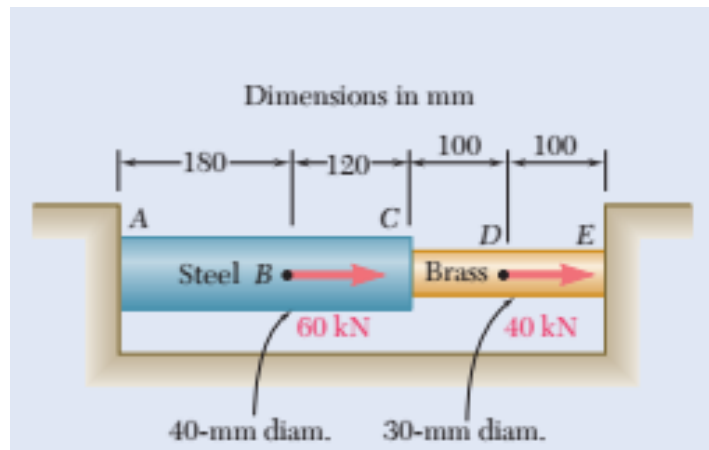


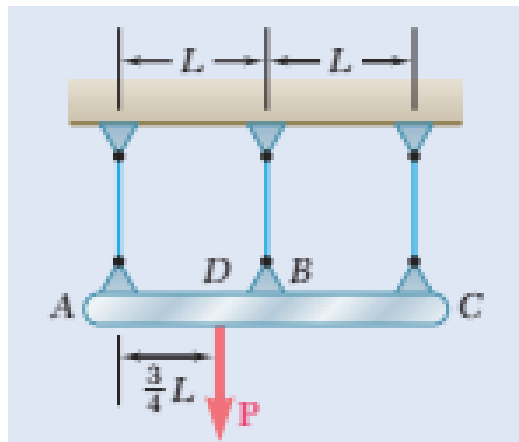
CEE 2219 TUTORIAL EXTRA-QUESTIONS

ANALYSIS OF STATICALLY INDETERMINATE STRUCTURES

1. Two cylindrical rods, one of steel and the other of brass, are joined at C and restrained by rigid supports at A and E . For the loading shown and knowing that $E_s=200$ GPa and $E_b= 105$ GPa, determine (a) the reactions at A and E , (b) the deflection of point C .

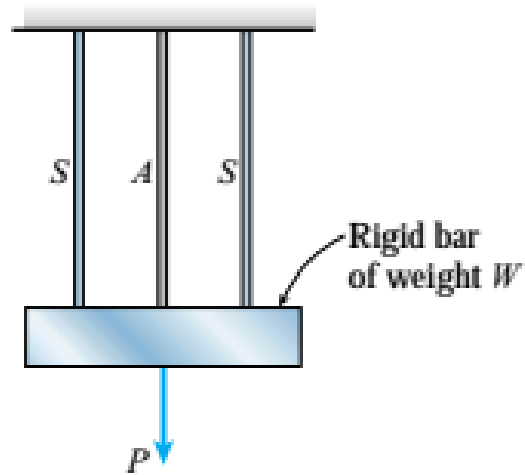


2. The rigid bar ABC is suspended from three wires of the same material. The cross-sectional area of the wire at B is equal to half of the cross-sectional area of the wires at A and C . Determine the tension in each wire caused by the load P shown.



3. A rigid bar of weight $W = 800$ N hangs from three equally spaced vertical wires, two of steel and one of aluminum. The wires also support a load P acting at the midpoint of the bar. The

diameter of the steel wires is 2 mm, and the diameter of the aluminium wire is 4 mm. What load P_{allow} can be supported if the allowable stress in the steel wires is 220 MPa and in the aluminium wire is 80 MPa? (Assume $E_s = 210$ GPa and $E_a = 70$ GPa.)



4. A cylindrical assembly consisting of a brass core and an aluminum collar is compressed by a load P . The length of the aluminum collar and brass core is 350 mm, the diameter of the core is 25 mm, and the outside diameter of the collar is 40 mm. Also, the moduli of elasticity of the aluminum and brass are 72 GPa and 100 GPa, respectively.

- (a) If the length of the assembly decreases by 0.1% when the load P is applied, what is the magnitude of the load?
- (b) What is the maximum permissible load P_{max} if the allowable stresses in the aluminum and brass are 80 MPa and 120 MPa, respectively?

