

$$\sum M_o = (\rho_1^2 + \rho_2^2 + \rho_3^2 + \rho_4^2 + \rho_5^2) \frac{F_s}{\rho_5}$$

$$\sum M_o = T_{\text{torque}} = 2700 \text{ Nm} \quad \text{By EQUILIBRIUM}$$

$$F_s = \frac{\rho_5 (2700)}{\sum \rho_i^2} \times 10^3 \quad (\text{if } \rho_i \text{ are in mm})$$

$$\frac{(90.1)(2700)}{[(2)(90.1)^2 + 50^2 + 70.7^2 + 79.1^2]} = 6.38 \text{ kN}$$

$$\delta_s = \frac{F_s}{A} = \frac{6.38 \times 10^3}{113 \times 10^{-8}} = 56.5 \text{ MPa.}$$