

E. Design Procedure for Columns

Step 1: Determine the factored design loads (AISC/LRFD Specification A4).

Step 2: From the column tables, determine the effective length KL using

$$KL = \max \left\{ K_y L_y (\text{weak-axis}), \frac{K_x L_x}{r_x/r_y} (\text{strong-axis}) \right\}$$

and pick a section.

Step 3: Check using Table 3-36 or 3-50.

1. Calculate KL/r and enter into Table 3-36 or 3-50.
2. Find the design stress $\phi_c F_{cr}$.
3. Find the design strength $\phi_c F_{cr} A_g$.

or using formulas:

$$\lambda_c = \max \left\{ \frac{K_x L_x}{r_x \pi} \sqrt{\frac{F_y}{E}}, \frac{K_y L_y}{r_y \pi} \sqrt{\frac{F_y}{E}} \right\} \quad (\text{E2-4})$$

$$F_{cr} = \begin{cases} 0.658 \lambda_c^2 F_y & \text{for } \lambda_c < 1.5 \\ 0.877 F_E = \frac{0.877}{\lambda_c^2} F_y & \text{for } \lambda_c \geq 1.5 \end{cases} \quad (\text{E2-2, E2-3})$$

$$\phi_c P_n = \phi_c F_{cr} A_g = 0.85 F_{cr} A_g \quad (\text{E2-1})$$