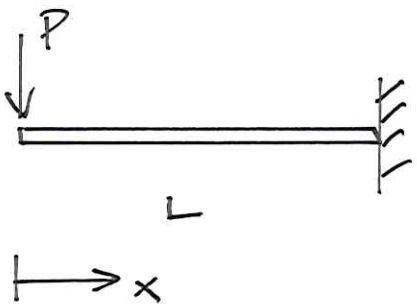
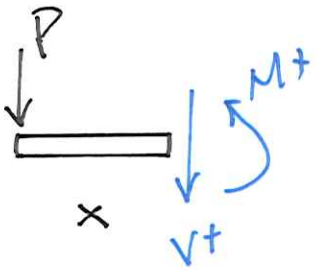


MOMENT



$\circlearrowleft +\sum M_{OUT} = 0 = M + Px$

$$M = -Px$$

$$\theta = \int \frac{M}{EI} dx = \frac{-P}{EI}\int x\,dx = \frac{-P}{EI}\left(\frac{x^2}{2}\right) + C_1$$

$$\theta(x=L) = 0$$

$$-\frac{P}{EI}\left(\frac{L^2}{2}\right) + C_1 = 0$$

$$C_1 = +\frac{PL^2}{2EI}$$

$$\theta(x) = \frac{P}{2EI}\left(-x^2 + L^2\right)$$

$$\theta(x=0) = +\frac{PL^2}{2EI}$$

$$Y = \int \theta\,dx = \frac{P}{2EI}\left[-\frac{x^3}{3} + xL^2\right] + C_2$$

$$Y(x=L) = 0$$

$$\frac{P}{2EI}\left[-\frac{L^3}{3} + L^3\right] + C_2 = 0$$

$$\frac{PL^3}{3EI} + C_2 = 0$$

$$C_2 = -\frac{PL^3}{3EI}$$

$$Y(x) = \frac{P}{EI}\left[-\frac{x^3}{6} + \frac{xL^2}{2} - \frac{L^3}{3}\right]$$

$$Y_{MAX} = -\frac{PL^3}{3EI}$$