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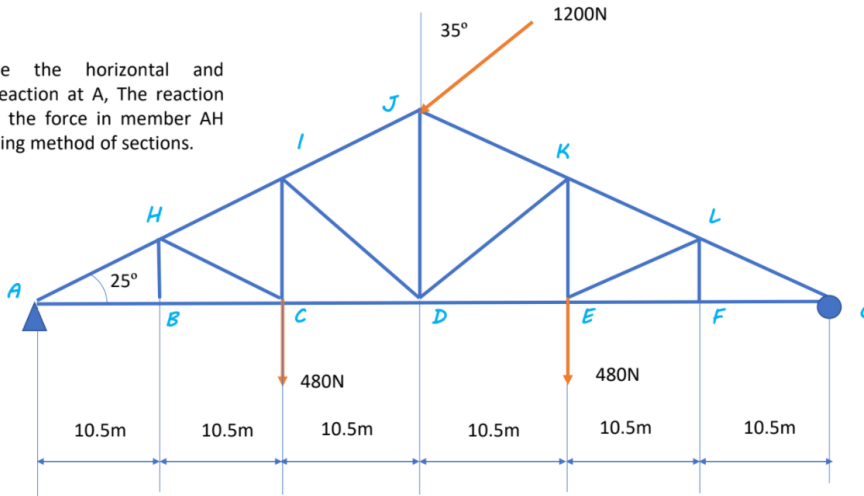
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Question: Determine the horizontal and vertical reaction at A, The reaction at G and the force in member AH...

Determine the horizontal and vertical reaction at A, The reaction at G and the force in member AH and JD using method of sections.

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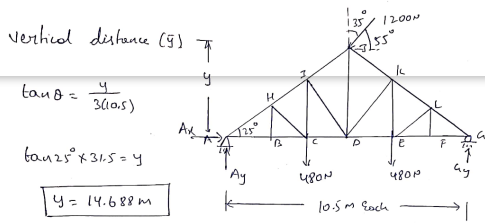
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Expert Answer



Anonymous
answered this

Given truss:



$$\sum M_A = 0$$

$$\Rightarrow C_y \times (10.5 \times 6) - 480 \times (10.5 \times 4) - 480 \times (10.5 \times 2) - 1200 \sin 55^\circ \times (10.5 \times 3) + 1200 \cos 55^\circ \times 14.688 = 0$$

$$\Rightarrow 63 C_y - 20160 - 10080 - 30963.95 + 10110.10 = 0$$

$$\Rightarrow 63 C_y = 51094.05$$

$$C_y = 811.02 \text{ N}$$

$$\sum M_A = 0$$

$$A_y \times (10.5 \times 6) - 480 \times (10.5 \times 4) - 480 \times (10.5 \times 2) - 1200 \sin 55^\circ \times (10.5 \times 3) + 1200 \cos 55^\circ \times 14.688 = 0$$

$$\Rightarrow 63 A_y - 20160 - 10080 - 30963.95 - 10110.10 = 0$$

$$A_y = 71314.05 / 63$$

$$A_y = 1131.97 \text{ N}$$

$$\sum F_x = 0$$

$$A_x = 1200 \cos 55^\circ$$

$$A_x = 688.29 \text{ N}$$

Using Method of Section

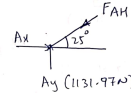
$$\sum F_y = 0$$

$$F_{AH} \sin 25^\circ = 1131.97$$

$$F_{AH} = \frac{1131.97}{\sin 25^\circ}$$

$$F_{AH} = 2678.47 \text{ N}$$

$$\therefore A_H = 2678.47 \text{ N Compression}$$



Before calculation JD, Firstly calculation (FJ)

$$\sum M_D = 0$$

$$\Rightarrow 811.02 \times 31.5 - 480 \times 10.5 + 1200 \cos 55^\circ \times 14.688 = F_{JF} \cos 25^\circ \times 14.688$$

$$\Rightarrow 25547.13 - 5040 + 10109.62 = F_{JF} \cos 25^\circ \times 14.688$$

$$\Rightarrow \frac{30616.75}{\cos 25^\circ \times 14.688} = F_{JF}$$

$$F_{JF} = 2299.96 \text{ N}$$

Now consider Joint (J)

$$\sum F_x = 0$$

$$2299.96 \cos 25^\circ - 1200 \cos 55^\circ = F_{JK} \cos 55^\circ$$

$$2084.47 - 688.291 = F_{JK} \cos 55^\circ$$

$$\frac{1396.179}{\cos 55^\circ} = F_{JK}$$

$$F_{JK} = 1540.51 \text{ N}$$

$$\sum F_y = 0$$

$$2299.96 \sin 25^\circ + 1540.51 \sin 25^\circ - 1200 \sin 55^\circ = F_{JD}$$

$$972 + 651.04 - 982.98 = F_{JD}$$

$$F_{JD} = 640.06 \text{ N Tension}$$

0 Comments

Was this answer helpful?



1



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memDel, m Design a.

A W16×100 with Fy