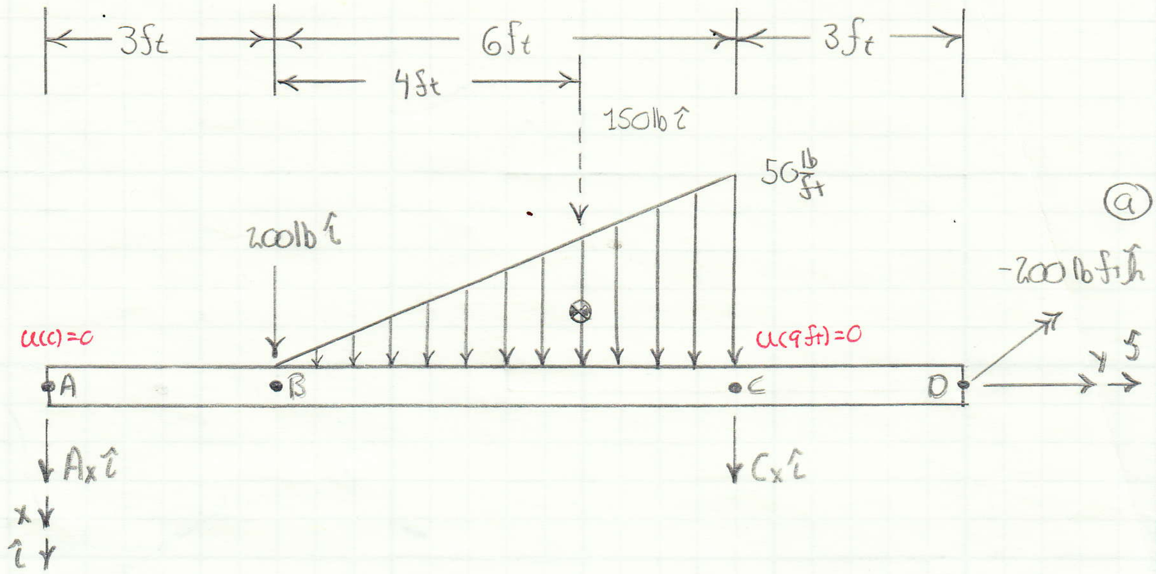


STARTING BY CONSIDERING THE EQUILIBRIUM OF THE STRUCTURE IN ORDER TO DETERMINE A_x AND C_x

$$\sum F_x = 0 = A_x + 200\,lb + \tfrac{1}{2}\cdot(6\,ft)\cdot\left(50\,\tfrac{lb}{ft}\right) + C_x$$

$$\Rightarrow A_x + C_x = -350\,lb \qquad (1)$$

$$\sum M_{z/@A} = 0 = -(3\,ft)(200\,lb) - (7\,ft)\cdot(150\,lb) - 9\,ft\cdot C_x - 200\,lb\cdot ft$$

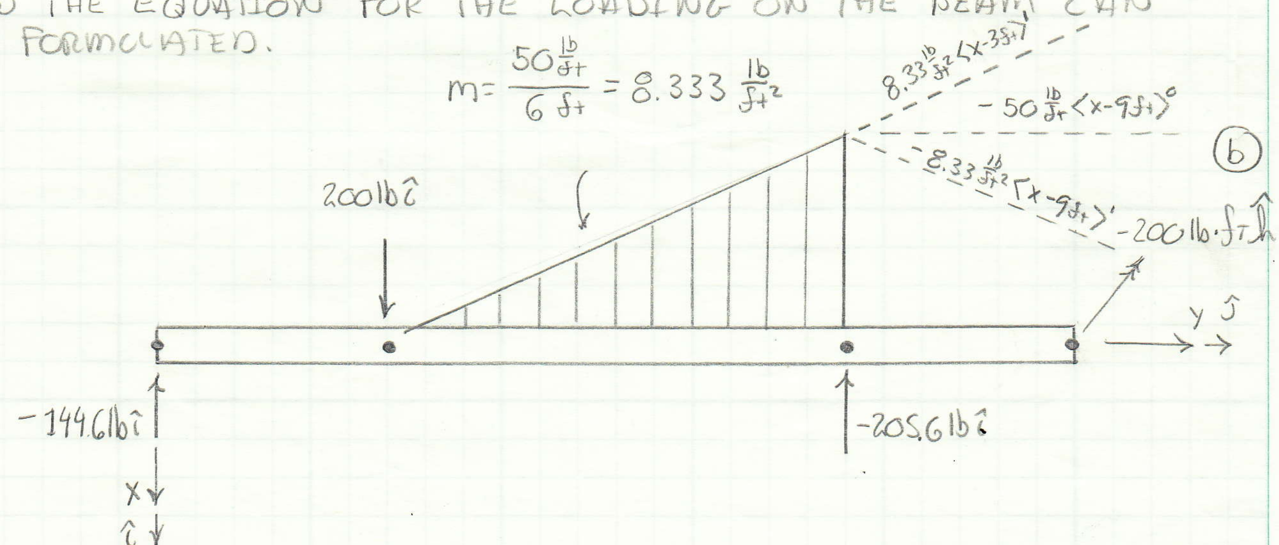
$$\Rightarrow C_x = \frac{-(3\,ft)(200\,lb) - (7\,ft)\cdot(150\,lb) - 200\,lb\cdot ft}{9\,ft} = \underline{\underline{-205.6\,lb}} \qquad (2)$$

SUBSTITUTING THIS RESULT INTO (1)

$$A_x = -350\,lb - C_x = -350\,lb - (-205.6\,lb) = \underline{\underline{-144.4\,lb}} \qquad (3)$$

NOW THE EQUATION FOR THE LOADING ON THE BEAM CAN BE FORMULATED.

$$m = \frac{50\,\frac{lb}{ft}}{6\,ft} = 8.333\,\frac{lb}{ft^2}$$



$$\begin{aligned} q(y) = & -144.6\text{ lb}\langle y-0\rangle_{-1} + 200\text{ lb}\langle y-3\text{ ft}\rangle_{-1} + 8.333\tfrac{\text{lb}}{\text{ft}^2}\langle y-3\text{ ft}\rangle^1 \\ & - 8.33\tfrac{\text{lb}}{\text{ft}^2}\langle y-9\text{ ft}\rangle^1 - 50\tfrac{\text{lb}}{\text{ft}}\langle y-9\text{ ft}\rangle^0 - 205.6\text{ lb}\langle y-9\text{ ft}\rangle_{-1} \\ & - 200\text{ lb}\cdot\text{ft}\langle y-12\text{ ft}\rangle_{-2} \end{aligned} \tag{4}$$

$$\begin{aligned} V(y) = & \ 144.6\text{ lb}\langle y-0\rangle^0 - 200\text{ lb}\langle y-3\text{ ft}\rangle^0 - \frac{8.333}{2}\tfrac{\text{lb}}{\text{ft}^2}\langle y-3\text{ ft}\rangle^2 \\ & + \frac{8.333}{2}\tfrac{\text{lb}}{\text{ft}^2}\langle y-9\text{ ft}\rangle^2 + 50\tfrac{\text{lb}}{\text{ft}}\langle y-9\text{ ft}\rangle^1 + 205.6\text{ lb}\cdot\langle y-9\text{ ft}\rangle^0 \\ & + 200\text{ lb}\cdot\text{ft}\langle y-12\text{ ft}\rangle_{-1} \end{aligned} \tag{5}$$

$$\begin{aligned} M(y) = & \ 144.6\text{ lb}\langle y-0\rangle^1 - 200\text{ lb}\langle y-3\text{ ft}\rangle^1 - \frac{8.333}{2\cdot 3}\tfrac{\text{lb}}{\text{ft}^2}\langle y-3\text{ ft}\rangle^3 \\ & + \frac{8.333}{2\cdot 3}\tfrac{\text{lb}}{\text{ft}^2}\langle y-9\text{ ft}\rangle^3 + \frac{50\frac{\text{lb}}{\text{ft}}}{2}\langle y-9\text{ ft}\rangle^2 + 205.6\text{ lb}\langle y-9\text{ ft}\rangle^1 \\ & + 200\text{ lb}\cdot\text{ft}\langle y-12\text{ ft}\rangle^0 \end{aligned} \tag{6}$$

$$\begin{aligned} \Theta(y) = \frac{1}{EI}\Big[& -\frac{144.6\text{ lb}}{2}\langle y-0\rangle^2 + \frac{200\text{ lb}}{2}\langle y-3\text{ ft}\rangle^2 + \frac{8.333}{2\cdot 3\cdot 4}\tfrac{\text{lb}}{\text{ft}^2}\langle y-3\text{ ft}\rangle^4 \\ & - \frac{8.333}{2\cdot 3\cdot 4}\tfrac{\text{lb}}{\text{ft}^2}\langle y-9\text{ ft}\rangle^4 - \frac{50}{2\cdot 3}\tfrac{\text{lb}}{\text{ft}}\cdot\langle y-9\text{ ft}\rangle^3 - \frac{205.6}{2}\text{ lb}\langle y-9\text{ ft}\rangle^2 \\ & - 200\text{ lb}\cdot\text{ft}\langle y-12\text{ ft}\rangle^1 + C_1 \Big] \end{aligned} \tag{7}$$

$$\begin{aligned} = \frac{1}{EI}\Big[& -72.3\text{ lb}\langle y-0\rangle^2 + 100\text{ lb}\langle y-3\text{ ft}\rangle^2 + 0.3472\tfrac{\text{lb}}{\text{ft}^2}\langle y-3\text{ ft}\rangle^4 \\ & - 0.3472\tfrac{\text{lb}}{\text{ft}^2}\langle y-9\text{ ft}\rangle^4 - 8.333\tfrac{\text{lb}}{\text{ft}}\langle y-9\text{ ft}\rangle^3 \\ & - 102.8\text{ lb}\langle x-9\text{ ft}\rangle^2 - 200\text{ lb}\cdot\text{ft}\langle x-12\text{ ft}\rangle^1 + C_1 \Big] \end{aligned} \tag{8}$$

$$\begin{aligned} u(y) = \frac{1}{EI}\Big[& -\frac{144.6}{2\cdot 3}\text{ lb}\langle y-0\rangle^3 + \frac{200}{2\cdot 3}\text{ lb}\langle y-3\text{ ft}\rangle^3 + \frac{8.333}{2\cdot 3\cdot 4\cdot 5}\tfrac{\text{lb}}{\text{ft}^2}\langle y-3\text{ ft}\rangle^5 \\ & - \frac{8.333}{2\cdot 3\cdot 4\cdot 5}\tfrac{\text{lb}}{\text{ft}^2}\langle y-9\text{ ft}\rangle^5 - \frac{50}{2\cdot 3\cdot 4}\tfrac{\text{lb}}{\text{ft}}\langle y-9\text{ ft}\rangle^4 \\ & - \frac{205.6}{2\cdot 3}\text{ lb}\langle y-9\text{ ft}\rangle^3 - \frac{200}{2}\text{ lb}\cdot\text{ft}\langle y-12\text{ ft}\rangle^2 + C_1\cdot y + C_2 \Big] \end{aligned} \tag{9}$$

$$\begin{aligned} = \frac{1}{EI}\Big[& -24.10\text{ lb}\langle y-0\rangle^3 + 33.33\text{ lb}\langle y-3\text{ ft}\rangle^3 \\ & + 0.06944\tfrac{\text{lb}}{\text{ft}^2}\langle y-3\text{ ft}\rangle^5 - 0.06944\tfrac{\text{lb}}{\text{ft}^2}\langle y-9\text{ ft}\rangle^5 \\ & - 2.083\tfrac{\text{lb}}{\text{ft}}\langle y-9\text{ ft}\rangle^4 - 34.27\text{ lb}\langle y-9\text{ ft}\rangle^3 \\ & - 100\text{ lb}\cdot\text{ft}\langle y-12\text{ ft}\rangle^2 + C_1\cdot y + C_2 \Big] \end{aligned} \tag{10}$$

THE CONSTANTS C_1 & C_2 ARE CALCULATED FROM THE BOUNDARY CONDITIONS IMPOSED BY THE CONSTRAINTS AT $y=0$ AND $y=9ft$.

$$u(0) = 0 = \frac{1}{EI}\left[-24.10\,lb(0)^3 + C_1(0) + C_2\right] \Rightarrow \underline{\underline{C_2 = 0}} \qquad (11)$$

$$\begin{aligned} u(9ft) = 0 = \frac{1}{EI}\Big[&-24.10\,lb(9ft)^3 + 33.33\,lb(6ft)^3 + .06944\,\tfrac{lb}{ft^2}(6ft)^5 \\ &-.06944\,\tfrac{lb}{ft^2}(0)^5 - 2.083\,\tfrac{lb}{ft}(0)^4 - 34.27\,lb(0)^3 + C_1(9ft)\Big] \end{aligned}$$

$$0 = -9.830(10^3)\,lb\cdot ft^3 + C_1\cdot 9ft \Rightarrow \underline{\underline{C_1 = 1092\,lb\cdot ft^2}} \qquad (12)$$

(8) AND (10) CAN NOW BE REWRITTEN USING (11) AND (12)

$$\begin{aligned} \Theta(y) = \frac{1}{EI}\Big[&-72.3\,lb\langle y-0\rangle^2 + 100\,lb\langle y-3ft\rangle^2 + 0.3472\,\tfrac{lb}{ft^2}\langle y-3ft\rangle^4 \\ &-0.3472\,\tfrac{lb}{ft^2}\langle y-9ft\rangle^5 - 8.333\,\tfrac{lb}{ft}\langle y-9ft\rangle^3 - 102.8\,lb\langle y-9ft\rangle^2 \\ &-200\,lb\cdot ft\langle y-12ft\rangle^1 + 1092\,lb\cdot ft^2\Big] \end{aligned} \qquad (13)$$

$$\begin{aligned} u(y) = \frac{1}{EI}\Big[&-24.10\,lb\langle y-0\rangle^3 + 33.33\,lb\langle y-3ft\rangle^3 \\ &+0.06944\,\tfrac{lb}{ft^2}\langle y-3ft\rangle^5 - 0.06944\,\tfrac{lb}{ft^2}\langle y-9ft\rangle^5 \\ &-2.083\,\tfrac{lb}{ft}\langle y-9ft\rangle^4 - 34.27\,lb\langle y-9ft\rangle^3 \\ &-100\,lb\cdot ft\langle y-12ft\rangle^2 + 1092\,lb\cdot ft^2\cdot y\Big] \end{aligned} \qquad (14)$$