

FLEXURE DESIGN (Cont'd)

$$L_e := \begin{cases} 2.06 \cdot L_u & \text{if } \frac{L_u}{d} < 7 \\ 1.84 \cdot L_u & \text{if } \frac{L_u}{d} > 14.3 \\ 1.63 \cdot L_u + 3 \cdot d & \text{otherwise} \end{cases}$$

$$L_e = 29.58 \cdot \text{ft}$$

effective unbraced length

$$R_B := \sqrt{\frac{L_e \cdot d}{b^2}} = 8.812$$

(8.6.2-5)

$$F_{bE} := \frac{K_{bE} \cdot E}{R_B^2} = 31.81 \cdot \text{ksi}$$

(8.6.2-4)

$$A_w := \frac{F_{bE}}{F_b} = 0.543$$

(8.6.2-3)

$$C_L := \frac{1 + A}{1.9} - \sqrt{\frac{(1 + A)^2}{3.61} - \frac{A}{0.95}} = 0.516$$

(8.6.2-2)

$$M_n := F_b \cdot S \cdot C_L = 657.765 \cdot \text{kip} \cdot \text{ft}$$

Nominal moment capacity

SHEAR DESIGN (Sec 8.7)

$$F_v := 2.620 \cdot \text{ksi}$$

Shear Strength (from Specifications)

$$V_n := \frac{F_v \cdot b \cdot d}{1.5} = 195.627 \cdot \text{kip}$$

Nominal shear capacity

FACTORED LOADS

$$\gamma_{\text{beam}} := 68 \cdot \frac{\text{lb}}{\text{ft}^3}$$

Density of beam (from Timber Holdings)