

Fig. P7.104

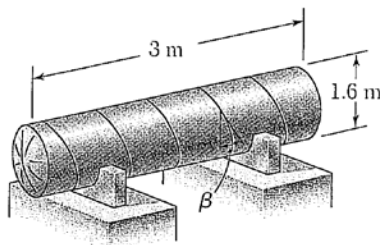


Fig. P7.117

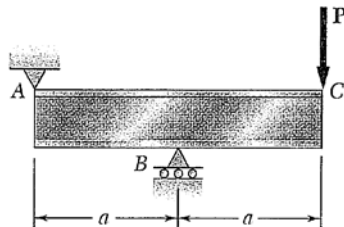


Fig. P8.3

**7.105** For the storage tank of Prob. 7.104, determine the maximum normal stress and the maximum shearing stress in the cylindrical wall when the tank is filled to capacity ( $h = 48$  ft).

**7.104** The unpressurized cylindrical storage tank shown has a  $\frac{3}{16}$ -in. wall thickness and is made of steel having a 60-ksi ultimate strength in tension. Determine the maximum height  $h$  to which it can be filled with water if a factor of safety of 4.0 is desired. (Specific weight of water =  $62.4$  lb/ft<sup>3</sup>.)

**7.118** For the tank of Prob. 7.117, determine the largest allowable gage pressure, knowing that the allowable normal stress perpendicular to the weld is 120 MPa and the allowable shearing stress parallel to the weld is 80 MPa.

**7.117** The pressure tank shown has an 8-mm wall thickness and butt welded seams forming an angle  $\beta = 20^\circ$  with a transverse plane. For a gage pressure of 600 kPa, determine (a) the normal stress perpendicular to the weld, (b) the shearing stress parallel to the weld.

**8.3** An overhanging W920  $\times$  446 rolled-steel beam supports a load  $P$  as shown. Knowing that  $P = 700$  kN,  $a = 2.5$  m, and  $\sigma_{all} = 100$  MPa, determine (a) the maximum value of the normal stress  $\sigma_m$  in the beam, (b) the maximum value of the principal stress  $\sigma_{max}$  at the junction of the flange and web, (c) whether the specified shape is acceptable as far as these two stresses are concerned.

**8.33** Two 1.2-kip forces are applied to an L-shaped machine element  $AB$  as shown. Determine the normal and shearing stresses at (a) point  $d$ , (b) point  $e$ , (c) point  $f$ .

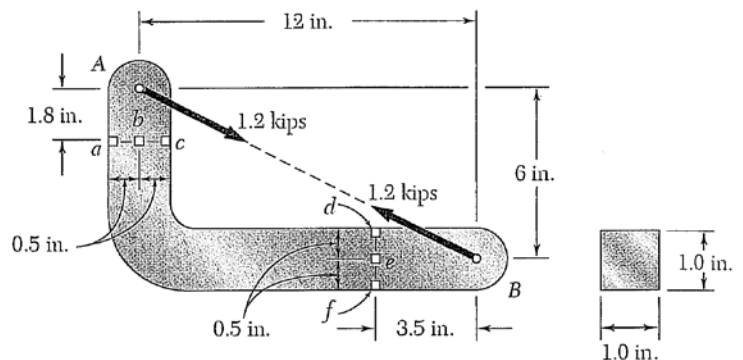


Fig. P8.32 and P8.33

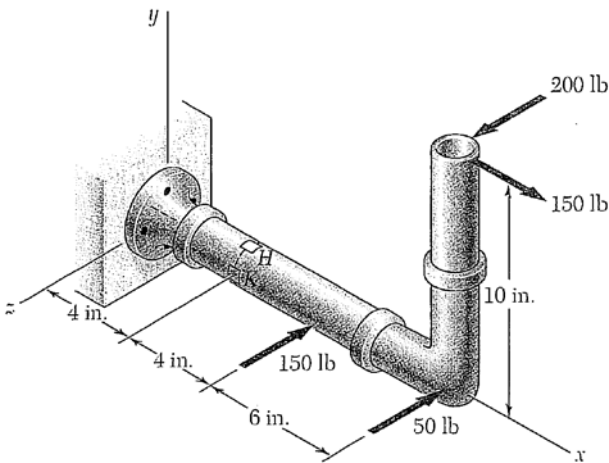


Fig. P8.39

**8.39** Several forces are applied to the pipe assembly shown. Knowing that the pipe has inner and outer diameters equal to 1.61 and 1.90 in., respectively, determine the normal and shearing stresses at (a) point *H*, (b) point *K*.

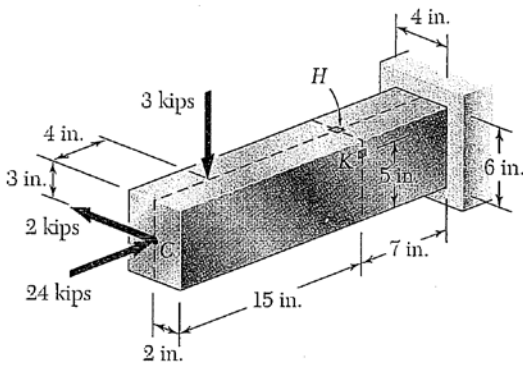


Fig. P8.51

**8.51** Three forces are applied to the cantilever beam shown. Determine the principal stresses and the maximum shearing stress at point *H*.