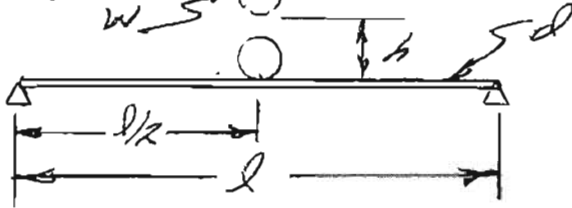


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Falling Weight on Simply Supported Beam



$$W = 5 \text{ lbs}$$

$$h = 1 \text{ in}$$

Simply Supported Beam, Circular Cross Section
 $l = 24 \text{ in}$ $d = 1/2 \text{ in}$.

Generic Steel let $E = 30 \times 10^6 \text{ lb/in}^2$
 $w = .283 \text{ lb/in}^3$

The maximum force due to impact of a falling weight onto an simply supported beam is:

$$F_{\max} = W \left[2 + \sqrt{1 + \frac{2h}{\delta_{st}} \left(\frac{1}{1 + \frac{12 w_b}{35 W}} \right)} \right] \quad \text{Approximate Solution}$$

where $\frac{w_b}{W} = A_b l_b w_b = \frac{\pi}{4} (1/2)^2 (24) (.283) = \underline{\underline{1.334 \text{ lbs}}}$

$$\delta_{st} = \frac{W l^3}{48 EI} = \frac{(5 \text{ lbs})(24 \text{ in})^3}{48 (30 \times 10^6 \frac{\text{lb}}{\text{in}^2}) \frac{\pi}{64} (1/2)^4} = \underline{\underline{0.018 \text{ in}}}$$

Substituting ...

$$F_{\max} = \underline{\underline{57.8 \text{ lbs}}} \quad \text{Approximate}$$