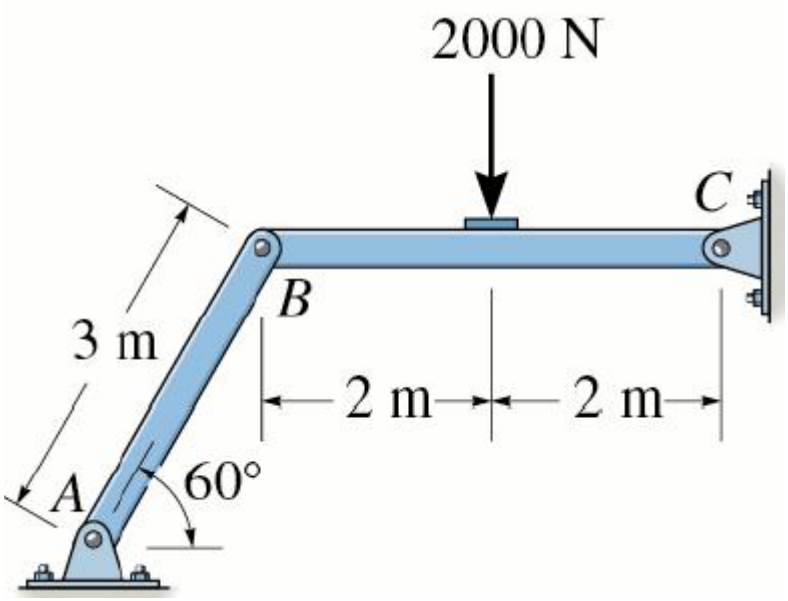
YAPILARIN ANALİZİ

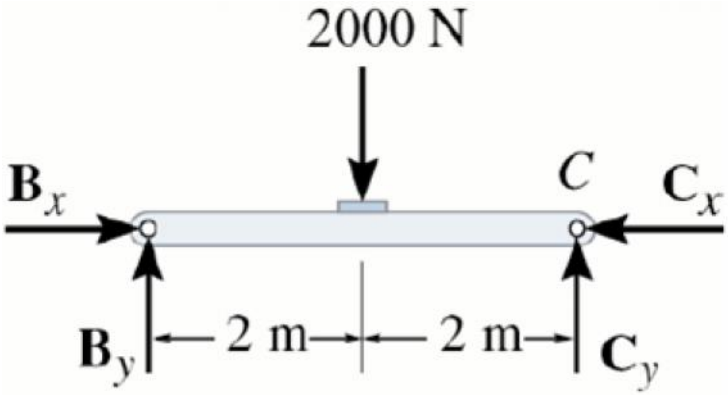
Örnek

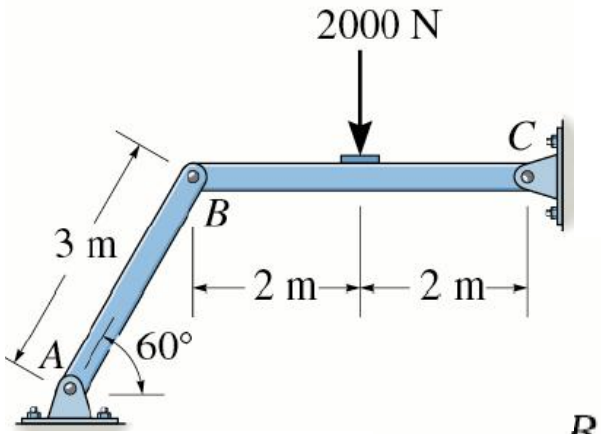


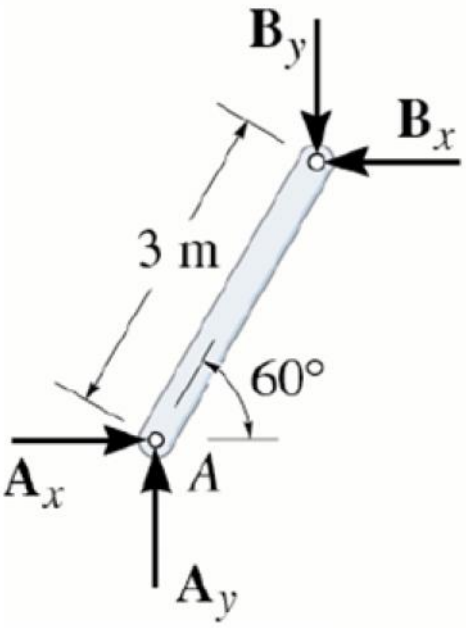
Yandaki çerçeve elemanlarında mesnet tepkilerini bulunuz.

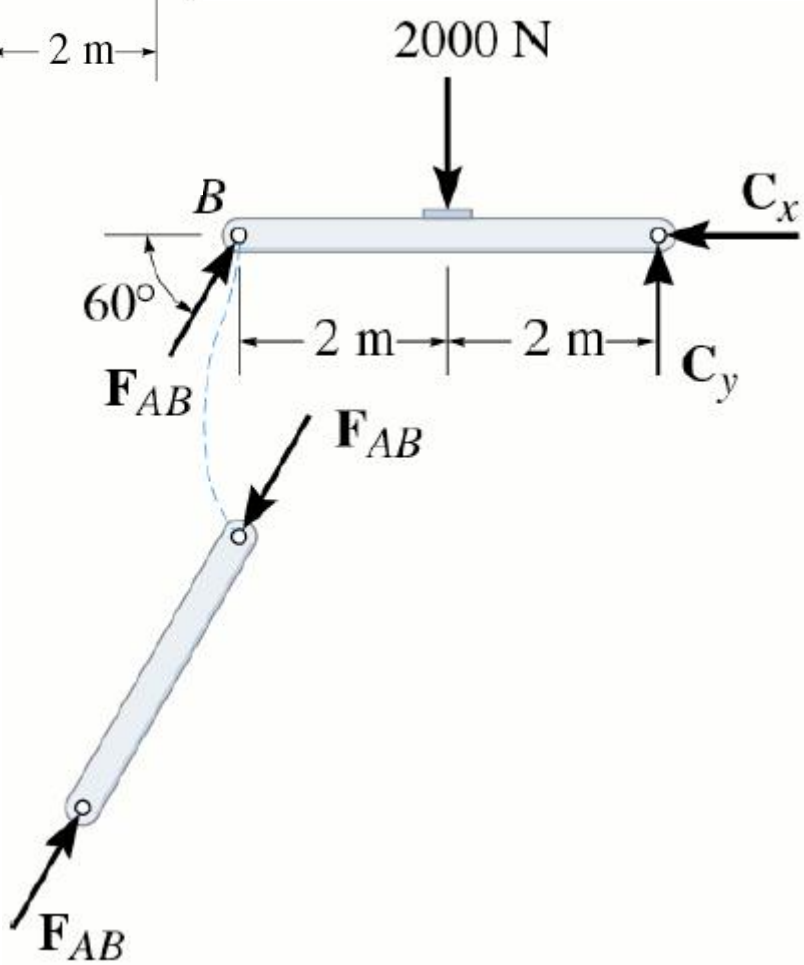
YAPILARIN ANALİZİ

Çözüm



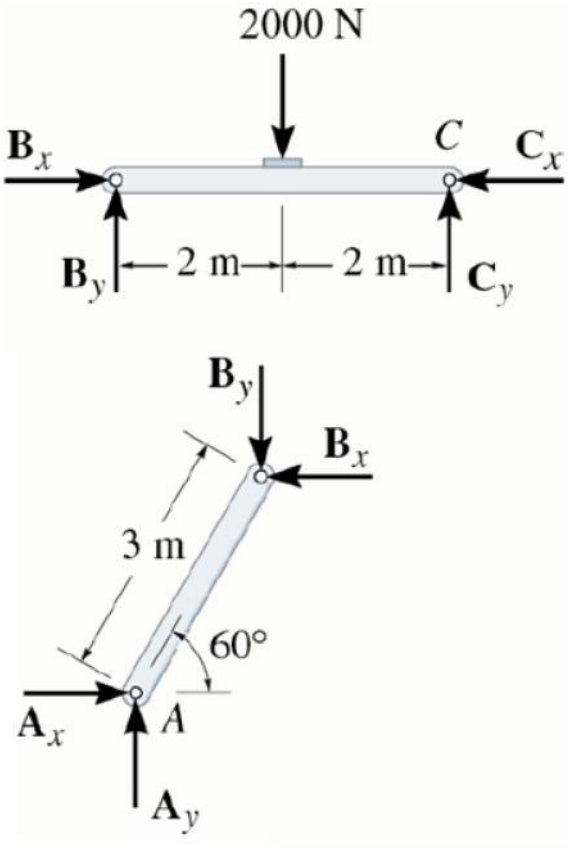






YAPILARIN ANALİZİ

Çözüm



$$\sum M_B = 0$$

$$-2000(2) + C_y(4) = 0$$

$$C_y = 1000\ N$$

$$\sum F_y = 0$$

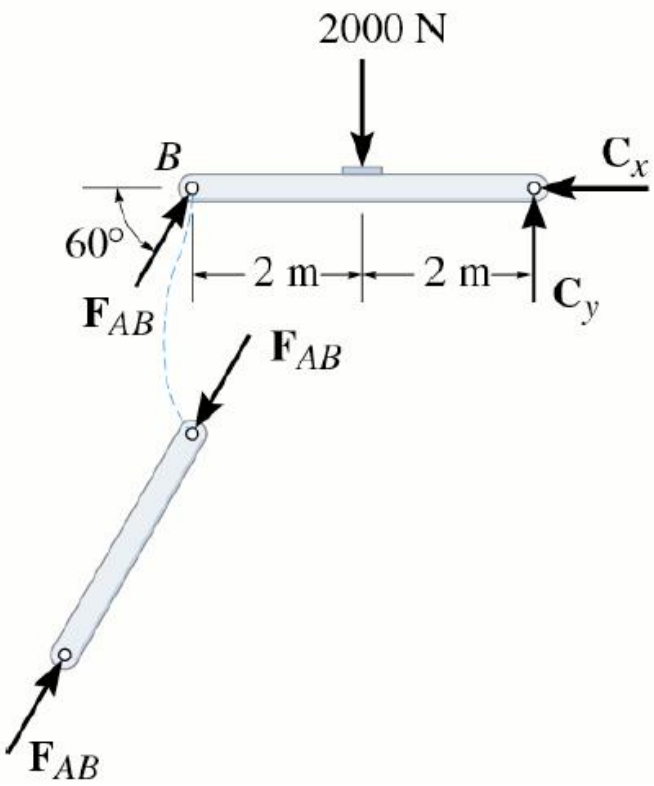
$$F_{AB}\sin 60^\circ + C_y - 2000 = 0$$

$$F_{AB} = 1154.7\ N$$

$$\sum F_x = 0$$

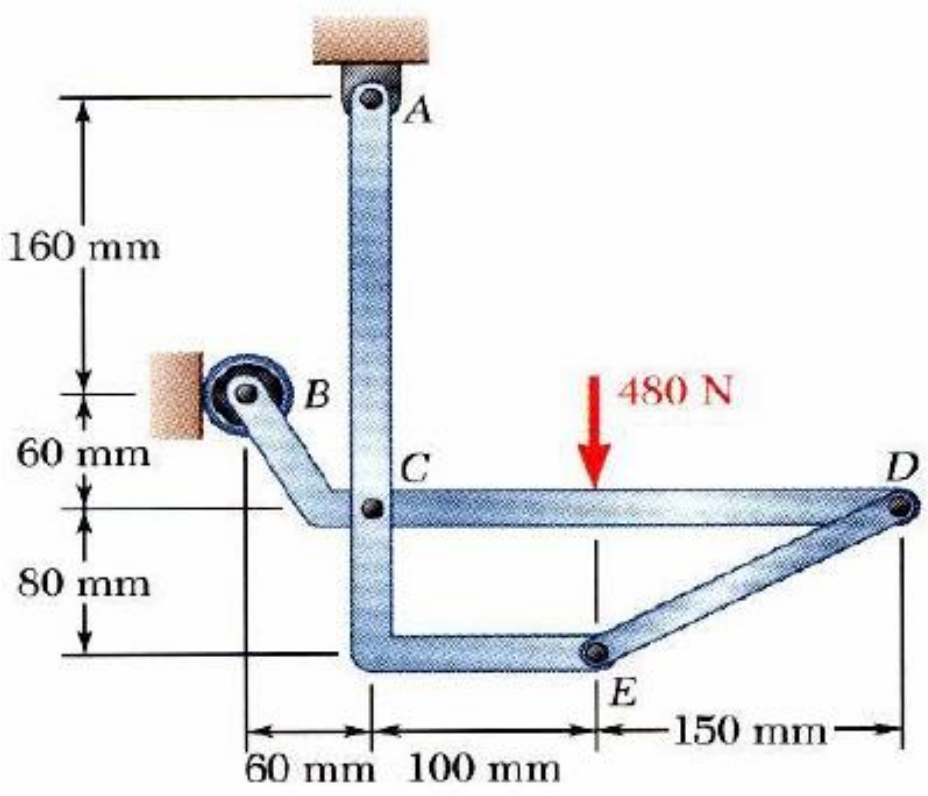
$$F_{AB}\cos 60^\circ - C_x = 0$$

$$C_x = 577.4\ N$$



YAPILARIN ANALİZİ

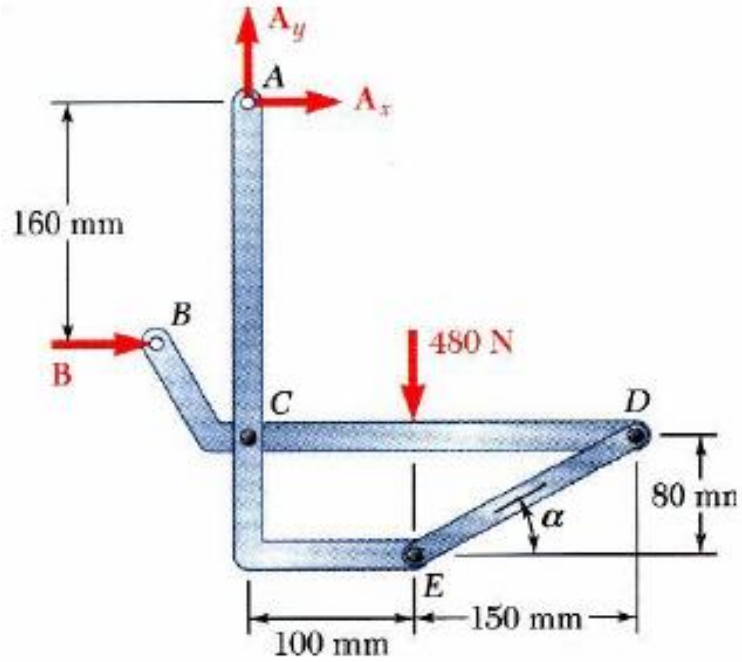
Örnek



Şekildeki çerçevede *ACE* ile *BCD* elemanları *C* noktasından bir pimle, ayrıca *DE* çubuğuyla bağlıdır. Verilen yüklemeye göre, *DE* çubuğundaki kuvveti ve C noktasında *BCD* elemanına gelen kuvvetin bileşenlerini hesaplayınız.

YAPILARIN ANALİZİ

Çözüm



$$\sum F_y = 0 = A_y - 480\ \text{N} \qquad \boxed{A_y = 480\ \text{N} \uparrow}$$

$$\sum M_A = 0 = -(480\ \text{N})(100\ \text{mm}) + B(160\ \text{mm})$$

$$\boxed{B = 300\ \text{N} \rightarrow}$$

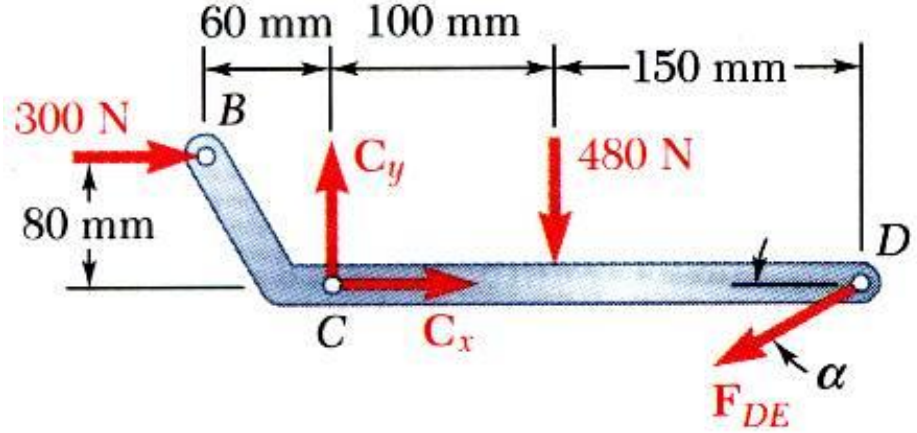
$$\sum F_x = 0 = B + A_x \qquad \boxed{A_x = -300\ \text{N} \leftarrow}$$

$$\alpha = \tan^{-1}\frac{80}{150} = 28.07^\circ$$

YAPILARIN ANALİZİ

Çözüm

BCD elemanı için SCD çizilir. *DE* çubuğundan gelen kuvvetin tesir çizgisi bellidir ama şiddet ve yönü belli değildir. Bunun için C noktasına göre moment denge denklemi kullanılabilir.



$$\sum M_C = 0 = (F_{DE}\sin\alpha)(250\text{ mm}) + (300\text{ N})(60\text{ mm}) + (480\text{ N})(100\text{ mm})$$

$$F_{DE} = -561\text{ N} \qquad \boxed{F_{DE} = 561\text{ N } C}$$

$$\sum F_x = 0 = C_x - F_{DE}\cos\alpha + 300\text{ N}$$

$$0 = C_x - (-561\text{ N})\cos\alpha + 300\text{ N} \qquad \boxed{C_x = -795\text{ N}}$$

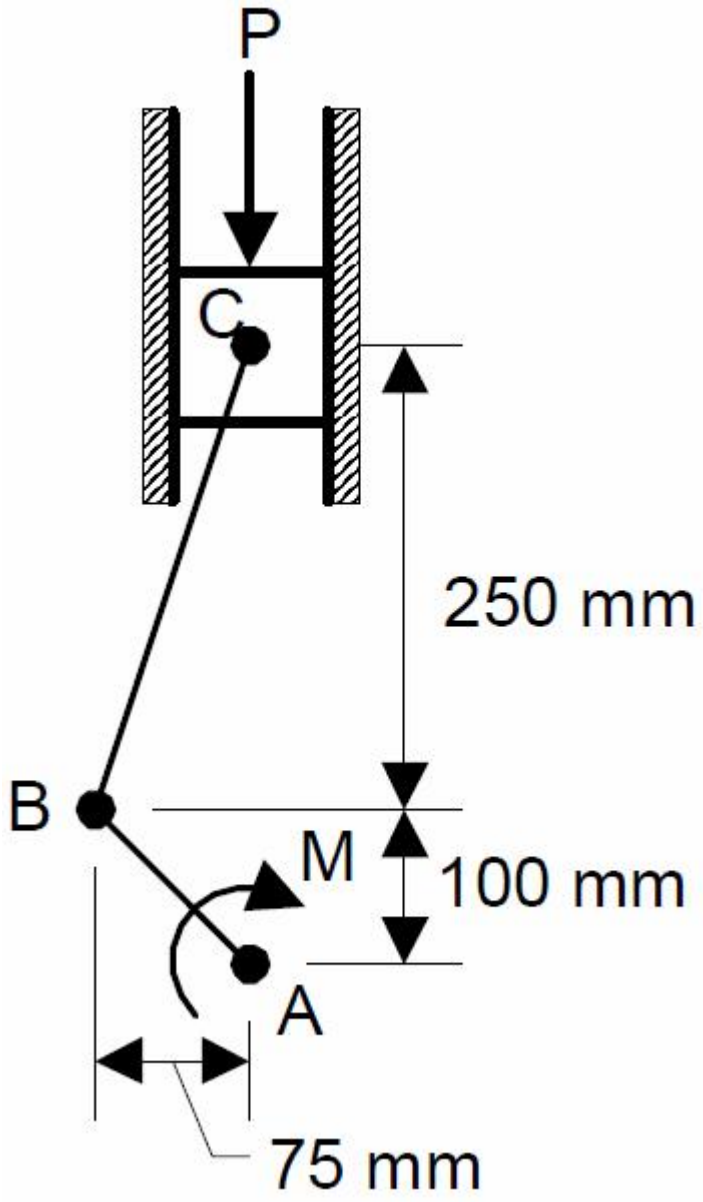
$$\sum F_y = 0 = C_y - F_{DE}\sin\alpha - 480\text{ N}$$

$$0 = C_y - (-561\text{ N})\sin\alpha - 480\text{ N} \qquad \boxed{C_y = 216\text{ N}}$$

YAPILARIN ANALİZİ

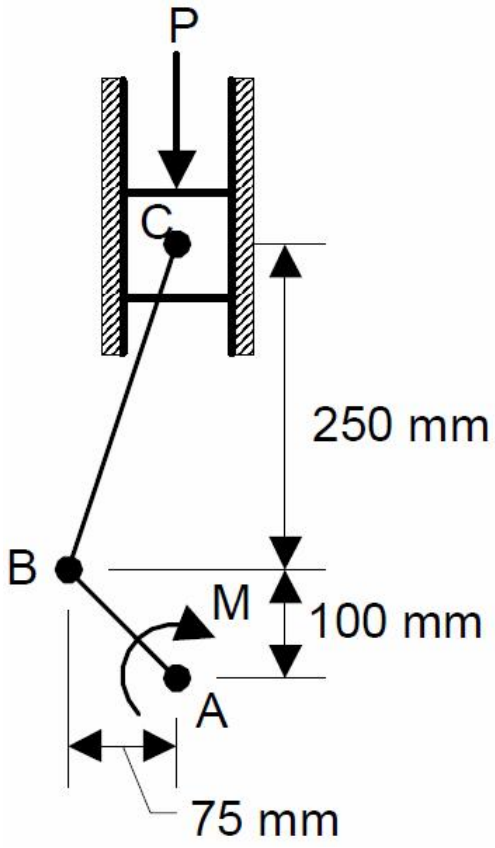
Örnek

2.4 kN şiddetinde bir P kuvveti, şekilde gösterilen motor sisteminin pistonuna etkimektedir. Sistemi dengede tutacak olan M momentini bulunuz.

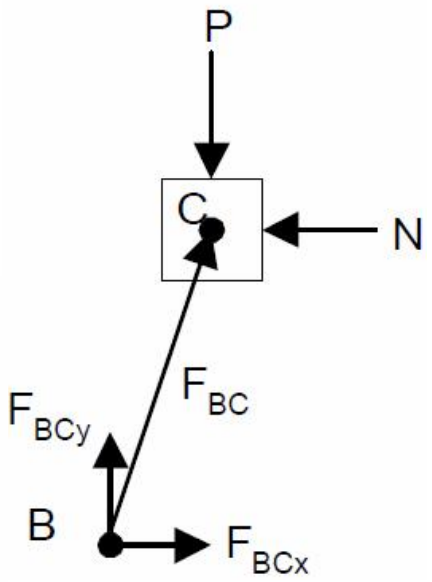


YAPILARIN ANALİZİ

Çözüm



Piston SCD



$$\Sigma F_y = 0$$

$$F_{BCy} - P = 0$$

$$F_{BCy} = P$$

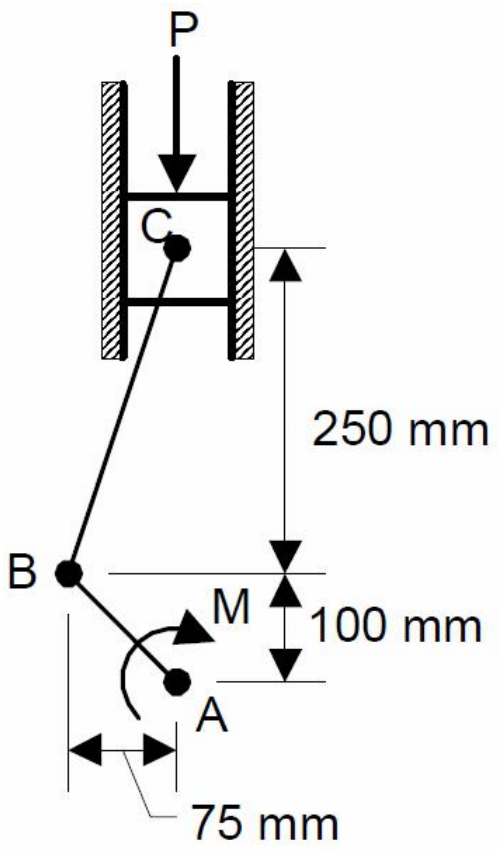
$$BC = \sqrt{75^2 + 250^2} = 261$$

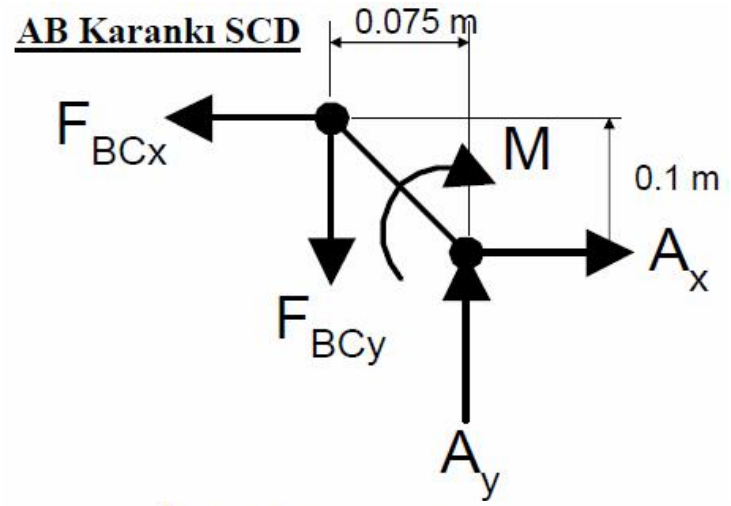
$$F_{BCy} = F_{BC}\left(\frac{250}{261}\right) \Rightarrow F_{BC} = F_{BCy}\left(\frac{261}{250}\right)$$

$$F_{BCx} = F_{BC}\left(\frac{75}{261}\right) = F_{BCy}\left(\frac{261}{250}\right)\left(\frac{75}{261}\right) = P\left(\frac{75}{250}\right) = 0.3P$$

YAPILARIN ANALİZİ

Çözüm





$$+\downarrow \Sigma M_A = 0$$

$$F_{BCx}(0.1) + F_{BCy}(0.075) - M = 0$$

$$M = 0.3P(0.1) + P(0.075)$$

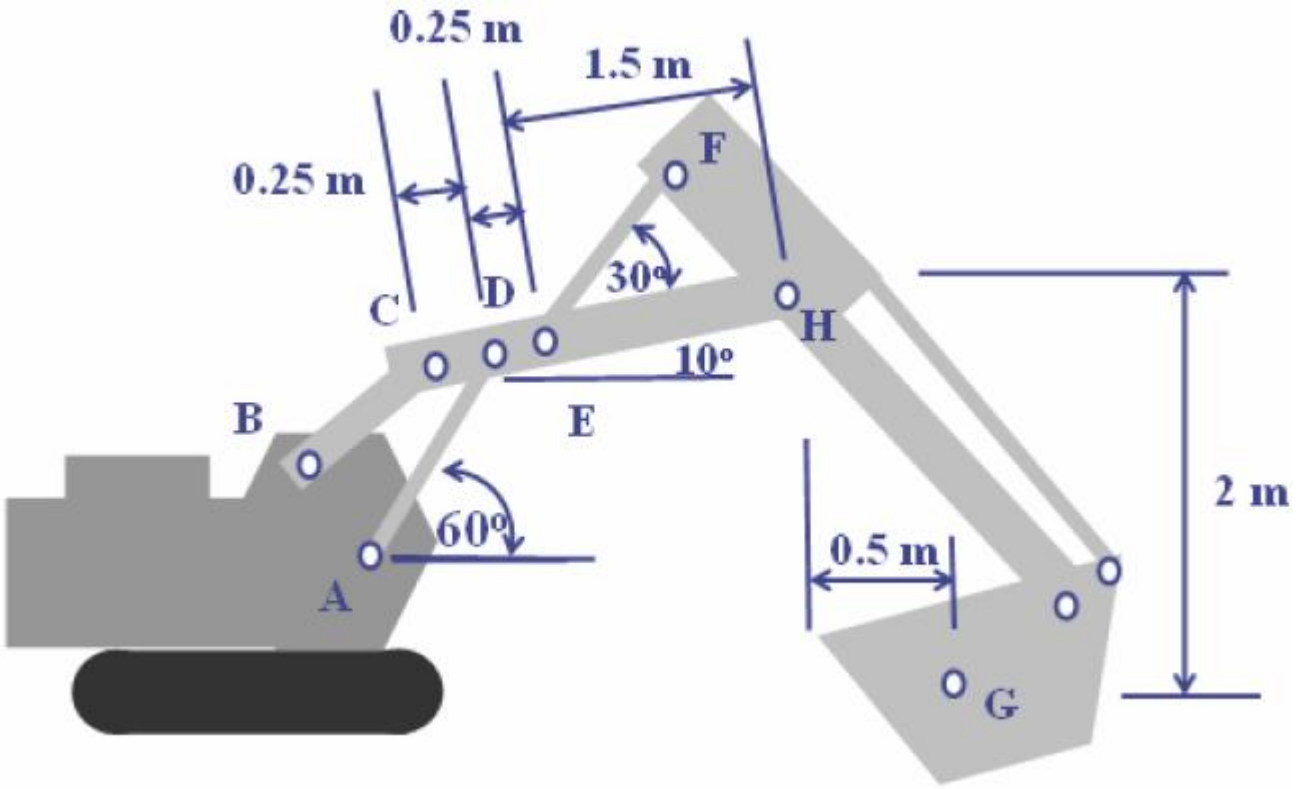
$$M = 0.105P$$

$$M = 0.105(2.4)$$

$$M = 252 \text{ Nm}$$

YAPILARIN ANALİZİ

Örnek

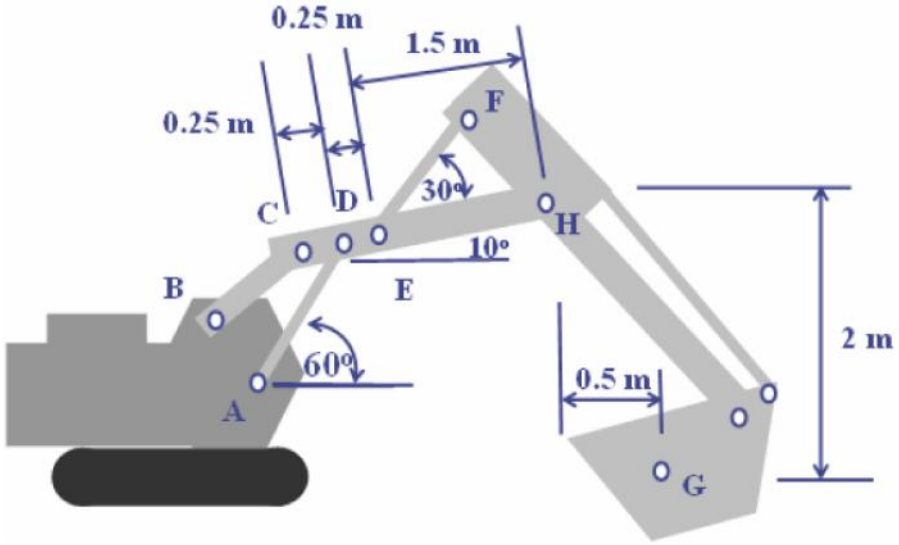


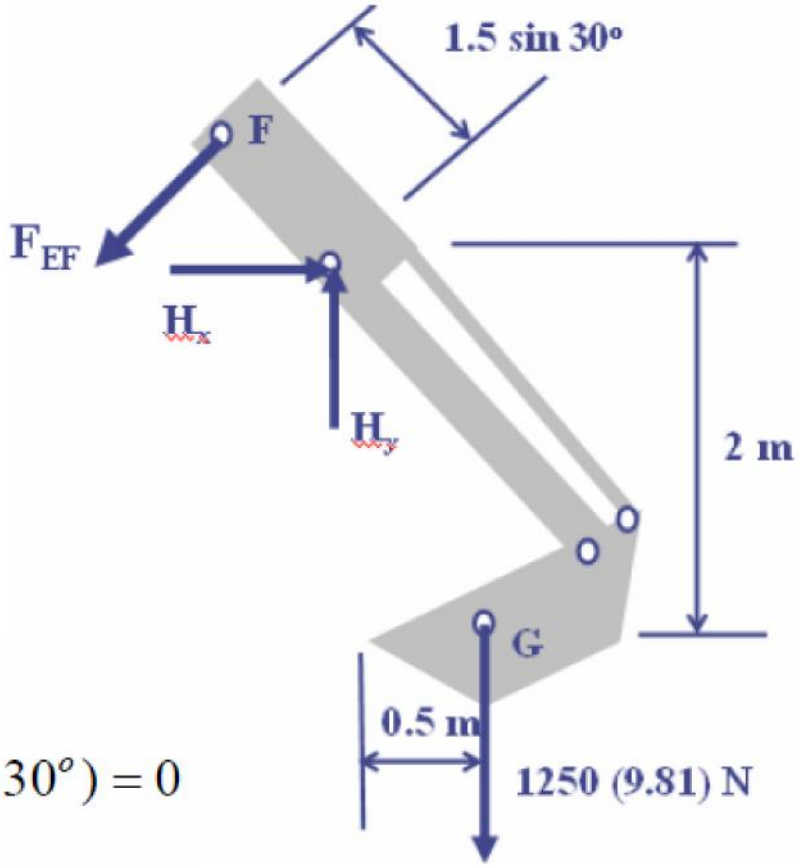
EF ve AD pistonlarına gelen kuvvetleri bulunuz.

Kepçenin içinde 1500 kg yük mevcuttur. EF pistonu gösterilen konumda FHG elemanına diktir.

YAPILARIN ANALİZİ

Çözüm





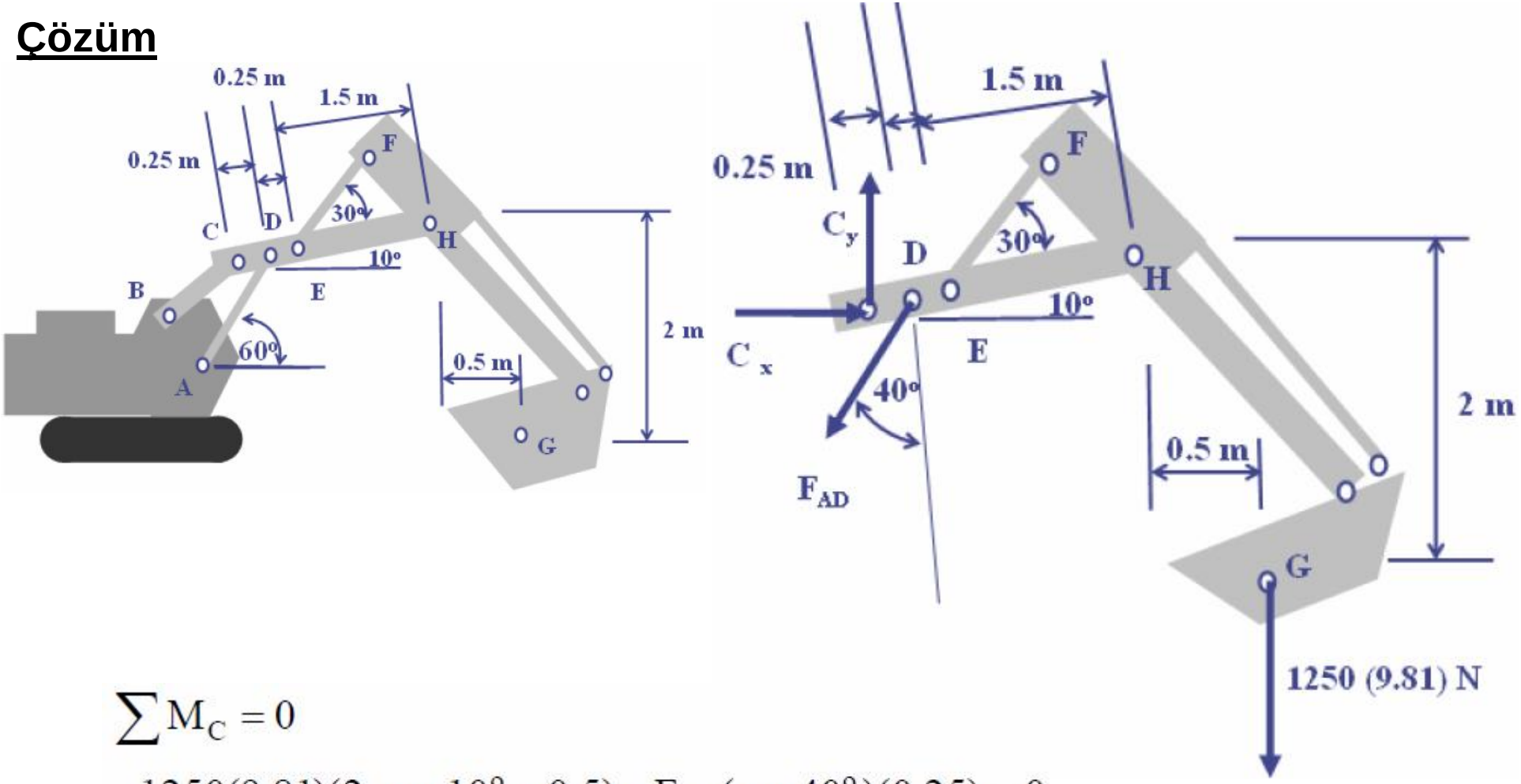
$$\sum M_H = 0$$

$$-1250(9.81)(0.5) + F_{EF}(1.5\sin 30^o) = 0$$

$$F_{EF} = 8175\ N = 8.18\ kN \quad (T)$$

YAPILARIN ANALİZİ

Çözüm



$$\sum M_C = 0$$

$$-1250(9.81)(2\ \cos 10^\circ + 0.5) - F_{AD}(\cos 40^\circ)(0.25) = 0$$

$$F_{AD} = -158130\text{N} = 158\ \text{kN}\ \ (C)$$