

5.9 Steps in the design of axially loaded columns

The procedure for the design of an axially compressed column is as follows:

- (i) Assume a suitable trial section and classify the section in accordance with the classification in chapter.
- (ii) Arrive at the effective length of the column by suitably considering the end conditions.
- (iii) Calculate the slenderness ratios (λ values) in both minor and major axes direction and also calculate λ_0 using the formula given below:

$$\lambda_0 = 0.2\pi\sqrt{\frac{E}{f_y}}$$

- (iv) Calculate f_{cd} values along both major and minor axes from equation 12
- (v) Compute the load that the compression member can resist ($p_d = A_c f_{cd}$)
- (vi) Calculate the factored applied load and check whether the column is safe against the given loading. The most economical but safe section can be arrived at by trial and error, i.e. repeating the above process.

The following values are suggested for initial choice of members:

- (i) Single angle size: 1/30 of the length of the strut ($L / r \sim 150$)
- (ii) Double angle size: 1/35 of the length of strut ($L / r \sim 100-120$)
- (iii) Circular hollow sections diameter = 1/40 length ($L / r \sim 100$)