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\[ \bar{X} = \frac{1A d}{\varepsilon A} = \frac{12(5.5) + 10(2.5)}{12 + 10} = 4.136'' \text{ (from 70)} \]

\[ I_x = \frac{12(1)^3 + 12(1.364)^2 + 2(5)^3}{12} = 1.864'' \text{ (from 70)} \]

\[ I_x = 70.936 \text{ in}^4 \leftarrow \text{ CONTROLS} \]

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

\[ A = 12 + 10 = 22 \]

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

\[ K_p \frac{L}{r_x} = \frac{1(120)}{1.7956} = 66.83 \]

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

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

\[ r = \sqrt{\frac{5}{A}} = \sqrt{\frac{32.94}{8.639}} = 1.952 \]

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