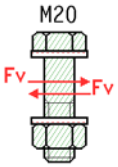
bc 11, bolts in shear

4H-EC3GK version: 10/2012-3j

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

1. input report

M 1:5.0



bolt class 8.8, bolt size M20
large wrench size (high strength bolt), slip resistant connection (prestressed)
preload force $F_{p,C} = 0.7 \cdot f_{ub} \cdot A_s = 137.2$ kN
shaft included in the shear plane
1-shear connection with packing, plate thickness $t_p = 10.0$ mm
slip: class of friction surfaces A (slip factor $\mu = 0.50$)
number of bolts $n_s = 2$
partial safety factors for material: $\gamma_{M2} = 1.25$, $\gamma_{M3} = 1.25$ (standard)
stress:
lc 1 : $F_{v,Ed} = 75.0$ kN

2. calculation

2.1. resistance

bolt category C (class of friction surfaces A):
preload force $F_{p,C} = 0.7 \cdot f_{ub} \cdot A_s = 137.2$ kN
slip resistance in ULS $F_{s,Rd} = (k_s \cdot n \cdot \mu \cdot F_{p,C}) / \gamma_{M3} = 54.88$ kN, $k_s = 1.00$, $n = 1$
shear resistance of 2 bolts (1-shear): $\Sigma F_{v,Rd} = 2 \cdot F_{v,Rd} = 109.76$ kN

2.2. verification

lc 1: $F_{v,Ed} = 75.0$ kN $<$ $F_{v,Rd} = 109.8$ kN $\Rightarrow$ $U = 0.683 < 1$ ok

verification succeeded