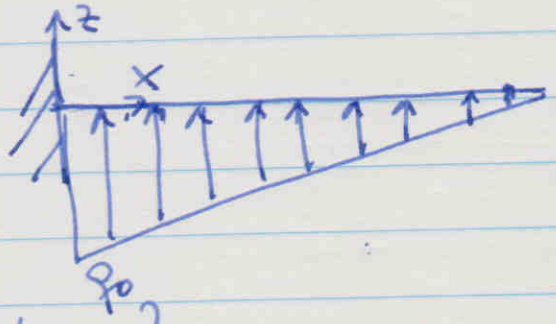
M7 Solution

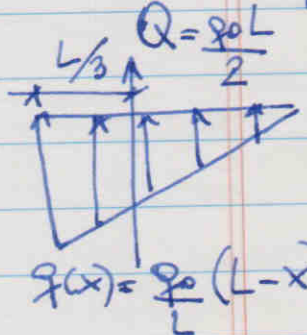


Maximum bending stress?

$$\sigma_{xx} = \frac{-M(x)\,z}{I}$$

Need maximum bending moment and "z"

M_{max} clearly occurs at $x = 0$



$$M_{max} = \underbrace{\frac{q_0 L}{2}}_{\text{equipolent force}} \times \underbrace{\frac{L}{3}}_{\text{distance}} = \frac{q_0 L^2}{6} = \frac{5\,kN}{m} \frac{(100\,m)^2}{6}$$

$$= \frac{500}{6}\,kNm$$

$$z_{max} = \pm \frac{h}{2} = \pm \frac{0.1\,m}{2} = \pm 0.05\,m$$

$$I = \frac{b h^3}{12} = \frac{0.05\,m \times (0.1\,m)^3}{12} = \frac{5}{12} \times 10^{-5}\,m^4$$

$$\sigma_{max} = \mp \frac{500}{6}\,kN/m \times \frac{0.1\,m}{2} \times \frac{12 \times 10^5}{5\,m^4} = \mp 1\,MPa$$