

Cevap - 3

St 70 iain , $\sigma_{A2} = 360 \text{ MPa}$, $\sigma_k = 700 \text{ MPa}$

$D/d = 1.02$, $1/d = 0.1$, $S = 2$, $\alpha = 75$, $r = 2.5$

Çözüm: $M_e = 20 \times 10^3 \cdot 200 = 4000 \times 10^3 \text{ Nmm}$

$$\sigma_e = \frac{M_e}{\frac{\pi d^3}{32}} = \frac{4000 \times 10^3}{\frac{\pi \cdot 75^3}{32}} = 96.6 \text{ MPa}$$

$$\sigma_o = \frac{96.6}{2} = 48.3 \text{ MPa} \quad \text{ve} \quad \sigma_g = 48.3 \text{ MPa}$$

$$\sigma_o^* = \frac{K_y \cdot K_b}{K_a} \cdot \sigma_o$$

$$K_y = 0.89 \quad , \quad K_b = 0.75 \quad \sigma_o = 0.5 \cdot \sigma_k = 350 \text{ MPa}$$

$$K_a = 1 + q(K_t - 1) \Rightarrow K_t = 1.45 \quad q = 0.86$$

$$K_a = 1.387$$

$$\sigma_o^* = \frac{0.89 \cdot 0.75}{1.387} \cdot 350 = 168.4 \text{ MPa}$$

$$\sigma_{gs} = 48.3 + \frac{360}{168.4} \cdot 48.3 = 151.5 \text{ MPa}$$

Burulan: $\tau_b = \frac{M_b}{W_p} = \frac{800 \times 10^3}{\frac{\pi \cdot 75^3}{16}} = 9.65 \text{ MPa}$

Esdeğer: $\sigma_B = \sqrt{\sigma_{gs}^2 + 3 \cdot \tau_b^2} \leq \frac{\sigma_{A2}}{S}$

$$= 152.4 \stackrel{?}{\leq} 180 \Rightarrow \underline{\text{Emniyetli}}$$

Soru 4

a-) Birim delik sisteme göre yapılmıştır.

c-) Delik için ;

$$A_d = 0$$

$$T = 54 \mu\text{m}$$

$$\text{Delik tolerans sınırları} \rightarrow A_{d0} = 0 \quad A_{d00} = 54 \mu\text{m}$$

Mil için ;

$$A_a = 71 \mu\text{m}$$

$$T = 35 \mu\text{m}$$

$$\text{Mil tolerans sınırları} \rightarrow A_{a0} = T + A_a = 106 \mu\text{m}$$

$$A_{a00} = 71 \mu\text{m}$$

b-) $A_{a0} > A_{d00} \Rightarrow$ Sıkı geçmedir.

Cevap - 5

16 Mn Cr S için $\sigma_{A2} = 600 \text{ MPa}$

$$Z_{A2} = 0,5. \sigma_{A2} = 300 \text{ MPa}$$

$$S = 3 \quad \text{ve} \quad K_L = 0,8 \text{ (II. kalite)}$$

$$Z_{ken} = \frac{F}{2 \cdot a \cdot l_L} = \frac{F}{1,4 \cdot S \cdot l_L}$$

$$Z_{ken} = \frac{K_L \cdot Z_{A2}}{S}$$

$$Z_{ken} = \frac{0,8 \cdot 300}{3} = \underline{80 \text{ MPa}}$$

$$\Rightarrow l_L = \frac{100 \times 10^3}{1,4 \cdot 10 \cdot 80} = \underline{89,2 \text{ mm}}$$

$$L = l_L + 2a = 89,2 + 2 \cdot 0,2 \cdot 10 = \underline{103,28 \text{ mm}}$$