

$$l = 39'' \quad P = 10.39 \text{ lb} + 0.31 \text{ lb} = 10.70 \text{ lb}$$

Yellow Pine $E = 1.75 \times 10^6 \text{ psi}$

Beam $1.50'' \times 0.28''$

$$I = 2.74 \times 10^{-3} \text{ in}^4$$

$$\Delta_{\text{Midspan}} = \frac{(5.35)(39)^3}{48(1.75 \times 10^6)(2.74 \times 10^{-3})} = 1.38'' \quad \text{Theoretical}$$

1.13'' Measured

Two Equal Load, One @ $x=0$, One @ Midspan

$$\Delta_{\text{Midspan}} = \frac{(10.70)(9.75)(19.5)}{6(1.75 \times 10^6)(2.74 \times 10^{-3})(39)} [39^2 - 9.75^2 - 19.5^2]$$

$$\Delta_{\text{Midspan}} = (1.813 \times 10^{-3}) (1521 - 95.1 - 380)$$

$$\Delta_{\text{Midspan}} = 1.90'' \quad \text{Theoretical}$$

1.56'' Measured

One Load @ Center

$$\frac{1.90''}{1.38''} = 1.38$$

$$\frac{1.56''}{1.13''} = 1.38$$

Theoretical

Empirical

Ratio of Deflections

Slide Rule Era

31 Jan 2015