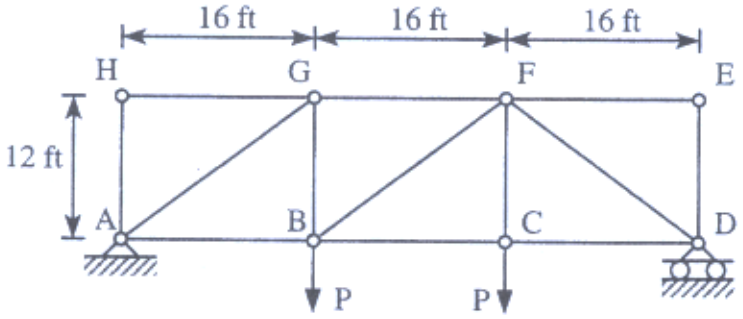
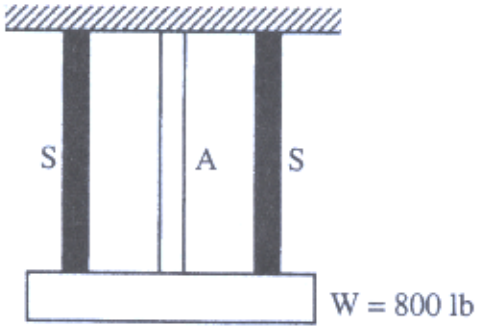
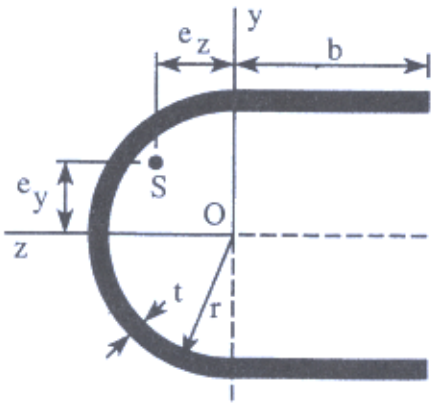
1. The members of the truss are assumed to be pin connected. All the members have circular cross sections with a diameter 2 in. (i) Determine the greatest magnitude of load P that can be supported by the truss without causing member GF to buckle. (ii) Determine the greatest magnitude of load P that can be supported by the truss without causing member AG to buekle. (20%)



2. A rigid beam of weight W = 800 lb hangs from three equally spaced wires, two of steel (E_s = 30×10^6 psi, $\alpha_s = 6.5\times10^{-6}/^oF$) and one of aluminum ($\alpha_a = 12\times10^{-6}/^oF$). The diameter of all the wires is 1/8 in. Before they were loaded, all three wires had the same length. What temperature increase ΔT in all three wires would result in the entire load being carried by the steel wires? (20%)

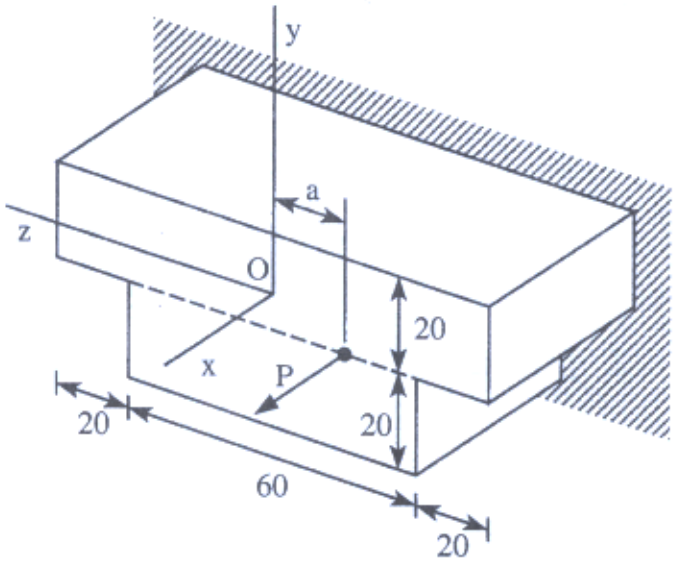


3. Determine the location of the shear center S of a U-shape cross section of constant thickness. (20%)



(背面仍有題目,請繼續作答)

4. A horizontal load P of magnitude 100 kN is applied to the beam shown. Determine the largest distance a for which the maximum tensile stress in the beam does not exceed 75 MPa. (20%)



Dimensions in mm

5. A rubber cylinder A of diameter d is compressed inside a rigid cylinder B by a force F. (i) Obtain a formula for the lateral pressure p between the rubber and the rigid cylinder. (Disregard friction between the rubber and the rigid cylinder.) (ii) Derive a formula for the shortening δ of the rubber cylinder. (20%)