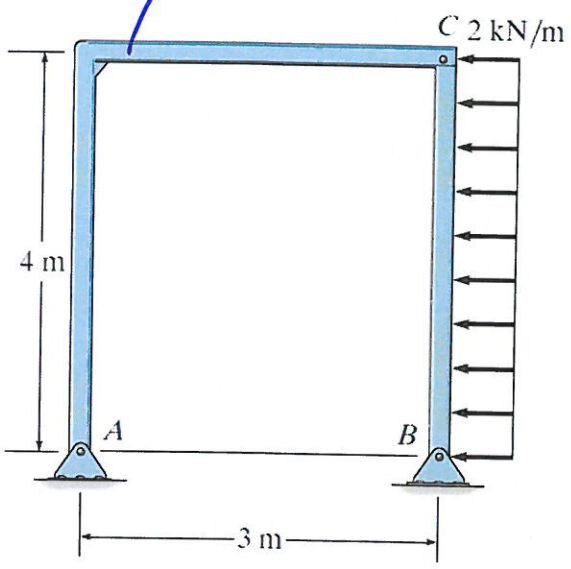
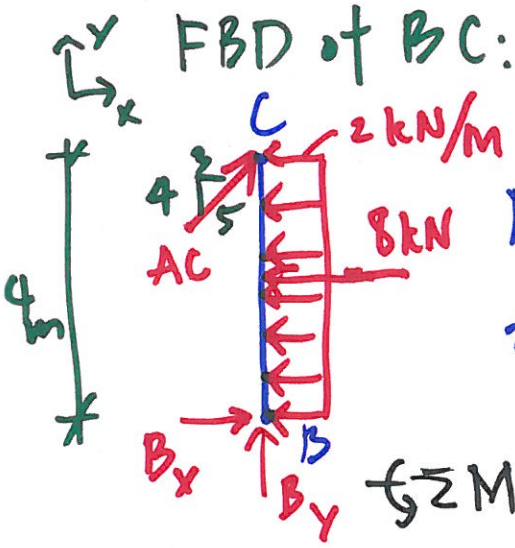
6-65

Determine the horizontal and vertical components of force that pins A and B exert on the frame.



2 Force member

FBD of BC:



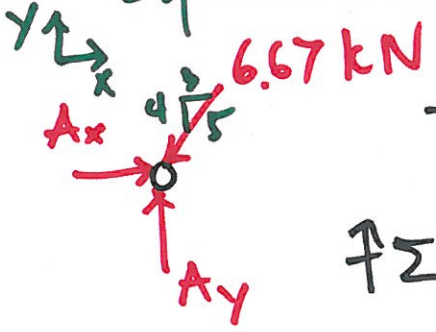
Non-concurrent
3 eqns
3 unknowns

$\curvearrowleft \Sigma M_B = 0 = 8(2) - \left(\frac{3}{5}\right) AC\,(4) \Rightarrow AC = 6.67\ \text{kN}$ on BC

$\rightarrow \Sigma F_x = 0 = B_x + \frac{3}{5}(6.67) - 8 \Rightarrow B_x = 4.00\ \text{kN} \rightarrow$

$\uparrow \Sigma F_y = 0 = B_y + \frac{4}{5}(6.67) \Rightarrow B_y = -5.33 \Rightarrow B_y = 5.33\ \text{kN} \downarrow$

Equilibrium of pin A:

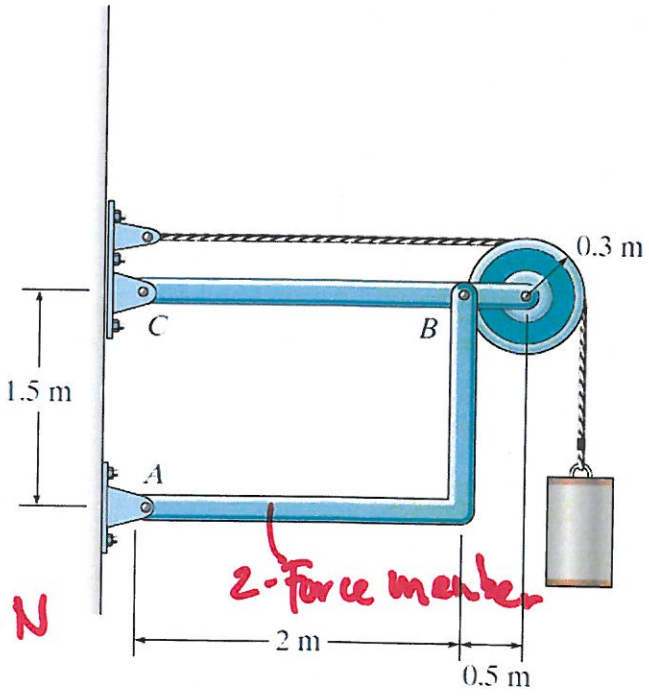


$\rightarrow \Sigma F_x = 0 = A_x - \frac{3}{5}(6.67) \Rightarrow A_x = 4.00\ \text{kN} \rightarrow$

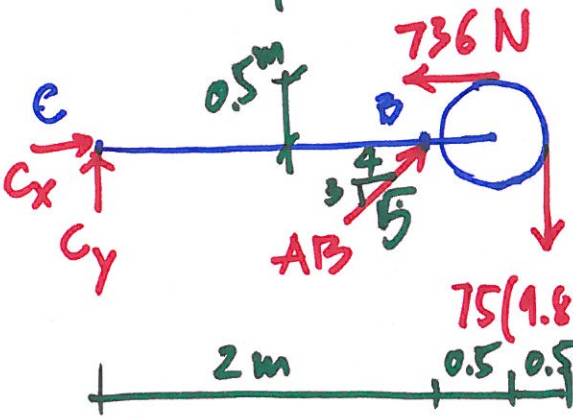
$\uparrow \Sigma F_y = 0 = A_y - \frac{4}{5}(6.67) \Rightarrow A_y = 5.33\ \text{kN} \uparrow$

6-70

Determine the horizontal and vertical components of force at pins *B* and *C*. The suspended cylinder has a mass of 75 kg.



FBD of BC:



3 eqns
3 unkns

$\circlearrowleft \Sigma M_C = 0 = \frac{3}{5} AB(2) + 736(0.5) - 736(3) \Rightarrow AB = 1533$ N on BC

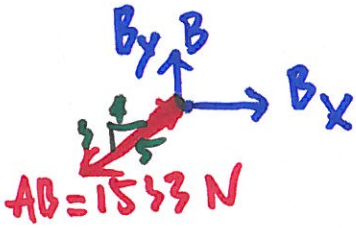
$\rightarrow \Sigma F_x = 0 = C_x + \frac{4}{5}(1533) - 736 \Rightarrow C_x = -490$

$C_x = 490$ N ←

$\uparrow \Sigma F_y = 0 = C_y + \frac{3}{5}(1533) - 736 \Rightarrow C_y = -183.8$

$C_y = 183.8$ N ↓

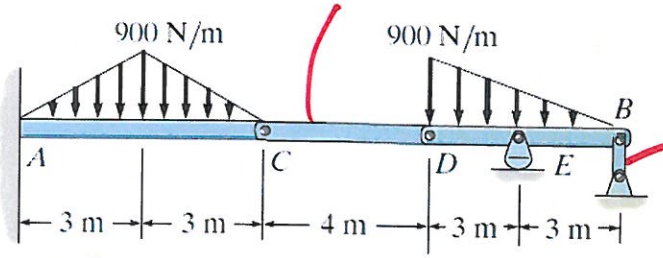
Equilibrium of pin B:



$\rightarrow \Sigma F_x = 0 = B_x - \frac{4}{5}(1533) \Rightarrow B_x = 1226$ N → on BC

$\uparrow \Sigma F_y = 0 = B_y - \frac{3}{5} AB \Rightarrow B_y = 920$ N ↑ on BC

6-73
Determine the reactions at the supports at *A*, *E*, and *B* of the compound beam.

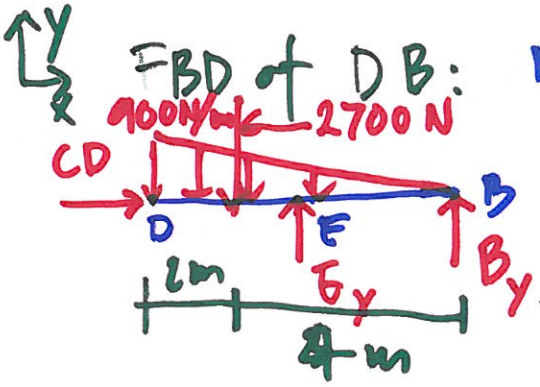


2 Force member

2 Force membe

FBD of DB:

Non-concurrent
3 eqns
3 unkns



$\circlearrowleft \Sigma M_B = 0 = 2700(4) - E_y(3)$

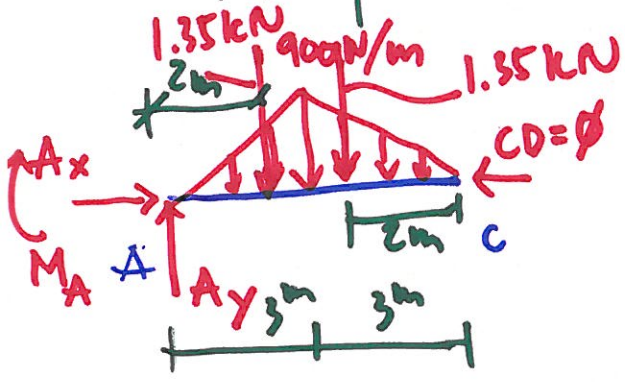
$E_y = \underline{3.60\ kN \uparrow}$

$\uparrow \Sigma F_y = 0 = -2700 + E_y + B_y \Rightarrow B_y = -0.9$

$B_y = \underline{0.90 kN \downarrow}$

$\rightarrow \Sigma F_x = 0 = CD \Rightarrow CD = 0$

FBD of AC



$\Sigma F_x = 0 \Rightarrow \underline{A_x = 0}$

$\uparrow \Sigma F_y = 0 = A_y - 1.35 - 1.35$

$A_y = \underline{2.70\ kN \uparrow}$

$\circlearrowleft \Sigma M_A = 0 = -M_A - 1.35(2) - 1.35(4)$

$M_A = -8.10 kN\,m \Rightarrow M_A = \underline{8.10\ kN\,m \circlearrowleft}$