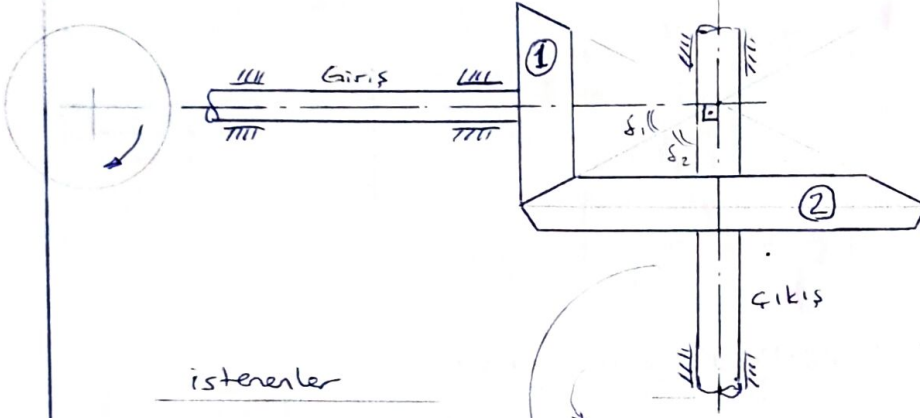


DÜZ KONİK DİSLİ ÖR.



verilenler

$$P_1 = 16 \text{ kW}$$

$$n_2 = 300 \text{ d/d}$$

$$b = 10 \text{ mm} \Rightarrow (\gamma_m = 10)$$

Dişli malz.: St 70

$$z_1 = 20 ; z_2 = 48$$

$$K_{Hf}(\text{kur}) \approx 1,4$$

$$K_{Hf}(\text{ez}) \approx 1,2$$

$$v \approx 5 \text{ m/s}$$

$$\alpha = 20^\circ$$

istenilenler

- δ_1 ve $\delta_2 = ?$
- Modülü belirleyiniz.
- Dişlilere etki eden kuvvetler ve yönleri?

Gözüm

$$a) \quad i = \frac{n_1}{n_2} = \frac{z_2}{z_1} = \frac{48}{20} = 2,4 \quad ; \quad i = \frac{1}{\tan \delta_1} = \tan \delta_2 = 2,4 \Rightarrow$$

$$\boxed{\delta_1 = 22,62^\circ} \quad ; \quad \boxed{\delta_2 = 67,38^\circ} \quad \left(n_1 = i \cdot n_2 = 2,4 \cdot 300 = 720 \text{ d/d} \right)$$

$$b) \quad \text{Kırılmağa göre: } m_m \geq \sqrt[3]{K_{Hf} \cdot K_{Hn} \cdot K_{Hd} \cdot \frac{0,2 \cdot M_{b1}}{z_1 \cdot \sigma_{em}} \cdot \frac{\gamma_F}{E_a}}$$

$$(b = 10 \text{ mm için})$$

$$\text{Ezilmeye göre: } m_m \geq \sqrt[3]{\frac{0,07 \cdot M_{b1} \cdot E_{et}}{z_1^2 \cdot \sigma_{Hem}^2} \cdot \frac{\sqrt{i^2 + 1}}{i} \cdot \frac{\gamma_c^2}{E_a}}$$

$$\left. \begin{array}{l} \text{Kırılmağa göre: } m_m \geq \sqrt[3]{K_{Hf} \cdot K_{Hn} \cdot K_{Hd} \cdot \frac{0,2 \cdot M_{b1}}{z_1 \cdot \sigma_{em}} \cdot \frac{\gamma_F}{E_a}} \\ \text{Ezilmeye göre: } m_m \geq \sqrt[3]{\frac{0,07 \cdot M_{b1} \cdot E_{et}}{z_1^2 \cdot \sigma_{Hem}^2} \cdot \frac{\sqrt{i^2 + 1}}{i} \cdot \frac{\gamma_c^2}{E_a}} \end{array} \right\} m = m_m \cdot \left(1 + \frac{10}{z_1} \cdot \sin \delta_1 \right)$$

$$v \approx 5 \text{ m/s} \rightarrow K_{Hn} = \frac{50 + v}{50} = 1,1 \quad ; \quad \gamma_m = 10 \rightarrow K_{Hd} = 1,1$$

$$M_{b1} = 9550 \cdot \frac{P_1}{n_1} = 9550 \cdot \frac{16}{720} = 208,2 \text{ N.m} \quad ; \quad \gamma_c^2 = 3,11$$

$$z_{e1} = \frac{z_1}{\cos \delta_1} = \frac{20}{\cos(22,62^\circ)} = 21,66 \rightarrow E_a = 1,66 \quad ; \quad \gamma_F = 2,85$$

$$\text{St 70} \rightarrow \sigma_{em} = 200 \text{ N/mm}^2 \quad ; \quad \sigma_{Hem} = 450 \text{ N/mm}^2 \quad ; \quad E_{et} = 210 \text{ kN/mm}^2$$

$$\text{Kır.} \rightarrow m_m \geq \sqrt[3]{1,4 \cdot 1,1 \cdot 1,1 \cdot \frac{0,2 \cdot 208,2 \cdot 10^3}{20 \cdot 200} \cdot \frac{2,85}{1,66}} = 3,16 \text{ mm}$$

$$\text{Ez.} \rightarrow m_m \geq \sqrt[3]{1,2 \cdot 1,1 \cdot 1,1 \cdot \frac{0,07 \cdot 208,2 \cdot 10^3 \cdot 210 \cdot 10^3}{20^2 \cdot 450^2} \cdot \frac{\sqrt{2,4^2 + 1}}{2,4} \cdot \frac{3,11}{1,66}} = 4,84 \text{ mm} \Rightarrow$$

$$m = 4,84 \cdot \left(1 + \frac{10}{20} \cdot \sin 22,62^\circ \right) = 5,77 \text{ mm} \xrightarrow{\text{st. değer}} \boxed{m = 6 \text{ mm}}$$

$$m = 6 \text{ mm} \text{ için } m_m = \frac{6}{1 + \frac{10}{20} \cdot \sin(22,62^\circ)} = 5,032 \text{ mm}$$