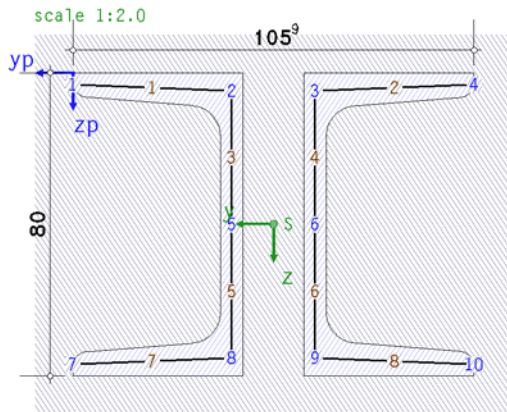


POS. 7: 4H-QUER-SECTION

Welded connection EC 3-1-8 (04.25), NA: Deutschland

1. input report



material

steel grade S235

material safety factors

resistance of cross-sections $\gamma_{M0} = 1.00$

resistance of bolts, welds, plates in bearing $\gamma_{M2} = 1.25$

geometry

section depth, width $h = 80.0$ mm, $b = 105.9$ mm

centroid $y_s = -53.0$ mm, $z_s = 40.0$ mm

cross-sectional area $A = 22.05$ cm²

second moments of area $I_y = 211.89$ cm⁴, $I_z = 150.45$ cm⁴

torsional moment of inertia $I_T = 4.33$ cm⁴

warping moment of inertia $I_\omega = 361.85$ cm⁶

plate: thickness $t_p = 35.0$ mm

full penetrated butt weld

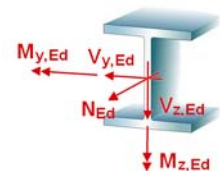
resistance

elastic cross-sectional check

internal forces and moments referring to local axes of cross-section

Lc 1: $N_{Ed} = -20.00$ kN, $M_{y,Ed} = 5.00$ kNm, $V_{z,Ed} = 10.00$ kN

$M_{z,Ed} = 3.00$ kNm, $V_{y,Ed} = 6.00$ kN



2. Lc 1

2.1. verification of cross-section

elastic verification for $N = -20.00$ kN, $M_y = 5.00$ kNm, $V_z = 10.00$ kN, $M_z = 3.00$ kNm

$V_y = 6.00$ kN

verification: $\sigma_v = 208.71$ N/mm² < $\sigma_{v,Rd} = 235.00$ N/mm² $\Rightarrow U_\sigma = 0.888 < 1$ ok

c/t-ratio (reg. section class 3):

outstand flange: utilization $U_{c/t} = 0.275 < 1$ ok

internal compression parts: utilization $U_{c/t} = 0.064 < 1$ ok

2.2. verification of welds

maximum utilization for $\sigma_{w,Ed} = 208.7$ N/mm², $t_1 = 35.0$ mm, $t_2 = 6.2$ mm, $a = 6.2$ mm

loading $F_{w,Ed} = \sigma \cdot a = 1295.63$ kN/m

resistance of the weld: $F_{w,Rd} = 0.9 \cdot f_u \cdot t / \gamma_{M2} = 1609.07$ kN/m

$F_{w,Ed} = 1295.63$ kN/m < $F_{w,Rd} = 1609.07$ kN/m $\Rightarrow U_w = 0.805 < 1$ ok

3. final result

maximum utilization:	resistance	max $U = 0.888 < 1$ ok
	c/t-ratio	max $U = 0.275 < 1$ ok

verification succeeded

4. Regulations

EN 1990, Eurocode 0: Grundlagen der Tragwerksplanung;
Deutsche Fassung EN 1990:2002 + A1:2005 + A1:2005/AC:2010, Ausgabe Dezember 2010
EN 1990/NA, Nationaler Anhang zur EN 1990, Ausgabe Dezember 2010

EN 1993-1-1, Eurocode 3: Bemessung und Konstruktion von Stahlbauten -
Teil 1-1: Allgemeine Bemessungsregeln und Regeln für den Hochbau;
Deutsche Fassung EN 1993-1-1:2022, Ausgabe April 2025
EN 1993-1-1/NA, Nationaler Anhang zur EN 1993-1-1, Ausgabe April 2026

EN 1993-1-8, Eurocode 3: Bemessung und Konstruktion von Stahlbauten -
Teil 1-8: Bemessung von Anschlüssen; Deutsche Fassung EN 1993-1-8:2024, Ausgabe April 2025
EN 1993-1-8/NA, Nationaler Anhang zur EN 1993-1-8, Ausgabe April 2026