

Name

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Section

A

Subject

Structure 1

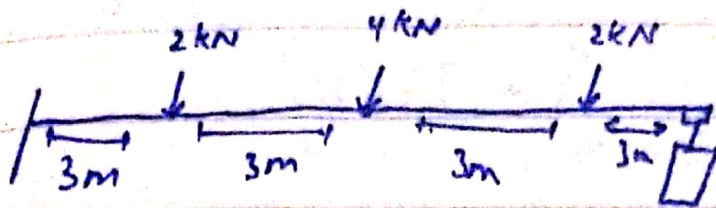
Dpt

Civil Engineering

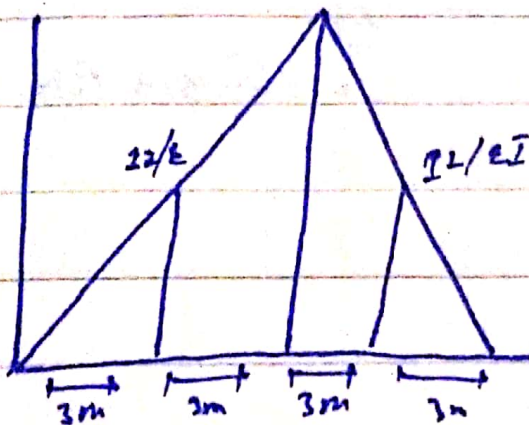
Date

13 July 2020

Determine the Slope at A and displacement at C of the beam in the figure moment area



Solution



$$\theta_A = \frac{1}{2} \left( \frac{22}{EI} \right) (3) + \left( \frac{12}{EI} \right) + \frac{1}{2} \left( \frac{6}{EI} \right) (3)$$

$$\theta_A = \left( \frac{18}{EI} \right) + \left( \frac{36}{EI} \right) + \left( \frac{9}{EI} \right)$$

$$\theta_A = \frac{63}{EI} \Rightarrow \frac{63}{(200 \times 10^6) / (6 \times 10^6) (1000)^4}$$

$$\theta_A = 0.0525 \text{ rad}$$



$$Q_n = 0.0525 \text{ yod}$$

$$\begin{aligned} \delta_{acc} &= \left[ \frac{1}{2} \left( \frac{12}{EI} \right) (3) \right] \left( \frac{2}{3} (3) \right) \\ &+ \left[ \frac{12}{EI} (3) \right] \left( 3 + \frac{1}{2} (3) \right) + \left[ \frac{1}{2} \left( \frac{6}{EI} \right) (3) \right] \\ &\quad \left[ 3 + \frac{2}{3} (3) \right] \end{aligned}$$

$$= 0.202 \text{ m}$$

So

$$\begin{aligned} \Delta C &= \frac{\delta_A}{\delta_C} = 0.202 \text{ m} \\ &= 202 \text{ mm AM} \end{aligned}$$