# Torsion in Shafts. Question 5-54 Solution

Saturday, 15 March, 2025 08:40 AM

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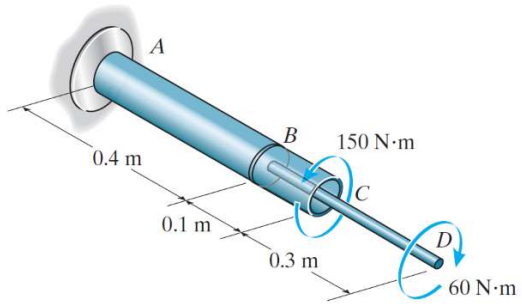


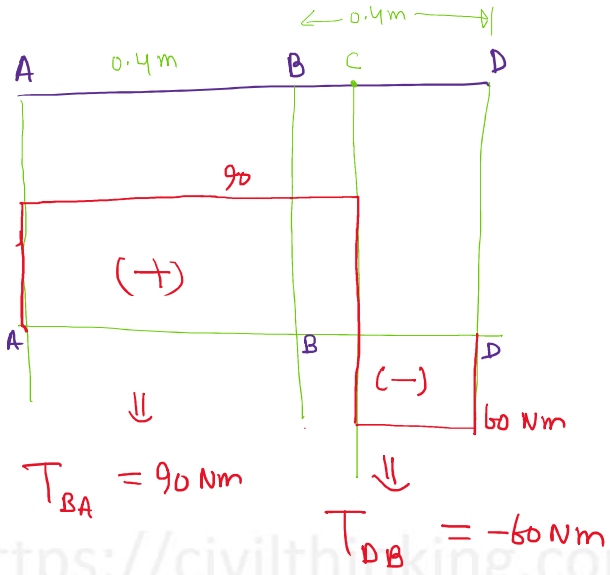




$\theta_{D/A} = \theta_{D/B} + \theta_{B/A}$ we know: $\frac{G\theta}{L} = \frac{T}{J} \Rightarrow \theta = \frac{TL}{GJ}$

$= \left(\frac{TL}{GJ}\right)_{DB} + \left(\frac{TL}{GJ}\right)_{BA}$

$= \frac{-60 \times 0.4}{75\times10^9 \times \frac{\pi}{2}(0.01)^4} + \frac{90 \times 0.4}{75\times10^9 \times \frac{\pi}{2}(0.02^4 - 0.015^4)} = -0.01758\ \text{rad} = |1.01°|$ ANS.