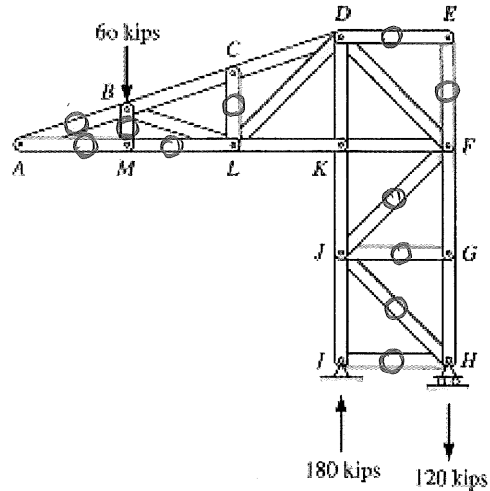


Name: Solution

In-Class Problem #3

Determine and list all zero-force members found in the truss shown below



Joint A

$$\begin{aligned} \uparrow \sum F_y = 0: & F_{AB} \sin \theta = 0 \Rightarrow F_{AB} = 0 \\ \rightarrow \sum F_x = 0: & F_{AM} + F_{AB} \cos \theta = 0 \Rightarrow F_{AM} = 0 \end{aligned}$$

Joint M

$$\begin{aligned} \rightarrow \sum F_x = 0: & -F_{AM} + F_{ML} = 0 \Rightarrow F_{ML} = 0 \\ \uparrow \sum F_y = 0: & F_{BM} = 0 \Rightarrow F_{BM} = 0 \end{aligned}$$

Joint C

$$\begin{aligned} \uparrow \sum F_y = 0: & -F_{CL} \sin \theta = 0 \Rightarrow F_{CL} = 0 \end{aligned}$$

Joint E

$$\begin{aligned} \rightarrow \sum F_x = 0: & -F_{DE} = 0 \Rightarrow F_{DE} = 0 \\ \uparrow \sum F_y = 0: & -F_{EF} = 0 \Rightarrow F_{EF} = 0 \end{aligned}$$

Joint I

$$\rightarrow \sum F_x = 0: I_x + F_{HI} = 0 \Rightarrow F_{HI} = 0$$

Joint H

$$\rightarrow \sum F_x = 0: -F_{HI} - F_{HJ} \cos \theta = 0 \Rightarrow F_{HJ} = 0$$

Joint G

$$\rightarrow \sum F_x = 0: -F_{GJ} = 0 \Rightarrow F_{GJ} = 0$$

Joint J

$$\rightarrow \sum F_x = 0: F_{FJ} \cos \theta + F_{GJ} + F_{HJ} \cos \theta = 0 \Rightarrow F_{FJ} = 0$$

Entire Structure

$$\rightarrow \sum F_x = 0: I_x = 0$$

Zero Force Members

AB	AM	BM
CL	DE	EF
FJ	GJ	HI
HJ	LM	

Note: This was done in detail to show how these forces come out to zero. Determining zero force members should be quick and typically done through inspection.