}{600} + 24} = \underline{\underline{6.36}}$$