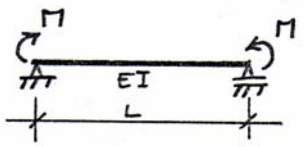
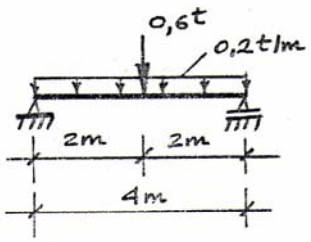
UYGULAMA 7
ELASTİK EĞRİ

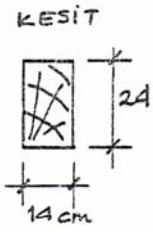
1-)



Şekilde verilen sistemde açıklık ortasındaki çökmeyi ve mesnetlerdeki dönme açısını hesaplayınız.

2-)

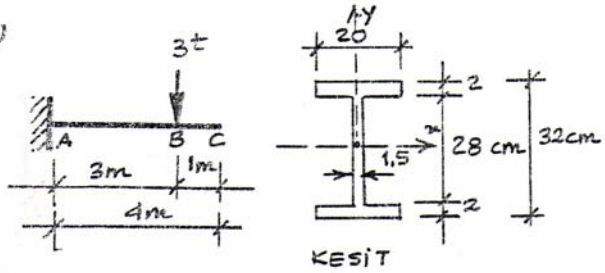




Şekilde ölçüleri ve yükleme durumu verilen döşeme kirişinde gerekli kontrolları yapınız.

$\sigma_{em} = 120\ kg/cm^2$, $\tau_{em} = 12\ kg/cm^2$, $f_{em} = L/300$, $E = 10^5\ kg/cm^2$

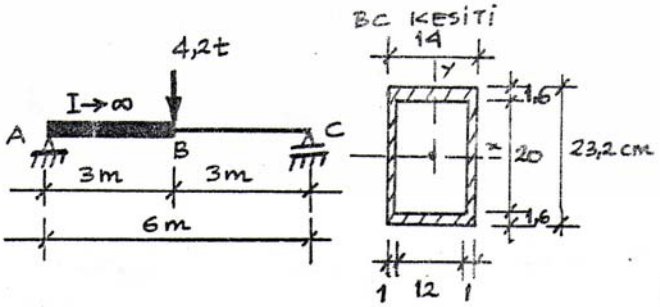
3-)



Şekilde verilen konsol kirişte,
a-) Gerekli geri lme kontrollarını yapınız.
b-) B ve C noktasının çökmesini, C noktasının dönme açısını hesaplayınız.

$\sigma_{em} = 1{,}4\ t/cm^2$, $\tau_{em} = 0{,}9\ t/cm^2$, $f_{em} = L/250$, $E = 2{,}1 \times 10^6\ kg/cm^2$.

4-)

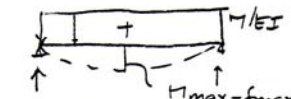


Şekilde verilen sistemde,
a-) Gerekli gerilme kontrollarını yapınız.
b-) B noktasının çökmesini, A ve C noktalarının dönme açılarını hesaplayınız.

$\sigma_{em} = 1400\ kg/cm^2$, $\tau_{em} = 900\ kg/cm^2$
$E = 2{,}1 \times 10^6\ kg/cm^2$, $f_{em} = L/300$

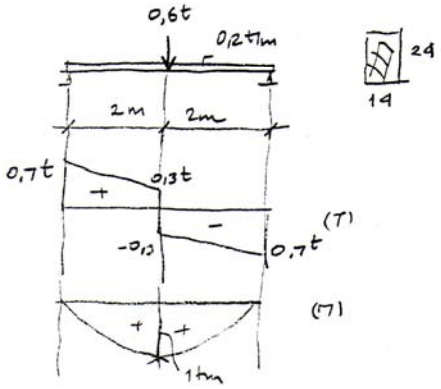
UYGULAMA 7 ÇÖZÜMLERİ

1-)



$\theta_A = \frac{ML}{2EI}$ ↓

2-)



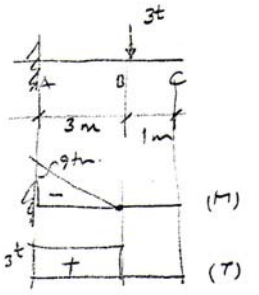
$\sigma_{max} = \frac{1 \times 10^5}{14 \cdot 24^2/6} = 74$ Atoy/cm² < 120 kg/cm² ✓

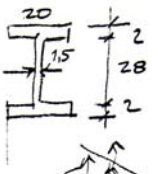
$\tau_{max} = 1{,}5 \cdot \frac{700}{14 \cdot 24} = 3{,}13$ kg/cm² < 12 kg/cm² ✓

$f_{max} = \frac{5}{384} \cdot \frac{2.400^4}{10^5 \cdot 14.24^3/12} + \frac{600 \cdot 100^3}{48 \cdot 10^5 \cdot 14.24^3/12} = 0{,}91$ cm

$f_{sın} = 400/300 = 1{,}33$ $\quad 0{,}91 < 1{,}33$ ✓

3-)





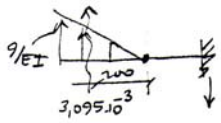
$I_x = 20770{,}67$ cm⁴.

$A = 122$ cm²

$W_x = 1298{,}17$ cm³

$\sigma_{max} = \frac{900}{1298{,}17} = 0{,}69 < 1{,}40$ ✓

$\tau_{max} = \frac{3 \cdot 787{,}5}{20770{,}67 \cdot 1{,}5} = 0{,}07 < 0{,}$

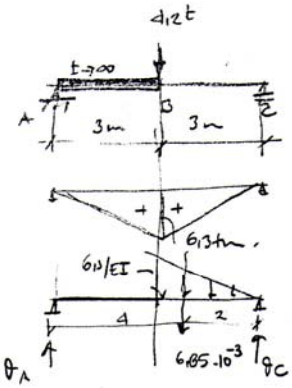


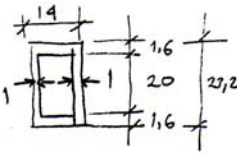
$\theta_C = 3{,}095 \cdot 10^{-3}$ radyan.

$f_B = 3{,}095 \cdot 10^{-3} \cdot 200 = 0{,}619$ cm ↓

$f_C = 3{,}095 \cdot 10^{-3}(200+100) = 0{,}929$ cm ↓ $< 400/250 = 1{,}60$ cm ↓

4-)





$I_x = 6568{,}36$ cm⁴.

$W_x = 566{,}24$ cm³ ↓

$\theta_A = \frac{2}{6} \cdot 6{,}85 \cdot 10^{-3} = 2{,}28 \cdot 10^{-3}$ rad. → $f_B = \theta_A \cdot 300 = 0{,}69$ cm ↓

$\theta_C = \frac{4}{6} \cdot 6{,}85 \cdot 10^{-3} = 4{,}57 \cdot 10^{-3}$ rad. ↓

$\sigma_{max} = \frac{630}{566{,}24} = 1{,}11$ t/cm² < 1,40 ✓

$\tau_{max} = \frac{2{,}1 \cdot 341{,}92}{6568{,}36 \cdot 2} = 0{,}05$ t/cm² < 0,9 ✓