Project: Amsterdam industrial
Project no: 20231090
Author: Dave the Engineer

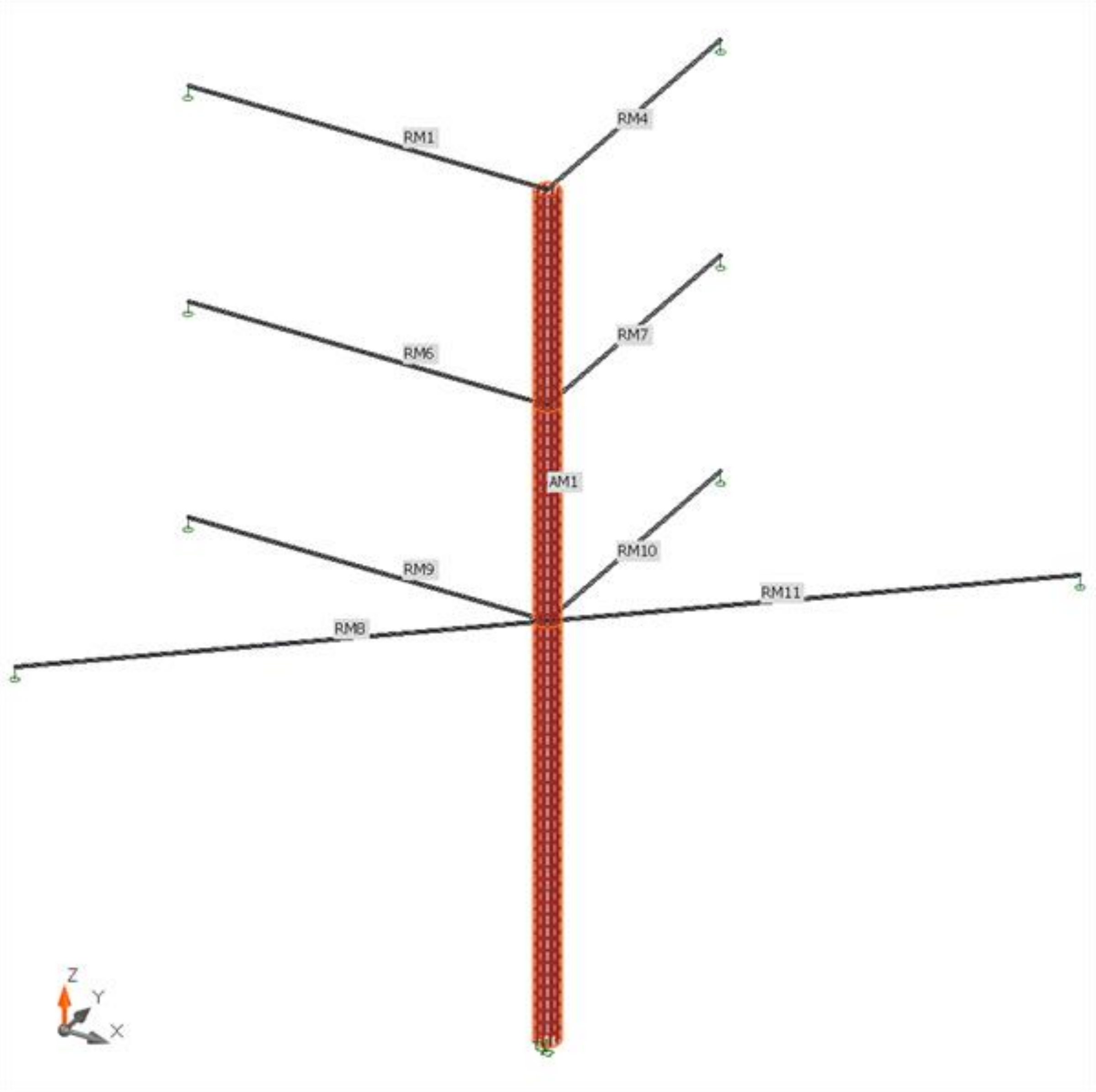
Project data

Project data: Amsterdam Industrial – Slender circular column

Date: 10.03.2023

Design code: EN

Geometry



Analyzed members

AM1

Property	Value
Name	AM1
Members	M2, M3, M4
Cross-section	Circle 410
Length	14,20 m
ey	0 mm
ez	0 mm
Begin	(0,00; 0,00; 0,00) m
End	(0,00; 0,00; 14,20) m
Member type	Column 1
Support	■ X | ■ Y | ■ Z | ■ Rx | ■ Ry | ■ Rz

Related members

RM1

Property	Value
Name	RM1
Members	M5
Cross-section	Rectangle 500, 250
Length	6,00 m
ey	0 mm
ez	0 mm
Begin	(-6,00; 0,00; 14,20) m
End	(0,00; 0,00; 14,20) m
Support	□ X | □ Y | ■ Z | □ Rx | □ Ry | □ Rz

RM4

Property	Value
Name	RM4
Members	M8
Cross-section	Rectangle 500, 250
Length	5,00 m
ey	0 mm
ez	0 mm
Begin	(0,00; 5,00; 14,20) m
End	(0,00; 0,00; 14,20) m
Support	□ X | □ Y | ■ Z | □ Rx | □ Ry | □ Rz

RM6

Property	Value
Name	RM6
Members	M9
Cross-section	Rectangle 500, 250
Length	6,00 m
ey	0 mm

ez	0 mm
Begin	(-6,00; 0,00; 10,60) m
End	(0,00; 0,00; 10,60) m
Support	□ X | □ Y | ■ Z | □ Rx | □ Ry | □ Rz

RM7

Property	Value
Name	RM7
Members	M10
Cross-section	Rectangle 500, 250
Length	5,00 m
ey	0 mm
ez	0 mm
Begin	(0,00; 5,00; 10,60) m
End	(0,00; 0,00; 10,60) m
Support	□ X | □ Y | ■ Z | □ Rx | □ Ry | □ Rz

RM8

Property	Value
Name	RM8
Members	M11
Cross-section	Rectangle 500, 250
Length	7,81 m
ey	0 mm
ez	0 mm
Begin	(-6,00; -5,00; 7,00) m
End	(0,00; 0,00; 7,00) m
Support	□ X | □ Y | ■ Z | □ Rx | □ Ry | □ Rz

RM9

Property	Value
Name	RM9
Members	M12
Cross-section	Rectangle 500, 250
Length	6,00 m
ey	0 mm
ez	0 mm
Begin	(-6,00; 0,00; 7,00) m
End	(0,00; 0,00; 7,00) m
Support	□ X | □ Y | ■ Z | □ Rx | □ Ry | □ Rz

RM10

Property	Value
Name	RM10
Members	M13
Cross-section	Rectangle 500, 250
Length	5,00 m
ey	0 mm
ez	0 mm
Begin	(0,00; 5,00; 7,00) m

End	(0,00; 0,00; 7,00) m
Support	□ X | □ Y | ■ Z | □ Rx | □ Ry | □ Rz

RM11

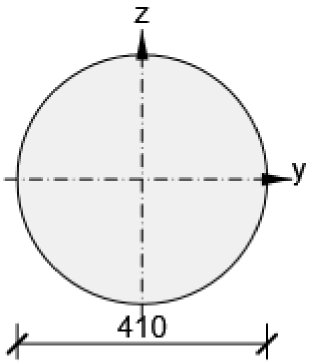
Property	Value
Name	RM11
Members	M14
Cross-section	Rectangle 500, 250
Length	7,81 m
ey	0 mm
ez	0 mm
Begin	(6,00; 5,00; 7,00) m
End	(0,00; 0,00; 7,00) m
Support	□ X | □ Y | ■ Z | □ Rx | □ Ry | □ Rz

Member type

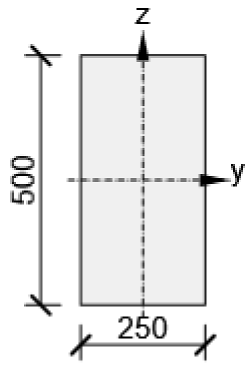
Column 1

Property	Value
Member type	Column
Name	Column 1
Carbonation	XC3
Chlorides	XD1
Chlorides from sea	Not allowed
Freeze/Thaw attack	Not allowed
Chemical attack	Not allowed
Effect considered	IsolatedMember
Geometric imperfections	BothDirections
Method of analysis	NominalCurvature
Factor c to y axis	UserDefined
cy	9,86960440108936
Factor c to z axis	UserDefined
cz	9,86960440108936

Cross-section



Circle 410, Material: C30/37



Rectangle 500, 250, Material: C25/30

Loading

LC1

Line load

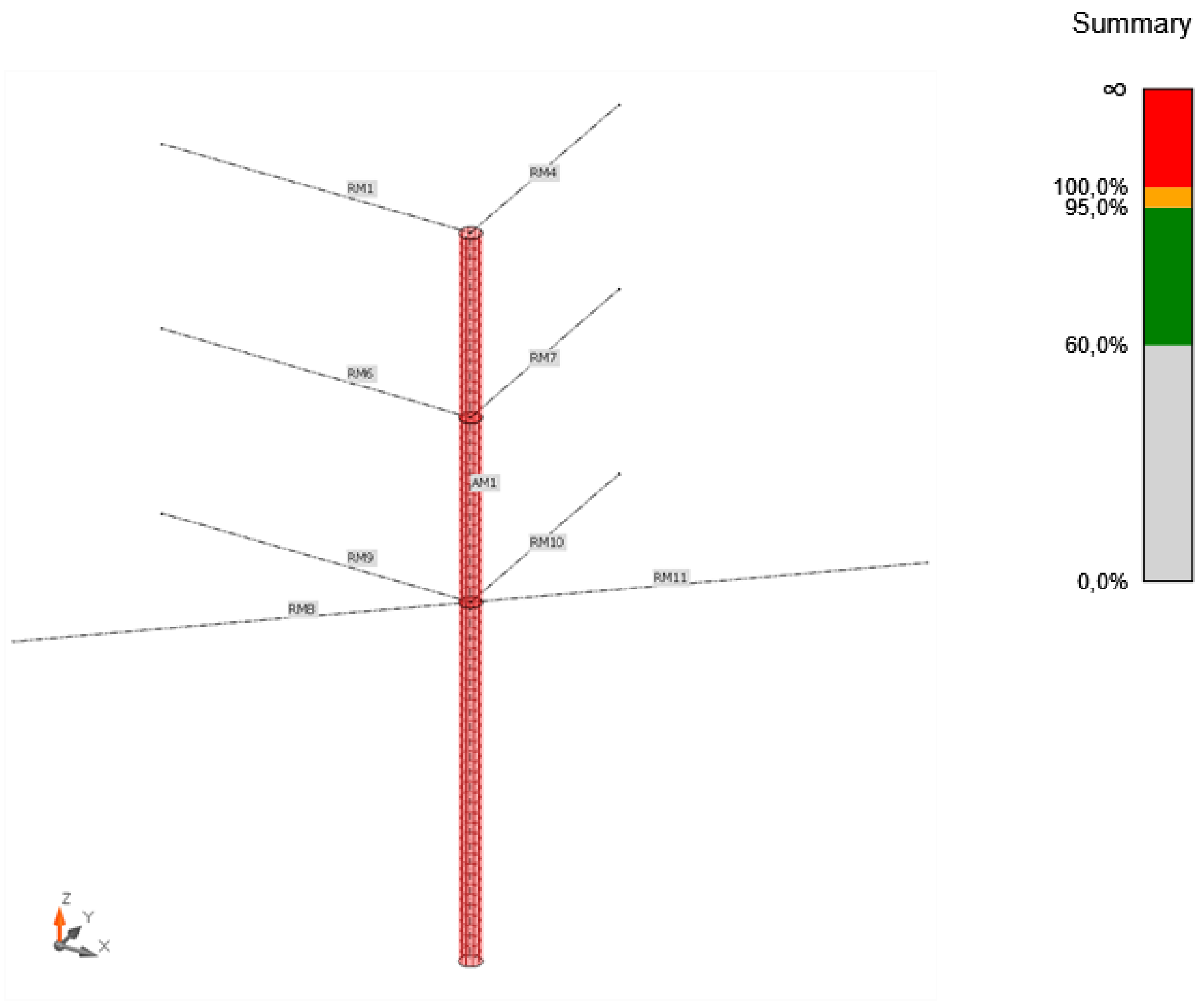
Member	Begin [m]	End [m]	X [kN/m]	Y [kN/m]	Z [kN/m]	Location	Width [mm]	Ey [mm]
AM1	0,00	14,20	-6,6	0,0	0,0	Member axis	0	0
RM1	0,00	6,00	0,0	0,0	-40,2	Member axis	0	0
RM4	0,00	5,00	0,0	0,0	-40,2	Member axis	0	0
RM9	0,00	6,00	0,0	0,0	-40,2	Member axis	0	0
RM10	0,00	5,00	0,0	0,0	-40,2	Member axis	0	0
RM8	0,00	7,81	0,0	0,0	-40,2	Member axis	0	0
RM11	0,00	7,81	0,0	0,0	-40,2	Member axis	0	0
RM6	0,00	6,00	0,0	0,0	-40,0	Member axis	0	0
RM7	0,00	5,00	0,0	0,0	-40,0	Member axis	0	0

Point load

Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kN]	My [kN]	Mz [kN]
RM1 / Begin	44,3	-1,0	116,0	0,0	-70,9	-3,9
RM4 / Begin	21,4	-1,1	-110,8	0,0	-95,9	3,1
RM6 / Begin	6,9	-0,6	96,9	0,0	-52,7	-2,5
RM7 / Begin	-8,9	-0,5	-98,2	0,0	-79,6	1,4
RM8 / Begin	4,5	-0,3	125,7	0,0	-35,6	-2,3
RM9 / Begin	-16,5	1,0	95,2	0,0	-7,2	2,7
RM10 / Begin	-18,6	1,4	-103,5	0,0	-87,9	-3,4
RM11 / Begin	15,9	0,5	-150,1	0,0	-168,4	-1,6

Results - Linear analysis (LA)

Overall



AM1

Begin [m]	End [m]	Governing type of check	Value [%]	Check
0,00	7,00	LE1 - Interaction	1000,0	Not OK
7,00	10,60	LE1 - Interaction	118,9	Not OK
10,60	14,20	LE1 - Interaction	110,6	Not OK

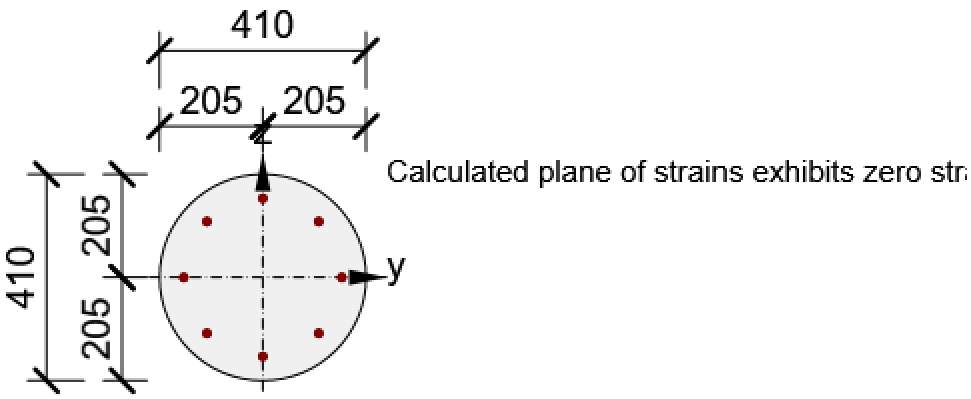
Section check for zone: 0,00 - 7,00 m

Governing type of check	Combination	N_{Ed} [kN]	$V_{Ed,y}$ [kN]	$V_{Ed,z}$ [kN]	$M_{Ed,x}$ [kN]	$M_{Ed,y}$ [kN]	$M_{Ed,z}$ [kN]	Value [%]	Check

Interaction	LE1 - Fundamental	-1132,7	2,4	26,2	-3,8	-192,9	-18,1	1000,0	Not OK

Type of check	Combination	N_{Ed} [kN]	$V_{Ed,y}$ [kN]	$V_{Ed,z}$ [kN]	$M_{Ed,x}$ [kN]	$M_{Ed,y}$ [kN]	$M_{Ed,z}$ [kN]	Value [%]	Check
Capacity N-M-M	LE1 - Fundamental	-1086,3	2,4	26,2	-3,8	-192,9	-18,1	119,4	Not OK
Shear	LE1 - Fundamental	-1132,7	2,4	26,2	-3,8	-192,9	-18,1	28,1	OK
Torsion	LE1 - Fundamental	-1132,7	2,4	26,2	-3,8	-192,9	-18,1	14,8	OK
Interaction	LE1 - Fundamental	-1132,7	2,4	26,2	-3,8	-192,9	-18,1	1000,0	Not OK
Stress limitation	LE1 - Quasi-permanent	0,0	2,4	26,2	-3,8	-192,9	-18,1	0,0	Not calculated
Crack width	LE1 - Quasi-permanent	0,0	2,4	26,2	-3,8	-192,9	-18,1	0,0	Not calculated
Detailing	LE1 - Fundamental	-1132,7	2,4	26,2	-3,8	-192,9	-18,1	62,5	OK

Interaction



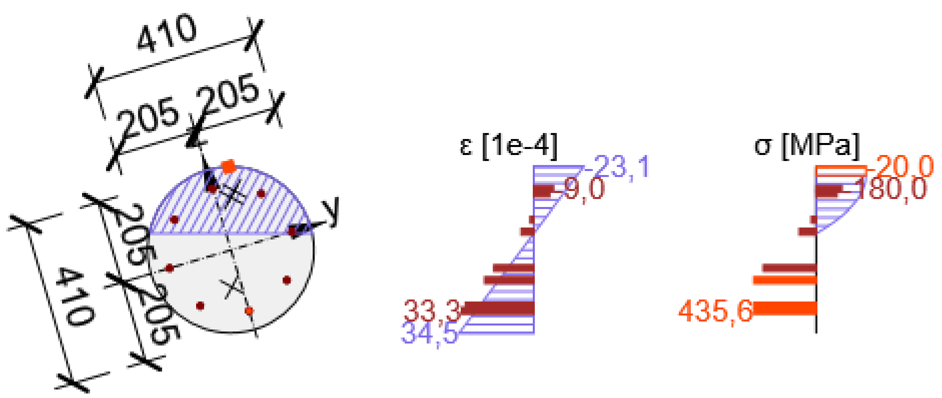
Section check for zone: 7,00 - 10,60 m

Governing type of check	Combination	N_{Ed} [kN]	$V_{Ed,y}$ [kN]	$V_{Ed,z}$ [kN]	$M_{Ed,x}$ [kN]	$M_{Ed,y}$ [kN]	$M_{Ed,z}$ [kN]	Value [%]	Check
Interaction	LE1 - Fundamental	-470,2	14,1	49,6	15,3	125,3	37,2	118,9	Not OK

Type of check	Combination	N_{Ed} [kN]	$V_{Ed,y}$ [kN]	$V_{Ed,z}$ [kN]	$M_{Ed,x}$ [kN]	$M_{Ed,y}$ [kN]	$M_{Ed,z}$ [kN]	Value [%]	Check
Capacity N-M-M	LE1 - Fundamental	-494,0	14,1	49,6	15,3	125,3	37,2	99,9	OK
Shear	LE1 - Fundamental	-470,2	14,1	49,6	15,3	125,3	37,2	44,3	OK
Torsion	LE1 - Fundamental	-494,0	14,1	49,6	15,3	125,3	37,2	60,5	OK
Interaction	LE1 - Fundamental	-470,2	14,1	49,6	15,3	125,3	37,2	118,9	Not OK
Stress limitation	LE1 - Quasi-permanent	0,0	14,1	49,6	15,3	125,3	37,2	0,0	Not calculated
Crack width	LE1 - Quasi-permanent	0,0	14,1	49,6	15,3	125,3	37,2	0,0	Not calculated
Detailing	LE1 - Fundamental	-494,0	14,1	49,6	15,3	125,3	37,2	62,5	OK

Project:	Amsterdam industrial
Project no:	20231090
Author:	Dave the Engineer

Interaction

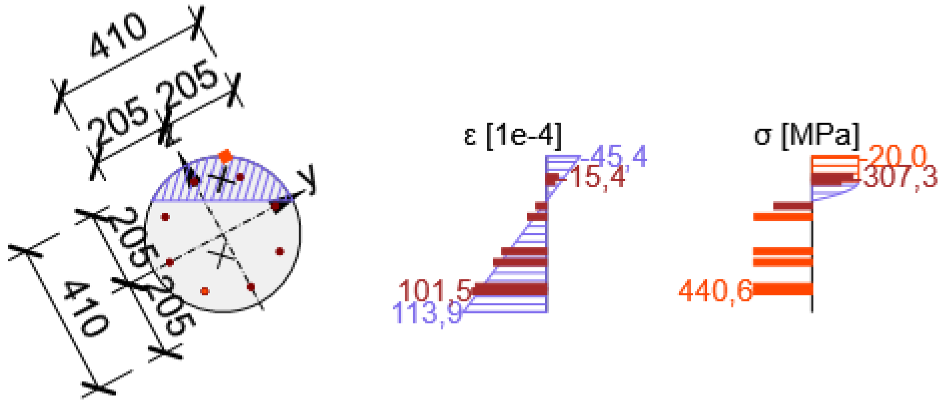


Section check for zone: 10,60 - 14,20 m

Governing type of check	Combination	N_{Ed} [kN]	$V_{Ed,y}$ [kN]	$V_{Ed,z}$ [kN]	$M_{Ed,x}$ [kN]	$M_{Ed,y}$ [kN]	$M_{Ed,z}$ [kN]	Value [%]	Check
Interaction	LE1 - Fundamental	-214,1	22,4	43,2	10,7	110,5	60,8	110,6	Not OK

Type of check	Combination	N_{Ed} [kN]	$V_{Ed,y}$ [kN]	$V_{Ed,z}$ [kN]	$M_{Ed,x}$ [kN]	$M_{Ed,y}$ [kN]	$M_{Ed,z}$ [kN]	Value [%]	Check
Capacity N-M-M	LE1 - Fundamental	-214,1	22,4	43,2	10,7	110,5	60,8	103,4	Not OK
Shear	LE1 - Fundamental	-214,1	22,4	43,2	10,7	110,5	60,8	58,6	OK
Torsion	LE1 - Fundamental	-238,0	22,4	43,2	10,7	110,5	60,8	42,2	OK
Interaction	LE1 - Fundamental	-214,1	22,4	43,2	10,7	110,5	60,8	110,6	Not OK
Stress limitation	LE1 - Quasi-permanent	0,0	22,4	43,2	10,7	110,5	60,8	0,0	Not calculated
Crack width	LE1 - Quasi-permanent	0,0	22,4	43,2	10,7	110,5	60,8	0,0	Not calculated
Detailing	LE1 - Fundamental	-238,0	22,4	43,2	10,7	110,5	60,8	62,5	OK

Interaction



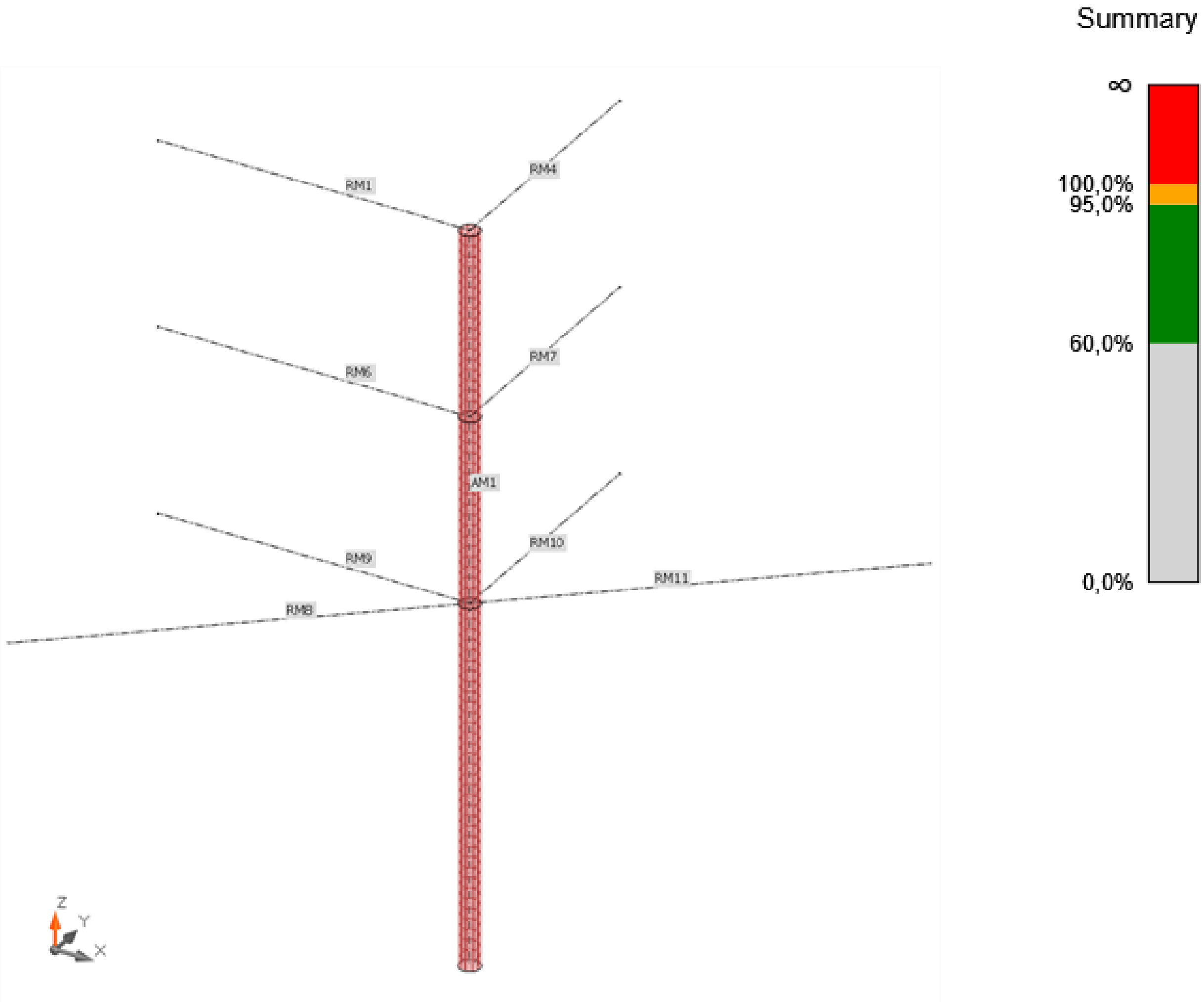
	Nonconformities
	Stress state of the cross-section, which would satisfy the conditions of equilibrium, and which would not violate the conditions of strain compatibility and plasticity, was not found. Applied internal forces are, most likely, too big to be resisted by the cross-section or the number of iteration steps is not sufficient for required precission of iteration. Increase the number of iteration steps in Code and calculation settings, chapter General.
	Conditions for biaxial bending (5.38a) a (5.38b) according to clause 5.8.9 are satisfied, therefore separate design in each principal direction may be done. The action point of normal force will be considered in the direction of lesser slenderness only.

Explanation

Symbol	Explanation
Governing type of check	Governing ratio of calculated to limit value, which expresses detailing rules
Value	Utilization of the cross-section or its component (e.g. reinforcement bar) related to the limit value
Check	Result of the check
Combination	Combination used for calculation including rsup or rinf coefficient acc. to 5.10.9
N_{Ed}	Design value of the applied axial force caused by permanent and variable external load, and by secondary effects of prestressing
$V_{Ed,y}$	Design value of the applied shear force (with effect of prestressing)
$V_{Ed,z}$	Design value of the applied shear force (with effect of prestressing)
$M_{Ed,x}$	Design value of the applied bending moment around y axis caused by permanent and variable external load, and by secondary effects of prestressing
$M_{Ed,y}$	Design value of the applied bending moment around y axis caused by permanent and variable external load, and by secondary effects of prestressing
$M_{Ed,z}$	Design value of the applied bending moment around z axis caused by permanent and variable external load, and by secondary effects of prestressing
Type of check	NuMuMu-Cross-sectional resistance is determined assuming proportional change of all components of acting internal forces (the eccentricity of normal force remains constant) until interaction surface is reached. The change of acting internal forces can be interpreted as the movement along the line connecting the origin of coordinate system (0,0,0) and the point of acting internal forces (NEd, MEd,y, MEd,z). Two points of intersection of the connecting line and interaction surface, which can be found, represent two sets of forces of resistance. Three resistance forces are determined in each point of intersection by the program: normal force capacity NRd, and capacities in flexure MRdy and MRdz.

Results - Materially non-linear analysis (MNA)

Overall



ULS strength

Detailed concrete strength results

Members	LE	Position X [m]	σ_c [MPa]	$\sigma_{c,lim}$ [MPa]	$\sigma_c/\sigma_{c,lim}$ [%]	ε_c [1e-4]	$\varepsilon_{c,lim}$ [1e-4]	$\varepsilon_c/\varepsilon_{c,lim}$ [%]	Check
AM1	LE1	3,33	-16,9	-20,0	84,3	-12,1	-35,0	34,5	OK

Detailed reinforcement strength results

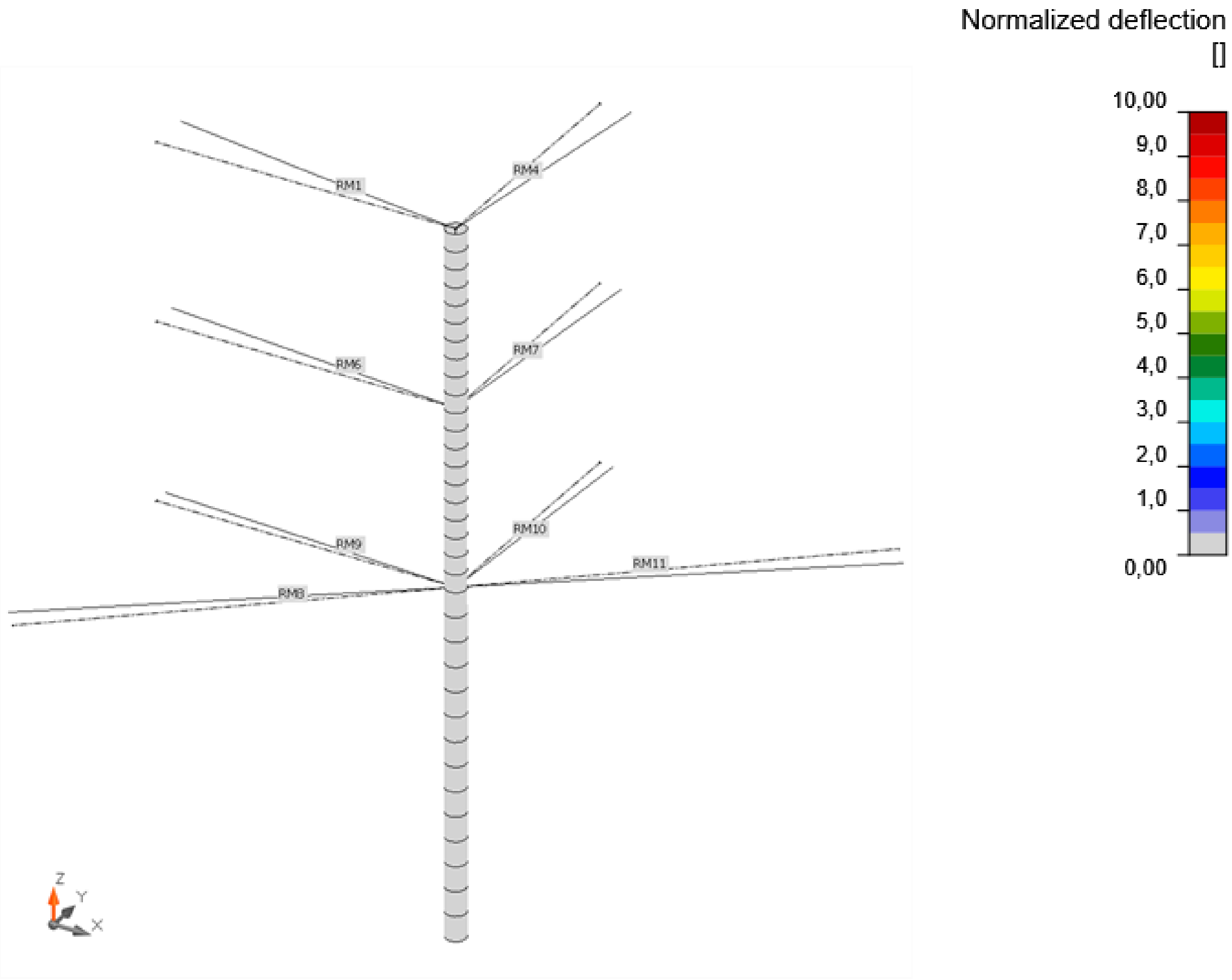
Members	LE	Position X	σ_s	$\sigma_{s,lim}$	$\sigma_s/\sigma_{s,lim}$	ε_s	$\varepsilon_{s,lim}$	$\varepsilon_s/\varepsilon_{s,lim}$	Check

		[m]	[MPa]	[MPa]	[%]	[1e-4]	[1e-4]	[%]	
AM1	LE1	3,33	405,9	469,6	86,4	20,3	500,0	4,1	OK

Results - Linear buckling analysis (LBA)

Linear buckling analysis (LBA)

Buckling

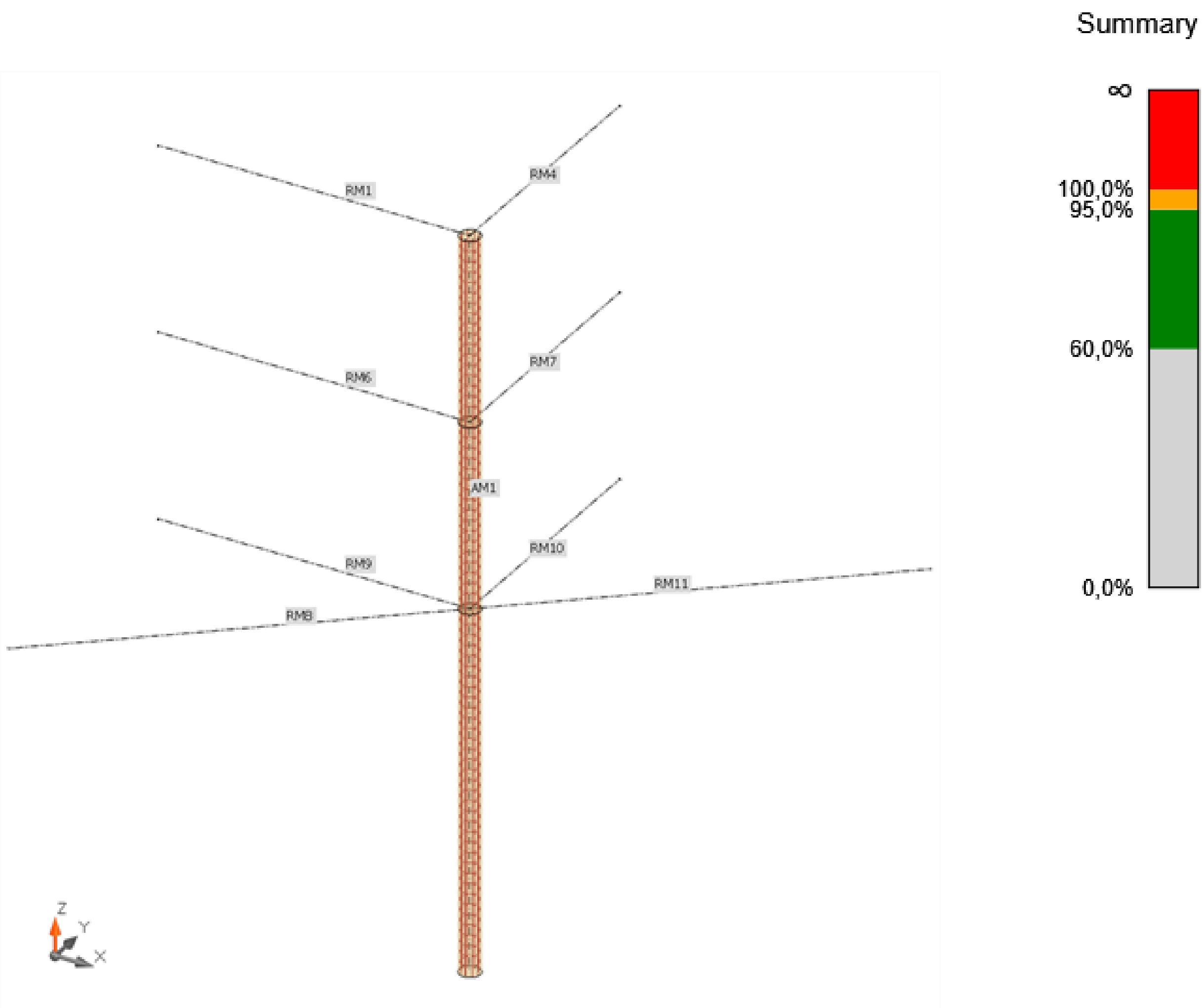


Normalized deflection, LE1, Buckling shape 1

Loads	1 [-]	2 [-]	3 [-]	4 [-]	5 [-]	6 [-]
LE1	6,21	6,51	7,35	23,55	27,77	36,33

Results - Geometrically and materially non-linear analysis (GMNIA)

Overall



Imperfections

Loads		1	2
LE1	Buckling factor [-]	6,21	6,51
	Amplitude [mm]	80	0

ULS strength

Detailed concrete strength results

Members	LE	Position X [m]	σ_c [MPa]	$\sigma_{c,lim}$ [MPa]	$\sigma_c/\sigma_{c,lim}$ [%]	ε_c [1e-4]	$\varepsilon_{c,lim}$ [1e-4]	$\varepsilon_c/\varepsilon_{c,lim}$ [%]	Check
AM1	LE1	0,13	-19,5	-20,0	97,7	-17,0	-35,0	48,5	OK

Detailed reinforcement strength results

Members	LE	Position X [m]	σ_s [MPa]	$\sigma_{s,lim}$ [MPa]	$\sigma_s/\sigma_{s,lim}$ [%]	ε_s [1e-4]	$\varepsilon_{s,lim}$ [1e-4]	$\varepsilon_s/\varepsilon_{s,lim}$ [%]	Check
AM1	LE1	3,33	397,9	469,6	84,7	19,9	500,0	4,0	OK

Symbol explanation

Symbol	Explanation
Governing type of check	Governing ratio of calculated to limit value, which expresses detailing rules
Value	Utilization of the cross-section or its component (e.g. reinforcement bar) related to the limit value
Check	Result of the check
Combination	Combination used for calculation including rsup or rinf coefficient acc. to 5.10.9
N_{Ed}	Design value of the applied axial force caused by permanent and variable external load, and by secondary effects of prestressing
$V_{Ed,y}$	Design value of the applied shear force (with effect of prestressing)
$V_{Ed,z}$	Design value of the applied shear force (with effect of prestressing)
$M_{Ed,x}$	Design value of the applied bending moment around y axis caused by permanent and variable external load, and by secondary effects of prestressing
$M_{Ed,y}$	Design value of the applied bending moment around y axis caused by permanent and variable external load, and by secondary effects of prestressing
$M_{Ed,z}$	Design value of the applied bending moment around z axis caused by permanent and variable external load, and by secondary effects of prestressing
Type of check	NuMuMu-Cross-sectional resistance is determined assuming proportional change of all components of acting internal forces (the eccentricity of normal force remains constant) until interaction surface is reached. The change of acting internal forces can be interpreted as the movement along the line connecting the origin of coordinate system (0,0,0) and the point of acting internal forces (NEd, MEd,y, MEd,z). Two points of intersection of the connecting line and interaction surface, which can be found, represent two sets of forces of resistance. Three resistance forces are determined in each point of intersection by the program: normal force capacity NRd, and capacities in flexure MRdy and MRdz.

Code settings

Clause	Value		
2.4.2.4 (1) EN 1992-1-1	γ_c	Persistent, transient	1,50-
		Accidental	1,20-
	Partial factor for concrete - Eq.: (3.15),(3.16)		
2.4.2.4 (1) EN 1992-1-1	γ_s	Persistent, transient	1,15-
		Accidental	1,00-
	Partial factor for reinforcing - Eq.: (3.15),(3.16)		
2.4.2.4 (1) EN 1992-1-1	γ_{sp}	Persistent, transient	1,15-
		Accidental	1,00-
	Partial factor for prestressing steel - Eq.: (3.15),(3.16)		
	α_{cc}		1,00-

3.1.6 (1) EN 1992-1-1	Coefficient taking account of long term effects on the compressive strength and of unfavourable effects resulting from the way the load is applied - Eq.: (3.15)		
3.1.6 (2) EN 1992-1-1	α_{ct}		1,00-
	Coefficient taking account of long term effects on the tensile strength and of unfavourable effects, resulting from the way the load is applied - Eq.: (3.16)		
3.2.7 (2) EN 1992-1-1	$\varepsilon_{ud}/\varepsilon_{uk}$		0,90-
	Ratio of design and characteristic strain limit		
3.3.6 (7) EN 1992-1-1	$f_{pk0,1k}/f_{pk}$		0,90-
	Ratio of characteristic 0,1% proof-stress of prestressing steel and characteristic tensile strength of prestressing steel		
5.2 (5) EN 1992-1-1	θ_0		0,01-
	Basic value of inclination - Eq.: (5.1)		
5.8.6 (3) EN 1992-1-1	γ_{ce}		1,20-
	Coefficient for calculation design value of the modulus of elasticity of concrete		
5.10.2.1 (1)P EN 1992-1-1	k_1		0,80-
	Coefficient for calculation of maximum stress applied to the tendon according to clause 5.10.2.1 (1) - Eq.: (5.41)		
5.10.2.1 (1)P EN 1992-1-1	k_2		0,90-
	Coefficient for calculation of maximum stress applied to the tendon according to clause 5.10.2.1 (1) - Eq.: (5.41)		
5.10.3 (2) EN 1992-1-1	k_8		0,85-
	Coefficient for calculation of maximum stress applied to the tendon according to clause 5.10.3 (2) - Eq.: (5.43)		
5.10.3 (2) EN 1992-1-1	k_7		0,75-
	Coefficient for calculation of maximum stress applied to the tendon according to clause 5.10.3 (2) - Eq.: (5.43)		
5.10.9 (1) EN 1992-1-1	$r_{inf, pre}$		0,95-
	for pre-tensioning or unbonded tendons:		
5.10.9 (1) EN 1992-1-1	$r_{sup, pre}$		1,05-
	for pre-tensioning or unbonded tendons:		
5.10.9 (1) EN 1992-1-1	$r_{inf, post}$		0,90-
	for post-tensioning with bonded tendons:		
5.10.9 (1) EN 1992-1-1	$r_{sup, post}$		1,10-
	for post-tensioning with bonded tendons:		
6.1 (4) EN 1992-1-1	Application of the minimum eccentricity		Total
6.2.2 (1) EN 1992-1-1	c_{rdc}		0,18-
	Coeficient Crdc / gamma_c - Eq.: (6.2a)		
6.2.2 (1) EN 1992-1-1	k_1		0,15-
	Coefficient k1 - Eq.: (6.2a)		
6.2.2 (1) EN 1992-1-1	v_{min}		0.035 * k^1.5 * fck^0.5
	Coefficient vmin - Eq.: (6.2a)		
6.2.2 (2) EN 1992-1-1	Neglect cracking status		On
	Neglect the status without flexural cracks in calculation of shear resistance. Shear resistance will always be calculated acc. to clause 6.2.2 (1) as if the cross-section was cracked bending		
6.2.2 (6) EN 1992-1-1	v		0.6 * [1 - fck / 250]
	Concrete strength reduction factor for the calculation of shear resistance - Eq.: (6.5)		
6.2.2 EN 1992-1-1	Values for shear check	d = h *	0,90-
		z = d *	0,90-
	The values of d (effective detpth) and z (lever arm) for shear check can by specified by the user, specifically in the dialog for the input of stirrups in the navigator Current Section & Extreme > Reinforcement		
6.2.3 (1) EN 1992-1-1	θ		45,0°
	Angle between the concrete compression strut and the beam axis perpendicular to the shear force - Eq.: (6.8), (6.9), (6.13), (6.14)		
	θ_{max}		45,0°

<table>
<tr><td>6.2.3 (2)
EN 1992-1-1</td><td colspan="3">Maximal angle between the concrete compression strut and the beam axis perpendicular to the shear force</td></tr>
<tr><td rowspan="2">6.2.3 (2)
EN 1992-1-1</td><td colspan="2">θ_{min}</td><td>21,8°</td></tr>
<tr><td colspan="3">Minimal angle between the concrete compression strut and the beam axis perpendicular to the shear force</td></tr>
<tr><td rowspan="3">6.2.3 (2)
EN 1992-1-1</td><td rowspan="2">Calculate angle of concrete compression strut</td><td rowspan="2"></td><td>Off</td></tr>
<tr><td>Long. reinf. and Strut</td></tr>
<tr><td colspan="3">Calculate angle of concrete compression strut to optimize the use of selected component of truss analogy. In the case that any other component of truss analogy is not satisfactory, the value of angle from code settings will be used.</td></tr>
<tr><td rowspan="2">6.2.3 (3)
EN 1992-1-1</td><td colspan="2">v_1</td><td>0,60-</td></tr>
<tr><td colspan="3">Concrete strength reduction factor for the calculation of shear resistance - Eq.: (6.9), (6.14)</td></tr>
<tr><td rowspan="3">6.2.3 (3)
EN 1992-1-1</td><td rowspan="2">α_{cw}</td><td rowspan="2"></td><td>Off</td></tr>
<tr><td>1,00-</td></tr>
<tr><td colspan="3">Coefficient taking account of the state of the stress in the compression chord - Eq.: (6.9), (6.14)</td></tr>
<tr><td rowspan="2">6.2.5 (1)
EN 1992-1-1</td><td colspan="2">Shear stress calculation in joints</td><td>Difference of normal forces</td></tr>
<tr><td colspan="3">Shear stress in joint is calculated according to settings</td></tr>
<tr><td rowspan="3">6.2.5 (2)
EN 1992-1-1</td><td colspan="3">Table (6.2.5 1992-1-1)</td></tr>
<tr><td colspan="3"><table>
<tr><th>Type</th><th>c</th><th>μ</th></tr>
<tr><td>Very smooth</td><td>0,10</td><td>0,50</td></tr>
<tr><td>Smooth</td><td>0,20</td><td>0,60</td></tr>
<tr><td>Rough</td><td>0,40</td><td>0,70</td></tr>
<tr><td>Indented</td><td>0,50</td><td>0,90</td></tr>
</table></td></tr>
<tr><td colspan="3">Factors which depend on the roughness of the interface</td></tr>
<tr><td rowspan="2">7.2 (2)
EN 1992-1-1</td><td colspan="2">k_1</td><td>0,60-</td></tr>
<tr><td colspan="3">Coefficient for calculation of the maximum compressive stress in concrete under SLS characteristic combination</td></tr>
<tr><td rowspan="2">7.2 (3)
EN 1992-1-1</td><td colspan="2">k_2</td><td>0,45-</td></tr>
<tr><td colspan="3">Coefficient for calculation of the stress in the concrete under the SLS quasi-permanent combination</td></tr>
<tr><td rowspan="2">7.2 (5)
EN 1992-1-1</td><td colspan="2">k_5</td><td>0,75-</td></tr>
<tr><td colspan="3">Coefficient for calculation of the maximal stress in prestressing tendons under SLS characteristic combination</td></tr>
<tr><td rowspan="2">7.2 (5)
EN 1992-1-1</td><td colspan="2">k_4</td><td>1,00-</td></tr>
<tr><td colspan="3">Coefficient for calculation of maximal tensile stress in the reinforcement caused by an imposed deformation under SLS characteristic combination</td></tr>
<tr><td rowspan="2">7.2 (5)
EN 1992-1-1</td><td colspan="2">k_3</td><td>0,80-</td></tr>
<tr><td colspan="3">Coefficient for calculation of maximal tensile stress in the reinforcement under SLS characteristic combination</td></tr>
<tr><td rowspan="3">7.3.1 (5)
EN 1992-1-1</td><td colspan="3">w_{max}</td></tr>
<tr><td colspan="3">Recommended values wmax [mm] and decompression (d) [mm]</td></tr>
<tr><td colspan="3"><table>
<tr><th>Exposure class</th><th>Reinforced members (Quasi-Permanent)</th><th colspan="3">Prestressed members (Frequent)</th></tr>
<tr><td>X0,XC1</td><td>0,400</td><td colspan="3">0,200</td></tr>
<tr><td rowspan="2">XC2, XC3, XC4</td><td rowspan="2">0,300</td><td>w_{max}</td><td>On</td><td>0,200</td></tr>
<tr><td>d</td><td>On</td><td>25</td></tr>
<tr><td rowspan="2">XD1, XD2, XS1, XS2, XS3</td><td rowspan="2">0,300</td><td>w_{max}</td><td>Off</td><td>0,200</td></tr>
<tr><td>d</td><td>On</td><td>25</td></tr>
</table></td></tr>
<tr><td rowspan="3">7.3.4 (2)
EN 1992-1-1</td><td rowspan="2">k_t</td><td>Short-term</td><td>0,60-</td></tr>
<tr><td>Long-term</td><td>0,40-</td></tr>
<tr><td colspan="3">Eq.: (7.9)</td></tr>
<tr><td rowspan="2">7.3.4 (3)
EN 1992-1-1</td><td colspan="2">k_3</td><td>3,40-</td></tr>
<tr><td colspan="3">Coefficient for calculation sr,max - Eq.: (7.11)</td></tr>
</table>

7.3.4 (3) EN 1992-1-1	k_4		0,43-
	Coefficient for calculation sr,max - Eq.: (7.11)		
8.2 (2) EN 1992-1-1	$s_{l,min}$		On
		Distance	20mm
		k1 (multiple)	1,00-
		k2 (increment)	5mm
	Minimal clear distance of longitudinal reinforcement		
8.3 (2) EN 1992-1-1	$\Phi_{m,min}$		On
		Φ_s<= 16mm	4,00Φ_s
		Φ_s> 16mm	7,00Φ_s
	Minimum mandrel diameter of stirrup as multiple of stirrup diameter		
8.10.1.2 (1) EN 1992-1-1	$s_{th,min}$		On
		add-on to aggregate size	5mm
		multiple of diameter	2,00-
		Distance	20mm
	Minimal clear spacing between tendons in horizontal direction		
8.10.1.2 (1) EN 1992-1-1	$s_{tv,min}$		On
		add-on to aggregate size	0mm
		multiple of diameter	2,00-
	Minimal clear spacing between tendons in vertical direction		
8.10.1.3 (3) EN 1992-1-1	$s_{dv,min}$		On
		add-on to aggregate size	0mm
		multiple of diameter	1,00-
		Distance	40mm
	Minimal clear spacing between ducts in vertical direction		
8.10.1.3 (3) EN 1992-1-1	$s_{dv,min}$		On
		add-on to aggregate size	5mm
		multiple of diameter	1,00-
		Distance	50mm
	Minimal clear spacing between ducts in horizontal direction		
9.5.2 (1) EN 1992-1-1	φ_{min}		On
			8mm
	Minimal diameter of longitudinal reinforcement		
9.5.2 (2) EN 1992-1-1	$\rho_{l,min}$		On
		Ratio	0,20%
		Factor	0,10-
	Minimal reinforcement ratio for longitudinal reinforcement - Eq.: (9.12N)		
9.5.2 (3) EN 1992-1-1	$\rho_{l,max}$		On
			4,00%
	Maximal reinforcement ratio for longitudinal reinforcement		
9.5.2 (4) EN 1992-1-1	n_{φ}		On
			4
	Minimal number of bars of longitudinal reinforcement		
9.5.3 (1) EN 1992-1-1	$\varphi_{w,min}$		On
			6mm
	Minimal diameter of shear reinforcement		
9.5.3 (3) EN 1992-1-1	$s_{ct,tmax}$		On
		Distance	400mm
		Factor	20,00-
	Maximal distance of stirrups		
	$\alpha_{ct,pl}$		0,80-

12.3.1 (1) EN 1992-1-1	Coefficient taking account of long term effects on the tensile strength and of unfavourable effects, resulting from the way the load is applied for plain and lightly reinforced concrete structures - Eq.: (12.1)		
12.3.1 (1) EN 1992-1-1	$\alpha_{cc,pl}$		0,80-
	Coefficient taking account of long term effects on the compressive strength and of unfavourable effects resulting from the way the load is applied for plain and lightly reinforced concrete structures - Eq.: (3.5)		
12.6.3 (2) EN 1992-1-1	k		1,50-
	Shear calculation factor for plain and lightly reinforced concrete - Eq.: (12.4)		
G.1	Limit value of exploitation		100,0%
	Limit value of the exploitation of the cross-section		
G.2	Maximal presentable value		1000,0%
	Maximal presentable value of the exploitation of cross-section		
G.3	Precision of iteration	Relative	0,01-
		Absolute	0,1kN
	The absolute error is calculated as: err = |b-a|. The relative error is calculated as: err = |(b-a)/b|. Here a - exact value of acting internal force, b - is aproximated value of resisting internal force after the iteration is finished.		
G.4	Number of iteration steps		20
G.5	Evaluation of interaction diagram		NuMuMu
G.6	Number of diagrams		18
	Number of vertical sections through interaction surface around vertical axis		
G.7	Division of interaction diagram		100
	Number of sections through interaction surface, which are parallel to the plane My, Mz		
G.8	Vestigial resistance		Off
	Capacity N-M-M. OFF - The left-hand side of the reliability condition contains the external load only. The right-hand side is the resistance, which consists of the primary effects resulting from the decompression prestressing force and the effects of the vestigial resistance of the prestressing reinforcement. ON – Additional table is displayed, in which the left-hand side of the reliability condition contains the external load minus the primary effects resulting from the decompression prestressing force. The right-hand side is the resistance, which consists of the effects of the vestigial resistance of the prestressing reinforcement only.		
G.9	Don't exclude tendons		Off
	Don't exclude tendons from calculation model of reinforced cross-section if tendons are outside of cross-section		
G.10	Use simplified model of cross-section		Off
	Use simplified calculation model of cross-section to increase the speed of checks		
G.17	Neglect redistribution of moments		10,0%
	Neglect redistribution of moments My, Mz, if the ratio My/Mz is less than 10%		

Software info

Application	IDEA StatiCa Member
Version	23.0.0.3259
Developed by	IDEA StatiCa