
Description:

Solves Formula 119 of Westergaard's "Computation of Stresses in Bridge Slabs due to Wheel Loads"

Geometry:

$$u := 1\text{ft}$$

Loading:

$$P := 20\text{kips}$$

Design:

$$\text{Formula (119) for a point load: } R_x(y) := 0.1830 \cdot \frac{P}{u} \cdot \left(\frac{1}{1 + \frac{y^2}{u^2}} \right) \cdot \left[1 + \frac{1.4783}{\left(1 + \frac{y^2}{u^2} \right)} \right]$$

Reaction at left
support per unit foot:

$$R_x(0\text{ft}) = 9.07\text{klf}$$

$$R_x(u) = 3.18\text{klf}$$

$$R_x(2u) = 0.95\text{klf}$$

$$R_x(3u) = 0.42\text{klf}$$

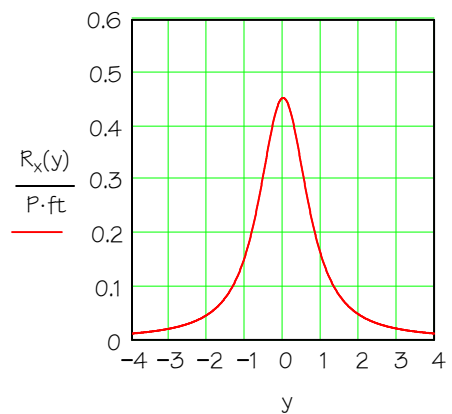
$$R_x(4u) = 0.23\text{klf}$$

$$\frac{R_x(u)}{P} = 0.1591\text{ft}^{-1}$$

$$\frac{R_x(2 \cdot u)}{P} = 0.0474\text{ft}^{-1}$$

$$\frac{R_x(3 \cdot u)}{P} = 0.0210\text{ft}^{-1}$$

$$\frac{R_x(4 \cdot u)}{P} = 0.0117\text{ft}^{-1}$$



$$\text{Total reaction should equal } P: \int_{-100\text{ft}}^{100\text{ft}} R_x(y) dy = 19.9\text{kips}$$