Solutions

2.1

- $\lambda = KL/r = 1500/6.25 = \mathbf{240}$.
- $240 > \lambda_t = 125.7$, so Euler governs.

2.2

- $P_{cr} = \pi^2 EI/L^2 = 9.870 \times 200 \times 10^9 \times 1.917 \times 10^{-8}/2.25 = \mathbf{16.8}$ kN.

2.3

- $P_{allow} = P_{cr}/n = 16.8/2.0 = \mathbf{8.4}$ kN.

2.4

- $\sigma' = \sqrt{60^2 - 60 \times 20 + 20^2} = \sqrt{2800} = \mathbf{52.9}$ MPa.
- It is compared with the yield stress in uniaxial tension ($\sigma_y = 250$ MPa): below, no yielding by the distortion-energy criterion.

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