

PolyColumn Documentation

Beam Properties

Concrete		Stirrups	Reinforcement	
C30	30MPa	No stirrups	f_{yk}	550MPa
b_w	1,000mm		Y8/200	34mm
t	250mm		Y8/200	216mm
cc	30mm			

Supports

x [m]	N	F_z	F_y	M_y	M_z	M_x
0	Fixed	Fixed	Fixed	Free	Free	Fixed
3	Free	Fixed	Fixed	Free	Free	Fixed

Loads

Load Case	x [m]	N [kN]	e_z [mm]	e_y [mm]
Load case 1	3	1,379	100	0

Results

Type	Design Check
ULS	96%

Design Check

The internal forces are calculated using a second-order analysis

Design Code

🇩🇰 Eurocode DKNA

Partial Factors

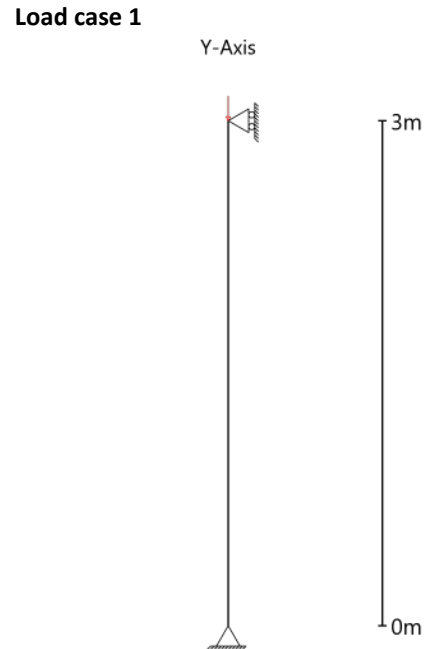
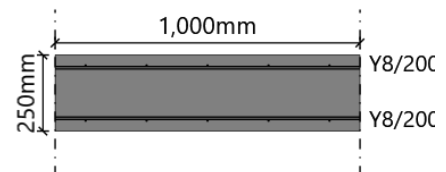
γ_c 1.400

γ_s 1.200

$\gamma_{c,fi}$ 1.000

$\gamma_{s,fi}$ 1.000

Concrete		Reinforcement	
		Longitudinal	
C30	30MPa	f_{yk}	550MPa
Cement	Class N	E_s	200,000MPa
Aggregate	Siliceous	Type	Hot rolled Class B



Buckling Settings

Z-Axis

Load attack point Top



Y-Axis

load attack point Top



Ultimate Limit State (ULS)

Compression Capacity

$$N_{Ed} = -1,379 \text{ kN}, x = 0 \text{ m}$$

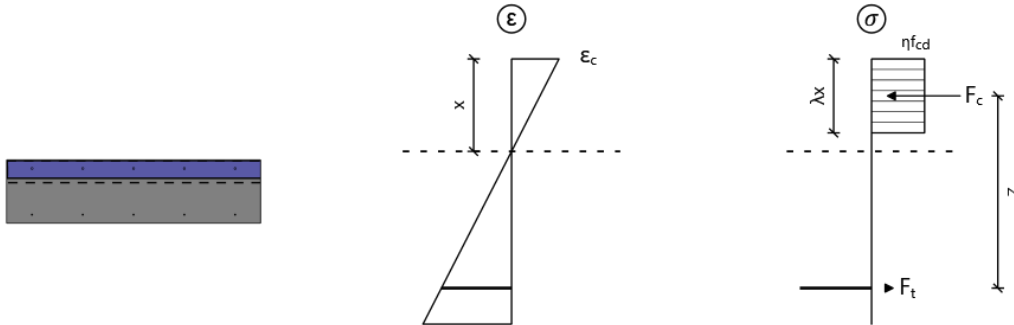
$$N_{Rd} = A_c \cdot f_{cd} + A_s \cdot (f_{yd} - f_{cd}) = 5,577 \text{ kN}$$

$$\frac{N_{Ed}}{N_{Rd}} = 25\% \leq 100\%$$

The compression force should be applied with a minimum eccentricity $e_0 = h/30 > 20 \text{ mm}$ acc. EN1992-1-1 6.1(4)

Bending Moment and Axial Force (EN 1992-1-1 6.1)

$$M_{y,Ed} = 139 \text{ kNm}, N_{Ed} = -1,379 \text{ kN}, x = 2.62 \text{ m}$$



$$M_{Ed} = \sqrt{M_{y,Ed}^2 + M_{z,Ed}^2} = 139 \text{ kNm}$$

$$M_{Rd} = 145 \text{ kNm}$$

$$\frac{M_{Ed}}{M_{Rd}} = 96\% \leq 100\%$$

$$x = 87.2 \text{ mm}$$

$$\epsilon_{cu3} = 0.0035$$

Shear Capacity Z-Axis (EN 1992-1-1 6.2.2)

$$V_{Ed} = 46 \text{ kN}, x = 1.5 \text{ m}$$

$$V_{Rd,c} = \left(C_{Rd,c} \cdot k \cdot (100 \cdot \rho_l \cdot f_{ck})^{1/3} + k_1 \cdot \sigma_{cp} \right) \cdot b_w \cdot d = 222 \text{ kN}$$

$$V_{Rd,c,min} = (v_{min} + k_1 \cdot \sigma_{cp}) \cdot b_w \cdot d = 257 \text{ kN}$$

$$\frac{V_{Ed}}{V_{Rd}} = 18\% \leq 100\%$$

Arch effects at the supports acc. DKNA 6.2.2(6) is included - $\beta = 1.00$ (distance to support edge = 1.5m)

