6-2 \[ S_y = 50 \text{ kpsi} \]

MSS: \[ \sigma_1 - \sigma_3 = S_y/n \Rightarrow n = \frac{S_y}{\sigma_1 - \sigma_3} \]

DE: \[ (\sigma_A^2 - \sigma_B^2)^{1/2} = \frac{S_y}{n} \Rightarrow n = \frac{S_y}{(\sigma_A^2 - \sigma_B^2)^{1/2}} \]

(a) MSS: \[ \sigma_1 = 12 \text{ kpsi}, \sigma_3 = 0, n = \frac{50}{12} = 4.17 \text{ Ans.} \]

DE: \[ n = \frac{50}{(12^2 - (12)(12) + 12^2)^{1/2}} = 4.17 \text{ Ans.} \]

(b) MSS: \[ \sigma_1 = 12 \text{ kpsi}, \sigma_3 = 0, n = \frac{50}{12} = 4.17 \text{ Ans.} \]

DE: \[ n = \frac{50}{(12^2 - (12)(6) + 6^2)^{1/2}} = 4.81 \text{ Ans.} \]

(c) MSS: \[ \sigma_1 = 12 \text{ kpsi}, \sigma_3 = -12 \text{ kpsi}, n = \frac{50}{12 - (-12)} = 2.08 \text{ Ans.} \]

DE: \[ n = \frac{50}{(12^2 - (12)(-12) + (-12)^2)^{1/3}} = 2.41 \text{ Ans.} \]

(d) MSS: \[ \sigma_1 = 0, \sigma_3 = -12 \text{ kpsi}, n = \frac{50}{-(-12)} = 4.17 \text{ Ans.} \]

DE: \[ n = \frac{50}{(-6)^2 - (-6)(-12) + (-12)^2)^{1/2}} = 4.81 \text{ Ans.} \]

6-3 \[ S_y = 390 \text{ MPa} \]

MSS: \[ \sigma_1 - \sigma_3 = S_y/n \Rightarrow n = \frac{S_y}{\sigma_1 - \sigma_3} \]

DE: \[ (\sigma_A^2 - \sigma_B^2)^{1/2} = \frac{S_y}{n} \Rightarrow n = \frac{S_y}{(\sigma_A^2 - \sigma_B^2)^{1/2}} \]

(a) MSS: \[ \sigma_1 = 180 \text{ MPa}, \sigma_3 = 0, n = \frac{390}{180} = 2.17 \text{ Ans.} \]

DE: \[ n = \frac{390}{180^2 - 180(100) + 100^2)^{1/2}} = 2.50 \text{ Ans.} \]

(b) \[ \sigma_A, \sigma_B = \frac{180}{2} \pm \sqrt{\left(\frac{180}{2}\right)^2 + 100^2} = 224.5, -44.5 \text{ MPa} = \sigma_1, \sigma_3 \]

MSS: \[ n = \frac{390}{224.5 - (-44.5)} = 1.45 \text{ Ans.} \]

DE: \[ n = \frac{390}{180^2 + 3(100)^2)^{1/2}} = 1.56 \text{ Ans.} \]