

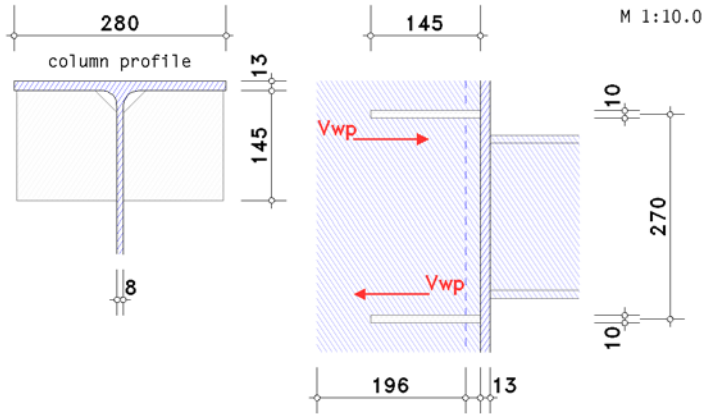
POS. 23: COLUMN WEB PANEL IN SHEAR

4H-EC3GK version: 1/2012-1k

Column web panel in shear

Basic component 1

EC 3-1-8 (12.10), NA: Germany



column:

clear depth of the web $d_c = 196.0$ mm

web thickness $t_{wc} = 8.0$ mm

flange thickness $t_{fc} = 13.0$ mm

flange width $b_{fc} = 280.0$ mm

steel grade S 275

shear area $A_{vc} = 3174.00$ mm²

reinforcement of column web with stiffeners:

plate thickness $t_{st} = 10.0$ mm, length $l_{st} = 145.0$ mm, steel grade S 235

distance of web stiffeners $d_{st} = 270.0$ mm

safety factor: $\gamma_{M0} = 1.00$

stress:

Lk 1 : $V_{wp,Ed} = 300.0$ kN [g+p1+w]

design resistance

column web slenderness $d_c/t_{wc} = 24.50 < 69 \cdot \epsilon = 63.78 \Rightarrow$ method applicable

plastic shear resistance without stiffeners $V_{wp,Rd} = (0.9 \cdot f_{y,wc} \cdot A_{vc}) / (3^{1/2} \cdot \gamma_{M0}) = 453.5$ kN

application of web stiffeners:

additional design resistance $V_{wp,add,Rd} = 4 \cdot M_{pl,fc,Rd} / d_s = 1038.1$ kN

$V_{wp,add,Rd} > 2 \cdot (M_{pl,fc,Rd} + M_{pl,st,Rd}) / d_s = 525.3$ kN $\Rightarrow V_{wp,add,Rd} = 525.3$ kN

plastic shear resistance with web stiffeners $V_{wp,Rd} = 978.9$ kN

verification

Lk 1: $V_{Ed} = 300.0$ kN $< V_{Rd} = 978.9$ kN \Rightarrow utilization = 0.306 < 1 ok.