ARCH 324 - Structures 2, Winter 2009

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\[ \bar{x} = \frac{2A_d}{\delta A} = \frac{12(5.5) + 10(2.5)}{12 + 10} = 4.136 \text{" (from 8.044)} \]

\[ I_x = \frac{12(1)^3 + 12(1.564)^2 + (5)^3}{12} = 1.864 \text{"} \text{" (from 7.04)} \]

\[ I_x = 70.936 \text{ in}^4 \quad \text{<-- CONTROLS} \]

\[ I_y = \frac{1(12)^3 + 5(2)^3}{12} = 147.33 \text{ in}^4 \]

\[ A = 12 + 10 = 22 \]

\[ r_x = \sqrt{\frac{I_y}{A}} = \sqrt{\frac{70.936}{22}} = 1.7956 \text{ in} \]

\[ \frac{K_d}{r} = \frac{1(120)}{1.7956} = 66.98 \]

\[ I = \frac{1}{4} \pi 3^4 - \frac{1}{4} \pi 2.5^4 = 32.94 \text{ in}^4 \]

\[ A = \pi 3^2 - \pi 2.5^2 = 8.639 \text{ in}^2 \]

\[ r = \sqrt{\frac{I}{A}} = \sqrt{\frac{32.94}{8.639}} = 1.952 \]

\[ \frac{K_A}{r} = \frac{1(120)}{1.952} = 61.458 \]