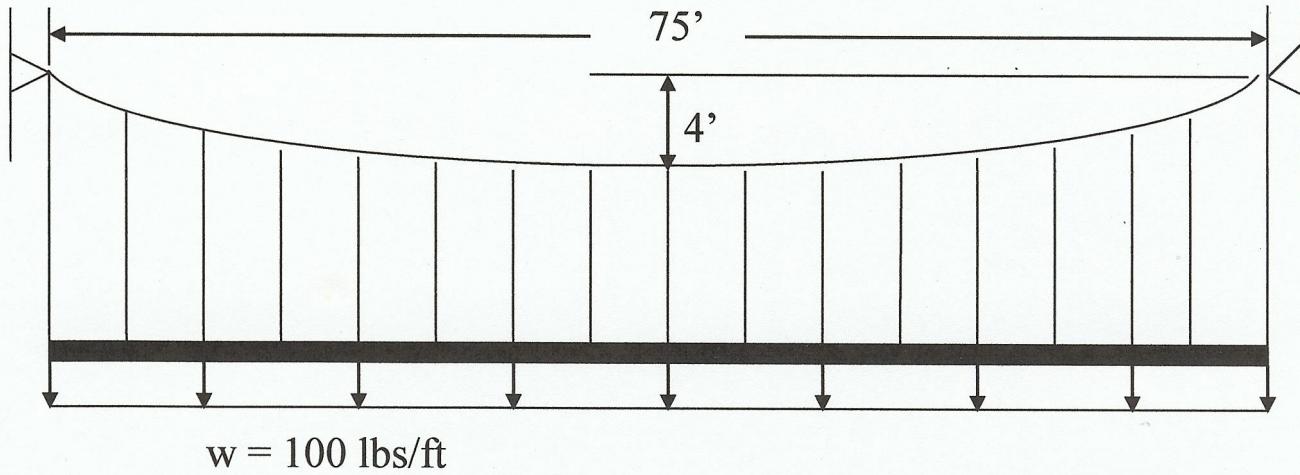


Problem 4: Cables – Distributed Loads

1. Determine the maximum tension in the cable and where it occurs.
2. Determine the minimum tension in the cable and where it occurs.
3. How long is the cable?



$$T_{\text{Max}} = \frac{w_0 L}{2} \sqrt{1 + \left(\frac{L}{4h}\right)^2} = \frac{100(75)}{2} \sqrt{1 + \left(\frac{75}{(4)(4)}\right)^2}$$

$$T_{\text{Max}} = 17,970 \text{ lbs} = \underline{\underline{17.97 \text{ Kips}}}$$

$$T_{\text{Min}} = F_H = \frac{w_0 L^2}{8h} = \frac{100(75)^2}{8(4)} = 17578 = \underline{\underline{17.58 \text{ Kips}}}$$

$$L_{\text{TOT}} = \frac{L}{2} \left[\sqrt{1 + \left(\frac{4h}{L}\right)^2} + \frac{L}{4h} \sin^{-1} \left(\frac{4h}{L} \right) \right]$$

$$= \frac{75}{2} \left[\sqrt{1 + \left(\frac{4(4)}{75}\right)^2} + \frac{75}{4(4)} \sin^{-1} \frac{4(4)}{75} \right] = \underline{\underline{75.6'}}$$