ARCH 324 - Structures 2, Winter 2009

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Determine the critical slenderness ratio for each of the following about the weak (Y-Y) axis.

Use 10' length.

\[ I_y = \frac{10(8)^3}{12} - 2\left(\frac{6(3)^3}{12}\right) - 2(3(6))(2.5^2) \]
\[ = 174.67 \text{ in}^4 \]
\[ A = 2(2)(8) + 2(6) = 44 \text{ in}^2 \]
\[ k_y = \sqrt{\frac{I_y}{A}} = \sqrt{\frac{174.67}{44}} = 1.972 \text{ in} \]
\[ \frac{K_y}{k_y} = \frac{1(120)}{1.972} \approx 60.22 \]

\[ I_y = \frac{4(4)^3}{12} - \frac{3(3)^3}{12} = 14.583 \text{ in}^4 \]
\[ A = 4^2 - 3^2 = 7 \text{ in}^2 \]
\[ k_y = \sqrt{\frac{I_y}{A}} = \sqrt{\frac{14.583}{7}} = 1.443 \text{ in} \]
\[ \frac{K_y}{k_y} = \frac{1(20)}{1.443} \approx 83.16 \]