RC open frame bridge

TABLE OF CONTENT

Part A : CALCULATION ASSUMPTIONS

RC open frame bridge

CONTENTS

1. GENERAL / MEASUREMENT

1.1 CONSTRUCTION TYPE

Open frame orthogoanal constructed using reinforced contrete.

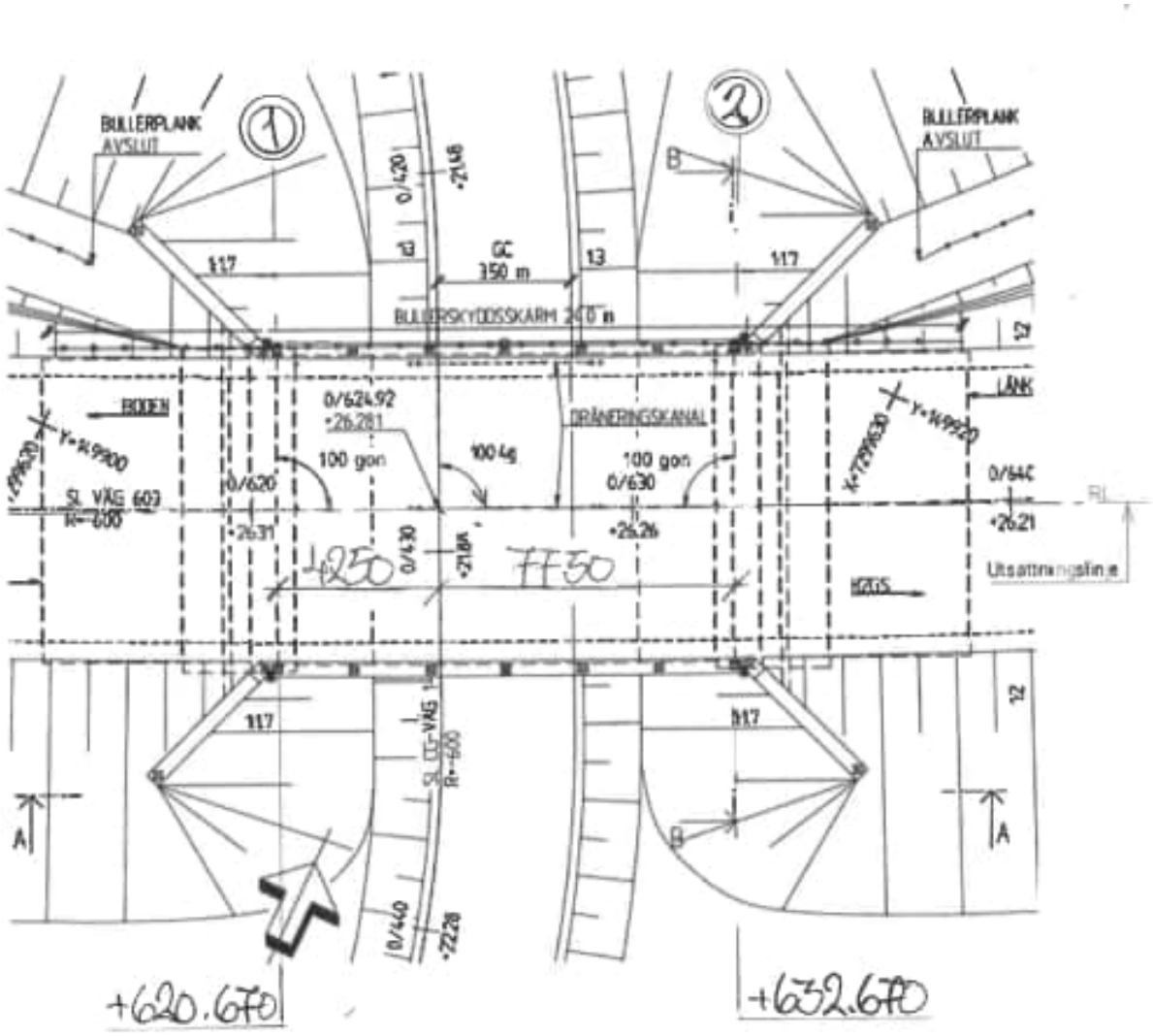
Foundation on compacted gravel.

At each abutement link slabs are constructed.

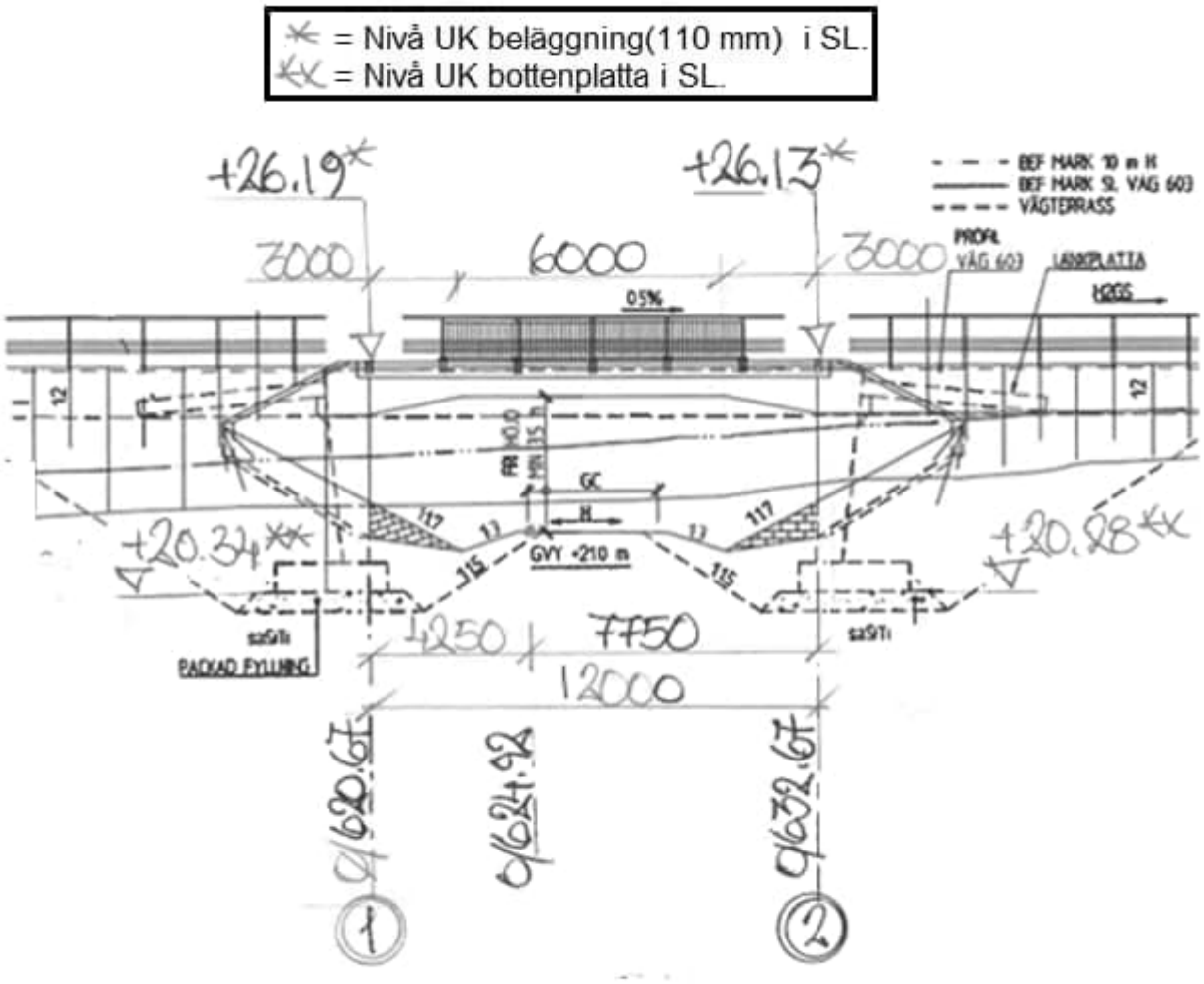
The bridges abutments, wingwall and bridge deck is constructed during one casting stage.

1.2 MEASUREMENTS

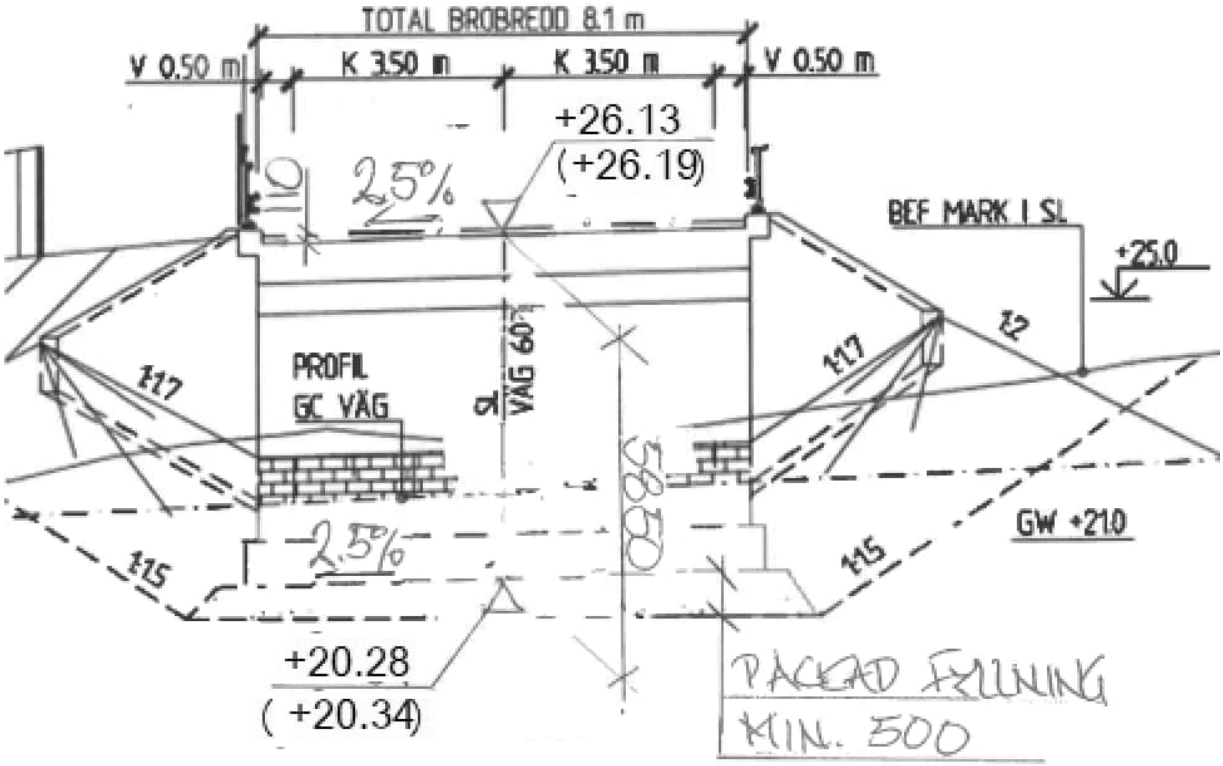
1.2.1 Theoretical geometry



PLAN
Översikt



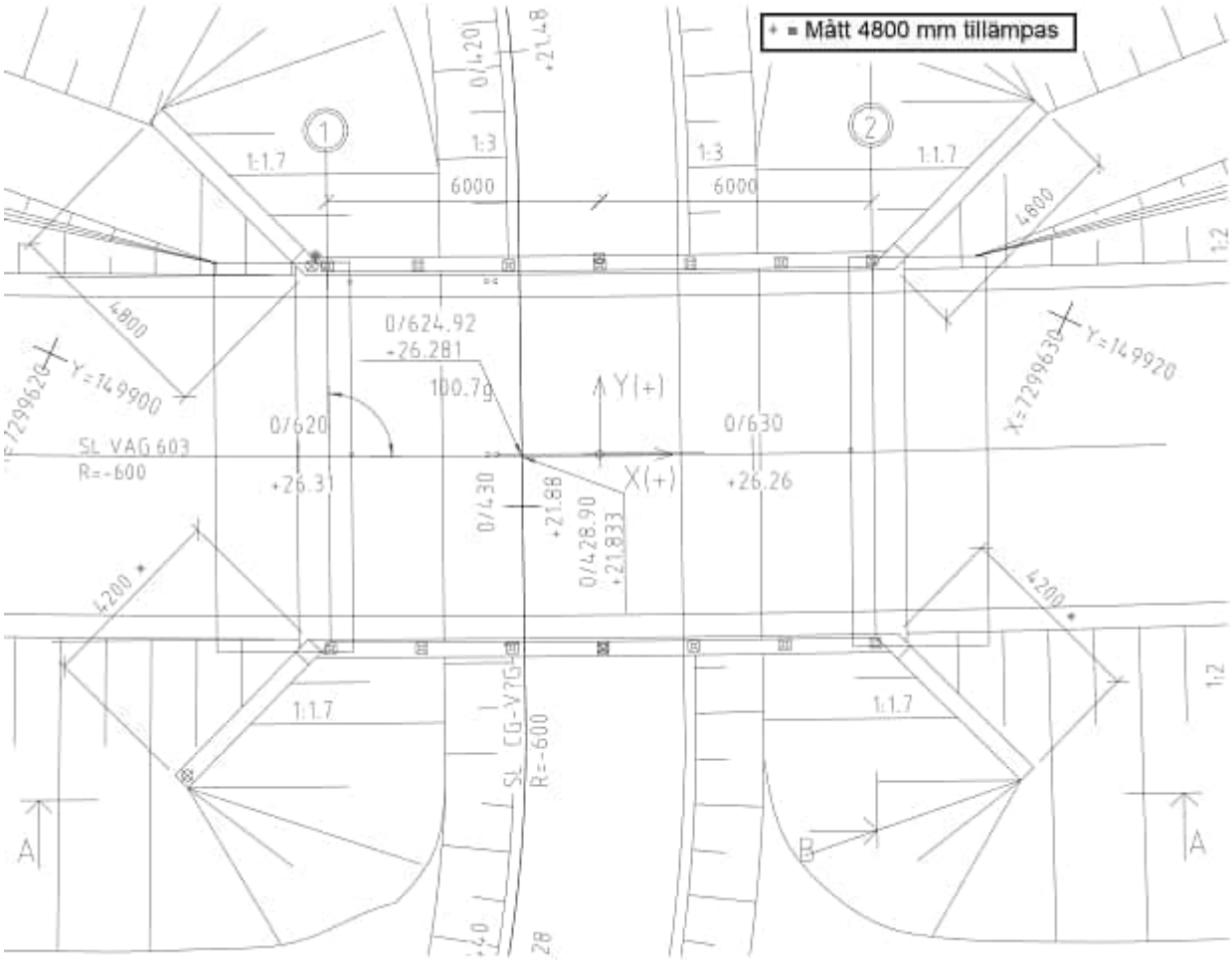
SECTION A-A
Elevation



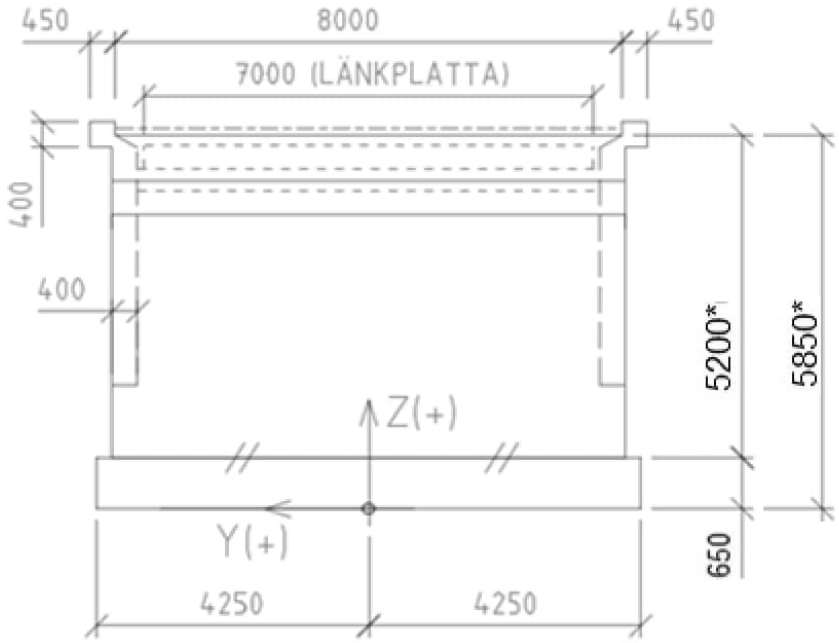
SECTION B-B

Abutement 2. Values inside parentensis are at abutement 1.

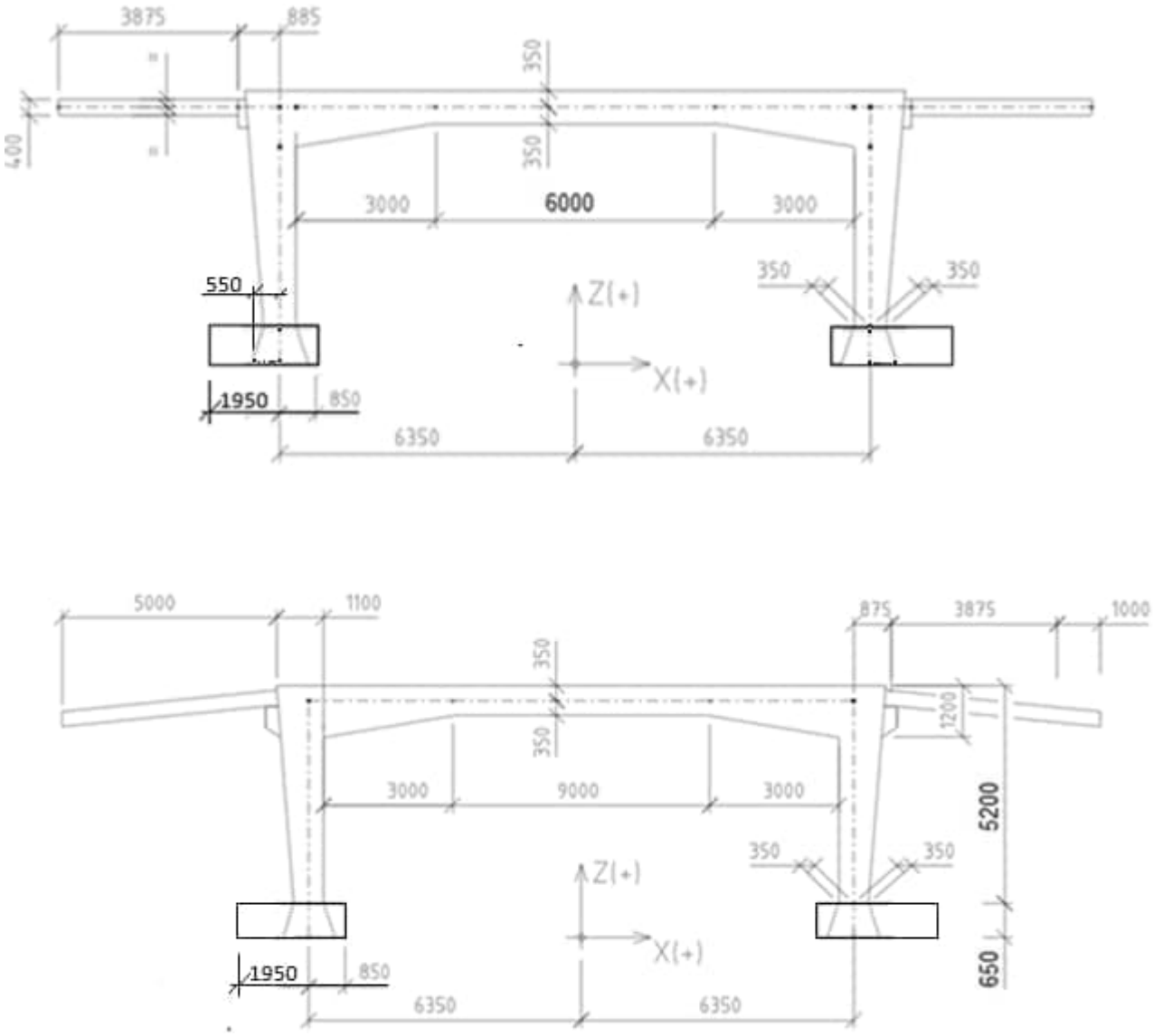
1.2.2 Geometry calcualtions



PLAN

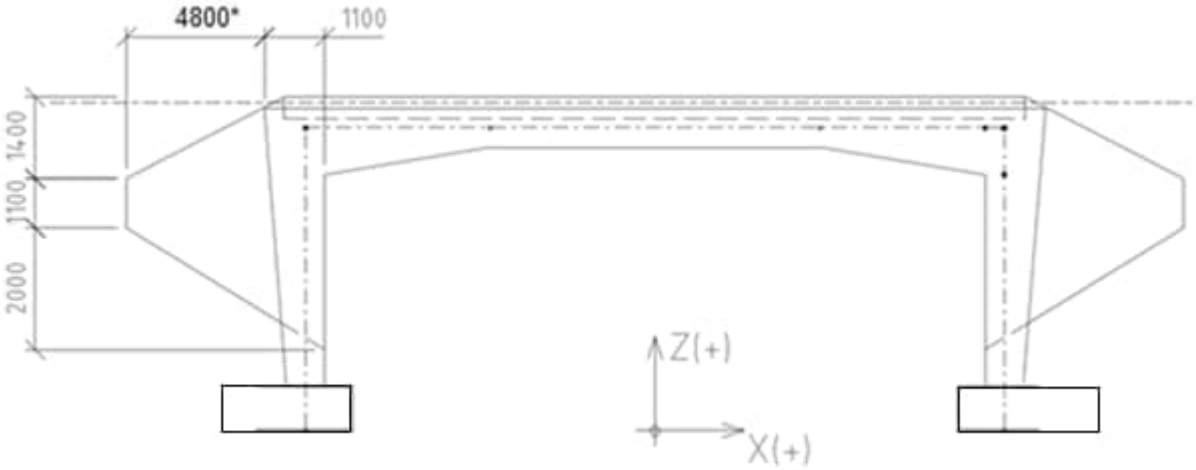


SECTION A-A
Transversal direction.



SECTION B-B

Longitudinal section through link slabs.Längsled genom länkplattor



SECTION B-B
Wingwalls.

1.3 FOUNDATION

Both bottom slabs are founded on 0.5 m compacted gravel on rock.

Abutement 1:
Foundation level +20.34 (SL road)
Level bottom of compacted gravel +19.70.

Abutement 2:
Foundation level +20.28 (SL road)
Level bottom of compacted gravel +19.64.

Design waterlevel:
Highest level +22.0.

1.4 CODE OCH TENDER DOCUMENTS

Documents	Version	Name
SS-EN 1990-1997	-	Svensk Standard Eurokod 1-7
TRVINFRA-00226	2.0	KRAV, Bro och broliknande konstruktion, Allmänna krav
TRVINFRA-00227	2.0	KRAV, Bro och broliknande konstruktion, Byggande
TRVINFRA-00228	2.0	KRAV, Bro och broliknande konstruktion, Brounderhåll
TRVINFRA-00331	2.0	KRAV, Bro och broliknande konstruktion, Bärighetsberäkning
TSFS 2018:57		Transportstyrelsens föreskrifter och allmänna råd om tillämpning av eurokoder
TDOK 2013:0667	2.0	Trafikverkets tekniska krav för geokonstruktioner. TK Geo 13
TDOK 2013:0668	2.0	Trafikverkets tekniska råd för geokonstruktioner. TR Geo 13
AMA Anläggning 23		AMA, Svensk Byggtjänst
TDOK 2023:0125	2.0	TRVAMA Anläggning 23
SS 137006:2015	-	Betongkonstruktioner – Utförande – Tillämpning av SS-EN 13670:2009 i Sverige

1.5 TECHNICAL SERVICE LIFE

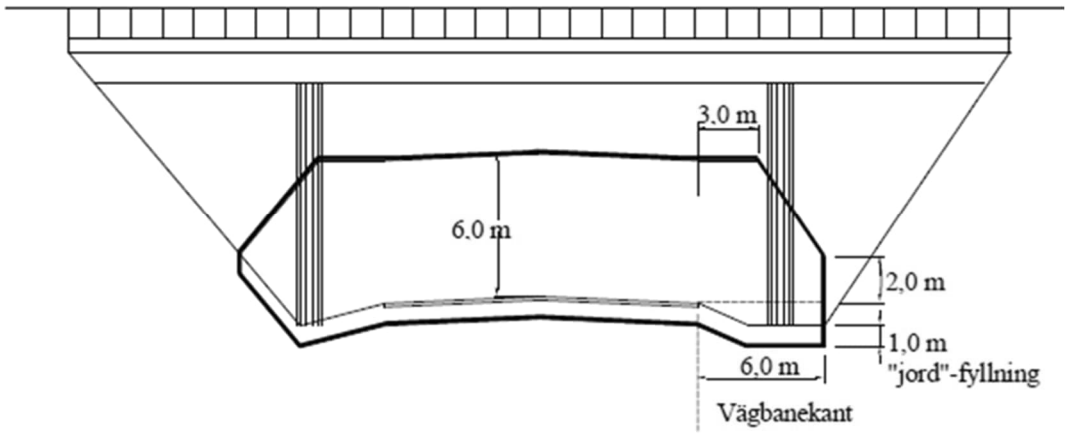
Technical life span 20 years (L20) for railing.

Technical life span 120 years (L100) for all else.

1.6 ENVIROMENT

Exposure class accoring to TSFS 2018:57 section 5.3.2.3 and SS-EN 206-1.

In TSFS 2021:57 figure 1.1, the road environment is defined according to the figure below. Which means that only edge beams in road environment.



1.7 MATERIAL

Concrete (see SS-EN 1992-1-1, Table 3.1):
C30/37 (f_{ck} = 30 MPa) - bottom slab
C35/45 (f_{ck} = 35 MPa) - other stuctures

Reinforcement (SS-EN 10080 och SS 212540):
K500CT (f_{yk} = 500MPa)

Backfill:
”Grovkrossad sprängsten” according to AMA CEB.524.
TRVINFRA-00230 table A1 gives material properties ϕ_k = 45°, $\gamma = 20\frac{kN}{m^3}$, $\gamma' = 13\frac{kN}{m^3}$ and E_k = 50 MPa.

Compacted fill:
”Krossad sprängsten” 500 mm according to AMA CEB.411.
TRVINFRA-00230 table A1 gives material properties ϕ_k = 45°, $\gamma = 18\frac{kN}{m^3}$, $\gamma' = 11\frac{kN}{m^3}$ and E_k = 50 MPa.

1.8 GEOTECHNICAL CLASS

Geotechnical class GK2.

1.9 SAFETY CLASS

Geotechnical resistance: SK 2

Linkplate & wingwall: SK 2

Bridge structure: SK 2 safety class 2 (∴ spann < 15 m)

Safety class 2 according to TSFS chapater 2 table 2.1.

1.10 CONCRETE COVER AND CRACK CRITERIA

Class identification bridge components :

Construction part	Exposure class [1.)]	Life spann	max vct_{ekv} [2.)]	ζ [3.)]
Substructure incl. linkplate :				
▫ Wingwall towards filling	XD1/XF4	L100	0.40	1.5
▫ Wingwall from filling	XD1/XF4	L100	0.40	1.5
▫ Abutment towards filling (level 1 m under surfacing)	XC2/XF3	L100	0.50	1.0
▫ Abutment from filling (above ground)	XC4/XF3	L100	0.50	1.2
▫ Abutment from filling (under ground)	XC2/XF3	L100	0.50	1.0
▫ Bottom slab in general	XC2/XF3	L100	0.50	1.0
▫ Bottom slab underside	XC2/XF3	L100	0.50	1.0
▫ Linkplate in general	XD1/XF2	L100	0.40	1.5
▫ Linkplate underside	XD1/XF2	L100	0.40	1.5
Superstructure:				
▫ Edge beam	XD3/XF3	L100	0.40	1.8
▫ Bridge deck	XD1/XF4	L100	0.40	1.5

Footnotes:

1.) TRVINRA-00227 section 5.3.2.3
2.) TSFS table 12.1
3.) TSFS table 12.3

Design parameters low corrosion sensitive reinforcement (rebars):

$c_{min.dur}$: minimum cover with regard to environmental impact

$c_{min.b}$: minimum cover with regard to adhesion requirements

Δc_{dev} : execution tolerance

$c_{min} = \max(c_{min.b}; c_{min.dur}; 10mm)$: SS-EN 1992-1-1 eq. 4.2

$c_{nom} = c_{min} + \Delta c_{dev}$: SS-EN 1992-1-1 eq. 4.1, noted as BM on the drawing

Construction part	$c_{min.dur}$ 1.)	$c_{min.b}$ 2.)	c_{min}	Δc_{dev} 3.)	c_{nom} 6.)	$w_{k,till}$ 4.)
Substructure incl. linkplate :						
▫ Wingwall towards filling	25	20	25	10	40	0.20
▫ Wingwall from filling	25	20	25	10	40	0.20
▫ Abutment towards filling (level 1 m under surfacing)	15	20	20	10	40	0.40
▫ Abutment from filling (above ground)	15	20	20	10	40	0.30
▫ Abutment from filling (under ground)	15	20	20	10	40	0.40
▫ Bottom slab in general	15	20	20	10	40	0.40
▫ Bottom slab underside	15	20	35 5.)	10	45	0.40
▫ Linkplate in general	25	20	25	10	40	0.20
▫ Linkplate underside	25	20	40 5.)	10	50	0.20
Superstructure:	45	20	45	10	55	0.15
▫ Edge beam	25	20	25	10	40	0.20
	mm	mm	mm	mm	mm	mm

Fotnotes:

1.) TSFS table 12.1
2.) SS-EN 1992-1-1 section 4.4.1.2 table 4.2
3.) SS-EN 1992-1-1 section 4.4.1.3
4.) TSFS table 12.2
5.) TSFS chapter 12 section 2§ $k_1 = c_{min} + 15$ mm when casting against building foil.
6.) General Swedish practice min. $c_{nom} = 40$ mm ($\therefore \phi 32 + 5$ mm)

2. SYSTEM ANALYSIS

2.1 GENERAL

The bridge is built using reinforced concrete.

The computational geometry is simplified so that the bridge deck is completely horizontal both longitudinally and vertically.

Abutments, bridge deck and link plate are modelled using high-node shell elements (QTS8). These shell elements are modelled with isotropic material properties corresponding to uncracked concrete.

The system calculation is performed using FEM- anlysis.

Wing walls are not modelled in the structural calculation as they are considered statically inactive in the vertical plane. Only minimum reinforcement will be introduced in the vertical plane to limit crack widths.

In the structural model, the wing length corresponding to the longest wing wall (4800 mm) is applied to all wing walls.

Edge beams are not modelled in the structural calculation on the safe side to allow future replacement without reduced load-bearing capacity.

The bottom of the girder will be connected to a fictitious "rigid beam" with negligible axial stiffness.

The centre of the "rigid beam" will be connected to a "super node” through a rigid joint (JSH4). This order to handle that bottom slabs are place excentric to abutments.

Link slabs are connected to top of abutments through a moment-free joint. These are designated as line joint element JNT4. Line supports are introduced 1.0 m from its end, which gives a slab with a free span of 4.0 m, considered to be on the safe side.

According to Swedish general practice a stiffness increase of 1:3 is applied within structural parts at the nodes.

Traffic load evaluation is carried out using Vehicle Load Optimiser (VLO) function for Swedish traffic loads.

Attachments:

Attachment	Name
1	Input receipt
2	Results reactions
3	Results abutments
4	Results bridge deck

2.2 SKETCH SYSTEM ANALYSIS

To describe geometry first POINTS are defined.

Beam elements are defined by applying attributes to LINES.

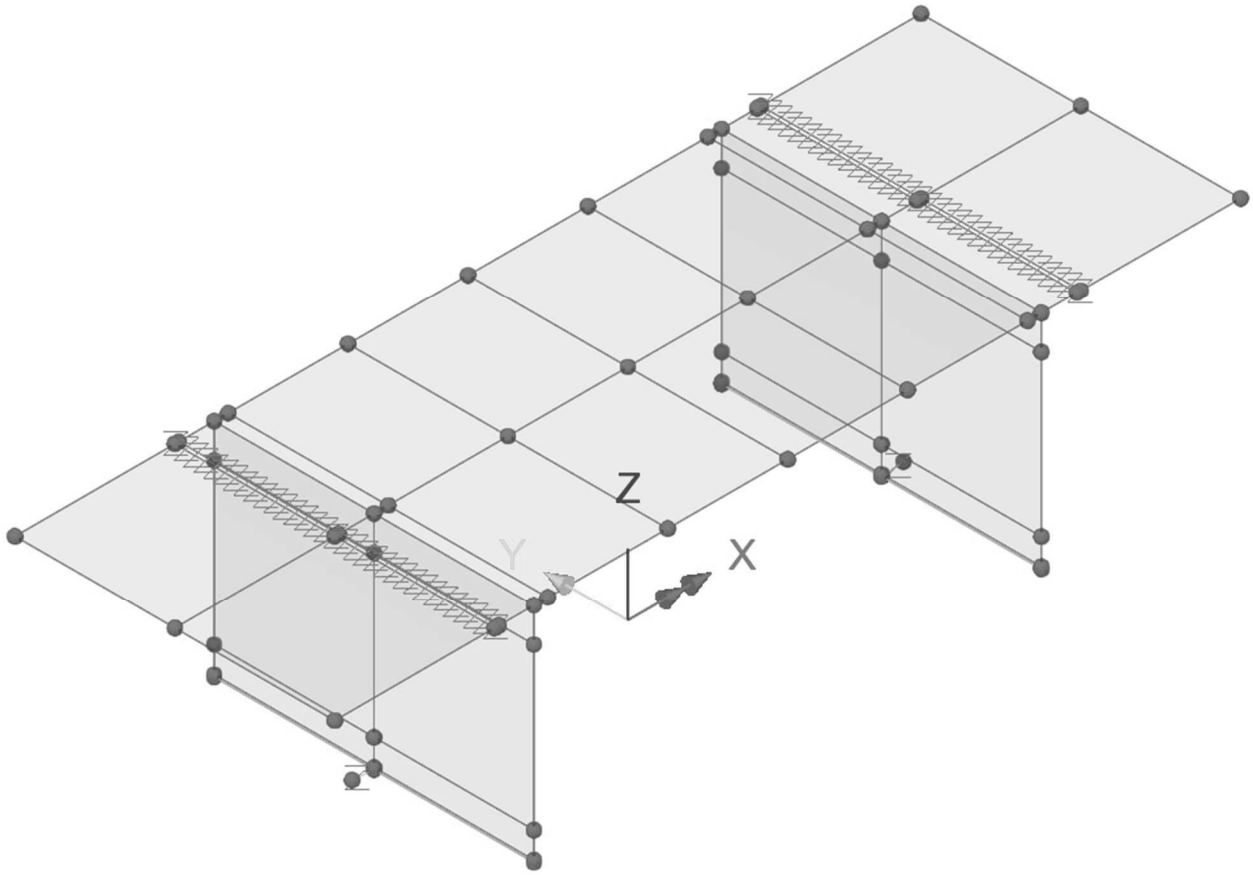
Shell elements are defined by applying attributes to SURFACES.

Attached pictures are retrieved from graphical sketches generated by FEM-program of POINTS, LINES and SURFACES.

All coordinates needed to describe POINTS are found in attachment 1.

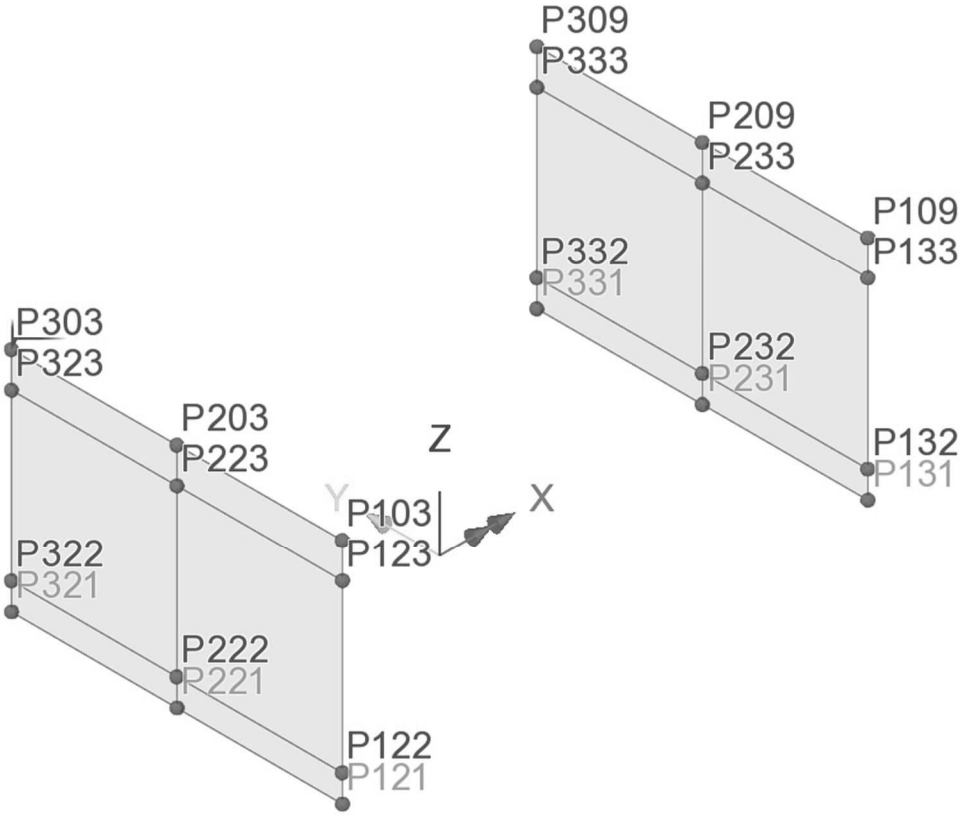
All POINTS needed to describe LINES are found in attachment 1.

All LINES need to describe SURFACE are found in attachment 1.

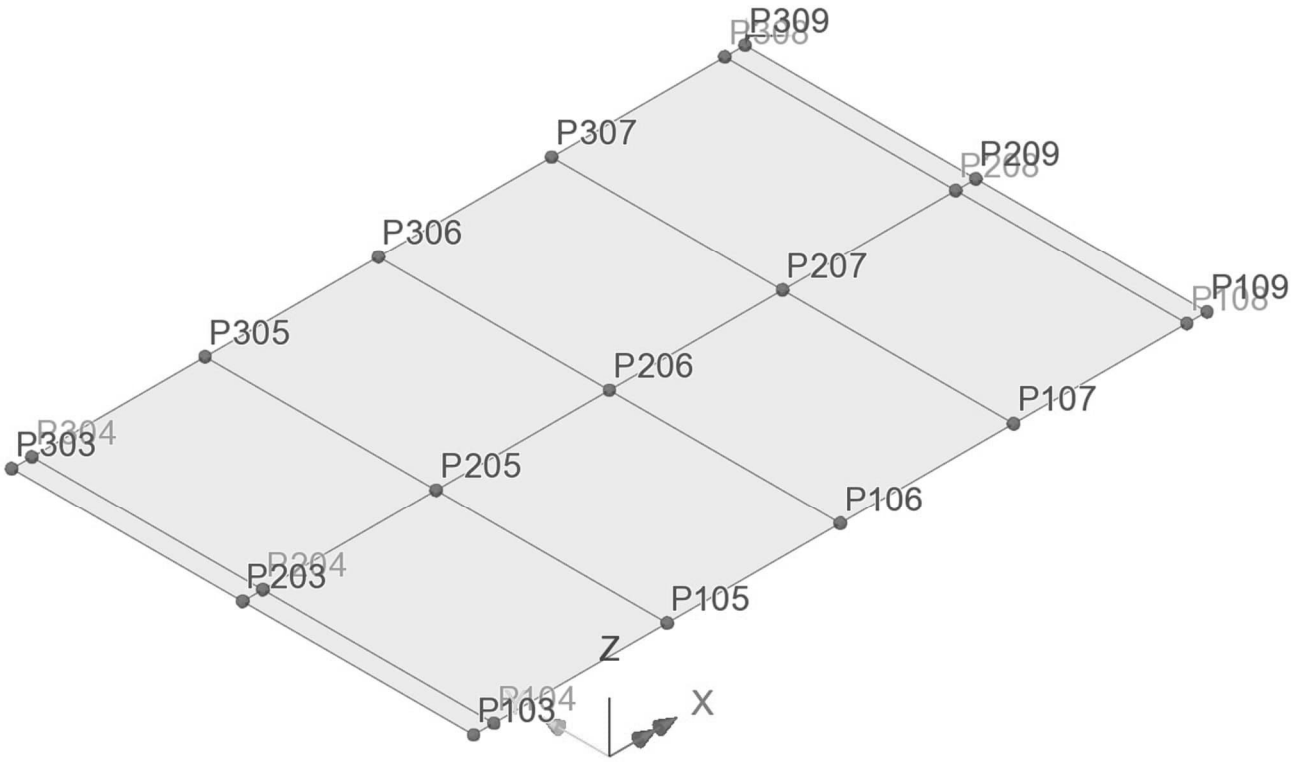


Overview 3D
Geometry

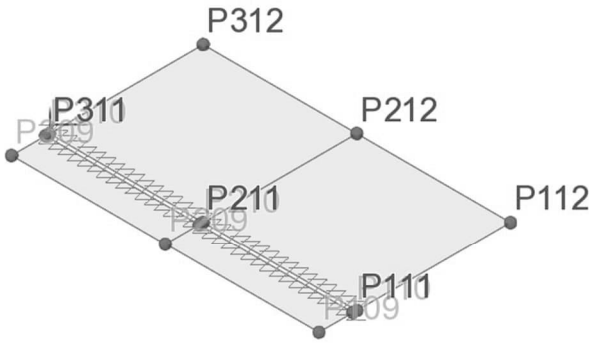
2.2.1 Geometry : POINTS

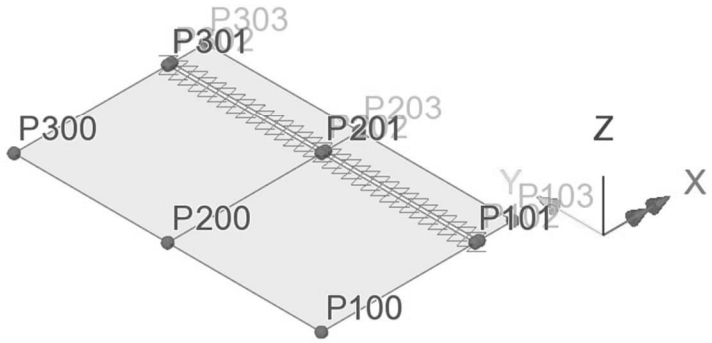


Abutment 1 & 2

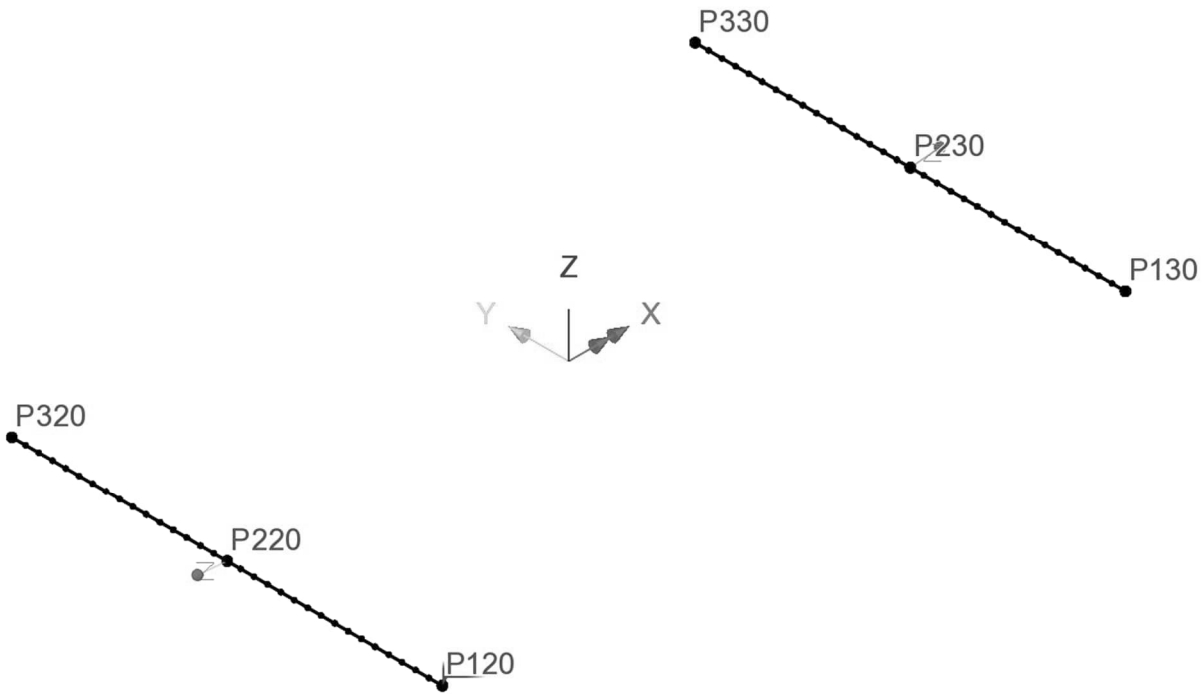


Bridge deck

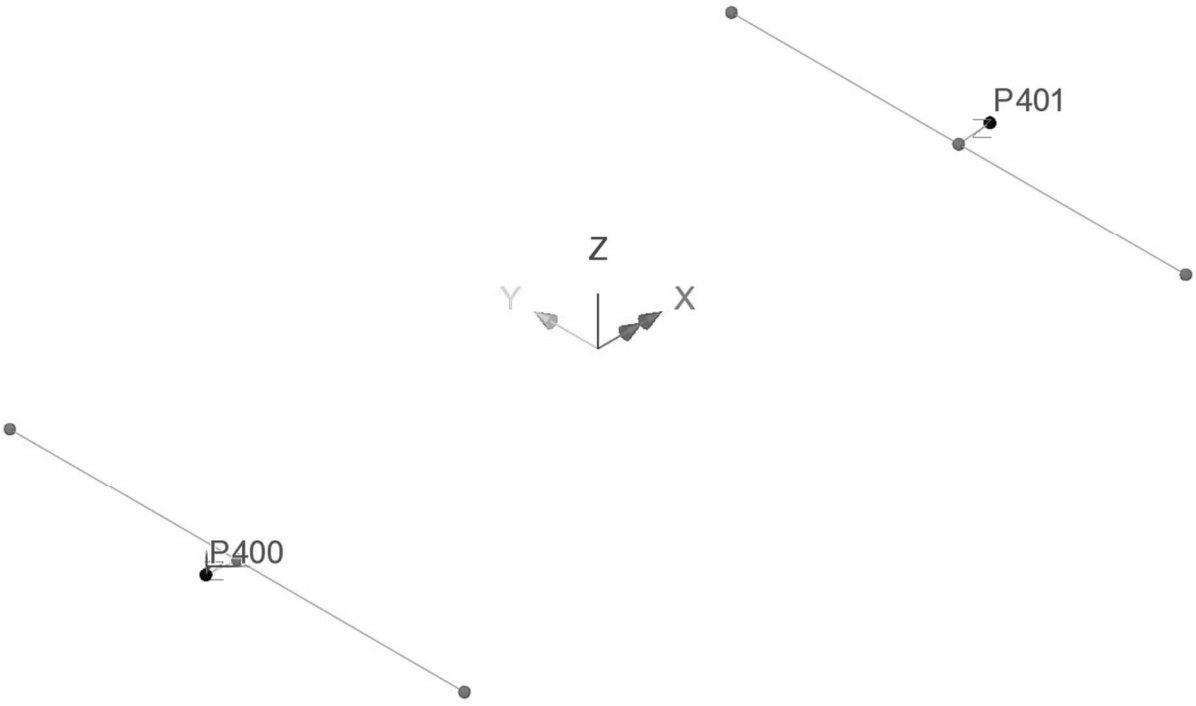




Link plate

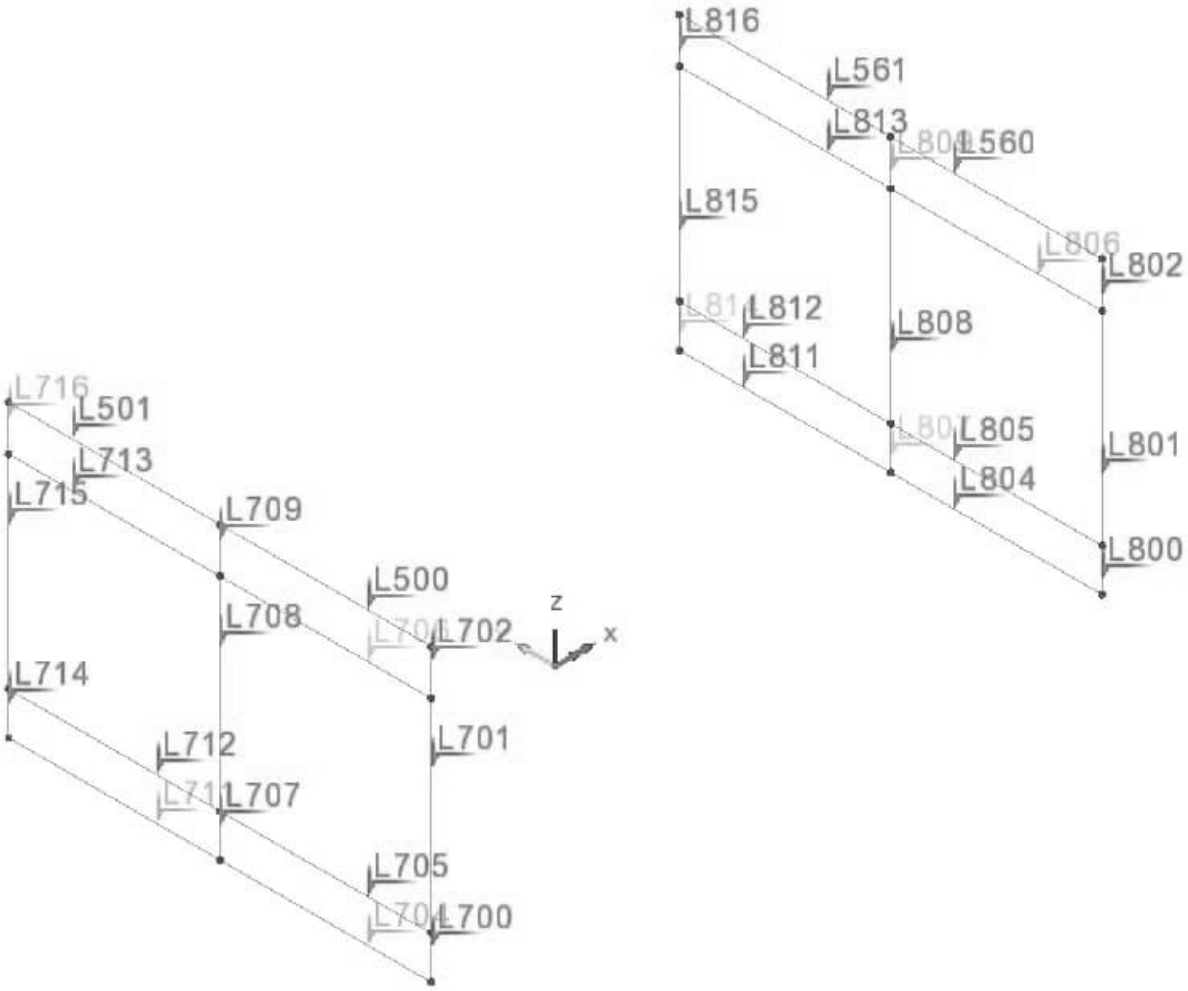


Fictious “rigid beam”

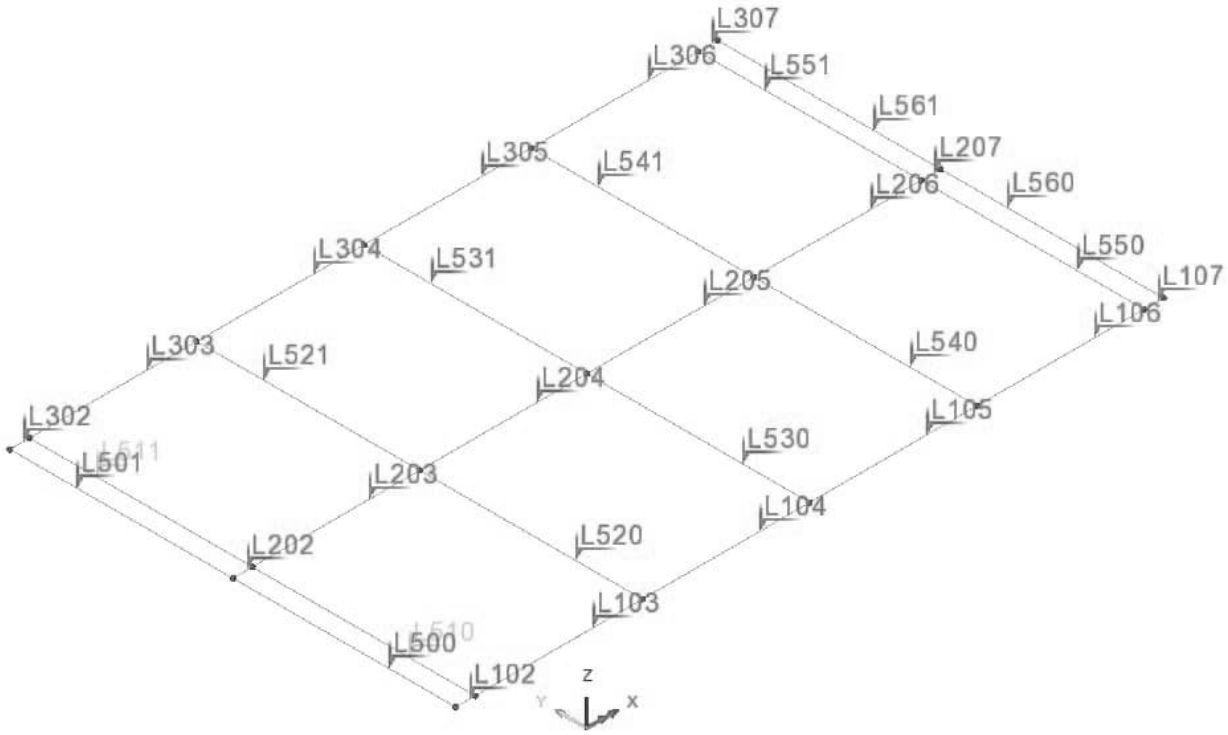


Fictious “super nodes”

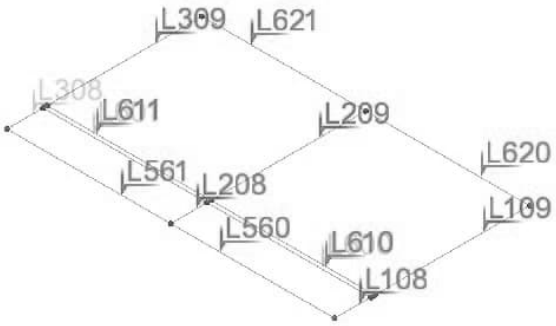
2.2.2 Geometry : LINES

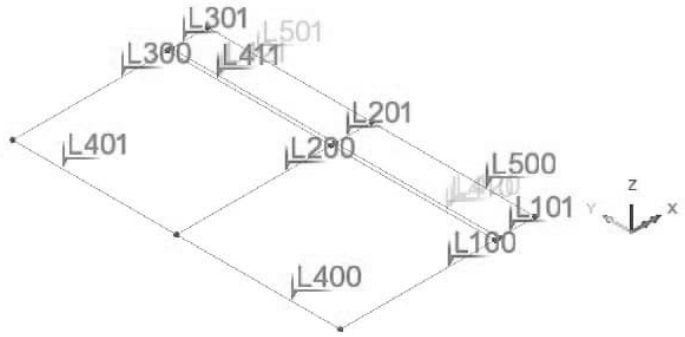


Abutment 1 & 2

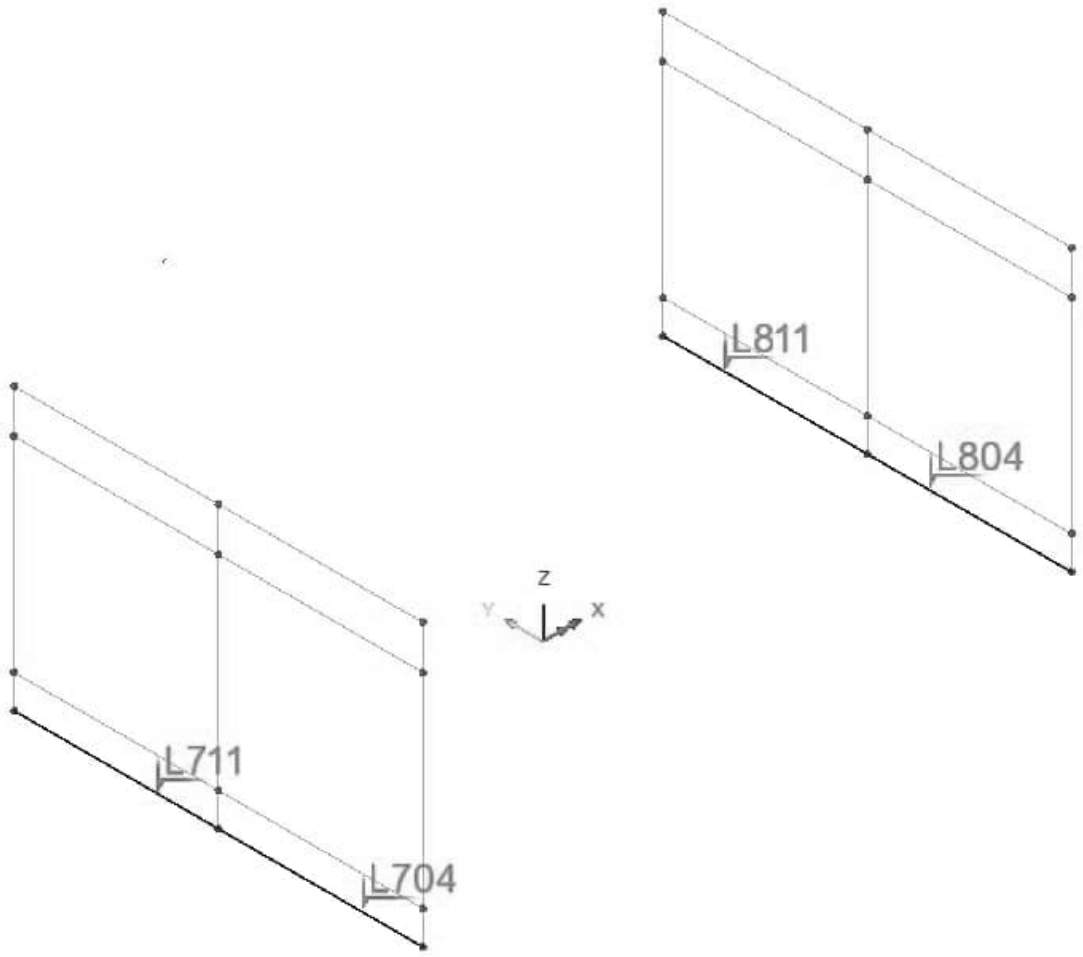


Bridge deck



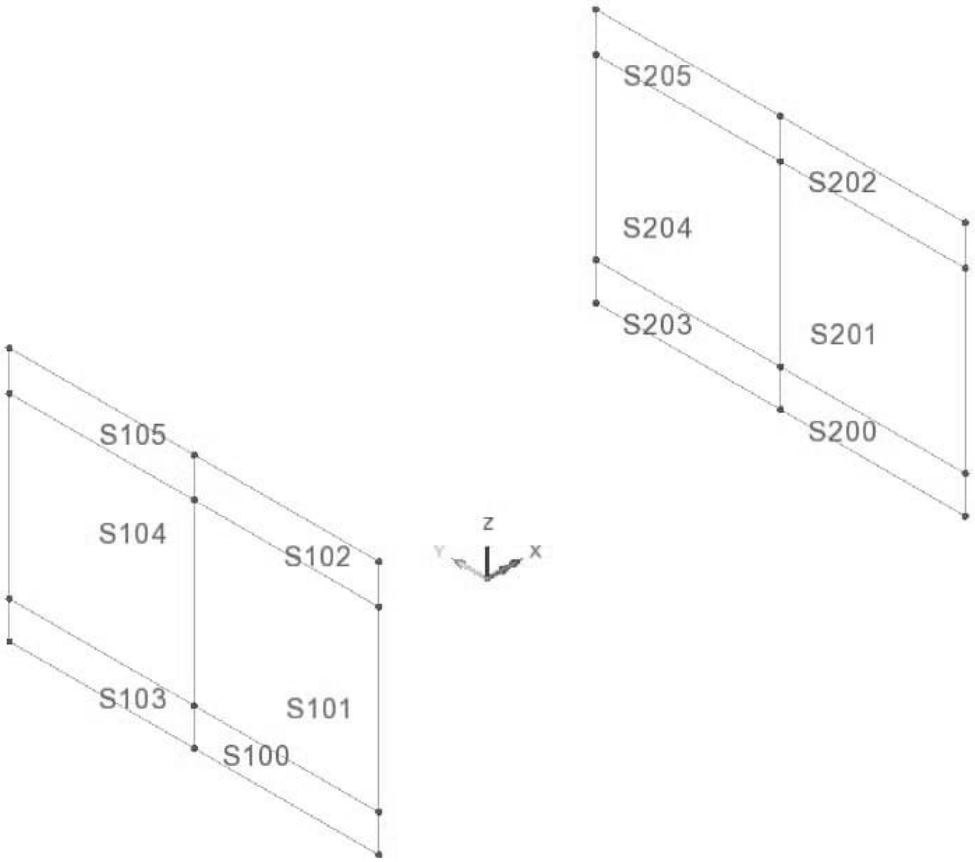


Link plates

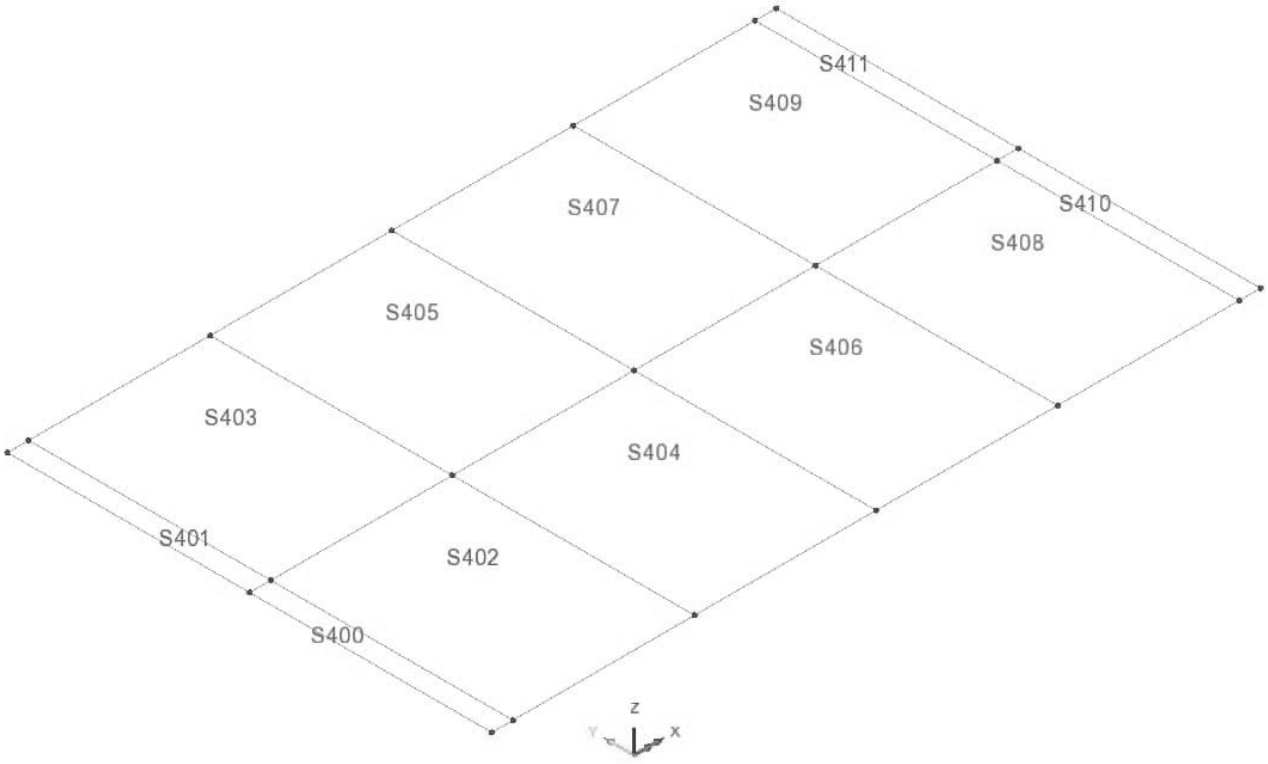


Fictious “rigid beam”

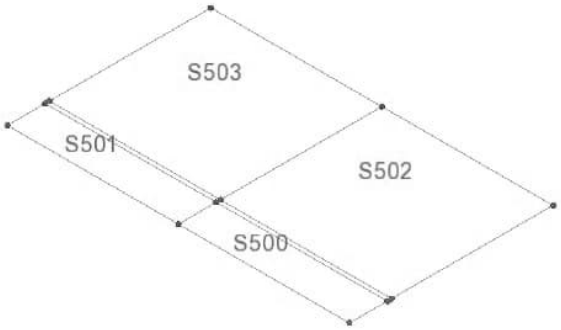
2.2.3 Geometri : SURFACES

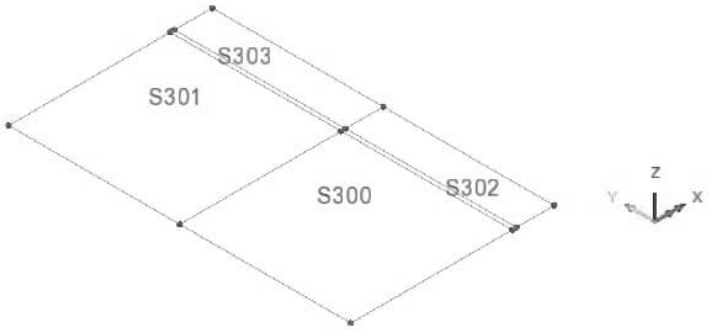


Abutemnent 1/2


S411
S409
S407
S410
S408
S405
S406
S403
S404
S401
S402
S400
z
x

Bridge deck

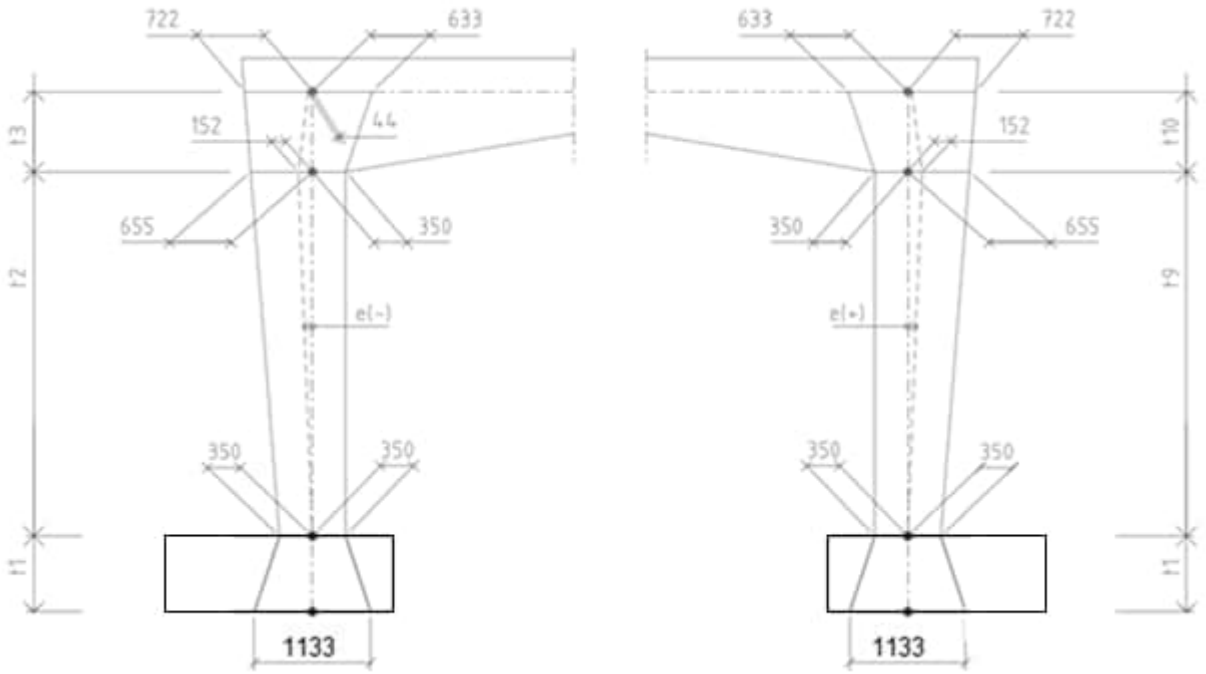




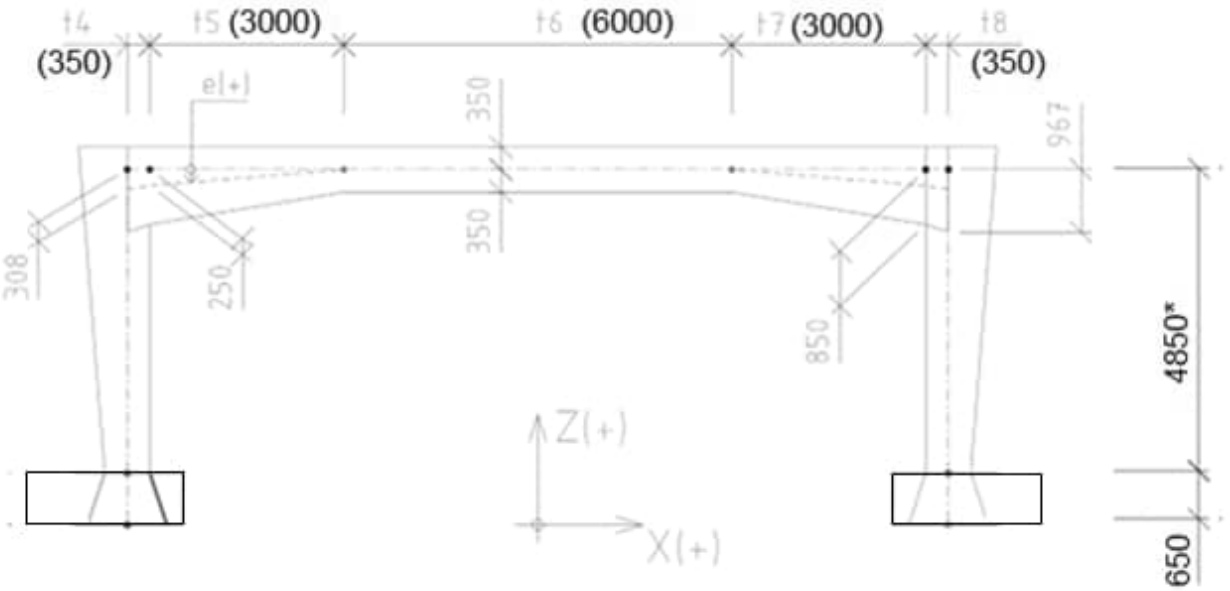
Link plate

2.3 CROSS SECTION PROPERTIES

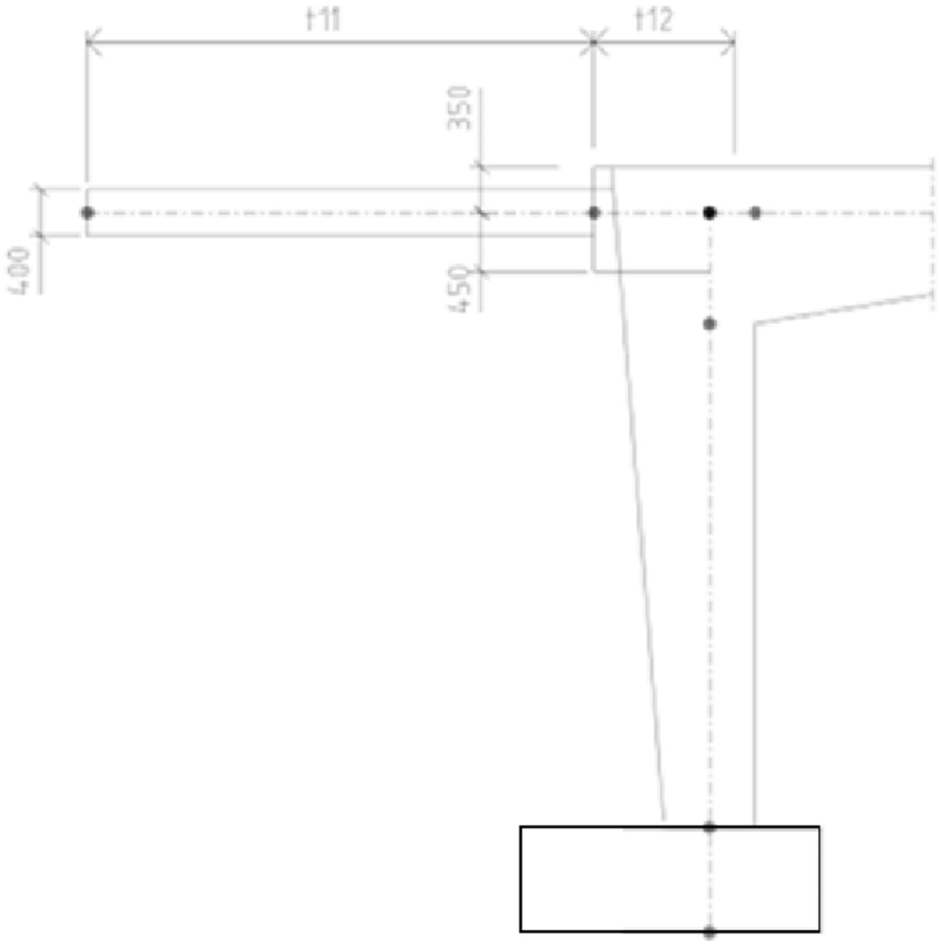
By experience stiffness increases by 1:3 at all joints as seen below.



Stöd 1/2



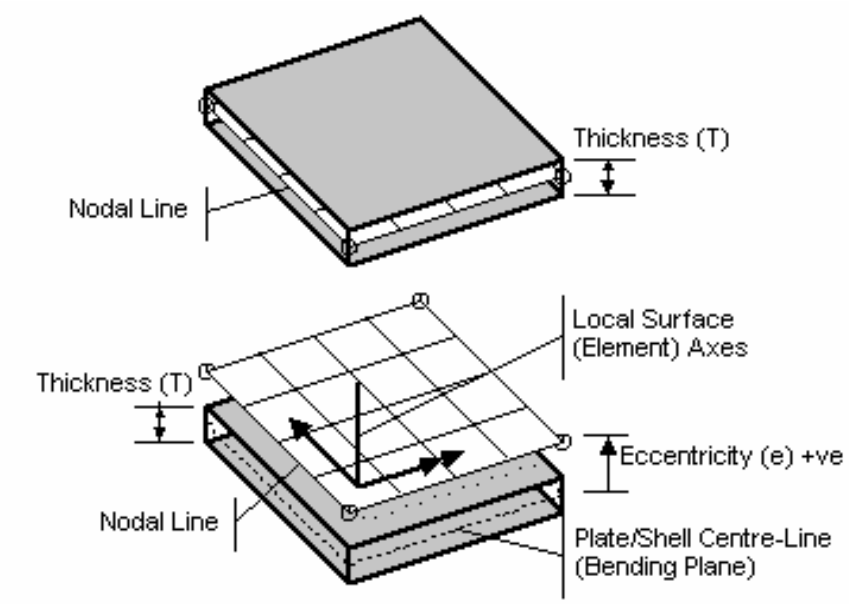
Bridge deck



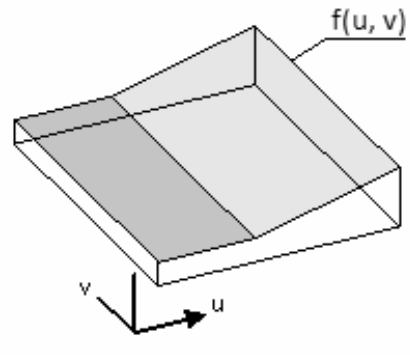
Link plate

2.3.1 Shell element

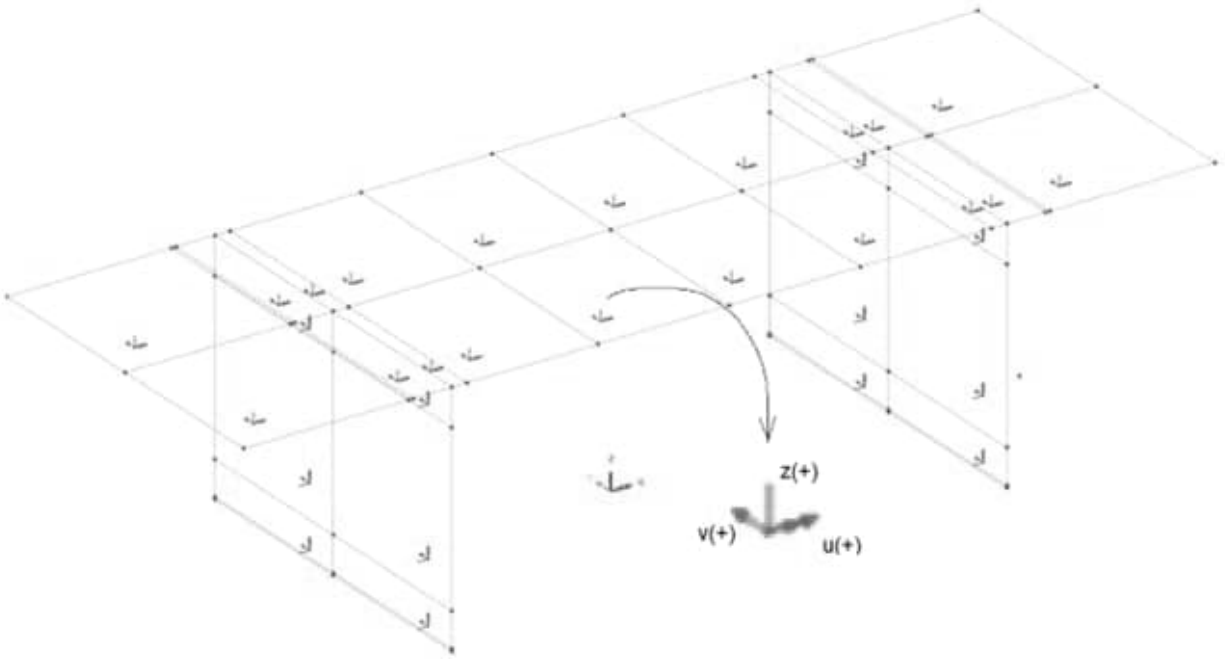
Principle figures of geometry associated to shell elements (”Thick shell” / QTS4) are seen below.



Varying thickness in shell element is handled using ”Function variation”. This makes it possible to create a function f(u,v) as seen below.



Local coordinate system (u,v) according to sketch below:



Surface function thickness :

Variation	Function(u,v)	Remark
t1	1.133-0.433·u	Bottom slab at abutement 1 & 212
t2	0.700+0.305·u	Abutement 1
t3	1.005+0.350·u	Abutement 1 conection superstructure
t4	1.317-0.117·u	Superstructure connection abutment 1
t5	1.200-0.500·u	Superstructure inclination area left side
t7	0.700+0.500·u	Superstructure inclination area right side
t8	1.200+0.117·u	Superstructure connection abutment 2
t9	0.700+0.305·u	Abutment 2
t10	1.005+0.350·u	Abutment 2 connection superstructure
-	m	-

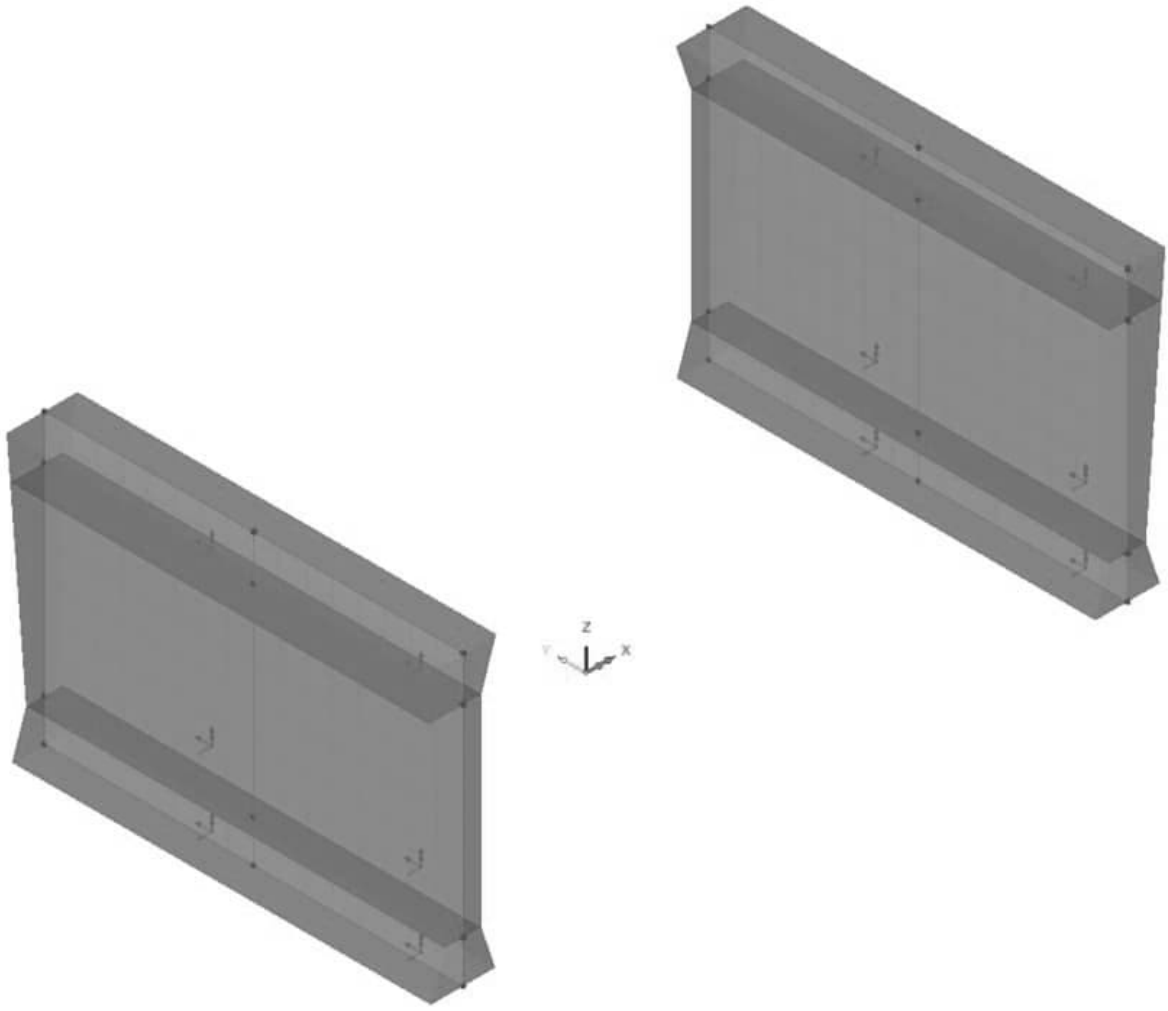
Surface function excentrisity :

Variation	Function(u,v)	Remark
e2	-0.152·u	Abutement 1
e3	-0.152+0.108·u	Abutement 1 conection superstructure
e4	0.308-0.058·u	Superstructure connection abutment 1
e5	0.250-0.250·u	Superstructure inclination area left side
e7	0.250·u	Superstructure inclination area right side
e8	0.250+0.058·u	Superstructure connection abutment 2
e9	0.152·u	Abutment 2
e10	0.152-0.108·u	Abutment 2 connection superstructure
-	m	-

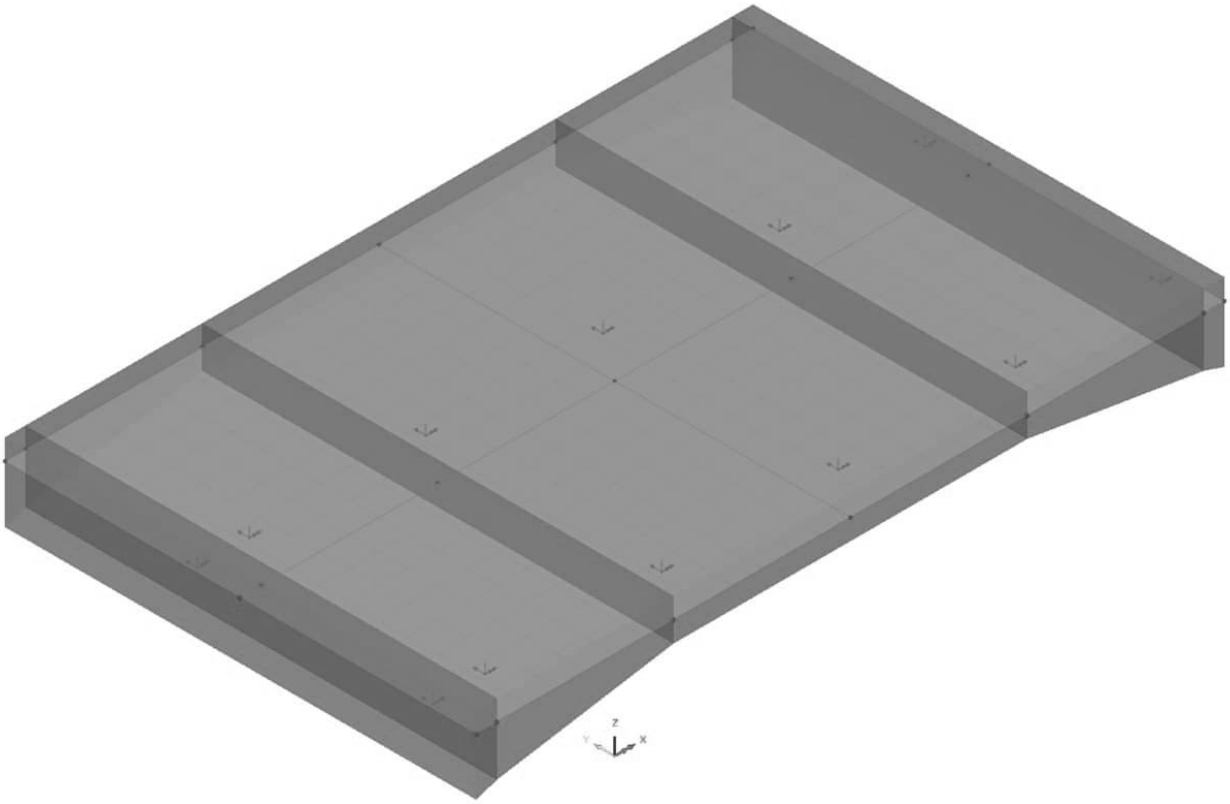
Surface geometry :

Attribute	t	ez	Remark
t1	*t1*	0	Bottomslab
t2	*t2*	e2	Abutement 1
t3	*t3*	e3	Abutement 1 conection superstructure
t4	*t4*	*e4*	Superstructure connection abutment 1
t5	*t5*	e5	Superstructure inclination area left side
t6	*t6*	*0*	Superstructure
t7	*t7*	e7	Superstructure inclination area left side
t8	*t8*	*e8*	Superstructure connection abutment 2
t9	*t9*	e9	Abutment 2
t10	*t10*	*e10*	Abutment 2 connection superstructure
t11	*0.400*	*0*	Linkplate
t12	*0.800*	*0*	Support area linkplate
-	m	m	-

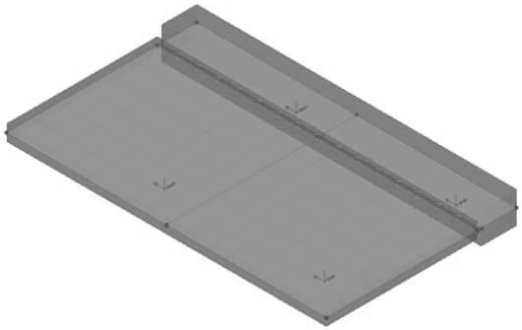
Abutment 1/2 :



Superstructure:

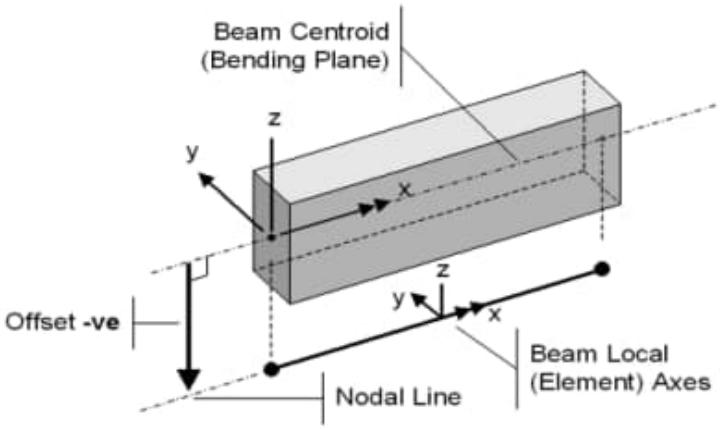


Link plates:

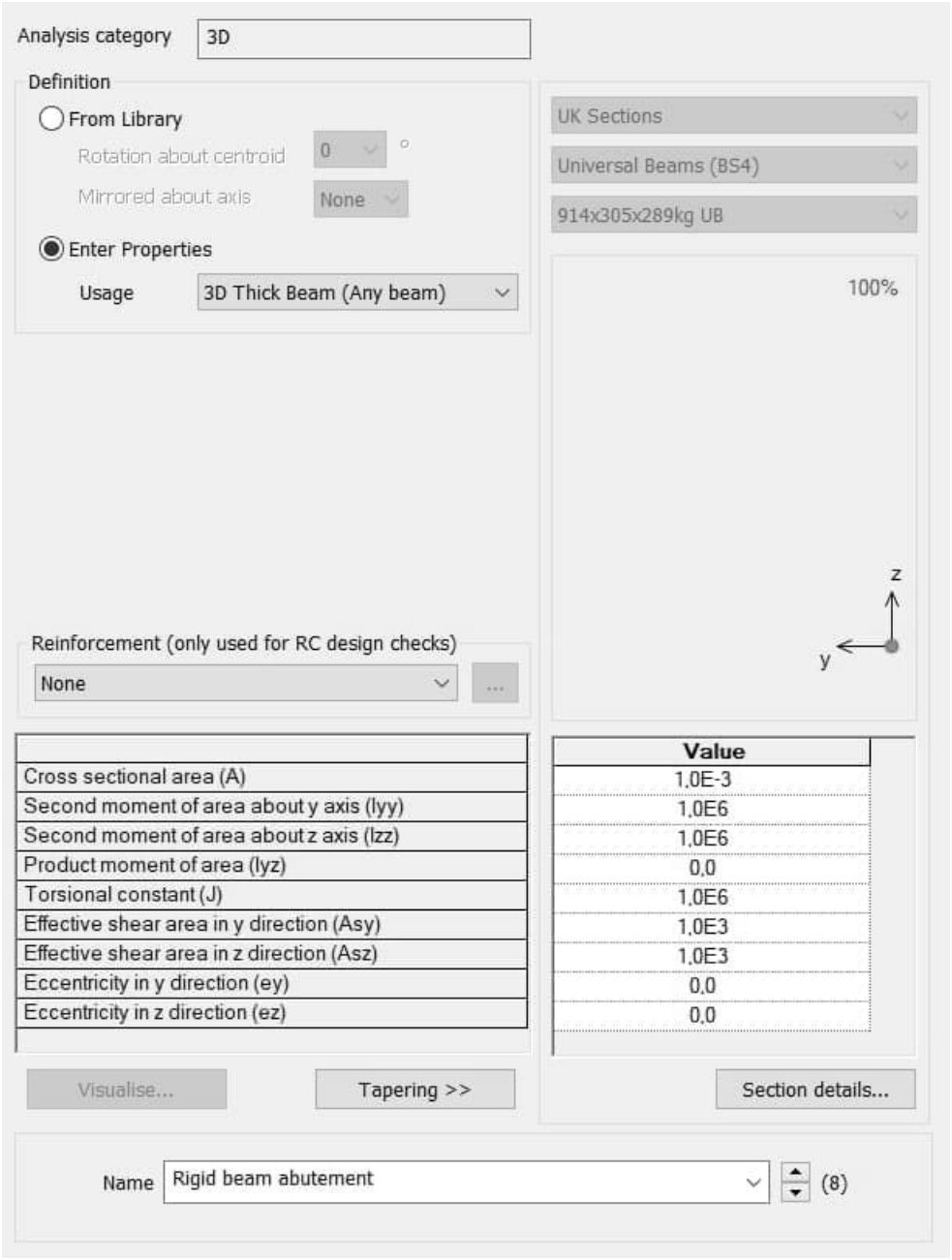


2.3.2 3D-beams (”Thick beam” / BMS3)

Principal sketch of geometry associated to 3D beam elements are seen below.



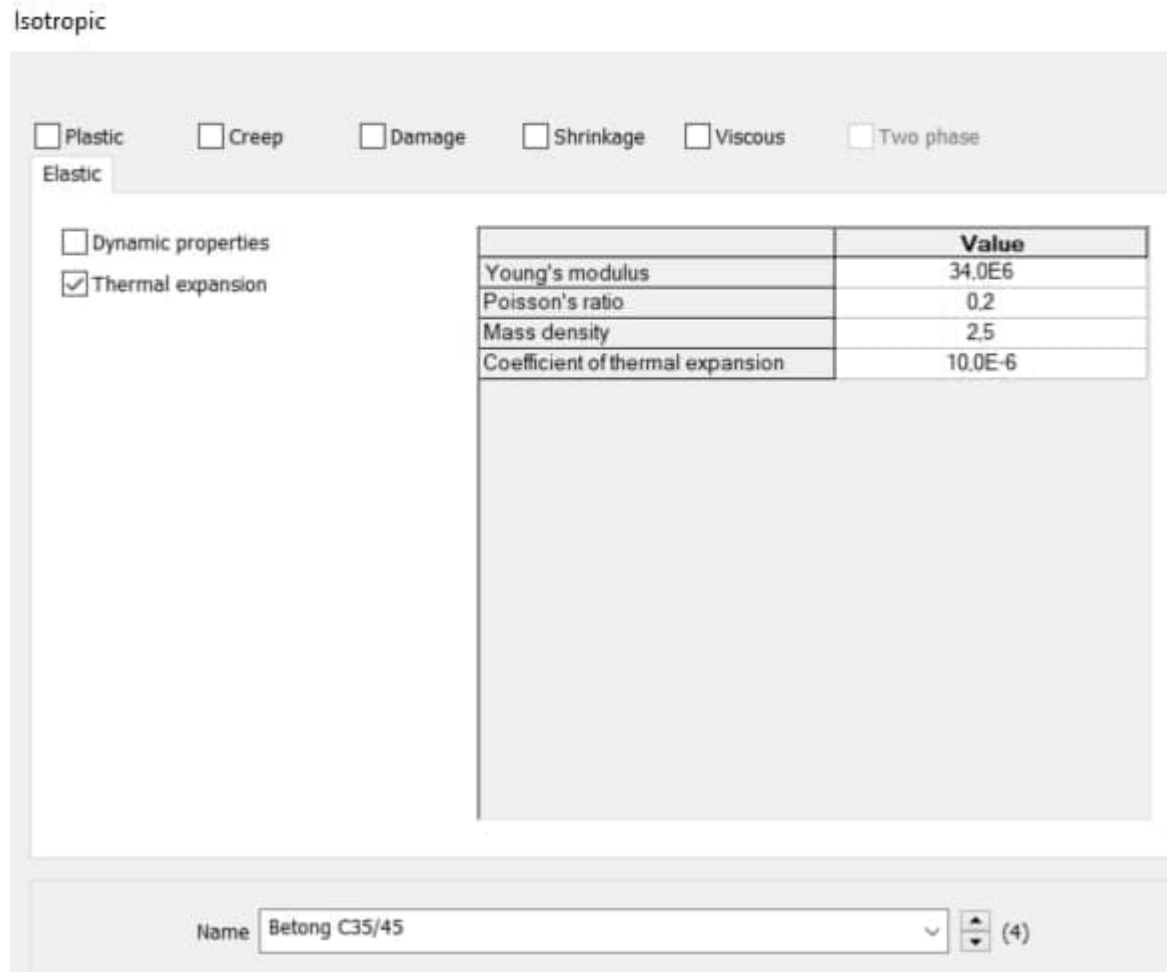
A fictive rigid beam is introduced at bottom of each abutment. The beam has infinite stiffness in all direction apart from axial direction. In this direction stiffness is negligible.



2.4 MATERIAL

Material properties seen below are to be used for all parts.

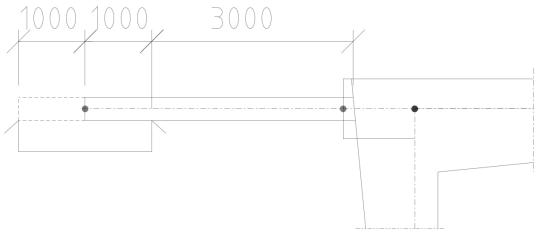
Substructure C35/45 : E_{cm} = 34 GPa

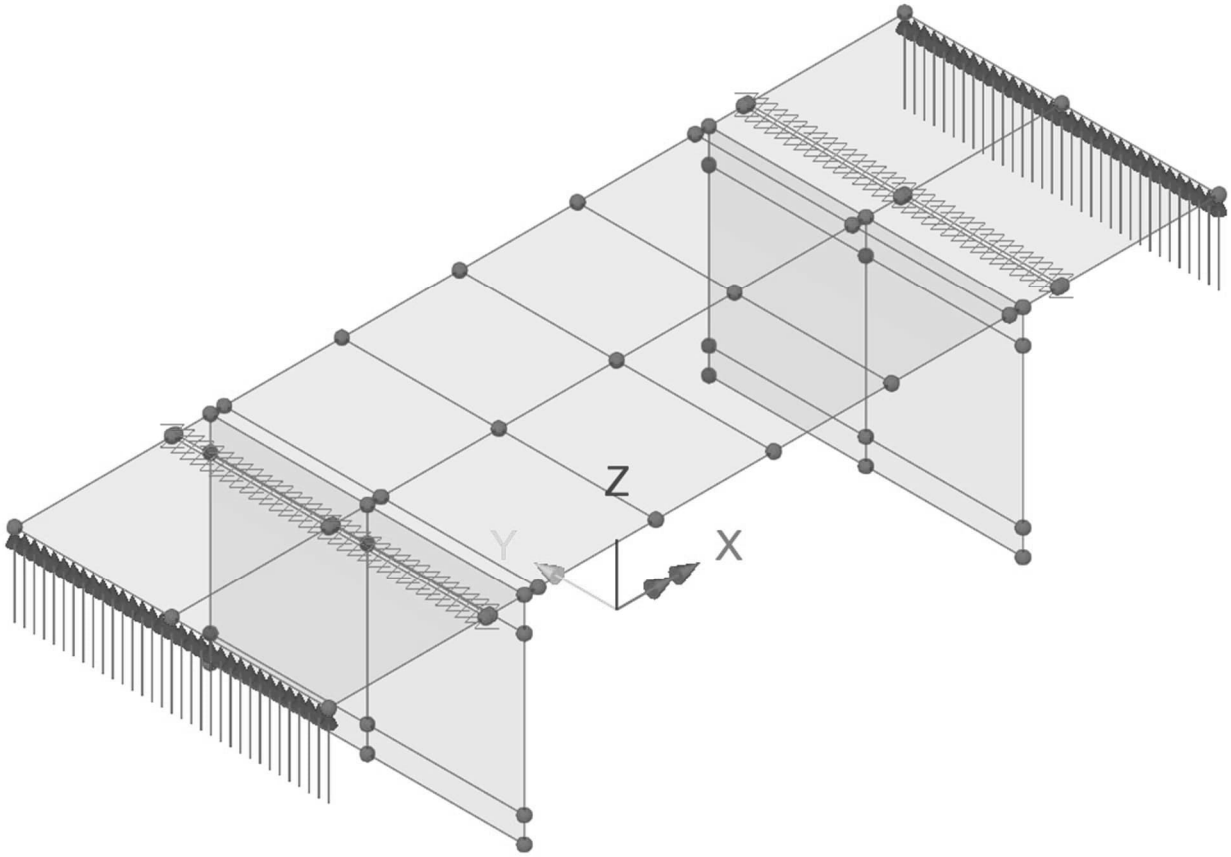


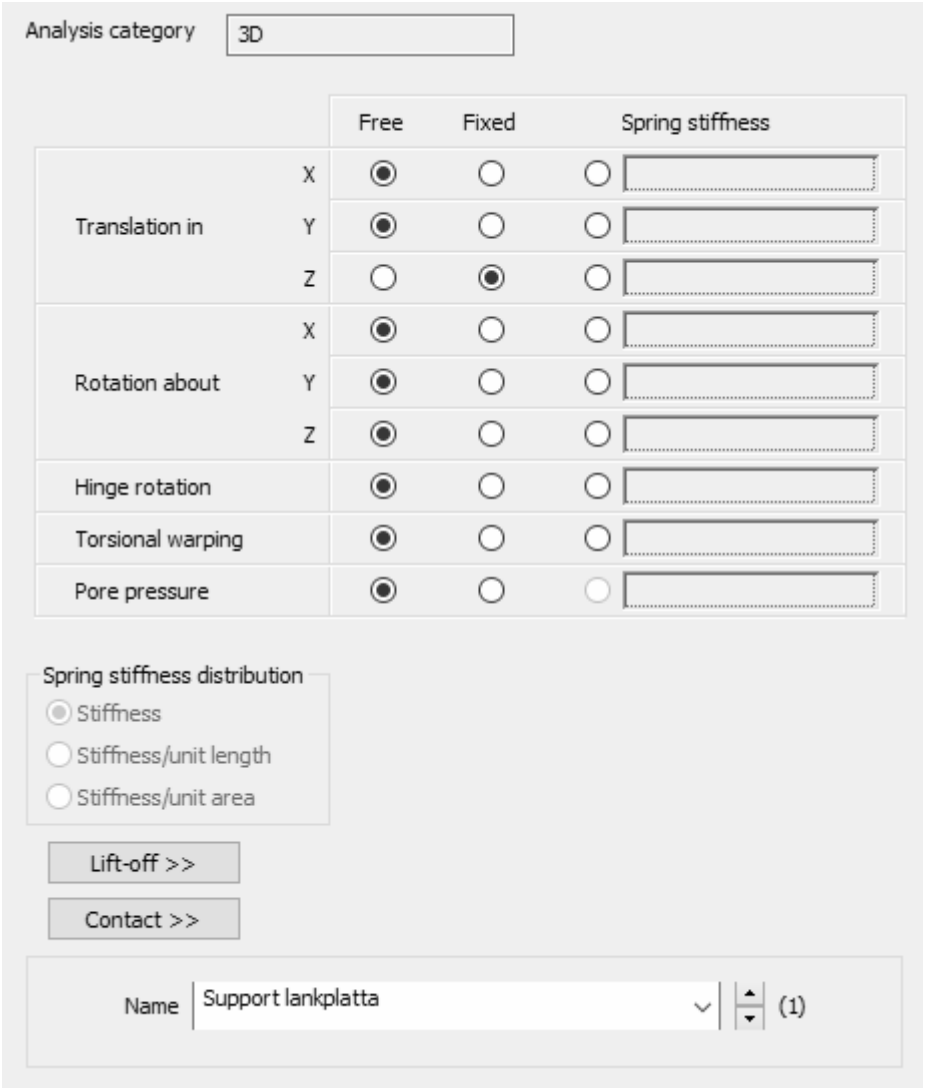
2.5 BOUNDARY CONDITIONS

2.5.1 Boundary conditions link slab

At a distance 1 m from edge of link slab att fictive line support is added in z-direction.



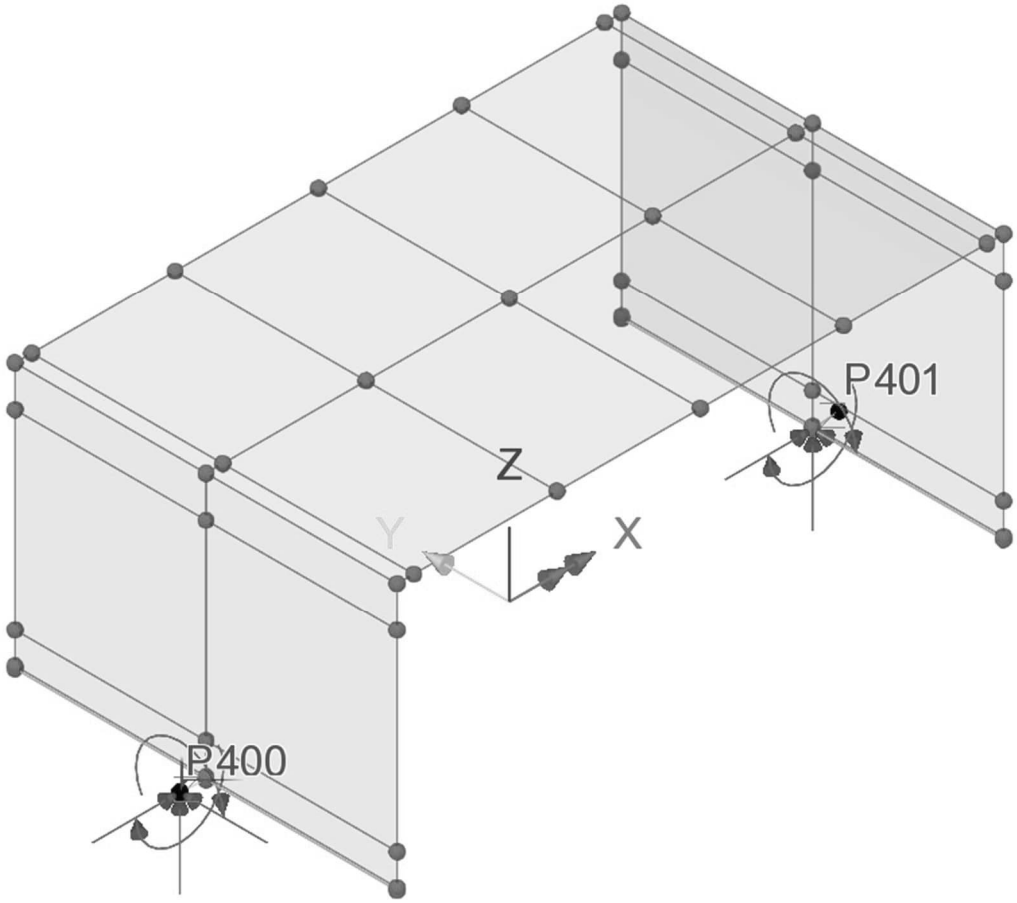



Analysis category
3D
Free
Fixed
Spring stiffness
Translation in
X
Y
Z
Rotation about
X
Y
Z
Hinge rotation
Torsional warping
Pore pressure
Spring stiffness distribution
Stiffness
Stiffness/unit length
Stiffness/unit area
Lift-off >>
Contact >>
Name
Support lankplatta
(1)

2.5.2 Boundary conditions abutments

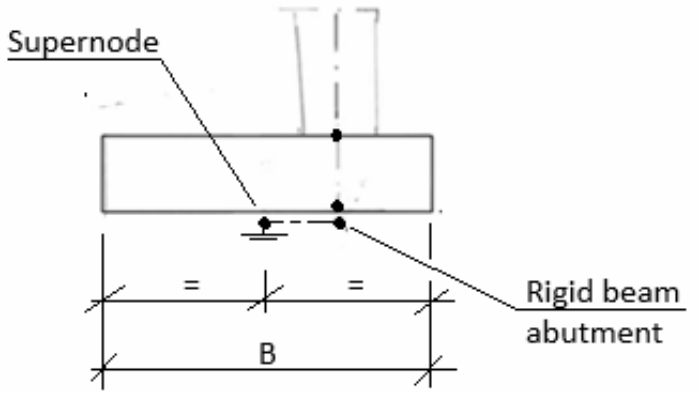
Boundary conditions for each support is modelled using super nodes.

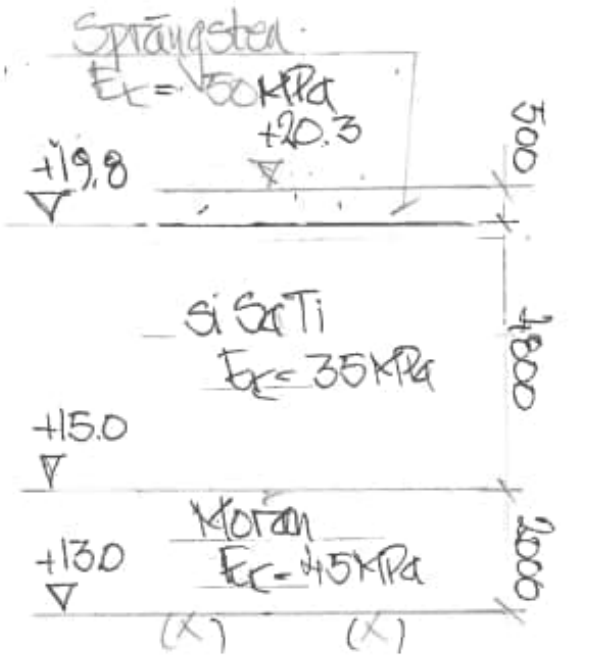
The super nodes are location at centre of rigid beam abutment, see sketches below.



Rotational stiffness of foundation is determined using software PROG G3.005.

Since the distance to solid ground (H) is less than twice the width of the bottom plate (2B), the method according to TRVINFRA-00227 appendix B5.1 since H > 2B.





Stiffness transversal direction (Rotation X-X) :

K_{Rx} = 678000 $\frac{kNm}{rad}$: page A2:33

Stiffness longitudinal direction (∴ Rotation Y-Y) :

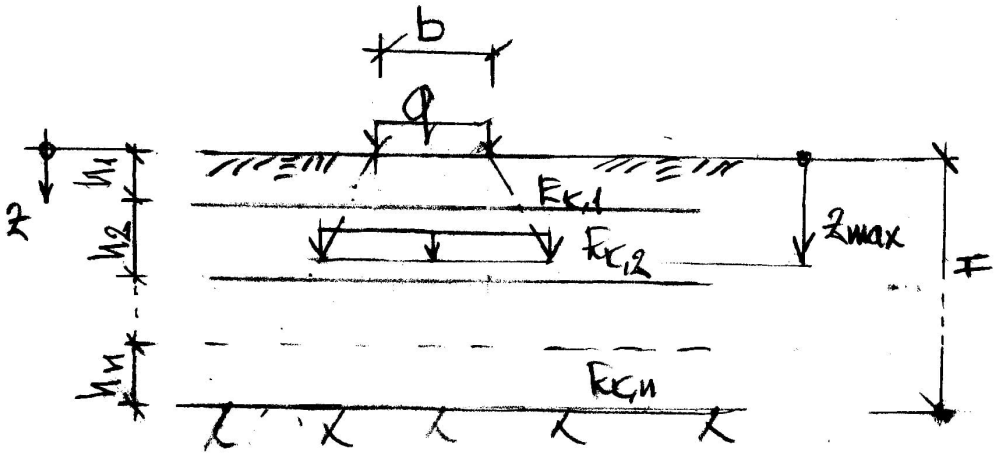
K_{Ry} = 136000 $\frac{kNm}{rad}$: page A2:33

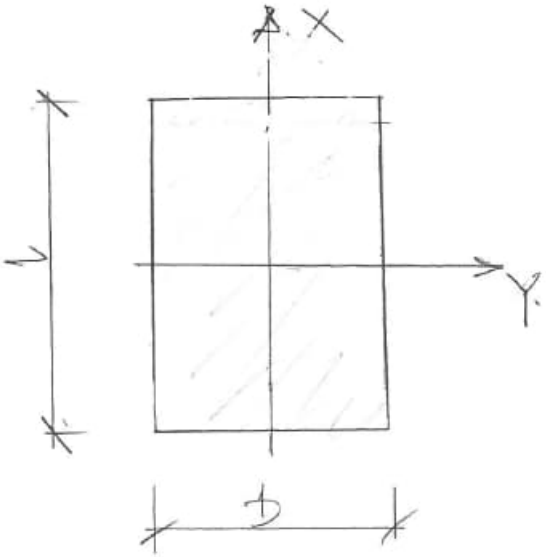
Object : Support 1/2

PRINCIPFIGUR

Geometri och undergrund

Beräkningen av ekivalent styvhet i grund är utförd enligt Råd Brobyggande bilaga 106. Den ekvivalenta E-modulen förutsätter lastspridning 2:1. Bestämningen har skett för en fiktiv lasten motsvarande q (= 100 kPa) .

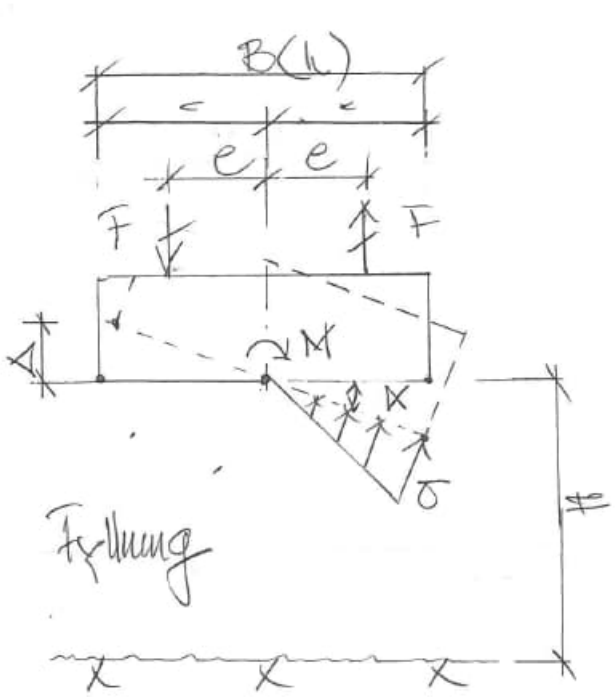




TEORI

När avståndet till fast botten är mindre än 2B så tilllämpas härled formel nedan som även förekommer i BH sida 594 (avsnitt 6.4:22 Beräkningsmodell).

När avstånd till fast botten är större än 2B tillämpas Råd Brobyggnade bilaga 107.



$$\Delta = \alpha \cdot \frac{B}{2} \; ; \qquad \varepsilon = \frac{\Delta}{H} = \frac{\alpha \cdot \frac{B}{2}}{H}$$

$$\sigma = \varepsilon \cdot E'_k = \frac{E'_k \cdot \alpha \cdot B}{2 \cdot H}$$

$$F = \sigma \cdot \frac{B}{2} \cdot \frac{1}{2} \cdot L = \frac{E'_k \cdot \alpha \cdot B}{2 \cdot H} \cdot \frac{B \cdot L}{4} = \frac{E'_k \cdot \alpha \cdot B^2 \cdot L}{8 \cdot H}$$

$$M = F \cdot 2e \; ; \qquad e = \frac{B}{3} \; ;$$

$$M = F \cdot \frac{2 \cdot B}{3} = \alpha \cdot \frac{L \cdot B^3 \cdot E'_k}{12 \cdot H}$$

$$\Rightarrow \frac{\alpha}{M} = \frac{12 \cdot H}{L \cdot B^3 \cdot E'_k}$$

INDATA

Geometri

Bottenplatta : $b = 2.8m$ $l = 8.5m$

Underliggande jordmaterial

Antal skikt (minst 2 skickt erfordras): $n = 3st$

Skikt	E_k	h
1	50	0,50
2	35	4,80
3	45	2,00
-	MPa	m

BERÄKNINGAR

Total skikttjocklek

$$H = \sum_{i=1}^{n} h_i \qquad H = 7.3\,m$$

Sättningsområde

$$z_{max} = \min(2 \cdot b, H) \qquad z_{max} = 3.4\,m$$

Nivåer för respektive skikt

$$z_S = \left| \begin{array}{l} \text{for } i \in 1..n \\ \quad \left| \begin{array}{l} z_{2 \cdot i} \leftarrow z_{2 \cdot i - 1} + h_i - 1mm \\ z_{2 \cdot i + 1} \leftarrow z_{2 \cdot i} + 1mm \end{array} \right. \\ z \end{array} \right.$$

$$z_S = (0.000 \quad 0.500 \quad 0.501 \quad 5.300 \quad 5.301 \quad 7.300 \quad 7.301)\,m$$

Funktion för sättningsmodul

$$E_{sk} := \left| \begin{array}{l} \text{for } i \in 1..n-1 \\ \quad \left| \begin{array}{l} E_{2\cdot i} \leftarrow E_{k_i} \\ E_{2\cdot i+1} \leftarrow E_{k_{i+1}} \end{array} \right. \\ E \end{array} \right.$$

$E_{sk} = (50 \;\; 50 \;\; 35 \;\; 35 \;\; 45 \;\; 45 \;\; 1000)\cdot MPa$

$E_k := \text{linterp}(z_s, E_{sk}, z)$

Påkänningar enligt 2:1

$q = 100kPa$

$$\Delta\sigma_v = q\cdot\frac{b\cdot l}{(b+z)\cdot(l+z)}$$

Karakteristisk sättning

$$s_k = \int_{0m}^{H} \frac{\Delta\sigma_v}{E_k}\,dz \qquad s_k = 5.9\cdot mm$$

Ekvivalent sättningsmodul

$$E'_k = \frac{\int_{0m}^{z_{max}} \Delta\sigma_v\,dz}{s_k} \qquad E'_k = 28\cdot MPa$$

Funktion för styvhet grunden när H < 2B
(Se härledning avsnitt TEORI)

$$k_{\theta k}(B,L) = \frac{L\cdot B^3\cdot E'_k}{12H}$$

RESULTAT

Resultat då H < 2B :

Rotation kring plattans korta riktning (x-x riktning):

$$k_{\theta k}(b,l) = 13167 \cdot \frac{kNm}{rad}$$

$$C_{\phi} = \frac{1}{k_{\theta k}(b,l)} \qquad 10^{9} \cdot C_{\phi} = 75950 \cdot \frac{rad}{kNm}$$

Rotation kring plattans långa riktning (y-y riktning):

$$k_{\theta k}(l,b) = 329163 \cdot \frac{kNm}{rad}$$

$$C_{\eta} = \frac{1}{k_{\theta k}(l,b)} \qquad 10^{9} \cdot C_{\eta} = 3038 \cdot \frac{rad}{kNm}$$

Resultat då H > 2B :

Rotation kring plattans korta riktning (x-x riktning):

$$K_{\phi} = E'_{k} \cdot \frac{b^{2} \cdot l}{5} = 135692 \cdot \frac{kNm}{rad}$$

$$C_{\phi} = \frac{1}{K_{\phi}} \qquad 10^{6} \cdot C_{\phi} = 7.370 \cdot \frac{rad}{kNm}$$

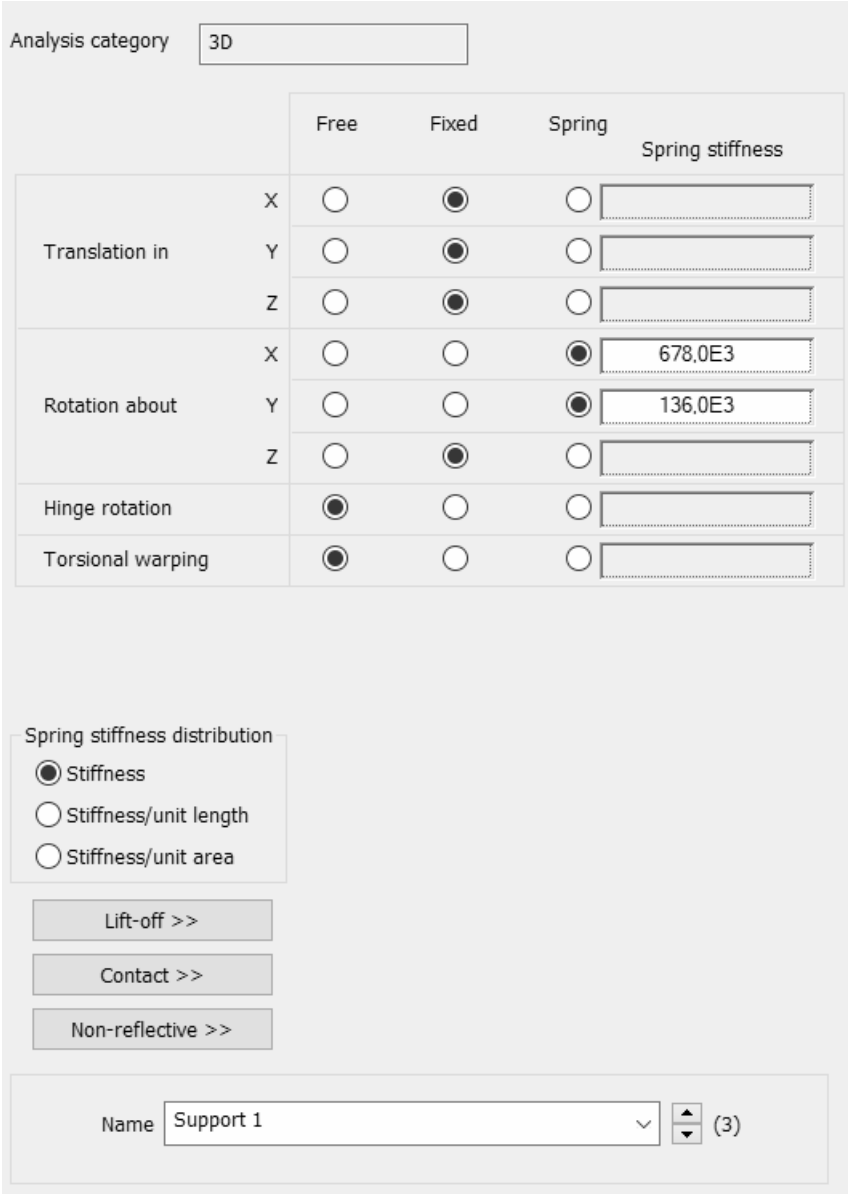
Rotation kring plattans långa riktning (y-y riktning):

$$K_{\eta} = E'_{k} \cdot \frac{l^{2} \cdot b}{5} = 678462 \cdot \frac{kNm}{rad}$$

$$C_{\eta} = \frac{1}{K_{\eta}} \qquad 10^{6} \cdot C_{\eta} = 1.474 \cdot \frac{rad}{kNm}$$

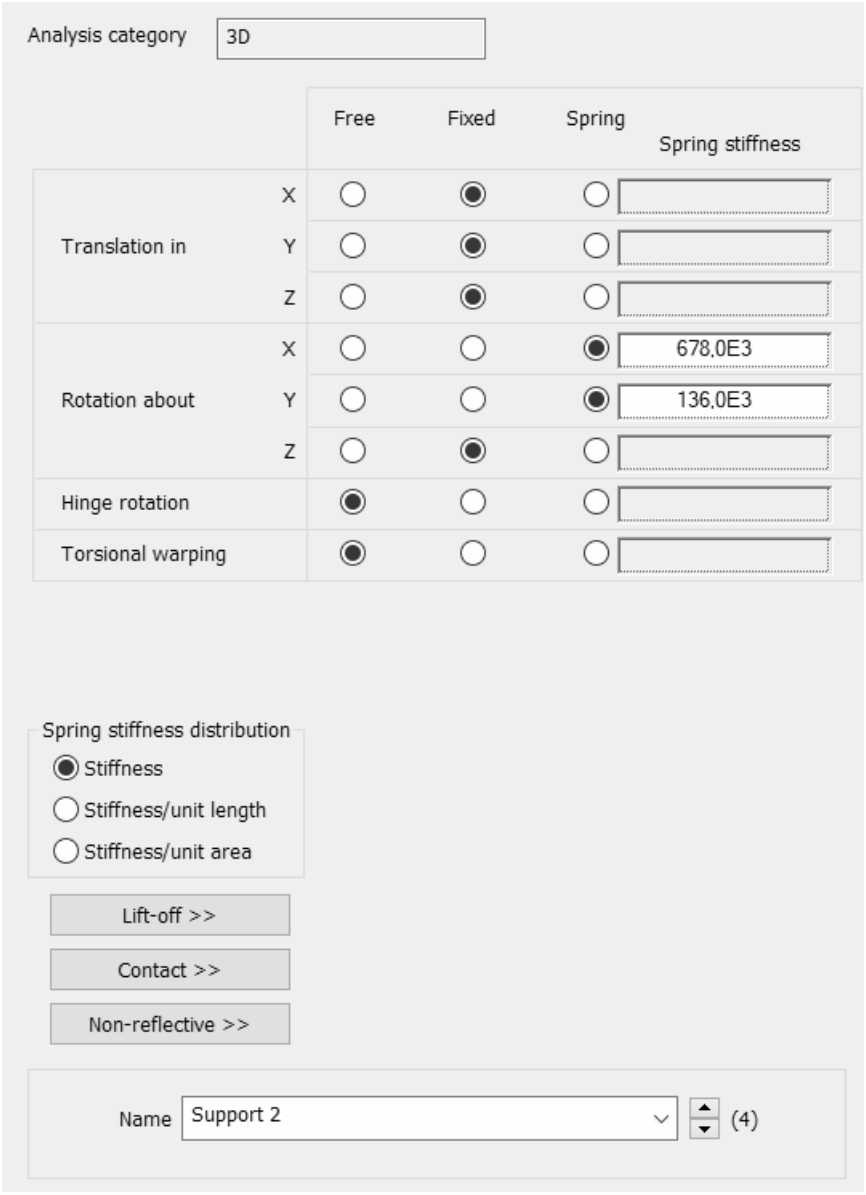
2.5.2.1 Boundary support 1

"Super node" at support 1 is modelled as seen below. This super node is termed point P221 in model of system analysis.



2.5.2.2 Boundary support 2

“Super node” at support 2 is modelled as seen below. This super node is termed point P231 in model of system analysis.



2.6 MESH

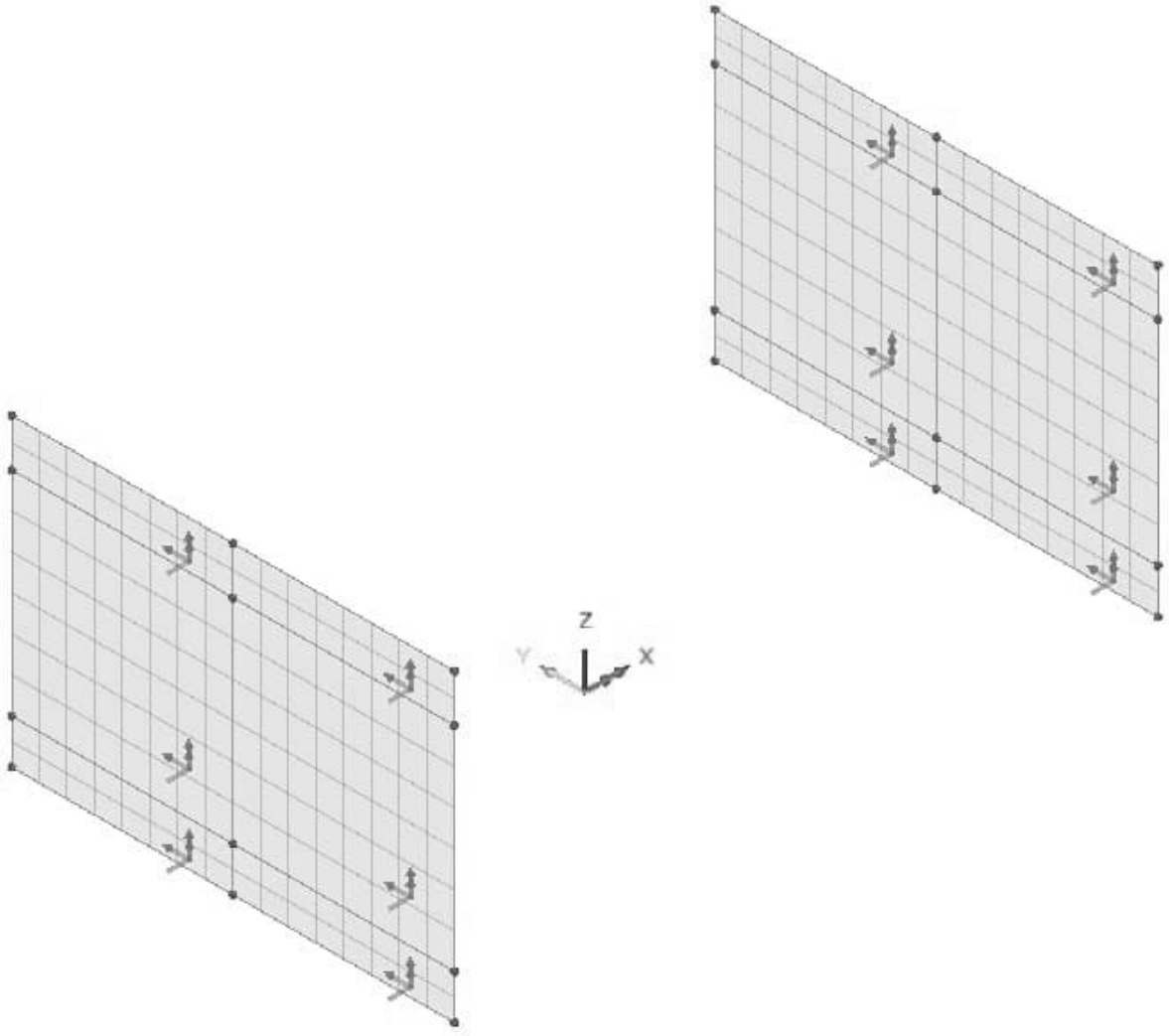
2.6.1 Shell element (QTS8): linear

Bridge is modelled using shell elements.

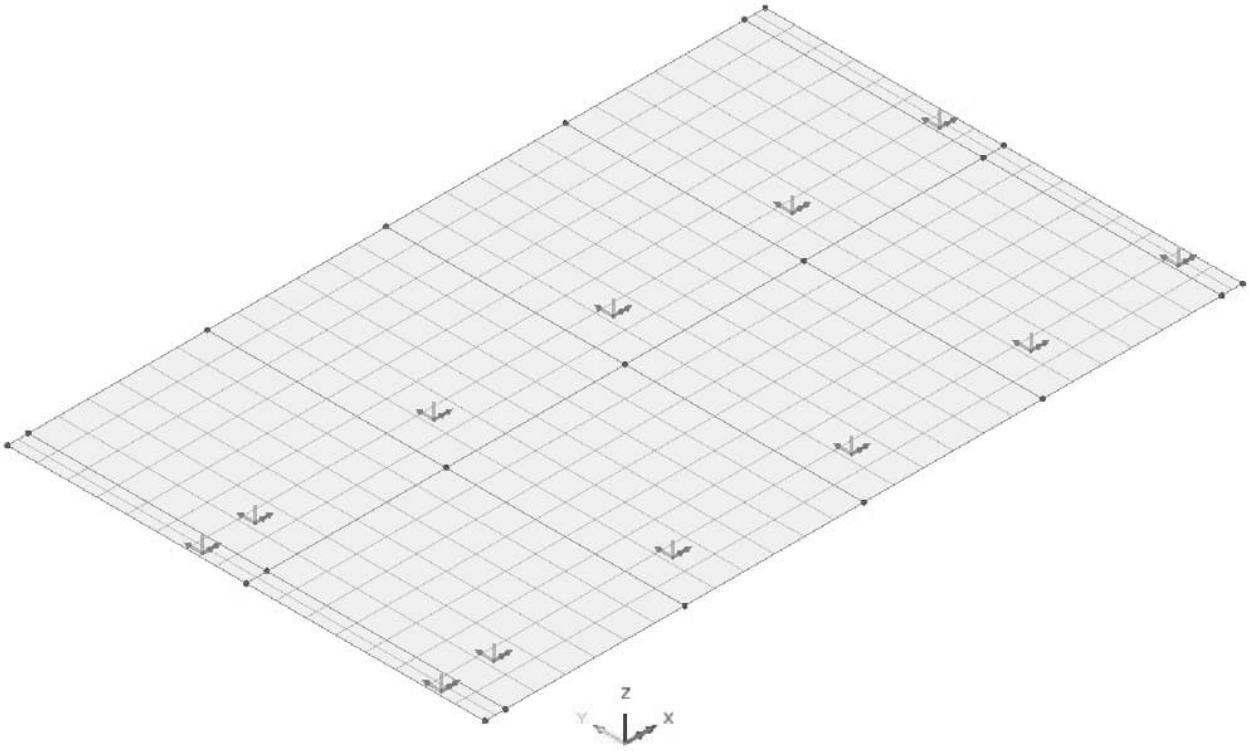
High node elements are chosen (”Thick shell” / QTS8) to limit the number of elements while maintaining accuracy.

Type	x-divisions	y-divisions
Element 2 x 8	2	8
Element 6 x 8	6	8

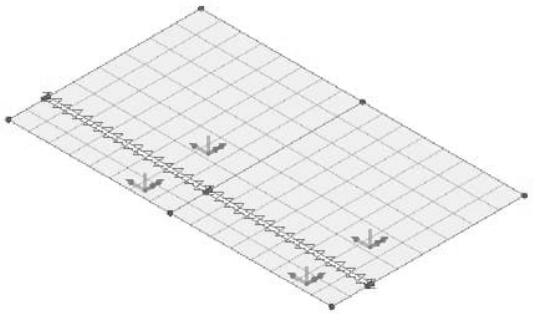
Abutment 1 & 2:

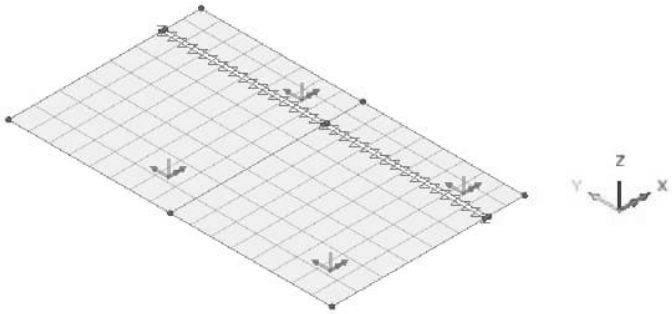


Bridge deck:



Linkplates :



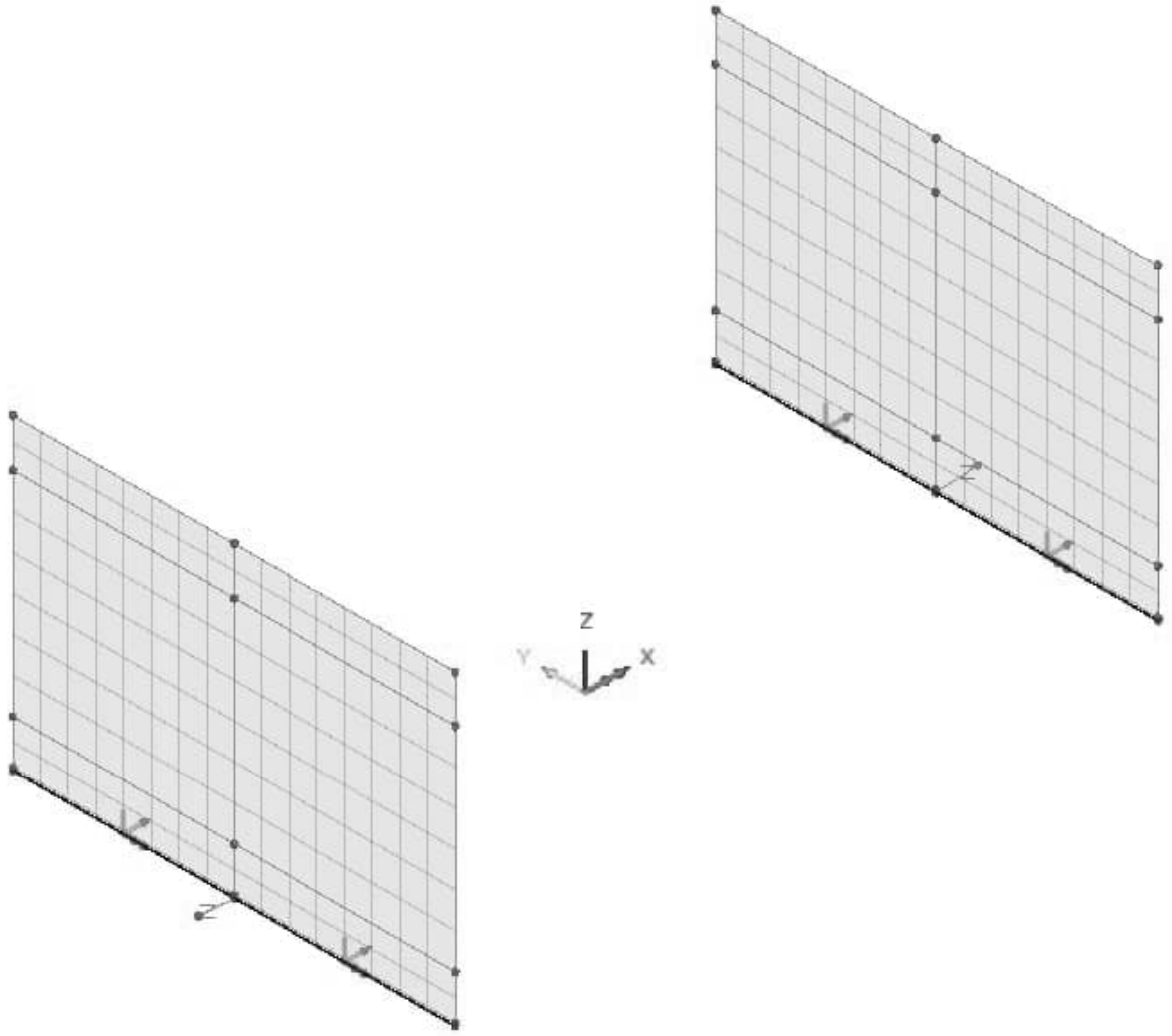


2.6.2 Beam element (BMI21) : linear

Studied bridge uses beam elements (" Beam element" / BMI21) for support beam.

Type	Divisions	End release: Start	End release: End	Structure
Element 8	8	None	None	Rigid support beam

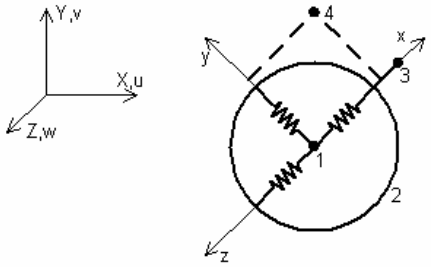
Rigid beam :



2.6.3 Joint element for between features (JNT4) : No rotational stiffness

Connection between link slab & superstructure is of type joint element, see presentation below. The joint uses no rotational stiffness in order achieve a hinge.

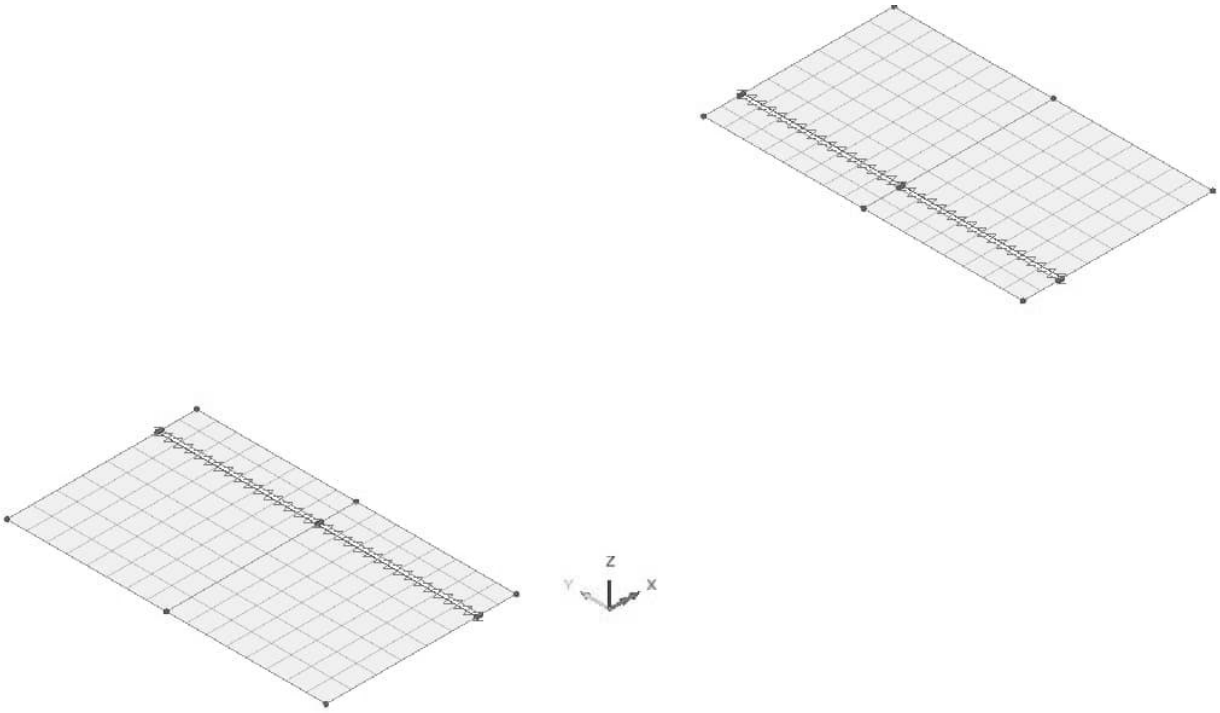
Element Name	**JNT4**



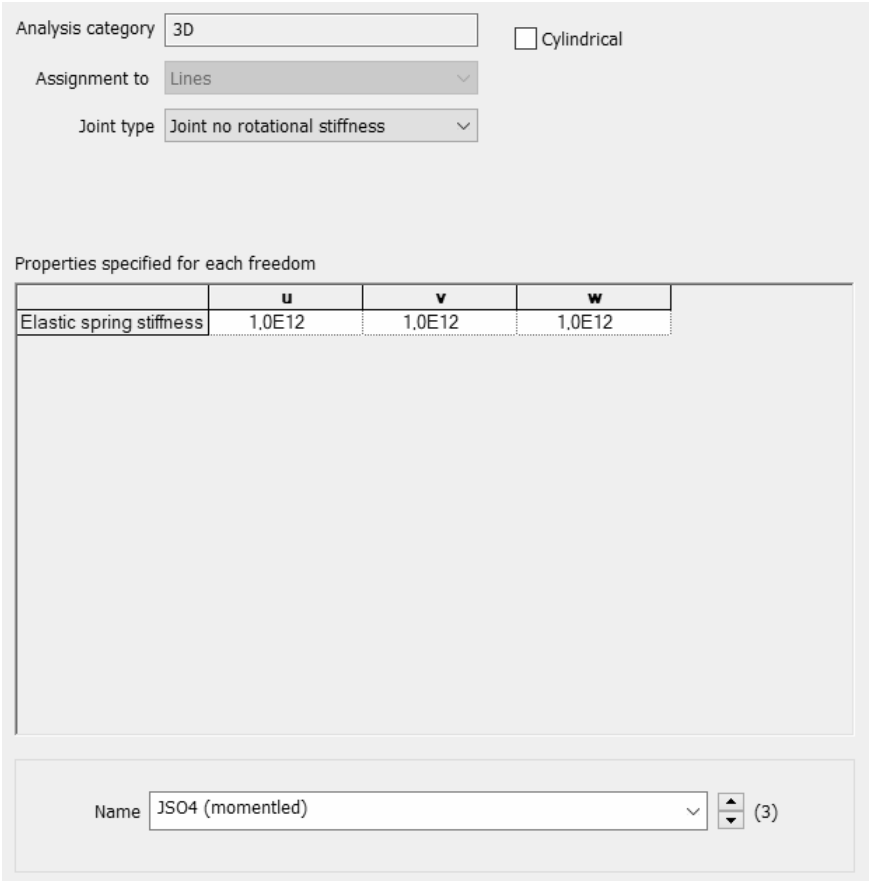
Element Group	Joints
Element Subgroup	3D Joints
Element Description	A 3D joint element which connects two nodes by three springs in the local x, y and z-directions.
Number Of Nodes	4. The 3rd and 4th nodes are used to define the local x-axis and local xy-plane.
Freedoms	U, V, W: at nodes 1 and 2 (active nodes).
Node Coordinates	X, Y, Z: at each node.

Link plate is termed *Master* while ridge deck is termed *Slave.*

Overview:



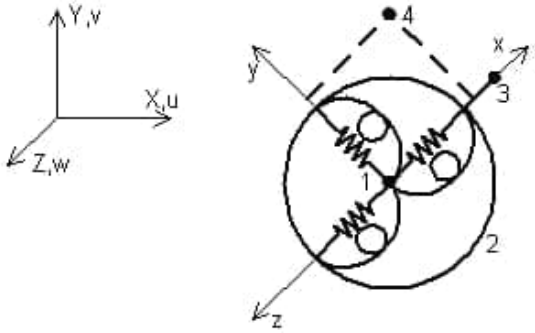
Joint material:



2.6.4 Joint point element for beams (JSH4)

Connection between link slab & superstructure is of type joint element, see presentation below. The joint uses no rotational stiffness in order achieve a hinge.

Element Name	**JSH4, JL46**



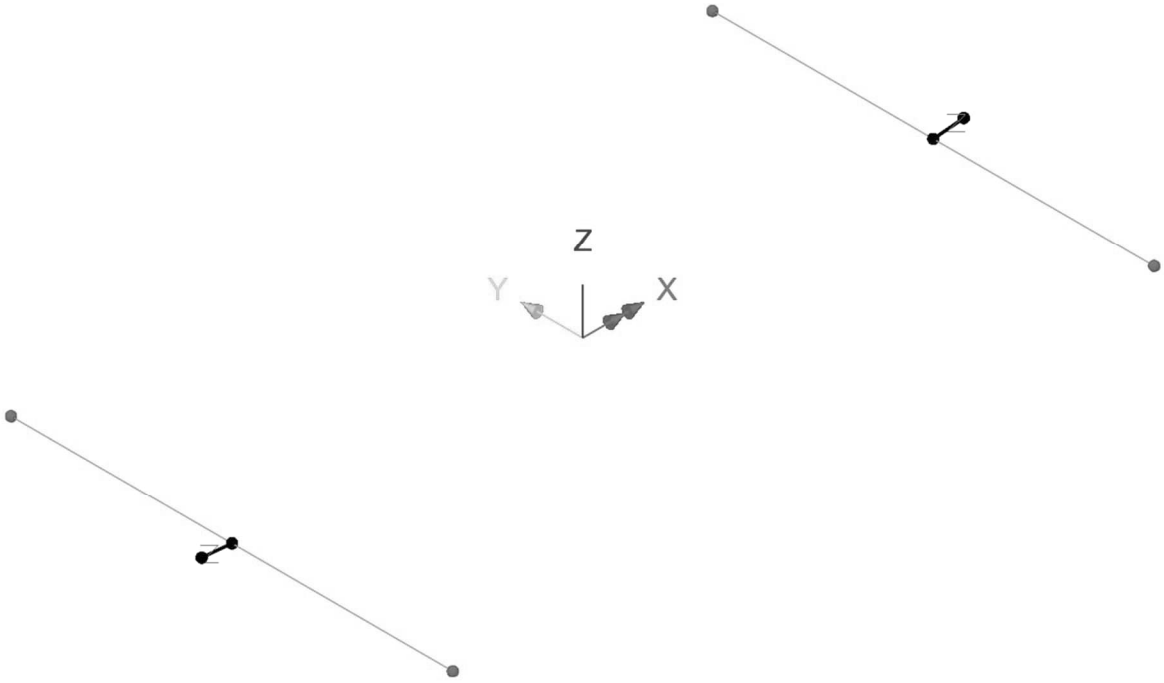
Element Group	Joints
Element Subgroup	3D Joints
Element Description	3D joint elements which connects two nodes by six springs in the local x, y and z-directions.
Number Of Nodes	4. The 3rd and 4th nodes are used to define the local x-axis and local xy-plane respectively.
Freedoms	U, V, W, θx, θy, θz: at nodes 1 and 2 (active nodes).
Node Coordinates	X, Y, Z: at each node.

Geometric Properties

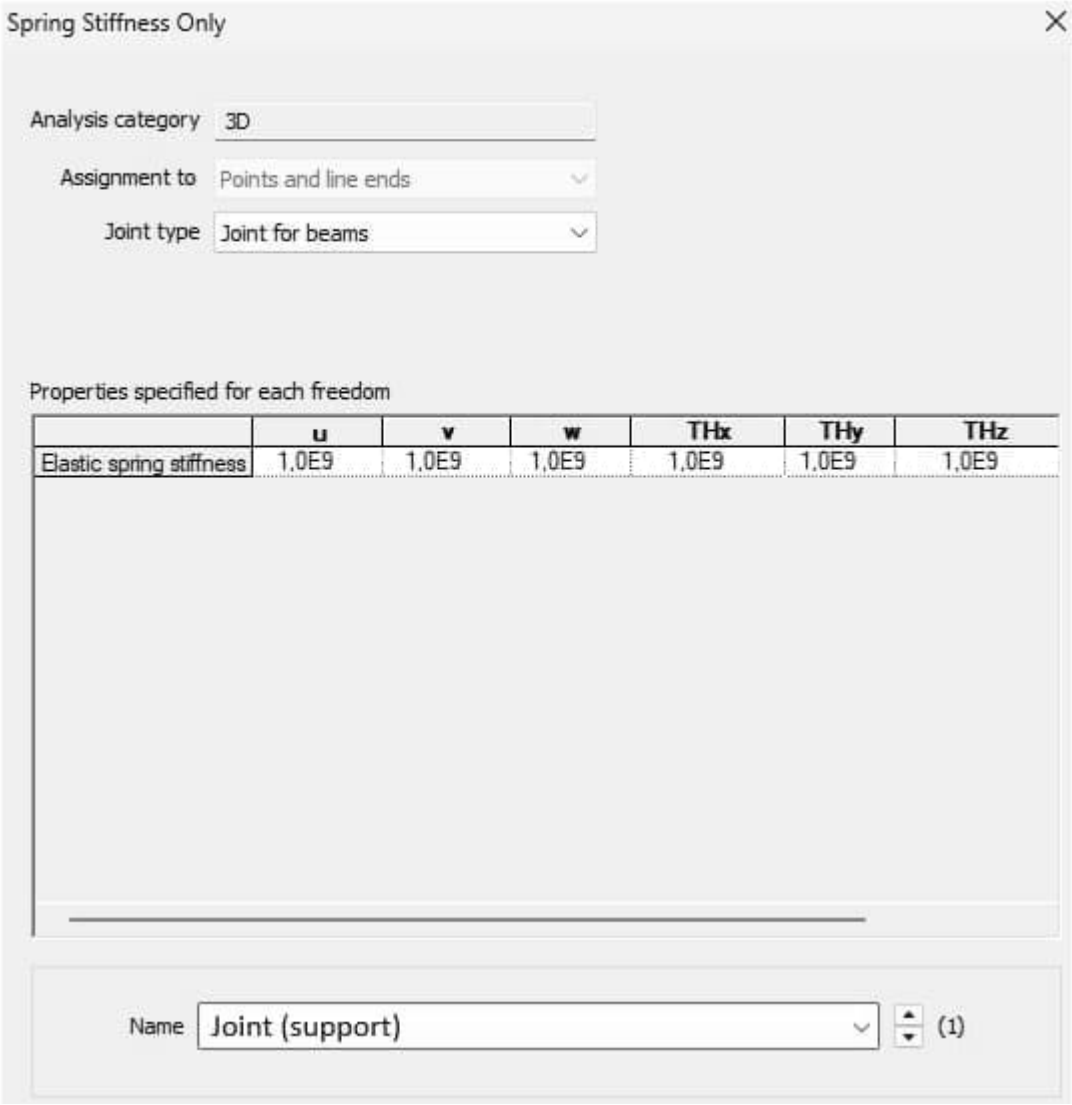
ez	Eccentricity measured from the joint xy-plane to the nodal line.
dy	Parametric distance factor (between 0.0 and 1.0), which defines the position of the shear spring for the local y direction between nodes 1 and 2. It is measured from node 1 (dy=0) along the local x direction.
dz	Parametric distance factor (between 0.0 and 1.0), which defines the position of the shear spring for the local z direction between nodes 1 and 2. It is measured from node 1 (dz=0) along the local x direction.

"Super nodes" are termed *Master* while centre of rigid beam is termed *Slave*.

Overview:



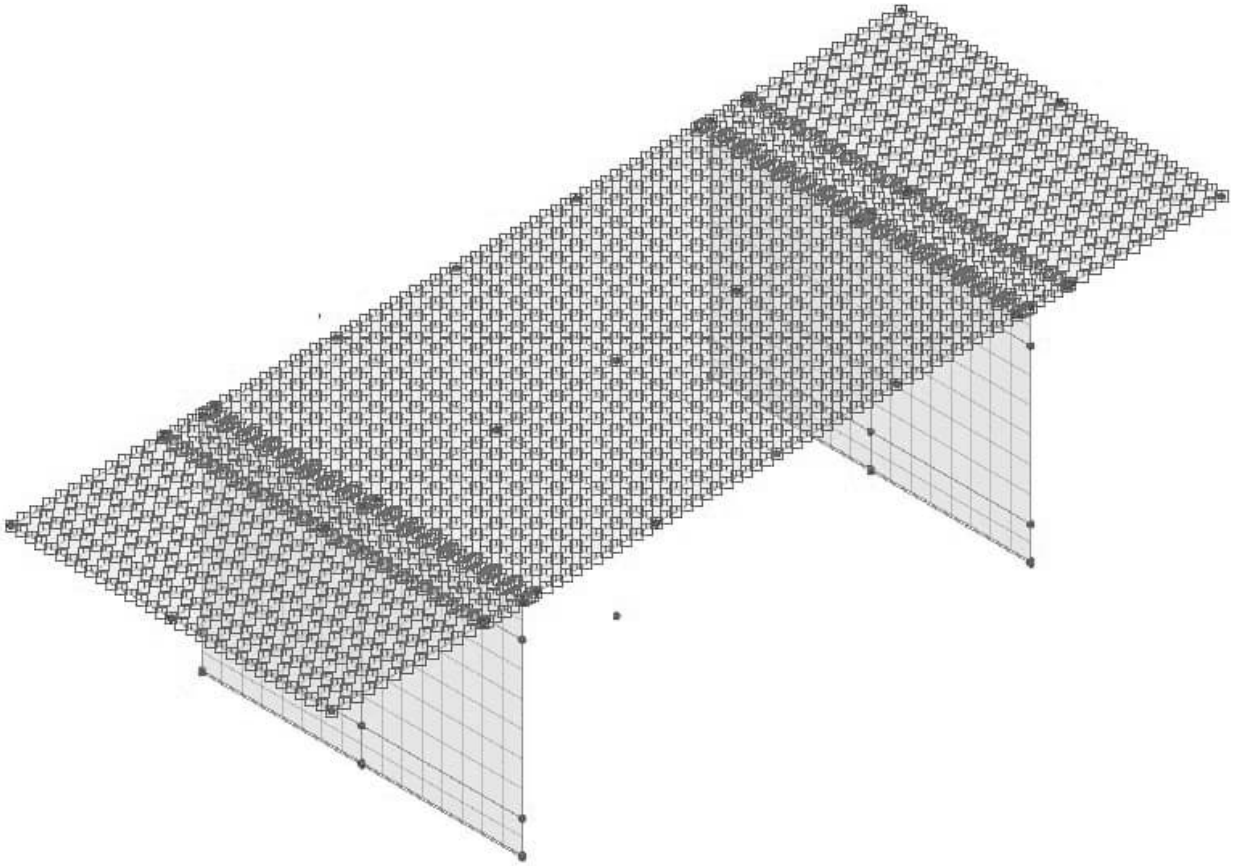
Joint material:



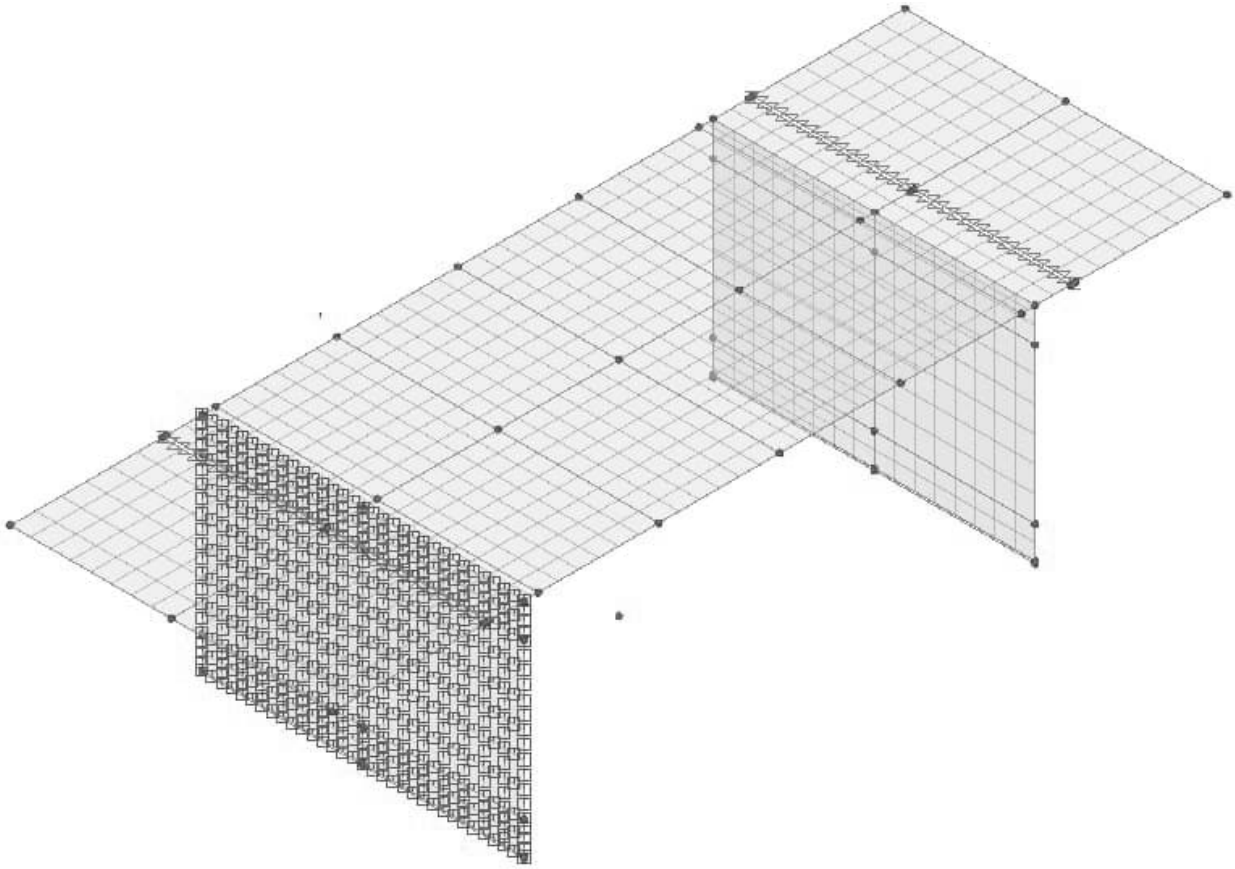
2.7 SEARCH AREA

Discrete load can be applied to structure as geometrical load areas. In FEM-program load areas are termed Search Area.

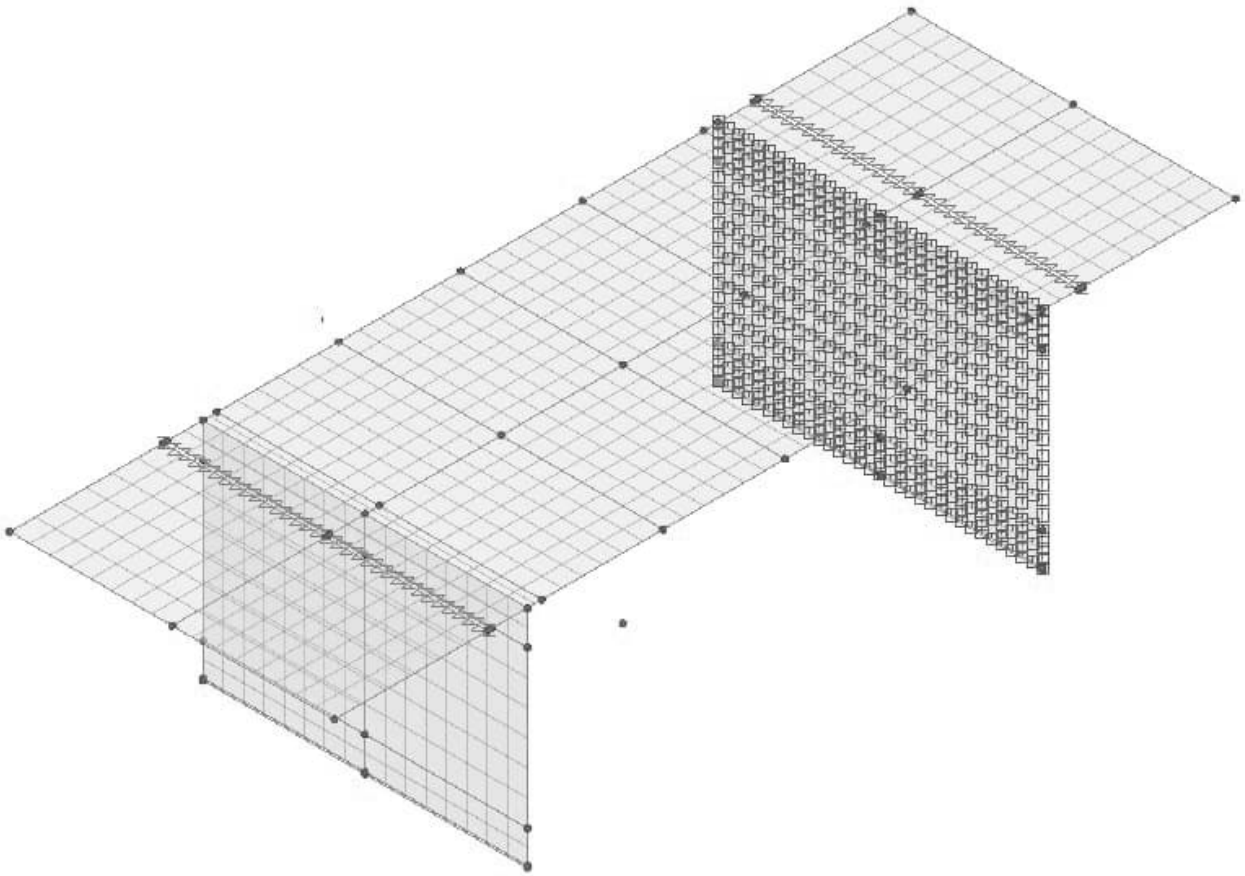
2.7.1 Search area : Superstructure



2.7.2 Search area : Abutment 1



2.7.3 Search area : Abutment 2



3. LASTER

3.1 DEAD WEIGHT

$\gamma_c = 25 \cdot \frac{kN}{m^3}$: concrete

3.1.1 Abutments

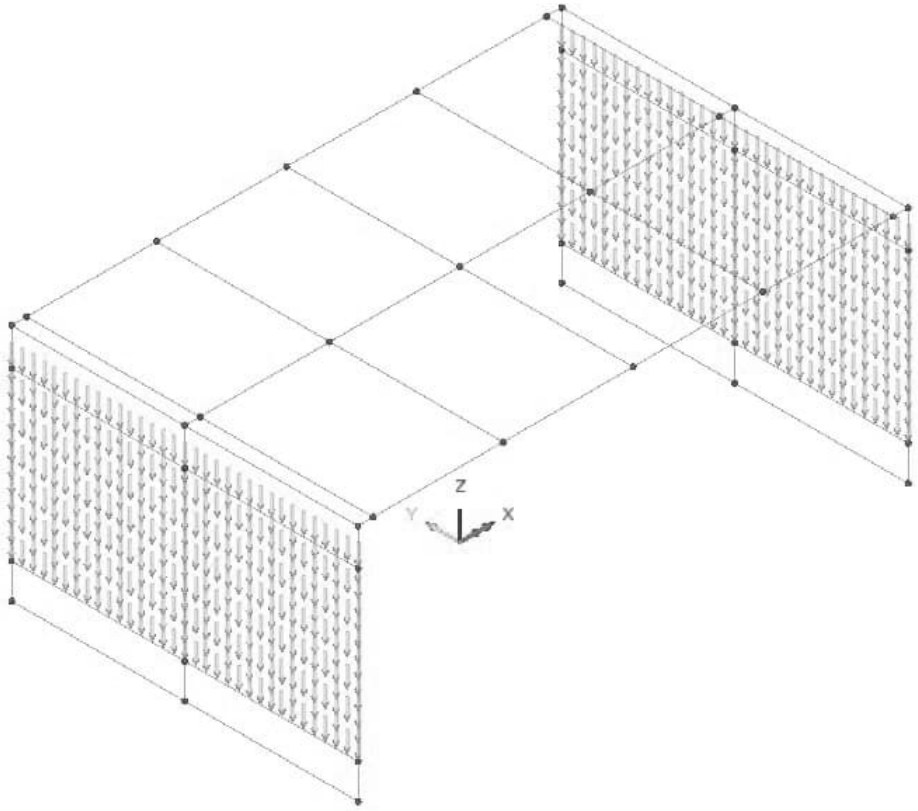
Load case : EGEN 1

Structural loading : Body force

Linear acceleration in Z (a_z) : -10 $\frac{m}{s^2}$

Component	Value
Linear acceleration in X	0,0
Linear acceleration in Y	0,0
Linear acceleration in Z	-10,0
Angular velocity about X axis	0,0
Angular velocity about Y axis	0,0
Angular velocity about Z axis	0,0
Angular acceleration about X axis	0,0
Angular acceleration about Y axis	0,0
Angular acceleration about Z axis	0,0

Name EGEN 1 (2)



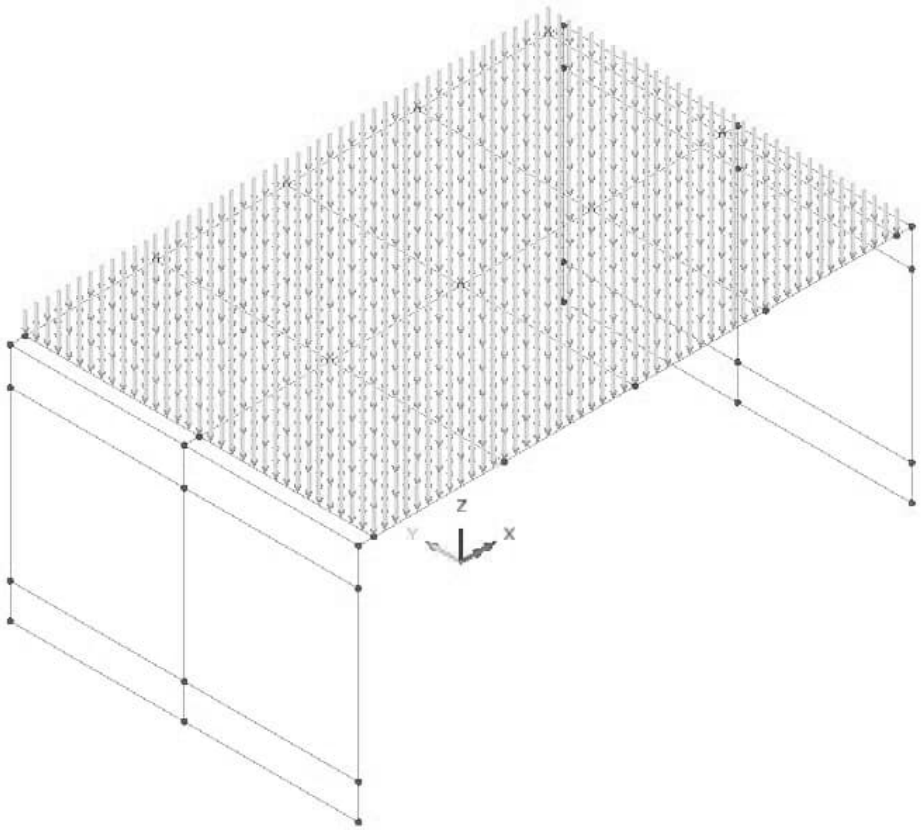
Overview 3D

3.1.2 Bridge deck

Load case : EGEN 2

Structural loading : Body force

Linear acceleration in Z (a_z) : -10 $\frac{m}{s^2}$



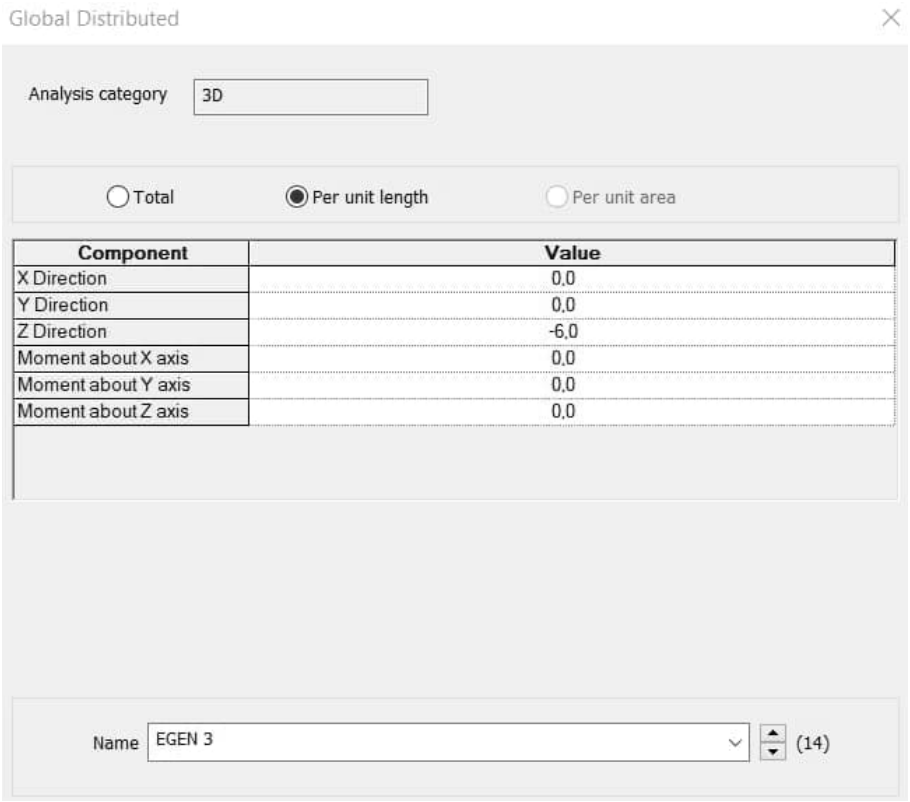
Overview 3D

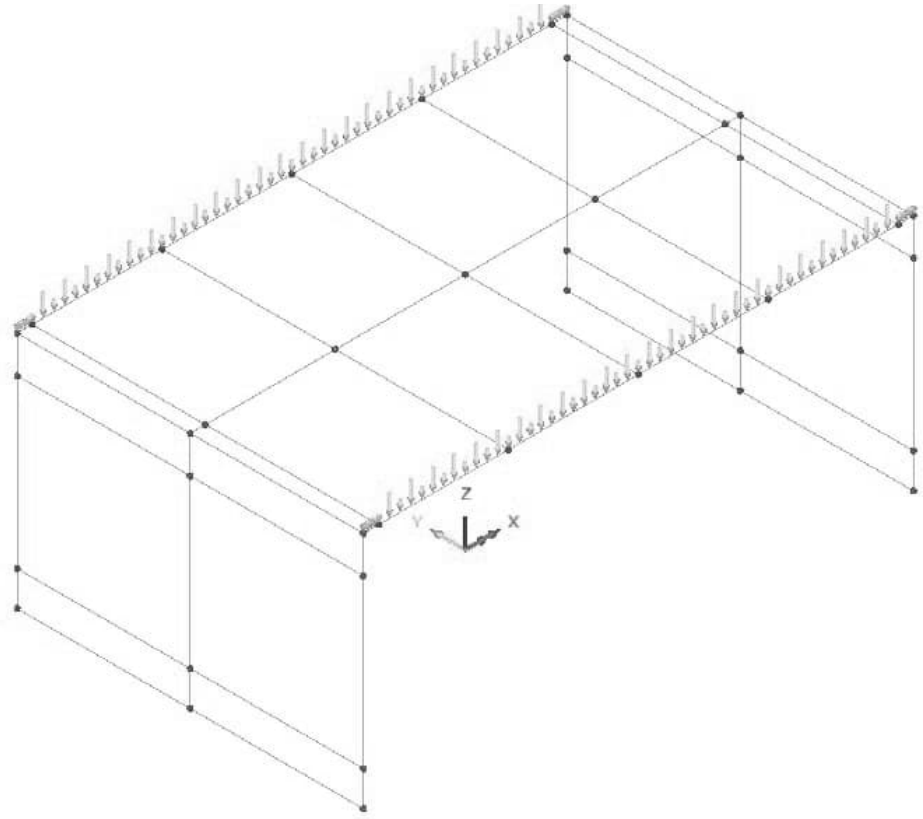
3.1.3 Edge beams including railing

Along each edge bream a line load is introduced. The load includes weight of edge beam and railing.

$p_{räcke} = 0.7\frac{kN}{m}$: weight railing

$\rightarrow p_z = p_{räcke} + p_{KB} = 0.7\frac{kN}{m} + 0.40m \cdot 0.45m \cdot 25\frac{kN}{m^3} = -6\frac{kN}{m}$





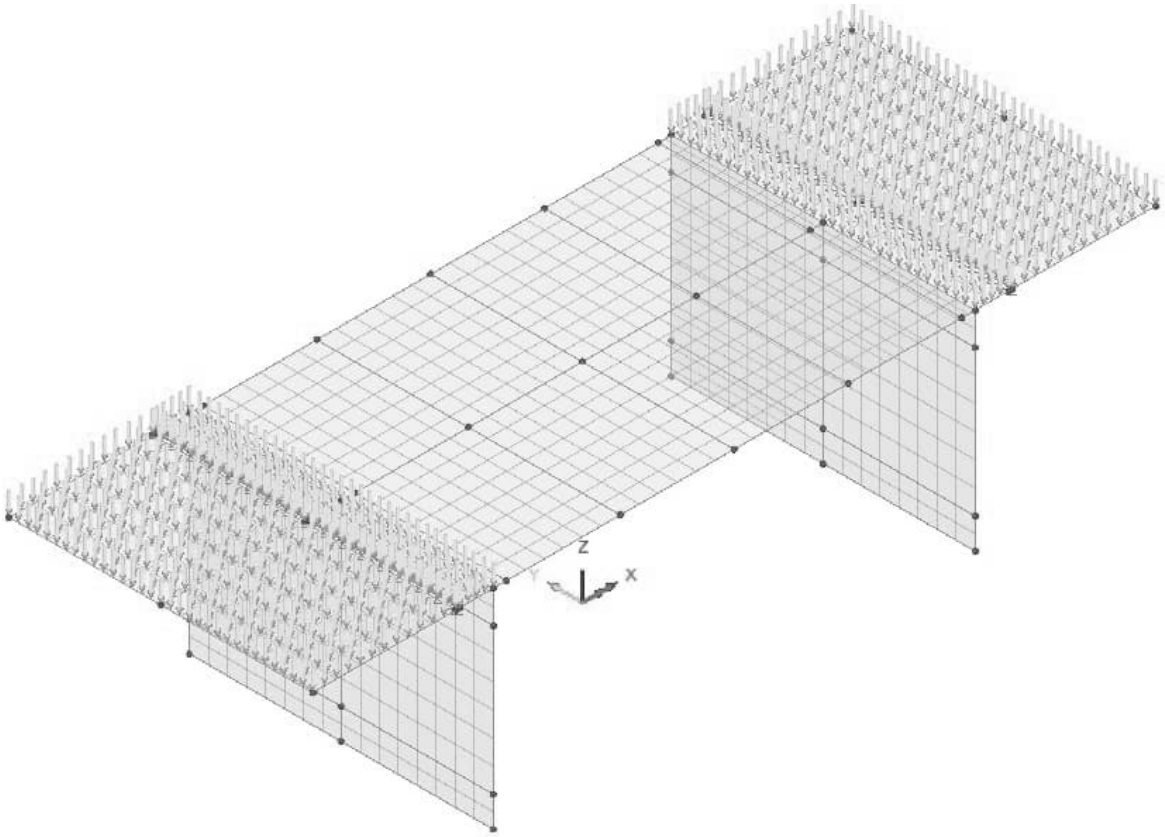
Overview 3D

3.1.4 Link plate

Load case : EGEN 4

Structural loading : Body force

Linear acceleration in Z (a_z) : -10 $\frac{m}{s^2}$



Ovierview 3D

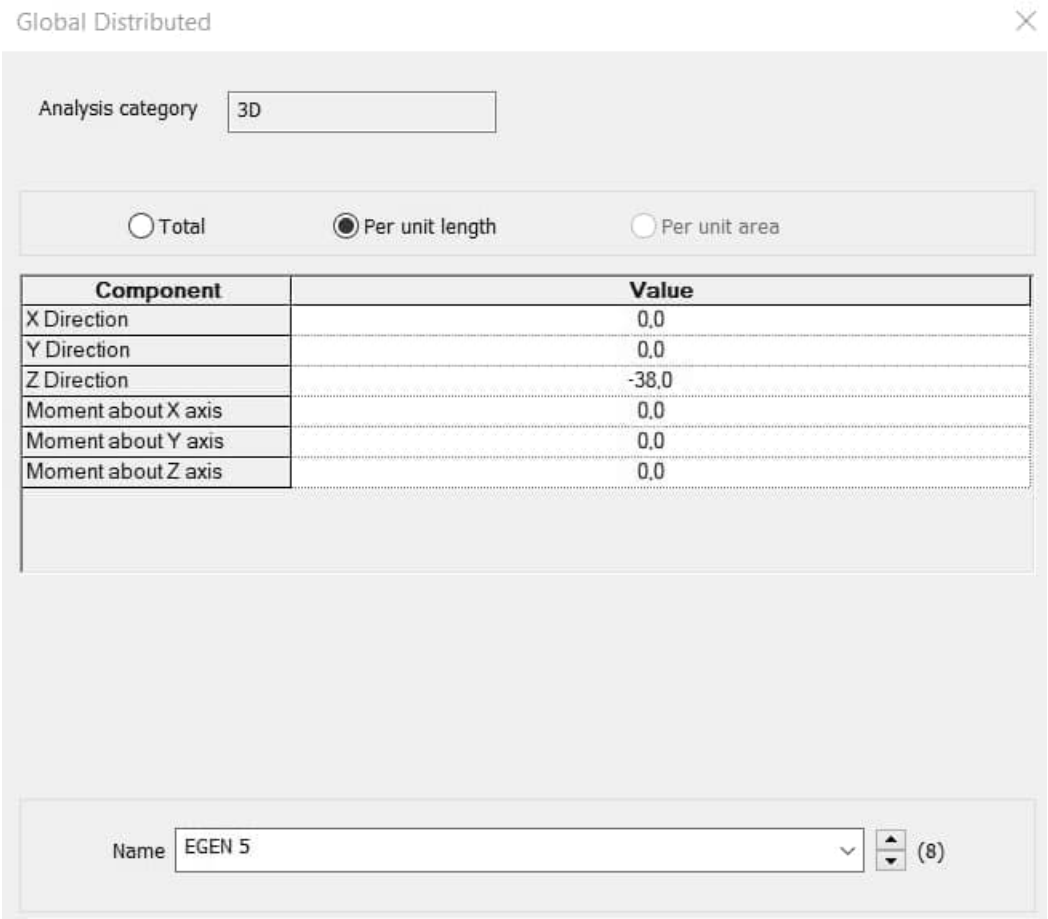
3.1.5 Wingwalls

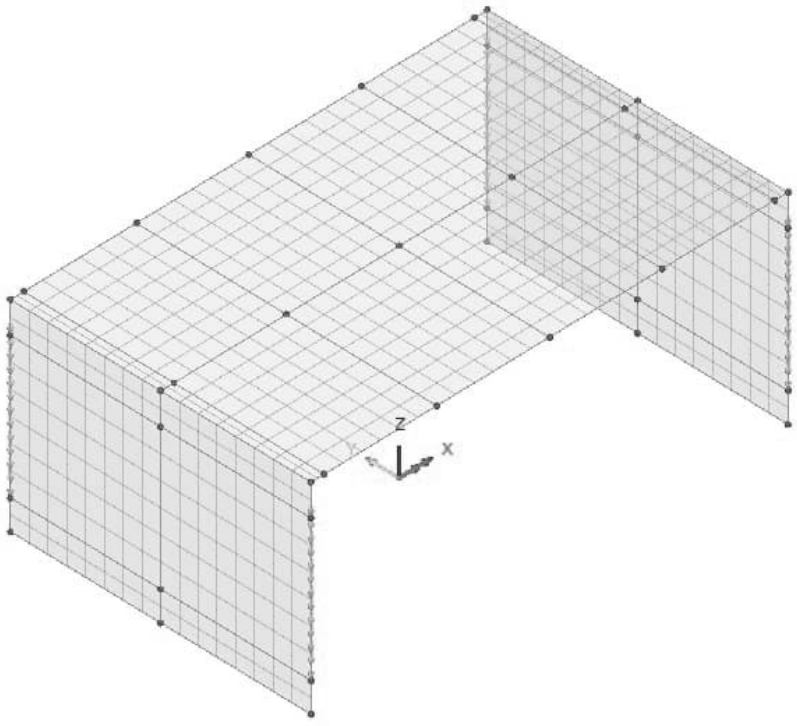
All wingwalls are alike (∴ L = 4.8 m).

$P_z = -145kN$: page A3:33

Load is distributed along edge of abutments from bottom of superstructure and distance 3.85 m downward.

$$p_z = \frac{P_z}{h} = -\frac{145kN}{3.85m} = -38\frac{kN}{m}$$





Ovierview 3D

3.1.6 Load combination dead weight: EGEN

Basic loadcomination EGEN :

Load case	Factor
EGEN 1	1.00
EGEN 2	1.00
EGEN 3	1.00
EGEN 4	1.00
EGEN 5	1.00

3.2 SURFACING

Thickness pavement with a thickness of 110 mm built as follows:

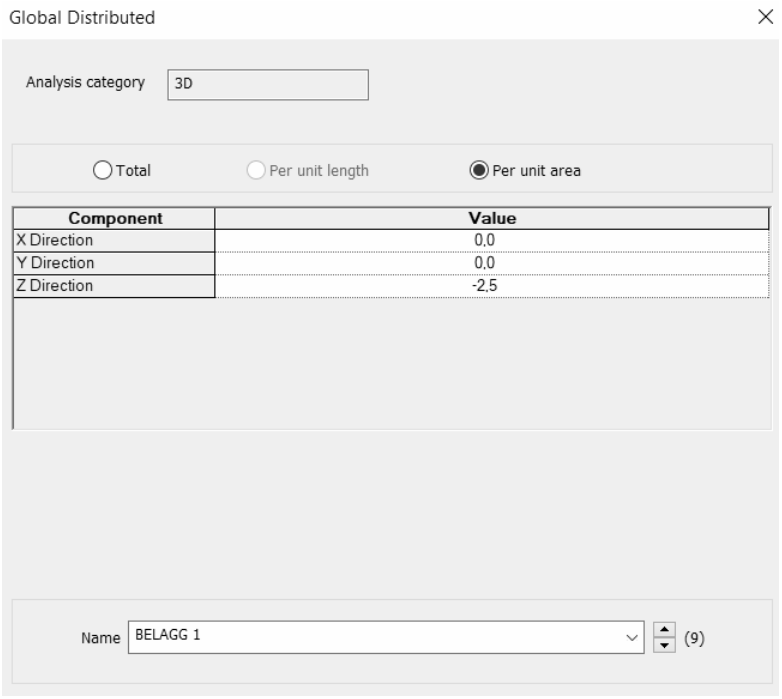
- Wearing course ABT 40 40 mm
- Binde course ABb 40 mm
- Protective course ABT 25 mm
- Waterproofing layer 5 mm

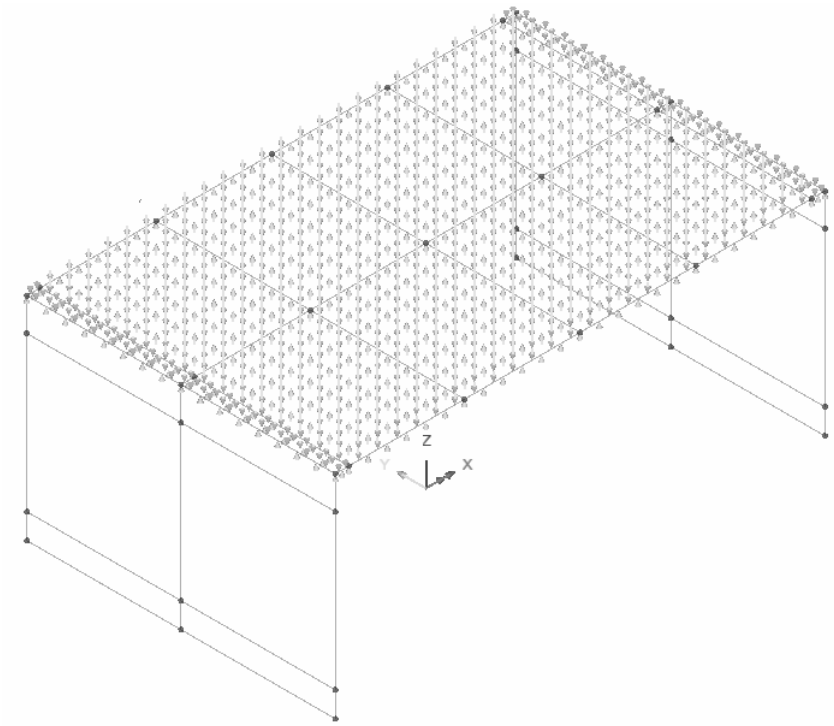
$\gamma = 23\frac{kN}{m^3}$: ABT and ABb

$\gamma = 23\frac{kN}{m^3}$: course

$\rightarrow p_{beläggg} = 0.11kPa + 23\frac{kN}{m^3} \cdot 0.105m = 2.5kPa$

3.2.1 Load on bridge deck





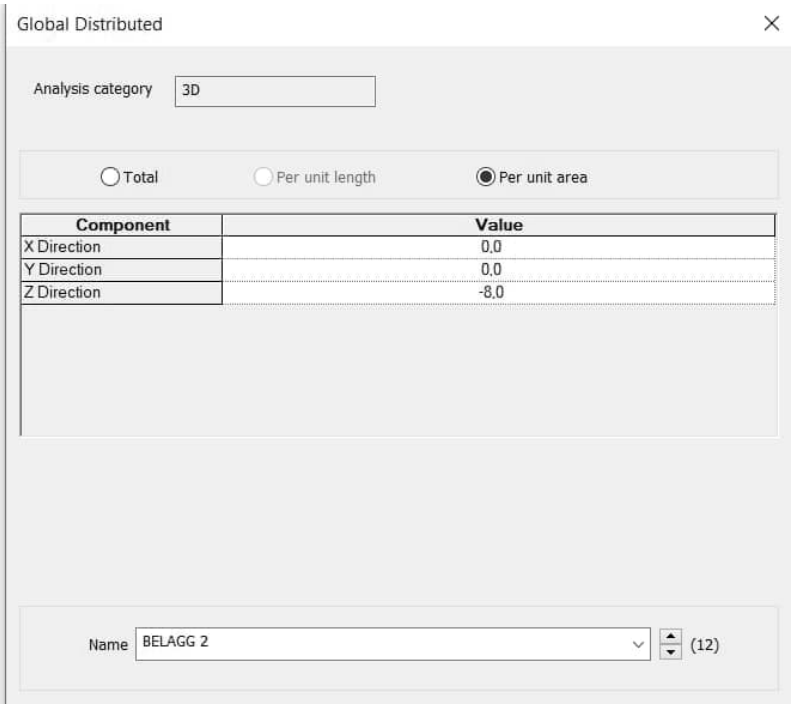
Overview 3D

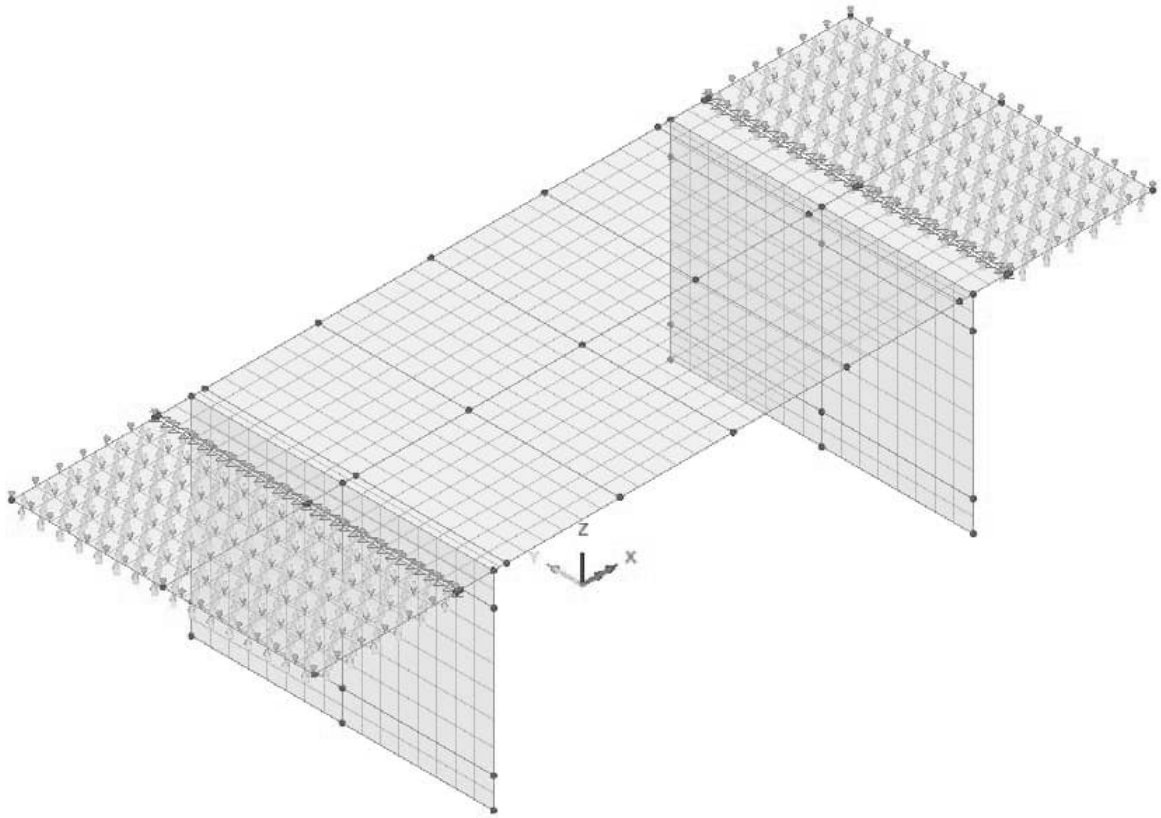
3.2.2 Load on link plate

On the upper side of the link plate, there is a 95 mm pavement and an overfill with varying thickness (100-400 mm).

The overfill is considered equivalent to the base layer. In the static model, a fictitious load corresponding to the weights for the pavement and overfill is introduced (an average thickness of 250 mm is applied.

$$q_{beläggg} = 2.5kPa + 22\frac{kN}{m^3} \cdot 0.25m = 8.0kPa$$





Overview 3D

3.2.3 Load combination surfacing: BELAGG

Basic loadcomination BELAGG :

Load case	Factor
BELAGG 1	1.00
BELAGG 2	1.00

3.3 EARTH PRESSURE

Earth pressure in filling corresponds to coarse crushed blasted rock (AMA CEB.524).

$\varphi_k = 45°$

$\gamma = 20 \frac{kN}{m^3}$

$\gamma' = 13 \frac{kN}{m^3}$

$$X_d = \frac{1}{\gamma_m} \cdot \eta \cdot \overline{X} \equiv \frac{1}{\gamma_m} \cdot X_k$$

Earth pressure coefficient for design method 2 (D2) :
Design coefficients associated to *A1 + M1 + R2* according to SS-EN 1997-1 section 2.4.7.3.4.3 is applied.

$\gamma_{m.D2} = 1.0$: see TSFS chapter 38 table 38.3 for M1

$\rightarrow \varphi_d = artctan\left(\frac{tan\varphi_k}{\gamma_{m.D2}}\right) = arctan\left(\frac{tan45°}{1.0}\right) = 45°$

$K_0 = 1 - \sin(\varphi_d) = 0.29$

$K_a = tan^2\left(45° - \frac{\varphi_d}{2}\right) = 0.17$

$K_p = tan^2\left(45° + \frac{\varphi_d}{2}\right) = 5.82$

Earth pressure for design method 3 (D3) :
Design coefficients associated to *A1(design loads) + A2(geotechnical loads) + M2 + R3* according to SS-EN 1997-1 section 2.4.7.3.4.4 is applied.

$\gamma_{m.D3} = 1.3$: see TSFS chapter 8 table 38.3 för M2

$\rightarrow \varphi_d = artctan\left(\frac{tan\varphi_k}{\gamma_m}\right) = arctan\left(\frac{tan45°}{1.3}\right) = 38°$

Remark
These are not used in FEM-analysis. This is done by adjusting load coefficients.

Earth pressure in FEM-analysis:

During design earth press coefficients associated to method D2 will used applied, however the load coefficients are adjusted according verification, see section 3.13.1.

$K_o = 1 - sin(\varphi_d)$

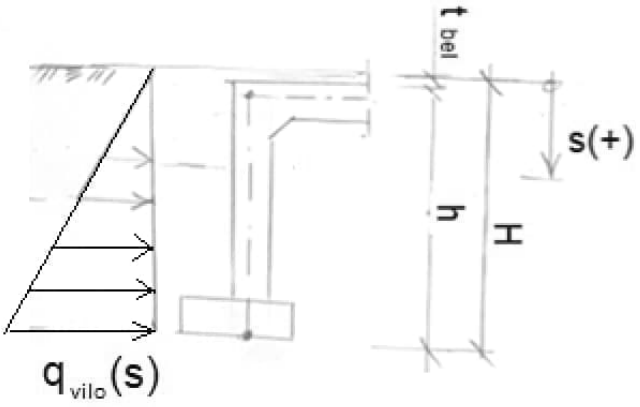
$K_a = tan^2(45° - \frac{\varphi_d}{2})$

$K_p = tan^2(45° + \frac{\varphi_d}{2})$

φ_d	K_a	K_0	K_p	Metod
(38°)	(0.24)	(0.38)	(4.20)	D3
45°	0.17	0.29	5.82	D2

$H = 0.11m + 5.85m = 5.96m$

$q_{vilo}(s) = K_0 \cdot \gamma \cdot s = 0.29 \cdot 20 \frac{kN}{m^3} \cdot s(+) = s(+) \cdot 5.8kPa$



Remark
Load width B = 8.0 m is used for the bottom slab even though width B = 8.5 m. This simplification is possible since favourable effect of passive earth pressure has not been considered on safe side.

3.3.1 Load against abutment 1

$q_{vilo}\ (0m) = 0kPa$: top surfacing

$q_{vilo}\ (5.96m) = 5.96m \cdot 5.8\frac{kN}{m^3} = 35kPa$: undersida bottom slab

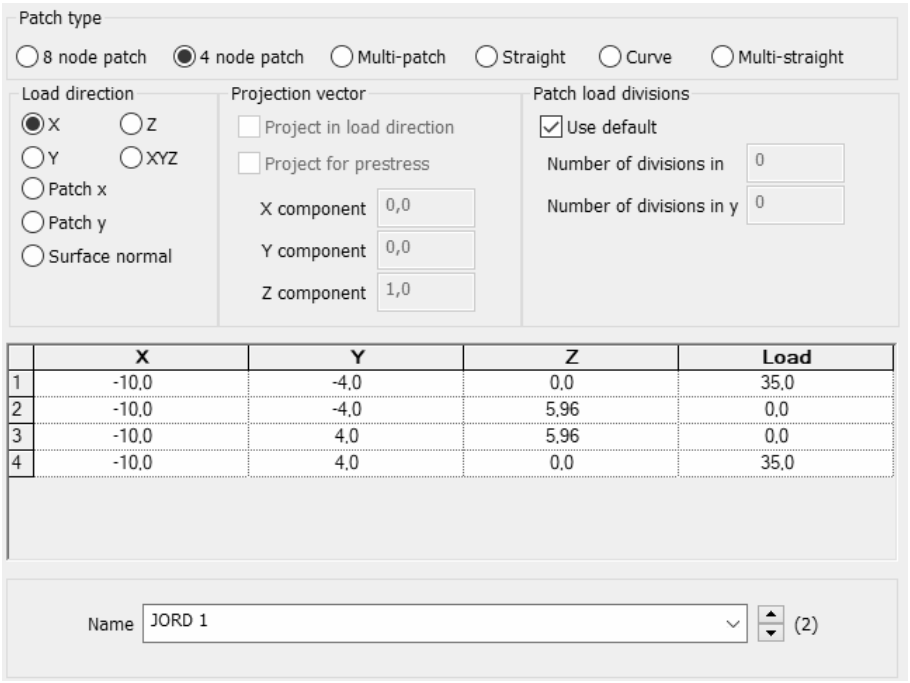
Load case : JORD 1

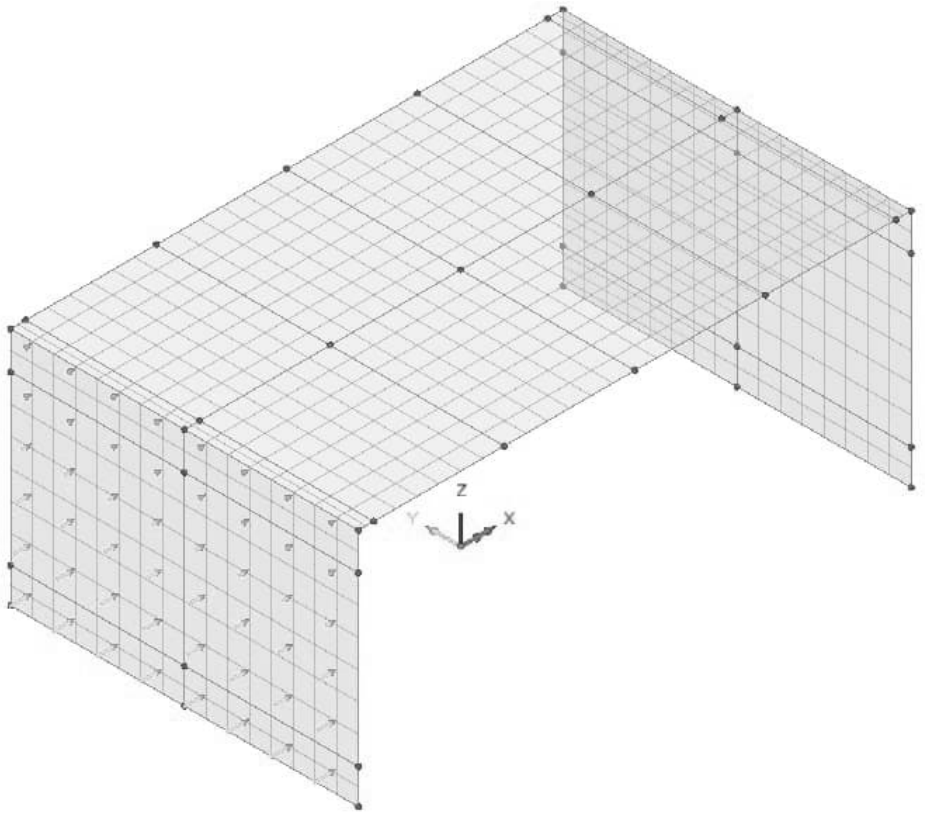
Structural loading : Discrete 4 node patch

Surface load (q_x) : 0 kPa $\rightarrow$ +35 kPa

Search Area : Abutment 1

Loads outside search area : Include full load





Overview 3D

3.3.2 Load against abutment 2

$q_{vilo}\ (0m) = 0kPa$: top surfacing

$q_{vilo}\ (5.96m) = 5.96m \cdot 5.8\frac{kN}{m^3} = 35kPa$: undersida bottom slab

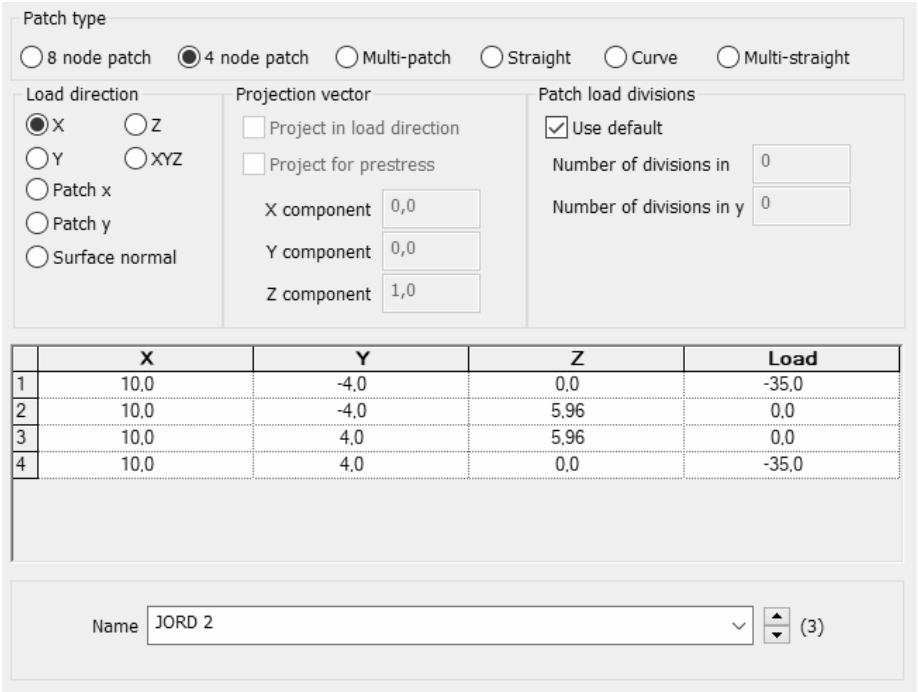
Loadcase : JORD 2

Structural loading : Discrete 4 node patch

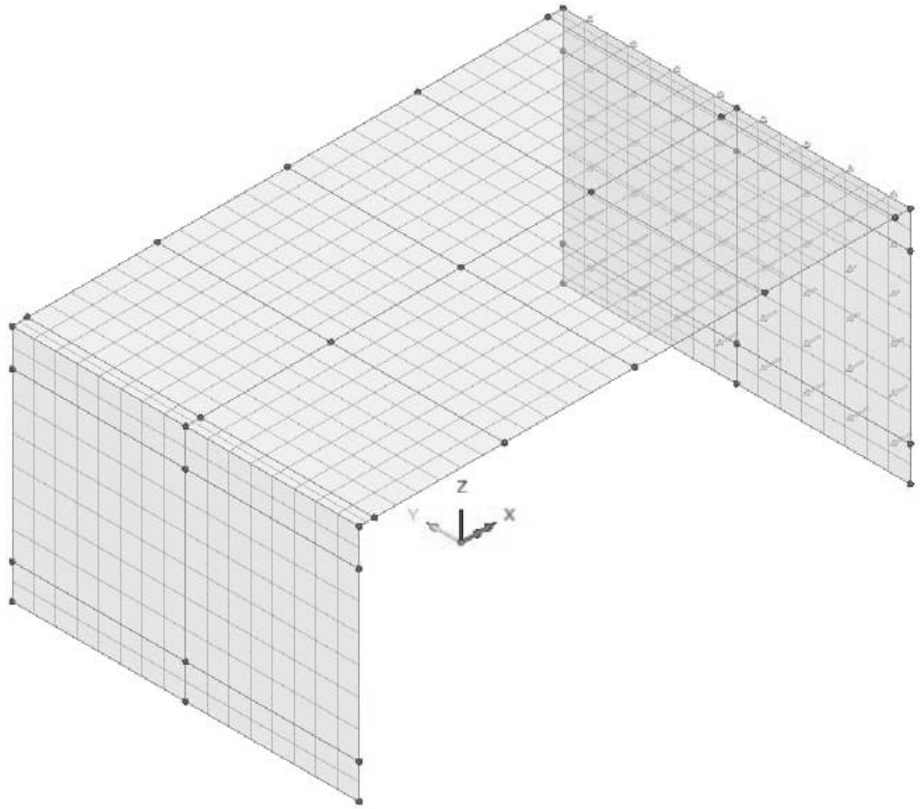
Surface load (q_x) : 0 kPa $\rightarrow$ -35 kPa

Search Area : Abutment 2

Loads outside search area : Include full load



	X	Y	Z	Load
1	10,0	-4,0	0,0	-35,0
2	10,0	-4,0	5,96	0,0
3	10,0	4,0	5,96	0,0
4	10,0	4,0	0,0	-35,0



Overview 3D

3.3.3 Load against wingwalls

Design software K2.002 is used to determine earth pressure against wingwalls according to Culmans´s theory. All wingwalls are assumed to have same length (L = 4.8 m).

Load is distributed along edge of abutments from bottom of superstructure and distance 3.85 m. This assumption is on safe side.

Effective height along edge abutment:

$H_{ef} = 3.85m$: see page A3:33

Load at abutment edge quasi-permanent load combination (SLS-Q):

$N_{SLS-Q} = +39\frac{kNm}{m}$: see page A3:33

$M_{SLS-Q} = 104\frac{kNm}{m}$: see page A3:33

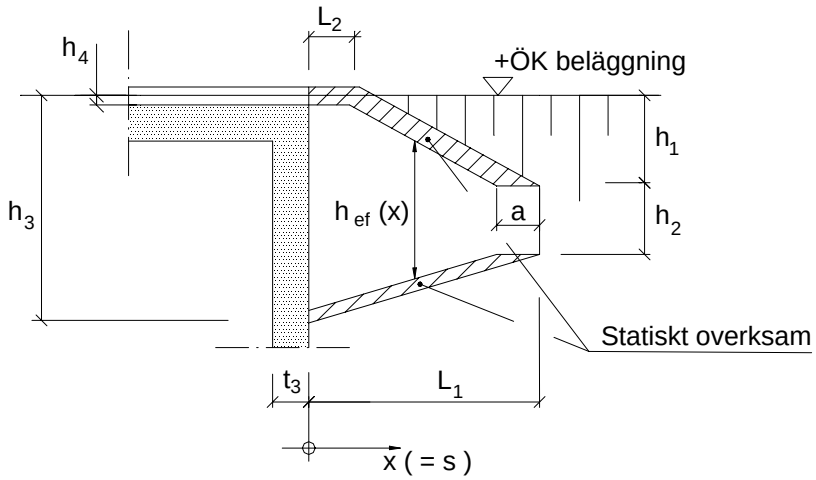
Characteristic earth pressure at abutment edge:

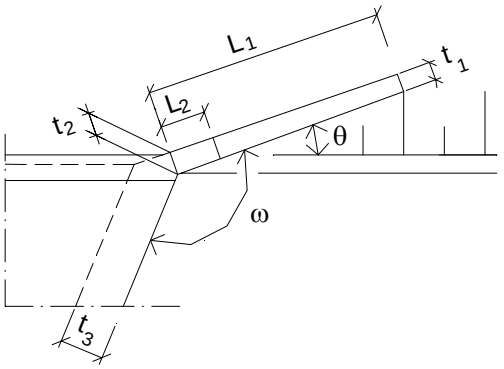
$$N_{jord} = +52\frac{kNm}{m} \cdot \frac{1}{1.35} = 29\frac{kN}{m}$$

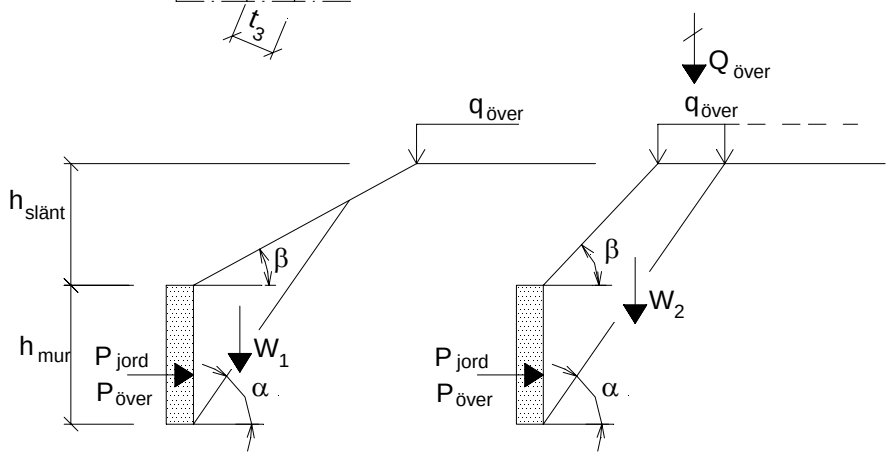
$$M_{jord} = 104\frac{kNm}{m} \cdot \frac{1}{1.35} = 77\frac{kNm}{m}$$

Objekt : Vingmur L = 4.8 m

PRINCIPFIGUR







Typ 1 ($Q_{över} = 0$) Typ 2 ($Q_{över} \neq 0$)

Jordtryck enligt Culmans metod

INDATA

Geometri :

$L_1 = 4.8m$ $L_2 = 0.5m$

$h_1 = 1.4m$ $h_2 = 1.1m$ $h_3 = 4.8m$ $h_4 = 0.2m$

$t_1 = 0.40m$ $t_2 = 0.40m$ $t_3 = \frac{0.7m + 1.1m}{2} = 0.9\,m$

Vinkel vinge-ramben på baksidan : $\omega = 135°$

Vinkel vinge-vägbankskrön på baksidan : $\theta = 45°$

Avstånd till brytpunkt för effektiv höjd : $a = 1.56m$

Material :

Jordmaterial : $\gamma_{jord} = 20\frac{kN}{m^3}$ $K_o = 0.29$ $K_a = 0.17$

Betong : $\gamma_{btg} = 25\frac{kN}{m^3}$

Laster :

Överlast : $q_{över} = 20kPa$

Lastkoefficienter :

Jordtryck

$\psi\gamma_{ULS.1} = 1.45$ $\psi\gamma_{SLS.1} = 1.35$

Överlast

$\psi\gamma_{ULS.2} = 1.70$ $\psi\gamma_{SLS.2} = 0$

BERÄKNING

Jordtryck enligt Culmans metod :

Nivå överkant vingmur : $mur_{ök} = linterp\left[\left(0m\ \ L_2\ \ L_1\right),\left(h_3\ \ h_3\ \ h_3 - h_1\right),s\right]$

Nivå underkant vingmur : $mur_{uk} = linterp\left[\left(0m\ \ L_1\right),\left(0m\ \ h_3 - h_1 - h_2\right),s\right]$

Vingmurens höjd : $h_{mur} = mur_{ök} - mur_{uk}$

Släntens höjd : $h_{slänt} = linterp\left[\left(0m\ \ L_2\ \ L_1\right),\left(0m\ \ 0m\ \ h_1\right),s\right]$

Friktionsvinkel: $\varphi = asin\left(1 - K_o\right)$

Lutning hos slänten ned till överkant vingmur mätt vinkelrätt mot vingen :

$$\beta = atan\left[\frac{h_1}{\left(L_1 - L_2\right)\tan(\theta)}\right]$$

Vertikallast för brottfigur typ 1 (= brottlinje i slänt, sålunda inget tillskott av överlast) :

$$W_1 = h_{mur}\cdot\sin\left(\frac{\pi}{2} - \alpha\right)\cdot\left(h_{mur}\cdot\cos\left(\frac{\pi}{2} - \alpha\right) + \frac{h_{mur}\cdot\sin\left(\frac{\pi}{2} - \alpha\right)}{\tan(\alpha - \beta)}\right)\cdot\frac{\gamma_{jord}}{2}$$

Vertikallaster för brottfigur typ 2 (= brottlinje hamnar ovanför slänt vilket ger ett bidrag från överlast) :

$$W_2 = \left[\left(h_{mur} + h_{slänt}\right)^2\cdot\tan\left(\frac{\pi}{2} - \alpha\right) - \frac{h_{slänt}^2}{\tan(\beta)}\right]\cdot\frac{\gamma_{jord}}{2}$$

$$Q_{över}(q) = q\cdot\left[\left(h_{mur} + h_{slänt}\right)\cdot\tan\left(\frac{\pi}{2} - \alpha\right) - \frac{h_{slänt}(s)}{\tan(\beta)}\right]$$

Vilojordtrycksresultant enligt Culmann under inverkan av jordlast + överlast :

$$p_o(q) = \begin{| W_{jord} \leftarrow W_1 \text{ if } (h_{mur} + h_{slänt}) \cdot \tan(90° - \alpha) < \frac{h_{slänt}}{\tan(\beta)} \\ W_{jord} \leftarrow W_2 + Q_{över}(q) \text{ otherwise} \\ p_{aktiv} \leftarrow W_{jord} \cdot \tan(\alpha - \varphi) \\ p_{aktiv} \cdot \frac{K_o}{K_a}$$

Utvärdera största last av jordtryck och överlast genom att kontrollera N_α antal vinklar mellan φ och 90°. Överlastens lasteffekt fås som skillnaden mellan jordtrycksresultant med och utan överlast.

$$p_{jord}(s) = \begin{| N_\alpha \leftarrow 20st \\ \Delta\alpha \leftarrow \frac{90° - \varphi}{N_\alpha - 1} \\ \alpha \leftarrow \varphi \\ p_{max} \leftarrow p_o(0kPa) \\ \text{for } i \in 2..N_\alpha \\ \quad \begin{| \alpha \leftarrow \alpha + \Delta\alpha \\ \quad p_{vilo} \leftarrow p_o(0kPa) \\ \quad \text{if } p_{vilo} > p_{max} \\ \quad \quad \begin{| p_{max} \leftarrow p_{vilo} \\ \quad \quad \alpha_{max} \leftarrow \alpha$$

$$p_{över}(s) = \begin{| N_\alpha \leftarrow 20st \\ \Delta\alpha \leftarrow \frac{90° - \varphi}{N_\alpha - 1} \\ \alpha \leftarrow \varphi \\ p_{max} \leftarrow p_o(q_{över}) - p_o(0kPa) \\ \text{for } i \in 2..N_\alpha \\ \quad \begin{| \alpha \leftarrow \alpha + \Delta\alpha \\ \quad p_{över} \leftarrow p_o(q_{över}) - p_o(0kPa) \\ \quad \text{if } p_{över} > p_{max} \\ \quad \quad \begin{| p_{max} \leftarrow p_{över} \\ \quad \quad \alpha_{max} \leftarrow \alpha$$

Snittkrafter jordtryck + överlast :

$$H'_{jord}(x_s) = \int_{x_s}^{L_1} p_{jord}(s)\, ds \qquad M'_{jord}(x_s) = \int_{x_s}^{L_1} (s - x_s) \cdot p_{jord}(s)\, ds$$

$$H'_{över}(x_s) = \int_{x_s}^{L_1} p_{över}(s)\, ds \qquad M'_{över}(x_s) = \int_{x_s}^{L_1} (s - x_s) \cdot p_{över}(s)\, ds$$

Lastkombinering - Lk ULS och Lk SLS :

Snittkraft i frontmur för inspänningssnitt :

$N'_{ULS.front} = \left(\psi\gamma_{ULS.1} \cdot H'_{jord}(0 \cdot m) + \psi\gamma_{ULS.2} \cdot H'_{över}(0 \cdot m)\right) \cdot \sin(\omega)$

$M'_{ULS.front} = \psi\gamma_{ULS.1} \cdot M'_{jord}(0 \cdot m) + \psi\gamma_{ULS.2} \cdot M'_{över}(0 \cdot m) + N'_{ULS.front} \frac{t_3}{2}$

$N'_{SLS.front} = \left(\psi\gamma_{SLS.1} \cdot H'_{jord}(0 \cdot m) + \psi\gamma_{SLS.2} \cdot H'_{över}(0 \cdot m)\right) \cdot \sin(\omega)$

$M'_{SLS.front} = \psi\gamma_{SLS.1} \cdot M'_{jord}(0 \cdot m) + \psi\gamma_{SLS.2} \cdot M'_{över}(0 \cdot m) + N'_{SLS.front} \frac{t_3}{2}$

Snittkrafter i vingmur :

$Q'_{ULS}(s) = \psi\gamma_{ULS.1} \cdot H'_{jord}(s) + \psi\gamma_{ULS.2} \cdot H'_{över}(s)$

$M'_{ULS}(s) = \psi\gamma_{ULS.1} \cdot M'_{jord}(s) + \psi\gamma_{ULS.2} \cdot M'_{över}(s)$

$M'_{SLS}(s) = \psi\gamma_{SLS.1} \cdot M'_{jord}(s) + \psi\gamma_{SLS.2} \cdot M'_{över}(s)$

Beräkning av effektiv höjd :

$\Delta h = h_3 - h_2 - h_1$ $\Delta h = 2.300 \cdot m$

Nivå överkant effektiv vingmur :

$Nivå_{ök} = \text{linterp}\left[\left(0m \;\; L_2 \;\; L_1 - a \;\; L_1\right), \left(h_3 - h_4 \;\; h_3 - h_4 \;\; h_3 - h_1 \;\; h_3 - h_1\right), s\right]$

Nivå underkant effektiv vingmur :

$Nivå_{uk} = \text{linterp}\left[\left(0m \;\; L_1 - L_2 \;\; L_1\right), \left(\frac{a}{L} \cdot \Delta h \;\; \Delta h \;\; \Delta h\right), s\right]$

Effektiv höjd vingmur :

$h_{ef}(s) = Nivå_{ök} - Nivå_{uk}$

Dimensionerande snittkrafter (Lk ULS och Lk SLS) fördelade på effektiv höjd :

Snittkraft i frontmur för inspänningssnitt :

$H_{ef} = h_{ef}(0m)$

$$N_{ULS.front} = \frac{N'_{ULS.front}}{H_{ef}}$$

$$M_{ULS.front} = \frac{M'_{ULS.front}}{H_{ef}}$$

$$N_{SLS.front} = \frac{N'_{SLS.front}}{H_{ef}}$$

$$M_{SLS.front} = \frac{M'_{SLS.front}}{H_{ef}}$$

Snittkrafter i vingmur :

$$Q_{ULS.ving} = \frac{Q'_{ULS}(s)}{h_{ef}(s)}$$

$$M_{ULS.ving} = \frac{M'_{ULS}(s)}{h_{ef}(s)}$$

$$M_{SLS.ving} = \frac{M'_{SLS}(s)}{h_{ef}(s)}$$

Egenvikt vingmur :

$$t = t_2 - \frac{t_2 - t_1}{L_1} \cdot s$$

$$A(s) = h_{mur} \cdot t$$

$$V_{egen} = \gamma_{btg} \cdot \int_0^{L_1} A(s)\, ds$$

$$M_{egen} = \gamma_{btg} \cdot \int_0^{L_1} A(s) \cdot s\, ds$$

RESULTAT

Mellanresultat

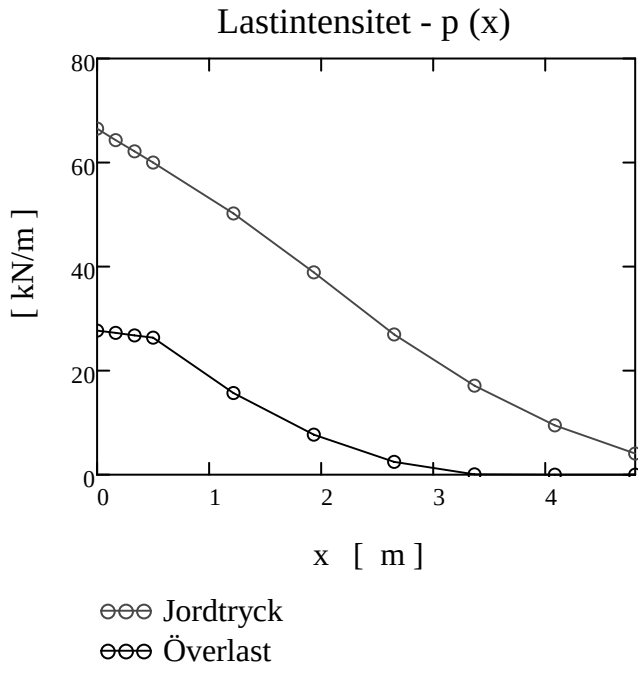
$\varphi = 45 \cdot °$: Dimensionerande friktionsvinkel tillhörande K_o

$\beta = 18 \cdot °$: Lutning hos slänten ned till överkant vingmur mätt vinkelrätt mot vingen

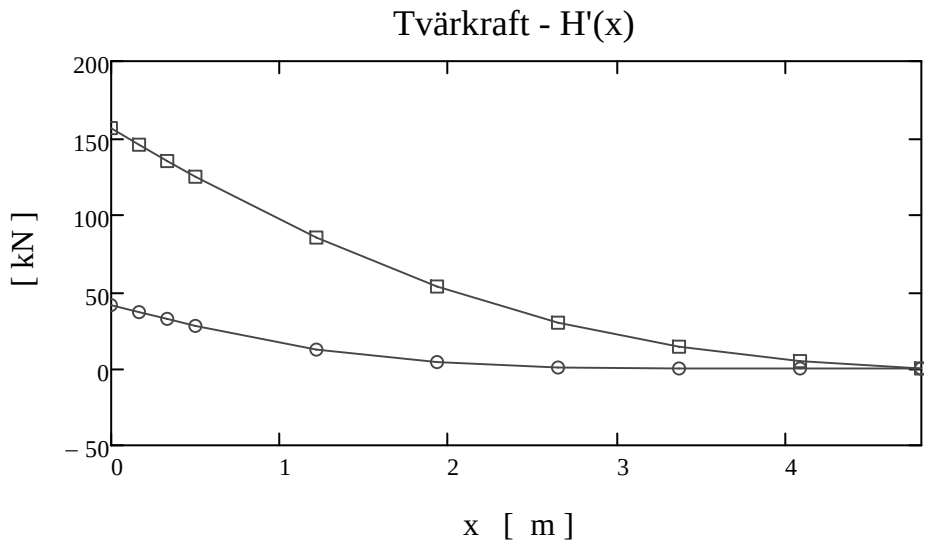
Utvärdering av jordtryck + överlast samt tilhörande farligaste brottvinkel redovisad i tabellform :

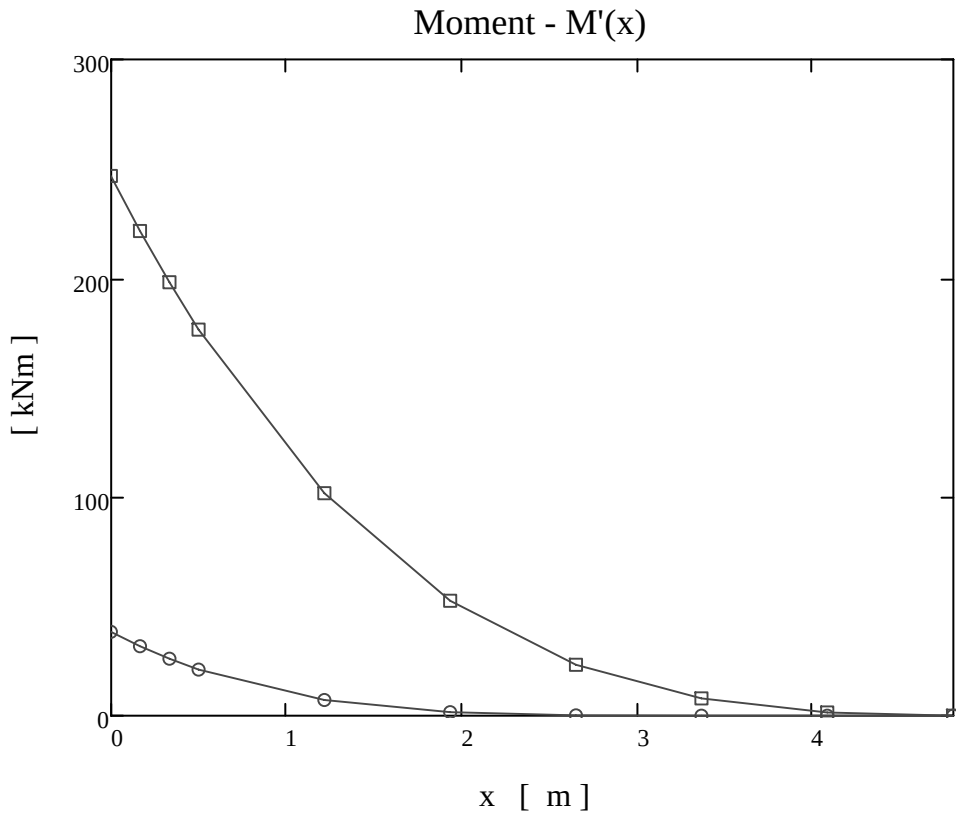
x	p_{jord}	α_{tillh}	$p_{över}$	α_{tillh}
0	66,5	66	27,7	66
0,167	64,3	66	27,2	66
0,333	62,1	66	26,8	66
0,500	60,0	66	26,3	66
1,22	50,2	66	15,7	62
1,93	38,9	66	7,7	57
2,65	26,9	66	2,4	52
3,37	17,1	66	0,1	48
4,08	9,5	66	0,0	0
4,80	4,1	66	0,0	0
m	kN/m	grader	kN/m	grader

Utvärdering av jordtryck + överlast i diagramform :

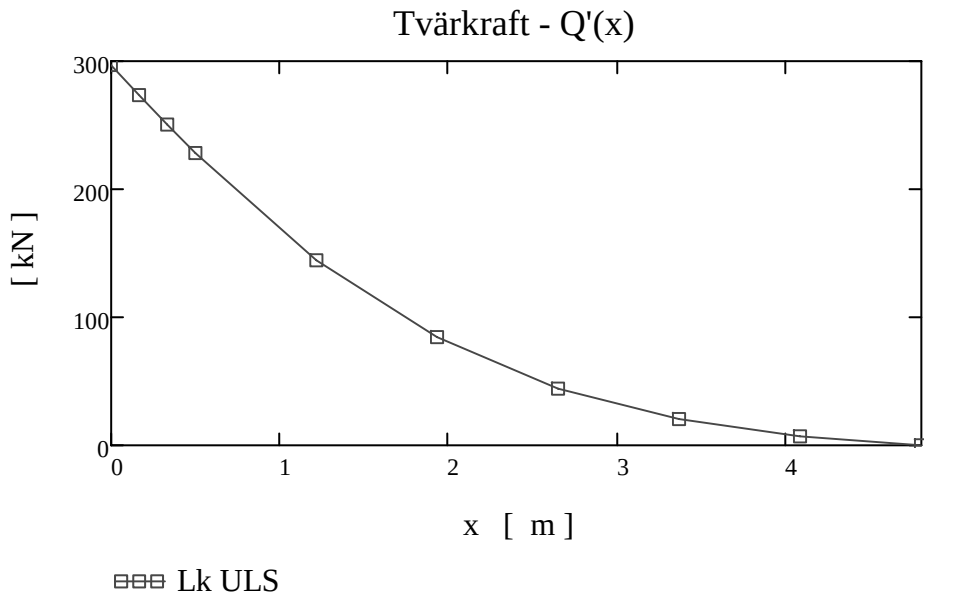


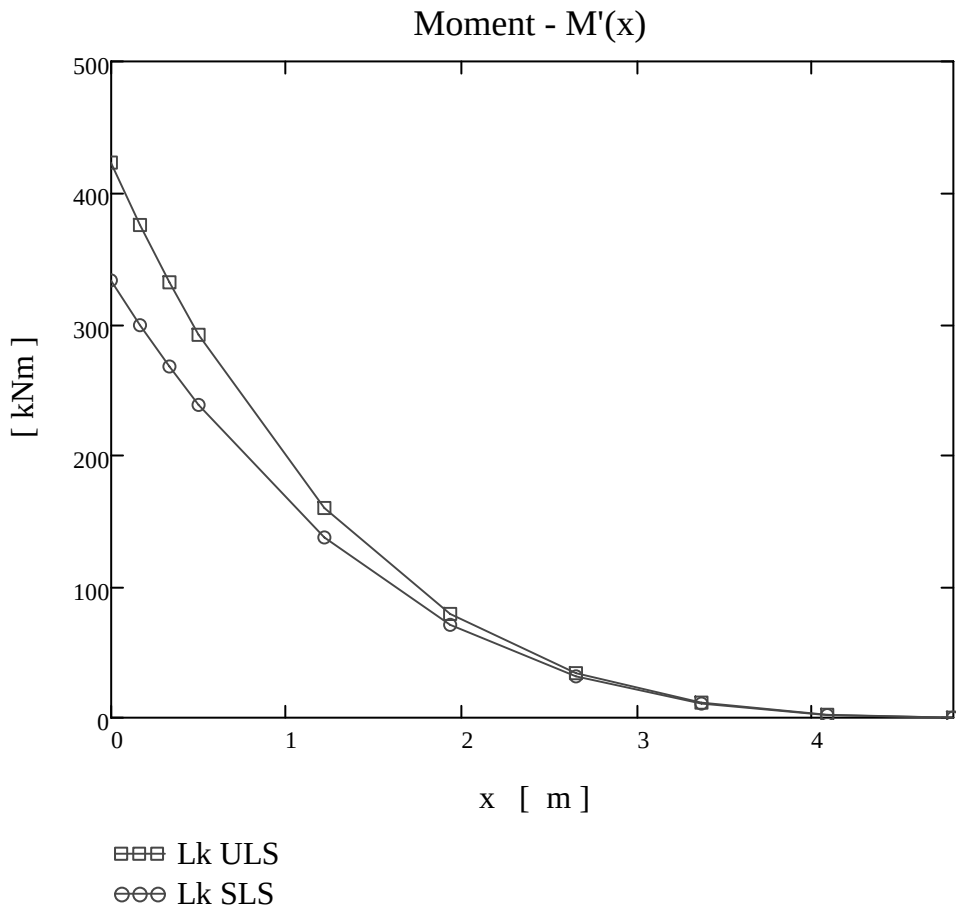
Uvärdering av snittkrafter tillhörande jordtryck + överlast i diagramform :



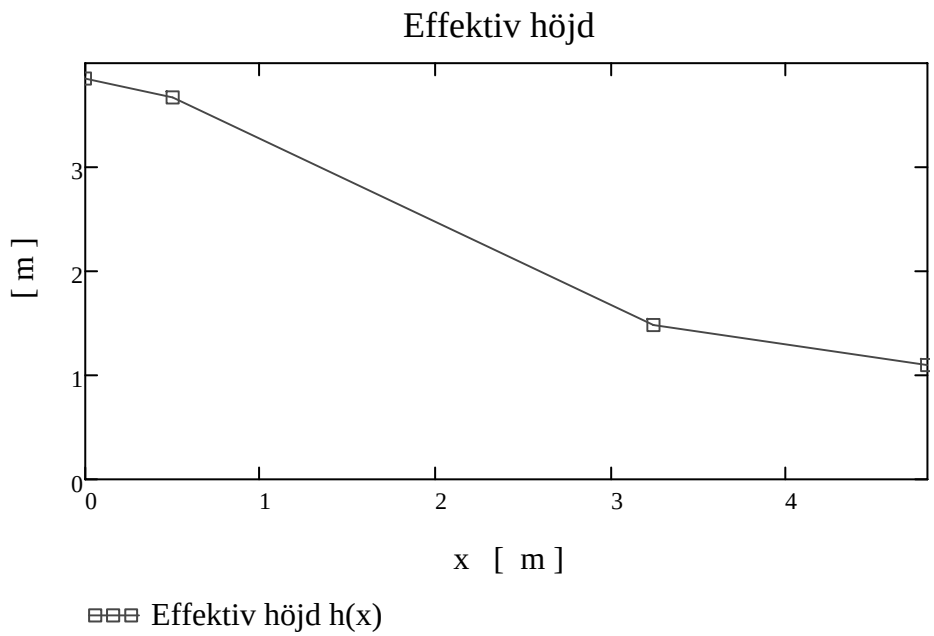


Uvärdering av dimensionerande snittkrafter för Lk ULS och Lk SLS i diagramform :





Uvärdering av effektivhöjd i diagramform :



Resultat

Dimensionerande snittkrafter i frontmur för inspänningssnitt

Effektiv höjd i inspänningssnitt : $H_{ef} = h_{ef}(0m)$ $H_{ef} = 3.85 \cdot m$

$N_{ULS.front}$	$M_{ULS.front}$	$N_{SLS.front}$	$M_{SLS.front}$
55	134	39	104
kN/m	kNm/m	kN/m	kNm/m

Dimensionerande snittkrafter i vingmur

x	$Q_{ULS.ving}$	$M_{ULS.ving}$	$M_{SLS.ving}$	t (x)
0	77	110	86	0,400
0,167	72	99	79	0,400
0,333	67	89	72	0,400
0,500	62	79	65	0,400
1,22	47	52	44	0,400
1,93	33	31	28	0,400
2,65	23	17	16	0,400
3,37	14	8	7	0,400
4,08	6	2	2	0,400
4,80	0	0	0	0,400
m	kN/m	kNm/m	kNm/m	m

Egenvikt vingmur

Egenvikt ger upphov till en triangulär linjelast med största intensiteten enligt nedan :

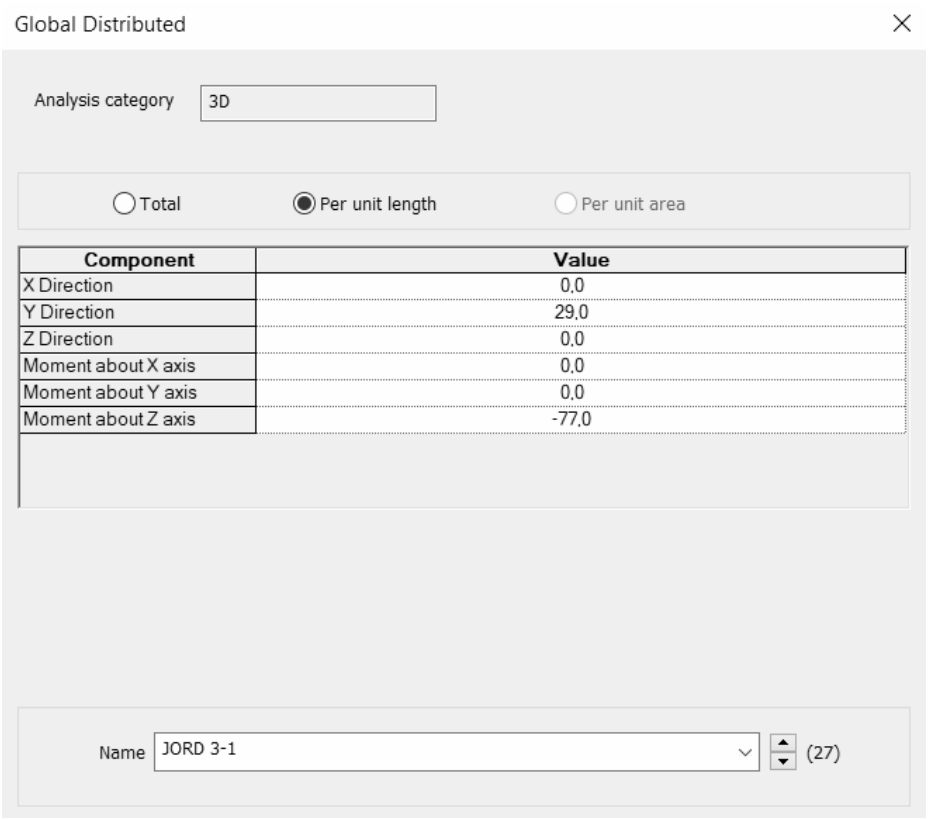
$V_{egen} = 145 \cdot kN$ $M_{egen} = 275 \cdot kNm$

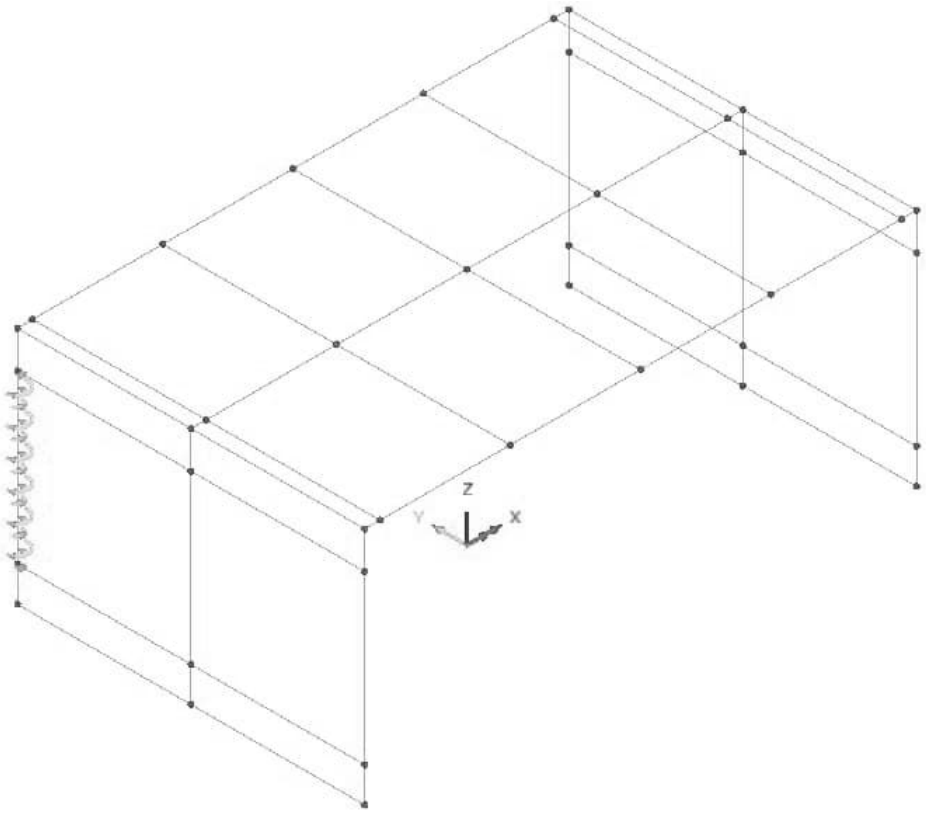
$x_{tp} = \frac{M_{egen}}{V_{egen}}$ $x_{tp} = 1.9\,m$

Load case: JORD 3-1
(Northern wingwall abutment 1)

$$p_y = +29\frac{kN}{m}$$

$$m_z = -77\frac{kNm}{m}$$



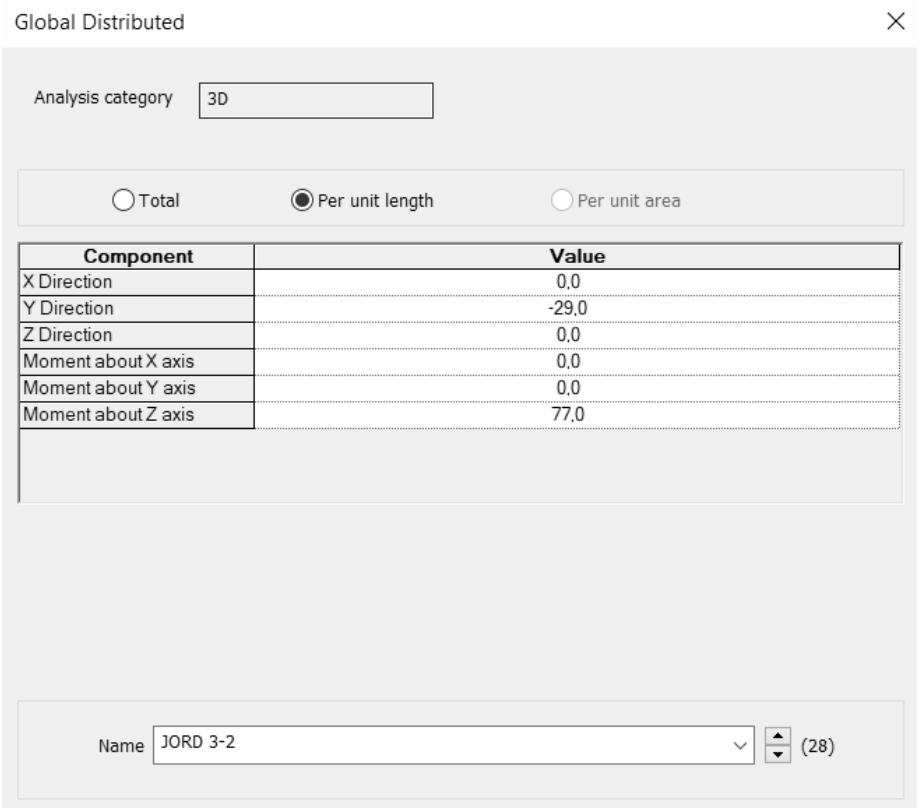


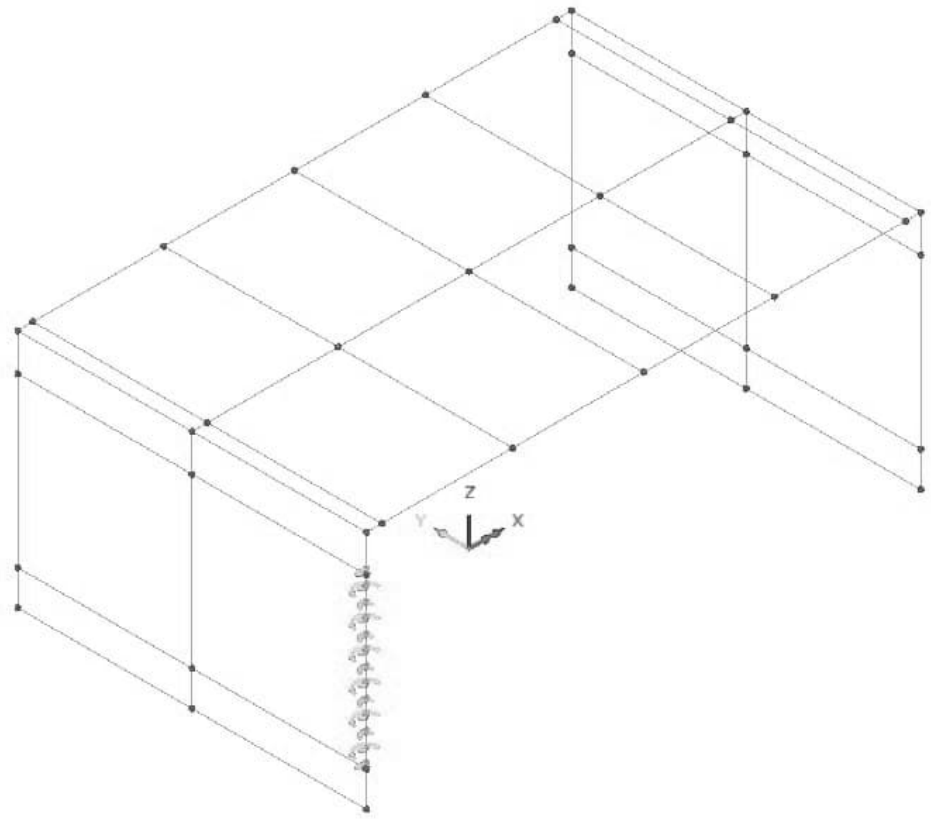
Overview 3D

Load case : JORD 3-2
(Southern wingwall abutment 1)

$$p_y = -29\frac{kN}{m}$$

$$m_z = +77\frac{kNm}{m}$$



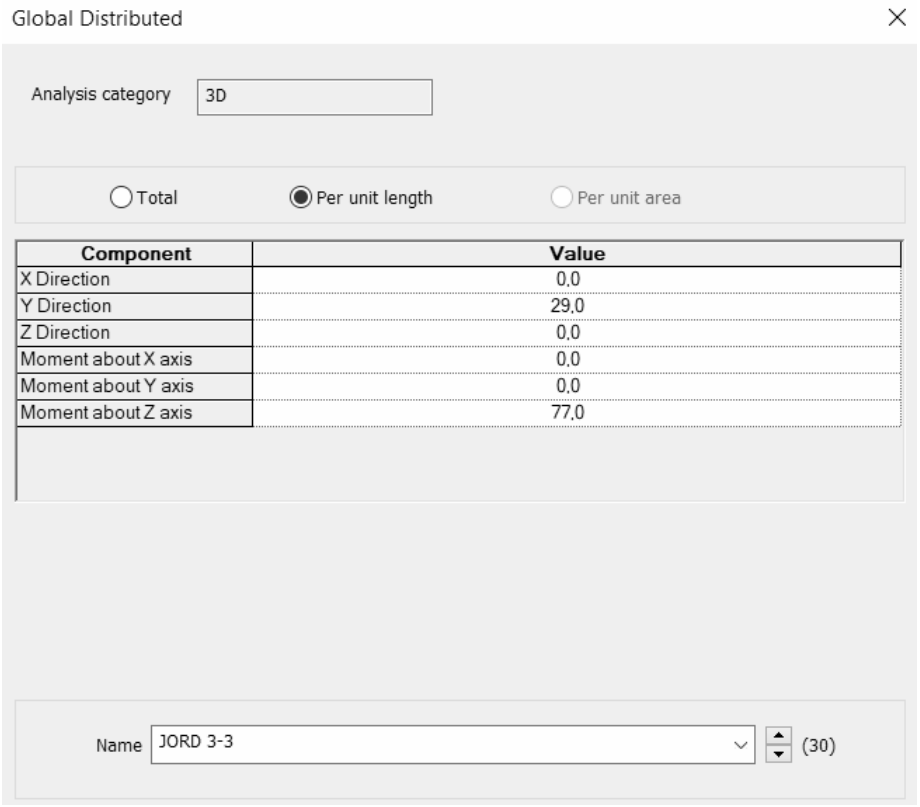


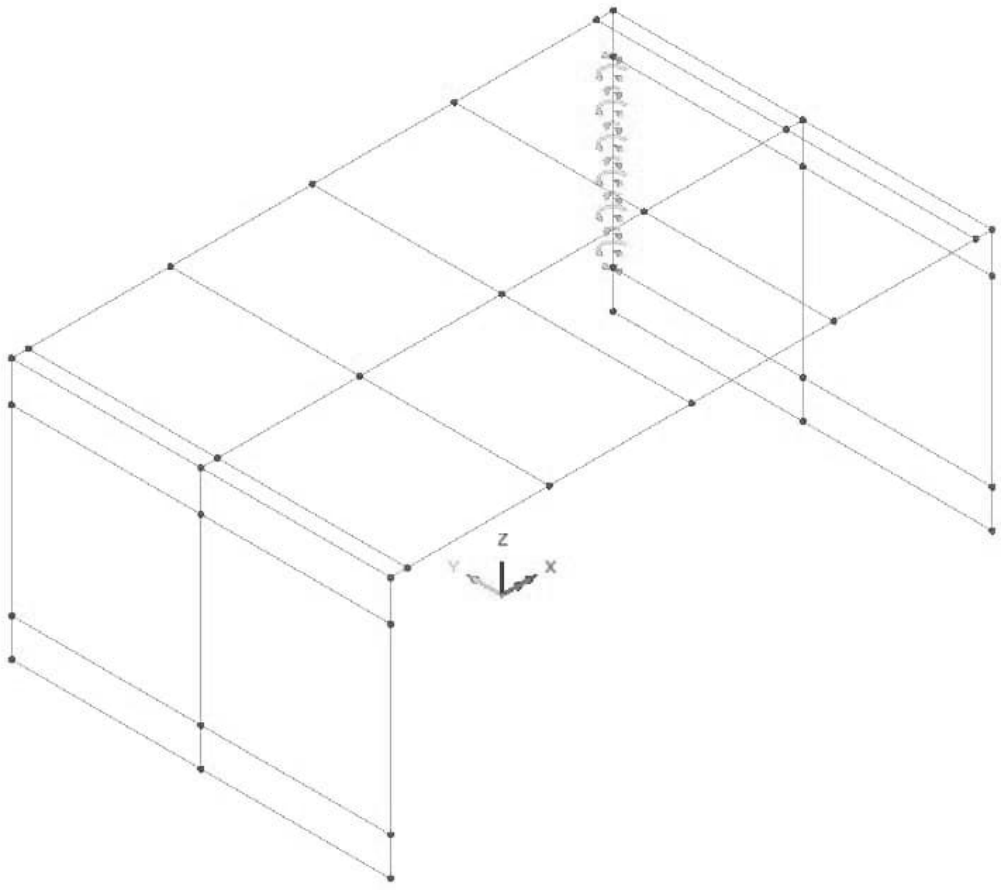
Oveview 3D

Load case : JORD 3-3
(Northern wingwall abutment 2)

$$p_y = +29\frac{kN}{m}$$

$$m_z = +77\frac{kNm}{m}$$



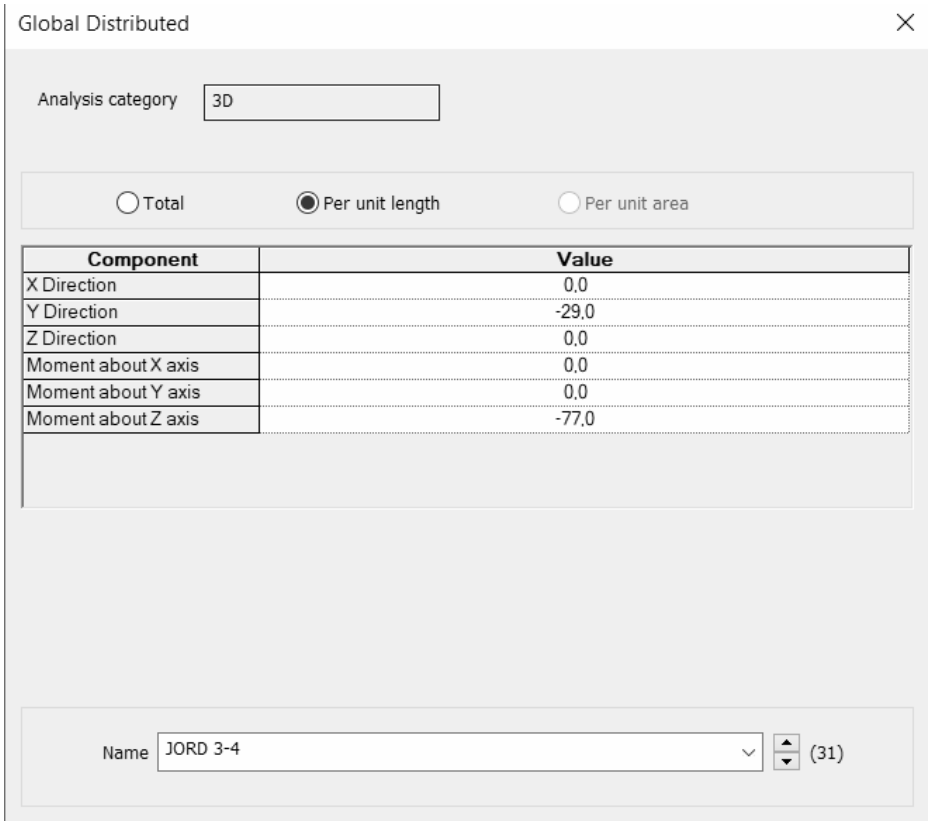


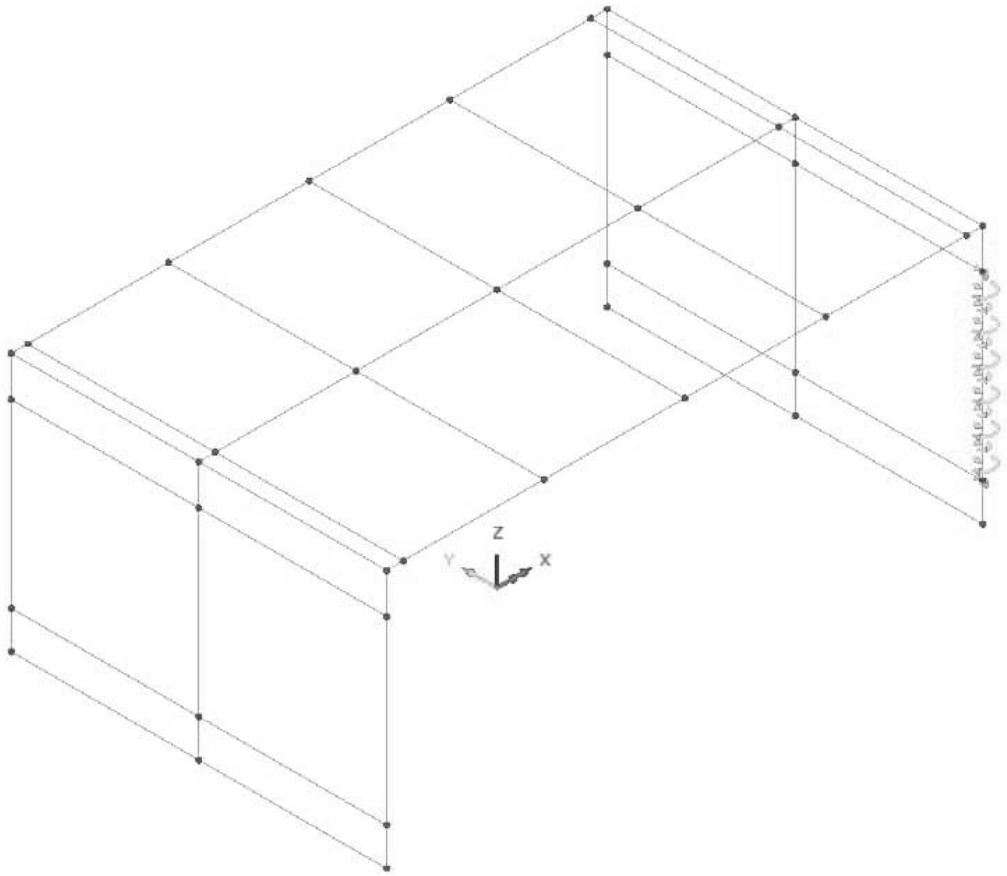
Overview 3D

Load case : JORD 3-4
(Southern wingwall abutment 2)

$p_y = +29 \frac{kN}{m}$

$m_z = +77 \frac{kNm}{m}$





Overview 3D

3.3.4 Last combination earth pressure: JORD

Basic load combination JORD :

Load case	Factor
JORD 1	1
JORD 2	1
JORD 3-1	1
JORD 3-2	1
JORD 3-3	1
JORD 3-4	1

3.4 SUPPORT SETTLEMENT

Load effect of support settlement shall be considered in TRVINFRA-00227 section 7.2.1.1.1.1.

Only horizontal support displacement in the longitudinal direction of the bridge needs to be considered. Additionally, it is stated that horizontal and vertical support displacements do not need to be combined.

A horizontal support displacement in the longitudinal direction of the bridge (x-direction) of ±5 mm for each support is applied.

Vertical settlement difference (Z-direction) corresponding to support settlement of 10 mm is assumed to occur for all supports.

A verification will be performed to demonstrate that this is on the safe side.

Horizontal displacement (X-direction) amounts to ±10 mm.

When determining associated load effects, reduction is carried out with consideration to creep and cracking.

Note:
The impact of support settlement in serviceability limit state (SLS) according to SS-EN 1992-1-1 §2.3.1.3. If this occurs, a gradual crack development should be applied according to SS-EN 1992-1-1 §5.4(3). Reduction is carried out with consideration to creep and cracking.

The impact of support settlement is not considered in the ultimate limit state (ULS) according to SS-EN 1992-1-1 §2.3.1.3 for this type of bridge.

3.4.1 Vertical settlement

3.4.1.1 Support 1

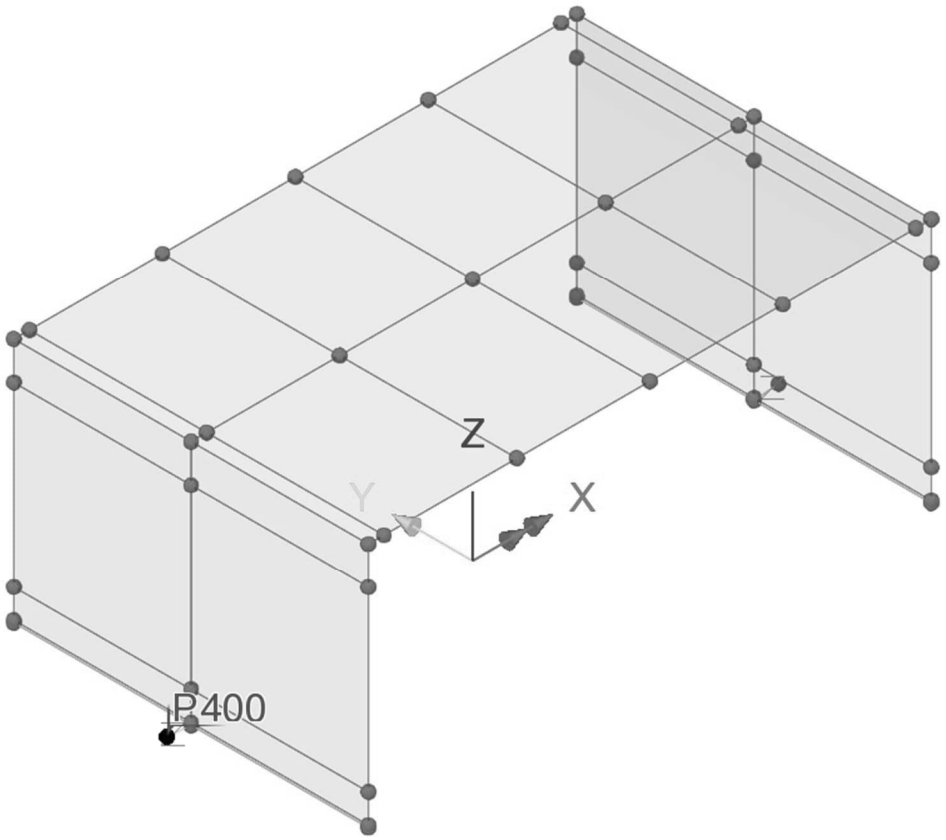
Load: STOD_1Z

Structural loading : Prescribed Displacement

Translation at point in Z direction : -0.010 m

Load case : STOD_1Z

Point : P400



Overview 3D

3.4.1.2 Support 2

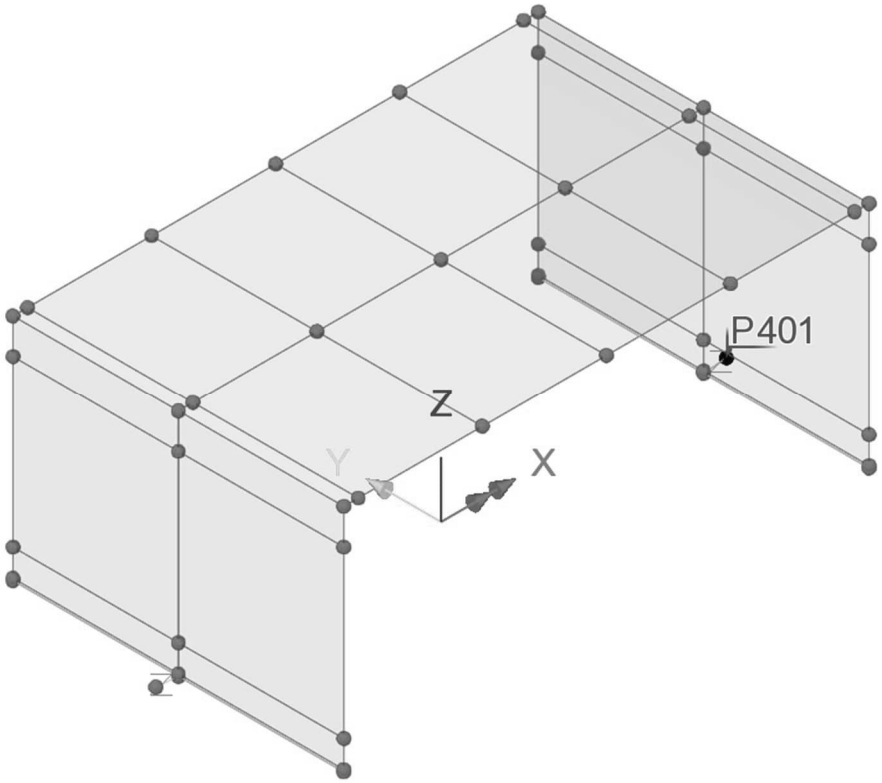
Load: STOD_2Z

Structural loading : Prescribed Displacement

Translation at point in Z direction : -0.010 m

Loadcase : STOD_2Z

Point : P401



Overview 3D

3.4.2 Horizontal settlement

3.4.2.1 Support 1

Load : STOD_1X

Structural loading : Prescribed Displacement

Translation at point in X direction : 0.010 m

Load case : STOD_1X+

Point : P400

3.4.2.2 Support 2

Load: STOD_2X

Structural loading: Prescribed Displacement

Translation at point in X direction: 0.010 m

Load case : STOD_2X+

Point : P401

3.4.3 Load combination settlement: STOD

Basic loadcases :

Loadcase	Loadcase	Factor
STOD_1X-	STOD_1X+	-1
STOD_2X-	STOD_2X+	-1

Envelope STOD-X :

Loadcase
STOD_1X+
STOD_2X+
STOD_1X-
STOD_2X-

Smart loadcombination STOD-Z :

Loadcase	Permanent factor	Variable factor
STOD_1Z	0	1.0
STOD_2Z	0	1.0

Envelope STOD :

Loadcase
STOD-X
STOD-Z

3.5 CREEP

Total creep is determined according to SS-EN 1992-1-1 §3.1.4 and TRVINFRA-00227 section 7.1.6.4 for RH 80% at time t_1.

Time for first loading (= time when formwork was removed) is termed t_0.

$t_0 = 5\ days$

$t_1 = 120\ years$

Bridge consists of parts with different thicknesses as seen below.

Creep is determine using Mathcad program PROG A001.

Structure (b = 8.0 m; C35/45):
For t = 0.80 m $\rightarrow$ $\phi(t_1, t_0) = 1.97$: see page A3:52
For t = 1.20 m $\rightarrow$ $\phi(t_1, t_0) = 1.91$: see page A3:52

Creep $\phi(t_1, t_0) = 1.9$ is used for the entire bridge on safe side since reduces stiffness and associated constraint forces ($\therefore$ support settlement, shrinkage and temperature).

$$\varepsilon_{cc}(t_1, t_0) = \varphi(t_1, t_0) \cdot \frac{\sigma_c}{E_c}$$

To study the effect concrete stiffness according to SS-EN 1992-1-1 5.8.7 creep values seen below are used.

Load cases	φ
Permanent	1.9
Variable excluding temperature	0
Temperature	0.3*

* = According to Swedish work practice

$$E^{system} = \frac{E_{cm}}{1+\varphi}$$

Instead of adjusting E-modulus the load coefficients are adjusted.

$$f_{KRYMP} = \frac{1}{1 + \varphi_{ef}} = \frac{1}{1 + 1.70} = 0.37$$

$$f_{STÖD} = \frac{1}{1 + \varphi_{ef}} = \frac{1}{1 + 1.70} = 0.37$$

$$f_{JTEMP} = \frac{1}{1 + \varphi_{ef}} = \frac{1}{1 + 0.3} = 0.77$$

Note:
According to TRVINFRA-00227 section 7.2.1.1.2.4, no reduction is permitted for uneven temperature across the cross-section. This is because this temperature variation is considered to have a very short duration (only over the day).

Objekt: Plattram

Betong (C30/37, C35/45, C40/50 och C45/55): BTG = "C35/45"

Relativ fuktighet : RH = 80%

Tvärsnittsbredd : b = 8.0m

Tvärsnittshöjd : h = 0.7m (1.20 m)

Tvärsnittsarea : $A_c = b \cdot h = 5.6 \cdot m^2$ ($9.60\ m^2$)

Omkrets i kontakt med "luft" : u = 2·b = 16 m

Bärverkets ekvivalenta tjocklek : $h_0 = \frac{2 \cdot A_c}{u} = 0.7\,m$

Studerad tidpunkt för bestämning av krypning : $t_1 = 120år$ $t_1 = 43800 \cdot dag$

Tidpunkt för pålastning (= formrivning): $t_0 = 5dag$

Indatakvitto

$f_{cm} = 43 \cdot MPa$

BERÄKNING

Uttryck för bestämning av kryptalet är hämtat från SS-EN 1992-1-1 Bilaga B.1.

$$\alpha_1 = \left(\frac{35\text{MPa}}{f_{cm}}\right)^{0.7} = 0.87$$

$$\alpha_2 = \left(\frac{35\text{MPa}}{f_{cm}}\right)^{0.2} = 0.96$$

$$\alpha_3 = \left(\frac{35\text{MPa}}{f_{cm}}\right)^{0.5} = 0.9$$

$$\varphi_{RH} = \begin{cases} 1 + \dfrac{1 - RH}{0.1\sqrt[3]{\dfrac{h_0}{\text{mm}}}} & \text{if } f_{cm} \le 35\text{MPa} \\ \left(1 + \dfrac{1 - RH}{0.1\sqrt[3]{\dfrac{h_0}{\text{mm}}}}\cdot\alpha_1\right)\cdot\alpha_2 & \text{otherwise} \end{cases} = 1.15$$

$$\beta_0 = \frac{1}{0.1 + t_0^{0.20}} = 0.68$$

$$\beta_{fcm} = \frac{16.8}{\sqrt{\dfrac{f_{cm}}{\text{MPa}}}} = 2.56$$

$$\beta_H = \left| \begin{array}{l} \text{if } f_{cm} \le 35\text{MPa} \\ \quad \left| \begin{array}{l} \beta_{H.max} \leftarrow 1500 \\ \beta_H \leftarrow \beta_{H.max} \text{ if } 1.5\cdot\left[1 + (0.012\cdot 100RH)^{18}\right]\cdot\frac{h_0}{mm} + 250 > \beta_{H.max} \\ \beta_H \leftarrow 1.5\cdot\left[1 + (0.012\cdot 100RH)^{18}\right]\cdot\frac{h_0}{mm} + 250 \text{ otherwise} \end{array} \right. \\ \text{if } f_{cm} > 35\text{MPa} \\ \quad \left| \begin{array}{l} \beta_{H.max} \leftarrow 1500\cdot\alpha_3 \\ \beta_H \leftarrow \beta_{H.max} \text{ if } 1.5\cdot\left[1 + (0.012\cdot 100RH)^{18}\right]\cdot\frac{h_0}{mm} + 250 > \beta_{H.max} \\ \beta_H \leftarrow 1.5\cdot\left[1 + (0.012\cdot 100RH)^{18}\right]\cdot\frac{h_0}{mm} + 250\cdot\alpha_3 \text{ otherwise} \end{array} \right. \\ \beta_H \end{array} \right.$$

$$\beta_H = 1353$$

$$\beta_c = \left(\frac{t_1 - t_0}{\beta_H + t_1 - t_0}\right)^{0.3} = 0.99$$

$$\varphi_{t0} = \varphi_{RH}\cdot\beta_{fcm}\cdot\beta_0 = 1.99 \qquad (1.93)$$

$$\varphi_{t1} = \varphi_{t0}\cdot\beta_c = 1.97 \qquad (1.91)$$

3.6 SHRINKAGE

Total shrinkage according to SS-EN 1992-1-1 §3.1.4 and TRVINFRA-00227 section 7.1.6.4 for RH 80% at time t_1.

Determination of load effect from shrinkage should consider the reduced concrete stiffness from creep.

$t_s = 0\ days$

$t_1 = 120\ years$

Shrinkage is determined using Mathcad program PROG A002 after time t_1.

Structure (b = 8.0 m; C35/45):
For t = 0.80 m → $\varepsilon_{cs}(t_1) = 0.024\%$: see page A3:53
For t = 1.20 m → $\varepsilon_{cs}(t_1) = 0.023\%$: see page A3:53

Shrinkage $\varepsilon_{cs} = 0.024\%$ is applied to all construction parts for safety. The movement corresponds to that which occurs due to an imaginary temperature load ∴ T = -24°C.

Remark
Shrinkage must be considered for service state (SLS) see SS-EN 1992-1-1 §2.3.2.2(1).

Shrinkage does not have to be used for ultimate state (ULS) see SS-EN 1992-1-1 §2.3.2.2(2).

Objekt: Plattram

Betong (C30/37, C35/45, C40/50 och C45/55): BTG = "C35/45"

Relativ fuktighet (se KBB avsnitt B.3.3.6): RH = 80%

Tvärsnittsbredd : b = 8.0m

Tvärsnittshöjd : h = 0.7m (1.2m)

Tvärsnittsarea : $A_c = b \cdot h = 5.60 \cdot m^2$

Omkrets i kontakt med "luft" : u = 2·b = 16 m

Bärverkets ekvivalenta tjocklek : $h_0 = \frac{2 \cdot A_c}{u} = 0.7\,m$

Studerad tidpunkt för bestämning av krympning : $t_1 = 120år$ $t_1 = 43800 \cdot dag$

Tidpunkt för pålastning (= formrivning): $t_0 = 5dag$

Cementklass (S, N, R) : Klass = "N"

Betongens ålder då uttorkningskrympning påbörjas : $t_s = 0dag$

Indatakvitto

$f_{cm} = 43 \cdot MPa$ $f_{ck} = 35 \cdot MPa$ $f_{ck.kub} = 45 \cdot MPa$

BERÄKNING

Grundvärdet för krympning från uttorkning (SS-EN 1992-1-1 Bilaga B.2)

$$\alpha_{ds1} = \begin{cases} 3.0 & \text{if Klass = "S"} \\ 4.0 & \text{if Klass = "N"} \\ 6.0 & \text{if Klass = "R"} \end{cases} = 4.00$$

$$\alpha_{ds2} = \begin{cases} 0.13 & \text{if Klass = "S"} \\ 0.12 & \text{if Klass = "N"} \\ 0.11 & \text{if Klass = "R"} \end{cases} = 0.12$$

$$RH_o = 100 \cdot \%$$

$$\beta_{RH} = 1.55 \cdot \left[1 - \left(\frac{RH}{RH_o} \right)^3 \right] = 0.76$$

$$\varepsilon_{cd.0} = 0.85 \left[\left(220 + 110 \cdot \alpha_{ds1} \right) \cdot e^{-\alpha_{ds2} \cdot \frac{f_{cm}}{f_{cmo}}} \right] \cdot 10^{-6} \cdot \beta_{RH} = 0.025 \cdot \%$$

Grundvärdet för krympning från uttorkning (SS-EN 1992-1-1 avsnitt 3.1.4 ekv. 3.9 och 3.10)

$$k_h = \text{linterp}\left[\left(0 \quad 100 \quad 200 \quad 300 \quad 500 \quad 10^4 \right) \text{mm}^T, (1.00 \quad 1.00 \quad 0.85 \quad 0.75 \quad 0.70 \quad 0.70)^T, h_0 \right] = 0.70$$

$$\beta_{ds} = \frac{t_1 - t_s}{t_1 - t_s + 0.04 \sqrt{\left(\frac{h_0}{mm} \right)^3}} = 0.98$$

$$\varepsilon_{cd} = \beta_{ds} \cdot k_h \cdot \varepsilon_{cd.0} = 0.017 \cdot \%$$

Autogen krympning (SS-EN 1992-1-1 avsnitt 3.1.4 ekv. 3.11, 3.12 och 3.13)

$$k_h = \text{linterp}\left[\left(0 \quad 100 \quad 200 \quad 300 \quad 500 \quad 10^4\right)\text{mm}^{T}, (1.00 \quad 1.00 \quad 0.85 \quad 0.75 \quad 0.70 \quad 0.70)^{T}, h_0\right] = 0.70$$

$$\beta_{as} = 1 - e^{-0.2\cdot\sqrt{t_1}} = 1.00$$

$$\varepsilon_{ca.\infty} = 2.5\cdot\left(\frac{f_{ck}}{\text{MPa}} - 10\right)\cdot 10^{-6} = 0.006\cdot\%$$

$$\varepsilon_{ca} = \beta_{as}\cdot\varepsilon_{ca.\infty} = 0.006\cdot\%$$

Total krympning (SS-EN 1992-1-1 avsnitt 3.1.4 ekv. 3.8)

$\varepsilon_{cs} = \varepsilon_{cd} + \varepsilon_{ca} = 0.024\cdot\%$ (0.023%)

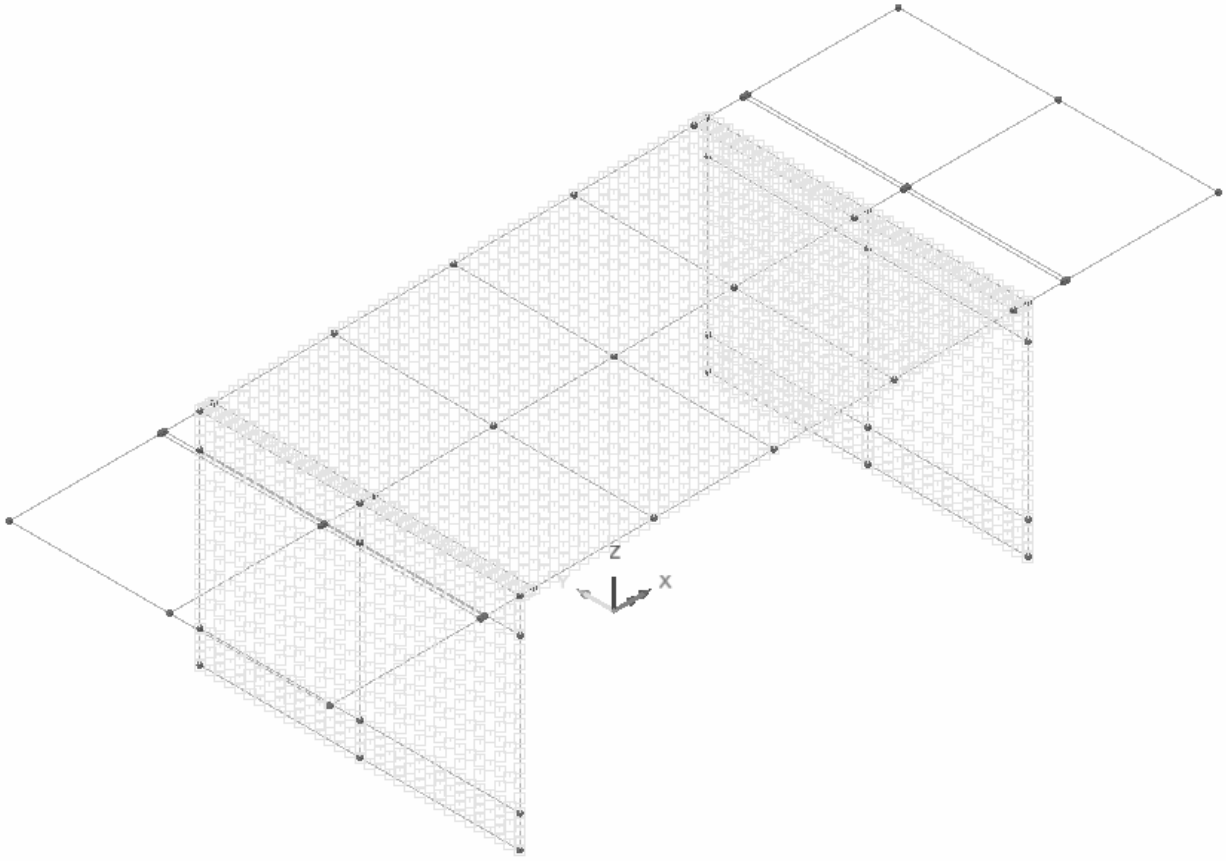
Load case : KRYMP

Structural loading : Temperature

Definition : Nodal

Initial temperature : 0 °C

Final temperature : -24 °C



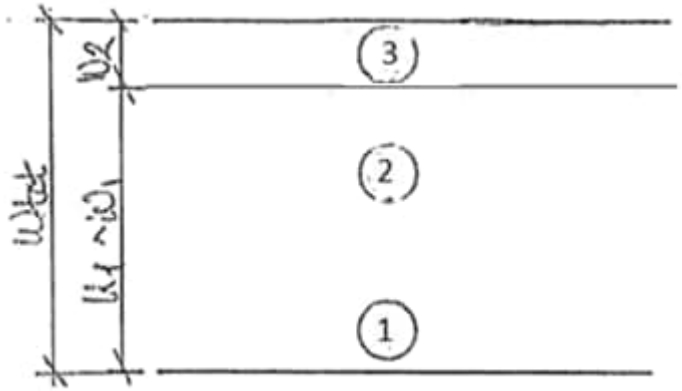
Overview 3D

3.7 TRAFFIC LOAD

Evaluation of vertical traffic is performed for LM 1 and LM 2 according to SS-EN 1991-2 section 4.3.

Evaluation will also be performed EG A/B = 180kN/300 kN according to TRVFS 2011:12 chapter 6 point 3§.

3.7.1 Traffic lane division

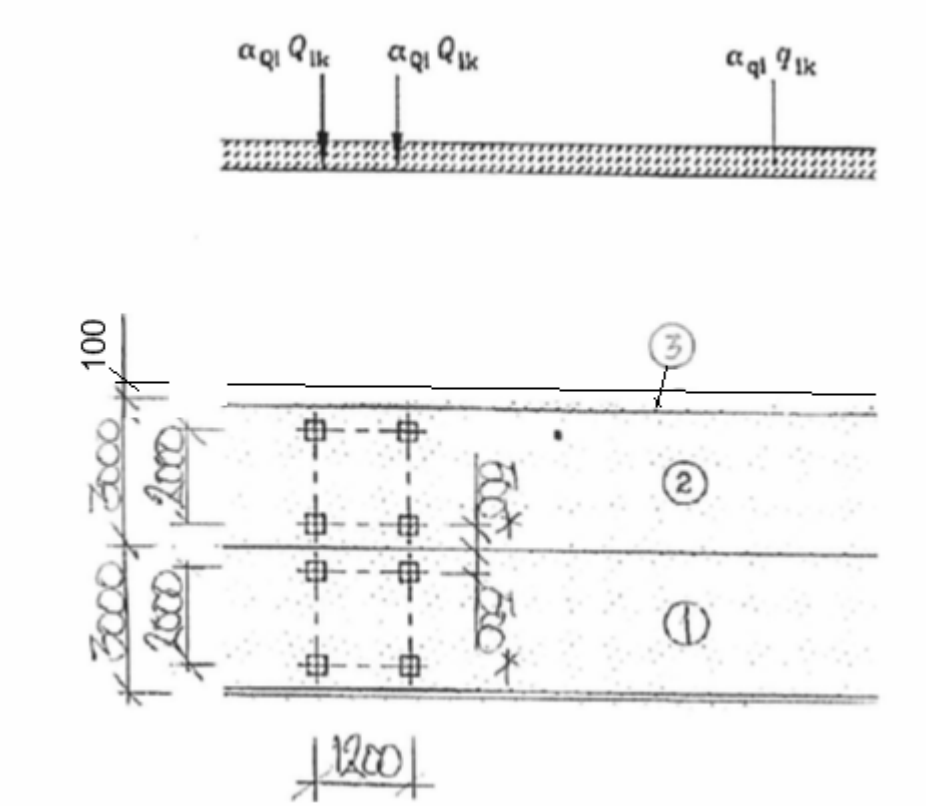


Total traffic width : $w_{tot} = 8.0\,m$

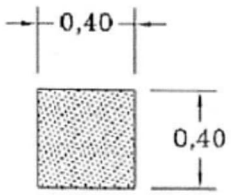
Number of traffic lanes : $n_1 = Integer\left[\frac{w_{tot}}{3.0m}\right] = 2\ lanes$

Full traffic width : $w_1 = 3.0m$

Remaining width : $w_2 = 2.0m$



* = When studying local effects 250 mm is to be assumed.



Axle loads:

α_Q : national adaptation factor according to TRVFS 2011:12 table 7.1

$Q'_k = \alpha_Q \cdot Q_k$: characteristic value including national adaptation factor

Traffic lane	Q_k	α_Q	Q'_k	Remark
1	300	0,9	270	LM1- 2 x 270 kN
2	200	0,9	180	LM1- 2 x 180 kN
3	100	0	0	No load
-	kN	-	kN	-

Surface loads:

α_q : national adaptation factor according to TRVFS 2011:12 table 7.1

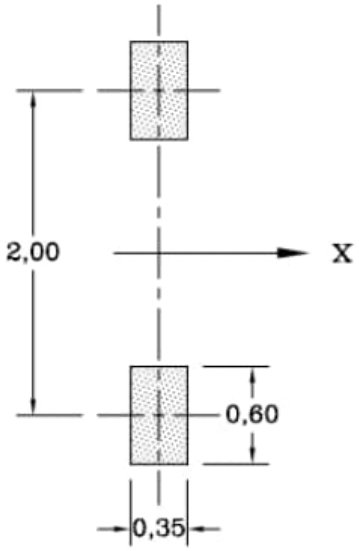
$q'_k = \alpha_q \cdot q_k$: characteristic value including national adaptation factor

Traffic lande	q_k	α_q	q'_k
1	9.0	0.8	7.2
2-3	2.5	1.0	2.5
-	kPa	-	kPa

Remark
Evaluation is performed using Vehicle Load Optimisation (VLO), see section 3.7.4.

3.7.3 Load model 2 (LM 2)

Characteristic vertical load according to SS-EN 1991-2 §4.3.3.



$\beta_Q = \alpha_Q = 0.90$: national adaptation factor

$Q_k = 400$ kN : characteristic value

$Q'_k = \beta_k \cdot Q_k = 360$ kN : characteristic value including national adaptation factor

Remark

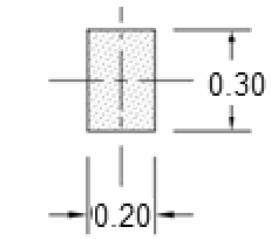
Not considered as critical for this bridge type, thus not included in FEM-analysis.

3.7.4 Load model EG A/B

Calculation is performed using traffic load EG A/B = 180 kN/300 kN excluding dynamic factor.

Traffic load EG A/B are applied to two traffic lanes. Traffic on first lane is multiplied by 1.00 while second lane is multiplied 0.80.

The center distance between the wheel pressures is 2.0 meters according to TSFS chapter 11 §2.



Wheel pressure

ε_{dyn} = 25 % : dynamic factor [1.)]

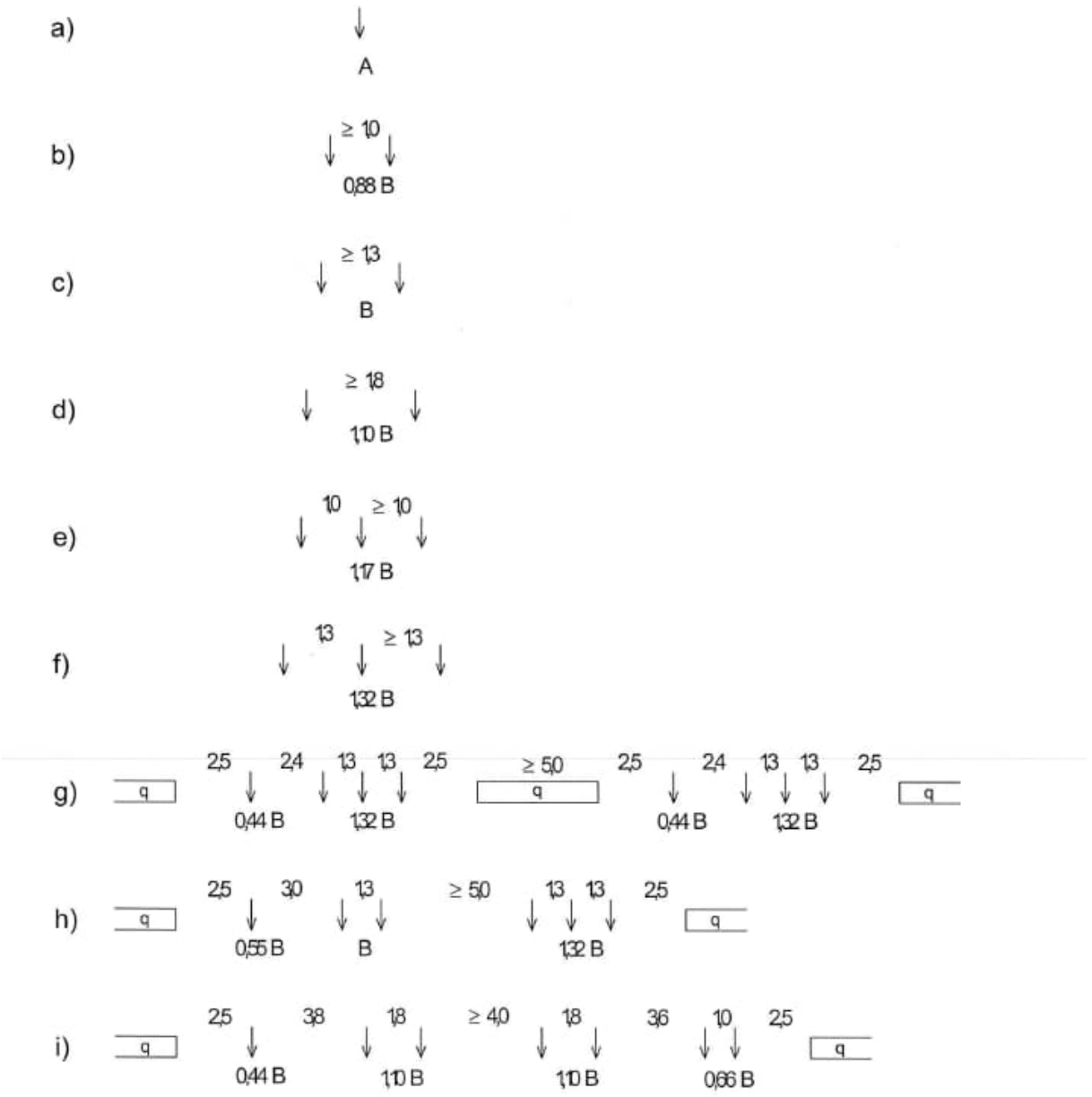
A´= A·(1 + ε_{dyn}) = 180 kN·(1+0.25) = 225 kN : single load including dynamic factor

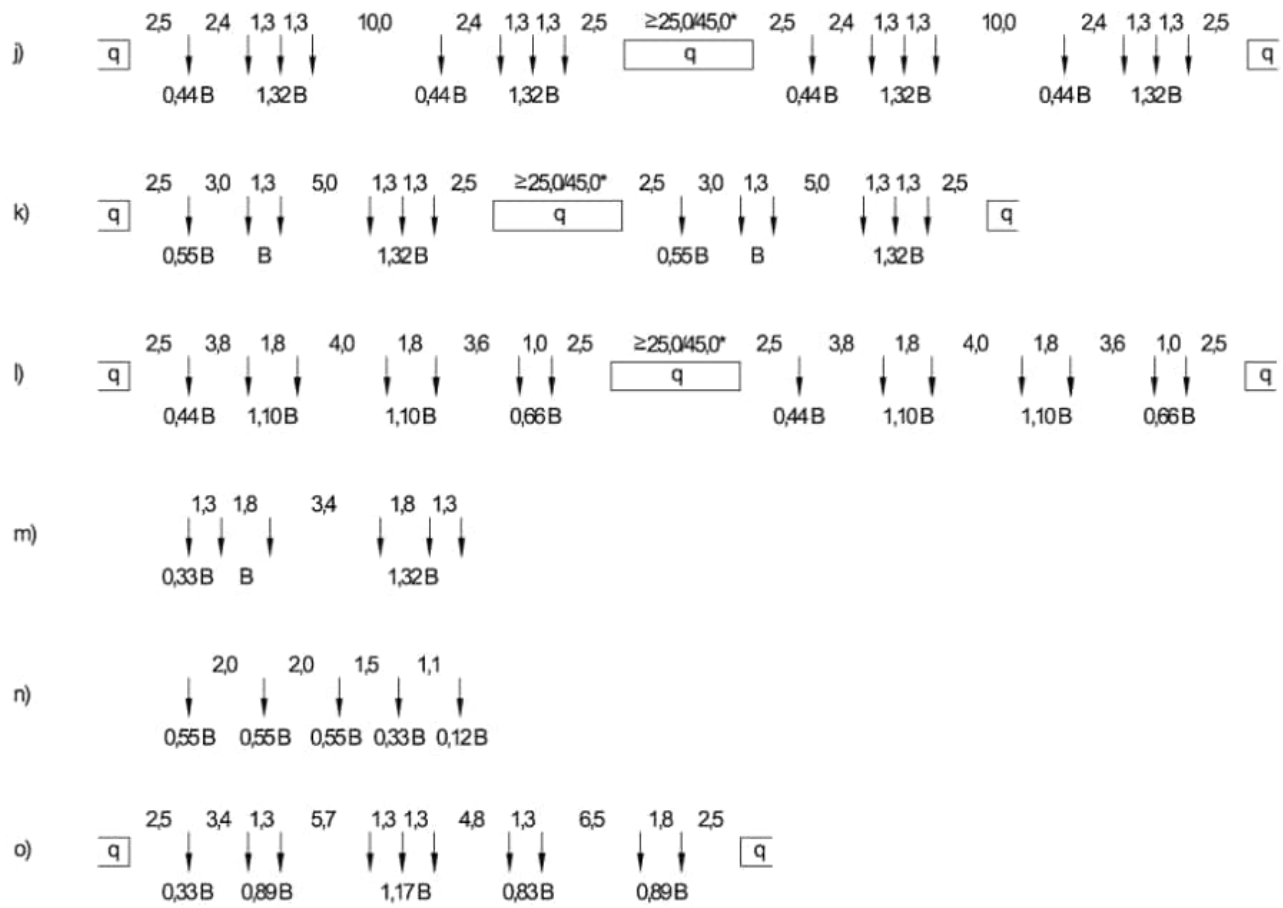
B´= B·(1 + ε_{dyn}) = 300 kN·(1+0.25) = 375 kN : tandem load including dynamic factor

$p = 5\frac{kN}{m}$: surface load

Footnote:
[1.)] TRVINFRA-00227 table 7.1-5 section 4.2.1(1) states apply 25 %.

Graphic presentation of common vehicle types:
(Vehicle types according to TRVINFRA-00331 Appendix 1)



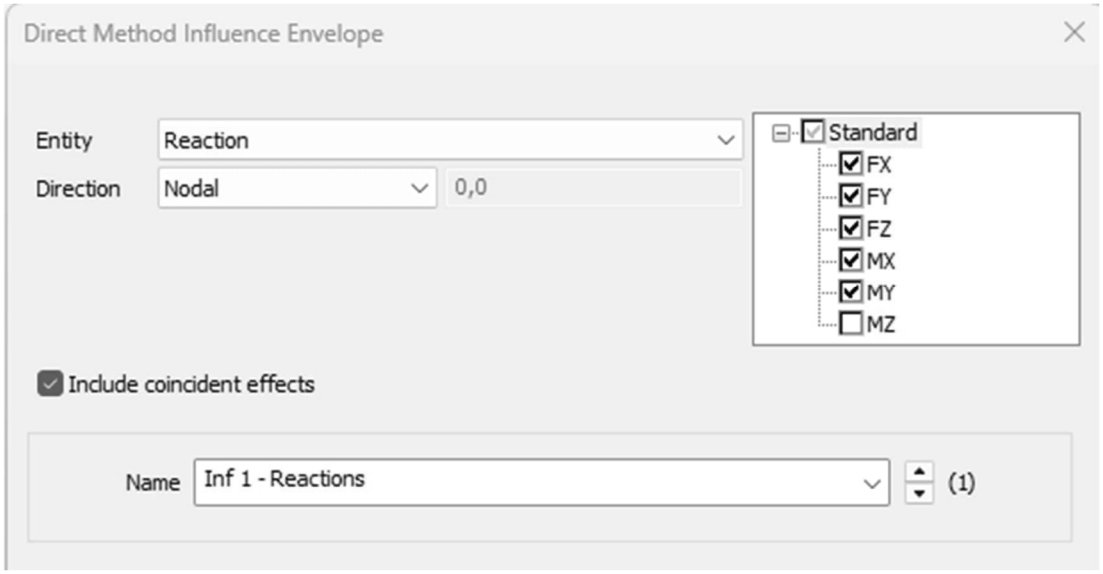


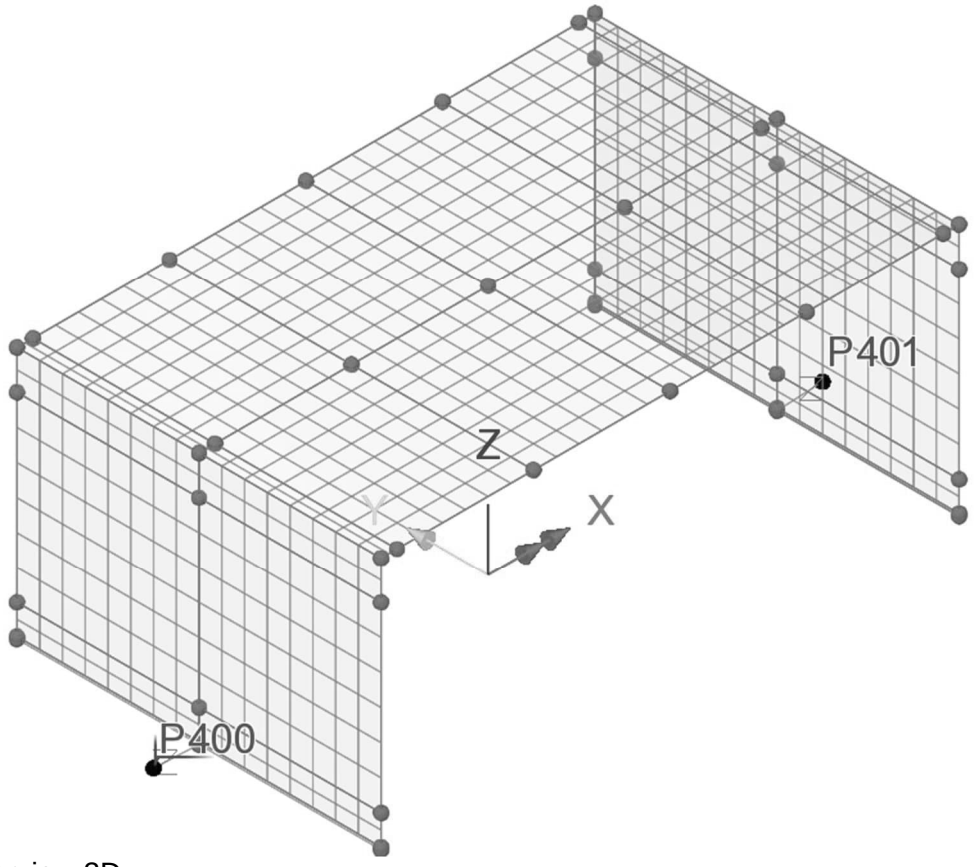
Note:
Evaluation is carried out with the script Vehicle Load Optimization (VLO), see sections 3.5.3 and 3.5.4.
Since there is no motorway, * = 45 m is applied according to TRVINFRA-00331 section 8.3.2.2.1 for vehicle types j, k, and l.

3.7.5 Vehicle Load Optimization (VLO)

Influence surfaces are created using *Direct Method Influence Envelope.* This is done by applying *Influence components* seen below.

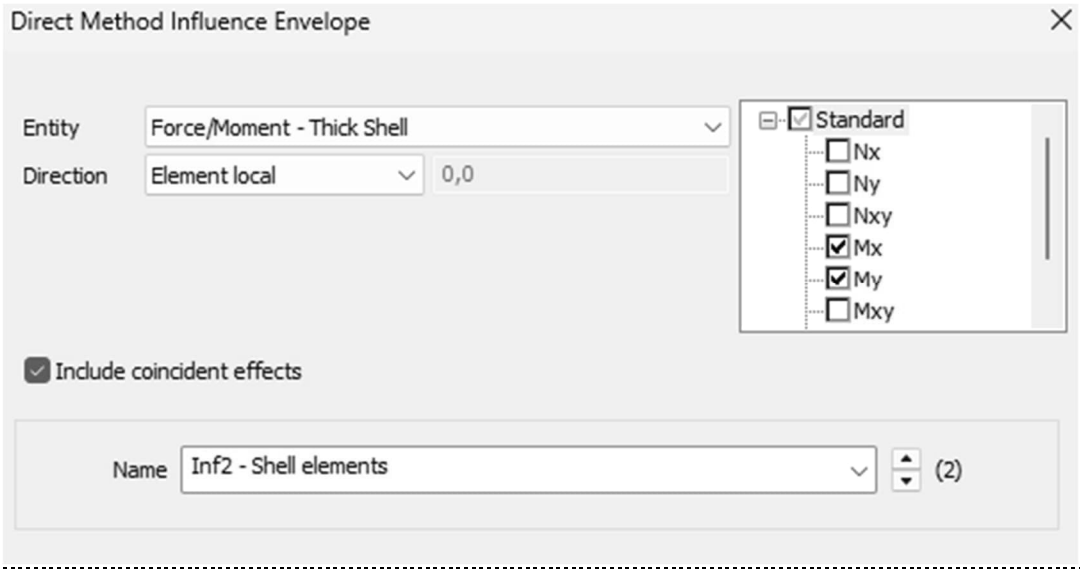
Inf1 – Reactions :

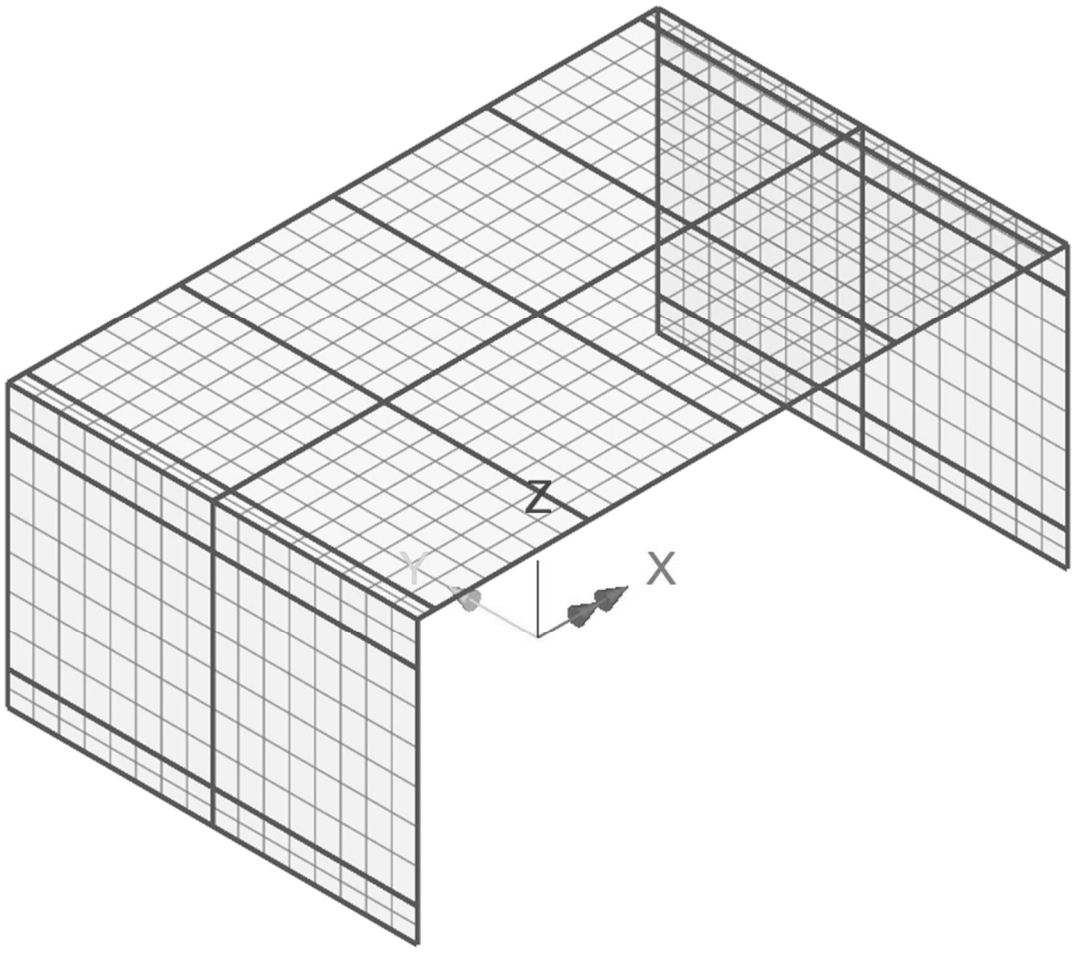




Overview 3D

Inf2 – Thick shells :
(Abutements & bridge deck)





Overview 3D

Influence surfaces :

Search area: Superstructure

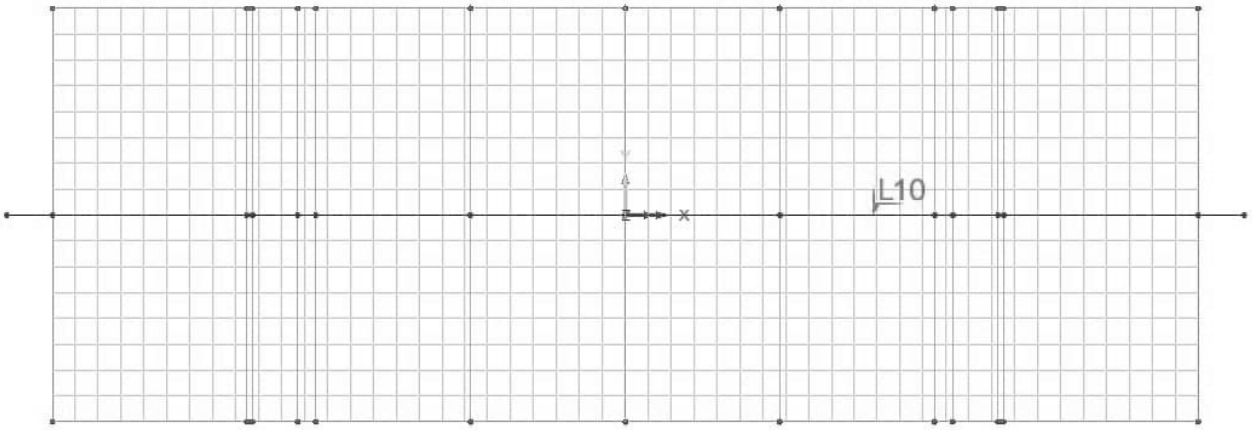
Definition type: Grid

Centerline (path): L10

Transverse width: 8.0 m

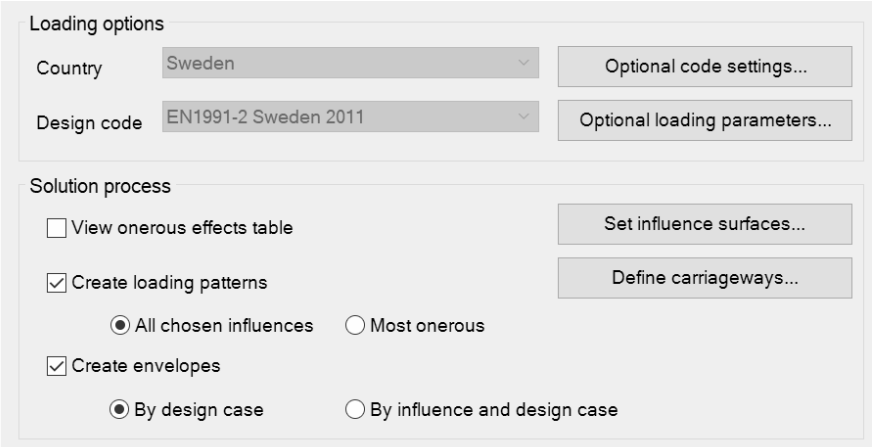
Longitudinal spacing: 0.5 m

Transversal spacing: 0.5 m



PLAN

Vehicle load optimisation options:



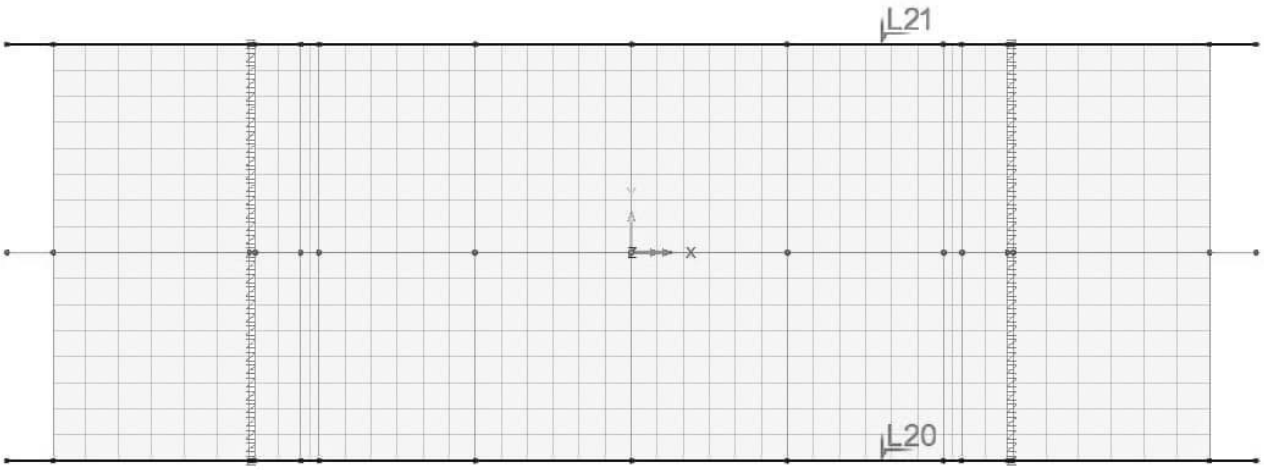
Vehicle longitudinal incremental movement: 0.25 m

Vehicle transverse incremental movement: 0.50 m

Vehicle direction: both

Definition of carriageway (kerbs): L20 & L21

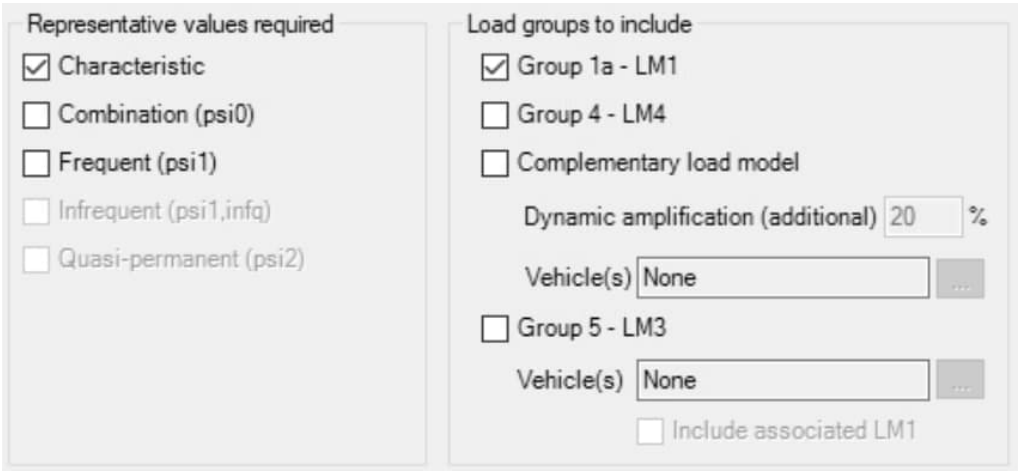
Influence surfaces: Include all (positive & negative)



PLAN

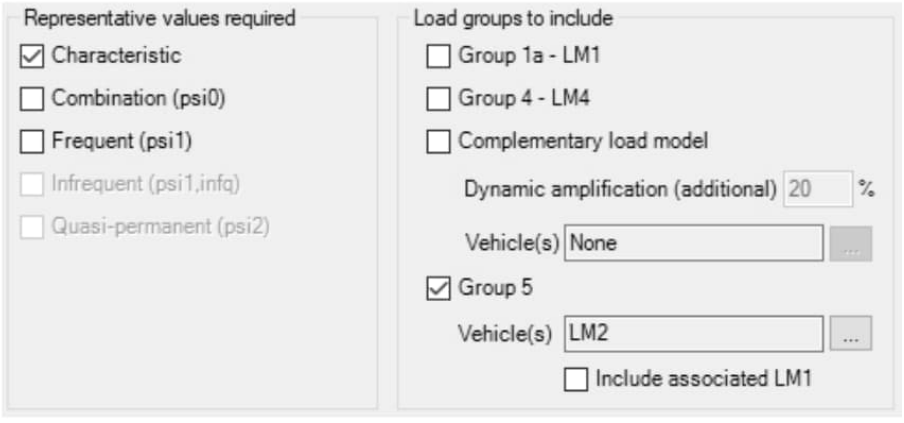
3.7.5.1 Envelope : LM 1

Lastmodell 1 (LM1) är definierad enligt SS-EN 1991-2 avsnitt 4.3.2.



3.7.5.2 Envelope : LM 2

Lastmodell 2 (LM2) är definierad enligt SS-EN 1991-2 avsnitt 4.3.3. Lasten är införd i Group 5 (special vehicle) eftersom Group 1b saknas i nuvarande version.

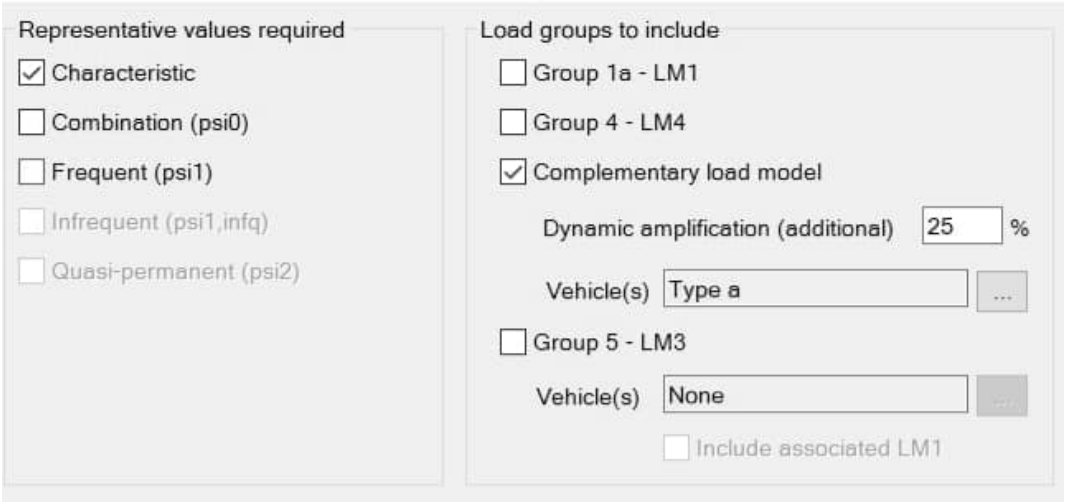


Anm.

Detta lastfall anses inte dimensionerade för studerade brotyp. Lastfall utgår i statisk modell.

3.7.5.3 Envelope : EG A

Typfordon EG A är definierad enligt nedan.

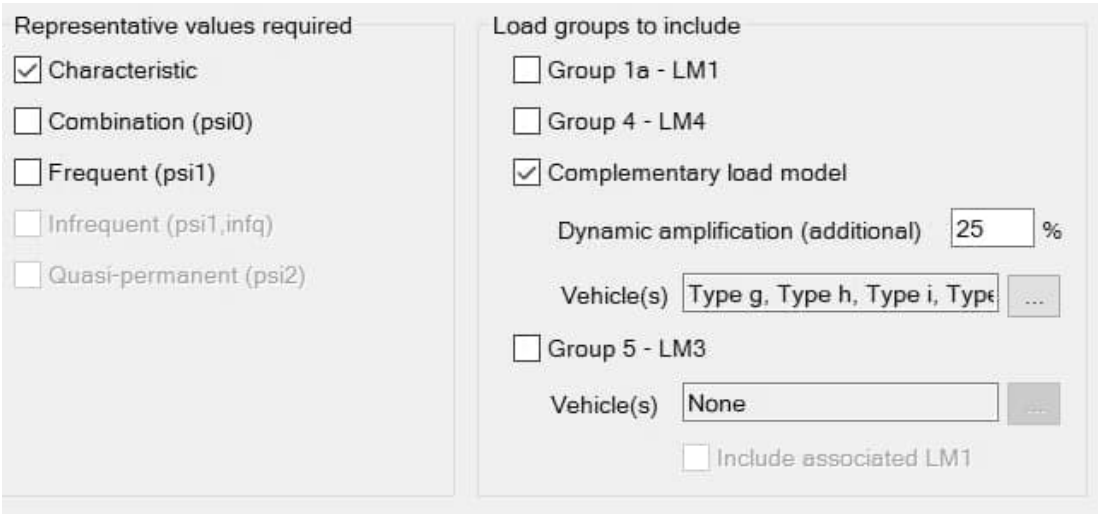


Dynamic amplification (additional): 25 %

Vehicle selection: Type a

3.7.5.4 Envelope : EG B

Typfordon EG B är definierad enligt nedan.



Dynamic amplification (additional): 25 %

Vehicle selection: Type b → o

3.7.5.5 Combined traffic load (TRAFIK)

There are a total 4 different traffic loads termed LM 1, LM2, EG A and EG B.

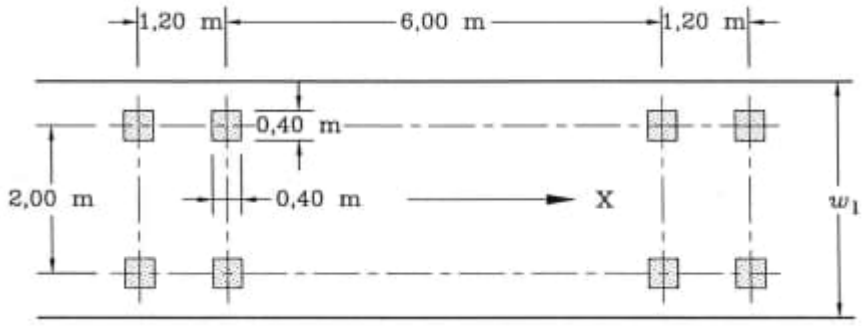
The envelope is used to identify the most onerous load effect.

Envelope TRAFIK :

Envelope
LM 1
LM 2
EG A
EG B

3.7.5.6 Fatigue model

Fatigue model 3 (UTM3) defined in SS-EN 1991-2 section 4.6.4. The load is defined in Group 5 (special vehicle) in present version of software.



Q_k = 120 kN : characteristic value including nation adaptation factors.

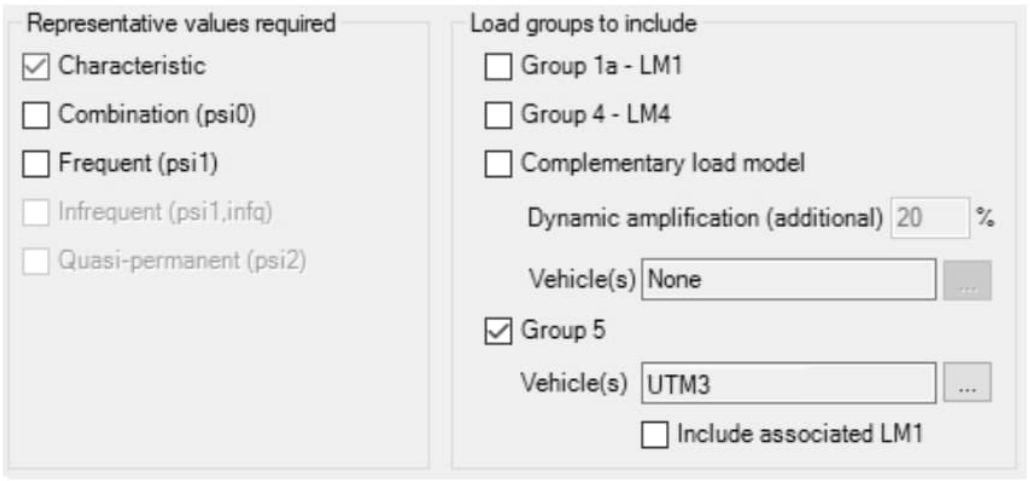
Traffic category:
TRVINFRA-0027 table 7.1-5(h) gives traffic category 3

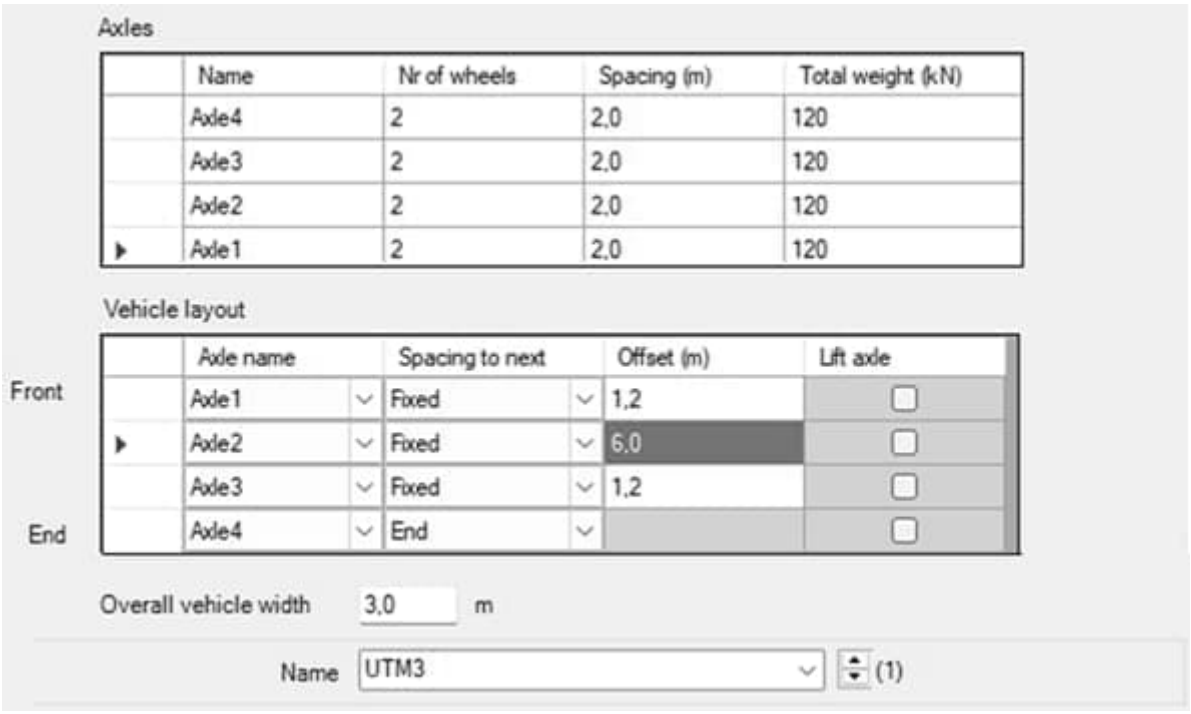
Reference values for the number of heavy vehicles:
According to SS-EN 1991-2 section 4.6.1 table 4.5(n), Category 3 is obtained

→ N_{obs} = 125,000 vehicles/year

The load definition:

The load UTM3 is defined as a special vehicle in "load group 5."





3.8 BRAKING LOAD

Braking load is defined by SS-EN 1991-2 §4.4.1.

Load acts at level of surfacing.

L = 0.25 m + 1.2 m + 12.0m + 1.2 m + 0.25 m = 14.4 m

Load modell LM 1 :

$$Q_{lk} = 0.6\alpha_{Q1} \cdot (2Q_{ik}) + 0.1\alpha_{q1} \cdot q_{1k} \cdot w_1 \cdot L$$

$$180kN \cdot \alpha_{Q1} \leq Q_{lk} \leq 900kN$$

$$Q_{broms} = 0.6 \cdot (2 \cdot 270kN) + 0.1 \cdot 7.2kPa \cdot 3.0m \cdot 14.4m = 324kN + 31kN = 355kN$$

Load model EG B = 300 kN (see TSFS chapter 11 §2) :

Type o is dimensioning.

$$Q_{lk} = 0.35 \cdot \sum Q_{EG\,B} + 0.1 \cdot p \cdot L_q$$

$$Q_{lk} \leq 500kN$$

$$Q_{broms} = 0.35 \cdot (0.44 + 1.10 + 1.10) \cdot B = 0.35 \cdot 2.64 \cdot 300kN = 277kN$$

Note:
The braking force associated with LM 1 is applied on the safe side in the system calculation.

The impact of the resisting earth pressure against the frame legs is neglected on the safe side.

Load definition:

The load is introduced as a surface load in the bridge deck's system line, located 0.46 meters below the pavement level. In the static model, this is disregarded since the effect of load my is small.

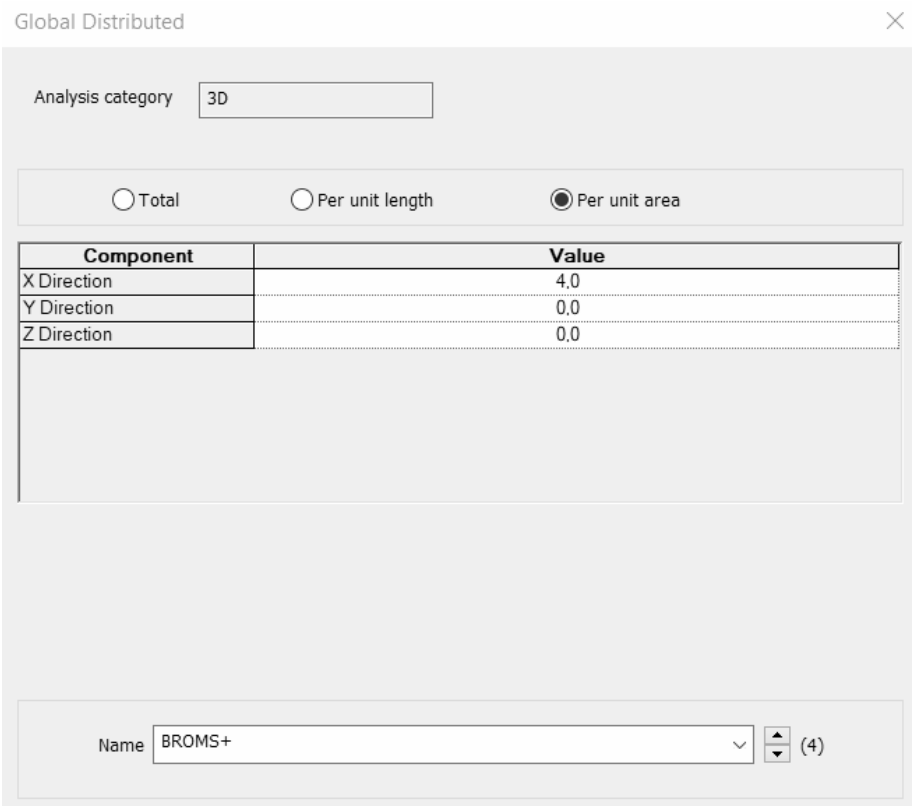
To avoid considering varying load placement laterally, it is assumed that two braking forces occur symmetrically on the bridge deck. This simplification of braking forces is considered safe.

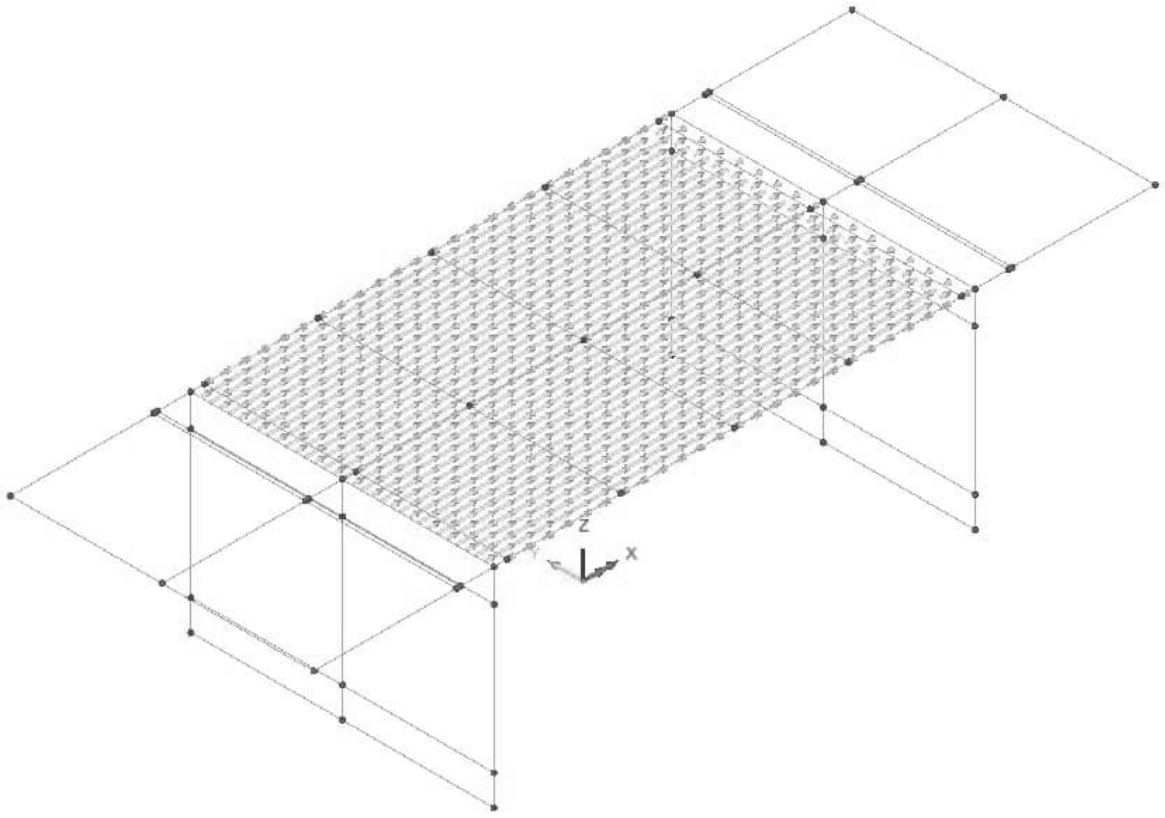
$$q_x = \frac{Q_{broms}}{w_{tot} \cdot L} = \frac{355kN}{8.0m \cdot 12.0m} = 4\frac{kN}{m^2}$$

$$m_y = q_x \cdot (0.35m + t_{bel}) = 4\frac{kN}{m} \cdot (0.35m + 0.11m) = 1.7\frac{kNm}{m^2}$$

.

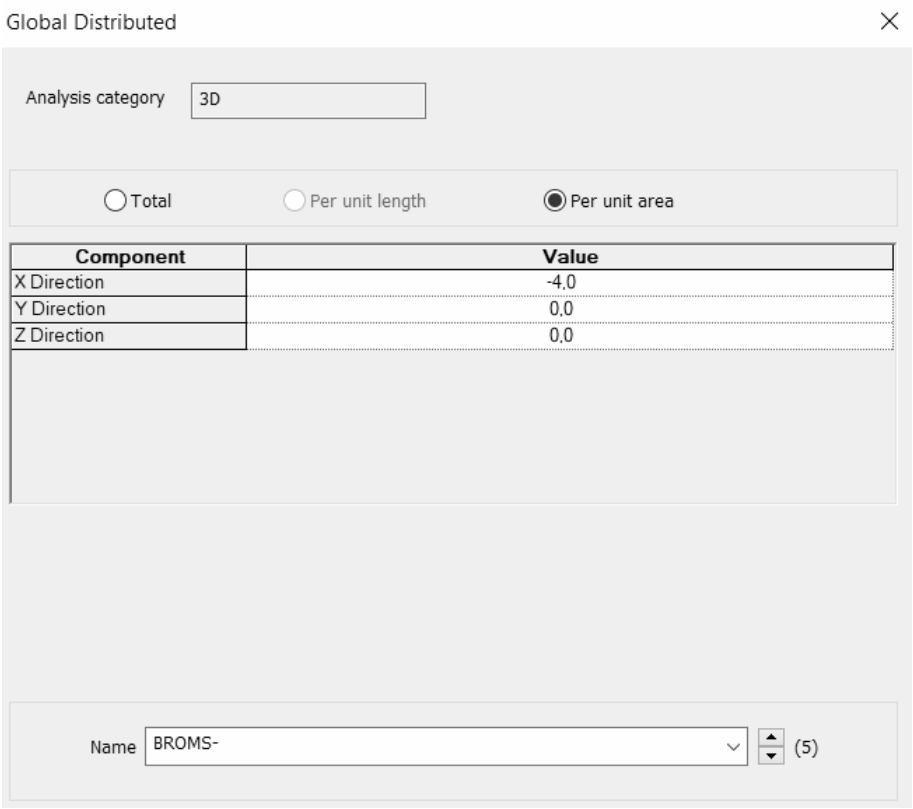
Load case : BROMS +

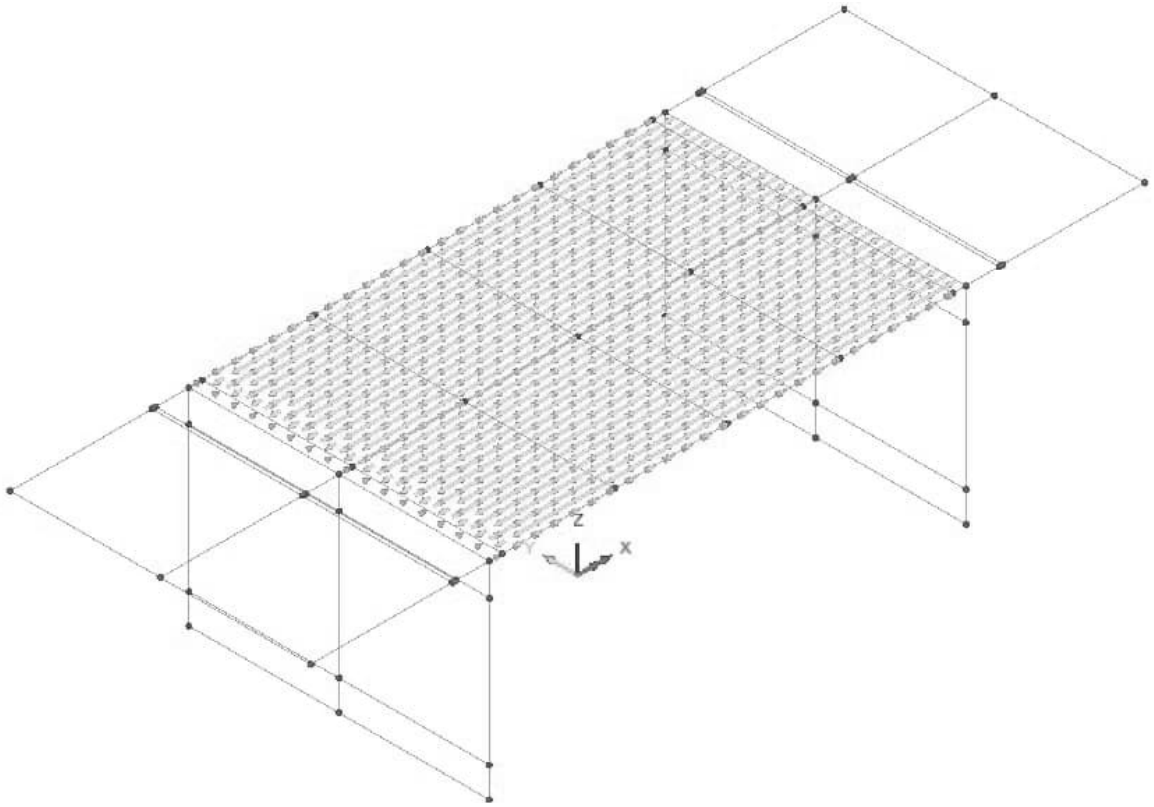




Overview 3D

Load case : BROMS-





Overview 3D

3.8.2.2 Load combination (BROMS)

Envelope BROMS :

Load case
BROMS +
BROMS -

3.9 LATERAL FORCE

Lateral force is defined by SS-EN 1991-2 §4.4.2.

The load is orthogonal to braking force and acts due to skewed braking or centrifugal forces (R = 600 m). The largest of these are used.

The acting load acts at the level of the pavement and evenly distributed over the load length.

Load model LM 1 :

$Q_{tk.1} = 0.25Q_{lk} = 0.25 \cdot 355kN = 89kN$: skewed braking

$Q_{tk.2} = \frac{40m}{R}\sum \alpha_{Qi} \cdot (2Q_{ik}) = \frac{40m}{600m} \cdot 2 \cdot (270kN + 180kN) = 60kN$: centrifugal force

Load model EG B = 300 kN (see TSFS chapter 11 §2) :
Type i is considered dimensioning.

$Q_{tk.1} = 0.25Q_{lk} = 0.25 \cdot 277kN = 69kN$: skewed braking

$Q_{tk.2} = \frac{40m}{R} \cdot Q_v = \frac{40m}{600m} \cdot (2.64 \cdot 300kN) = 53kN$: centrifugalkraft

Load definition:

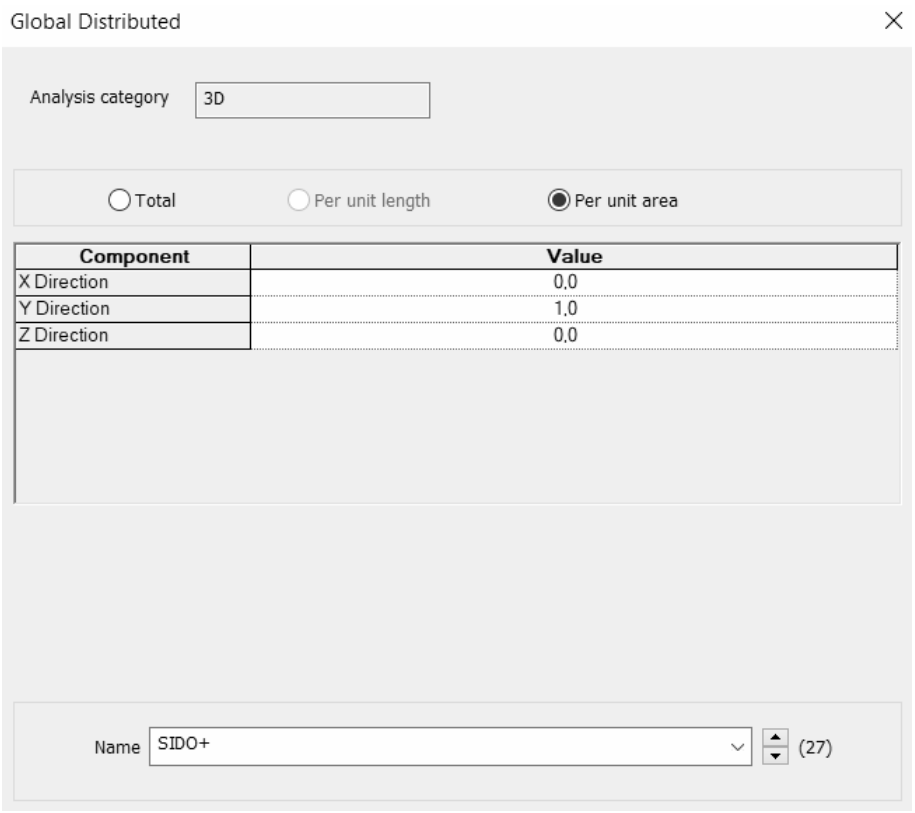
The load is applied as a surface load on the system line of the bridge deck, which is located 0.46 m below the pavement level. In the static model, the impact of m_x is not considered as it is deemed negligible.

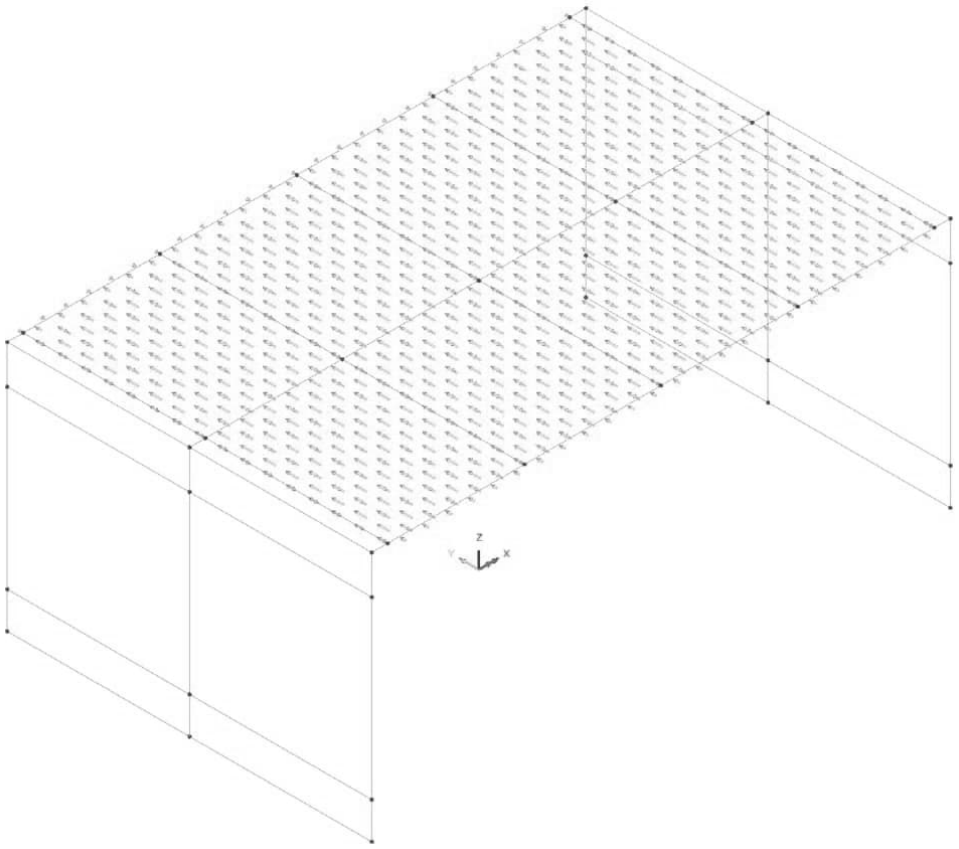
$$q_y = \frac{Q_{sido}}{w_{tot} \cdot L} = \frac{89kN}{8.0m \cdot 12.0m} = 1\frac{kN}{m^2}$$

$$m_x = q_y \cdot (0.35m + t_{bel}) = 1\frac{kN}{m} \cdot (0.35m + 0.11m) = 0.4\frac{kNm}{m^2}$$

.

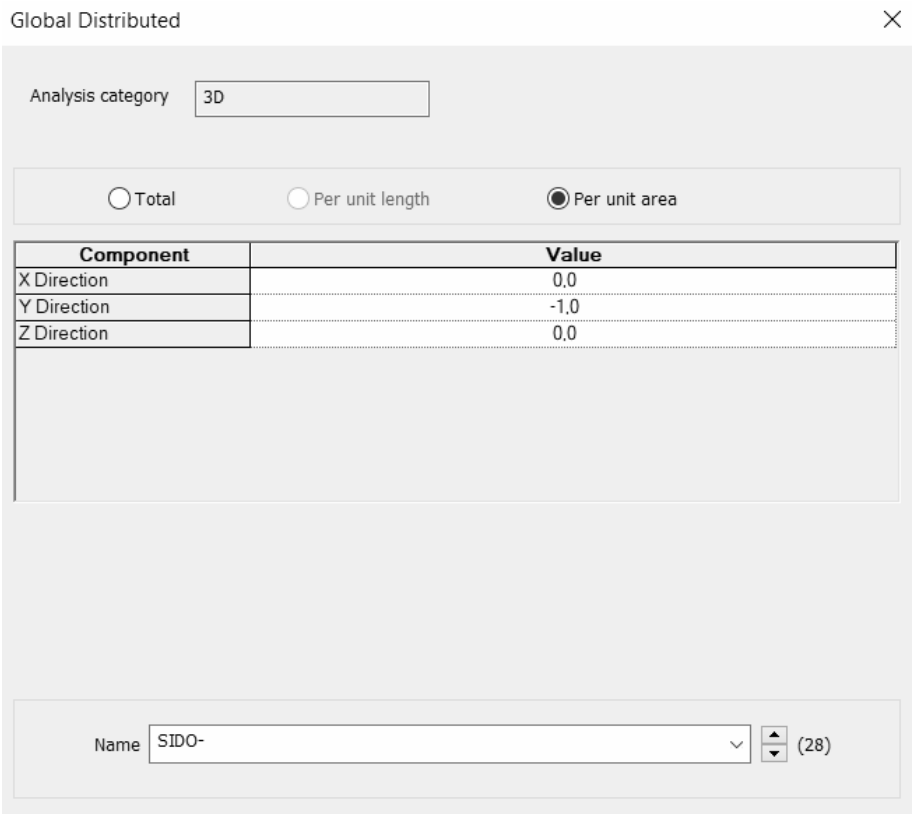
Load case : SIDO +

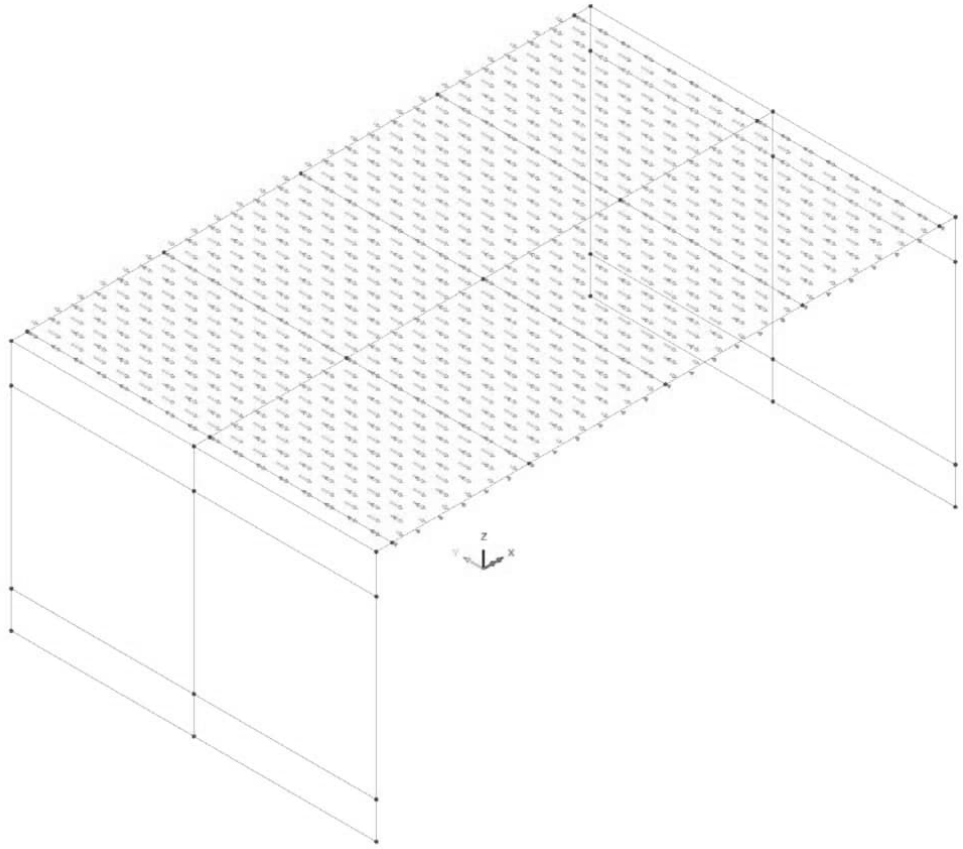




Overview 3D

Load case : SIDO-





Overview 3D

3.9.2.2 Load combination

Envelope SIDO :

Load case
SIDO+
SIDO-

3.10 WIND LOAD

Wind load on bridges is defined by EN 1991-1-4 chapter 8.

The effect of wind is considered as negligible for this bridge type; thus, wind load is not applied to model.

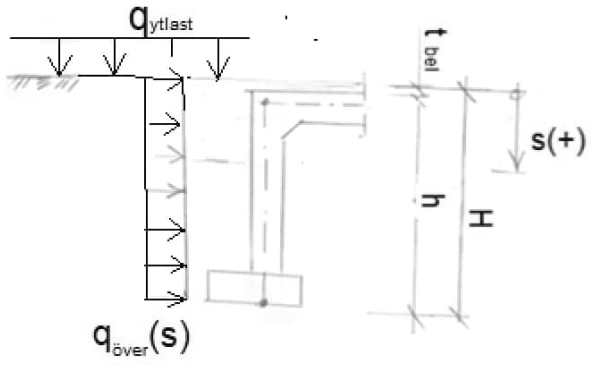
3.11 SURCHARGE

TSFS chapter 11 section §8 describes load seen below.

$q_{ytlast.1} = 20kPa$: road width 6.0 m

$q_{ytlast.2} = 10kPa$: remaining width

$q_{över}(s) = K_0 \cdot q_{ytlast}$



$q_{ytlast} = 0.29 \cdot 20kPa = 6kPa$

Note:
Since the bridge has a link plate with a fictitious bearing located 4 meters from the back edge of the frame beam, no overload theoretically occurs towards the frame beam or wing walls. On the safe side, this favourable effect is not considered.

On the safe side, a surface load of 20 kPa is applied to the entire bridge width of 8 meters.

The favourable impact of the counteracting earth pressure due to movement is not accounted for on the safe side.

3.11.1 Load abutment 1

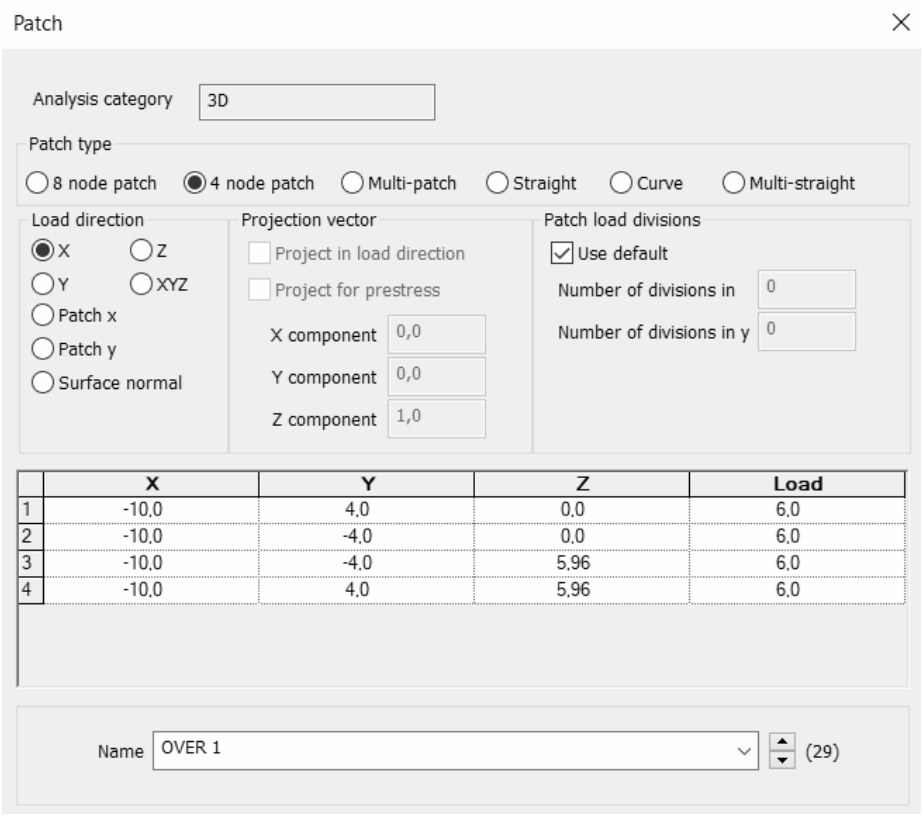
Load case : OVER 1

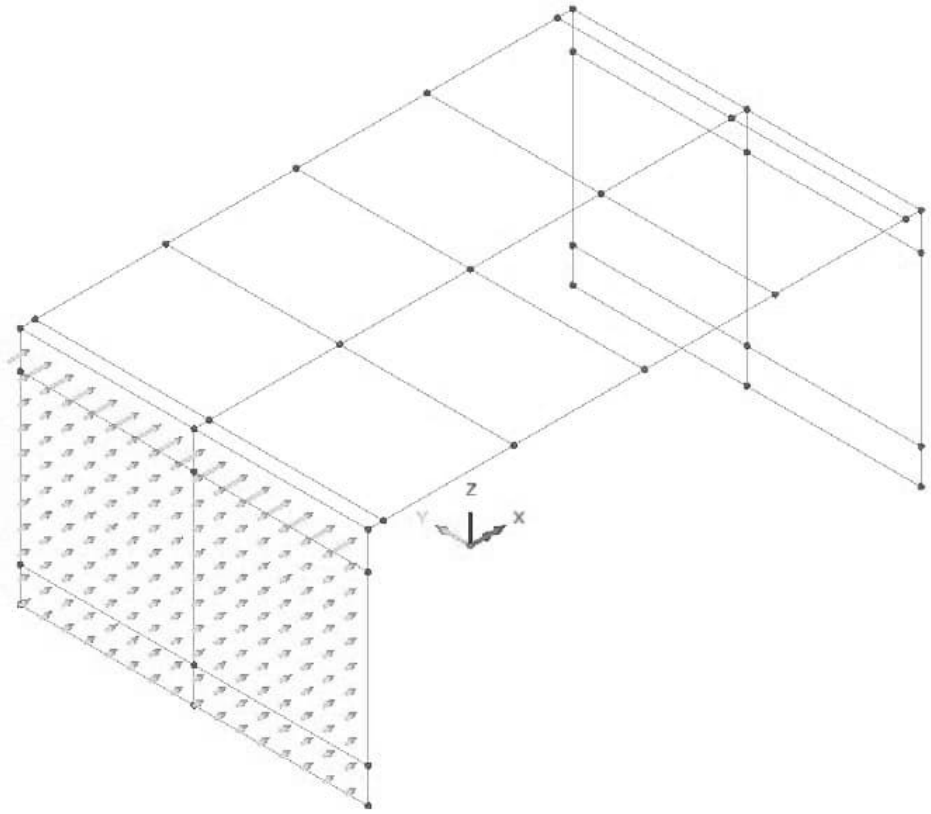
Structural loading : Discrete 4 node patch load

Surface load (q_x) : 6 kPa

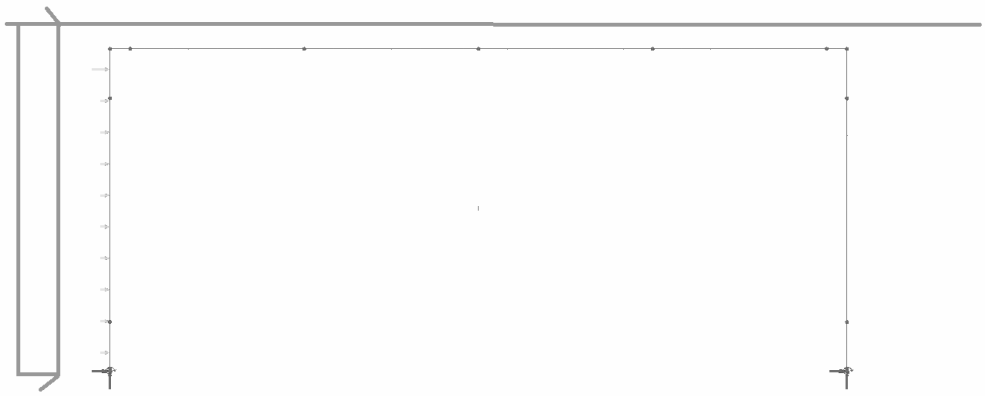
Search Area : Abutment 1

Loads outside search area : Include full load





Overview 3D



Elevation

The vector for load intensity in the figure appears to be higher at the top of the frame leg. This is because the load surface 'Abutment 1' is lower than the load surface."

3.11.2 Load abutment 2

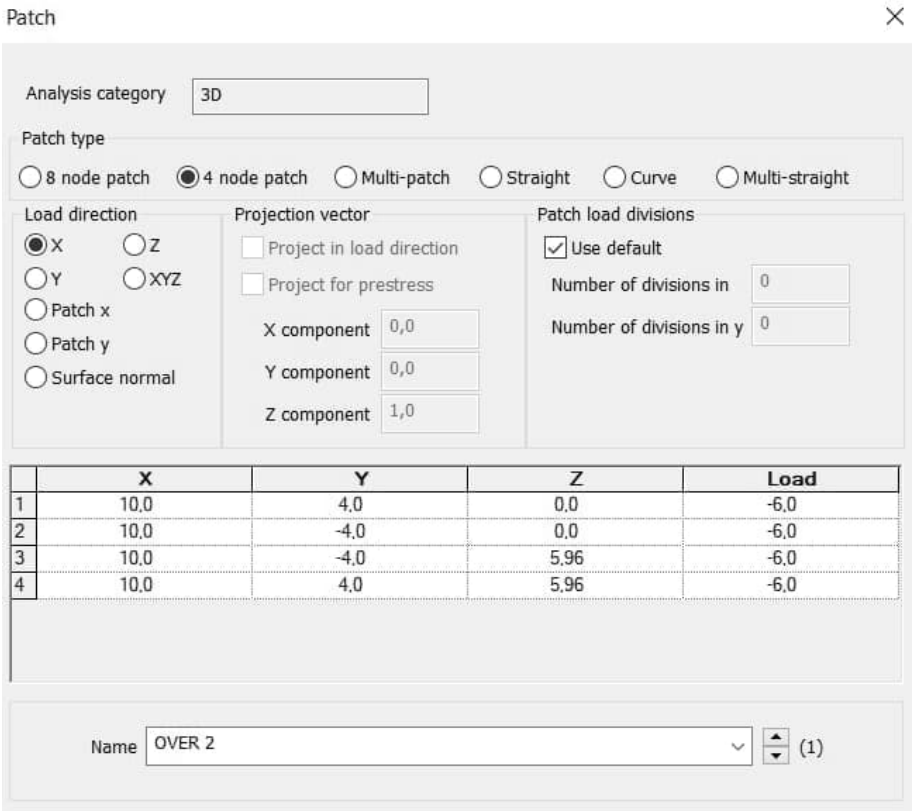
Load case : OVER 2

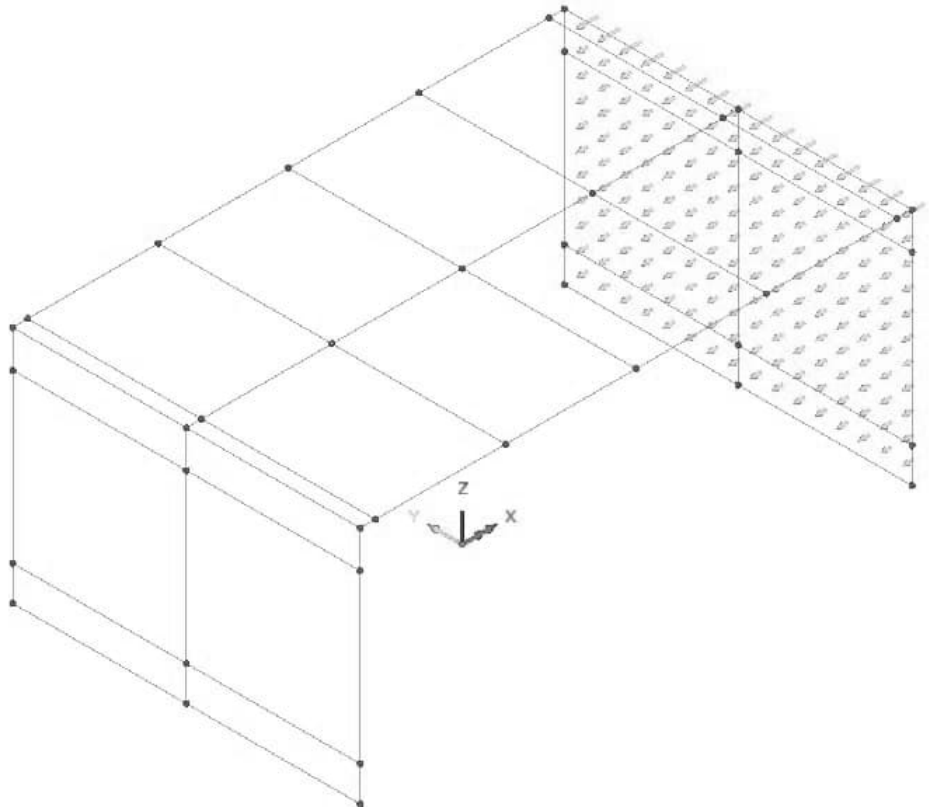
Structural loading : Discrete 4 node patch load

Surface load (q_x) : -6 kPa

Search Area : Ramben 2

Loads outside search area : Include full load





Overview 3D

3.11.3 Load wingwalls

Calculation software K2.002 is used to determine the earth pressure against wing walls according to Culman's method. All wing walls are assumed to have the same length (L = 4.8 m).

Load is distributed along edge of abutments from bottom of superstructure and distance 3.85 m downward. This assumption is on safe side.

Effective height at edge abutment:

$H_{ef} = 3.85m$: see page A3:33

Forces at edge abutment in limit state (ULS):

$N_{ULS} = +55\frac{kNm}{m}$: see page A3:33

$M_{ULS} = 134\frac{kNm}{m}$: see page A3:33

Characteristic earth pressure at edge abutment:

$N_{jord} = 29\frac{kN}{m}$: see page A3:21

$M_{jord} = 77\frac{kNm}{m}$: see page A3:21

Characteristic surcharge at edge abutment:

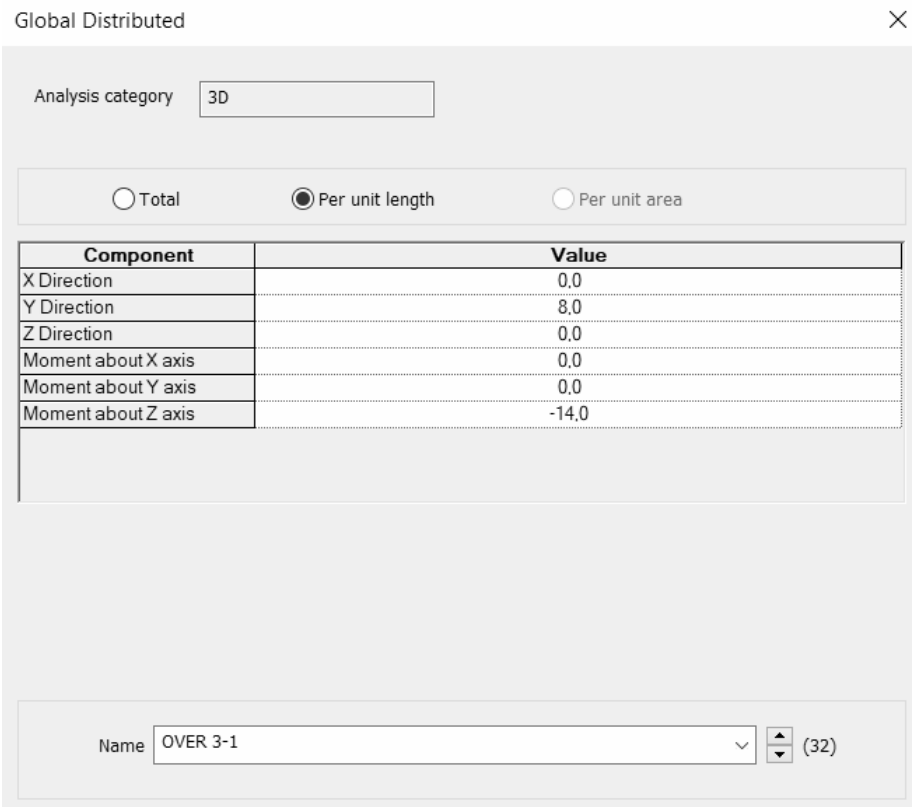
$$N_{\ddot{o}ver} = \left(52\frac{kN}{m} - 29\frac{kN}{m} \cdot 1.45\right) \cdot \frac{1}{1.70} = 8\frac{kN}{m}$$

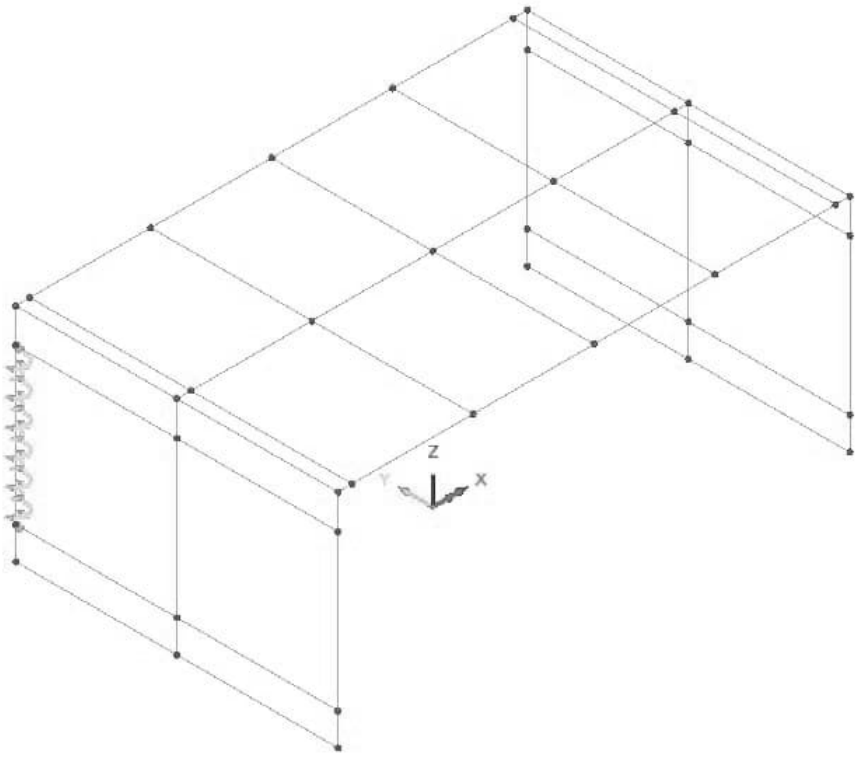
$$M_{\ddot{o}ver} = \left(127\frac{kNm}{m} - 77\frac{kNm}{m} \cdot 1.45\right) \cdot \frac{1}{1.70} = 14\frac{kN}{m}$$

Load case : JORD 3-1
(Northern wing wall abutment 1)

$$p_y = +8\frac{kN}{m}$$

$$m_z = -14\frac{kNm}{m}$$



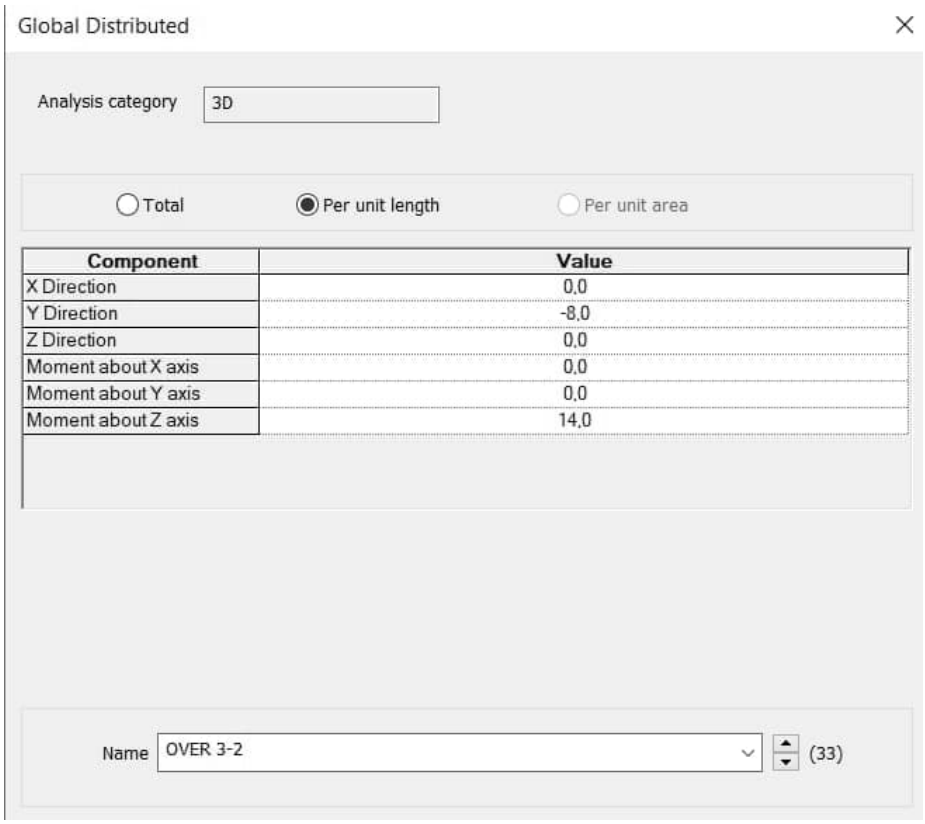


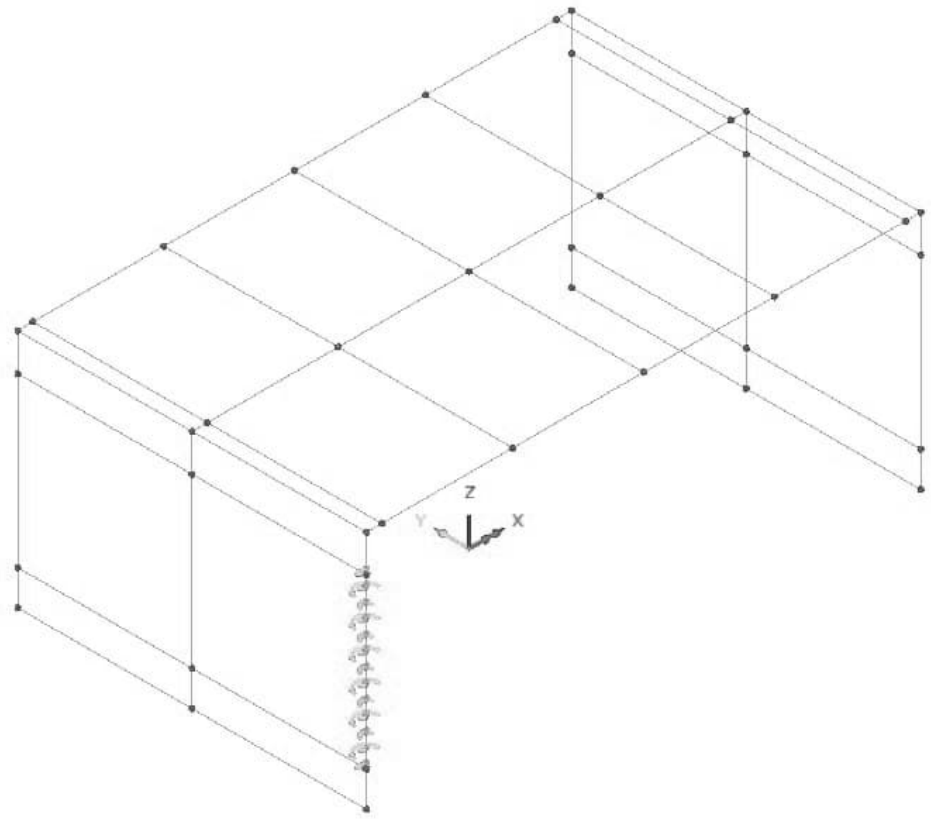
Overview 3D

Load case : OVER 3-2
(Southern wing wall abutment 1)

$$p_y = -8\frac{kN}{m}$$

$$m_z = +14\frac{kNm}{m}$$



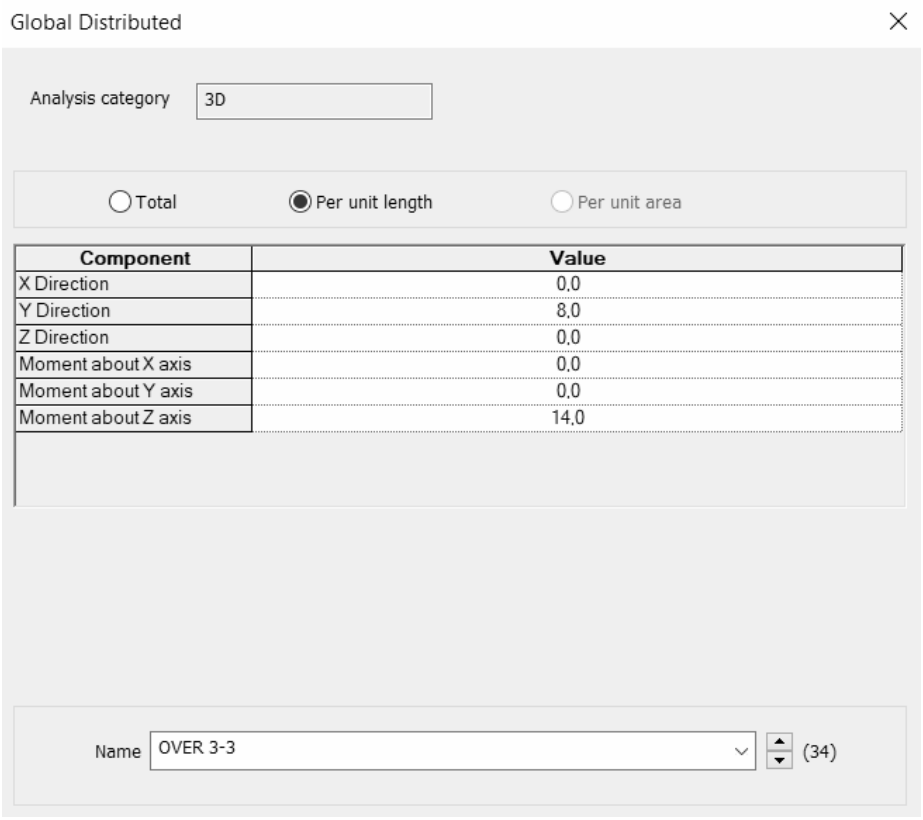


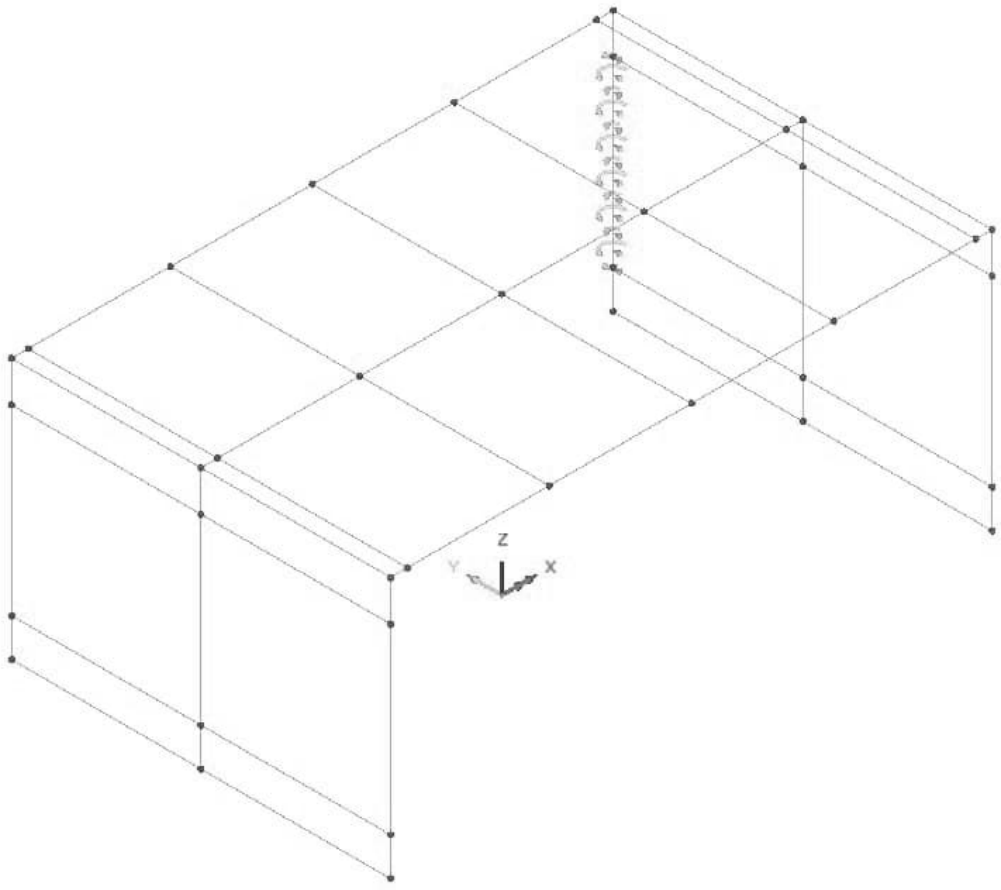
Overview 3D

Load case : OVER 3-3
(Northern wing wall abutment 2)

$$p_y = +8\frac{kN}{m}$$

$$m_z = +14\frac{kNm}{m}$$





Overview 3D

Load case : OVER 3-4
(Southern wing wall abutment 2)

$p_y = +8\frac{kN}{m}$

$m_z = +14\frac{kNm}{m}$

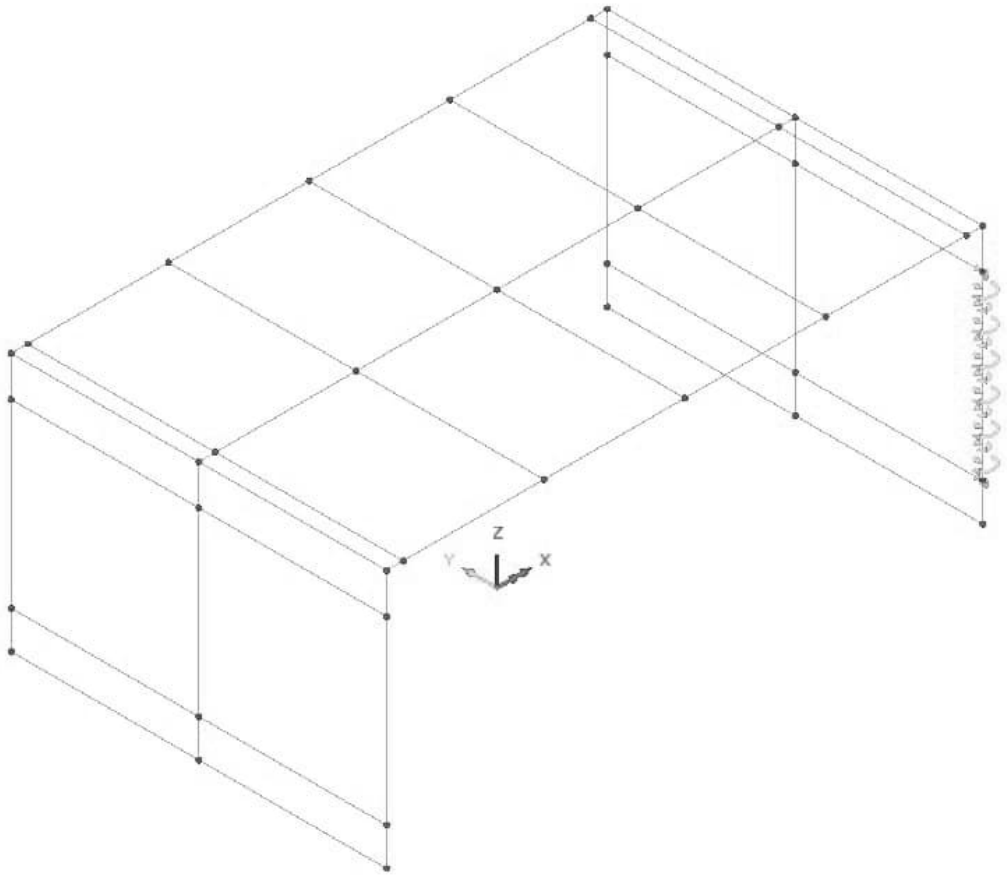
Global Distributed

Analysis category 3D

Total | Per unit length | Per unit area

Component	Value
X Direction	0,0
Y Direction	-8,0
Z Direction	0,0
Moment about X axis	0,0
Moment about Y axis	0,0
Moment about Z axis	-14,0

Name OVER 3-4 (35)



Overview 3D

3.11.5 Load combination

Load combination smart OVER :

Load case	Permanent factor	Variable factor
OVER 1	0	1
OVER 2	0	1
OVER 3-1	0	1
OVER 3-2	0	1
OVER 3-3	0	1
OVER 3-4	0	1

3.12 TEMPERATURE

Temperaturpåverkan på broar anges i TSFS 2018:57 avsnitt B.3.2.5 och EN 1991-1-5 kapitel 6.

Inverkan av gradvis sprickutveckling medges enligt SS-EN 1992-1-1 §5.4(3) vid bestämning av lasteffekter. Detta hanteras genom tillämpning av reducerad styvhet.

Temperature effect bridges according to TSFS section B.3.2.5 and EN 1991-1-5 chapter 6.

Effect in service state see SS-EN 1992-1-1 §2.3.1.2. If used then apply effect of gradual cracking according to SS-EN 1992-1-1 §5.4(3).

Effect in ultimate state is not required according to SS-EN 1992-1-1 §2.3.1.2. If used apply reduced stiffness according to SS-EN 1992-1-1 §5.4(3).

Casting temperature, T_{mont} = +10° C : EN 1991-1-5A.1(3)

Expansion coefficient, $\alpha = 12 \cdot 10^{-6}$

Concrete slab $\Rightarrow$ typ 3

Location : Boden

T_{max} = +32℃ : TSFS chapter 8 sketch 8.1
T_{min} = −42℃ : TSFS chapter 8 sketch 8.2

Duration coefficients :

Coefficients according to SS-EN 1990/A1 table A2.3

ψ_0 = 0.60
ψ_1 = 0.60
ψ_2 = 0.50

3.12.1 Effect of concrete stiffness due to cracking

Impact is considered in the serviceability limit state according to SS-EN 1992-1-1 §2.3.1.2 (1). If this is done, a gradual development of cracking may be applied according to SS-EN 1992-1-1 §5.4(3).

In the studied bridge, all concrete is assumed to be cracked for the load cases of temperature, support settlement, and creep.

This assumption will be verified to ensure that it is accurate. If it is not, the calculation model will be adjusted accordingly.

Verification of whether the concrete is cracked will be done according to SS-EN 1992.2 section 7.2 (102) under the condition $\sigma_{ct}^{SLS-K} > f_{ctm}$.

A review of the bending stiffness according to SS-EN 1992-1-1 shows that completely uncracked reinforced concrete has a stiffness that is 16% of the cracked concrete according to SS-EN 1992-1-1 section 7.4.3 when applied to a slab with a thickness of 700 mm, see page A3:107.

Selected bending stiffness in the calculation model:

In the chosen calculation, standard Swedish calculation practice is applied with stiffness of 60% for cracked compared to uncracked concrete.

Uncracked section (stage I): $EI_{osprucket} = EI_I = E_{cm} \cdot I_c$

Cracked section (stage II): $EI_{sprucket} = EI_{II} = 0.6E_{cm} \cdot I_c$

Evaluation of bending stiffnesses according to SS-EN 1992-1-1 :
The control is performed for a section corresponding to b x h = 1000 mm x 1200 mm and reinforcement ϕ16s250 (∴ 804 mm^2/m).

The evaluation of stiffness for stage II (cracked section) is done using the calculation program caeEc205.

$I_I = \frac{b \cdot h^3}{12} = \frac{1.0m \cdot (0.70m)^3}{12} = 286 \cdot 10^{-4} m^4$: uncracked crossection

$I_{II} = 42 \cdot 10^{-3} m^4$: cracked crossection, see page A3: 108

$\rightarrow \eta = \frac{I_{II}}{I_I} = 16\% < 60\,\%$ thus, on safe side !

```
Projekt: Bro 2
Position: Kontroll böjstyvhet stadium II
caeEc205-------------------------------------------------------------Version 2.2.2
```

Stadium I och II

```
Materialparametrar bruksstadie-------------------------------------------------

Betong ...........  fcm        fctk0,05     Ecm ---------------------------
                    MPa          MPa        GPa
C30/37                2,9        2,00        33,0


Materialindata-----------------------------------------------------------------

Spricksäkerhetsfaktor, Zeta.........................   1,00
Effektivt kryptal, FIeff ...........................   2,00
Betongens slutkrympning, ecs .......................   0,00 ‰
Elasticitetsmodul armering, Es..................... 200,00 GPa
Töjning i förespänd armering, ep ...................   0,00 ‰


Krafter + armering-------------------------------------------------------------

Moment, MEd (Positivt dragen underkant).............   200,0 kNm
Normalkraft, NEd (Positiv draget tvärsnitt).........     0,0 kN
Normalkraftens excentricitet, e (Pos från ÖK uppåt)     0 mm
Effektiv höjd underkantsarmering, d.................  620 mm
Armeringsarea underkantsarmering, As................  804 mm2


Rektangulärt tvärsnitt, mått i mm----------------------------------------------

    h      bw     bök    tök   tsök    buk    tuk   tsuk
    700   1000      0      0      0      0      0      0


Beräkningsresultat stadium II--------------------------------------------------

Neutrallagrets läge ................................  0,120 m
Ideelt tröghetsmoment .............................. 42,304*10^-4 m4
Betongspänning tryckt kant ..........................  -5,71 MPa
Stålspänning tryckt kant ............................  -60,9 MPa
Stålspänning dragen kant ............................  429,1 MPa
```

3.12.2 Even temperature over entire bridge (JTEMP)

Even temperature over entire bridge according to EN 1991-1-5 section 6.1.3.3. This temperature change is seasonal.

Uniform temperature change across the entire bridge is given by EN 1991-1-5, section 6.1.3.3. This temperature change is seasonal and primarily causes translation from the bridge's movement center towards the respective supports. This movement is considered to give rise to increased earth pressure due to the movement.

Function according to SS EN 1991-1-5 sketch 6.1 (bridge type 3):

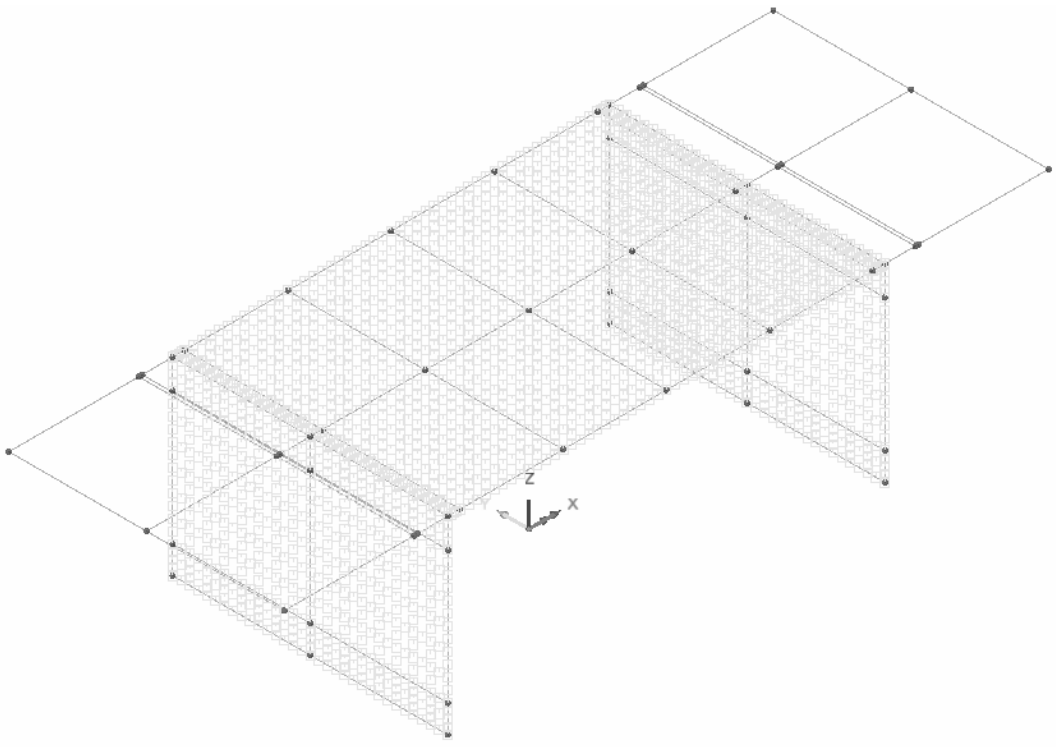
$$T_e(T) = \text{linterp}\left[(-50\ \ 0\ \ 30\ \ 50)^T \cdot °C, (-42\ \ 7\ \ 32\ \ 52)^T \cdot °C, T\right]$$

$$T_{e.max} = T_e(T_{max}) = 34\ °C$$

$$T_{e.min} = T_e(T_{min}) = -34\ °C$$

$$T^+ = T_{e.max} - T_0 = +34°C - 10°C = +24°C$$

$$T^- = T_{e.min} - T_0 = -34°C - 10°C = -44°C$$



Load : JTEMP+

Structural loading : Temperature

Final temperature : +24C

Initial temperature : ±0 C

Load case : JTEMP+

Temperature

Analysis category 3D

Nodal Element

Component	Value
Final temperature	24,0
Final X temperature gradient	0,0
Final Y temperature gradient	0,0
Final Z temperature gradient	0,0
Initial temperature	0,0
Initial X temperature gradient	0,0
Initial Y temperature gradient	0,0
Initial Z temperature gradient	0,0

Name JTEMP+ (24)

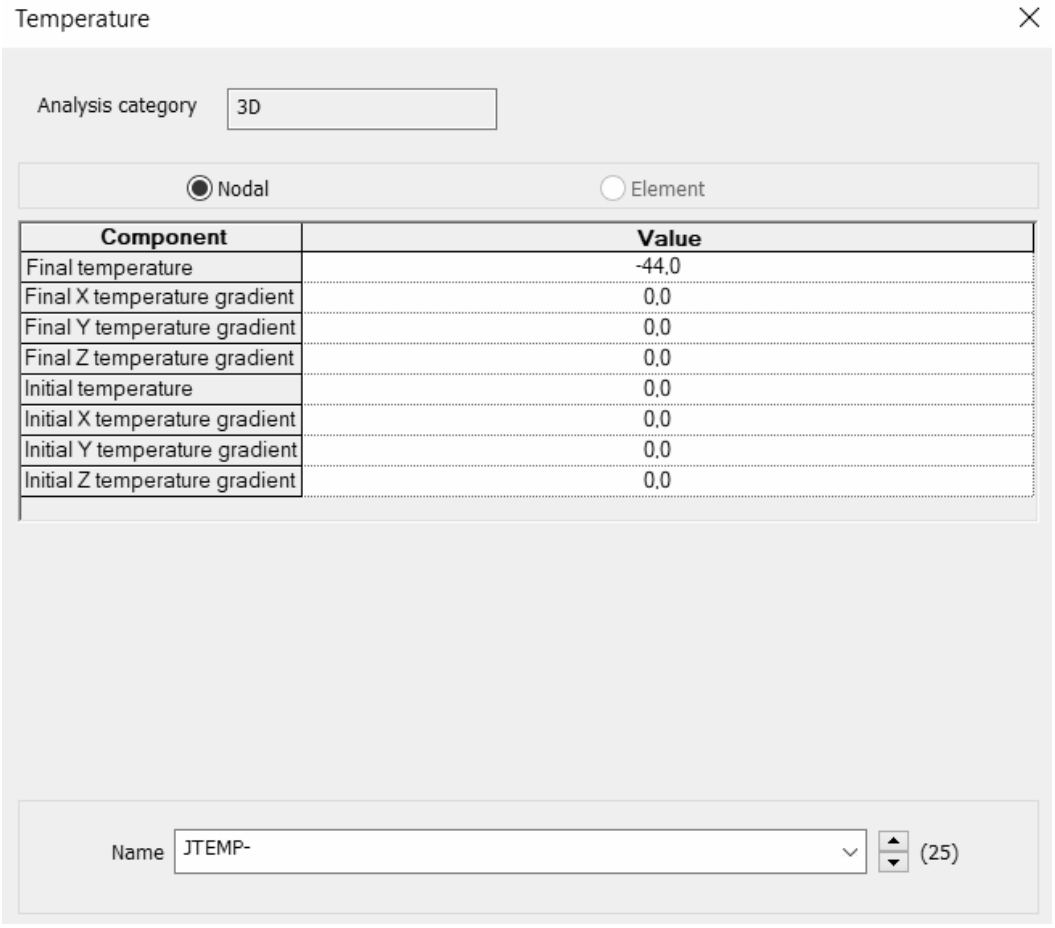
Load : JTEMP-

Structural loading : Temperature

Final temperature : -44C

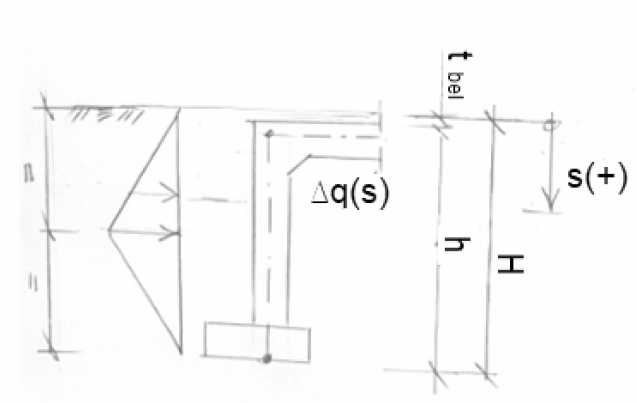
Initial temperature : ±0 C

Load case : JTEMP-



3.12.3 Increased earth pressure due to movement (DELTA P)

The increased earth pressure caused by the movement of the approach slab towards the backfill is calculated according to TRVINFRA-00227, section 7.2.1..2.1. This load corresponds to what is stated in SS-EN 1997-1, section C.3. This section is used to ensure that movements for Δq(s) do not exceed the limit for passive earth pressure. During this check, "firm ground" and "wall movement type" b are applied.



$$\rightarrow \delta = (T^{+} - T^{-}) \cdot \alpha \cdot \frac{L_{bro}}{2} = (24℃ + 44℃) \cdot 1.2 \cdot 10^{-5} \cdot \frac{14200mm}{2} = 6mm$$

$$\Delta q(s) = c \cdot \gamma \cdot s \cdot \frac{\delta}{H} = 600 \cdot 20\frac{kN}{m^3} \cdot s \cdot \frac{\delta}{H}$$

$$H = 0.11m + 5.85m = 5.96m$$

$$\Delta q(s) = c \cdot \gamma \cdot s \cdot \frac{\delta}{h} = 600 \cdot 22\frac{kN}{m^3} \cdot s \cdot \frac{13mm}{6975mm}$$

$$\Delta q_{max} = 600 \cdot 20\frac{kN}{m^3} \cdot \frac{5960mm}{2} \cdot \frac{6mm}{5960mm} = 36kPa$$

Note:
No reduction is made considering creep or cracking, as this is not an internal constraint load. This applies to both ultimate limit state (ULS) and serviceability limit state (SLS).

3.12.3.1 Load abutment 1

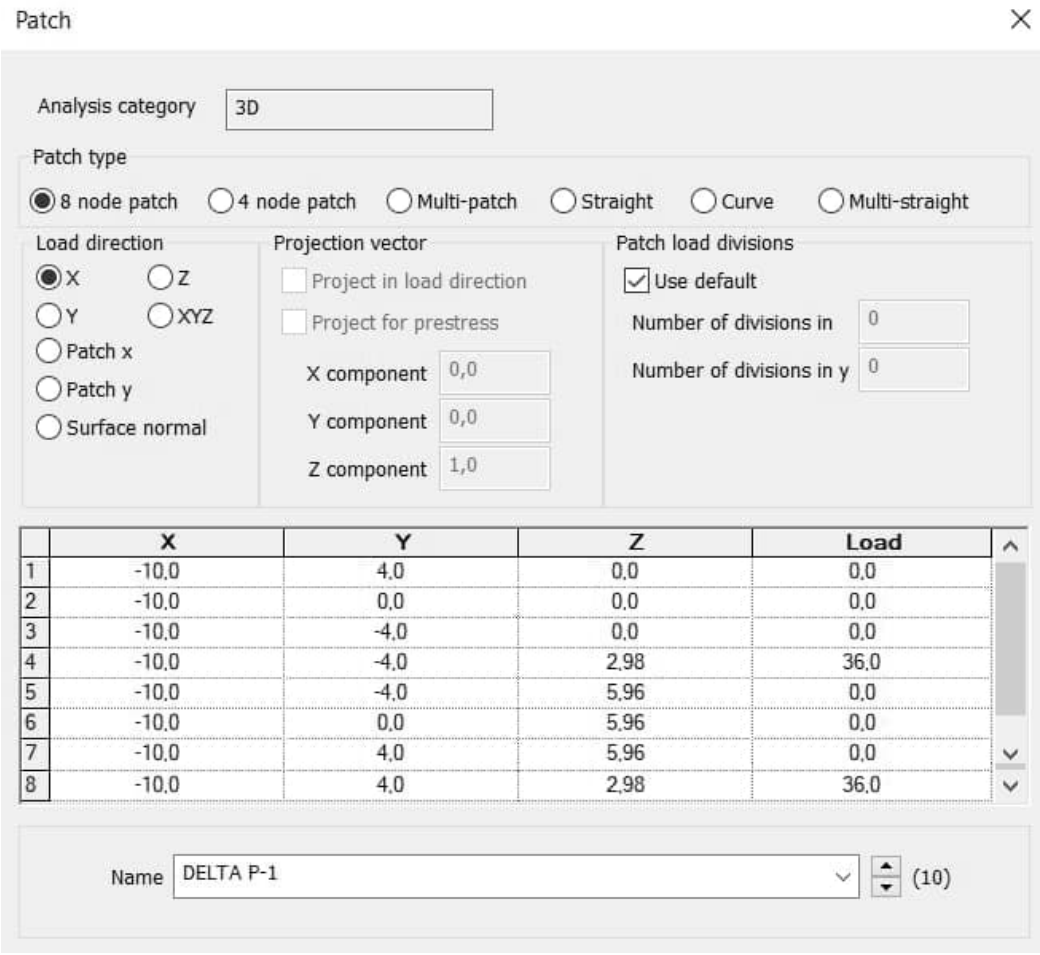
Discrete patch load : DELTA P-1

Structural loading : Discrete 8 node patch

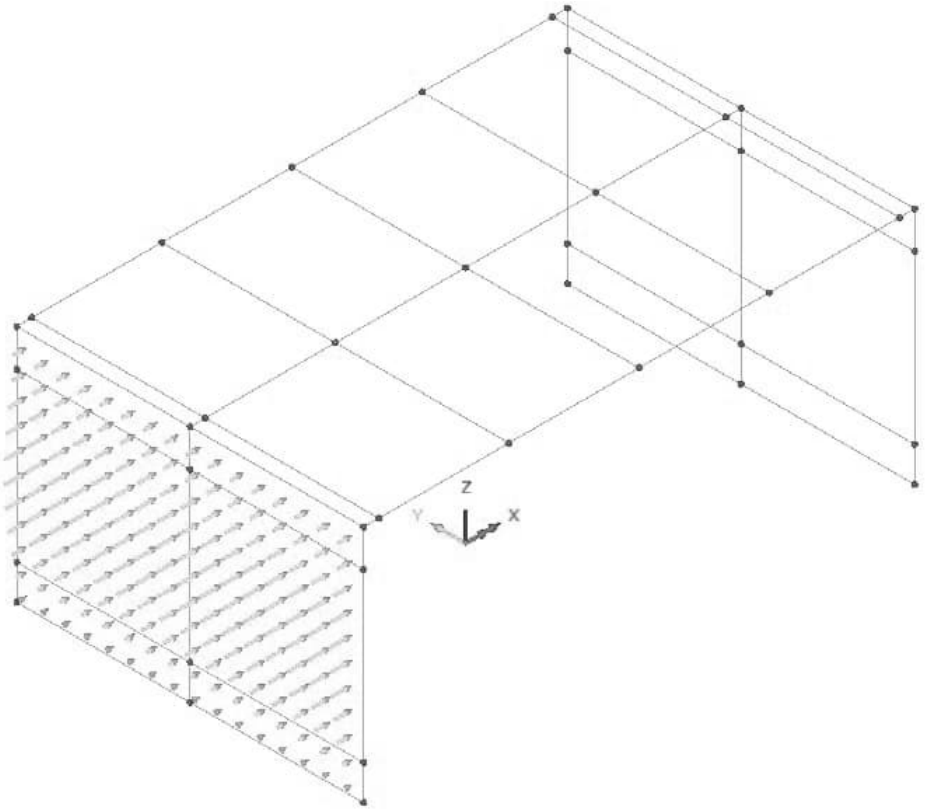
Surface load (q_x) : 0 kPa → +36 kPa

Search Area : Abutment 1

Loads outside search area : Include full load



	X	Y	Z	Load
1	-10,0	4,0	0,0	0,0
2	-10,0	0,0	0,0	0,0
3	-10,0	-4,0	0,0	0,0
4	-10,0	-4,0	2,98	36,0
5	-10,0	-4,0	5,96	0,0
6	-10,0	0,0	5,96	0,0
7	-10,0	4,0	5,96	0,0
8	-10,0	4,0	2,98	36,0



Overview 3D

3.12.3.2 Load abutment 2

Discrete patch load : DELTA P-2

Structural loading : Discrete 8 node patch

Surface load (q_x) : 0 kPa → -36 kPa

Search Area : Abutement 2

Loads outside search area : Include full load

Patch

Analysis category: 3D

Patch type: (●) 8 node patch ( ) 4 node patch ( ) Multi-patch ( ) Straight ( ) Curve ( ) Multi-straight

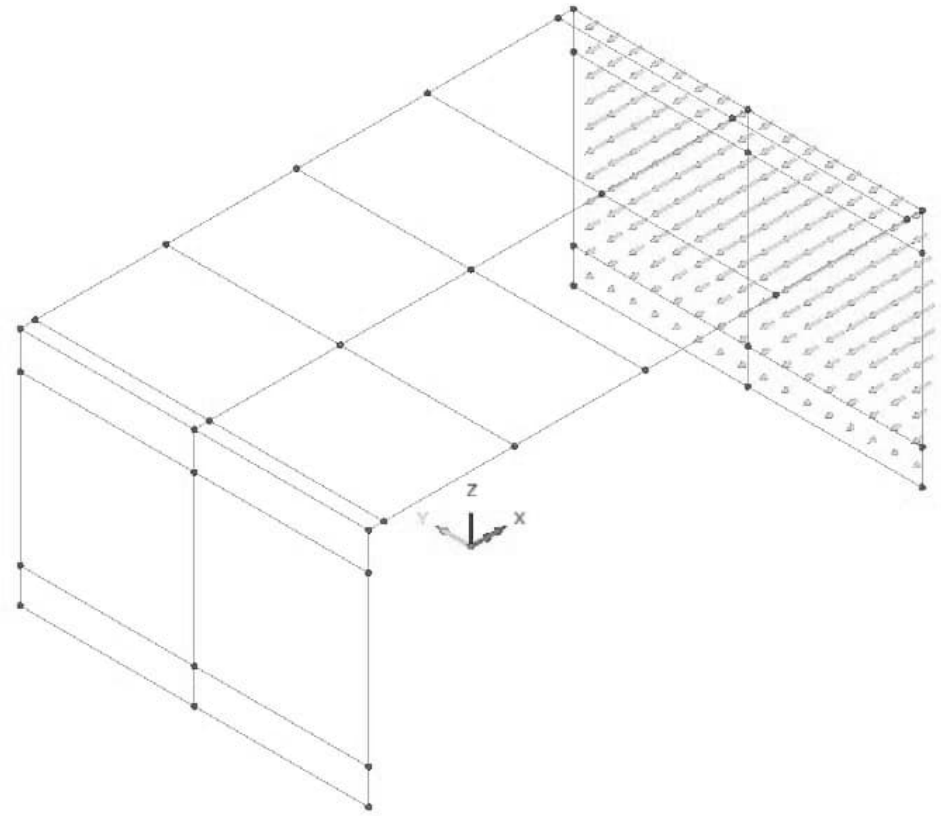
Load direction: (●) X ( ) Z ( ) Y ( ) XYZ ( ) Patch x ( ) Patch y ( ) Surface normal

Projection vector: [ ] Project in load direction [ ] Project for prestress; X component 0,0; Y component 0,0; Z component 1,0

Patch load divisions: [✓] Use default; Number of divisions in 0; Number of divisions in y 0

	X	Y	Z	Load
1	10,0	4,0	0,0	0,0
2	10,0	0,0	0,0	0,0
3	10,0	-4,0	0,0	0,0
4	10,0	-4,0	2,98	-36,0
5	10,0	-4,0	5,96	0,0
6	10,0	0,0	5,96	0,0
7	10,0	4,0	5,96	0,0
8	10,0	4,0	2,98	-36,0

Name: DELTA P-2 (11)



Overview 3D

3.12.3.3 Load combination

Load combination basic DELTA P :

Load case	Factor
DELTA P-1	1
DELTA P-2	1

3.12.4 Ojämn temperatur över tvärsnittet (OJTEMP 1)

Determined according to EN 1991-1-5 § 6.1.4.1. When assessing the impact, a coating with a thickness of 110 mm is applied on the safe side.

$k_{1.sur}(t = 100mm) = 0.7$

$k_{1.sur}(t = 150mm) = 0.5$

$\rightarrow \quad k_{1.sur}(t = 110mm) = 0.66$

$k_{2.sur}(t = 110mm) = 1.0$

$\Delta T_{max} = +15℃ \cdot k_{1.sur} = +10℃$: upper surface warmer

$\Delta T_{min} = -8℃ \cdot k_{2.sur} = -8℃$: lower surface warmer

The occurring temperature change ΔT refers to the linear difference between the temperature at the top and bottom of the bridge deck slab.

Uneven temperature is indicated as a temperature gradient $\frac{\delta T}{\delta Z}$ when defined in FEM-program.

On safe side δZ = 0.7 m is assumed.

$\frac{\delta T^{max}}{\delta Z} = \frac{+10℃}{0.7m} = +14\frac{℃}{m}$: maximal temperature gradient

$\frac{\delta T^{min}}{\delta Z} = \frac{-8℃}{0.70m} = -11\frac{℃}{m}$: maximal temperature gradient

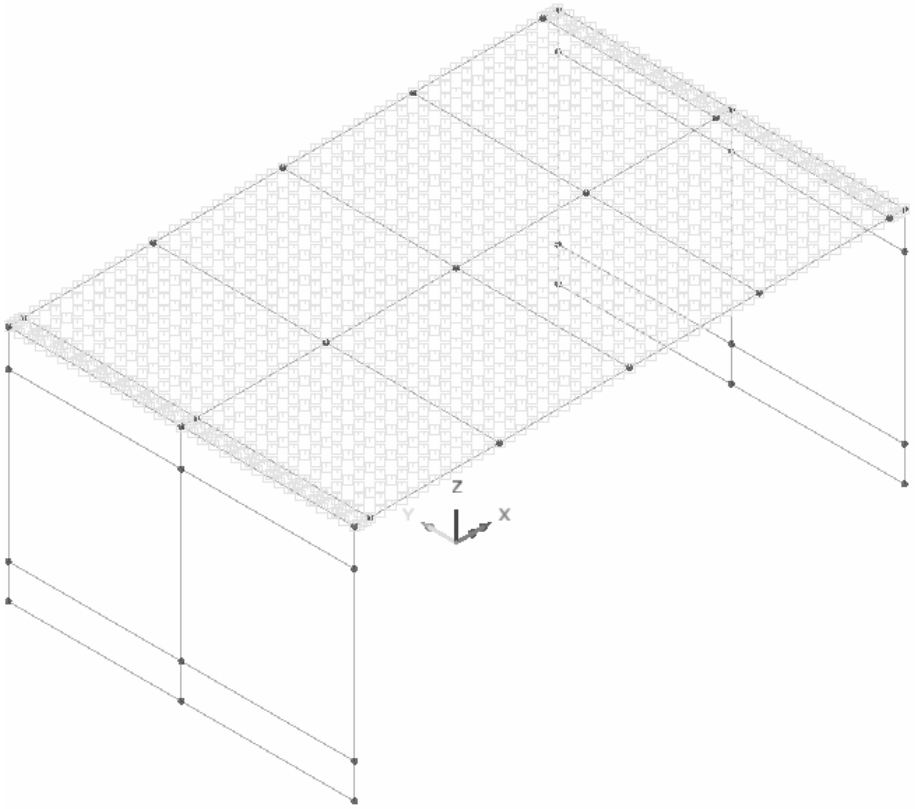
Load case : OJTEMP 1+

Structural loading : Temperature

Definition : Element

Final Z temperature gradient : +14 °C/m

Initial Z temperature gradient : 0°C/m



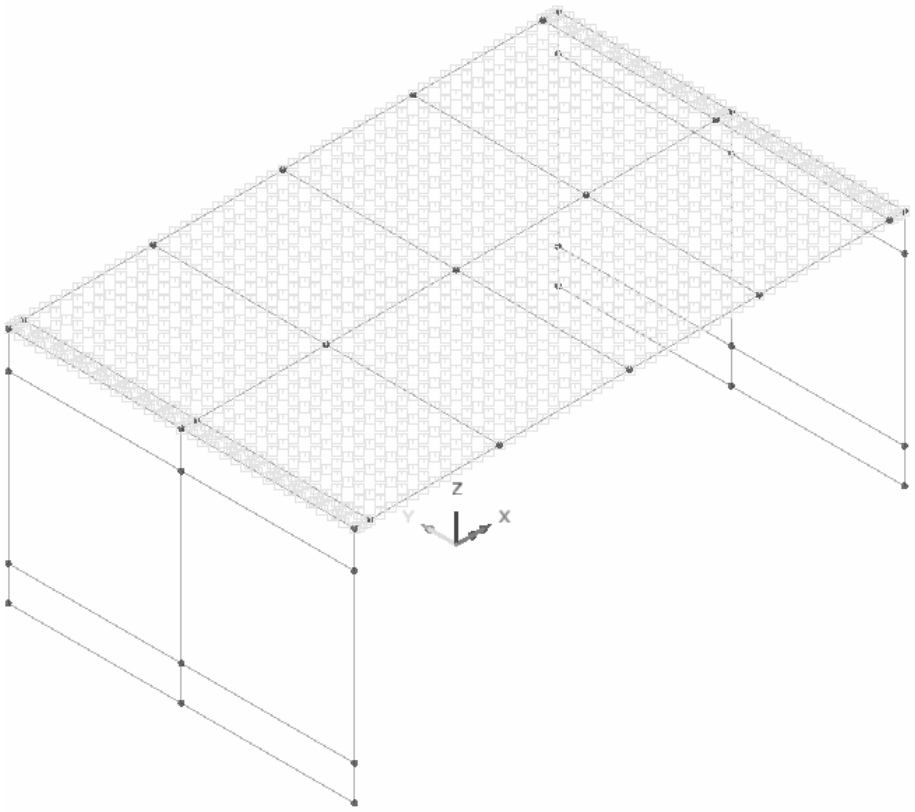
Load case : OJTEMP 1-

Structural loading : Temperature

Definition : Element

Final Z temperature gradient : -11 °C/m

Initial Z temperature gradient : 0°C/m



Envelope OJTEMP 1 :

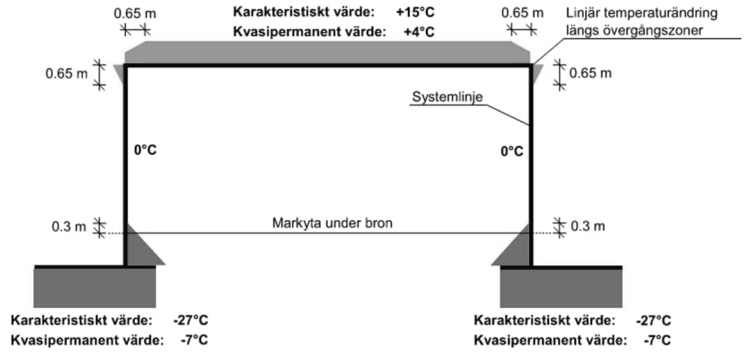
Load case
OJTEMP 1+
OJTEMP 1-

3.12.5 Uneven temperature differences between different construction parts (OJTEMP 2)

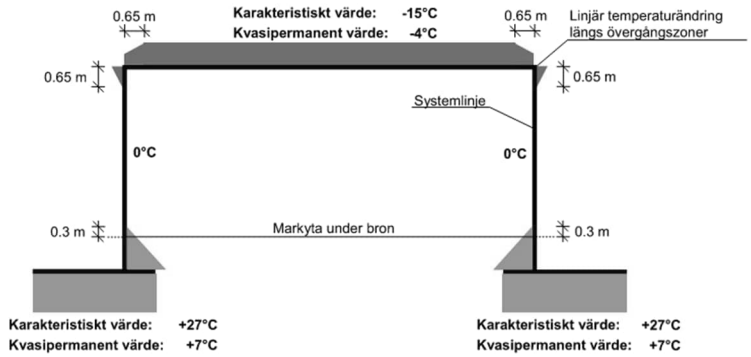
This section states that these effects should be combined with those caused by uniform temperature across the entire bridge (JTEMP).

Recommended values should, according to TRVINFRA-00227 section 2.1.1.2.4, be obtained from TVBK-0373. See extract below.

In TRVINFRA-00227 section 2.1.1.2.4, it is stated that no reduction should be made considering creep, but consideration should be made for cracking.



Principal sketch T(+)



Principal sketch T(-)

Applied temperature differences between superstructure and abutments:

$\Delta T = \pm 4°C$: SLS-Q

$\Delta T = \pm 15°C$: SLS-K, SLS-F and ULS

Remark

Since temperature load is not considered in the ultimate limit state (ULS) only temperature variation $\Delta T = \pm 4°C$ is considered.

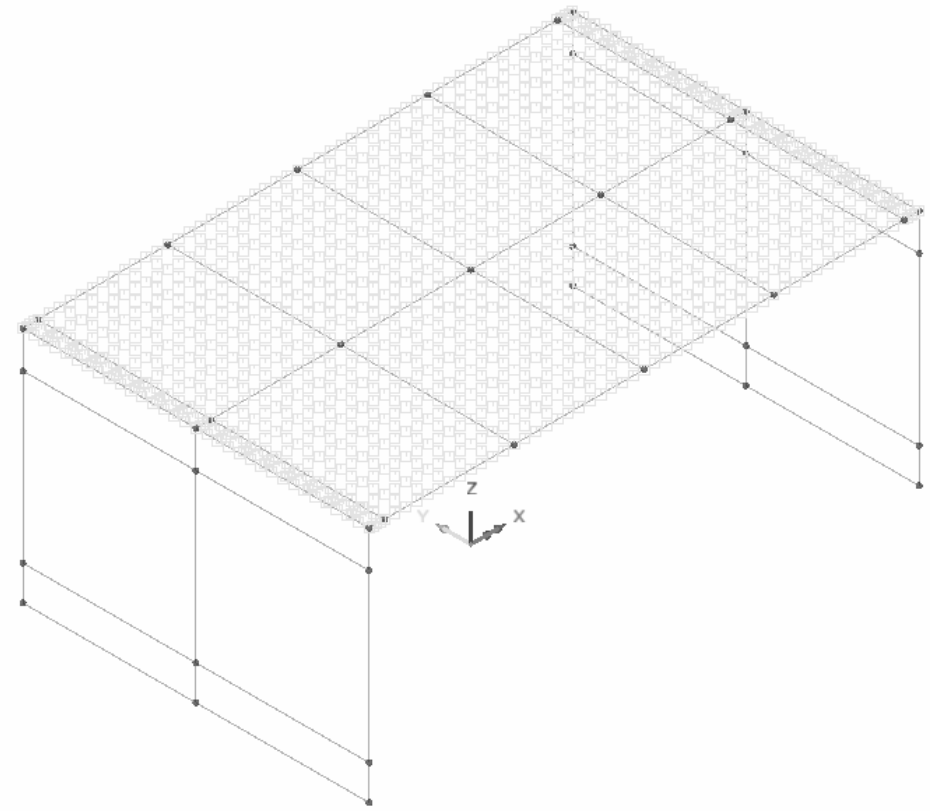
Load : OJTEMP 2

Structural loading : Temperature

Final temperature : +4 C

Initial temperature : ±0 C

Loadcase : OJTEMP 2+



Basic load cases :

Loadcase	Load	Factor
OJTEMP 2-	OJTEMP 2+	-1

Envelope OJTEMP *2:*

Loadcase
OTJEMP 2+
OJTEMP 2-

3.12.6 Impact of uniform temperature change

Load combination basic JTEMP MAX *:*

Load case	Factor
JTEMP+	1.00

Load combination basic JTEMP MIN *:*

Load case	Factor
JTEMP-	1.00

Envelope JTEMP *:*

Load case
JTEMP MAX
JTEMP MIN

3.12.6.1 Combining load case JTEMP and OJTEMP 1

Load combination is conducted according to SS-EN 1991-1-5, section 6.1.5. For such a combination, $\omega_M = 0.75$ och $\omega_N = 0.35$ shall be applied as shown below.

Alternative 1 ($\omega_M = 0.75$) : $T + \omega_M \cdot \Delta T$

Alternative 2 ($\omega_N = 0.35$) : $\omega_N \cdot T + \Delta T$

Load combination smart TEMP-1 :

Load case	Permanent factor	Variable factor
JTEMP	0	0.47 (= 0.77[1.] x 0.6[2.] x 1.00)
OJTEMP 1	0	0.45 (= 1.00[1.] x 0.6[2.] x 0.75)
DELTA-P	0	1.0

Load combination smart TEMP-2 :

Load case	Permanent factor	Variable factor
JTEMP	0	0.16 (= 0.77[1.] x 0.6[2.] x 0.35)
OJTEMP 1	0	0.60 (= 1.00[1.] x 0.6[2.] x 1.00)
DELTA-P	0	1.0

Note:
1.) Impact of creep results in reduced rigidity, see page A3:49.
2.) Impact of cracking results in reduced rigidity, see page A3:105.

3.12.6.2 Combining load case JTEMP and OJTEMP 2

Load combination smart TEMP-3 (SLS-F & SLS-K) :

Load case	Permanent factor	Variable factor
JTEMP	0	0.46 (= 0.77[1.] x 0.6[2.])
OJTEMP 2	0	0.60 (= 1.00 x 0.6[2.])
DELTA-P	0	1.0

Note:
1.) Impact of creep results in reduced rigidity, see page A3:49.
2.) Impact of cracking results in reduced rigidity, see page A3:105.

3.12.6.3 Summary load combination limit service state (SLS)

Envelope TEMP:

Loadcase
TEMP-1
TEMP-2
TEMP-3

3.12.6.4 Summary load combination ultimate limit state (ULS)

Basic loadcomination TEMP-ULS:

Load case
DELTA P

3.13 LOAD COMBINATIONS

Verification of load capacity shall be carried out for several limit states as detailed in this section.

Fatigue Limit State:
The risk of fatigue according to the partial factor method is checked using equation 6.69 provided in document SS-EN 1992-1-1.

Other Limit States:
For other limit states, section 6.4.3 of EN-1990 is applied.

3.13.1 Ultimate Limit States (ULS)

When checking the ultimate limit state, the load factors vary depending on the type of failure as detailed below:

STR: Verification of structural bearing capacity

GEO: Verification of geotechnical bearing capacity

For checking the ultimate limit state, TRVNFRA-00227 section 7.1.6.3 specifies requirements for load combinations as follows.

Design Method D2 (Set B):
Design Method D2 (Set B) according to TSFS 2018:57 Table 4.4 shall be applied for the structural bearing capacity of the construction (STR; SK 3).

Design Method is defined according to EN-1990 equations 6.10a and 6.10b as detailed below.

$$E_{Sd}^{10a} = \sum_{j\geq 1} \gamma_{G.j} \cdot G_{k,j} + \gamma_{Q.1} \cdot \psi_{0,1} \cdot Q_{k.1} + \sum_{i>1} \gamma_{Q.i} \cdot \psi_{0,i} \cdot Q_{k,i} = \psi\gamma_{ULS-A} \cdot (\sum_{j>1} G_{k,j} + \sum_{i>1} Q_{k,i})$$

$$E_{sd}^{10b} = \sum_{j\geq 1} \xi_j \cdot \gamma_{G.j} \cdot G_{k,j} + \gamma_{Q.1} \cdot Q_{k.1} + \sum_{i>1} \gamma_{Q.i} \cdot \psi_{0,i} \cdot Q_{k,i} = \psi\gamma_{ULS-B} \cdot (\sum_{j>1} G_{k,j} + \sum_{i>1} Q_{k,i})$$

Equation 6.10a refers to the (ULS-A) case where the permanent loads are dominant, usually during the construction phase.

Equation 6.10b refers to the (ULS-B) case where the variable loads are dominant.
Design method 2 (set B) according to TSFS 2018:57 table 4.4 shall be applied for the structural capacity (STR; SK3).

A1 (construction loads)
All load factors are greater than set C.

A2 (geotechnical loads)

- Load coefficient earth pressure:

  $\psi\gamma_{\mathrm{ULS-A}} = \gamma_{\mathrm{d}} \cdot 1.35 \cdot \eta_{\mathrm{sup.G}} = 0.91 \cdot 0.89 \cdot 1.35 \cdot 1.1 = 1.21$ ← dimensioning

  $\psi\gamma_{\mathrm{ULS-B}} = \gamma_{\mathrm{d}} \cdot 0.89 \cdot 1.35 \cdot \eta_{\mathrm{sup.G}} = 0.91 \cdot 0.89 \cdot 1.35 \cdot 1.1 = 1.20$

- Load coefficient surcharge:

  $\psi\gamma_{\mathrm{ULS-A}} = \gamma_{\mathrm{d}} \cdot \psi_0 \cdot 1.50 = 0.91 \cdot 0.75 \cdot 1.50 = 1.02$

  $\psi\gamma_{\mathrm{ULS-B}} = \gamma_{\mathrm{d}} \cdot 1.50 = 0.91 \cdot 1.50 = 1.37$ ← dimensioning

Design method D3 (set C):

Design method D3 (set C) according to TSFS 2018:57 table 4.5 shall be applied for determining geotechnical bearing capacity (GEO; SK 2).

The design method is defined according to EN-1990 equation 6.10a and 6.10b as presented below.

$$E_{Sd}^{10a} = \sum_{j\geq 1} \gamma_{G.j} \cdot G_{k,j} + \gamma_{Q.1} \cdot \psi_{0,1} \cdot Q_{k.1} + \sum_{i>1} \gamma_{Q.i} \cdot \psi_{0,i} \cdot Q_{k,i} = \psi\gamma_{ULS-GA} \cdot (\sum_{j>1} G_{k,j} + \sum_{i>1} Q_{k,i})$$

$$E_{sd}^{10b} = \sum_{j\geq 1} \xi_j \cdot \gamma_{G.j} \cdot G_{k,j} + \gamma_{Q.1} \cdot Q_{k.1} + \sum_{i>1} \gamma_{Q.i} \cdot \psi_{0,i} \cdot Q_{k,i} = \psi\gamma_{ULS-GB} \cdot (\sum_{j>1} G_{k,j} + \sum_{i>1} Q_{k,i})$$

Equation 6.10a refers to the (ULS-A) case where the permanent loads are dominant, usually during the construction phase.

Equation 6.10b (ULS-B) refers to the case where the variable loads are dominant.

Design method 3 (set C) according to TSFS 2018:57 table 4.5 shall be applied for determining geotechnical bearing capacity (GEO).

A1 (construction loads)
All load factors are less than set B.

A2 (geotechnical loads)

- Load coefficient earth pressure: $\psi\gamma_{jord} = \gamma_d \cdot 1.1 \cdot \eta_{sup.G} = 0.91 \cdot 1.1 \cdot 1.1 = 1.10$

- Load coefficient surcharge: $\psi\gamma_{\text{över}} = \gamma_{\text{d}} \cdot 1.40 = 0.91 \cdot 1.40 = 1.27$

Simplified Design Method ULS:

To limit the number of load combinations, design method D2 (STR) is also applied for checking geotechnical bearing capacity (GEO). This is done by adjusting load coefficients associated with the geotechnical loads.
When applying the geotechnical loads, the earth pressure coefficient corresponding to D2 is applied.

Check load coefficients associated with the geotechnical loads

$K_o(D2) = 1 - sin(\varphi_d) = 1 - sin45^\circ = 0.29$

$K_o(D3) = 1 - sin(\varphi_d) = 1 - sin38^\circ = 0.38$

Earth pressure→ $1.45^{1.)} \cdot K_0(D2) = 0.42 \equiv 1.10 \cdot K_0(D3) = 0.42$ i.e. OK!

Surcharge → $1.70^{2.)} \cdot K_0(D2) = 0.49 \equiv 1.27 \cdot K_0(D3) = 0.49$ i.e. OK!

Footnotes
1.) Last coefficient $\psi\gamma_{ULS} = 1.45$ is applied instead of 1.21.
2.) Last coefficient $\psi\gamma_{ULS} = 1.70$ is applied instead of 1.37.

Permanent loads:

Nr	Load		$\psi\gamma_{ULS-A}$	$\psi\gamma_{ULS-B}$		$\psi\gamma_{ULS}$
1	Egentyngd	max	1,23	1,09		1,09
		min	1,00	1,00		1,00
2	Beläggning	max	1,36	1,21		1,21
		min	0,90	0.90		0,90
3	Överfyllnad	max	1,36	1,21		1,21
		min	0,90	0,90		1,00
4	Jordtryck	max	1,36	1,21	⇒	1,45[1.)]
		min	0.90	0,90		0.90
5	Vattentryck	max	1,23	1,09		1,09
		min	1,00	1,00		1,00
6	Stödförskjutning	max	1,23	1,09		1,09
		min	1,00	1,00		1,00
7	Krympning	max	1,23	1,09		1,09
		min	1,00	1,00		1,00

Footnote:

1.) Load coefficient according to page A3:131 is applied.

Remark

Equation ULS-B is considered dominant; thus ULS-A is not considered.

Variable loads:

Nr	Load	$\psi\gamma_{ULS-A}$	$\psi\gamma_{ULS-B}$		$\psi\gamma_{ULS}$
	Lastmodell LM 1 :				
9	Boggiesystem	1.03	1.03/1.37		1.03/1.37
10	Utbredd last	0.55	0.55/1.37		0.55/1.37
11	Bromskraft	0.76	0.76/1.03		0.76/1.03
12	Sidokraft	0.76	0.76/1.03		0.76/1.03
13	Centrifugalkraft	0.76	0.76/1.03		0.76/1.03
	Lastmodell LM 2 :				
14	Enstaka axellast	0	0/1.37		0/1.37
	Typfordon EG A/B :				
15	Typfordon EG A/B	1.03	1.03/1.37		1.03/1.37
16	Bromskraft	0.76	0.76/1.03		0.76/1.03
17	Sidokraft	0.76	0.76/1.03		0.76/1.03
18	Centrifugalkraft	0.76	0.76/1.03	$\Rightarrow$	0.76/1.03
19	Temperatur	0.82	0.82/1.37		0.82/1.37
	Vindlaster:				
20	Vindlast mot bro	0.41	0.41/1.37		0.41/1.37
21	Vindlast mot trafik	0.45	0.41		0.45/1.50
22	Överlast	1.03	1.03/1.37		1.03/1.70[2)]

Footnote:
[2.)] Load coefficient according to page A3:131 is applied.

Loadcombination smart *ULS-PERM :*

Load case	Permanent factor	Variable factor
EGEN	1.00	0.09
BELÄGG	0.90	0.31
JORD	0.90	0.55
STOD	0	0.22 = (1.09 x 0.34.[1)] x 0.6[2.)])
KRYMP	0	0.22 = (1.09 x 0.34.[1)] x 0.6[2.)])

Footnotes:
[1.)] The effect of creep results in reduced stiffness; see page A3:49.
[2.)] The effect of cracking results in reduced stiffness; see page A3:105.

Load combination smart *ULS-VAR :*
(Load cases to consider: 5 / Variable load cases : 1)

Load case	Permanent factor	Variable factor
TRAFIK	1.03	0.34
BROMS	0.76	0.27
SIDO	0.76	0.27
TEMP-ULS	0.82	0.55
OVER	1.03	0.67

Load combination smart *ULS :*

Load case	Permanent factor	Variable factor
ULS-PERM	1	0
ULS-VAR	0	1

3.16.2 Service limit state (SLS)

The service limit state is divided into 3 load combinations based on their duration. The load combinations are presented below.

Load combination	Duration
SLS:K	Characteristic
SLS:F	Frequent
SLS:Q	Quasi-permanent

Load Combination SLS:K according to EN 1990 equation 6.14b is presented below.

$$E_{Sd} = \sum_{j\geq 1} G_{k,j} + Q_{k.1} + \sum_{i>1} \psi_{0,i} \cdot Q_{k,i} = \psi\gamma_{SLS.K} \cdot (\sum_{j>1} G_{k,j} + \sum_{i>1} Q_{k,i})$$

Load Combination SLS:F according to EN 1990 equation 6.15b is presented below.

$$E_{Sd} = \sum_{j\geq 1} G_{k,j} + \psi_1 \cdot Q_{k.1} + \sum_{i>1} \psi_{2,i} \cdot Q_{k,i} = \psi\gamma_{SLS.2} \cdot (\sum_{j>1} G_{k,j} + \sum_{i>1} Q_{k,i})$$

Load Combination SLS:Q according to EN 1990 equation 6.16b is presented below.

$$E_{Sd} = \sum_{j\geq 1} G_{k,j} + \sum_{i>0} \psi_{2,i} \cdot Q_{k,i} = \psi\gamma_{SLS.Q} \cdot (\sum_{j>1} G_{k,j} + \sum_{i>1} Q_{k,i})$$

When designing, load coefficients according to equations 6.14a, 6.15b, and 6.16b are applied.

Adjustment of load coefficients for geotechnical loads:

$K_o(D2) = 1 - sin(\varphi_d) = 1 - sin45^\circ = 0.29$

$K_o(D3) = 1 - sin(\varphi_d) = 1 - sin38^\circ = 0.39$

LC	Earth pressue
SLS-K	$\frac{K0(D3)}{K0(D2)} \cdot 1.1 = \frac{0.39}{0.29} \cdot 1.1 = 1.48$
SLS-F	$\frac{K0(D3)}{K0(D2)} \cdot 1.1 = \frac{0.39}{0.29} \cdot 1.1 = 1.48$
SLS-Q	$\frac{K0(D3)}{K0(D2)} \cdot 1.0 = \frac{0.39}{0.29} \cdot 1.0 = 1.34$

LC	Temperature
SLS-K	$\frac{K0(D3)}{K0(D2)} \cdot 1.0 = \frac{0.39}{0.29} \cdot 1.00 = 1.34$
SLS-F	$\frac{K0(D3)}{K0(D2)} \cdot 0.60 = \frac{0.39}{0.29} \cdot 0.60 = 0.81$
SLS-Q	0

LC	Surcharge
SLS-K	$\frac{K0(D3)}{K0(D2)} \cdot 1.0 = \frac{0.39}{0.29} \cdot 1.00 = 1.34$
SLS-F	$\frac{K0(D3)}{K0(D2)} \cdot 0.75 = \frac{0.39}{0.29} \cdot 0.75 = 1.01$
SLS-Q	0

Permanent loads:

Nr	Load		$\psi\gamma_{SLS-K}$	$\psi\gamma_{SLS-F}$	$\psi\gamma_{SLS-Q}$
1	Egentyngd	max	1.00	1.00	1.00
		min	1.00	1.00	1.00
2	Beläggning	max	1.10	1.10	1.00
		min	0.90	0.90	1.00
3	Överfyllnad	max	1.10	1.10	1.00
		min	0.90	0.90	1.00
4	Jordtryck	max	1.48[3.)]	1.48[3.)]	1.34[3.)]
		min	0.90	0.90	1.00
5	Vattentryck	max	1.00	1.00	1,00
		min	1.00	1.00	1.00
6	Stödförskjutning	max	1.00	1.00	1.00
		min	1.00	1.00	1.00
7	Krympning	max	1.00	1.00	1.00
		min	1.00	1.00	1.00
8	Spännkraft	max	1.00	1.00	1.00
		min	1.00	1.00	1.00

Footnote:
[3.)] Load coefficient page A3:136 is applied.

Variable loads:

Nr	Load	$\psi\gamma_{SLS-K}$	$\psi\gamma_{SLS-F}$	$\psi\gamma_{SLS-Q}$
	Lastmodell LM 1 :			
9	Boggiesystem	0.75/1.00	0/0.75	0
10	Utbredd last	0.40/1.00	0/0.40	0
11	Bromskraft	0.56/0.75	0/0.56	0
12	Sidokraft	0.56/0.75	0/0.56	0
13	Centrifugalkraft	0.56/0.75	0/0.56	0
	Lastmodell LM 2 :			
14	Enstaka axellast	0.75/1.00	0/0.75	0
	Typfordon EG A/B :			
15	Typfordon EG A/B	0.75/1.00	0/0.75	0
16	Bromskraft	0.56/0.75	0/0.56	0
17	Sidokraft	0.56/0.75	0/0.56	0
18	Centrifugalkraft	0.56/0.75	0/0.56	0
19	Temperatur	0.60/1.00	0.50/0.60	0.50
	Vindlaster:			
20	Vindlast mot bro	0.30/1.00	0/0.30	0
21	Vindlast mot trafik	0.30/1.00	0/0.30	0
22	Överlast	0.75/1.34[4.)]	0/1.01[4.)]	0

Footnote:

[4.)] Load coefficients according to page A3:136 is applied.

Load combination smart *SLS-PERM :*

Loadcase	Permanent factor	Variable factor
EGEN	1.00	0
BELÄGG	0.90	0.20
JORD	0.90	0.58
STOD	0	0.22 = (1.0 x 0.37[1.)] x 0.6[2.)])
KRYMP	0	0.22 = (1.0 x 0.37[1).] x 0.6[2.)])

Footnotes:
[1.)] The effect of creep results in reduced stiffness; see page A3:49
[2.)] The effect of cracking results in reduced stiffness; see page A3:105

Load combination smart *SLS-K-VAR :*
(Load cases to consider : 5 / Variable load cases : 1)

Load case	Permanent factor	Variable factor
TRAFIK	0.75	0.25
BROMS	0.56	0.19
SIDO	0.56	0.19
TEMP	0.60	0.40
OVER	0.75	0.50

Load combination smart *SLS-F-VAR :*

Load case	Permanent factor	Variable factor
TRAFIK	0	0.75
BROMS	0	0.56
SIDO	0	0.56
TEMP	0	0.60
OVER	0	0.95

Load combination smart *SLS-K :*

Load case	Permanent factor	Variable factor
SLS-PERM	1	0
SLS-K-VAR	0	1

Load combination smart *SLS-F :*

Load case	Permanent factor	Variable factor
SLS-PERM	1	0
SLS-F-VAR	0	1

Load combination smart *SLS-O :*

Load case	Permanent factor	Variable factor
SLS-PERM	1	0
TEMP	0	0.50

3.16.3 Accidental load combination

No accidental load cases are assumed.

3.14.4 Fatigue load combination

Fatigue is considered according to SS EN 1992-1-1, 6.8.4 and 6.8.6, and SS EN 1992-2, 6.8 and Appendix NN.

The risk of fatigue is checked using a simplified method, denoted as the λ-method.
Load combination according to equation SS-EN 1992-1-1 section 6.8.3 equation 6.69.

In this load combination, the traffic load is considered to consist of UTM, whereby other traffic loads are excluded.

$$E_{Sd} = \sum_{j\geq 1} G_{k,j} + P + \psi_{1,1} \cdot Q_{k,1} + \sum_{i>1} \psi_{2,i} \cdot Q_{k,i} + Q_{fat} = \psi\gamma_{UTM} \cdot (\sum_{j\geq 1} G_{k,j} + P + \sum_{i\geq 1} Q_{k,i} + Q_{fat})$$

Permanent loads:

Nr	Load		ψγUTM
1	Egentyngd	max	1.00
		min	1.00
2	Beläggning	max	1.10
		min	0.90
3	Överfyllnad	max	1.10
		min	0.90
4	Jordtryck	max	1.48
		min	0.90
5	Vattentryck	max	1.00
		min	1.00
6	Stödförskjutning	max	1.00
		min	1.00
7	Krympning	max	1.00
		min	1.00

Variable loads:

Nr	Load	ψγUTM
	Lastmodell LM 1 :	
9	Boggiesystem	-
10	Utbredd last	-
11	Bromskraft	-
12	Sidokraft	-
13	Centrifugalkraft	-
	Lastmodell LM 2 :	
14	Enstaka axellast	-
	Typfordon EG A/B :	
15	Typfordon EG A/B	-
16	Bromskraft	-
17	Sidokraft	-
18	Centrifugalkraft	-
19	Temperatur	0.60
	Vindlaster:	
20	Vindlast mot bro	0.30
21	Vindlast mot trafik	0.30
22	Överlast	1.01
23	UTM3	1.00

Load combination smart FAT *:*

Load case	Permanent factor	Variable factor
EGEN	1.00	0
BELÄGG	1.00	0
JORD	1.35	0
STOD	-	-
KRYMP	-	-
VIND	-	-
UTM	-	1.00
OVER	-	-
TEMP	-	-

Load case JORD is not a fatigue load, thus load coefficient highest load coefficient is applied.

Load cases TEMP, VIND and OVER are not fatigue loads, thus load is not considered.

During verification STR, the load case TEMP can be neglected according to SS-EN 1992-1-1 section 2.3.1.2(2).

Appendix 1: Input receipt (system 001)

RC open frame bridge

Title: Input receipt

Model Units: kN,m,t,s,C
Report Units: kN,m,t,s,C

Model Title: System 001
Model File: System 001

Clarification of definitions.

In the report, the letter “T” is used to describe a range. The letter is an abbreviation of “to”.

See example of assignment below.

Assignment to Lines:
105T110;114T119

This expression means that the assignment occurs to the lines L105 → L110 and L114 → L119.

Assignment to Surfaces:
3T17;19T24
This expression means that the assignment occurs to the surfaces S3 → S17 and S19 → S24.

Table of Contents

1. Points

Point	X coordinate	Y coordinate	Z coordinate
28	-3,2	0,0	-4,7
34	-3,7	0,0	-4,7
100	-11,1	-4,0	5,5
101	-7,3	-4,0	5,5
102	-7,2	-4,0	5,5
103	-6,3	-4,0	5,5
104	-6,0	-4,0	5,5
105	-3,0	-4,0	5,5
106	0,0	-4,0	5,5
107	3,0	-4,0	5,5
108	6,0	-4,0	5,5
109	6,3	-4,0	5,5
110	7,2	-4,0	5,5
111	7,3	-4,0	5,5
112	11,1	-4,0	5,5
121	-6,3	-4,0	0,0
122	-6,3	-4,0	0,7
123	-6,3	-4,0	4,7
131	6,3	-4,0	0,0
132	6,3	-4,0	0,7
133	6,3	-4,0	4,7
200	-11,1	0,0	5,5
201	-7,3	0,0	5,5
202	-7,2	0,0	5,5
203	-6,3	0,0	5,5
204	-6,0	0,0	5,5
205	-3,0	0,0	5,5
206	0,0	0,0	5,5
207	3,0	0,0	5,5
208	6,0	0,0	5,5
209	6,3	0,0	5,5
210	7,2	0,0	5,5
211	7,3	0,0	5,5
212	11,1	0,0	5,5
221	-6,3	0,0	0,0
222	-6,3	0,0	0,7
223	-6,3	0,0	4,7
231	6,3	0,0	0,0
232	6,3	0,0	0,7
233	6,3	0,0	4,7
300	-11,1	4,0	5,5
301	-7,3	4,0	5,5
302	-7,2	4,0	5,5
303	-6,3	4,0	5,5
304	-6,0	4,0	5,5
305	-3,0	4,0	5,5
306	0,0	4,0	5,5
307	3,0	4,0	5,5
308	6,0	4,0	5,5
309	6,3	4,0	5,5
310	7,2	4,0	5,5
311	7,3	4,0	5,5
312	11,1	4,0	5,5
321	-6,3	4,0	0,0
322	-6,3	4,0	0,7
323	-6,3	4,0	4,7
331	6,3	4,0	0,0
332	6,3	4,0	0,7
333	6,3	4,0	4,7
400	-6,9	0,0	0,0
401	6,9	0,0	0,0

712	9,3	0,0	-0,1
721	9,8	0,0	-0,1
722	-10,0	-4,0	6,0
723	-10,0	-4,0	0,0
724	-10,0	4,0	6,0
725	-10,0	4,0	0,0
726	0,0	0,0	0,0
727	10,0	4,0	0,0
728	10,0	-4,0	0,0
729	10,0	-4,0	6,0
730	10,0	4,0	6,0
731	-10,0	4,0	3,0
732	-10,0	-4,0	3,0
733	10,0	4,0	3,0
734	10,0	-4,0	3,0
735	-10,0	0,0	6,0
736	-10,0	0,0	0,0
737	10,0	0,0	6,0
738	10,0	0,0	0,0
739	-12,0	0,0	5,5
743	12,0	0,0	5,5
744	-12,0	4,0	5,5
745	12,0	4,0	5,5
746	-12,0	-4,0	5,5
747	12,0	-4,0	5,5
748	-12,0	-1,5	5,5
749	12,0	-1,5	5,5
750	-12,0	1,5	5,5
751	12,0	1,5	5,5
752	-12,0	-0,5	5,5
753	12,0	-0,5	5,5
754	-12,0	2,5	5,5
755	12,0	2,5	5,5
756	-12,0	-2,5	5,5
757	12,0	-2,5	5,5
758	-12,0	0,5	5,5
759	12,0	0,5	5,5

2. Lines

Line	Points	Line	Points
10	739;743		
20	746;747	21	744;745
100	100;101	101	103;102
102	103;104	103	104;105
104	105;106	105	106;107
106	107;108	107	108;109
108	109;110	109	111;112
200	200;201	201	203;202
202	203;204	203	204;205
204	205;206	205	206;207
206	207;208	207	208;209
208	209;210	209	211;212
300	300;301	301	303;302
302	303;304	303	304;305
304	305;306	305	306;307
306	307;308	307	308;309
308	309;310	309	311;312
400	200;100	401	200;300
410	201;101	411	201;301
420	202;102	421	202;302
500	203;103	501	203;303
510	204;104	511	204;304
520	205;105	521	205;305
530	206;106	531	206;306
540	207;107	541	207;307
550	208;108	551	208;308
560	109;209	561	309;209
600	210;110	601	210;310
610	211;111	611	211;311
620	212;112	621	212;312
700	121;122	701	122;123
702	123;103	704	221;121
705	222;122	706	223;123
707	221;222	708	222;223
709	223;203	711	321;221
712	322;222	713	223;323
714	321;322	715	322;323
716	323;303	800	132;131
801	133;132	802	109;133
804	131;231	805	132;232
806	233;133	807	232;231
808	233;232	809	209;233
811	231;331	812	232;332
813	333;233	814	332;331
815	333;332	816	309;333
20	746;747	21	744;745
22	752;753	23	754;755
24	748;749	25	750;751
26	756;757	27	758;759

3. Surfaces

Surface	Lines	Surface	Lines
100	700;705;707;704	101	701;706;708;705
102	702;500;709;706	103	707;712;714;711
104	708;713;715;712	105	709;501;716;713
200	800;805;807;804	201	801;806;808;805
202	802;560;809;806	203	807;812;814;811
204	808;813;815;812	205	809;561;816;813
300	100;410;200;400	301	200;411;300;401
302	101;500;201;420	303	201;501;301;421
400	102;510;202;500	401	202;511;302;501
402	103;520;203;510	403	203;521;303;511
404	104;530;204;520	405	204;531;304;521
406	105;540;205;530	407	205;541;305;531
408	106;550;206;540	409	206;551;306;541
410	107;560;207;550	411	207;561;307;551
500	108;600;208;560	501	208;601;308;561
502	109;620;209;610	503	209;621;309;611

4. MESH:Line

Attribute: 7 Title: Element 8

Sub Type = Line Mesh **Element Type = BMI31**

Mesh spacing	**Nr. of elements**	**Start node end releases:**	**End node end releases:**
Uniform	8	None	None

Assignment to Lines: **Beta angle = 0,0**

704;711;804;811

5. MESH:Surface

Attribute: 3 Title: Element 6 x 8
Sub Type = Surface Mesh Element Type = QTS8

Property	Symbol	Value
Element size	size	0,0
Number of divisions in x	xDivisions	6
Number of divisions in y	yDivisions	8
Transition mesh	transition	false
Allow irregular mesh	allowIrregular	false
Element defined by name	DefinedByName	true
Single feature joint	isSingleFtrJnt	false

Assignment to Surfaces:
101;104;201;204;300;301;402T409;502;503

Attribute: 4 Title: Element 2 x 8
Sub Type = Surface Mesh Element Type = QTS8

Property	Symbol	Value
Element size	size	0,0
Number of divisions in x	xDivisions	2
Number of divisions in y	yDivisions	8
Transition mesh	transition	false
Allow irregular mesh	allowIrregular	false
Element defined by name	DefinedByName	true
Single feature joint	isSingleFtrJnt	false

Assignment to Surfaces:
100;102;103;105;200;202;203;205;302;303;400;401;410;411;500;501

6. MESH:Joint

Attribute: 1 Title: JNT4 (momentled)
Sub Type = Line Mesh **Element Type = JNT4**

Mesh spacing	Nr. of elements	Start node end releases:	End node end releases:
Uniform	8	None	None

Assignment to Lines: Beta angle = 0,0, Interface secondary Line 421, Mesh from primary to secondary
410;411;610;611

Attribute: 8 Title: JSH4 (support)
Sub Type = Point Mesh **Element Type = JSH4**

Property	Symbol	Value
Element defined by name	DefinedByName	false
Single feature joint	isSingleFtrJnt	false

Assignment to Points: Beta angle = 0,0, Interface secondary Point 220, Mesh from primary to secondary
400;401

7. Geometric : Line

Attribute: 1 Title: Rigid beam

Sub Type = Line Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Cross sectional area	A	0,0
Second moment of area about y axis	Iyy	1000000,0
Second moment of area about z axis	Izz	1000000,0
Product moment of area	Iyz	0,0
Torsional constant	J	1000000,0
Eccentricity in local z direction, relative to specified origin	ez0	0,0
Eccentricity in local y direction, relative to specified origin	ey0	0,0
Eccentricity in local z direction, relative to beam centroid	ez	0,0
Eccentricity in local y direction, relative to beam centroid	ey	0,0
Wagner constant 1st moment of square radius about y (Iyr)	Iyr	0,0
Wagner constant 1st moment of square radius about z (Izr)	Izr	0,0
Wagner constant 4th moment of area about origin (Irr)	Irr	0,0
Wagner constant 2nd moment of warping about origin (Iwr)	Iwr	0,0
Effective shear area in local z direction	Asz	1000,0
Effective shear area in local y direction	Asy	1000,0
Radius of gyration about y axis	ky	31622,8
Radius of gyration about z axis	kz	31622,8
y axis extreme fibre, top	yt	0,0
y axis extreme fibre, bottom	yb	0,0
z axis extreme fibre, top	zt	0,0
z axis extreme fibre, bottom	zb	0,0
Shape code identifier	Type	-1
Element type	elementType	"3D Thick Beam"
Reinforcement	reinforcement	None

Assignment to Lines:
704;711;804;811

8. Geometric: Surface

Attribute: 2 Title: t1
Sub Type = Surface Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Thickness	t	Funktion t1
Eccentricity in local z direction, relative to beam centroid	ez	0,0

Assignment to Surfaces:
100;103;200;203

Attribute: 3 Title: t2
Sub Type = Surface Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Thickness	t	Funktion t2
Eccentricity in local z direction, relative to beam centroid	ez	Funktion e2

Assignment to Surfaces:
101;104

Attribute: 4 Title: t3
Sub Type = Surface Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Thickness	t	Funktion t3
Eccentricity in local z direction, relative to beam centroid	ez	Funktion e3

Assignment to Surfaces:
102;105

Attribute: 5 Title: t4
Sub Type = Surface Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Thickness	t	Funktion t4
Eccentricity in local z direction, relative to beam centroid	ez	Funktion e4

Assignment to Surfaces:
400;401

Attribute: 6 Title: t5
Sub Type = Surface Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Thickness	t	Funktion t5
Eccentricity in local z direction, relative to beam centroid	ez	Funktion e5

Assignment to Surfaces:
402;403

Attribute: 7 Title: t6
Sub Type = Surface Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Thickness	t	0,7
Eccentricity in local z direction, relative to beam centroid	ez	0,0

Assignment to Surfaces:
404T407

Attribute: 8 Title: t7
Sub Type = Surface Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Thickness	t	Funktion t7
Eccentricity in local z direction, relative to beam centroid	ez	Funktion e7

Assignment to Surfaces:
408;409

Attribute: 9 Title: t8
Sub Type = Surface Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Thickness	t	Funktion t8
Eccentricity in local z direction, relative to beam centroid	ez	Funktion e8

Assignment to Surfaces:
410;411

Attribute: 10 Title: t9
Sub Type = Surface Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Thickness	t	Funktion t9
Eccentricity in local z direction, relative to beam centroid	ez	Funktion e9

Assignment to Surfaces:
201;204

Attribute: 11 Title: t10
Sub Type = Surface Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Thickness	t	Funktion t10
Eccentricity in local z direction, relative to beam centroid	ez	Funktion e10

Assignment to Surfaces:
202;205

Attribute: 12 Title: t11
Sub Type = Surface Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Thickness	t	0,4
Eccentricity in local z direction, relative to beam centroid	ez	0,0

Assignment to Surfaces:
300;301;502;503

Attribute: 13 Title: t12
Sub Type = Surface Geometric
Assigned in: Analysis 1

Property	Symbol	Value
Thickness	t	0,8
Eccentricity in local z direction, relative to beam centroid	ez	0,0

Assignment to Surfaces:
302;303;500;501

Attribute: 1 Title: Funktion t1
Sub Type = Surface Function Variation

Property	Symbol	Value
Function	function	"1.133 - 0.433 * u"

Attribute: 2 Title: Funktion t2
Sub Type = Surface Function Variation

Property	Symbol	Value
Function	function	"0.7 + 0.305 * u"

Attribute: 4 Title: Funktion t3
Sub Type = Surface Function Variation

Property	Symbol	Value
Function	function	"1.005 + 0.35 * u"

Attribute: 6 Title: Funktion t4
Sub Type = Surface Function Variation

Property	Symbol	Value
Function	function	"1.317 - u * 0.117"

Attribute: 7 Title: Funktion t5
Sub Type = Surface Function Variation

Property	Symbol	Value
Function	function	"1.2 - u * 0.5"

Attribute: 9 Title: Funktion t7
Sub Type = Surface Function Variation

Property	**Symbol**	**Value**
Function	function	"0.7 + u * 0.5"

Attribute: 10 Title: Funktion t8
Sub Type = Surface Function Variation

Property	**Symbol**	**Value**
Function	function	"1.2 + u * 0.117"

Attribute: 11 Title: Funktion t9
Sub Type = Surface Function Variation

Property	**Symbol**	**Value**
Function	function	"0.7 + u * 0.305"

Attribute: 12 Title: Funktion t10
Sub Type = Surface Function Variation

Property	**Symbol**	**Value**
Function	function	"1.005 + u * 0.35"

Attribute: 15 Title: Funktion e2
Sub Type = Surface Function Variation

Property	**Symbol**	**Value**
Function	function	"-u * 0.152"

Attribute: 16 Title: Funktion e3
Sub Type = Surface Function Variation

Property	**Symbol**	**Value**
Function	function	"-0.152 + 0.108 * u"

Attribute: 17 Title: Funktion e4
Sub Type = Surface Function Variation

Property	**Symbol**	**Value**
Function	function	"0.308 - u * 0.058"

Attribute: 20 Title: Funktion e5
Sub Type = Surface Function Variation

Property	**Symbol**	**Value**
Function	function	"0.25 - u * 0.25"

Attribute: 18 Title: Funktion e7
Sub Type = Surface Function Variation

Property	**Symbol**	**Value**
Function	function	"u * 0.25"

Attribute: 21 Title: Funktion e8
Sub Type = Surface Function Variation

Property	**Symbol**	**Value**
Function	function	"0.25 + 0.058 * u"

Attribute: 22 Title: Funktion e9
Sub Type = Surface Function Variation

Property	**Symbol**	**Value**
Function	function	"u * 0.152"

Attribute: 23 Title: Funktion e10
Sub Type = Surface Function Variation

Property	**Symbol**	**Value**
Function	function	"0.152 - u * 0.108"

9. Isotropic material

Attribute: 4 Title: Betong C35/45
Sub Type = Isotropic Material
Assigned in: Analysis 1

Property	**Symbol**	**Value**
Young's modulus	E	34000000,0
Poisson's ratio	nu	0,2
Density	rho	2,5
Coefficient of thermal expansion	alpha	0,0

Assignment to Lines:
704;711;804;811

Assignment to Surfaces:
100T105;200T205;300T303;400T411;500T503

10. Joint material

Attribute: 3 Title: JSO4 (momentled)
Sub Type = Joint Material, Spring Stiffness Only
Assigned in: Analysis 1

	u	**v**	**w**
K	1000000000000,0	1000000000000,0	1000000000000,0
Number of degrees of freedom	nDOF	3	3
Joint type	JointType	"Solids / 3D space membranes"	"Solids / 3D space membranes"
Assignment type	Assignment	"Line"	"Line"

Assignment to Lines:
410;411;420;421;600;601;610;611

Attribute: 1 Title: Joint (support)
Sub Type = Joint Material, Spring Stiffness Only
Assigned in: Analysis 1

	u	**v**	**w**	**THx**	**THy**	**THz**
Number of degrees of freedom	nDOF	6	6	6	6	6
Joint type	JointType	"3D beams and/or shells"	"3D beams and/or shells"	"3D beams and/or shells"	"3D beams and/or shells"	"3D beams and/or shells"
Assignment type	Assignment	"Point"	"Point"	"Point"	"Point"	"Point"
Elastic spring stiffness	K[0]	1,00000E9	1,00000E9	1,00000E9	1,00000E9	1,00000E9
Elastic spring stiffness	K[1]	1,00000E9	1,00000E9	1,00000E9	1,00000E9	1,00000E9
Elastic spring stiffness	K[2]	1,00000E9	1,00000E9	1,00000E9	1,00000E9	1,00000E9
Elastic spring stiffness	K[3]	1,00000E9	1,00000E9	1,00000E9	1,00000E9	1,00000E9
Elastic spring stiffness	K[4]	1,00000E9	1,00000E9	1,00000E9	1,00000E9	1,00000E9
Elastic spring stiffness	K[5]	1,00000E9	1,00000E9	1,00000E9	1,00000E9	1,00000E9

Assignment to Points:
220;400;401

11. Support

Attribute: 1 Title: Support lankplatta
Sub Type = Structural Support
Assigned in: Analysis 1

Property	Symbol	Value
Translation in X	U	"F"
Translation in Y	V	"F"
Translation in Z	W	"R"
Rotation about X	THX	"F"
Rotation about Y	THY	"F"
Rotation about Z	THZ	"F"
Torsional warping	Torsion	"F"
Moment about hinge	L1	"F"
Pore pressure	pore	"C"

Assignment to Lines:
400;401;620;621

Attribute: 3 Title: Support 1
Sub Type = Structural Support
Assigned in: Analysis 1

Property	Symbol	Value
Translation in X	U	"R"
Translation in Y	V	"R"
Translation in Z	W	"R"
Rotation about X	THX	"S"
Rotation about Y	THY	"S"
Rotation about Z	THZ	"R"
Torsional warping	Torsion	"F"
Moment about hinge	L1	"F"
Spring stiffness distribution	springType	"Total"
Stiffness in rotation about X	THXstiff	678000,0
Stiffness in rotation about Y	THYstiff	136000,0

Assignment to Points:
400

Attribute: 4 Title: Support 2
Sub Type = Structural Support
Assigned in: Analysis 1

Property	Symbol	Value
Translation in X	U	"R"
Translation in Y	V	"R"
Translation in Z	W	"R"
Rotation about X	THX	"S"
Rotation about Y	THY	"S"
Rotation about Z	THZ	"R"
Torsional warping	Torsion	"F"
Moment about hinge	L1	"F"
Spring stiffness distribution	springType	"Total"
Stiffness in rotation about X	THXstiff	678000,0
Stiffness in rotation about Y	THYstiff	136000,0

Assignment to Points:
401

12. Search Area

Attribute: 1 Title: Överbyggnad
Sub Type = Search Area

Assignment to Surfaces:
300T303;400T411;500T503

Attribute: 2 Title: Ramben 1
Sub Type = Search Area

Assignment to Surfaces:
100T105

Attribute: 3 Title: Ramben 2
Sub Type = Search Area

Assignment to Surfaces:
200T205

13. Global distributed

Attribute: 6 Title: EGEN 3
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Length"
X Direction	WX	0,0
Y Direction	WY	0,0
Z Direction	WZ	-6,0
Moment about X axis	MX	0,0
Moment about Y axis	MY	0,0
Moment about Z axis	MZ	0,0
Moment about hinge nodes	Hinge	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 9 Title: EGEN 3 Factor = 1
Assignment to Lines:
102T107;302T307

Attribute: 7 Title: EGEN 4
Sub Type = Body Force Load

Property	Symbol	Value
Linear acceleration in X	AccX	0,0
Linear acceleration in Y	AccY	0,0
Linear acceleration in Z	AccZ	-10,0
Angular velocity about X axis	AngVelX	0,0
Angular velocity about Y axis	AngVelY	0,0
Angular velocity about Z axis	AngVelZ	0,0
Angular acceleration about X axis	AngAccX	0,0
Angular acceleration about Y axis	AngAccY	0,0
Angular acceleration about Z axis	AngAccZ	0,0
Linear acceleration In X fluid phase	lnFlAccX	0,0
Linear acceleration In Y fluid phase	lnFlAccY	0,0
Linear acceleration In Z fluid phase	lnFlAccZ	-10,0

Loadcase ID: 10 Title: EGEN 4 Factor = 1
Assignment to Surfaces:
300T303;500T503

Attribute: 8 Title: EGEN 5
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Length"
X Direction	WX	0,0
Y Direction	WY	0,0
Z Direction	WZ	-38,0
Moment about X axis	MX	0,0
Moment about Y axis	MY	0,0
Moment about Z axis	MZ	0,0
Moment about hinge nodes	Hinge	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 11 Title: EGEN 5 Factor = 1
Assignment to Lines:
701;715;801;815

Attribute: 9 Title: BELAGG 1
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Area"
X Direction	WX	0,0
Y Direction	WY	0,0
Z Direction	WZ	-2,5
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 12 Title: BELAGG 1 Factor = 1
Assignment to Surfaces:
400T411

Attribute: 12 Title: BELAGG 2
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Area"
X Direction	WX	0,0
Y Direction	WY	0,0
Z Direction	WZ	-8,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 13 Title: BELAGG 2 Factor = 1
Assignment to Surfaces:
300;301;502;503

Attribute: 23 Title: BROMS+
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Area"
X Direction	WX	4,0
Y Direction	WY	0,0
Z Direction	WZ	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 68 Title: BROMS+ Factor = 1
Assignment to Surfaces:
402T409

Attribute: 24 Title: BROMS-
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Area"
X Direction	WX	-4,0
Y Direction	WY	0,0
Z Direction	WZ	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 69 Title: BROMS- Factor = 1
Assignment to Surfaces:
402T409

Attribute: 25 Title: SIDO+
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Area"
X Direction	WX	0,0
Y Direction	WY	1,0
Z Direction	WZ	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 70 Title: SIDO+ Factor = 1
Assignment to Surfaces:
402T409

Attribute: 26 Title: SIDO-
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Area"
X Direction	WX	0,0
Y Direction	WY	-1,0
Z Direction	WZ	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 71 Title: SIDO- Factor = 1
Assignment to Surfaces:
402T409

Attribute: 27 Title: JORD 3-1
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Length"
X Direction	WX	0,0
Y Direction	WY	29,0
Z Direction	WZ	0,0
Moment about X axis	MX	0,0
Moment about Y axis	MY	0,0
Moment about Z axis	MZ	-77,0
Moment about hinge nodes	Hinge	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 73 Title: JORD 3-1 Factor = 1
Assignment to Lines:
715

Attribute: 28 Title: JORD 3-2
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Length"
X Direction	WX	0,0
Y Direction	WY	-29,0
Z Direction	WZ	0,0
Moment about X axis	MX	0,0
Moment about Y axis	MY	0,0
Moment about Z axis	MZ	77,0
Moment about hinge nodes	Hinge	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 74 Title: JORD 3-2 Factor = 1
Assignment to Lines:
701

Attribute: 30 Title: JORD 3-3
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Length"
X Direction	WX	0,0
Y Direction	WY	29,0
Z Direction	WZ	0,0
Moment about X axis	MX	0,0
Moment about Y axis	MY	0,0
Moment about Z axis	MZ	77,0
Moment about hinge nodes	Hinge	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 77 Title: JORD 3-3 Factor = 1
Assignment to Lines:
815

Attribute: 31 Title: JORD 3-4
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Length"
X Direction	WX	0,0
Y Direction	WY	-29,0
Z Direction	WZ	0,0
Moment about X axis	MX	0,0
Moment about Y axis	MY	0,0
Moment about Z axis	MZ	-77,0
Moment about hinge nodes	Hinge	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 78 Title: JORD 3-4 Factor = 1
Assignment to Lines:
801

Attribute: 32 Title: OVER 3-1
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Length"
X Direction	WX	0,0
Y Direction	WY	8,0
Z Direction	WZ	0,0
Moment about X axis	MX	0,0
Moment about Y axis	MY	0,0
Moment about Z axis	MZ	-14,0
Moment about hinge nodes	Hinge	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 75 Title: OVER 3-1 Factor = 1
Assignment to Lines:
715

Attribute: 33 Title: OVER 3-2
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Length"
X Direction	WX	0,0
Y Direction	WY	-8,0
Z Direction	WZ	0,0
Moment about X axis	MX	0,0
Moment about Y axis	MY	0,0
Moment about Z axis	MZ	14,0
Moment about hinge nodes	Hinge	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 76 Title: OVER 3-2 Factor = 1
Assignment to Lines:
701

Attribute: 34 Title: OVER 3-3
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Length"
X Direction	WX	0,0
Y Direction	WY	8,0
Z Direction	WZ	0,0
Moment about X axis	MX	0,0
Moment about Y axis	MY	0,0
Moment about Z axis	MZ	14,0
Moment about hinge nodes	Hinge	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 79 Title: OVER 3-3 Factor = 1
Assignment to Lines:
815

Attribute: 35 Title: OVER 3-4
Sub Type = Global Distributed Load

Property	Symbol	Value
Attribute type	type	"Length"
X Direction	WX	0,0
Y Direction	WY	-8,0
Z Direction	WZ	0,0
Moment about X axis	MX	0,0
Moment about Y axis	MY	0,0
Moment about Z axis	MZ	-14,0
Moment about hinge nodes	Hinge	0,0
Pore pressure flux	pwp	0,0
Keep global	keepGlobal	false

Loadcase ID: 80 Title: OVER 3-4 Factor = 1
Assignment to Lines:
801

14. Body load

Attribute: 4 Title: EGEN 1

Sub Type = Body Force Load

Property	Symbol	Value
Linear acceleration in X	AccX	0,0
Linear acceleration in Y	AccY	0,0
Linear acceleration in Z	AccZ	-10,0
Angular velocity about X axis	AngVelX	0,0
Angular velocity about Y axis	AngVelY	0,0
Angular velocity about Z axis	AngVelZ	0,0
Angular acceleration about X axis	AngAccX	0,0
Angular acceleration about Y axis	AngAccY	0,0
Angular acceleration about Z axis	AngAccZ	0,0
Linear acceleration In X fluid phase	lnFlAccX	0,0
Linear acceleration In Y fluid phase	lnFlAccY	0,0
Linear acceleration In Z fluid phase	lnFlAccZ	-10,0

Loadcase ID: 7 Title: EGEN 1 Factor = 1
Assignment to Surfaces:
101;104;201;204

Attribute: 5 Title: EGEN 2
Sub Type = Body Force Load

Property	Symbol	Value
Linear acceleration in X	AccX	0,0
Linear acceleration in Y	AccY	0,0
Linear acceleration in Z	AccZ	-10,0
Angular velocity about X axis	AngVelX	0,0
Angular velocity about Y axis	AngVelY	0,0
Angular velocity about Z axis	AngVelZ	0,0
Angular acceleration about X axis	AngAccX	0,0
Angular acceleration about Y axis	AngAccY	0,0
Angular acceleration about Z axis	AngAccZ	0,0
Linear acceleration In X fluid phase	lnFlAccX	0,0
Linear acceleration In Y fluid phase	lnFlAccY	0,0
Linear acceleration In Z fluid phase	lnFlAccZ	-10,0

Loadcase ID: 8 Title: EGEN 2 Factor = 1
Assignment to Surfaces:
402T409

15. Prescribed load

Attribute: 13 Title: STOD_1Z
Sub Type = Prescribed Load

Property	Symbol	Value
Attribute type	type	"Total"
Prescribed displacement in X	U	0,0
Prescribed displacement in Y	V	0,0
Prescribed displacement in Z	W	0,0
Prescribed rotation about X	THX	0,0
Prescribed rotation about Y	THY	0,0
Prescribed rotation about Z	THZ	0,0
Prescribed hinge rotation	L2	0,0
Pore pressure	PorePressure	0,0
Fixed displacement in X	haveDispX	false
Fixed displacement in Y	haveDispY	false
Fixed displacement in Z	haveDispZ	true
Fixed rotation about X	haveRotX	false
Fixed rotation about Y	haveRotY	false
Fixed rotation about Z	haveRotZ	false
Fixed hinge rotation	haveRotLocal	false
Fixed pore pressure	havePorePres	false

Loadcase ID: 16 Title: STOD_1Z Factor = 1
Assignment to Points:
400

Attribute: 14 Title: STOD_2Z
Sub Type = Prescribed Load

Property	Symbol	Value
Attribute type	type	"Total"
Prescribed displacement in X	U	0,0
Prescribed displacement in Y	V	0,0
Prescribed displacement in Z	W	0,0
Prescribed rotation about X	THX	0,0
Prescribed rotation about Y	THY	0,0
Prescribed rotation about Z	THZ	0,0
Prescribed hinge rotation	L2	0,0
Pore pressure	PorePressure	0,0
Fixed displacement in X	haveDispX	false
Fixed displacement in Y	haveDispY	false
Fixed displacement in Z	haveDispZ	true
Fixed rotation about X	haveRotX	false
Fixed rotation about Y	haveRotY	false
Fixed rotation about Z	haveRotZ	false
Fixed hinge rotation	haveRotLocal	false
Fixed pore pressure	havePorePres	false

Loadcase ID: 17 Title: STOD_2Z Factor = 1
Assignment to Points:
401

Attribute: 15 Title: STOD_1X
Sub Type = Prescribed Load

Property	**Symbol**	**Value**
Attribute type	type	"Total"
Prescribed displacement in X	U	0,0
Prescribed displacement in Y	V	0,0
Prescribed displacement in Z	W	0,0
Prescribed rotation about X	THX	0,0
Prescribed rotation about Y	THY	0,0
Prescribed rotation about Z	THZ	0,0
Prescribed hinge rotation	L2	0,0
Pore pressure	PorePressure	0,0
Fixed displacement in X	haveDispX	true
Fixed displacement in Y	haveDispY	false
Fixed displacement in Z	haveDispZ	false
Fixed rotation about X	haveRotX	false
Fixed rotation about Y	haveRotY	false
Fixed rotation about Z	haveRotZ	false
Fixed hinge rotation	haveRotLocal	false
Fixed pore pressure	havePorePres	false

Loadcase ID: 18 Title: STOD_1X+ Factor = 1
Assignment to Points:
400

Attribute: 16 Title: STOD_2X
Sub Type = Prescribed Load

Property	**Symbol**	**Value**
Attribute type	type	"Total"
Prescribed displacement in X	U	0,0
Prescribed displacement in Y	V	0,0
Prescribed displacement in Z	W	0,0
Prescribed rotation about X	THX	0,0
Prescribed rotation about Y	THY	0,0
Prescribed rotation about Z	THZ	0,0
Prescribed hinge rotation	L2	0,0
Pore pressure	PorePressure	0,0
Fixed displacement in X	haveDispX	true
Fixed displacement in Y	haveDispY	false
Fixed displacement in Z	haveDispZ	false
Fixed rotation about X	haveRotX	false
Fixed rotation about Y	haveRotY	false
Fixed rotation about Z	haveRotZ	false
Fixed hinge rotation	haveRotLocal	false
Fixed pore pressure	havePorePres	false

Loadcase ID: 19 Title: STOD_2X+ Factor = 1
Assignment to Points:
401

16. Temperature and shrinkage load

Attribute: 17 Title: KRYMP
Sub Type = Temperature Load

Property	Symbol	Value
Attribute type	type	"nodal"
Final temperature	T	-24,0
Final X temperature gradient	dT/dX	0,0
Final Y temperature gradient	dT/dY	0,0
Final Z temperature gradient	dT/dZ	0,0
Initial temperature	T0	0,0
Initial X temperature gradient	dT0/dX	0,0
Initial Y temperature gradient	dT0/dY	0,0
Initial Z temperature gradient	dT0/dZ	0,0

Loadcase ID: 20 Title: KRYMP Factor = 1
Assignment to Surfaces:
100T105;200T205;400T411

Attribute: 18 Title: JTEMP+
Sub Type = Temperature Load

Property	Symbol	Value
Attribute type	type	"nodal"
Final temperature	T	24,0
Final X temperature gradient	dT/dX	0,0
Final Y temperature gradient	dT/dY	0,0
Final Z temperature gradient	dT/dZ	0,0
Initial temperature	T0	0,0
Initial X temperature gradient	dT0/dX	0,0
Initial Y temperature gradient	dT0/dY	0,0
Initial Z temperature gradient	dT0/dZ	0,0

Loadcase ID: 23 Title: JTEMP+ Factor = 1
Assignment to Surfaces:
100T105;200T205;400T411

Attribute: 19 Title: JTEMP-
Sub Type = Temperature Load

Property	Symbol	Value
Attribute type	type	"nodal"
Final temperature	T	-44,0
Final X temperature gradient	dT/dX	0,0
Final Y temperature gradient	dT/dY	0,0
Final Z temperature gradient	dT/dZ	0,0
Initial temperature	T0	0,0
Initial X temperature gradient	dT0/dX	0,0
Initial Y temperature gradient	dT0/dY	0,0
Initial Z temperature gradient	dT0/dZ	0,0

Loadcase ID: 24 Title: JTEMP- Factor = 1
Assignment to Surfaces:
100T105;200T205;400T411

Attribute: 20 Title: OJTEMP 1+
Sub Type = Temperature Load

Property	Symbol	Value
Attribute type	type	"element"
Final temperature	T	0,0
Final X temperature gradient	dT/dX	0,0
Final Y temperature gradient	dT/dY	0,0
Final Z temperature gradient	dT/dZ	14,0
Initial temperature	T0	0,0
Initial X temperature gradient	dT0/dX	0,0
Initial Y temperature gradient	dT0/dY	0,0
Initial Z temperature gradient	dT0/dZ	0,0

Loadcase ID: 25 Title: OJTEMP:1+ Factor = 1
Assignment to Surfaces:
400T411

Attribute: 21 Title: OJTEMP 1-
Sub Type = Temperature Load

Property	Symbol	Value
Attribute type	type	"element"
Final temperature	T	0,0
Final X temperature gradient	dT/dX	0,0
Final Y temperature gradient	dT/dY	0,0
Final Z temperature gradient	dT/dZ	-11,0
Initial temperature	T0	0,0
Initial X temperature gradient	dT0/dX	0,0
Initial Y temperature gradient	dT0/dY	0,0
Initial Z temperature gradient	dT0/dZ	0,0

Loadcase ID: 26 Title: OJTEMP:1- Factor = 1
Assignment to Surfaces:
400T411

Attribute: 22 Title: OJTEMP 2
Sub Type = Temperature Load

Property	Symbol	Value
Attribute type	type	"element"
Final temperature	T	4,0
Final X temperature gradient	dT/dX	0,0
Final Y temperature gradient	dT/dY	0,0
Final Z temperature gradient	dT/dZ	0,0
Initial temperature	T0	0,0
Initial X temperature gradient	dT0/dX	0,0
Initial Y temperature gradient	dT0/dY	0,0
Initial Z temperature gradient	dT0/dZ	0,0

Loadcase ID: 27 Title: OJTEMP 2+ Factor = 1
Assignment to Surfaces:
400T411

17. Discrete patch load

Symbol	Property
patchType	Patch type
sweptAngle	Swept angle
xDivisions	Number of local x divisions
yDivisions	Number of local y divisions
dirType	Load direction
pDir	Projection vector
nGridX	X Grid size
nGridY	Y Grid size
pos	Coordinates
P	Load

Attribute: 1 Title: JORD 1
Sub Type = Discrete Patch Load
Patch type: 4-noded quadrilateral

dirType	pDir_x	pDir_y	pDir_z	nGridX	nGridY
X	0,0	0,0	1,0	0	0

pos_x	pos_y	pos_z	Px
-10,0	-4,0	0,0	35,0
-10,0	-4,0	5,96	0,0
-10,0	4,0	5,96	0,0
-10,0	4,0	0,0	35,0

Loadcase ID: 14 Title: JORD 1 Factor = 1
Patch transformation = None Load transformation = None
Search area=Ramben 1
Moving status = Include Full Load Assign type = area
Include moments All
Assignment to Points:
726

Attribute: 2 Title: JORD 2
Sub Type = Discrete Patch Load
Patch type: 4-noded quadrilateral

dirType	**pDir_x**	**pDir_y**	**pDir_z**	**nGridX**	**nGridY**
X	0,0	0,0	1,0	0	0

pos_x	**pos_y**	**pos_z**	**Px**
10,0	-4,0	0,0	-35,0
10,0	-4,0	5,96	0,0
10,0	4,0	5,96	0,0
10,0	4,0	0,0	-35,0

Loadcase ID: 15 Title: JORD 2 Factor = 1
Patch transformation = None Load transformation = None
Search area=Ramben 2
Moving status = Include Full Load Assign type = area
Include moments All
Assignment to Points:
726

Attribute: 3 Title: OVER 1
Sub Type = Discrete Patch Load
Patch type: 4-noded quadrilateral

dirType	**pDir_x**	**pDir_y**	**pDir_z**	**nGridX**	**nGridY**
X	0,0	0,0	1,0	0	0

pos_x	**pos_y**	**pos_z**	**Px**
-10,0	4,0	0,0	6,0
-10,0	-4,0	0,0	6,0
-10,0	-4,0	5,96	6,0
-10,0	4,0	5,96	6,0

Loadcase ID: 28 Title: OVER 1 Factor = 1
Patch transformation = None Load transformation = None
Search area=Ramben 1
Moving status = Include Full Load Assign type = area
Include moments All
Assignment to Points:
726

Attribute: 10 Title: OVER 2
Sub Type = Discrete Patch Load
Patch type: 4-noded quadrilateral

dirType	pDir_x	pDir_y	pDir_z	nGridX	nGridY
X	0,0	0,0	1,0	0	0

pos_x	pos_y	pos_z	Px
10,0	4,0	0,0	-6,0
10,0	-4,0	0,0	-6,0
10,0	-4,0	5,96	-6,0
10,0	4,0	5,96	-6,0

Loadcase ID: 29 Title: OVER 2 Factor = 1
Patch transformation = None Load transformation = None
Search area=Ramben 2
Moving status = Include Full Load Assign type = area
Include moments All
Assignment to Points:
726

Attribute: 11 Title: DELTA P-1
Sub Type = Discrete Patch Load
Patch type: 8-noded quadrilateral

dirType	pDir_x	pDir_y	pDir_z	nGridX	nGridY
X	0,0	0,0	1,0	0	0

pos_x	pos_y	pos_z	Px
-10,0	4,0	0,0	0,0
-10,0	0,0	0,0	0,0
-10,0	-4,0	0,0	0,0
-10,0	-4,0	2,98	36,0
-10,0	-4,0	5,96	0,0
-10,0	0,0	5,96	0,0
-10,0	4,0	5,96	0,0
-10,0	4,0	2,98	36,0

Loadcase ID: 21 Title: DELTA P-1 Factor = 1
Patch transformation = None Load transformation = None
Search area=Ramben 1
Moving status = Include Full Load Assign type = area
Include moments All
Assignment to Points:
726

Attribute: 29 Title: DELTA P-2
Sub Type = Discrete Patch Load
Patch type: 8-noded quadrilateral

dirType	**pDir_x**	**pDir_y**	**pDir_z**	**nGridX**	**nGridY**
X	0,0	0,0	1,0	0	0

pos_x	**pos_y**	**pos_z**	**Px**
10,0	4,0	0,0	0,0
10,0	0,0	0,0	0,0
10,0	-4,0	0,0	0,0
10,0	-4,0	2,98	-36,0
10,0	-4,0	5,96	0,0
10,0	0,0	5,96	0,0
10,0	4,0	5,96	0,0
10,0	4,0	2,98	-36,0

Loadcase ID: 22 Title: DELTA P-2 Factor = 1
Patch transformation = None Load transformation = None
Search area=Ramben 2
Moving status = Include Full Load Assign type = area
Include moments All
Assignment to Points:
726

18. Direct Method Influence Envelope

Attribute: 1 Title: Inf1 - Reactions
Sub Type = Direct method influence
Entity: Reactions
Directions: FX, FY, FZ, MX, MY
Assignment to Points:
400;401

Attribute: 2 Title: Inf2 – Shell elements
Sub Type = Direct method influence
Entity: Force/Moment – Thick Shell
D**irections:** Sx, Mx, My
A**ssignment to Surfaces:**
100T105, 200T205;400T411;

19. Load groups: traffic

Load groups : Eurocode Load Modell 1 (LM1)
Type: Tandem axle
Axle load - lane 1: 300 kN
Axle load - lane 2: 200 kN
Axel load - lane 3: 100 kN

Lane load
Surface load - lane 1: 9.0 kPa
Surface load - remaining: 2.5 kPa

Load groups : Eurocode Load Modell 2 (LM2)
Type: Single axle
Axle load: 400 kN

Load groups : Fatigue modell 3 (UTM3)
Type: Quadruple axel
Axle load: 120 kN

20. VLO Analysis

Type: VLO – LM1 ~ Characteristic
Representative values : Charateristic
Design code : EN 1991-2 Sweden 2011
Load groups : LM1
Longitudinal increment : 0.50 m
Transverse increment : 0.50 m
Vehicule direction : Both
Kerbs : L20, L21
UDL alfa factor : 0.8, 1, 1 , 1, 1
TS alfa factor : 0.9, 0.9,0
Influence attributes :
Inf 1 - Reactions
Inf 2 - Shell elements

Type: VLO – LM2 ~ Characteristic
Representative values : Charateristic
Design code : EN 1991-2 Sweden 2011
Load groups : LM2
Longitudinal increment : 0.50 m
Transverse increment : 0.50 m
Vehicule direction : Both
Kerbs : L20, L21
TS alfa factor : 0.9
Influence attributes :
Inf 1 - Reactions
Inf 2 - Shell elements

Type: VLO – UTM3 ~ Characteristic
Representative values : Charateristic
Design code : EN 1991-2 Sweden 2011
Load groups : UTM3
Longitudinal increment : 0.50 m
Transverse increment : 0.50 m
Vehicule direction : Both
Kerbs : L20, L21
Influence attributes :
Inf 1 - Reactions
Inf 2 - Shell elements

Type: VLO – EG A ~ Characteristic
Representative values : Charateristic
Design code : EN 1991-2 Sweden 2011
Load groups : Complementary load modell
Dynamic amplification : 25 %
Load model value A : 180 kN
Load model value B : 300 kN
Load modell valute q : 5 kN/m
Lane vehicule factor most onerous lane : 1.0
Lane vehicule factor second lane : 0.8
Type vehicules : a
Longitudinal increment : 0.50 m
Transverse increment : 0.50 m
Vehicule direction : Both
Kerbs : L20, L21
Minimum width vehicule : 2.0 m
Maximum width vehicle : 2.0 m
Influence attributes :
Inf 1 - Reactions
Inf 2 - Shell elements

Type: VLO – EG B ~ Characteristic
Representative values : Charateristic
Design code : EN 1991-2 Sweden 2011
Load groups : Complementary load modell
Dynamic amplification : 25 %
Load model value A : 180 kN
Load model value B : 300 kN
Load modell valute q : 5 kN/m
Lane vehicule factor most onerous lane : 1.0
Lane vehicule factor second lane : 0.8
Type vehicules : b, c, d, e, f, g,h,I,j,k,l,m,n,o
Longitudinal increment : 0.50 m
Transverse increment : 0.50 m
Vehicule direction : Both
Kerbs : L20, L21
Minimum width vehicule : 2.0 m
Maximum width vehicle : 2.0 m
Influence attributes :
Inf 1 - Reactions
Inf 2 - Shell elements

21. Basic combination

Loadcase ID: 91 Title: EGEN
Sub Type: Basic Combination

Loadcase File	Results Factor	Title	Type
7	0	1,0	EGEN 1
8	0	1,0	EGEN 2
9	0	1,0	EGEN 3
10	0	1,0	EGEN 4
11	0	1,0	EGEN 5

Loadcase ID: 92 Title: BELAGG
Sub Type: Basic Combination

Loadcase File	Results Factor	Title	Type
12	0	1,0	BELAGG 1
13	0	1,0	BELAGG 2

Loadcase ID: 93 Title: JORD
Sub Type: Basic Combination

Loadcase File	Results Factor	Title	Type
14	0	1,0	JORD 1
15	0	1,0	JORD 2
73	0	1,0	JORD 3-1
74	0	1,0	JORD 3-2
75	0	1,0	JORD 3-3
76	0	1,0	JORD 3-4

Loadcase ID: 94 Title: STOD_1X-
Sub Type: Basic Combination

Loadcase File	Results Factor	Title	Type
18	0	-1,0	STOD_1X+

Loadcase ID: 95 Title: STOD_2X-
Sub Type: Basic Combination

Loadcase File	Results Factor	Title	Type
19	0	-1,0	STOD_2X+

Loadcase ID: 108 Title: DELTA P
Sub Type: Basic Combination

Loadcase File	Results Factor	Title	Type
21	0	1,0	DELTA P-1
22	0	1,0	DELTA P-2

Loadcase ID: 109 Title: OJTEMP 2-
Sub Type: Basic Combination

Loadcase Results File	Factor	Title	Type
27	0	-1,0	OJTEMP 2+

Loadcase ID: 112 Title: JTEMP MAX
Sub Type: Basic Combination

Loadcase Results File	Factor	Title	Type
23	0	1,0	JTEMP+

Loadcase ID: 113 Title: JTEMP MIN
Sub Type: Basic Combination

Loadcase Results File	Factor	Title	Type
24	0	1,0	JTEMP-

Loadcase ID: 126 Title: TEMP-ULS
Sub Type: Basic Combination

Loadcase Results File	Factor	Title	Type
108	0	1,0	DELTA P

22. Smart combination

Loadcase ID: 98 Title: STOD-Z
Sub Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: All

Loadcase File	Results Permanent Factor		Variable Factor	Title
16	0	0,0	1,0	STOD_1Z
17	0	0,0	1,0	STOD_2Z

Loadcase ID: 106 Title: OVER
Sub Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: All

Loadcase File	Results Permanent Factor		Variable Factor	Title
28	0	0,0	1,0	OVER 1
29	0	0,0	1,0	OVER 2
77	0	0,0	1,0	OVER 3-1
78	0	0,0	1,0	OVER 3-2
79	0	0,0	1,0	OVER 3-3
80	0	0,0	1,0	OVER 3-4

Loadcase ID: 116 Title: TEMP-1
Sub Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: All

Loadcase File	Results Permanent Factor		Variable Factor	Title
114	0	0,0	0,47	JTEMP (Max)
115	0	0,0	0,47	JTEMP (Min)
120	0	0,0	0,45	OJTEMP 1 (Max)
121	0	0,0	0,45	OJTEMP 1 (Min)
108	0	0,0	1,0	DELTA P

Loadcase ID: 118 Title: TEMP-2
Sub Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: All

Loadcase File	Results Permanent Factor		Variable Factor	Title
114	0	0,0	0,16	JTEMP (Max)
115	0	0,0	0,16	JTEMP (Min)
120	0	0,0	0,6	OJTEMP 1 (Max)
121	0	0,0	0,6	OJTEMP 1 (Min)
108	0	0,0	1,0	DELTA P

Loadcase ID: 122 Title: TEMP-3
Sub Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: All

Loadcase File	Results Permanent Factor	Variable Factor	Title
114	0 0,0	0,46	JTEMP (Max)
115	0 0,0	0,46	JTEMP (Min)
110	0 0,0	0,6	OJTEMP 2 (Max)
111	0 0,0	0,6	OJTEMP 2 (Min)
108	0 0,0	1,0	DELTA P

Loadcase ID: 127 Title: ULS-PERM
Sub s46Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: All

Loadcase File	Results Permanent Factor	Variable Factor	Title
91	0 1,0	0,09	EGEN
92	0 0,9	0,31	BELAGG
93	0 0,9	0,55	JORD
100	0 0,0	0,22	STOD (Max)
101	0 0,0	0,22	STOD (Min)
20	0 0,0	0,22	KRYMP

Loadcase ID: 129 Title: ULS-VAR
Sub Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: 1

Loadcase File	Results Permanent Factor	Variable Factor	Title
131	0 1,03	0,34	TRAFIK (Max)
132	0 1,03	0,34	TRAFIK (Min)
102	0 0,76	0,27	BROMS (Max)
103	0 0,76	0,27	BROMS (Min)
104	0 0,76	0,27	SIDO (Max)
105	0 0,76	0,27	SIDO (Min)
126	0 0,82	0,55	TEMP-ULS
106	0 1,03	0,67	OVER (Max)
107	0 1,03	0,67	OVER (Min)

Loadcase ID: 133 Title: ULS
Sub Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: All

Loadcase File	Results Permanent Factor	Variable Factor	Title
127	0 1,0	0,0	ULS-PERM (Max)
128	0 1,0	0,0	ULS-PERM (Min)
129	0 0,0	1,0	ULS-VAR (Max)
130	0 0,0	1,0	ULS-VAR (Min)

Loadcase ID: 135 Title: SLS-PERM
Sub Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: All

Loadcase File	Results Permanent Factor		Variable Factor	Title
91	0	1,00	0,0	EGEN
92	0	0,90	0,20	BELAGG
93	0	0,90	0,45	JORD
100	0	0,0	0,22	STOD (Max)
101	0	0,0	0,22	STOD (Min)
20	0	0,0	0,22	KRYMP

Loadcase ID: 137 Title: SLS-K-VAR
Sub Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: 1

Loadcase File	Results Permanent Factor		Variable Factor	Title
131	0	0,75	0,25	TRAFIK (Max)
132	0	0,75	0,25	TRAFIK (Min)
102	0	0,56	0,19	BROMS (Max)
103	0	0,56	0,19	BROMS (Min)
104	0	0,56	0,19	SIDO (Max)
105	0	0,56	0,19	SIDO (Min)
124	0	0,6	0,40	TEMP (Max)
125	0	0,6	0,40	TEMP (Min)
106	0	0,75	0,50	OVER (Max)
107	0	0,75	0,50	OVER (Min)

Loadcase ID: 139 Title: SLS-F-VAR
Sub Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: All

Loadcase File	Results Permanent Factor		Variable Factor	Title
131	0	0,0	0,75	TRAFIK (Max)
132	0	0,0	0,75	TRAFIK (Min)
102	0	0,0	0,56	BROMS (Max)
103	0	0,0	0,56	BROMS (Min)
104	0	0,0	0,56	SIDO (Max)
105	0	0,0	0,56	SIDO (Min)
124	0	0,0	0,60	TEMP (Max)
125	0	0,0	0,60	TEMP (Min)
106	0	0,0	0,95	OVER (Max)
107	0	0,0	0,95	OVER (Min)

Loadcase ID: 141 Title: SLS-F
Sub Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: All

Loadcase File	Results Permanent Factor		Variable Factor	Title
135	0	1,0	0,0	SLS-PERM (Max)
136	0	1,0	0,0	SLS-PERM (Min)
139	0	0,0	1,0	SLS-F-VAR (Max)
140	0	0,0	1,0	SLS-F-VAR (Min)

Loadcase ID: 143 Title: SLS-K
Sub Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: All

Loadcase File	Results Permanent Factor		Variable Factor	Title
135	0	1,0	0,0	SLS-PERM (Max)
136	0	1,0	0,0	SLS-PERM (Min)
137	0	0,0	1,0	SLS-K-VAR (Max)
138	0	0,0	1,0	SLS-K-VAR (Min)

Loadcase ID: 145 Title: SLS-Q
Sub Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: All

Loadcase File	Results Permanent Factor		Variable Factor	Title
135	0	1,0	0,0	SLS-PERM (Max)
136	0	1,0	0,0	SLS-PERM (Min)
124	0	0,0	0,5	TEMP (Max)
125	0	0,0	0,5	TEMP (Min)

Loadcase ID: 147 Title: FAT
Sub Type: Smart Combination
Loadcases to consider: All
Variable Loadcases: All

Loadcase File	Results Permanent Factor		Variable Factor	Title
91	0	1,0	0,0	EGEN
92	0	1,0	0,0	BELAGG
93	0	1,0	0,0	JORD
149	0	0,0	1,0	UTM (Max)
150	0	0,0	1,0	UTM (Min)

23. Envelopes

Loadcase ID: 96 Title: STOD-X
Sub Type: Envelope

Loadcase File	Results Title	Type
18	0	STOD_1X+
19	0	STOD_2X+
94	0	STOD_1X-
95	0	STOD_2X-

Loadcase ID: 100 Title: STOD
Sub Type: Envelope

Loadcase File	Results Title	Type
98	0	STOD-Z (Max)
99	0	STOD-Z (Min)
96	0	STOD-X (Max)
97	0	STOD-X (Min)

Loadcase ID: 102 Title: BROMS
Sub Type: Envelope

Loadcase File	Results Title	Type
68	0	BROMS+
69	0	BROMS-

Loadcase ID: 104 Title: SIDO
Sub Type: Envelope

Loadcase File	Results Title	Type
70	0	SIDO+
71	0	SIDO-

Loadcase ID: 110 Title: OJTEMP 2
Sub Type: Envelope

Loadcase File	Results Title	Type
27	0	OJTEMP 2+
109	0	OJTEMP 2-

Loadcase ID: 114 Title: JTEMP
Sub Type: Envelope

Loadcase File	Results Title	Type
112	0	JTEMP MAX
113	0	JTEMP MIN

Loadcase ID: 120 Title: OJTEMP 1
Sub Type: Envelope

Loadcase File	Results Title	Type
25	0	OJTEMP:1+
26	0	OJTEMP:1-

Loadcase ID: 124 Title: TEMP
Sub Type: Envelope

Loadcase File	Results Title	Type
116	0	TEMP-1 (Max)
117	0	TEMP-1 (Min)
118	0	TEMP-2 (Max)
119	0	TEMP-2 (Min)
122	0	TEMP-3 (Max)
123	0	TEMP-3 (Min)

Loadcase ID: 4682 Title: EG A
Sub Type: Envelope

Loadcase File	Results Title	Type
2895	0	VLO – EG A ~ Characteristic

Loadcase ID: 4684 Title: EG B
Sub Type: Envelope

Loadcase File	Results Title	Type
3297	0	VLO – EG B ~ Characteristic

Loadcase ID: 4686 Title: UTM3
Sub Type: Envelope

Loadcase File	Results Title	Type
4503	0	VLO – UTM3 ~ Characteristic

Loadcase ID: 4634 Title: LM1
Sub Type: Envelope

Loadcase File	Results Title	Type
3699	0	VLO – LM1 ~ Characteristic

Loadcase ID: 4636 Title: LM2
Sub Type: Envelope

Loadcase File	Results Title	Type
3699	0	VLO – LM1 ~ Characteristic

Loadcase ID: 4636 Title: TRAFIK
Sub Type: Envelope

Loadcase File	Results Title	Type
4682	0	EG A (Max)
4683	0	EG A (Min)
4684	0	EG B (Max)
4685	0	EG B (Min)
4634	0	LM1 (Max)
4635	0	LM1 (Min)
4636	0	LM2 (Max)
4637	0	LM2 (Min)

Appendix 2: Reactions (system 001)

RC open frame bridge

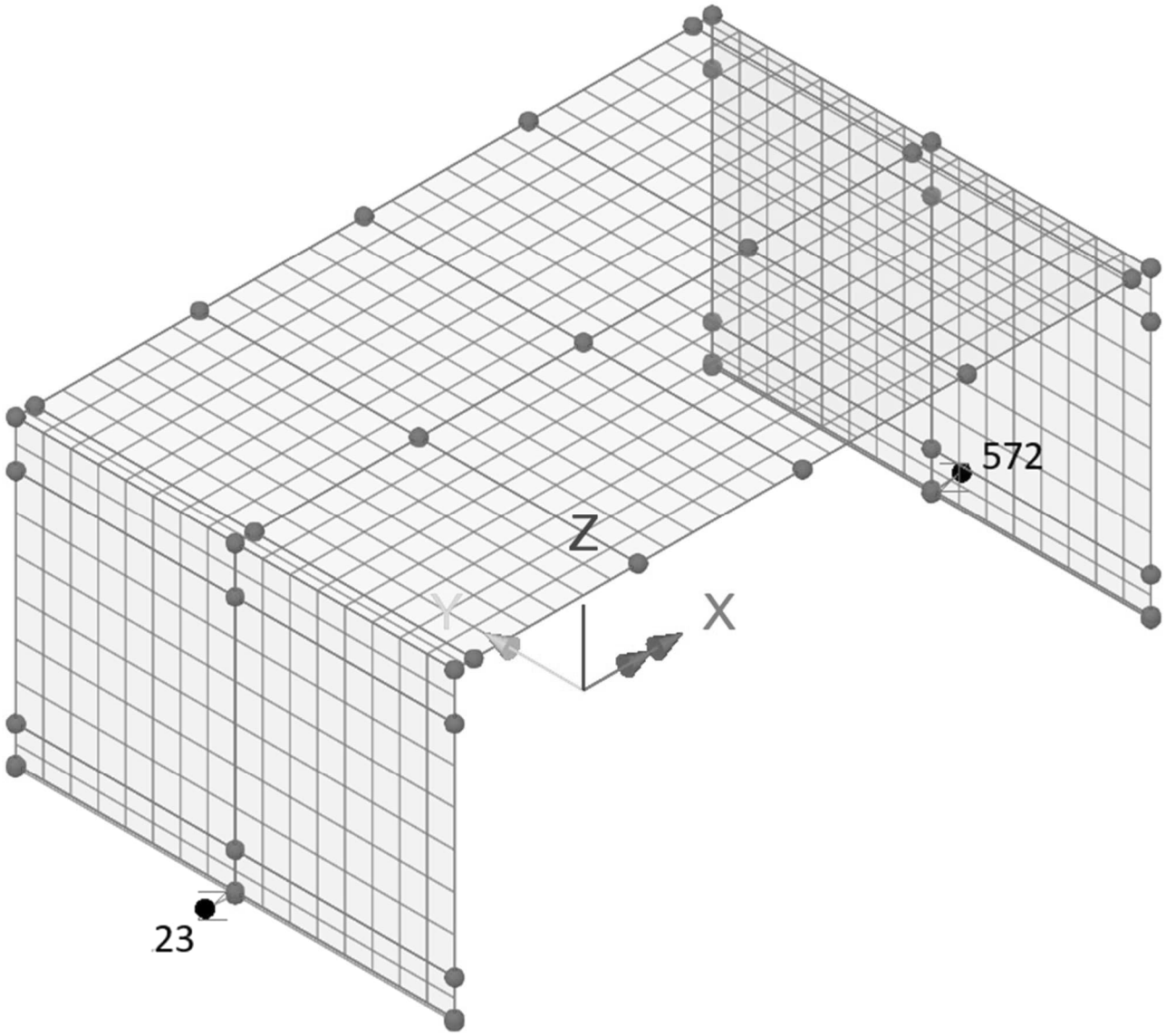
Title: Results reactions

Model Units: kN,m,t,s,C
Report Units: kN,m,t,s,C

Model Title: System 001
Model File: System 001

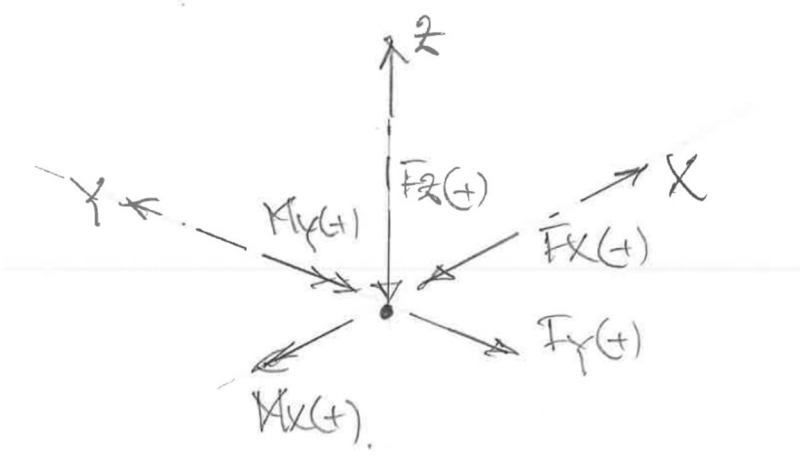
Table of Contents

1. Reaction nodes



Support 1 & 2
Nodes at location of reactions.

2. Sign convention



3. Results loadcase

EGEN 1

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-10	0	682	0	0	0
572	6,9	0,0	0,0	10	0	682	0	0	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

EGEN 2

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	389	0	990	0	19	0
572	6,9	0,0	0,0	-389	0	990	0	-19	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

EGEN 3

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	32	0	76	0	2	0
572	6,9	0,0	0,0	-32	0	76	0	-2	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

EGEN 4

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-32	0	293	0	-1	0
572	6,9	0,0	0,0	32	0	293	0	1	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

EGEN 5

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	0	0	304	0	0	0
572	6,9	0,0	0,0	0	0	304	0	0	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

EGEN

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	378	0	2345	0	19	0
572	6,9	0,0	0,0	-378	0	2345	0	-19	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

BELAGG 1

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	51	0	127	0	3	0
572	6,9	0,0	0,0	-51	0	127	0	-3	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

BELAGG 2

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-18	0	121	0	-1	0
572	6,9	0,0	0,0	18	0	121	0	1	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

BELAGG

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	34	0	248	0	2	0
572	6,9	0,0	0,0	-34	0	248	0	-2	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

JORD 1

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-673	0	-126	0	-44	0
572	6,9	0,0	0,0	-161	0	126	0	-33	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

JORD 2

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	161	0	126	0	33	0
572	6,9	0,0	0,0	673	0	-126	0	44	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

JORD 3-1

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	0	-104	0	95	-1	307
572	6,9	0,0	0,0	0	-12	0	72	0	150
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

JORD 3-2

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	0	104	0	-95	-1	-307
572	6,9	0,0	0,0	0	12	0	-72	0	-150
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

JORD 3-3

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	0	-12	0	72	0	-150
572	6,9	0,0	0,0	0	-104	0	95	1	-307
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

JORD 3-4

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	0	12	0	-72	0	150
572	6,9	0,0	0,0	0	104	0	-95	1	307
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

JORD

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-511	0	0	0	-12	0
572	6,9	0,0	0,0	511	0	0	0	12	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

OVER 1

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-206	0	-64	0	-19	0
572	6,9	0,0	0,0	-80	0	64	0	-16	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

OVER 2

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	80	0	64	0	16	0
572	6,9	0,0	0,0	206	0	-64	0	19	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

OVER 3-1

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	0	-28	0	26	0	65
572	6,9	0,0	0,0	0	-4	0	20	0	37
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

OVER 3-2

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	0	28	0	-26	0	-65
572	6,9	0,0	0,0	0	4	0	-20	0	-37
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

OVER 3-3

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	0	-4	0	20	0	-37
572	6,9	0,0	0,0	0	-28	0	26	0	-65
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

OVER 3-4

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	0	4	0	-20	0	37
572	6,9	0,0	0,0	0	28	0	-26	0	65
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

STOD_1Z

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	0	0	-37	0	232	0
572	6,9	0,0	0,0	0	0	37	0	232	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

STOD_2Z

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	0	0	37	0	-232	0
572	6,9	0,0	0,0	0	0	-37	0	-232	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

STOD_1X+

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	317	0	0	0	324	0
572	6,9	0,0	0,0	-317	0	0	0	-324	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

STOD_2X+

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-317	0	0	0	-324	0
572	6,9	0,0	0,0	317	0	0	0	324	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

KRYMP

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-88	0	0	0	-99	0
572	6,9	0,0	0,0	88	0	0	0	99	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

DELTA P-1

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-798	0	-250	0	-78	0
572	6,9	0,0	0,0	-315	0	250	0	-63	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

DELTA P-2

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	315	0	250	0	63	0
572	6,9	0,0	0,0	798	0	-250	0	78	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

DELTA P

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-483	0	0	0	-15	0
572	6,9	0,0	0,0	483	0	0	0	15	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

JTEMP+

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	88	0	0	0	99	0
572	6,9	0,0	0,0	-88	0	0	0	-99	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

JTEMP-

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-162	0	0	0	-182	0
572	6,9	0,0	0,0	162	0	0	0	182	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

OJTEMP:1+

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-272	0	0	0	-27	0
572	6,9	0,0	0,0	272	0	0	0	27	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

OJTEMP:1-

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	214	0	0	0	21	0
572	6,9	0,0	0,0	-214	0	0	0	-21	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

OJTEMP:2+

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	16	0	0	0	17	0
572	6,9	0,0	0,0	-16	0	0	0	-17	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

BROMS+

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-192	0	-161	0	-36	0
572	6,9	0,0	0,0	-192	0	161	0	-36	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

BROMS-

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	192	0	161	0	36	0
572	6,9	0,0	0,0	192	0	-161	0	36	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

SIDO+

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	0	-48	0	178	0	-9
572	6,9	0,0	0,0	0	-48	0	178	0	9
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

SIDO-

Node	X	Y	Z	FX	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	0	48	0	-178	0	9
572	6,9	0,0	0,0	0	48	0	-178	0	-9
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

4. Results load – Fz

EG A: Max FZ

Node	X	Y	Z	FX	FY	FZ*	MX	MY	MZ
23	-6,9	0,0	0,0	-24	0	473	0	2	0
572	6,9	0,0	0,0	24	0	473	0	-2	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

EG A: Min FZ

Node	X	Y	Z	FX	FY	FZ*	MX	MY	MZ
23	-6,9	0,0	0,0	-31	0	-29	0	-5	0
572	6,9	0,0	0,0	31	0	-29	0	5	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

EG B: Max FZ

Node	X	Y	Z	FX	FY	FZ*	MX	MY	MZ
23	-6,9	0,0	0,0	289	0	1454	0	15	0
572	6,9	0,0	0,0	-277	0	1445	0	-13	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

EG B: Min FZ

Node	X	Y	Z	FX	FY	FZ*	MX	MY	MZ
23	-6,9	0,0	0,0	-45	0	-43	0	-7	0
572	6,9	0,0	0,0	47	0	-45	0	7	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

LM 1: Max FZ

Node	X	Y	Z	FX	FY	FZ*	MX	MY	MZ
23	-6,9	0,0	0,0	45	28	1203	254	8	137
572	6,9	0,0	0,0	-56	28	1212	253	-7	-139
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

LM 1: Min Fz

Node	X	Y	Z	FX	FY	FZ*	MX	MY	MZ
23	-6,9	0,0	0,0	-57	24	-54	-106	-9	140
572	6,9	0,0	0,0	50	22	-48	-95	8	-126
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

5. Results loads – My

EG A: Max MY

Node	X	Y	Z	FX	FY	FZ	MX	MY*	MZ
23	-6,9	0,0	0,0	118	0	136	0	11	0
572	6,9	0,0	0,0	31	24	-29	-105	5	-138
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

EG A: Min MY

Node	X	Y	Z	FX	FY	FZ	MX	MY*	MZ
23	-6,9	0,0	0,0	-31	24	-29	-105	-5	138
572	6,9	0,0	0,0	-118	0	136	0	-11	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

EG B: Max MY

Node	X	Y	Z	FX	FY	FZ	MX	MY*	MZ
23	-6,9	0,0	0,0	396	0	561	0	28	0
572	6,9	0,0	0,0	-100	0	548	0	9	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

EG B: Min MY

Node	X	Y	Z	FX	FY	FZ	MX	MY*	MZ
23	-6,9	0,0	0,0	104	0	547	0	-8	0
572	6,9	0,0	0,0	-401	0	574	0	-28	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

LM 1: Max MY

Node	X	Y	Z	FX	FY	FZ	MX	MY*	MZ
23	-6,9	0,0	0,0	288	-11	482	212	26	-161
572	6,9	0,0	0,0	38	-25	33	102	8	143
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

LM 1: Min MY

Node	X	Y	Z	FX	FY	FZ	MX	MY*	MZ
23	-6,9	0,0	0,0	-41	27	23	-113	-9	158
572	6,9	0,0	0,0	-299	-9	492	209	-26	156
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

6. Results loadcombination – Fx

ULS: Max FX

Node	X	Y	Z	FX*	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	941	-37	4126	109	135	-9
572	6,9	0,0	0,0	1570	-39	3035	-172	132	53
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

ULS: Min FX

Node	X	Y	Z	FX*	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-1570	39	2967	-386	-132	2
572	6,9	0,0	0,0	-941	37	4182	-109	-134	-9
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

SLS-Q: Max FX

Node	X	Y	Z	FX*	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	88	0	2617	0	46	0
572	6,9	0,0	0,0	698	0	2568	0	61	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

SLS-Q: Min FX

Node	X	Y	Z	FX*	FY	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-698	0	2568	0	-61	0
572	6,9	0,0	0,0	-88	0	2617	0	-46	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

7. Results loadcombination – Fy

ULS: Max FY

Node	X	Y	Z	FX	FY*	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-380	294	3749	-26	41	1402
572	6,9	0,0	0,0	-208	294	4035	-42	2	-1413
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

ULS: Min FY

Node	X	Y	Z	FX	FY*	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-379	-294	3660	26	-93	-1402
572	6,9	0,0	0,0	966	-294	3370	42	49	1413
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

SLS-Q: Max FY

Node	X	Y	Z	FX	FY*	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-501	0	2568	0	8	0
572	6,9	0,0	0,0	162	0	2617	0	47	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

SLS-Q: Min FY

Node	X	Y	Z	FX	FY*	FZ	MX	MY	MZ
23	-6,9	0,0	0,0	-162	0	2617	0	-47	0
572	6,9	0,0	0,0	501	0	2568	0	-8	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

8. Results loadcombination – Fz

ULS-PERM: Max FZ

Node	X	Y	Z	FX	FY	FZ*	MX	MY	MZ
23	-6,9	0,0	0,0	-317	0	2859	0	-32	0
572	6,9	0,0	0,0	7	0	2859	0	10	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

ULS-PERM : Min FZ

Node	X	Y	Z	FX	FY	FZ*	MX	MY	MZ
23	-6,9	0,0	0,0	-52	0	2564	0	32	0
572	6,9	0,0	0,0	362	0	2564	0	-11	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

ULS-VAR: Max FZ

Node	X	Y	Z	FX	FY	FZ*	MX	MY	MZ
23	-6,9	0,0	0,0	228	-37	2180	109	51	-9
572	6,9	0,0	0,0	-609	37	2168	-109	-62	-9
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

ULS: Max FZ

Node	X	Y	Z	FX	FY	FZ*	MX	MY	MZ
23	-6,9	0,0	0,0	602	-37	5039	109	52	-9
572	6,9	0,0	0,0	-602	37	5027	-109	-52	-9
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

ULS: Min FZ

Node	X	Y	Z	FX	FY	FZ*	MX	MY	MZ
23	-6,9	0,0	0,0	-521	61	2277	-218	-33	153
572	6,9	0,0	0,0	1220	-14	2283	10	66	-121
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

SLS-Q: Max FZ

Node	X	Y	Z	FX	FY	FZ*	MX	MY	MZ
23	-6,9	0,0	0,0	-629	0	2621	0	-54	0
572	6,9	0,0	0,0	-21	0	2621	0	0	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

SLS-Q: Min FZ

Node	X	Y	Z	FX	FY	FZ*	MX	MY	MZ
23	-6,9	0,0	0,0	15	0	2564	0	44	0
572	6,9	0,0	0,0	635	0	2564	0	10	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

9. Results loadcombination – Mx

ULS: Max MX

Node	X	Y	Z	FX	FY	FZ	MX*	MY	MZ
23	-6,9	0,0	0,0	-609	-80	3144	1248	-32	-379
572	6,9	0,0	0,0	139	-59	3523	1257	45	249
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

ULS: Min MX

Node	X	Y	Z	FX	FY	FZ	MX*	MY	MZ
23	-6,9	0,0	0,0	166	80	3815	-1248	37	379
572	6,9	0,0	0,0	303	59	3605	-1257	-53	-249
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

SLS-Q: Max MX

Node	X	Y	Z	FX	FY	FZ	MX*	MY	MZ
23	-6,9	0,0	0,0	-348	0	2564	0	-4	0
572	6,9	0,0	0,0	23	0	2621	0	0	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

SLS-Q: Min MX

Node	X	Y	Z	FX	FY	FZ	MX*	MY	MZ
23	-6,9	0,0	0,0	-253	0	2621	0	-6	0
572	6,9	0,0	0,0	635	0	2564	0	10	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

10. Results loadcombination – My

ULS-PERM: Max My

Node	X	Y	Z	FX	FY	FZ	MX	MY*	MZ
23	-6,9	0,0	0,0	98	0	2856	0	62	0
572	6,9	0,0	0,0	467	0	2568	0	61	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

ULS-PERM : Min My

Node	X	Y	Z	FX	FY	FZ	MX	MY*	MZ
23	-6,9	0,0	0,0	-467	0	2568	0	-61	0
572	6,9	0,0	0,0	-98	0	2856	0	-62	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

ULS-VAR: Max My

Node	X	Y	Z	FX	FY	FZ	MX	MY*	MZ
23	-6,9	0,0	0,0	772	-37	957	109	81	-9
572	6,9	0,0	0,0	703	-37	332	109	78	9
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

ULS-VAR: Min My

Node	X	Y	Z	FX	FY	FZ	MX	MY*	MZ
23	-6,9	0,0	0,0	-848	65	-208	-226	-78	172
572	6,9	0,0	0,0	-778	37	975	-109	-81	-9
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

ULS: Max My

Node	X	Y	Z	FX	FY	FZ	MX	MY*	MZ
23	-6,9	0,0	0,0	869	-37	3813	109	143	-9
572	6,9	0,0	0,0	1170	-37	2900	109	139	9
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

ULS: Min My

Node	X	Y	Z	FX	FY	FZ	MX	MY*	MZ
23	-6,9	0,0	0,0	-1315	65	2359	-226	-139	172
572	6,9	0,0	0,0	-876	37	3830	-109	-143	-9
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

SLS-Q: Max My

Node	X	Y	Z	FX	FY	FZ	MX	MY*	MZ
23	-6,9	0,0	0,0	84	0	2617	0	51	0
572	6,9	0,0	0,0	698	0	2568	0	61	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

SLS-Q: Min My

Node	X	Y	Z	FX	FY	FZ	MX	MY*	MZ
23	-6,9	0,0	0,0	-698	0	2568	0	-61	0
572	6,9	0,0	0,0	-84	0	2617	0	-51	0
-	m	m	m	kN	kN	kN	kNm	kNm	kNm

Appendix 3: Abutments (system 001)

RC open frame bridge

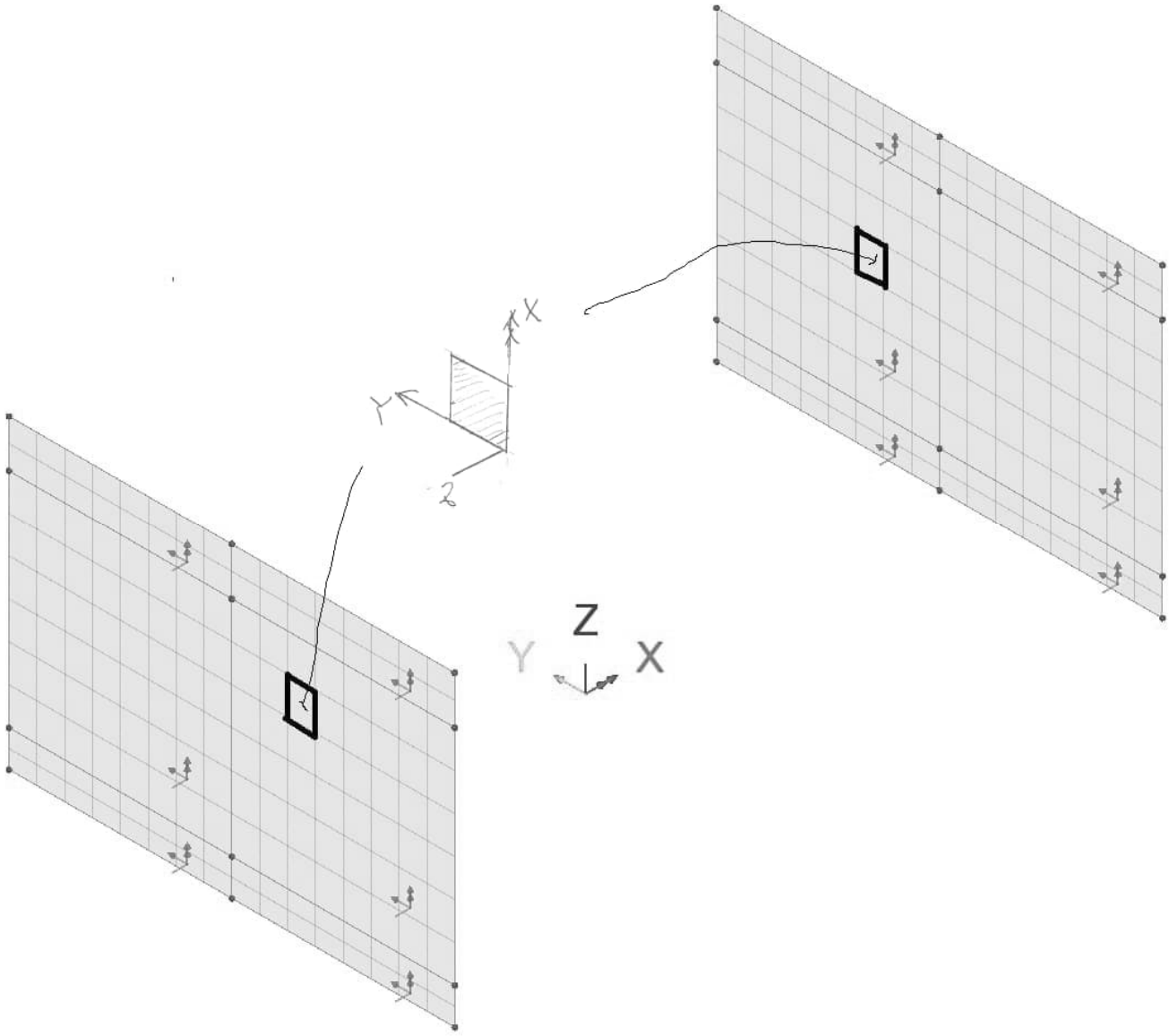
Title: Results abutments

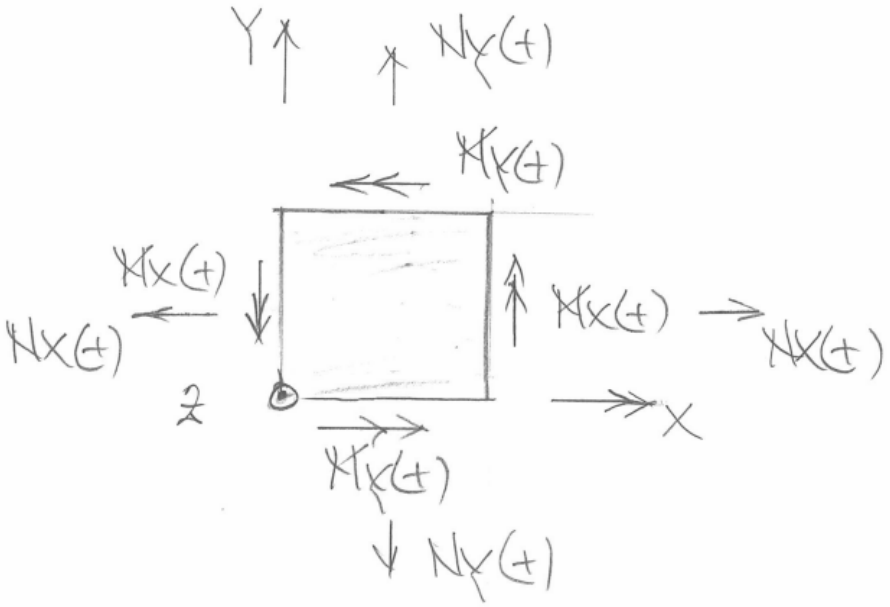
Model Units: kN,m,t,s,C
Report Units: kN,m,t,s,C

Model Title: System 001
Model File: System 001

Table of Contents

1. Sign convention

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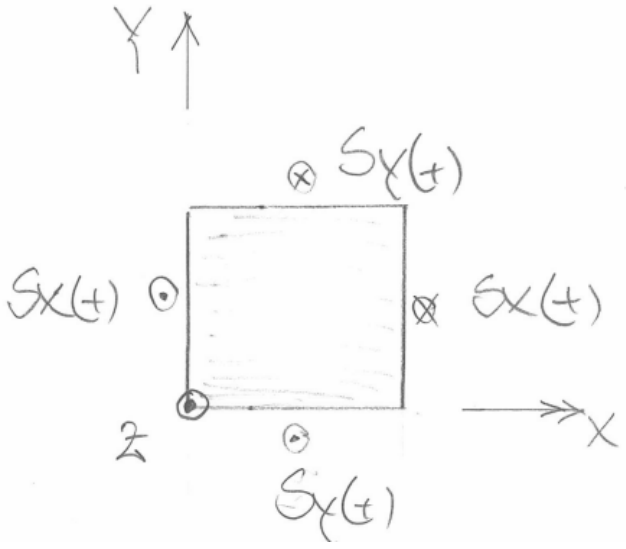
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Z
X
Sy(+)

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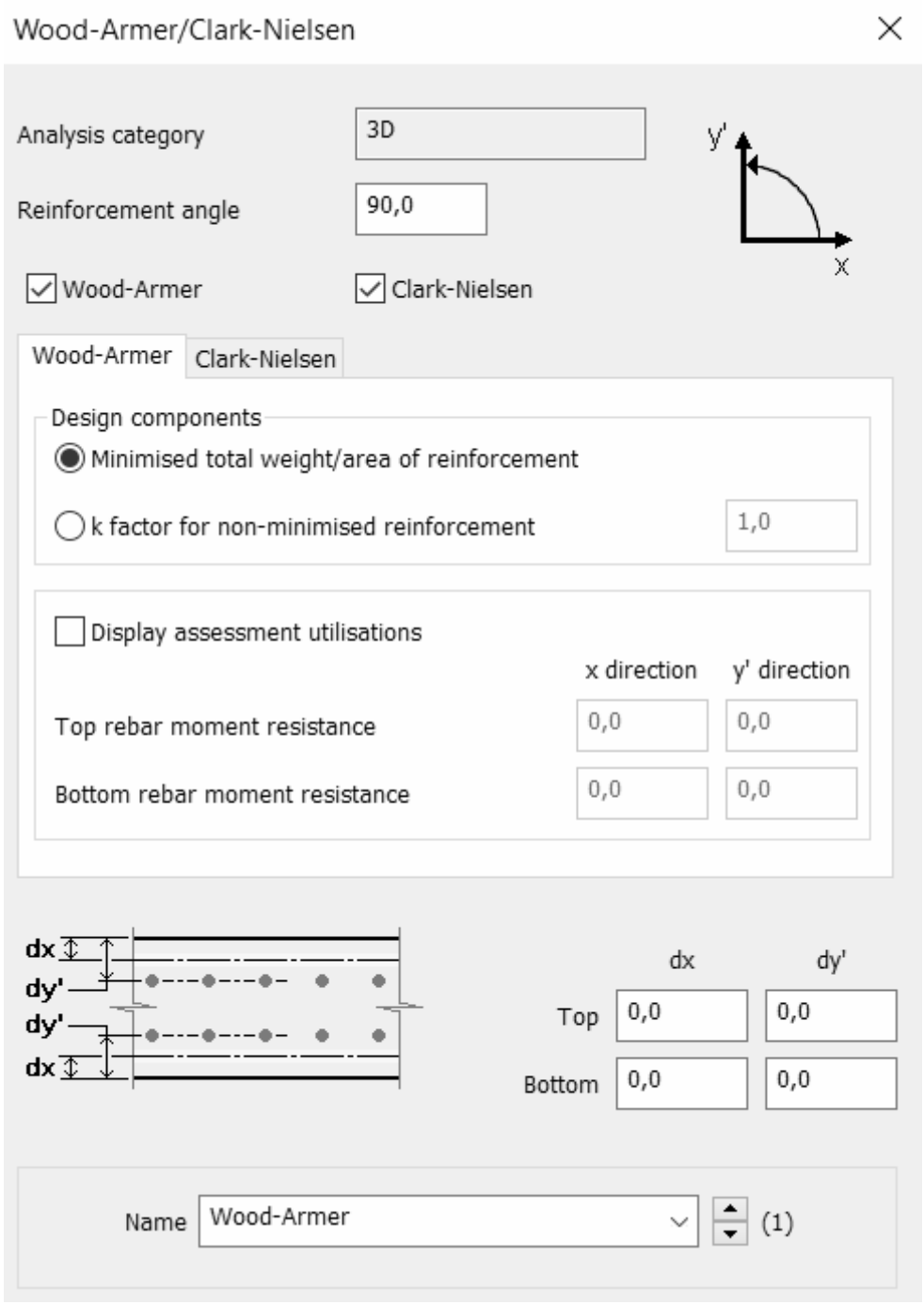
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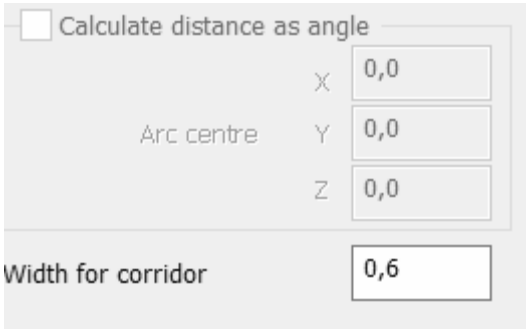
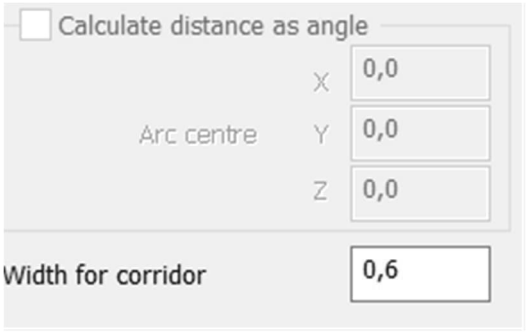
Analysis category
3D
Reinforcement angle
90,0
y'
x
Wood-Armer
Clark-Nielsen
Wood-Armer
Clark-Nielsen
Design components
Minimised total weight/area of reinforcement
k factor for non-minimised reinforcement
1,0
Display assessment utilisations
x direction
y' direction
Top rebar moment resistance
0,0
0,0
Bottom rebar moment resistance
0,0
0,0
dx
dy'
dy'
dx
dx
dy'
Top
0,0
0,0
Bottom
0,0
0,0
Name
Wood-Armer
(1)

3. Slice Data

3.1 Results Nx, Sx and Mx

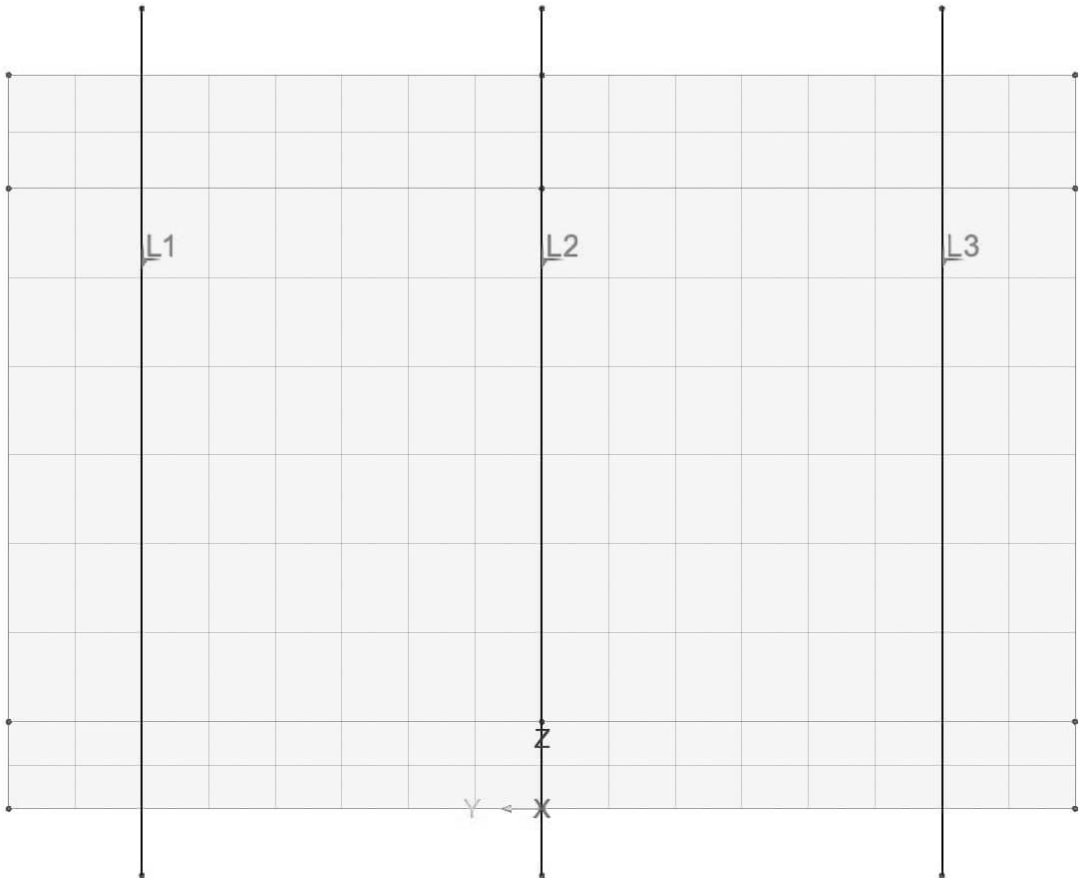


3.2 Results Ny, Sy and My

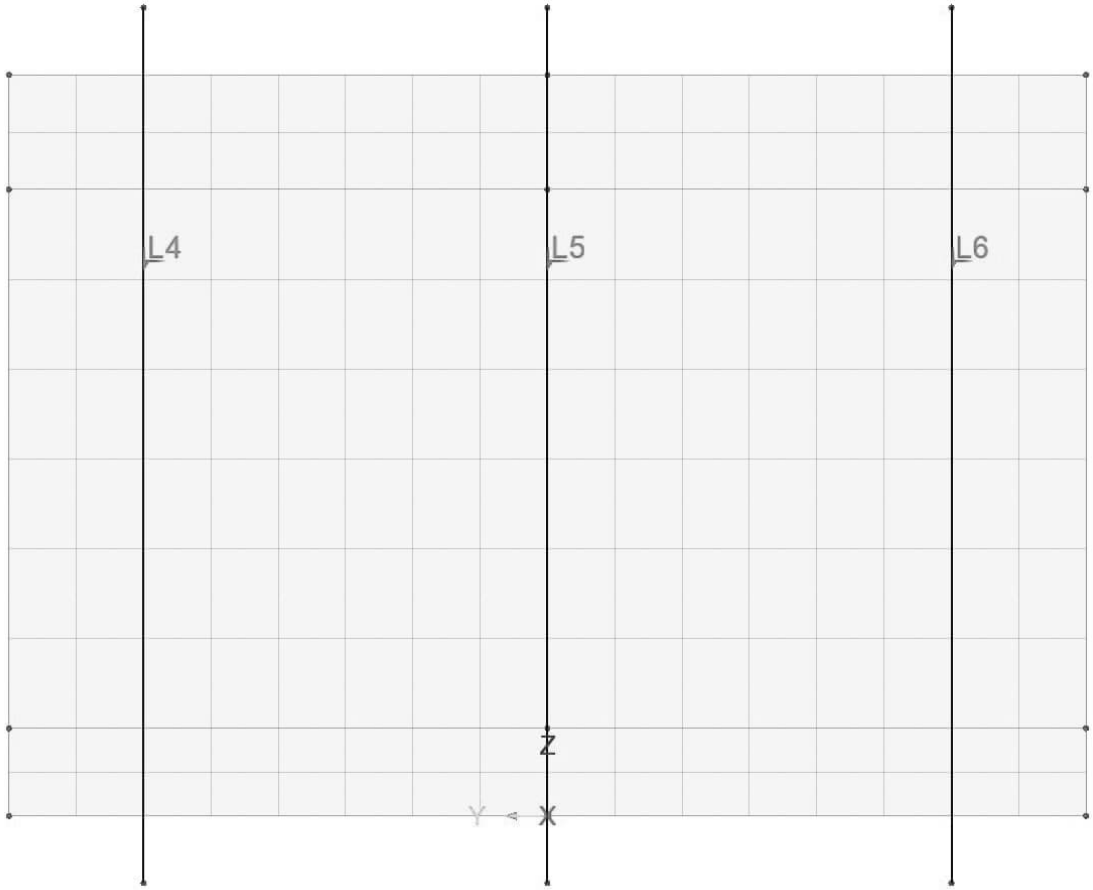


4. Definition resultatlinjer

Abutment 1:



Abutment 2:



Points:

Point	X coordinate	Y coordinate	Z coordinate
766	-9,0	3,0	-0,5
767	-9,0	3,0	6,0
736	-9,0	0,0	-0,5
765	-9,0	0,0	6,0
768	-9,0	-3,0	-0,5
769	-9,0	-3,0	6,0
770	9,0	3,0	-0,5
771	9,0	3,0	6,0
772	9,0	0,0	-0,5
773	9,0	0,0	6,0
774	9,0	-3,0	-0,5
775	9,0	-3,0	6,0

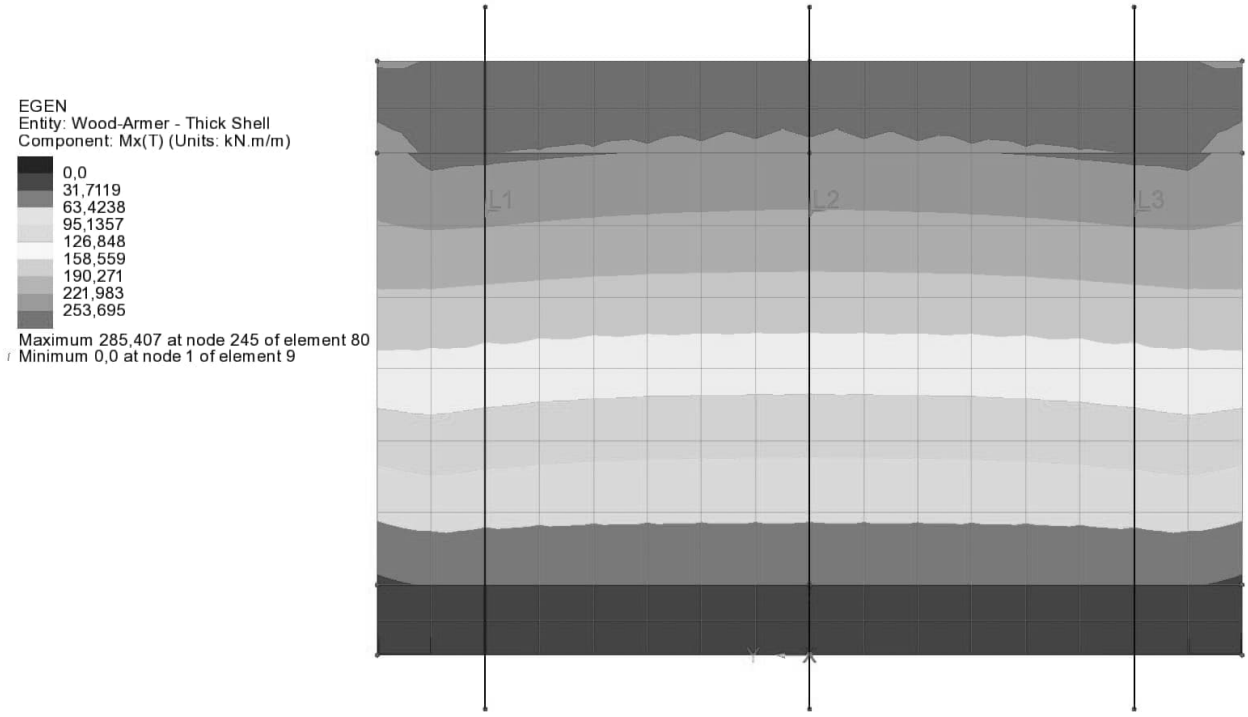
Lines:

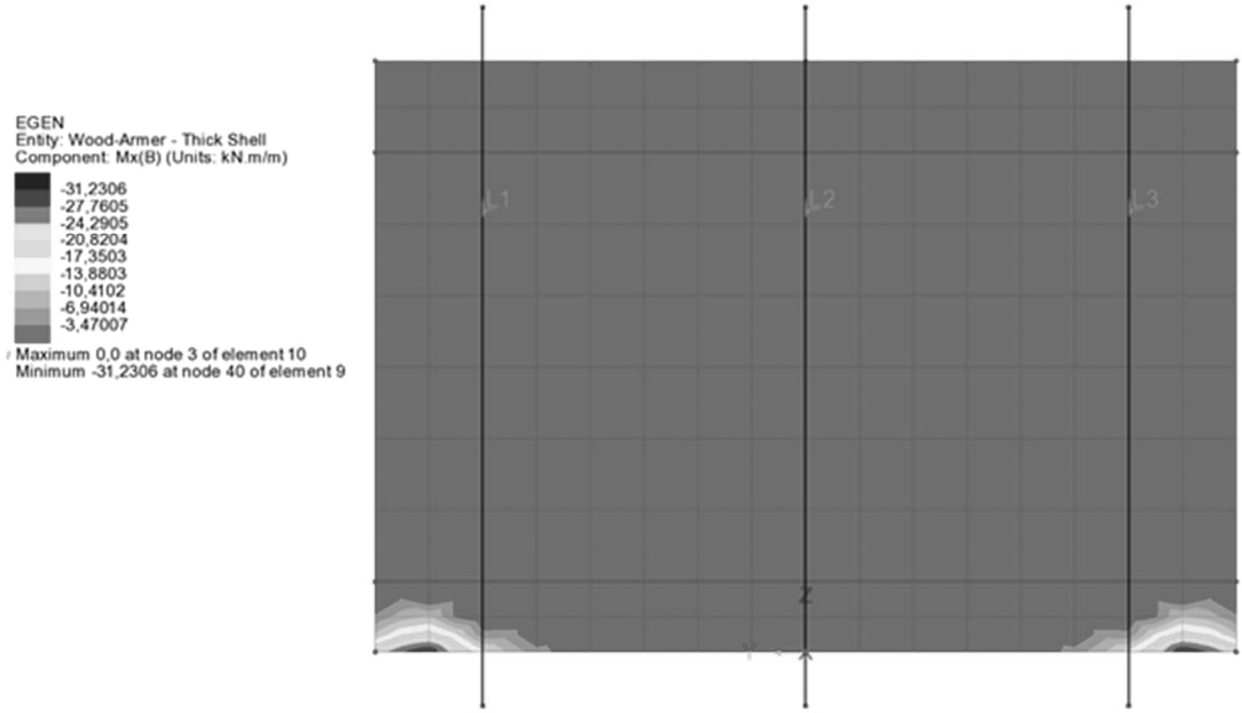
Line	Points
1	766;767
2	736;765
3	768;769
4	770;771
5	772:773
6	774;775

5. EGEN - Mx(B)/Mx(T)

5.1 ABUTEMENT 1

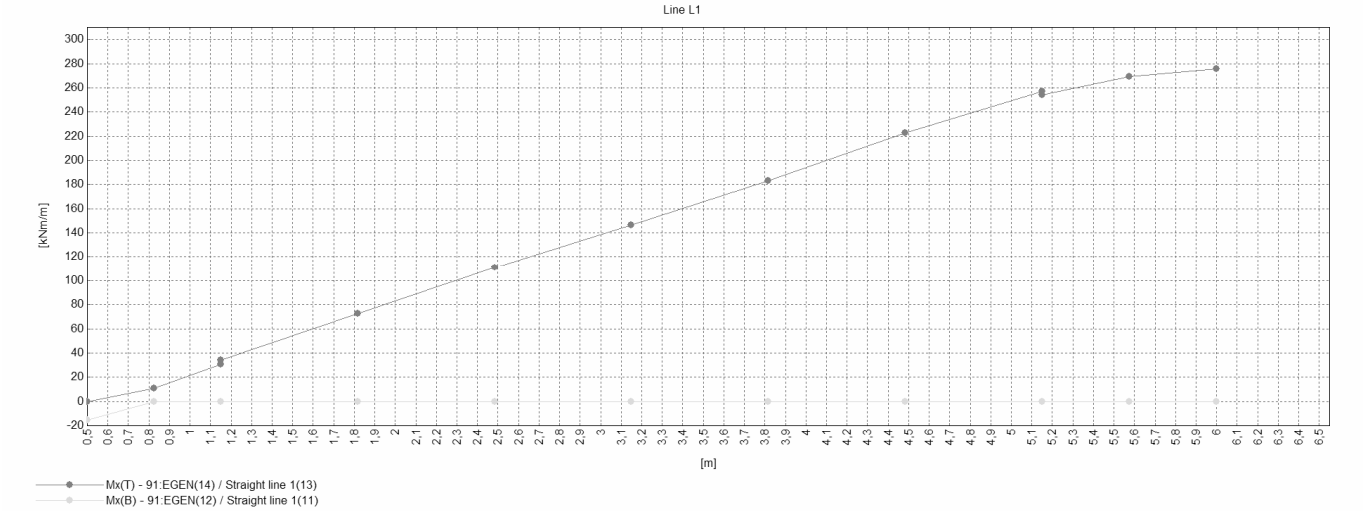
5.1.1 Contour

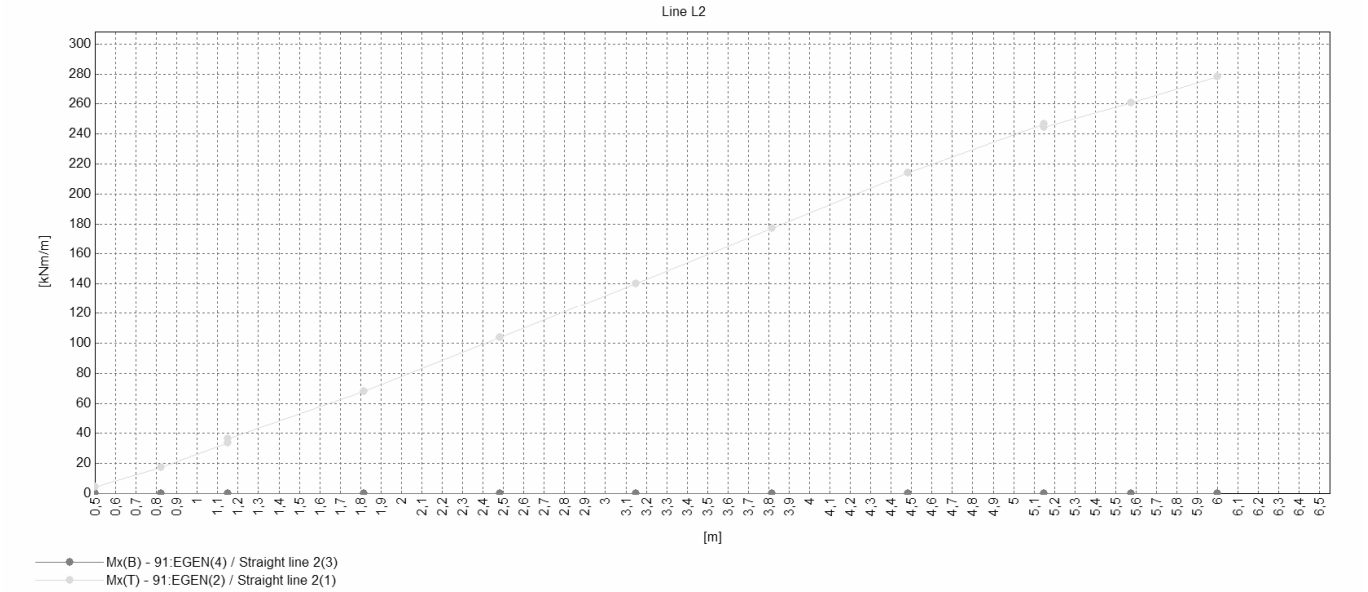


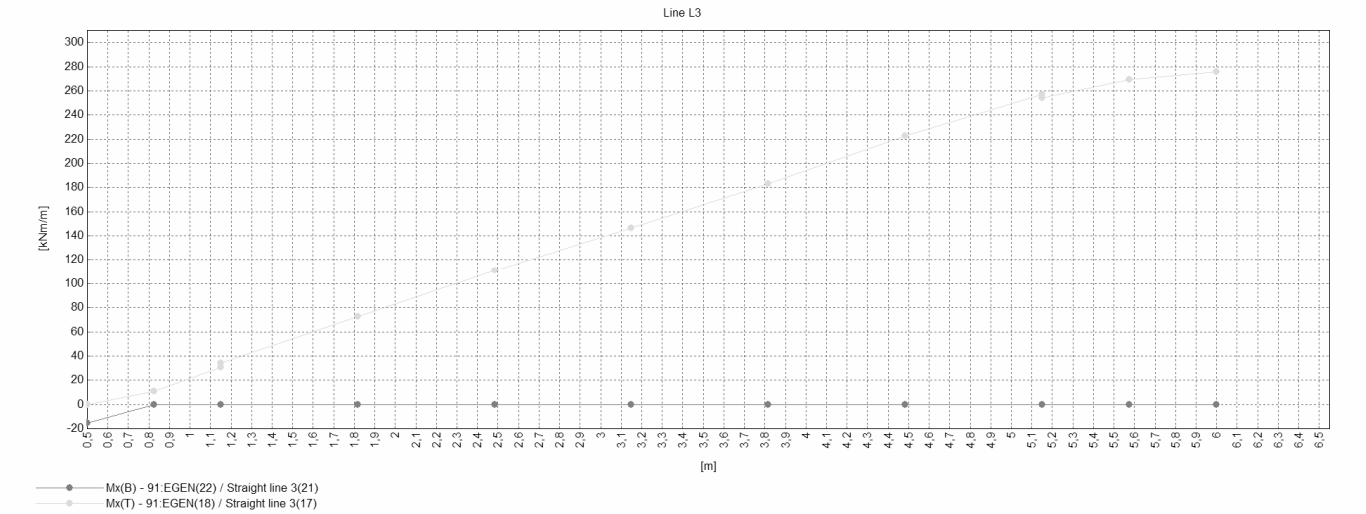


5.1.2 Diagram

LUSAS 21.0-1c2 March 04, 2024






Line L3
[kNm/m]
[m]
Mx(B) - 91:EGEN(22) / Straight line 3(21)
Mx(T) - 91:EGEN(18) / Straight line 3(17)

5.1.3 Table

Line 1:

s	Min Mx(B)	Max Mx(T)	Tillh Nx
0,50	-15	0	-298
0,83	0	11	-297
1,15	0	31	-297
1,15	0	34	-298
1,82	0	72	-281
2,48	0	111	-258
3,15	0	146	-234
3,82	0	183	-212
4,48	0	223	-193
5,15	0	257	-178
5,15	0	254	-178
5,58	0	269	-177
6,00	0	276	-173
m	kNm/m	kNm/m	kN/m

Line 2:

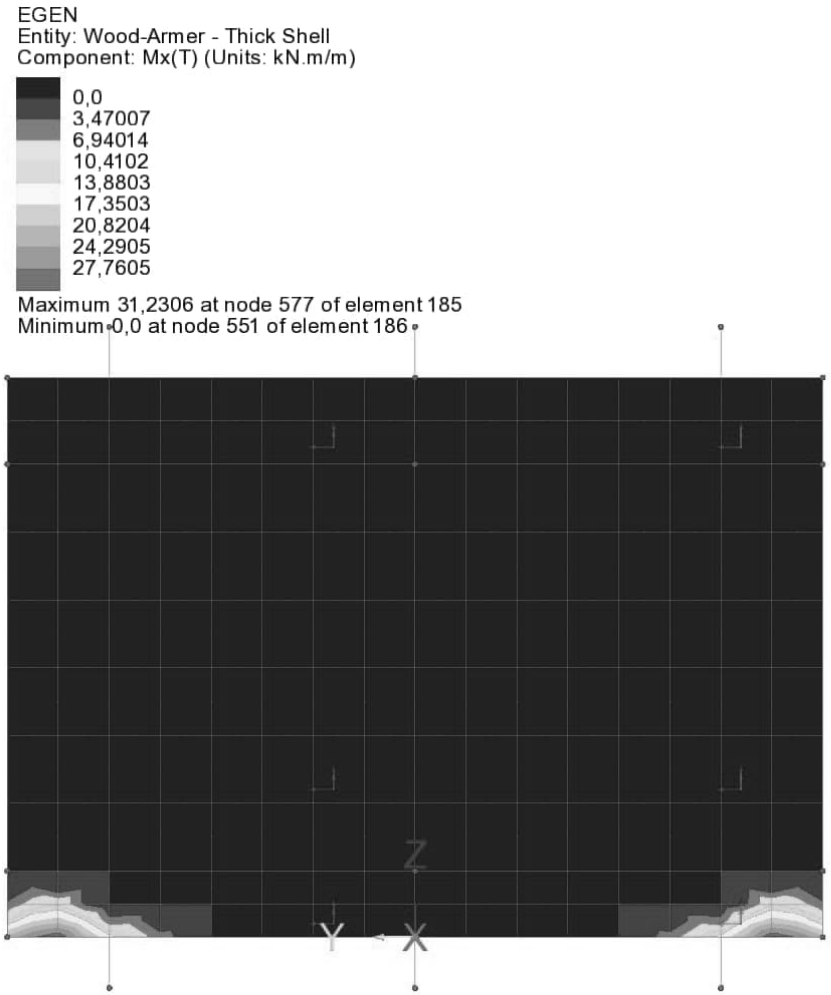
s	Min Mx(B)	Max Mx(T)	Tillh Nx
0,50	0	4	-279
0,83	0	17	-277
1,15	0	34	-278
1,15	0	37	-279
1,82	0	68	-266
2,48	0	104	-252
3,15	0	140	-236
3,82	0	177	-217
4,48	0	214	-196
5,15	0	247	-172
5,15	0	244	-171
5,58	0	261	-167
6,00	0	278	-163
m	kNm/m	kNm/m	kN/m

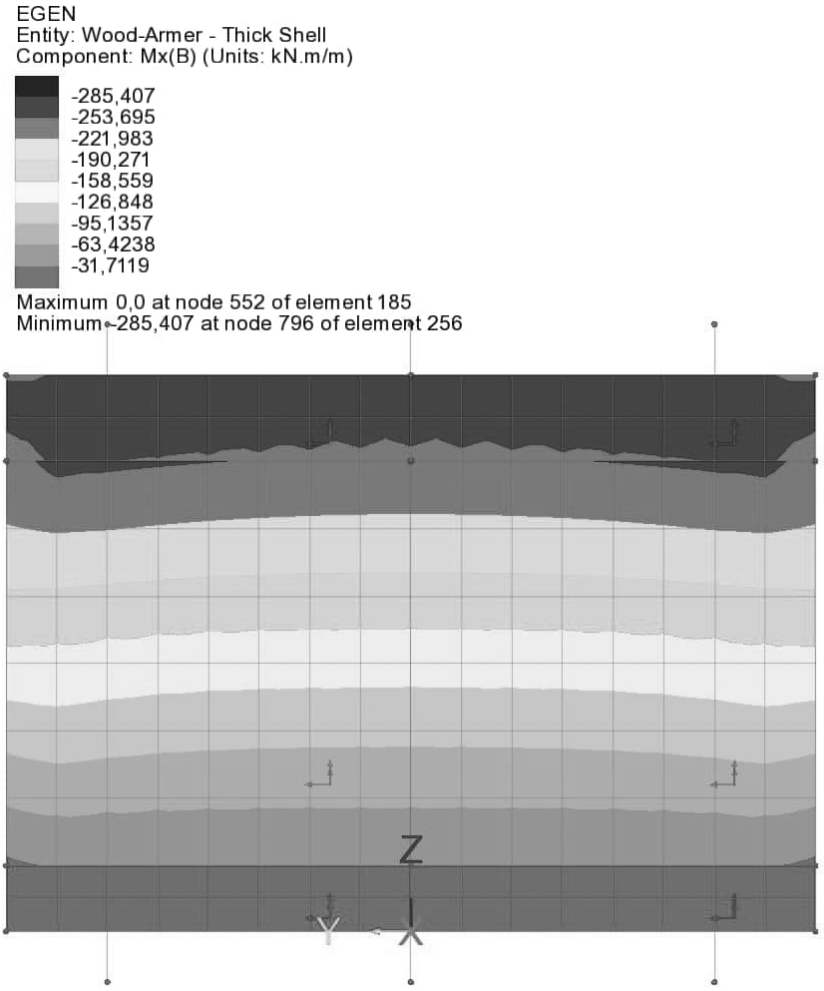
Line 3:

s	Min Mx(B)	Max Mx(T)	Tillh Nx
0,50	-15	0	-298
0,83	0	11	-297
1,15	0	31	-297
1,15	0	34	-298
1,82	0	72	-281
2,48	0	111	-258
3,15	0	146	-234
3,82	0	183	-212
4,48	0	223	-193
5,15	0	257	-178
5,15	0	254	-178
5,58	0	269	-177
6,00	0	276	-173
m	kNm/m	kNm/m	kN/m

5.2 ABUTEMENT 2

5.2.1 Contour




EGEN
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)
-285,407
-253,695
-221,983
-190,271
-158,559
-126,848
-95,1357
-63,4238
-31,7119
Maximum 0,0 at node 552 of element 185
Minimum -285,407 at node 796 of element 256
Z
Y

5.2.2 Diagram

Compare abutement 1.

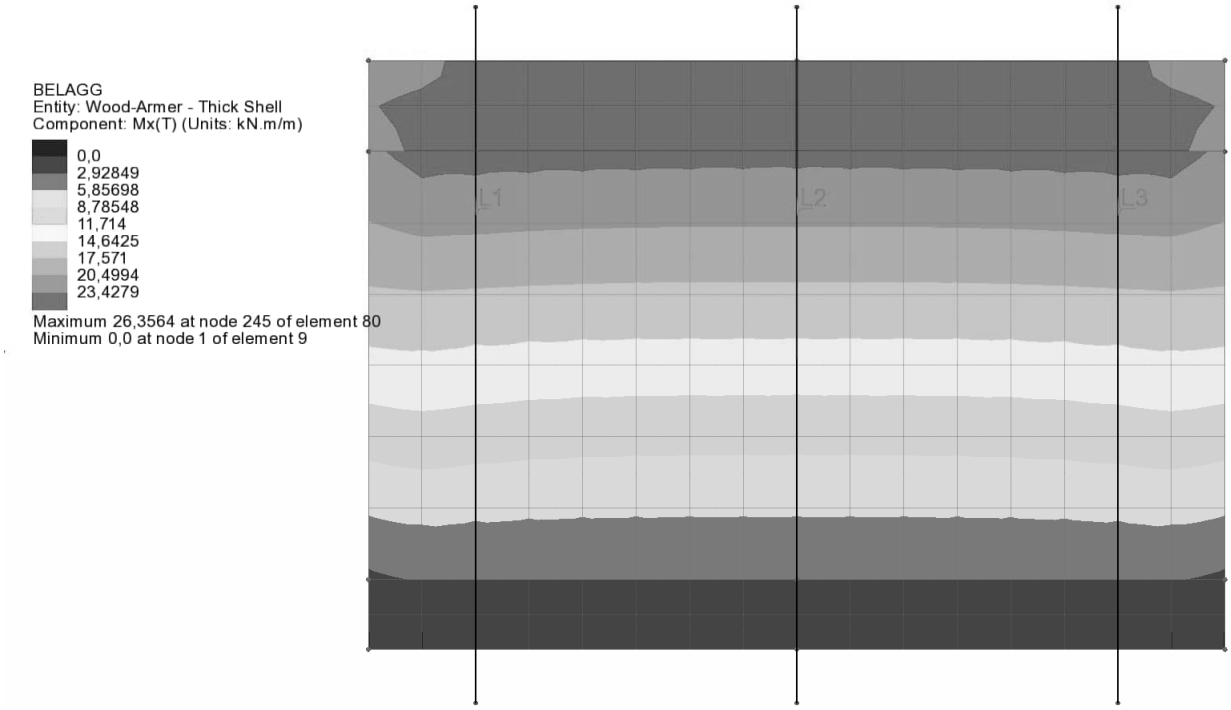
5.2.3 Table

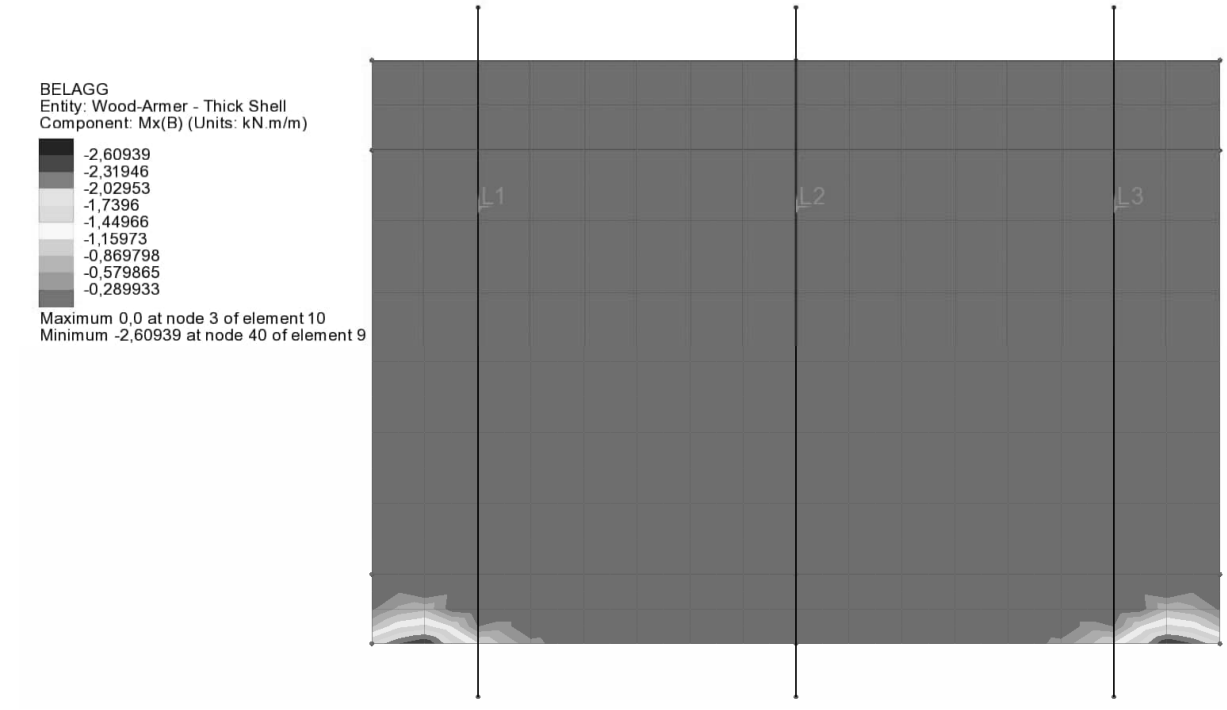
Compare abutement 1.

6. BELAGG - Mx(B)/Mx(T)

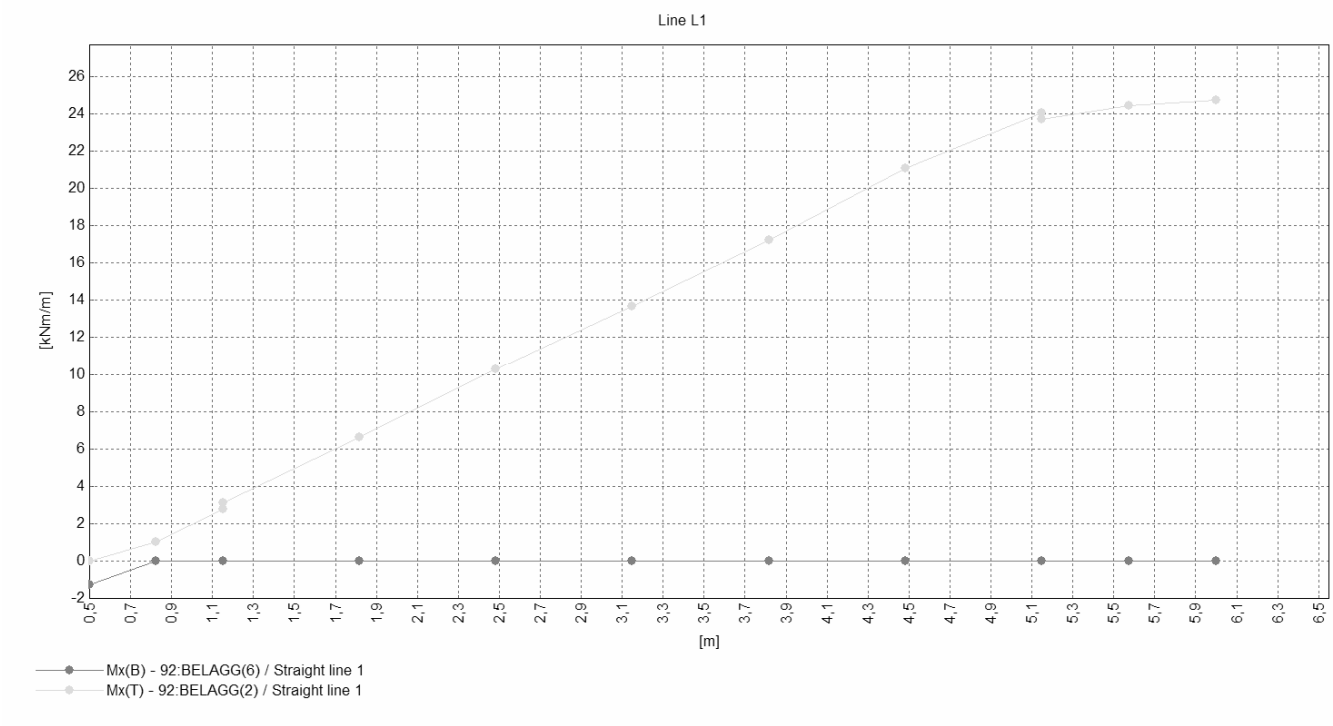
6.1 ABUTEMENT 1

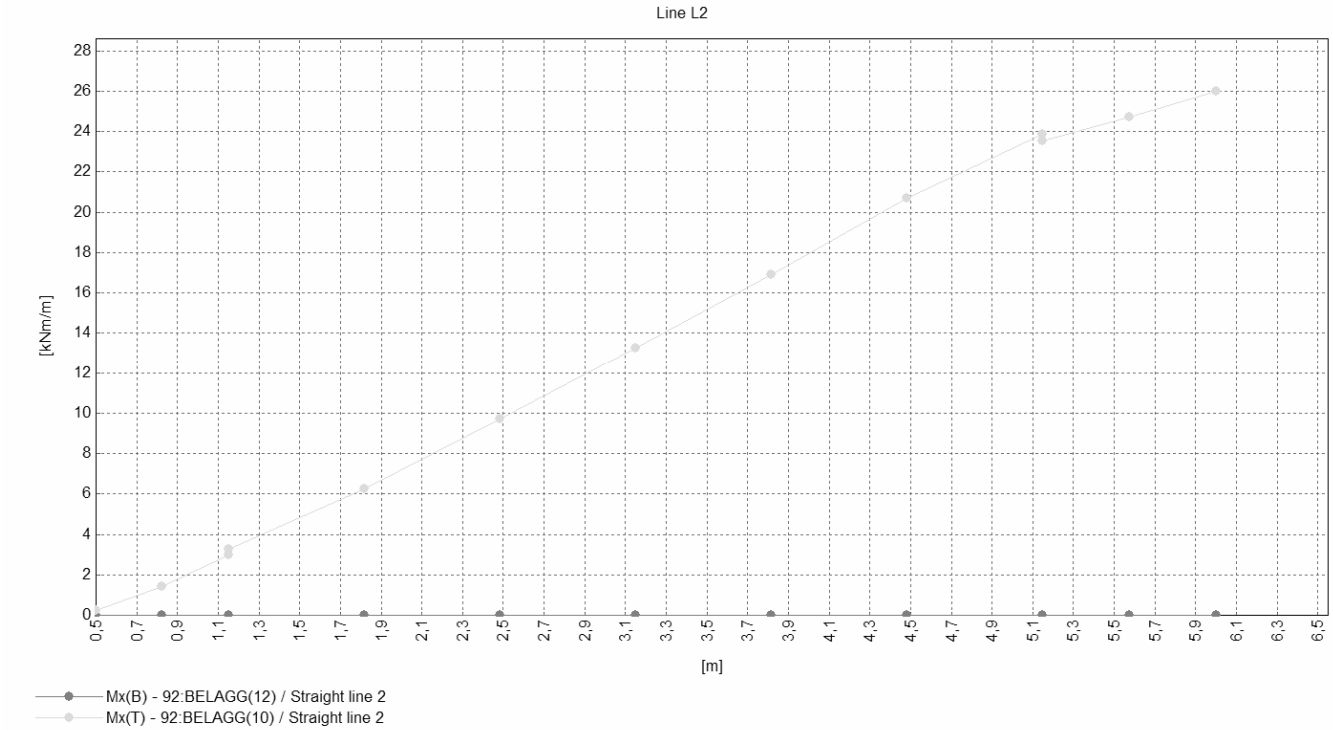
6.1.1 Contour

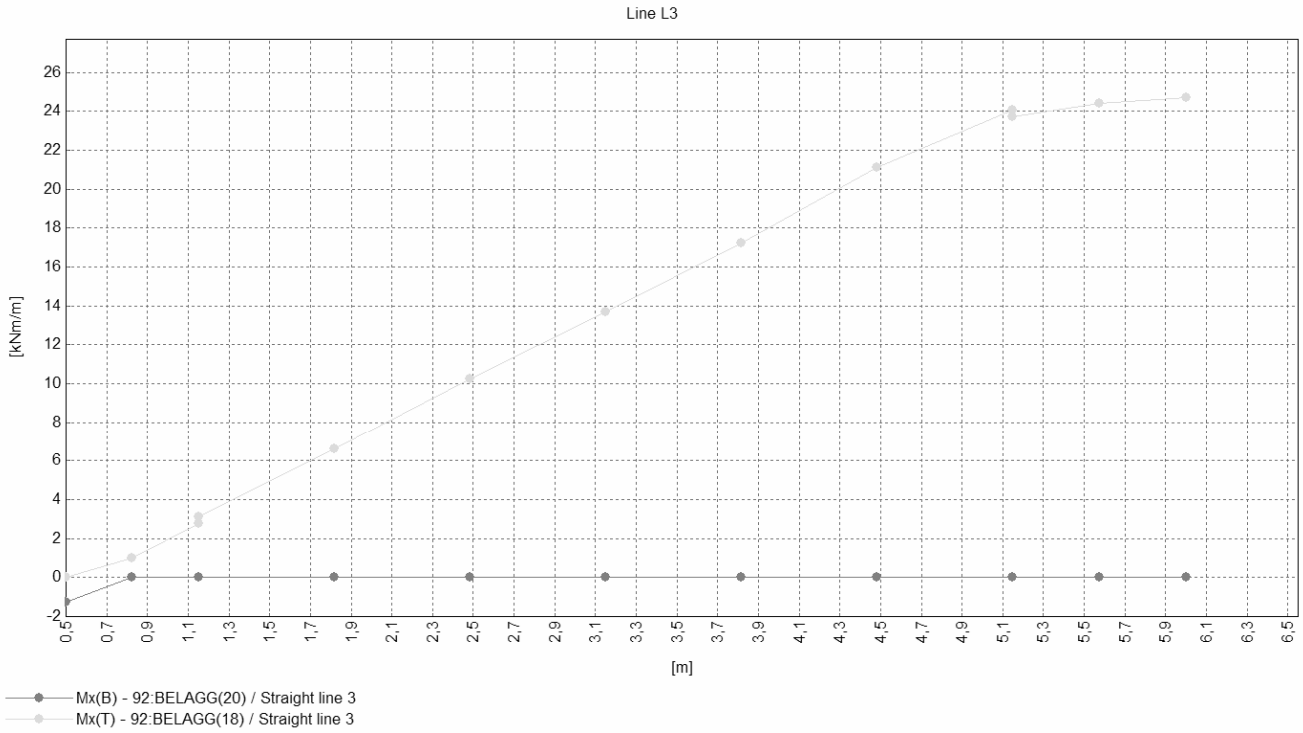




6.1.2 Digram


Line L1
[kNm/m]
[m]
Mx(B) - 92:BELAGG(6) / Straight line 1
Mx(T) - 92:BELAGG(2) / Straight line 1


Line L2
[kNm/m]
[m]
Mx(B) - 92:BELAGG(12) / Straight line 2
Mx(T) - 92:BELAGG(10) / Straight line 2


Line L3
[kNm/m]
[m]
Mx(B) - 92:BELAGG(20) / Straight line 3
Mx(T) - 92:BELAGG(18) / Straight line 3

6.1.3 Table

Line 1:

s	Min Mx(B)	Max Mx(T)	Tillh Nx
0,50	-1	0	-30
0,83	0	1	-30
1,15	0	3	-30
1,15	0	3	-30
1,82	0	7	-30
2,48	0	10	-30
3,15	0	14	-30
3,82	0	17	-30
4,48	0	21	-31
5,15	0	24	-31
5,15	0	24	-31
5,58	0	24	-32
6,00	0	25	-31
m	kNm/m	kNm/m	kN/m

Line 2:

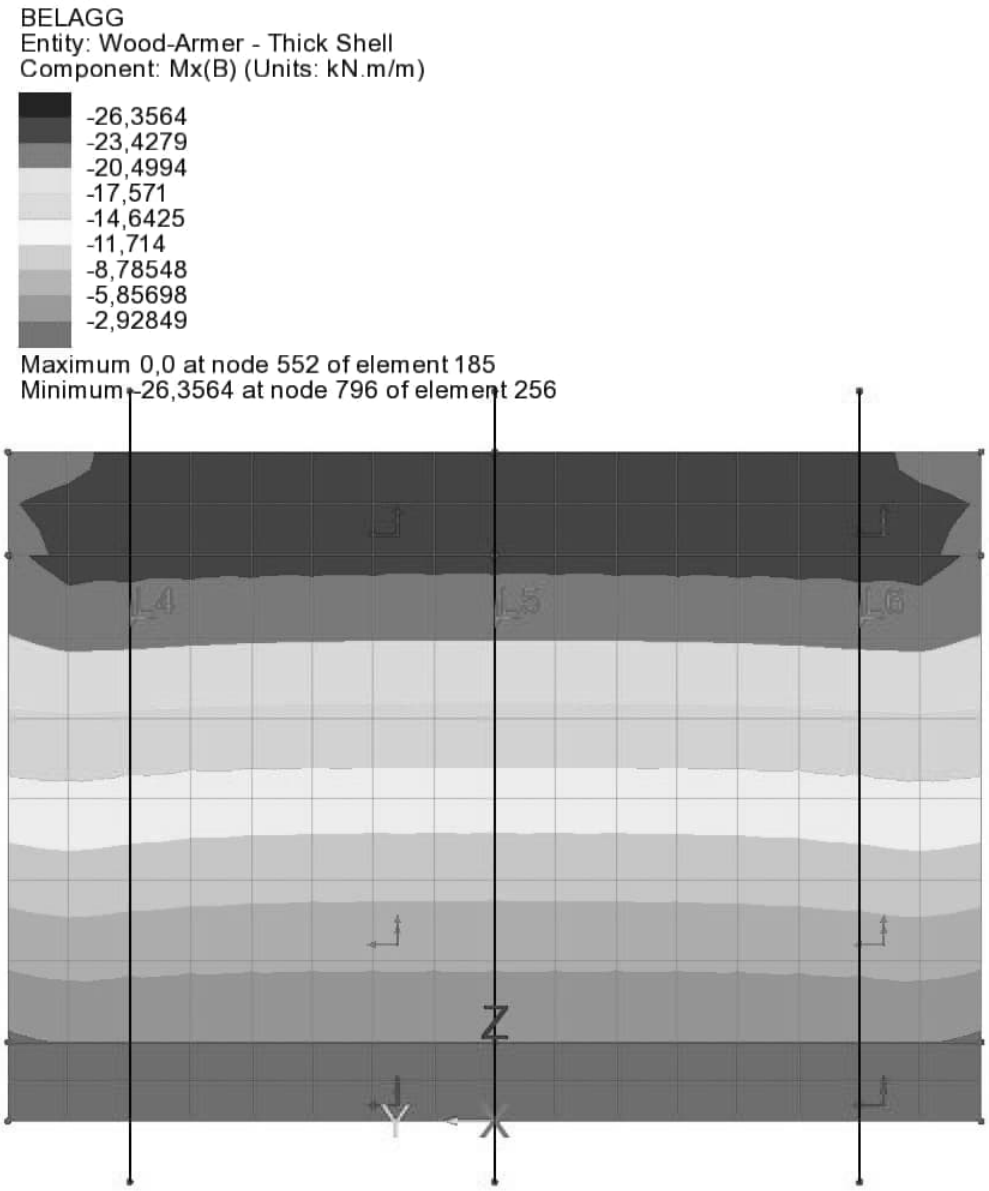
s	Min Mx(B)	Max Mx(T)	Tillh Nx
0,50	0	0	-32
0,83	0	1	-32
1,15	0	3	-32
1,15	0	3	-32
1,82	0	6	-32
2,48	0	10	-32
3,15	0	13	-32
3,82	0	17	-32
4,48	0	21	-32
5,15	0	24	-31
5,15	0	24	-31
5,58	0	25	-31
6,00	0	26	-31
m	kNm/m	kNm/m	kN/m

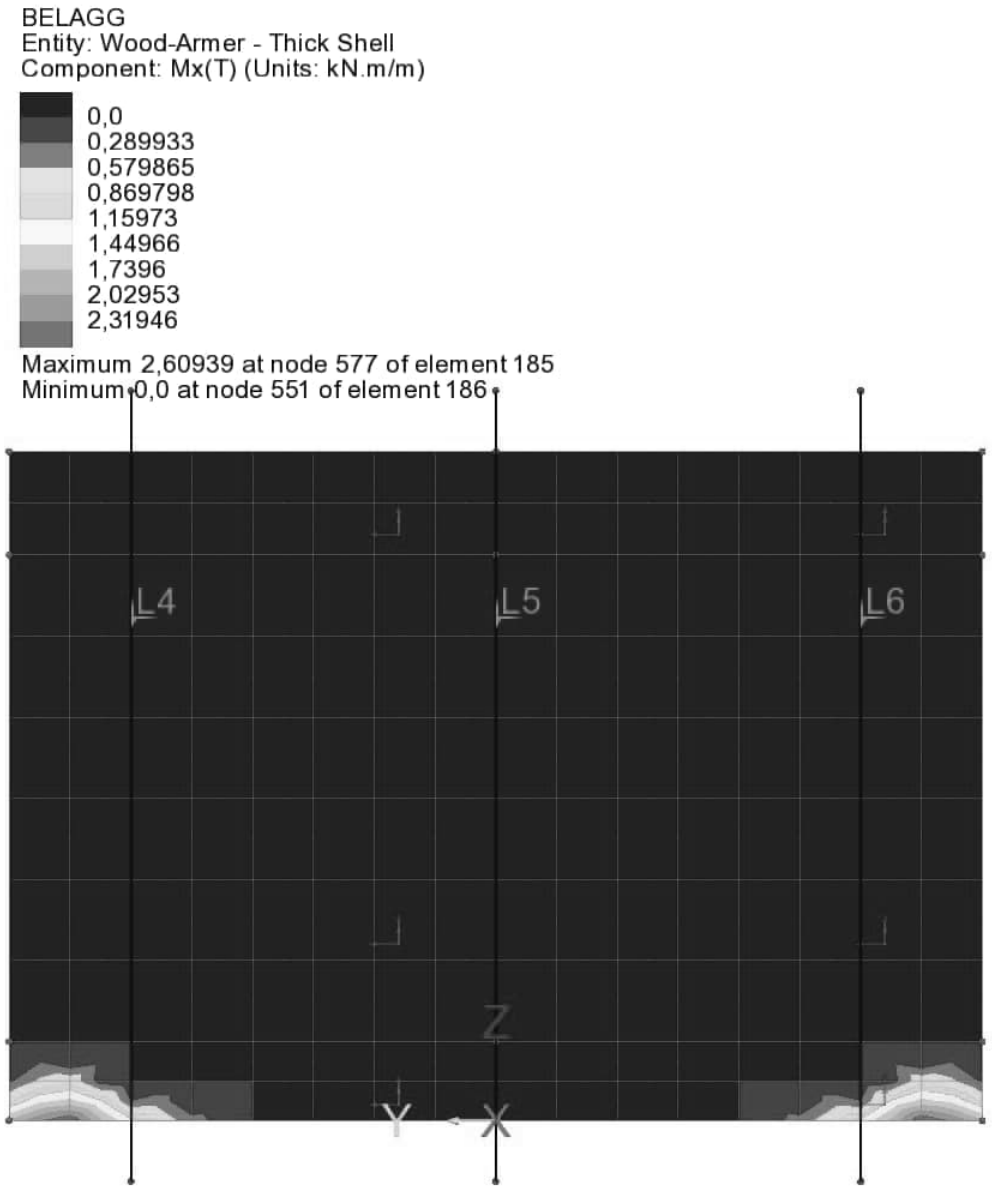
Line 3:

s	Min Mx(B)	Max Mx(T)	Tillh Nx
0,50	-1	0	-30
0,83	0	1	-30
1,15	0	3	-30
1,15	0	3	-30
1,82	0	7	-30
2,48	0	10	-30
3,15	0	14	-30
3,82	0	17	-30
4,48	0	21	-31
5,15	0	24	-31
5,15	0	24	-31
5,58	0	24	-32
6,00	0	25	-31
m	kNm/m	kNm/m	kN/m

6.2 ABUTEMENT 2

6.2.1 Contour




BELAGG
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)
0,0
0,289933
0,579865
0,869798
1,15973
1,44966
1,7396
2,02953
2,31946
Maximum 2,60939 at node 577 of element 185
Minimum 0,0 at node 551 of element 186
L4
L5
L6
Z
Y
X

6.2.2 Diagram

Compare abutement 1.

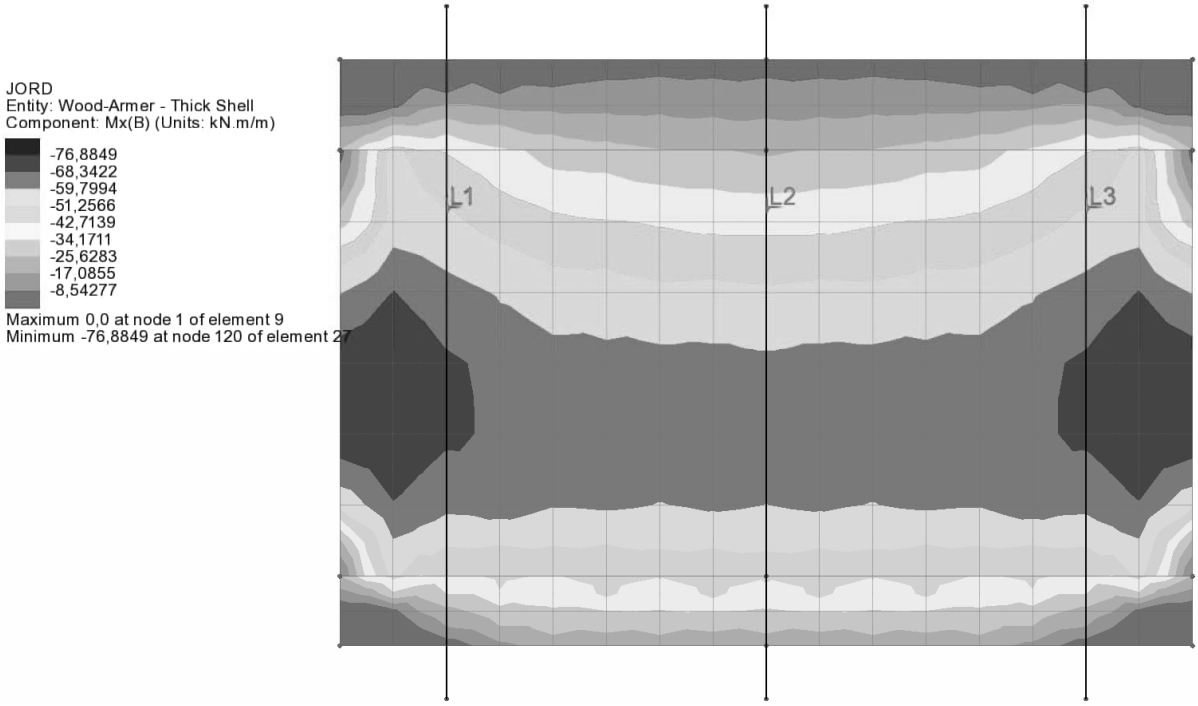
6.2.3 Table

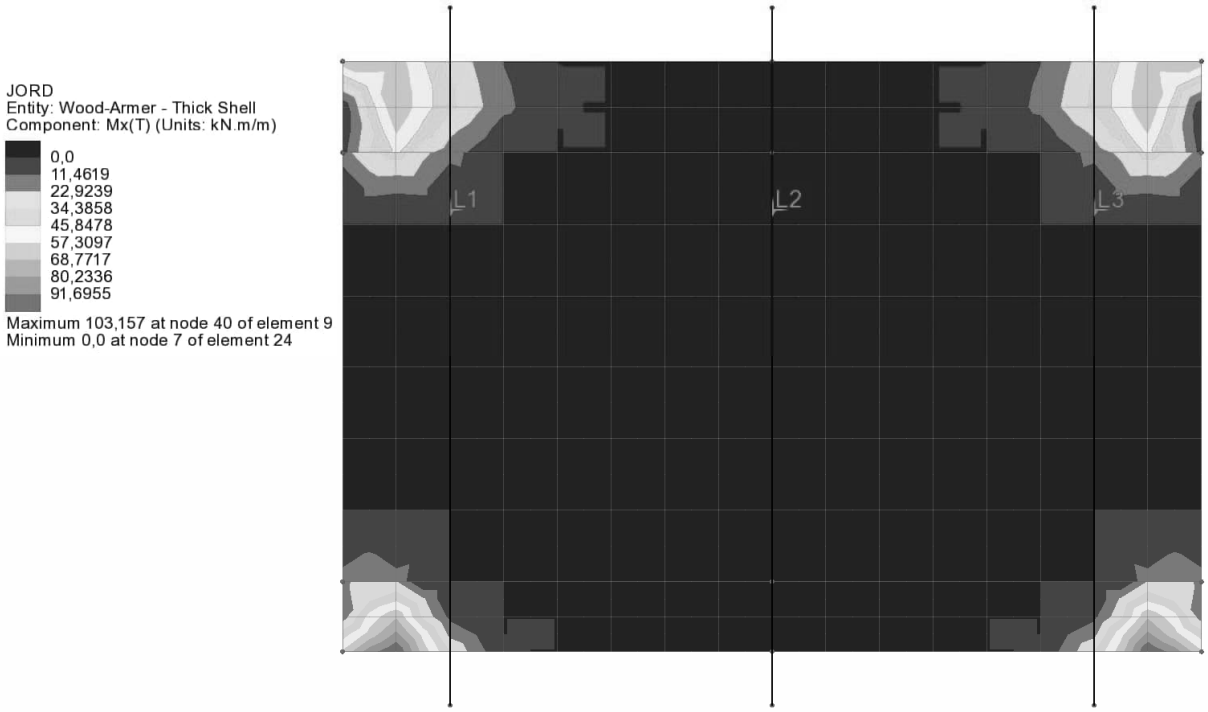
Cmpare abutement 1.

7. JORD - Mx(B)/ Mx(T)

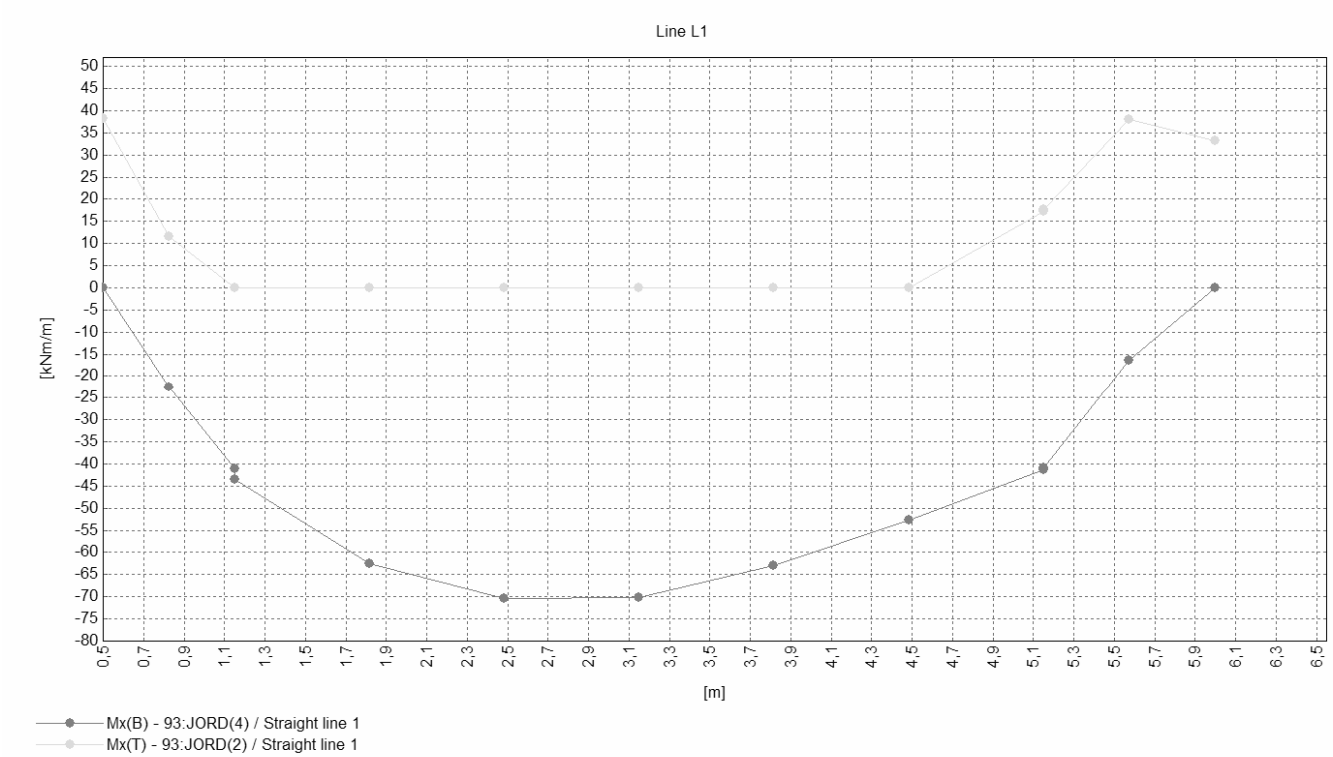
7.1 ABUTEMENT 1

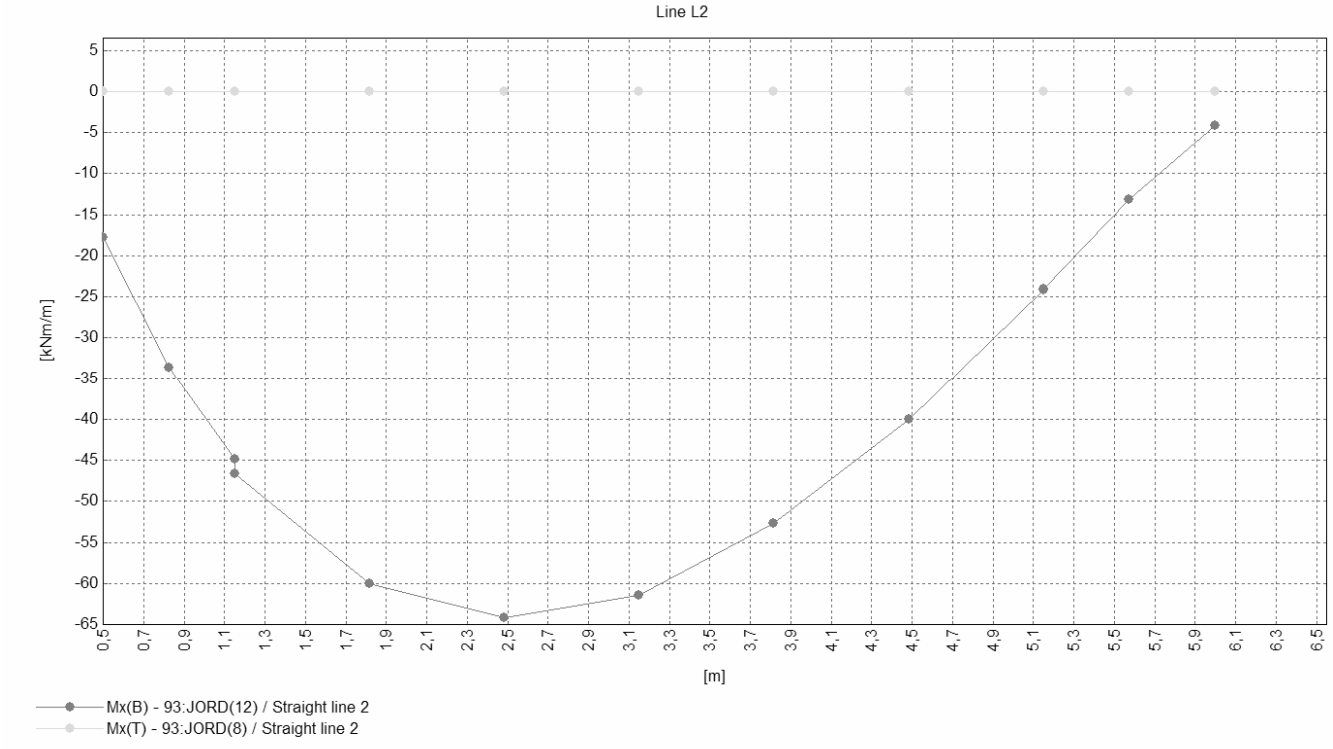
7.1.1 Contour

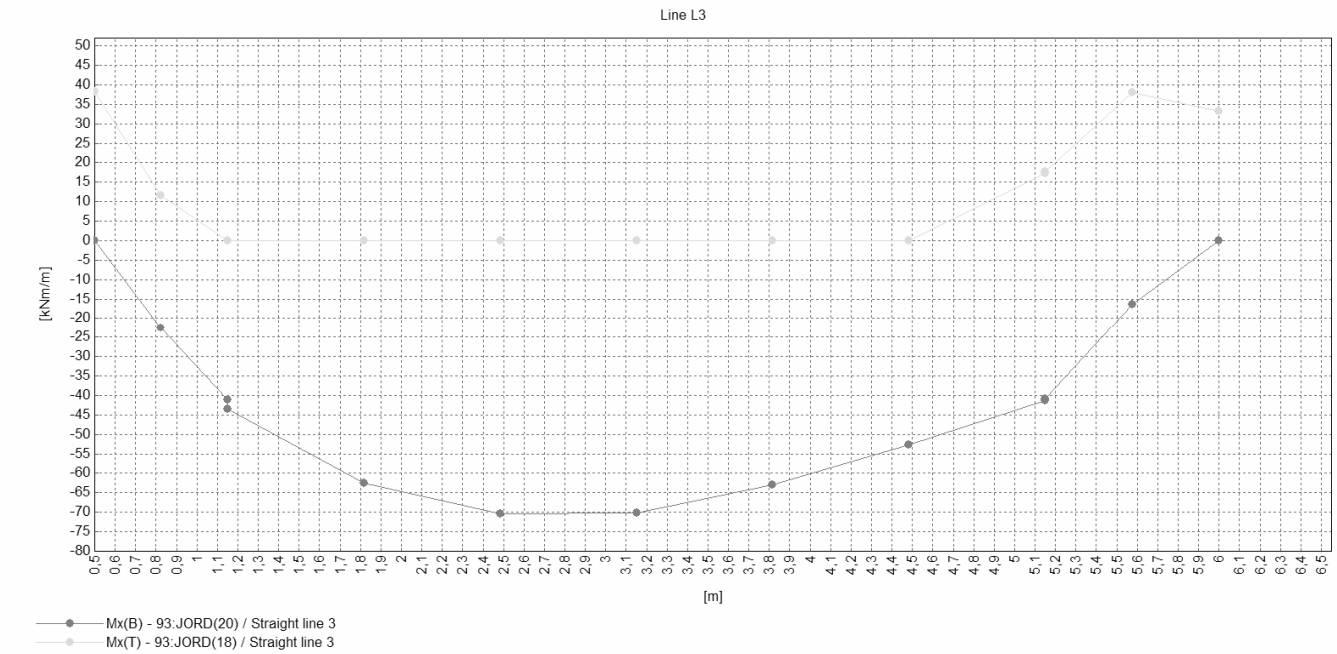




7.1.2 Digram


Line L1
[kNm/m]
[m]
Mx(B) - 93:JORD(4) / Straight line 1
Mx(T) - 93:JORD(2) / Straight line 1


Line L2
[kNm/m]
[m]
Mx(B) - 93:JORD(12) / Straight line 2
Mx(T) - 93:JORD(8) / Straight line 2


Line L3
[kNm/m]
[m]
Mx(B) - 93:JORD(20) / Straight line 3
Mx(T) - 93:JORD(18) / Straight line 3

7.1.3 Table

Line 1:

s	Min Mx(B)	Max Mx(T)	Tillh Nx
0,50	0	38	1
0,83	-22	12	1
1,15	-41	0	-1
1,15	-43	0	-2
1,82	-63	0	-2
2,48	-70	0	0
3,15	-70	0	2
3,82	-63	0	3
4,48	-53	0	2
5,15	-41	17	1
5,15	-41	18	1
5,58	-16	38	-2
6,00	0	33	-6
m	kNm/m	kNm/m	kN/m

Line 2:

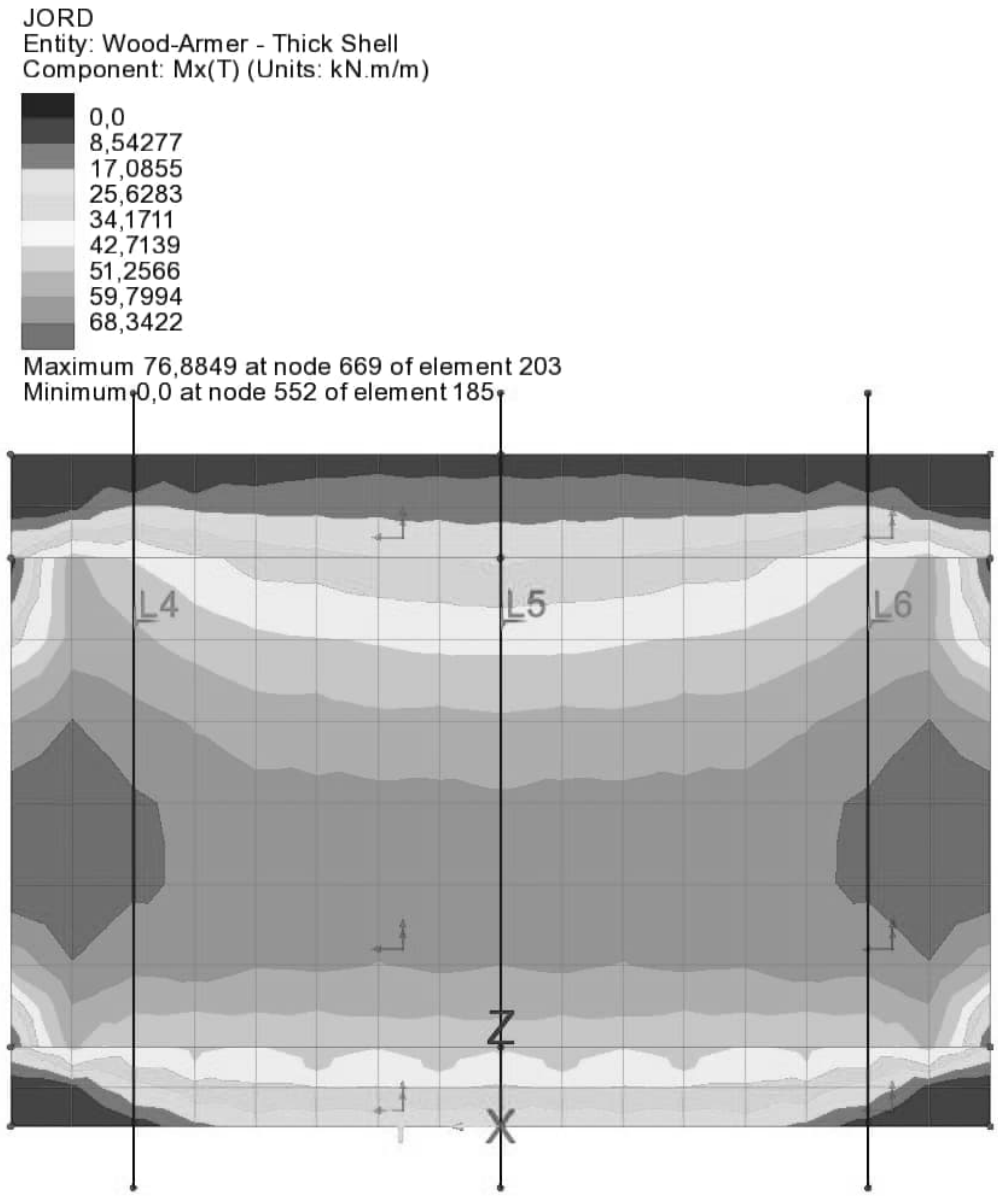
s	Min Mx(B)	Max Mx(T)	Tillh Nx
0,50	-18	0	0
0,83	-34	0	0
1,15	-45	0	0
1,15	-47	0	0
1,82	-60	0	-1
2,48	-64	0	-2
3,15	-61	0	-2
3,82	-53	0	-2
4,48	-40	0	-1
5,15	-24	0	0
5,15	-24	0	0
5,58	-13	0	1
6,00	-4	0	2
m	kNm/m	kNm/m	kN/m

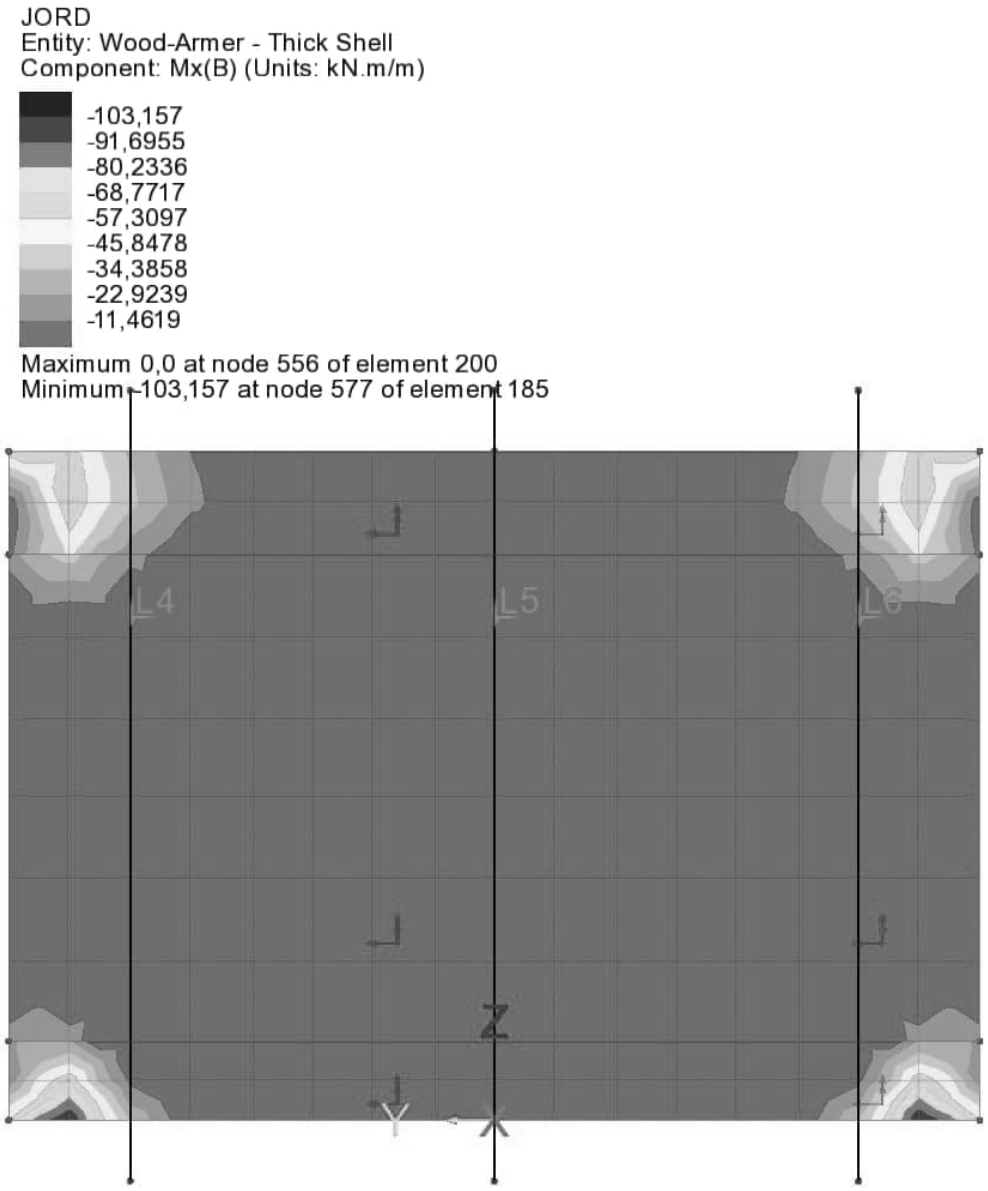
Line 3:

s	Min Mx(B)	Max Mx(T)	Tillh Nx
0,50	0	38	1
0,83	-22	12	1
1,15	-41	0	-1
1,15	-43	0	-2
1,82	-63	0	-2
2,48	-70	0	0
3,15	-70	0	2
3,82	-63	0	3
4,48	-53	0	2
5,15	-41	17	1
5,15	-41	18	1
5,58	-16	38	-2
6,00	0	33	-6
m	kNm/m	kNm/m	kN/m

7.2 ABUTEMENT 2

7.2.1 Contour




JORD
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)
-103,157
-91,6955
-80,2336
-68,7717
-57,3097
-45,8478
-34,3858
-22,9239
-11,4619
Maximum 0,0 at node 556 of element 200
Minimum -103,157 at node 577 of element 185
L4
L5
L6
Z
Y
X

7.2.2 Digram

Compare abutement 1.

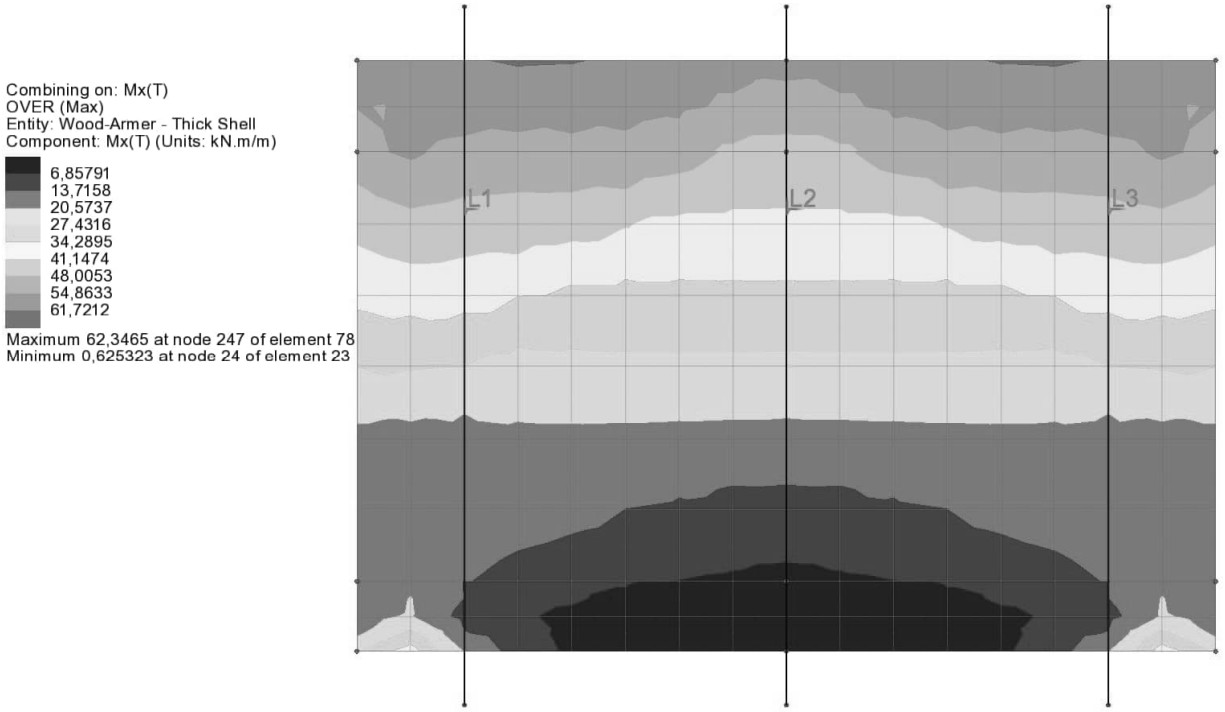
7.2.3 Table

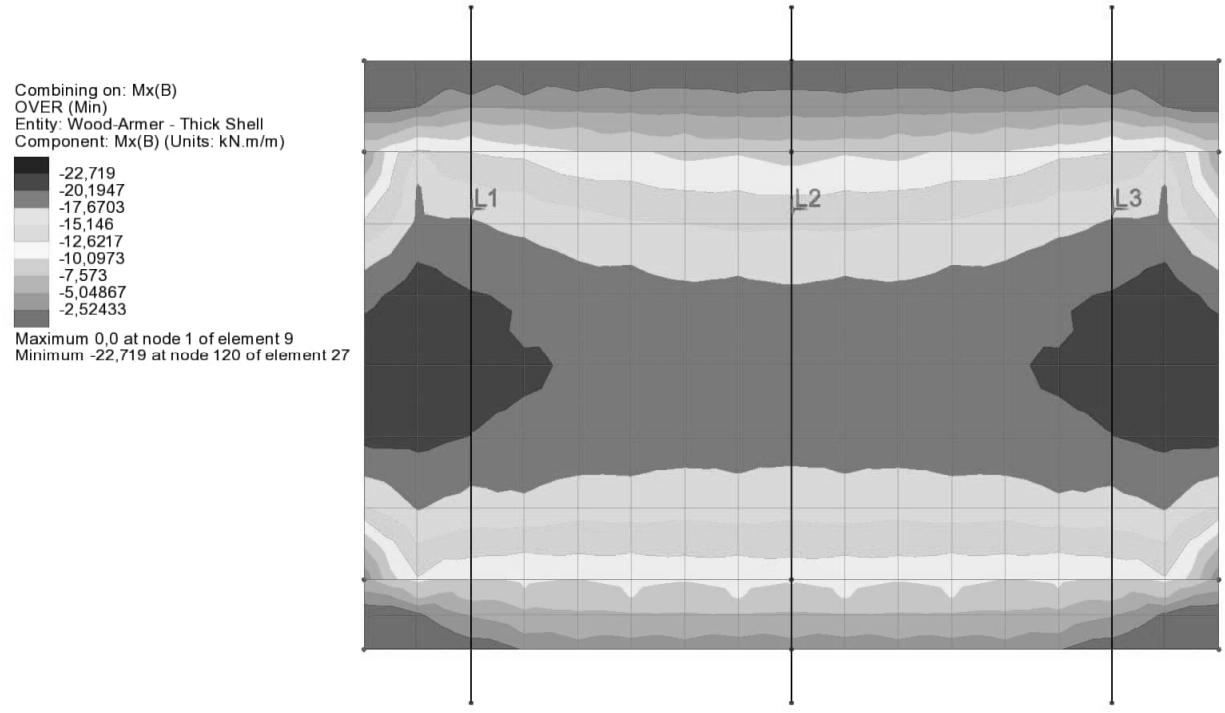
Compare abutement 1.

8. OVER Min Mx(B)/Max Mx(T)

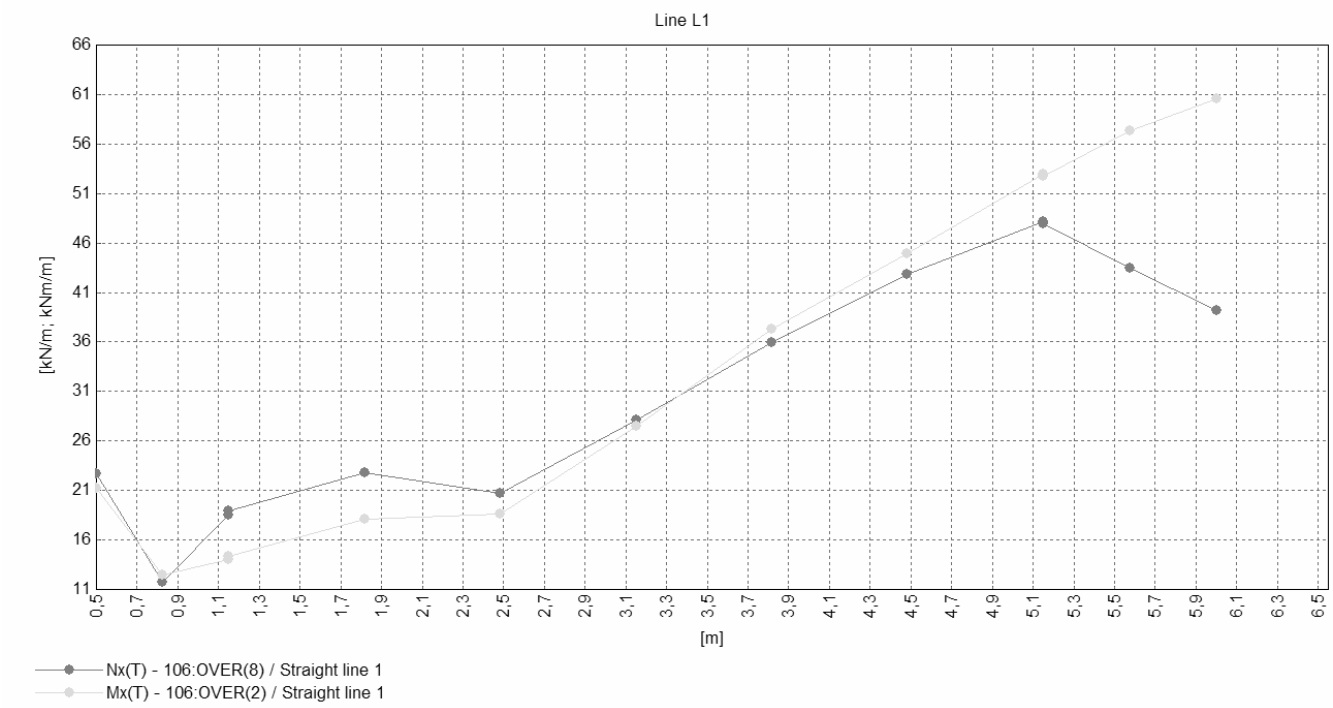
8.1 ABUTEMENT 1

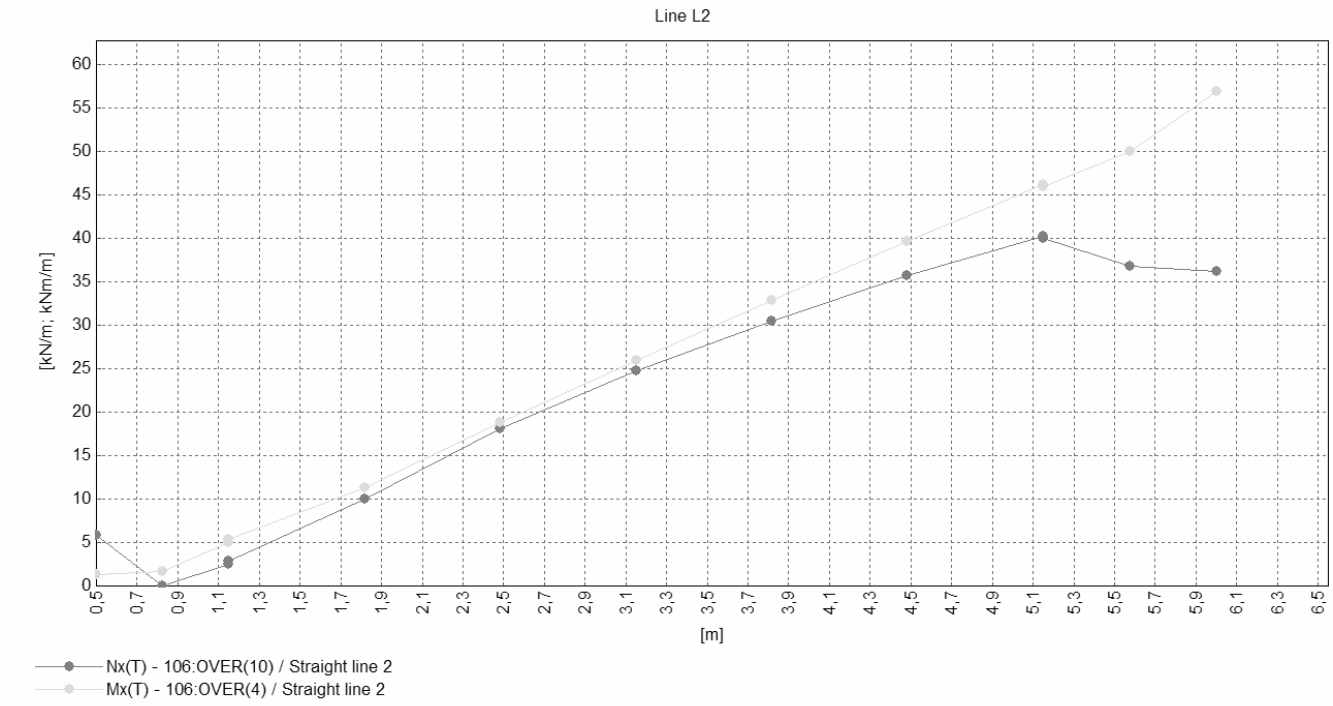
8.1.1 Contour

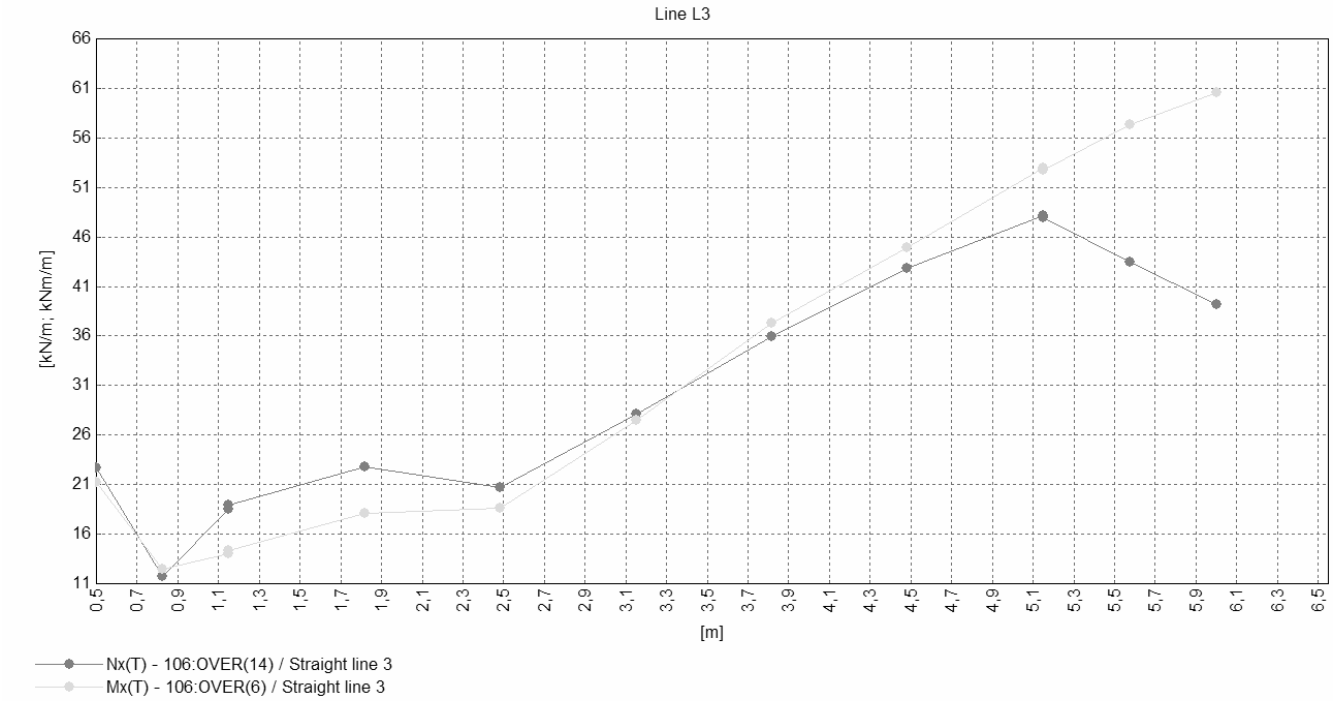


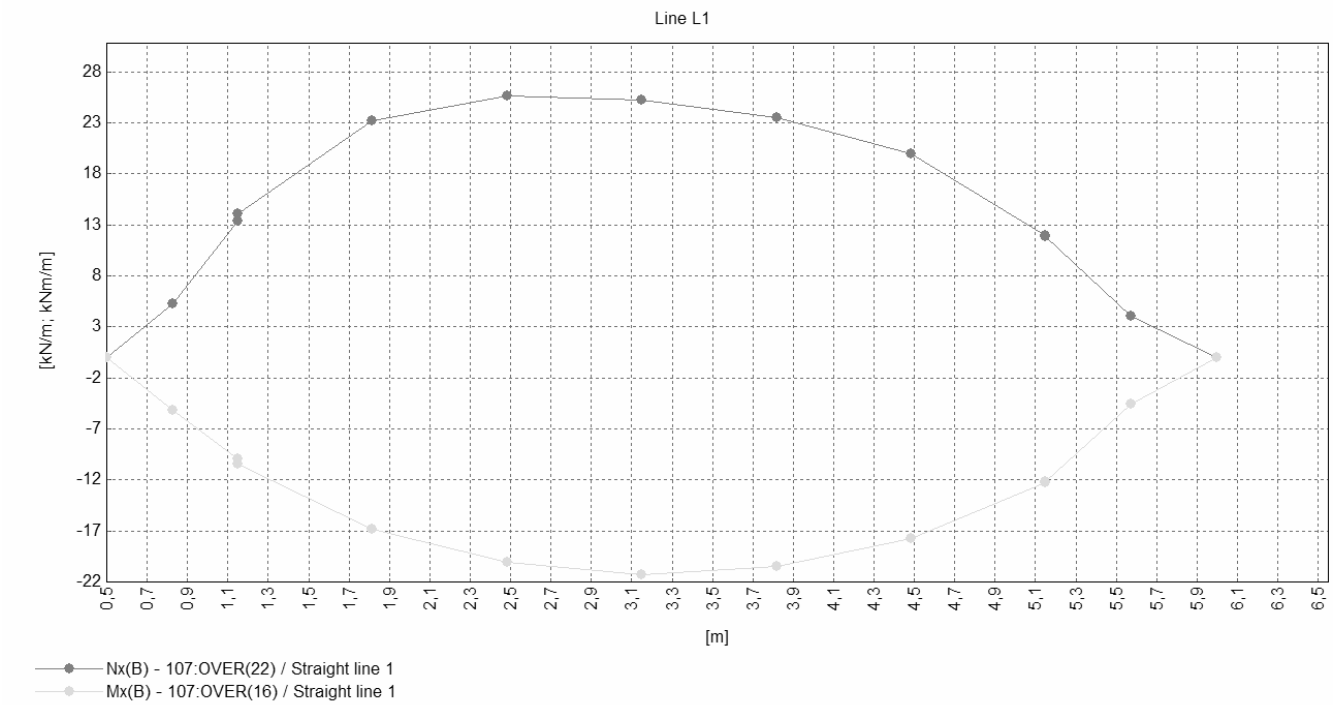


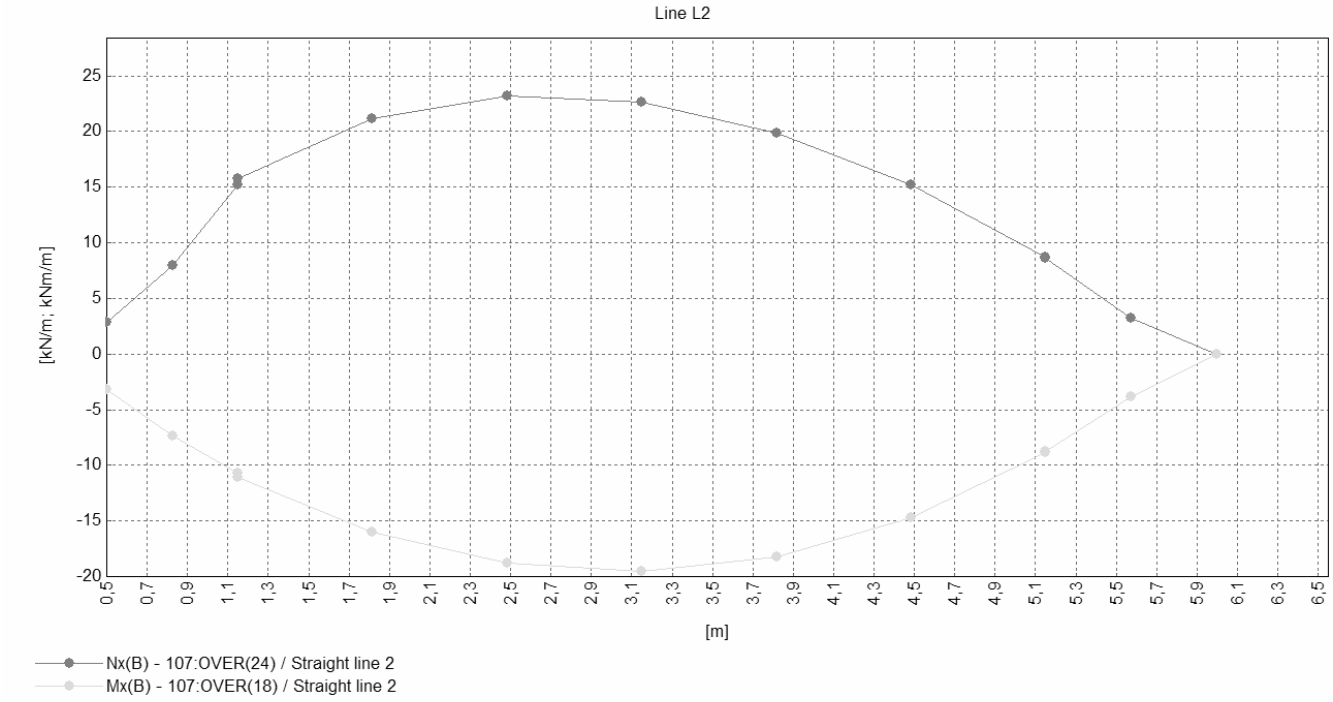
8.1.2 Digram

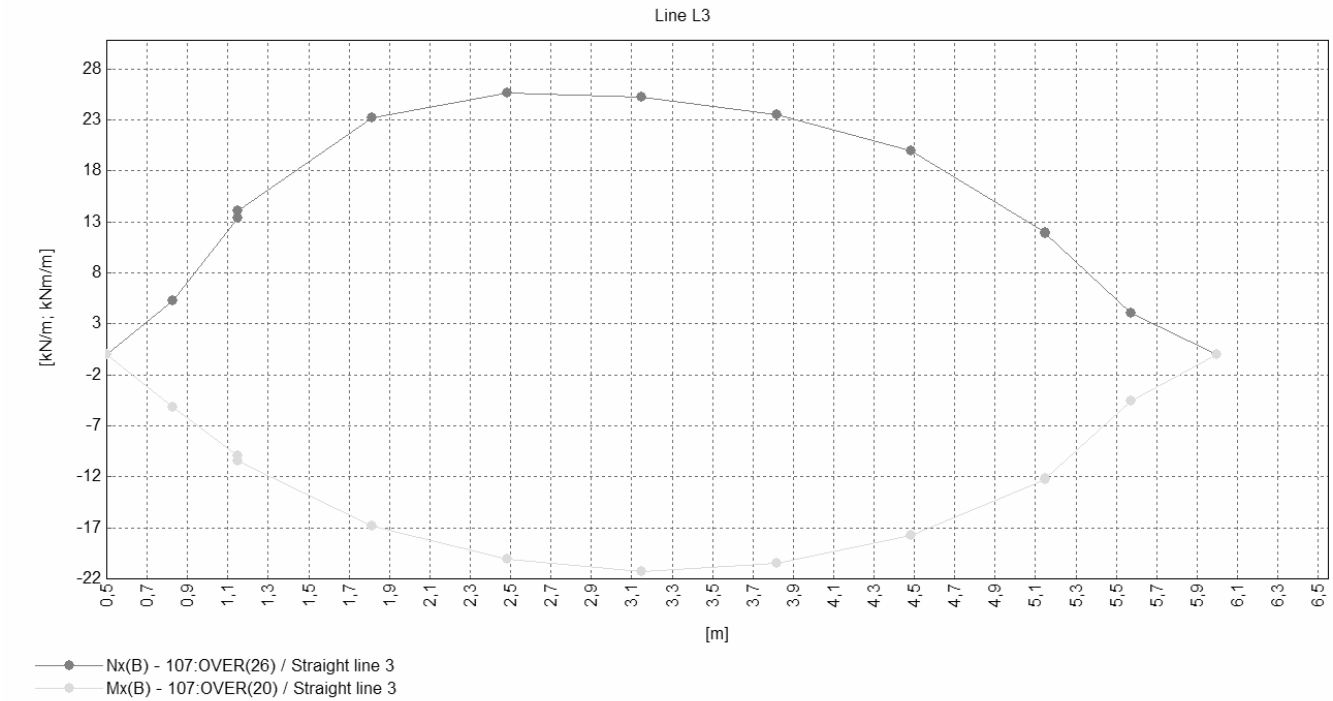

Line L1
[kN/m; kNm/m]
[m]
Nx(T) - 106:OVER(8) / Straight line 1
Mx(T) - 106:OVER(2) / Straight line 1


Line L2
[kN/m; kNm/m]
[m]
Nx(T) - 106:OVER(10) / Straight line 2
Mx(T) - 106:OVER(4) / Straight line 2


Line L3
[kN/m; kNm/m]
[m]
Nx(T) - 106:OVER(14) / Straight line 3
Mx(T) - 106:OVER(6) / Straight line 3


Line L1
[kN/m; kNm/m]
28
23
18
13
8
3
-2
-7
-12
-17
-22
0,5 0,7 0,9 1,1 1,3 1,5 1,7 1,9 2,1 2,3 2,5 2,7 2,9 3,1 3,3 3,5 3,7 3,9 4,1 4,3 4,5 4,7 4,9 5,1 5,3 5,5 5,7 5,9 6,1 6,3 6,5
[m]
Nx(B) - 107:OVER(22) / Straight line 1
Mx(B) - 107:OVER(16) / Straight line 1


Line L2
[kN/m; kNm/m]
25
20
15
10
5
0
-5
-10
-15
-20
0,5 0,7 0,9 1,1 1,3 1,5 1,7 1,9 2,1 2,3 2,5 2,7 2,9 3,1 3,3 3,5 3,7 3,9 4,1 4,3 4,5 4,7 4,9 5,1 5,3 5,5 5,7 5,9 6,1 6,3 6,5
[m]
Nx(B) - 107:OVER(24) / Straight line 2
Mx(B) - 107:OVER(18) / Straight line 2


Line L3
[kN/m; kNm/m]
28
23
18
13
8
3
-2
-7
-12
-17
-22
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
[m]
Nx(B) - 107:OVER(26) / Straight line 3
Mx(B) - 107:OVER(20) / Straight line 3

8.1.3 Table

Line 1:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	0	1	21	8
0,83	-5	0	12	-6
1,15	-10	0	14	-6
1,15	-10	0	14	-6
1,82	-17	0	18	-6
2,48	-20	0	19	-6
3,15	-21	1	27	-8
3,82	-20	1	37	-9
4,48	-18	1	45	-6
5,15	-12	0	53	-7
5,15	-12	0	53	-7
5,58	-5	0	57	-8
6,00	0	-1	61	-11
m	kNm/m	kN/m	kNm/m	kN/m

Line 2;

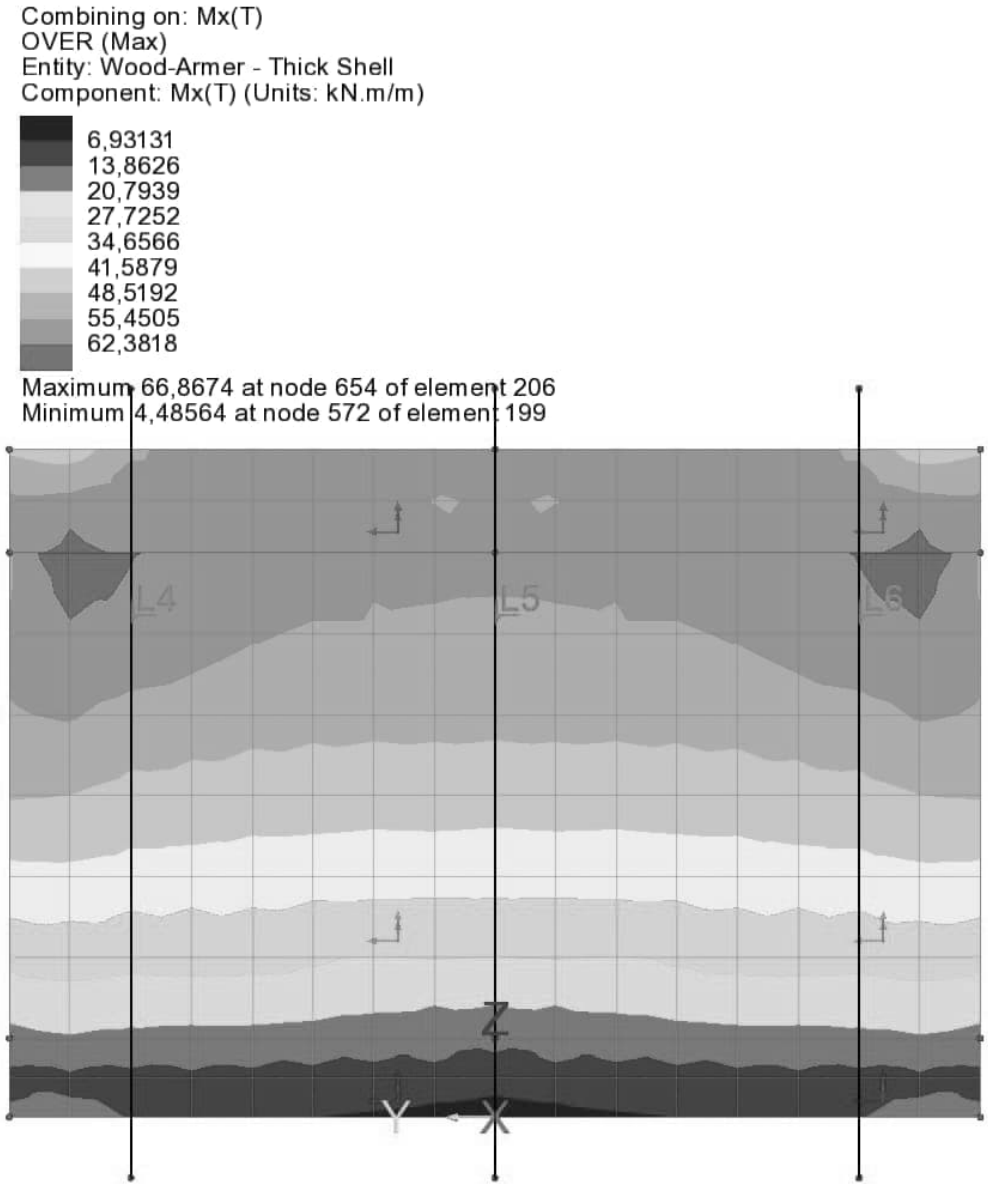
s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-3	0	1	9
0,83	-7	0	2	-9
1,15	-11	0	5	-9
1,15	-11	0	5	-9
1,82	-16	0	11	-10
2,48	-19	-1	19	-11
3,15	-20	-1	26	-11
3,82	-18	-1	33	-12
4,48	-15	-1	40	-12
5,15	-9	0	46	-11
5,15	-9	0	46	-11
5,58	-4	0	50	-11
6,00	0	0	57	-12
m	kNm/m	kN/m	kNm/m	kN/m

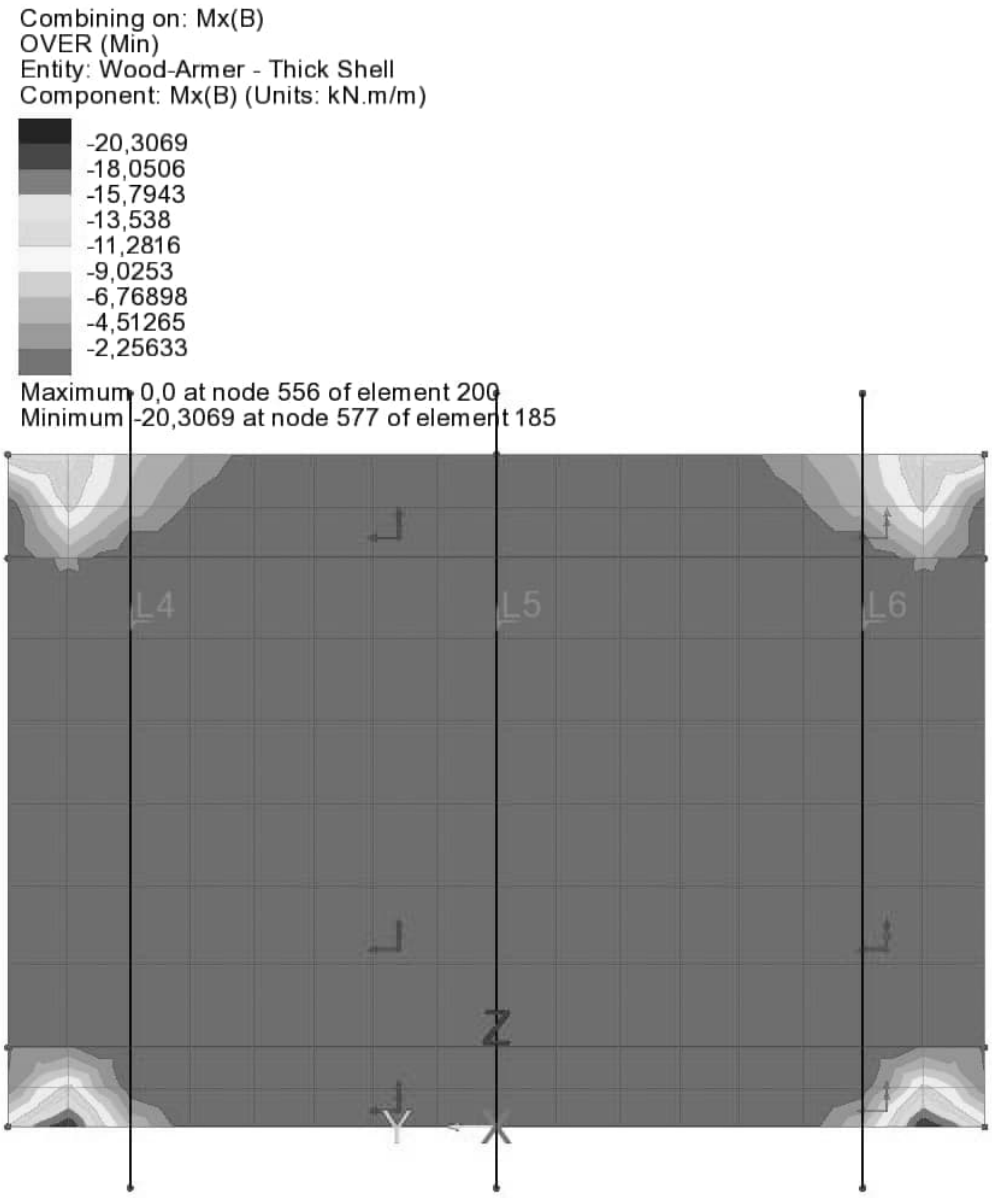
Line 3:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	0	0	21	8
0,83	-5	1	12	-6
1,15	-10	1	14	-6
1,15	-10	1	14	-6
1,82	-17	1	18	-6
2,48	-20	1	19	-6
3,15	-21	1	27	-8
3,82	-20	1	37	-9
4,48	-18	0	45	-6
5,15	-12	0	53	-7
5,15	-12	0	53	-7
5,58	-5	0	57	-8
6,00	0	0	61	-11
m	kNm/m	kN/m	kNm/m	kN/m

8.2 ABUTEMENT 2

8.2.1 Contour




Combining on: Mx(B)
OVER (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)
-20,3069
-18,0506
-15,7943
-13,538
-11,2816
-9,0253
-6,76898
-4,51265
-2,25633
Maximum 0,0 at node 556 of element 200
Minimum -20,3069 at node 577 of element 185
L4
L5
L6
Z
Y
X

8.2.2 Digram

Compare abutement 1.

8.2.3 Table

Compare abutement 1.

9. EG A Min Mx(B)/Max Mx(T)

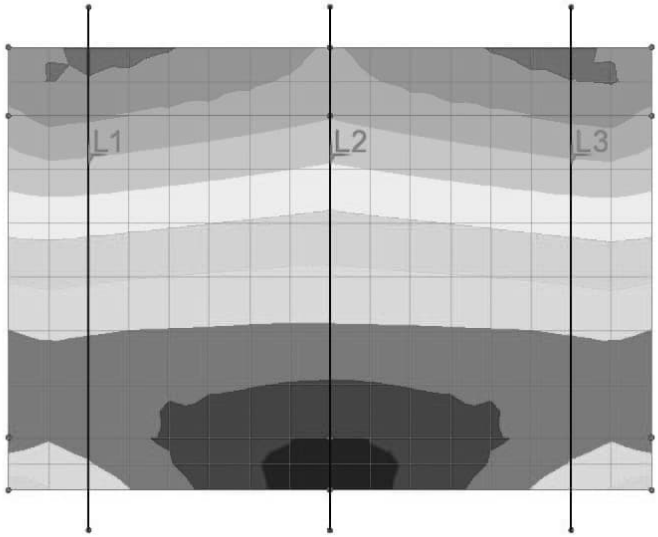
9.1 ABUTEMENT 1

9.1.1 Contour

Enveloping on: Mx(T)
VLO - EG A ~ Characteristic (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)

13,1469
26,2938
39,4408
52,5877
65,7346
78,8815
92,0284
105,175
118,322

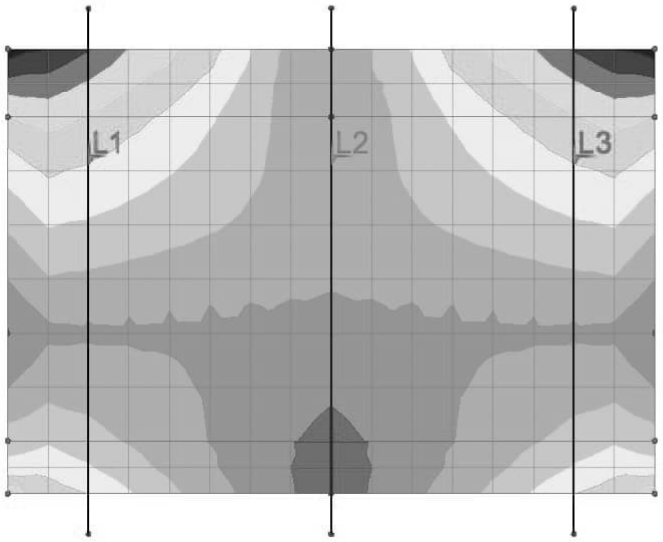
Maximum 121,618 at node 250 of element 76 (1981:Inf1 (Mx) - Point 206 - Negative - Characteristic)
Minimum 3,29531 at node 23 of element 23 (2091:Inf2 (My) - (-4.5, 3.0, 5.5) - Negative - Characteristic)



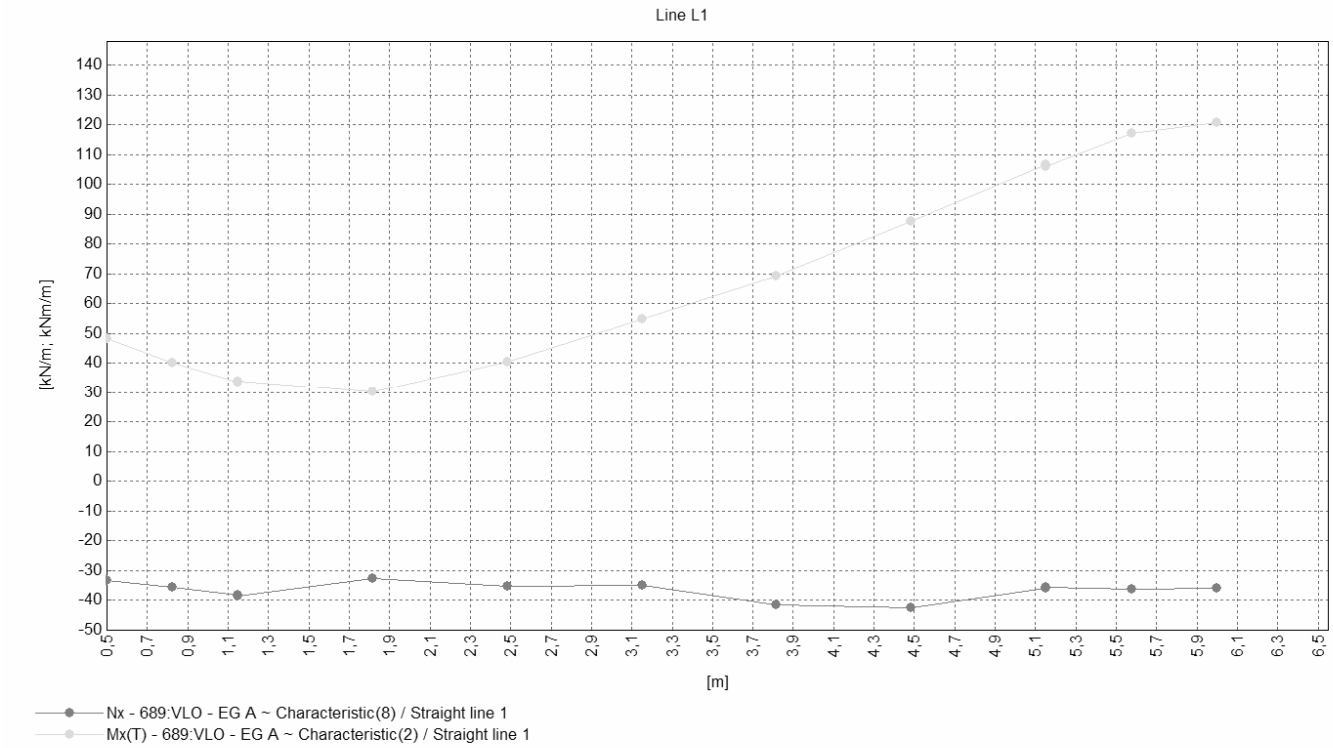
Enveloping on: Mx(B)
VLO - EG A ~ Characteristic (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)

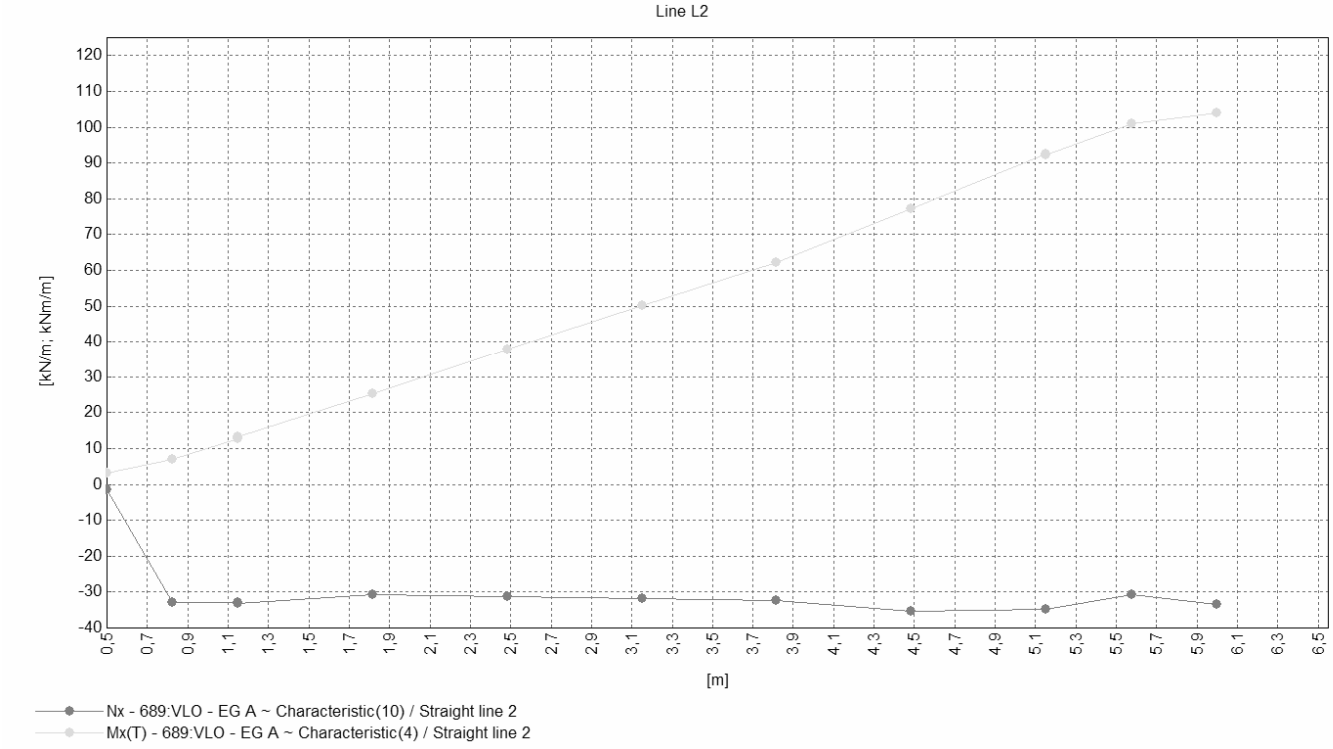
-89,311
-79,3876
-69,4641
-59,5407
-49,6172
-39,6938
-29,7703
-19,8469
-9,92345

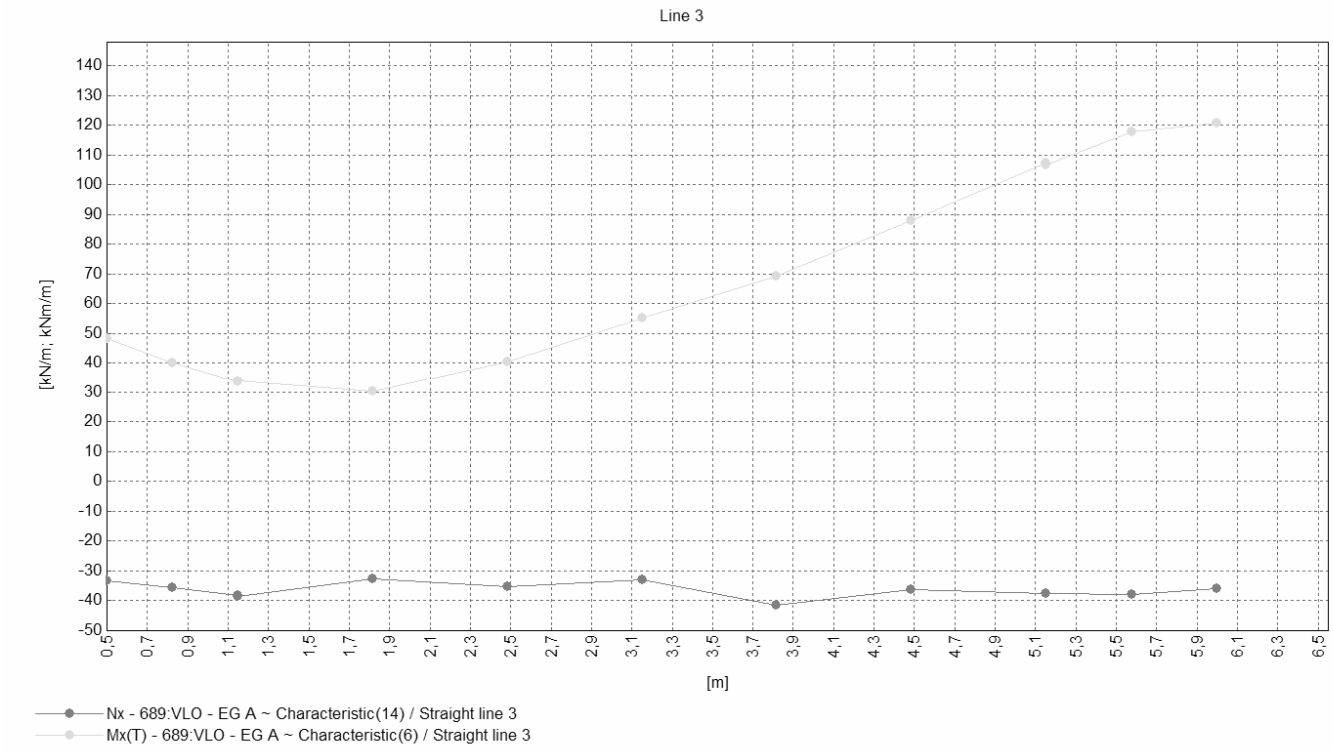
Maximum -4,0046 at node 23 of element 23 (2170:Inf3 (Sx) - (3.0, 3.0, 5.5) - (Element 788, Element 794) - Negative - Characteristic)
Minimum -93,3156 at node 249 of element 74 (2021:Inf1 (Mx) - Point 206 - Positive - Characteristic)

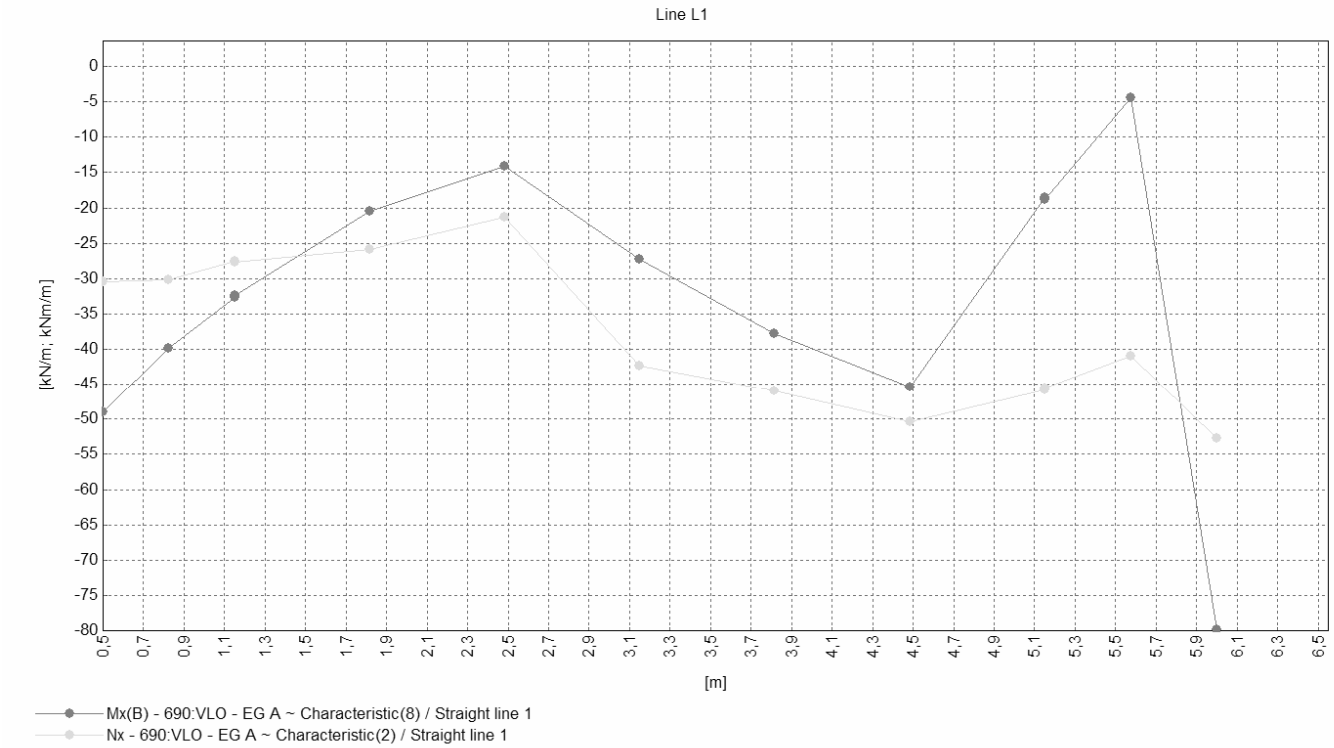


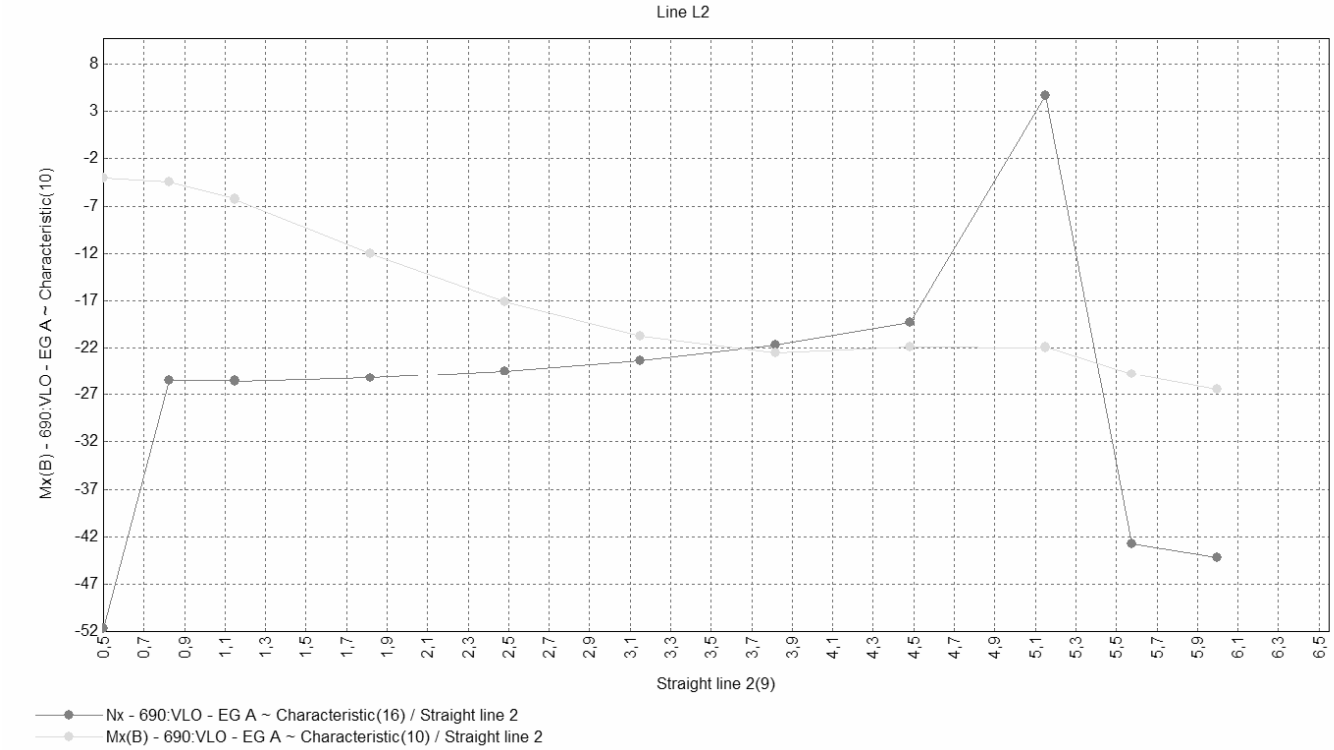
9.1.2 Digram

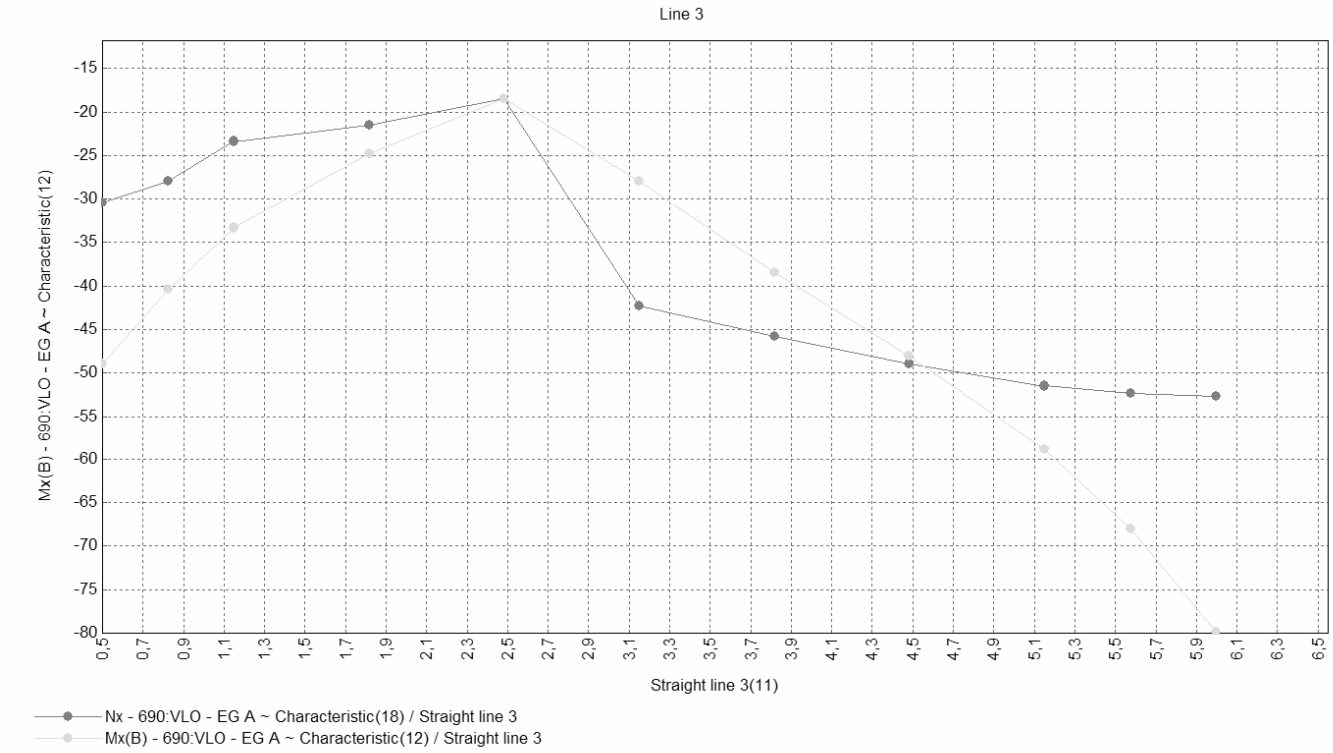

Line L1
[kN/m; kNm/m]
[m]
Nx - 689:VLO - EG A ~ Characteristic(8) / Straight line 1
Mx(T) - 689:VLO - EG A ~ Characteristic(2) / Straight line 1


Line L2
[kN/m; kNm/m]
[m]
Nx - 689:VLO - EG A ~ Characteristic(10) / Straight line 2
Mx(T) - 689:VLO - EG A ~ Characteristic(4) / Straight line 2


Line 3
[kN/m; kNm/m]
[m]
Nx - 689:VLO - EG A ~ Characteristic(14) / Straight line 3
Mx(T) - 689:VLO - EG A ~ Characteristic(6) / Straight line 3


Line L1
[kN/m; kNm/m]
[m]
Mx(B) - 690:VLO - EG A ~ Characteristic(8) / Straight line 1
Nx - 690:VLO - EG A ~ Characteristic(2) / Straight line 1


Line L2
Mx(B) - 690:VLO - EG A ~ Characteristic(10)
Straight line 2(9)
Nx - 690:VLO - EG A ~ Characteristic(16) / Straight line 2
Mx(B) - 690:VLO - EG A ~ Characteristic(10) / Straight line 2


Line 3
Mx(B) - 690:VLO - EG A ~ Characteristic(12)
-15
-20
-25
-30
-35
-40
-45
-50
-55
-60
-65
-70
-75
-80
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
Straight line 3(11)
Nx - 690:VLO - EG A ~ Characteristic(18) / Straight line 3
Mx(B) - 690:VLO - EG A ~ Characteristic(12) / Straight line 3

9.1.3 Table

Line 1:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-49	-30	48	-33
0,83	-40	-28	40	-35
1,15	-33	-23	34	-38
1,15	-33	-23	34	-38
1,82	-25	-21	30	-33
2,48	-18	-18	40	-35
3,15	-28	-42	55	-35
3,82	-38	-46	69	-41
4,48	-48	-49	88	-43
5,15	-59	-51	107	-36
5,15	-59	-51	106	-36
5,58	-68	-52	117	-36
6,00	-80	-53	121	-36
m	kNm/m	kN/m	kNm/m	kN/m

Line 2:

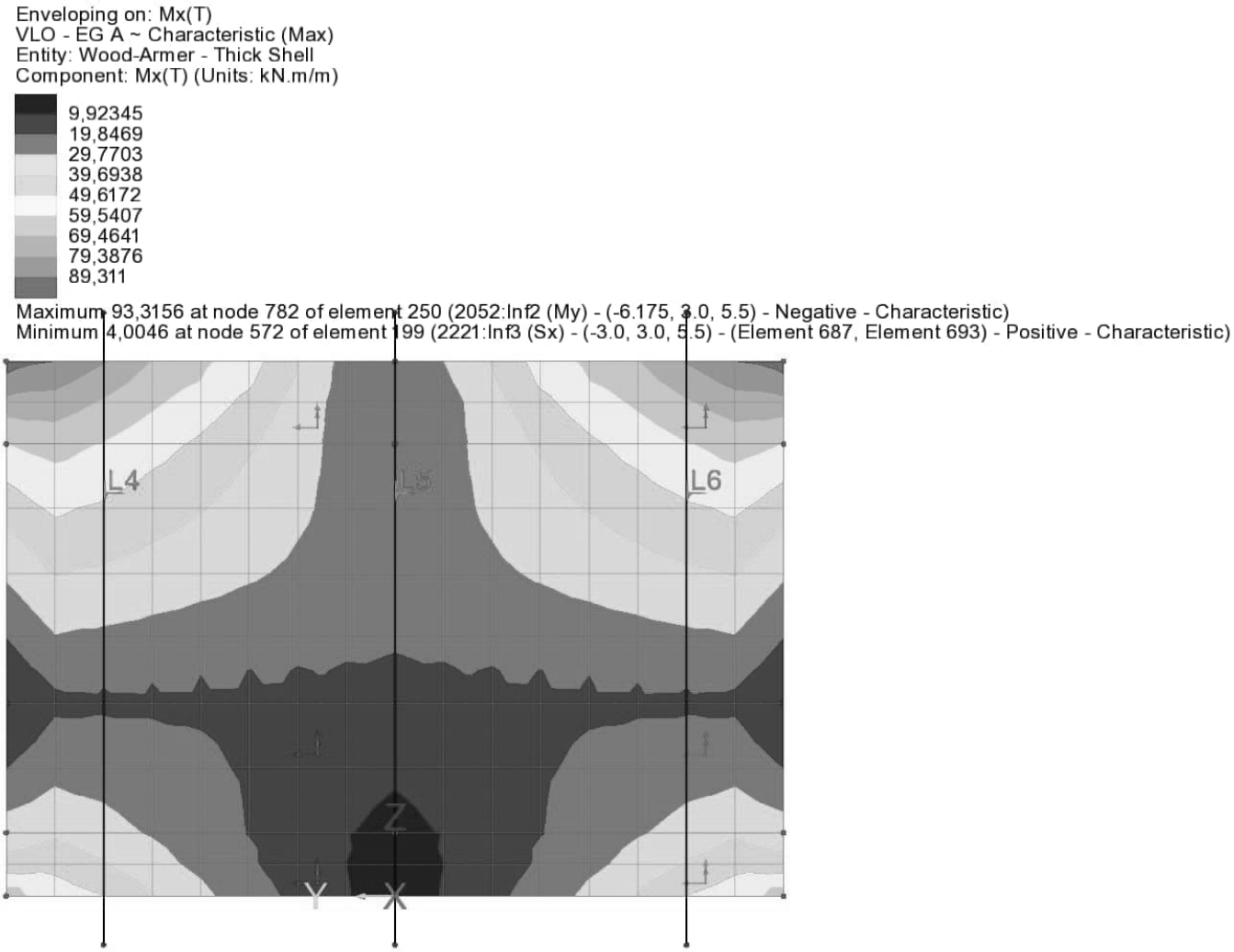
s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-4	-52	3	-2
0,83	-4	-26	7	-33
1,15	-6	-26	13	-33
1,15	-6	-26	13	-33
1,82	-12	-25	25	-31
2,48	-17	-24	38	-31
3,15	-21	-23	50	-32
3,82	-22	-22	62	-32
4,48	-22	-19	77	-35
5,15	-22	5	93	-35
5,15	-22	5	92	-35
5,58	-25	-43	101	-31
6,00	-26	-44	104	-33
m	kNm/m	kN/m	kNm/m	kN/m

Line 3:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-49	-30	48	-33
0,83	-40	-28	40	-35
1,15	-33	-23	34	-38
1,15	-33	-23	34	-38
1,82	-25	-21	30	-33
2,48	-18	-18	40	-35
3,15	-28	-42	55	-33
3,82	-38	-46	69	-41
4,48	-48	-49	88	-36
5,15	-59	-51	107	-38
5,15	-59	-51	107	-37
5,58	-68	-52	118	-38
6,00	-80	-53	121	-36
m	kNm/m	kN/m	kNm/m	kN/m

9.2 ABUTEMENT 2

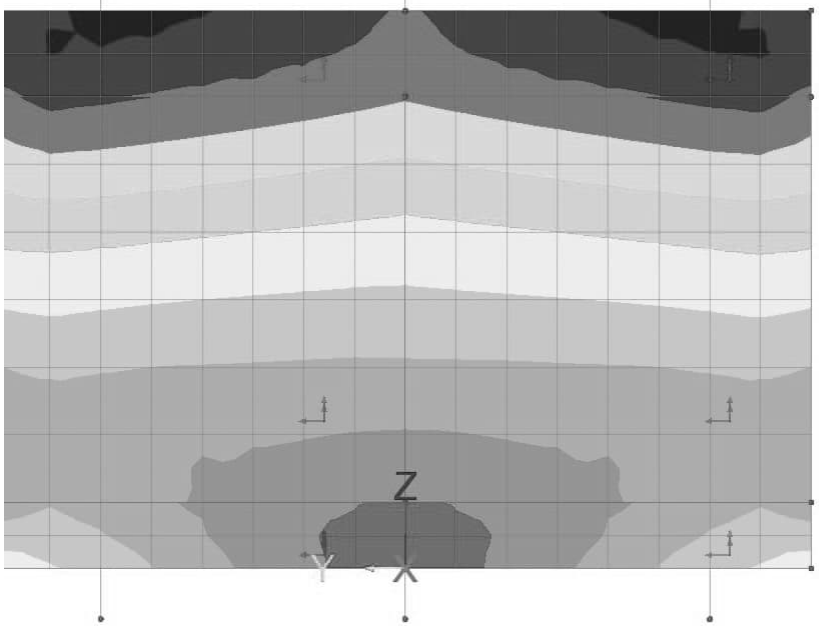
9.2.1 Contour



Enveloping on: Mx(B)
VLO - EG A ~ Characteristic (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)

-118,322
-105,175
-92,0284
-78,8815
-65,7346
-52,5877
-39,4408
-26,2938
-13,1469

Maximum -3,29531 at node 572 of element 199 (2100:Inf2 (My) - (4.5, 3.0, 5.5) - Negative - Characteristic)
Minimum -121,618 at node 792 of element 252 (1981:Inf1 (Mx) - Point 206 - Negative - Characteristic)



9.2.2 Digram

Compare abutement 1.

9.2.3 Table

Compare abutement 1.

10. EG B - Min Mx(B)/Max Mx(T)

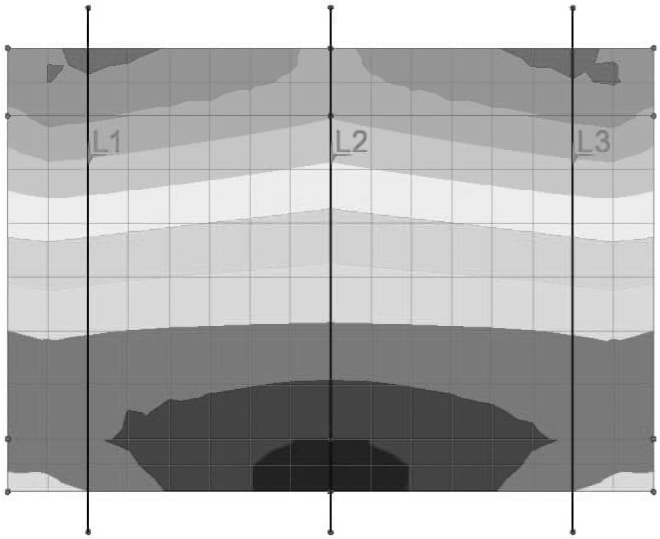
10.1 ABUTEMENT 1

10.1.1 Contour

Enveloping on: Mx(T)
VLO - EG B ~ Characteristic (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)

41,7877
83,5755
125,363
167,151
208,939
250,726
292,514
334,302
376,09

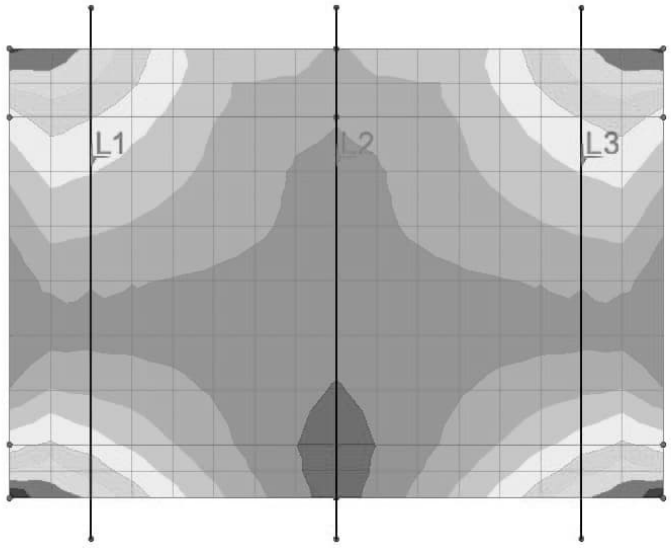
Maximum 385,666 at node 250 of element 76 (2588:Inf3 (Sx) - Point 205 - (Surface 405) - Negative - Characteristic (2588))
Minimum 9,57614 at node 23 of element 23 (2569:Inf2 (My) - (1.5, 3.0, 5.5) - Positive - Characteristic (2569))



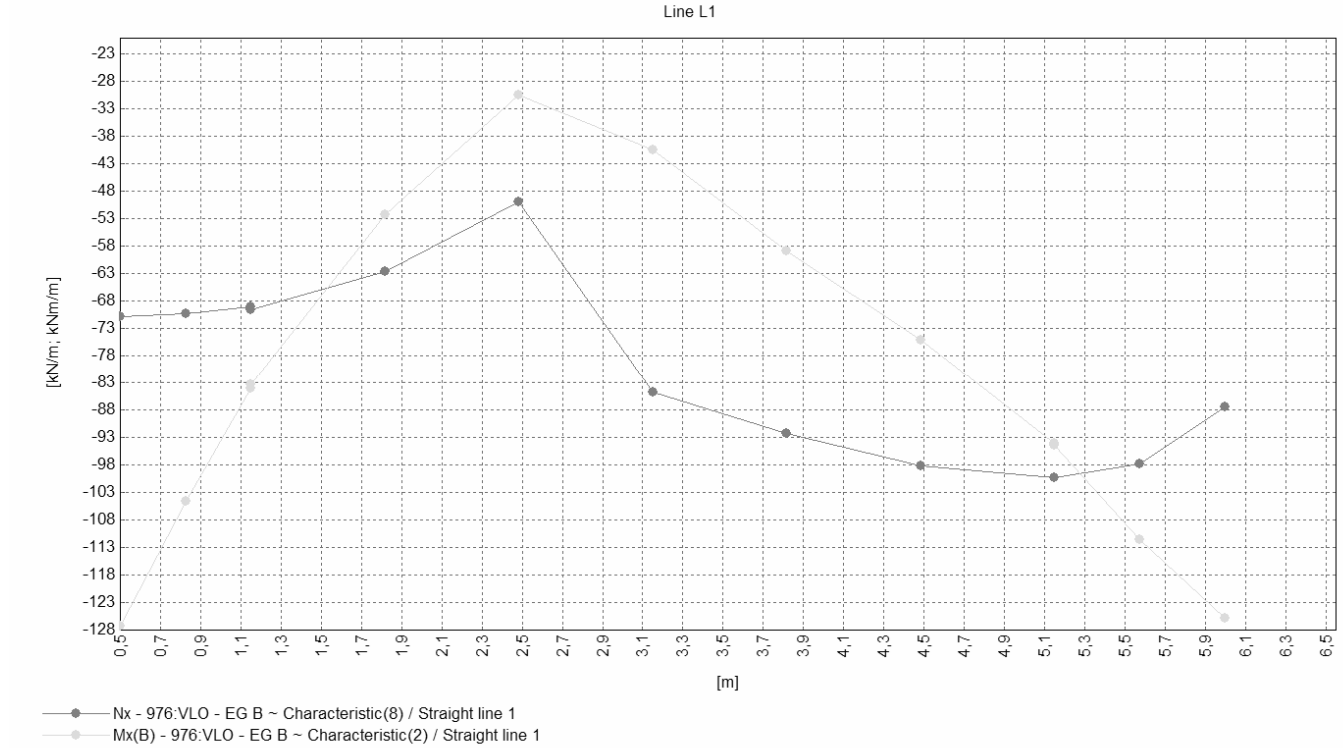
Enveloping on: Mx(B)
VLO - EG B ~ Characteristic (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)

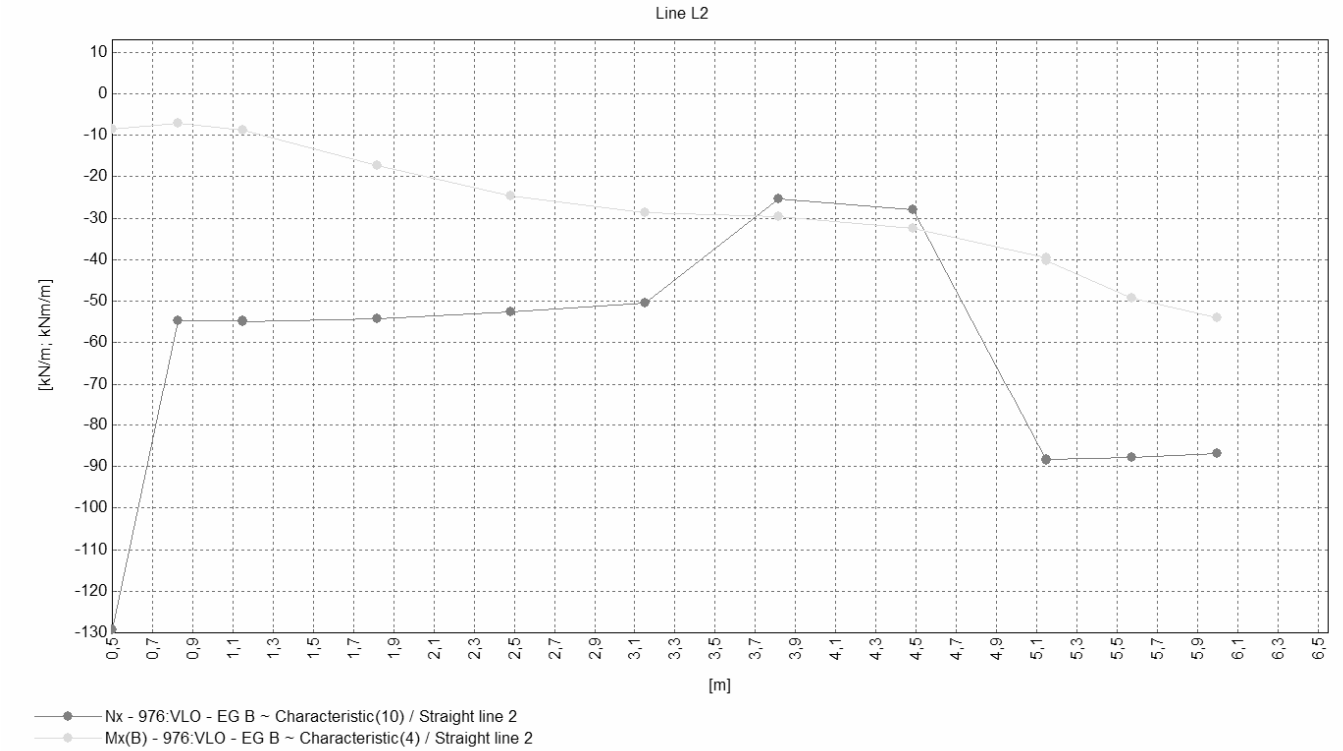
-168,661
-149,921
-131,181
-112,441
-93,7005
-74,9604
-56,2203
-37,4802
-18,7401

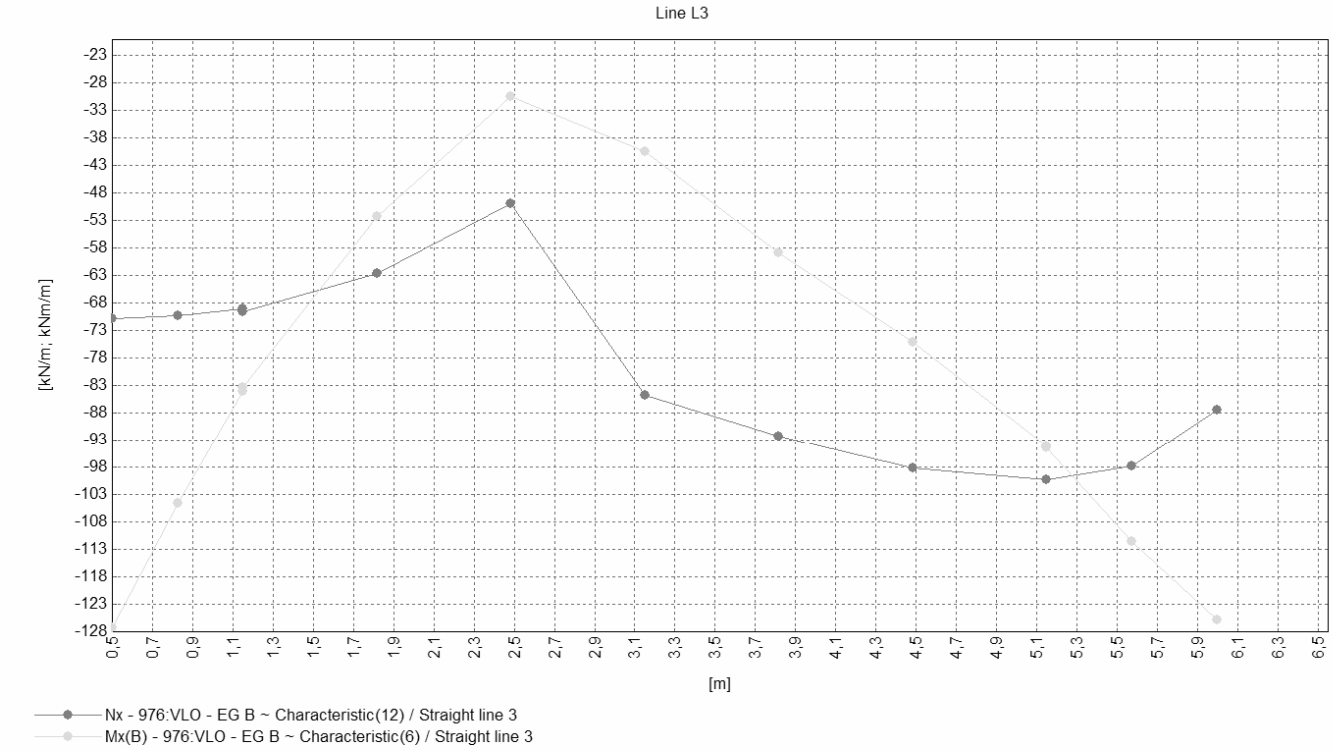
Maximum -7,07097 at node 25 of element 23 (2388:Inf1 (Mx) - (-6.175, 3.0, 5.5) - Negative - Characteristic (2388))
Minimum -175,732 at node 1 of element 9 (2615:Inf3 (Sx) - (3.0, -3.0, 5.5) - (Element 807, Element 813) - Negative - Characteristic (2615))

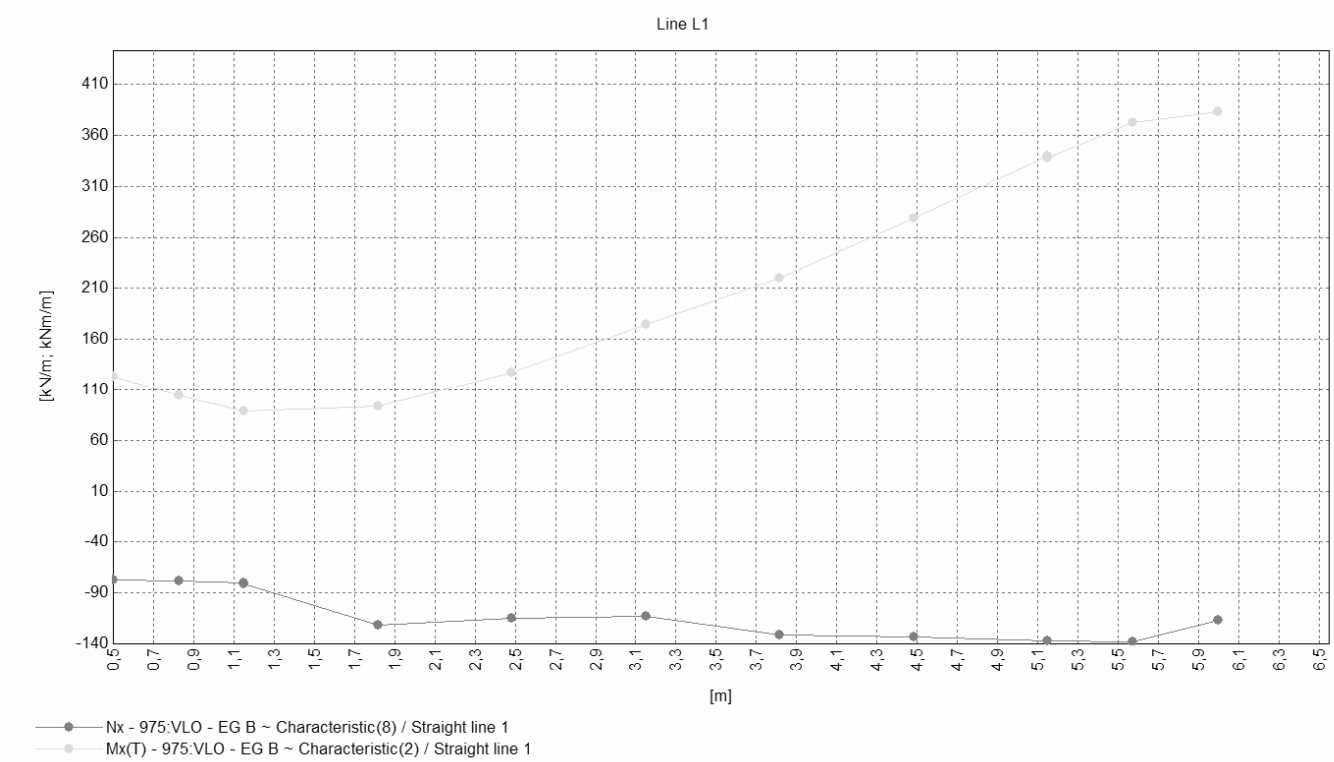


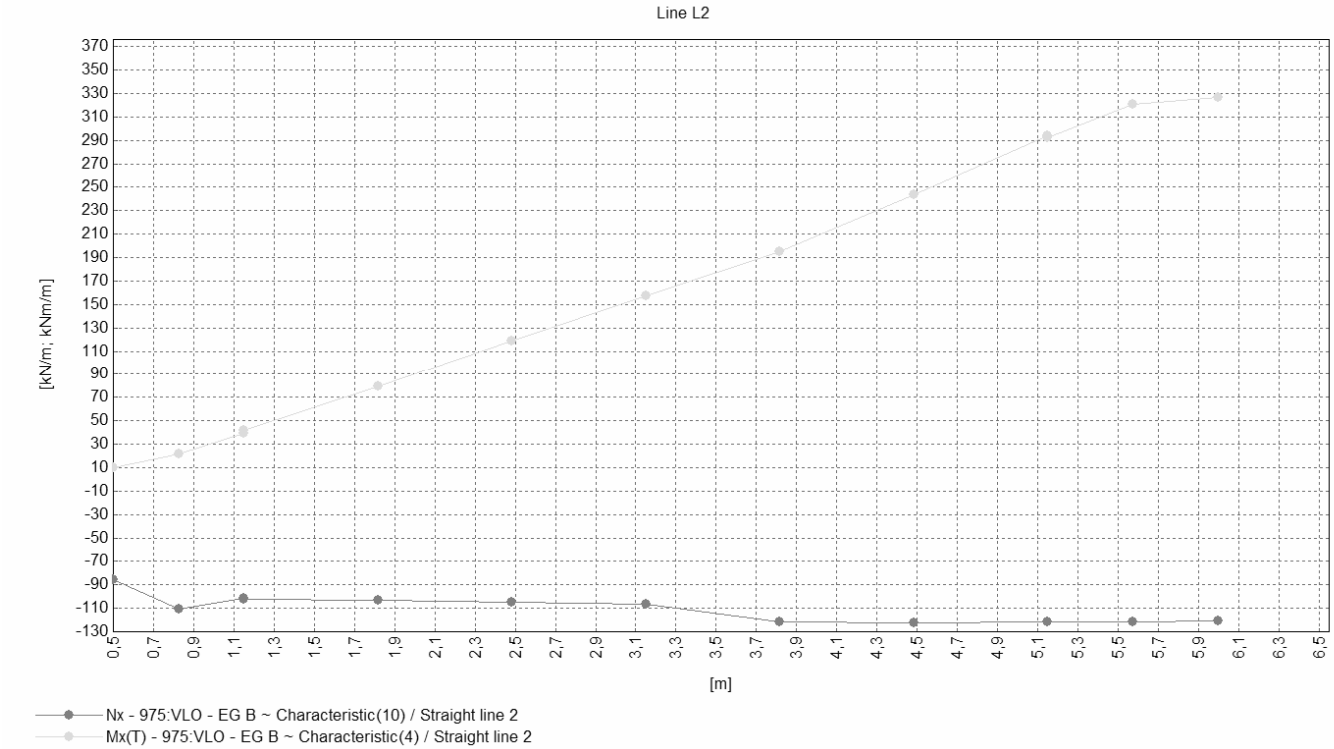
10.1.2 Diagram

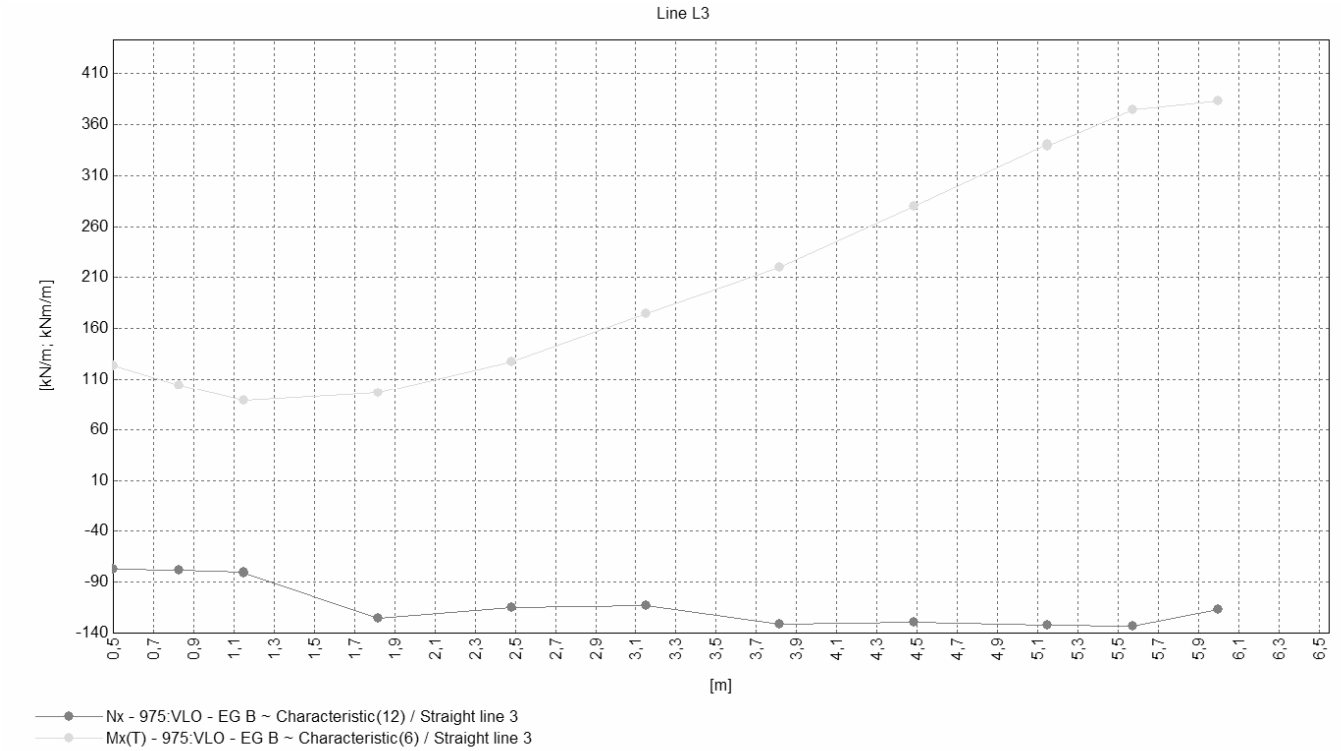





Line L3
[kN/m; kNm/m]
-23
-28
-33
-38
-43
-48
-53
-58
-63
-68
-73
-78
-83
-88
-93
-98
-103
-108
-113
-118
-123
-128
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
[m]
Nx - 976:VLO - EG B ~ Characteristic(12) / Straight line 3
Mx(B) - 976:VLO - EG B ~ Characteristic(6) / Straight line 3


Line L1
[kN/m; kNm/m]
[m]
Nx - 975:VLO - EG B ~ Characteristic(8) / Straight line 1
Mx(T) - 975:VLO - EG B ~ Characteristic(2) / Straight line 1


Line L2
[kN/m; kNm/m]
[m]
Nx - 975:VLO - EG B ~ Characteristic(10) / Straight line 2
Mx(T) - 975:VLO - EG B ~ Characteristic(4) / Straight line 2


Line L3
[kN/m; kNm/m]
410
360
310
260
210
160
110
60
10
-40
-90
-140
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
[m]
Nx - 975:VLO - EG B ~ Characteristic(12) / Straight line 3
Mx(T) - 975:VLO - EG B ~ Characteristic(6) / Straight line 3

10.1.3 Table

Line 1:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-127	-71	123	-77
0,83	-105	-70	104	-78
1,15	-84	-69	88	-80
1,15	-83	-70	89	-81
1,82	-52	-63	93	-121
2,48	-31	-50	127	-115
3,15	-41	-85	175	-113
3,82	-59	-92	220	-131
4,48	-75	-98	279	-134
5,15	-94	-100	340	-137
5,15	-94	-100	338	-137
5,58	-112	-98	372	-138
6,00	-126	-88	383	-116
m	kNm/m	kN/m	kNm/m	kN/m

Line 2:

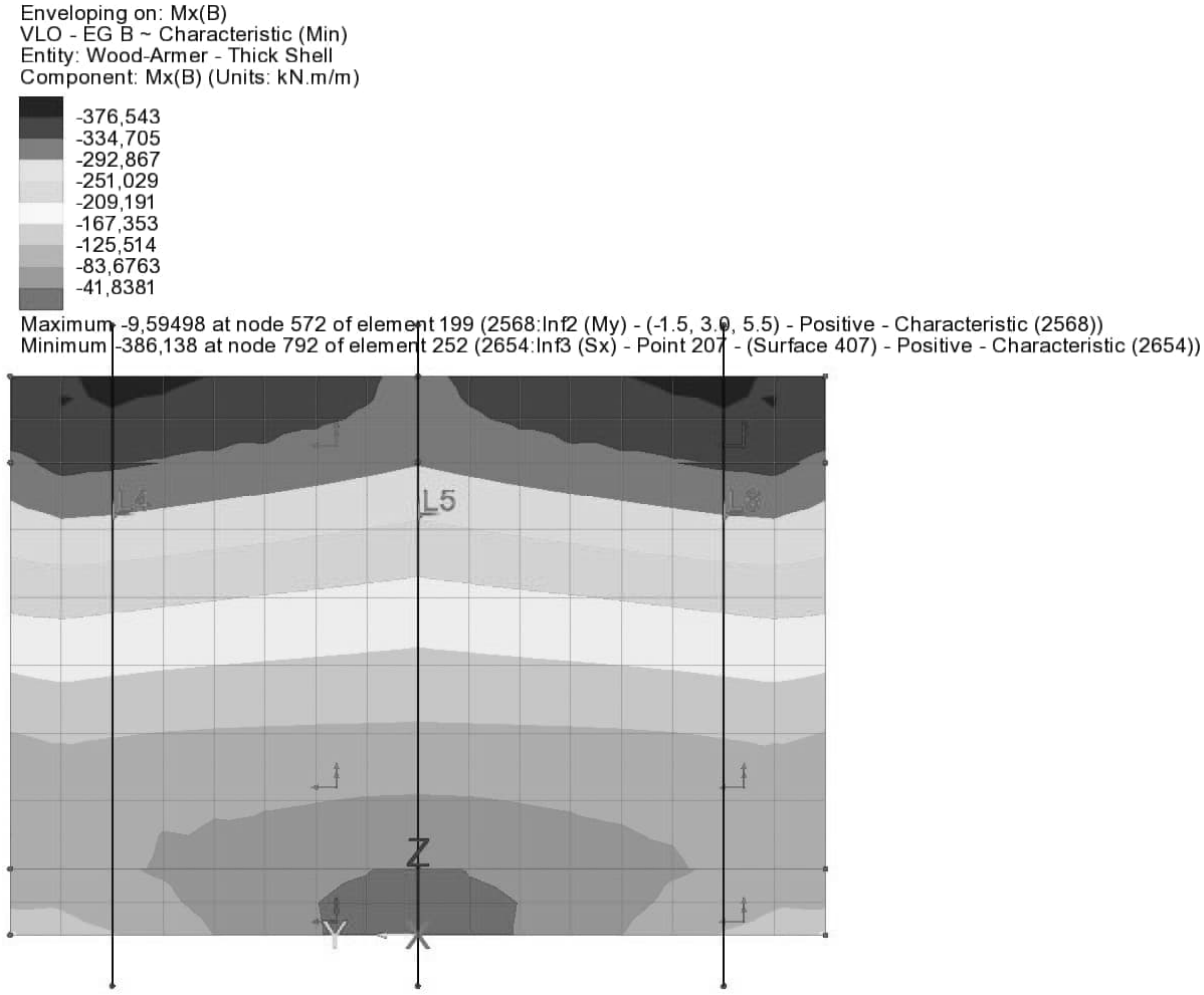
s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-8	-129	10	-86
0,83	-7	-55	22	-111
1,15	-9	-55	39	-101
1,15	-9	-55	41	-102
1,82	-17	-54	79	-103
2,48	-25	-53	119	-105
3,15	-29	-50	157	-106
3,82	-30	-25	195	-122
4,48	-32	-28	243	-122
5,15	-40	-89	294	-122
5,15	-40	-88	292	-122
5,58	-49	-88	320	-121
6,00	-54	-87	327	-121
m	kNm/m	kN/m	kNm/m	kN/m

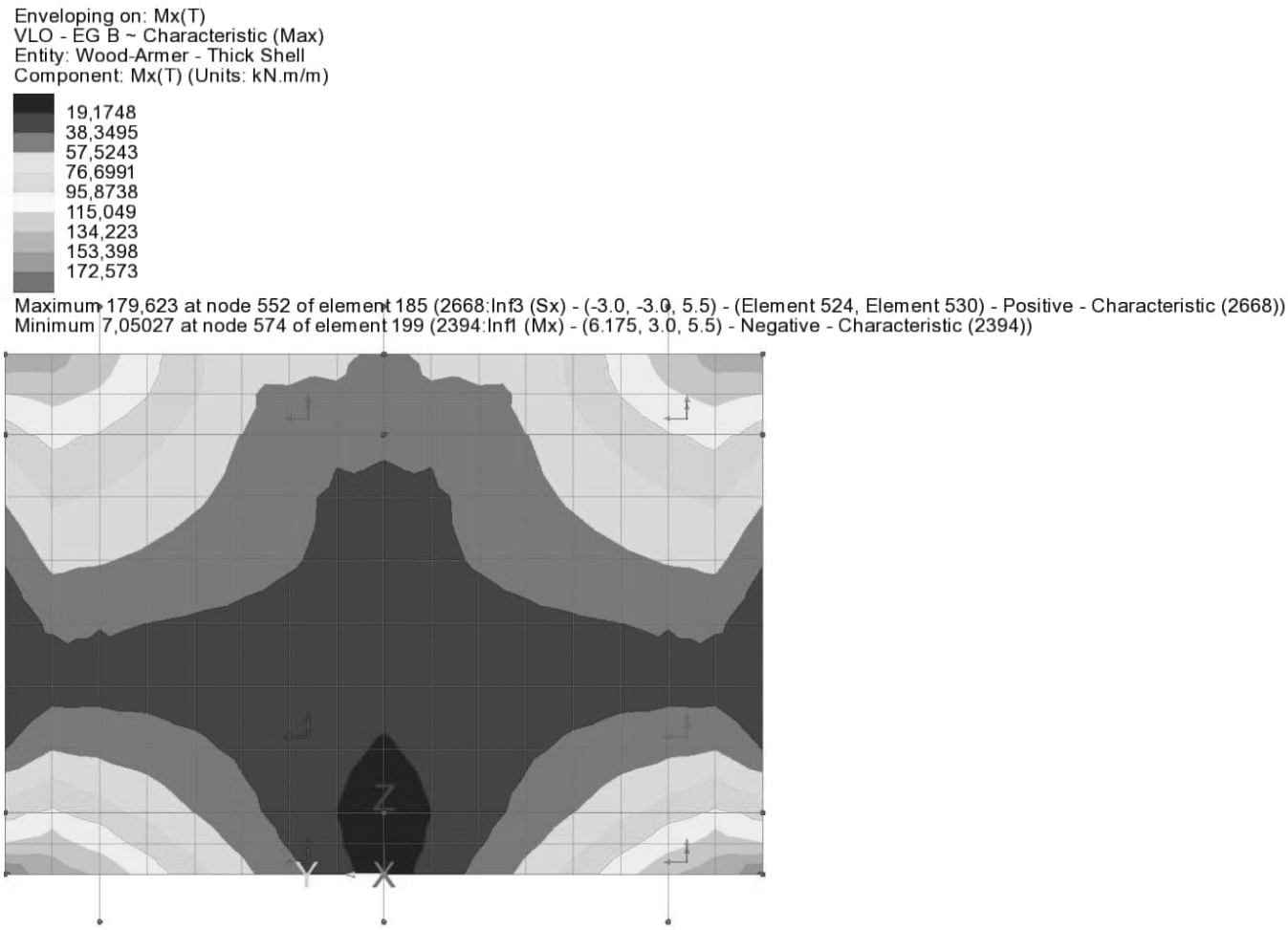
Line 3:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-127	-71	123	-77
0,83	-105	-70	104	-78
1,15	-84	-69	88	-80
1,15	-83	-70	89	-81
1,82	-52	-63	96	-126
2,48	-31	-50	127	-115
3,15	-41	-85	175	-113
3,82	-59	-92	220	-131
4,48	-75	-98	279	-129
5,15	-94	-100	341	-133
5,15	-94	-100	339	-133
5,58	-112	-98	374	-134
6,00	-126	-88	383	-116
m	kNm/m	kN/m	kNm/m	kN/m

10.2 ABUTEMENT 2

10.2.1 Contour




Enveloping on: Mx(T)
VLO - EG B ~ Characteristic (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)
19,1748
38,3495
57,5243
76,6991
95,8738
115,049
134,223
153,398
172,573
Maximum 179,623 at node 552 of element 185 (2668:Inf3 (Sx) - (-3.0, -3.0, 5.5) - (Element 524, Element 530) - Positive - Characteristic (2668))
Minimum 7,05027 at node 574 of element 199 (2394:Inf1 (Mx) - (6.175, 3.0, 5.5) - Negative - Characteristic (2394))
Z
Y
X

10.2.2 Digram

Compare abutement 1.

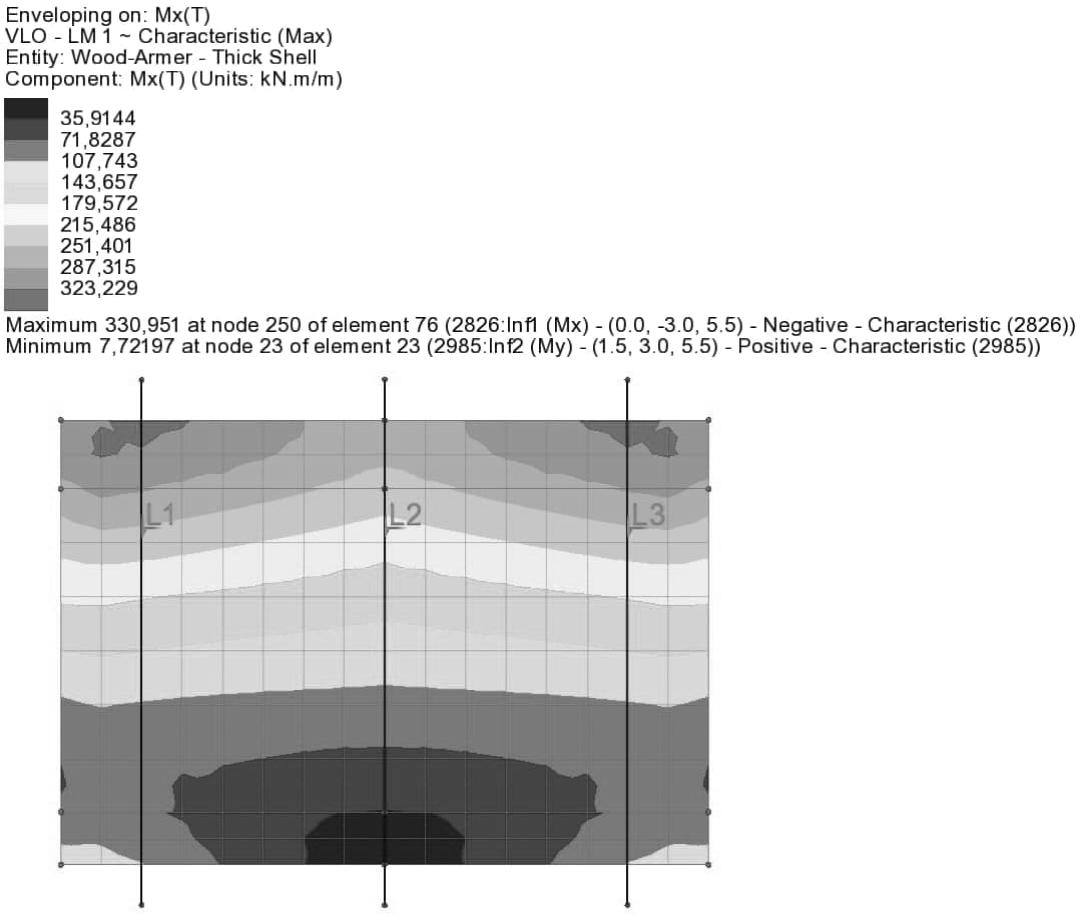
10.2.3 Table

Compare abutement 1.

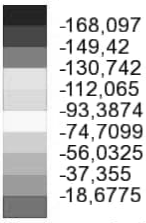
11. LM 1 - Min Mx(B)/Max Mx(T)

11.1 ABUTEMENT 1

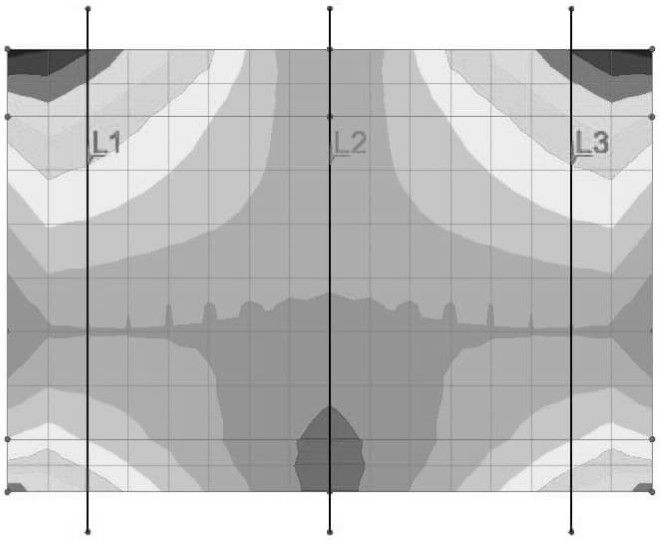
11.1.1 Contour



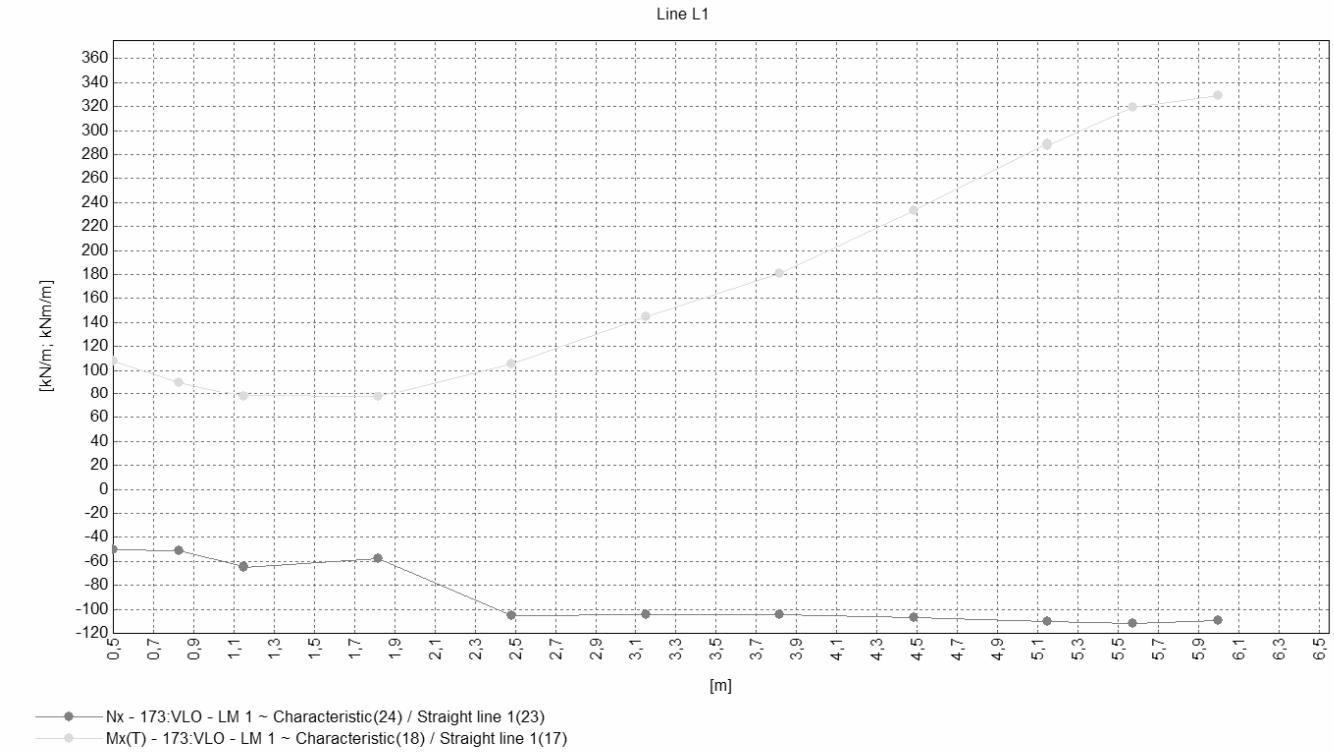
Enveloping on: Mx(B)
VLO - LM 1 ~ Characteristic (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)

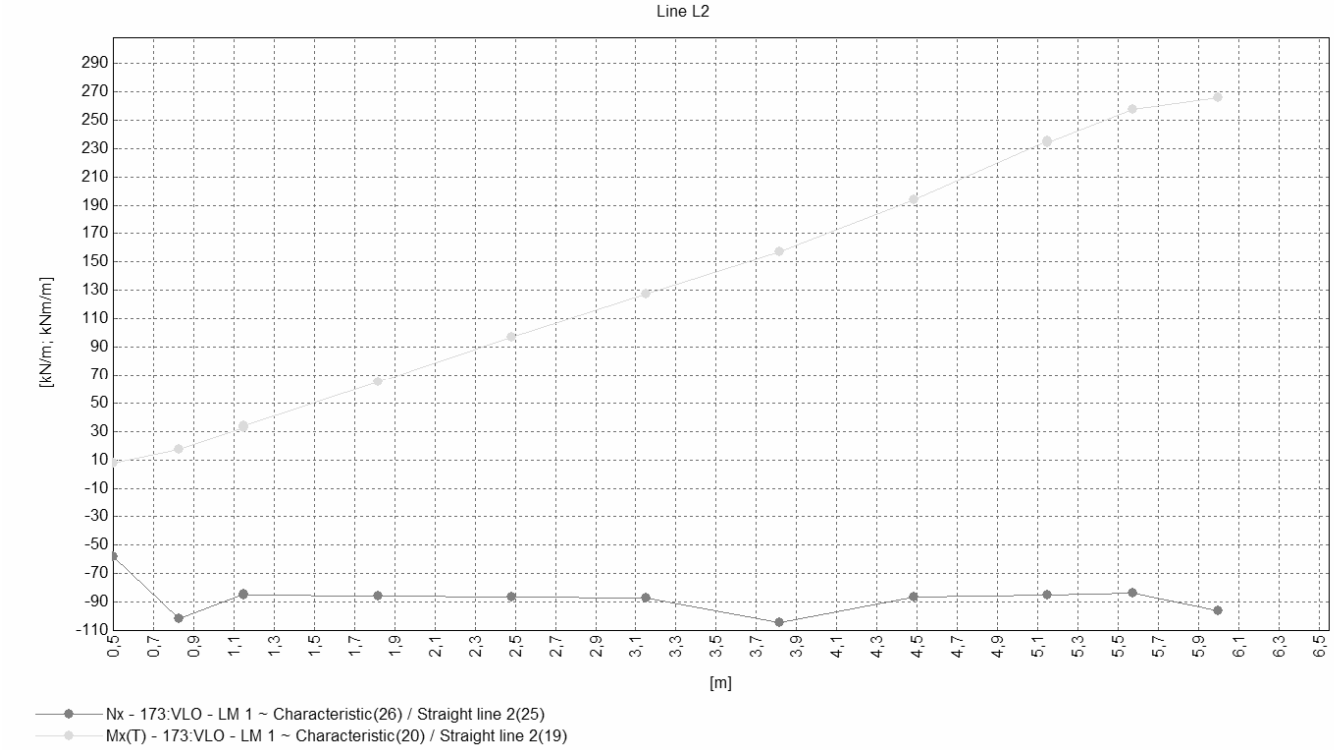


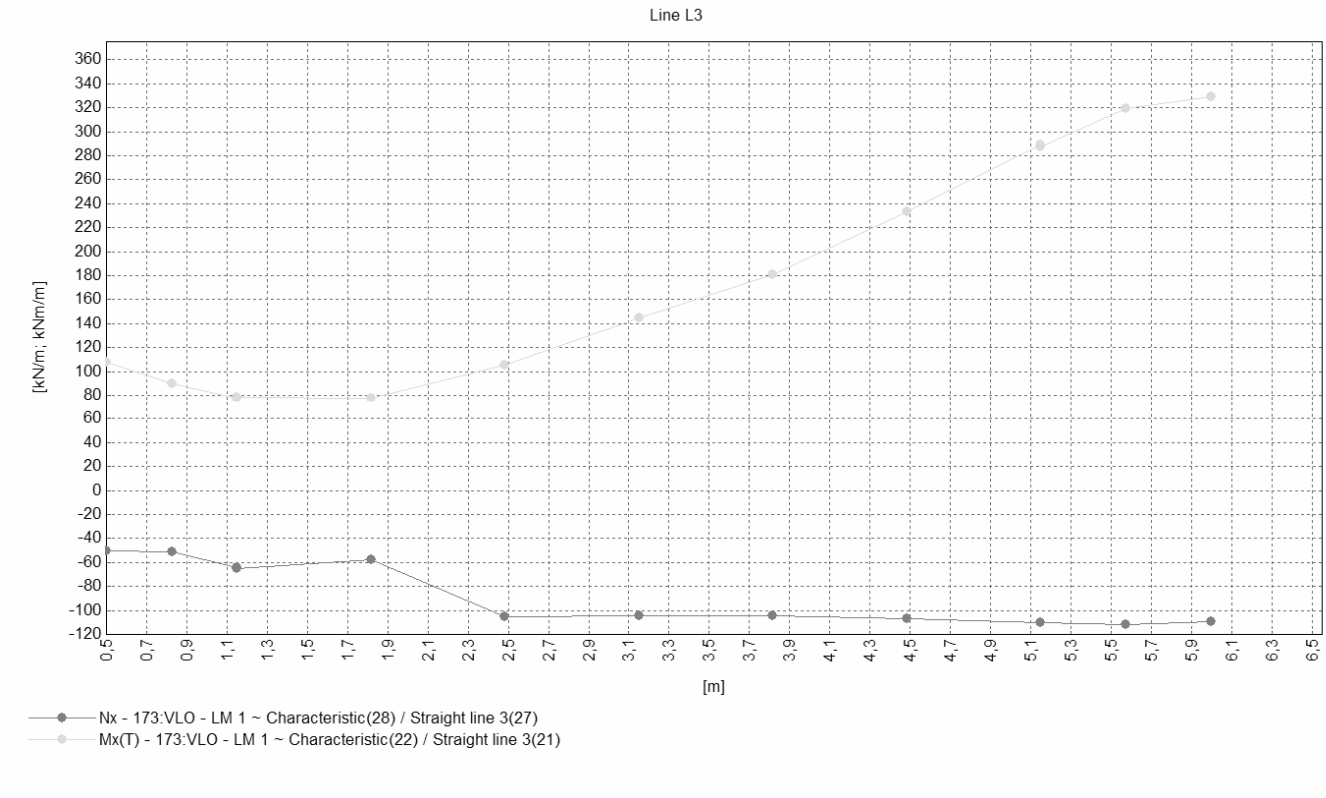
Maximum -8,21822 at node 23 of element 23 (3002:Inf3 (Sx) - (3.0, 3.0, 5.5) - (Element 788, Element 794) - Negative - Characteristic (3002))
Minimum -176,316 at node 249 of element 74 (3090:Inf3 (Sx) - (-6.175, -3.0, 5.5) - Positive - Characteristic (3090))

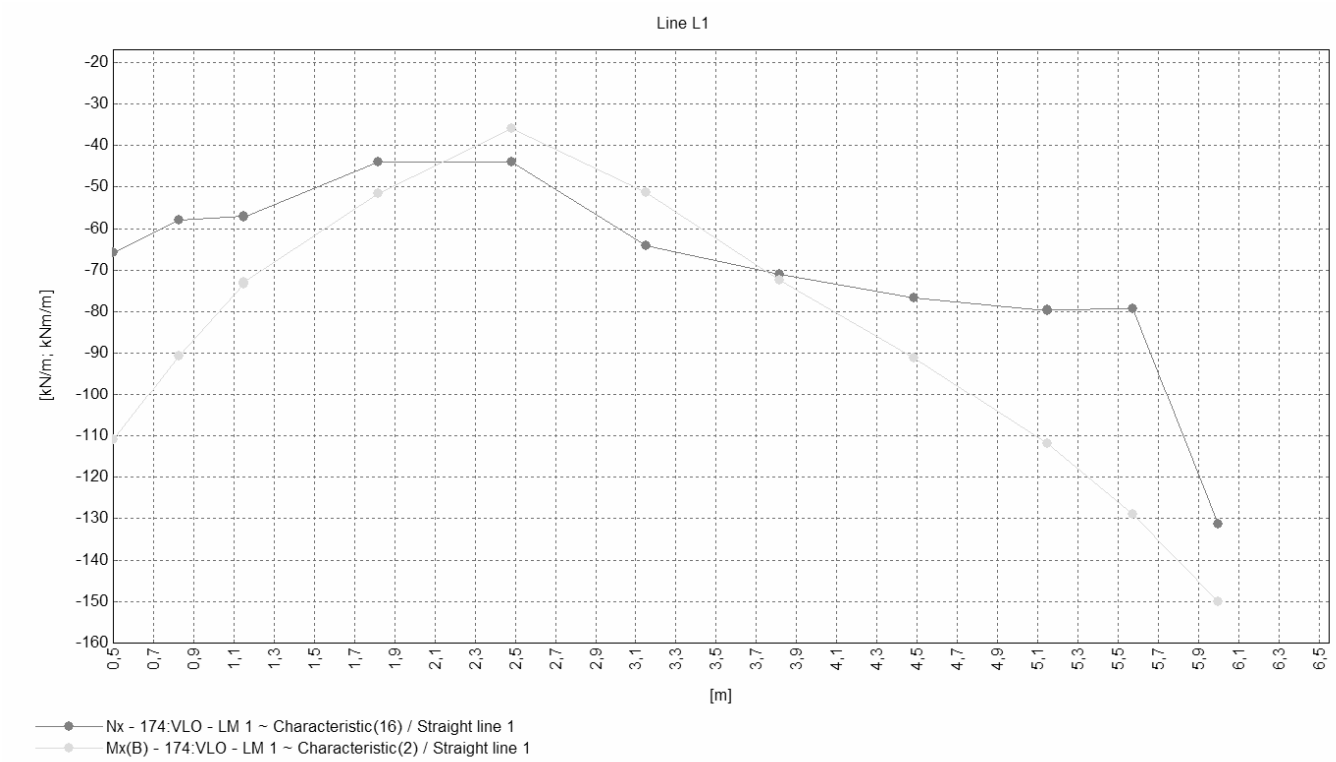


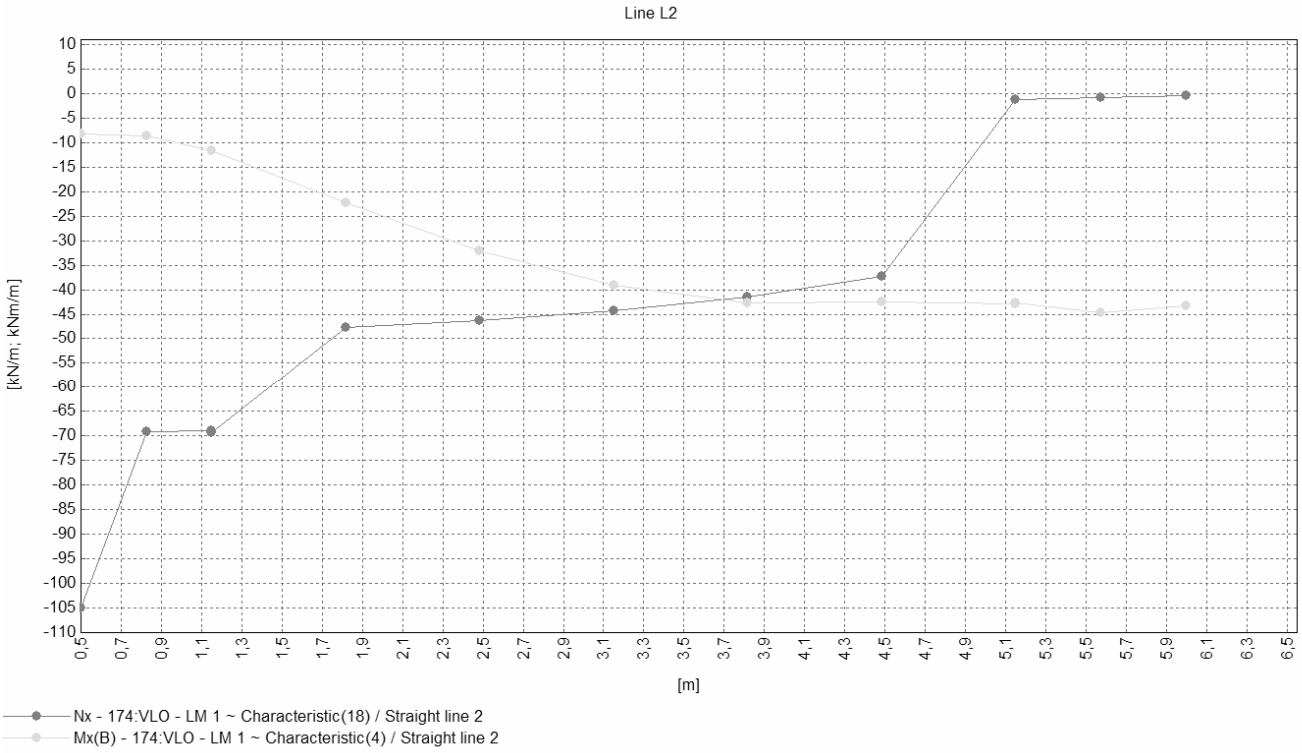
11.1.2 Diagram

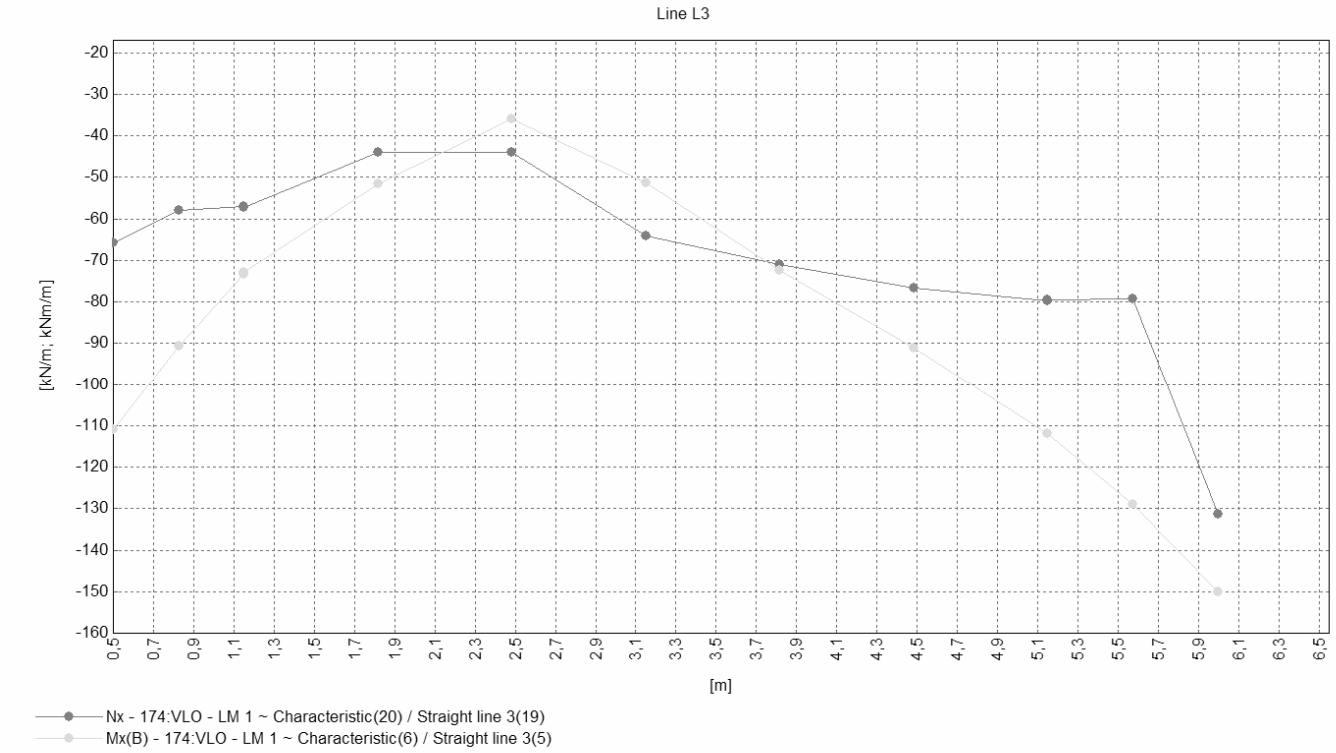





Line L3
[kN/m; kNm/m]
[m]
Nx - 173:VLO - LM 1 ~ Characteristic(28) / Straight line 3(27)
Mx(T) - 173:VLO - LM 1 ~ Characteristic(22) / Straight line 3(21)


Line L1
[kN/m; kNm/m]
[m]
Nx - 174:VLO - LM 1 ~ Characteristic(16) / Straight line 1
Mx(B) - 174:VLO - LM 1 ~ Characteristic(2) / Straight line 1


Line L2
[kN/m; kNm/m]
[m]
Nx - 174:VLO - LM 1 ~ Characteristic(18) / Straight line 2
Mx(B) - 174:VLO - LM 1 ~ Characteristic(4) / Straight line 2


Line L3
[kN/m; kNm/m]
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
[m]
Nx - 174:VLO - LM 1 ~ Characteristic(20) / Straight line 3(19)
Mx(B) - 174:VLO - LM 1 ~ Characteristic(6) / Straight line 3(5)

11.1.3 Table

Line 1:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-111	-66	108	-50
0,83	-91	-58	90	-51
1,15	-73	-57	78	-64
1,15	-73	-57	78	-65
1,82	-52	-44	78	-58
2,48	-36	-44	106	-105
3,15	-51	-64	144	-104
3,82	-72	-71	181	-105
4,48	-91	-77	233	-107
5,15	-112	-80	289	-110
5,15	-112	-79	287	-110
5,58	-129	-79	320	-111
6,00	-150	-131	329	-109
m	kNm/m	kN/m	kNm/m	kN/m

Line 2:

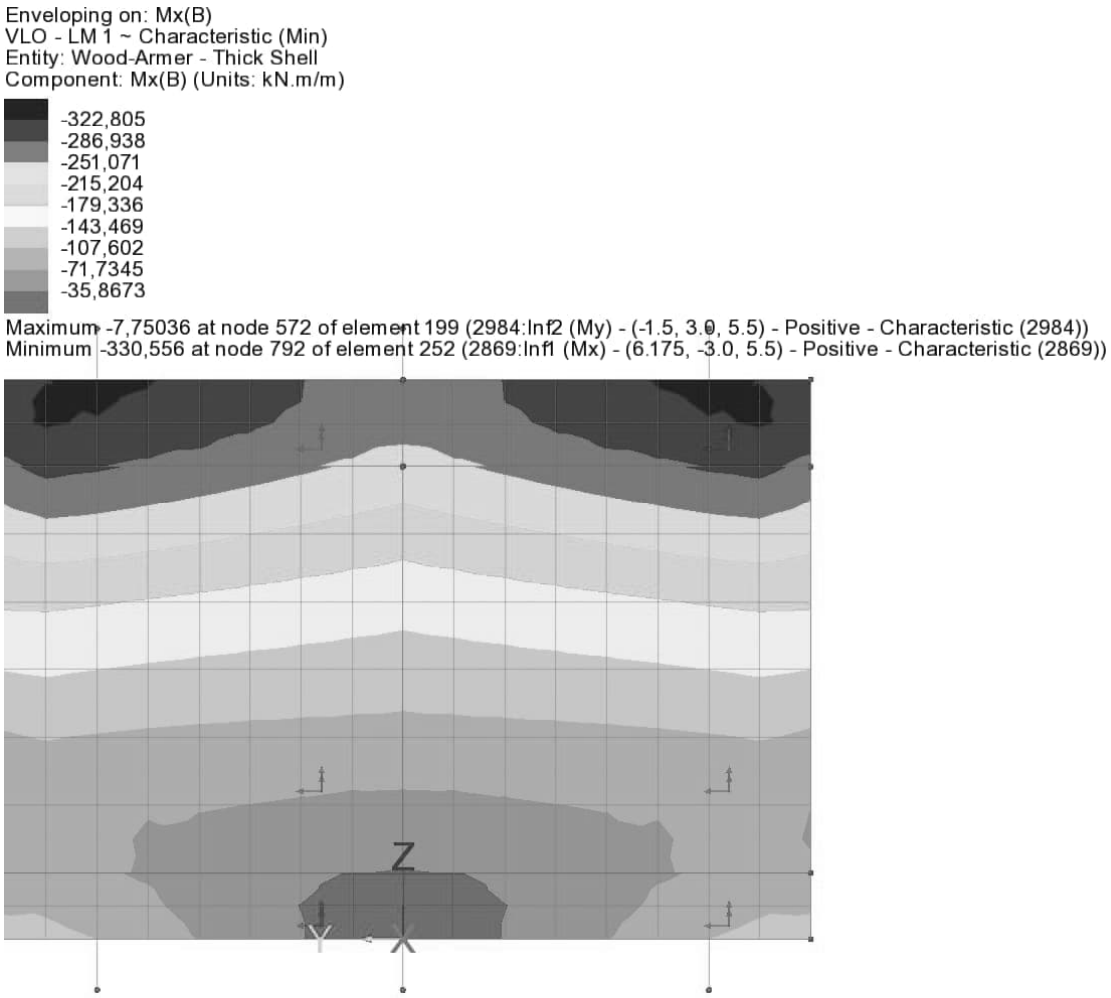
s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-8	-105	8	-58
0,83	-9	-69	18	-102
1,15	-12	-69	32	-85
1,15	-12	-69	34	-85
1,82	-22	-48	65	-86
2,48	-32	-46	97	-86
3,15	-39	-44	127	-87
3,82	-43	-41	157	-104
4,48	-42	-37	194	-87
5,15	-43	-1	235	-85
5,15	-43	-1	234	-85
5,58	-45	-1	257	-84
6,00	-43	0	266	-96
m	kNm/m	kN/m	kNm/m	kN/m

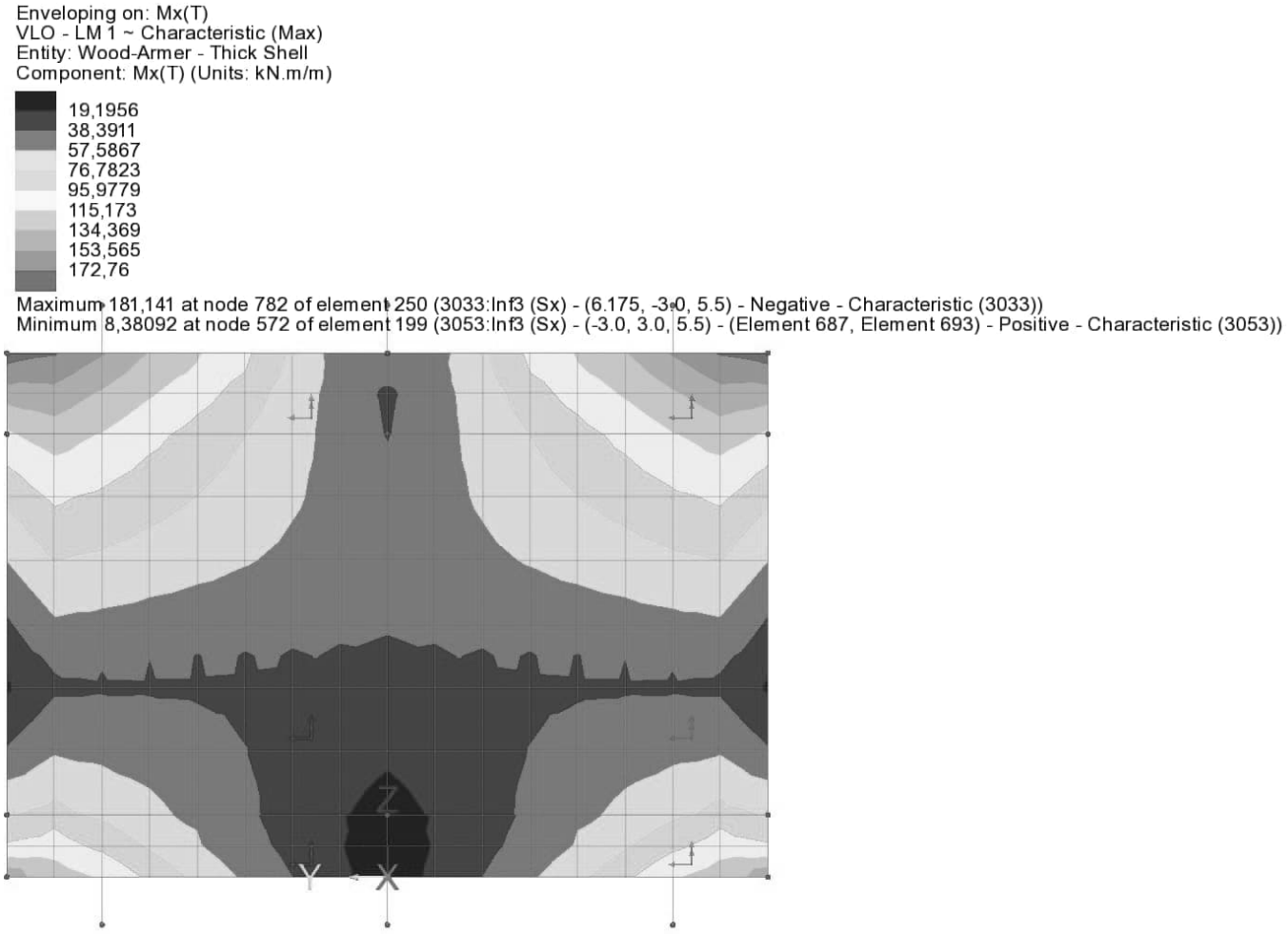
Line 3:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-111	-66	108	-50
0,83	-91	-58	90	-51
1,15	-73	-57	78	-64
1,15	-73	-57	78	-65
1,82	-52	-44	78	-58
2,48	-36	-44	106	-105
3,15	-51	-64	144	-104
3,82	-72	-71	181	-105
4,48	-91	-77	233	-107
5,15	-112	-80	289	-110
5,15	-112	-79	287	-110
5,58	-129	-79	320	-111
6,00	-150	-131	329	-109
m	kNm/m	kN/m	kNm/m	kN/m

11.2 ABUTEMENT 2

11.2.1 Contour




Enveloping on: Mx(T)
VLO - LM 1 ~ Characteristic (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)
19,1956
38,3911
57,5867
76,7823
95,9779
115,173
134,369
153,565
172,76
Maximum 181,141 at node 782 of element 250 (3033:Inf3 (Sx) - (6.175, -3.0, 5.5) - Negative - Characteristic (3033))
Minimum 8,38092 at node 572 of element 199 (3053:Inf3 (Sx) - (-3.0, 3.0, 5.5) - (Element 687, Element 693) - Positive - Characteristic (3053))
Z
Y
X

11.2.2 Digram

Compare abutement 1.

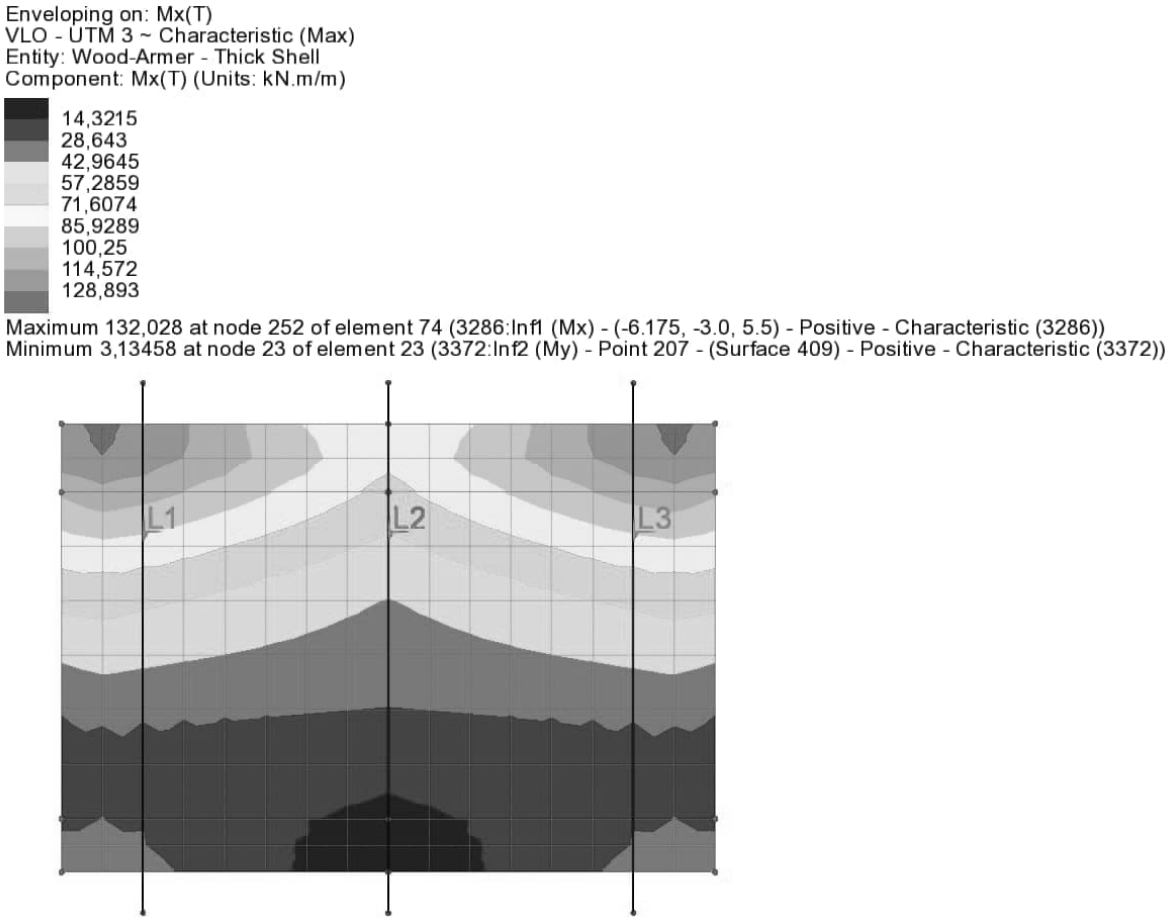
11.2.3 Table

Compare abutement 1.

12. UTM 3 - Min Mx(B)/Max Mx(T)

12.1 ABUTEMENT 1

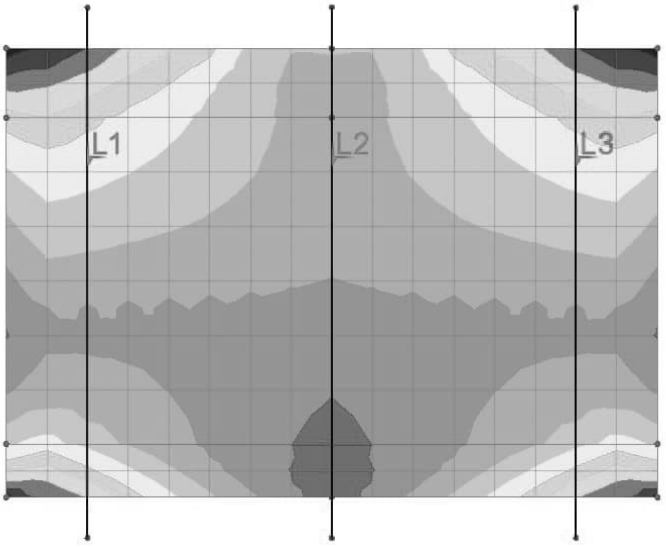
12.1.1 Contour



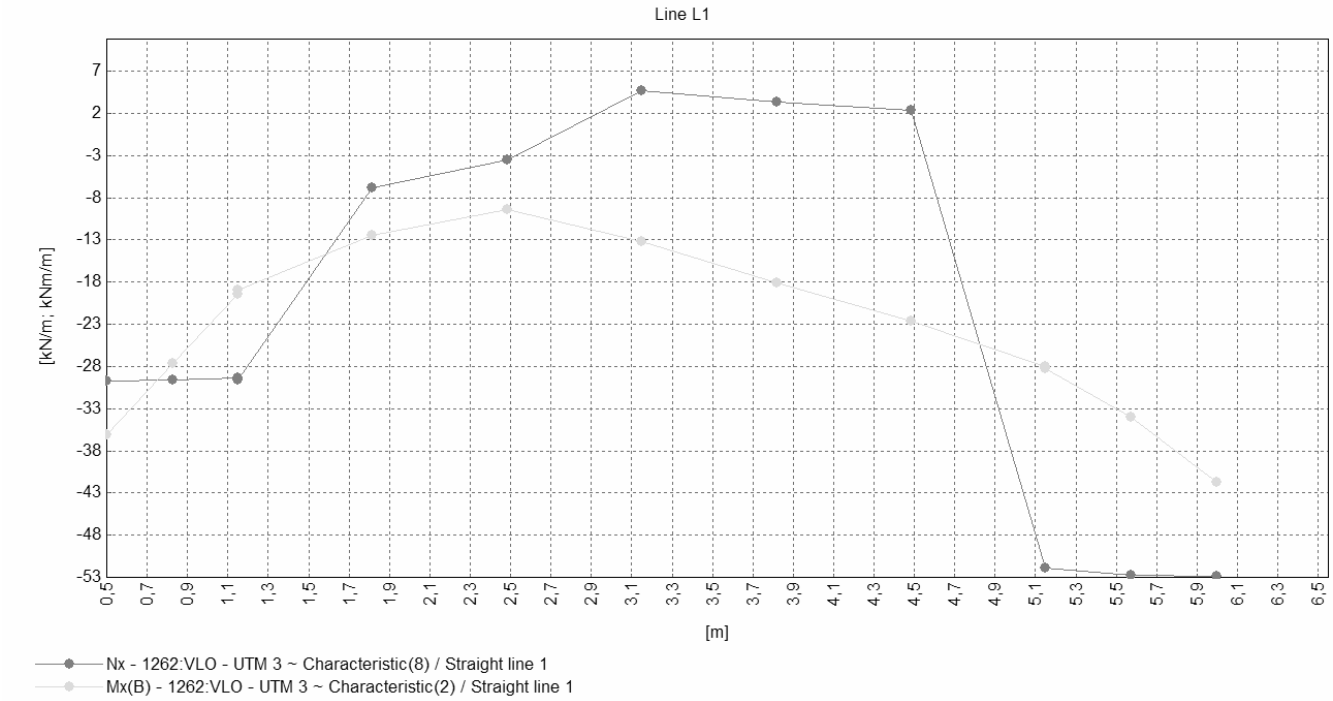
Enveloping on: Mx(B)
VLO - UTM 3 ~ Characteristic (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)

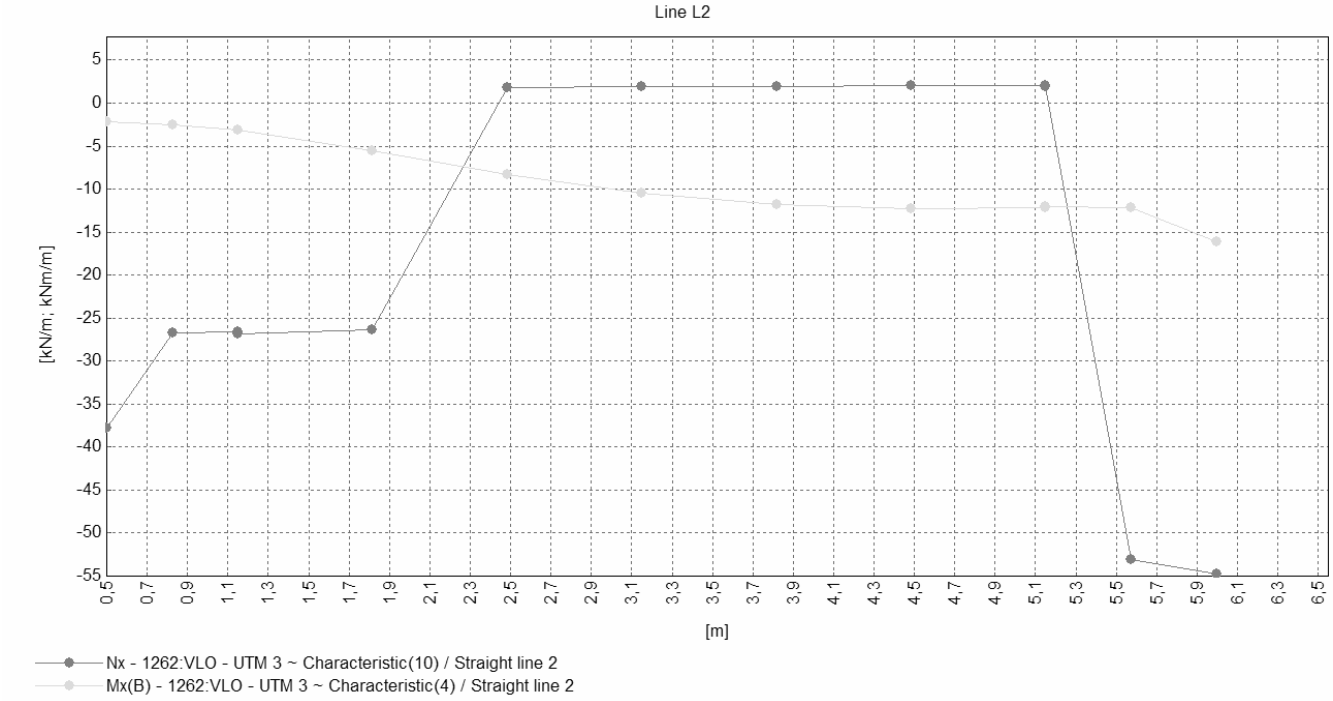
-47,3641
-42,1015
-36,8388
-31,5761
-26,3134
-21,0507
-15,788
-10,5254
-5,26268

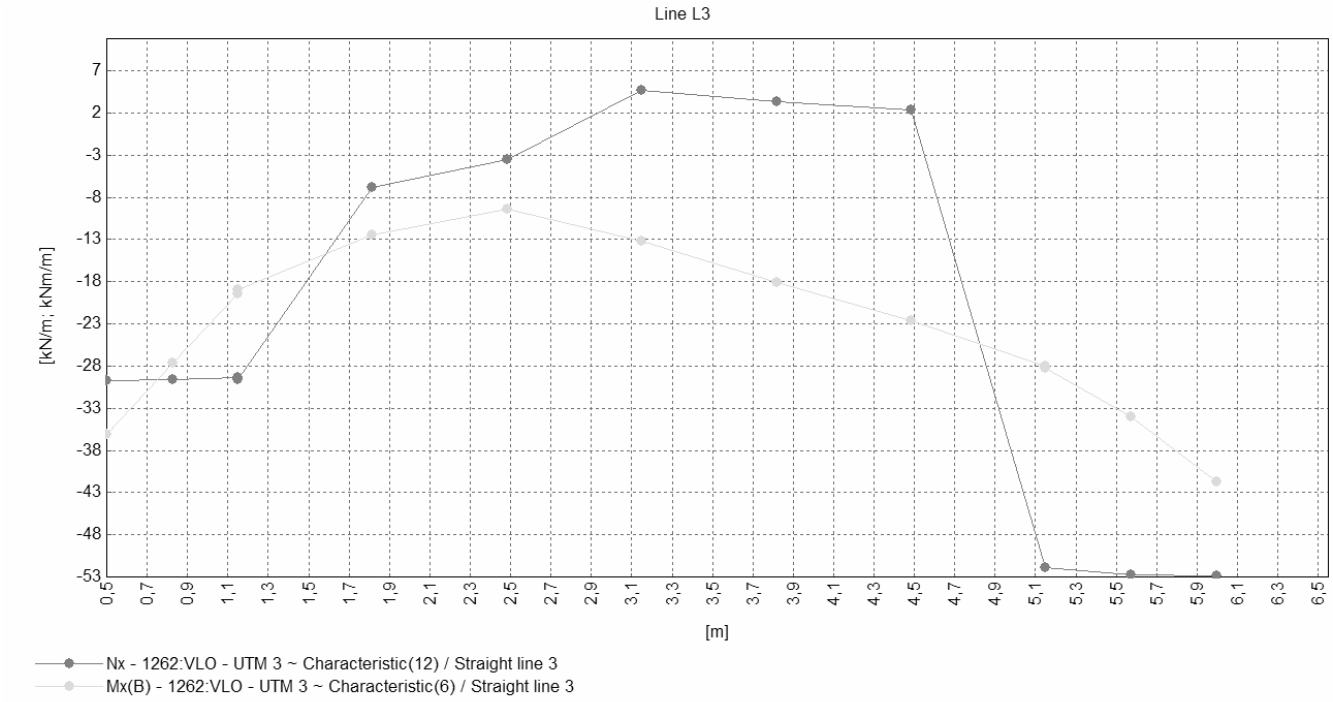
Maximum -2,11709 at node 23 of element 23 (3226:Inf1 (Mx) - (6.175, 3.0, 5.5) - Negative - Characteristic (3226))
Minimum -49,4812 at node 249 of element 74 (3226:Inf1 (Mx) - (6.175, 3.0, 5.5) - Negative - Characteristic (3226))

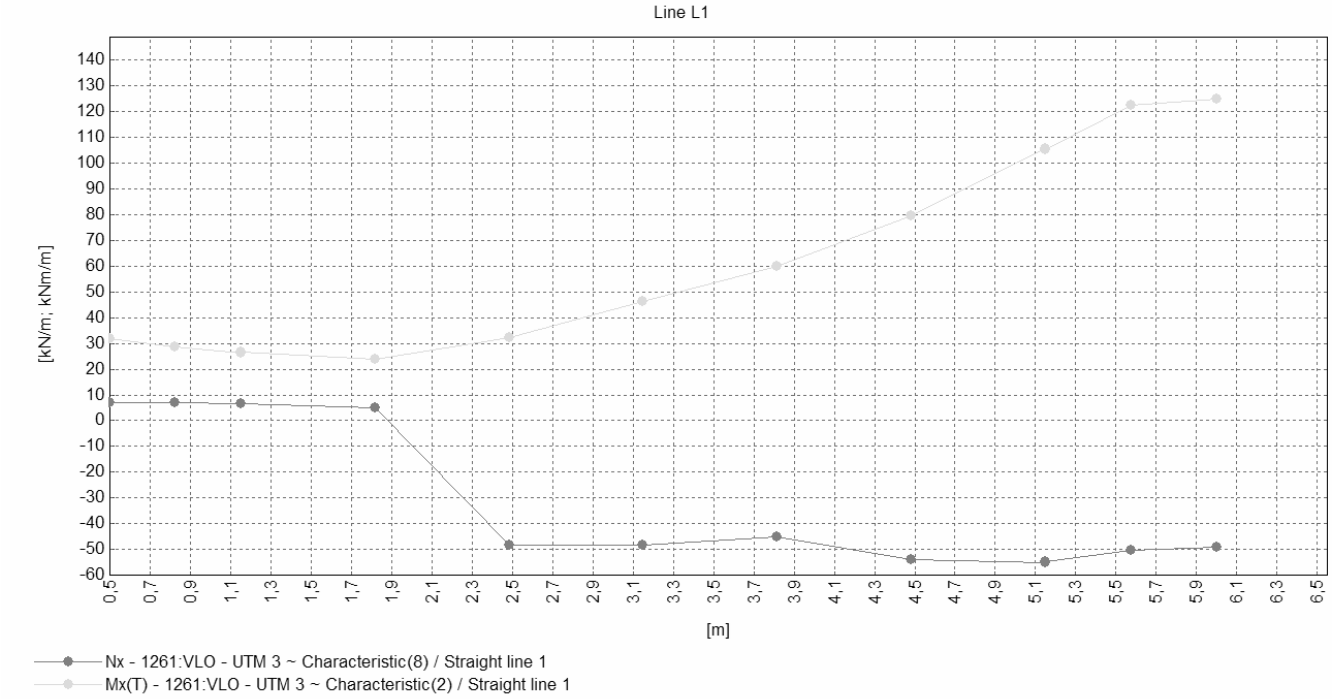


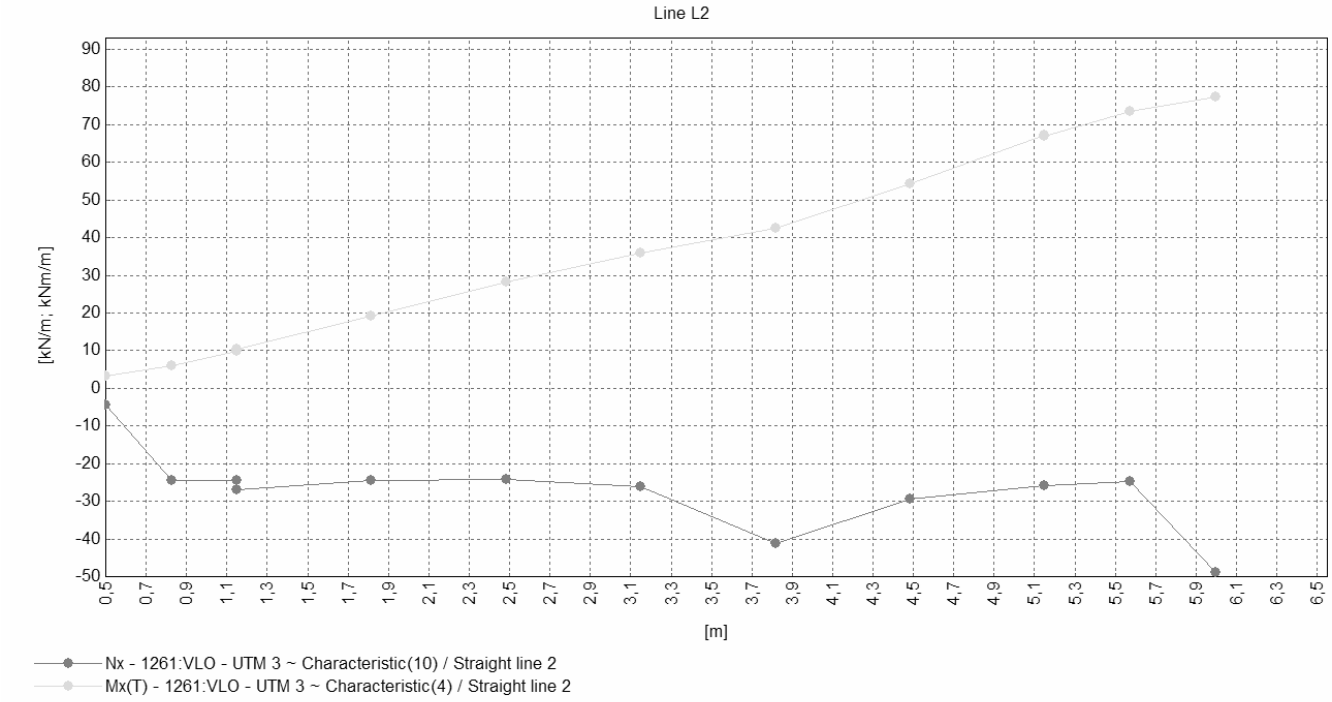
12.1.2 Diagram

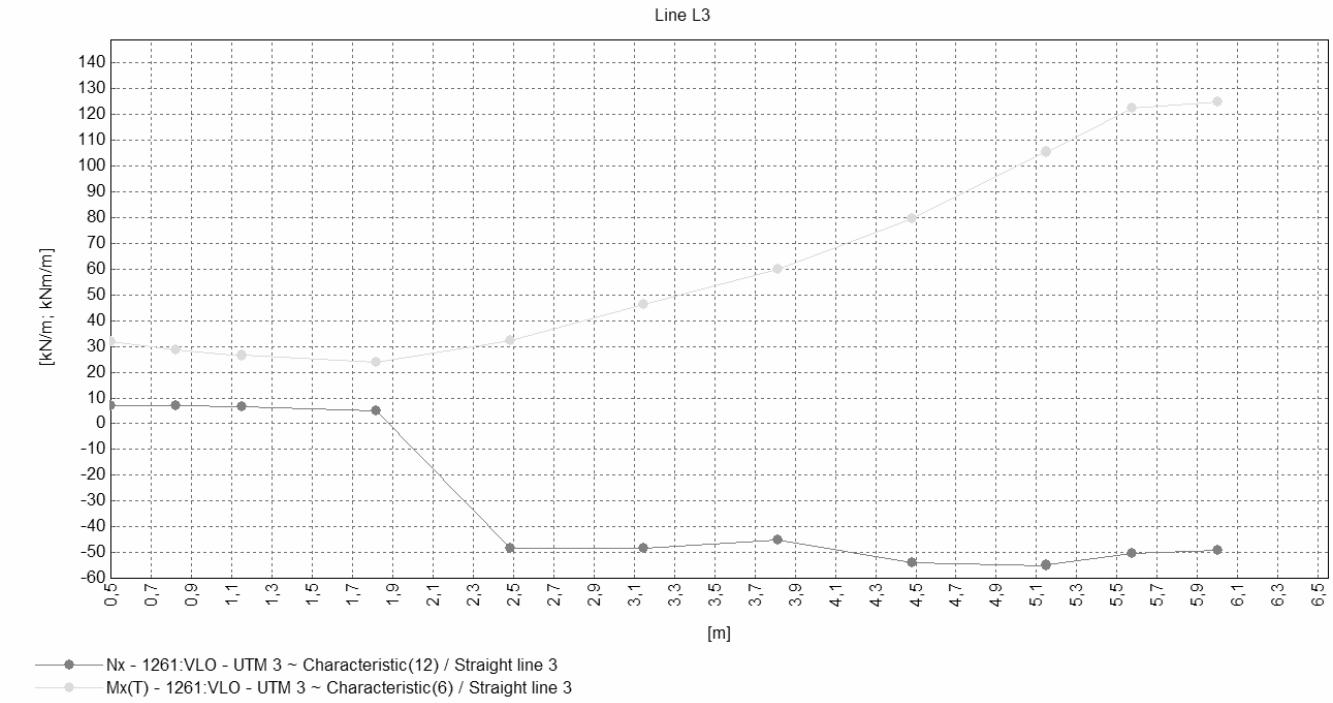





Line L3
7
2
-3
-8
-13
-18
-23
-28
-33
-38
-43
-48
-53
[kN/m; kNm/m]
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
[m]
Nx - 1262:VLO - UTM 3 ~ Characteristic(12) / Straight line 3
Mx(B) - 1262:VLO - UTM 3 ~ Characteristic(6) / Straight line 3


Line L1
[kN/m; kNm/m]
[m]
Nx - 1261:VLO - UTM 3 ~ Characteristic(8) / Straight line 1
Mx(T) - 1261:VLO - UTM 3 ~ Characteristic(2) / Straight line 1


Line L2
[kN/m; kNm/m]
[m]
Nx - 1261:VLO - UTM 3 ~ Characteristic(10) / Straight line 2
Mx(T) - 1261:VLO - UTM 3 ~ Characteristic(4) / Straight line 2


Line L3
[kN/m; kNm/m]
[m]
Nx - 1261:VLO - UTM 3 ~ Characteristic(12) / Straight line 3
Mx(T) - 1261:VLO - UTM 3 ~ Characteristic(6) / Straight line 3

12.1.3 Table

Line 1:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-36	-30	32	7
0,83	-28	-30	29	7
1,15	-19	-29	26	7
1,15	-19	-30	27	7
1,82	-12	-7	24	5
2,48	-9	-4	32	-48
3,15	-13	5	46	-48
3,82	-18	3	60	-45
4,48	-23	2	80	-54
5,15	-28	-52	106	-55
5,15	-28	-52	105	-55
5,58	-34	-53	122	-50
6,00	-42	-53	125	-49
m	kNm/m	kN/m	kNm/m	kN/m

Line 2:

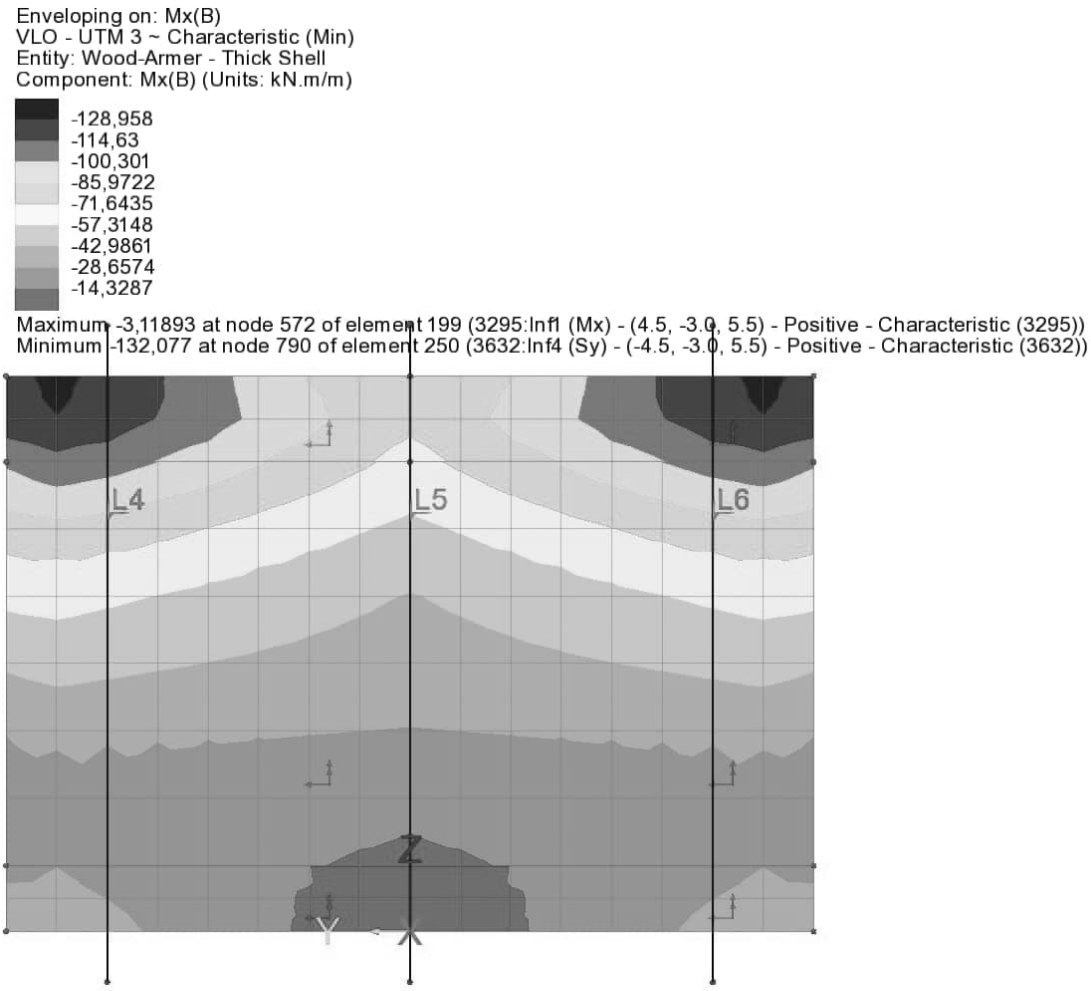
s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-2	-38	3	-4
0,83	-2	-27	6	-25
1,15	-3	-27	10	-25
1,15	-3	-27	10	-27
1,82	-6	-26	19	-25
2,48	-8	2	28	-24
3,15	-10	2	36	-26
3,82	-12	2	42	-41
4,48	-12	2	54	-29
5,15	-12	2	67	-26
5,15	-12	2	67	-26
5,58	-12	-53	74	-25
6,00	-16	-55	77	-49
m	kNm/m	kN/m	kNm/m	kN/m

Line 3:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-36	-30	32	7
0,83	-28	-30	29	7
1,15	-19	-29	26	7
1,15	-19	-30	27	7
1,82	-12	-7	24	5
2,48	-9	-4	32	-48
3,15	-13	5	46	-48
3,82	-18	3	60	-45
4,48	-23	2	80	-54
5,15	-28	-52	106	-55
5,15	-28	-52	105	-55
5,58	-34	-53	122	-50
6,00	-42	-53	125	-49
m	kNm/m	kN/m	kNm/m	kN/m

12.2 ABUTEMENT 2

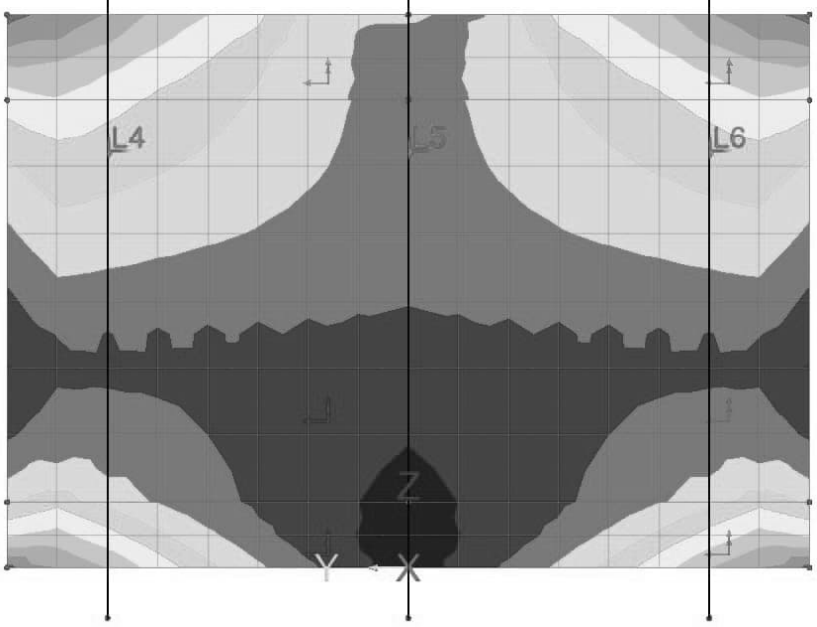
12.2.1 Contour



Enveloping on: Mx(T)
VLO - UTM 3 ~ Characteristic (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)

5,17576
10,3515
15,5273
20,703
25,8788
31,0545
36,2303
41,4061
46,5818

Maximum 48,6712 at node 552 of element 185 (3399:Inf2 (My) - (-1.5, 0.0, 5.5) - (Element 653, Element 654) - Positive - Characteristic (3399))
Minimum 2,08937 at node 572 of element 199 (3220:Inf1 (Mx) - (-6.175, 3.0, 5.5) - Negative - Characteristic (3220))



12.2.2 Digram

Compare abutement 1.

12.2.3 Table

Compare abutement 1.

13. ULS - Min Mx(B)/Max Mx(T)

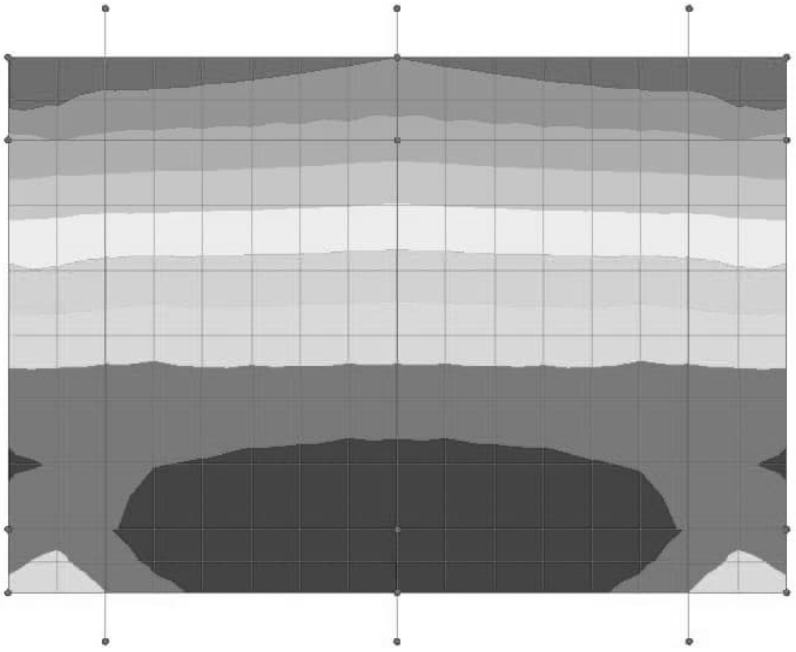
13.1 ABUTEMENT 1

13.1.1 Contour

Combining on: Mx(T)
ULS (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)

0,0
128,114
256,228
384,342
512,455
640,569
768,683
896,797
1,02491E3

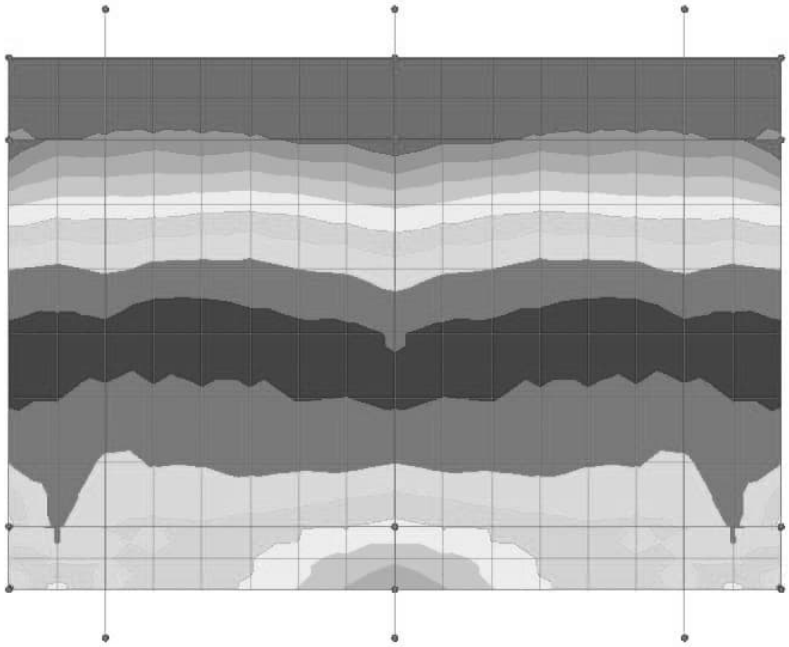
Maximum 1,15302E3 at node 250 of element 76
Minimum 0,0 at node 24 of element 23



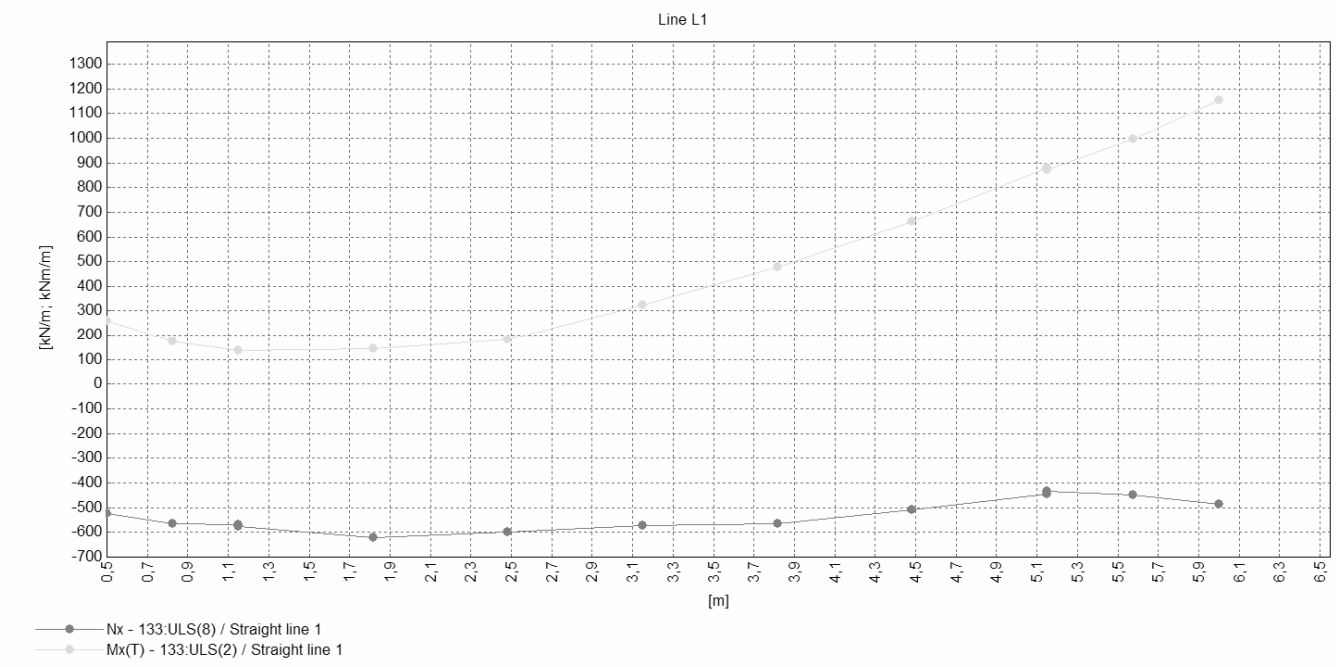
Combining on: Mx(B)
ULS (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)

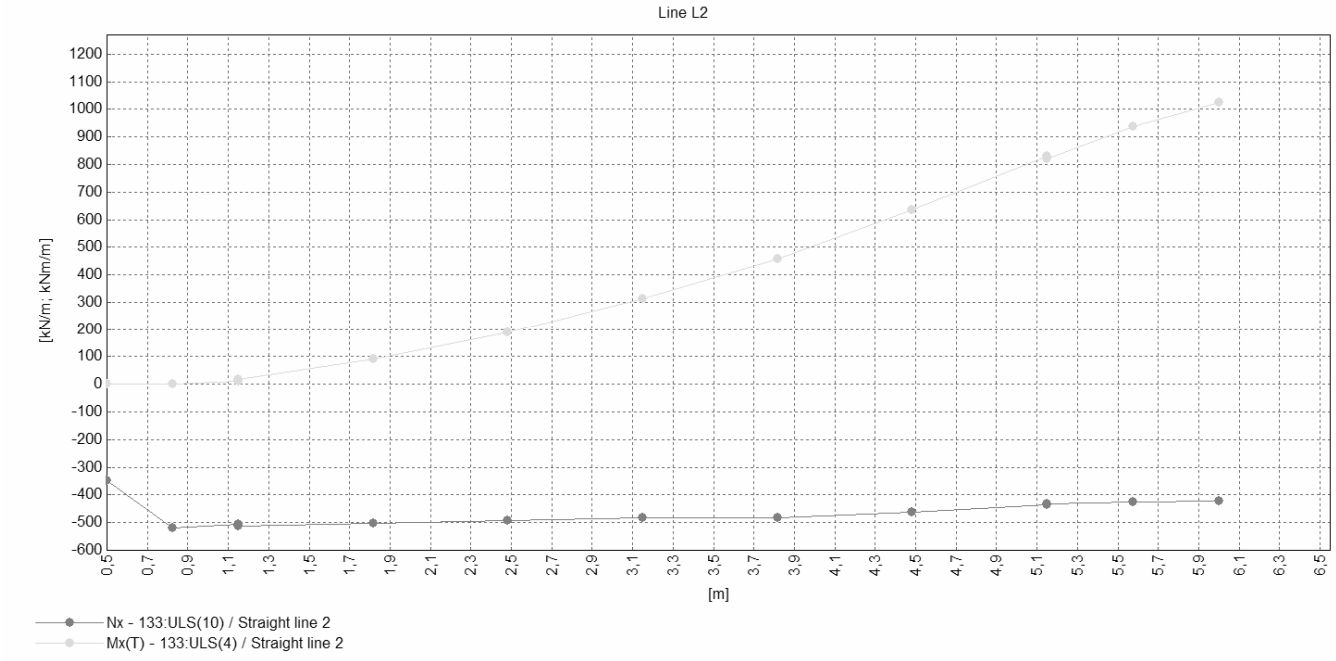
-228,089
-202,746
-177,402
-152,059
-126,716
-101,373
-76,0296
-50,6864
-25,3432

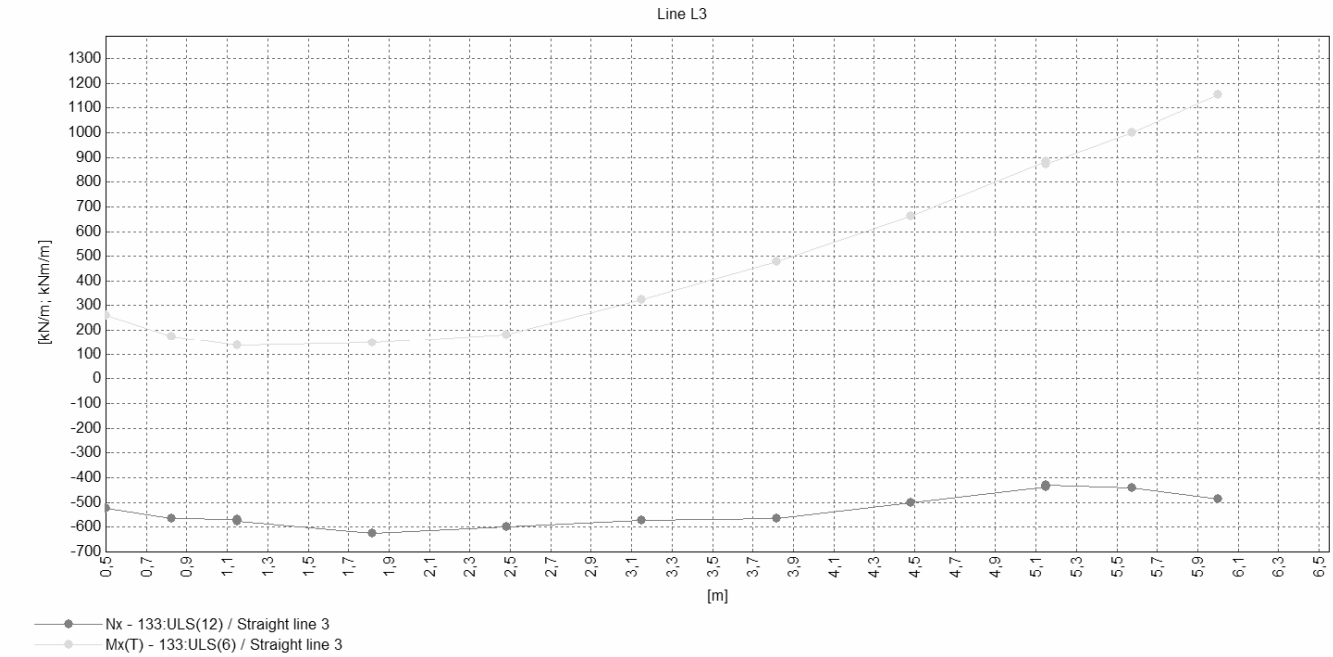
Maximum 0,0 at node 79 of element 30
Minimum -228,089 at node 130 of element 39

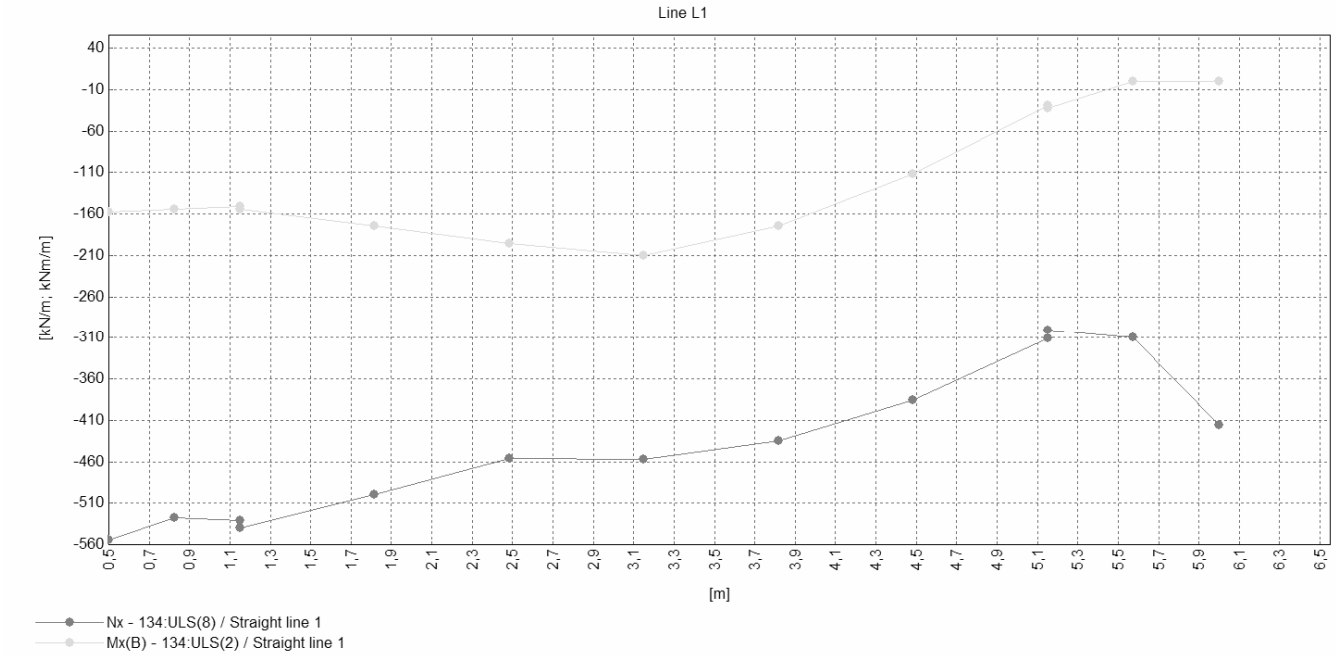


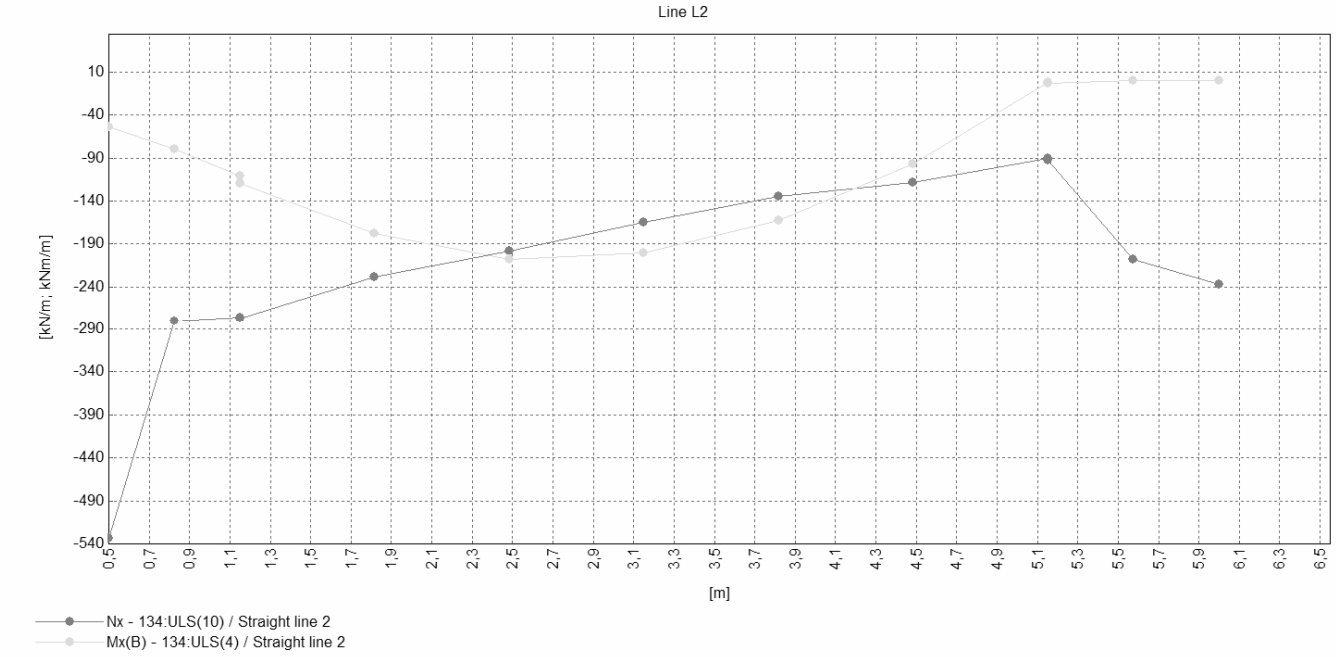
13.1.2 Diagram

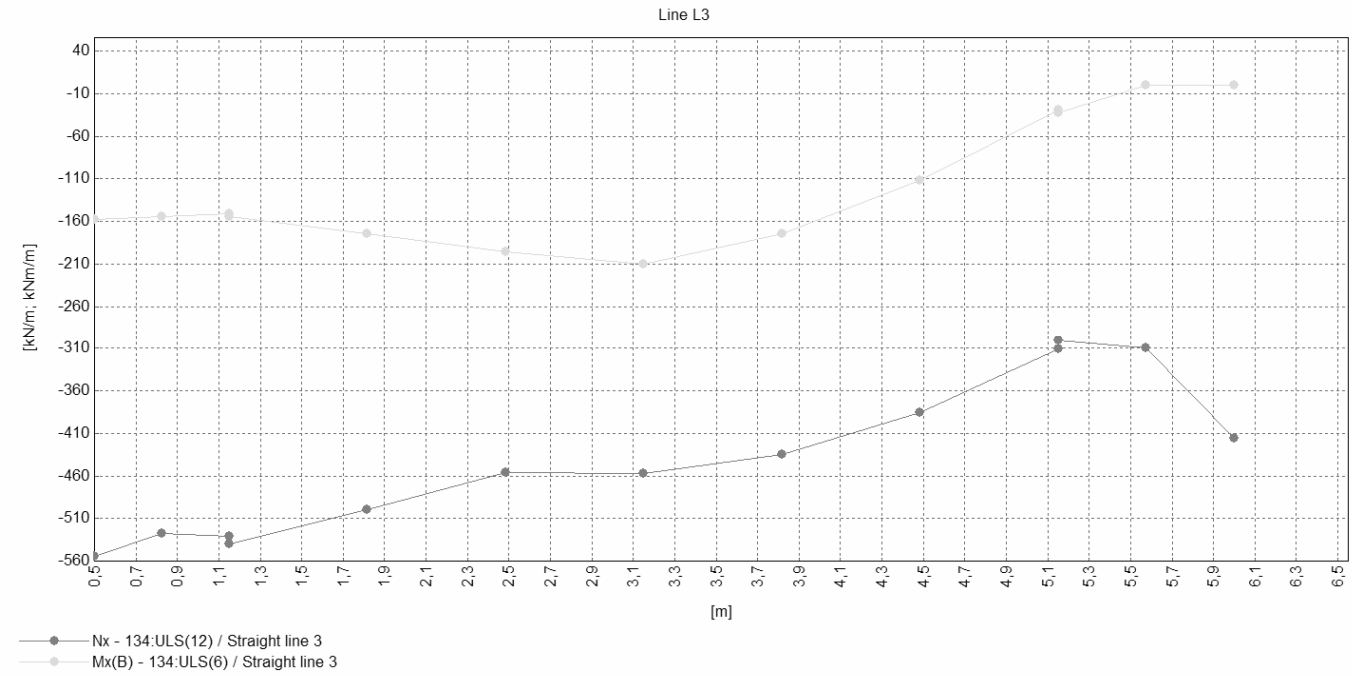





Line L3
[kN/m; kNm/m]
[m]
Nx - 133:ULS(12) / Straight line 3
Mx(T) - 133:ULS(6) / Straight line 3


Line L1
[kN/m; kNm/m]
[m]
Nx - 134:ULS(8) / Straight line 1
Mx(B) - 134:ULS(2) / Straight line 1


Line L2
[kN/m; kNm/m]
[m]
Nx - 134:ULS(10) / Straight line 2
Mx(B) - 134:ULS(4) / Straight line 2


Line L3
40
-10
-60
-110
-160
-210
-260
-310
-360
-410
-460
-510
-560
[kN/m; kNm/m]
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
[m]
Nx - 134:ULS(12) / Straight line 3
Mx(B) - 134:ULS(6) / Straight line 3

13.1.3 Tables

Line 1:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-158	-554	261	-522
0,83	-154	-527	176	-564
1,15	-151	-531	136	-570
1,15	-155	-540	138	-575
1,82	-174	-500	144	-620
2,48	-196	-456	182	-599
3,15	-210	-458	325	-573
3,82	-174	-435	478	-564
4,48	-112	-385	663	-509
5,15	-29	-311	881	-444
5,15	-32	-300	871	-434
5,58	0	-310	997	-448
6,00	0	-416	1153	-486
m	kNm/m	kN/m	kNm/m	kN/m

Line 2:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-53	-534	0	-349
0,83	-80	-280	0	-520
1,15	-111	-276	12	-506
1,15	-119	-276	19	-513
1,82	-178	-229	91	-502
2,48	-208	-198	191	-493
3,15	-201	-164	315	-481
3,82	-163	-134	457	-484
4,48	-97	-119	634	-462
5,15	-2	-91	832	-435
5,15	-3	-92	820	-433
5,58	0	-208	938	-426
6,00	0	-237	1026	-421
m	kNm/m	kN/m	kNm/m	kN/m

Line 3:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-158	-554	261	-522
0,83	-154	-527	176	-564
1,15	-151	-531	136	-570
1,15	-155	-540	138	-575
1,82	-174	-500	148	-626
2,48	-196	-456	182	-599
3,15	-210	-458	325	-573
3,82	-174	-435	478	-564
4,48	-112	-385	664	-503
5,15	-29	-311	883	-438
5,15	-32	-300	872	-428
5,58	0	-310	999	-442
6,00	0	-416	1153	-486
m	kNm/m	kN/m	kNm/m	kN/m

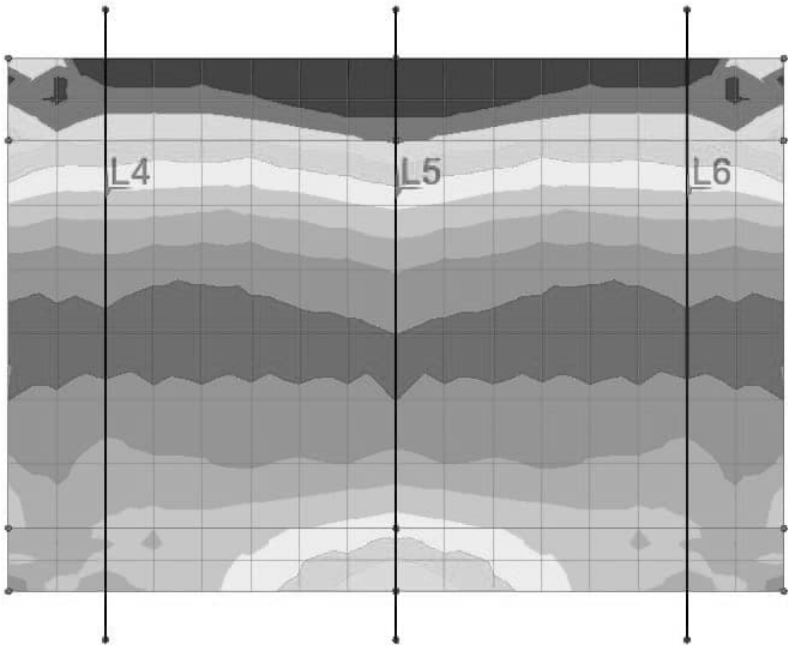
13.2 ABUTEMENT 2

13.2.1 Contour

Combining on: Mx(T)
ULS (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)

0,0
28,384
56,768
85,152
113,536
141,92
170,304
198,688
227,072

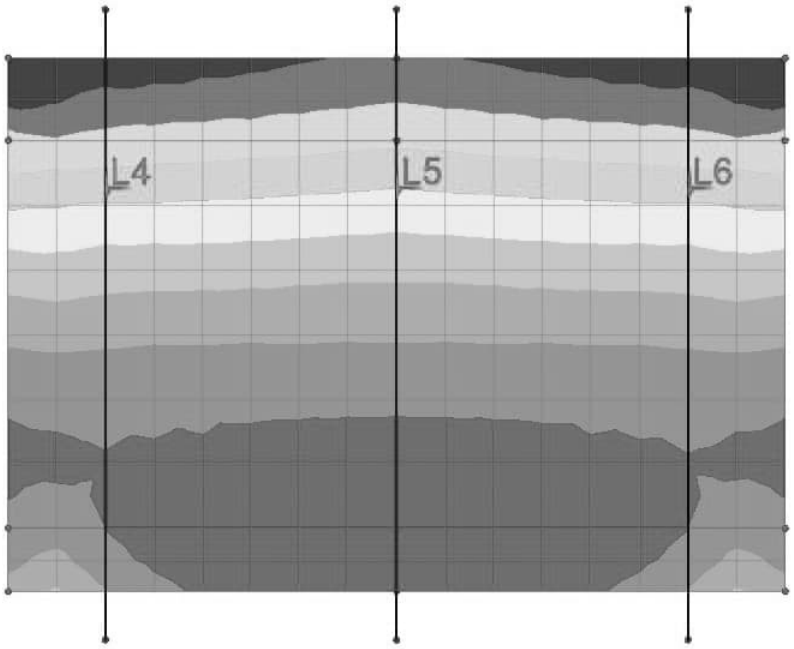
Maximum 255,456 at node 679 of element 215
Minimum 0,0 at node 786 of element 264



Combining on: Mx(B)
ULS (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)

-1,09826E3
-976,234
-854,205
-732,176
-610,146
-488,117
-366,088
-244,059
-122,029

Maximum 0,0 at node 556 of element 200
Minimum -1,09826E3 at node 792 of element 252



13.2.2 Diagram

Compare abutement 1.

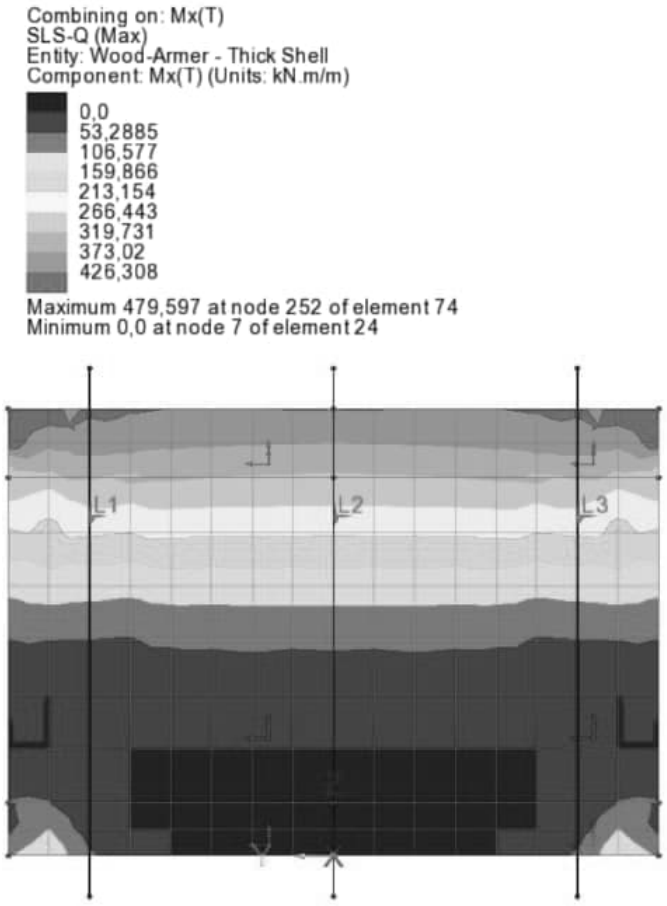
13.2.3 Tables

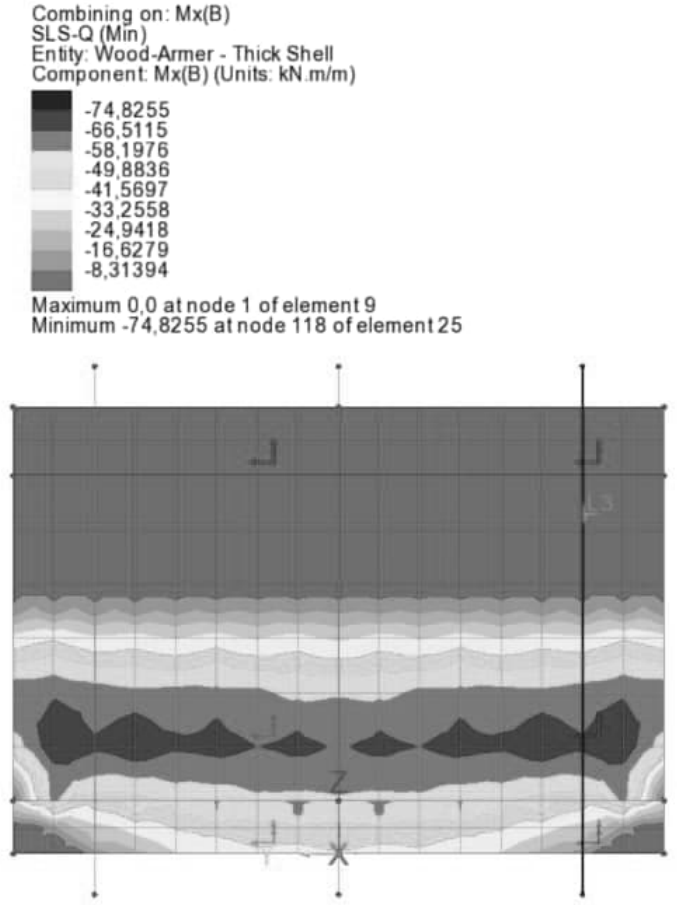
Compare abutement 1.

14. SLS:Q - Min Mx(B)/Max Mx(T)

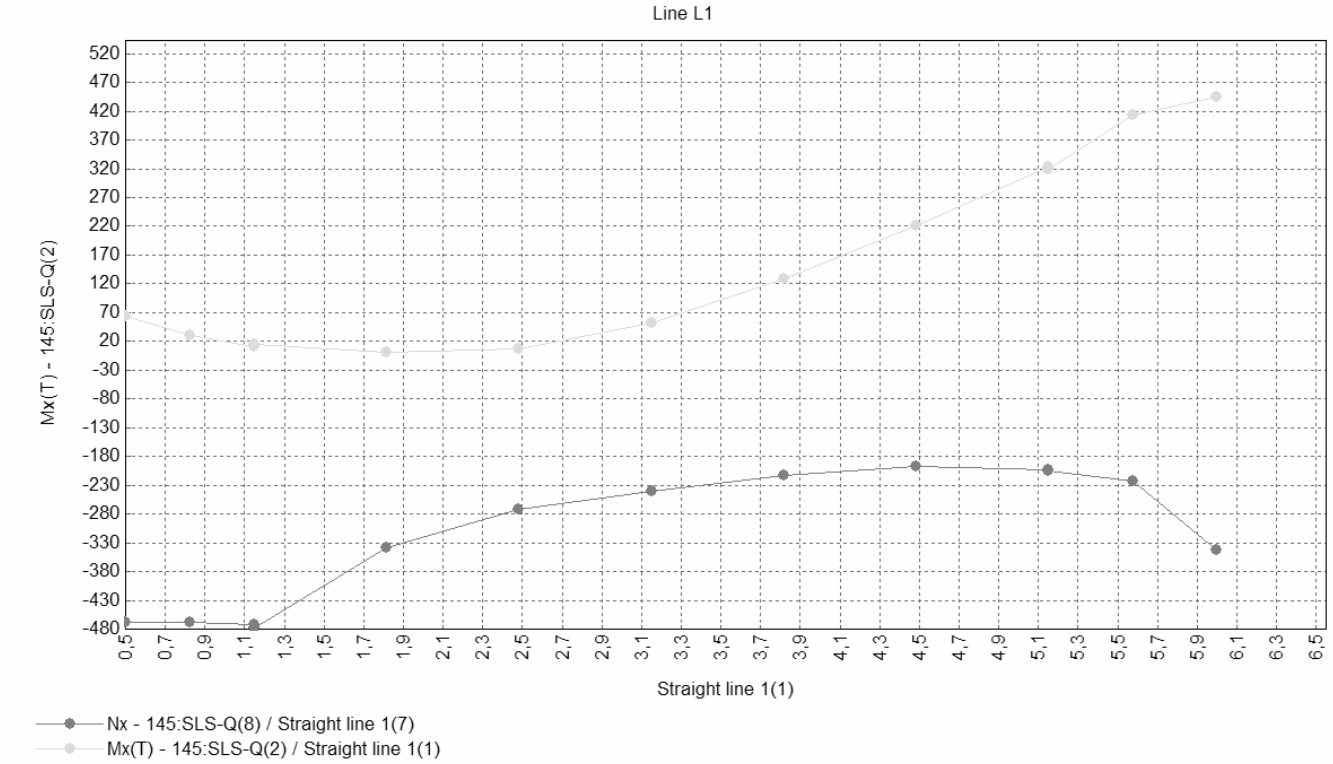
14.1 ABUTEMENT 1

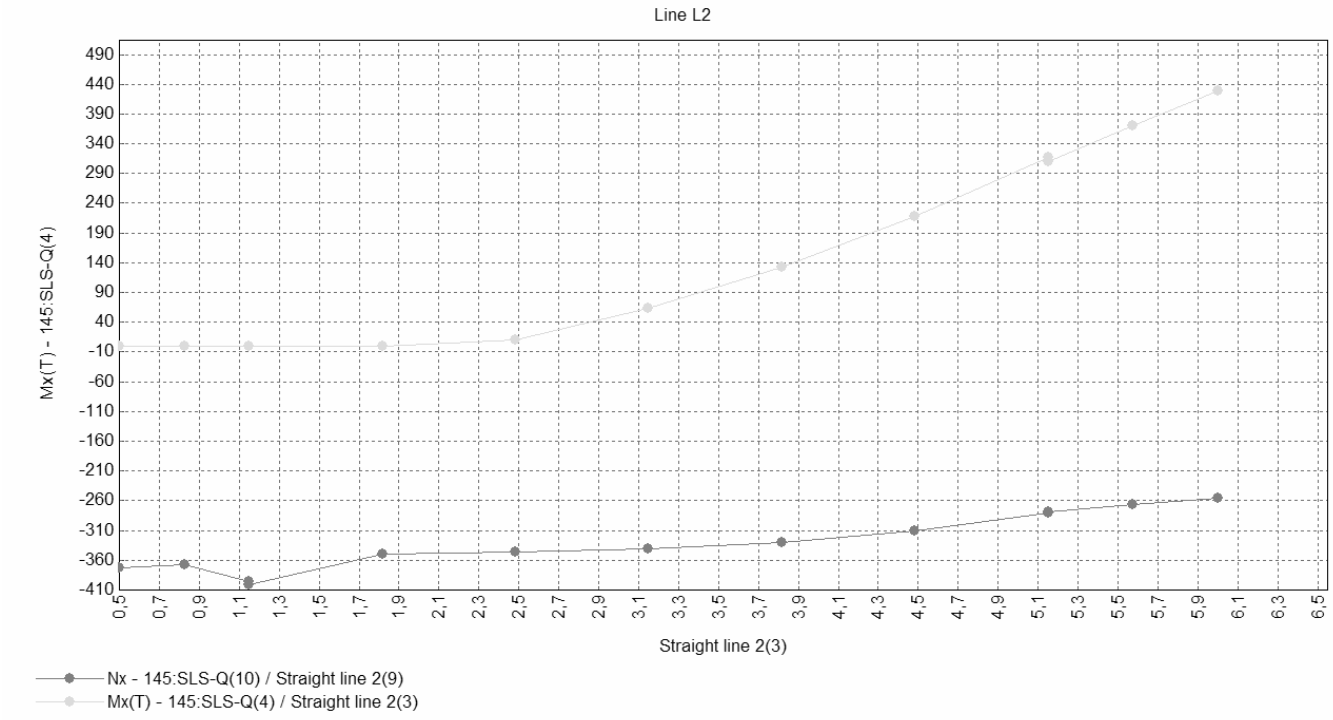
14.1.1 Contour

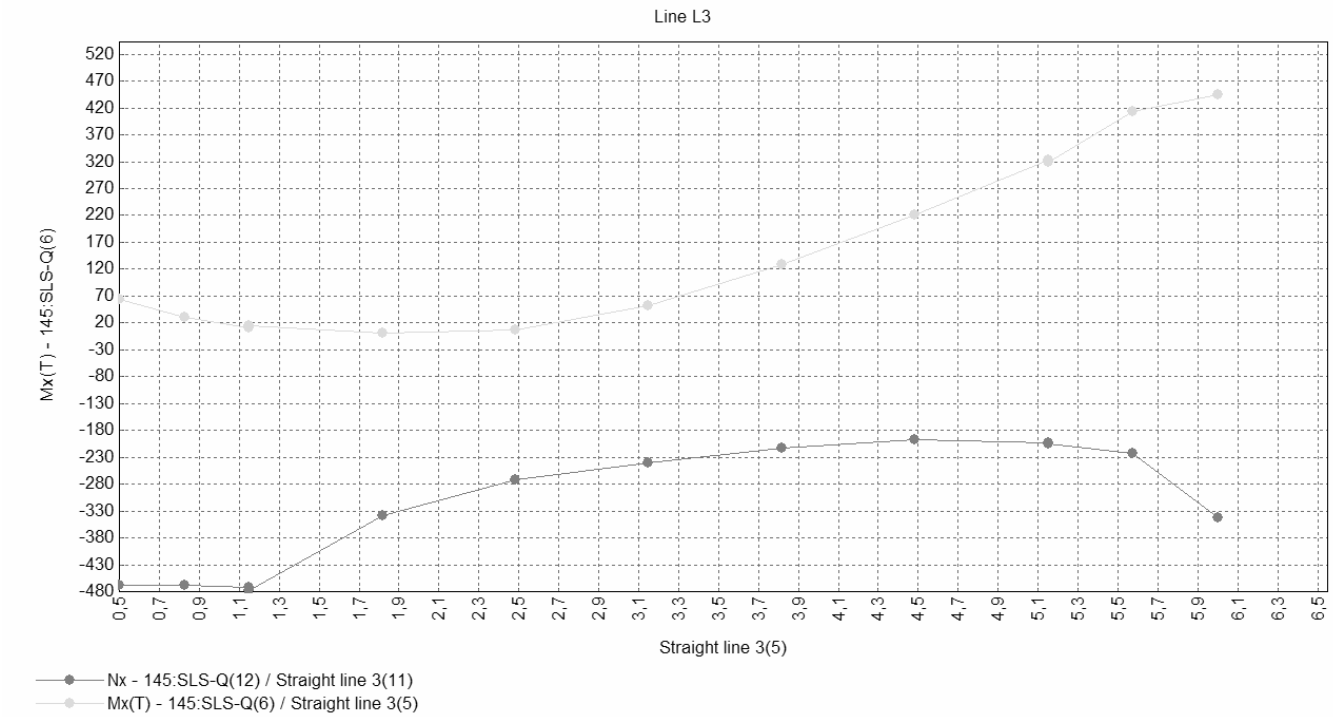


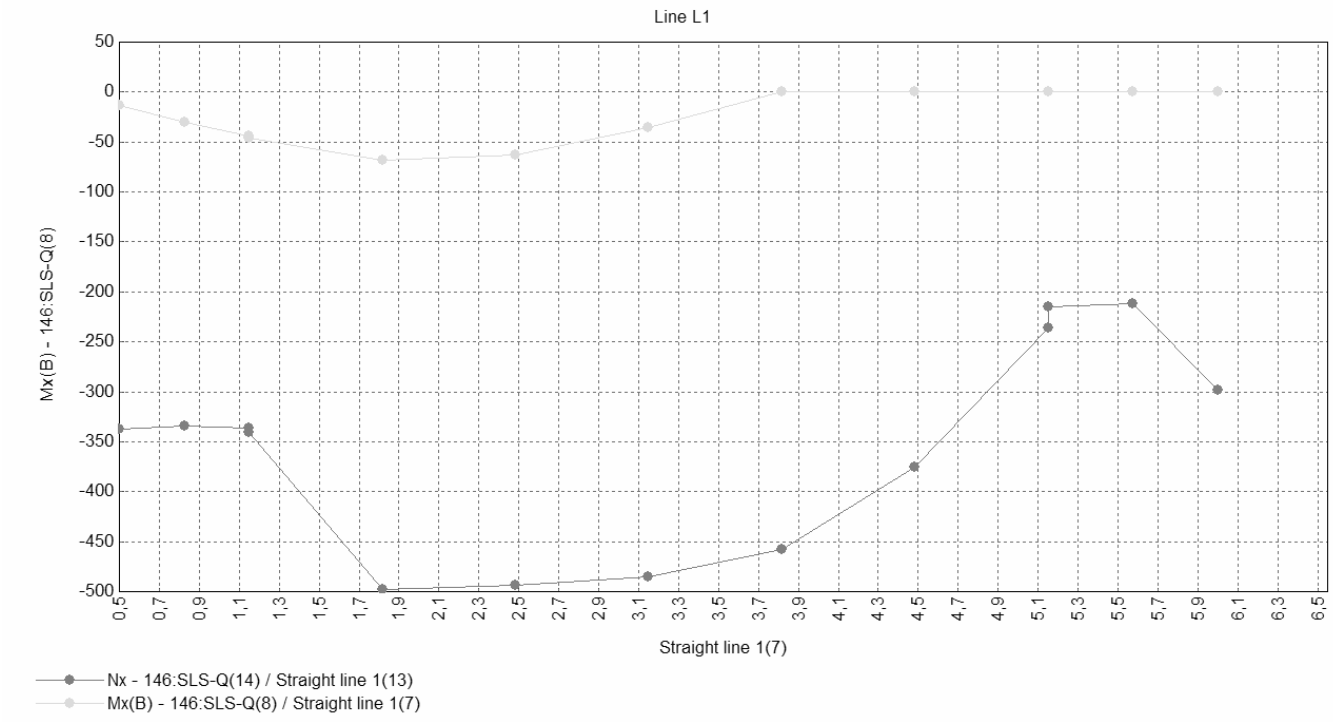

Combining on: Mx(B)
SLS-Q (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)
-74,8255
-66,5115
-58,1976
-49,8836
-41,5697
-33,2558
-24,9418
-16,6279
-8,31394
Maximum 0,0 at node 1 of element 9
Minimum -74,8255 at node 118 of element 25

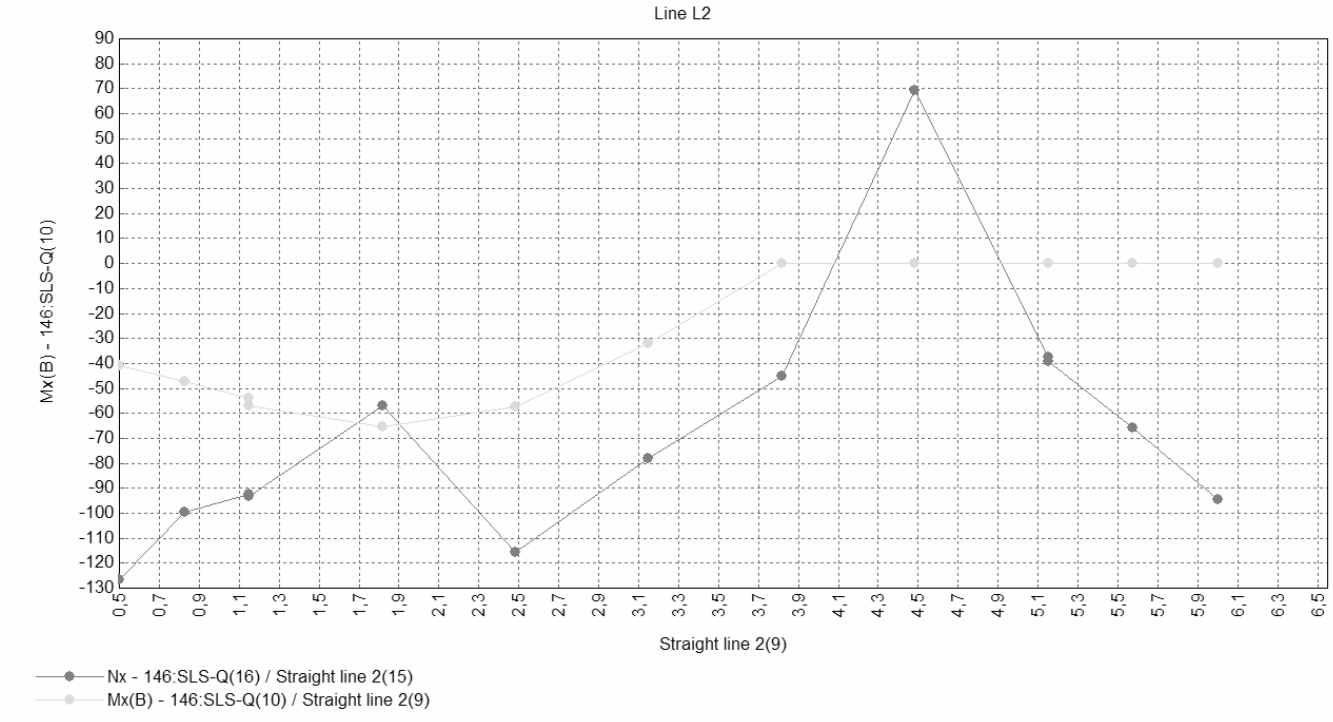
14.1.2 Diagram

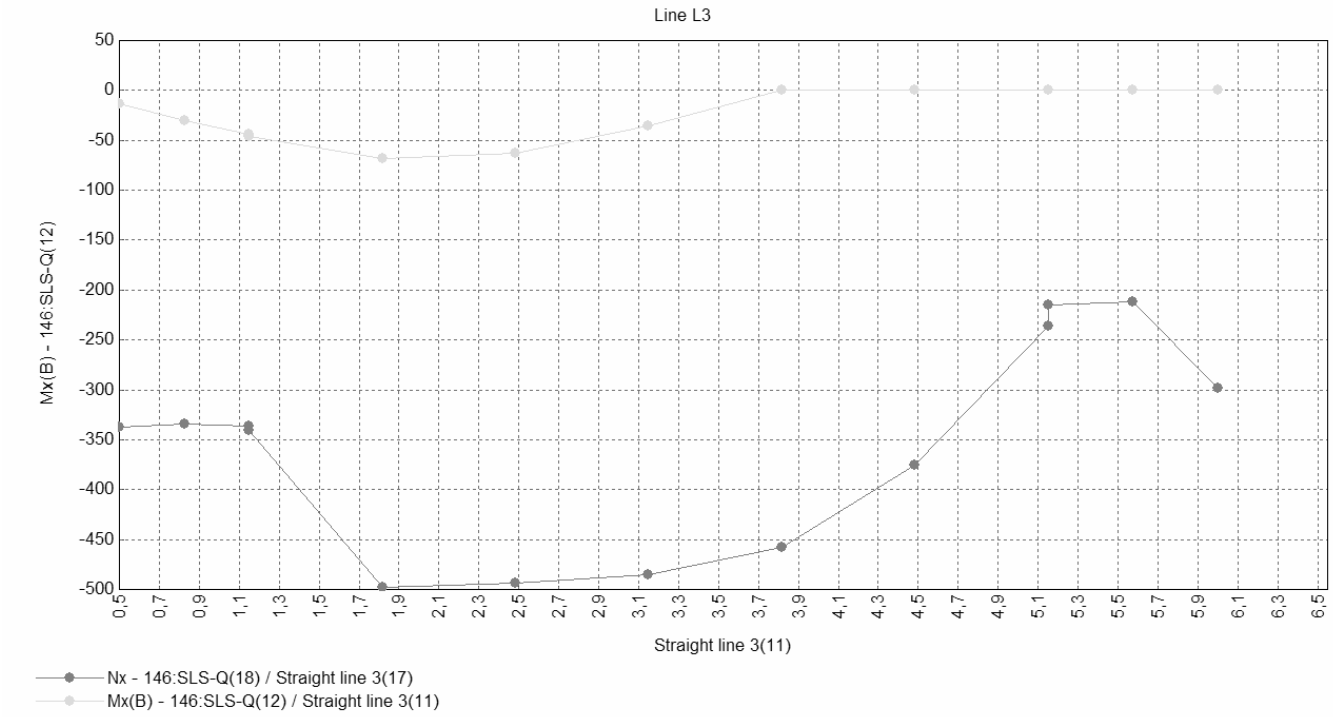





Line L3
Mx(T) - 145:SLS-Q(6)
520
470
420
370
320
270
220
170
120
70
20
-30
-80
-130
-180
-230
-280
-330
-380
-430
-480
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
Straight line 3(5)
Nx - 145:SLS-Q(12) / Straight line 3(11)
Mx(T) - 145:SLS-Q(6) / Straight line 3(5)


Line L1
Mx(B) - 146:SLS-Q(8)
Straight line 1(7)
Nx - 146:SLS-Q(14) / Straight line 1(13)
Mx(B) - 146:SLS-Q(8) / Straight line 1(7)


Line L2
Mx(B) - 146:SLS-Q(10)
Straight line 2(9)
Nx - 146:SLS-Q(16) / Straight line 2(15)
Mx(B) - 146:SLS-Q(10) / Straight line 2(9)


Line L3
Mx(B) - 146:SLS-Q(12)
Straight line 3(11)
Nx - 146:SLS-Q(18) / Straight line 3(17)
Mx(B) - 146:SLS-Q(12) / Straight line 3(11)

15.1.3 Tables

Line 1:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-14	-363	63	-467
0,83	-22	-359	30	-467
1,15	-27	-364	11	-473
1,15	-29	-371	14	-479
1,82	-36	-526	1	-338
2,48	-24	-525	7	-273
3,15	0	-519	52	-241
3,82	0	-490	129	-212
4,48	0	-396	220	-197
5,15	0	-239	323	-202
5,15	0	-215	319	-205
5,58	0	-215	413	-224
6,00	0	-263	444	-343
m	kNm/m	kN/m	kNm/m	kN/m

Line 2:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-41	-127	0	-372
0,83	-47	-100	0	-367
1,15	-54	-92	0	-397
1,15	-57	-93	0	-401
1,82	-65	-57	0	-350
2,48	-57	-116	10	-346
3,15	-32	-78	64	-341
3,82	0	-45	133	-330
4,48	0	69	218	-311
5,15	0	-37	316	-281
5,15	0	-39	311	-279
5,58	0	-66	370	-266
6,00	0	-94	428	-255
m	kNm/m	kN/m	kNm/m	kN/m

Line 3:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-13	-337	63	-467
0,83	-30	-334	30	-467
1,15	-44	-336	11	-473
1,15	-46	-341	14	-479
1,82	-68	-498	1	-338
2,48	-63	-493	7	-273
3,15	-35	-486	52	-241
3,82	0	-458	129	-212
4,48	0	-375	220	-197
5,15	0	-236	323	-202
5,15	0	-215	319	-205
5,58	0	-212	413	-224
6,00	0	-299	444	-343
m	kNm/m	kN/m	kNm/m	kN/m

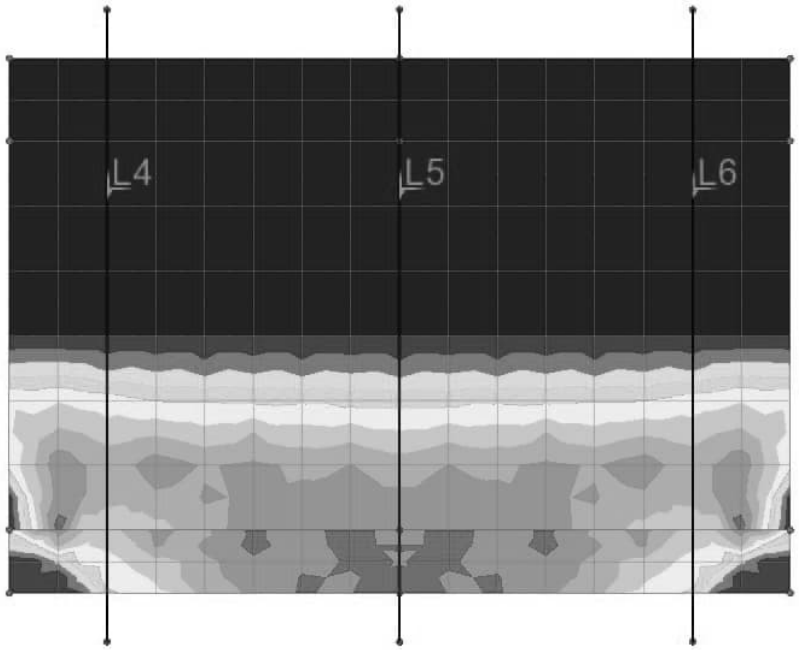
14.2 ABUTEMENT 2

14.2.1 Contour

Combining on: Mx(T)
SLS-Q (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)

0,0
5,36673
10,7335
16,1002
21,4669
26,8336
32,2004
37,5671
42,9338

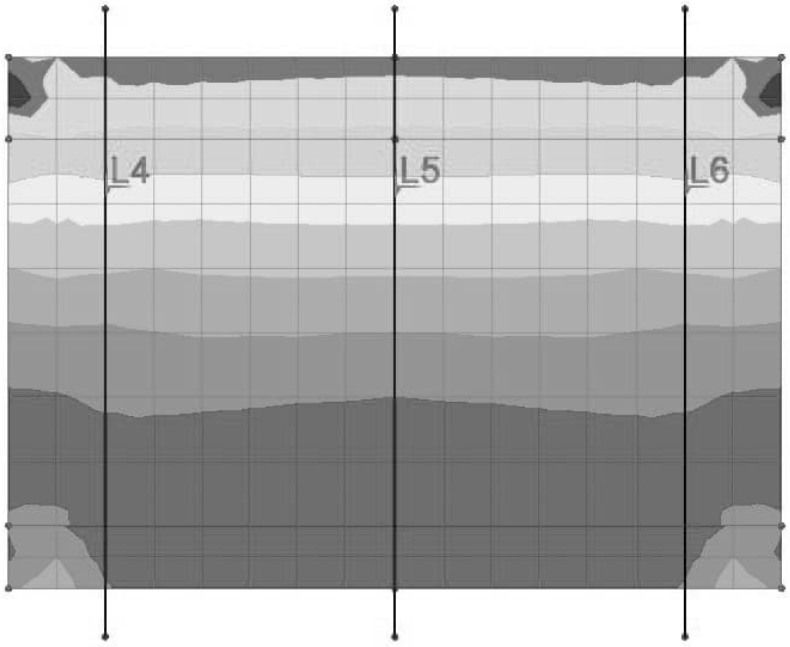
Maximum 48,3006 at node 626 of element 198
Minimum 0,0 at node 551 of element 201



Combining on: Mx(B)
SLS-Q (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)

-518,998
-461,331
-403,665
-345,999
-288,332
-230,666
-172,999
-115,333
-57,6664

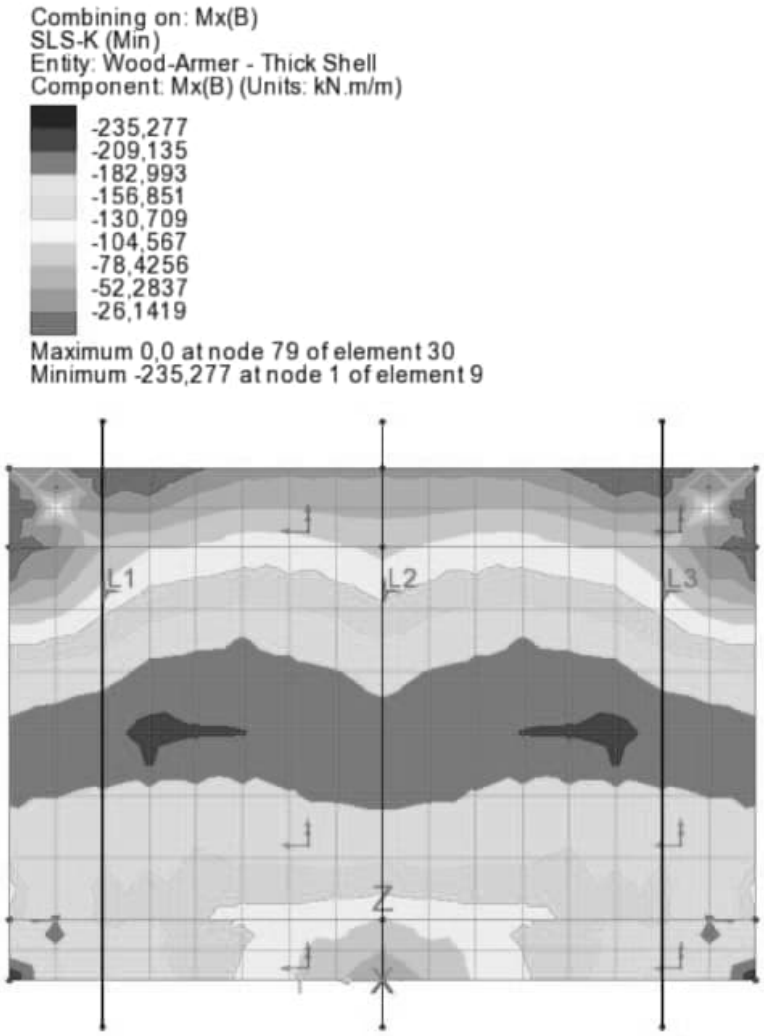
Maximum 0,0 at node 556 of element 200
Minimum -518,998 at node 787 of element 249



15. SLS:K- Min Mx(B)/Max Mx(T)

15.1 ABUTEMENT 1

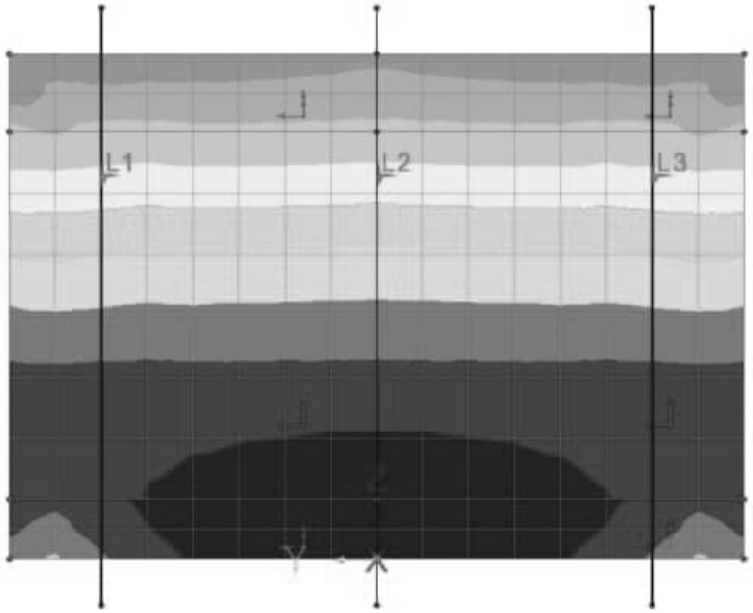
15.1.1 Contour

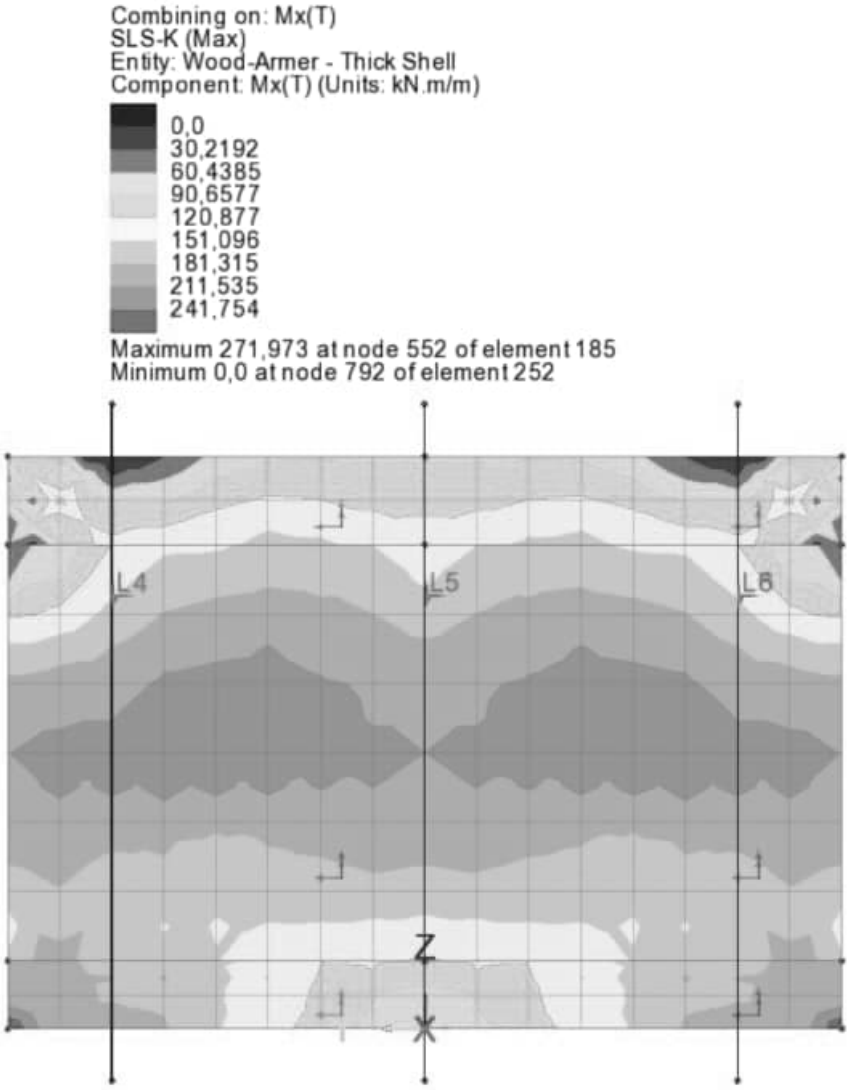


Combining on: Mx(T)
SLS-K (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)

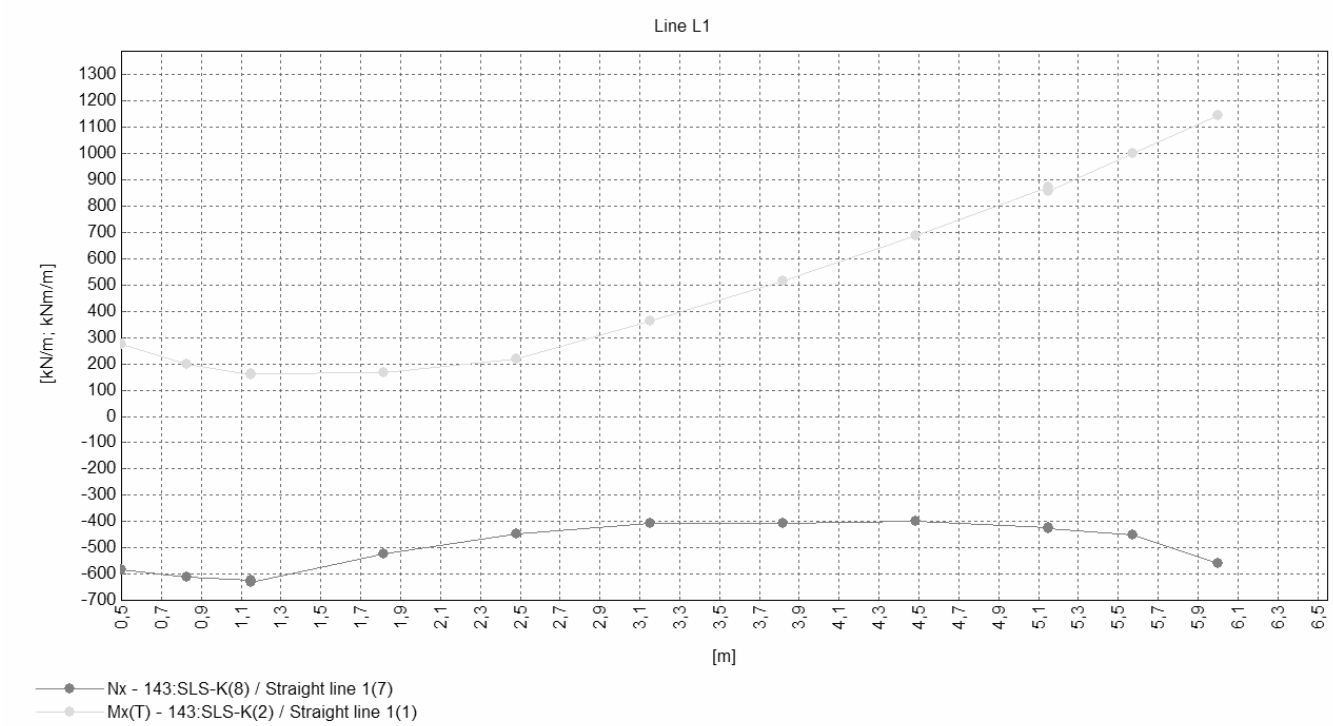
128,184
256,369
384,553
512,737
640,922
769,106
897,291
1,02547E3
1,15366E3

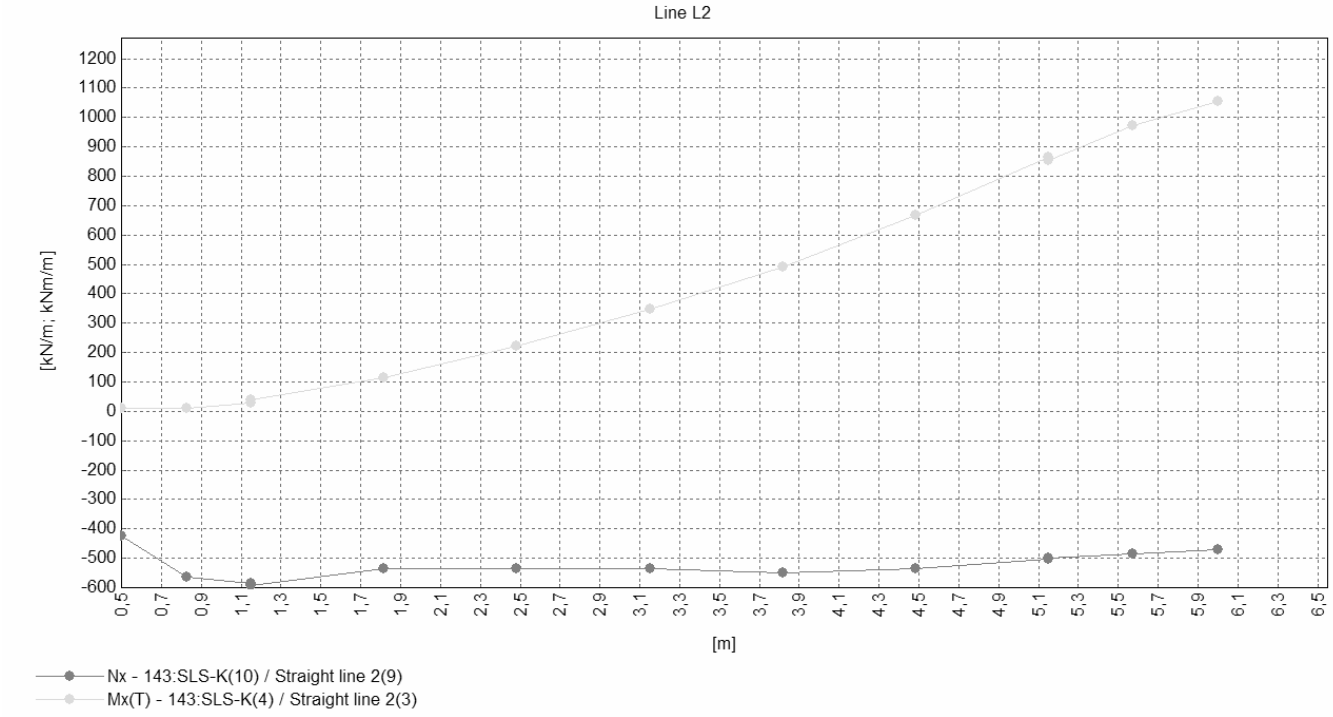
Maximum 1,16024E3 at node 252 of element 74
Minimum 6,57836 at node 24 of element 23

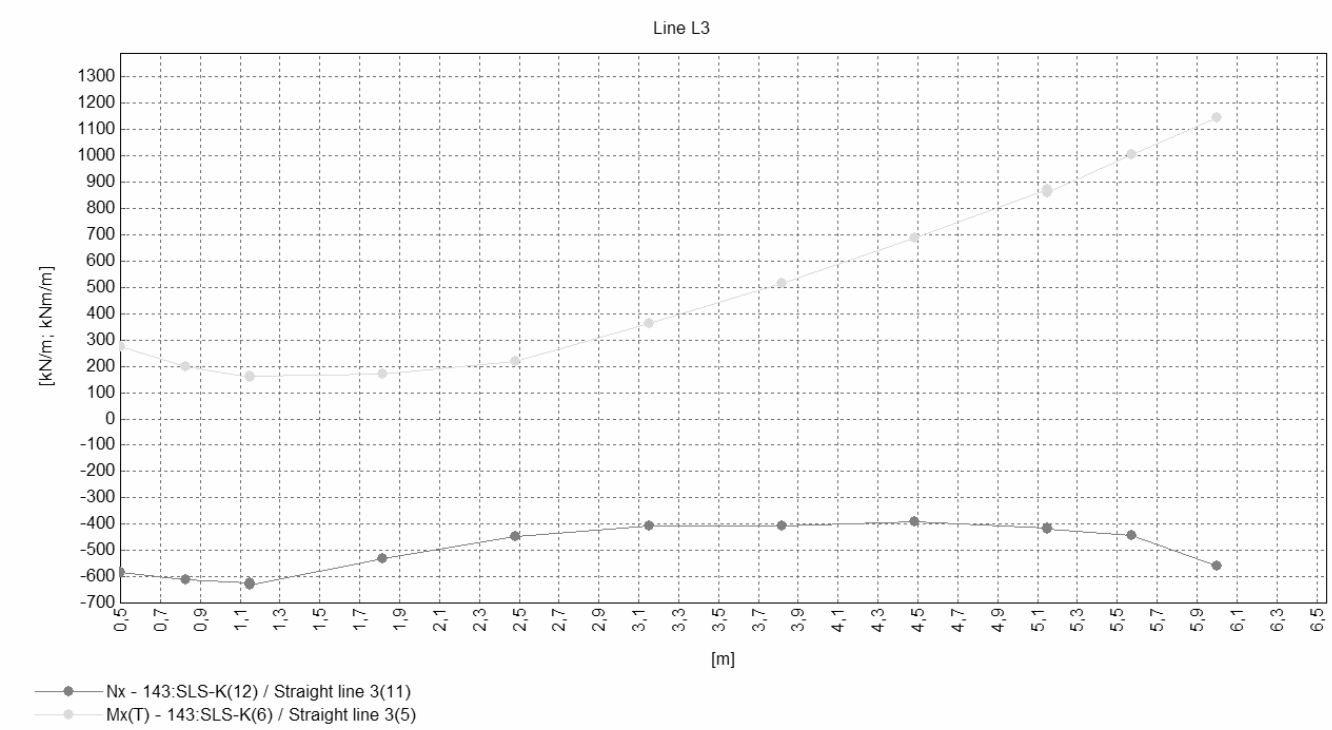


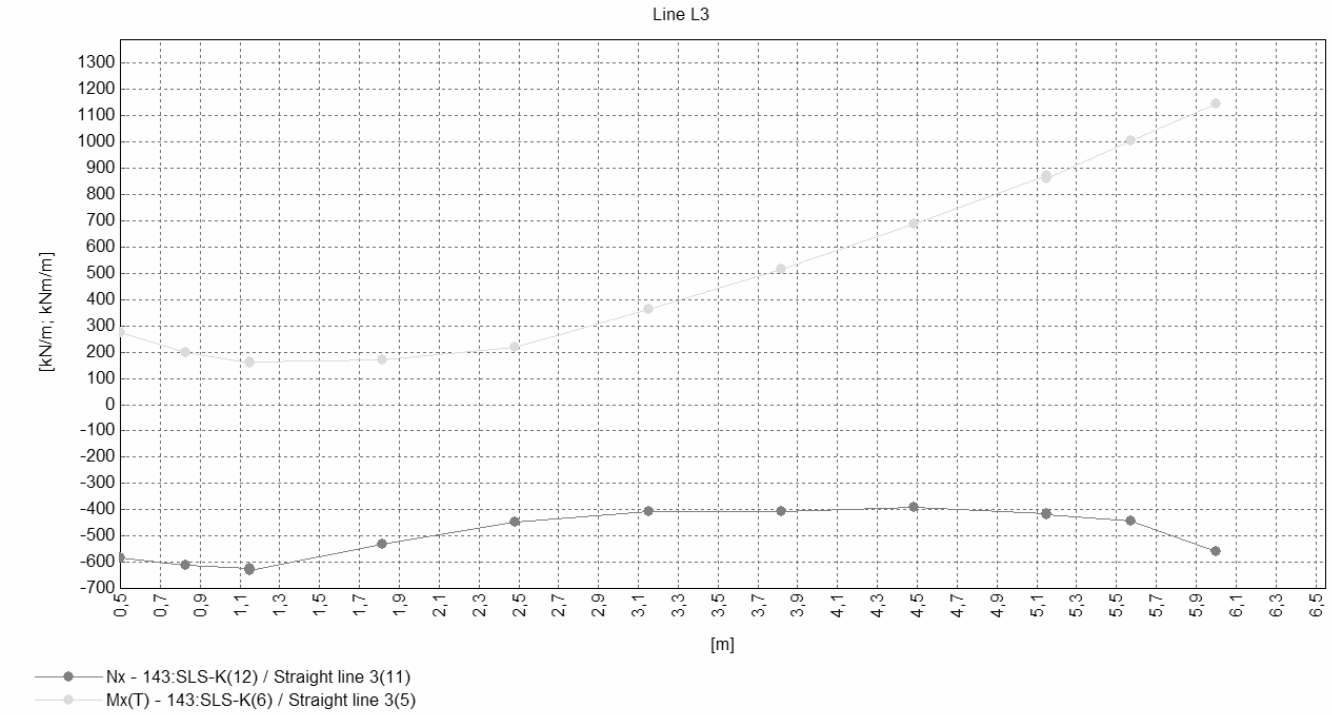

Combining on: Mx(T)
SLS-K (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)
0,0
30,2192
60,4385
90,6577
120,877
151,096
181,315
211,535
241,754
Maximum 271,973 at node 552 of element 185
Minimum 0,0 at node 792 of element 252
L4
L5
L6
Z
X

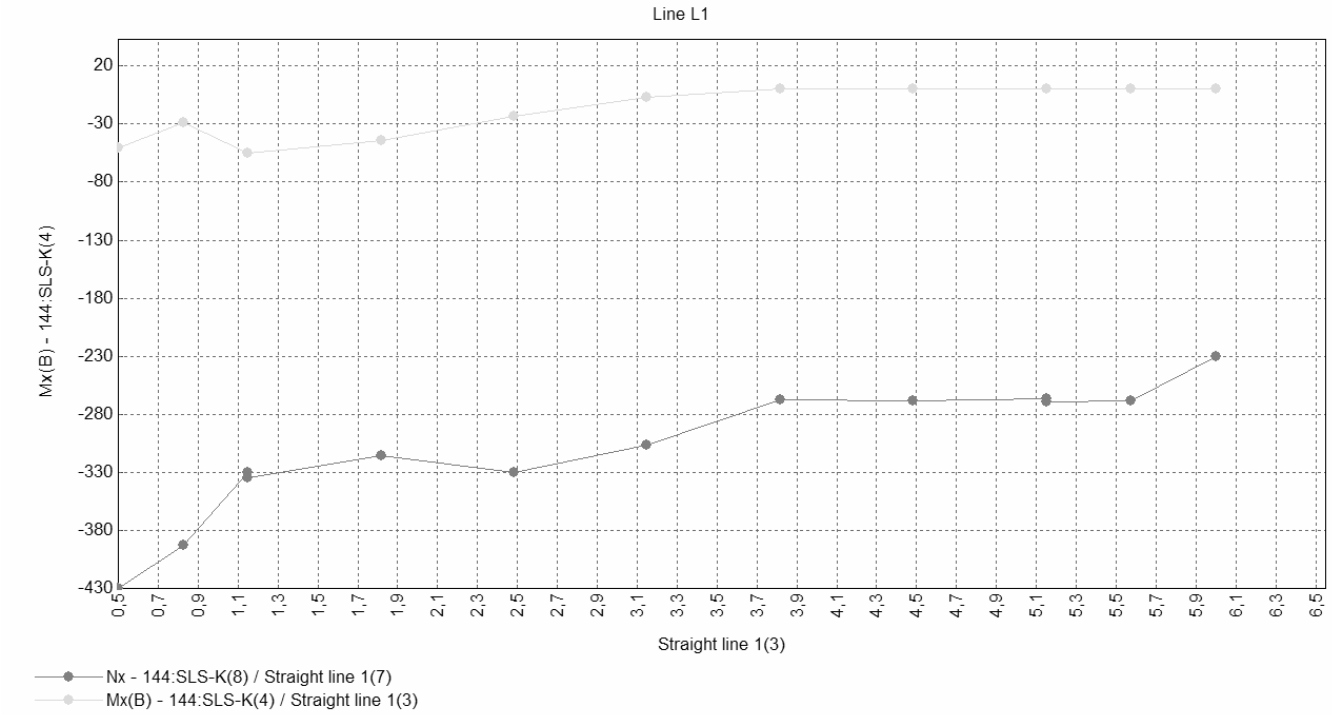
14.1.2 Diagram

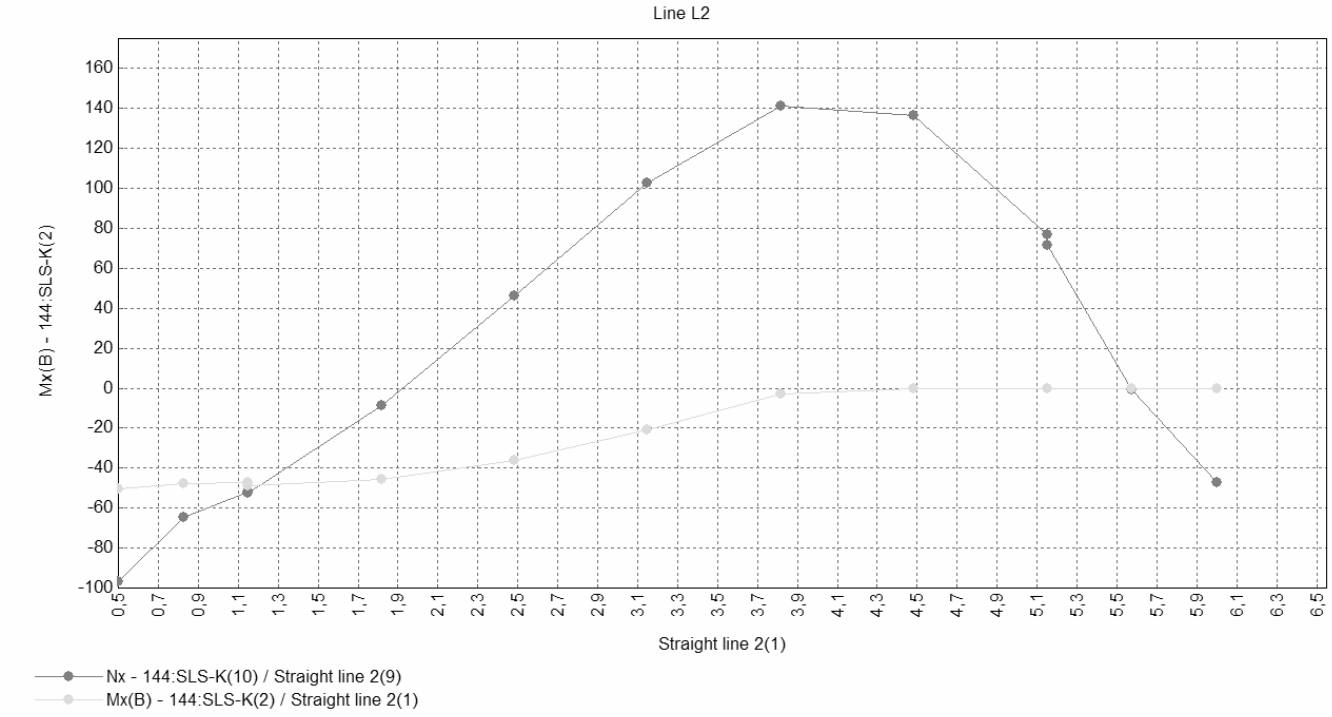


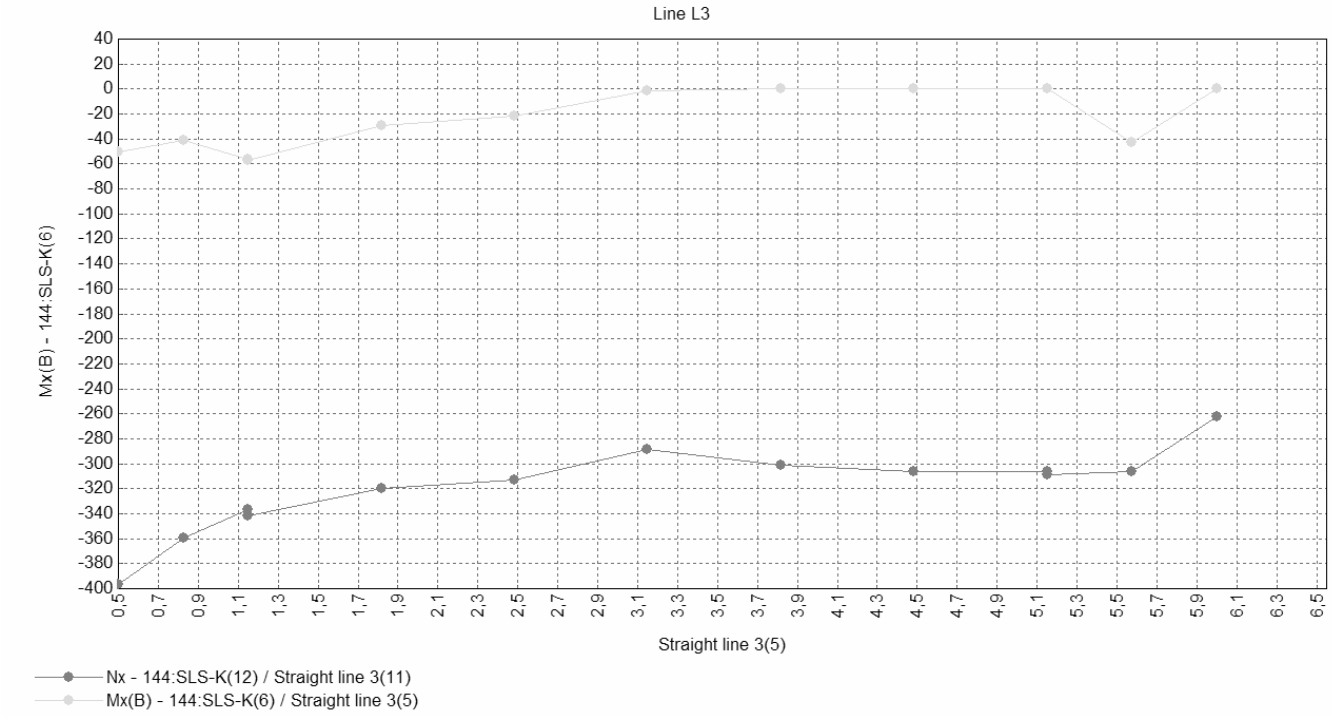



Line L3
[kN/m; kNm/m]
[m]
Nx - 143:SLS-K(12) / Straight line 3(11)
Mx(T) - 143:SLS-K(6) / Straight line 3(5)


Line L3
[kN/m; kNm/m]
[m]
Nx - 143:SLS-K(12) / Straight line 3(11)
Mx(T) - 143:SLS-K(6) / Straight line 3(5)


Line L1
Mx(B) - 144:SLS-K(4)
Straight line 1(3)
Nx - 144:SLS-K(8) / Straight line 1(7)
Mx(B) - 144:SLS-K(4) / Straight line 1(3)


Line L2
Mx(B) - 144:SLS-K(2)
Straight line 2(1)
Nx - 144:SLS-K(10) / Straight line 2(9)
Mx(B) - 144:SLS-K(2) / Straight line 2(1)


Line L3
Mx(B) - 144:SLS-K(6)
Straight line 3(5)
Nx - 144:SLS-K(12) / Straight line 3(11)
Mx(B) - 144:SLS-K(6) / Straight line 3(5)

15.1.3 Tables

Line 1:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-51	-430	277	-607
0,83	-29	-393	208	-639
1,15	-55	-330	177	-648
1,15	-55	-334	184	-654
1,82	-44	-316	209	-554
2,48	-23	-330	278	-524
3,15	-7	-306	429	-446
3,82	0	-267	575	-442
4,48	0	-268	731	-421
5,15	0	-267	904	-425
5,15	0	-269	891	-425
5,58	0	-268	1017	-449
6,00	0	-230	1154	-574
m	kNm/m	kN/m	kNm/m	kN/m

Line 2:

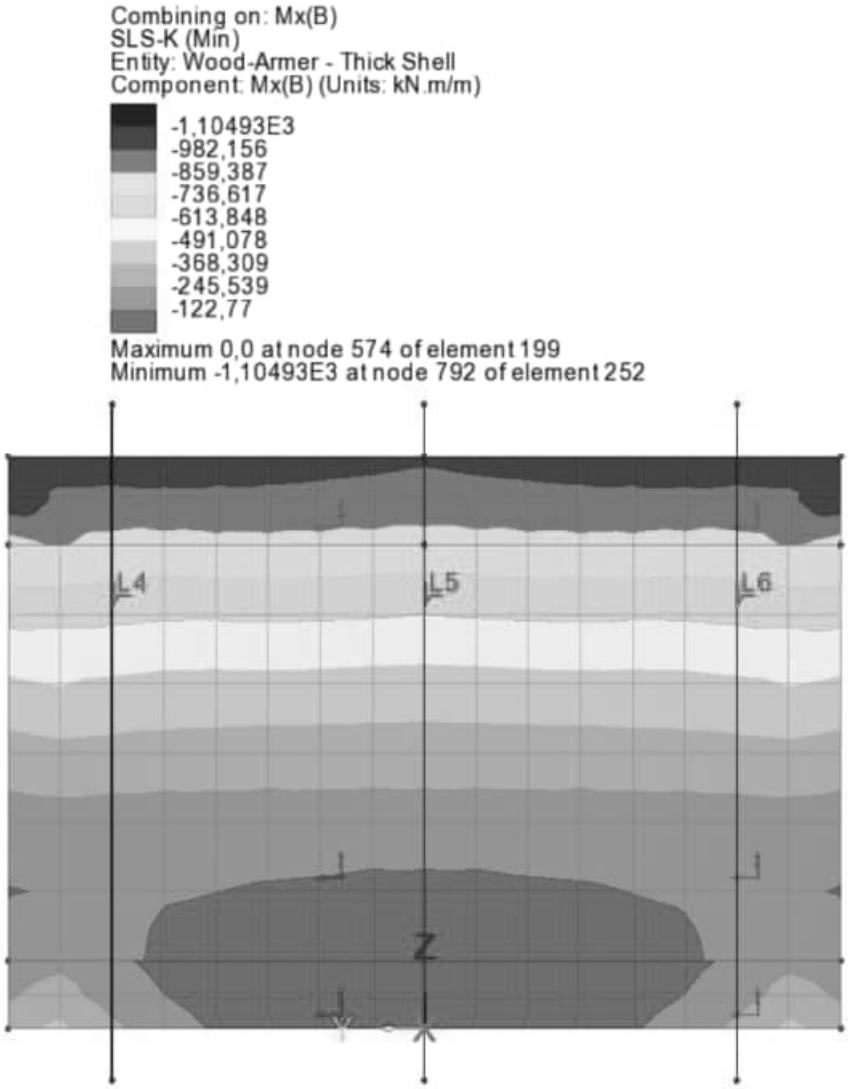
s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-51	-97	10	-425
0,83	-48	-65	20	-564
1,15	-47	-52	49	-583
1,15	-49	-53	61	-591
1,82	-46	-9	161	-536
2,48	-36	46	283	-537
3,15	-21	103	417	-538
,82	-3	141	559	-554
4,48	0	136	727	-536
5,15	0	77	908	-504
5,15	0	72	895	-501
5,58	0	-1	998	-487
6,00	0	-47	1067	-473
m	kNm/m	kN/m	kNm/m	kN/m

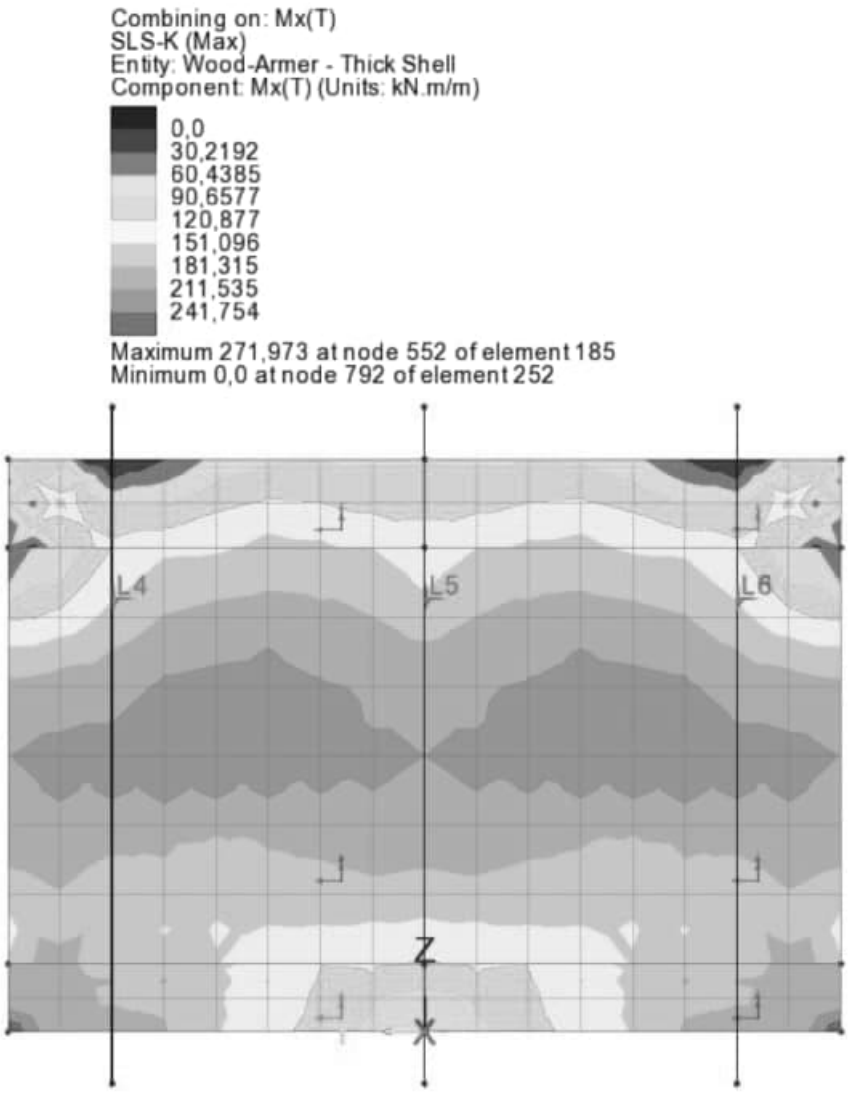
Line 3:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-51	-430	277	-607
0,83	-29	-393	208	-639
1,15	-55	-330	177	-648
1,15	-55	-334	184	-654
1,82	-44	-316	213	-561
2,48	-23	-330	278	-524
3,15	-7	-306	429	-446
3,82	0	-267	575	-442
4,48	0	-268	733	-415
5,15	0	-267	905	-419
5,15	0	-269	892	-419
5,58	0	-268	1021	-443
6,00	0	-230	1154	-574
m	kNm/m	kN/m	kNm/m	kN/m

15.2 ABUTEMENT 2

15.2.1 Contour

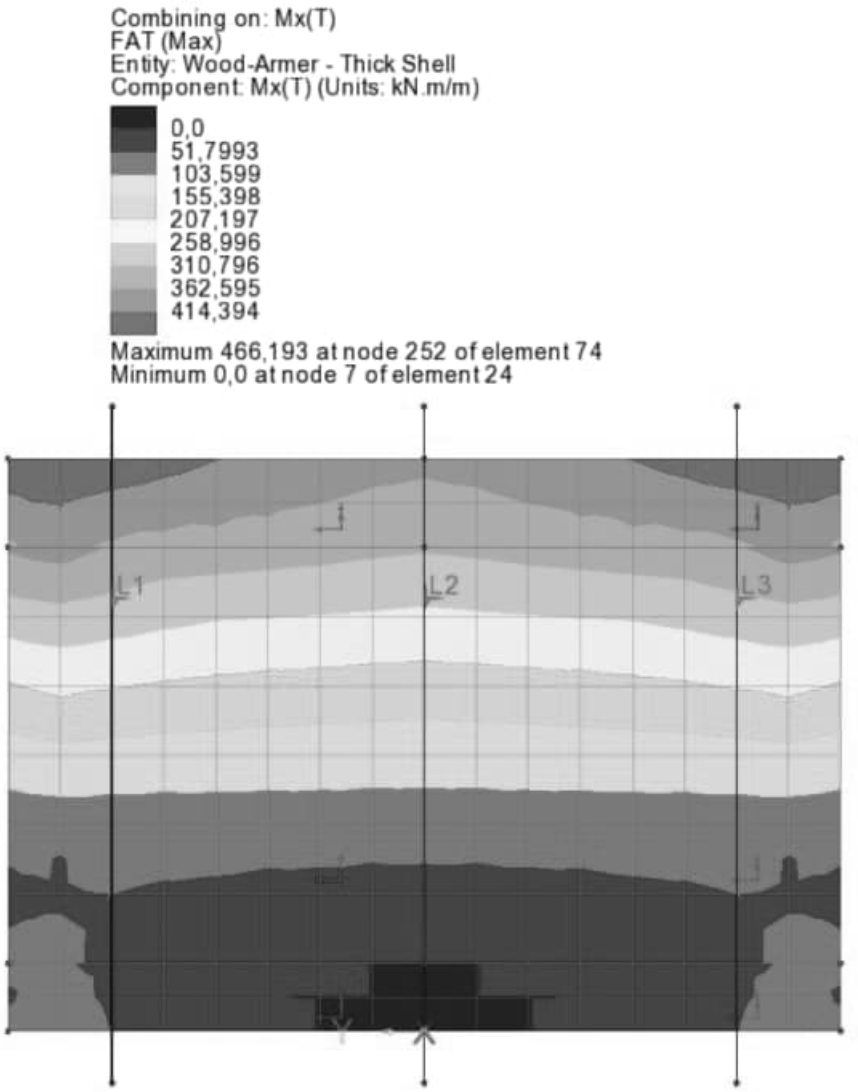


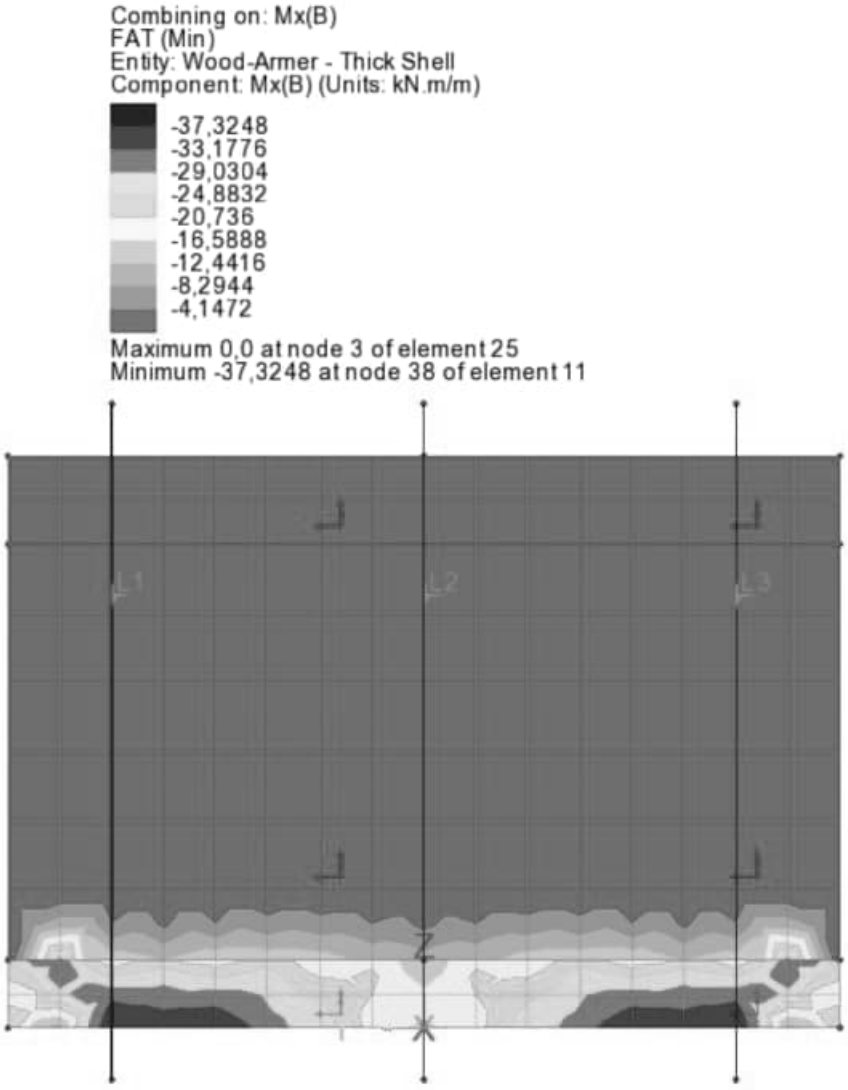

Combining on: Mx(T)
SLS-K (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)
0,0
30,2192
60,4385
90,6577
120,877
151,096
181,315
211,535
241,754
Maximum 271,973 at node 552 of element 185
Minimum 0,0 at node 792 of element 252
L4
L5
L6
Z

16. FAT - Min Mx(B)/Max Mx(T)

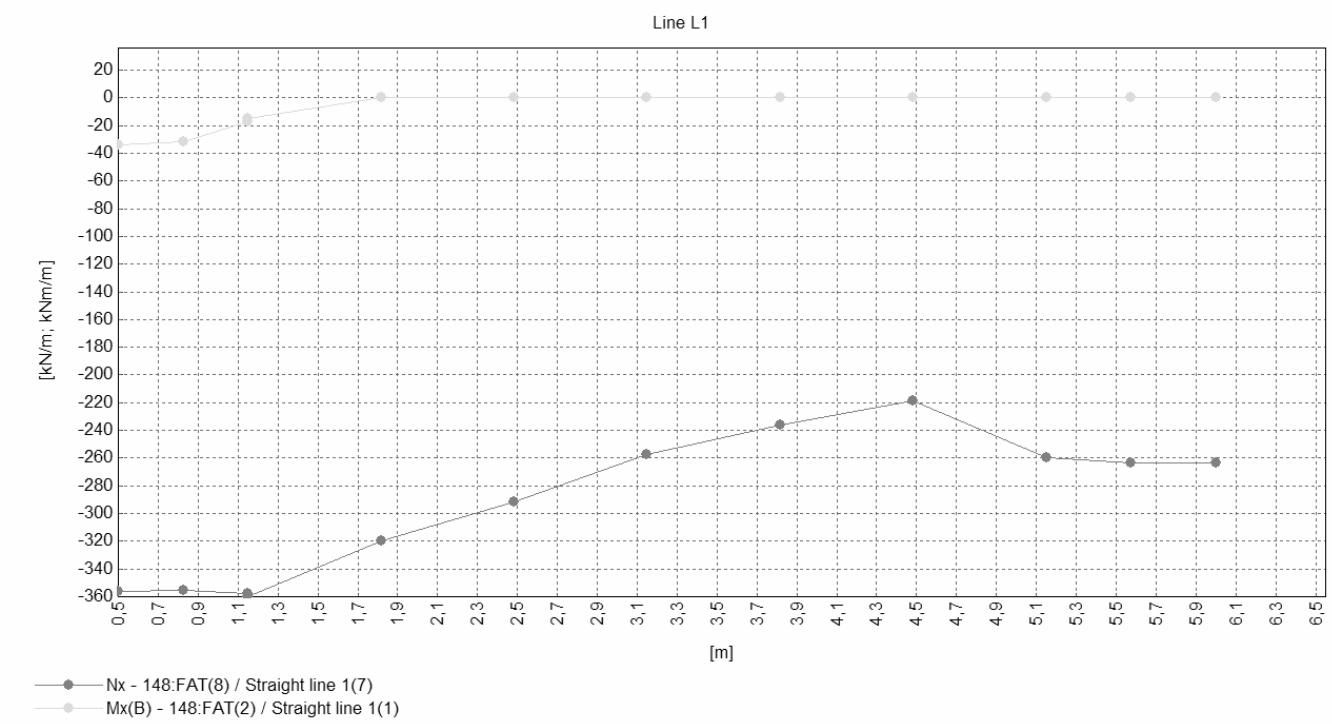
16.1 ABUTEMENT 1

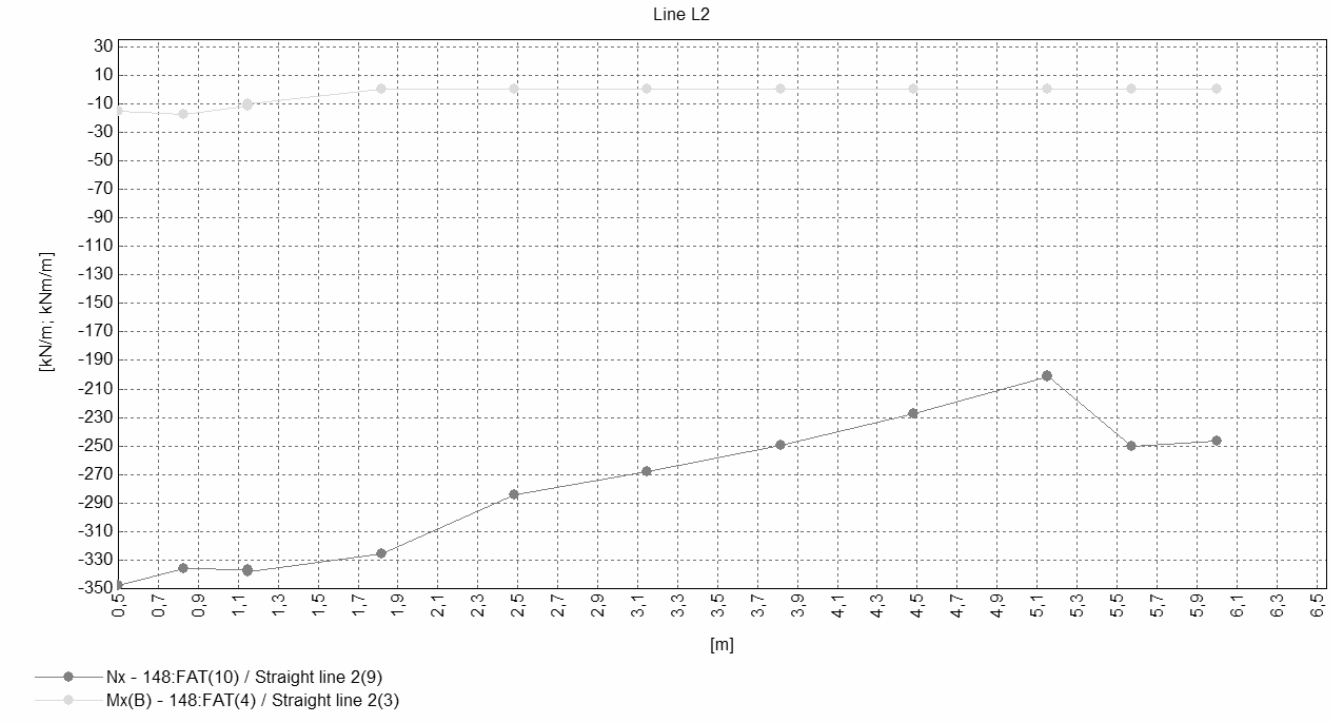
16.1.1 Contour

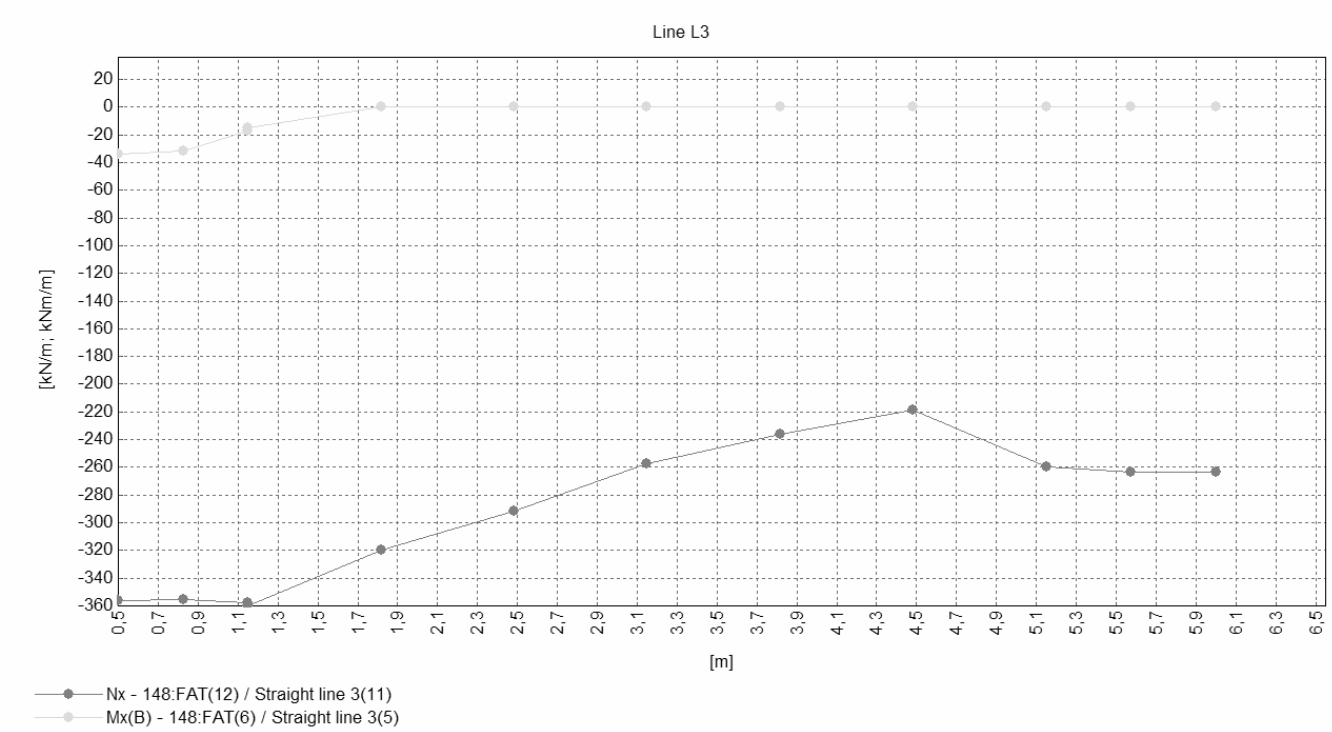


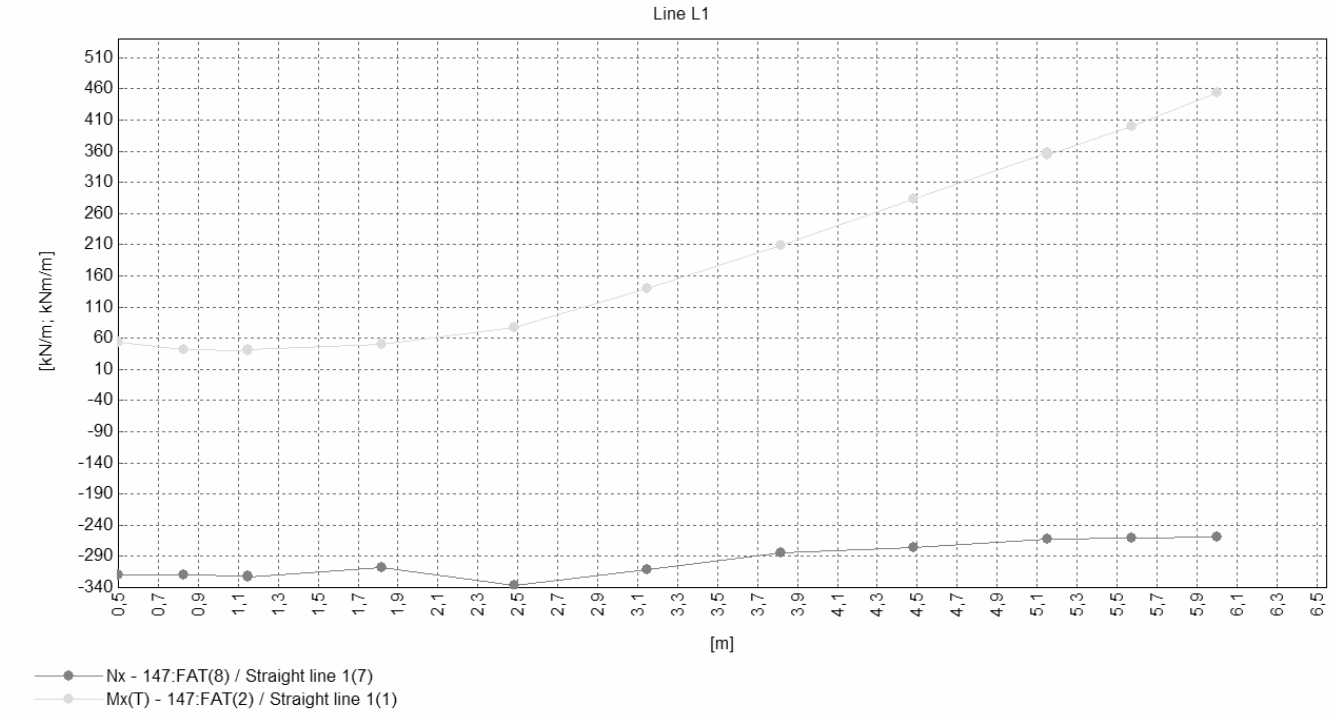

Combining on: Mx(B)
FAT (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)
-37,3248
-33,1776
-29,0304
-24,8832
-20,736
-16,5888
-12,4416
-8,2944
-4,1472
Maximum 0,0 at node 3 of element 25
Minimum -37,3248 at node 38 of element 11

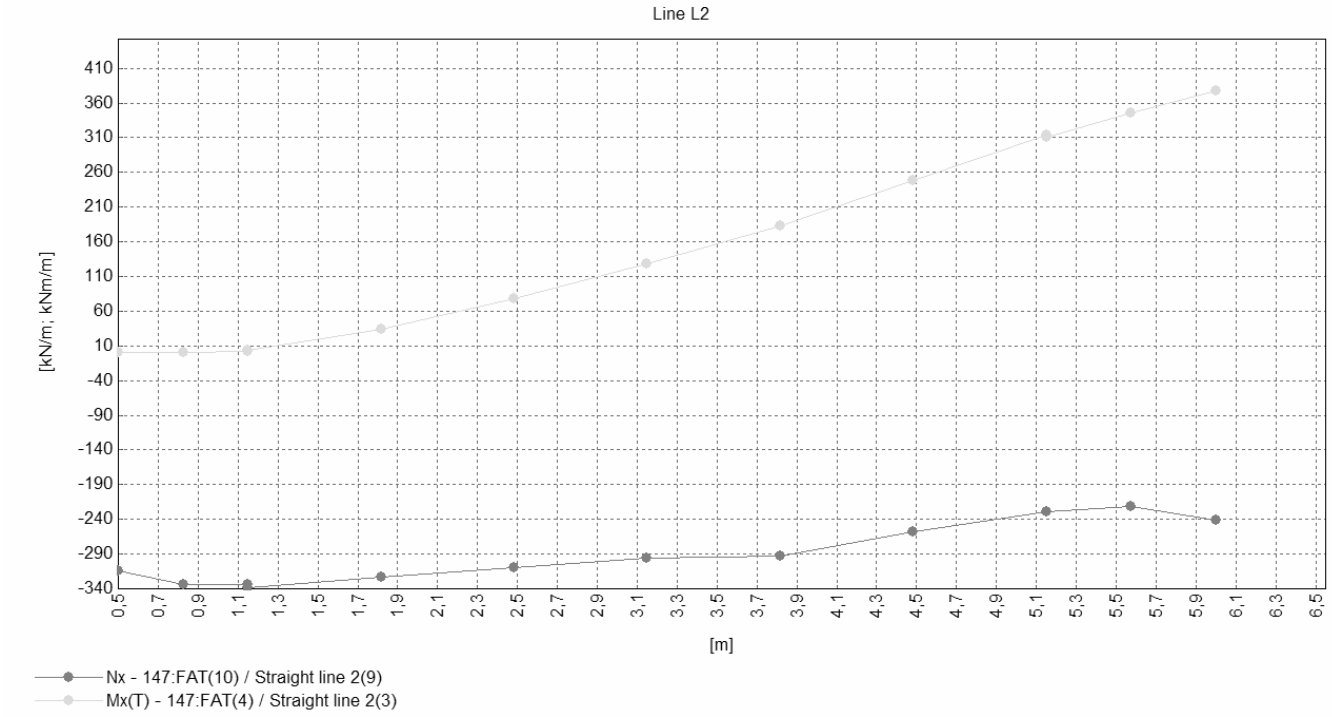
16.1.2 Diagram

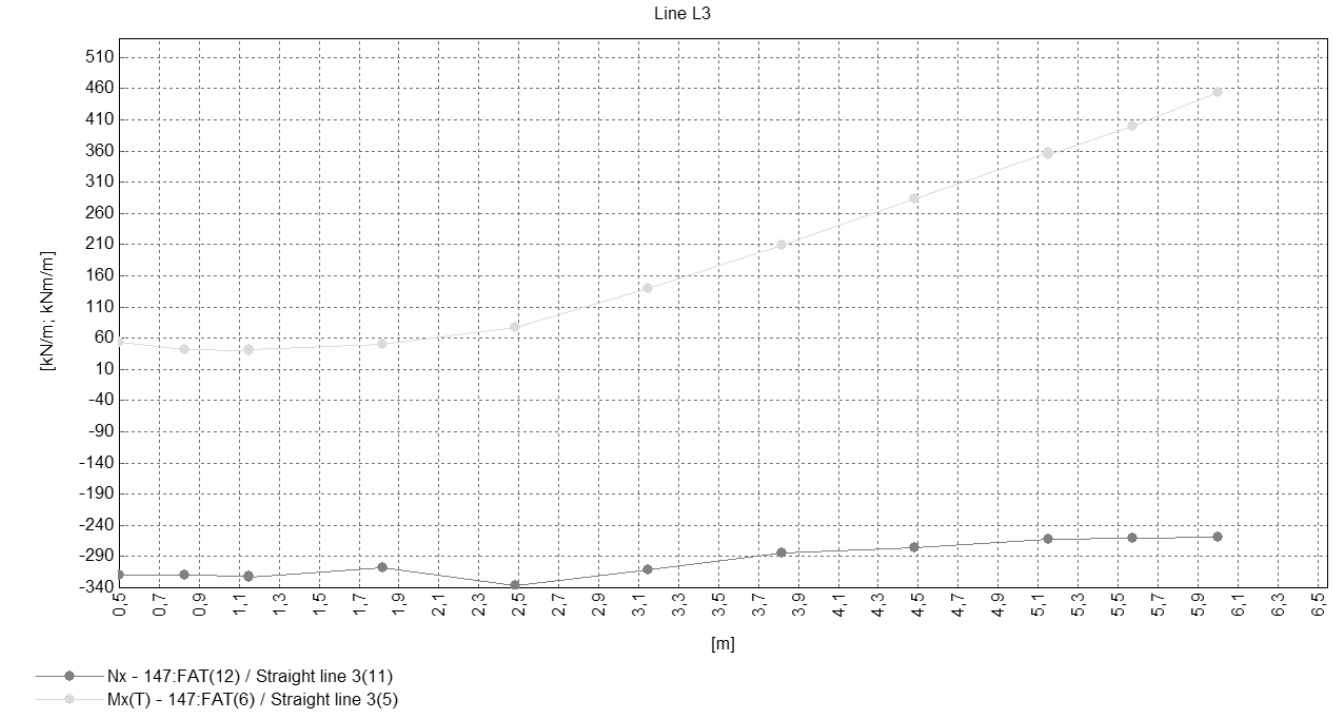





Line L3
[kN/m; kNm/m]
[m]
Nx - 148:FAT(12) / Straight line 3(11)
Mx(B) - 148:FAT(6) / Straight line 3(5)


Line L1
[kN/m; kNm/m]
[m]
Nx - 147:FAT(8) / Straight line 1(7)
Mx(T) - 147:FAT(2) / Straight line 1(1)


Line L2
[kN/m; kNm/m]
[m]
Nx - 147:FAT(10) / Straight line 2(9)
Mx(T) - 147:FAT(4) / Straight line 2(3)


Line L3
[kN/m; kNm/m]
510
460
410
360
310
260
210
160
110
60
10
-40
-90
-140
-190
-240
-290
-340
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
[m]
Nx - 147:FAT(12) / Straight line 3(11)
Mx(T) - 147:FAT(6) / Straight line 3(5)

16.1.3 Tables

Line 1:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-34	-356	53	-319
0,83	-32	-355	42	-319
1,15	-17	-357	41	-321
1,15	-15	-360	43	-323
1,82	0	-320	51	-308
2,48	0	-291	77	-336
3,15	0	-258	139	-311
3,82	0	-236	210	-284
4,48	0	-219	283	-275
5,15	0	-260	357	-263
5,15	0	-260	354	-263
5,58	0	-263	400	-261
6,00	0	-263	454	-260
m	kNm/m	kN/m	kNm/m	kN/m

Line 2:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-15	-348	0	-315
0,83	-17	-336	0	-334
1,15	-11	-336	2	-334
1,15	-10	-338	4	-339
1,82	0	-326	34	-324
2,48	0	-284	77	-310
3,15	0	-268	128	-296
3,82	0	-249	183	-292
4,48	0	-227	249	-258
5,15	0	-201	314	-229
5,15	0	-201	311	-229
5,58	0	-250	346	-222
6,00	0	-247	377	-241
m	kNm/m	kN/m	kNm/m	kN/m

Line 3:

s	Min Mx(B)	Tillh Nx	Max Mx(T)	Tillh Nx
0,50	-34	-356	53	-319
0,83	-32	-355	42	-319
1,15	-17	-357	41	-321
1,15	-15	-360	43	-323
1,82	0	-320	51	-308
2,48	0	-291	77	-336
3,15	0	-258	139	-311
3,82	0	-236	210	-284
4,48	0	-219	283	-275
5,15	0	-260	357	-263
5,15	0	-260	354	-263
5,58	0	-263	400	-261
6,00	0	-263	454	-260
m	kNm/m	kN/m	kNm/m	kN/m

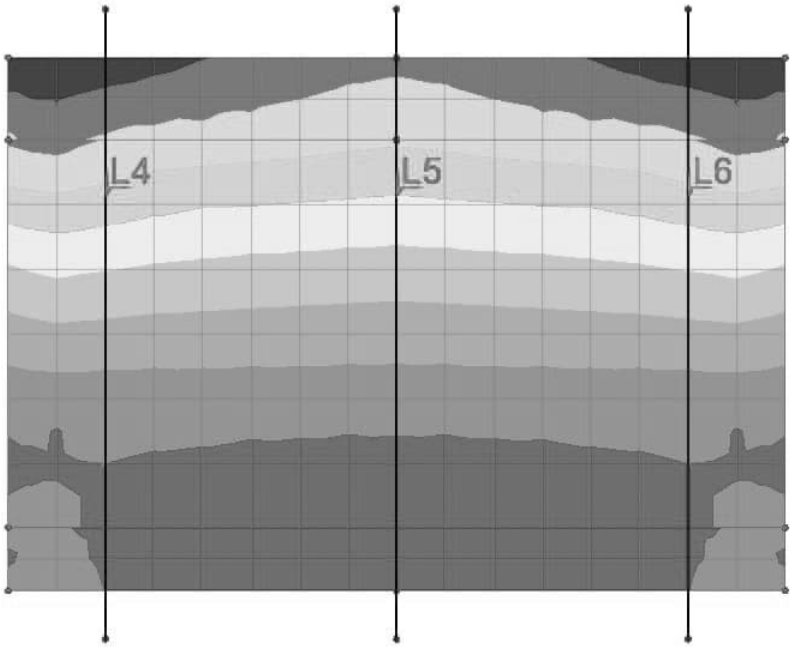
16.2 ABUTEMENT 2

16.2.1 Contour

Combining on: Mx(B)
FAT (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)

-466,243
-414,438
-362,633
-310,828
-259,024
-207,219
-155,414
-103,609
-51,8047

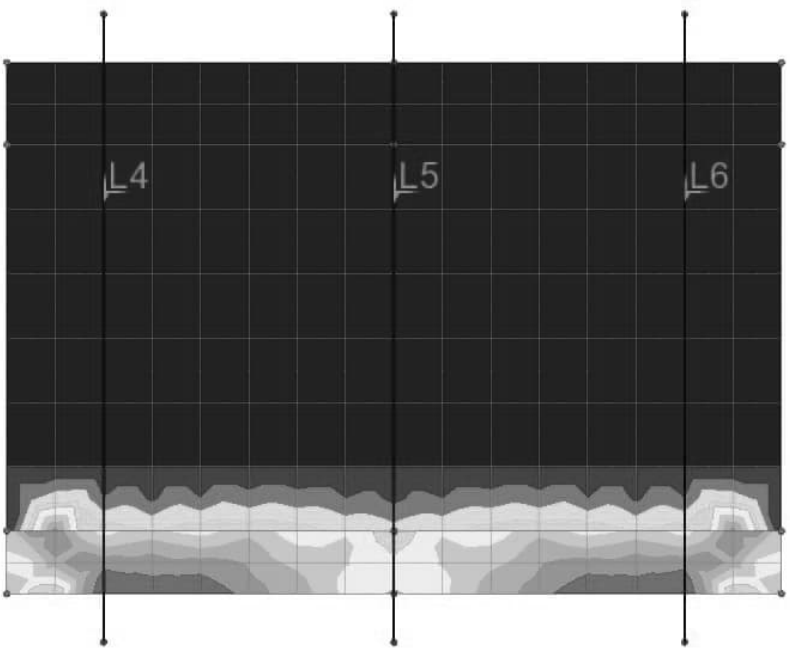
Maximum 0,0 at node 556 of element 200
Minimum -466,243 at node 790 of element 250



Combining on: Mx(T)
FAT (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)

0,0
4,10328
8,20657
12,3099
16,4131
20,5164
24,6197
28,723
32,8263

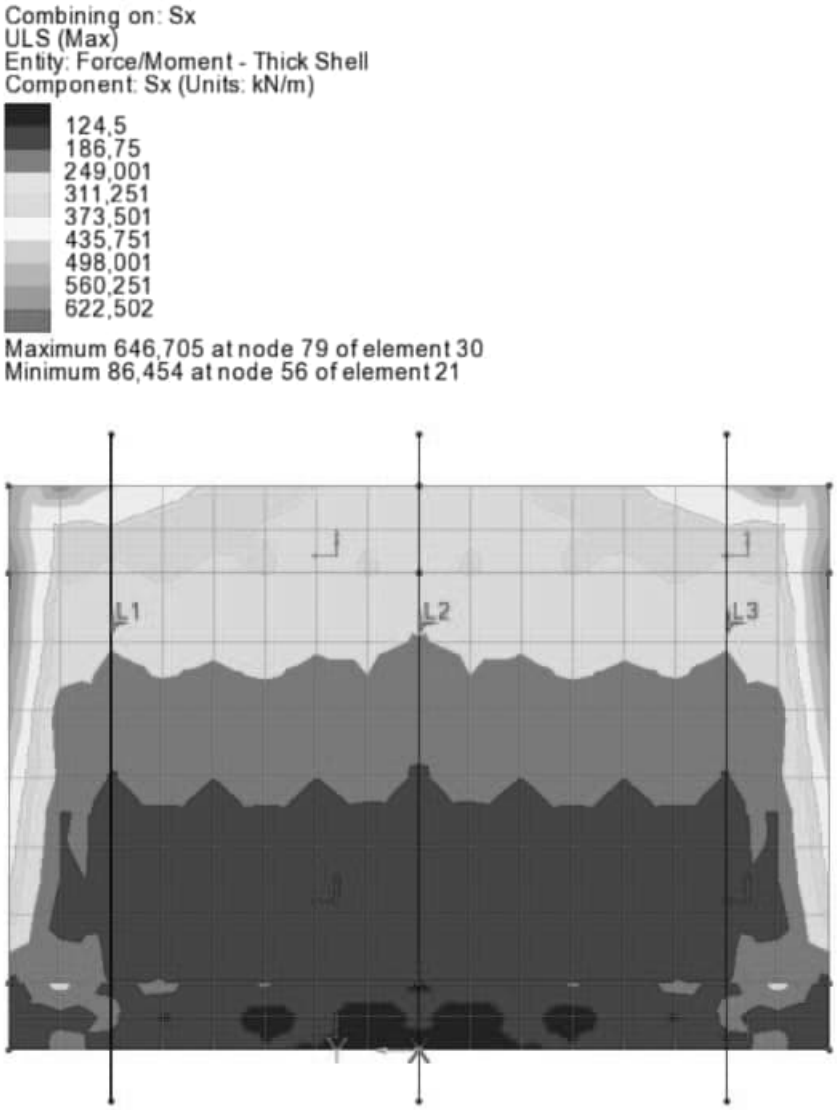
Maximum 36,9296 at node 579 of element 187
Minimum 0,0 at node 551 of element 201



17. ULS - Min Sx/Max Sx

17.1 ABUTEMENT 1

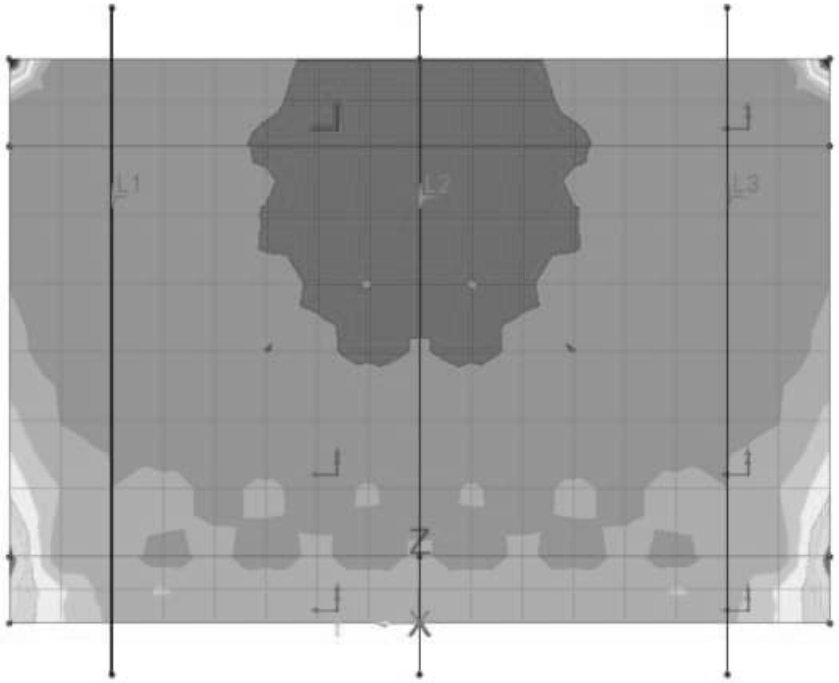
17.1.1 Contour



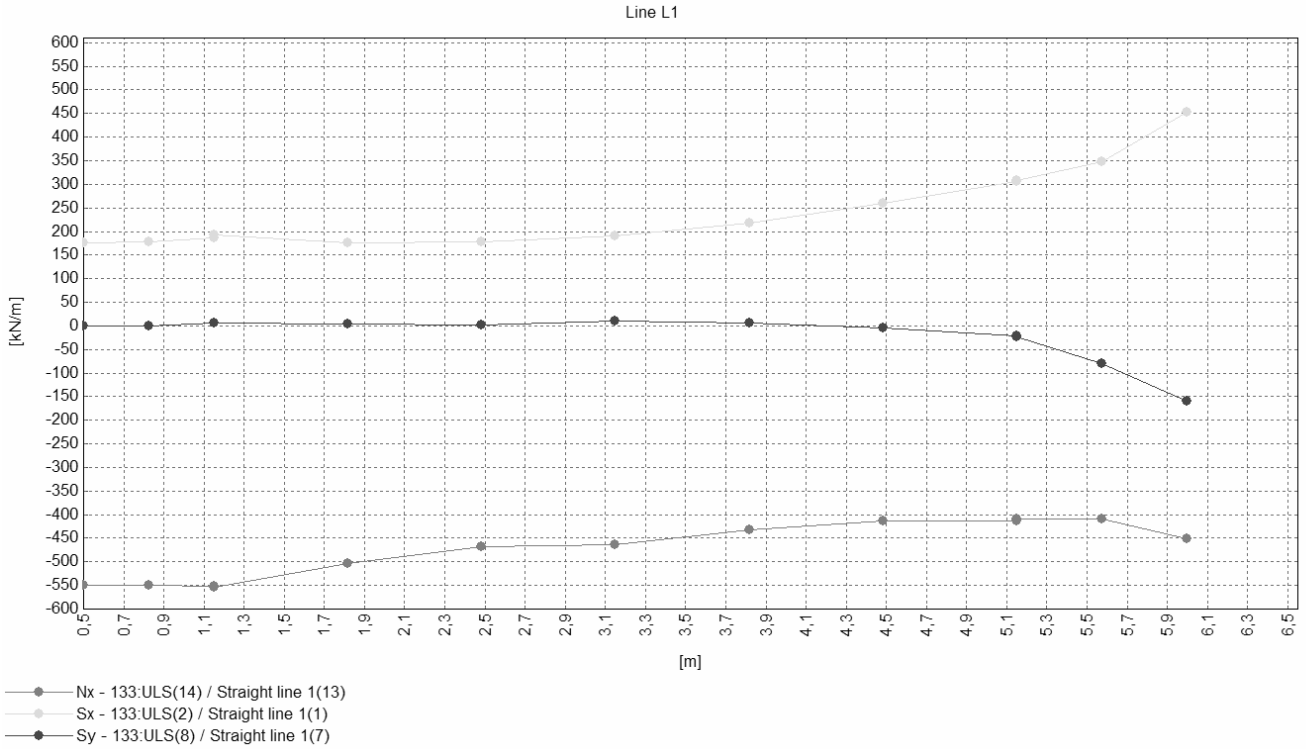
Combining on: Sx
ULS (Min)
Entity: Force/Moment - Thick Shell
Component: Sx (Units: kN/m)

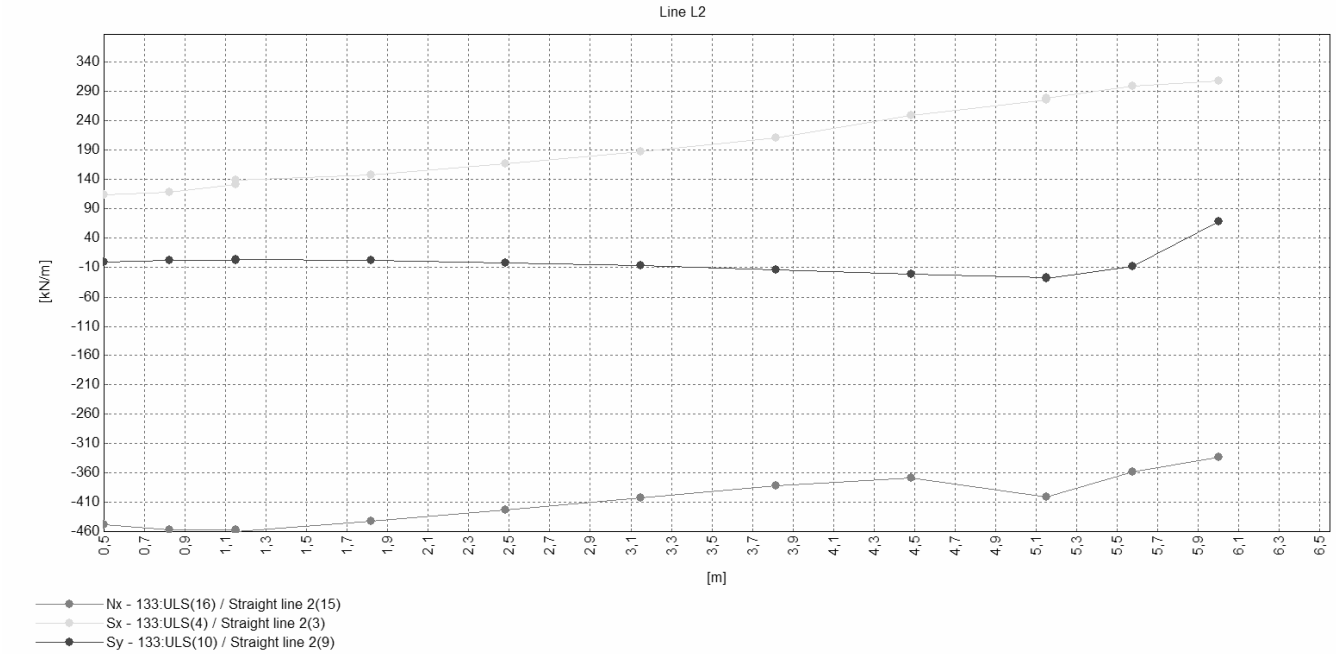
-936,314
-819,275
-702,235
-585,196
-468,157
-351,118
-234,078
-117,039
0,0

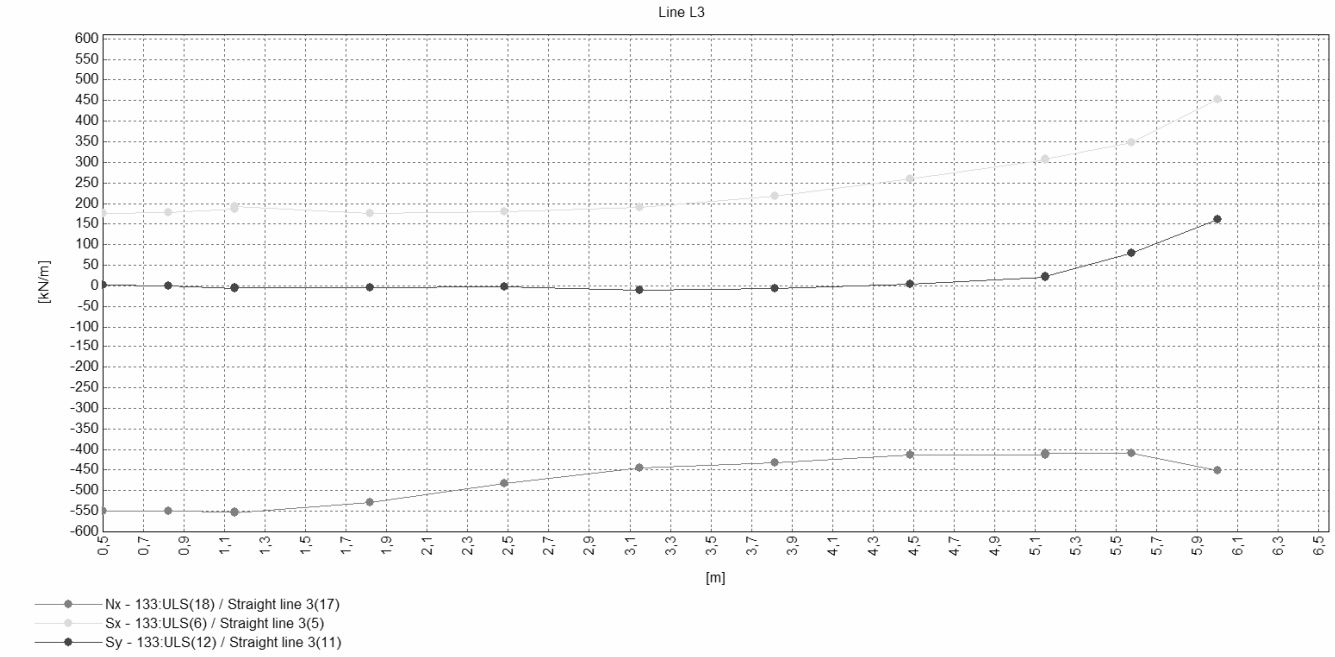
Maximum 23,8763 at node 93 of element 85
Minimum -1,02948E3 at node 509 of element 176

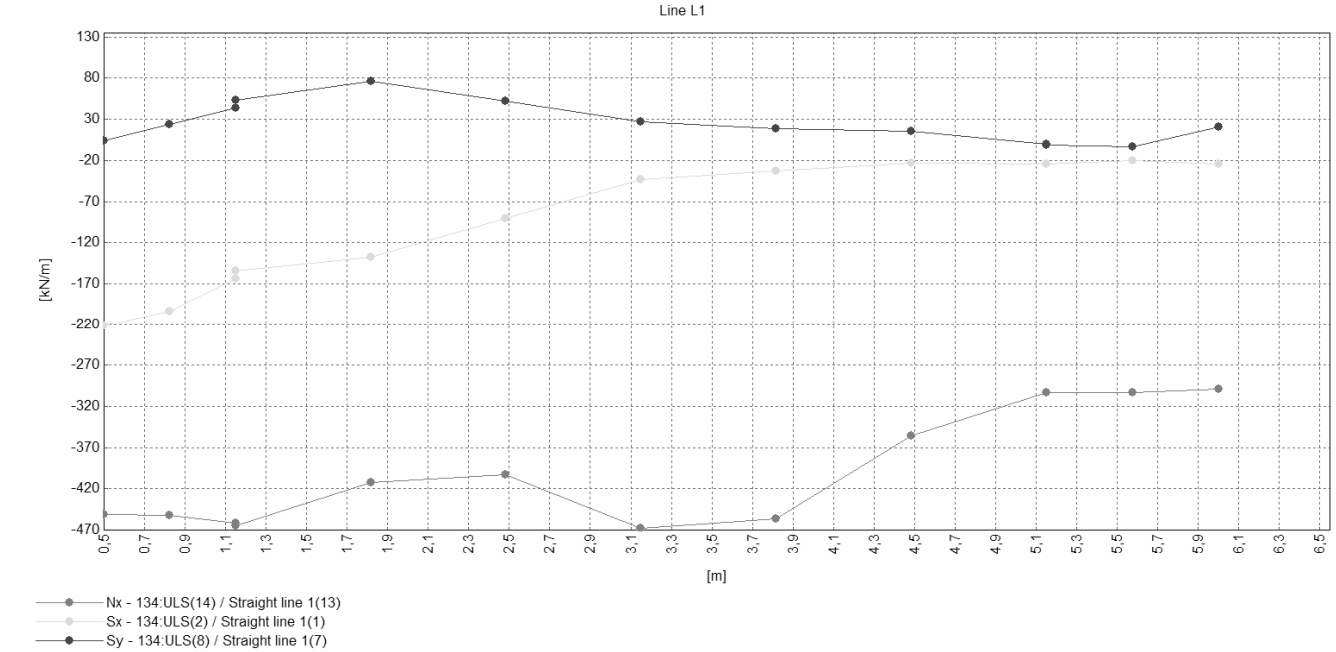


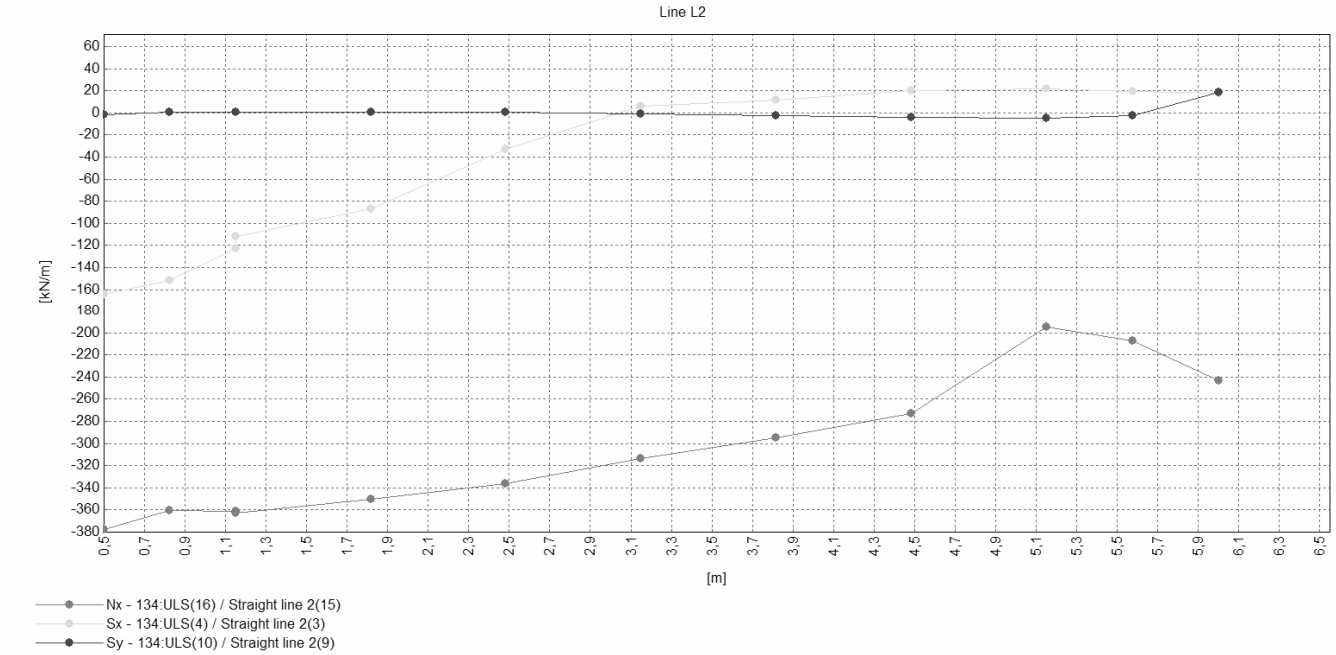
17.1.2 Diagram

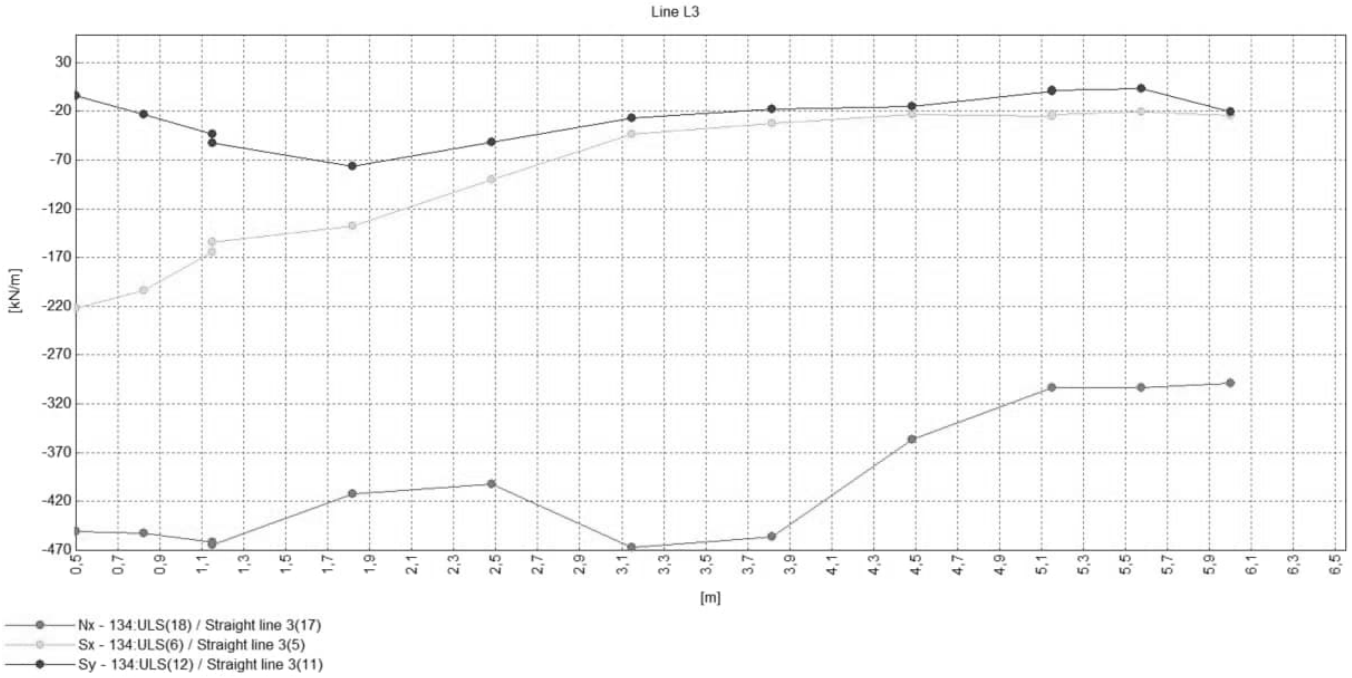





Line L3
[kN/m]
[m]
Nx - 133:ULS(18) / Straight line 3(17)
Sx - 133:ULS(6) / Straight line 3(5)
Sy - 133:ULS(12) / Straight line 3(11)


Line L1
[kN/m]
[m]
Nx - 134:ULS(14) / Straight line 1(13)
Sx - 134:ULS(2) / Straight line 1(1)
Sy - 134:ULS(8) / Straight line 1(7)


Line L2
[kN/m]
[m]
Nx - 134:ULS(16) / Straight line 2(15)
Sx - 134:ULS(4) / Straight line 2(3)
Sy - 134:ULS(10) / Straight line 2(9)


Line L3
30
-20
-70
-120
-170
-220
-270
-320
-370
-420
-470
[kN/m]
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
[m]
Nx - 134:ULS(18) / Straight line 3(17)
Sx - 134:ULS(6) / Straight line 3(5)
Sy - 134:ULS(12) / Straight line 3(11)

16.1.3 Tables

Line 1:

s	Max Sx	Sy	Nx	$\sqrt{Sx^2 + Sy^2}$
0,50	177	-1	-550	177
0,83	179	1	-549	179
1,15	186	6	-551	186
1,15	192	5	-554	192
1,82	176	4	-503	176
2,48	179	2	-467	179
3,15	191	10	-463	191
3,82	218	6	-433	218
4,48	260	-5	-414	260
5,15	306	-21	-413	307
5,15	308	-23	-410	309
5,58	349	-79	-410	357
6,00	452	-160	-452	480
m	kN/m	kN/m	kN/m	kN/m

s	Min Sx	Sy	Nx	$\sqrt{Sx^2 + Sy^2}$
0,50	-222	4	-451	222
0,83	-204	24	-453	205
1,15	-164	44	-461	170
1,15	-154	53	-464	163
1,82	-137	76	-412	157
2,48	-90	52	-403	104
3,15	-43	27	-468	51
3,82	-32	18	-456	37
4,48	-23	15	-356	28
5,15	-25	0	-304	25
5,15	-24	-1	-303	24
5,58	-20	-3	-304	21
6,00	-25	20	-299	32
m	kN/m	kN/m	kN/m	kN/m

Line 2:

s	Max Sx	Sy	Nx	$\sqrt{Sx^2 + Sy^2}$
0,50	114	-1	-449	114
0,83	119	2	-457	119
1,15	132	3	-457	132
1,15	139	4	-460	139
1,82	148	3	-442	148
2,48	167	-2	-424	167
3,15	187	-7	-403	187
3,82	211	-14	-383	212
4,48	249	-22	-369	250
5,15	276	-28	-402	277
5,15	278	-29	-401	280
5,58	300	-8	-358	300
6,00	307	68	-334	315
m	kN/m	kN/m	kN/m	kN/m

s	Min Sx	Sy	Nx	$\sqrt{Sx^2 + Sy^2}$
0,50	-164	-1	-378	164
0,83	-152	0	-360	152
1,15	-123	1	-361	123
1,15	-112	1	-363	112
1,82	-87	1	-350	87
2,48	-33	0	-336	33
3,15	6	-1	-314	6
3,82	11	-2	-295	12
4,48	20	-4	-273	20
5,15	22	-5	-195	22
5,15	22	-5	-195	23
5,58	19	-2	-208	19
6,00	18	18	-243	25
m	kN/m	kN/m	kN/m	kN/m

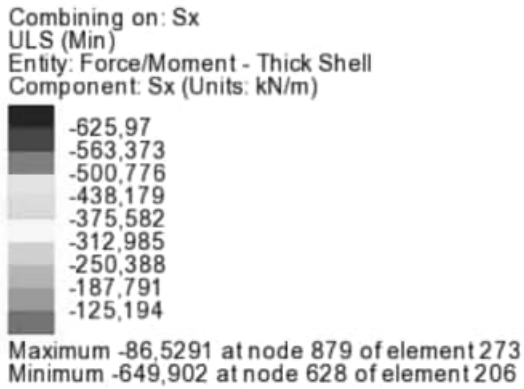
Line 3:

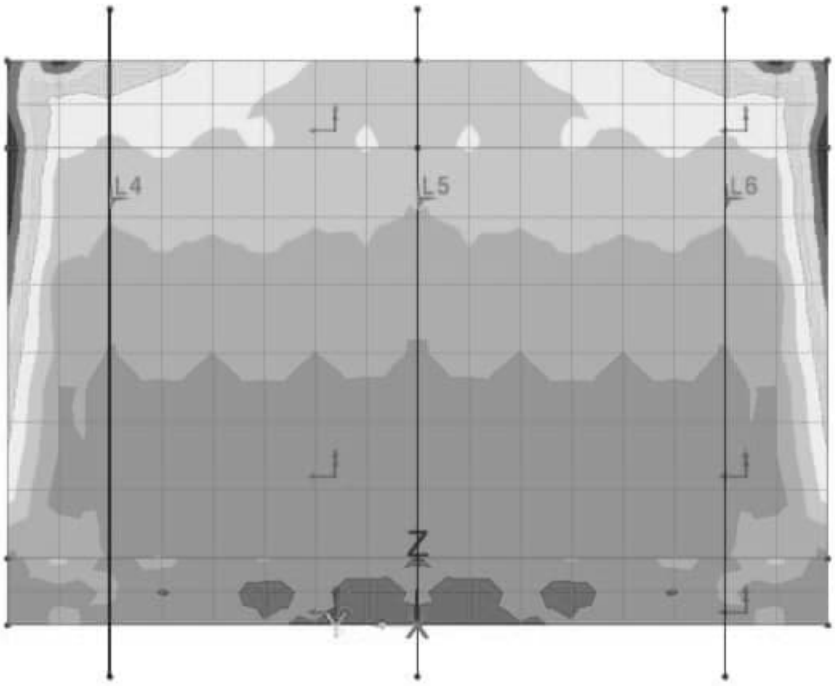
s	Max Sx	Sy	Nx	$\sqrt{Sx^2 + Sy^2}$
0,50	177	1	-550	177
0,83	179	-1	-549	179
1,15	186	-6	-551	186
1,15	192	-5	-554	192
1,82	175	-5	-530	175
2,48	180	-3	-483	180
3,15	191	-10	-445	191
3,82	218	-6	-433	218
4,48	260	5	-414	260
5,15	306	21	-413	307
5,15	308	23	-410	309
5,58	349	79	-410	357
6,00	452	160	-452	480
m	kN/m	kN/m	kN/m	kN/m

s	Min Sx	Sy	Nx	$\sqrt{Sx^2 + Sy^2}$
0,50	-222	-4	-451	222
0,83	-204	-24	-453	205
1,15	-164	-44	-461	170
1,15	-154	-53	-464	163
1,82	-137	-76	-412	157
2,48	-90	-52	-403	104
3,15	-43	-27	-468	51
3,82	-32	-18	-456	37
4,48	-23	-15	-356	28
5,15	-25	0	-304	25
5,15	-24	1	-303	24
5,58	-20	3	-304	21
6,00	-25	-20	-299	32
m	kN/m	kN/m	kN/m	kN/m

17.2 ABUTEMENT 2

17.2.1 Contour

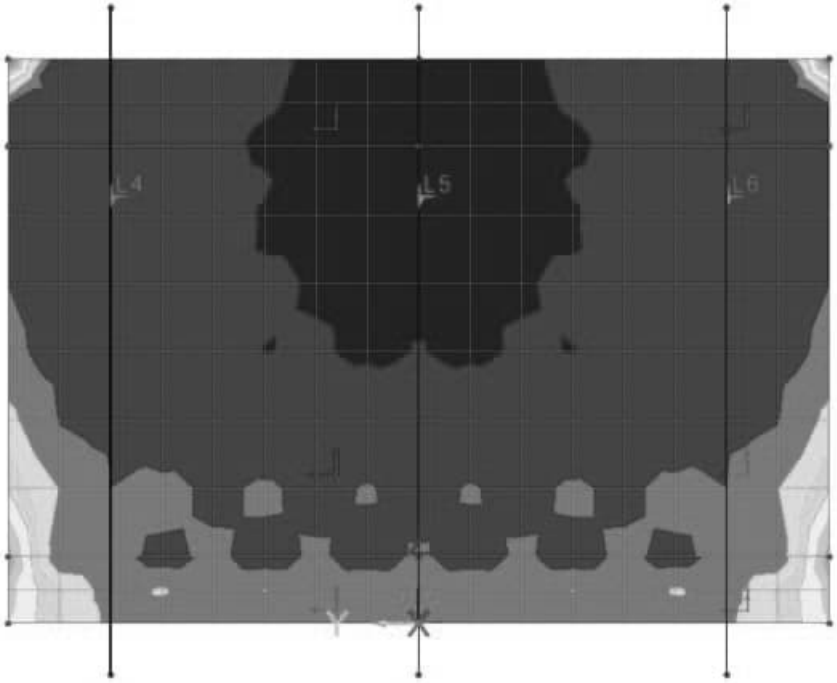




Combining on: Sx
ULS (Max)
Entity: Force/Moment - Thick Shell
Component: Sx (Units: kN/m)

0,0
117,145
234,29
351,434
468,579
585,724
702,869
820,013
937,158

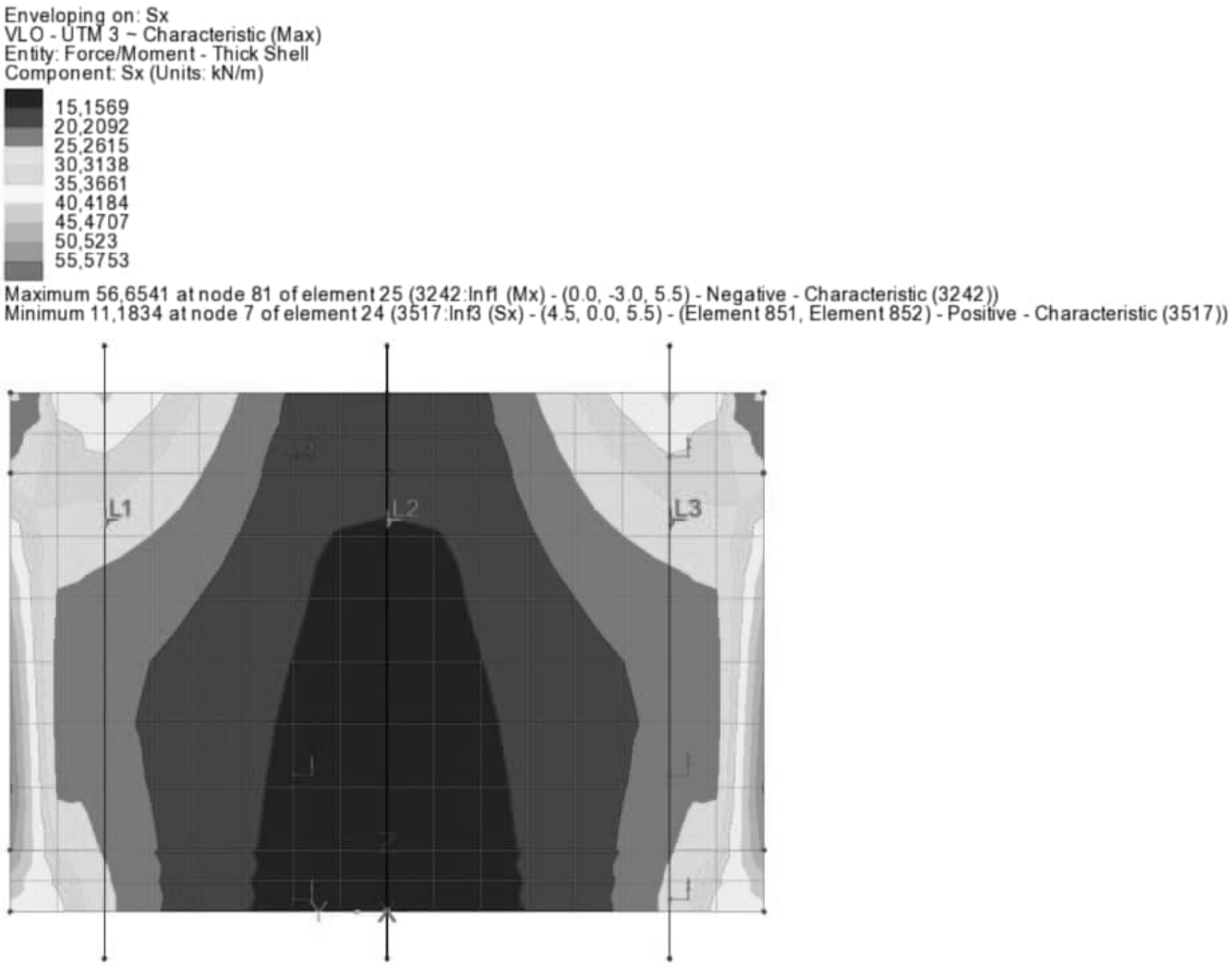
Maximum 1,02983E3 at node 1042 of element 352
Minimum -24,4729 at node 922 of element 337



18. UTM 3 - Min Sx/Max Sx

18.1 ABUTEMENT 1

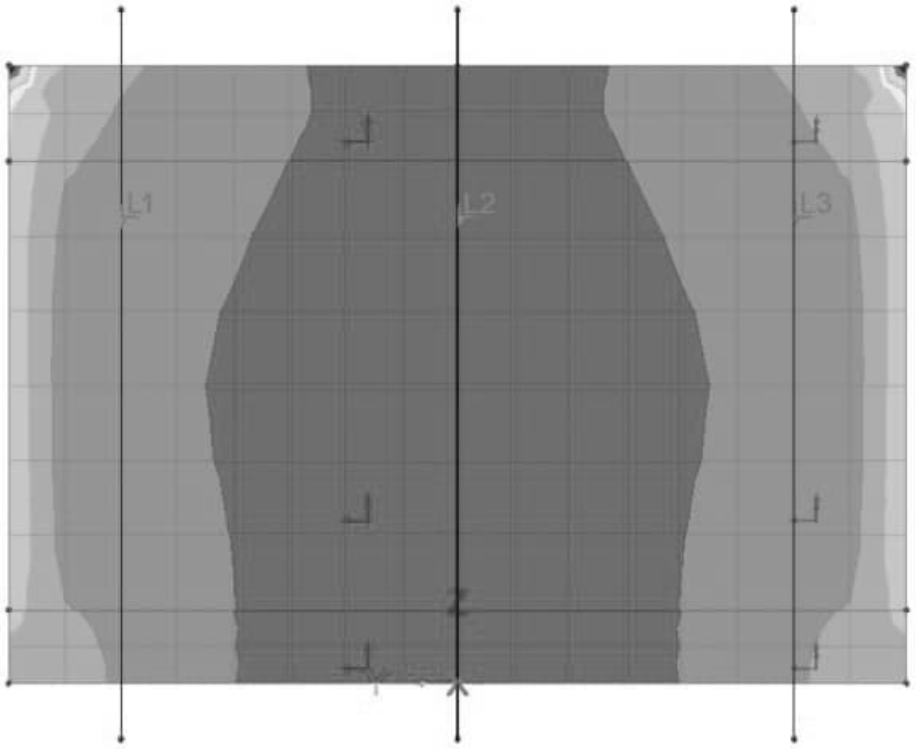
18.1.1 Contour



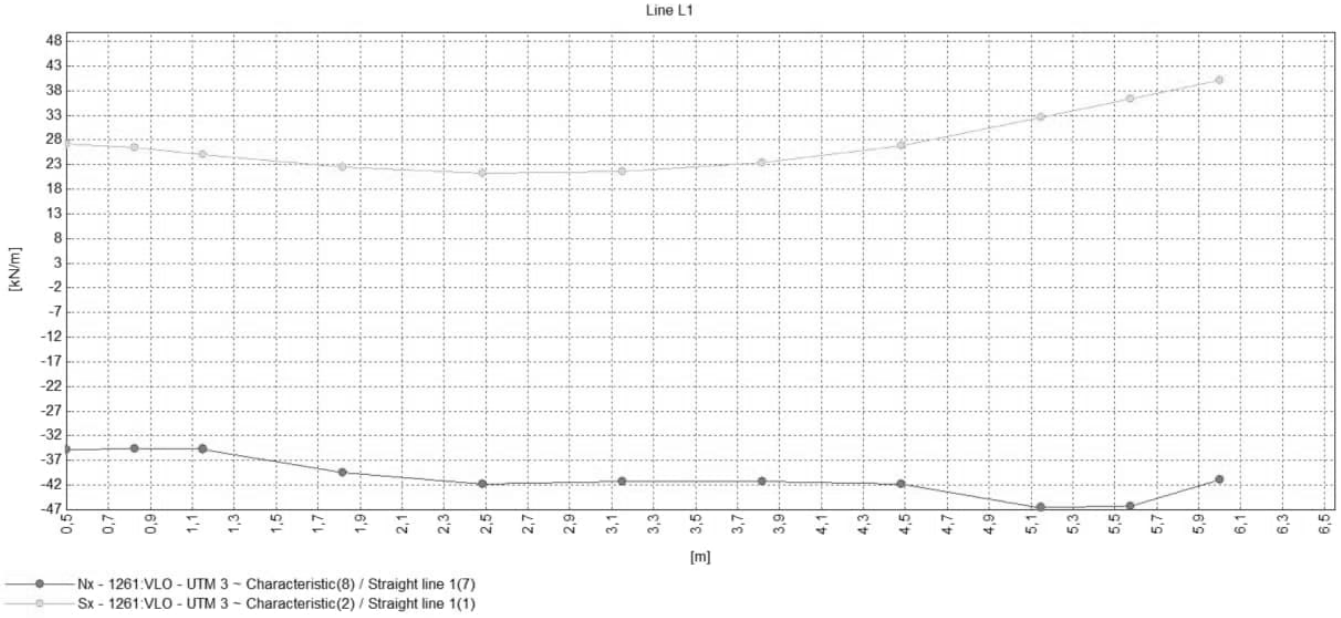
Enveloping on: Sx
VLO - UTM 3 ~ Characteristic (Min)
Entity: Force/Moment - Thick Shell
Component: Sx (Units: kN/m)

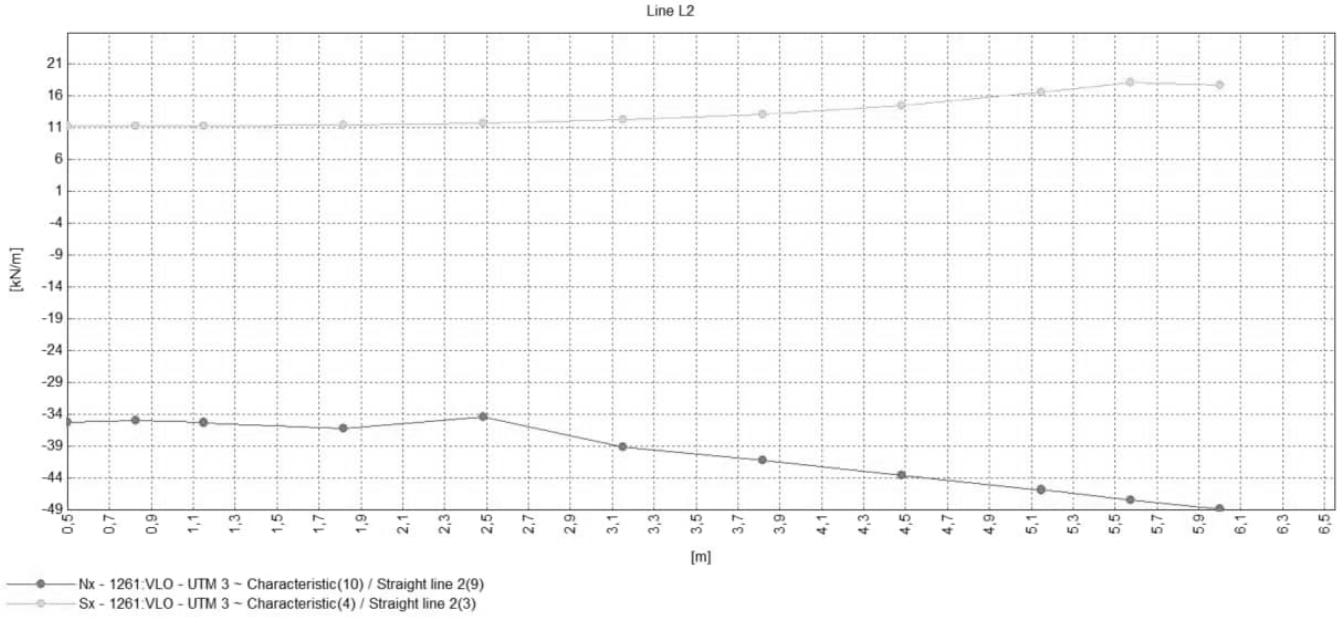
-72,8885
-64,7898
-56,6911
-48,5923
-40,4936
-32,3949
-24,2962
-16,1974
-8,09872

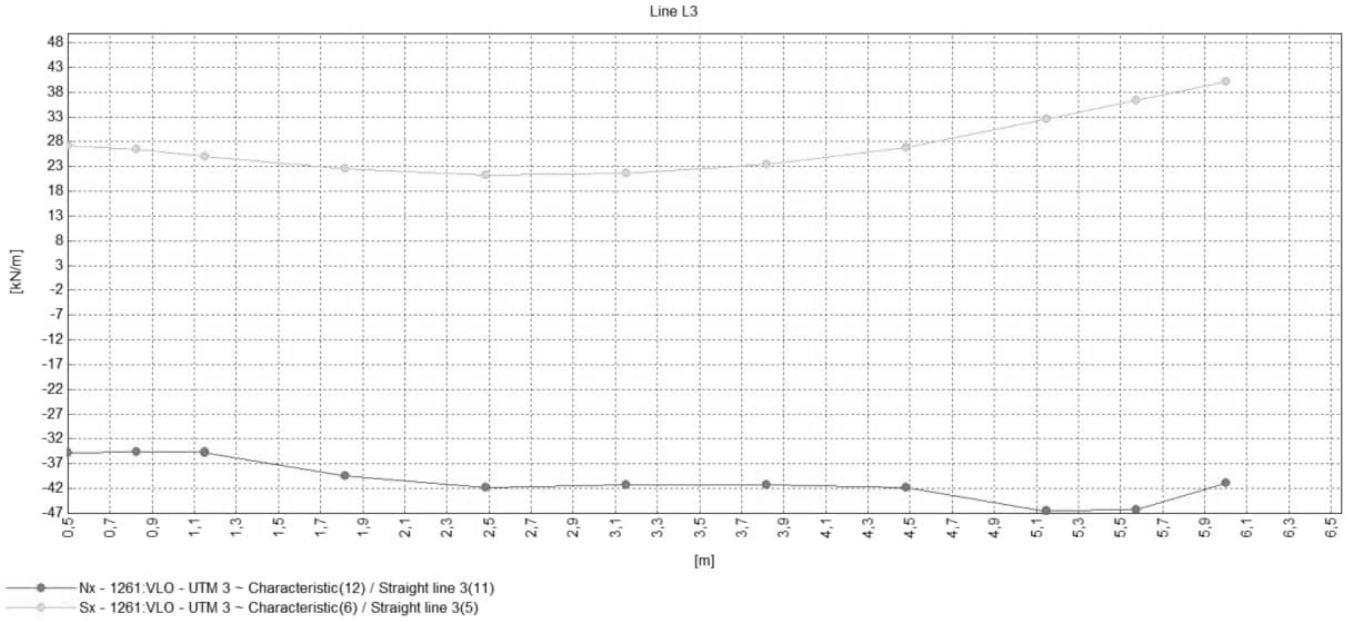
Maximum -2,16326 at node 7 of element 24 (3232:Inf1 (Mx) - (6.175, 0.0, 5.5) - Negative - Characteristic (3232))
Minimum -75,0518 at node 249 of element 74 (3632:Inf4 (Sy) - (-4.5, -3.0, 5.5) - Positive - Characteristic (3632))

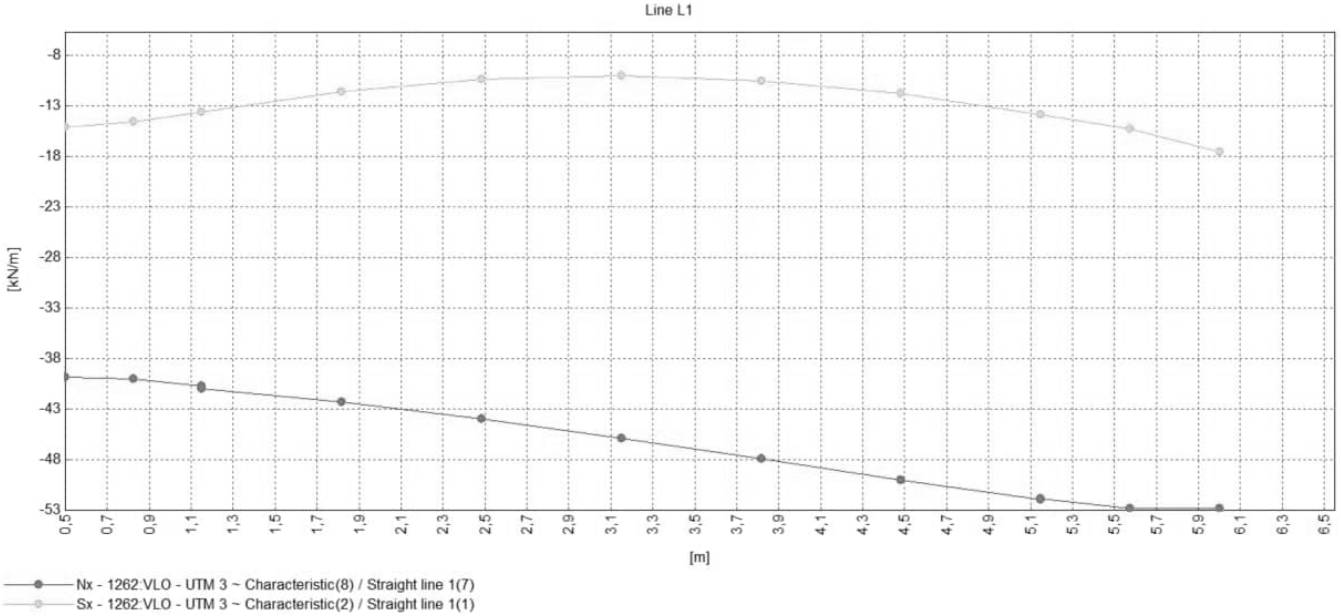


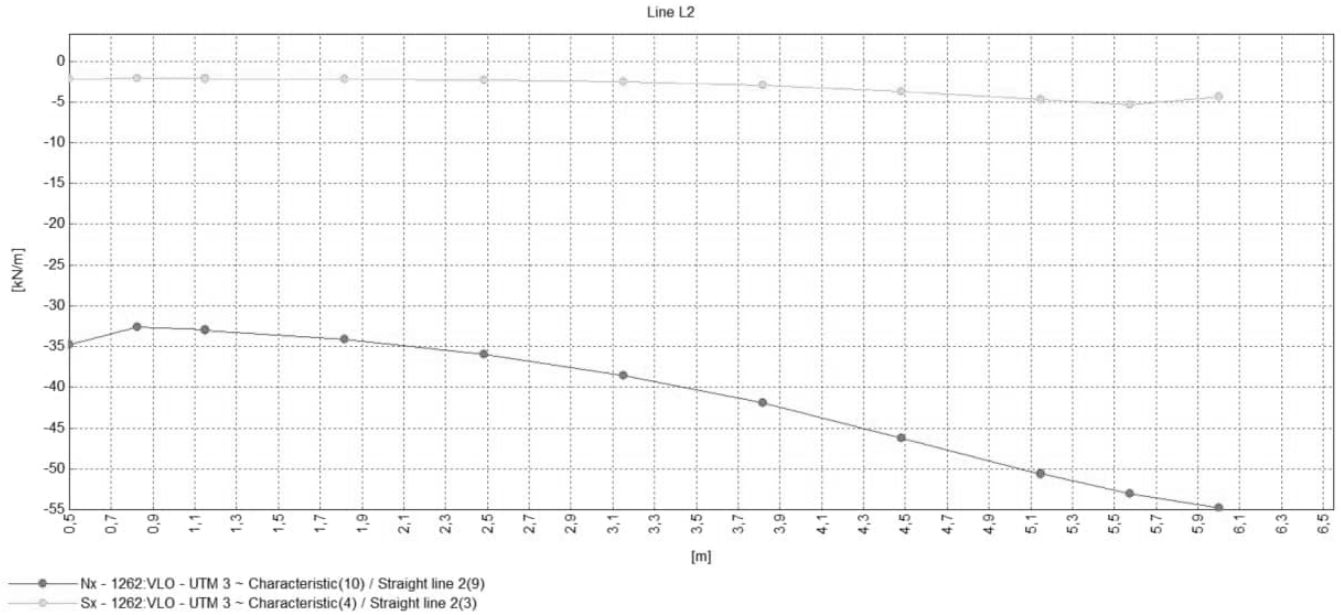
18.1.2 Diagram

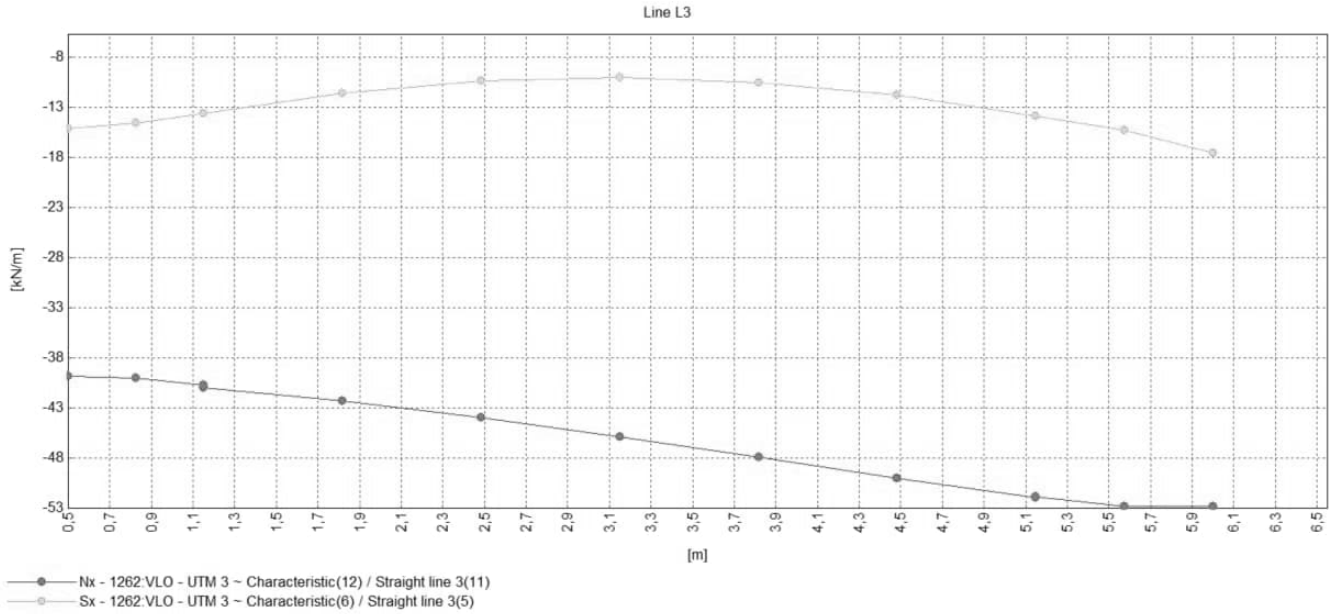





Line L3
[kN/m]
48
43
38
33
28
23
18
13
8
3
-2
-7
-12
-17
-22
-27
-32
-37
-42
-47
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
[m]
Nx - 1261:VLO - UTM 3 ~ Characteristic(12) / Straight line 3(11)
Sx - 1261:VLO - UTM 3 ~ Characteristic(6) / Straight line 3(5)


Line L1
[kN/m]
[m]
Nx - 1262:VLO - UTM 3 ~ Characteristic(8) / Straight line 1(7)
Sx - 1262:VLO - UTM 3 ~ Characteristic(2) / Straight line 1(1)


Line L2
[kN/m]
[m]
Nx - 1262:VLO - UTM 3 ~ Characteristic(10) / Straight line 2(9)
Sx - 1262:VLO - UTM 3 ~ Characteristic(4) / Straight line 2(3)


Line L3
[kN/m]
-8
-13
-18
-23
-28
-33
-38
-43
-48
-53
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
[m]
Nx - 1262:VLO - UTM 3 ~ Characteristic(12) / Straight line 3(11)
Sx - 1262:VLO - UTM 3 ~ Characteristic(6) / Straight line 3(5)

18.1.3 Tables

Line 1:

s	Min Sx	Tillh Nx	Max Sx	Tillh Nx
0,50	-15	-40	27	-35
0,83	-15	-40	26	-35
1,15	-14	-41	25	-35
1,15	-14	-41	25	-35
1,82	-12	-42	22	-40
2,48	-10	-44	21	-42
3,15	-10	-46	22	-41
3,82	-10	-48	23	-41
4,48	-12	-50	27	-42
5,15	-14	-52	33	-47
5,15	-14	-52	33	-47
5,58	-15	-53	36	-46
6,00	-18	-53	40	-41
m	kN/m	kN/m	kN/m	kN/m

Line 2:

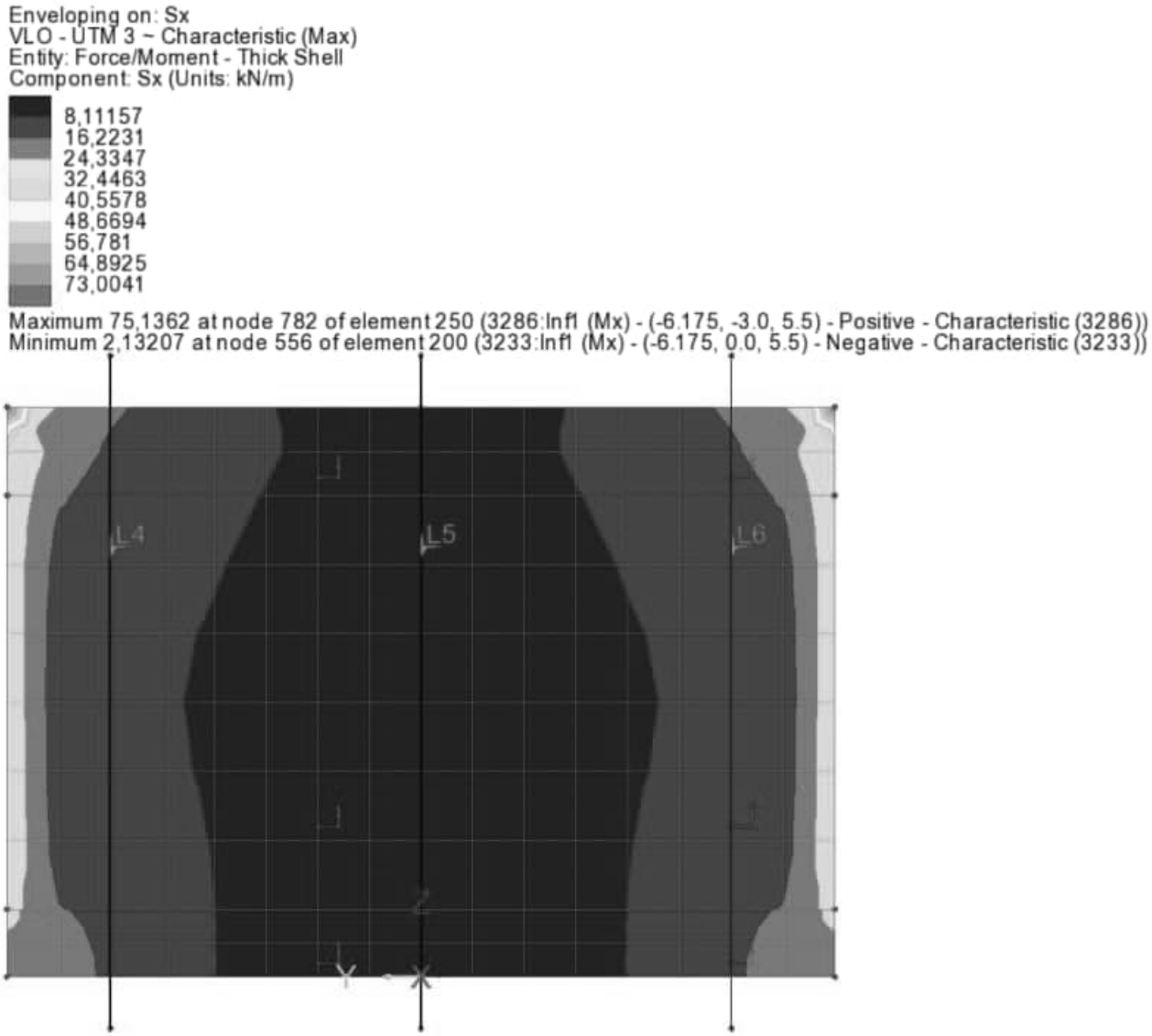
s	Min Sx	Tillh Nx	Max Sx	Tillh Nx
0,50	-2	-35	11	-35
0,83	-2	-33	11	-33
1,15	-2	-33	11	-33
1,15	-2	-33	11	-33
1,82	-2	-34	11	-34
2,48	-2	-36	12	-36
3,15	-3	-39	12	-39
3,82	-3	-42	13	-42
4,48	-4	-46	14	-46
5,15	-5	-51	17	-51
5,15	-5	-51	17	-51
5,58	-5	-53	18	-53
6,00	-4	-55	18	-55
m	kN/m	kN/m	kN/m	kN/m

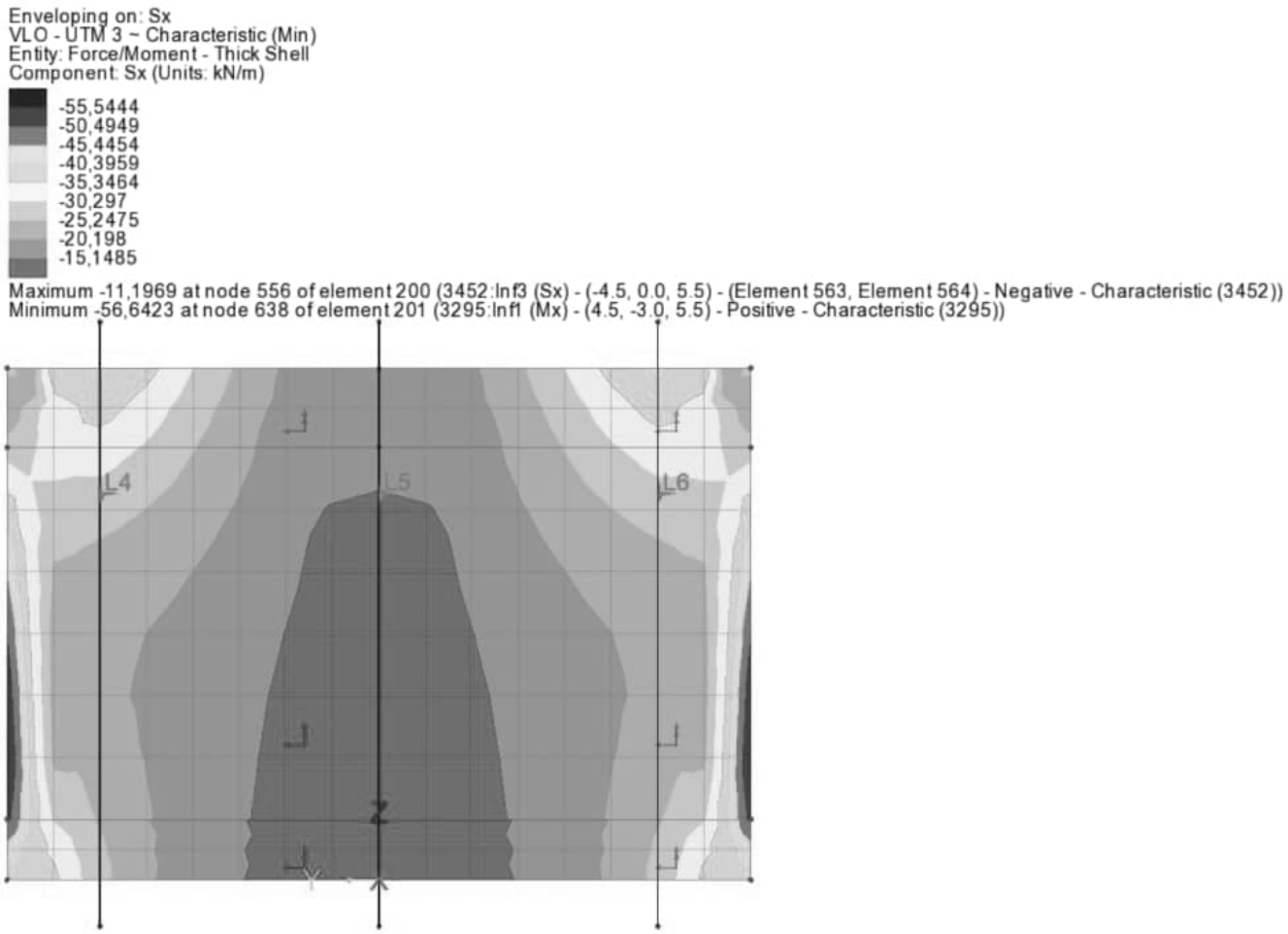
Line 3:

s	Min Sx	Tillh Nx	Max Sx	Tillh Nx
0,50	-15	-40	27	-35
0,83	-15	-40	26	-35
1,15	-14	-41	25	-35
1,15	-14	-41	25	-35
1,82	-12	-42	22	-40
2,48	-10	-44	21	-42
3,15	-10	-46	22	-41
3,82	-10	-48	23	-41
4,48	-12	-50	27	-42
5,15	-14	-52	33	-47
5,15	-14	-52	33	-47
5,58	-15	-53	36	-46
6,00	-18	-53	40	-41
m	kN/m	kN/m	kN/m	kN/m

18.2 ABUTEMENT 2

18.2.1 Contour

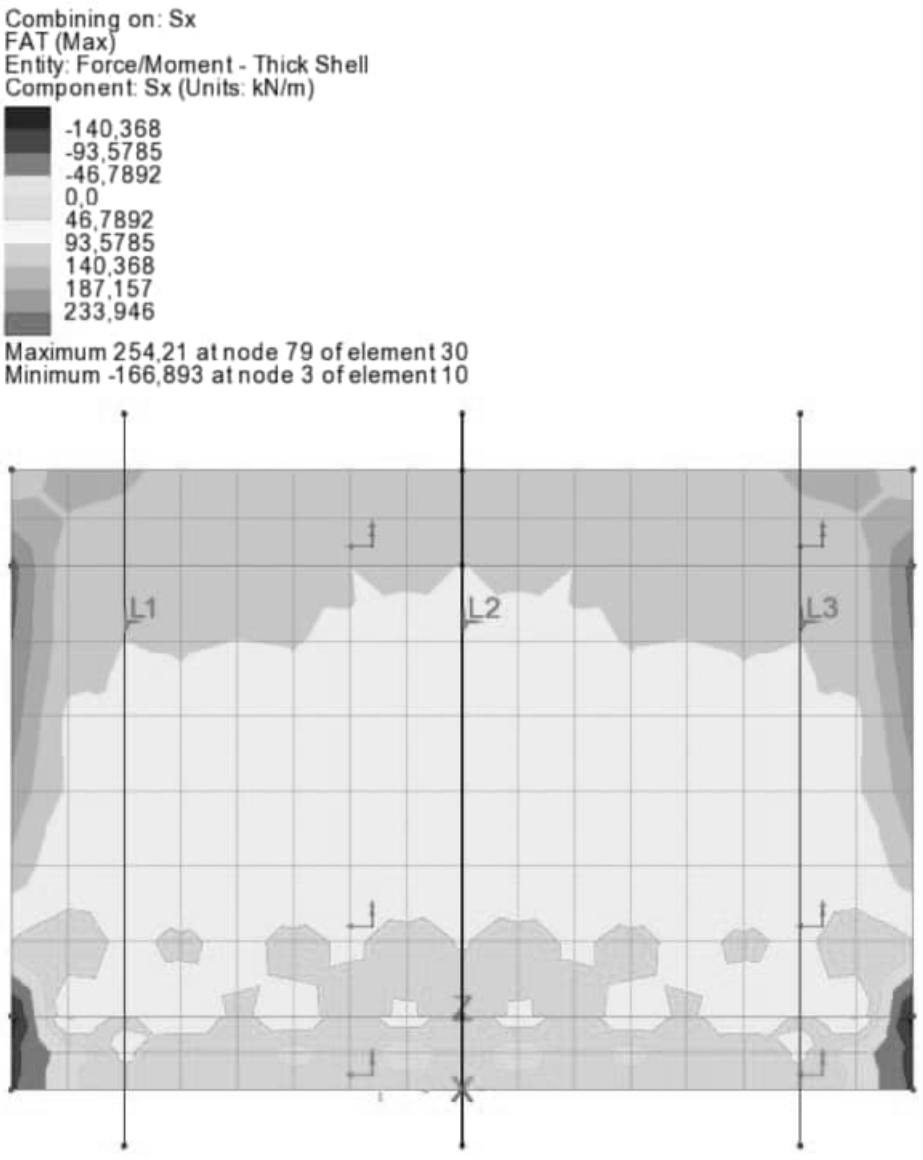


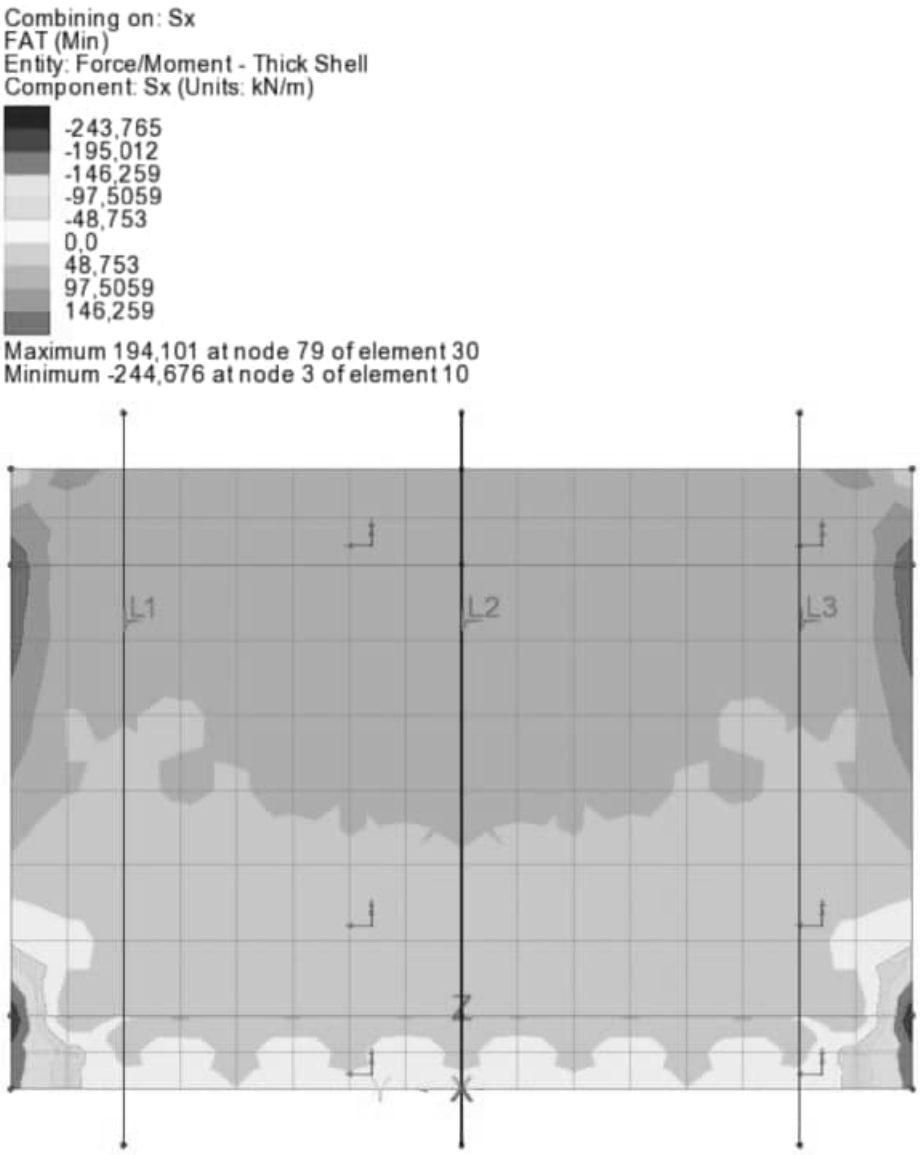

Enveloping on: Sx
VLO - UTM 3 ~ Characteristic (Min)
Entity: Force/Moment - Thick Shell
Component: Sx (Units: kN/m)
-55,5444
-50,4949
-45,4454
-40,3959
-35,3464
-30,297
-25,2475
-20,198
-15,1485
Maximum -11,1969 at node 556 of element 200 (3452:Inf3 (Sx) - (-4.5, 0.0, 5.5) - (Element 563, Element 564) - Negative - Characteristic (3452))
Minimum -56,6423 at node 638 of element 201 (3295:Inf1 (Mx) - (4.5, -3.0, 5.5) - Positive - Characteristic (3295))
L4
L5
L6

19. FAT - Min Sx/Max Sx

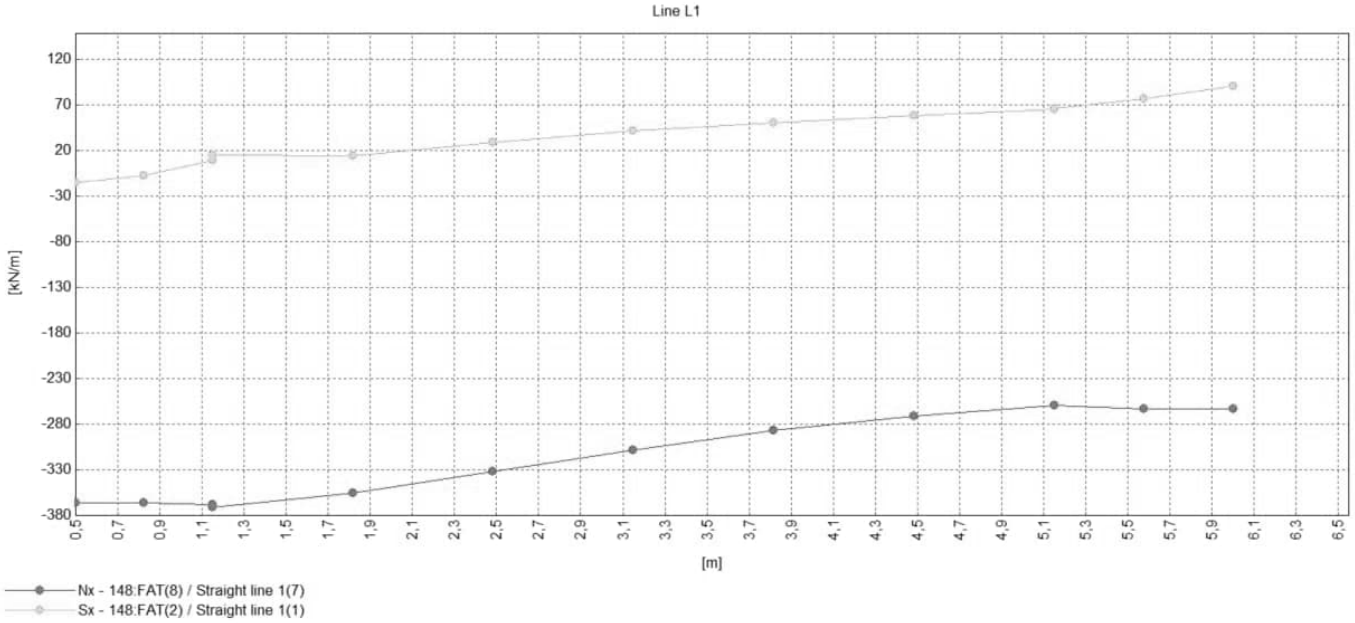
19.1 ABUTEMENT 1

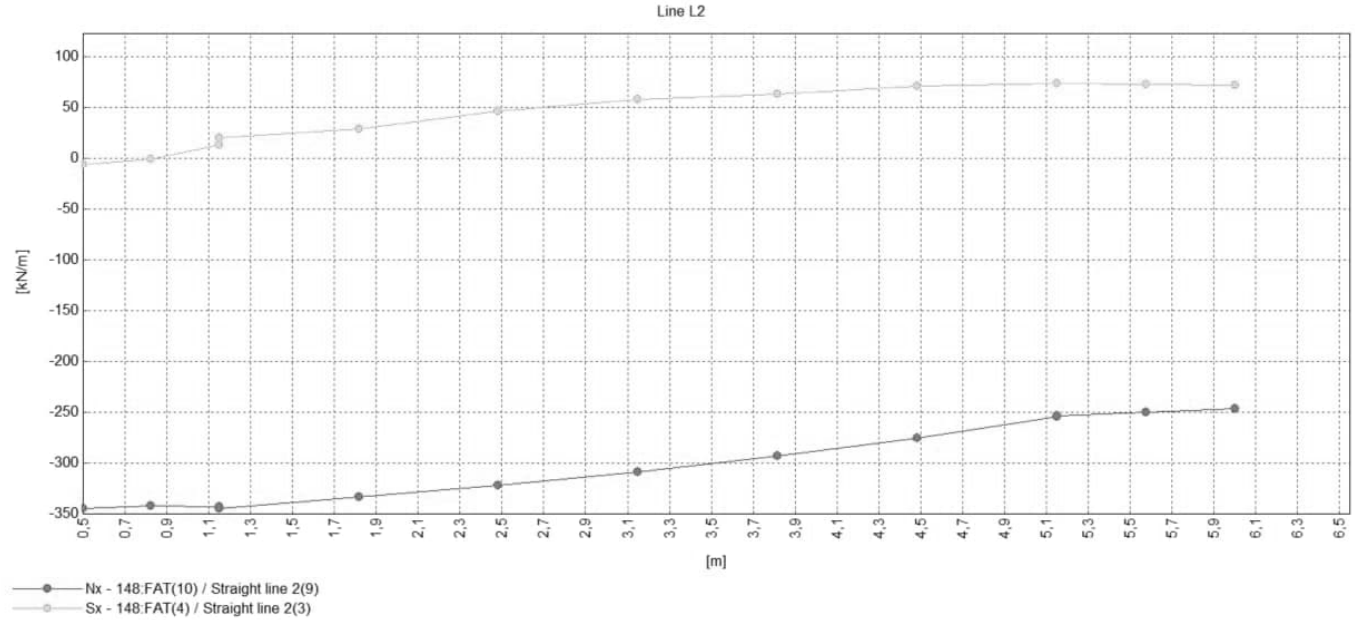
19.1.1 Contour

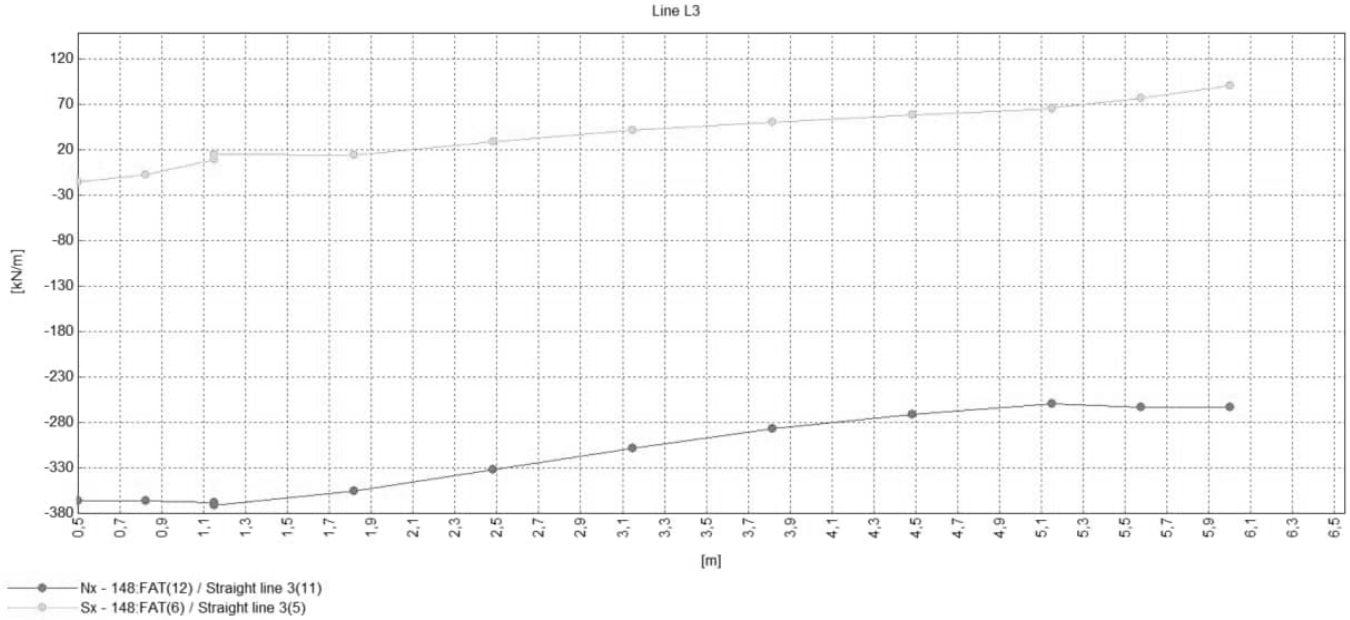


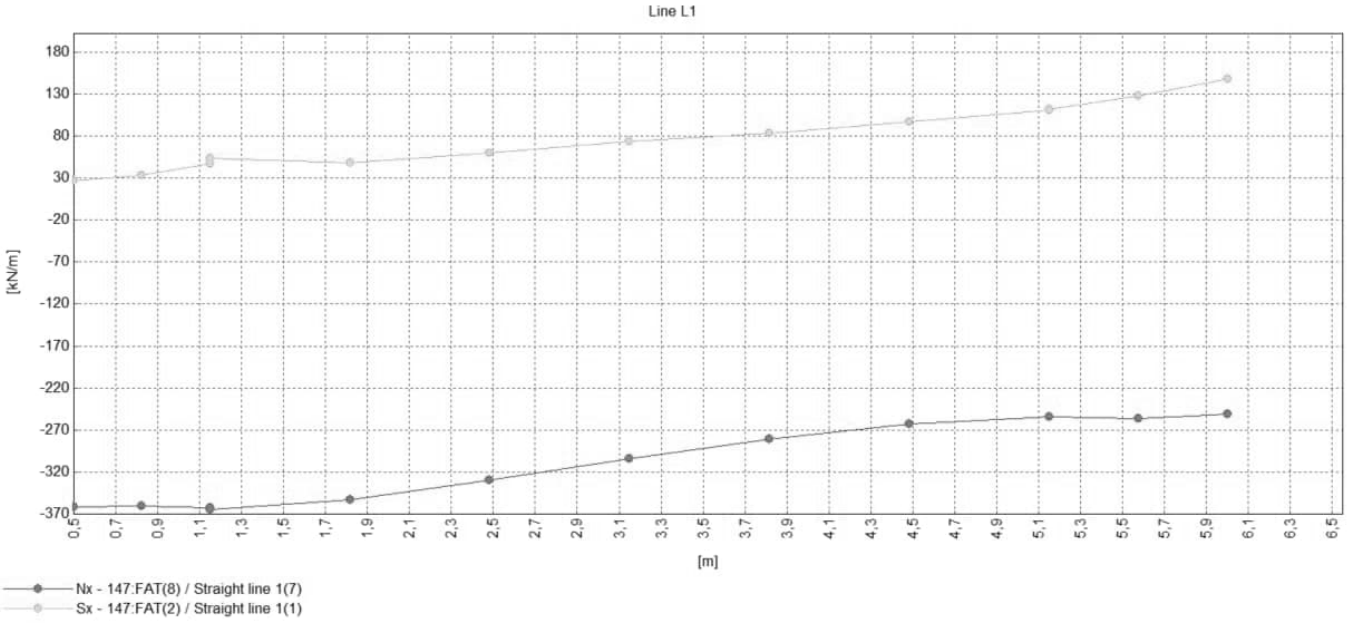

Combining on: Sx
FAT (Min)
Entity: Force/Moment - Thick Shell
Component: Sx (Units: kN/m)
-243,765
-195,012
-146,259
-97,5059
-48,753
0,0
48,753
97,5059
146,259
Maximum 194,101 at node 79 of element 30
Minimum -244,676 at node 3 of element 10
L1
L2
L3

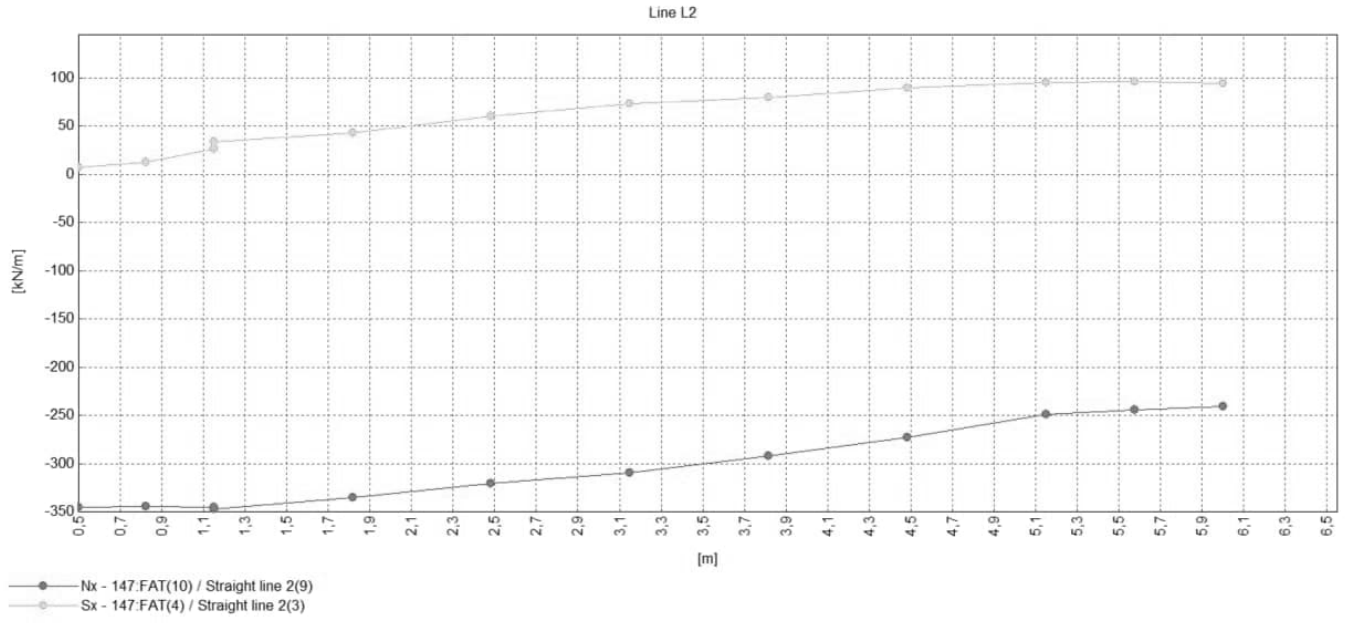
19.1.2 Diagram

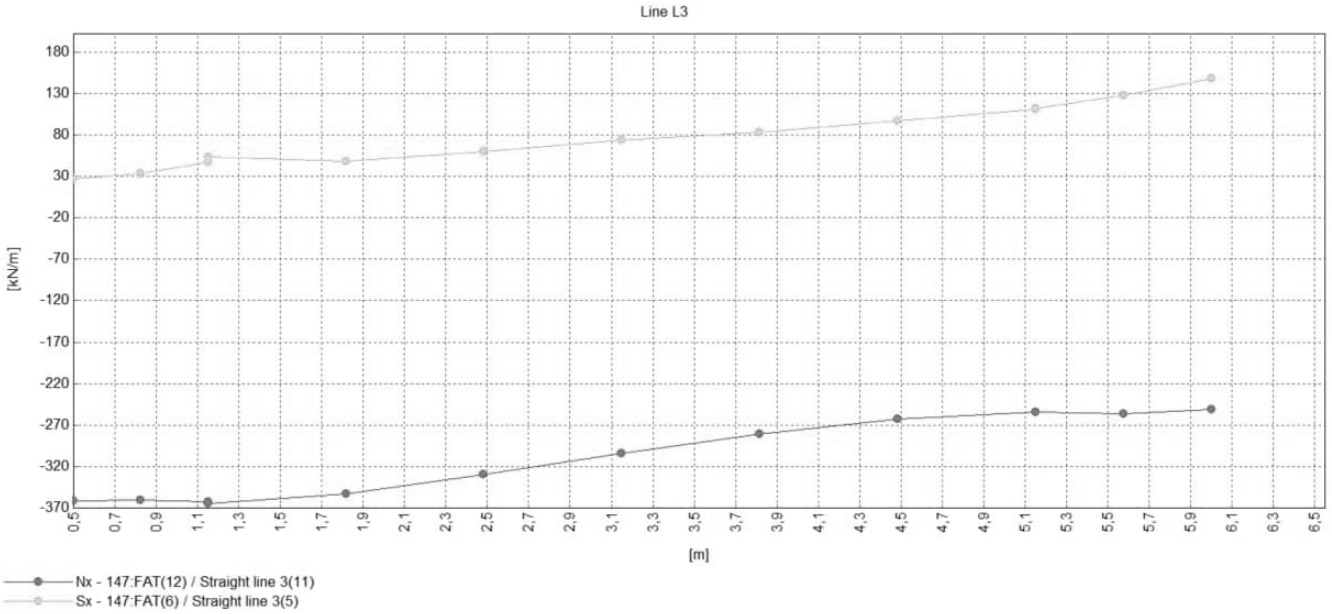





Line L3
120
70
20
-30
-80
-130
-180
-230
-280
-330
-380
[kN/m]
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
[m]
Nx - 148:FAT(12) / Straight line 3(11)
Sx - 148:FAT(6) / Straight line 3(5)


Line L1
180
130
80
30
-20
-70
-120
-170
-220
-270
-320
-370
[kN/m]
0,5 0,7 0,9 1,1 1,3 1,5 1,7 1,9 2,1 2,3 2,5 2,7 2,9 3,1 3,3 3,5 3,7 3,9 4,1 4,3 4,5 4,7 4,9 5,1 5,3 5,5 5,7 5,9 6,1 6,3 6,5
[m]
Nx - 147:FAT(8) / Straight line 1(7)
Sx - 147:FAT(2) / Straight line 1(1)


Line L2
100
50
0
-50
-100
-150
-200
-250
-300
-350
[kN/m]
0,5 0,7 0,9 1,1 1,3 1,5 1,7 1,9 2,1 2,3 2,5 2,7 2,9 3,1 3,3 3,5 3,7 3,9 4,1 4,3 4,5 4,7 4,9 5,1 5,3 5,5 5,7 5,9 6,1 6,3 6,5
[m]
Nx - 147:FAT(10) / Straight line 2(9)
Sx - 147:FAT(4) / Straight line 2(3)


Line L3
180
130
80
30
-20
-70
-120
-170
-220
-270
-320
-370
[kN/m]
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
[m]
Nx - 147:FAT(12) / Straight line 3(11)
Sx - 147:FAT(6) / Straight line 3(5)

19.1.3 Tables

Line 1:

s	Min Sx	Tillh Nx	Max Sx	Tillh Nx
0,50	-16	-366	27	-361
0,83	-8	-366	33	-361
1,15	9	-369	47	-363
1,15	15	-371	54	-365
1,82	14	-356	48	-353
2,48	28	-332	60	-330
3,15	42	-308	73	-304
3,82	50	-287	83	-281
4,48	58	-271	97	-263
5,15	65	-260	111	-255
5,15	65	-260	112	-254
5,58	77	-263	128	-257
6,00	91	-263	148	-251
m	kN/m	kN/m	kN/m	kN/m

Line 2:

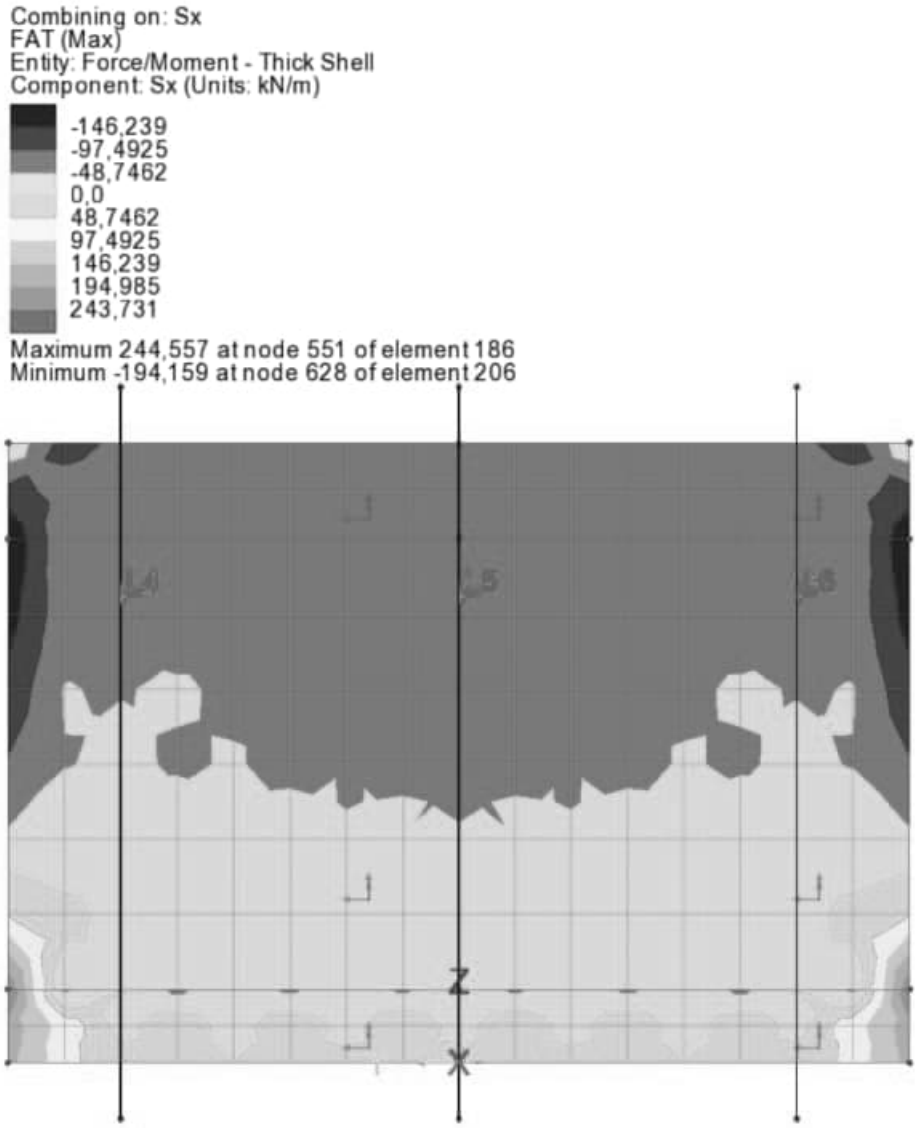
s	Min Sx	Tillh Nx	Max Sx	Tillh Nx
0,50	-6	-345	7	-346
0,83	-1	-342	13	-344
1,15	13	-343	27	-345
1,15	20	-345	33	-347
1,82	29	-333	43	-335
2,48	47	-322	61	-320
3,15	58	-309	73	-309
3,82	63	-293	79	-292
4,48	71	-275	89	-273
5,15	74	-254	95	-249
5,15	74	-253	96	-249
5,58	73	-250	96	-244
6,00	73	-247	94	-241
m	kN/m	kN/m	kN/m	kN/m

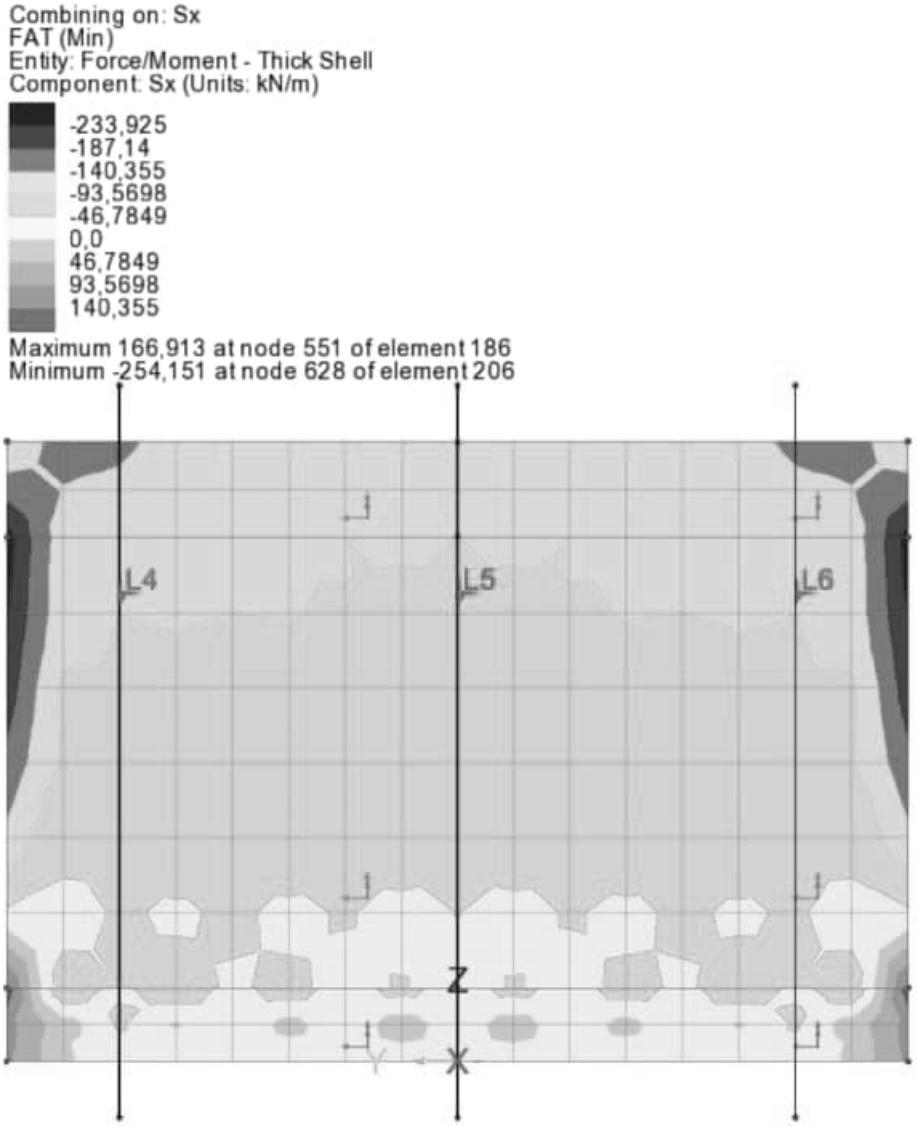
Line 3:

s	Min Sx	Tillh Nx	Max Sx	Tillh Nx
0,50	-16	-366	27	-361
0,83	-8	-366	33	-361
1,15	9	-369	47	-363
1,15	15	-371	54	-365
1,82	14	-356	48	-353
2,48	28	-332	60	-330
3,15	42	-308	73	-304
3,82	50	-287	83	-281
4,48	58	-271	97	-263
5,15	65	-260	111	-255
5,15	65	-260	112	-254
5,58	77	-263	128	-257
6,00	91	-263	148	-251
m	kN/m	kN/m	kN/m	kN/m

19.2 ABUTEMENT 2

19.2.1 Contour

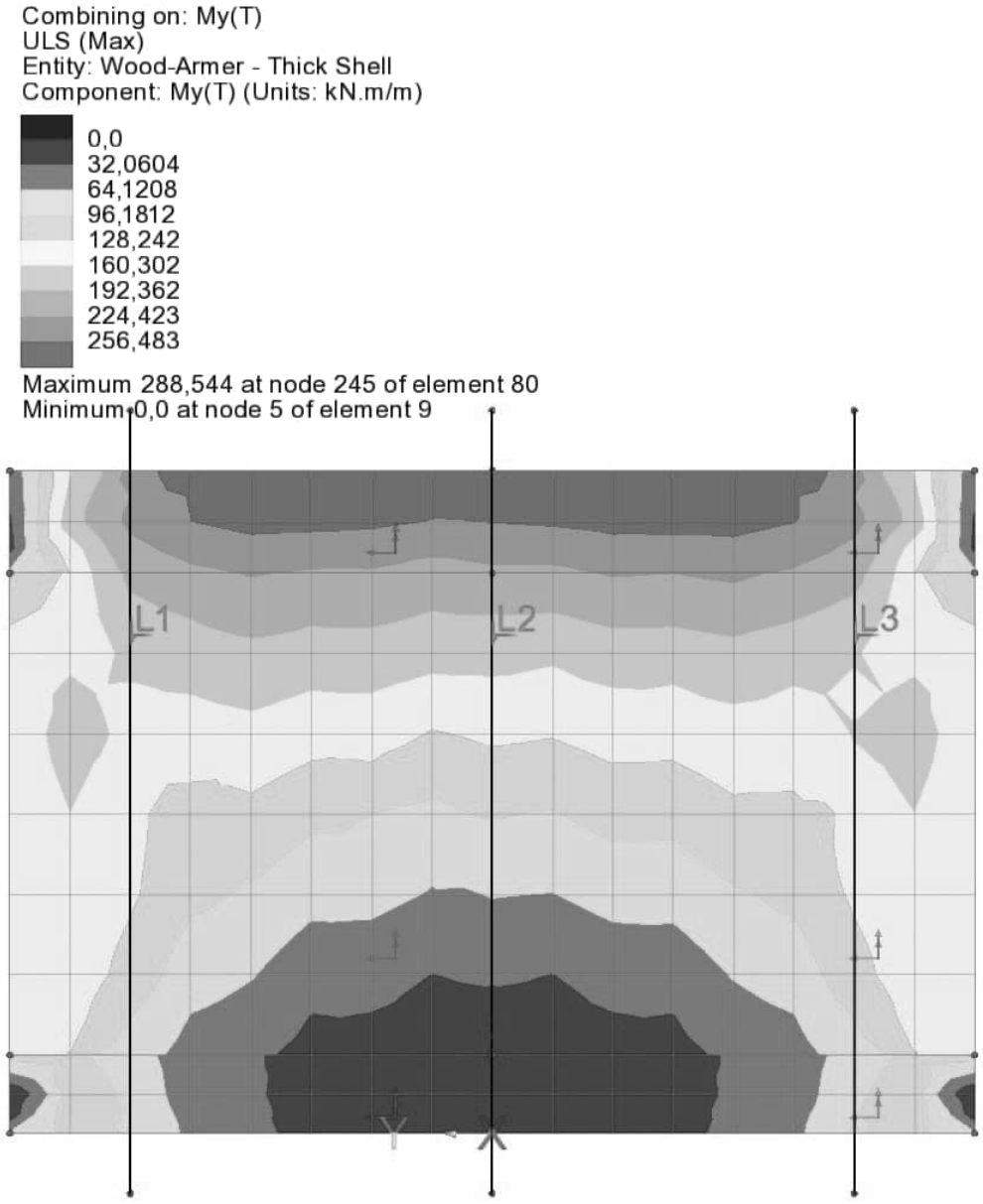


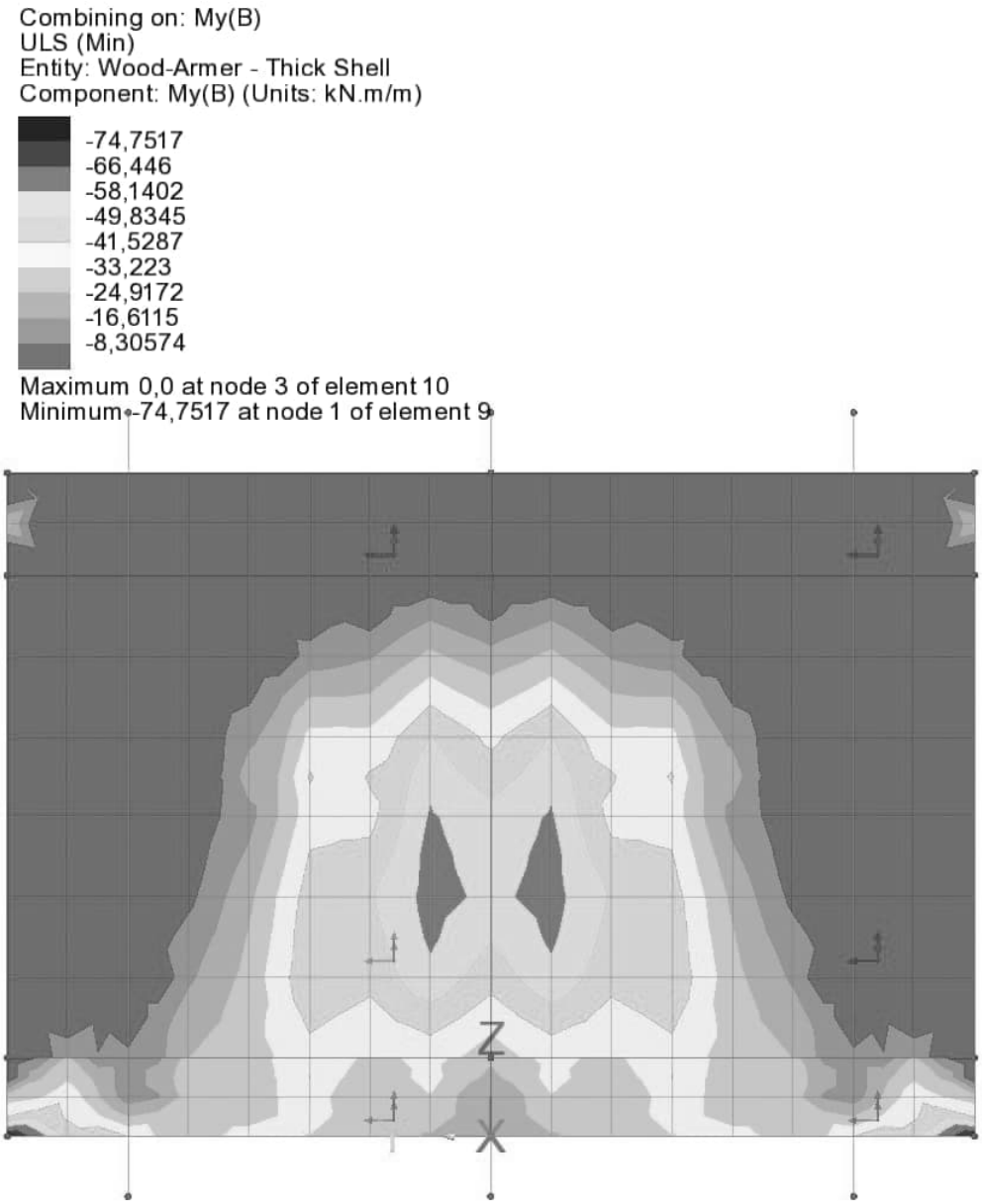

Combining on: Sx
FAT (Min)
Entity: Force/Moment - Thick Shell
Component: Sx (Units: kN/m)
-233,925
-187,14
-140,355
-93,5698
-46,7849
0,0
46,7849
93,5698
140,355
Maximum 166,913 at node 551 of element 186
Minimum -254,151 at node 628 of element 206
L4
L5
L6
Z
Y
X

20. ULS - Min My(B)/Max My(T)

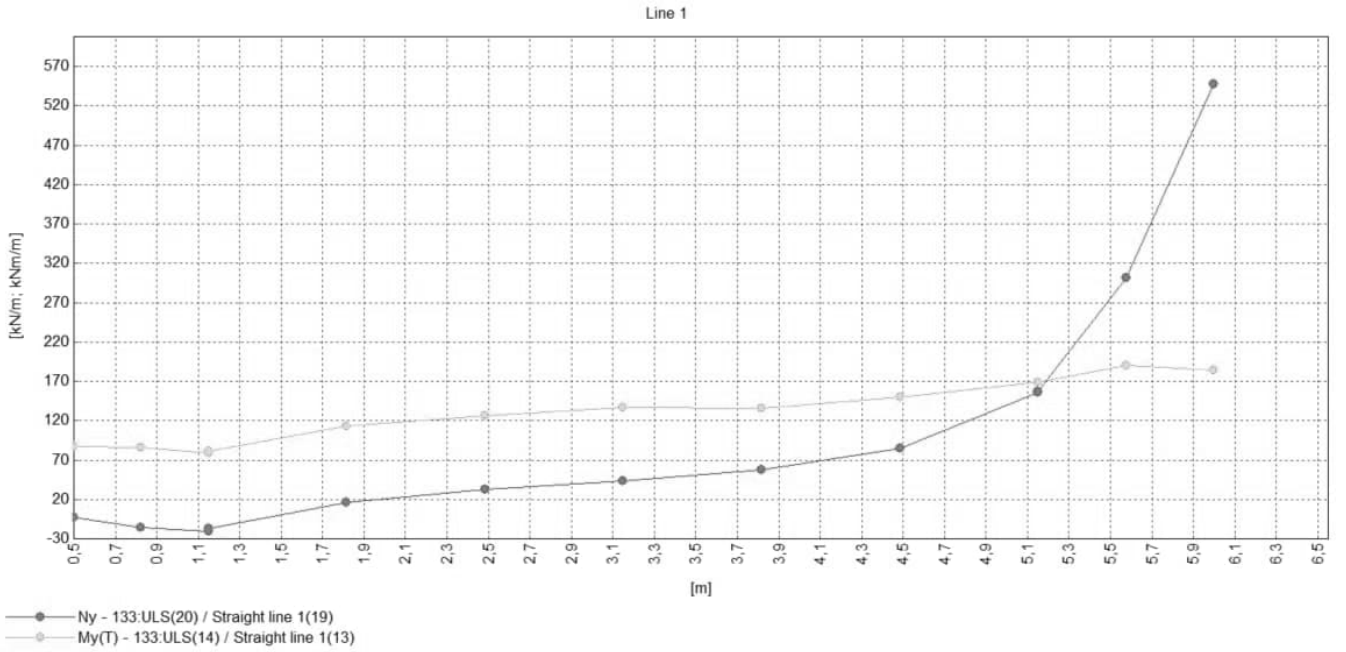
20.1 ABUTEMENT 1

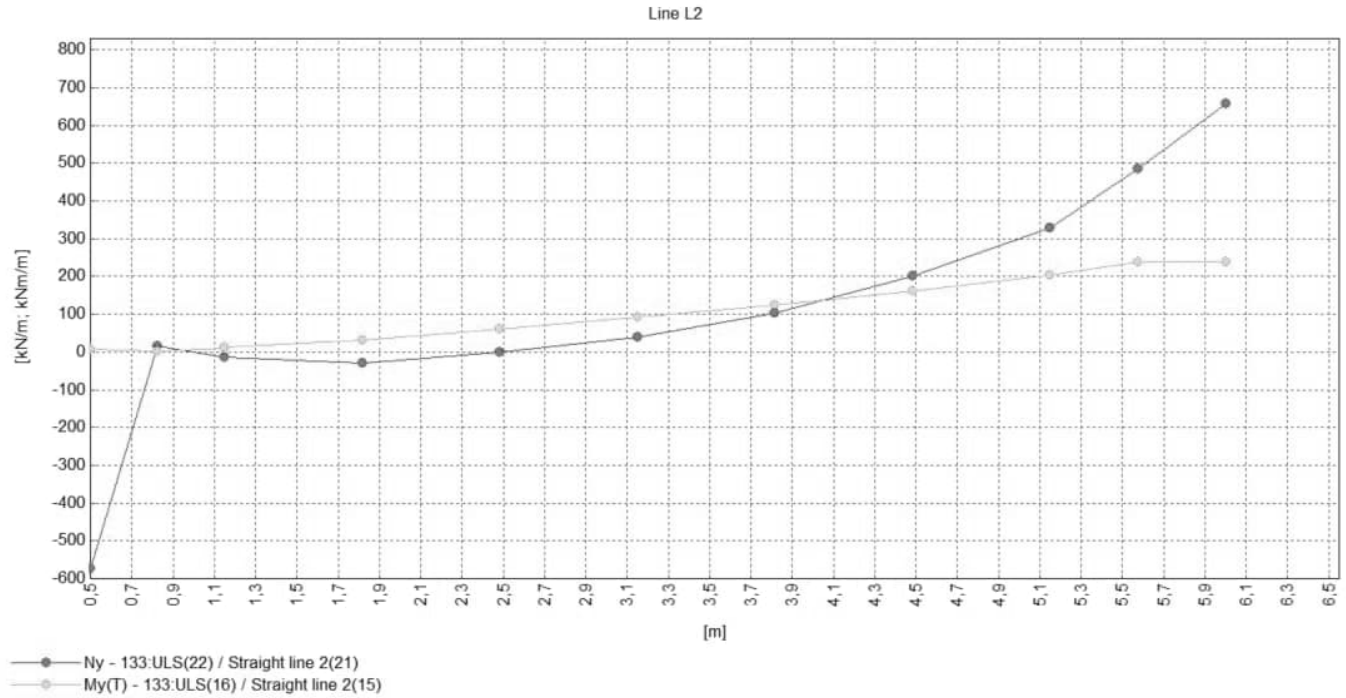
20.1.1 Contour

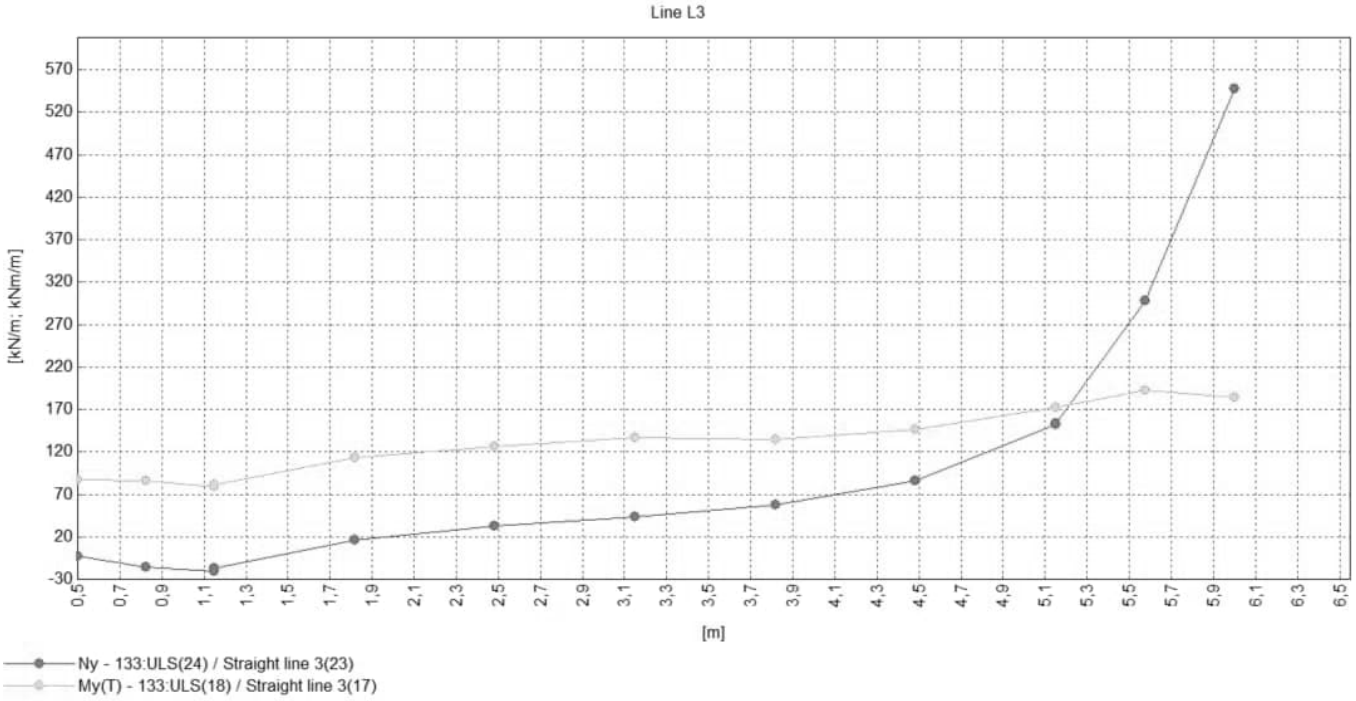


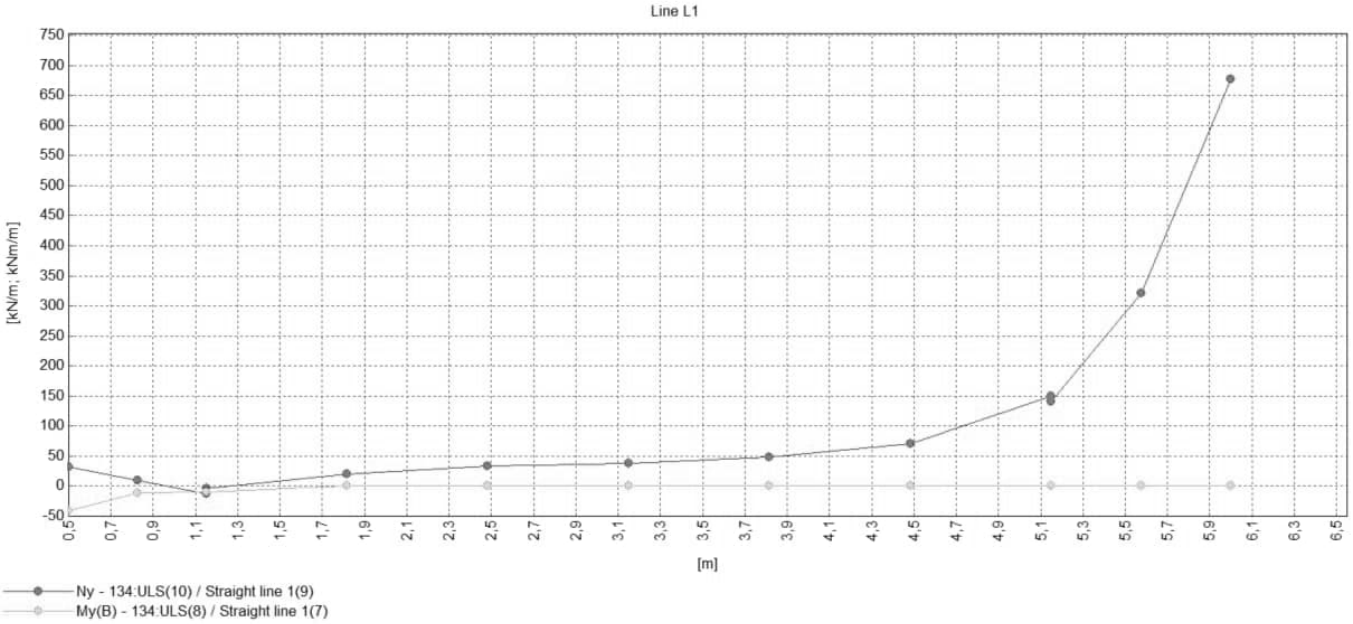

Combining on: My(B)
ULS (Min)
Entity: Wood-Armer - Thick Shell
Component: My(B) (Units: kN.m/m)
-74,7517
-66,446
-58,1402
-49,8345
-41,5287
-33,223
-24,9172
-16,6115
-8,30574
Maximum 0,0 at node 3 of element 10
Minimum -74,7517 at node 1 of element 9
Z
X

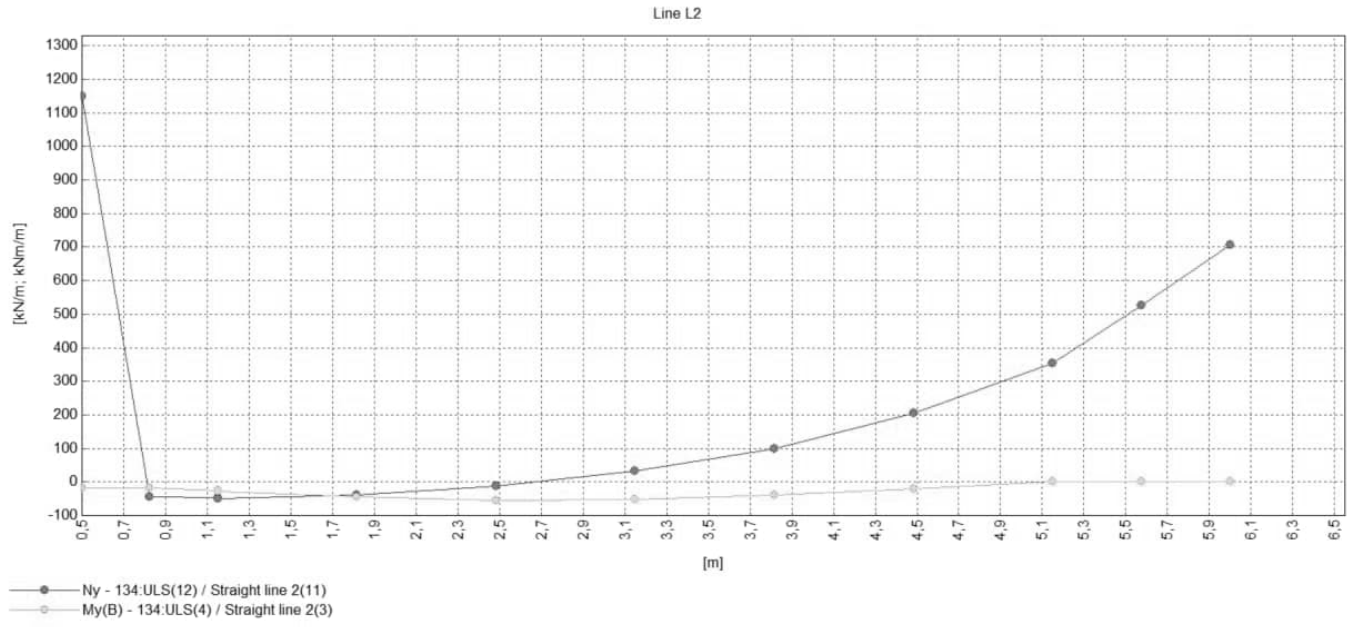
20.1.2 Diagram

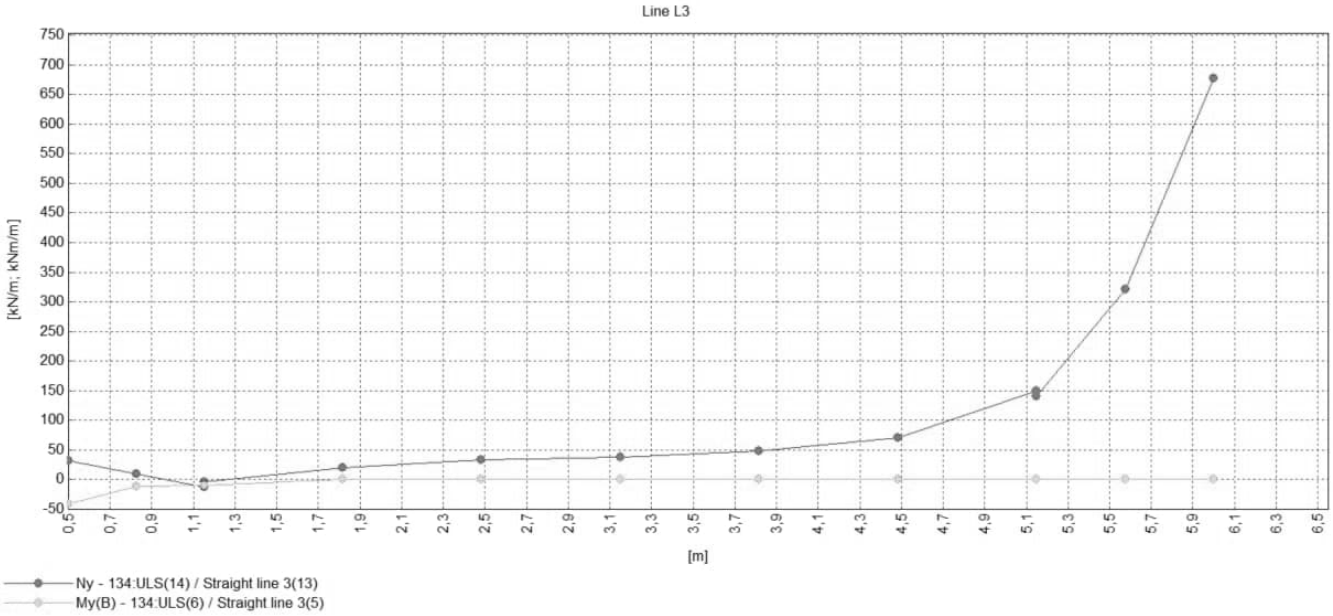





Line L3
[kN/m; kNm/m]
570
520
470
420
370
320
270
220
170
120
70
20
-30
0,5
0,7
0,9
1,1
1,3
1,5
1,7
1,9
2,1
2,3
2,5
2,7
2,9
3,1
3,3
3,5
3,7
3,9
4,1
4,3
4,5
4,7
4,9
5,1
5,3
5,5
5,7
5,9
6,1
6,3
6,5
[m]
Ny - 133:ULS(24) / Straight line 3(23)
My(T) - 133:ULS(18) / Straight line 3(17)


Line L1
[kN/m; kNm/m]
[m]
Ny - 134:ULS(10) / Straight line 1(9)
My(B) - 134:ULS(8) / Straight line 1(7)


Line L2
[kN/m; kNm/m]
[m]
Ny - 134:ULS(12) / Straight line 2(11)
My(B) - 134:ULS(4) / Straight line 2(3)


Line L3
[kN/m; kNm/m]
[m]
Ny - 134:ULS(14) / Straight line 3(13)
My(B) - 134:ULS(6) / Straight line 3(5)

20.1.3 Tables

Line 1:

s	Min My(B)	Tillh Ny	Max My(T)	Tillh Ny
0,50	-41	32	88	-3
0,83	-11	10	86	-16
1,15	-10	-13	79	-21
1,15	-9	-4	81	-17
1,82	0	20	113	16
2,48	0	33	126	33
3,15	0	37	136	43
3,82	0	48	136	57
4,48	0	71	150	85
5,15	0	149	169	156
5,15	0	141	169	157
5,58	0	320	191	301
6,00	0	677	185	547
m	kNm/m	kN/m	kNm/m	kN/m

Line 2:

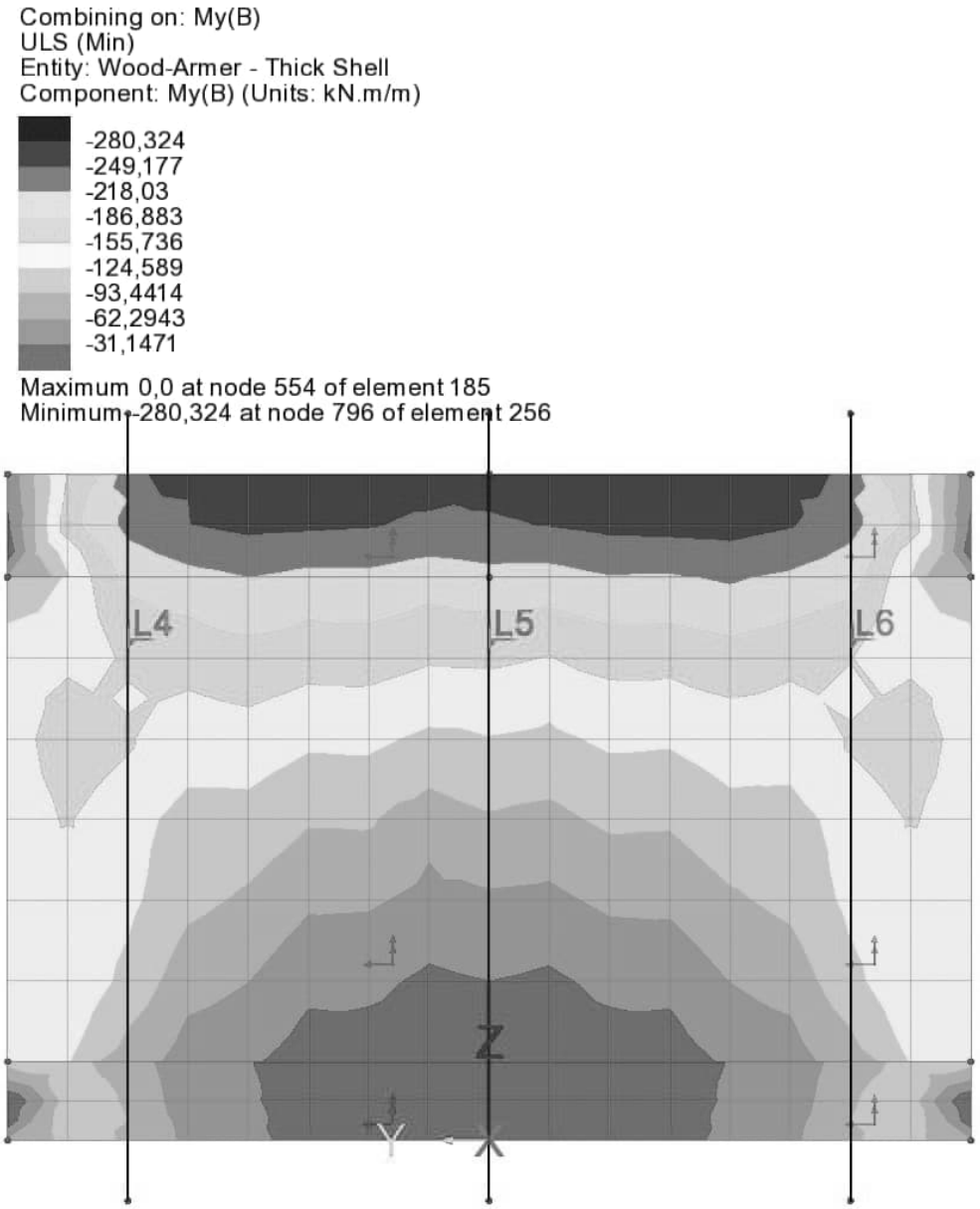
s	Min My(B)	Tillh Ny	Max My(T)	Tillh Ny
0,50	-18	1148	7	-573
0,83	-17	-44	2	17
1,15	-26	-48	11	-12
1,15	-28	-49	12	-13
1,82	-45	-38	32	-30
2,48	-55	-13	61	-1
3,15	-52	31	92	40
3,82	-40	99	125	103
4,48	-22	206	161	201
5,15	0	355	204	329
5,15	0	353	203	328
5,58	0	526	237	484
6,00	0	706	238	657
m	kNm/m	kN/m	kNm/m	kN/m

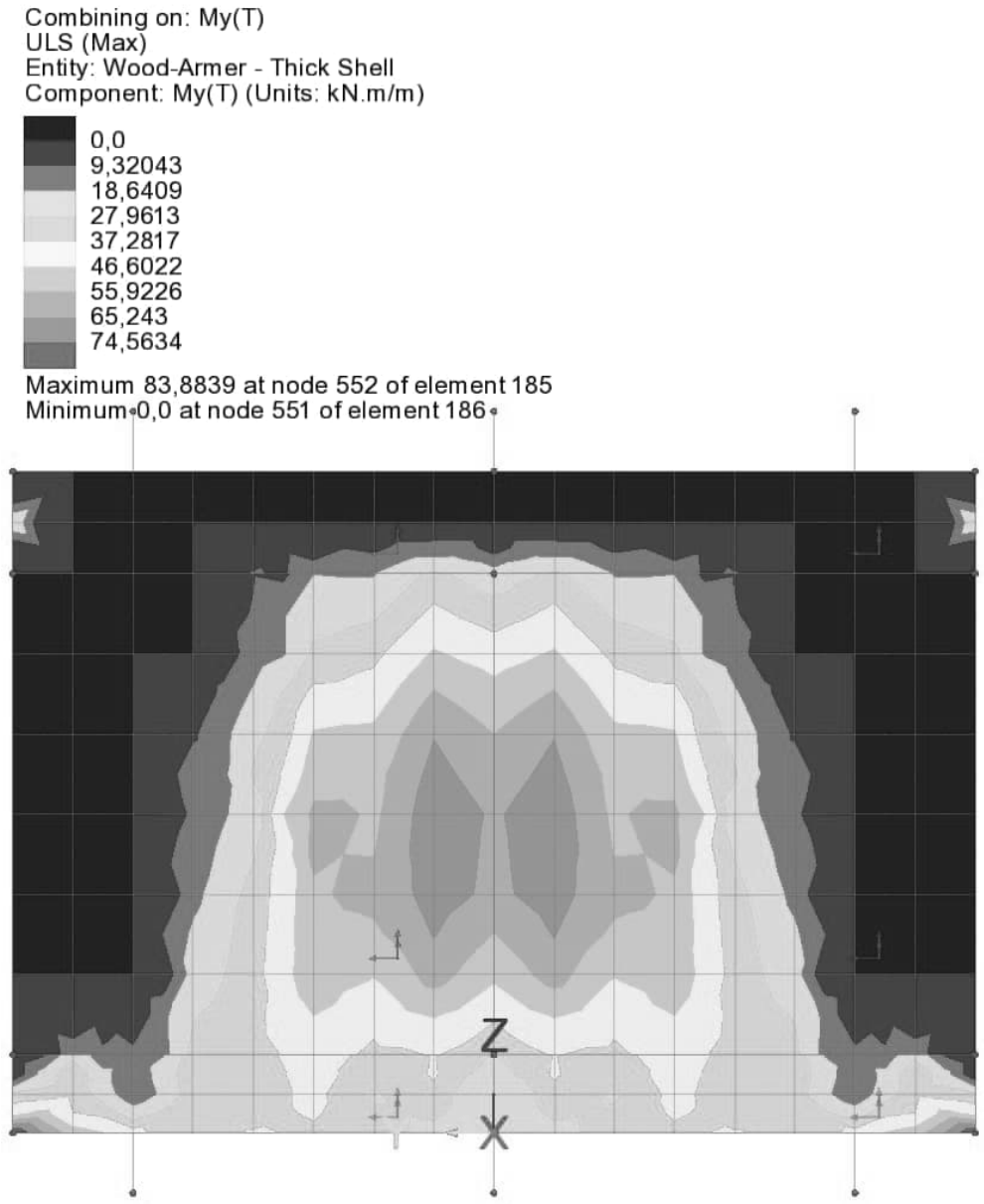
Line 3:

s	Min My(B)	Tillh Ny	Max My(T)	Tillh Ny
0,50	-41	32	88	-3
0,83	-11	10	86	-16
1,15	-10	-13	79	-21
1,15	-9	-4	81	-17
1,82	0	20	113	16
2,48	0	33	126	33
3,15	0	37	136	43
3,82	0	48	135	57
4,48	0	71	146	86
5,15	0	149	173	153
5,15	0	141	172	153
5,58	0	320	192	298
6,00	0	677	185	547
m	kNm/m	kN/m	kNm/m	kN/m

20.2 ABUTEMENT 2

20.2.1 Contour

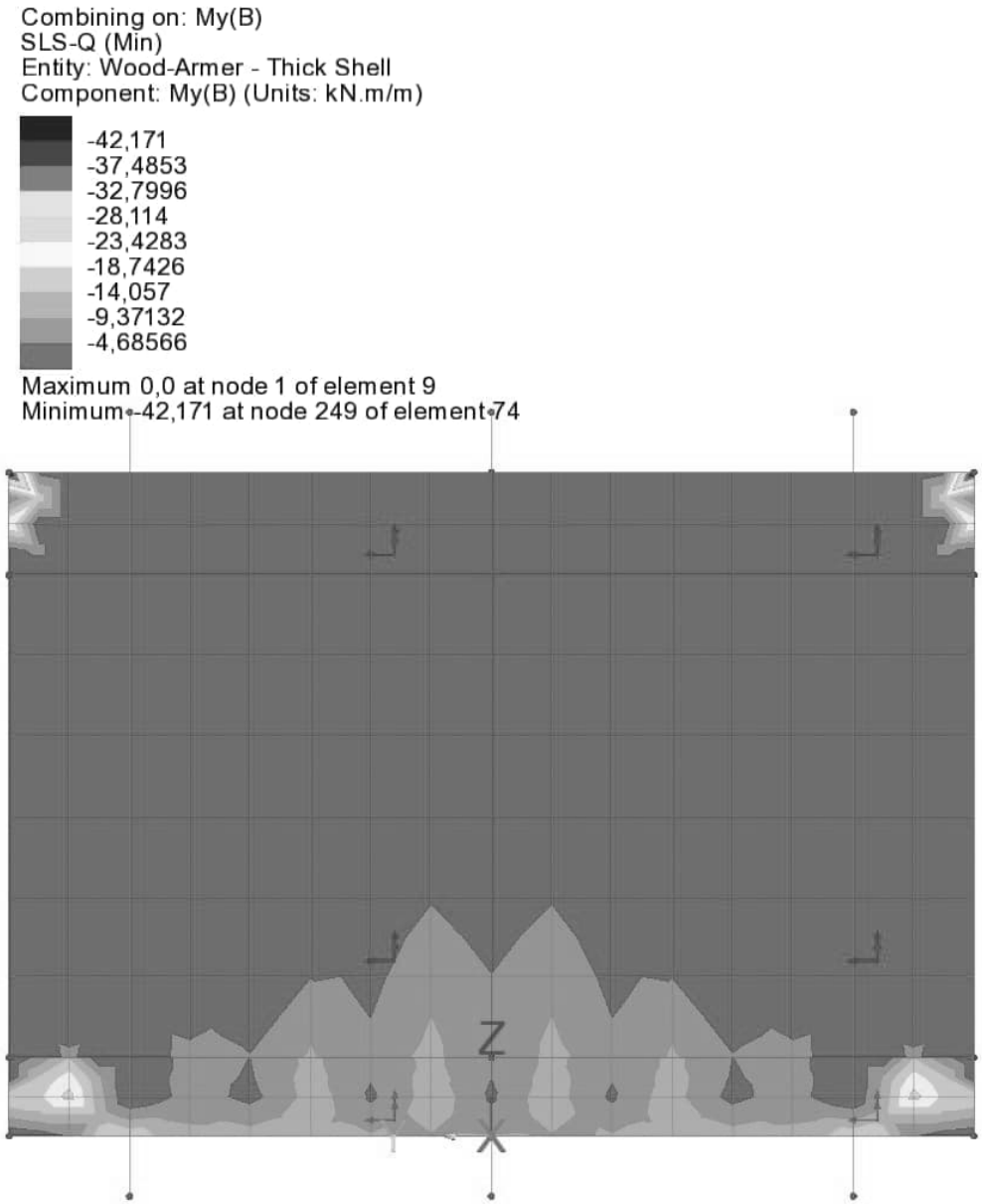


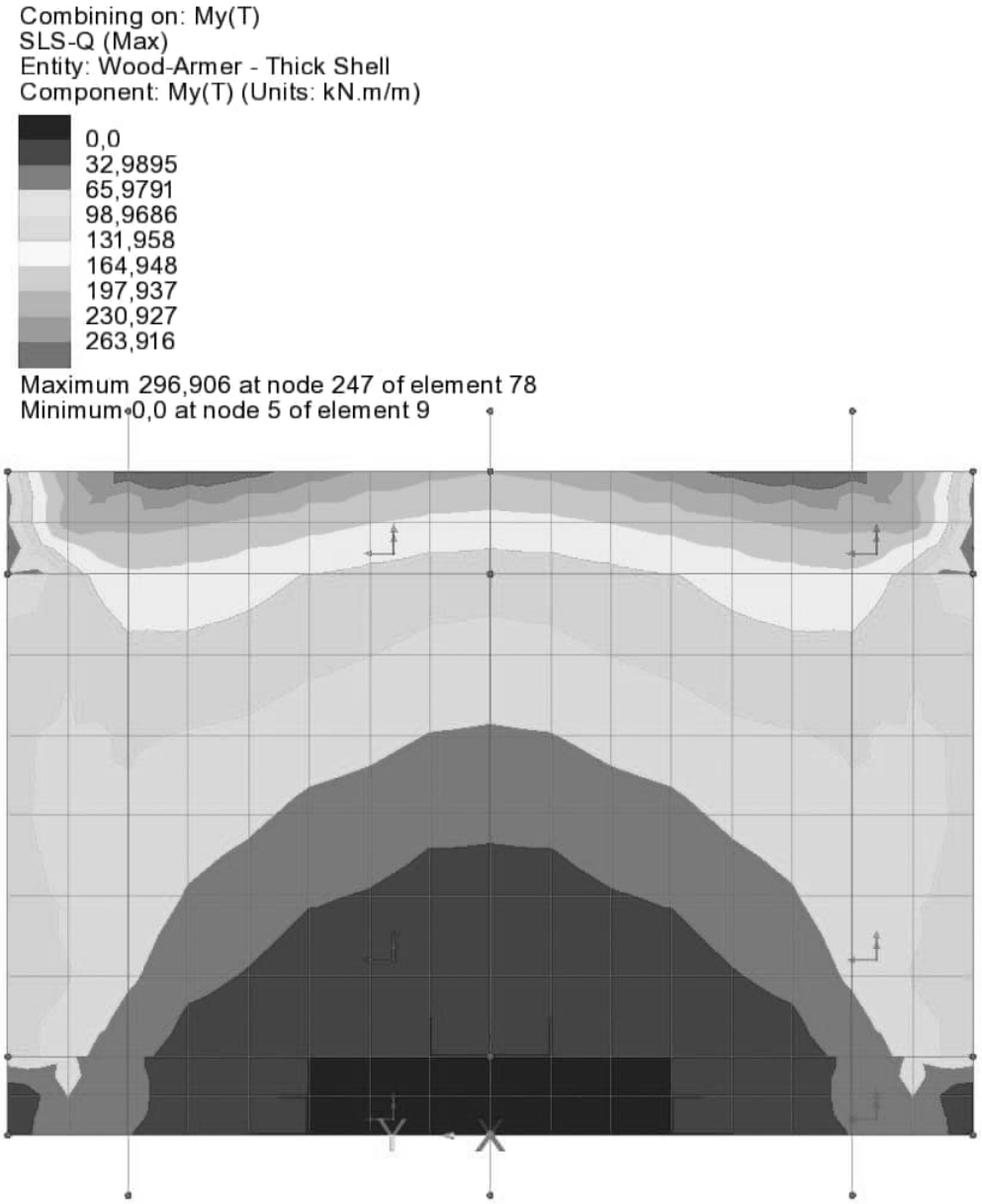

Combining on: My(T)
ULS (Max)
Entity: Wood-Armer - Thick Shell
Component: My(T) (Units: kN.m/m)
0,0
9,32043
18,6409
27,9613
37,2817
46,6022
55,9226
65,243
74,5634
Maximum 83,8839 at node 552 of element 185
Minimum 0,0 at node 551 of element 186
Z
X

21. SLS-Q Min My(B)/Max My(T)

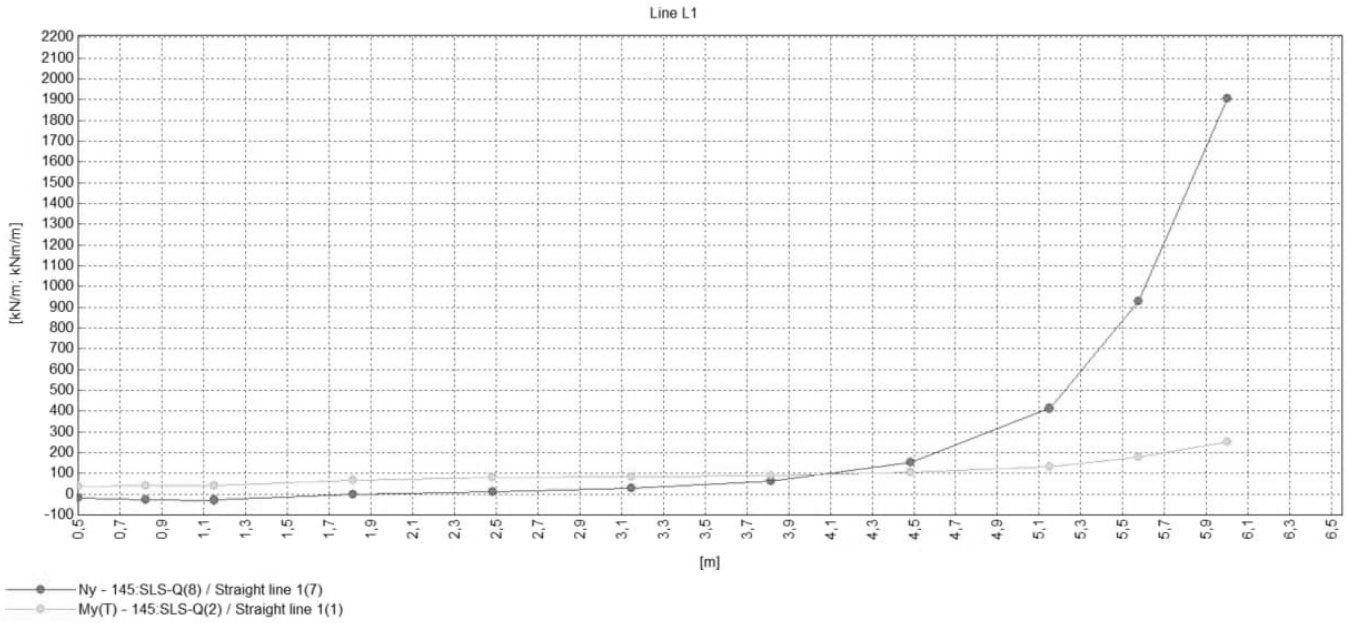
21.1 ABUTEMENT 1

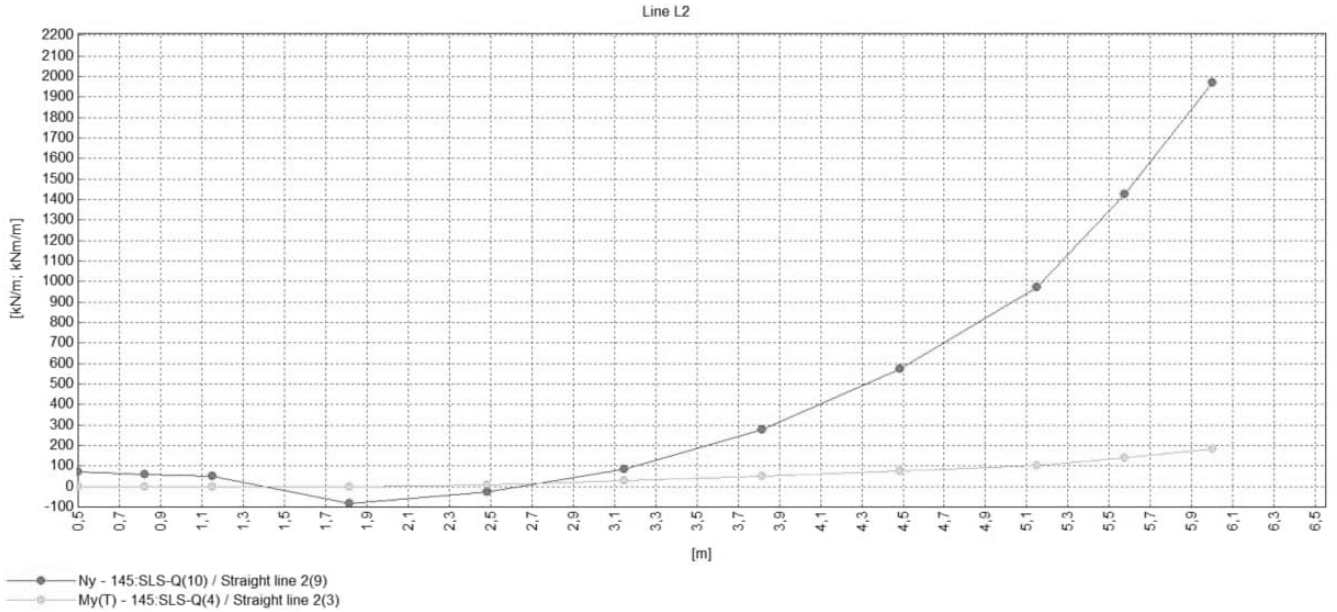
21.1.1 Contour

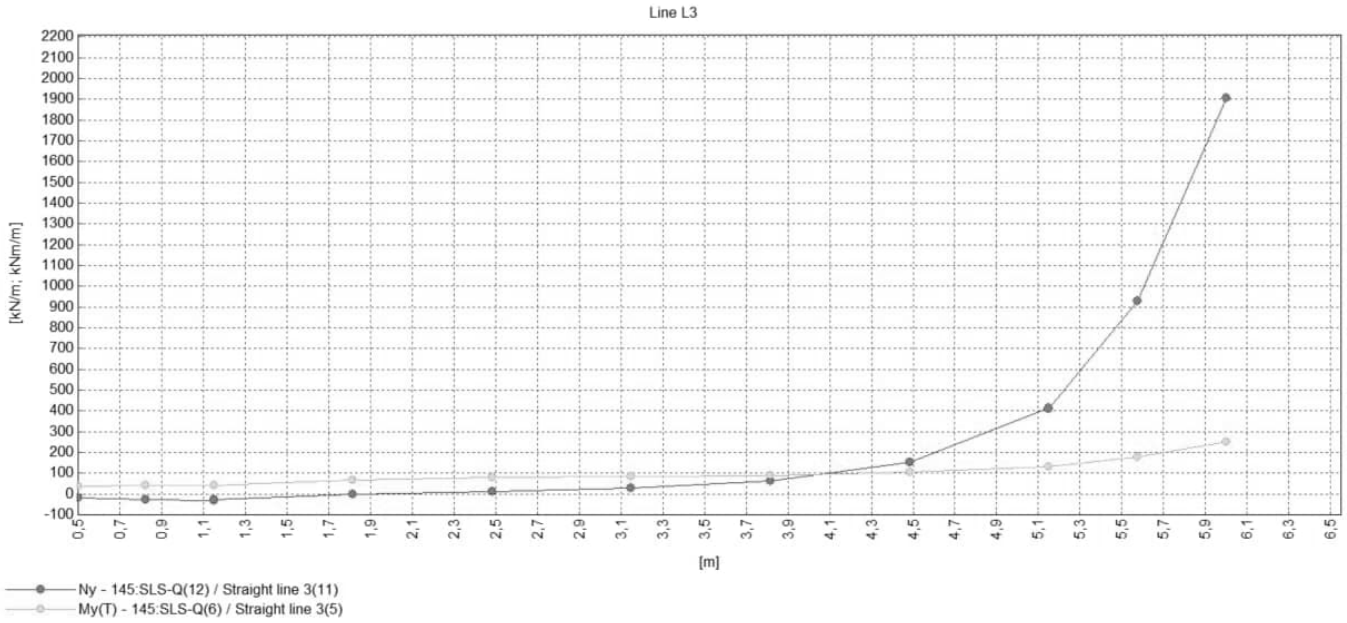


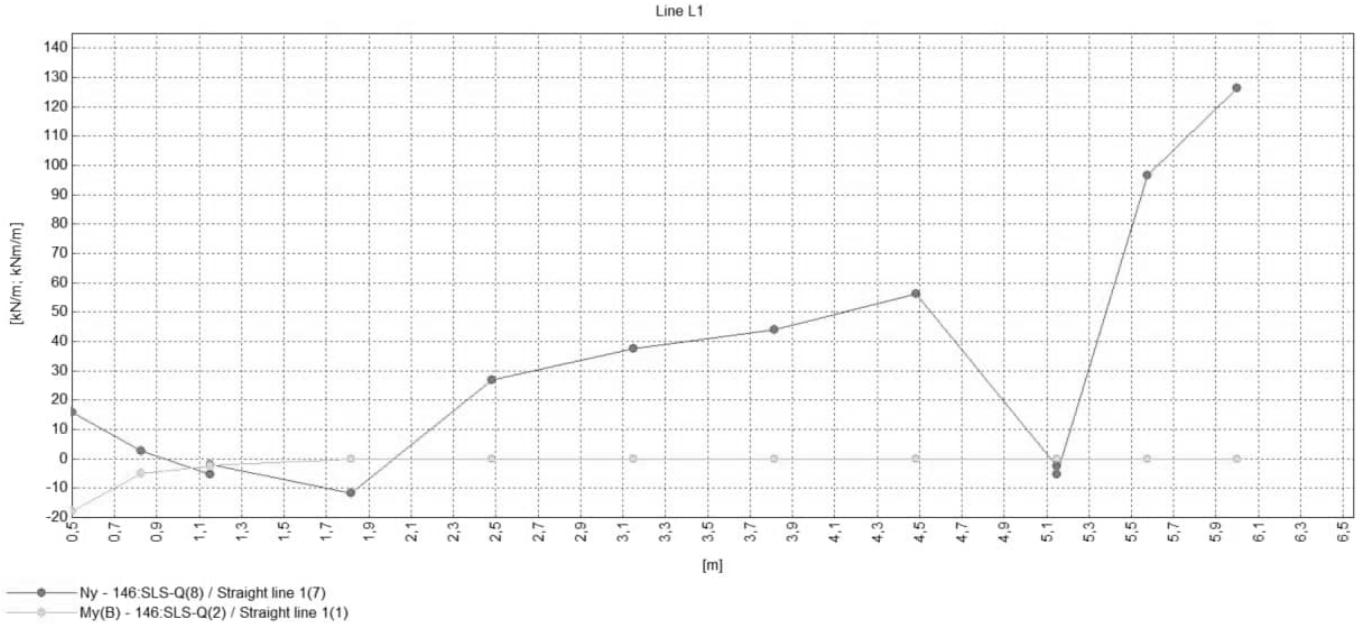

Combining on: My(T)
SLS-Q (Max)
Entity: Wood-Armer - Thick Shell
Component: My(T) (Units: kN.m/m)
0,0
32,9895
65,9791
98,9686
131,958
164,948
197,937
230,927
263,916
Maximum 296,906 at node 247 of element 78
Minimum 0,0 at node 5 of element 9
Y
X

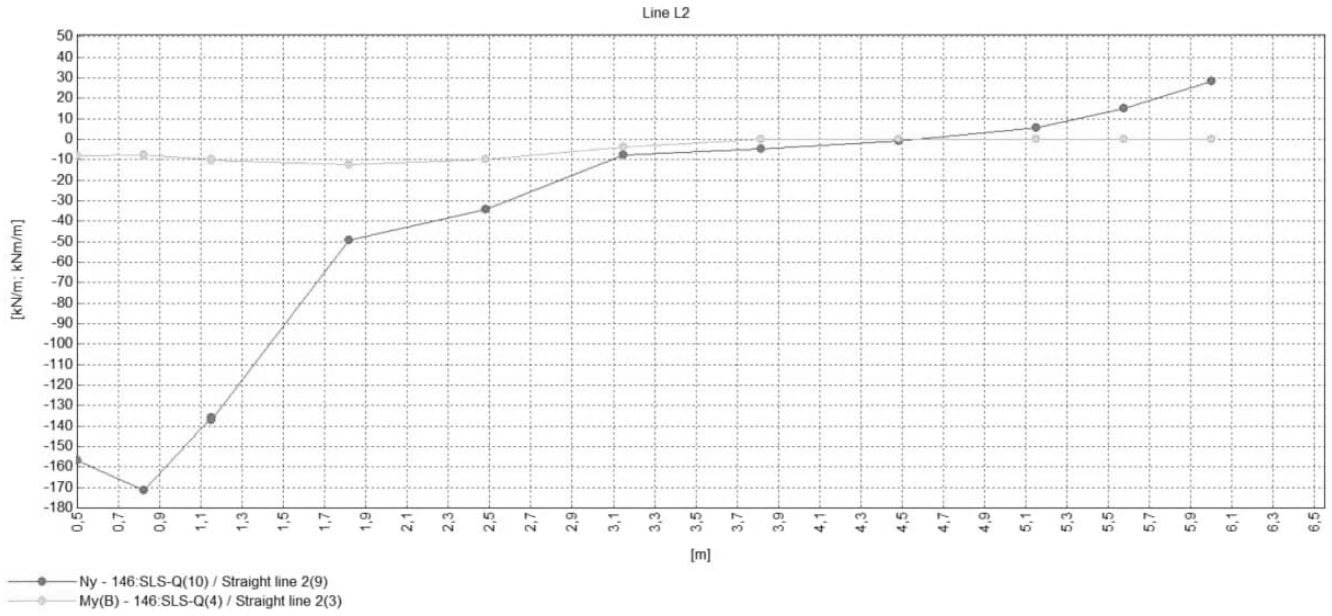
21.1.2 Diagram

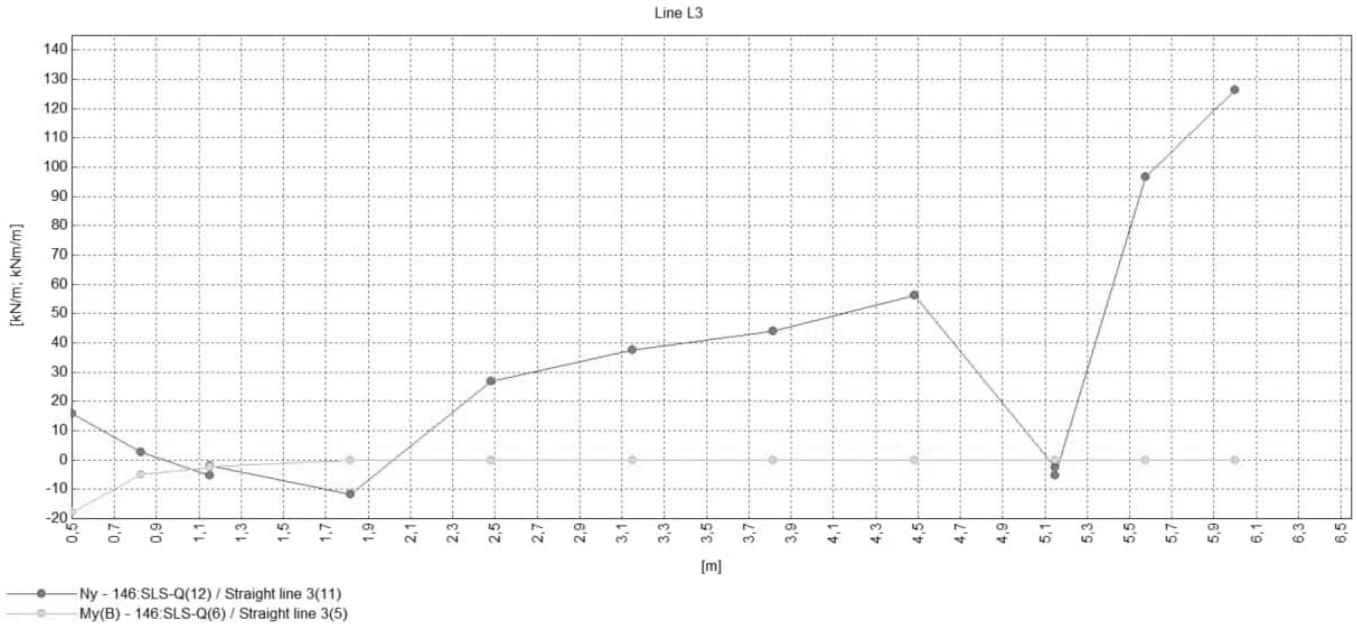





Line L3
[kN/m; kNm/m]
[m]
Ny - 145:SLS-Q(12) / Straight line 3(11)
My(T) - 145:SLS-Q(6) / Straight line 3(5)


Line L1
[kN/m; kNm/m]
[m]
Ny - 146:SLS-Q(8) / Straight line 1(7)
My(B) - 146:SLS-Q(2) / Straight line 1(1)


Line L2
[kN/m; kNm/m]
[m]
Ny - 146:SLS-Q(10) / Straight line 2(9)
My(B) - 146:SLS-Q(4) / Straight line 2(3)


Line L3
[kN/m; kNm/m]
[m]
Ny - 146:SLS-Q(12) / Straight line 3(11)
My(B) - 146:SLS-Q(6) / Straight line 3(5)

21.1.3 Tables

Line 1:

s	Min My(B)	Tillh Ny	Max My(T)	Tillh Ny
0,50	-18	16	35	-18
0,83	-5	3	42	-28
1,15	-2	-5	41	-32
1,15	-2	-2	43	-28
1,82	0	-12	68	-3
2,48	0	27	78	11
3,15	0	37	83	27
3,82	0	44	90	63
4,48	0	56	105	153
5,15	0	-2	130	412
5,15	0	-5	132	410
5,58	0	97	179	928
6,00	0	126	249	1907
m	kNm/m	kN/m	kNm/m	kN/m

Line 2:

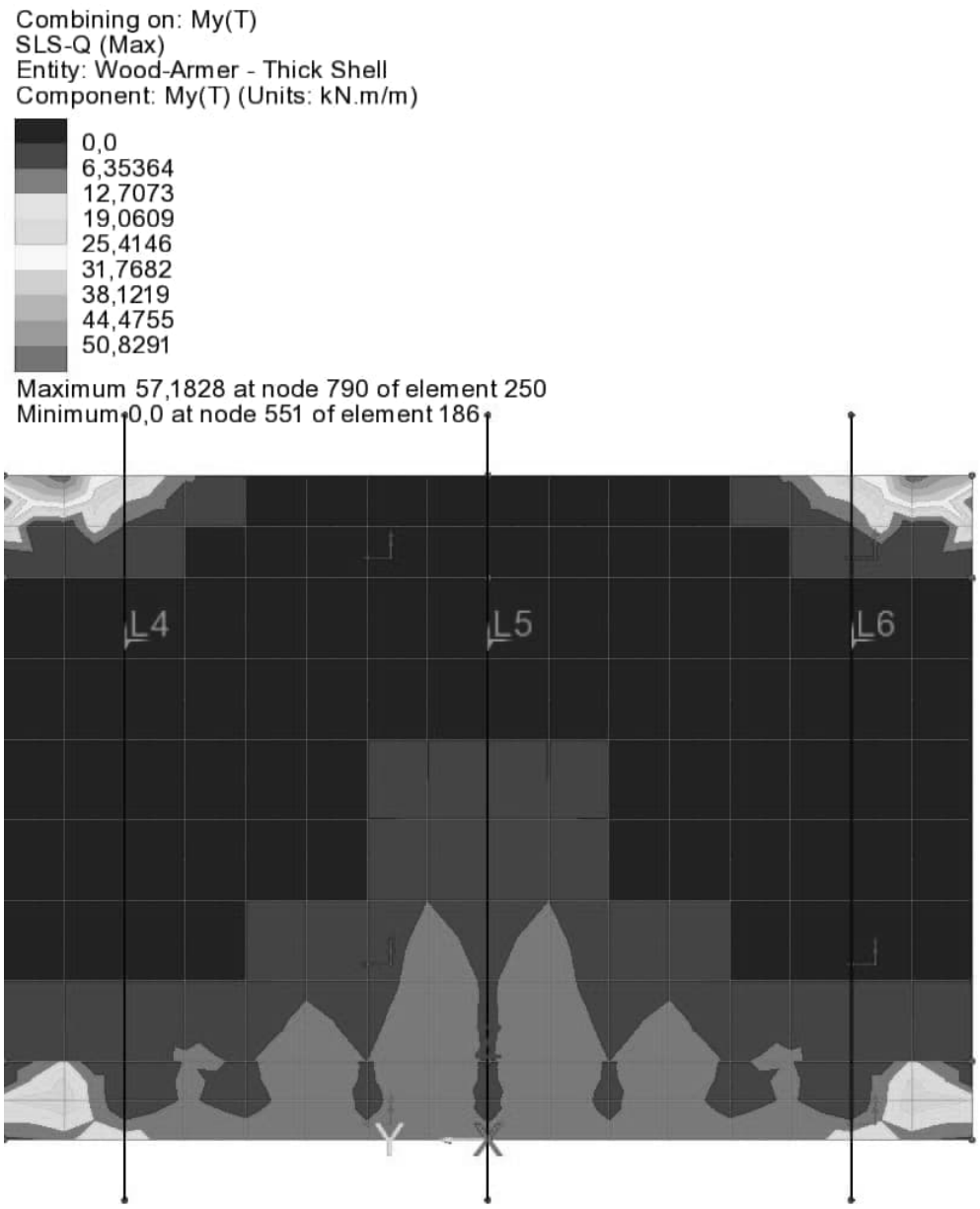
s	Min My(B)	Tillh Ny	Max My(T)	Tillh Ny
0,50	-8	-157	0	71
0,83	-8	-171	0	59
1,15	-10	-136	0	49
1,15	-10	-137	0	50
1,82	-12	-49	0	-85
2,48	-10	-34	9	-27
3,15	-4	-8	26	85
3,82	0	-5	48	276
4,48	0	-1	74	571
5,15	0	5	100	972
5,15	0	5	99	971
5,58	0	15	138	1427
6,00	0	28	183	1968
m	kNm/m	kN/m	kNm/m	kN/m

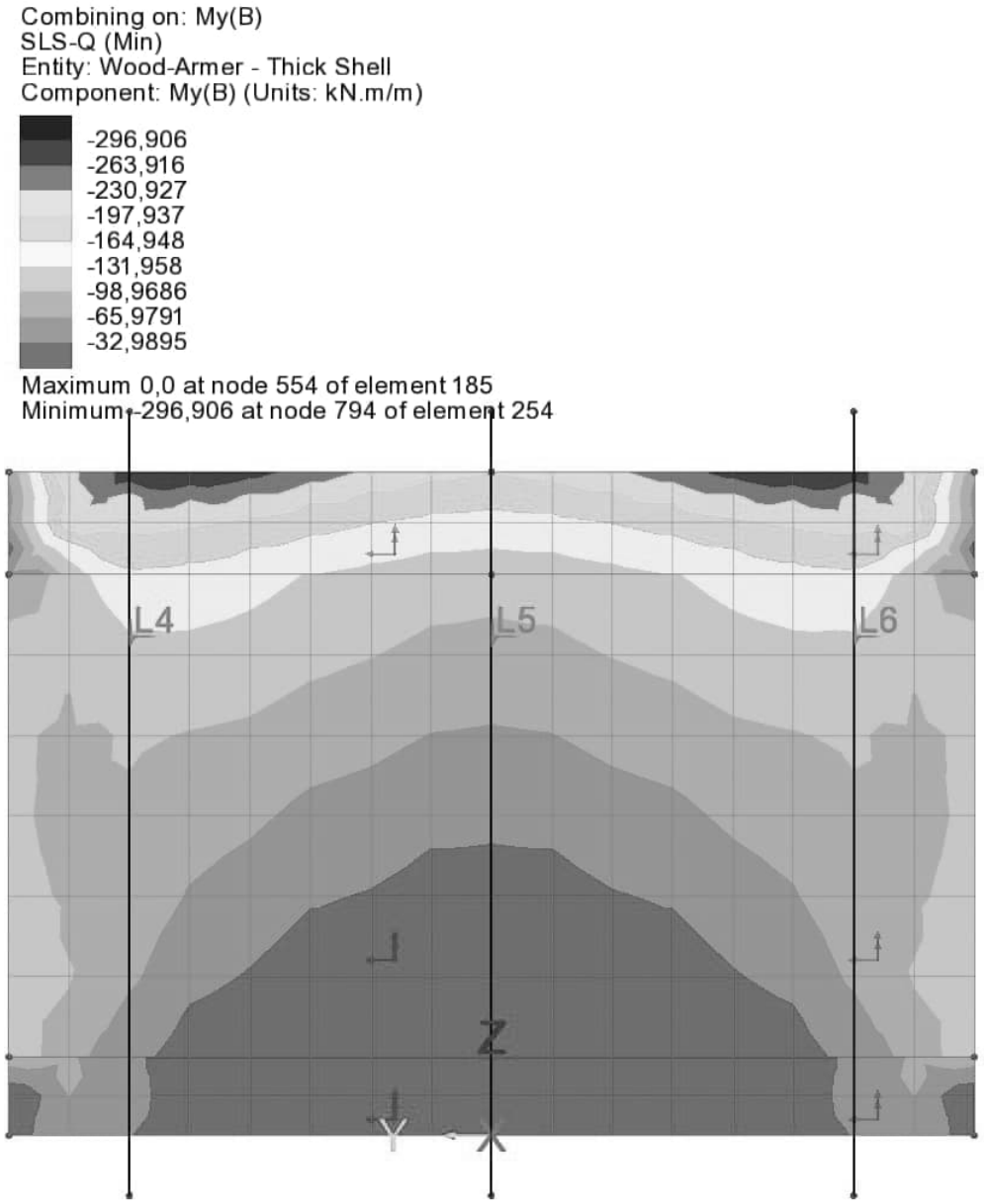
Line 3:

s	Min My(B)	Tillh Ny	Max My(T)	Tillh Ny
0,50	-18	16	35	-18
0,83	-5	3	42	-28
1,15	-2	-5	41	-32
1,15	-2	-2	43	-28
1,82	0	-12	68	-3
2,48	0	27	78	11
3,15	0	37	83	27
3,82	0	44	90	63
4,48	0	56	105	153
5,15	0	-2	130	412
5,15	0	-5	132	410
5,58	0	97	179	928
6,00	0	126	249	1907
m	kNm/m	kN/m	kNm/m	kN/m

21.2 ABUTEMENT 2

21.2.1 Contour




Combining on: My(B)
SLS-Q (Min)
Entity: Wood-Armer - Thick Shell
Component: My(B) (Units: kN.m/m)
-296,906
-263,916
-230,927
-197,937
-164,948
-131,958
-98,9686
-65,9791
-32,9895
Maximum 0,0 at node 554 of element 185
Minimum -296,906 at node 794 of element 254
L4
L5
L6
Z
Y

Appendix 4: Superstructure (system 001)

RC open frame bridge

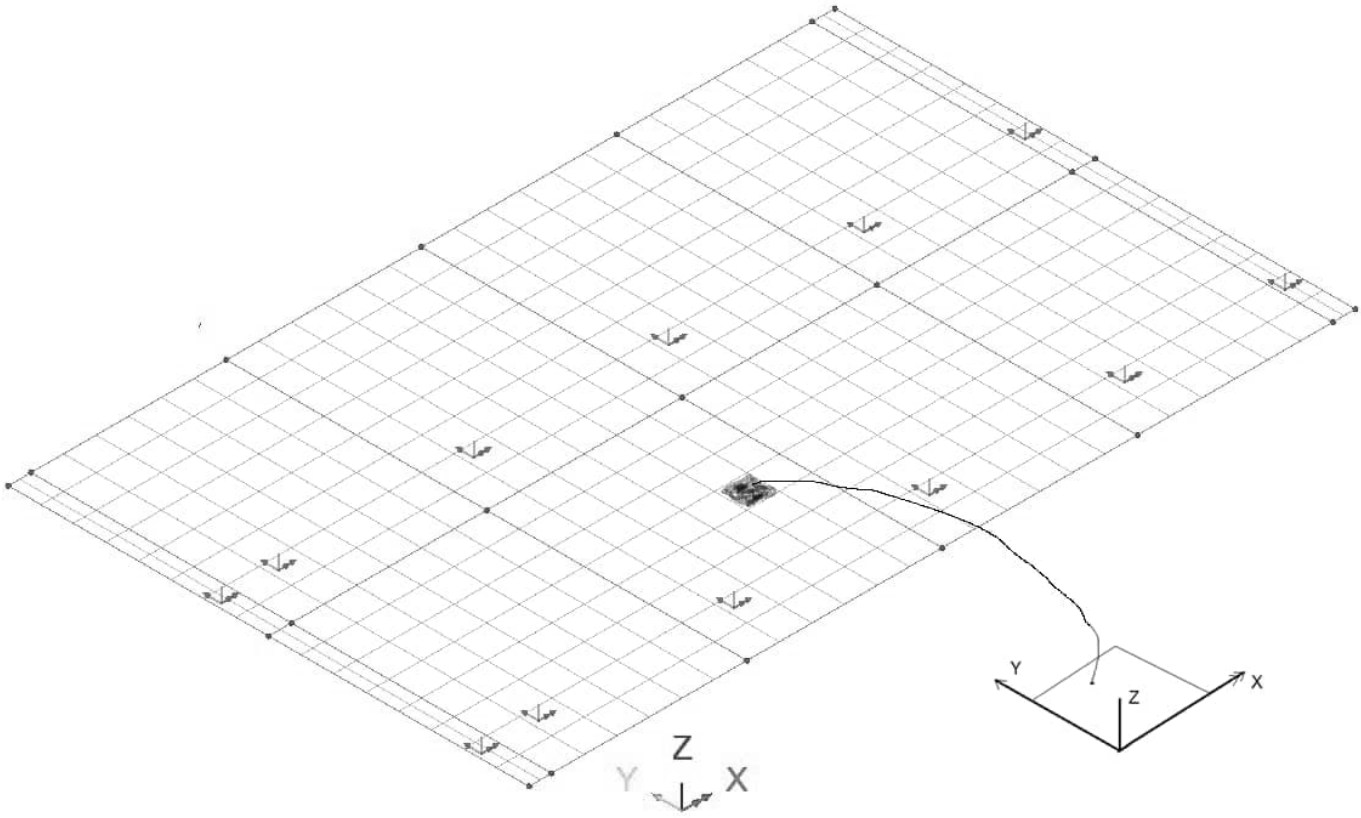
Title: Results superstucture

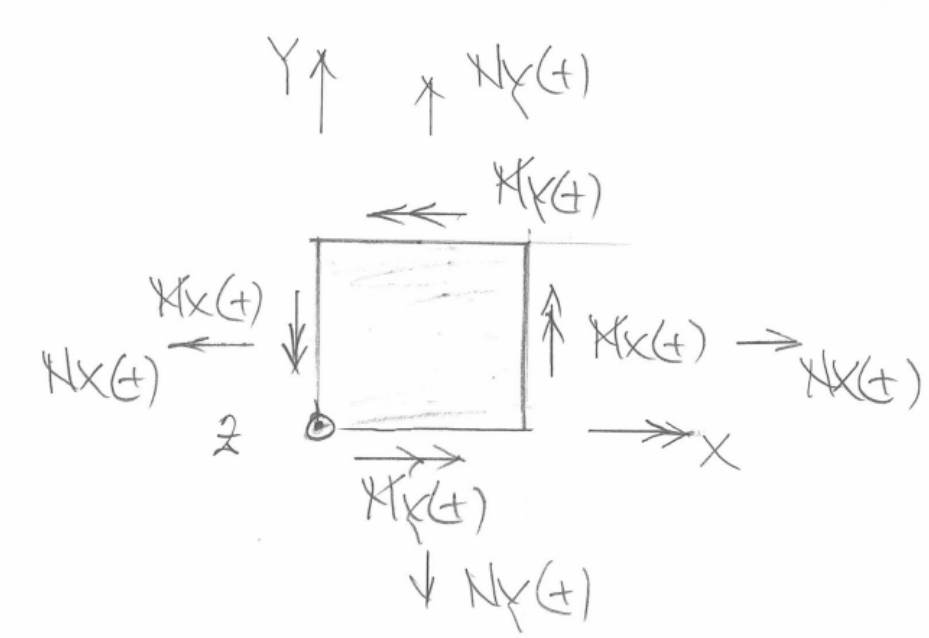
Model Units: kN,m,t,s,C
Report Units: kN,m,t,s,C

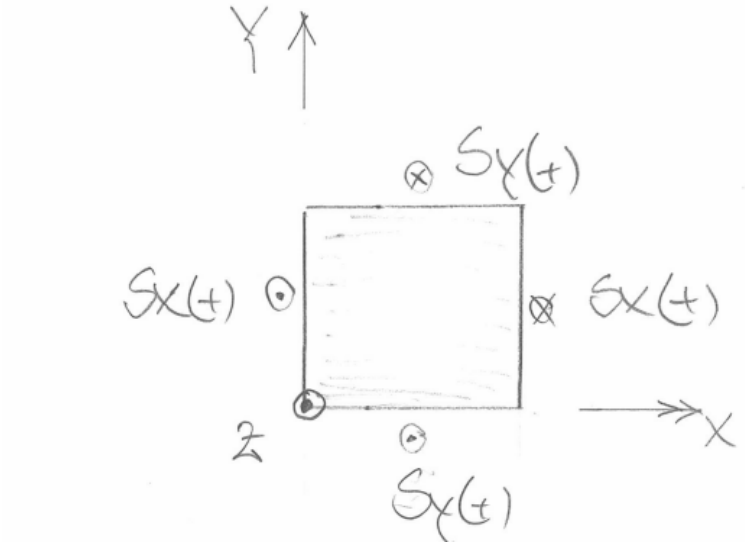
Model Title: System 001
Model File: System 001

Table of Contents

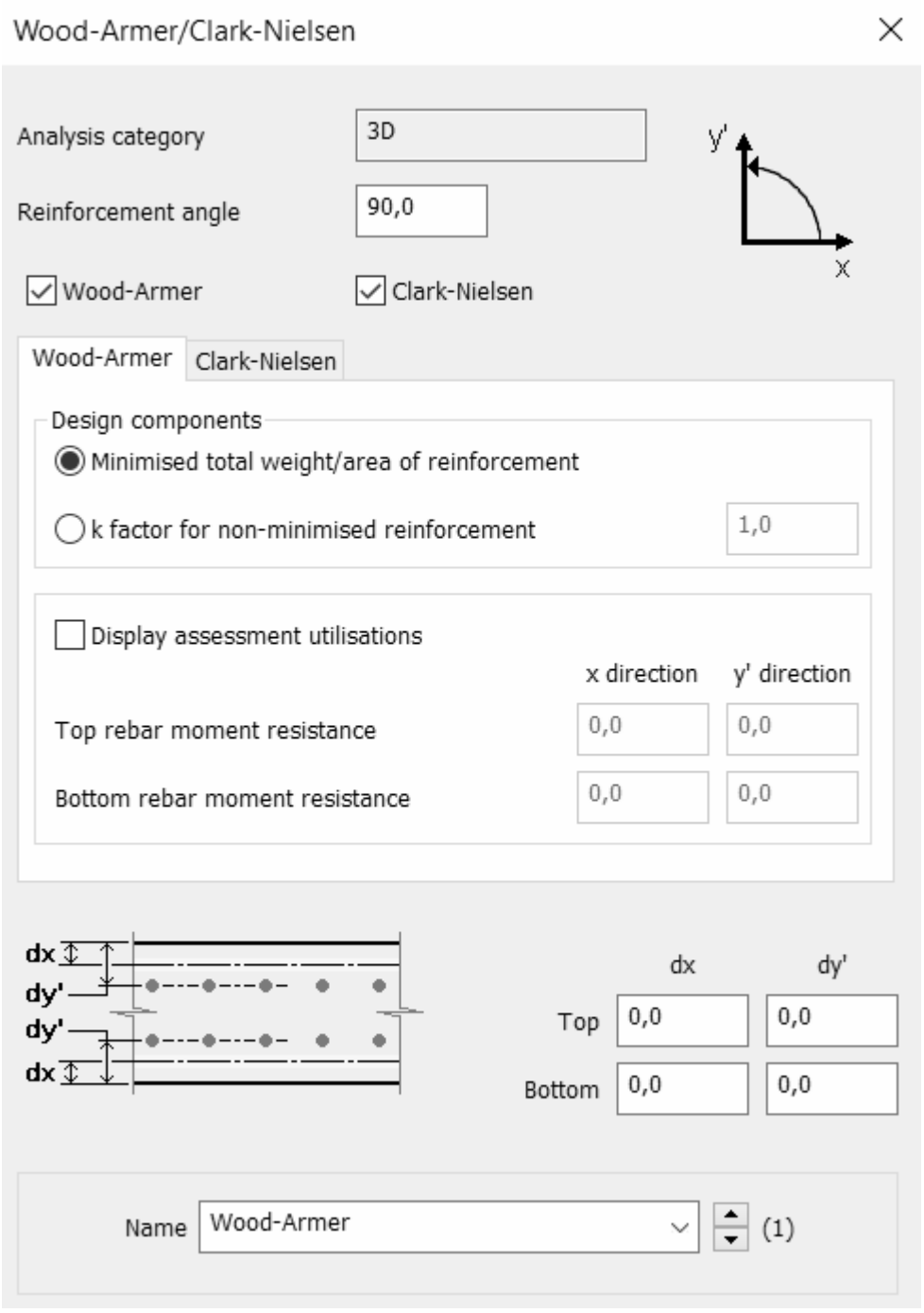
1. Sign convention




Y
Ny(+)
Nx(+)
Nx(+)
Nx(+)
Nx(+)
Nx(+)
Nx(+)
Z
X
Ny(+)

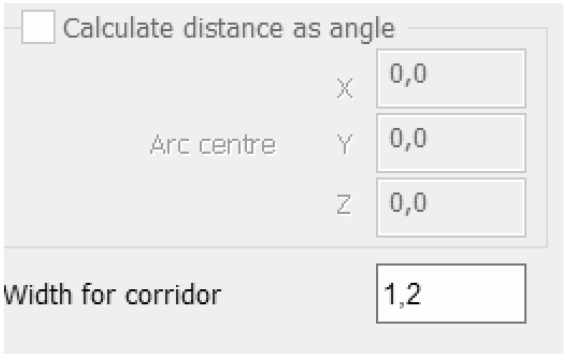

Y
Sy(+)
Sx(+)
Sx(+)
Z
X
Sy(+)

2. Wood-Armer

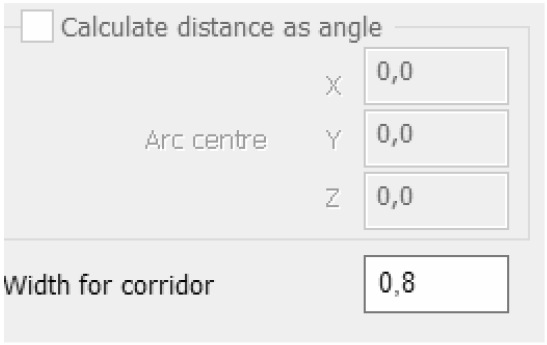

Wood-Armer/Clark-Nielsen
Analysis category
3D
Reinforcement angle
90,0
y'
x
Wood-Armer
Clark-Nielsen
Wood-Armer
Clark-Nielsen
Design components
Minimised total weight/area of reinforcement
k factor for non-minimised reinforcement
1,0
Display assessment utilisations
x direction
y' direction
Top rebar moment resistance
0,0
0,0
Bottom rebar moment resistance
0,0
0,0
dx
dy'
dy'
dx
dx
dy'
Top
0,0
0,0
Bottom
0,0
0,0
Name
Wood-Armer
(1)

3. Slice Data

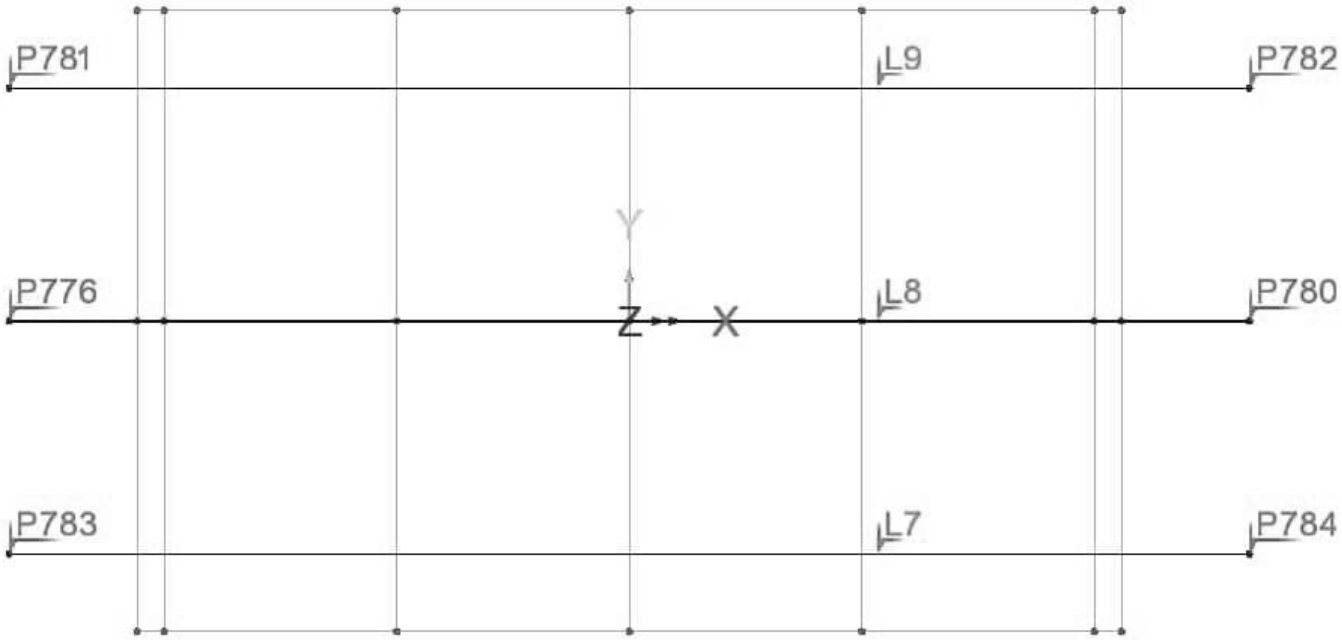
3.1 Results Nx, Sx and Mx



3.2 Results Ny, Sy and My



4. Definition result lines



Points:

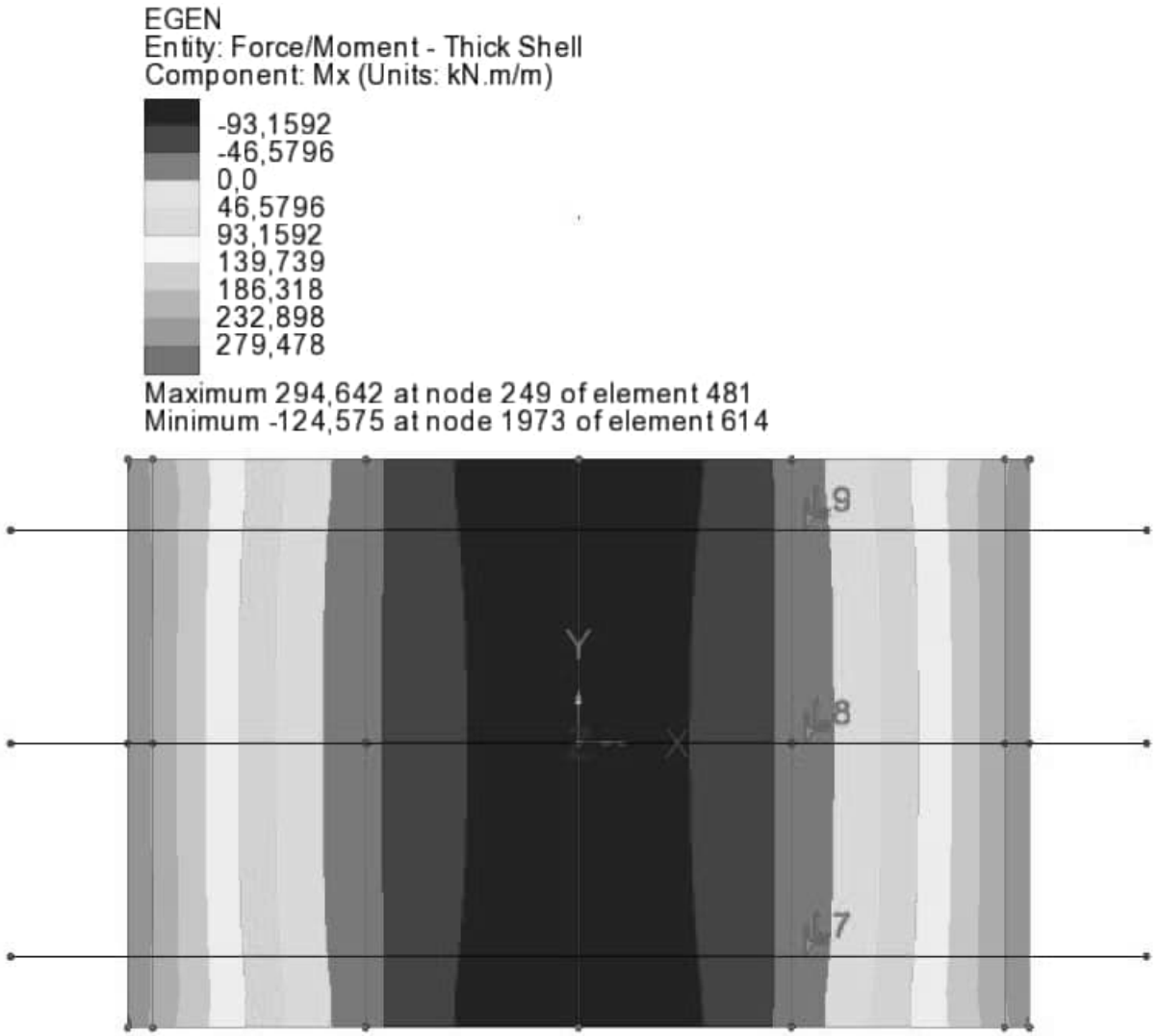
Point	X coordinate	Y coordinate	Z coordinate
783	-8,0	-3,0	5,5
784	8,0	-3,0	5,5
776	-8,0	0,0	5,5
780	8,0	0,0	5,5
781	-8,0	3,0	5,5
782	8,0	3,0	5,5

Lines:

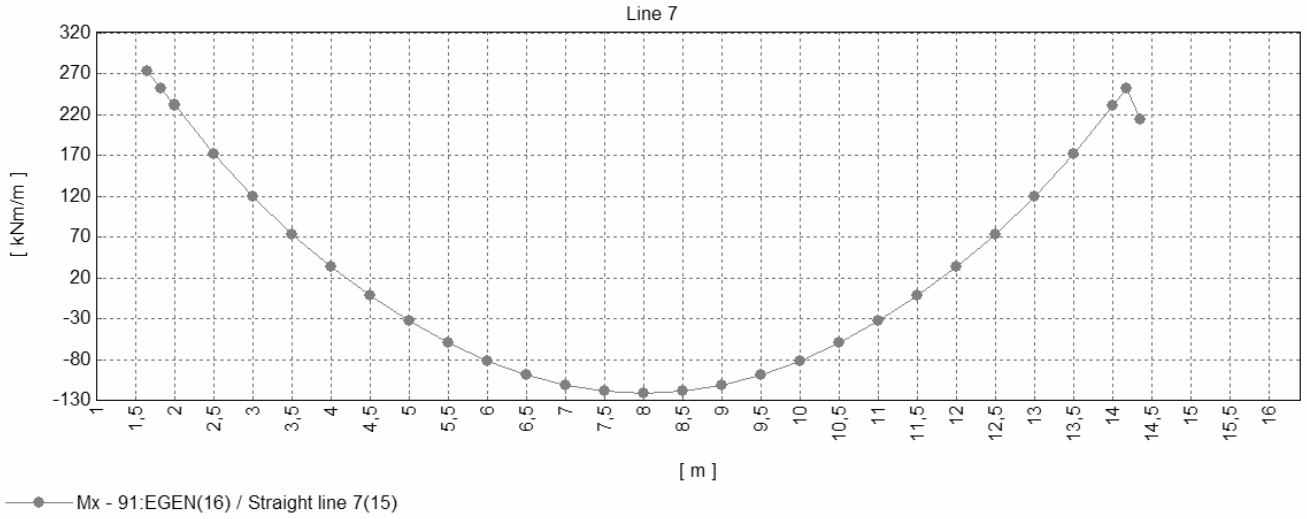
Line	Points
7	783;784
8	776;780
9	781;782

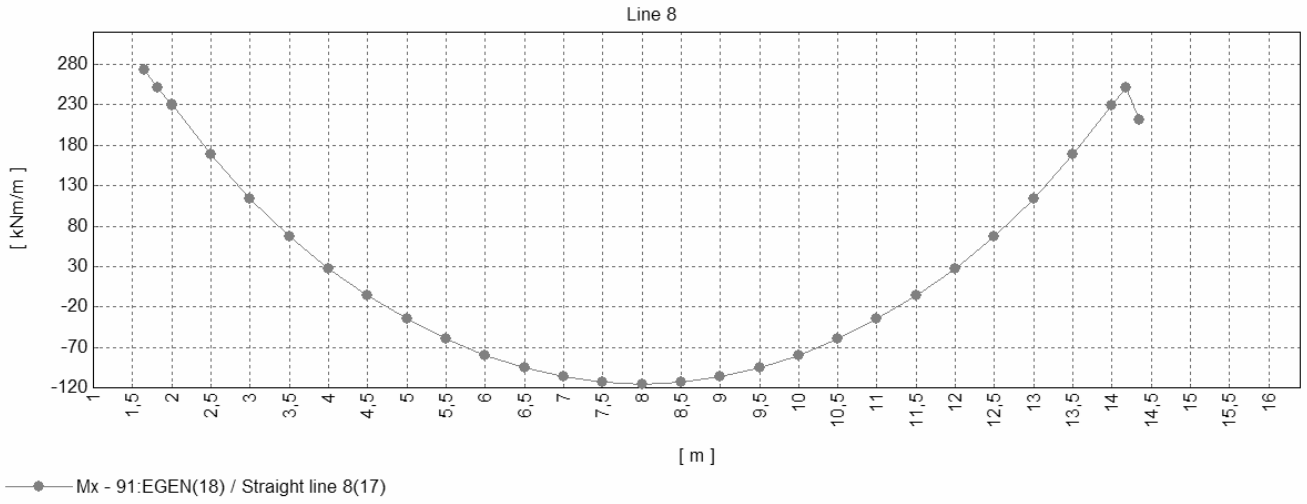
5. EGEN – Mx

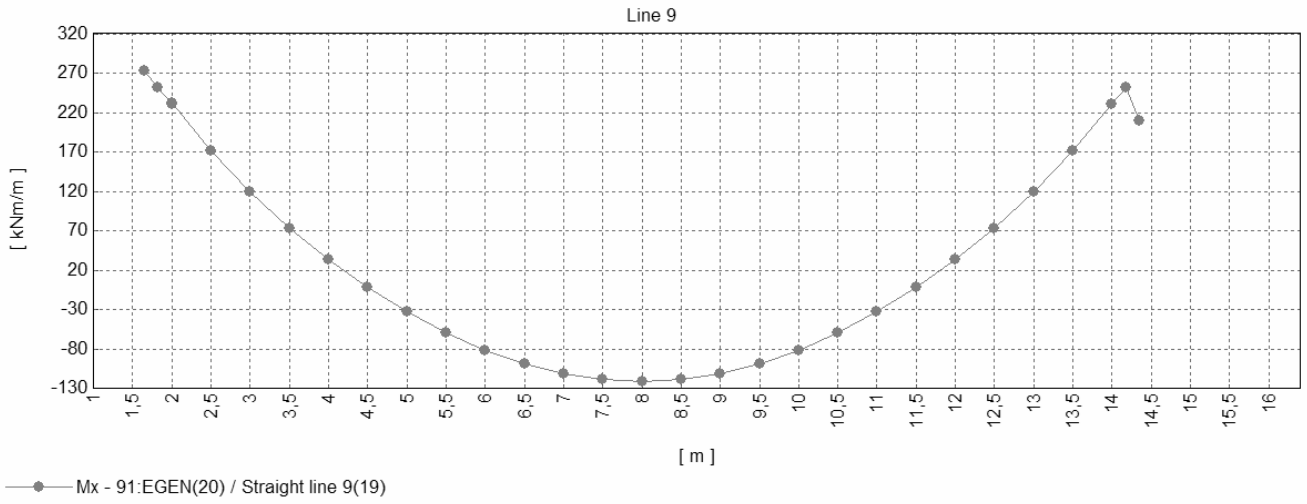
5.1 CONTOUR



5.2 DIAGRAM


Line 7
[kNm/m]
320
270
220
170
120
70
20
-30
-80
-130
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
Mx - 91:EGEN(16) / Straight line 7(15)


Line 8
[kNm/m]
280
230
180
130
80
30
-20
-70
-120
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
Mx - 91:EGEN(18) / Straight line 8(17)


Line 9
[kNm/m]
320
270
220
170
120
70
20
-30
-80
-130
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
Mx - 91:EGEN(20) / Straight line 9(19)

5.3 TABLE

Line 7:

s	Mx
1,65	273
1,83	252
2,00	231
2,50	172
3,00	120
3,50	74
4,00	33
4,50	-2
5,00	-33
5,50	-60
6,00	-82
6,50	-100
7,00	-112
7,50	-119
8,00	-122
8,50	-119
9,00	-112
9,50	-100
10,00	-82
10,50	-60
11,00	-33
11,50	-2
12,00	33
13,00	120
13,50	172
14,00	231
14,18	252
14,35	273
m	kNm/m

Line 8:

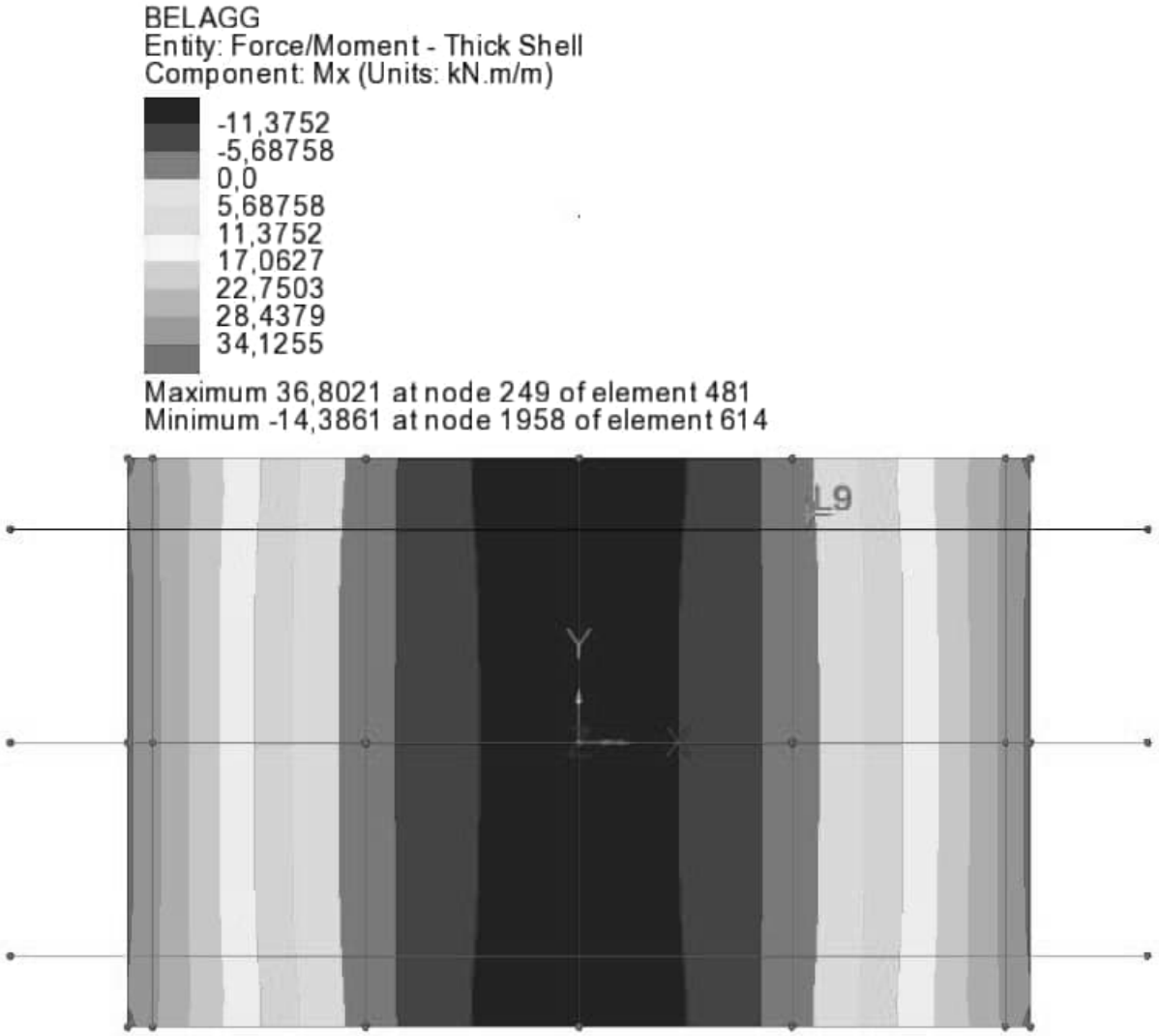
s	Mx
1,65	274
1,83	251
2,00	230
2,50	168
3,00	114
3,50	67
4,00	28
4,50	-6
5,00	-34
5,50	-59
6,00	-80
6,50	-95
7,00	-107
7,50	-114
8,00	-116
8,50	-114
9,00	-107
9,50	-95
10,00	-80
10,50	-59
11,00	-34
11,50	-6
12,00	28
13,00	114
13,50	168
14,00	230
14,18	251
14,35	211
m	kNm/m

Line 9:

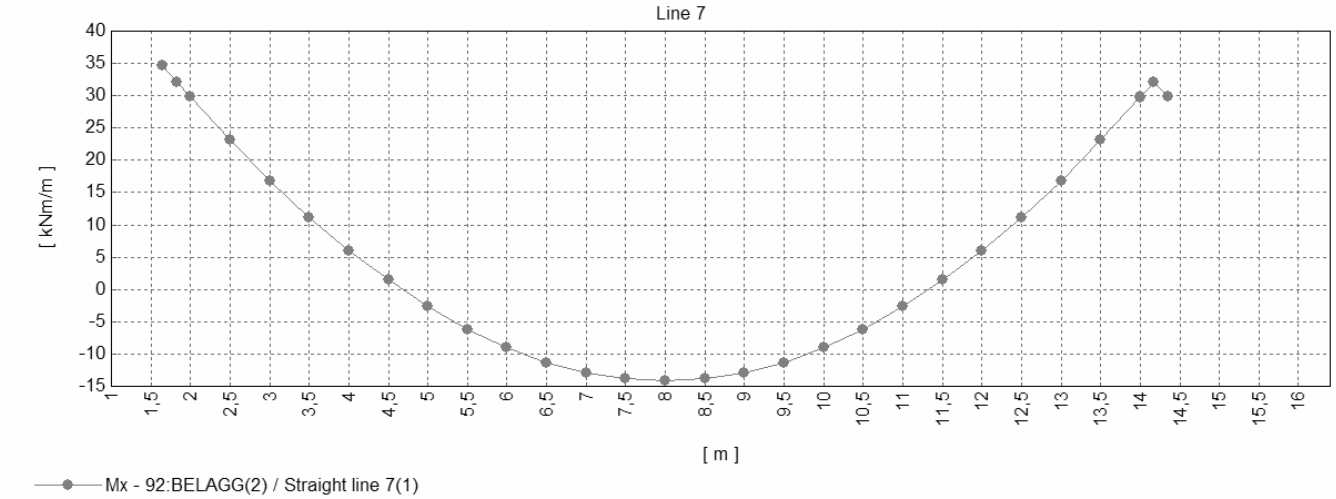
s	Mx
1,65	273
1,83	252
2,00	231
2,50	172
3,00	120
3,50	74
4,00	33
4,50	-2
5,00	-33
5,50	-60
6,00	-82
6,50	-100
7,00	-112
7,50	-119
8,00	-122
8,50	-119
9,00	-112
9,50	-100
10,00	-82
10,50	-60
11,00	-33
11,50	-2
12,00	33
13,00	120
13,50	172
14,00	231
14,18	252
14,35	273
m	kNm/m

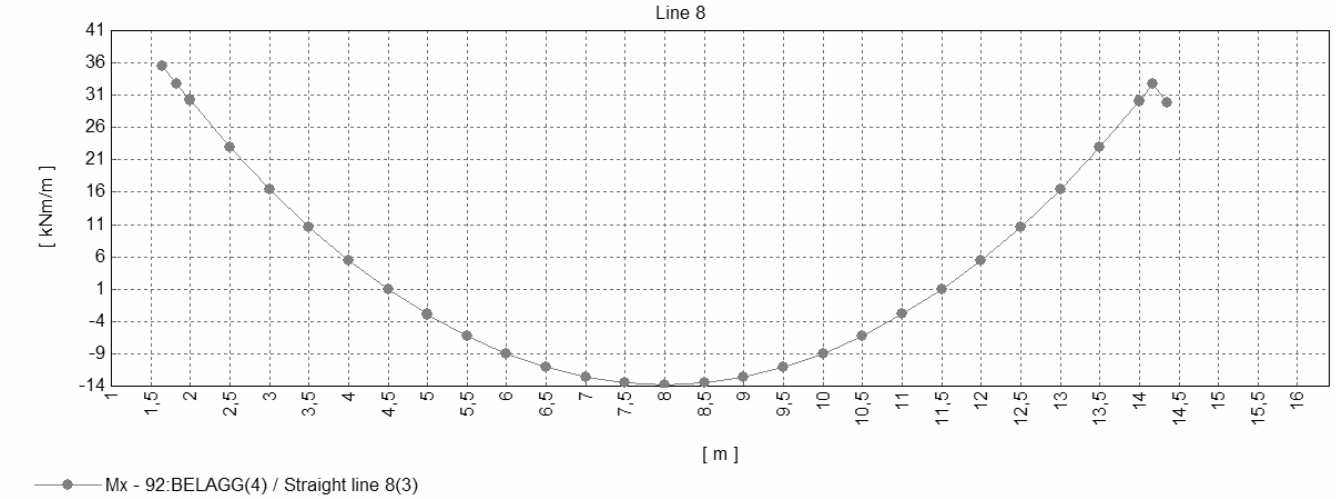
6. BELAGG - Mx

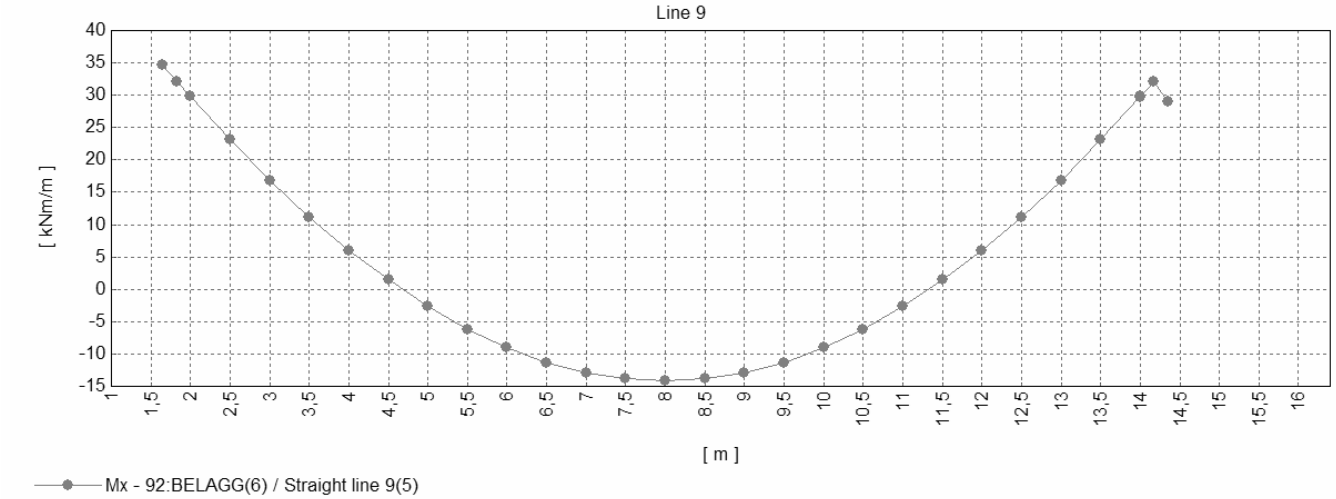
6. CONTOUR



6.2 DIAGRAM


Line 7
[kNm/m]
[m]
Mx - 92:BELAGG(2) / Straight line 7(1)


Line 8
[kNm/m]
[m]
Mx - 92:BELAGG(4) / Straight line 8(3)


Line 9
[kNm/m]
[m]
Mx - 92:BELAGG(6) / Straight line 9(5)

6.3 TABLE

Line 7:

s	Mx
1,65	35
1,83	32
2,00	30
2,50	23
3,00	17
3,50	11
4,00	6
4,50	1
5,00	-3
5,50	-6
6,00	-9
6,50	-11
7,00	-13
7,50	-14
8,00	-14
8,50	-14
9,00	-13
9,50	-11
10,00	-9
10,50	-6
11,00	-3
11,50	1
12,00	6
13,00	17
13,50	23
14,00	30
14,18	32
14,35	30
m	kNm/m

Line 8:

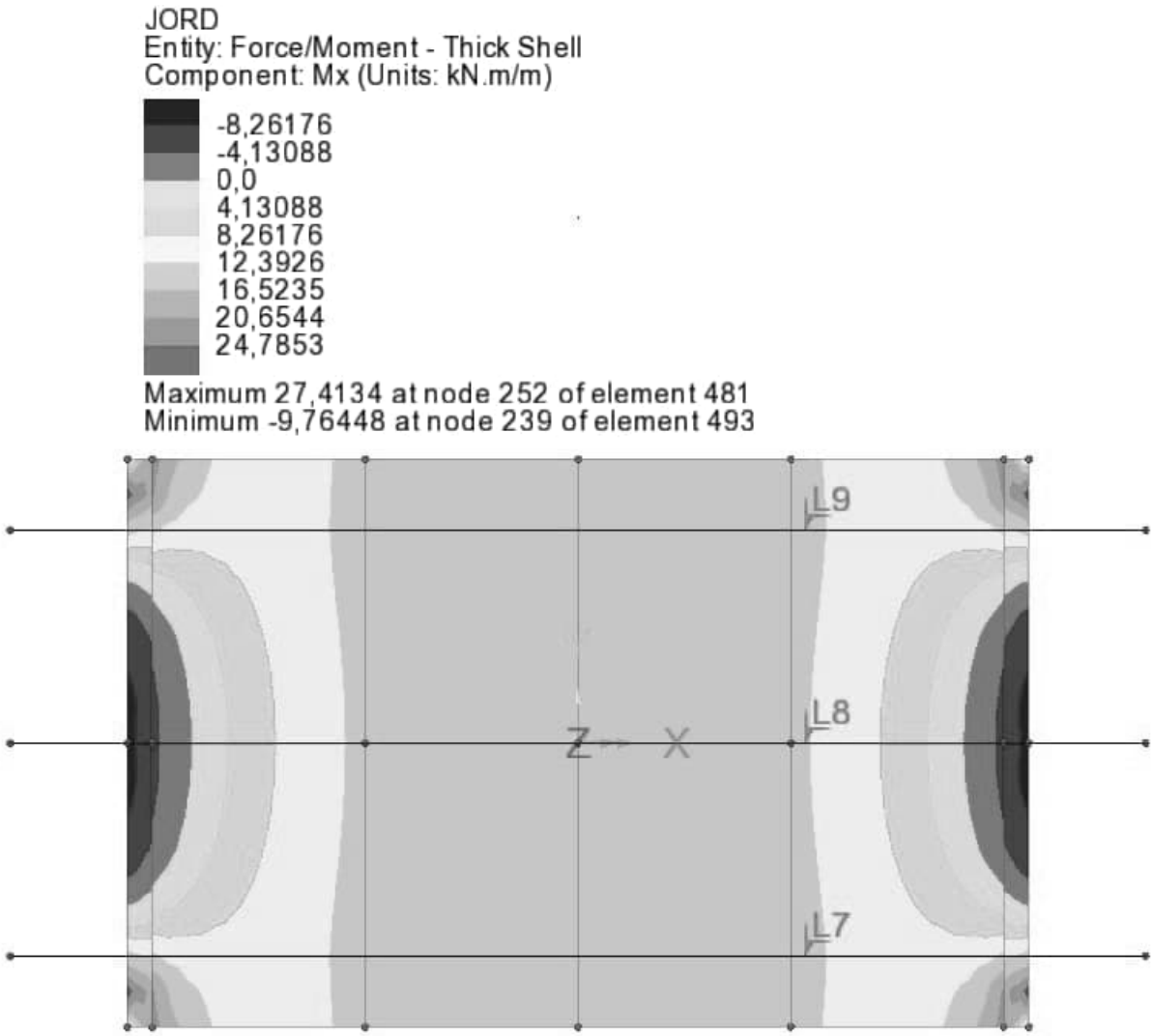
s	Mx
1,65	36
1,83	33
2,00	30
2,50	23
3,00	16
3,50	11
4,00	5
4,50	1
5,00	-3
5,50	-6
6,00	-9
6,50	-11
7,00	-13
7,50	-14
8,00	-14
8,50	-14
9,00	-13
9,50	-11
10,00	-9
10,50	-6
11,00	-3
11,50	1
12,00	5
13,00	16
13,50	23
14,00	30
14,18	33
14,35	30
m	kNm/m

Line 9:

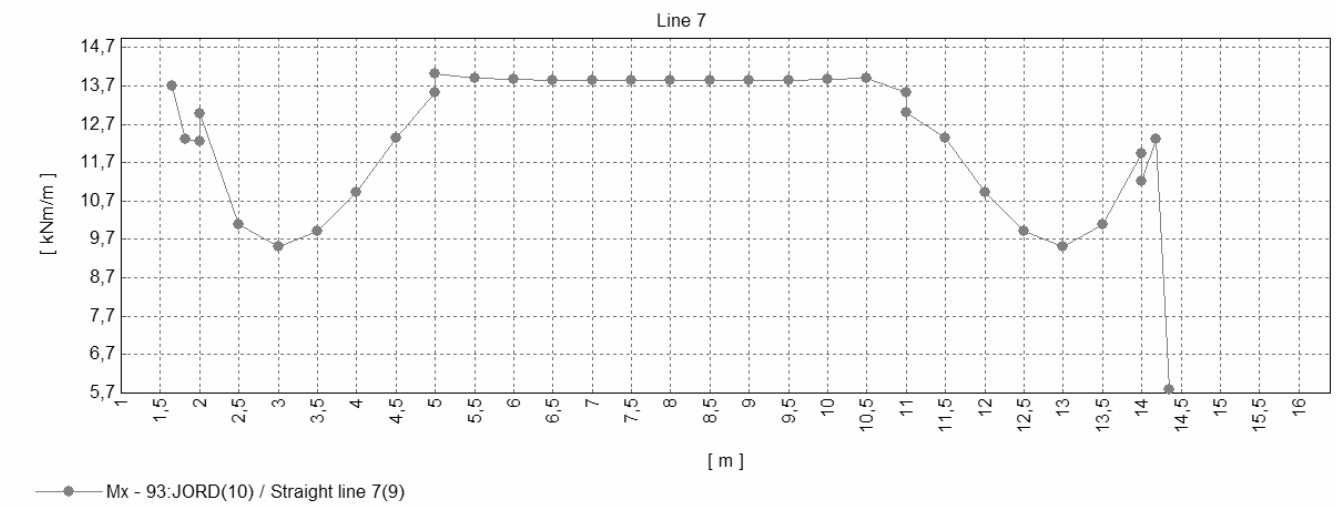
s	Mx
1,65	35
1,83	32
2,00	30
2,50	23
3,00	17
3,50	11
4,00	6
4,50	1
5,00	-3
5,50	-6
6,00	-9
6,50	-11
7,00	-13
7,50	-14
8,00	-14
8,50	-14
9,00	-13
9,50	-11
10,00	-9
10,50	-6
11,00	-3
11,50	1
12,00	6
13,00	17
13,50	23
14,00	30
14,18	32
14,35	29
m	kNm/m

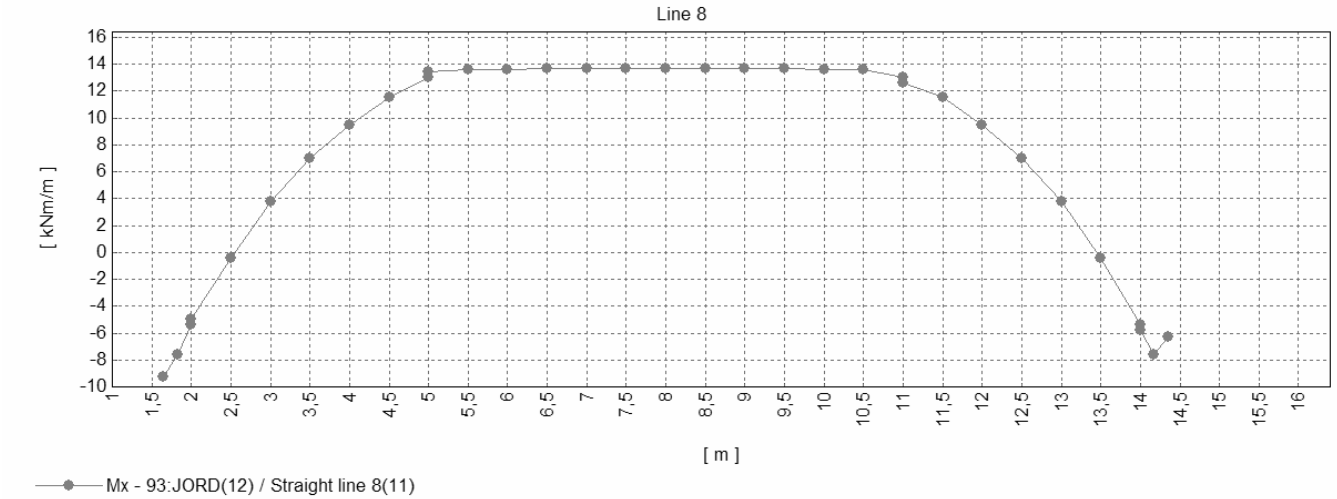
7. JORD - Mx

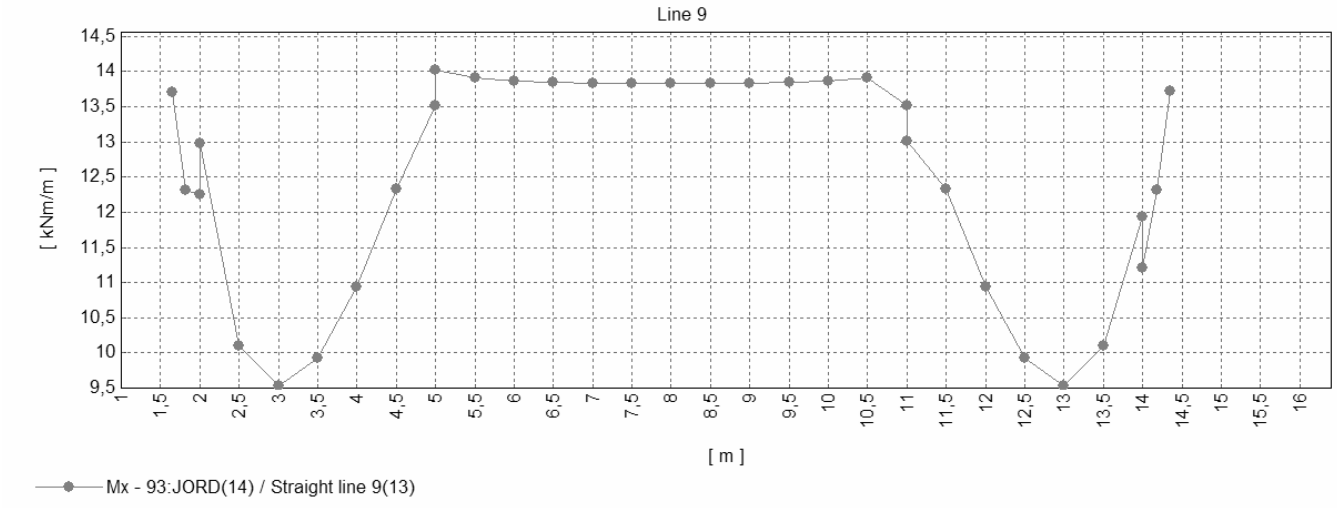
7.1 CONTOUR



7.2 DIAGRAM


Line 7
[kNm/m]
[m]
Mx - 93:JORD(10) / Straight line 7(9)


Line 8
[kNm/m]
[m]
Mx - 93:JORD(12) / Straight line 8(11)


Line 9
[kNm/m]
[m]
Mx - 93:JORD(14) / Straight line 9(13)

7.3 TABLE

Line 7:

s	Mx
1,65	14
1,83	12
2,00	12
2,50	10
3,00	10
3,50	10
4,00	11
4,50	12
5,00	14
5,50	14
6,00	14
6,50	14
7,00	14
7,50	14
8,00	14
8,50	14
9,00	14
9,50	14
10,00	14
10,50	14
11,00	14
11,50	12
12,00	11
13,00	10
13,50	10
14,00	12
14,18	12
14,35	6
m	kNm/m

Line 8:

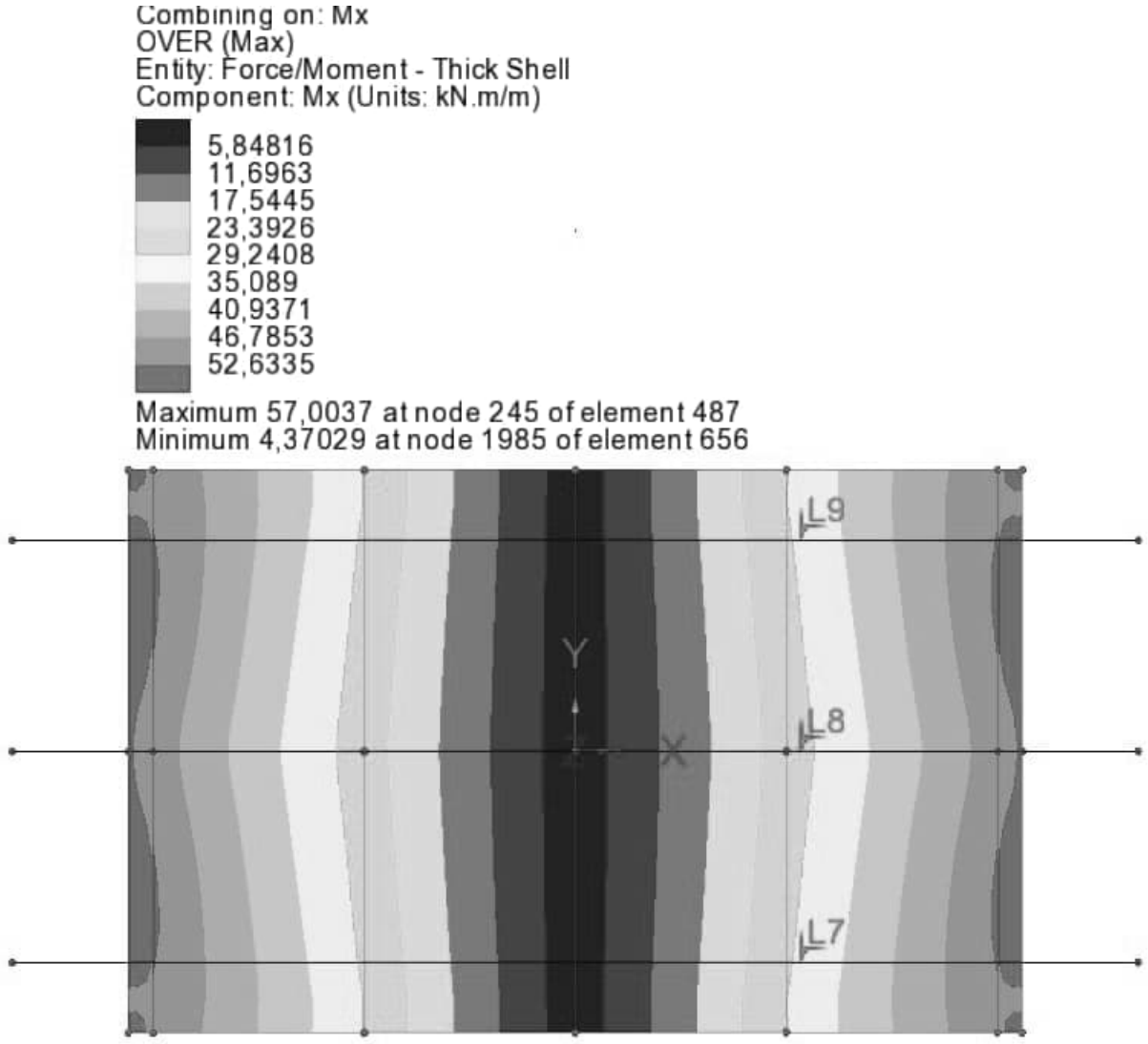
s	Mx
1,65	-9
1,83	-8
2,00	-5
2,50	0
3,00	4
3,50	7
4,00	10
4,50	12
5,00	13
5,50	14
6,00	14
6,50	14
7,00	14
7,50	14
8,00	14
8,50	14
9,00	14
9,50	14
10,00	14
10,50	14
11,00	13
11,50	12
12,00	10
13,00	4
13,50	0
14,00	-5
14,18	-8
14,35	-6
m	kNm/m

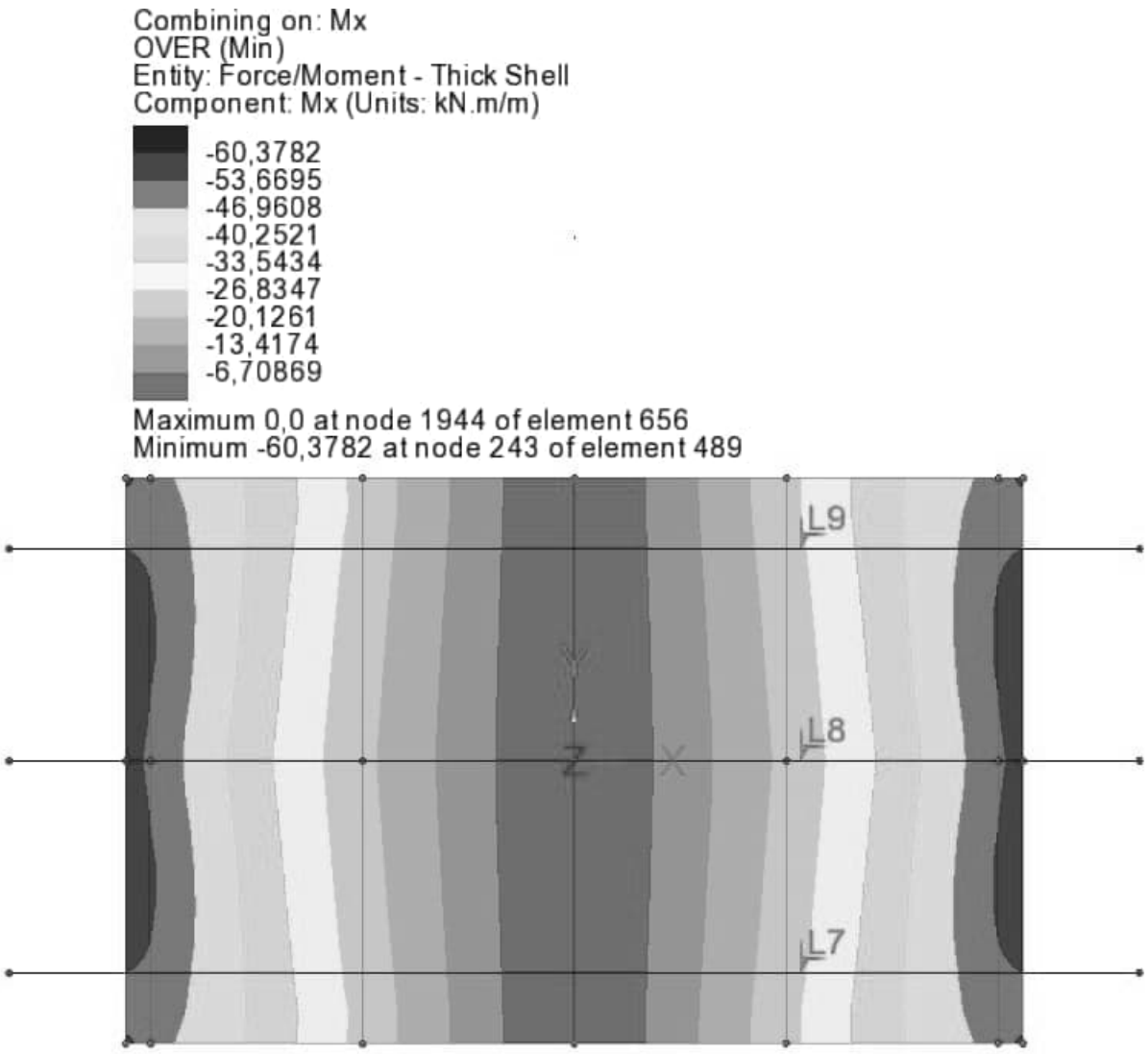
Line 9:

s	Mx
1,65	14
1,83	12
2,00	12
2,50	10
3,00	10
3,50	10
4,00	11
4,50	12
5,00	14
5,50	14
6,00	14
6,50	14
7,00	14
7,50	14
8,00	14
8,50	14
9,00	14
9,50	14
10,00	14
10,50	14
11,00	14
11,50	12
12,00	11
13,00	10
13,50	10
14,00	12
14,18	12
14,35	14
m	kNm/m

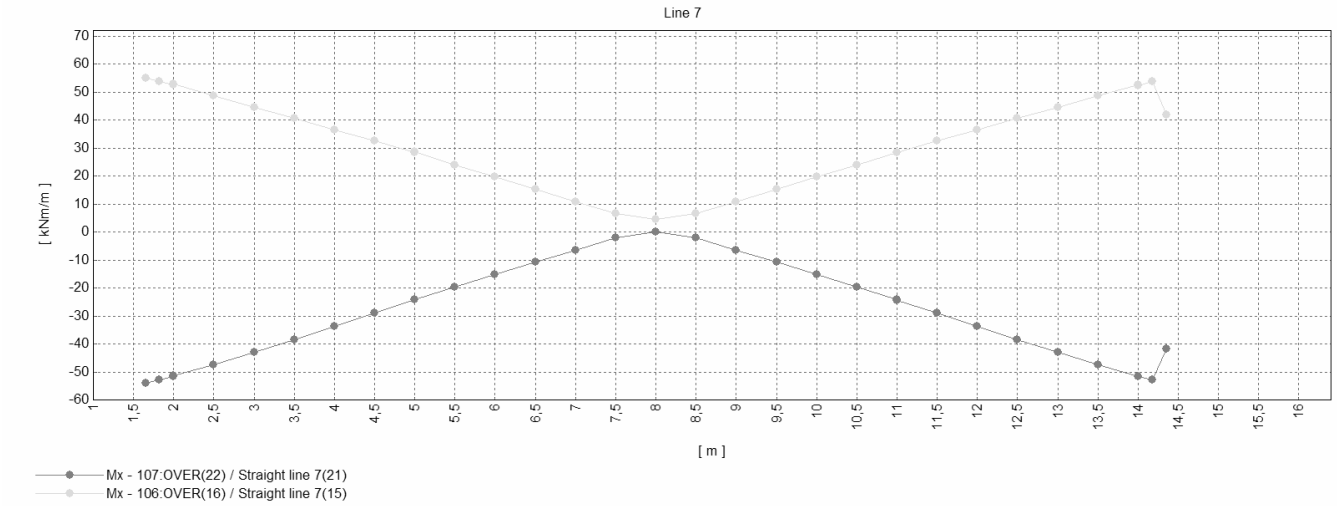
8. OVER Max/Min Mx

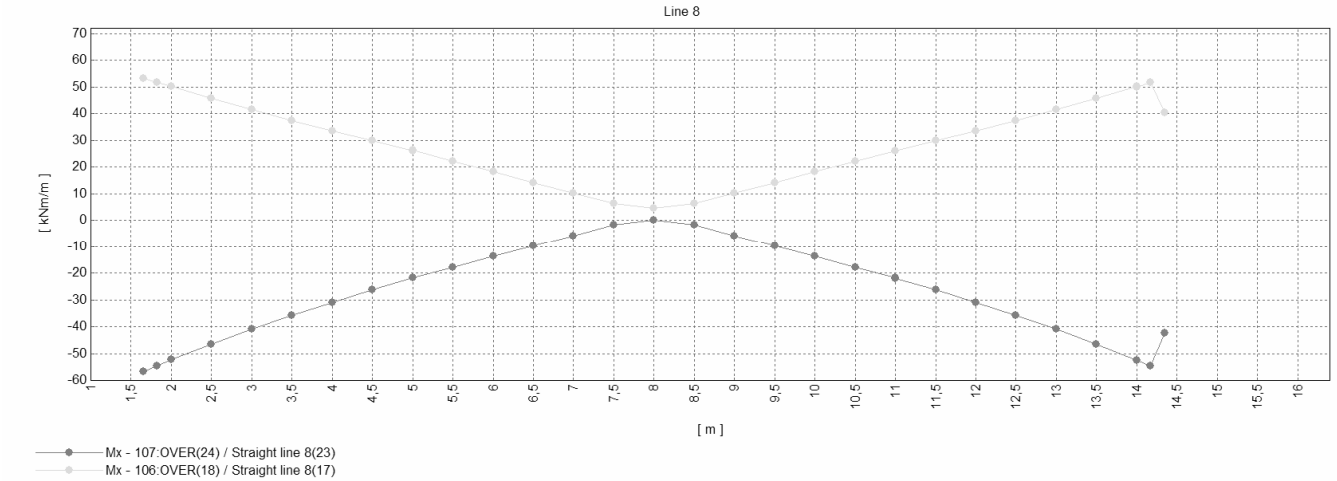
8.1 CONTOUR

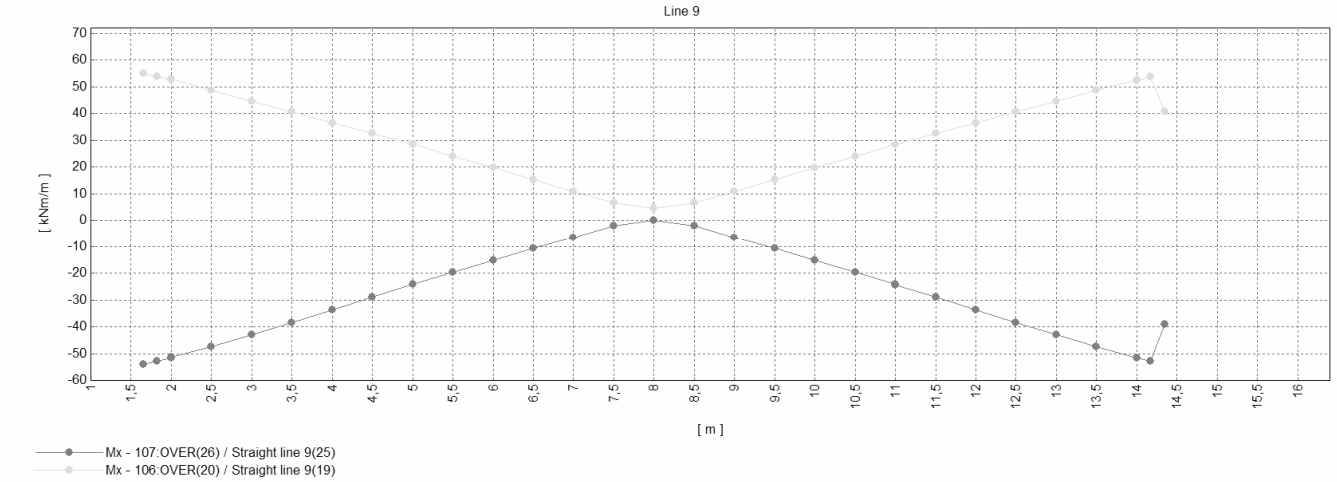



Combining on: Mx
OVER (Min)
Entity: Force/Moment - Thick Shell
Component: Mx (Units: kN.m/m)
-60,3782
-53,6695
-46,9608
-40,2521
-33,5434
-26,8347
-20,1261
-13,4174
-6,70869
Maximum 0,0 at node 1944 of element 656
Minimum -60,3782 at node 243 of element 489
L9
L8
L7
Y
Z
X

8.2 DIAGRAM


Line 7
[kNm/m]
[m]
Mx - 107:OVER(22) / Straight line 7(21)
Mx - 106:OVER(16) / Straight line 7(15)


Line 8
[kNm/m]
[m]
Mx - 107:OVER(24) / Straight line 8(23)
Mx - 106:OVER(18) / Straight line 8(17)


Line 9
[kNm/m]
[m]
Mx - 107:OVER(26) / Straight line 9(25)
Mx - 106:OVER(20) / Straight line 9(19)

8.3 TABLE

Line 7:

s	Max Mx	Min Mx
1,65	55	-54
1,83	54	-53
2,00	53	-52
2,50	49	-48
3,00	45	-43
3,50	41	-38
4,00	37	-34
4,50	33	-29
5,00	28	-24
5,50	24	-20
6,00	20	-15
6,50	15	-11
7,00	11	-6
7,50	7	-2
8,00	4	0
8,50	7	-2
9,00	11	-6
9,50	15	-11
10,00	20	-15
10,50	24	-20
11,00	28	-24
11,50	33	-29
12,00	37	-34
13,00	45	-43
13,50	49	-48
14,00	53	-52
14,18	54	-53
14,35	42	-42
m	kNm/m	kNm/m

Line 8:

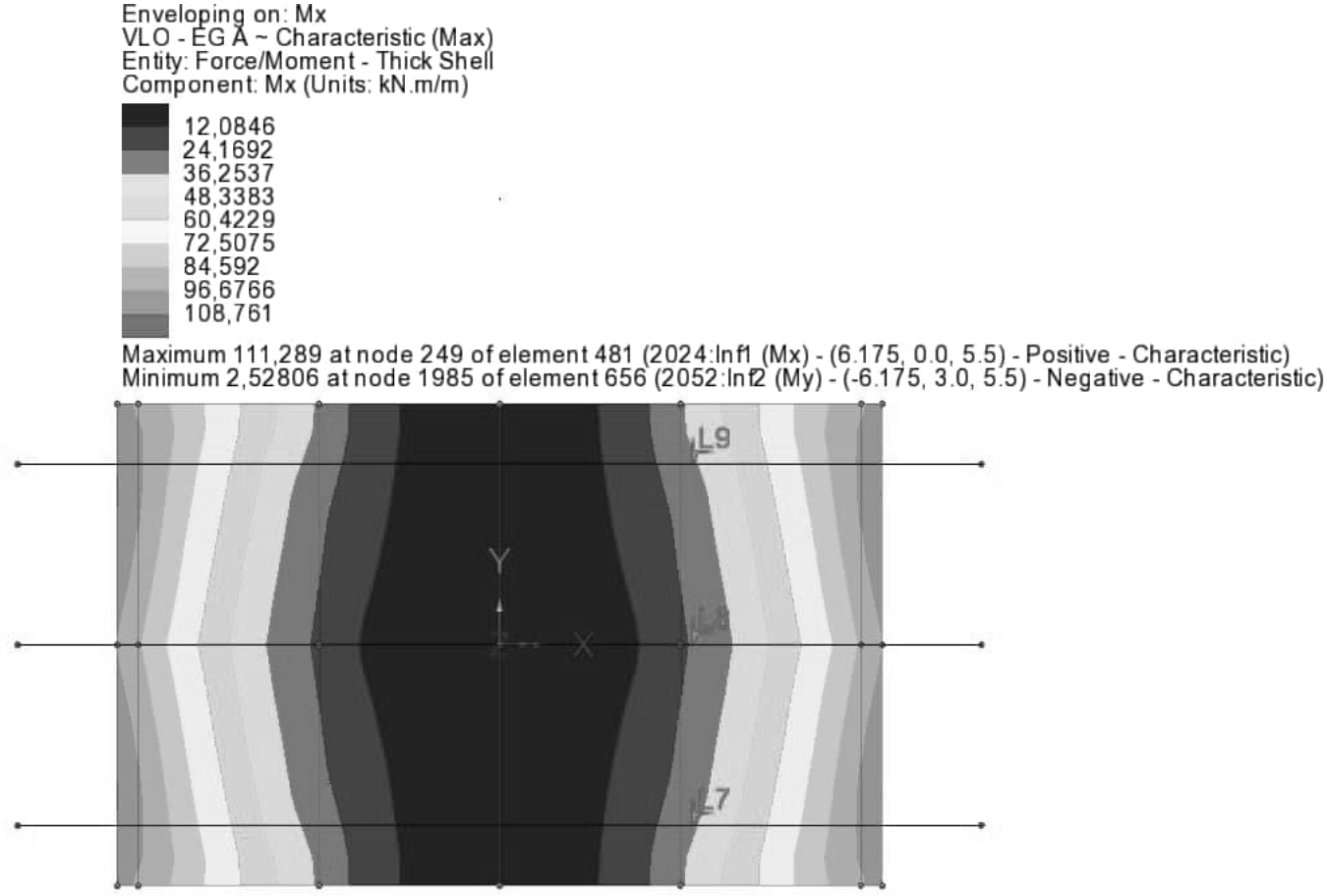
s	Max Mx	Min Mx
1,65	53	-57
1,83	52	-55
2,00	50	-52
2,50	46	-46
3,00	41	-41
3,50	37	-36
4,00	34	-31
4,50	30	-26
5,00	26	-22
5,50	22	-18
6,00	18	-14
6,50	14	-10
7,00	10	-6
7,50	6	-2
8,00	4	0
8,50	6	-2
9,00	10	-6
9,50	14	-10
10,00	18	-14
10,50	22	-18
11,00	26	-22
11,50	30	-26
12,00	34	-31
13,00	41	-41
13,50	46	-46
14,00	50	-52
14,18	52	-55
14,35	40	-42
m	kNm/m	kNm/m

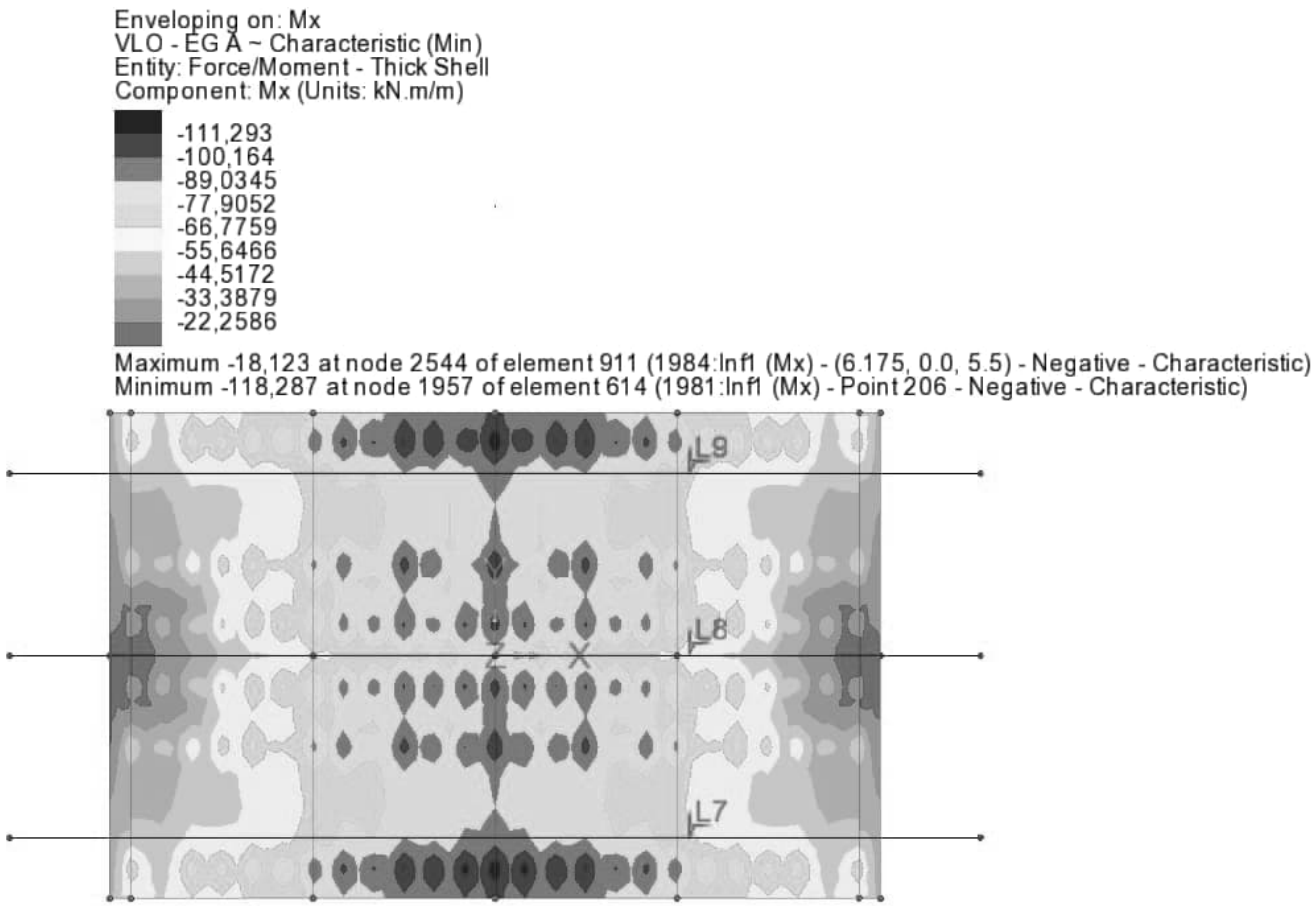
Line 9:

s	Max Mx	Min Mx
1,65	55	-54
1,83	54	-53
2,00	53	-52
2,50	49	-48
3,00	45	-43
3,50	41	-38
4,00	37	-34
4,50	33	-29
5,00	28	-24
5,50	24	-20
6,00	20	-15
6,50	15	-11
7,00	11	-6
7,50	7	-2
8,00	4	0
8,50	7	-2
9,00	11	-6
9,50	15	-11
10,00	20	-15
10,50	24	-20
11,00	28	-24
11,50	33	-29
12,00	37	-34
13,00	45	-43
13,50	49	-48
14,00	53	-52
14,18	54	-53
14,35	41	-39
m	kNm/m	kNm/m

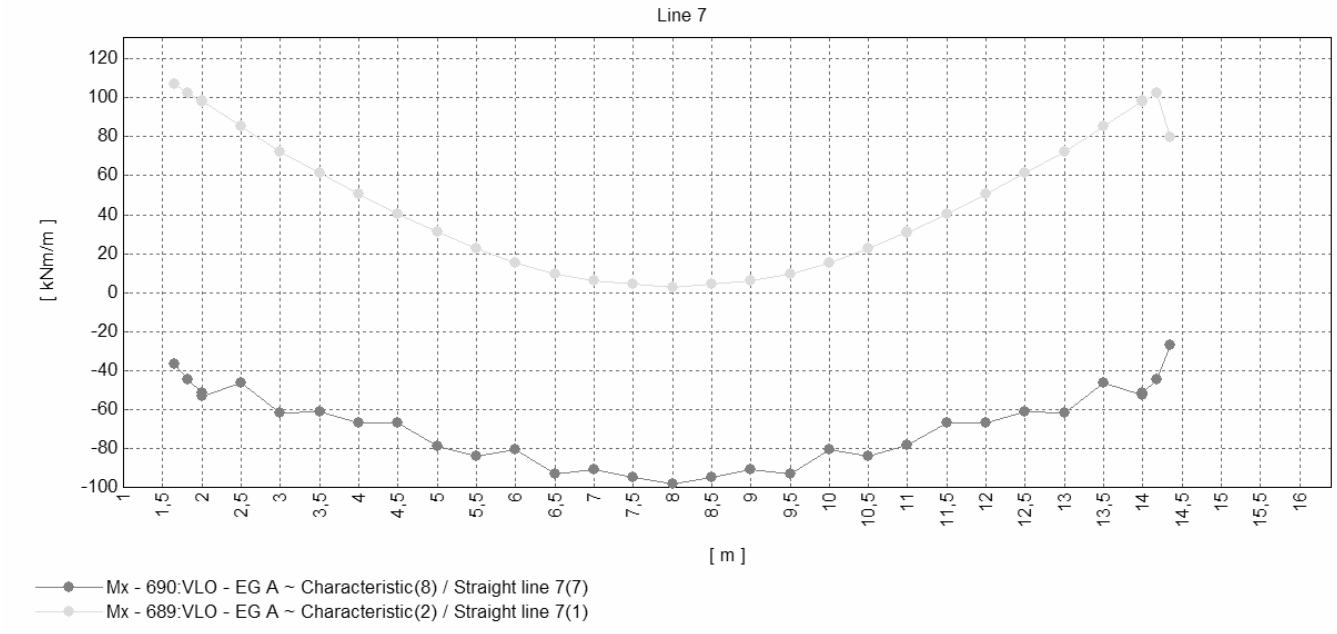
9. EG A Max/Min Mx

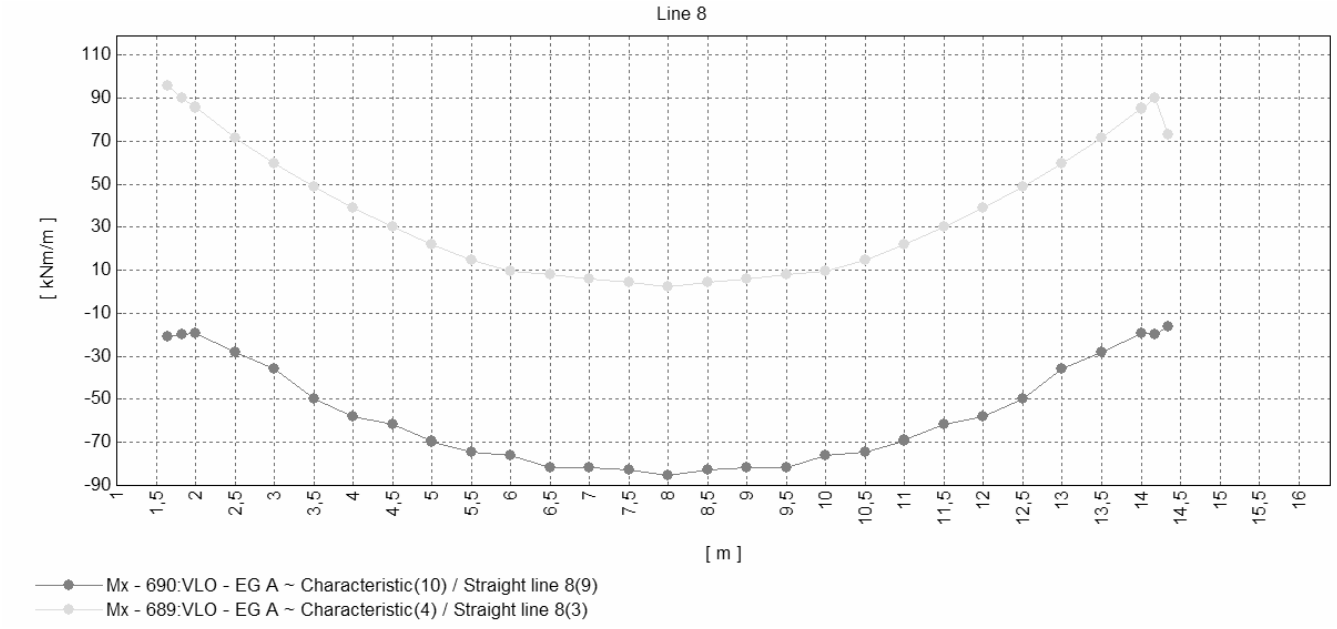
9.1 CONTOUR

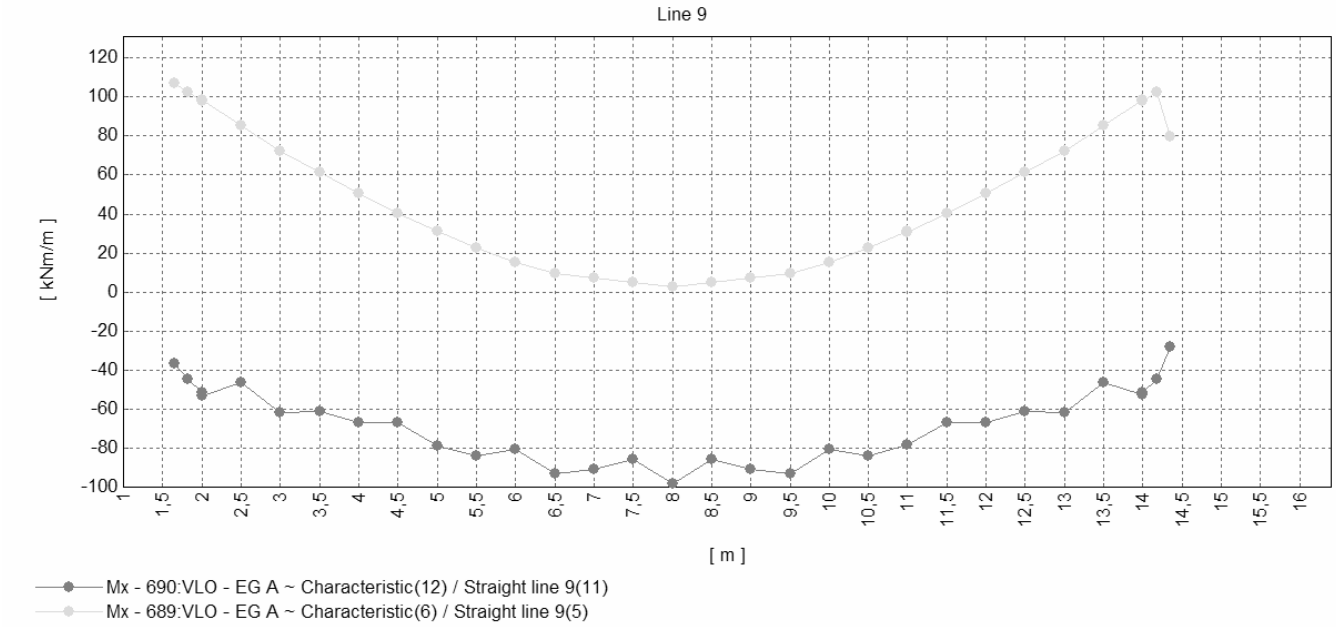



Enveloping on: Mx
VLO - EG A ~ Characteristic (Min)
Entity: Force/Moment - Thick Shell
Component: Mx (Units: kN.m/m)
-111,293
-100,164
-89,0345
-77,9052
-66,7759
-55,6466
-44,5172
-33,3879
-22,2586
Maximum -18,123 at node 2544 of element 911 (1984:Inf1 (Mx) - (6.175, 0.0, 5.5) - Negative - Characteristic)
Minimum -118,287 at node 1957 of element 614 (1981:Inf1 (Mx) - Point 206 - Negative - Characteristic)
L9
L8
L7

9.2 DIAGRAM


Line 7
[kNm/m]
[m]
Mx - 690:VLO - EG A ~ Characteristic(8) / Straight line 7(7)
Mx - 689:VLO - EG A ~ Characteristic(2) / Straight line 7(1)


Line 8
[kNm/m]
[m]
Mx - 690:VLO - EG A ~ Characteristic(10) / Straight line 8(9)
Mx - 689:VLO - EG A ~ Characteristic(4) / Straight line 8(3)


Line 9
[kNm/m]
[m]
Mx - 690:VLO - EG A ~ Characteristic(12) / Straight line 9(11)
Mx - 689:VLO - EG A ~ Characteristic(6) / Straight line 9(5)

9..3 TABLE

Line 7:

s	Max Mx	Min Mx
1,65	107	-37
1,83	102	-45
2,00	98	-51
2,50	85	-46
3,00	72	-62
3,50	61	-61
4,00	50	-67
4,50	40	-67
5,00	31	-79
5,50	22	-84
6,00	15	-80
6,50	10	-93
7,00	6	-91
7,50	4	-95
8,00	3	-98
8,50	4	-95
9,00	6	-91
9,50	10	-93
10,00	15	-80
10,50	22	-84
11,00	31	-78
11,50	40	-67
12,00	50	-67
13,00	72	-62
13,50	85	-46
14,00	98	-53
14,18	102	-45
14,35	80	-27
m	kNm/m	kNm/m

Line 8:

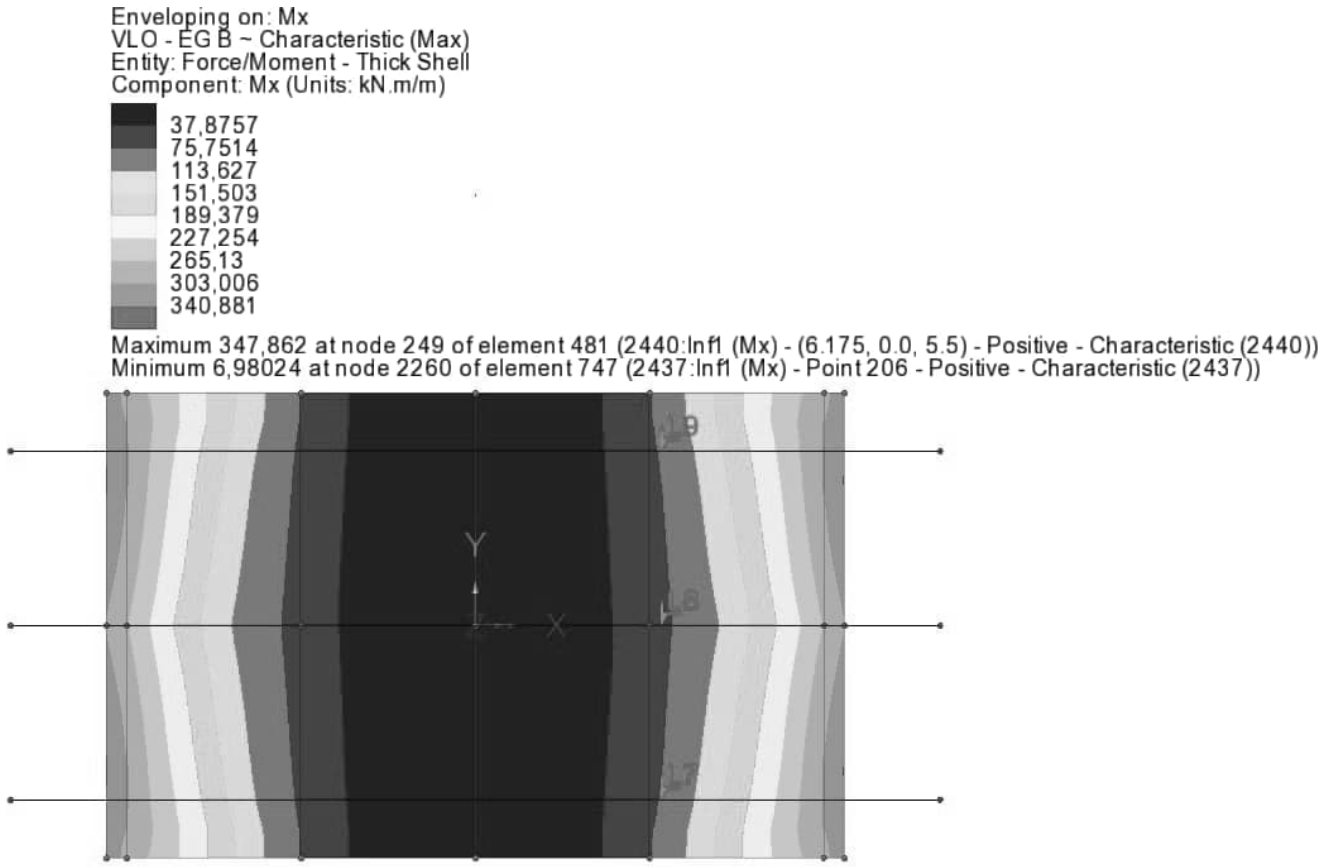
s	Max Mx	Min Mx
1,65	96	-21
1,83	90	-20
2,00	86	-19
2,50	72	-28
3,00	60	-36
3,50	49	-50
4,00	39	-58
4,50	30	-62
5,00	22	-70
5,50	15	-75
6,00	10	-76
6,50	8	-82
7,00	6	-82
7,50	4	-83
8,00	3	-85
8,50	4	-83
9,00	6	-82
9,50	8	-82
10,00	10	-76
10,50	15	-75
11,00	22	-69
11,50	30	-62
12,00	39	-58
13,00	60	-36
13,50	72	-28
14,00	86	-19
14,18	90	-20
14,35	73	-16
m	kNm/m	kNm/m

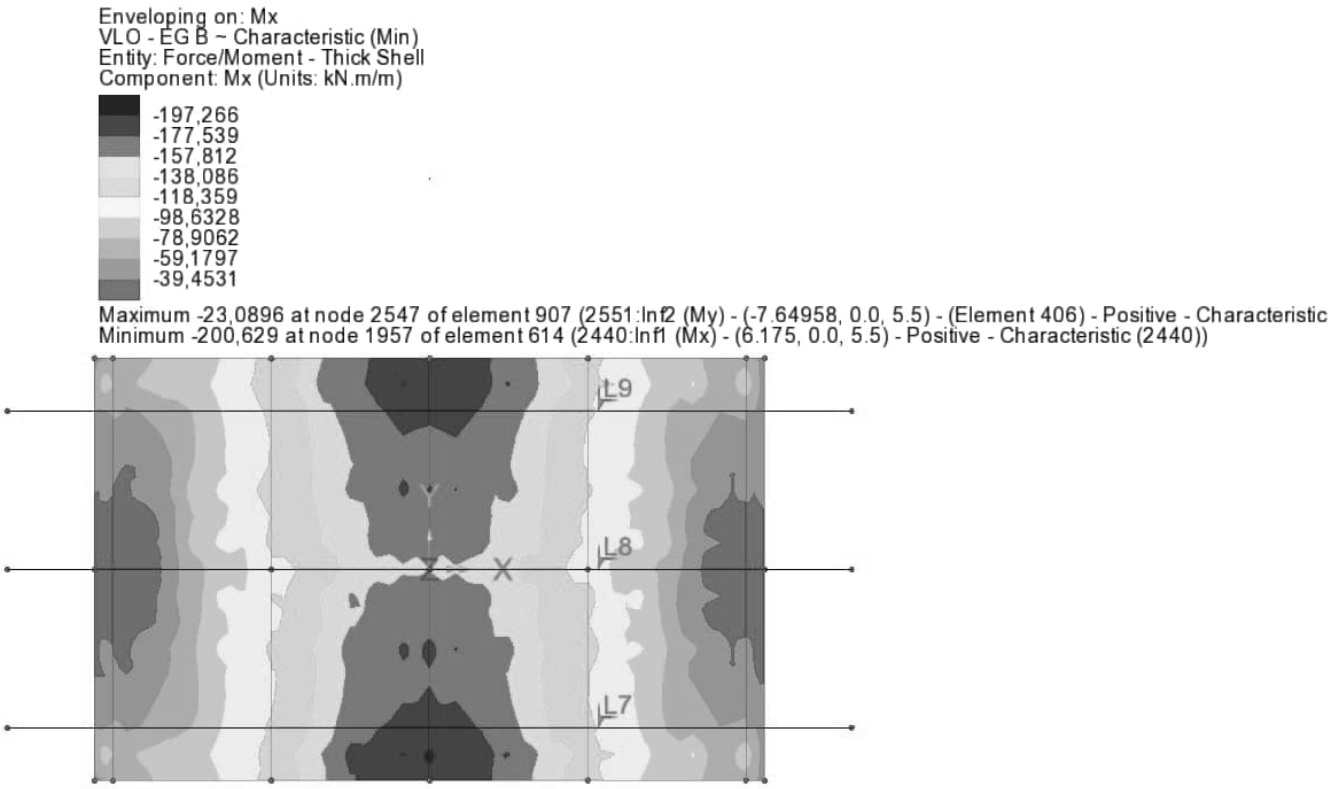
Line 3:

s	Max Mx	Min Mx
1,65	107	-37
1,83	102	-45
2,00	98	-51
2,50	85	-46
3,00	72	-62
3,50	61	-61
4,00	50	-67
4,50	40	-67
5,00	31	-79
5,50	22	-84
6,00	15	-80
6,50	10	-93
7,00	7	-91
7,50	5	-86
8,00	3	-98
8,50	5	-86
9,00	7	-91
9,50	10	-93
10,00	15	-80
10,50	22	-84
11,00	31	-78
11,50	40	-67
12,00	50	-67
13,00	72	-62
13,50	85	-46
14,00	98	-53
14,18	102	-45
14,35	80	-28
m	kNm/m	kNm/m

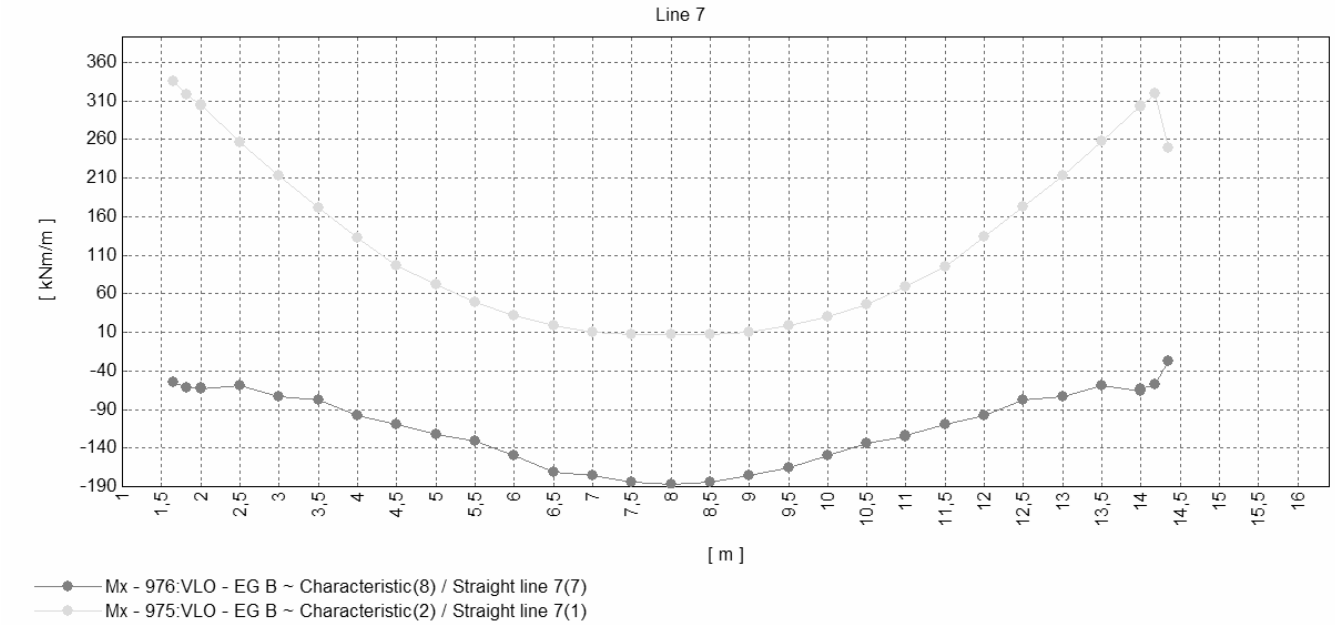
10. EG B – Max/Min Mx

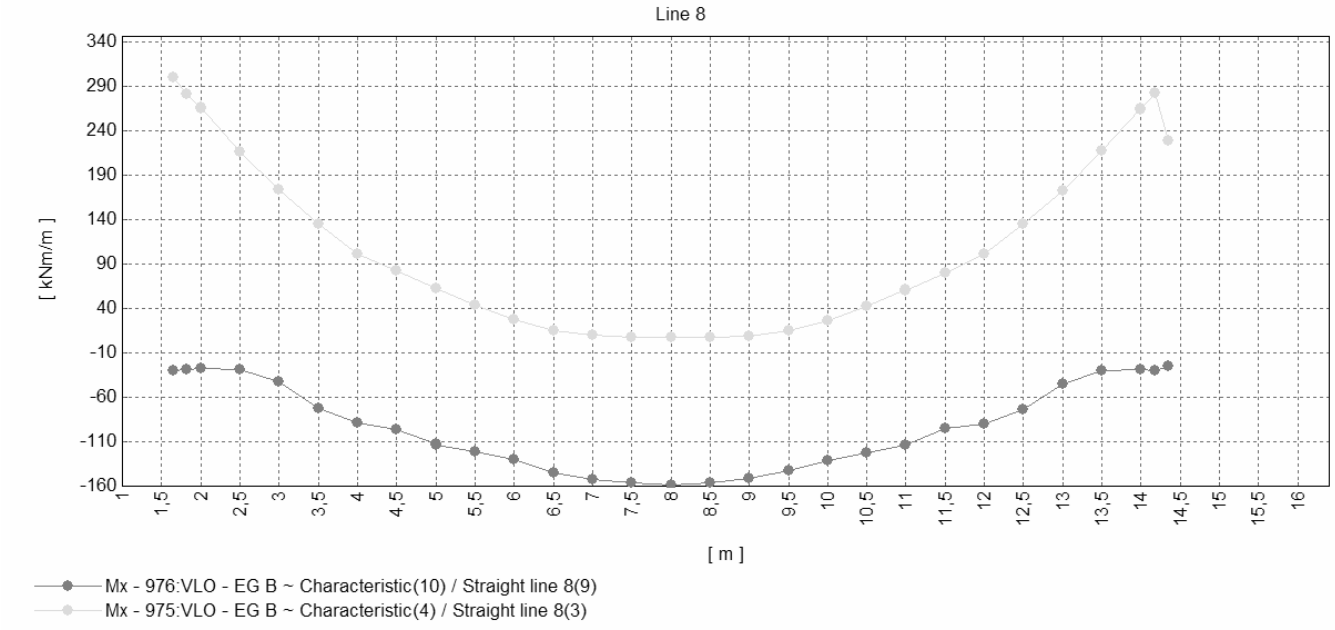
10.1 CONTOUR

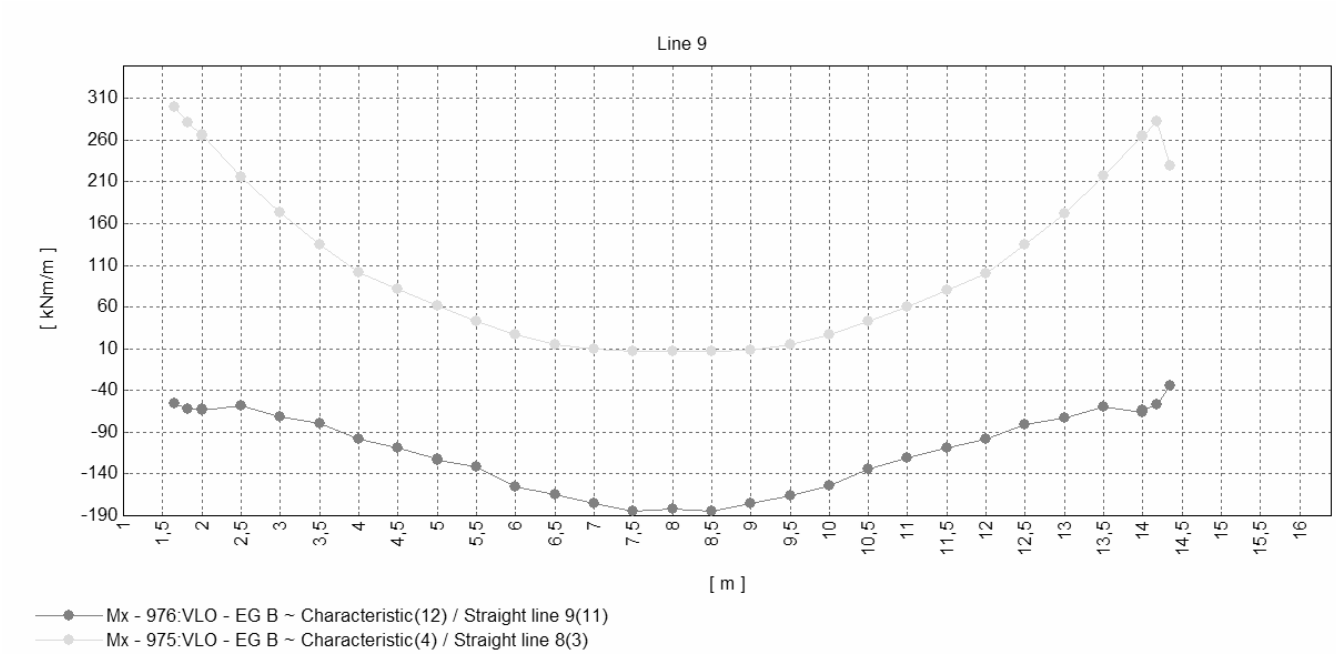



Enveloping on: Mx
VLO - EG B ~ Characteristic (Min)
Entity: Force/Moment - Thick Shell
Component: Mx (Units: kN.m/m)
-197,266
-177,539
-157,812
-138,086
-118,359
-98,6328
-78,9062
-59,1797
-39,4531
Maximum -23,0896 at node 2547 of element 907 (2551:Inf2 (My) - (-7.64958, 0.0, 5.5) - (Element 406) - Positive - Characteristic
Minimum -200,629 at node 1957 of element 614 (2440:Inf1 (Mx) - (6.175, 0.0, 5.5) - Positive - Characteristic (2440))
L9
L8
L7
Y
Z
X

10.2 DIAGRAM


Line 7
[kNm/m]
360
310
260
210
160
110
60
10
-40
-90
-140
-190
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
Mx - 976:VLO - EG B ~ Characteristic(8) / Straight line 7(7)
Mx - 975:VLO - EG B ~ Characteristic(2) / Straight line 7(1)


Line 8
[kNm/m]
340
290
240
190
140
90
40
-10
-60
-110
-160
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
Mx - 976:VLO - EG B ~ Characteristic(10) / Straight line 8(9)
Mx - 975:VLO - EG B ~ Characteristic(4) / Straight line 8(3)


Line 9
[kNm/m]
310
260
210
160
110
60
10
-40
-90
-140
-190
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
Mx - 976:VLO - EG B ~ Characteristic(12) / Straight line 9(11)
Mx - 975:VLO - EG B ~ Characteristic(4) / Straight line 8(3)

10.3 Table

Line 7:

s	Max Mx	Min Mx
1,65	336	-55
1,83	319	-62
2,00	304	-62
2,50	256	-58
3,00	213	-73
3,50	172	-78
4,00	133	-98
4,50	96	-109
5,00	71	-122
5,50	49	-131
6,00	31	-150
6,50	19	-171
7,00	10	-176
7,50	8	-185
8,00	7	-187
8,50	7	-185
9,00	10	-176
9,50	19	-165
10,00	31	-149
10,50	46	-134
11,00	69	-125
11,50	95	-109
12,00	134	-98
13,00	212	-74
13,50	257	-59
14,00	304	-66
14,18	319	-57
14,35	249	-27
m	kNm/m	kNm/m

Line 8:

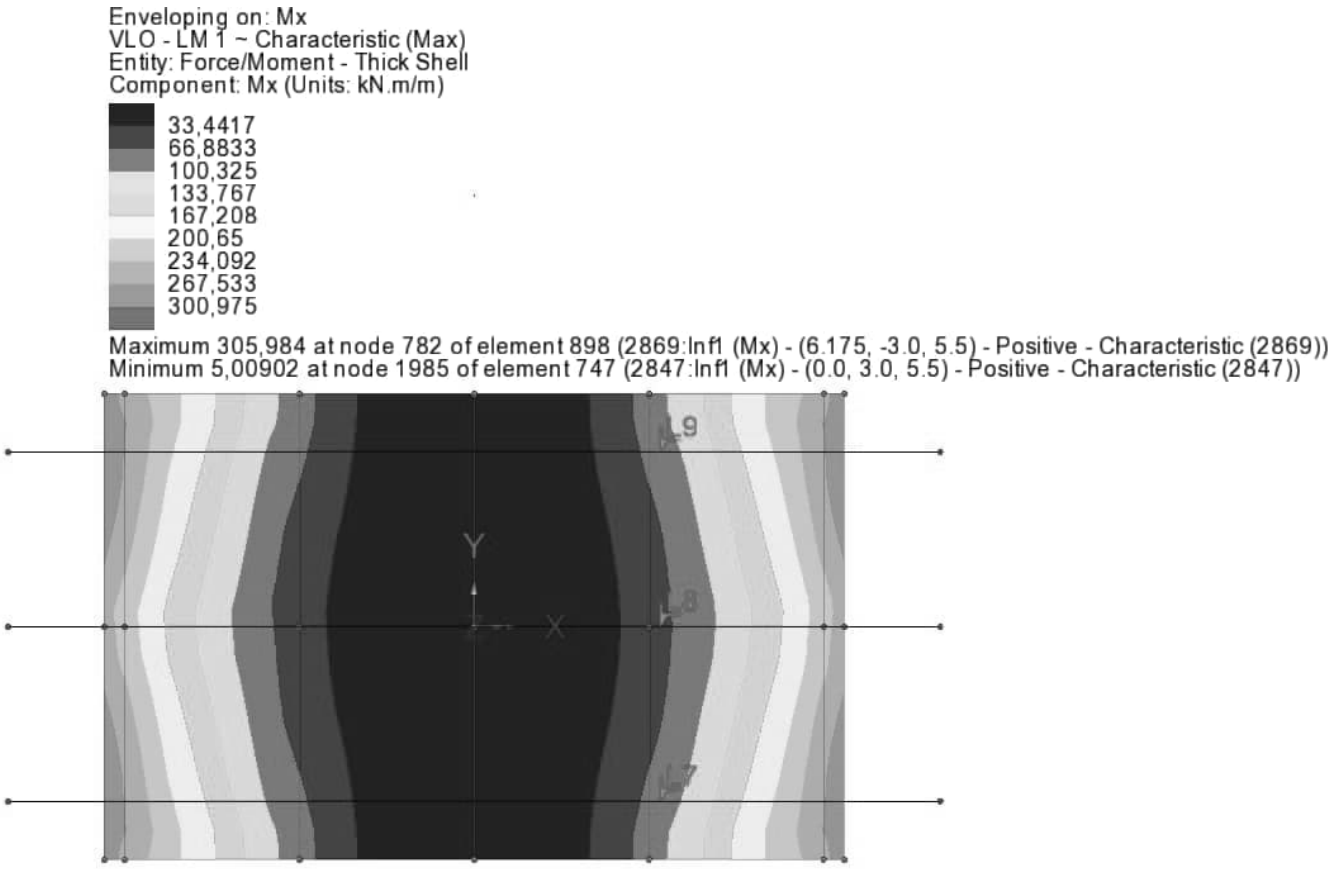
s	Max Mx	Min Mx
1,65	299	-30
1,83	281	-29
2,00	265	-28
2,50	217	-29
3,00	173	-42
3,50	135	-73
4,00	102	-89
4,50	82	-96
5,00	62	-113
5,50	43	-121
6,00	27	-130
6,50	15	-146
7,00	9	-153
7,50	7	-156
8,00	7	-159
8,50	7	-157
9,00	9	-152
9,50	14	-143
10,00	27	-131
10,50	42	-122
11,00	61	-114
11,50	80	-95
12,00	101	-90
13,00	172	-46
13,50	217	-30
14,00	265	-29
14,18	282	-30
14,35	229	-25
m	kNm/m	kNm/m

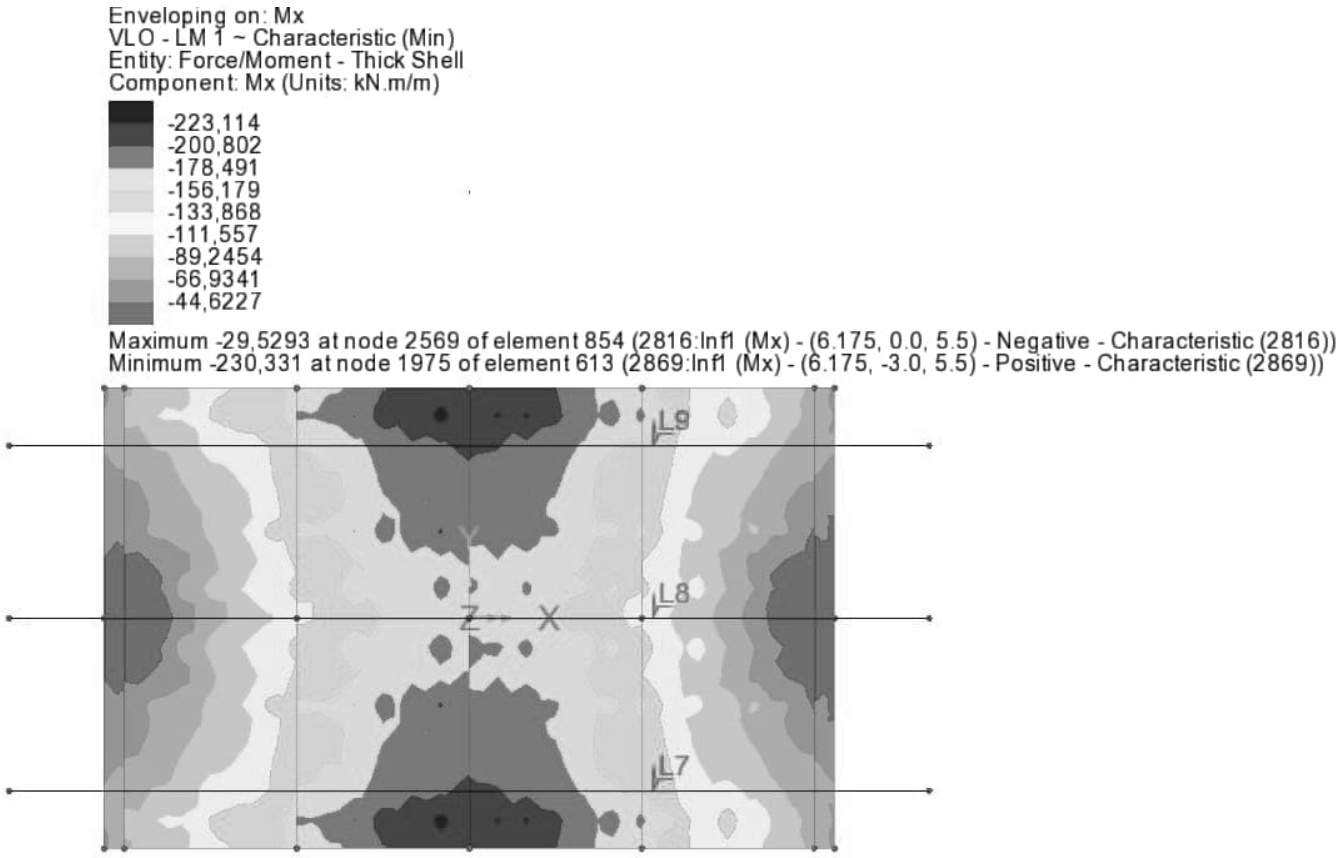
Line 9:

s	Max Mx	Min Mx
1,65	335	-55
1,83	319	-62
2,00	304	-62
2,50	256	-58
3,00	213	-71
3,50	171	-80
4,00	133	-98
4,50	96	-109
5,00	71	-123
5,50	48	-131
6,00	31	-155
6,50	19	-165
7,00	11	-175
7,50	8	-185
8,00	7	-182
8,50	7	-185
9,00	10	-176
9,50	18	-166
10,00	31	-154
10,50	49	-134
11,00	70	-121
11,50	96	-109
12,00	134	-98
13,00	212	-74
13,50	257	-59
14,00	304	-66
14,18	319	-57
14,35	249	-34
m	kNm/m	kNm/m

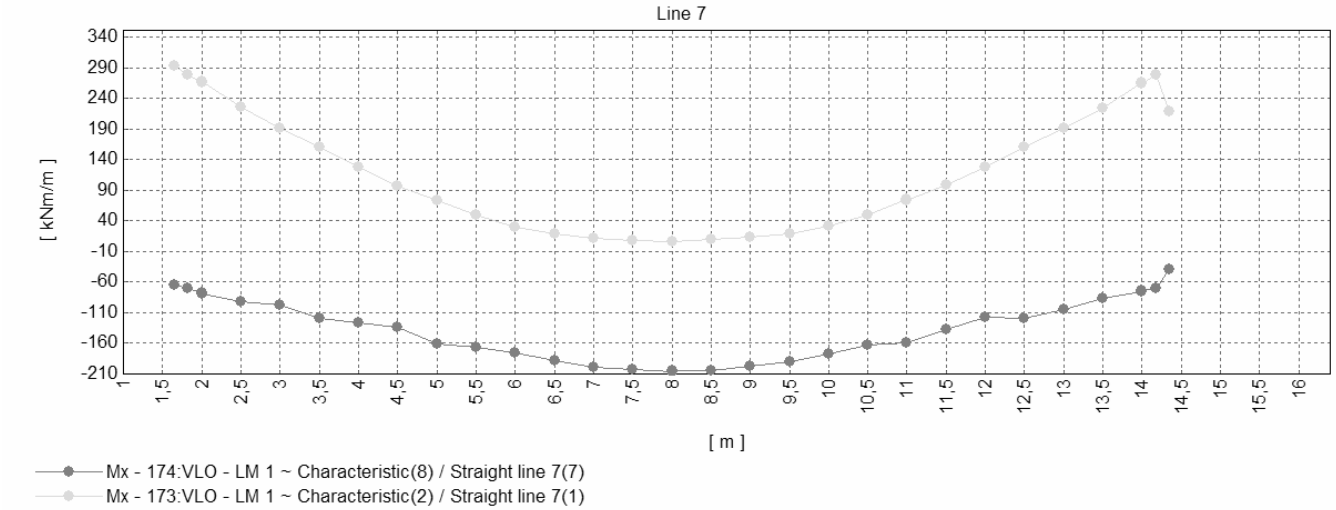
11. LM 1 – Max/Min Mx

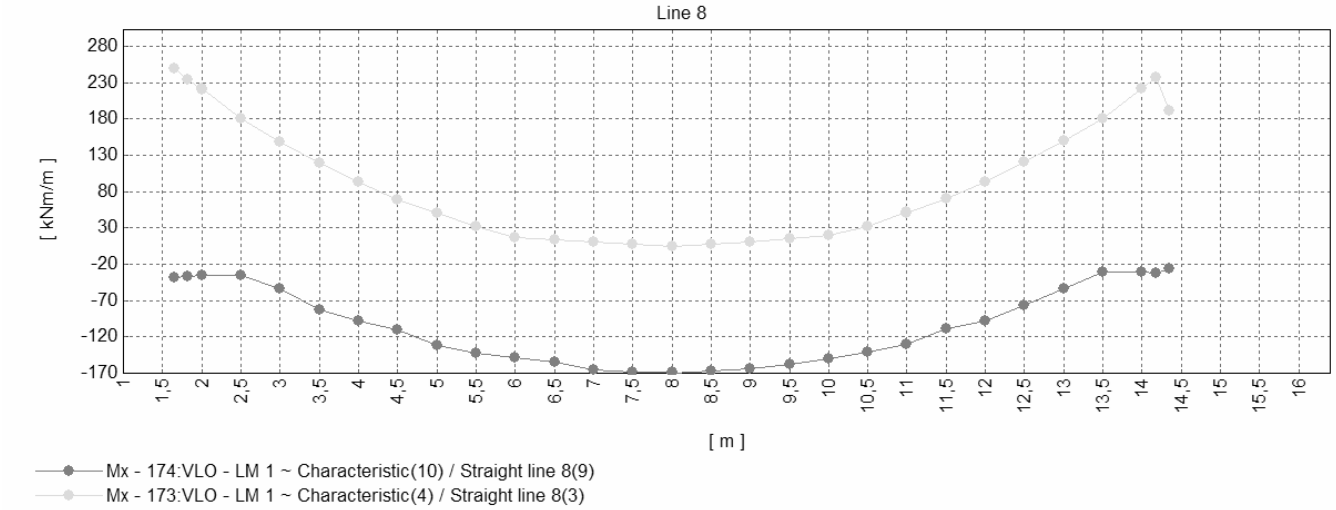
11.1.1 Contour

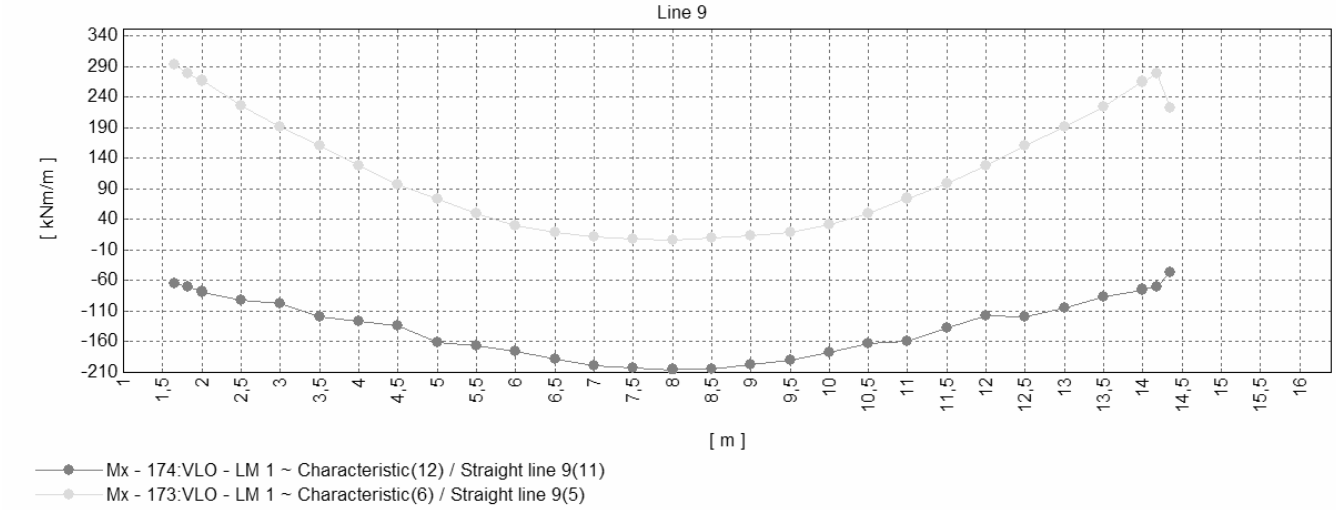



Enveloping on: Mx
VLO - LM 1 ~ Characteristic (Min)
Entity: Force/Moment - Thick Shell
Component: Mx (Units: kN.m/m)
-223,114
-200,802
-178,491
-156,179
-133,868
-111,557
-89,2454
-66,9341
-44,6227
Maximum -29,5293 at node 2569 of element 854 (2816:Inf1 (Mx) - (6.175, 0.0, 5.5) - Negative - Characteristic (2816))
Minimum -230,331 at node 1975 of element 613 (2869:Inf1 (Mx) - (6.175, -3.0, 5.5) - Positive - Characteristic (2869))
L9
L8
L7
Y
Z
X

11.2 DIAGRAM


Line 7
[kNm/m]
[m]
Mx - 174:VLO - LM 1 ~ Characteristic(8) / Straight line 7(7)
Mx - 173:VLO - LM 1 ~ Characteristic(2) / Straight line 7(1)


Line 8
[kNm/m]
[m]
Mx - 174:VLO - LM 1 ~ Characteristic(10) / Straight line 8(9)
Mx - 173:VLO - LM 1 ~ Characteristic(4) / Straight line 8(3)


Line 9
[kNm/m]
[m]
Mx - 174:VLO - LM 1 ~ Characteristic(12) / Straight line 9(11)
Mx - 173:VLO - LM 1 ~ Characteristic(6) / Straight line 9(5)

11.3 TABLE

Line 7:

s	Max Mx	Min Mx
1,65	294	-65
1,83	279	-70
2,00	266	-78
2,50	226	-91
3,00	190	-98
3,50	160	-119
4,00	128	-127
4,50	96	-133
5,00	73	-161
5,50	50	-166
6,00	30	-176
6,50	19	-189
7,00	11	-200
7,50	8	-203
8,00	5	-206
8,50	9	-204
9,00	13	-198
9,50	20	-190
10,00	31	-178
10,50	50	-163
11,00	74	-160
11,50	98	-137
12,00	127	-118
13,00	192	-105
13,50	224	-86
14,00	266	-76
14,18	279	-70
14,35	219	-40
m	kNm/m	kNm/m

Line 8:

s	Max Mx	Min Mx
1,65	250	-38
1,83	235	-37
2,00	221	-35
2,50	180	-36
3,00	148	-54
3,50	120	-82
4,00	93	-98
4,50	69	-110
5,00	51	-132
5,50	32	-142
6,00	17	-149
6,50	13	-155
7,00	10	-165
7,50	7	-168
8,00	5	-169
8,50	8	-167
9,00	11	-163
9,50	15	-158
10,00	19	-150
10,50	33	-141
11,00	51	-130
11,50	71	-109
12,00	93	-98
13,00	149	-54
13,50	181	-30
14,00	222	-31
14,18	237	-32
14,35	191	-26
m	kNm/m	kNm/m

Line 9:

s	Max Mx	Min Mx
1,65	294	-65
1,83	279	-70
2,00	266	-78
2,50	226	-91
3,00	190	-98
3,50	160	-119
4,00	128	-127
4,50	96	-133
5,00	73	-161
5,50	50	-166
6,00	30	-176
6,50	19	-189
7,00	11	-200
7,50	8	-203
8,00	5	-206
8,50	9	-204
9,00	13	-198
9,50	20	-190
10,00	31	-178
10,50	50	-163
11,00	74	-160
11,50	98	-137
12,00	127	-118
13,00	192	-105
13,50	224	-86
14,00	266	-76
14,18	279	-70
14,35	221	-46
m	kNm/m	kNm/m

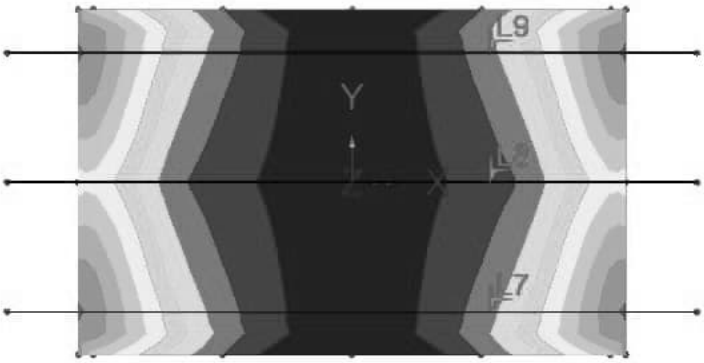
12. UTM 3 - Min Mx(B)/Max Mx(T)

12.1 CONTOUR

Enveloping on: Mx(T)
VLO - UTM 3 ~ Characteristic (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)

13,2686
26,5373
39,8059
53,0746
66,3432
79,6119
92,8805
106,149
119,418

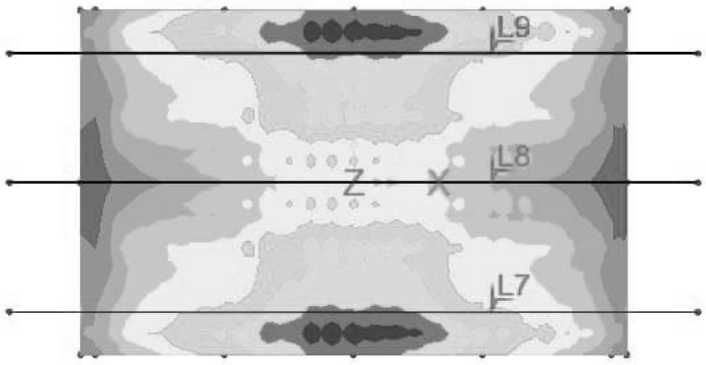
Maximum 121,281 at node 792 of element 900 (3632:Inf4 (Sy) - (-4.5, -3.0, 5.5) - Positive - Characteristic (3632))
Minimum 1,86369 at node 1973 of element 705 (3226:Inf1 (Mx) - (6.175, 3.0, 5.5) - Negative - Characteristic (3226))



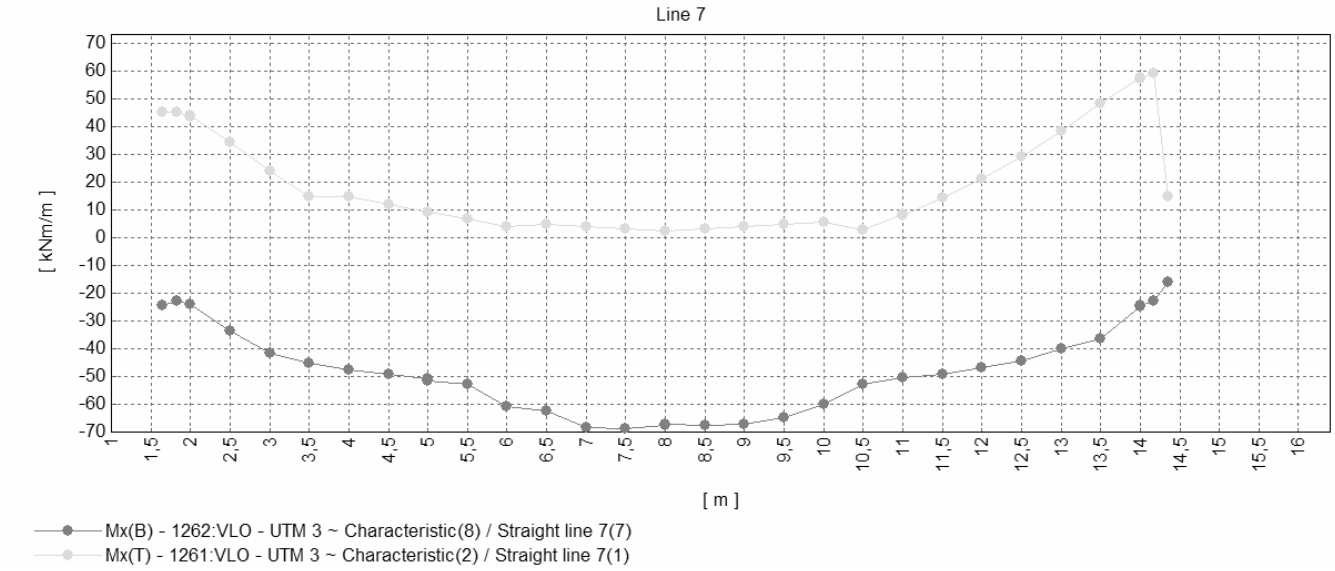
Enveloping on: Mx(B)
VLO - UTM 3 ~ Characteristic (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)

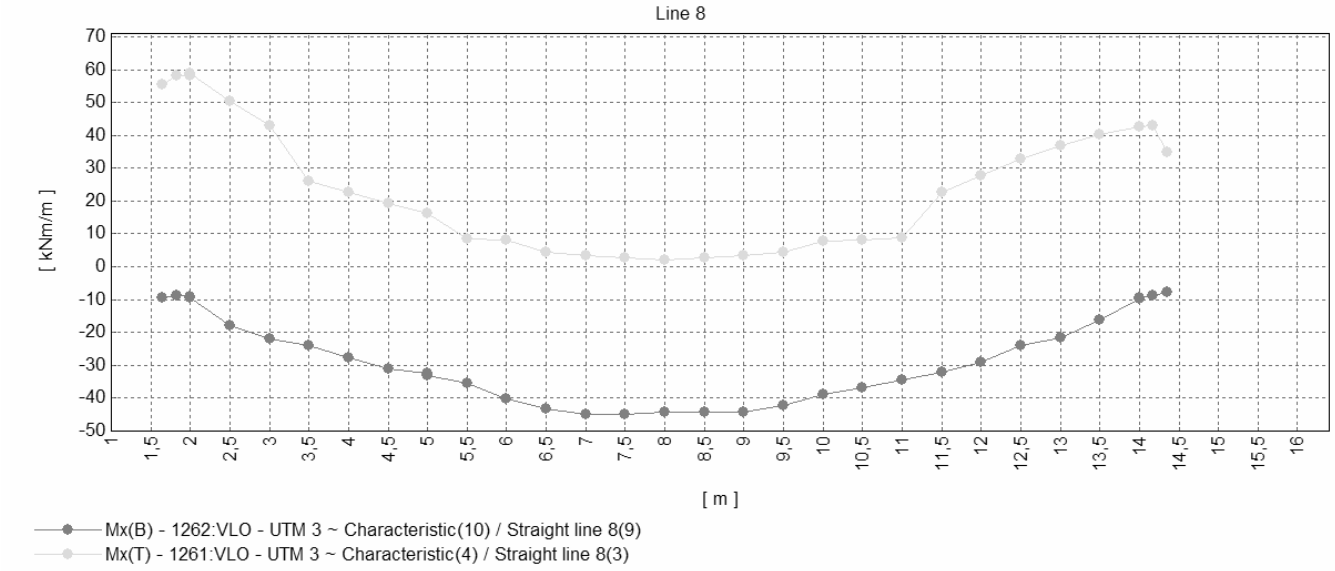
-81,7946
-73,6152
-65,4357
-57,2562
-49,0768
-40,8973
-32,7178
-24,5384
-16,3589

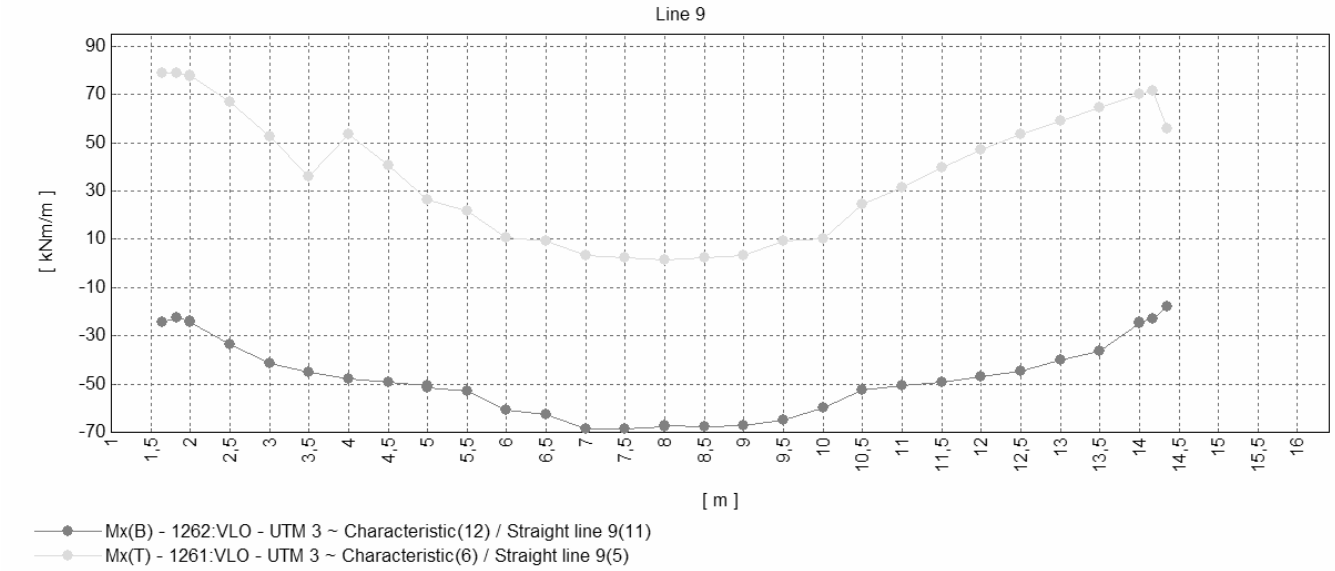
Maximum -8,74813 at node 1553 of element 496 (3263:Inf1 (Mx) - (0.0, 3.0, 5.5) - Positive - Characteristic (3263))
Minimum -82,3633 at node 1975 of element 613 (3242:Inf1 (Mx) - (0.0, -3.0, 5.5) - Negative - Characteristic (3242))



12.2 DIAGRAM


Line 7
[kNm/m]
[m]
Mx(B) - 1262:VLO - UTM 3 ~ Characteristic(8) / Straight line 7(7)
Mx(T) - 1261:VLO - UTM 3 ~ Characteristic(2) / Straight line 7(1)


Line 8
[kNm/m]
[m]
Mx(B) - 1262:VLO - UTM 3 ~ Characteristic(10) / Straight line 8(9)
Mx(T) - 1261:VLO - UTM 3 ~ Characteristic(4) / Straight line 8(3)


Line 9
[kNm/m]
90
70
50
30
10
-10
-30
-50
-70
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
Mx(B) - 1262:VLO - UTM 3 ~ Characteristic(12) / Straight line 9(11)
Mx(T) - 1261:VLO - UTM 3 ~ Characteristic(6) / Straight line 9(5)

12.3 TABLE

Line 7:

s	Max Mx(T)	Min Mx(B)
1,65	118	-24
1,83	116	-23
2,00	113	-24
2,50	98	-33
3,00	83	-42
3,50	68	-45
4,00	53	-48
4,50	42	-49
5,00	32	-51
5,50	24	-53
6,00	18	-61
6,50	13	-62
7,00	8	-68
7,50	7	-69
8,00	5	-68
8,50	7	-68
9,00	8	-67
9,50	13	-65
10,00	18	-60
10,50	24	-53
11,00	32	-51
11,50	42	-49
12,00	53	-47
13,00	83	-40
13,50	99	-36
14,00	113	-25
14,18	116	-23
14,35	88	-16
m	kNm/m	kNm/m

Line 8:

s	Max Mx(T)	Min Mx(B)
1,65	76	-9
1,83	76	-9
2,00	75	-9
2,50	65	-18
3,00	52	-22
3,50	40	-24
4,00	30	-28
4,50	23	-31
5,00	18	-33
5,50	15	-36
6,00	12	-40
6,50	9	-43
7,00	7	-45
7,50	6	-45
8,00	6	-44
8,50	6	-44
9,00	7	-44
9,50	9	-42
10,00	12	-39
10,50	15	-37
11,00	18	-35
11,50	23	-32
12,00	30	-29
13,00	52	-22
13,50	65	-16
14,00	75	-10
14,18	76	-9
14,35	67	-8
m	kNm/m	kNm/m

Line 9:

s	Max Mx(T)	Min Mx(B)
1,65	118	-24
1,83	116	-23
2,00	113	-24
2,50	98	-33
3,00	83	-42
3,50	68	-45
4,00	53	-48
4,50	42	-49
5,00	32	-51
5,50	24	-53
6,00	18	-61
6,50	13	-62
7,00	8	-68
7,50	7	-69
8,00	5	-68
8,50	7	-68
9,00	8	-67
9,50	13	-65
10,00	18	-60
10,50	24	-53
11,00	32	-51
11,50	42	-49
12,00	53	-47
13,00	83	-40
13,50	99	-36
14,00	113	-25
14,18	116	-23
14,35	88	-16
m	kNm/m	kNm/m

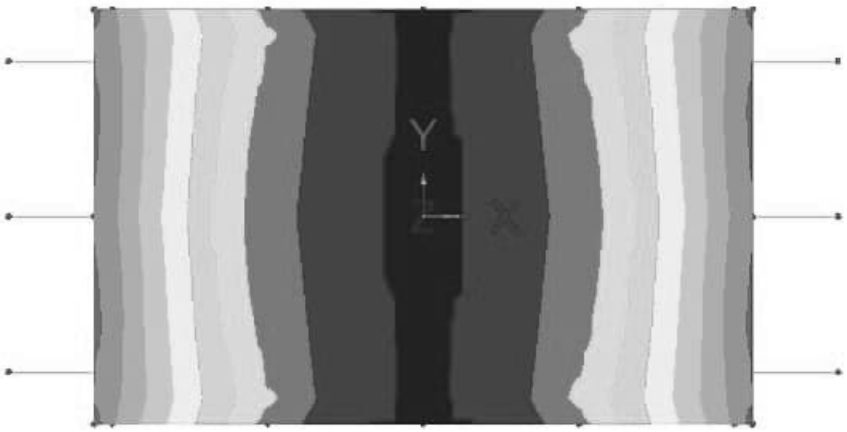
13. ULS - Min Mx(B)/Max Mx(T)

13.1 CONTOUR

Combining on: Mx(T)
ULS (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)

0,0
123,525
247,051
370,576
494,101
617,626
741,152
864,677
988,202

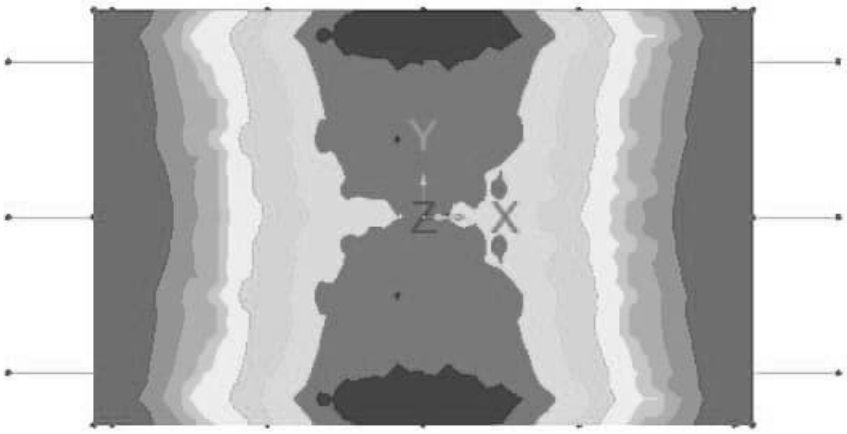
Maximum 1,11173E3 at node 249 of element 481
Minimum 0,0 at node 1940 of element 612



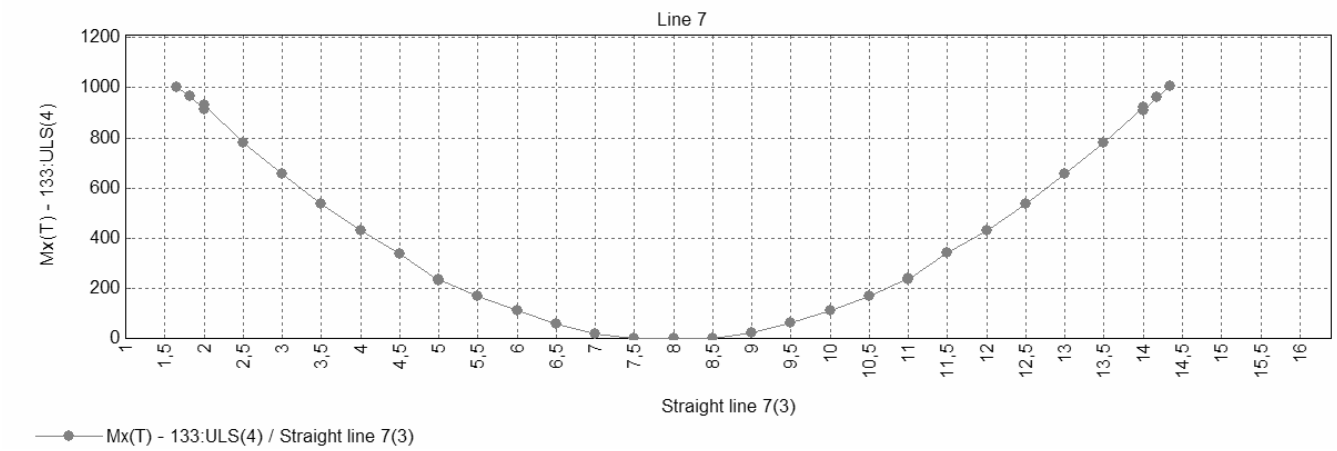
Combining on: Mx(B)
ULS (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)

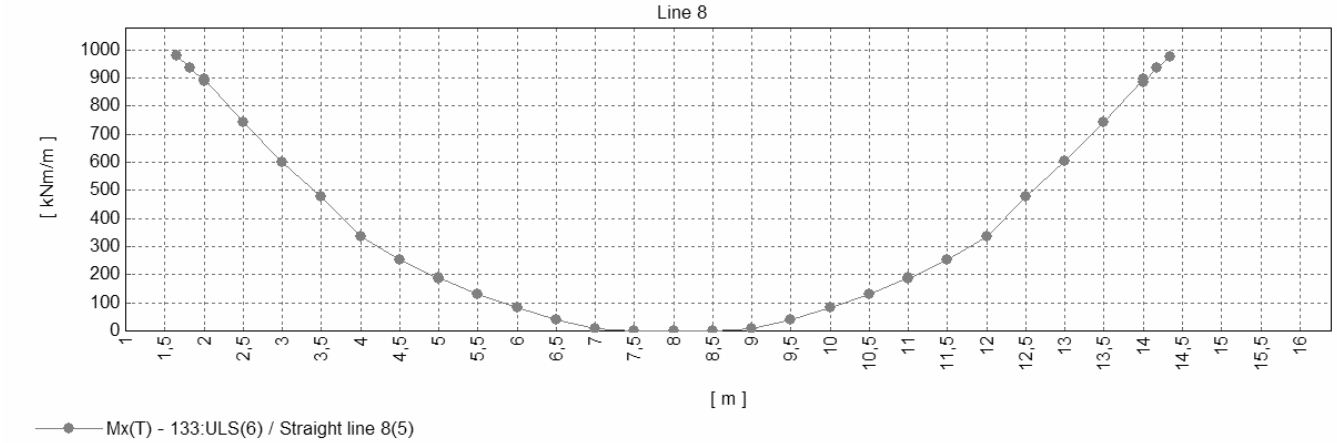
-498,676
-443,267
-387,859
-332,45
-277,042
-221,634
-166,225
-110,817
-55,4084

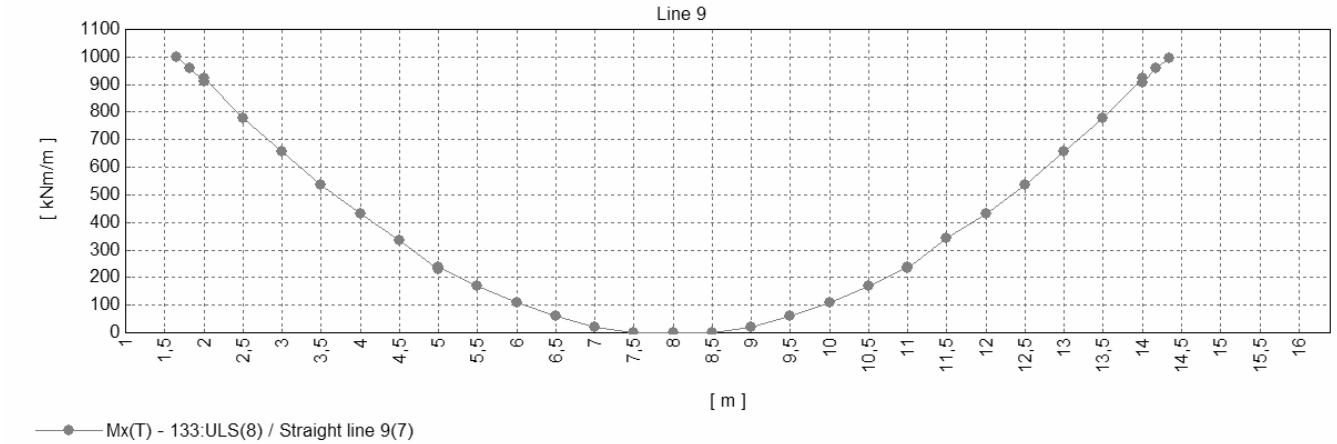
Maximum 0,0 at node 238 of element 495
Minimum -498,676 at node 1975 of element 613

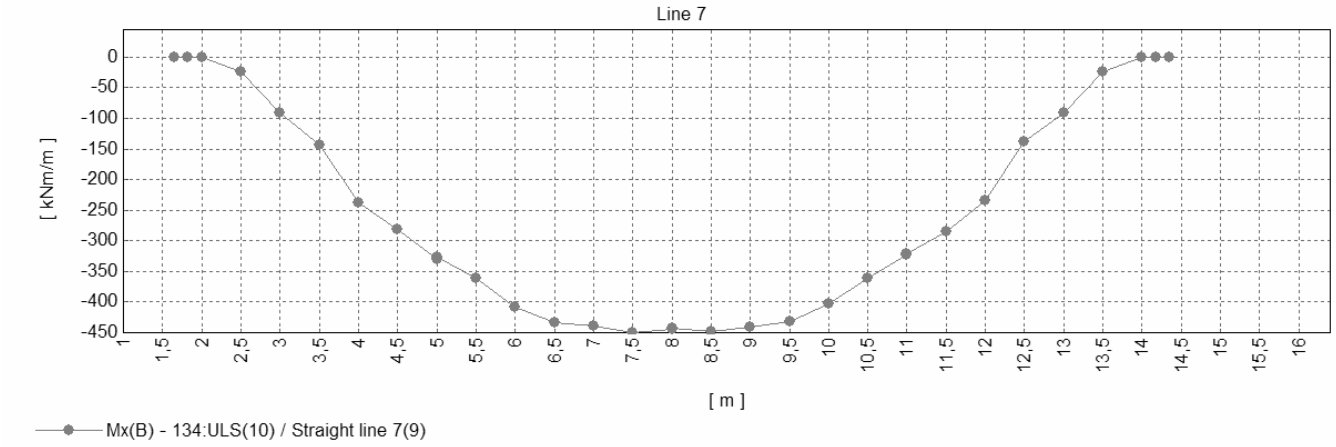


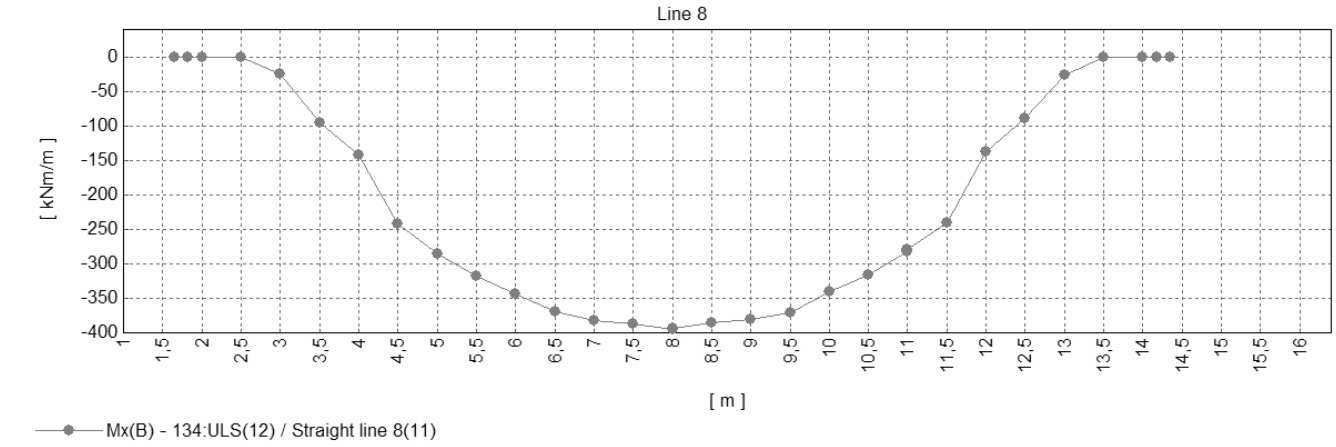
13.2 DIAGRAM

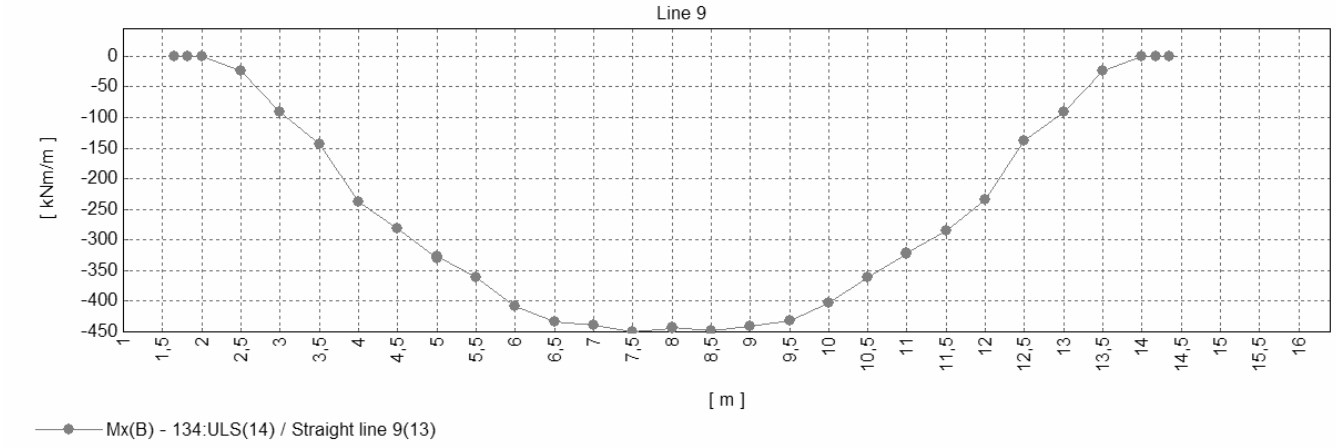

Line 7
Mx(T) - 133:ULS(4)
Straight line 7(3)
Mx(T) - 133:ULS(4) / Straight line 7(3)


Line 8
[kNm/m]
[m]
Mx(T) - 133:ULS(6) / Straight line 8(5)


Line 9
[kNm/m]
[m]
Mx(T) - 133:ULS(8) / Straight line 9(7)


Line 7
[kNm/m]
0
-50
-100
-150
-200
-250
-300
-350
-400
-450
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
Mx(B) - 134:ULS(10) / Straight line 7(9)


Line 8
[kNm/m]
0
-50
-100
-150
-200
-250
-300
-350
-400
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
Mx(B) - 134:ULS(12) / Straight line 8(11)


Line 9
[kNm/m]
0
-50
-100
-150
-200
-250
-300
-350
-400
-450
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
Mx(B) - 134:ULS(14) / Straight line 9(13)

13.3 TABLE

Line 7:

s	Max Mx(T)	Min Mx(B)
1,65	1003	0
1,83	965	0
2,00	915	0
2,50	779	-24
3,00	656	-91
3,50	536	-143
4,00	430	-238
4,50	336	-281
5,00	231	-331
5,50	169	-361
6,00	110	-407
6,50	60	-433
7,00	20	-440
7,50	0	-450
8,00	0	-445
8,50	0	-449
9,00	20	-440
9,50	60	-432
10,00	110	-402
10,50	169	-361
11,00	238	-322
11,50	341	-286
12,00	430	-234
13,00	657	-91
13,50	779	-23
14,00	924	0
14,18	960	0
14,35	1008	0
m	kNm/m	kNm/m

Line 8:

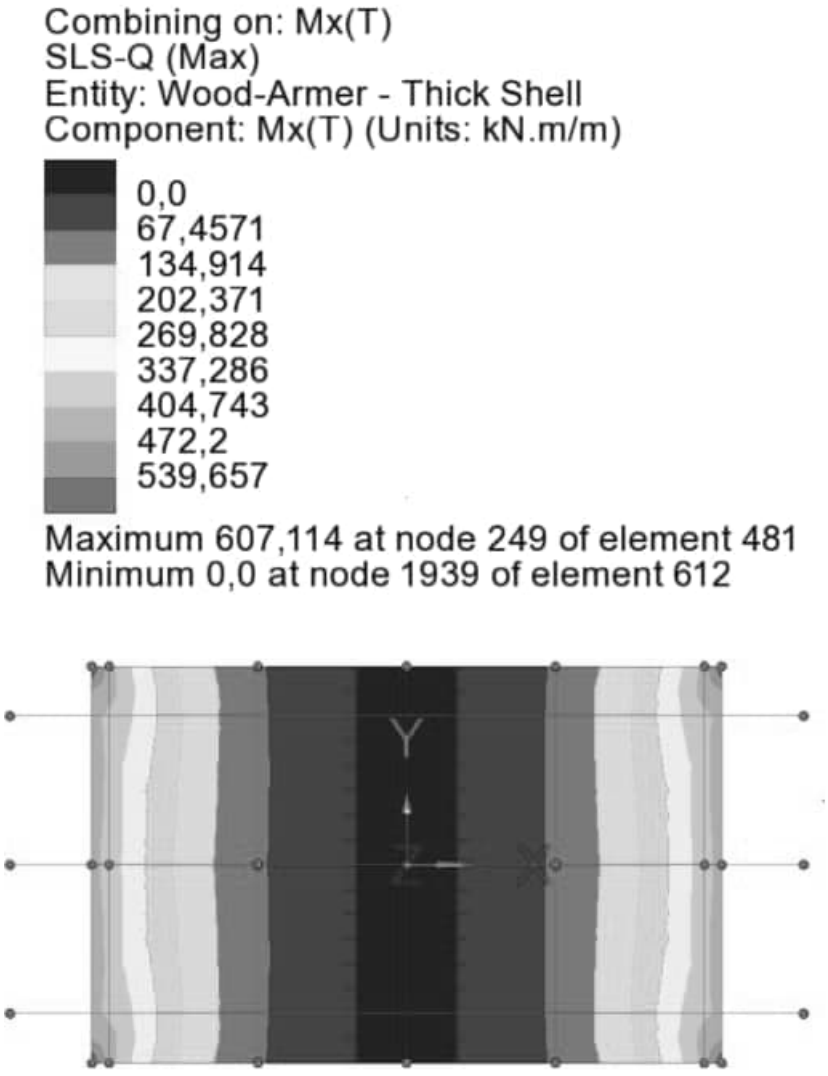
s	Max Mx(T)	Min Mx(B)
1,65	978	0
1,83	936	0
2,00	888	0
2,50	744	0
3,00	602	-24
3,50	479	-96
4,00	334	-143
4,50	253	-242
5,00	186	-286
5,50	129	-318
6,00	82	-343
6,50	41	-369
7,00	8	-382
7,50	0	-386
8,00	0	-395
8,50	0	-385
9,00	9	-381
9,50	41	-370
10,00	82	-340
10,50	129	-316
11,00	189	-283
11,50	253	-240
12,00	335	-137
13,00	602	-27
13,50	743	0
14,00	895	0
14,18	935	0
14,35	976	0
m	kNm/m	kNm/m

Line 9:

s	Max Mx(T)	Min Mx(B)
1,65	999	0
1,83	960	0
2,00	909	0
2,50	778	-24
3,00	656	-91
3,50	536	-143
4,00	430	-238
4,50	336	-281
5,00	231	-331
5,50	169	-361
6,00	110	-407
6,50	60	-433
7,00	20	-440
7,50	0	-450
8,00	0	-445
8,50	0	-449
9,00	20	-440
9,50	60	-432
10,00	110	-402
10,50	169	-361
11,00	238	-322
11,50	341	-286
12,00	430	-234
13,00	657	-91
13,50	779	-23
14,00	921	0
14,18	958	0
14,35	997	0
m	kNm/m	kNm/m

14. SLS:Q - Min Mx(B)/Max Mx(T)

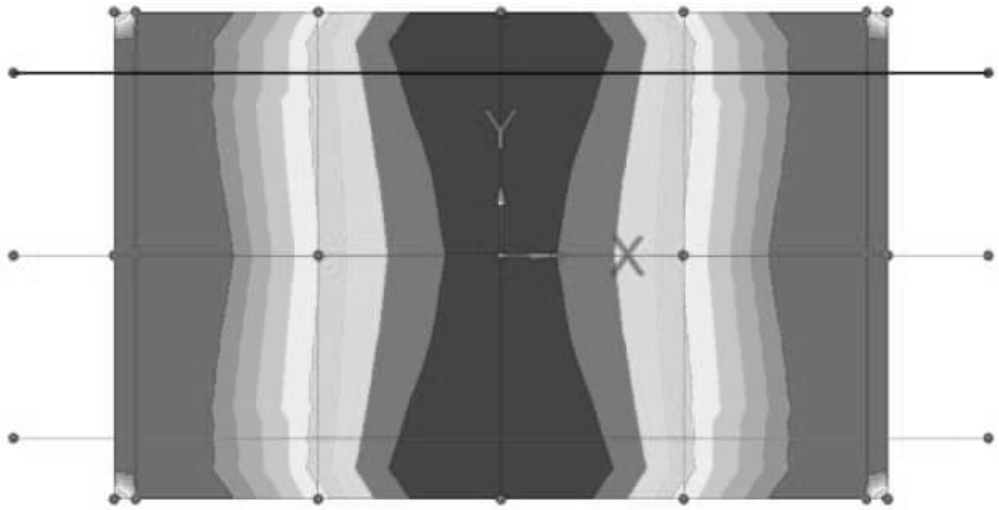
14.1 CONTOUR



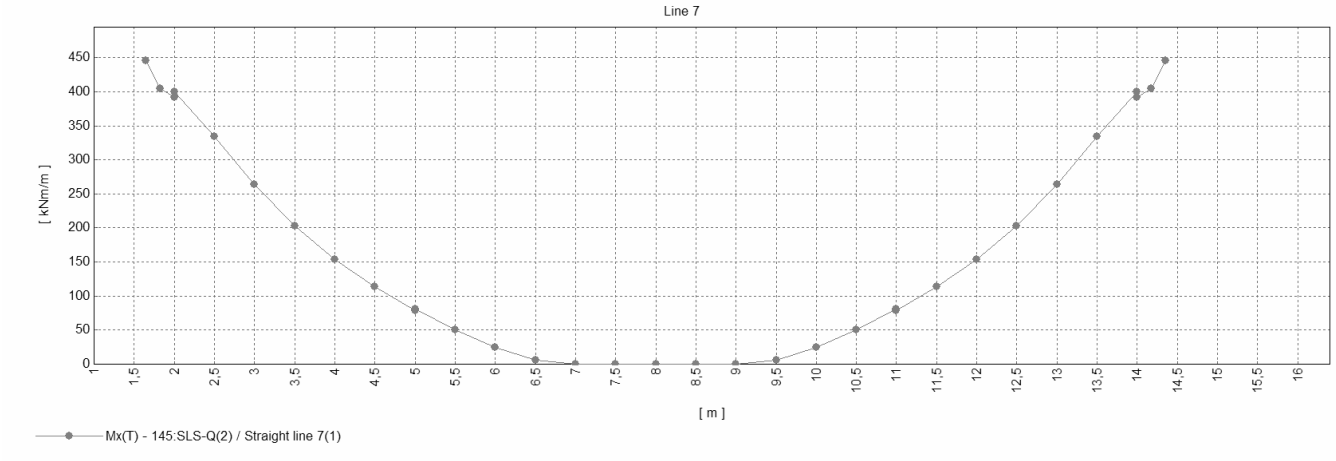
Combining on: Mx(B)
SLS-Q (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)

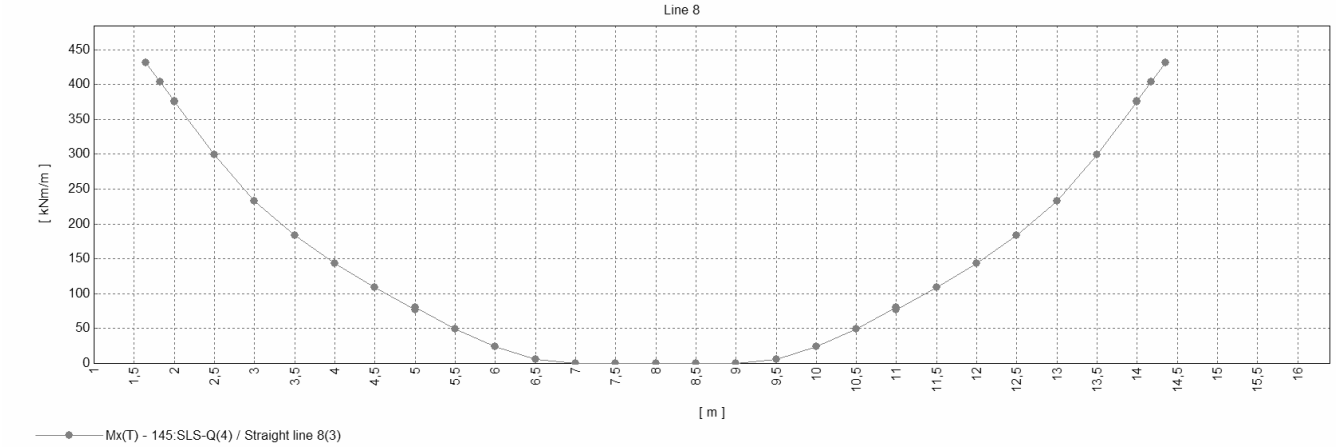
-230,436
-204,832
-179,228
-153,624
-128,02
-102,416
-76,8121
-51,2081
-25,604

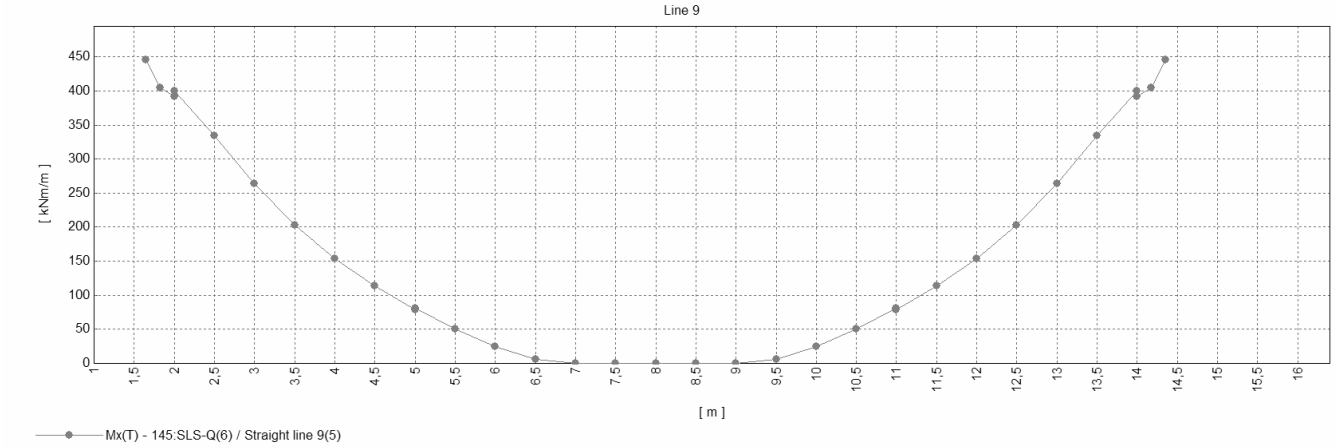
Maximum 0,0 at node 238 of element 495
Minimum -230,436 at node 1975 of element 613

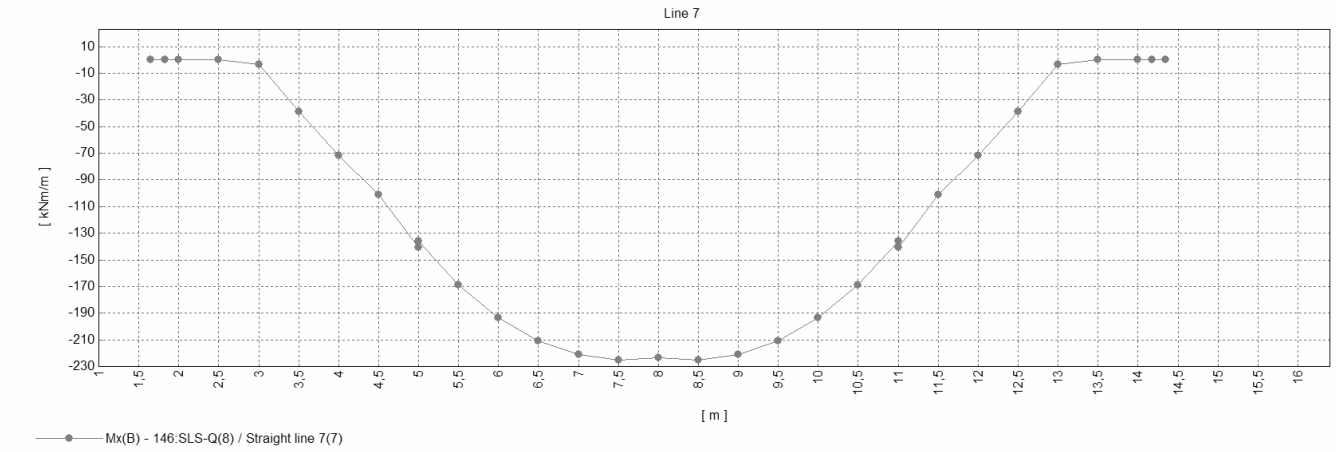


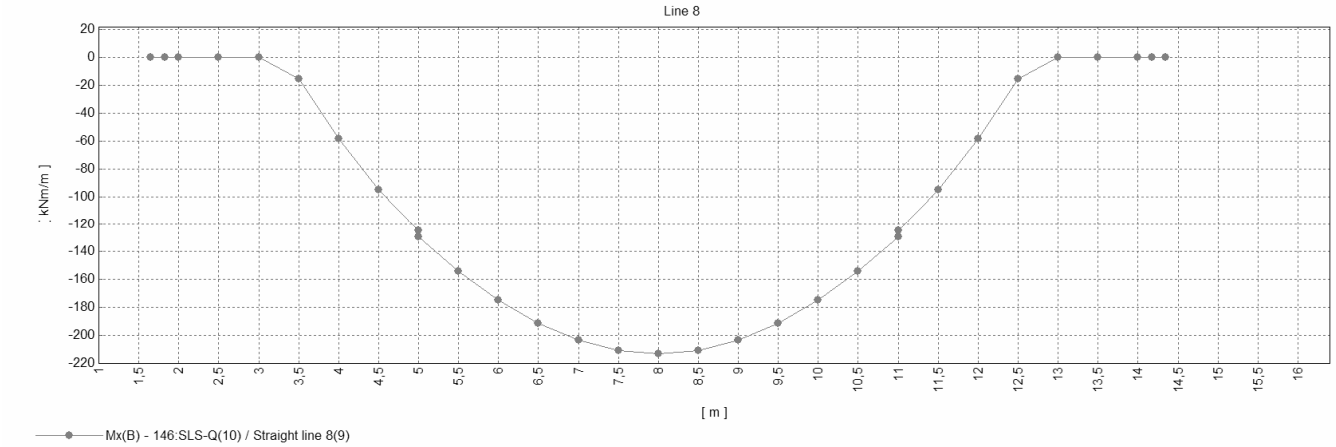
14.2 DIAGRAM

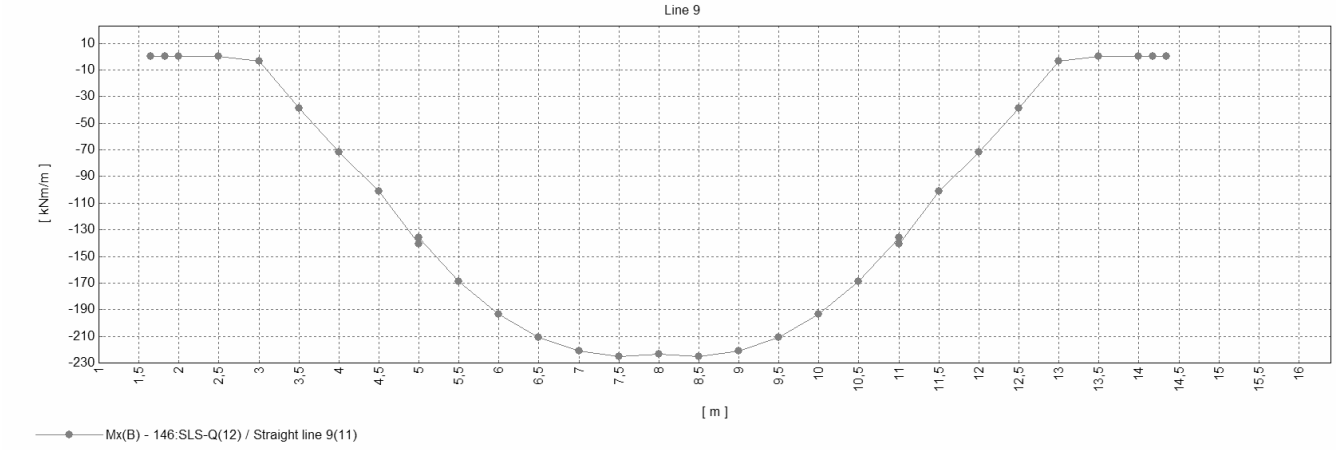

Line 7
[kNm/m]
[m]
Mx(T) - 145:SLS-Q(2) / Straight line 7(1)


Line 8
[kNm/m]
[m]
Mx(T) - 145:SLS-Q(4) / Straight line 8(3)


Line 9
[kNm/m]
[m]
Mx(T) - 145:SLS-Q(6) / Straight line 9(5)


Line 7
[kNm/m]
[m]
Mx(B) - 146:SLS-Q(8) / Straight line 7(7)


Line 8
[kNm/m]
[m]
Mx(B) - 146:SLS-Q(10) / Straight line 8(9)


Line 9
[kNm/m]
[m]
Mx(B) - 146:SLS-Q(12) / Straight line 9(11)

14.3 TABLE

Line 7:

s	Max Mx(T)	Min Mx(B)
1,65	445	0
1,83	405	0
2,00	392	0
2,50	334	0
3,00	264	-4
3,50	203	-39
4,00	154	-72
4,50	113	-101
5,00	79	-140
5,50	50	-169
6,00	25	-194
6,50	6	-211
7,00	0	-221
7,50	0	-225
8,00	0	-224
8,50	0	-225
9,00	0	-221
9,50	6	-211
10,00	25	-194
10,50	50	-169
11,00	81	-136
11,50	113	-101
12,00	154	-72
13,00	264	-4
13,50	334	0
14,00	400	0
14,18	405	0
14,35	445	0
m	kNm/m	kNm/m

Line 8:

s	Max Mx(T)	Min Mx(B)
1,65	431	0
1,83	404	0
2,00	376	0
2,50	300	0
3,00	233	0
3,50	184	-15
4,00	143	-58
4,50	109	-95
5,00	76	-125
5,50	49	-154
6,00	24	-175
6,50	5	-191
7,00	0	-203
7,50	0	-211
8,00	0	-213
8,50	0	-211
9,00	0	-203
9,50	5	-191
10,00	24	-175
10,50	49	-154
11,00	80	-130
11,50	109	-95
12,00	143	-58
13,00	233	0
13,50	300	0
14,00	376	0
14,18	404	0
14,35	431	0
m	kNm/m	kNm/m

Line 9:

s	Max Mx(T)	Min Mx(B)
1,65	445	0
1,83	405	0
2,00	392	0
2,50	334	0
3,00	264	-4
3,50	203	-39
4,00	154	-72
4,50	113	-101
5,00	79	-140
5,50	50	-169
6,00	25	-194
6,50	6	-211
7,00	0	-221
7,50	0	-225
8,00	0	-224
8,50	0	-225
9,00	0	-221
9,50	6	-211
10,00	25	-194
10,50	50	-169
11,00	81	-136
11,50	113	-101
12,00	154	-72
13,00	264	-4
13,50	334	0
14,00	400	0
14,18	405	0
14,35	445	0
m	kNm/m	kNm/m

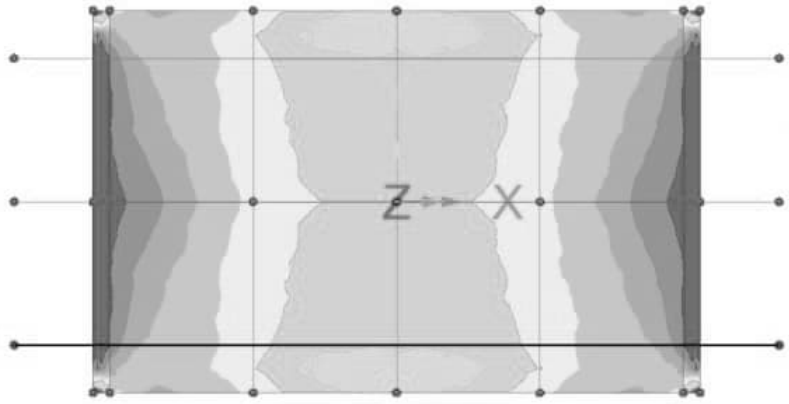
15. SLS:K- Min Mx(B)/Max Mx(T)

15.1 CONTOUR

Combining on: Mx(B)
SLS-K (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)

-670,968
-596,416
-521,864
-447,312
-372,76
-298,208
-223,656
-149,104
-74,552

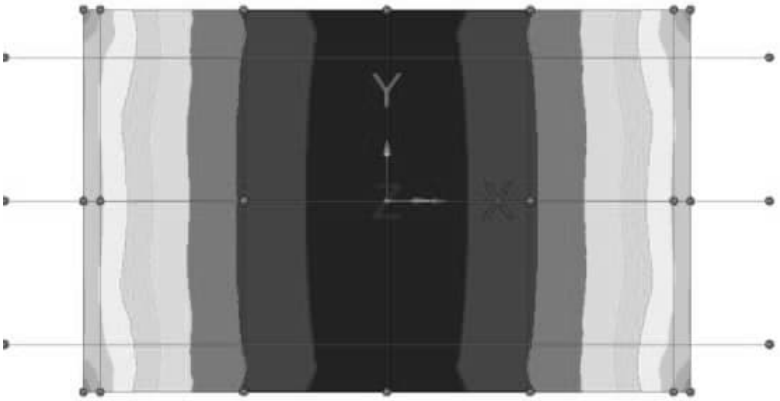
Maximum 0,0 at node 246 of element 487
Minimum -670,968 at node 782 of element 898



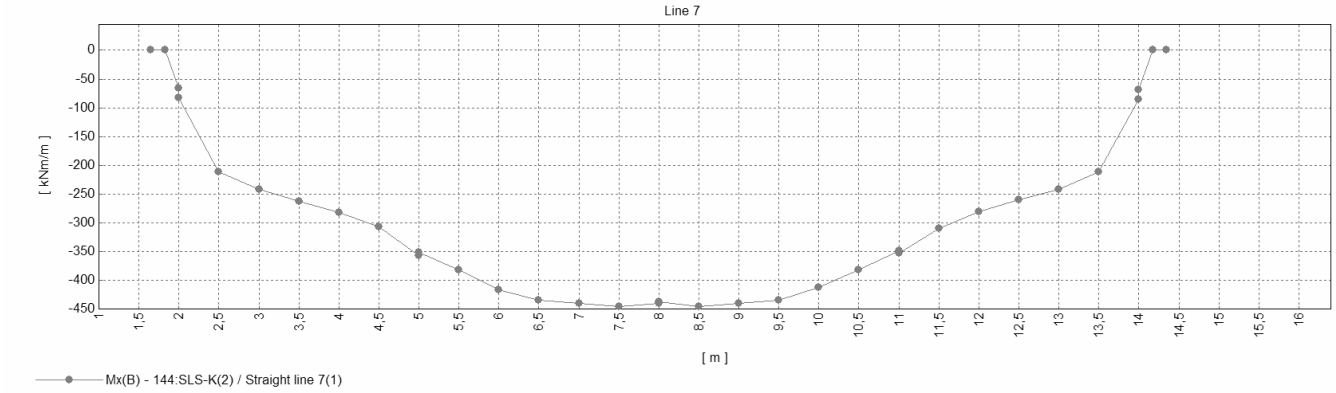
Combining on: Mx(T)
SLS-K (Max)
Entity: Wood-Armer - Thick Shell
Component: Mx(T) (Units: kN.m/m)

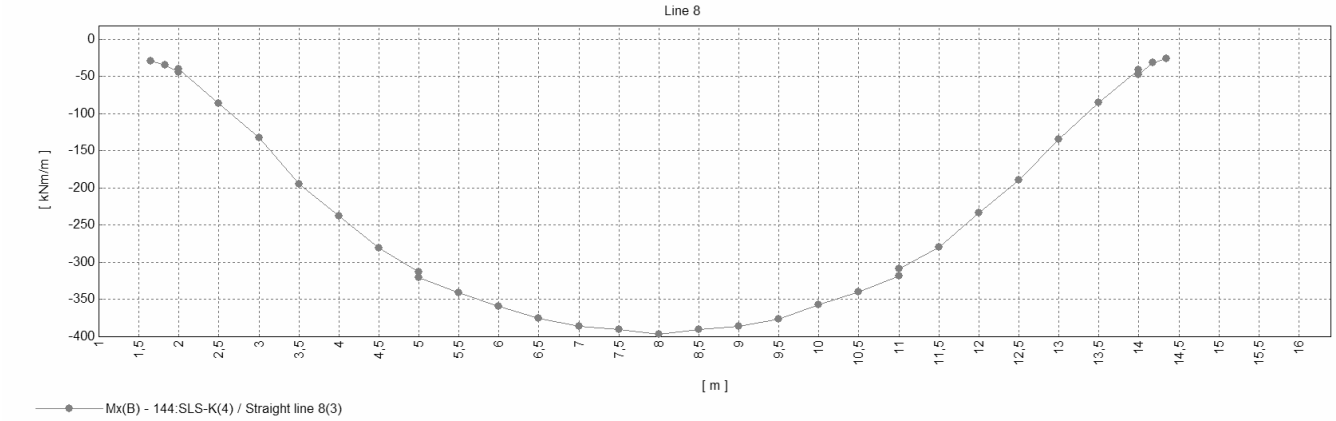
127,532
255,063
382,595
510,127
637,658
765,19
892,722
1,02025E3
1,14779E3

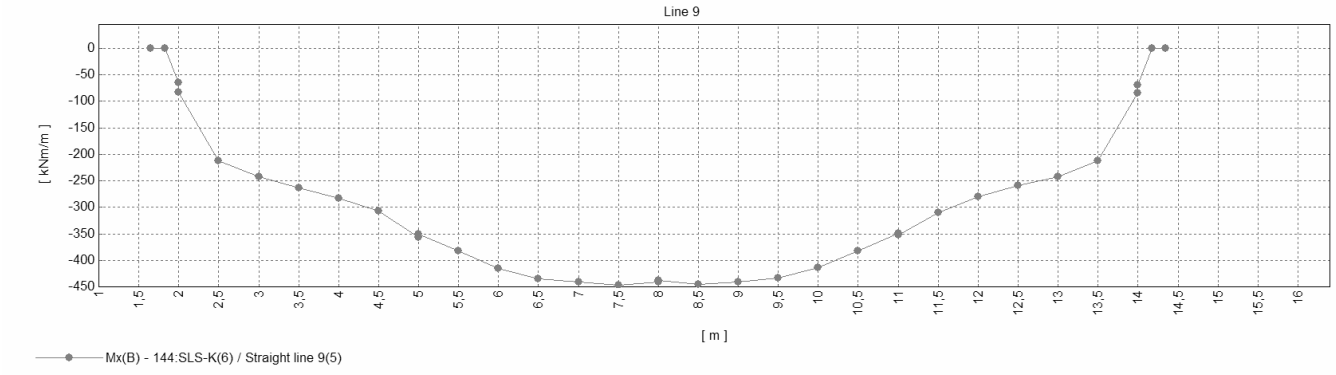
Maximum 1,19867E3 at node 249 of element 481
Minimum 50,8883 at node 1973 of element 614

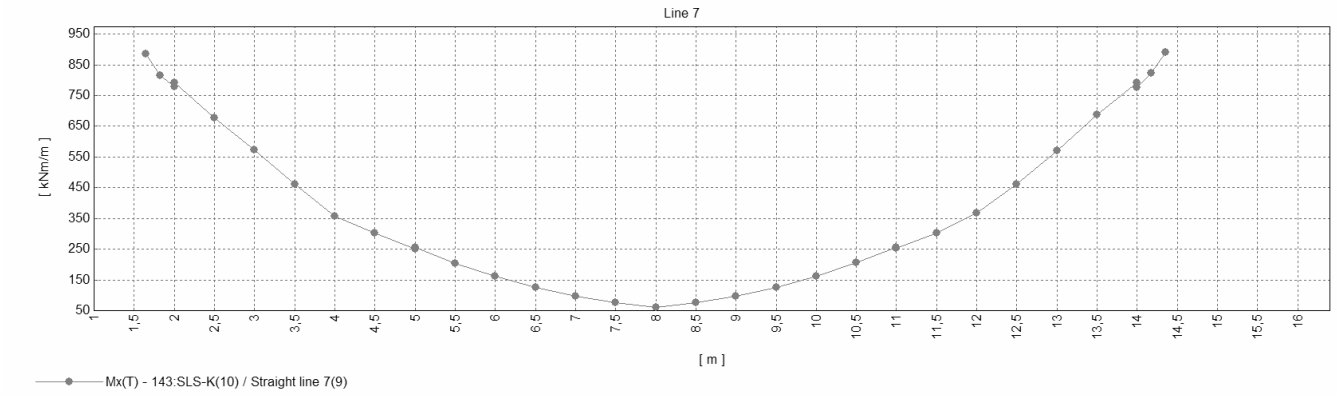


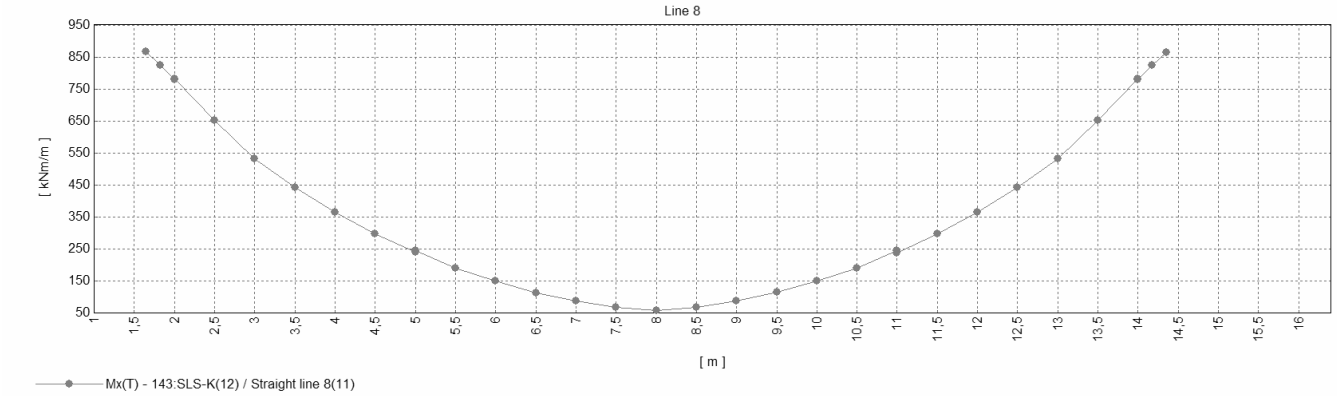
15.2 DIAGRAM

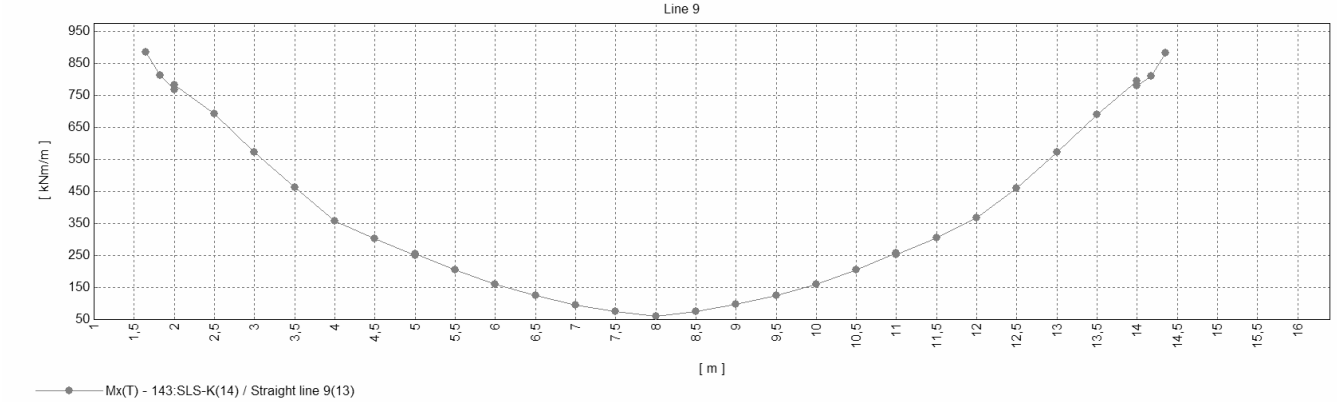

Line 7
[kNm/m]
[m]
Mx(B) - 144:SLS-K(2) / Straight line 7(1)


Line 8
[kNm/m]
[m]
Mx(B) - 144:SLS-K(4) / Straight line 8(3)


Line 9
[kNm/m]
[m]
Mx(B) - 144:SLS-K(6) / Straight line 9(5)


Line 7
[kNm/m]
[m]
Mx(T) - 143:SLS-K(10) / Straight line 7(9)


Line 8
[kNm/m]
[m]
Mx(T) - 143:SLS-K(12) / Straight line 8(11)


Line 9
[kNm/m]
[m]
Mx(T) - 143:SLS-K(14) / Straight line 9(13)

15.3 TABLE

Line 7:

s	Max Mx(T)	Min Mx(B)
1,65	886	0
1,83	816	0
2,00	778	-65
2,50	677	-212
3,00	572	-242
3,50	462	-263
4,00	357	-283
4,50	301	-307
5,00	251	-357
5,50	205	-382
6,00	161	-416
6,50	124	-435
7,00	96	-441
7,50	76	-446
8,00	60	-440
8,50	75	-446
9,00	96	-441
9,50	125	-434
10,00	161	-413
10,50	205	-383
11,00	257	-349
11,50	304	-309
12,00	367	-281
13,00	571	-242
13,50	687	-212
14,00	792	-85
14,18	823	0
14,35	890	0
m	kNm/m	kNm/m

Line 8 :

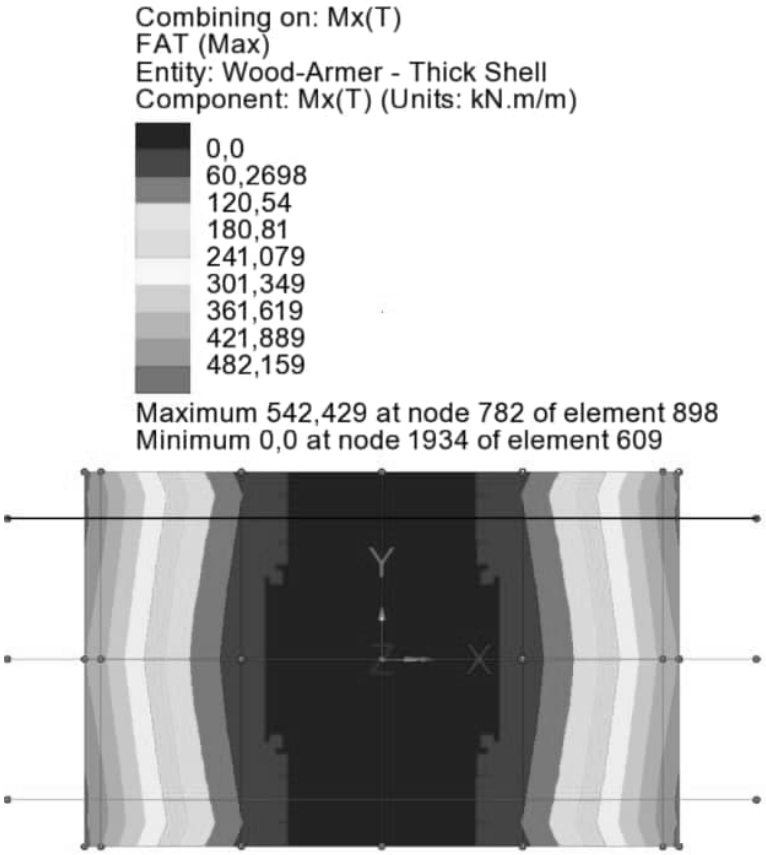
s	Max Mx(T)	Min Mx(B)
1,65	866	-29
1,83	825	-35
2,00	780	-44
2,50	651	-87
3,00	533	-133
3,50	443	-194
4,00	364	-238
4,50	297	-281
5,00	239	-312
5,50	191	-341
6,00	149	-359
6,50	114	-375
7,00	87	-386
7,50	68	-391
8,00	58	-397
8,50	67	-390
9,00	87	-386
9,50	114	-376
10,00	149	-357
10,50	191	-340
11,00	244	-318
11,50	297	-279
12,00	365	-233
13,00	533	-135
13,50	651	-86
14,00	781	-42
14,18	825	-31
14,35	865	-26
m	kNm/m	kNm/m

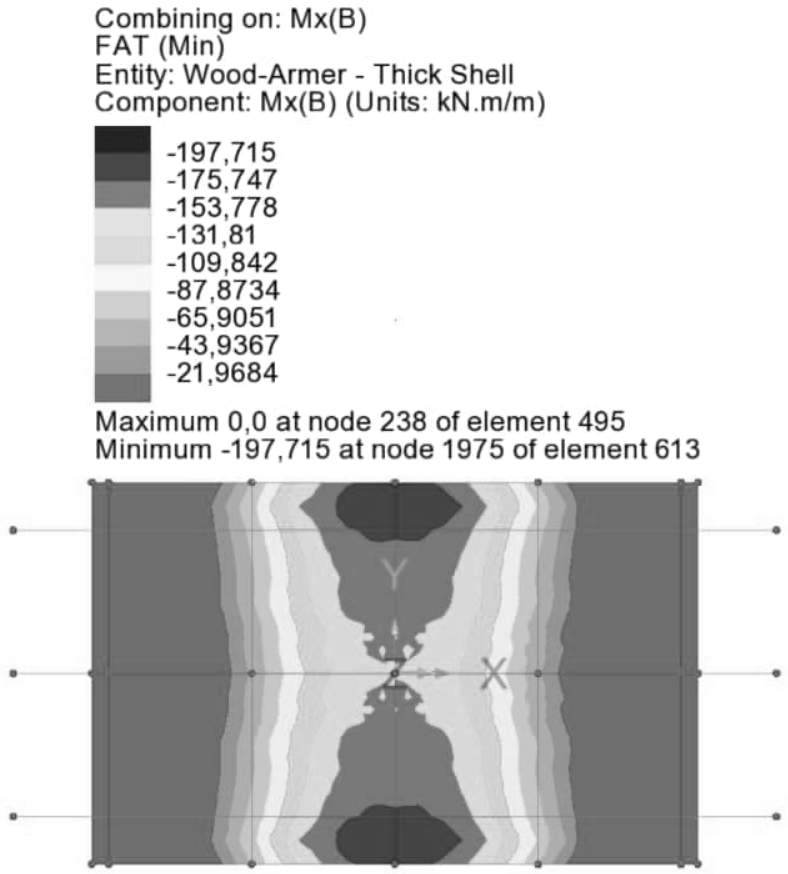
Line 9:

s	Max Mx(T)	Min Mx(B)
1,65	883	0
1,83	812	0
2,00	766	-65
2,50	691	-212
3,00	572	-242
3,50	462	-263
4,00	357	-283
4,50	301	-307
5,00	251	-357
5,50	205	-382
6,00	161	-416
6,50	124	-435
7,00	96	-441
7,50	76	-446
8,00	60	-440
8,50	75	-446
9,00	96	-441
9,50	125	-434
10,00	161	-413
10,50	205	-383
11,00	257	-349
11,50	304	-309
12,00	367	-281
13,00	571	-242
13,50	690	-212
14,00	794	-85
14,18	810	0
14,35	882	0
m	kNm/m	kNm/m

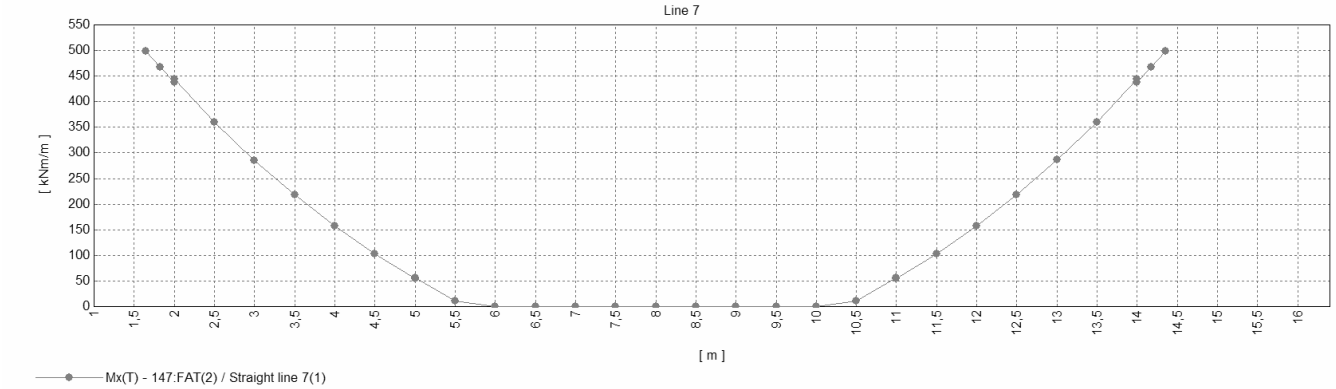
16. FAT - Min Mx(B)/Max Mx(T)

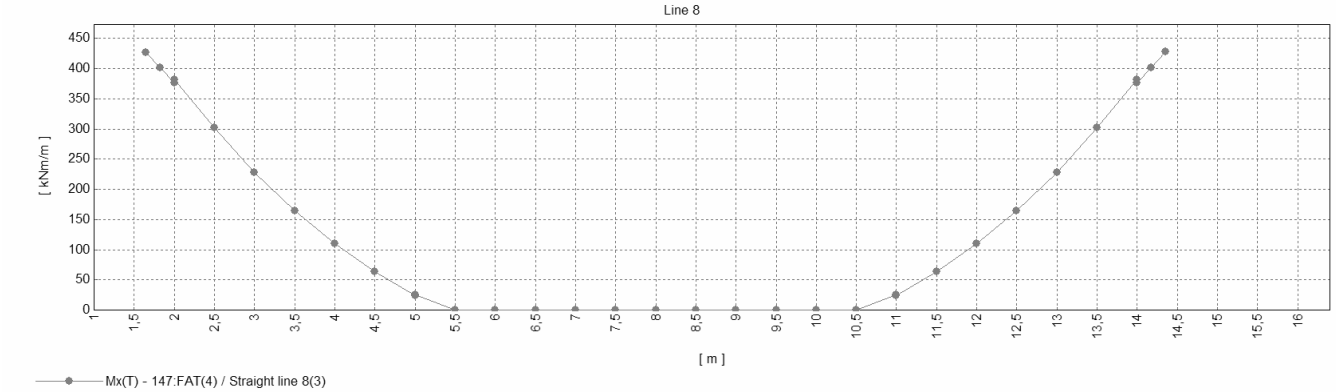
16.1 CONTOUR

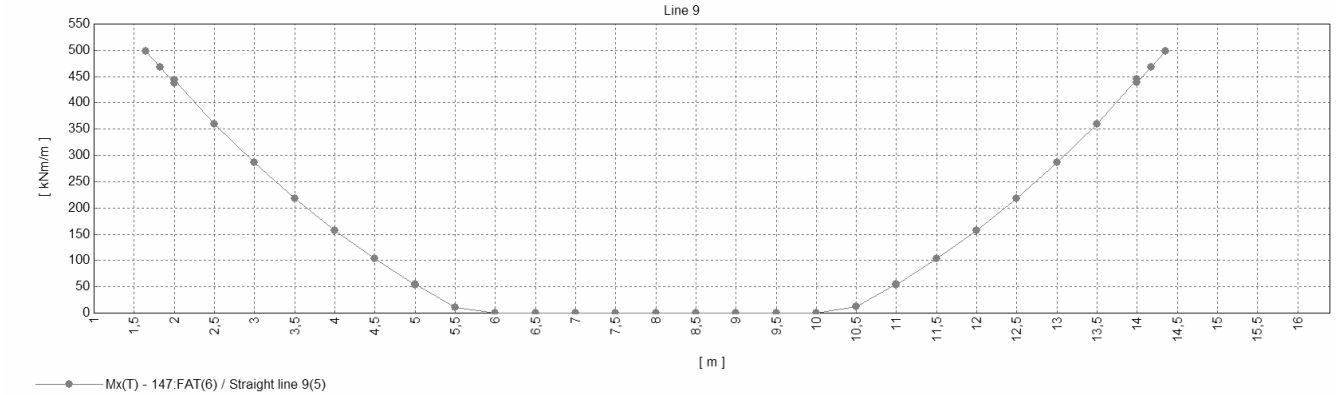


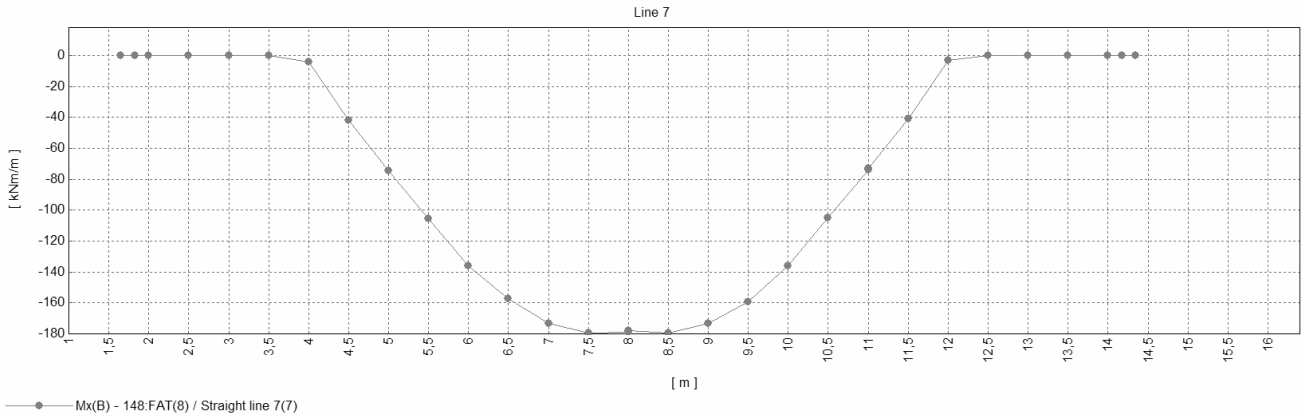

Combining on: Mx(B)
FAT (Min)
Entity: Wood-Armer - Thick Shell
Component: Mx(B) (Units: kN.m/m)
-197,715
-175,747
-153,778
-131,81
-109,842
-87,8734
-65,9051
-43,9367
-21,9684
Maximum 0,0 at node 238 of element 495
Minimum -197,715 at node 1975 of element 613
Y
X

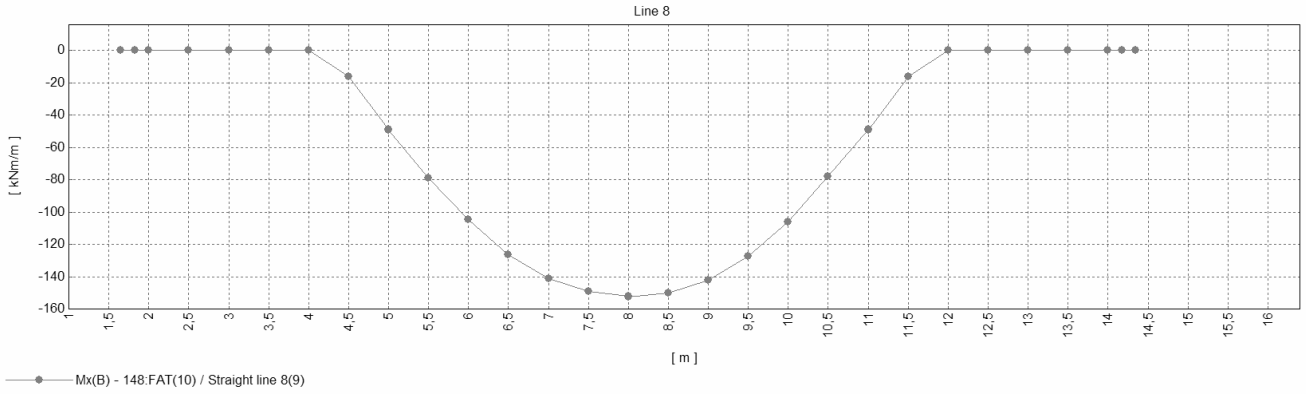
16.2 DIAGRAM

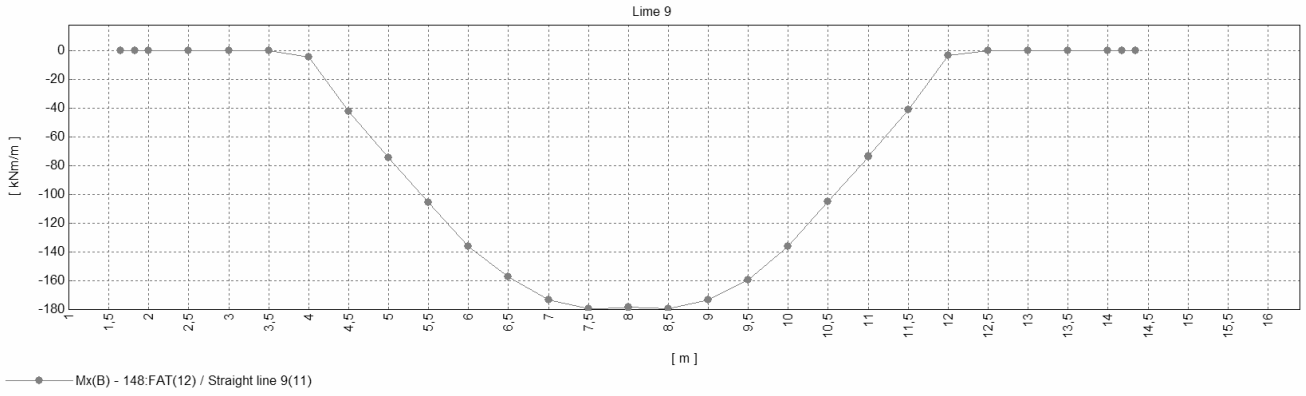

Line 7
[kNm/m]
[m]
Mx(T) - 147:FAT(2) / Straight line 7(1)


Line 8
[kNm/m]
[m]
Mx(T) - 147:FAT(4) / Straight line 8(3)


Line 9
[kNm/m]
[m]
Mx(T) - 147:FAT(6) / Straight line 9(5)


Line 7
[kNm/m]
[m]
Mx(B) - 148:FAT(8) / Straight line 7(7)


Line 8
[kNm/m]
[m]
Mx(B) - 148:FAT(10) / Straight line 8(9)


Lime 9
[kNm/m]
[m]
Mx(B) - 148:FAT(12) / Straight line 9(11)

16.3 TABLE

Line 7:

s	Max Mx(T)	Min Mx(B)
1,65	498	0
1,83	467	0
2,00	438	0
2,50	360	0
3,00	286	0
3,50	218	0
4,00	157	-4
4,50	103	-42
5,00	54	-74
5,50	11	-106
6,00	0	-136
6,50	0	-157
7,00	0	-173
7,50	0	-180
8,00	0	-179
8,50	0	-180
9,00	0	-173
9,50	0	-159
10,00	0	-136
10,50	11	-105
11,00	55	-74
11,50	103	-41
12,00	157	-3
13,00	286	0
13,50	360	0
14,00	444	0
14,18	467	0
14,35	498	0
m	kNm/m	kNm/m

Line 8:

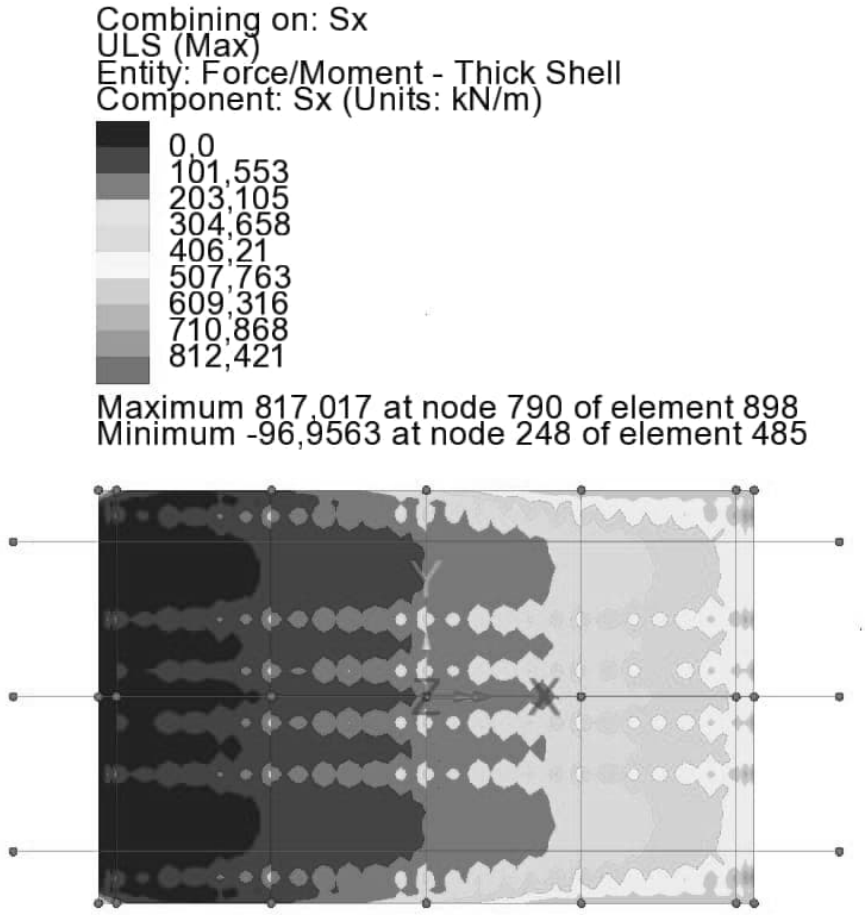
s	Max Mx(T)	Min Mx(B)
1,65	427	0
1,83	402	0
2,00	376	0
2,50	302	0
3,00	228	0
3,50	165	0
4,00	110	0
4,50	64	-16
5,00	24	-49
5,50	0	-79
6,00	0	-105
6,50	0	-126
7,00	0	-141
7,50	0	-149
8,00	0	-152
8,50	0	-150
9,00	0	-142
9,50	0	-127
10,00	0	-106
10,50	0	-78
11,00	25	-49
11,50	64	-16
12,00	110	0
13,00	229	0
13,50	302	0
14,00	381	0
14,18	402	0
14,35	427	0
m	kNm/m	kNm/m

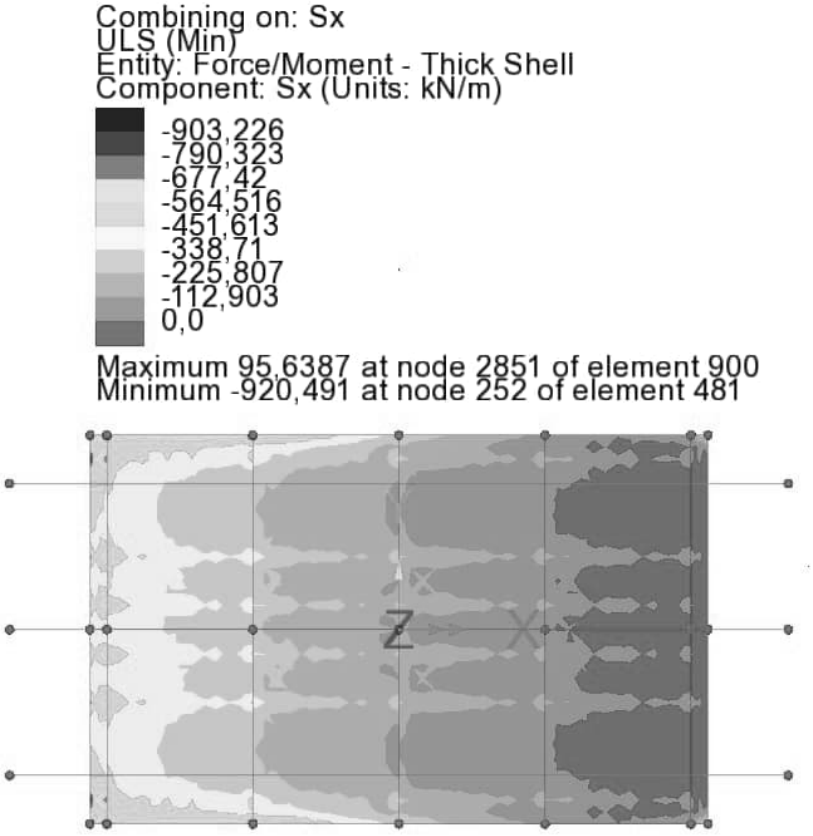
Line 9:

s	Max Mx(T)	Min Mx(B)
1,65	498	0
1,83	467	0
2,00	438	0
2,50	360	0
3,00	286	0
3,50	218	0
4,00	157	-4
4,50	103	-42
5,00	54	-74
5,50	11	-106
6,00	0	-136
6,50	0	-157
7,00	0	-173
7,50	0	-180
8,00	0	-179
8,50	0	-180
9,00	0	-173
9,50	0	-159
10,00	0	-136
10,50	11	-105
11,00	55	-74
11,50	103	-41
12,00	157	-3
13,00	286	0
13,50	360	0
14,00	444	0
14,18	467	0
14,35	498	0
m	kNm/m	kNm/m

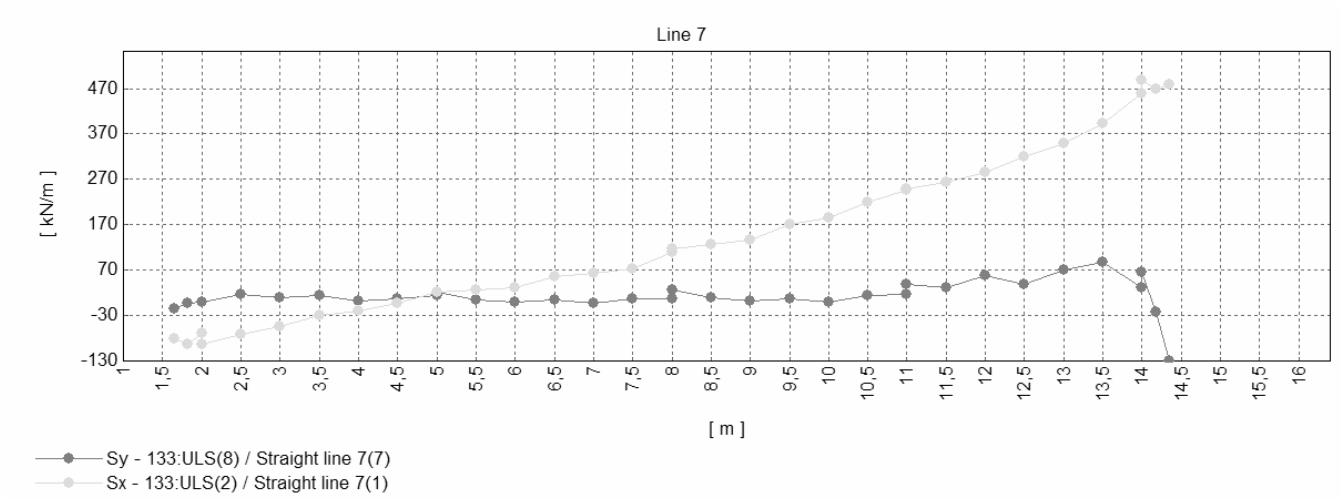
17. ULS - Min Sx/Max Sx

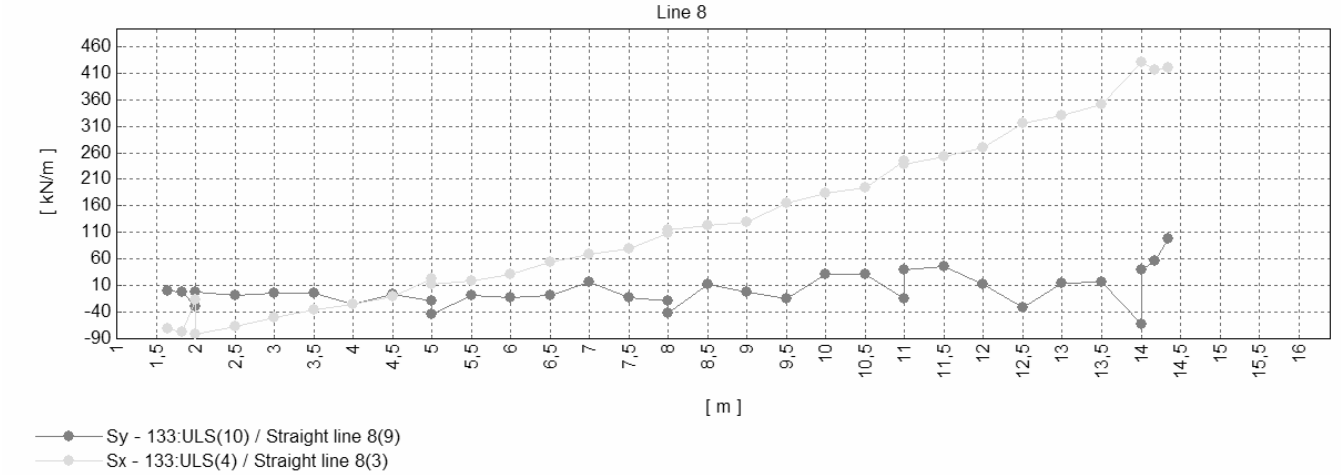
17.1 CONTOUR

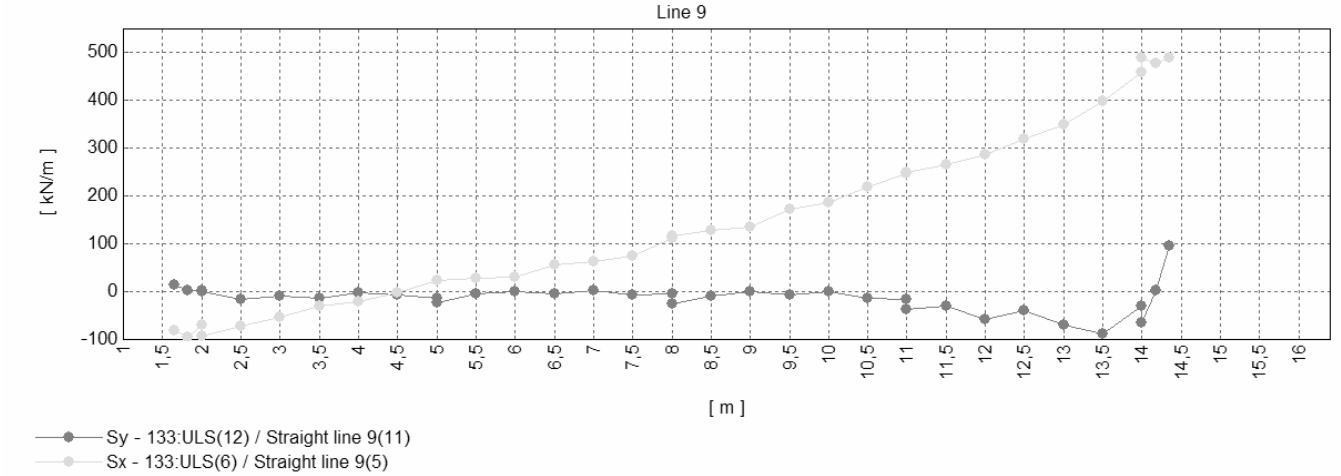


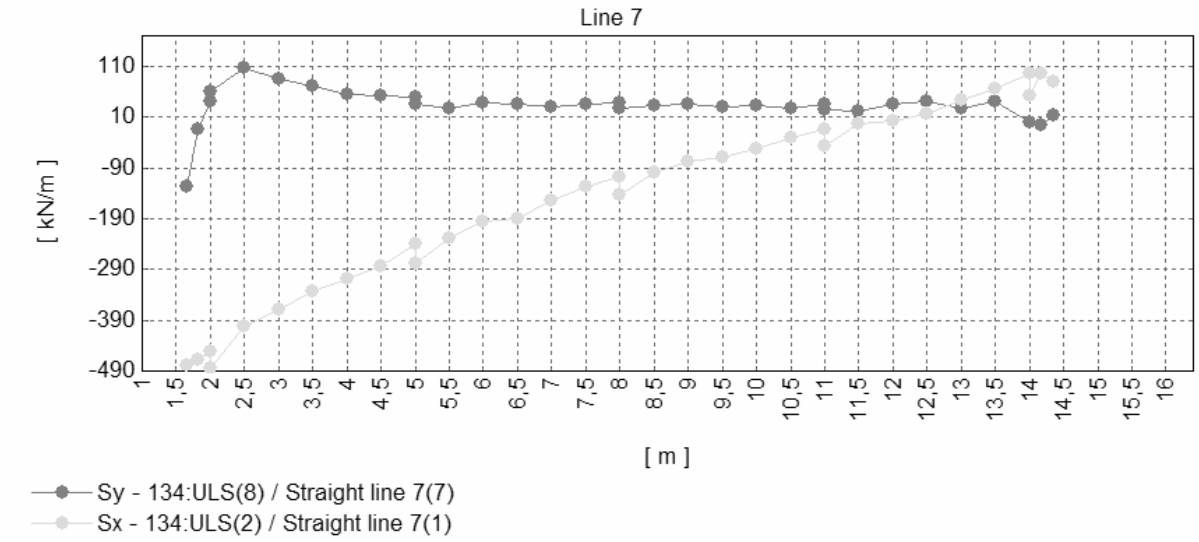

Combining on: Sx
ULS (Min)
Entity: Force/Moment - Thick Shell
Component: Sx (Units: kN/m)
-903,226
-790,323
-677,42
-564,516
-451,613
-338,71
-225,807
-112,903
0,0
Maximum 95,6387 at node 2851 of element 900
Minimum -920,491 at node 252 of element 481
Z
X

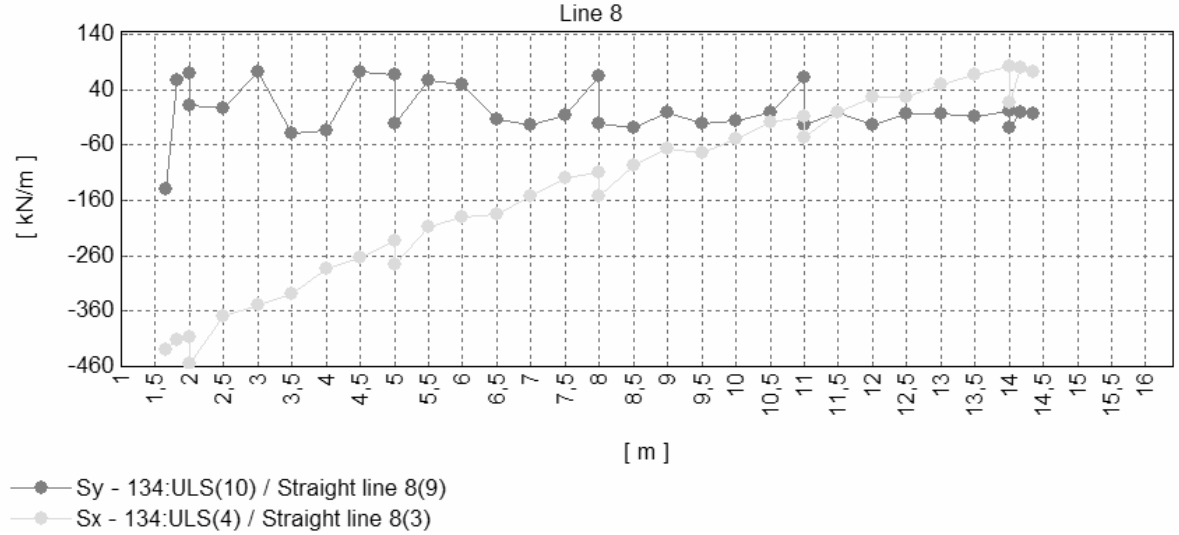
17.2 DIAGRAM

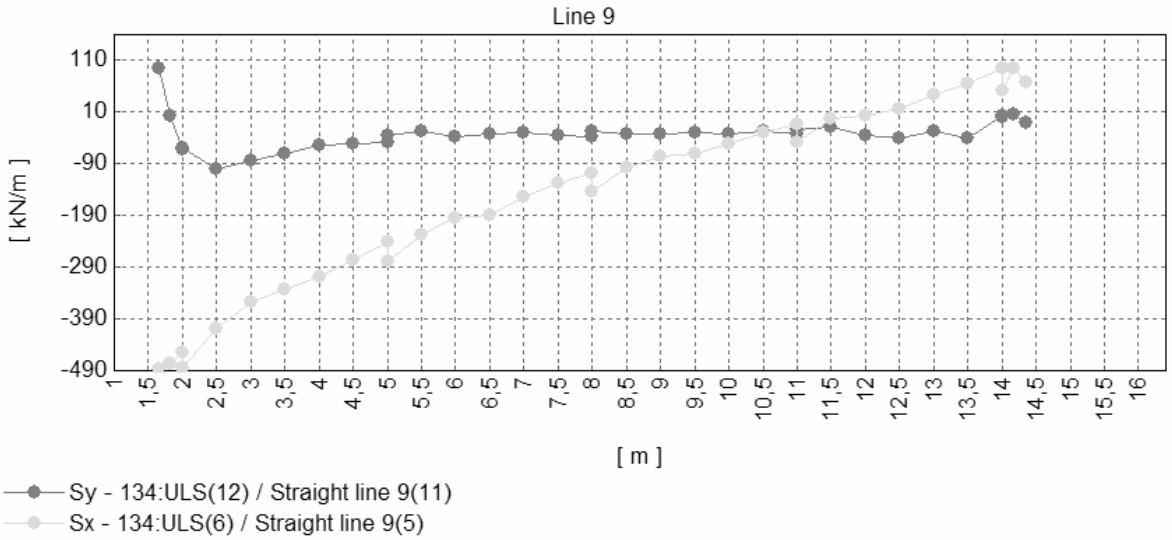

Line 7
[kN/m]
[m]
Sy - 133:ULS(8) / Straight line 7(7)
Sx - 133:ULS(2) / Straight line 7(1)


Line 8
[kN/m]
[m]
Sy - 133:ULS(10) / Straight line 8(9)
Sx - 133:ULS(4) / Straight line 8(3)


Line 9
[kN/m]
[m]
Sy - 133:ULS(12) / Straight line 9(11)
Sx - 133:ULS(6) / Straight line 9(5)


Line 7
110
10
-90
-190
-290
-390
-490
[kN/m]
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
Sy - 134:ULS(8) / Straight line 7(7)
Sx - 134:ULS(2) / Straight line 7(1)


Line 8
140
40
-60
-160
-260
-360
-460
[kN/m]
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
Sy - 134:ULS(10) / Straight line 8(9)
Sx - 134:ULS(4) / Straight line 8(3)


Line 9
110
10
-90
-190
-290
-390
-490
[kN/m]
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
Sy - 134:ULS(12) / Straight line 9(11)
Sx - 134:ULS(6) / Straight line 9(5)

17.3 TABLE

Line 7:

s	Max Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-80	-15	82
1,83	-94	-3	95
2,00	-93	0	93
2,50	-71	17	74
3,00	-54	10	55
3,50	-31	14	34
4,00	-21	2	21
4,50	-2	7	8
5,00	23	22	32
5,50	28	5	28
6,00	31	-1	31
6,50	55	4	55
7,00	62	-3	63
7,50	74	8	74
8,00	117	26	120
8,50	128	9	128
9,00	136	1	136
9,50	171	8	172
10,00	186	0	186
10,50	219	14	219
11,00	248	38	251
11,50	264	31	266
12,00	287	59	293
13,00	348	71	355
13,50	394	86	403
14,00	489	66	493
14,18	468	-23	468
14,35	478	-129	495
m	kN/m	kN/m	kN/m

s	Min Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-480	-126	496
1,83	-469	-15	469
2,00	-485	59	489
2,50	-403	107	417
3,00	-369	85	378
3,50	-333	72	341
4,00	-308	55	313
4,50	-285	52	289
5,00	-278	34	280
5,50	-229	27	230
6,00	-196	38	200
6,50	-190	34	193
7,00	-155	30	158
7,50	-127	36	132
8,00	-145	28	147
8,50	-99	33	104
9,00	-77	34	85
9,50	-70	29	76
10,00	-52	32	61
10,50	-31	28	42
11,00	-49	25	54
11,50	-3	20	20
12,00	3	36	37
13,00	43	28	52
13,50	64	40	76
14,00	51	0	51
14,18	95	-5	95
14,35	80	13	81
m	kN/m	kN/m	kN/m

Line 8:

s	Max Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-72	-141	158
1,83	-78	56	96
2,00	-82	12	82
2,50	-67	7	67
3,00	-50	72	88
3,50	-35	-38	52
4,00	-26	-34	42
4,50	-10	72	73
5,00	12	-21	24
5,50	20	58	61
6,00	32	50	59
6,50	53	-15	55
7,00	68	-23	72
7,50	80	-7	80
8,00	114	-21	116
8,50	122	-29	126
9,00	129	-2	129
9,50	165	-22	166
10,00	183	-17	184
10,50	195	-1	195
11,00	239	-23	240
11,50	254	-2	254
12,00	269	-25	270
13,00	331	-4	331
13,50	352	-8	352
14,00	429	-30	430
14,18	415	-2	415
14,35	420	-3	420
m	kN/m	kN/m	kN/m

s	Min Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-430	-141	452
1,83	-413	56	417
2,00	-456	12	456
2,50	-369	7	369
3,00	-349	72	357
3,50	-329	-38	332
4,00	-284	-34	286
4,50	-263	72	272
5,00	-275	-21	276
5,50	-208	58	216
6,00	-191	50	198
6,50	-185	-15	185
7,00	-151	-23	153
7,50	-121	-7	121
8,00	-153	-21	154
8,50	-97	-29	101
9,00	-67	-2	67
9,50	-74	-22	77
10,00	-50	-17	53
10,50	-18	-1	18
11,00	-48	-23	53
11,50	0	-2	2
12,00	26	-25	36
13,00	50	-4	50
13,50	67	-8	67
14,00	17	-30	34
14,18	79	-2	79
14,35	73	-3	73
m	kN/m	kN/m	kN/m

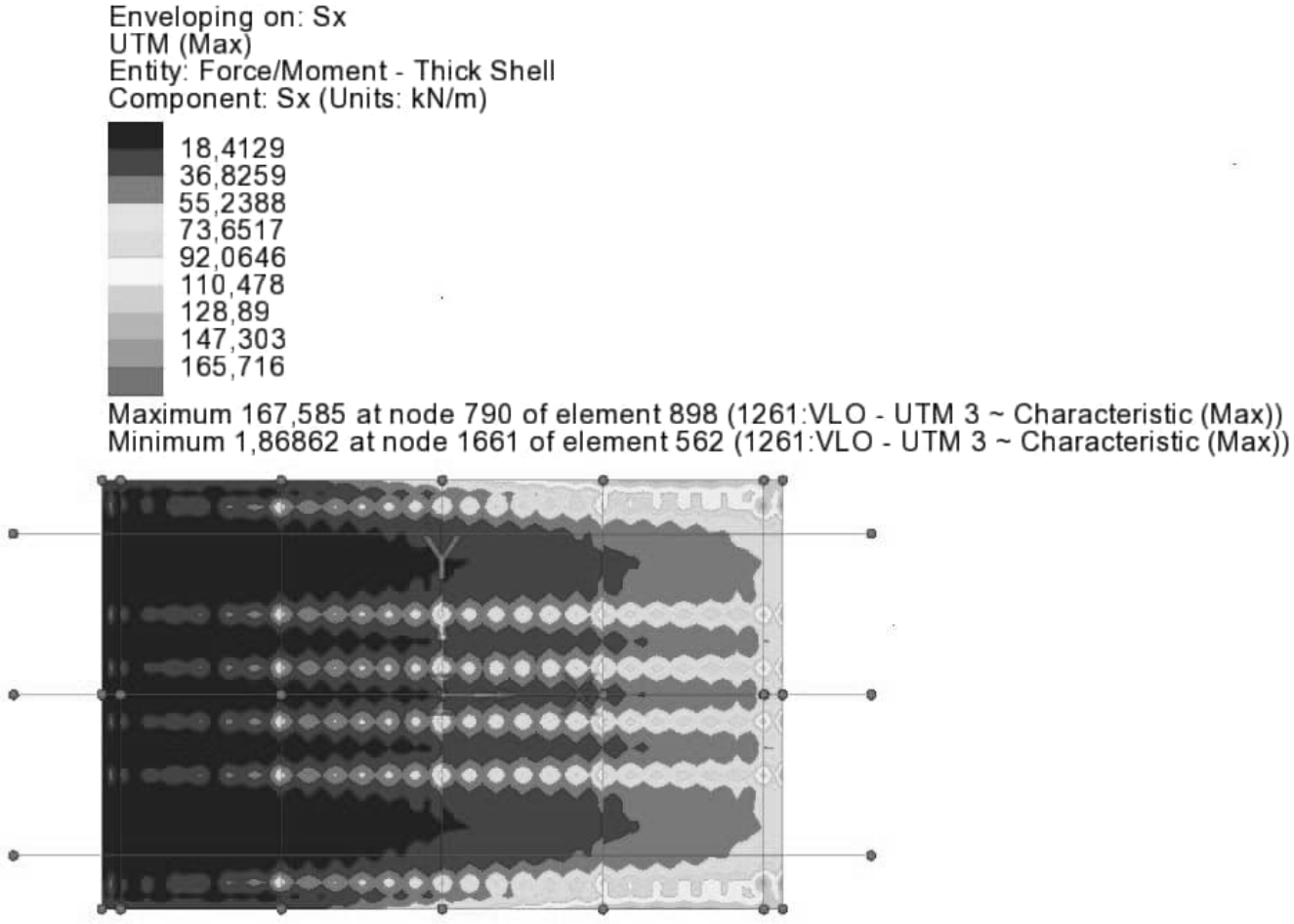
Line 9:

s	Max Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-80	15	82
1,83	-94	3	95
2,00	-93	0	93
2,50	-71	-17	74
3,00	-54	-10	55
3,50	-31	-14	34
4,00	-21	-2	21
4,50	-2	-7	8
5,00	23	-22	32
5,50	28	-5	28
6,00	31	1	31
6,50	55	-4	55
7,00	62	3	63
7,50	74	-8	74
8,00	117	-26	120
8,50	128	-9	128
9,00	136	-1	136
9,50	171	-8	172
10,00	186	0	186
10,50	219	-14	219
11,00	248	-38	251
11,50	264	-31	266
12,00	287	-59	293
13,00	348	-71	355
13,50	399	-87	408
14,00	489	-66	493
14,18	478	3	478
14,35	488	95	497
m	kN/m	kN/m	kN/m

s	Min Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-488	0	488
1,83	-478	0	478
2,00	-485	0	485
2,50	-408	0	408
3,00	-358	0	358
3,50	-333	0	333
4,00	-308	0	308
4,50	-277	0	277
5,00	-278	0	278
5,50	-229	0	229
6,00	-196	0	196
6,50	-190	0	190
7,00	-155	0	155
7,50	-127	0	127
8,00	-145	0	145
8,50	-99	0	99
9,00	-77	0	77
9,50	-70	0	70
10,00	-52	0	52
10,50	-31	0	31
11,00	-49	0	49
11,50	-3	0	3
12,00	3	0	3
13,00	43	0	43
13,50	64	0	64
14,00	51	0	51
14,18	95	0	95
14,35	66	0	66
m	kN/m	kN/m	kN/m

18. UTM 3 - Min Sx/Max Sx

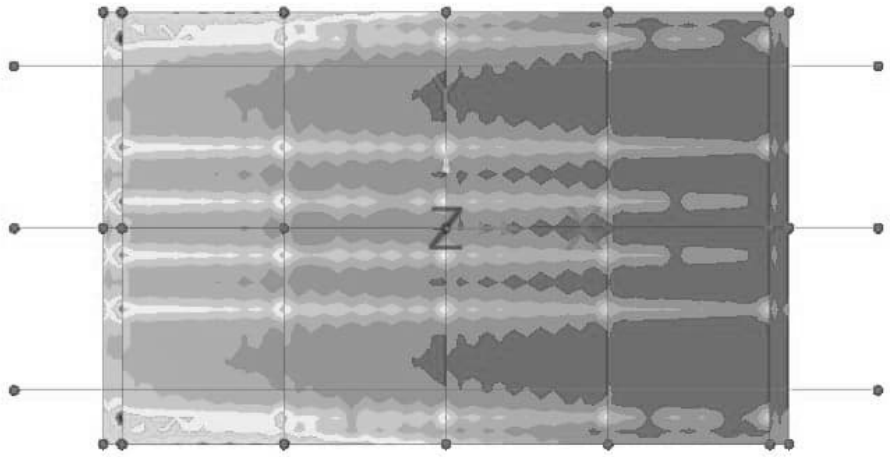
18.1 CONTOUR



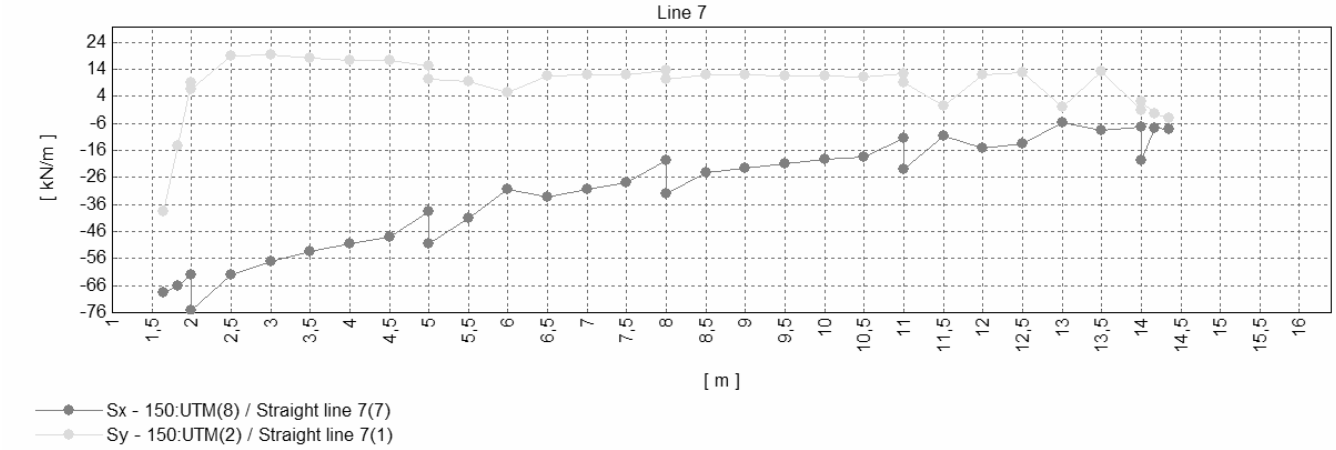
Enveloping on: Sx
UTM (Min)
Entity: Force/Moment - Thick Shell
Component: Sx (Units: kN/m)

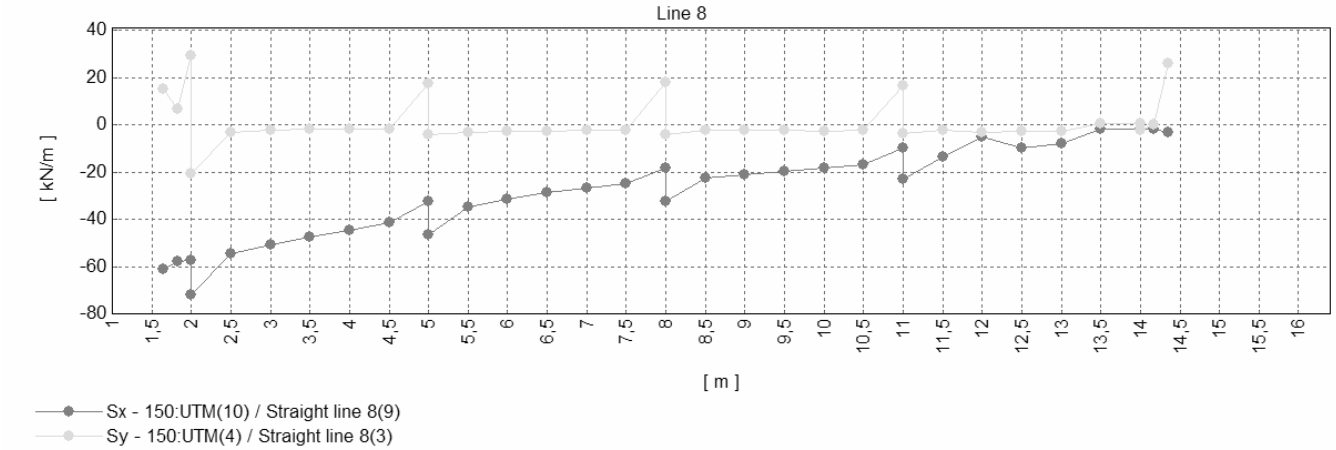
-175,899
-156,355
-136,81
-117,266
-97,7216
-78,1773
-58,633
-39,0886
-19,5443

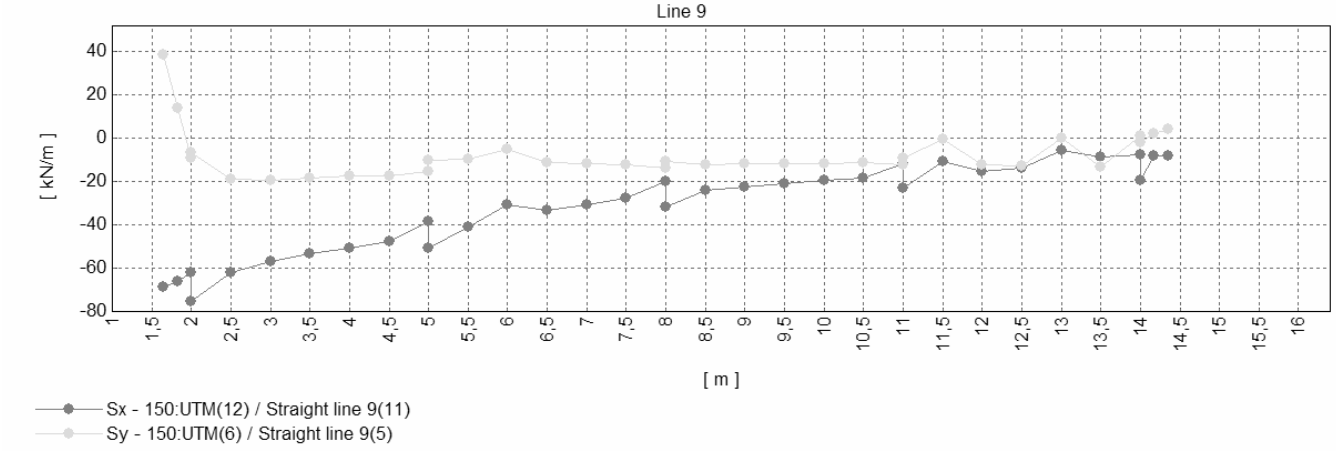
Maximum -1,86461 at node 2567 of element 847 (1262:VLO - UTM 3 ~ Characteristic (Min))
Minimum -177,764 at node 1549 of element 482 (1262:VLO - UTM 3 ~ Characteristic (Min))

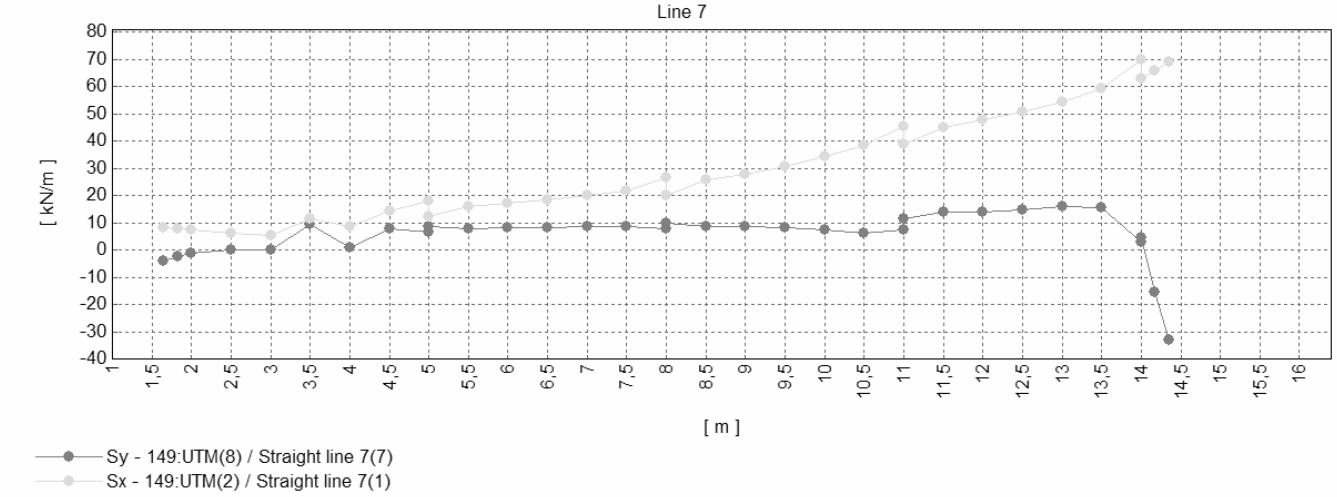


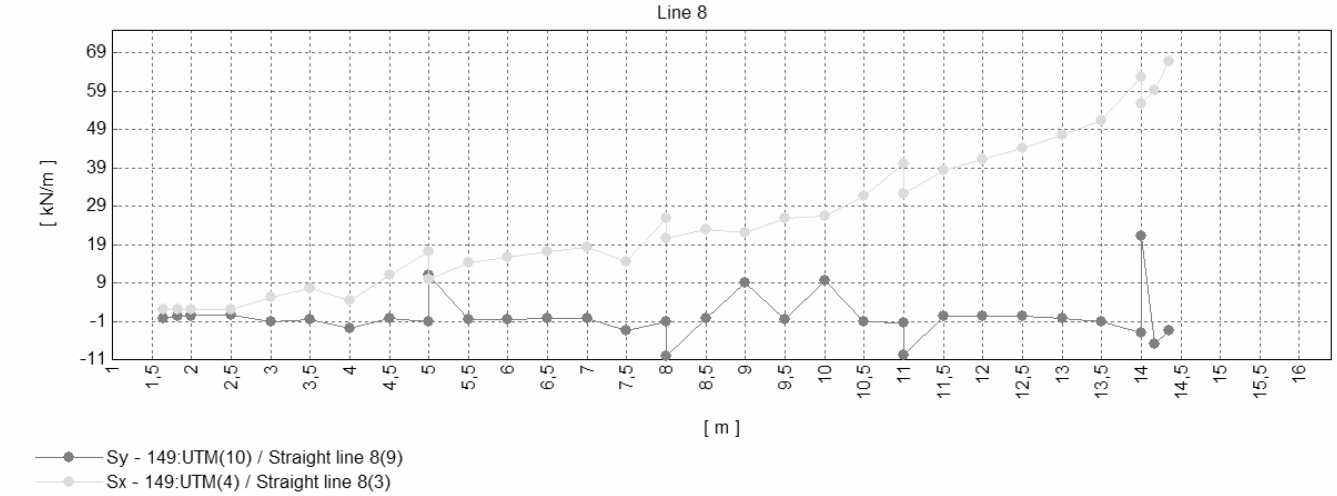
18.2 DIAGRAM

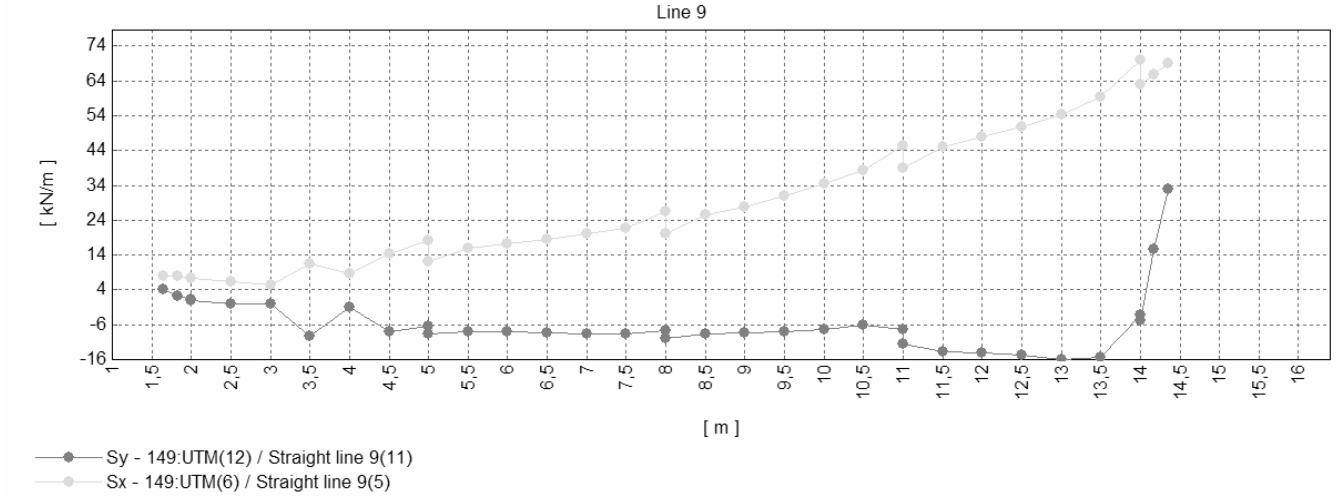

Line 7
[kN/m]
[m]
Sx - 150:UTM(8) / Straight line 7(7)
Sy - 150:UTM(2) / Straight line 7(1)


Line 8
[kN/m]
[m]
Sx - 150:UTM(10) / Straight line 8(9)
Sy - 150:UTM(4) / Straight line 8(3)


Line 9
[kN/m]
[m]
Sx - 150:UTM(12) / Straight line 9(11)
Sy - 150:UTM(6) / Straight line 9(5)


Line 7
[kN/m]
[m]
Sy - 149:UTM(8) / Straight line 7(7)
Sx - 149:UTM(2) / Straight line 7(1)


Line 8
[kN/m]
[m]
Sy - 149:UTM(10) / Straight line 8(9)
Sx - 149:UTM(4) / Straight line 8(3)


Line 9
[kN/m]
[m]
Sy - 149:UTM(12) / Straight line 9(11)
Sx - 149:UTM(6) / Straight line 9(5)

18.3 Tables

Line 7:

s	Max Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	8	-4	9
1,83	8	-2	8
2,00	7	-1	8
2,50	6	0	6
3,00	6	0	6
3,50	11	9	15
4,00	9	1	9
4,50	14	8	16
5,00	12	9	15
5,50	16	8	18
6,00	17	8	19
6,50	19	8	20
7,00	20	9	22
7,50	22	9	23
8,00	20	10	22
8,50	26	9	27
9,00	28	8	29
9,50	31	8	32
10,00	34	7	35
10,50	38	6	39
11,00	39	11	40
11,50	45	14	47
12,00	48	14	50
13,00	54	16	57
13,50	59	15	61
14,00	63	5	63
14,18	66	-16	68
14,35	69	-33	77
m	kN/m	kN/m	kN/m

s	Min Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-69	-39	79
1,83	-66	-14	68
2,00	-75	6	76
2,50	-62	19	65
3,00	-57	19	60
3,50	-53	18	56
4,00	-51	17	53
4,50	-48	17	51
5,00	-51	10	52
5,50	-41	9	42
6,00	-31	5	31
6,50	-33	11	35
7,00	-30	12	33
7,50	-28	12	30
8,00	-32	10	34
8,50	-24	12	27
9,00	-22	12	25
9,50	-21	12	24
10,00	-19	11	23
10,50	-18	11	21
11,00	-23	9	25
11,50	-11	1	11
12,00	-15	12	19
13,00	-6	0	6
13,50	-9	13	16
14,00	-20	2	20
14,18	-8	-2	8
14,35	-8	-4	9
m	kN/m	kN/m	kN/m

Line 8:

s	Max Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	2	0	2
1,83	2	0	2
2,00	2	0	2
2,50	2	1	2
3,00	5	-1	5
3,50	8	-1	8
4,00	4	-3	5
4,50	11	0	11
5,00	10	11	15
5,50	14	0	14
6,00	16	0	16
6,50	17	0	17
7,00	18	0	18
7,50	15	-3	15
8,00	21	-10	23
8,50	23	0	23
9,00	22	9	24
9,50	26	-1	26
10,00	26	10	28
10,50	32	-1	32
11,00	32	-10	34
11,50	38	0	38
12,00	41	0	41
13,00	47	0	47
13,50	51	-1	51
14,00	56	21	60
14,18	59	-7	60
14,35	67	-4	67
m	kN/m	kN/m	kN/m

s	Min Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-61	15	63
1,83	-58	7	58
2,00	-72	-21	75
2,50	-55	-3	55
3,00	-51	-2	51
3,50	-48	-2	48
4,00	-45	-2	45
4,50	-42	-2	42
5,00	-47	-4	47
5,50	-35	-3	35
6,00	-32	-3	32
6,50	-29	-3	29
7,00	-27	-2	27
7,50	-25	-2	25
8,00	-32	-4	33
8,50	-23	-2	23
9,00	-21	-2	21
9,50	-20	-2	20
10,00	-19	-3	19
10,50	-17	-3	17
11,00	-23	-4	23
11,50	-13	-2	14
12,00	-5	-3	6
13,00	-8	-3	8
13,50	-2	1	2
14,00	-2	-2	3
14,18	-2	0	2
14,35	-3	26	26
m	kN/m	kN/m	kN/m

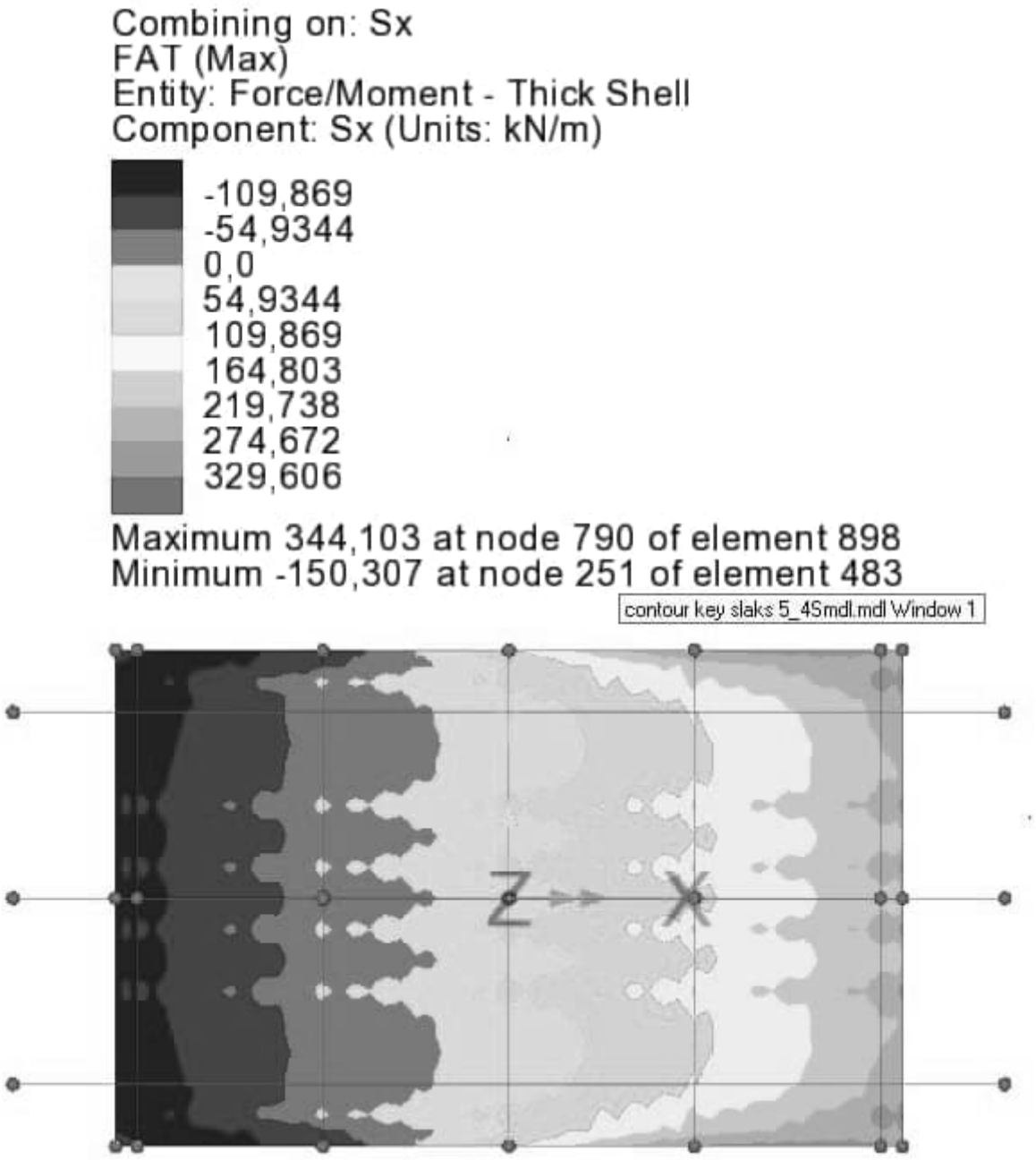
Line 9:

s	Max Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	8	-4	9
1,83	8	-2	8
2,00	7	-1	8
2,50	6	0	6
3,00	6	0	6
3,50	11	9	15
4,00	9	1	9
4,50	14	8	16
5,00	12	9	15
5,50	16	8	18
6,00	17	8	19
6,50	19	8	20
7,00	20	9	22
7,50	22	9	23
8,00	20	10	22
8,50	26	9	27
9,00	28	8	29
9,50	31	8	32
10,00	34	7	35
10,50	38	6	39
11,00	39	11	40
11,50	45	14	47
12,00	48	14	50
13,00	54	16	57
13,50	59	15	61
14,00	63	5	63
14,18	66	-16	68
14,35	69	-33	77
m	kN/m	kN/m	kN/m

s	Min Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-69	39	79
1,83	-66	14	68
2,00	-75	-6	76
2,50	-62	-19	65
3,00	-57	-19	60
3,50	-53	-18	56
4,00	-51	-17	53
4,50	-48	-17	51
5,00	-51	-10	52
5,50	-41	-9	42
6,00	-31	-5	31
6,50	-33	-11	35
7,00	-30	-12	33
7,50	-28	-12	30
8,00	-32	-10	34
8,50	-24	-12	27
9,00	-22	-12	25
9,50	-21	-12	24
10,00	-19	-11	23
10,50	-18	-11	21
11,00	-23	-9	25
11,50	-11	-1	11
12,00	-15	-12	19
13,00	-6	0	6
13,50	-9	-13	16
14,00	-20	-2	20
14,18	-8	2	8
14,35	-8	4	9
m	kN/m	kN/m	kN/m

19. FAT - Min Sx/Max Sx

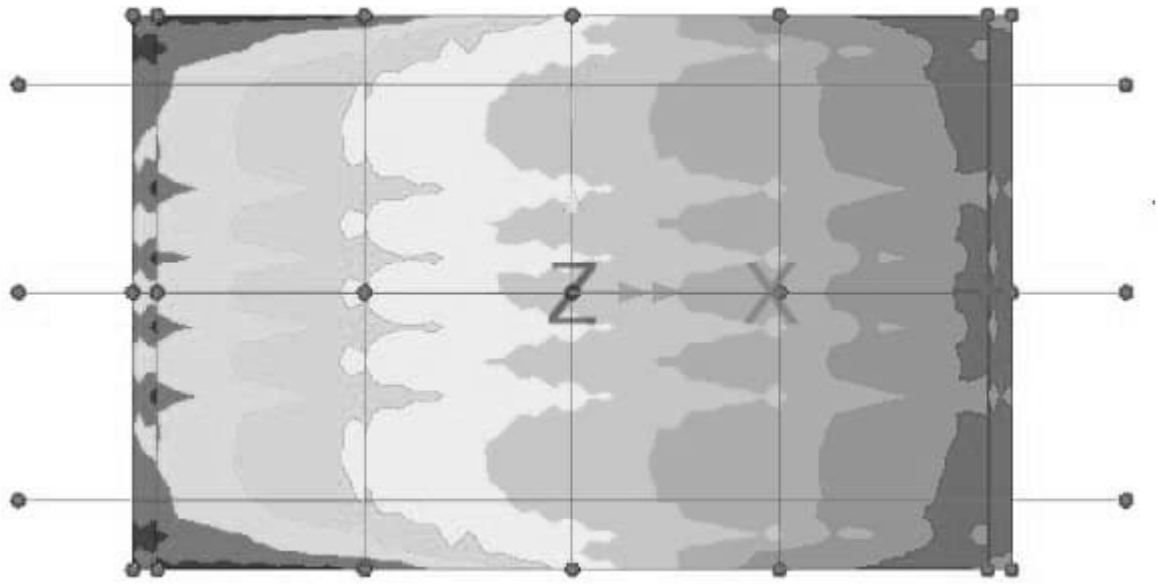
19.1 CONTOUR



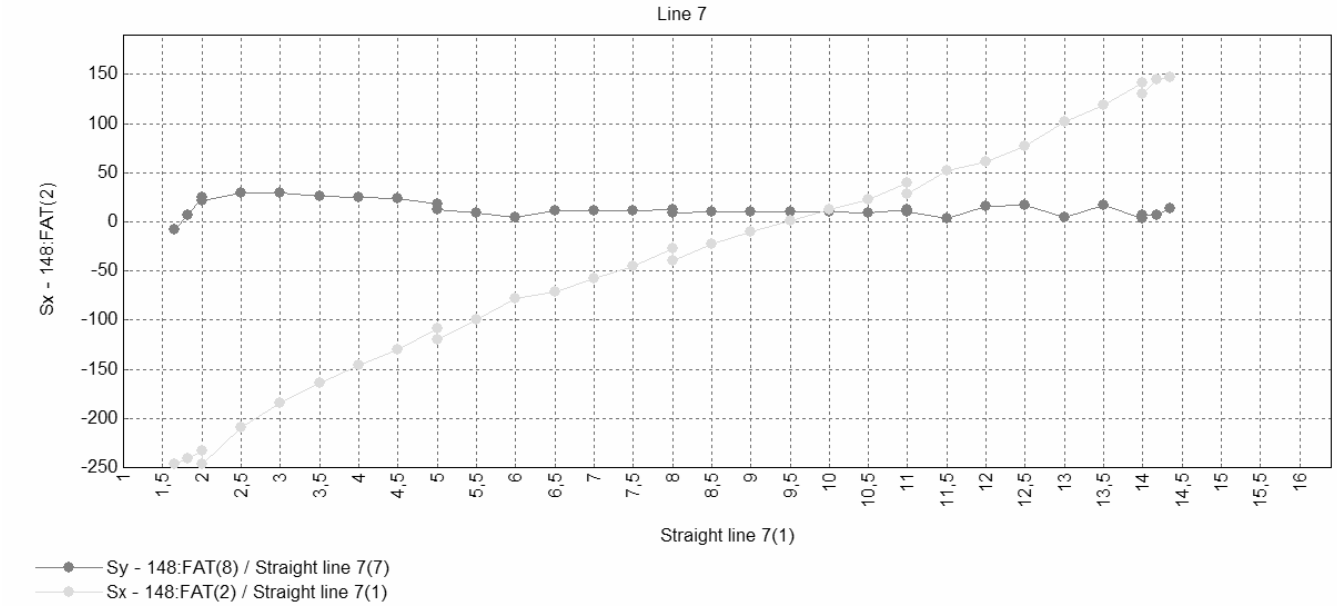
Combining on: Sx
FAT (Min)
Entity: Force/Moment - Thick Shell
Component: Sx (Units: kN/m)

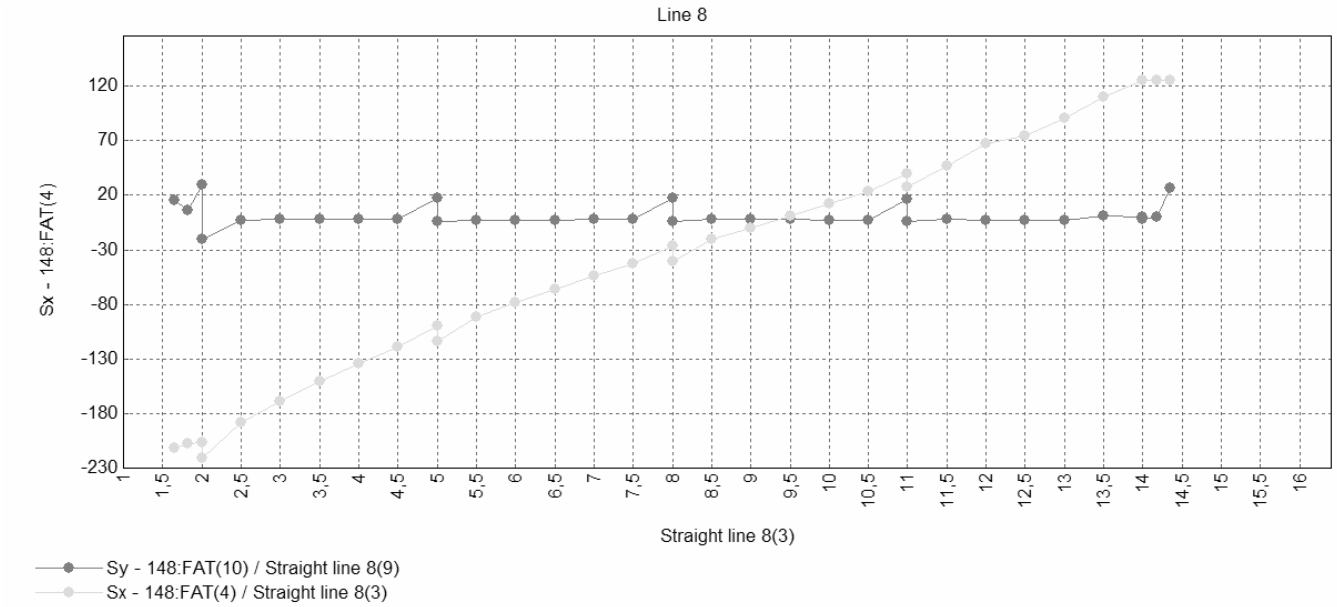
-331,846
-276,539
-221,231
-165,923
-110,615
-55,3077
0,0
55,3077
110,615

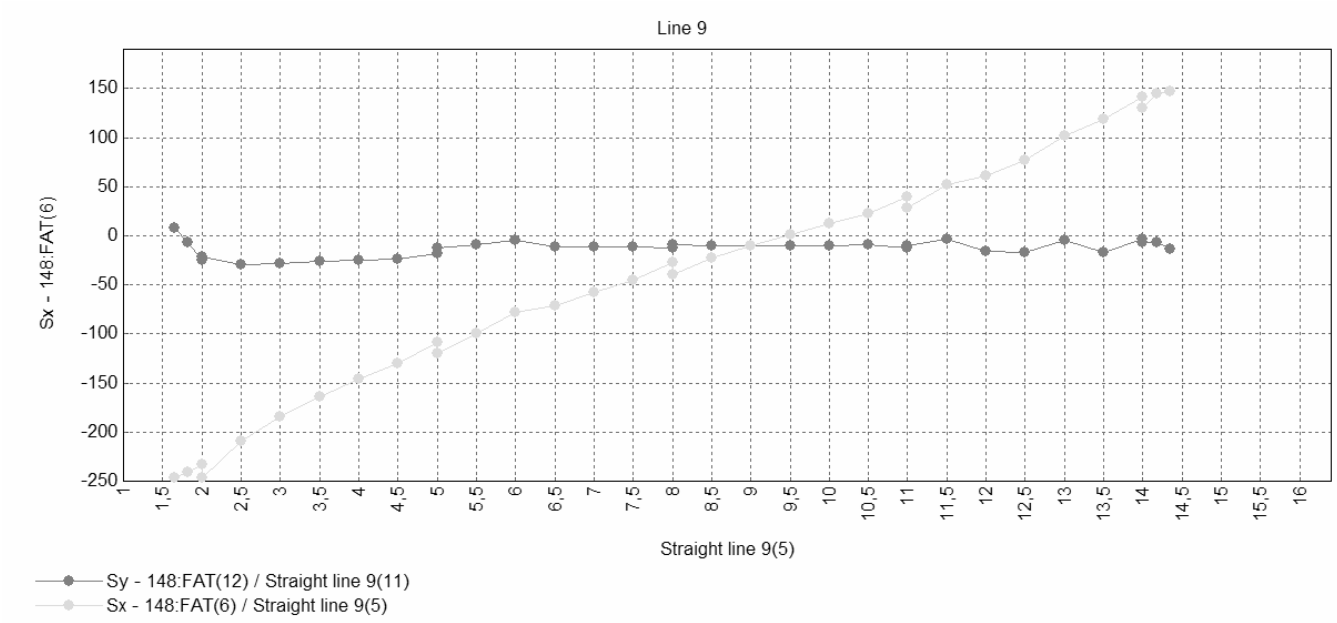
Maximum 148,846 at node 2849 of element 899
Minimum -348,924 at node 1549 of element 482

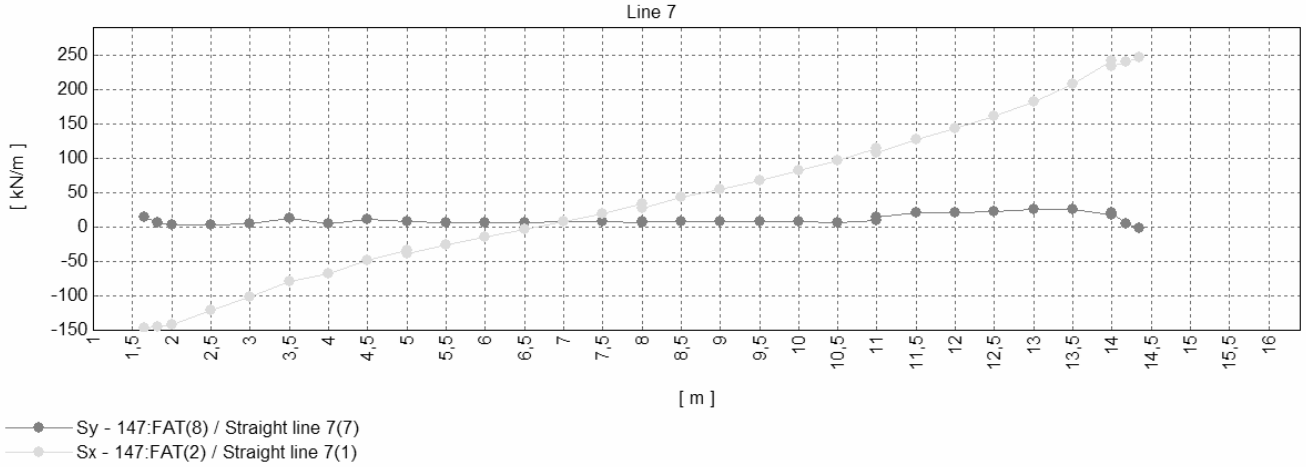


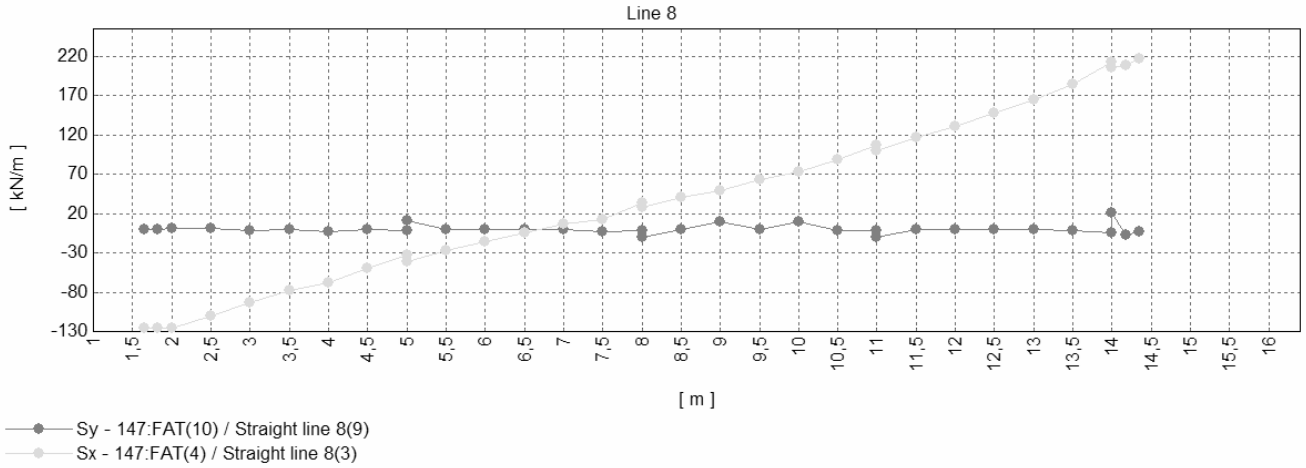
19.2 DIAGRAM

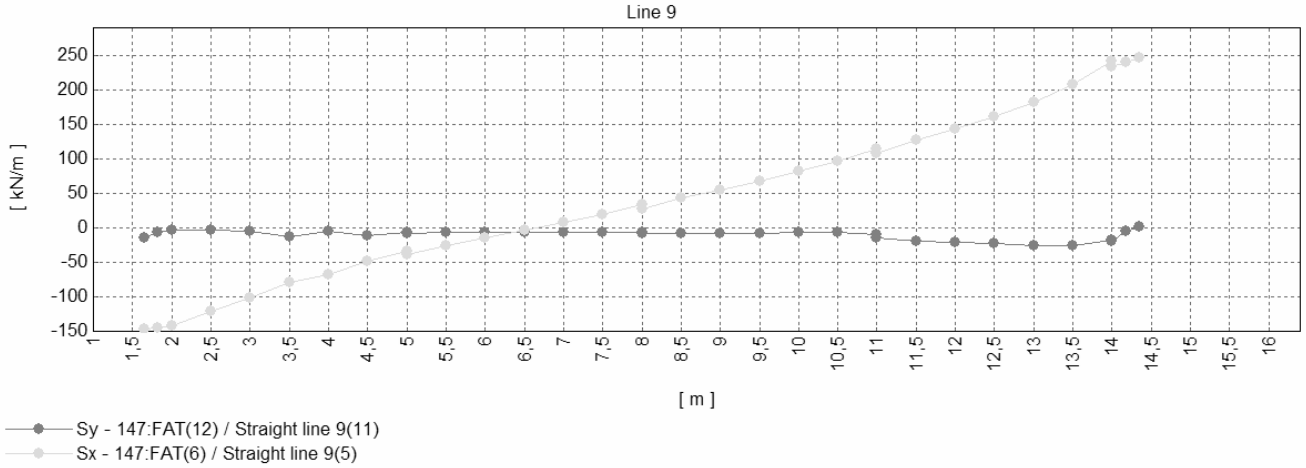

Line 7
Sx - 148:FAT(2)
Straight line 7(1)
Sy - 148:FAT(8) / Straight line 7(7)
Sx - 148:FAT(2) / Straight line 7(1)


Line 8
Sx - 148:FAT(4)
Straight line 8(3)
Sy - 148:FAT(10) / Straight line 8(9)
Sx - 148:FAT(4) / Straight line 8(3)


Line 9
Sx - 148:FAT(6)
150
100
50
0
-50
-100
-150
-200
-250
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
Straight line 9(5)
Sy - 148:FAT(12) / Straight line 9(11)
Sx - 148:FAT(6) / Straight line 9(5)


Line 7
[kN/m]
[m]
Sy - 147:FAT(8) / Straight line 7(7)
Sx - 147:FAT(2) / Straight line 7(1)


Line 8
[kN/m]
[m]
Sy - 147:FAT(10) / Straight line 8(9)
Sx - 147:FAT(4) / Straight line 8(3)


Line 9
[kN/m]
[m]
Sy - 147:FAT(12) / Straight line 9(11)
Sx - 147:FAT(6) / Straight line 9(5)

19.3 TABLE

Line 7:

s	Max Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-147	-14	148
1,83	-144	-6	145
2,00	-142	-4	142
2,50	-121	-4	121
3,00	-102	-4	102
3,50	-79	-13	80
4,00	-67	-4	67
4,50	-49	-11	50
5,00	-39	-8	40
5,50	-25	-6	26
6,00	-14	-7	16
6,50	-3	-7	8
7,00	8	-7	11
7,50	20	-7	21
8,00	28	-9	29
8,50	43	-8	44
9,00	55	-8	56
9,50	68	-8	69
10,00	82	-7	83
10,50	97	-6	97
11,00	109	-15	110
11,50	127	-20	129
12,00	143	-21	145
13,00	182	-25	184
13,50	207	-26	209
14,00	234	-20	235
14,18	241	-5	241
14,35	247	2	247
m	kN/m	kN/m	kN/m

s	Min Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-247	8	247
1,83	-241	-7	241
2,00	-246	-21	247
2,50	-210	-30	212
3,00	-185	-29	187
3,50	-164	-26	166
4,00	-146	-24	148
4,50	-130	-23	132
5,00	-120	-12	121
5,50	-100	-9	100
6,00	-78	-5	79
6,50	-71	-11	72
7,00	-58	-11	59
7,50	-45	-11	47
8,00	-40	-9	41
8,50	-22	-11	25
9,00	-11	-11	15
9,50	1	-10	10
10,00	12	-10	16
10,50	23	-9	25
11,00	29	-10	30
11,50	52	-3	52
12,00	61	-15	63
13,00	102	-4	102
13,50	118	-17	119
14,00	130	-7	130
14,18	144	-6	145
14,35	147	-14	148
m	kN/m	kN/m	kN/m

Line 8:

s	Max Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-126	0	126
1,83	-126	0	126
2,00	-125	0	125
2,50	-110	1	110
3,00	-93	-1	93
3,50	-77	-1	77
4,00	-68	-3	68
4,50	-50	0	50
5,00	-40	11	42
5,50	-26	0	26
6,00	-15	0	15
6,50	-4	0	4
7,00	7	0	7
7,50	13	-3	13
8,00	28	-10	30
8,50	41	0	41
9,00	49	9	50
9,50	63	-1	63
10,00	74	10	74
10,50	89	-1	89
11,00	99	-10	100
11,50	116	0	116
12,00	131	0	131
13,00	165	0	165
13,50	185	-1	185
14,00	205	21	206
14,18	209	-7	209
14,35	217	-4	217
m	kN/m	kN/m	kN/m

s	Min Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-212	15	212
1,83	-208	7	208
2,00	-221	-21	222
2,50	-188	-3	188
3,00	-169	-2	169
3,50	-151	-2	151
4,00	-135	-2	135
4,50	-120	-2	120
5,00	-114	-4	114
5,50	-92	-3	92
6,00	-79	-3	79
6,50	-66	-3	66
7,00	-54	-2	54
7,50	-43	-2	43
8,00	-40	-4	40
8,50	-21	-2	21
9,00	-10	-2	10
9,50	1	-2	3
10,00	12	-3	13
10,50	24	-3	24
11,00	27	-4	27
11,50	47	-2	47
12,00	67	-3	67
13,00	90	-3	90
13,50	110	1	110
14,00	125	-2	125
14,18	126	0	126
14,35	125	26	128
m	kN/m	kN/m	kN/m

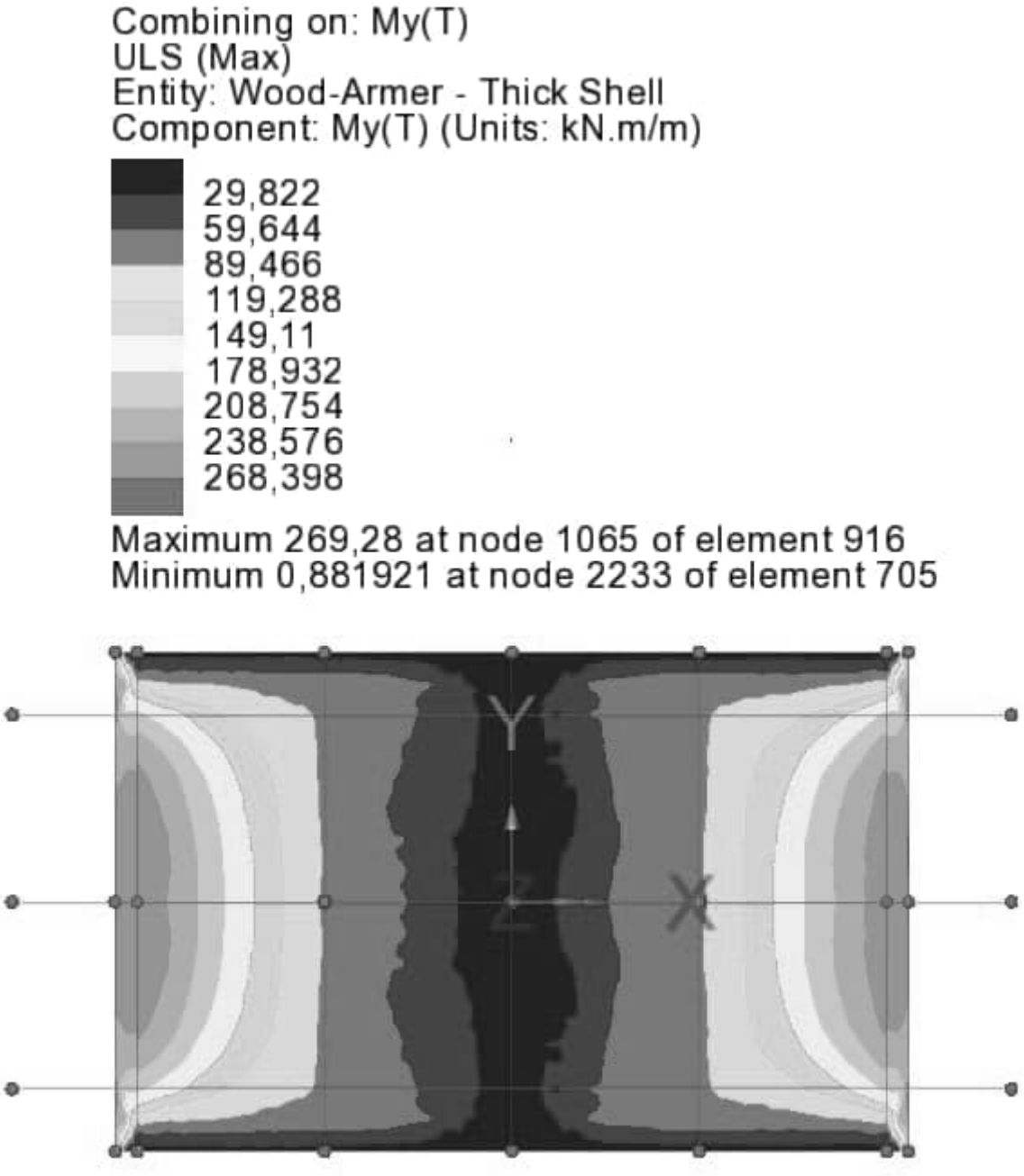
Line 9:

s	Max Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-147	-14	148
1,83	-144	-6	145
2,00	-142	-4	142
2,50	-121	-4	121
3,00	-102	-4	102
3,50	-79	-13	80
4,00	-67	-4	67
4,50	-49	-11	50
5,00	-39	-8	40
5,50	-25	-6	26
6,00	-14	-7	16
6,50	-3	-7	8
7,00	8	-7	11
7,50	20	-7	21
8,00	28	-9	29
8,50	43	-8	44
9,00	55	-8	56
9,50	68	-8	69
10,00	82	-7	83
10,50	97	-6	97
11,00	109	-15	110
11,50	127	-20	129
12,00	143	-21	145
13,00	182	-25	184
13,50	207	-26	209
14,00	234	-20	235
14,18	241	-5	241
14,35	247	2	247
m	kN/m	kN/m	kN/m

s	Min Sx	Sy	$\sqrt{Sx^2+Sy^2}$
1,65	-247	8	247
1,83	-241	-7	241
2,00	-246	-21	247
2,50	-210	-30	212
3,00	-185	-29	187
3,50	-164	-26	166
4,00	-146	-24	148
4,50	-130	-23	132
5,00	-120	-12	121
5,50	-100	-9	100
6,00	-78	-5	79
6,50	-71	-11	72
7,00	-58	-11	59
7,50	-45	-11	47
8,00	-40	-9	41
8,50	-22	-11	25
9,00	-11	-11	15
9,50	1	-10	10
10,00	12	-10	16
10,50	23	-9	25
11,00	29	-10	30
11,50	52	-3	52
12,00	61	-15	63
13,00	102	-4	102
13,50	118	-17	119
14,00	130	-7	130
14,18	144	-6	145
14,35	147	-14	148
m	kN/m	kN/m	kN/m

20. ULS - Min My(B)/Max My(T)

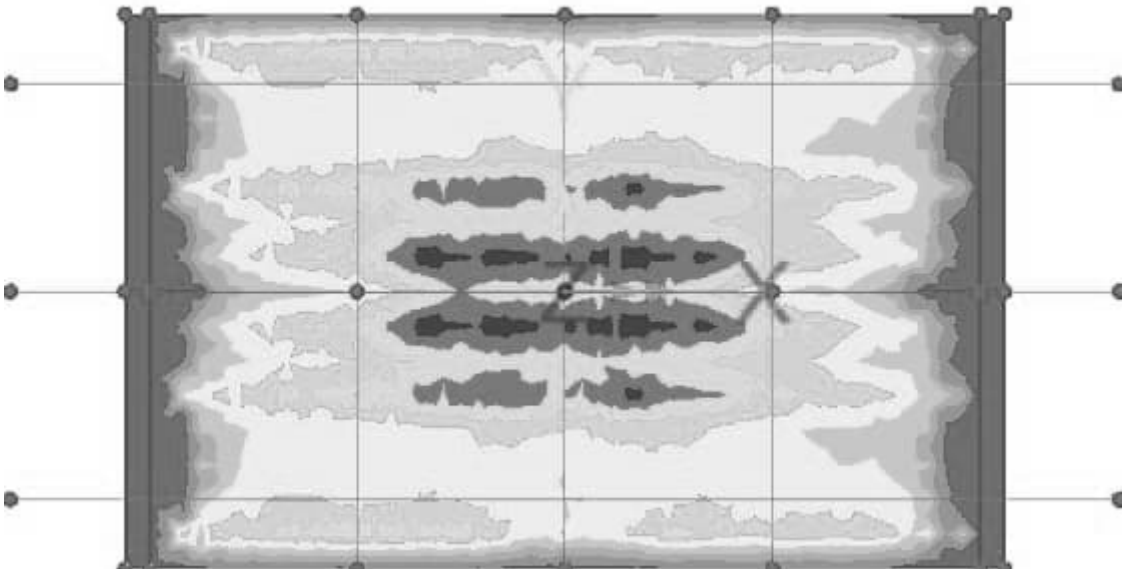
20.1 CONTOUR



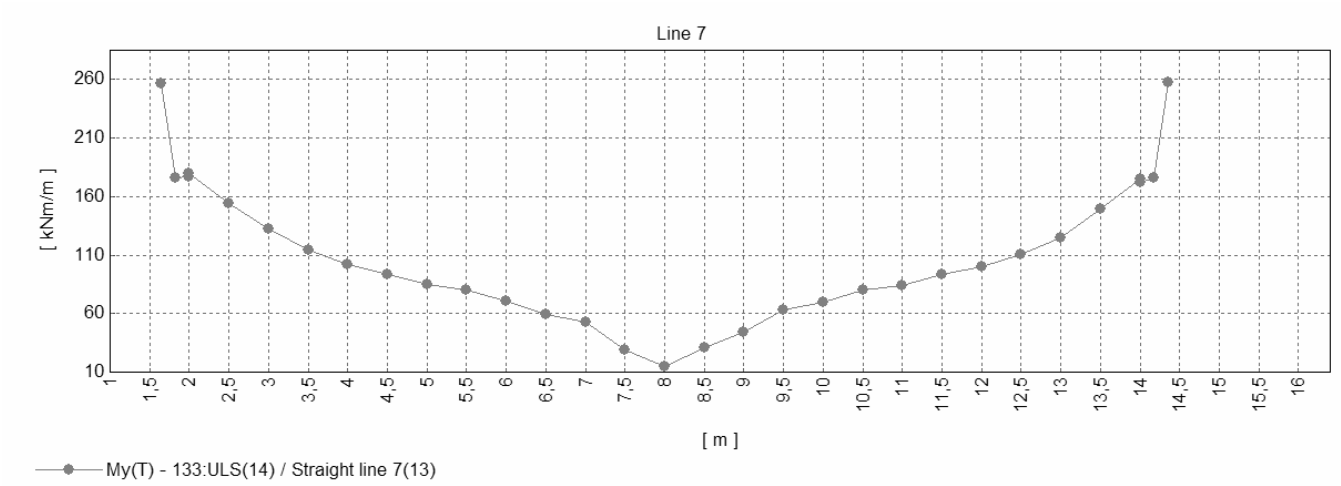
Combining on: My(B)
ULS (Min)
Entity: Wood-Armer - Thick Shell
Component: My(B) (Units: kN.m/m)

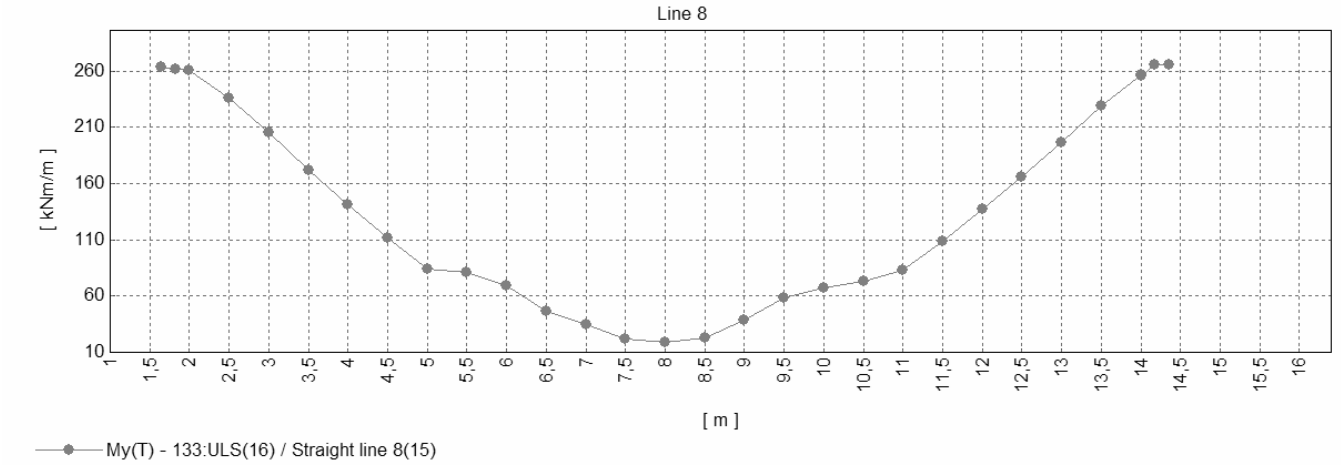
-137,251
-122,001
-106,751
-91,5008
-76,2507
-61,0006
-45,7504
-30,5003
-15,2501

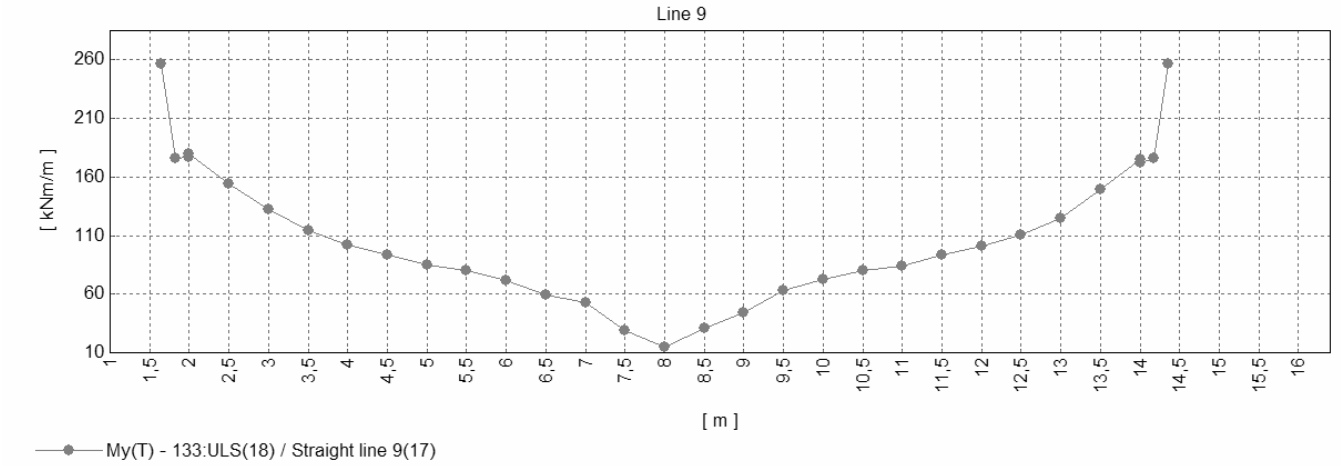
Maximum 0,0 at node 238 of element 495
Minimum -137,251 at node 2003 of element 646

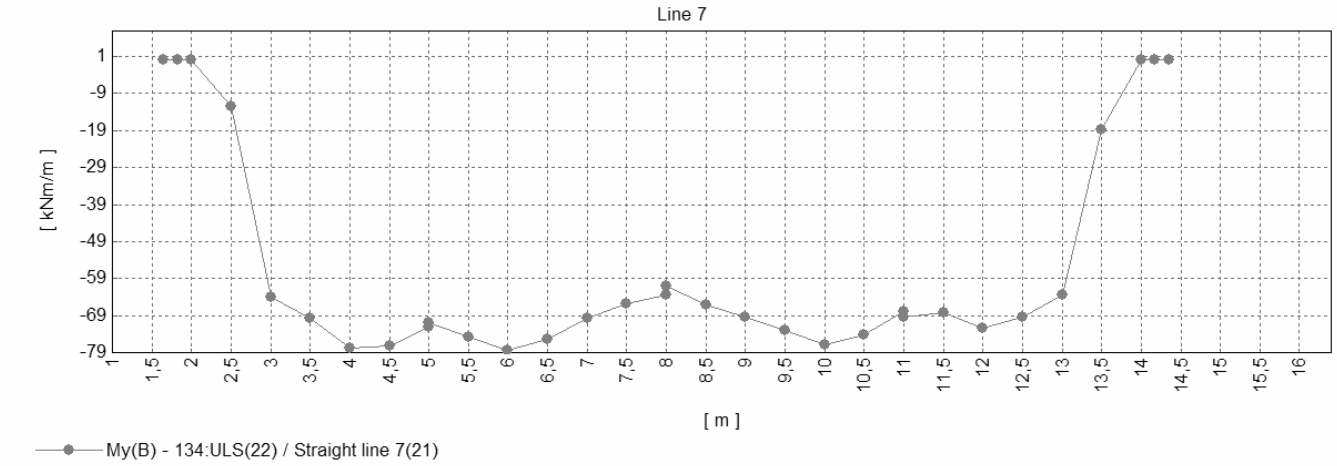


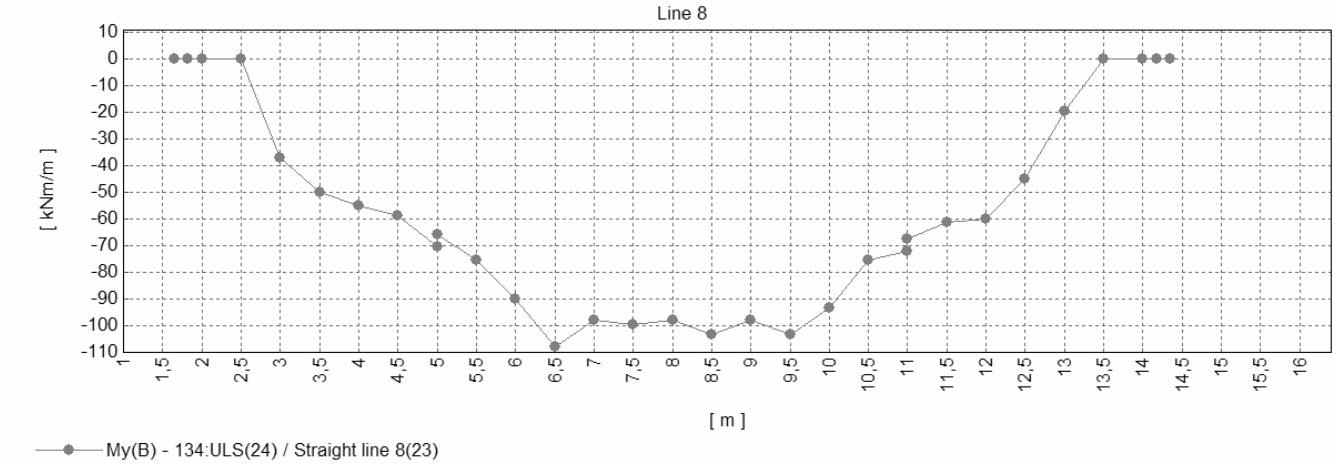
20.2 DIAGRAM

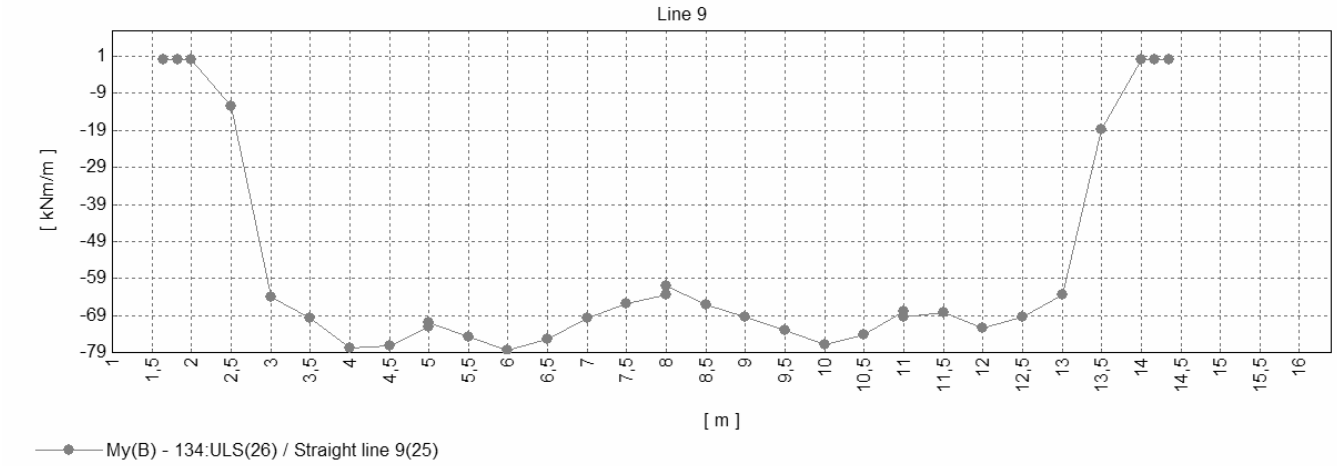

Line 7
[kNm/m]
260
210
160
110
60
10
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
My(T) - 133:ULS(14) / Straight line 7(13)


Line 8
[kNm/m]
260
210
160
110
60
10
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
My(T) - 133:ULS(16) / Straight line 8(15)


Line 9
[kNm/m]
260
210
160
110
60
10
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
My(T) - 133:ULS(18) / Straight line 9(17)


Line 7
[kNm/m]
1
-9
-19
-29
-39
-49
-59
-69
-79
1 1,5 2 2,5 3 3,5 4 4,5 5 5,5 6 6,5 7 7,5 8 8,5 9 9,5 10 10,5 11 11,5 12 12,5 13 13,5 14 14,5 15 15,5 16
[m]
My(B) - 134:ULS(22) / Straight line 7(21)


Line 8
[kNm/m]
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
1 1,5 2 2,5 3 3,5 4 4,5 5 5,5 6 6,5 7 7,5 8 8,5 9 9,5 10 10,5 11 11,5 12 12,5 13 13,5 14 14,5 15 15,5 16
[m]
My(B) - 134:ULS(24) / Straight line 8(23)


Line 9
[kNm/m]
1
-9
-19
-29
-39
-49
-59
-69
-79
1 1,5 2 2,5 3 3,5 4 4,5 5 5,5 6 6,5 7 7,5 8 8,5 9 9,5 10 10,5 11 11,5 12 12,5 13 13,5 14 14,5 15 15,5 16
[m]
My(B) - 134:ULS(26) / Straight line 9(25)

20.3 TABLE

Line 7:

s	Max My(T)	Min My(B)
1,65	257	0
1,83	176	0
2,00	177	0
2,50	154	-12
3,00	132	-64
3,50	114	-70
4,00	102	-78
4,50	94	-77
5,00	85	-72
5,50	80	-75
6,00	70	-79
6,50	59	-75
7,00	53	-70
7,50	29	-66
8,00	15	-63
8,50	30	-66
9,00	45	-70
9,50	63	-73
10,00	70	-77
10,50	80	-74
11,00	84	-68
11,50	94	-68
12,00	100	-73
13,00	125	-63
13,50	149	-19
14,00	175	0
14,18	176	0
14,35	257	0
m	kNm/m	kNm/m

Line 8:

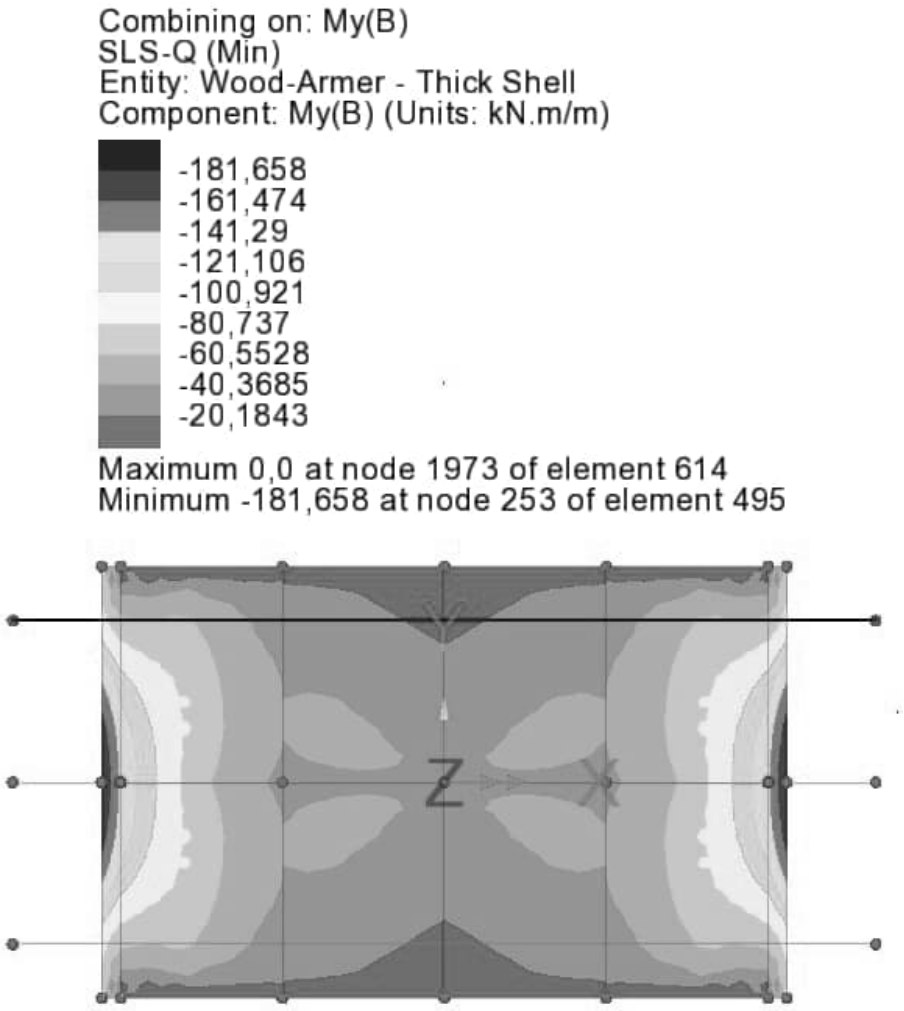
s	Max My(T)	Min My(B)
1,65	264	0
1,83	261	0
2,00	260	0
2,50	236	0
3,00	205	-37
3,50	172	-50
4,00	141	-55
4,50	111	-59
5,00	84	-70
5,50	81	-76
6,00	69	-90
6,50	47	-108
7,00	34	-98
7,50	22	-100
8,00	18	-98
8,50	23	-103
9,00	39	-98
9,50	58	-103
10,00	67	-93
10,50	73	-75
11,00	83	-72
11,50	108	-61
12,00	137	-60
13,00	196	-20
13,50	229	0
14,00	257	0
14,18	265	0
14,35	265	0
m	kNm/m	kNm/m

Line 9:

s	Max My(T)	Min My(B)
1,65	257	0
1,83	176	0
2,00	177	0
2,50	154	-12
3,00	132	-64
3,50	114	-70
4,00	102	-78
4,50	94	-77
5,00	85	-72
5,50	80	-75
6,00	72	-79
6,50	59	-75
7,00	53	-70
7,50	29	-66
8,00	15	-63
8,50	30	-66
9,00	45	-70
9,50	63	-73
10,00	72	-77
10,50	80	-74
11,00	84	-68
11,50	94	-68
12,00	101	-73
13,00	125	-63
13,50	149	-19
14,00	175	0
14,18	176	0
14,35	257	0
m	kNm/m	kNm/m

21. SLS-Q Min My(B)/Max My(T)

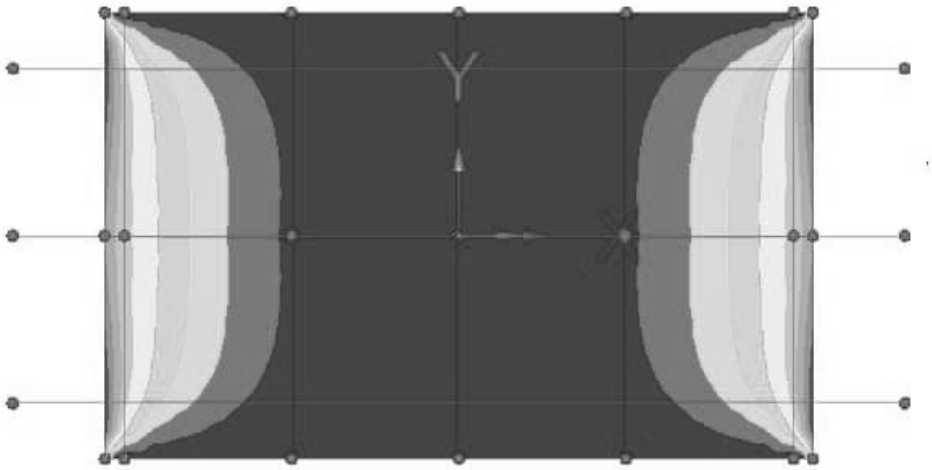
21.1 CONTOUR



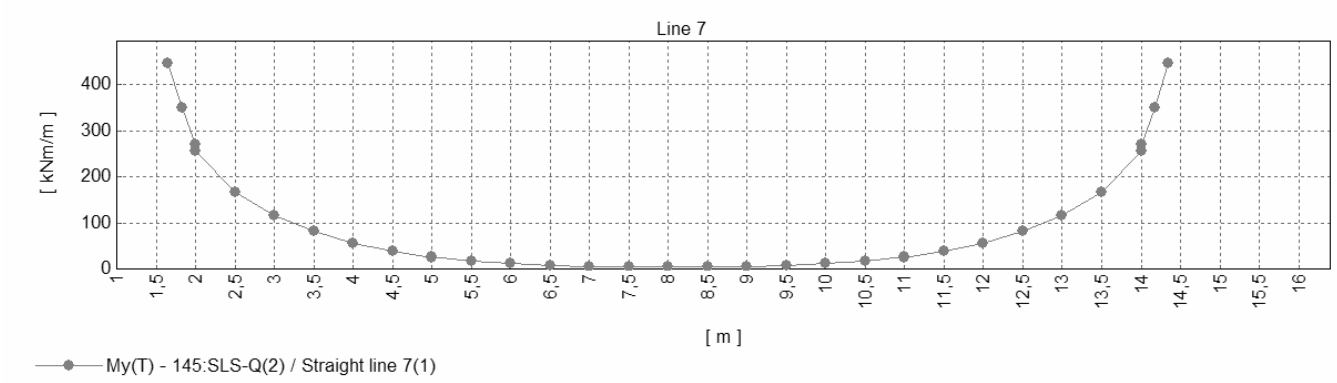
Combining on: My(T)
SLS-Q (Max)
Entity: Wood-Armer - Thick Shell
Component: My(T) (Units: kN.m/m)

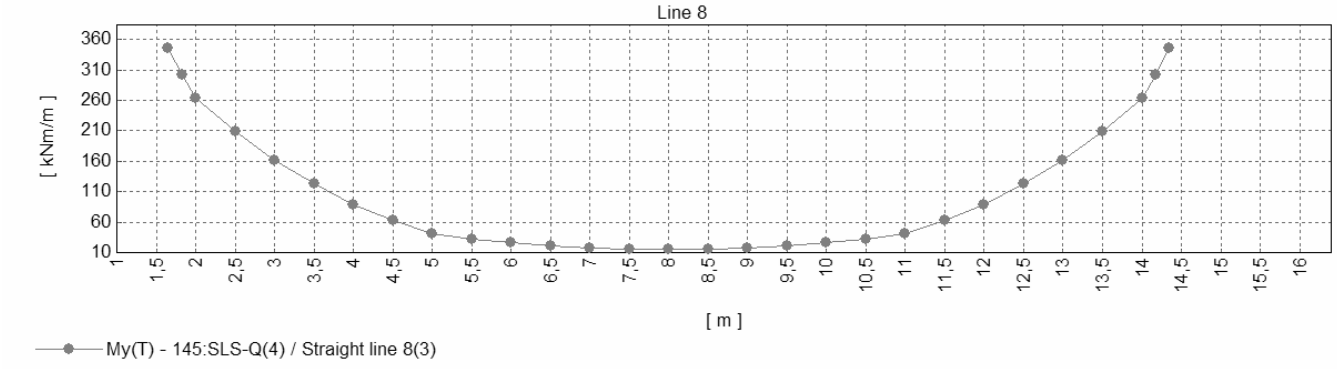
0,0
49,8107
99,6213
149,432
199,243
249,053
298,864
348,675
398,485

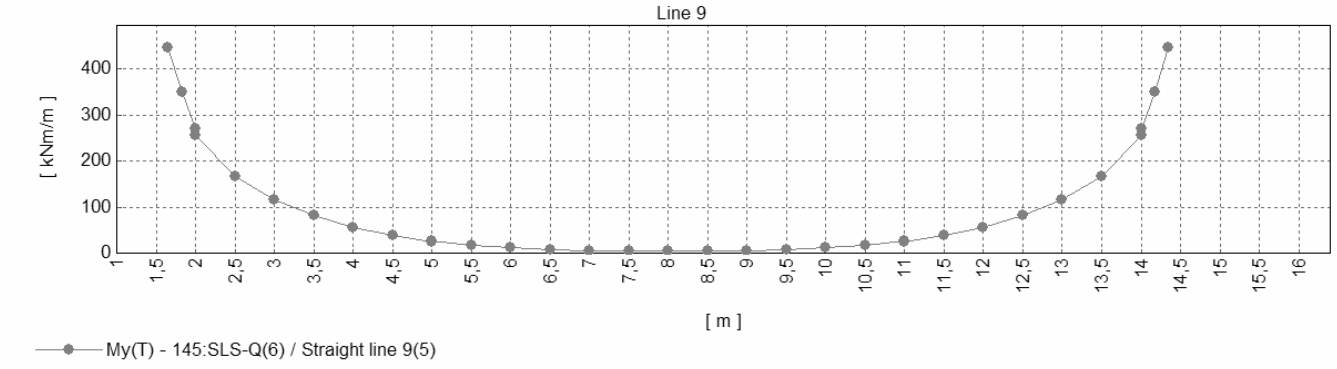
Maximum 448,296 at node 251 of element 483
Minimum 0,0 at node 1639 of element 516

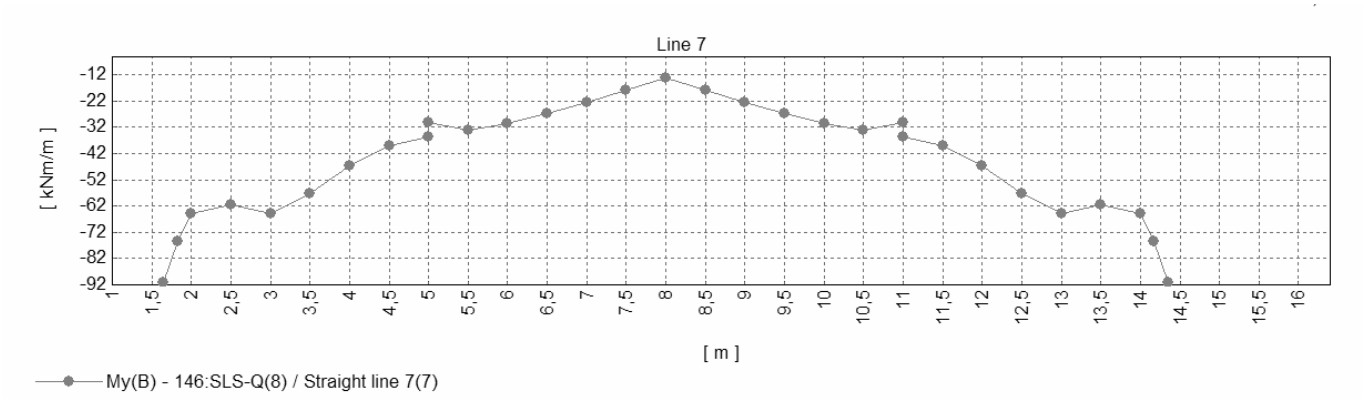


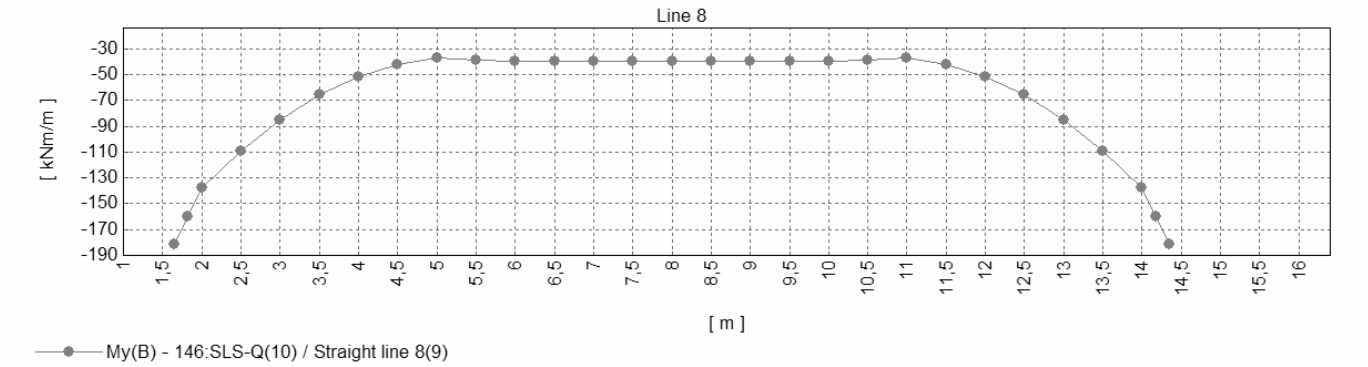
21.2 DIAGRAM

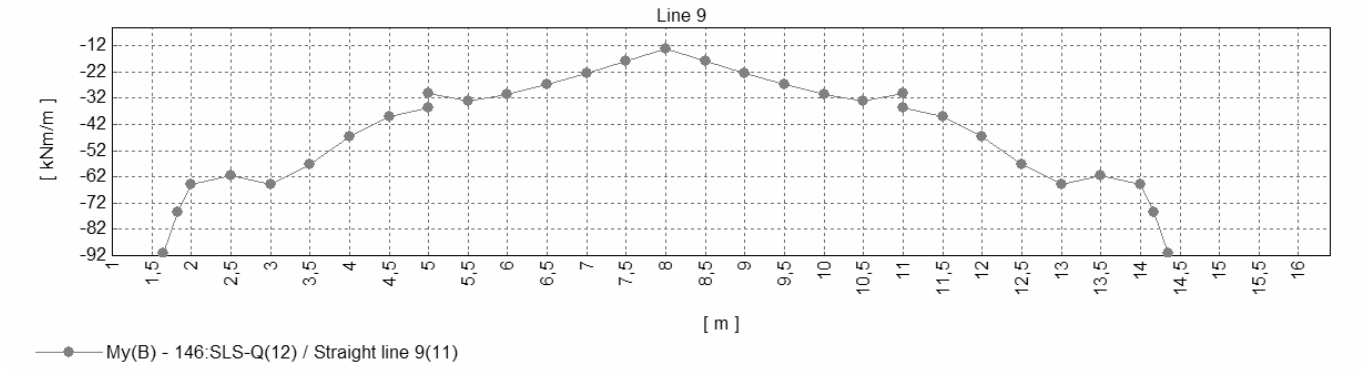

Line 7
[kNm/m]
400
300
200
100
0
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
My(T) - 145:SLS-Q(2) / Straight line 7(1)


Line 8
[kNm/m]
360
310
260
210
160
110
60
10
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
My(T) - 145:SLS-Q(4) / Straight line 8(3)


Line 9
[kNm/m]
400
300
200
100
0
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
My(T) - 145:SLS-Q(6) / Straight line 9(5)


Line 7
[kNm/m]
-12
-22
-32
-42
-52
-62
-72
-82
-92
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
My(B) - 146:SLS-Q(8) / Straight line 7(7)


Line 8
[kNm/m]
-30
-50
-70
-90
-110
-130
-150
-170
-190
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
My(B) - 146:SLS-Q(10) / Straight line 8(9)


Line 9
[kNm/m]
-12
-22
-32
-42
-52
-62
-72
-82
-92
1
1,5
2
2,5
3
3,5
4
4,5
5
5,5
6
6,5
7
7,5
8
8,5
9
9,5
10
10,5
11
11,5
12
12,5
13
13,5
14
14,5
15
15,5
16
[m]
My(B) - 146:SLS-Q(12) / Straight line 9(11)

21.3 TABLE

Line 7:

s	Max My(T)	Min My(B)
1,65	447	-91
1,83	350	-75
2,00	270	-65
2,50	167	-61
3,00	117	-65
3,50	83	-57
4,00	55	-47
4,50	37	-39
5,00	23	-36
5,50	18	-33
6,00	12	-31
6,50	7	-27
7,00	5	-23
7,50	5	-18
8,00	4	-13
8,50	5	-18
9,00	5	-23
9,50	7	-27
10,00	12	-31
10,50	18	-33
11,00	26	-30
11,50	37	-39
12,00	55	-47
13,00	117	-65
13,50	167	-61
14,00	257	-65
14,18	350	-75
14,35	447	-91
m	kNm/m	kNm/m

Line 8:

s	Max My(T)	Min My(B)
1,65	345	-182
1,83	302	-160
2,00	264	-138
2,50	209	-110
3,00	162	-85
3,50	123	-66
4,00	89	-52
4,50	62	-43
5,00	40	-37
5,50	32	-39
6,00	26	-39
6,50	21	-40
7,00	18	-40
7,50	15	-40
8,00	15	-40
8,50	15	-40
9,00	18	-40
9,50	21	-40
10,00	26	-39
10,50	32	-39
11,00	40	-37
11,50	62	-43
12,00	89	-52
13,00	162	-85
13,50	209	-110
14,00	264	-137
14,18	302	-160
14,35	345	-182
m	kNm/m	kNm/m

Line 9:

s	Max My(T)	Min My(B)
1,65	447	-91
1,83	350	-75
2,00	270	-65
2,50	167	-61
3,00	117	-65
3,50	83	-57
4,00	55	-47
4,50	37	-39
5,00	23	-36
5,50	18	-33
6,00	12	-31
6,50	7	-27
7,00	5	-23
7,50	5	-18
8,00	4	-13
8,50	5	-18
9,00	5	-23
9,50	7	-27
10,00	12	-31
10,50	18	-33
11,00	26	-30
11,50	37	-39
12,00	55	-47
13,00	117	-65
13,50	167	-61
14,00	257	-65
14,18	350	-75
14,35	447	-91
m	kNm/m	kNm/m