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ARCH 324 - Structures 2, Winter 2009

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14-1 (3) e

\[ W = 20k \]

\[ M_{\text{max}} = \frac{Wl}{8} = \frac{20 \times 32}{8} = 80 \text{ k-ft} \]

\[ M_{\text{max}} = \frac{PL}{4} = \frac{20 \times 32}{4} = 160 \text{ k-ft} \]

\[ \Sigma M_{\text{max}} = 80 + 160 = 240 \text{ k-ft} \]

\[ f_b = 30 \text{ ksi} \geq \frac{M_{\text{max}}}{S} = \frac{2880 \text{ k-ft}}{S} \]

\[ S \geq \frac{2880}{30} = 96 \text{ in}^3 \]

\[ \text{From D-36, choose W18x55: } S = 98.3 \text{ in}^3 \]