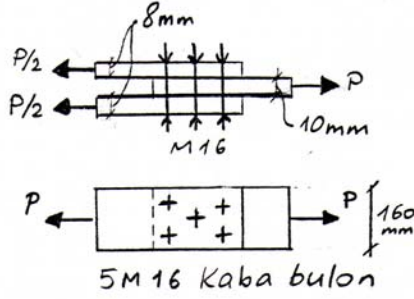


UYGULAMA 3 KESME KUVVETİ ETKİSİ

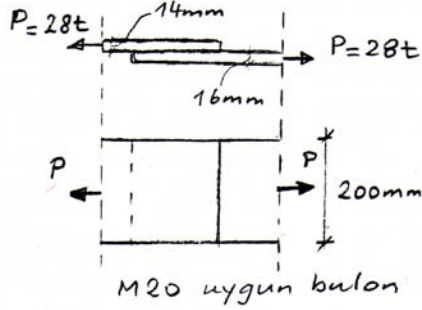
①



Sekilde verilen birleşimin taşıyabileceği en büyük P kuvvetini hesaplayınız.

$$\begin{cases} \text{bulonda} \left\{ \begin{aligned} \tau_{a,emn} &= 1,12 \text{ t/cm}^2 \\ \sigma_{l,emn} &= 2,4 \text{ t/cm}^2 \end{aligned} \right. \\ \text{levhada} \left\{ \begin{aligned} \tau_{emn} &= 1,4 \text{ t/cm}^2 \end{aligned} \right. \end{cases}$$

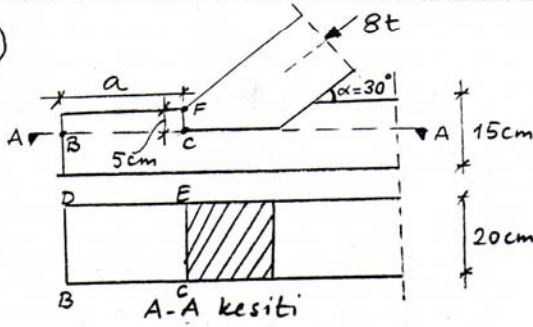
②



Sekilde verilen uygun bulonlu birleşimde, taşıyabilecek en büyük P yükü 28 t olduğuna göre, kullanılması gereken, uygun bulon sayısını saptayınız.

$$\begin{aligned} \tau_{a,emn} &= 1,12 \text{ t/cm}^2 \\ \sigma_{l,emn} &= 2,4 \text{ t/cm}^2 \\ \tau_{emn} &= 1,4 \text{ t/cm}^2 \end{aligned}$$

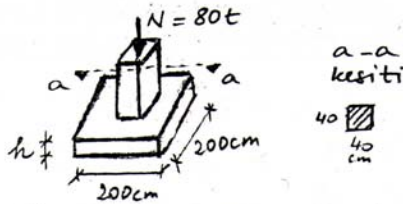
③



$$\begin{aligned} \tau_{emn} &= 120 \text{ kg/cm}^2 \\ \tau_{emn} &= 12 \text{ kg/cm}^2 \end{aligned}$$

Sekilde ölçüleri verilen ahşap çatı makası detayında,
a) CF yüzeyindeki ezilme gerilmesini,
b) BCDE yüzeyindeki a uzunluğunu hesaplayınız.

④



$$\text{Zeminde: } (\sigma_z)_{emn} = 2,5 \text{ kg/cm}^2$$

$$\left\{ \begin{aligned} \sigma_b &= 2,4 \text{ t/m}^2, \tau_{emn} = 5 \text{ kg/cm}^2 \text{ betonunda} \end{aligned} \right.$$

Sekilde yükleme durumu ve ölçüleri verilen betonarme kolon temelinde,
a) h temel yüksekliğini
b) Temel altındaki en büyük zemin gerilmesini hesaplayınız.

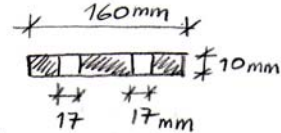
UYGULAMA 3 ÇÖZÜMLERİ

$$\textcircled{1} \left\{ \begin{array}{l} P_{1emna} = 2 \times \pi \times \frac{1,6^2}{4} \times 1,12 = 4,50 t \\ P_{1emne} = 2,4 \times 1 \times 1,6 = 3,84 t \\ P_{1emn} = 3,84 t \\ P_{max} = 3,84 \times 5 = 19,2 t \end{array} \right\}_{min}$$

bulon

levha :

$$A_{net} = 16 \times 1 - 2 \times 1 \times 1,7 = 12,6 \text{ cm}^2$$



$$P_{max} = 12,6 \times 1,4 = 17,64 t$$

$$P_{max} = \left(\begin{array}{l} 19,2 t \\ 17,64 t \end{array} \right)_{min} = \underline{\underline{17,64 t}}$$

$$\textcircled{2} \text{ bulon : } P_{1emna} = \frac{1 \times \pi \times (2,1)^2}{4} \times 1,12 = 3,88 t$$

$$P_{max} = \left(\begin{array}{l} 3,88 \times n \\ 6,72 \times n \end{array} \right)_{min}$$

$$P_{1emne} = 1,4 \times 2,1 \times 2,4 = 6,72 t$$

$$P_{max} = 3,88 \times n$$

levha : $P_{max} = [20 \times 1,4 - n' (2,1 \times 1,4)] \times 1,4$

$$P_{max} = \underline{\underline{39,2 - 4,12 n'}}$$

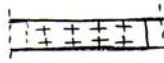
$$3,88 n = 28$$

$$n > 7,22$$

$$39,2 - 4,12 n' = 28$$

$$n' < 2,72$$

8 M 20 uygun bulon



↑ kısıt

$$\textcircled{3} \begin{array}{l} 4t \quad 8t \\ \swarrow \quad \searrow \\ 30^\circ \\ \swarrow \quad \searrow \\ 6,93t \end{array}$$

$$a) \tau_{max} = \frac{6,93 \cdot 10^3}{5 \cdot 20} = 69,3 \text{ kg/cm}^2 < 120 \text{ kg/cm}^2$$

$$b) \tau_{max} = \frac{6,93 \cdot 10^3}{a \cdot 20} \leq 12 \Rightarrow a = 28,88 \text{ cm} \\ a \approx 30 \text{ cm}$$

$$\textcircled{4} a) \tau_{max} = \frac{N}{4 \times h \times b} \leq \tau_{emn} \Rightarrow \frac{80 \cdot 10^3}{4 \cdot h \cdot 40} \leq 5 \Rightarrow h = 100 \text{ cm}$$

$$b) \Sigma N = 80 + 2 \cdot 2 \cdot 1 \cdot 2,4 = 89,6 t$$

$$(\tau_{max})_{\tau_{emin}} = \frac{89,6 \cdot 10^3}{200 \cdot 200} = 2,24 \text{ kg/cm}^2 < 2,50 \text{ kg/cm}^2$$