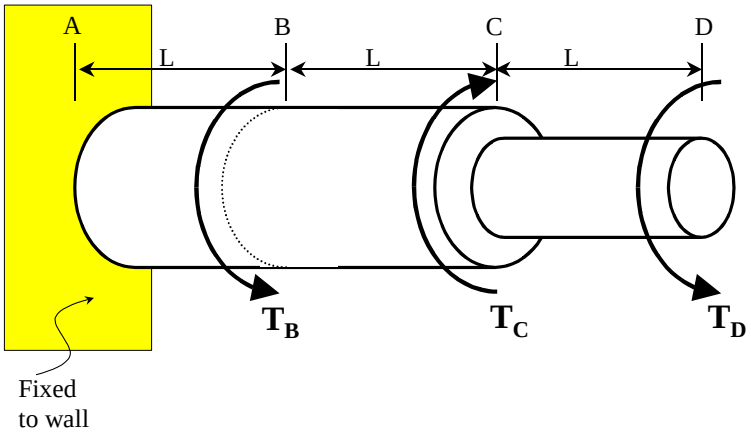
Example: Multiple rods in series



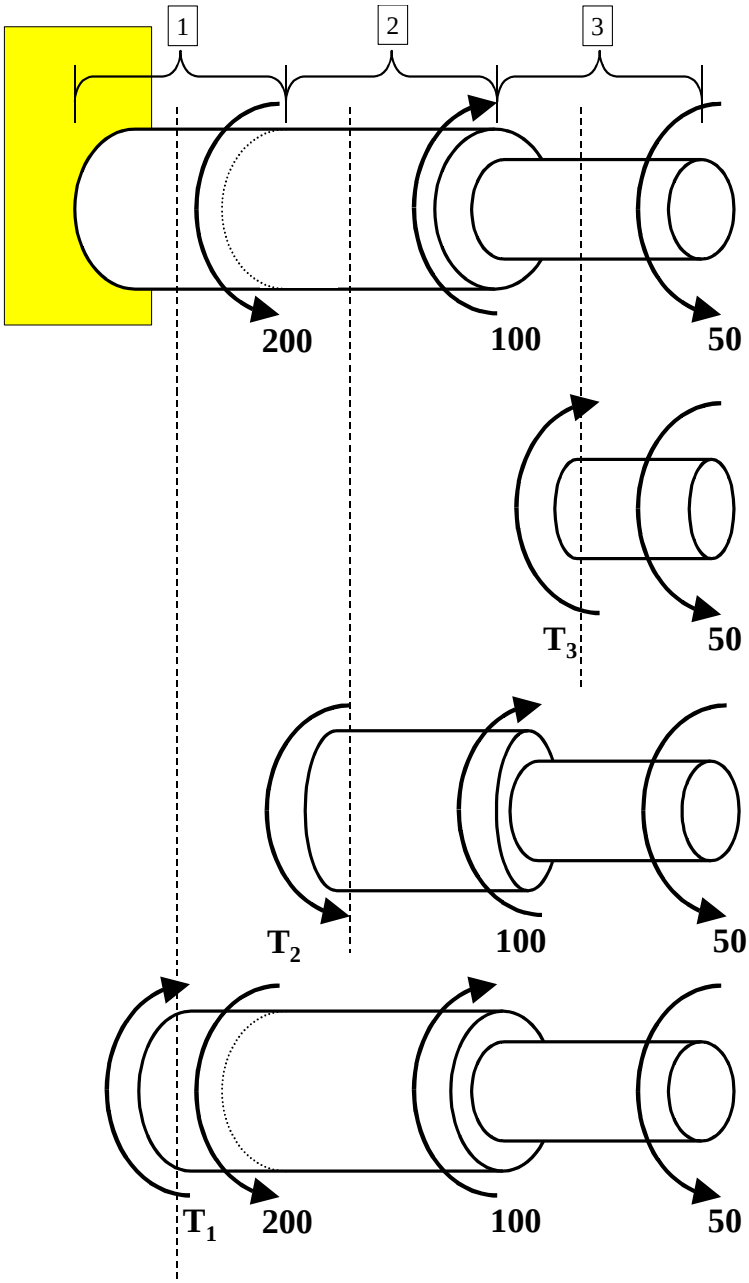
$T_B = 200$ Nm, $T_C = 100$ Nm, $T_D = 50$ Nm

L = 1 m, G = 27 GPa (steel)

$d_{AC} = 40$ mm $\rightarrow c_{AC} = 20$ mm $\rightarrow J_{AC} = 2.513 \times 10^{-7}$ m^4
$d_{CD} = 20$ mm $\rightarrow c_{CD} = 10$ mm $\rightarrow J_{CD} = 1.571 \times 10^{-8}$ m^4

Find: a) twist at point D, ϕ_D
b) maximum shear stress in section AB, τ_{ABmax}

Relevant formulas: $\phi = \sum \frac{TL}{JG}, \quad \tau_{max} = \frac{Tc}{J}$


1
2
3
200
100
50
T3
50
T2
100
50
T1
200
100
50