· **1.7** Each of the four vertical links has an 8 × 36-mm uniform rectangular cross section and each of the four pins has a 16-mm diameter. Determine the maximum value of the average normal stress in the links connecting (*a*) points *B* and *D*, (*b*) points *C* and *E*.

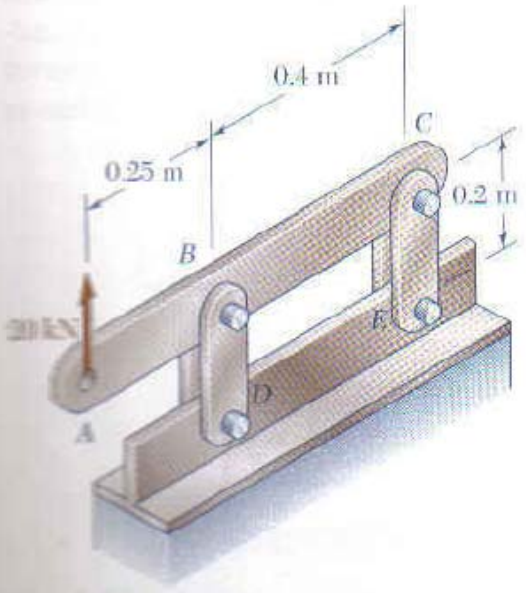


Fig. P1.7

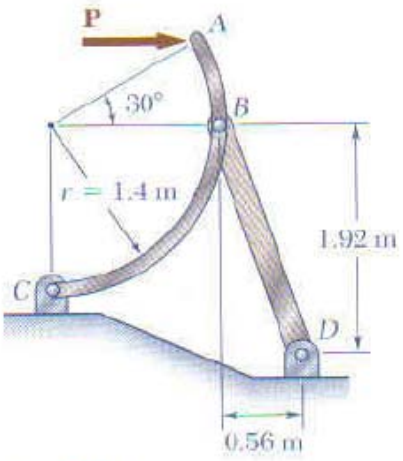


Fig. P1.8

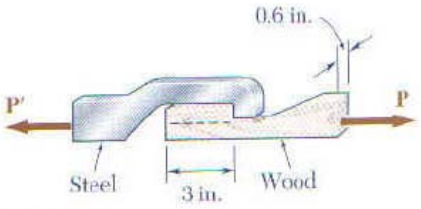


Fig. P1.16

Fig. P1.15

· **1.16** When the force **P** reached 1600 lb, the wooden specimen shown failed in shear along the surface indicated by the dashed line. Determine the average shearing stress along that surface at the time of failure.

1.42 Link AB is to be made of a steel for which the ultimate normal stress is 450 MPa. Determine the cross-sectional area for AB for which the factor of safety will be 3.50. Assume that the link will be adequately reinforced around the pins at A and B.

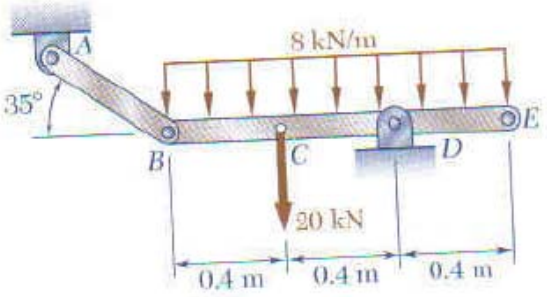


Fig. *P1.42*

1.65 Two wooden members of 70 × 110-mm uniform rectangular cross section are joined by the simple glued scarf splice shown. Knowing that the maximum allowable shearing stress in the glued splice is 500 kPa, determine the largest axial load **P** that can be safely applied.

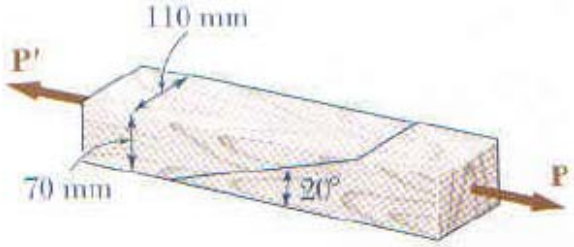


Fig. P1.65

2.25 Each of the four vertical links connecting the two horizontal members is made of aluminum ($E = 70$ GPa) and has a uniform rectangular cross section of 10×40 mm. For the loading shown, determine the deflection of (*a*) point E, (*b*) point F, (*c*) point G.

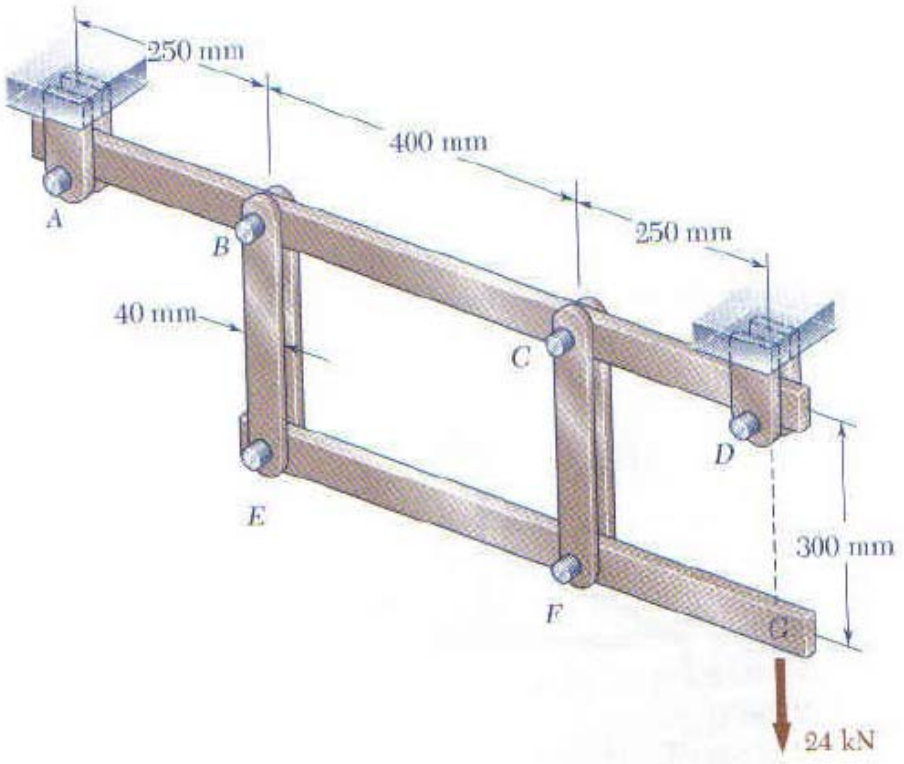


Fig. P2.25

2.41 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.

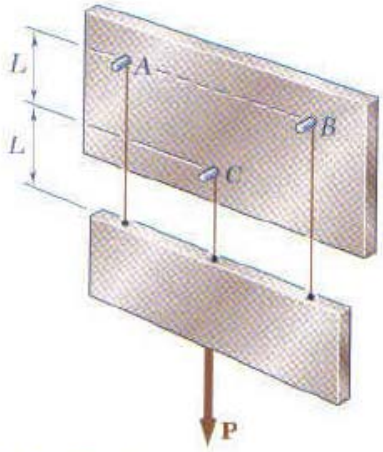


Fig. P2.40

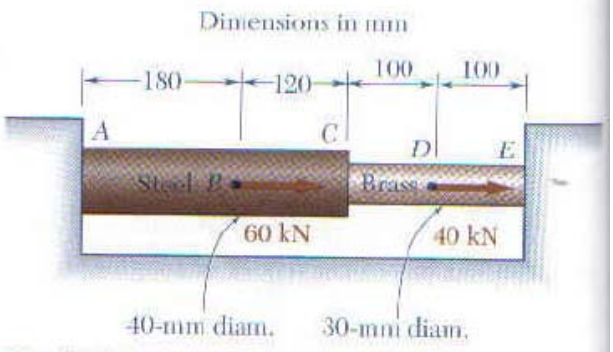


Fig. P2.41

2.45 Links BC and DE are both made of steel ($E = 29 \times 10^6$ psi) and are $\frac{1}{2}$ in. wide and $\frac{1}{4}$ in. thick. Determine (a) the force in each link when a 600-lb force **P** is applied to the rigid member AF shown, (b) the corresponding deflection of point A.

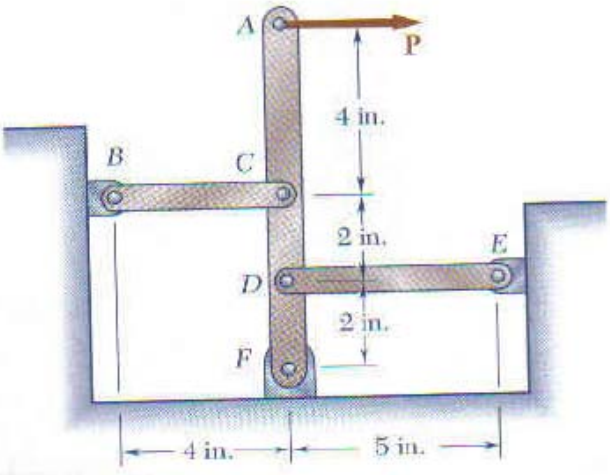
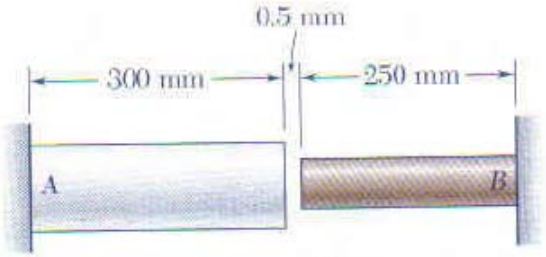


Fig. P2.45

- and 1/2 in.
- force P
- tion

2.60 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
$A = 2000\ \text{mm}^2$
$E = 75\ \text{GPa}$
$\alpha = 23 \times 10^{-6}/°\text{C}$

Stainless steel
$A = 800\ \text{mm}^2$
$E = 190\ \text{GPa}$
$\alpha = 17.3 \times 10^{-6}/°\text{C}$

Fig. *P2.60*