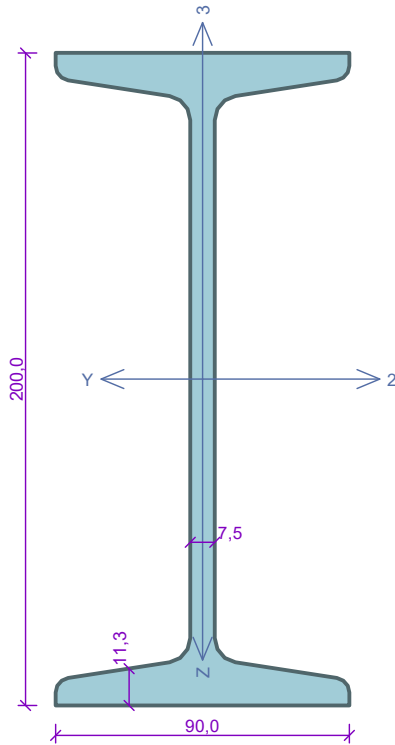


Section 1



Standard **EN 1993-1-1/Czech Rep..**

Section capacity : $\gamma_{M0} = 1,000$
 Section resistance when checking stability : $\gamma_{M1} = 1,000$
 Perforated section capacity : $\gamma_{M2} = 1,250$

Section I(IPN) 200

Cross-sectional area: $A = 3,340E03 \text{ mm}^2$
 Centre 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:

Yield strength f_y : 235,0 MPa
 Ultimate strength f_u : 360,0 MPa
 Elastic modulus E : 210000 MPa
 Shear modulus G : 81000 MPa

Internal forces in system of cross-section coordinates

Load with maximal utilization

Load 01: 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

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

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 01: Compression + bending; **Cross-section class:** 1

Check of shear due to shear force V_z :

20,000 kN < 211,691 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: $N_R = -704,193 \text{ kN}$; $M_{y,R} = 51,052 \text{ kNm}$

$|0,078 + 0,274 + 0,000| = |0,352| < 1$ **Pass**

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

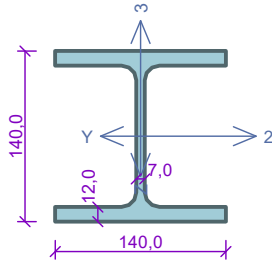
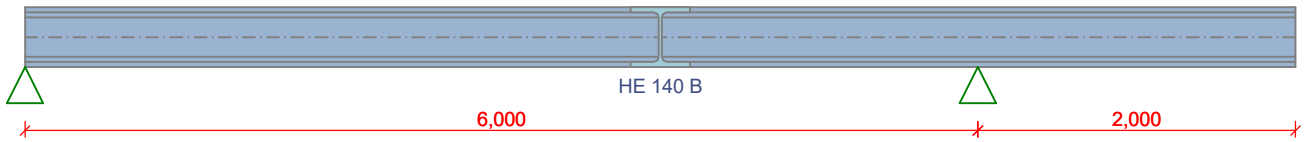
$|0,499 + 0,266 + 0,000| = |0,766| < 1$ **Pass**

Member slenderness: 234,2

Section ok

PASS

Beam 1



Standard EN 1993-1-1/Czech Rep..

Section HE 140 B

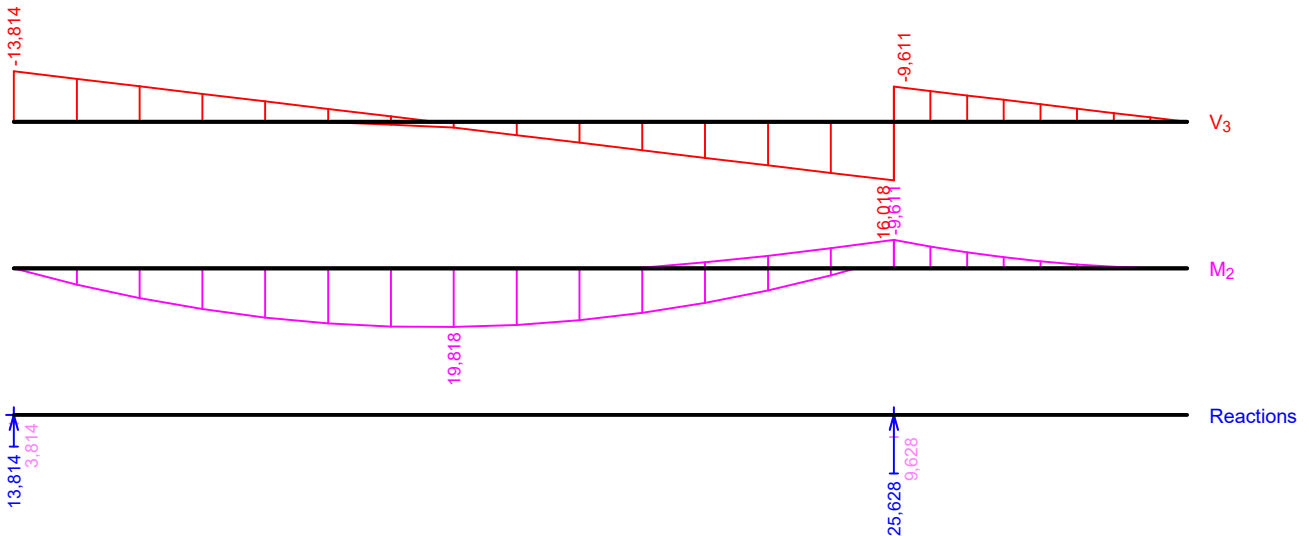
Material: EN 10210-1 : S 235

Load

$f_{q,1} = 0,337$ kN/m	$\gamma_f = 1,35$
$f_{q,2} = 1,000$ kN/m	$\gamma_f = 1,35$
$f_{q,3} = 2,000$ kN/m	$\gamma_f = 1,5$
$f_{q,4} = 2,000$ kN/m (0,000 - 6,000m)	$\gamma_f = 1,5$
$f_{q,5} = 2,000$ kN/m (6,000 - 8,000m)	$\gamma_f = 1,5$

LTB parameters

End condition factors: $k_y = -$ $k_z = 1,0$ $k_w = 1,0$
 $l_{z1} = 8,000$ m M_y : Shape no.4 $z_p = 1,000$



Results - Decisive load: Q4:G1+G2; Cross-section class: 1

Check of shear due to shear force V_z :

$0,602$ kN < $177,466$ kN **Pass**

Bending moment: $M_y = 19,818$ kNm

Bending moment check:

Resistance: $M_{y,R} = 37,781$ kNm

$|0,525| < 1$ **Pass**

Section ok

Characteristic load states

Maximum deformation is $14,7$ mm at point $x = 8,000$ m

Maximum allowed deformation is $4,000$ / $250,0 = 16,0$ mm

$14,7$ mm < $16,0$ mm **Pass**

Member deflection PASS

PASS