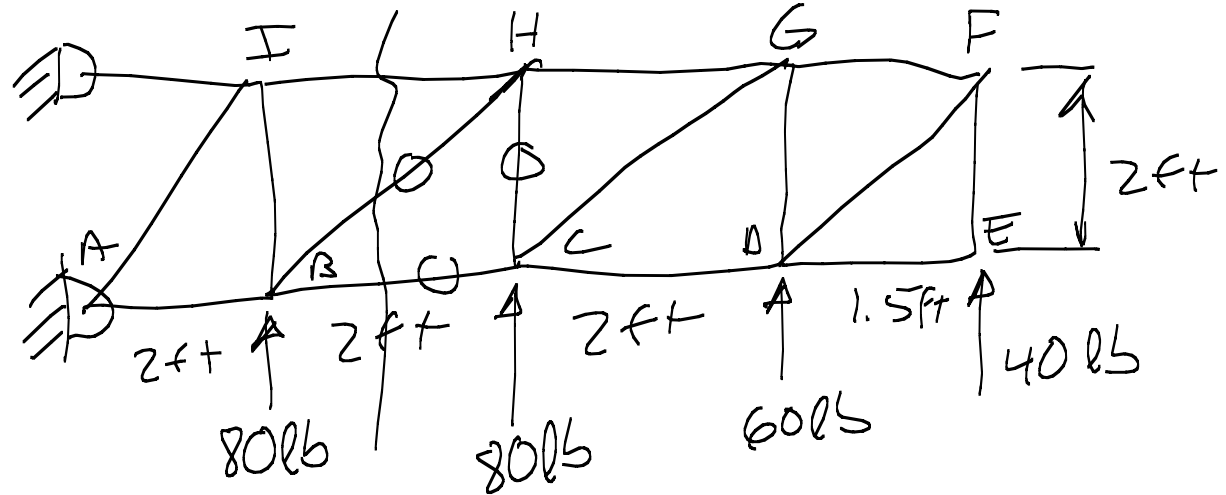


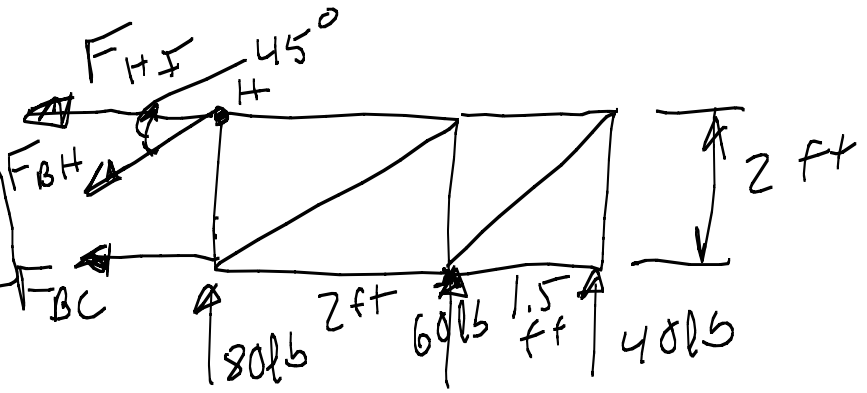
6.31

BC, BH, HC



$$\sum F_y = 0 - F_{BH} \sin 45^\circ + 80 \text{ lb} + 60 \text{ lb} + 40 \text{ lb} = 0$$

$$F_{BH} = 255 \text{ lb (T)}$$

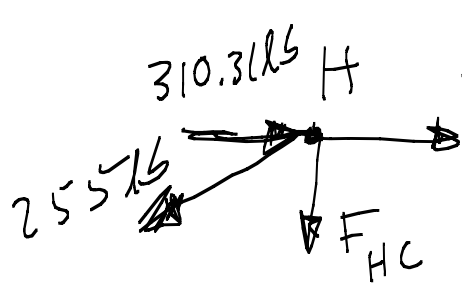


$$\sum M_H = 0 \rightarrow F_{BC} (2 \text{ ft}) + (60 \text{ lb}) (2 \text{ ft}) + (40 \text{ lb}) (3.5 \text{ ft}) = 0$$

$$F_{BC} = 130 \text{ lb (T)}$$

$$\rightarrow \sum F_x = 0 \Rightarrow -F_{HI} - (255 \text{ lb})(\cos 45^\circ) - (130 \text{ lb}) = 0$$

$$F_{HI} = -310.31 \text{ lb}$$

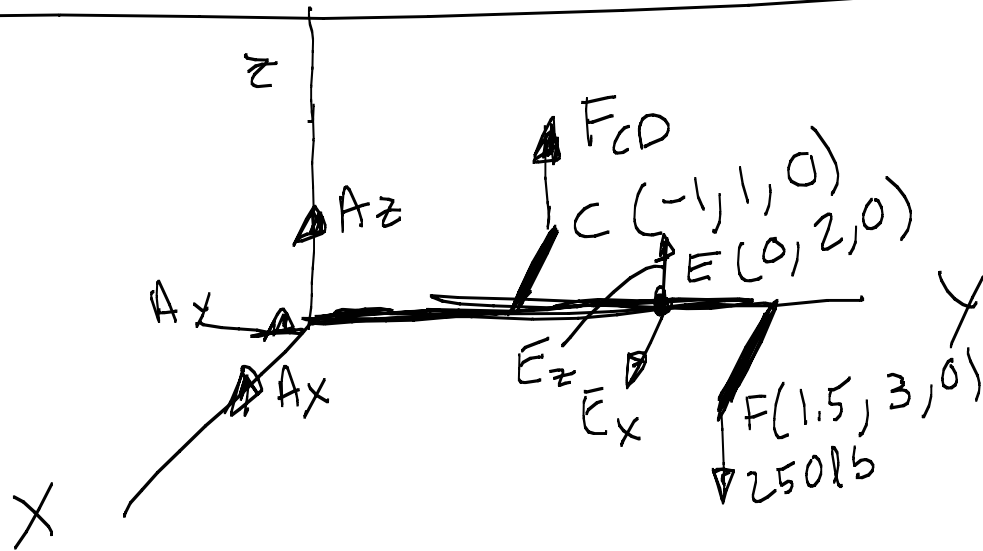


$$+ \uparrow \sum F_y = 0 \Rightarrow -(255)(\sin 45^\circ) - F_{HC} = 0$$

$$F_{HC} = -180.3 \text{ lb}$$

$$F_{HC} = 180.3 \text{ lb (C)}$$

5-71



$$\sum F_x = 0 \Rightarrow A_x + E_x = 0$$

$$\sum F_y = 0 \Rightarrow \boxed{A_y = 0}$$

$$\sum F_z = 0 \Rightarrow A_z + F_{CD} + E_z - 250 \text{ lb} = 0$$

$$\sum \vec{M}_A = 0 \quad \left(\vec{r}_{AC} \times \vec{F}_{CD} \right) + \left(\vec{r}_{AE} \times \vec{E} \right) + \left(\vec{r}_{AF} \times 250 \text{ lb} \right)$$

$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ -1 & -1 & 0 \\ 0 & 0 & F_{CD} \end{vmatrix} = [F_{CD}] \hat{i} - [-F_{CD}] \hat{j} + 0 \hat{k}$$

$$= \boxed{\{ F_{CD} \hat{i} + F_{CD} \hat{j} \}}$$

$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 2 & 0 \\ E_x & 0 & E_z \end{vmatrix} = 2E_z \hat{i} + [0 - 2E_x] \hat{k}$$

$$= \boxed{\{ 2E_z \hat{i} - 2E_x \hat{k} \}}$$

$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1.5 & 3 & 0 \\ 0 & 0 & -250 \end{vmatrix} = (3)(-250)\hat{i} - (1.5)(-250)\hat{j} \\ = -750\hat{i} + 375\hat{j}$$

$$(\sum M_A)_x = 0 \Rightarrow F_{CD} + 2E_z - 750 = 0$$

$$(\sum M_A)_y = 0 \Rightarrow F_{CD} + 375 = 0$$

$$(\sum M_A)_z = 0 \Rightarrow -2E_x = 0$$

$$E_x = 0$$

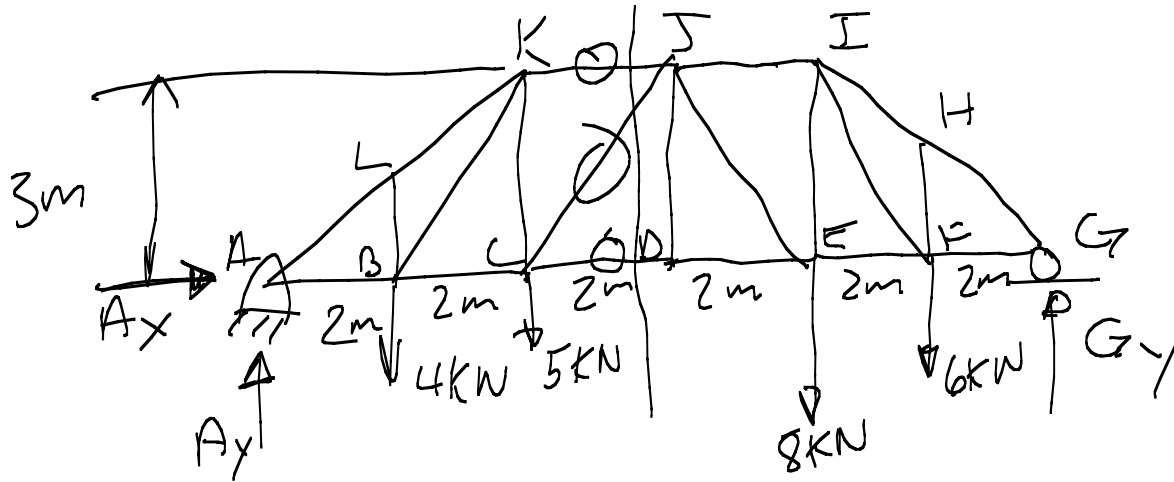
$$F_{CD} = -375 \text{ lb}$$

$$A_z = 62.5 \text{ lb}$$

$$E_z = 562.5 \text{ lb}$$

$$A_x = 0$$

6.34



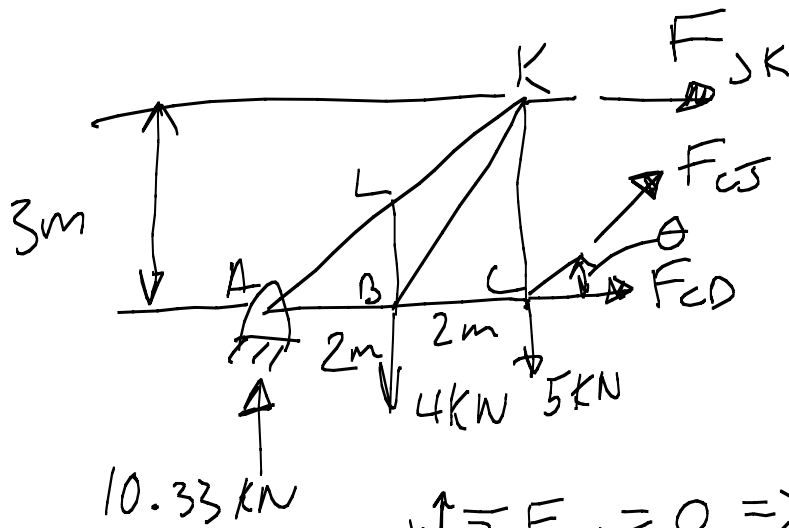
$$\sum F_x = 0 \Rightarrow A_x = 0$$

$$\sum M_A = 0 \Rightarrow - (4 \text{ kN})(2 \text{ m}) - (5 \text{ kN})(4 \text{ m}) - (8 \text{ kN})(8 \text{ m}) - (6 \text{ kN})(10 \text{ m}) + G_y(12 \text{ m}) = 0$$

$$G_y = 12.67 \text{ kN}$$

$$\sum F_y = 0 \Rightarrow A_y - 4 - 5 - 8 - 6 + 12.67 = 0$$

$$A_y = 10.33 \text{ kN}$$



$$\tan \theta = \frac{3}{2}$$

$$\theta = 56.31^\circ$$

$$+\uparrow \sum F_y = 0 \Rightarrow 10.33 \text{ kN} - 4 \text{ kN} - 5 \text{ kN} + F_{CJ} \sin 56.31^\circ = 0$$

$$F_{CJ} = -1.6 \text{ kN}$$

$$F_{CJ} = 1.6 \text{ kN (C)}$$

$$+\uparrow \sum M_C = 0 \Rightarrow (4 \text{ kN})(2 \text{ m}) - (10.33 \text{ kN})(4 \text{ m}) - (F_{JK})(3 \text{ m}) = 0$$

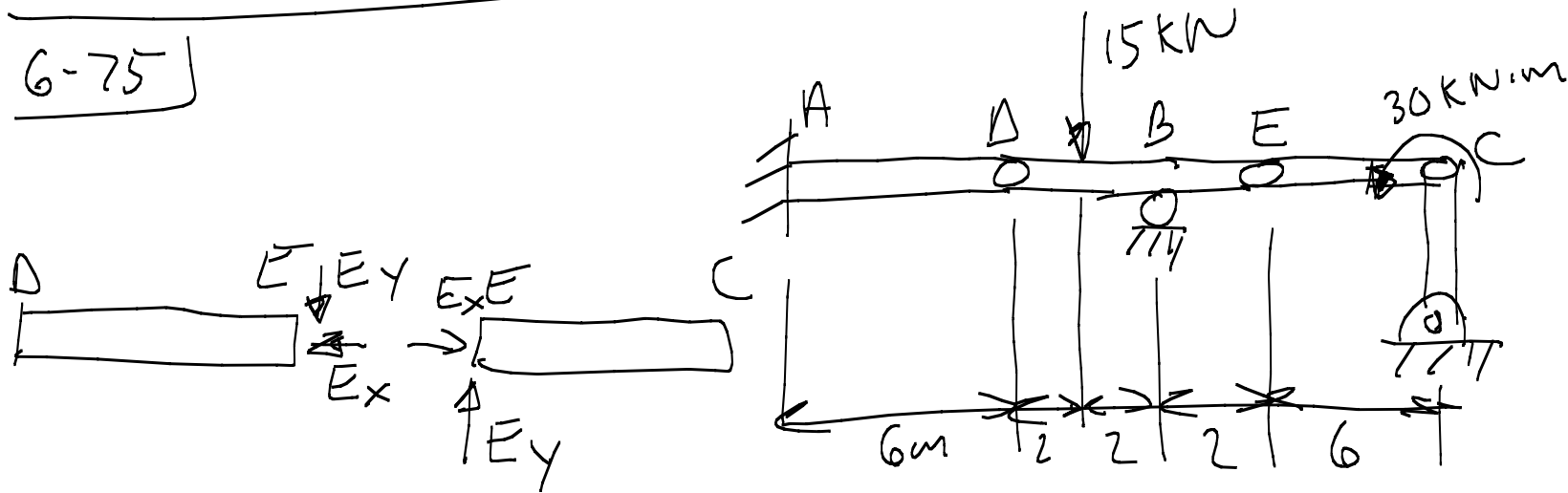
$$F_{JK} = -11.1 \text{ kN}$$

$$F_{JK} = 11.1 \text{ kN (C)}$$

$$\rightarrow \sum F_x = 0 \Rightarrow -11.1 \text{ kN} + (-1.6 \text{ kN}) \cos(56.31^\circ) + F_{CD} = 0$$

$$F_{CD} = 12 \text{ kN} (\leftarrow)$$

6-75



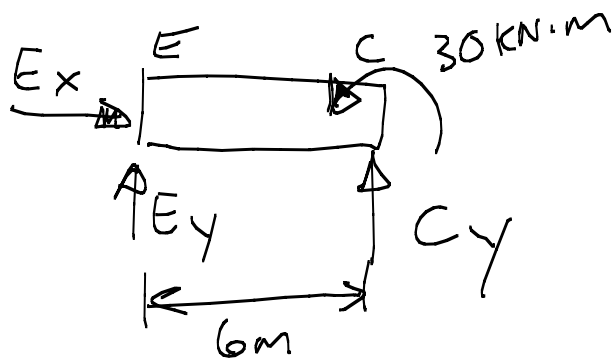
$$\sum F_x = 0 \Rightarrow E_x = 0$$

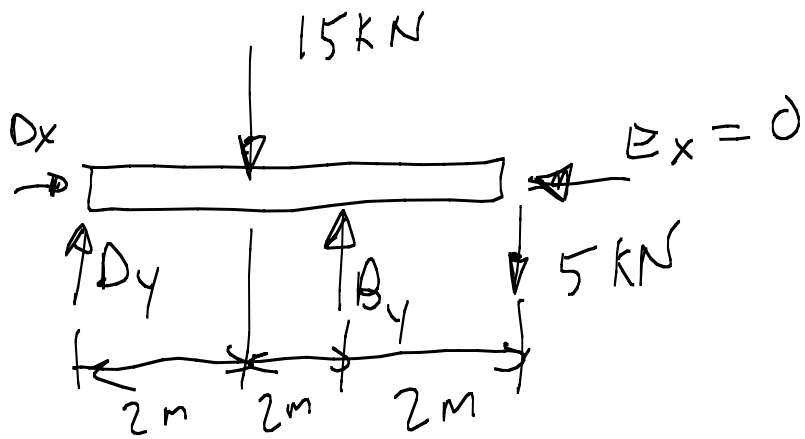
$$+\uparrow \sum M_C = 0 \Rightarrow 30 \text{ kN}\cdot\text{m} - (E_y)(6\text{m}) = 0$$

$$E_y = 5 \text{ kN}$$

$$+\uparrow \sum F_y = 0 \Rightarrow E_y + C_y = 0$$

$$C_y = -5 \text{ kN}$$





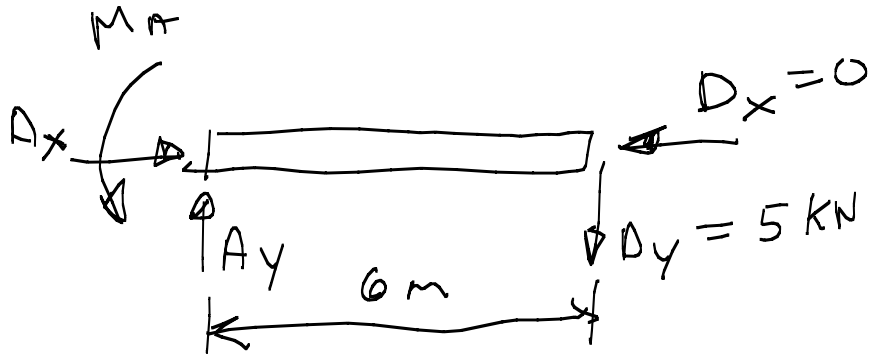
$$\sum F_x \Rightarrow \boxed{D_x = 0}$$

$$+\uparrow \sum M_D = 0 \Rightarrow -(5 \text{ kN})(2 \text{ m}) + B_y(4 \text{ m}) - (5 \text{ kN})(6 \text{ m}) = 0$$

$$\boxed{B_y = 15 \text{ kN}}$$

$$\sum F_y = 0 \Rightarrow D_y - 15 \text{ kN} + B_y - 5 \text{ kN} = 0$$

$$\boxed{D_y = 5 \text{ kN}}$$



$$\sum F_x = A_x = 0$$

$$\sum F_y = 0 \Rightarrow A_y - 5 \text{ kN} = 0$$

$$\boxed{A_y = 5 \text{ kN}}$$

$$+\uparrow \sum M_A = 0 \Rightarrow M_A - (5 \text{ kN})(6 \text{ m}) = 0$$

$$\boxed{M_A = 30 \text{ kN} \cdot \text{m}}$$