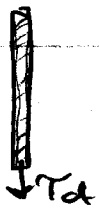
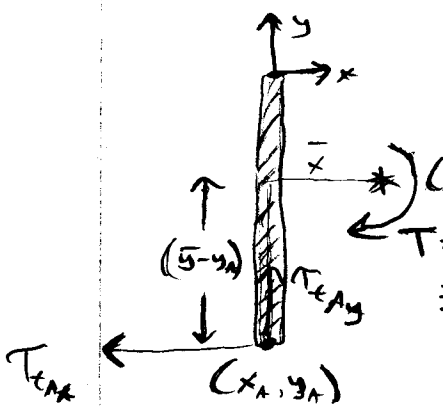
DIRECT SHEAR

$$\tau_d = \frac{P}{A} = \frac{20\,kN}{1768\,mm^2} = 11.3\,MPa$$



TORSIONAL SHEAR COMPONENTS

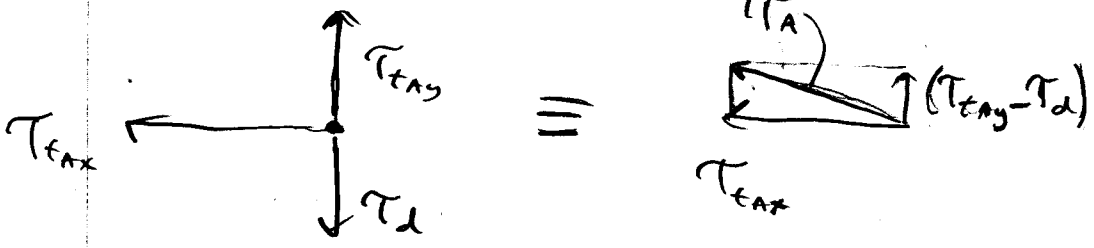


$$T = P(c-\bar{x}) = 20\times10^3(300-20) = 5.6\times10^6\,N\cdot mm$$

$$\tau_{tA_x} = \frac{T(\bar{y}-y_A)}{J} = \frac{5.6\times10^6(150-45)}{6.03\times10^6} = 97.5\,MPa$$

$$\tau_{tA_y} = \frac{T\bar{x}}{J} = \frac{5.6\times10^6(20)}{6.03\times10^6} = 18.6\,MPa$$

RESULTANT SHEAR STRESS



$$\tau_A = \sqrt{\tau_{tA_x}^2 + (\tau_{tA_y}-\tau_d)^2}$$

$$= \sqrt{(97.5)^2 + (18.6-11.3)^2}$$

$$= \boxed{97.8\,MPa}$$