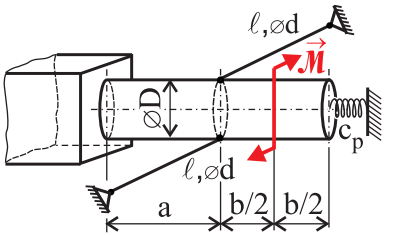
Problem 507



The bar is welded to the base on one of its ends and, in addition, supported by a spring with torsional yielding c_p and by two other bars. Determine the maximum value of the couple $\mathcal{M}$ which the body (in the figure) can be acted upon by, if the linearity of the problem should not be violated. The geometry and material characteristics (all the bars are made of the same material) are known. Gravitational forces can be neglected.

Input values:

$a = 1000\,\mathrm{mm}$,	$b = 600\,\mathrm{mm}$,	$l = 800\,\mathrm{mm}$,
$\emptyset D = 30\,\mathrm{mm}$,	$\emptyset d = 20\,\mathrm{mm}$,	$\mu = 0,3$
$E = 2 \cdot 10^5\,\mathrm{MPa}$,	$\sigma_K = 400\,\mathrm{MPa}$,	$c_p = 0,1\,\mathrm{rad.m^{-1}.kN^{-1}}$.

Solutions torsion linearity of the problem Castigliano's theorem