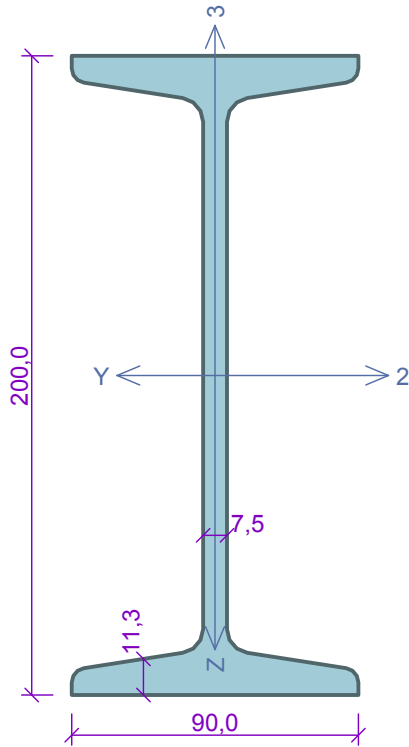


Beam B3



Calculation standard EN 1993-1-1
Calculation in accordance with Czech national annex.
Cross-section resistance factor $\gamma_{M0} = 1,000$
Stability check resistance factor $\gamma_{M1} = 1,000$
Perforated cross-section resistance factor $\gamma_{M2} = 1,250$

Section I 200
Cross-sectional area:
 $A = 3,340E03 \text{ mm}^2$
Center of gravity position:
 $y_T = 45,0 \text{ mm}$ $z_T = 100,0 \text{ mm}$
Second moments of area:
 $I_y = 2,140E07 \text{ mm}^4$ $I_z = 1,160E06 \text{ mm}^4$
Cross-section moduli:
 $W_{y,1} = -2,132E05 \text{ mm}^3$ $W_{z,1} = 2,544E04 \text{ mm}^3$
 $W_{y,2} = 2,132E05 \text{ mm}^3$ $W_{z,2} = -2,544E04 \text{ mm}^3$
Torsion constant:
 $I_k = 1,360E05 \text{ mm}^4$
Warping constant:
 $I_\omega = 9,980E09 \text{ mm}^6$
Plastic cross-section moduli:
 $W_{pl,y} = 2,481E05 \text{ mm}^3$ $W_{pl,z} = 4,310E04 \text{ mm}^3$

Material: EN 10025 : Fe 360
Material characteristics:
Elastic modulus $E : 210000 \text{ MPa}$
Shear modulus $G : 81000 \text{ MPa}$
Yield strength $f_y : 235,0 \text{ MPa}$
Ultimate strength $f_u : 360,0 \text{ MPa}$

Internal forces in system of cross-section coordinates

Load with maximal utilization

Load 1: compression + bending

$N = -55,000 \text{ kN}$
 $V_z = 20,000 \text{ kN}$ $M_y = 14,000 \text{ kNm}$
 $V_y = 0,000 \text{ kN}$ $M_z = 0,000 \text{ kNm}$
 $T_t = 0,000 \text{ kNm}$
 $T_\omega = 0,000 \text{ kNm}$ $B = 0,000 \text{ kNm}^2$

Buckling parameters

Length: 8,730 m

$L_z = 4,365 \text{ m}$ $k_z = 1,000$ $L_{cr,z} = 4,365 \text{ m}$
 $L_y = 4,365 \text{ m}$ $k_y = 1,000$ $L_{cr,y} = 4,365 \text{ m}$
 $L_\omega = 4,365 \text{ m}$ $k_\omega = 1,000$ $L_{cr,\omega} = 4,365 \text{ m}$

LTB parameters

End condition factors: $k_y = -$ $k_z = 1.0$ $k_w = 1.0$

$l_{z1} = 1,000 \text{ m}$ M_y : Shape no.1
 $l_{y1} = 1,000 \text{ m}$ M_z : Shape N/A

Results

Decisive load: Load 1: compression + bending

Cross-section class: 1

Shear check due to shear force V_z :

$20,000 \text{ kN} < 211,691 \text{ kN}$ **Pass**

Internal forces: $N = -55,000 \text{ kN}$; $M_y = 14,000 \text{ kNm}$; $M_z = 0,000 \text{ kNm}$

Critical combination check: buckling compression and bending moment:

Buckling Y: Resistances: $N_R = -704,193 \text{ kN}$; $M_{y,R} = 52,569 \text{ kNm}$

$|0,078 + 0,266 + 0,000| = |0,344| < 1$ **Pass**

Buckling Z: Resistances: $N_R = -110,123 \text{ kN}$; $M_{y,R} = 52,569 \text{ kNm}$

$|0,499 + 0,266 + 0,000| = |0,766| < 1$ **Pass**

Member slenderness: 234,2

Section ok

PASS