

Problem 403

Compare two of the possible bearings of the bar in the figure from the viewpoint of the safety factor, if loaded by the force \vec{F} in operation. The length of the bar is produced with tolerance of $\pm 0,2$ mm.

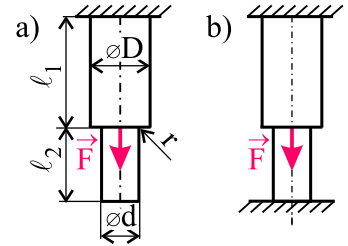
In the case b), fixed supports carried out by welding are on both ends of the bar.

Input values:

$$l_1 = 0,15 \text{ m}, \quad F = 10^5 \text{ N}, \quad E = 2 \cdot 10^5 \text{ MPa},$$

$$l_2 = 0,1 \text{ m}, \quad r = 3 \text{ mm}, \quad \sigma_K = 300 \text{ MPa},$$

$$\varnothing D = 25 \text{ mm}, \quad \varnothing d = 20 \text{ mm}.$$



tension

released structure

simple tension of supported bars