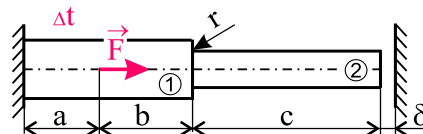


Problem 408

Determine the safety factor against the limit state of elasticity at a bar with bearings according to the figure, which is loaded by an isolated force \vec{F} and by a uniform temperature increase of Δt . Part 1 is made of copper, part 2 is of steel. The dimensions of the bar were measured at the temperature of $T_0 = 20$ deg.

Input values:

$\phi d_1 = 40$ mm,	$a = 400$ mm	$E_1 = 1,2 \cdot 10^5$ MPa,
$r = 2$ mm,	$b = 500$ mm	$\alpha_1 = 16 \cdot 10^{-6}$ K ⁻¹ ,
$\phi d_2 = 35$ mm,	$c = 1000$ mm	$E_2 = 2,1 \cdot 10^5$ MPa,
$\delta = 0,1$ mm,	$\Delta t = 35$ deg	$\alpha_2 = 12 \cdot 10^{-6}$ K ⁻¹ ,
$F = 20$ kN,	$\sigma_{K1} = 130$ MPa,	$\sigma_{K2} = 350$ MPa.



tension

deformation