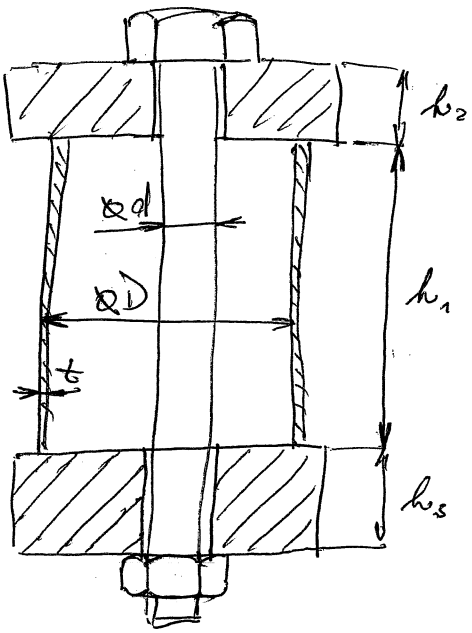


Vypočítejte potřebné otočení matice šroubu, aby klak v trubce byl P.

$F = p \cdot S_t$

délka šroubu L

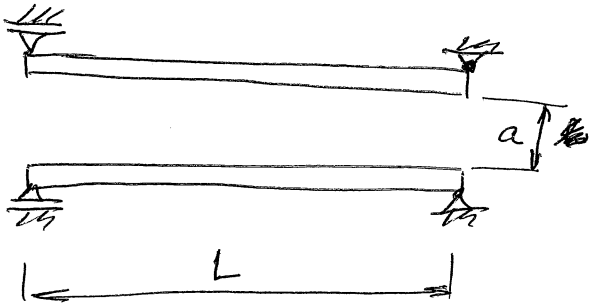
$$L \cdot \left(1 + \frac{F}{S_š \cdot E_š}\right) = h_1 \cdot \left(1 - \frac{F}{S_t \cdot E_t}\right) + h_2 + h_3$$

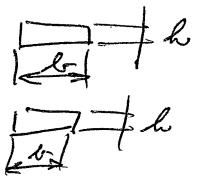
$$L = \frac{h_1\left(1 - \frac{P}{E_t}\right) + h_2 + h_3}{1 + \frac{P \cdot S_t}{S_š \cdot E_š}}$$

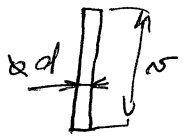
potřebné posunutí matice $h_1 + h_2 + h_3 - L$

otočení šroubu s

potřebné otočení $n = \frac{h_1 + h_2 + h_3 - L}{s}$

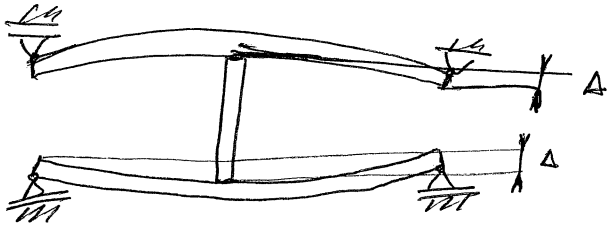


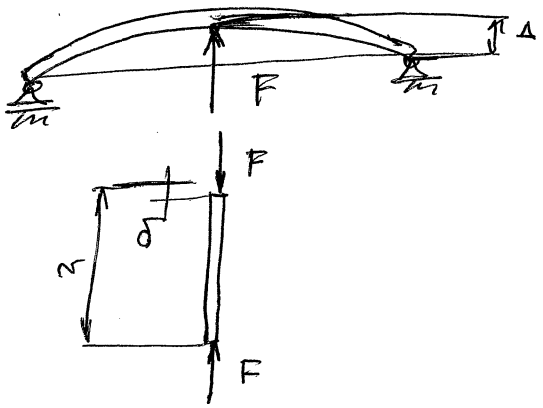




Mezi dva nosníky délky L vzdálené a vložíme tyč ~~kruhového~~ kruhového průřezu o průměru d a délky n.

Vypočítejte průhyb nosníků a napětí v nosnících a tyči.





$$a + 2\cdot\Delta + \delta = n$$

$$\Delta = \frac{F L^3}{48 E_1 I_1}$$

$$\delta = \frac{F \cdot n}{S_2 \cdot E_2}$$

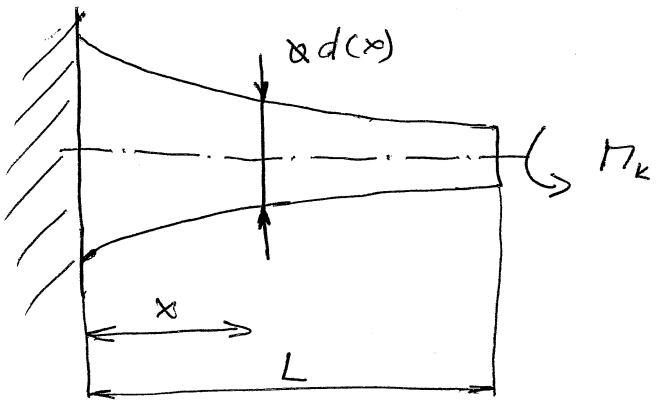
$$a + 2\cdot\frac{F L^3}{48 E_1 I_1} + \frac{F n}{S_2 E_2} = n$$

$$F\left(\frac{2L^3}{48 E_1 I_1} + \frac{n}{S_2 E_2}\right) = n - a$$

$$F = \frac{n - a}{\frac{2L^3}{48 E_1 I_1} + \frac{n}{S_2 E_2}}$$

$$\sigma_o = \frac{M_o}{W_o} = \frac{\frac{FL}{4}}{\frac{b h^2}{6}}$$

$$\sigma = \frac{F}{S_2}$$



$$I_p(x) = \frac{I_p(L)\,\frac{3}{2}L}{x+\frac{L}{2}} \qquad I_p(L) = \frac{\pi\, d^4(L)}{32}$$

$$\varphi = \int_0^L \frac{M_k}{G\,I_p(x)}\,dx = \int_0^L \frac{M_k\,(x+\frac{L}{2})}{G\cdot I_p(L)\,\frac{3}{2}L}\,dx =$$

$$= \frac{M_k}{G\cdot I_p(L)\,\frac{3}{2}L}\int_0^L \left(x+\frac{L}{2}\right)dx = \frac{M_k}{G\cdot I_p(L)\,\frac{3}{2}L}\left[\frac{x^2}{2}+\frac{Lx}{2}\right]_0^L$$

$$= \frac{M_k}{G\cdot I_p(L)\,\frac{3}{2}L}\cdot L^2 = \frac{2\,M_k\,L}{3\,G\cdot I_p(L)}$$

$$W_k(x) = \frac{\pi\, d^3(x)}{16} \qquad d^4(L) = \frac{32\,I_p(L)}{\pi}$$

$$\tau_k = \frac{M_k}{W_k(L)} = \frac{16\,M_k}{\pi\, d^3(L)} \le \tau_D \qquad d^4(x) = \frac{32\,I_p(x)}{\pi} = \frac{32\,I_p(L)\,\frac{3}{2}L}{\pi\left(x+\frac{L}{2}\right)}$$

$$d^3(L) \ge \frac{16\,M_k}{\tau_D} \qquad d^4(x) = \frac{32\cdot\pi\, d^4(L)\,\frac{3}{2}L}{\pi\cdot 32\cdot\left(x+\frac{L}{2}\right)} = d^4(L)\,\frac{3L}{2\left(x+\frac{L}{2}\right)}$$

$$d(L) \ge \sqrt[3]{\frac{16\,M_k}{\tau_D}} \qquad d(x) = d(L)\sqrt[4]{\frac{3L}{2(x+\frac{L}{2})}}$$

$$d(x) = \sqrt[3]{\frac{16\,M_k}{\tau_D}}\sqrt[4]{\frac{3L}{2(x+\frac{L}{2})}}$$

$$\varphi = \frac{2M_k\cdot L}{3G\,\frac{\pi}{32}\left(\frac{16M_k}{\tau_D}\right)^{\frac{4}{3}}} = \frac{64\,M_k\cdot L}{3\cdot G\cdot\left(\frac{16M_k}{\tau_D}\right)^{\frac{4}{3}}}$$