

1. A force P is applied to one end of a uniform L-shaped bar of solid circular cross section that is fixed at the other end, as shown in Figure 1. Force P acts normal to the plane of the bar. The material is isotropic and yields at 280 MPa in a tension test. We like to know what value of P will initiate yielding.
- (a): Where is the stress critical location? Please draw its stress state. (5 Pts)
- (b): What is the maximum shear stress and the von Mises failure criteria? (6 Pts)
- (c): Please calculate P based on the maximum shear stress criterion. (7 Pts)
- (d): Please use the von Mises criteria to obtain P . (7 Pts)

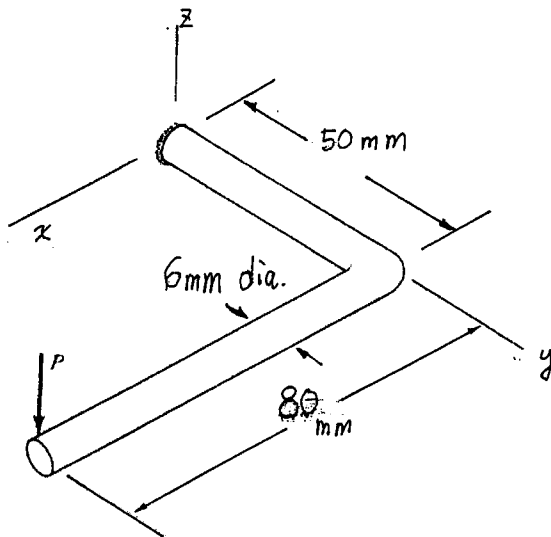


Figure 1

(背面仍有題目,請繼續作答)

2. The beam shown in the Figure 2 has a slight taper. For what value of h_1/h_0 does the largest flexural stress appear at $x=L/2$? What then is the ratio of flexural stress at $x=L/2$ to flexural stress at $x=L$? State clearly your all assumptions. (25%)

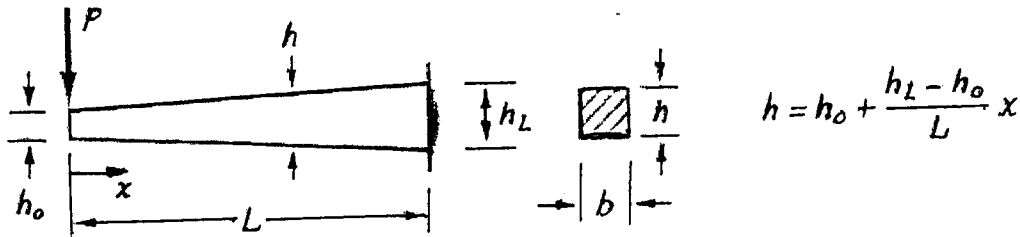


Figure 2

3. A beam is subjected to a uniformly distributed loading w_0 as shown in Figure 3. Please determine (a) all the reactions in this problem, and (b) the maximum deflection of the beam. (25%)

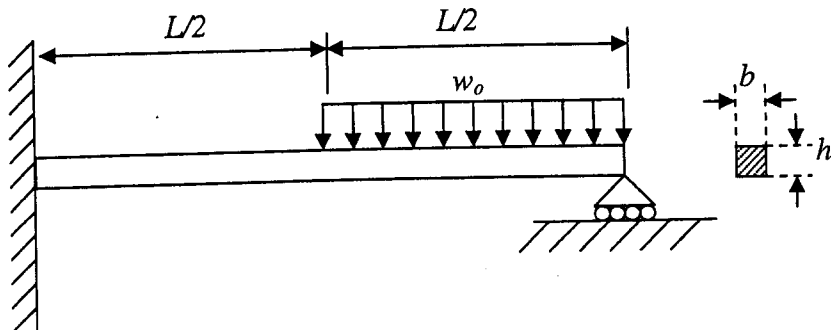


Figure 3

4. As shown in Figure 4, a slightly tapered circular shaft is fixed into a wall at one end. If a torque T_o is applied at the other end, please determine the twist angle ϕ of the shaft. (25%)

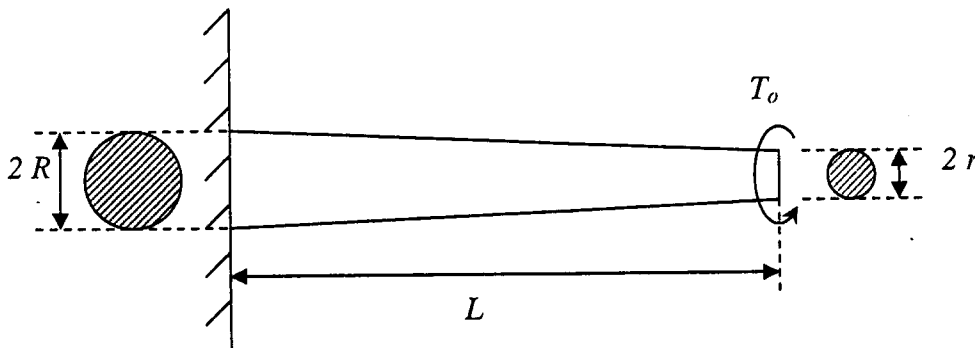


Figure 4.