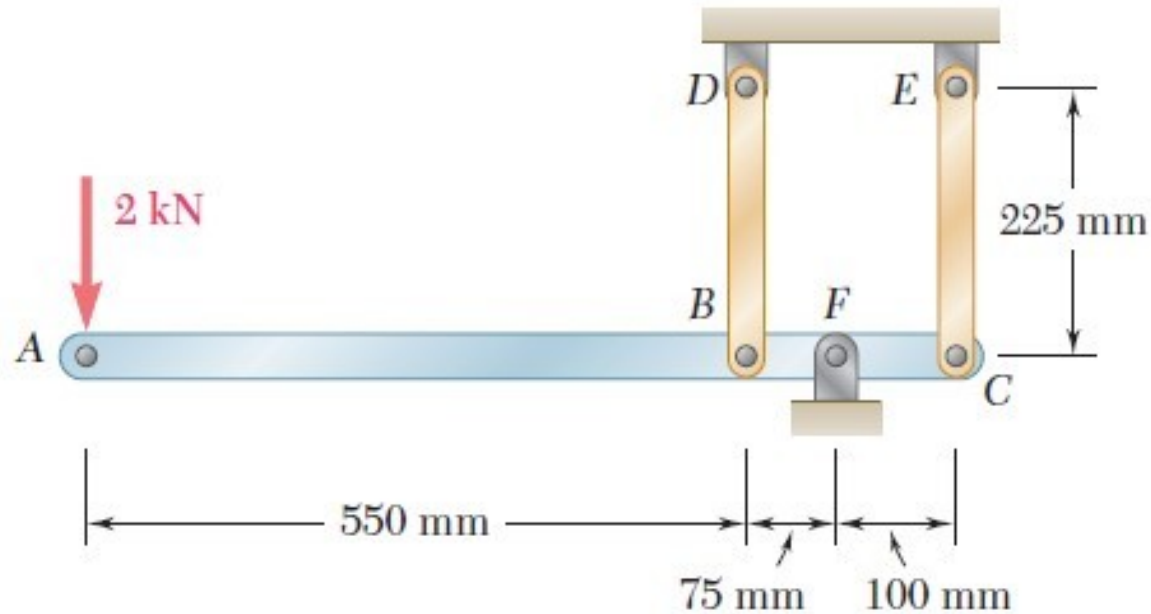


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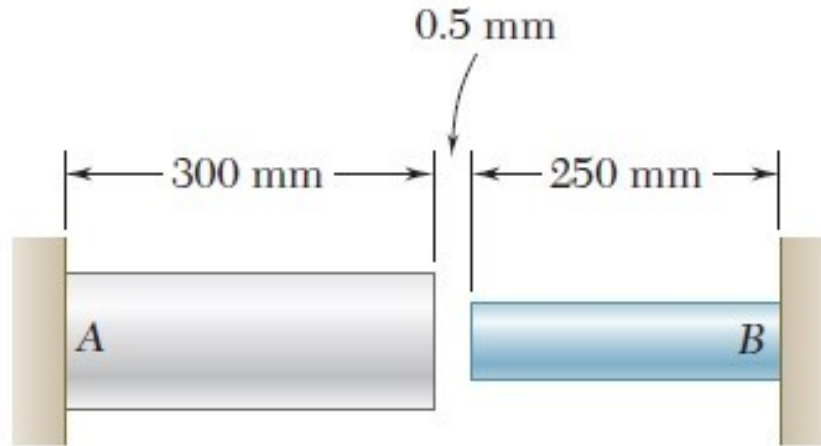


PROBLEM HOUR III

Q1) Each of the rods BD and CE is made of brass ($E = 105 \text{ GPa}$) and has a cross-sectional area of 200 mm^2 . Determine the deflection of end A of the rigid member ABC caused by the 2-kN load.



Q2) At room temperature (20°C) a 0.5-mm gap exists between the ends of the rods shown. At a later time when the temperature has reached 140°C , determine (a) the normal stress in the aluminum rod, (b) the change in length of the aluminum rod.



Aluminum

$$A = 2000 \text{ mm}^2$$

$$E = 75 \text{ GPa}$$

$$\alpha = 23 \times 10^{-6}/^{\circ}\text{C}$$

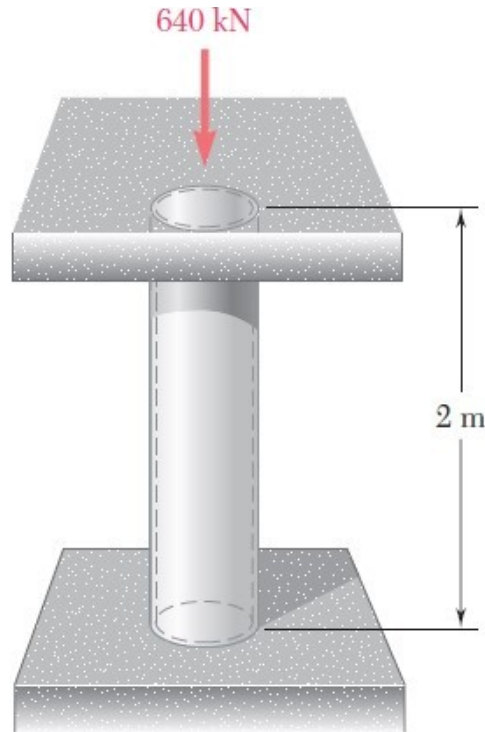
Stainless steel

$$A = 800 \text{ mm}^2$$

$$E = 190 \text{ GPa}$$

$$\alpha = 17.3 \times 10^{-6}/^{\circ}\text{C}$$

- Q3) A 2-m length of an aluminum pipe of 240-mm outer diameter and 10-mm wall thickness is used as a short column to carry a 640-kN centric axial load. Knowing that $E = 73$ GPa and $\nu = 0.33$, determine (a) the change in length of the pipe, (b) the change in its outer diameter, (c) the change in its wall thickness.



Q4)

The brass rod AD is fitted with a jacket that is used to apply a hydrostatic pressure of 48 MPa to the 240-mm portion BC of the rod. Knowing that $E = 105$ GPa and $\nu = 0.33$, determine (a) the change in the total length AD , (b) the change in diameter at the middle of the rod.

