

Steel Structures

Eccentric compression

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- double symmetric sections
- no torsional deformation
- full support in the axes of both direction in the ends of the bar
- 1, 2 and 3 class sections

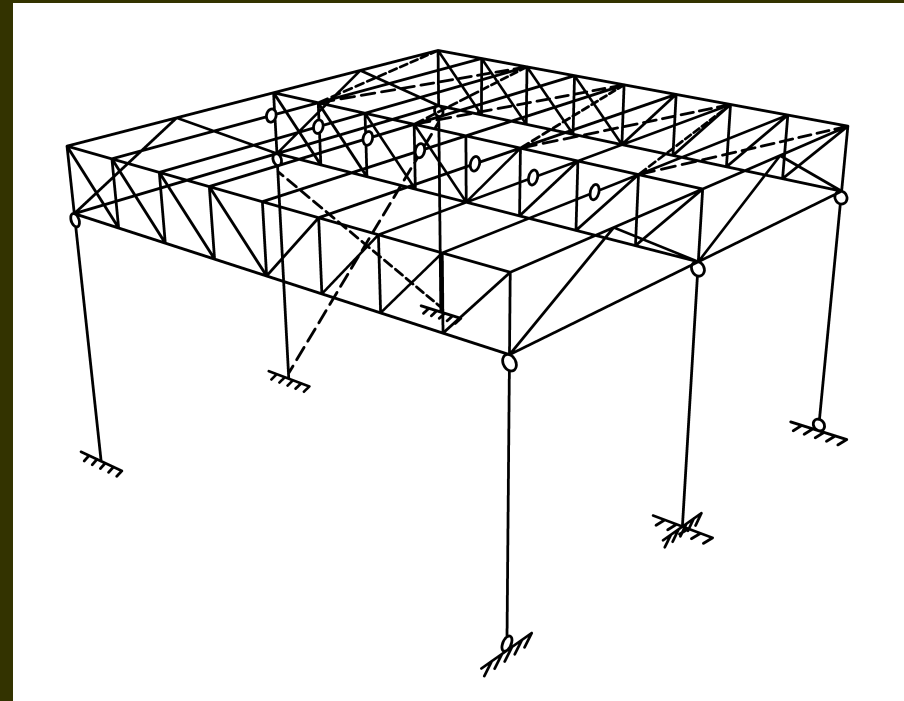
The general equations

$$\frac{\frac{N_{Ed}}{\chi_y Af_y}}{\gamma_{M1}} + k_{yy} \frac{\frac{M_{y,Ed}}{W_y f_y}}{\chi_{LT} \gamma_{M1}} + k_{yz} \frac{\frac{M_{z,Ed}}{W_z f_y}}{\gamma_{M1}} \leq 1,0$$

$$\frac{\frac{N_{Ed}}{\chi_z Af_y}}{\gamma_{M1}} + k_{zy} \frac{\frac{M_{y,Ed}}{W_y f_y}}{\chi_{LT} \gamma_{M1}} + k_{zz} \frac{\frac{M_{z,Ed}}{W_z f_y}}{\gamma_{M1}} \leq 1,0$$

where:

- the effects are
- the (buckling) resistances are
- the modification factors are



$$N_{Ed}, M_{y,Ed}, M_{z,Ed}$$

$$\frac{\chi_y Af_y}{\gamma_{M1}}, \chi_{LT} \frac{W_y f_y}{\gamma_{M1}}, \frac{W_z f_y}{\gamma_{M1}}$$

$$k_{yy}, k_{yz}, k_{zy}, k_{zz}$$

The modification factors

No torsional buckling and 3 class section:

- Full lateral bracing

- $\chi_{LT} \approx 1$

$$k_{yy} = C_{my} \left(1 + 0,6 \bar{\lambda}_y \frac{N_{Ed}}{\chi_y \frac{N_{Rk}}{\gamma_{M1}}} \right) \quad \text{but } \bar{\lambda}_y \leq 1,0 \quad \text{and} \quad k_{yz} = k_{zz}$$

$$k_{zz} = C_{mz} \left(1 + 0,6 \bar{\lambda}_z \frac{N_{Ed}}{\chi_z \frac{N_{Rk}}{\gamma_{M1}}} \right) \quad \text{but } \bar{\lambda}_z \leq 1,0 \quad \text{and} \quad k_{zy} = k_{yy}$$

where C_{mz} is the moment factor

The modification factors

No torsional buckling and 1, 2 classes section:

- Full lateral bracing

- $\chi_{LT} \approx 1$

$$k_{yy} = C_{my} \left(1 + (\bar{\lambda}_y - 0,2) \frac{N_{Ed}}{\chi_y \frac{N_{Rk}}{\gamma_{M1}}} \right) \quad \text{but } \bar{\lambda}_y \leq 1,0 \quad \text{and} \quad k_{yz} = 0,6k_{zz}$$

- for I and H sections:

$$k_{zz} = C_{mz} \left(1 + (2\bar{\lambda}_z - 0,6) \frac{N_{Ed}}{\chi_z \frac{N_{Rk}}{\gamma_{M1}}} \right) \quad \text{but } \bar{\lambda}_z \leq 1,0 \quad \text{and} \quad k_{zy} = 0,6k_{yy}$$

- for hollow sections:

$$k_{zz} = C_{mz} \left(1 + (\bar{\lambda}_z - 0,2) \frac{N_{Ed}}{\chi_z \frac{N_{Rk}}{\gamma_{M1}}} \right) \quad \text{but } \bar{\lambda}_z \leq 1,0 \quad \text{and} \quad k_{zy} = 0,6k_{yy}$$

The modification factors

With torsional buckling and 1, 2 classes section:

- k_{yy} , k_{yz} and k_{zz} are the same like with no torsional buckling

- for 3 class

$$k_{zy} = \left(1 - \frac{0,05 \bar{\lambda}_z}{(C_{mLT} - 0,25)} \frac{N_{Ed}}{\chi_z \frac{N_{Rk}}{\gamma_{M1}}} \right) \quad \text{but } \bar{\lambda}_z \leq 1,0$$

- for 1, 2 classes

$$k_{zy} = \left(1 - \frac{0,01 \bar{\lambda}_z}{(C_{mLT} - 0,25)} \frac{N_{Ed}}{\chi_z \frac{N_{Rk}}{\gamma_{M1}}} \right) \quad \text{but } \bar{\lambda}_z \leq 1,0$$