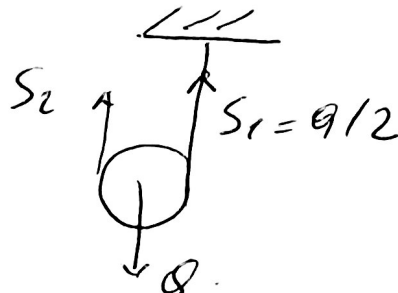


Problem 1.6

$$\eta_h = 0.98$$

$$\eta_s = 0.96$$

$$\eta_h = \frac{Q/2}{S_{max}}$$



Halenin boğalan tarafı,
her zaman daha büyük kuvvet uygulanır.
(Yataklardaki kayıplardan dolayı)

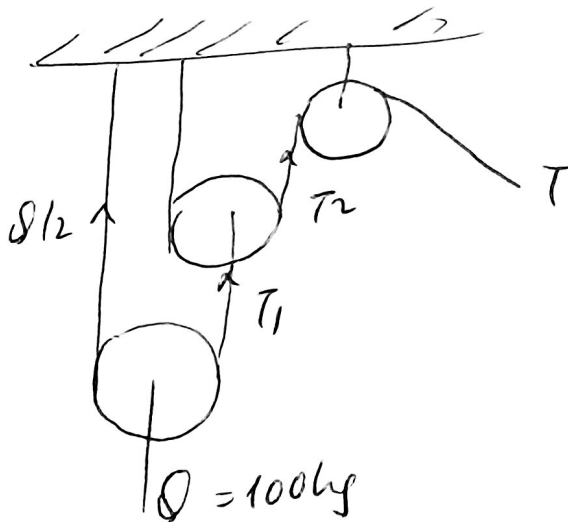
$$\eta_h = \frac{S_1}{S_2} \Rightarrow S_2 = \eta_{max} \cdot S_1$$

$$S_2 + S_1 = Q \Rightarrow S_2 + (\eta_{max} S_2) = Q$$

$$S_2 (1 + \eta_{max}) = Q$$

$$S_2 = \frac{Q}{(1 + \eta_{max})}$$

$$\eta_h = \frac{Q/2}{Q/(1 + \eta_{max})} = \frac{1 + \eta_{max}}{2} = 0.98$$



$$\eta_h = \frac{Q/2}{T_1}$$

$$T_1 = \frac{Q}{2} \cdot \frac{1}{\eta_h} = 51 \text{ kg}$$

$$T_2 = \frac{T_1}{2} \cdot \frac{1}{\eta_h} = \frac{51}{2} \cdot \frac{1}{0.98} = 26 \text{ kg}$$

$$T = \frac{T_2}{\eta_s} = \frac{26}{0.96} = 27 \text{ kg}$$

$$\text{Sistem Toplam Verim} = 0.98 \cdot 0.98 \cdot 0.96 = 0.92$$

Problem 1.6 devam

ilk olarak aletle
1x19 Monokron kablolar

(2)

Qapını bulunur?

Sensiyetli en ucuz halat seçeriz

(180 kg/mm²) olanlar da halat
(2M iletme derecesi
guruğu)

(Yükseklik
kordonlu)

$$d = k \sqrt{s_{max}} \quad \#$$

$$k = 0,3$$

$$d = 0,3 \sqrt{51} = 2,14 \text{ mm}$$

$$s = \frac{F_{max}}{s_{max}} = \frac{851}{51} = 16$$

Aok sensiyetli

Polipropilen

$$s = \frac{F_{max}}{s_{max}}$$

$$= \frac{600 \text{ kg}}{51}$$

$$= 11,7 > 5 \text{ sensiyetli}$$

d = 6 mm
seçilm

7x19 Polyester halat

d = 3 mm ren

$$s = \frac{F_{max}}{s_{max}}$$

$$= \frac{477 \text{ kg}}{51} = 9,3$$

uygun

Slayt Problem 1

3

$$D_{tam} = 150 \text{ mm} \quad K = 200 \text{ N} \quad L_{kol} = 135 \text{ mm} \quad z_1 = 14$$

$$z_2 = 49$$

$$\eta_{t_1} = 0,97 \quad \eta_{t_{tam}} = 0,96$$

(2 Misletne gurubu)

$$a) \quad \underline{\delta = ?} \quad i = \frac{M_{tam}}{M_{el} \eta_{kp}} = \frac{\delta \cdot D_{tam} / 2}{K \cdot L \cdot \eta_{kp}}$$

$$\eta_{kp} = 0,97 \cdot 0,96 = 0,93$$

$$i = \frac{z_2}{z_1} = \frac{49}{14} < 3,5 \quad i = 3,5$$

$$a) \quad \underline{\delta = 0,93 \cdot 3,5 \cdot 200 \cdot 135 \cdot 2} = 1171,8 \text{ N}$$

$$s = 5 \text{ (Gerekti emayet)} \quad 150$$

$$d = k \sqrt{s_{max}} = 3,24 \text{ mm}$$

b)

Endüstriyel metal kalot
seme?
(160 kg/m²)

$$1 \times 7 \text{ Monoton}$$

$$F_{mm} = 1070 \text{ kg}$$

$$s = \frac{F_{mm}}{\delta}$$

$$s = \frac{1070}{117,18} = 9,13 \text{ Emayet}$$

Dolgu Faktörünü bulunuz?

c) Tel gapını bulunuz?

$$A_{net} = 7 \times 1 \cdot \frac{\pi d^2}{4}$$

$$A_{met} = \frac{F_{mm}}{\sigma_{hej}} = \frac{1070}{160} = 6,68 \text{ mm}^2$$

$$d_{tel} = 1,1 \text{ mm}$$

$$w = \frac{A_{net}}{A_{teorik}} = \frac{6,68}{\pi (3,5)^2} = 0,169$$

Problem 1.7 $Q = 200 \text{ kN}$ $t = 4$ $2M$ işletme grubu 4
 $\sigma_{\text{kop}} = 160 \text{ kg/mm}^2$

$$\tau = \frac{Q}{n} = \frac{20000}{4} = 5000 \text{ kg} = \tau_{\text{max}} \quad d = ?$$

a) $2M$ işletme grubu $k = 0.3$ Cetvel 1.6

$$d = k \sqrt{\tau_{\text{max}}} = 0.3 \sqrt{5000} = 21.21 \text{ mm}$$

$6 \times 19M$ tps halat seçiniz (Lipözlü halat)
 Enniyet katsayısı τ_{iam} seçiniz (160 kg/mm^2)
 1. h. halat

$$F_{\text{min}} = 23800 \text{ kg}$$

$$s = \frac{F_{\text{min}}}{\tau_{\text{max}}} = \frac{23800}{5000} = 4.76$$

uygun değil

$$s = \frac{28300}{5000} = 5.66 > 5 \text{ uygundur}$$

$d = 24 \text{ mm}$ / h
 halat seçildi

Halat dolgu Faktörü?

b) Tel çapını bulunuz?

$$A_{\text{met}} = \frac{F_{\text{min}}}{\sigma_{\text{kop}}} =$$

$$\frac{28300}{160} = 176.875 \text{ mm}^2$$

$$A_{\text{met}} = \left(\frac{\pi \cdot d^2}{4} \right) \cdot 6 \times 19 = 176.875 \quad d = 1.6 \text{ mm}$$

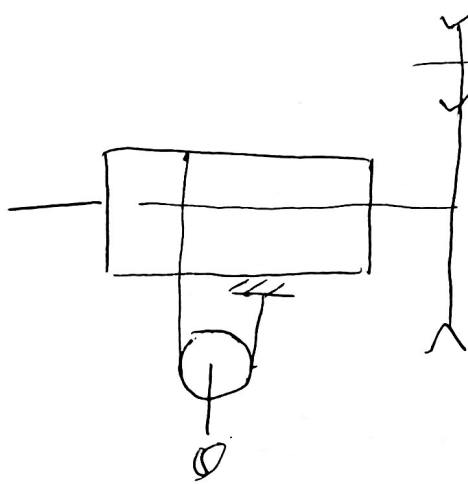
$w =$ Dolgu Faktörü

$$w = \frac{A_{\text{met}}}{A_{\text{teorik}}}$$

$$w = \frac{176.875}{160}$$

$$w = \frac{176.875}{\pi \cdot (24)^2} \cdot 4 = 0.391$$

Problem 2



$$L = 350 \text{ mm}$$

(5)

$$K = 200 \text{ N}$$

$$z_1 = 18 \quad z_2 = 54$$

$$z_3 = 14 \quad z_4 = 56$$

$$D_t = 200 \text{ mm}$$

2 Missetme grubu lam

(180 kg/mm² S=6 emniyetli)

b) kalot aapını bulunuz?

a) kaldırılacak Yüke bulunuz?

$$\frac{\sigma/2}{S_{ma}} = \gamma_h$$

$$\gamma_h = 1 + \frac{\gamma_{smak}}{2} = 0,98$$

γ_{smak}
Keyme
= 0,96

$$\gamma_{rul} = 0,98$$

$$S_{max} = \frac{\sigma}{2 \gamma_h} =$$

$$M_t = \frac{S_{max} \cdot D_t}{2}$$

$$M_d = 2 \cdot K \cdot L$$

$$i = \frac{z_2}{z_1} \cdot \frac{z_4}{z_3} = \frac{54}{18} \cdot \frac{56}{14} = 3 \cdot 4 = 12$$

$$i = \frac{M_t}{M_d \gamma_{top}} = \frac{n \cdot l}{\lambda t}$$

$$12 - (2 \cdot 200 \cdot 0,35) \cdot \gamma_{top} = M_t$$

$$\gamma_{top} = \gamma_{tan} \gamma_{dis1} \cdot \gamma_{dis2} \gamma_{ek} = 0,849$$

$$= 0,96 \cdot 0,96 \cdot 0,96 \cdot 0,96$$

$$M_t = 24 \cdot 70 \cdot 0,849 = 1426 \text{ Nm}$$

$$M_t = \frac{\sigma \cdot D_t}{2} \Rightarrow \frac{\sigma}{S_{max}} = \frac{2 \cdot 1426}{0,2} \Rightarrow$$

$$S_{max} = 14263,2 \text{ N}$$

$$\sigma = 2 \cdot 14263,2 \cdot 0,98 = 27955,87 \text{ N} = 27,9 \text{ kN}$$

kalot aapını bulunuz?

$$d = k \sqrt{S_{max}} = 11,32 \text{ mm}$$

$$0,13 \quad 1426,32$$

tablodan S=6 emniyetli lam kontrol ediniz.

Prb3

• ①

$$z_1 = 25 \quad z_2 = 65 \quad z_3 = 21 \quad z_4 = 72$$

$$z_5 = 14 \quad z_6 = 70$$

$$\gamma_{dis} = 0,97 \quad \gamma_{dis} = 0,94 \quad \gamma_{dis} = 0,94$$

a) $\theta = 3$ ton Yükleme $d = ?$ $D_{tan} = ?$
(2M 6x19 Filler)

$$d = k \sqrt{S_{max}}$$

$$k = 0,3$$

$$s = 8$$

Lif Östü

$$d = 0,3 \sqrt{3000} = 16,43 \text{ l}$$

$$s = \frac{F_{min}}{S_{max} = 4}$$

$$= \frac{17600}{3000} = 5,8$$

definin $S_{max} = 4$

$$d = 20 \text{ mm iken } s = \frac{24300}{3000} > 8 \quad d = 22 \text{ mm}$$

seçildi:

$$D = H_1 \cdot H_2 \cdot d$$

" " "

16 1 20mm

1 ton bur
 $H_2 = 2$

$$= 360 \text{ mm}$$

b) $n_4 = 25$ dld için

Prb3

(2)

$$n_m = ?$$

$$i = \frac{z_2}{z_1} \cdot \frac{z_4}{z_3} \cdot \frac{z_6}{z_5} = \frac{65}{25} \cdot \frac{32}{21} \cdot \frac{70}{74}$$

$$= 44 = \frac{n_m}{n_4} \cdot 25$$

$$n_m = 1114.2$$

dld

c) $V_{y\ddot{u}k} = ?$

$$V_{tam} = V_{y\ddot{u}k}$$

$$= \frac{\pi \cdot D_{tam} \cdot n_{tam}}{60}$$

$$= \frac{\pi \cdot 0.36 \cdot 25}{60} = 0.471 \text{ m/s}$$

d) $N_{mot} = ?$

$$1) N_{mot} = \frac{Q \cdot V_{y\ddot{u}k}}{1000 \cdot \eta_{op}}$$

$$N_{mot} = \frac{30000 \cdot 0,471}{1000 \cdot \eta_{tot}} \quad P_{ib?} \quad (3) \quad \eta_1 = 0,96$$

$$\eta_{tot} = \eta_1 \cdot \eta_{dis1} \cdot \eta_{dis2} \cdot \eta_{dis3} = 0,79$$

$\overset{''}{0,96} \quad \overset{''}{0,97} \quad \overset{''}{0,94} \quad \overset{''}{0,91}$

$$N_{mot} = 17,88 \text{ kW}$$

$$i = \frac{M_{tan}}{M_{mot} \cdot \eta_{tot}} \quad i = 46 \quad M_{tan} = Q \cdot \Delta t / 2$$

$$M_{tan} = \frac{30000 \cdot 0,136}{2} = 5400 \text{ Nm}$$

$$M_{mot} = \frac{5400}{46 \cdot 0,79} = 155 \text{ Nm}$$

$$M_{mot} = 9550 \frac{N}{n} \quad N_{mot} = 18 \text{ kW}$$

Problem 4 devam

$$V_{AS} = 0,5 \text{ m/s}$$

$$K = 5000 \text{ N} \quad \textcircled{6} \quad \frac{z}{2} = 4$$

$S = 15 \text{ lam}$ holat qopini bulunuz? 2 M. istekme gurubu

a) $d = k \sqrt{\frac{S_{max}}{0,3}} \quad \eta_{top} = 0,30 \quad i = 6 \text{ ihsan sayisi}$ $6 \times 13 \text{ Filler Trip}$
 1800 MPa 11.6 holat

$$S_{max} = \frac{S_r}{\frac{z}{2}} = (K + \theta) \left(1 + \frac{b}{g}\right)$$

$\frac{z}{2} = \text{holat sayisi}$

$$b = \frac{V_{AS}^2}{g} = \frac{0,5^2}{9,81} = 0,025 \text{ m/s}^2$$

~~§~~ $\theta = 0$

$$\theta = i \cdot G_{hsan} = 4800 \text{ N}$$

$\frac{1}{6} \quad "80 \text{ kg}$

$$S_{max} = \frac{(5000 + 4800) \left(1 + \frac{0,025}{9,81}\right)}{4}$$

$$= \frac{10060}{4} = 2520 \text{ N} \quad d = k \sqrt{252} = 4,76 \text{ mm}$$

$d = 8 \text{ mm}$ ilk holat secildi $\frac{z}{2}$

$$S = \frac{F_{max}}{S_{max} \times 252}$$

b) Tahrikli Karnaği qopini bulunuz? $D_{th} = 40 d_h \geq 320 \text{ mm}$
Kosnoli devir sayisini ve $\frac{1}{8} \quad 400 \text{ mm}$
alindi
 $n_m = 1000 \text{ d/d lam}$ $l_{su} = ?$

$$V_{karneli} = V_{AS} = 0,5 \text{ m/s} = \frac{\pi \cdot D_{th} \cdot n_{th}}{60} \Rightarrow \frac{500 \cdot 60}{400 \pi} = 23,5 \text{ d/d}$$

$$i = \frac{n_m}{n_{th}} = \frac{1000}{23,5} \approx 40 \text{ bulunur}$$

c) Motor gucu bulunuz?

$$N = \frac{P \cdot Q \cdot 10^{-3}}{\eta_{top} = 0,30}$$

$$P = K + \theta - G_k$$

$$\Rightarrow G_k = K + \theta / 2$$

$$P = \theta / 2$$

$$N = \frac{2400 \cdot 0,5 \times 10^{-3}}{0,3} \approx 4 \text{ kW}$$