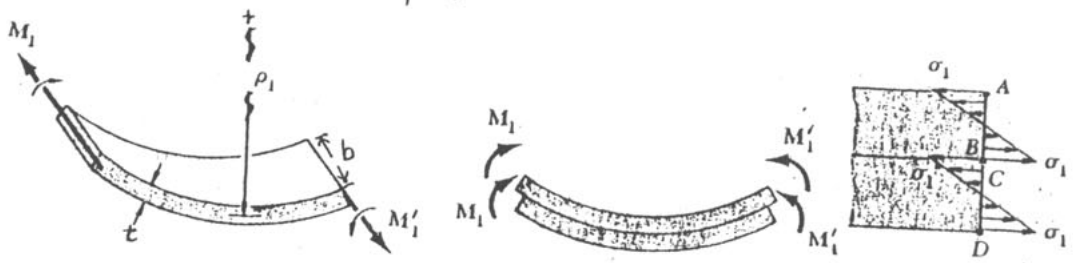
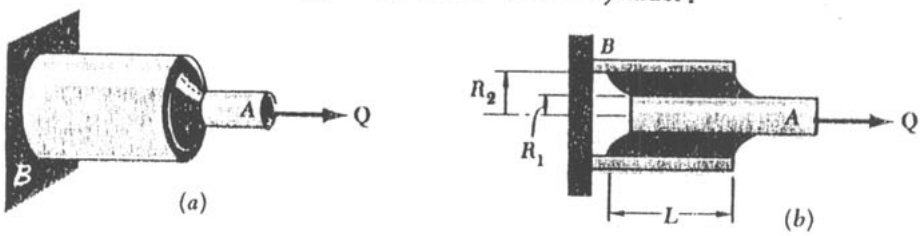
(25pt) Prob. 1. Two thin strips of the same cross section are bent by couples of the same magnitude and glued together. After the two surfaces in contact have been securely bonded, the couples are removed. Denoting by σ_1 the maximum stress and by ρ_1 the radius of curvature of each strip while the couples were applied, determine (*a*) the final stresses at points *A*, *B*, *C*, and *D*, (*b*) the final radius of curvature. Assume $\sigma_1 < \sigma_Y$ and $t \ll \rho_1$. σ_Y = yield stress.



(25pt) Prob. 2. A vibration isolation support is made by bonding a rod *A*, of radius R_1, and a tube *B*, of inside radius R_2, to a hollow rubber cylinder. Denoting by *G* the modulus of rigidity of the rubber, and assuming the elastic response,

(a) express the deflection of rod *A* in terms of *Q*, *L*, *G*, R_1, and R_2.

(b) determine the strain energy of the hollow rubber cylinder.

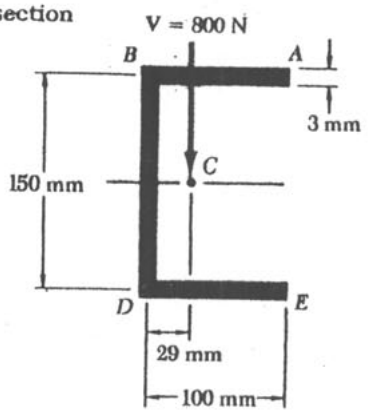


(25pt) Prob. 3.

For the channel section shown in the Fig. and neglecting stress concentrations,

(a) determine the shear center of the channel section

(b) determine the maximum shearing stress



(背面仍有題目,請繼續作答)

(25pt) Prob.4. The 1.5-in.-diameter shaft AB is made of a grade of steel for which the yield strength is $\sigma_Y = 36$ ksi. (A) Using the maximum-shearing-stress criterion, determine the magnitude of the torque **T** at which yield first occurs when $P = 55$ kips.

(B) Solve the Prob. using the maximum-distortion-energy criterion.

(Hint: The elastic distorsion-energy density U_d under three principal stresses:

$$U_d = \frac{1}{12G}\left[(\sigma_a-\sigma_b)^2+(\sigma_b-\sigma_c)^2+(\sigma_c-\sigma_a)^2\right]$$)