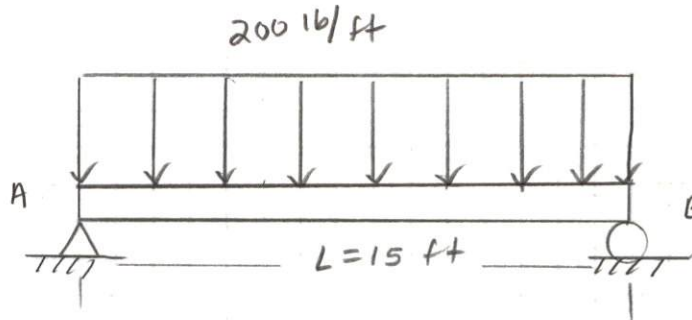


14-8

A log of 10-in. average diameter is used in a simple span of 15 ft. Determine the maximum normal stress in the log caused by a uniform load of 200 lb/ft.

Solution,



From Table 13-1, case 4

$$M_{\max} = \frac{WL^2}{8} = \frac{200 \frac{\text{lb}}{\text{ft}} (15\text{ft})^2}{8} = 5625 \text{ lb}\cdot\text{ft}$$

Section Modulus for a Circular Section

$$S = \frac{\pi d^3}{32} = \frac{\pi (10\text{in})^3}{32} = 98.17 \text{ in}^3$$

$$\begin{aligned} \sigma_{\max} &= \frac{M_{\max}}{S} = \frac{5625 \text{ lb}\cdot\text{ft} \left( \frac{12\text{in}}{\text{ft}} \right)}{98.17 \text{ in}^3} \\ &= 688 \text{ psi} \end{aligned}$$