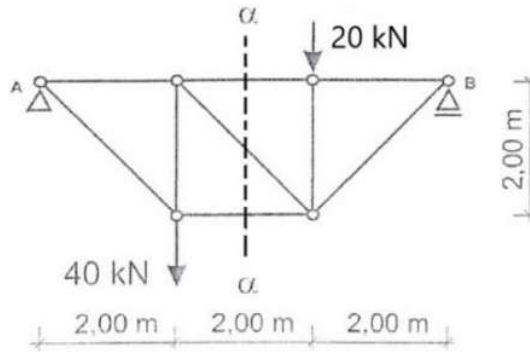
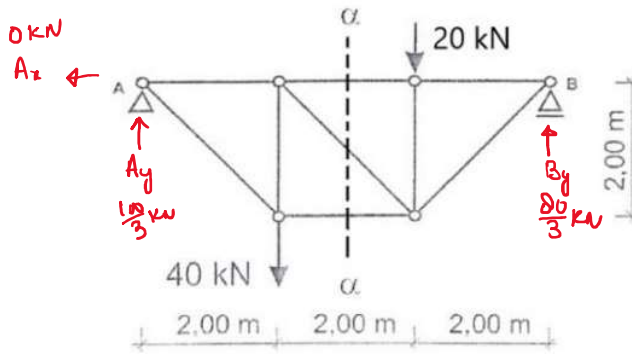


Ritter's Method Truss Analysis Problem-2 Solution

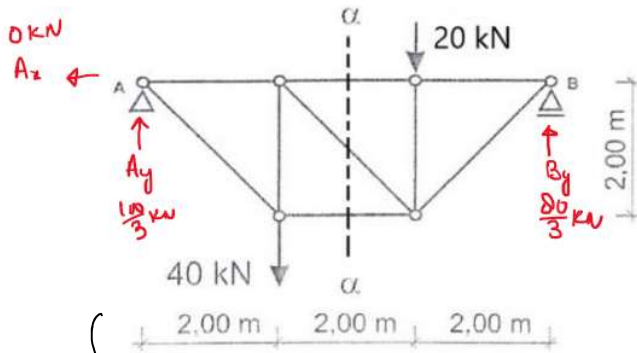
2. Please find the forces in $\alpha - \alpha$ section using Ritter method.



Step-1: Find the support reactions:

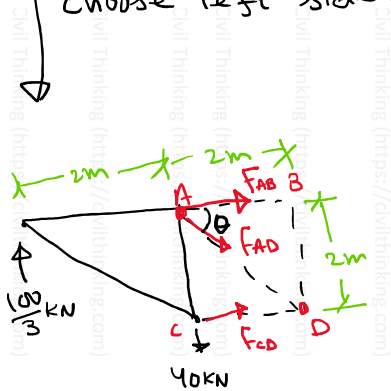


$$\begin{aligned} \sum F_x = 0: \\ A_x = 0 \\ \curvearrowright \sum M_B = 0: \\ (A_y \times 6) - (40 \times 4) - (20 \times 2) = 0 \\ \Rightarrow A_y = \frac{100}{3} \text{ kN} = 33.33 \text{ kN} \\ \curvearrowleft \sum M_A = 0: \\ -(B_y \times 6) + (20 \times 4) + (40 \times 2) = 0 \\ \Rightarrow B_y = \frac{80}{3} \text{ kN} = 26.67 \text{ kN} \\ \text{Check: } \uparrow \sum F_y = \frac{100}{3} - 40 - 20 + \frac{80}{3} = 0 \text{ O.K.} \end{aligned}$$



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choose left side of α



$$\theta = \tan^{-1}\left(\frac{2}{2}\right) = 45^\circ$$

$$\sum M_A = 0:$$

$$\left(\frac{100}{3} \times 2\right) - (F_{CD} \times 2) = 0 \Rightarrow F_{CD} = \frac{100}{3} \text{ kN}$$

$$\sum M_D = 0:$$

$$\left(\frac{100}{3} \times 4\right) - (40 \times 2) + (F_{AB} \times 2) = 0 \Rightarrow F_{AB} = -\frac{80}{3} \text{ kN}$$

$$\sum F_x = 0:$$

$$\frac{100}{3} + \left(-\frac{80}{3}\right) + F_{AD} \cos 45^\circ = 0 \Rightarrow F_{AD} = -\frac{20\sqrt{2}}{3} \text{ kN}$$

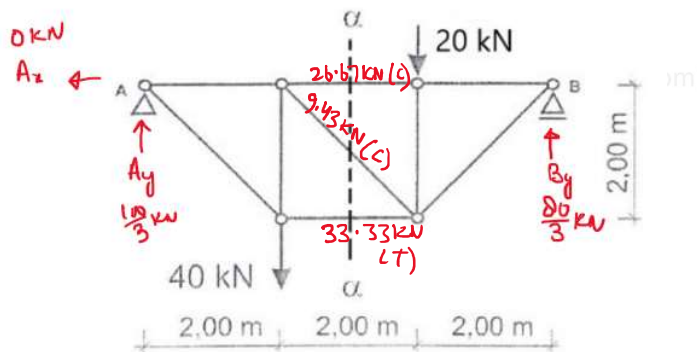
Check:

$$+\uparrow \sum F_y = \frac{100}{3} - 40 - \left(-\frac{20\sqrt{2}}{3}\right) \sin 45^\circ = 0 \quad \text{O.K. } \checkmark$$

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Final Answers:

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