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| Investitor: | Projektant načrta/elaborata: |
|  Mestna občina Ljubljana Mestni trg 1 1000 Ljubljana &  |  |

PRILOGA 1C

NASLOVNA STRAN NAČRTA

2 - Načrt s področja gradbeništva

2/7 - Načrt rekonstrukcije nadvoza VA0235
nad AC A1 na Barjanski cesti

PODATKI O GRADNJI

naziv gradnje

UREDITEV BARJANSKE CESTE MED KRIŽANJEM Z
ZIHERLOVO CESTO IN AC PRIKLJUČKOM LJUBLJANA
CENTER

kratek opis gradnje

Rekonstrukcija obstoječega nadvoza VA0235 nad AC A1 na Barjanski cesti z
razširitvijo obstoječega nadvoza zaradi novih predvidenih površin za
kolesarje in pešce.

VRSTE GRADNJE

označiti vse ustrezne vrste gradnje

NOVOGRADNJA - NOVOZGRAJEN OBJEKT

NOVOGRADNJA - PRIZIDAVA

☒ REKONSTRUKCIJA

SPREMEMBA NAMEMBNOSTI

ODSTRANITEV CELOTNEGA OBJEKTA

LEGALIZACIJA

MANJŠA REKONSTRUKCIJA

PODATKI O PROJEKTNI DOKUMENTACIJI

vrsta dokumentacije

PZI (izvleček za razpis)

številka projekta

8953

PODATKI O NAČRTU

strokovno področje načrta

2 Načrt s področja gradbeništva

naziv načrta

2/7 - Načrt rekonstrukcije nadvoza VA0235 nad AC A1 na Barjanski
cesti

številka načrta

18-3/2023

datum izdelave

november 2024, dopolnjeno marec 2025

datum spremembe

PODATKI O PROJEKTANTU NAČRTA

projektant načrta (naziv družbe)

PROMICO d.o.o.

naslov

Šmartinska cesta 56, 1000 Ljubljana

odgovorna oseba projektanta načrta

Iztok Turk

podpis odgovorne osebe

projektanta načrta

PODATKI O IZDELOVALCU NAČRTA

ime in priimek pooblaščenega arhitekta, pooblaščenega inženirja

Iztok Turk, univ. dipl. inž. grad.

identifikacijska številka

IZS PI G-0048

podpis pooblaščenega arhitekta, pooblaščenega inženirja

IZTOK TURK
univ. dipl. inž. grad.
IZS G-0048

Zvezek 1 od 4

Splošni del, tehnični del (1. del)

vsebina zvezka:

| Številka odseka | Arhivska št. | Faza / objekt | Šifra priloge | Prostor za črtno kodo |
|-----------------|--------------|---------------|---------------|-----------------------|
| | | 004.2160 | S.1 | |

S.2.1**Podatki o sodelujočih**

| | |
|---------------------------|--|
| <i>Številka projekta</i> | 8953 |
| <i>Številka načrta</i> | 18-3/2023 |
| <i>Projektant načrta</i> | PROMICO d.o.o., Šmartinska cesta 56, 1000 Ljubljana |
| <i>Pooblaščen inženir</i> | IZTOK TURK, univ.dipl.inž.grad., PI G-0048 PROMICO d.o.o.,Šmartinska cesta 56, 1000 Ljubljana |
| <i>Sodelavci načrta</i> | DAVID PESEK, univ.dipl.inž.grad., PI G-4592 PROMICO d.o.o.,Šmartinska cesta 56, 1000 Ljubljana MATIC ŠUŠTERŠIČ, mag.inž.grad., PI G-4846 PROMICO d.o.o.,Šmartinska cesta 56, 1000 Ljubljana VIT LJUBETIČ, inž.grad., PROMICO d.o.o.,Šmartinska cesta 56, 1000 Ljubljana |

| | | | | |
|-----------------|--------------|---------------|---------------|-----------------------|
| Številka odseka | Arhivska št. | Faza / objekt | Šifra priloge | Prostor za črtno kodo |
| | | 004.2160 | S.2.1 | |

| | |
|--------------|---|
| S.3.2 | KAZALO VSEBINE NAČRTA PZI, št. 18-3/2023 |
|--------------|---|

2 Načrt s področja gradbenih konstrukcij
2/7 Načrt rekonstrukcije nadvoza VA0235 nad AC A1 na Barjanski cesti

Zvezek 2/7.1 - Splošni del, tehnični del (1. del)

| | |
|----------|---|
| S | Splošni del |
| S.1 | Naslovna stran s ključnimi podatki o načrtu (priloga 1B) |
| S.2.1 | Podatki o sodelujočih |
| S.3.2 | Kazalo vsebine načrta |
| S.5.1 | Izjava projektanta načrta in pooblaščenega strokovnjaka, ki je izdelal načrt PZI (Priloga 2C) |
| S.6.1 | Dokumentacija o recenziji |
| T | Tehnični del |
| T.1.1 | Tehnično poročilo |
| T.1.2 | Statični račun (1. del) |

Zvezek 2/7.2 – Tehnični del (2. del), Lokacijski prikazi

| | | | |
|-------------|--|---------|-----------|
| S | Splošni del | | |
| S.1 | Naslovna stran s ključnimi podatki o načrtu | | |
| S.3.2 | Kazalo vsebine načrta | | |
| T | Tehnični del | | |
| T.1.2 | Statični račun (2. del) | | |
| T.2.1 | Projektantski popis | | |
| T.2.2 | Projektantski predračun | | |
| G | Risbe | | |
| šifra risbe | Lokacijski prikazi | merilo | št. lista |
| G.201 | Ureditvena situacija s prikazom komunalnih vodov | M 1:500 | L 1 |

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|-----------------|--------------|---------------|---------------|-----------------------|
| Številka odseka | Arhivska št. | Faza / objekt | Šifra priloge | Prostor za črtno kodo |
| | | 004.2160 | S.3.2 | |

Zvezek 2/7.3 - Splošni načrti, Opažni načrti, Armaturni načrti

S Splošni del

- S.1 Naslovna stran s ključnimi podatki o načrtu
S.3.2 Kazalo vsebine načrta

| šifra risbe | Splošni načrti | merilo | št. lista |
|-------------|---|------------|-----------|
| G.221.1 | Dispozicija obstoječega stanja | M 1:200/50 | 1 |
| G.221.2 | Tloris in vzdolžni prerez nadvoza | M 1:200 | 2 |
| G.232.1 | Karakteristični prečni prerez | M 1:25 | 3 |
| G.232.2 | Rekonstrukcija krajne podpore v osi 0 | M 1:50 | 4 |
| G.232.3 | Rekonstrukcija tipične vmesne podpore | M 1:50 | 5 |
| G.232.1 | Rekonstrukcija krajne podpore v osi 9 | M 1:50 | 6 |
| G.219.1 | Tehnologija gradnje | M 1:50/100 | 7 |
| G.251 | Detajl sanacije poškodb betonskih površin z lokalno reprofilacijo | M 1:10/5 | 8 |

| šifra risbe | Opažni načrti | merilo | št. lista |
|-------------|-------------------------------------|------------|-----------|
| G.261.1 | Opažni načrt krajne podpore v osi 1 | M 1:25/50 | OP-1 |
| G.261.2 | Opažni načrt krajne podpore v osi 9 | M 1:25/50 | OP-2 |
| G.261.3 | Opažni načrt prekladne konstrukcije | M 1:25/50 | OP-3 |
| G.261.4 | Opažni načrt hodnika | M 1:100/25 | OP-4 |

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|-----------------|--------------|---------------|---------------|-----------------------|
| Številka odseka | Arhivska št. | Faza / objekt | Šifra priloge | Prostor za črtno kodo |
| | | 004.2160 | S.3.2 | |

Zvezek 2/7.4 – Detajli in oprema, Odvodnja

S Splošni del

| | |
|-------|---|
| S.1 | Naslovna stran s ključnimi podatki o načrtu |
| S.3.2 | Kazalo vsebine načrta |

| šifra risbe | Detajli in oprema | merilo | št. lista |
|-------------|--|--------------|-----------|
| G.251.1 | Detajl vgradnje ležišč | M 1:200/10/5 | DET-1 |
| G.251.2 | Podloga za delavniški načrt dilatacije v osi 1 | M 1:25/10 | DET-2 |
| G.251.3 | Podloga za delavniški načrt dilatacije v osi 9 | M 1:25/10 | DET-3 |
| G.251.4 | Detajl robnika | M 1:5 | DET-4 |
| G.251.5 | Dispozicija merilnih čepov | M 1:200/10 | DET-5 |
| G.251.6 | Detajl merilnega čepa | M 1:1 | DET-6 |
| G.251.7 | Detajl prehodnega revizijskega jaška | M 1:10 | DET-7 |
| G.251.8 | Detajl podkonstrukcije za komunalne vode | M 1:10 | DET-8 |
| G.251.9 | Prehodni revizijski jašek | M 1:20 | DET-9 |

T Tehnični del

| | |
|-----|---|
| T.1 | Tehnično poročilo k odvodnji meteornih voda |
|-----|---|

| šifra risbe | Odvodnja | merilo | št. lista |
|-------------|--|---------|-----------|
| G.319.1 | Odvodnja meteornih voda-tloris in vzdolžni prerez kanala I | M 1:100 | ODV-1 |
| G.319.2 | Odvodnja meteornih voda- tloris in vzdolžni prerez kanala II | M 1:100 | ODV-2 |
| G.331.1 | Odvodnja meteornih voda-karakteristični prečni prerez | M 1:25 | ODV-3 |
| | | | |
| | Detajli odvodnje | | |
| G.351.1 | Detajl vgradnje izlivnika v obstoječo AB konstrukcijo | M 1:10 | ODV-4 |
| G.351.2 | Izlivnik »ACO« HSD-2 | M 1:10 | ODV-5 |
| G.351.3 | Začasna pokrivna pločevina za sklede izlivnikov | M 1:5 | ODV-6 |
| G.351.4 | Cevke za odvajanje pronicajoče vode | M 1:10 | ODV-7 |
| G.351.5 | Obešanje Hobas cevi DN200 na AB konstrukcijo | M 1:10 | ODV-8 |
| G.351.6 | Prehod AP cevi skozi AB steno, detajl zgibne zidne zveze | M 1:10 | ODV-9 |
| G.351.7 | Polaganje cevi iz armiranega poliestra | M 1:20 | ODV-10 |

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| Številka odseka | Arhivska št. | Faza / objekt | Šifra priloge | Prostor za črtno kodo |
| | | 004.2160 | S.3.2 | |

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| S.5.1 | Izjava projektanta načrta in pooblaščenega strokovnjaka, ki je izdelal načrt PZI (Priloga 2C) |
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| <i>Številka projekta</i> | 8953 |
| <i>Številka načrta</i> | 18-3/2023 |

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|-----------------|--------------|---------------|---------------|-----------------------|
| Številka odseka | Arhivska št. | Faza / objekt | Šifra priloge | Prostor za črtno kodo |
| | | 004.2160 | S.5.1 | |

PRILOGA 2C

**IZJAVA PROJEKTANTA NAČRTA
IN POOBLAŠČENEGA STOKOVNJAKA,
KI JE IZDELAL NAČRT V PZI IN PID**

PROJEKTANT NAČRTA

| | |
|------------------------------------|-------------------------------------|
| projektant načrta (naziv družbe) | PROMICO d.o.o. |
| naslov | Šmartinska cesta 56, 1000 Ljubljana |
| odgovorna oseba projektanta načrta | Iztok Turk |

IN POOBLAŠČENI STROKOVNJAK, KI JE IZDELAL NAČRT





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| pooblaščen strokovnjak | Iztok Turk, univ. dipl. inž. grad. |
|------------------------|------------------------------------|

IZJAVLJAVA:

da načrt

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| vrsta dokumentacije | PZI (izvleček za razpis) |
| strokovno področje načrta | 2 - Načrt s področja gradbeništva |
| naziv načrta | 2/7 - Načrt rekonstrukcije nadvoza VA0235 nad AC A1 na Barjanski cesti |
| številka načrta | 18-3/2023 |
| datum izdelave | november 2024, dopolnjeno marec 2025 |

upoštevam relevantne predpise in druge normativne dokumente ter da so upoštewane ustrezne bistvene in druge zahteve.

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| pooblaščen strokovnjak | Iztok Turk, univ. dipl. inž. grad. |
| identifikacijska številka | IZS PI G-0048 |
| podpis pooblaščenega strokovnjaka |   |
| odgovorna oseba projektanta načrta | Iztok Turk |
| podpis odgovorne osebe projektanta načrta |   |

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|--------------|----------------------------------|
| S.6.1 | Dokumentacija o recenziji |
|--------------|----------------------------------|

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|-------------------|-----------|
| Številka projekta | 8953 |
| Številka načrta | 18-3/2023 |

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|-----------------|--------------|---------------|---------------|-----------------------|
| Številka odseka | Arhivska št. | Faza / objekt | Šifra priloge | Prostor za črtno kodo |
| | | 004.2160 | S.6.1 | |

PRIPOMBE RECENZENTOV NA PRIPRAVLJENO PZI DOKUMENTACIJO REKONSTRUKCIJE NADVOZA VA0235 BARJANSKE CESTE ČEZ AC NA BARJANSKI CESTI

IN ODGOVORI PROJEKTANTA NA KOMENTARJE IN PRIPOMBE

SPLOŠNI PODATKI:

PROJEKT: **UREDITEV BARJANSKE CESTE MED KRIŽANJEM Z ZIHERLOVO ULICO IN
AC PRIKLJUČKOM LJUBLJANA CENTER**

OBJEKT: **REKONSTRUKCIJA OBSTOJEČEGA NADVOZA VA0235 NAD AC A1,
ODSEK 0017/0617 LJUBLJANA BARJANSKA–LJUBLJANA VIČ**

ŠTEVILKA PROJEKTA: 8953

FAZA PROJEKTA : PZI

DATUM: februar 2025

PREGLEDOVALCI: Miran Šmon, u.d.i.g., DARS
Matej Murn, dipl. inž. prom., DARS

VODJA PROJEKTA: Uroš Maršič, u.d.i.g.

VODJA NAČRTA NADVOZ: Iztok Turk, u.d.i.g.

Sodelavci na načrtu: David Pesek, u.d.i.g.

VODJA NAČRTA ZAPORE NA AC: Milivoj Ročenovič, u.d.i.g.

Sodelavci na načrtu: Tanja Horvat, u.d.i.g.

VSEBINA

| | | |
|-----|--|---|
| 1 | PREJETE PRIPOMBE | 3 |
| 1.1 | PREJETE PRIPOMBE z dne 26. 2. 2025 | 3 |
| 1.2 | PREJETE PRIPOMBE od razprave z dne 28. 2. 2025 | 3 |
| 2 | ODGOVORI PROJEKTANTA | 4 |
| 2.1 | ODGOVORI NA PREJETE PRIPOMBE z dne 26. 2. 2025 | 4 |
| 2.2 | ODGOVORI NA PREJETE PRIPOMBE od razprave z dne 28. 2. 2025 | 4 |

1 PREJETE PRIPOMBE

1.1 PREJETE PRIPOMBE z dne 26. 2. 2025

Pripombe prejete dne 26. 2. 2025 po elektronski pošti od Miran Šmon.

- 1) Na videokonferenci za nadhoda Gotska in Ledarska smo se malo dotaknili tudi nadvoza Barjanska cesta in se dogovorili, da bi se v projekt pod enim hodnikom vključila tudi brizgana hidroizolacija (MMA) – 'Eliminator'. Da jo imamo v popisu in dobimo ceno na razpisu.
- 2) Pripraviti bi bilo potrebno skupni predračun za nadvoz Barjanska cesta (v poslani dokumentaciji še ni bil združen).

1.2 PREJETE PRIPOMBE od razprave z dne 28. 2. 2025

Pripombe prejete dne 3. 3. 2025 po elektronski pošti od Miran Šmon.

ELABORAT ZAPORE (Elaborata vodenja prometa in zavarovanja prometa v času gradnje za projekt Ureditve Barjanske ceste med križanjem z Ziherlovo cesto in AC priključkom Ljubljana center)

- 3) V vseh fazah ureditve prometa v času gradnje se začasne rumene talne označbe podaljšajo v priključne krake AC (velja za vse krake).
- 4) Na priključnih krakih na AC, kjer je predviden stop znak, se omejitev na kraku predvidi na 40 km/h.
- 5) V situaciji zapore tipa B-2 (list 3) – zapore prehitevalnega in delno voznega pasu v smeri Kozarje in v smeri Malence se v smeri razcepa Kozarje začetek zapore predvidi nekoliko prej tako, da se zagotovi dovolj delovne širine za pripravo predvidenega službenega prehoda (potreben v nadaljnjih fazah). Prav tako se začasne rumene talne označbe predvidijo na način da se lahko uporabijo tudi v naslednji fazi zapore (zapora C2+2).
- 6) V situaciji zapore tipa B-2 (list 3) se varovalni pas iz 50 m podaljša na 100 m, preusmeritev prometa se predvidi na razdalji 100m.
- 7) V situaciji zapore tipa B-2 (list 5) se znak omejitev hitrosti 80 km/h predvidi v okviru bližnjega obstoječega SPIS portala (znak SPZ), podobno velja za znak omejitev hitrosti 80 km/h v situaciji zapore tipa C2+2 (list 15).
- 8) Na znaku 2220 – prepoved prometa za vozila, katerih skupna širina presega določeno širino se iz ponekod naveden širine 2,5 m popravi na 2,2 m.
- 9) Prikažejo se obstoječi znaki ter se upošteva pravilna postavitve znaka 2238 – prenehanje vseh prepovedi in omejitev.
- 10) Zaradi zaprtja priključka Lj-center (krak A) v eni izmed faz se namesto obvoza na priključek Ljubljana Rudnik predvidi obvoz na priključek Ljubljana – Vič.
- 11) Prav tako se podrobneje prikaže oz. opiše potek obvoza v času zaprtja kraka D.
- 12) Korigira se postavitve oz. razdalja na dopolnilni tabli pri določenih znakih (npr. razdalja iz 330 m se korigiran na razdaljo 300 m).
- 13) Optimirati časovni okvir postavitve zapor na AC.

FAZNOST IZVEDBE DEL

- 14) Faza 1A : predvideno trajanje faze 1A je 60 dni : Dars poda predlog, da se v tej fazi predvidi izvajanja del pod zaporo AC v trajanju 20 dni (zapora se postavi zadnjih 20 dni trajanja te faze)
- 15) Faza 2A, 3A, 3B in 4B : poenotenje izvedbe del pod zaporo AC znotraj posamezne faze na 30 dni (trajanje posamezne faze je lahko sicer daljša, ampak za dela pod zaporo AC se predvidi trajanje 30 dni)

PREDRAČUNSKI ELABORAT

- 16) V skupnem predvidenem projektantskem predračunu se pod eno 'poglavje' združijo vse postavke za nadvoz VA0235 (Barjanska cesta)

2 ODGOVORI PROJEKTANTA**2.1 ODGOVORI NA PREJETE PRIPOMBE z dne 26. 2. 2025**

- 1) Brizgano hidroizolacijo (MMA – Eliminator smo dodali.
- 2) Projektantski predračun za rekonstrukcijo nadvoza in zapore na AC smo združili ter pripravili rekapitulacijo za oba načrta.

2.2 ODGOVORI NA PREJETE PRIPOMBE od razprave z dne 28. 2. 2025

- 3) ODG.: Pripomba se upošteva.
- 4) ODG.: Pripomba se upošteva.
- 5) ODG.: Pripomba se upošteva.
- 6) ODG.: Pripomba se upošteva.
- 7) ODG.: Pripomba se upošteva.
- 8) ODG.: Pripomba se upošteva.
- 9) ODG.: Pripomba se upošteva.
- 10) ODG.: Glede na tehnologijo gradnje je predvideno, da bo priključek Lj – center (krak A) – zaviralni pas večji del trajanja sankcijskih del na nadvozu aktiven, predvidene so le vikend zapore priključka – kraka A za potrebe ureditve prometnega režima in postavitve ter odstranitve delovno varovalnih odrov. V času trajanja vikend zapore se lahko promet na avtocesto proti Kozarjam preusmeri na priključek Ljubljana - zahod ali Ljubljana – Rudnik.
- 11) ODG.: Glede na tehnologijo gradnje je predvideno, da bo priključek Lj – center (krak D) – pospeševalni pas večji del trajanja sankcijskih del na nadvozu aktiven, predvidene so le vikend zapore priključka – kraka D za potrebe ureditve prometnega režima in postavitve ter odstranitve delovno varovalnih odrov. V času trajanja vikend zapore se lahko promet na avtocesto proti Malencam preusmeri na priključek Ljubljana - zahod ali Ljubljana – Rudnik.
- 12) ODG.: Pripomba se upošteva.
- 13) Dela znotraj posameznih faz smo prerazporedili tako, da je trajanje zapor na AC skrajšano na skupno 5,5 mesecev.
- 14) Pripomba se upošteva. Zapora na AC se izvede z zamikom glede na začetek faze 1 in traja 30 dni.
- 15) Trajanje faz 2A, 2B, 3A in 3B (zaradi novih podfaz novo poimenovanje!) skrajšano na minimalno potrebno.

- 16) Projektantski predračun za rekonstrukcijo nadvoza in zapore na AC bomo združili ter pripravili rekapitulacijo za oba načrta.

Dodaten komentar projektantov:

Širine asfaltnega vozišča: Zaradi prometa in priključkov takoj za oz. pred objektom, brez zapore AC ni možno posneti dejanske širine asfaltnega vozišča. Širine so določene na podlagi ortofoto, geodetskih posnetkov na trasi in arhivske dokumentacije nadvoza. Količine za širitev roba vozišča so predpostavljene. Večje odstopanje se ne pričakuje.

Dodatne podfaze pri vodenju prometa na AC: zaradi omejitev pri preusmeritvi prometa (zapora kraka D in A) so bile dodane podfaza, ki omogočajo skoraj nemoten potek prometa na kraku D in A. Predvidene so samo vikend zapore omenjenih krakov.

Ljubljana, marec 2025

Pripravili:

David Pesek, u.d.i.g.

Tanja Horvat, u.d.i.g.

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| T.1.1 | Tehnično poročilo |
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|--------------------------|-----------|
| <i>Številka projekta</i> | 8953 |
| <i>Številka načrta</i> | 18-3/2023 |

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|-----------------|--------------|---------------|---------------|-----------------------|
| Številka odseka | Arhivska št. | Faza / objekt | Šifra priloge | Prostor za črtno kodo |
| | | 004.2160 | T.1.1 | |

2/7 – NAČRT REKONSTRUKCIJE OBSTOJEČEGA NADVOZA VA0235 NAD AC A1 NA BARJANSKI CESTI

TEHNIČNO POROČILO

SPLOŠNI PODATKI:

| | |
|--------------------|---|
| PROJEKT: | UREDITEV BARJANSKE CESTE MED KRIŽANJEM Z ZIHERLOVO ULICO IN AC PRIKLJUČKOM LJUBLJANA CENTER |
| OBJEKT: | Rekonstrukcija obstoječega nadvoza VA0235 nad AC A1, odsek 0017/0617 Ljubljana Barjanska–Ljubljana Vič |
| LOKACIJA: | Ljubljana |
| ŠTEVILKA PROJEKTA: | 8953 |
| ŠTEVILKA NAČRTA: | 18-3/2023 |
| FAZA PROJEKTA : | PZI |
| DATUM: | november 2024 Dopolnjeno po pregledu, marec 2025 |
| PRIPRAVILA: | Iztok Turk, u.d.i.g. David Pesek, u.d.i.g. |

VSEBINA TEHNIČNEGA POROČILA

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1 SPLOŠNO

1.1 NAMEN

Predvidena je rekonstrukcija južne mestne vpadnice - Barjanske ceste. Barjanska cesta se rekonstruira od Zihërlove ulice do avtocestnega priključka LJ-Center in P+R Barje.

Obstoječa Barjanska cesta je glavna mestna cesta, razdeljena na več odsekov. Trenutno je to dvopasovna cesta, z urejenimi posebnimi pasovi za leve zavijalce v križiščih. Na odseku od Ceste v Mestni log do Ceste dveh cesarjev je urejen dvostranski drevored, enostranski hodnik za pešce, ter enostranska dvosmerna kolesarska steza. Na odseku od Ceste v Mestni log do Zihërlove ulice je urejena dvostranska kolesarska in dvostranski hodnik za pešce.

Predvidena rekonstrukcija Barjanske ceste vključuje razširitev na štiripasovno mestno cesto, s posebnimi pasovi za vozila mestnega javnega potniškega prometa, vmesno zelenico, ter dvosmerno kolesarsko stezo in dvosmerni hodnik za pešce. Skupna dolžina rekonstrukcije Barjanske ceste je cca. 1623 m in cca. 125 m novogradnje – Opekarska ulica.

Zaradi novih predvidenih površin za kolesarje in pešce je predvidena širitev obstoječega nadvoza VA0235 Barjanske ceste preko AC.

Obstoječi nadvoz zgrajen pred slabimi 40 leti, je precej v slabem stanju. Skupna dolžina objekta je cca. 153,0 m in prečka AC A1 (južna ljubljanska obvoznica), odsek 0017 v km 0,020 (po BCP) z osmimi polji razponov 18,4 + 4x19,0 + 19,19,08 + 18,92 + 18,4 m. Skupna širina obstoječega objekta znaša 12,25 m. širina vzdrževalnega hodnika na levi strani je 0,95 m, širina desnega hodnika (mešana površina za pešce in kolesarje) pa znaša 3,60 m.

Ob rekonstrukciji objekta se tudi uredi površine za kolesarje na levi strani objekta, na desni pa hodnik za pešce. Objekt se s tem razširi za cca. 1,25 m, skupna širina objekta po rekonstrukciji znaša tako 13,50 m.

Rekonstrukcija objekta se izvaja v sklopu rekonstrukcije ceste v območju varovalnega pasu ceste, v skladu s Pravilnikom za izvedbo investicijskih vzdrževalnih del in vzdrževalnih del v javno korist na javnih cestah po postopku vzdrževalnih del v javno korist (VDJK).

1.2 PODLOGE

- [1] UREDITEV BARJANSKE CESTE MED KRIŽANJEM Z ZIHËRLOVO CESTO IN AC PRIKLJUČKOM LJUBLJANA CENTER, PZI, št. projekta: 8953, LJUBLJANSKI URBANISTIČNI ZAVOD d.d., avgust 2022
- [2] PGD Nadvoz Kardeljeve ceste, obvoznica Ljubljana, odsek Vič – Dolenjska cesta (PZI obstoječega objekta); SCT tozd projekt Ljubljana, št. projekta: 14-244/2, november 1984 – arhivska dokumentacija
- [3] Spremembe med gradnjo Nadvoza Kardeljeve ceste, obvoznica Ljubljana, odsek Vič – Dolenjska cesta (PZI obstoječega objekta); SCT tozd projekt Ljubljana, št. projekta: 14-244/2K, april 1987 – arhivska dokumentacija
- [4] ELABORAT DETAJNEGA PREGLEDA PREMOSTITVENEGA OBJEKTA; Nadvoz Barjanske ceste v Ljubljani, Poročilo: 482-KON-22, IGMAT d.d., avgust 2022.
- [5] GEOLOŠKO GEOTEHNIČNI ELABORAT ZA NADVOZ VA0235 NAD AC A1 NA BARJANSKI CESTI, št. elaborata: 60-G-2024, STABI d.o.o., december 2024

2 ELEMENTI KOMUNIKACIJ

2.1 Kot križanja

Obstoječi nadvoz prečka južno Ljubljansko obvoznico AC A1 pod kotom 89,62°.

2.2 Pod objektom

Pod četrtim in petim poljem (med podporama v oseh 4, 5 in 6) poteka južna obvoznica AC A1 z minimalno svetlo varnostno višino cca. 4,7 m.

2.3 Na objektu

2.3.1 Obstoječi nadvoz

| | | |
|---|---|---------|
| - robni venec z ograjo za vzdrževalce: | = | 0,35 m |
| - vzdrževalni hodnik: | = | 0,95 m |
| - cestišče: | = | 7,00 m |
| - hodnik za pešce in kolesarje (mešana površina): | = | 3,60 m |
| - <u>robni venec z ograjo za pešce:</u> | = | 0,35 m |
| Skupaj: | = | 12,25 m |

2.3.2 Rekonstruirani nadvoz

| | | |
|---|---------------------------|----------|
| - robni venec z ograjo za pešce: | = | 0,25 m |
| - hodnik za kolesarje: | 0,25 + 1,00 + 1,00 + 0,25 | = 2,50 m |
| - JVO H2, W4: | = | 0,25 m |
| - varnostna širina: | 0,30(na hodniku) + 0,20 | = 0,50 m |
| - vozišče: | 0,25 + 3,25 + 3,25 + 0,25 | = 7,00 m |
| - varnostna širina: | 0,2 + 0,30(na hodniku) | = 0,50 m |
| - JVO H2, W4: | = | 0,25 m |
| - hodnik za pešce: | 0,20 + 0,80 + 0,80 + 0,20 | = 2,00 m |
| - <u>robni venec z ograjo za pešce:</u> | = | 0,25 m |
| Skupaj: | = | 13,50 m |

3 POGOJI TEMELJENJA

Geomehanski podatki so povzeti po GG poročilu.

Obravnavano področje leži na Ljubljanskem barju. Kvartarne naplavine, ki zapolnjujejo kotlino Ljubljanskega barja, po podatkih vrtanja in kartiranja sestoje na površini delno iz šote, šotnega blata in jezerskega melja (polžarice), delno pa iz rjave peščene gline in peščenega melja, ki sta se odlagala v času občasnih poplav.

Glede na geomehanske raziskave je sestava tal vzdolž nadvoza tipično barjanska. Površinska šota je debeline do 1,5 m, polžarica je debela 4 – 7 m. Mehka barjanska glina sega do povprečne globine 15 m pod površino tal. Bolje nosilna barjanska cona je pod prvim slojem.

Dolžine uvrtenih AB pilotov Φ 150 cm znašajo ca 25 m in so vpeti v spodnjo prodno cono.

Geološko-geomehanski model:

Leta 1962 so v vzhodnem delu Barja, pri Črni vasi izvrtali vrtino globine 116,8 m. Geološki popis vrtine ne obstaja, obstajajo pa grafični podatki (Mencej, 1988/89) in iz njih je moč razbrati geološko sestavo vrtine PB-1:

- 0–20 m barjanski sedimenti (glina, polžarica)
- 20–141 m holocenski in pleistocenski sedimenti (prod, pesek, glina, melj)
- 141 m– zgornje triasni dolomit

V bližini je bila izvrtana tudi vrtina TB-3/89. Geološki popis je naslednji:

- 0–20 m barjanski sedimenti (glina, polžarica)
- 20–149 m holocenski in pleistocenski sedimenti (prod, pesek, glina, melj)
- 149 m– zgornje triasni dolomit.

Preglednica 2 : Model in fizikalne karakteristike zemljin na območju nadvoza na Barjanski cesti

| Opis | γ | τ_u | q_u | ϕ | c | M_r |
|--|---------------------|------------|--------------|------------|----------|----------------|
| | kN/m ³ | kPa | kPa | ° | kPa | MPa |
| a) Umetni nasip | 21,0 | / | / | 31,3–33,0 | 0–1 | 18,9–24,8 |
| b) Šota | 7,0 | 10,2 | 3,1 | 10–18 | 0–15 | 0,1–0,5 |
| 1. Polžarica in mastna glina lahko gnetne in židke konsistence | 16,4±0,8 – 18,1±1,1 | 1–23,3 (8) | 7–37 (14) | 18–20 (19) | 5–10 | 1,5–1,8 |
| 2. Prod, srednje gost do zelo gost | 21,5 | / | / | 33,0–39,8 | 0–1 | 32–80 |
| 3. Glina srednje do težko gnetne konsistence | 18,4±1,1 | 24–41 (24) | 57–226 (117) | 19–29 (19) | 2–10 (5) | 6,3–10,8 (8,6) |
| 4. Prod, gost do zelo gost | 21,5 | / | / | 36,8–39,8 | 0–1 | 36–100 |
| 5. Glina srednje gnetne do trdne konsistence | 18,4–19,5 | 29–100 | 78–235 | 25–29 | 3–5 | 1,8–10 |

Opombe:

Globina in debelina posamezne plasti je razvidna iz vzdolžnega prereza, ki je prikazan na grafični prilogi.

$V()$ je podana mediana vrednosti.

Seizmičnost raziskovanega območja:

Po karti pospeška tal, ki jo je v letu 2021 izdala Agencija RS za okolje, je področje umeščeno v območje z vrednostjo projektnega pospeška tal $a_g = 0,250$ g.

Tip tal za seizmični izračun na območju je po EC 8 tip S1.

Način temeljenja:

Nadvoz dolžine cca 153 m je izveden na devetih podporah (2 krajni in 7 vmesnih). Razmak med osmi podpor je 18,4–19,0 m. Krajni podpori sta temeljeni na štirih pilotih – na vsaki podpori dva pilota premera 150 cm in dva pilota 125 cm dolžine 27,3 m (severna krajna podpora) in 29,5 m (južna krajna podpora). Na vmesnih podporah 2, 3, 5, 7 in 8 sta izvedena po dva pilota premera 150 cm dolžine 25,0–27,5 m, na vmesnih podporah 4 in 6 pa po štirje piloti premera 150 cm dolžine 25,6–26,6 m. Piloti so armiranobetonski, uvtani, s konico pa segajo cca 2 m v meljno peščen prod v gostem do zelo gostem gostotnem stanju. V zgornjem delu pilotov je v dolžini 15 m vgrajena srajčka iz jeklene pločevine.

Nosilnost pilotov:

Projektne nosilnosti R_d za izvedene pilote so iz vrednotene z upoštevanjem trenja po plašču od globine 15 m naprej in nosilnosti pod nogo pilotov.

Preglednica 3: Projektna nosilnost uvrtnih pilotov na krajnih podporah

| Podpora | Premier pilota | Dolžina pilota | $R_{b,d}$ | $R_{s,d}$ | R_d | $R_{d,red}$ | V_d |
|-----------|----------------|----------------|------------|------------|------------|-------------|------------|
| | m | m | kN / pilot | kN / pilot | kN / pilot | kN / pilot | kN / pilot |
| 1 (sever) | 1,25 | 27,0 | 4408,9 | 991,7 | 5400 | 5063 | 2500–3000 |
| | 1,50 | 27,0 | 6348,7 | 1190,1 | 7538 | 7067 | 3600–4200 |
| 9 (jug) | 1,25 | 29,5 | 4408,9 | 1241,7 | 5651 | 5297 | 2800–3300 |
| | 1,50 | 29,5 | 6348,7 | 1490,0 | 7839 | 7348 | 3600–4200 |

Preglednica 4: Projektna nosilnost uvrtnih pilotov na vmesnih podporah 2, 3, 5, 7 in 8

| Podpora | Premier pilota | Dolžina pilota | $R_{b,d}$ | $R_{s,d}$ | R_d | V_d |
|---------|----------------|----------------|------------|------------|-------------|------------|
| | m | m | kN / pilot | kN / pilot | kN / pilot | kN / pilot |
| 2, 5 | 1,50 | 25,0 | 6433,4 | 1086,3 | 7519 | 6300–7300 |
| 3 | 1,50 | 26,0 | 6433,4 | 1207,2 | 7640 | 6500–7300 |
| 7, 8 | 1,50 | 27,0 | 6433,4 | 1350,6 | 7784 | 6500–7400 |

Preglednica 5: Projektna nosilnost uvrtnih pilotov na vmesnih podporah 4 in 6

| Podpora | Premier pilota | Dolžina pilota | $R_{b,d}$ | $R_{s,d}$ | R_d | $R_{d,red}$ | V_d |
|---------|----------------|----------------|------------|------------|------------|-------------|------------|
| | m | m | kN / pilot | kN / pilot | kN / pilot | kN / pilot | kN / pilot |
| 4 | 1,50 | 26,6 | 6348,7 | 1259,3 | 7608 | 7132 | 4250–4750 |
| 6 | 1,50 | 25,6 | 6348,7 | 1182,9 | 7532 | 7061 | 4200–4700 |

4 OBSTOJEČI NADVOZ

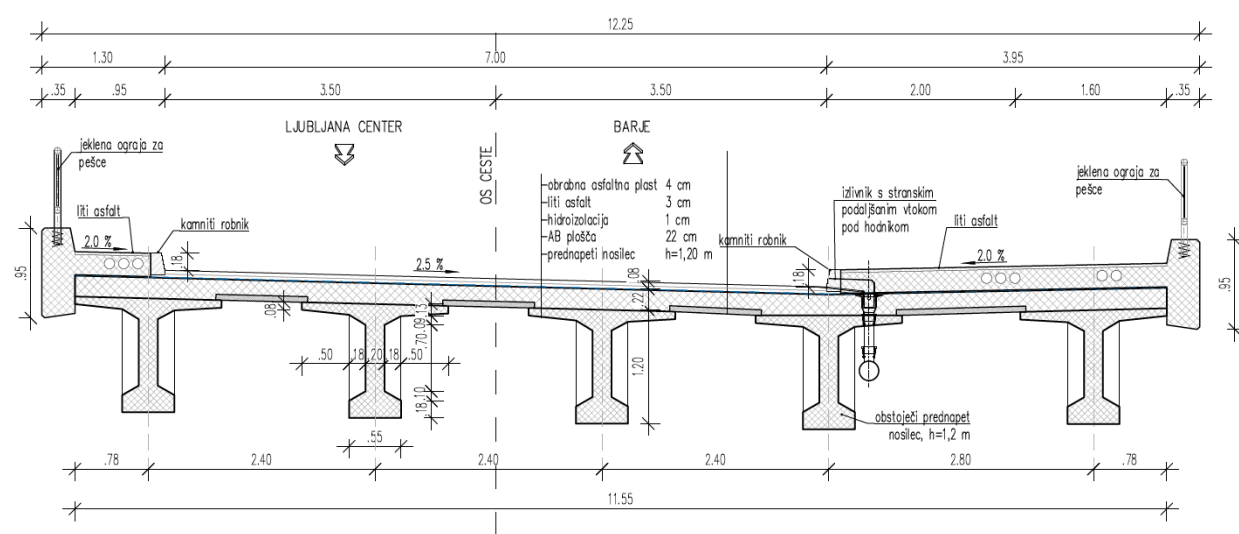
4.1 OPIS NOSILNE KONSTRUKCIJE

Nadvoz VA0235 premošča južno ljubljansko obvoznico AC A1 (odsek 0017 v km 0,020). Obstoječi objekt je zasnovan kot polno-montažna AB konstrukcija preko osmih (8) polj z eno zavorno enoto) iz montažnih prednapetih nosilcev in monolitne voziščne plošče. Temeljenje je globoko na uvrtnih AB pilotih premera $\Phi 150$ cm.

Osnovni geometrijski podatki o objektu:

- Razponi: 18,4 + 4x19,0 + 9,08 + 18,92 + 18,4 m
- Skupna dolžina: 153 m
- Širina objekta brez RV: 11,55 m

V prečnem prerezu je prekladna konstrukcija sestavljena iz petih prefabriciranih AB prednapetih T nosilcev višine 1,2 m, ki so postavljeni na osnih razmakih 2,40 + 2,40 + 2,40 + 2,80 m. Nad nosilci je izvedena AB monolitna plošča debeline 22 cm. Nosilci potekajo preko enega polja in so prostoležeči, AB monolitna plošča pa je nad podporami povezana z elastičnimi ploščami v eno zavorno enoto.



Karakteristični prerez obstoječega objekta

Prostoležeči vzdolžni T nosilci prekladne konstrukcije, dolžin 18,35 - 19,03 m, so prednapeti s kabli za prednapenjanje sistema BBRV 150. Nosilci so v 1. fazi napeti s Hoyerjevimi vrvmi, v 2. fazi pa s po tremi kabli 30 Φ 7 mm.

Posamezni AB krajni opornik sestoji iz grede na kateri preko neoprenskih ležišč nalegajo AB nosilci prekladne konstrukcije. AB grede so vpete v AB ploščo preko 4 pilotov (2 + 2) Φ 150 cm.

AB vmesne podpore v oseh 2, 3, 7 in 8 sestojijo iz prečne grede na katero nalegajo prostoležeči nosilci preko neoprenskih ležišč. Greda širine 1,8 m je spodaj vpeta v 2 stebra premera Φ 100 cm, ta pa v prečno gredo preko dveh pilotov Φ 150 cm.

AB vmesni podpori v oseh 4 in 5 sestojijo iz prečne grede na katero nalegajo prostoležeči nosilci preko neoprenskih ležišč. Greda širine 1,8 m je spodaj vpeta v 2 stebra premera Φ 100 cm, ta pa v ploščo nad 4 piloti (2 + 2) premera Φ 150 cm.

4.2 POVZETEK STANJA OBSTOJEČEGA OBJEKTA

Glede na detajlni pregled [5] je trenutno stanje obstoječega objekta dokaj slabo. Nosilna konstrukcija izkazuje večje število poškodb. V večini gre za ne-konstrukcijske poškodbe oz. poškodbe, ki vplivajo na trajnost objekta.

Predvidena je sanacija vseh poškodovanih betonskih površin. V večini gre za območja, ki so zamočena zaradi ne-tesnjenja konstrukcijskih dilatacij. Torej horizontalne in vertikalne površine gred AB stebrov in vertikalne elemente prekladne konstrukcije v območju dilatacij ter lokalna zamočena mesta plafona AB plošče.

Generalno gledano je stanje objekta iz vidika poškodovanosti dokaj slabo. Razlog za tako oceno je predvsem slabo stanje asfaltnega vozišča, zamakanje preko dilatacij po krajnih opornikih ter zamočenost in korozijske poškodbe predvsem osrednjih zunanjih vzdolžnih nosilcev na strani KP. Dodatno se na konstrukcijskih elementih objekta pojavlja še več drugih poškodb, predvsem v obliki premajhnega zaščitnega sloja betona nad armaturo. Temu primerno je armatura na teh mestih površinsko korodirana. Taka mesta so predvsem na spodnjih pasnicah vzdolžnih nosilcev nad podporami, na zgornjih pasnicah notranjih vzdolžnih nosilcev, na prečnikih nad krajnima opornikoma ter na prečki sredinske vmesne podpore med obema voznima pasovoma AC. Nekatera ležišča izkazujejo prekomerne deformacije in neustrezno naleganje.

Iz vidika poškodovanosti objekta lahko izpostavimo predvsem naslednje bistvene poškodbe:

- Po celotnem krajnem oporniku os 9 (na strani proti obvoznici) je prisotno močno zamakanje zaradi netesne dilatacije. Posledično se na posameznih mestih že pojavljajo dokaj močne korozijske poškodbe betona in armature, lokalno je armatura (predvsem vertikalna) že izpostavljena in površinsko korodirana. Mestoma so po oporniku prisotne manjše razpoke raznih smeri debeline $< 0,3$ mm, najverjetneje nastale zaradi krčenja in korozijskih poškodb zaradi zamakanja.
- Vmesna podpora v osi 5 (podpora med obema voznima pasovima AC), konkretnije steber vmesne podpore v smeri vožnje, izkazuje večje območje (cca 1m^2) popolnoma razkrite in površinsko korodirane armature. Prečka podpore prav tako izkazuje dokaj močne poškodbe v obliki vertikalnih razpok in delaminacij po celotni površini
- Na približno polovici vzdolžnih nosilcev so opazne majhne poškodbe v obliki izpostavljene armature zaradi premajhnega zaščitnega sloja betona, ki se v veliki večini pojavljajo na koncih nosilcev, največkrat neposredno nad podporami. Te poškodbe so velikosti približno 50cm^2 .
- Na približno polovici vzdolžnih nosilcev so opazne poškodbe v obliki premajhnega zaščitnega sloja betona nad stremensko armaturo zgornje pasnice nosilcev. Na posameznih nosilcih je armatura izpostavljena po pretežni dolžini nosilca.
- Predvsem v 5. polju (AC smer Malence) so opazne nekoliko močnejše mehanske poškodbe na spodnji pasnici nosilcev, najverjetneje nastale zaradi udarcev vozil. Na teh mestih je armatura izpostavljena in površinsko korodirana. Tipičen obseg teh poškodb znaša do 50cm^2 . Te poškodbe so opazne predvsem na tretjem, četrtem in petem nosilcu.
- Na nosilcih v 5. polju je opazno nekoliko večje zamakanje v območju naleganja na podporo v osi 6, nastalo zaradi zamakanja preko stikov robnega venca
- Robni nosilec v 5. polju je od vseh nosilcev najbolj poškodovan. Poškodbe se pojavljajo predvsem v sredini razpona nosilca v obliki zamakanja in s tem povezanih korozijskih poškodb mehke armature spodnje pasnice. Ocenjujemo, da so poškodbe nastale zaradi neustreznega odvodnjavanja in naleta vozil.
- Asfaltno vozišče na objektu je v celoti dotrajano in potrebno zamenjave.
- Dilataciji sta zablateni in neustrezno vzdrževani ter posledično netesni, kar povzroča zamakanje po stenah krajnih opornikov in ležiščni polici krajnih opornikov, posebej krajnega opornika v osi 9 na strani proti obvoznici
- Generalno gledano so ležišča v dokaj dobrem stanju, pri čemer pa je na posameznih ležiščih opaziti neenakomerno naleganje in prekomerne deformacije.

5 REKONSTRUKCIJA OBJEKTA

Zaradi predvidenih novih površin za kolesarje in pešce je potrebna širitev obstoječega nadvoza VA0235 Barjanske ceste preko južne Ljubljanske obvoznice. Širitev objekta se izvede enostranske z AB konzolo.

Istočasno se izvede zamenjava kompletnega krova, ki zajema asfaltne plasti, hidroizolacijo, hodnike z robnimi venci in robniki, ograje za pešce in konzole za komunalne vode. Kompletna odvodnja objekta (izlivniki in horizontalnimi ter vertikalnimi cevmi meteorne kanalizacije) se zamenja.

S strani IGMAT d.d. je bil izveden detajlni pregled premostitvenega objekta. Glede na detajlni pregled je trenutno stanje obstoječega objekta dokaj slabo. Nosilna konstrukcija izkazuje večje število poškodb. V večini gre za ne-konstrukcijske poškodbe oz. poškodb, ki vplivajo na trajnost objekta.

Predvidena je sanacija vseh poškodovanih betonskih površin podpornega sistema in prekladne konstrukcije z AB ploščo. Precejšnje poškodbe betonskih površin se pojavljajo v območju dilatacij in

izlivnikov. Predvidena je odstranitev zgornje površine AB monolitne plošče do obstoječe armature, s čimer omogočimo tudi kvalitetno odstranitev obstoječe hidroizolacije in kontaminiranega betona. Na obstoječo monolitno AB ploščo na to izvedemo v povprečju 10 cm novega betona (predvideno cca. 2 – 3 cm nadomestitev odstranjenega betona in cca. 7 – 8 cm nadbetoniranja). S tem izboljšamo trajnost obstoječe konstrukcije in korigiramo potek nivelete.

Obstoječe dotrajane dilatacije se zamenjajo z novimi, sanirajo se vsa poškodovana mesta okrog obstoječih dilatacij. Nekatera obstoječa ležišča in AB ležiščne bloke se zamenja, preostale pa sanira.

5.1 REKONSTRUKCIJA IN SANACIJA PREKLADNE KONSTRUKCIJE

Pri izvedbi sanacijskih del je potrebno uporabljati material in izvesti vsa dela skladno s standardi SIST EN 1504-1 do 1504-10.

5.1.1 SANACIJA KROVA, ODVODNJE IN OGRAJ

Izvede se zamenjava kompletnega krova, ograj in opreme objekta. Vsi elementi so detajlno določeni v poglavju »OPREMA IN DETAJLI«. Povzetek glavnih ukrepov:

- I. Odstranitev obstoječega krova in opreme
Odstranitev vseh obstoječih ograj skladno s fazami rekonstrukcije. Hodnika se odreže od robnih vencev ter se ga razreže na primerno velikost za manipulacijo. Robna venca se odstrani mehansko. Odstranitev obstoječih kovinskih lamelnih dilatacij skladno s fazami rekonstrukcije objekta. Odstranitev asfaltnih plasti in HI se izvede strojno z rezkanjem (rezkalnik za odstranitev HI z razmikom med zobmi max. 8 mm).
- II. Odstranitev obstoječih izlivnikov *skladno s fazami rekonstrukcije*.
- III. Izvedba odprtín za nove izlivnike in vgradnja novih izlivnikov *skladno s fazami rekonstrukcije*.
- IV. Izvedba nove HI pod hodniki in izvedba hodnikov *skladno s fazami rekonstrukcije*.
- V. Montaža jeklenih ograj za pešce in kolesarje ter montaža JVO.
- VI. Izvedba nove HI na cestišču *skladno s fazami rekonstrukcije*.
- VII. Vgradnja novih dilatacij *skladno s fazami rekonstrukcije*.
- VIII. Izvedba novih asfaltnih plasti *skladno s fazami rekonstrukcije*.
- IX. Izvedba novega sistema odvodnjavanja objekta.

5.1.2 SANACIJA AB VOZIŠČNE PLOŠČE

- I. Sanacija zgornjega sloja betona AB voziščne plošče skladno s fazami rekonstrukcije

Odstranitev zgornjega sloja betona AB voziščne plošče:

Lokalna mehanska odstranitev (npr. z lahkim pnevmatskim orodjem) obstoječega betona za določitev krovnega sloja oz. globino armature in odstranitev vseh nevezanih delaminiranih površin. Nato se izvede odstranitev preostalega krovnega sloja betona z rezkanjem. Po celotni dolžini objekta se odstrani tudi poškodovani sloj betona na vertikalni površini AB konzol z vodnim curkom pod visokim pritiskom.

Na mestih kjer je potrebno odstraniti beton v ali pod nivo armature se to izvede z vodnim curkom pod visokim pritiskom v debelini cca. 3 cm oz. do zdrave podlage. Odstrani se vse poškodovane, razpadle nevezane in kontaminirane betone (izvajanje sprotne kontrole kontaminiranosti pri rekonstrukciji). Betonsko površino na območju obstoječe kovinske dilatacije se odstrani z vodnim curkom pod visokim pritiskom, ohrani se obstoječo armaturo. Za izvedbo dilatacijske rege se na strani prekladne konstrukcije odstraniti beton v širini 35 cm in globini 30 cm.

Kriteriji kakovosti:

- vizualni izgled in zvočno ugotavljanje kompaktnosti s kladivom,
- ocenitev trdnosti s sklerometriranjem,
- minimalna tlačna trdnost obstoječega betona: 30 MPa,

- pH faktor: ≥ 10
- natezna trdnost na betonski podlagi "pull-off test": $> 1,5 \text{ MPa}$.

Čiščenje in zaščita armature:

Korodirano in nasploh razkrito armaturno jeklo se očisti do kovinskega sijaja s suhim peskanjem z abrazivom (stopnja priprave Sa 2 ½ skladno z ISO 8501). V kolikor je zaradi okolja možno samo mokro peskanje ali strojno čiščenje, je potrebno čiščenje jeklenih površin do kakovosti St. 3.

Takoj po čiščenju se armaturno jeklo zaščiti z protikorozijskim epoksi cementnim premazom (v dveh slojih). Pri izvedbi protikorozijskega nanosa potrebno upoštevati navodila proizvajalca izbranega proizvoda. Preveri in evidentirajo se poškodbe razkrite armature zaradi korozije.

Kriteriji kakovosti:

- minimalna debelina zaščite 1 mm,
- vizualni pregled in primerjava s korozijsko skalo po ISO 8501,
- merjenje oprijema po ASTM D 3359/A,
- optično merjenje debeline suhega filma na prerezu.

Čiščenje betonskih površin:

Čiščenje celotne betonske površine z vodnim curkom pod visokim pritiskom (500 barov) za odstranitev vseh nečistoč, ki bi lahko vplivale na sprijem nove betonske plasti.

Reprofilacija in nadbetoniranje zgornje površine AB voziščne plošče:

Nadomestitev odstranjenega sloja betona in nadbetoniranje AB plošče se izvede z mikroarmiranim betonom z dodatkom polipropilenskih vlaken in dodatkom proti krčenju v skupni debelini cca. 10 cm (nadomestitev odstranjenega betona cca. 2 - 3 cm in nadbetoniranje 7 – 8 cm).

Za potrebe sprijemnosti in strižne povezave med obstoječim in novim betom je potrebno obstoječo betonsko površino nahrapaviti tako, da ustreza zahtevam po EC1992 - 1 (točka 6.2.5 (2)):

- *Hrapava površina z vsaj 3 mm globoko hrapavostjo na medsebojni oddaljenosti 40 mm, ki se dobi z grabljanjem, površinsko izpostavljenimi zrni agregata ali drugimi postopki, ki zagotavljajo primerno obnašanje.*

Izvedejo se dodatne strižne povezave med novim in starim betonom s strižnimi trni iz armaturnih palic, ki se jih v predhodno izvrtane luknje zalepi z ekspanzijsko malto. Pri uporabi malt za sidranje armature je potrebno upoštevati navodila proizvajalca. Vgradnja sider in dodatne zgornje armature se izvede skladno z armaturnimi načrti.

Reprofilacija zunanjih vertikalnih robnih površin AB plošče:

Reprofilacijo teh površin se izvede z uporabo hitrovezoče s polimernimi vlakni armirane cementne malte R4 z omejenim krčenjem. Konzole se po celotni dolžini očisti in odstrani za 1-2 cm z vodnim topom z visokim pritiskom, zglati in reprofilira tako, da so primerne za vgraditev / naleganje jeklenih konzol.

Izvedba nadbetona je predvidena v več delovnih fazah. Zaradi prostorske omejitve je potrebna uporaba mehanskih spojk oz. priključnih elementov armature (npr. CAVIC) za potrebe preklapljanja armature.

II. Sanacija plafona AB voziščne plošče in vzdolžnih AB ter prednapetih nosilcev

Na plafonu AB plošče in vzdolžnih nosilcih se pojavljajo poškodbe predvsem zaradi ne-tesnjenja in zamakanja obstoječih dilatacij in sistema odvodnjavanja ter zaradi zamakanja preko stikov robnega venca.

Odstranitev poškodovanih betonskih površin:

Lokalna mehanska odstranitev (npr. z lahkim pnevmatskim orodjem) obstoječega poškodovanega betona nevezanih delaminiranih površin, ter odstranitev preostalega kontaminiranega in neveznega betona z vodnim curkom pod visokim pritiskom. Pred odstranitvijo z vodnim curkom se s kotno brusilko izvede 1 cm globoka zarez po obodu poškodovane površine za zagotavljanje čistega prehoda med sanirano in ne sanirano površino. Odstrani se vse poškodovane, razpadle nevezane in kontaminirane betone

(izvajanje sprotne kontrola kontaminiranosti pri rekonstrukciji). Odstranjevanje betona bo na najbolj poškodovanih površinah globine predvidoma od 6 cm, v povprečju pa se izvede odstranitev betona v debelini ca. 3,0 cm.

Kriteriji kakovosti → velja enako kot za I. točko.

Čiščenje in zaščita armature → velja enako kot za I. točko.

Čiščenje betonskih površin → velja enako kot za I. točko.

Reprofilacija betonskih površin z reperaturno malto (glej poglavje 5.1.2, I. točka):

Sanacija betonskih površin se izvede z uporabo hitrovezoče s polimernimi vlakni armirane cementne malte R4 z omejenim krčenjem, ki je v skladu z EN 1504-3 (npr. MAPEI Planitop Rasa & Ripara R4).

Na očiščeno vlažno betonsko površino sledi sistem za sanacijo:

- vezoči sloj s polimernim cementnim premazom,
- groba polnilna polimerna cementna malta,
- izravnava s fino polimerno cementno malto.

Pri izravnavi hrapavih površin ni potrebna groba PC malta. Nanos reparačne malte se pri globokih poškodbah izvede strojno z brizganjem v več slojih do debeline posameznega sloja 30 mm.

Kriteriji kvalitete:

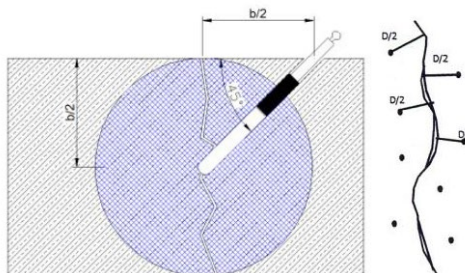
- Tlačna trdnost (po 28 dneh): > 40 MPa,
- Natezna upogibna trdnost: > 5 MPa,
- Sprijemnost s podlago (pull out): > 1,5 MPa
- Delovna temperatura: 5 C do 35 C
- Minimalna debelina zaščitnega sloja: > 2,0 cm

Pri izvedbi sanacijske malte je potrebno upoštevati vsa navodila proizvajalca malte (npr. minimalne zahtevane temperature za vgradnjo malte).

Injektiranje razpok:

Najprej se izvede čiščenje betonskih površin v okolici razpok z vodnim curkom pod visokim pritiskom (500 barov), da se ugotovi oblika razpoke ali stika. Injektiranje razpok se izvede s pomočjo injekcijskih nastavkov - packerjev, ki se vstavijo v predhodno izvrtane luknje. Luknje se izvedejo na razmaku 20 – 30 cm, približno 10 cm vstran od razpoke in v naklonu 45° glede na površino. Luknje morajo biti globoke toliko, **da prečkajo razpoko**. Premer luknje se izvede glede na izbrani premer injekcijskega nastavka.

Pred vgradnjo injekcijskih nastavkov je luknje potrebno temeljito očistiti. Pred injektiranjem smole je priporočljivo injektiranje razpoke z vodo, da iz razpoke izperemo preostali prah, tujke itd. Injekcijske nastavke vstavimo v luknje do cca. 2/3 dolžine in mehansko pričvrstimo s pomočjo nameščenega vijaka oz. napenjalca.



Shematski prikaz za izdelavo lukenj in vgradnjo injekcijskih nastavkov

Injektiranje:

- Injektiranje globinskih razpok z nizko-viskozno epoksidno smolo, cementno suspenzijo ali poliuretansko smolo skladno z navodili proizvajalca.

- Injektiranje razpok karakteristične širine nad 0,30 mm.

Izbira injektirne mase je odvisna od tipa puščanja, pretoka vode in velikosti razpok. Pomembno je, da se glede na velikost razpoke uporabi injektirna masa s primerno viskoznostjo.

Zaščitni elastomerni premaz :

Vidne betonske površine se zaščitijo z elastičnim, alkalijsko odpornim premazom na akrilni osnovi, ki ščiti pred karbonizacijo betona in ustreza EN 1504-2 (npr. Betonprotect color). Zaščitni premaz se izvede po celotni spodnji vidni površini prekladne konstrukcije skladno s fazami gradnje.

5.1.3 ŠIRITEV OBJEKTA

Širitev objekta se izvede enostransko na levi (vzhodni) strani z AB konzolo dolžine 1,20 m. Obstoječi rob plošče se očisti, poškodovan beton se odstrani po celotni dolžini objekta z vodnim curkom pod visokim pritiskom. Za potrebe sprijemnosti in strižne povezave med obstoječim in novim betom je potrebno obstoječi rob plošče v sklopu obdelave z vodnim curkom nahrapati tako, da ustreza zahtevam po EC1992 - 1 (točka 6.2.5 (2)):

- *Hrapava površina z vsaj 3 mm globoko hrapavostjo na medsebojni oddaljenosti 40 mm, ki se dobi z grabljanjem, površinsko izpostavljenimi zrni agregata ali drugimi postopki, ki zagotavljajo primerno obnašanje.*

V višini obstoječe AB plošče se na primerni razdalji izvedejo uvrtna in lepljena sidra z armaturnimi palicami, natezna armatura nove AB konzole poteka v nivoju nadbetona.

5.2 REKONSTRUKCIJA in SANACIJA PODPORNEGA SISTEMA

Pri izvedbi sanacijskih del je potrebno uporabljati material in izvesti vsa dela skladno s standardi SIST EN 1504-1 do 1504-10.

I. Sanacija betonskih površin

Na podpornem sistemu je evidentiranih precej poškodb betonskih površin kot posledica dolgotrajnega zamakanja dilatacij in sistema odvodnje. Najbolj izrazite poškodbe so vidne na mestu dilatacij, to je v oseh 1 in 9.

Pri poškodbah betonskih površin se izvede sanacija poškodovanih mest z reprofilacijo. Kot prvo se izvede odstranitev vseh poškodovanih in močno kontaminiranih betonskih površin na AB ležiščnih blazinah, stebrih in opornikih. Na to se izvede čiščenje in zaščita armature ter čiščenje vseh preostalih vidnih betonskih površin. Ko je podlaga primerno pripravljena se izvede Reprofilacija z reperaturno malto R4.

Pri izvedbi posameznih ukrepov sanacije se upošteva detajlna navodila iz prejšnjega poglavja **5.1.2(II)**:

- Odstranitev poškodovanih betonskih površin:
- Čiščenje in zaščita armature
- Čiščenje betonskih površin
- Reprofilacija betonskih površin z reperaturno malto
- Injektiranje razpok:

Zaščitni elastomerni premaz:

Za enovit izgled se izvede zaščitni elastomerni premaz tudi na podporni konstrukciji. Zahteve in usmeritve so podane v poglavju 5.1.

II. Sanacija potresnih blokov

Poškodovane potresne bloke se sanira z reprofilacijo betonskih površin.

Ne mestih kjer so betonski bloki odlomljeni pa se izvedejo novi. Obstoječe se odstrani z vodnim curkom pod visokim pritiskom tako, da se ohrani komplet obstoječo armaturo. V AB ležišče grede se pod kotom izvede luknje in zalepi dodatne strižne povezave (armaturne palice). Nove AB potresne bloke se izvede iz mikroarmiranega samozgoščevalnega betona z reduciranim krčenjem.

III. Rekonstrukcija krilnih zidov s konzolami

Zaradi širitve objekta je potrebna rekonstrukcija / nadvišanje obstoječih krilnih zidov. Zgornja površina obstoječih krilnih zidov se pripravi / nahrapavi z vodnim curkom pod visokim pritiskom. Izvede se strižna povezava med obstoječim in novim betonom z lepljenimi sidri iz armaturnih palic.

Na zgornji strani obstoječih krilnih zidov se na to izvede nadbetoniranje do predvidene višine skladno z opažnimi risbami.

IV. Preboji skozi prečnike in zaledne stene

Za potrebe izvedbe novega kanala meteorne kanalizacije se izvedejo preboji skozi obstoječe AB prečnike. Dodatno je potrebno za navezavo meteorne kanalizacije v sistem odvodnjavanja Barjanske ceste izvesti preboje skozi obstoječe zaledne stene. Preboje se izvaja z vrtanje, velikost izvrtine $\Phi 300$ mm.

5.3 OPREMA IN DETAJLI

5.3.1 Dilatacije

Obstoječi dilataciji na krajnih opornikih v oseh 1 in 9 se zamenja z eno-profilno kovinsko vodonепropustno dilatacijo skupnega hoda 120 mm (kot. npr. Mageba TEBSA GRIP RS-LS 120).

Vgradnja dilatacij se izvede po navodilih proizvajalca. Predvidena temperatura med vgradnjo dilatacij je 10°C ($\pm 5^{\circ}\text{C}$). Pred vgradnjo se s strani projektanta predpišejo pred-nastavitve dilatacije glede na točno temperaturo vgradnje.

Pri pripravi delavniške dokumentacije za dilatacije je potrebno upoštevati dejansko predvideni terminski plan in faznost vgradnje – po potrebi se dilatacija vgradi po segmentih.

5.3.2 Ležišča

Obstoječa ležišča so na splošno v dobrem stanju. V vseh oseh razen 1 in 9 so vgrajena elastomerna ležišča dimenzije 200×400 mm in višine 30, 63 oz. 85 mm. V oseh 1 in 9 so vgrajena teflonska ležišča dimenzije 200×400 mm in višine 41 mm. Obstoječa ležišča se očisti vseh nečistoč⁽¹⁾.

Med detajlnim pregledom je bilo zaznано nepopolno naleganje nekaterih nosilcev na elastomerna ležišča. Izvede se sanacija špranj⁽¹⁾ na način, da se pri zunanji temperaturi zraka $10 - 20^{\circ}\text{C}$ v špranjo injektira dvokomponentno redko tekočo epoksidno lepilo za konstrukcijska podlivanja kot npr. Mapei Epojet. Špranjo je potrebno predhodno očistiti, opaziti in opremiti z odprtino za vgradnjo mase in odprtino za odzračevanje.

⁽¹⁾Skladno s statičnim izračunom obstoječa ležišča v oseh 2, 3, 7 in 8 ne ustrezajo zahtevani nosilnosti po trenutno veljavnih predpisih Evrokod. Zaradi slednjega se vsa ležišča v omenjenih oseh zamenja.

V oseh 2, 3, 7 in 8 je predvidena vgradnja novih elastomernih ležišč TIP B z dodatno spodnjo in zgornjo jekleno pločevino debeline 15 mm, dimenzije $250 / 400 / 85$ (61), kot npr. Mageba Lasto Block Type B.

Obstoječa ležišča se odstrani skupaj z ležiščnimi blazinami. Odstranitev slednjih se izvede z vodnim curkom pod visokim pritiskom, da se ohrani obstoječo armaturo (v kolikor prisotna) in ne poškoduje AB grede.

Nova elastomerna ležišča se vgradi na podlitje, ki se ga izvede s hitro vezočo z vlakni armirano podlívno cementno malto s kompenziranim krčenjem razreda R4. Izvedba z min. 5 mm in maks. 100 mm nanosa (v slojih predpisanih s strani proizvajalca cementne malte za podlitje). Ležiščne blazine večje debeline je potrebno izvesti iz samozgoščevalnega betona C35/45/XC4/XD3/XF4/PV-II/SCC/Dmax8 (mikroarmiran s polipropilenskimi vlakni in dodatkom proti krčenju). Blazine se armira in sidra v AB prečnik (uporabi se obstoječa armatura v kolikor je vgrajena, v kolikor ni se izvedejo nova sidra).

Detajle ležišč in vgradnje se po potrebi prilagodi glede na delavniško dokumentacijo izbranega proizvajalca ležišča.

Ležišča morajo biti izdelana in montirana skladno z evropsko in slovensko zakonodajo EN 1337.

Dvig prekladne konstrukcije se izvede s hidravličnimi dvigalkami za cca. 2 cm (sinhronizirani dvig prekladne konstrukcije na posamezni podpori) v osi posameznega nosilca. Minimalna nosilnost posamezne dvigalke (pri posameznem ležišču):

- OS 2 in 8: Nrd \geq 1000 kN, 10 kom na podporo
- OS 3 in 7: Nrd \geq 1000 kN, 10 kom na podporo

Zaradi omejenega prostora na AB prečniku se za namestitev dvigalk predvidi uporaba začasne jeklene konstrukcije. Začasna jeklena konstrukcija je sestavljena iz para togih jeklenih nosilcev, ki se jih vgradi na vsaki strani AB prečnika. Jeklena nosilca z začasnimi jeklenimi elementi obesimo na AB prečnike (izvedba začasnih ležišč) in med seboj povežemo. Dimenzioniranje in detajlno zasnovo začasne jeklene konstrukcije za potrebe dviga izvede izvajalec v sklopu TEE.

Med dvigom konstrukcije je potrebno zagotoviti stabilnost objekta v vzdolžni in prečni smeri.

5.3.3 Komunalni vodi

Preko obstoječega nadvoza potekajo v desnem hodniku zaščitne cevi 2x fi110 za potrebe javne razsvetljave, dodatne 3 zaščitne cevi fi110 od CR in TK vodi v levem hodniku (3x fi110).

V času rekonstrukcije se javno razsvetljavo začasno odklopi.

Obstoječe TK vode se za čas gradnje začasno prestavi in varuje. Začasna prestavitev, varovanje in vgradnja novih TK vodov je obdelana v ločenem načrtu TK vodov.

Pri rekonstrukciji je predvidena vgradnja po 2x Φ 80mm PE-HD cevi v levem in desnem robnem vencu za potrebe javne razsvetljave. TK vode iz levega hodnika se prestavi na kabelsko polico. Dodatne 3x fi125mm zaščitne cevi od CR se namestijo pod desni hodnik na kabelsko polico.

Pod levo konzolo je predvidena kabelska polica s prostorom za 6x fi125mm zaščitnih cevi za potrebe TK vodov in rezerve.

Prestavitev in novogradnja elektro vodov (javne razsvetljave in začasno varovanje, prestavitev in novogradnja TK vodov) je obdelana v projektu *Ureditve barjanske ceste med križanjem z Zihorlovo ulico in AC priključkom Ljubljana center, št. projekta 8953, LUZ d.d., avgust 2022* v pripadajočih načrtih.

5.3.4 Hidroizolacija voziščne plošče

Za hidroizolacijo AB krovne plošče pod hodniki se uporabi HI sistem, ki omogoča takojšnjo izvedbo hidroizolacije (npr. Servipak/Servidek). Pri tem se izvede vodotesen preklon bitumenskih trakov ob robnikih v primerni širini (10 - 15 cm).

Pod voziščem je za 50 % površine predvidena izvedba s klasično HI debeline 1,0 cm:

- predhodni epoksidni premaz
- posip s kremenčevim peskom
- epoksidni premaz
- bitumenska lepilna masa
- bitumenski varjeni trak s poliestrsko plastjo, d=0,5 cm
- zaščitni sloj asfalt-betona SMA 8 PmB 45/80-65, A2 Z4 3,0 cm
- ojačitvena mreža iz steklenih vlaken 100/100 kN (npr. Adfors GG100)
- vezni sloj asfalt-betona SMA 8 PmB 45/80-65, A2 3,0 cm
- obrabni sloj asfalt-betona SMA 11 PmB 45/80-65, A2 4,0 cm

Za preostalih 50 % površine pod voziščem je predvidena izvedba hidroizolacije na osnovi brizganih metakrilatov, ki jo je možno polagati na vlažen beton (Eliminator), v sestavi:

- čiščenje in priprava betonske površine
- predhodni premaz za stik z betonsko površino
- 1. sloj brizgane vodoneprepustne membrane na osnovi MMA

- 2. sloj brizgane vodoneprepustne membrane na osnovi MMA
- premaz za sprijem z asfaltom kot npr. Bond coat SA1030

5.3.5 Merilni čepi

Čepe za kontrolo povesov in posedanja objekta se vgradi na oba hodnika na zgornji površini robnega venca in sicer v sredini vsakega razpona in nad vsako podporo:

- 2 x 8 v območju polj in
- 2 x 9 nad vsako podporo

Skupno je predvidenih 34 merilnih čepov. Točne lokacije z detajlom merilnega čepa so prikazane v risbah – detajli.

5.3.6 Ograje, hodniki in robniki

Na obeh straneh mostu sta predvidena robna venca s hodnikom in z granitnimi robniki prečnih dimenzijami 20/13 cm, ki so dvignjeni 7 cm nad vozišče. Levi hodnik skupne širine 3,30 m je namenjen površinam za kolesarje, desni hodnik skupne širine 2,80 m pa površinam za pešce.

Ob vozišču se na hodnik vgradi JVO H2, W4 (brez distančnika). Zaradi preprečitve naleta in preglednosti se na začetku in koncu objekta izvede JVO s spušenimi zaključnicami ($l = 4$ m). Na strani proti pešcem in kolesarjem se dodatno na JVO vgradi ročaj za kolesarje in pešce. V območju nad avtocesto se izvedejo mrežni paneli 2,0 m višine. **JVO se izvede z dodatnim zaključnim slojem v barvi po izbiri naročnika MOL.**

Zaradi dolžine posameznih elementov hodnika se za kontrolirano tvorjenje razpok na zunanji površini hodnikov in robnih vencev izvedejo rege. V svež beton se izvede zareza globine 2 cm in širine 5 - 10 mm (zaščitni sloj betona 4,5 cm – zareza nad armaturo) na razdalji 8 m. Zareze se zapolnijo s trajno – elastično tesnilno maso za zapolnitev fug.

Jekleni ograji za pešce in kolesarje, ki sta nameščeni obojestransko na robnih vencih objekta sta sestavljeni iz jeklenih škatlastih stebričkov 60/60/5 mm, dveh horizontal 60/40/5 mm in horizontalnega ročaja iz škatlastega profila 120/60/5 mm. Polna vertikalna polnima, ki so nameščena na razdalji cca. 12 cm so dimenzije 25/25/3 mm. Skupna višina ograje znaša 1,3 m. Stebričke jeklene ograje se v robni venec pritrdi z kemičnimi sidri iz nerjavnega materiala A4. Alternativno je možna pritrditev z mehanskimi sidri iz nerjavnega jekla A4, pri čemer je potrebno izvrtine dodatno zaliti s sidrno maso, da se prepreči možnost zastajanja vode v luknjah za sidra.

Vsi elementi jeklenih ograj morajo biti vroče pocinkani, med seboj galvansko povezani in priključeni na obstoječi sistem ozemljitve. V kolikor je ta poškodovana jo je potrebno obnoviti. Povezavo posameznih segmentov ograje se izvede z bakrenimi vodniki P/F preseka 16 mm². Zaključni sloj jeklenih ograj se izvede v barvi RAL 7021 oz. po izbiri investitorja.

Vidne površine hodnikov in robnih vencev se zaščiti z visoko sposobnim penetracijskim sistemom za betonske površine, ki zagotavljajo kvalitetno in dolgotrajno zaščito elementa (kot npr. MAPEI Planiseal WR85 gel).

5.3.7 Odvodnjavanje na objektu

Ob rekonstrukciji krova mostu se obstoječ sistem odvodnje objekta v celoti ukine in odstrani, izdelava se nov sistem odvodnje po najnovejših smernicah.

Most ima v prečnem prerezu enostranski prečni padec z naklonom 2.0 %, ki se ohrani tudi po rekonstrukciji. V vzdolžnem prerezu pa poteka niveleta most v konveksni zaokrožitvi s temenom na sredini most, kjer je vzdolžni padec 0 %, nato pa se vzdolžni padec proti krajnim podporam počasi povečuje do maksimalne vrednosti 3.90 % na severni strani oziroma 3.80 % na južni strani. Meteorna odvodnja je zagotovljena s po enim kanalom na vsaki strani konveksne zaokrožitve, ki potekata od temena konveksne zaokrožitve na vsako stran mosta proti krajnim opornikom.

Meteorna voda na objektu se odvodnjava preko LTŽ mostnih izlivnikov s talnim vtokom in vertikalnim iztokom, ob desnem robniku mostu. Izlivniki so pozicionirani na razmaku 5 m na območju temena objekta v nadaljevanju pa na 7,5, 10, 13 oz. 15 m proti obema krajnim podporama. Izlivniki so speljani v vzdolžni sistem odvodnje (AP cev DN200), ki se za krajnima podporama v osi 1 in 9 navezuje na sistem odvodnje Barjanske ceste.

V območju dilatacij se pred njimi v prečni smeri med nosilci izvedejo cevke za pronicajočo vodo za preprečitev zastajanja vode v območju dilatacije.

Na spodnji in zgornji strani AB plošče ob obeh robnikih se izvede nad HI v nivoju zaščitnega sloja asfalt-betona drenažni rebri širine 20 cm in debeline 3,0 cm (mešanica epoksidne smole in kamnite frakcije 8/16).

5.3.8 Zasipni klin, prehodne plošče

Obstoječe prehodne plošče so izvedene kot enojne dolžino 3,7 m. Na asfaltni površini so pred in za objektom vidne mulde v asfaltu, ki so zelo verjetno posledica posedanja prehodnih plošč. Zelo verjetno je, da se je pod prehodnimi ploščami v času konsolidacije terena ustvarila praznina. Prehodne plošče predvidoma niso sidrane v opornike in so posledično lahko zdrsnile iz ležišča.

Predvidena je zamenjava obstoječih prehodnih plošč v celoti. Izvede se nova enojna prehodna plošča dolžine 3,70 m in debeline 25 cm.

Zasipni klin za stenama krajnih opornikov in krili je potrebno zaradi verjetnega posedanja materiala izvesti z gramoznim materialom (GW, SW). Komprimacija se izvede z lažjimi komprimacijskimi sredstvi v slojih po 30 cm na 98 % po MPP (modificiran postopek po Proctorju), oziroma $E_{v2} > 40$ MPa. ($E_{v2} = 80$ MPa). Pod nov zasipni klin je potrebno vgraditi ločilni geosintetik.

5.3.9 Prometna signalizacija

Horizontalna talna signalizacija se izvede v skladu s tehničnimi smernicami. Na vozišču so predvidene debeloslojne vzdolžne črte širine 15 cm, na kolesarski stezi pa tankoslojne črte širine 10 cm. Prometna signalizacija je obdelana v sklopu 2/1 Načrt prometnih površin.

5.4 DELOVNI ODER

Delovni in zaščitni oder za izvedbo rekonstrukcije nadvoza se izvede pod obstoječim objektom na predvidoma sistemskem podpornem sistemu. Potrebno je upoštevati previdene faze postavitve in prestavitve delovnega odra v območju AC skladno s fazami gradnje.

Zasnovo in detajle delovnega odra pripravi izvajalec v sklopu tehnološko-ekonomskega elaborata (TEE).

6 MATERIALI

6.1 OBSTOJEČA KONSTRUKCIJA

BETON in ARMATURA

OPORNIKI

| | | |
|------------|---|--------------------------|
| Beton MB30 | → | C25/30 |
| ARMATURA | | ČBR 400-2/500 / Č240/360 |

GLAVA STEBRA

| | | |
|------------|---|-----------------------|
| Beton MB35 | → | C30/37 |
| ARMATURA | | ČBR400/500 / Č340/500 |

STEBRI

| | | |
|------------|---|-----------|
| Beton MB35 | → | C30/37 |
| ARMATURA | | RA400/500 |

PILOTI

| | | |
|------------|---|----------------------------------|
| Beton MB30 | → | C25/30 |
| ARMATURA | | ČBR 400-2/500, Č200 ^v |

TEMELJNE BLAZINE

| | | |
|------------|---|---------------|
| Beton MB30 | → | C25/30 |
| ARMATURA | | ČBR 400-2/500 |

PREKLADNA KONSTRUKCIJA – NOSILCI IN AB PLOŠČA

| | | |
|---------------------------|---|-----------|
| Beton MB40 | → | C35/45 |
| Mehka armat ČBR 400-2/500 | | Č 340/500 |

JEKLO ZA PREDNAPENJANJE

| | | |
|----------------------|--------------------|-------|
| Trdnost: | 1667/1500MPa | Y1500 |
| Elastični modul: | $E_p = 210000$ MPa | |
| Relaksacija: | 5,0 % | |
| Zdrs ob zaklinjenju: | $\Delta z = 9$ mm | |

Sistem za prednapenjanje: BBRV 150 27 Ø 7 mm**6.2 REKONSTRUKCIJA IN OJAČITVE****6.2.1 BETON in ARMATURA:**

| | | |
|-------------------------------------|-------------|---|
| krovna plošča nadbetoniranje: | C35/45 | XC4 / XD1 / XF3 / PV-II / Dmax16 mikroarmiran s polipropilenskimi vlakni in z dodatki proti krčenju |
| dobetonirani del opornikov in kril: | C30/37 | XC4, XD3, XF4 (PV-II) |
| robni venci s hodniki: | C30/37 | XC4 / XD3 / XF4 / PV-II mikroarmiran s polipropilenskimi vlakni in z dodatki proti krčenju |
| Novi protipotresni bloki: | C35/45 | XC4 / XD1 / XF3 / PV-II / SCC / Dmax16 mikroarmiran s polipropilenskimi vlakni in z dodatki proti krčenju |
| Nosilna armatura: | B 500 S (B) | |

Vidne betonske površine, ki so izpostavljene soljenju se zaščitijo z visoko sposobnim penetracijskim sistemom za betonske površine, ki zagotavljajo kvalitetno in dolgotrajno zaščito elementa (kot npr. MAPEI Planiseal WR85 gel).

6.2.2 REPARATurna MALTA

Pri sanaciji betonskih površin se uporabijo polimerne cemente sanacijske malte R4, ki so v skladu z EN 1504. Vgradnja skladno z navodili proizvajalca.

7 TEHNOLOGIJA GRADNJE**FAZE REKONSTRUKCIJE NADVOZA**

Predvideni skupni čas rekonstrukcije je 12 – 14 mesecev.

Faze so označene glede na dela, ki se odvijajo na objektu z A, B, C, D, E in F, ter z deli, ki so vezana na zapore na AC z 1, 2.1, 2.2, 3.1, 3.2 in 4.1.

FAZA A-1 - trajanje 2,5 mesece

Prometna ureditev avtoceste: Promet na AC poteka po obojestranski zapori B-2, vzpostavitev zapore 30 dni pred koncem faze.

Priključki AC: Promet na vseh priključkih poteka brez ovir.

Prometna ureditev na objektu: Dvosmerni promet urejen na preostalem vozišču po levi strani objekta.

Pešci in kolesarji: Za pešce in kolesarje je promet zaprt.

Dela na krovu objekta na desni strani nadvoza:

- Preusmeritev in zavarovanje prometa na objektu.
- Postavitev delovnih odrov po celotni dolžini objekta (razen območje AC kjer poteka promet).
- Začasna prestavitev obst. TK vodov iz hodnika na delovni oder oz. pod AB konzolo.
- Odstranitev desnega hodnika z RV po celotni dolžini objekta. Nad AC, kjer ni zaščitnega odra se odstrani samo hodnik, RV z zaščitno ograjo se začasno ohrani.
- Odstranitev HI po celotni dolžini objekta na območju gradbišča.
- Odstranitev obstoječih izlivnikov in vzdolžnega sistema odvodnje po celotni dolžini nadvoza razen v območju vozišča AC.
- Odstranitev vrhnjega sloja AB plošče v debelini 2-3 cm po celotni dolžini objekta razen dela nad AC, kjer ni zaščitnega odra.
- Čiščenje in AK zaščita odkrite armature.
- Vgradnja novih izlivnikov od osi 6 do 9.
- Vgradnja začasnih povoznih pločevin na sklede izlivnikov.
- Izvedba nadbetoniranja AB plošče v zadnjih treh poljih (osi od 6 do 9).
- Izvedba HI na robu plošče v zadnjih treh poljih (osi od 6 do 9).
- Izvedba robnega venca v zadnjih treh poljih (osi od 6 do 9).
- Izvedba kandelabrov za javno razsvetljavo od osi 6 do 9.

Sanacijska dela na prekladni konstrukciji (območje ločilnega pasu AC) in na podpori v osi 5:

- Vzpostavitev delne zapore AC.
- Izdelava zaščitno delovnega odra v ločilnem pasu.
- Izvedba sanacijskih del na plafonu prekladne konstrukcije na območju ločilnega pasu.
- Sanacija stebrov, AB ležiščne blazine in proti potresnih blokov na podpori v osi 5.
- Zamenjava ležišč v osi 5 ter drugih pripravljenih oseh.
- Izvedba zaščitnega premaza vseh vidnih betonskih površin na podpori v osi 5.
- Ureditev vozišča do lica JVO na levem in desnem smernem vozišču AC.

FAZA A-2.1 - trajanje 3 tedne

Prometna ureditev avtoceste: Promet na AC poteka v režimu zapore C2+2 po desnem smernem vozišču AC - smer razcep Kozarje

Priključki AC: Priključek LJ – Malence (krak D) - promet poteka po pospeševalnem pasu levega smernega vozišča AC, predvidene so vikend zapore kraka za ureditev prometnega režima in postavitev in odstranitev delovno varovalnih odrov.

Prometna ureditev na objektu: Dvosmerni promet urejen na preostalem vozišču po levi strani objekta.

Pešci in kolesarji: Za pešce in kolesarje je promet zaprt.

Dela na krovu objekta na desni strani nadvoza:

- Odstranitev desnega hodnika z robnim vencem v območju levega smern. vozišča AC.
- Odstranitev vrhnjega sloja AB plošče v debelini 2-3 cm v območju levega smernega vozišča AC.
- Odstranitev obstoječih izlivnikov in vzdolžnega sistema odvodnje v območju levega smernega vozišča AC.
- Čiščenje in AK zaščita odkrite armature.
- Odstranitev poškodovanega roba AB konzol in reprofilacija betonskih površin.
- Vgradnja novih izlivnikov od osi 5 do 6.

- Vgradnja začasnih povoznih pločevin na sklede izlivnikov.
- Izvedba nadbetoniranja AB plošče v petem polju (med osema 5 in 6).
- Izvedba HI na robu plošče v petem polju (osi od 5 do 6).
- Izvedba robnega venca v petem polju (osi od 5 do 6).
- Izvedba kandelabrov za javno razsvetljavo v petem polju (osi od 5 do 6).
- Izvedba jeklene ograje za pešce od osi 5 do 9.
- Izvedba konzol za komunalne vode od osi 5 do 9.

Sanacijska dela na prekladni konstrukciji (območje levega smernega vozišča AC):

- Izdelava zaščitno-delovnega odra.
- Izvedba sanacijskih del na plafonu prekladne konstrukcije.
- Visokotlačno pranje vseh vidnih betonskih površin.
- Pregled betonske konstrukcije in sanacije betonskih površin.
- Odstranitev zaščitnega delovnega odra.

FAZA A-2.2 - trajanje 1 teden

Prometna ureditev avtoceste: Promet na AC poteka v režimu zapore C2+2 po desnem smernem vozišču AC - smer razcep Kozarje

Priključki AC: Priključek LJ – Malence (krak D) - promet poteka po prehitevalnem pasu levega smernega vozišča AC, predvidene so popolne vikend zapore kraka za ureditev prometnega režima in postavitev in odstranitev delovno varovalnih odrov.

Prometna ureditev na objektu: Dvosmerni promet urejen na preostalem vozišču po levi strani objekta.

Pešci in kolesarji: Za pešce in kolesarje je promet zaprt.

Dela na krovu objekta na desni strani nadvoza:

- Dokončanje del iz faze 2.1

Sanacijska dela na prekladni konstrukciji (območje levega smernega vozišča AC):

- Izvedba sanacijskih del na plafonu prekladne konstrukcije v območju pospeševalnega pasu.

Faza 2.2 je pomožna faza in predvidena za primer, da je veliko sanacijskih del na plafonu prekladne konstrukcije v območju pospeševalnega pasu.

V kolikor je možno sanacijska dela na plafonu prekladne konstrukcije izvesti tekom popoldne vikend zapore kraka D, ki je namenjena tudi odstranitvi oz. prestavitvi delovno zaščitnih odrov, se fazo 2.2 preskoči. V slednjem primeru se trajanje faze 2.1 podaljša na skupno 4 tedne.

FAZA A-3.1 - trajanje 5 tednov

Prometna ureditev avtoceste: Promet na AC poteka v režimu zapore C2+2 po levem smernem vozišču AC - smer razcep Malence

Priključki AC: Priključek Malence – LJ (krak A) - promet poteka po zaviralnem pasu desnega smernega vozišča AC, predvidene so vikend zapore kraka za ureditev prometnega režima in postavitev in odstranitev delovno varovalnih odrov.

Prometna ureditev na objektu: Dvosmerni promet urejen na preostalem vozišču po levi strani objekta.

Pešci in kolesarji: Za pešce in kolesarje je promet zaprt.

Dela na krovu objekta na desni strani nadvoza:

- Odstranitev desnega hodnika z robnim vencem v območju desnega smernega vozišča AC.
- Odstranitev obstoječih izlivnikov in vzdolžnega sistema odvodnje v območju desnega smernega vozišča AC.

- Odstranitev preostalega vrhnjega sloja AB plošče v debelini 2-3 cm v območju desnega smernega vozišča AC.
- Odstranitev poškodovanega roba konzol in reprofilacije betonske površine.
- Čiščenje in AK zaščita odkrite armature.
- Izvedba nadbetoniranja AB plošče v preostalem območju od osi 1 do 5.
- Vgradnja novih izlivnikov od osi 1 do 5.
- Vgradnja začnih povoznih pločevin na sklede izlivnikov.
- Izvedba HI na robu plošče v preostalem območju od osi 1 do 5.
- Izvedba robnega venca v preostalem območju od osi 1 do 5.
- Izvedba jeklene ograje za pešce od osi 1 do 5.
- Izvedba konzol za komunalne vode od osi 1 do 5.

Sanacijska dela na prekladni konstrukciji (območje desnega smernega vozišča AC):

- Preusmeritev in zavarovanje prometa na AC.
- Izdelava zaščitno-delovnega odra.
- Izvedba sanacijskih del na plafonu prekladne konstrukcije (razen območje zaviralnega pasu).
- Visokotlačno pranje vseh vidnih betonskih površin.
- Pregled betonske konstrukcije in sanacije betonskih površin.

FAZA A-3.2 - trajanje 1 teden

Prometna ureditev avtoceste: Promet na AC poteka v režimu zapore C2+2 po levem smernem vozišču AC - smer razcep Malence

Priključki AC: Priključek Malence – LJ (krak A) - promet poteka po prehitevalnem pasu desnega smernega vozišča AC, predvidene so vikend zapore kraka za ureditev prometnega režima in postavitve in odstranitev delovno varovalnih odrov.

Prometna ureditev na objektu: Dvosmerni promet urejen na preostalem vozišču po levi strani objekta.

Pešci in kolesarji: Za pešce in kolesarje je promet zaprt.

Dela na krovu objekta na desni strani nadvoza:

- Dokončanje del iz faze 3.1

Sanacijska dela na prekladni konstrukciji (območje levega smernega vozišča AC):

- Izvedba sanacijskih del na plafonu prekladne konstrukcije v območju zaviralnega pasu.

Faza 3.2 je pomožna faza in predvidena za primer, da je veliko sanacijskih del na plafonu prekladne konstrukcije v območju zaviralnega pasu.

V kolikor možno sanacijska dela na plafonu prekladne konstrukcije izvesti tekom popoldne vikend zapore kraka A, ki je namenjena tudi odstranitvi oz. prestavitvi delovno zaščitnih odrov, se fazo 3.2 preskoči. V slednjem primeru se trajanje faze 3.1 podaljša na skupno 6 tednov.

FAZA B-3.1 - trajanje 1 mesec

Prometna ureditev avtoceste: Promet na AC poteka v režimu zapore C2+2 po levem smernem vozišču AC - smer razcep Malence

Priključki AC: Priključek Malence – LJ (krak A) - promet poteka po zaviralnem pasu desnega smernega vozišča AC, predvidene so vikend zapore kraka za ureditev prometnega režima in postavitve in odstranitev delovno varovalnih odrov.

Prometna ureditev na objektu: Dvosmerni promet urejen na preostalem vozišču po desni strani objekta.

Pešci in kolesarji: Za pešce in kolesarje je promet zaprt.

Dela na krovu objekta na levi strani nadvoza:

- Preusmeritev in zavarovanje prometa na objektu.
- Odstranitev asfalta in HI na levi strani nadvoza v območju gradbišča.
- Odstranitev levega hodnika z robnim vencem po celotni dolžini objekta razen nad levim smernim voziščem AC.
- Odstranitev vrhnjega sloja AB plošče v debelini 2-3 cm po celotni dolžini objekta razen nad levim smernim voziščem AC.
- Odstranitev poškodovanega roba konzol in reprofilacije betonskih površin.
- Čiščenje in AK zaščita odkrite armature.
- Izvedba nadbetoniranja AB plošče in nove AB konzole od osi 1 do 5.
- Izvedba HI na robu plošče od osi 1 do 5.
- Izvedba robnega venca od osi 1 do 5.
- Izvedba jeklene ograje za pešce od osi 1 do 5.
- Izvedba kandelabrov za javno razsvetljavo od osi 1 do 5.

Sanacijska dela na prekladni konstrukciji (območje desnega smernega vozišča AC):

- Visokotlačno pranje vseh vidnih betonskih površin.
- Pregled betonske konstrukcije in določitev območja sanacije betonskih površin.
- Izvedba zaščitnega premaza vseh vidnih betonskih površin od osi 1-5 po celotni širini nadvoza (razen območje zaviralnega pasu).

Prioritetno se izvajajo vsa zgoraj navedena dela v območju četrtega polja nad desnim smernim voziščem AC. Dela izven območja desnega smernega vozišča, ki ostanejo, se lahko nadaljujejo v naslednji fazi.

FAZA B-4.1 - trajanje 2 meseca

Prometna ureditev avtoceste: Promet na AC poteka v režimu zapore C2+2 po desnem smernem vozišču AC - smer razcep Kozarje, zapora se po 30 dneh odstrani.

Priključki AC: Priključek Malence – LJ (krak A) - promet poteka po pospeševalnem pasu levega smernega vozišča AC, predvidene so vikend zapore kraka za ureditev prometnega režima in postavitve in odstranitev delovno varovalnih odrov.

Prometna ureditev na objektu: Dvosmerni promet urejen na preostalem vozišču po desni strani objekta.
Pešci in kolesarji: Za pešce in kolesarje je promet zaprt.

Dela na krovu objekta na levi strani nadvoza:

- Odstranitev dela levega hodnika in robnega venca v območju levega smernega vozišča AC.
- Odstranitev vrhnjega sloja AB plošče v debelini 2-3 cm v območju leve polovice AC.
- Odstranitev poškodovanega roba konzol in reprofilacije betonske površine.
- Čiščenje in AK zaščita odkrite armature.
- Izvedba nadbetoniranja AB plošče in AB konzole v preostalem območju (od osi 5 do 9).
- Vgradnja novega vzdolžnega sistema odvodnje od osi 5 do 9 (na desni strani nadvoza).
- Izvedba HI na robu plošče v preostalem območju (od osi 5 do 9).
- Izvedba robnega venca v preostalem območju (od osi 5 do 9).
- Izvedba jeklene ograje za pešce od osi 5 do 9.
- Izvedba kandelabrov za javno razsvetljavo od osi 5 do 9.

Sanacijska dela na prekladni konstrukciji (območje levega smernega vozišča AC):

- Izdelava zaščitno-delovnega odra.
- Izvedba sanacijskih del na plafonu prekladne konstrukcije.
- Visokotlačno pranje vseh vidnih betonskih površin.

- Pregled betonske konstrukcije in določitev območja sanacije betonskih površin.
- Izvedba zaščitnega premaza vseh vidnih betonskih površin od osi 1 do 5 po celotni širini nadvoza.
- Odstranitev zaščitno-delovnega odra.
- Odprava zapor na AC.

Prioritetno se izvedejo vsa dela v območju levega smernega vozišča (5. polja), da je možna odstranitev zapore na AC v predvidenem roku. V fazi B-4 se prav tako izvedejo morebitna dela izven območja AC, ki jih zaradi časovne omejitve zapore AC ni bilo možno izvesti v fazi B-3.

FAZA C - trajanje 1,5 meseca

Prometna ureditev avtoceste: Promet na AC poteka brez ovir.

Prometna ureditev na objektu: Dvosmerni promet urejen na preostalem vozišču po levi in desni strani objekta.

Pešci in kolesarji: Za pešce in kolesarje je promet zaprt.

Dela na krovu objekta na sredini nadvoza:

- Preusmeritev in zaščita prometa na objektu.
- Odstranitev asfalta in HI na sredini nadvoza v območju gradbišča.
- Odstranitev vrhnjega sloja AB plošče v debelini 2-3 cm.
- Čiščenje in AK zaščita odkrite armature.
- Izvedba nadbetoniranja AB plošče v območju gradbišča (od osi 1 do 9).

FAZA D - trajanje 1 mesec

Prometna ureditev avtoceste: Promet na AC poteka brez ovir.

Prometna ureditev na objektu: Dvosmerni promet urejen na preostalem vozišču po levi strani objekta.

Pešci in kolesarji: Za pešce in kolesarje je promet zaprt.

Dela na krovu objekta na desni strani nadvoza:

- Preusmeritev in zaščita prometa na objektu
- Odstranitev preostalega obstoječega asfalta in HI na sredini nadvoza v območju gradbišča.
- Odstranitev vrhnjega sloja AB plošče v debelini 2-3 cm.
- Čiščenje in AK zaščita odkrite armature.
- Izvedba nadbetoniranja AB plošče v območju gradbišča (od osi 1 do 9).
- Izvedba HI v območju hodnika.
- Izvedba hodnika na desni strani objekta.
- Izvedba vlečnih jaškov za komunalne vode na desni strani objekta.
- Vgradnja komunalnih vodov v desni hodnik in na obešeno konzolo na levi strani objekta.
- Izvedba JVO ograje.

FAZA E - trajanje 1 mesec

Prometna ureditev avtoceste: Promet na AC poteka brez ovir.

Prometna ureditev na objektu: Dvosmerni promet urejen na preostalem vozišču na desni strani objekta.

Pešci in kolesarji: Za pešce in kolesarje je promet zaprt.

Dela na krovu objekta na levi strani nadvoza:

- Preusmeritev in zaščita prometa na objektu
- Izvedba HI pod hodnikom.
- Izvedba hodnika na levi strani objekta.
- Izvedba vlečnih jaškov za komunalne vode na levi strani objekta.

- Vgradnja komunalnih vodov v levi hodnik in na obešeno konzolo na levi strani objekta..
- Izvedba JVO ograje.

FAZA F - trajanje 10 dni

Prometna ureditev avtoceste: Promet na AC poteka brez ovir.

Prometna ureditev na objektu: Popolna 10 dnevna zapora.

Pešci in kolesarji: Za pešce in kolesarje je promet zaprt.

Dela na krovu objekta na sredini nadvoza:

- Izvedba HI v območju vozišča.
- Vgradnja rešetk izlivnikov.
- Izvedba asfaltnih plasti.
- Vgradnja dilatacije v osi 1 in osi 9.
- Zaključna dela.
- Izvedba prometne signalizacije.

Sanacijska dela na podpornem sistemu se izvajajo vzporedno z zgornjimi delovnimi fazami na prekladni konstrukciji.

Za menjavo ležišč so predvidene 3 popolne vikend zapore na nadvozu. Zaradi slednjega je potrebno zagotoviti 2 začasni jekleni konstrukciji za potrebe namestitve dvigalk. Prva menjava ležišč je zaradi zapore na AC predvidena že znotraj faze 1.

8 POVZETEK STATIČNEGA IZRAČUNA

Statična analiza je opravljena na podlagi pravil **Evrokodov**.

Upoštevani so naslednji standardi:

- SIST EN 1990 Evrokod: Osnove projektiranja konstrukcij
- SIST EN 1991 Evrokod 1: Vplivi na konstrukcije
- SIST EN 1992 Evrokod 2: Projektiranje betonskih konstrukcij
- SIST EN 1997 Evrokod 7: Geotehnično projektiranje
- SIST EN 1998 Evrokod 8: Projektiranje potresno odpornih konstrukcij

Račun je izveden s programom SOFiSTiK. Program uporablja prostorski model po MKE z linijskimi in ploskovnimi elementi z upoštevanjem prednapenjanja. Izvedeni so dokazi za mejna stanja nosilnosti in uporabnosti po SIST EN 1992-1 in SIST EN 1992-2 in določena je potrebna armatura za vse konstrukcijske elemente oz. nosilnost posameznih prerezov.

obtežba LM1 in obtežba pešcev po Evrokodu 1991-2.

- | | | |
|------------------|---|---|
| TS ₁ | → | 300 kN osna obremenitev 1. vozni pas |
| UDL ₁ | → | 9,0 kN/m ² zvezna obremenitev 1. vozni pas |
| TS ₂ | → | 200 kN osna obremenitev 2. vozni pas |
| UDL ₂ | → | 2,5 kN/m ² zvezna obremenitev 2. vozni pas in preostala površina |
| pešci | → | 5 kN/m ² |

Zaradi nižje prometne hitrosti na nadvozu napram AC in posledično manjšim dinamičnim vplivom na konstrukcijo je upoštevana redukcija prometne obtežbe s faktorjem $\alpha = 0,8$ (samo glavni pas koncentrirana obtežba – tandemski sistem)

Geometrija obstoječega nadvoza in podatki za vgrajene kable za prednapenjanje ter mehke armature so bili upoštevani glede na arhivsko dokumentacijo obstoječega objekta.

POVZETEK REZULTATOV IZ STATIČNEGA IZRAČUNA

PREKLADNA KONSTRUKCIJA

Stopnja izkoriščenosti posameznih obstoječih nosilcev prekladne konstrukcije glede na MSN z upoštevanjem povečane obtežbe zaradi rekonstrukcije krovnih elementov v najbolj neugodnem primeru znaša $MEd / MRd = 4815 \text{ kN} / 6584 \text{ kN} = 0,73 = < 1,0 = \text{OK}$.

Deformacija ob kablu za pogosto kombinacijo MSU (kontrola dekompresije) v najbolj neugodnem primeru z upoštevanjem $\pm 10\%$ napenjalne sile doseže majhno natezno vrednost $0,059\%$, kar predstavlja natezno napetost na spodnjem robu nosilca $0,8 \text{ MPa}$. To pomeni, da ima beton še precej rezerve do pojava razpok in smatramo, da je pogoj uporabnosti za naslednjih 40 let izpolnjen in nosilcev ni potrebno ojačevati.

Obstoječa armatura v prečnikih je večja od izračunane potrebne armature.

LEŽIŠČA

Prekoračen je pogoj uklonske stabilnosti ležišča za nekatera višja ležišča – za ležišča 200/400/63 na podporah 3 in 7 za 2% in za ležišča 200/400/85 na podporah 2 in 8 za 37%. Izračunani so ustrezni tipi ležišč za zamenjavo, in sicer 250/300/63 za podpori 3 in 7 (zaradi enotnejših dimenzij izberemo 250/400/63) in 250/400/85 na podporah 2 in 8.

Horizontalne sile v ležiščih za neseizmično obtežbo so v mejah dopustnih, v primeru rušilnega potresa računanega po evrokodu pa so horizontalne sile prekoračene in bo prišlo do zdrsa nosilcev z ležišč (udar v zaščitne betonske bloke), kar je bilo predvideno že pri osnovni zasnovi objekta in rekonstrukcija na to nima vpliva.

PODPORNA KONSTRUKCIJA

Za vse elemente podporne konstrukcije je izračunana največja potrebna armatura z upoštevanjem pogojev MSN, MSU in potresa in primerjana z obstoječo armaturo.

Prečke (glave stebrov) izkazujejo zadostno nosilnost.

Stebri za neseizmično obtežbo izkazujejo zadostno nosilnost, za rušilni potres računan po evrokodu za tip tal S1 pa stebra 4 in 6 (bolj toge podpore s 4 piloti) dobijo večjo potrebno armaturo, kot je dejansko vgrajena⁽¹⁾.

Grede opornikov in pilotne grede vmesnih podpor izkazujejo zadostno nosilnost.

Piloti za neseizmično obtežbo izkazujejo zadostno nosilnost, za rušilni potres računan po evrokodu za tip tal S1 pa vsi piloti dobijo malo več potrebne armature, kot je dejansko vgrajena⁽¹⁾.

Geomehanska nosilnost pilotov oz. reakcije pod peto pilotov so manjše od v GG poročilu izračunane nosilnosti pilotov.

Opomba ⁽¹⁾: Do prekoračitev med računsko potrebno in vgrajeno armaturo prihaja zaradi različnih pristopov izračuna potresne sile po evrokodu in po predpisih, ki so bili upoštevani pri zasnovi objekta. Hkrati iz arhivskih podlog ni možno razbrati ali se je takrat upošteval tip tal S1, ki je zelo neugoden za konstrukcijo z vidika potresne obtežbe. Zaradi slednjega lahko podamo ugotovitve, da računske prekoračitve vgrajene armature veljajo tudi za obstoječi objekt in sama rekonstrukcija nima bistvenega vpliva na nosilnosti obstoječih nosilnih elementov objekta.

9 UREDITEV IN VAROVANJE PROMETA

Potrebne zapore in vodenje prometa AC je obravnavano v Elaboratu vodenja in zavarovanja prometa na AC v času rekonstrukcije nadvoza VA0235, št. načrta: 784-PRO, BPI d.o.o.. Po izboru izvajalca del, ko bo znan detajlni terminski plan gradbenih del je potrebno ponovno preveriti in po potrebi optimizirati elaborat zapor AC.

Po izboru izvajalca in izdelavi detajlnega terminskega plana je potrebno izdelati elaborat začasne prometne ureditve Barjanske ceste in lokalnih cest, vključno s pridobitvijo potrebnih dovoljenj. Elaborat mora biti usklajen s fazami izvajanja gradbenih del in potrjen s strani naročnika.

10 POGOJI PRI IZVEDBI DEL IN ZAKLJUČEK

Izvajalec del mora pred pričetkom del detaljno pregledati vso razpoložljivo dokumentacijo ter o nejasnostih obvestiti projektanta. Za vse postopke, opremo, materiale in detajle, ki niso posebej navedeni, veljajo splošni in posebni pogoji investitorja ter ostale priznane tehnične norme, predpisi in standardi. Izvajalec mora pridobiti za uporabljene materiale ustrezne ateste.

Ves odpadni gradbeni material, zemeljski višek in druge odpadke je treba odpeljati na za ta namen urejeno odlagališče izven zavarovanega območja.

Zagotoviti je potrebno vse tehnične in druge ukrepe za preprečitev onesnaženja območja (odtekanje naftnih derivatov, olj v vodo, tla in okolico). Uporabiti lažjo mehanizacijo, tehnično brezhibne stroje, ki ne oddajajo prekomerne količine izpušnih plinov in ne povzročajo prekomernega hrupa.

Lokalne pote do stanovanjskih objektov morajo biti ves čas tekom rekonstrukcije prevozne v kolikor ni predviden drug dostop z obvozom.

Med zaključnimi deli je potrebno izvesti povrnitev terena pod objektom v prvotno stanje, odpraviti vse poškodbe na lokalnih cestah, ki so nastale tekom rekonstrukcije nadvoza, ipd.

Izvajalec mora s svojo organizacijo del zagotoviti varnost pri delu (obdelati v elaboratu varstva pri delu) ter voditi vso s predpisi in razpisom zahtevano tehnično dokumentacijo. Posebno pozornost je potrebno zagotoviti varovanju prometa med izvedbo sanacijskih del.

O začetku del je potrebno pravočasno pisno obvestiti vse upravljalce komunalnih vodov.

Ljubljana, november 2024

Dopolnjeno po pregledu marec 2025

Pripravila:

Iztok Turk, u.d.i.g.

David Pesek, u.d.i.g.

| | |
|--------------|----------------------------------|
| T.1.2 | Statični izračun (1. del) |
|--------------|----------------------------------|

| | |
|--------------------------|-----------|
| <i>Številka projekta</i> | 8953 |
| <i>Številka načrta</i> | 18-3/2023 |

| | | | | |
|-----------------|--------------|---------------|---------------|-----------------------|
| Številka odseka | Arhivska št. | Faza / objekt | Šifra priloge | Prostor za črtno kodo |
| | | 004.2160 | T.1.2 | |

2/7 – NAČRT REKONSTRUKCIJE NADVOZA VA0235 NAD AC A1 NA BARJANSKI CESTI

RAČUN KONSTRUKCIJE

PZI

SPLOŠNI PODATKI:

| | |
|--------------------|--|
| Naziv gradnje: | UREDITEV BARJANSKE CESTE MED KRIŽANJEM Z ZIHERLOVO CESTO IN AC PRIKLJUČKOM LJUBLJANA CENTER |
| Objekt: | Nadvoz VA0235 nad AC A1 na Barjanski cesti - rekonstrukcija in vzpostavitev razširjenega prečnega profila |
| Številka projekta: | 8953 |
| Številka načrta: | 18-3/2023 |
| Faza projekta : | PZI |
| Datum: | november 2024 |
| Pripravil: | Matej Oman, u.d.i.g. |

VSEBINA STATIČNE ANALIZE

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- 0.3.2 PREKLADNA KONSTRUKCIJA
- 0.3.3 LEŽIŠČA
- 0.3.4 PODPORNA KONSTRUKCIJA

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 - 1.4.1.3 Armatura krajnih podpor
 - 1.4.1.4 Armatura stebrov
 - 1.4.1.5 Armatura prečk (glave stebrov)

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3.1.1.2 HORIZONTALNE SILE V LEŽIŠČIH

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3.1.2.1 POVESI PREKLADNE KONSTRUKCIJE

3.1.2.2 POMIKI LEŽIŠČ

3.1.3 NOTRANJE SILE

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4.2.2 IZKORIŠČENOST OBSTOJEČIH LEŽIŠČ

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4.3.2 STEBRI

4.3.3 PILOTNE GREDE

4.3.4 PILOTI

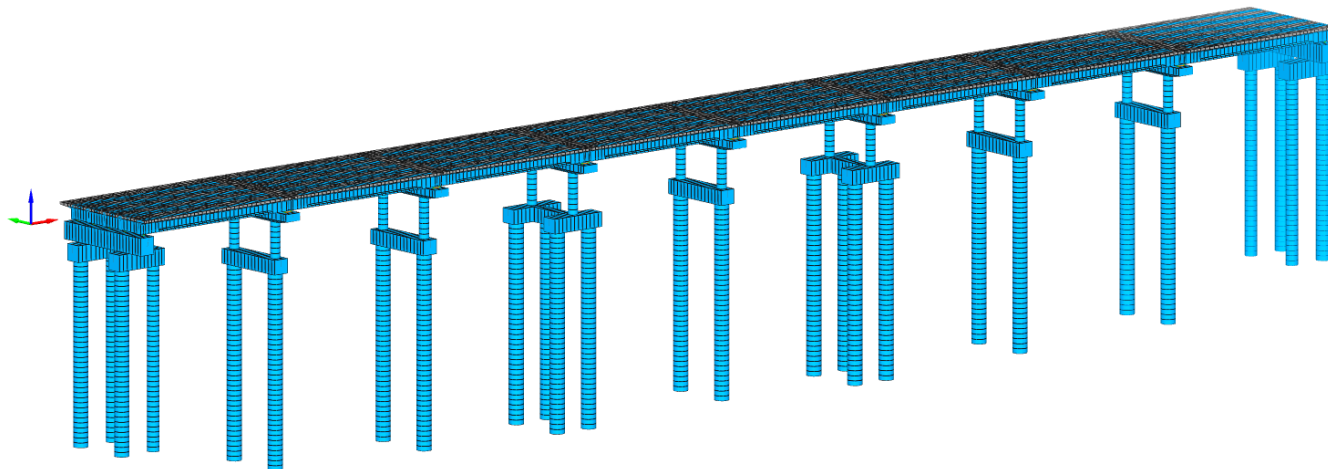
4.4 GEOMEHANSKA NOSILNOST PILOTOV

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4.4.2 Največja obremenitev na pilot rekonstruiranega objekta

0 POVZETEK RAČUNA KONSTRUKCIJE

0.1 RAČUNSKI MODEL



Račun je izveden s programom SOFiSTiK z uporabo linijskih elementov za PB nosilce, prečne nosilce, stebre, pilotne grede in pilote ter ploskovnih elementov za AB ploščo, togih povezav in vzmeti za simulacijo ležišč in horizontalnih in vertikalnih podpor pilotov.

0.2 ANALIZA

Upoštevani so naslednji standardi:

- SIST EN 1990 Evrokod: Osnove projektiranja konstrukcij
- SIST EN 1991 Evrokod 1: Vplivi na konstrukcije
- SIST EN 1992 Evrokod 2: Projektiranje betonskih konstrukcij
- SIST EN 1997 Evrokod 7: Geotehnično projektiranje
- SIST EN 1998 Evrokod 8: Projektiranje potresno odpornih konstrukcij
- SIST EN 1337-3 Elastomerna ležišča

Upoštevana je obtežba mostu

- po EN 1990/A1 (kombinacije akcij za mostove),
- po EN 1991-1-1 (lastne teže),
- po EN 1991-1-4 (veter),
- po EN 1991-1-5 (temperatura),
- po EN 1991-2 (promet LM1 s prilagoditvenim faktorjem koncentriranih sil glavnega pasu 0,8),
- po EN 1992-1,2 (krčenje in tečenje betona, relaksacija napenjalnega jekla),
- po EN 1998-1,2 (potres, $a_g = 0.25g$, kategorija tal C).

Časovni vplivi so upoštevani najprej 40 let do rekonstrukcije z obstoječo težo konstrukcije in krovnih elementov (opreme), potem pa še 40 let z rekonstruirano težo AB plošče in opreme.

Obstoječi napenjalni kabli so upoštevani v 100% iznosu, brez redukcije zaradi korodiranosti.

Izračunane so vse statične količine (reakcije, pomiki, notranje sile) za stalne vplive po fazah gradnje in uporabe do rekonstrukcije in po rekonstrukciji in za spremenljive vplive v fazi uporabe po rekonstrukciji.

0.3 DOKAZI O MEHANSKI ODPORNOSTI IN STABILNOSTI

0.3.1 IZVEDENI DOKAZI

Izračunana je nosilnost in uporabnost (pogoj dekompresije) posameznih elementov oz. prereзов konstrukcije in analizirana izkoriščenost obstoječe nosilne prekladne in podporne konstrukcije glede na dodatno stalno obtežbo rekonstruiranega razširjenega profila in za prometno obtežbo LM1.

Mejna stanja nosilnosti

Obravnava se mejno stanje porušitve ali prevelikih deformacij prereza, elementa ali povezave (STR in/ali GEO) po EN 1990, tč. 6.4.2 (3)P, en. (6.8):

$$E_d \leq R_d$$

Projektna vrednost učinkov vplivov E_d je določena s kombinacijami vplivov, in sicer za stalna in začasna projektna stanja (osnovne kombinacije) po EN 1990, tč. 6.4.3.2 (3), en. 6.10:

$$\gamma_G \cdot G_k + \gamma_P \cdot P + \gamma_{Q,1} \cdot Q_{k,1} + \sum_{i>1} \gamma_{Q,i} \cdot \psi_{0,i} \cdot Q_{k,i}$$

za potresna projektna stanja pa po EN 1990, tč. 6.4.3.4 (2), en. 6.12.b:

$$G_k + P + A_{Ed} + \sum \psi_{2,i} \cdot Q_{k,i}$$

kjer po EN 1998-2, tč. 5.5, en. 5.4 velja:

- $i = 1$: $Q_{k,1}$ karakteristična vrednost prometne obtežbe
 $\psi_{2,1}$ kombinacijski faktor za prometno obtežbo po EN 1998-2, tč. 4.1.2(3)P
= 0.0 za normalni promet in peš mostove
= 0.2 za težki promet in UDL sistem Modela 1 (LM1)
- $i > 1$: navidezno stalna vrednost akcij z dolgim trajanjem (zemeljski pritisk).

Parcialni varnostni faktorji za cestne mostove so v EN 1990, Annex A2, Table A2.4.(B):

Za neugodno delujoče akcije:

- $\gamma_G = 1.35$ lastna teža konstrukcijskih in nekonstrukcijskih elementov in zemljine
 $\gamma_Q = 1.35$ vertikalne akcije od cestnega in peš prometa
 $\gamma_Q = 1.50$ vse ostale spremenljive akcije

Za ugodno delujoče akcije:

- $\gamma_G = 1.00$
 $\gamma_Q = 0.00$

Projektne vrednosti pripadajočih odpornosti R_d (upogibna, strižna in torzijska nosilnost prerezov linijskih elementov ter upogibna in strižna nosilnost prerezov ploskovnih elementov) se izračunajo z upoštevanjem projektnih vrednosti lastnosti betona in jekla v skladu z EN 1992-1 in EN 1992-2.

Mejna stanja uporabnosti

Se po EN 1990, tč. 6.5.1 (1)P, en. (6.13) preverijo tako, da je projektna vrednost učinkov vplivov E_d manjša ali enaka mejni projektni vrednosti ustreznih kriterijev uporabnosti C_d :

$$E_d \leq C_d$$

Projektna vrednost učinkov vplivov E_d je določena z naslednjimi kombinacijami vplivov po EN 1990, tč. 6.5.3 (2):

- a) karakteristična kombinacija: $G_k + P + Q_{k,1} + \sum_{i>1} \psi_{0,i} \cdot Q_{k,i}$
- b) pogosta kombinacija: $G_k + P + \psi_{1,1} \cdot Q_{k,1} + \sum_{i>1} \psi_{2,i} \cdot Q_{k,i}$
- c) navidezno stalna kombinacija: $G_k + P + \psi_{2,1} \cdot Q_{k,1} + \sum_{i>1} \psi_{2,i} \cdot Q_{k,i}$

Kriteriji uporabnosti C_d pa so po EN 1992-2, tč. 7.2 in 7.3:

- | | armirani elementi | prednapeti elementi |
|----------------------------------|--|--|
| a) karakteristična kombinacija: | $f_c \leq 0.6 \cdot f_{ck}$ $f_s \leq 0.8 \cdot f_{yk}$ | $f_c \leq 0.6 \cdot f_{ck}$ $f_s \leq 0.8 \cdot f_{yk}$ $f_{p,t\infty} \leq 0.75 \cdot f_{pk}$ |
| b) pogosta kombinacija: | | $f_{c,p\pm 10cm} > 0$ (dekompresija) $w_{max} \leq 0.2$ |
| c) navidezno stalna kombinacija: | $w_{max} \leq 0.3$ $f_c \leq 0.45 \cdot f_{ck}$ | $f_c \leq 0.45 \cdot f_{ck}$ |

Vrednosti Ψ faktorjev za cestne mostove

(EN 1990, Annex A2, Table A2.1, EN 1998-2, tč. 5.5(2)P, EN 1998-2, tč. 4.1.2(3)P):

| | | Ψ_0 | Ψ_1 | $\Psi_{2(EN2)}$ | $\Psi_{2(EN8-potres)}$ norm. pomembni | |
|-------------------------|------------|----------|----------|-----------------|--|-----|
| - spremembe temperature | T_k | 0.6 | 0.6 | 0.5 | 0.0 | 0.0 |
| - promet LM1 | L_{TS} | 0.75 | 0.75 | 0.0 | 0.0 | 0.0 |
| | L_{UDL} | 0.40 | 0.40 | 0.0 | 0.0 | 0.2 |
| | q_{fk}^* | 0.40 | 0.40 | 0.0 | 0.0 | 0.0 |
| - veter | F_{Wk} | 0.60 | 0.20 | 0.0 | 0.0 | 0.0 |

Opomba 1: Vplivov vetra in spremembe temperature ne upoštevamo istočasno.

0.3.2 PREKLADNA KONSTRUKCIJA

Stopnja izkoriščenosti posameznih obstoječih nosilcev prekladne konstrukcije glede na MSN z upoštevanjem povečane obtežbe zaradi rekonstrukcije krovnih elementov je grafično prikazana v točki 4.1.1 in v najbolj neugodnem primeru znaša $MEd / MRd = 4815 \text{ kN} / 6584 \text{ kN} = 0,73 = < 1,0 = \text{OK}$.

Deformacija ob kablu za pogosto kombinacijo MSU (kontrola dekompresije) je grafično prikazana v tč. 4.1.2 in sicer v najbolj neugodnem primeru z upoštevanjem $\pm 10\%$ napenjalne sile doseže majhno natezno vrednost 0,059‰, kar predstavlja natezno napetost na spodnjem robu nosilca 0,8 MPa. To pomeni, da ima beton še precej rezerve do pojava razpok in smatramo, da je pogoj uporabnosti za naslednjih 40 let izpolnjen in nosilec ni potrebno ojačevati.

Obstoječa armatura v prečnikih je večja od izračunane potrebne armature.

0.3.3 LEŽIŠČA

Izkoriščenost ležišč po posameznih podporah je tabelarično prikazana v točki 4.2.2. Prekoračen je pogoj uklonske stabilnosti ležišča za nekatera višja ležišča – za ležišča 200/400/63 na podporah 3 in 7 za 2% in za ležišča 200/400/85 na podporah 2 in 8 za 37%. Izračunani so ustrezni tipi ležišč za zamenjavo, in sicer 250/300/63 za podpori 3 in 7 (zaradi enotnejših dimenzij izberemo 250/400/63) in 250/400/85 na podporah 2 in 8.

Horizontalne sile v ležiščih za neseizmično obtežbo so v mejah dopustnih, v primeru rušilnega potresa računanega po evrokodu pa so horizontalne sile prekoračene in bo prišlo do zdrsa nosilcev z ležišč (udar v zaščitne betonske bloke), kar je bilo predvideno že pri osnovni zasnovi objekta in rekonstrukcija na to nima vpliva.

0.3.4 PODPORNA KONSTRUKCIJA

Za vse elemente podporne konstrukcije je izračunana največja potrebna armatura z upoštevanjem pogojev MSN, MSU in potresa in primerjana z obstoječo armaturo. Diagrami potrebne armature so prikazani v tč. 4.2.2.

Prečke (glave stebrov) izkazujejo zadostno nosilnost.

Stebri za neseizmično obtežbo izkazujejo zadostno nosilnost, za rušilni potres računan po evrokodu za tip tal S1 pa stebra 4 in 6 (bolj toge podpore s 4 piloti) dobijo večjo potrebno armaturo, kot je dejansko vgrajena⁽¹⁾.

Grede opornikov in pilotne grede vmesnih podpor izkazujejo zadostno nosilnost.

Piloti za neseizmično obtežbo izkazujejo zadostno nosilnost, za rušilni potres računan po evrokodu za tip tal S1 pa vsi piloti dobijo malo več potrebne armature, kot je dejansko vgrajena⁽¹⁾.

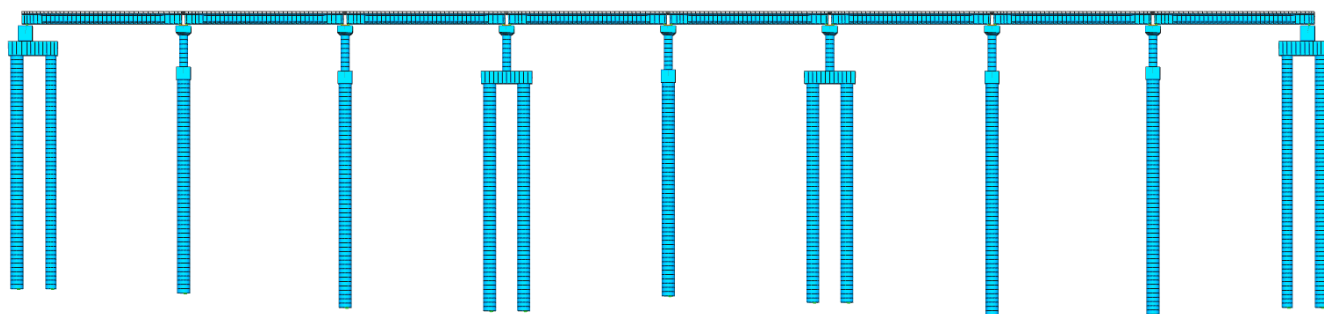
Geomehanska nosilnost pilotov oz. reakcije pod peto pilotov so manjše od v GG poročilu izračunane nosilnosti pilotov.

Opomba (1): Do prekoračitev med računsko potrebno in vgrajeno armaturo prihaja zaradi različnih pristopov izračuna potresne sile po evrokodu in po predpisih, ki so bili upoštevani pri zasnovi objekta. Hkrati iz arhivskih podlog ni možno razbrati ali se je takrat upošteval tip tal S1, ki je zelo neugoden za konstrukcijo z vidika potresne obtežbe. Zaradi slednjega lahko podamo ugotovitve, da računske prekoračitve vgrajene armature veljajo tudi za obstoječi objekt in sama rekonstrukcija nima bistvenega vpliva na nosilnosti obstoječih nosilnih elementov objekta.

1 KONSTRUKCIJA

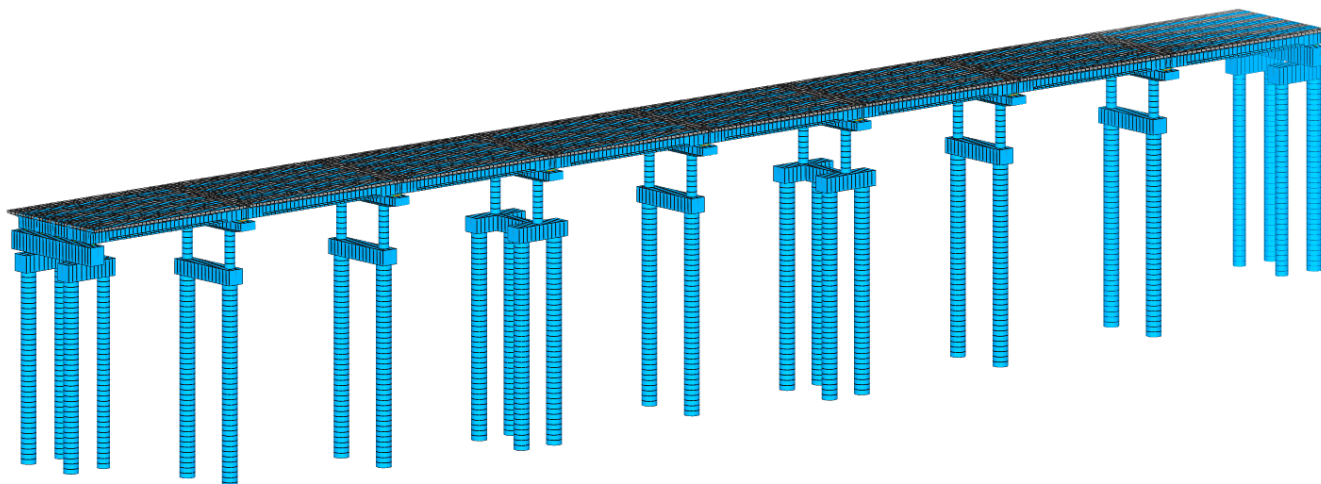
1.1 OPIS KONSTRUKCIJE

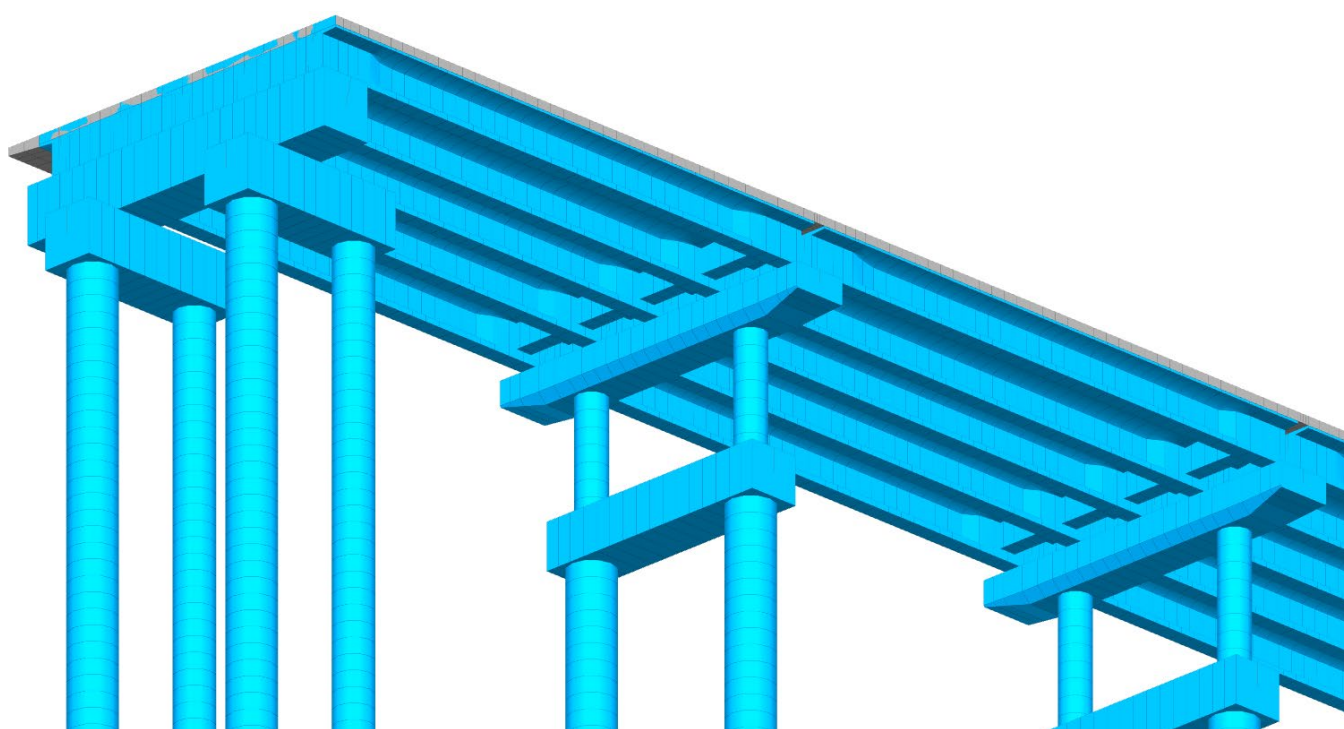
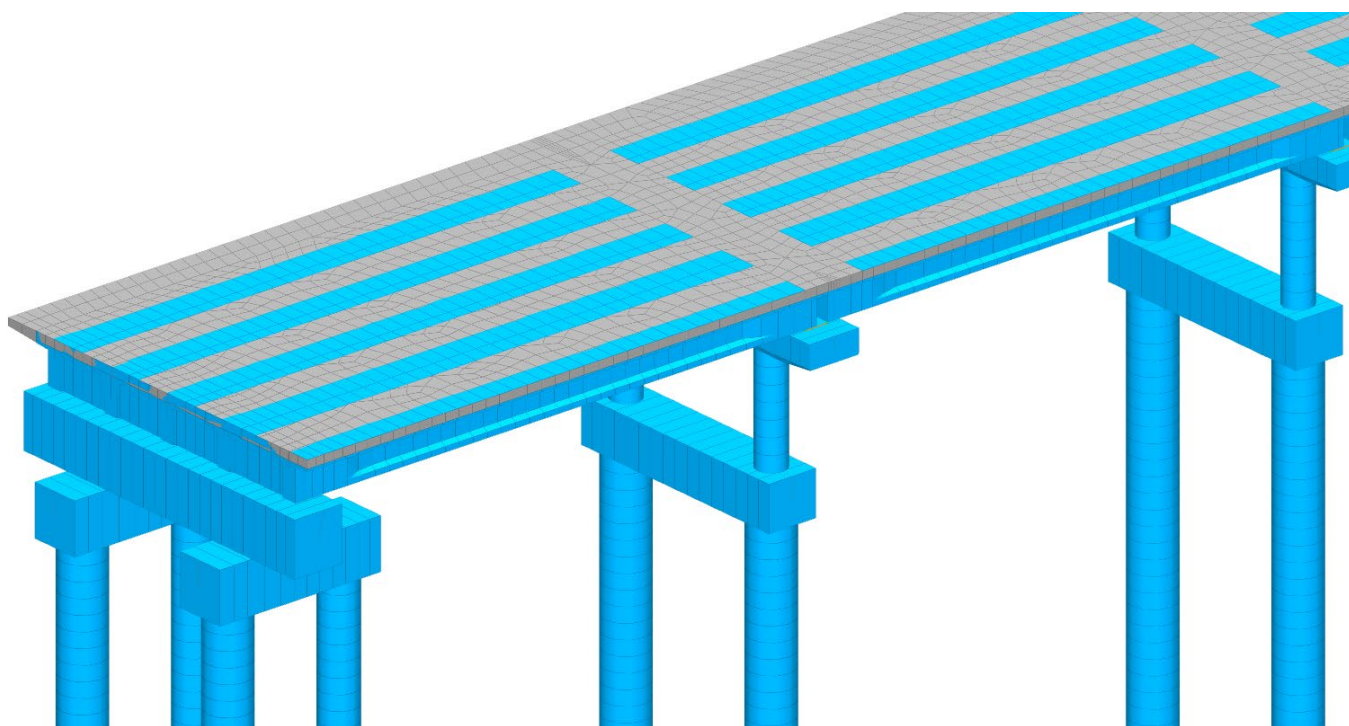
Nadvoz VA0235 Barjanske ceste prečka AC A1 (južno ljubljansko obvoznico). Dolžina objekta preko osmih polj z razponi $18,4 + 4 \times 19,0 + 19,08 + 18,92 + 18,4$ m je 153,0 m. Skupna širina obstoječega objekta znaša 12,25 m. Objekt je zasnovan kot polno-montažna AB konstrukcija z eno zavorno enoto iz montažnih prednapetih nosilcev in monolitne voziščne plošče. Temeljenje je globoko na uvrtnih AB pilotih premera $\Phi 150$ cm in $\Phi 125$ cm dolžine 25,0 do 27,0 m.



V prečnem prerezu je prekladna konstrukcija sestavljena iz petih prefabriciranih AB prednapetih T nosilcev višine 1,2 m, ki so postavljeni na osnih razmakih $2,40 + 2,40 + 2,40 + 2,80$ m. Nad nosilci je izvedena AB monolitna plošča debeline 22 cm. Nosilci potekajo preko enega polja in so prostoležeči, AB monolitna plošča pa je nad podporami povezana z elastičnimi ploščami v eno zavorno enoto. Prostoležeči vzdolžni T nosilci prekladne konstrukcije so v krajnih poljih dolžine 18,35 m, v vmesnih poljih pa 18,95 m, s tem, da so v 6. polju za 5 cm daljši, v 7. polju pa za 5 cm krajši. Prednapeti so s kabli za prednapenjanje sistema BBRV 150, vsak nosilec s po tremi paraboličnimi kabli $\Phi 7$ mm. (Kabelski in armaturni načrti SCT 1986).

Poleg dveh krajnih opornikov ima objekt 8 vmesnih podpor, ki so izvedene iz prečne grede nad stebri (prečke), na katero nalegajo prostoležeči nosilci preko neoprenskih ležišč. Greda širine 1,8 m je spodaj vpeta v 2 stebra premera $\Phi 100$ cm, ta pa v prečno gredo preko dveh pilotov $\Phi 150$ cm. Posamezni AB krajni opornik sestoji iz grede, na katero preko neoprenskih ležišč nalegajo AB nosilci prekladne konstrukcije. Greda opornika leži na dveh AB pilotnih gredah s po dvema pilotoma, zaledni $\Phi 150$ cm in prednji $\Phi 125$ cm.



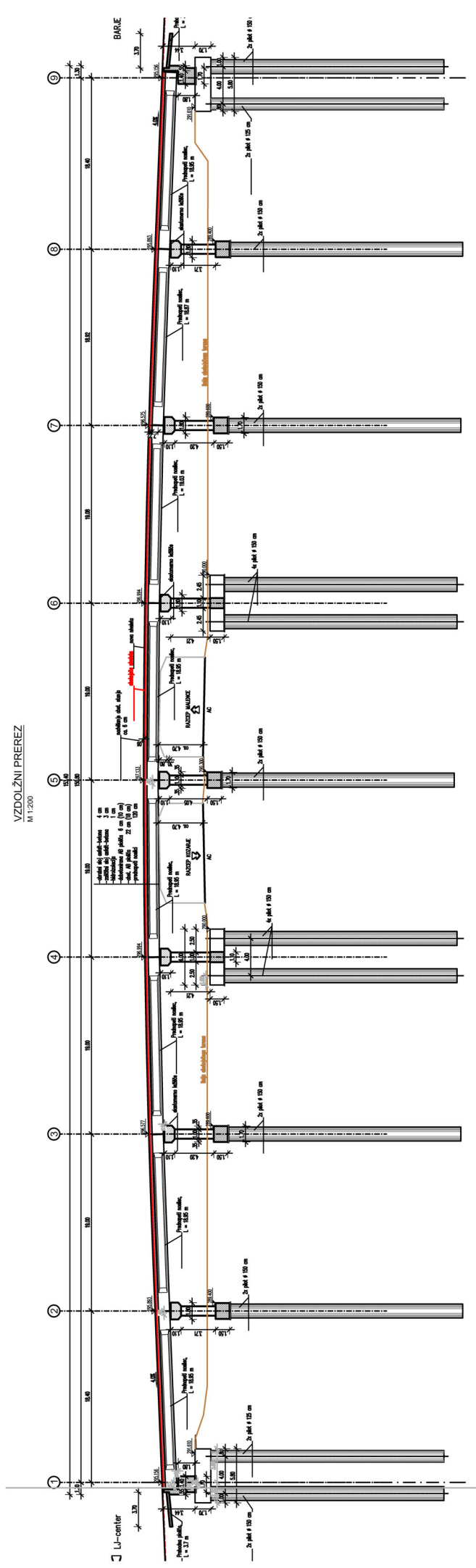
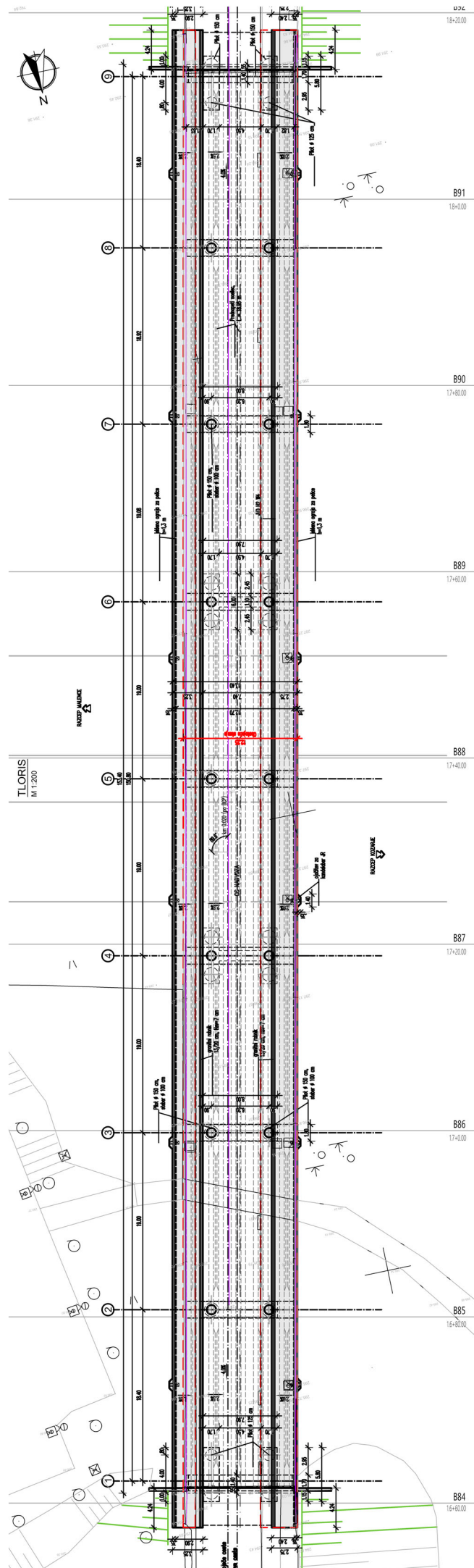


1.1.1 PREČNI PREREZ

1.1.2 TLORIS, VZDOLŽNI PREREZ

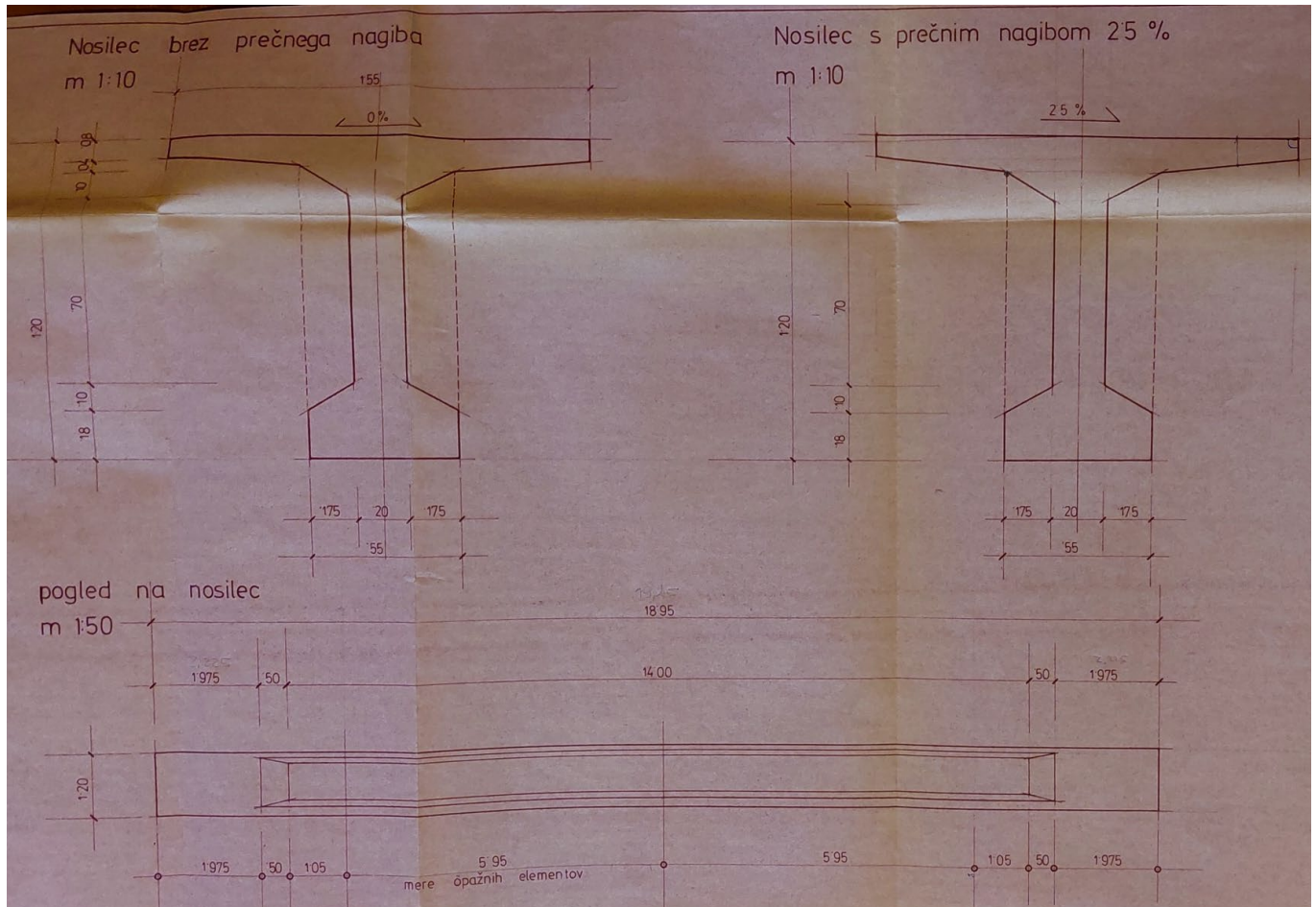
M 1:25





1.2 PREKLADNA KONSTRUKCIJA

1.2.1 GEOMETRIJA NOSILCEV



1.2.2 NAPENJALNI KABLI

PODATKI O KABLIH:

ZA 1 NOSILEC 3 nestandardni kabli BBRV 150, 27 ϕ 7
kvaliteta žice ϕ 7 za kable: $\sigma_{m/302} = 1667/1500 \text{ N/mm}^2$
dopustna napetost: $0.70 \sigma_m = 1167 \text{ N/mm}^2 < 0.85 \cdot 1500 = 1275$
predpisana je žica z relaksacijo 5 % sile prednapenjanja ki je pri
BBRV 150, 27 ϕ 7: $V_b = 27 \cdot 3848 \cdot 1167 \cdot \frac{1}{1000} = 1212 \text{ kN}$

Vsak kabel ima 1 pomično sidro tipa B 150 in 1 nepomično
sidro S 150 s kvadratno prenosno ploščo Obe sidri sta za 27 ϕ 7

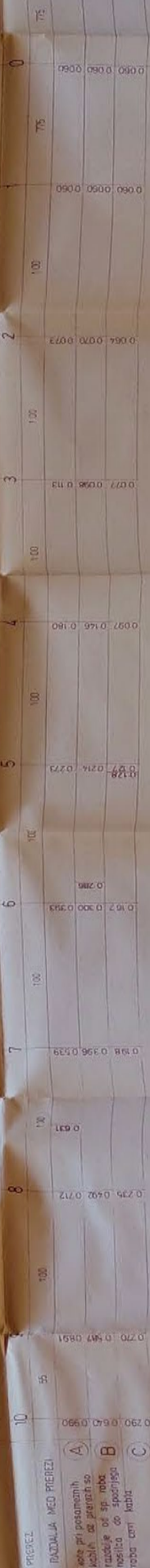
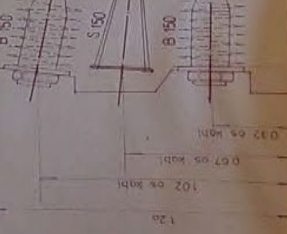
Raztegi kablov pri prednapenjanju

kabel A : 99 mm

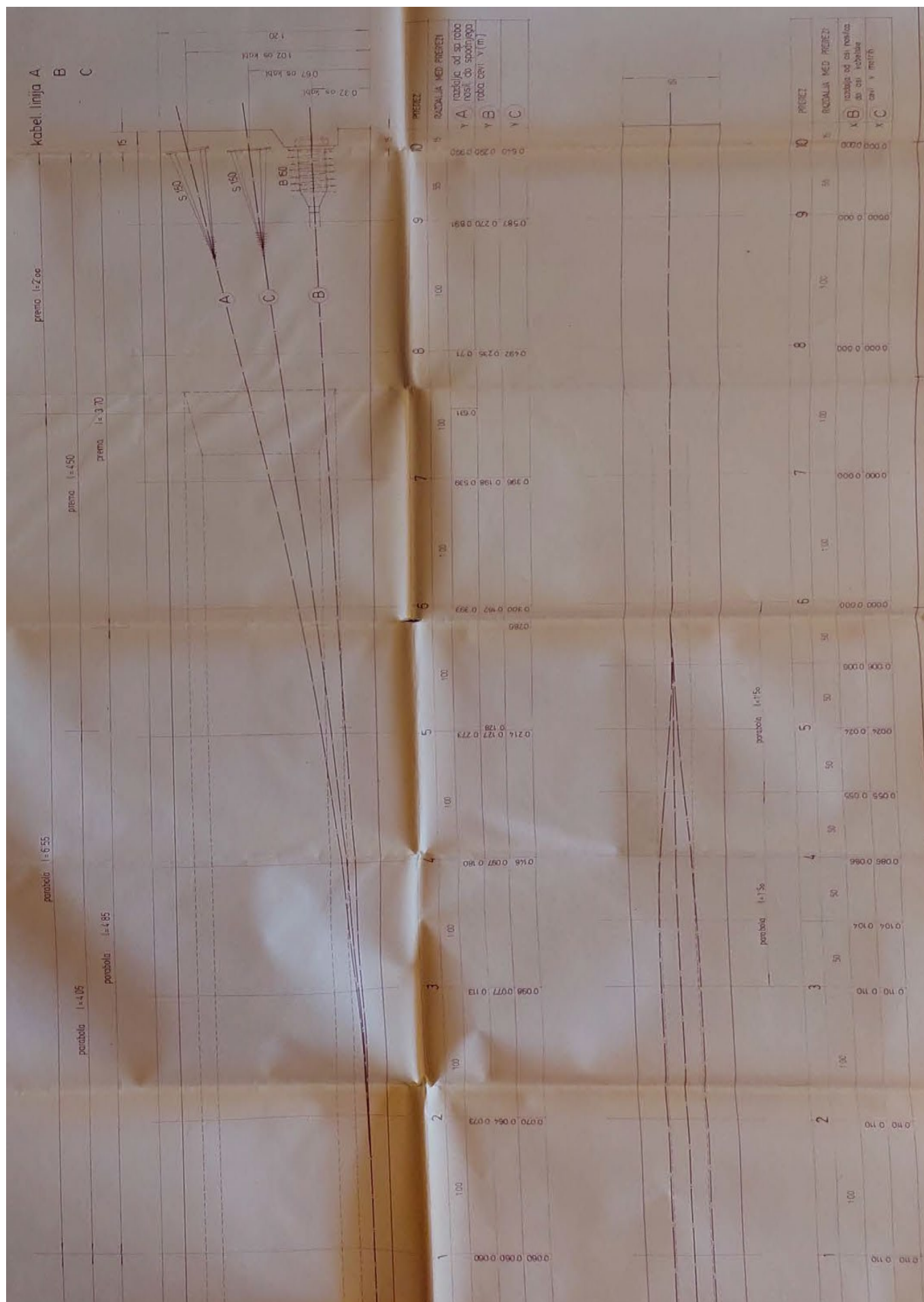
kabel B in C : 101 mm

MB 40

05-04-0



RAZVOD KABLOV - tlorisno



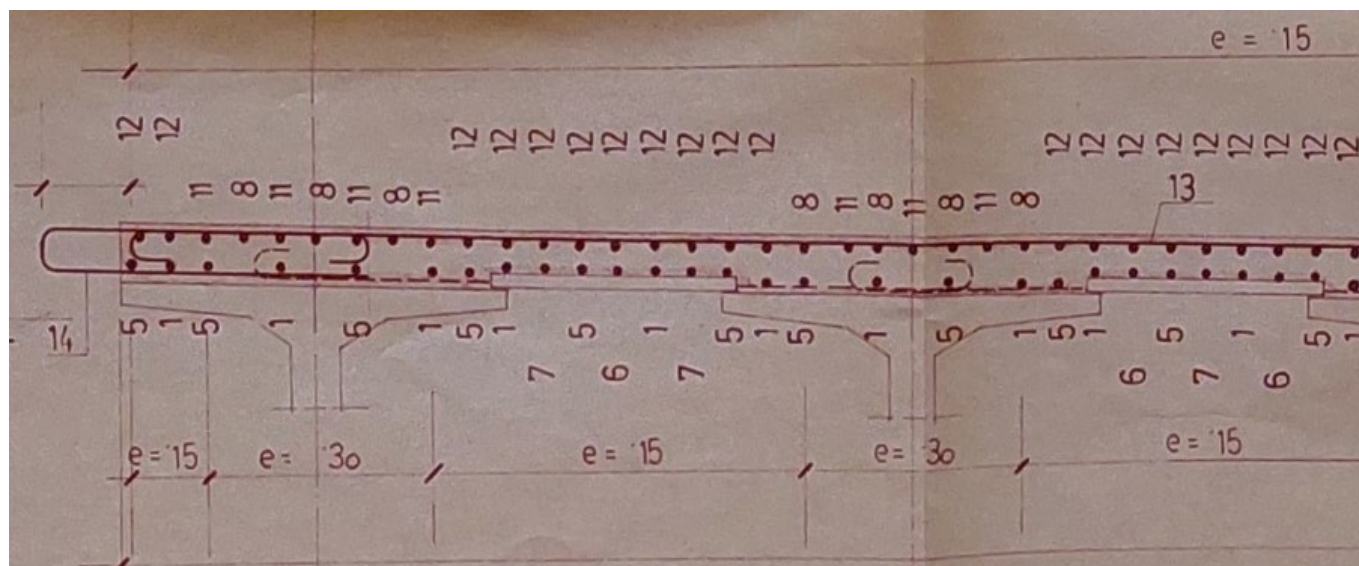
1.2.3 OBSTOJEČA ARMATURA

1.2.3.1 Armatura v voziščni plošči

Prečna: zg. $\emptyset 14/15$ (1. sloj)
 sp. -
 Vzдолžna: zg. $\emptyset 8/15$ (2. sloj)
 sp. $\emptyset 14/30 + \emptyset 16/30$

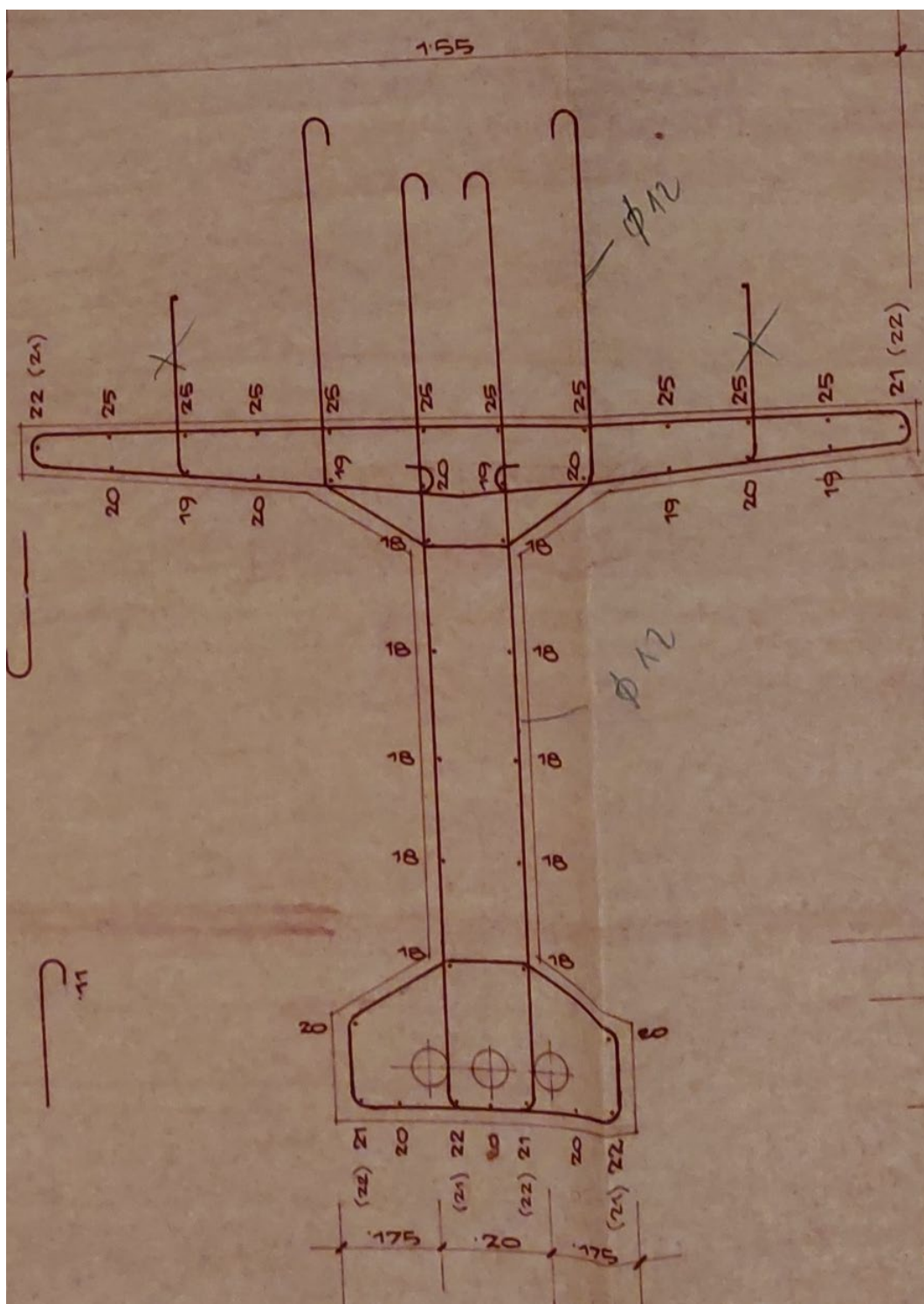
MB 40

J 340/500

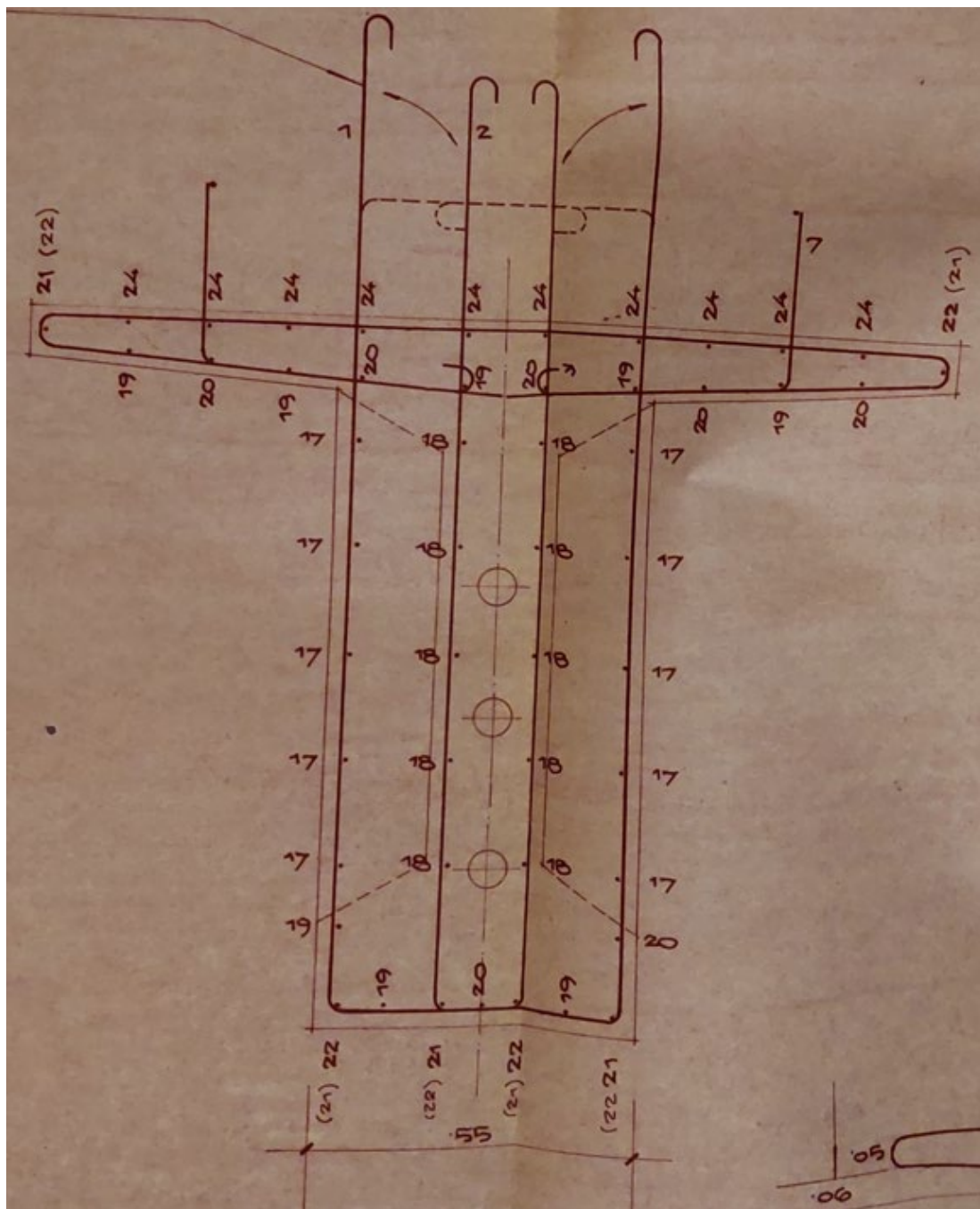


| poz | ϕ | | |
|-----|--------|----|----|
| 1 | 14 | 11 | 8 |
| 2 | 14 | 12 | 8 |
| 3 | 14 | 13 | 14 |
| 4 | 14 | 14 | 14 |
| 5 | 14 | 15 | 18 |
| 6 | 16 | 16 | 16 |
| 7 | 16 | 17 | 8 |
| 8 | 14 | 18 | 8 |
| 9 | 14 | 19 | 8 |
| 10 | 8 | 20 | 8 |

1.2.3.2 Armatura v nosilcu $L = 18,95\text{ m}$



| Poz | ϕ |
|-----|--------|
| 1 | 12 |
| 2 | 10 |
| 3 | 8 |
| 4 | 10 |
| 5 | 10 |
| 6 | 10 |
| 7 | 8 |
| 8 | 10 |
| 9 | 10 |
| 10 | 10 |
| 11 | 10 |
| 12 | 10 |
| 13 | 10 |
| 14 | 6 |
| 15 | 8 |
| 16 | 12 |
| 17 | 10 |
| 18 | 10 |
| 19 | 10 |
| 20 | 10 |
| 21 | 14 |
| 22 | 14 |
| 23 | 6 |
| 24 | 10 |
| 25 | 10 |



| Row | R_{bz} | ϕ |
|-----|----------|--------|
| 1 | 12 | |
| 2 | 10 | |
| 3 | 8 | |
| 4 | 10 | |
| 5 | 10 | |
| 6 | 10 | |
| 7 | 8 | |
| 8 | 10 | |
| 9 | 10 | |
| 10 | 10 | |
| 11 | 10 | |
| 12 | 10 | |
| 13 | 10 | |
| 14 | 6 | 1 |
| 15 | 8 | 0.7 |
| 16 | 12 | 1 |
| 17 | 10 | 2 |
| 18 | 10 | 2 |
| 19 | 10 | 3 |
| 20 | 10 | 1 |
| 21 | 14 | |
| 22 | 14 | |
| 23 | 6 | |
| 24 | 10 | |
| 25 | 10 | |

1.3 LEŽIŠČA

1.3.1 TIPI IN RAZPOREDITEV OBSTOJEČIH LEŽIŠČ

| | | | |
|--|----------------|-------------------------|-------------------|
| <u>Podpore 1 in 9:</u> (krajna opornika) | 4 x 200/400/41 | $k_x = 0$ kN/m (teflon) | $k_y = 2483$ kN/m |
| <u>Podpore 2 in 8:</u> (prvi vmesni podpori) | 8 x 200/400/85 | $k_{xy} = 1180$ kN/m | |
| <u>Podpore 3 in 7:</u> (drugi vmesni podpori) | 8 x 200/400/63 | $k_{xy} = 1600$ kN/m | |
| <u>Podpore 4, 5, 6:</u> (srednje 3 vmesne podpore) | 8 x 200/400/30 | $k_{xy} = 3429$ kN/m | |

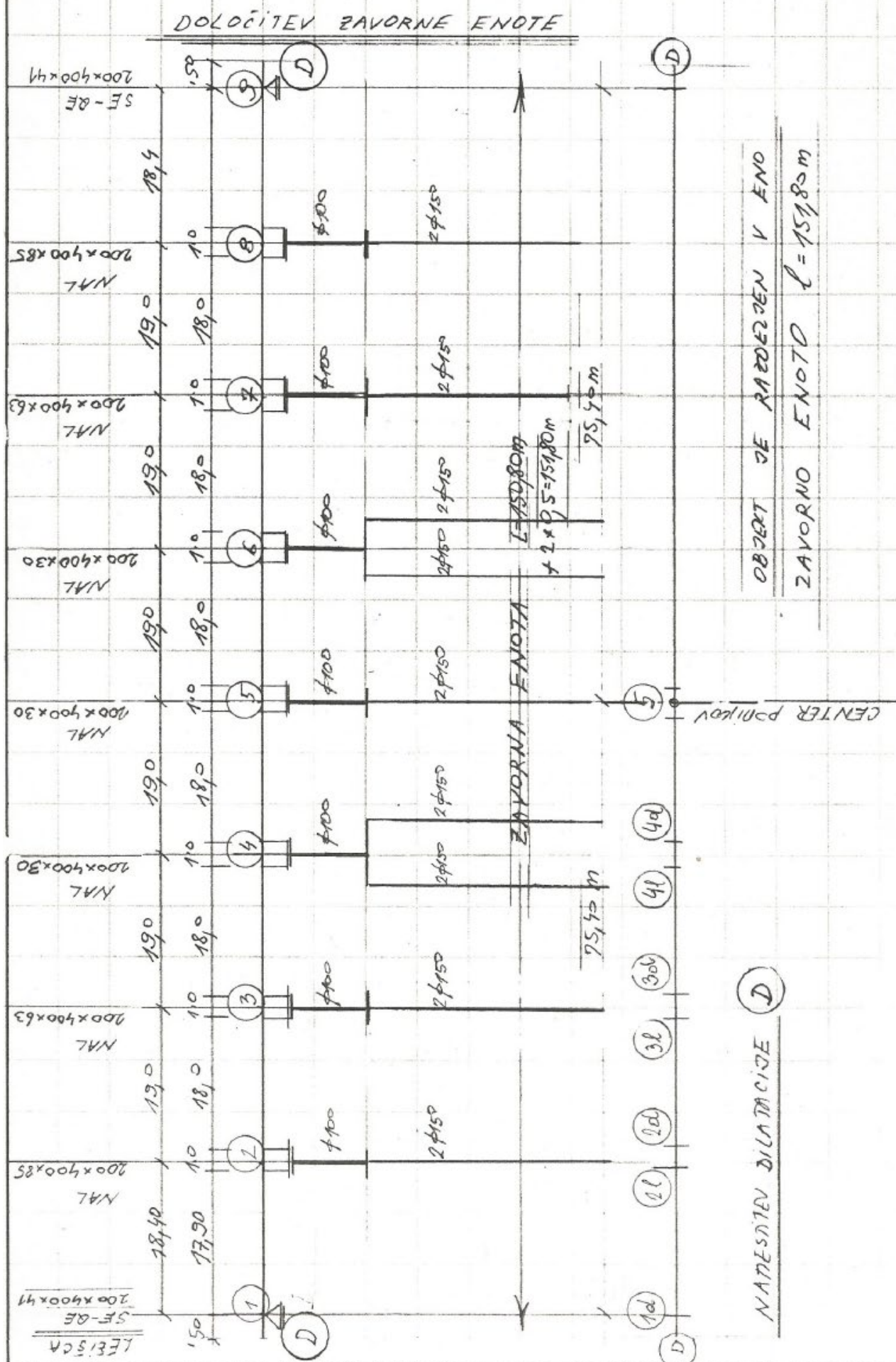
1.3.2 IZRAČUN TOGOSTI OBSTOJEČIH LEŽIŠČ

(po EN 1337-3)

| Geometrija ležišča: | | | | Togost ležišča: | |
|---------------------|-----------|-------|-------|-----------------|--------|
| $a_{(x)}$ | $b_{(y)}$ | T_b | T_e | K_{xy} | K_z |
| mm | mm | mm | mm | kN/mm | kN/mm |
| 200 | 400 | 41 | 29 | 2,483 | 788,5 |
| | | | | | |
| Geometrija ležišča: | | | | Togost ležišča: | |
| $a_{(x)}$ | $b_{(y)}$ | T_b | T_e | K_{xy} | K_z |
| mm | mm | mm | mm | kN/mm | kN/mm |
| 200 | 400 | 63 | 45 | 1,600 | 481,3 |
| | | | | | |
| Geometrija ležišča: | | | | Togost ležišča: | |
| $a_{(x)}$ | $b_{(y)}$ | T_b | T_e | K_{xy} | K_z |
| mm | mm | mm | mm | kN/mm | kN/mm |
| 200 | 400 | 85 | 61 | 1,180 | 346,4 |
| | | | | | |
| Geometrija ležišča: | | | | Togost ležišča: | |
| $a_{(x)}$ | $b_{(y)}$ | T_b | T_e | K_{xy} | K_z |
| mm | mm | mm | mm | kN/mm | kN/mm |
| 200 | 400 | 30 | 21 | 3,429 | 1158,0 |

1.3.3 SHEMA OBSTOJEČIH LEŽIŠČ IN PODPORNE KONSTRUKCIJE

(»Dodatni statični izračun« SCT marec 1986 – Mapa III Statični račun podpornega sistema)



1.4 PODPORNA KONSTRUKCIJA

1.4.1 OBSTOJEČA ARMATURA PODPORNE KONSTRUKCIJE

1.4.1.1 Armatura pilotov

Po »Tehničnem poročilu za dodatni statični izračun« SCT marec 1986:

Piloti vmesnih podpor D = 150 cm so armirani z 0,76% armaturo (114 cm²).

Piloti krajnih opornikov D = 150 cm so armirani z 0,8% armaturo (120 cm²).

Piloti krajnih opornikov D = 125 cm so armirani z 0,8% armaturo (82 cm²).

Po armaturnih načrtih PZI projekta SCT april 1985:

| Armatura pilotov D = 150 cm: | | | MB 30 | | | | | |
|------------------------------|--------|---------|--------------------|------|-----|------|------|------------|
| | | | As | Φ | kom | e | B | |
| | | | [cm ²] | [mm] | | [cm] | [m] | |
| pilot zgornjih 15,0 m | vzd | M1 | 91,23 | 22 | 24 | 17,3 | 4,15 | RA 400/500 |
| | vzd | M2 | 22,81 | 22 | 6 | 69,1 | 4,15 | Č0200 |
| | vzd | M3 | 29,45 | 25 | 6 | 69,1 | 4,15 | Č0200 |
| | prečna | špirala | 7,85 | 10 | 5 | 20,0 | 1,00 | Č0200 |
| pilot spodnjih 12,0 m | vzd | M1 | 91,23 | 22 | 24 | 17,3 | 4,15 | RA 400/500 |
| | vzd | M2 | 22,81 | 22 | 6 | 69,1 | 4,15 | Č0200 |
| | prečna | špirala | 7,85 | 10 | 5 | 20,0 | 1,00 | Č0200 |

| Armatura pilotov D = 125 cm: | | | MB 30 | | | | | |
|------------------------------|--------|---------|--------------------|------|-----|------|------|------------|
| | | | As | Φ | kom | e | B | |
| | | | [cm ²] | [mm] | | [cm] | [m] | |
| pilot zgornjih 15,0 m | vzd | M1 | 114,04 | 22 | 30 | 11,2 | 3,36 | RA 400/500 |
| | vzd | M2 | 22,81 | 22 | 6 | 56,0 | 3,36 | Č0200 |
| | vzd | M3 | 29,45 | 25 | 6 | 56,0 | 3,36 | Č0200 |
| | prečna | špirala | 7,85 | 10 | 5 | 20,0 | 1,00 | Č0200 |
| pilot spodnjih 12,0 m | vzd | M1 | 68,42 | 22 | 18 | 18,7 | 3,36 | RA 400/500 |
| | vzd | M2 | 22,81 | 22 | 6 | 56,0 | 3,36 | Č0200 |
| | prečna | špirala | 7,85 | 10 | 5 | 20,0 | 1,00 | Č0200 |

1.4.1.2 Armatura pilotnih gred vmesnih podpor

| PILOTNE GREDE PRI ENOJNIH PODPORAH | | | | | | | | |
|--|--------|-----------------------|--------------------|--------|-----|-------|------|------------|
| Armatura pilotnih gred B/H = 170/150 cm: | | | | | | MB 30 | | |
| | | | As | Φ | kom | e | B | |
| | | | [cm ²] | [mm] | | [cm] | [m] | |
| prečna greda | bočna | M3 | 16,08 | 16 | 8 | 27,5 | 2,20 | RA 400/500 |
| | zg | M2 | 41,81 | 22 | 11 | 14,5 | 1,60 | |
| | sp | M1 | 26,61 | 22 | 7 | 14,3 | 1,00 | |
| | sp | M1 | 11,34 | 19 | 4 | 25,0 | 1,00 | |
| | prečna | stremena 4 strižna | 10,26 | 14 | 3 | 30,0 | 1,00 | RA 400/500 |
| PILOTNE GREDE PRI DVOJNIH PODPORAH | | | | | | | | |
| Armatura pilotnih gred B/H = 170/150 cm: | | | | | | MB 30 | | |
| | | | As | Φ | kom | e | B | |
| | | | [cm ²] | [mm] | | [cm] | [m] | |
| vzdolžna greda | bočna | M3 | 16,08 | 16 | 8 | 27,5 | 2,20 | RA 400/500 |
| | zg | M2 | 58,90 | 25 | 12 | 13,3 | 1,60 | |
| | sp | M1 | 117,81 | 25 | 24 | 4,2 | 1,00 | |
| | prečna | stremena 4 strižna | 10,26 | 14 | 3 | 30,0 | 1,00 | RA 400/500 |
| Armatura pilotnih gred B/H = 110/150 cm: | | | | | | MB 30 | | |
| | | | As | Φ | kom | e | B | |
| | | | [cm ²] | [mm] | | [cm] | [m] | |
| prečna greda | bočna | M3 | 16,08 | 16 | 8 | 27,5 | 2,20 | RA 400/500 |
| | zg | M2 | 29,45 | 25 | 6 | 26,7 | 1,60 | |
| | zg | M2 | 8,04 | 16 | 4 | 40,0 | 1,60 | |
| | sp | M1 | 29,45 | 25 | 6 | 16,7 | 1,00 | |
| | sp | M1 | 8,04 | 16 | 4 | 25,0 | 1,00 | |
| | prečna | stremena 4 strižna | 10,26 | 14 | 3 | 30,0 | 1,00 | RA 400/500 |

1.4.1.3 Armatura krajnih podpor

| Armatura pilotnih gred B/H = 170/170 cm: | | | MB 30 | | | | | |
|--|--------|-----------------------|--------------------|------|-----|------|------|------------|
| | | | As | Φ | kom | e | B | |
| | | | [cm ²] | [mm] | | [cm] | [m] | |
| vzdolžna greda | bočna | M3 | 17,01 | 19 | 6 | 36,7 | 2,20 | RA 400/500 |
| | zg | M2 | 41,81 | 22 | 11 | 14,5 | 1,60 | |
| | zg | M2 | 22,81 | 22 | 6 | 26,7 | 1,60 | |
| | sp | M1 | 41,81 | 22 | 11 | 9,1 | 1,00 | |
| | sp | M1 | 22,81 | 22 | 6 | 16,7 | 1,00 | |
| | prečna | stremena 4 strižna | 10,26 | 14 | 3 | 30,0 | 1,00 | RA 400/500 |

| Armatura grede opornika B/H = 170/180 cm: | | | MB 30 | | | | | |
|---|--------|-----------------------|--------------------|------|-----|------|------|------------|
| | | | As | Φ | kom | e | B | |
| | | | [cm ²] | [mm] | | [cm] | [m] | |
| prečna greda | bočna | M3 | 22,68 | 19 | 8 | 27,5 | 2,20 | RA 400/500 |
| | zg | M2 | 41,81 | 22 | 11 | 14,5 | 1,60 | |
| | zg | M2 | 22,81 | 22 | 6 | 26,7 | 1,60 | |
| | sp | M1 | 41,81 | 22 | 11 | 9,1 | 1,00 | |
| | sp | M1 | 22,81 | 22 | 6 | 16,7 | 1,00 | |
| | prečna | stremena 4 strižna | 10,26 | 14 | 3 | 30,0 | 1,00 | RA 400/500 |

1.4.1.4 Armatura stebrov

Po »Tehničnem poročilu za dodatni statični izračun« SCT marec 1986:

Stebri D = 100 cm so armirani z 2,5% armaturo (196 cm²).

Po armaturnih načrtih PZI projekta SCT april 1985:

| Armatura stebrov D = 100 cm: | | | MB 35 | | | | | |
|------------------------------|-----|---------|--------------------|------|-----|------|------|-----------|
| | | | As | Φ | kom | e | B | |
| | | | [cm ²] | [mm] | | [cm] | [m] | |
| steber | vzd | M1 | 147,78 | 28 | 24 | 12,0 | 2,89 | Č 340/500 |
| | pre | špirala | 12,57 | 8 | 13 | 8,0 | 1,00 | Č 340/500 |

1.4.1.5 Armatura prečk (glave stebrov)

| Armatura prečke B/H = 180/110 cm: | | | | | | MB 30 | | |
|-----------------------------------|--------|-----------------------|-------|------|-----|-------|------|------------|
| | | | As | Ø | kom | e | B | |
| | | | [cm²] | [mm] | | [cm] | [m] | |
| prerez nad stebrom | bočna | M3 | 24,63 | 28 | 4 | 55,0 | 2,20 | RA 400/500 |
| | zg | M2 | 80,05 | 28 | 13 | 12,3 | 1,60 | |
| | zg | M2 | 80,05 | 28 | 13 | 12,3 | 1,60 | |
| | sp | M1 | 30,79 | 28 | 5 | 20,0 | 1,00 | |
| | sp | M1 | 12,32 | 28 | 2 | 50,0 | 1,00 | |
| | prečna | stremena 4 strižna | 20,53 | 14 | 7 | 15,0 | 1,00 | RA 400/500 |
| | | | | | | | | |
| prerez na sredini | bočna | M3 | 24,63 | 28 | 4 | 55,0 | 2,20 | RA 400/500 |
| | zg | M2 | 80,05 | 28 | 13 | 12,3 | 1,60 | |
| | zg | M2 | 24,63 | 28 | 4 | 40,0 | 1,60 | |
| | sp | M1 | 55,42 | 28 | 9 | 11,1 | 1,00 | |
| | sp | M1 | 30,79 | 28 | 5 | 20,0 | 1,00 | |
| | prečna | stremena 4 strižna | 10,26 | 14 | 3 | 30,0 | 1,00 | RA 400/500 |

4.38 PRESLED KOLIČINE ARMATURE V STEBRIH

STATIČNO POTREBNA ARMATURA

| PODPORA | | 2,8 | 4 | 5 | 3 |
|-------------------|-------|---------------------|---------------------|---------------------|---------------------|
| STEBER $\phi 100$ | % | 2,4% | 2,5% | 2,6% | 1,8% |
| $\bar{C} 340/500$ | F_a | 188 cm ² | 196 cm ² | 204 cm ² | 141 cm ² |
| KOLI $\phi 15$ | % | 0,6% | 0,6% | 0,8% | 0,6% |
| $\bar{C} 240/360$ | F_a | 90 cm ² | 90 cm ² | 120 cm ² | 90 cm ² |

VOLENA ARMATURA

STEBRI

Vse stebre armiramo z vinkovrednim jeklom
 $\bar{C} 340/500$ z 2,5% armiranjem

$$F_a = 196 \text{ cm}^2$$

KOLI

Vse kole armiramo z vinkovrednim jeklom
 razlogov z rebrestim armaturnim jeklom
 $\bar{C} 400/500-2$, z 0,76% armiranjem

(ustreznim potrebne police iz malega jekla
 za konstrukcijo armaturnega koša)

$$F_a = 114,0 \text{ cm}^2$$

$$\begin{array}{r}
 24 \phi 22^R \quad (91,20 \text{ cm}^2) \\
 \text{in 14 del. koša } 6 \phi 22 \quad (22,80 \text{ cm}^2) \\
 \hline
 \Sigma F_a = 114 \text{ cm}^2
 \end{array}$$

1.5 TEMELJNA TLA

1.5.1 MODULI ZEMLJINE

(Podatki iz GG elaborata STABI d.o.o. 2024)

Sestavo tal glej na vzdolžnem prerezu!

| Oznaka na vzdolžnem profilu | Opis | Modul horizontalne podajnosti k_h , piloti 1,25 m |
|-----------------------------|--|---|
| | | kN/m^3 |
| 1 | Melj in glina-polžarica, židke do lahko gnetne konsistence | 500–1.200 |
| 2 | Meljno peščen prod, srednje do zelo gost | 20.000–45.000 |
| 3 | Melj in glina srednje do težko gnetne konsistence | 3.000–6.000 |
| 4 | Meljno peščen prod, gost do zelo gost | 20.000–60.000 |

Piloti segajo s konico v peščen prod (4). Vertikalni modul podajnosti se upošteva v intervalu:

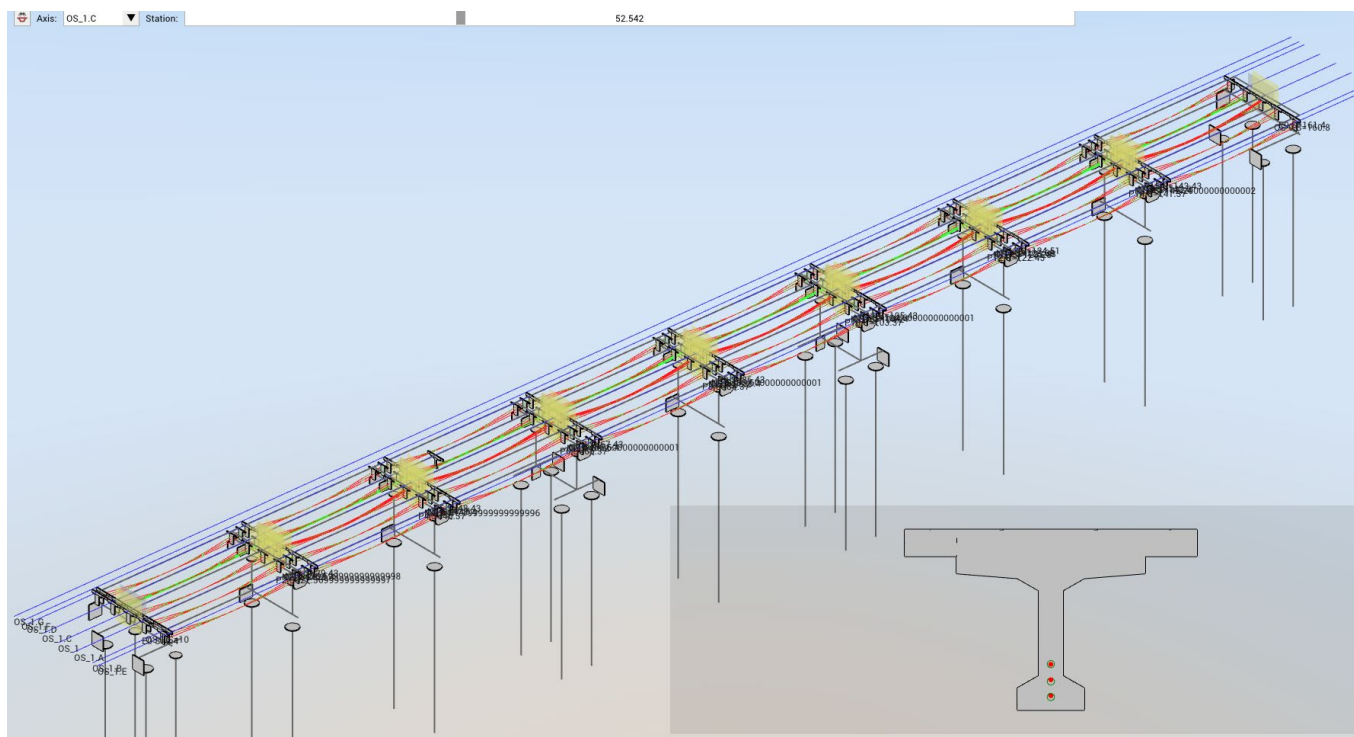
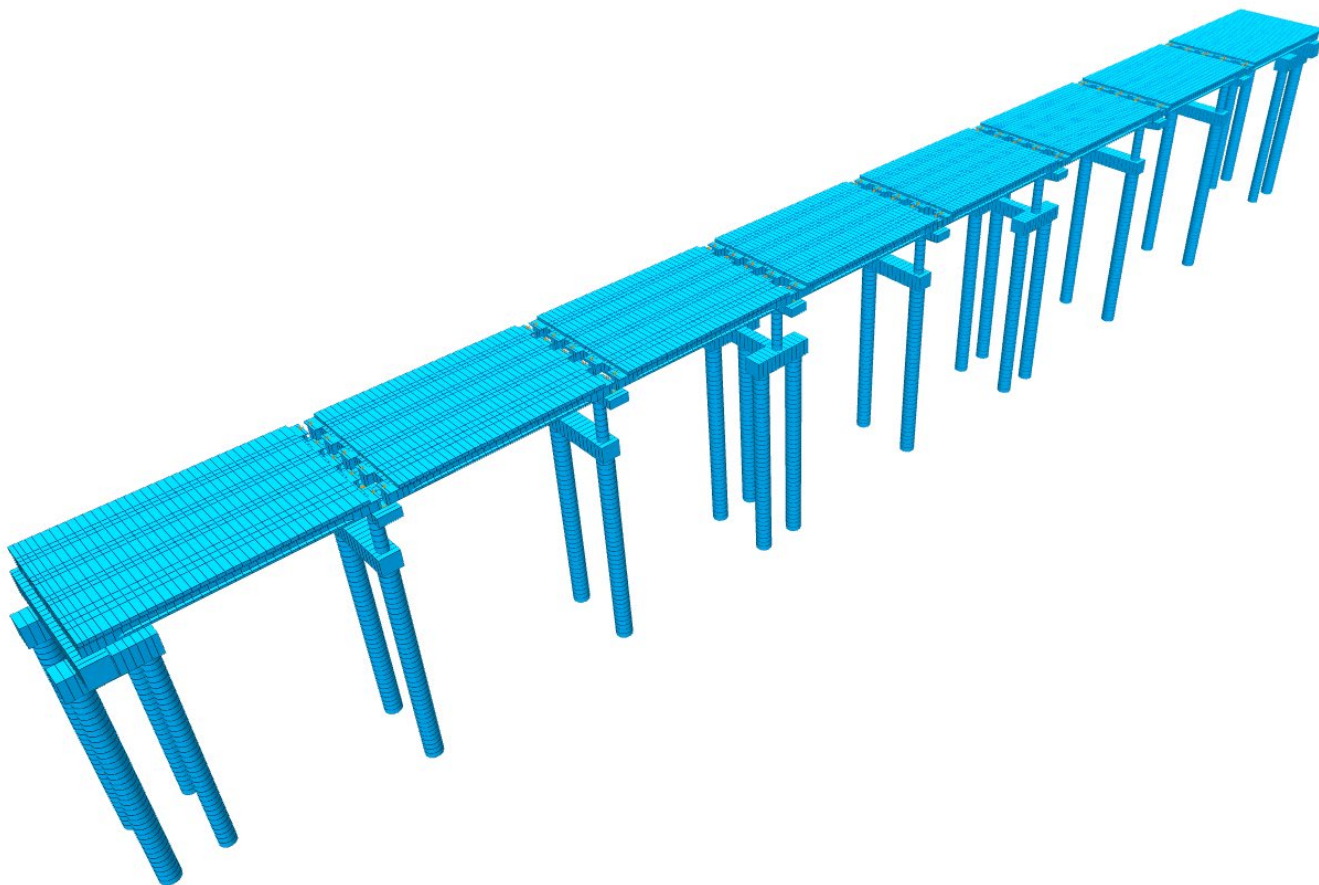
$$k_v = 80.000\text{--}130.000 \text{ kN/m}^3$$

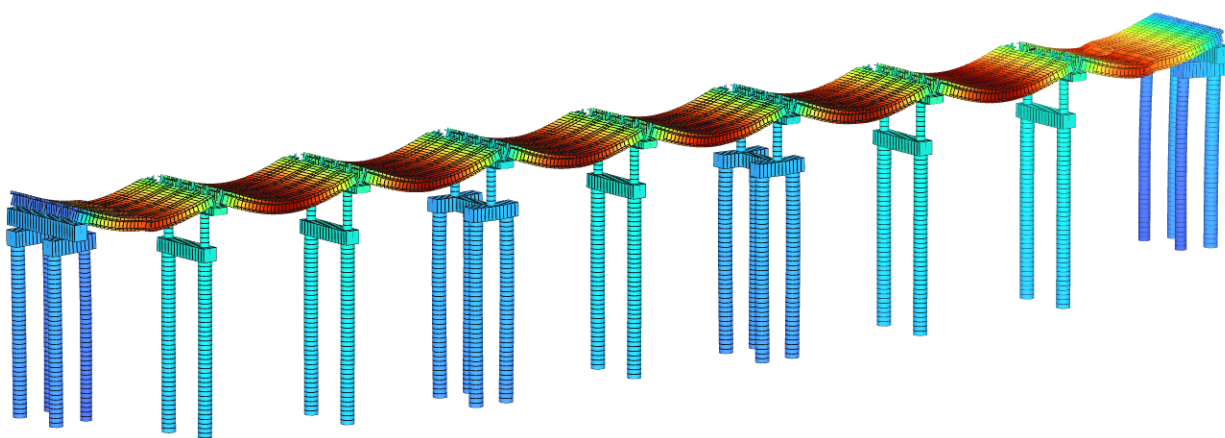
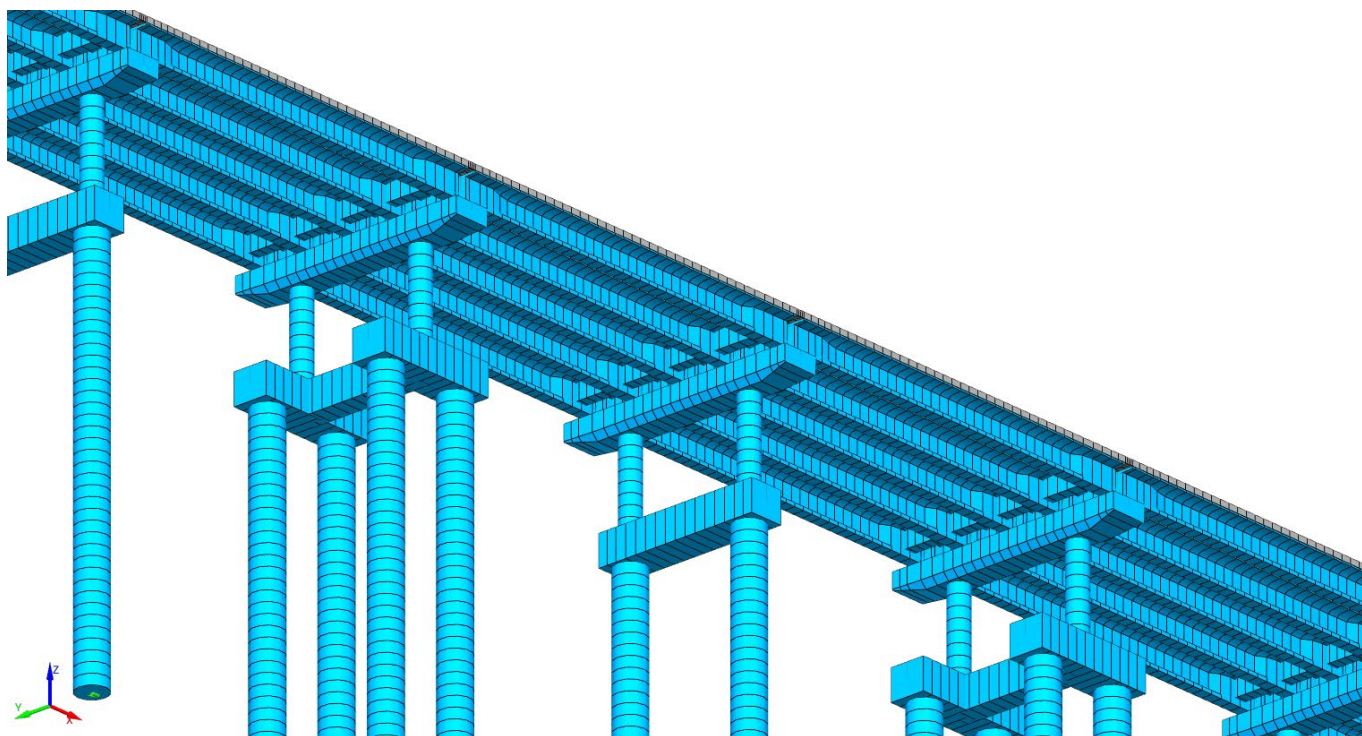
1.5.2 SESTAVA TAL IN RAČUNSKE DOLŽINE PILOTOV

1.6 RAČUNSKI MODEL

1.6.1 MKE MODEL KONSTRUKCIJE

Kontroliramo izkoriščenost obstoječe nosilne prekladne konstrukcije z rekonstruiranim razširjenim profilom glede na prometno obtežbo LM1 s prilagoditvenim faktorjem koncentriranih sil glavnega pasu 0,8. Korodiranosti kablov ni opaziti, zato upoštevamo 100% prerez kablov.





Deformation - Load case 4010: Montaza PB nosilcev
0.000 mm

$\sum RX = 0.0 \text{ kN}$ $\sum RY = -0.0 \text{ kN}$ $\sum RZ = 46239.5 \text{ kN}$
9.262 mm

1.6.2 RAČUNSKI MATERIALI

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Nadvoz Barjanska rekonstruiran v1
Materials

Design Code

EuroNorm Bridges: EN 1992-2:2005 Design of concrete structures (Slovenija) V 2025
Structure: B (Road bridges)
Snow load zone : 1

National Defined Parameters

| Reference of parameter in design code | Value |
|--|--------------------|
| long term reduction concrete compressive strength α -cc EN 1992-2 3.1.6 | 0.850 ¹ |
| long term reduction concrete tensile strength α -ct EN 1992-1-1 3.1.6 (2) | 1.000 ¹ |
| safety coefficient γ -c for concrete EN 1992-1-1 2.4.2.4 | 1.500 ¹ |
| safety coefficient γ -CE for concrete elasticity EN 1992-1-1 5.8.6 (3) | 1.200 ¹ |
| safety coefficient γ -s for reinforcing steel EN 1992-1-1 2.4.2.4 | 1.150 ¹ |
| safety coefficient γ -s for prestressing steel EN 1992-1-1 2.4.2.4 | 1.150 ¹ |

¹ national defined parameter taken from the INI-files

Materials

| Mat | Classification |
|-----|----------------------------------|
| 1 | C 30/37 (MB 35) STEBRI |
| 2 | Č 340/500 STEBRI |
| 3 | C 50/60 (meritve) NOSILCI |
| 4 | GA340/500 NOSILCI |
| 5 | C 50/60 (meritve) AB PLOSCA G=0 |
| 6 | C 50/60 (meritve) AB PLOSCA V PR |
| 7 | GA340/500 AB PLOSCA |
| 8 | C 30/37 AB PLO NOVA KONZOLA |
| 9 | B 500 B (EN 1992) |
| 15 | C 50/60 AB PLOSCA (G) |
| 21 | Y 1667/1500 |
| 31 | C 25/30 (MB 30) OPORNIK |
| 32 | B 400 B (ČBR 400/500) OPORNIK |
| 33 | C 25/30 (MB 30) PILOTNA GREDA |
| 34 | B 400 B (ČBR 400/500) PILOTNA GR |
| 35 | C 25/30 (MB 30) PILOTI |
| 36 | B 340 B (Č 340/500) PILOTI |
| 37 | C 25/30 (MB 30) GLAVA STEBRA |
| 38 | B 400 B (ČBR 400/500) GLAVA STEB |

Mat 1 C 30/37 (MB 35) STEBRI

| | | | | | | |
|------------------------|----------|----------|----------------------|------------------------|---------|-------------|
| Young's modulus | E | 32837 | [N/mm ²] | Safetyfactor | 1.50 | [-] |
| Poisson's ratio | μ | 0.20 | [-] | Strength ¹ | fc | 25.50 [MPa] |
| Shear modulus | G | 13682 | [N/mm ²] | Nominal strength | fck | 30.00 [MPa] |
| Compression modulus | K | 18243 | [N/mm ²] | Tensile strength | fctm | 2.90 [MPa] |
| Nominal Weight | γ | 25.0 | [kN/m ³] | Tensile strength | fctk,05 | 2.03 [MPa] |
| Mean density | ρ | 2400.0 | [kg/m ³] | Tensile strength | fctk,95 | 3.77 [MPa] |
| Elongation coefficient | α | 1.00E-05 | [1/K] | Bond strength | fbd | 3.04 [MPa] |
| | | | | Service strength | fc | 38.00 [MPa] |
| | | | | Fatigue strength | fcd,fat | 14.96 [MPa] |
| | | | | Tensile strength | fctd | 1.35 [MPa] |
| | | | | Tensile failure energy | Gf | 0.14 [N/mm] |

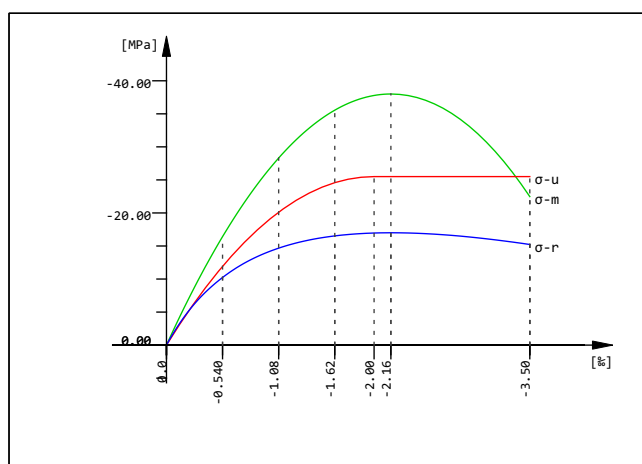
¹ fc = fck * α -cc

| Stress-Strain for serviceability | ϵ [%] | σ -m[MPa] | E-t[N/mm ²] |
|---|----------------|------------------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 34478 |
| | -0.540 | -16.42 | 26234 |
| | -1.081 | -28.31 | 17746 |
| | -1.621 | -35.55 | 9005 |
| | -2.162 | -38.00 | 0 |
| | -3.500 | -22.47 | -23499 |
| | Safetyfactor | | 1.50 |

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| Stress-Strain for ultimate load | ϵ [%] | σ -u [MPa] | E-t [N/mm ²] |
|---|----------------|-------------------|--------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 25500 |
| | -2.000 | -25.50 | 0 |
| | -3.500 | -25.50 | 0 |
| Safetyfactor | | | 1.50 |

| Stress-Strain of calc. mean values | ϵ [%] | σ -r [MPa] | E-t [N/mm ²] |
|---|----------------|-------------------|--------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 28732 |
| | -0.540 | -10.23 | 12007 |
| | -1.081 | -14.67 | 5278 |
| | -1.621 | -16.53 | 1917 |
| | -2.162 | -17.00 | 0 |
| | -3.500 | -15.23 | -2279 |
| Safetyfactor | | | (1.50) |



C 30/37 (MB 35) STEBRI

Mat 2 Č 340/500 STEBRI

| | | | | | | |
|------------------------|----------|----------|----------------------|----------------------|---------------|--------------|
| Young's modulus | E | 200000 | [N/mm ²] | Safetyfactor | 1.15 | [-] |
| Poisson's ratio | μ | 0.30 | [-] | Yield stress | fy | 340.00 [MPa] |
| Shear modulus | G | 76923 | [N/mm ²] | Compressive yield | fyc | 340.00 [MPa] |
| Compression modulus | K | 166667 | [N/mm ²] | Tensile strength | ft | 500.00 [MPa] |
| Nominal Weight | γ | 78.5 | [kN/m ³] | Compressive strength | fc | 500.00 [MPa] |
| Mean density | ρ | 7850.0 | [kg/m ³] | Ultimate strain | | 0.00 [%] |
| Elongation coefficient | α | 1.20E-05 | [1/K] | relative bond coeff. | | 1.00 [-] |
| max. thickness | t-max | 32.00 | [mm] | EN 1992 bond coeff. | k1 | 0.80 [-] |
| | | | | Hardening modulus | Eh | 0.00 [MPa] |
| | | | | Proportional limit | fp | 340.00 [MPa] |
| | | | | Dynamic allowance | σ -dyn | 152.17 [MPa] |

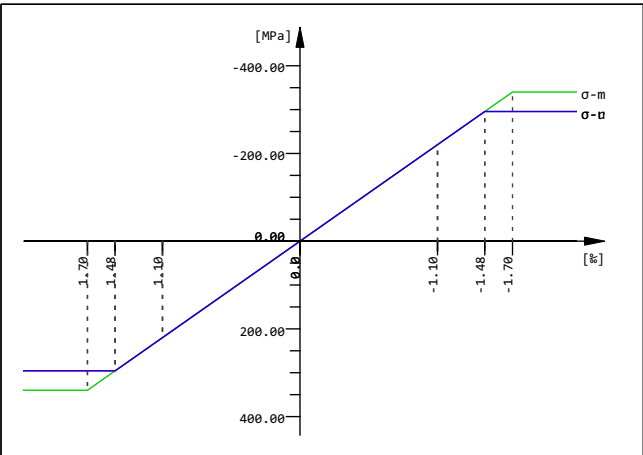
| Stress-Strain for serviceability | ϵ [%] | σ -m [MPa] | E-t [N/mm ²] |
|--|----------------|-------------------|--------------------------|
| Is also extended beyond the defined stress range | 1000.000 | 340.00 | 0 |
| | 1.700 | 340.00 | 0 |
| | 1.100 | 220.00 | 200000 |
| | 0.000 | 0.00 | 200000 |
| | -1.100 | -220.00 | 200000 |
| | -1.700 | -340.00 | 0 |
| | -1000.000 | -340.00 | 0 |
| Safetyfactor | | | 1.15 |

| Stress-Strain for ultimate load | ϵ [%] | σ -u [MPa] | E-t [N/mm ²] |
|--|----------------|-------------------|--------------------------|
| Is also extended beyond the defined stress range | 1000.000 | 295.65 | 0 |
| | 1.478 | 295.65 | 0 |
| | 1.100 | 220.00 | 200000 |
| | 0.000 | 0.00 | 200000 |
| | -1.100 | -220.00 | 200000 |

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| Stress-Strain for ultimate load | ϵ [%] | σ -u [MPa] | E-t [N/mm ²] |
|---------------------------------|----------------|-------------------|--------------------------|
| | -1.478 | -295.65 | 0 |
| | -1000.000 | -295.65 | 0 |
| Safetyfactor | | | (1.15) |

| Stress-Strain of calc. mean values | ϵ [%] | σ -r [MPa] | E-t [N/mm ²] |
|------------------------------------|----------------|-------------------|--------------------------|
| Is also extended beyond the | 1000.000 | 295.65 | 0 |
| defined stress range | 1.478 | 295.65 | 0 |
| | 1.100 | 220.00 | 200000 |
| | 0.000 | 0.00 | 200000 |
| | -1.100 | -220.00 | 200000 |
| | -1.478 | -295.65 | 0 |
| | -1000.000 | -295.65 | 0 |
| Safetyfactor | | | (1.15) |



Č 340/500 STEBRI

Mat 3 C 50/60 (meritve) NOSILCI

| | | | | | | |
|------------------------|----------|----------|----------------------|---------------------------------------|---------------------|-------------|
| Young's modulus | E | 37278 | [N/mm ²] | Safetyfactor | 1.50 | [-] |
| Poisson's ratio | μ | 0.20 | [-] | Strength ¹ | f _c | 42.50 [MPa] |
| Shear modulus | G | 15532 | [N/mm ²] | Nominal strength | f _{ck} | 50.00 [MPa] |
| Compression modulus | K | 20710 | [N/mm ²] | Tensile strength | f _{ctm} | 4.07 [MPa] |
| Nominal Weight | γ | 25.0 | [kN/m ³] | Tensile strength | f _{ctk,05} | 2.85 [MPa] |
| Mean density | ρ | 2400.0 | [kg/m ³] | Tensile strength | f _{ctk,95} | 5.29 [MPa] |
| Elongation coefficient | α | 1.00E-05 | [1/K] | Bond strength | f _{bd} | 4.28 [MPa] |
| | | | | Service strength | f _{cm} | 58.00 [MPa] |
| | | | | Fatigue strength | f _{cd,fat} | 22.67 [MPa] |
| | | | | Tensile strength | f _{ctd} | 1.90 [MPa] |
| | | | | Tensile failure energy G _f | 0.15 | [N/mm] |

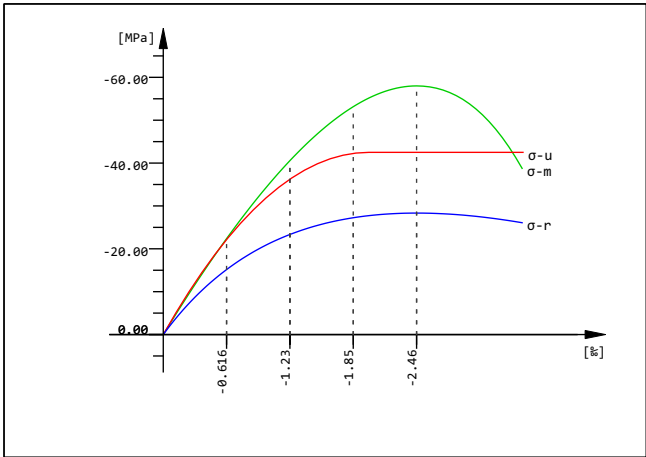
¹ f_c = f_{ck} * α -cc

| Stress-Strain for serviceability | ϵ [%] | σ -m [MPa] | E-t [N/mm ²] |
|----------------------------------|----------------|-------------------|--------------------------|
| Is only valid within the defined | 0.000 | 0.00 | 39142 |
| stress range | -0.616 | -22.38 | 33229 |
| | -1.232 | -40.56 | 25432 |
| | -1.849 | -53.15 | 14855 |
| | -2.465 | -58.00 | 0 |
| | -3.491 | -38.77 | -42498 |
| Safetyfactor | | | 1.50 |

| Stress-Strain for ultimate load | ϵ [%] | σ -u [MPa] | E-t [N/mm ²] |
|----------------------------------|----------------|-------------------|--------------------------|
| Is only valid within the defined | 0.000 | 0.00 | 42500 |
| stress range | -2.000 | -42.50 | 0 |
| | -3.500 | -42.50 | 0 |
| Safetyfactor | | | 1.50 |

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| Stress-Strain of calc. mean values | ϵ [%] | σ -r [MPa] | E-t [N/mm ²] |
|---|----------------------|-------------------|--------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 32618 |
| | -0.616 | -15.15 | 17961 |
| | -1.232 | -23.34 | 9299 |
| | -1.849 | -27.25 | 3758 |
| | -2.465 | -28.33 | 0 |
| | -3.491 | -26.09 | -4031 |
| | Safetyfactor (1.50) | | |



C 50/60 (meritve) NOSILCI

Mat 4 GA340/500 NOSILCI

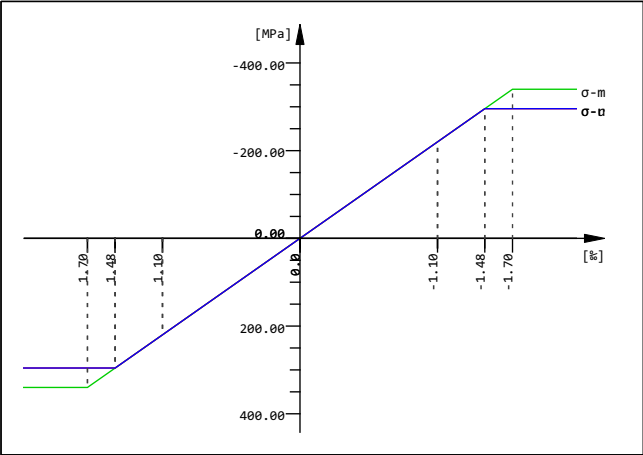
| | | | | | | |
|------------------------|----------|----------|----------------------|----------------------|---------------|--------------|
| Young's modulus | E | 200000 | [N/mm ²] | Safetyfactor | 1.15 | [-] |
| Poisson's ratio | μ | 0.30 | [-] | Yield stress | fy | 340.00 [MPa] |
| Shear modulus | G | 76923 | [N/mm ²] | Compressive yield | fyc | 340.00 [MPa] |
| Compression modulus | K | 166667 | [N/mm ²] | Tensile strength | ft | 500.00 [MPa] |
| Nominal Weight | γ | 78.5 | [kN/m ³] | Compressive strength | fc | 500.00 [MPa] |
| Mean density | ρ | 7850.0 | [kg/m ³] | Ultimate strain | | 0.00 [%] |
| Elongation coefficient | α | 1.20E-05 | [1/K] | relative bond coeff. | | 1.00 [-] |
| max. thickness | t-max | 32.00 | [mm] | EN 1992 bond coeff. | k1 | 0.80 [-] |
| | | | | Hardening modulus | Eh | 0.00 [MPa] |
| | | | | Proportional limit | fp | 340.00 [MPa] |
| | | | | Dynamic allowance | σ -dyn | 152.17 [MPa] |

| Stress-Strain for serviceability | ϵ [%] | σ -m [MPa] | E-t [N/mm ²] |
|--|-------------------|-------------------|--------------------------|
| Is also extended beyond the defined stress range | 1000.000 | 340.00 | 0 |
| | 1.700 | 340.00 | 0 |
| | 1.100 | 220.00 | 200000 |
| | 0.000 | 0.00 | 200000 |
| | -1.100 | -220.00 | 200000 |
| | -1.700 | -340.00 | 0 |
| | -1000.000 | -340.00 | 0 |
| | Safetyfactor 1.15 | | |

| Stress-Strain for ultimate load | ϵ [%] | σ -u [MPa] | E-t [N/mm ²] |
|--|----------------------|-------------------|--------------------------|
| Is also extended beyond the defined stress range | 1000.000 | 295.65 | 0 |
| | 1.478 | 295.65 | 0 |
| | 1.100 | 220.00 | 200000 |
| | 0.000 | 0.00 | 200000 |
| | -1.100 | -220.00 | 200000 |
| | -1.478 | -295.65 | 0 |
| | -1000.000 | -295.65 | 0 |
| | Safetyfactor (1.15) | | |

Nadvoz Barjanska rekonstruiran v1
Materials

| Stress-Strain of calc. mean values | ϵ [%] | σ -r [MPa] | E-t [N/mm ²] |
|--|----------------|-------------------|--------------------------|
| Is also extended beyond the defined stress range | 1000.000 | 295.65 | 0 |
| | 1.478 | 295.65 | 0 |
| | 1.100 | 220.00 | 200000 |
| | 0.000 | 0.00 | 200000 |
| | -1.100 | -220.00 | 200000 |
| | -1.478 | -295.65 | 0 |
| | -1000.000 | -295.65 | 0 |
| | Safetyfactor | | (1.15) |



GA340/500 NOSILCI

Mat 5 C 50/60 (meritve) AB PLOSCA G=0

| | | | | | | |
|------------------------|----------|----------|----------------------|---------------------------------------|----------------------|-------------|
| Young's modulus | E | 37278 | [N/mm ²] | Safetyfactor | 1.50 | [-] |
| Poisson's ratio | μ | 0.20 | [-] | Strength ¹ | f _c | 42.50 [MPa] |
| Shear modulus | G | 15532 | [N/mm ²] | Nominal strength | f _{ck} | 50.00 [MPa] |
| Compression modulus | K | 20710 | [N/mm ²] | Tensile strength | f _{ctm} | 4.07 [MPa] |
| Nominal Weight | γ | 0.0 | [kN/m ³] | Tensile strength | f _{ctk,05} | 2.85 [MPa] |
| Mean density | ρ | 0.0 | [kg/m ³] | Tensile strength | f _{ctk,95} | 5.29 [MPa] |
| Elongation coefficient | α | 1.00E-05 | [1/K] | Bond strength | f _{bd} | 4.28 [MPa] |
| | | | | Service strength | f _{cm} | 58.00 [MPa] |
| | | | | Fatigue strength | f _{cd, fat} | 22.67 [MPa] |
| | | | | Tensile strength | f _{ctd} | 1.90 [MPa] |
| | | | | Tensile failure energy G _f | 0.15 | [N/mm] |

¹ f_c = f_{ck} * α -cc

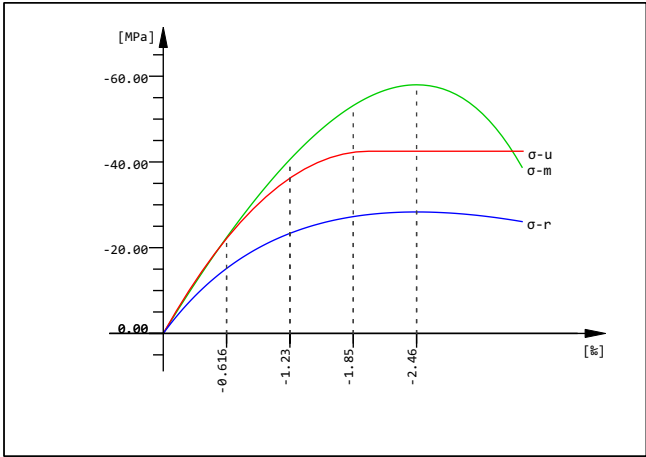
| Stress-Strain for serviceability | ϵ [%] | σ -m [MPa] | E-t [N/mm ²] |
|---|----------------|-------------------|--------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 39142 |
| | -0.616 | -22.38 | 33229 |
| | -1.232 | -40.56 | 25432 |
| | -1.849 | -53.15 | 14855 |
| | -2.465 | -58.00 | 0 |
| | -3.491 | -38.77 | -42498 |
| | Safetyfactor | | 1.50 |

| Stress-Strain for ultimate load | ϵ [%] | σ -u [MPa] | E-t [N/mm ²] |
|---|----------------|-------------------|--------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 42500 |
| | -2.000 | -42.50 | 0 |
| | -3.500 | -42.50 | 0 |
| | Safetyfactor | | 1.50 |

| Stress-Strain of calc. mean values | ϵ [%] | σ -r [MPa] | E-t [N/mm ²] |
|---|----------------|-------------------|--------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 32618 |
| | -0.616 | -15.15 | 17961 |
| | -1.232 | -23.34 | 9299 |
| | -1.849 | -27.25 | 3758 |

Nadvoz Barjanska rekonstruiran v1
Materials

| Stress-Strain of calc. mean values | ϵ [%] | σ -r [MPa] | E-t [N/mm ²] |
|------------------------------------|----------------|-------------------|--------------------------|
| | -2.465 | -28.33 | 0 |
| | -3.491 | -26.09 | -4031 |
| Safetyfactor | | | (1.50) |



C 50/60 (meritve) AB PLOSCA G=0

Mat 6 C 50/60 (meritve) AB PLOSCA V PRE

| | | | | | | |
|------------------------|----------|----------|----------------------|------------------------|---------------------|-------------|
| Young's modulus | E | 37278 | [N/mm ²] | Safetyfactor | 1.50 | [-] |
| Poisson's ratio | μ | 0.20 | [-] | Strength ¹ | f _c | 42.50 [MPa] |
| Shear modulus | G | 15532 | [N/mm ²] | Nominal strength | f _{ck} | 50.00 [MPa] |
| Compression modulus | K | 20710 | [N/mm ²] | Tensile strength | f _{ctm} | 4.07 [MPa] |
| Nominal Weight | γ | 25.0 | [kN/m ³] | Tensile strength | f _{ctk,05} | 2.85 [MPa] |
| Mean density | ρ | 2400.0 | [kg/m ³] | Tensile strength | f _{ctk,95} | 5.29 [MPa] |
| Elongation coefficient | α | 1.00E-05 | [1/K] | Bond strength | f _{bd} | 4.28 [MPa] |
| | | | | Service strength | f _{cm} | 58.00 [MPa] |
| | | | | Fatigue strength | f _{cd,fat} | 22.67 [MPa] |
| | | | | Tensile strength | f _{ctd} | 1.90 [MPa] |
| | | | | Tensile failure energy | G _f | 0.15 [N/mm] |

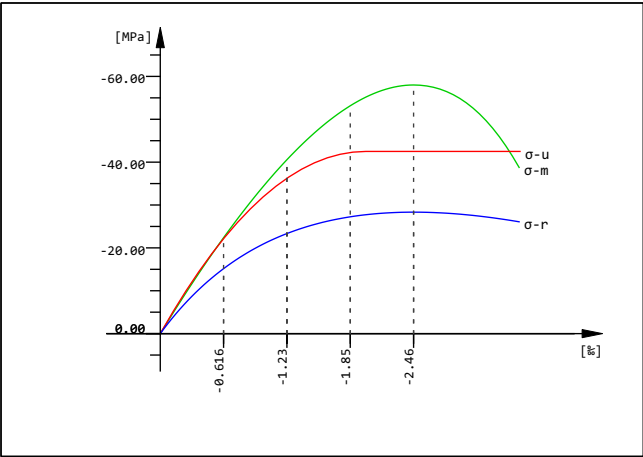
¹ f_c = f_{ck} * α -cc

| Stress-Strain for serviceability | ϵ [%] | σ -m [MPa] | E-t [N/mm ²] |
|---|----------------|-------------------|--------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 39142 |
| | -0.616 | -22.38 | 33229 |
| | -1.232 | -40.56 | 25432 |
| | -1.849 | -53.15 | 14855 |
| | -2.465 | -58.00 | 0 |
| | -3.491 | -38.77 | -42498 |
| Safetyfactor | | | 1.50 |

| Stress-Strain for ultimate load | ϵ [%] | σ -u [MPa] | E-t [N/mm ²] |
|---|----------------|-------------------|--------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 42500 |
| | -2.000 | -42.50 | 0 |
| | -3.500 | -42.50 | 0 |
| Safetyfactor | | | 1.50 |

| Stress-Strain of calc. mean values | ϵ [%] | σ -r [MPa] | E-t [N/mm ²] |
|---|----------------|-------------------|--------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 32618 |
| | -0.616 | -15.15 | 17961 |
| | -1.232 | -23.34 | 9299 |
| | -1.849 | -27.25 | 3758 |
| | -2.465 | -28.33 | 0 |
| | -3.491 | -26.09 | -4031 |
| Safetyfactor | | | (1.50) |

Nadvoz Barjanska rekonstruiran v1
Materials



C 50/60 (meritve) AB PLOSCA V PRE

Mat 7 GA340/500 AB PLOSCA

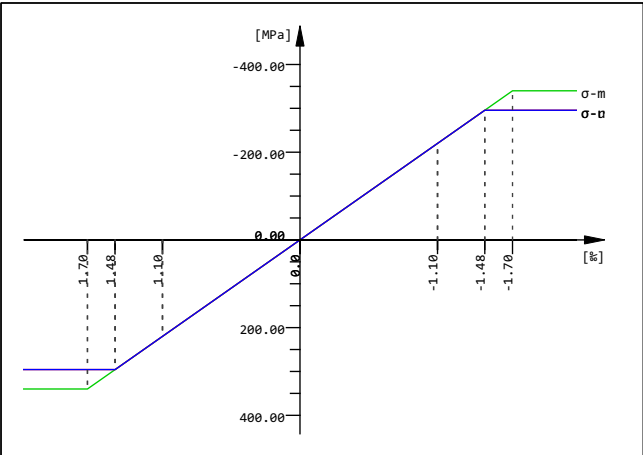
| | | | | | | |
|------------------------|-------|----------|----------------------|----------------------|-----------------|--------------|
| Young's modulus | E | 200000 | [N/mm ²] | Safetyfactor | 1.15 | [-] |
| Poisson's ratio | μ | 0.30 | [-] | Yield stress | f _y | 340.00 [MPa] |
| Shear modulus | G | 76923 | [N/mm ²] | Compressive yield | f _{yc} | 340.00 [MPa] |
| Compression modulus | K | 166667 | [N/mm ²] | Tensile strength | f _t | 500.00 [MPa] |
| Nominal Weight | γ | 78.5 | [kN/m ³] | Compressive strength | f _c | 500.00 [MPa] |
| Mean density | ρ | 7850.0 | [kg/m ³] | Ultimate strain | | 0.00 [%] |
| Elongation coefficient | α | 1.20E-05 | [1/K] | relative bond coeff. | | 1.00 [-] |
| max. thickness | t-max | 32.00 | [mm] | EN 1992 bond coeff. | k ₁ | 0.80 [-] |
| | | | | Hardening modulus | E _h | 0.00 [MPa] |
| | | | | Proportional limit | f _p | 340.00 [MPa] |
| | | | | Dynamic allowance | σ-dyn | 152.17 [MPa] |

| Stress-Strain for serviceability | ε[%] | σ-m[MPa] | E-t[N/mm ²] |
|--|-----------|----------|-------------------------|
| Is also extended beyond the defined stress range | 1000.000 | 340.00 | 0 |
| | 1.700 | 340.00 | 0 |
| | 1.100 | 220.00 | 200000 |
| | 0.000 | 0.00 | 200000 |
| | -1.100 | -220.00 | 200000 |
| | -1.700 | -340.00 | 0 |
| | -1000.000 | -340.00 | 0 |
| Safetyfactor | 1.15 | | |

| Stress-Strain for ultimate load | ε[%] | σ-u[MPa] | E-t[N/mm ²] |
|--|-----------|----------|-------------------------|
| Is also extended beyond the defined stress range | 1000.000 | 295.65 | 0 |
| | 1.478 | 295.65 | 0 |
| | 1.100 | 220.00 | 200000 |
| | 0.000 | 0.00 | 200000 |
| | -1.100 | -220.00 | 200000 |
| | -1.478 | -295.65 | 0 |
| | -1000.000 | -295.65 | 0 |
| Safetyfactor | (1.15) | | |

| Stress-Strain of calc. mean values | ε[%] | σ-r[MPa] | E-t[N/mm ²] |
|--|-----------|----------|-------------------------|
| Is also extended beyond the defined stress range | 1000.000 | 295.65 | 0 |
| | 1.478 | 295.65 | 0 |
| | 1.100 | 220.00 | 200000 |
| | 0.000 | 0.00 | 200000 |
| | -1.100 | -220.00 | 200000 |
| | -1.478 | -295.65 | 0 |
| | -1000.000 | -295.65 | 0 |
| Safetyfactor | (1.15) | | |

Nadvoz Barjanska rekonstruiran v1
Materials



GA340/500 AB PLOSCA

Mat 8 C 30/37 AB PLO NOVA KONZOLA

| | | | | | | |
|------------------------|---|----------|----------------------|------------------------|---------------------|-------------|
| Young's modulus | E | 32837 | [N/mm ²] | Safetyfactor | 1.50 | [-] |
| Poisson's ratio | μ | 0.20 | [-] | Strength ¹ | f _c | 25.50 [MPa] |
| Shear modulus | G | 13682 | [N/mm ²] | Nominal strength | f _{ck} | 30.00 [MPa] |
| Compression modulus | K | 18243 | [N/mm ²] | Tensile strength | f _{ctm} | 2.90 [MPa] |
| Nominal Weight | γ | 25.0 | [kN/m ³] | Tensile strength | f _{ctk,05} | 2.03 [MPa] |
| Mean density | ρ | 2400.0 | [kg/m ³] | Tensile strength | f _{ctk,95} | 3.77 [MPa] |
| Elongation coefficient | α | 1.00E-05 | [1/K] | Bond strength | f _{bd} | 3.04 [MPa] |
| | | | | Service strength | f _{cm} | 38.00 [MPa] |
| | | | | Fatigue strength | f _{cd,fat} | 14.96 [MPa] |
| | | | | Tensile strength | f _{ctd} | 1.35 [MPa] |
| | | | | Tensile failure energy | G _f | 0.14 [N/mm] |

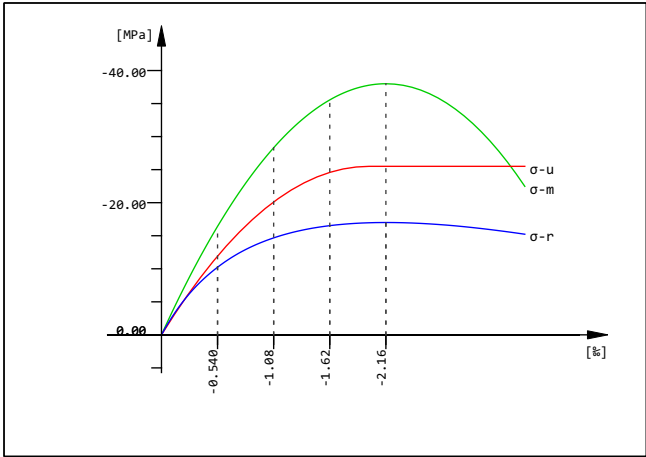
¹ f_c = f_{ck} * α-cc

| Stress-Strain for serviceability | ε[%] | σ-m[MPa] | E-t[N/mm ²] |
|---|--------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 34478 |
| | -0.540 | -16.42 | 26234 |
| | -1.081 | -28.31 | 17746 |
| | -1.621 | -35.55 | 9005 |
| | -2.162 | -38.00 | 0 |
| | -3.500 | -22.47 | -23499 |
| Safetyfactor | | | 1.50 |

| Stress-Strain for ultimate load | ε[%] | σ-u[MPa] | E-t[N/mm ²] |
|---|--------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 25500 |
| | -2.000 | -25.50 | 0 |
| | -3.500 | -25.50 | 0 |
| Safetyfactor | | | 1.50 |

| Stress-Strain of calc. mean values | ε[%] | σ-r[MPa] | E-t[N/mm ²] |
|---|--------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 28732 |
| | -0.540 | -10.23 | 12007 |
| | -1.081 | -14.67 | 5278 |
| | -1.621 | -16.53 | 1917 |
| | -2.162 | -17.00 | 0 |
| | -3.500 | -15.23 | -2279 |
| Safetyfactor | | | (1.50) |

Nadvoz Barjanska rekonstruiran v1
Materials



C 30/37 AB PLO NOVA KONZOLA

Mat 9 B 500 B (EN 1992)

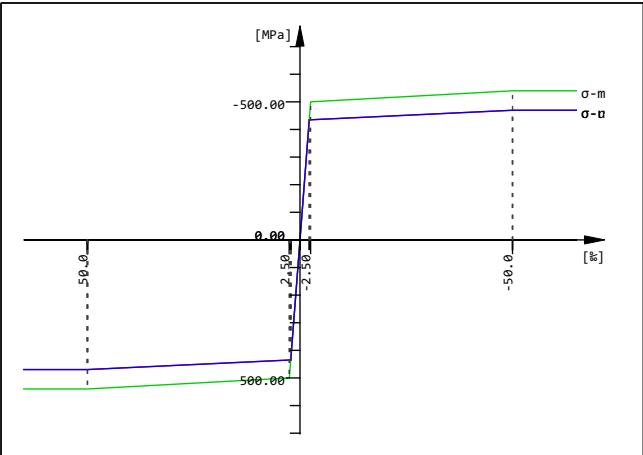
| | | | | | | |
|------------------------|-------|----------|----------------------|----------------------|-----------------|--------------|
| Young's modulus | E | 200000 | [N/mm ²] | Safetyfactor | 1.15 | [-] |
| Poisson's ratio | μ | 0.30 | [-] | Yield stress | f _y | 500.00 [MPa] |
| Shear modulus | G | 76923 | [N/mm ²] | Compressive yield | f _{yc} | 500.00 [MPa] |
| Compression modulus | K | 166667 | [N/mm ²] | Tensile strength | f _t | 540.00 [MPa] |
| Nominal Weight | γ | 78.5 | [kN/m ³] | Compressive strength | f _c | 540.00 [MPa] |
| Mean density | ρ | 7850.0 | [kg/m ³] | Ultimate strain | | 50.00 [%] |
| Elongation coefficient | α | 1.20E-05 | [1/K] | relative bond coeff. | | 1.00 [-] |
| max. thickness | t-max | 32.00 | [mm] | EN 1992 bond coeff. | k ₁ | 0.80 [-] |
| | | | | Hardening modulus | E _h | 0.00 [MPa] |
| | | | | Proportional limit | f _p | 500.00 [MPa] |
| | | | | Dynamic allowance | σ-dyn | 152.17 [MPa] |

| Stress-Strain for serviceability | ε[%] | σ-m[MPa] | E-t[N/mm²] | |
|----------------------------------|--------------|----------|------------|------|
| Is also extended beyond the | 1000.000 | 540.00 | 0 | |
| defined stress range | 50.000 | 540.00 | 0 | |
| | 2.500 | 500.00 | 842 | |
| | 0.000 | 0.00 | 200000 | |
| | -2.500 | -500.00 | 842 | |
| | -50.000 | -540.00 | 0 | |
| | -1000.000 | -540.00 | 0 | |
| | Safetyfactor | | | 1.15 |

| Stress-Strain for ultimate load | ε[%] | σ-u[MPa] | E-t[N/mm²] |
|---------------------------------|----------------------|----------|------------|
| Is also extended beyond the | 1000.000 | 469.57 | 0 |
| defined stress range | 50.000 | 469.57 | 0 |
| | 2.174 | 434.78 | 727 |
| | 0.000 | 0.00 | 200000 |
| | -2.174 | -434.78 | 727 |
| | -50.000 | -469.57 | 0 |
| | -1000.000 | -469.57 | 0 |
| | Safetyfactor (1.15) | | |

| Stress-Strain of calc. mean values | ε[%] | σ-r [MPa] | E-t [N/mm²] |
|------------------------------------|----------------------|-----------|-------------|
| Is also extended beyond the | 1000.000 | 469.57 | 0 |
| defined stress range | 50.000 | 469.57 | 0 |
| | 2.174 | 434.78 | 727 |
| | 0.000 | 0.00 | 200000 |
| | -2.174 | -434.78 | 727 |
| | -50.000 | -469.57 | 0 |
| | -1000.000 | -469.57 | 0 |
| | Safetyfactor (1.15) | | |

Nadvoz Barjanska rekonstruiran v1
Materials



B 500 B (EN 1992)

Mat 15 C 50/60 AB PLOSCA (G)

| | | | | | | |
|------------------------|---|----------|----------------------|------------------------|---------------------|-------------|
| Young's modulus | E | 37278 | [N/mm ²] | Safetyfactor | 1.50 | [-] |
| Poisson's ratio | μ | 0.20 | [-] | Strength ¹ | f _c | 42.50 [MPa] |
| Shear modulus | G | 15532 | [N/mm ²] | Nominal strength | f _{ck} | 50.00 [MPa] |
| Compression modulus | K | 20710 | [N/mm ²] | Tensile strength | f _{ctm} | 4.07 [MPa] |
| Nominal Weight | γ | 25.0 | [kN/m ³] | Tensile strength | f _{ctk,05} | 2.85 [MPa] |
| Mean density | ρ | 2400.0 | [kg/m ³] | Tensile strength | f _{ctk,95} | 5.29 [MPa] |
| Elongation coefficient | α | 1.00E-05 | [1/K] | Bond strength | f _{bd} | 4.28 [MPa] |
| | | | | Service strength | f _{cm} | 58.00 [MPa] |
| | | | | Fatigue strength | f _{cd,fat} | 22.67 [MPa] |
| | | | | Tensile strength | f _{ctd} | 1.90 [MPa] |
| | | | | Tensile failure energy | G _f | 0.15 [N/mm] |

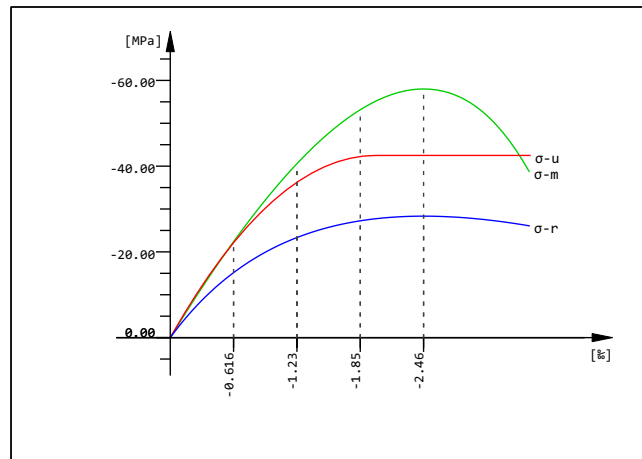
¹ f_c = f_{ck} * α-cc

| Stress-Strain for serviceability | ε[‰] | σ-m[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 39142 |
| | -0.616 | -22.38 | 33229 |
| | -1.232 | -40.56 | 25432 |
| | -1.849 | -53.15 | 14855 |
| | -2.465 | -58.00 | 0 |
| | -3.491 | -38.77 | -42498 |
| | Safetyfactor | 1.50 | |

| Stress-Strain for ultimate load | ε[‰] | σ-u[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 42500 |
| | -2.000 | -42.50 | 0 |
| | -3.500 | -42.50 | 0 |
| | Safetyfactor | 1.50 | |

| Stress-Strain of calc. mean values | ε[‰] | σ-r[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 32618 |
| | -0.616 | -15.15 | 17961 |
| | -1.232 | -23.34 | 9299 |
| | -1.849 | -27.25 | 3758 |
| | -2.465 | -28.33 | 0 |
| | -3.491 | -26.09 | -4031 |
| | Safetyfactor | (1.50) | |

Nadvoz Barjanska rekonstruiran v1
 Materials



C 50/60 AB PLOSCA (G)

Mat 21 Y 1667/1500

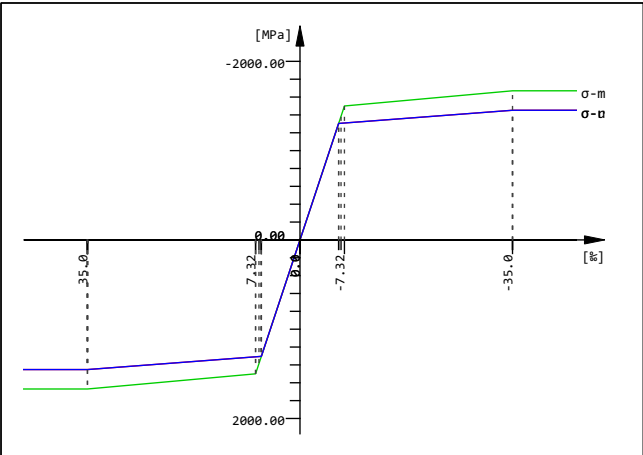
| | | | | | | |
|------------------------|----------|----------|----------------------|----------------------|-------|---------------|
| Young's modulus | E | 205000 | [N/mm ²] | Safetyfactor | 1.15 | [-] |
| Poisson's ratio | μ | 0.30 | [-] | Yield stress | fy | 1500.00 [MPa] |
| Shear modulus | G | 78846 | [N/mm ²] | Compressive yield | fyc | 1500.00 [MPa] |
| Compression modulus | K | 170833 | [N/mm ²] | Tensile strength | ft | 1670.00 [MPa] |
| Nominal Weight | γ | 78.5 | [kN/m ³] | Compressive strength | fc | 1670.00 [MPa] |
| Mean density | ρ | 7850.0 | [kg/m ³] | Ultimate strain | | 35.00 [%] |
| Elongation coefficient | α | 1.20E-05 | [1/K] | relative bond coeff. | | 0.50 [-] |
| max. thickness | t-max | 8.00 | [mm] | EN 1992 bond coeff. | k1 | 1.60 [-] |
| Relaxation | EN-1992 | Class 1 | | Hardening modulus | Eh | 0.00 [MPa] |
| Relaxation | ρ(1000h) | 8.00 | [%] | Proportional limit | fp | 1500.00 [MPa] |
| | | | | Dynamic allowance | σ-dyn | 160.87 [MPa] |

| Stress-Strain for serviceability | ε[%] | σ-m [MPa] | E-t [N/mm ²] |
|----------------------------------|-----------|-----------|--------------------------|
| Is also extended beyond the | 1000.000 | 1670.00 | 0 |
| defined stress range | 35.000 | 1670.00 | 0 |
| | 7.317 | 1500.00 | 6141 |
| | 6.756 | 1385.00 | 205000 |
| | 0.000 | 0.00 | 205000 |
| | -6.756 | -1385.00 | 205000 |
| | -7.317 | -1500.00 | 6141 |
| | -35.000 | -1670.00 | 0 |
| | -1000.000 | -1670.00 | 0 |
| Safetyfactor | 1.15 | | |

| Stress-Strain for ultimate load | ε[%] | σ-u [MPa] | E-t [N/mm ²] |
|---------------------------------|-----------|-----------|--------------------------|
| Is also extended beyond the | 1000.000 | 1452.17 | 0 |
| defined stress range | 35.000 | 1452.17 | 0 |
| | 6.363 | 1304.35 | 5162 |
| | 0.000 | 0.00 | 205000 |
| | -6.363 | -1304.35 | 5162 |
| | -35.000 | -1452.17 | 0 |
| | -1000.000 | -1452.17 | 0 |
| Safetyfactor | (1.15) | | |

| Stress-Strain of calc. mean values | ε[%] | σ-r [MPa] | E-t [N/mm ²] |
|------------------------------------|-----------|-----------|--------------------------|
| Is also extended beyond the | 1000.000 | 1452.17 | 0 |
| defined stress range | 35.000 | 1452.17 | 0 |
| | 6.363 | 1304.35 | 5162 |
| | 0.000 | 0.00 | 205000 |
| | -6.363 | -1304.35 | 5162 |
| | -35.000 | -1452.17 | 0 |
| | -1000.000 | -1452.17 | 0 |
| Safetyfactor | (1.15) | | |

Nadvoz Barjanska rekonstruiran v1
Materials



Y 1667/1500

Mat 31 C 25/30 (MB 30) OPORNIK

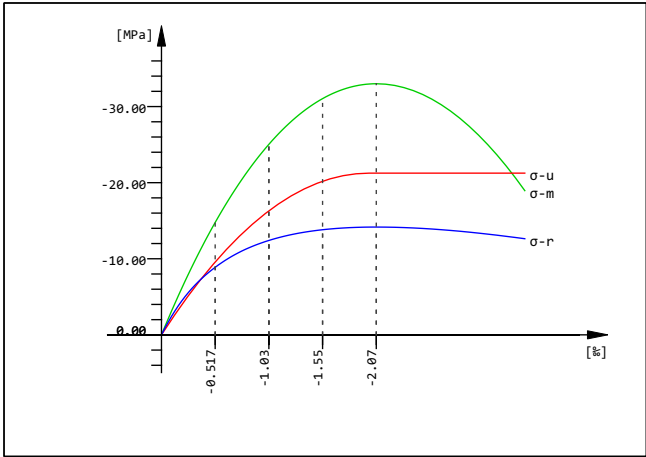
| | | | | | | |
|--|---|----------|----------------------|------------------------|---------------------|-------------|
| Young's modulus | E | 31476 | [N/mm ²] | Safetyfactor | 1.50 | [-] |
| Poisson's ratio | μ | 0.20 | [-] | Strength ¹ | f _c | 21.25 [MPa] |
| Shear modulus | G | 13115 | [N/mm ²] | Nominal strength | f _{ck} | 25.00 [MPa] |
| Compression modulus | K | 17487 | [N/mm ²] | Tensile strength | f _{ctm} | 2.56 [MPa] |
| Nominal Weight | γ | 25.0 | [kN/m ³] | Tensile strength | f _{ctk,05} | 1.80 [MPa] |
| Mean density | ρ | 2400.0 | [kg/m ³] | Tensile strength | f _{ctk,95} | 3.33 [MPa] |
| Elongation coefficient | α | 1.00E-05 | [1/K] | Bond strength | f _{bd} | 2.69 [MPa] |
| | | | | Service strength | f _{cm} | 33.00 [MPa] |
| | | | | Fatigue strength | f _{cd,fat} | 12.75 [MPa] |
| | | | | Tensile strength | f _{ctd} | 1.20 [MPa] |
| | | | | Tensile failure energy | G _f | 0.14 [N/mm] |
| ¹ f _c = f _{ck} * α-cc | | | | | | |

| Stress-Strain for serviceability | ε[‰] | σ-m[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 33050 |
| | -0.517 | -14.77 | 24122 |
| | -1.035 | -25.04 | 15658 |
| | -1.552 | -31.04 | 7627 |
| | -2.069 | -33.00 | 0 |
| | -3.500 | -18.95 | -19203 |
| | Safetyfactor | | 1.50 |

| Stress-Strain for ultimate load | ε[‰] | σ-u[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 21250 |
| | -2.000 | -21.25 | 0 |
| | -3.500 | -21.25 | 0 |
| | Safetyfactor | | 1.50 |

| Stress-Strain of calc. mean values | ε[‰] | σ-r[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 27541 |
| | -0.517 | -8.87 | 10256 |
| | -1.035 | -12.41 | 4259 |
| | -1.552 | -13.81 | 1496 |
| | -2.069 | -14.17 | 0 |
| | -3.500 | -12.64 | -1802 |
| | Safetyfactor | | (1.50) |

Nadvoz Barjanska rekonstruiran v1
Materials



C 25/30 (MB 30) OPORNIK

Mat 32 B 400 B (ČBR 400/500) OPORNIK

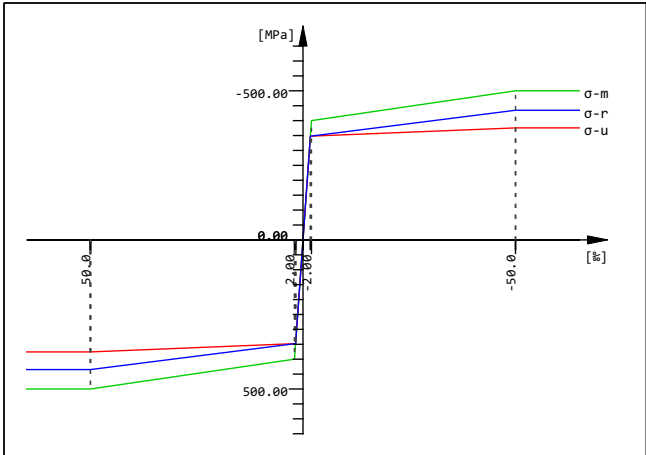
| | | | | | | |
|------------------------|-------|----------|----------------------|----------------------|-----------------|--------------|
| Young's modulus | E | 200000 | [N/mm ²] | Safetyfactor | 1.15 | [-] |
| Poisson's ratio | μ | 0.30 | [-] | Yield stress | f _y | 400.00 [MPa] |
| Shear modulus | G | 76923 | [N/mm ²] | Compressive yield | f _{yc} | 400.00 [MPa] |
| Compression modulus | K | 166667 | [N/mm ²] | Tensile strength | f _t | 500.00 [MPa] |
| Nominal Weight | γ | 78.5 | [kN/m ³] | Compressive strength | f _c | 500.00 [MPa] |
| Mean density | ρ | 7850.0 | [kg/m ³] | Ultimate strain | | 50.00 [%] |
| Elongation coefficient | α | 1.20E-05 | [1/K] | relative bond coeff. | | 1.00 [-] |
| max. thickness | t-max | 32.00 | [mm] | EN 1992 bond coeff. | k ₁ | 0.80 [-] |
| | | | | Hardening modulus | E _h | 0.00 [MPa] |
| | | | | Proportional limit | f _p | 400.00 [MPa] |
| | | | | Dynamic allowance | σ-dyn | 152.17 [MPa] |

| Stress-Strain for serviceability | ε[%] | σ-m[MPa] | E-t[N/mm²] | |
|----------------------------------|--------------|----------|------------|------|
| Is also extended beyond the | 1000.000 | 500.00 | 0 | |
| defined stress range | 50.000 | 500.00 | 0 | |
| | 2.000 | 400.00 | 2083 | |
| | 0.000 | 0.00 | 200000 | |
| | -2.000 | -400.00 | 2083 | |
| | -50.000 | -500.00 | 0 | |
| | -1000.000 | -500.00 | 0 | |
| | Safetyfactor | | | 1.15 |

| Stress-Strain for ultimate load | ε[%] | σ-u[MPa] | E-t[N/mm²] |
|---------------------------------|----------------------|----------|------------|
| Is also extended beyond the | 1000.000 | 375.65 | 0 |
| defined stress range | 50.000 | 375.65 | 0 |
| | 1.739 | 347.83 | 577 |
| | 0.000 | 0.00 | 200000 |
| | -1.739 | -347.83 | 577 |
| | -50.000 | -375.65 | 0 |
| | -1000.000 | -375.65 | 0 |
| | Safetyfactor (1.15) | | |

| Stress-Strain of calc. mean values | ε[%] | σ-r [MPa] | E-t [N/mm²] |
|------------------------------------|----------------------|-----------|-------------|
| Is also extended beyond the | 1000.000 | 434.78 | 0 |
| defined stress range | 50.000 | 434.78 | 0 |
| | 1.739 | 347.83 | 1802 |
| | 0.000 | 0.00 | 200000 |
| | -1.739 | -347.83 | 1802 |
| | -50.000 | -434.78 | 0 |
| | -1000.000 | -434.78 | 0 |
| | Safetyfactor (1.15) | | |

Nadvoz Barjanska rekonstruiran v1
Materials



B 400 B (ČBR 400/500) OPORNIK

Mat 33 C 25/30 (MB 30) PILOTNA GREDA

| | | | | | | |
|------------------------|---|----------|----------------------|------------------------|---------------------|-------------|
| Young's modulus | E | 31476 | [N/mm ²] | Safetyfactor | 1.50 | [-] |
| Poisson's ratio | μ | 0.20 | [-] | Strength ¹ | f _c | 21.25 [MPa] |
| Shear modulus | G | 13115 | [N/mm ²] | Nominal strength | f _{ck} | 25.00 [MPa] |
| Compression modulus | K | 17487 | [N/mm ²] | Tensile strength | f _{ctm} | 2.56 [MPa] |
| Nominal Weight | γ | 25.0 | [kN/m ³] | Tensile strength | f _{ctk,05} | 1.80 [MPa] |
| Mean density | ρ | 2400.0 | [kg/m ³] | Tensile strength | f _{ctk,95} | 3.33 [MPa] |
| Elongation coefficient | α | 1.00E-05 | [1/K] | Bond strength | f _{bd} | 2.69 [MPa] |
| | | | | Service strength | f _{cm} | 33.00 [MPa] |
| | | | | Fatigue strength | f _{cd,fat} | 12.75 [MPa] |
| | | | | Tensile strength | f _{ctd} | 1.20 [MPa] |
| | | | | Tensile failure energy | G _f | 0.14 [N/mm] |

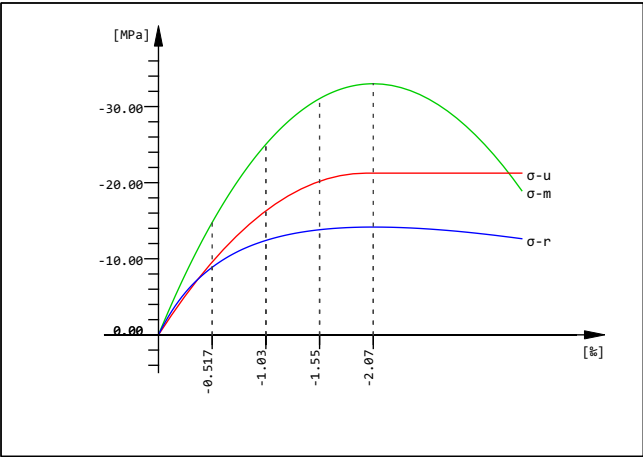
¹ f_c = f_{ck} * α-cc

| Stress-Strain for serviceability | ε[‰] | σ-m[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 33050 |
| | -0.517 | -14.77 | 24122 |
| | -1.035 | -25.04 | 15658 |
| | -1.552 | -31.04 | 7627 |
| | -2.069 | -33.00 | 0 |
| | -3.500 | -18.95 | -19203 |
| | Safetyfactor | | 1.50 |

| Stress-Strain for ultimate load | ε[‰] | σ-u[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 21250 |
| | -2.000 | -21.25 | 0 |
| | -3.500 | -21.25 | 0 |
| | Safetyfactor | | 1.50 |

| Stress-Strain of calc. mean values | ε[‰] | σ-r[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 27541 |
| | -0.517 | -8.87 | 10256 |
| | -1.035 | -12.41 | 4259 |
| | -1.552 | -13.81 | 1496 |
| | -2.069 | -14.17 | 0 |
| | -3.500 | -12.64 | -1802 |
| | Safetyfactor | | (1.50) |

Nadvoz Barjanska rekonstruiran v1
Materials



C 25/30 (MB 30) PILOTNA GREDA

Mat 34 B 400 B (ČBR 400/500) PILOTNA GRE

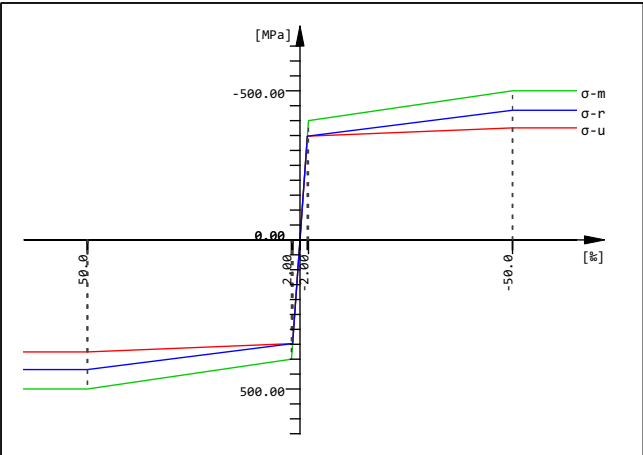
| | | | | | | |
|------------------------|-------|----------|----------------------|----------------------|-------|--------------|
| Young's modulus | E | 200000 | [N/mm ²] | Safetyfactor | 1.15 | [-] |
| Poisson's ratio | μ | 0.30 | [-] | Yield stress | fy | 400.00 [MPa] |
| Shear modulus | G | 76923 | [N/mm ²] | Compressive yield | fyc | 400.00 [MPa] |
| Compression modulus | K | 166667 | [N/mm ²] | Tensile strength | ft | 500.00 [MPa] |
| Nominal Weight | γ | 78.5 | [kN/m ³] | Compressive strength | fc | 500.00 [MPa] |
| Mean density | ρ | 7850.0 | [kg/m ³] | Ultimate strain | | 50.00 [%] |
| Elongation coefficient | α | 1.20E-05 | [1/K] | relative bond coeff. | | 1.00 [-] |
| max. thickness | t-max | 32.00 | [mm] | EN 1992 bond coeff. | k1 | 0.80 [-] |
| | | | | Hardening modulus | Eh | 0.00 [MPa] |
| | | | | Proportional limit | fp | 400.00 [MPa] |
| | | | | Dynamic allowance | σ-dyn | 152.17 [MPa] |

| Stress-Strain for serviceability | ε[%] | σ-m[MPa] | E-t[N/mm ²] | |
|----------------------------------|--------------|----------|-------------------------|------|
| Is also extended beyond the | 1000.000 | 500.00 | 0 | |
| defined stress range | 50.000 | 500.00 | 0 | |
| | 2.000 | 400.00 | 2083 | |
| | 0.000 | 0.00 | 200000 | |
| | -2.000 | -400.00 | 2083 | |
| | -50.000 | -500.00 | 0 | |
| | -1000.000 | -500.00 | 0 | |
| | Safetyfactor | | | 1.15 |

| Stress-Strain for ultimate load | ε[%] | σ-u[MPa] | E-t[N/mm²] |
|---------------------------------|----------------------|----------|------------|
| Is also extended beyond the | 1000.000 | 375.65 | 0 |
| defined stress range | 50.000 | 375.65 | 0 |
| | 1.739 | 347.83 | 577 |
| | 0.000 | 0.00 | 200000 |
| | -1.739 | -347.83 | 577 |
| | -50.000 | -375.65 | 0 |
| | -1000.000 | -375.65 | 0 |
| | Safetyfactor (1.15) | | |

| Stress-Strain of calc. mean values | ε[%] | σ-r [MPa] | E-t [N/mm²] |
|------------------------------------|----------------------|-----------|-------------|
| Is also extended beyond the | 1000.000 | 434.78 | 0 |
| defined stress range | 50.000 | 434.78 | 0 |
| | 1.739 | 347.83 | 1802 |
| | 0.000 | 0.00 | 200000 |
| | -1.739 | -347.83 | 1802 |
| | -50.000 | -434.78 | 0 |
| | -1000.000 | -434.78 | 0 |
| | Safetyfactor (1.15) | | |

Nadvoz Barjanska rekonstruiran v1
Materials



B 400 B (ČBR 400/500) PILOTNA GRE

Mat 35 C 25/30 (MB 30) PILOTI

| | | | | | | |
|------------------------|---|----------|----------------------|------------------------|---------------------|-------------|
| Young's modulus | E | 31476 | [N/mm ²] | Safetyfactor | 1.50 | [-] |
| Poisson's ratio | μ | 0.20 | [-] | Strength ¹ | f _c | 21.25 [MPa] |
| Shear modulus | G | 13115 | [N/mm ²] | Nominal strength | f _{ck} | 25.00 [MPa] |
| Compression modulus | K | 17487 | [N/mm ²] | Tensile strength | f _{ctm} | 2.56 [MPa] |
| Nominal Weight | γ | 25.0 | [kN/m ³] | Tensile strength | f _{ctk,05} | 1.80 [MPa] |
| Mean density | ρ | 2400.0 | [kg/m ³] | Tensile strength | f _{ctk,95} | 3.33 [MPa] |
| Elongation coefficient | α | 1.00E-05 | [1/K] | Bond strength | f _{bd} | 2.69 [MPa] |
| | | | | Service strength | f _{cm} | 33.00 [MPa] |
| | | | | Fatigue strength | f _{cd,fat} | 12.75 [MPa] |
| | | | | Tensile strength | f _{ctd} | 1.20 [MPa] |
| | | | | Tensile failure energy | G _f | 0.14 [N/mm] |

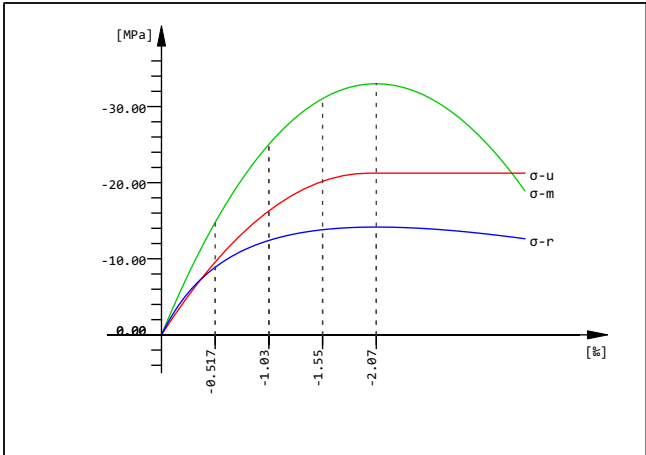
¹ f_c = f_{ck} * α-cc

| Stress-Strain for serviceability | ε[‰] | σ-m[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 33050 |
| | -0.517 | -14.77 | 24122 |
| | -1.035 | -25.04 | 15658 |
| | -1.552 | -31.04 | 7627 |
| | -2.069 | -33.00 | 0 |
| | -3.500 | -18.95 | -19203 |
| | Safetyfactor | | 1.50 |

| Stress-Strain for ultimate load | ε[‰] | σ-u[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 21250 |
| | -2.000 | -21.25 | 0 |
| | -3.500 | -21.25 | 0 |
| | Safetyfactor | | 1.50 |

| Stress-Strain of calc. mean values | ε[‰] | σ-r[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 27541 |
| | -0.517 | -8.87 | 10256 |
| | -1.035 | -12.41 | 4259 |
| | -1.552 | -13.81 | 1496 |
| | -2.069 | -14.17 | 0 |
| | -3.500 | -12.64 | -1802 |
| | Safetyfactor | | (1.50) |

Nadvoz Barjanska rekonstruiran v1
Materials



C 25/30 (MB 30) PILOTI

Mat 36 B 340 B (Č 340/500) PILOTI

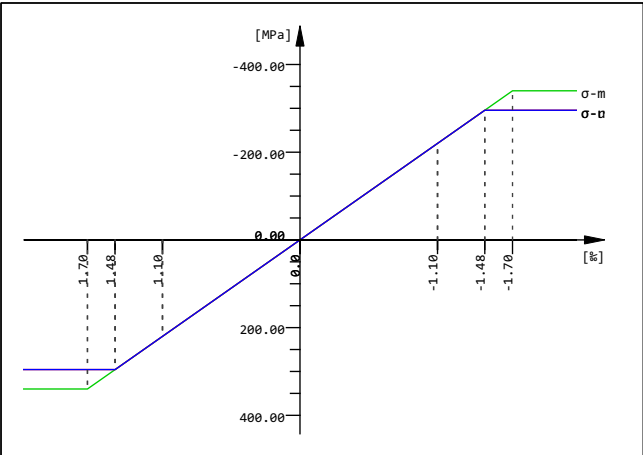
| | | | | | | |
|------------------------|-------|----------|----------------------|----------------------|-----------------|--------------|
| Young's modulus | E | 200000 | [N/mm ²] | Safetyfactor | 1.15 | [-] |
| Poisson's ratio | μ | 0.30 | [-] | Yield stress | f _y | 340.00 [MPa] |
| Shear modulus | G | 76923 | [N/mm ²] | Compressive yield | f _{yc} | 340.00 [MPa] |
| Compression modulus | K | 166667 | [N/mm ²] | Tensile strength | f _t | 500.00 [MPa] |
| Nominal Weight | γ | 78.5 | [kN/m ³] | Compressive strength | f _c | 500.00 [MPa] |
| Mean density | ρ | 7850.0 | [kg/m ³] | Ultimate strain | | 0.00 [%] |
| Elongation coefficient | α | 1.20E-05 | [1/K] | relative bond coeff. | | 1.00 [-] |
| max. thickness | t-max | 32.00 | [mm] | EN 1992 bond coeff. | k ₁ | 0.80 [-] |
| | | | | Hardening modulus | E _h | 0.00 [MPa] |
| | | | | Proportional limit | f _p | 340.00 [MPa] |
| | | | | Dynamic allowance | σ-dyn | 152.17 [MPa] |

| Stress-Strain for serviceability | ε[%] | σ-m[MPa] | E-t[N/mm²] | |
|----------------------------------|--------------|----------|------------|------|
| Is also extended beyond the | 1000.000 | 340.00 | 0 | |
| defined stress range | 1.700 | 340.00 | 0 | |
| | 1.100 | 220.00 | 200000 | |
| | 0.000 | 0.00 | 200000 | |
| | -1.100 | -220.00 | 200000 | |
| | -1.700 | -340.00 | 0 | |
| | -1000.000 | -340.00 | 0 | |
| | Safetyfactor | | | 1.15 |

| Stress-Strain for ultimate load | ε[%] | σ-u[MPa] | E-t[N/mm²] |
|---------------------------------|----------------------|----------|------------|
| Is also extended beyond the | 1000.000 | 295.65 | 0 |
| defined stress range | 1.478 | 295.65 | 0 |
| | 1.100 | 220.00 | 200000 |
| | 0.000 | 0.00 | 200000 |
| | -1.100 | -220.00 | 200000 |
| | -1.478 | -295.65 | 0 |
| | -1000.000 | -295.65 | 0 |
| | Safetyfactor (1.15) | | |

| Stress-Strain of calc. mean values | ε[%] | σ-r [MPa] | E-t [N/mm²] |
|------------------------------------|----------------------|-----------|-------------|
| Is also extended beyond the | 1000.000 | 295.65 | 0 |
| defined stress range | 1.478 | 295.65 | 0 |
| | 1.100 | 220.00 | 200000 |
| | 0.000 | 0.00 | 200000 |
| | -1.100 | -220.00 | 200000 |
| | -1.478 | -295.65 | 0 |
| | -1000.000 | -295.65 | 0 |
| | Safetyfactor (1.15) | | |

Nadvoz Barjanska rekonstruiran v1
Materials



B 340 B (Č 340/500) PILOTI

Mat 37 C 25/30 (MB 30) GLAVA STEBRA

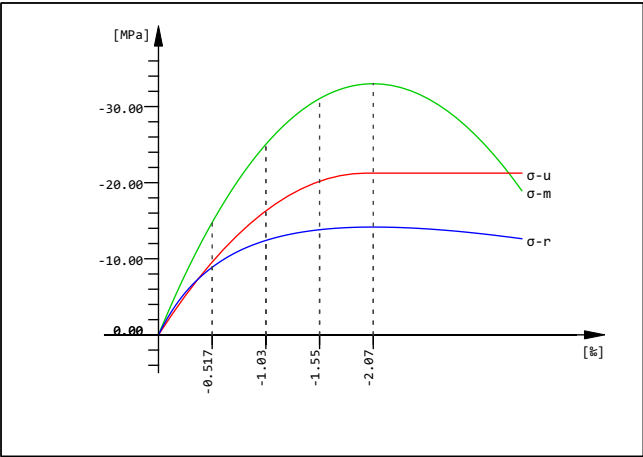
| | | | | | | |
|--|---|----------|----------------------|------------------------|---------------------|-------------|
| Young's modulus | E | 31476 | [N/mm ²] | Safetyfactor | 1.50 | [-] |
| Poisson's ratio | μ | 0.20 | [-] | Strength ¹ | f _c | 21.25 [MPa] |
| Shear modulus | G | 13115 | [N/mm ²] | Nominal strength | f _{ck} | 25.00 [MPa] |
| Compression modulus | K | 17487 | [N/mm ²] | Tensile strength | f _{ctm} | 2.56 [MPa] |
| Nominal Weight | γ | 25.0 | [kN/m ³] | Tensile strength | f _{ctk,05} | 1.80 [MPa] |
| Mean density | ρ | 2400.0 | [kg/m ³] | Tensile strength | f _{ctk,95} | 3.33 [MPa] |
| Elongation coefficient | α | 1.00E-05 | [1/K] | Bond strength | f _{bd} | 2.69 [MPa] |
| | | | | Service strength | f _{cm} | 33.00 [MPa] |
| | | | | Fatigue strength | f _{cd,fat} | 12.75 [MPa] |
| | | | | Tensile strength | f _{ctd} | 1.20 [MPa] |
| | | | | Tensile failure energy | G _f | 0.14 [N/mm] |
| ¹ f _c = f _{ck} * α-cc | | | | | | |

| Stress-Strain for serviceability | ε[‰] | σ-m[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 33050 |
| | -0.517 | -14.77 | 24122 |
| | -1.035 | -25.04 | 15658 |
| | -1.552 | -31.04 | 7627 |
| | -2.069 | -33.00 | 0 |
| | -3.500 | -18.95 | -19203 |
| | Safetyfactor | | 1.50 |

| Stress-Strain for ultimate load | ε[‰] | σ-u[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 21250 |
| | -2.000 | -21.25 | 0 |
| | -3.500 | -21.25 | 0 |
| | Safetyfactor | | 1.50 |

| Stress-Strain of calc. mean values | ε[‰] | σ-r[MPa] | E-t[N/mm ²] |
|---|--------------|----------|-------------------------|
| Is only valid within the defined stress range | 0.000 | 0.00 | 27541 |
| | -0.517 | -8.87 | 10256 |
| | -1.035 | -12.41 | 4259 |
| | -1.552 | -13.81 | 1496 |
| | -2.069 | -14.17 | 0 |
| | -3.500 | -12.64 | -1802 |
| | Safetyfactor | | (1.50) |

Nadvoz Barjanska rekonstruiran v1
Materials



C 25/30 (MB 30) GLAVA STEBRA

Mat 38 B 400 B (ČBR 400/500) GLAVA STEBR

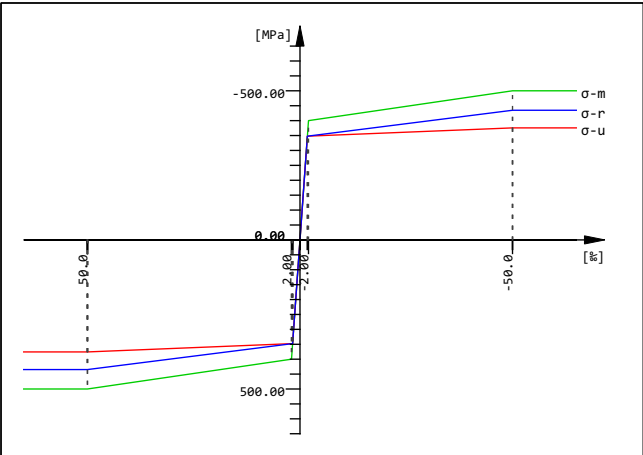
| | | | | | | |
|------------------------|-------|----------|----------------------|----------------------|-----------------|--------------|
| Young's modulus | E | 200000 | [N/mm ²] | Safetyfactor | 1.15 | [-] |
| Poisson's ratio | μ | 0.30 | [-] | Yield stress | f _y | 400.00 [MPa] |
| Shear modulus | G | 76923 | [N/mm ²] | Compressive yield | f _{yc} | 400.00 [MPa] |
| Compression modulus | K | 166667 | [N/mm ²] | Tensile strength | f _t | 500.00 [MPa] |
| Nominal Weight | γ | 78.5 | [kN/m ³] | Compressive strength | f _c | 500.00 [MPa] |
| Mean density | ρ | 7850.0 | [kg/m ³] | Ultimate strain | | 50.00 [%] |
| Elongation coefficient | α | 1.20E-05 | [1/K] | relative bond coeff. | | 1.00 [-] |
| max. thickness | t-max | 32.00 | [mm] | EN 1992 bond coeff. | k ₁ | 0.80 [-] |
| | | | | Hardening modulus | E _h | 0.00 [MPa] |
| | | | | Proportional limit | f _p | 400.00 [MPa] |
| | | | | Dynamic allowance | σ-dyn | 152.17 [MPa] |

| Stress-Strain for serviceability | ε[%] | σ-m[MPa] | E-t[N/mm²] |
|----------------------------------|--------------|----------|------------|
| Is also extended beyond the | 1000.000 | 500.00 | 0 |
| defined stress range | 50.000 | 500.00 | 0 |
| | 2.000 | 400.00 | 2083 |
| | 0.000 | 0.00 | 200000 |
| | -2.000 | -400.00 | 2083 |
| | -50.000 | -500.00 | 0 |
| | -1000.000 | -500.00 | 0 |
| | Safetyfactor | | 1.15 |

| Stress-Strain for ultimate load | ε[%] | σ-u[MPa] | E-t[N/mm²] |
|---------------------------------|----------------------|----------|------------|
| Is also extended beyond the | 1000.000 | 375.65 | 0 |
| defined stress range | 50.000 | 375.65 | 0 |
| | 1.739 | 347.83 | 577 |
| | 0.000 | 0.00 | 200000 |
| | -1.739 | -347.83 | 577 |
| | -50.000 | -375.65 | 0 |
| | -1000.000 | -375.65 | 0 |
| | Safetyfactor (1.15) | | |

| Stress-Strain of calc. mean values | ε[%] | σ-r [MPa] | E-t [N/mm²] |
|------------------------------------|----------------------|-----------|-------------|
| Is also extended beyond the | 1000.000 | 434.78 | 0 |
| defined stress range | 50.000 | 434.78 | 0 |
| | 1.739 | 347.83 | 1802 |
| | 0.000 | 0.00 | 200000 |
| | -1.739 | -347.83 | 1802 |
| | -50.000 | -434.78 | 0 |
| | -1000.000 | -434.78 | 0 |
| | Safetyfactor (1.15) | | |

Nadvoz Barjanska rekonstruiran v1
Materials



B 400 B (ČBR 400/500) GLAVA STEBR

Thermal material constants

| Mat | T [°C] | S [kJ/K/m³] | Kxx [W/K/m] | Kyy [W/K/m] | Kzz [W/K/m] | |
|--------|-----------------|---------------------------------------|-------------------|-------------|-------------|-----------------------------------|
| 1 | AUTO | 2.16E+03 | 1.951E+00 | | | C 30/37 (MB 35) STEBRI |
| 2 | AUTO | 3.45E+03 | 5.333E+01 | | | Č 340/500 STEBRI |
| 3 | AUTO | 2.16E+03 | 1.951E+00 | | | C 50/60 (meritve) NOSILCI |
| 4 | AUTO | 3.45E+03 | 5.333E+01 | | | GA340/500 NOSILCI |
| 5 | AUTO | 2.16E+03 | 1.951E+00 | | | C 50/60 (meritve) AB PLOSCA G=0 |
| 6 | AUTO | 2.16E+03 | 1.951E+00 | | | C 50/60 (meritve) AB PLOSCA V PRE |
| 7 | AUTO | 3.45E+03 | 5.333E+01 | | | GA340/500 AB PLOSCA |
| 8 | AUTO | 2.16E+03 | 1.951E+00 | | | C 30/37 AB PLO NOVA KONZOLA |
| 9 | AUTO | 3.45E+03 | 5.333E+01 | | | B 500 B (EN 1992) |
| 15 | AUTO | 2.16E+03 | 1.951E+00 | | | C 50/60 AB PLOSCA (G) |
| 21 | AUTO | 3.45E+03 | 5.333E+01 | | | Y 1667/1500 |
| 31 | AUTO | 2.16E+03 | 1.951E+00 | | | C 25/30 (MB 30) OPORNIK |
| 32 | AUTO | 3.45E+03 | 5.333E+01 | | | B 400 B (ČBR 400/500) OPORNIK |
| 33 | AUTO | 2.16E+03 | 1.951E+00 | | | C 25/30 (MB 30) PILOTNA GREDA |
| 34 | AUTO | 3.45E+03 | 5.333E+01 | | | B 400 B (ČBR 400/500) PILOTNA GRE |
| 35 | AUTO | 2.16E+03 | 1.951E+00 | | | C 25/30 (MB 30) PILOTI |
| 36 | AUTO | 3.45E+03 | 5.333E+01 | | | B 340 B (Č 340/500) PILOTI |
| 37 | AUTO | 2.16E+03 | 1.951E+00 | | | C 25/30 (MB 30) GLAVA STEBRA |
| 38 | AUTO | 3.45E+03 | 5.333E+01 | | | B 400 B (ČBR 400/500) GLAVA STEBR |
| Mat | material number | S [kJ/K/m³] | Heat capacity | | | |
| T [°C] | Temperature | Kxx [W/K/m], Kyy [W/K/m], Kzz [W/K/m] | Heat conductivity | | | |

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1.6.3 RAČUNSKI PREČNI PREREZI

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Nadvoz Barjanska rekonstruiran v1
Sections

Design Code

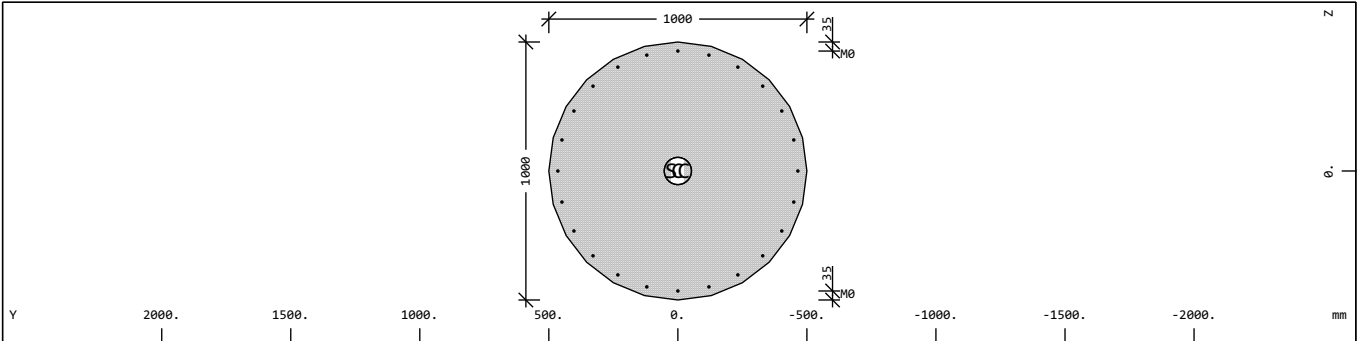
EuroNorm Bridges: EN 1992-2:2005 Design of concrete structures (Slovenija) V 2025
Structure: B (Road bridges)

Snow load zone : 1

Materials

| Mat | Classification |
|-----|----------------------------------|
| 1 | C 30/37 (MB 35) STEBRI |
| 2 | Č 340/500 STEBRI |
| 3 | C 50/60 (meritve) NOSILCI |
| 4 | GA340/500 NOSILCI |
| 5 | C 50/60 (meritve) AB PLOSCA G=0 |
| 6 | C 50/60 (meritve) AB PLOSCA V PR |
| 7 | GA340/500 AB PLOSCA |
| 8 | C 30/37 AB PLO NOVA KONZOLA |
| 9 | B 500 B (EN 1992) |
| 15 | C 50/60 AB PLOSCA (G) |
| 21 | Y 1667/1500 |
| 31 | C 25/30 (MB 30) OPORNIK |
| 32 | B 400 B (ČBR 400/500) OPORNIK |
| 33 | C 25/30 (MB 30) PILOTNA GREDA |
| 34 | B 400 B (ČBR 400/500) PILOTNA GR |
| 35 | C 25/30 (MB 30) PILOTI |
| 36 | B 340 B (Č 340/500) PILOTI |
| 37 | C 25/30 (MB 30) GLAVA STEBRA |
| 38 | B 400 B (ČBR 400/500) GLAVA STEB |

Cross section No. 7 - STEBER FI-100



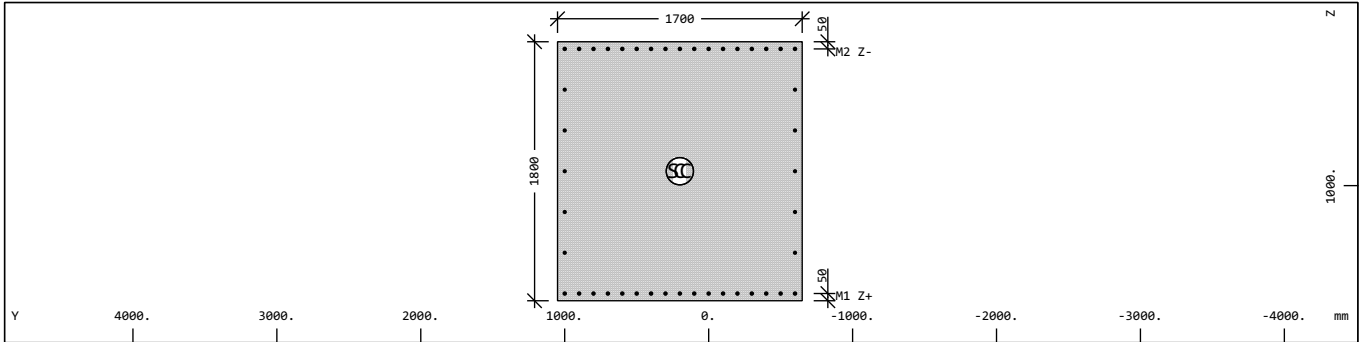
Cross section No. 7 - STEBER FI-100

Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--------|------------------------------|-----|--------------------------|------------------------------|------------------------------|------------------------------|------------|------------|----------------|-------------|---------------|---------------|
| M0 | 1 | 2 | 13.56 | 13.56 | | 28 | 0.0 | 0.0 | 2921.7 | | | |
| Layer | layer of reinforcement | | | D | | bar diameter | | | | | | |
| Mref | embedding reference material | | | yr,zr | | ordinate of elastic centroid | | | | | | |
| Mat | material number | | | L-tors | | torsional effective length | | | | | | |
| As | reinforcement area | | | N-p | | prestress normal force | | | | | | |
| As-min | minimum reinforcement area | | | My-p,Mz-p | | prestress bending moment | | | | | | |
| As-max | maximum reinforcement area | | | | | | | | | | | |

Nadvoz Barjanska rekonstruiran v1
Sections

Cross section No. 8 - OPORNIK 170/180

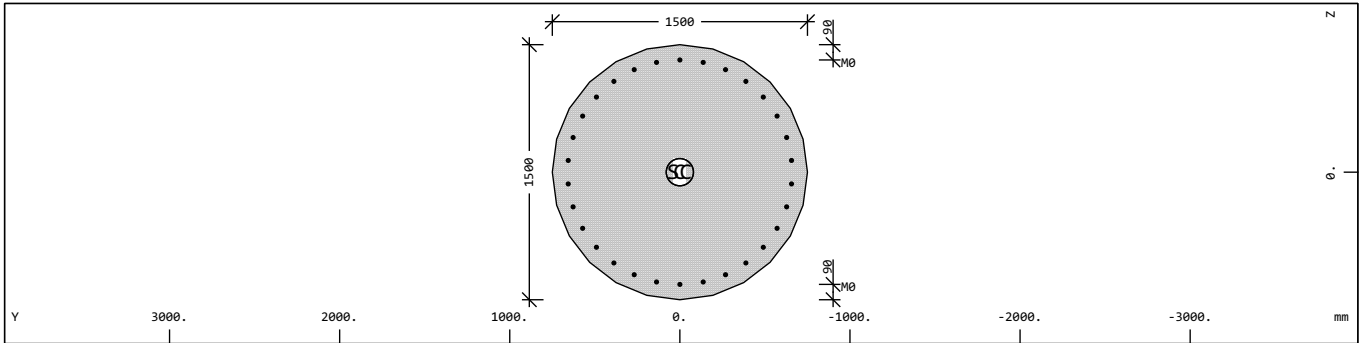


Cross section No. 8 - OPORNIK 170/180

Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--------|------------------------------|-----|--------------------------|------------------------------|------------------------------|------------------------------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | Z+ | 31 | 32 | 64.60 | 64.62 | | 22 | 200.0 | 1750.0 | 1600.0 | | |
| M2 | Z- | 31 | 32 | 64.60 | 64.60 | | 22 | 200.0 | 50.0 | 1600.0 | | |
| M3 | Y+- | 31 | 32 | 31.40 | 31.40 | 31.40 | 20 | 200.0 | 900.0 | 3400.0 | | |
| Layer | layer of reinforcement | | | | D | bar diameter | | | | | | |
| Mref | embedding reference material | | | | yr,zr | ordinate of elastic centroid | | | | | | |
| Mat | material number | | | | L-tors | torsional effective length | | | | | | |
| As | reinforcement area | | | | N-p | prestress normal force | | | | | | |
| As-min | minimum reinforcement area | | | | My-p,Mz-p | prestress bending moment | | | | | | |
| As-max | maximum reinforcement area | | | | | | | | | | | |

Cross section No. 9 - PILOT FI-150



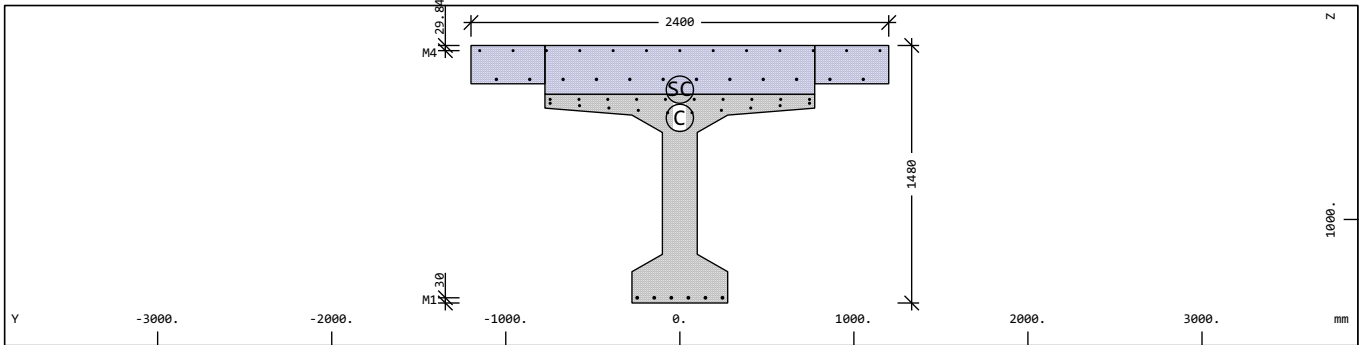
Cross section No. 9 - PILOT FI-150

Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--------|------------------------------|-----|--------------------------|------------------------------|------------------------------|------------------------------|------------|------------|----------------|-------------|---------------|---------------|
| M0 | 35 | 36 | 114.04 | 114.04 | | 22 | 0.0 | 0.0 | 4146.9 | | | |
| Layer | layer of reinforcement | | | D | | bar diameter | | | | | | |
| Mref | embedding reference material | | | yr,zr | | ordinate of elastic centroid | | | | | | |
| Mat | material number | | | L-tors | | torsional effective length | | | | | | |
| As | reinforcement area | | | N-p | | prestress normal force | | | | | | |
| As-min | minimum reinforcement area | | | My-p,Mz-p | | prestress bending moment | | | | | | |
| As-max | maximum reinforcement area | | | | | | | | | | | |

Nadvoz Barjanska rekonstruiran v1
Sections

Cross section No. 10 - PB NOSILEC S PLOSCO

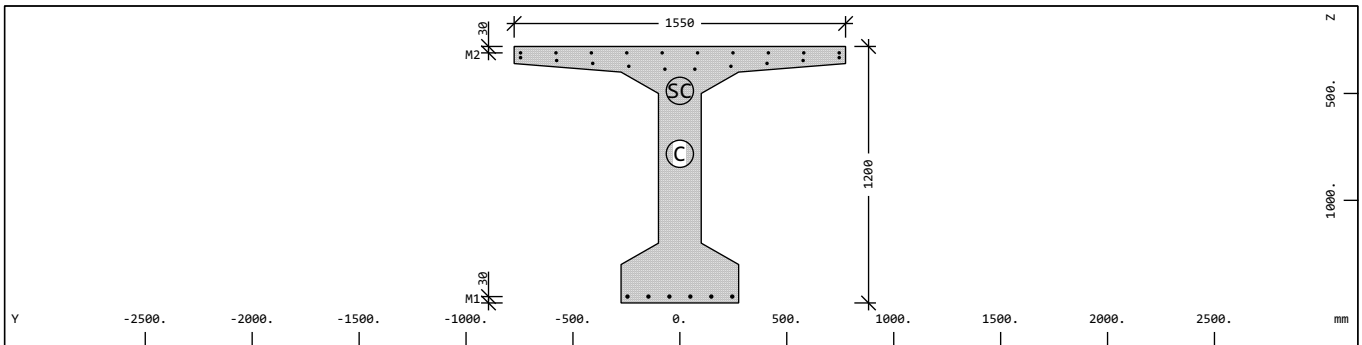


Cross section No. 10 - PB NOSILEC S PLOSCO

Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--------|------------------------------|-----|--------------------------|------------------------------|------------------------------|------------------------------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 3 | 4 | 9.24 | 9.24 | | 14 | 0.0 | 1450.0 | 0.9 | | | |
| M2 | 3 | 4 | 15.71 | 15.71 | | 10 | 0.0 | 334.7 | 0.8 | | | |
| M3 | 6 | 7 | 12.99 | 12.99 | | 12 | 0.0 | 194.9 | | | | |
| M4 | 6 | 7 | 9.04 | 9.04 | | 10 | 0.0 | 29.8 | | | | |
| Layer | layer of reinforcement | | | D | | bar diameter | | | | | | |
| Mref | embedding reference material | | | yr,zr | | ordinate of elastic centroid | | | | | | |
| Mat | material number | | | L-tors | | torsional effective length | | | | | | |
| As | reinforcement area | | | N-p | | prestress normal force | | | | | | |
| As-min | minimum reinforcement area | | | My-p,Mz-p | | prestress bending moment | | | | | | |
| As-max | maximum reinforcement area | | | | | | | | | | | |

Cross section No. 10.1 = CS 10 - NOSILCI



Cross section No. 10

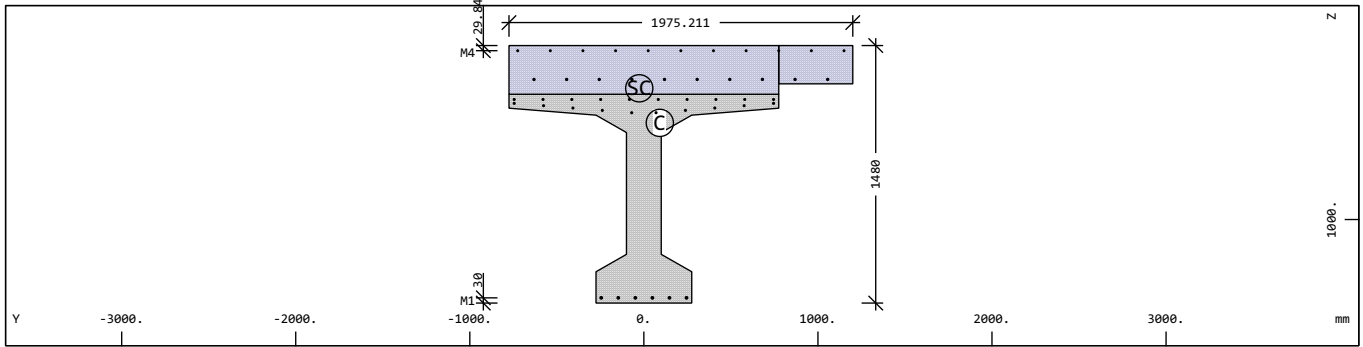
Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--------|------------------------------|-----|--------------------------|------------------------------|------------------------------|------------------------------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 3 | 4 | 9.24 | 9.24 | | 14 | 0.0 | 1450.0 | 0.9 | | | |
| M2 | 3 | 4 | 15.71 | 15.71 | | 10 | 0.0 | 334.7 | 0.8 | | | |
| M3 | 6 | 7 | 0.00 | 0.00 | | | 0.0 | 0.0 | | | | |
| M4 | 6 | 7 | 0.00 | 0.00 | | | 0.0 | 0.0 | | | | |
| Layer | layer of reinforcement | | | D | | bar diameter | | | | | | |
| Mref | embedding reference material | | | yr,zr | | ordinate of elastic centroid | | | | | | |
| Mat | material number | | | L-tors | | torsional effective length | | | | | | |
| As | reinforcement area | | | N-p | | prestress normal force | | | | | | |
| As-min | minimum reinforcement area | | | My-p,Mz-p | | prestress bending moment | | | | | | |
| As-max | maximum reinforcement area | | | | | | | | | | | |

Nadvoz Barjanska rekonstruiran v1
Sections

Cross section No. 10.2 = CS 20 - AB PLOSCA NAD NOSILCI

Cross section No. 11 - PB NOSILEC LEVI KRAJNI

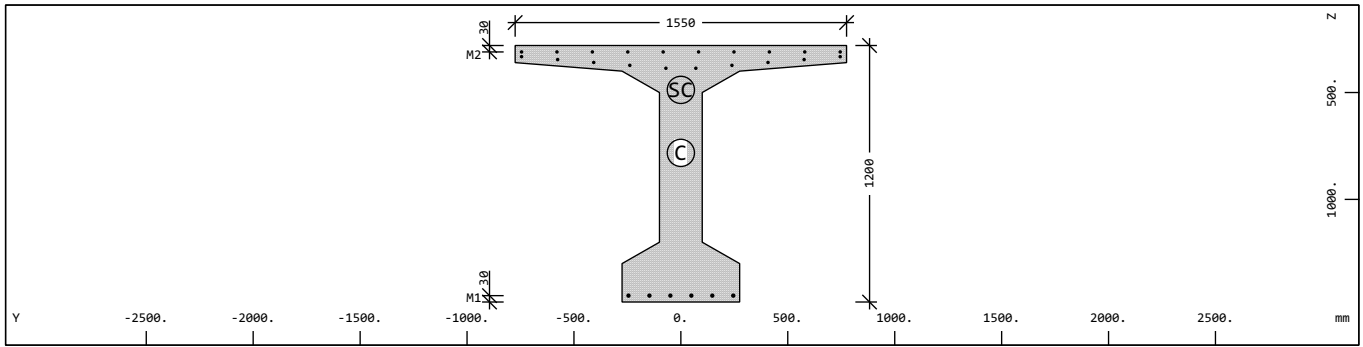


Cross section No. 11 - PB NOSILEC LEVI KRAJNI

Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--|------|-----|--------------------------|------------------------------|------------------------------|-----------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 3 | 4 | 9.24 | 9.24 | | 14 | 0.0 | 1450.0 | 0.9 | | | |
| M2 | 3 | 4 | 15.71 | 15.71 | | 10 | 0.0 | 334.7 | 0.8 | | | |
| M3 | 6 | 7 | 10.59 | 10.59 | | 12 | 212.4 | 194.9 | | | | |
| M4 | 6 | 7 | 7.37 | 7.37 | | 10 | 212.4 | 29.8 | | | | |
| Layer layer of reinforcement Mref embedding reference material Mat material number As reinforcement area As-min minimum reinforcement area As-max maximum reinforcement area D bar diameter yr,zr ordinate of elastic centroid L-tors torsional effective length N-p prestress normal force My-p,Mz-p prestress bending moment | | | | | | | | | | | | |

Cross section No. 11.1 = CS 10 - NOSILCI



Cross section No. 11

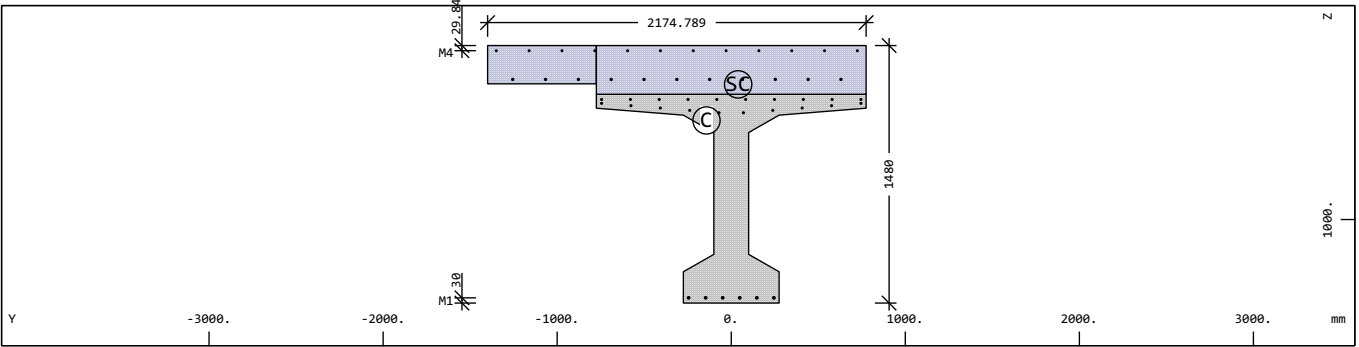
Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--|------|-----|--------------------------|------------------------------|------------------------------|-----------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 3 | 4 | 9.24 | 9.24 | | 14 | 0.0 | 1450.0 | 0.9 | | | |
| M2 | 3 | 4 | 15.71 | 15.71 | | 10 | 0.0 | 334.7 | 0.8 | | | |
| M3 | 6 | 7 | 0.00 | 0.00 | | | 0.0 | 0.0 | | | | |
| M4 | 6 | 7 | 0.00 | 0.00 | | | 0.0 | 0.0 | | | | |
| Layer layer of reinforcement Mref embedding reference material Mat material number As reinforcement area As-min minimum reinforcement area As-max maximum reinforcement area D bar diameter yr,zr ordinate of elastic centroid L-tors torsional effective length N-p prestress normal force My-p,Mz-p prestress bending moment | | | | | | | | | | | | |

Nadvoz Barjanska rekonstruiran v1
Sections

Cross section No. 11.2 = CS 20 - AB PLOSCA NAD NOSILCI

Cross section No. 12 - PB NOSILEC DESNI KRAJNI

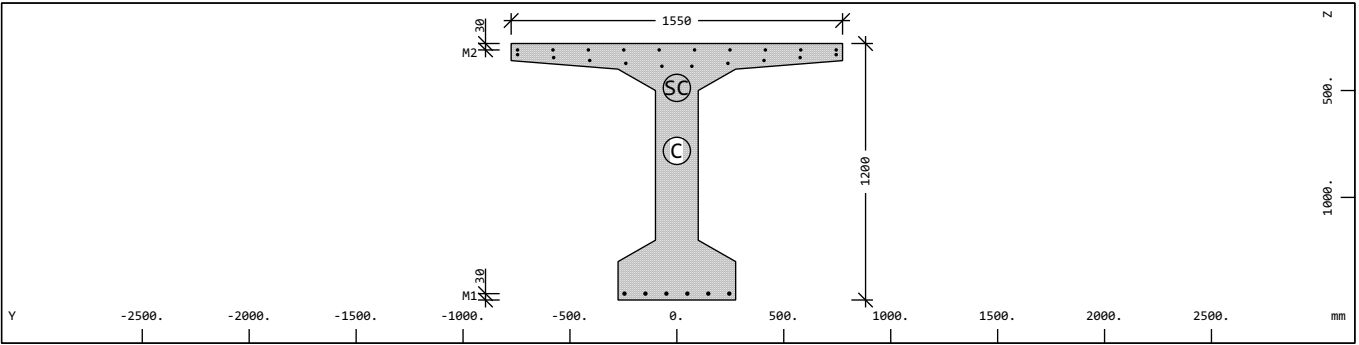


Cross section No. 12 - PB NOSILEC DESNI KRAJNI

Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--|------|-----|--------------------------|------------------------------|------------------------------|-----------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 3 | 4 | 9.24 | 9.24 | | 14 | 0.0 | 1450.0 | 0.9 | | | |
| M2 | 3 | 4 | 15.71 | 15.71 | | 10 | 0.0 | 334.7 | 0.8 | | | |
| M3 | 6 | 7 | 11.72 | 11.72 | | 12 | -312.6 | 194.9 | | | | |
| M4 | 6 | 7 | 8.15 | 8.15 | | 10 | -312.6 | 29.8 | | | | |
| Layer layer of reinforcement Mref embedding reference material Mat material number As reinforcement area As-min minimum reinforcement area As-max maximum reinforcement area D bar diameter yr,zr ordinate of elastic centroid L-tors torsional effective length N-p prestress normal force My-p,Mz-p prestress bending moment | | | | | | | | | | | | |

Cross section No. 12.1 = CS 10 - NOSILCI



Cross section No. 12

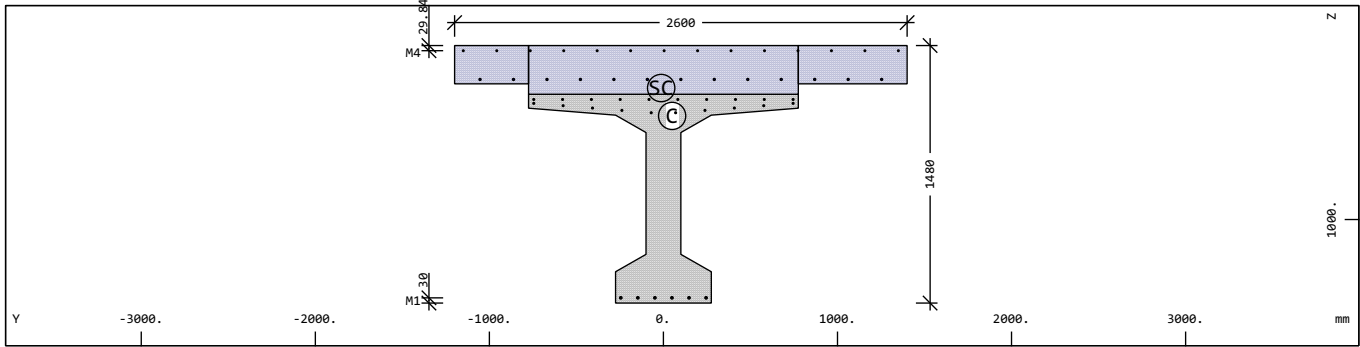
Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--|------|-----|--------------------------|------------------------------|------------------------------|-----------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 3 | 4 | 9.24 | 9.24 | | 14 | 0.0 | 1450.0 | 0.9 | | | |
| M2 | 3 | 4 | 15.71 | 15.71 | | 10 | 0.0 | 334.7 | 0.8 | | | |
| M3 | 6 | 7 | 0.00 | 0.00 | | | 0.0 | 0.0 | | | | |
| M4 | 6 | 7 | 0.00 | 0.00 | | | 0.0 | 0.0 | | | | |
| Layer layer of reinforcement Mref embedding reference material Mat material number As reinforcement area As-min minimum reinforcement area As-max maximum reinforcement area D bar diameter yr,zr ordinate of elastic centroid L-tors torsional effective length N-p prestress normal force My-p,Mz-p prestress bending moment | | | | | | | | | | | | |

Nadvoz Barjanska rekonstruiran v1
Sections

Cross section No. 12.2 = CS 20 - AB PLOSCA NAD NOSILCI

Cross section No. 14 - PB NOSILEC DRUGI Z DESNE

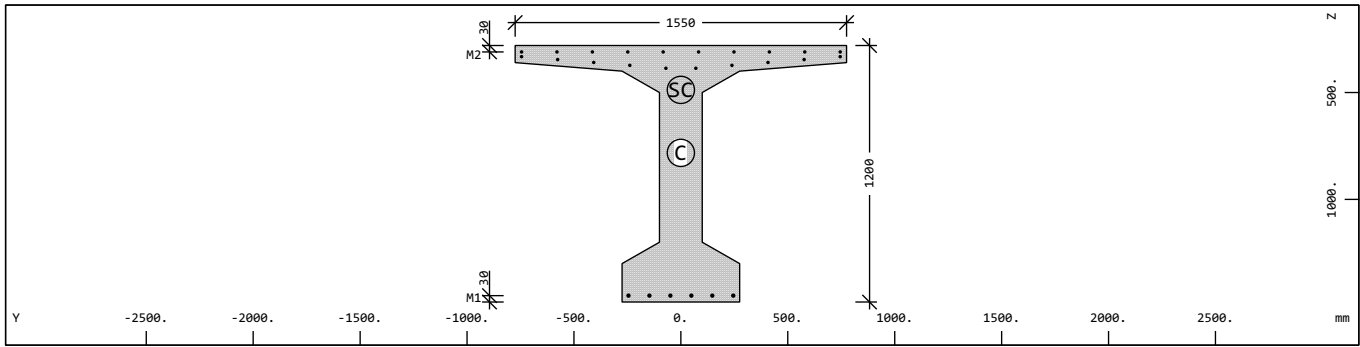


Cross section No. 14 - PB NOSILEC DRUGI Z DESNE

Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--|------|-----|--------------------------|------------------------------|------------------------------|-----------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 3 | 4 | 9.24 | 9.24 | | 14 | 0.0 | 1450.0 | 0.9 | | | |
| M2 | 3 | 4 | 15.71 | 15.71 | | 10 | 0.0 | 334.7 | 0.8 | | | |
| M3 | 6 | 7 | 14.12 | 14.12 | | 12 | 100.0 | 194.9 | | | | |
| M4 | 6 | 7 | 9.82 | 9.82 | | 10 | 100.0 | 29.8 | | | | |
| Layer layer of reinforcement Mref embedding reference material Mat material number As reinforcement area As-min minimum reinforcement area As-max maximum reinforcement area D bar diameter yr,zr ordinate of elastic centroid L-tors torsional effective length N-p prestress normal force My-p,Mz-p prestress bending moment | | | | | | | | | | | | |

Cross section No. 14.1 = CS 10 - NOSILCI



Cross section No. 14

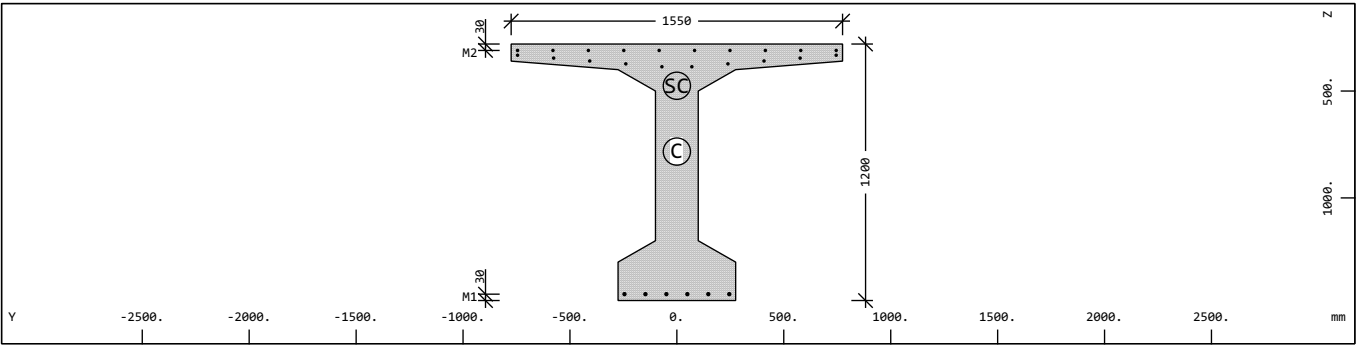
Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--|------|-----|--------------------------|------------------------------|------------------------------|-----------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 3 | 4 | 9.24 | 9.24 | | 14 | 0.0 | 1450.0 | 0.9 | | | |
| M2 | 3 | 4 | 15.71 | 15.71 | | 10 | 0.0 | 334.7 | 0.8 | | | |
| M3 | 6 | 7 | 0.00 | 0.00 | | | 0.0 | 0.0 | | | | |
| M4 | 6 | 7 | 0.00 | 0.00 | | | 0.0 | 0.0 | | | | |
| Layer layer of reinforcement Mref embedding reference material Mat material number As reinforcement area As-min minimum reinforcement area As-max maximum reinforcement area D bar diameter yr,zr ordinate of elastic centroid L-tors torsional effective length N-p prestress normal force My-p,Mz-p prestress bending moment | | | | | | | | | | | | |

Nadvoz Barjanska rekonstruiran v1
Sections

Cross section No. 14.2 = CS 20 - AB PLOSCA NAD NOSILCI

Cross section No. 15 - PB NOSILEC BREZ PLOSCE



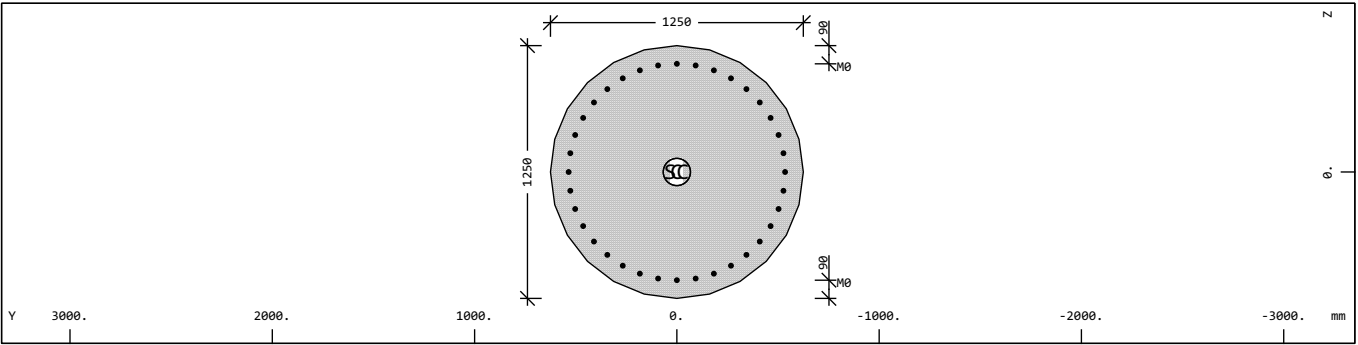
Cross section No. 15 - PB NOSILEC BREZ PLOSCE

Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--|------|-----|--------------------------|------------------------------|------------------------------|-----------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 3 | 4 | 9.24 | 9.24 | | 14 | 0.0 | 1450.0 | 0.9 | | | |
| M2 | 3 | 4 | 15.71 | 15.71 | | 10 | 0.0 | 334.7 | 0.8 | | | |
| M3 | 0 | 7 | 0.00 | 0.00 | | | 0.0 | 0.0 | | | | |
| M4 | 0 | 7 | 0.00 | 0.00 | | | 0.0 | 0.0 | | | | |
| Layer layer of reinforcement Mref embedding reference material Mat material number As reinforcement area As-min minimum reinforcement area As-max maximum reinforcement area D bar diameter yr,zr ordinate of elastic centroid L-tors torsional effective length N-p prestress normal force My-p,Mz-p prestress bending moment | | | | | | | | | | | | |

Cross section No. 15.1 = CS 10 - NOSILCI

Cross section No. 19 - PILOT FI-125



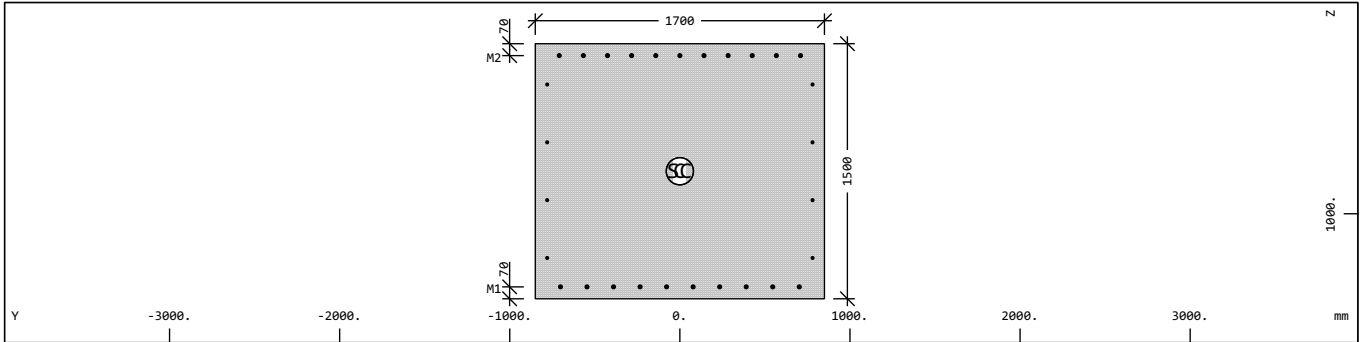
Cross section No. 19 - PILOT FI-125

Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--|------|-----|--------------------------|------------------------------|------------------------------|-----------|------------|------------|----------------|-------------|---------------|---------------|
| M0 | 35 | 36 | 136.85 | 136.85 | | 22 | 0.0 | 0.0 | 3361.5 | | | |
| Layer layer of reinforcement Mref embedding reference material Mat material number As reinforcement area As-min minimum reinforcement area As-max maximum reinforcement area D bar diameter yr,zr ordinate of elastic centroid L-tors torsional effective length N-p prestress normal force My-p,Mz-p prestress bending moment | | | | | | | | | | | | |

Nadvoz Barjanska rekonstruiran v1
Sections

Cross section No. 51 - PILOTNA GREDA 2 3 5 7 8 170/150

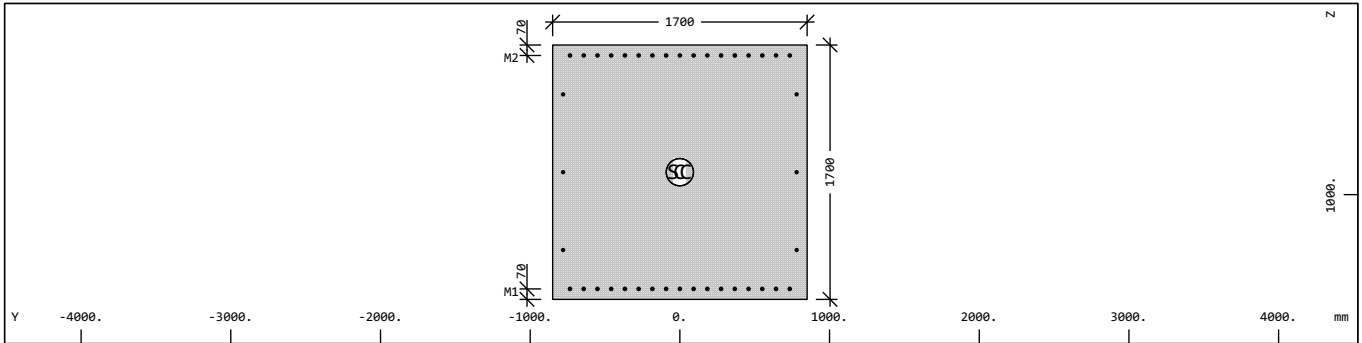


Cross section No. 51 - PILOTNA GREDA 2 3 5 7 8 170/150

Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--------|------------------------------|-----|--------------------------|------------------------------|------------------------------|-----------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 33 | 34 | 38.01 | 38.01 | | 22 | 0.0 | 1430.0 | 2221.3 | | | |
| M2 | 33 | 34 | 41.81 | 41.81 | | 22 | 0.0 | 70.0 | 2443.4 | | | |
| M3 | 33 | 34 | 16.08 | 16.08 | | 16 | 0.0 | 750.0 | 939.9 | | | |
| Layer | layer of reinforcement | | D | bar diameter | | | | | | | | |
| Mref | embedding reference material | | yr,zr | ordinate of elastic centroid | | | | | | | | |
| Mat | material number | | L-tors | torsional effective length | | | | | | | | |
| As | reinforcement area | | N-p | prestress normal force | | | | | | | | |
| As-min | minimum reinforcement area | | My-p,Mz-p | prestress bending moment | | | | | | | | |
| As-max | maximum reinforcement area | | | | | | | | | | | |

Cross section No. 53 - PILOTNA GREDA 1 9 170/170



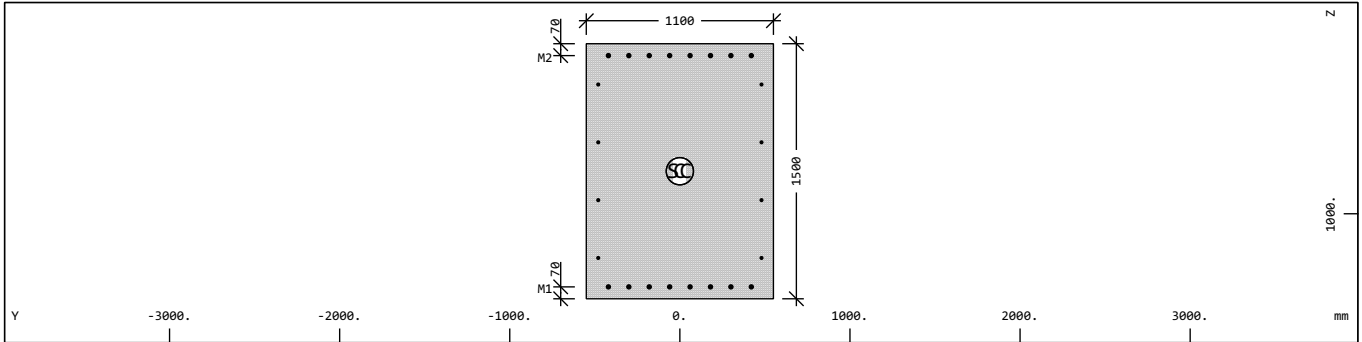
Cross section No. 53 - PILOTNA GREDA 1 9 170/170

Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--------|------------------------------|-----|--------------------------|------------------------------|------------------------------|-----------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 33 | 34 | 64.62 | 64.62 | | 22 | 0.0 | 1630.0 | 2649.8 | | | |
| M2 | 33 | 34 | 64.62 | 64.62 | | 22 | 0.0 | 70.0 | 2649.8 | | | |
| M3 | 33 | 34 | 18.85 | 18.85 | | 20 | 0.0 | 850.0 | 772.9 | | | |
| Layer | layer of reinforcement | | D | bar diameter | | | | | | | | |
| Mref | embedding reference material | | yr,zr | ordinate of elastic centroid | | | | | | | | |
| Mat | material number | | L-tors | torsional effective length | | | | | | | | |
| As | reinforcement area | | N-p | prestress normal force | | | | | | | | |
| As-min | minimum reinforcement area | | My-p,Mz-p | prestress bending moment | | | | | | | | |
| As-max | maximum reinforcement area | | | | | | | | | | | |

Nadvoz Barjanska rekonstruiran v1
Sections

Cross section No. 55 - PILOTNA GREDA 4 6 110/150 PRE

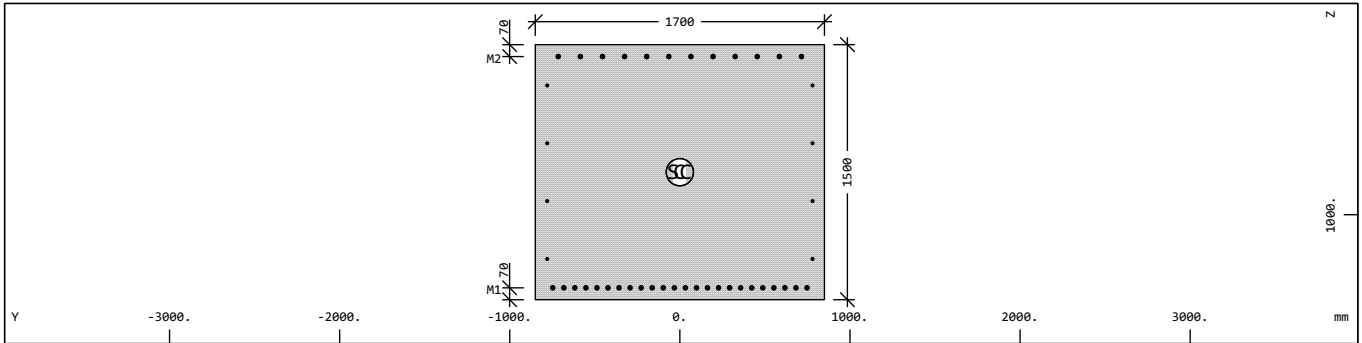


Cross section No. 55 - PILOTNA GREDA 4 6 110/150 PRE

Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--------|------------------------------|-----|--------------------------|------------------------------|------------------------------|------------------------------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 33 | 34 | 36.25 | 36.25 | | 25 | 0.0 | 1430.0 | 1817.4 | | | |
| M2 | 33 | 34 | 36.25 | 36.25 | | 25 | 0.0 | 70.0 | 1817.4 | | | |
| M3 | 33 | 34 | 16.08 | 16.08 | | 16 | 0.0 | 750.0 | 806.4 | | | |
| Layer | layer of reinforcement | | | D | | bar diameter | | | | | | |
| Mref | embedding reference material | | | yr,zr | | ordinate of elastic centroid | | | | | | |
| Mat | material number | | | L-tors | | torsional effective length | | | | | | |
| As | reinforcement area | | | N-p | | prestress normal force | | | | | | |
| As-min | minimum reinforcement area | | | My-p,Mz-p | | prestress bending moment | | | | | | |
| As-max | maximum reinforcement area | | | | | | | | | | | |

Cross section No. 56 - PILOTNA GREDA 4 6 170/150 VZD



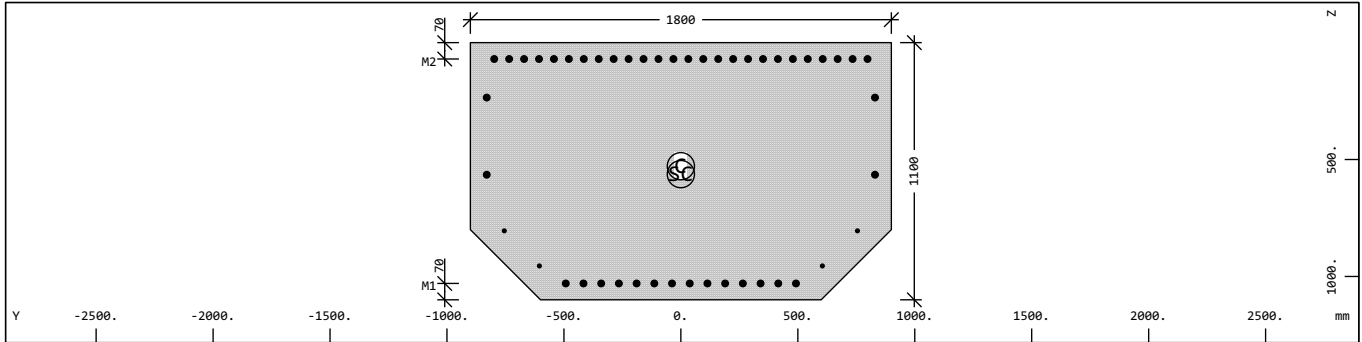
Cross section No. 56 - PILOTNA GREDA 4 6 170/150 VZD

Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--------|------------------------------|-----|--------------------------|------------------------------|------------------------------|------------------------------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 33 | 34 | 117.81 | 117.81 | | 25 | 0.0 | 1430.0 | 3467.8 | | | |
| M2 | 33 | 34 | 58.90 | 58.90 | | 25 | 0.0 | 70.0 | 1733.9 | | | |
| M3 | 33 | 34 | 8.04 | 8.04 | | 16 | -780.0 | 750.0 | 236.7 | | | |
| M4 | 33 | 34 | 8.04 | 8.04 | | 16 | 780.0 | 750.0 | 236.7 | | | |
| Layer | layer of reinforcement | | | D | | bar diameter | | | | | | |
| Mref | embedding reference material | | | yr,zr | | ordinate of elastic centroid | | | | | | |
| Mat | material number | | | L-tors | | torsional effective length | | | | | | |
| As | reinforcement area | | | N-p | | prestress normal force | | | | | | |
| As-min | minimum reinforcement area | | | My-p,Mz-p | | prestress bending moment | | | | | | |
| As-max | maximum reinforcement area | | | | | | | | | | | |

Nadvoz Barjanska rekonstruiran v1
Sections

Cross section No. 61 - GLAVA STEBRA



Cross section No. 61 - GLAVA STEBRA

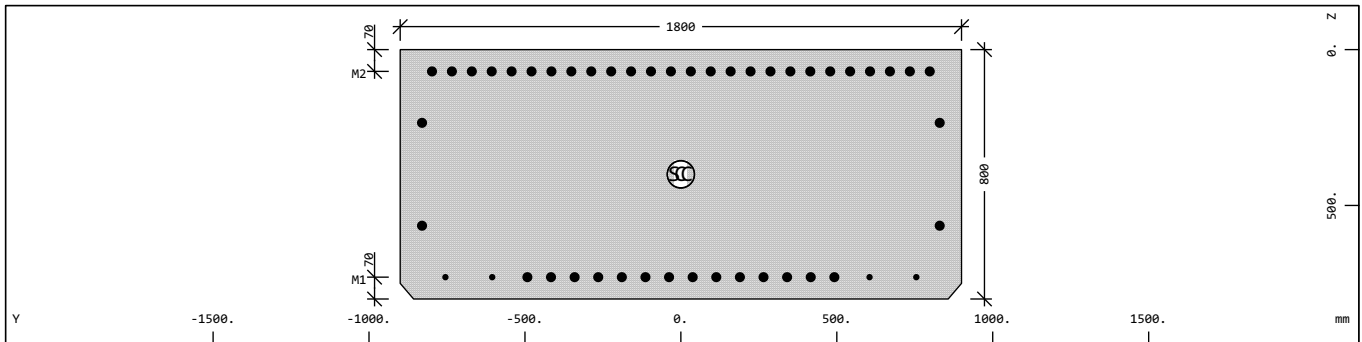
Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|-------|------|-----|--------------------------|------------------------------|------------------------------|-----------------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 37 | 38 | 94.25 | 94.25 | 94.25 | 28 ¹ | 0.0 | 1017.2 | 1613.1 | | | |
| M2 | 37 | 38 | 160.10 | 160.10 | | 28 | 0.0 | 70.0 | 2740.1 | | | |
| M3 | 37 | 38 | 24.63 | 24.63 | | 28 | 0.0 | 400.0 | 421.6 | | | |
| M4 | 0 | 38 | 0.00 | 0.00 | | | 0.0 | 0.0 | | | | |

¹ Maximum of defined diameters

| | | | |
|--------|------------------------------|-----------|------------------------------|
| Layer | layer of reinforcement | D | bar diameter |
| Mref | embedding reference material | yr,zr | ordinate of elastic centroid |
| Mat | material number | L-tors | torsional effective length |
| As | reinforcement area | N-p | prestress normal force |
| As-min | minimum reinforcement area | My-p,Mz-p | prestress bending moment |
| As-max | maximum reinforcement area | | |

Cross section No. 62 - GLAVA STEBRA >



Cross section No. 62 - GLAVA STEBRA >

Reinforcement global values

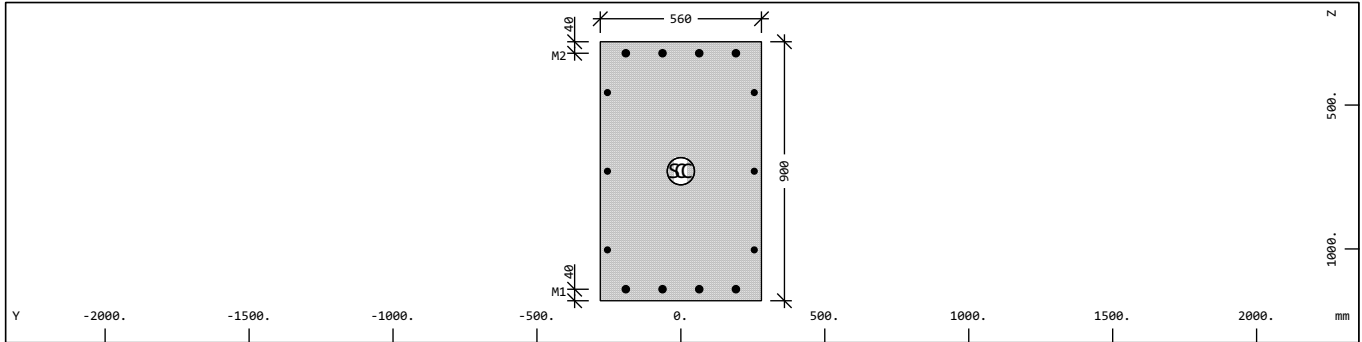
| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|-------|------|-----|--------------------------|------------------------------|------------------------------|-----------------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 37 | 38 | 94.25 | 94.25 | | 28 ¹ | 0.0 | 730.0 | 1508.4 | | | |
| M2 | 37 | 38 | 160.10 | 160.10 | | 28 | 0.0 | 70.0 | 2562.2 | | | |
| M3 | 37 | 38 | 24.63 | 24.63 | | 28 | 0.0 | 400.0 | 394.2 | | | |
| M4 | 0 | 38 | 0.00 | 0.00 | | | 0.0 | 0.0 | | | | |

¹ Maximum of defined diameters

| | | | |
|--------|------------------------------|-----------|------------------------------|
| Layer | layer of reinforcement | D | bar diameter |
| Mref | embedding reference material | yr,zr | ordinate of elastic centroid |
| Mat | material number | L-tors | torsional effective length |
| As | reinforcement area | N-p | prestress normal force |
| As-min | minimum reinforcement area | My-p,Mz-p | prestress bending moment |
| As-max | maximum reinforcement area | | |

Nadvoz Barjanska rekonstruiran v1
Sections

Cross section No. 71 - PRECNIK VMESNI

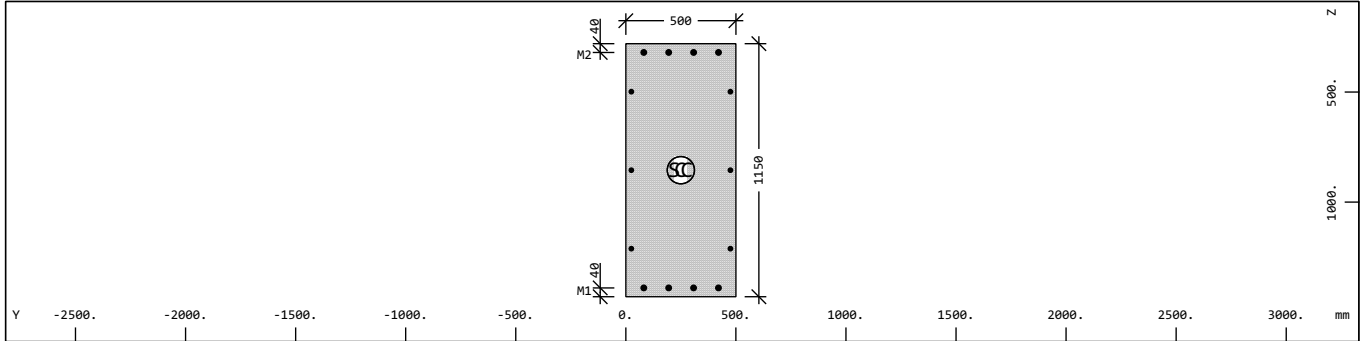


Cross section No. 71 - PRECNIK VMESNI

Reinforcement global values

| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--------|------------------------------|-----|--------------------------|------------------------------|------------------------------|-----------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 3 | 4 | 19.63 | 19.63 | | 25 | 0.0 | 1140.0 | 831.6 | | | |
| M2 | 3 | 4 | 19.63 | 19.63 | 19.63 | 25 | 0.0 | 320.0 | 831.6 | | | |
| M3 | 3 | 4 | 18.85 | 18.85 | | 20 | 0.0 | 730.0 | 798.3 | | | |
| Layer | layer of reinforcement | | D | bar diameter | | | | | | | | |
| Mref | embedding reference material | | yr,zr | ordinate of elastic centroid | | | | | | | | |
| Mat | material number | | L-tors | torsional effective length | | | | | | | | |
| As | reinforcement area | | N-p | prestress normal force | | | | | | | | |
| As-min | minimum reinforcement area | | My-p,Mz-p | prestress bending moment | | | | | | | | |
| As-max | maximum reinforcement area | | | | | | | | | | | |

Cross section No. 72 - PRECNIK OPORNIK

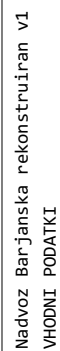


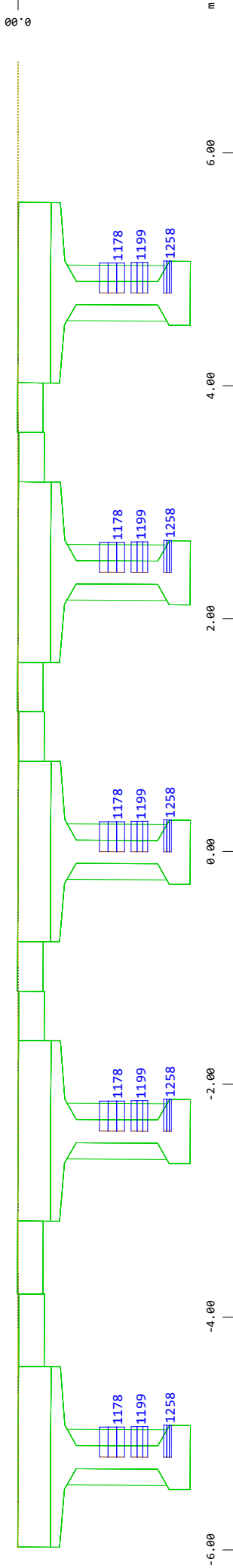
Cross section No. 72 - PRECNIK OPORNIK

Reinforcement global values

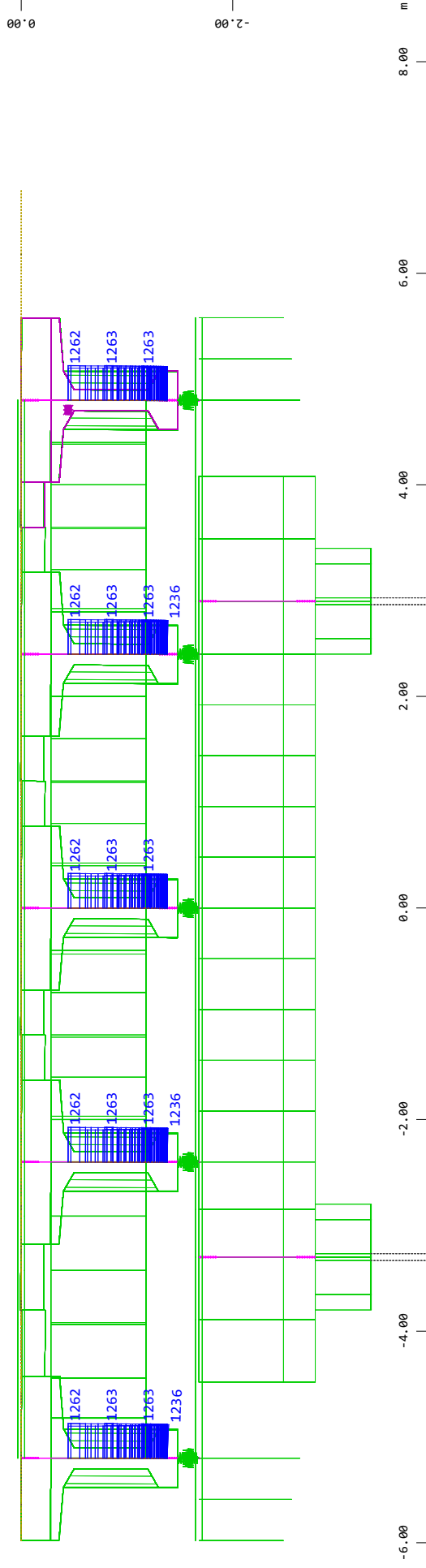
| Layer | Mref | Mat | As [cm ²] | As-min [cm ²] | As-max [cm ²] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|--------|------------------------------|-----|--------------------------|------------------------------|------------------------------|-----------|------------|------------|----------------|-------------|---------------|---------------|
| M1 | 3 | 4 | 19.63 | 19.63 | | 25 | 251.2 | 1390.0 | 963.6 | | | |
| M2 | 3 | 4 | 19.63 | 19.63 | | 25 | 251.3 | 320.0 | 963.6 | | | |
| M3 | 3 | 4 | 18.85 | 18.85 | | 20 | 250.0 | 855.0 | 925.1 | | | |
| Layer | layer of reinforcement | | D | bar diameter | | | | | | | | |
| Mref | embedding reference material | | yr,zr | ordinate of elastic centroid | | | | | | | | |
| Mat | material number | | L-tors | torsional effective length | | | | | | | | |
| As | reinforcement area | | N-p | prestress normal force | | | | | | | | |
| As-min | minimum reinforcement area | | My-p,Mz-p | prestress bending moment | | | | | | | | |
| As-max | maximum reinforcement area | | | | | | | | | | | |

1.6.4 RAČUNSKI KABLI ZA PREDNAPENJANJE

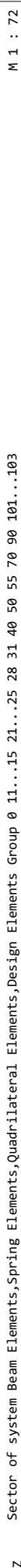


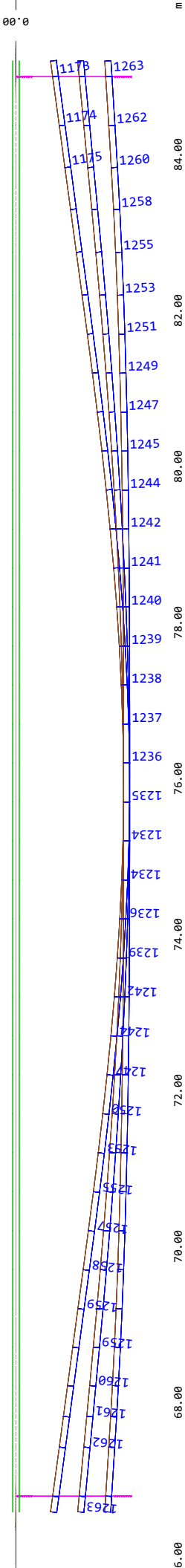


Z
X-Y
Sector of system Beam Elements, Spring Elements, Quadrilateral Elements, Design Elements Group 0 11...15 21...25 28 31 40 50 55 70 90 101...103
Cross sections
Beam Tendons , Prestress force, 1 cm 3D = 2242.2 kN (Max=1258)
M 1 : 49



Z
X-Y
Sector of system Beam Elements, Spring Elements, Quadrilateral Elements, Design Elements Group 0 11...15 21...25 28 31 40 50 55 70 90 101...103
Cross sections
Beam Tendons , Prestress force, 1 cm 3D = 2242.2 kN (Max=1263)
M 1 : 58





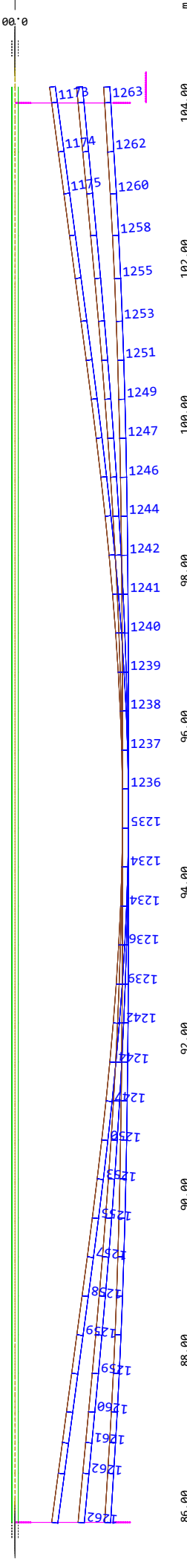
M 1 : 72

Z

↓ X

Sector of system Beam Elements, Spring Elements, Quadrilateral Elements, Design Elements Group 0 11...15 21...25 28 31 40 50 55 70 90 101...103

Beam Tendons , Prestress force, 1 cm 3D = 11430 kN (Max=1263)



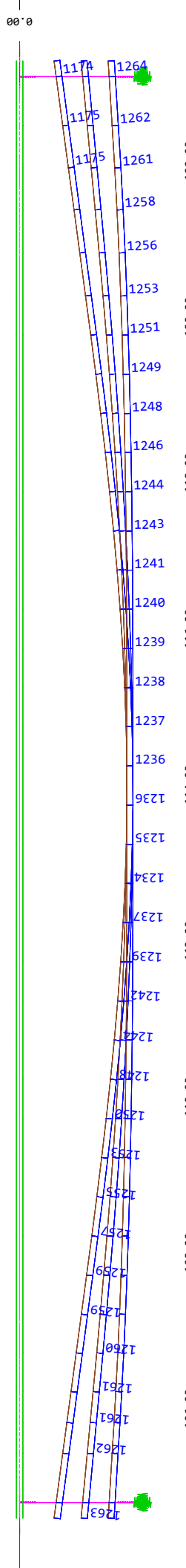
M 1 : 72

Z

↓ X

Sector of system Group 11...15 21...25 28 31 40 50 55 70 90

Beam Tendons , Prestress force, 1 cm 3D = 11430 kN (Max=1263)



M 1 : 72

Z

↓ X

Sector of system Group 11...15 21...25 28 31 40 50 55 70 90

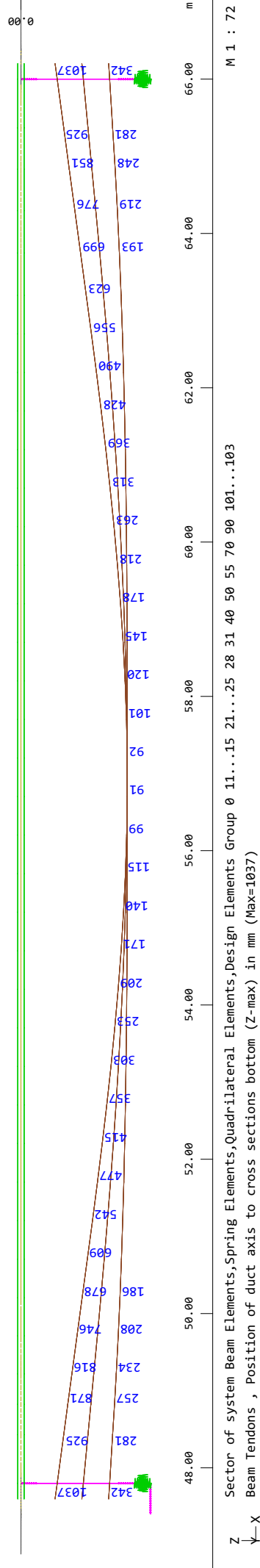
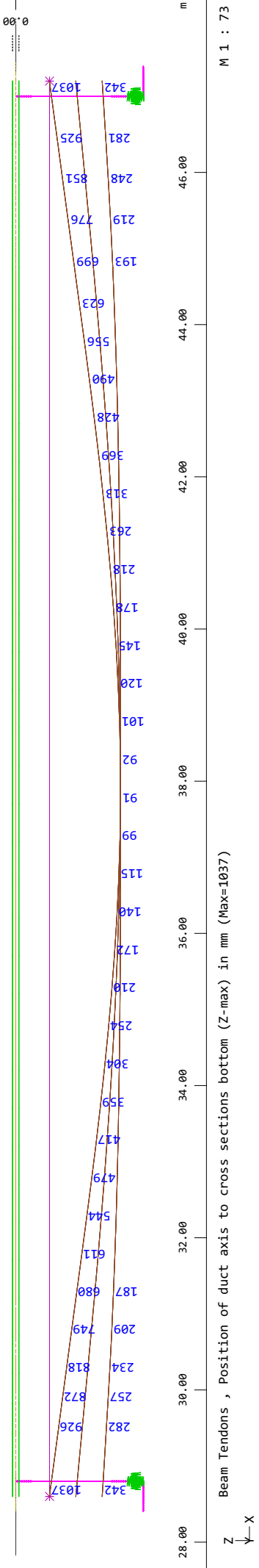
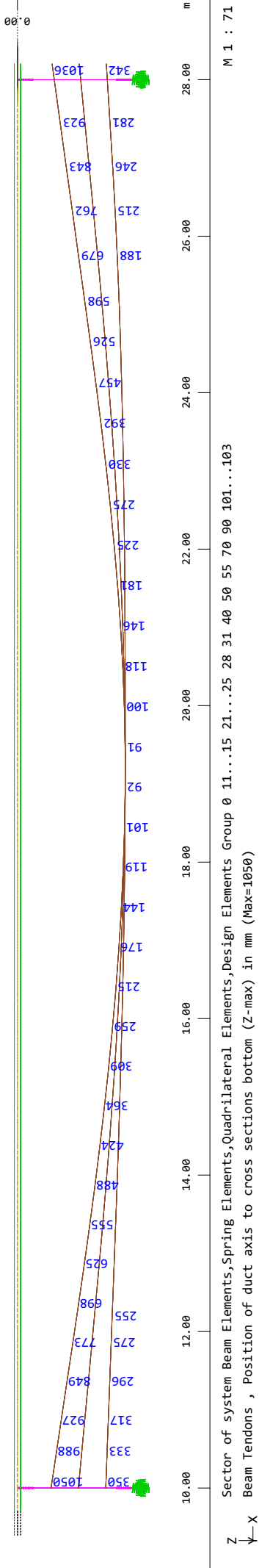
Beam Tendons , Prestress force, 1 cm 3D = 11430 kN (Max=1264)

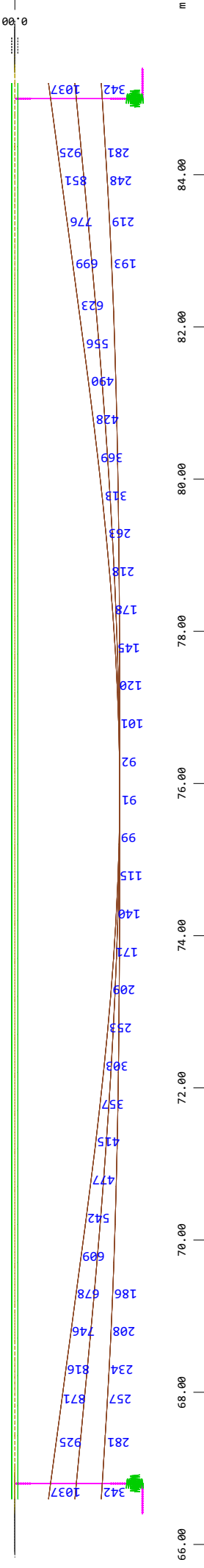


Beam Tendons , Prestress force, 1 cm 3D = 11430 kN (Max=1263)

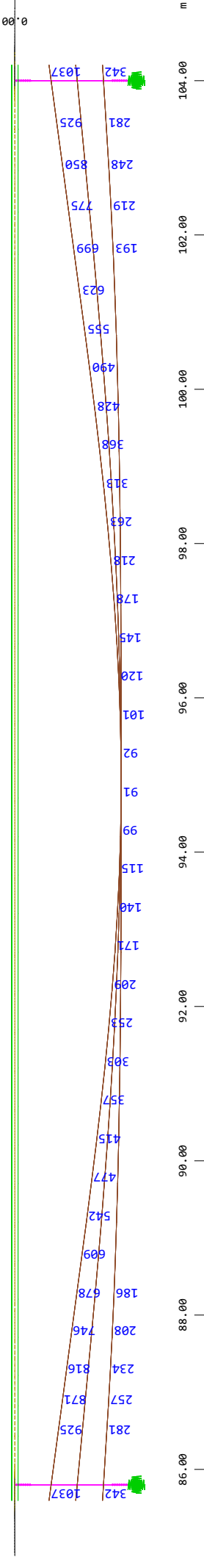


Beam Tendons , Prestress force, 1 cm 3D = 11430 kN (Max=1261)

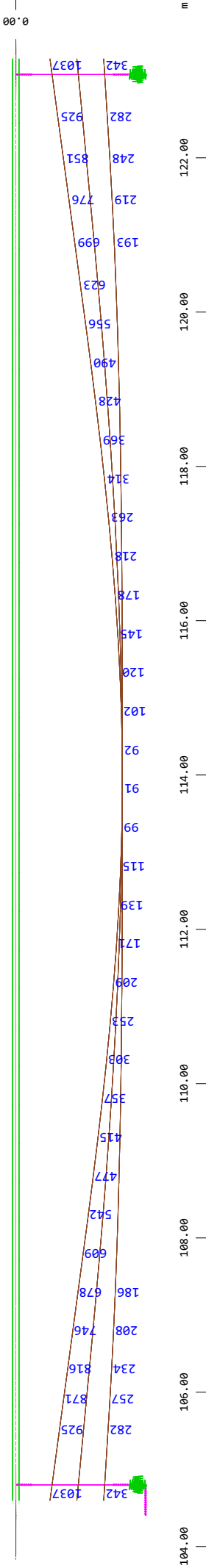




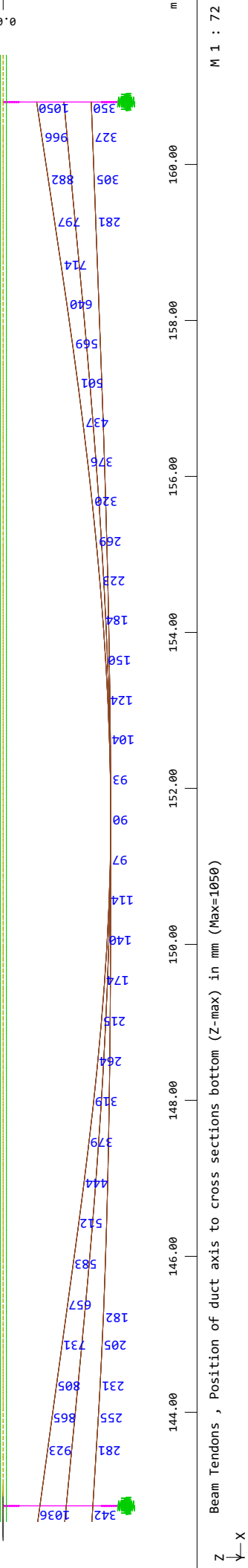
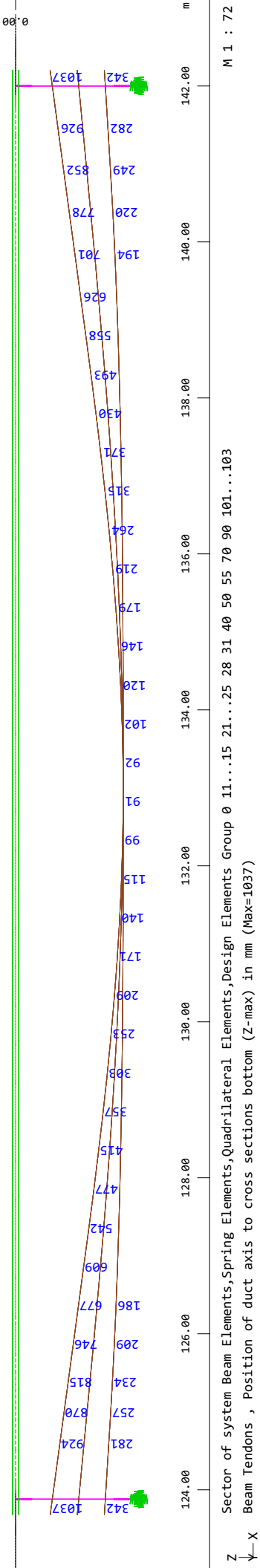
Z Sector of system Beam Elements, Spring Elements, Quadrilateral Elements, Design Elements Group 0 11...15 21...25 28 31 40 50 55 70 90 101...103
X Beam Tendons , Position of duct axis to cross sections bottom (Z-max) in mm (Max=1037)



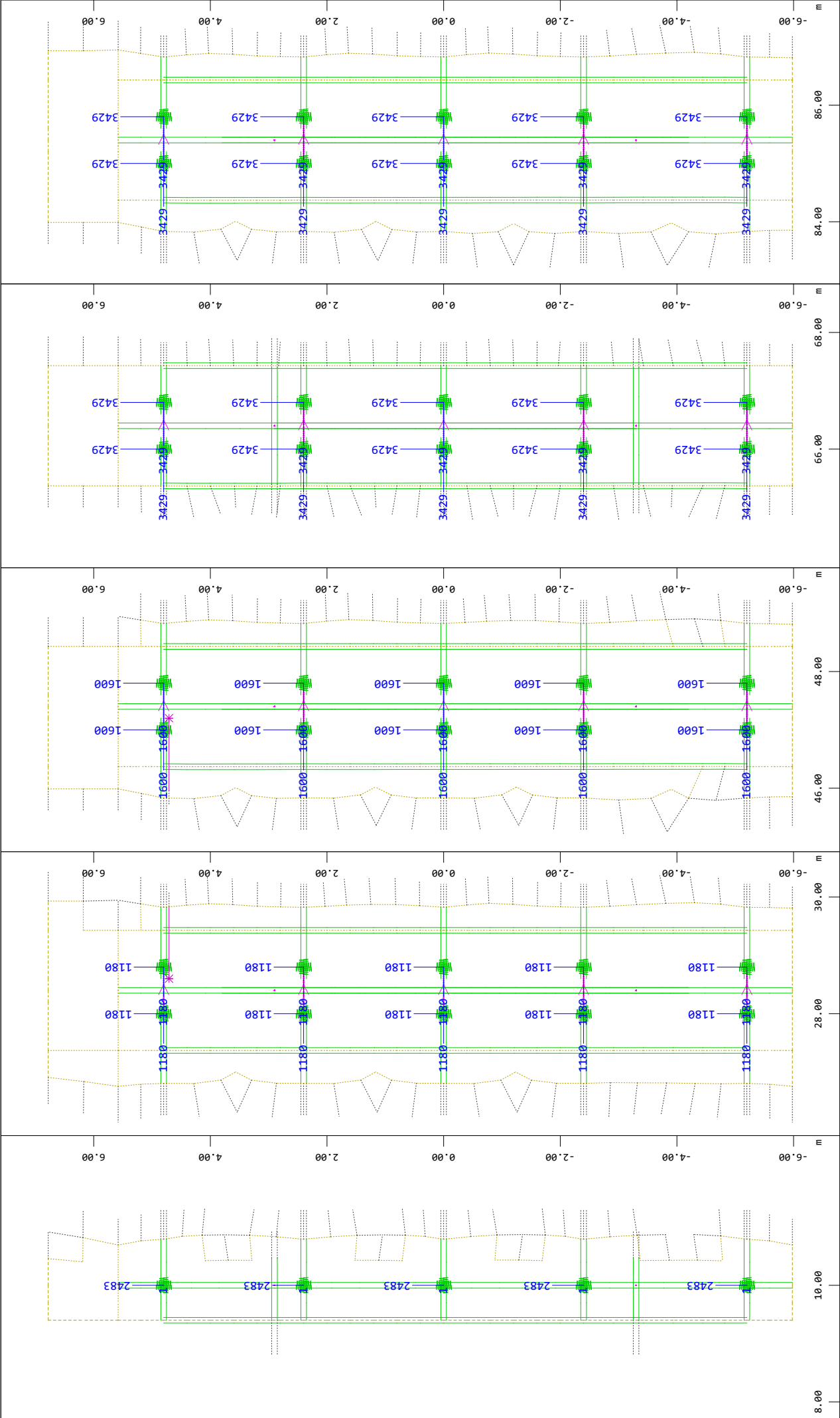
Z Beam Tendons , Position of duct axis to cross sections bottom (Z-max) in mm (Max=1037)
X



Z Sector of system Beam Elements, Spring Elements, Quadrilateral Elements, Design Elements Group 0 11...15 21...25 28 31 40 50 55 70 90 101...103
X Beam Tendons , Position of duct axis to cross sections bottom (Z-max) in mm (Max=1037)



1.6.5 TOGOSTI RAČUNSKIH PODPOR



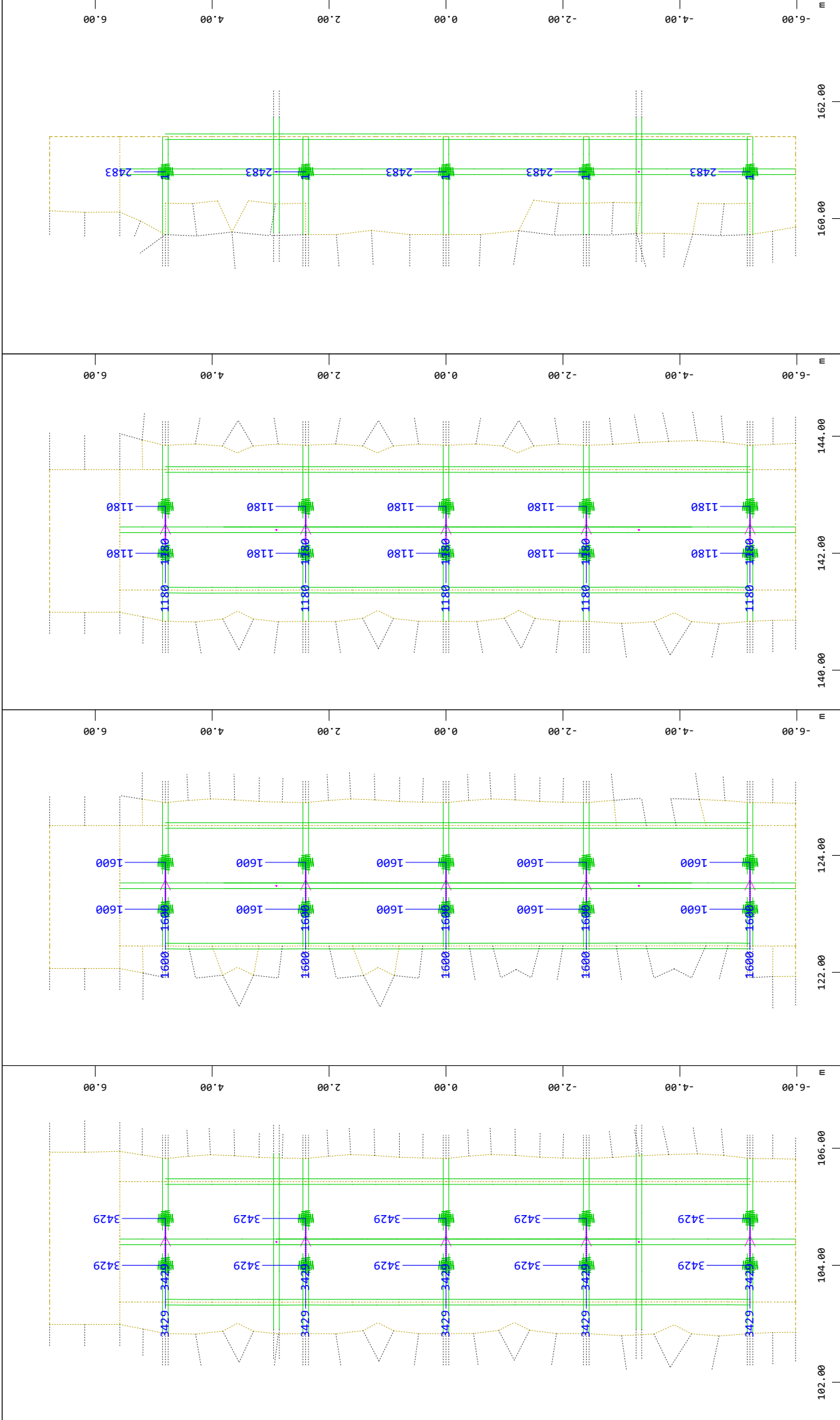
Y Z-X M 1 : 86 Spring constant, 1 cm 30 = 4800.0 kN/m (Max=2483)

Y Z-X M 1 : 86 Spring constant, 1 cm 30 = 4800.0 kN/m (Max=3429)

Y Z-X M 1 : 86 Spring constant, 1 cm 30 = 2800.0 kN/m (Max=1600)

Y Z-X M 1 : 86 Spring constant, 1 cm 30 = 2800.0 kN/m (Max=1180)

Y Z-X M 1 : 86 Spring constant, 1 cm 30 = 4800.0 kN/m (Max=2483)

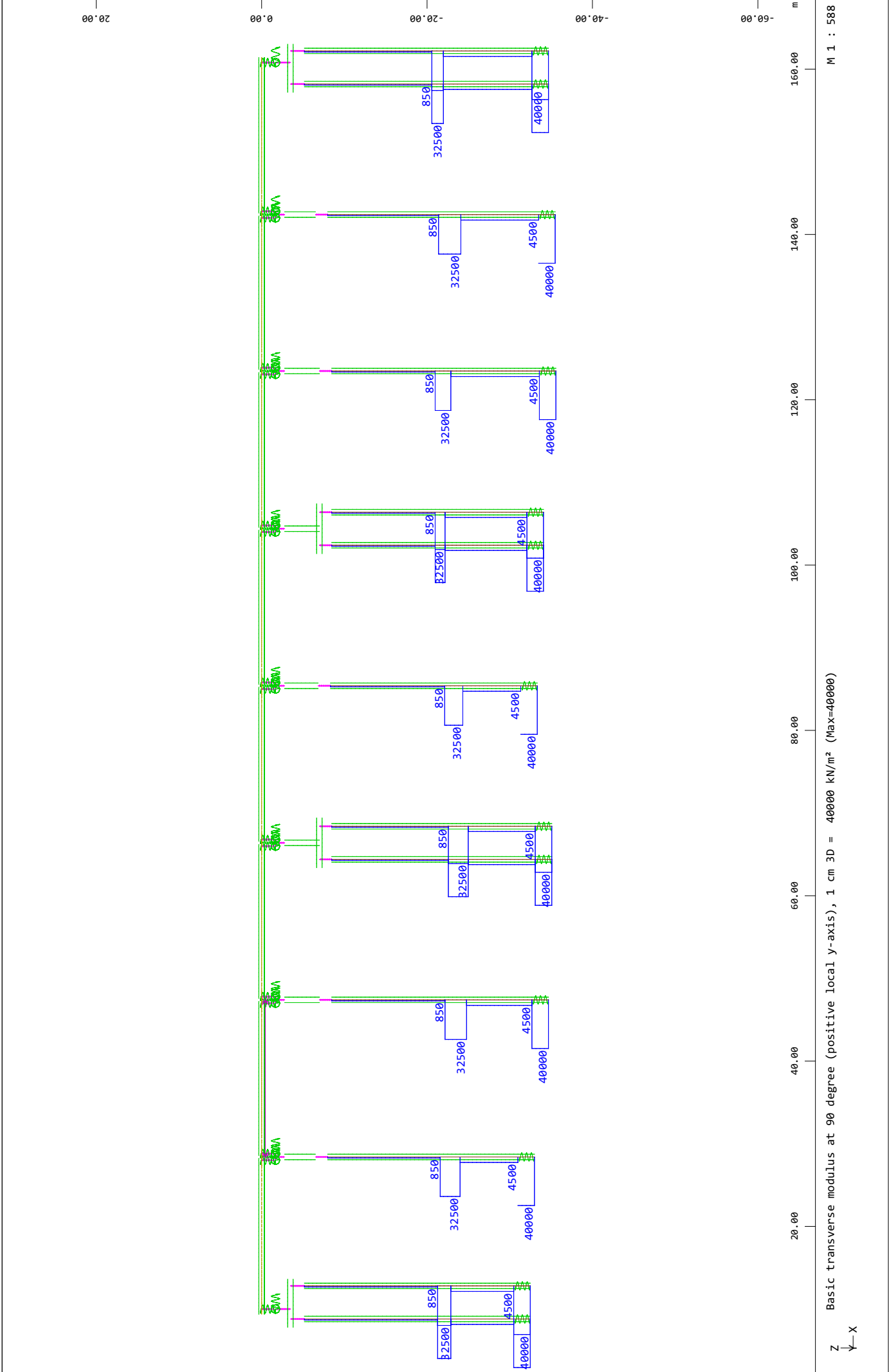


M 1 : 86 Spring constant, 1 cm 30 = 4000.0 kN/m (Max=2483)

M 1 : 86 Spring constant, 1 cm 30 = 2000.0 kN/m (Max=1180)

M 1 : 86 Spring constant, 1 cm 30 = 2000.0 kN/m (Max=1600)

M 1 : 86 Spring constant, 1 cm 30 = 4000.0 kN/m (Max=3429)



Nadvoz Barjanska rekonstruiran v1
Sections

Bore Profile NoP 1 VRT 1

| X[m] | Y[m] | Z[m] | dX[-] | dY[-] | dZ[-] | α[°] | Hgw1[m] | Hgwh[m] |
|-------------------|-------|----------------------------------|-------|-------|---------|----------------------------|---------|---------|
| 0.000 | 0.000 | -5.180 | 0.000 | 0.000 | -1.000 | 0.0 | 0.000 | 0.000 |
| X[m],Y[m],Z[m] | | coordinates of the start point | | | Hgw1[m] | lowest ground water level | | |
| dX[-],dY[-],dZ[-] | | direction of the bore profile | | | Hgwh[m] | highest ground water level | | |
| α[°] | | rotation angle of the local axes | | | | | | |

Transverse

| s | K0-t | K1-t | K2-t | K3-t | P0 | P1 | P2 | P3 | Pmax |
|---|----------|---------|---------|---------|------|------|------|------|--------|
| [m] | [kN/m²] | [kN/m²] | [kN/m²] | [kN/m²] | [-] | [-] | [-] | [-] | [kN/m] |
| 0.000 | 850.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 16.100 | | | | | | | | | 0.00 |
| 16.100 | 32500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 17.700 | | | | | | | | | 0.00 |
| 17.700 | 4500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 25.300 | | | | | | | | | 0.00 |
| 25.300 | 40000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 29.100 | | | | | | | | | 0.00 |
| 29.100 | 4500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 37.400 | | | | | | | | | 0.00 |
| 37.400 | 40000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 40.000 | | | | | | | | | 0.00 |
| s ordinate of the profile axis | | | | | | | | | |
| K0-t,K1-t,K2-t,K3-t parameter of the foundation profile | | | | | | | | | |
| P0,P1,P2,P3 form factor as variation along periphery | | | | | | | | | |
| Pmax maximum foundation value | | | | | | | | | |

Bore Profile NoP 2 VRT 2

| X[m] | Y[m] | Z[m] | dX[-] | dY[-] | dZ[-] | α[°] | Hgw1[m] | Hgwh[m] |
|-------------------|-------|----------------------------------|-------|-------|---------|----------------------------|---------|---------|
| 0.000 | 0.000 | -7.990 | 0.000 | 0.000 | -1.000 | 0.0 | 0.000 | 0.000 |
| X[m],Y[m],Z[m] | | coordinates of the start point | | | Hgw1[m] | lowest ground water level | | |
| dX[-],dY[-],dZ[-] | | direction of the bore profile | | | Hgwh[m] | highest ground water level | | |
| α[°] | | rotation angle of the local axes | | | | | | |

Transverse

| s | K0-t | K1-t | K2-t | K3-t | P0 | P1 | P2 | P3 | Pmax |
|---|----------|---------|---------|---------|------|------|------|------|--------|
| [m] | [kN/m²] | [kN/m²] | [kN/m²] | [kN/m²] | [-] | [-] | [-] | [-] | [kN/m] |
| 0.000 | 850.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 13.600 | | | | | | | | | 0.00 |
| 13.600 | 32500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 16.000 | | | | | | | | | 0.00 |
| 16.000 | 4500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 23.000 | | | | | | | | | 0.00 |
| 23.000 | 40000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 27.900 | | | | | | | | | 0.00 |
| 27.900 | 4500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 34.900 | | | | | | | | | 0.00 |
| 34.900 | 40000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 37.000 | | | | | | | | | 0.00 |
| s ordinate of the profile axis | | | | | | | | | |
| K0-t,K1-t,K2-t,K3-t parameter of the foundation profile | | | | | | | | | |
| P0,P1,P2,P3 form factor as variation along periphery | | | | | | | | | |
| Pmax maximum foundation value | | | | | | | | | |

Bore Profile NoP 3 VRT 3

| X[m] | Y[m] | Z[m] | dX[-] | dY[-] | dZ[-] | α[°] | Hgw1[m] | Hgwh[m] |
|-------------------|-------|----------------------------------|-------|-------|---------|----------------------------|---------|---------|
| 0.000 | 0.000 | -8.480 | 0.000 | 0.000 | -1.000 | 0.0 | 0.000 | 0.000 |
| X[m],Y[m],Z[m] | | coordinates of the start point | | | Hgw1[m] | lowest ground water level | | |
| dX[-],dY[-],dZ[-] | | direction of the bore profile | | | Hgwh[m] | highest ground water level | | |
| α[°] | | rotation angle of the local axes | | | | | | |

Nadvoz Barjanska rekonstruiran v1
Sections

Transverse

| s [m] | K0-t [kN/m²] | K1-t [kN/m²] | K2-t [kN/m²] | K3-t [kN/m²] | P0 [-] | P1 [-] | P2 [-] | P3 [-] | Pmax [kN/m] |
|----------|-----------------|-----------------|-----------------|-----------------|-----------|-----------|-----------|-----------|----------------|
| 0.000 | 850.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 13.700 | | | | | | | | | 0.00 |
| 13.700 | 32500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 16.300 | | | | | | | | | 0.00 |
| 16.300 | 4500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 24.200 | | | | | | | | | 0.00 |
| 24.200 | 40000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 29.300 | | | | | | | | | 0.00 |
| 29.300 | 4500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 34.700 | | | | | | | | | 0.00 |
| 34.700 | 40000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 37.500 | | | | | | | | | 0.00 |

s
K0-t,K1-t,K2-t,K3-t
P0,P1,P2,P3
Pmax

ordinate of the profile axis
parameter of the foundation profile
form factor as variation along periphery
maximum foundation value

Bore Profile NoP 4 VRT 4

| X[m] | Y[m] | Z[m] | dX[-] | dY[-] | dZ[-] | α[°] | Hgwl[m] | Hgwh[m] |
|-------|-------|--------|-------|-------|--------|------|---------|---------|
| 0.000 | 0.000 | -8.480 | 0.000 | 0.000 | -1.000 | 0.0 | 0.000 | 0.000 |

X[m],Y[m],Z[m]
dX[-],dY[-],dZ[-]
α[°]

coordinates of the start point
direction of the bore profile
rotation angle of the local axes

Hgwl[m]
Hgwh[m]

lowest ground water level
highest ground water level

Transverse

| s [m] | K0-t [kN/m²] | K1-t [kN/m²] | K2-t [kN/m²] | K3-t [kN/m²] | P0 [-] | P1 [-] | P2 [-] | P3 [-] | Pmax [kN/m] |
|----------|-----------------|-----------------|-----------------|-----------------|-----------|-----------|-----------|-----------|----------------|
| 0.000 | 850.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 14.100 | | | | | | | | | 0.00 |
| 14.100 | 32500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 16.500 | | | | | | | | | 0.00 |
| 16.500 | 4500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 24.600 | | | | | | | | | 0.00 |
| 24.600 | 40000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 31.900 | | | | | | | | | 0.00 |
| 31.900 | 4500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 35.600 | | | | | | | | | 0.00 |
| 35.600 | 40000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 38.700 | | | | | | | | | 0.00 |

s
K0-t,K1-t,K2-t,K3-t
P0,P1,P2,P3
Pmax

ordinate of the profile axis
parameter of the foundation profile
form factor as variation along periphery
maximum foundation value

Bore Profile NoP 5 VRT 5

| X[m] | Y[m] | Z[m] | dX[-] | dY[-] | dZ[-] | α[°] | Hgwl[m] | Hgwh[m] |
|-------|-------|--------|-------|-------|--------|------|---------|---------|
| 0.000 | 0.000 | -8.330 | 0.000 | 0.000 | -1.000 | 0.0 | 0.000 | 0.000 |

X[m],Y[m],Z[m]
dX[-],dY[-],dZ[-]
α[°]

coordinates of the start point
direction of the bore profile
rotation angle of the local axes

Hgwl[m]
Hgwh[m]

lowest ground water level
highest ground water level

Transverse

| s [m] | K0-t [kN/m²] | K1-t [kN/m²] | K2-t [kN/m²] | K3-t [kN/m²] | P0 [-] | P1 [-] | P2 [-] | P3 [-] | Pmax [kN/m] |
|----------|-----------------|-----------------|-----------------|-----------------|-----------|-----------|-----------|-----------|----------------|
| 0.000 | 850.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 13.800 | | | | | | | | | 0.00 |
| 13.800 | 32500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 16.000 | | | | | | | | | 0.00 |
| 16.000 | 4500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 23.000 | | | | | | | | | 0.00 |
| 23.000 | 40000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |

Nadvoz Barjanska rekonstruiran v1
Sections

Transverse

| s | K0-t | K1-t | K2-t | K3-t | P0 | P1 | P2 | P3 | Pmax |
|--|----------------------|----------------------|----------------------|----------------------|-----|-----|-----|-----|--------|
| [m] | [kN/m ²] | [kN/m ²] | [kN/m ²] | [kN/m ²] | [-] | [-] | [-] | [-] | [kN/m] |
| 39.700 | | | | | | | | | 0.00 |
| s ordinate of the profile axis K0-t,K1-t,K2-t,K3-t parameter of the foundation profile P0,P1,P2,P3 form factor as variation along periphery Pmax maximum foundation value | | | | | | | | | |

Bore Profile NoP 6 VRT 6

| X[m] | Y[m] | Z[m] | dX[-] | dY[-] | dZ[-] | α[°] | Hgw1[m] | Hgwh[m] |
|--|-------|--------|-------|-------|--------|------|---------|---------|
| 0.000 | 0.000 | -8.480 | 0.000 | 0.000 | -1.000 | 0.0 | 0.000 | 0.000 |
| X[m],Y[m],Z[m] coordinates of the start point dX[-],dY[-],dZ[-] direction of the bore profile α[°] rotation angle of the local axes Hgw1[m] lowest ground water level Hgwh[m] highest ground water level | | | | | | | | |

Transverse

| s | K0-t | K1-t | K2-t | K3-t | P0 | P1 | P2 | P3 | Pmax |
|--|----------------------|----------------------|----------------------|----------------------|------|------|------|------|--------|
| [m] | [kN/m ²] | [kN/m ²] | [kN/m ²] | [kN/m ²] | [-] | [-] | [-] | [-] | [kN/m] |
| 0.000 | 850.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 12.500 | | | | | | | | | 0.00 |
| 12.500 | 32500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 13.700 | | | | | | | | | 0.00 |
| 13.700 | 4500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 23.600 | | | | | | | | | 0.00 |
| 23.600 | 40000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 34.900 | | | | | | | | | 0.00 |
| 34.900 | 4000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 40.000 | | | | | | | | | 0.00 |
| s ordinate of the profile axis K0-t,K1-t,K2-t,K3-t parameter of the foundation profile P0,P1,P2,P3 form factor as variation along periphery Pmax maximum foundation value | | | | | | | | | |

Bore Profile NoP 7 VRT 7

| X[m] | Y[m] | Z[m] | dX[-] | dY[-] | dZ[-] | α[°] | Hgw1[m] | Hgwh[m] |
|--|-------|--------|-------|-------|--------|------|---------|---------|
| 0.000 | 0.000 | -8.480 | 0.000 | 0.000 | -1.000 | 0.0 | 0.000 | 0.000 |
| X[m],Y[m],Z[m] coordinates of the start point dX[-],dY[-],dZ[-] direction of the bore profile α[°] rotation angle of the local axes Hgw1[m] lowest ground water level Hgwh[m] highest ground water level | | | | | | | | |

Transverse

| s | K0-t | K1-t | K2-t | K3-t | P0 | P1 | P2 | P3 | Pmax |
|--|----------------------|----------------------|----------------------|----------------------|------|------|------|------|--------|
| [m] | [kN/m ²] | [kN/m ²] | [kN/m ²] | [kN/m ²] | [-] | [-] | [-] | [-] | [kN/m] |
| 0.000 | 850.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 12.500 | | | | | | | | | 0.00 |
| 12.500 | 32500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 14.400 | | | | | | | | | 0.00 |
| 14.400 | 4500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 25.100 | | | | | | | | | 0.00 |
| 25.100 | 40000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 33.800 | | | | | | | | | 0.00 |
| 33.800 | 4000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 40.000 | | | | | | | | | 0.00 |
| s ordinate of the profile axis K0-t,K1-t,K2-t,K3-t parameter of the foundation profile P0,P1,P2,P3 form factor as variation along periphery Pmax maximum foundation value | | | | | | | | | |

Bore Profile NoP 8 VRT 8

| X[m] | Y[m] | Z[m] | dX[-] | dY[-] | dZ[-] | α[°] | Hgw1[m] | Hgwh[m] |
|--|-------|--------|-------|-------|--------|------|---------|---------|
| 0.000 | 0.000 | -7.990 | 0.000 | 0.000 | -1.000 | 0.0 | 0.000 | 0.000 |
| X[m],Y[m],Z[m] coordinates of the start point dX[-],dY[-],dZ[-] direction of the bore profile α[°] rotation angle of the local axes Hgw1[m] lowest ground water level Hgwh[m] highest ground water level | | | | | | | | |

Nadvoz Barjanska rekonstruiran v1
Sections

Transverse

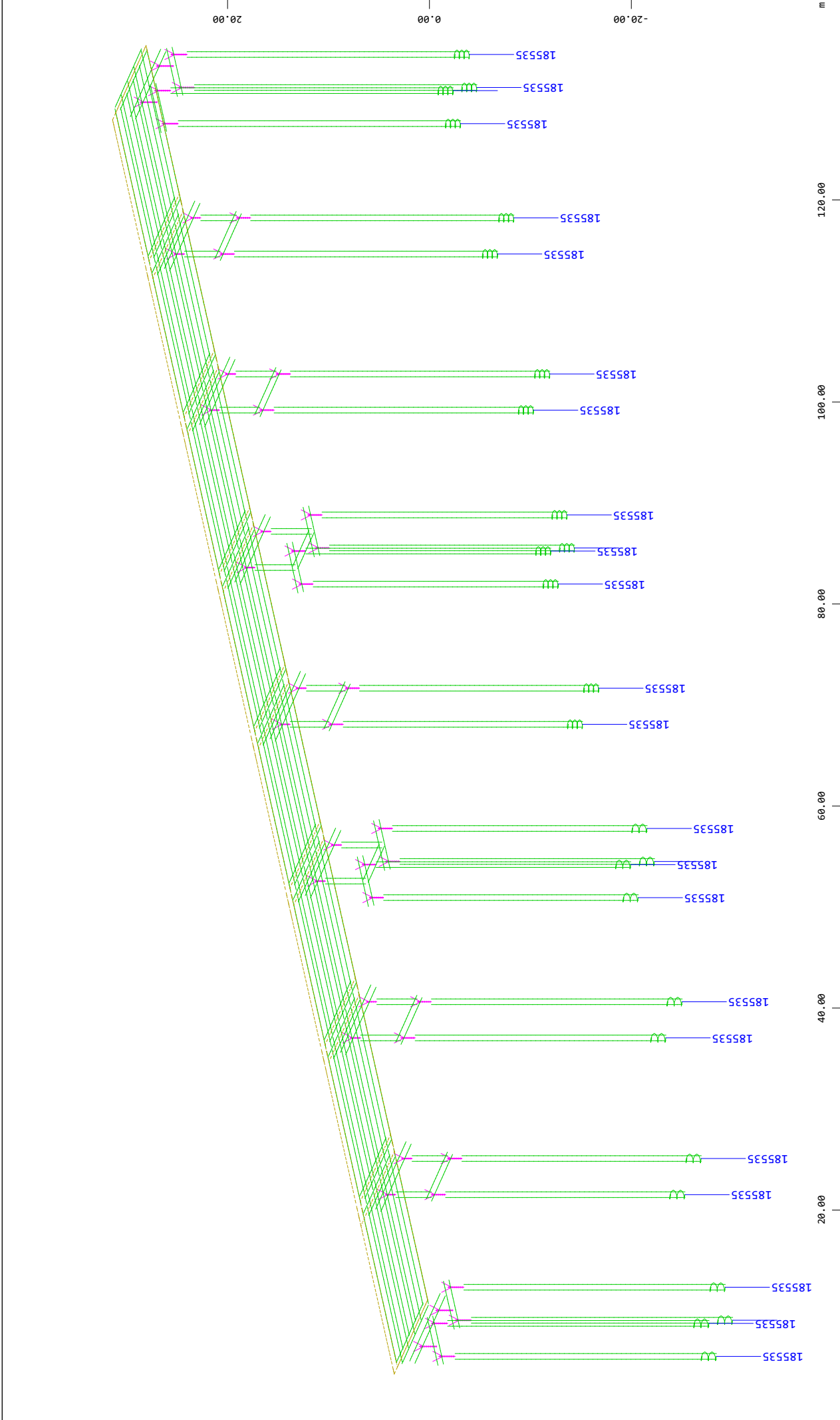
| s [m] | K0-t [kN/m²] | K1-t [kN/m²] | K2-t [kN/m²] | K3-t [kN/m²] | P0 [-] | P1 [-] | P2 [-] | P3 [-] | Pmax [kN/m] |
|--|-----------------|-----------------|-----------------|-----------------|-----------|-----------|-----------|-----------|----------------|
| 0.000 | 850.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 13.400 | | | | | | | | | 0.00 |
| 13.400 | 32500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 16.100 | | | | | | | | | 0.00 |
| 16.100 | 4500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 25.500 | | | | | | | | | 0.00 |
| 25.500 | 40000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 38.600 | | | | | | | | | 0.00 |
| 38.600 | 4000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 40.000 | | | | | | | | | 0.00 |
| s ordinate of the profile axis K0-t,K1-t,K2-t,K3-t parameter of the foundation profile P0,P1,P2,P3 form factor as variation along periphery Pmax maximum foundation value | | | | | | | | | |

Bore Profile NoP 9 VRT 9

| X[m] | Y[m] | Z[m] | dX[-] | dY[-] | dZ[-] | α[°] | Hgwl[m] | Hgwh[m] |
|---|-------|--------|-------|-------|--------|------|---------|---------|
| 0.000 | 0.000 | -5.180 | 0.000 | 0.000 | -1.000 | 0.0 | 0.000 | 0.000 |
| X[m],Y[m],Z[m] coordinates of the start point dX[-],dY[-],dZ[-] direction of the bore profile α[°] rotation angle of the local axes Hgwl[m] lowest ground water level Hgwh[m] highest ground water level | | | | | | | | |

Transverse

| s [m] | K0-t [kN/m²] | K1-t [kN/m²] | K2-t [kN/m²] | K3-t [kN/m²] | P0 [-] | P1 [-] | P2 [-] | P3 [-] | Pmax [kN/m] |
|--|-----------------|-----------------|-----------------|-----------------|-----------|-----------|-----------|-----------|----------------|
| 0.000 | 850.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 15.400 | | | | | | | | | 0.00 |
| 15.400 | 32500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 16.800 | | | | | | | | | 0.00 |
| 16.800 | 4500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 27.500 | | | | | | | | | 0.00 |
| 27.500 | 40000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 35.100 | | | | | | | | | 0.00 |
| 35.100 | 4500.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 37.300 | | | | | | | | | 0.00 |
| 37.300 | 40000.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| 40.000 | | | | | | | | | 0.00 |
| s ordinate of the profile axis K0-t,K1-t,K2-t,K3-t parameter of the foundation profile P0,P1,P2,P3 form factor as variation along periphery Pmax maximum foundation value | | | | | | | | | |



M 1 : 498
X * 0.837
Y * 0.633
Z * 0.948

Spring constant, 1 cm 3D = 200000 kN/m (Max=185535)

Z
Y X

2 OBTEŽBA

2.1 STALNA OBTEŽBA

2.1.1 LASTNA TEŽA

| L.T. (NOSILEC + AB PLOŠČA na 1 nosilec) | | | | | | | |
|---|------|-------|----|-------|---------------------|------|------|
| | h1 | p1 | h2 | p2 | B | A | F |
| | m | kN/m2 | m | kN/m2 | m | cm2 | kN/m |
| AB plošča/1nos | 0,22 | | | | 2,40 | 5280 | 13,2 |
| AB plošča/1nos | 0,28 | | | | 2,40 | 6720 | 16,8 |
| PB nosilec | | | | | | 4800 | 12,0 |
| | | | | | obstoječa: | Σ | 25,2 |
| | | | | | nadbetonirana 6 cm: | Σ | 28,8 |

2.1.2 STALNA TEŽA – KROV

| OBSTOJEČI KROV | | | | | | | | | |
|----------------|------|-------|------|-------|------|------|------|------|------|
| | h1 | p1 | h2 | p2 | B | A | F | e | M |
| | m | kN/m2 | m | kN/m2 | m | cm2 | kN/m | m | kN/m |
| RV | 0,95 | | | | 0,35 | 3325 | 8,3 | 0,18 | 1,5 |
| ograja | | | | | | | 1,0 | 0,18 | 0,2 |
| hodnik | 0,26 | 6,5 | 0,26 | 6,5 | 1,83 | 4758 | 11,9 | | |
| asfalt | 0,08 | 2,0 | | | 7,00 | 5600 | 14,0 | | |
| hodnik | 0,26 | 6,5 | 0,26 | 6,5 | 3,60 | 9360 | 23,4 | | |
| ograja | | | | | | | 1,0 | 0,18 | 0,2 |
| RV | 0,95 | | | | 0,35 | 3325 | 8,3 | 0,18 | 1,5 |
| | | | | | | Σ | 67,9 | | |

| REKONSTRUIRANI KROV | | | | | | | | | |
|---------------------|------|-------|------|-------|-------|-------|------|------|------|
| | h1 | p1 | h2 | p2 | B | A | F | e | M |
| | m | kN/m2 | m | kN/m2 | m | cm2 | kN/m | m | kN/m |
| RV | 0,60 | | | | 0,40 | 2400 | 6,0 | 0,20 | 1,2 |
| ograja | | | | | | | 3,0 | 0,18 | 0,5 |
| razš. AB plošče | 0,25 | 6,3 | 0,35 | 8,8 | 1,20 | 3600 | 9,0 | | |
| hodnik | 0,20 | 5,0 | 0,20 | 5,0 | 2,92 | 5840 | 14,6 | | |
| JVO | | | | | | | 2,0 | | |
| asfalt | 0,12 | 3,0 | | | 12,67 | 15204 | 38,0 | | |
| JVO | | | | | | | 2,0 | | |
| hodnik | 0,20 | 5,0 | 0,20 | 5,0 | 2,43 | 4860 | 12,2 | | |
| ograja | | | | | | | 3,0 | 0,18 | 0,5 |
| RV | 0,60 | | | | 0,40 | 2400 | 6,0 | 0,20 | 1,2 |
| | | | | | | Σ | 86,8 | | |

2.2 SPREMENLJIVA OBTEŽBA

2.2.1 PROMET

Cestni promet LM1:

EN 1991-2:2004, tč. 4

Vertikalne sile: (tč. 4.3.2)

LM 1: 2 pasova širine 3.0 m

glavni pas: TS (600 kN)*0,8 + UDL (9,0 kN/m²),

drugi pas: TS (400 kN)*1,0 + UDL (2,5 kN/m²),

tretji pas: TS (200 kN) + UDL (2,5 kN/m²),

ostale površine: UDL (2,5 kN/m²),

pešci in kolesarji: UDL (3,5 kN/m²),

Glavni pas TS je upoštevan s prilagoditvenim faktorjem $\alpha_{Q1} = 0,8$.

Horizontalne sile: (tč. 4.4)

Zavorne in speljevalne sile: vzdolžno:

$$Q_{lk} = 0,6 \cdot Q_{1k} + 0,10 \cdot q_{1k} \cdot w_1 \cdot L \quad Q_{lk} = 0,6 \cdot 600 + 0,10 \cdot 9,0 \cdot 3,0 \cdot 152 = 770 \text{ kN}$$

$$Q_{lk,MAX} = 900 \text{ kN } Q_{lk}$$

2.2.2 TEMPERATURA

| | | | | | |
|---|-------------|------------------|--|---------------------------------------|--|
| Temperaturne spremembe: | | | | (EN 1991-1-5, tč. 6) | |
| Absolutna najvišja/najnižja temperatura zraka s povratno dobo 50 let (1951-2005): | | | | | |
| (Vrednosti iz karte pri Ljubljani) | | | (Računske vrednosti - Fig.6.1, Type 3 - concrete box girder) | | |
| $T_{\max} =$ | 38 | | $T_{e,\max} =$ | 40 | |
| $T_{\min} =$ | -24 | | $T_{e,\min} =$ | -25 | |
| Računska enakomerna sprememba: | | | | | |
| $T_0 =$ | 10 | | | | |
| $\Delta T_{N,\exp} = T_{e,\max} - T_0 =$ | 30 | raztezanje | | | |
| $\Delta T_{N,\text{con}} = T_0 - T_{e,\min} =$ | 35 | krčenje | | | |
| Računska neenakomerna sprememba: | | | | 8 kombinacij | (tč. 6.1.5) |
| | (Table 6.1) | k_{sur} | | $(\omega_N = 0.35, \omega_M = 0.75):$ | |
| $\Delta T_{M,\text{heat}} =$ | 10 | 0,60 | 6,0 | zg. topleje | $\Delta T_{N,\exp \text{con}} + \omega_M \Delta T_{M,\text{heat} \text{cool}}$ |
| $\Delta T_{M,\text{cool}} =$ | 5 | 1,00 | 5,0 | sp. topleje | $\omega_N \Delta T_{N,\exp \text{con}} + \Delta T_{M,\text{heat} \text{cool}}$ |
| (Table 6.2, za 14 cm asfalta) | | | | | |
| Za ležišča in dilatacije pa po 6.1.3.3(3) NOTE 2 še ($\Delta T_N + 10^\circ$). | | | | | |
| Za ležišča: (znana temperatura ob montaži) | | | Za ležišča: (ni znana temperatura ob montaži) | | |
| $\Delta T_{N,\exp} + 10^\circ =$ | 40 | raztezanje | $\Delta T_{N,\exp} + 20^\circ =$ | 50 | raztezanje |
| $\Delta T_{N,\text{con}} + 10^\circ =$ | 45 | krčenje | $\Delta T_{N,\text{con}} + 20^\circ =$ | 55 | krčenje |

Spekter odziva

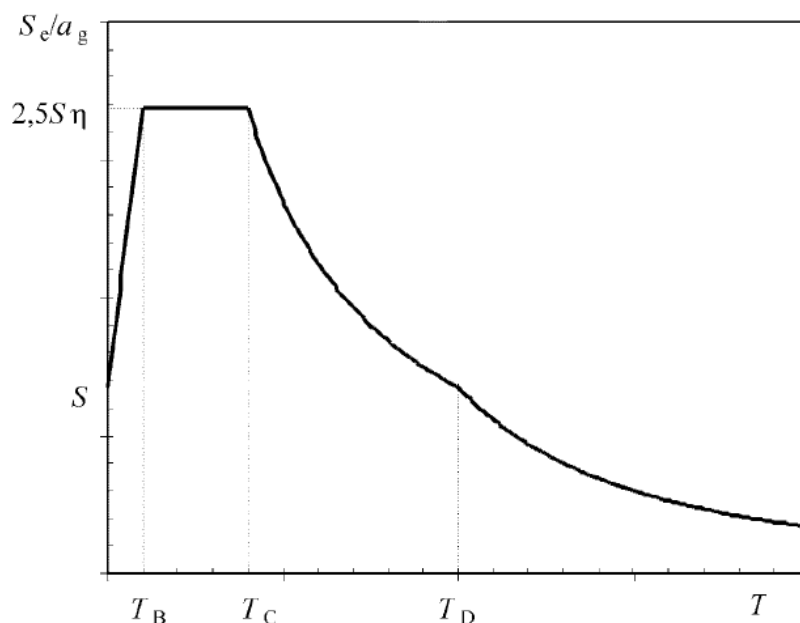


Figure 3.1: Shape of the elastic response spectrum

Elastični spekter odziva tipa 1 za horizontalno smer:

| Tip tal | S | T_B (s) | T_C (s) | T_D (s) |
|---------|------|-----------|-----------|-----------|
| A | 1,0 | 0,10 | 0,4 | 2,0 |
| B | 1,2 | 0,15 | 0,5 | 2,0 |
| C | 1,15 | 0,20 | 0,6 | 2,0 |
| D | 1,35 | 0,20 | 0,8 | 2,0 |
| E | 1,7 | 0,10 | 0,4 | 2,0 |

| | | | | |
|------------|-------------|-------------|------------|------------|
| S1* | 2,55 | 0,20 | 0,8 | 2,0 |
|------------|-------------|-------------|------------|------------|

(*): Potresna mikrorajonizacija Ljubljane (2003)

Elastični spekter odziva tipa 1 za navpično smer:

| Spekter | a_{vg}/a_g | T_B (s) | T_C (s) | T_D (s) |
|---------|--------------|-----------|-----------|-----------|
| Tip 1 | 0,90 | 0,05 | 0,15 | 1,0 |

Seizmične inertne sile določimo z modalno analizo, ki zajema spekter odziva temeljnih tal. Zajete so bistvene nihajne oblike, tako da se aktivira vsaj 90% modalne mase. Bistvene nihajne oblike so med seboj kombinirani po SRSS pravilu (kvadratni koren vsote kvadratov).

Računski parametri

Elastični spekter odziva tipa 1 za kategorijo tal S1:

$S = 2,55$ $T_B = 0,20$ s , $T_C = 0,80$ s , $T_D = 2,0$ s *horizontalno*

$T_B = 0,05$ s , $T_C = 0,15$ s , $T_D = 1,0$ s *vertikalno*

Seizmična cona: $a_g = 0,25g$ $\Rightarrow a_{g,HOR} = 1,0 \cdot 0,25 \cdot 9,81 = 2,46$ m/s²

$\Rightarrow a_{g,VER} = 0,9 \cdot 0,25 \cdot 9,81 = 2,21$ m/s²

V programu SOFiSTiK je podan pospešek temeljnih tal $a_g = 2,46$ m/s² s faktorjem 1,0 v vzdolžni in prečni smeri ter s faktorjem 0,9 v vertikalni smeri. Izbran je izračun **s projektnim spektrom odziva** po EC8 tip 1.

Upoštevamo omejeno duktilno obnašanje konstrukcije:

| | | |
|---------------------|--------------|-----------|
| Faktor obnašanja q: | smer X in Y: | $q = 1,5$ |
| | smer Z: | $q = 1,0$ |

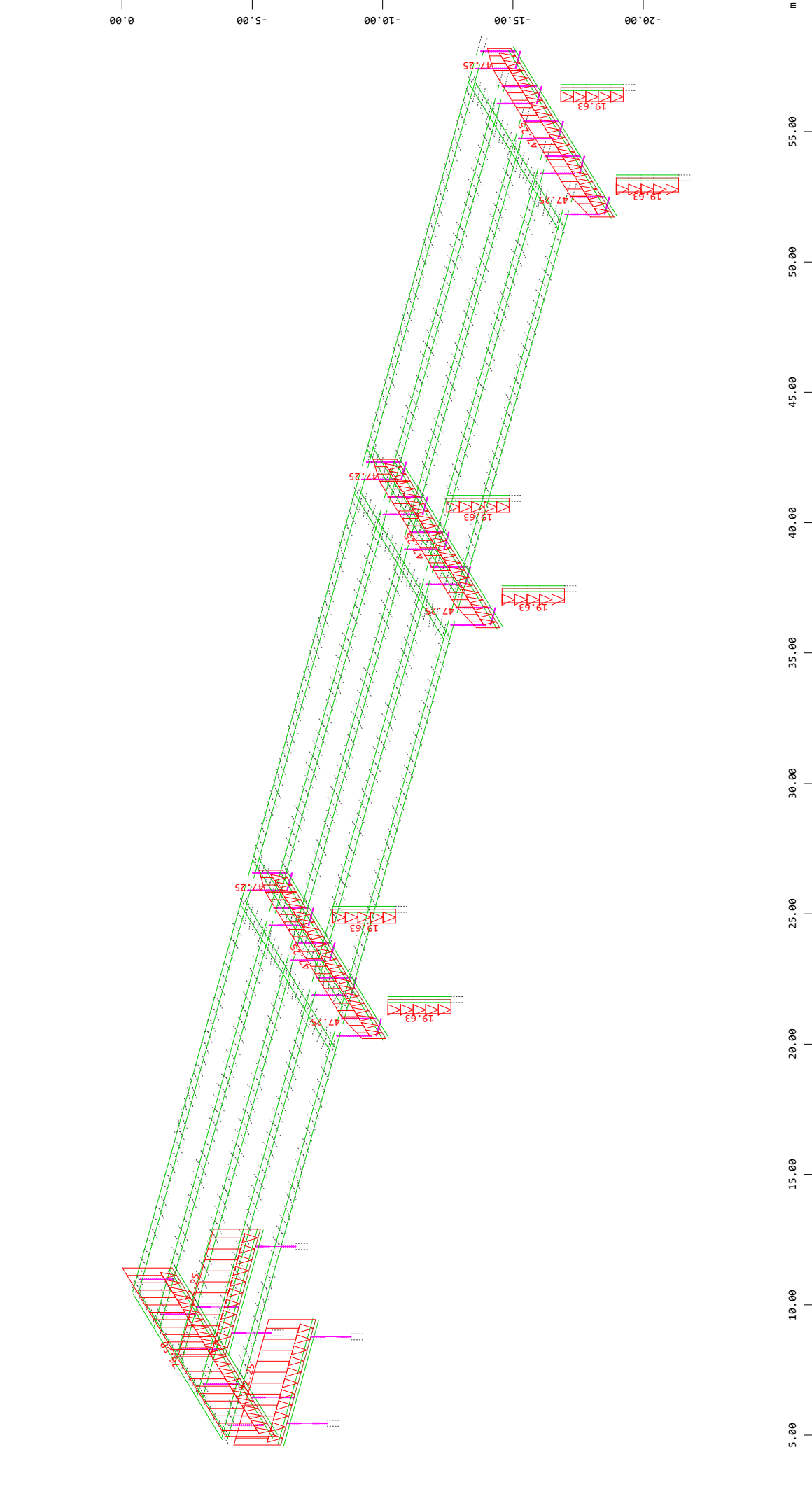
Pri določitvi pomikov v X in Y smer je potrebno računske pomike dodatno pomnožiti s faktorjem q.

Upoštevana prometna obtežba za potresno projektno stanje:

Skladno s SIST EN 1998-2 upoštevamo pri potresni analizi objektov na bolj frekvenčnih prometnicah prometno obremenitev LM1 UDL zvezna s kombinacijskim faktorjem $\Psi_{2,1} = 0,2$. Za most se smatra, da je na manj obremenjeni prometnici, tako da prometne obtežbe pri potresu ne upoštevamo.

2.4 PRIKAZ RAČUNSKIH OBTEŽB

2.4.1 STALNE OBTEŽBE



Z

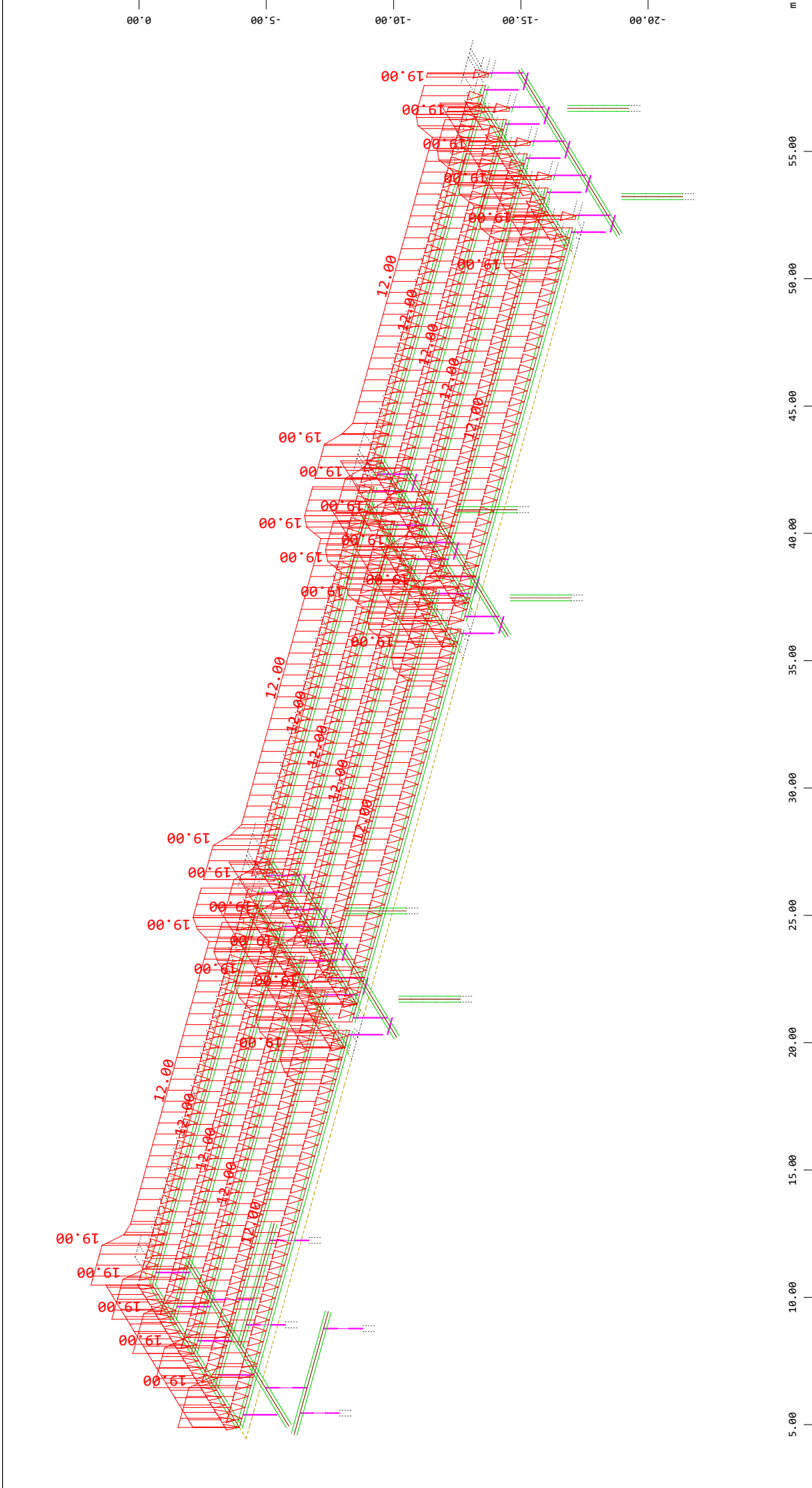
Y

X

All loads, Loadcase 5005 (CS 5) Podporni sistem , (1 cm 3D = unit) Beam dead load in global Z (Unit=74.22 kN/m

(Min=-76.50) (Max=-19.63)

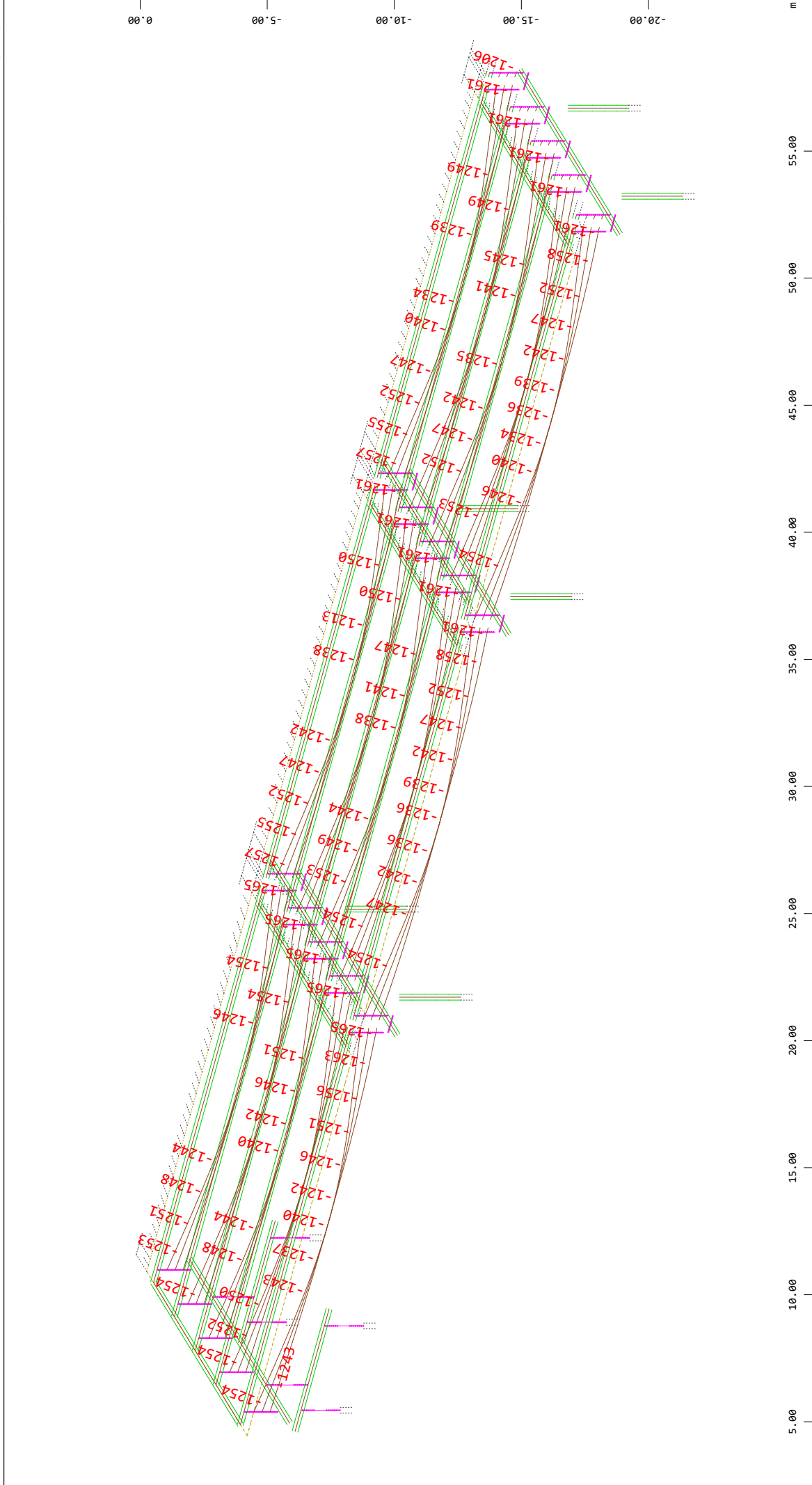
M 1 : 203
X * 0.861
Y * 0.655
Z * 0.911



z y x

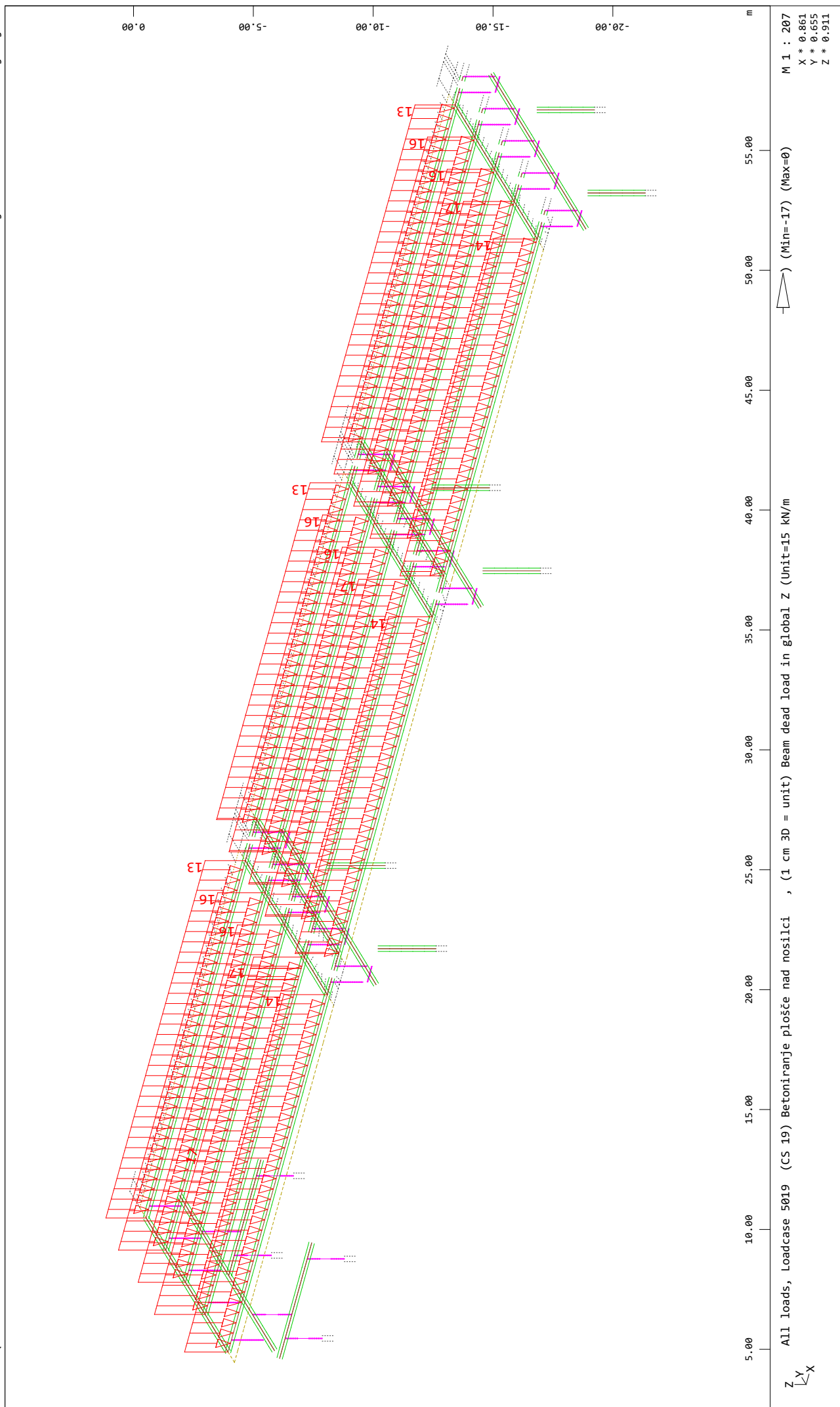
ALL loads, Loadcase 5010 (CS 10) Montaza PB nosilcev , (1 cm 3D = unit) Beam dead load in global Z (Unit=14.84 kN/m) (Min=-19.00) (Max=0)

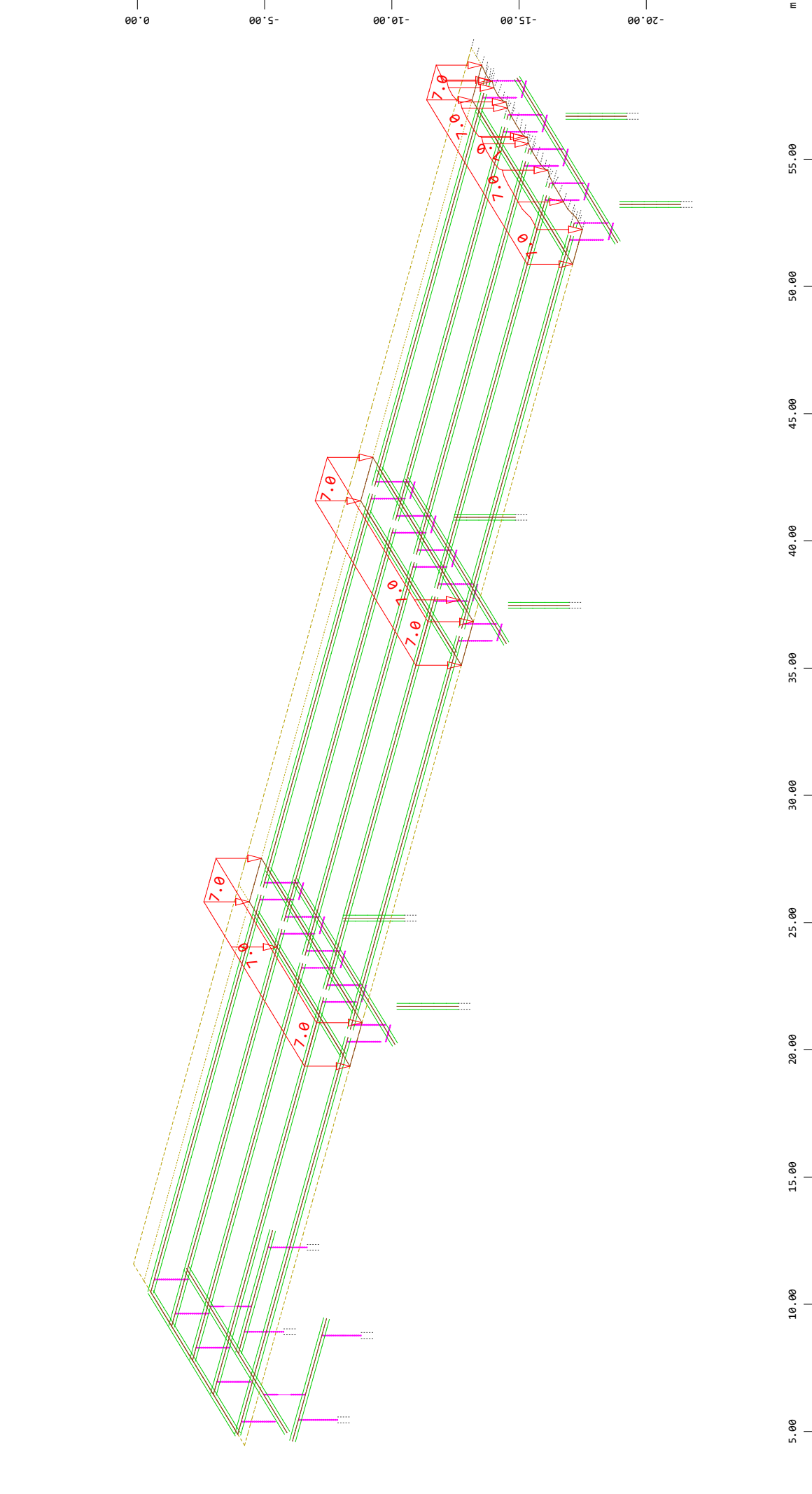
M 1 : 207
X * 0.861
Y * 0.655
Z * 0.911



M 1 : 207
X * 0.861
Y * 0.655
Z * 0.911

All loads, Loadcase 5011 (CS 11) Prestress , Beam dead load in global Z(Max=0kN/m), Beam internal prestress Normal force Nx(Min=-1265Max=-1159kN)



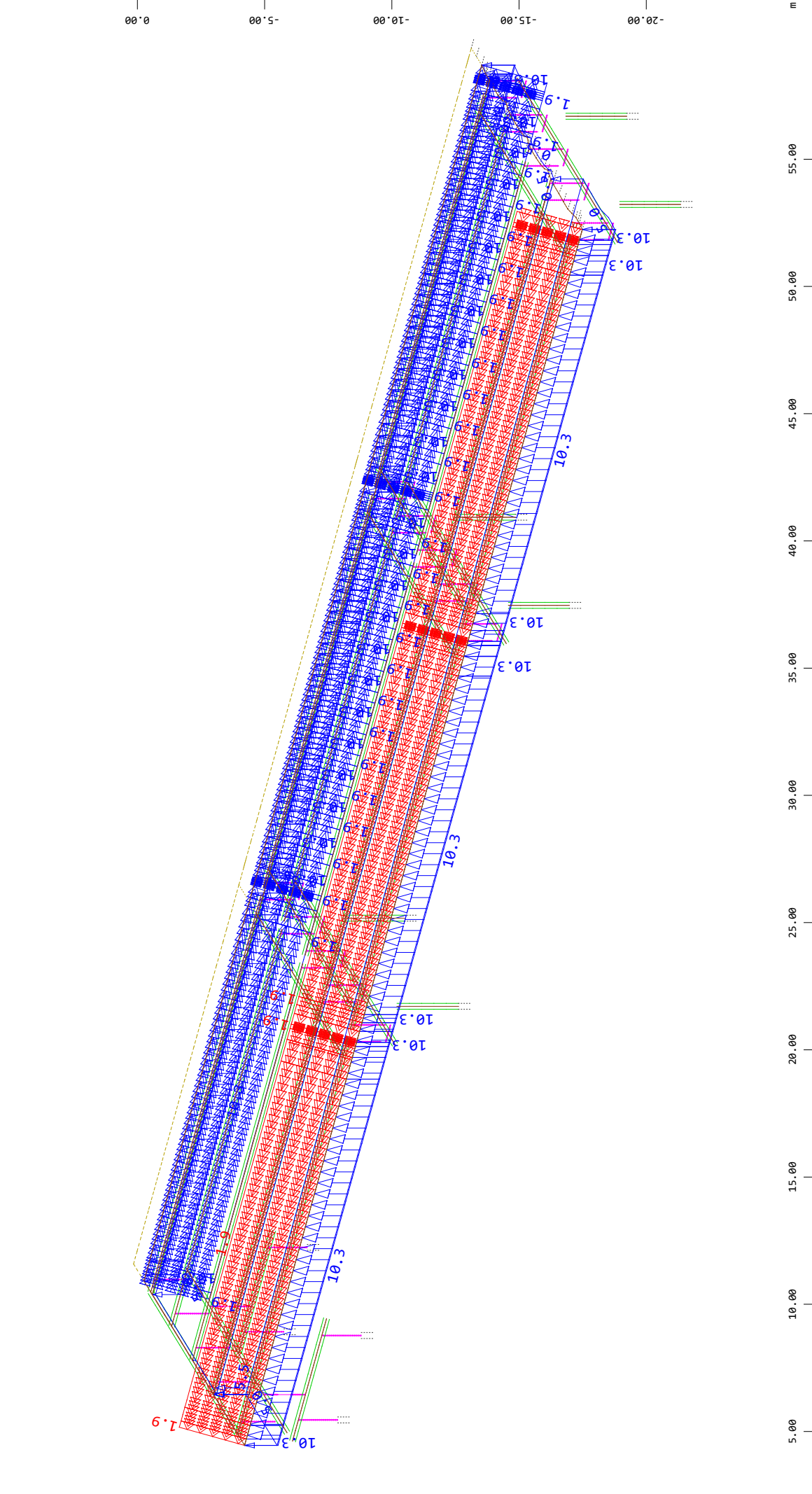


M 1 : 208
X * 0.861
Y * 0.655
Z * 0.911

Z $\begin{matrix} \swarrow \\ \searrow \end{matrix}$ X

All loads, Loadcase 5030 (CS 30) Povezava AB plošče nad podporo , (1 cm 3D = unit) QUAD-Area dead load in global Z in Element (Unit=7.4 kN/m²,Min=-7.0 Max=-7.0 $\begin{matrix} \swarrow \\ \searrow \end{matrix}$), Beam dead load in global Z (Unit=0.00 kN/m,Max=0.00 $\begin{matrix} \swarrow \\ \searrow \end{matrix}$)





Z

All loads, Loadcase 5050 (CS 50) Odstranjen obstoječi krov , (1 cm 3D = unit) Free line load (force) in global Z (Unit=14.8 kN/m,Max=10.3

line load (moment) about global X (Unit=1.5 kNm/m,Min=-1.9 Max=1.9

load in global Z (Unit=14.8 kN/m,Max=0.00

M 1 : 208

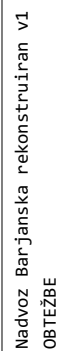
X * 0.861

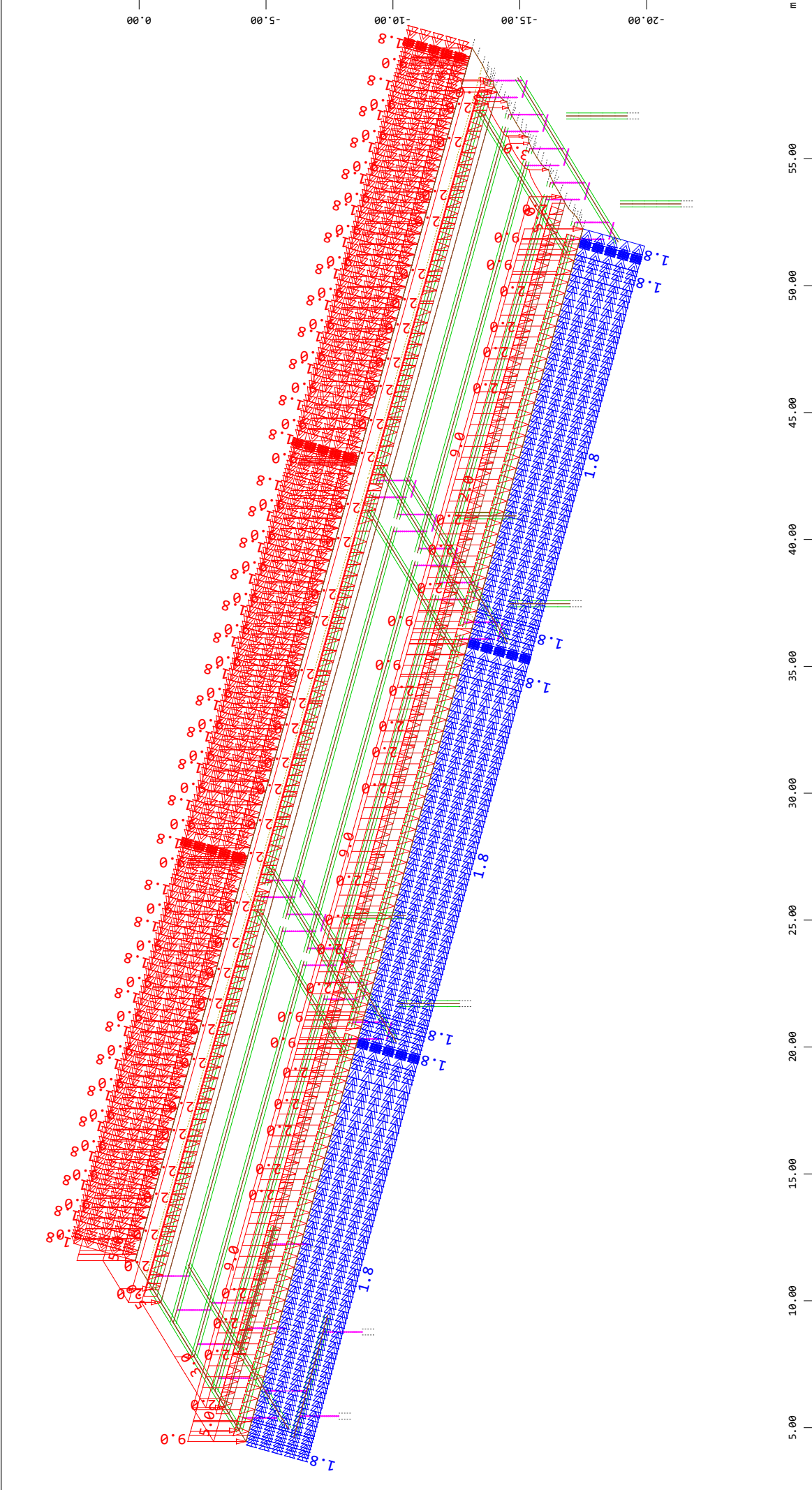
Y * 0.655

Z * 0.911

), Beam dead

), Free



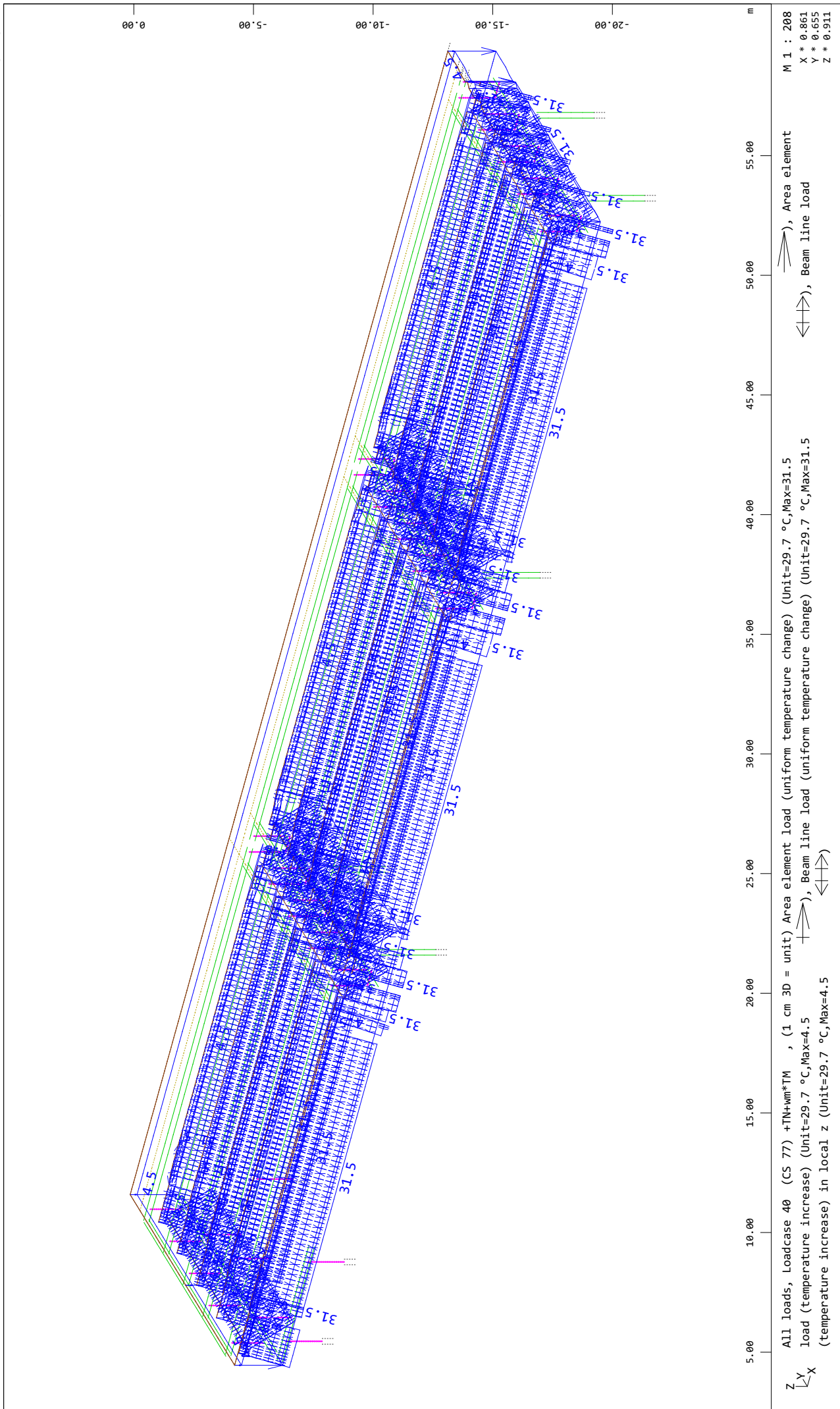


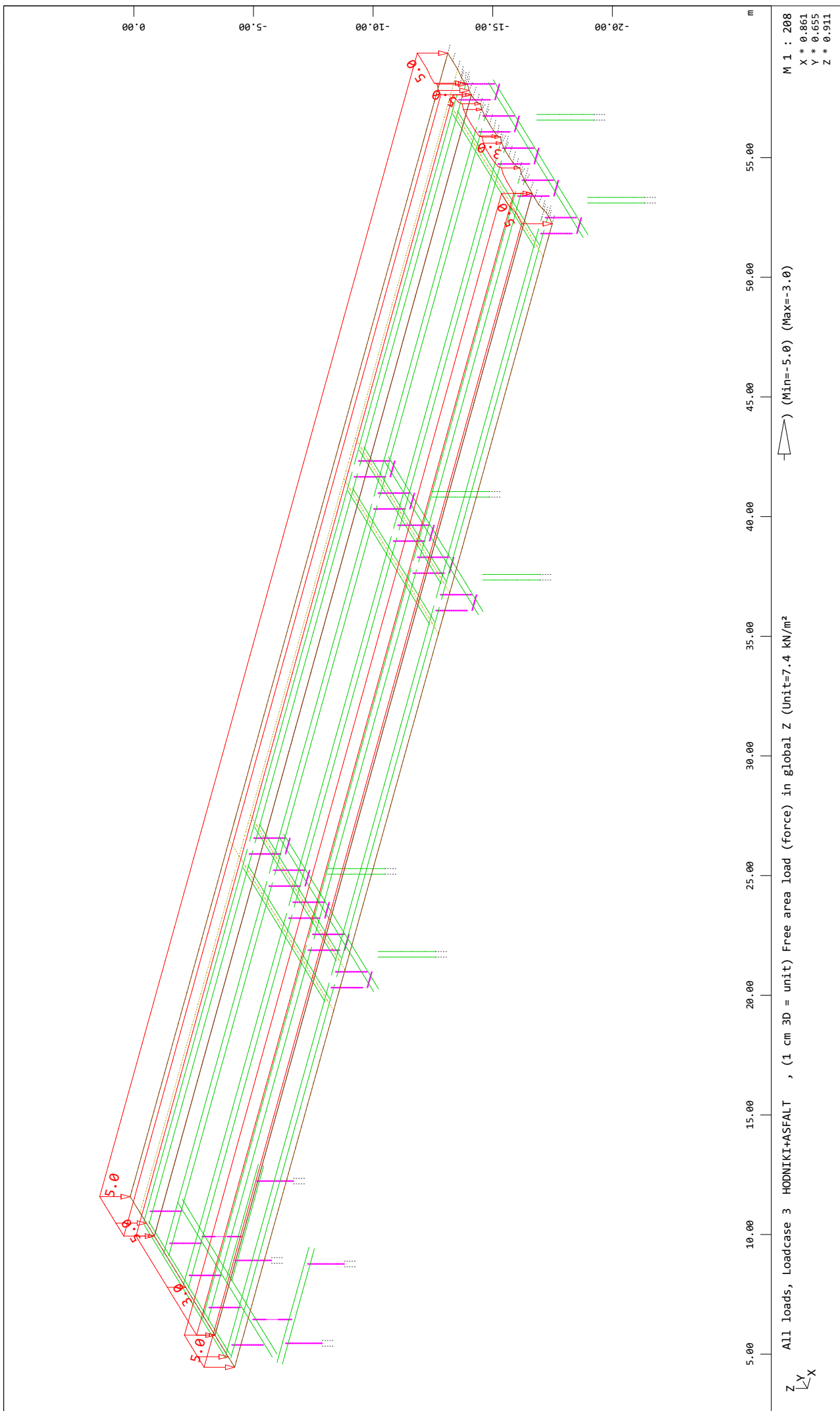
M 1 : 208
X * 0.861
Y * 0.655
Z * 0.911

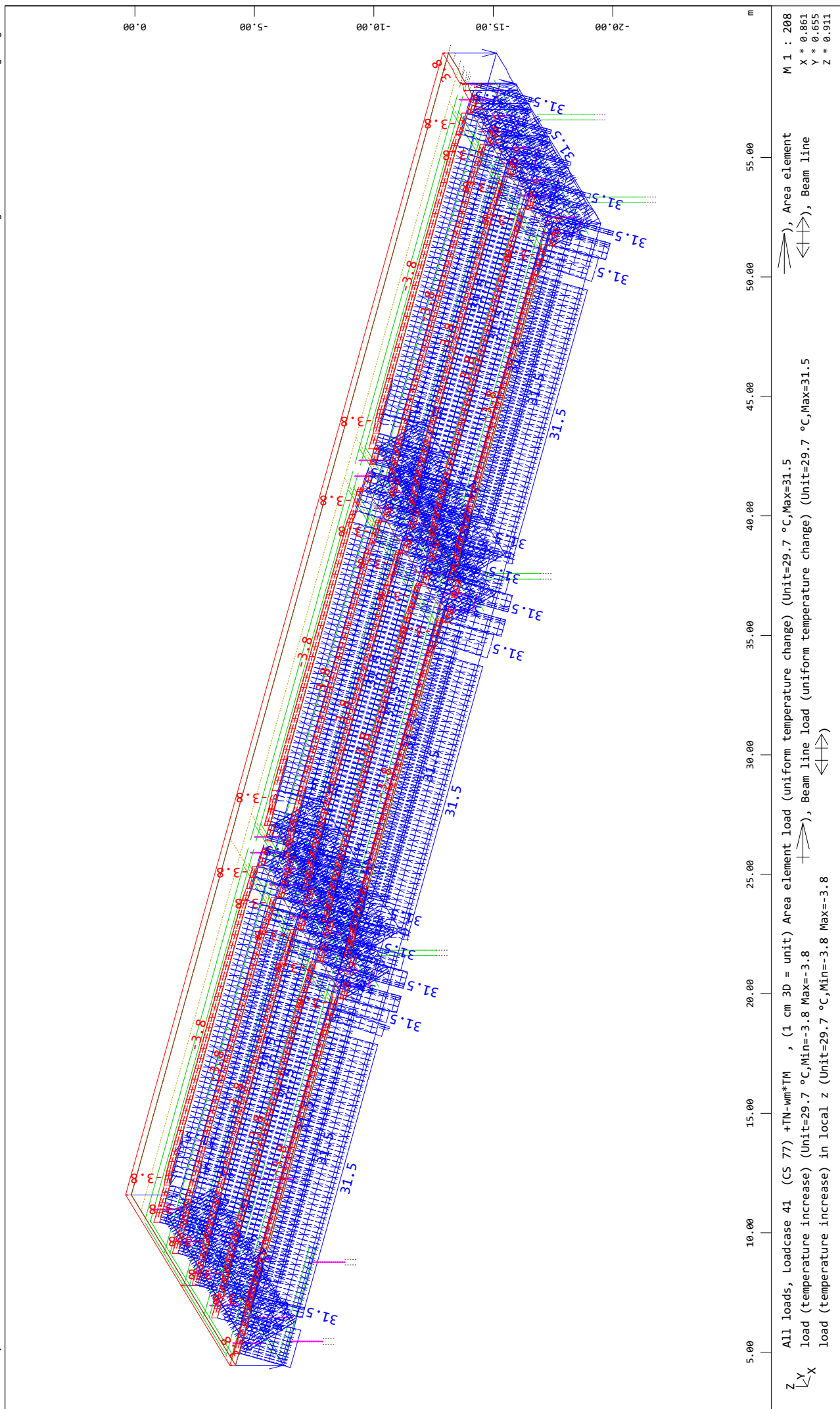
Z $\begin{matrix} \nearrow Y \\ \nwarrow X \end{matrix}$

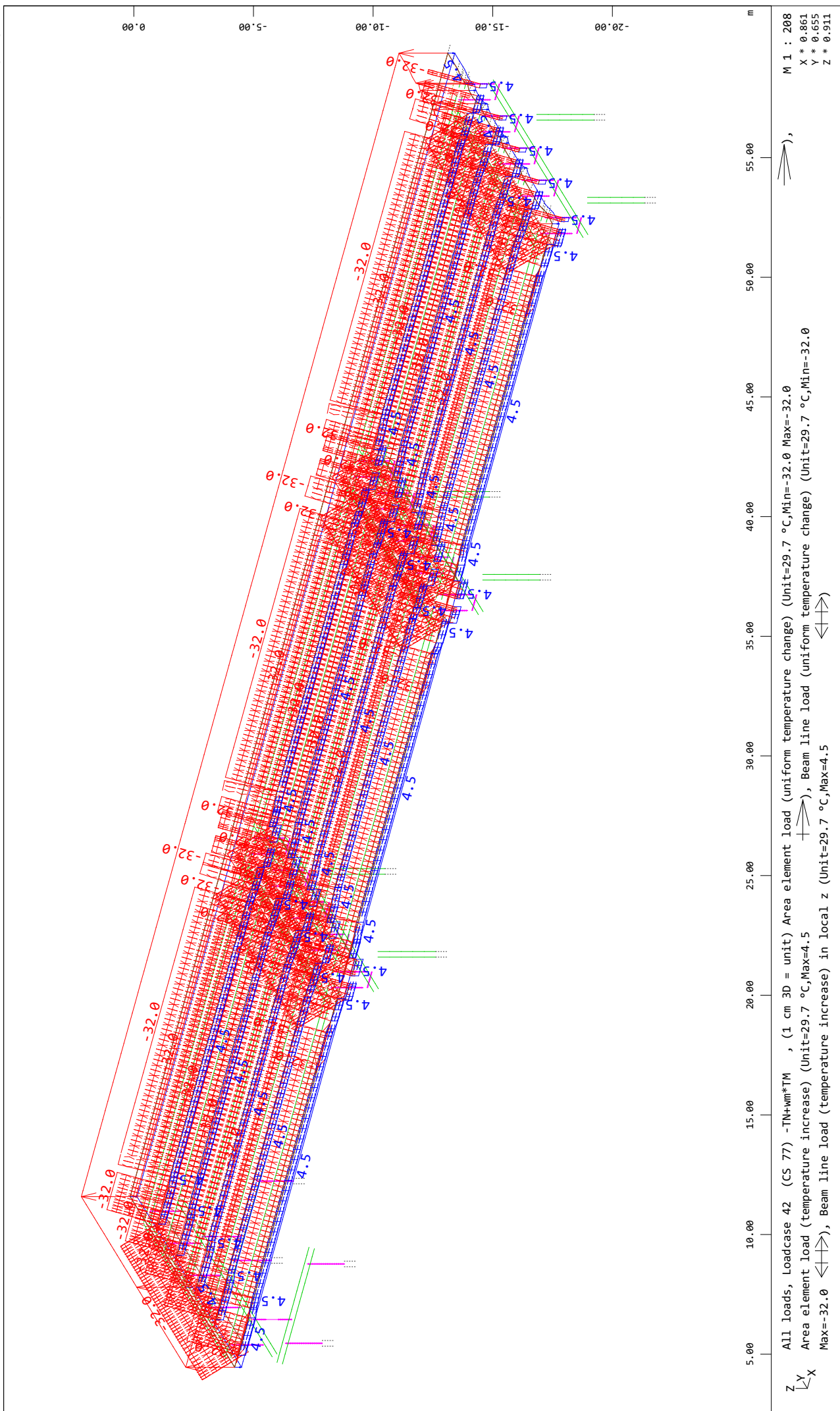
All loads, Loadcase 5070 (CS 70) Rekonstruiran krov - dodatno nov , (1 cm 3D = unit) Free line load (force) in global Z (Unit=7.4 kN/m,Min=-9.0
Max=-2.0 $\begin{matrix} \nearrow \\ \nwarrow \end{matrix}$), Free line load (moment) about global X (Unit=1.5 kNm/m,Min=-1.8 Max=1.8
kN/m²,Min=-5.0 Max=-3.0 $\begin{matrix} \nearrow \\ \nwarrow \end{matrix}$), Beam dead load in global Z (Unit=7.4 kN/m,Max=0.00 $\begin{matrix} \nearrow \\ \nwarrow \end{matrix}$), Free area load (force) in global Z (Unit=7.4

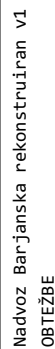
2.4.2 SPREMENLJIVE OBTEŽBE

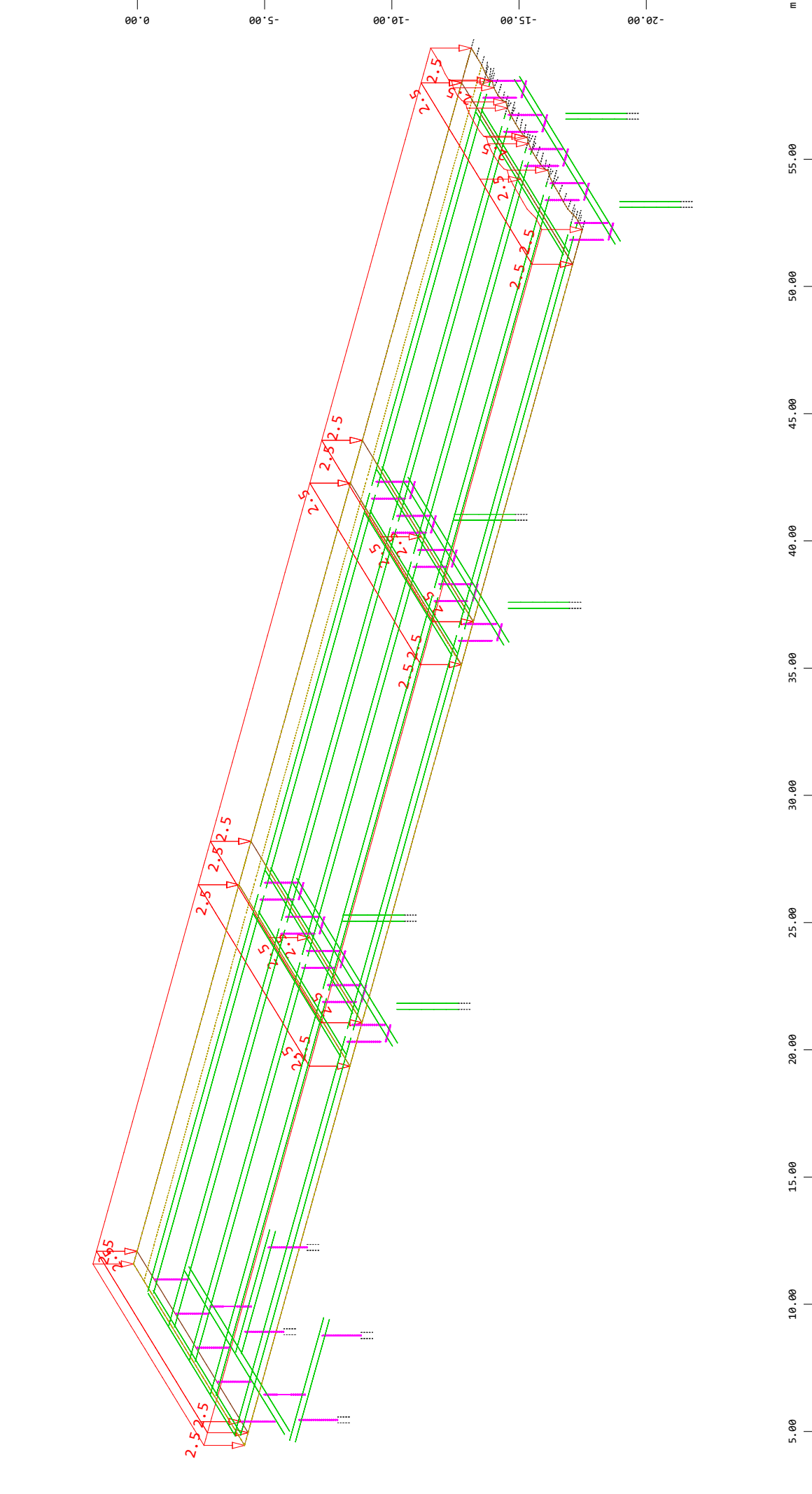




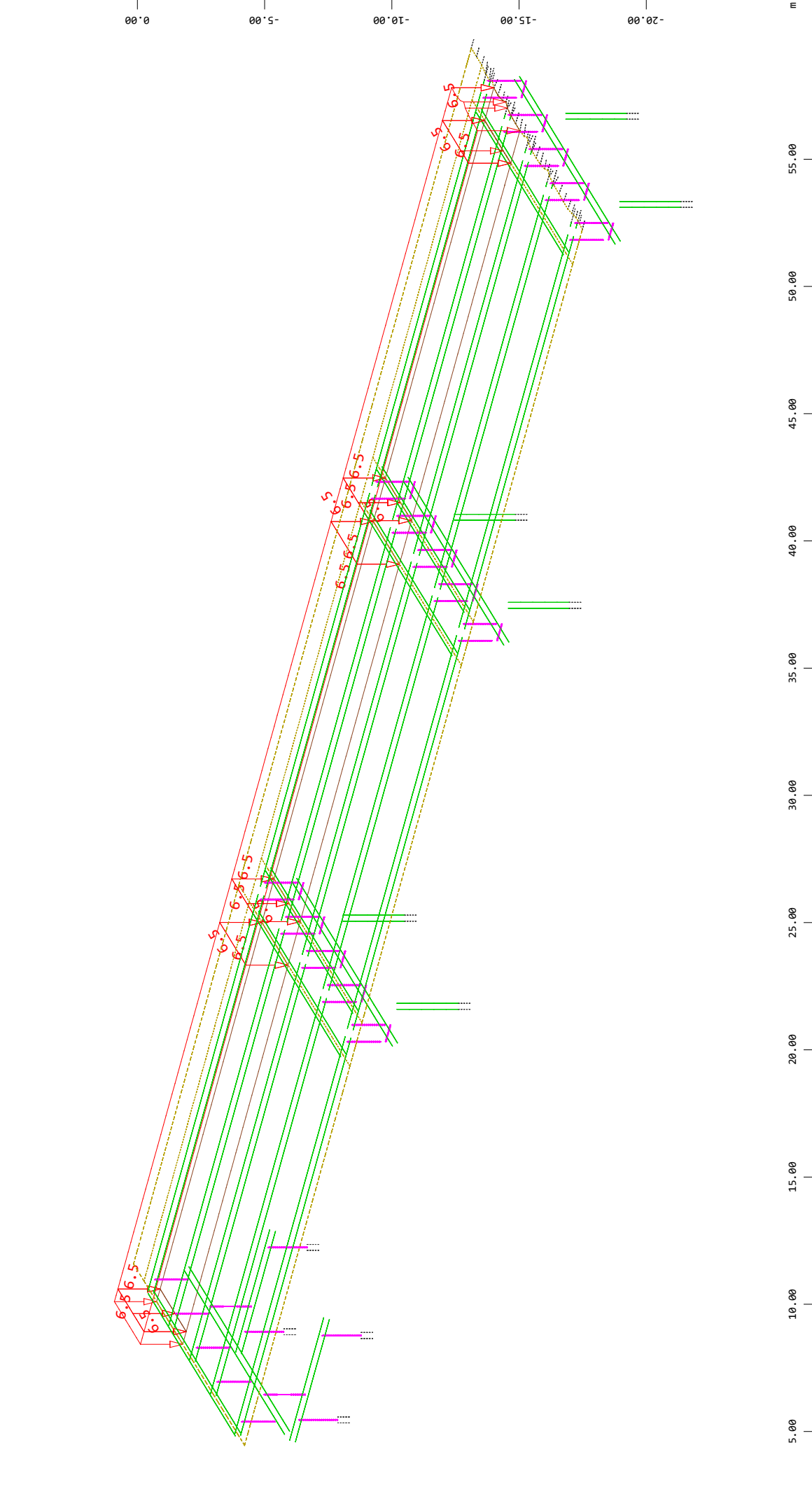




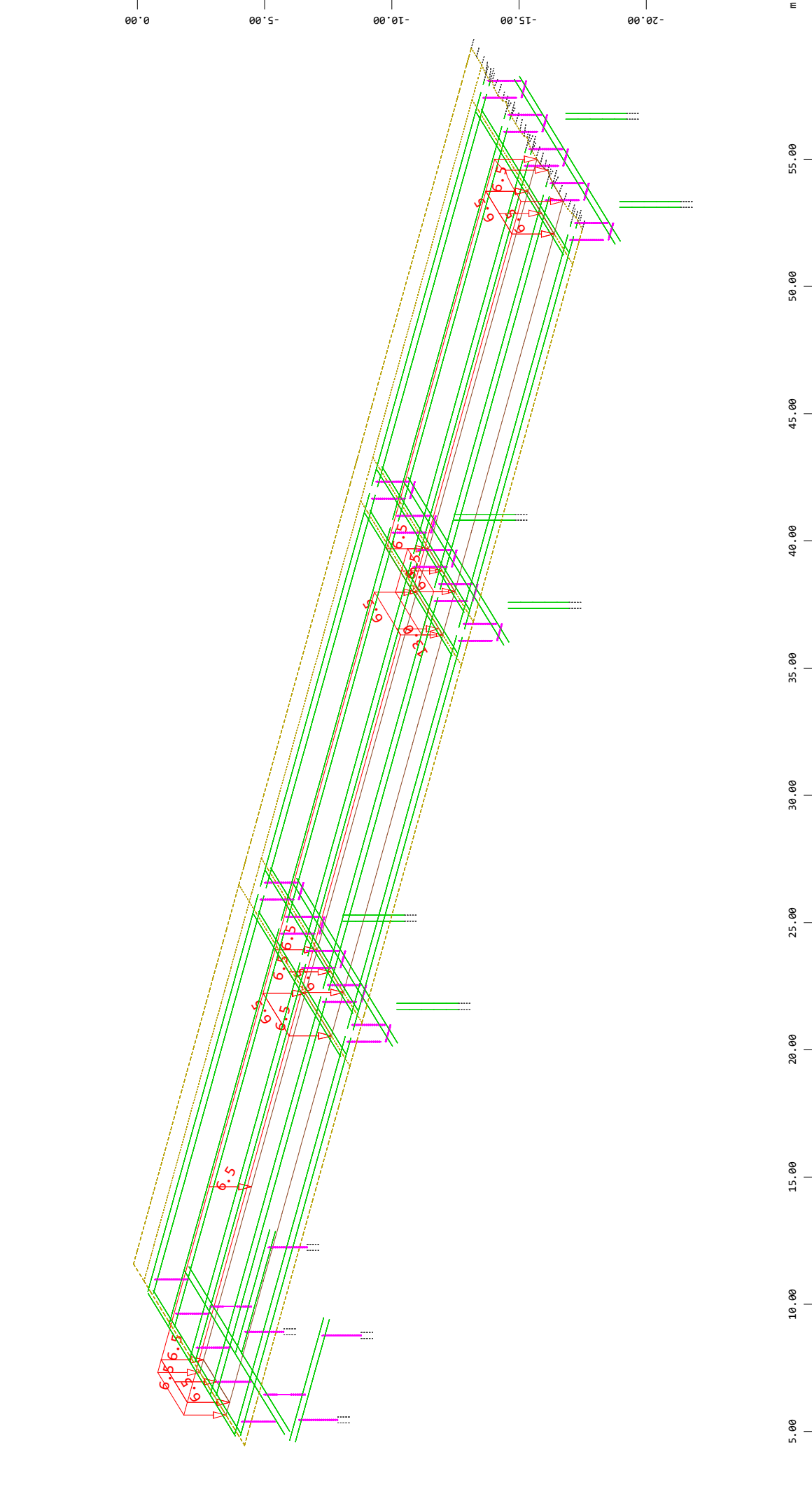




| | | | | | | | |
|---|-------------------------|---------|---------------|--------------------|--|-----------------------|-----------|
| Z | All loads, Loadcase 101 | (CS 77) | LM1-UDL-basic | , (1 cm 3D = unit) | Free area load (force) in global Z (Unit=3.0 kN/m ²) | (Min=-2.5) (Max=-2.5) | M 1 : 208 |
| Y | All loads, Loadcase 102 | (CS 77) | LM1-UDL-basic | , (1 cm 3D = unit) | Free area load (force) in global Y (Unit=3.0 kN/m ²) | (Min=-2.5) (Max=-2.5) | X * 0.861 |
| X | All loads, Loadcase 103 | (CS 77) | LM1-UDL-basic | , (1 cm 3D = unit) | Free area load (force) in global X (Unit=3.0 kN/m ²) | (Min=-2.5) (Max=-2.5) | Y * 0.655 |
| | | | | | | | Z * 0.911 |



| | | | | | | | |
|---|-------------------------|---------|-----------------------|--------------------|---|-----------------------|-----------|
| Z | All loads, Loadcase 111 | (CS 77) | LM1-UDL-overload-Left | , (1 cm 3D = unit) | Free area load (force) in global Z (Unit=7.4 kN/m²) | (Min=-6.5) (Max=-6.5) | M 1 : 208 |
| Y | All loads, Loadcase 112 | (CS 77) | LM1-UDL-overload-Left | , (1 cm 3D = unit) | Free area load (force) in global Z (Unit=7.4 kN/m²) | (Min=-6.5) (Max=-6.5) | X * 0.861 |
| X | All loads, Loadcase 113 | (CS 77) | LM1-UDL-overload-Left | , (1 cm 3D = unit) | Free area load (force) in global Z (Unit=7.4 kN/m²) | (Min=-6.5) (Max=-6.5) | Y * 0.655 |
| | | | | | | | Z * 0.911 |



Z

Y

X

All loads, Loadcase 121 (CS 77) LM1-UDL-overload-Right , (1 cm 3D = unit) Free area load (force) in global Z (Unit=7.4 kN/m²) (Max=-6.5)

Z

Y

X

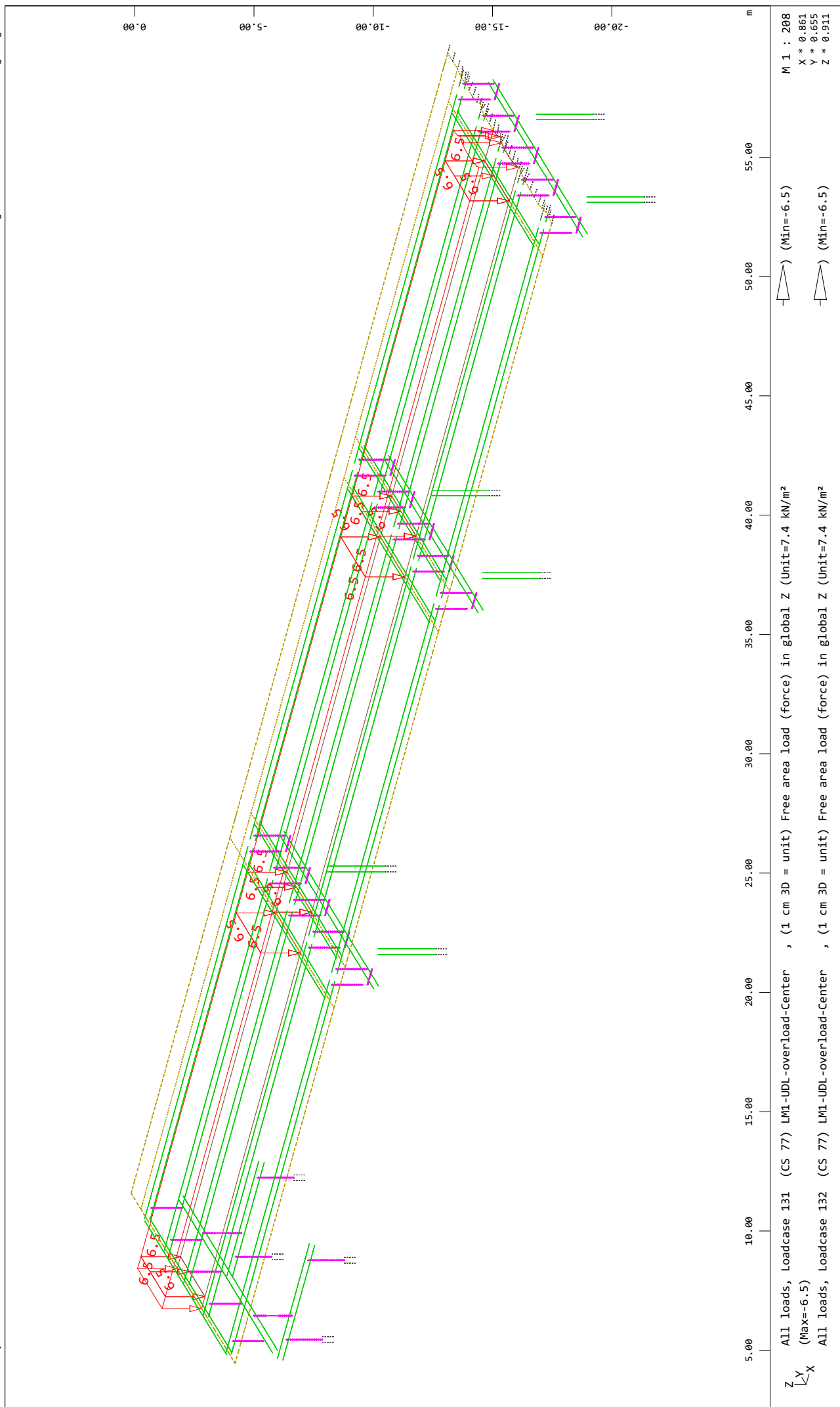
All loads, Loadcase 122 (CS 77) LM1-UDL-overload-Right , (1 cm 3D = unit) Free area load (force) in global Z (Unit=7.4 kN/m²) (Min=-6.5)

Z

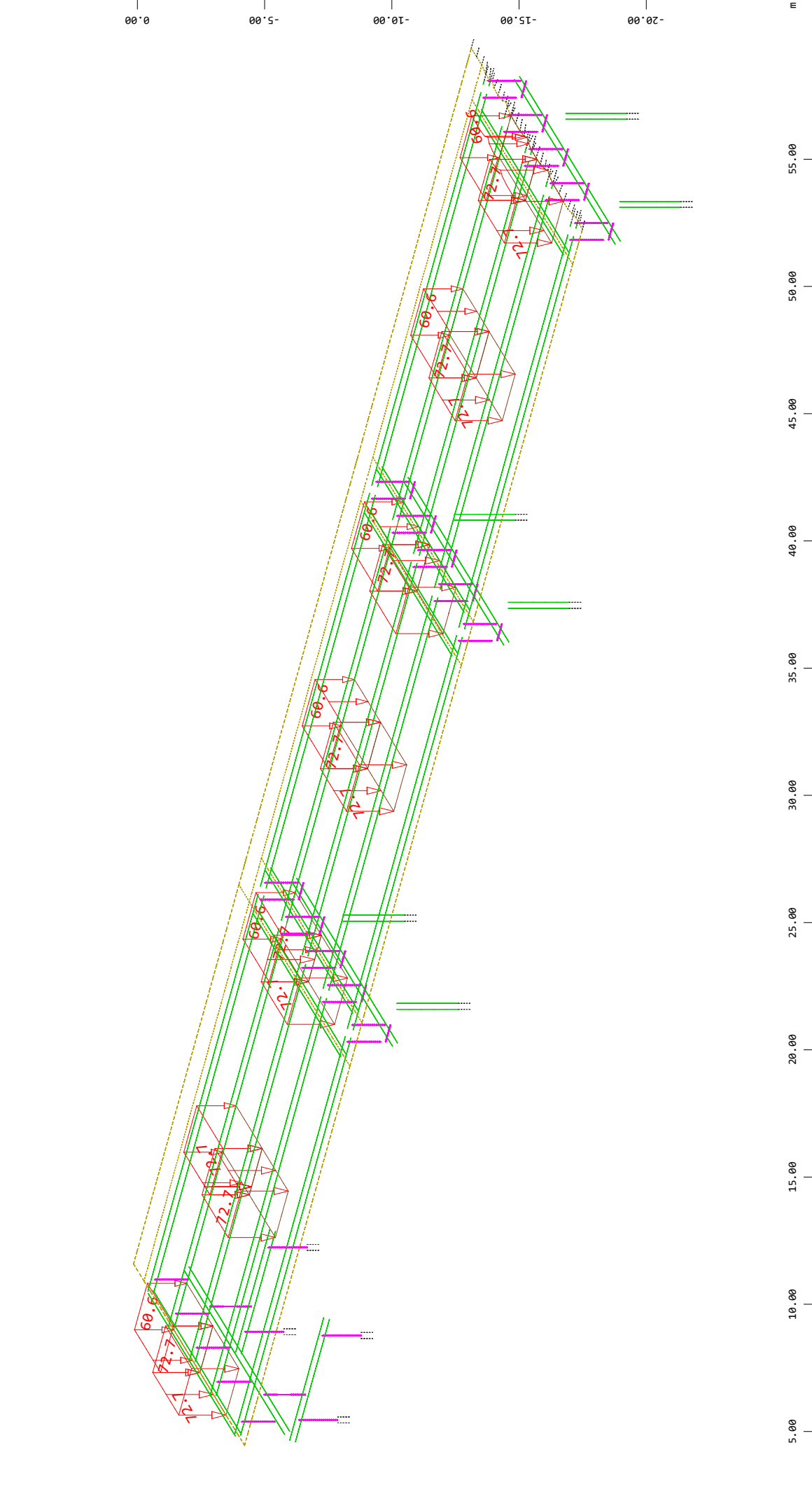
Y

X

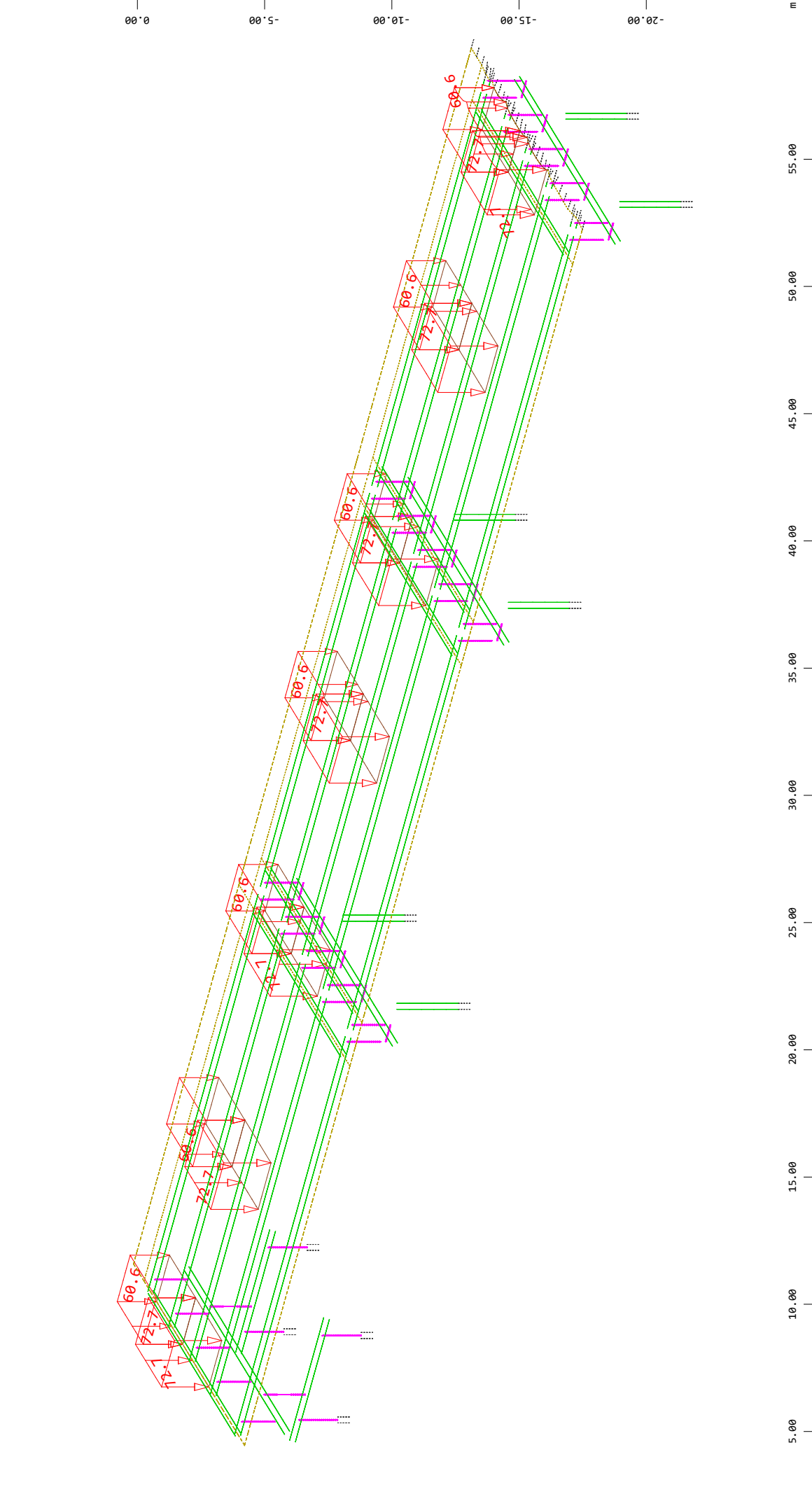
M 1 : 208
X * 0.861
Y * 0.655
Z * 0.911





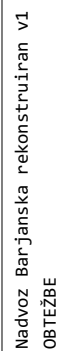


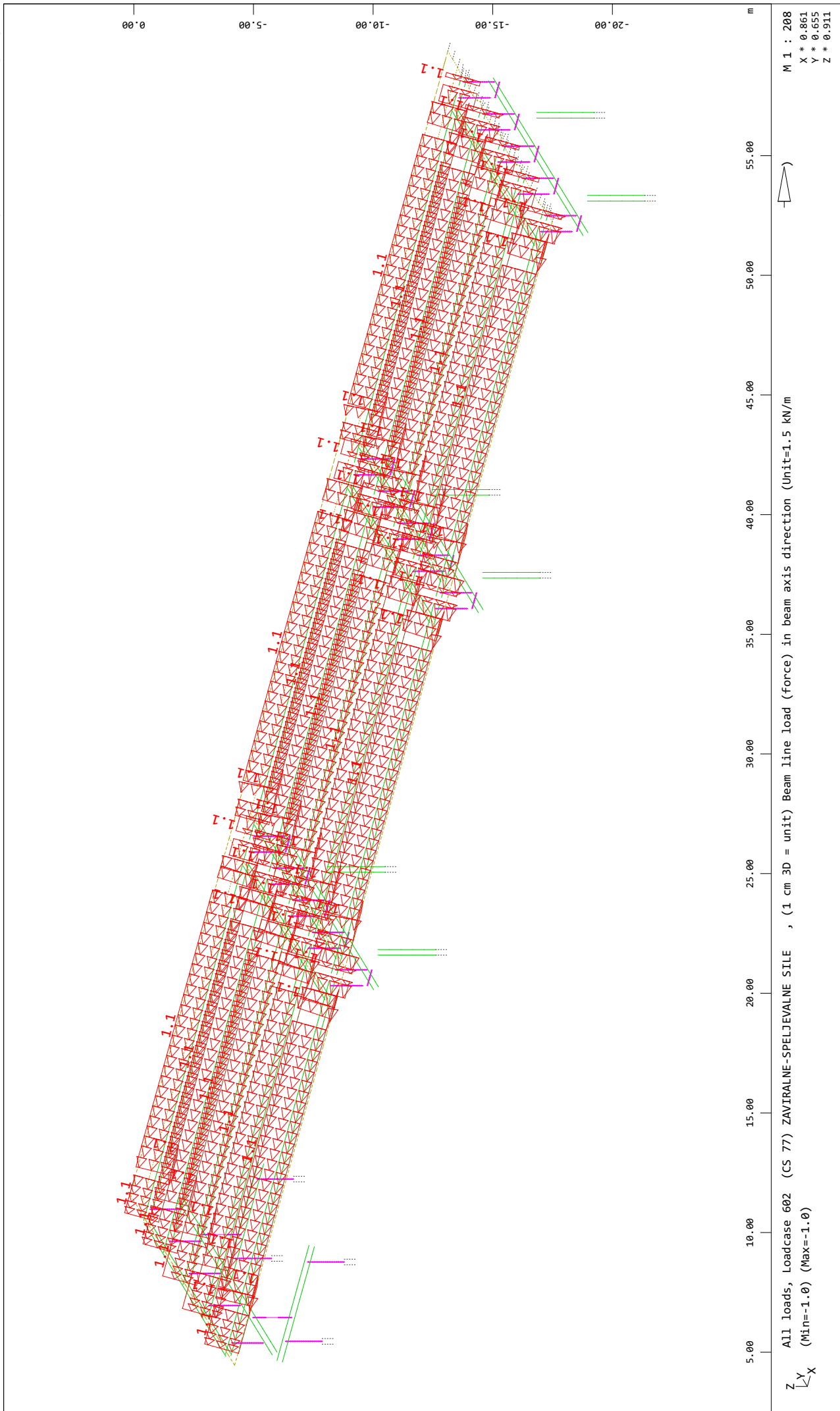
| | | | |
|---|---|-------------------------|-----------|
| Z | All loads, Loadcase 301 (CS 77) LM1-TS-Right, (1 cm 3D = unit) Free area load (force) in global Z (Unit=74.2 kN/m²) | (Min=-72.7) (Max=-60.6) | M 1 : 208 |
| Y | All loads, Loadcase 306 (CS 77) LM1-TS-Right, (1 cm 3D = unit) Free area load (force) in global Z (Unit=74.2 kN/m²) | (Min=-72.7) (Max=-60.6) | X * 0.861 |
| X | All loads, Loadcase 312 (CS 77) LM1-TS-Right, (1 cm 3D = unit) Free area load (force) in global Z (Unit=74.2 kN/m²) | (Min=-72.7) (Max=-60.6) | Y * 0.655 |
| | | | Z * 0.911 |



| | | | | | |
|--|-------------------------|-----------------------|--------------------|------------------------------------|--------------------------------|
| $\begin{matrix} Z \\ \swarrow \searrow \\ Y \\ X \end{matrix}$ | All loads, Loadcase 401 | (CS 77) LM1-TS-Center | , (1 cm 3D = unit) | Free area load (force) in global Z | (Unit=74.2 kN/m ²) |
| | All loads, Loadcase 406 | (CS 77) LM1-TS-Center | , (1 cm 3D = unit) | Free area load (force) in global Z | (Unit=74.2 kN/m ²) |
| | All loads, Loadcase 412 | (CS 77) LM1-TS-Center | , (1 cm 3D = unit) | Free area load (force) in global Z | (Unit=74.2 kN/m ²) |
| | | | | | |
| | | | | | (Min=-72.7) (Max=-60.6) |
| | | | | | (Min=-72.7) (Max=-60.6) |
| | | | | | (Min=-72.7) (Max=-60.6) |
| | | | | | M 1 : 208 |
| | | | | | X * 0.861 |
| | | | | | Y * 0.655 |
| | | | | | Z * 0.911 |

Nadvoz Barjanska rekonstruiran v1
OBTEŽBE





2.4.3 POTRES

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Nadvoz Barjanska rekonstruiran v1
 Calculation Of Eigenvalues

Elementgroups

| No. | Fac-S | Fac-B | Fac-L | LC-P |
|--|-------|-------|-------|------|
| 10 | 1.000 | 1.000 | 1.000 | 0 |
| 11 | 1.000 | 1.000 | 1.000 | 0 |
| 12 | 1.000 | 1.000 | 1.000 | 0 |
| 13 | 1.000 | 1.000 | 1.000 | 0 |
| 14 | 1.000 | 1.000 | 1.000 | 0 |
| 15 | 1.000 | 1.000 | 1.000 | 0 |
| 21 | 1.000 | 1.000 | 1.000 | 0 |
| 22 | 1.000 | 1.000 | 1.000 | 0 |
| 23 | 1.000 | 1.000 | 1.000 | 0 |
| 24 | 1.000 | 1.000 | 1.000 | 0 |
| 25 | 1.000 | 1.000 | 1.000 | 0 |
| 28 | 1.000 | 1.000 | 1.000 | 0 |
| 31 | 1.000 | 1.000 | 1.000 | 0 |
| 40 | 1.000 | 1.000 | 1.000 | 0 |
| 50 | 1.000 | 1.000 | 1.000 | 0 |
| 55 | 1.000 | 1.000 | 1.000 | 0 |
| 70 | 1.000 | 1.000 | 1.000 | 0 |
| 90 | 1.000 | 1.000 | 1.000 | 0 |
| 101 | 1.000 | 1.000 | 1.000 | 0 |
| 102 | 1.000 | 1.000 | 1.000 | 0 |
| 103 | 1.000 | 1.000 | 1.000 | 0 |
| No. group number Fac-S factor stiffness Fac-B factor stiffness quad bedding Fac-L factor loads from primary stress state LC-P primary loadcase | | | | |

Additional group data GRP2

| No. | QUEX | QUEY | QEMX | QEMY |
|--|-------|-------|-------|-------|
| 10 | 1.000 | 1.000 | 1.000 | 1.000 |
| 11 | 1.000 | 1.000 | 1.000 | 1.000 |
| 12 | 1.000 | 1.000 | 1.000 | 1.000 |
| 13 | 1.000 | 1.000 | 1.000 | 1.000 |
| 14 | 1.000 | 1.000 | 1.000 | 1.000 |
| 15 | 1.000 | 1.000 | 1.000 | 1.000 |
| 21 | 0.000 | 1.000 | 0.000 | 1.000 |
| 22 | 0.000 | 1.000 | 0.000 | 1.000 |
| 23 | 0.000 | 1.000 | 0.000 | 1.000 |
| 24 | 0.000 | 1.000 | 0.000 | 1.000 |
| 25 | 1.000 | 1.000 | 1.000 | 1.000 |
| 28 | 1.000 | 1.000 | 1.000 | 1.000 |
| 31 | 1.000 | 1.000 | 1.000 | 1.000 |
| 40 | 1.000 | 1.000 | 1.000 | 1.000 |
| 50 | 1.000 | 1.000 | 1.000 | 1.000 |
| 55 | 1.000 | 1.000 | 1.000 | 1.000 |
| 70 | 1.000 | 1.000 | 1.000 | 1.000 |
| 90 | 1.000 | 1.000 | 1.000 | 1.000 |
| 101 | 1.000 | 1.000 | 1.000 | 1.000 |
| 102 | 1.000 | 1.000 | 1.000 | 1.000 |
| 103 | 1.000 | 1.000 | 1.000 | 1.000 |
| No. group number QUEX reduction of the QUAD axial force stiffness only in local x QUEY reduction of the QUAD axial force stiffness only in local y QEMX,QEMY reduction of E-modulus of QUAD elements in local x+y direction | | | | |

Sum of Masses

| | TM-X[t] | TM-Y[t] | TM-Z[t] | RM-X[tm²] | RM-Y[tm²] | RM-Z[tm²] |
|-------|----------|----------|----------|-----------|-----------|-----------|
| total | 7962.051 | 7962.051 | 7962.051 | 2413.992 | 2061.625 | 827.234 |
| activ | 7962.099 | 7962.099 | 7962.099 | 2413.992 | 2061.614 | 827.234 |

Nadvoz Barjanska rekonstruiran v1
Calculation Of Eigenvalues

Center of mass

| X[m] | Y[m] | Z[m] |
|--------|-------|--------|
| 85.896 | 0.042 | -8.565 |

Parameter of System of Equations

Number of unknowns 62340 DIRECT-SPARSE
Total entries 1024006
Total entries after fill in 6684258
Mass matrix 149888 (consistent)

Eigenfrequencies

Using Lanczos Method
Iterationsvectors 400
Rayleighfactor A 0.00000
Rayleighfactor B 0.00000
Modal Damping 0.05000

| No | LC | Eigenvalue [1/Sec2] | Relativ error | frequency [Hertz] | Period [sec] | modal damping |
|----|-------|------------------------|------------------|----------------------|-----------------|------------------|
| 1 | 10001 | 1.13349E+01 | 3.84E-20 | 0.536 | 1.866254 | 0.05000 |
| 2 | 10002 | 1.84168E+01 | 1.85E-19 | 0.683 | 1.464106 | 0.05000 |
| 3 | 10003 | 2.02634E+01 | 7.18E-20 | 0.716 | 1.395802 | 0.05000 |
| 4 | 10004 | 6.16143E+01 | 2.91E-19 | 1.249 | 0.800459 | 0.05000 |
| 5 | 10005 | 1.13980E+02 | 7.44E-19 | 1.699 | 0.588526 | 0.05000 |
| 6 | 10006 | 1.16764E+02 | 5.77E-19 | 1.720 | 0.581467 | 0.05000 |
| 7 | 10007 | 1.41818E+02 | 6.92E-19 | 1.895 | 0.527611 | 0.05000 |
| 8 | 10008 | 1.67812E+02 | 6.78E-19 | 2.062 | 0.485030 | 0.05000 |
| 9 | 10009 | 1.73360E+02 | 3.80E-19 | 2.096 | 0.477206 | 0.05000 |
| 10 | 10010 | 1.73731E+02 | 2.36E-19 | 2.098 | 0.476696 | 0.05000 |
| 11 | 10011 | 1.77534E+02 | 3.43E-19 | 2.121 | 0.471562 | 0.05000 |
| 12 | 10012 | 1.83687E+02 | 9.50E-20 | 2.157 | 0.463598 | 0.05000 |
| 13 | 10013 | 1.97010E+02 | 8.42E-19 | 2.234 | 0.447647 | 0.05000 |
| 14 | 10014 | 2.05659E+02 | 1.83E-19 | 2.282 | 0.438134 | 0.05000 |
| 15 | 10015 | 2.12820E+02 | 1.70E-18 | 2.322 | 0.430699 | 0.05000 |
| 16 | 10016 | 2.14613E+02 | 1.15E-18 | 2.332 | 0.428895 | 0.05000 |
| 17 | 10017 | 2.18321E+02 | 4.05E-19 | 2.352 | 0.425238 | 0.05000 |
| 18 | 10018 | 2.27962E+02 | 1.36E-18 | 2.403 | 0.416149 | 0.05000 |
| 19 | 10019 | 2.43024E+02 | 4.88E-19 | 2.481 | 0.403047 | 0.05000 |
| 20 | 10020 | 2.70605E+02 | 5.71E-19 | 2.618 | 0.381955 | 0.05000 |
| 21 | 10021 | 2.78620E+02 | 5.03E-19 | 2.657 | 0.376421 | 0.05000 |
| 22 | 10022 | 2.79314E+02 | 1.57E-18 | 2.660 | 0.375953 | 0.05000 |
| 23 | 10023 | 2.89979E+02 | 2.66E-19 | 2.710 | 0.368975 | 0.05000 |
| 24 | 10024 | 2.91017E+02 | 1.13E-18 | 2.715 | 0.368316 | 0.05000 |
| 25 | 10025 | 3.03100E+02 | 1.17E-18 | 2.771 | 0.360900 | 0.05000 |
| 26 | 10026 | 3.20655E+02 | 1.42E-18 | 2.850 | 0.350882 | 0.05000 |
| 27 | 10027 | 3.26758E+02 | 5.76E-19 | 2.877 | 0.347590 | 0.05000 |
| 28 | 10028 | 3.28569E+02 | 2.93E-18 | 2.885 | 0.346630 | 0.05000 |
| 29 | 10029 | 3.34789E+02 | 1.33E-19 | 2.912 | 0.343395 | 0.05000 |
| 30 | 10030 | 3.34934E+02 | 3.62E-19 | 2.913 | 0.343321 | 0.05000 |
| 31 | 10031 | 3.48044E+02 | 1.45E-18 | 2.969 | 0.336793 | 0.05000 |
| 32 | 10032 | 3.82888E+02 | 0.00E+00 | 3.114 | 0.321103 | 0.05000 |
| 33 | 10033 | 3.87272E+02 | 0.00E+00 | 3.132 | 0.319280 | 0.05000 |
| 34 | 10034 | 4.20433E+02 | 0.00E+00 | 3.263 | 0.306430 | 0.05000 |
| 35 | 10035 | 4.35871E+02 | 0.00E+00 | 3.323 | 0.300954 | 0.05000 |
| 36 | 10036 | 4.49733E+02 | 0.00E+00 | 3.375 | 0.296280 | 0.05000 |
| 37 | 10037 | 4.81621E+02 | 0.00E+00 | 3.493 | 0.286304 | 0.05000 |
| 38 | 10038 | 4.93217E+02 | 0.00E+00 | 3.535 | 0.282918 | 0.05000 |
| 39 | 10039 | 5.25419E+02 | 0.00E+00 | 3.648 | 0.274111 | 0.05000 |
| 40 | 10040 | 5.33208E+02 | 0.00E+00 | 3.675 | 0.272102 | 0.05000 |
| 41 | 10041 | 5.84540E+02 | 0.00E+00 | 3.848 | 0.259880 | 0.05000 |
| 42 | 10042 | 6.19260E+02 | 0.00E+00 | 3.961 | 0.252490 | 0.05000 |

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Nadvoz Barjanska rekonstruiran v1
 Calculation Of Eigenvalues

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| No | LC | Eigenvalue [1/Sec ²] | Relativ error | frequency [Hertz] | Period [sec] | modal damping |
|-----|-------|-------------------------------------|------------------|----------------------|-----------------|------------------|
| 43 | 10043 | 6.52722E+02 | 0.00E+00 | 4.066 | 0.245932 | 0.05000 |
| 44 | 10044 | 6.65658E+02 | 0.00E+00 | 4.106 | 0.243531 | 0.05000 |
| 45 | 10045 | 6.74593E+02 | 0.00E+00 | 4.134 | 0.241913 | 0.05000 |
| 46 | 10046 | 7.22119E+02 | 0.00E+00 | 4.277 | 0.233817 | 0.05000 |
| 47 | 10047 | 8.09254E+02 | 0.00E+00 | 4.528 | 0.220870 | 0.05000 |
| 48 | 10048 | 8.27167E+02 | 0.00E+00 | 4.577 | 0.218466 | 0.05000 |
| 49 | 10049 | 8.36293E+02 | 0.00E+00 | 4.603 | 0.217270 | 0.05000 |
| 50 | 10050 | 8.36626E+02 | 0.00E+00 | 4.603 | 0.217227 | 0.05000 |
| 51 | 10051 | 8.71207E+02 | 0.00E+00 | 4.698 | 0.212872 | 0.05000 |
| 52 | 10052 | 8.82595E+02 | 0.00E+00 | 4.728 | 0.211495 | 0.05000 |
| 53 | 10053 | 9.64978E+02 | 0.00E+00 | 4.944 | 0.202265 | 0.05000 |
| 54 | 10054 | 9.83922E+02 | 0.00E+00 | 4.992 | 0.200309 | 0.05000 |
| 55 | 10055 | 1.01555E+03 | 0.00E+00 | 5.072 | 0.197164 | 0.05000 |
| 56 | 10056 | 1.02592E+03 | 0.00E+00 | 5.098 | 0.196166 | 0.05000 |
| 57 | 10057 | 1.02640E+03 | 0.00E+00 | 5.099 | 0.196120 | 0.05000 |
| 58 | 10058 | 1.02644E+03 | 0.00E+00 | 5.099 | 0.196116 | 0.05000 |
| 59 | 10059 | 1.02645E+03 | 0.00E+00 | 5.099 | 0.196115 | 0.05000 |
| 60 | 10060 | 1.02646E+03 | 0.00E+00 | 5.099 | 0.196114 | 0.05000 |
| 61 | 10061 | 1.02672E+03 | 0.00E+00 | 5.100 | 0.196089 | 0.05000 |
| 62 | 10062 | 1.16055E+03 | 0.00E+00 | 5.422 | 0.184437 | 0.05000 |
| 63 | 10063 | 1.21423E+03 | 0.00E+00 | 5.546 | 0.180314 | 0.05000 |
| 64 | 10064 | 1.22441E+03 | 0.00E+00 | 5.569 | 0.179563 | 0.05000 |
| 65 | 10065 | 1.22510E+03 | 0.00E+00 | 5.571 | 0.179513 | 0.05000 |
| 66 | 10066 | 1.22513E+03 | 0.00E+00 | 5.571 | 0.179510 | 0.05000 |
| 67 | 10067 | 1.22517E+03 | 0.00E+00 | 5.571 | 0.179507 | 0.05000 |
| 68 | 10068 | 1.22521E+03 | 0.00E+00 | 5.571 | 0.179504 | 0.05000 |
| 69 | 10069 | 1.22577E+03 | 0.00E+00 | 5.572 | 0.179463 | 0.05000 |
| 70 | 10070 | 1.25095E+03 | 0.00E+00 | 5.629 | 0.177648 | 0.05000 |
| 71 | 10071 | 1.28361E+03 | 0.00E+00 | 5.702 | 0.175373 | 0.05000 |
| 72 | 10072 | 1.30413E+03 | 0.00E+00 | 5.748 | 0.173988 | 0.05000 |
| 73 | 10073 | 1.33354E+03 | 0.00E+00 | 5.812 | 0.172059 | 0.05000 |
| 74 | 10074 | 1.34250E+03 | 0.00E+00 | 5.831 | 0.171483 | 0.05000 |
| 75 | 10075 | 1.37978E+03 | 0.00E+00 | 5.912 | 0.169151 | 0.05000 |
| 76 | 10076 | 1.39163E+03 | 0.00E+00 | 5.937 | 0.168429 | 0.05000 |
| 77 | 10077 | 1.41131E+03 | 0.00E+00 | 5.979 | 0.167251 | 0.05000 |
| 78 | 10078 | 1.41860E+03 | 0.00E+00 | 5.994 | 0.166821 | 0.05000 |
| 79 | 10079 | 1.45617E+03 | 0.00E+00 | 6.073 | 0.164655 | 0.05000 |
| 80 | 10080 | 1.49386E+03 | 0.00E+00 | 6.151 | 0.162564 | 0.05000 |
| 81 | 10081 | 1.57896E+03 | 0.00E+00 | 6.324 | 0.158123 | 0.05000 |
| 82 | 10082 | 1.58085E+03 | 0.00E+00 | 6.328 | 0.158028 | 0.05000 |
| 83 | 10083 | 1.58170E+03 | 0.00E+00 | 6.330 | 0.157986 | 0.05000 |
| 84 | 10084 | 1.58177E+03 | 0.00E+00 | 6.330 | 0.157982 | 0.05000 |
| 85 | 10085 | 1.58188E+03 | 0.00E+00 | 6.330 | 0.157977 | 0.05000 |
| 86 | 10086 | 1.58204E+03 | 0.00E+00 | 6.330 | 0.157969 | 0.05000 |
| 87 | 10087 | 1.58282E+03 | 0.00E+00 | 6.332 | 0.157930 | 0.05000 |
| 88 | 10088 | 1.60356E+03 | 0.00E+00 | 6.373 | 0.156905 | 0.05000 |
| 89 | 10089 | 1.61757E+03 | 0.00E+00 | 6.401 | 0.156224 | 0.05000 |
| 90 | 10090 | 1.65448E+03 | 0.00E+00 | 6.474 | 0.154472 | 0.05000 |
| 91 | 10091 | 1.66453E+03 | 0.00E+00 | 6.493 | 0.154005 | 0.05000 |
| 92 | 10092 | 1.72100E+03 | 0.00E+00 | 6.603 | 0.151457 | 0.05000 |
| 93 | 10093 | 1.73189E+03 | 0.00E+00 | 6.623 | 0.150980 | 0.05000 |
| 94 | 10094 | 1.74262E+03 | 0.00E+00 | 6.644 | 0.150515 | 0.05000 |
| 95 | 10095 | 1.77082E+03 | 0.00E+00 | 6.697 | 0.149311 | 0.05000 |
| 96 | 10096 | 1.82759E+03 | 0.00E+00 | 6.804 | 0.146974 | 0.05000 |
| 97 | 10097 | 1.85300E+03 | 0.00E+00 | 6.851 | 0.145963 | 0.05000 |
| 98 | 10098 | 1.88601E+03 | 0.00E+00 | 6.912 | 0.144680 | 0.05000 |
| 99 | 10099 | 1.90301E+03 | 0.00E+00 | 6.943 | 0.144032 | 0.05000 |
| 100 | 10100 | 1.91841E+03 | 0.00E+00 | 6.971 | 0.143453 | 0.05000 |

Nadvoz Barjanska rekonstruiran v1
 Calculation Of Eigenvalues

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| No | LC | Eigenvalue [1/Sec ²] | Relativ error | frequency [Hertz] | Period [sec] | modal damping |
|-----|-------|-------------------------------------|------------------|----------------------|-----------------|------------------|
| 101 | 10101 | 1.94078E+03 | 0.00E+00 | 7.011 | 0.142624 | 0.05000 |
| 102 | 10102 | 1.97681E+03 | 0.00E+00 | 7.076 | 0.141318 | 0.05000 |
| 103 | 10103 | 1.99545E+03 | 0.00E+00 | 7.110 | 0.140656 | 0.05000 |
| 104 | 10104 | 2.00335E+03 | 0.00E+00 | 7.124 | 0.140379 | 0.05000 |
| 105 | 10105 | 2.01553E+03 | 0.00E+00 | 7.145 | 0.139954 | 0.05000 |
| 106 | 10106 | 2.04292E+03 | 0.00E+00 | 7.194 | 0.139013 | 0.05000 |
| 107 | 10107 | 2.06897E+03 | 0.00E+00 | 7.239 | 0.138135 | 0.05000 |
| 108 | 10108 | 2.07785E+03 | 0.00E+00 | 7.255 | 0.137839 | 0.05000 |
| 109 | 10109 | 2.08185E+03 | 0.00E+00 | 7.262 | 0.137707 | 0.05000 |
| 110 | 10110 | 2.08545E+03 | 0.00E+00 | 7.268 | 0.137588 | 0.05000 |
| 111 | 10111 | 2.08652E+03 | 0.00E+00 | 7.270 | 0.137553 | 0.05000 |
| 112 | 10112 | 2.08665E+03 | 0.00E+00 | 7.270 | 0.137548 | 0.05000 |
| 113 | 10113 | 2.08679E+03 | 0.00E+00 | 7.270 | 0.137544 | 0.05000 |
| 114 | 10114 | 2.08694E+03 | 0.00E+00 | 7.271 | 0.137539 | 0.05000 |
| 115 | 10115 | 2.08698E+03 | 0.00E+00 | 7.271 | 0.137537 | 0.05000 |
| 116 | 10116 | 2.08728E+03 | 0.00E+00 | 7.271 | 0.137527 | 0.05000 |
| 117 | 10117 | 2.08811E+03 | 0.00E+00 | 7.273 | 0.137500 | 0.05000 |
| 118 | 10118 | 2.09552E+03 | 0.00E+00 | 7.286 | 0.137257 | 0.05000 |
| 119 | 10119 | 2.10848E+03 | 0.00E+00 | 7.308 | 0.136834 | 0.05000 |
| 120 | 10120 | 2.12400E+03 | 0.00E+00 | 7.335 | 0.136334 | 0.05000 |
| 121 | 10121 | 2.15131E+03 | 0.00E+00 | 7.382 | 0.135465 | 0.05000 |
| 122 | 10122 | 2.15494E+03 | 0.00E+00 | 7.388 | 0.135351 | 0.05000 |
| 123 | 10123 | 2.15909E+03 | 0.00E+00 | 7.395 | 0.135221 | 0.05000 |
| 124 | 10124 | 2.20072E+03 | 0.00E+00 | 7.466 | 0.133936 | 0.05000 |
| 125 | 10125 | 2.21411E+03 | 0.00E+00 | 7.489 | 0.133530 | 0.05000 |
| 126 | 10126 | 2.22338E+03 | 0.00E+00 | 7.505 | 0.133252 | 0.05000 |
| 127 | 10127 | 2.23604E+03 | 0.00E+00 | 7.526 | 0.132874 | 0.05000 |
| 128 | 10128 | 2.40991E+03 | 0.00E+00 | 7.813 | 0.127991 | 0.05000 |
| 129 | 10129 | 2.43741E+03 | 0.00E+00 | 7.857 | 0.127267 | 0.05000 |
| 130 | 10130 | 2.44068E+03 | 0.00E+00 | 7.863 | 0.127182 | 0.05000 |
| 131 | 10131 | 2.46113E+03 | 0.00E+00 | 7.896 | 0.126652 | 0.05000 |
| 132 | 10132 | 2.47834E+03 | 0.00E+00 | 7.923 | 0.126212 | 0.05000 |
| 133 | 10133 | 2.49817E+03 | 0.00E+00 | 7.955 | 0.125710 | 0.05000 |
| 134 | 10134 | 2.50378E+03 | 0.00E+00 | 7.964 | 0.125569 | 0.05000 |
| 135 | 10135 | 2.50811E+03 | 0.00E+00 | 7.971 | 0.125460 | 0.05000 |
| 136 | 10136 | 2.51063E+03 | 0.00E+00 | 7.975 | 0.125397 | 0.05000 |
| 137 | 10137 | 2.51463E+03 | 0.00E+00 | 7.981 | 0.125298 | 0.05000 |
| 138 | 10138 | 2.56534E+03 | 0.00E+00 | 8.061 | 0.124053 | 0.05000 |
| 139 | 10139 | 2.57095E+03 | 0.00E+00 | 8.070 | 0.123918 | 0.05000 |
| 140 | 10140 | 2.57290E+03 | 0.00E+00 | 8.073 | 0.123871 | 0.05000 |
| 141 | 10141 | 2.60348E+03 | 0.00E+00 | 8.121 | 0.123141 | 0.05000 |
| 142 | 10142 | 2.62018E+03 | 0.00E+00 | 8.147 | 0.122748 | 0.05000 |
| 143 | 10143 | 2.72508E+03 | 0.00E+00 | 8.308 | 0.120362 | 0.05000 |
| 144 | 10144 | 2.72630E+03 | 0.00E+00 | 8.310 | 0.120335 | 0.05000 |
| 145 | 10145 | 2.72693E+03 | 0.00E+00 | 8.311 | 0.120321 | 0.05000 |
| 146 | 10146 | 2.72729E+03 | 0.00E+00 | 8.312 | 0.120314 | 0.05000 |
| 147 | 10147 | 2.72749E+03 | 0.00E+00 | 8.312 | 0.120309 | 0.05000 |
| 148 | 10148 | 2.72854E+03 | 0.00E+00 | 8.314 | 0.120286 | 0.05000 |
| 149 | 10149 | 2.72931E+03 | 0.00E+00 | 8.315 | 0.120269 | 0.05000 |
| 150 | 10150 | 2.82102E+03 | 0.00E+00 | 8.453 | 0.118298 | 0.05000 |
| 151 | 10151 | 2.84642E+03 | 0.00E+00 | 8.491 | 0.117769 | 0.05000 |
| 152 | 10152 | 2.87521E+03 | 0.00E+00 | 8.534 | 0.117178 | 0.05000 |
| 153 | 10153 | 2.93006E+03 | 0.00E+00 | 8.615 | 0.116076 | 0.05000 |
| 154 | 10154 | 2.95765E+03 | 0.00E+00 | 8.656 | 0.115533 | 0.05000 |
| 155 | 10155 | 2.97719E+03 | 0.00E+00 | 8.684 | 0.115153 | 0.05000 |
| 156 | 10156 | 3.13315E+03 | 0.00E+00 | 8.909 | 0.112251 | 0.05000 |
| 157 | 10157 | 3.13729E+03 | 0.00E+00 | 8.915 | 0.112177 | 0.05000 |
| 158 | 10158 | 3.15624E+03 | 0.00E+00 | 8.941 | 0.111839 | 0.05000 |

Nadvoz Barjanska rekonstruiran v1
 Calculation Of Eigenvalues

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| No | LC | Eigenvalue [1/Sec ²] | Relativ error | frequency [Hertz] | Period [sec] | modal damping |
|-----|-------|-------------------------------------|------------------|----------------------|-----------------|------------------|
| 159 | 10159 | 3.19385E+03 | 0.00E+00 | 8.995 | 0.111179 | 0.05000 |
| 160 | 10160 | 3.29001E+03 | 0.00E+00 | 9.129 | 0.109542 | 0.05000 |
| 161 | 10161 | 3.32254E+03 | 0.00E+00 | 9.174 | 0.109005 | 0.05000 |
| 162 | 10162 | 3.32659E+03 | 0.00E+00 | 9.180 | 0.108938 | 0.05000 |
| 163 | 10163 | 3.35465E+03 | 0.00E+00 | 9.218 | 0.108482 | 0.05000 |
| 164 | 10164 | 3.36277E+03 | 2.17E-38 | 9.229 | 0.108351 | 0.05000 |
| 165 | 10165 | 3.38022E+03 | 7.16E-38 | 9.253 | 0.108071 | 0.05000 |
| 166 | 10166 | 3.42944E+03 | 5.49E-35 | 9.320 | 0.107292 | 0.05000 |
| 167 | 10167 | 3.48285E+03 | 1.51E-26 | 9.393 | 0.106466 | 0.05000 |
| 168 | 10168 | 3.48957E+03 | 1.11E-21 | 9.402 | 0.106364 | 0.05000 |
| 169 | 10169 | 3.49032E+03 | 5.54E-19 | 9.403 | 0.106352 | 0.05000 |
| 170 | 10170 | 3.49062E+03 | 5.41E-19 | 9.403 | 0.106348 | 0.05000 |
| 171 | 10171 | 3.49089E+03 | 6.97E-19 | 9.403 | 0.106344 | 0.05000 |
| 172 | 10172 | 3.49115E+03 | 5.07E-20 | 9.404 | 0.106340 | 0.05000 |
| 173 | 10173 | 3.49361E+03 | 1.19E-22 | 9.407 | 0.106302 | 0.05000 |
| 174 | 10174 | 3.50197E+03 | 3.86E-25 | 9.418 | 0.106175 | 0.05000 |
| 175 | 10175 | 3.50826E+03 | 1.80E-24 | 9.427 | 0.106080 | 0.05000 |
| 176 | 10176 | 3.52271E+03 | 4.63E-28 | 9.446 | 0.105862 | 0.05000 |
| 177 | 10177 | 3.54634E+03 | 1.51E-29 | 9.478 | 0.105509 | 0.05000 |
| 178 | 10178 | 3.58493E+03 | 1.98E-27 | 9.529 | 0.104940 | 0.05000 |
| 179 | 10179 | 3.62752E+03 | 1.17E-28 | 9.586 | 0.104322 | 0.05000 |
| 180 | 10180 | 3.65084E+03 | 8.56E-26 | 9.616 | 0.103988 | 0.05000 |
| 181 | 10181 | 3.65238E+03 | 1.12E-26 | 9.619 | 0.103966 | 0.05000 |
| 182 | 10182 | 3.68553E+03 | 2.20E-25 | 9.662 | 0.103497 | 0.05000 |
| 183 | 10183 | 3.69439E+03 | 1.68E-26 | 9.674 | 0.103373 | 0.05000 |
| 184 | 10184 | 3.70837E+03 | 4.91E-23 | 9.692 | 0.103178 | 0.05000 |
| 185 | 10185 | 3.71445E+03 | 9.11E-25 | 9.700 | 0.103094 | 0.05000 |
| 186 | 10186 | 3.72017E+03 | 1.51E-24 | 9.707 | 0.103015 | 0.05000 |
| 187 | 10187 | 3.93640E+03 | 3.27E-24 | 9.986 | 0.100145 | 0.05000 |
| 188 | 10188 | 3.96752E+03 | 9.26E-23 | 10.025 | 0.099752 | 0.05000 |
| 189 | 10189 | 4.04396E+03 | 9.72E-18 | 10.121 | 0.098804 | 0.05000 |
| 190 | 10190 | 4.06628E+03 | 4.05E-17 | 10.149 | 0.098533 | 0.05000 |
| 191 | 10191 | 4.09758E+03 | 4.73E-14 | 10.188 | 0.098156 | 0.05000 |
| 192 | 10192 | 4.11309E+03 | 8.19E-13 | 10.207 | 0.097971 | 0.05000 |
| 193 | 10193 | 4.11782E+03 | 8.05E-13 | 10.213 | 0.097914 | 0.05000 |
| 194 | 10194 | 4.12251E+03 | 5.53E-11 | 10.219 | 0.097859 | 0.05000 |
| 195 | 10195 | 4.12907E+03 | 3.46E-12 | 10.227 | 0.097781 | 0.05000 |
| 196 | 10196 | 4.13635E+03 | 1.46E-12 | 10.236 | 0.097695 | 0.05000 |
| 197 | 10197 | 4.14812E+03 | 1.91E-14 | 10.251 | 0.097556 | 0.05000 |
| 198 | 10198 | 4.19832E+03 | 1.66E-13 | 10.312 | 0.096971 | 0.05000 |
| 199 | 10199 | 4.20775E+03 | 1.34E-13 | 10.324 | 0.096862 | 0.05000 |
| 200 | 10200 | 4.22416E+03 | 5.07E-13 | 10.344 | 0.096674 | 0.05000 |
| 201 | | 4.30126E+03 | 2.30E-12 | 10.438 | 0.095804 | |
| 202 | | 4.34909E+03 | 3.66E-07 | 10.496 | 0.095275 | |
| 203 | | 4.35146E+03 | 4.66E-05 | 10.499 | 0.095249 | |
| 204 | | 4.35176E+03 | 5.04E-05 | 10.499 | 0.095246 | |
| 205 | | 4.35205E+03 | 4.94E-05 | 10.499 | 0.095243 | |
| 206 | | 4.35498E+03 | 3.26E-07 | 10.503 | 0.095211 | |
| 207 | | 4.46059E+03 | 4.47E-11 | 10.630 | 0.094077 | |
| 208 | | 4.47350E+03 | 9.47E-09 | 10.645 | 0.093941 | |
| 209 | | 4.48677E+03 | 1.74E-10 | 10.661 | 0.093802 | |
| 210 | | 4.58146E+03 | 3.11E-11 | 10.773 | 0.092828 | |
| 211 | | 4.62122E+03 | 1.38E-09 | 10.819 | 0.092428 | |
| 212 | | 4.64683E+03 | 3.51E-07 | 10.849 | 0.092173 | |
| 213 | | 4.65856E+03 | 7.12E-08 | 10.863 | 0.092056 | |
| 214 | | 4.69789E+03 | 5.73E-08 | 10.909 | 0.091670 | |
| 215 | | 4.72638E+03 | 1.57E-04 | 10.942 | 0.091394 | |
| 216 | | 4.75272E+03 | 3.67E-07 | 10.972 | 0.091140 | |

Nadvoz Barjanska rekonstruiran v1
 Calculation Of Eigenvalues

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| No | LC | Eigenvalue [1/Sec ²] | Relativ error | frequency [Hertz] | Period [sec] | modal damping |
|-----|----|-------------------------------------|------------------|----------------------|-----------------|------------------|
| 217 | | 4.75988E+03 | 2.51E-07 | 10.980 | 0.091071 | |
| 218 | | 4.81057E+03 | 1.28E-06 | 11.039 | 0.090590 | |
| 219 | | 4.85918E+03 | 4.86E-07 | 11.094 | 0.090136 | |
| 220 | | 4.86603E+03 | 5.86E-07 | 11.102 | 0.090073 | |
| 221 | | 4.96335E+03 | 8.55E-06 | 11.213 | 0.089185 | |
| 222 | | 4.96767E+03 | 2.80E-05 | 11.218 | 0.089146 | |
| 223 | | 4.99951E+03 | 6.44E-06 | 11.253 | 0.088862 | |
| 224 | | 5.04788E+03 | 5.47E-05 | 11.308 | 0.088435 | |
| 225 | | 5.07088E+03 | 3.31E-04 | 11.333 | 0.088234 | |
| 226 | | 5.07640E+03 | 2.14E-04 | 11.340 | 0.088186 | |
| 227 | | 5.12028E+03 | 3.27E-04 | 11.389 | 0.087808 | |
| 228 | | 5.13529E+03 | 1.61E-04 | 11.405 | 0.087679 | |
| 229 | | 5.19389E+03 | 8.33E-06 | 11.470 | 0.087183 | |
| 230 | | 5.25412E+03 | 2.75E-04 | 11.536 | 0.086682 | |
| 231 | | 5.26127E+03 | 5.34E-02 | 11.544 | 0.086623 | |
| 232 | | 5.30602E+03 | 2.55E-03 | 11.593 | 0.086257 | |
| 233 | | 5.31148E+03 | 2.52E-03 | 11.599 | 0.086213 | |
| 234 | | 5.37131E+03 | 1.84E-04 | 11.664 | 0.085731 | |
| 235 | | 5.37188E+03 | 4.95E-05 | 11.665 | 0.085727 | |
| 236 | | 5.45833E+03 | 4.11E-06 | 11.758 | 0.085045 | |
| 237 | | 5.58329E+03 | 7.46E-09 | 11.892 | 0.084088 | |
| 238 | | 5.74094E+03 | 7.58E-08 | 12.059 | 0.082926 | |
| 239 | | 5.81640E+03 | 1.87E-01 | 12.138 | 0.082386 | |
| 240 | | 5.90641E+03 | 9.44E-03 | 12.232 | 0.081756 | |
| 241 | | 5.92791E+03 | 2.67E-02 | 12.254 | 0.081607 | |
| 242 | | 5.94198E+03 | 1.31E-03 | 12.268 | 0.081511 | |
| 243 | | 5.96132E+03 | 4.56E-04 | 12.288 | 0.081378 | |
| 244 | | 6.03143E+03 | 5.95E-05 | 12.360 | 0.080904 | |
| 245 | | 6.08651E+03 | 1.35E-04 | 12.417 | 0.080537 | |
| 246 | | 6.15089E+03 | 1.84E-03 | 12.482 | 0.080114 | |
| 247 | | 6.16678E+03 | 8.48E-05 | 12.498 | 0.080011 | |
| 248 | | 6.27700E+03 | 4.43E-05 | 12.609 | 0.079306 | |
| 249 | | 6.35456E+03 | 2.46E-03 | 12.687 | 0.078820 | |
| 250 | | 6.36287E+03 | 2.05E-03 | 12.695 | 0.078769 | |
| 251 | | 6.50895E+03 | 1.03E-03 | 12.840 | 0.077880 | |
| 252 | | 6.58905E+03 | 6.48E-04 | 12.919 | 0.077405 | |
| 253 | | 6.59925E+03 | 9.61E-03 | 12.929 | 0.077345 | |
| 254 | | 6.77614E+03 | 1.64E-04 | 13.101 | 0.076329 | |
| 255 | | 6.86390E+03 | 6.90E-02 | 13.186 | 0.075839 | |
| 256 | | 6.89408E+03 | 6.06E-03 | 13.215 | 0.075673 | |
| 257 | | 7.00199E+03 | 1.66E-01 | 13.318 | 0.075088 | |
| 258 | | 7.08948E+03 | 7.84E-02 | 13.401 | 0.074623 | |
| 259 | | 7.12337E+03 | 1.05E-01 | 13.433 | 0.074445 | |
| 260 | | 7.18473E+03 | 4.12E-02 | 13.490 | 0.074127 | |
| 261 | | 7.24138E+03 | 5.16E-02 | 13.543 | 0.073836 | |
| 262 | | 7.27550E+03 | 1.62E-02 | 13.575 | 0.073663 | |
| 263 | | 7.49780E+03 | 1.05E-02 | 13.781 | 0.072563 | |
| 264 | | 7.61262E+03 | 6.35E-02 | 13.886 | 0.072013 | |
| 265 | | 7.65464E+03 | 1.04E-01 | 13.925 | 0.071815 | |
| 266 | | 7.70241E+03 | 5.81E-02 | 13.968 | 0.071592 | |
| 267 | | 7.82963E+03 | 1.11E-01 | 14.083 | 0.071008 | |
| 268 | | 7.90433E+03 | 2.66E-02 | 14.150 | 0.070672 | |
| 269 | | 8.03535E+03 | 1.76E-02 | 14.267 | 0.070093 | |
| 270 | | 8.10138E+03 | 1.32E-01 | 14.325 | 0.069807 | |
| 271 | | 8.17390E+03 | 7.26E-02 | 14.389 | 0.069497 | |
| 272 | | 8.23769E+03 | 4.54E-02 | 14.445 | 0.069227 | |
| 273 | | 8.39781E+03 | 4.10E-02 | 14.585 | 0.068564 | |
| 274 | | 8.47897E+03 | 3.85E-02 | 14.655 | 0.068235 | |

Nadvoz Barjanska rekonstruiran v1
 Calculation Of Eigenvalues

SOFiSTiK AG - www.sofistik.de

| No | LC | Eigenvalue [1/Sec2] | Relativ error | frequency [Hertz] | Period [sec] | modal damping |
|-----|----|------------------------|------------------|----------------------|-----------------|------------------|
| 275 | | 8.62904E+03 | 3.51E-02 | 14.784 | 0.067639 | |
| 276 | | 8.73874E+03 | 8.32E-03 | 14.878 | 0.067213 | |
| 277 | | 8.86028E+03 | 2.14E-02 | 14.981 | 0.066751 | |
| 278 | | 8.92314E+03 | 5.95E-03 | 15.034 | 0.066515 | |
| 279 | | 9.10451E+03 | 1.45E-03 | 15.186 | 0.065849 | |
| 280 | | 9.26471E+03 | 1.63E-02 | 15.319 | 0.065278 | |
| 281 | | 9.31225E+03 | 1.00E-01 | 15.358 | 0.065111 | |
| 282 | | 9.54584E+03 | 6.86E-03 | 15.550 | 0.064309 | |
| 283 | | 9.68488E+03 | 8.38E-03 | 15.663 | 0.063846 | |
| 284 | | 9.89415E+03 | 1.08E-02 | 15.831 | 0.063167 | |
| 285 | | 9.95250E+03 | 1.12E-02 | 15.878 | 0.062982 | |
| 286 | | 1.01789E+04 | 1.05E-02 | 16.057 | 0.062277 | |
| 287 | | 1.03054E+04 | 8.46E-03 | 16.157 | 0.061894 | |
| 288 | | 1.05328E+04 | 7.99E-02 | 16.334 | 0.061222 | |
| 289 | | 1.07382E+04 | 4.90E-03 | 16.493 | 0.060634 | |
| 290 | | 1.07977E+04 | 4.23E-03 | 16.538 | 0.060466 | |
| 291 | | 1.11056E+04 | 1.04E-03 | 16.772 | 0.059622 | |
| 292 | | 1.13478E+04 | 3.93E-02 | 16.954 | 0.058983 | |
| 293 | | 1.15311E+04 | 3.80E-02 | 17.091 | 0.058512 | |
| 294 | | 1.15778E+04 | 2.34E-02 | 17.125 | 0.058394 | |
| 295 | | 1.19181E+04 | 8.79E-02 | 17.375 | 0.057554 | |
| 296 | | 1.20468E+04 | 4.82E-02 | 17.468 | 0.057246 | |
| 297 | | 1.22059E+04 | 3.86E-02 | 17.583 | 0.056872 | |
| 298 | | 1.24695E+04 | 5.06E-02 | 17.772 | 0.056267 | |
| 299 | | 1.27084E+04 | 5.40E-02 | 17.942 | 0.055736 | |
| 300 | | 1.28523E+04 | 8.79E-02 | 18.043 | 0.055423 | |
| 301 | | 1.30065E+04 | 1.04E-01 | 18.151 | 0.055093 | |
| 302 | | 1.33063E+04 | 3.19E-02 | 18.359 | 0.054469 | |
| 303 | | 1.36783E+04 | 5.10E-02 | 18.614 | 0.053723 | |
| 304 | | 1.38348E+04 | 7.49E-02 | 18.720 | 0.053419 | |
| 305 | | 1.40617E+04 | 4.51E-02 | 18.873 | 0.052986 | |
| 306 | | 1.43651E+04 | 1.20E-02 | 19.075 | 0.052423 | |
| 307 | | 1.47375E+04 | 1.31E-02 | 19.321 | 0.051757 | |
| 308 | | 1.49674E+04 | 1.64E-02 | 19.471 | 0.051358 | |
| 309 | | 1.54023E+04 | 1.01E-02 | 19.752 | 0.050628 | |
| 310 | | 1.59475E+04 | 1.74E-02 | 20.099 | 0.049755 | |
| 311 | | 1.61362E+04 | 7.19E-02 | 20.217 | 0.049463 | |
| 312 | | 1.64219E+04 | 3.73E-02 | 20.395 | 0.049031 | |
| 313 | | 1.67428E+04 | 9.80E-02 | 20.594 | 0.048559 | |
| 314 | | 1.70880E+04 | 7.51E-02 | 20.805 | 0.048066 | |
| 315 | | 1.74613E+04 | 5.12E-02 | 21.031 | 0.047549 | |
| 316 | | 1.79189E+04 | 5.03E-02 | 21.305 | 0.046938 | |
| 317 | | 1.83522E+04 | 1.09E-01 | 21.561 | 0.046381 | |
| 318 | | 1.86458E+04 | 1.09E-01 | 21.733 | 0.046014 | |
| 319 | | 1.91333E+04 | 5.91E-02 | 22.015 | 0.045424 | |
| 320 | | 1.95092E+04 | 7.15E-02 | 22.230 | 0.044984 | |
| 321 | | 1.99242E+04 | 7.92E-02 | 22.465 | 0.044513 | |
| 322 | | 2.05218E+04 | 4.86E-02 | 22.800 | 0.043860 | |
| 323 | | 2.12037E+04 | 1.02E-01 | 23.175 | 0.043149 | |
| 324 | | 2.15464E+04 | 9.49E-02 | 23.362 | 0.042805 | |
| 325 | | 2.23125E+04 | 1.56E-01 | 23.774 | 0.042064 | |
| 326 | | 2.26318E+04 | 8.32E-02 | 23.943 | 0.041766 | |
| 327 | | 2.32662E+04 | 8.82E-02 | 24.276 | 0.041192 | |
| 328 | | 2.37392E+04 | 5.85E-02 | 24.522 | 0.040780 | |
| 329 | | 2.46552E+04 | 8.76E-02 | 24.990 | 0.040015 | |
| 330 | | 2.53871E+04 | 9.34E-02 | 25.359 | 0.039434 | |
| 331 | | 2.60612E+04 | 9.52E-02 | 25.693 | 0.038921 | |
| 332 | | 2.66154E+04 | 9.97E-02 | 25.965 | 0.038514 | |

Nadvoz Barjanska rekonstruiran v1
 Calculation Of Eigenvalues

SOFiSTiK AG - www.sofistik.de

| No | LC | Eigenvalue [1/Sec ²] | Relativ error | frequency [Hertz] | Period [sec] | modal damping |
|-----|----|-------------------------------------|------------------|----------------------|-----------------|------------------|
| 333 | | 2.74262E+04 | 1.36E-01 | 26.357 | 0.037940 | |
| 334 | | 2.81793E+04 | 6.52E-02 | 26.717 | 0.037430 | |
| 335 | | 2.89680E+04 | 1.49E-01 | 27.088 | 0.036917 | |
| 336 | | 2.94552E+04 | 1.40E-01 | 27.315 | 0.036610 | |
| 337 | | 3.12678E+04 | 1.40E-01 | 28.143 | 0.035533 | |
| 338 | | 3.21295E+04 | 1.47E-01 | 28.528 | 0.035053 | |
| 339 | | 3.26067E+04 | 1.25E-01 | 28.739 | 0.034796 | |
| 340 | | 3.43841E+04 | 1.41E-01 | 29.512 | 0.033884 | |
| 341 | | 3.51556E+04 | 6.07E-02 | 29.841 | 0.033511 | |
| 342 | | 3.62217E+04 | 6.65E-02 | 30.290 | 0.033014 | |
| 343 | | 3.73262E+04 | 1.01E-01 | 30.749 | 0.032522 | |
| 344 | | 3.82392E+04 | 9.11E-02 | 31.122 | 0.032131 | |
| 345 | | 4.00246E+04 | 1.48E-01 | 31.841 | 0.031406 | |
| 346 | | 4.20856E+04 | 5.91E-02 | 32.650 | 0.030628 | |
| 347 | | 4.31825E+04 | 1.14E-01 | 33.073 | 0.030236 | |
| 348 | | 4.46096E+04 | 1.65E-01 | 33.615 | 0.029749 | |
| 349 | | 4.66356E+04 | 1.64E-01 | 34.370 | 0.029095 | |
| 350 | | 4.81184E+04 | 1.16E-01 | 34.912 | 0.028643 | |
| 351 | | 4.97702E+04 | 1.35E-01 | 35.506 | 0.028164 | |
| 352 | | 5.20786E+04 | 1.17E-01 | 36.320 | 0.027533 | |
| 353 | | 5.47498E+04 | 1.89E-01 | 37.240 | 0.026853 | |
| 354 | | 5.65821E+04 | 1.73E-01 | 37.858 | 0.026414 | |
| 355 | | 5.91899E+04 | 1.49E-01 | 38.721 | 0.025826 | |
| 356 | | 6.22041E+04 | 1.70E-01 | 39.694 | 0.025192 | |
| 357 | | 6.49080E+04 | 1.66E-01 | 40.548 | 0.024662 | |
| 358 | | 6.75044E+04 | 1.36E-01 | 41.351 | 0.024183 | |
| 359 | | 7.12711E+04 | 1.46E-01 | 42.489 | 0.023535 | |
| 360 | | 7.41642E+04 | 2.04E-01 | 43.343 | 0.023072 | |
| 361 | | 7.85048E+04 | 1.77E-01 | 44.593 | 0.022425 | |
| 362 | | 8.27001E+04 | 1.65E-01 | 45.769 | 0.021849 | |
| 363 | | 8.84486E+04 | 1.11E-01 | 47.333 | 0.021127 | |
| 364 | | 9.22271E+04 | 2.05E-01 | 48.334 | 0.020690 | |
| 365 | | 9.89158E+04 | 2.28E-01 | 50.056 | 0.019978 | |
| 366 | | 1.03390E+05 | 2.02E-01 | 51.175 | 0.019541 | |
| 367 | | 1.10602E+05 | 1.37E-01 | 52.930 | 0.018893 | |
| 368 | | 1.17402E+05 | 2.44E-01 | 54.533 | 0.018338 | |
| 369 | | 1.24029E+05 | 2.41E-01 | 56.051 | 0.017841 | |
| 370 | | 1.31525E+05 | 2.24E-01 | 57.720 | 0.017325 | |
| 371 | | 1.41926E+05 | 2.24E-01 | 59.958 | 0.016678 | |
| 372 | | 1.51833E+05 | 2.10E-01 | 62.016 | 0.016125 | |
| 373 | | 1.63205E+05 | 2.61E-01 | 64.297 | 0.015553 | |
| 374 | | 1.76546E+05 | 2.98E-01 | 66.873 | 0.014954 | |
| 375 | | 1.89577E+05 | 2.95E-01 | 69.297 | 0.014431 | |
| 376 | | 2.04944E+05 | 3.20E-01 | 72.051 | 0.013879 | |
| 377 | | 2.24893E+05 | 1.84E-01 | 75.476 | 0.013249 | |
| 378 | | 2.41725E+05 | 2.62E-01 | 78.249 | 0.012780 | |
| 379 | | 2.69252E+05 | 3.52E-01 | 82.585 | 0.012109 | |
| 380 | | 2.97173E+05 | 2.75E-01 | 86.761 | 0.011526 | |
| 381 | | 3.27946E+05 | 3.09E-01 | 91.143 | 0.010972 | |
| 382 | | 3.65138E+05 | 3.42E-01 | 96.172 | 0.010398 | |
| 383 | | 4.03546E+05 | 4.09E-01 | 101.104 | 0.009891 | |
| 384 | | 4.62529E+05 | 3.99E-01 | 108.240 | 0.009239 | |
| 385 | | 5.22917E+05 | 5.14E-01 | 115.090 | 0.008689 | |
| 386 | | 6.04395E+05 | 5.91E-01 | 123.732 | 0.008082 | |
| 387 | | 6.88582E+05 | 5.81E-01 | 132.068 | 0.007572 | |
| 388 | | 8.06193E+05 | 5.32E-01 | 142.902 | 0.006998 | |
| 389 | | 9.80637E+05 | 3.83E-01 | 157.607 | 0.006345 | |
| 390 | | 1.14285E+06 | 7.45E-01 | 170.143 | 0.005877 | |

Nadvoz Barjanska rekonstruiran v1
 Calculation Of Eigenvalues

| No | LC | Eigenvalue [1/Sec2] | Relativ error | frequency [Hertz] | Period [sec] | modal damping |
|-----|----|------------------------|------------------|----------------------|-----------------|------------------|
| 391 | | 1.41532E+06 | 7.03E-01 | 189.342 | 0.005281 | |
| 392 | | 1.74770E+06 | 9.60E-01 | 210.404 | 0.004753 | |
| 393 | | 2.30726E+06 | 9.84E-01 | 241.751 | 0.004136 | |
| 394 | | 3.15217E+06 | 1.22E+00 | 282.569 | 0.003539 | |
| 395 | | 4.39898E+06 | 1.36E+00 | 333.808 | 0.002996 | |
| 396 | | 6.76126E+06 | 1.75E+00 | 413.842 | 0.002416 | |
| 397 | | 1.13300E+07 | 2.25E+00 | 535.717 | 0.001867 | |
| 398 | | 2.22513E+07 | 3.05E+00 | 750.755 | 0.001332 | |
| 399 | | 5.54358E+07 | 4.03E+00 | 1184.992 | 0.000844 | |
| 400 | | 1.92335E+08 | 6.27E+00 | 2207.237 | 0.000453 | |

Modal masses - activated mass

| no | LC | frequency [Hertz] | effective modal mass X[%] Y[%] Z[%] | | | activated mass[%] | rotation around S phiX[%] phiY[%] phiZ[%] | | |
|----|-------|----------------------|--|-------|-------|----------------------|--|-------|-------|
| 1 | 10001 | 0.536 | 62.22 | 0.00 | 0.00 | 51.64546 | 0.00 | 1.45 | 0.02 |
| 2 | 10002 | 0.683 | 0.00 | 65.66 | 0.01 | 43.18671 | 24.89 | 0.00 | 0.36 |
| 3 | 10003 | 0.716 | 0.01 | 0.23 | 0.00 | 18.44359 | 0.10 | 0.01 | 69.15 |
| 4 | 10004 | 1.249 | 0.00 | 0.13 | 0.00 | 17.44696 | 0.10 | 0.00 | 0.00 |
| 5 | 10005 | 1.699 | 4.48 | 0.00 | 0.03 | 2.76197 | 0.00 | 0.13 | 0.00 |
| 6 | 10006 | 1.720 | 4.39 | 0.00 | 0.02 | 2.73323 | 0.00 | 0.11 | 0.00 |
| 7 | 10007 | 1.895 | 0.00 | 0.00 | 0.00 | 15.37662 | 0.00 | 0.00 | 3.18 |
| 8 | 10008 | 2.062 | 0.00 | 0.08 | 0.00 | 1.33839 | 0.00 | 0.00 | 0.00 |
| 9 | 10009 | 2.096 | 0.10 | 0.00 | 0.00 | 1.77880 | 0.00 | 0.00 | 0.00 |
| 10 | 10010 | 2.098 | 0.00 | 0.25 | 0.00 | 1.37780 | 0.01 | 0.00 | 0.02 |
| 11 | 10011 | 2.121 | 0.82 | 0.00 | 0.00 | 1.78384 | 0.00 | 0.00 | 0.00 |
| 12 | 10012 | 2.157 | 0.00 | 2.08 | 0.00 | 4.64481 | 0.02 | 0.00 | 0.08 |
| 13 | 10013 | 2.234 | 0.00 | 0.05 | 0.00 | 8.09571 | 0.00 | 0.01 | 2.99 |
| 14 | 10014 | 2.282 | 0.22 | 0.00 | 0.01 | 1.64723 | 0.00 | 0.01 | 0.00 |
| 15 | 10015 | 2.322 | 0.00 | 1.90 | 0.04 | 3.32875 | 0.00 | 0.00 | 0.86 |
| 16 | 10016 | 2.332 | 0.83 | 0.00 | 0.00 | 1.63244 | 0.00 | 0.02 | 0.04 |
| 17 | 10017 | 2.352 | 0.00 | 0.00 | 0.00 | 4.16103 | 0.01 | 0.11 | 11.01 |
| 18 | 10018 | 2.403 | 0.00 | 3.33 | 0.11 | 3.76207 | 0.01 | 0.00 | 0.17 |
| 19 | 10019 | 2.481 | 0.00 | 0.14 | 0.01 | 3.24747 | 0.00 | 0.03 | 0.10 |
| 20 | 10020 | 2.618 | 0.00 | 0.00 | 0.00 | 0.53712 | 0.00 | 0.00 | 0.02 |
| 21 | 10021 | 2.657 | 0.71 | 0.00 | 0.01 | 3.26417 | 0.00 | 0.03 | 0.00 |
| 22 | 10022 | 2.660 | 0.01 | 0.00 | 0.00 | 0.53973 | 0.00 | 0.00 | 0.01 |
| 23 | 10023 | 2.710 | 0.00 | 1.03 | 0.00 | 6.47879 | 0.23 | 0.00 | 0.00 |
| 24 | 10024 | 2.715 | 2.76 | 0.00 | 0.00 | 3.26958 | 0.00 | 0.11 | 0.00 |
| 25 | 10025 | 2.771 | 0.00 | 0.00 | 0.00 | 0.54805 | 0.00 | 0.00 | 0.01 |
| 26 | 10026 | 2.850 | 0.00 | 0.01 | 0.00 | 0.54702 | 0.00 | 0.00 | 0.02 |
| 27 | 10027 | 2.877 | 0.01 | 0.33 | 0.01 | 7.98909 | 0.07 | 0.02 | 0.23 |
| 28 | 10028 | 2.885 | 1.40 | 0.00 | 0.00 | 1.89496 | 0.00 | 0.07 | 0.00 |
| 29 | 10029 | 2.912 | 0.01 | 1.72 | 0.09 | 5.07872 | 0.30 | 0.00 | 0.02 |
| 30 | 10030 | 2.913 | 0.04 | 0.65 | 0.02 | 1.64442 | 0.12 | 0.02 | 0.03 |
| 31 | 10031 | 2.969 | 0.02 | 0.00 | 0.00 | 1.23503 | 0.00 | 0.01 | 0.01 |
| 32 | 10032 | 3.114 | 0.00 | 0.24 | 34.85 | 5.66328 | 0.34 | 18.79 | 0.15 |
| 33 | 10033 | 3.132 | 0.00 | 0.15 | 25.15 | 5.13140 | 0.30 | 25.92 | 0.20 |
| 34 | 10034 | 3.263 | 0.00 | 0.15 | 8.02 | 5.60119 | 0.37 | 0.00 | 0.00 |
| 35 | 10035 | 3.323 | 0.00 | 0.00 | 0.00 | 0.61013 | 0.00 | 0.00 | 0.00 |
| 36 | 10036 | 3.375 | 0.00 | 0.75 | 2.18 | 7.37642 | 1.09 | 0.00 | 0.00 |
| 37 | 10037 | 3.493 | 0.02 | 0.00 | 0.12 | 7.39395 | 0.00 | 3.89 | 0.01 |
| 38 | 10038 | 3.535 | 0.01 | 0.00 | 0.82 | 7.41421 | 0.00 | 0.97 | 0.00 |
| 39 | 10039 | 3.648 | 0.00 | 0.55 | 1.54 | 4.44746 | 2.86 | 1.68 | 1.42 |
| 40 | 10040 | 3.675 | 0.00 | 1.27 | 2.36 | 4.81297 | 5.53 | 0.64 | 0.90 |
| 41 | 10041 | 3.848 | 0.00 | 0.01 | 0.37 | 5.12701 | 0.58 | 0.00 | 0.00 |
| 42 | 10042 | 3.961 | 0.00 | 0.00 | 0.00 | 9.18734 | 0.00 | 3.64 | 0.03 |
| 43 | 10043 | 4.066 | 0.00 | 0.00 | 0.00 | 12.43411 | 0.00 | 2.86 | 0.11 |
| 44 | 10044 | 4.106 | 0.00 | 0.00 | 0.00 | 18.47486 | 0.00 | 0.25 | 0.29 |

Nadvoz Barjanska rekonstruiran v1
 Calculation Of Eigenvalues

Modal masses - activated mass

| no | LC | frequency [Hertz] | effective modal mass | | | activated mass[%] | rotation around S | | |
|-----|-------|----------------------|----------------------|------|-------|----------------------|-------------------|---------|---------|
| | | | X[%] | Y[%] | Z[%] | | phiX[%] | phiY[%] | phiZ[%] |
| 45 | 10045 | 4.134 | 0.00 | 0.05 | 0.03 | 10.24882 | 0.37 | 0.01 | 0.00 |
| 46 | 10046 | 4.277 | 0.00 | 0.01 | 12.45 | 14.15812 | 0.03 | 0.03 | 0.00 |
| 47 | 10047 | 4.528 | 0.05 | 0.00 | 0.15 | 6.89696 | 0.00 | 10.81 | 0.15 |
| 48 | 10048 | 4.577 | 0.00 | 0.04 | 1.72 | 9.12563 | 0.18 | 0.56 | 0.05 |
| 49 | 10049 | 4.603 | 0.06 | 0.02 | 0.25 | 10.11230 | 0.07 | 10.61 | 0.06 |
| 50 | 10050 | 4.603 | 0.00 | 0.00 | 0.00 | 0.01934 | 0.00 | 0.01 | 0.00 |
| 51 | 10051 | 4.698 | 0.00 | 0.22 | 2.93 | 14.06370 | 1.20 | 0.03 | 0.00 |
| 52 | 10052 | 4.728 | 0.00 | 0.00 | 0.00 | 0.01499 | 0.00 | 0.00 | 0.00 |
| 53 | 10053 | 4.944 | 0.02 | 0.00 | 0.01 | 10.07356 | 0.01 | 1.84 | 0.84 |
| 54 | 10054 | 4.992 | 0.00 | 0.12 | 0.54 | 10.46479 | 0.71 | 0.02 | 0.01 |
| 55 | 10055 | 5.072 | 0.00 | 0.03 | 0.00 | 17.12831 | 0.09 | 0.00 | 0.00 |
| 56 | 10056 | 5.098 | 0.00 | 0.00 | 0.00 | 0.09690 | 0.00 | 0.00 | 0.00 |
| 57 | 10057 | 5.099 | 0.00 | 0.00 | 0.00 | 0.09901 | 0.00 | 0.00 | 0.00 |
| 58 | 10058 | 5.099 | 0.00 | 0.00 | 0.00 | 0.21441 | 0.00 | 0.00 | 0.00 |
| 59 | 10059 | 5.099 | 0.00 | 0.00 | 0.00 | 0.17250 | 0.00 | 0.00 | 0.00 |
| 60 | 10060 | 5.099 | 0.00 | 0.00 | 0.00 | 0.18319 | 0.00 | 0.00 | 0.00 |
| 61 | 10061 | 5.100 | 0.00 | 0.00 | 0.00 | 0.09792 | 0.00 | 0.00 | 0.00 |
| 62 | 10062 | 5.422 | 0.09 | 0.00 | 0.00 | 4.82698 | 0.00 | 0.56 | 0.05 |
| 63 | 10063 | 5.546 | 0.06 | 0.00 | 0.00 | 16.69633 | 0.00 | 0.08 | 0.13 |
| 64 | 10064 | 5.569 | 0.00 | 0.00 | 0.00 | 0.10211 | 0.00 | 0.00 | 0.00 |
| 65 | 10065 | 5.571 | 0.00 | 0.00 | 0.00 | 0.13025 | 0.00 | 0.00 | 0.00 |
| 66 | 10066 | 5.571 | 0.00 | 0.00 | 0.00 | 0.21101 | 0.00 | 0.00 | 0.00 |
| 67 | 10067 | 5.571 | 0.00 | 0.00 | 0.00 | 0.21375 | 0.00 | 0.00 | 0.00 |
| 68 | 10068 | 5.571 | 0.00 | 0.00 | 0.00 | 0.25117 | 0.00 | 0.00 | 0.00 |
| 69 | 10069 | 5.572 | 0.00 | 0.00 | 0.00 | 0.10336 | 0.00 | 0.00 | 0.00 |
| 70 | 10070 | 5.629 | 0.00 | 0.04 | 0.21 | 8.58875 | 0.15 | 0.01 | 0.01 |
| 71 | 10071 | 5.702 | 1.32 | 0.00 | 0.21 | 3.14996 | 0.00 | 0.11 | 0.00 |
| 72 | 10072 | 5.748 | 0.14 | 0.00 | 0.62 | 3.99652 | 0.00 | 0.29 | 0.00 |
| 73 | 10073 | 5.812 | 1.12 | 0.00 | 0.07 | 5.60155 | 0.01 | 0.16 | 0.02 |
| 74 | 10074 | 5.831 | 0.77 | 0.00 | 0.14 | 2.90741 | 0.00 | 0.25 | 0.00 |
| 75 | 10075 | 5.912 | 1.73 | 0.04 | 0.09 | 4.20962 | 0.11 | 0.03 | 0.02 |
| 76 | 10076 | 5.937 | 0.76 | 0.00 | 0.00 | 2.82245 | 0.01 | 0.22 | 0.03 |
| 77 | 10077 | 5.979 | 0.60 | 0.00 | 0.01 | 2.30098 | 0.01 | 0.01 | 0.05 |
| 78 | 10078 | 5.994 | 0.38 | 0.10 | 0.01 | 9.26548 | 0.23 | 0.00 | 0.02 |
| 79 | 10079 | 6.073 | 1.72 | 0.00 | 0.00 | 2.56916 | 0.00 | 0.20 | 0.03 |
| 80 | 10080 | 6.151 | 0.03 | 0.13 | 0.25 | 6.91279 | 0.37 | 0.03 | 0.00 |
| 81 | 10081 | 6.324 | 0.00 | 0.03 | 0.00 | 5.13471 | 0.05 | 0.47 | 0.72 |
| 82 | 10082 | 6.328 | 0.00 | 0.00 | 0.00 | 0.09764 | 0.00 | 0.00 | 0.00 |
| 83 | 10083 | 6.330 | 0.00 | 0.00 | 0.00 | 0.30636 | 0.00 | 0.00 | 0.00 |
| 84 | 10084 | 6.330 | 0.00 | 0.00 | 0.00 | 0.22722 | 0.00 | 0.00 | 0.00 |
| 85 | 10085 | 6.330 | 0.00 | 0.00 | 0.00 | 0.23582 | 0.00 | 0.00 | 0.00 |
| 86 | 10086 | 6.330 | 0.00 | 0.00 | 0.00 | 0.25855 | 0.00 | 0.00 | 0.00 |
| 87 | 10087 | 6.332 | 0.00 | 0.00 | 0.00 | 0.10022 | 0.00 | 0.00 | 0.00 |
| 88 | 10088 | 6.373 | 0.00 | 0.00 | 0.00 | 1.89541 | 0.00 | 0.00 | 0.05 |
| 89 | 10089 | 6.401 | 0.03 | 0.00 | 0.00 | 6.57987 | 0.00 | 0.56 | 0.01 |
| 90 | 10090 | 6.474 | 0.00 | 0.01 | 0.01 | 1.95046 | 0.03 | 0.00 | 0.00 |
| 91 | 10091 | 6.493 | 0.00 | 0.01 | 0.00 | 2.25723 | 0.01 | 0.01 | 0.00 |
| 92 | 10092 | 6.603 | 0.00 | 0.22 | 0.03 | 3.18150 | 0.48 | 0.00 | 0.01 |
| 93 | 10093 | 6.623 | 0.00 | 0.00 | 0.00 | 3.35895 | 0.00 | 0.00 | 0.01 |
| 94 | 10094 | 6.644 | 0.00 | 0.20 | 0.04 | 4.19881 | 0.45 | 0.00 | 0.02 |
| 95 | 10095 | 6.697 | 0.00 | 0.04 | 0.30 | 3.51756 | 0.10 | 0.01 | 0.01 |
| 96 | 10096 | 6.804 | 0.00 | 0.00 | 0.01 | 2.89603 | 0.01 | 0.00 | 0.00 |
| 97 | 10097 | 6.851 | 0.00 | 0.03 | 0.03 | 3.17191 | 0.06 | 0.09 | 0.83 |
| 98 | 10098 | 6.912 | 0.00 | 0.23 | 0.06 | 7.35534 | 0.46 | 0.55 | 1.02 |
| 99 | 10099 | 6.943 | 0.00 | 0.00 | 0.00 | 3.20172 | 0.00 | 0.00 | 0.00 |
| 100 | 10100 | 6.971 | 0.00 | 0.00 | 0.00 | 2.48830 | 0.00 | 0.00 | 0.01 |
| 101 | 10101 | 7.011 | 0.00 | 0.48 | 1.94 | 3.92496 | 1.07 | 0.04 | 0.00 |

Nadvoz Barjanska rekonstruiran v1
Calculation Of Eigenvalues

Modal masses - activated mass

| no | LC | frequency [Hertz] | effective modal mass | | | activated mass[%] | rotation around S | | |
|-----|-------|----------------------|----------------------|------|------|----------------------|-------------------|---------|---------|
| | | | X[%] | Y[%] | Z[%] | | phiX[%] | phiY[%] | phiZ[%] |
| 102 | 10102 | 7.076 | 0.00 | 0.29 | 0.00 | 4.36989 | 0.50 | 0.00 | 0.25 |
| 103 | 10103 | 7.110 | 0.00 | 0.00 | 0.00 | 1.14261 | 0.00 | 0.00 | 0.01 |
| 104 | 10104 | 7.124 | 0.00 | 0.02 | 0.00 | 1.07664 | 0.04 | 0.01 | 0.02 |
| 105 | 10105 | 7.145 | 0.00 | 0.00 | 0.01 | 1.51444 | 0.00 | 0.03 | 0.00 |
| 106 | 10106 | 7.194 | 0.00 | 0.01 | 0.15 | 4.15145 | 0.04 | 0.12 | 0.31 |
| 107 | 10107 | 7.239 | 0.01 | 1.14 | 0.08 | 2.46137 | 2.33 | 0.40 | 2.42 |
| 108 | 10108 | 7.255 | 0.00 | 0.30 | 0.00 | 1.43348 | 0.61 | 0.08 | 0.12 |
| 109 | 10109 | 7.262 | 0.00 | 0.00 | 0.02 | 1.23778 | 0.00 | 0.03 | 0.00 |
| 110 | 10110 | 7.268 | 0.00 | 0.00 | 0.00 | 0.09420 | 0.00 | 0.00 | 0.00 |
| 111 | 10111 | 7.270 | 0.00 | 0.00 | 0.00 | 0.26321 | 0.00 | 0.00 | 0.00 |
| 112 | 10112 | 7.270 | 0.00 | 0.00 | 0.00 | 0.24294 | 0.00 | 0.00 | 0.00 |
| 113 | 10113 | 7.270 | 0.00 | 0.00 | 0.00 | 0.25701 | 0.00 | 0.00 | 0.00 |
| 114 | 10114 | 7.271 | 0.00 | 0.00 | 0.00 | 0.25869 | 0.00 | 0.00 | 0.00 |
| 115 | 10115 | 7.271 | 0.00 | 0.00 | 0.00 | 2.95548 | 0.00 | 0.00 | 0.00 |
| 116 | 10116 | 7.271 | 0.00 | 0.00 | 0.00 | 3.29109 | 0.00 | 0.01 | 0.07 |
| 117 | 10117 | 7.273 | 0.00 | 0.00 | 0.00 | 0.09760 | 0.00 | 0.00 | 0.00 |
| 118 | 10118 | 7.286 | 0.00 | 0.03 | 0.00 | 2.98584 | 0.06 | 0.00 | 0.00 |
| 119 | 10119 | 7.308 | 0.00 | 0.00 | 0.30 | 2.72653 | 0.00 | 0.02 | 0.63 |
| 120 | 10120 | 7.335 | 0.00 | 0.00 | 0.00 | 3.08852 | 0.01 | 0.00 | 0.01 |
| 121 | 10121 | 7.382 | 0.00 | 0.84 | 0.02 | 3.24172 | 1.83 | 0.24 | 0.89 |
| 122 | 10122 | 7.388 | 0.00 | 0.23 | 0.01 | 3.07979 | 0.45 | 0.00 | 0.02 |
| 123 | 10123 | 7.395 | 0.00 | 2.19 | 0.13 | 8.33414 | 4.20 | 0.03 | 0.19 |
| 124 | 10124 | 7.466 | 0.00 | 0.00 | 0.00 | 1.69985 | 0.01 | 0.00 | 0.01 |
| 125 | 10125 | 7.489 | 0.00 | 1.17 | 0.00 | 2.04729 | 2.24 | 0.09 | 0.04 |
| 126 | 10126 | 7.505 | 0.00 | 0.00 | 0.00 | 1.55025 | 0.00 | 0.00 | 0.00 |
| 127 | 10127 | 7.526 | 0.01 | 0.58 | 0.00 | 3.90006 | 1.19 | 0.11 | 0.38 |
| 128 | 10128 | 7.813 | 0.01 | 0.98 | 0.16 | 4.75600 | 1.56 | 0.19 | 1.43 |
| 129 | 10129 | 7.857 | 0.00 | 0.01 | 0.00 | 3.08037 | 0.01 | 0.00 | 0.00 |
| 130 | 10130 | 7.863 | 0.00 | 0.05 | 0.02 | 3.17354 | 0.07 | 0.00 | 0.04 |
| 131 | 10131 | 7.896 | 0.00 | 0.00 | 0.00 | 3.43931 | 0.00 | 0.00 | 0.02 |
| 132 | 10132 | 7.923 | 0.00 | 0.00 | 0.00 | 1.89720 | 0.00 | 0.00 | 0.00 |
| 133 | 10133 | 7.955 | 0.01 | 0.01 | 0.03 | 5.45048 | 0.02 | 0.53 | 3.25 |
| 134 | 10134 | 7.964 | 0.00 | 0.00 | 0.00 | 1.92827 | 0.00 | 0.03 | 0.17 |
| 135 | 10135 | 7.971 | 0.00 | 0.00 | 0.00 | 2.27307 | 0.00 | 0.02 | 0.06 |
| 136 | 10136 | 7.975 | 0.00 | 0.03 | 0.01 | 2.17844 | 0.06 | 0.16 | 0.81 |
| 137 | 10137 | 7.981 | 0.00 | 0.00 | 0.00 | 1.49449 | 0.00 | 0.00 | 0.01 |
| 138 | 10138 | 8.061 | 0.00 | 0.50 | 0.00 | 6.68614 | 0.57 | 0.24 | 0.01 |
| 139 | 10139 | 8.070 | 0.00 | 0.02 | 0.00 | 1.67152 | 0.01 | 0.03 | 0.00 |
| 140 | 10140 | 8.073 | 0.00 | 0.01 | 0.00 | 1.75012 | 0.02 | 0.01 | 0.01 |
| 141 | 10141 | 8.121 | 0.03 | 0.01 | 0.06 | 5.08889 | 0.07 | 0.17 | 0.04 |
| 142 | 10142 | 8.147 | 0.00 | 0.00 | 0.00 | 1.49237 | 0.00 | 0.00 | 0.00 |
| 143 | 10143 | 8.308 | 0.00 | 0.36 | 0.01 | 0.13936 | 0.68 | 0.00 | 0.09 |
| 144 | 10144 | 8.310 | 0.00 | 0.30 | 0.01 | 0.34951 | 0.56 | 0.00 | 0.08 |
| 145 | 10145 | 8.311 | 0.00 | 0.01 | 0.00 | 0.19602 | 0.03 | 0.00 | 0.00 |
| 146 | 10146 | 8.312 | 0.00 | 0.00 | 0.00 | 0.26935 | 0.00 | 0.00 | 0.00 |
| 147 | 10147 | 8.312 | 0.00 | 0.01 | 0.00 | 0.19925 | 0.01 | 0.00 | 0.00 |
| 148 | 10148 | 8.314 | 0.00 | 0.71 | 0.02 | 0.35348 | 1.32 | 0.00 | 0.18 |
| 149 | 10149 | 8.315 | 0.00 | 0.43 | 0.01 | 0.14877 | 0.79 | 0.00 | 0.11 |
| 150 | 10150 | 8.453 | 0.00 | 0.11 | 0.03 | 3.97647 | 0.04 | 0.09 | 0.80 |
| 151 | 10151 | 8.491 | 0.16 | 0.24 | 0.00 | 6.44145 | 0.44 | 0.00 | 0.04 |
| 152 | 10152 | 8.534 | 1.13 | 0.03 | 0.00 | 2.13655 | 0.07 | 0.26 | 0.07 |
| 153 | 10153 | 8.615 | 0.08 | 0.85 | 0.02 | 6.59915 | 1.55 | 0.00 | 0.25 |
| 154 | 10154 | 8.656 | 1.97 | 0.00 | 0.01 | 2.31133 | 0.00 | 0.37 | 0.00 |
| 155 | 10155 | 8.684 | 0.88 | 0.05 | 0.00 | 2.86729 | 0.11 | 0.17 | 0.14 |
| 156 | 10156 | 8.909 | 0.01 | 0.01 | 0.00 | 4.90036 | 0.00 | 0.01 | 0.17 |
| 157 | 10157 | 8.915 | 1.61 | 0.02 | 0.00 | 1.99380 | 0.06 | 0.22 | 0.03 |
| 158 | 10158 | 8.941 | 0.26 | 0.26 | 0.05 | 5.24576 | 0.71 | 0.04 | 1.40 |

Nadvoz Barjanska rekonstruiran v1
 Calculation Of Eigenvalues

Modal masses - activated mass

| no | LC | frequency [Hertz] | effective modal mass | | | activated mass[%] | rotation around S | | |
|-------|-------|----------------------|----------------------|-------|-------|----------------------|-------------------|---------|---------|
| | | | X[%] | Y[%] | Z[%] | | phiX[%] | phiY[%] | phiZ[%] |
| 159 | 10159 | 8.995 | 1.51 | 0.00 | 0.00 | 5.19877 | 0.04 | 0.48 | 0.32 |
| 160 | 10160 | 9.129 | 0.17 | 0.03 | 0.01 | 3.55910 | 0.06 | 0.19 | 0.34 |
| 161 | 10161 | 9.174 | 0.00 | 0.02 | 0.01 | 2.97371 | 0.05 | 0.11 | 0.06 |
| 162 | 10162 | 9.180 | 0.07 | 0.02 | 0.03 | 2.46978 | 0.04 | 0.00 | 0.22 |
| 163 | 10163 | 9.218 | 0.23 | 0.03 | 0.00 | 3.72302 | 0.07 | 0.01 | 0.12 |
| 164 | 10164 | 9.229 | 0.17 | 0.04 | 0.00 | 3.39042 | 0.12 | 0.00 | 0.01 |
| 165 | 10165 | 9.253 | 0.55 | 0.00 | 0.00 | 5.88654 | 0.01 | 0.02 | 0.34 |
| 166 | 10166 | 9.320 | 0.28 | 0.02 | 0.00 | 2.90498 | 0.06 | 0.00 | 0.02 |
| 167 | 10167 | 9.393 | 0.00 | 0.57 | 0.00 | 0.60242 | 1.43 | 0.10 | 0.06 |
| 168 | 10168 | 9.402 | 0.00 | 0.08 | 0.00 | 0.13118 | 0.21 | 0.01 | 0.01 |
| 169 | 10169 | 9.403 | 0.00 | 0.00 | 0.00 | 0.28629 | 0.00 | 0.00 | 0.00 |
| 170 | 10170 | 9.403 | 0.00 | 0.00 | 0.00 | 0.26315 | 0.01 | 0.00 | 0.00 |
| 171 | 10171 | 9.403 | 0.00 | 0.00 | 0.00 | 0.21497 | 0.00 | 0.00 | 0.00 |
| 172 | 10172 | 9.404 | 0.00 | 0.01 | 0.00 | 0.22334 | 0.02 | 0.00 | 0.00 |
| 173 | 10173 | 9.407 | 0.00 | 0.03 | 0.00 | 0.11900 | 0.07 | 0.01 | 0.00 |
| 174 | 10174 | 9.418 | 0.00 | 0.03 | 0.00 | 2.12662 | 0.04 | 0.00 | 0.05 |
| 175 | 10175 | 9.427 | 0.00 | 0.00 | 0.00 | 0.02278 | 0.00 | 0.00 | 0.00 |
| 176 | 10176 | 9.446 | 1.53 | 0.01 | 0.03 | 2.07017 | 0.01 | 0.34 | 0.00 |
| 177 | 10177 | 9.478 | 0.09 | 1.35 | 0.04 | 3.75920 | 3.30 | 0.00 | 0.00 |
| 178 | 10178 | 9.529 | 0.00 | 0.03 | 0.00 | 1.76534 | 0.07 | 0.01 | 0.01 |
| 179 | 10179 | 9.586 | 0.61 | 0.21 | 0.00 | 1.67295 | 0.45 | 0.07 | 0.20 |
| 180 | 10180 | 9.616 | 0.00 | 0.00 | 0.00 | 7.93009 | 0.00 | 0.00 | 0.03 |
| 181 | 10181 | 9.619 | 0.19 | 1.50 | 0.00 | 4.18557 | 3.21 | 0.00 | 2.08 |
| 182 | 10182 | 9.662 | 0.00 | 0.00 | 0.00 | 4.07351 | 0.00 | 0.00 | 0.00 |
| 183 | 10183 | 9.674 | 0.78 | 0.00 | 0.00 | 1.40815 | 0.00 | 0.10 | 0.00 |
| 184 | 10184 | 9.692 | 0.00 | 0.00 | 0.00 | 0.01398 | 0.00 | 0.00 | 0.00 |
| 185 | 10185 | 9.700 | 0.00 | 0.01 | 0.00 | 4.68199 | 0.01 | 0.00 | 0.01 |
| 186 | 10186 | 9.707 | 0.00 | 0.00 | 0.00 | 0.02031 | 0.00 | 0.00 | 0.00 |
| 187 | 10187 | 9.986 | 0.00 | 0.00 | 0.00 | 2.18635 | 0.00 | 0.00 | 0.00 |
| 188 | 10188 | 10.025 | 0.00 | 0.00 | 0.00 | 1.12335 | 0.00 | 0.00 | 0.00 |
| 189 | 10189 | 10.121 | 0.00 | 0.00 | 0.00 | 0.01898 | 0.00 | 0.00 | 0.00 |
| 190 | 10190 | 10.149 | 0.00 | 0.00 | 0.00 | 2.24668 | 0.00 | 0.00 | 0.00 |
| 191 | 10191 | 10.188 | 0.00 | 0.00 | 0.00 | 0.01367 | 0.00 | 0.00 | 0.00 |
| 192 | 10192 | 10.207 | 0.00 | 0.00 | 0.00 | 1.51613 | 0.01 | 0.00 | 0.01 |
| 193 | 10193 | 10.213 | 0.03 | 0.00 | 0.02 | 1.44541 | 0.00 | 0.00 | 0.00 |
| 194 | 10194 | 10.219 | 0.00 | 0.01 | 0.00 | 1.16478 | 0.02 | 0.00 | 0.00 |
| 195 | 10195 | 10.227 | 0.00 | 0.00 | 0.01 | 1.13743 | 0.00 | 0.00 | 0.00 |
| 196 | 10196 | 10.236 | 0.00 | 0.00 | 0.00 | 1.21272 | 0.00 | 0.00 | 0.00 |
| 197 | 10197 | 10.251 | 0.00 | 0.01 | 0.67 | 9.04437 | 0.06 | 0.00 | 0.00 |
| 198 | 10198 | 10.312 | 0.00 | 0.00 | 0.00 | 0.90336 | 0.00 | 0.00 | 0.00 |
| 199 | 10199 | 10.324 | 0.00 | 0.00 | 0.02 | 1.64933 | 0.00 | 0.00 | 0.00 |
| 200 | 10200 | 10.344 | 0.00 | 0.01 | 0.00 | 1.59284 | 0.00 | 0.00 | 0.00 |
| ----- | | | ----- | | | ----- | | | |
| | | sum | 99.36 | 98.62 | 99.93 | | | | |

. The effective modal masses are evaluated for the global X, Y and Z direction (earthquake).
 . The "activated mass" also includes torsional and opposite movements
 . without a global displacement (tuning fork):
 . activated mass in % = product $u^2 \cdot M$ = displacement² * mass, in relation to the
 . sum of active mass, u scaled on a maximum displacement or rotation of 1.00.
 . (this activated mass is often also called generalized modal mass)
 --> a critical earthquake eigenform has high values in "effective modal mass"
 --> an inner eigenform like a tuning fork torque has high values in "activated mass"
 --> torsional eigenforms have high values in "rotation around the system center S" (relative values)

Nadvoz Barjanska rekonstruiran v1
 Definition Response Spectra

Actions

| type | part | sup | Designation | γ -u | γ -f | γ -a | ψ_0 | ψ_1 | ψ_2 | ψ_{1inf} |
|------|-------------------------|------|---------------------------------------|---|-------------|-------------|----------|----------|----------|---------------|
| B | G | perm | erection load | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| C | G | perm | creep and shrinkage | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| C_1 | G | perm | C+S til traffic opening | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| C_2 | G | perm | C+S after traff.opening | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| G | G | perm | dead loads | 1.35 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| G_1 | G | perm | dead loads g_1 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| G_2 | G | perm | dead loads g_2 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| G_3 | G | perm | deck surfacing g_3 | 1.35 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| G_4 | G | perm | svez beton | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| G_9 | G | perm | permanent earthpressure g_9 | 1.35 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| X | G | perm | single loadcase | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| ZC | G | perm | UDL basic load part C+S | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| ZP | G | perm | Static undetermined part | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| P | P | perm | prestress | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PB | P | perm | Static determined part | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FAT | Q | excl | Fatigue FLM3 | 1.35 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| L | Q | excl | live loading | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| L_A | Q | exex | TS impact envelope (accidental) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| L_T | Q | excl | TS tandemsystem | 1.35 | 0.00 | 1.00 | 0.75 | 0.75 | 0.00 | 0.80 |
| L_U | Q | excl | UDL envelope | 1.35 | 0.00 | 1.00 | 0.40 | 0.40 | 0.20 | 0.80 |
| R | Q | excl | earth pressure traffic | 1.50 | 0.00 | 1.00 | 0.80 | 0.50 | 0.00 | 1.00 |
| SF | Q | cond | possible settlement | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| SL | Q | excl | LM3 fatigue | 1.35 | 0.00 | 1.00 | 0.75 | 0.75 | 0.00 | 0.80 |
| SW | Q | cond | wind without traffic | 1.50 | 0.00 | 1.00 | 0.60 | 0.20 | 0.00 | 1.00 |
| T | Q | excl | temperature | 0.90 | 0.00 | 1.00 | 0.60 | 0.60 | 0.50 | 0.80 |
| Y_1 | Q | exex | rare without gpc | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_2 | Q | exex | nonf without gpc | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_3 | Q | exex | freq without gpc | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_4 | Q | exex | perm without gpc | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_5 | Q | exex | deko with psi 0.5 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_6 | Q | exex | Y_6 without gpc | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_7 | Q | exex | Y_7 without gpc | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_8 | Q | exex | Y_8 without gpc | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_9 | Q | exex | 1.0* without gpc | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_A | Q | exex | acci without gpc | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_D | Q | exex | desi without gpc | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_E | Q | exex | earq without gpc | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_F | Q | exex | fati without gpc | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_G | Q | exex | stress range L+Q | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_R | Q | exex | robust without p | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Y_X | Q | exex | extra-temporary | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| ZF | Q | cond | probable settlement | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| ZL | Q | excl | brake+zentrifugal | 1.50 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ZW | Q | cond | wind on traffic | 1.50 | 0.00 | 1.00 | 0.60 | 0.20 | 0.00 | 1.00 |
| GR_T | Q_1 | excl | TS tandemsystem | 1.35 | 0.00 | 1.00 | 0.75 | 0.75 | 0.00 | 0.80 |
| GR_U | Q_1 | excl | UDL envelope | 1.35 | 0.00 | 1.00 | 0.40 | 0.40 | 0.20 | 0.80 |
| GR_2 | Q_2 | excl | brake+zentrifugal | 1.35 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| GR_3 | Q_3 | exex | gr3 Footways | 1.35 | 0.00 | 1.00 | 0.00 | 0.40 | 0.00 | 0.80 |
| E | E | usex | seismic loading | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | | | Reliability factor | Kfi | 1.000 | | | | | |
| | | | Reduction factor | xsi | 0.850 | | | | | |
| type | action | | γ -u, γ -f, γ -a | partial safety factors for unfavourable/favourable/accidental | | | | | | |
| part | partition of the action | | $\psi_0,\psi_1,\psi_2,\psi_{1inf}$ | combination coefficients | | | | | | |
| sup | superposition type | | | | | | | | | |

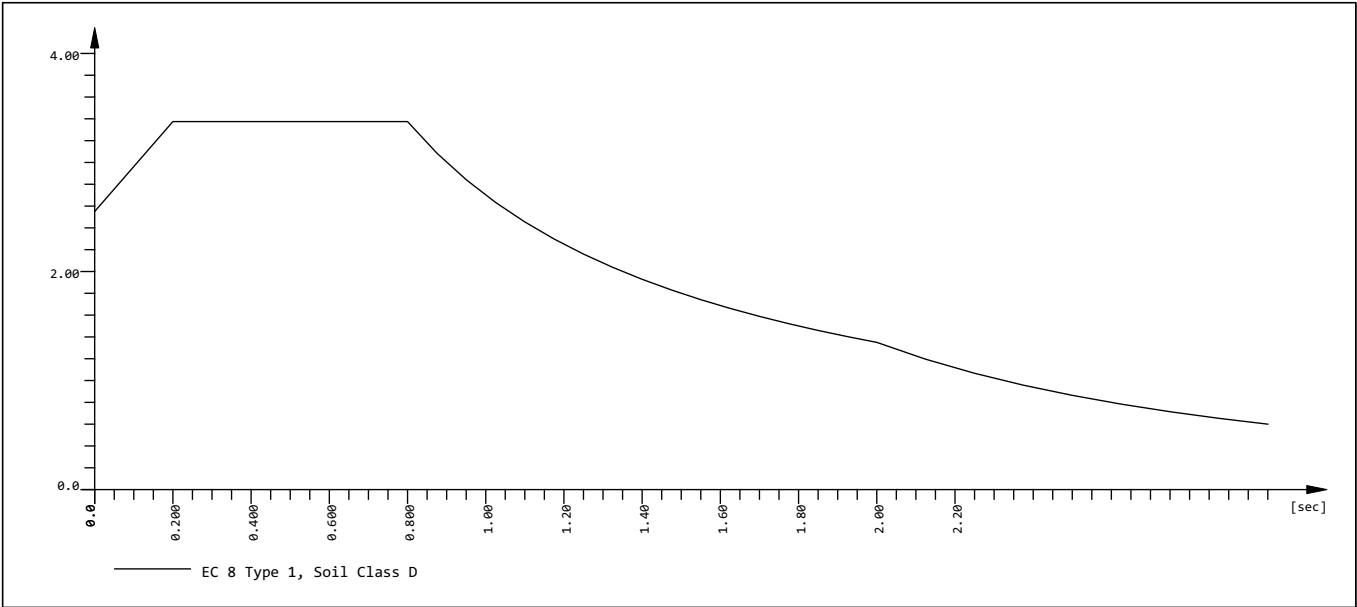
Load Case 801

Factor forces and moments 1.000

Nadvoz Barjanska rekonstruiran v1
Definition Response Spectra

Response spectra EC 8 Type 1, Soil Class D

| D[-] | SA[-] | SB[-] | MIN[-] | TB[sec] | TC[sec] | TD[sec] | TE[sec] | K1[-] | K2[-] | A[m/sec²] |
|--------|-------|-------|--------|---------|---------|---------|---------|-------|-------|-----------|
| auto | 2.550 | 3.375 | 0.000 | 0.200 | 0.800 | 2.000 | 0.000 | 1.000 | 2.000 | 2.45 |
| Zone = | | | | ah = * | 1.000 | av = * | 0.000 | | | |



Loads acting on Nodes

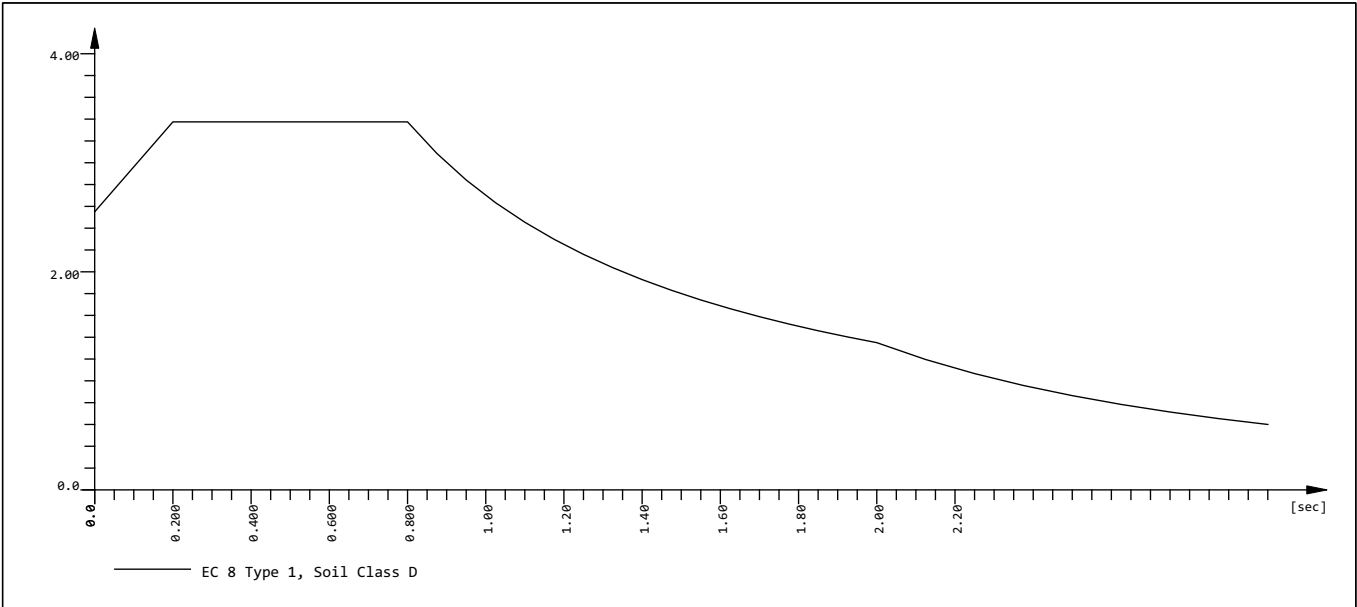
| Node | A-X [m/sec²] | A-Y [m/sec²] | A-Z [m/sec²] | A-XX [rad/sec²] | A-YY [rad/sec²] | A-ZZ [rad/sec²] | ref-X [m] | ref-Y [m] | ref-Z [m] |
|--------|-----------------|-----------------|-----------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|
| Origin | 2.45 | | | | | | 0.000 | 0.000 | 0.000 |
| Node | PX[kN] | PY[kN] | PZ[kN] | MX[kNm] | MY[kNm] | MZ[kNm] | MB[kNm²] | | |
| sum | -19507.4 | | | | -7.75 | -0.08 | 85.903 | 0.041 | -8.318 |

Load Case 804

Factor forces and moments 1.000

Response spectra EC 8 Type 1, Soil Class D

| D[-] | SA[-] | SB[-] | MIN[-] | TB[sec] | TC[sec] | TD[sec] | TE[sec] | K1[-] | K2[-] | A[m/sec²] |
|--------|-------|-------|--------|---------|---------|---------|---------|-------|-------|-----------|
| auto | 2.550 | 3.375 | 0.000 | 0.200 | 0.800 | 2.000 | 0.000 | 1.000 | 2.000 | 2.45 |
| Zone = | | | | ah = * | 1.000 | av = * | 0.000 | | | |



Nadvoz Barjanska rekonstruiran v1
Definition Response Spectra

Loads acting on Nodes

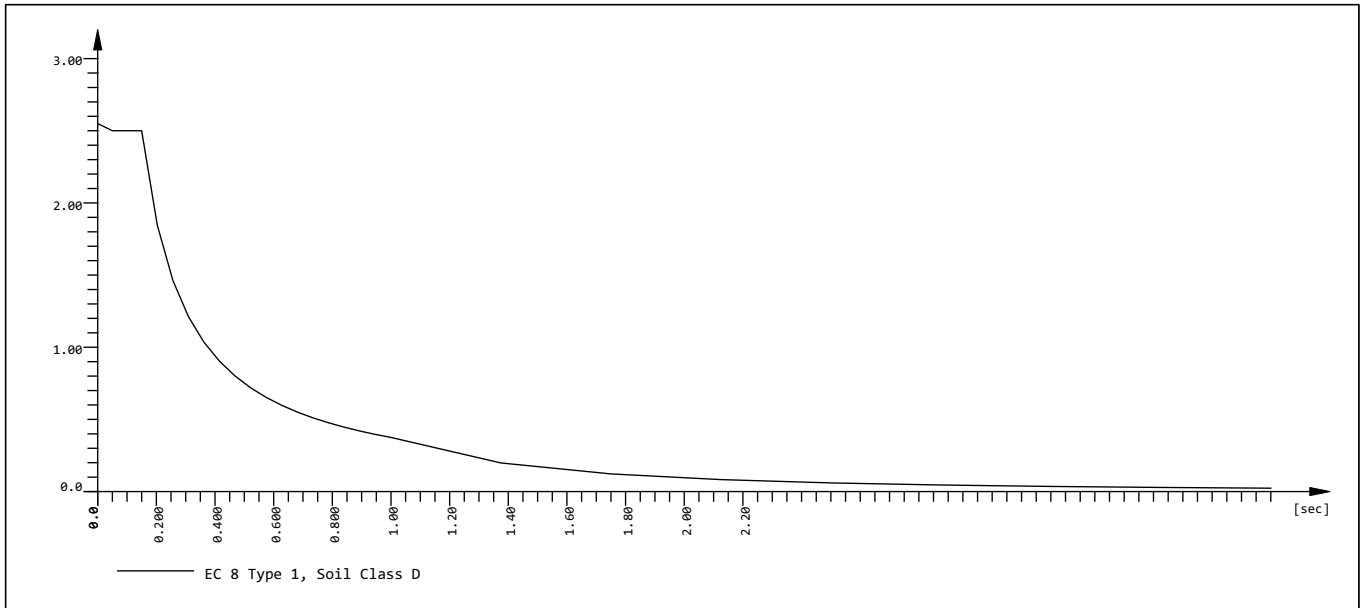
| Node | A-X [m/sec ²] | A-Y [m/sec ²] | A-Z [m/sec ²] | A-XX [rad/sec ²] | A-YY [rad/sec ²] | A-ZZ [rad/sec ²] | ref-X [m] | ref-Y [m] | ref-Z [m] |
|--------|------------------------------|------------------------------|------------------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|--------------|--------------|
| Origin | | 2.45 | | | | | 0.000 | 0.000 | 0.000 |
| Node | PX[kN] | PY[kN] | PZ[kN] | MX[kNm] | MY[kNm] | MZ[kNm] | MB[kNm ²] | | |
| sum | | -19507.4 | | 7.75 | | 60.62 | 85.903 | 0.041 | -8.318 |

Load Case 809

Factor forces and moments 1.000

Response spectra EC 8 Type 1, Soil Class D

D[-] SA[-] SB[-] MIN[-] TB[sec] TC[sec] TD[sec] TE[sec] K1[-] K2[-] A[m/sec²]
1.0000 2.550 2.500 0.000 0.050 0.150 1.000 4.000 1.000 2.000 2.45
Zone = ah =* 0.000 av =* 0.900



Loads acting on Nodes

| Node | A-X [m/sec ²] | A-Y [m/sec ²] | A-Z [m/sec ²] | A-XX [rad/sec ²] | A-YY [rad/sec ²] | A-ZZ [rad/sec ²] | ref-X [m] | ref-Y [m] | ref-Z [m] |
|--------|------------------------------|------------------------------|------------------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------|--------------|--------------|
| Origin | | | 2.20 | | | | 0.000 | 0.000 | 0.000 |
| Node | PX[kN] | PY[kN] | PZ[kN] | MX[kNm] | MY[kNm] | MZ[kNm] | MB[kNm ²] | | |
| sum | | | -17556.4 | 0.03 | -33.88 | | 85.903 | 0.041 | -8.318 |

Nadvoz Barjanska rekonstruiran v1
 Calculation of Spectras - Evaluation case (X , Y , Z)

System- and Control Information

Control Information

QUAD-elements with higher non conforming modes 3
 QUAD-elements with all rotational degrees of freedom
 Number of unknowns 62340 (Pure modal analysis)
 unknowns per node 6
 Number eigenvalues 200

Groups

| Grp | Option | CS | Factor | Rayleigh-A [Hz] | Rayleigh-B [msec] | ξ [%] | Wind |
|------------|--------|---------------------------------|--------|--------------------|----------------------|--------------------------------------|------|
| 10 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 11 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 12 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 13 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 14 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 15 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 21 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 22 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 23 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 24 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 25 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 28 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 31 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 40 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 50 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 55 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 70 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 90 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 101 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 102 | FULL | | 1.000 | 0.000 | 0.000 | | |
| 103 | FULL | | 1.000 | 0.000 | 0.000 | | |
| CS | | construction stage | | Rayleigh-B | | stiffness proportional damping ratio | |
| Factor | | Factor on stiffness | | ξ | | modal damping ratio | |
| Rayleigh-A | | mass proportional damping ratio | | Wind | | options for dynamic wind loading | |

Beam Elements

Finite beam elements without intermediate sections
 Shear deformations accounted for with nonconforming SOFiSTiK-Timoshenko beam

Sum of masses and mass moments of inertia

| Node | TM | | | RM | | | RMB [tm ²] |
|--|-------------------|----------|----------|---------------------|---------------------|---------------------|---------------------------|
| | X[t] | Y[t] | Z[t] | X[tm ²] | Y[tm ²] | Z[tm ²] | |
| total ¹ | 7962.051 | 7962.051 | 7962.051 | 2.792E+03 | 2.410E+03 | 1.625E+03 | - |
| | S[m] ² | | | RM(S) ³ | | | |
| | 85.901 | 0.041 | -8.318 | 1.029E+06 | 2.277E+02 | -9.405E+04 | |
| | | | | 2.277E+02 | 1.868E+07 | 1.598E+04 | |
| | | | | -9.405E+04 | 1.598E+04 | 1.785E+07 | |
| active ¹ | 7962.051 | 7962.051 | 7962.051 | 2.792E+03 | 2.410E+03 | 1.625E+03 | - |
| | S[m] ² | | | RM(S) ³ | | | |
| | 85.901 | 0.041 | -8.318 | 1.029E+06 | 2.277E+02 | -9.405E+04 | |
| | | | | 2.277E+02 | 1.868E+07 | 1.598E+04 | |
| | | | | -9.405E+04 | 1.598E+04 | 1.785E+07 | |
| ¹ sum of the total and the active nodal masses | | | | | | | |
| ² coordinates of the center of gravity | | | | | | | |
| ³ 3x3 rotational mass matrix at the center of gravity | | | | | | | |
| TM translational masses in X-, Y- and Z-direction | | | | | | | |
| RM rotational masses about X-, Y- and Z-axis | | | | | | | |
| RMB warping mass | | | | | | | |

++++ warning no. 112 in program DYNA
 Damping of groups will not be used for buckling eigen value analysis or with EIGE REST.

Nadvoz Barjanska rekonstruiran v1
 Calculation of Spectras - Evaluation case (X , Y , Z)

Processing
 Eigenvalues

| No. | LC | λ [rad ² /sec ²] | error [-] | ω [rad/sec] | f [Hz] | T [sec] | ξ [%] | Meff | | | participation | | |
|-----|-------|--|--------------|-----------------------|-----------|------------|--------------|------|------|------|---------------|------|------|
| | | | | | | | | X[%] | Y[%] | Z[%] | X[%] | Y[%] | Z[%] |
| 1 | 10001 | 1.1335E+01 | - | 3.367 | 0.536 | 1.866 | 5.000 | 62.2 | 0.0 | 0.0 | 61.7 | 0.0 | 0.0 |
| 2 | 10002 | 1.8417E+01 | - | 4.291 | 0.683 | 1.464 | 5.000 | 0.0 | 65.7 | 0.0 | 0.0 | 64.4 | 0.0 |
| 3 | 10003 | 2.0263E+01 | - | 4.501 | 0.716 | 1.396 | 5.000 | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 | 0.0 |
| 4 | 10004 | 6.1615E+01 | - | 7.849 | 1.249 | 0.800 | 5.000 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| 5 | 10005 | 1.1398E+02 | - | 10.676 | 1.699 | 0.589 | 5.000 | 4.5 | 0.0 | 0.0 | 4.3 | 0.0 | 0.0 |
| 6 | 10006 | 1.1676E+02 | - | 10.806 | 1.720 | 0.581 | 5.000 | 4.4 | 0.0 | 0.0 | 4.2 | 0.0 | 0.0 |
| 7 | 10007 | 1.4182E+02 | - | 11.909 | 1.895 | 0.528 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8 | 10008 | 1.6781E+02 | - | 12.954 | 2.062 | 0.485 | 5.000 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| 9 | 10009 | 1.7336E+02 | - | 13.167 | 2.096 | 0.477 | 5.000 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| 10 | 10010 | 1.7373E+02 | - | 13.181 | 2.098 | 0.477 | 5.000 | 0.0 | 0.2 | 0.0 | 0.0 | 0.3 | 0.0 |
| 11 | 10011 | 1.7754E+02 | - | 13.324 | 2.121 | 0.472 | 5.000 | 0.8 | 0.0 | 0.0 | 0.8 | 0.0 | 0.0 |
| 12 | 10012 | 1.8369E+02 | - | 13.553 | 2.157 | 0.464 | 5.000 | 0.0 | 2.1 | 0.0 | 0.0 | 2.0 | 0.0 |
| 13 | 10013 | 1.9701E+02 | - | 14.036 | 2.234 | 0.448 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 14 | 10014 | 2.0566E+02 | - | 14.341 | 2.282 | 0.438 | 5.000 | 0.2 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 |
| 15 | 10015 | 2.1282E+02 | - | 14.588 | 2.322 | 0.431 | 5.000 | 0.0 | 1.9 | 0.0 | 0.0 | 1.7 | 0.0 |
| 16 | 10016 | 2.1461E+02 | - | 14.650 | 2.332 | 0.429 | 5.000 | 0.8 | 0.0 | 0.0 | 0.8 | 0.0 | 0.0 |
| 17 | 10017 | 2.1832E+02 | - | 14.776 | 2.352 | 0.425 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 18 | 10018 | 2.2796E+02 | - | 15.098 | 2.403 | 0.416 | 5.000 | 0.0 | 3.3 | 0.1 | 0.0 | 3.0 | 0.1 |
| 19 | 10019 | 2.4303E+02 | - | 15.589 | 2.481 | 0.403 | 5.000 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| 20 | 10020 | 2.7061E+02 | - | 16.450 | 2.618 | 0.382 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 21 | 10021 | 2.7862E+02 | - | 16.692 | 2.657 | 0.376 | 5.000 | 0.7 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 |
| 22 | 10022 | 2.7932E+02 | - | 16.713 | 2.660 | 0.376 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 23 | 10023 | 2.8998E+02 | - | 17.029 | 2.710 | 0.369 | 5.000 | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 |
| 24 | 10024 | 2.9102E+02 | - | 17.059 | 2.715 | 0.368 | 5.000 | 2.8 | 0.0 | 0.0 | 2.7 | 0.0 | 0.0 |
| 25 | 10025 | 3.0310E+02 | - | 17.410 | 2.771 | 0.361 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 26 | 10026 | 3.2066E+02 | - | 17.907 | 2.850 | 0.351 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 27 | 10027 | 3.2676E+02 | - | 18.076 | 2.877 | 0.348 | 5.000 | 0.0 | 0.3 | 0.0 | 0.0 | 0.3 | 0.0 |
| 28 | 10028 | 3.2857E+02 | - | 18.127 | 2.885 | 0.347 | 5.000 | 1.4 | 0.0 | 0.0 | 1.4 | 0.0 | 0.0 |
| 29 | 10029 | 3.3479E+02 | - | 18.297 | 2.912 | 0.343 | 5.000 | 0.0 | 1.7 | 0.1 | 0.0 | 1.6 | 0.1 |
| 30 | 10030 | 3.3494E+02 | - | 18.301 | 2.913 | 0.343 | 5.000 | 0.0 | 0.6 | 0.0 | 0.0 | 0.6 | 0.0 |
| 31 | 10031 | 3.4805E+02 | - | 18.656 | 2.969 | 0.337 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 32 | 10032 | 3.8289E+02 | - | 19.568 | 3.114 | 0.321 | 5.000 | 0.0 | 0.2 | 34.8 | 0.0 | 0.3 | 34.8 |
| 33 | 10033 | 3.8727E+02 | - | 19.679 | 3.132 | 0.319 | 5.000 | 0.0 | 0.2 | 25.1 | 0.0 | 0.2 | 25.1 |
| 34 | 10034 | 4.2043E+02 | - | 20.505 | 3.263 | 0.306 | 5.000 | 0.0 | 0.2 | 8.0 | 0.0 | 0.2 | 8.0 |
| 35 | 10035 | 4.3587E+02 | - | 20.878 | 3.323 | 0.301 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 36 | 10036 | 4.4973E+02 | - | 21.207 | 3.375 | 0.296 | 5.000 | 0.0 | 0.8 | 2.2 | 0.0 | 0.9 | 2.2 |
| 37 | 10037 | 4.8162E+02 | - | 21.946 | 3.493 | 0.286 | 5.000 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 |
| 38 | 10038 | 4.9322E+02 | - | 22.209 | 3.535 | 0.283 | 5.000 | 0.0 | 0.0 | 0.8 | 0.0 | 0.0 | 0.8 |
| 39 | 10039 | 5.2542E+02 | - | 22.922 | 3.648 | 0.274 | 5.000 | 0.0 | 0.5 | 1.5 | 0.0 | 1.0 | 1.5 |
| 40 | 10040 | 5.3321E+02 | - | 23.091 | 3.675 | 0.272 | 5.000 | 0.0 | 1.3 | 2.4 | 0.0 | 2.2 | 2.4 |
| 41 | 10041 | 5.8454E+02 | - | 24.177 | 3.848 | 0.260 | 5.000 | 0.0 | 0.0 | 0.4 | 0.0 | 0.1 | 0.4 |
| 42 | 10042 | 6.1926E+02 | - | 24.885 | 3.961 | 0.252 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 43 | 10043 | 6.5272E+02 | - | 25.548 | 4.066 | 0.246 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 44 | 10044 | 6.6566E+02 | - | 25.800 | 4.106 | 0.244 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 45 | 10045 | 6.7460E+02 | - | 25.973 | 4.134 | 0.242 | 5.000 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| 46 | 10046 | 7.2212E+02 | - | 26.872 | 4.277 | 0.234 | 5.000 | 0.0 | 0.0 | 12.5 | 0.0 | 0.0 | 12.4 |
| 47 | 10047 | 8.0926E+02 | - | 28.447 | 4.528 | 0.221 | 5.000 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.1 |
| 48 | 10048 | 8.2717E+02 | - | 28.761 | 4.577 | 0.218 | 5.000 | 0.0 | 0.0 | 1.7 | 0.0 | 0.1 | 1.7 |
| 49 | 10049 | 8.3630E+02 | - | 28.919 | 4.603 | 0.217 | 5.000 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.3 |
| 50 | 10050 | 8.3663E+02 | - | 28.925 | 4.603 | 0.217 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 51 | 10051 | 8.7121E+02 | - | 29.516 | 4.698 | 0.213 | 5.000 | 0.0 | 0.2 | 2.9 | 0.0 | 0.4 | 2.9 |
| 52 | 10052 | 8.8260E+02 | - | 29.709 | 4.728 | 0.211 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 53 | 10053 | 9.6498E+02 | - | 31.064 | 4.944 | 0.202 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 54 | 10054 | 9.8393E+02 | - | 31.368 | 4.992 | 0.200 | 5.000 | 0.0 | 0.1 | 0.5 | 0.0 | 0.2 | 0.5 |
| 55 | 10055 | 1.0156E+03 | - | 31.868 | 5.072 | 0.197 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| 56 | 10056 | 1.0259E+03 | - | 32.030 | 5.098 | 0.196 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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Nadvoz Barjanska rekonstruiran v1

Calculation of Spectras - Evaluation case (X , Y , Z)

Eigenvalues

| No. | LC | λ [rad ² /sec ²] | error [-] | ω [rad/sec] | f [Hz] | T [sec] | ξ [%] | X[%] | Meff Y[%] | Z[%] | participation | | |
|-----|-------|--|--------------|-----------------------|-----------|------------|--------------|------|--------------|------|---------------|------|------|
| | | | | | | | | | | | X[%] | Y[%] | Z[%] |
| 57 | 10057 | 1.0264E+03 | - | 32.038 | 5.099 | 0.196 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 58 | 10058 | 1.0264E+03 | - | 32.038 | 5.099 | 0.196 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 59 | 10059 | 1.0265E+03 | - | 32.038 | 5.099 | 0.196 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 60 | 10060 | 1.0265E+03 | - | 32.039 | 5.099 | 0.196 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 61 | 10061 | 1.0267E+03 | - | 32.043 | 5.100 | 0.196 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 62 | 10062 | 1.1606E+03 | - | 34.067 | 5.422 | 0.184 | 5.000 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| 63 | 10063 | 1.2142E+03 | - | 34.846 | 5.546 | 0.180 | 5.000 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| 64 | 10064 | 1.2244E+03 | - | 34.992 | 5.569 | 0.180 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 65 | 10065 | 1.2251E+03 | - | 35.001 | 5.571 | 0.180 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 66 | 10066 | 1.2251E+03 | - | 35.002 | 5.571 | 0.180 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 67 | 10067 | 1.2252E+03 | - | 35.003 | 5.571 | 0.180 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 68 | 10068 | 1.2252E+03 | - | 35.003 | 5.571 | 0.180 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 69 | 10069 | 1.2258E+03 | - | 35.011 | 5.572 | 0.179 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 70 | 10070 | 1.2510E+03 | - | 35.369 | 5.629 | 0.178 | 5.000 | 0.0 | 0.0 | 0.2 | 0.0 | 0.1 | 0.2 |
| 71 | 10071 | 1.2836E+03 | - | 35.828 | 5.702 | 0.175 | 5.000 | 1.3 | 0.0 | 0.2 | 1.7 | 0.0 | 0.2 |
| 72 | 10072 | 1.3041E+03 | - | 36.113 | 5.748 | 0.174 | 5.000 | 0.1 | 0.0 | 0.6 | 0.2 | 0.0 | 0.6 |
| 73 | 10073 | 1.3335E+03 | - | 36.518 | 5.812 | 0.172 | 5.000 | 1.1 | 0.0 | 0.1 | 1.4 | 0.0 | 0.1 |
| 74 | 10074 | 1.3425E+03 | - | 36.640 | 5.831 | 0.171 | 5.000 | 0.8 | 0.0 | 0.1 | 1.0 | 0.0 | 0.1 |
| 75 | 10075 | 1.3798E+03 | - | 37.145 | 5.912 | 0.169 | 5.000 | 1.7 | 0.0 | 0.1 | 2.1 | 0.0 | 0.1 |
| 76 | 10076 | 1.3916E+03 | - | 37.305 | 5.937 | 0.168 | 5.000 | 0.8 | 0.0 | 0.0 | 0.9 | 0.0 | 0.0 |
| 77 | 10077 | 1.4113E+03 | - | 37.567 | 5.979 | 0.167 | 5.000 | 0.6 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 |
| 78 | 10078 | 1.4186E+03 | - | 37.664 | 5.994 | 0.167 | 5.000 | 0.4 | 0.1 | 0.0 | 0.5 | 0.1 | 0.0 |
| 79 | 10079 | 1.4562E+03 | - | 38.160 | 6.073 | 0.165 | 5.000 | 1.7 | 0.0 | 0.0 | 2.1 | 0.0 | 0.0 |
| 80 | 10080 | 1.4939E+03 | - | 38.651 | 6.151 | 0.163 | 5.000 | 0.0 | 0.1 | 0.3 | 0.0 | 0.2 | 0.3 |
| 81 | 10081 | 1.5790E+03 | - | 39.736 | 6.324 | 0.158 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 82 | 10082 | 1.5809E+03 | - | 39.760 | 6.328 | 0.158 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 83 | 10083 | 1.5817E+03 | - | 39.771 | 6.330 | 0.158 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 84 | 10084 | 1.5818E+03 | - | 39.772 | 6.330 | 0.158 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 85 | 10085 | 1.5819E+03 | - | 39.773 | 6.330 | 0.158 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 86 | 10086 | 1.5820E+03 | - | 39.775 | 6.330 | 0.158 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87 | 10087 | 1.5828E+03 | - | 39.785 | 6.332 | 0.158 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 88 | 10088 | 1.6036E+03 | - | 40.045 | 6.373 | 0.157 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 89 | 10089 | 1.6176E+03 | - | 40.219 | 6.401 | 0.156 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90 | 10090 | 1.6545E+03 | - | 40.675 | 6.474 | 0.154 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 91 | 10091 | 1.6645E+03 | - | 40.799 | 6.493 | 0.154 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 92 | 10092 | 1.7210E+03 | - | 41.485 | 6.603 | 0.151 | 5.000 | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 | 0.0 |
| 93 | 10093 | 1.7319E+03 | - | 41.616 | 6.623 | 0.151 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 94 | 10094 | 1.7426E+03 | - | 41.745 | 6.644 | 0.151 | 5.000 | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 | 0.0 |
| 95 | 10095 | 1.7708E+03 | - | 42.081 | 6.697 | 0.149 | 5.000 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.3 |
| 96 | 10096 | 1.8276E+03 | - | 42.750 | 6.804 | 0.147 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 97 | 10097 | 1.8530E+03 | - | 43.047 | 6.851 | 0.146 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 98 | 10098 | 1.8860E+03 | - | 43.428 | 6.912 | 0.145 | 5.000 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 |
| 99 | 10099 | 1.9030E+03 | - | 43.624 | 6.943 | 0.144 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 100 | 10100 | 1.9184E+03 | - | 43.800 | 6.971 | 0.143 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 101 | 10101 | 1.9408E+03 | - | 44.054 | 7.011 | 0.143 | 5.000 | 0.0 | 0.5 | 1.9 | 0.0 | 0.5 | 2.0 |
| 102 | 10102 | 1.9768E+03 | - | 44.461 | 7.076 | 0.141 | 5.000 | 0.0 | 0.3 | 0.0 | 0.0 | 0.3 | 0.0 |
| 103 | 10103 | 1.9955E+03 | - | 44.671 | 7.110 | 0.141 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 104 | 10104 | 2.0034E+03 | - | 44.759 | 7.124 | 0.140 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 105 | 10105 | 2.0155E+03 | - | 44.895 | 7.145 | 0.140 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 106 | 10106 | 2.0429E+03 | - | 45.199 | 7.194 | 0.139 | 5.000 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.2 |
| 107 | 10107 | 2.0690E+03 | - | 45.486 | 7.239 | 0.138 | 5.000 | 0.0 | 1.1 | 0.1 | 0.0 | 1.2 | 0.1 |
| 108 | 10108 | 2.0779E+03 | - | 45.584 | 7.255 | 0.138 | 5.000 | 0.0 | 0.3 | 0.0 | 0.0 | 0.3 | 0.0 |
| 109 | 10109 | 2.0819E+03 | - | 45.627 | 7.262 | 0.138 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 110 | 10110 | 2.0855E+03 | - | 45.667 | 7.268 | 0.138 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 111 | 10111 | 2.0865E+03 | - | 45.679 | 7.270 | 0.138 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 112 | 10112 | 2.0867E+03 | - | 45.680 | 7.270 | 0.138 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 113 | 10113 | 2.0868E+03 | - | 45.682 | 7.270 | 0.138 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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Nadvoz Barjanska rekonstruiran v1

Calculation of Spectras - Evaluation case (X , Y , Z)

Eigenvalues

| No. | LC | λ [rad ² /sec ²] | error [-] | ω [rad/sec] | f [Hz] | T [sec] | ξ [%] | X[%] | Meff Y[%] | Z[%] | participation | | |
|-----|-------|--|--------------|-----------------------|-----------|------------|--------------|------|--------------|------|---------------|------|------|
| | | | | | | | | | | | X[%] | Y[%] | Z[%] |
| 114 | 10114 | 2.0870E+03 | - | 45.683 | 7.271 | 0.138 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 115 | 10115 | 2.0870E+03 | - | 45.684 | 7.271 | 0.138 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 116 | 10116 | 2.0873E+03 | - | 45.687 | 7.271 | 0.138 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 117 | 10117 | 2.0881E+03 | - | 45.696 | 7.273 | 0.137 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 118 | 10118 | 2.0955E+03 | - | 45.777 | 7.286 | 0.137 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 119 | 10119 | 2.1085E+03 | - | 45.918 | 7.308 | 0.137 | 5.000 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.3 |
| 120 | 10120 | 2.1240E+03 | - | 46.087 | 7.335 | 0.136 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 121 | 10121 | 2.1513E+03 | - | 46.382 | 7.382 | 0.135 | 5.000 | 0.0 | 0.8 | 0.0 | 0.0 | 0.8 | 0.0 |
| 122 | 10122 | 2.1549E+03 | - | 46.421 | 7.388 | 0.135 | 5.000 | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 | 0.0 |
| 123 | 10123 | 2.1591E+03 | - | 46.466 | 7.395 | 0.135 | 5.000 | 0.0 | 2.2 | 0.1 | 0.0 | 2.1 | 0.1 |
| 124 | 10124 | 2.2007E+03 | - | 46.912 | 7.466 | 0.134 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 125 | 10125 | 2.2141E+03 | - | 47.054 | 7.489 | 0.134 | 5.000 | 0.0 | 1.2 | 0.0 | 0.0 | 1.2 | 0.0 |
| 126 | 10126 | 2.2234E+03 | - | 47.153 | 7.505 | 0.133 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 127 | 10127 | 2.2360E+03 | - | 47.287 | 7.526 | 0.133 | 5.000 | 0.0 | 0.6 | 0.0 | 0.0 | 0.6 | 0.0 |
| 128 | 10128 | 2.4099E+03 | - | 49.091 | 7.813 | 0.128 | 5.000 | 0.0 | 1.0 | 0.2 | 0.0 | 0.9 | 0.2 |
| 129 | 10129 | 2.4374E+03 | - | 49.370 | 7.858 | 0.127 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 130 | 10130 | 2.4407E+03 | - | 49.403 | 7.863 | 0.127 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 131 | 10131 | 2.4611E+03 | - | 49.610 | 7.896 | 0.127 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 132 | 10132 | 2.4784E+03 | - | 49.783 | 7.923 | 0.126 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 133 | 10133 | 2.4982E+03 | - | 49.982 | 7.955 | 0.126 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 134 | 10134 | 2.5038E+03 | - | 50.038 | 7.964 | 0.126 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 135 | 10135 | 2.5081E+03 | - | 50.081 | 7.971 | 0.125 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 136 | 10136 | 2.5106E+03 | - | 50.106 | 7.975 | 0.125 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 137 | 10137 | 2.5146E+03 | - | 50.146 | 7.981 | 0.125 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 138 | 10138 | 2.5654E+03 | - | 50.649 | 8.061 | 0.124 | 5.000 | 0.0 | 0.5 | 0.0 | 0.0 | 0.4 | 0.0 |
| 139 | 10139 | 2.5710E+03 | - | 50.705 | 8.070 | 0.124 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 140 | 10140 | 2.5729E+03 | - | 50.724 | 8.073 | 0.124 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 141 | 10141 | 2.6035E+03 | - | 51.024 | 8.121 | 0.123 | 5.000 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 |
| 142 | 10142 | 2.6202E+03 | - | 51.188 | 8.147 | 0.123 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 143 | 10143 | 2.7251E+03 | - | 52.202 | 8.308 | 0.120 | 5.000 | 0.0 | 0.4 | 0.0 | 0.0 | 0.3 | 0.0 |
| 144 | 10144 | 2.7263E+03 | - | 52.214 | 8.310 | 0.120 | 5.000 | 0.0 | 0.3 | 0.0 | 0.0 | 0.3 | 0.0 |
| 145 | 10145 | 2.7269E+03 | - | 52.220 | 8.311 | 0.120 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 146 | 10146 | 2.7273E+03 | - | 52.224 | 8.312 | 0.120 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 147 | 10147 | 2.7275E+03 | - | 52.225 | 8.312 | 0.120 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 148 | 10148 | 2.7286E+03 | - | 52.236 | 8.314 | 0.120 | 5.000 | 0.0 | 0.7 | 0.0 | 0.0 | 0.6 | 0.0 |
| 149 | 10149 | 2.7293E+03 | - | 52.243 | 8.315 | 0.120 | 5.000 | 0.0 | 0.4 | 0.0 | 0.0 | 0.4 | 0.0 |
| 150 | 10150 | 2.8210E+03 | - | 53.113 | 8.453 | 0.118 | 5.000 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| 151 | 10151 | 2.8464E+03 | - | 53.352 | 8.491 | 0.118 | 5.000 | 0.2 | 0.2 | 0.0 | 0.1 | 0.2 | 0.0 |
| 152 | 10152 | 2.8752E+03 | - | 53.621 | 8.534 | 0.117 | 5.000 | 1.1 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| 153 | 10153 | 2.9301E+03 | - | 54.130 | 8.615 | 0.116 | 5.000 | 0.1 | 0.8 | 0.0 | 0.1 | 0.7 | 0.0 |
| 154 | 10154 | 2.9577E+03 | - | 54.384 | 8.656 | 0.116 | 5.000 | 2.0 | 0.0 | 0.0 | 1.6 | 0.0 | 0.0 |
| 155 | 10155 | 2.9772E+03 | - | 54.564 | 8.684 | 0.115 | 5.000 | 0.9 | 0.1 | 0.0 | 0.8 | 0.0 | 0.0 |
| 156 | 10156 | 3.1332E+03 | - | 55.975 | 8.909 | 0.112 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 157 | 10157 | 3.1373E+03 | - | 56.012 | 8.915 | 0.112 | 5.000 | 1.6 | 0.0 | 0.0 | 1.4 | 0.0 | 0.0 |
| 158 | 10158 | 3.1563E+03 | - | 56.181 | 8.941 | 0.112 | 5.000 | 0.3 | 0.3 | 0.1 | 0.2 | 0.2 | 0.1 |
| 159 | 10159 | 3.1939E+03 | - | 56.514 | 8.995 | 0.111 | 5.000 | 1.5 | 0.0 | 0.0 | 1.4 | 0.0 | 0.0 |
| 160 | 10160 | 3.2900E+03 | - | 57.359 | 9.129 | 0.110 | 5.000 | 0.2 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 |
| 161 | 10161 | 3.3226E+03 | - | 57.642 | 9.174 | 0.109 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 162 | 10162 | 3.3266E+03 | - | 57.677 | 9.180 | 0.109 | 5.000 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| 163 | 10163 | 3.3547E+03 | - | 57.920 | 9.218 | 0.108 | 5.000 | 0.2 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 |
| 164 | 10164 | 3.3628E+03 | - | 57.990 | 9.229 | 0.108 | 5.000 | 0.2 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| 165 | 10165 | 3.3802E+03 | - | 58.140 | 9.253 | 0.108 | 5.000 | 0.6 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| 166 | 10166 | 3.4295E+03 | - | 58.562 | 9.320 | 0.107 | 5.000 | 0.3 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 |
| 167 | 10167 | 3.4829E+03 | - | 59.016 | 9.393 | 0.106 | 5.000 | 0.0 | 0.6 | 0.0 | 0.0 | 0.5 | 0.0 |
| 168 | 10168 | 3.4896E+03 | - | 59.073 | 9.402 | 0.106 | 5.000 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| 169 | 10169 | 3.4903E+03 | - | 59.079 | 9.403 | 0.106 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 170 | 10170 | 3.4906E+03 | - | 59.082 | 9.403 | 0.106 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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Nadvoz Barjanska rekonstruiran v1

Calculation of Spectras - Evaluation case (X , Y , Z)

Eigenvalues

| No. | LC | λ [rad ² /sec ²] | error [-] | ω [rad/sec] | f [Hz] | T [sec] | ξ [%] | X[%] | Meff Y[%] | Z[%] | participation X[%] Y[%] Z[%] | | |
|-----|-------|--|--------------|-----------------------|-----------|------------|----------------|------|--------------|------|---------------------------------|------|------|
| 171 | 10171 | 3.4909E+03 | - | 59.084 | 9.403 | 0.106 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 172 | 10172 | 3.4912E+03 | - | 59.086 | 9.404 | 0.106 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 173 | 10173 | 3.4936E+03 | - | 59.107 | 9.407 | 0.106 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 174 | 10174 | 3.5020E+03 | - | 59.178 | 9.418 | 0.106 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 175 | 10175 | 3.5083E+03 | - | 59.231 | 9.427 | 0.106 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 176 | 10176 | 3.5227E+03 | - | 59.353 | 9.446 | 0.106 | 5.000 | 1.5 | 0.0 | 0.0 | 1.2 | 0.0 | 0.0 |
| 177 | 10177 | 3.5464E+03 | - | 59.551 | 9.478 | 0.106 | 5.000 | 0.1 | 1.3 | 0.0 | 0.1 | 1.3 | 0.0 |
| 178 | 10178 | 3.5850E+03 | - | 59.874 | 9.529 | 0.105 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 179 | 10179 | 3.6275E+03 | - | 60.229 | 9.586 | 0.104 | 5.000 | 0.6 | 0.2 | 0.0 | 0.5 | 0.2 | 0.0 |
| 180 | 10180 | 3.6509E+03 | - | 60.422 | 9.617 | 0.104 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 181 | 10181 | 3.6524E+03 | - | 60.435 | 9.619 | 0.104 | 5.000 | 0.2 | 1.5 | 0.0 | 0.2 | 1.4 | 0.0 |
| 182 | 10182 | 3.6855E+03 | - | 60.709 | 9.662 | 0.103 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 183 | 10183 | 3.6944E+03 | - | 60.782 | 9.674 | 0.103 | 5.000 | 0.8 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 |
| 184 | 10184 | 3.7084E+03 | - | 60.897 | 9.692 | 0.103 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 185 | 10185 | 3.7145E+03 | - | 60.946 | 9.700 | 0.103 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 186 | 10186 | 3.7202E+03 | - | 60.993 | 9.707 | 0.103 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 187 | 10187 | 3.9364E+03 | - | 62.741 | 9.986 | 0.100 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 188 | 10188 | 3.9675E+03 | - | 62.988 | 10.025 | 0.100 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 189 | 10189 | 4.0440E+03 | - | 63.592 | 10.121 | 0.099 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 190 | 10190 | 4.0663E+03 | - | 63.768 | 10.149 | 0.099 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 191 | 10191 | 4.0976E+03 | - | 64.012 | 10.188 | 0.098 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 192 | 10192 | 4.1131E+03 | - | 64.134 | 10.207 | 0.098 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 193 | 10193 | 4.1178E+03 | - | 64.170 | 10.213 | 0.098 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 194 | 10194 | 4.1225E+03 | - | 64.207 | 10.219 | 0.098 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 195 | 10195 | 4.1291E+03 | - | 64.258 | 10.227 | 0.098 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 196 | 10196 | 4.1364E+03 | - | 64.315 | 10.236 | 0.098 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 197 | 10197 | 4.1481E+03 | - | 64.406 | 10.251 | 0.098 | 5.000 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 | 0.6 |
| 198 | 10198 | 4.1983E+03 | - | 64.795 | 10.312 | 0.097 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 199 | 10199 | 4.2078E+03 | - | 64.867 | 10.324 | 0.097 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 200 | 10200 | 4.2242E+03 | - | 64.994 | 10.344 | 0.097 | 5.000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | $\Sigma(\%)^1$ | 99.4 | 98.6 | 99.9 | 98.7 | 98.0 | 99.9 |

¹ Total effective mass / participation factors of activated masses in X-, Y- and Z-direction.

| | | | |
|-----------|---------------------------|---------------|---|
| No. | eigenmode number | f | eigenfrequency |
| LC | load case | T | eigenperiod |
| λ | eigenvalue | ξ | modal damping ratio |
| error | relative eigenvalue error | Meff | effective modal mass in X-, Y- and Z-direction |
| ω | circular eigenfrequency | participation | participation factors in X-, Y- and Z-direction |

Load Cases

-- Spectra 801 EC 8 Type 1, Soil Class D

| D[-] | SA[-] | SB[-] | MIN[-] | TB[sec] | TC[sec] | TD[sec] | TE[sec] | K1[-] | K2[-] | A[m/sec ²] |
|------|-----------|-------|--------|---------|---------|---------|---------------------|-------|-------|------------------------|
| auto | 2.550 | 3.375 | 0.000 | 0.200 | 0.800 | 2.000 | 0.000 | 1.000 | 2.000 | 2.45 |
| Node | PX | PY | PZ | MX | MY | MZ | Mb | | | |
| | [kN] | [kN] | [kN] | [kNm] | [kNm] | [kNm] | [kNm ²] | | | |
| sum | -1.95E+04 | 0.0 | 0.0 | 0.00 | -750.78 | 0.00 | | | | |

Loads on kinematic constraints have been transfered to their master

-- Spectra 804 EC 8 Type 1, Soil Class D

| D[-] | SA[-] | SB[-] | MIN[-] | TB[sec] | TC[sec] | TD[sec] | TE[sec] | K1[-] | K2[-] | A[m/sec ²] |
|------|-------|-----------|--------|---------|---------|---------|---------------------|-------|-------|------------------------|
| auto | 2.550 | 3.375 | 0.000 | 0.200 | 0.800 | 2.000 | 0.000 | 1.000 | 2.000 | 2.45 |
| Node | PX | PY | PZ | MX | MY | MZ | Mb | | | |
| | [kN] | [kN] | [kN] | [kNm] | [kNm] | [kNm] | [kNm ²] | | | |
| sum | 0.0 | -1.95E+04 | 0.0 | 750.78 | 0.00 | 79.22 | | | | |

Loads on kinematic constraints have been transfered to their master

-- Spectra 809 EC 8 Type 1, Soil Class D

| D[-] | SA[-] | SB[-] | MIN[-] | TB[sec] | TC[sec] | TD[sec] | TE[sec] | K1[-] | K2[-] | A[m/sec ²] |
|--------|-------|-------|--------|---------|---------|---------|---------|-------|-------|------------------------|
| 1.0000 | 2.550 | 2.500 | 0.000 | 0.050 | 0.150 | 1.000 | 4.000 | 1.000 | 2.000 | 2.45 |

Nadvoz Barjanska rekonstruiran v1
Calculation of Spectras - Evaluation case (X , Y , Z)

| Node | PX [kN] | PY [kN] | PZ [kN] | MX [kNm] | MY [kNm] | MZ [kNm] | Mb [kNm ²] |
|------|------------|------------|------------|-------------|-------------|-------------|---------------------------|
| sum | 0.0 | 0.0 | -1.76E+04 | 0.00 | -71.30 | 0.00 | |

Loads on kinematic constraints have been transfered to their master

Results

Nodal Displacements, method CQC

| Node | u-X [mm] | u-Y [mm] | u-Z [mm] | u-XX [mrad] | u-YY [mrad] | u-ZZ [mrad] |
|------|-------------|-------------|-------------|----------------|----------------|----------------|
| MAX | 343.828 | 288.115 | 60.613 | 10.346 | 17.649 | 2.313 |

Supporting Forces in Nodes, method CQC

| Node | P-X [kN] | P-Y [kN] | P-Z [kN] | M-X [kNm] | M-Y [kNm] | M-Z [kNm] |
|------|-------------|-------------|-------------|--------------|--------------|--------------|
| MAX | 6.7 | 5.4 | 4647.7 | 0.00 | 0.00 | 0.00 |

Nodal velocities, method CQC

| Node | v-X [m/sec] | v-Y [m/sec] | v-Z [m/sec] | v-XX [rad/sec] | v-YY [rad/sec] | v-ZZ [rad/sec] |
|------|----------------|----------------|----------------|-------------------|-------------------|-------------------|
| MAX | 1.16 | 1.24 | 0.45 | 0.074 | 0.072 | 0.023 |

Nodal accelerations, method CQC

| Node | a-X [m/sec ²] | a-Y [m/sec ²] | a-Z [m/sec ²] | a-XX [rad/sec ²] | a-YY [rad/sec ²] | a-ZZ [rad/sec ²] |
|------|------------------------------|------------------------------|------------------------------|---------------------------------|---------------------------------|---------------------------------|
| MAX | 11.43 | 7.36 | 11.15 | 2.597 | 2.227 | 0.330 |

Generated load cases for maximum results

| Type | LC-MAX | LC-MIN | STYP |
|-----------------|--------------------------|--------|------|
| Beam Elements | | | |
| N | 8011 | - | CQC |
| Vy | 8012 | - | CQC |
| Vz | 8013 | - | CQC |
| Mt | 8014 | - | CQC |
| My | 8016 | - | CQC |
| Mz | 8017 | - | CQC |
| Spring Elements | | | |
| P | 8038 | - | CQC |
| PtX | 8040 | - | CQC |
| PtY | 8041 | - | CQC |
| PtZ | 8042 | - | CQC |
| elements | | | |
| SPX | 8045 | - | CQC |
| SPY | 8046 | - | CQC |
| SPZ | 8047 | - | CQC |
| SPRX | 8048 | - | CQC |
| SPRY | 8049 | - | CQC |
| SPRZ | 8050 | - | CQC |
| SP | 8044 | - | CQC |
| Type | result type | | |
| LC-MAX,LC-MIN | load case | | |
| STYP | modal superposition type | | |

Sum of supporting spring elements

| Number | LC | P-X [kN] | P-Y [kN] | P-Z [kN] | M-X [kNm] | M-Y [kNm] | M-Z [kNm] |
|--------|------|-------------|-------------|-------------|--------------|--------------|--------------|
| 90 | 8045 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| | 8046 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| | 8047 | 0.0 | 0.0 | 16354.5 | 3766.71 | -1404720. | 0.00 |
| | 8048 | 0.0 | 0.0 | 268.0 | 229900.08 | -23265.82 | 0.00 |
| | 8049 | 0.0 | 0.0 | -16253.6 | -3784.25 | 1413442.9 | 0.00 |
| | 8050 | 0.0 | 0.0 | -7.3 | -138107.1 | -93087.40 | 0.00 |

3 REZULTATI

3.1 PREKLADNA KONSTRUKCIJA

3.1.1 REAKCIJE

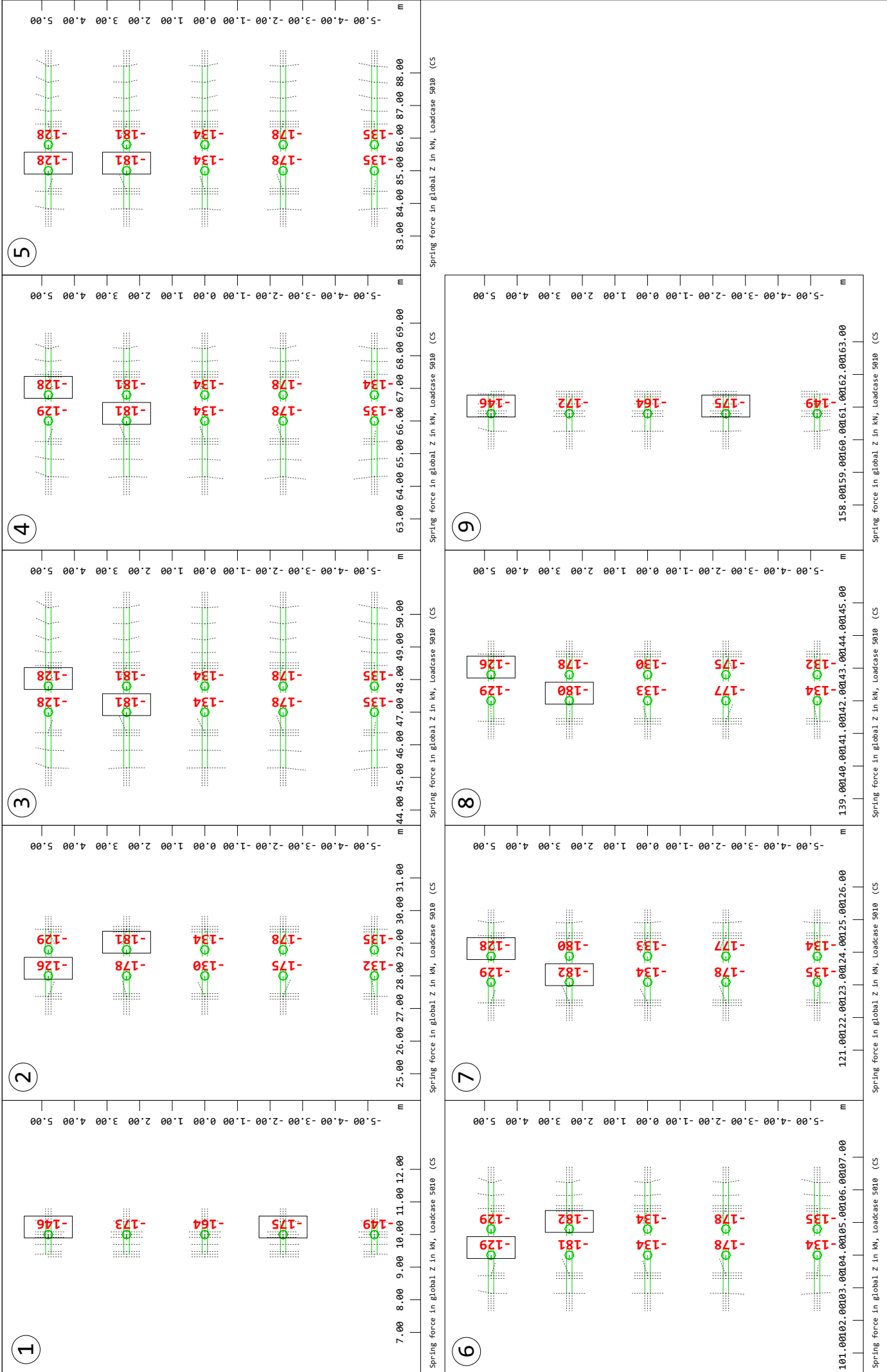
3.1.1.1 VERTIKALNE SILE V LEŽIŠČIH

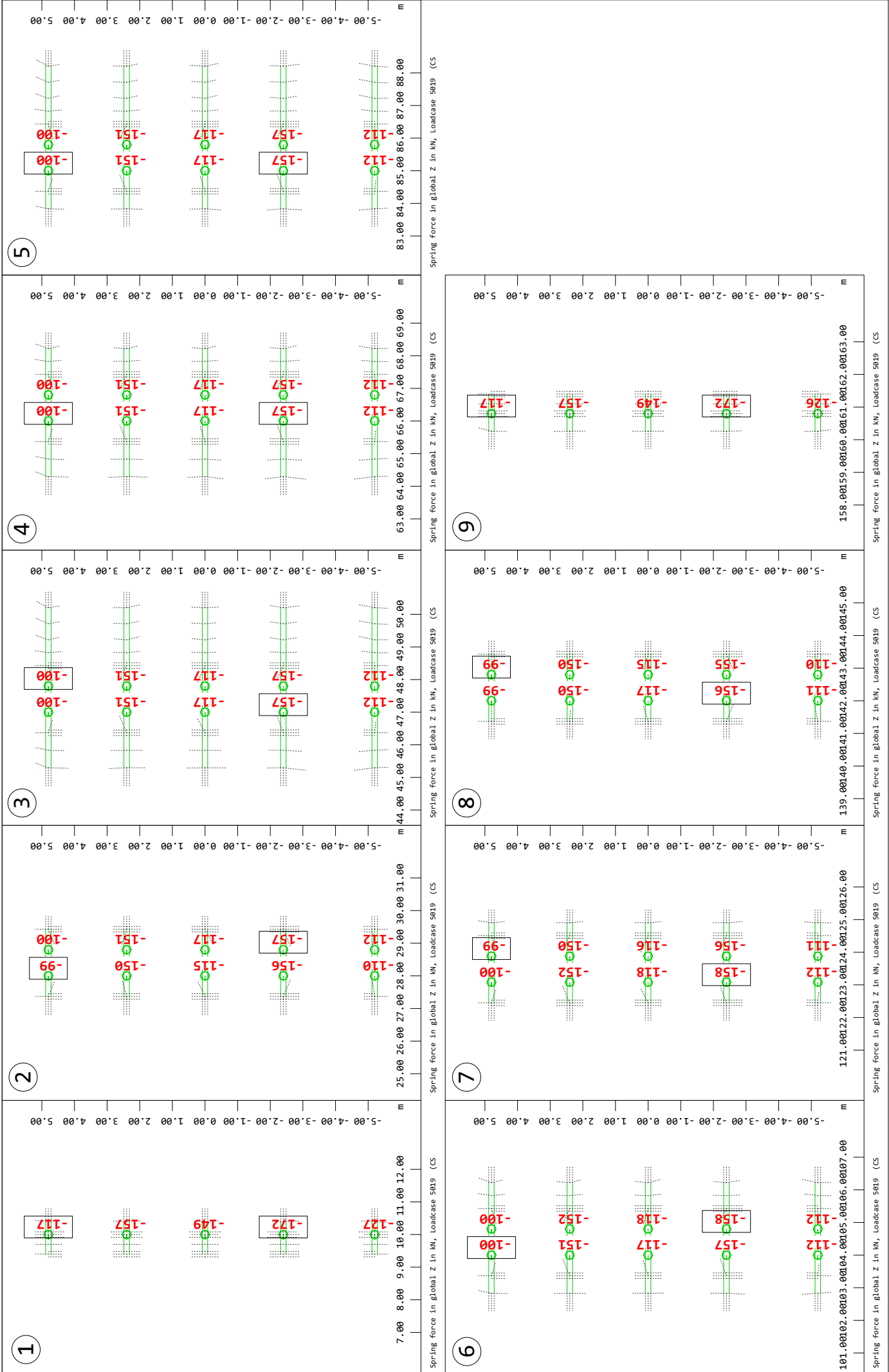
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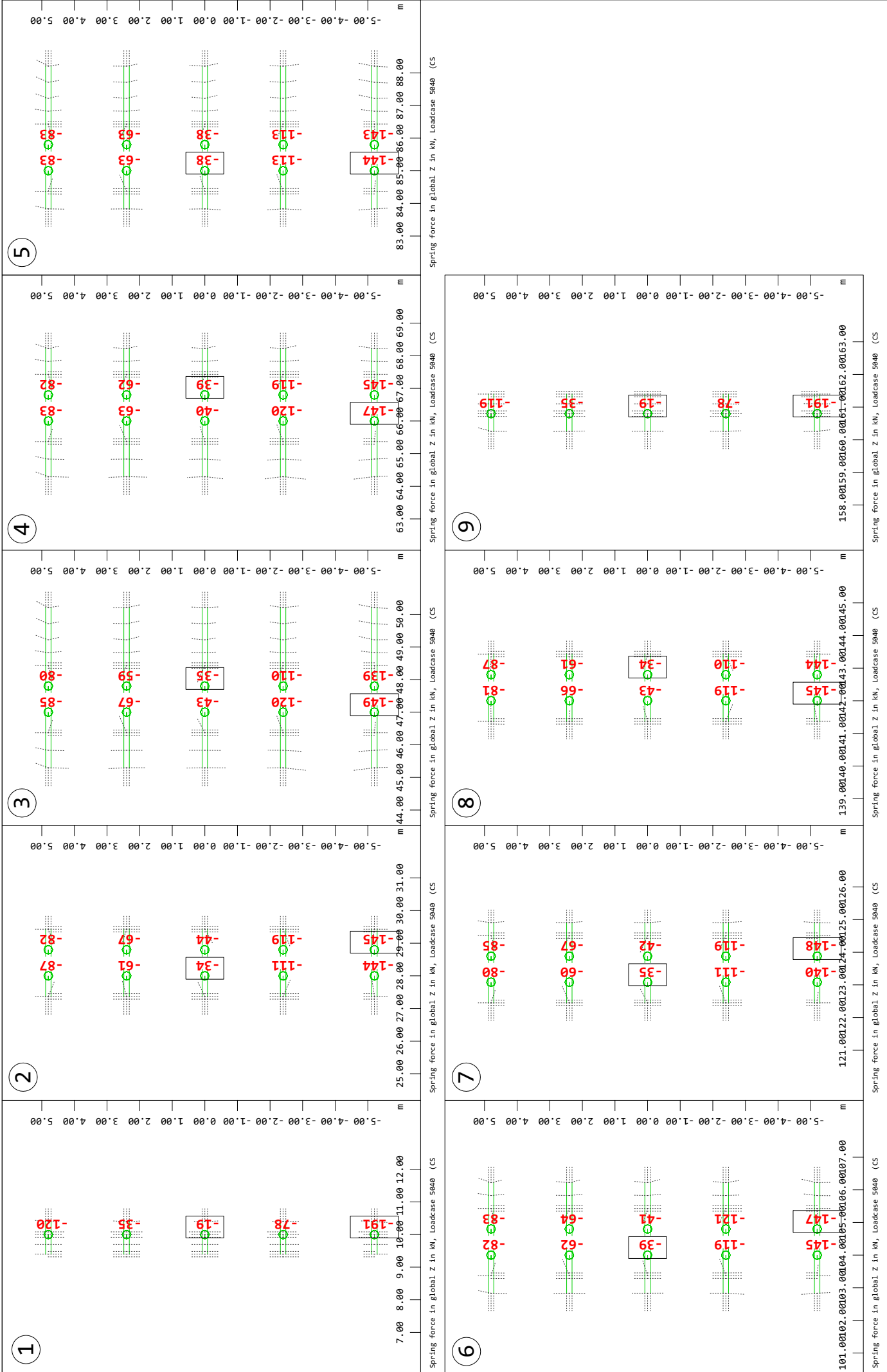
3.1.1.1 VERTIKALNE SILE V LEŽIŠČIH

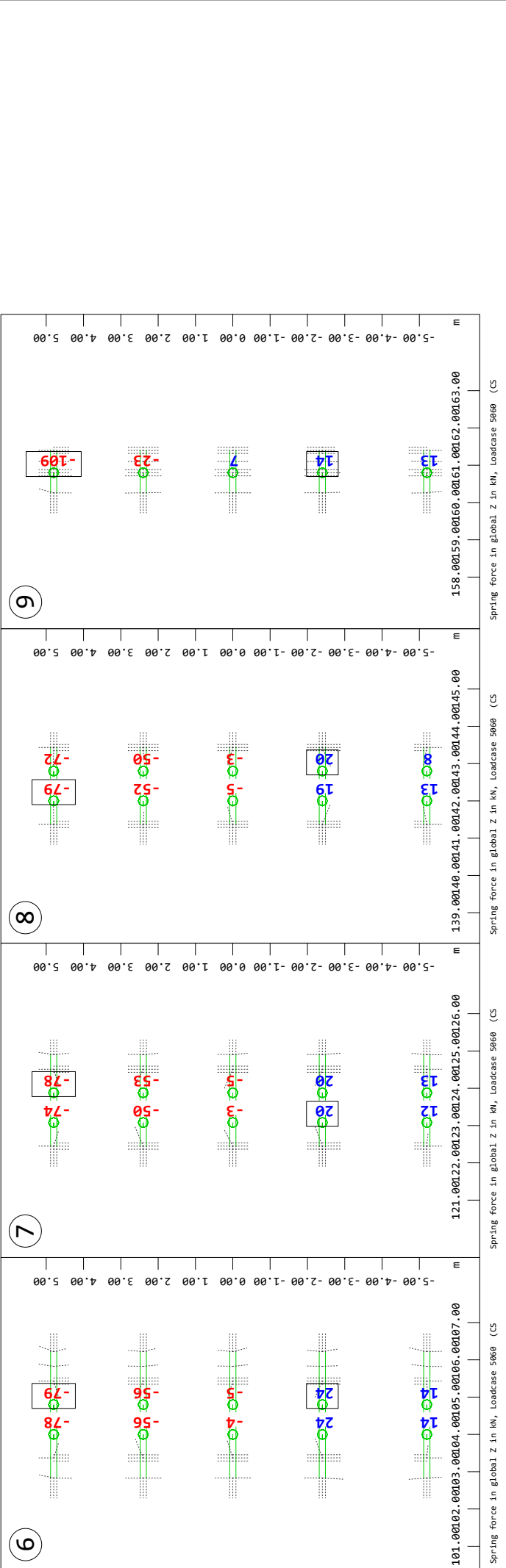
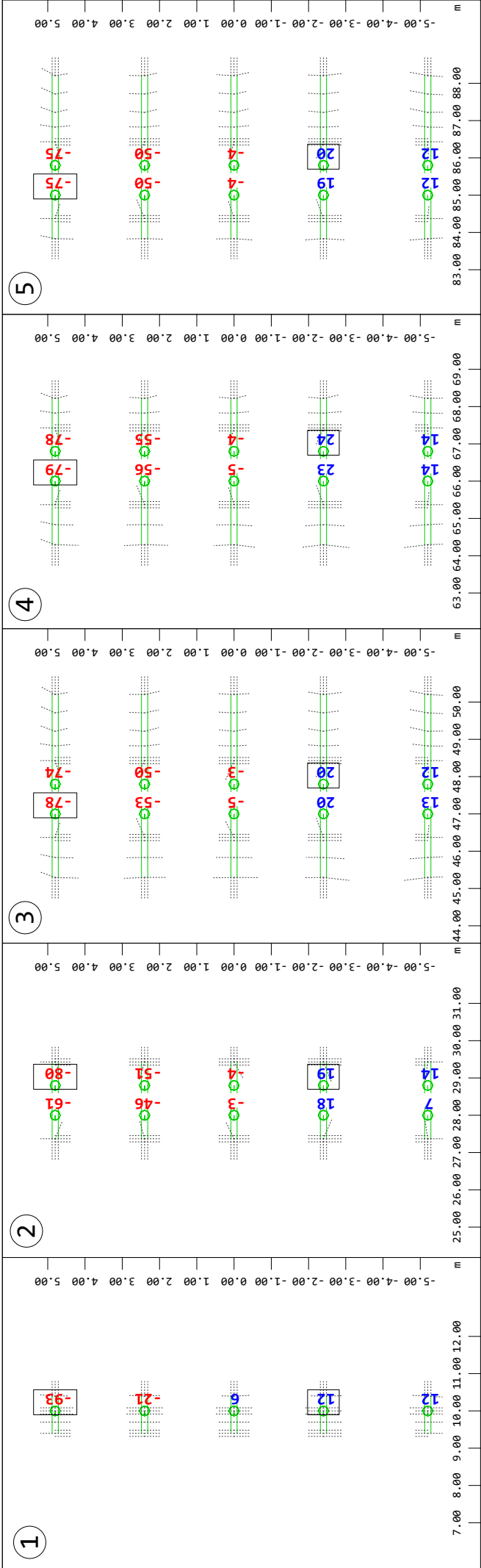
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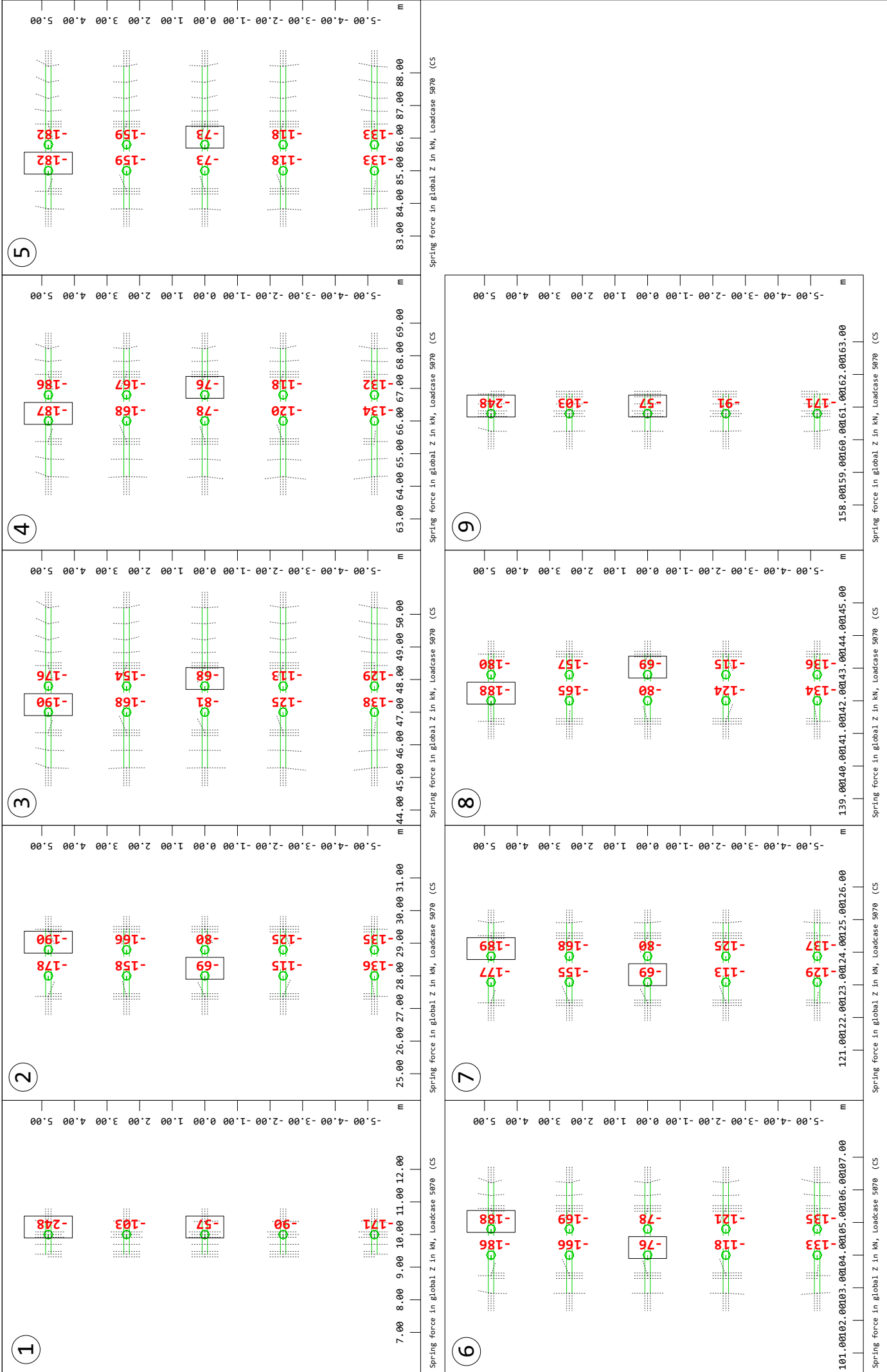
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|---|---------|
| Spring force in global Z LC: 5010 | Page 2 |
| Spring force in global Z LC: 5019 | Page 3 |
| Spring force in global Z LC: 5040 | Page 4 |
| Spring force in global Z LC: 5060 | Page 5 |
| Spring force in global Z LC: 5070 | Page 6 |
| Spring force in global Z LC: 4049 | Page 7 |
| Spring force in global Z LC: 4070 | Page 8 |
| Spring force in global Z LC: 902 | Page 9 |
| Spring force in global Z LC: 922 | Page 10 |
| Spring force in global Z LC: 942 | Page 11 |
| Spring force in global Z LC: 1421 | Page 12 |
| Spring force in global Z LC: 1422 | Page 13 |
| Spring force in global Z LC: 1121 | Page 14 |
| Spring force in global Z LC: 1122 | Page 15 |
| Spring force in global Z LC: 2121 | Page 16 |
| Spring force in global Z LC: 2122 | Page 17 |
| Spring force in global Z LC: 2621 | Page 18 |
| Spring force in global Z LC: 2622 | Page 19 |

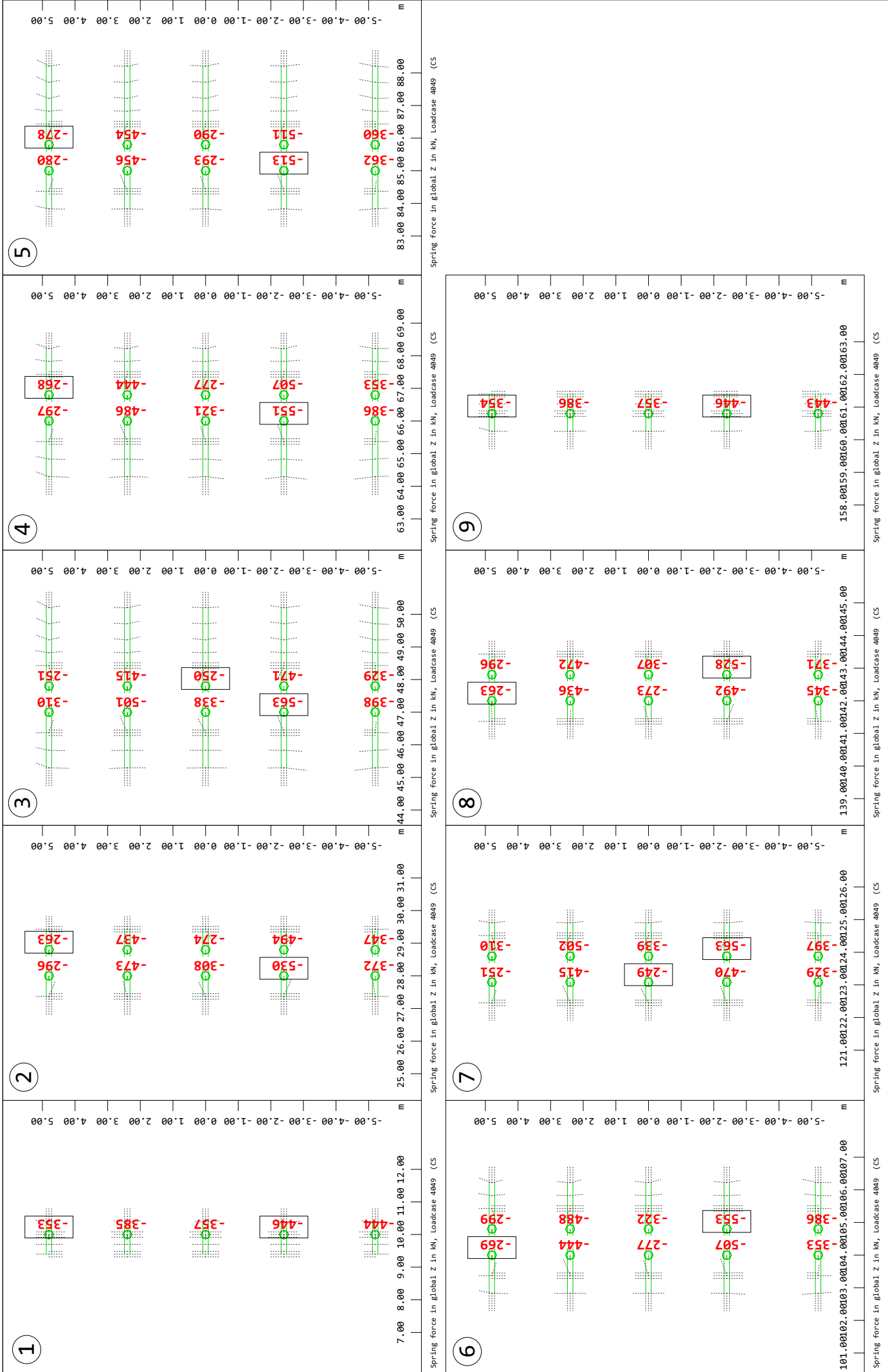


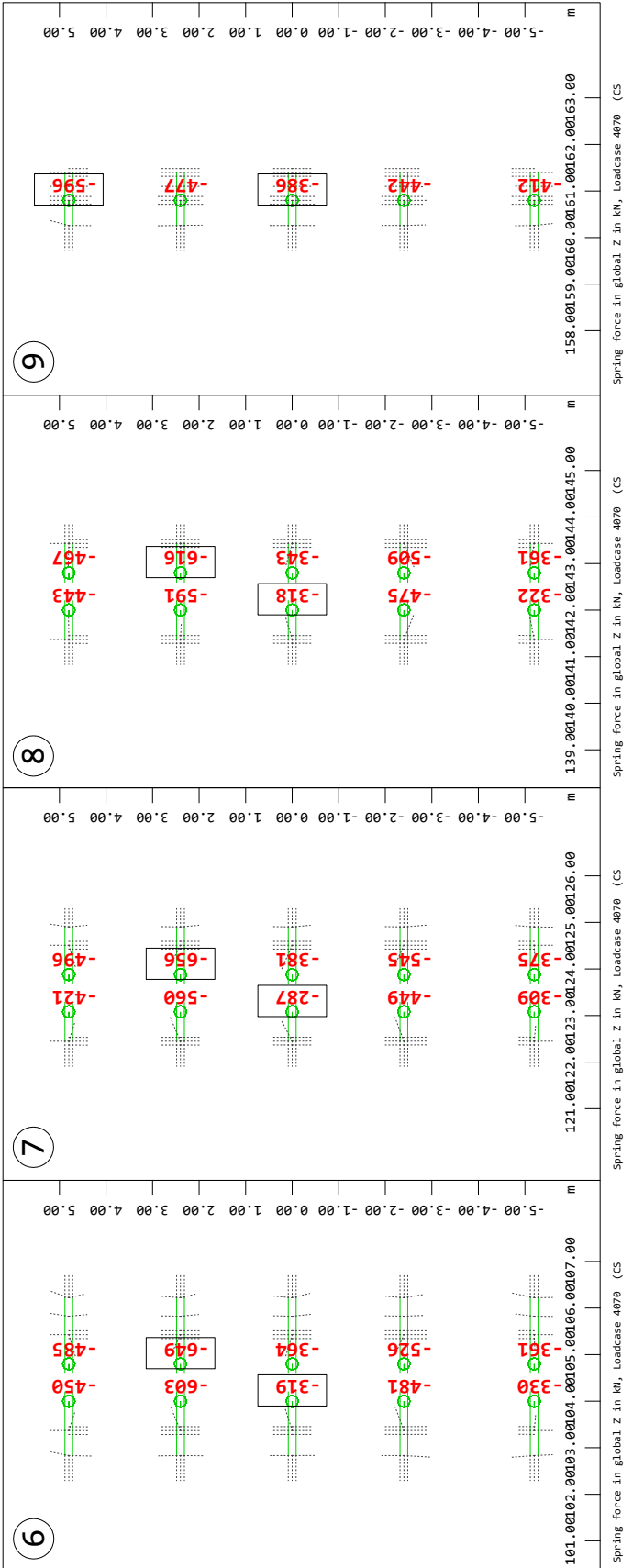
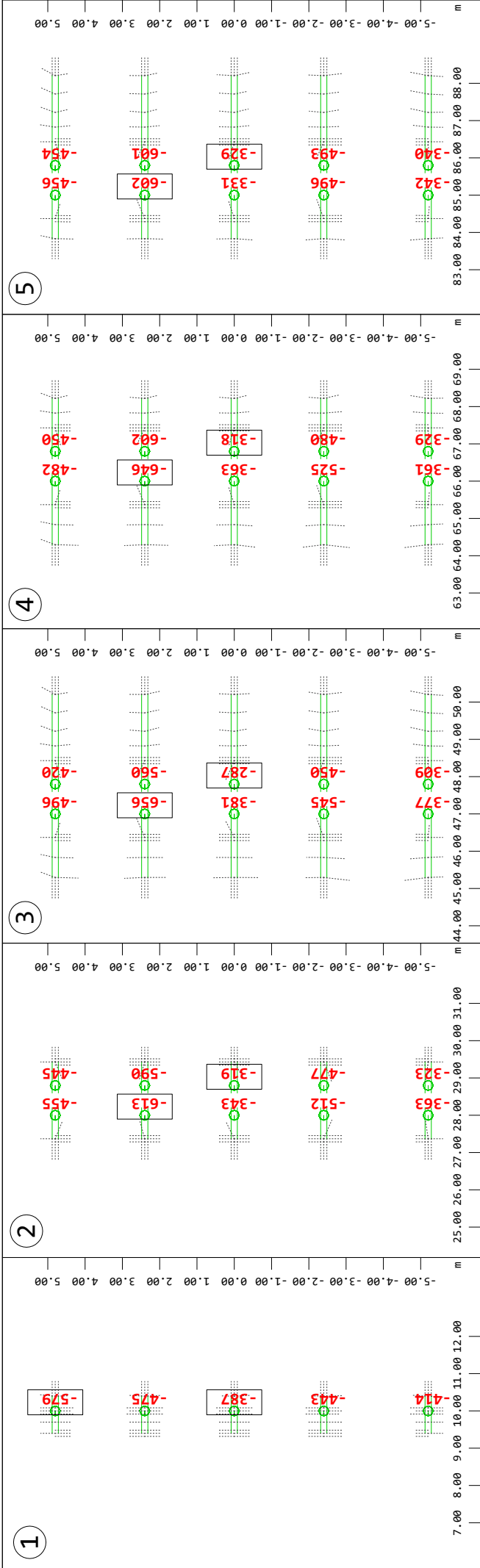


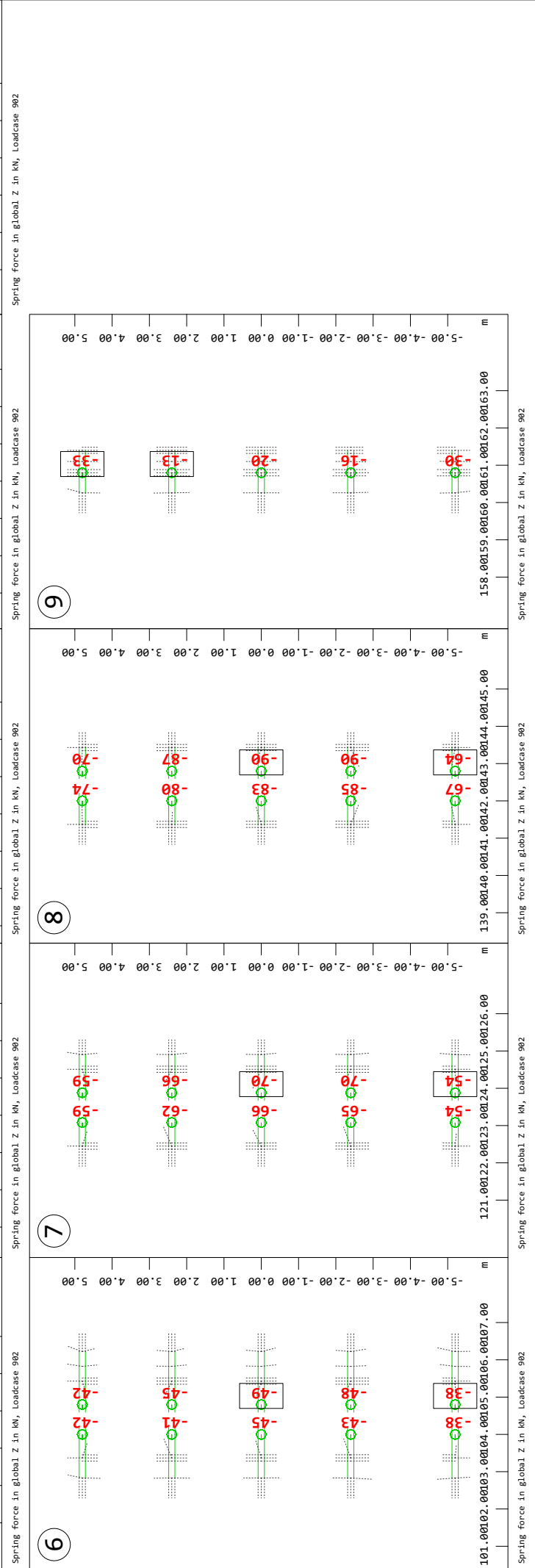
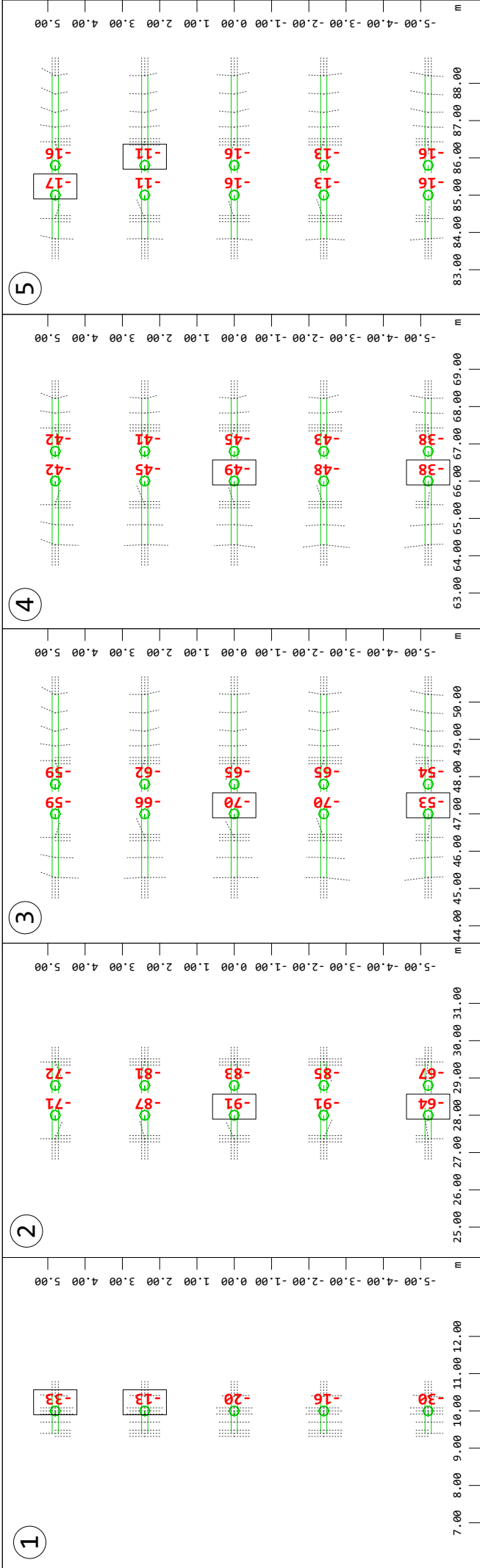


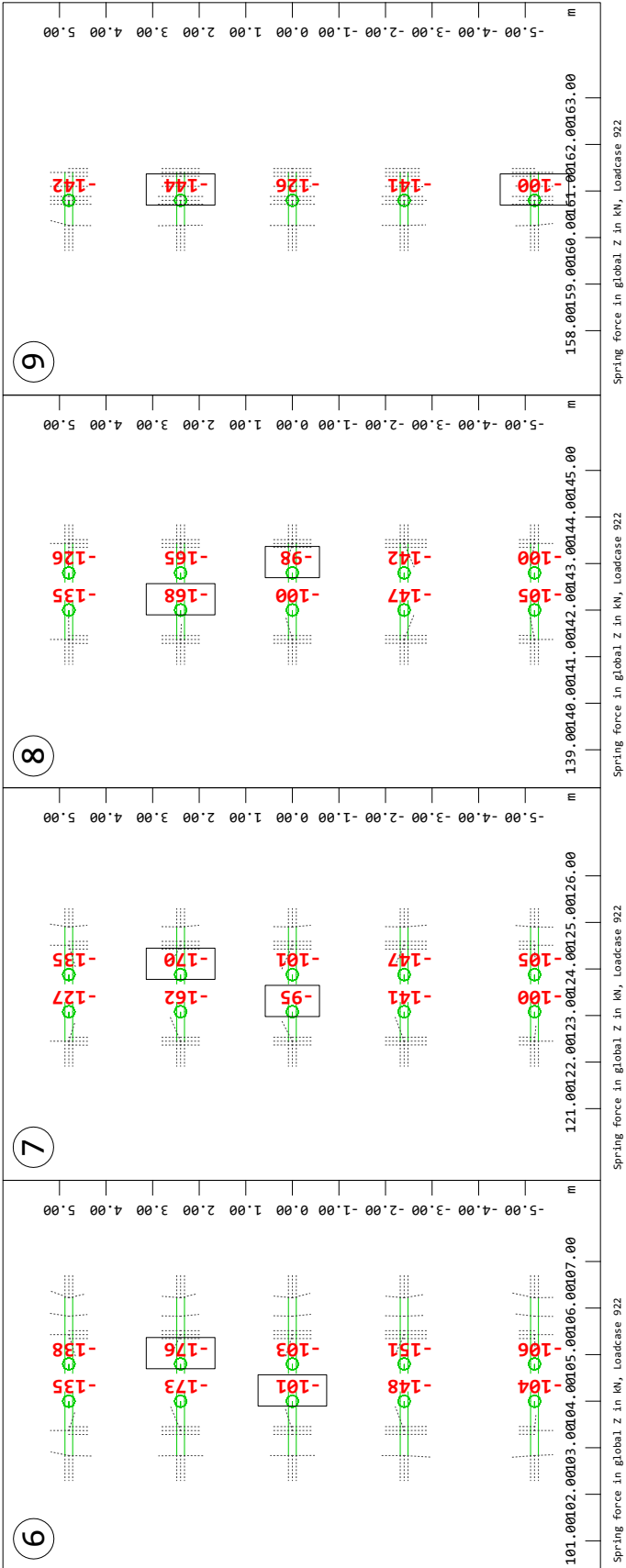
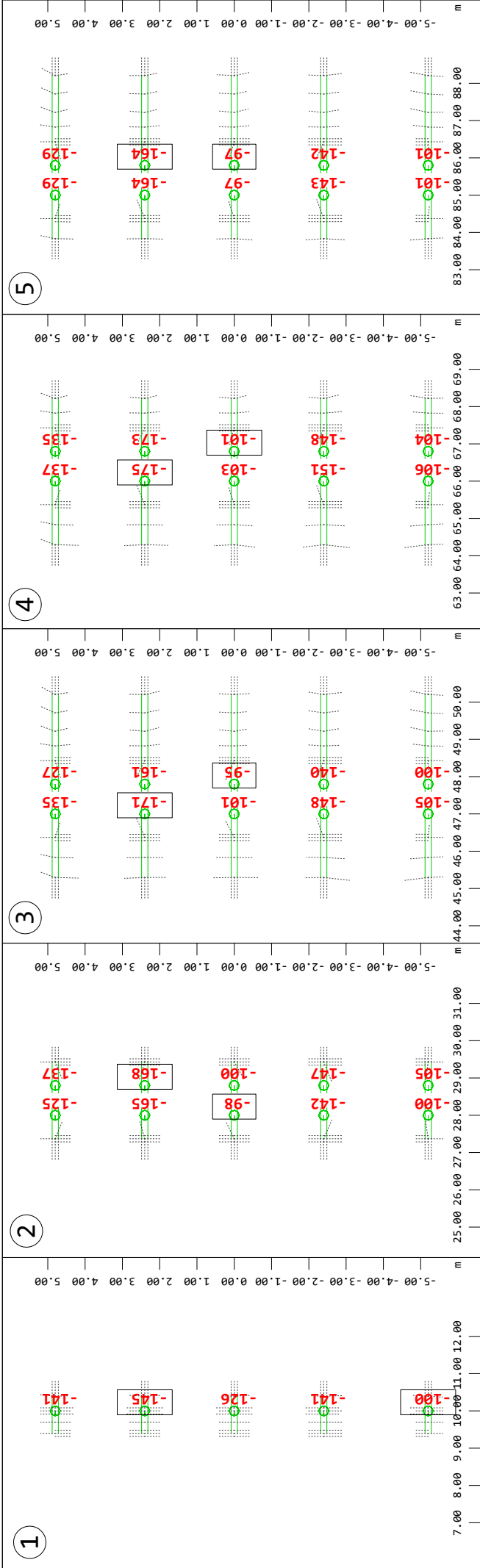


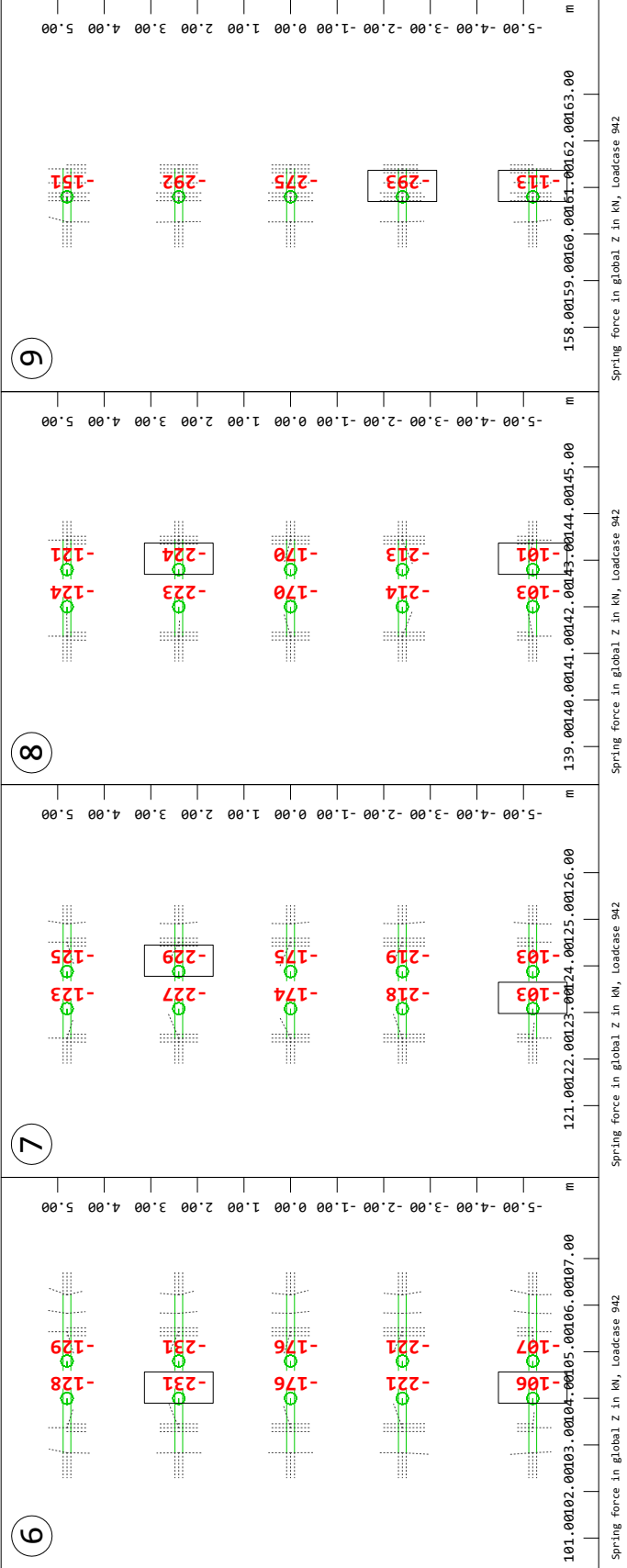
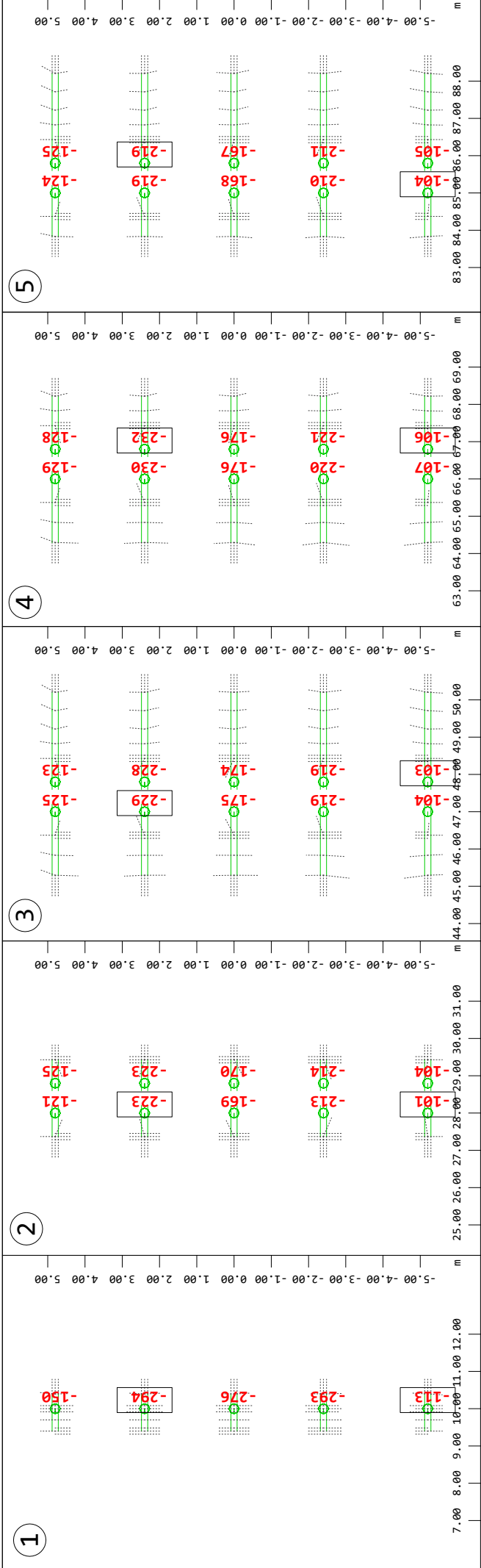


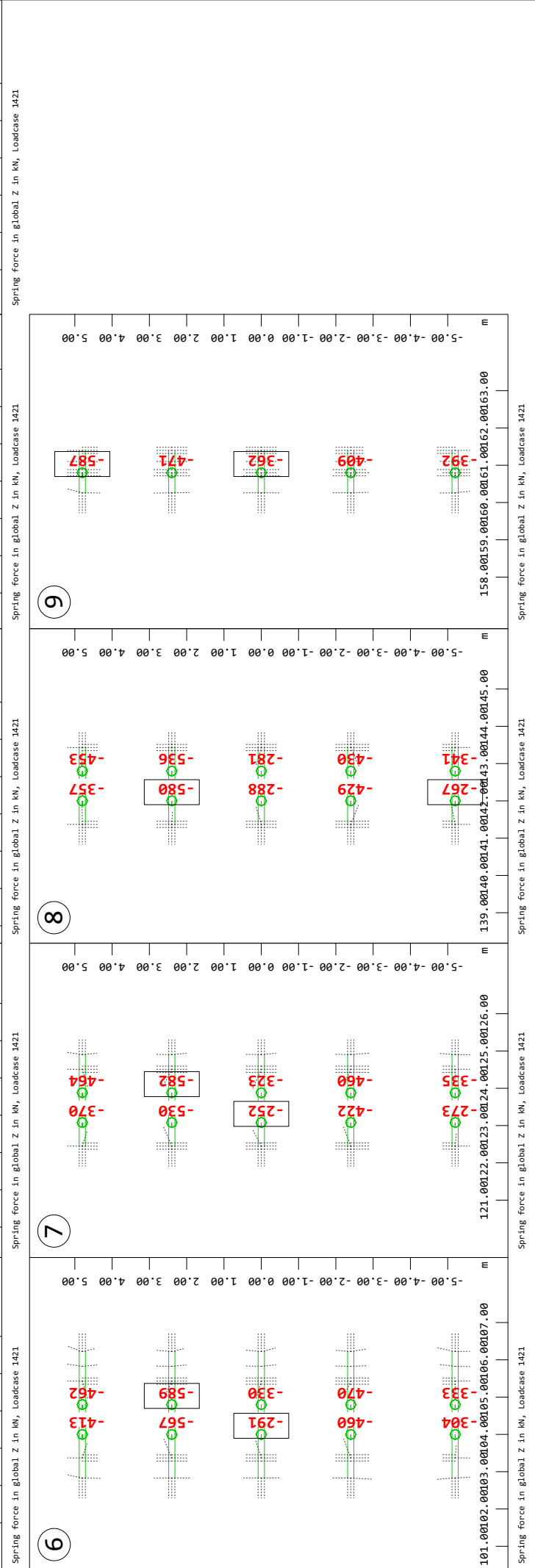
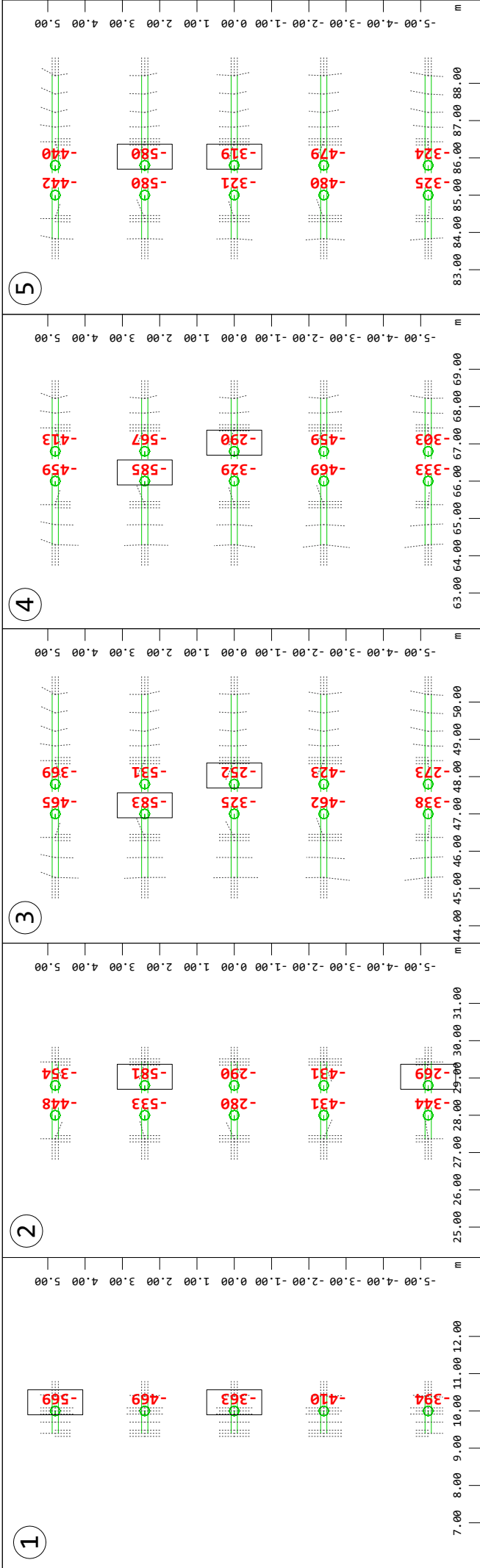


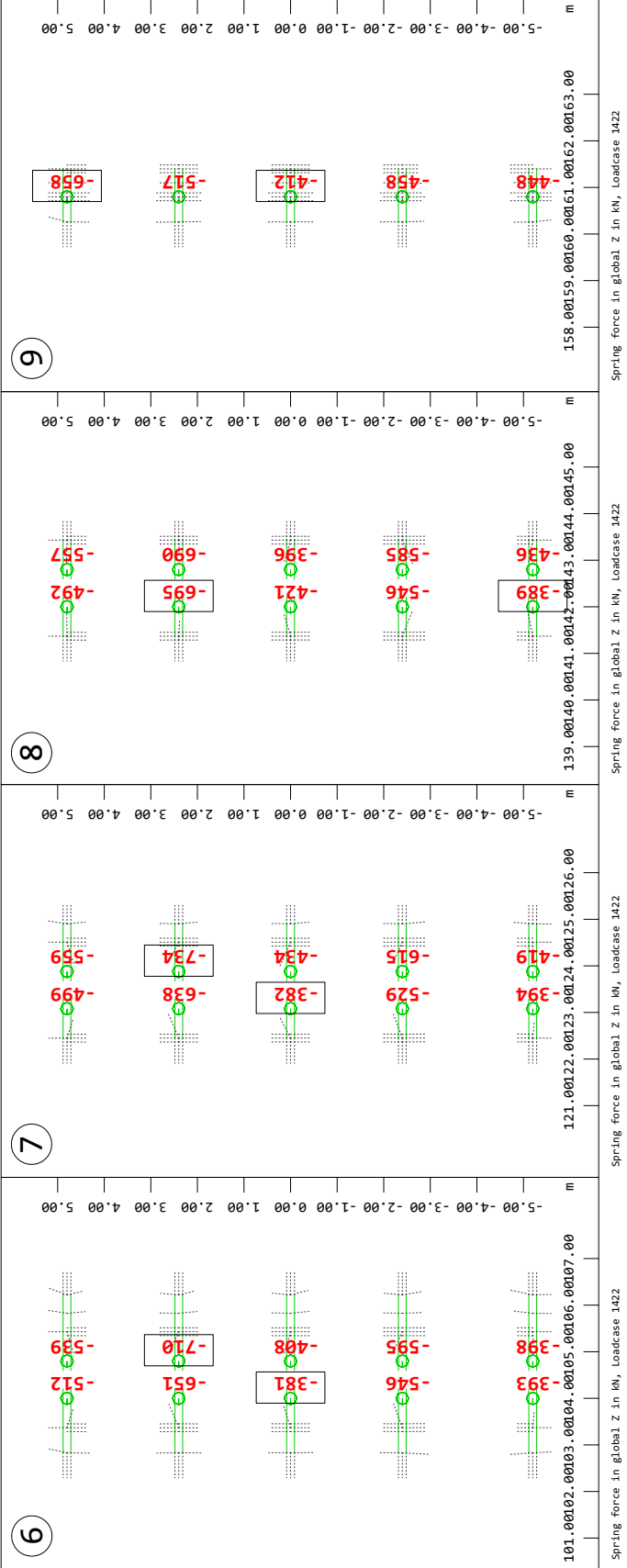
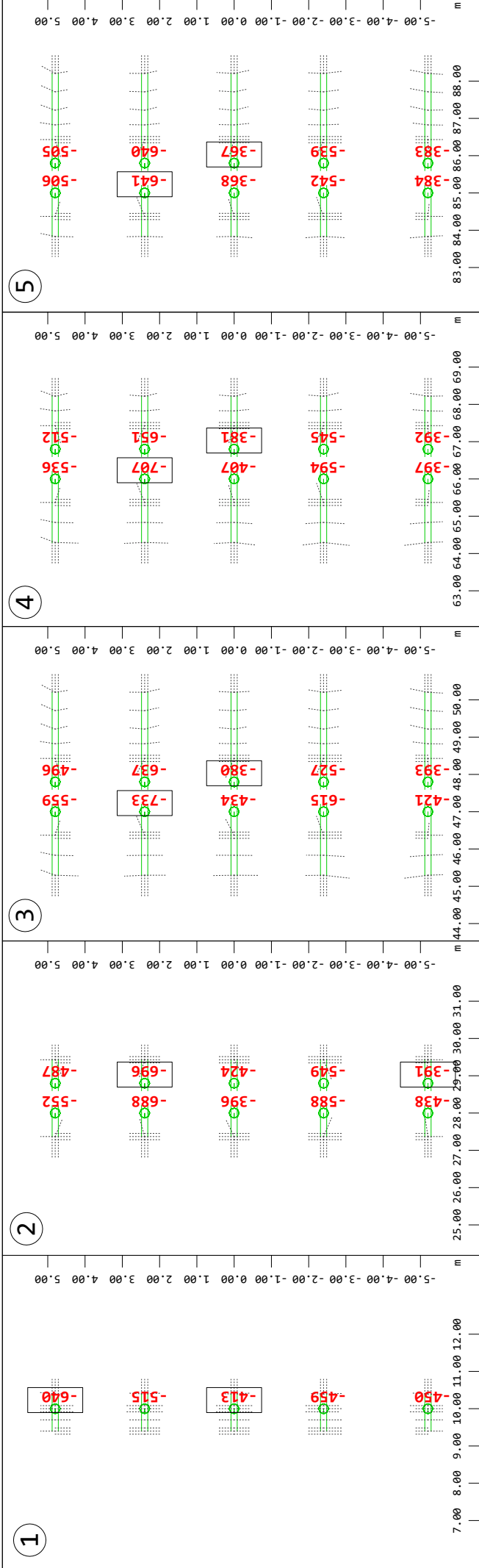


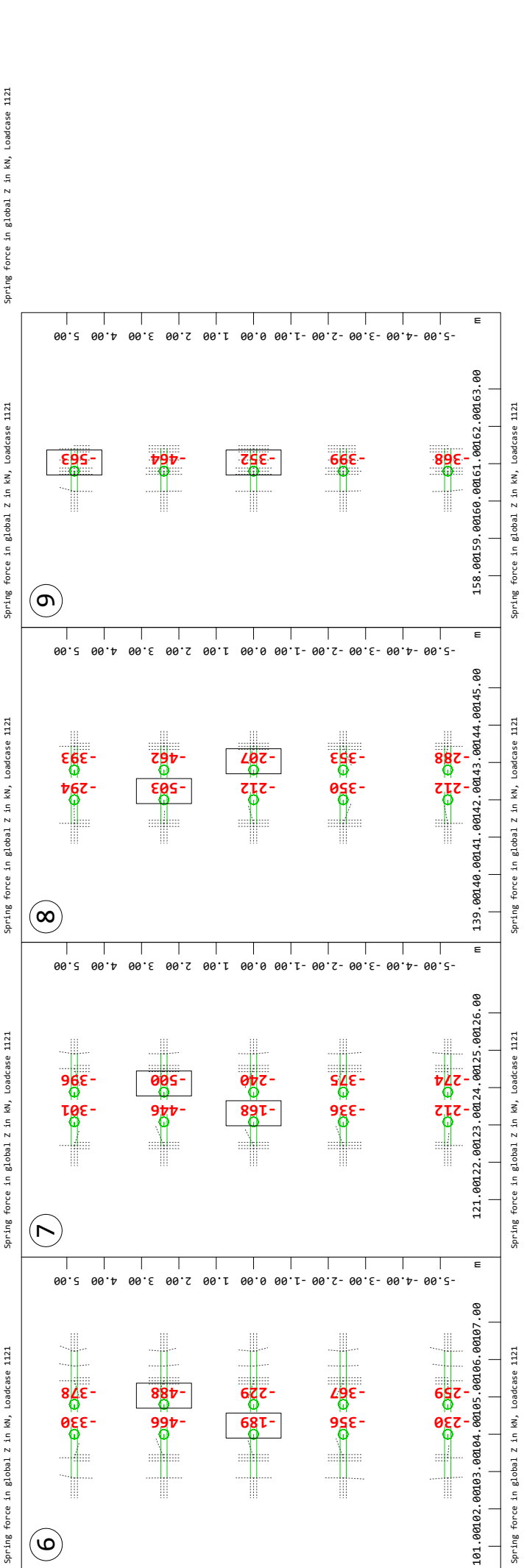
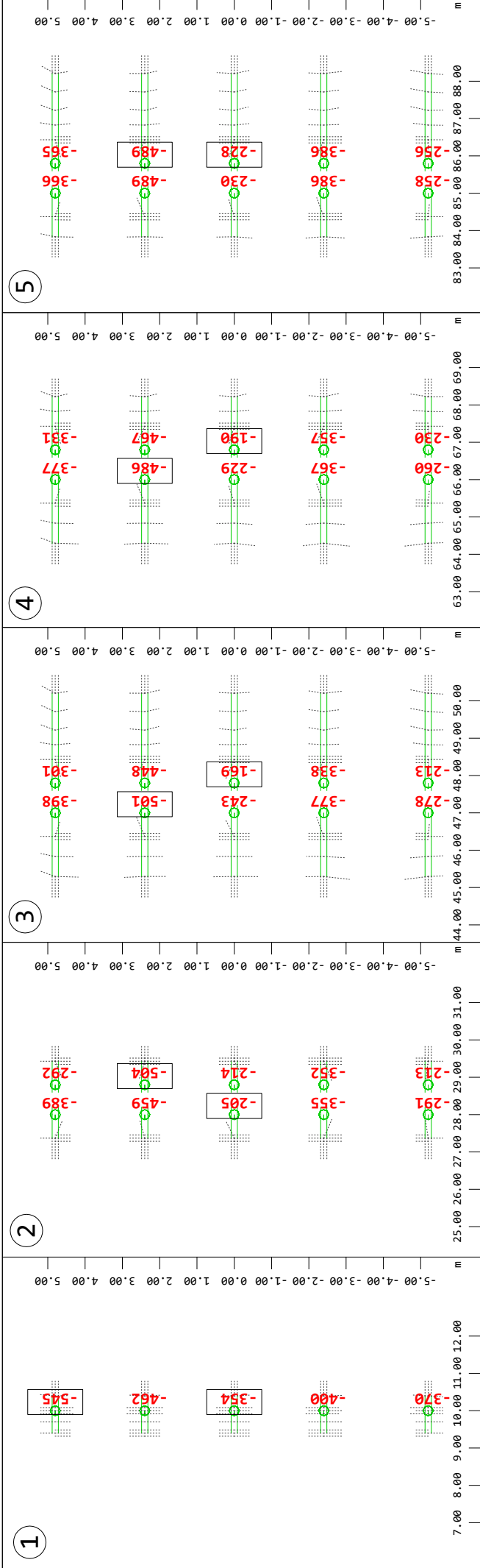


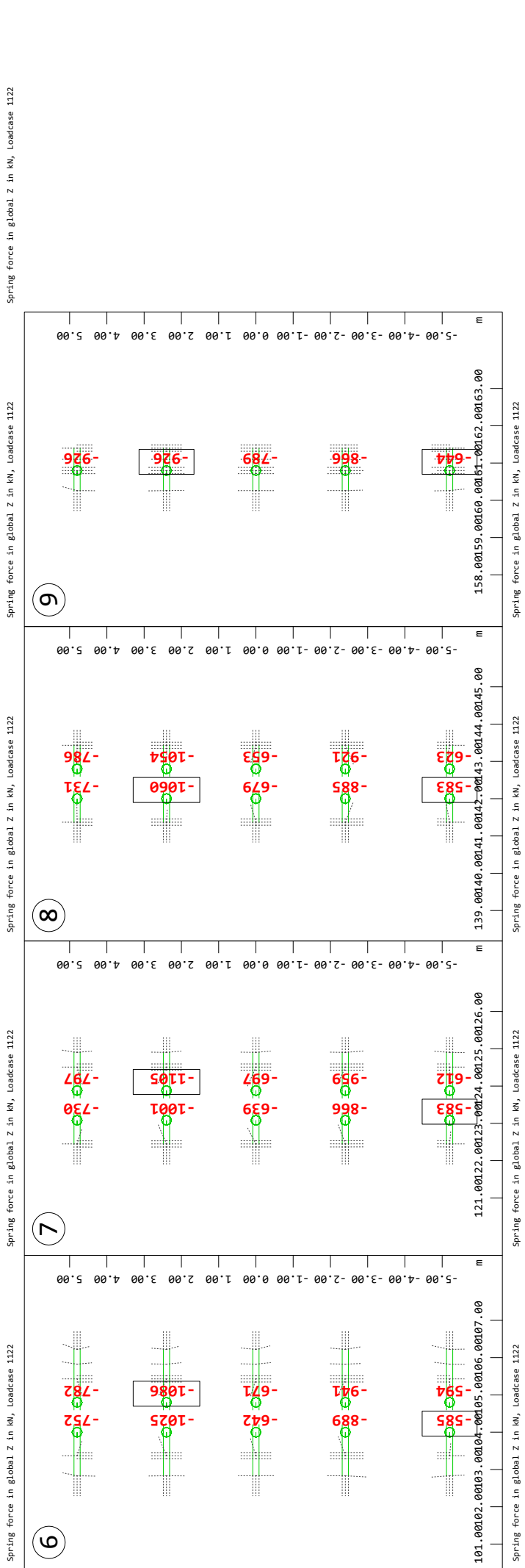
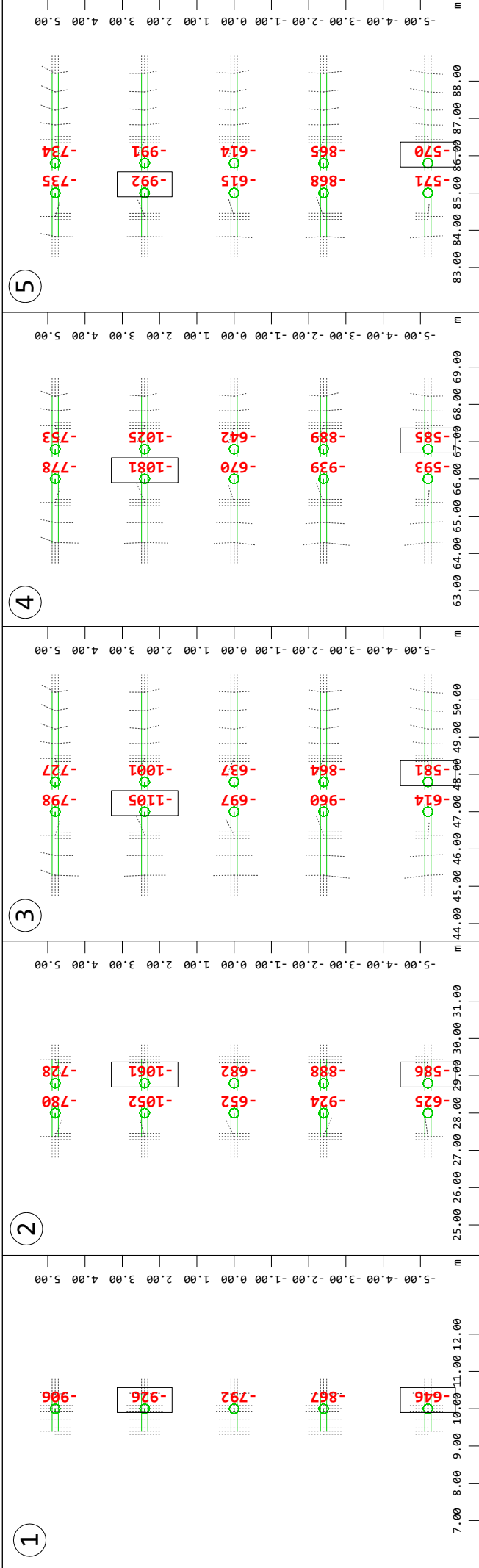


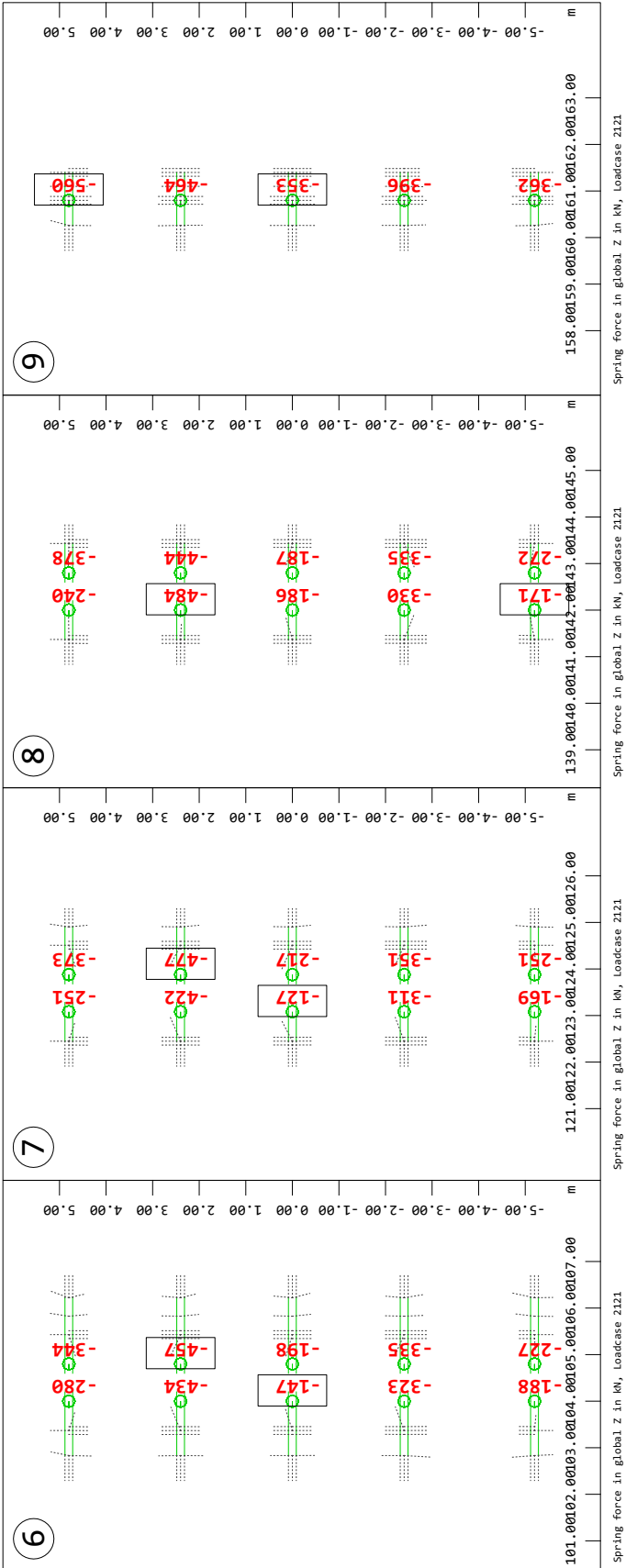
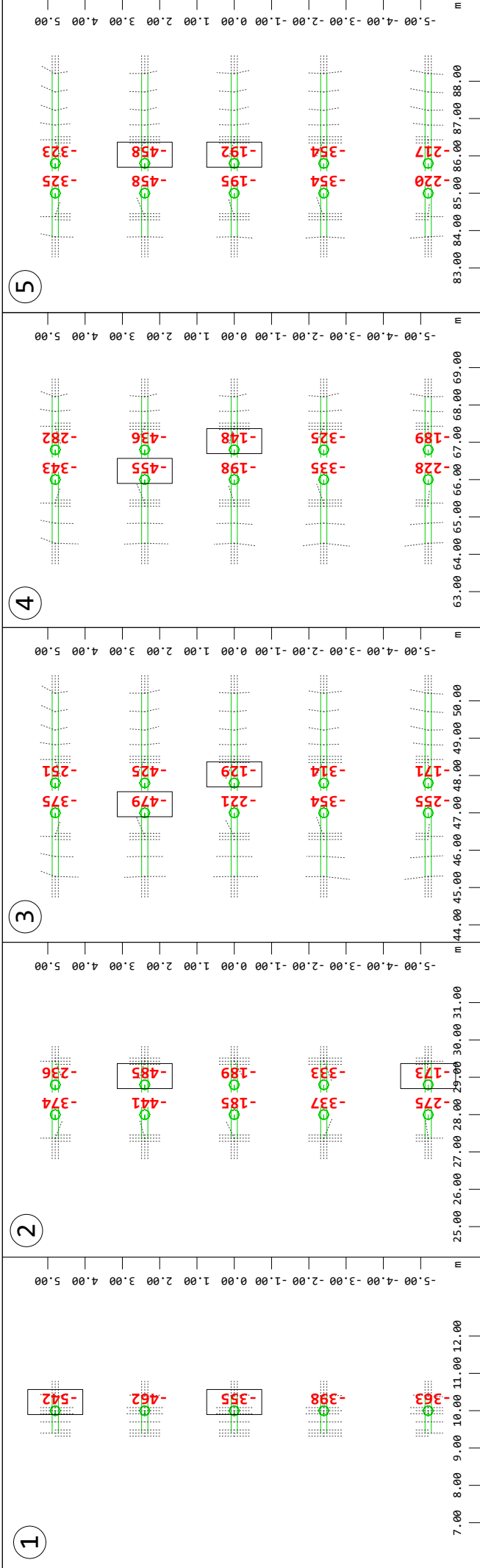


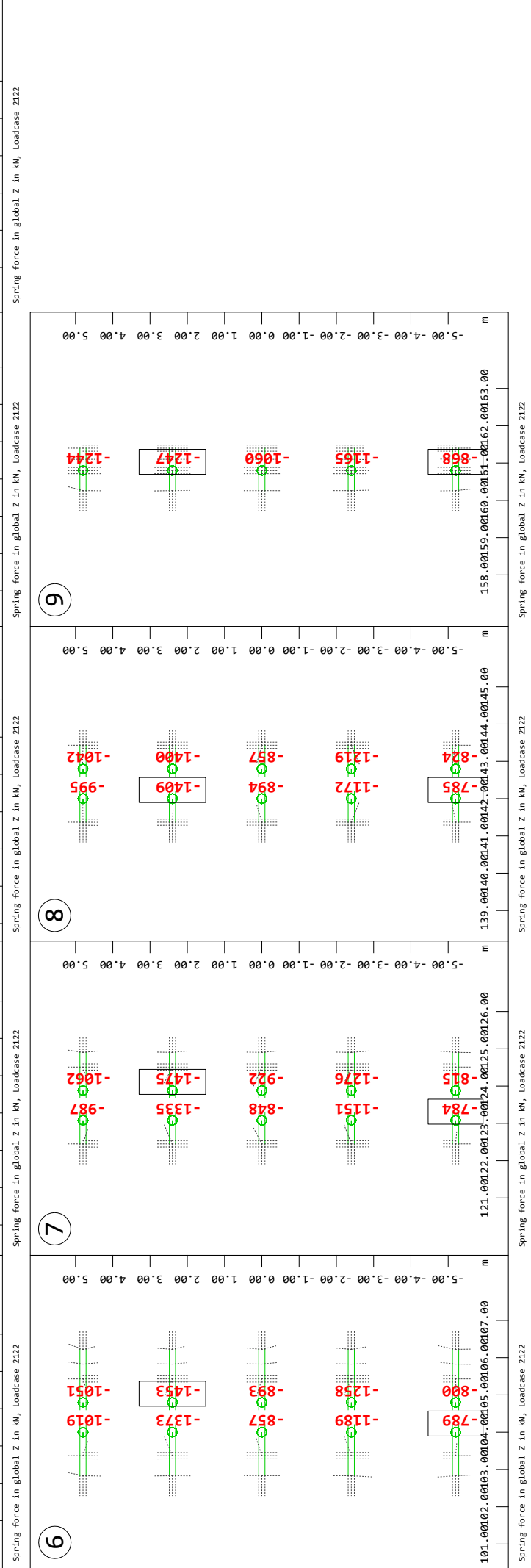
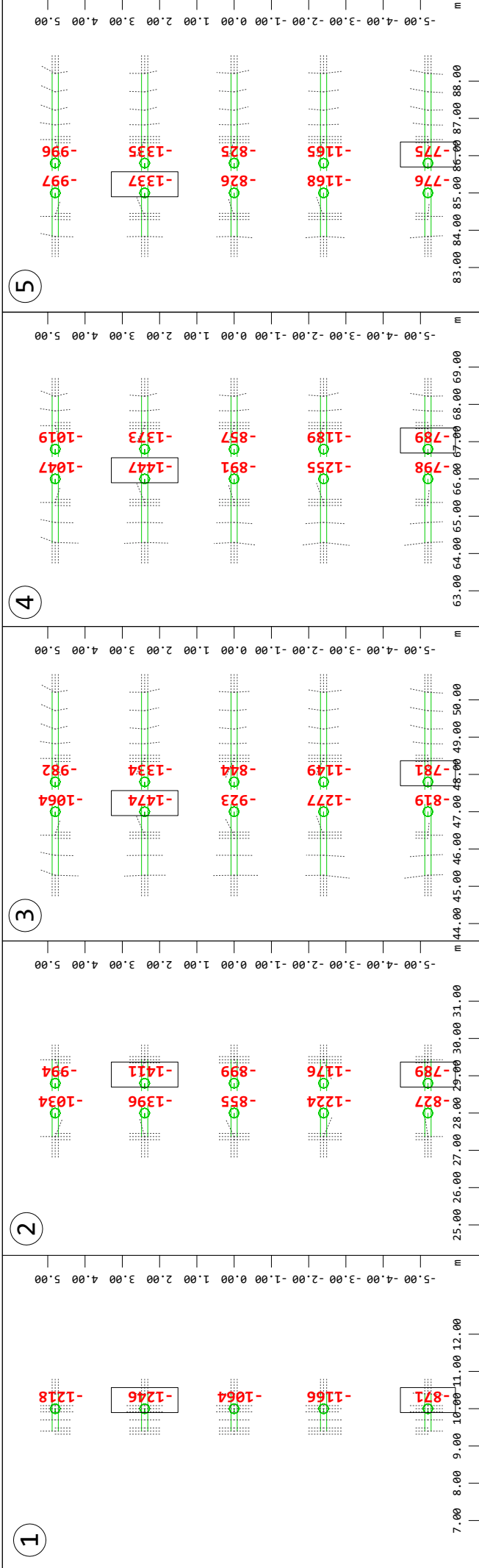


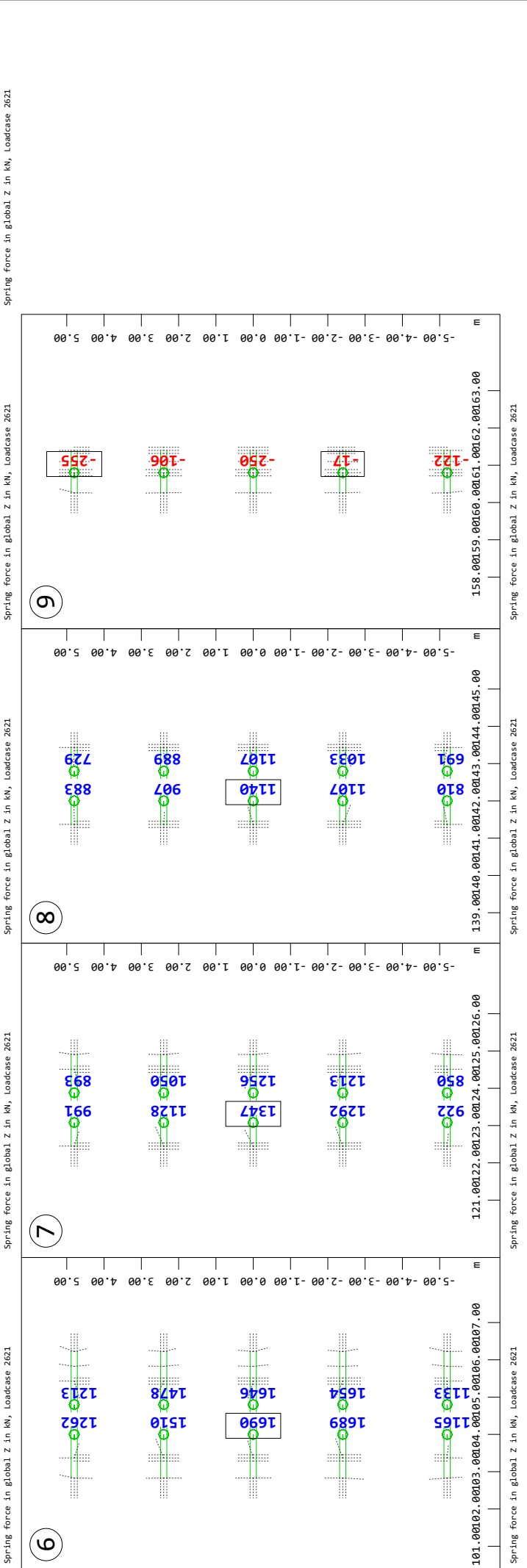
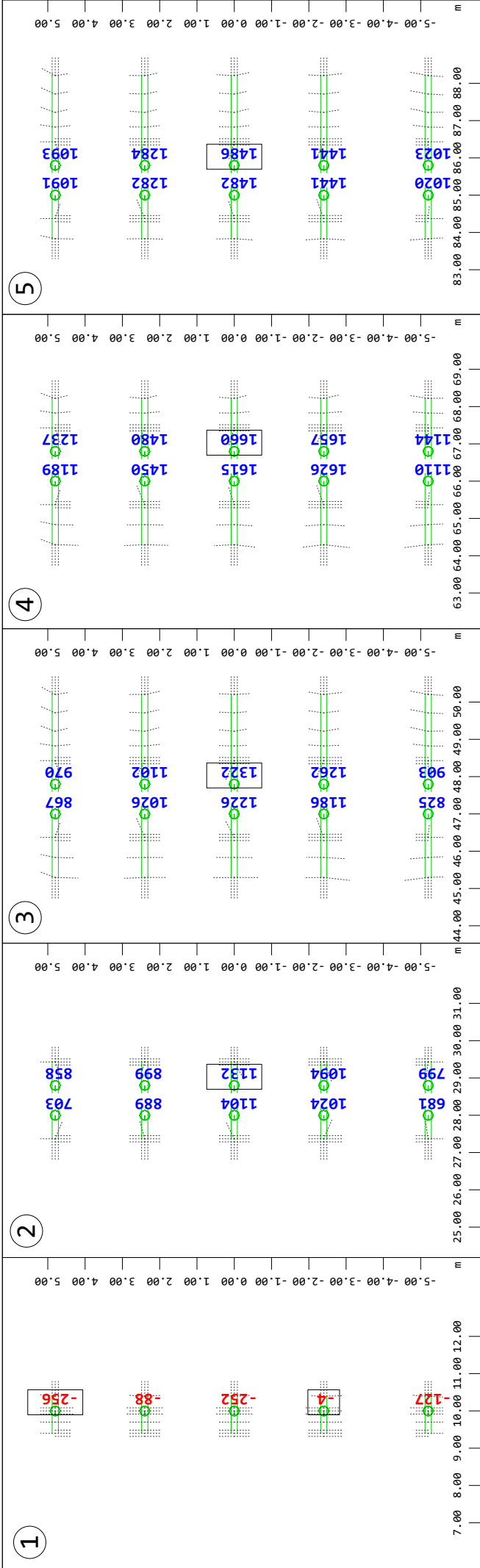


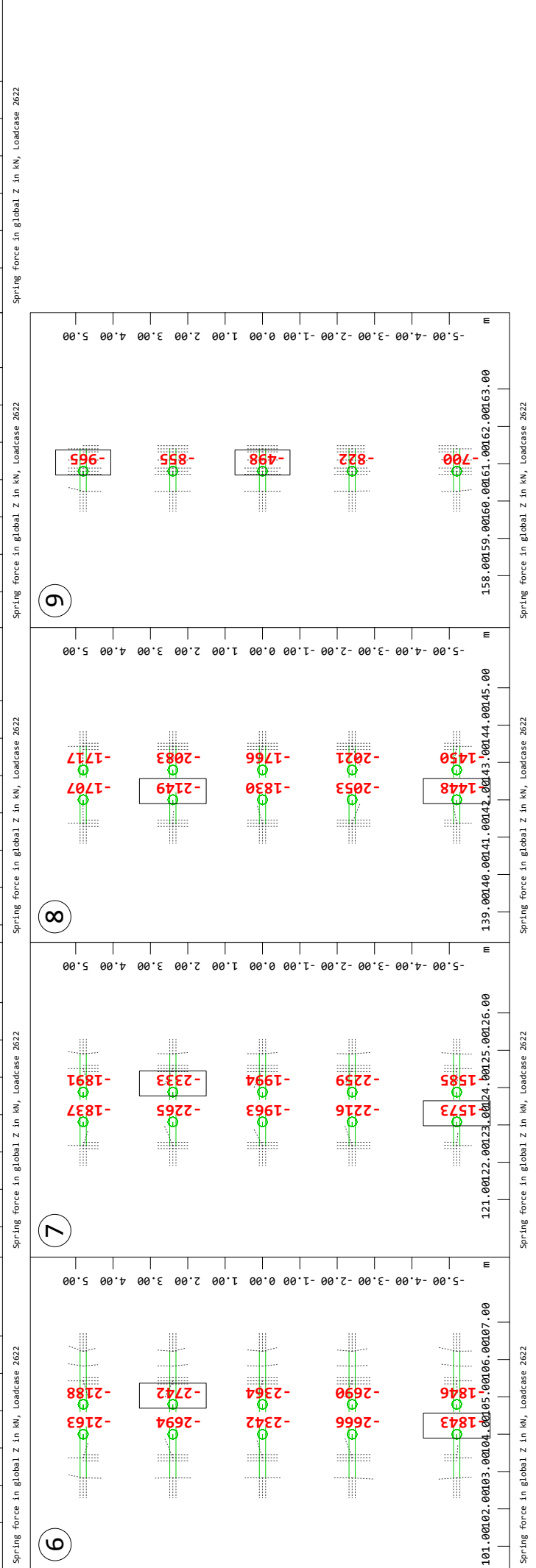
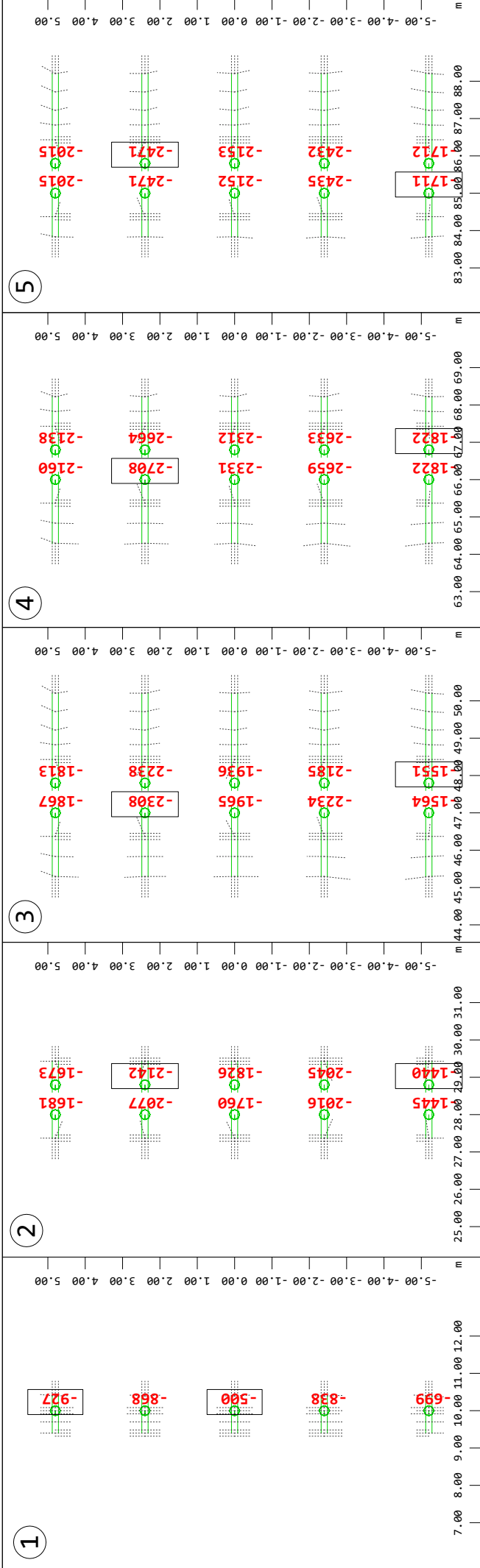












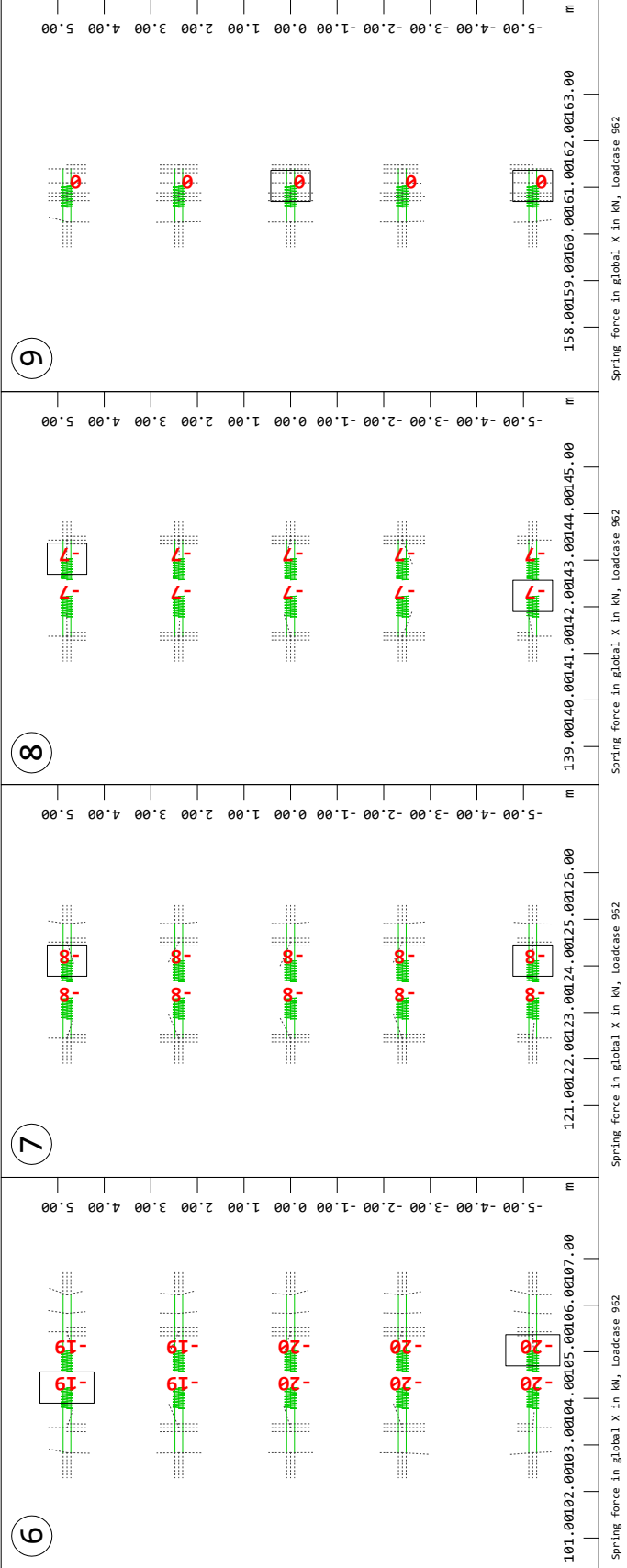
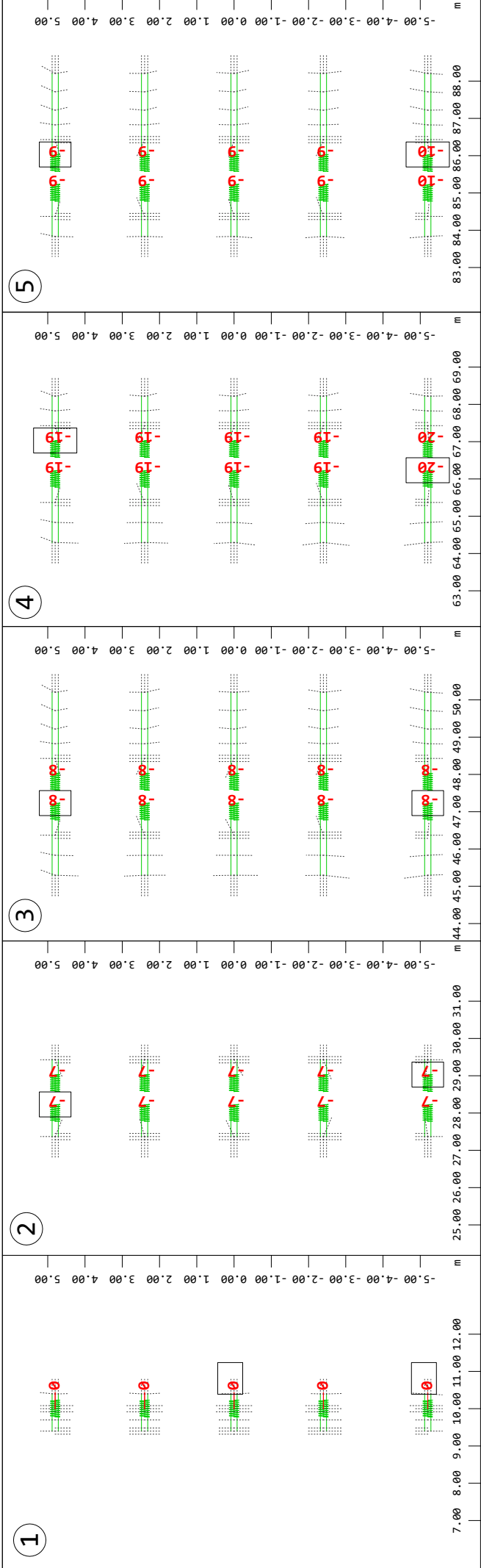
3.1.1.2 HORIZONTALNE SILE V LEŽIŠČIH

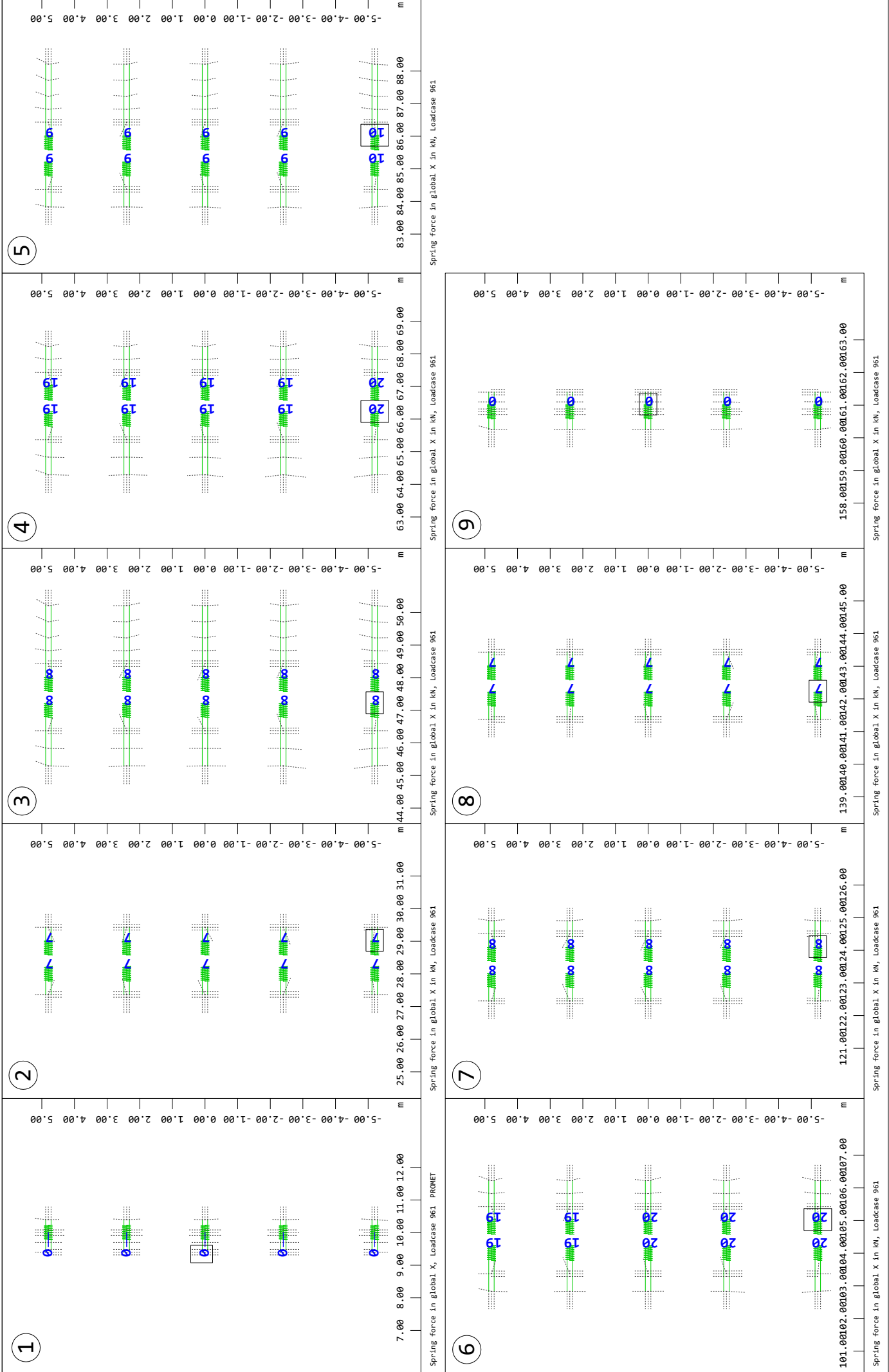
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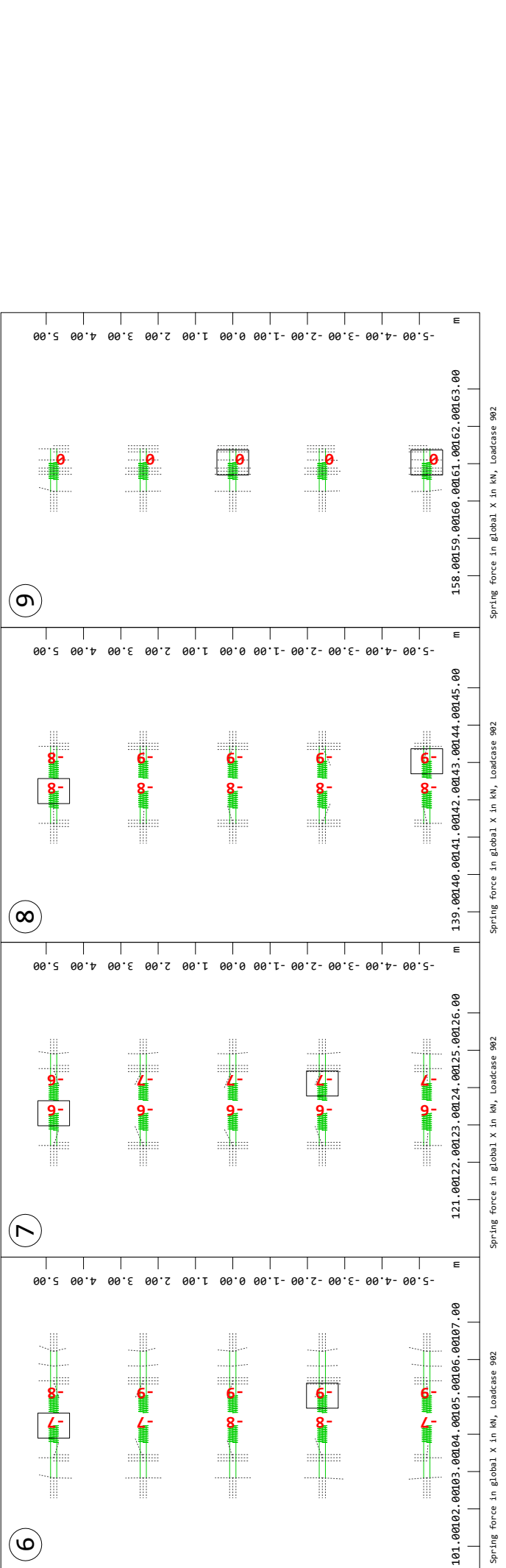
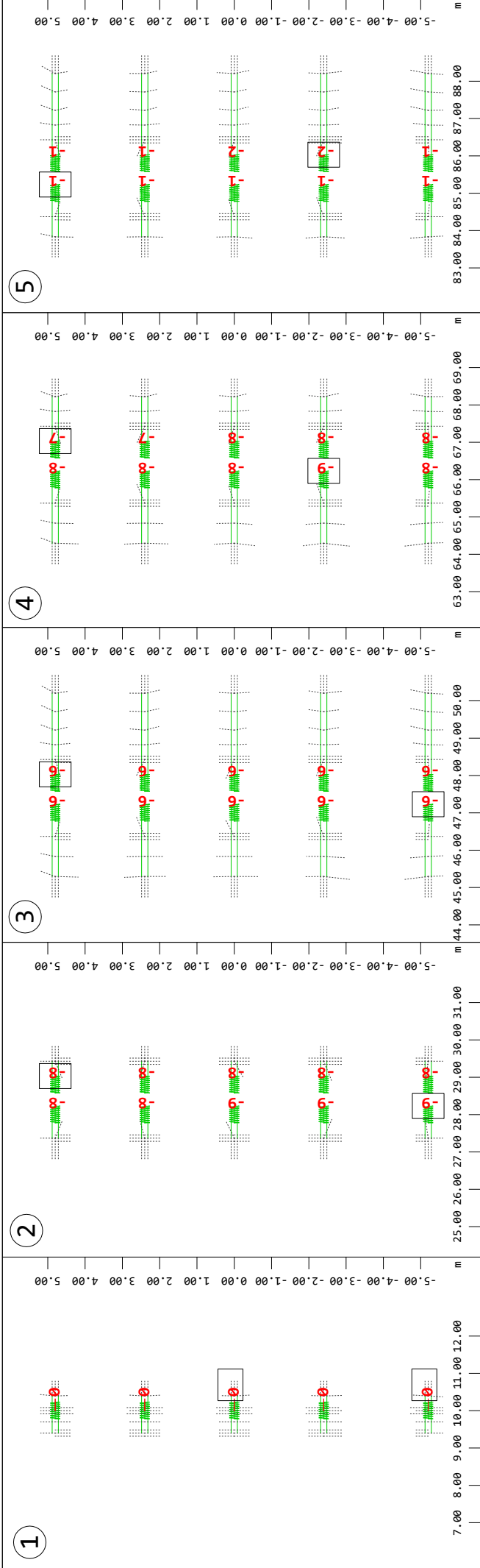
3.1.1.2 HORIZONTALNE SILE V LEŽIŠČIH

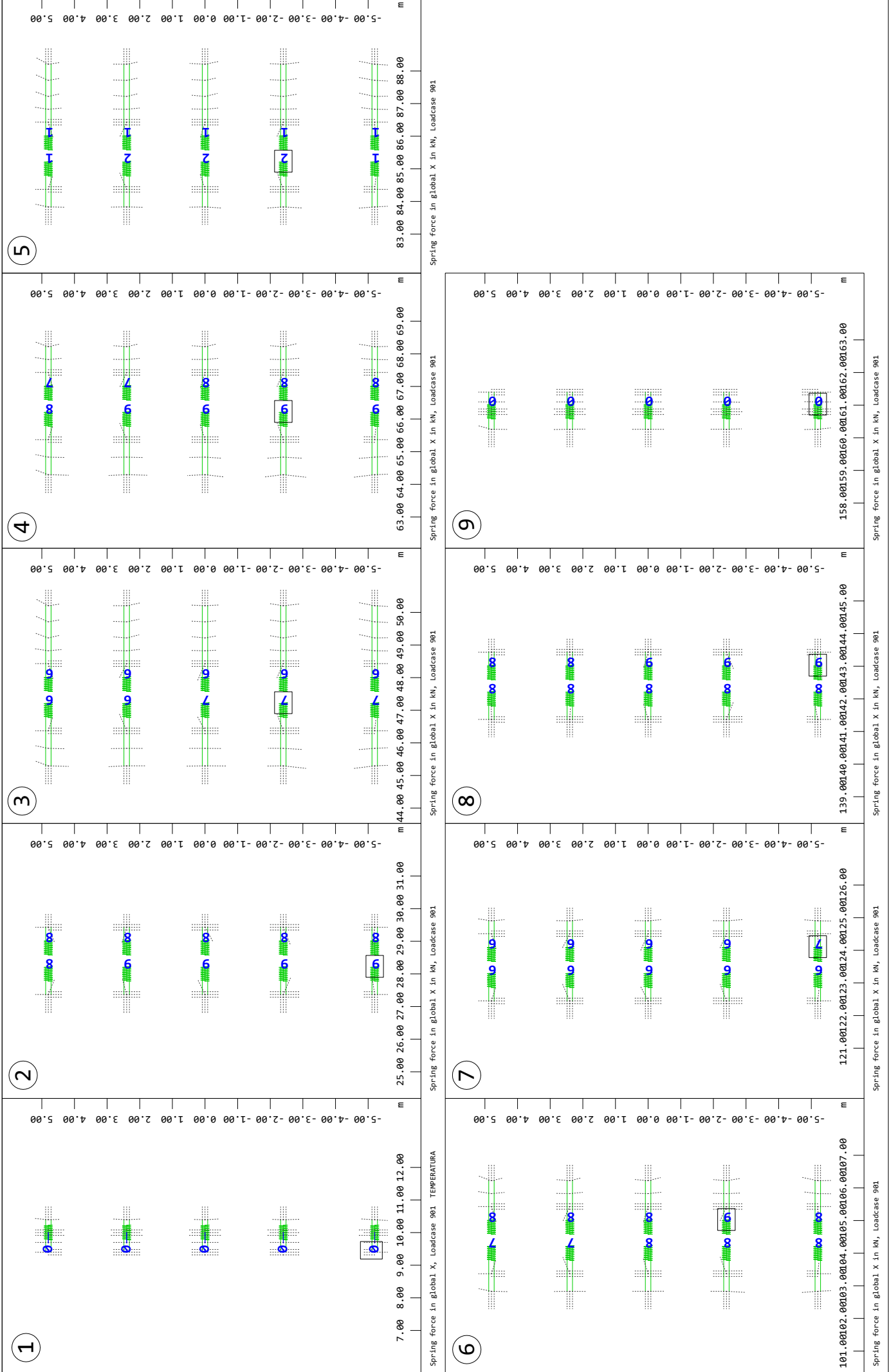
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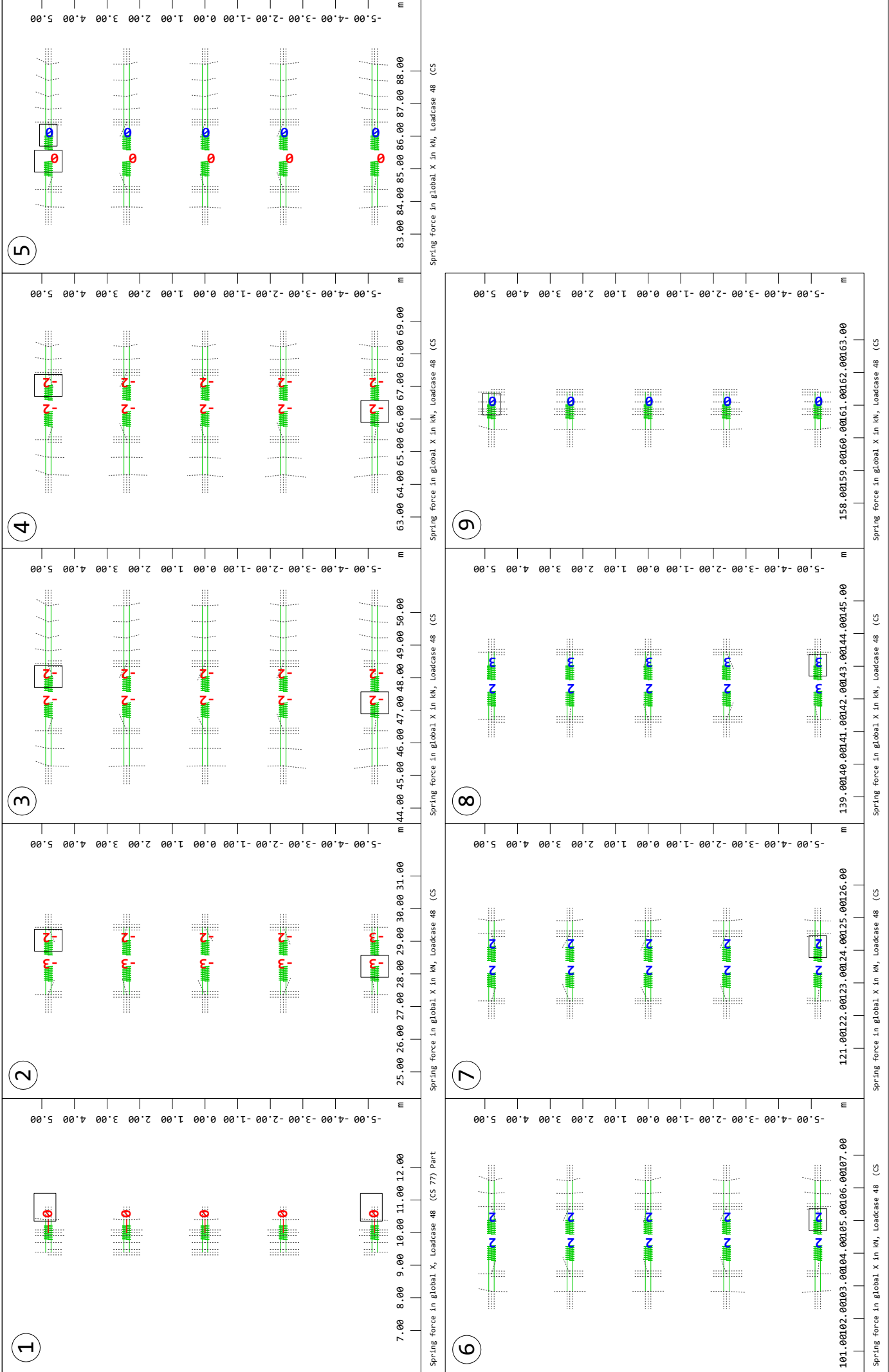
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|---|---------|
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| Spring force in global X LC: 901 | Page 5 |
| Spring force in global X LC: 48 | Page 6 |
| Spring force in global X LC: 1121 | Page 7 |
| Spring force in global X LC: 1122 | Page 8 |
| Spring force in global X LC: 2121 | Page 9 |
| Spring force in global X LC: 2122 | Page 10 |
| Spring force in global Y LC: 2121 | Page 11 |
| Spring force in global Y LC: 2122 | Page 12 |
| Spring force in global X LC: 8038 | Page 13 |
| Spring force in global X LC: 2621 | Page 14 |
| Spring force in global X LC: 2622 | Page 15 |
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| Spring force in global Y LC: 2621 | Page 17 |
| Spring force in global Y LC: 2622 | Page 18 |

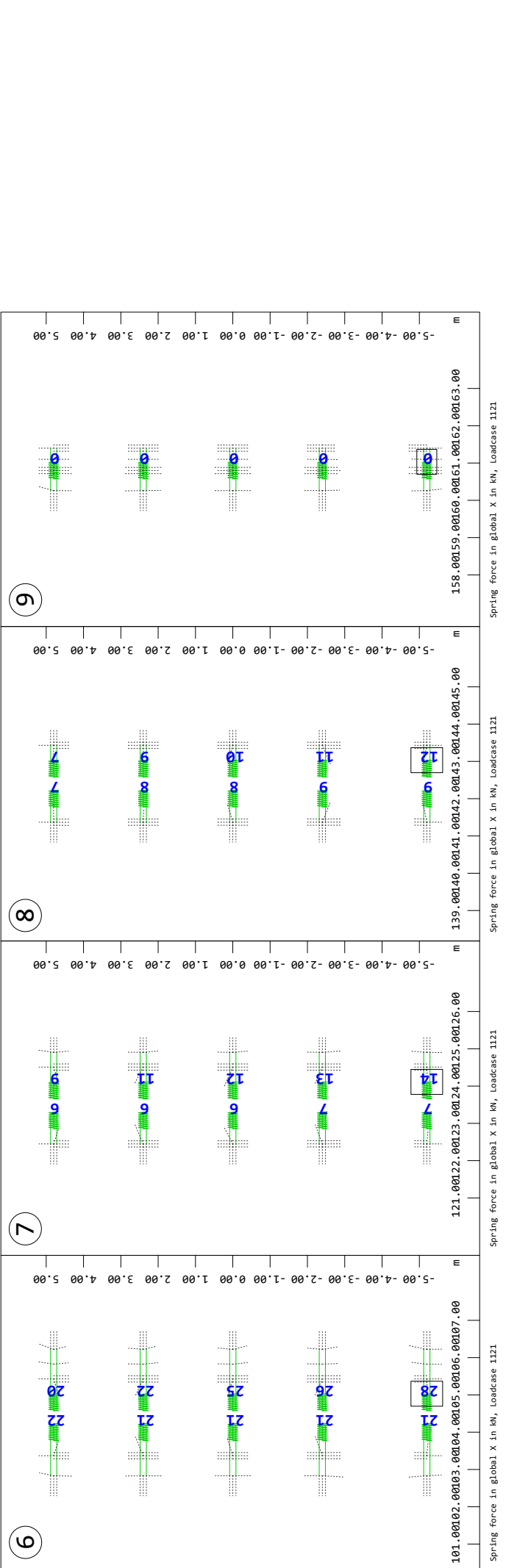
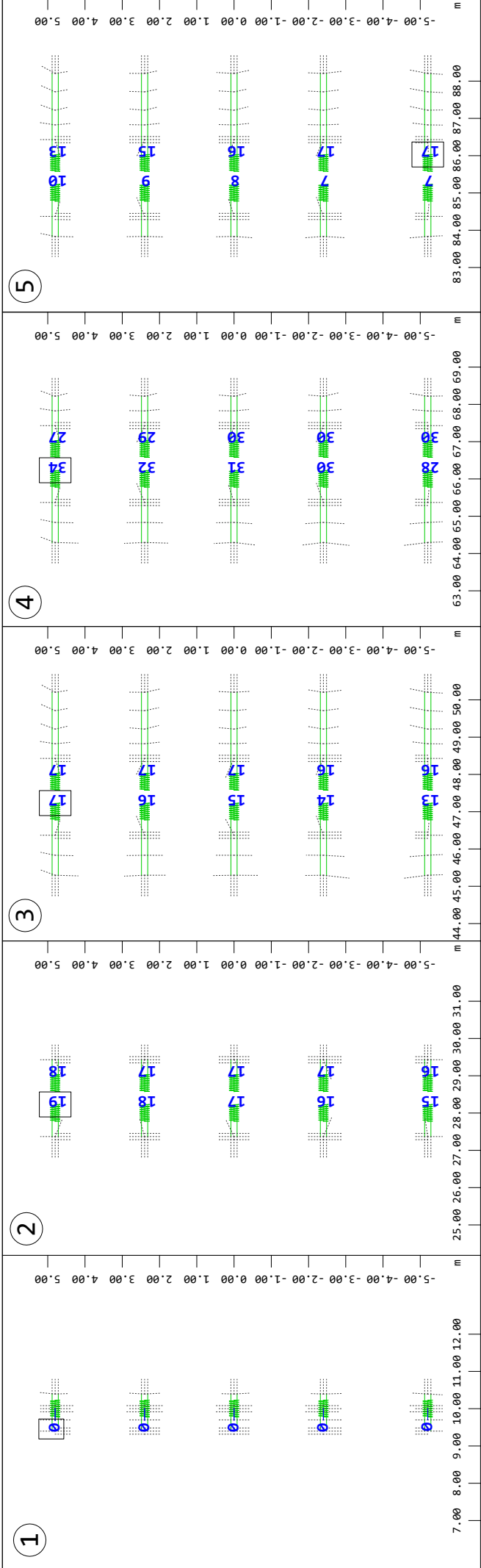


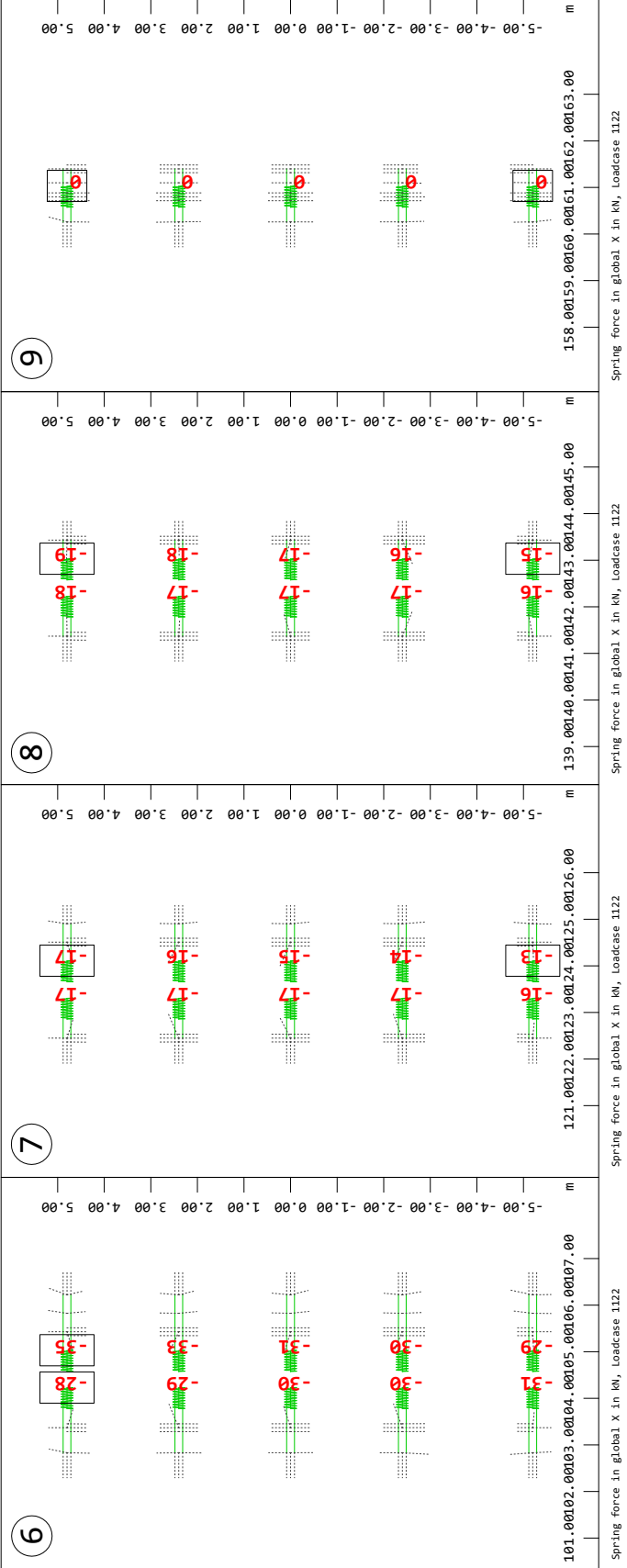
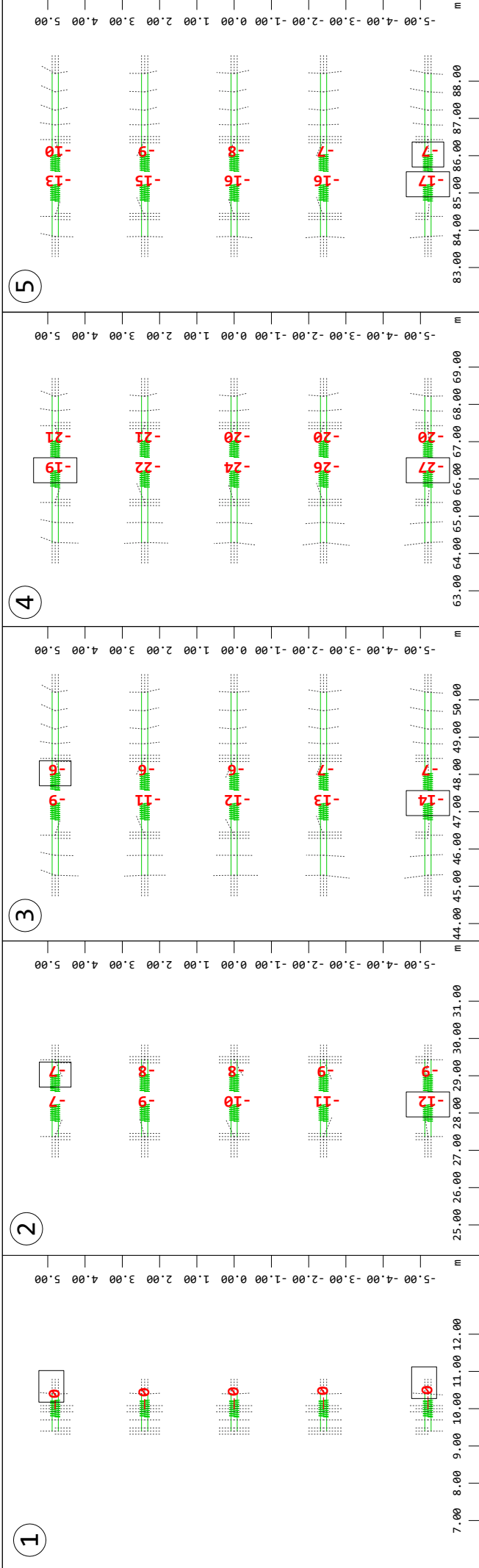


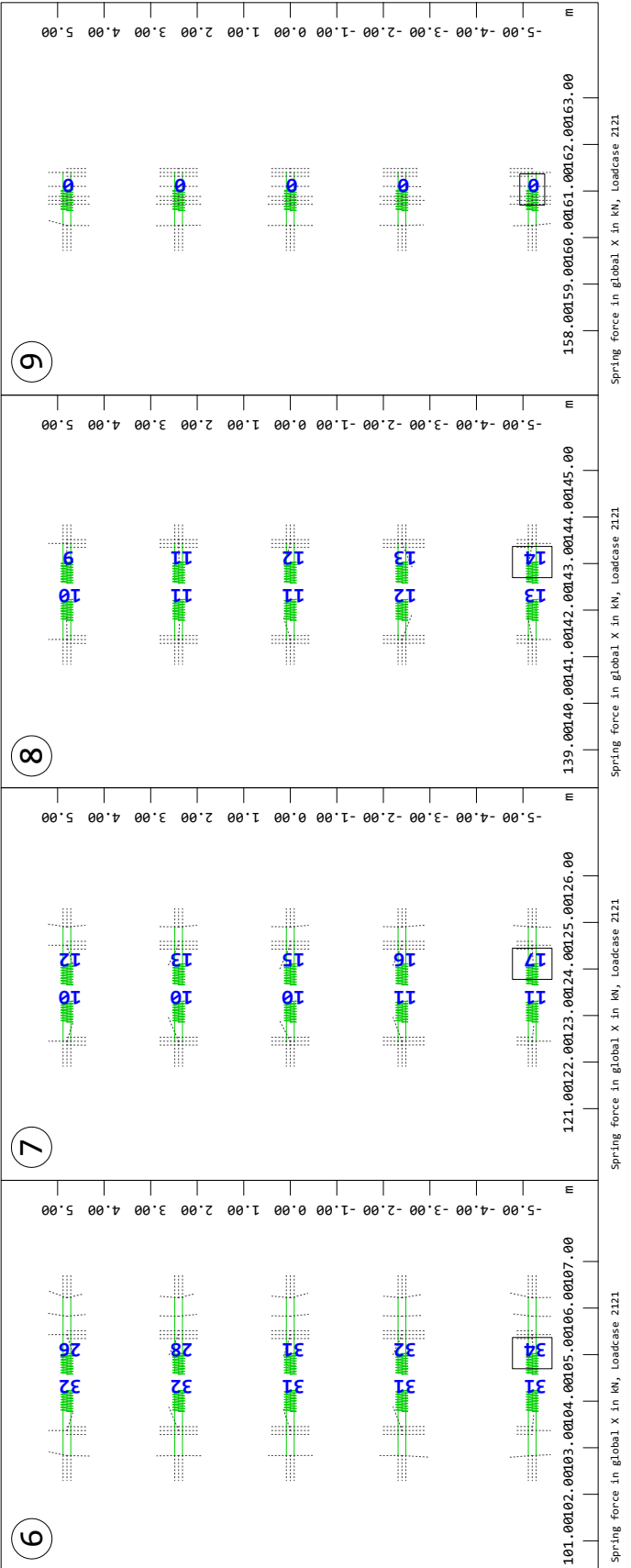
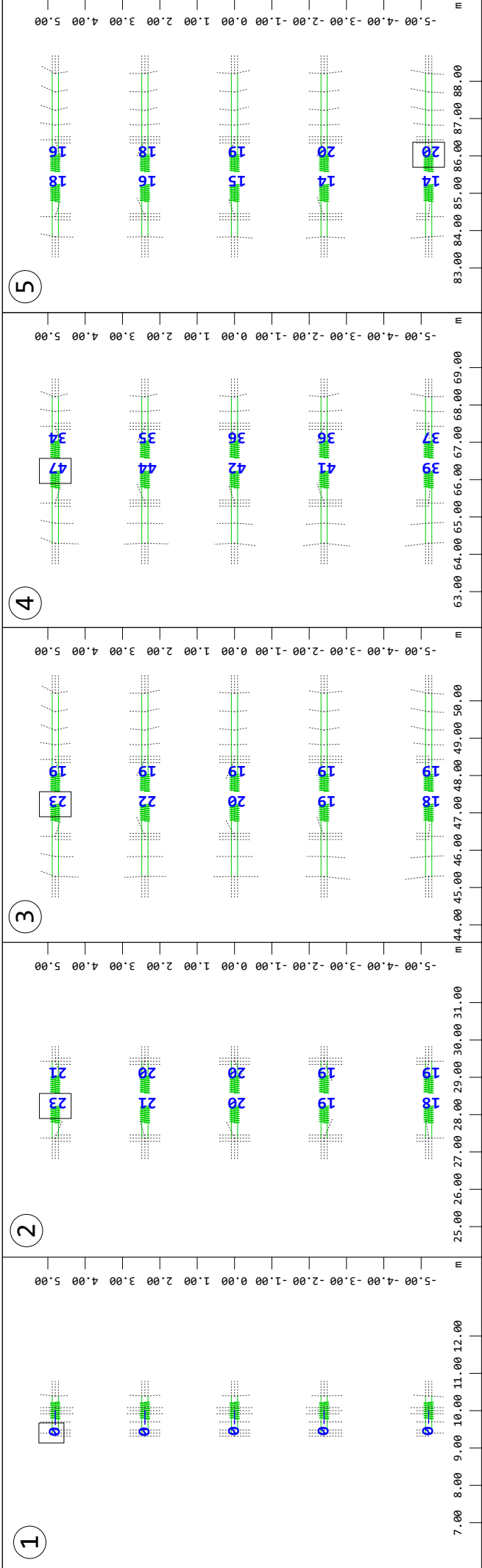


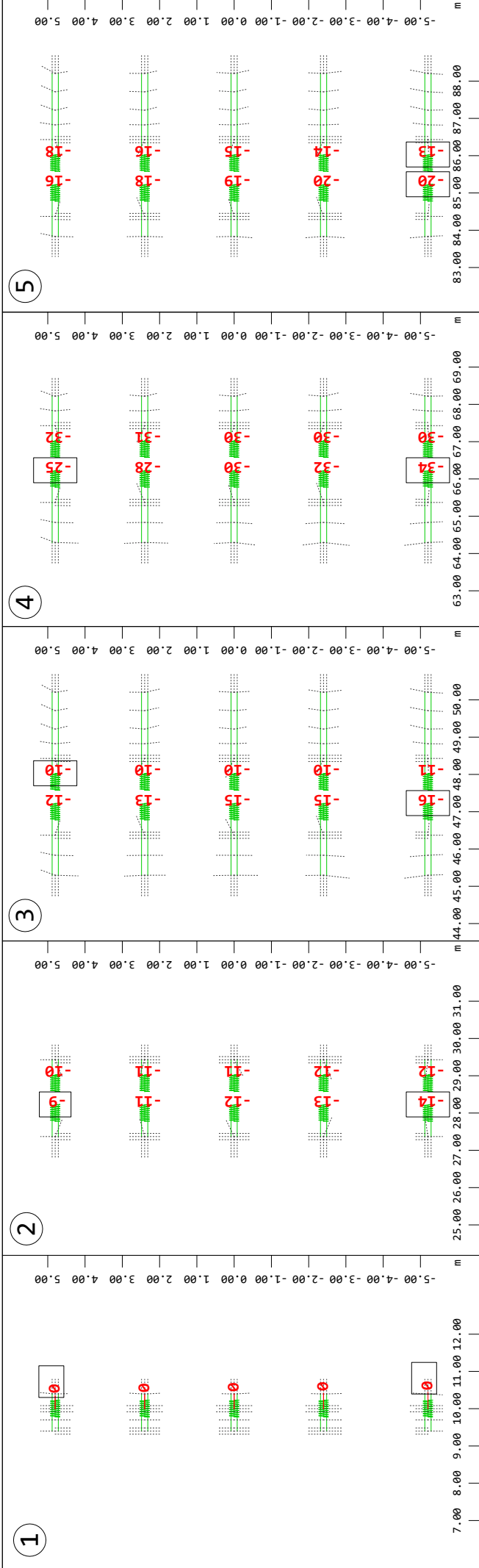




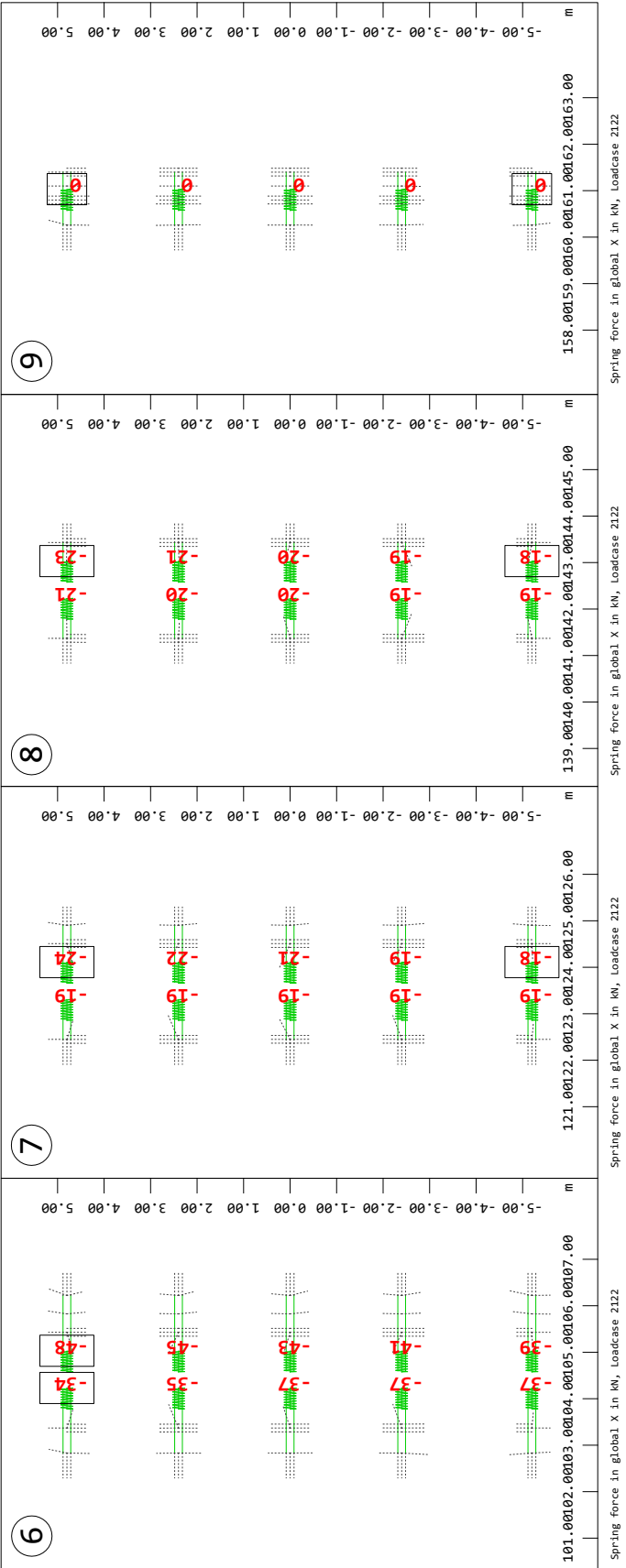




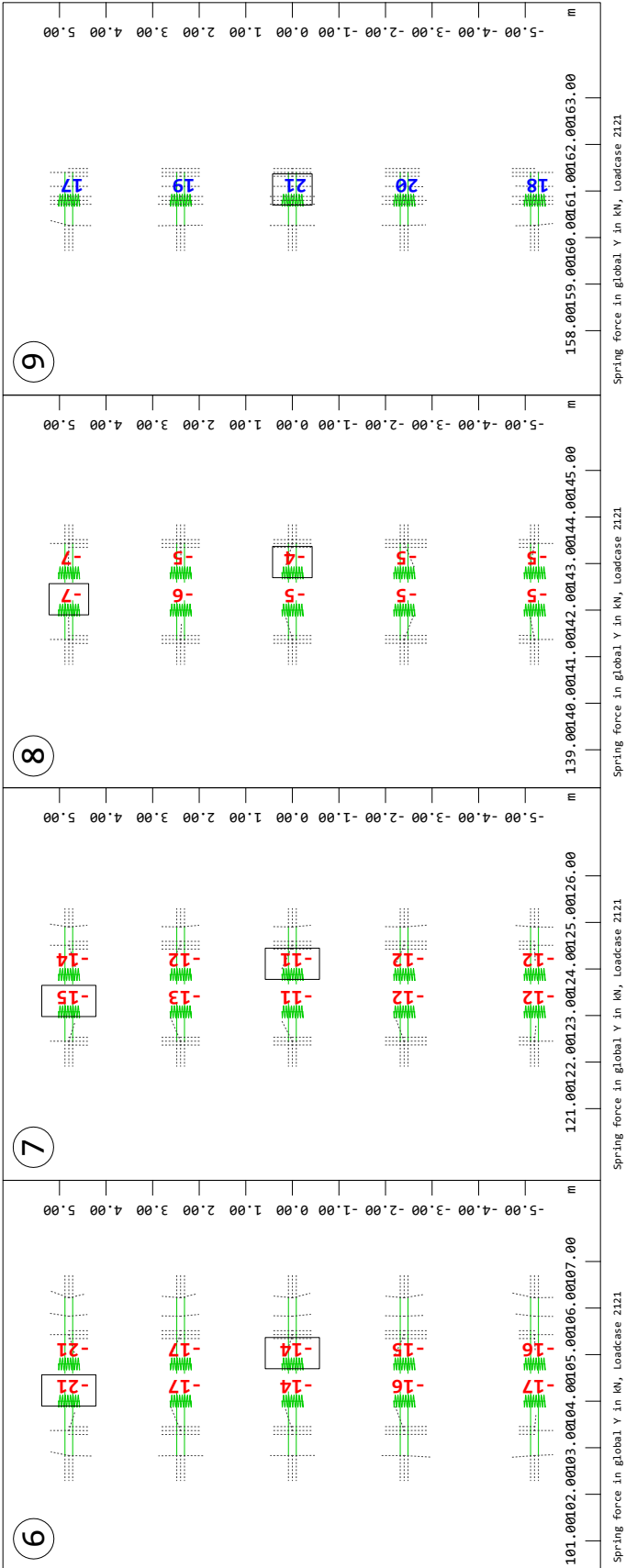
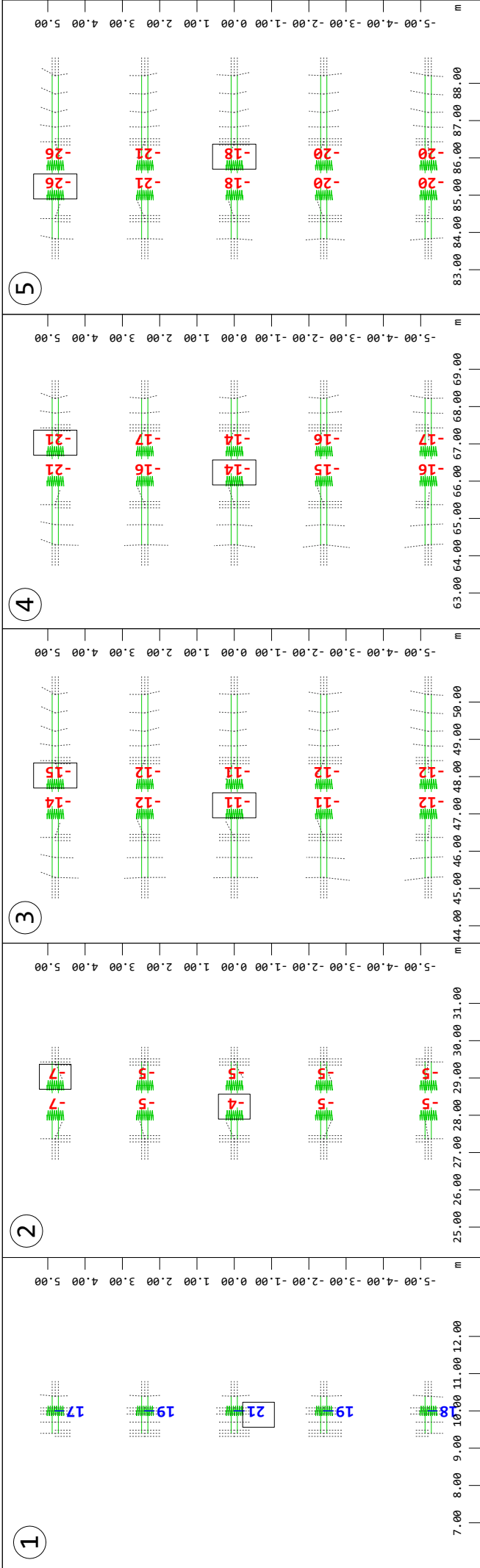


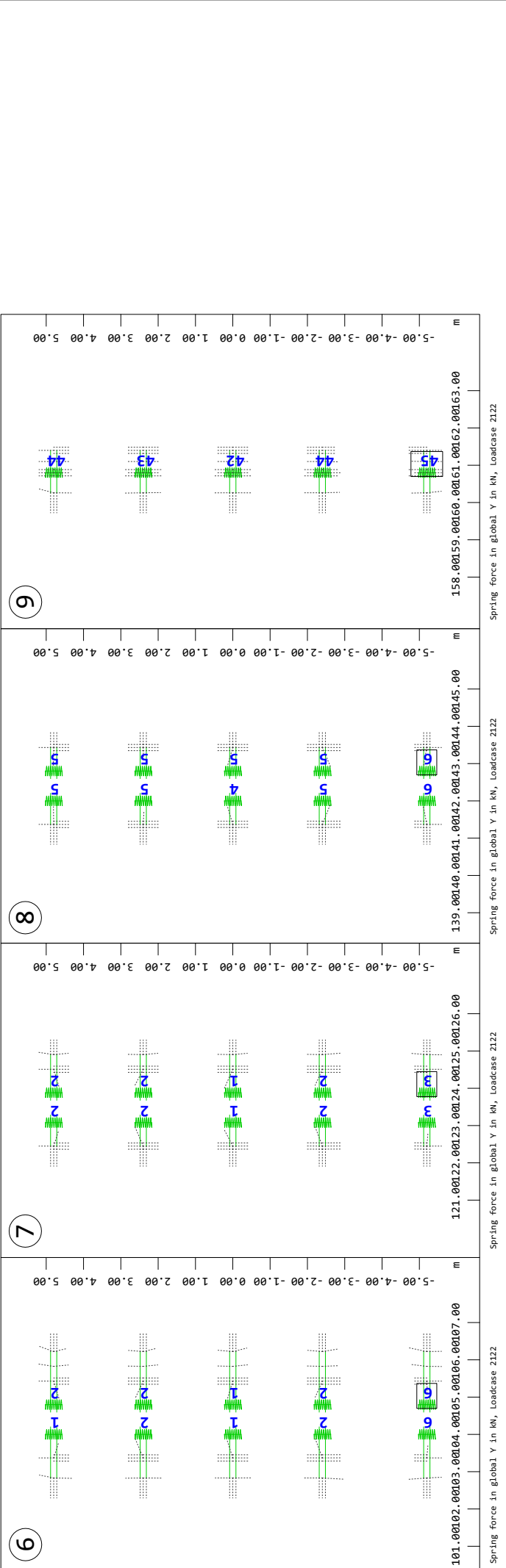
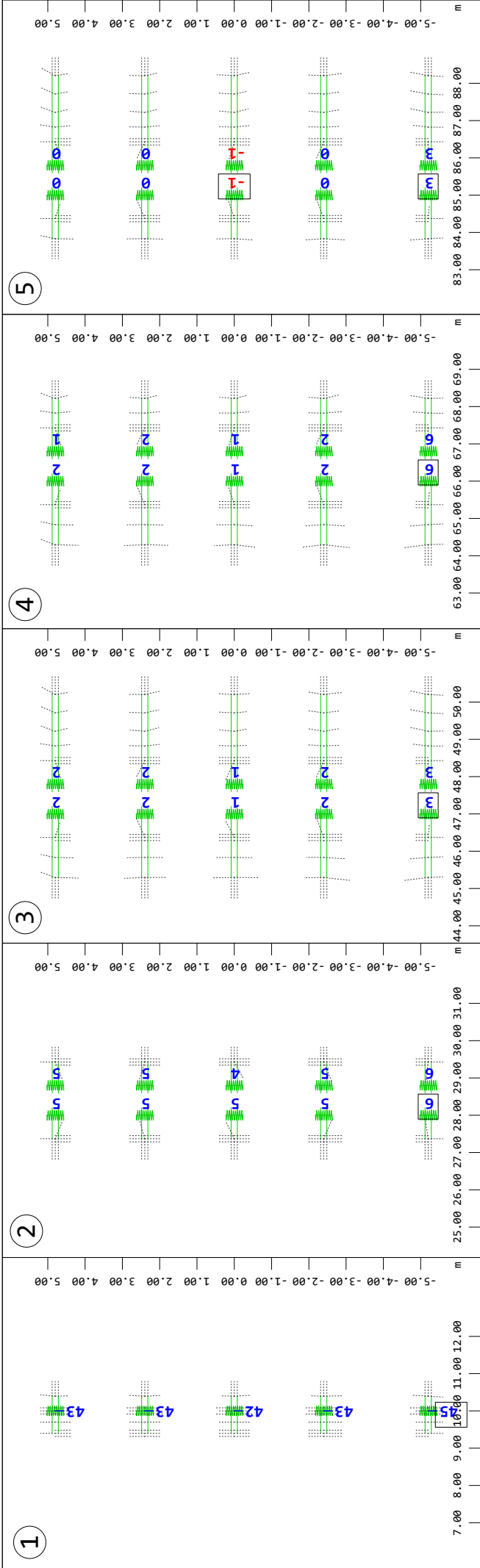


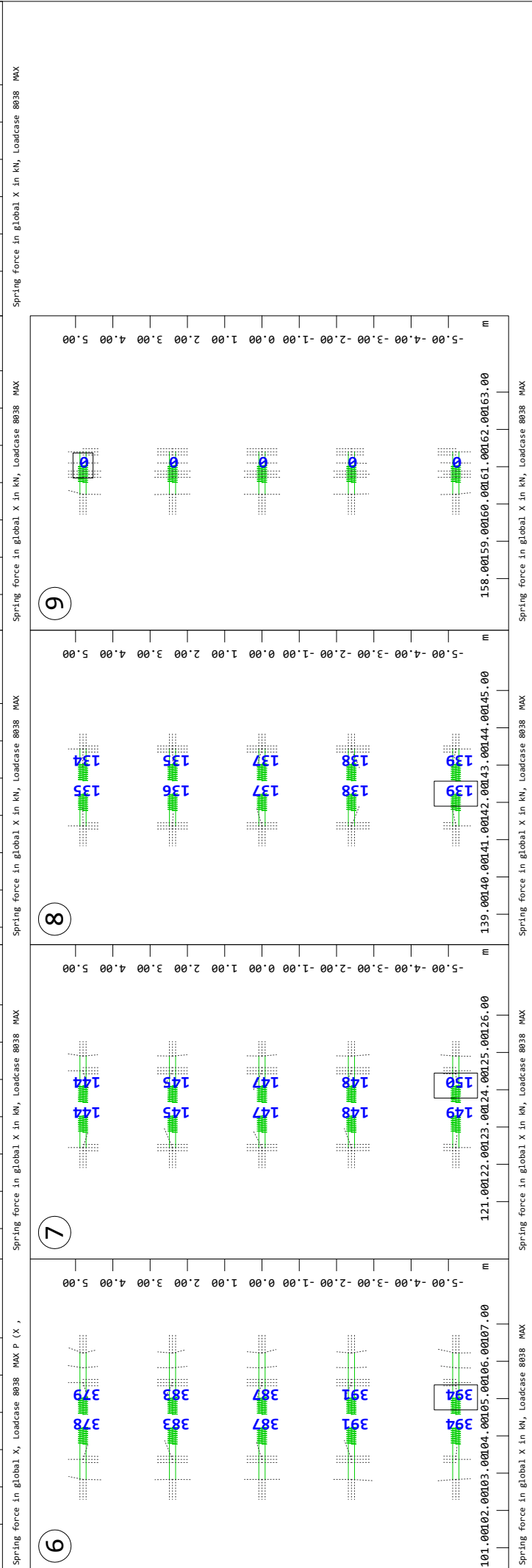
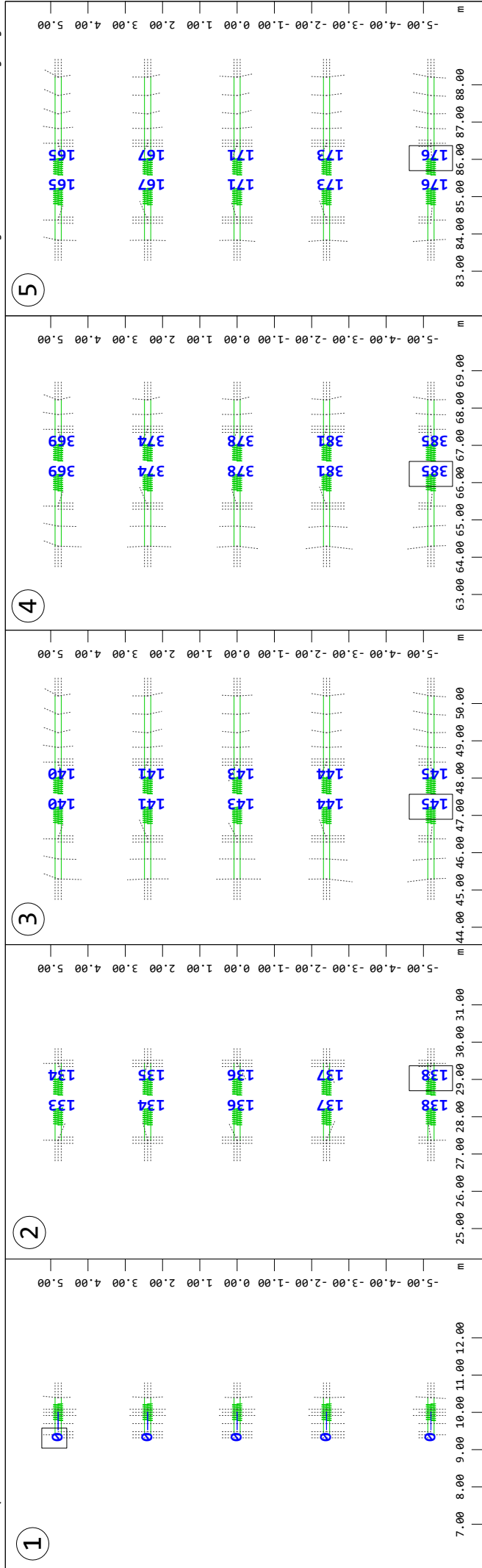
Nadvoz čez AC A1 na Barjanski cesti

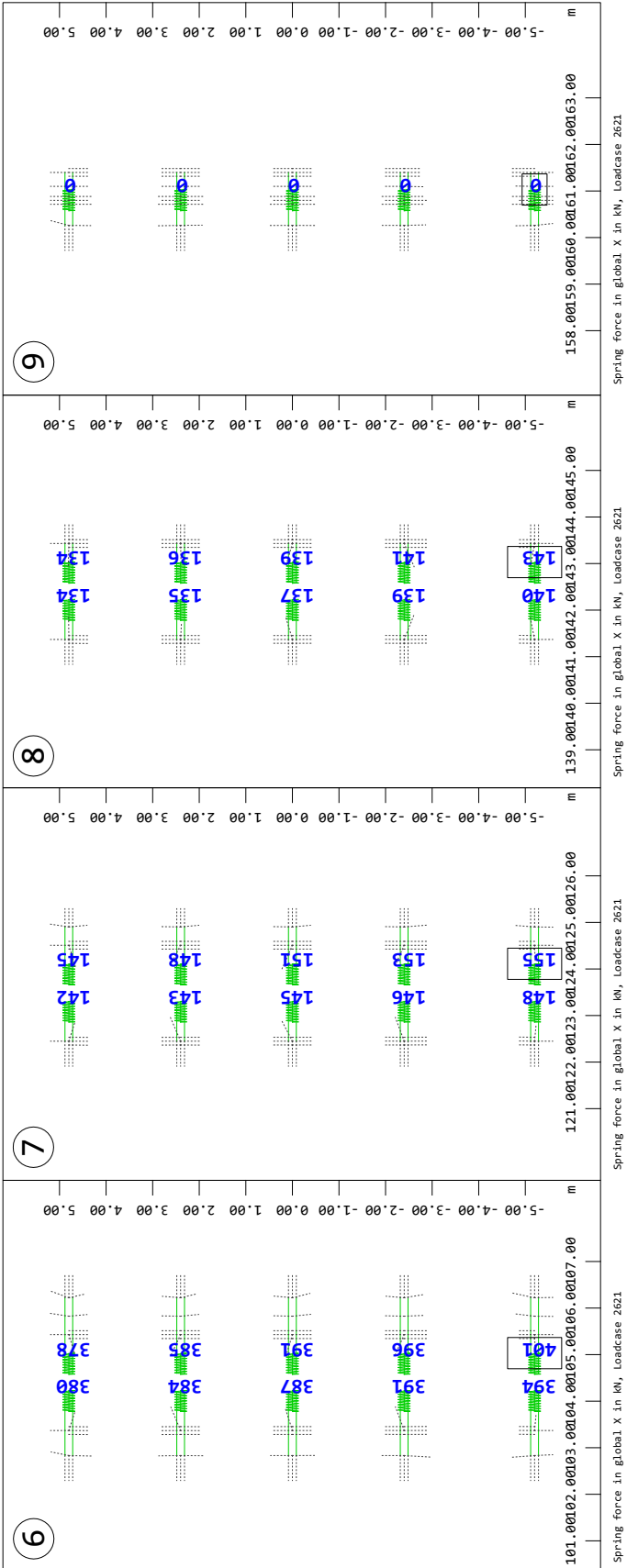
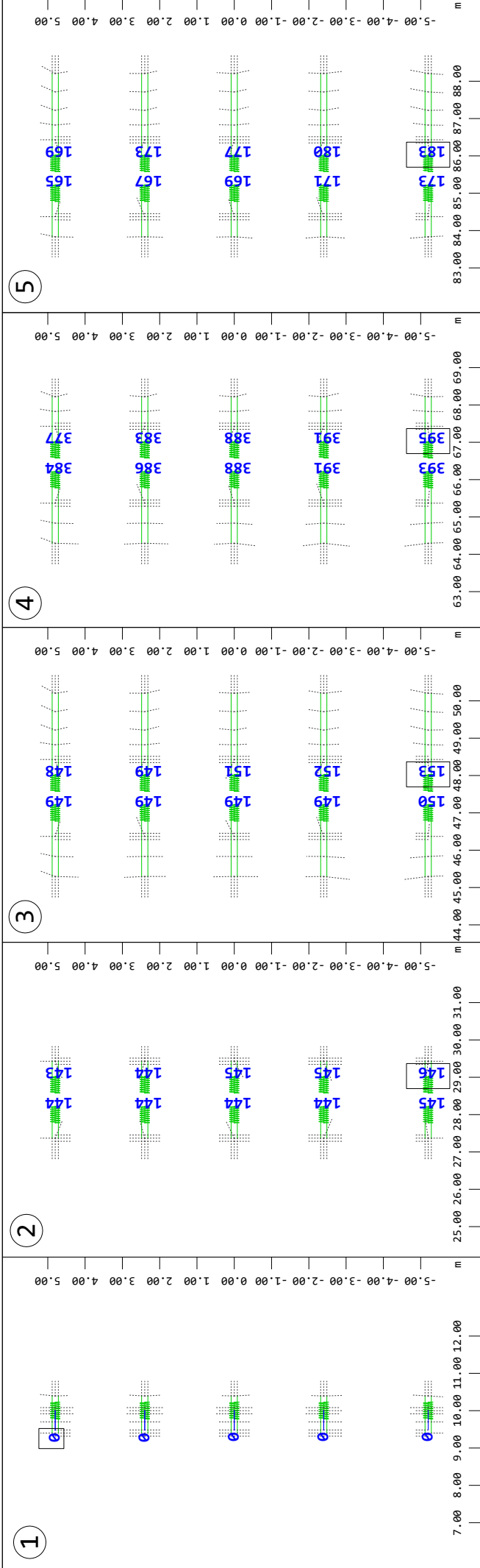


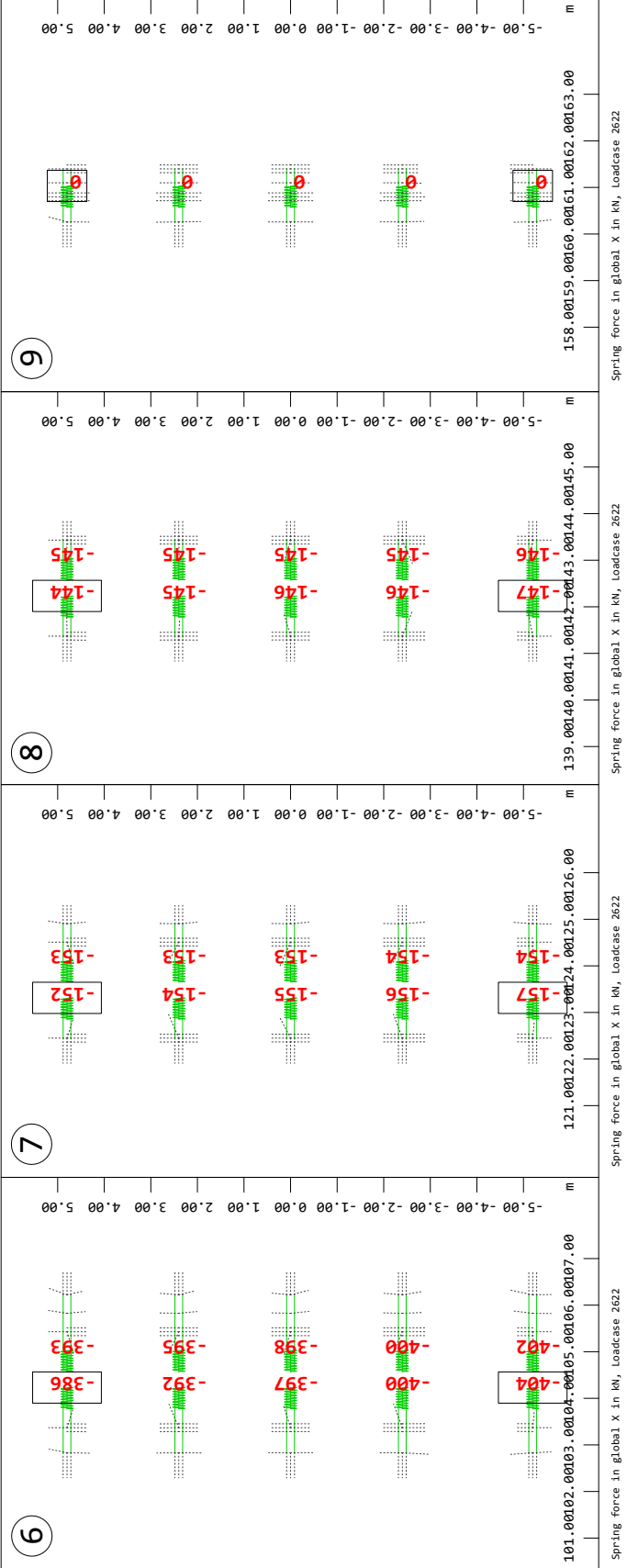
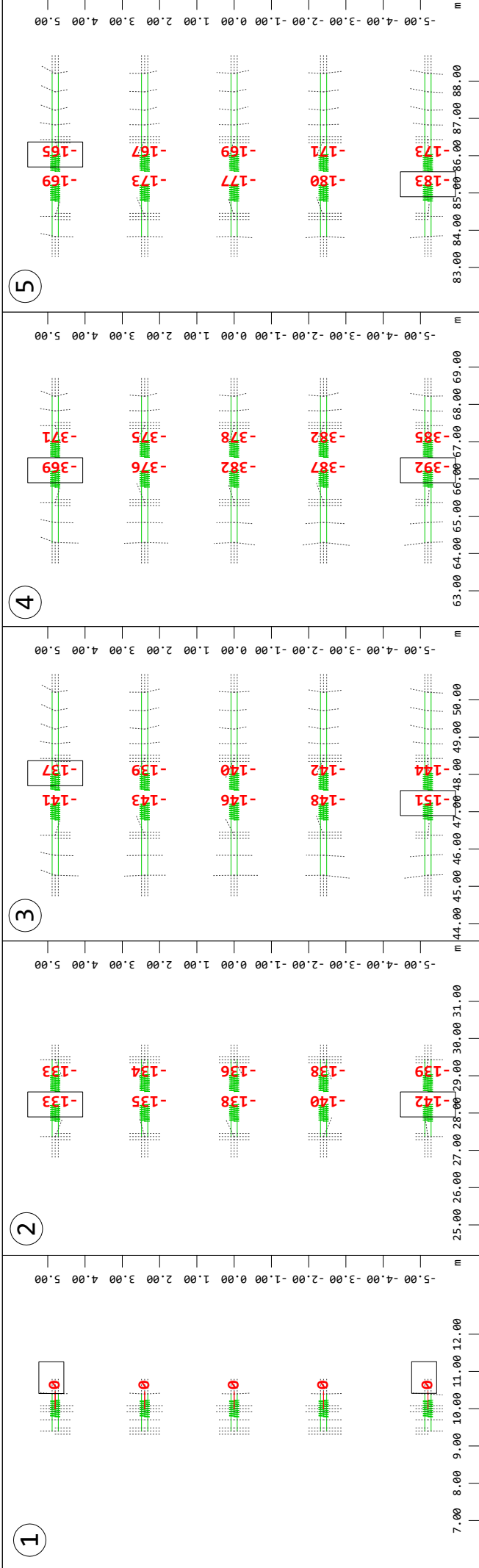
Nadvoz Barjanska rekonstruiran v1
Vzdolžne sile na ležišča - MSN,d,min

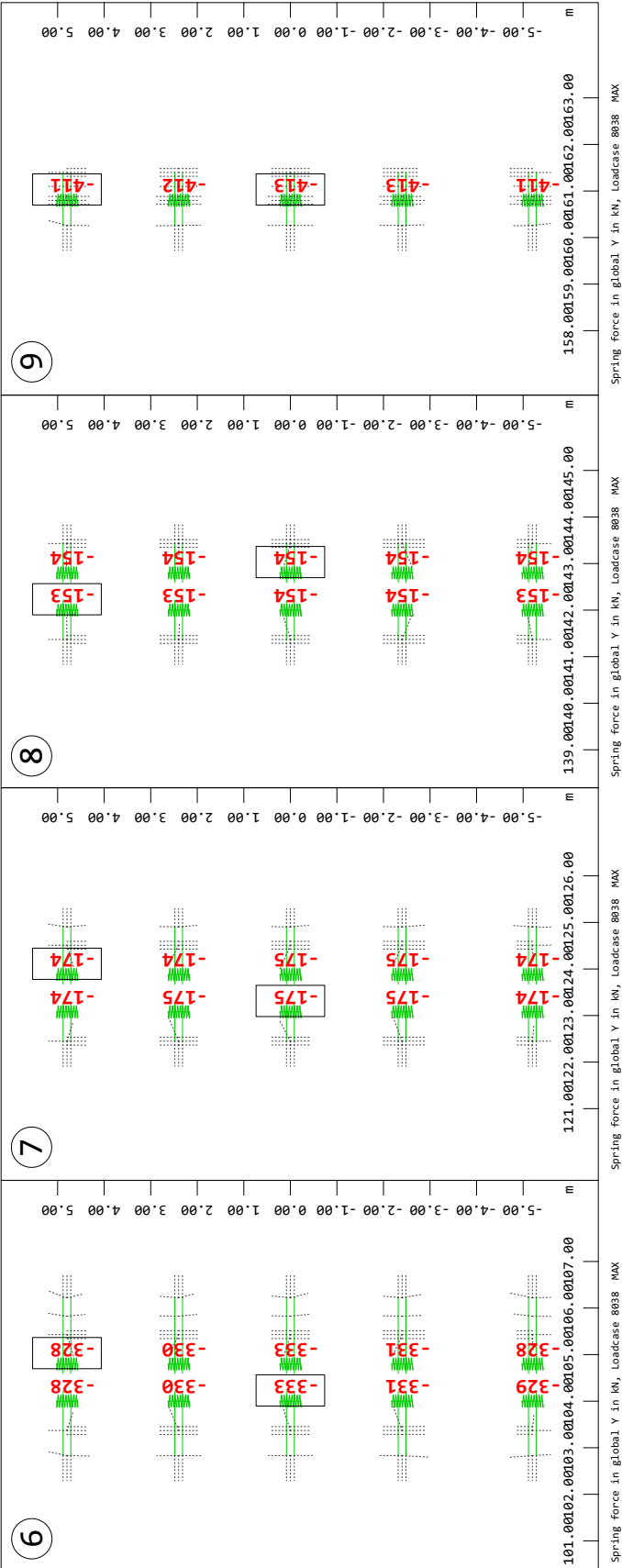
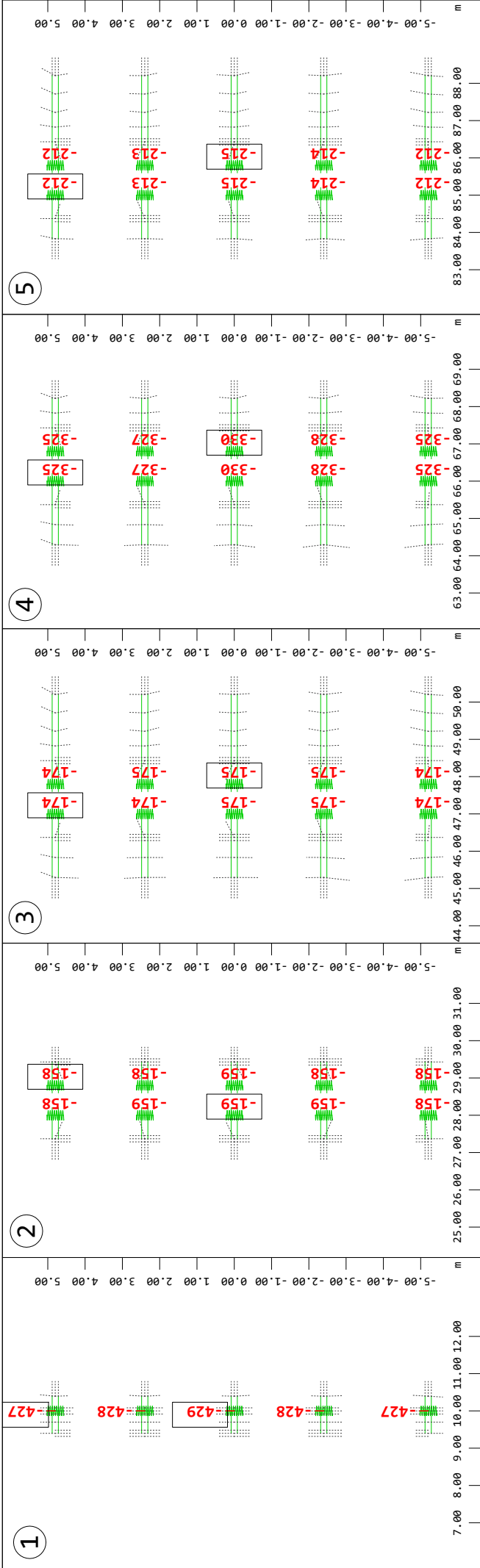


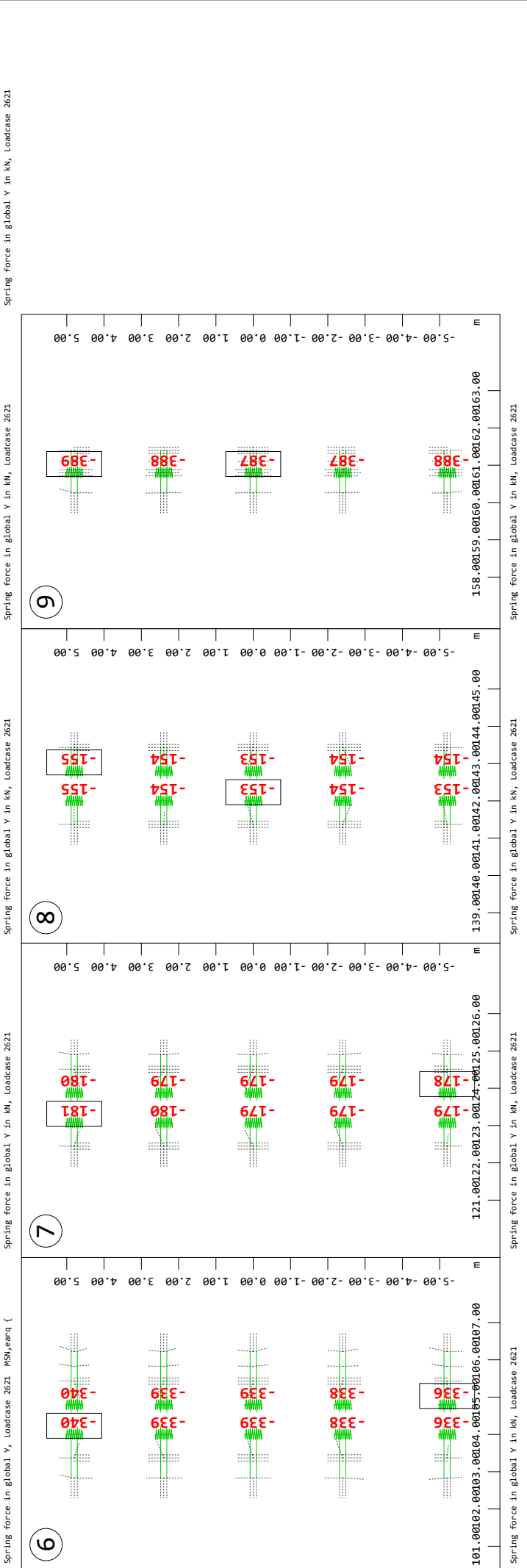
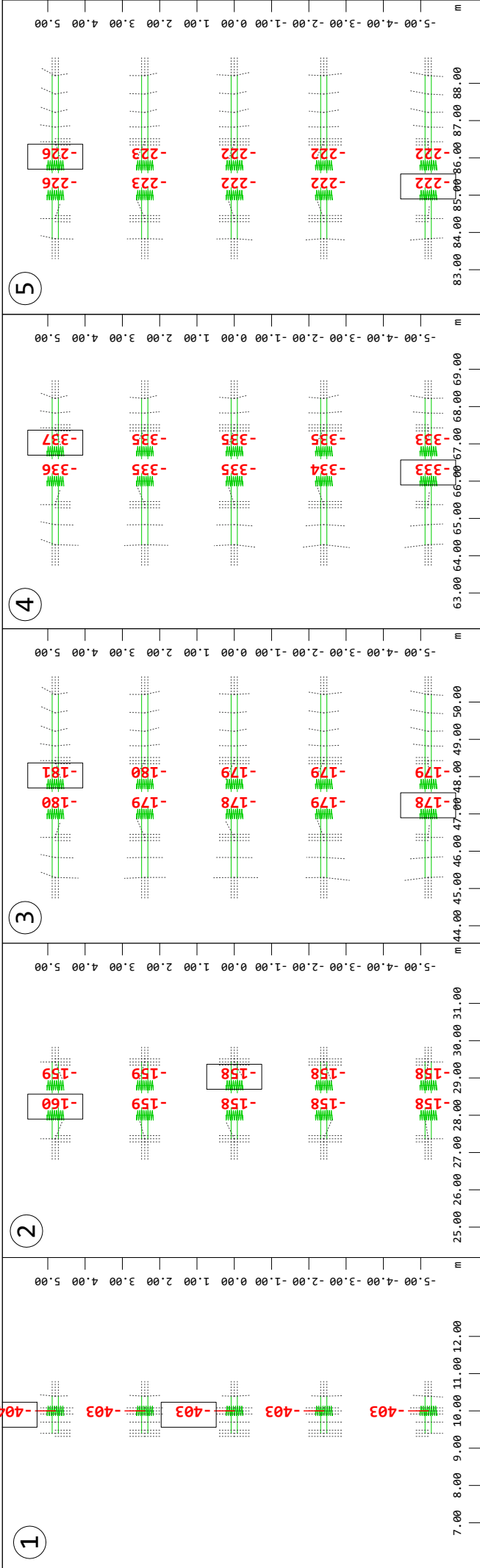


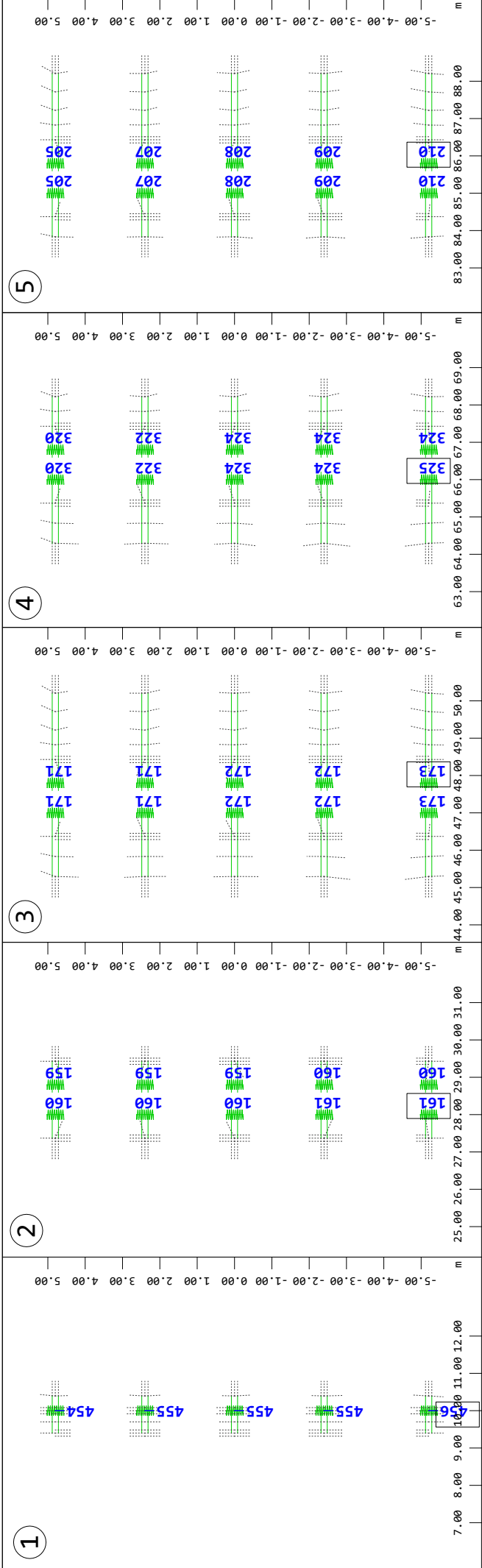




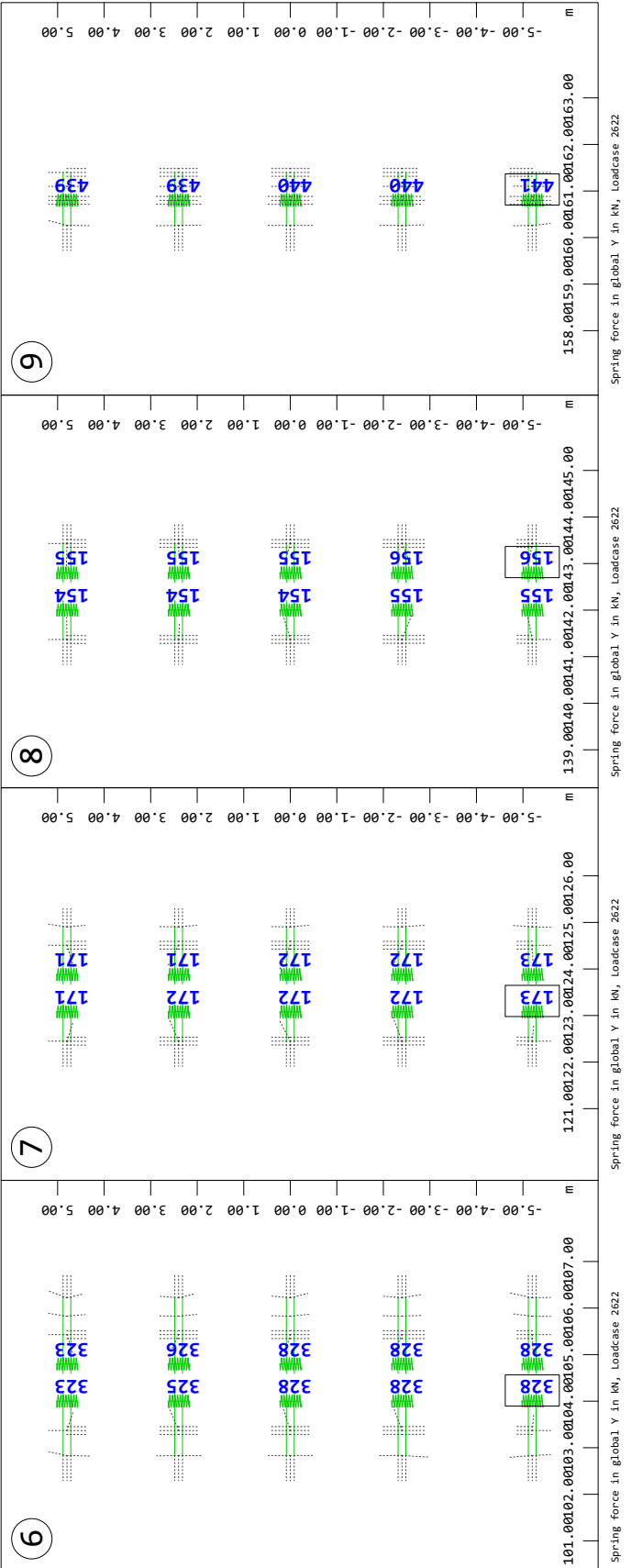








Nadvoz čez AC A1 na Barjanski cesti



Nadvoz Barjanska rekonstruiran v1
Sile na ležišča V PREČNI SMERI - MSN,earq,max

3.1.2 POMIKI

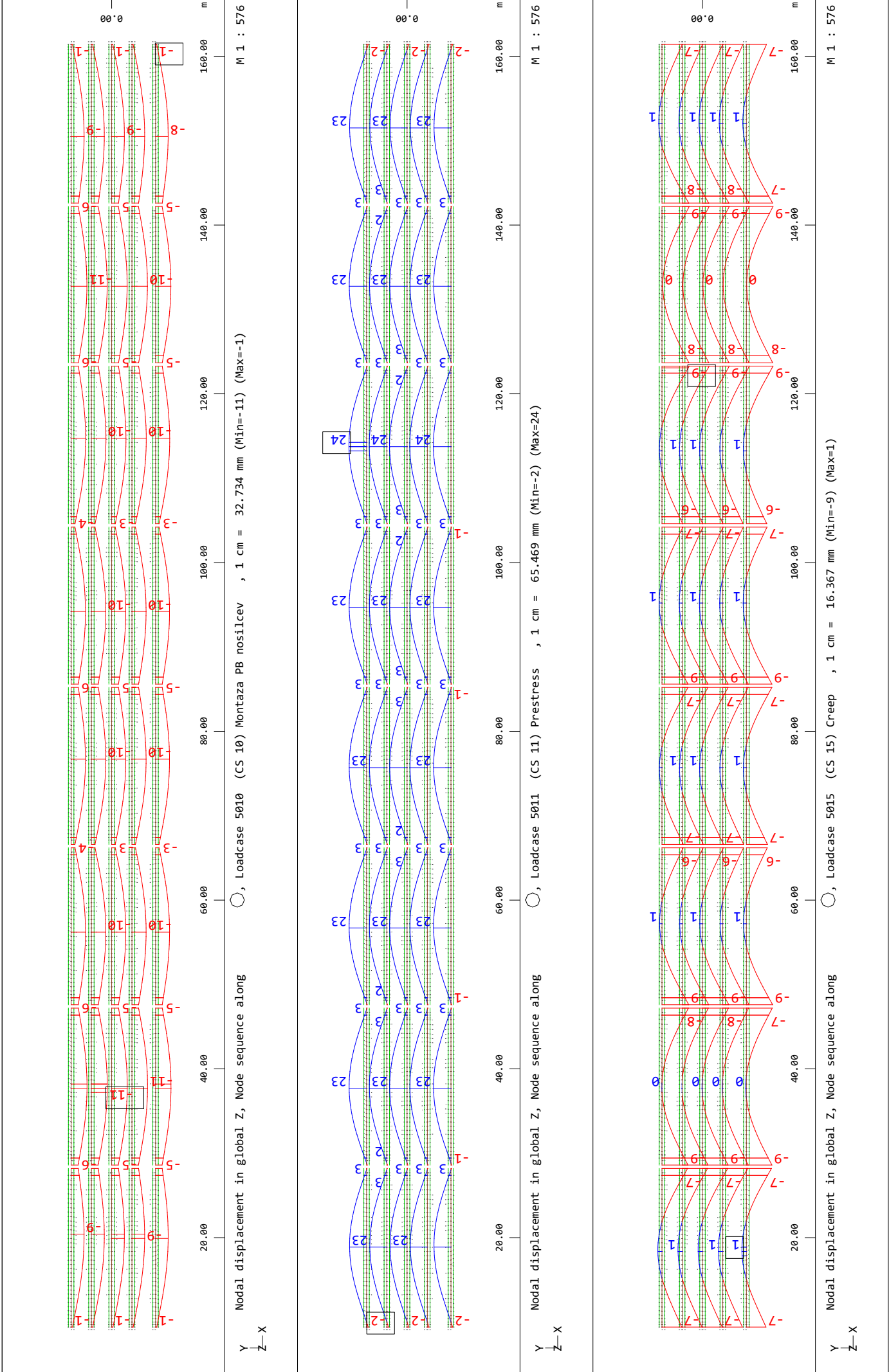
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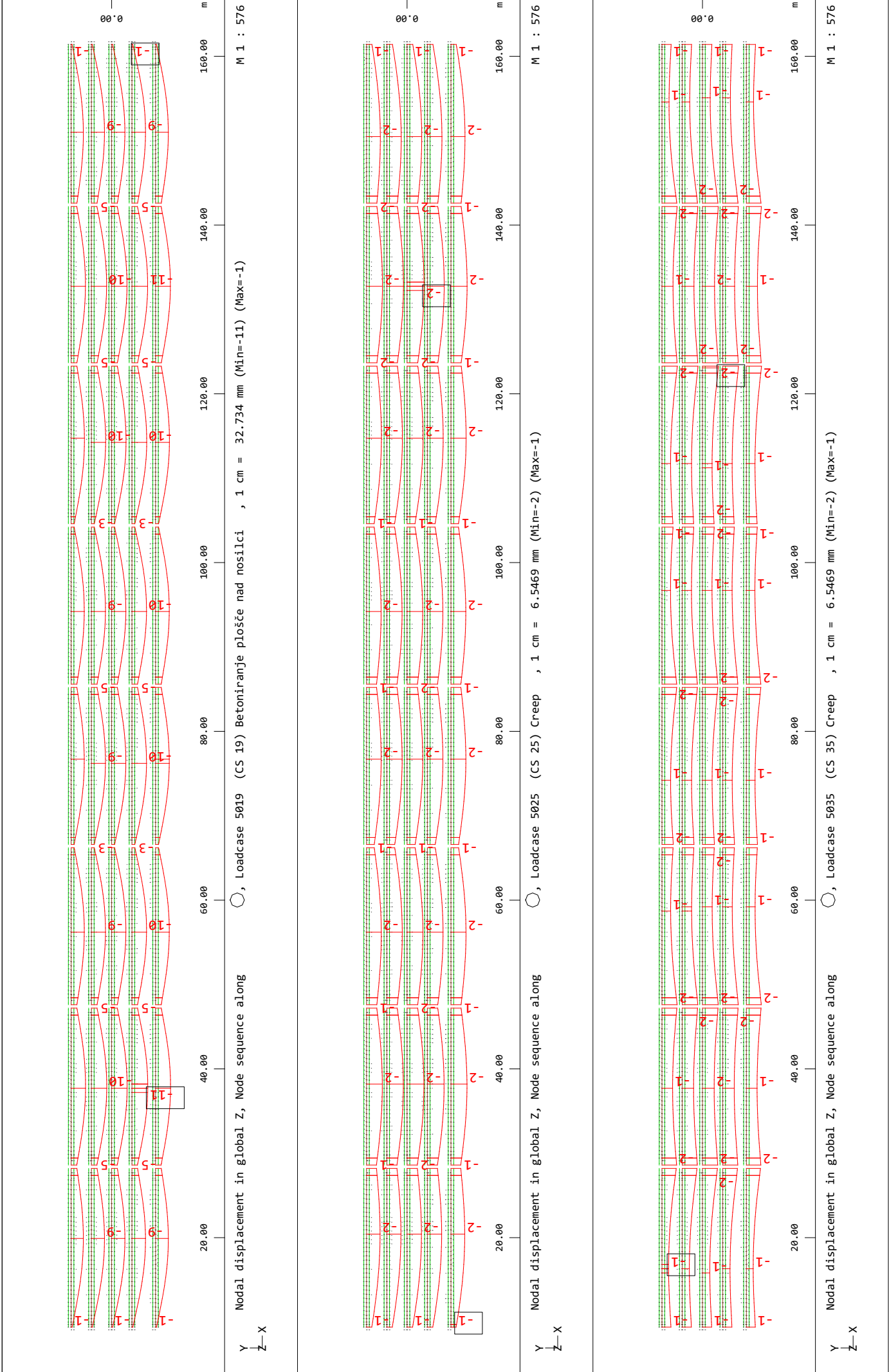
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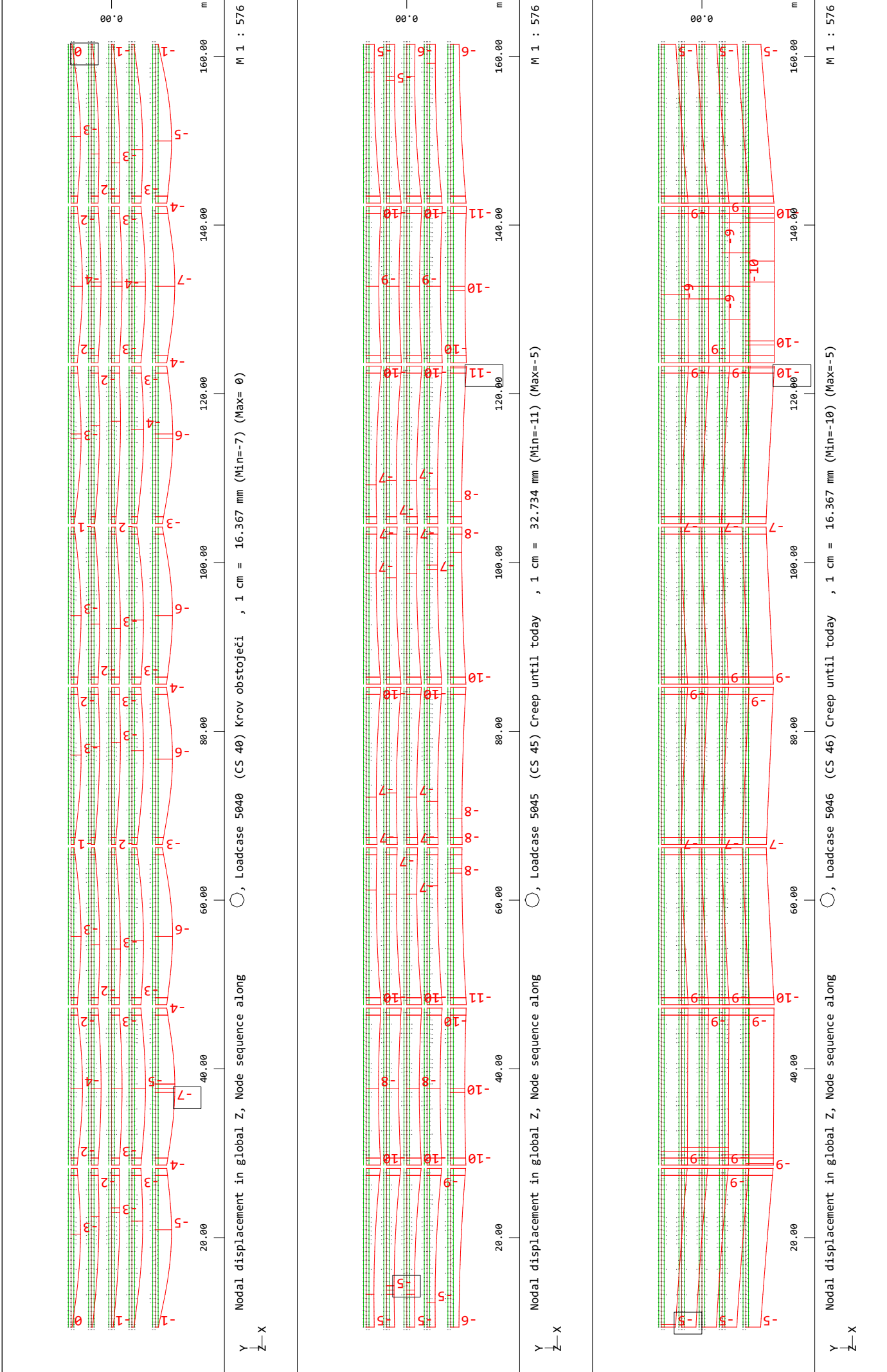
3.1.2.1 POVESI - PREKLADNA

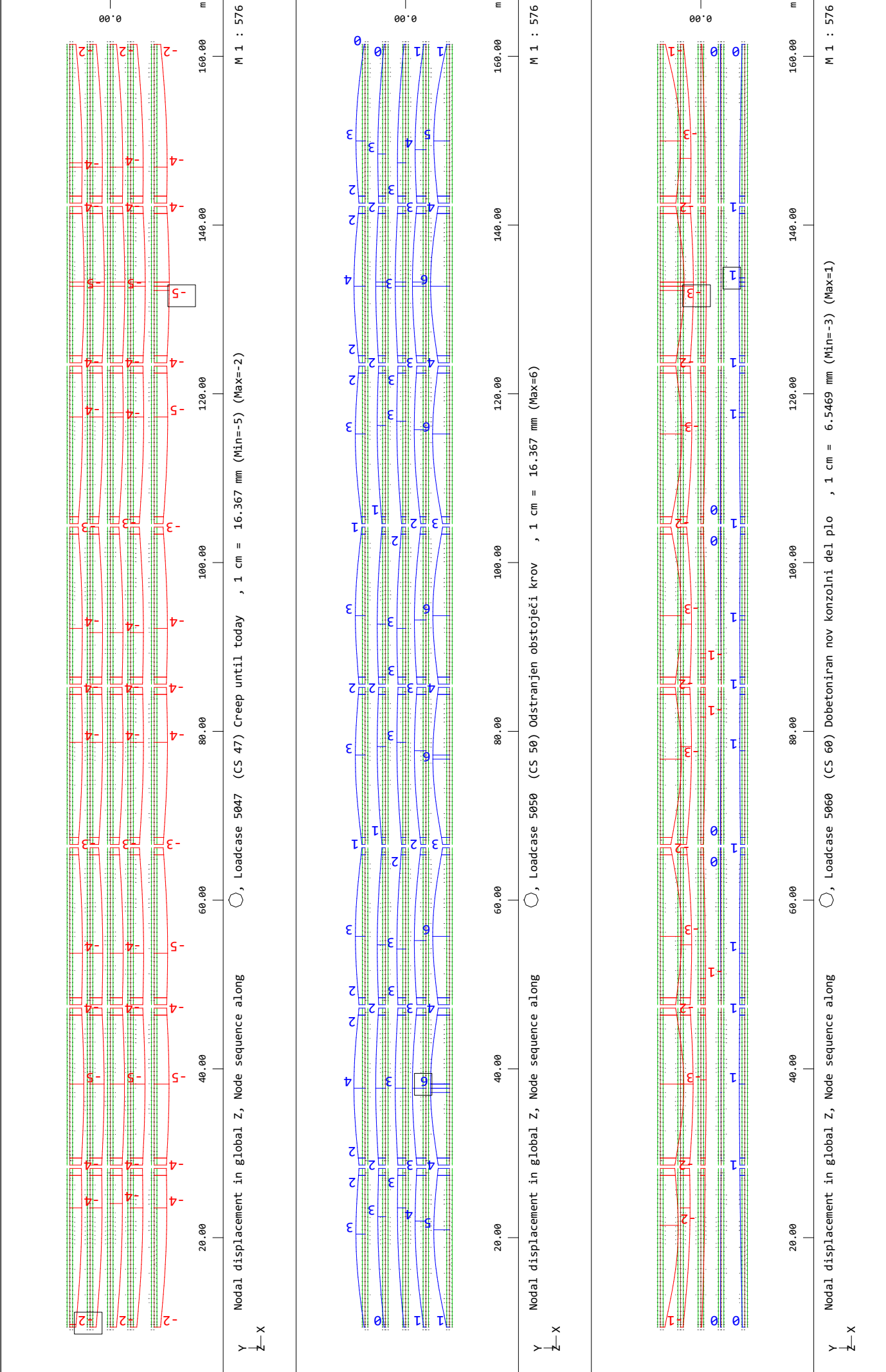
Interactive Graphics

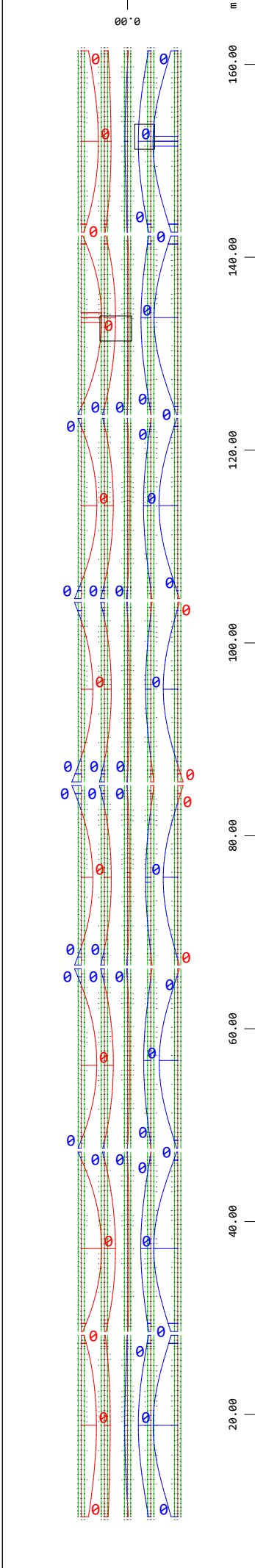
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|---|---------|
| Nodal displacement in global Z LC: 5010 | Page 2 |
| Nodal displacement in global Z LC: 5019 | Page 3 |
| Nodal displacement in global Z LC: 5040 | Page 4 |
| Nodal displacement in global Z LC: 5047 | Page 5 |
| Nodal displacement in global Z LC: 5065 | Page 6 |
| Nodal displacement in global Z LC: 5076 | Page 7 |
| Nodal displacement in global Z LC: 911 | Page 8 |
| Nodal displacement in global Z LC: 932 | Page 9 |
| Nodal displacement in global Z LC: 1351 | Page 10 |
| Nodal displacement in global Z LC: 1331 | Page 11 |



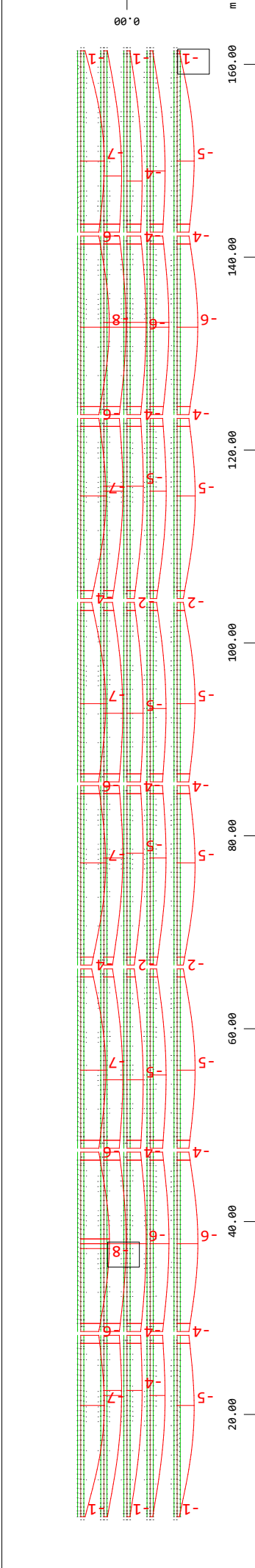




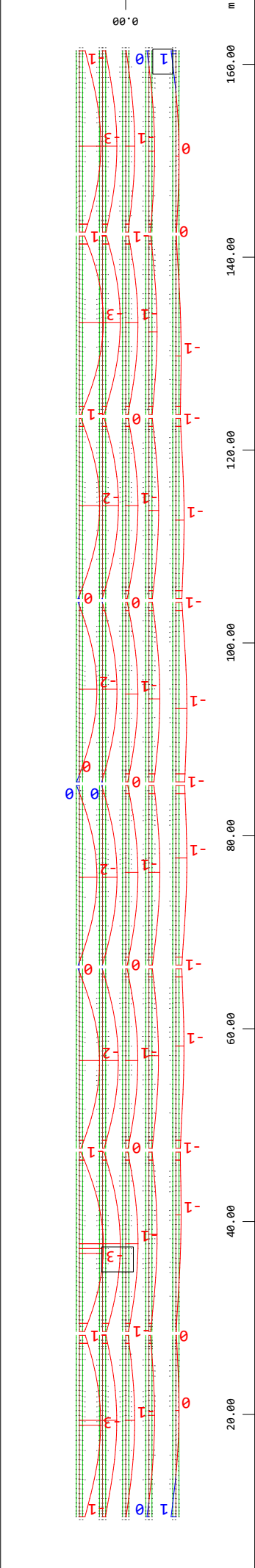




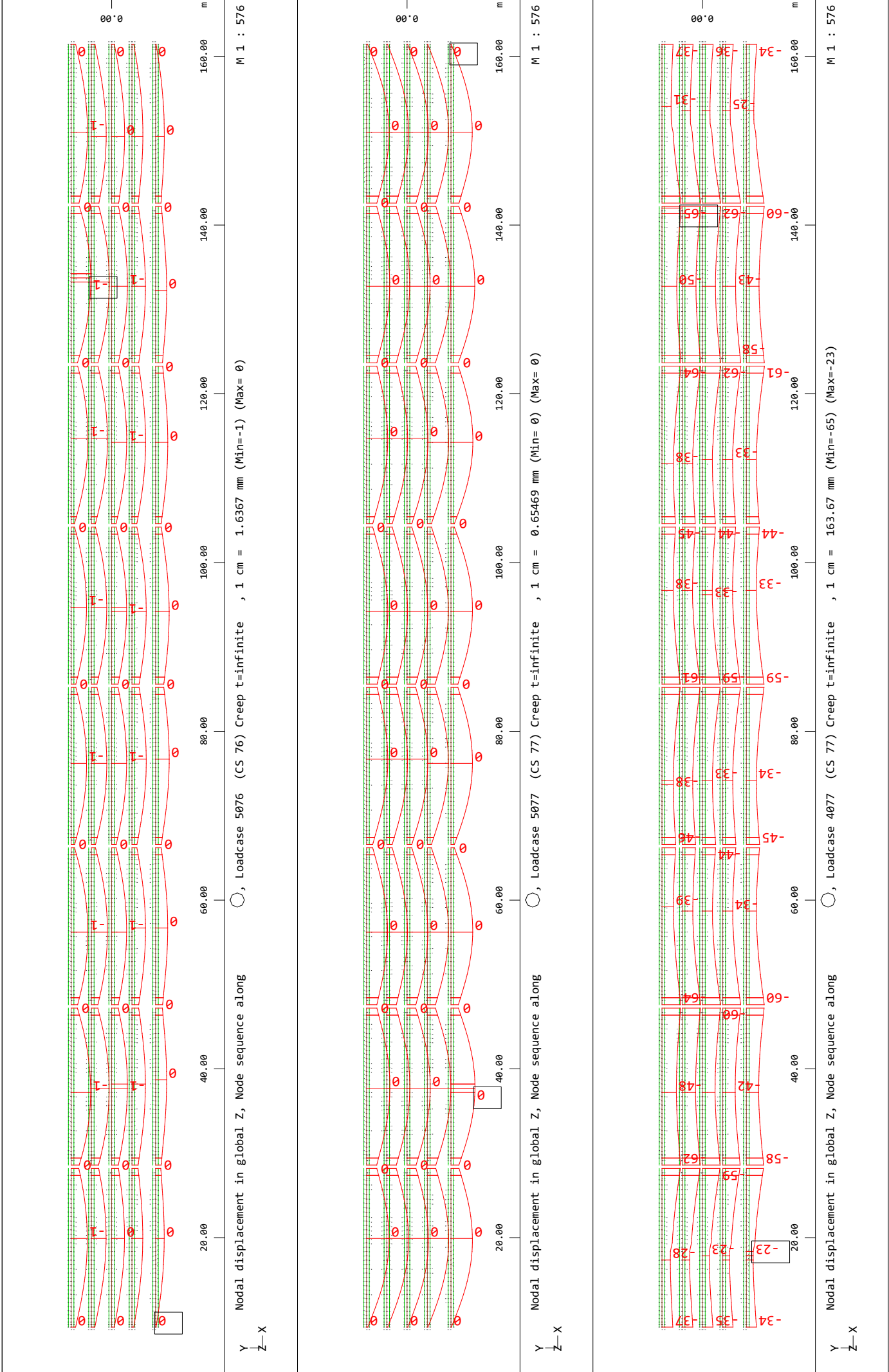
Nadvoz čez AC A1 na Barjanski cesti

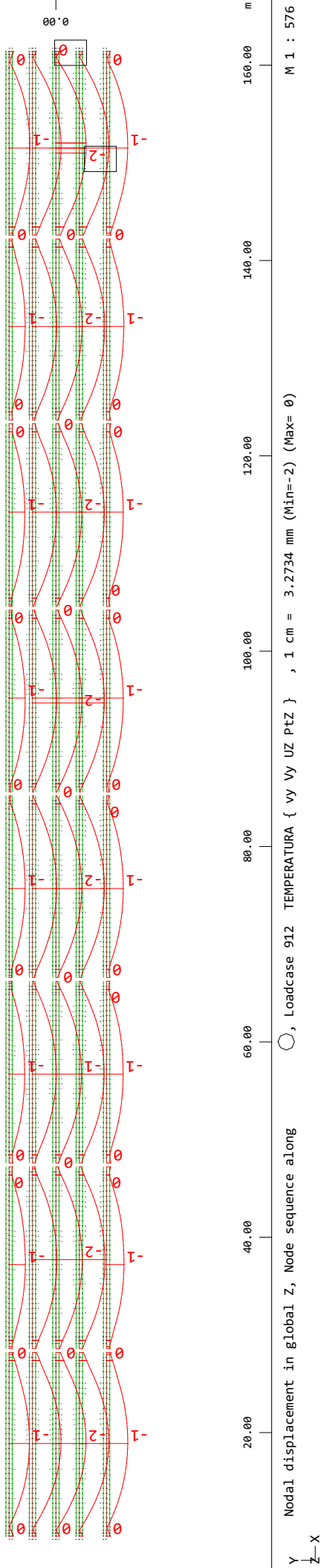
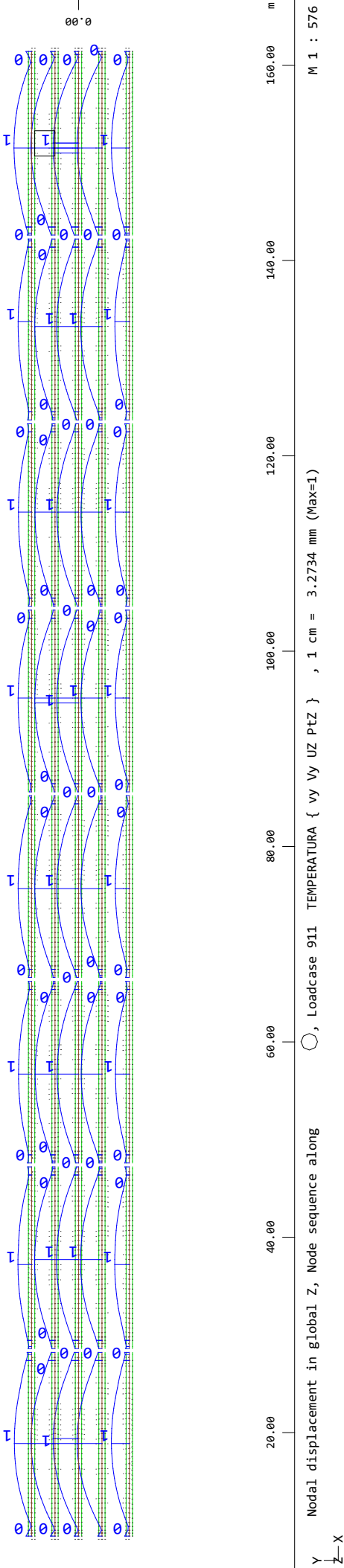


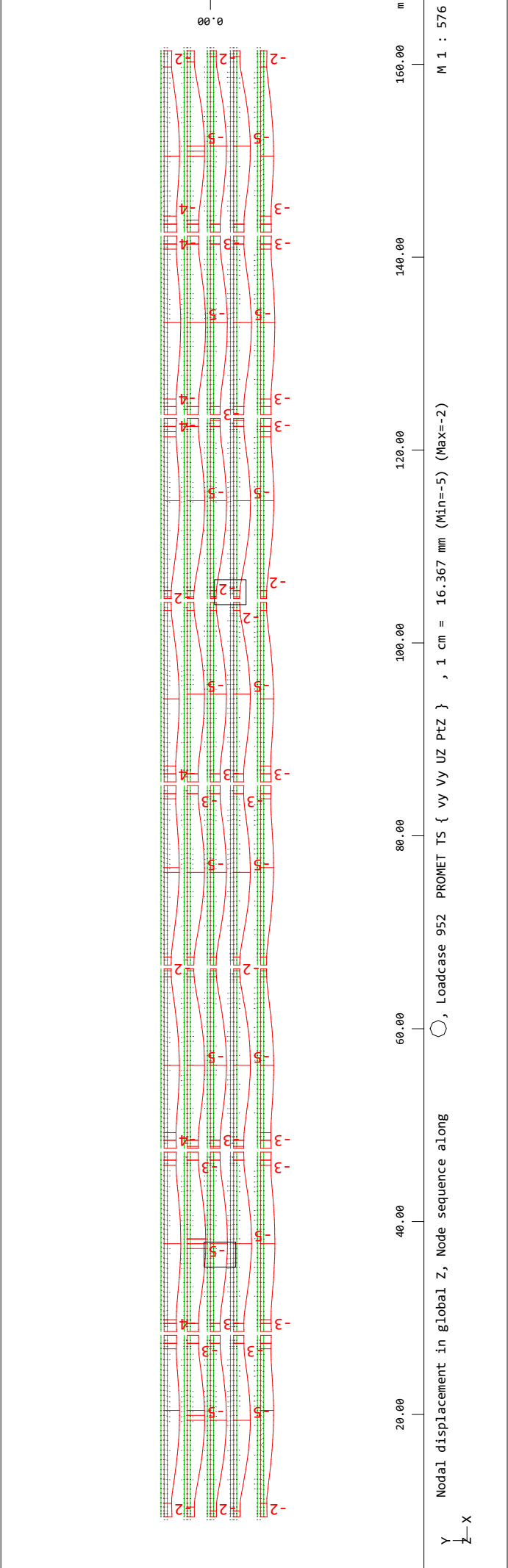
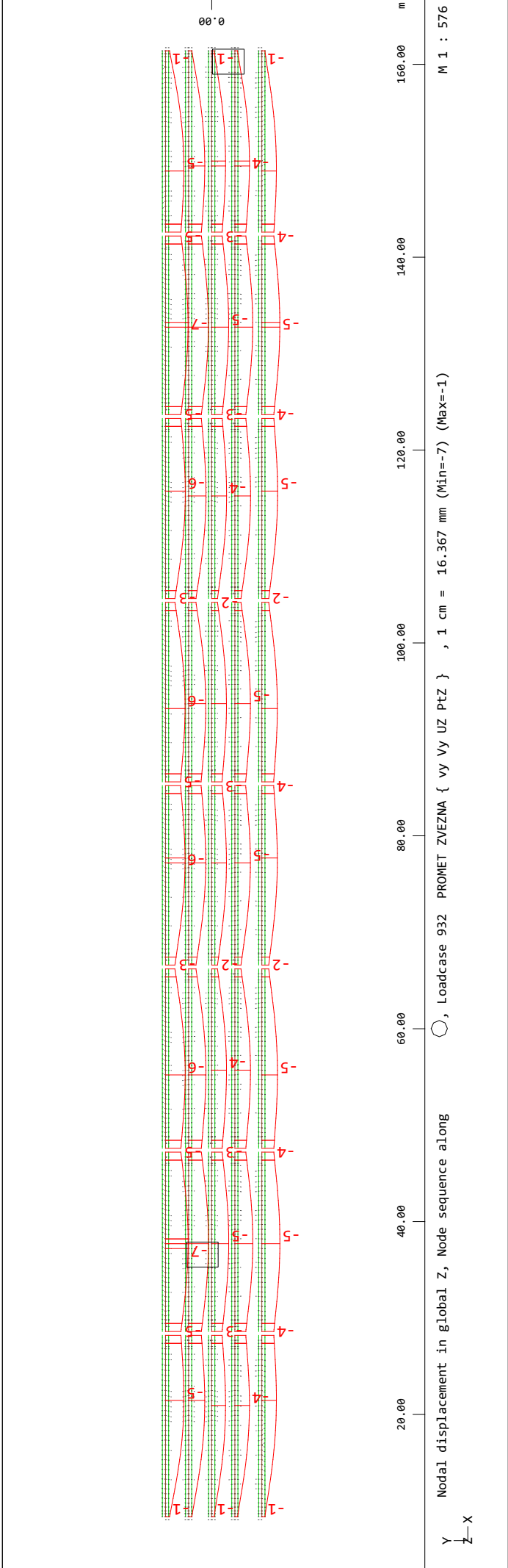
Rekonstrukcija - Račun konstrukcije

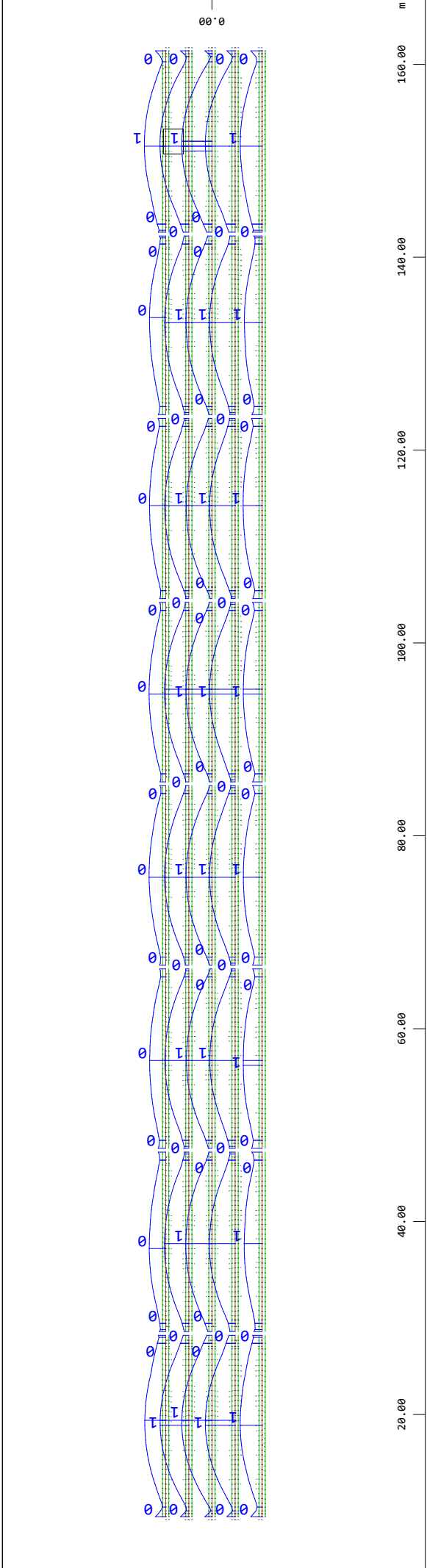


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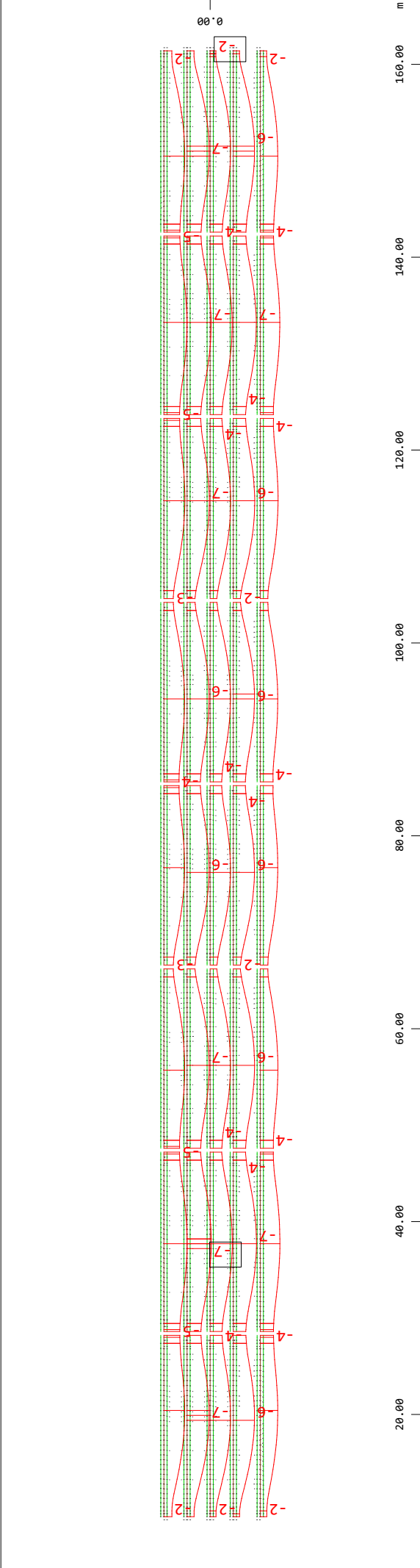




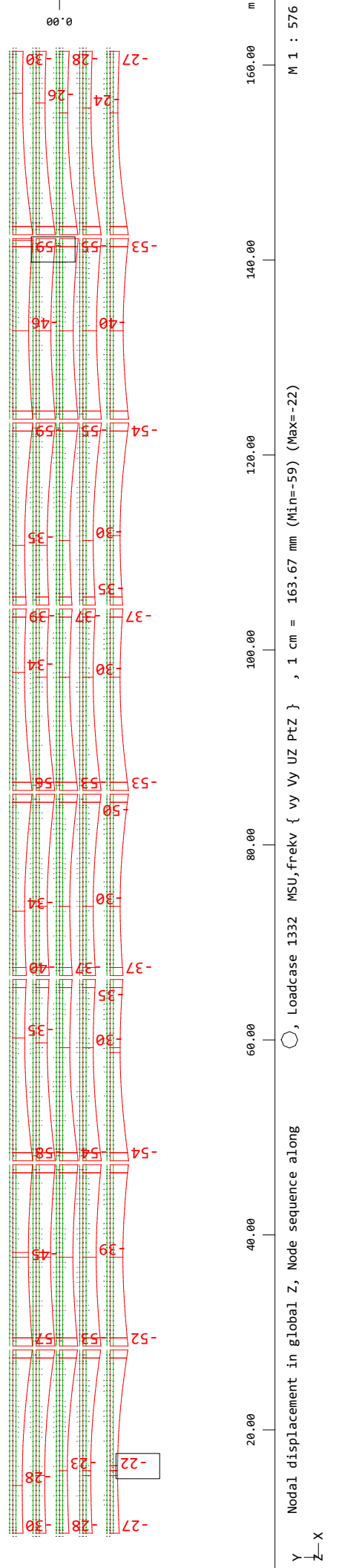
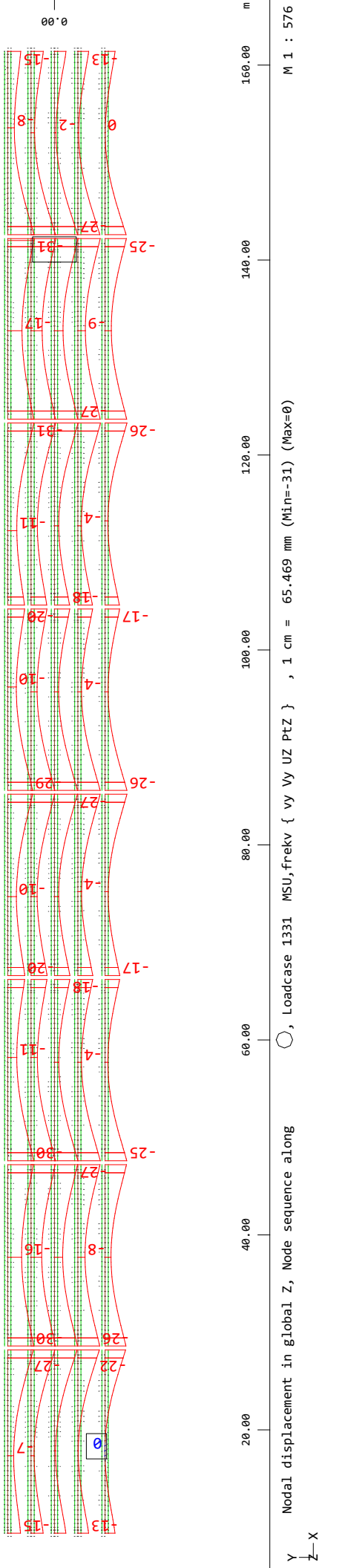




○, Loadcase 1351 MSU,frekv(L+T) { vy Vy UZ PtZ } , 1 cm = 1.6367 mm (Max=1)



○, Loadcase 1352 MSU,frekv(L+T) { vy Vy UZ PtZ } , 1 cm = 16.367 mm (Min=-7) (Max=-2)



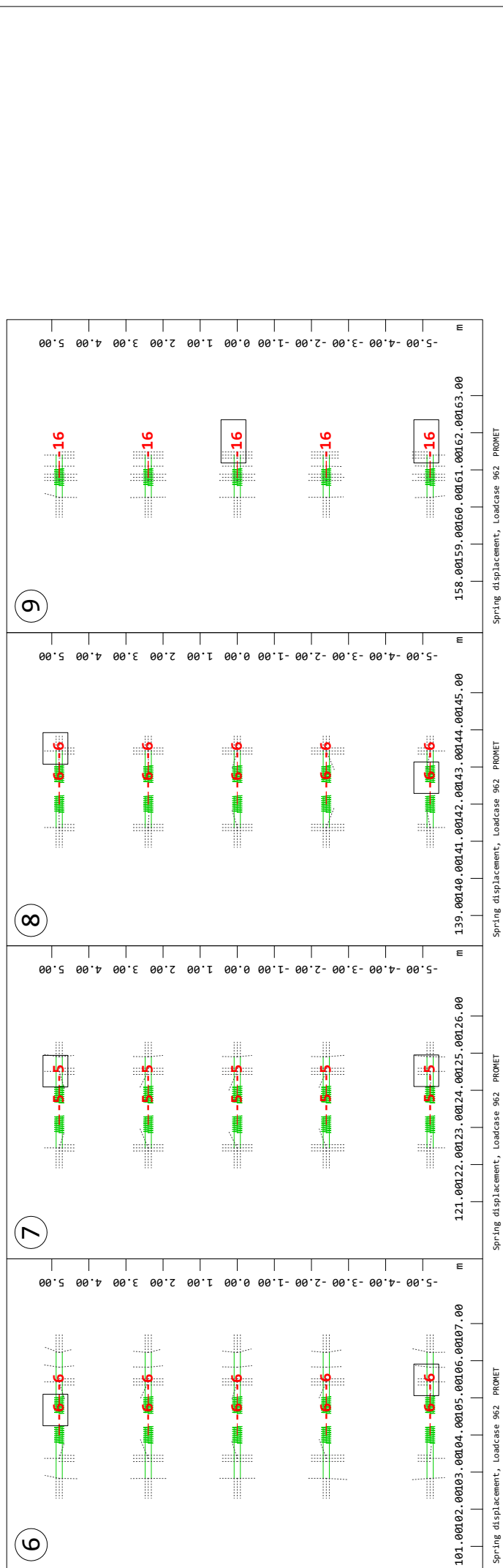
3.1.2.2 POMIKI LEŽIŠČ

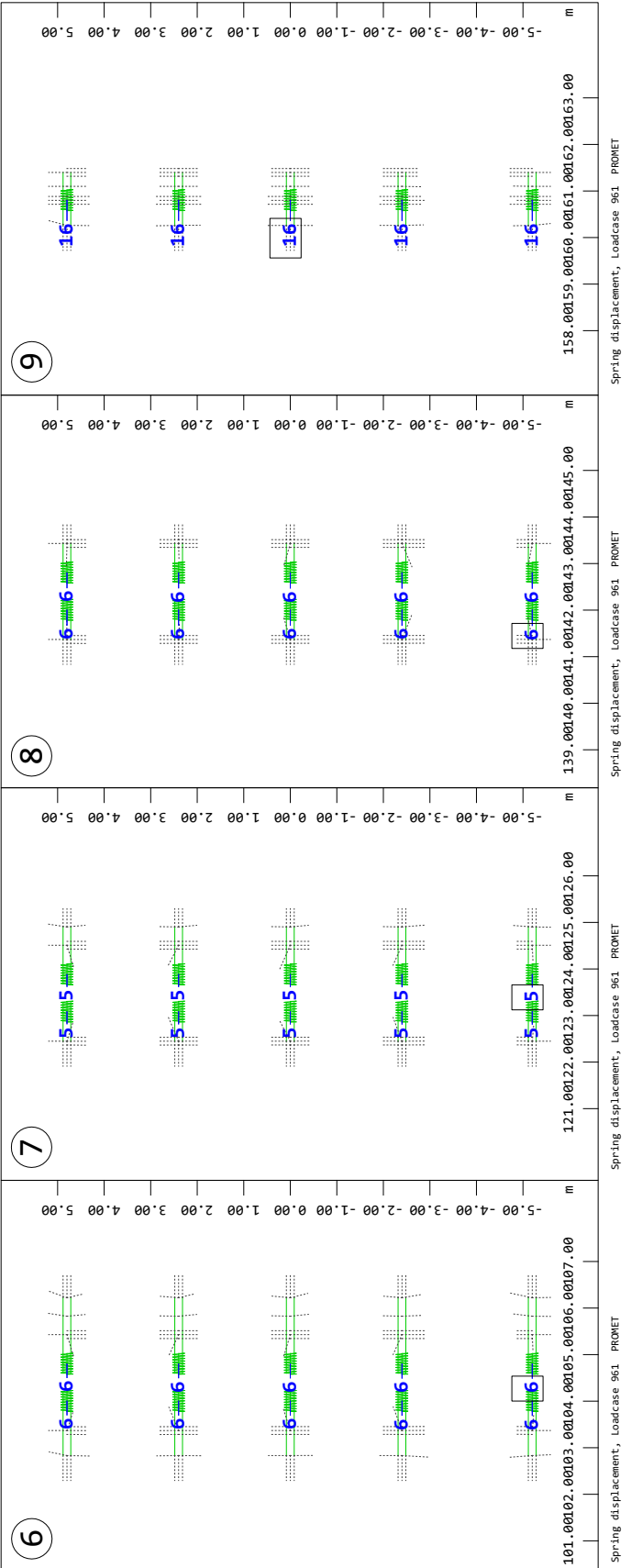
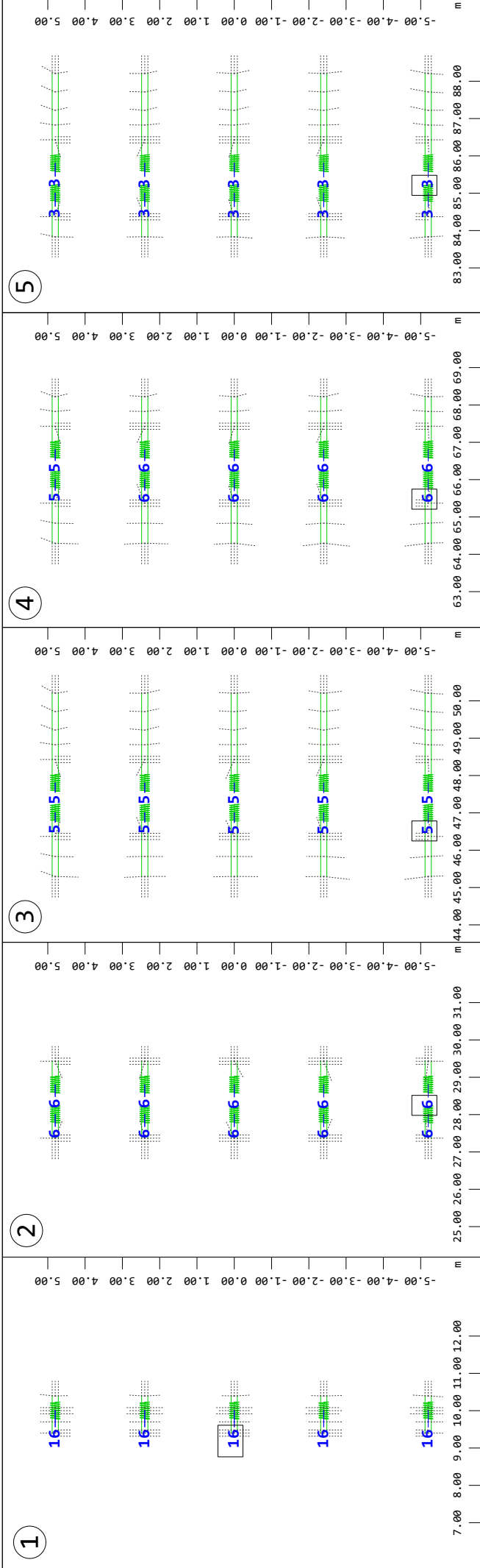
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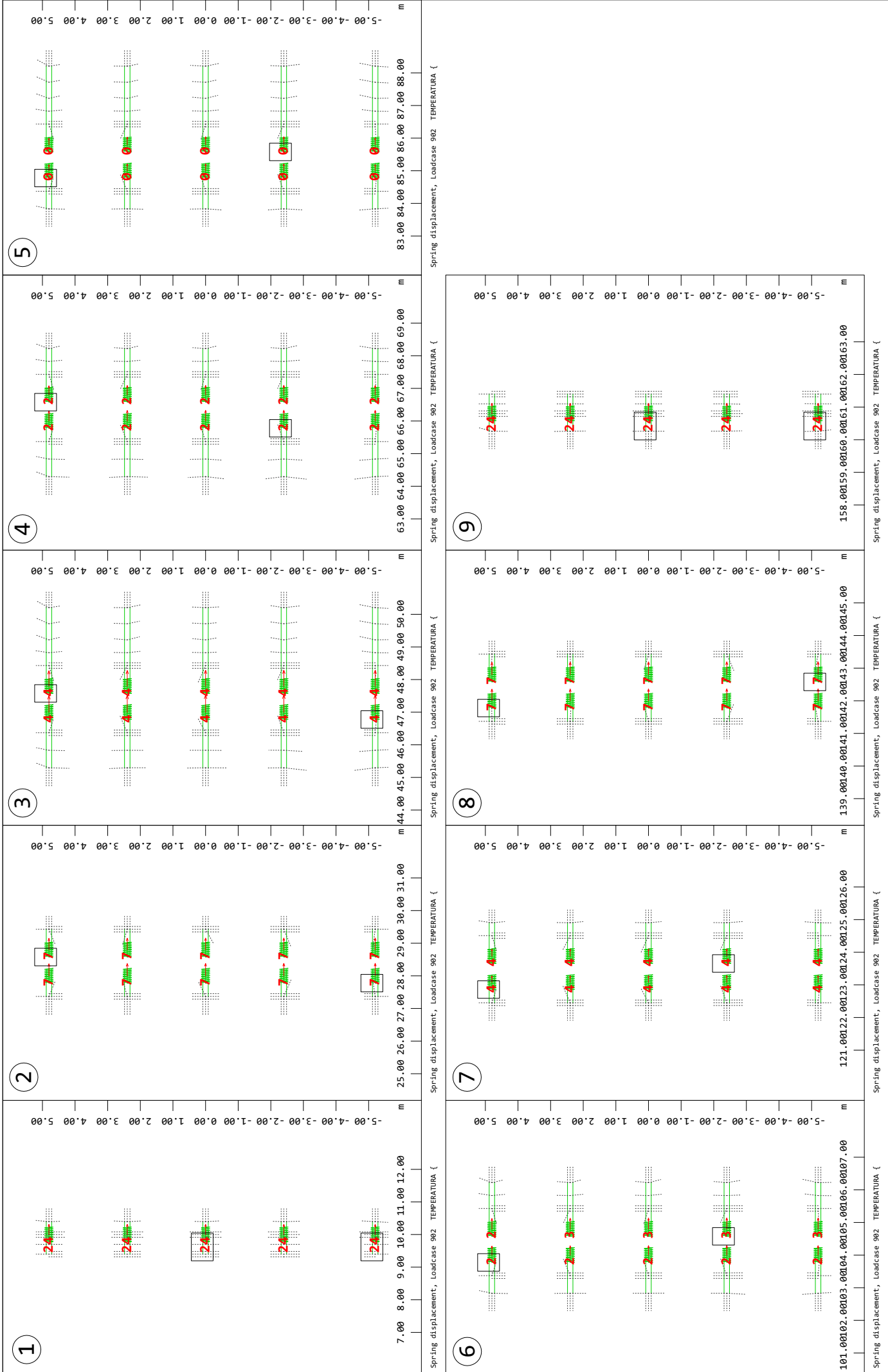
3.1.2.2 POMIKI LEŽIŠČ

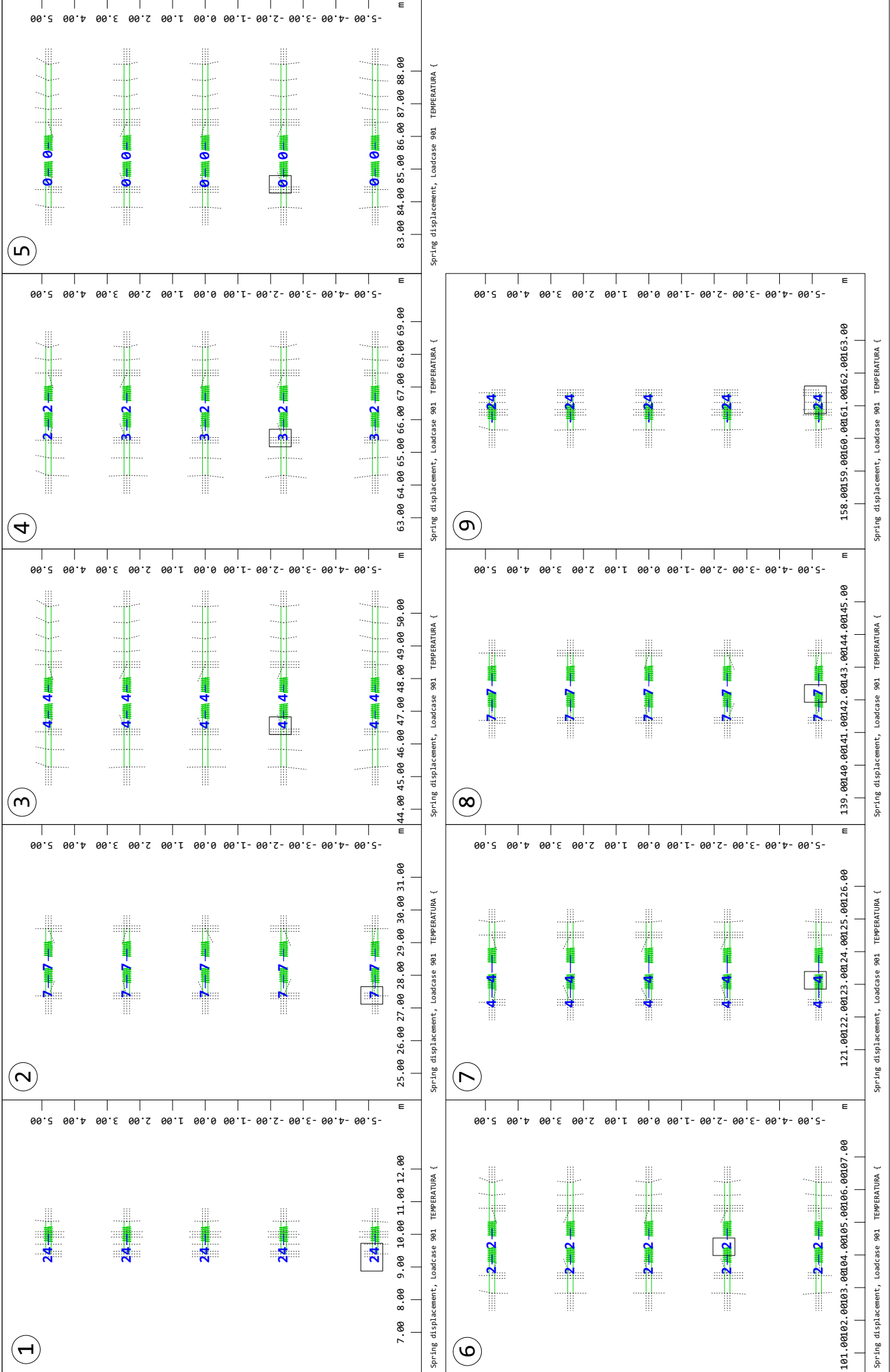
Interactive Graphics

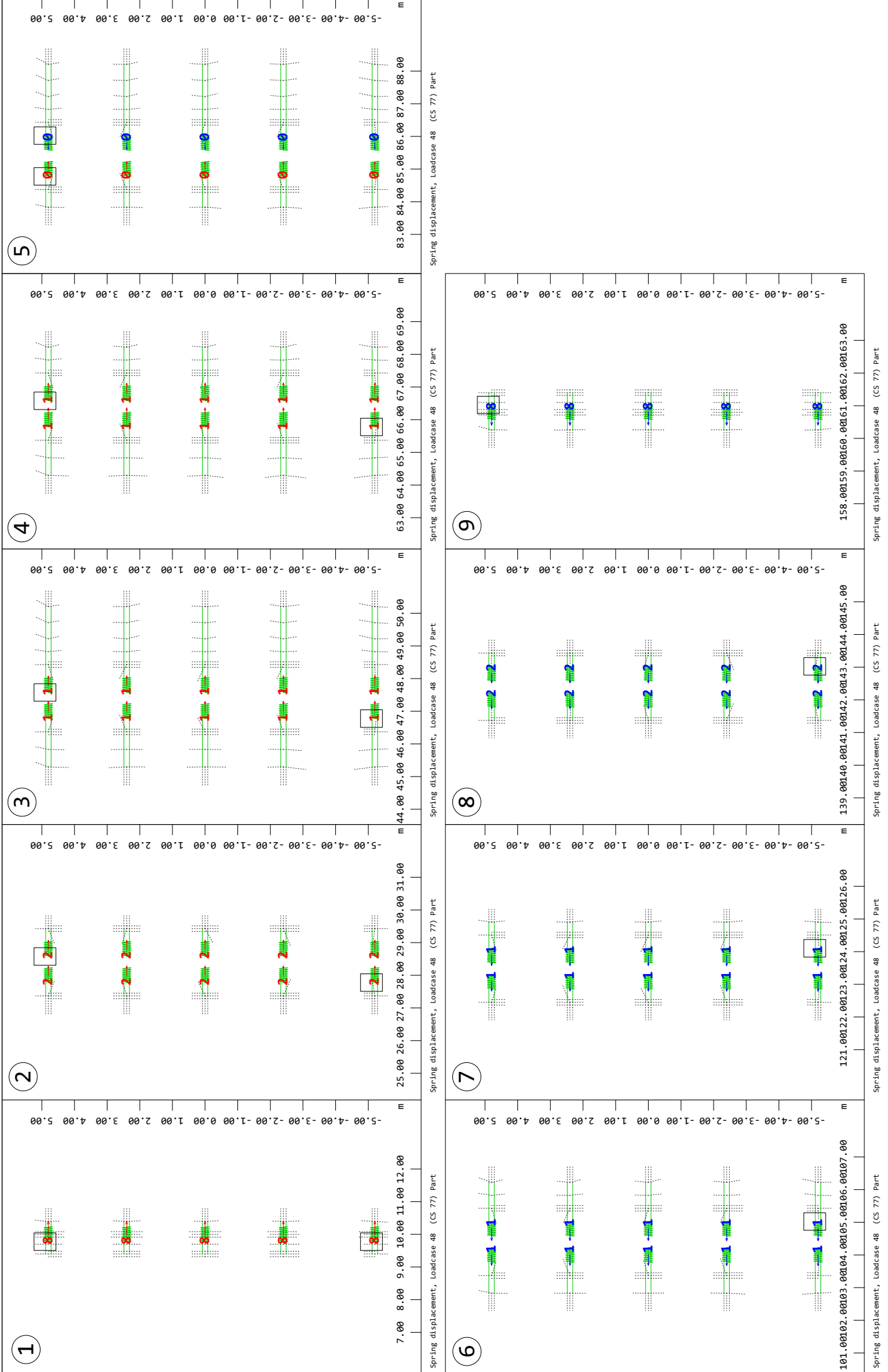
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| Spring displacement LC: 901 | Page 5 |
| Spring displacement LC: 48 | Page 6 |
| Spring displacement LC: 2621 | Page 7 |
| Spring displacement LC: 2622 | Page 8 |
| Spring displacement LC: 8038 | Page 9 |
| Spring displacement LC: 2621 | Page 10 |
| Spring displacement LC: 2622 | Page 11 |
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| Quadrilateral Elements , Displacement in local x LC: 907 | Page 13 |
| Quadrilateral Elements , Displacement in local x LC: 967 | Page 14 |
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| Quadrilateral Elements , Displacement in local x LC: 907 | Page 16 |
| Quadrilateral Elements , Displacement in local y LC: 967 | Page 17 |

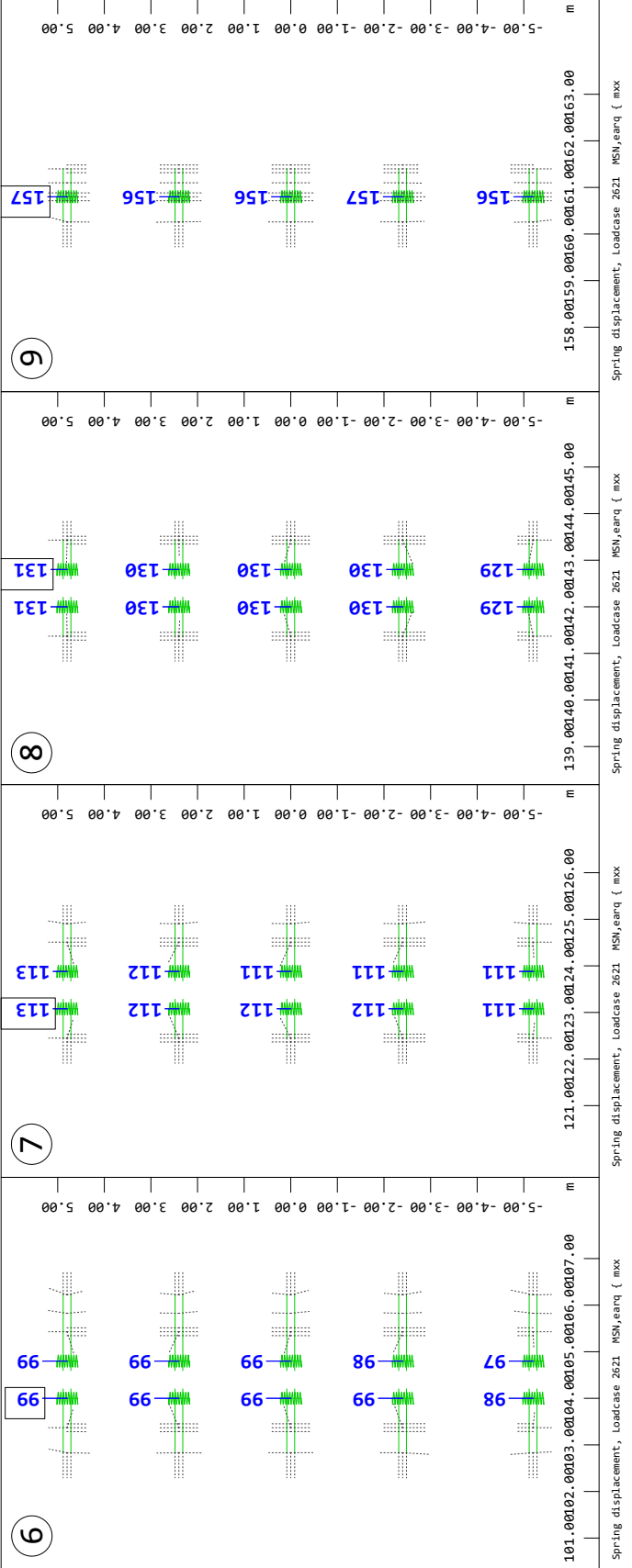
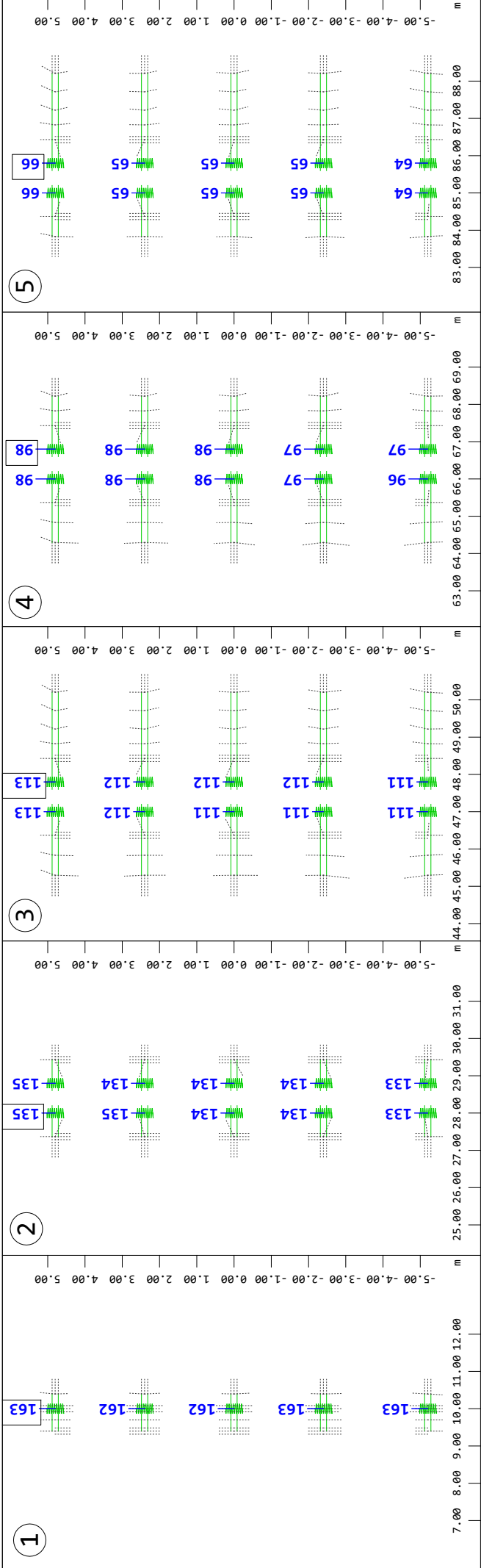


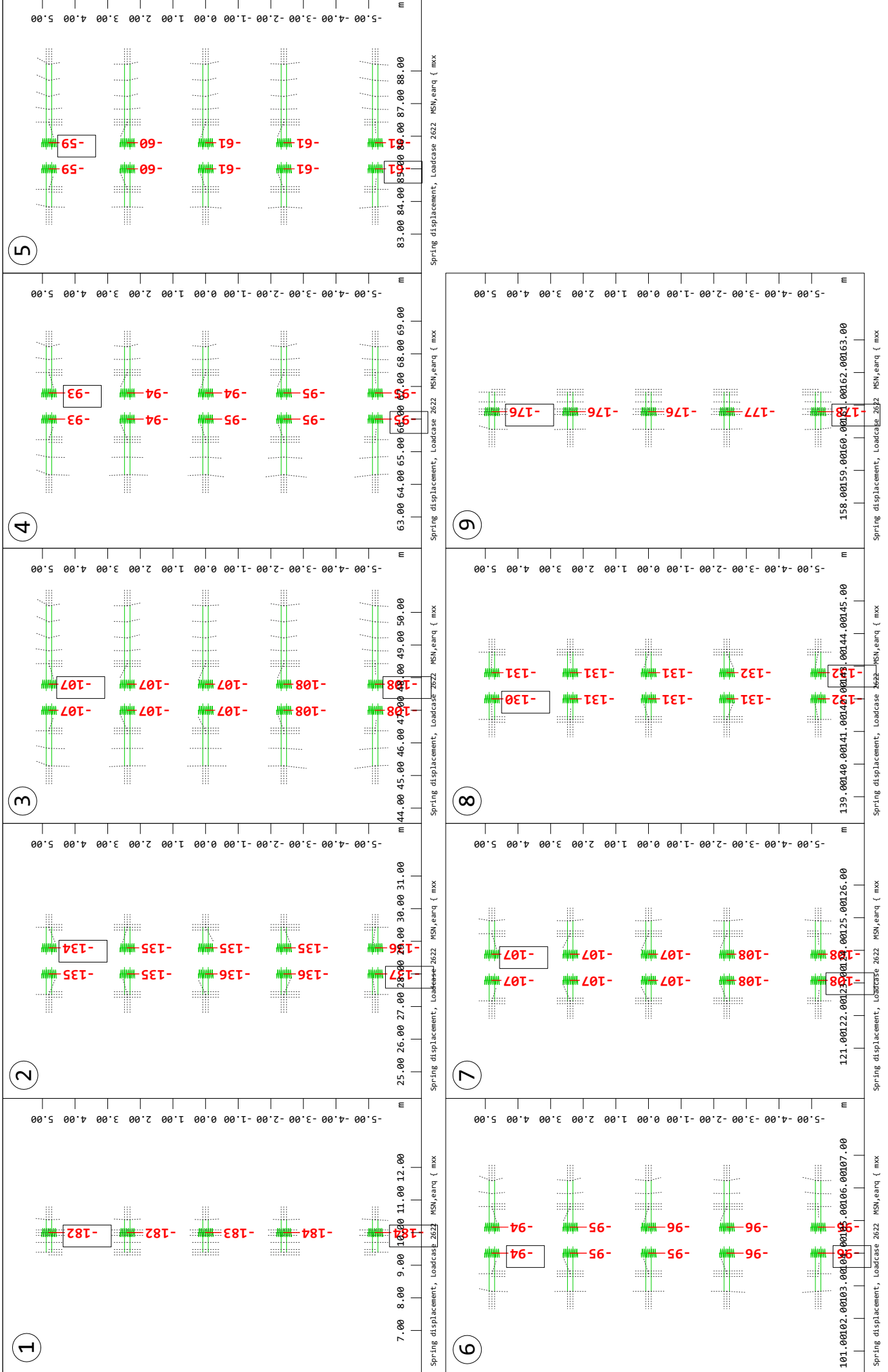


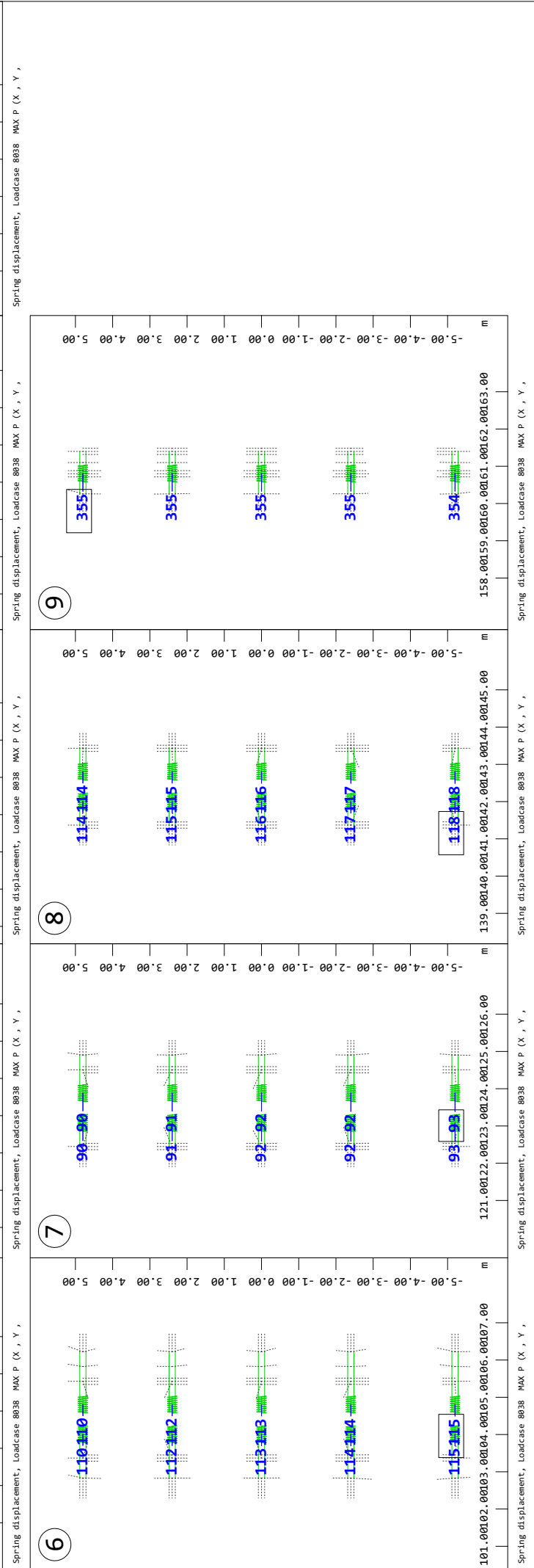
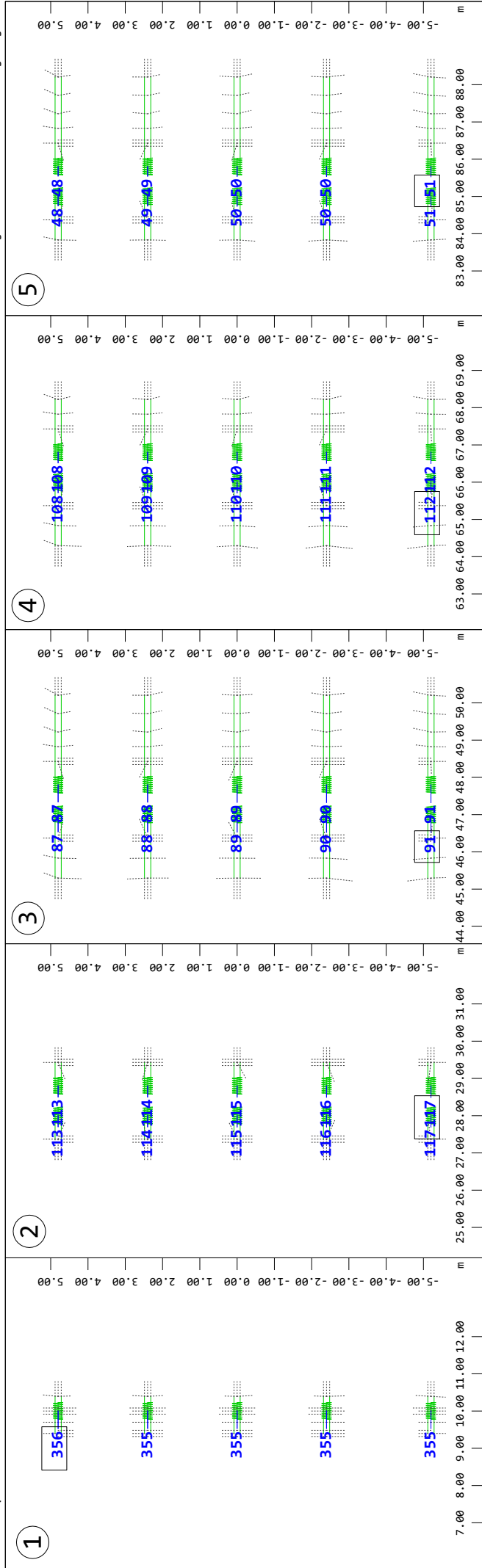


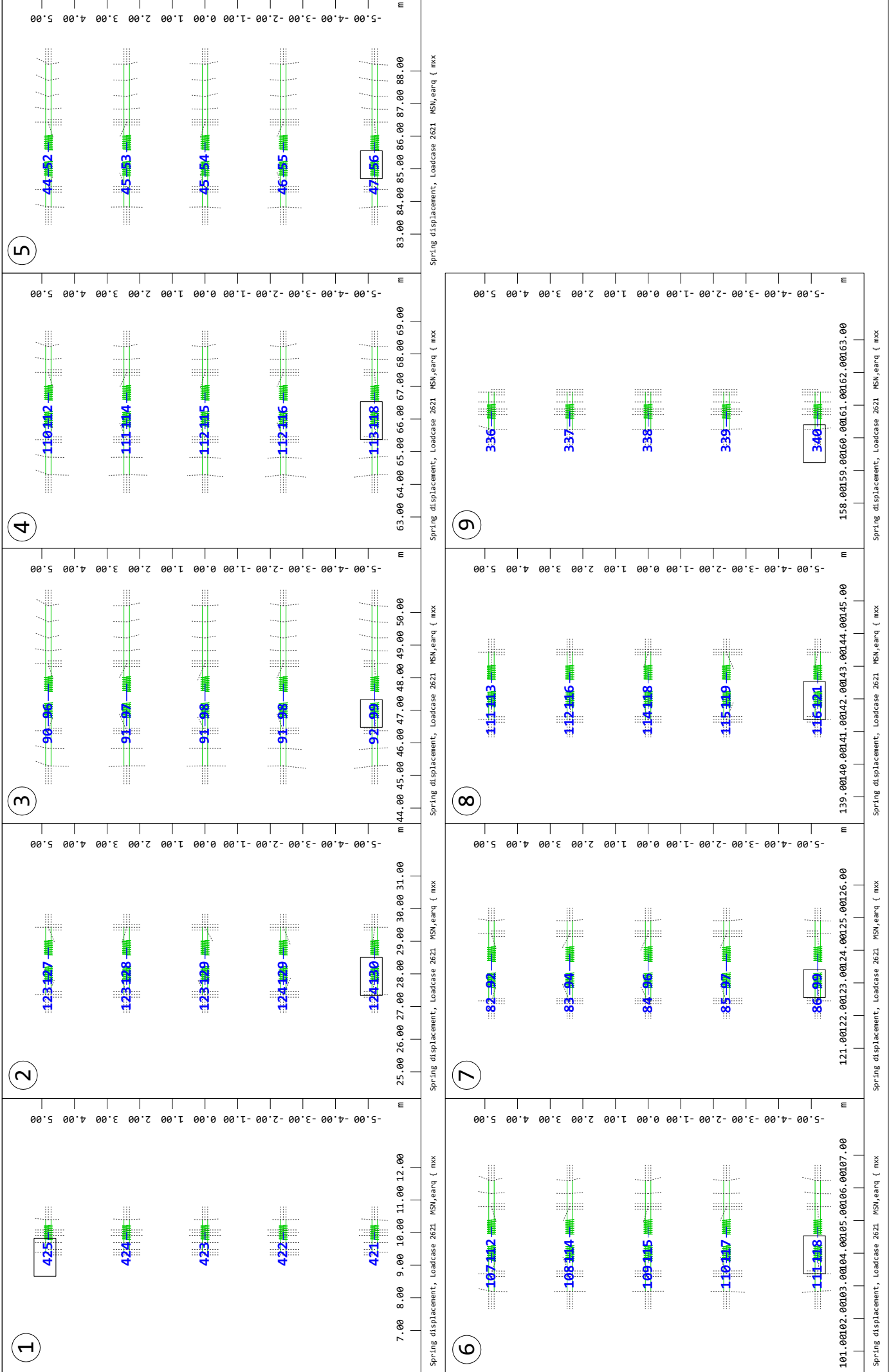


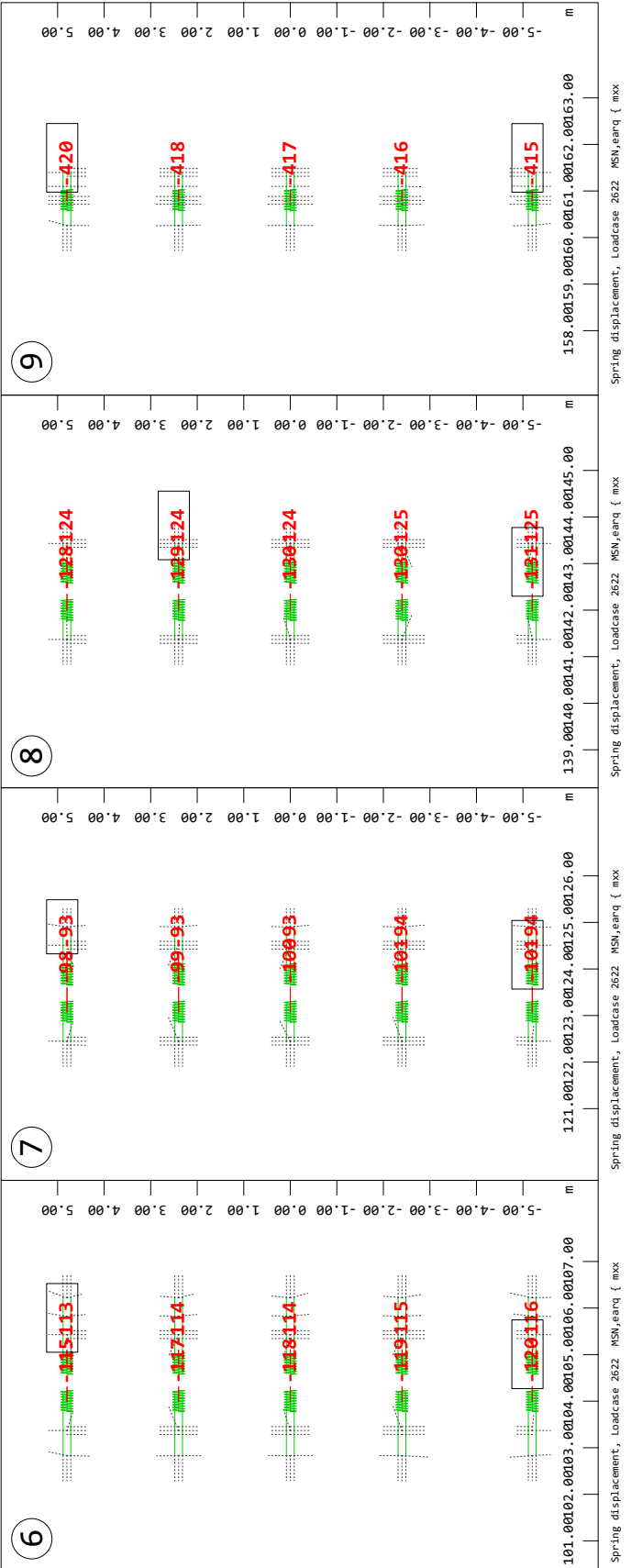
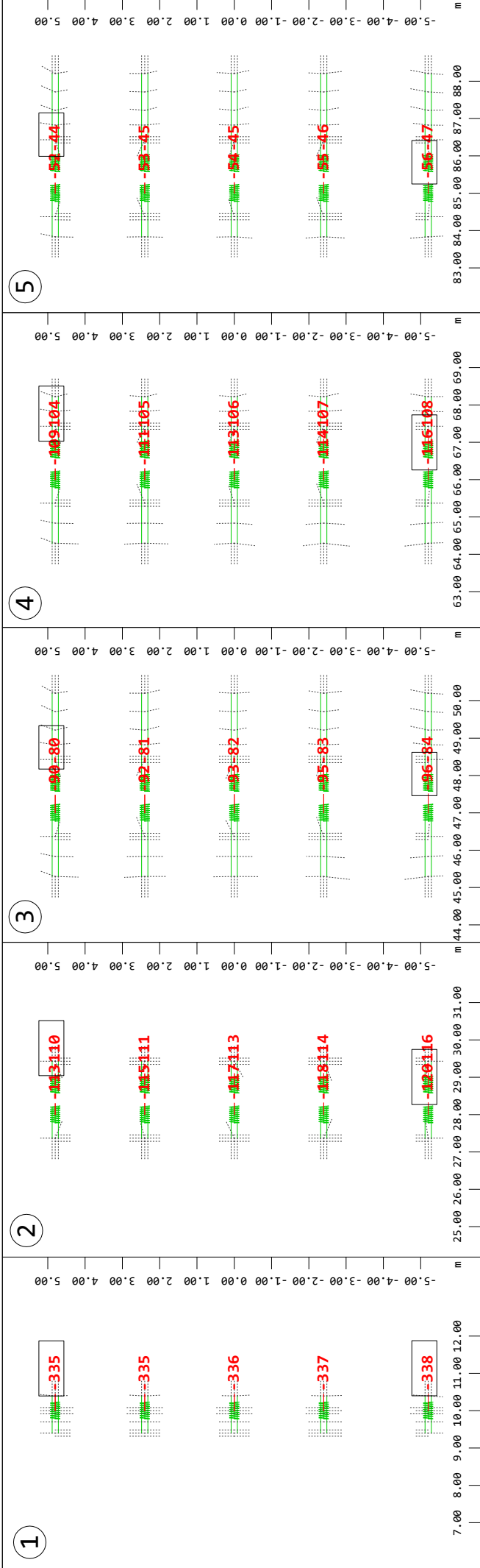


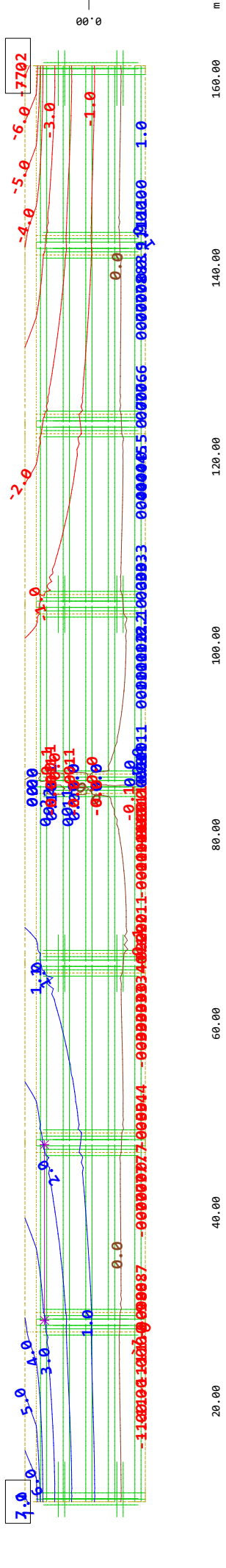




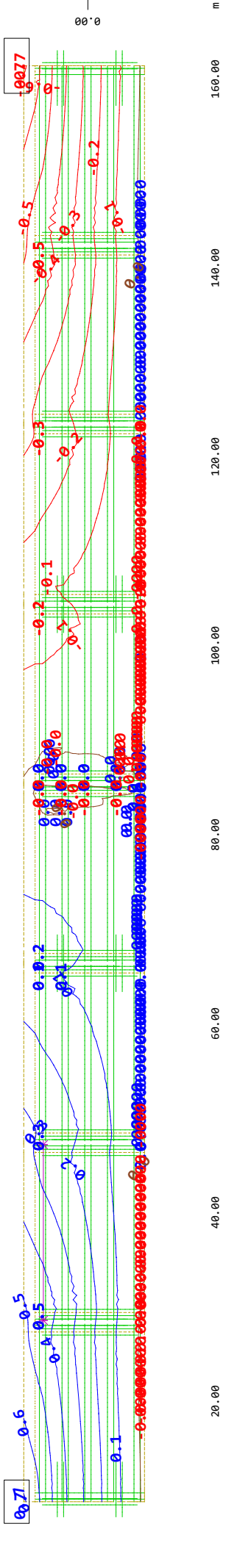




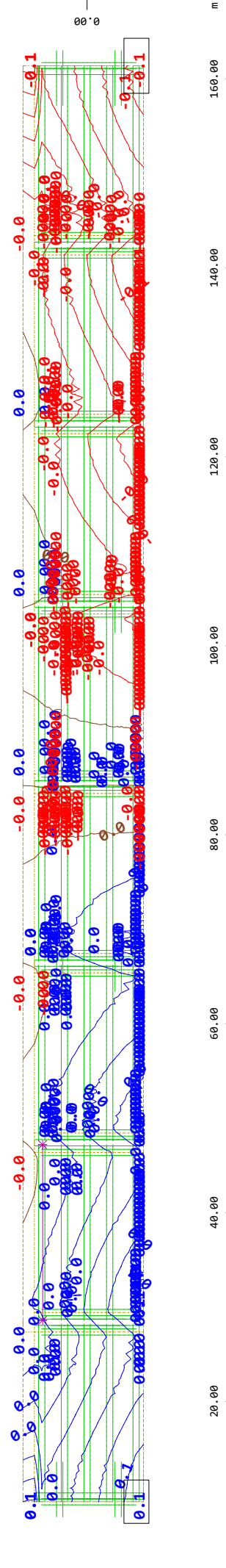




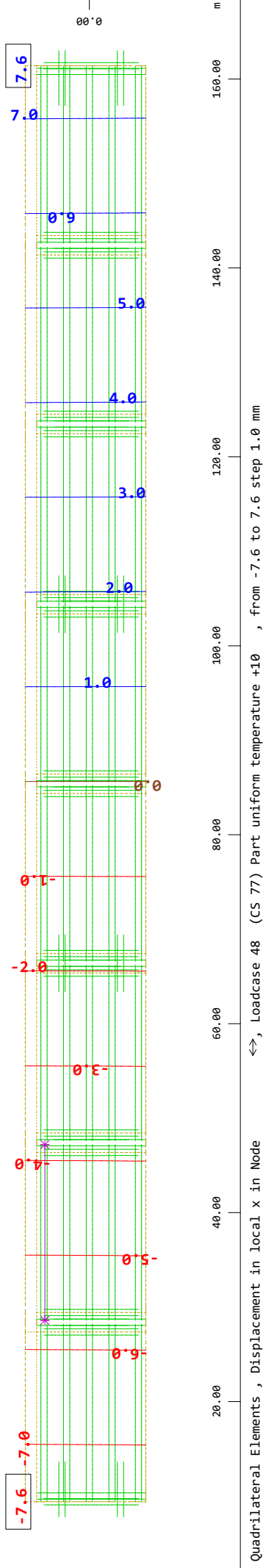
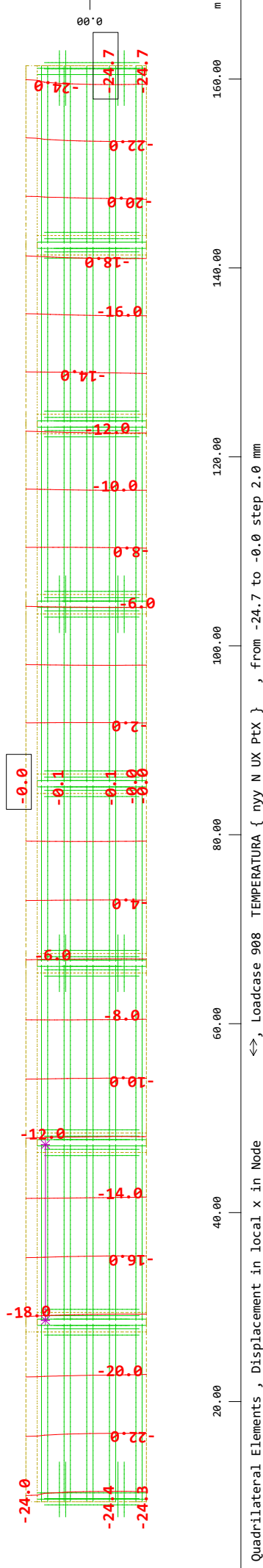
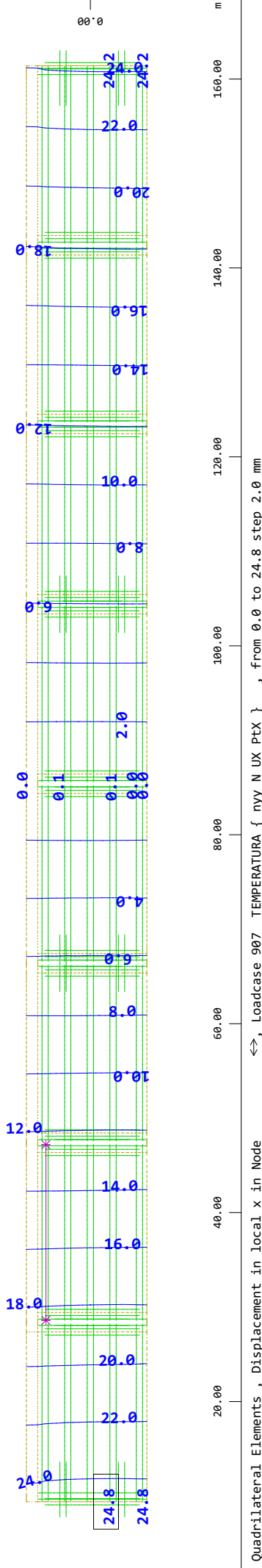
Quadrilateral Elements, Displacement in local x in Node <=>, Loadcase 5075 (CS 75) Creep t=infinite, from -7.2 to 7.1 step 1.0 mm

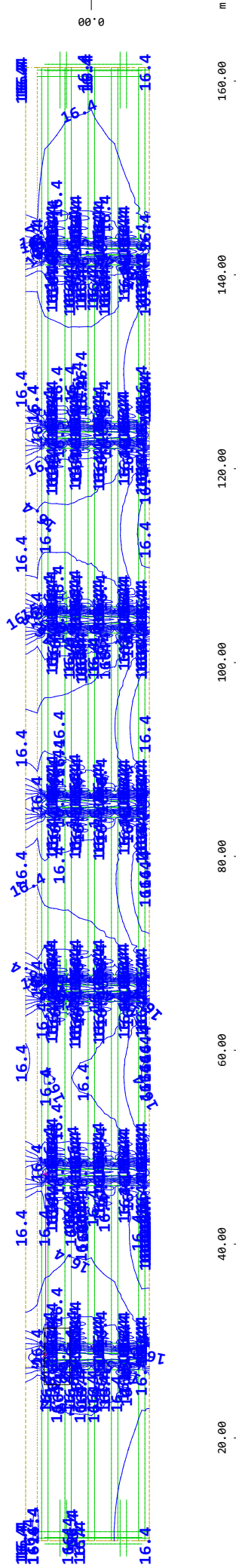


Quadrilateral Elements, Displacement in local x in Node <=>, Loadcase 5076 (CS 76) Creep t=infinite, from -0.7 to 0.7 step 0.1 mm

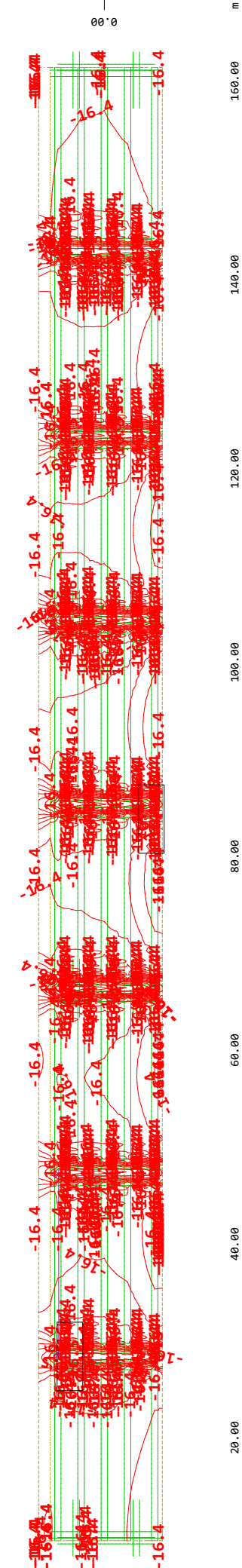


Quadrilateral Elements, Displacement in local x in Node <=>, Loadcase 5077 (CS 77) Creep t=infinite, from -0.1 to 0.1 step 0.0 mm

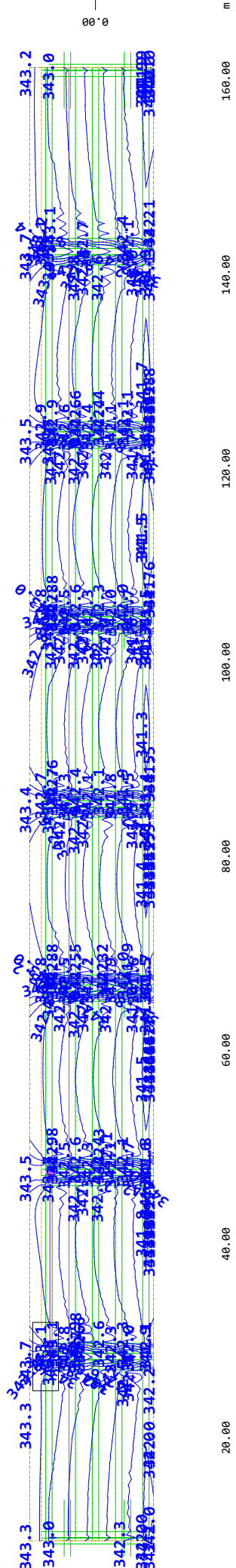




Quadrilateral Elements , Displacement in local x in Node <=> , Loadcase 967 PROMET HORIZONTALNE { nyy N UX Pt , from 16.4 to 16.5 step 0.0 mm



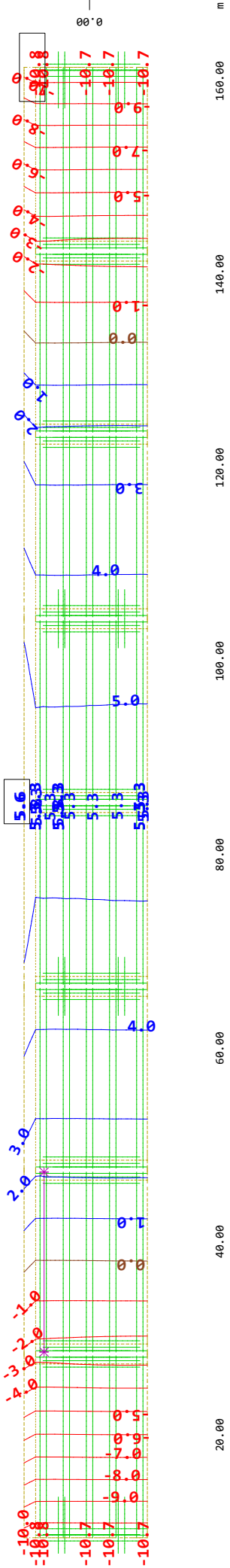
Quadrilateral Elements , Displacement in local x in Node <=> , Loadcase 968 PROMET HORIZONTALNE { nyy N UX Pt , from -16.5 to -16.4 step 0.0 mm



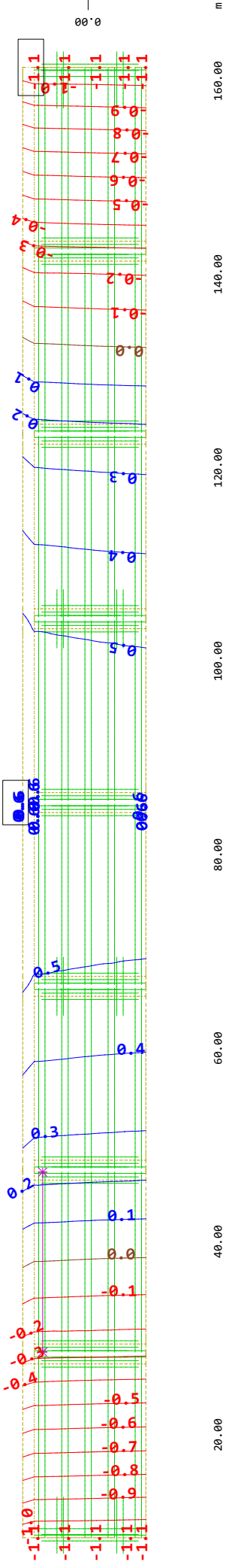
Quadrilateral Elements , Displacement in local x in Node <=> , Loadcase 8001 MAX U (X , Y , Z) , from 341.3 to 343.8 step 0.2 mm

Nadvoz Barjanska rekonstruiran v1

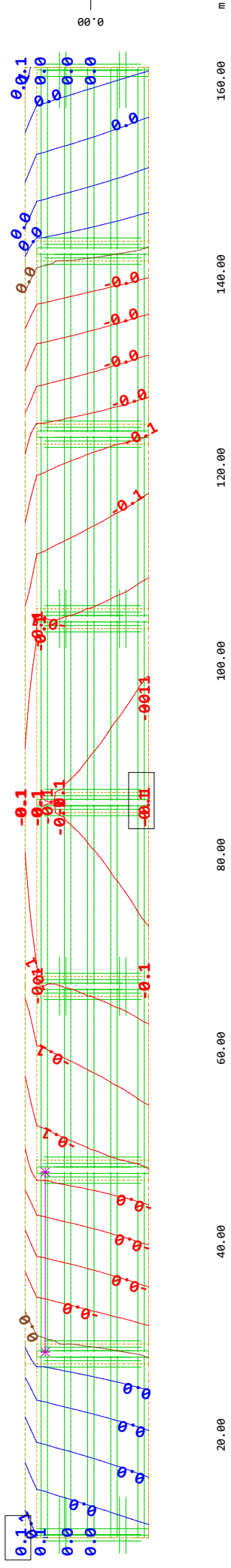
Vzdolžni pomiki PLOŠČE - PROMET, POTRES



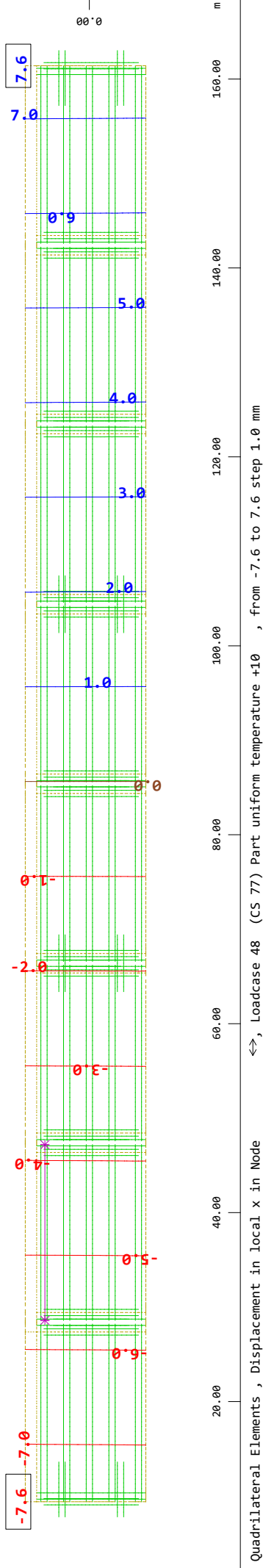
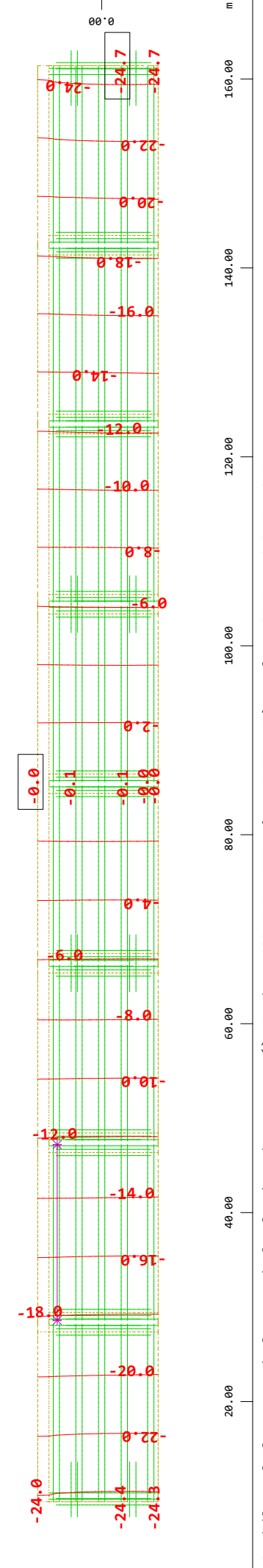
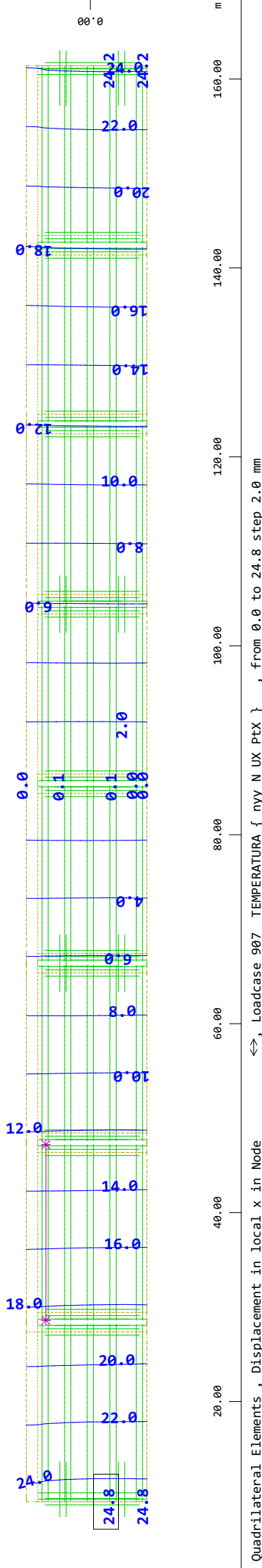
Quadrilateral Elements , Displacement in local y in Node ↕ , Loadcase 5075 (CS 75) Creep t=infinite , from -10.8 to 5.6 step 1.0 mm

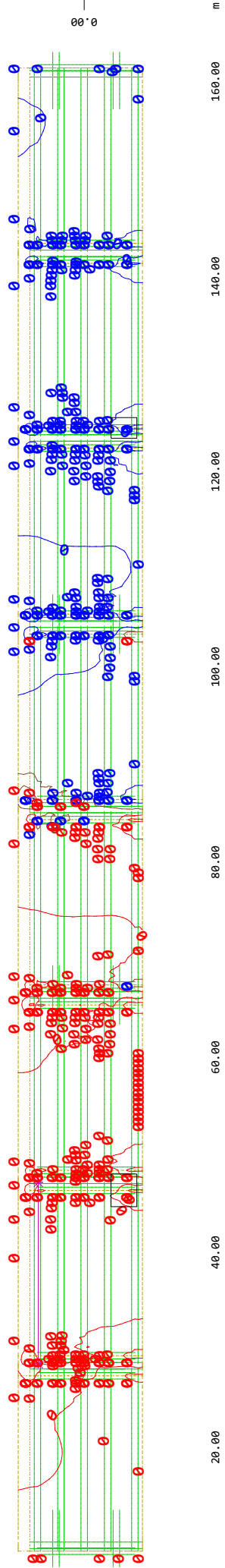


Quadrilateral Elements , Displacement in local y in Node ↕ , Loadcase 5076 (CS 76) Creep t=infinite , from -1.1 to 0.6 step 0.1 mm

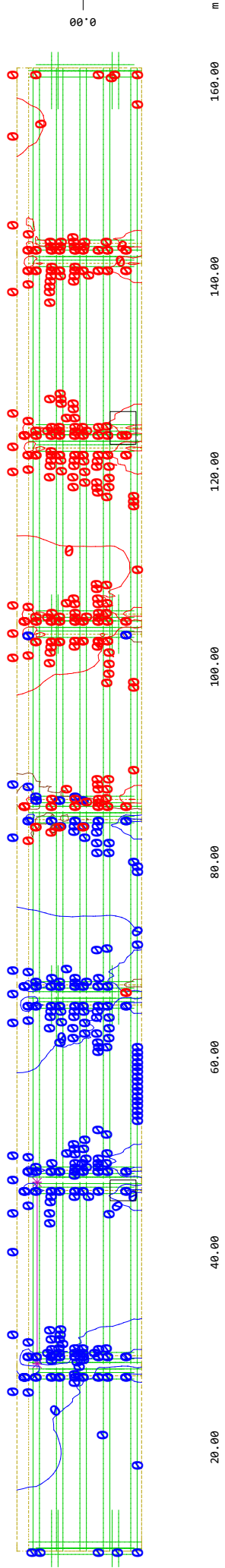


Quadrilateral Elements , Displacement in local y in Node ↕ , Loadcase 5077 (CS 77) Creep t=infinite , from -0.1 to 0.1 step 0.0 mm

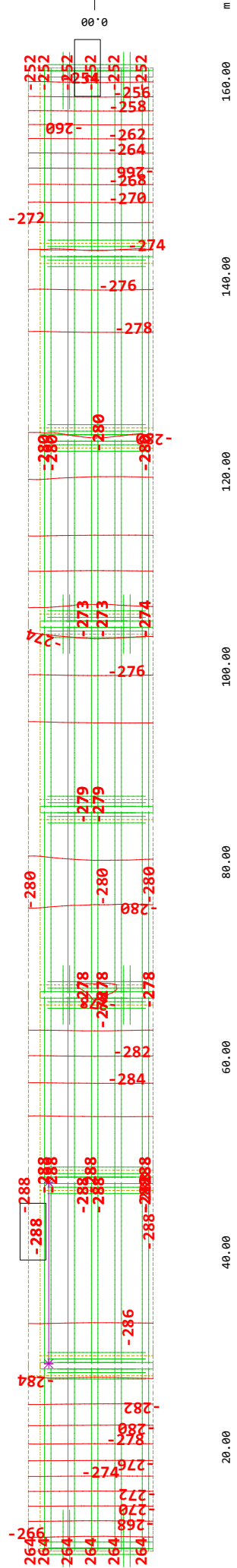




Quadrilateral Elements , Displacement in local y in Node ↕ , Loadcase 967 PROMET HORIZONTALNE { nyy N UX Pt , from 0 to 0 step 0 mm



Quadrilateral Elements , Displacement in local y in Node ↕ , Loadcase 968 PROMET HORIZONTALNE { nyy N UX Pt , from 0 to 0 step 0 mm



Quadrilateral Elements , Displacement in local y in Node ↕ , Loadcase 8001 MAX U (X , Y , Z) , from -288 to -252 step 2 mm

Nadvoz Barjanska rekonstruiran v1
Prečni pomiki PLOŠČE - PROMET, POTRES

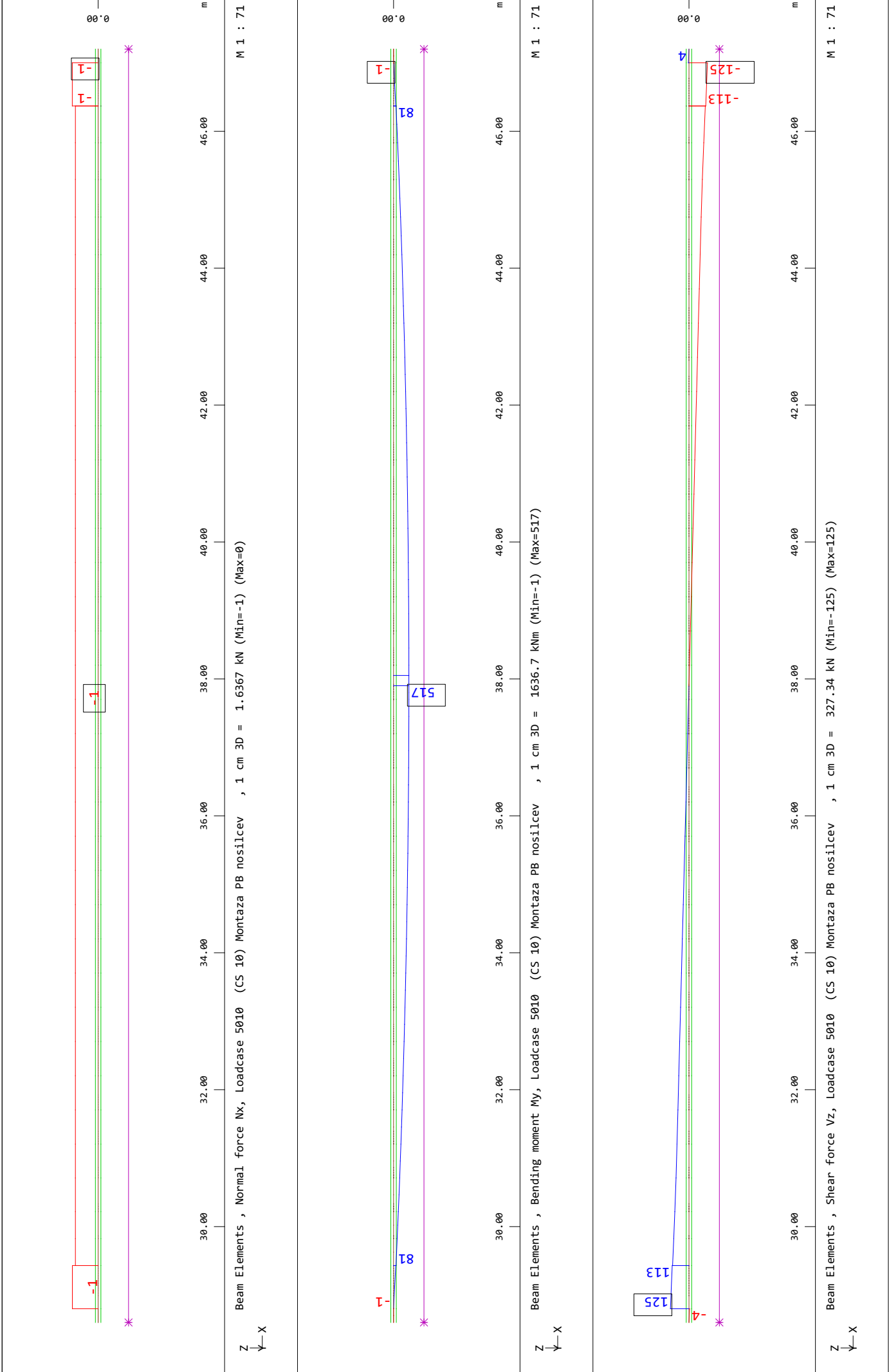
3.1.3 NOTRANJE SILE

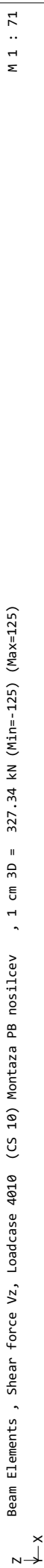
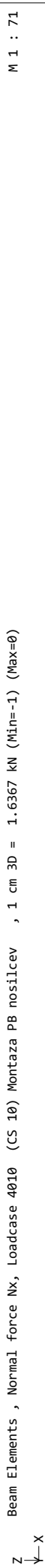
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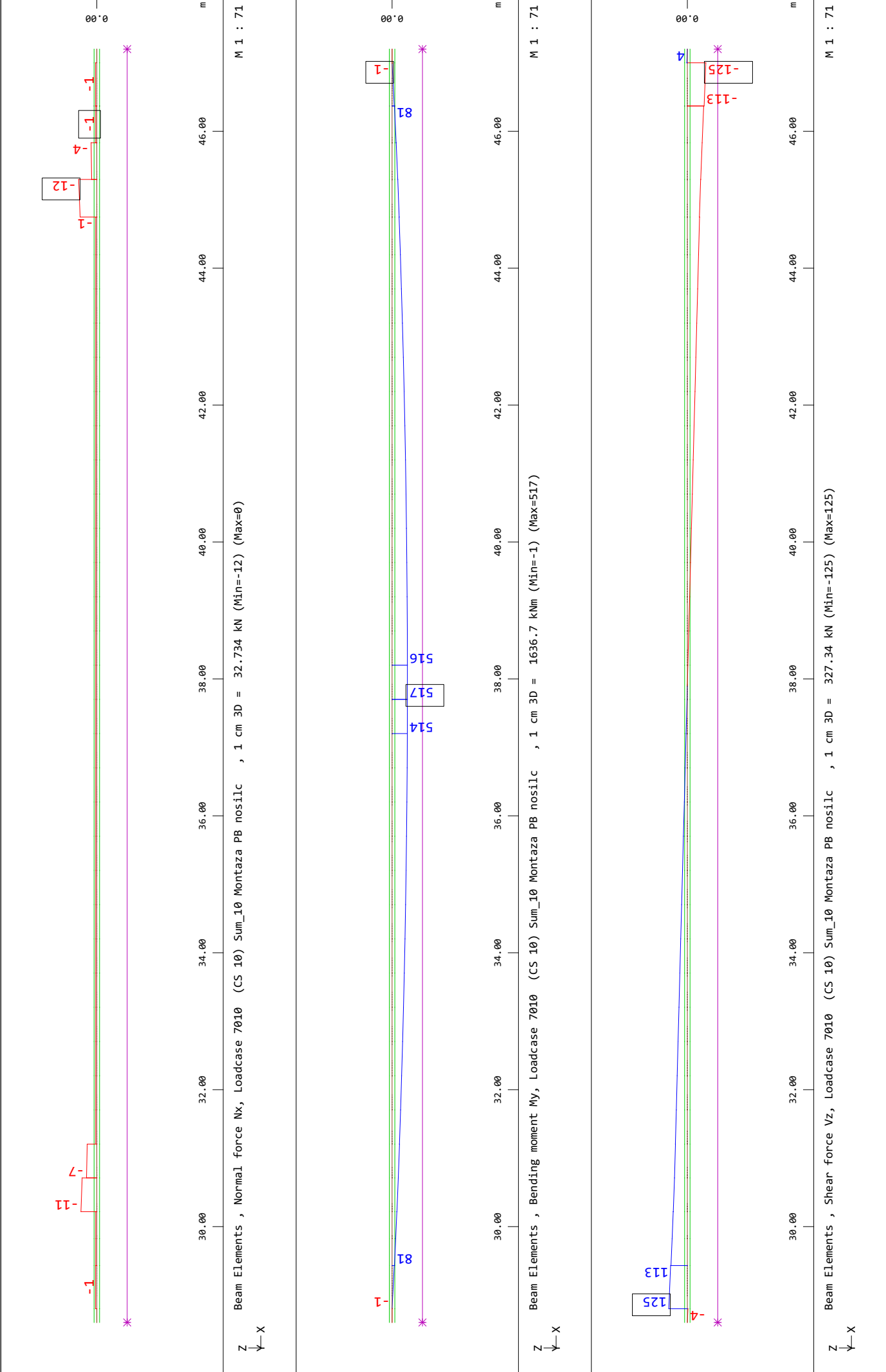
3.1.3 NOTRANJE SILE - PREKLADNA

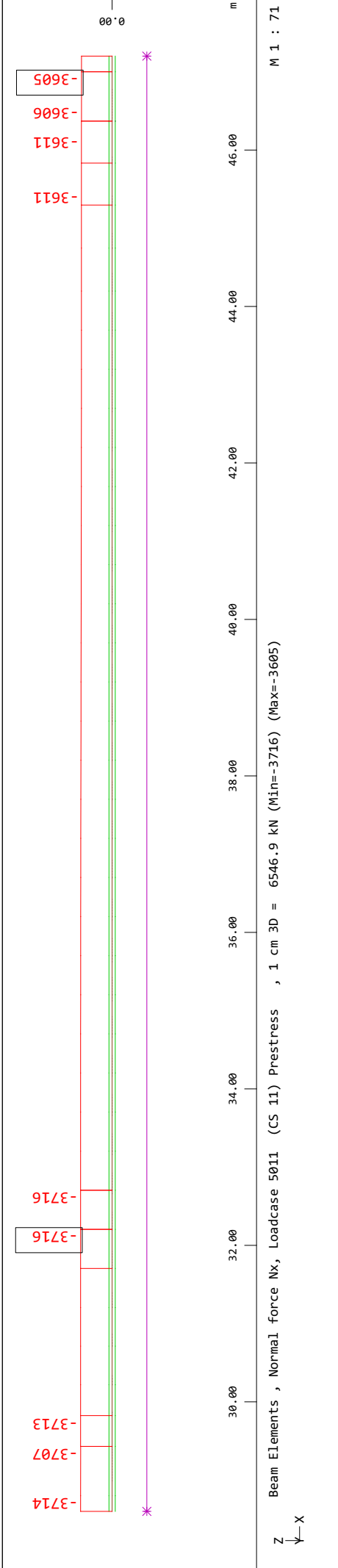
Interactive Graphics

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| Beam Elements , Normal force Nx LC: 4010 | Page 3 |
| Beam Elements , Normal force Nx LC: 7010 | Page 4 |
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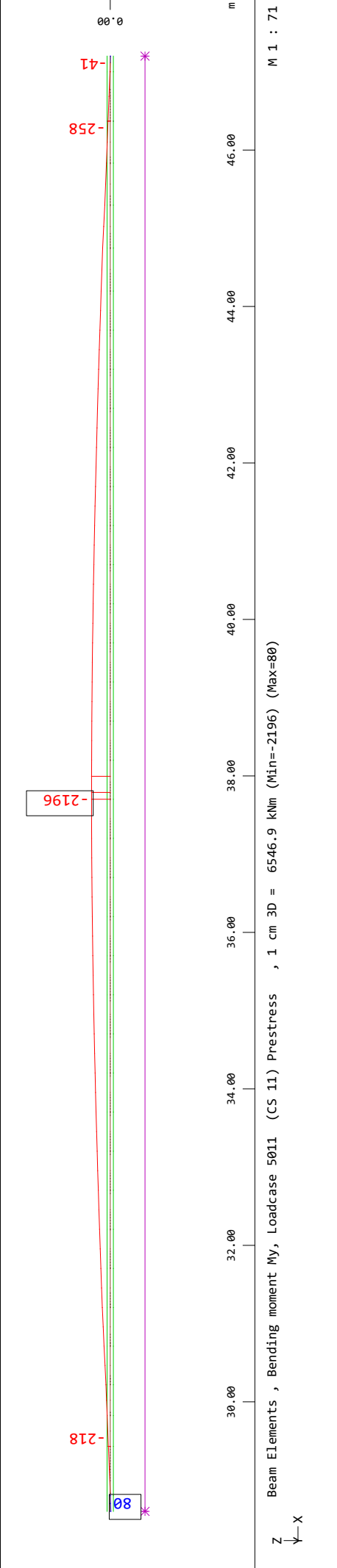




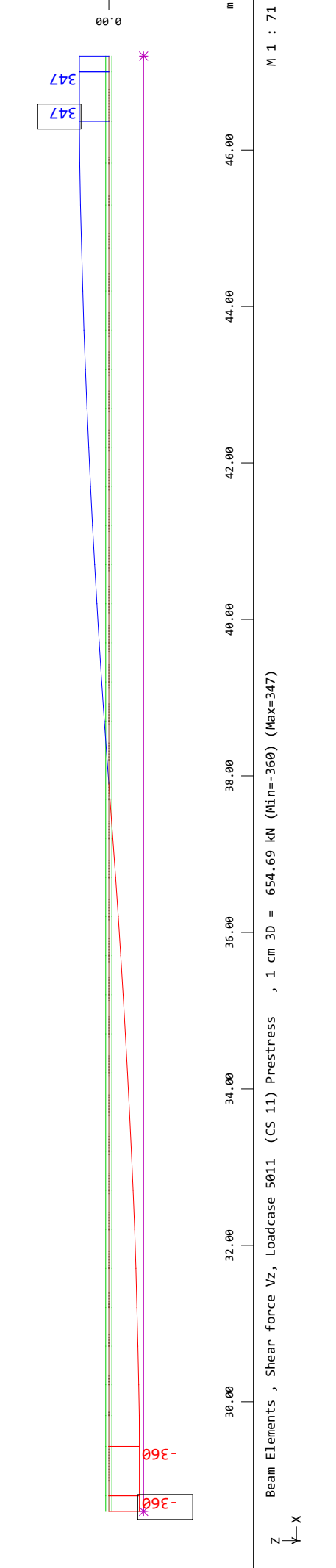


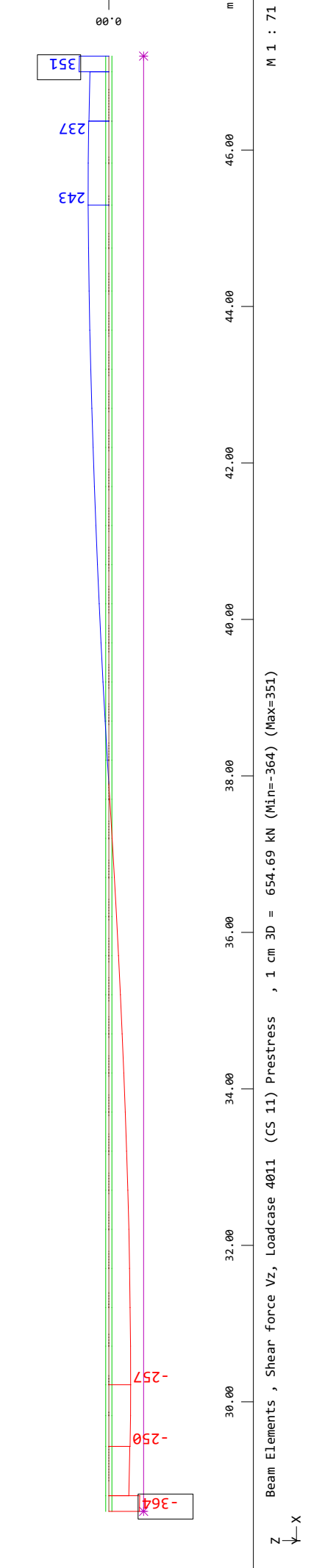
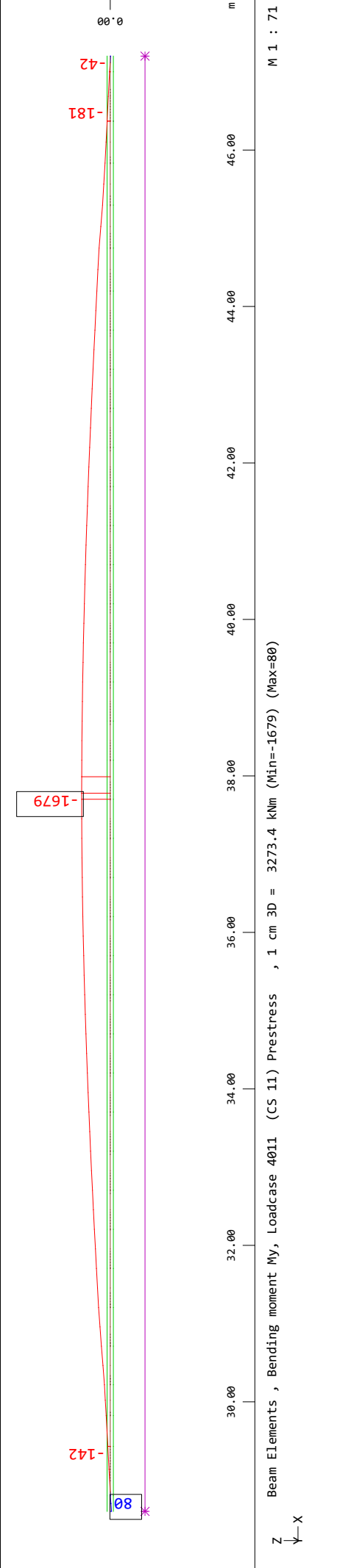
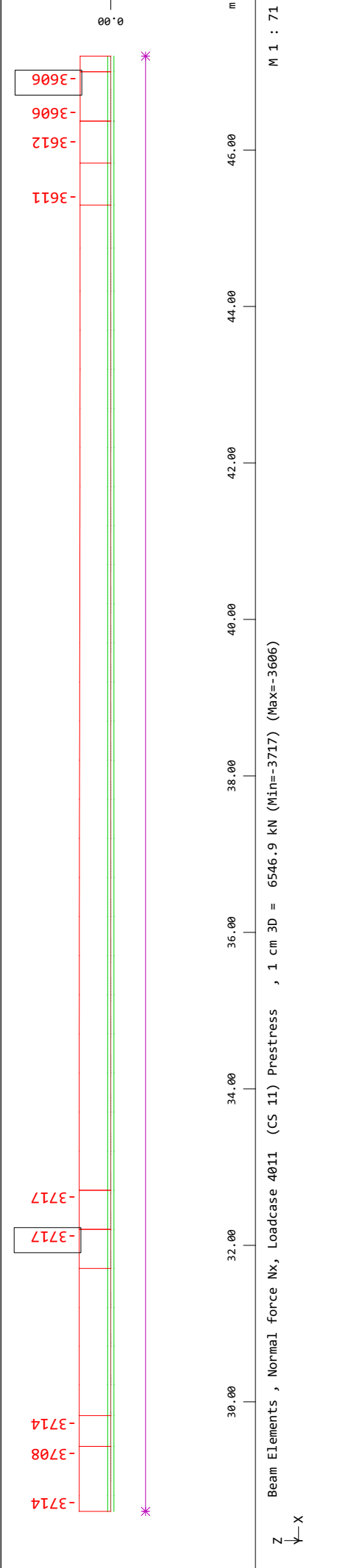


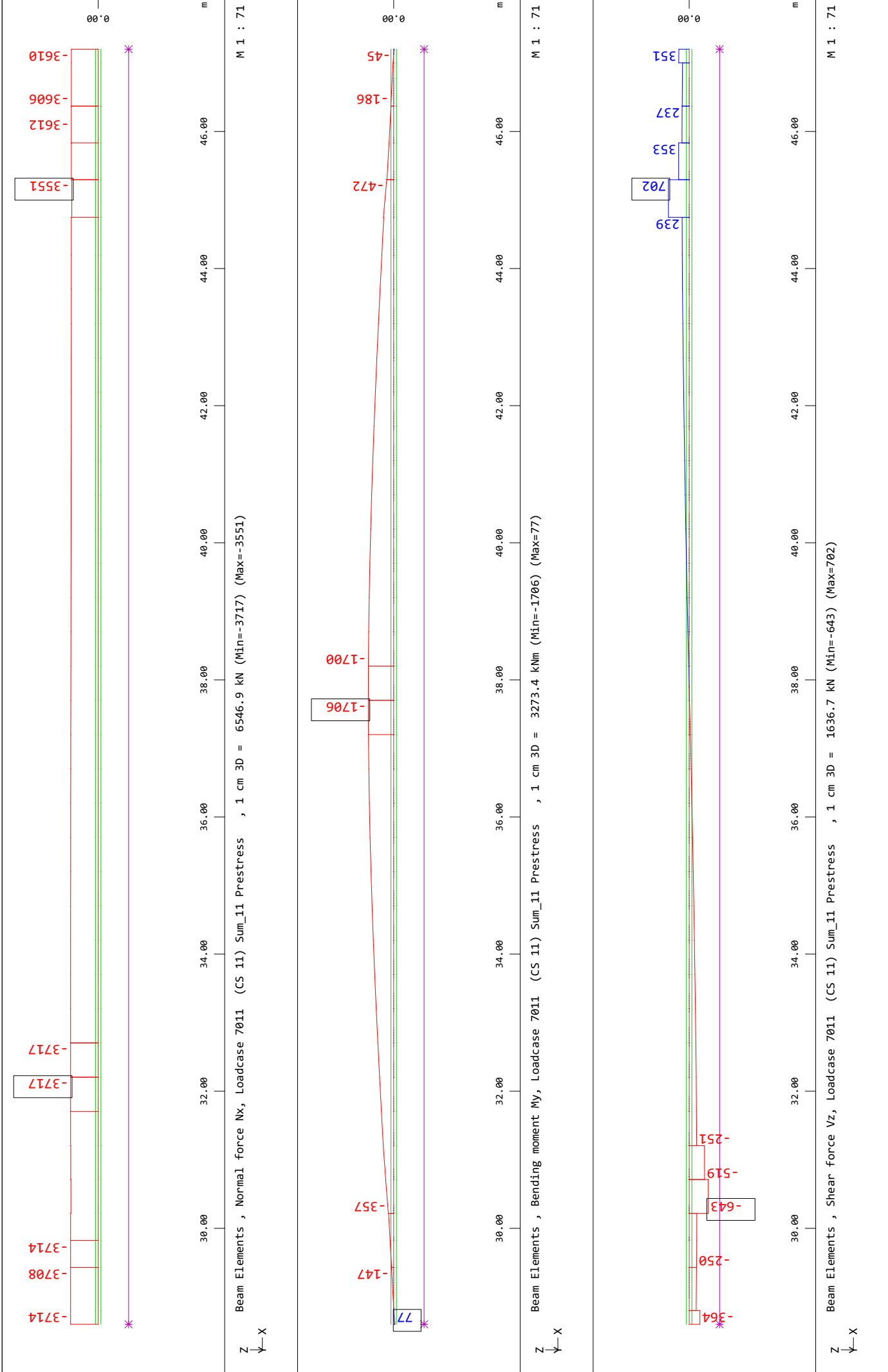
Nadvoz čez AC A1 na Barjanski cesti

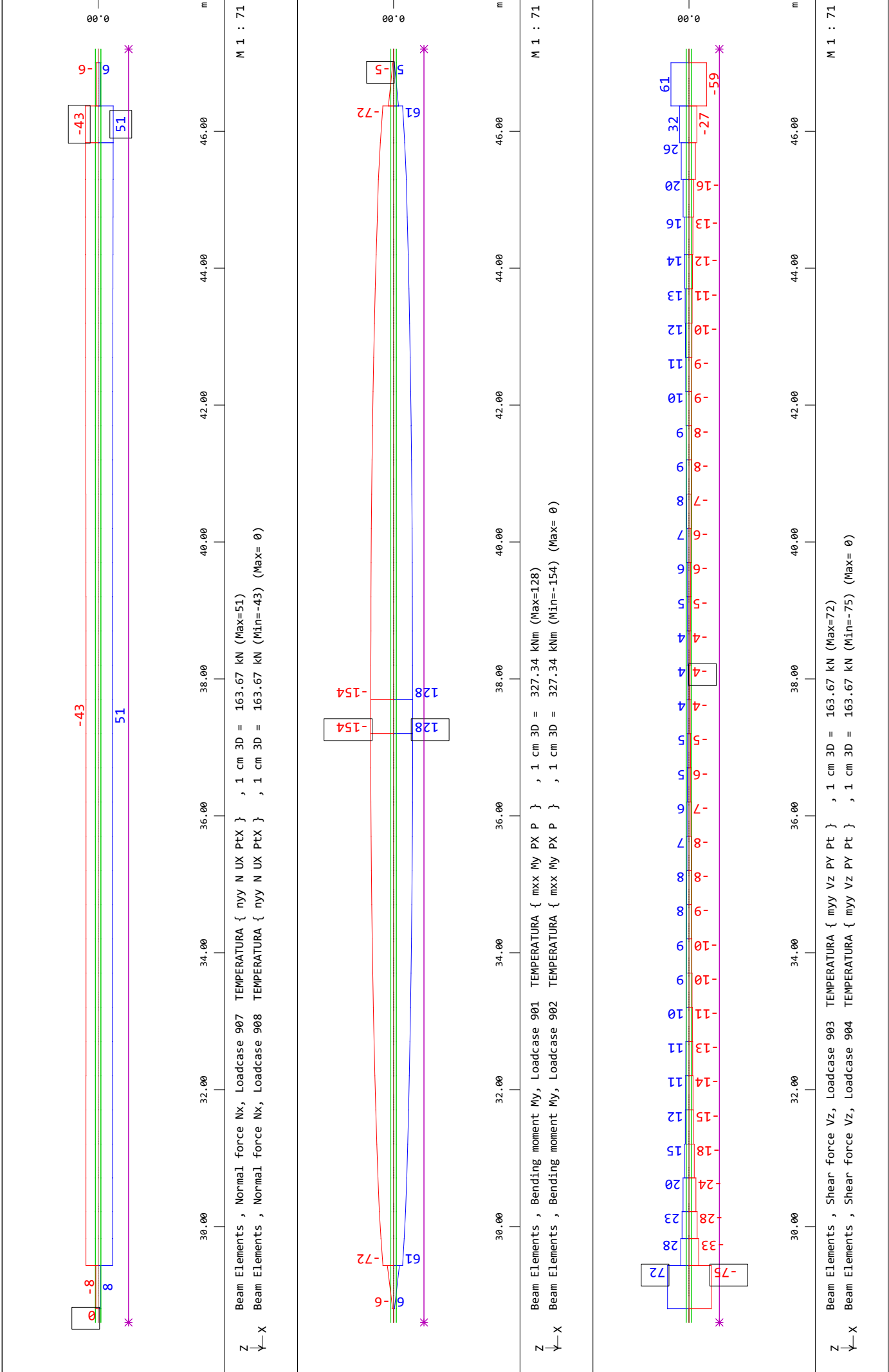


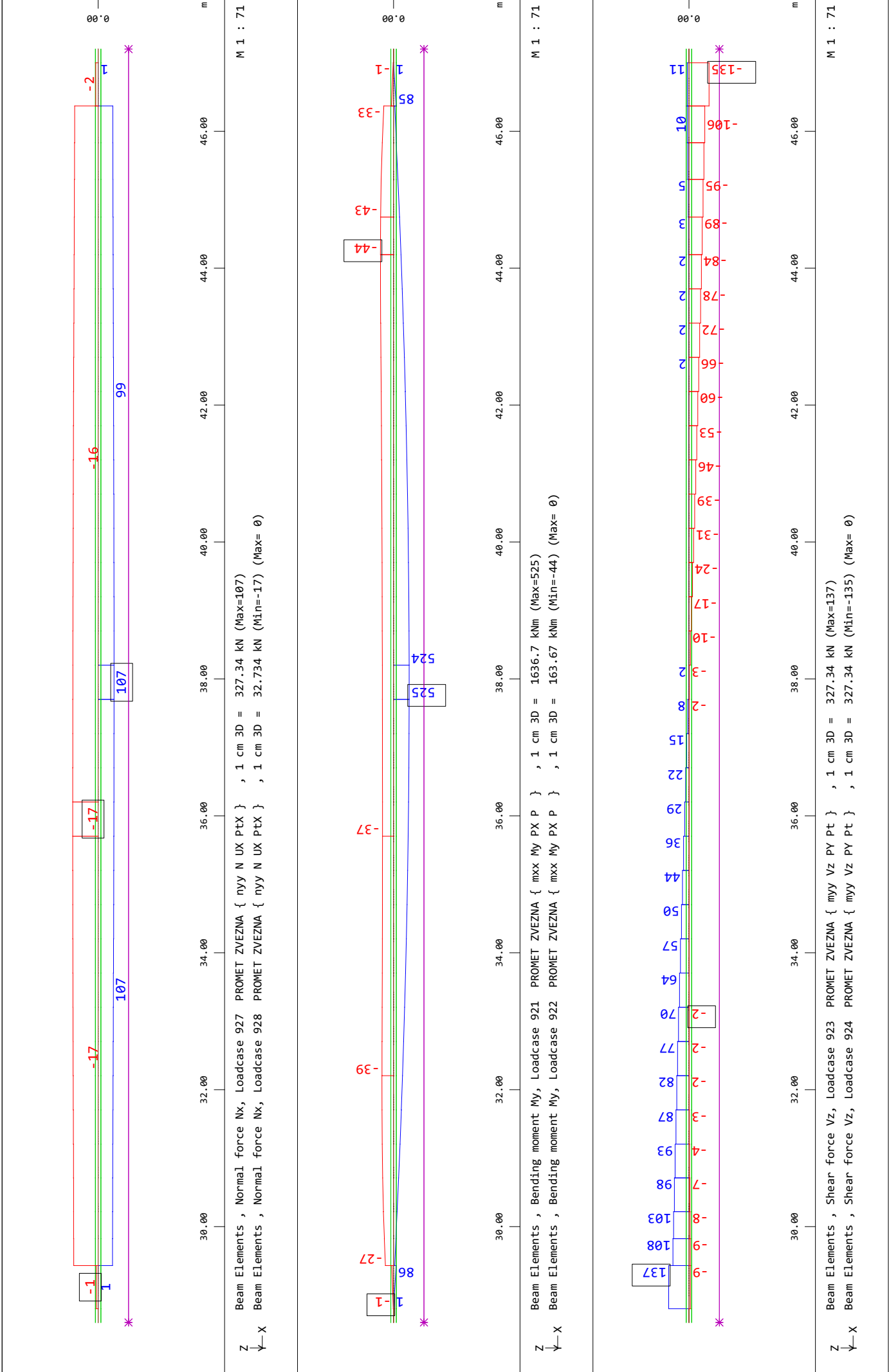
Rekonstrukcija - Račun konstrukcije

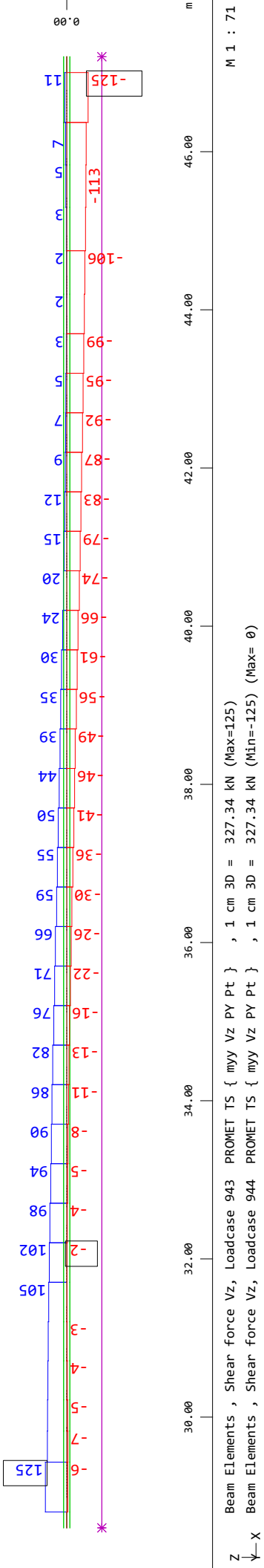
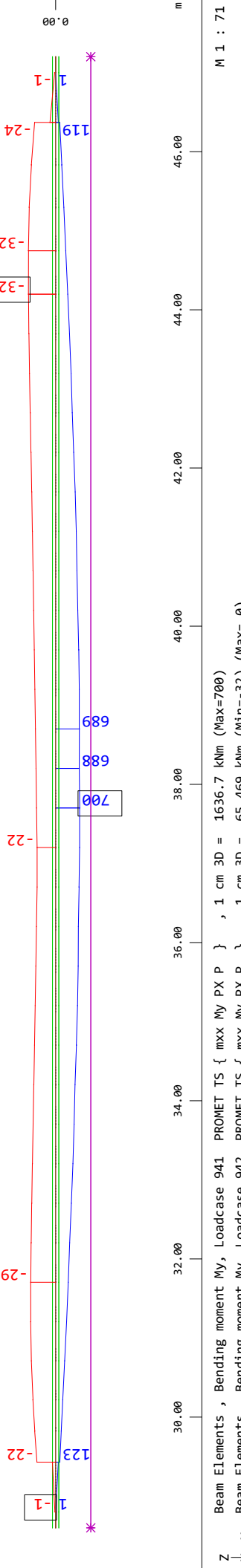
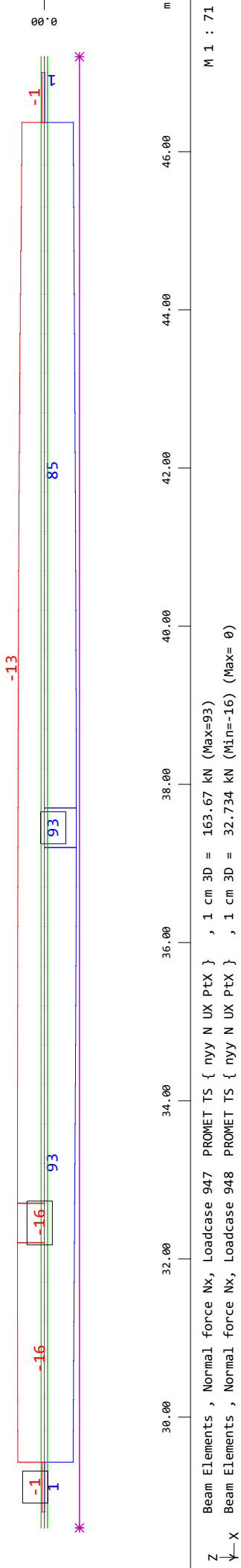


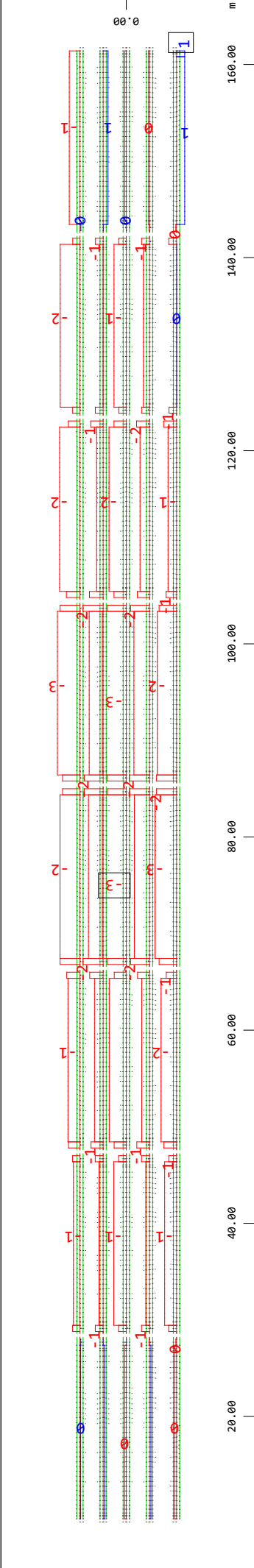




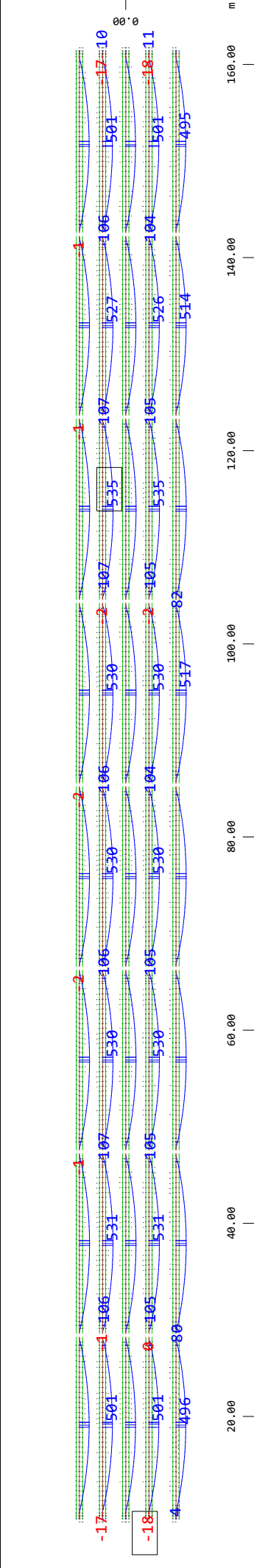




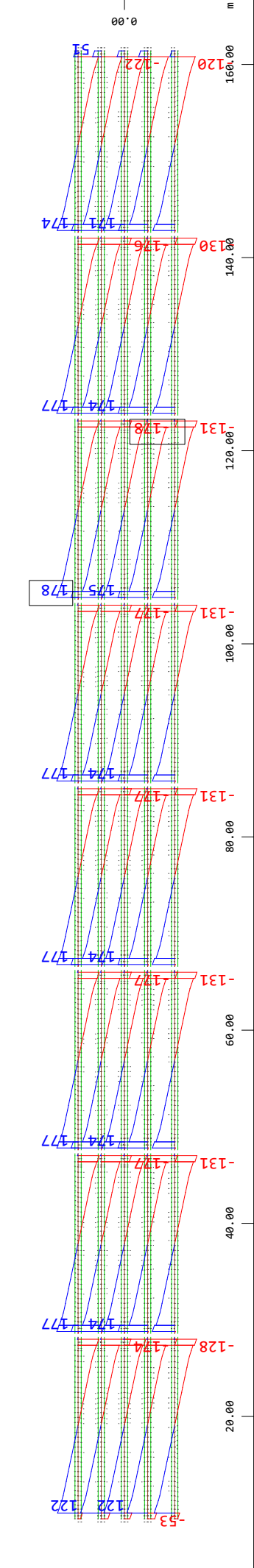




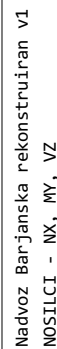
Beam Elements , Normal force Nx, Loadcase 5010 (CS 10) Montaza PB nosilcev , 1 cm 3D = 6.5469 kN (Min=-3) (Max=1)

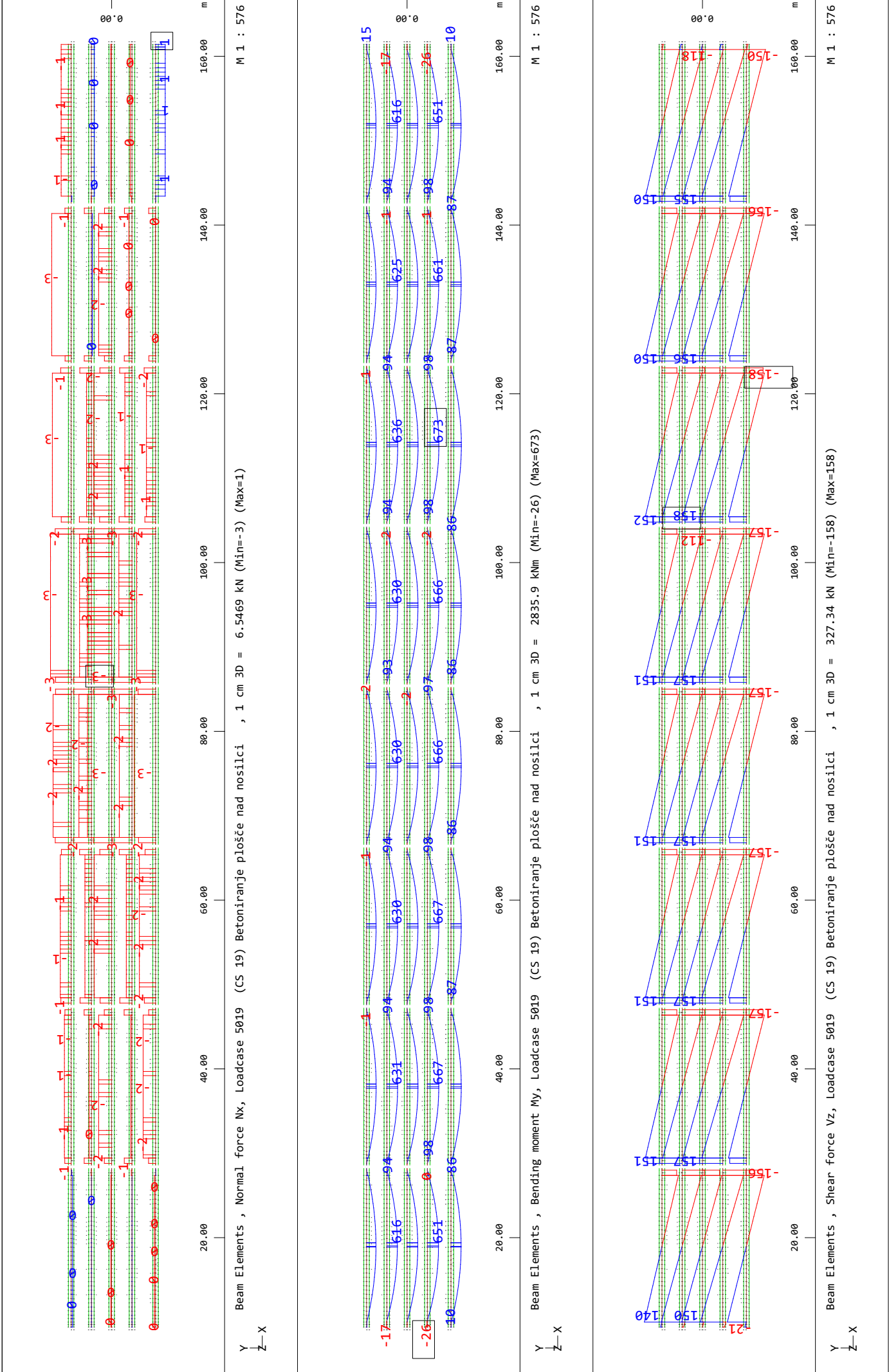


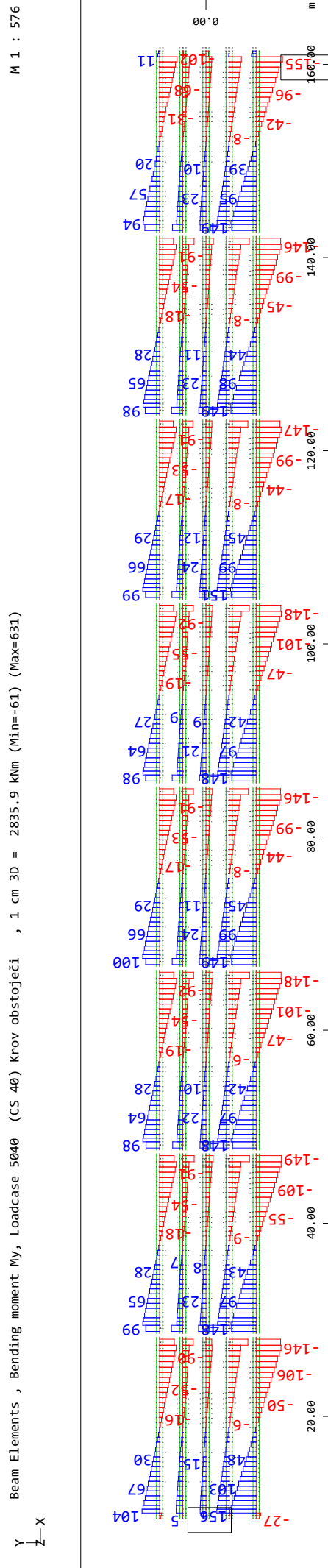
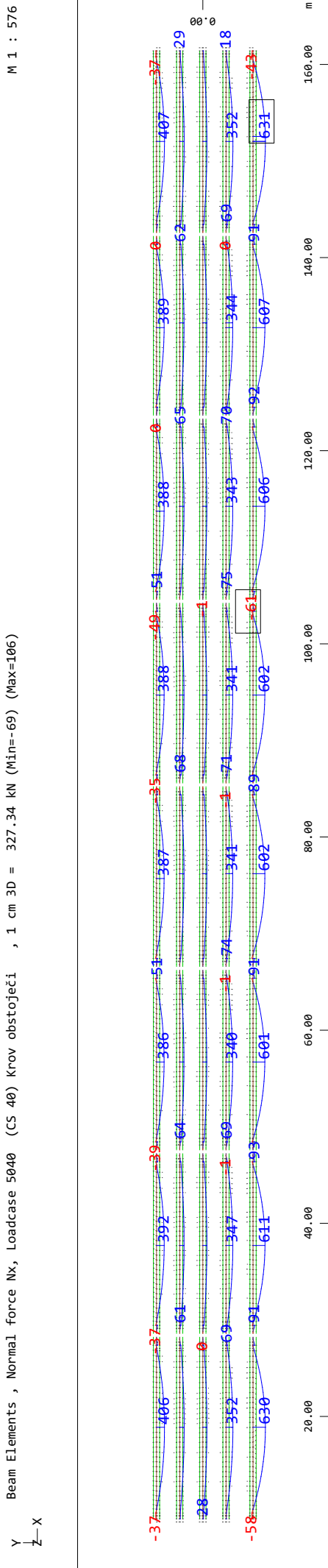
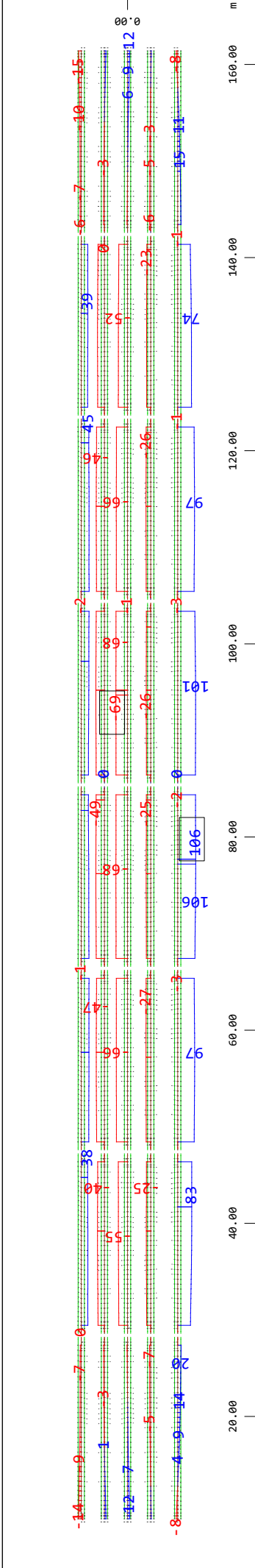
Beam Elements , Bending moment My, Loadcase 5010 (CS 10) Montaza PB nosilcev , 1 cm 3D = 2835.9 kNm (Min=-18) (Max=535)

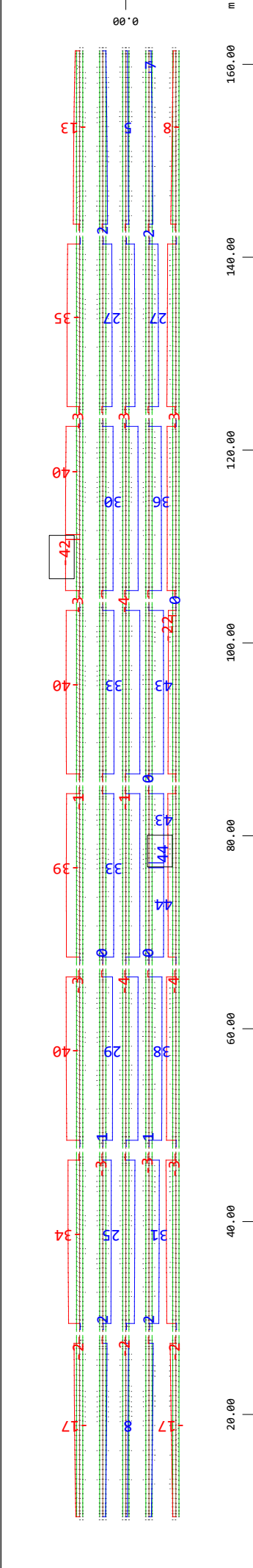


Beam Elements , Shear force Vz, Loadcase 5010 (CS 10) Montaza PB nosilcev , 1 cm 3D = 327.34 kN (Min=-178) (Max=178)

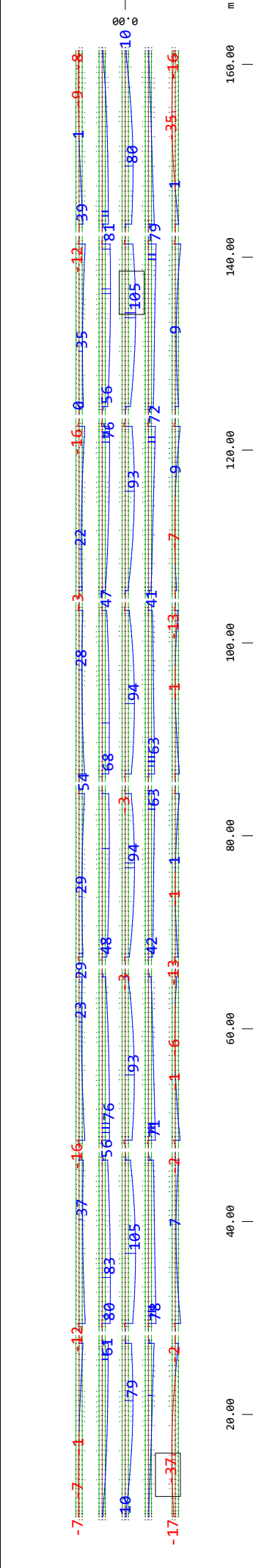




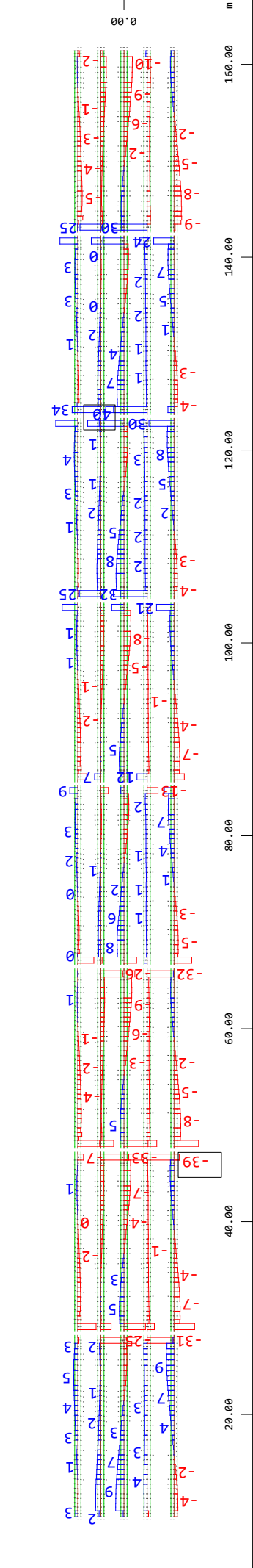




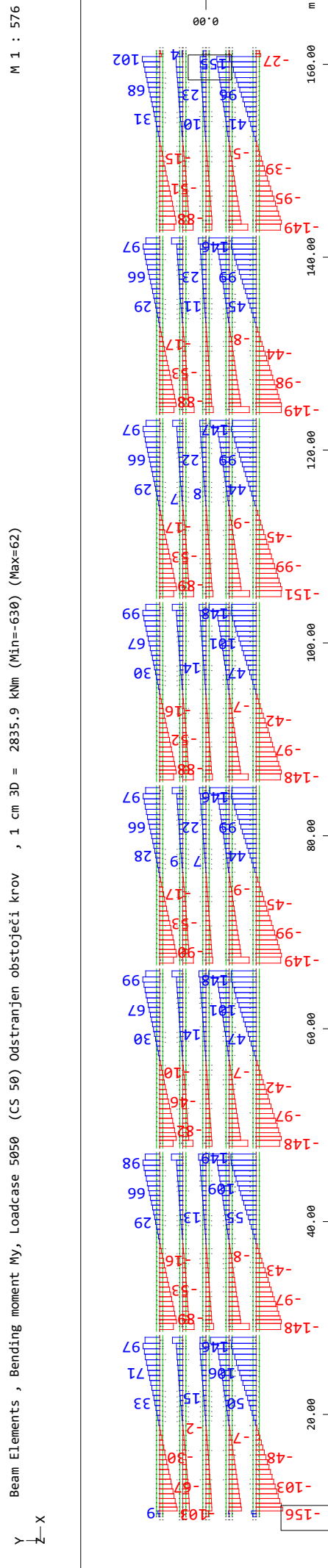
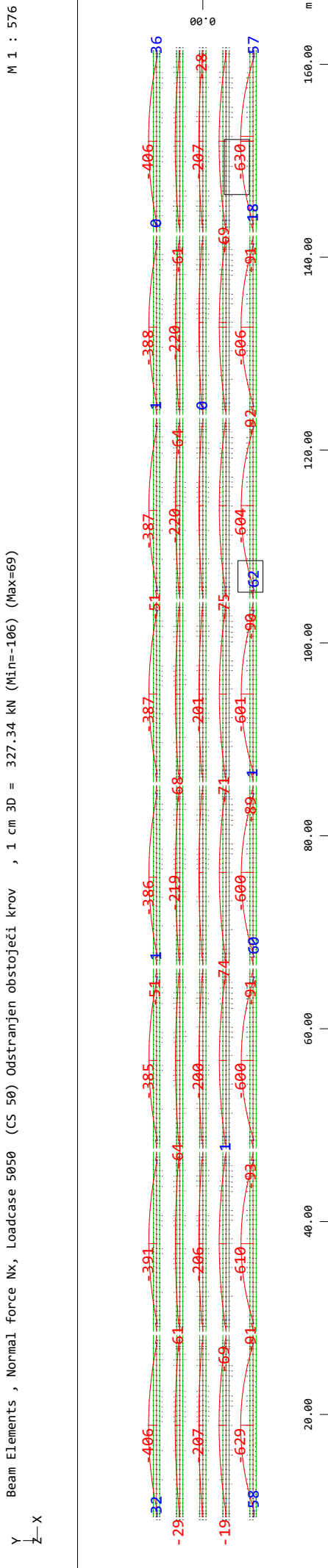
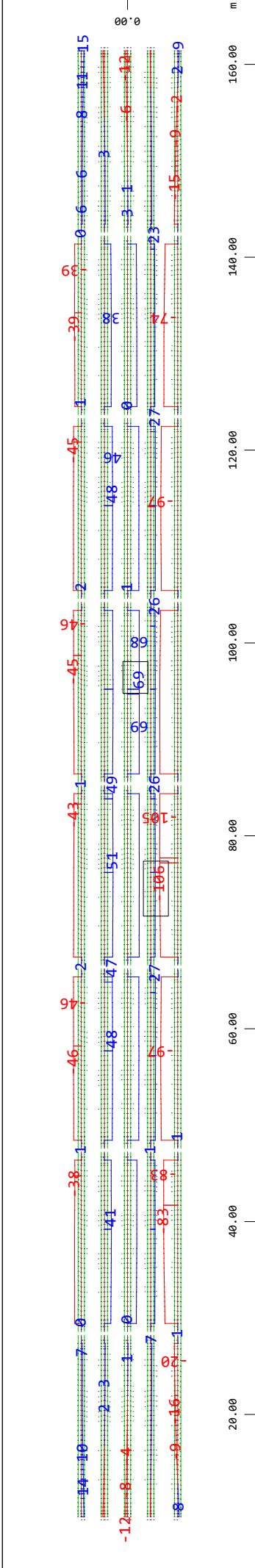
Y
Z-X

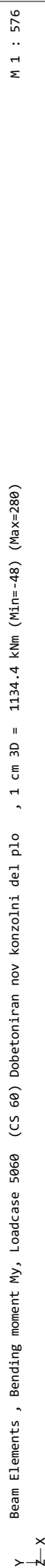


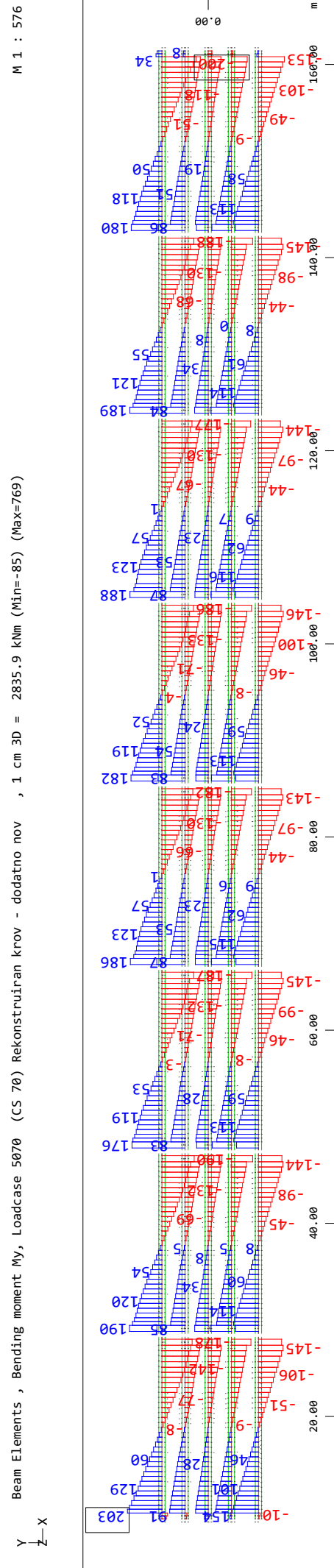
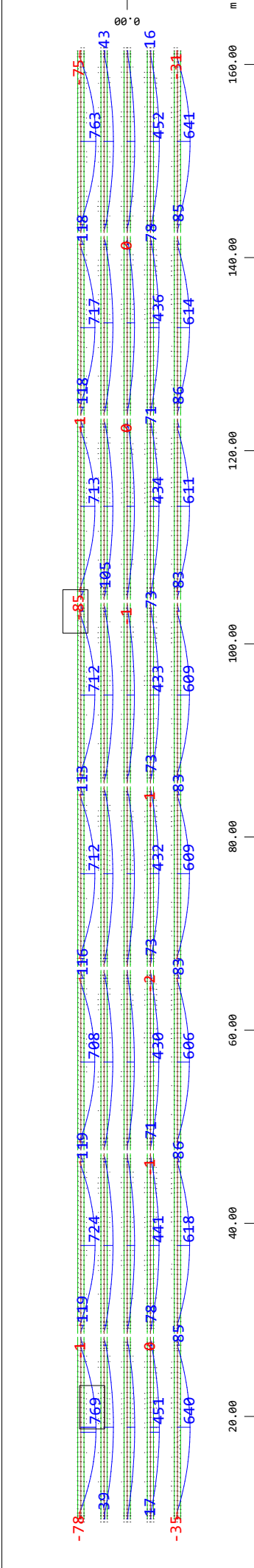
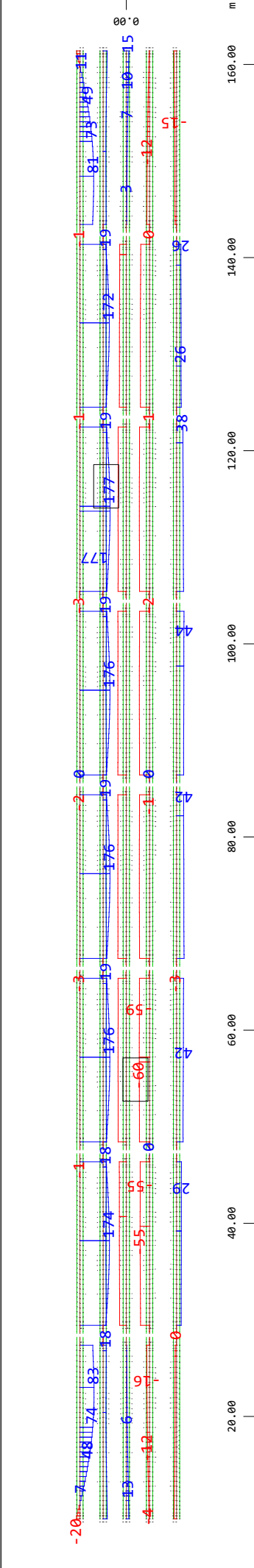
Y
Z-X



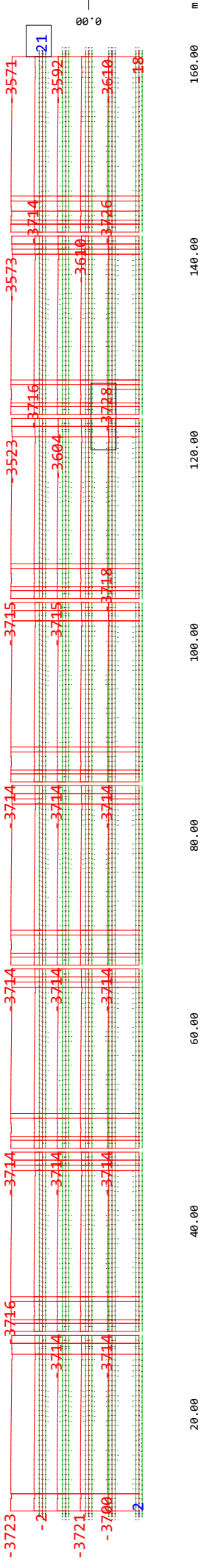
Y
Z-X



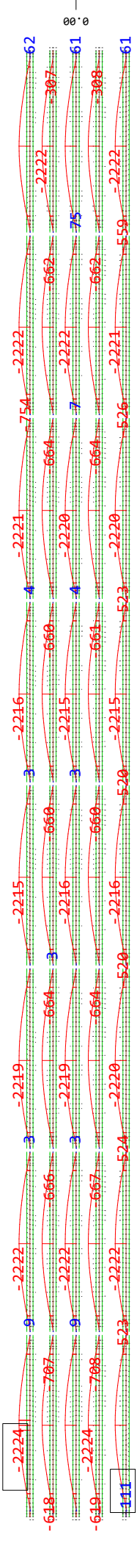




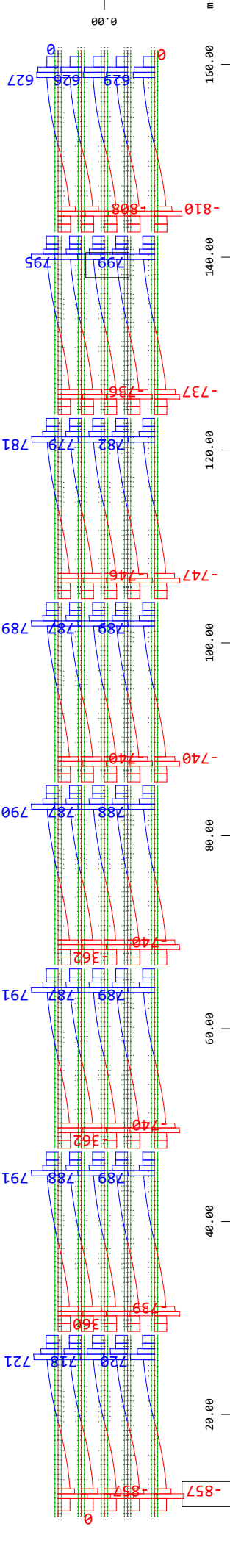




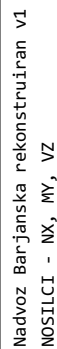
Y Z-X
M 1 : 576

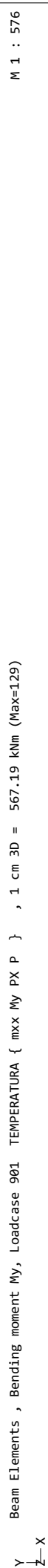


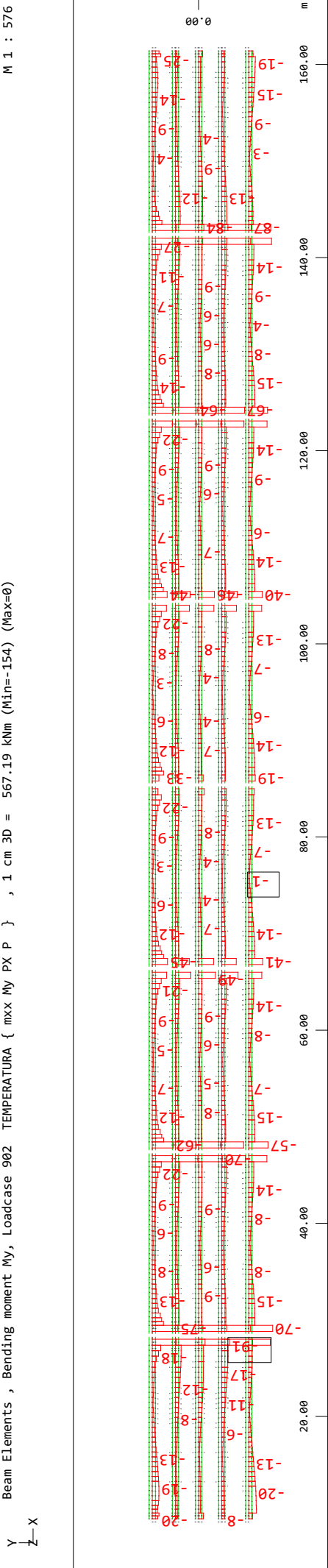
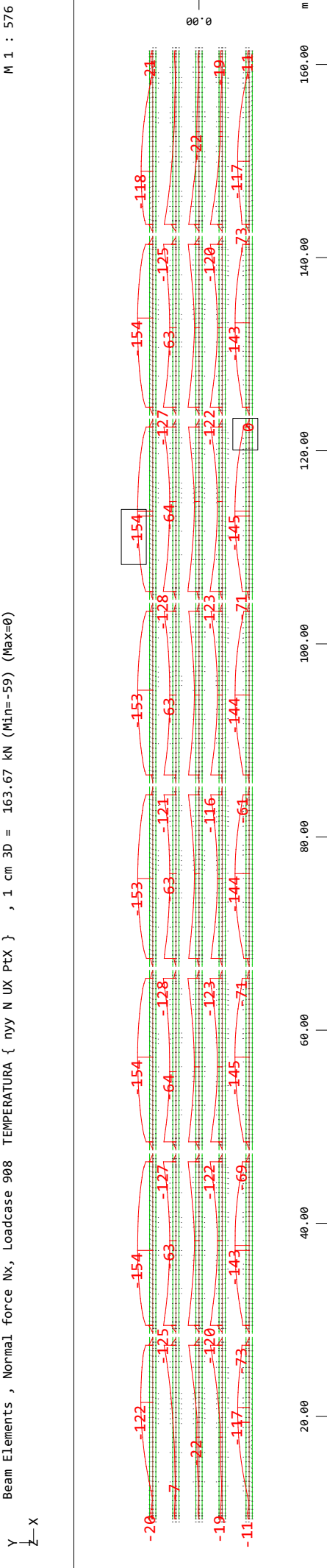
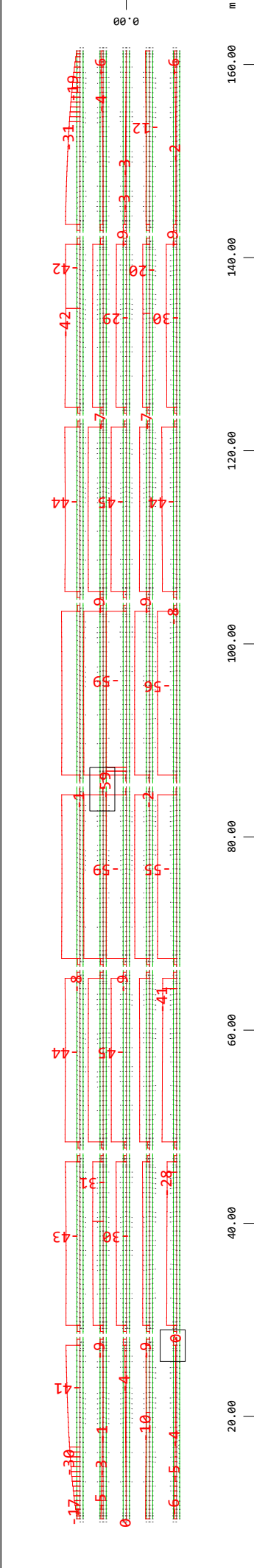
Y Z-X
M 1 : 576

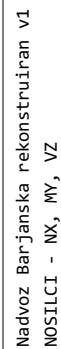
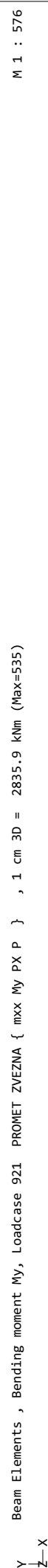
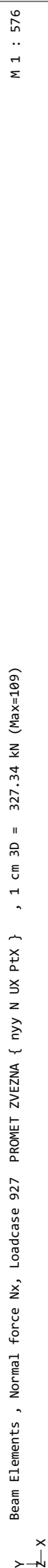


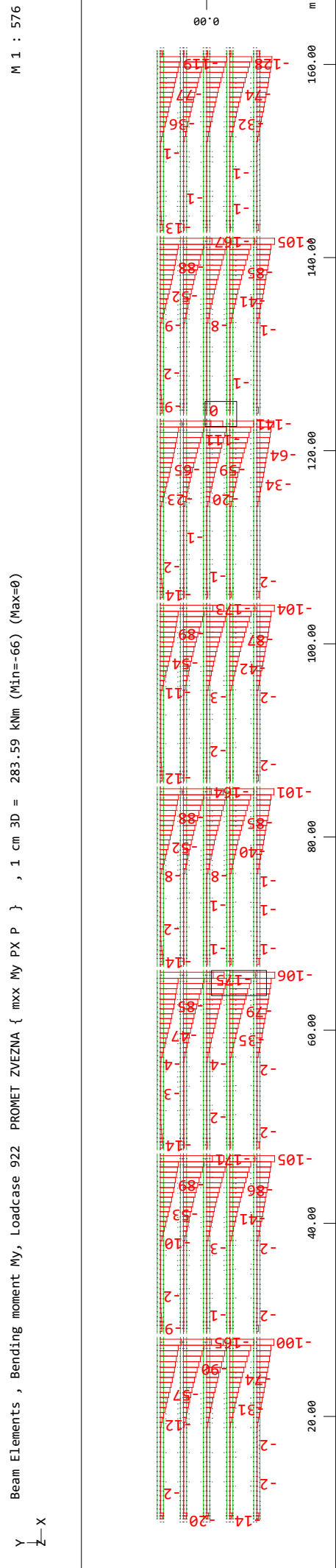
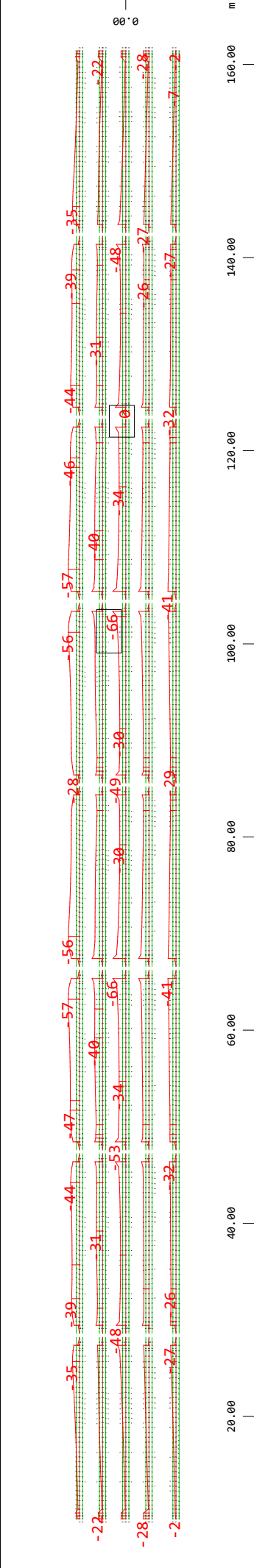
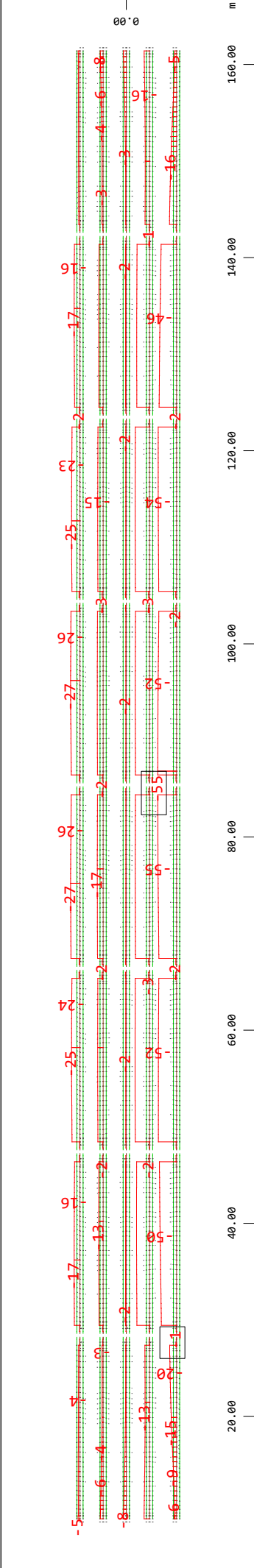
Y Z-X
M 1 : 576

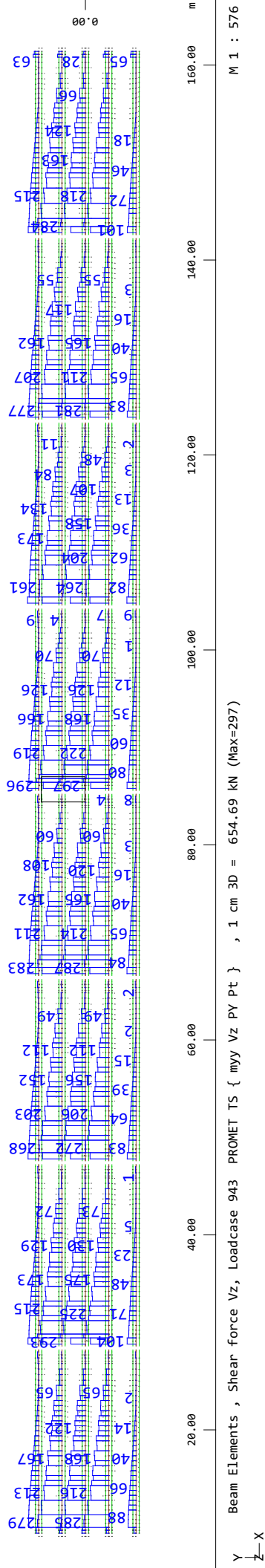
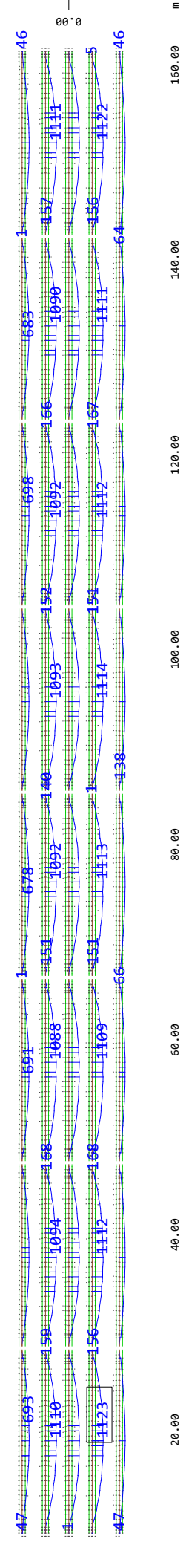
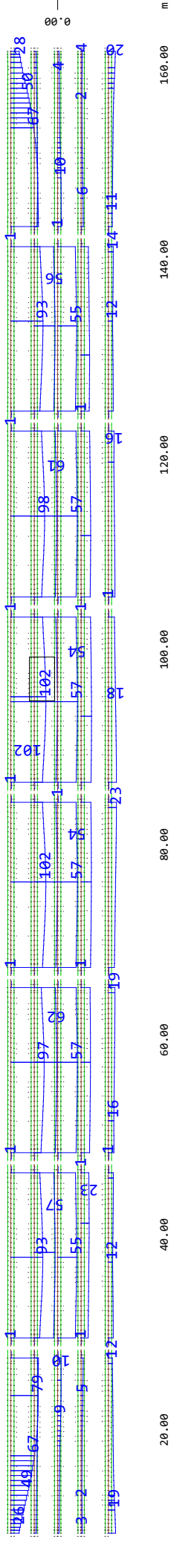


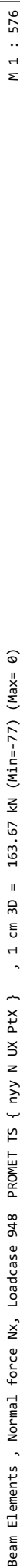


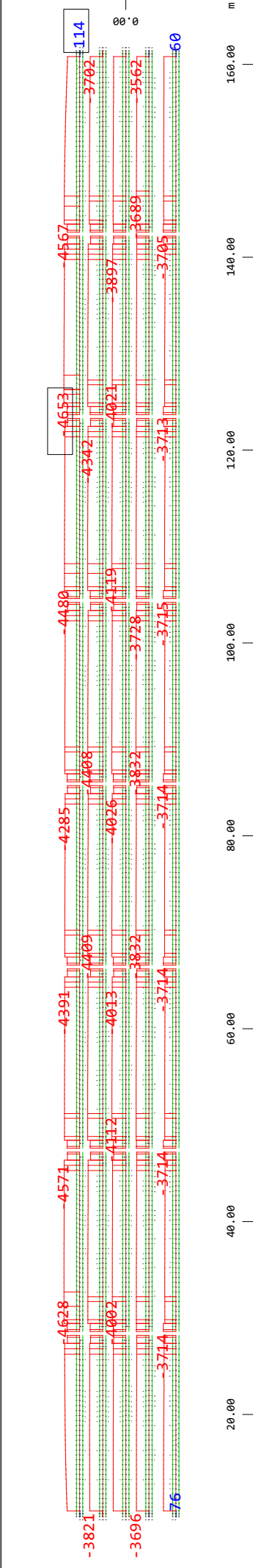


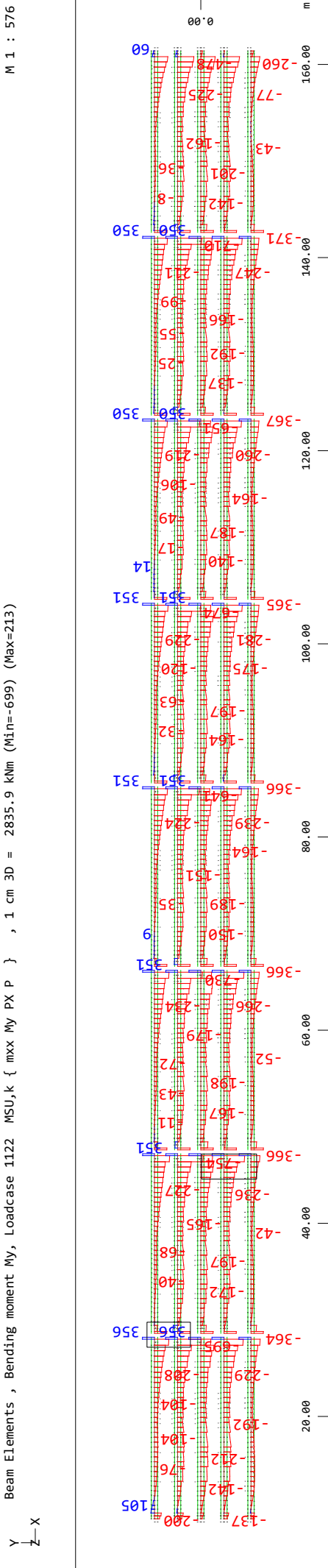
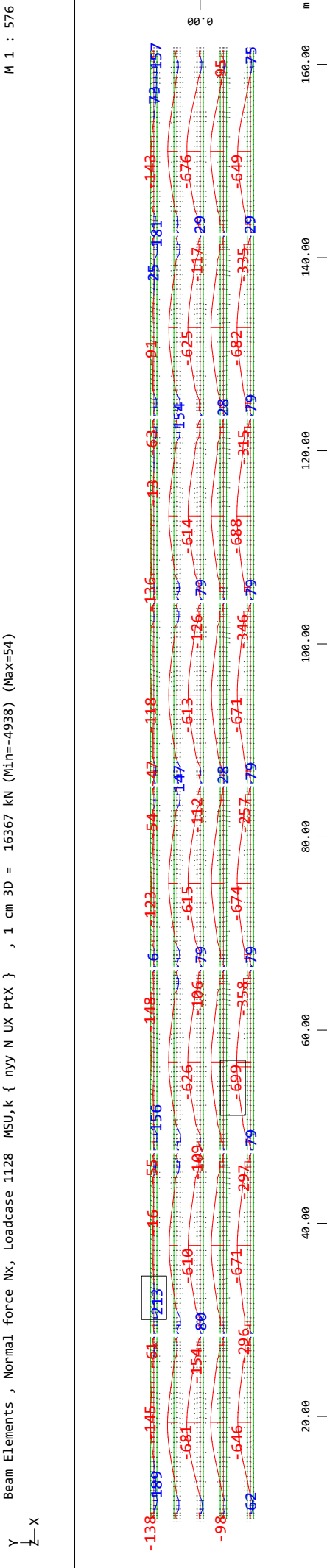
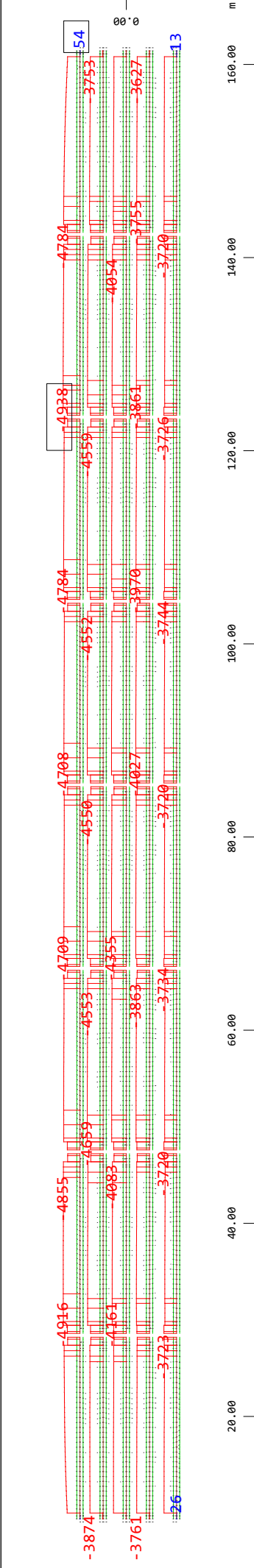


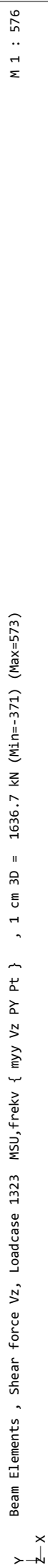
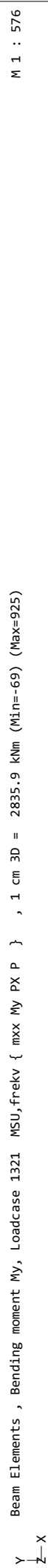
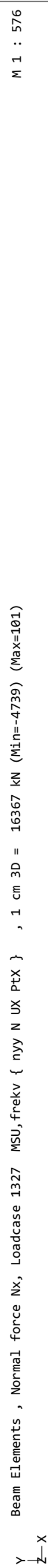


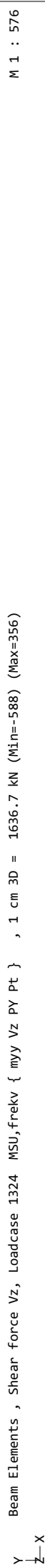
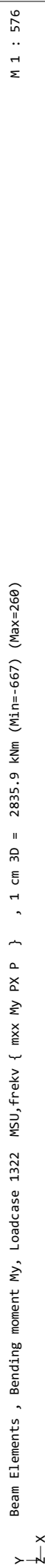
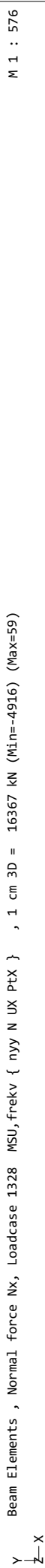


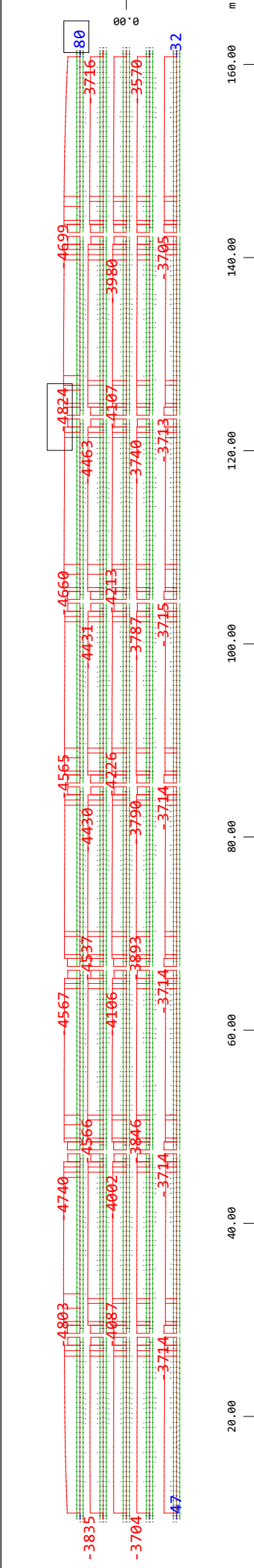




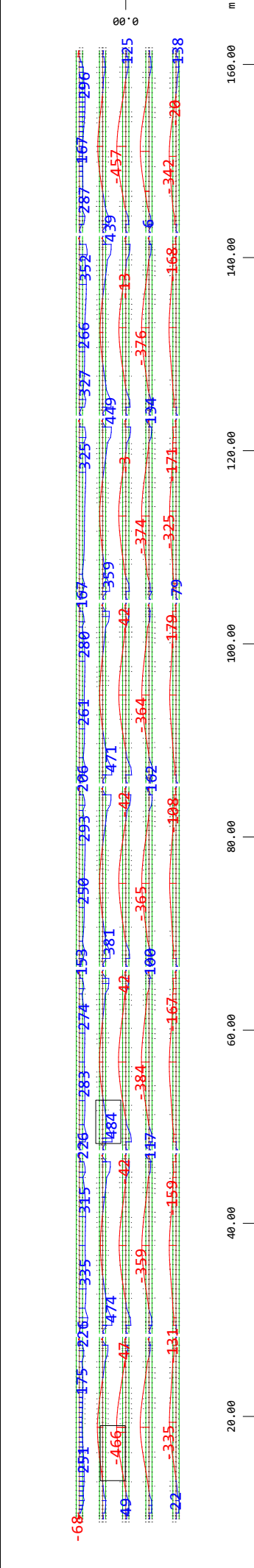




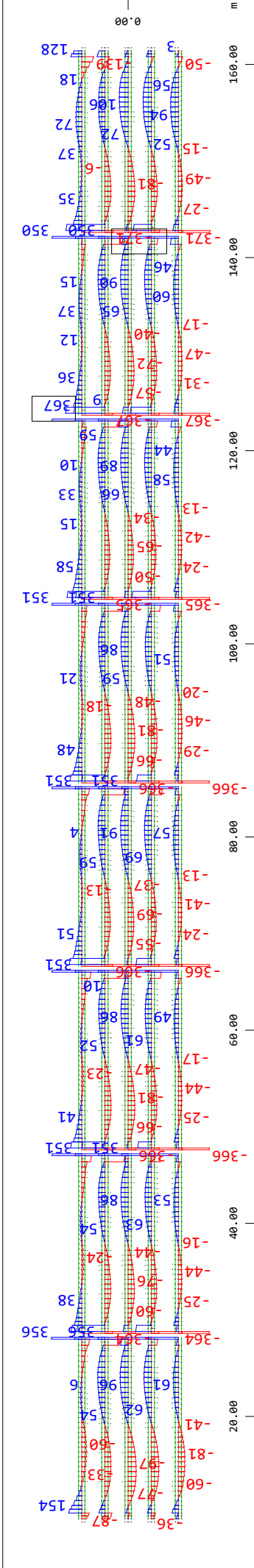




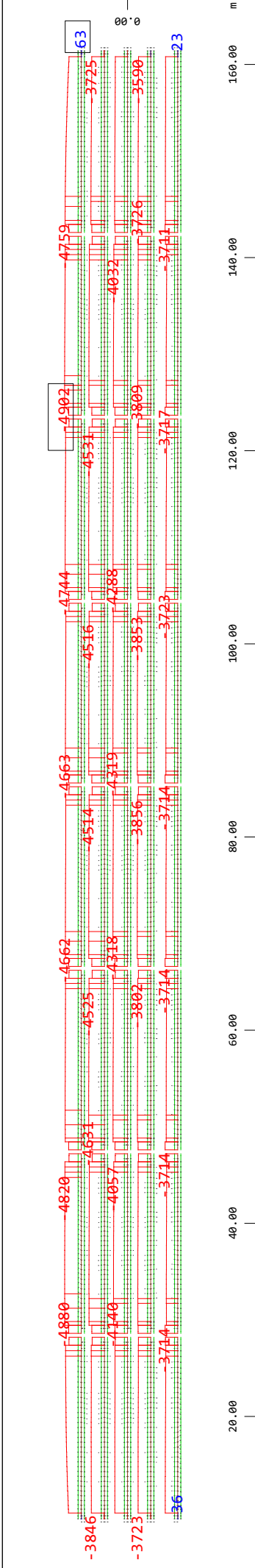
Beam Elements , Normal force Nx, Loadcase 1427 MSU,ns { nvy N UX PtX } , 1 cm 3D = 16367 kN (Min=-4824) (Max=80) M 1 : 576



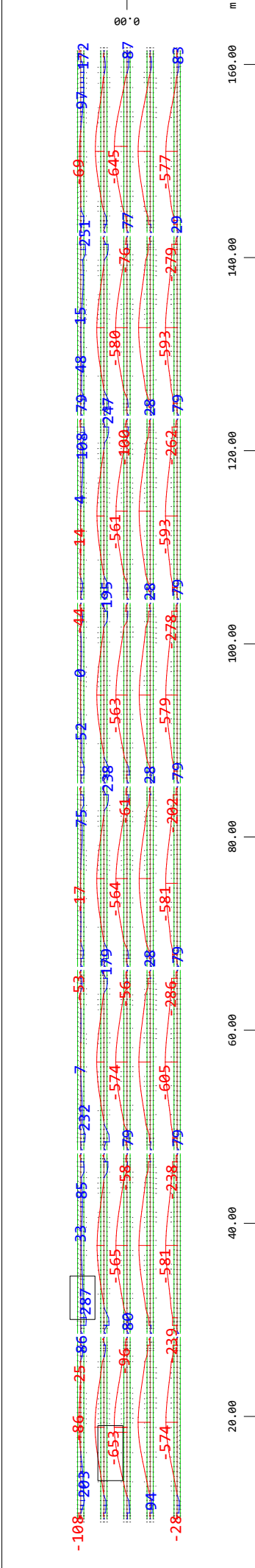
Beam Elements , Bending moment My, Loadcase 1421 MSU,ns { mxx My PX P } , 1 cm 3D = 2835.9 kNm (Min=-466) (Max=484) M 1 : 576



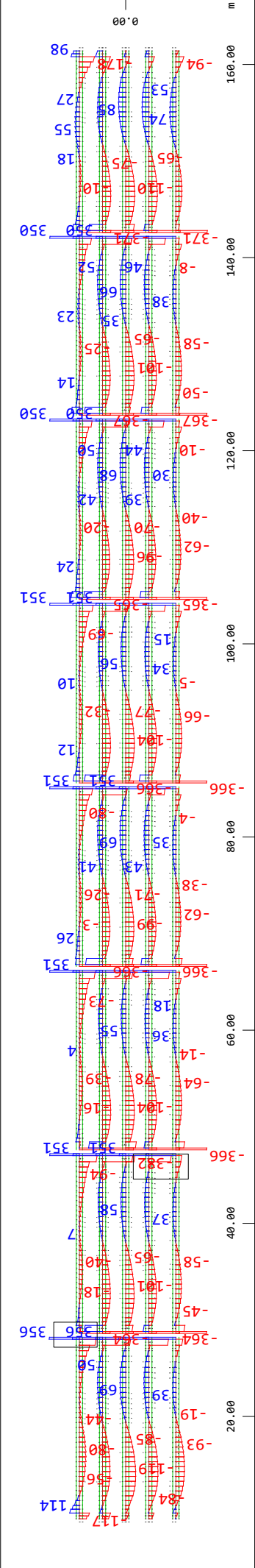
Beam Elements , Shear force Vz, Loadcase 1423 MSU,ns { myy Vz PY Pt } , 1 cm 3D = 654.69 kN (Min=-371) (Max=367) M 1 : 576



Y Z-X
Beam Elements , Normal force Nx, Loadcase 1428 MSU,ns { nvy N UX PtX } , 1 cm 3D = 16367 kN (Min=-4902) (Max=63)
M 1 : 576



Y Z-X
Beam Elements , Bending moment My, Loadcase 1422 MSU,ns { mxx My PX P } , 1 cm 3D = 2835.9 kNm (Min=-653) (Max=287)
M 1 : 576



Y Z-X
Beam Elements , Shear force Vz, Loadcase 1424 MSU,ns { myy Vz PY Pt } , 1 cm 3D = 654.69 kN (Min=-382) (Max=356)
M 1 : 576

