



CLIENT

Structural Analysis

Karel Hlavacek

Chapters

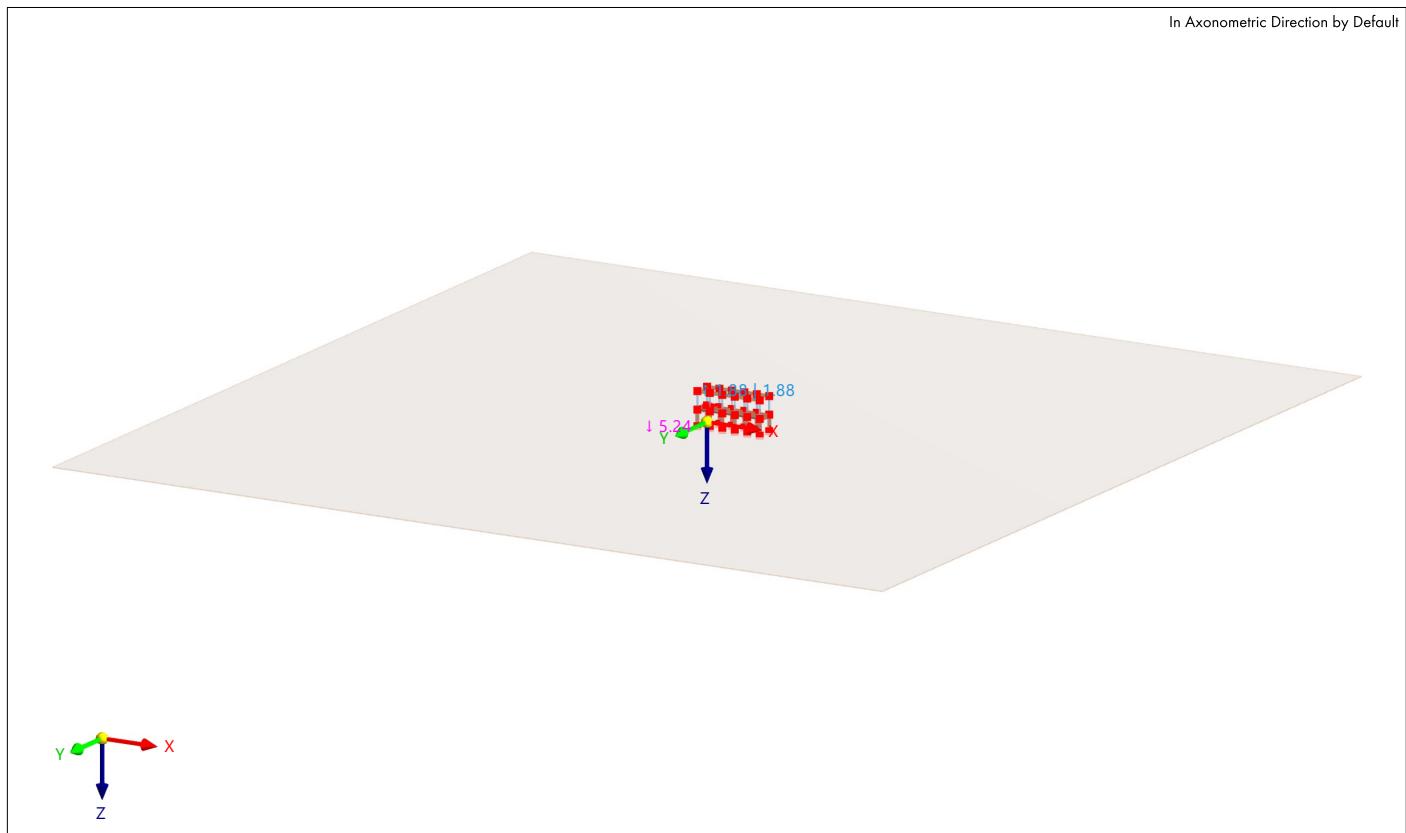
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CREATED BY

PROJECT

MODEL

In Axonometric Direction by Default





MODEL

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A MODEL - LOCATION

Location



| | | |
|-------------------|---|-----|
| Country | : | - |
| Street | : | |
| Zip / Postal code | : | |
| City | : | |
| State | : | |
| Latitude | : | deg |
| Longitude | : | deg |
| Altitude | : | m |

B MODEL - PARAMETERS

Model ID {c2cf035c-b7e3-4a35-a477-29a10016b498}

Unique model identifier

Project ID {8096c5bb-f640-44a6-9f7e-a83810bfedba}

Unique project identifier

Client name Karel Hlavacek

My new parameter not sure what to put here
not sure what to put here tooMy new parameter not sure what to put here
not sure what to put here tooMy new parameter not sure what to put here
not sure what to put here too

C MODEL - BASE DATA

Main



| | | |
|-------------------|---|---------------------|
| Model name | : | EmptyWithReport.rf6 |
| Model description | : | |
| Type of model | : | 3D |

Add-ons



| | |
|---|--|
| Dynamic Analysis - Modal Analysis | |
| Dynamic Analysis - Response Spectrum Analysis | |
| Concrete Design | |
| Steel Design | |
| Timber Design | |
| Aluminum Design | |

Standards I



| | | |
|---|---|---|
| Load case classification & combination wizard | : | EN 1990 Base + Timber |
| Load Wizard | : | CEN 2010-04 |
| Standard group for concrete design | : | EN 1991 |
| Standard group for steel design | : | CEN 2015-09 |
| Standard group for timber design | : | EN 1992 |
| Standard group for aluminum design | : | CEN 2014-11 |
| Standard group for glass design | : | EN 1993 |
| | : | CEN 2015-06 |
| | : | EN 1995 |
| | : | CEN 2014-05 |
| | : | EN 1999 |
| | : | CEN 2013-12 |
| | : | Dummy Standard Group Glass Design |
| | : | Edition for group Dummy Standard Group Glass Design |

Standards II

| | | |
|---------------------------------|---|-----------------------------------|
| Standard group for tower design | : | Dummy Standard Group Tower Design |
|---------------------------------|---|-----------------------------------|



C

MODEL - BASE DATA



Standard group for piping design

- Edition for group Dummy Standard Group Tower Design
- Dummy Standard Group Piping Design
- Edition for group Dummy Standard Group Piping Design

Standard group for concrete foundations

EN 1997 + 1992

Edition for group EN 1997 + 1992

Standard group for geotechnical analysis

EN 1997

CEN | 2004

Standard group for dynamic analysis

EN 1998

CEN | 2013-05

Settings & Options



Acceleration of gravity / mass conversion constant

g : 10.00 m/s²

Date of day zero in time diagram

: 01.01.2017

Global axes XYZ

: Z downward

Local axes xyz

: z downward

Tolerances

- | | |
|-------------------------------|-------------|
| Tolerance for nodes | : 0.01000 m |
| Tolerance for lines | : 0.01000 m |
| Tolerance for surfaces/planes | : 0.01000 m |
| Tolerance for directions | : 0.01000 m |

D

LOAD CASES & COMBINATION SETTINGS

Settings & Options

Combination wizard and classification according to standard is active
Combination wizard is active

Statistics

- | | |
|---------------------------------|-----|
| Load Cases | : 8 |
| Actions | : 5 |
| Design Situations | : 1 |
| Action Combinations | : 0 |
| Load Combinations | : 1 |
| Result Combinations | : 0 |
| Combination Wizards | : 0 |
| Relationship Between Load Cases | : 1 |

1

Basic Objects



1.1

MATERIALS

- Legend
- Concrete Settings
 - Stiffness modification
 - User-Defined Material

| Material No. | Material Name | Material Type | Analysis Model | Options |
|--------------|---|-------------------|----------------------------|---------|
| 1 | S235 Isotropic Linear Elastic | Steel | Isotropic Linear Elastic | |
| 2 | C20/25 Isotropic Linear Elastic | Concrete | Isotropic Linear Elastic | |
| 3 | B550S(A) Isotropic Linear Elastic | Reinforcing Steel | Isotropic Linear Elastic | |
| 4 | C24 Isotropic Linear Elastic | Timber | Isotropic Linear Elastic | |
| 5 | EN AW-3004 H14 Isotropic Linear Elastic | Aluminum | Isotropic Linear Elastic | |
| 11 | Gravel, closely graded Isotropic Linear Elastic | Soil | Isotropic Linear Elastic | |
| 12 | Sand Isotropic Linear Elastic | Soil | Isotropic Linear Elastic | |
| 13 | Clay, slightly plastic Isotropic Linear Elastic | Soil | Isotropic Linear Elastic | |

1.2

SECTIONS

IPE 200

R_M1
500/1000

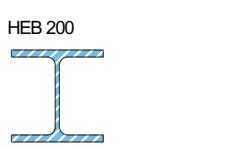
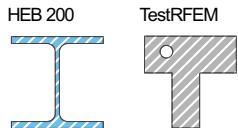
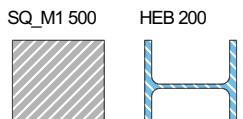
| Section No. | Material No. | Section Type | Manufacturing Type | I _x [cm ⁴] A [cm ²] | I _y [cm ⁴] A _y [cm ²] | I _z [cm ⁴] A _z [cm ²] | Overall Dimensions b [mm] | h [mm] |
|-------------|----------------------------|------------------------|--------------------|---|--|--|------------------------------|--------|
| 1 | IPE 200 1 - S235 | Standardized - Steel | Hot rolled | 6.92 | 1943.00 | 142.00 | 100.0 | 200.0 |
| | 1 | | | 28.50 | 13.97 | 10.69 | | |
| 2 | R_M1 500/1000 2 - C20/25 | Parametric - Massive I | | 2861002.60 | 4166666.67 | 1041666.67 | 500.0 | 1000.0 |
| | 2 | | | 5000.00 | 4166.67 | 4166.67 | | |
| 3 | SQ_M1 500 2 - C20/25 | | | | | | | |



MODEL

1.2

SECTIONS



| Section No. | Material No. | Section Type | Manufacturing Type | $I_x [cm^4]$ $A [cm^2]$ | $I_y [cm^4]$ $A_y [cm^2]$ | $I_z [cm^4]$ $A_z [cm^2]$ | Overall Dimensions b [mm] | h [mm] |
|-------------|--------------|---|--------------------|----------------------------|------------------------------|------------------------------|---------------------------|--------|
| | 2 | Parametric - Massive I | | 880208.33 2500.00 | 520833.33 2083.33 | 520833.33 2083.33 | 500.0 | 500.0 |
| 4 | 1 | HEB 200 1 - S235 Standardized - Steel | Hot rolled | 59.59 78.08 | 5696.00 48.90 | 2003.00 16.47 | 200.0 | 200.0 |
| 5 | 4 | SQ_M1 500 4 - C24 Parametric - Massive I | | 880208.33 2500.00 | 520833.33 2083.33 | 520833.33 2083.33 | 500.0 | 500.0 |
| 6 | 5 | UU 150/75/125/8/6/12/0/0 5 - EN AW-3004 H14 Parametric - Thin-Walled | Welded | 9.87 30.06 | 1060.91 13.66 | 318.30 9.71 | 125.0 | 150.0 |
| 7 | 1 | HEB 200 1 - S235 Standardized - Steel | Hot rolled | 59.59 78.08 | 5696.00 48.90 | 2003.00 16.47 | 200.0 | 200.0 |
| 8 | 2 | TestRFEM General by RSECTION | | 2392146.44 5651.27 | 4286239.97 3495.62 | 3241147.66 3016.64 | | |
| 16 | 1 | HEB 200 1 - S235 Standardized - Steel | Hot rolled | 59.59 78.08 | 5696.00 48.90 | 2003.00 16.47 | 200.0 | 200.0 |

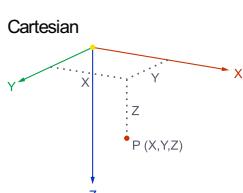
1.3

THICKNESSES

| Thick. No. | Type | Assigned to Surface No. | Material | Symbol | Thickness Value | Unit | Nodes | Direction |
|------------|--|-------------------------|----------|--------|-----------------|------|-------|-----------|
| 1 | Uniform d : 500.0 mm 2 - C20/25 Uniform | 1 | 2 | d | 500.0 | mm | | |

1.4

NODES

Legend
Nodal Support

| Node No. | Node Type | Reference Node | Coordinate System | Coordinate Type | X [m] | Y [m] | Z [m] | Options | Comment |
|----------|-----------|----------------|-------------------|-----------------|--------|-------|--------|---------|-----------------------------|
| 1 | Standard | — | 1 | Cartesian | 0.000 | 0.000 | 0.000 | | concrete part |
| 2 | Standard | — | 1 | Cartesian | 0.000 | 0.000 | -3.600 | | concrete top + steel bottom |
| 3 | Standard | — | 1 | Cartesian | 0.000 | 0.000 | -7.600 | | steel top |
| 4 | Standard | — | 1 | Cartesian | 3.000 | 0.000 | 0.000 | | concrete part |
| 5 | Standard | — | 1 | Cartesian | 3.000 | 0.000 | -3.600 | | concrete top + steel bottom |
| 6 | Standard | — | 1 | Cartesian | 3.000 | 0.000 | -7.600 | | steel top |
| 7 | Standard | — | 1 | Cartesian | 6.000 | 0.000 | 0.000 | | concrete part |
| 8 | Standard | — | 1 | Cartesian | 6.000 | 0.000 | -3.600 | | concrete top + steel bottom |
| 9 | Standard | — | 1 | Cartesian | 6.000 | 0.000 | -7.600 | | steel top |
| 10 | Standard | — | 1 | Cartesian | 9.000 | 0.000 | 0.000 | | concrete part |
| 11 | Standard | — | 1 | Cartesian | 9.000 | 0.000 | -3.600 | | concrete top + steel bottom |
| 12 | Standard | — | 1 | Cartesian | 9.000 | 0.000 | -7.600 | | steel top |
| 13 | Standard | — | 1 | Cartesian | 12.000 | 0.000 | 0.000 | | concrete part |
| 14 | Standard | — | 1 | Cartesian | 12.000 | 0.000 | -3.600 | | concrete top + steel bottom |
| 15 | Standard | — | 1 | Cartesian | 12.000 | 0.000 | -7.600 | | steel top |



MODEL

1.4

NODES

| Node No. | Node Type | Reference Node | Coordinate System | Coordinate Type | Node Coordinates | | | Options | Comment |
|----------|-----------|----------------|-------------------|-----------------|------------------|-------|--------|---------|-----------------------------|
| | | | | | X [m] | Y [m] | Z [m] | | |
| 16 | Standard | — | 1 | Cartesian | 15.000 | 0.000 | 0.000 | | concrete part |
| 17 | Standard | — | 1 | Cartesian | 15.000 | 0.000 | -3.600 | | concrete top + steel bottom |
| 18 | Standard | — | 1 | Cartesian | 15.000 | 0.000 | -7.600 | | steel top |
| 19 | Standard | — | 1 | Cartesian | 0.000 | 4.000 | 0.000 | | concrete part |
| 20 | Standard | — | 1 | Cartesian | 0.000 | 4.000 | -3.600 | | concrete top + steel bottom |
| 21 | Standard | — | 1 | Cartesian | 0.000 | 4.000 | -7.600 | | steel top |
| 22 | Standard | — | 1 | Cartesian | 3.000 | 4.000 | 0.000 | | concrete part |
| 23 | Standard | — | 1 | Cartesian | 3.000 | 4.000 | -3.600 | | concrete top + steel bottom |
| 24 | Standard | — | 1 | Cartesian | 3.000 | 4.000 | -7.600 | | steel top |
| 25 | Standard | — | 1 | Cartesian | 6.000 | 4.000 | 0.000 | | concrete part |
| 26 | Standard | — | 1 | Cartesian | 6.000 | 4.000 | -3.600 | | concrete top + steel bottom |
| 27 | Standard | — | 1 | Cartesian | 6.000 | 4.000 | -7.600 | | steel top |
| 28 | Standard | — | 1 | Cartesian | 9.000 | 4.000 | 0.000 | | concrete part |
| 29 | Standard | — | 1 | Cartesian | 9.000 | 4.000 | -3.600 | | concrete top + steel bottom |
| 30 | Standard | — | 1 | Cartesian | 9.000 | 4.000 | -7.600 | | steel top |
| 31 | Standard | — | 1 | Cartesian | 12.000 | 4.000 | 0.000 | | concrete part |
| 32 | Standard | — | 1 | Cartesian | 12.000 | 4.000 | -3.600 | | concrete top + steel bottom |
| 33 | Standard | — | 1 | Cartesian | 12.000 | 4.000 | -7.600 | | steel top |
| 34 | Standard | — | 1 | Cartesian | 15.000 | 4.000 | 0.000 | | concrete part |
| 35 | Standard | — | 1 | Cartesian | 15.000 | 4.000 | -3.600 | | concrete top + steel bottom |
| 36 | Standard | — | 1 | Cartesian | 15.000 | 4.000 | -7.600 | | steel top |
| 37 | Standard | — | 1 | Cartesian | 1.000 | 1.000 | -3.600 | | opening node |
| 38 | Standard | — | 1 | Cartesian | 1.000 | 2.000 | -3.600 | | opening node |
| 39 | Standard | — | 1 | Cartesian | 2.000 | 2.000 | -3.600 | | opening node |
| 40 | Standard | — | 1 | Cartesian | 2.000 | 1.000 | -3.600 | | opening node |

1.5

LINES

Legend
 Member

Polyline



| Line No. | Line Type | Nodes No. | Line Length L [m] | Position | Options | Comment |
|----------|-----------|-----------|-------------------|----------|---------|-------------------|
| 1 | Polyline | 1,2 | 3.600 | On Z | | lines for columns |
| 2 | Polyline | 2,3 | 4.000 | On Z | | lines for columns |
| 3 | Polyline | 4,5 | 3.600 | Z | | lines for columns |
| 4 | Polyline | 5,6 | 4.000 | Z | | lines for columns |
| 5 | Polyline | 7,8 | 3.600 | Z | | lines for columns |
| 6 | Polyline | 8,9 | 4.000 | Z | | lines for columns |
| 7 | Polyline | 10,11 | 3.600 | Z | | lines for columns |
| 8 | Polyline | 11,12 | 4.000 | Z | | lines for columns |
| 9 | Polyline | 13,14 | 3.600 | Z | | lines for columns |
| 10 | Polyline | 14,15 | 4.000 | Z | | lines for columns |
| 11 | Polyline | 16,17 | 3.600 | Z | | lines for columns |
| 12 | Polyline | 17,18 | 4.000 | Z | | lines for columns |
| 13 | Polyline | 19,20 | 3.600 | Z | | lines for columns |
| 14 | Polyline | 20,21 | 4.000 | Z | | lines for columns |
| 15 | Polyline | 22,23 | 3.600 | Z | | lines for columns |
| 16 | Polyline | 23,24 | 4.000 | Z | | lines for columns |
| 17 | Polyline | 25,26 | 3.600 | Z | | lines for columns |
| 18 | Polyline | 26,27 | 4.000 | Z | | lines for columns |
| 19 | Polyline | 28,29 | 3.600 | Z | | lines for columns |
| 20 | Polyline | 29,30 | 4.000 | Z | | lines for columns |
| 21 | Polyline | 31,32 | 3.600 | Z | | lines for columns |



MODEL

1.5

LINES

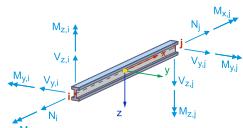
| Line No. | Line Type | Nodes No. | Line Length L [m] | Position | Options | Comment |
|----------|-----------|--------------|-------------------|----------|---------|-------------------------|
| 22 | Polyline | 32,33 | 4.000 | Z | | lines for columns |
| 23 | Polyline | 34,35 | 3.600 | Z | | lines for columns |
| 24 | Polyline | 35,36 | 4.000 | Z | | lines for columns |
| 25 | Polyline | 2,20 | 4.000 | Y | | lines for beams |
| 26 | Polyline | 3,21 | 4.000 | Y | | lines for beams |
| 27 | Polyline | 5,23 | 4.000 | Y | | lines for beams |
| 28 | Polyline | 6,24 | 4.000 | Y | | lines for beams |
| 29 | Polyline | 8,26 | 4.000 | Y | | lines for beams |
| 30 | Polyline | 9,27 | 4.000 | Y | | lines for beams |
| 31 | Polyline | 11,29 | 4.000 | Y | | lines for beams |
| 32 | Polyline | 12,30 | 4.000 | Y | | lines for beams |
| 33 | Polyline | 14,32 | 4.000 | Y | | lines for beams |
| 34 | Polyline | 15,33 | 4.000 | Y | | lines for beams |
| 35 | Polyline | 17,35 | 4.000 | Y | | lines for beams |
| 36 | Polyline | 18,36 | 4.000 | Y | | lines for beams |
| 37 | Polyline | 3,18 | 15.000 | X | | lines for timber beam |
| 38 | Polyline | 21,36 | 15.000 | X | | lines for timber beam |
| 39 | Polyline | 3,24 | 5.000 | XY | | lines for aluminum beam |
| 40 | Polyline | 2,20,35,17,2 | 38.000 | XY | | closed line for slab |
| 41 | Polyline | 37-40,37 | 4.000 | XY | | closed line for slab |

1.6

MEMBERS

- Legend
- Boundary Conditions (Steel Design)
 - Concrete Durability (Concrete Design)
 - Design properties
 - Effective Length (Aluminum Design)
 - Effective Length (Concrete Design)
 - Effective Length (Steel Design)
 - Member Transverse Stiffener
 - Service Class (Timber Design)

Beam



| Member No. | Line No. | Member Type Section Distribution | Rotation Type | β [deg] | Section i/k/j | Hinge i/j | Eccentricity i/j | Length L [m] | Position |
|------------------------|----------|----------------------------------|---------------|---------------|---------------|-----------|------------------|--------------|----------|
| 1 | 1 | Beam Uniform | Angle | 0.00 | ■ ■ 3 | -- | -- | 3.600 | On Z |
| concrete column | | | | | | | | | |
| 2 | 2 | Beam Uniform | Angle | 0.00 | ■ ■ 4 | -- | -- | 4.000 | On Z |
| steel column | | | | | | | | | |
| 3 | 3 | Beam Uniform | Angle | 0.00 | ■ ■ 3 | -- | -- | 3.600 | Z |
| concrete column | | | | | | | | | |
| 4 | 4 | Beam Uniform | Angle | 0.00 | ■ ■ 4 | -- | -- | 4.000 | Z |
| steel column | | | | | | | | | |
| 5 | 5 | Beam Uniform | Angle | 0.00 | ■ ■ 3 | -- | -- | 3.600 | Z |
| concrete column | | | | | | | | | |
| 6 | 6 | Beam Uniform | Angle | 0.00 | ■ ■ 4 | -- | -- | 4.000 | Z |
| steel column | | | | | | | | | |
| 7 | 7 | Beam Uniform | Angle | 0.00 | ■ ■ 3 | -- | -- | 3.600 | Z |
| concrete column | | | | | | | | | |
| 8 | 8 | Beam Uniform | Angle | 0.00 | ■ ■ 4 | -- | -- | 4.000 | Z |
| steel column | | | | | | | | | |
| 9 | 9 | Beam Uniform | Angle | 0.00 | ■ ■ 3 | -- | -- | 3.600 | Z |
| concrete column | | | | | | | | | |
| 10 | 10 | Beam Uniform | Angle | 0.00 | ■ ■ 4 | -- | -- | 4.000 | Z |
| steel column | | | | | | | | | |
| 11 | 11 | Beam | Angle | 0.00 | ■ ■ 3 | -- | -- | 3.600 | Z |



MODEL

1.6

MEMBERS

| Member No. | Line No. | Member Type Section Distribution | Rotation Type | β [deg] | Section i/k/j | Hinge i/j | Eccentricity i/j | Length L [m] | Position |
|------------|----------|-------------------------------------|---------------|---------------|---------------|-----------|------------------|--------------|----------|
| | | Uniform | | | | -- | -- | | |
| | | concrete column | | | | | | | |
| 12 | 12 | Beam Uniform | Angle | 0.00 | ■ I 4 | -- | -- | 4.000 | Z |
| | | steel column | | | | | | | |
| 13 | 13 | Beam Uniform | Angle | 0.00 | ■ ■ 3 | -- | -- | 3.600 | Z |
| | | concrete column | | | | | | | |
| 14 | 14 | Beam Uniform | Angle | 0.00 | ■ I 4 | -- | -- | 4.000 | Z |
| | | steel column | | | | | | | |
| 15 | 15 | Beam Uniform | Angle | 0.00 | ■ ■ 3 | -- | -- | 3.600 | Z |
| | | concrete column | | | | | | | |
| 16 | 16 | Beam Uniform | Angle | 0.00 | ■ I 4 | -- | -- | 4.000 | Z |
| | | steel column | | | | | | | |
| 17 | 17 | Beam Uniform | Angle | 0.00 | ■ ■ 3 | -- | -- | 3.600 | Z |
| | | concrete column | | | | | | | |
| 18 | 18 | Beam Uniform | Angle | 0.00 | ■ I 4 | -- | -- | 4.000 | Z |
| | | steel column | | | | | | | |
| 19 | 19 | Beam Uniform | Angle | 0.00 | ■ ■ 3 | -- | -- | 3.600 | Z |
| | | concrete column | | | | | | | |
| 20 | 20 | Beam Uniform | Angle | 0.00 | ■ I 4 | -- | -- | 4.000 | Z |
| | | steel column | | | | | | | |
| 21 | 21 | Beam Uniform | Angle | 0.00 | ■ ■ 3 | -- | -- | 3.600 | Z |
| | | concrete column | | | | | | | |
| 22 | 22 | Beam Uniform | Angle | 0.00 | ■ I 4 | -- | -- | 4.000 | Z |
| | | steel column | | | | | | | |
| 23 | 23 | Beam Uniform | Angle | 0.00 | ■ ■ 3 | -- | -- | 3.600 | Z |
| | | concrete column | | | | | | | |
| 24 | 24 | Beam Uniform | Angle | 0.00 | ■ I 4 | -- | -- | 4.000 | Z |
| | | steel column | | | | | | | |
| 25 | 25 | Beam Uniform | Angle | 0.00 | ■ ■ 2 | -- | -- | 4.000 | Y |
| | | concrete beam | | | | | | | |
| 26 | 26 | Beam Uniform | Angle | 0.00 | ■ I 1 | -- | -- | 4.000 | Y |
| | | steel beam | | | | | | | |



MODEL

1.6

MEMBERS

| Member No. | Line No. | Member Type Section Distribution | Rotation Type | β [deg] | Section i/k/j | Hinge i/j | Eccentricity i/j | Length L [m] | Position |
|----------------|----------|-------------------------------------|---------------|---------------|---------------|-----------|------------------|--------------|----------|
| steel beam | | | | | | | | | |
| 27 | 27 | Beam Uniform | Angle | 0.00 | ■ ■ 2 | — | — | 4.000 | Y |
| concrete beam | | | | | | | | | |
| 28 | 28 | Beam Uniform | Angle | 0.00 | ■ I 1 | — | — | 4.000 | Y |
| steel beam | | | | | | | | | |
| 29 | 29 | Beam Uniform | Angle | 0.00 | ■ ■ 2 | — | — | 4.000 | Y |
| concrete beam | | | | | | | | | |
| 30 | 30 | Beam Uniform | Angle | 0.00 | ■ I 1 | — | — | 4.000 | Y |
| steel beam | | | | | | | | | |
| 31 | 31 | Beam Uniform | Angle | 0.00 | ■ ■ 2 | — | — | 4.000 | Y |
| concrete beam | | | | | | | | | |
| 32 | 32 | Beam Uniform | Angle | 0.00 | ■ I 1 | — | — | 4.000 | Y |
| steel beam | | | | | | | | | |
| 33 | 33 | Beam Uniform | Angle | 0.00 | ■ ■ 2 | — | — | 4.000 | Y |
| concrete beam | | | | | | | | | |
| 34 | 34 | Beam Uniform | Angle | 0.00 | ■ I 1 | — | — | 4.000 | Y |
| steel beam | | | | | | | | | |
| 35 | 35 | Beam Uniform | Angle | 0.00 | ■ ■ 2 | — | — | 4.000 | Y |
| concrete beam | | | | | | | | | |
| 36 | 36 | Beam Uniform | Angle | 0.00 | ■ I 1 | — | — | 4.000 | Y |
| steel beam | | | | | | | | | |
| 37 | 37 | Beam Uniform | Angle | 0.00 | ■ ■ 5 | — | — | 15.000 | X |
| timber beam | | | | | | | | | |
| 38 | 38 | Beam Uniform | Angle | 0.00 | ■ ■ 5 | — | — | 15.000 | X |
| timber beam | | | | | | | | | |
| 39 | 39 | Beam Uniform | Angle | 0.00 | ■ C 6 | — | — | 5.000 | XY |
| Aluminium beam | | | | | | | | | |

1.7

SURFACES

Legend
■ Concrete Durability (Concrete Design)
■ Design properties

| Surface No. | Boundary Lines | Stiffness Type | Geometry Type | Thickness | Material | Position | Options |
|-------------|----------------|----------------|---------------|-----------|----------|----------|---|
| 1 | 40 | Standard | Plane | 1 | ■ 2 | XY | ■ ■ ■ ■ |

■ Grid for Results ■ Integrated Objects ■ Reinforcement Direction – Bottom ■ Reinforcement Direction – Top ■ Surface Reinforcement Table




MODEL

1.8

OPENINGS

| Opening No. | Surfaces No. | Boundary Lines No. | Area A [m ²] | X _c | Center of opening [m] Y _c | Z _c | Position |
|-------------|--------------|--------------------|--------------------------|----------------|---|----------------|----------|
| 1 | 1 | 41 | 1.000 | 1.400 | 1.400 | -3.600 | XY |

2

Special Objects

Legend
T Groundwater

2.1

BOREHOLES

| Borehole No. | X [m] | Coordinates Y [m] | Z [m] | Import Z from Terrain | Total Thickness Σt [m] | Groundwater Enabled | Z [m] | Options |
|--------------|-------|-------------------|-------|-------------------------------------|--------------------------------|-------------------------------------|-------|--------------------------------------|
| 1 | 1.000 | 2.000 | 0.000 | <input checked="" type="checkbox"/> | 6.000 | <input checked="" type="checkbox"/> | 1.000 | T |

Soil Sample 1

3

Types for Nodes

3.1

NODAL SUPPORTS

| Support No. | Nodes No. | Coordinate System | Translation Spring [kN/m] | | | Rotation Spring [kNm/rad] | | |
|-------------|---|-------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| | | | C _{u,X} | C _{u,Y} | C _{u,Z} | C _{φ,X} | C _{φ,Y} | C _{φ,Z} |
| 1 | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> u _z : Diagram 1, 4,7,10,13,16,19,22,25,2, 8,31,34 | 1 - Global XYZ | <input checked="" type="checkbox"/> |

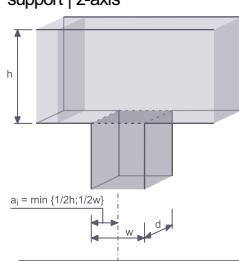
4

Types for Members

4.1

DESIGN SUPPORTS

Concrete | Direct support |
Monolithic connection | Inner support | z-axis



Concrete

| Support No. | Name | Symbol | Value | Unit |
|-------------|--|--|---|------|
| 1 | Concrete design support scripted Design support type Assigned to Members and Nodes No. Assigned to members Assigned to member sets Assigned to nodes Activate in z-axis Activate in y-axis Support width z-axis Support depth by section width of member Monolithic connection z-axis Inner support z-axis Ratio of moment redistribution z-axis Design support orientation z-axis Direct support z-axis Active for deflection design in y-axis Active for deflection design in z-axis scripted support | C Concrete | 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35 | |
| | | w | 1, 2,4,5,7,8,10,11,13,14,16,17,19,20,22,23,25,26,28,29,31,32, 34,35 | mm |
| | | δ | 300.0 | mm |
| | | +z-axis | 1.000 | - |
| | | | | |
| | | | | |
| | | | | |

5

Types for Concrete Design

5.1

EFFECTIVE LENGTHS

| No. | Description | Symbol | Value | Unit |
|-----|---|--|--|------|
| 2 | Standard (Members : 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35) Assigned to members Assigned to member sets Flexural buckling about y Flexural buckling about z Structure type about y-axis Structure type about z-axis Intermediate nodes Different properties | C Standard | 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35 | |
| | | <input checked="" type="checkbox"/> | | |
| | | <input checked="" type="checkbox"/> | | |
| | | Unbraced | | |
| | | Unbraced | | |
| | | <input type="checkbox"/> | | |
| | | <input checked="" type="checkbox"/> | | |

5.1.7

EFFECTIVE LENGTHS - NODAL SUPPORTS

| No. | Node Seq. No. | Support Type | Fixed in | | Nodes | Comment |
|-----|---------------|--------------|-------------------------------------|-----|-------------------------------------|---|
| | | | z/v | y/u | | |
| 2 | Start | Fixed in z | <input checked="" type="checkbox"/> | 2 | <input type="checkbox"/> | 1, 2,4,5,7,8,10,11,13,14,16,17,19,22,25, 28,31,34 |
| | End | Fixed all | <input checked="" type="checkbox"/> | 2 | <input checked="" type="checkbox"/> | 2,5,8,11,14,17,20,23,26,29,32,35 |

5.1.2

EFFECTIVE LENGTHS - FACTORS

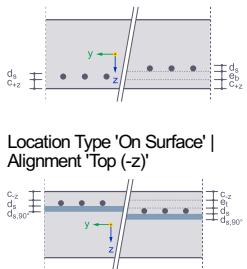
| No. | Flexural Buckling | | Unbraced Flexural Buckling | | Braced Flexural Buckling | | Comment |
|-----|-------------------|-----------|----------------------------|---------------|--------------------------|---------------|---------|
| | k_y [-] | k_z [-] | $k_{u,y}$ [-] | $k_{u,z}$ [-] | $k_{b,y}$ [-] | $k_{b,z}$ [-] | |
| 2 | 1.00 | 1.00 | | | | | |

5.2

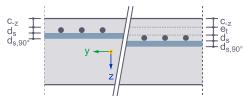
SURFACE REINFORCEMENTS

Location Type 'On Surface' |
Alignment 'Bottom (+z)'

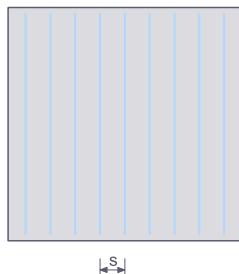
Location Type 'On Surface'
Alignment 'Top (-z)'



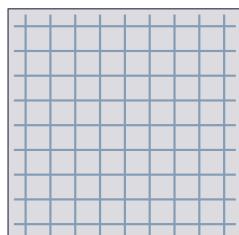
Reinforcement Type 'Rebar'



Reinforcement Type 'Rebar'



Reinforcement Type 'Mesh'



| Reinf. No. | Description | Symbol | Value | Unit |
|---------------|--|--|---|------|
| 1 | On Surface Rebar $d_s : 10.0 \text{ mm}$ $s : 0.150 \text{ m}$ Bottom (+z) (Surfaces : 1) Assigned to Surfaces No. Location type Material Reinforcement type Assigned to side Rebar diameter Rebar spacing Additional transverse reinforcement enabled Top alignment enabled Bottom alignment enabled Bottom additional offset to concrete cover Reinforcement direction type In reinforcement direction of design Reinforcement area Reinforcement area Rebar diameter Usable diameters enabled Rebar diameter Rebar diameter Priority Rebar diameter Rebar diameter Rebar spacing Rebar spacing Priority Rebar spacing Increment Rebar spacing Rebar spacing | d_s s e_b $a_{s,1}$ $a_{s,1,+z}$ p $d_{s,min}$ $d_{s,max}$ Δ_s s_{min} s_{max} | 1 On Surface 3 - B550S(A) Isotropic Linear Elastic Rebar Bottom (+z) 10.0 mm 0.150 m <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> 0.0 mm In reinforcement direction 5.24 cm^2/m 5.24 cm^2/m <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1 10.0 mm 20.0 mm <input type="checkbox"/> 1 0.010 m 0.100 m <input type="checkbox"/> 0.300 m | |
| 2 | On Surface Mesh Q188A Top (-z) (Surfaces : 1) Assigned to Surfaces No. Location type Material Reinforcement type Assigned to side Mesh product range Mesh name Mesh shape Rebar diameter Rebar spacing Additional transverse reinforcement enabled Additional rebar diameter Additional rebar spacing Top alignment enabled Bottom alignment enabled Top additional offset to concrete cover Reinforcement direction type In reinforcement direction of design Reinforcement area Reinforcement area Reinforcement area Reinforcement area Rebar diameter Usable diameters enabled Rebar diameter Rebar diameter Priority Rebar diameter Rebar diameter Rebar spacing Rebar spacing Priority Rebar spacing Increment Rebar spacing Rebar spacing | d_s s $d_{s,90^\circ}$ s_{90° e_t $a_{s,1}$ $a_{s,2}$ $a_{s,1,z}$ $a_{s,2,z}$ p $d_{s,min}$ $d_{s,max}$ Δ_s s_{min} s_{max} | 1 On Surface 3 - B550S(A) Isotropic Linear Elastic Mesh Top (-z) Germany - 2008-01-01 Q188A Q-Mesh 6.0 mm 0.150 m <input checked="" type="checkbox"/> 6.0 mm 0.150 m <input type="checkbox"/> <input type="checkbox"/> 0.0 mm In reinforcement direction 1.88 cm^2/m 1.88 cm^2/m 1.88 cm^2/m 1.88 cm^2/m <input type="checkbox"/> <input type="checkbox"/> 1 10.0 mm 20.0 mm <input type="checkbox"/> 1 0.010 m 0.100 m <input type="checkbox"/> 0.300 m | |



5.2

SURFACE REINFORCEMENTS

| Reinf. No. | Description | Symbol | Value | Unit |
|------------|--|------------------------|--------------------------|------|
| | Additional rebar diameter Usable diameters enabled | | <input type="checkbox"/> | |
| | Additional rebar diameter | | <input type="checkbox"/> | |
| | Additional rebar diameter Priority | p | 1 | |
| | Additional rebar diameter | $d_{s,90^\circ, \min}$ | 10.0 | mm |
| | Additional rebar diameter | $d_{s,90^\circ, \max}$ | 20.0 | mm |
| | Additional rebar spacing | | <input type="checkbox"/> | |
| | Additional rebar spacing Priority | p | 1 | |
| | Additional rebar spacing Increment | Δ_s | 0.010 | m |
| | Additional rebar spacing | $s_{90^\circ, \min}$ | 0.100 | m |
| | Additional rebar spacing | $s_{90^\circ, \max}$ | 0.300 | m |

5.3

CONCRETE DURABILITIES

| Cond. No. | Description | Symbol | Value | Unit |
|-----------|---|--------|---|------|
| 1 | XC1 (Members : 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35 Surfaces : 1) Assigned to Members No. Assigned to Member Sets No. Assigned to Surfaces No. Corrosion induced by carbonation Structural class type Increase design working life from 50 to 100 years enabled Position of reinforcement not affected by construction process enabled Special quality control of production enabled Air entrainment of more than 4% enabled Allowance for deviation type | | 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35 XC1 - Dry or permanently wet According to standard | |
| | | | <input type="checkbox"/> | |
| | | | According to standard | |

5.4

REINFORCEMENT DIRECTIONS

| Direction No. | Type | Surfaces | Reinf. Dir. Rotations About z Related to x | | |
|---------------|------------------------------------|----------|--|-------------------|-------------------------|
| Direction No. | Type | Surfaces | φ_1 [deg] | φ_2 [deg] | $\Delta\varphi_2$ [deg] |
| 1 | First Reinforcement Direction in x | 1 | | | |

6

Imperfections

6.1.1

IMPERFECTION CASES

| Case No. | Parameters | | Unit | |
|----------|--|--------|-------------------------------------|---------------------|
| Case No. | Name | Symbol | Value | Unit |
| 1 | Is Active | | <input type="checkbox"/> | |
| | Imperfection Case Type | | <input checked="" type="checkbox"/> | Local Imperfections |
| | Assigned to Load Cases | | 4 | |
| | Assigned to Load Combinations | | | |
| | Assign to all COs without assigned Imperfection Case | | <input checked="" type="checkbox"/> | |

7

Load Cases & Combinations

7.1

LOAD CASES

| LC No. | Settings | Value | Unit | To Solve | Options |
|--------|---|---|------|-------------------------------------|---------|
| 1 | SelfWeight Analysis type Static analysis settings Action category Self-weight - Factor in direction X Self-weight - Factor in direction Y Self-weight - Factor in direction Z Load duration Stability analysis settings | Static Analysis SA1 - MySettingsSecondOrder <input checked="" type="checkbox"/> Permanent 0.000 0.000 1.000 Permanent ST101 - My SAS | -- | <input checked="" type="checkbox"/> | |
| 2 | My load case Analysis type Static analysis settings Action category Load duration | Static Analysis SA1 - MySettingsSecondOrder <input checked="" type="checkbox"/> Permanent/Imposed Permanent | | <input checked="" type="checkbox"/> | |

Legend
 Imperfection Case
 Stability Analysis Settings



LOADS

7.1

LOAD CASES

| LC No. | Settings | Value | Unit | To Solve | Options |
|--------|--|---|------|-------------------------------------|---------|
| 3 | Qs My load case snow Analysis type Static analysis settings Action category Load duration | Static Analysis SA1 - MySettingsSecondOrder Qs Snow/Ice loads - H > 1000 m Medium-term | | <input checked="" type="checkbox"/> | |
| 4 | Qs My load case Analysis type Static analysis settings Action category Load duration Imperfection case | Static Analysis SA1 - MySettingsSecondOrder Qs Snow/Ice loads - H > 1000 m Medium-term IC1 | | <input checked="" type="checkbox"/> | |
| 5 | Qw My load case wind Analysis type Static analysis settings Action category Load duration | Static Analysis SA1 - MySettingsSecondOrder Qw Wind Short-term | | <input checked="" type="checkbox"/> | |
| 6 | G Stability Analysis type Static analysis settings Action category Self-weight - Factor in direction X Self-weight - Factor in direction Y Self-weight - Factor in direction Z Load duration Stability analysis settings | Static Analysis SA1 - MySettingsSecondOrder G Permanent 0.000 0.000 1.000 Permanent ST101 - My SAS | | <input checked="" type="checkbox"/> | |
| 10 | AE My load case for modal analysis Analysis type Modal analysis settings Import masses from Action category | Modal Analysis MOS1 - Generated via Script LC2 AE Seismic actions | | <input checked="" type="checkbox"/> | |
| 20 | AE Spectral Analysis type Spectral analysis settings Import modal analysis from Action category Load duration | Response Spectrum Analysis SPS1 - MySRSS LC10 AE Seismic actions Instantaneous | | <input checked="" type="checkbox"/> | |

7.1.1

LOAD CASES - RESPONSE SPECTRUM

| LC No. | Response Spectrum | | | Scale Factor | | | Rotation α [deg] | Comment |
|--------|-------------------|---|---|--------------|-------|-------|------------------|---------|
| | X | Y | Z | X [-] | Y [-] | Z [-] | | |
| 20 | | | | RS1 | | | 1.000 | 0.0000 |

7.1.2

LOAD CASES - SELECTION OF MODES

| LC No. | To Generate | Period T [s] | Frequency f [Hz] | Acceleration [m/s²] | | | Factor [-] | Damping D [-] | M _{eff,i} / Σ M [-] |
|--------|-------------------------------------|--------------|------------------|---------------------|-----------------|-----------------|------------------|------------------|------------------------------|
| | | | | S _{aX} | S _{aY} | S _{aZ} | f _{max} | f _{meY} | f _{meZ} |
| 20 | <input checked="" type="checkbox"/> | 1.228 | 0.814 | | | 0.54 | 0.461 | 0.000 | 0.000 |
| | <input checked="" type="checkbox"/> | 1.156 | 0.865 | | | 0.58 | 0.000 | 0.000 | 0.000 |
| | <input checked="" type="checkbox"/> | 1.155 | 0.866 | | | 0.58 | 0.000 | 0.000 | 0.000 |
| | <input checked="" type="checkbox"/> | 1.139 | 0.878 | | | 0.59 | 0.027 | 0.001 | 0.000 |
| | <input checked="" type="checkbox"/> | 1.097 | 0.912 | | | 0.61 | 0.001 | 0.002 | 0.000 |

7.2

LOAD COMBINATIONS

| CO No. | Settings | Value | Unit | To Solve |
|--------|---|---|------|-------------------------------------|
| 1 | EQU ScriptedCombination Analysis type Static analysis settings Design Situation Load duration | Static Analysis SA1 - MySettingsSecondOrder EQU DS1 - ScriptedDS Permanent | | <input checked="" type="checkbox"/> |





7.3

STATIC ANALYSIS SETTINGS

| Settings No. | Description | Symbol | Value | Unit |
|--------------|--|--------|-------------------------------------|--------------------|
| 1 | MySettingsSecondOrder | | | |
| | Analysis type | | <input checked="" type="checkbox"/> | Second-order (P-Δ) |
| | Iterative method for nonlinear analysis | | <input checked="" type="checkbox"/> | Newton-Raphson |
| | Maximum number of iterations | | 100 | |
| | Number of load increments | | 1 | |
| | Modify standard precision and tolerance settings | | <input type="checkbox"/> | |
| | Ignore all nonlinearities | | <input type="checkbox"/> | |
| | Modify loading by multiplier factor | | <input type="checkbox"/> | |
| | Consider favorable effect due to tension in members | | <input checked="" type="checkbox"/> | |
| | Displacements due to member load of type 'Pipe internal pressure' (Bourdon effect) | | <input type="checkbox"/> | |
| | Refer internal forces to deformed structure | | <input checked="" type="checkbox"/> | |
| | Refer internal forces to deformed structure for normal forces | | <input checked="" type="checkbox"/> | |
| | Refer internal forces to deformed structure for shear forces | | <input checked="" type="checkbox"/> | |
| | Refer internal forces to deformed structure for moments | | <input checked="" type="checkbox"/> | |
| | Method for equation system | | <input type="checkbox"/> | Direct |
| | Plate bending theory | | <input type="checkbox"/> | Mindlin |
| | Activate mass conversion to load | | <input type="checkbox"/> | |
| | Asymmetric direct solver | | <input checked="" type="checkbox"/> | |
| | Equilibrium for undeformed structure | | <input type="checkbox"/> | |
| | Check of stability based on deformation rate | | <input type="checkbox"/> | |

7.4

RELATIONSHIP BETWEEN LOAD CASES

| Rel. No. | Assigned to | Comment |
|----------|-------------|---------|
| 1 | 1 | |

8

Guide Objects

8.1

COORDINATE SYSTEMS

| System No. | Type | Symbol | Coordinates Value | Unit | Rotation Sequence | Symbol | Value | Unit | Comment |
|------------|------------|--------|-------------------|------|-------------------|--------|-------|------|---------|
| 1 | Global XYZ | | | | | | | | |

9

Parts List



9.1 PARTS LIST - ALL BY MATERIAL

Parts Lists

| Material No. | Material Name | Object Type | Tot. Coating $C_{\Sigma} [m^2]$ | Tot. Volume $V_{\Sigma} [m^3]$ | Total Mass $M_{\Sigma} [t]$ |
|----------------|----------------|-------------|---------------------------------|--------------------------------|-----------------------------|
| 1 | S235 | Members | 73.908 | 0.443 | 3.479 |
| Total | | | 73.908 | 0.443 | 3.479 |
| 2 | C20/25 | Members | 170.400 | 22.800 | 57.000 |
| Total | | Surfaces | 139.000 | 29.500 | 73.750 |
| | | | 309.400 | 52.300 | 130.750 |
| 4 | C24 | Members | 61.000 | 7.500 | 3.750 |
| Total | | | 61.000 | 7.500 | 3.750 |
| 5 | EN AW-3004 H14 | Members | 3.586 | 0.015 | 0.041 |
| Total | | | 3.586 | 0.015 | 0.041 |
| Σ Total | | | 447.894 | 60.258 | 138.020 |

10

Static Analysis Results



10.1 SUMMARY

Static Analysis

| | Description | Value | Unit | Notes |
|--|--|-------|------|-------|
| | LC1 - SelfWeight Sum of loads and the sum of support forces | | | |





RESULTS

10.1 SUMMARY

Static Analysis

| | Description | Value | Unit | Notes |
|---|-------------------------------------|-------|------|--|
| Sum of loads in X | 0.00 | kN | | |
| Sum of support forces in X | 0.00 | kN | | |
| Sum of loads in Y | 0.00 | kN | | |
| Sum of support forces in Y | 0.00 | kN | | |
| Sum of loads in Z | 1380.19 | kN | | |
| Sum of support forces in Z | 1380.19 | kN | | Deviation: 0.00 % |
| Resultant of reactions | | | | |
| Resultant of reactions about X | 0.03 | kNm | | At center of gravity of model (7.553, 2.005, -3.416 m) |
| Resultant of reactions about Y | -0.21 | kNm | | At center of gravity of model |
| Resultant of reactions about Z | 0.00 | kNm | | At center of gravity of model |
| Maximum deformations | | | | |
| Maximum displacement in X-direction | 1.5 | mm | | Member No. 12, x: 2.667 m |
| Maximum displacement in Y-direction | 0.1 | mm | | Member No. 2, x: 2.222 m |
| Maximum displacement in Z-direction | 125.0 | mm | | Member No. 38, x: 7.500 m |
| Maximum vectorial displacement | 125.0 | mm | | Member No. 38, x: 7.500 m |
| Maximum rotation about X-axis | -0.5 | mrad | | Member No. 39, x: 3.333 m |
| Maximum rotation about Y-axis | -2.1 | mrad | | Member No. 38, x: 1.500 m |
| Maximum rotation about Z-axis | 0.2 | mrad | | Member No. 28, x: 0.444 m |
| Calculation statistic | | | | |
| Number of iterations | 3 | | | |
| Maximum value of element of stiffness matrix on diagonal | 8.92e+10 | -- | | |
| Minimum value of element of stiffness matrix on diagonal | 309654.00 | -- | | |
| Stiffness matrix determinant | 1.67e+16489 | -- | | |
| Infinity Norm | 1.93e+11 | -- | | |
| Static Analysis Settings No. 1 - MySettingsSecondOrder | | | | |
| Analysis type | Second-order (P-Δ) | | | |
| Iterative method | Newton-Raphson | | | |
| Maximum number of iterations | 100 | | | |
| Number of load increments | 1 | | | |
| Modify loading by multiplier factor | <input type="checkbox"/> | | | |
| Consider favorable effects due to tension forces of members | <input checked="" type="checkbox"/> | | | |
| Asymmetric direct solver | <input checked="" type="checkbox"/> | | | |
| Method for Equation System | Direct | | | |
| Plate bending theory | Mindlin | | | |
| LC2 - My load case | | | | |
| Sum of loads and the sum of support forces | | | | |
| Sum of loads in X | 0.00 | kN | | |
| Sum of support forces in X | 0.00 | kN | | |
| Sum of loads in Y | 0.00 | kN | | |
| Sum of support forces in Y | 0.00 | kN | | |
| Sum of loads in Z | 2612.92 | kN | | |
| Sum of support forces in Z | 2612.92 | kN | | Deviation: 0.00 % |
| Resultant of reactions | | | | |
| Resultant of reactions about X | 166.76 | kNm | | At center of gravity of model (7.553, 2.005, -3.416 m) |
| Resultant of reactions about Y | 204.51 | kNm | | At center of gravity of model |
| Resultant of reactions about Z | 0.24 | kNm | | At center of gravity of model |
| Maximum deformations | | | | |
| Maximum displacement in X-direction | -19.3 | mm | | Member No. 2, x: 2.667 m |
| Maximum displacement in Y-direction | -16.8 | mm | | Member No. 39, x: 2.500 m |
| Maximum displacement in Z-direction | 351.7 | mm | | Member No. 37, x: 7.500 m |
| Maximum vectorial displacement | 351.7 | mm | | Member No. 37, x: 7.500 m |
| Maximum rotation about X-axis | -28.1 | mrad | | Member No. 39, x: 3.889 m |
| Maximum rotation about Y-axis | -31.6 | mrad | | Member No. 39, x: 0.556 m |
| Maximum rotation about Z-axis | 19.8 | mrad | | Member No. 39, x: 3.889 m |
| Calculation statistic | | | | |
| Number of iterations | 4 | | | |
| Maximum value of element of stiffness matrix on diagonal | 8.92e+10 | -- | | |
| Minimum value of element of stiffness matrix on diagonal | 306397.00 | -- | | |
| Stiffness matrix determinant | 4.02e+16488 | -- | | |
| Infinity Norm | 1.93e+11 | -- | | |
| Static Analysis Settings No. 1 - MySettingsSecondOrder | | | | |
| Analysis type | Second-order (P-Δ) | | | |
| Iterative method | Newton-Raphson | | | |
| Maximum number of iterations | 100 | | | |
| Number of load increments | 1 | | | |
| Modify loading by multiplier factor | <input type="checkbox"/> | | | |
| Consider favorable effects due to tension forces of members | <input checked="" type="checkbox"/> | | | |
| Asymmetric direct solver | <input checked="" type="checkbox"/> | | | |





RESULTS

10.1 SUMMARY

Static Analysis

| | Description | Value | Unit | Notes |
|---|-------------------------------------|-------|------|--|
| Method for Equation System | Direct | | | |
| Plate bending theory | Mindlin | | | |
| Qs LC4 - My load case | | | | |
| Sum of loads and the sum of support forces | | | | |
| Sum of loads in X | 0.00 | kN | | |
| Sum of support forces in X | 0.00 | kN | | |
| Sum of loads in Y | 0.00 | kN | | |
| Sum of support forces in Y | 0.00 | kN | | |
| Sum of loads in Z | 0.00 | kN | | |
| Sum of support forces in Z | 0.00 | kN | | |
| Resultant of reactions | | | | |
| Resultant of reactions about X | 0.00 | kNm | | At center of gravity of model (7.553, 2.005, -3.416 m) |
| Resultant of reactions about Y | 0.00 | kNm | | At center of gravity of model |
| Resultant of reactions about Z | 0.00 | kNm | | At center of gravity of model |
| Maximum deformations | | | | |
| Maximum displacement in X-direction | 0.0 | mm | | |
| Maximum displacement in Y-direction | 0.0 | mm | | |
| Maximum displacement in Z-direction | 0.0 | mm | | |
| Maximum vectorial displacement | 0.0 | mm | | |
| Maximum rotation about X-axis | 0.0 | mrad | | |
| Maximum rotation about Y-axis | 0.0 | mrad | | |
| Maximum rotation about Z-axis | 0.0 | mrad | | |
| Calculation statistic | | | | |
| Number of iterations | 2 | | | |
| Maximum value of element of stiffness matrix on diagonal | 8.92e+10 | -- | | |
| Minimum value of element of stiffness matrix on diagonal | 309790.00 | -- | | |
| Stiffness matrix determinant | 1.77e+16489 | -- | | |
| Infinity Norm | 1.93e+11 | -- | | |
| Static Analysis Settings No. 1 - MySettingsSecondOrder | | | | |
| Analysis type | Second-order (P-Δ) | | | |
| Iterative method | Newton-Raphson | | | |
| Maximum number of iterations | 100 | | | |
| Number of load increments | 1 | | | |
| Modify loading by multiplier factor | <input type="checkbox"/> | | | |
| Consider favorable effects due to tension forces of members | <input checked="" type="checkbox"/> | | | |
| Asymmetric direct solver | <input checked="" type="checkbox"/> | | | |
| Method for Equation System | Direct | | | |
| Plate bending theory | Mindlin | | | |
| G LC6 - Stability | | | | |
| Sum of loads and the sum of support forces | | | | |
| Sum of loads in X | 0.00 | kN | | |
| Sum of support forces in X | 0.00 | kN | | |
| Sum of loads in Y | 0.00 | kN | | |
| Sum of support forces in Y | 0.00 | kN | | |
| Sum of loads in Z | 1380.19 | kN | | |
| Sum of support forces in Z | 1380.19 | kN | | Deviation: 0.00 % |
| Resultant of reactions | | | | |
| Resultant of reactions about X | 0.03 | kNm | | At center of gravity of model (7.553, 2.005, -3.416 m) |
| Resultant of reactions about Y | -0.21 | kNm | | At center of gravity of model |
| Resultant of reactions about Z | 0.00 | kNm | | At center of gravity of model |
| Maximum deformations | | | | |
| Maximum displacement in X-direction | 1.5 | mm | | Member No. 12, x: 2.667 m |
| Maximum displacement in Y-direction | 0.1 | mm | | Member No. 2, x: 2.222 m |
| Maximum displacement in Z-direction | 125.0 | mm | | Member No. 38, x: 7.500 m |
| Maximum vectorial displacement | 125.0 | mm | | Member No. 38, x: 7.500 m |
| Maximum rotation about X-axis | -0.5 | mrad | | Member No. 39, x: 3.333 m |
| Maximum rotation about Y-axis | -2.1 | mrad | | Member No. 38, x: 1.500 m |
| Maximum rotation about Z-axis | 0.2 | mrad | | Member No. 28, x: 0.444 m |
| Calculation statistic | | | | |
| Number of iterations | 3 | | | |
| Maximum value of element of stiffness matrix on diagonal | 8.92e+10 | -- | | |
| Minimum value of element of stiffness matrix on diagonal | 309654.00 | -- | | |
| Stiffness matrix determinant | 1.67e+16489 | -- | | |
| Infinity Norm | 1.93e+11 | -- | | |
| Static Analysis Settings No. 1 - MySettingsSecondOrder | | | | |
| Analysis type | Second-order (P-Δ) | | | |
| Iterative method | Newton-Raphson | | | |



RESULTS

10.1 SUMMARY

Static Analysis

| | Description | Value | Unit | Notes |
|--|---|-------------------------------------|------|--|
| | Maximum number of iterations | 100 | | |
| | Number of load increments | 1 | | |
| | Modify loading by multiplier factor | <input type="checkbox"/> | | |
| | Consider favorable effects due to tension forces of members | <input checked="" type="checkbox"/> | | |
| | Asymmetric direct solver | <input checked="" type="checkbox"/> | | |
| | Method for Equation System | Direct | | |
| | Plate bending theory | Mindlin | | |
| EQU DS1 - ScriptedDS | | | | |
| | Maximum deformations | | | |
| | Maximum displacement in X-direction | -30.8 | mm | Member No. 2, x: 2.667 m CO1 |
| | Maximum displacement in Y-direction | -26.1 | mm | Member No. 39, x: 2.500 m CO1 |
| | Maximum displacement in Z-direction | 698.5 | mm | Member No. 37, x: 7.500 m CO1 |
| | Maximum vectorial displacement | 698.6 | mm | Member No. 37, x: 7.500 m CO1 |
| | Maximum rotation about X-axis | -43.2 | mrad | Member No. 39, x: 3.889 m CO1 |
| | Maximum rotation about Y-axis | -50.3 | mrad | Member No. 39, x: 0.556 m CO1 |
| | Maximum rotation about Z-axis | 30.8 | mrad | Member No. 39, x: 3.889 m CO1 |
| EQU CO1 - ScriptedCombination | | | | |
| | Sum of loads and the sum of support forces | | | |
| | Sum of loads in X | 0.00 | kN | |
| | Sum of support forces in X | 0.00 | kN | |
| | Sum of loads in Y | 0.00 | kN | |
| | Sum of support forces in Y | 0.00 | kN | |
| | Sum of loads in Z | 5782.54 | kN | |
| | Sum of support forces in Z | 5782.54 | kN | Deviation: 0.00 % |
| Resultant of reactions | | | | |
| | Resultant of reactions about X | 253.27 | kNm | At center of gravity of model (7.553, 2.005, -3.416 m) |
| | Resultant of reactions about Y | 309.68 | kNm | At center of gravity of model |
| | Resultant of reactions about Z | 0.63 | kNm | At center of gravity of model |
| Maximum deformations | | | | |
| | Maximum displacement in X-direction | -30.8 | mm | Member No. 2, x: 2.667 m |
| | Maximum displacement in Y-direction | -26.1 | mm | Member No. 39, x: 2.500 m |
| | Maximum displacement in Z-direction | 698.5 | mm | Member No. 37, x: 7.500 m |
| | Maximum vectorial displacement | 698.6 | mm | Member No. 37, x: 7.500 m |
| | Maximum rotation about X-axis | -43.2 | mrad | Member No. 39, x: 3.889 m |
| | Maximum rotation about Y-axis | -50.3 | mrad | Member No. 39, x: 0.556 m |
| | Maximum rotation about Z-axis | 30.8 | mrad | Member No. 39, x: 3.889 m |
| Calculation statistic | | | | |
| | Number of iterations | 5 | -- | |
| | Maximum value of element of stiffness matrix on diagonal | 8.92e+10 | -- | |
| | Minimum value of element of stiffness matrix on diagonal | 304550.00 | -- | |
| | Stiffness matrix determinant | 1.66e+16488 | -- | |
| | Infinity Norm | 1.93e+11 | -- | |
| Static Analysis Settings No. 1 - MySettingsSecondOrder | | | | |
| | Analysis type | Second-order (P-Δ) | | |
| | Iterative method | Newton-Raphson | | |
| | Maximum number of iterations | 100 | | |
| | Number of load increments | 1 | | |
| | Modify loading by multiplier factor | <input type="checkbox"/> | | |
| | Consider favorable effects due to tension forces of members | <input checked="" type="checkbox"/> | | |
| | Asymmetric direct solver | <input checked="" type="checkbox"/> | | |
| | Method for Equation System | Direct | | |
| | Plate bending theory | Mindlin | | |

10.2 CALCULATION DIAGRAMS

Static Analysis

| Calc. Diagram | Name | Options | Comment |
|---------------|---------------------------------------|---------|---|
| CD1 | LC1 - SelfWeight MyScriptedDiagram | | Nodes - Support Forces Pz (Node No. 19) Nodes - Support Forces M _y (Node No. 19) |

10.3 NODES - SUPPORT FORCES

Static Analysis

| Node No. | | P _x [kN] | P _y [kN] | P _z [kN] | M _x [kNm] | M _y [kNm] | M _z [kNm] | Node Comment Cor. Loading |
|----------|------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|---------------------------|
| 1 | LC1 - SelfWeight | -12.33 | -3.47 | 113.71 | -3.40 | 10.63 | 0.06 | concrete part |
| 4 | | -11.06 | -3.26 | 114.65 | -3.22 | 9.19 | 0.03 | concrete part |
| 7 | | -4.54 | -2.99 | 115.36 | -2.98 | 1.64 | 0.00 | concrete part |
| 10 | | 3.63 | -2.95 | 115.64 | -3.00 | -7.82 | -0.05 | concrete part |





RESULTS

10.3 NODES - SUPPORT FORCES

Static Analysis

| Node No. | | Support Forces | | | Support Moments | | | Node Comment Cor. Loading | |
|--|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|------------------------------|--|
| | | P _x [kN] | P _y [kN] | P _z [kN] | M _x [kNm] | M _y [kNm] | M _z [kNm] | | |
| 13 | | 10.75 | -3.06 | 115.51 | -3.20 | -16.07 | -0.08 | concrete part | |
| 16 | | 12.93 | -3.35 | 115.09 | -3.60 | -18.57 | -0.11 | concrete part | |
| 19 | | -12.15 | 3.27 | 113.78 | 4.47 | 10.34 | -0.11 | concrete part | |
| 22 | | -10.80 | 3.13 | 114.71 | 4.23 | 8.80 | -0.09 | concrete part | |
| 25 | | -4.27 | 3.05 | 115.40 | 4.07 | 1.24 | -0.05 | concrete part | |
| 28 | | 3.85 | 3.08 | 115.68 | 4.04 | -8.16 | -0.01 | concrete part | |
| 31 | | 10.92 | 3.18 | 115.54 | 4.08 | -16.35 | 0.03 | concrete part | |
| 34 | | 13.07 | 3.36 | 115.12 | 4.24 | -18.82 | 0.06 | concrete part | |
| G LC1 - SelfWeight | | | | | | | | | |
| Total max/min values with corresponding values | | | | | | | | | |
| 34 | P _x | 13.07 | 3.36 | 115.12 | 4.24 | -18.82 | 0.06 | concrete part | |
| 1 | P _y | -12.33 | -3.47 | 113.71 | -3.40 | 10.63 | 0.06 | concrete part | |
| 34 | P _y | 13.07 | 3.36 | 115.12 | 4.24 | -18.82 | 0.06 | concrete part | |
| 1 | P _z | -12.33 | -3.47 | 113.71 | -3.40 | 10.63 | 0.06 | concrete part | |
| 28 | P _z | 3.85 | 3.08 | 115.68 | 4.04 | -8.16 | -0.01 | concrete part | |
| 1 | M _x | -12.33 | -3.47 | 113.71 | -3.40 | 10.63 | 0.06 | concrete part | |
| 19 | M _x | -12.15 | 3.27 | 113.78 | 4.47 | 10.34 | -0.11 | concrete part | |
| 16 | M _x | 12.93 | -3.35 | 115.09 | -3.60 | -18.57 | -0.11 | concrete part | |
| 1 | M _y | -12.33 | -3.47 | 113.71 | -3.40 | 10.63 | 0.06 | concrete part | |
| 34 | M _y | 13.07 | 3.36 | 115.12 | 4.24 | -18.82 | 0.06 | concrete part | |
| 34 | M _y | 13.07 | 3.36 | 115.12 | 4.24 | -18.82 | 0.06 | concrete part | |
| 16 | M _y | 12.93 | -3.35 | 115.09 | -3.60 | -18.57 | -0.11 | concrete part | |
| G LC1 - SelfWeight | | | | | | | | | |
| Sum of loads and the sum of support forces | | | | | | | | | |
| Σ | P _x [kN] | 0.00 | 0.00 | 1380.19 | Loads | | | | |
| Σ | P _y [kN] | 0.00 | 0.00 | 1380.19 | Support Forces | | | | |
| G_a LC2 - My load case | | | | | | | | | |
| Total max/min values with corresponding values | | | | | | | | | |
| 1 | P _x | 54.22 | 4.92 | 220.24 | 18.93 | -58.99 | -0.82 | concrete part | |
| 4 | P _x | 44.04 | -3.94 | 217.14 | 8.85 | -47.67 | -0.16 | concrete part | |
| 7 | P _x | 17.95 | -4.31 | 215.18 | 8.61 | -17.56 | -0.04 | concrete part | |
| 10 | P _x | -15.02 | -3.56 | 214.87 | 9.61 | 20.51 | 0.12 | concrete part | |
| 13 | P _x | -44.16 | -2.51 | 216.29 | 10.91 | 54.17 | 0.26 | concrete part | |
| 16 | P _x | -53.65 | 2.32 | 218.89 | 16.68 | 64.74 | 0.88 | concrete part | |
| 19 | P _x | 49.62 | 1.21 | 221.30 | 14.43 | -53.39 | 0.98 | concrete part | |
| 22 | P _x | 41.69 | -0.71 | 218.53 | 12.63 | -44.70 | 0.28 | concrete part | |
| 25 | P _x | 18.48 | 2.04 | 216.54 | 15.99 | -18.00 | 0.16 | concrete part | |
| 28 | P _x | -14.76 | 3.03 | 216.18 | 17.25 | 20.36 | -0.04 | concrete part | |
| 31 | P _x | -44.08 | 2.93 | 217.58 | 17.25 | 54.18 | -0.20 | concrete part | |
| 34 | P _x | -54.34 | -1.43 | 220.18 | 12.13 | 65.61 | -0.86 | concrete part | |
| G_a LC2 - My load case | | | | | | | | | |
| Total max/min values with corresponding values | | | | | | | | | |
| 1 | P _y | 54.22 | 4.92 | 220.24 | 18.93 | -58.99 | -0.82 | concrete part | |
| 34 | P _y | -54.34 | -1.43 | 220.18 | 12.13 | 65.61 | -0.86 | concrete part | |
| 1 | P _y | 54.22 | 4.92 | 220.24 | 18.93 | -58.99 | -0.82 | concrete part | |
| 7 | P _y | 17.95 | -4.31 | 215.18 | 8.61 | -17.56 | -0.04 | concrete part | |
| 19 | P _y | 49.62 | 1.21 | 221.30 | 14.43 | -53.39 | 0.98 | concrete part | |
| 10 | P _y | -15.02 | -3.56 | 214.87 | 9.61 | 20.51 | 0.12 | concrete part | |
| 1 | M _x | 54.22 | 4.92 | 220.24 | 18.93 | -58.99 | -0.82 | concrete part | |
| 7 | M _x | 17.95 | -4.31 | 215.18 | 8.61 | -17.56 | -0.04 | concrete part | |
| 34 | M _x | -54.34 | -1.43 | 220.18 | 12.13 | 65.61 | -0.86 | concrete part | |
| 1 | M _x | 54.22 | 4.92 | 220.24 | 18.93 | -58.99 | -0.82 | concrete part | |
| 19 | M _x | 49.62 | 1.21 | 221.30 | 14.43 | -53.39 | 0.98 | concrete part | |
| 34 | M _x | -54.34 | -1.43 | 220.18 | 12.13 | 65.61 | -0.86 | concrete part | |
| G_a LC2 - My load case | | | | | | | | | |
| Sum of loads and the sum of support forces | | | | | | | | | |
| Σ | P _x [kN] | 0.00 | 0.00 | 2612.92 | Loads | | | | |
| Σ | P _y [kN] | 0.00 | 0.00 | 2612.92 | Support Forces | | | | |
| Q_s LC4 - My load case | | | | | | | | | |
| Total max/min values with corresponding values | | | | | | | | | |
| 1 | Q _s | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part | |
| 4 | Q _s | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part | |
| 7 | Q _s | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part | |
| 10 | Q _s | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part | |
| 13 | Q _s | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part | |
| 16 | Q _s | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part | |
| 19 | Q _s | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part | |
| 22 | Q _s | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part | |
| 25 | Q _s | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part | |
| 28 | Q _s | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part | |
| 31 | Q _s | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part | |





RESULTS

10.3 NODES - SUPPORT FORCES

Static Analysis

| Node No. | | Support Forces | | | Support Moments | | | Node Comment Cor. Loading | |
|--|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|---------------------------|---------------|
| 34 | | P _x [kN] | P _y [kN] | P _z [kN] | M _x [kNm] | M _y [kNm] | M _z [kNm] | 0.00 | concrete part |
| Qs LC4 - My load case | | | | | | | | | |
| Total max/min values with corresponding values | | | | | | | | | |
| 1 | P _x | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part |
| 1 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part |
| 1 | P _y | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part |
| 1 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part |
| 1 | P _z | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part |
| 1 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part |
| 1 | M _x | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part |
| 1 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part |
| 1 | M _y | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part |
| 1 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part |
| 1 | M _z | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part |
| 1 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part |
| Qs LC4 - My load case | | | | | | | | | |
| Sum of loads and the sum of support forces | | | | | | | | | |
| Σ | P _x [kN] | 0.00 | P _y [kN] | 0.00 | P _z [kN] | 0.00 | Loads | | |
| Σ | | 0.00 | | 0.00 | | 0.00 | Support Forces | | |
| G LC6 - Stability | | | | | | | | | |
| 1 | | -12.33 | -3.47 | 113.71 | -3.40 | 10.63 | 0.06 | concrete part | |
| 4 | | -11.06 | -3.26 | 114.65 | -3.22 | 9.19 | 0.03 | concrete part | |
| 7 | | -4.54 | -2.99 | 115.36 | -2.98 | 1.64 | 0.00 | concrete part | |
| 10 | | 3.63 | -2.95 | 115.64 | -3.00 | -7.82 | -0.05 | concrete part | |
| 13 | | 10.75 | -3.06 | 115.51 | -3.20 | -16.07 | -0.08 | concrete part | |
| 16 | | 12.93 | -3.35 | 115.09 | -3.60 | -18.57 | -0.11 | concrete part | |
| 19 | | -12.15 | 3.27 | 113.78 | 4.47 | 10.34 | -0.11 | concrete part | |
| 22 | | -10.80 | 3.13 | 114.71 | 4.23 | 8.80 | -0.09 | concrete part | |
| 25 | | -4.27 | 3.05 | 115.40 | 4.07 | 1.24 | -0.05 | concrete part | |
| 28 | | 3.85 | 3.08 | 115.68 | 4.04 | -8.16 | -0.01 | concrete part | |
| 31 | | 10.92 | 3.18 | 115.54 | 4.08 | -16.35 | 0.03 | concrete part | |
| 34 | | 13.07 | 3.36 | 115.12 | 4.24 | -18.82 | 0.06 | concrete part | |
| G LC6 - Stability | | | | | | | | | |
| Total max/min values with corresponding values | | | | | | | | | |
| 34 | P _x | 13.07 | 3.36 | 115.12 | 4.24 | -18.82 | 0.06 | concrete part | |
| 1 | | -12.33 | -3.47 | 113.71 | -3.40 | 10.63 | 0.06 | concrete part | |
| 34 | P _y | 13.07 | 3.36 | 115.12 | 4.24 | -18.82 | 0.06 | concrete part | |
| 1 | | -12.33 | -3.47 | 113.71 | -3.40 | 10.63 | 0.06 | concrete part | |
| 28 | P _z | 3.85 | 3.08 | 115.68 | 4.04 | -8.16 | -0.01 | concrete part | |
| 1 | | -12.33 | -3.47 | 113.71 | -3.40 | 10.63 | 0.06 | concrete part | |
| 19 | M _x | -12.15 | 3.27 | 113.78 | 4.47 | 10.34 | -0.11 | concrete part | |
| 16 | | 12.93 | -3.35 | 115.09 | -3.60 | -18.57 | -0.11 | concrete part | |
| 1 | M _y | -12.33 | -3.47 | 113.71 | -3.40 | 10.63 | 0.06 | concrete part | |
| 34 | | 13.07 | 3.36 | 115.12 | 4.24 | -18.82 | 0.06 | concrete part | |
| 34 | M _z | 13.07 | 3.36 | 115.12 | 4.24 | -18.82 | 0.06 | concrete part | |
| 16 | | 12.93 | -3.35 | 115.09 | -3.60 | -18.57 | -0.11 | concrete part | |
| G LC6 - Stability | | | | | | | | | |
| Sum of loads and the sum of support forces | | | | | | | | | |
| Σ | P _x [kN] | 0.00 | P _y [kN] | 0.00 | P _z [kN] | 1380.19 | Loads | | |
| Σ | | 0.00 | | 0.00 | | 1380.19 | Support Forces | | |
| EQU DS1 - ScriptedDS | | | | | | | | | |
| 1 | P _x | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| | | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| | P _y | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| | | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| | P _z | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| | | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| | M _x | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| | | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| | M _y | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| | | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| | M _z | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| Extremes | | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| 1 | | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| | | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| EQU DS1 - ScriptedDS | | | | | | | | | |
| 4 | P _x | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | CO1 | |
| | | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | CO1 | |



RESULTS

10.3 NODES - SUPPORT FORCES

Static Analysis

| Node No. | | Support Forces | | | Support Moments | | | Node Comment Cor. Loading | | |
|----------|-----------------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|------------------------------|-------|-----|
| | | P _x [kN] | P _y [kN] | P _z [kN] | M _x [kNm] | M _y [kNm] | M _z [kNm] | | | |
| 4 | P _y | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | CO1 | CO1 | |
| | P _y | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | | | |
| | P _z | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | CO1 | CO1 | |
| | P _z | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | | | |
| | M _x | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | CO1 | CO1 | |
| | M _x | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | | | |
| | M _y | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | CO1 | CO1 | |
| Extremes | M _y | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | | | |
| | M _z | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | CO1 | CO1 | |
| 4 | | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | | | |
| 7 | EQU DS1 - ScriptedDS | | P _x | -20.82 | -10.51 | 478.49 | 9.11 | -24.00 | -0.05 | CO1 |
| | P _x | 20.82 | -10.51 | 478.49 | 9.11 | -24.00 | -0.05 | CO1 | CO1 | |
| | P _y | 20.82 | -10.51 | 478.49 | 9.11 | -24.00 | -0.05 | | | |
| | | 20.82 | -10.51 | 478.49 | 9.11 | -24.00 | -0.05 | CO1 | CO1 | |
| | P _z | 20.82 | -10.51 | 478.49 | 9.11 | -24.00 | -0.05 | | | |
| | | 20.82 | -10.51 | 478.49 | 9.11 | -24.00 | -0.05 | CO1 | CO1 | |
| | M _x | 20.82 | -10.51 | 478.49 | 9.11 | -24.00 | -0.05 | | | |
| Extremes | M _x | 20.82 | -10.51 | 478.49 | 9.11 | -24.00 | -0.05 | CO1 | CO1 | |
| | M _y | 20.82 | -10.51 | 478.49 | 9.11 | -24.00 | -0.05 | | | |
| 7 | M _y | 20.82 | -10.51 | 478.49 | 9.11 | -24.00 | -0.05 | CO1 | CO1 | |
| | M _z | 20.82 | -10.51 | 478.49 | 9.11 | -24.00 | -0.05 | | | |
| 7 | | 20.82 | -10.51 | 478.49 | 9.11 | -24.00 | -0.05 | | | |
| 10 | EQU DS1 - ScriptedDS | | P _x | -17.69 | -9.32 | 478.39 | 10.60 | 20.47 | 0.13 | CO1 |
| | 17.69 | -9.32 | 478.39 | 10.60 | 20.47 | 0.13 | CO1 | CO1 | | |
| | P _y | -17.69 | -9.32 | 478.39 | 10.60 | 20.47 | | | 0.13 | |
| | | 17.69 | -9.32 | 478.39 | 10.60 | 20.47 | 0.13 | CO1 | CO1 | |
| | P _z | -17.69 | -9.32 | 478.39 | 10.60 | 20.47 | 0.13 | | | |
| | | 17.69 | -9.32 | 478.39 | 10.60 | 20.47 | 0.13 | CO1 | CO1 | |
| | M _x | -17.69 | -9.32 | 478.39 | 10.60 | 20.47 | 0.13 | | | |
| Extremes | M _x | -17.69 | -9.32 | 478.39 | 10.60 | 20.47 | 0.13 | CO1 | CO1 | |
| | M _y | -17.69 | -9.32 | 478.39 | 10.60 | 20.47 | 0.13 | | | |
| 10 | M _y | -17.69 | -9.32 | 478.39 | 10.60 | 20.47 | 0.13 | CO1 | CO1 | |
| | M _z | -17.69 | -9.32 | 478.39 | 10.60 | 20.47 | 0.13 | | | |
| 10 | | -17.69 | -9.32 | 478.39 | 10.60 | 20.47 | 0.13 | | | |
| 13 | EQU DS1 - ScriptedDS | | P _x | -51.88 | -7.89 | 480.34 | 12.31 | 59.95 | 0.28 | CO1 |
| | 51.88 | -7.89 | 480.34 | 12.31 | 59.95 | 0.28 | CO1 | CO1 | | |
| | P _y | -51.88 | -7.89 | 480.34 | 12.31 | 59.95 | | | 0.28 | |
| | | 51.88 | -7.89 | 480.34 | 12.31 | 59.95 | 0.28 | CO1 | CO1 | |
| | P _z | -51.88 | -7.89 | 480.34 | 12.31 | 59.95 | 0.28 | | | |
| | | 51.88 | -7.89 | 480.34 | 12.31 | 59.95 | 0.28 | CO1 | CO1 | |
| | M _x | -51.88 | -7.89 | 480.34 | 12.31 | 59.95 | 0.28 | | | |
| Extremes | M _x | -51.88 | -7.89 | 480.34 | 12.31 | 59.95 | 0.28 | CO1 | CO1 | |
| | M _y | -51.88 | -7.89 | 480.34 | 12.31 | 59.95 | 0.28 | | | |
| 13 | M _y | -51.88 | -7.89 | 480.34 | 12.31 | 59.95 | 0.28 | CO1 | CO1 | |
| | M _z | -51.88 | -7.89 | 480.34 | 12.31 | 59.95 | 0.28 | | | |
| 13 | | -51.88 | -7.89 | 480.34 | 12.31 | 59.95 | 0.28 | | | |
| 16 | EQU DS1 - ScriptedDS | | P _x | -63.35 | -1.04 | 483.67 | 20.45 | 72.65 | 1.18 | CO1 |
| | 63.35 | -1.04 | 483.67 | 20.45 | 72.65 | 1.18 | CO1 | CO1 | | |
| | P _y | -63.35 | -1.04 | 483.67 | 20.45 | 72.65 | | | 1.18 | |
| | | 63.35 | -1.04 | 483.67 | 20.45 | 72.65 | 1.18 | CO1 | CO1 | |
| | P _z | -63.35 | -1.04 | 483.67 | 20.45 | 72.65 | 1.18 | | | |
| | | 63.35 | -1.04 | 483.67 | 20.45 | 72.65 | 1.18 | CO1 | CO1 | |
| | M _x | -63.35 | -1.04 | 483.67 | 20.45 | 72.65 | 1.18 | | | |
| Extremes | M _x | -63.35 | -1.04 | 483.67 | 20.45 | 72.65 | 1.18 | CO1 | CO1 | |
| | M _y | -63.35 | -1.04 | 483.67 | 20.45 | 72.65 | 1.18 | | | |
| 16 | M _y | -63.35 | -1.04 | 483.67 | 20.45 | 72.65 | 1.18 | CO1 | CO1 | |
| | M _z | -63.35 | -1.04 | 483.67 | 20.45 | 72.65 | 1.18 | | | |
| 16 | | -63.35 | -1.04 | 483.67 | 20.45 | 72.65 | 1.18 | | | |





RESULTS

10.3 NODES - SUPPORT FORCES

Static Analysis

| Node No. | | Support Forces | | | Support Moments | | | Node Comment Cor. Loading | |
|-----------------------------|----------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|---------------------------|--|
| | | P _x [kN] | P _y [kN] | P _z [kN] | M _x [kNm] | M _y [kNm] | M _z [kNm] | | |
| EQU DS1 - ScriptedDS | | | | | | | | | |
| 19 | P _x | 58.43 | 6.29 | 485.59 | 27.97 | -66.43 | 1.33 | CO1 | |
| | P _y | 58.43 | 6.29 | 485.59 | 27.97 | -66.43 | 1.33 | CO1 | |
| | P _z | 58.43 | 6.29 | 485.59 | 27.97 | -66.43 | 1.33 | CO1 | |
| | M _x | 58.43 | 6.29 | 485.59 | 27.97 | -66.43 | 1.33 | CO1 | |
| | M _y | 58.43 | 6.29 | 485.59 | 27.97 | -66.43 | 1.33 | CO1 | |
| | M _z | 58.43 | 6.29 | 485.59 | 27.97 | -66.43 | 1.33 | CO1 | |
| Extremes | | 58.43 | 6.29 | 485.59 | 27.97 | -66.43 | 1.33 | CO1 | |
| 19 | | 58.43 | 6.29 | 485.59 | 27.97 | -66.43 | 1.33 | CO1 | |
| EQU DS1 - ScriptedDS | | | | | | | | | |
| 22 | P _x | 48.08 | 3.11 | 482.67 | 24.83 | -55.15 | 0.32 | CO1 | |
| | P _y | 48.08 | 3.11 | 482.67 | 24.83 | -55.15 | 0.32 | CO1 | |
| | P _z | 48.08 | 3.11 | 482.67 | 24.83 | -55.15 | 0.32 | CO1 | |
| | M _x | 48.08 | 3.11 | 482.67 | 24.83 | -55.15 | 0.32 | CO1 | |
| | M _y | 48.08 | 3.11 | 482.67 | 24.83 | -55.15 | 0.32 | CO1 | |
| | M _z | 48.08 | 3.11 | 482.67 | 24.83 | -55.15 | 0.32 | CO1 | |
| Extremes | | 48.08 | 3.11 | 482.67 | 24.83 | -55.15 | 0.32 | CO1 | |
| 22 | | 48.08 | 3.11 | 482.67 | 24.83 | -55.15 | 0.32 | CO1 | |
| EQU DS1 - ScriptedDS | | | | | | | | | |
| 25 | P _x | 21.94 | 7.17 | 480.59 | 29.71 | -25.13 | 0.17 | CO1 | |
| | P _y | 21.94 | 7.17 | 480.59 | 29.71 | -25.13 | 0.17 | CO1 | |
| | P _z | 21.94 | 7.17 | 480.59 | 29.71 | -25.13 | 0.17 | CO1 | |
| | M _x | 21.94 | 7.17 | 480.59 | 29.71 | -25.13 | 0.17 | CO1 | |
| | M _y | 21.94 | 7.17 | 480.59 | 29.71 | -25.13 | 0.17 | CO1 | |
| | M _z | 21.94 | 7.17 | 480.59 | 29.71 | -25.13 | 0.17 | CO1 | |
| Extremes | | 21.94 | 7.17 | 480.59 | 29.71 | -25.13 | 0.17 | CO1 | |
| 25 | | 21.94 | 7.17 | 480.59 | 29.71 | -25.13 | 0.17 | CO1 | |
| EQU DS1 - ScriptedDS | | | | | | | | | |
| 28 | P _x | -17.05 | 8.70 | 480.43 | 31.60 | 19.84 | -0.06 | CO1 | |
| | P _y | -17.05 | 8.70 | 480.43 | 31.60 | 19.84 | -0.06 | CO1 | |
| | P _z | -17.05 | 8.70 | 480.43 | 31.60 | 19.84 | -0.06 | CO1 | |
| | M _x | -17.05 | 8.70 | 480.43 | 31.60 | 19.84 | -0.06 | CO1 | |
| | M _y | -17.05 | 8.70 | 480.43 | 31.60 | 19.84 | -0.06 | CO1 | |
| | M _z | -17.05 | 8.70 | 480.43 | 31.60 | 19.84 | -0.06 | CO1 | |
| Extremes | | -17.05 | 8.70 | 480.43 | 31.60 | 19.84 | -0.06 | CO1 | |
| 28 | | -17.05 | 8.70 | 480.43 | 31.60 | 19.84 | -0.06 | CO1 | |
| EQU DS1 - ScriptedDS | | | | | | | | | |
| 31 | P _x | -51.57 | 8.69 | 482.33 | 31.66 | 59.64 | -0.25 | CO1 | |
| | P _y | -51.57 | 8.69 | 482.33 | 31.66 | 59.64 | -0.25 | CO1 | |
| | P _z | -51.57 | 8.69 | 482.33 | 31.66 | 59.64 | -0.25 | CO1 | |
| | M _x | -51.57 | 8.69 | 482.33 | 31.66 | 59.64 | -0.25 | CO1 | |
| | M _y | -51.57 | 8.69 | 482.33 | 31.66 | 59.64 | -0.25 | CO1 | |
| | M _z | -51.57 | 8.69 | 482.33 | 31.66 | 59.64 | -0.25 | CO1 | |
| Extremes | | -51.57 | 8.69 | 482.33 | 31.66 | 59.64 | -0.25 | CO1 | |
| 31 | | -51.57 | 8.69 | 482.33 | 31.66 | 59.64 | -0.25 | CO1 | |





RESULTS

10.3 NODES - SUPPORT FORCES

Static Analysis

| Node No. | | Support Forces | | | Support Moments | | | Node Comment Cor. Loading | |
|--|----------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|---------------------------|--|
| | | P _x [kN] | P _y [kN] | P _z [kN] | M _x [kNm] | M _y [kNm] | M _z [kNm] | | |
| Extremes 31 | | -51.57 | 8.69 | 482.33 | 31.66 | 59.64 | -0.25 | | |
| EQU DS1 - ScriptedDS | | | | | | | | | |
| 34 | P _x | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | CO1 | |
| | P _y | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | CO1 | |
| | P _z | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | CO1 | |
| | M _x | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | CO1 | |
| | M _y | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | CO1 | |
| | M _z | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | CO1 | |
| Extremes 34 | | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | CO1 | |
| EQU DS1 - ScriptedDS | | | | | | | | | |
| Total max/min values with corresponding values | | | | | | | | | |
| 1 | P _x | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| 34 | | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | CO1 | |
| 28 | P _y | -17.05 | 8.70 | 480.43 | 31.60 | 19.84 | -0.06 | CO1 | |
| 7 | | 20.82 | -10.51 | 478.49 | 9.11 | -24.00 | 0.05 | CO1 | |
| 34 | P _z | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | CO1 | |
| 10 | | -17.69 | -9.32 | 478.39 | 10.60 | 20.47 | 0.13 | CO1 | |
| 31 | M _x | -51.57 | 8.69 | 482.33 | 31.66 | 59.64 | -0.25 | CO1 | |
| 4 | | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | CO1 | |
| 34 | M _y | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | CO1 | |
| 1 | | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | CO1 | |
| 19 | M _z | 58.43 | 6.29 | 485.59 | 27.97 | -66.43 | 1.33 | CO1 | |
| 34 | | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | CO1 | |
| EQU CO1 - ScriptedCombination | | | | | | | | | |
| Total max/min values with corresponding values | | | | | | | | | |
| 1 | P _x | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | concrete part | |
| 4 | | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | concrete part | |
| 7 | P _y | 20.82 | -10.51 | 478.49 | 9.11 | -24.00 | 0.05 | concrete part | |
| 10 | | -17.69 | -9.32 | 478.39 | 10.60 | 20.47 | 0.13 | concrete part | |
| 13 | | -51.88 | -7.89 | 480.34 | 12.31 | 59.95 | 0.28 | concrete part | |
| 16 | | -63.35 | -1.04 | 483.67 | 20.45 | 72.65 | 1.18 | concrete part | |
| 19 | | 58.43 | 6.29 | 485.59 | 27.97 | -66.43 | 1.33 | concrete part | |
| 22 | | 48.08 | 3.11 | 482.67 | 24.83 | -55.15 | 0.32 | concrete part | |
| 25 | | 21.94 | 7.17 | 480.59 | 29.71 | -25.13 | 0.17 | concrete part | |
| 28 | | -17.05 | 8.70 | 480.43 | 31.60 | 19.84 | -0.06 | concrete part | |
| 31 | | -51.57 | 8.69 | 482.33 | 31.66 | 59.64 | -0.25 | concrete part | |
| 34 | | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | concrete part | |
| EQU CO1 - ScriptedCombination | | | | | | | | | |
| Total max/min values with corresponding values | | | | | | | | | |
| 1 | P _x | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | concrete part | |
| 34 | | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | concrete part | |
| 28 | P _y | -17.05 | 8.70 | 480.43 | 31.60 | 19.84 | -0.06 | concrete part | |
| 7 | | 20.82 | -10.51 | 478.49 | 9.11 | -24.00 | 0.05 | concrete part | |
| 34 | P _z | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | concrete part | |
| 10 | | -17.69 | -9.32 | 478.39 | 10.60 | 20.47 | 0.13 | concrete part | |
| 31 | M _x | -51.57 | 8.69 | 482.33 | 31.66 | 59.64 | -0.25 | concrete part | |
| 4 | | 51.28 | -10.36 | 480.50 | 9.09 | -59.14 | -0.19 | concrete part | |
| 34 | M _y | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | concrete part | |
| 1 | | 65.29 | 2.79 | 483.90 | 24.12 | -74.70 | -1.16 | concrete part | |
| 19 | M _z | 58.43 | 6.29 | 485.59 | 27.97 | -66.43 | 1.33 | concrete part | |
| 34 | | -64.31 | 2.38 | 485.65 | 24.19 | 73.76 | -1.20 | concrete part | |
| EQU CO1 - ScriptedCombination | | | | | | | | | |
| Sum of loads and the sum of support forces | | | | | | | | | |
| Σ | | P _x [kN] | P _y [kN] | P _z [kN] | Loads | | | | |
| Σ | | 0.00 | 0.00 | 5782.54 | Support Forces | | | | |

10.4 MEMBERS - INTERNAL FORCES BY SECTION

Static Analysis

| Section No. | Member No. | Node No. | Location x [m] | | N | Forces [kN] V _y / V _u | V _z / V _v | M _r | Moments [kNm] M _y / M _u | M _z / M _v | Member Comment Cor. Loading |
|---------------------------|------------|----------|----------------|--|------|--|---------------------------------|----------------|--|---------------------------------|-----------------------------|
| G LC1 - SelfWeight | | | | | | | | | | | |
| 2 | 35 | | 2.000 ½ N | | 2.27 | 0.00 | 0.10 | 0.03 | 46.80 | 0.17 | |





RESULTS

10.4 MEMBERS - INTERNAL FORCES BY SECTION

Static Analysis

| Section No. | Member No. | Node No. | Location x [m] | | Forces [kN] | | | Moments [kNm] | | | Member Comment Cor. Loading |
|-------------|------------|----------|----------------|---------------------------------|-------------|---------------------------------|---------------------------------|----------------|---------------------------------|---------------------------------|-----------------------------|
| | | | | | N | V _y / V _u | V _z / V _v | M _T | M _y / M _u | M _z / M _v | |
| 3 | 19 | 28 | 0.000 | N | -115.68 | 3.08 | 3.85 | 0.01 | -8.16 | 4.04 | |
| 4 | 12 | | 1.333 | V _y / V _u | -11.45 | 3.36 | 0.22 | 0.00 | -0.29 | 0.40 | |
| 3 | 1 | | 1.080 | | -106.96 | -3.47 | -12.33 | -0.06 | -2.69 | 0.35 | |
| 2 | 35 | 17 | 0.000 | V _z / V _v | -0.74 | -3.09 | 58.76 | 25.49 | -6.70 | 0.31 | |
| 2 | 35 | 35 | 4.000 | | -0.68 | 3.06 | -58.63 | -25.65 | -6.10 | 0.37 | |
| 2 | 25 | 20 | 4.000 | M _T | -0.87 | -2.83 | -57.11 | 29.93 | -5.32 | -0.28 | |
| 2 | 25 | 2 | 0.000 | | -0.96 | 2.74 | 57.47 | -30.20 | -7.01 | -0.37 | |
| 2 | 25 | | 2.000 | M _y / M _u | 1.87 | 0.10 | 0.31 | 0.26 | 47.01 | -0.19 | |
| 3 | 1 | 2 | 3.600 | | -91.21 | -3.46 | -12.30 | -0.05 | -33.74 | 9.08 | |
| 3 | 1 | 2 | 3.600 | M _z / M _v | -91.21 | -3.46 | -12.30 | -0.05 | -33.74 | 9.08 | |
| 4 | 12 | 18 | 4.000 | | -9.82 | 3.34 | 0.22 | 0.00 | 0.29 | -8.54 | |

| G1 LC2 - My load case | | | | | | | | | | | |
|--|----|----|--------|---------------------------------|---------|--------|---------|--------|---------|--------|--|
| Total max/min values with corresponding values | | | | | | | | | | | |
| 2 | 27 | 23 | 4.000 | N | 6.57 | 6.66 | -24.81 | -76.56 | -3.48 | 1.25 | |
| 3 | 13 | 19 | 0.000 | V _y / V _u | -221.30 | 1.21 | 49.62 | -0.98 | -53.39 | 14.43 | |
| 4 | 24 | | 1.333 | | -202.64 | 37.72 | -6.30 | 0.09 | -0.99 | -3.18 | |
| 4 | 2 | | 1.333 | | -201.33 | -42.22 | 13.68 | 0.21 | -2.90 | -0.98 | |
| 5 | 38 | 21 | 0.000 | V _z / V _v | -34.09 | -0.14 | 100.82 | 0.27 | -97.75 | 0.26 | |
| 5 | 37 | 18 | 15.000 | | -30.81 | -0.02 | -125.98 | -0.25 | -94.34 | -0.36 | |
| 2 | 27 | 5 | 0.000 | M _T | -2.43 | -7.34 | 54.20 | 76.32 | -22.39 | 1.76 | |
| 2 | 27 | 23 | 4.000 | | 6.57 | 6.66 | -24.81 | -76.56 | -3.48 | 1.25 | |
| 5 | 37 | | 7.500 | M _y / M _u | -34.06 | 0.20 | 6.12 | -0.22 | 333.15 | 1.09 | |
| 3 | 23 | 35 | 3.600 | | -166.22 | -1.38 | -54.21 | 0.83 | -130.01 | 17.18 | |
| 4 | 2 | 3 | 4.000 | M _z / M _v | -158.27 | -36.44 | 13.10 | 0.56 | 33.09 | 105.76 | |
| 4 | 24 | 36 | 4.000 | | -159.36 | 32.19 | -5.94 | 0.30 | -17.43 | -97.88 | |

| Qs LC4 - My load case | | | | | | | | | | | |
|--|---|---|-------|---------------------------------|------|------|------|------|------|------|--|
| Total max/min values with corresponding values | | | | | | | | | | | |
| 3 | 1 | 1 | 0.000 | N | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3 | 1 | 1 | 0.000 | V _y / V _u | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3 | 1 | 1 | 0.000 | V _z / V _v | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3 | 1 | 1 | 0.000 | M _T | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3 | 1 | 1 | 0.000 | M _y / M _u | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3 | 1 | 1 | 0.000 | M _z / M _v | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3 | 1 | 1 | 0.000 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |

| G1 LC6 - Stability | | | | | | | | | | | |
|--|----|----|-------|---------------------------------|---------|-------|--------|--------|--------|-------|--|
| Total max/min values with corresponding values | | | | | | | | | | | |
| 2 | 35 | | 2.000 | N | 2.27 | 0.00 | 0.10 | 0.03 | 46.80 | 0.17 | |
| 3 | 19 | 28 | 0.000 | V _y / V _u | -115.68 | 3.08 | 3.85 | 0.01 | -8.16 | 4.04 | |
| 4 | 12 | | 1.333 | | -11.45 | 3.36 | 0.22 | 0.00 | -0.29 | 0.40 | |
| 3 | 1 | | 1.080 | | -106.96 | -3.47 | -12.33 | -0.06 | -2.69 | 0.35 | |
| 2 | 35 | 17 | 0.000 | V _z / V _v | -0.74 | -3.09 | 58.76 | 25.49 | -6.70 | 0.31 | |
| 2 | 35 | 35 | 4.000 | | -0.68 | 3.06 | -58.63 | -25.65 | -6.10 | 0.37 | |
| 2 | 25 | 20 | 4.000 | M _T | -0.87 | -2.83 | -57.11 | 29.93 | -5.32 | -0.28 | |
| 2 | 25 | 2 | 0.000 | | -0.96 | 2.74 | 57.47 | -30.20 | -7.01 | -0.37 | |
| 2 | 25 | | 2.000 | M _y / M _u | 1.87 | 0.10 | 0.31 | 0.26 | 47.01 | -0.19 | |
| 3 | 1 | 2 | 3.600 | | -91.21 | -3.46 | -12.30 | -0.05 | -33.74 | 9.08 | |
| 3 | 1 | 2 | 3.600 | M _z / M _v | -91.21 | -3.46 | -12.30 | -0.05 | -33.74 | 9.08 | |
| 4 | 12 | 18 | 4.000 | | -9.82 | 3.34 | 0.22 | 0.00 | 0.29 | -8.54 | |

| EQU DS1 - ScriptedDS | | | | | | | | | | | |
|--|----|----|--------|---------------------------------|---------|--------|---------|--------|---------|-------|-----|
| Total max/min values with corresponding values | | | | | | | | | | | |
| 2 | 27 | 23 | 4.000 | N | 7.92 | 6.99 | -113.65 | -86.15 | -14.33 | 1.36 | CO1 |
| 3 | 23 | 34 | 0.000 | V _y / V _u | -485.65 | 2.38 | -64.31 | 1.20 | 73.76 | 24.19 | CO1 |
| 4 | 24 | | 1.333 | | -319.03 | 63.11 | -9.88 | 0.24 | -1.07 | -4.50 | CO1 |
| 4 | 2 | | 1.333 | | -317.31 | -70.31 | 21.19 | 0.52 | -5.09 | -2.14 | CO1 |
| 2 | 31 | 11 | 0.000 | V _z / V _v | -4.58 | 3.47 | 167.71 | -29.97 | -43.76 | -0.63 | CO1 |
| 5 | 37 | 18 | 15.000 | | -47.38 | -0.20 | -202.44 | -0.37 | -151.79 | -0.44 | CO1 |
| 2 | 33 | 32 | 4.000 | M _T | -4.19 | -9.60 | -150.62 | 87.52 | -4.43 | -1.95 | CO1 |
| 2 | 33 | 14 | 0.000 | | -2.92 | 9.62 | 163.81 | -87.95 | -42.06 | -1.87 | CO1 |
| 5 | 37 | | 7.500 | M _y / M _u | -55.79 | 0.33 | 9.30 | -0.27 | 541.42 | 2.01 | CO1 |



RESULTS

10.4 MEMBERS - INTERNAL FORCES BY SECTION

Static Analysis

| Section No. | Member No. | Node No. | Location x [m] | | Forces [kN] | | | Moments [kNm] | | | Member Comment Cor. Loading |
|-------------|------------|----------|----------------|--|-------------|---------------------------------|---------------------------------|----------------|---------------------------------|---------------------------------|-----------------------------|
| | | | | | N | V _y / V _u | V _z / V _v | M _T | M _y / M _u | M _z / M _v | |
| 5 | 38 | 21 | 0.000 | | -53.21 | -0.41 | 164.85 | 0.43 | -158.04 | 0.23 | CO1 |
| 4 | 2 | 3 | 4.000 | | -252.04 | -55.35 | 19.81 | 1.40 | 50.25 | 170.22 | CO1 |
| 4 | 24 | 36 | 4.000 | | -253.19 | 48.80 | -9.02 | 0.76 | -26.54 | -157.61 | CO1 |

| EQU CO1 - ScriptedCombination Total max/min values with corresponding values | | | | | | | | | | | |
|--|----|----|--------|---------------------------------|---------|--------|---------|--------|---------|---------|--|
| 2 | 27 | 23 | 4.000 | N | 7.92 | 6.99 | -113.65 | -86.15 | -14.33 | 1.36 | |
| 3 | 23 | 34 | 0.000 | | -485.65 | 2.38 | -64.31 | 1.20 | 73.76 | 24.19 | |
| 4 | 24 | | 1.333 | V _y / V _u | -319.03 | 63.11 | -9.88 | 0.24 | -1.07 | -4.50 | |
| 4 | 2 | | 1.333 | V _z / V _v | -317.31 | -70.31 | 21.19 | 0.52 | -5.09 | -2.14 | |
| 2 | 31 | 11 | 0.000 | V _z / V _v | -4.58 | 3.47 | 167.71 | -29.97 | -43.76 | -0.63 | |
| 5 | 37 | 18 | 15.000 | | -47.38 | -0.20 | -202.44 | -0.37 | -151.79 | -0.44 | |
| 2 | 33 | 32 | 4.000 | M _T | -4.19 | -9.60 | -150.62 | 87.52 | -4.43 | -1.95 | |
| 2 | 33 | 14 | 0.000 | | -2.92 | 9.62 | 163.81 | -87.95 | -42.06 | -1.87 | |
| 5 | 37 | | 7.500 | M _y / M _u | -55.79 | 0.33 | 9.30 | -0.27 | 541.42 | 2.01 | |
| 5 | 38 | 21 | 0.000 | | -53.21 | -0.41 | 164.85 | 0.43 | -158.04 | 0.23 | |
| 4 | 2 | 3 | 4.000 | M _z / M _v | -252.04 | -55.35 | 19.81 | 1.40 | 50.25 | 170.22 | |
| 4 | 24 | 36 | 4.000 | | -253.19 | 48.80 | -9.02 | 0.76 | -26.54 | -157.61 | |

11 Stability Analysis Results

Stability Analysis

11.1 CRITICAL LOAD FACTORS

| Mode No. | Critical Load Factor f [-] | | Magnification Factor α [-] | | | | | | | |
|-----------------|----------------------------|--|----------------------------|--|--|--|--|--|--|--|
| | LC1 - SelfWeight | | α [-] | | | | | | | |
| 1 | 198.894 | | 1.005 | | | | | | | |
| 2 | 237.212 | | 1.004 | | | | | | | |
| 3 | 241.677 | | 1.004 | | | | | | | |
| 4 | 302.796 | | 1.003 | | | | | | | |
| LC6 - Stability | | | | | | | | | | |
| 1 | 198.894 | | 1.005 | | | | | | | |
| 2 | 237.212 | | 1.004 | | | | | | | |
| 3 | 241.677 | | 1.004 | | | | | | | |
| 4 | 302.796 | | 1.003 | | | | | | | |

12 Modal Analysis Results

Modal Analysis

12.1 NATURAL FREQUENCIES

| Mode No. | Eigenvalue λ [1/s ²] | | Angular Frequency ω [rad/s] | | Natural Frequency f [Hz] | | Natural Period T [s] | | | |
|----------|--|--|-----------------------------|--|--------------------------|--|----------------------|--|--|--|
| | LC10 - My load case for modal analysis | | ω [rad/s] | | f [Hz] | | T [s] | | | |
| 1 | 26.179 | | 5.117 | | 0.814 | | 1.228 | | | |
| 2 | 29.556 | | 5.437 | | 0.865 | | 1.156 | | | |
| 3 | 29.597 | | 5.440 | | 0.866 | | 1.155 | | | |
| 4 | 30.418 | | 5.515 | | 0.878 | | 1.139 | | | |
| 5 | 32.822 | | 5.729 | | 0.912 | | 1.097 | | | |

12.2 EFFECTIVE MODAL MASSES

Modal Analysis

| Mode No. | Modal Mass M [kg] | | Transl. Eff. Modal Mass [kg] | | Rotat. Eff. Modal Mass [kgm ²] | | Transl. Eff. Modal Mass Factor [-] | | Rotat. Eff. Modal Mass Factor [-] | |
|--|-------------------|-----------------|------------------------------|-----------------|--|------------------|------------------------------------|------------------|-----------------------------------|------------------|
| | m _{ex} | m _{ey} | m _{ex} | m _{ey} | m _{ez} | f _{meX} | f _{meY} | f _{meZ} | f _{mpX} | f _{mpY} |
| LC10 - My load case for modal analysis | | | | | | | | | | |
| 1 | 53202.5 | 120465.0 | 110.4 | 1.0 | 737.51 | 2115470.00 | 10453.10 | 0.461 | 0.000 | 0.000 |
| 2 | 13204.0 | 1.5 | 0.1 | 3.6 | 0.49 | 73.37 | 3.83 | 0.000 | 0.000 | 0.000 |
| 3 | 9888.7 | 1.5 | 0.1 | 0.0 | 0.84 | 13.66 | 5.14 | 0.000 | 0.000 | 0.000 |
| 4 | 31353.7 | 7066.9 | 378.6 | 2.3 | 2371.03 | 145550.00 | 49135.90 | 0.027 | 0.001 | 0.001 |
| 5 | 16900.0 | 131.4 | 503.8 | 1.3 | 3126.96 | 3545.24 | 114202.00 | 0.001 | 0.002 | 0.001 |
| Σ _M | 124548.9 | 127667.0 | 993.0 | 8.1 | 6236.84 | 2264660.00 | 173800.00 | 0.489 | 0.004 | 0.002 |
| % | 261300.0 | 261300.0 | 261300.0 | 2734430.00 | 10068900.00 | 9233480.00 | | | 0.225 | 0.019 |
| | 48.86 % | 0.38 % | 0.00 % | 0.23 % | 22.49 % | 1.88 % | | | | |





13 Spectral Analysis Results

13.1 SUMMARY

Spectral Analysis

| | Description | Value | Unit | Notes |
|--|-------------------------------------|-------|------|---------------------------|
| | ■ AE LC20 - Spectral Z | | | |
| | Maximum deformations | | | |
| | Maximum displacement in X-direction | 0.4 | mm | Member No. 22, x: 4.000 m |
| | Maximum displacement in Y-direction | 0.0 | mm | Member No. 2, x: 4.000 m |
| | Maximum displacement in Z-direction | 0.0 | mm | Member No. 39, x: 3.333 m |
| | Maximum vectorial displacement | 0.4 | mm | Member No. 22, x: 4.000 m |
| | Maximum rotation about X-axis | 0.0 | mrad | Member No. 39, x: 2.778 m |
| | Maximum rotation about Y-axis | 0.1 | mrad | Member No. 22, x: 4.000 m |
| | Maximum rotation about Z-axis | 0.1 | mrad | Member No. 34, x: 2.000 m |

13.2 NODES - SUPPORT FORCES

Spectral Analysis

| Node No. | | P _x | Support Forces [kN] | | Support Moments [kNm] | | | Node Comment Cor. Loading |
|----------|--------------------------|----------------|---------------------|-------|-----------------------|-------|------|---------------------------|
| 1 | ■ AE LC20 - Spectral Z | | | | | | | |
| | P _x | 0.02 | 0.00 | 0.00 | -0.01 | -0.05 | 0.00 | concrete part |
| | | -0.02 | 0.00 | 0.00 | 0.01 | 0.05 | 0.00 | concrete part |
| | P _y | 0.01 | 0.01 | 0.01 | 0.01 | 0.03 | 0.00 | concrete part |
| | | -0.01 | -0.01 | -0.01 | -0.01 | -0.03 | 0.00 | concrete part |
| | P _z | 0.00 | 0.00 | 0.01 | 0.00 | 0.10 | 0.00 | concrete part |
| | | 0.00 | 0.00 | 0.01 | 0.00 | -0.10 | 0.00 | concrete part |
| | M _x | -0.01 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | concrete part |
| | | 0.01 | 0.00 | 0.00 | -0.02 | 0.00 | 0.00 | concrete part |
| | M _y | -0.01 | 0.00 | 0.01 | 0.00 | 0.10 | 0.00 | concrete part |
| | | 0.01 | 0.00 | 0.01 | 0.00 | -0.10 | 0.00 | concrete part |
| | M _z | 0.00 | -0.01 | 0.00 | -0.01 | 0.00 | 0.00 | concrete part |
| Extremes | | 0.00 | 0.01 | 0.01 | 0.02 | 0.10 | 0.00 | concrete part |
| 1 | | -0.02 | 0.01 | 0.01 | -0.02 | -0.10 | 0.00 | concrete part |
| | | 0.00 | -0.01 | -0.01 | 0.00 | 0.00 | 0.00 | |
| 4 | ■ AE LC20 - Spectral Z | | | | | | | |
| | P _x | 0.02 | 0.00 | -0.01 | 0.00 | -0.09 | 0.00 | concrete part |
| | | -0.02 | 0.00 | 0.01 | 0.00 | 0.09 | 0.00 | concrete part |
| | P _y | 0.00 | 0.01 | 0.00 | 0.02 | -0.03 | 0.00 | concrete part |
| | | 0.00 | -0.01 | -0.01 | -0.02 | 0.03 | 0.00 | concrete part |
| | P _z | -0.01 | 0.00 | 0.01 | 0.00 | 0.11 | 0.00 | concrete part |
| | | 0.01 | 0.00 | -0.01 | 0.01 | -0.11 | 0.00 | concrete part |
| | M _x | 0.00 | 0.01 | 0.00 | 0.02 | -0.03 | 0.00 | concrete part |
| | | 0.00 | -0.01 | -0.01 | -0.02 | 0.03 | 0.00 | concrete part |
| | M _y | -0.02 | 0.00 | 0.01 | 0.00 | 0.11 | 0.00 | concrete part |
| | | 0.02 | 0.00 | -0.01 | 0.01 | -0.11 | 0.00 | concrete part |
| | M _z | 0.00 | -0.01 | 0.00 | -0.02 | 0.03 | 0.00 | concrete part |
| Extremes | | 0.00 | 0.01 | 0.01 | 0.02 | 0.11 | 0.00 | concrete part |
| 4 | | -0.02 | 0.01 | -0.01 | 0.00 | -0.11 | 0.00 | |
| 7 | ■ AE LC20 - Spectral Z | | | | | | | |
| | P _x | 0.02 | 0.00 | 0.00 | 0.01 | -0.10 | 0.00 | concrete part |
| | | -0.02 | 0.00 | 0.00 | -0.01 | 0.10 | 0.00 | concrete part |
| | P _y | 0.01 | 0.01 | 0.00 | 0.02 | -0.04 | 0.00 | concrete part |
| | | -0.01 | -0.01 | 0.00 | -0.02 | 0.04 | 0.00 | concrete part |
| | P _z | -0.02 | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | concrete part |
| | | 0.02 | 0.00 | 0.00 | 0.01 | -0.11 | 0.00 | concrete part |
| | M _x | 0.02 | 0.00 | 0.00 | 0.02 | -0.06 | 0.00 | concrete part |
| | | -0.02 | 0.00 | 0.00 | -0.02 | 0.06 | 0.00 | concrete part |
| | M _y | -0.02 | 0.00 | 0.00 | 0.01 | 0.11 | 0.00 | concrete part |
| | | 0.02 | 0.00 | 0.00 | -0.01 | -0.11 | 0.00 | concrete part |
| | M _z | 0.01 | -0.01 | 0.00 | -0.01 | 0.03 | 0.00 | concrete part |
| Extremes | | 0.02 | 0.01 | 0.01 | 0.02 | 0.11 | 0.00 | concrete part |
| 7 | | -0.02 | 0.01 | 0.00 | -0.02 | -0.11 | 0.00 | |
| 10 | ■ AE LC20 - Spectral Z | | | | | | | |
| | P _x | 0.02 | 0.00 | 0.00 | 0.01 | -0.10 | 0.00 | concrete part |
| | | -0.02 | 0.00 | 0.00 | -0.01 | 0.10 | 0.00 | concrete part |
| | P _y | 0.01 | 0.01 | 0.00 | 0.01 | -0.04 | 0.00 | concrete part |
| | | -0.01 | 0.00 | 0.00 | -0.01 | 0.04 | 0.00 | concrete part |
| | P _z | 0.02 | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | concrete part |
| | | -0.02 | 0.00 | 0.00 | 0.00 | -0.11 | 0.00 | concrete part |
| | M _x | 0.02 | 0.00 | 0.00 | 0.01 | -0.06 | 0.00 | concrete part |
| | | -0.02 | 0.00 | 0.00 | -0.01 | 0.06 | 0.00 | concrete part |
| | M _y | -0.02 | 0.00 | 0.00 | -0.01 | 0.12 | 0.00 | concrete part |





RESULTS

13.2 NODES - SUPPORT FORCES

Spectral Analysis

| Node No. | | Support Forces [kN] | | | Support Moments [kNm] | | | Node Comment Cor. Loading |
|----------|------------------------|---------------------|----------------|----------------|-----------------------|----------------|----------------|------------------------------|
| | | P _x | P _y | P _z | M _x | M _y | M _z | |
| 10 | M _y | 0.02 | 0.00 | 0.00 | 0.01 | -0.12 | 0.00 | concrete part |
| | M _z | -0.01 | 0.00 | 0.00 | -0.01 | 0.03 | 0.00 | concrete part |
| | Extremes | 0.01 | 0.00 | 0.00 | 0.01 | -0.03 | 0.00 | concrete part |
| 10 | | 0.02 | 0.00 | 0.00 | 0.01 | 0.12 | 0.00 | concrete part |
| | | -0.02 | 0.00 | 0.00 | -0.01 | -0.12 | 0.00 | concrete part |
| | | | | | | | | |
| 13 | AE LC20 - Spectral Z | | | | | | | |
| | P _x | 0.03 | 0.00 | 0.01 | 0.01 | -0.09 | 0.00 | concrete part |
| | | -0.03 | 0.00 | -0.01 | -0.01 | 0.09 | 0.00 | concrete part |
| | P _y | 0.00 | 0.01 | 0.00 | 0.01 | -0.02 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.01 | 0.02 | 0.00 | concrete part |
| | P _z | 0.02 | 0.00 | 0.01 | 0.01 | -0.11 | 0.00 | concrete part |
| | | -0.02 | 0.00 | -0.01 | -0.01 | 0.11 | 0.00 | concrete part |
| | M _x | 0.01 | 0.00 | 0.00 | 0.01 | -0.05 | 0.00 | concrete part |
| | | -0.01 | 0.00 | 0.00 | -0.01 | 0.05 | 0.00 | concrete part |
| | M _y | 0.02 | 0.00 | 0.01 | 0.01 | 0.11 | 0.00 | concrete part |
| | | -0.02 | 0.00 | -0.01 | -0.01 | -0.11 | 0.00 | concrete part |
| | M _z | 0.01 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | concrete part |
| | | 0.01 | 0.00 | 0.00 | 0.00 | -0.02 | 0.00 | concrete part |
| | Extremes | 0.03 | 0.01 | 0.01 | 0.01 | 0.11 | 0.00 | concrete part |
| | | -0.03 | 0.00 | -0.01 | -0.01 | -0.11 | 0.00 | concrete part |
| 13 | AE LC20 - Spectral Z | | | | | | | |
| | P _x | 0.02 | 0.00 | 0.01 | 0.00 | -0.08 | 0.00 | concrete part |
| | | -0.02 | 0.00 | -0.01 | 0.00 | 0.08 | 0.00 | concrete part |
| | P _y | 0.00 | 0.01 | 0.00 | 0.02 | -0.03 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.02 | 0.03 | 0.00 | concrete part |
| | P _z | 0.01 | 0.00 | 0.01 | 0.01 | -0.10 | 0.00 | concrete part |
| | | -0.01 | 0.00 | -0.01 | -0.01 | 0.10 | 0.00 | concrete part |
| | M _x | 0.00 | 0.01 | 0.00 | 0.02 | -0.04 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.02 | 0.04 | 0.00 | concrete part |
| | M _y | 0.01 | 0.00 | 0.01 | 0.01 | 0.11 | 0.00 | concrete part |
| | | -0.01 | 0.00 | -0.01 | -0.01 | -0.11 | 0.00 | concrete part |
| | M _z | 0.00 | 0.01 | 0.00 | 0.02 | -0.03 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.02 | 0.03 | 0.00 | concrete part |
| | Extremes | 0.02 | 0.01 | 0.01 | 0.02 | 0.11 | 0.00 | concrete part |
| | | -0.02 | 0.00 | -0.01 | -0.01 | -0.11 | 0.00 | concrete part |
| 16 | AE LC20 - Spectral Z | | | | | | | |
| | P _x | 0.02 | 0.00 | 0.01 | 0.00 | -0.08 | 0.00 | concrete part |
| | | -0.02 | 0.00 | -0.01 | 0.00 | 0.08 | 0.00 | concrete part |
| | P _y | 0.00 | 0.01 | 0.00 | 0.02 | -0.03 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.02 | 0.03 | 0.00 | concrete part |
| | P _z | 0.01 | 0.00 | 0.01 | 0.01 | -0.10 | 0.00 | concrete part |
| | | -0.01 | 0.00 | -0.01 | -0.01 | 0.10 | 0.00 | concrete part |
| | M _x | 0.00 | 0.01 | 0.00 | 0.02 | -0.04 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.02 | 0.04 | 0.00 | concrete part |
| | M _y | 0.01 | 0.00 | 0.01 | 0.01 | 0.11 | 0.00 | concrete part |
| | | -0.01 | 0.00 | -0.01 | -0.01 | -0.11 | 0.00 | concrete part |
| | M _z | 0.00 | 0.01 | 0.00 | 0.02 | -0.03 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.02 | 0.03 | 0.00 | concrete part |
| | Extremes | 0.02 | 0.01 | 0.01 | 0.02 | 0.11 | 0.00 | concrete part |
| | | -0.02 | 0.00 | -0.01 | -0.01 | -0.11 | 0.00 | concrete part |
| 19 | AE LC20 - Spectral Z | | | | | | | |
| | P _x | 0.02 | 0.00 | 0.00 | 0.00 | -0.09 | 0.00 | concrete part |
| | | -0.02 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | concrete part |
| | P _y | 0.00 | 0.01 | 0.00 | 0.01 | -0.03 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.01 | 0.03 | 0.00 | concrete part |
| | P _z | 0.01 | 0.00 | 0.01 | 0.01 | -0.11 | 0.00 | concrete part |
| | | -0.01 | 0.00 | -0.01 | -0.01 | 0.11 | 0.00 | concrete part |
| | M _x | 0.00 | 0.00 | 0.00 | 0.02 | -0.02 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.02 | 0.02 | 0.00 | concrete part |
| | M _y | 0.01 | 0.00 | 0.01 | 0.01 | 0.11 | 0.00 | concrete part |
| | | -0.01 | 0.00 | -0.01 | -0.01 | -0.11 | 0.00 | concrete part |
| | M _z | 0.00 | 0.01 | 0.00 | 0.02 | -0.04 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.02 | 0.04 | 0.00 | concrete part |
| | Extremes | 0.02 | 0.01 | 0.01 | 0.02 | 0.11 | 0.00 | concrete part |
| | | -0.02 | 0.00 | -0.01 | -0.01 | -0.11 | 0.00 | concrete part |
| 22 | AE LC20 - Spectral Z | | | | | | | |
| | P _x | 0.02 | 0.00 | 0.00 | 0.00 | -0.09 | 0.00 | concrete part |
| | | -0.02 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | concrete part |
| | P _y | 0.00 | 0.01 | 0.00 | 0.02 | -0.03 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.02 | 0.03 | 0.00 | concrete part |
| | P _z | 0.02 | 0.00 | 0.01 | 0.01 | -0.11 | 0.00 | concrete part |
| | | -0.02 | 0.00 | -0.01 | -0.01 | 0.11 | 0.00 | concrete part |
| | M _x | 0.00 | 0.01 | 0.00 | 0.02 | -0.04 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.02 | 0.04 | 0.00 | concrete part |
| | M _y | 0.02 | 0.00 | 0.01 | 0.01 | 0.11 | 0.00 | concrete part |
| | | -0.02 | 0.00 | -0.01 | -0.01 | -0.11 | 0.00 | concrete part |
| | M _z | 0.00 | 0.01 | 0.00 | 0.02 | -0.03 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.02 | 0.03 | 0.00 | concrete part |
| | Extremes | 0.02 | 0.01 | 0.01 | 0.02 | 0.11 | 0.00 | concrete part |
| | | -0.02 | 0.00 | -0.01 | -0.01 | -0.11 | 0.00 | concrete part |
| 25 | AE LC20 - Spectral Z | | | | | | | |
| | P _x | 0.04 | 0.00 | 0.00 | 0.01 | -0.10 | 0.00 | concrete part |
| | | -0.04 | 0.00 | 0.00 | -0.01 | 0.10 | 0.00 | concrete part |
| | P _y | 0.01 | 0.00 | 0.00 | 0.01 | -0.04 | 0.00 | concrete part |
| | | -0.01 | 0.00 | 0.00 | -0.01 | 0.04 | 0.00 | concrete part |
| 25 | P _z | -0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | concrete part |
| | | 0.02 | 0.00 | 0.00 | 0.00 | -0.11 | 0.00 | concrete part |
| | | | | | | | | |
| | | | | | | | | |





RESULTS

13.2 NODES - SUPPORT FORCES

Spectral Analysis

| Node No. | | Support Forces [kN] | | | Support Moments [kNm] | | | Node Comment Cor. Loading |
|---|----------------|---------------------|----------------|----------------|-----------------------|----------------|----------------|------------------------------|
| | | P _x | P _y | P _z | M _x | M _y | M _z | |
| 25 | M _x | 0.02 | 0.00 | 0.00 | 0.02 | -0.06 | 0.00 | concrete part |
| | | -0.02 | 0.00 | 0.00 | -0.02 | 0.06 | 0.00 | concrete part |
| | M _y | -0.03 | 0.00 | 0.00 | -0.01 | 0.13 | 0.00 | concrete part |
| | | 0.03 | 0.00 | 0.00 | 0.01 | -0.13 | 0.00 | concrete part |
| | M _z | 0.02 | 0.00 | 0.00 | -0.01 | -0.01 | 0.00 | concrete part |
| | | -0.02 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | concrete part |
| Extremes | | 0.04 | 0.00 | 0.00 | 0.02 | 0.13 | 0.00 | concrete part |
| 25 | | -0.04 | 0.00 | 0.00 | -0.02 | -0.13 | 0.00 | concrete part |
| Extremes | | | | | | | | |
| 25 | | | | | | | | |
| 28 | P _x | 0.03 | 0.00 | 0.00 | 0.01 | -0.11 | 0.00 | concrete part |
| | | -0.03 | 0.00 | 0.00 | -0.01 | 0.11 | 0.00 | concrete part |
| | P _y | 0.01 | 0.01 | 0.00 | 0.01 | -0.04 | 0.00 | concrete part |
| | | -0.01 | -0.01 | 0.00 | -0.01 | 0.04 | 0.00 | concrete part |
| | P _z | 0.03 | 0.00 | 0.00 | 0.01 | -0.12 | 0.00 | concrete part |
| | | -0.03 | 0.00 | 0.00 | -0.01 | 0.12 | 0.00 | concrete part |
| | M _x | 0.02 | 0.00 | 0.00 | 0.02 | -0.07 | 0.00 | concrete part |
| | | -0.02 | 0.00 | 0.00 | -0.02 | 0.07 | 0.00 | concrete part |
| | M _y | -0.03 | 0.00 | 0.00 | -0.01 | 0.12 | 0.00 | concrete part |
| | | 0.03 | 0.00 | 0.00 | 0.01 | -0.12 | 0.00 | concrete part |
| Extremes | | 0.03 | 0.01 | 0.00 | 0.02 | 0.12 | 0.00 | concrete part |
| 28 | | -0.03 | -0.01 | 0.00 | -0.02 | -0.12 | 0.00 | concrete part |
| Extremes | | | | | | | | |
| 28 | | | | | | | | |
| 31 | P _x | 0.04 | 0.00 | 0.00 | 0.01 | -0.10 | 0.00 | concrete part |
| | | -0.04 | 0.00 | 0.00 | -0.01 | 0.10 | 0.00 | concrete part |
| | P _y | 0.01 | 0.01 | 0.00 | 0.01 | -0.04 | 0.00 | concrete part |
| | | -0.01 | -0.01 | 0.00 | -0.01 | 0.04 | 0.00 | concrete part |
| | P _z | 0.02 | 0.00 | 0.01 | 0.01 | -0.12 | 0.00 | concrete part |
| | | -0.02 | 0.00 | -0.01 | -0.01 | 0.12 | 0.00 | concrete part |
| | M _x | 0.02 | 0.01 | 0.00 | 0.02 | -0.06 | 0.00 | concrete part |
| | | -0.02 | -0.01 | 0.00 | -0.02 | 0.06 | 0.00 | concrete part |
| | M _y | -0.03 | 0.00 | -0.01 | -0.01 | 0.12 | 0.00 | concrete part |
| | | 0.03 | 0.00 | 0.01 | 0.01 | -0.12 | 0.00 | concrete part |
| Extremes | | 0.04 | 0.01 | 0.01 | 0.02 | 0.12 | 0.00 | concrete part |
| 31 | | -0.04 | -0.01 | -0.01 | -0.02 | -0.12 | 0.00 | concrete part |
| Extremes | | | | | | | | |
| 31 | | | | | | | | |
| 34 | P _x | 0.02 | 0.00 | 0.01 | 0.00 | -0.10 | 0.00 | concrete part |
| | | -0.02 | 0.00 | -0.01 | 0.00 | 0.10 | 0.00 | concrete part |
| | P _y | 0.00 | 0.01 | 0.00 | 0.02 | -0.02 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.02 | 0.02 | 0.00 | concrete part |
| | P _z | 0.02 | 0.00 | 0.01 | 0.01 | -0.11 | 0.00 | concrete part |
| | | -0.02 | 0.00 | -0.01 | -0.01 | 0.11 | 0.00 | concrete part |
| | M _x | 0.00 | 0.01 | 0.00 | 0.02 | -0.03 | 0.00 | concrete part |
| | | 0.00 | -0.01 | 0.00 | -0.02 | 0.03 | 0.00 | concrete part |
| | M _y | -0.02 | 0.00 | -0.01 | -0.01 | 0.11 | 0.00 | concrete part |
| | | 0.02 | 0.00 | 0.01 | 0.01 | -0.11 | 0.00 | concrete part |
| Extremes | | 0.02 | 0.01 | 0.01 | 0.02 | 0.11 | 0.00 | concrete part |
| 34 | | -0.02 | -0.01 | -0.01 | -0.02 | -0.11 | 0.00 | concrete part |
| Extremes | | | | | | | | |
| 34 | | | | | | | | |
| Total max/min values with corresponding values | | | | | | | | |
| 31 | P _x | 0.04 | 0.00 | 0.00 | 0.01 | -0.10 | 0.00 | concrete part |
| 31 | | -0.04 | 0.00 | 0.00 | -0.01 | 0.10 | 0.00 | concrete part |
| 16 | P _y | 0.00 | 0.01 | 0.00 | 0.02 | -0.03 | 0.00 | concrete part |
| 16 | | 0.00 | -0.01 | 0.00 | -0.02 | 0.03 | 0.00 | concrete part |
| 1 | P _z | 0.00 | 0.00 | 0.01 | 0.00 | -0.10 | 0.00 | concrete part |
| 1 | | 0.00 | 0.00 | -0.01 | 0.00 | -0.10 | 0.00 | concrete part |
| 4 | M _x | 0.00 | 0.01 | 0.00 | 0.02 | -0.03 | 0.00 | concrete part |
| 4 | | 0.00 | -0.01 | 0.00 | -0.02 | 0.03 | 0.00 | concrete part |
| 25 | M _y | -0.03 | 0.00 | 0.00 | -0.01 | 0.13 | 0.00 | concrete part |
| 25 | | 0.03 | 0.00 | 0.00 | 0.01 | -0.13 | 0.00 | concrete part |
| 31 | M _z | 0.03 | 0.00 | 0.00 | 0.01 | -0.03 | 0.00 | concrete part |
| 31 | | -0.03 | 0.00 | 0.00 | -0.01 | 0.03 | 0.00 | concrete part |





RESULTS

13.3 MEMBERS - INTERNAL FORCES BY SECTION

Spectral Analysis

| Section No. | Member No. | Node No. | Location x [m] | | N | Forces [kN] V _y / V _u | V _z / V _v | M _T | Moments [kNm] M _y / M _u | M _z / M _v | Member Comment Cor. Loading |
|--|------------|----------|----------------|---------------------------------|-------|--|---------------------------------|----------------|--|---------------------------------|-----------------------------|
| AE LC20 - Spectral Z | | | | | | | | | | | |
| Total max/min values with corresponding values | | | | | | | | | | | |
| 4 | 2 | 2 | 0.000 | N | -0.03 | 0.05 | -0.02 | 0.00 | 0.05 | 0.11 | |
| 4 | 2 | 2 | 0.000 | | -0.03 | -0.05 | 0.02 | 0.00 | -0.05 | -0.11 | |
| 4 | 22 | 32 | 0.000 | V _y / V _u | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.29 | |
| 4 | 22 | 32 | 0.000 | | 0.00 | -0.07 | 0.00 | 0.00 | 0.00 | -0.29 | |
| 3 | 21 | 31 | 0.000 | V _z / V _v | 0.00 | 0.00 | 0.04 | 0.00 | -0.10 | 0.01 | |
| 3 | 21 | 31 | 0.000 | | 0.00 | 0.00 | -0.04 | 0.00 | 0.10 | -0.01 | |
| 2 | 29 | 26 | 4.000 | M _T | 0.00 | 0.02 | 0.00 | 0.14 | 0.00 | 0.00 | |
| 2 | 29 | 26 | 4.000 | | 0.00 | -0.02 | 0.00 | -0.14 | 0.00 | 0.00 | |
| 3 | 17 | 25 | 0.000 | M _y / M _u | 0.00 | 0.00 | -0.03 | 0.00 | 0.13 | -0.01 | |
| 3 | 17 | 25 | 0.000 | | 0.00 | 0.00 | 0.03 | 0.00 | -0.13 | 0.01 | |
| 4 | 22 | 32 | 0.000 | M _z / M _v | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.29 | |
| 4 | 22 | 32 | 0.000 | | 0.00 | -0.07 | 0.00 | 0.00 | 0.00 | -0.29 | |

14 Concrete Design

14.1

OBJECTS TO DESIGN

| Object Type | Design All | Objects to Design | | | Comment |
|-------------|-------------------------------------|-------------------|-----------|---------|---------|
| | | Selected | To Design | Removed | |
| Members | <input checked="" type="checkbox"/> | 1-39 | | | 1-39 |
| Surfaces | <input checked="" type="checkbox"/> | 1 | | | |
| Nodes | <input checked="" type="checkbox"/> | 1-40 | | | 1-40 |

14.2

DESIGN SITUATIONS

| DS No. | EN 1990 Base + Timber CEN 2010-0 Design Situation Type | To Design | Active | EN 1992 CEN 2014-11 Design Situation Type | Combinations to Design for Enumeration Method |
|--------|--|-------------------------------------|-------------------------------------|---|---|
| 1 | EQU ULS (EQU) - Permanent and transient | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | ULS ULS (STR/GEO) - Seismic | All |

14.3

MATERIALS

Legend
● Concrete Settings
☒ Stiffness modification
☒ User-Defined Material

| Material No. | Name | To Design | Material Type | Options | Comment |
|--------------|------------------------|-------------------------------------|-------------------|---------|---------|
| 1 | S235 | <input checked="" type="checkbox"/> | Steel | | |
| 2 | C20/25 | <input checked="" type="checkbox"/> | Concrete | | |
| 3 | B550S(A) | <input checked="" type="checkbox"/> | Reinforcing Steel | | |
| 4 | C24 | <input checked="" type="checkbox"/> | Timber | | |
| 5 | EN AW-3004 H14 | <input checked="" type="checkbox"/> | Aluminum | | |
| 11 | Gravel, closely graded | <input checked="" type="checkbox"/> | Soil | | |
| 12 | Sand | <input checked="" type="checkbox"/> | Soil | | |
| 13 | Clay, slightly plastic | <input checked="" type="checkbox"/> | Soil | | |

14.3.1

MATERIALS - CONCRETE SETTINGS

| Material No. | Description | Symbol | Value | Unit | Comment |
|--------------|-------------------------------------|----------------|-----------------------|------|---------|
| 2 | C20/25 Isotropic Linear Elastic | | | | |
| | Maximum aggregate size | d _g | 16.0 | mm | |
| | Aggregate type | | Quartzite (siliceous) | | |
| | Cement class | | N (normal) | | |
| | Concrete type | | Monolithic | | |

14.3.2

MATERIALS - TIME-DEPENDENT PROPERTIES OF CONCRETE

Legend
● Concrete Settings

| Material No. | Description | Symbol | Value | Unit | Options |
|--------------|-------------------------------------|--------|-------|------|---------|
| 2 | C20/25 Isotropic Linear Elastic | | | | |
| | Creep | | | | |
| | Shrinkage | | | | |





CONCRETE

14.4

SECTIONS

Legend
■ Section is rotated and/or mirrored
I Thin-walled model
I Warping stiffness deactivated

| Section No. | Name | Material | To Design | Section Type | Use Other Section for Design | Options |
|-------------|--------------------------|----------|-------------------------------------|--------------------------|------------------------------|--------------------------------------|
| 1 | IPE 200 | 1 | <input checked="" type="checkbox"/> | Standardized - Steel | -- | I |
| 2 | R_M1 500/1000 | 2 | <input checked="" type="checkbox"/> | Parametric - Massive I | -- | I |
| 3 | SQ_M1 500 | 2 | <input checked="" type="checkbox"/> | Parametric - Massive I | -- | |
| 4 | HEB 200 | 1 | <input checked="" type="checkbox"/> | Standardized - Steel | -- | |
| 5 | SQ_M1 500 | 4 | <input checked="" type="checkbox"/> | Parametric - Massive I | -- | I |
| 6 | UU 150/75/125/8/6/12/0/0 | 5 | <input checked="" type="checkbox"/> | Parametric - Thin-Walled | -- | I |
| 7 | HEB 200 | 1 | <input checked="" type="checkbox"/> | Standardized - Steel | -- | I |
| 8 | TestRFEM | 2 | <input checked="" type="checkbox"/> | General by RSECTION | -- | I |
| 16 | HEB 200 | 1 | <input checked="" type="checkbox"/> | Standardized - Steel | -- | I |

14.5

THICKNESSES

| Thick. No. | Name | Type | Material | To Design | Use Other Thick. d [mm] for Design |
|------------|-------------------------------------|---------|----------|-------------------------------------|------------------------------------|
| 1 | Uniform d : 500.0 mm 2 - C20/25 | Uniform | 2 | <input checked="" type="checkbox"/> | -- |

14.6

ULTIMATE CONFIGURATIONS

| Config. No. | Name | Nodes | Members | Assigned to Member Sets | Surfaces | Surface Sets | Comment |
|-------------|----------------------------|-------|---------|-------------------------|----------|--------------|---------|
| 2 | ScriptedULSC configuration | | All | | All | | |

14.6.1

ULTIMATE CONFIGURATIONS - SETTINGS - MEMBERS

| Config. No. | Description | Symbol | Value | Unit |
|-------------|--|------------------------|-------|-----------------|
| 2 | <p>■ ScriptedULSCConfiguration Consider Internal Forces for Concrete Design <input checked="" type="checkbox"/> Axial forces N_{Ed} <input checked="" type="checkbox"/> Bending moments $M_{y,Ed}$ <input checked="" type="checkbox"/> Bending moments $M_{z,Ed}$ <input checked="" type="checkbox"/> Torsional moments $M_{T,Ed}$ <input checked="" type="checkbox"/> Shear forces $V_{y,Ed}$ <input checked="" type="checkbox"/> Shear forces $V_{z,Ed}$</p> <p>Reductions of Internal Forces in z-Direction <input type="checkbox"/> Consideration of limited moment redistribution of the supporting moments according to 5.5 <input type="checkbox"/> Reduction of the moments or dimensioning for the moments at the face of a monolithic support according to 5.3.2.2 <input checked="" type="checkbox"/> Reduction of the shear forces in the support face and distance d acc. to 6.2.1(8) <input type="checkbox"/> Reduction of the shear forces with concentrated load acc. to 6.2.2(6) and 6.2.3(8) <input type="checkbox"/> Consideration of minimum eccentricity acc. to 6.1(4)</p> <p>Required Longitudinal Reinforcement Reinforcement layout <input type="checkbox"/> Distribute reinforcement evenly over complete slab width <input checked="" type="checkbox"/> Include tensile force due to shear in required longitudinal reinforcement</p> <p>Optimize provided reinforcement</p> <p>Detailing and Particular Rules <input checked="" type="checkbox"/> Minimum longitudinal reinforcement acc. to standard <input checked="" type="checkbox"/> User-defined minimum longitudinal reinforcement area <input checked="" type="checkbox"/> Minimum reinforcement area Top reinforcement area Bottom reinforcement area Total reinforcement area <input checked="" type="checkbox"/> Minimum reinforcement percentage Total reinforcement area <input checked="" type="checkbox"/> Minimum shear reinforcement acc. to standard <input type="checkbox"/> Compression longitudinal reinforcement for maximum stirrup spacing acc. to 9.2.1.2(3) <input checked="" type="checkbox"/> Minimum construction reinforcement acc. to 9.2.1.2(1), 9.2.1.4(1) <input checked="" type="checkbox"/> Design check for tensile force in longitudinal reinforcement, including tension due to shear acc. to 9.2.1.3(2)</p> <p>Required Shear Reinforcement - Shear Capacity <input checked="" type="radio"/> Use required longitudinal reinforcement <input type="radio"/> Use provided longitudinal reinforcement <input type="radio"/> Automatically increase required longitudinal reinf. to avoid shear reinf.</p> <p>Shear two chords and mirror method</p> | $A_{s,min,z}$ (top) | 0.00 | cm ² |
| | | $A_{s,min,z}$ (bottom) | 0.00 | cm ² |
| | | $A_{s,min,tot}$ | 0.00 | cm ² |
| | | $\rho_{s,min,tot}$ | 0.00 | % |





14.6.1

ULTIMATE CONFIGURATIONS - SETTINGS - MEMBERS

| Config. No. | Description | Symbol | Value | Unit |
|----------------|--|----------------------|-------------------------------------|-------------------|
| | Limit angle V_{Ed} and neutral axis <input checked="" type="checkbox"/> Applies mirror about Z axis on V_{Ed} for unfavorable angles. | $\alpha_{Ved,limit}$ | 20.00 | deg |
| | Shear Joint <input checked="" type="checkbox"/> Design of shear joint Analysis method for shear stress in joint <input checked="" type="radio"/> Analytical with shear force $V_{z,Ed}$ and β -factor acc. to Eq. 6.24 ($M_{z,Ed}$ not considered) <input type="radio"/> General integration of axial stresses into section parts | | | |
| | <input type="checkbox"/> Fatigue or dynamic loads acc. to 6.2.5 (5) Normal stress across joint surfaces (tension negative) | σ_n | 0.000 | N/mm ² |
| | <input type="checkbox"/> Design of flange connections on segmented cross-sections | | | |
| | General Percentage of Reinforcement Minimum percentages | ρ_{min} | 0.00 | % |
| | Maximum percentages | ρ_{max} | 8.00 | % |
| | Neutral Axis Depth Limitation <input type="checkbox"/> Consider neutral axis depth limitation acc. to 5.6.2(2), 5.6.3(2) | | | |
| | Calculation Setting <input type="checkbox"/> Net concrete area | | | |
| | Fiber Concrete <input type="checkbox"/> Calculation of fiber concrete | | | |
| | <input type="checkbox"/> Number of Solver Calculations | | | |
| | Settings for Stability Design Slenderness Limiting slenderness about y-axis <input type="checkbox"/> Determine factor A_y <input type="checkbox"/> Determine factor B_y <input type="checkbox"/> Determine factor C_y | | | |
| | Limiting slenderness about z-axis <input type="checkbox"/> Determine factor A_z <input type="checkbox"/> Determine factor B_z <input type="checkbox"/> Determine factor C_z | | | |
| | Load Distribution <input checked="" type="checkbox"/> Structural system of isolated columns | | | |
| | Biaxial Bending <input type="checkbox"/> Separate design in each principal direction acc. to 5.8.9 <input type="checkbox"/> Use simplified criterion acc. to Equation 5.39 | | | |
| | Curvature for Required Reinforcement <input checked="" type="radio"/> Factor K_r acc. to 5.8.8.3 <input type="radio"/> User-Defined | | | |
| | Required Reinforcement Reinforcement layout Reinforcement diameter for preliminary design | | Uniformly surrounding Max of all | |

14.6.2

ULTIMATE CONFIGURATIONS - SETTINGS - SURFACES

| Config. No. | Description | Symbol | Value | Unit |
|----------------|--|--------|-------|------|
| 2 | ScriptedULSConfiguration Design Method <input type="radio"/> No optimization of design internal forces (recommended for predominantly pressure-stressed components) <input checked="" type="radio"/> Optimization of design internal forces (recommended for components subject to additional or tensile stress) | | | |
| | Internal Forces Diagram Used for Design <input checked="" type="checkbox"/> Subtraction of rib components for the ULS calculation and for the analytic method of SLS calculation | | | |
| | Limits of Reinforcement Areas <input checked="" type="checkbox"/> Minimum longitudinal reinforcement acc. to standard <input checked="" type="radio"/> Minimum longitudinal reinforcement for plates acc. to 9.3.1 Direction of minimum reinforcement <input checked="" type="radio"/> Direction with main tension in the element <input type="radio"/> Direction with main tension in the surface <input type="radio"/> Defined | | | |





14.6.2

ULTIMATE CONFIGURATIONS - SETTINGS - SURFACES

| Config. No. | Description | Symbol | Value | Unit |
|----------------|--|--------|-------|------|
| | <input type="radio"/> Minimum longitudinal reinforcement for walls acc. to 9.6 <input type="checkbox"/> User-defined minimum longitudinal reinforcement percentage <input checked="" type="checkbox"/> Maximum longitudinal reinforcement acc. to standard <input checked="" type="radio"/> Maximum longitudinal reinforcement for plates acc. to 9.3.1 <input type="radio"/> Maximum longitudinal reinforcement for walls acc. to 9.6 | | | |
| | <input type="checkbox"/> User-defined maximum longitudinal reinforcement percentage <input checked="" type="checkbox"/> Minimum shear reinforcement acc. to 9.3.2 <input type="checkbox"/> User-defined minimum shear reinforcement percentage | | | |
| | Required Longitudinal Reinforcement <input type="checkbox"/> Include tensile force due to shear in required longitudinal reinforcement | | | |
| | Required Shear Reinforcement - Shear Capacity <input checked="" type="radio"/> Use required longitudinal reinforcement <input type="radio"/> Use provided longitudinal reinforcement <input type="radio"/> Automatically increase required longitudinal reinf. to avoid shear reinf. | | | |
| | Neutral Axis Depth Limitation <input type="checkbox"/> Consider neutral axis depth limitation acc. to 5.6.2(2), 5.6.3(2) | | | |

14.6.3

ULTIMATE CONFIGURATIONS - SETTINGS - PUNCHING

| Config. No. | Description | Symbol | Value | Unit |
|----------------|--|--------------------|---|------|
| 2 | <input checked="" type="checkbox"/> ScriptedULSConfiguration Structural Element Structural element type | | | |
| | Auto | | | |
| | Punching Load Used punching load for columns Used punching load for walls <input type="checkbox"/> Consider surface load inside critical perimeter | | Single force from column / load / nodal support Smoothed shear force over the critical perimeter | |
| | Deductible surface load for foundation Deductible portion Maximum distance of deductible surface | | Automatically 100.00 a_crit | % |
| | <input type="checkbox"/> Deductible surface load for slab | | | |
| | Factor β Applied method for determining factor β | | 6.4.3(3) - Full-plastic shear distribution | |
| | Basic control perimeter <input type="checkbox"/> Define critical section for slab <input type="checkbox"/> Define iterative critical section for foundation | | | |
| | Mean effective depth <input type="checkbox"/> Define area for detection of effective depth <input type="checkbox"/> Column penetration | | | |
| | Punching shear reinforcement Minimum Spacing of Reinforcement Perimeters | s _{r,min} | 0.100 | m |
| | Required Punching Reinforcement - Punching Shear Capacity <input type="radio"/> Use provided longitudinal reinforcement <input checked="" type="radio"/> Calculate required longitudinal reinforcement to avoid punching reinforcement or fulfill Eq. 6.52 | | | |
| | Minimum Reinforcement Acc. to Standard. <input checked="" type="checkbox"/> Minimum punching reinforcement acc. to 9.4.3(2) | | | |

14.7

SERVICEABILITY CONFIGURATIONS

| Config. No. | Name | Nodes | Members | Assigned to Member Sets | Surfaces | Surface Sets | Comment |
|----------------|--|-------|---------|----------------------------|----------|--------------|---------|
| 2 | <input checked="" type="checkbox"/> ScriptedSLSConfiguration | | All | | All | | |





14.7.1

SERVICEABILITY CONFIGURATIONS - SETTINGS

| Config. No. | Description | Symbol | Value | Unit |
|----------------|---|------------------|---------------|------|
| 2 | <p>ScriptedSLSConfiguration</p> <p>Stress Analysis</p> <p><input type="checkbox"/> Limitation of concrete pressure stress σ_c</p> <p><input checked="" type="checkbox"/> Limitation of steel stress σ_s</p> <p>Crack Analysis</p> <p><input checked="" type="radio"/> Limit values of allowable crack width acc. to standard</p> <p>Top (-z) limit values of allowable crack width</p> <p>Bottom (+z) limit values of allowable crack width</p> <p><input type="radio"/> User-defined limit values of allowable crack width</p> <p><input checked="" type="checkbox"/> Design without direct crack width calculation</p> <p><input type="checkbox"/> Calculation of limit diameter lim d_s</p> <p><input type="checkbox"/> Calculation of maximum member spacing lim s_i</p> <p><input checked="" type="checkbox"/> Design with direct crack width calculation</p> <p><input type="checkbox"/> Use Eq. (7.14) for $s_{i,max}$</p> <p>Effective concrete tensile strength at time of cracking</p> <p><input type="checkbox"/> Crack width control for $\sigma_{c,i,Ed} \leq f_{ct,eff,wk}$</p> | | Automatically | |
| | | | 1.000 | -- |
| | A _{s,min} for Effects Due to Restraint | | | |
| | <input checked="" type="checkbox"/> Calculation of minimum reinforcement area A _{s,min} | | | |
| | Stress distribution within the section prior to cracking | | | |
| | <input checked="" type="radio"/> Depending on the defined load ($k_c = 0.0 \dots 1.0$) | | | |
| | <input type="radio"/> Approach of pure tension restraint ($k_c = 1.0$) | | | |
| | <input type="radio"/> Approach of bending restraint ($k_c = 0.4$) | | | |
| | A _{s,min} layout on member | | Tension side | |
| | A _{s,min} layout on surface | | | |
| | <input checked="" type="checkbox"/> Top (-z) reinforcement φ_1 | | | |
| | <input checked="" type="checkbox"/> Top (-z) reinforcement φ_2 | | | |
| | <input checked="" type="checkbox"/> Bottom (+z) reinforcement φ_1 | | | |
| | <input checked="" type="checkbox"/> Bottom (+z) reinforcement φ_2 | | | |
| | <input type="checkbox"/> Crack formation within the first 28 days | | | |
| | Deflection Analysis | | | |
| | <input checked="" type="checkbox"/> Limitation of deflection | | | |
| | Limit values of allowable deflection | | | |
| | Support on both sides | | | |
| | Quasi-permanent | L / | 250 | |
| | One-sided support | | | |
| | Quasi-permanent | L _c / | 250 | |
| | <input checked="" type="checkbox"/> Consider resistance of concrete between cracks (tension stiffening effect) | | | |
| | <input type="checkbox"/> Consider minimum value of distribution factor | | | |
| | Crack state detection | | | |
| | <input checked="" type="radio"/> Crack state calculated from associated load | | | |
| | <input type="radio"/> Crack state determined as envelope from all SLS design situations | | | |
| | <input type="radio"/> Crack state independent of load | | | |
| | Developer Settings | | | |
| | Effective depth factor for design forces ($d = k_d * h$) | k _d | 0.900 | -- |
| | Lever arm factor for design forces ($z = k_z * d$) | k _z | 0.900 | -- |