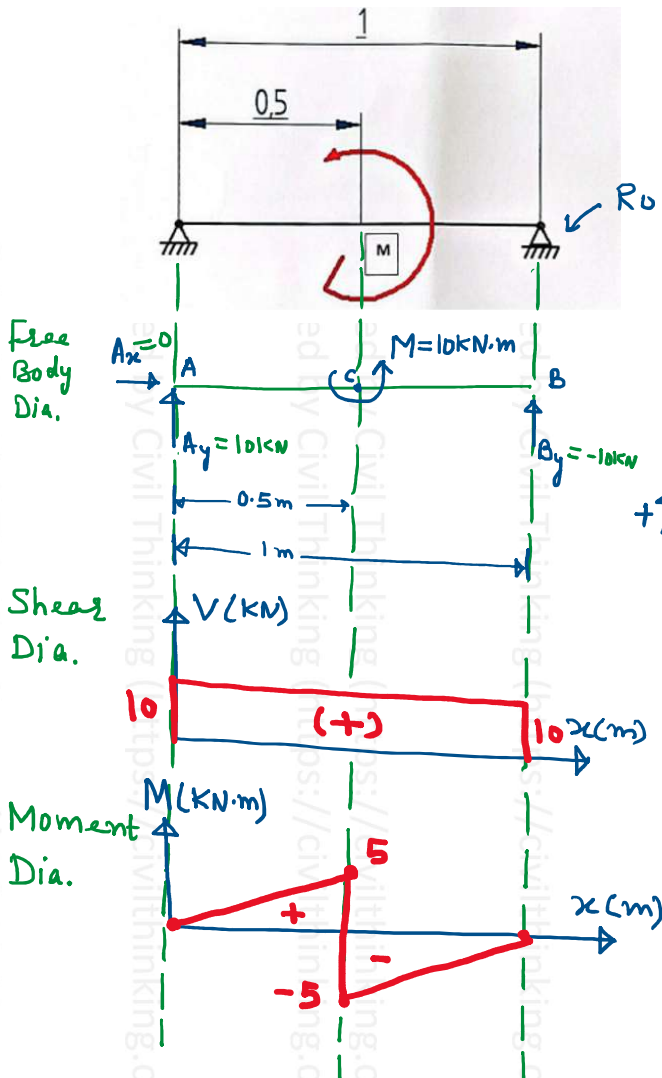


Solution of: Shear distribution and moment distribution diagram of simply supported beam carrying a concentrated moment M at the center.

Determine the distribution of shear forces and bending moments in a flexural beam for concentrated moment, $M=10\text{kN}\cdot\text{m}$ at its center. Take length of beam, $L=1\text{m}$.



Apply Equations of Equilibrium on Free Body:

$$\sum M_B = 0 : (A_y \times 1\text{m}) - M = 0 \Rightarrow A_y = 10\text{kN}$$

$$\sum F_y = 0 : A_y + B_y = 0 \Rightarrow B_y = -10\text{kN}$$

$$\sum F_x = 0 : A_x = 0$$

$$M_A = M_B = 0 \quad [\text{At Hinge, Roller, Moment} = 0]$$

$$M_{c-} = A_y \times 0.5\text{m} = 10\text{kN} \times 0.5\text{m} = 5\text{kN}\cdot\text{m}$$

$$M_{c+} = M_{c-} - M = 5\text{kN}\cdot\text{m} - 10\text{kN}\cdot\text{m} = -5\text{kN}\cdot\text{m}$$

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