ARCH 324 - Structures 2, Winter 2009

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<http://hdl.handle.net/2027.42/64938>
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\[ \bar{X} = \frac{\sum A d}{\sum A} = \frac{12(5.5) + 10(2.5)}{12 + 10} = 4.136 \text{"} \] (from previous work)

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

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

\[ I_Y = \frac{1(12)^3}{12} + \frac{5(2)^3}{12} = 14.733 \text{ in}^4 \]

\[ A = 12 + 10 = 22 \]

\[ r_X = \sqrt{\frac{I_X}{A}} = \sqrt{\frac{70.936}{22}} = 1.7956 \text{ in} \]

\[ \frac{K^2}{r_X} = \frac{1(120)}{1.7956} = 66.83 \]

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

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

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

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