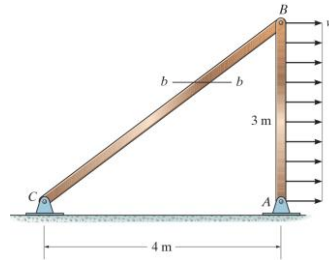
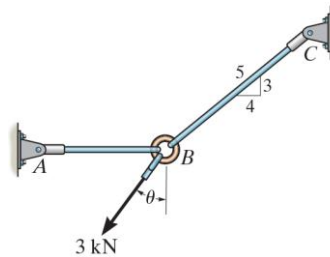


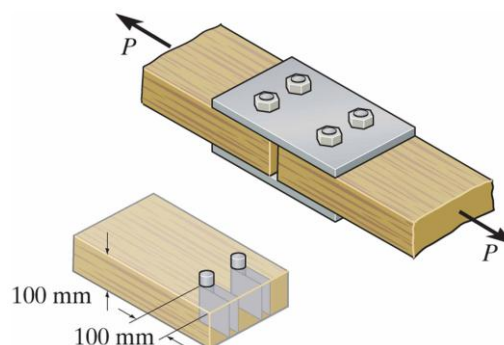
1. Determine the largest intensity w of the uniform loading that can be applied to the frame without causing either the average normal stress or the average shear stress at section $b-b$ to exceed $\sigma = 15 \text{ MPa}$ and $\tau = 16 \text{ MPa}$, respectively. Member CB has a square cross section of 30 mm on each side. [15%] Ans: $w = 16 \text{ kN/m}$



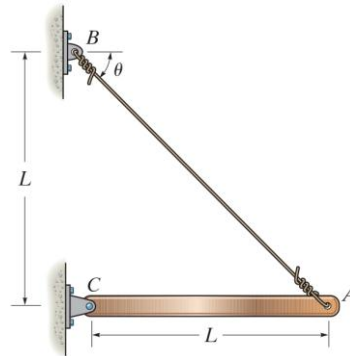
2. Rods AB and BC have diameters of 4 mm and 6 mm, respectively. If the 3 kN force is applied to the ring at B, determine the angle θ so that the average normal stress in each rod is equivalent. What is this stress? [15%] Ans: 30.7° , 152 MPa



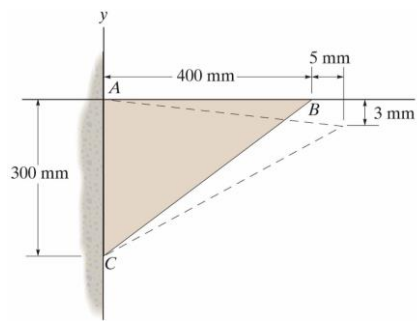
3. (a) If the joint is subjected to an axial force of $P = 9 \text{ kN}$, determine the average shear stress developed in each of the 6-mm diameter bolts between the plates and the members. Also determine the average shear stress developed along each of the four shaded shear planes. [10%] Ans: 79.6 MPa, 225 MPa
- (b) The average shear stress in each of the 6-mm diameter bolts and along each of the four shaded shear planes is not allowed to exceed 80 MPa and 500 kPa, respectively. Determine the maximum force P that can be applied to the joint. [10%] Ans: 9.05 kN



4. The wire AB is unstretched when $\theta = 45^\circ$. If a load is applied to the bar AC , which causes θ to become 47° , determine the normal strain in the wire. Assume that the bar AC is rigid. [15%] Ans: 0.0343



5. The triangle plate is deformed into the shape shown by the dashed line (虛線). Determine the normal strain developed along edge BC and the average shear strain at corner A with respect to the x and y axes. [15%] Ans: 0.00446, -0.00741 rad



6. The square deforms into the position shown by the dashed lines. (a) Determine the average normal strain along each diagonal, AB and CD . (b) Determine the shear strain at each of its corners, A , B , C , and D . Side $D'B'$ remains horizontal. [20%] Ans: $1.606(10^{-3})$, $125.34(10^{-3})$, $-26.18(10^{-3})$, $-204.71(10^{-3})$, $204.71(10^{-3})$, $26.18(10^{-3})$

