

Názov stavby: **Kyslíkový aparát č.9**
Construction name: **Oxygen plant ASU No.9**

Investor: **U.S. Steel, s.r.o. Vstupný areál U.S. Steel, Košice**

Stupeň: **Statické posúdenie**
Level: **Structural expert's option**

Účel: **Posúdenie projektovej dokumentácie fy KMW
podľa STN**

Scope: **Check of original project by KMW co. according to
STN**

Archívne číslo: **RP - 147/2004**
Archival No.:

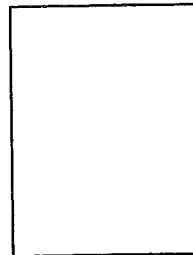
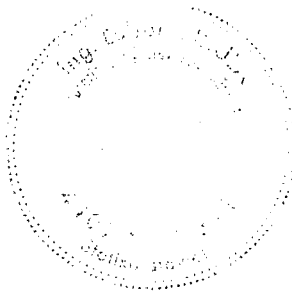
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Košice, 10/2004



7/10 - Nipper

Obsah

Predmet, účel a rozsah posúdenia	2
Overovaná dokumentácia	2
Podklady, Použitá literatúra	2
Posúdenie	2
Záver	5

Predmet, účel a rozsah posúdenia

Predmetom posúdenia sú základové konštrukcie pod technologické zariadenia kyslíkového aparátu č.9. v areáli US Steel Košice. Zoznam základových konštrukcií jednotlivých technologických zariadení je uvedený v Statickom výpočte firmy KMW na strane 3.

Účelom posúdenia je porovnať, overiť a posúdiť projektovú dokumentáciu vypracovanú podľa DIN s platnými STN normami a miestnymi geotechnickými podmienkami.

Overovaná dokumentácia

- Statický výpočet – Static Calculation 7584, KMW Saarbrücken-Brebach, September 2004
strany A1-A97, B1-B29, C1-C33, D1-D21, E1-E34, F1-F30, G1-G16
- výkres č. 792.87041 – Foundation Formwork Plan, Key Plan ASU No.9
- výkres č. 792.87040 – LP-LOX Tank, Tank Formwork, Plans and Sections
- výkres č. 792.87042 – Reinforcement Drawing, Foundation LOX Tank
- výkres č. 792.87043 – Reinforcement, Table Slab +3,50 m
- výkres č. 792.87044 – Reinforcement, Foundation Tank Farm

Podklady, Použitá literatúra

- Podrobný inžiniersko-geologický prieskum - Záverečná správa, Montana s.r.o., máj 2004
- DIN 1055 – Lastannahmen für Bauten / Zaťaženie stavebných konštrukcií
- DIN 1054 – Baugrund, Zulässige Belastung des Baugrunds / Navrhovanie základových konštrukcií
- DIN 1045 (07.88) – Beton und Stahlbeton, Bemessung und Ausführung / Navrhovanie betónových konštrukcií
- STN 73 0035 – Zaťaženie stavebných konštrukcií
- STN 73 1001 – Základová pôda pod plošnými základmi
- STN 73 1201 – Navrhovanie betónových konštrukcií
- STN EN 206-1 – Betón, Špecifikácia, vlastnosti, výroba a zhoda

Posúdenie

1) Statický výpočet

Pre výpočet metódou konečných prvkov bol použitý 3D model na pružnom podloží s koeficientom odporu proti pretvoreniu $k_s=15 \text{ MN/m}^3$, za použitia materiálových charakteristík betónu a výstuže v zmysle DIN 1045. Zaťaženie bolo uvažované podľa podkladov dodávateľa technológie. Zaťaženie vetrom bolo uvažované v zmysle DIN 1055 - T4, Strana 4, Tab.1: $q=0,5 \text{ kN/m}^2$. Tvarové súčinitele boli uvažované v závislosti na tvare konštrukcie. V zmysle STN 73 0035 je podľa mapy vetrových oblastí pre danú lokalitu základný tlak vetra $w_0 = 0,55 \text{ kN/m}^2$.

Statické posúdenie

Prevodná tabuľka použitých materiálov

DIN 1045	STN 73 1201
betón B25 – tab.1, strana 19 kocková pevnosť $\beta_{wN} = 25 \text{ MPa}$ normová pevnosť $\beta_R = 17,5 \text{ MPa}$ modul pružnosti $E = 30 \text{ GPa}$	betón B25 – tab.1, strana 19 kocková pevnosť 25 MPa normová pevnosť $R_{bn} = 18,5 \text{ MPa}$ výpočtová pevnosť $R_{bd} = 14,5 \text{ MPa}$ modul pružnosti $E = 30 \text{ GPa}$
ocel' BSt 420 – tab.6, strana 24 pevnosť v ťahu $\beta_{tZ} = 500 \text{ MPa}$ medza klzu $\beta_{tS} = 420 \text{ MPa}$	ocel' 10425 (V) – tab.29, príloha 1, str.2 pevnosť v ťahu 420 MPa normová pevnosť v ťahu $R_{sn} = 410 \text{ MPa}$ výpočtová pevnosť v ťahu $R_{sd} = 375 \text{ MPa}$
ocel' BSt 500 – tab.6, strana 24 pevnosť v ťahu $\beta_{tZ} = 550 \text{ MPa}$ medza klzu $\beta_{tS} = 500 \text{ MPa}$	ocel' 10505 (R) – tab.29, príloha 1, str.2 pevnosť v ťahu 500 MPa normová pevnosť v ťahu $R_{sn} = 490 \text{ MPa}$ výpočtová pevnosť v ťahu $R_{sd} = 450 \text{ MPa}$

Poznámky:

- v statickom výpočte bola uvažovaná prúťová výstuž BSt 420, vo výkresoch bola použitá výstuž BSt 500
- norma DIN 1045 (07.88) používa pre výpočet klasickú teóriu, STN 73 1201 je založená na teórii medzných stavov

- Základ pre 1800 MT LOX-Storage Tank (strany A1-A97):

Výpočet zaťaženia a model konštrukcie zodpovedá pôsobeniu nádrže na základ a geometrii základu. Porovnávacím prepočtom na podrobnejšom modeli podložia bolo zistené vyššie namáhanie základovej dosky ako je uvedené vo výpočte. Vzhľadom na použitú výstuž 10505 (R) je však rezerva konštrukcie dostatočná a množstvo a usporiadanie navrhutej výstuže vyhovuje ustanoveniam STN 73 1201. Základ vyhovuje ustanoveniam STN 73 1001 na únosnosť a spoľahlivosť.

- Základ pre LIN/LOX Water Bath Vaporizer W64001 a W73001 (strana B1-B29):

Výpočet zaťaženia a model konštrukcie zodpovedá pôsobeniu zariadenia na základ a geometrii základu. Množstvo navrhutej výstuže nezodpovedá ustanoveniam STN 73 1201 o minimálnom stupni vystuženia pre železobetónový prierez. Vzhľadom na množstvo výstuže sa malo pri posudzovaní postupovať ako pri slabo vystuženom priereze. Pri takomto posúdení prierez naďalej vyhovuje. Základ vyhovuje ustanoveniam STN 73 1001 a STN 73 1201 na únosnosť a spoľahlivosť.

- Základ pre HP-LIN Vaporizer W74101, W74201, W74301, W74401 (strana C1-C33):

Výpočet zaťaženia a model konštrukcie zodpovedá pôsobeniu zariadenia na základ a geometrii základu. Množstvo navrhutej výstuže nezodpovedá ustanoveniam STN 73 1201 o minimálnom stupni vystuženia pre železobetónový prierez. Vzhľadom na množstvo výstuže sa malo pri posudzovaní postupovať ako pri slabo

Statické posúdenie

vystuženom priereze. Pri takomto posúdení prierez naďalej vyhovuje. Základ vyhovuje ustanoveniam STN 73 1001 a STN 73 1201 na únosnosť a spoľahlivosť.

- Základ pre LIN Water Bath Vaporizer W73101 (strana D1-D21):

Výpočet zaťaženia a model konštrukcie zodpovedá pôsobeniu zariadenia na základ a geometrii základu. Množstvo navrhutej výstuže nezodpovedá ustanoveniam STN 73 1201 o minimálnom stupni vystuženia pre železobetónový prierez. Vzhľadom na množstvo výstuže sa malo pri posudzovaní postupovať ako pri slabo vystuženom priereze. Pri takomto posúdení prierez naďalej vyhovuje. Základ vyhovuje ustanoveniam STN 73 1001 a STN 73 1201 na únosnosť a spoľahlivosť.

- Základ pre HP-GAN Reservoir B73002 (strana E1-E34):

Výpočet zaťaženia a model konštrukcie zodpovedá pôsobeniu nádrže na základ a geometrii základu. Kotvenie bude realizované namiesto rozperných kotiev HILTI HST M10 lepenými kotvami HILTI HVA+HAS M16. Množstvo navrhutej výstuže nezodpovedá ustanoveniam STN 73 1201 o minimálnom stupni vystuženia pre železobetónový prierez. Vzhľadom na množstvo výstuže sa malo pri posudzovaní postupovať ako pri slabo vystuženom priereze. Pri takomto posúdení prierez naďalej vyhovuje. Základ vyhovuje ustanoveniam STN 73 1001 a STN 73 1201 na únosnosť a spoľahlivosť.

- Základ pre MP-LIN Storage Tank B73001 (strana F1-F30):

Výpočet zaťaženia a model konštrukcie zodpovedá pôsobeniu nádrže na základ a geometrii základu. Množstvo navrhutej výstuže nezodpovedá ustanoveniam STN 73 1201 o minimálnom stupni vystuženia pre železobetónový prierez. Vzhľadom na množstvo výstuže sa malo pri posudzovaní postupovať ako pri slabo vystuženom priereze. Pri takomto posúdení prierez naďalej vyhovuje. Základ vyhovuje ustanoveniam STN 73 1001 a STN 73 1201 na únosnosť a spoľahlivosť.

- Základ pre LIN Truck Filling Pupm P72001, HP-LIN Backup Pumps P74101, P74201 (strana G1-G16):

Výpočet zaťaženia a model konštrukcie zodpovedá pôsobeniu púmp na základ a geometrii základu. Základ vyhovuje ustanoveniam STN 73 1001 a STN 73 1201 na únosnosť a spoľahlivosť.

2) Výkresová dokumentácia

Výkresová dokumentácia je spracovaná podľa štandardov používaných v Nemecku.

Kótovanie je v zmiešanej forme – hodnoty pod 1m sú kótované v cm, hodnoty nad 1 m sú kótované v m s presnosťou na dve desatinné miesta. Údaje v „exponente“ označujú mm. Vo výkresoch výstuže je raster ukladania výstužných prútov udávaný v cm.

Vo všetkých výkresoch je označený betón triedy B25, ktorý zodpovedá betónu C20/25 v zmysle STN EN 206-1.

Vo všetkých výkresoch je uvedené krytie 40 mm. Použitá výstuž BSt 500 je ekvivalentom výstuže 10505 (R).

Výkresová dokumentácia vyhovuje ustanoveniam STN 73 1201. Množstvo a poloha výstuže zodpovedá výsledkom statického výpočtu.

3) Posúdenie základových pomerov

Výsledky IG prieskumu poukazujú na prítomnosť navážky v hrúbke 0,7m (vrt VK4) až 1,7 m (vrt (VK12). pod navážkou sa nachádzajú únosné vrstvy stredne uľahlého až uľahlého štrku tried G3 resp. G5, prípadne tuhého až pevného ílu triedy F6. Hladina podzemnej vody sa nachádza 5,3 m pod úrovňou terénu.


Pod všetkými základovými konštrukciami je potrebné prítomnú navážku odstrániť a nahradiť únosnou zeminou.

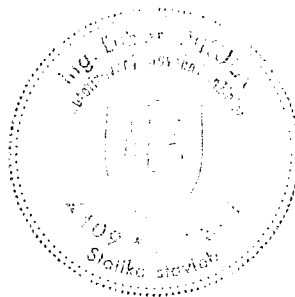
Pod základom pre 1800 MT LOX-Storage Tank je potrebné vymeniť zeminu až po uľahlý štrk G3 ktorý sa nachádza v úrovni 2,0 m pod úrovňou terénu. Spätňý zásyp bude realizovaný zo štrkopiesku s požadovanou mierou zhutnenia $E_{v2} \geq 60 \text{ MPa}$, pri $E_{v2}/E_{v1} \leq 2,6$.

Záver

Realizovaním základových konštrukcií podľa pôvodnej projektovej dokumentácie pri súčasnom zohľadnení pripomienok uvedených v predchádzajúcej stati budú základové konštrukcie bezpečné a schopné prenášať zaťaženie na nich pôsobiace a súčasne budú spĺňať ustanovenia platných technických noriem pre navrhovanie stavebných konštrukcií.

Vypracoval:


Ing. Ľubor Pikula
autorizovaný stavebný inžinier



Názov stavby: **Kyslíkový aparát č.9**
Construction name: **Oxygen plant ASU No.9**

Investor: **U.S. Steel, s.r.o. Vstupný areál U.S. Steel, Košice**

Stupeň: **Statické posúdenie**
Level: **Structural expert's option**

Účel: **Posúdenie projektovej dokumentácie fy KMW
podľa STN**
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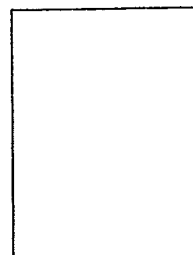
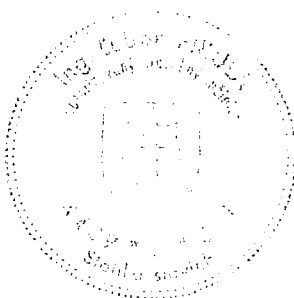
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Košice, 10/2004



Content

Subject, Purpose and Scope of Opinion.....	2
Documents to be verified.....	2
Used codes, Literature	2
Document check	2
Conclusion	5

Subject, Purpose and Scope of Opinion

The subject of opinion are foundation structures for ASU No: 9 equipment located in US Steel Košice. The list of equipment is stated in Structural Analysis prepared by KMW on page No.3. Purpose of opinion is to compare, to verify and to check the original project prepared according to DIN standards with valid STN (Slovak Technical Standard) as well as with local geotechnical conditions.

Documents to be verified

- Structural Analysis – Static Calculation 7584, KMW Saarbrücken-Brebach, September 2004 pages A1-A97, B1-B29, C1-C33, D1-D21, E1-E34, F1-F30, G1-G16
- Drawing No. 792.87041 – Foundation Formwork Plan, Key Plan ASU No.9
- Drawing No. 792.87040 – LP-LOX Tank, Tank Formwork, Plans and Sections
- Drawing No. 792.87042 – Reinforcement Drawing, Foundation LOX Tank
- Drawing No. 792.87043 – Reinforcement, Table Slab +3,50 m
- Drawing No. 792.87044 – Reinforcement, Foundation Tank Farm

Used codes, Literature

- Detailed Engineering Geological Survey – Final Report, Montana s.r.o., May 2004
- DIN 1055 – Lastannahmen für Bauten / Actions on structures
- DIN 1054 – Baugrund, Zulässige Belastung des Baugrunds / Subsoil, Permissible loading of subsoil
- DIN 1045 (07.88) – Beton und Stahlbeton, Bemessung und Ausführung / Reinforced concrete structures, Design and construction
- STN 73 0035 – Zaťaženie stavebných konštrukcií / Actions on structures
- STN 73 1001 – Základová pôda pod plošnými základmi / Subsoil under shallow foundations
- STN 73 1201 – Navrhovanie betónových konštrukcií / Design of concrete structures
- STN EN 206-1 – Betón, Špecifikácia, vlastnosti, výroba a zhoda / Concrete, Specification, performances, production and conformity

Document check

1) Structural Analysis

For the calculation was FEM 3D model used with elastic-bedded foundation slabs. The bedding coefficient assumed for calculation was $k_s=15 \text{ MN/m}^3$. Concrete and reinforcement material characteristics were used according to DIN 1045 standard. Loading was considered according to data by equipment supplier. Wind load was considered according to DIN 1055 – T4, Page 4, Table 1: $q=0,5 \text{ kN/m}^2$. Wind shape coefficients were considered depending on shape of structure.

According to STN 73 0035 – Map of wind load areas, the basic wind load for given site location is $w_0 = 0,55 \text{ kN/m}^2$.

Conversion material table

DIN 1045	STN 73 1201
concrete B25 – table.1, page 19 cube strength $\beta_{wN} = 25$ MPa characteristic strength $\beta_R = 17,5$ MPa modulus of elasticity $E = 30$ GPa	concrete B25 – table.1, page 19 cube strength 25 MPa characteristic strength $R_{bn} = 18,5$ MPa design strength $R_{bd} = 14,5$ MPa modulus of elasticity $E = 30$ GPa
reinforcement steel BSt 420 – table.6, page 24 tensile strength $\beta_Z = 500$ MPa yield strength $\beta_S = 420$ MPa	reinforcement steel 10425 (V)–table.29, app.1, page 2 tensile strength 420 MPa characteristic yield strength $R_{sn} = 410$ MPa design yield strength $R_{sd} = 375$ MPa
reinforcement steel BSt 500 – table.6, page 24 tensile strength $\beta_Z = 550$ MPa yield strength $\beta_S = 500$ MPa	reinforcement steel 10505 (R)–table.29, app.1, page 2 tensile strength 500 MPa characteristic yield strength $R_{sn} = 490$ MPa design yield strength $R_{sd} = 450$ MPa

Notes:

- In the original structural analysis was assumed reinforcement steel grade BSt 420, in original drawings was used reinforcement steel grade BSt 500
- DIN 1045 (07.88) standard is based on classical theory, STN 73 1201 is based on limit states theory

- Foundation for 1800 MT LOX-Storage Tank (pages A1-A97):

Determination of load and model of structure match action of the tank to the foundation and foundation geometry. Comparative calculation with more detailed subsoil model shows increased internal forces on the foundation slabs as stated in original calculation. Considering used reinforcement 10505 (R) there is enough capacity margin. Designed quantity of reinforcement as well as reinforcement layout meets STN 73 1201 requirements.

- Foundation for LIN/LOX Water Bath Vaporizer W64001 a W73001 (pages B1-B29):

Determination of load and model of structure match action of the equipment to the foundation and foundation geometry. Designed quantity of reinforcement doesn't meet minimum percentages of reinforcement stated in STN 73 1201. Such section has to be designed as low-reinforced section. Check calculation shows that low-reinforced section also satisfies. Foundation fulfill STN 73 1001 and STN 73 1201 requirements for stability and bearing capacity.

- Foundation for HP-LIN Vaporizer W74101, W74201, W74301, W74401 (pages C1-C33):

Determination of load and model of structure match action of the equipment to the foundation and foundation geometry. Designed quantity of reinforcement doesn't meet minimum percentages of reinforcement stated in STN 73 1201. Such section has to be designed as low-reinforced section. Check calculation shows that

Expert's Opinion

low-reinforced section also satisfies. Foundation fulfill STN 73 1001 and STN 73 1201 requirements for stability and bearing capacity.

- Foundation for LIN Water Bath Vaporizer W73101 (pages D1-D21):

Determination of load and model of structure match action of the equipment to the foundation and foundation geometry. Designed quantity of reinforcement doesn't meet minimum percentages of reinforcement stated in STN 73 1201. Such section has to be designed as low-reinforced section. Check calculation shows that low-reinforced section also satisfies. Foundation fulfill STN 73 1001 and STN 73 1201 requirements for stability and bearing capacity.

- Foundation for HP-GAN Reservoir B73002 (pages E1-E34):

Determination of load and model of structure match action of the reservoir to the foundation and foundation geometry. Instead of anchors HILTI HST M10, anchors HILTI HVA+HAS M16 will be used. Designed quantity of reinforcement doesn't meet minimum percentages of reinforcement stated in STN 73 1201. Such section has to be designed as low-reinforced section. Check calculation shows that low-reinforced section also satisfies. Foundation fulfill STN 73 1001 and STN 73 1201 requirements for stability and bearing capacity.

- Foundation for MP-LIN Storage Tank B73001 (pages F1-F30):

Determination of load and model of structure match action of the tank to the foundation and foundation geometry. Designed quantity of reinforcement doesn't meet minimum percentages of reinforcement stated in STN 73 1201. Such section has to be designed as low-reinforced section. Check calculation shows that low-reinforced section also satisfies. Foundation fulfill STN 73 1001 and STN 73 1201 requirements for stability and bearing capacity.

- Foundation for LIN Truck Filling Pump P72001, HP-LIN Backup Pumps P74101, P74201 (pages G1-G16):

Determination of load and model of structure match action of the pumps to the foundation and foundation geometry. Foundation fulfill STN 73 1001 and STN 73 1201 requirements for stability and bearing capacity.

2) Drawings

All drawings were prepared according to standards used in Germany. Dimensions are in mixed form – values below 1 m are shown in cm, values above 1 m are shown in meters with two digit accuracy. Values shown as index represent millimeters. In the reinforcement drawings are cc's of bars shown in cm.

The concrete grade shown in all drawings is B25. Equivalent concrete grade according to STN EN 206-1 is C20/25. The concrete cover is 40 mm for all structures. Used reinforcement BSt 500 is equivalent with 10505 (R). Drawings fulfill requirements of STN 73 1201. Quantity and layout of reinforcement matches structural analysis results.

3) Geological conditions


Results of geological survey refer to presence of anthropogenic made-up ground in thickness of 0.7 m (borehole VK4) up to 1.7 m (borehole VK12). Beneath this layer was found medium compact to compact well gravel soil (grade G3 and G5) as well as clay of solid consistency. The groundwater level was found at 5.3 m depth.

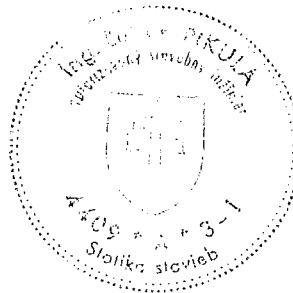
All made up ground below the new foundations has to be removed and replaced with well grained compacted backfill. For 1800 MT LOX-Storage Tank foundation it is necessary to replace soil up to compact gravel G3 on level 2.0 m below ground level. Backfill will be gravel-sand with required compaction $E_{v2} \geq 60$ MPa, at $E_{v2}/E_{v1} \leq 2,6$.

Conclusion

By construction of foundation structures according to original project considering comments mentioned above will foundations safe and be able to carry loads from equipment as well as they will fulfill requirements of valid technical standards for design of structures.

Prepared:


Ing. Ľubor Pikula
structural engineer



Static Calculation

7584

Part 1

Air Liquide AGS GmbH
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47805 Krefeld

K70101, ASU No. 9 Kosice
Tank Farm

Saarbrücken, im September 2004

(statische Berechnung Seiten A1-A97, B1-B29, C1-C33, D1-D21, E1-E34, F1-F30, G1-G16)

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Remarks

The following structural (static) calculations provide the calculatory proof for the foundation of the Storage Tank facility ASU No. 6 in Kosice.

The foundations for single structures consist of shallow build single footings or foundation slabs. According to the submitted soil report there is load bearing soil at approx. depths – 1.50 to max. 2.60 m below ground level consisting of a layer of dense coarse grained gravel with fine grained sand/clay admixture. The non-load bearing sand/clay layer above is to be excavated, an exchange of soil is to be carried out, backfilled in layers and compacted down to be load bearing gravel layer. According to the soil report soil loads $> 250 \text{ kN/m}^2$ are then permissible. The bedding coefficient assumed for the calculations of elastic-bedded foundation slabs with $k_s = 15 \text{ MN/m}^3$ to be on the safe side.

All foundations cast are frost-free at a depth of approx. - 1.20 m below ground level.

The load specifications for single structures have been provided by Air Liquide AGS and are attached to the following calculations. Wind and snow loads have been calculated in cooperation with Air Liquide AGS GmbH in accordance with DIN 1055 Standard Parts 4 and 5. According to Air Liquide AGS GmbH loads resulting from earthquakes need not be taken into consideration.

The dimensions for all reinforced concrete structures have been calculated in cooperation with Air Liquide AGS GmbH according to DIN 1045 Standard (07.88).

Calculation are based on:

- Specifications through the Cotracting Agency
- Soil Report
- Standard DIN 1055
- Standard DIN 1045 (07.88)
- any relevant regulations

Materials:

- Concrete class B 25
- Reinforcement steel, class BSt 500S (Reinf. steel IV)



	Page
<u>Chapter A:</u> Foundation 1800 MT LOX-Storage-Tank B62001	A-1 – A-97
<u>Chapter B:</u> Foundation LIN/LOX Wather bath Vaporizer W64001 and W73001	B-1 – B-29
<u>Chapter C:</u> Foundation HP-LIN Vaporizer W74101, W74201, W74301 and W74401	C-1 – C-33
<u>Chapter D:</u> Foundation LIN Wather bath Vaporizer W73101	D-1 – D-21
<u>Chapter E:</u> Foundation HP-GAN Reservoir B73002	E-1 – E-34
<u>Chapter F:</u> Foundation MP-LIN Storage Tank B73001	F-1 – F-30
<u>Chapter G:</u> Foundation LIN Truck filling Pump P72001 HP-Lin Backup Pump P74101 and P74201	G-1 – G-16



Chapter A

Foundation 1800 MT LOX-Storage-Tank B62001



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Dossier CMP Arles : 783

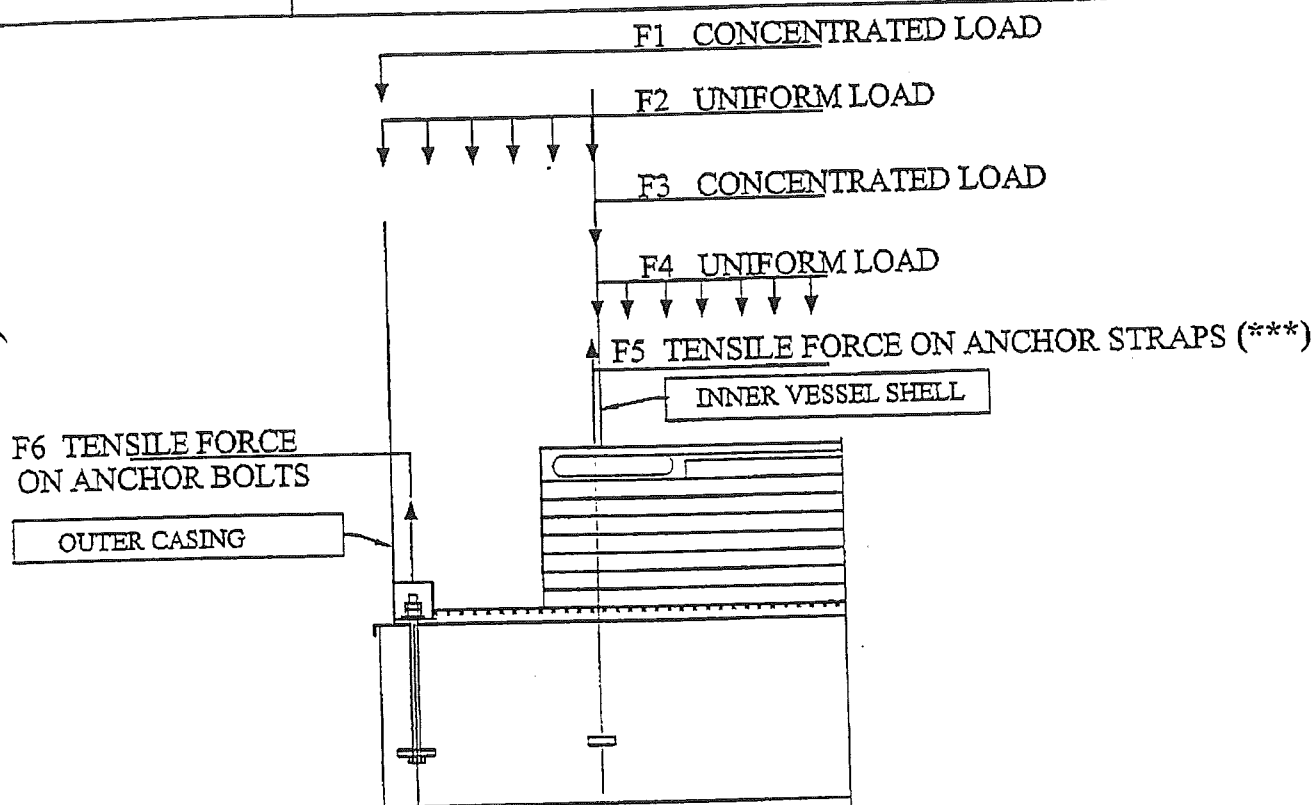
Page/Sheet 343
Rev 0 F-2

Client / Customer : MESSER

Engineered System N° :

Plan N° : 783-01

CIVIL ENGINEERING DATA FOR CIVIL ENGINEERING

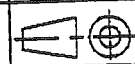
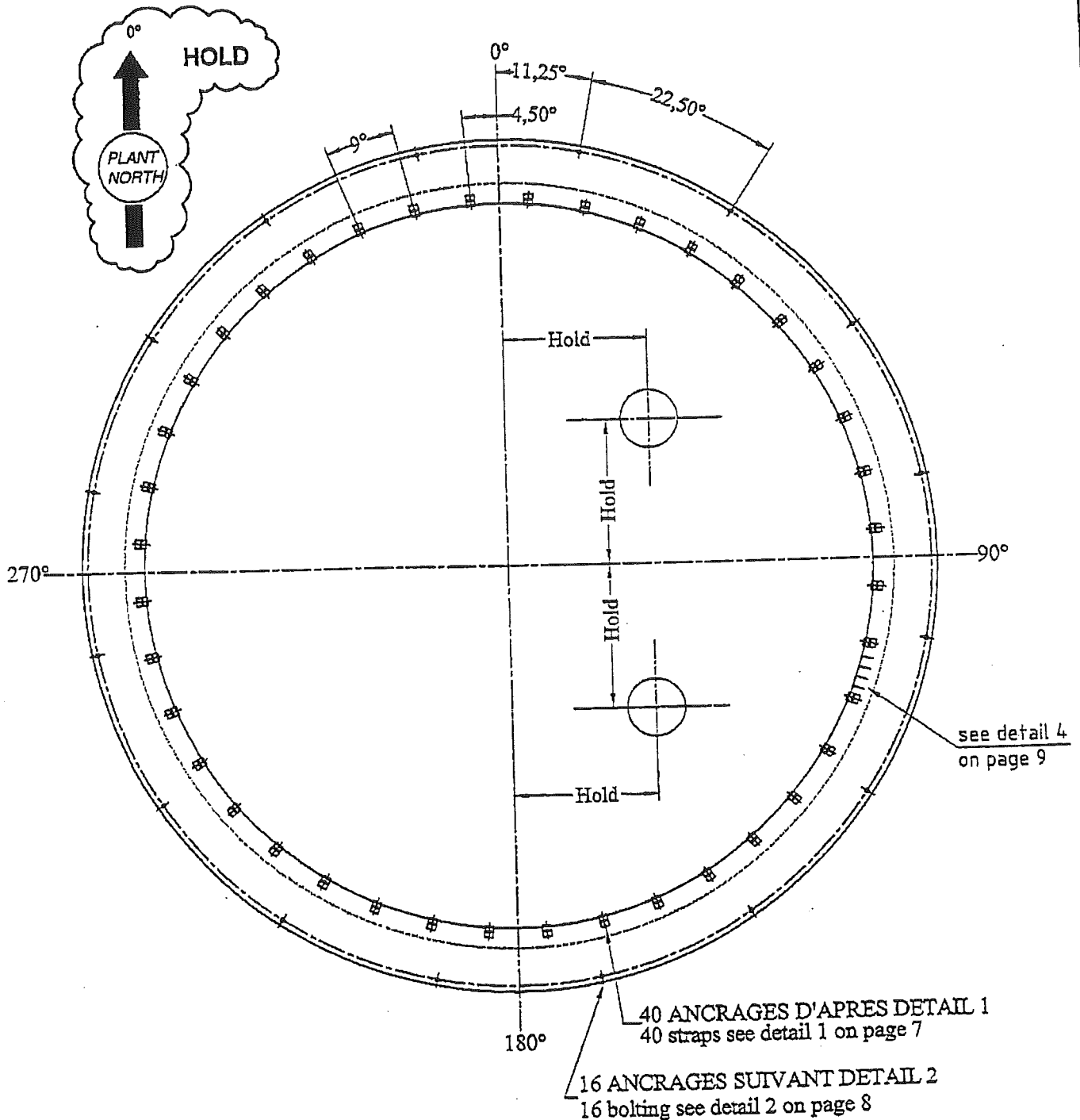
Echelle/Scale
1

Loads in metric tons, moments in metric ton meters

A/ FULL OF LIQUID WITHOUT GAS PRESURE
F1=53 F2=46.5 F3=50.1 F4=1915.7 F5=0B/ FULL OF LIQUID WITH GAS PRESURE
F1=53 F2=46.5 F3=0 F4=2168.7 F5=5.1x40=204C/ HYDROPNEUMATIC TEST
F1=53 F2=6.6 F3=0 F4=2008.7 F5=6.9x40=276D/ LOADS DUE TO THE SNOW (see note 5)
F1=25E/ LOADS DUE TO WIND (see note 5)
SHEAR FORCE: 27 MOMENT (at 0.00CMP): 244.1 F6=4.2x16=67.2F/ LOADS DUE TO EARTHQUAKE (see note 5)
SHEAR FORCE: 233 MOMENT (at 0.00CMP): 1539.9
F5=9.8x40=392 F6=2x16=32(***) 10% of straps (with a mini of 4 straps, every 90°)
shall be individually tested at the force of 16.6 Tons, at time of slab acceptance.Ce document est la propriété de CMP Arles. Il ne pourra sans autorisation écrite être utilisé ou communiqué à des tiers, toutes
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Rev 0 A-4**Client / Customer : MESSER**

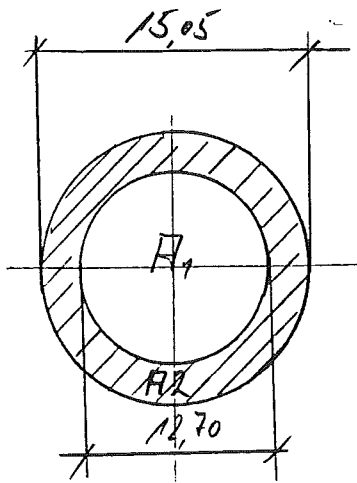
Engineered System N° :

Plan N° : 783-01**CIVIL ENGINEERING ANCHOR ORIENTATIONS**
(PLAN VIEW)Echelle/Scale
1/100

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Loadcases

$$A_1 = \frac{12,7^2 \cdot \pi}{4} = \underline{\underline{126,68 \text{ m}^2}}$$

$$A_2 = \frac{15,05^2 \cdot \pi}{4} - 126,68 = \underline{\underline{51,22 \text{ m}^2}}$$

$$U_1 = 12,7 \cdot \pi = \underline{\underline{39,90 \text{ m}}}$$

$$U_2 = 15,05 \cdot \pi = \underline{\underline{47,28 \text{ m}}}$$

LC A:

$$F_4 = \frac{F_4}{A_1} = \frac{19157}{126,68} = \underline{\underline{151,22 \text{ kN/m}^2 \downarrow}}$$

$$F_2 = \frac{F_2}{A_2} = \frac{465}{51,22} = \underline{\underline{9,10 \text{ kN/m}^2 \downarrow}}$$

$$F_1 = \frac{F_1}{U_2} = \frac{530}{47,28} = \underline{\underline{11,20 \text{ kN/m} \downarrow}}$$

$$F_3 = \frac{F_3}{U_1} = \frac{501}{39,9} = \underline{\underline{12,60 \text{ kN/m} \downarrow}}$$

$$F_5 = \underline{\underline{0}}$$

LC B:

$$F_4 = \frac{21687}{126,68} = \underline{\underline{171,20 \text{ kN/m}^2 \downarrow}}$$

$$F_2 = \frac{465}{51,22} = \underline{\underline{9,10 \text{ kN/m}^2 \downarrow}}$$

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$$F_1 = \frac{530}{47,28} = \underline{\underline{11,20 \text{ kN/m} \downarrow}}$$

$$F_3 = \underline{\underline{0}}$$

$$F_5 = 40 \times 51 \uparrow = \underline{\underline{2040 \text{ kN} \uparrow}}$$

LC G:

$$F_4 = \frac{20087}{126,68} = \underline{\underline{158,6 \text{ kN/m}^2 \downarrow}}$$

$$F_2 = \frac{66}{5,22} = \underline{\underline{1,3 \text{ kN/m}^2 \downarrow}}$$

$$F_1 = \frac{530}{47,28} = \underline{\underline{11,20 \text{ kN/m} \downarrow}}$$

$$F_3 = \underline{\underline{0}}$$

$$F_5 = 40 \times 69 \uparrow = \underline{\underline{2760 \text{ kN} \uparrow}}$$

LC D:

$$F_1 = \frac{250}{47,28} = \underline{\underline{5,3 \text{ kN/m} \downarrow}}$$

LC E:

$$M_{x,y} = \underline{\underline{\pm 2441 \text{ kNm} \curvearrowright}}$$

$$H_{x,y} = \underline{\underline{\pm 270 \text{ kN} \leftrightarrow}}$$

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Inhalt

plan view	9
System	10
System	11
Basic data , used materials	12
List of material	12
Nodes	13
Members	20
Boundaries	26
2D Macros	27
Profile characteristics , standard description , used profiles	27
Hinges	29
Supports & Subsoil	30
Loadcases	30
2. LC A	31
3. LC B	32
4. LC C	33
5. Snow	34
6. Wind +X.	35
7. Wind -X	36
8. Wind +Y	37
9. Wind -Y	38
10. Wind +X/+Y	39
11. Wind -X/+Y	40
12. Wind -X/-Y	41
13. Wind +X/-Y	42
Variable loads group	43
Nodal loads	43
Distributed loads	46
Distributed loads 2D. Loadcases	46
Free loads	47
Combinations	50
Subsoil - database	52
Calculation protocol.	52
Contact stress - max sigmz - FEM Combi : 1	54
Contact stress - min sigmz - FEM Combi : 1	55
Contact stress - FEM Combi : 1, min	56
Internal forces - My on member(s). Ult. combi : 1/61	57
Internal forces - Mz on member(s). Ult. combi : 1/61	57
Internal forces - N on member(s). Ult. combi : 1/61	58
Internal forces on member(s) 33/48, ult. comb (all), global extremes.	58
Internal forces on macro(s). Ult. combi : 1/61	59
Internal forces on macro(s) 1/8, ult. comb (all), global extremes.	59
Deformation in node(s). Load case(s) : 6	60
Deformation in node(s). Load case(s) : 8	60
Internal force - max mx - FEM Combi : 1	61
Internal force - max my - FEM Combi : 1	62
Internal force - min mx - FEM Combi : 1	63
Internal force - min my - FEM Combi : 1	64
Internal force - max qx - FEM Combi : 1	65
Internal force - max qy - FEM Combi : 1	66
Internal force - min qx - FEM Combi : 1	67



Foundation 1800 MT LOX Storage Tank, B62001

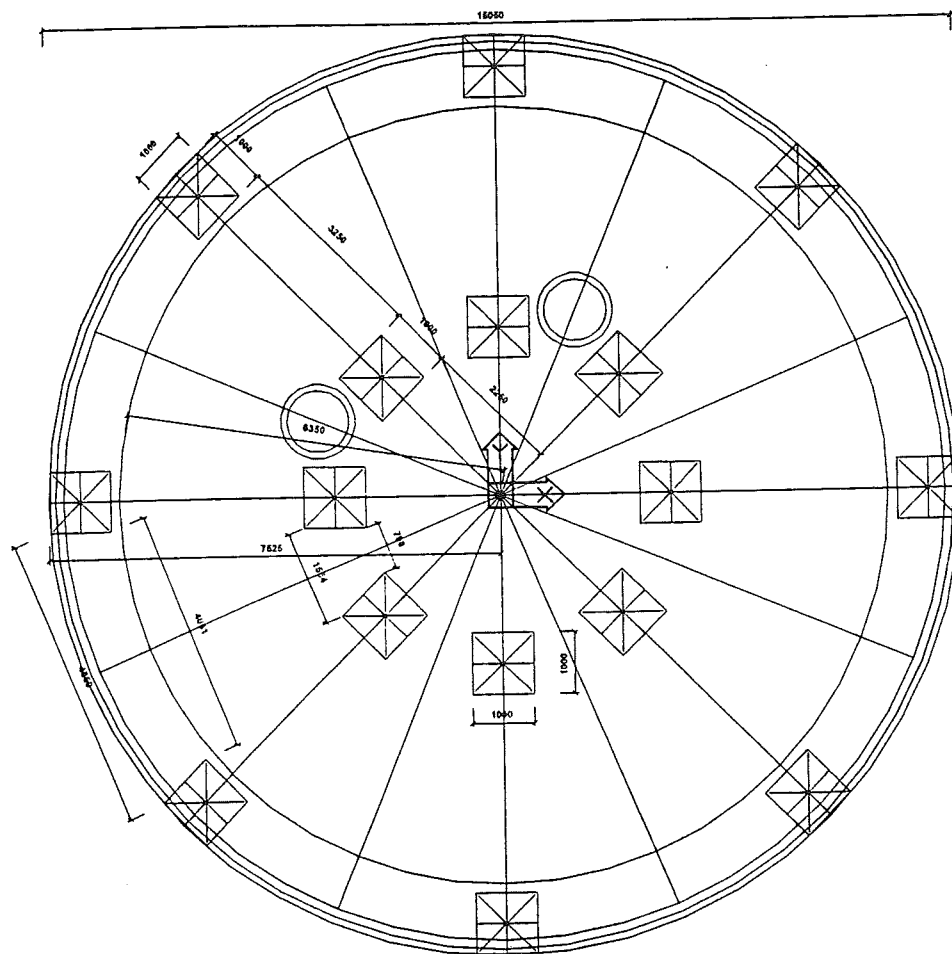
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Author : Orth

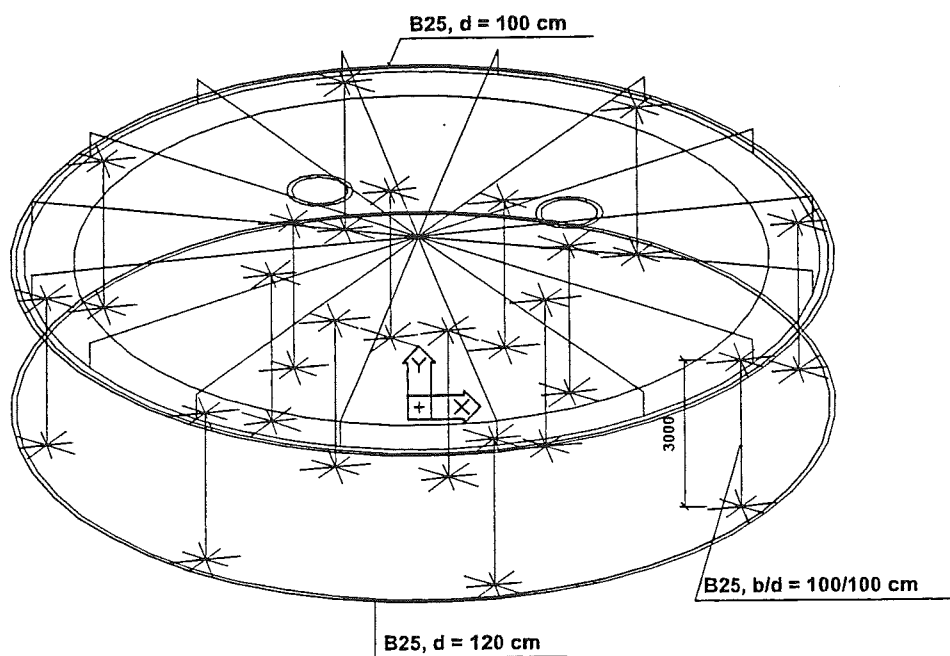
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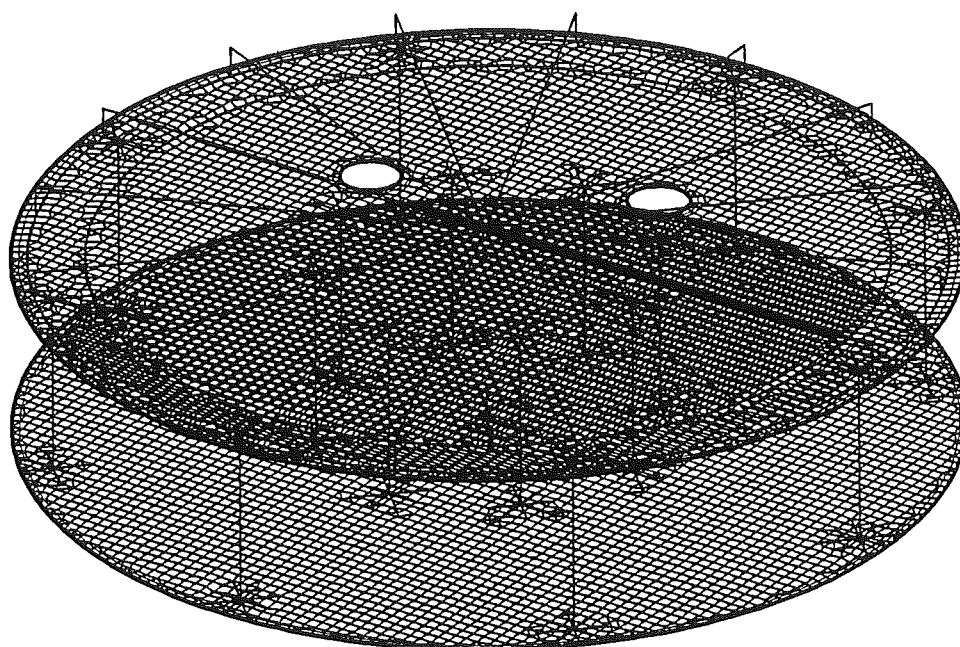
Internal force - min qy - FEM Combi : 1	68
Internal force - FEM Combi : 1, min	69
Internal force - max mx - FEM Combi : 1	70
Internal force - max my - FEM Combi : 1	71
Internal force - min mx - FEM Combi : 1	72
Internal force - min my - FEM Combi : 1	73
Internal force - max qx - FEM Combi : 1	74
Internal force - max qy - FEM Combi : 1	75
Internal force - min qx - FEM Combi : 1	76
Internal force - min qy - FEM Combi : 1	77
Internal force - FEM Combi : 1, min	78
Shifting, As, stirrups - DIN88	78
Needed areas, stirrups	83
2D reinforcement	84
2D reinforcement - As1+	87
2D reinforcement - As2+	88
2D reinforcement - As2-	89
2D reinforcement - As1-	90
2D reinforcement - Ass	91
2D reinforcement - As1+	92
2D reinforcement - As2+	93
2D reinforcement - As2-	94
2D reinforcement - As1-	95
2D reinforcement - Ass	96



plan view



System



System

Basic data**Type of structure : General XYZ**

Number of nodes: 379
 Number of members: 304
 Number of 1D macros: 168
 Number of bound. lines: 6
 Number of 2D macros: 2
 Number of profiles : 2
 Number of cases: 13
 Number of materials: 2

Material**Name:**

B 25

E modulus 30000.00 MPa
 Poisson coeff. 0.20
 Density 2500.000 kg/m³
 Extensibility 0.01 mm/m.K

B 25 gewichtslos

E modulus 30000.00 MPa
 Poisson coeff. 0.20
 Density 0.000 kg/m³
 Extensibility 0.01 mm/m.K

List of material**Group of members :**

1/304

no.	Name:	quality	unit weight kg/m	length m	weight kg
2	REC (100.0,100.0)	B 25	2500.00	48.00	120000.00

List of material - Macro2D**Group of members :**

1/6

no.	Name:	quality	unit volume weight kgm ³	volume m ³	weight kg
4	B 25	B 25	2500.00	389.79	974480.30

The total weight of the structure: 1094480.30 kg
 Surface for painting: 192.00 m²

Nodes

node	X m	Y m	Z m
1	7.525	0.000	0.000
2	0.000	7.525	0.000
3	-7.525	0.000	0.000
4	7.525	0.000	3.000
5	0.000	7.525	3.000
6	-7.525	0.000	3.000
7	0.000	-7.525	3.000
8	0.000	0.000	3.000
9	7.275	0.000	3.000
10	-3.637	6.300	3.000
11	-3.638	-6.300	3.000
12	6.350	0.000	3.000
13	-3.175	5.499	3.000
14	-3.175	-5.499	3.000
15	6.721	2.784	3.000
16	5.144	5.144	3.000
17	2.784	6.721	3.000
18	0.000	7.275	3.000
19	-2.784	6.721	3.000
20	-5.144	5.144	3.000
21	-6.721	2.784	3.000
22	-7.275	0.000	3.000
23	-6.721	-2.784	3.000
24	-5.144	-5.144	3.000
25	-2.784	-6.721	3.000
26	-0.000	-7.275	3.000
27	2.784	-6.721	3.000
28	5.144	-5.144	3.000
29	6.721	-2.784	3.000
30	6.272	0.993	3.000
31	6.039	1.962	3.000
32	5.658	2.883	3.000
33	5.137	3.732	3.000
34	4.490	4.490	3.000
35	3.732	5.137	3.000
36	2.883	5.658	3.000
37	1.962	6.039	3.000
38	0.993	6.272	3.000
39	0.000	6.350	3.000
40	-0.993	6.272	3.000
41	-1.962	6.039	3.000
42	-2.883	5.658	3.000
43	-3.732	5.137	3.000
44	-4.490	4.490	3.000
45	-5.137	3.732	3.000
46	-5.658	2.883	3.000
47	-6.039	1.962	3.000
48	-6.272	0.993	3.000

node	X m	Y m	Z m
49	-6.350	0.000	3.000
50	-6.272	-0.993	3.000
51	-6.039	-1.962	3.000
52	-5.658	-2.883	3.000
53	-5.137	-3.732	3.000
54	-4.490	-4.490	3.000
55	-3.732	-5.137	3.000
56	-2.883	-5.658	3.000
57	-1.962	-6.039	3.000
58	-0.993	-6.272	3.000
59	-0.000	-6.350	3.000
60	0.993	-6.272	3.000
61	1.962	-6.039	3.000
62	2.883	-5.658	3.000
63	3.732	-5.137	3.000
64	4.490	-4.490	3.000
65	5.137	-3.732	3.000
66	5.658	-2.883	3.000
67	6.039	-1.962	3.000
68	6.272	-0.993	3.000
69	0.000	7.275	3.500
70	-0.000	-7.275	3.500
71	2.784	6.721	3.500
72	-2.784	-6.721	3.500
73	5.144	5.144	3.500
74	-5.144	-5.144	3.500
75	6.721	2.784	3.500
76	-6.721	-2.784	3.500
77	7.275	0.000	3.500
78	-7.275	0.000	3.500
79	6.721	-2.784	3.500
80	-6.721	2.784	3.500
81	5.144	-5.144	3.500
82	-5.144	5.144	3.500
83	2.784	-6.721	3.500
84	-2.784	6.721	3.500
85	7.000	0.000	0.000
86	2.750	0.000	0.000
87	4.950	4.950	0.000
88	0.000	7.000	0.000
89	-4.950	4.950	0.000
90	-7.000	0.000	0.000
91	-4.950	-4.950	0.000
92	-0.000	-7.000	0.000
93	4.950	-4.950	0.000
94	1.945	1.945	0.000
95	0.000	2.750	0.000
96	-1.945	1.945	0.000
97	-2.750	0.000	0.000
98	-1.945	-1.945	0.000

node	X m	Y m	Z m
99	-0.000	-2.750	0.000
100	1.945	-1.945	0.000
101	4.950	-4.950	3.000
102	-0.000	-7.000	3.000
103	-4.950	-4.950	3.000
104	-7.000	0.000	3.000
105	-4.950	4.950	3.000
106	0.000	7.000	3.000
107	4.950	4.950	3.000
108	7.000	0.000	3.000
109	2.750	0.000	3.000
110	1.945	-1.945	3.000
111	-0.000	-2.750	3.000
112	-1.945	-1.945	3.000
113	-1.945	1.945	3.000
114	0.000	2.750	3.000
115	1.945	1.945	3.000
116	-2.750	0.000	3.000
117	-0.500	-7.000	0.000
118	0.500	-7.000	0.000
119	-0.000	-7.500	0.000
120	-0.000	-6.500	0.000
121	6.500	0.000	0.000
122	7.500	0.000	0.000
123	7.000	-0.500	0.000
124	7.000	0.500	0.000
125	-0.500	-7.000	3.000
126	0.500	-7.000	3.000
127	-0.000	-7.500	3.000
128	-0.000	-6.500	3.000
129	6.500	0.000	3.000
130	7.500	0.000	3.000
131	7.000	-0.500	3.000
132	7.000	0.500	3.000
133	-7.500	0.000	0.000
134	-6.500	0.000	0.000
135	-7.000	-0.500	0.000
136	-7.000	0.500	0.000
137	-7.500	0.000	3.000
138	-6.500	0.000	3.000
139	-7.000	-0.500	3.000
140	-7.000	0.500	3.000
141	-0.500	7.000	0.000
142	0.500	7.000	0.000
143	0.000	6.500	0.000
144	0.000	7.500	0.000
145	-0.500	7.000	3.000
146	0.500	7.000	3.000
147	0.000	6.500	3.000
148	0.000	7.500	3.000

node	X m	Y m	Z m
149	4.596	-5.303	0.000
150	5.303	-4.596	0.000
151	5.303	-5.303	0.000
152	4.596	-4.596	0.000
153	4.596	-5.303	3.000
154	5.303	-4.596	3.000
155	5.303	-5.303	3.000
156	4.596	-4.596	3.000
157	-5.303	4.596	0.000
158	-4.596	5.303	0.000
159	-4.596	4.596	0.000
160	-5.303	5.303	0.000
161	-5.303	4.596	3.000
162	-4.596	5.303	3.000
163	-4.596	4.596	3.000
164	-5.303	5.303	3.000
165	-5.303	-5.303	0.000
166	-4.596	-4.596	0.000
167	-4.596	-5.303	0.000
168	-5.303	-4.596	0.000
169	-5.303	-5.303	3.000
170	-4.596	-4.596	3.000
171	-4.596	-5.303	3.000
172	-5.303	-4.596	3.000
173	4.596	4.596	0.000
174	5.303	5.303	0.000
175	5.303	4.596	0.000
176	4.596	5.303	0.000
177	4.596	4.596	3.000
178	5.303	5.303	3.000
179	5.303	4.596	3.000
180	4.596	5.303	3.000
181	1.591	-2.298	0.000
182	2.298	-1.591	0.000
183	2.298	-2.298	0.000
184	1.591	-1.591	0.000
185	1.591	-2.298	3.000
186	2.298	-1.591	3.000
187	2.298	-2.298	3.000
188	1.591	-1.591	3.000
189	-2.298	1.591	0.000
190	-1.591	2.298	0.000
191	-1.591	1.591	0.000
192	-2.298	2.298	0.000
193	-2.298	1.591	3.000
194	-1.591	2.298	3.000
195	-1.591	1.591	3.000
196	-2.298	2.298	3.000
197	1.591	1.591	0.000
198	2.298	2.298	0.000

node	X m	Y m	Z m
199	2.298	1.591	0.000
200	1.591	2.298	0.000
201	1.591	1.591	3.000
202	2.298	2.298	3.000
203	2.298	1.591	3.000
204	1.591	2.298	3.000
205	-2.298	-2.298	0.000
206	-1.591	-1.591	0.000
207	-1.591	-2.298	0.000
208	-2.298	-1.591	0.000
209	-2.298	-2.298	3.000
210	-1.591	-1.591	3.000
211	-1.591	-2.298	3.000
212	-2.298	-1.591	3.000
213	-0.500	-2.750	0.000
214	0.500	-2.750	0.000
215	-0.000	-3.250	0.000
216	-0.000	-2.250	0.000
217	-0.500	-2.750	3.000
218	0.500	-2.750	3.000
219	-0.000	-3.250	3.000
220	-0.000	-2.250	3.000
221	-3.250	0.000	0.000
222	-2.250	0.000	0.000
223	-2.750	-0.500	0.000
224	-2.750	0.500	0.000
225	-3.250	0.000	3.000
226	-2.250	0.000	3.000
227	-2.750	-0.500	3.000
228	-2.750	0.500	3.000
229	-0.500	2.750	0.000
230	0.500	2.750	0.000
231	0.000	2.250	0.000
232	0.000	3.250	0.000
233	-0.500	2.750	3.000
234	0.500	2.750	3.000
235	0.000	2.250	3.000
236	0.000	3.250	3.000
237	2.250	0.000	0.000
238	3.250	0.000	0.000
239	2.750	-0.500	0.000
240	2.750	0.500	0.000
241	2.250	0.000	3.000
242	3.250	0.000	3.000
243	2.750	-0.500	3.000
244	2.750	0.500	3.000
245	-0.460	-7.460	0.000
246	0.460	-6.540	0.000
247	-0.460	-6.540	0.000
248	0.460	-7.460	0.000

node	X m	Y m	Z m
249	-0.460	-7.460	3.000
250	0.460	-6.540	3.000
251	-0.460	-6.540	3.000
252	0.460	-7.460	3.000
253	-0.460	-3.210	0.000
254	0.460	-2.290	0.000
255	-0.460	-2.290	0.000
256	0.460	-3.210	0.000
257	-0.460	-3.210	3.000
258	0.460	-2.290	3.000
259	-0.460	-2.290	3.000
260	0.460	-3.210	3.000
261	-0.460	2.290	0.000
262	0.460	3.210	0.000
263	-0.460	3.210	0.000
264	0.460	2.290	0.000
265	-0.460	2.290	3.000
266	0.460	3.210	3.000
267	-0.460	3.210	3.000
268	0.460	2.290	3.000
269	-0.460	6.540	0.000
270	0.460	7.460	0.000
271	-0.460	7.460	0.000
272	0.460	6.540	0.000
273	-0.460	6.540	3.000
274	0.460	7.460	3.000
275	-0.460	7.460	3.000
276	0.460	6.540	3.000
277	-7.460	-0.460	0.000
278	-6.540	0.460	0.000
279	-7.460	0.460	0.000
280	-6.540	-0.460	0.000
281	-7.460	-0.460	3.000
282	-6.540	0.460	3.000
283	-7.460	0.460	3.000
284	-6.540	-0.460	3.000
285	-3.210	-0.460	0.000
286	-2.290	0.460	0.000
287	-3.210	0.460	0.000
288	-2.290	-0.460	0.000
289	-3.210	-0.460	3.000
290	-2.290	0.460	3.000
291	-3.210	0.460	3.000
292	-2.290	-0.460	3.000
293	2.290	-0.460	0.000
294	3.210	0.460	0.000
295	2.290	0.460	0.000
296	3.210	-0.460	0.000
297	2.290	-0.460	3.000
298	3.210	0.460	3.000

node	X m	Y m	Z m
299	2.290	0.460	3.000
300	3.210	-0.460	3.000
301	6.540	-0.460	0.000
302	7.460	0.460	0.000
303	6.540	0.460	0.000
304	7.460	-0.460	0.000
305	6.540	-0.460	3.000
306	7.460	0.460	3.000
307	6.540	0.460	3.000
308	7.460	-0.460	3.000
309	4.300	-4.950	0.000
310	5.600	-4.950	0.000
311	4.950	-4.300	0.000
312	4.950	-5.600	0.000
313	4.300	-4.950	3.000
314	5.600	-4.950	3.000
315	4.950	-4.300	3.000
316	4.950	-5.600	3.000
317	1.295	-1.945	0.000
318	2.595	-1.945	0.000
319	1.945	-1.295	0.000
320	1.945	-2.595	0.000
321	1.295	-1.945	3.000
322	2.595	-1.945	3.000
323	1.945	-1.295	3.000
324	1.945	-2.595	3.000
325	-2.595	1.945	0.000
326	-1.295	1.945	0.000
327	-1.945	2.595	0.000
328	-1.945	1.295	0.000
329	-2.595	1.945	3.000
330	-1.295	1.945	3.000
331	-1.945	2.595	3.000
332	-1.945	1.295	3.000
333	-5.600	4.950	0.000
334	-4.300	4.950	0.000
335	-4.950	5.600	0.000
336	-4.950	4.300	0.000
337	-5.600	4.950	3.000
338	-4.300	4.950	3.000
339	-4.950	5.600	3.000
340	-4.950	4.300	3.000
341	-5.600	-4.950	0.000
342	-4.300	-4.950	0.000
343	-4.950	-4.300	0.000
344	-4.950	-5.600	0.000
345	-5.600	-4.950	3.000
346	-4.300	-4.950	3.000
347	-4.950	-4.300	3.000
348	-4.950	-5.600	3.000

node	X m	Y m	Z m
349	-2.595	-1.945	0.000
350	-1.295	-1.945	0.000
351	-1.945	-1.295	0.000
352	-1.945	-2.595	0.000
353	-2.595	-1.945	3.000
354	-1.295	-1.945	3.000
355	-1.945	-1.295	3.000
356	-1.945	-2.595	3.000
357	1.295	1.945	0.000
358	2.595	1.945	0.000
359	1.945	2.595	0.000
360	1.945	1.295	0.000
361	1.295	1.945	3.000
362	2.595	1.945	3.000
363	1.945	2.595	3.000
364	1.945	1.295	3.000
365	4.300	4.950	0.000
366	5.600	4.950	0.000
367	4.950	5.600	0.000
368	4.950	4.300	0.000
369	4.300	4.950	3.000
370	5.600	4.950	3.000
371	4.950	5.600	3.000
372	4.950	4.300	3.000
373	1.707	3.196	3.000
374	0.848	3.309	3.000
375	1.179	2.509	3.000
376	-2.543	1.436	3.000
377	-3.402	1.549	3.000
378	-3.070	0.749	3.000
379	-0.000	0.000	3.500

Members

macro	memb	node 1	node 2	length m	Rx deg	profile	quality
1	1	69	379	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	2	379	70	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
2	3	71	379	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	4	379	72	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
3	5	73	379	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	6	379	74	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
4	7	75	379	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	8	379	76	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
5	9	77	379	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	10	379	78	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
6	11	79	379	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	12	379	80	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
7	13	81	379	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos

macro	memb	node 1	node 2	length m	Rx deg	profile	quality
	14	379	82	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
8	15	83	379	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	16	379	84	7.275	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
9	17	26	70	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
10	18	25	72	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
11	19	24	74	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
12	20	23	76	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
13	21	22	78	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
14	22	27	83	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
15	23	28	81	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
16	24	29	79	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
17	25	9	77	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
18	26	15	75	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
19	27	16	73	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
20	28	17	71	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
21	29	18	69	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
22	30	19	84	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
23	31	20	82	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
24	32	21	80	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
25	33	93	101	3.000	45.00	2 - REC (100.0,100.0)	B 25
26	34	92	102	3.000	0.00	2 - REC (100.0,100.0)	B 25
27	35	91	103	3.000	45.00	2 - REC (100.0,100.0)	B 25
28	36	90	104	3.000	0.00	2 - REC (100.0,100.0)	B 25
29	37	89	105	3.000	45.00	2 - REC (100.0,100.0)	B 25
30	38	88	106	3.000	0.00	2 - REC (100.0,100.0)	B 25
31	39	87	107	3.000	45.00	2 - REC (100.0,100.0)	B 25
32	40	85	108	3.000	0.00	2 - REC (100.0,100.0)	B 25
33	41	86	109	3.000	0.00	2 - REC (100.0,100.0)	B 25
34	42	100	110	3.000	45.00	2 - REC (100.0,100.0)	B 25
35	43	99	111	3.000	0.00	2 - REC (100.0,100.0)	B 25
36	44	98	112	3.000	45.00	2 - REC (100.0,100.0)	B 25
37	45	96	113	3.000	45.00	2 - REC (100.0,100.0)	B 25
38	46	95	114	3.000	0.00	2 - REC (100.0,100.0)	B 25
39	47	94	115	3.000	45.00	2 - REC (100.0,100.0)	B 25
40	48	97	116	3.000	0.00	2 - REC (100.0,100.0)	B 25
41	49	117	92	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	50	92	118	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
42	51	119	92	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	52	92	120	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
43	53	121	85	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	54	85	122	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
44	55	123	85	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	56	85	124	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
45	57	125	102	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	58	102	126	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
46	59	127	102	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	60	102	128	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
47	61	129	108	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	62	108	130	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
48	63	131	108	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos

macro	memb	node.1	node.2	length m	Rx deg	profile	quality
	64	108	132	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
49	65	133	90	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	66	90	134	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
50	67	135	90	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	68	90	136	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
51	69	137	104	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	70	104	138	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
52	71	139	104	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	72	104	140	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
53	73	141	88	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	74	88	142	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
54	75	143	88	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	76	88	144	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
55	77	145	106	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	78	106	146	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
56	79	147	106	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	80	106	148	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
57	81	149	93	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	82	93	150	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
58	83	151	93	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	84	93	152	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
59	85	153	101	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	86	101	154	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
60	87	155	101	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	88	101	156	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
61	89	157	89	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	90	89	158	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
62	91	159	89	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	92	89	160	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
63	93	161	105	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	94	105	162	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
64	95	163	105	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	96	105	164	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
65	97	165	91	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	98	91	166	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
66	99	167	91	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	100	91	168	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
67	101	169	103	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	102	103	170	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
68	103	171	103	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	104	103	172	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
69	105	173	87	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	106	87	174	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
70	107	175	87	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	108	87	176	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
71	109	177	107	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	110	107	178	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
72	111	179	107	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	112	107	180	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
73	113	181	100	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos

macro	memb	node 1	node 2	length m	Rx deg	profile	quality
	114	100	182	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
74	115	183	100	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	116	100	184	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
75	117	185	110	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	118	110	186	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
76	119	187	110	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	120	110	188	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
77	121	189	96	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	122	96	190	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
78	123	191	96	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	124	96	192	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
79	125	193	113	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	126	113	194	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
80	127	195	113	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	128	113	196	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
81	129	197	94	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	130	94	198	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
82	131	199	94	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	132	94	200	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
83	133	201	115	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	134	115	202	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
84	135	203	115	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	136	115	204	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
85	137	205	98	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	138	98	206	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
86	139	207	98	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	140	98	208	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
87	141	209	112	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	142	112	210	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
88	143	211	112	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	144	112	212	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
89	145	213	99	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	146	99	214	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
90	147	215	99	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	148	99	216	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
91	149	217	111	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	150	111	218	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
92	151	219	111	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	152	111	220	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
93	153	221	97	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	154	97	222	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
94	155	223	97	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	156	97	224	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
95	157	225	116	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	158	116	226	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
96	159	227	116	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	160	116	228	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
97	161	229	95	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	162	95	230	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
98	163	231	95	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos

macro	memb	node 1	node 2	length m	Rx deg	profile	quality
	164	95	232	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
99	165	233	114	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	166	114	234	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
100	167	235	114	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	168	114	236	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
101	169	237	86	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	170	86	238	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
102	171	239	86	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	172	86	240	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
103	173	241	109	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	174	109	242	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
104	175	243	109	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	176	109	244	0.500	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
105	177	245	92	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	178	92	246	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
106	179	247	92	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	180	92	248	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
107	181	249	102	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	182	102	250	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
108	183	251	102	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	184	102	252	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
109	185	253	99	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	186	99	254	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
110	187	255	99	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	188	99	256	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
111	189	257	111	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	190	111	258	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
112	191	259	111	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	192	111	260	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
113	193	261	95	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	194	95	262	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
114	195	263	95	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	196	95	264	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
115	197	265	114	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	198	114	266	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
116	199	267	114	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	200	114	268	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
117	201	269	88	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	202	88	270	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
118	203	271	88	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	204	88	272	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
119	205	273	106	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	206	106	274	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
120	207	275	106	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	208	106	276	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
121	209	277	90	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	210	90	278	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
122	211	279	90	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	212	90	280	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
123	213	281	104	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos

macro	memb	node 1	node 2	length m	Rx deg	profile	quality
	214	104	282	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
124	215	283	104	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	216	104	284	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
125	217	285	97	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	218	97	286	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
126	219	287	97	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	220	97	288	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
127	221	289	116	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	222	116	290	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
128	223	291	116	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	224	116	292	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
129	225	293	86	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	226	86	294	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
130	227	295	86	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	228	86	296	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
131	229	297	109	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	230	109	298	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
132	231	299	109	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	232	109	300	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
133	233	301	85	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	234	85	302	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
134	235	303	85	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	236	85	304	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
135	237	305	108	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	238	108	306	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
136	239	307	108	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	240	108	308	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
137	241	309	93	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	242	93	310	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
138	243	311	93	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	244	93	312	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
139	245	313	101	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	246	101	314	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
140	247	315	101	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	248	101	316	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
141	249	317	100	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	250	100	318	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
142	251	319	100	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	252	100	320	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
143	253	321	110	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	254	110	322	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
144	255	323	110	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	256	110	324	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
145	257	325	96	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	258	96	326	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
146	259	327	96	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	260	96	328	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
147	261	329	113	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	262	113	330	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
148	263	331	113	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos

macro	memb	node 1	node 2	length m	Rx deg	profile	quality
149	264	113	332	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	265	333	89	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	266	89	334	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
150	267	335	89	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	268	89	336	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
151	269	337	105	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	270	105	338	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
152	271	339	105	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	272	105	340	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
153	273	341	91	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	274	91	342	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
154	275	343	91	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	276	91	344	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
155	277	345	103	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	278	103	346	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
156	279	347	103	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	280	103	348	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
157	281	349	98	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	282	98	350	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
158	283	351	98	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	284	98	352	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
159	285	353	112	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	286	112	354	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
160	287	355	112	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	288	112	356	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
161	289	357	94	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	290	94	358	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
162	291	359	94	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	292	94	360	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
163	293	361	115	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	294	115	362	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
164	295	363	115	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	296	115	364	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
165	297	365	87	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	298	87	366	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
166	299	367	87	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	300	87	368	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
167	301	369	107	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	302	107	370	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
168	303	371	107	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos
	304	107	372	0.650	0.00	1 - Hilfsstäbe (100.0)	B 25 gewichtslos

Boundaries

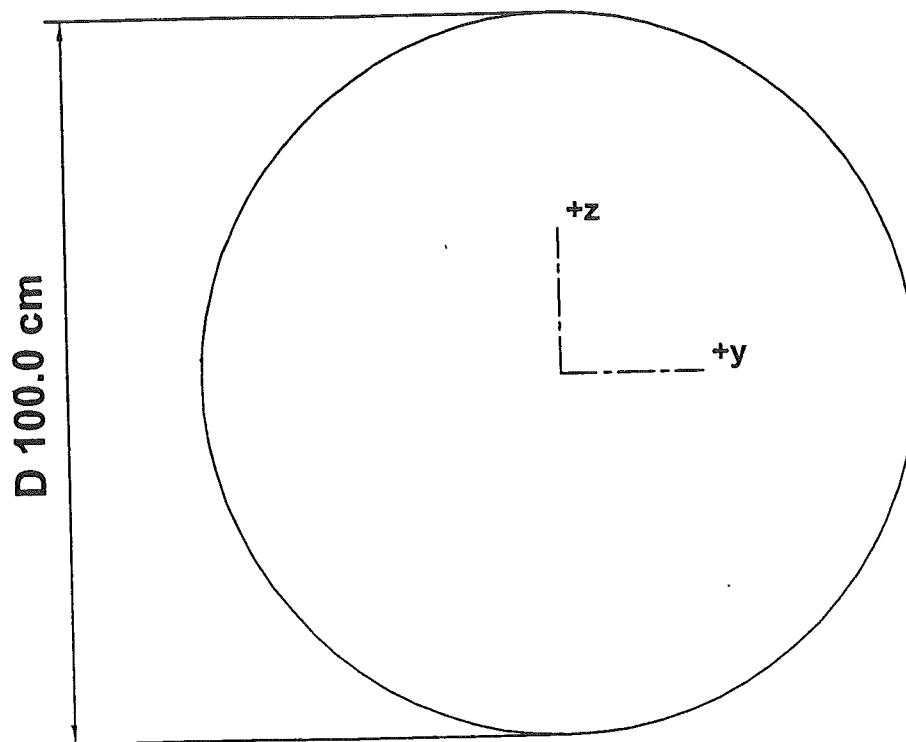
bound. line	type	node
1	Circle	1,2,3
2	Circle	4,5,6
3	Circle	9,10,11

bound. line	type	node
4	Circle	12,13,14
5	Circle	373,374,375
6	Circle	376,377,378

2D Macros

num	type	
1		
	B 25	Thickness 1.20 m
	Boundary:	1
	Nodes :	119,117,118,120,245,248,246,247,1,2,3,121,123,124,134,135,136 141,142,143,149,150,151,152,157,158,159,160,165,166,167,168,173 174,175,176,181,182,183,184,189,190,191,192,197,198,199,200,205 206,207,208,213,214,215,216,221,222,223,224,229,230,231,232,237 238,239,240,253,254,255,256,261,262,263,264,269,270,271,272,277 278,279,280,285,286,287,288,293,294,295,296,301,302,303,304,309 310,311,312,317,318,319,320,325,326,327,333,334,335,336,341,342 343,344,349,350,351,352,357,358,359,360,365,366,367,368
2		
	B 25	Thickness 1.00 m
	Boundary:	2
	Nodes :	7,8,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34 35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56 57,58,59,60,61,62,63,64,65,66,67,68,125,126,127,128,129,130,131 132,137,138,139,140,145,146,147,148,153,154,155,156,161,162,163 164,169,170,171,172,177,178,179,180,185,186,187,188,193,194,195 196,201,202,203,204,209,210,211,212,217,218,225,226,227,228,233 234,235,236,241,242,243,244,249,250,251,252,257,258,259,260,265 266,267,268,273,274,275,276,281,282,283,284,289,290,291,292,297 298,299,300,305,306,307,308,313,314,315,316,321,322,323,324,329 330,331,332,337,338,339,340,345,346,347,348,353,354,355,356,361 362,363,364,369,370,371,372
	1 Inner line:	3
	2 Inner line:	4
	1 Hole:	5
	2 Hole:	6

Profiles

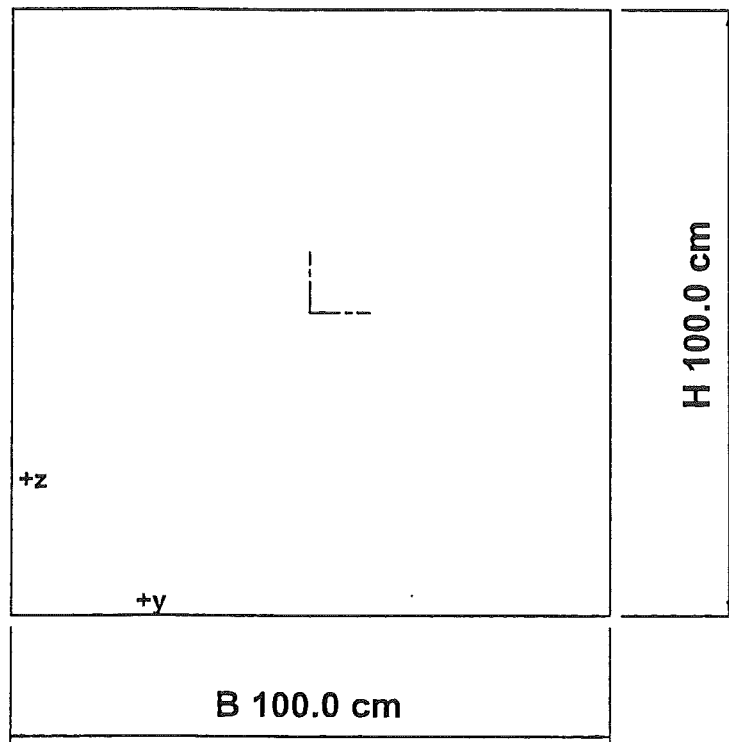


Hilfsstäbe (100.0)

Profile no. 1 - Hilfsstäbe (100.0)
Material : 8 - B 25 gewichtslos

A:	7.853982e+003 cm ²	Az/A:	0.850
Ay/A:	0.850	Iz:	4.908739e+006 cm ⁴
Iy:	4.908739e+006 cm ⁴	It:	9.817477e+006 cm ⁴
Iyz:	6.234027e-008 cm ⁴		
Iw:	0.000000e+000 cm ⁶		
Wely:	9.792584e+004 cm ³	Welz:	9.792584e+004 cm ³
Wply:	1.663471e+005 cm ³	Wplz:	1.663496e+005 cm ³
cy:	0.00 cm	cz:	0.00 cm
iy:	25.00 cm	iz:	25.00 cm
dy:	0.00 cm	dz:	0.00 cm
Outline :			313.76 cm

Type for check: Untypical section



REC (100.0,100.0)

Profile no. 2 - REC (100.0,100.0)
 Material : 4 - B 25

A:	1.000000e+004 cm ²		
Ay/A:	0.833	Az/A:	0.833
Iy:	8.333334e+006 cm ⁴	Iz:	8.333334e+006 cm ⁴
Iyz:	0.000000e+000 cm ⁴	It:	1.406000e+007 cm ⁴
Iw:	0.000000e+000 cm ⁶		
Wely:	1.666667e+005 cm ³	Welz:	1.666667e+005 cm ³
Wply:	2.500000e+005 cm ³	Wplz:	2.500000e+005 cm ³
cy:	50.00 cm	cz:	50.00 cm
iy:	28.87 cm	iz:	28.87 cm
dy:	0.00 cm	dz:	0.00 cm
Outline :			400.00 cm

Type for check: Untypical section

Hinges

The stiffness values of line hinges are stated in 1 m' of length

macro	type	pos
9	flyfiz	beg
10	flyfiz	beg
11	flyfiz	beg
12	flyfiz	beg
13	flyfiz	beg

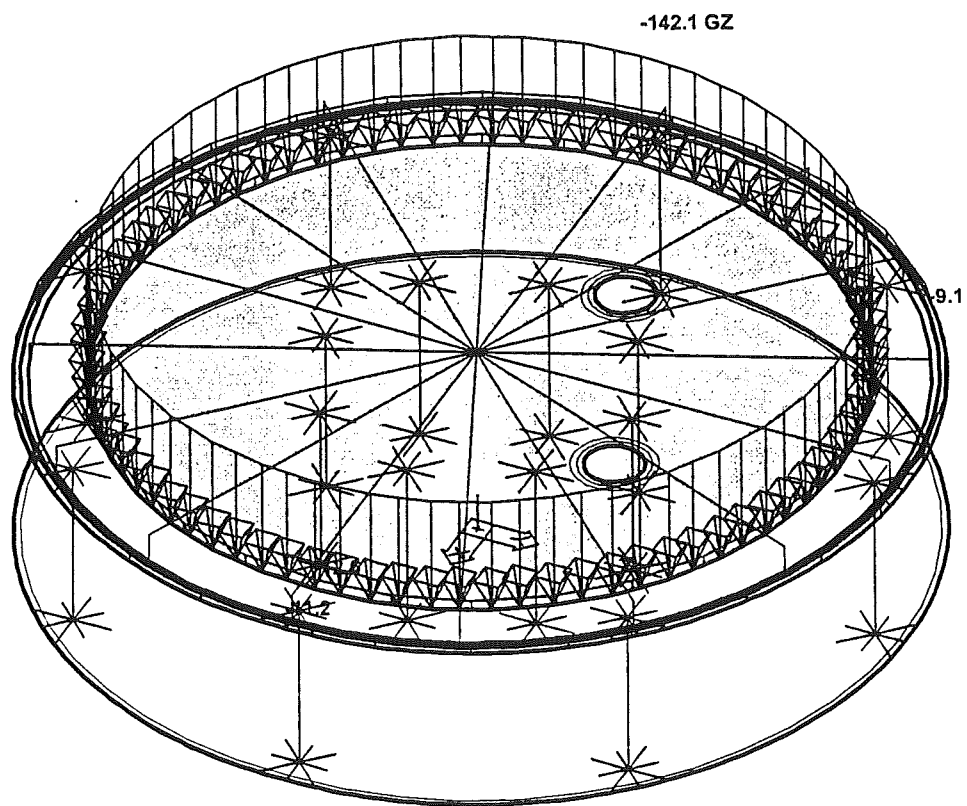
macro	type	pos
14	flyfiz	beg
15	flyfiz	beg
16	flyfiz	beg
17	flyfiz	beg
18	flyfiz	beg
19	flyfiz	beg
20	flyfiz	beg
21	flyfiz	beg
22	flyfiz	beg
23	flyfiz	beg
24	flyfiz	beg

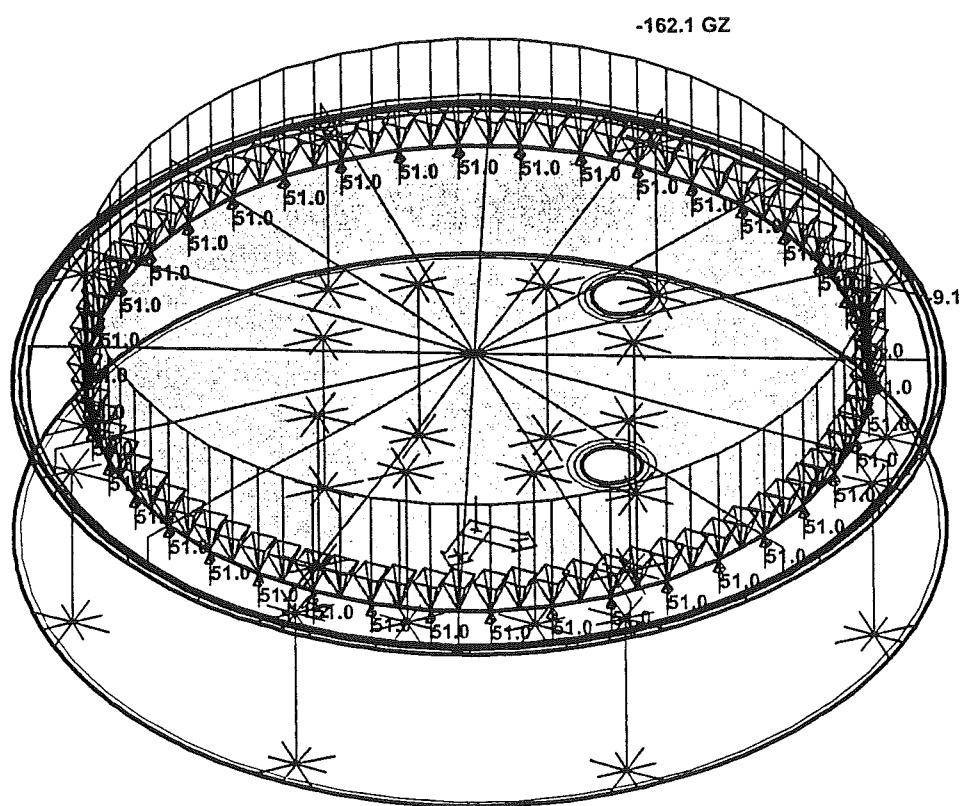
Soil - 2D macro

Index	2D macro	Name of subsoil
1	1	gemischtkörniger Sand

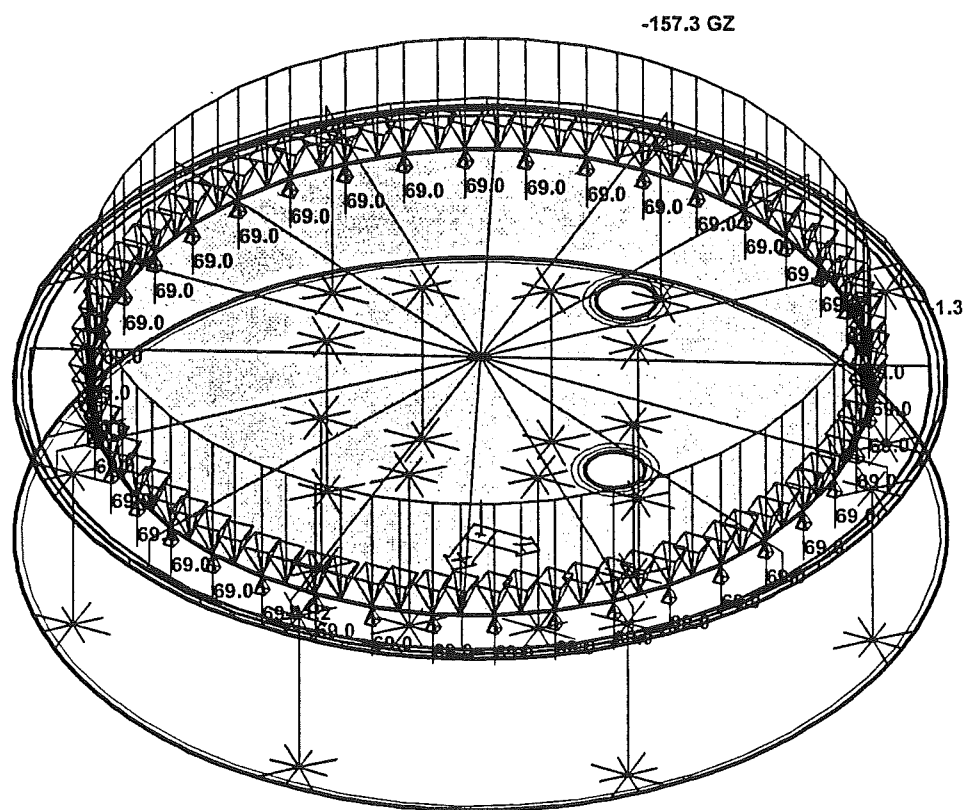
Loadcases

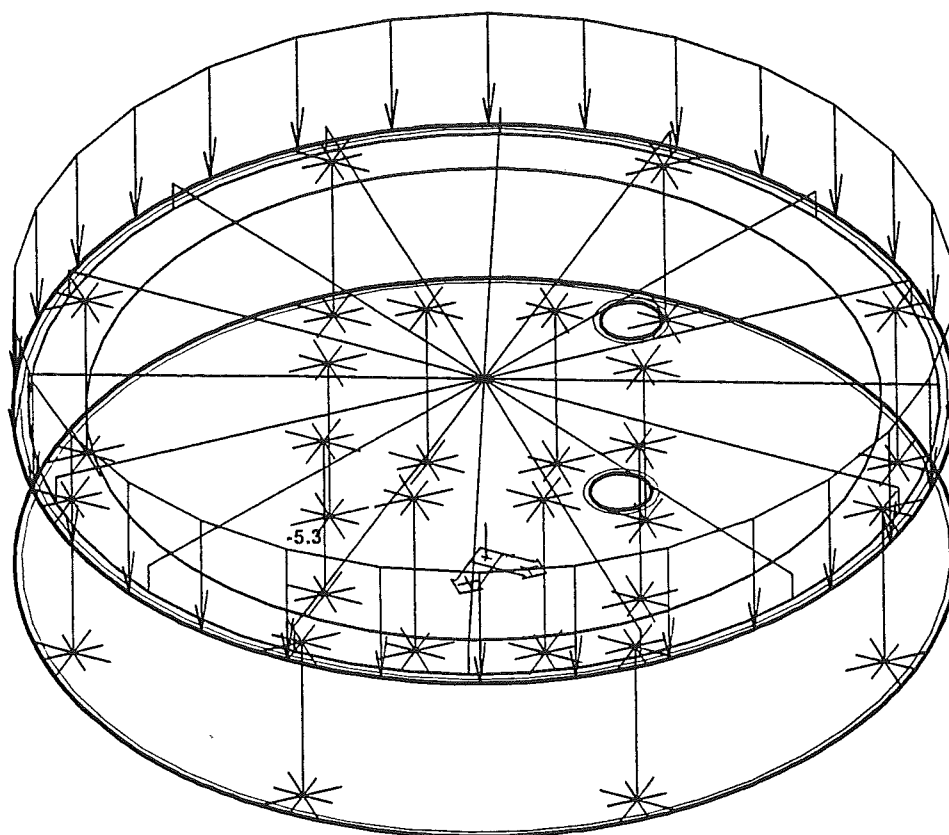
Case	Name:	Description
1	Self weight	Self weight. Direction -Z
2	LC A	Variable - LC Excl.
3	LC B	Variable - LC Excl.
4	LC C	Variable - LC Excl.
5	Snow	Variable - Snow
6	Wind +X	Variable - Wind Excl.
7	Wind -X	Variable - Wind Excl.
8	Wind +Y	Variable - Wind Excl.
9	Wind -Y	Variable - Wind Excl.
10	Wind +X/+Y	Variable - Wind Excl. Summational load case 6. Wind +X, 0.71 8. Wind +Y, 0.71
11	Wind -X/+Y	Variable - Wind Excl. Summational load case 7. Wind -X, 0.71 8. Wind +Y, 0.71
12	Wind -X/-Y	Variable - Wind Excl. Summational load case 7. Wind -X, 0.71 9. Wind -Y, 0.71
13	Wind +X/-Y	Variable - Wind Excl. Summational load case 6. Wind +X, 0.71 9. Wind -Y, 0.71

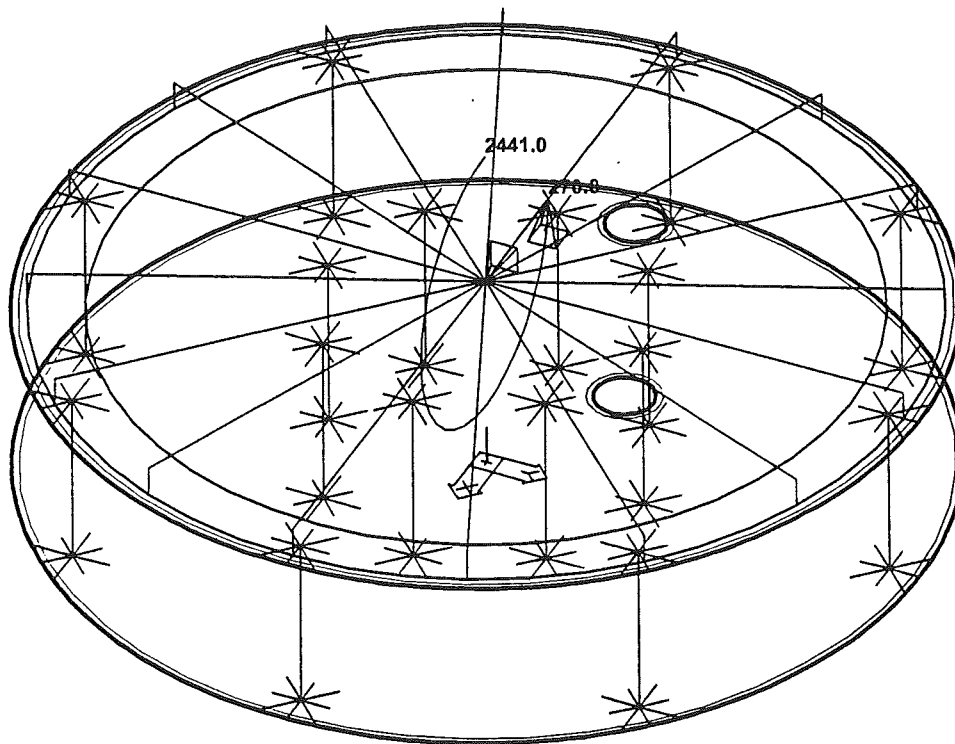




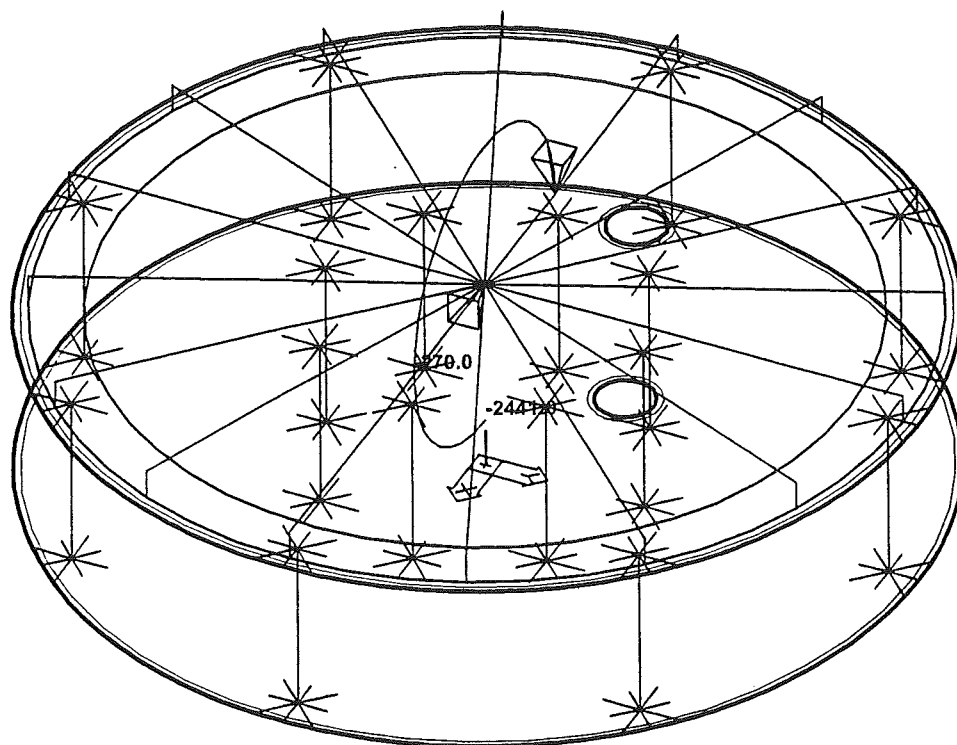
3. LC B



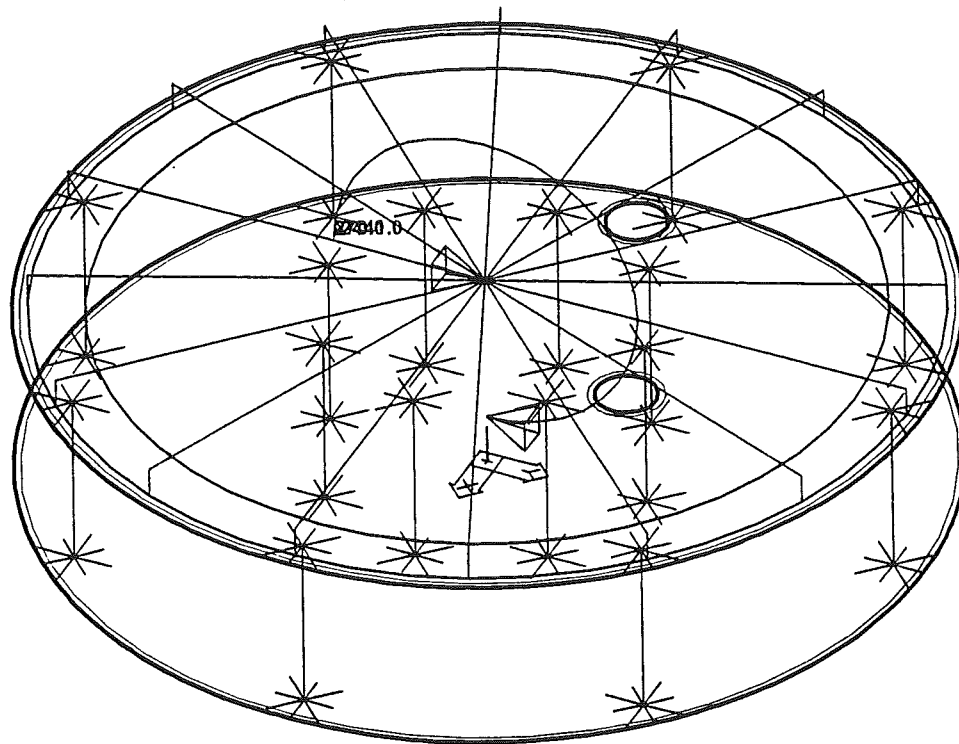




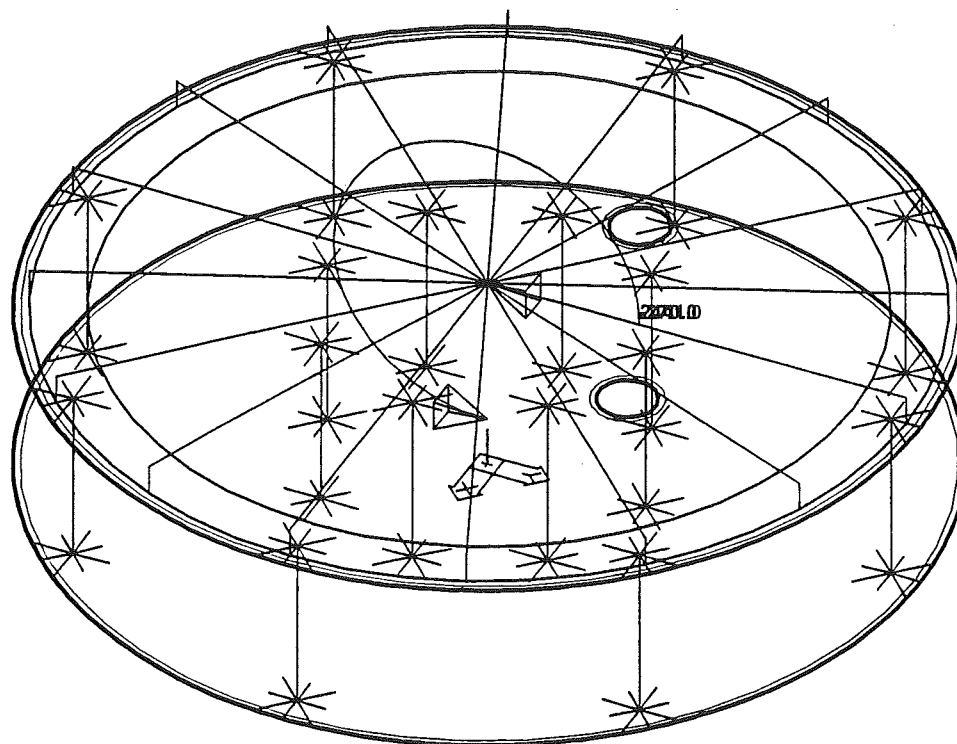
6. Wind +X

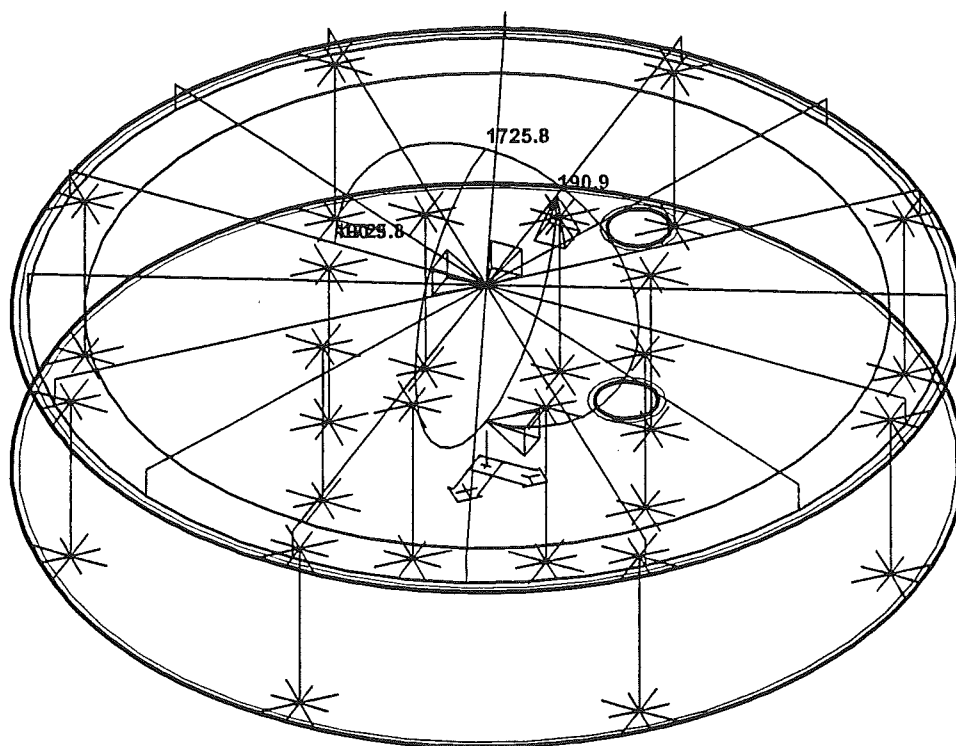


7. Wind -X

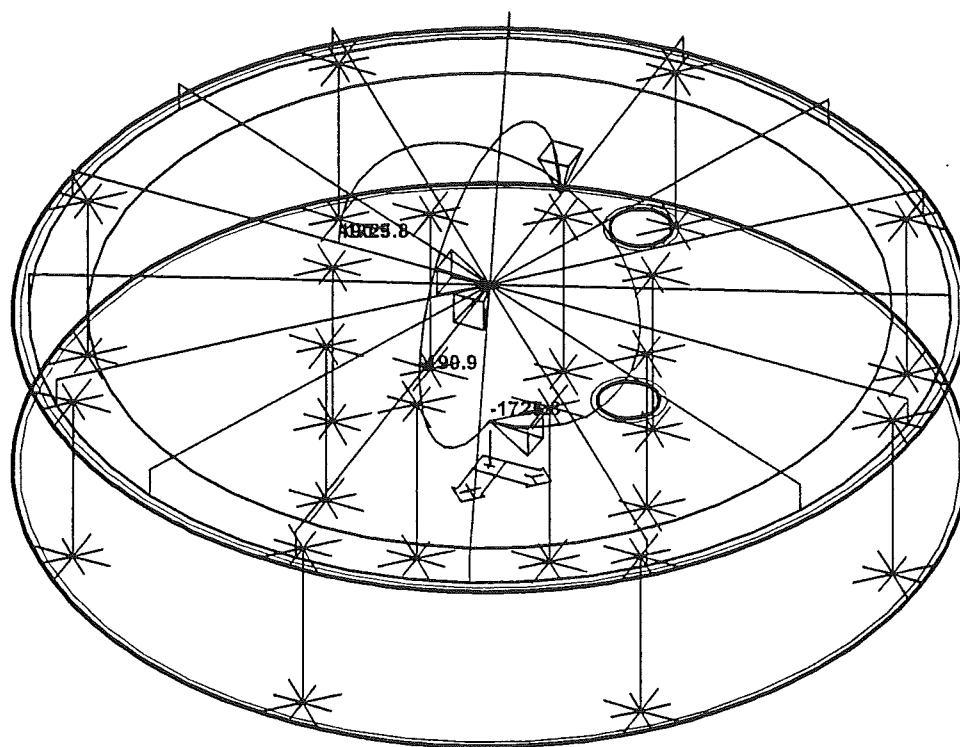


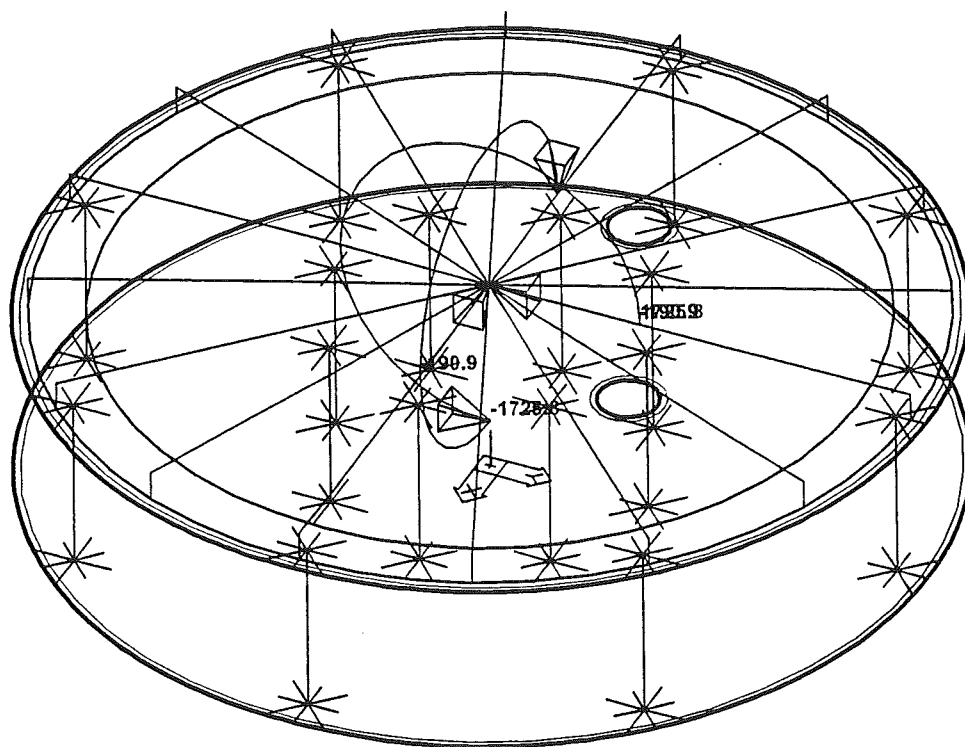
8. Wind +Y

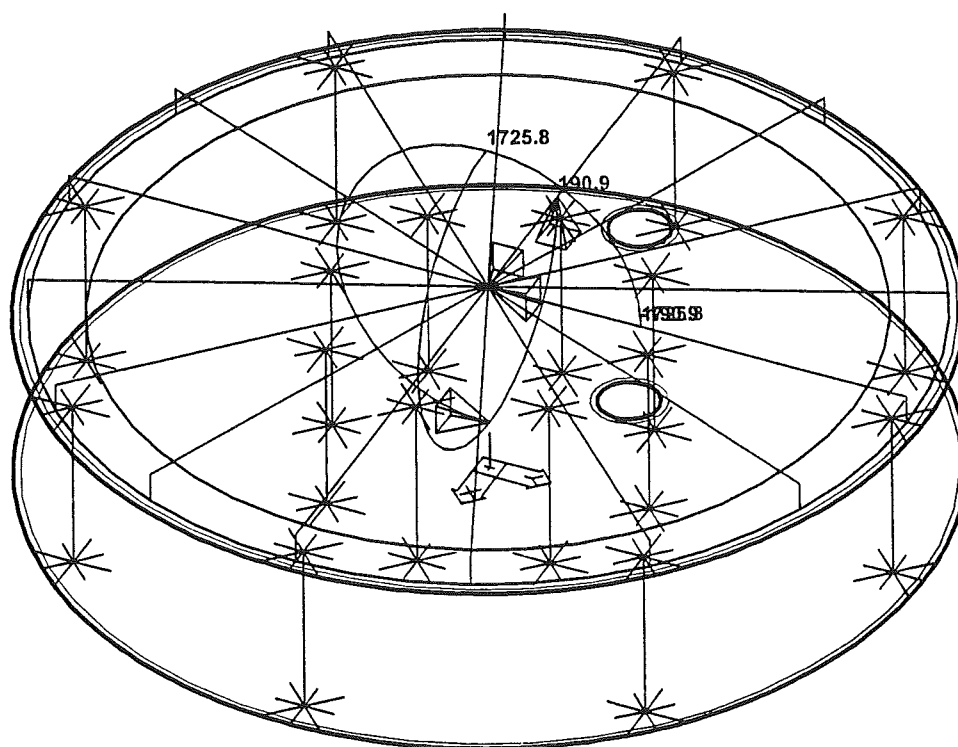




10. Wind +X/+Y







Variable loads group

Name:

LC Excl.

Snow

Wind Excl.

Loadcase no. 3 - nodal loads

node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
12	0.00	0.00	51.00	0.00	0.00	0.00
30	0.00	0.00	51.00	0.00	0.00	0.00
31	0.00	0.00	51.00	0.00	0.00	0.00
32	0.00	0.00	51.00	0.00	0.00	0.00
33	0.00	0.00	51.00	0.00	0.00	0.00
34	0.00	0.00	51.00	0.00	0.00	0.00
35	0.00	0.00	51.00	0.00	0.00	0.00
36	0.00	0.00	51.00	0.00	0.00	0.00
37	0.00	0.00	51.00	0.00	0.00	0.00
38	0.00	0.00	51.00	0.00	0.00	0.00
39	0.00	0.00	51.00	0.00	0.00	0.00
40	0.00	0.00	51.00	0.00	0.00	0.00
41	0.00	0.00	51.00	0.00	0.00	0.00
42	0.00	0.00	51.00	0.00	0.00	0.00
43	0.00	0.00	51.00	0.00	0.00	0.00
44	0.00	0.00	51.00	0.00	0.00	0.00
45	0.00	0.00	51.00	0.00	0.00	0.00
46	0.00	0.00	51.00	0.00	0.00	0.00
47	0.00	0.00	51.00	0.00	0.00	0.00
48	0.00	0.00	51.00	0.00	0.00	0.00
49	0.00	0.00	51.00	0.00	0.00	0.00
50	0.00	0.00	51.00	0.00	0.00	0.00
51	0.00	0.00	51.00	0.00	0.00	0.00
52	0.00	0.00	51.00	0.00	0.00	0.00
53	0.00	0.00	51.00	0.00	0.00	0.00
54	0.00	0.00	51.00	0.00	0.00	0.00
55	0.00	0.00	51.00	0.00	0.00	0.00
56	0.00	0.00	51.00	0.00	0.00	0.00
57	0.00	0.00	51.00	0.00	0.00	0.00
58	0.00	0.00	51.00	0.00	0.00	0.00
59	0.00	0.00	51.00	0.00	0.00	0.00
60	0.00	0.00	51.00	0.00	0.00	0.00
61	0.00	0.00	51.00	0.00	0.00	0.00
62	0.00	0.00	51.00	0.00	0.00	0.00
63	0.00	0.00	51.00	0.00	0.00	0.00
64	0.00	0.00	51.00	0.00	0.00	0.00
65	0.00	0.00	51.00	0.00	0.00	0.00
66	0.00	0.00	51.00	0.00	0.00	0.00
67	0.00	0.00	51.00	0.00	0.00	0.00
68	0.00	0.00	51.00	0.00	0.00	0.00

Loadcase no. 4 - nodal loads

node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
12	0.00	0.00	69.00	0.00	0.00	0.00
30	0.00	0.00	69.00	0.00	0.00	0.00
31	0.00	0.00	69.00	0.00	0.00	0.00
32	0.00	0.00	69.00	0.00	0.00	0.00
33	0.00	0.00	69.00	0.00	0.00	0.00
34	0.00	0.00	69.00	0.00	0.00	0.00
35	0.00	0.00	69.00	0.00	0.00	0.00
36	0.00	0.00	69.00	0.00	0.00	0.00
37	0.00	0.00	69.00	0.00	0.00	0.00
38	0.00	0.00	69.00	0.00	0.00	0.00
39	0.00	0.00	69.00	0.00	0.00	0.00
40	0.00	0.00	69.00	0.00	0.00	0.00
41	0.00	0.00	69.00	0.00	0.00	0.00
42	0.00	0.00	69.00	0.00	0.00	0.00
43	0.00	0.00	69.00	0.00	0.00	0.00
44	0.00	0.00	69.00	0.00	0.00	0.00
45	0.00	0.00	69.00	0.00	0.00	0.00
46	0.00	0.00	69.00	0.00	0.00	0.00
47	0.00	0.00	69.00	0.00	0.00	0.00
48	0.00	0.00	69.00	0.00	0.00	0.00
49	0.00	0.00	69.00	0.00	0.00	0.00
50	0.00	0.00	69.00	0.00	0.00	0.00
51	0.00	0.00	69.00	0.00	0.00	0.00
52	0.00	0.00	69.00	0.00	0.00	0.00
53	0.00	0.00	69.00	0.00	0.00	0.00
54	0.00	0.00	69.00	0.00	0.00	0.00
55	0.00	0.00	69.00	0.00	0.00	0.00
56	0.00	0.00	69.00	0.00	0.00	0.00
57	0.00	0.00	69.00	0.00	0.00	0.00
58	0.00	0.00	69.00	0.00	0.00	0.00
59	0.00	0.00	69.00	0.00	0.00	0.00
60	0.00	0.00	69.00	0.00	0.00	0.00
61	0.00	0.00	69.00	0.00	0.00	0.00
62	0.00	0.00	69.00	0.00	0.00	0.00
63	0.00	0.00	69.00	0.00	0.00	0.00
64	0.00	0.00	69.00	0.00	0.00	0.00
65	0.00	0.00	69.00	0.00	0.00	0.00
66	0.00	0.00	69.00	0.00	0.00	0.00
67	0.00	0.00	69.00	0.00	0.00	0.00
68	0.00	0.00	69.00	0.00	0.00	0.00

Loadcase no. 6 - nodal loads

node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
379	270.00	0.00	0.00	0.00	2441.00	0.00

Loadcase no. 7 - nodal loads

node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
379	-270.00	0.00	0.00	0.00	-2441.00	0.00

Loadcase no. 8 - nodal loads

node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
379	0.00	270.00	0.00	-2441.00	0.00	0.00

Loadcase no. 9 - nodal loads

node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
379	0.00	-270.00	0.00	2441.00	0.00	0.00

Loadcase no. 10 - nodal loads

node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
379	190.89	0.00	0.00	0.00	1725.79	0.00
	0.00	190.89	0.00	-1725.79	0.00	0.00

Loadcase no. 11 - nodal loads

node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
379	-190.89	0.00	0.00	0.00	-1725.79	0.00
	0.00	190.89	0.00	-1725.79	0.00	0.00

Loadcase no. 12 - nodal loads

node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
379	-190.89	0.00	0.00	0.00	-1725.79	0.00
	0.00	-190.89	0.00	1725.79	0.00	0.00

Loadcase no. 13 - nodal loads

node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
379	190.89	0.00	0.00	0.00	1725.79	0.00
	0.00	-190.89	0.00	1725.79	0.00	0.00

Loadcase no. 2 - distributed loads

bound	type	dx m	exY m	exZ m		X beg end	Y beg end	Z beg end
2	force	0.00 rel	0.00	0.00	glo	0.00	0.00	-11.20
	kN/m	1.00			len	0.00	0.00	-11.20
4	force	0.00 rel	0.00	0.00	glo	0.00	0.00	-12.60
	kN/m	1.00			len	0.00	0.00	-12.60

Loadcase no. 3 - distributed loads

bound	type	dx m	exY m	exZ m		X beg end	Y beg end	Z beg end
2	force	0.00 rel	0.00	0.00	glo	0.00	0.00	-11.20
	kN/m	1.00			len	0.00	0.00	-11.20

Loadcase no. 4 - distributed loads

bound	type	dx m	exY m	exZ m		X beg end	Y beg end	Z beg end
2	force	0.00 rel	0.00	0.00	glo	0.00	0.00	-11.20
	kN/m	1.00			len	0.00	0.00	-11.20

Loadcase no. 5 - distributed loads

bound	type	dx m	exY m	exZ m		X beg end	Y beg end	Z beg end
2	force	0.00 rel	0.00	0.00	glo	0.00	0.00	-5.30
	kN/m	1.00			len	0.00	0.00	-5.30

Loadcase no. 2 - Distributed loads 2D

macro	qx kN/m^2	qy kN/m^2	qz kN/m^2
2	0.00	0.00	-9.10

Loadcase no. 3 - Distributed loads 2D

macro	qx kN/m^2	qy kN/m^2	qz kN/m^2
2	0.00	0.00	-9.10

Loadcase no. 4 - Distributed loads 2D

macro	qx kN/m^2	qy kN/m^2	qz kN/m^2
2	0.00	0.00	-1.30

Loadcase no. 2 - Free loads

Polygons

Index	Distribution	x m	y m	qz kN/m ²	System	Validity	Location
1	Uniform	-5.87	2.43	-142.12	Global	All	Length
		-5.41	3.32				
		-4.83	4.12				
		-4.12	4.83				
		-3.32	5.41				
		-2.43	5.87				
		-1.48	6.17				
		-0.50	6.33				
		0.50	6.33				
		1.48	6.17				
		2.43	5.87				
		3.32	5.41				
		4.12	4.83				
		4.83	4.12				
		5.41	3.32				
		5.87	2.43				
		6.17	1.48				
		6.33	0.50				
		6.33	-0.50				
		6.17	-1.48				
		5.87	-2.43				
		5.41	-3.32				
		4.83	-4.12				
		4.12	-4.83				
		3.32	-5.41				
		2.43	-5.87				
		1.48	-6.17				
		0.50	-6.33				
		-0.50	-6.33				
		-1.48	-6.17				
		-2.43	-5.87				
		-3.32	-5.41				
		-4.12	-4.83				
		-4.83	-4.12				
		-5.41	-3.32				
		-5.87	-2.43				
		-6.17	-1.48				
		-6.33	-0.50				
		-6.33	0.50				
		-6.17	1.48				

Loadcase no. 3 - Free loads

Polygons

Index	Distribution	x m	y m	qz kN/m ²	System	Validity	Location
1	Uniform	-5.87	2.43	-162.10	Global	All	Length
		-5.41	3.32				
		-4.83	4.12				
		-4.12	4.83				
		-3.32	5.41				
		-2.43	5.87				
		-1.48	6.17				
		-0.50	6.33				
		0.50	6.33				
		1.48	6.17				
		2.43	5.87				
		3.32	5.41				
		4.12	4.83				
		4.83	4.12				
		5.41	3.32				
		5.87	2.43				
		6.17	1.48				
		6.33	0.50				
		6.33	-0.50				
		6.17	-1.48				
		5.87	-2.43				
		5.41	-3.32				
		4.83	-4.12				
		4.12	-4.83				
		3.32	-5.41				
		2.43	-5.87				
		1.48	-6.17				
		0.50	-6.33				
		-0.50	-6.33				
		-1.48	-6.17				
		-2.43	-5.87				
		-3.32	-5.41				
		-4.12	-4.83				
		-4.83	-4.12				
		-5.41	-3.32				
		-5.87	-2.43				
		-6.17	-1.48				
		-6.33	-0.50				
		-6.33	0.50				
		-6.17	1.48				

Loadcase no. 4 - Free loads

Polygons

Index	Distribution	x m	y m	qz kN/m^2	System	Validity	Location
1	Uniform	-5.87	2.43	-157.30	Global	All	Length
		-5.41	3.32				
		-4.83	4.12				
		-4.12	4.83				
		-3.32	5.41				
		-2.43	5.87				
		-1.48	6.17				
		-0.50	6.33				
		0.50	6.33				
		1.48	6.17				
		2.43	5.87				
		3.32	5.41				
		4.12	4.83				
		4.83	4.12				
		5.41	3.32				
		5.87	2.43				
		6.17	1.48				
		6.33	0.50				
		6.33	-0.50				
		6.17	-1.48				
		5.87	-2.43				
		5.41	-3.32				
		4.83	-4.12				
		4.12	-4.83				
		3.32	-5.41				
		2.43	-5.87				
		1.48	-6.17				
		0.50	-6.33				
		-0.50	-6.33				
		-1.48	-6.17				
		-2.43	-5.87				
		-3.32	-5.41				
		-4.12	-4.83				
		-4.83	-4.12				
		-5.41	-3.32				
		-5.87	-2.43				
		-6.17	-1.48				
		-6.33	-0.50				
		-6.33	0.50				
		-6.17	1.48				

Combinations

Combi	Norm	Case	coeff.
1.	User-ultimate	1 Self weight	1.00
		2 LC A	1.00
		3 LC B	1.00
		4 LC C	1.00
		5 Snow	1.00
		6 Wind +X	1.00
		7 Wind -X	1.00
		8 Wind +Y	1.00
		9 Wind -Y	1.00
		10 Wind +X/+Y	1.00
		11 Wind -X/+Y	1.00
		12 Wind -X/-Y	1.00
		13 Wind +X/-Y	1.00
2.	User-serviceability	1 Self weight	1.00
		2 LC A	1.00
		3 LC B	1.00
		4 LC C	1.00
		5 Snow	1.00
		6 Wind +X	1.00
		7 Wind -X	1.00
		8 Wind +Y	1.00
		9 Wind -Y	1.00
		10 Wind +X/+Y	1.00
		11 Wind -X/+Y	1.00
		12 Wind -X/-Y	1.00
		13 Wind +X/-Y	1.00

Basic rules for generation of ultimate load combinations:

1 : 1.00*LC1 / 1.00*LC2 / 1.00*LC3 / 1.00*LC4 / 1.00*LC5 / 1.00*LC6 / 1.00*LC7 / 1.00*LC8 / 1.00*LC9 / 1.00*LC10 / 1.00*LC11 / 1.00*LC12 / 1.00*LC13

Basic rules for generation of serviceability load combinations:

1 : 1.00*LC1 / 1.00*LC2 / 1.00*LC3 / 1.00*LC4 / 1.00*LC5 / 1.00*LC6 / 1.00*LC7 / 1.00*LC8 / 1.00*LC9 / 1.00*LC10 / 1.00*LC11 / 1.00*LC12 / 1.00*LC13

List of extreme ultimate load combinations

- 1/ 1 : +1.00*LC1+1.00*LC6
- 2/ 1 : +1.00*LC1+1.00*LC7
- 3/ 1 : +1.00*LC1+1.00*LC8
- 4/ 1 : +1.00*LC1+1.00*LC9
- 5/ 1 : +1.00*LC1+1.00*LC10
- 6/ 1 : +1.00*LC1+1.00*LC11
- 7/ 1 : +1.00*LC1+1.00*LC12
- 8/ 1 : +1.00*LC1+1.00*LC13
- 9/ 1 : +1.00*LC1+1.00*LC2+1.00*LC6
- 10/ 1 : +1.00*LC1+1.00*LC3+1.00*LC6
- 11/ 1 : +1.00*LC1+1.00*LC2+1.00*LC7
- 12/ 1 : +1.00*LC1+1.00*LC3+1.00*LC7
- 13/ 1 : +1.00*LC1+1.00*LC4+1.00*LC6
- 14/ 1 : +1.00*LC1+1.00*LC2+1.00*LC8
- 15/ 1 : +1.00*LC1+1.00*LC3+1.00*LC8
- 16/ 1 : +1.00*LC1+1.00*LC5+1.00*LC6
- 17/ 1 : +1.00*LC1+1.00*LC4+1.00*LC7
- 18/ 1 : +1.00*LC1+1.00*LC2+1.00*LC9
- 19/ 1 : +1.00*LC1+1.00*LC5+1.00*LC7
- 20/ 1 : +1.00*LC1+1.00*LC3+1.00*LC9

21/ 1 : +1.00*LC1+1.00*LC4+1.00*LC8
 22/ 1 : +1.00*LC1+1.00*LC2+1.00*LC10
 23/ 1 : +1.00*LC1+1.00*LC5+1.00*LC8
 24/ 1 : +1.00*LC1+1.00*LC4+1.00*LC9
 25/ 1 : +1.00*LC1+1.00*LC3+1.00*LC10
 26/ 1 : +1.00*LC1+1.00*LC2+1.00*LC11
 27/ 1 : +1.00*LC1+1.00*LC5+1.00*LC9
 28/ 1 : +1.00*LC1+1.00*LC3+1.00*LC11
 29/ 1 : +1.00*LC1+1.00*LC4+1.00*LC10
 30/ 1 : +1.00*LC1+1.00*LC2+1.00*LC12
 31/ 1 : +1.00*LC1+1.00*LC5+1.00*LC10
 32/ 1 : +1.00*LC1+1.00*LC3+1.00*LC12
 33/ 1 : +1.00*LC1+1.00*LC4+1.00*LC11
 34/ 1 : +1.00*LC1+1.00*LC2+1.00*LC13
 35/ 1 : +1.00*LC1+1.00*LC4+1.00*LC12
 36/ 1 : +1.00*LC1+1.00*LC3+1.00*LC13
 37/ 1 : +1.00*LC1+1.00*LC5+1.00*LC11
 38/ 1 : +1.00*LC1+1.00*LC5+1.00*LC12
 39/ 1 : +1.00*LC1+1.00*LC4+1.00*LC13
 40/ 1 : +1.00*LC1+1.00*LC5+1.00*LC13
 41/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC6
 42/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC7
 43/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC6
 44/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC8
 45/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC7
 46/ 1 : +1.00*LC1+1.00*LC4+1.00*LC5+1.00*LC6
 47/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC8
 48/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC9
 49/ 1 : +1.00*LC1+1.00*LC4+1.00*LC5+1.00*LC8
 50/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC10
 51/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC9
 52/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC10
 53/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC11
 54/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC11
 55/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC12
 56/ 1 : +1.00*LC1+1.00*LC4+1.00*LC5+1.00*LC10
 57/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC13
 58/ 1 : +1.00*LC1+1.00*LC4+1.00*LC5+1.00*LC11
 59/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC12
 60/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC13
 61/ 1 : +1.00*LC1+1.00*LC4+1.00*LC5+1.00*LC12

List of extreme serviceability load combinations

1/ 1 : +1.00*LC1+1.00*LC6
 2/ 1 : +1.00*LC1+1.00*LC7
 3/ 1 : +1.00*LC1+1.00*LC8
 4/ 1 : +1.00*LC1+1.00*LC9
 5/ 1 : +1.00*LC1+1.00*LC10
 6/ 1 : +1.00*LC1+1.00*LC11
 7/ 1 : +1.00*LC1+1.00*LC12
 8/ 1 : +1.00*LC1+1.00*LC13
 9/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5
 10/ 1 : +1.00*LC1+1.00*LC2+1.00*LC6
 11/ 1 : +1.00*LC1+1.00*LC3+1.00*LC6
 12/ 1 : +1.00*LC1+1.00*LC2+1.00*LC7
 13/ 1 : +1.00*LC1+1.00*LC3+1.00*LC7
 14/ 1 : +1.00*LC1+1.00*LC4+1.00*LC6
 15/ 1 : +1.00*LC1+1.00*LC2+1.00*LC8
 16/ 1 : +1.00*LC1+1.00*LC3+1.00*LC8
 17/ 1 : +1.00*LC1+1.00*LC5+1.00*LC6
 18/ 1 : +1.00*LC1+1.00*LC4+1.00*LC7
 19/ 1 : +1.00*LC1+1.00*LC2+1.00*LC9
 20/ 1 : +1.00*LC1+1.00*LC3+1.00*LC9
 21/ 1 : +1.00*LC1+1.00*LC5+1.00*LC7
 22/ 1 : +1.00*LC1+1.00*LC4+1.00*LC8
 23/ 1 : +1.00*LC1+1.00*LC2+1.00*LC10
 24/ 1 : +1.00*LC1+1.00*LC5+1.00*LC8
 25/ 1 : +1.00*LC1+1.00*LC4+1.00*LC9

26/ 1 : +1.00*LC1+1.00*LC3+1.00*LC10
 27/ 1 : +1.00*LC1+1.00*LC2+1.00*LC11
 28/ 1 : +1.00*LC1+1.00*LC5+1.00*LC9
 29/ 1 : +1.00*LC1+1.00*LC3+1.00*LC11
 30/ 1 : +1.00*LC1+1.00*LC4+1.00*LC10
 31/ 1 : +1.00*LC1+1.00*LC2+1.00*LC12
 32/ 1 : +1.00*LC1+1.00*LC5+1.00*LC10
 33/ 1 : +1.00*LC1+1.00*LC3+1.00*LC12
 34/ 1 : +1.00*LC1+1.00*LC4+1.00*LC11
 35/ 1 : +1.00*LC1+1.00*LC2+1.00*LC13
 36/ 1 : +1.00*LC1+1.00*LC4+1.00*LC12
 37/ 1 : +1.00*LC1+1.00*LC3+1.00*LC13
 38/ 1 : +1.00*LC1+1.00*LC5+1.00*LC11
 39/ 1 : +1.00*LC1+1.00*LC5+1.00*LC12
 40/ 1 : +1.00*LC1+1.00*LC4+1.00*LC13
 41/ 1 : +1.00*LC1+1.00*LC5+1.00*LC13
 42/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC6
 43/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC7
 44/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC6
 45/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC8
 46/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC7
 47/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC9
 48/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC8
 49/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC10
 50/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC9
 51/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC11
 52/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC10
 53/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC12
 54/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC11
 55/ 1 : +1.00*LC1+1.00*LC2+1.00*LC5+1.00*LC13
 56/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC12
 57/ 1 : +1.00*LC1+1.00*LC3+1.00*LC5+1.00*LC13
 58/ 1 : +1.00*LC1+1.00*LC4+1.00*LC5+1.00*LC12

Subsoils

Name:	Type of position	C1x kN/m ³	C1y kN/m ³	C1z kN/m ³	C2x kN/m	C2y kN/m	SigZpl kN/m ²
gemischtkörniger Sand	Under plate, block	1000.000	1000.000	15000.000	0.000	0.000	0.000

Calculation protocol.**Linear calculation**

Number of 2D elements 9797
 Number of 1D elements 304
 Number of mesh nodes 9474
 Number of equations 56844
 Loadcases
 LC 1 Self weight
 LC 2 LC A
 LC 3 LC B
 LC 4 LC C
 LC 5 Snow
 LC 6 Wind +X
 LC 7 Wind -X
 LC 8 Wind +Y
 LC 9 Wind -Y
 LC 10 Wind +X/+Y
 LC 11 Wind -X/+Y

Number of 2D elements 9797
 Number of 1D elements 304
 Number of mesh nodes 9474
 Number of equations 56844

LC 12 Wind -X/-Y
 LC 13 Wind +X/-Y

Bending theory Mindlin
 Start of calculation 26.08.2004 13:40
 End of calculation 26.08.2004 13:42

Sum of loads and reactions.

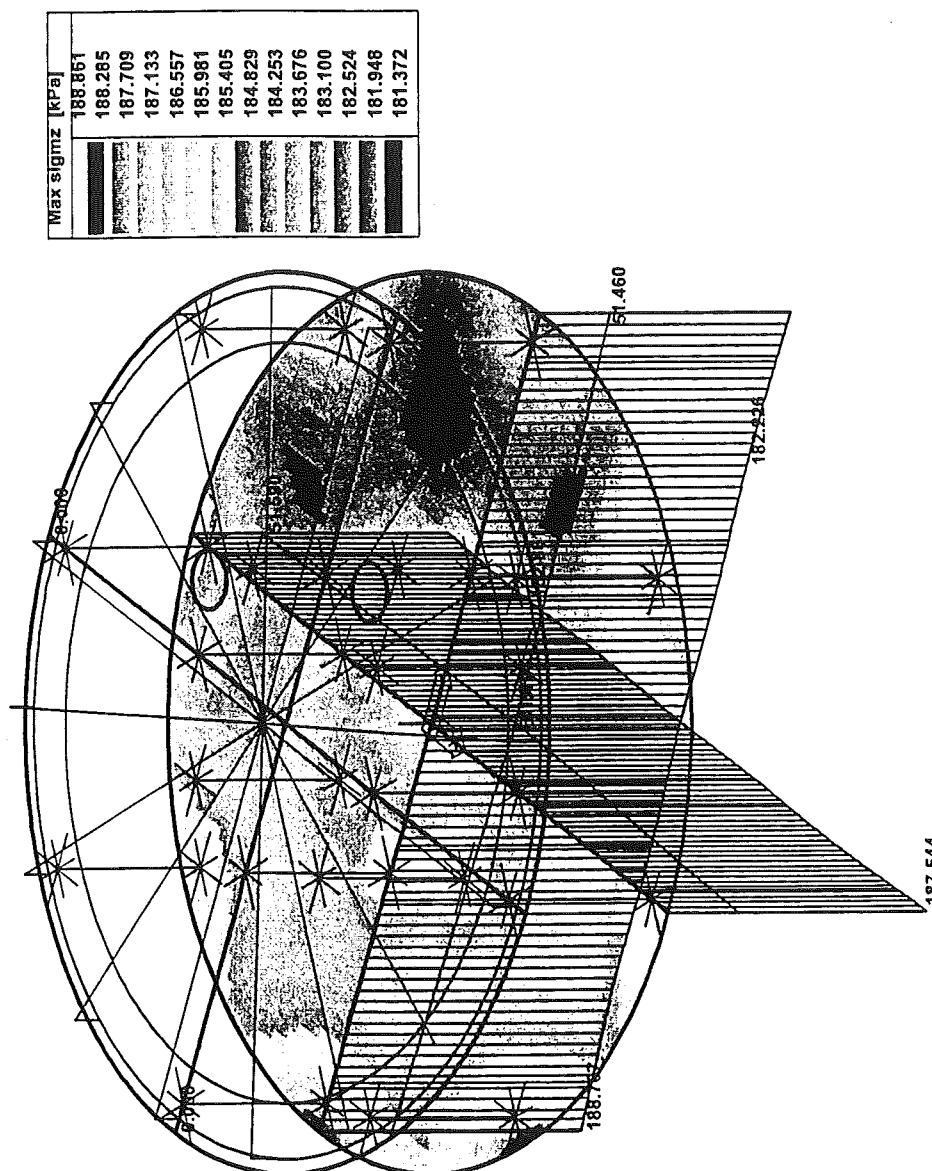
		X	Y	Z
loadcase 1	loads	0.0	0.0	-10944.8
	reactions	0.0	0.0	0.0
	contact	0.0	-0.0	10944.8
loadcase 2	loads	0.0	0.0	-20348.9
	reactions	0.0	0.0	0.0
	contact	0.0	-0.0	20348.9
loadcase 3	loads	0.0	0.0	-20296.2
	reactions	0.0	0.0	0.0
	contact	0.0	-0.0	20296.2
loadcase 4	loads	0.0	0.0	-17602.6
	reactions	0.0	0.0	0.0
	contact	0.0	0.0	17602.6
loadcase 5	loads	0.0	0.0	-250.6
	reactions	0.0	0.0	0.0
	contact	0.0	-0.0	250.6
loadcase 6	loads	270.0	0.0	0.0
	reactions	0.0	0.0	0.0
	contact	-270.0	-0.0	0.0
loadcase 7	loads	-270.0	0.0	0.0
	reactions	0.0	0.0	0.0
	contact	270.0	0.0	-0.0
loadcase 8	loads	0.0	270.0	0.0
	reactions	0.0	0.0	0.0
	contact	-0.0	-270.0	0.0
loadcase 9	loads	0.0	-270.0	0.0
	reactions	0.0	0.0	0.0
	contact	0.0	270.0	-0.0
loadcase 10	loads	190.9	190.9	0.0
	reactions	0.0	0.0	0.0
	contact	-190.9	-190.9	0.0
loadcase 11	loads	-190.9	190.9	0.0
	reactions	0.0	0.0	0.0
	contact	190.9	-190.9	-0.0
loadcase 12	loads	-190.9	-190.9	0.0
	reactions	0.0	0.0	0.0
	contact	190.9	190.9	-0.0
loadcase 13	loads	190.9	-190.9	0.0
	reactions	0.0	0.0	0.0
	contact	-190.9	190.9	0.0

$$G = \frac{15.05^2 \cdot \pi}{4} \cdot (1.2 + 1.0) \cdot 25.0 = 9.7842$$

$$+ 16 \cdot 10^2 \cdot 3.0 \cdot 25 = 1.200$$

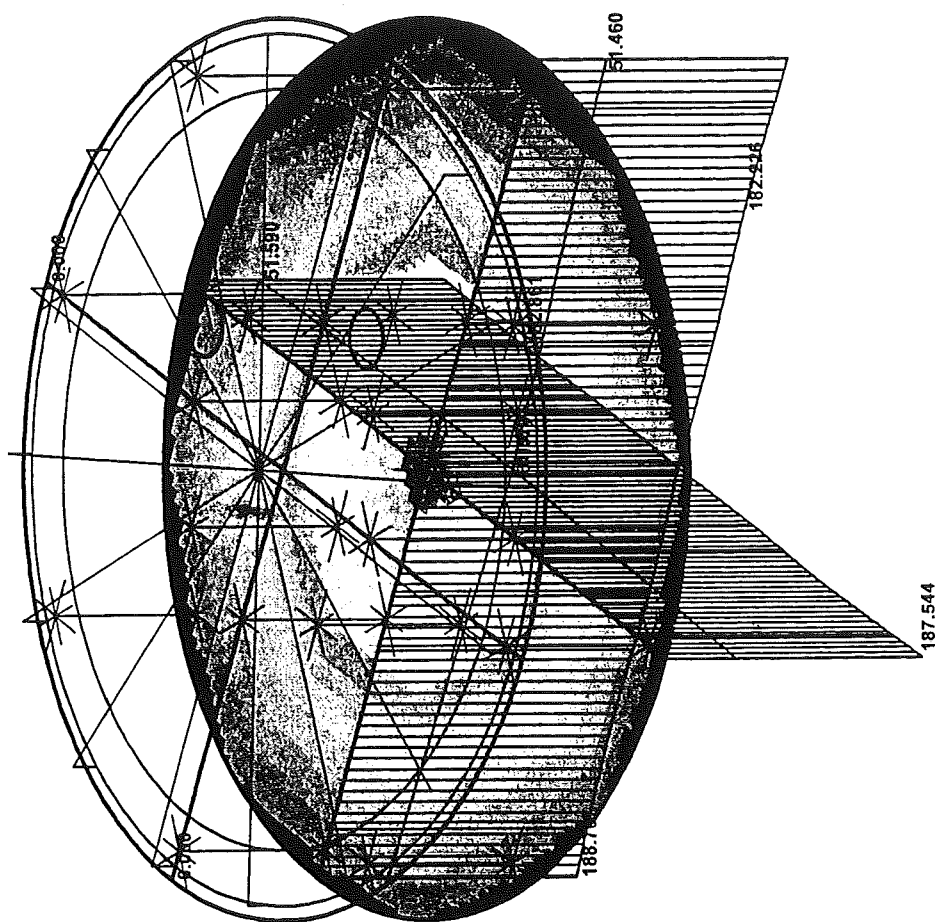
$$- 2 \cdot \frac{16^2 \cdot \pi}{4} \cdot 1.0 \cdot 25.0 = -39.3$$

10.944,9 kN



Contact stress - max sigmz - FEM Combi : 1

Min sigmz [kPa]	
61.870	
61.061	
60.252	
59.444	
58.635	
57.826	
57.017	
56.209	
55.400	
54.591	
53.782	
52.974	
52.165	
51.356	



Contact stress - min sigmz - FEM Combi : 1



Foundation 1800 MT LOX Storage Tank, B62001

Project : 7574 ASU No. 9 Kosice
Author : Orth

Page :A-56

Date : Freitag, 27. August 2004

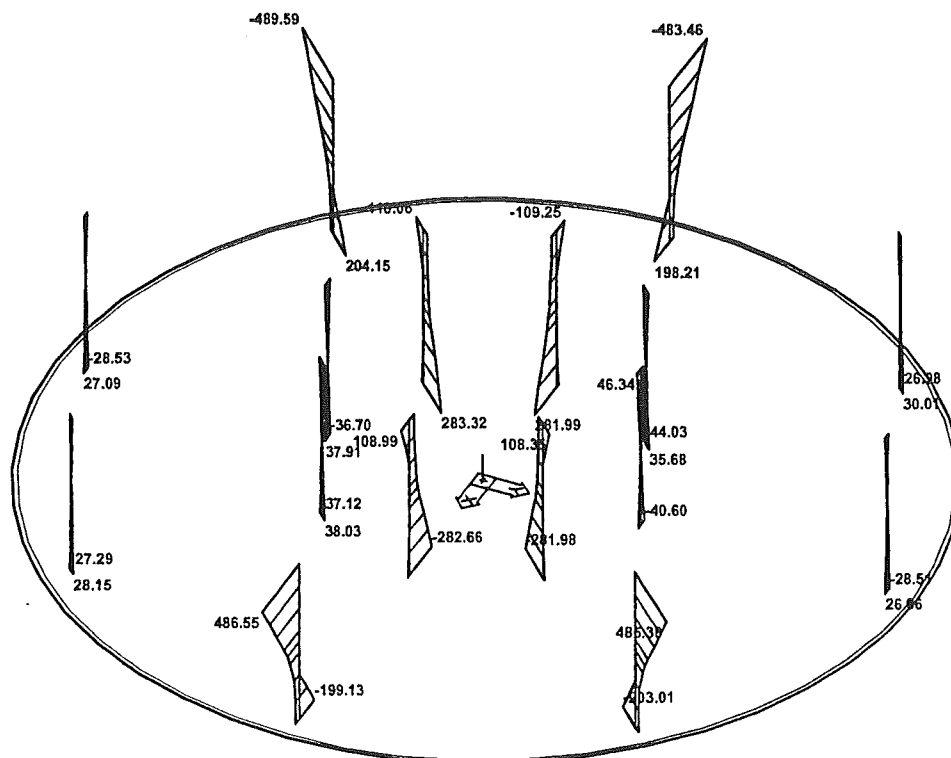
RESULTS : CONTACT STRESSES

FEM Combi:
C1 Eigen-Tragfähigk.

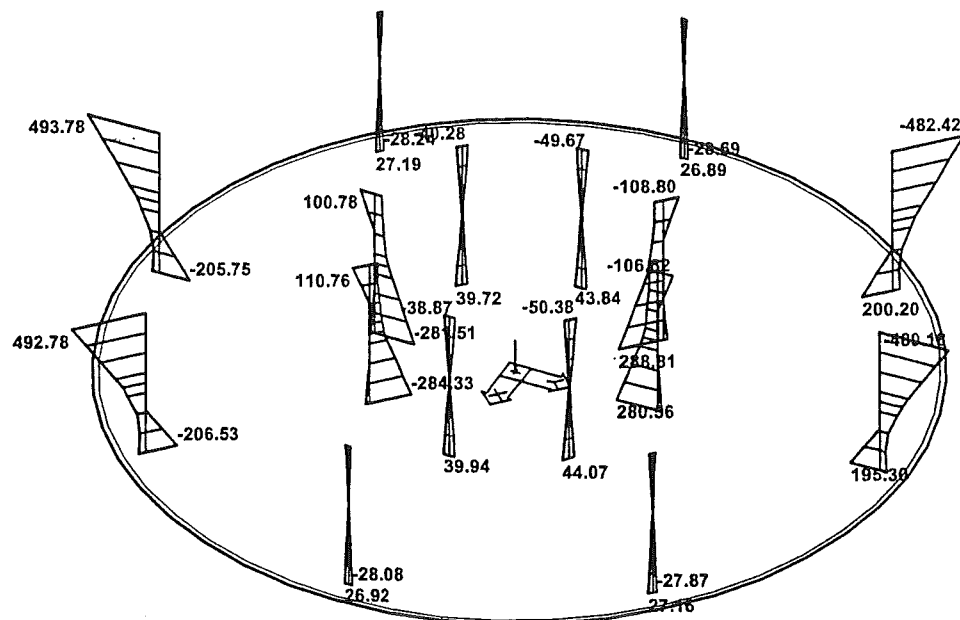
Global extremes

elem	sigmz [kPa]
3773	188.861
3558	51.356

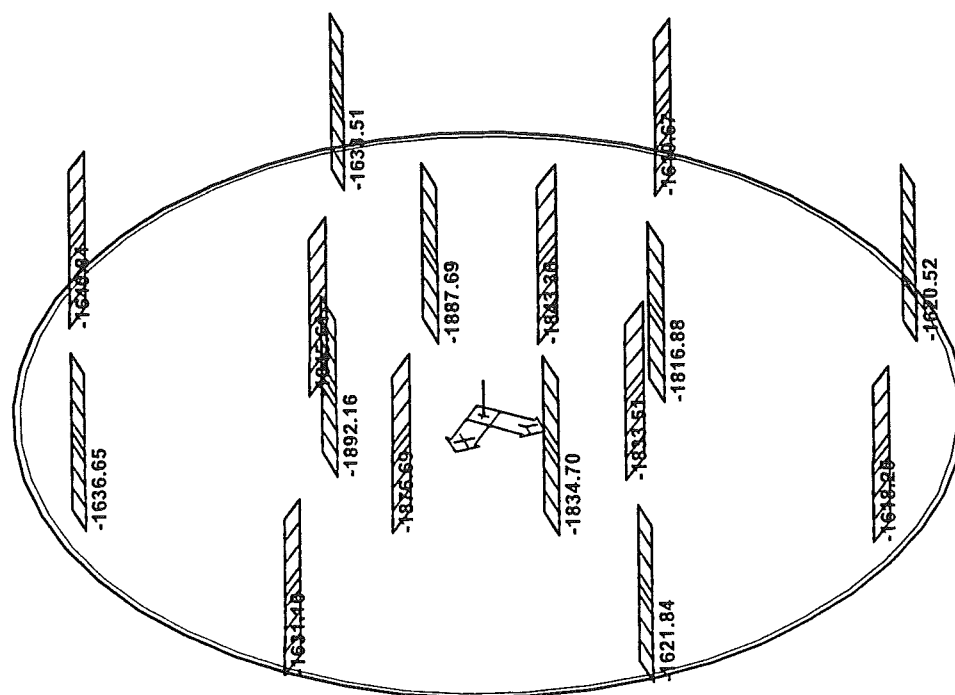
Selection was done for macros: 1/2



Internal forces - My on member(s). Ult. combi : 1/61



Internal forces - Mz on member(s). Ult. combi : 1/61



Internal forces - N on member(s). Ult. combi : 1/61

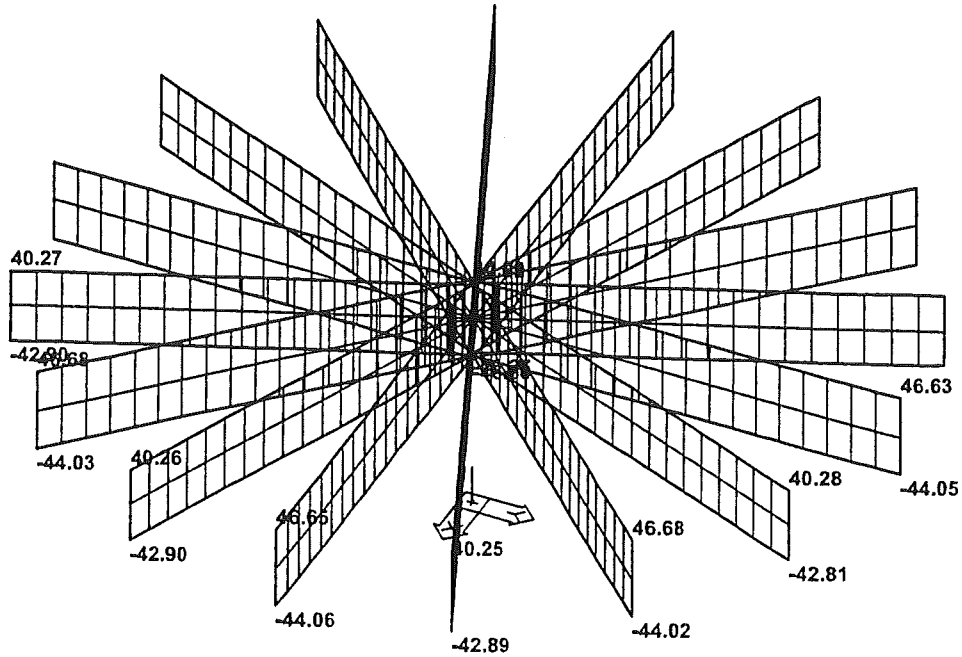
Internal forces on member(s). Global extreme

Linear static - extreme or all combinations

Group of member(s) :33/48

Group of ultimate combi :1/61

memb	cr.nr	combi	dx [m]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
42	2	60	0.000	-1892.16	119.41	0.22	-0.04	0.88	-276.97
34		24		-1338.27	227.86	0.66	-0.04	-1.10	-205.75
37		33		-1315.01	-222.54	-2.09	0.04	2.44	200.20
39		29		-1317.18	-0.60	224.39	-0.04	-203.01	-0.24
35		35		-1330.94	0.35	-226.04	-0.04	204.15	-0.89
48		24		-1663.78	19.04	-110.11	0.12	248.47	-32.68
45		17		-1656.95	-126.71	-15.57	-0.21	18.38	279.31
40		10	3.000	-1439.08	0.48	222.77	-0.06	486.55	0.46
35		32		-1441.35	0.38	-225.52	-0.04	-489.59	0.19
34		20		-1449.28	227.49	0.74	-0.04	1.00	493.78
37		28		-1425.00	-221.62	-2.24	0.04	-4.10	-482.42



Internal forces on macro(s). Ult. combi : 1/61

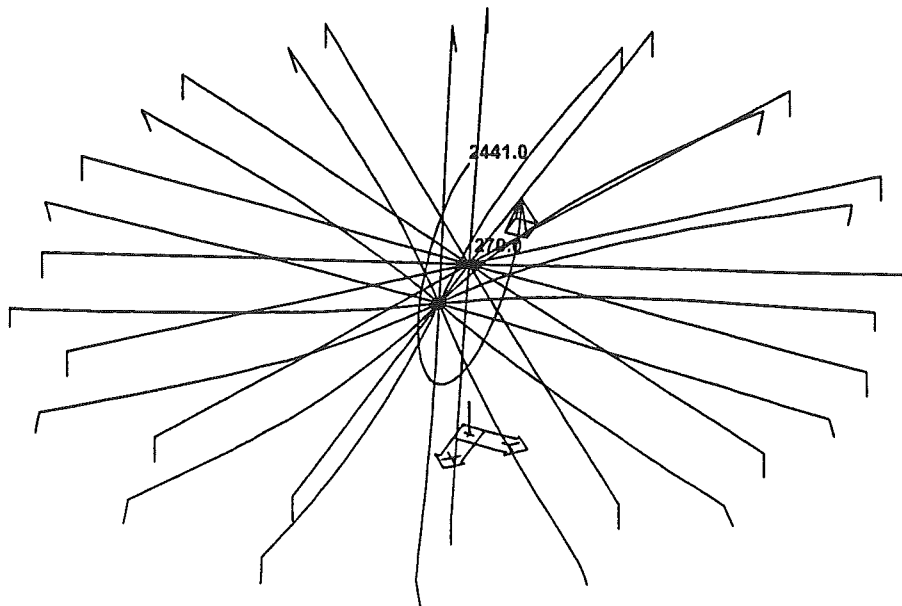
Internal forces on macro(s). Global extreme

Linear static - extreme or all combinations

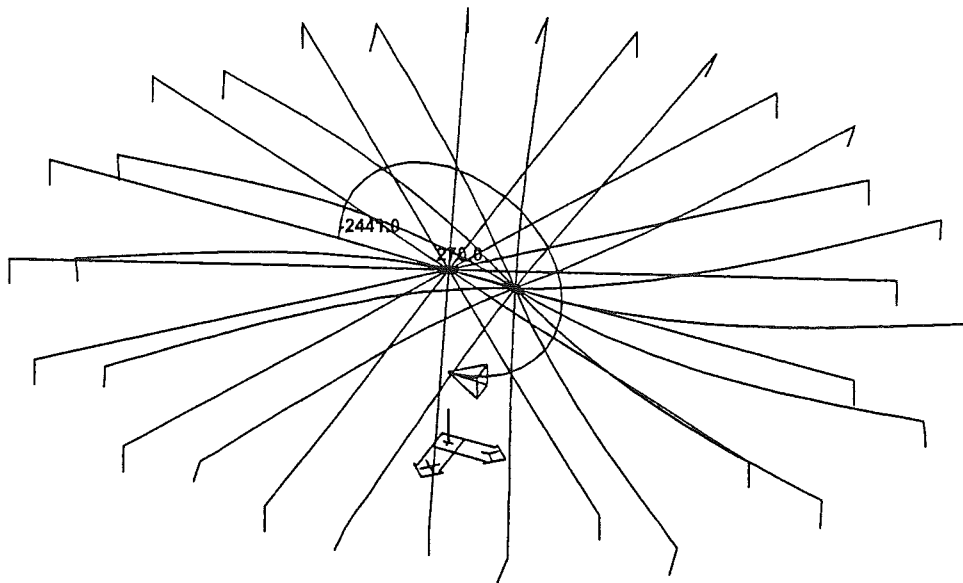
Group of macro(s) :1/8

Group of ultimate combi :1/61

macro	memb	combi	dx [m]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
7	13	57	0.000	-58.83	0.01	46.68	0.00	-29.42	-0.03
1	2	48		-58.98	-0.01	46.70	-0.01	310.26	0.02

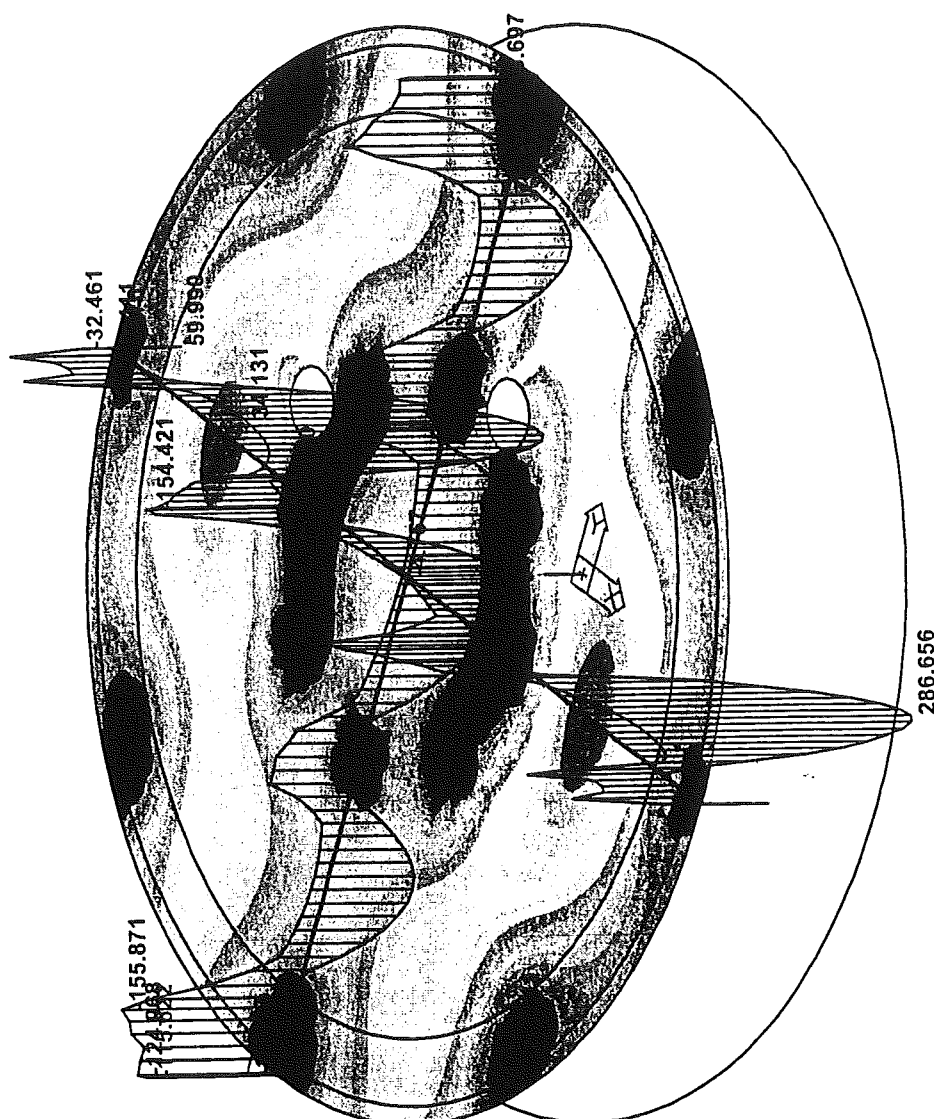


Deformation in node(s). Load case(s) : 6

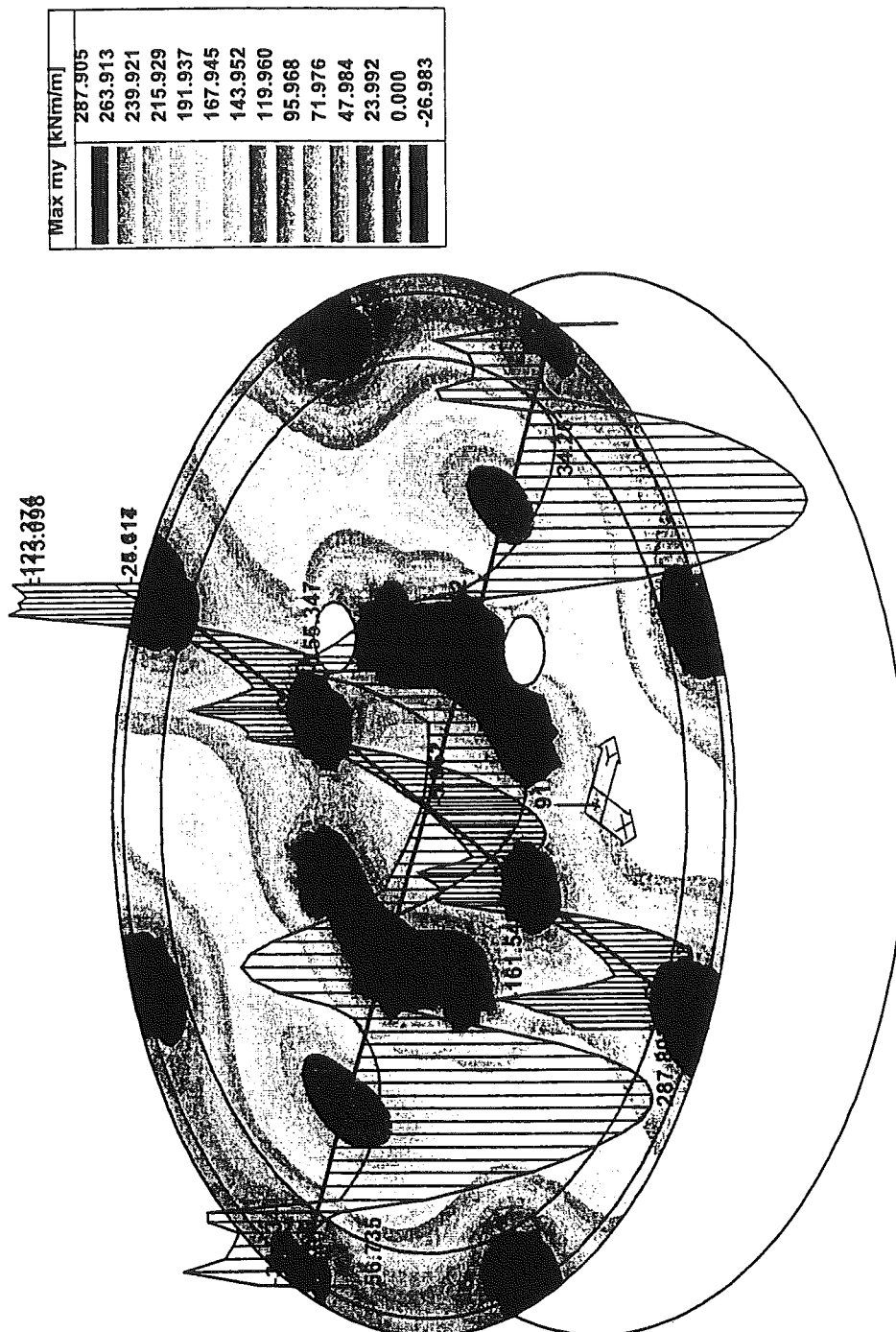


Deformation in node(s). Load case(s) : 8

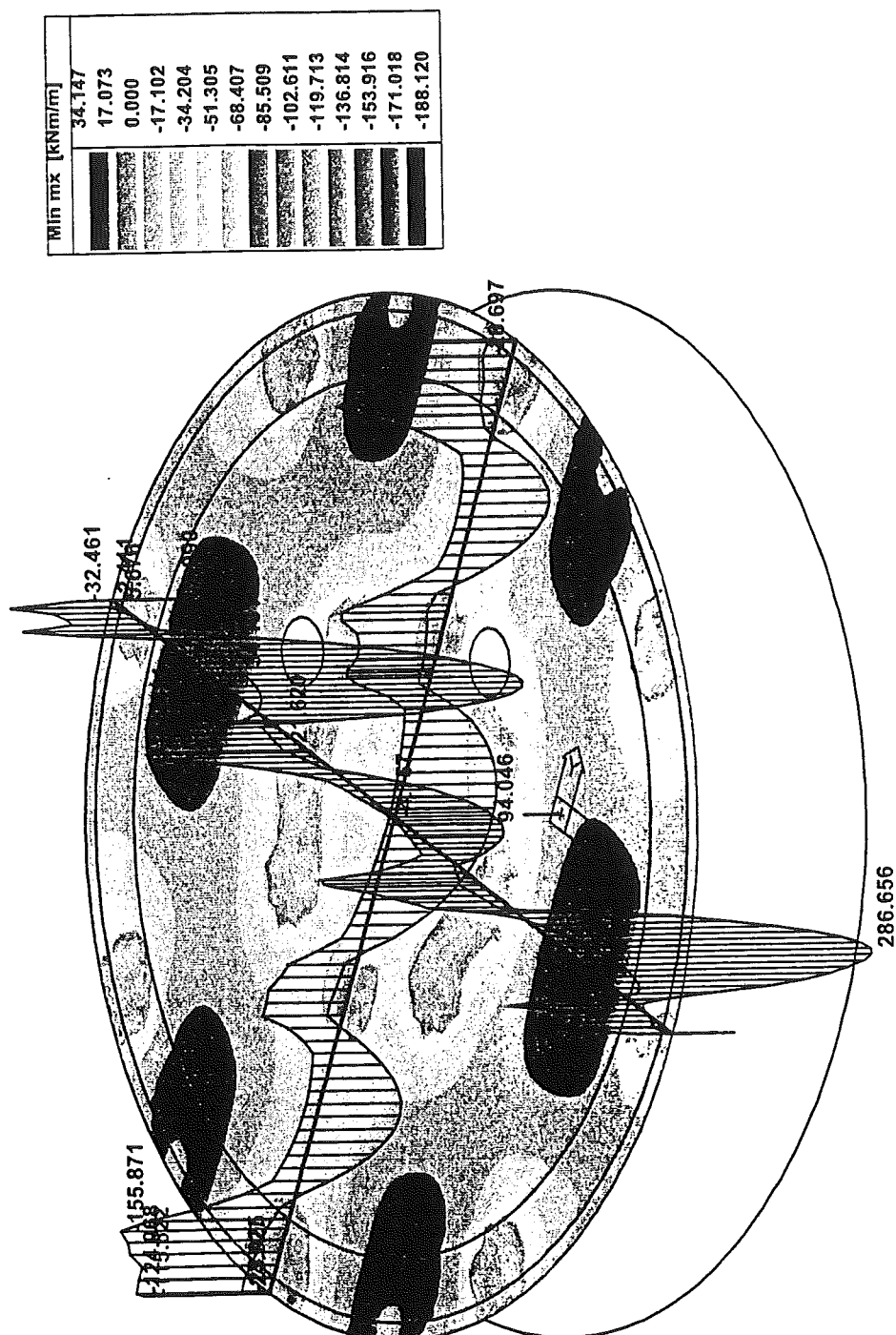
Max mx [kN/mm]
286.672
262.782
238.893
215.004
191.114
167.225
143.336
119.446
95.557
71.668
47.779
23.889
0.000
-28.697



Internal force - max mx - FEM Combi : 1

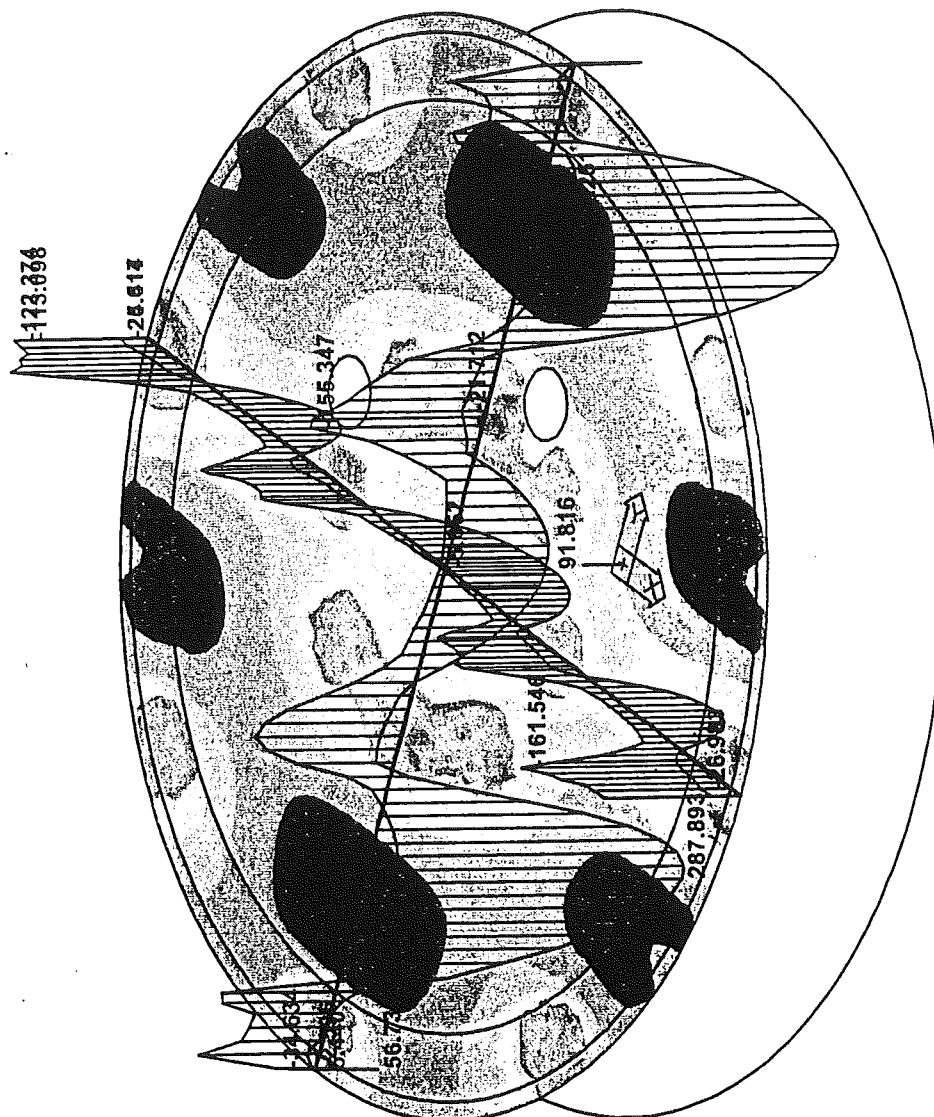


Internal force - max my - FEM Combi : 1



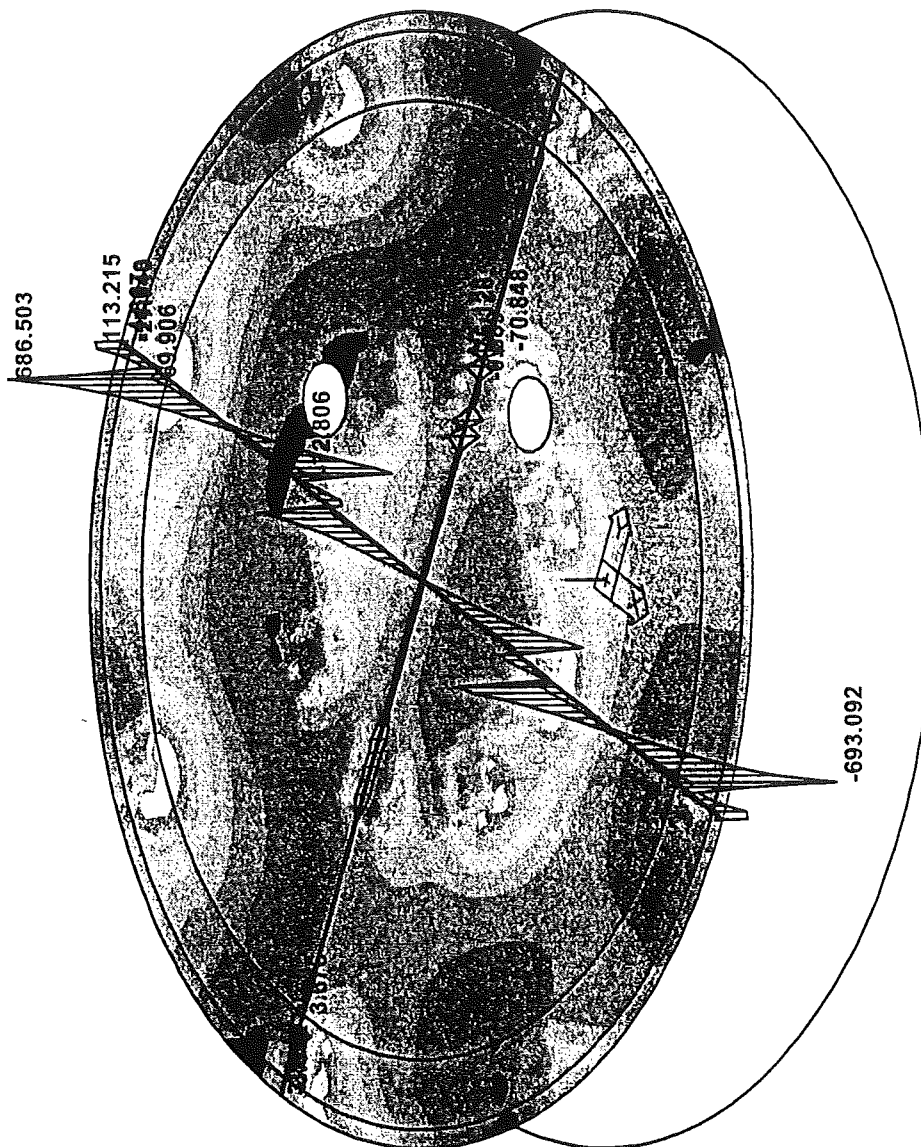
Internal force - min mx - FEM Combi : 1

Min my [kNm/m]	
34.256	
17.128	
0.000	
-16.171	
-32.343	
-48.514	
-64.685	
-80.857	
-97.028	
-113.199	
-129.370	
-145.542	
-161.713	
-177.884	

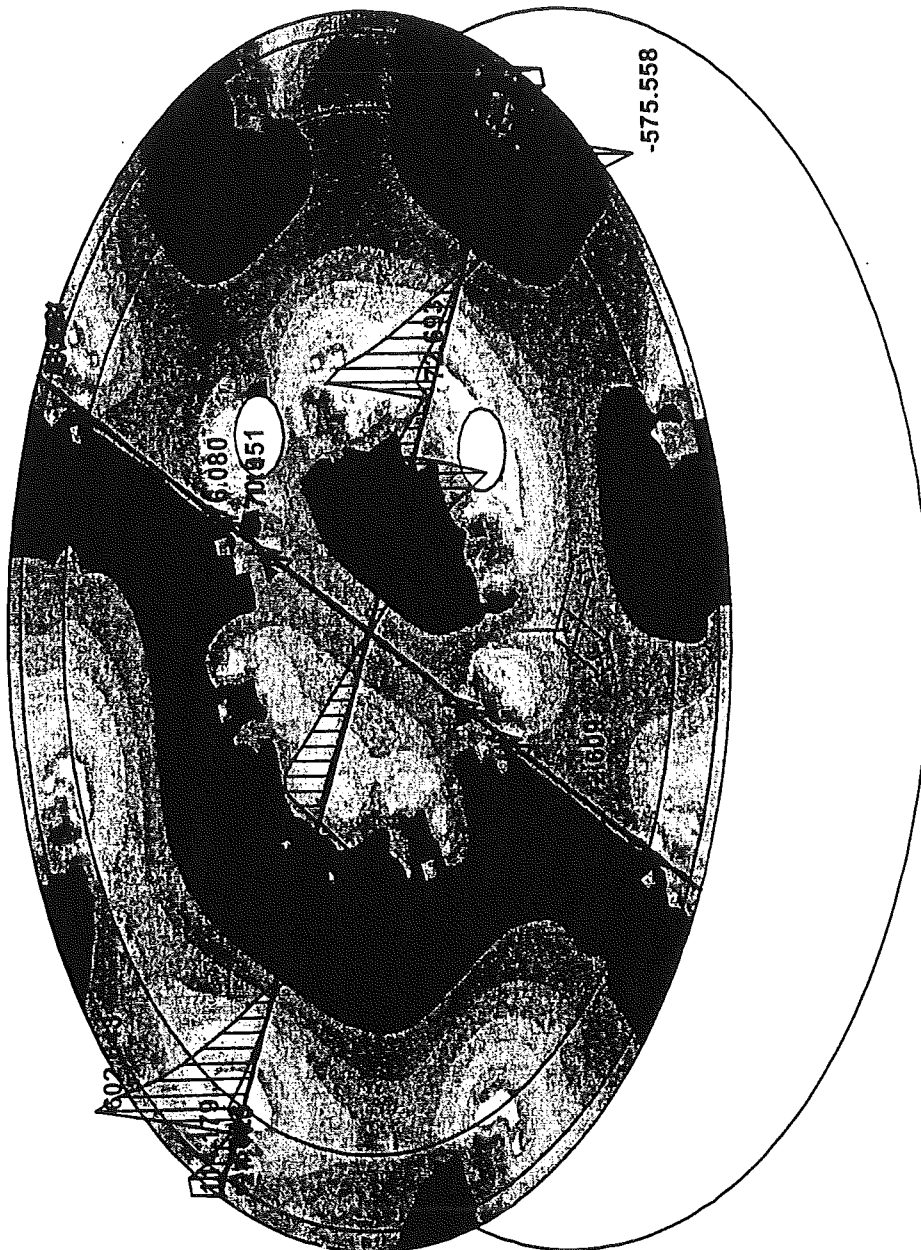
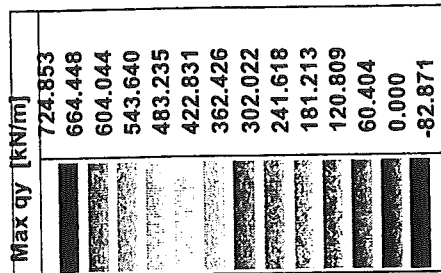


Internal force - min my - FEM Combi : 1

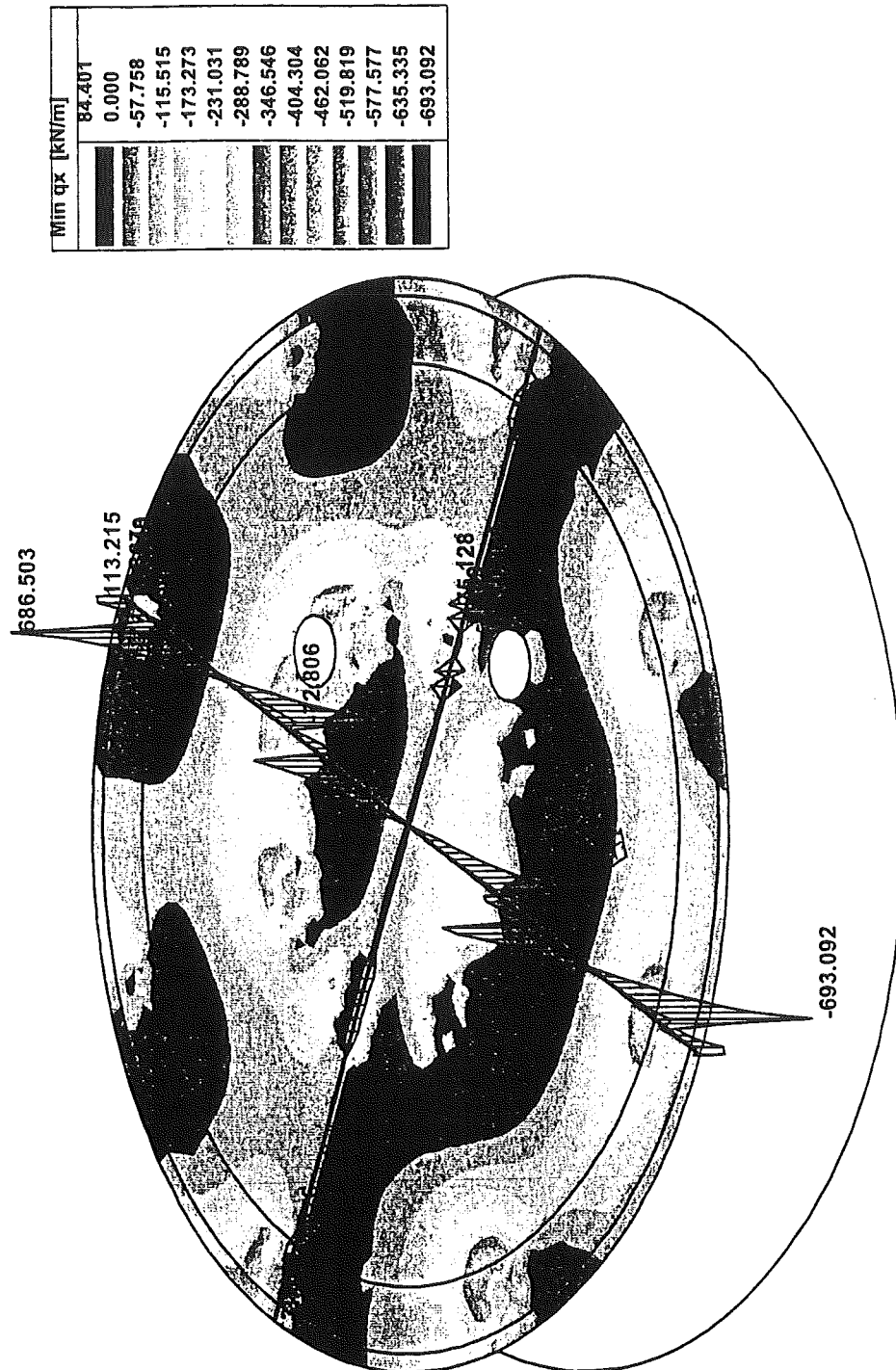
Max qx [kN/m]	
686.503	
624.093	
561.684	
499.275	
436.865	
374.456	
312.047	
249.637	
187.228	
124.819	
62.409	
0.000	
-49.068	
-98.135	



Internal force - max qx - FEM Combi : 1

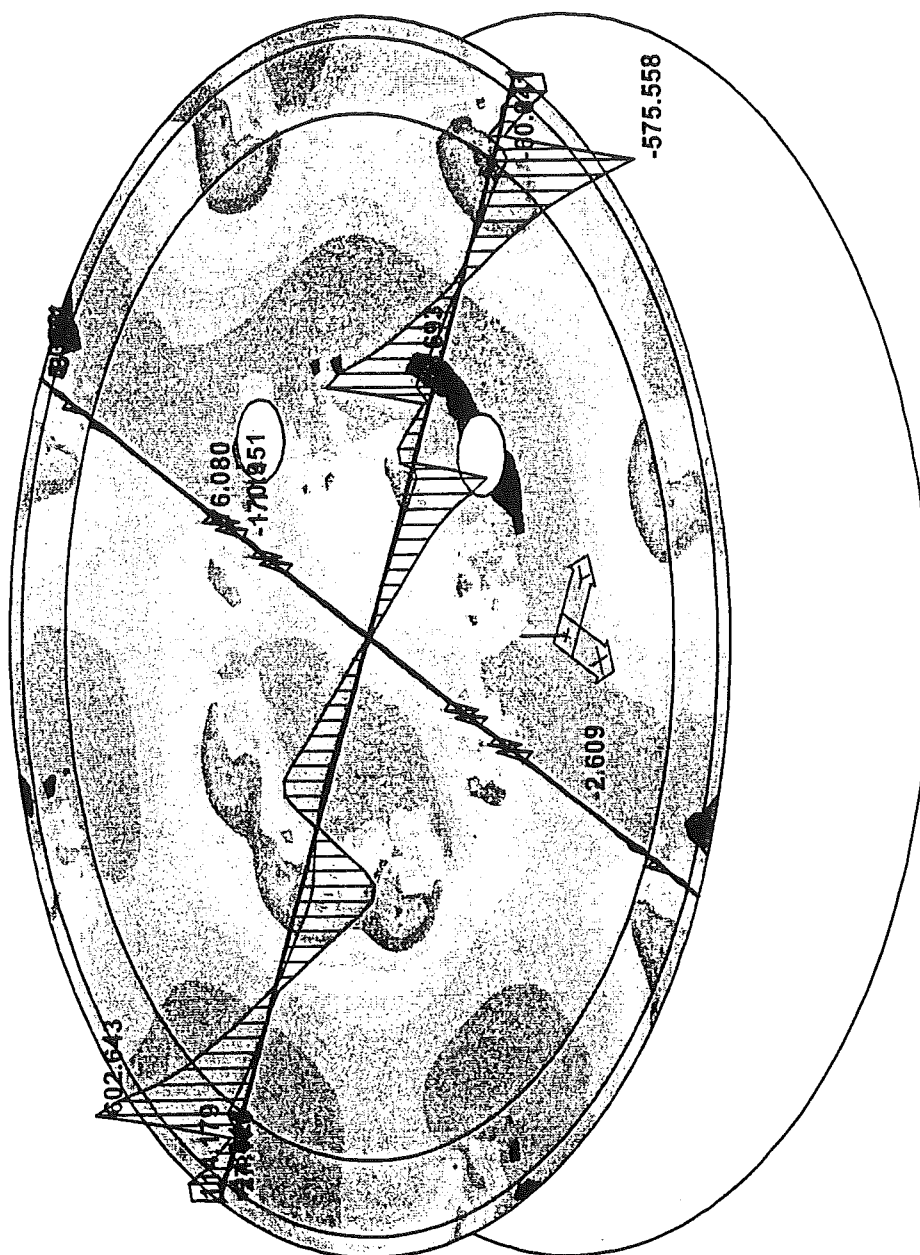


Internal force - max qy - FEM Combi : 1



Internal force - min qx - FEM Combi : 1

Min qy [kN/m]	
105.145	
52.572	
0.000	
-52.323	
-104.647	
-156.970	
-209.294	
-261.617	
-313.941	
-366.264	
-418.588	
-470.911	
-523.235	
-575.558	



Internal force - min qy - FEM Combi : 1

RESULTS : INTERNAL FORCES

FEM Combi:

C1 Eigen-Tragfähigk.

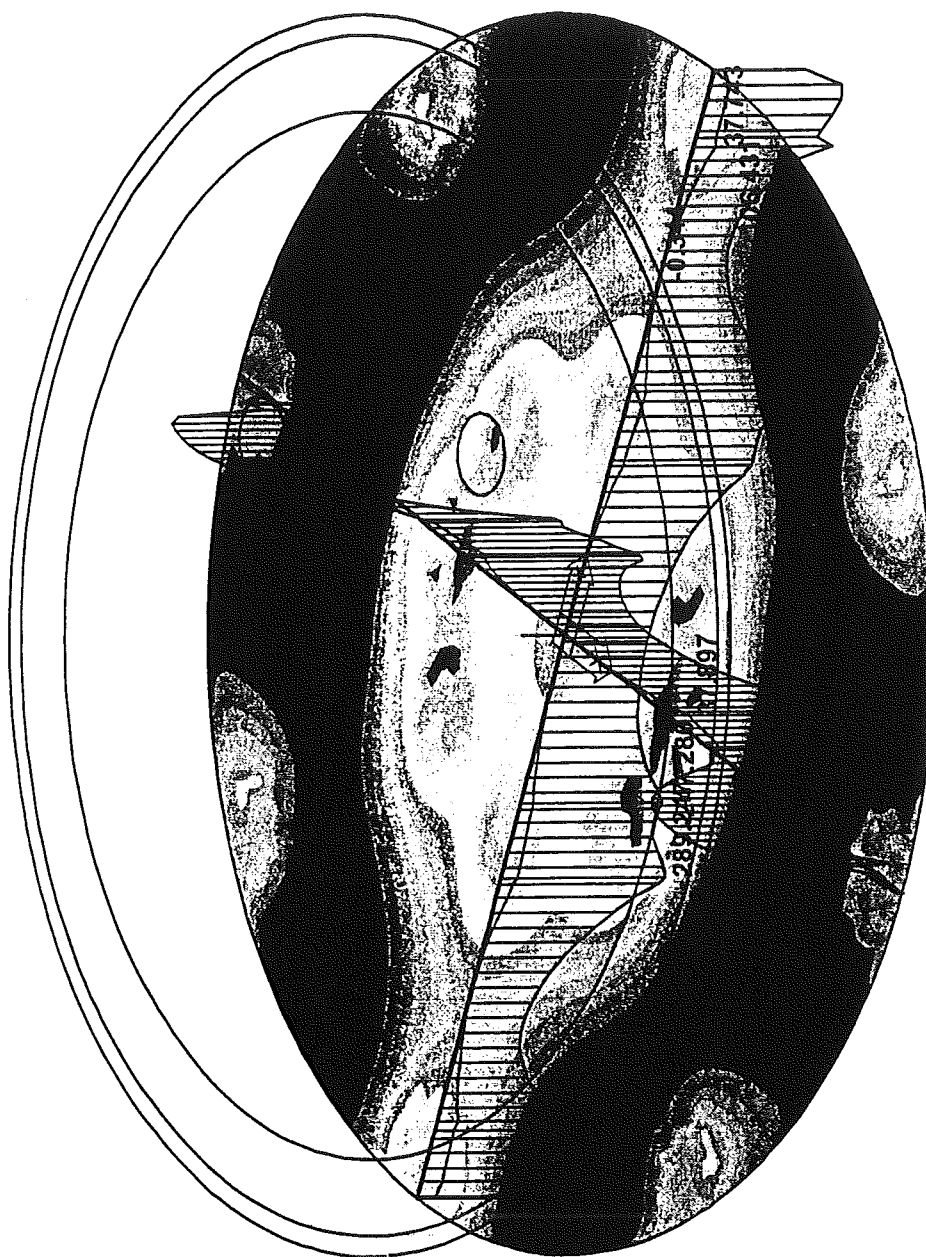
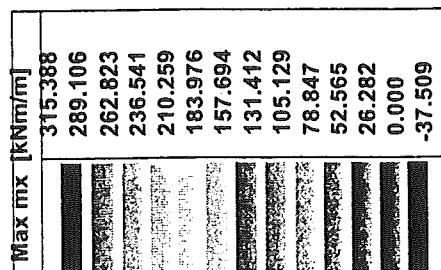
Global extremes

Rotation of the local system: No

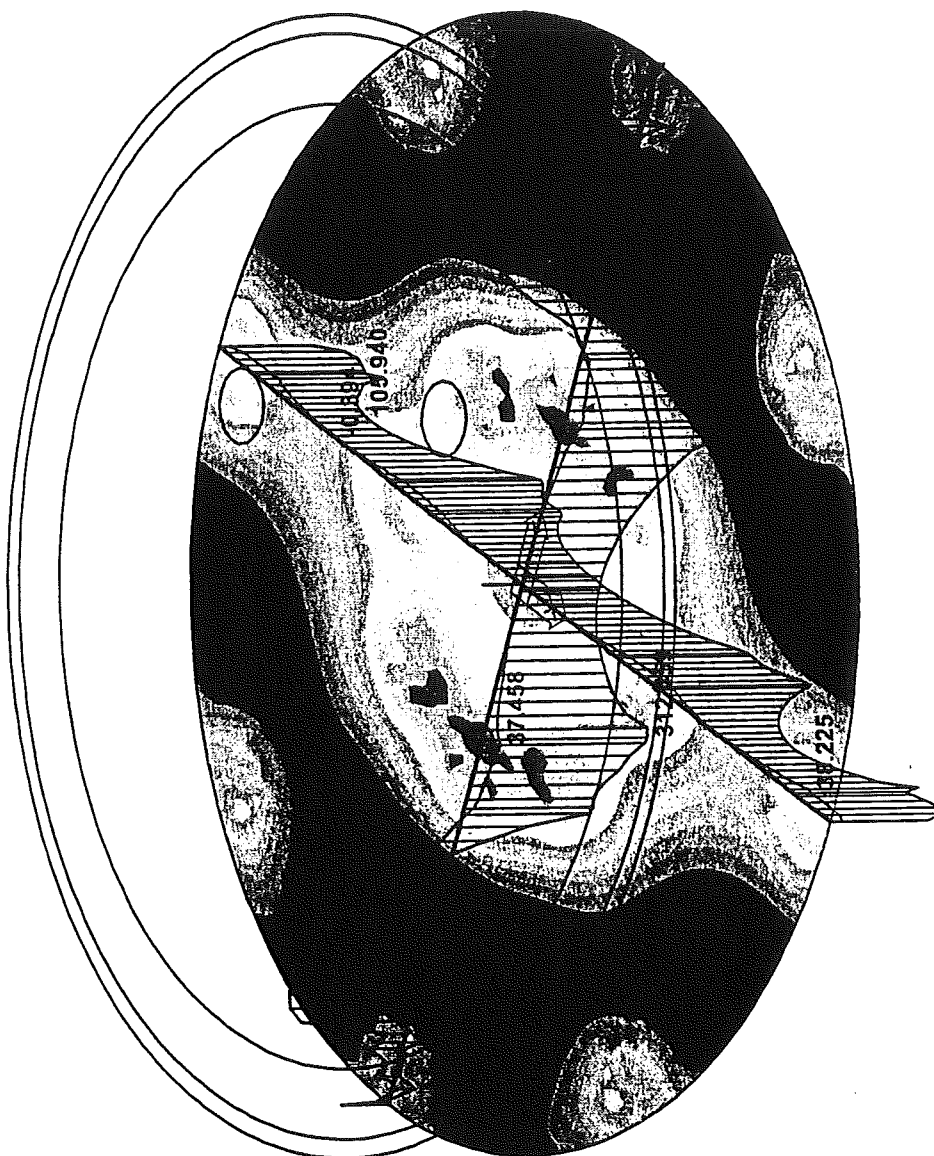
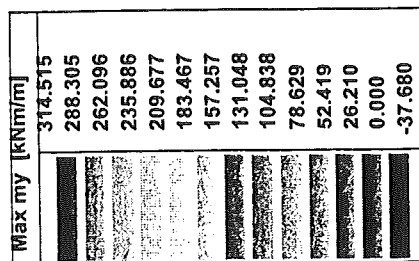
Basic magnitudes - bending, membrane

node	mx [kNm/m]	my [kNm/m]	mxy [kNm/m]	qx [kN/m]	qy [kN/m]	nx [kN/m]	ny [kN/m]	qxy [kN/m]
6116	286.672	75.886	2.757	23.098	5.662	12.923	10.679	1.414
9333	188.120	-127.509	-29.058	80.373	27.447	-96.118	-110.484	-48.660
4875	78.709	287.905	2.865	-0.599	21.071	10.784	12.485	1.933
9078	-96.960	177.884	-2.288	18.122	-357.041	-35.695	-98.695	-10.214
6885	172.508	177.680	117.266	25.466	20.937	11.139	12.358	0.926
6863	7.836	8.243	-116.605	-20.645	-3.160	-50.815	-45.854	-1.028
49	31.021	-17.351	7.470	686.503	0.184	26.555	8.176	13.765
12	-79.142	-127.465	-8.525	693.092	-4.797	-185.152	-23.329	-13.683
7383	4.217	236.088	30.384	43.174	724.853	2.774	29.845	7.403
39	-128.045	-88.151	-6.593	3.399	-575.558	-28.803	-139.636	-10.736
9355	161.093	26.557	69.030	23.427	32.569	353.552	271.890	88.510
9167	10.398	1.783	5.660	-23.188	-31.987	-370.678	-265.116	-102.939
9216	26.098	157.587	68.074	35.017	20.071	328.440	415.430	199.816
	1.452	9.096	5.542	-39.181	-30.934	-322.766	-428.548	-213.557
8595	-25.141	-1.948	3.024	4.827	20.238	127.911	100.652	230.135
	-123.834	-79.476	-1.900	-11.696	-106.538	-156.549	-113.491	-228.269

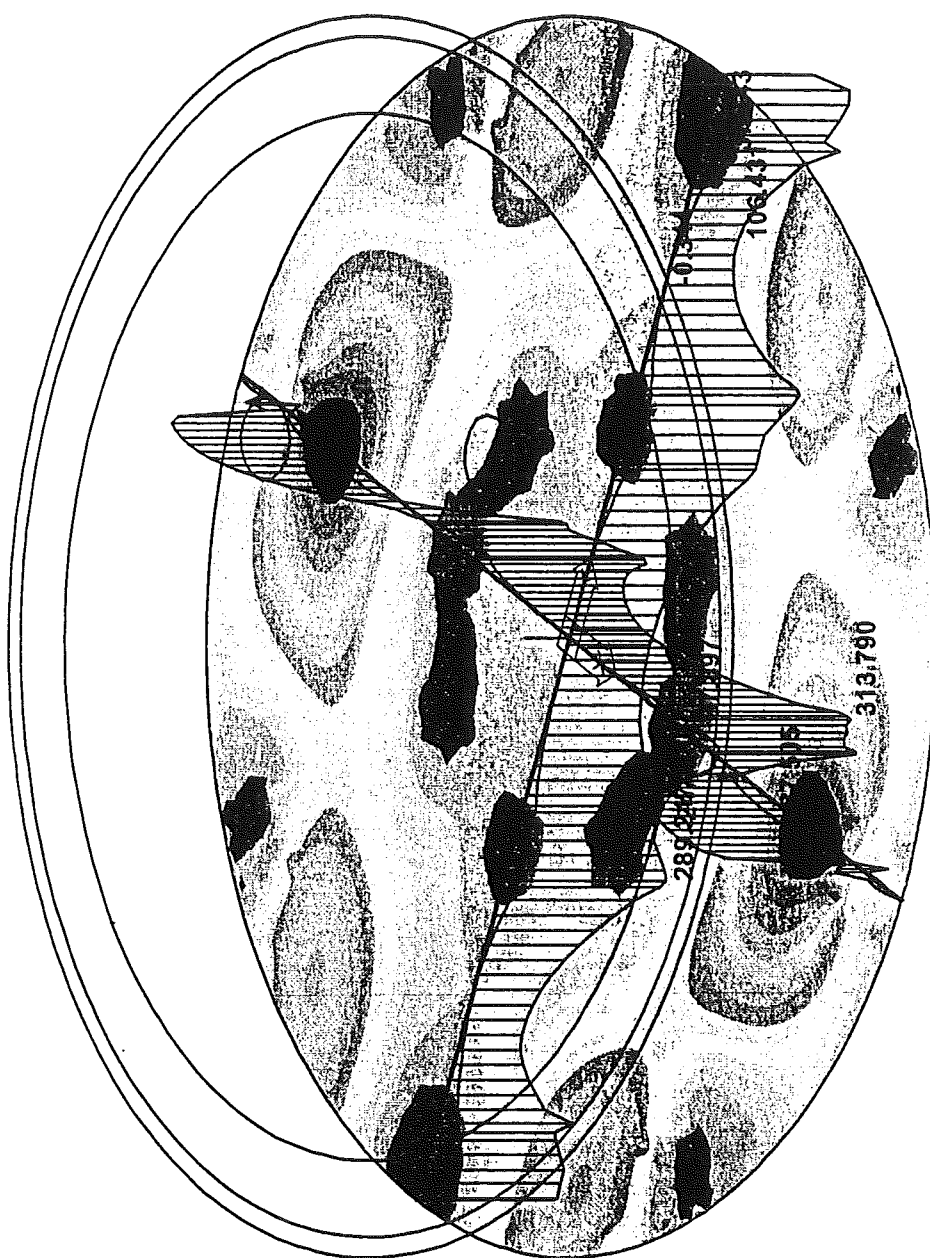
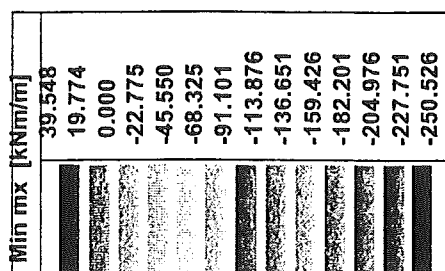
Selection was done for macros: 2



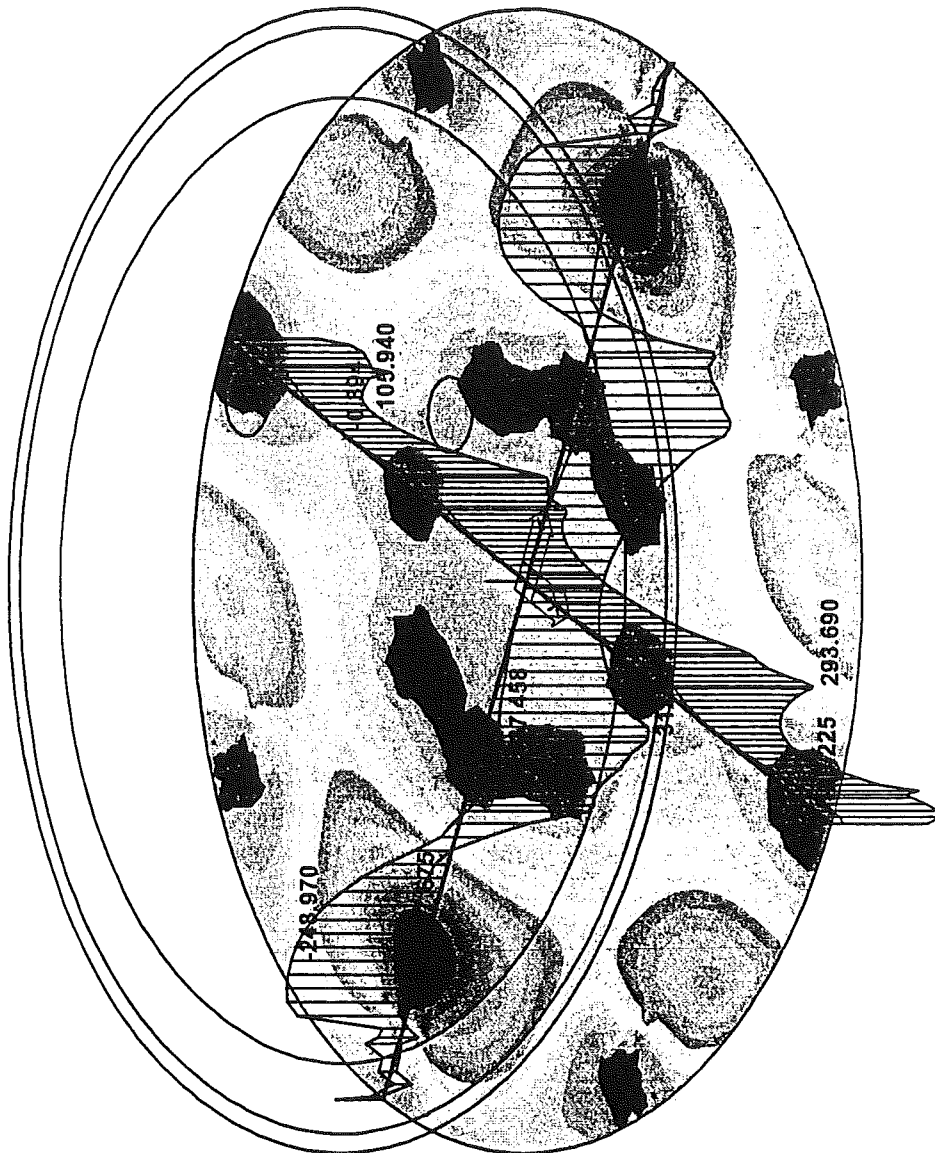
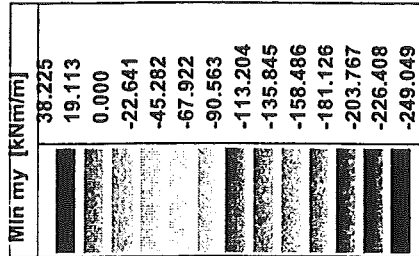
Internal force - max mx - FEM Combi : 1



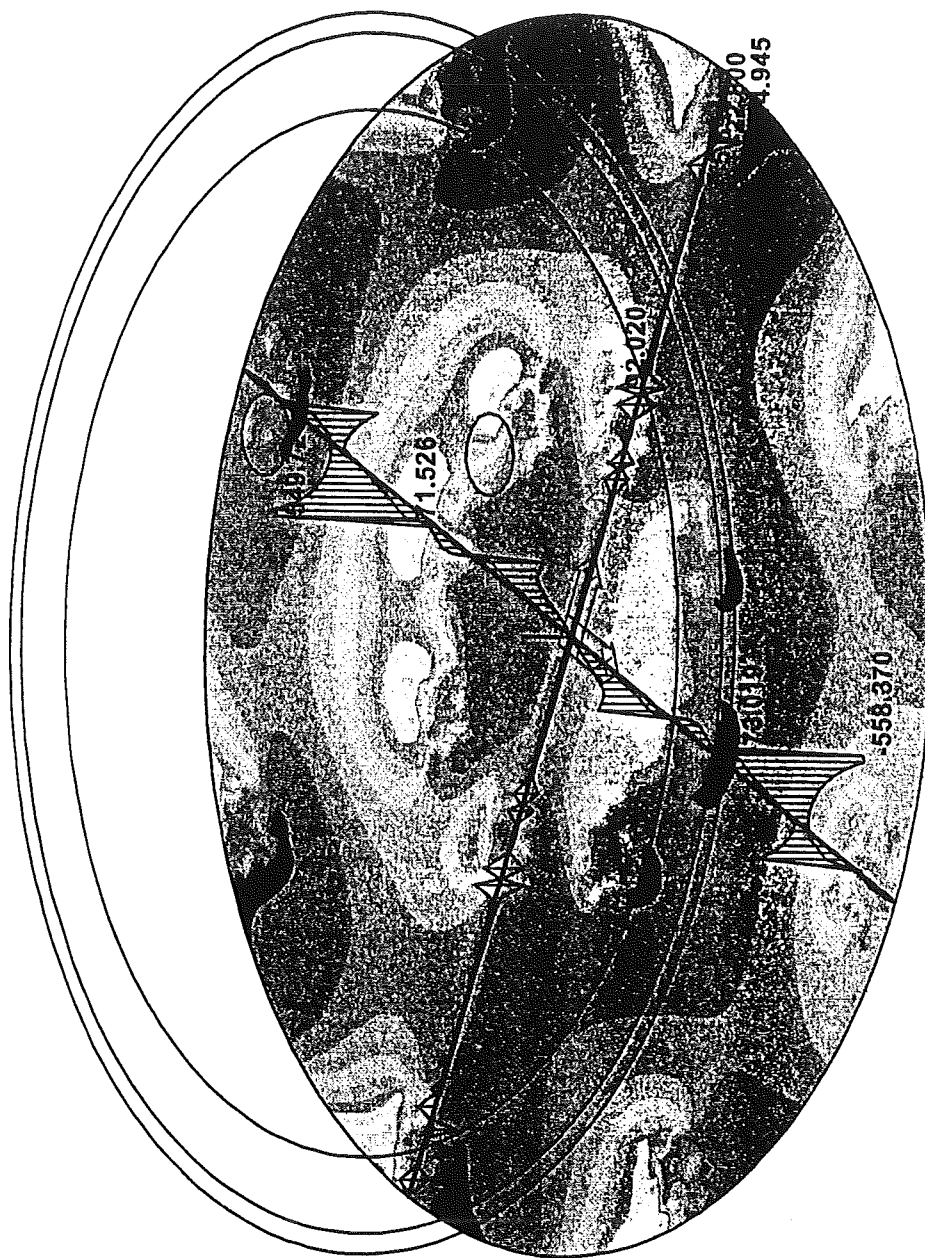
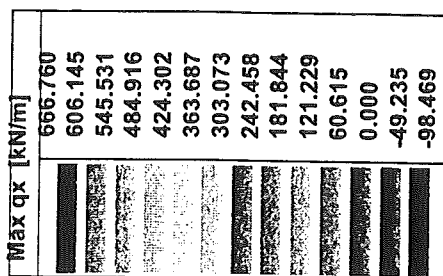
Internal force - max my - FEM Combi : 1



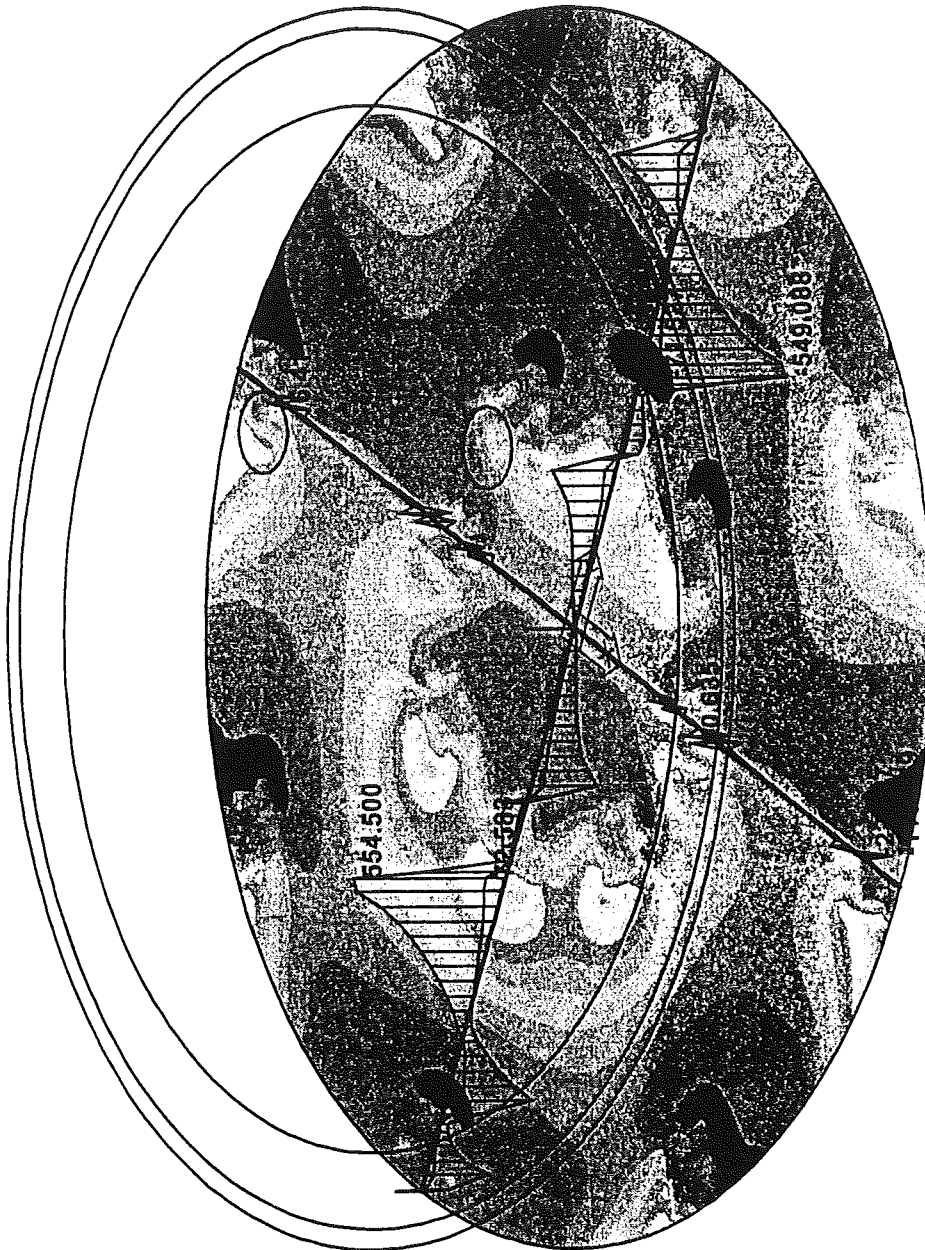
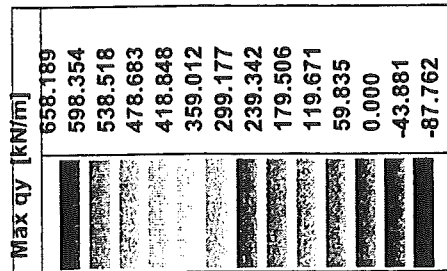
Internal force - min mx - FEM Combi : 1



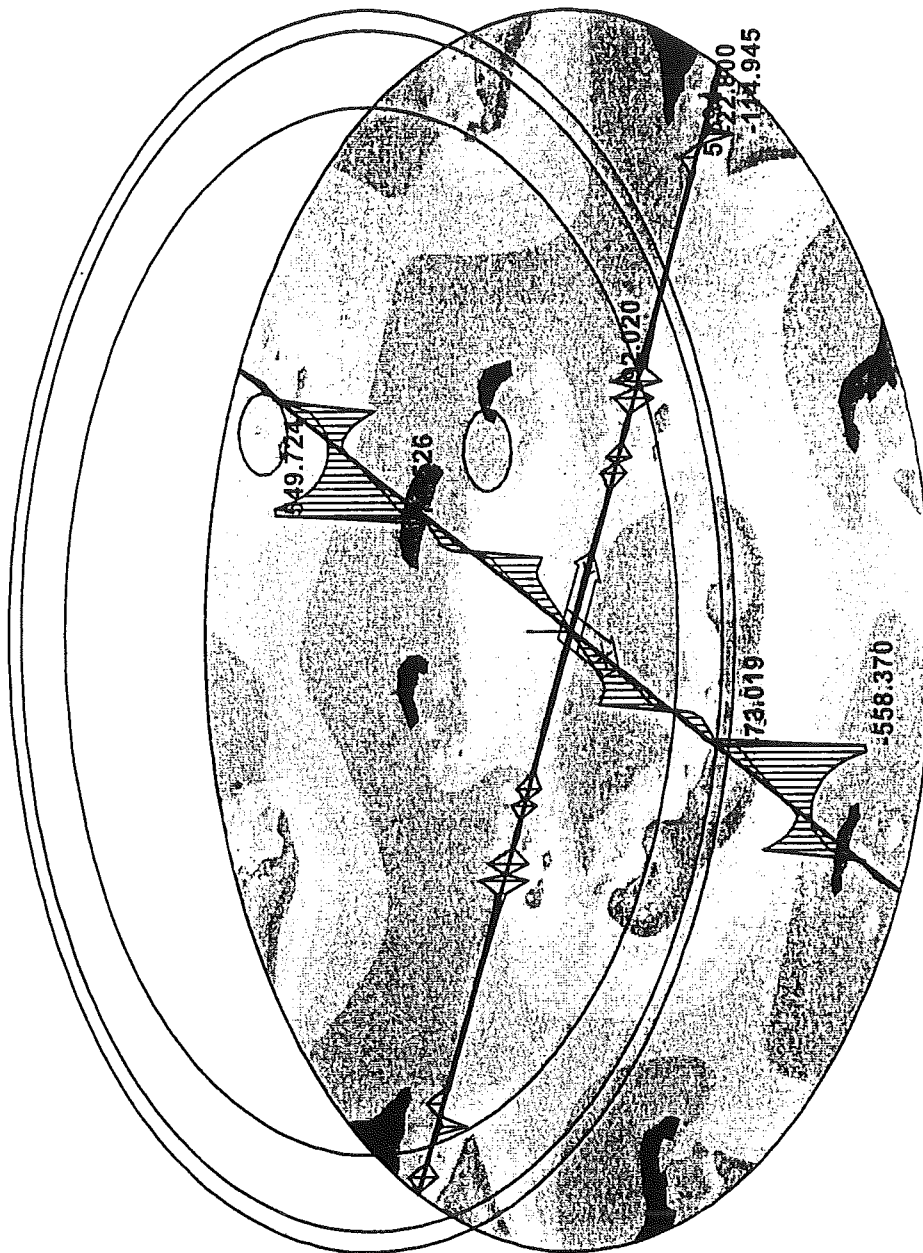
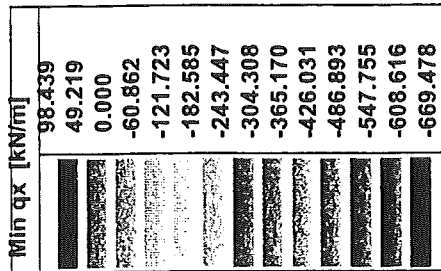
Internal force - min my - FEM Combi : 1



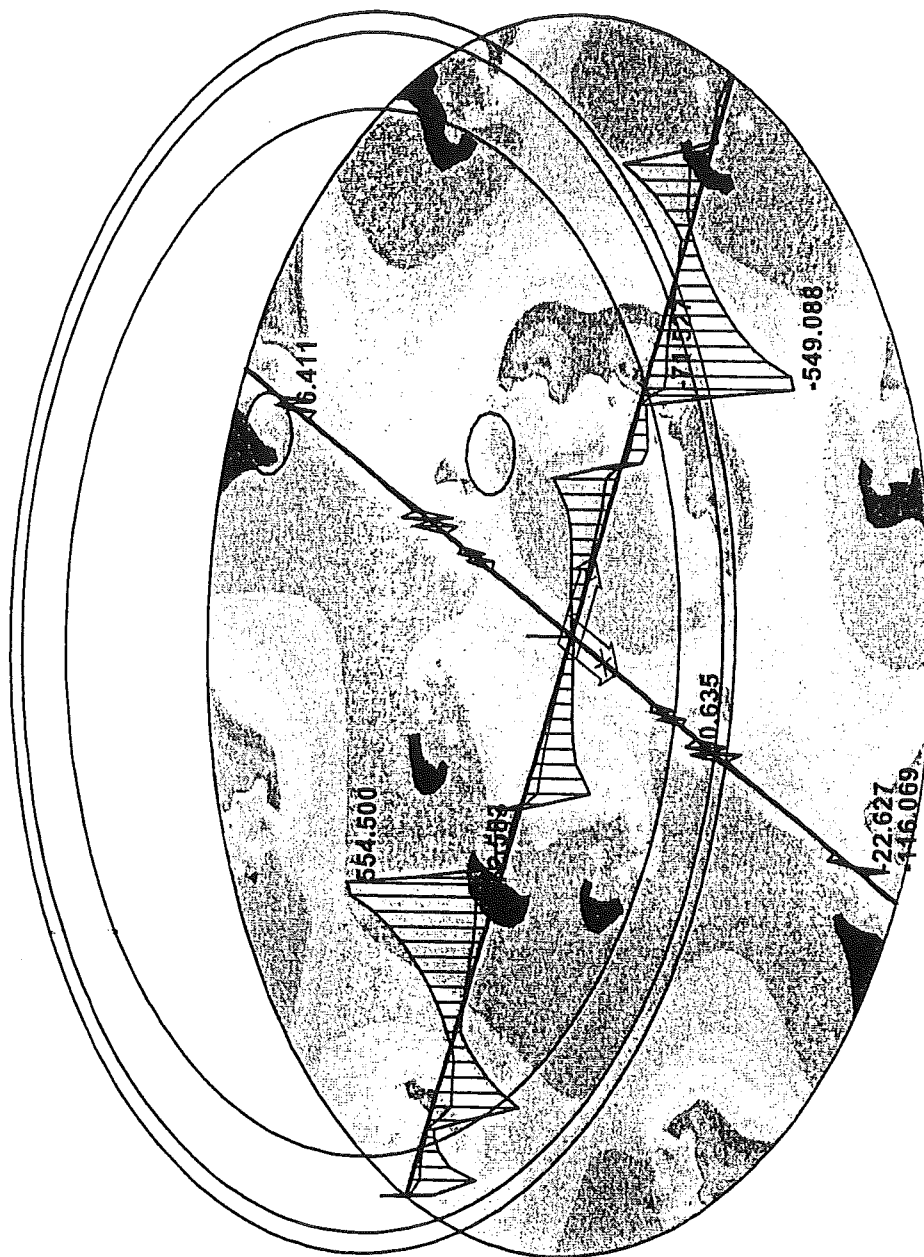
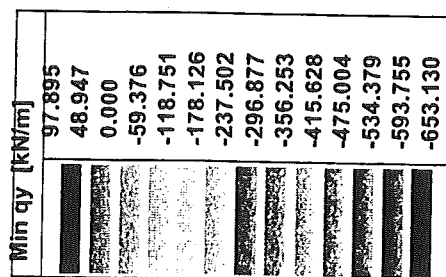
Internal force - max qx - FEM Combi : 1



Internal force - max qy - FEM Combi : 1



Internal force - min qx - FEM Combi : 1



Internal force - min qy - FEM Combi : 1

RESULTS : INTERNAL FORCES**FEM Combi:**

C1 Eigen-Tragfähigk.

Global extremes

Rotation of the local system: No

Basic magnitudes - bending, membrane

node	mx [kNm/m]	my [kNm/m]	mxy [kNm/m]	qx [kN/m]	qy [kN/m]	nx [kN/m]	ny [kN/m]	qxy [kN/m]
4596	-315.388	232.935	-0.337	62.054	-10.497	52.988	19.411	2.722
1816	-250.526	24.390	-56.909	70.900	28.914	-6.023	-2.522	-4.568
4443	241.881	314.515	3.116	331.034	185.980	105.188	33.882	23.173
9230	9.101	-249.049	-7.279	-9.416	-60.681	-1.126	-1.965	-0.307
4388	16.020	15.892	198.925	270.204	-58.291	76.654	77.185	3.181
4409	-22.347	-22.454	-198.469	-271.871	-270.419	-4.521	-4.471	-3.322
4210	239.653	5.580	-1.154	666.760	19.984	88.277	8.008	1.473
4224	31.926	-1.057	1.194	-669.478	1.319	-7.499	-0.618	-1.492
4316	7.340	238.617	16.069	-4.578	658.189	0.802	87.080	27.525
3907	-1.563	32.879	-16.334	-49.601	-653.130	-7.055	-7.560	-27.636
1940	-11.779	211.524	-0.468	364.050	126.645	146.762	18.820	53.194
4574	32.507	-92.838	-4.799	-51.744	35.483	-29.100	-3.016	-18.886
4371	208.230	-11.399	29.988	120.480	-78.093	18.531	146.108	3.911
4216	29.424	-91.073	-0.713	-3.512	10.894	-7.226	-52.124	-2.078
4338	3.382	220.474	-3.802	109.984	255.842	62.977	17.035	83.944
4352	-73.921	29.518	3.175	-104.625	56.350	-1.539	-7.227	-98.105

Selection was done for macros: 1

DIN 1045 7/88 concrete design**Design data & safety factors, ULS settings, detailing provisions and calculation settings**

Description	Value
Calculation	
Number of iteration steps	100
Precision of iteration	1 %
Check min/max tension reinforcement	ON
Columns: Determine governing cross-section in forehand	ON
Columns: Check min compress reinforcement	ON
Columns: Safety factor for bi-axial bending interaction formula $(M_y/M_{y0})^x + (M_z/M_{z0})^x < 1$ x=	1.4
Columns: Optimisation method number of bars in cross-section	OFF
Beams: Check max. depth of compression zone	ON
Beams: Calculate compression reinforcement	OFF
Beams: Check max compress reinforcement	ON
Beams: Check symetric reinforcement for compress reinforcement (17.2.3.2)	ON
Beams: Moment capping at supports	ON

Description	Value
Beams: Reduce shear force - At the effective depth from the face (support/column)	
Beams: Beta = angle between stirrups and beam	90 deg
Beams: Theta = angle between shear strut and axis of beam	45 deg
Beams: Check minimum shear reinforcement	OFF
Detailing provisions	
Min. perc. of reinforcement in cross-section for columns and beams	0.8 %
Max. degree of reinforcement in cross-section	9 %
Check min. bar distances	OFF
Check max. bar distances	OFF

Input for selected beams (shear reinforcement)

elem	stirr. diam. [cm]	qual.stirr.	#cuts	dist.stirr. [cm]
33	1	BSt 420	2	20.00
34	1	BSt 420	2	20.00
35	1	BSt 420	2	20.00
36	1	BSt 420	2	20.00
37	1	BSt 420	2	20.00
38	1	BSt 420	2	20.00
39	1	BSt 420	2	20.00
40	1	BSt 420	2	20.00
41	1	BSt 420	2	20.00
42	1	BSt 420	2	20.00
43	1	BSt 420	2	20.00
44	1	BSt 420	2	20.00
45	1	BSt 420	2	20.00
46	1	BSt 420	2	20.00
47	1	BSt 420	2	20.00
48	1	BSt 420	2	20.00

Explanation of concrete symbols

Abbreviation	Explanation
betaWN	Concrete cube compression strength.
betaR	Design concrete compression strength.
Tau01	1st shear stress limit according Table 13.
Tau02	2nd shear stress limit according Table 13.
Tau03	3rd shear stress limit according Table 13.

Concrete characteristics

	B 25
betaWN	25000.00 kPa
betaR	17500.00 kPa
Tau011_1 plates	350.00 kPa
Tau011_2 plates	500.00 kPa
Tau02 plates	1800.00 kPa
Tau012 beams	750.00 kPa
Tau02 beams	1800.00 kPa
Tau03 beams	3000.00 kPa

Explanation of reinforcement steel symbols

Abbreviation	Explanation
betaS	Characteristic yield strength of reinforcement

Steel characteristics

	BSI 420
betaS	420000.00 kPa
E modulus	200000000.00 kPa

Explanation of input for selected columns

Abbreviation	Explanation
qual.main.	Quality of main reinforcement
cov.y	Concrete cover in to direction axis Y
cov.z	Concrete cover in to direction axis Z
C/R	Circle or Rectangle column

Input for selected columns

elem	qual.main. [kPa]	cov.y [cm]	cov.z [cm]	C/R	stirr. diam. [cm]	qual.stirr.	Concr. class
33	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
34	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
35	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
36	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
37	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
38	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
39	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
40	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
41	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
42	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
43	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
44	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
45	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
46	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
47	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25
48	BSI 420	3(2)	3(2)	R	1	BSI 420	B 25

Explanation of main reinforcement for selected columns

Abbreviation	Explanation
diam	Bar diameter
As	Theoretical reinforcement area
U	Uni-axial (diagram)
B	Bi-axial (formula)
N/A	Not available
Interaction check	Result of the interaction formula $(M_{dy}/M_{uy})^x + (M_{dz}/M_{uz})^x < 1$ (safety factor $x = 1.4$)
Ratio	Ration among reinforcement

Main reinforcement for selected rectangular columns

elem	Combi Case	x.loc [m]	diam [cm]	As [cm ²]	Calc. Type	Interaction Check	Ratio y/z	#bars y/z
33	C13	0.00	2	40	B	0.11 < 1	0.50/0.50	
33	C13	0.00	2	40	B	0.11 < 1	0.50/0.50	

Foundation 1800 MT LOX Storage Tank, B62001

IKM

Project : 7574 ASU No. 9 Kosice

Author : Orth

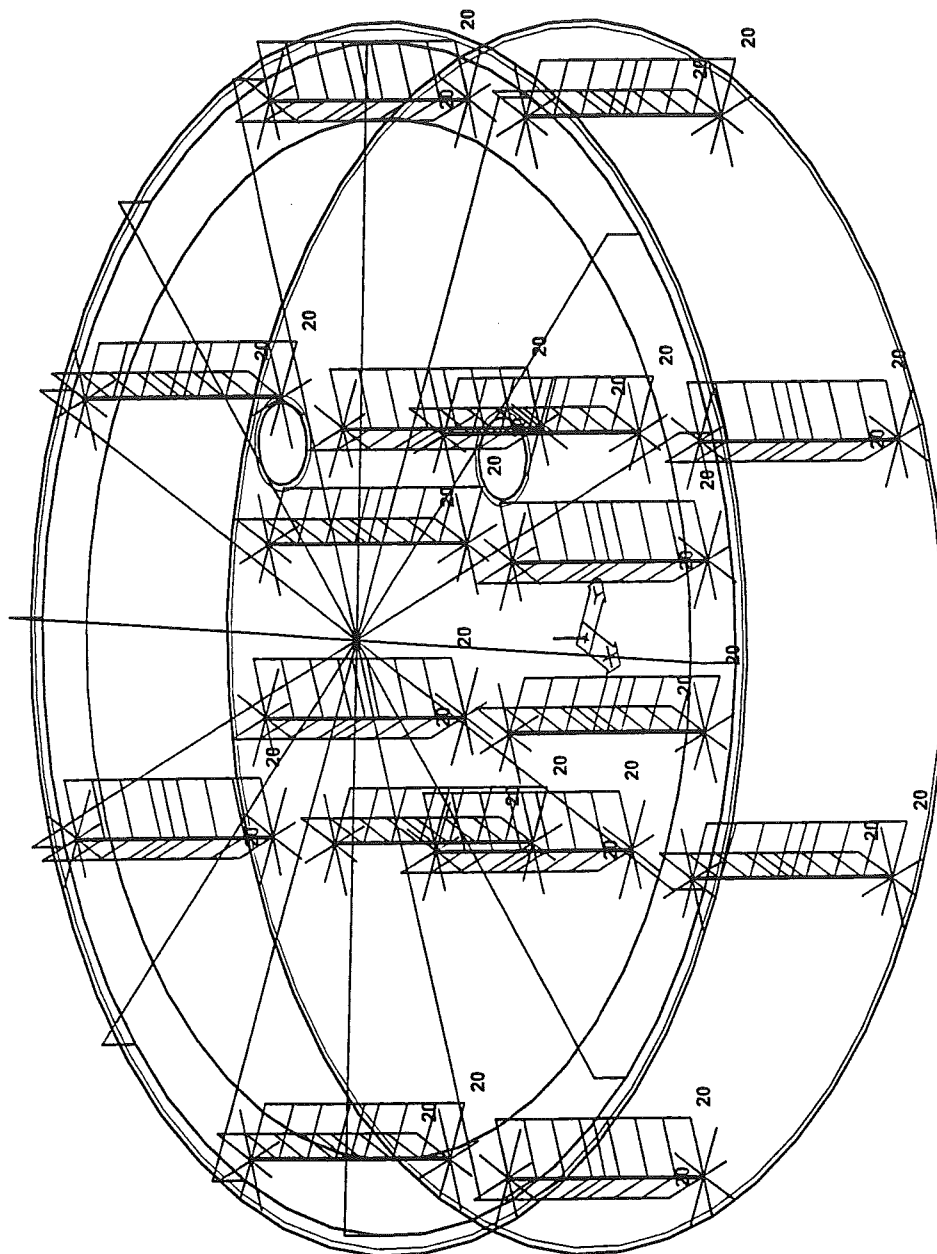
Page :A-81

Date : Freitag, 27. August 2004

elem	Combi Case	x.loc [m]	diam [cm]	As [cm^2]	Calc. Type	Interaction Check	Ratio y/z	#bars y/z
33	C13&C13	0.00	2	40	B		0.50/0.50	10/10
33	C35	3.00	2	40	B	0.38 < 1	0.50/0.50	
33	C35	3.00	2	40	B	0.38 < 1	0.50/0.50	
33	C35&C35	3.00	2	40	B		0.50/0.50	10/10
34	C24	0.00	2	40	B	0.11 < 1	0.50/0.50	
34	C24	0.00	2	40	B	0.11 < 1	0.50/0.50	
34	C24&C24	0.00	2	40	B		0.50/0.50	10/10
34	C20	3.00	2	40	B	0.36 < 1	0.50/0.50	
34	C20	3.00	2	40	B	0.36 < 1	0.50/0.50	
34	C20&C20	3.00	2	40	B		0.50/0.50	10/10
35	C35	0.00	2	40	B	0.11 < 1	0.50/0.50	
35	C35	0.00	2	40	B	0.11 < 1	0.50/0.50	
35	C35&C35	0.00	2	40	B		0.50/0.50	10/10
35	C33	3.00	2	40	B	0.38 < 1	0.50/0.50	
35	C33	3.00	2	40	B	0.38 < 1	0.50/0.50	
35	C33&C33	3.00	2	40	B		0.50/0.50	10/10
36	C17	0.00	2	40	B	0.11 < 1	0.50/0.50	
36	C17	0.00	2	40	B	0.11 < 1	0.50/0.50	
36	C17&C17	0.00	2	40	B		0.50/0.50	10/10
36	C21	3.00	2	40	B	0.37 < 1	0.50/0.50	
36	C21	3.00	2	40	B	0.37 < 1	0.50/0.50	
36	C21&C21	3.00	2	40	B		0.50/0.50	10/10
37	C33	0.00	2	40	B	0.11 < 1	0.50/0.50	
37	C33	0.00	2	40	B	0.11 < 1	0.50/0.50	
37	C33&C33	0.00	2	40	B		0.50/0.50	10/10
37	C32	3.00	2	40	B	0.36 < 1	0.50/0.50	
37	C32	3.00	2	40	B	0.36 < 1	0.50/0.50	
37	C32&C32	3.00	2	40	B		0.50/0.50	10/10
38	C21	0.00	2	40	B	0.10 < 1	0.50/0.50	
38	C21	0.00	2	40	B	0.10 < 1	0.50/0.50	
38	C21&C21	0.00	2	40	B		0.50/0.50	10/10
38	C10	3.00	2	40	B	0.36 < 1	0.50/0.50	
38	C10	3.00	2	40	B	0.36 < 1	0.50/0.50	
38	C10&C10	3.00	2	40	B		0.50/0.50	10/10
39	C29	0.00	2	40	B	0.11 < 1	0.50/0.50	
39	C29	0.00	2	40	B	0.11 < 1	0.50/0.50	
39	C29&C29	0.00	2	40	B		0.50/0.50	10/10
39	C33	3.00	2	40	B	0.38 < 1	0.50/0.50	
39	C33	3.00	2	40	B	0.38 < 1	0.50/0.50	
39	C33&C33	3.00	2	40	B		0.50/0.50	10/10
40	C13	0.00	2	40	B	0.11 < 1	0.50/0.50	
40	C13	0.00	2	40	B	0.11 < 1	0.50/0.50	
40	C13&C13	0.00	2	40	B		0.50/0.50	10/10
40	C10	3.00	2	40	B	0.36 < 1	0.50/0.50	
40	C10	3.00	2	40	B	0.36 < 1	0.50/0.50	
40	C10&C10	3.00	2	40	B		0.50/0.50	10/10
41	C13	0.00	2	40	B	0.15 < 1	0.50/0.50	
41	C13	0.00	2	40	B	0.15 < 1	0.50/0.50	
41	C13&C13	0.00	2	40	B		0.50/0.50	10/10
41	C13	3.00	2	40	B	0.04 < 1	0.50/0.50	

elem	Combi Case	x.loc [m]	diam [cm]	As [cm ²]	Calc. Type	Interaction Check	Ratio y/z	#bars y/z
41	C13	3.00	2	40	B	0.04 < 1	0.50/0.50	
41	C13&C13	3.00	2	40	B		0.50/0.50	10/10
42	C39	0.00	2	40	B	0.15 < 1	0.50/0.50	
42	C39	0.00	2	40	B	0.15 < 1	0.50/0.50	
42	C39&C39	0.00	2	40	B		0.50/0.50	10/10
42	C39	3.00	2	40	B	0.04 < 1	0.50/0.50	
42	C39	3.00	2	40	B	0.04 < 1	0.50/0.50	
42	C39&C39	3.00	2	40	B		0.50/0.50	10/10
43	C24	0.00	2	40	B	0.15 < 1	0.50/0.50	
43	C24	0.00	2	40	B	0.15 < 1	0.50/0.50	
43	C24&C24	0.00	2	40	B		0.50/0.50	10/10
43	C24	3.00	2	40	B	0.04 < 1	0.50/0.50	
43	C24	3.00	2	40	B	0.04 < 1	0.50/0.50	
43	C24&C24	3.00	2	40	B		0.50/0.50	10/10
44	C35	0.00	2	40	B	0.15 < 1	0.50/0.50	
44	C35	0.00	2	40	B	0.15 < 1	0.50/0.50	
44	C35&C35	0.00	2	40	B		0.50/0.50	10/10
44	C35	3.00	2	40	B	0.04 < 1	0.50/0.50	
44	C35	3.00	2	40	B	0.04 < 1	0.50/0.50	
44	C35&C35	3.00	2	40	B		0.50/0.50	10/10
45	C33	0.00	2	40	B	0.16 < 1	0.50/0.50	
45	C33	0.00	2	40	B	0.16 < 1	0.50/0.50	
45	C33&C33	0.00	2	40	B		0.50/0.50	10/10
45	C33	3.00	2	40	B	0.04 < 1	0.50/0.50	
45	C33	3.00	2	40	B	0.04 < 1	0.50/0.50	
45	C33&C33	3.00	2	40	B		0.50/0.50	10/10
46	C21	0.00	2	40	B	0.15 < 1	0.50/0.50	
46	C21	0.00	2	40	B	0.15 < 1	0.50/0.50	
46	C21&C21	0.00	2	40	B		0.50/0.50	10/10
46	C21	3.00	2	40	B	0.04 < 1	0.50/0.50	
46	C21	3.00	2	40	B	0.04 < 1	0.50/0.50	
46	C21&C21	3.00	2	40	B		0.50/0.50	10/10
47	C29	0.00	2	40	B	0.15 < 1	0.50/0.50	
47	C29	0.00	2	40	B	0.15 < 1	0.50/0.50	
47	C29&C29	0.00	2	40	B		0.50/0.50	10/10
47	C29	3.00	2	40	B	0.04 < 1	0.50/0.50	
47	C29	3.00	2	40	B	0.04 < 1	0.50/0.50	
47	C29&C29	3.00	2	40	B		0.50/0.50	10/10
48	C17	0.00	2	40	B	0.15 < 1	0.50/0.50	
48	C17	0.00	2	40	B	0.15 < 1	0.50/0.50	
48	C17&C17	0.00	2	40	B		0.50/0.50	10/10
48	C17	3.00	2	40	B	0.04 < 1	0.50/0.50	
48	C17	3.00	2	40	B	0.04 < 1	0.50/0.50	
48	C17&C17	3.00	2	40	B		0.50/0.50	10/10

| geo.: 4ø25 + 8ø20
 Bu 4 10/20cm



Needed areas, stirrups

Code for calculation: DIN 1045 7/88
Serviceability crack proof

Explanation of concrete symbols

Abbreviation	Explanation
betaWN	Concrete cube compression strength.
betaR	Design concrete compression strength.
Tau01	1st shear stress limit according Table 13.
Tau02	2nd shear stress limit according Table 13.
Tau03	3rd shear stress limit according Table 13.

Concrete characteristics

	B 25
betaWN	25000.000 kPa
betaR	17500.000 kPa
Tau011_1 plates	350.000 kPa
Tau011_2 plates	500.000 kPa
Tau02 plates	1800.000 kPa
Tau012 beams	750.000 kPa
Tau02 beams	1800.000 kPa
Tau03 beams	3000.000 kPa

Explanation of reinforcement steel symbols

Abbreviation	Explanation
betaS	Characteristic yield strength of reinforcement

Steel characteristics

	BSt 420
betaS	420000.000 kPa
E modulus	200000000.000 kPa

Input parameters

Description	Percentage
Maximum % of reinforcement	9.00
Minimum % of net reinforcement	0.00
Minimum % of pressure reinforcement	0.50
Minimum % of tension reinforcement	0.00
Minimum % of transverse reinforcement	20.00

Shear mode

Tension reinforcement goes from one support to the other in full value.

Description	Value
height < 7 cm represents increase of internal forces (§ 17.2.1 (6))	ON
Structural reinforcement of deep beam	OFF

Description	Value
Maximum allowable crack width on face Zp+	0.25
Maximum allowable crack width on face Zp-	0.25
Characteristic bar distances on face Zp+	200.00

Description	Value
Characteristic bar distances on face Zp-	200.00
Load case attribute	crack proof LC due to internally caused imposed deformations
Effect upon the mean strain	1.00
Effect upon the mean crack distance	0.80
Environment class	3. moist - buildings with access outdoor air

Explanation of symbols - longitudinal reinforcement

Symbol	Explanation
s	Minimum constructive reinforcement superposing statically required tension reinforcement
c	Minimum constructive reinforcement superposing statically required pressure reinforcement
v	Virtual tension reinf (elliptic pressure state)
m	Min. pressure reinforcement percentage
+	Statically required reinforcement is designed according to crack proof requirements

Explanation of symbols - shear reinforcement

Symbol	Explanation
+	Shear reinforcement required (Shear Region 2)

Macro 1 extremes

Necessary areas

node	As1+ [cm ² /m]	As2+ [cm ² /m]	As3+ [cm ² /m]	As3- [cm ² /m]	As2- [cm ² /m]	As1- [cm ² /m]	Ass [cm ² /m ²]	tau [MPa]	tau0 [MPa]
1816	14.572	2.900	~	~	9.734	1.947	5.493	0.13	0.33
1002	0.000	0.000	~	~	9.924c	11.556v	3.909	0.09	0.24
713	4.014s	14.607	~	~	4.227c	9.130	6.132	0.15	0.37
1002	0.000	0.000	~	~	9.924c	11.556v	3.909	0.09	0.24
4465	0.001	0.003	~	~	13.834	13.155	6.165	0.15	0.37
9467	7.339	5.749	~	~	0.000	0.000	0.000+	0.00	0.07
4216	0.712	3.558	~	~	2.235	13.978	7.054+	0.17	0.42
9467	7.339	5.749	~	~	0.000	0.000	0.000+	0.00	0.07
238	0.220	0.044	~	~	12.224c	10.325	13.803	0.33	0.69
7548	0.422m	2.112m	~	~	2.073	10.367	0.000	0.00	0.01
238	0.220	0.044	~	~	12.224c	10.325	13.803	0.33	0.69
7548	0.422m	2.112m	~	~	2.073	10.367	0.000	0.00	0.01
183	0.139	0.152	~	~	13.046c	12.972	12.748	0.31	0.73
3870	0.128	0.642	~	~	1.820c	9.098v	0.000	0.00	0.00

Macro 2 extremes

Necessary areas

node	As1+ [cm ² /m]	As2+ [cm ² /m]	As3+ [cm ² /m]	As3- [cm ² /m]	As2- [cm ² /m]	As1- [cm ² /m]	Ass [cm ² /m ²]	tau [MPa]	tau0 [MPa]
20	12.170c	12.218	~	~	7.658s	6.676	1.313+	0.03	0.12
4825	0.000	0.000	~	~	8.843	8.627	0.000	0.00	0.00
20	12.170c	12.218	~	~	7.658s	6.676	1.313+	0.03	0.12
4825	0.000	0.000	~	~	8.843	8.627	0.000	0.00	0.00
29	9.747s	9.058	~	~	13.897s	14.453	0.000+	0.00	0.08