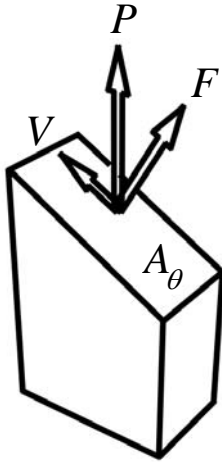


Assignment 3



1.30

Calculate F , V , A_θ in figure.

$$F = P \sin 60^\circ = 2800\sqrt{3} \text{ [N]} \quad \text{eq1}$$

$$V = P \cos 60^\circ = 2800 \text{ [N]} \quad \text{eq2}$$

$$A_\theta = \frac{75 \times 125}{\sin 60^\circ} = 6250\sqrt{3} \text{ [mm}^2\text{]} \quad \text{eq3}$$

$$\sigma = F / A_\theta \quad \text{eq4}$$

$$\tau = V / A_\theta \quad \text{eq5}$$

Substituting F , V , A_θ to eq4 and eq5, answer is obtained as follows.

$$\sigma = \frac{2800\sqrt{3}}{6250\sqrt{3}} = 0.448 \text{ [MPa]} = 448 \text{ [kPa]} \quad \text{Answer}$$

$$\tau = \frac{2800}{6250\sqrt{3}} \cong 0.259 \text{ [MPa]} = 259 \text{ [kPa]} \quad \text{Answer}$$

1.31

From eq1 and eq4, the following equation is obtained.

$$P = \frac{\sigma A_\theta}{\sin 60^\circ} \quad \text{eq6}$$

Substituting $\sigma = 525 \text{ kPa}$ to eq6, P is obtained.

$$P = 6.5625 \cong 6.56 \text{ [kN]} \quad \text{Answer}$$

Calculate τ by eq2, eq3, eq5 and $P = 6.56 \text{ kN}$,

$$\tau \cong 303 \text{ [kPa]} \quad \text{Answer}$$