Comparison of strength of two beams

$L_1 := 8\text{ft}$ $L_2 := 12\text{ft}$ *Two different length beams*

$\text{Reaction} := 1\text{lbf}$ *Same centered force, same reaction force*

$b := 4\text{in}$ *Same base on each beam*

$h_1 := 10\text{in}$ $h_2 := 12\text{in}$ *Different beam heights*

$I_1 := \frac{1}{12} b \cdot h_1^{\,3} = 333.333\text{in}^4$

Calculated section moduli

$I_2 := \frac{1}{12} b \cdot h_2^{\,3} = 576\text{in}^4$

$M_{max.1} := \text{Reaction} \cdot \frac{L_1}{2} = 4\,\text{ft}\cdot\text{lbf}$

Max bending moment in beams

$M_{max.2} := \text{Reaction} \cdot \frac{L_2}{2} = 6\,\text{ft}\cdot\text{lbf}$

$c_{sec.1} := \frac{h_1}{2} = 5\,\text{in}$

Fiber distance in beam (half the height)

$c_{sec.2} := \frac{h_2}{2} = 6\,\text{in}$

$\sigma_{max.1} := \frac{M_{max.1} c_{sec.1}}{I_1} = 7.2 \times 10^{-4}\,\text{ksi}$

Calculated max stresses

$\sigma_{max.2} := \frac{M_{max.2} c_{sec.2}}{I_2} = 7.5 \times 10^{-4}\,\text{ksi}$

$\text{PercentDiff} := \frac{\left(\sigma_{max.2} - \sigma_{max.1}\right)}{\sigma_{max.1}} \cdot 100 = 4.167$

Percent Difference σ.2 vs. σ.1