



2.1

NASLOVNICA NAČRTA

Načrt:

**Načrt s področja gradbeništva  
2/5 KONSTRUKCIJE SIGNALOV**

Investitor:



Republika Slovenija, Ministrstvo za infrastrukturo  
Direkcija RS za infrastrukturo  
Tržaška cesta 19, 1000 Ljubljana

Objekt/Projekt

**UMESTITEV NADHODA NA  
ŽELEZNIŠKI POSTAJI ZAGORJE**

Vrsta projektne dokumentacije:

**IZVEDBENI NAČRT**

Za gradnjo:

**VZDRŽEVALNA DELA V JAVNO KORIST**

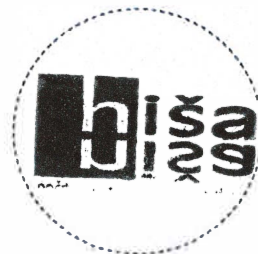
Projektant:

**HIŠA NIŠA**  
Načrtovanje in svetovanje, d. o. o.  
Verd 252, 1360 Vrhnika

Odgovorni predstavnik projektanta:

mag. Tomaž Habič,  
univ. dipl. inž. grad.

Podpis:



Pooblaščen inženir:

mag. Tomaž Habič,  
univ. dipl. inž. grad.  
G-0332

Podpis:

mag. TOMAŽ HABIČ  
univ. dipl. inž. grad.  
IZS G-0332

Številka načrta:

101/21

Številka projekta:

3710/Z

Kraj in datum:

Ljubljana, februar 2021

dopolnjeno po pregledu, julij 2021

Vodja projekta:

mag. Edvin Hadžiahmetović,  
univ. dipl. inž. grad.  
G-0133

Podpis:

mag. EDVIN HADŽIAHMETOVIČ  
univ. dipl. inž. grad.  
IZS G-0133

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| ZG1000 | 0146.00 | 007.2145 | S.1 |  |
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**2.1B**

**PRILOGA 1B – NASLOVNA STRAN NAČRTA**

**2/5 KONSTRUKCIJE SIGNALOV**

**OSNOVNI PODATKI O GRADNJI**

|                     |  |
|---------------------|--|
| naziv gradnje       | Umestitev nadhoda na železniški postaji Zagorje  |
| kratek opis gradnje | Nadgradnja postaje Zagorje na progi št. 10 d.m.-Dobova-Ljubljana. V sklopu nadgradnje bosta obnovljena glavna prevozna tira in vgrajene dvojne tirne zveze na obeh straneh postaje. Predvidena je tudi gradnja parkirišč in nadhoda ter bočnih peronov z upoštevanjem kombinacije prometnih kod P4-P5-F1. Vozna mreža bo nova. Obnovljeno bo tudi skladišče. |
| VRSTE GRADNJE       | REKONSTRUKCIJA   |

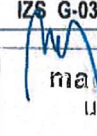
**DOKUMENTACIJA**

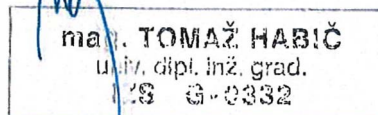
|                     |                       |
|---------------------|-----------------------|
| vrsta dokumentacije | IzN (Izvedbeni načrt) |
| številka projekta   | 3710/Z                |

**PODATKI O NAČRTU**

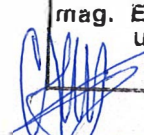
|                           |                           |
|---------------------------|---------------------------|
| strokovno področje načrta | 2/5 KONSTRUKCIJE SIGNALOV |
| številka načrta           | 101/21                    |
| datum izdelave            | februar 2021              |

**PODATKI O IZDELOVALCU NAČRTA**

|   |   |
|---|---|
| ime in priimek pooblaščenega arhitekta, pooblaščenega inženirja | mag. Tomaž Habič, univ. dipl. inž. grad.  |
| identifikacijska številka                                       | IZS G-0332  |
| podpis pooblaščenega arhitekta, pooblaščenega inženirja         |  |



**PODATKI O PROJEKTANTU**

|                           |  |
|---------------------------|--|
| projektant (naziv družbe) | HIŠA NIŠA, d. o. o.  |
| sedež družbe              | Verd 252, 1360 Vrhnika   |
| vodja projekta            | mag. Edvin Hadžiahmetović, univ. dipl. inž. grad.                                    |
| identifikacijska številka | IZS G-0133   |
| podpis vodje projekta     |  |

mag. EDVIN HADŽIAHMETOVIČ  
 univ. dipl. inž. grad.  
 IZS G-0133

|                                    |   |
|------------------------------------|---|
| odgovorna oseba projektanta        | mag. Tomaž Habič, univ. dipl. inž. grad.  |
| podpis odgovorne osebe projektanta |  |



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2.1.1

**SEZNAM SODELAVCEV PRI IZDELAVI NAČRTA**

NAČRT IN ŠTEVILČNA OZNAKA NAČRTA:

**2 – NAČRT S PODROČJA GRADBENIŠTVA**

**2/5 Konstrukcije signalov**

INVESTITOR:

**REPUBLIKA SLOVENIJA,  
DIREKCIJA RS ZA INFRASTRUKTURO**

**Tržaška cesta 19**

**1000 LJUBLJANA**

OBJEKT:

**Umestitev nadhoda na železniški postaji Zagorje**

SEZNAM SODELAVCEV – PROJEKTANTOV PRI IZDELAVI NAČRTA:

*2/5 Konstrukcije signalov*

*postaja ZAGORJE*

|               |                |                 |            |  |
|---------------|----------------|-----------------|------------|--|
| <b>ZG1000</b> | <b>0146.00</b> | <b>007.2145</b> | <b>S.2</b> |  |
|---------------|----------------|-----------------|------------|--|

|            |   |  |
|------------|---|--|
| <b>2.2</b> | <b>KAZALO VSEBINE NAČRTA št. 101/21</b>   |  |
| 2.1        | <b>Naslovnica načrta</b>                  |  |
| 2.1B       | <b>Priloga 1B – Naslovna stran načrta</b> |  |
|            | 2.1.1                                     | Seznam sodelavcev pri izdelavi načrta                  |
| 2.2        | <b>Kazalo vsebine načrta</b>              |  |
| 2.3        | <b>Izjava</b>                             |  |
|            | 2.3.1                                     | Dokumentacija o pregledu projekta, ...                 |
| 2.4        | <b>Tehnično poročilo</b>                  |  |
|            | 2.4.1                                     | Tehnični opis  |
|            | 2.4.2                                     | Projektantski popis s predizmerami in stroškovno oceno |
|            | 2.4.3                                     | Projektantski popis s predizmerami                     |
| 2.5        | <b>Tehnični prikazi (Risbe)</b>           |  |

|               |                |                 |              |  |
|---------------|----------------|-----------------|--------------|--|
| <b>ZG1000</b> | <b>0146.00</b> | <b>007.2145</b> | <b>S.3.2</b> |  |
|---------------|----------------|-----------------|--------------|--|



2.3

**IZJAVA**

Pooblaščen inženir

**mag. Tomaž HABIČ, univ. dipl. inž. grad.**

V skladu s 7. točko 27. člena Pravilnika o pogojih in postopku za začetek, izvajanje in dokončanje tekočega in investicijskega vzdrževanja ter vzdrževalnih del v javno korist na področju železniške infrastrukture (Ur. l. RS, št. 82/2006),

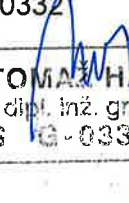
**I Z J A V L J A M ,**

1. da je izvedbeni načrt skladen s projektno nalogo,
2. da predmetni izvedbeni načrt izpolnjuje vse pogoje interoperabilnosti podane v tehnični specifikaciji za interoperabilnost vseevropskega železniškega sistema za konvencionalne hitrosti v zvezi
  - z »infrastrukturnim« podsystemom TSI-2014/1299/EU z dne 18.11.2014,
  - s »funkcionalno oviranimi osebami« TSI-2014/1300/EU z dne 18.11.2014.

Projekt št. 3710/Z

mag. Tomaž HABIČ, univ. dipl. inž. grad.  
IZS G – 0332

Ljubljana, februar 2021

  
mag. TOMAZ HABIČ  
univ. dipl. inž. grad.  
IZS G - 0332

2/5 Konstrukcije signalov

postaja ZAGORJE

|        |         |          |       |  |
|--------|---------|----------|-------|--|
| ZG1000 | 0146.00 | 007.2145 | S.5.1 |  |
|--------|---------|----------|-------|--|

2.3.1

**DOKUMENTACIJA O PREGLEDU PROJEKTA, ...**

Dokumentacija o pregledu projekta je sestavni del vodilnega načrta.

*2/5 Konstrukcije signalov*

*postaja ZAGORJE*

|               |                |                 |            |  |
|---------------|----------------|-----------------|------------|--|
| <b>ZG1000</b> | <b>0146.00</b> | <b>007.2145</b> | <b>S.6</b> |  |
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|            |                          |
|------------|--------------------------|
| <b>2.4</b> | <b>TEHNIČNO POROČILO</b> |
|------------|--------------------------|

- 2.4.1**            **TEHNIČNI OPIS**
- 2.4.1.1**        **Analiza konstrukcije**
- 2.4.1.2**        **Seznam elementov za polmostno konstrukcijo 31 in 21**
- 2.4.1.3**        **Seznam elementov za polmostno konstrukcijo 32**

*2/5 Konstrukcije signalov*

*postaja ZAGORJE*

|               |                |                 |            |  |
|---------------|----------------|-----------------|------------|--|
| <b>ZG1000</b> | <b>0146.00</b> | <b>007.2145</b> | <b>T.1</b> |  |
|---------------|----------------|-----------------|------------|--|



## TEHNIČNI OPIS

rev.1; 24.05.2021 po reviziji

|                              |                          |
|------------------------------|--------------------------|
| signal M11 in PP22, Hrastnik | 1 x 4 lučni signal + MTS |
| signal 32, Zagorje           | 1 x 4 lučni signal       |
| signal 31 in 21, Zagorje     | 2 x 4 lučni signal       |

### 1 SPLOŠNO

Predmet tega načrta so polmostne konstrukcije za namestitev tirnih izvoznih oziroma uvoznih signalov.

Za prostorsko umestitev konstrukcije smo uporabili podatke prejete s strani naročnika PAP.

INVESTITOR: REPUBLIKA SLOVENIJA, Ministrstvo za infrastrukturo,  
Direkcija RS za infrastrukturo, Tržaška cesta 19, 1000 Ljubljana

NAZIV OBJEKTA: Umestitev nadhodov na železniški postaji Hrastnik in Zagorje, Polmostni Signali

FAZA OBDELAVE: IZN (PZI)

### 2 ZASNOVA NOSILNE JEKLENE KONSTRUKCIJE

#### Polmostna konstrukcija

Signale se pritruje na konzolno jekleno konstrukcijo, ki je plitvo temeljena preko točkovnega armiranobetonskega temelja. Steber portala predstavljata po dva vroče valjana profila UNP300, ki sta med seboj zvarjena, razmak med zvarjencema znaša 560 mm in sta medsebojno povezana s profili UNP300 na svetlem razmaku cca 600 mm. Preko stebrov, ki sta vpeta v a.b. temelj, je položena (vpeta) konzolna konstrukcija – konzolni polmost, na katero je pritrjena podkonstrukcija signalov. Konzolna polmostna konstrukcija je v stebre vpeta. Za zagotavljanje togosti konzole se v spojnem vogalu vgradita diagonalni iz okroglih cevi  $\phi 88.9 \times 6.3$ .

Konstrukcijo "konzolnega polmosta" predstavljata dva profila UNP300, ki sta medsebojno povezana s sistemom horizontal – prečk (KC 80x4) in diagonal (KC60x4), ki polmostno konstrukcijo zavetrujejo in hkrati služijo kot podpora pohodnim rešetkam. Na diagonale se rešetke ne polagajo. Na mestih, kjer so obešeni koši za montažo signalov so horizontalne prečke KC100x5. Na konzolni polmostni konstrukciji je izvedena tudi ograja višine 110 cm in podkonstrukcija za pritrditev signalov. Dostop na polmostno konstrukcijo je preko lestve s hrbtnim varovalom.

**V okviru izdelave delavniških risb je potrebno upoštevati, da je potrebno horizontalni konzolni nosilec polmostne konstrukcije izvesti konstruktivno nadvišan in sicer za 5 cm na skrajnem robu konzole.**



Celotna konstrukcija portala je vroče cinkana in mora biti ustrezno ozemljena.

Na lokacijah:

- signal M11 in PP22, Hrastnik
- signal 32, Zagorje

je temelj AB točkovni, tlorisnih dimenzij 2.50x2.50mx1.00m (temeljna peta) s temeljnim nastavkom (čšašo) 1.14x1.80x1.90m. Temeljni nastavek mora biti zasut z komprimirano zemljino. Teren v okolici temelja ne sme biti več kot 45cm pod vrhom temeljnega nastavka. Debelina sten čase znaša 35 cm. Skupna višina temelja je 2.90 m.

V temelju se izvede katodna zaščita proti blodečim tokovom.

Na lokaciji signal M11 in PP2, Hrastnik je temelj vkomponiran v novo kamnito zložbo. Kamnita zložba ni del tega načrta.

Na lokaciji:

- signal 31 in 21, Zagorje

je temelj AB točkovni, tlorisnih dimenzij 2.50x2.50mx1.50m (temeljna peta) s temeljnim nastavkom (čšašo) 1.14x1.80x1.90m. Temeljni nastavek zaradi konfiguracije terena glede ven iz terena. Posledično se je morala povečati globina temeljne pete na 1.5m (globina zmrzovanja, zadostna teža). Debelina sten čase znaša 35 cm. Skupna višina temelja je 3.40 m.

V temelju se izvede katodna zaščita proti blodečim tokovom.

### 3 ANALIZA KONSTRUKCIJE IN VPLIVI NA KONSTRUKCIJO

Analiza konstrukcije je izvedena z linearno elastično analizo TPR in nelinearno elastično analizo TDR ob upoštevanju začetnih nepopolnosti. Narejena je kontrola nosilnosti prerezov in stabilnosti elementov za vse merodajne obtežne kombinacije v mejnem stanju nosilnosti. Kontrolirano je mejno stanje uporabnosti.

Obremenitve posameznih elementov gradbenih konstrukcij smo določili s pomočjo programa Scia Engineer.

Uporabljeni standardi:

- SIST EN 1990: Osnove projektiranja
- SIST EN 1991: Vplivi na konstrukcije
- SIST EN 1992: Projektiranje betonskih konstrukcij
- SIST EN 1993: Projektiranje jeklenih konstrukcij
- SIST EN 1997: Geotehnično projektiranje

V analizi so upoštevane sledeče obtežbe:



### Lastna teža

Lastna teža konstrukcije je upoštevana avtomatično v računalniškem programu.

### Stalna obtežba

- ograja, streha in zaščita za žice 433kg
- rešetka 0.65kN/m<sup>2</sup>
- lestev s hrbtobranom 2.53kN

### Signali LC3

- na lokaciji ene signalne košare
 

|   |             |       |
|---|-------------|-------|
| -košara                                     | 120kg       |       |
| -glava 4 lučnega signala                    | 72kg        |       |
| <u>-glava mejnega tirnega signala (MTS)</u> | <u>52kg</u> |       |
| skupaj                                      | 244kg       | 2.5kN |

Na polomostu se nahajate dve ali ena signalna košara.
- na spodnjem delu stebra
 

|                   |        |        |       |
|-------------------|--------|--------|-------|
| -signalne omarice | 4x34kg | skupaj | 1.4kN |
|-------------------|--------|--------|-------|

|                              |                          |
|------------------------------|--------------------------|
| Signal M11 in PP22, Hrastnik | 1 x 4 lučni signal + MTS |
| signal 32, Zagorje           | 1 x 4 lučni signal       |
| signal 31 in 21, Zagorje     | 2 x 4 lučni signal       |

### Vzdrževanje

- na lokaciji ene signalne košare 2 kN  $\psi_0=0$

### Obtežba s snegom

- Cona A2, 300m n.v.,  $S=\mu \times S_k=0.8 \times 1.52=1.21 \text{ kN/m}^2$   $\psi_0=0.5$

### Obtežba z vetrom

Cona 1, pod 800m n.v.;  $v_{b,0}=20 \text{ m/s}$ ,  $q_b=0.25 \text{ kN/m}^2$ ,  $\psi_0=0.6$

II. kateg. terena,  $h=9 \text{ m}$ ;  $C_e(z)=2.29$

$$q_p = q_b \times C_e = 0.25 \times 2.29 = 0.58 \text{ kN/m}^2$$

$$w = C_p \times q_p = C_p \times 0.58 \text{ kN/m}^2$$

profili  $C_p = 2.0$   $w = 2.0 \times 0.58 = 1.16 \text{ kN/m}^2$

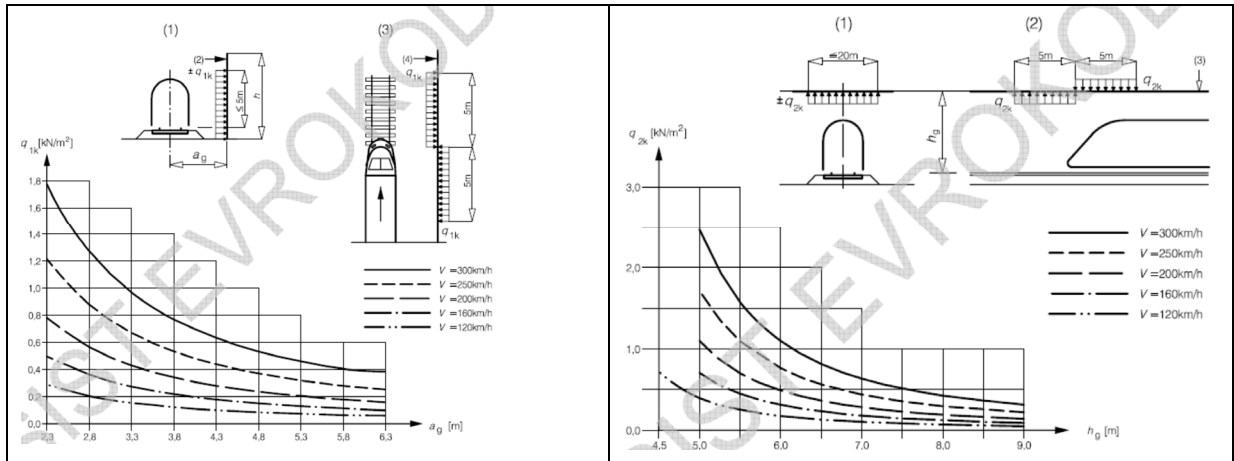
**Aerodinamični učinki vlakov**

projektna hitrost vlakov na trasi  $v=95\text{km/h}$

upoštevanja hitrost vlakov  $v_{\max} \leq 120\text{km/h}$

$\psi_0=0.6$

SIST EN 1991-2



**4 MATERIAL**

Ves vgrajeni material (pločevine, profilacija, dodatni material, spojna sredstva ...) mora biti opremljen s potrdili o kvaliteti v skladu z zakonom o standardizaciji. Potrdila o kvaliteti morajo biti stopnje v skladu z določili podanimi v SIST EN 1090-2.

Obseg reatestacije oziroma dodatnih preiskav osnovnega materiala določi nadzorni organ na podlagi predloženih potrdil o kvaliteti in upošteva zahteve, podane v projektni dokumentaciji.

V vseh fazah izdelave in montaže nosilne jeklene konstrukcije mora biti zagotovljena sledljivost materiala.

**Osnovni material**

Za glavno nosilno jekleno konstrukcijo portalov (profili, prirobnične pločevine, rebra) je predviden material kvalitete S235J2.

**Vijaki**

Pri izračunu spojev elementov jeklenih konstrukcij ni upoštevano prednapenjanje. V projektu so v spojih predvidene vijajčne zveze (vijaki, matice in podložke) kvalitete 8.8 SIST EN 15048-1. Vijajčni in spojni material je vroče cinkan.

**Beton, armatura**

Marka betona C30/37, XC4, XF3, XD1, PV-II vodonepropusten beton, podložni beton C12/15

Armatura: S500-B



## 5 IZDELAVA IN MONTAŽA JEKLENE KONSTRUKCIJE

Pri izdelavi in montaži nosilne jeklene konstrukcije je potrebno dosledno upoštevati določila slovenskega standarda: SIST EN 1090-2 "Izvedba jeklenih in aluminijastih konstrukcij – 2. del: Tehnične zahteve za izvedbo jeklenih konstrukcij", v katerem so navedene splošne zahteve za izdelavo in montažo jeklenih nosilnih konstrukcij, narejenih iz vroče valjanih, vroče obdelanih, varjenih in hladno oblikovanih jeklenih izdelkov.

### **Izvedbeni razred jeklene konstrukcije je EXC2.**

Posebno pozornost je potrebno posvetiti spoštovanju geometrijskih toleranc pri izdelavi in montaži ter zahtevam glede izdelave in kontrole kvalitete izdelanih zvarov.

S pravilnim vrstnim redom montaže je potrebno zagotoviti stabilnost konstrukcije v času montaže. Mere v načrtih so nominalne in jih je potrebno natančno določiti glede na dejansko geometrijo konstrukcije. Spremembe na nosilni konstrukciji so dovoljene samo v soglasju z pooblaščenim inženirjem.

Konstrukcijo lahko izdelava in montira le usposobljeno podjetje. Zagotoviti je potrebno strokovni nadzor nad izvajanjem jeklene konstrukcije. Nadzor mora opraviti strokovnjak za jeklene konstrukcije.

Izvajalec je dolžan pred začetkom izvedbe oz. gradnje na osnovi PZI izdelati:

- delavniške risbe
- navodila za montažo
- elaborat varstva pri delu.

### ***NADVIŠANJE HORIZONTALNEGA KONZOLNEGA POLMOSTNEGA NOSILCA***

**V okviru izdelave delavniških risb je potrebno upoštevati, da je potrebno horizontalni konzolni nosilec polmostne konstrukcije izvesti konstruktivno nadvišan in sicer za 5 cm na skrajnem robu konzole.**

## 6 ZAŠČITA PRED KOROZIJO

Predvidena je zaščit nosilnih jeklenih konstrukcij pred korozijo z vročim cinkanjem. Upoštevati je potrebno standarda SIST EN ISO 1461 in SIST EN ISO 14713. Minimalna debelina nanosa cinka je 90 µm.

Vsi jekleni elementi morajo biti pripravljene za vroče cinkanje v skladu z navodili izvajalca pocinkanja (odprtine v ceveh ograj, odprtine v čelnih pločevinah, odprtine v ceveh,...),

Ves vijaka material oziroma pritrdilni material in sidra morajo biti dobavljeni vroče cinkani.

## 7 TEMELJENJE

Izdelavo AB temeljev je potrebno izvesti v skladu z SIST EN 13670, izvedbeni razred konstrukcije je EXC2.

Predvideni so armiranobetonski, masivni in točkovni temelji.





Maksimalne robne napetosti v temeljnih tleh pri mejnem stanju uporabnosti (MSU, delovna obtežba) znašajo do 148 kN/m<sup>2</sup>.

Maksimalne robne napetosti v temeljnih tleh pri mejnem stanju uporabnosti (MSN, faktorirana obtežba) znašajo do 209 kN/m<sup>2</sup>.

V temeljih se izvede katodna zaščita proti blodečim tokovom. Utrditev temeljnih tal izvesti z gramozno gredo globine 0.5m, S.Z. 98%, EV2 80.

**V okviru izvedbe mora biti zagotovljen geotehnični nadzor.**

**Pred izvedbo temelja je potrebno pridobiti geotehnično mnenje o ustreznosti temeljnih tal in po potrebi izvesti ustrezno sanacijo temeljnih tal.**

## **8 ZDRAVJE, VARNOST IN OKOLJE**

Železnica je za delo nevarno okolje. Izvajalec mora pripraviti in izdelati varnostni načrt (uporabljena kratica VN), ki vključuje vse subjekte, ki jih zadeva varnost. Varnostni načrt se izvaja v skladu z navodili, podanimi v slovenskem pravnem redu (Zakon o varnosti in zdravju pri delu (Uradni list RS, št. 56/1999, 64/2001, 43/2011) in Uredba o zagotavljanju varnosti in zdravja pri delu na začasnih in premičnih gradbiščih (Uradni list RS, št. 83/2005). VN mora vsebovati vse vsebine, ki jih predpisuje zakonodaja. VN se izdelata kot generalni VN, s tem da se posamezna specifična tveganja povezana z lokacijo ali specifičnimi deli obdelajo v posebnem VN mora izdelati pooblaščen organizacija, naročnik pa ga potrdi. VN mora zajeti vse elemente in vsebovati povzetek vseh analiz tveganja, ki kažejo na mesta tveganja pri uvedbi omrežja in zahtevanih funkcionalnosti.

V vseh procesih načrtovanja in gradnje, je potrebno upoštevati standarde, zdravstveno in varnostno zakonodajo in prakse. Poleg tega je treba tiste, ki opravljajo strokovno delo, za te naloge ustrezno usposobiti.

Vse konstrukcije, opreme in drugi izdelki morajo izpolnjevati ustrezne evropske in mednarodne strokovne in varnostne standarde in ne smejo zmanjšati varnosti in zdravja vzdrževalnega osebja ali tretjih oseb.

V skladu z Zakonom o varnosti osebja in zdravja je izvajalec odgovoren za varnost osebja.

Posebne varnostne zahteve bodo veljale v času, ko izvajalec opravlja dela na infrastrukturi naročnika.

Izvajalec mora upoštevati dodatne zahteve lastnikov zemljišč v zvezi z oskrbo lokacije, skladiščenju na kraju samem in pri uporabi nevarnih snovi. Ocena tveganja mora opredeliti ukrepe za varno odstranitev razlite tekočine in varno odstranjevanje odpadkov, ki se pojavijo.

Pogoji za začetek dela so predani varnostni načrt (VN), potrjeni izvedbeni načrti in dovoljenje za pričetek del izdano od javne agencije za varnost v železniškem prometu.

Poleg izpolnjevanja zakonskih zahtev za uporabo izdelkov, načina dela in zaščitnih ukrepov za zmanjšanje zdravstvene in varnostne nevarnosti, mora izvajalec vnaprej obvestiti naročnika o vseh varnostnih predpisih in postopkih (vključno s tistimi, ki se nanašajo na materiale, ki so lahko škodljivi), ki bi zahtevali sodelovanje naročnika ali njegovega zastopnika na lokaciji.



Izvajalec mora zagotoviti, da njegovo delo ne vpliva na varno in učinkovito delovanje obstoječe infrastrukture, vključno z vsemi obstoječimi radijskimi in telekomunikacijskimi napravami.

Osebe izvajalca mora biti ustrezno usposobljeno za delo z opremo, ki se bo vgrajevala. Ta projekt se ne sme uporabljati za usposabljanje neizkušenega osebja, razen če je le-to nenehno pod nadzorom usposobljenih in izkušenih kadrov za delo z opremo in samo s predhodnim soglasjem naročnika.

Izvajalec zagotovi, da je vse njegovo osebje seznanjeno z obsegom dela, ki je potrebno za izvajanje njihovih nalog. Usposabljanje in seznanjanje z lokacijami uredi izvajalec na lastne stroške.

Vse osebe izvajalca mora, kot minimum, imeti varnostno spričevalo za delo na progi.

Zapisala

mag. Tomaž Habič, udig

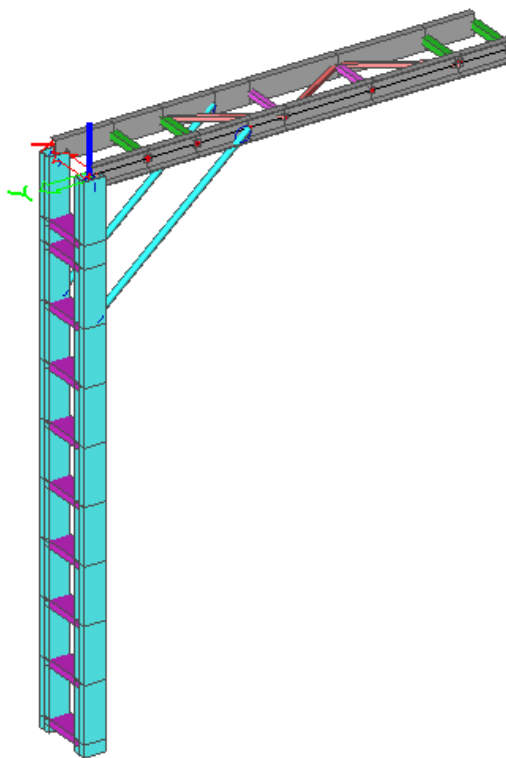
dr. Leon Hladnik, udig

# SIGNALNI POLMOST

## ANALIZA KONSTRUKCIJE

signal PK M11 in PP22, Hrastnik  
signal 32, Zagorje  
signal 31 in 21, Zagorje

rev.1, 24.05.2021 po reviziji



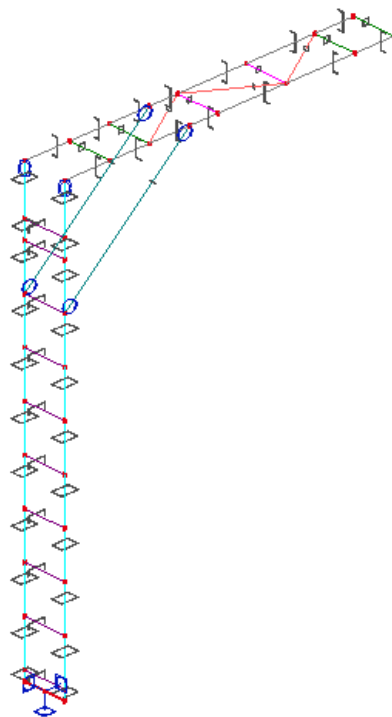
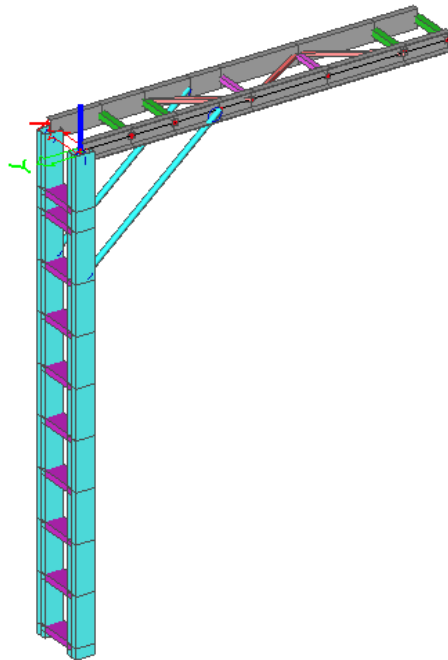
Obdelava:  
Dr. Leon Hladnik, udig – G-0296

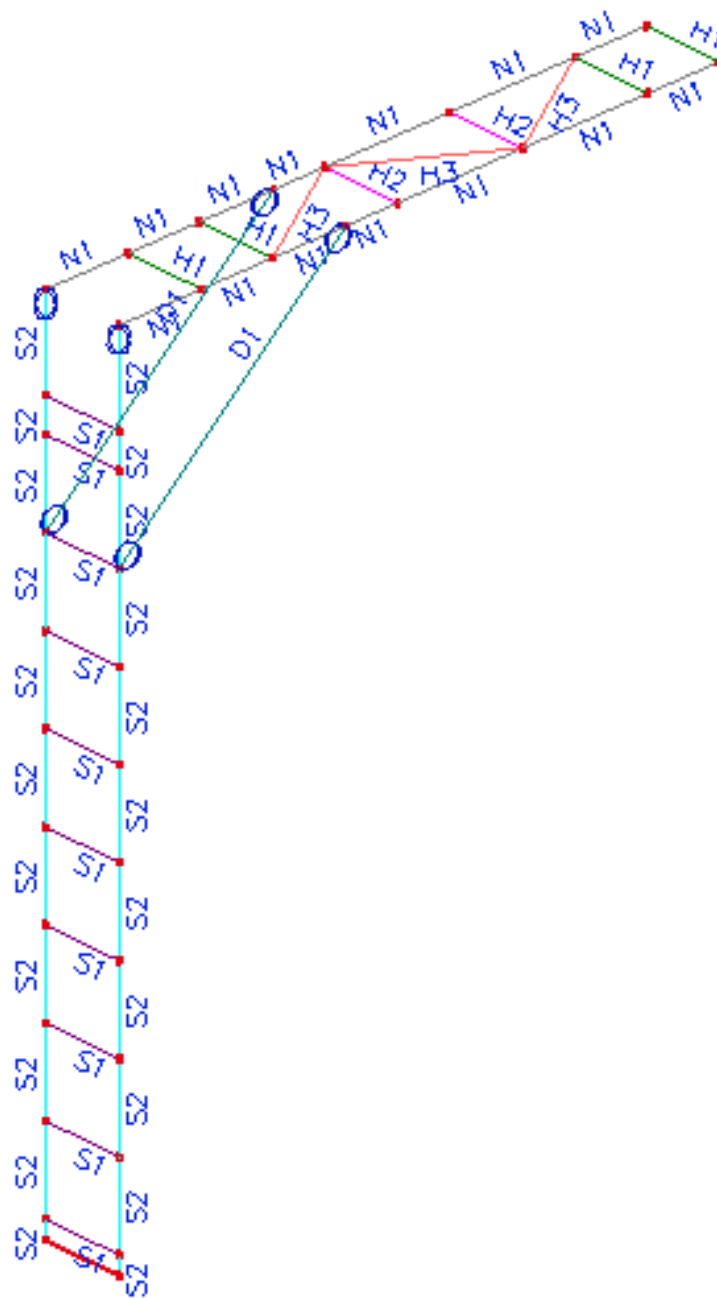


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## 1. RAČUNSKI MODEL







## 2. ANALIZA OBTEŽB

### 2.1. Lastna teža LC1

Lastna teža konstrukcije je upoštevana avtomatično v računalniškem programu.

### 2.2. Stalna obtežba LC2

- ograja, streha in zaščita za žice

$$\begin{aligned}L &= 2 \times 5.9 \text{ m} \\m &= 433 \text{ kg} \\g &= 4.33 / 2 / 5.9 = 0.37 \text{ kN/m}\end{aligned}$$

- rešetka  $0.65 \text{ kN/m}^2$

$$\begin{aligned}L &= 2 \times 5.9 \text{ m} \\b &= 1.0 \text{ m} \\g &= 0.65 \times 1.0 / 2 = 0.33 \text{ kN/m}\end{aligned}$$

$$\text{skupaj } g = 0.37 + 0.33 = 0.70 \text{ kN/m} \quad \text{na posmezen horizontalni nosilec}$$

- lestev s hrbtno branom  $2.53 \text{ kN}$   
 $G = 2.53 / 2 = 1.27 \text{ kN}$  na vrhu posameznega stebrička

### 2.3. Signali LC3

- na lokaciji ene signalne košare

|                                      |       |       |
|--------------------------------------|-------|-------|
| -košara                              | 120kg |       |
| -glava 4 lučnega signala             | 72kg  |       |
| -glava mejnega tirnega signala (MTS) | 52kg  |       |
| skupaj                               | 244kg | 2.5kN |

Na polomustu se nahajate dve ali ena signalna košara.

- na spodnjem delu stebra

|                   |        |        |       |
|-------------------|--------|--------|-------|
| -signalne omarice | 4x34kg | skupaj | 1.4kN |
|-------------------|--------|--------|-------|



|                                    |                          |
|------------------------------------|--------------------------|
| signal PK M11 in PP22,<br>Hrastnik | 1 x 4 lučni signal + MTS |
| signal 32, Zagorje                 | 1 x 4 lučni signal       |
| signal 31 in 21, Zagorje           | 2 x 4 lučni signal       |

## 2.4. Vzdrževanje LC4

- na lokaciji ene signalne košare 2 kN  $\psi_0=0$   
Na polomustu se nahajate dve ali ena signalna košara.

## 2.5. Obtežba s snegom LC5

- Cona A2, 300m n.v.,  $S=\mu \times S_k=0.8 \times 1.52=1.21 \text{ kN/m}^2$   $\psi_0=0.5$   
 $s=1.21 \times 1.0/2=0.70 \text{ kN/m}$  na posmezen horizontalni nosilec

## 2.6. Obtežba z vetrom LC6

Cona 1, pod 800m n.v.;  $v_{b,0}=20 \text{ m/s}$ ,  $q_b=0.25 \text{ kN/m}^2$ ,  $\psi_0=0.6$

II. kateg. terena,  $h=9 \text{ m}$ ;  $C_e(z)=2.29$

$$q_p = q_b \times C_e = 0.25 \times 2.20 = 0.58 \text{ kN/m}^2$$

$$w = C_p \times q_p = C_p \times 0.58 \text{ kN/m}^2$$

profili  $C_p = 2.0$   $w = 2.0 \times 0.58 = 1.16 \text{ kN/m}^2$

- LC6.1 ( $\pm Y$ ) – pravokotno na tir
  - veter na steber
    - na vertikalo  $w = 1.16 \times 0.2 = 0.232 \text{ kN/m}$
    - na horizontalo  $w = 1.16 \times 0.1 = 0.116 \text{ kN/m}$
  - veter na košaro
    - $H_w = 1.16 \times 0.6 \times 2.34 = 1.63 \text{ kN}$   $1.63/2 = 0.815 \text{ kN}$
    - $M_w = 1.64 \times 2.34/2 = 1.92 \text{ kNm}$   $1.92/2 = 0.96 \text{ kNm}$
- LC6.2 ( $\pm X$ ) – vzdolžno s tirom
  - veter na steber in lestev
    - $w = 1.16 \times (0.3 + 0.1) = 0.47 \text{ kN/m}$



- veter na nosilec in ograjo

$$w = 1.16 \times (0.3 + 0.15) = 0.52 \text{ kN/m}$$

- veter na košaro

$$Hw = 1.16 \times 0.6 \times 2.34 = 1.63 \text{ kN} \quad 1.63/4 = 0.41 \text{ kN}$$

$$Mw = 1.64 \times 2.34 / 2 = 1.92 \text{ kNm} \quad 1.92 / 0.76 / 2 = 1.27 \text{ kNm}$$

## 2.7. Aerodinamični učinki vlakov LC7

projektna hitrost vlakov na trasi  $v = 95 \text{ km/h}$

upoštevanja hitrost vlakov  $v_{\max} \leq 120 \text{ km/h}$

$$\psi_0 = 0.6$$

SIST EN 1991-2

|  |  |
|--|--|
| <p><u>Steber</u></p> <p><math>a_g = 3.6 \text{ m}</math></p> <p><math>q_{1k} = 0.15 \text{ kN/m}^2</math>, din.fak.=2</p> <p><math>q_{1d} = 0.15 \times 2.0 = 0.30 \text{ kN/m}^2</math></p> | <p><u>Horizontalni nosilec</u></p> <p><math>h_g = 7.5 \text{ m}</math></p> <p><math>q_{1k} = 0.15 \text{ kN/m}^2</math>, din.fak.=2</p> <p><math>q_{1d} = 0.15 \times 2.0 = 0.30 \text{ kN/m}^2</math></p> |
|  |  |
| <p><math>\pm Y</math></p> <p>vertikala stebera <math>0.3 \times 0.2 = 0.06 \text{ kN/m}</math></p> <p>horizontala stebera <math>0.3 \times 0.1 = 0.03 \text{ kN/m}</math></p>                | <p><math>\pm Z</math></p> <p>oba horizontalna nosilca <math>0.3 \times 1/2 = 0.15 \text{ kN/m}</math></p>  |

### 3. VHODNI PODATKI RAČUNALNIŠKEGA PROGRAMA

#### 1. Materials

| Name  | Unit mass [kg/m <sup>3</sup> ] | E mod [MPa] | Poisson - nu | G mod [MPa] | Thermal exp [m/mK] |
|-------|--------------------------------|-------------|--------------|-------------|--------------------|
| S 235 | 7850.00                        | 2.1000e+05  | 0.3          | 8.0769e+04  | 0.00               |

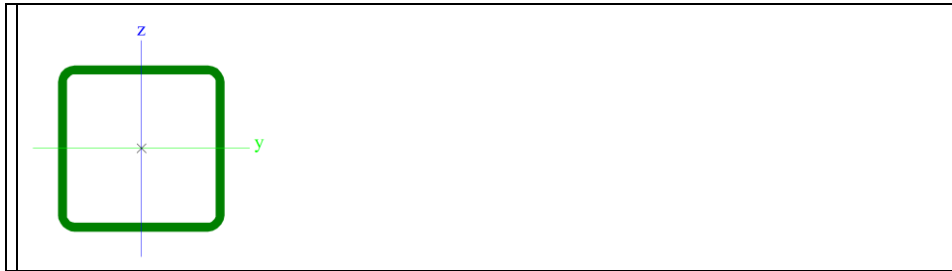
#### 2. Cross-sections

|                            |   |
|----------------------------|---|
| Name                       | N1  |
| Type                       | UNP300  |
| Source description         | Stahlbau Zentrum Schweiz / Konstruktionstabellen / 9.Ausgabe 2005 |
| Item material              | S 235   |
| Fabrication                | rolled  |
| Flexural buckling y-y      | c   |
| Flexural buckling z-z      | c   |
| Lateral torsional buckling | Default   |
| Use 2D FEM analysis        | *   |



|   |            |            |
|---|------------|------------|
| A [m <sup>2</sup> ]                                   | 5.8800e-03 |            |
| A <sub>y</sub> , z [m <sup>2</sup> ]                  | 3.0546e-03 | 2.9933e-03 |
| I <sub>y</sub> , z [m <sup>4</sup> ]                  | 8.0300e-05 | 4.9500e-06 |
| I <sub>w</sub> [m <sup>6</sup> ], t [m <sup>4</sup> ] | 7.8943e-08 | 3.8000e-07 |
| W <sub>el</sub> y, z [m <sup>3</sup> ]                | 5.3500e-04 | 6.7800e-05 |
| W <sub>pl</sub> y, z [m <sup>3</sup> ]                | 6.3200e-04 | 1.3000e-04 |
| d y, z [mm]   | -61        | 0          |
| c YUCS, ZUCS [mm]                                     | 27         | 150        |
| α [deg]   | 0.00       |            |
| A <sub>L</sub> , D [m <sup>2</sup> /m]                | 9.5000e-01 | 9.4901e-01 |
| M <sub>ply</sub> +, - [Nm]                            | 148652.53  | 148652.53  |
| M <sub>plz</sub> +, - [Nm]                            | 30521.03   | 30521.03   |

|                            |  |
|----------------------------|--|
| Name                       | H1   |
| Type                       | CFRHS100X100X5   |
| Source description         | Rautaruukki Oyj / Structural Hollow Sections EN10219 / Ed.2007 |
| Item material              | S 235  |
| Fabrication                | cold formed  |
| Flexural buckling y-y      | c  |
| Flexural buckling z-z      | c  |
| Lateral torsional buckling | Default  |
| Use 2D FEM analysis        | *  |



|  |            |            |
|--|------------|------------|
| A [m <sup>2</sup> ]                        | 1.8360e-03 |            |
| A y, z [m <sup>2</sup> ]                   | 9.1721e-04 | 9.1721e-04 |
| I y, z [m <sup>4</sup> ]                   | 2.7110e-06 | 2.7110e-06 |
| I w [m <sup>6</sup> ], t [m <sup>4</sup> ] | 4.1667e-09 | 4.4052e-06 |
| W <sub>el</sub> y, z [m <sup>3</sup> ]     | 5.4220e-05 | 5.4220e-05 |
| W <sub>pl</sub> y, z [m <sup>3</sup> ]     | 6.4590e-05 | 6.4590e-05 |
| d y, z [mm]                                | 0          | 0          |
| c YUCS, ZUCS [mm]                          | 50         | 50         |
| α [deg]                                    | 0.00       |            |
| A L, D [m <sup>2</sup> /m]                 | 3.8300e-01 | 7.3413e-01 |
| M <sub>ply</sub> +, - [Nm]                 | 15165.68   | 15165.68   |
| M <sub>plz</sub> +, - [Nm]                 | 15165.68   | 15165.68   |

|                            |  |
|----------------------------|--|
| Name                       | H2   |
| Type                       | CFRHS80X80X4   |
| Source description         | Rautaruukki Oyj / Structural Hollow Sections EN10219 / Ed.2007 |
| Item material              | S 235  |
| Fabrication                | cold formed  |
| Flexural buckling y-y      | c  |
| Flexural buckling z-z      | c  |
| Lateral torsional buckling | Default  |
| Use 2D FEM analysis        | x  |

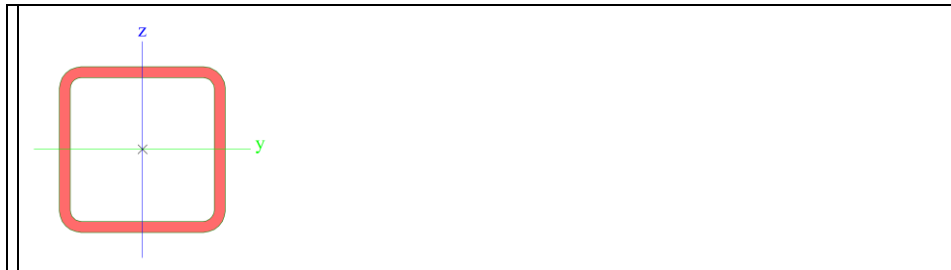


|  |            |            |
|--|------------|------------|
| A [m <sup>2</sup> ]                        | 1.1750e-03 |            |
| A y, z [m <sup>2</sup> ]                   | 5.8702e-04 | 5.8702e-04 |
| I y, z [m <sup>4</sup> ]                   | 1.1104e-06 | 1.1104e-06 |
| I w [m <sup>6</sup> ], t [m <sup>4</sup> ] | 1.0923e-09 | 1.8044e-06 |
| W <sub>el</sub> y, z [m <sup>3</sup> ]     | 2.7760e-05 | 2.7760e-05 |
| W <sub>pl</sub> y, z [m <sup>3</sup> ]     | 3.3070e-05 | 3.3070e-05 |
| d y, z [mm]                                | 0          | 0          |
| c YUCS, ZUCS [mm]                          | 40         | 40         |
| α [deg]                                    | 0.00       |            |
| A L, D [m <sup>2</sup> /m]                 | 3.0600e-01 | 5.8730e-01 |
| M <sub>ply</sub> +, - [Nm]                 | 7764.83    | 7764.83    |
| M <sub>plz</sub> +, - [Nm]                 | 7764.83    | 7764.83    |

|                       |  |
|-----------------------|--|
| Name                  | H3   |
| Type                  | CFRHS60X60X4   |
| Source description    | Rautaruukki Oyj / Structural Hollow Sections EN10219 / Ed.2007 |
| Item material         | S 235  |
| Fabrication           | cold formed  |
| Flexural buckling y-y | c  |
| Flexural buckling z-z | c  |

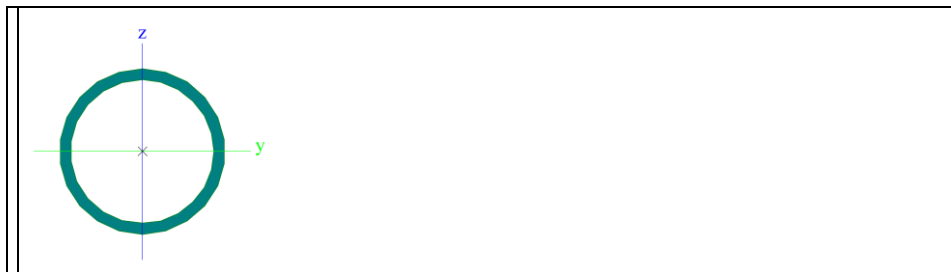


|                            |         |
|----------------------------|---------|
| Lateral torsional buckling | Default |
| Use 2D FEM analysis        | x       |



|   |            |            |
|---|------------|------------|
| A [m <sup>2</sup> ]                                   | 8.5500e-04 |            |
| A <sub>y, z</sub> [m <sup>2</sup> ]                   | 4.2702e-04 | 4.2702e-04 |
| I <sub>y, z</sub> [m <sup>4</sup> ]                   | 4.3550e-07 | 4.3550e-07 |
| I <sub>w</sub> [m <sup>6</sup> ], t [m <sup>4</sup> ] | 2.5920e-10 | 7.2640e-07 |
| W <sub>el y, z</sub> [m <sup>3</sup> ]                | 1.4520e-05 | 1.4520e-05 |
| W <sub>pl y, z</sub> [m <sup>3</sup> ]                | 1.7640e-05 | 1.7640e-05 |
| d <sub>y, z</sub> [mm]                                | 0          | 0          |
| c <sub>YUCS, ZUCS</sub> [mm]                          | 30         | 30         |
| α [deg]   | 0.00       |            |
| A <sub>L, D</sub> [m <sup>2</sup> /m]                 | 2.2600e-01 | 4.2730e-01 |
| M <sub>ply +, -</sub> [Nm]                            | 4141.05    | 4141.05    |
| M <sub>plz +, -</sub> [Nm]                            | 4141.05    | 4141.05    |

|                            |  |
|----------------------------|--|
| Name                       | D1   |
| Type                       | CFCHS88.9X6  |
| Source description         | Rautaruukki Oyj / Structural Hollow Sections EN10219 / Ed.2007 |
| Item material              | S 235  |
| Fabrication                | cold formed  |
| Flexural buckling y-y      | c  |
| Flexural buckling z-z      | c  |
| Lateral torsional buckling | Default  |
| Use 2D FEM analysis        | x  |



|   |            |            |
|---|------------|------------|
| A [m <sup>2</sup> ]                                   | 1.5630e-03 |            |
| A <sub>y, z</sub> [m <sup>2</sup> ]                   | 9.9480e-04 | 9.9480e-04 |
| I <sub>y, z</sub> [m <sup>4</sup> ]                   | 1.3494e-06 | 1.3494e-06 |
| I <sub>w</sub> [m <sup>6</sup> ], t [m <sup>4</sup> ] | 3.0628e-42 | 2.6988e-06 |
| W <sub>el y, z</sub> [m <sup>3</sup> ]                | 3.0360e-05 | 3.0360e-05 |
| W <sub>pl y, z</sub> [m <sup>3</sup> ]                | 4.1310e-05 | 4.1310e-05 |
| d <sub>y, z</sub> [mm]                                | 0          | 0          |
| c <sub>YUCS, ZUCS</sub> [mm]                          | 44         | 44         |
| α [deg]   | 0.00       |            |
| A <sub>L, D</sub> [m <sup>2</sup> /m]                 | 2.7900e-01 | 5.2085e-01 |
| M <sub>ply +, -</sub> [Nm]                            | 9704.06    | 9704.06    |
| M <sub>plz +, -</sub> [Nm]                            | 9704.06    | 9704.06    |

|                    |   |
|--------------------|---|
| Name               | S1  |
| Type               | UNP300  |
| Source description | Stahlbau Zentrum Schweiz / Konstruktionstabellen / 9.Ausgabe 2005 |
| Item material      | S 235   |



|                            |         |
|----------------------------|---------|
| Fabrication                | rolled  |
| Flexural buckling y-y      | c       |
| Flexural buckling z-z      | c       |
| Lateral torsional buckling | Default |
| Use 2D FEM analysis        | *       |



|  |            |            |
|--|------------|------------|
| A [m <sup>2</sup> ]                        | 5.8800e-03 |            |
| A y, z [m <sup>2</sup> ]                   | 3.0546e-03 | 2.9933e-03 |
| I y, z [m <sup>4</sup> ]                   | 8.0300e-05 | 4.9500e-06 |
| I w [m <sup>6</sup> ], t [m <sup>4</sup> ] | 7.8943e-08 | 3.8000e-07 |
| Wel y, z [m <sup>3</sup> ]                 | 5.3500e-04 | 6.7800e-05 |
| Wpl y, z [m <sup>3</sup> ]                 | 6.3200e-04 | 1.3000e-04 |
| d y, z [mm]                                | -61        | 0          |
| c YUCS, ZUCS [mm]                          | 27         | 150        |
| α [deg]                                    | 0.00       |            |
| A L, D [m <sup>2</sup> /m]                 | 9.5000e-01 | 9.4901e-01 |
| Mply +, - [Nm]                             | 148652.53  | 148652.53  |
| Mplz +, - [Nm]                             | 30521.03   | 30521.03   |

|                            |                |
|----------------------------|----------------|
| Name                       | S2             |
| Type                       | 2Uc            |
| Detailed                   | UNP300; 0; 200 |
| Item material              | S 235          |
| Fabrication                | rolled         |
| Flexural buckling y-y      | c              |
| Flexural buckling z-z      | c              |
| Lateral torsional buckling | Default        |
| Use 2D FEM analysis        | *              |



|  |            |            |
|--|------------|------------|
| A [m <sup>2</sup> ]                        | 1.1756e-02 |            |
| A y, z [m <sup>2</sup> ]                   | 5.7148e-03 | 5.9866e-03 |
| I y, z [m <sup>4</sup> ]                   | 1.6060e-04 | 7.2515e-05 |
| I w [m <sup>6</sup> ], t [m <sup>4</sup> ] | 1.2009e-07 | 1.4530e-04 |
| Wel y, z [m <sup>3</sup> ]                 | 1.0707e-03 | 7.2515e-04 |
| Wpl y, z [m <sup>3</sup> ]                 | 1.2651e-03 | 8.5824e-04 |
| d y, z [mm]                                | 0          | 0          |
| c YUCS, ZUCS [mm]                          | 100        | 150        |
| α [deg]                                    | 0.00       |            |
| A L, D [m <sup>2</sup> /m]                 | 1.0000e+00 | 1.8796e+00 |
| Mply +, - [Nm]                             | 297305.05  | 297305.05  |
| Mplz +, - [Nm]                             | 201687.08  | 201687.08  |



### 3. Load cases

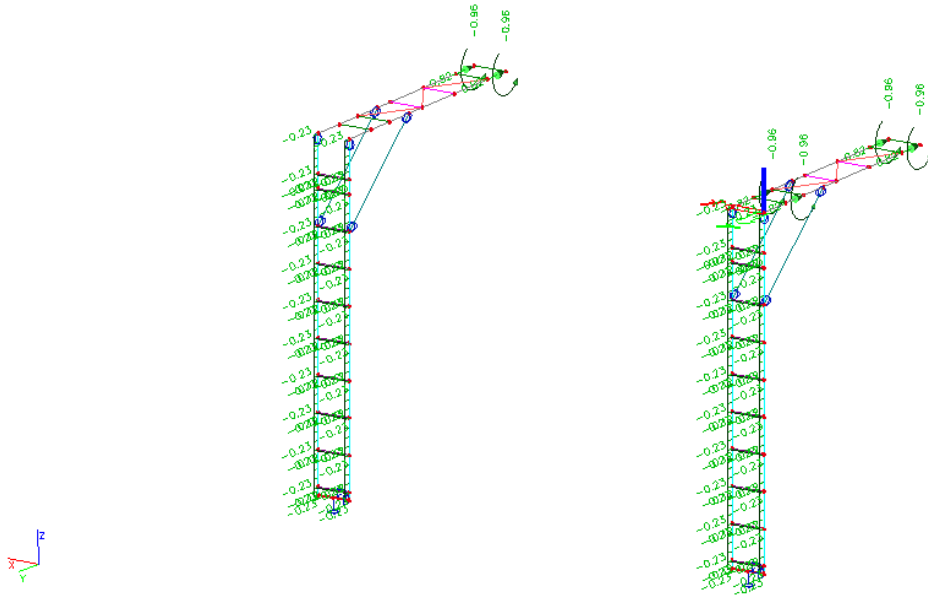
| Name            | Action type | Load group  | Load type   | Spec     | Direction | Duration | Master load case |
|-----------------|-------------|-------------|-------------|----------|-----------|----------|------------------|
| LC1-lastna      | Permanent   | stalna      | Self weight |          | -Z        |          |                  |
| LC2-stalna      | Permanent   | stalna      | Standard    |          |           |          |                  |
| LC3-signali     | Permanent   | stalna      | Standard    |          |           |          |                  |
| LC4-vzdrzevanje | Variable    | vzdrzevanje | Static      | Standard |           | Long     | None             |
| LC5-sneg        | Variable    | sneg        | Static      | Standard |           | Long     | None             |
| LC6.1.1-W(-Y)   | Variable    | veter       | Static      | Standard |           | Short    | None             |
| LC6.2.1-W(+X)   | Variable    | veter       | Static      | Standard |           | Short    | None             |
| LC7.1-Aero(-Y)  | Variable    | aero        | Static      | Standard |           | Short    | None             |
| LC7.2-Aero(+Y)  | Variable    | aero        | Static      | Standard |           | Short    | None             |
| LC6.1.2-W(+Y)   | Variable    | veter       | Static      | Standard |           | Short    | None             |
| LC6.2.2-W(-X)   | Variable    | veter       | Static      | Standard |           | Short    | None             |



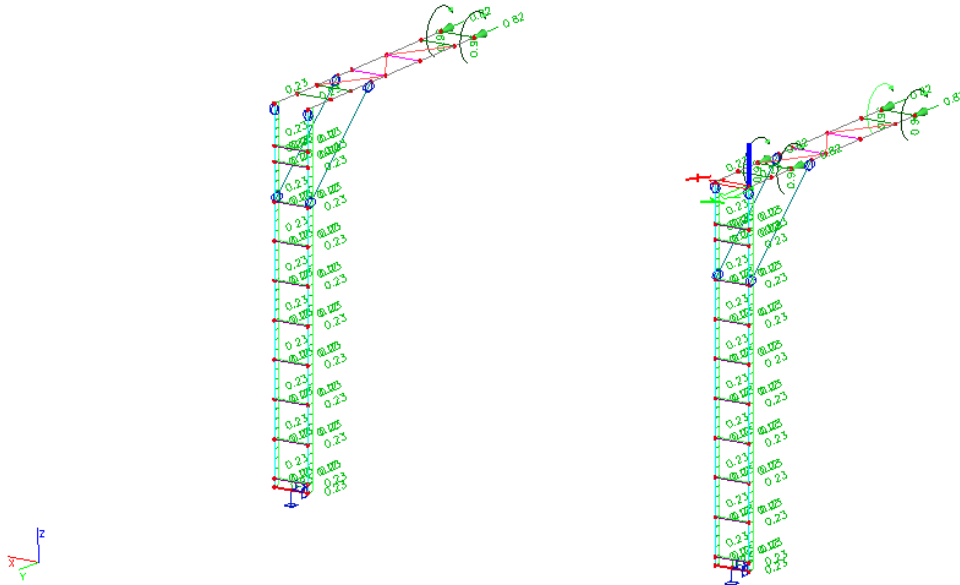




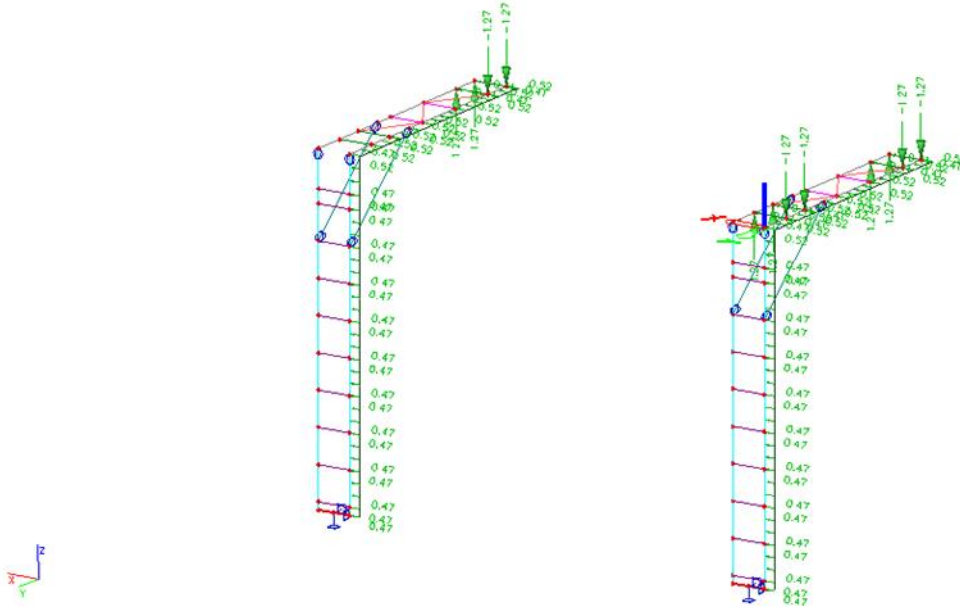
LC6.1.1



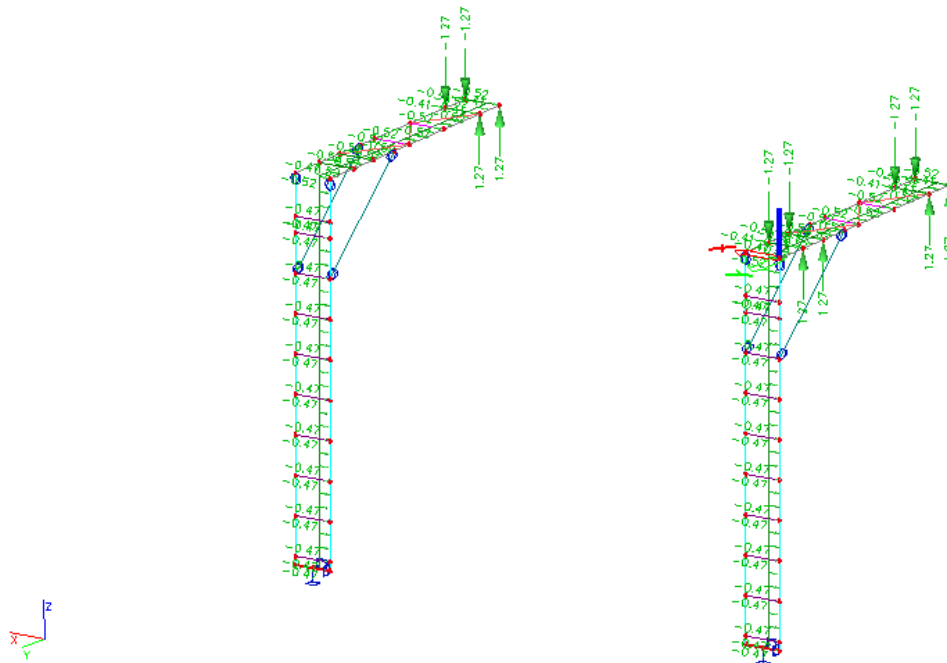
LC6.1.2



LC6.2.1

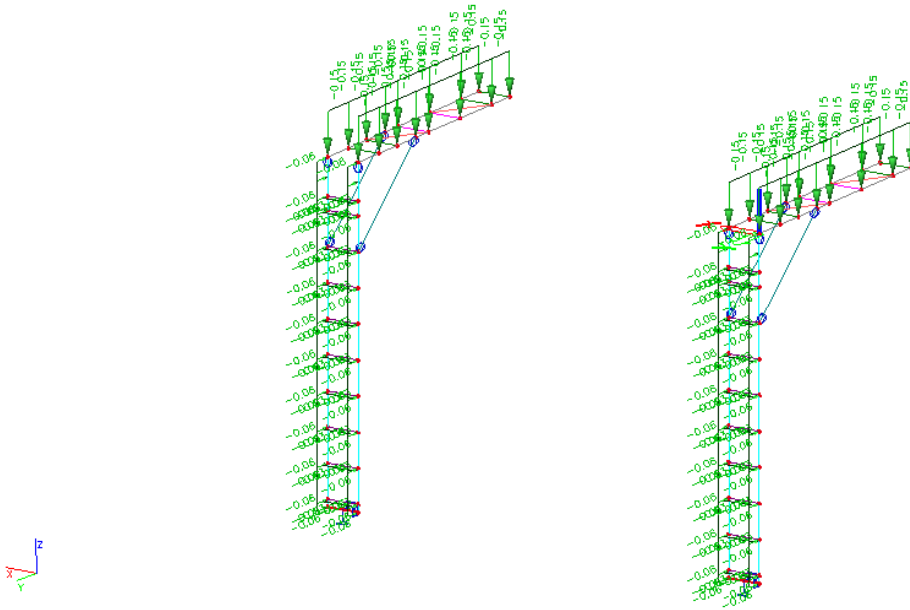


LC6.2.2

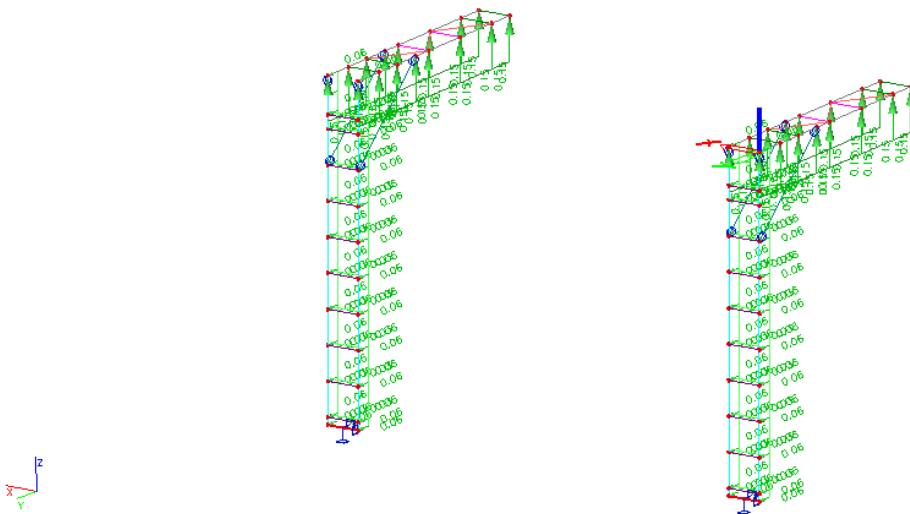




LC7.1



LC7.2





#### 4. Combinations

| Name | Description    | Type                | Load cases   | Coeff. [-]   |
|------|----------------|---------------------|--|--|
| MSN1 | 1.5vzdrzevanje | Envelope - ultimate | LC1-lastna<br>LC2-stalna<br>LC3-signali<br>LC4-vzdrzevanje<br>LC5-sneg<br>LC6.1.1-W(-Y)<br>LC6.2.1-W(+X)<br>LC7.1-Aero(-Y)<br>LC7.2-Aero(+Y)<br>LC6.1.2-W(+Y)<br>LC6.2.2-W(-X) | 1.35<br>1.35<br>1.35<br>1.50<br>0.75<br>0.90<br>0.90<br>0.90<br>0.90<br>0.90<br>0.90 |
| MSN2 | 1.5sneg        | Envelope - ultimate | LC1-lastna<br>LC2-stalna<br>LC3-signali<br>LC4-vzdrzevanje<br>LC5-sneg<br>LC6.1.1-W(-Y)<br>LC6.2.1-W(+X)<br>LC7.1-Aero(-Y)<br>LC7.2-Aero(+Y)<br>LC6.1.2-W(+Y)<br>LC6.2.2-W(-X) | 1.35<br>1.35<br>1.35<br>0.00<br>1.50<br>0.90<br>0.90<br>0.90<br>0.90<br>0.90<br>0.90 |
| MSN3 | 1.5veter       | Envelope - ultimate | LC1-lastna<br>LC2-stalna<br>LC3-signali<br>LC4-vzdrzevanje<br>LC5-sneg<br>LC6.1.1-W(-Y)<br>LC6.2.1-W(+X)<br>LC7.1-Aero(-Y)<br>LC7.2-Aero(+Y)<br>LC6.1.2-W(+Y)<br>LC6.2.2-W(-X) | 1.35<br>1.35<br>1.35<br>0.00<br>0.75<br>1.50<br>1.50<br>0.90<br>0.90<br>1.50<br>1.50 |
| MSN4 | 1.5aero        | Envelope - ultimate | LC1-lastna<br>LC2-stalna<br>LC3-signali<br>LC4-vzdrzevanje<br>LC5-sneg<br>LC6.1.1-W(-Y)<br>LC6.2.1-W(+X)<br>LC7.1-Aero(-Y)<br>LC7.2-Aero(+Y)<br>LC6.1.2-W(+Y)<br>LC6.2.2-W(-X) | 1.35<br>1.35<br>1.35<br>0.00<br>0.75<br>0.90<br>0.90<br>1.50<br>1.50<br>0.90<br>0.90 |
| MSN5 | 1.0G1.5W       | Envelope - ultimate | LC1-lastna<br>LC2-stalna<br>LC3-signali<br>LC4-vzdrzevanje<br>LC5-sneg<br>LC6.1.1-W(-Y)<br>LC6.2.1-W(+X)<br>LC7.1-Aero(-Y)<br>LC7.2-Aero(+Y)<br>LC6.1.2-W(+Y)<br>LC6.2.2-W(-X) | 1.00<br>1.00<br>1.00<br>0.00<br>0.00<br>1.50<br>1.50<br>0.90<br>0.90<br>1.50<br>1.50 |
| MSN6 | 1.0G1.5A       | Envelope - ultimate | LC1-lastna<br>LC2-stalna<br>LC3-signali<br>LC4-vzdrzevanje<br>LC5-sneg<br>LC6.1.1-W(-Y)<br>LC6.2.1-W(+X)<br>LC7.1-Aero(-Y)<br>LC7.2-Aero(+Y)<br>LC6.1.2-W(+Y)<br>LC6.2.2-W(-X) | 1.00<br>1.00<br>1.00<br>0.00<br>0.00<br>0.90<br>0.90<br>1.50<br>1.50<br>0.90<br>0.90 |
| MSU1 | 1.0vzdrzevanje | Envelope -          | LC1-lastna   | 1.00   |



|      |          |                           |  |  |
|------|----------|---------------------------|--|--|
|      |          | serviceability            | LC2-stalna<br>LC3-signali<br>LC4-vzdrzevanje<br>LC5-sneg<br>LC6.1.1-W(-Y)<br>LC6.2.1-W(+X)<br>LC7.1-Aero(-Y)<br>LC7.2-Aero(+Y)<br>LC6.1.2-W(+Y)<br>LC6.2.2-W(-X)               | 1.00<br>1.00<br>1.00<br>0.50<br>0.60<br>0.60<br>0.60<br>0.60<br>0.60<br>0.60         |
| MSU2 | 1.0sneg  | Envelope - serviceability | LC1-lastna<br>LC2-stalna<br>LC3-signali<br>LC4-vzdrzevanje<br>LC5-sneg<br>LC6.1.1-W(-Y)<br>LC6.2.1-W(+X)<br>LC7.1-Aero(-Y)<br>LC7.2-Aero(+Y)<br>LC6.1.2-W(+Y)<br>LC6.2.2-W(-X) | 1.00<br>1.00<br>1.00<br>0.00<br>1.00<br>0.60<br>0.60<br>0.60<br>0.60<br>0.60<br>0.60 |
| MSU3 | 1.0veter | Envelope - serviceability | LC1-lastna<br>LC2-stalna<br>LC3-signali<br>LC4-vzdrzevanje<br>LC5-sneg<br>LC6.1.1-W(-Y)<br>LC6.2.1-W(+X)<br>LC7.1-Aero(-Y)<br>LC7.2-Aero(+Y)<br>LC6.1.2-W(+Y)<br>LC6.2.2-W(-X) | 1.00<br>1.00<br>1.00<br>0.00<br>0.50<br>1.00<br>1.00<br>0.60<br>0.60<br>1.00<br>1.00 |
| MSU4 | 1.0aero  | Envelope - serviceability | LC1-lastna<br>LC2-stalna<br>LC3-signali<br>LC4-vzdrzevanje<br>LC5-sneg<br>LC6.1.1-W(-Y)<br>LC6.2.1-W(+X)<br>LC7.1-Aero(-Y)<br>LC7.2-Aero(+Y)<br>LC6.1.2-W(+Y)<br>LC6.2.2-W(-X) | 1.00<br>1.00<br>1.00<br>0.00<br>0.50<br>0.60<br>0.60<br>1.00<br>1.00<br>0.60<br>0.60 |

## 5.Nonlinear combinations

| Name  | Type     | Load cases  | Coeff. [-]   |
|-------|----------|---|--|
| NC1   | Ultimate | LC1-lastna<br>LC2-stalna<br>LC3-signali<br>LC4-vzdrzevanje<br>LC5-sneg                                    | 1.35<br>1.35<br>1.35<br>1.50<br>1.50                 |
| NC2.1 | Ultimate | LC1-lastna<br>LC2-stalna<br>LC3-signali<br>LC4-vzdrzevanje<br>LC5-sneg<br>LC6.1.1-W(-Y)<br>LC7.1-Aero(-Y) | 1.35<br>1.35<br>1.35<br>0.00<br>1.50<br>0.90<br>0.90 |
| NC3.1 | Ultimate | LC1-lastna<br>LC2-stalna<br>LC3-signali<br>LC4-vzdrzevanje<br>LC5-sneg<br>LC6.2.1-W(+X)<br>LC7.1-Aero(-Y) | 1.35<br>1.35<br>1.35<br>0.00<br>1.50<br>0.90<br>0.90 |
| NC4   | Ultimate | LC1-lastna<br>LC2-stalna<br>LC3-signali<br>LC4-vzdrzevanje  | 1.00<br>1.00<br>1.00<br>0.00                         |



|       |          |                 |      |
|-------|----------|-----------------|------|
|       |          | LC5-sneg        | 0.00 |
|       |          | LC7.2-Aero(+Y)  | 1.50 |
|       |          | LC6.1.2-W(+Y)   | 1.50 |
| NC2.2 | Ultimate | LC1-lastna      | 1.35 |
|       |          | LC2-stalna      | 1.35 |
|       |          | LC3-signali     | 1.35 |
|       |          | LC4-vzdrzevanje | 0.00 |
|       |          | LC5-sneg        | 0.75 |
|       |          | LC6.1.1-W(-Y)   | 1.50 |
|       |          | LC7.1-Aero(-Y)  | 1.50 |
| NC3.2 | Ultimate | LC1-lastna      | 1.35 |
|       |          | LC2-stalna      | 1.35 |
|       |          | LC3-signali     | 1.35 |
|       |          | LC4-vzdrzevanje | 0.00 |
|       |          | LC5-sneg        | 0.75 |
|       |          | LC6.2.1-W(+X)   | 1.50 |
|       |          | LC7.1-Aero(-Y)  | 1.50 |

## 6.Result classes

| Name      | List   |
|-----------|--|
| MSN-lin   | MSN1 - Envelope - ultimate<br>MSN2 - Envelope - ultimate<br>MSN3 - Envelope - ultimate<br>MSN4 - Envelope - ultimate<br>MSN5 - Envelope - ultimate<br>MSN6 - Envelope - ultimate |
| MSU-lin   | MSU1 - Envelope - serviceability<br>MSU2 - Envelope - serviceability<br>MSU3 - Envelope - serviceability<br>MSU4 - Envelope - serviceability                                     |
| MSN-nelin | NC1<br>NC2.1<br>NC3.1<br>NC4<br>NC2.2<br>NC3.2   |

## 7.Calculation protocol

| Calculation protocol               |                    |     |      |       |
|------------------------------------|--------------------|-----|------|-------|
| <b>Linear calculation</b>          |                    |     |      |       |
| Number of 2D elements              | 0                  |     |      |       |
| Number of 1D elements              | 440                |     |      |       |
| Number of mesh nodes               | 404                |     |      |       |
| Number of equations                | 2424               |     |      |       |
| Loadcases                          | LC1-lastna         |     |      |       |
|                                    | LC2-stalna         |     |      |       |
|                                    | LC3-signali        |     |      |       |
|                                    | LC4-vzdrzevanje    |     |      |       |
|                                    | LC5-sneg           |     |      |       |
|                                    | LC6.1.1-W(-Y)      |     |      |       |
|                                    | LC6.2.1-W(+X)      |     |      |       |
|                                    | LC7.1-Aero(-Y)     |     |      |       |
|                                    | LC7.2-Aero(+Y)     |     |      |       |
|                                    | LC6.1.2-W(+Y)      |     |      |       |
|                                    | LC6.2.2-W(-X)      |     |      |       |
| Bending theory                     | Mindlin            |     |      |       |
| Start of calculation               | 29.01.2021 10:23   |     |      |       |
| End of calculation                 | 29.01.2021 10:23   |     |      |       |
| <b>Sum of loads and reactions.</b> |                    |     |      |       |
|                                    | [kN]               | X   | Y    | Z     |
| Loadcase LC1-lastna                | loads              | 0.0 | -0.0 | -49.6 |
|                                    | reactions in nodes | 0.0 | 0.0  | 49.6  |
|                                    | reactions on lines | 0.0 | 0.0  | 0.0   |



|                          |                    |       |       |       |
|--------------------------|--------------------|-------|-------|-------|
|                          | contact 1D         | 0.0   | 0.0   | 0.0   |
|                          | contact 2D         | 0.0   | 0.0   | 0.0   |
| Loadcase LC2-stalna      | loads              | 0.0   | 0.0   | -22.2 |
|                          | reactions in nodes | 0.0   | 0.0   | 22.2  |
|                          | reactions on lines | 0.0   | 0.0   | 0.0   |
|                          | contact 1D         | 0.0   | 0.0   | 0.0   |
|                          | contact 2D         | 0.0   | 0.0   | 0.0   |
| Loadcase LC3-signali     | loads              | 0.0   | 0.0   | -10.3 |
|                          | reactions in nodes | 0.0   | 0.0   | 10.3  |
|                          | reactions on lines | 0.0   | 0.0   | 0.0   |
|                          | contact 1D         | 0.0   | 0.0   | 0.0   |
|                          | contact 2D         | 0.0   | 0.0   | 0.0   |
| Loadcase LC4-vzdrzevanje | loads              | 0.0   | 0.0   | -6.0  |
|                          | reactions in nodes | 0.0   | 0.0   | 6.0   |
|                          | reactions on lines | 0.0   | 0.0   | 0.0   |
|                          | contact 1D         | 0.0   | 0.0   | 0.0   |
|                          | contact 2D         | 0.0   | 0.0   | 0.0   |
| Loadcase LC5-sneg        | loads              | 0.0   | 0.0   | -14.9 |
|                          | reactions in nodes | 0.0   | 0.0   | 14.9  |
|                          | reactions on lines | 0.0   | 0.0   | 0.0   |
|                          | contact 1D         | 0.0   | 0.0   | 0.0   |
|                          | contact 2D         | 0.0   | 0.0   | 0.0   |
| Loadcase LC6.1.1-W(-Y)   | loads              | 0.0   | -13.8 | 0.0   |
|                          | reactions in nodes | 0.0   | 13.8  | 0.0   |
|                          | reactions on lines | 0.0   | 0.0   | 0.0   |
|                          | contact 1D         | 0.0   | 0.0   | 0.0   |
|                          | contact 2D         | 0.0   | 0.0   | 0.0   |
| Loadcase LC6.2.1-W(+X)   | loads              | 18.4  | 0.0   | 0.0   |
|                          | reactions in nodes | -18.4 | 0.0   | 0.0   |
|                          | reactions on lines | 0.0   | 0.0   | 0.0   |
|                          | contact 1D         | 0.0   | 0.0   | 0.0   |
|                          | contact 2D         | 0.0   | 0.0   | 0.0   |
| Loadcase LC7.1-Aero(-Y)  | loads              | 0.0   | -2.3  | -3.7  |
|                          | reactions in nodes | 0.0   | 2.3   | 3.7   |
|                          | reactions on lines | 0.0   | 0.0   | 0.0   |
|                          | contact 1D         | 0.0   | 0.0   | 0.0   |
|                          | contact 2D         | 0.0   | 0.0   | 0.0   |
| Loadcase LC7.2-Aero(+Y)  | loads              | 0.0   | 2.3   | 3.7   |
|                          | reactions in nodes | 0.0   | -2.3  | -3.7  |
|                          | reactions on lines | 0.0   | 0.0   | 0.0   |
|                          | contact 1D         | 0.0   | 0.0   | 0.0   |
|                          | contact 2D         | 0.0   | 0.0   | 0.0   |
| Loadcase LC6.1.2-W(+Y)   | loads              | 0.0   | 13.8  | 0.0   |
|                          | reactions in nodes | 0.0   | -13.8 | 0.0   |
|                          | reactions on lines | 0.0   | 0.0   | 0.0   |
|                          | contact 1D         | 0.0   | 0.0   | 0.0   |
|                          | contact 2D         | 0.0   | 0.0   | 0.0   |
| Loadcase LC6.2.2-W(-X)   | loads              | -18.4 | 0.0   | 0.0   |
|                          | reactions in nodes | 18.4  | 0.0   | 0.0   |
|                          | reactions on lines | 0.0   | 0.0   | 0.0   |
|                          | contact 1D         | 0.0   | 0.0   | 0.0   |
|                          | contact 2D         | 0.0   | 0.0   | 0.0   |

## 4. REZULTATI ANALIZE KONSTRUKCIJE

### 4.1. Notranje statične količine

#### LINEARNA ANALIZA - TPR

##### 8. Internal forces on member

Linear calculation, Extreme : Global, System : Principal

Selection : All

Class : MSN-lin

Cross-section : N1 - UNP300

| Member | Case   | dx [m] | N [kN]        | Vy [kN]      | Vz [kN]       | Mx [kNm]     | My [kNm]      | Mz [kNm]     |
|--------|--------|--------|---------------|--------------|---------------|--------------|---------------|--------------|
| B236   | MSN3/1 | 0.000  | <b>-23.40</b> | -0.28        | -6.75         | <b>0.35</b>  | -14.08        | 0.13         |
| B222   | MSN3/1 | 0.000  | <b>59.87</b>  | -3.82        | -12.38        | 0.10         | 14.89         | 0.83         |
| B239   | MSN5/2 | 0.812  | 48.55         | <b>-4.95</b> | 3.56          | 0.00         | 0.00          | -6.10        |
| B239   | MSN3/3 | 0.812  | -5.58         | <b>4.96</b>  | 7.02          | 0.00         | 0.00          | 6.10         |
| B221   | MSN1/4 | 0.000  | 46.02         | -0.08        | <b>-18.53</b> | -0.03        | 30.85         | 0.12         |
| B237   | MSN1/5 | 0.000  | 50.88         | -0.19        | <b>18.44</b>  | 0.03         | -30.71        | 0.17         |
| B236   | MSN5/6 | 0.000  | 23.22         | 0.18         | -7.63         | <b>-0.35</b> | -13.48        | -0.07        |
| B294   | MSN1/5 | 0.501  | 13.76         | -0.22        | -13.58        | -0.19        | <b>-30.86</b> | -0.04        |
| B279   | MSN1/4 | 0.501  | 8.97          | -0.12        | 13.52         | 0.19         | <b>30.99</b>  | -0.09        |
| B223   | MSN5/7 | 0.812  | 48.58         | -4.74        | -3.58         | 0.00         | 0.00          | <b>-6.12</b> |
| B223   | MSN3/8 | 0.812  | -5.55         | 4.75         | -7.05         | 0.00         | 0.00          | <b>6.13</b>  |

##### 9. Internal forces on member

Linear calculation, Extreme : Global, System : Principal

Selection : All

Class : MSN-lin

Cross-section : H1 - CFRHS100X100X5

| Member | Case    | dx [m] | N [kN]       | Vy [kN]      | Vz [kN]      | Mx [kNm]     | My [kNm]     | Mz [kNm]     |
|--------|---------|--------|--------------|--------------|--------------|--------------|--------------|--------------|
| B165   | MSN3/1  | 0.000  | <b>-2.17</b> | -1.97        | 0.21         | -1.19        | -0.14        | 0.76         |
| B165   | MSN5/6  | 0.000  | <b>2.07</b>  | 2.11         | -0.05        | 1.19         | 0.15         | -0.81        |
| B165   | MSN5/9  | 0.000  | -2.14        | <b>-2.01</b> | 0.18         | -1.19        | -0.15        | 0.77         |
| B165   | MSN3/10 | 0.000  | 2.04         | <b>2.15</b>  | -0.03        | 1.19         | 0.15         | <b>-0.82</b> |
| B166   | MSN3/11 | 0.760  | 1.30         | 0.89         | <b>-0.47</b> | 1.64         | -0.01        | 0.34         |
| B166   | MSN3/1  | 0.000  | -1.31        | -0.89        | <b>0.47</b>  | <b>-1.64</b> | <b>-0.29</b> | 0.33         |
| B166   | MSN5/6  | 0.000  | 1.30         | 0.89         | -0.34        | <b>1.64</b>  | 0.29         | -0.33        |
| B166   | MSN3/11 | 0.000  | 1.30         | 0.89         | -0.32        | 1.64         | <b>0.29</b>  | -0.33        |
| B165   | MSN3/10 | 0.760  | 2.04         | 2.15         | -0.18        | 1.19         | 0.07         | <b>0.81</b>  |

##### 10. Internal forces on member

Linear calculation, Extreme : Global, System : Principal

Selection : All

Class : MSN-lin

Cross-section : H2 - CFRHS80X80X4

| Member | Case    | dx [m] | N [kN]       | Vy [kN]      | Vz [kN]      | Mx [kNm]     | My [kNm]     | Mz [kNm]     |
|--------|---------|--------|--------------|--------------|--------------|--------------|--------------|--------------|
| B257   | MSN3/10 | 0.000  | <b>-0.84</b> | 0.34         | 0.08         | 0.66         | 0.00         | -0.13        |
| B257   | MSN5/9  | 0.000  | <b>0.80</b>  | -0.35        | 0.04         | -0.66        | 0.00         | 0.13         |
| B258   | MSN5/9  | 0.000  | 0.11         | <b>-0.37</b> | 0.44         | -0.58        | -0.13        | 0.14         |
| B258   | MSN3/10 | 0.000  | -0.24        | <b>0.44</b>  | -0.46        | 0.58         | 0.21         | <b>-0.17</b> |
| B169   | MSN3/10 | 0.760  | -0.18        | 0.41         | <b>-0.62</b> | 0.60         | <b>-0.21</b> | 0.16         |
| B169   | MSN5/9  | 0.000  | 0.04         | -0.34        | <b>0.51</b>  | -0.60        | -0.15        | 0.13         |
| B168   | MSN3/1  | 0.000  | 0.77         | -0.36        | 0.06         | <b>-0.68</b> | 0.00         | 0.14         |



|      |         |       |       |      |       |             |             |             |
|------|---------|-------|-------|------|-------|-------------|-------------|-------------|
| B168 | MSN5/6  | 0.000 | -0.81 | 0.35 | 0.06  | <b>0.68</b> | 0.00        | -0.13       |
| B169 | MSN3/10 | 0.000 | -0.18 | 0.41 | -0.53 | 0.60        | <b>0.23</b> | -0.16       |
| B258 | MSN3/10 | 0.760 | -0.24 | 0.44 | -0.56 | 0.58        | -0.18       | <b>0.17</b> |

### 11. Internal forces on member

Linear calculation, Extreme : Global, System : Principal  
 Selection : All  
 Class : MSN-lin  
 Cross-section : H3 - CFRHS60X60X4

| Member | Case    | dx [m] | N [kN]       | Vy [kN]      | Vz [kN]      | Mx [kNm]     | My [kNm]     | Mz [kNm]     |
|--------|---------|--------|--------------|--------------|--------------|--------------|--------------|--------------|
| B172   | MSN5/6  | 0.000  | <b>-9.47</b> | <b>-0.02</b> | -0.12        | -0.07        | 0.40         | 0.01         |
| B172   | MSN3/1  | 0.000  | <b>9.88</b>  | <b>0.03</b>  | -0.02        | 0.12         | -0.24        | -0.02        |
| B261   | MSN3/10 | 0.000  | -9.13        | -0.01        | <b>-0.15</b> | -0.06        | 0.43         | 0.01         |
| B260   | MSN3/10 | 1.445  | 8.18         | -0.01        | <b>0.14</b>  | -0.14        | -0.24        | 0.00         |
| B171   | MSN3/10 | 0.000  | 8.13         | 0.00         | 0.00         | <b>-0.15</b> | -0.35        | 0.00         |
| B170   | MSN3/1  | 0.000  | 6.81         | 0.01         | -0.06        | <b>0.13</b>  | -0.35        | -0.01        |
| B170   | MSN5/9  | 0.903  | 6.80         | 0.01         | 0.01         | 0.13         | <b>-0.37</b> | 0.00         |
| B170   | MSN3/10 | 1.445  | -6.78        | -0.01        | 0.11         | -0.11        | <b>0.44</b>  | 0.00         |
| B172   | MSN5/6  | 1.445  | -9.47        | -0.02        | -0.02        | -0.07        | 0.30         | <b>-0.02</b> |
| B172   | MSN3/1  | 1.445  | 9.88         | 0.03         | 0.11         | 0.12         | -0.18        | <b>0.03</b>  |

### 12. Internal forces on member

Linear calculation, Extreme : Global, System : Principal  
 Selection : All  
 Class : MSN-lin  
 Cross-section : D1 - CFCHS88.9X6

| Member | Case    | dx [m] | N [kN]        | Vy [kN]     | Vz [kN]      | Mx [kNm]     | My [kNm]    | Mz [kNm]    |
|--------|---------|--------|---------------|-------------|--------------|--------------|-------------|-------------|
| B152   | MSN1/4  | 2.968  | <b>-49.31</b> | 0.00        | -0.19        | 0.32         | 0.00        | 0.00        |
| B151   | MSN5/9  | 0.000  | <b>-11.16</b> | 0.00        | 0.14         | 0.53         | 0.00        | 0.00        |
| B151   | MSN5/6  | 0.000  | -28.71        | <b>0.00</b> | 0.14         | -0.53        | 0.00        | 0.00        |
| B151   | MSN3/1  | 0.000  | -27.94        | <b>0.00</b> | 0.19         | <b>0.53</b>  | 0.00        | 0.00        |
| B151   | MSN1/12 | 2.968  | -25.99        | 0.00        | <b>-0.19</b> | 0.32         | 0.00        | 0.00        |
| B151   | MSN1/13 | 0.000  | -32.13        | 0.00        | <b>0.19</b>  | 0.00         | 0.00        | 0.00        |
| B152   | MSN3/10 | 0.000  | -27.99        | 0.00        | 0.19         | <b>-0.53</b> | 0.00        | 0.00        |
| B151   | MSN1/14 | 0.000  | -42.49        | 0.00        | 0.19         | 0.00         | <b>0.00</b> | 0.00        |
| B151   | MSN1/15 | 1.484  | -32.77        | 0.00        | 0.00         | 0.32         | <b>0.14</b> | 0.00        |
| B151   | MSN3/10 | 0.000  | -45.49        | 0.00        | 0.19         | -0.53        | 0.00        | <b>0.00</b> |

### 13. Internal forces on member

Linear calculation, Extreme : Global, System : Principal  
 Selection : All  
 Class : MSN-lin  
 Cross-section : S1 - UNP300

| Member | Case    | dx [m] | N [kN]       | Vy [kN]       | Vz [kN]       | Mx [kNm]     | My [kNm]      | Mz [kNm]     |
|--------|---------|--------|--------------|---------------|---------------|--------------|---------------|--------------|
| B217   | MSN3/16 | 0.000  | <b>-0.98</b> | 10.41         | -45.10        | 0.10         | 17.15         | -4.03        |
| B217   | MSN5/9  | 0.000  | <b>0.81</b>  | -10.82        | 45.14         | -0.10        | -17.16        | 4.08         |
| B183   | MSN3/1  | 0.000  | 0.28         | <b>-11.77</b> | -0.78         | -0.04        | 0.30          | <b>4.41</b>  |
| B183   | MSN3/11 | 0.760  | -0.28        | <b>11.77</b>  | 0.80          | 0.04         | 0.30          | 4.41         |
| B217   | MSN5/6  | 0.000  | -0.95        | 10.47         | <b>-45.13</b> | <b>0.10</b>  | 17.15         | -4.03        |
| B217   | MSN3/1  | 0.000  | 0.79         | -10.88        | <b>45.17</b>  | <b>-0.10</b> | <b>-17.17</b> | 4.08         |
| B217   | MSN3/1  | 0.760  | 0.79         | -10.41        | 45.15         | -0.10        | <b>17.16</b>  | -4.01        |
| B183   | MSN5/7  | 0.760  | 0.28         | -11.36        | -0.80         | -0.04        | -0.30         | <b>-4.36</b> |

### 14. Internal forces on member

Linear calculation, Extreme : Global, System : Principal  
 Selection : All  
 Class : MSN-lin  
 Cross-section : S2 - 2Uc (UNP300; 0; 200)

| Member | Case    | dx [m] | N [kN]         | Vy [kN]      | Vz [kN]       | Mx [kNm]      | My [kNm]      | Mz [kNm]      |
|--------|---------|--------|----------------|--------------|---------------|---------------|---------------|---------------|
| B233   | MSN3/10 | 0.168  | <b>-121.56</b> | 7.49         | -22.86        | -6.78         | 33.67         | 10.25         |
| B233   | MSN5/9  | 0.000  | <b>69.25</b>   | -7.43        | 22.86         | 6.78          | 46.20         | -9.02         |
| B249   | MSN5/2  | 0.168  | 67.45          | <b>-7.59</b> | -23.88        | -6.78         | -58.95        | -10.31        |
| B249   | MSN3/17 | 0.168  | -117.13        | <b>7.65</b>  | 23.88         | 6.78          | -16.26        | 10.29         |
| B177   | MSN3/10 | 0.846  | 3.23           | -5.54        | <b>-58.71</b> | -6.10         | -49.65        | -4.44         |
| B178   | MSN3/1  | 0.846  | 3.26           | -4.74        | <b>58.75</b>  | 6.12          | 49.69         | -4.01         |
| B251   | MSN5/6  | 0.000  | -19.04         | 5.51         | 30.34         | <b>-23.63</b> | -3.84         | -2.18         |
| B251   | MSN3/1  | 0.000  | 23.34          | -5.42        | 12.65         | <b>23.65</b>  | 53.79         | 2.14          |
| B249   | MSN3/18 | 0.168  | -32.15         | 0.03         | -6.29         | 0.01          | <b>-84.54</b> | -0.01         |
| B233   | MSN3/18 | 0.168  | -32.15         | 0.03         | 6.29          | -0.01         | <b>84.54</b>  | -0.01         |
| B249   | MSN3/10 | 0.168  | 57.26          | -7.58        | -23.88        | -6.78         | -78.66        | <b>-10.32</b> |
| B249   | MSN5/9  | 0.168  | -109.73        | 7.64         | 23.88         | 6.78          | -5.05         | <b>10.30</b>  |

### 15. Internal forces on member

Nonlinear calculation, Extreme : Global, System : Principal

Selection : All

Class : MSN-nelin

Cross-section : N1 - UNP300

| Member | Case  | dx [m] | N [kN]        | Vy [kN]      | Vz [kN]       | Mx [kNm]     | My [kNm]      | Mz [kNm]     |
|--------|-------|--------|---------------|--------------|---------------|--------------|---------------|--------------|
| B279   | NC3.2 | 0.000  | <b>-15.16</b> | 0.28         | 7.01          | -0.50        | 14.25         | -0.18        |
| B238   | NC3.2 | 0.700  | <b>61.33</b>  | -4.24        | 11.02         | -0.16        | -6.96         | -1.97        |
| B239   | NC3.2 | 0.812  | 60.37         | <b>-5.16</b> | 6.17          | <b>0.04</b>  | -0.04         | <b>-6.23</b> |
| B223   | NC3.2 | 0.000  | -2.25         | <b>5.04</b>  | -9.66         | -0.10        | 7.15          | 2.23         |
| B221   | NC1   | 0.000  | 36.37         | 0.09         | <b>-18.09</b> | 0.00         | 30.17         | -0.01        |
| B237   | NC1   | 0.000  | 36.31         | -0.09        | <b>18.03</b>  | 0.00         | -30.15        | 0.01         |
| B236   | NC3.2 | 0.501  | 23.63         | -0.10        | -13.39        | <b>-0.73</b> | -28.19        | 0.05         |
| B294   | NC1   | 0.501  | 0.05          | -0.08        | -13.19        | 0.00         | <b>-30.15</b> | 0.01         |
| B220   | NC1   | 0.501  | 0.05          | 0.09         | 13.18         | 0.00         | <b>30.17</b>  | -0.01        |
| B223   | NC3.2 | 0.812  | -2.25         | 5.02         | -7.84         | 0.03         | 0.04          | <b>6.32</b>  |

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### 16. Internal forces on member

Nonlinear calculation, Extreme : Global, System : Principal

Selection : All

Class : MSN-nelin

Cross-section : H1 - CFRHS100X100X5

| Member | Case  | dx [m] | N [kN]       | Vy [kN]      | Vz [kN]      | Mx [kNm]    | My [kNm]     | Mz [kNm]     |
|--------|-------|--------|--------------|--------------|--------------|-------------|--------------|--------------|
| B164   | NC3.2 | 0.000  | <b>-0.51</b> | -1.01        | <b>0.27</b>  | 1.16        | -0.09        | 0.41         |
| B165   | NC3.2 | 0.570  | <b>2.16</b>  | 2.27         | -0.17        | 1.20        | 0.08         | 0.43         |
| B253   | NC3.2 | 0.760  | -0.48        | <b>-1.58</b> | 0.11         | 1.01        | 0.06         | -0.58        |
| B165   | NC3.2 | 0.000  | 2.16         | <b>2.27</b>  | -0.07        | 1.21        | 0.14         | <b>-0.86</b> |
| B166   | NC3.2 | 0.760  | 1.31         | 0.88         | <b>-0.48</b> | 1.64        | -0.03        | 0.38         |
| B254   | NC1   | 0.000  | -0.08        | 0.12         | 0.09         | <b>0.00</b> | 0.00         | -0.04        |
| B166   | NC3.2 | 0.000  | 1.31         | 0.88         | -0.33        | <b>1.66</b> | <b>0.27</b>  | -0.30        |
| B167   | NC3.2 | 0.760  | -0.11        | 0.86         | -0.46        | 1.59        | <b>-0.16</b> | 0.37         |
| B165   | NC3.2 | 0.760  | 2.16         | 2.27         | -0.21        | 1.20        | 0.04         | <b>0.86</b>  |

### 17. Internal forces on member

Nonlinear calculation, Extreme : Global, System : Principal

Selection : All

Class : MSN-nelin

Cross-section : H2 - CFRHS80X80X4

| Member | Case  | dx [m] | N [kN]       | Vy [kN] | Vz [kN] | Mx [kNm] | My [kNm] | Mz [kNm] |
|--------|-------|--------|--------------|---------|---------|----------|----------|----------|
| B257   | NC3.2 | 0.000  | <b>-0.83</b> | 0.34    | 0.07    | 0.66     | -0.01    | -0.12    |
| B257   | NC4   | 0.000  | <b>0.00</b>  | 0.00    | 0.05    | 0.00     | 0.00     | 0.00     |

|      |       |       |       |              |              |             |              |              |
|------|-------|-------|-------|--------------|--------------|-------------|--------------|--------------|
| B168 | NC1   | 0.760 | -0.04 | <b>-0.01</b> | -0.02        | 0.00        | 0.02         | 0.00         |
| B258 | NC3.2 | 0.760 | -0.18 | <b>0.42</b>  | -0.57        | 0.58        | -0.19        | <b>0.17</b>  |
| B169 | NC3.2 | 0.760 | -0.12 | 0.39         | <b>-0.63</b> | 0.60        | <b>-0.22</b> | 0.16         |
| B257 | NC1   | 0.000 | -0.04 | -0.01        | <b>0.07</b>  | 0.00        | 0.00         | 0.00         |
| B169 | NC1   | 0.000 | -0.12 | 0.06         | -0.04        | <b>0.00</b> | 0.06         | -0.02        |
| B168 | NC3.2 | 0.000 | -0.82 | 0.35         | 0.07         | <b>0.68</b> | -0.01        | -0.12        |
| B169 | NC3.2 | 0.000 | -0.12 | 0.39         | -0.54        | 0.61        | <b>0.23</b>  | -0.14        |
| B258 | NC3.2 | 0.000 | -0.18 | 0.42         | -0.47        | 0.58        | 0.20         | <b>-0.15</b> |

### 18. Internal forces on member

Nonlinear calculation, Extreme : Global, System : Principal

Selection : All

Class : MSN-nelin

Cross-section : H3 - CFRHS60X60X4

| Member | Case  | dx [m] | N [kN]       | Vy [kN]      | Vz [kN]      | Mx [kNm]     | My [kNm]     | Mz [kNm]     |
|--------|-------|--------|--------------|--------------|--------------|--------------|--------------|--------------|
| B172   | NC3.2 | 0.000  | <b>-9.63</b> | -0.02        | -0.11        | -0.07        | 0.44         | <b>0.01</b>  |
| B260   | NC3.2 | 1.445  | <b>8.17</b>  | -0.01        | 0.12         | -0.14        | -0.25        | 0.00         |
| B172   | NC3.2 | 0.542  | -9.63        | <b>-0.02</b> | -0.08        | -0.06        | 0.38         | 0.00         |
| B172   | NC1   | 1.445  | 0.35         | <b>0.01</b>  | 0.04         | 0.04         | 0.10         | 0.00         |
| B261   | NC3.2 | 0.000  | -9.39        | -0.01        | <b>-0.12</b> | -0.06        | 0.43         | 0.01         |
| B260   | NC3.1 | 1.445  | 4.94         | -0.01        | <b>0.12</b>  | -0.10        | -0.10        | 0.00         |
| B171   | NC3.2 | 1.445  | 8.11         | -0.01        | 0.11         | <b>-0.14</b> | -0.26        | 0.00         |
| B261   | NC1   | 1.445  | 0.33         | 0.01         | 0.05         | <b>0.04</b>  | 0.10         | 0.00         |
| B171   | NC3.2 | 0.000  | 8.11         | 0.00         | 0.02         | -0.14        | <b>-0.36</b> | 0.01         |
| B170   | NC3.2 | 1.445  | -6.78        | -0.01        | 0.09         | -0.12        | <b>0.44</b>  | -0.01        |
| B172   | NC3.2 | 1.445  | -9.63        | -0.02        | -0.04        | -0.06        | 0.33         | <b>-0.02</b> |

### 19. Internal forces on member

Nonlinear calculation, Extreme : Global, System : Principal

Selection : All

Class : MSN-nelin

Cross-section : D1 - CFCHS88.9X6

| Member | Case  | dx [m] | N [kN]        | Vy [kN]      | Vz [kN]      | Mx [kNm]     | My [kNm]    | Mz [kNm]     |
|--------|-------|--------|---------------|--------------|--------------|--------------|-------------|--------------|
| B152   | NC1   | 2.968  | <b>-48.24</b> | 0.00         | <b>-0.22</b> | 0.00         | 0.00        | 0.00         |
| B274   | NC4   | 0.000  | <b>-18.76</b> | 0.00         | 0.14         | 0.00         | 0.00        | 0.00         |
| B151   | NC3.2 | 0.000  | -46.59        | <b>-0.01</b> | <b>0.22</b>  | -0.54        | 0.01        | -0.01        |
| B151   | NC1   | 0.000  | -47.85        | <b>0.00</b>  | 0.21         | 0.00         | 0.00        | 0.00         |
| B152   | NC3.2 | 0.000  | -29.28        | 0.00         | 0.21         | <b>-0.54</b> | 0.01        | -0.01        |
| B274   | NC1   | 1.484  | -45.48        | 0.00         | 0.00         | <b>0.00</b>  | 0.16        | 0.00         |
| B151   | NC1   | 2.968  | -48.17        | 0.00         | -0.22        | 0.00         | <b>0.00</b> | 0.00         |
| B151   | NC3.2 | 1.484  | -46.75        | 0.00         | 0.00         | -0.54        | <b>0.17</b> | -0.01        |
| B151   | NC3.2 | 2.968  | -46.91        | -0.01        | -0.22        | -0.54        | 0.01        | <b>-0.01</b> |
| B151   | NC1   | 1.484  | -48.01        | 0.00         | 0.00         | 0.00         | 0.17        | <b>0.00</b>  |

### 20. Internal forces on member

Nonlinear calculation, Extreme : Global, System : Principal

Selection : All

Class : MSN-nelin

Cross-section : S1 - UNP300

| Member | Case  | dx [m] | N [kN]       | Vy [kN]      | Vz [kN]       | Mx [kNm]    | My [kNm]      | Mz [kNm]     |
|--------|-------|--------|--------------|--------------|---------------|-------------|---------------|--------------|
| B217   | NC3.2 | 0.000  | <b>-1.31</b> | 10.77        | -45.73        | <b>0.16</b> | <b>17.44</b>  | -4.17        |
| B250   | NC3.2 | 0.380  | <b>0.72</b>  | 11.10        | -1.04         | 0.09        | 0.02          | -0.02        |
| B180   | NC1   | 0.000  | 0.01         | <b>-0.24</b> | -0.02         | 0.00        | 0.01          | 0.03         |
| B183   | NC3.2 | 0.760  | -0.22        | <b>12.11</b> | 0.76          | 0.02        | 0.30          | <b>4.54</b>  |
| B217   | NC3.2 | 0.760  | -1.31        | 11.36        | <b>-45.75</b> | 0.05        | <b>-17.32</b> | 4.23         |
| B180   | NC3.2 | 0.000  | -0.03        | 11.14        | <b>13.42</b>  | 0.08        | -5.10         | -4.29        |
| B276   | NC1   | 0.380  | -0.09        | 0.00         | 0.04          | <b>0.00</b> | 0.00          | -0.02        |
| B183   | NC3.2 | 0.000  | -0.22        | 11.63        | 0.79          | 0.06        | -0.29         | <b>-4.48</b> |

## 21. Internal forces on member

Nonlinear calculation, Extreme : Global, System : Principal

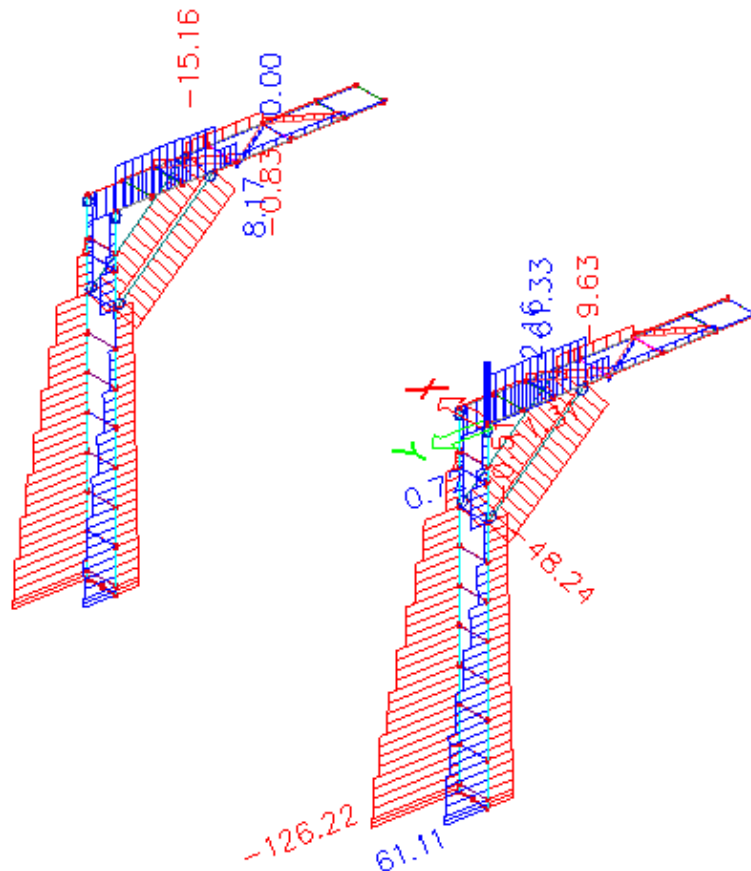
Selection : All

Class : MSN-nelin

Cross-section : S2 - 2Uc (UNP300; 0; 200)

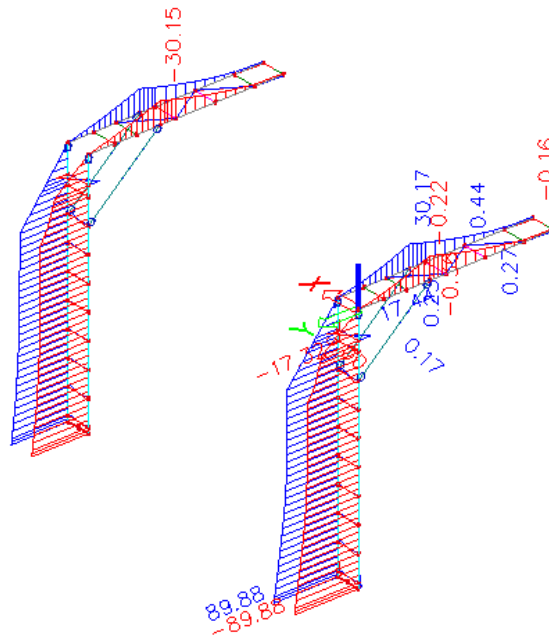
| Member | Case  | dx [m] | N [kN]         | Vy [kN]      | Vz [kN]       | Mx [kNm]      | My [kNm]      | Mz [kNm]      |
|--------|-------|--------|----------------|--------------|---------------|---------------|---------------|---------------|
| B233   | NC3.2 | 0.168  | <b>-126.22</b> | 7.68         | -22.81        | -6.94         | 38.25         | <b>10.52</b>  |
| B249   | NC3.2 | 0.000  | <b>61.11</b>   | -7.59        | -24.81        | -6.99         | -79.75        | -9.27         |
| B247   | NC3.2 | 0.786  | 59.48          | <b>-7.75</b> | -17.20        | -9.87         | -79.75        | -9.95         |
| B233   | NC3.2 | 0.000  | -126.01        | <b>7.69</b>  | -22.80        | -6.94         | 42.08         | 9.22          |
| B177   | NC3.2 | 0.846  | 3.77           | -5.76        | <b>-60.47</b> | -6.21         | -51.11        | -4.69         |
| B251   | NC3.2 | 0.786  | -18.76         | 5.80         | <b>44.83</b>  | -24.00        | 47.08         | 2.45          |
| B252   | NC3.2 | 0.000  | 24.76          | -5.28        | -13.64        | <b>-24.09</b> | -55.37        | 2.14          |
| B298   | NC1   | 0.000  | 7.77           | 0.10         | -34.68        | <b>0.02</b>   | -29.30        | -0.02         |
| B249   | NC2.2 | 0.168  | -32.67         | 0.03         | -6.79         | 0.01          | <b>-89.88</b> | -0.01         |
| B233   | NC2.2 | 0.168  | -32.67         | 0.03         | 6.79          | -0.01         | <b>89.88</b>  | -0.01         |
| B249   | NC3.2 | 0.168  | 60.89          | -7.72        | -24.85        | -6.99         | -83.93        | <b>-10.56</b> |

N (kN)

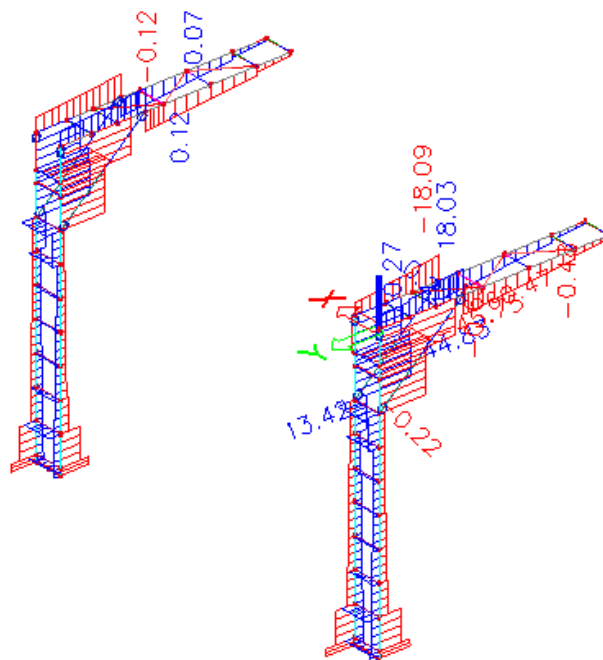




My (kNm)



Vz (kN)



## 4.2. Kontrola elementov

### 22.EC-EN 1993 Steel check ULS

Linear calculation  
 Class: MSN-lin  
 Coordinate system: Principal  
 Extreme 1D: Cross-section  
 Selection: All

#### Overall Unity Check

| Name | dx [m] | Case   | Cross-section             | Material | UC_Overall [-] | UC_Sec [-] | UC_Stab [-] |
|------|--------|--------|---------------------------|----------|----------------|------------|-------------|
| B166 | 0.000  | MSN3/1 | H1 - CFRHS100X100X5       | S 235    | 0.13           | 0.13       | 0.03        |
| B168 | 0.000  | MSN3/1 | H2 - CFRHS80X80X4         | S 235    | 0.11           | 0.11       | 0.00        |
| B172 | 0.000  | MSN3/2 | H3 - CFRHS60X60X4         | S 235    | 0.16           | 0.11       | 0.16        |
| B239 | 0.812  | MSN3/1 | N1 - UNP300               | S 235    | 0.27           | 0.20       | 0.27        |
| B231 | 0.786  | MSN3/1 | S2 - 2Uc (UNP300; 0; 200) | S 235    | 0.39           | 0.39       | 0.00        |
| B217 | 0.000  | MSN3/1 | S1 - UNP300               | S 235    | 0.25           | 0.25       | 0.00        |
| B152 | 2.968  | MSN1/3 | D1 - CFCHS88.9X6          | S 235    | 0.29           | 0.13       | 0.29        |

### 23.Stress

Linear calculation, Extreme : Cross-section  
 Selection : All  
 Class : MSN-lin  
 Values : von Mises

| Member | Case    | dx [m] | Normal - [MPa] | Normal + [MPa] | Shear [MPa] | von Mises [MPa] |
|--------|---------|--------|----------------|----------------|-------------|-----------------|
| B166   | MSN3/1  | 0.000  | -11.5          |                | 19.3        | 35.3            |
| B165   | MSN3/10 | 0.000  |                | 18.0           | 14.9        | 31.4            |
| B166   | MSN3/11 | 0.570  |                | 4.7            | 19.3        | 33.7            |
| B169   | MSN3/10 | 0.000  | -13.3          |                | 14.1        | 27.9            |
| B168   | MSN3/1  | 0.760  |                | 5.6            | 15.1        | 26.8            |
| B168   | MSN3/1  | 0.190  |                | 1.1            | 15.3        | 26.5            |
| B172   | MSN3/10 | 0.000  | -41.7          |                | 2.6         | 42.0            |
| B170   | MSN3/10 | 1.445  | -38.5          |                | 4.6         | 39.3            |
| B234   | MSN3/1  | 0.000  | -9.7           |                | 6.1         | 14.3            |
| B223   | MSN3/1  | 0.812  |                | 100.3          | 0.0         | 100.3           |
| B220   | MSN3/1  | 0.376  |                | 50.8           | 18.4        | 60.0            |
| B231   | MSN1/14 | 0.197  | -78.1          |                | 0.5         | 78.1            |
| B249   | MSN3/10 | 0.168  |                | 92.6           | 9.3         | 94.0            |
| B252   | MSN3/10 | 0.786  |                | 58.5           | 26.2        | 74.0            |
| B233   | MSN3/1  | 0.168  |                | 92.5           | 11.4        | 94.6            |
| B217   | MSN3/1  | 0.000  | -92.2          |                | 4.4         | 92.5            |
| B217   | MSN3/1  | 0.570  |                | 45.9           | 4.4         | 46.6            |
| B217   | MSN3/1  | 0.380  |                | 0.1            | 23.2        | 40.1            |
| B152   | MSN1/4  | 1.484  | -36.0          |                | 4.9         | 37.0            |
| B152   | MSN3/1  | 0.000  | -29.1          |                | 8.4         | 32.6            |
| B152   | MSN1/4  | 1.484  | -36.0          |                | 4.9         | 37.0            |



### EC-EN 1993 Steel check ULS

Values: **UC** Overall

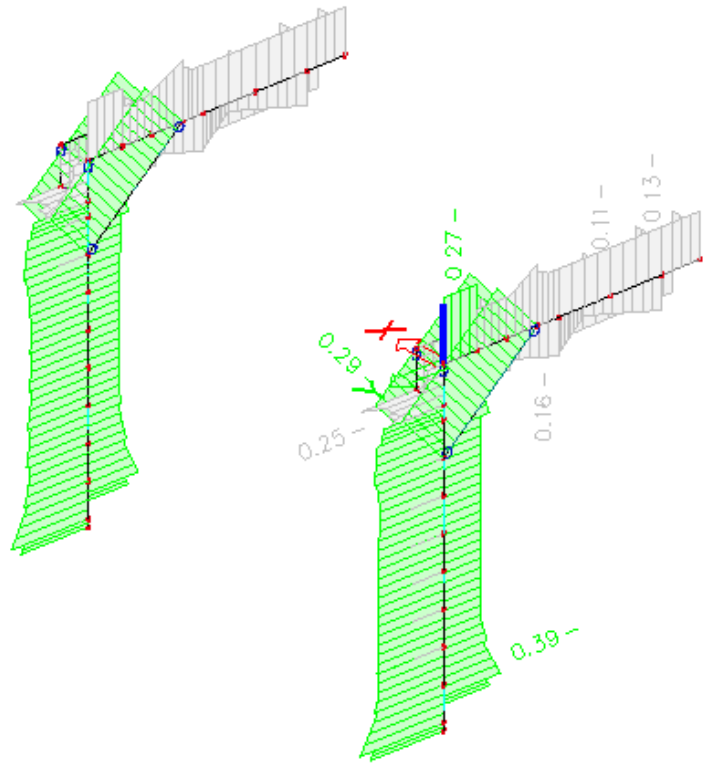
Linear calculation

Class: MSN-lin

Coordinate system: Principal

Extreme 1D: Cross-section

Selection: All



## 24.EC-EN 1993 Steel check ULS

Nonlinear calculation  
Class: MSN-nelin  
Coordinate system: Principal  
Extreme 1D: Cross-section  
Selection: All

### Overall Unity Check

| Name | dx [m] | Case  | Cross-section             | Material | UC_Overall [-] | UC_Sec [-] | UC_Stab [-] |
|------|--------|-------|---------------------------|----------|----------------|------------|-------------|
| B166 | 0.000  | NC3.2 | H1 - CFRHS100X100X5       | S 235    | 0.14           | 0.14       | 0.00        |
| B168 | 0.000  | NC3.2 | H2 - CFRHS80X80X4         | S 235    | 0.11           | 0.11       | 0.01        |
| B172 | 0.000  | NC3.2 | H3 - CFRHS60X60X4         | S 235    | 0.16           | 0.11       | 0.16        |
| B239 | 0.812  | NC3.2 | N1 - UNP300               | S 235    | 0.25           | 0.25       | 0.00        |
| B249 | 0.168  | NC3.2 | S2 - 2Uc (UNP300; 0; 200) | S 235    | 0.42           | 0.42       | 0.00        |
| B217 | 0.760  | NC3.2 | S1 - UNP300               | S 235    | 0.26           | 0.26       | 0.18        |
| B152 | 2.968  | NC1   | D1 - CFCHS88.9X6          | S 235    | 0.28           | 0.13       | 0.28        |

## 25.Stress

Nonlinear calculation, Extreme : Cross-section  
Selection : All  
Class : MSN-nelin  
Values : von Mises

| Member | Case  | dx [m] | Normal - [MPa] | Normal + [MPa] | Shear [MPa] | von Mises [MPa] |
|--------|-------|--------|----------------|----------------|-------------|-----------------|
| B253   | NC3.2 | 0.000  | -12.4          |                | 12.6        | 25.1            |
| B165   | NC3.2 | 0.000  |                | 18.7           | 15.2        | 32.3            |
| B166   | NC3.2 | 0.190  |                | 6.4            | 19.4        | 34.1            |
| B166   | NC3.2 | 0.000  |                | 10.6           | 19.3        | 35.1            |
| B169   | NC3.2 | 0.760  | -12.9          |                | 14.3        | 27.9            |
| B168   | NC3.2 | 0.190  | -0.8           |                | 15.3        | 26.6            |
| B172   | NC3.2 | 0.000  | -41.9          |                | 2.8         | 42.2            |
| B171   | NC3.2 | 0.000  |                | 34.7           | 5.7         | 36.1            |
| B171   | NC3.2 | 1.445  |                | 27.7           | 5.8         | 29.5            |
| B223   | NC3.2 | 0.812  | -93.6          |                | 1.3         | 93.6            |
| B239   | NC3.2 | 0.812  |                | 102.2          | 1.9         | 102.2           |
| B236   | NC3.2 | 0.501  |                | 56.7           | 33.4        | 81.0            |
| B233   | NC2.2 | 0.168  | -86.7          |                | 0.9         | 86.8            |
| B249   | NC3.2 | 0.168  |                | 98.1           | 9.6         | 99.5            |
| B251   | NC3.2 | 0.000  | -4.4           |                | 32.6        | 56.7            |
| B217   | NC3.2 | 0.760  | -95.0          |                | 2.0         | 95.1            |
| B217   | NC3.2 | 0.000  |                | 93.9           | 7.0         | 94.7            |
| B217   | NC3.2 | 0.380  | -0.3           |                | 23.7        | 41.0            |
| B152   | NC1   | 1.484  | -36.2          |                | 0.0         | 36.2            |
| B151   | NC3.2 | 0.000  | -30.1          |                | 8.5         | 33.5            |
| B151   | NC3.2 | 1.484  | -35.5          |                | 8.3         | 38.3            |





### EC-EN 1993 Steel check ULS

Values: **UC** Overall

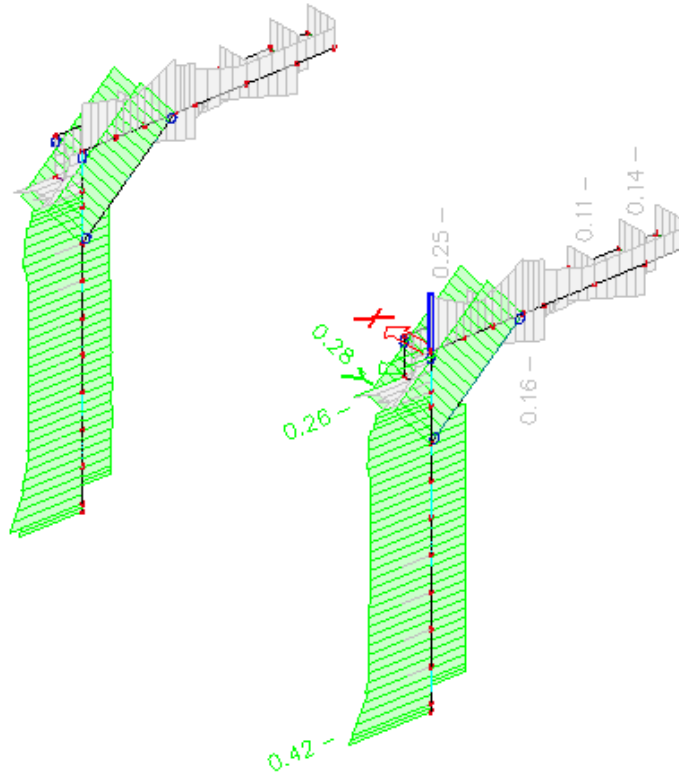
Nonlinear calculation

Class: MSN-nelin

Coordinate system: Principal

Extreme 1D: Cross-section

Selection: All



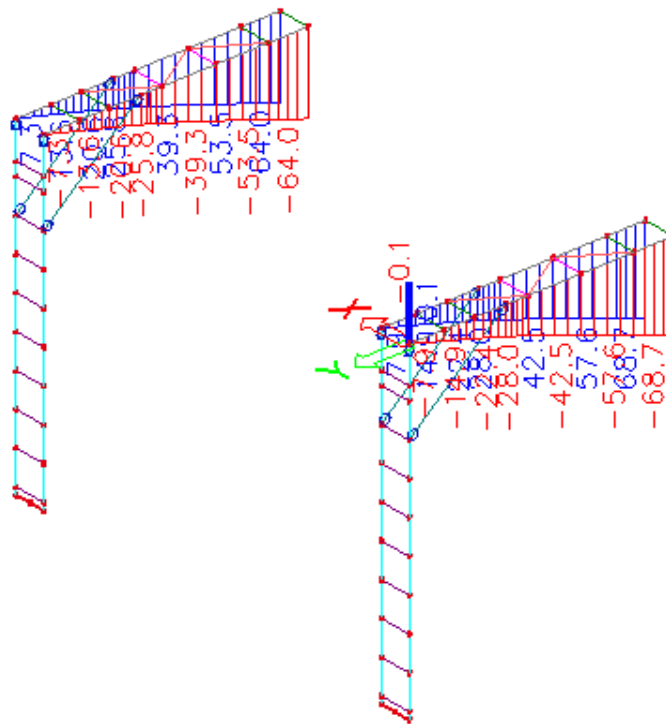
### 4.3. Kontrola pomikov

Pomioki pri MSU

- Vertikalni pomik

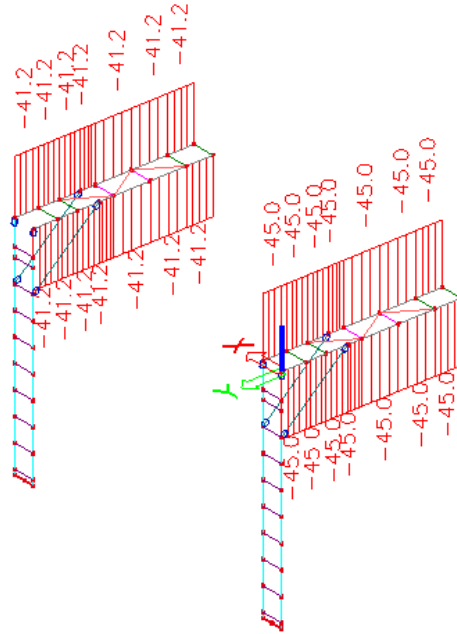
$$U_{max} = 6.9 \text{ cm} > L/100 \text{ (konzola)} = 610 \text{ cm} / 100 = 6.1 \text{ cm}$$

**konstrukcija se na koncu konzole nadviša za lastne in stalne vplive  
nadvišanje 5cm**



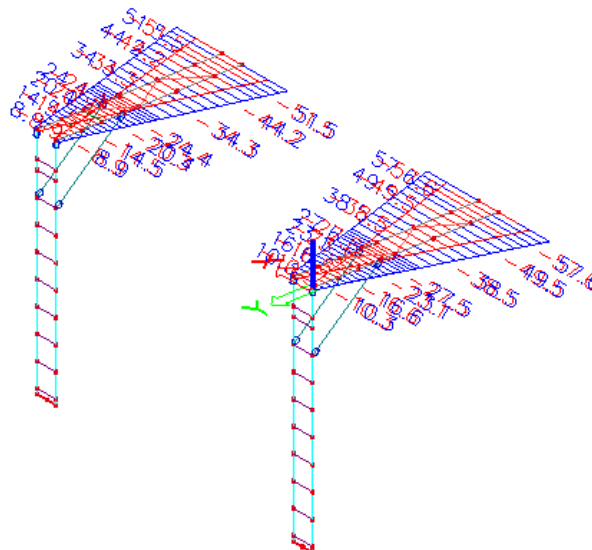
- Horizontalni pomik v smeri prečno na tir

$U_{max} = 4.5\text{cm} < H/150 = 760/150 = 5.0\text{cm}$



- Horizontalni pomik v smeri vzdolž tira

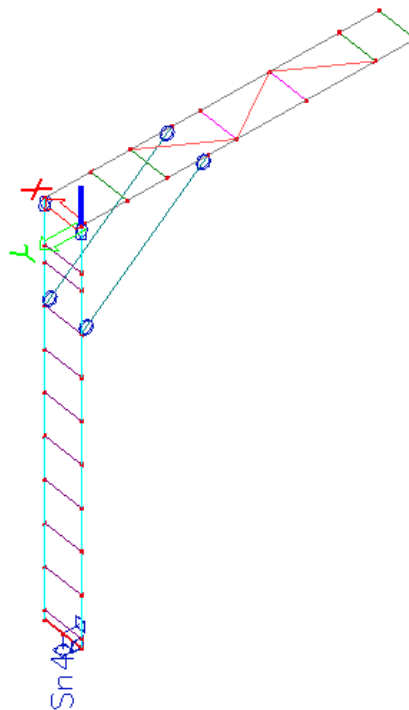
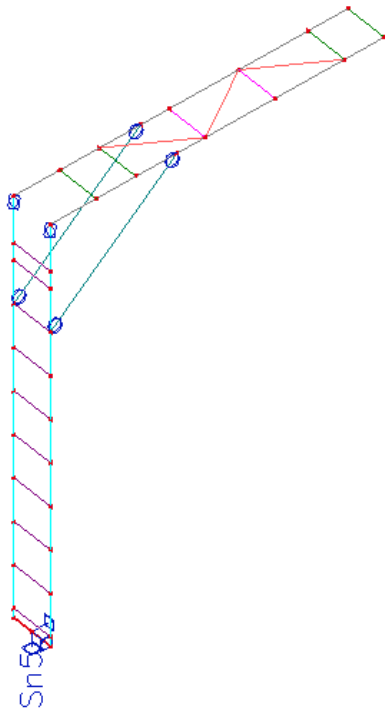
$U_{max} = 5.8\text{cm} \approx H/150 = 760/150 = 5.0\text{cm}$       zanemarljiva prekoračitev



## 4.4. Reakcije

Obravnavana sta dva primera:

- z enim signalom SN5
- z dvema signaloma SN4





## Mejno stanje nosilnosti - MSN

### 26.Reactions

Linear calculation, Extreme : Node

Selection : All

Class : MSN-lin

| Support  | Case    | Rx<br>[kN]    | Ry<br>[kN]    | Rz<br>[kN]   | Mx<br>[kNm]    | My<br>[kNm]   | Mz<br>[kNm]   |
|----------|---------|---------------|---------------|--------------|----------------|---------------|---------------|
| Sn4/N221 | MSN3/16 | <b>-15.07</b> | 1.03          | 58.73        | -95.31         | <b>-88.52</b> | <b>-31.32</b> |
| Sn4/N221 | MSN3/3  | <b>15.07</b>  | -1.03         | 61.01        | -94.52         | <b>88.52</b>  | <b>31.32</b>  |
| Sn4/N221 | MSN3/23 | 0.00          | <b>-12.57</b> | 61.01        | -37.78         | 0.00          | 0.00          |
| Sn4/N221 | MSN3/24 | 0.00          | <b>12.57</b>  | 58.73        | -152.06        | 0.00          | 0.00          |
| Sn4/N221 | MSN6/25 | 0.00          | 5.21          | <b>39.54</b> | -83.21         | 0.00          | 0.00          |
| Sn4/N221 | MSN1/26 | 0.00          | -5.90         | <b>70.31</b> | -98.73         | 0.00          | 0.00          |
| Sn4/N221 | MSN3/18 | 0.00          | 12.57         | 64.31        | <b>-169.08</b> | 0.00          | 0.00          |
| Sn4/N221 | MSN5/27 | 0.00          | -12.57        | 40.63        | <b>1.64</b>    | 0.00          | 0.00          |
| Sn5/N265 | MSN3/11 | <b>-12.61</b> | -1.03         | 52.06        | -73.58         | -72.67        | -28.47        |
| Sn5/N265 | MSN3/1  | <b>12.61</b>  | 1.03          | 60.93        | -108.42        | 72.67         | 28.47         |
| Sn5/N265 | MSN3/23 | 0.00          | <b>-10.11</b> | 57.64        | -49.72         | 0.00          | 0.00          |
| Sn5/N265 | MSN3/24 | 0.00          | <b>10.11</b>  | 55.35        | -132.28        | 0.00          | 0.00          |
| Sn5/N265 | MSN6/25 | 0.00          | 3.74          | <b>37.04</b> | -70.79         | 0.00          | 0.00          |
| Sn5/N265 | MSN2/28 | 0.00          | -4.42         | <b>66.51</b> | -100.91        | 0.00          | 0.00          |
| Sn5/N265 | MSN2/22 | 0.00          | 6.48          | 66.51        | <b>-149.97</b> | 0.00          | 0.00          |
| Sn5/N265 | MSN5/27 | 0.00          | -10.11        | 38.13        | <b>-11.31</b>  | 0.00          | 0.00          |
| Sn5/N265 | MSN3/16 | -12.61        | 1.03          | 55.35        | -91.39         | <b>-72.67</b> | <b>-28.47</b> |
| Sn5/N265 | MSN3/3  | 12.61         | -1.03         | 57.64        | -90.60         | <b>72.67</b>  | <b>28.47</b>  |

### 27.Reactions

Nonlinear calculation, Extreme : Node

Selection : All

Class : MSN-nelin

| Support  | Case  | Rx<br>[kN]    | Ry<br>[kN]    | Rz<br>[kN]   | Mx<br>[kNm]    | My<br>[kNm]   | Mz<br>[kNm]   |
|----------|-------|---------------|---------------|--------------|----------------|---------------|---------------|
| Sn4/N221 | NC3.2 | <b>-15.07</b> | 1.71          | 65.41        | -122.24        | <b>-92.02</b> | <b>-31.89</b> |
| Sn4/N221 | NC2.1 | <b>0.00</b>   | 7.95          | 69.89        | -168.71        | 0.00          | 0.00          |
| Sn4/N221 | NC4   | 0.00          | <b>-13.26</b> | <b>39.53</b> | <b>8.44</b>    | <b>0.00</b>   | 0.00          |
| Sn4/N221 | NC2.2 | 0.00          | <b>13.26</b>  | 65.41        | <b>-179.77</b> | 0.00          | <b>0.00</b>   |
| Sn4/N221 | NC1   | 0.00          | 0.00          | <b>74.24</b> | -146.66        | 0.00          | 0.00          |
| Sn5/N265 | NC3.2 | <b>-12.61</b> | 1.71          | 62.03        | -118.02        | <b>-75.79</b> | <b>-28.91</b> |
| Sn5/N265 | NC1   | <b>0.00</b>   | 0.00          | <b>67.87</b> | -138.44        | 0.00          | 0.00          |
| Sn5/N265 | NC4   | 0.00          | <b>-10.80</b> | <b>37.03</b> | <b>-4.66</b>   | <b>0.00</b>   | 0.00          |
| Sn5/N265 | NC2.2 | 0.00          | <b>10.80</b>  | 62.03        | <b>-159.44</b> | 0.00          | <b>0.00</b>   |

## Mejno stanje uporanosti - MSU

### 28.Reactions

Linear calculation, Extreme : Node

Selection : All

Class : MSU-lin

| Support  | Case    | Rx [kN]       | Ry [kN]      | Rz [kN]      | Mx [kNm]       | My [kNm]      | Mz [kNm]      |
|----------|---------|---------------|--------------|--------------|----------------|---------------|---------------|
| Sn4/N221 | MSU3/29 | <b>-10.04</b> | 0.69         | 43.38        | -69.94         | <b>-59.01</b> | <b>-20.88</b> |
| Sn4/N221 | MSU3/30 | <b>10.04</b>  | -0.69        | 44.90        | -69.42         | <b>59.01</b>  | <b>20.88</b>  |
| Sn4/N221 | MSU3/31 | 0.00          | <b>-8.38</b> | 44.90        | -31.59         | 0.00          | 0.00          |
| Sn4/N221 | MSU3/32 | 0.00          | <b>8.38</b>  | 43.38        | -107.77        | 0.00          | 0.00          |
| Sn4/N221 | MSU4/33 | 0.00          | 3.48         | <b>40.45</b> | -76.81         | 0.00          | 0.00          |
| Sn4/N221 | MSU1/34 | 0.00          | -3.93        | <b>51.10</b> | -72.22         | 0.00          | 0.00          |
| Sn4/N221 | MSU3/35 | 0.00          | 8.38         | 47.10        | <b>-119.12</b> | 0.00          | 0.00          |
| Sn4/N221 | MSU3/36 | 0.00          | -8.38        | 41.18        | <b>-20.24</b>  | 0.00          | 0.00          |
| Sn5/N265 | MSU3/37 | <b>-8.40</b>  | -0.69        | 38.68        | -55.16         | -48.45        | -18.98        |
| Sn5/N265 | MSU3/38 | <b>8.40</b>   | 0.69         | 44.60        | -78.39         | 48.45         | 18.98         |
| Sn5/N265 | MSU3/31 | 0.00          | <b>-6.74</b> | 42.40        | -39.25         | 0.00          | 0.00          |
| Sn5/N265 | MSU3/32 | 0.00          | <b>6.74</b>  | 40.88        | -94.30         | 0.00          | 0.00          |
| Sn5/N265 | MSU4/33 | 0.00          | 2.49         | <b>37.95</b> | -67.56         | 0.00          | 0.00          |
| Sn5/N265 | MSU2/39 | 0.00          | -2.95        | <b>48.32</b> | -73.38         | 0.00          | 0.00          |
| Sn5/N265 | MSU2/40 | 0.00          | 4.32         | 48.32        | <b>-106.09</b> | 0.00          | 0.00          |
| Sn5/N265 | MSU3/36 | 0.00          | -6.74        | 38.68        | <b>-27.91</b>  | 0.00          | 0.00          |
| Sn5/N265 | MSU3/29 | -8.40         | 0.69         | 40.88        | -67.04         | <b>-48.45</b> | <b>-18.98</b> |
| Sn5/N265 | MSU3/30 | 8.40          | -0.69        | 42.40        | -66.51         | <b>48.45</b>  | <b>18.98</b>  |



## Obtežni primeri - LC

### 29.Reactions

Linear calculation, Extreme : Node

Selection : All

Load cases : LC1-lastna

| Support  | Case       | Rx<br>[kN] | Ry<br>[kN] | Rz<br>[kN] | Mx<br>[kNm] | My<br>[kNm] | Mz<br>[kNm] |
|----------|------------|------------|------------|------------|-------------|-------------|-------------|
| Sn4/N221 | LC1-lastna | 0.00       | 0.00       | 24.80      | -20.93      | 0.00        | 0.00        |
| Sn5/N265 | LC1-lastna | 0.00       | 0.00       | 24.80      | -20.93      | 0.00        | 0.00        |

### 30.Reactions

Linear calculation, Extreme : Node

Selection : All

Load cases : LC2-stalna

| Support  | Case       | Rx<br>[kN] | Ry<br>[kN] | Rz<br>[kN] | Mx<br>[kNm] | My<br>[kNm] | Mz<br>[kNm] |
|----------|------------|------------|------------|------------|-------------|-------------|-------------|
| Sn4/N221 | LC2-stalna | 0.00       | 0.00       | 11.08      | -26.05      | 0.00        | 0.00        |
| Sn5/N265 | LC2-stalna | 0.00       | 0.00       | 11.08      | -26.05      | 0.00        | 0.00        |

### 31.Reactions

Linear calculation, Extreme : Node

Selection : All

Load cases : LC3-signali

| Support  | Case        | Rx<br>[kN] | Ry<br>[kN] | Rz<br>[kN] | Mx<br>[kNm] | My<br>[kNm] | Mz<br>[kNm] |
|----------|-------------|------------|------------|------------|-------------|-------------|-------------|
| Sn4/N221 | LC3-signali | 0.00       | 0.00       | 6.40       | -17.03      | 0.00        | 0.00        |
| Sn5/N265 | LC3-signali | 0.00       | 0.00       | 3.90       | -14.12      | 0.00        | 0.00        |

### 32.Reactions

Linear calculation, Extreme : Node

Selection : All

Load cases : LC4-vzdrzevanje

| Support  | Case            | Rx<br>[kN] | Ry<br>[kN] | Rz<br>[kN] | Mx<br>[kNm] | My<br>[kNm] | Mz<br>[kNm] |
|----------|-----------------|------------|------------|------------|-------------|-------------|-------------|
| Sn4/N221 | LC4-vzdrzevanje | 0.00       | 0.00       | 4.00       | -13.62      | 0.00        | 0.00        |
| Sn5/N265 | LC4-vzdrzevanje | 0.00       | 0.00       | 2.00       | -11.30      | 0.00        | 0.00        |

### 33.Reactions

Linear calculation, Extreme : Node

Selection : All

Load cases : LC5-sneg

| Support  | Case     | Rx<br>[kN] | Ry<br>[kN] | Rz<br>[kN] | Mx<br>[kNm] | My<br>[kNm] | Mz<br>[kNm] |
|----------|----------|------------|------------|------------|-------------|-------------|-------------|
| Sn4/N221 | LC5-sneg | 0.00       | 0.00       | 7.44       | -22.70      | 0.00        | 0.00        |
| Sn5/N265 | LC5-sneg | 0.00       | 0.00       | 7.44       | -22.70      | 0.00        | 0.00        |

### 34.Reactions

Linear calculation, Extreme : Node

Selection : All

Load cases : LC6.1.1-W(-Y)

| Support  | Case          | Rx<br>[kN] | Ry<br>[kN] | Rz<br>[kN] | Mx<br>[kNm] | My<br>[kNm] | Mz<br>[kNm] |
|----------|---------------|------------|------------|------------|-------------|-------------|-------------|
| Sn4/N221 | LC6.1.1-W(-Y) | 0.00       | 7.70       | 0.00       | -37.83      | 0.00        | 0.00        |
| Sn5/N265 | LC6.1.1-W(-Y) | 0.00       | 6.06       | 0.00       | -27.26      | 0.00        | 0.00        |



### 35.Reactions

Linear calculation, Extreme : Node

Selection : All

Load cases : LC6.2.1-W(+X)

| Support  | Case          | Rx<br>[kN] | Ry<br>[kN] | Rz<br>[kN] | Mx<br>[kNm] | My<br>[kNm] | Mz<br>[kNm] |
|----------|---------------|------------|------------|------------|-------------|-------------|-------------|
| Sn4/N221 | LC6.2.1-W(+X) | -10.04     | 0.00       | 0.00       | 0.00        | -59.01      | -20.88      |
| Sn5/N265 | LC6.2.1-W(+X) | -8.40      | 0.00       | 0.00       | 0.00        | -48.45      | -18.98      |

### 36.Reactions

Linear calculation, Extreme : Node

Selection : All

Load cases : LC6.1.2-W(+Y)

| Support  | Case          | Rx<br>[kN] | Ry<br>[kN] | Rz<br>[kN] | Mx<br>[kNm] | My<br>[kNm] | Mz<br>[kNm] |
|----------|---------------|------------|------------|------------|-------------|-------------|-------------|
| Sn4/N221 | LC6.1.2-W(+Y) | 0.00       | -7.70      | 0.00       | 37.83       | 0.00        | 0.00        |
| Sn5/N265 | LC6.1.2-W(+Y) | 0.00       | -6.06      | 0.00       | 27.26       | 0.00        | 0.00        |

### 37.Reactions

Linear calculation, Extreme : Node

Selection : All

Load cases : LC6.2.2-W(-X)

| Support  | Case          | Rx<br>[kN] | Ry<br>[kN] | Rz<br>[kN] | Mx<br>[kNm] | My<br>[kNm] | Mz<br>[kNm] |
|----------|---------------|------------|------------|------------|-------------|-------------|-------------|
| Sn4/N221 | LC6.2.2-W(-X) | 10.04      | 0.00       | 0.00       | 0.00        | 59.01       | 20.88       |
| Sn5/N265 | LC6.2.2-W(-X) | 8.40       | 0.00       | 0.00       | 0.00        | 48.45       | 18.98       |

### 38.Reactions

Linear calculation, Extreme : Node

Selection : All

Load cases : LC7.1-Aero(-Y)

| Support  | Case           | Rx<br>[kN] | Ry<br>[kN] | Rz<br>[kN] | Mx<br>[kNm] | My<br>[kNm] | Mz<br>[kNm] |
|----------|----------------|------------|------------|------------|-------------|-------------|-------------|
| Sn4/N221 | LC7.1-Aero(-Y) | 0.00       | 1.14       | 1.83       | -9.90       | 0.00        | 0.00        |
| Sn5/N265 | LC7.1-Aero(-Y) | 0.00       | 1.14       | 1.83       | -9.90       | 0.00        | 0.00        |

### 39.Reactions

Linear calculation, Extreme : Node

Selection : All

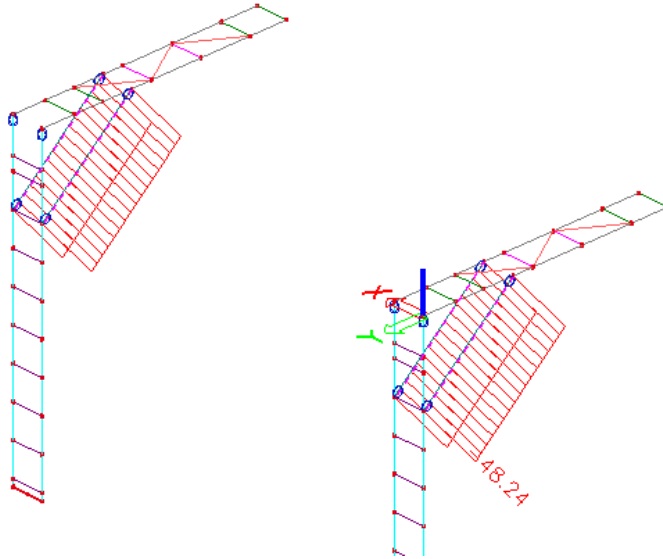
Load cases : LC7.2-Aero(+Y)

| Support  | Case           | Rx<br>[kN] | Ry<br>[kN] | Rz<br>[kN] | Mx<br>[kNm] | My<br>[kNm] | Mz<br>[kNm] |
|----------|----------------|------------|------------|------------|-------------|-------------|-------------|
| Sn4/N221 | LC7.2-Aero(+Y) | 0.00       | -1.14      | -1.83      | 9.90        | 0.00        | 0.00        |
| Sn5/N265 | LC7.2-Aero(+Y) | 0.00       | -1.14      | -1.83      | 9.90        | 0.00        | 0.00        |



## 4.5. Detajli

- diagonalna opora  $\phi 88.9/6$

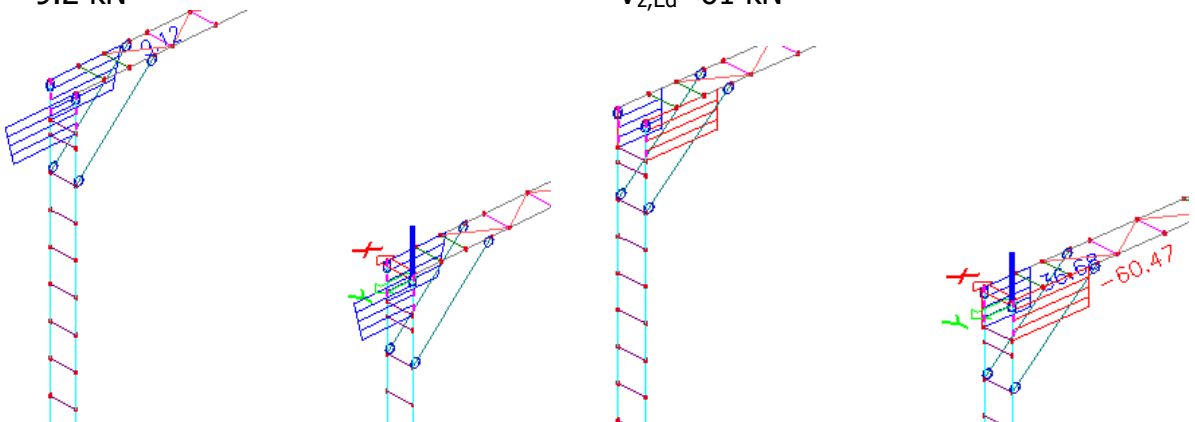


priključek 2xM20 8.8  $F_{v,Rd}=2 \times 94.1=188 \text{ kN} > F_{v,Rd}=49 \text{ kN}$

- priključek nosilca NPU300 na stebriček

$N_{Ed} = 9.2 \text{ kN}$

$V_{z,Ed}=61 \text{ kN}$



priključek 4xM20 8.8 konstruktivno

$V_{y,Ed}=6 \text{ kN}$



## 5. TOČKOVNI TEMELJI

### Obremenitve pri delovni obtežbi $\gamma=1.0$

Obremenitve so izračunane po TPR zato jih pomnožimo s katorjem  $k_d$ , ki zajma vpliv TDR

$$k_d = M_{MSN,TDR} / M_{MSN,TPR} = 179.77/169.09 = 1.07 \quad \text{upoštevam 1.1}$$

Moment  $M_x$  dodatno povečam zaradi ekscentrične priključitve stebra in temeljne čaše na temeljno peto v semri pravokotno na tir. Vertikalna sila  $R_z$  zaradi ekscentričnosti e posledično povzroča dodaten moment.

$$\text{ekscentričnost } e = 2.5/2 - 0.35 - 0.44/2 = 0.68 \text{ m}$$

### 1OP

$$R_z = 51 \text{ kN}$$

$$R_y = 8.4 \text{ kN}$$

$$M_x = 116 \text{ kNm}$$

$$M_{x, \text{rac}, \text{TDR}} = (120 + 51 \times 0.68) \times 1.1 = 171 \text{ kNm}$$

### 2OP

$$R_z = 51 \text{ kN}$$

$$R_y = 4 \text{ kN}$$

$$M_x = 70 \text{ kNm}$$

$$M_{x, \text{rac}, \text{TDR}} = (70 + 51 \times 0.68) \times 1.1 = 116 \text{ kNm}$$

$$R_x = 10 \text{ kN}$$

$$M_y = 60 \text{ kNm}$$

$$M_{y, \text{rac}, \text{TDR}} = 60 \times 1.1 = 66 \text{ kNm} \quad \text{v tej smeri } e=0$$

SIGNAL 32 Zagorje  
temelj vkopan, zemljina cca 40 cm pod vrhom temelja  
temeljna peta obrtnjena stran od tira

SIGNALI PK M11 in PP22 Hrastnik  
temelj vkopna le na strani proti tiru, temeljna peta obrnjena proti tiru in v celoti vkopana

Mejno stanje nosilnosti - MSN

**1OP - MSN**

**ANALIZA TOČKOVNEGA TEMELJA**

signal M11 in PP2 Hrastnik  
signal 32 Zagorje

**MATERIALNE KARAKTERISTIKE**

|            |       |                   |
|------------|-------|-------------------|
| $\gamma_c$ | 25.0  | kN/m <sup>3</sup> |
| $\gamma_z$ | 19.0  | kN/m <sup>3</sup> |
| $f_{yk}$   | 500   | MPa               |
| $\phi_z$   | 20.0  | °                 |
| $c_z$      | 0.0   | kPa               |
| $E_z$      | 40000 | kN/m <sup>2</sup> |
| $\nu_z$    | 0.30  |                   |

**GEOMETRIJA TEMELJA**

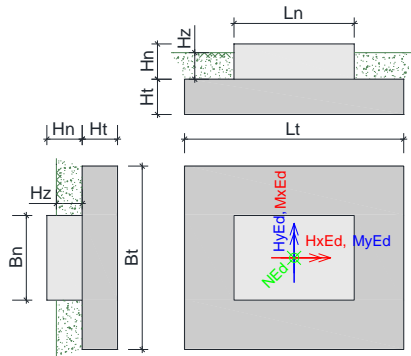
|                |      |   |
|----------------|------|---|
| Lt             | 2.50 | m |
| Bt             | 2.50 | m |
| Ht             | 0.90 | m |
| Ln             | 1.14 | m |
| Bn             | 1.80 | m |
| Hn             | 1.95 | m |
| H <sub>z</sub> | 1.50 | m |
| H <sub>w</sub> | 0.00 | m |

**OBREMNITVE**

|                |        |     |
|----------------|--------|-----|
| N              | 51.00  | kN  |
| H <sub>x</sub> | 8.40   | kN  |
| H <sub>y</sub> | 0.00   | kN  |
| M <sub>x</sub> | 171.00 | kNm |
| M <sub>y</sub> | 0.00   | kNm |

**PARCIALNI VARNOSTNI FAKTORJI**

|            |      |
|------------|------|
| $\gamma_N$ | 1.00 |
| $\gamma_H$ | 1.50 |
| $\gamma_M$ | 1.50 |



|                    |       |    |
|--------------------|-------|----|
| silna teža temelja | 240.7 | kN |
| silna teža zasipa  | 119.6 | kN |
|                    | 360.3 | kN |

Izračunaj

**OMEJITEV NAPETOSTI V TEMELJNIH TLEH**

|                |       |                   |
|----------------|-------|-------------------|
| $\sigma_{min}$ | 0     | kN/m <sup>2</sup> |
| $\sigma_{max}$ | 10000 | kN/m <sup>2</sup> |

**OBREMNITVE NA DNU TEMELJA**

|                   |       |     |            |
|-------------------|-------|-----|------------|
| N <sub>Ed</sub>   | 411.3 | kN  | + ... tlak |
| H <sub>x,Ed</sub> | 12.6  | kN  |            |
| H <sub>y,Ed</sub> | 0.0   | kN  |            |
| M <sub>x,Ed</sub> | 292.4 | kNm |            |
| M <sub>y,Ed</sub> | 0.0   | kNm |            |

**ODPOR TEMELJA PROTI PREVRNITVI**

|                   |       |     |       |       |
|-------------------|-------|-----|-------|-------|
| N <sub>Rd</sub>   | 411.3 | kN  | Ierrj | 9E-13 |
| M <sub>Rd</sub>   | 292.4 | kNm | Ierrj | 2E-13 |
| M <sub>y,Rd</sub> | 0.0   | kNm | Ierrj | 2E-13 |
| $\Sigma Ierrj$    | 0.000 |     |       |       |

**KONTROLA TLAČNEGA DELA PREREZA**  
A<sub>comp</sub> 65%

**KONTROLA EKSCENTRIČNOSTI**

|   |       |                    |       |
|---|-------|--------------------|-------|
| e <sub>x</sub>                              | 0.711 | e <sub>x,max</sub> | 1.250 |
| e <sub>y</sub>                              | 0.000 | e <sub>y,max</sub> | 1.250 |
| $((e_x/e_{max})^2 + (e_y/e_{max})^2)^{0.5}$ | 0.569 |                    |       |

**ODPOR TEMELJA PROTI ZDRSU**

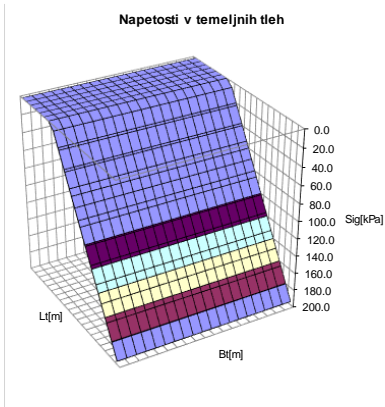
|                                  |       |         |
|----------------------------------|-------|---------|
| H <sub>Ed</sub>                  | 12.6  | kN      |
| H <sub>Rd</sub>                  | 149.7 | kN      |
| H <sub>Ed</sub> /H <sub>Rd</sub> | 0.084 | < 1 OK! |

**NOSILNOST TEMELJNIH TAL V DRENIRANIH POGOJIH**

|                                 |        |                |
|---------------------------------|--------|----------------|
| $\gamma_R$                      | 1.40   |                |
| V                               | 411.3  | kN             |
| H                               | 12.6   | kN             |
| L'                              | 1.078  | m              |
| B'                              | 2.500  | m              |
| A'                              | 2.695  | m <sup>2</sup> |
| N <sub>q</sub>                  | 6.40   |                |
| N <sub>c</sub>                  | 14.83  |                |
| N <sub>i</sub>                  | 3.93   |                |
| b <sub>q</sub> =b <sub>y</sub>  | 1.0    |                |
| b <sub>c</sub>                  | 1.000  |                |
| s <sub>q</sub>                  | 1.147  |                |
| s <sub>c</sub>                  | 0.871  |                |
| s <sub>e</sub>                  | 1.175  |                |
| i <sub>c</sub>                  | 0.947  |                |
| i <sub>q</sub>                  | 0.949  |                |
| i <sub>e</sub>                  | 0.919  |                |
| m                               | 1.699  |                |
| H                               | smer x |                |
| q'                              | 54.15  | kPa            |
| R <sub>d</sub> /A'              | 269.41 | kPa            |
| <b>Odpornost temeljnih tal</b>  |        |                |
| R <sub>d</sub>                  | 726.14 | kN             |
| N <sub>Ed</sub> /R <sub>d</sub> | 0.566  | < 1 OK!        |

**KONTROLA ROTACIJE TEMELJA**

|                |           |     |       |   |
|----------------|-----------|-----|-------|---|
| $\theta_x$     | 0.0010502 | =   | 0.060 | ° |
| $\theta_y$     | 0.0000000 | =   | 0.000 | ° |
| $\theta$       | 0.0010502 | =   | 0.060 | ° |
| $\theta_{max}$ | 0.05      | OK! |       |   |



**NAPETOSTI V TEMELJNIH TLEH [kPa]**

| x/y   | 0.063 | 0.188 | 0.313 | 0.438 | 0.563 | 0.688 | 0.813 | 0.938 | 1.063 | 1.188 | 1.313 | 1.438 | 1.563 | 1.688 | 1.813 | 1.938 | 2.063 | 2.188 | 2.313 | 2.438 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.063 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 0.188 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 0.313 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 0.438 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 0.563 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 0.688 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 0.813 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 0.938 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.063 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.188 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.313 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.438 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.563 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.688 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.813 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.938 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 2.063 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 2.188 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 2.313 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 2.438 | 196.2 | 180.3 | 164.5 | 148.7 | 132.9 | 117.1 | 101.2 | 85.4  | 69.6  | 53.8  | 38.0  | 22.1  | 6.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

ZOP - MSN

ANALIZA TOČKOVNEGA TEMELJA

signal M11 in PP2 Hrastnik  
signal 32 Zagorje

**MATERIALNE KARAKTERISTIKE**

|            |       |                   |
|------------|-------|-------------------|
| $\gamma_c$ | 25.0  | kN/m <sup>3</sup> |
| $\gamma_z$ | 19.0  | kN/m <sup>3</sup> |
| $f_{yk}$   | 500   | MPa               |
| $\phi_z$   | 20.0  | °                 |
| $c_z$      | 0.0   | kPa               |
| $E_z$      | 40000 | kN/m <sup>2</sup> |
| $\nu_z$    | 0.30  |                   |

**GEOMETRIJA TEMELJA**

|                |      |   |
|----------------|------|---|
| Lt             | 2.50 | m |
| Bt             | 2.50 | m |
| Ht             | 0.90 | m |
| Ln             | 1.14 | m |
| Bn             | 1.80 | m |
| Hn             | 1.95 | m |
| H <sub>z</sub> | 1.50 | m |
| Hw             | 0.00 | m |

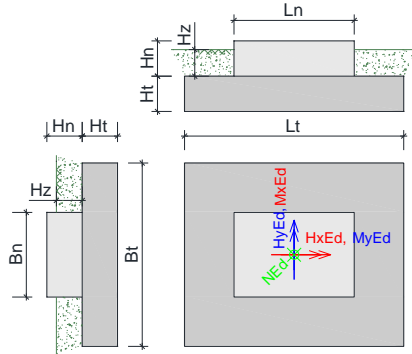
**OBREMNITVE**

|                |        |     |
|----------------|--------|-----|
| N              | 51.00  | kN  |
| H <sub>x</sub> | 4.00   | kN  |
| H <sub>y</sub> | 10.00  | kN  |
| M <sub>x</sub> | 116.00 | kNm |
| M <sub>y</sub> | 66.00  | kNm |

**PARCIALNI VARNOSTNI FAKTORJI**

|            |      |
|------------|------|
| $\gamma_N$ | 1.00 |
| $\gamma_H$ | 1.50 |
| $\gamma_M$ | 1.50 |

|                    |       |    |
|--------------------|-------|----|
| silna teža temelja | 240.7 | kN |
| silna teža zasipa  | 119.6 | kN |
|                    | 360.3 | kN |



Izračunaj

**OMEJITEV NAPETOSTI V TEMELJNIH TLEH**

|                |       |                   |
|----------------|-------|-------------------|
| $\sigma_{min}$ | 0     | kN/m <sup>2</sup> |
| $\sigma_{max}$ | 10000 | kN/m <sup>2</sup> |

**OBREMNITVE NA DNU TEMELJA**

|                   |       |     |            |
|-------------------|-------|-----|------------|
| N <sub>Ed</sub>   | 411.3 | kN  | + ... tlak |
| H <sub>x,Ed</sub> | 6.0   | kN  |            |
| H <sub>y,Ed</sub> | 15.0  | kN  |            |
| M <sub>x,Ed</sub> | 191.1 | kNm |            |
| M <sub>y,Ed</sub> | 141.8 | kNm |            |

**ODPOR TEMELJA PROTI PREVRNITVI**

|                   |       |                |       |       |
|-------------------|-------|----------------|-------|-------|
| N <sub>Rd</sub>   | 411.3 | kN             | lejri | 4E-07 |
| M <sub>x,Rd</sub> | 191.1 | kNm            | lejri | 3E-07 |
| M <sub>y,Rd</sub> | 141.8 | kNm            | lejri | 1E-07 |
|                   |       | $\Sigma$ lejri |       | 0.000 |

**KONTROLA TLAČENEGA DELA PREREZA**

|                    |     |
|--------------------|-----|
| A <sub>compr</sub> | 82% |
|--------------------|-----|

**KONTROLA EKSCENTRIČNOSTI**

|   |       |                    |       |
|---|-------|--------------------|-------|
| e <sub>x</sub>                                      | 0.465 | e <sub>x,max</sub> | 1.250 |
| e <sub>y</sub>                                      | 0.345 | e <sub>y,max</sub> | 1.250 |
| $((e_x/e_{max})^2 + (e_y/e_{max})^2)^{0.5} = 0.463$ |       |                    |       |

**ODPOR TEMELJA PROTI ZDRSU**

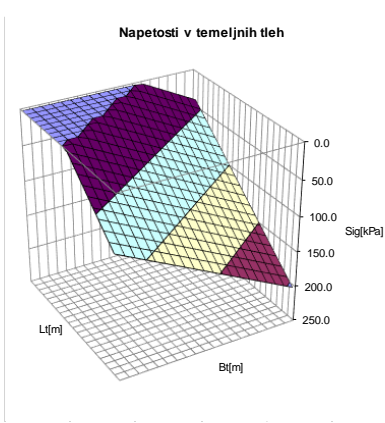
|                                  |       |         |
|----------------------------------|-------|---------|
| H <sub>Ed</sub>                  | 16.2  | kN      |
| H <sub>Rd</sub>                  | 149.7 | kN      |
| H <sub>Ed</sub> /H <sub>Rd</sub> | 0.108 | < 1 OK! |

NOSILNOST TEMELJNIH TAL V DRENIRANIH POGOJIH

|                                 |        |                |
|---------------------------------|--------|----------------|
| $\gamma_R$                      | 1.40   |                |
| V                               | 411.3  | kN             |
| H                               | 15.0   | kN             |
| L'                              | 1.571  | m              |
| B'                              | 1.811  | m              |
| A'                              | 2.844  | m <sup>2</sup> |
| N <sub>q</sub>                  | 6.40   |                |
| N <sub>c</sub>                  | 14.83  |                |
| N <sub>v</sub>                  | 3.93   |                |
| b <sub>c</sub> =b <sub>r</sub>  | 1.0    |                |
| b <sub>c</sub>                  | 1.000  |                |
| s <sub>q</sub>                  | 1.297  |                |
| s <sub>v</sub>                  | 0.740  |                |
| s <sub>c</sub>                  | 1.352  |                |
| i <sub>c</sub>                  | 0.946  |                |
| i <sub>q</sub>                  | 0.947  |                |
| i <sub>v</sub>                  | 0.913  |                |
| m                               | 1.465  |                |
| H                               | smer y |                |
| q'                              | 54.15  | kPa            |
| R <sub>d</sub> /A'              | 303.96 | kPa            |
| <b>Odpornost temeljnih tal</b>  |        |                |
| R <sub>d</sub>                  | 864.53 | kN             |
| N <sub>Ed</sub> /R <sub>d</sub> | 0.476  | < 1 OK!        |

**KONTROLA ROTACIJE TEMELJA**

|                |           |                |       |     |
|----------------|-----------|----------------|-------|-----|
| e <sub>x</sub> | 0.0006863 | =              | 0.039 | °   |
| e <sub>y</sub> | 0.0005091 | =              | 0.029 | °   |
| $\theta$       | 0.0008545 | =              | 0.049 | °   |
|                |           | $\theta_{max}$ | 0.05  | OK! |



**NAPETOSTI V TEMELJNIH TLEH [kPa]**

| x/y   | 0.063 | 0.188 | 0.313 | 0.438 | 0.563 | 0.688 | 0.813 | 0.938 | 1.063 | 1.188 | 1.313 | 1.438 | 1.563 | 1.688 | 1.813 | 1.938 | 2.063 | 2.188 | 2.313 | 2.438 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.063 | 204.1 | 195.5 | 186.9 | 178.3 | 169.7 | 161.1 | 152.5 | 144.0 | 135.4 | 126.8 | 118.2 | 109.6 | 101.0 | 92.4  | 83.8  | 75.2  | 66.6  | 58.0  | 49.4  | 40.8  |
| 0.188 | 197.5 | 189.0 | 180.4 | 171.8 | 163.2 | 154.6 | 146.0 | 137.4 | 128.8 | 120.2 | 111.6 | 103.0 | 94.4  | 85.8  | 77.3  | 68.7  | 60.1  | 51.5  | 42.9  | 34.3  |
| 0.313 | 191.0 | 182.4 | 173.8 | 165.2 | 156.6 | 148.0 | 139.4 | 130.8 | 122.3 | 113.7 | 105.1 | 96.5  | 87.9  | 79.3  | 70.7  | 62.1  | 53.5  | 44.9  | 36.3  | 27.7  |
| 0.438 | 184.4 | 175.8 | 167.2 | 158.6 | 150.0 | 141.4 | 132.8 | 124.3 | 115.7 | 107.1 | 98.5  | 89.9  | 81.3  | 72.7  | 64.1  | 55.5  | 47.0  | 38.4  | 29.8  | 21.2  |
| 0.563 | 177.9 | 169.3 | 160.7 | 152.1 | 143.5 | 134.9 | 126.3 | 117.7 | 109.1 | 100.5 | 92.0  | 83.4  | 74.8  | 66.2  | 57.6  | 49.0  | 40.4  | 31.8  | 23.2  | 14.6  |
| 0.688 | 171.3 | 162.7 | 154.1 | 145.5 | 137.0 | 128.4 | 119.8 | 111.2 | 102.6 | 94.0  | 85.4  | 76.8  | 68.2  | 59.6  | 51.0  | 42.4  | 33.8  | 25.2  | 16.6  | 8.0   |
| 0.813 | 164.8 | 156.2 | 147.6 | 139.0 | 130.4 | 121.8 | 113.2 | 104.6 | 96.0  | 87.4  | 78.8  | 70.2  | 61.6  | 53.0  | 44.4  | 35.8  | 27.2  | 18.6  | 10.0  | 1.4   |
| 0.938 | 158.2 | 149.6 | 141.0 | 132.4 | 123.8 | 115.3 | 106.7 | 98.1  | 89.5  | 80.9  | 72.3  | 63.7  | 55.1  | 46.5  | 37.9  | 29.3  | 20.7  | 12.1  | 3.5   | 0.0   |
| 1.063 | 151.7 | 143.1 | 134.5 | 125.9 | 117.3 | 108.7 | 100.1 | 91.5  | 82.9  | 74.3  | 65.7  | 57.1  | 48.5  | 40.0  | 31.4  | 22.8  | 14.2  | 5.6   | 0.0   | 0.0   |
| 1.188 | 145.1 | 136.5 | 127.9 | 119.3 | 110.7 | 102.1 | 93.5  | 85.0  | 76.4  | 67.8  | 59.2  | 50.6  | 42.0  | 33.4  | 24.8  | 16.2  | 7.6   | 0.0   | 0.0   | 0.0   |
| 1.313 | 138.6 | 130.0 | 121.4 | 112.8 | 104.2 | 95.6  | 87.0  | 78.4  | 69.8  | 61.2  | 52.6  | 44.0  | 35.4  | 26.8  | 18.2  | 9.6   | 1.0   | 0.0   | 0.0   | 0.0   |
| 1.438 | 132.0 | 123.4 | 114.8 | 106.2 | 97.6  | 89.0  | 80.4  | 71.8  | 63.2  | 54.6  | 46.0  | 37.4  | 28.8  | 20.2  | 11.6  | 3.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.563 | 125.4 | 116.8 | 108.2 | 99.6  | 91.0  | 82.4  | 73.8  | 65.2  | 56.6  | 48.0  | 39.4  | 30.8  | 22.2  | 13.6  | 5.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.688 | 118.8 | 110.2 | 101.6 | 93.0  | 84.4  | 75.8  | 67.2  | 58.6  | 50.0  | 41.4  | 32.8  | 24.2  | 15.6  | 7.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.813 | 112.2 | 103.6 | 95.0  | 86.4  | 77.8  | 69.2  | 60.6  | 52.0  | 43.4  | 34.8  | 26.2  | 17.6  | 9.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.938 | 105.6 | 97.0  | 88.4  | 79.8  | 71.2  | 62.6  | 54.0  | 45.4  | 36.8  | 28.2  | 19.6  | 11.0  | 2.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 2.063 | 99.0  | 90.4  | 81.8  | 73.2  | 64.6  | 56.0  | 47.4  | 38.8  | 30.2  | 21.6  | 13.0  | 4.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 2.188 | 92.4  | 83.8  | 75.2  | 66.6  | 58.0  | 49.4  | 40.8  | 32.2  | 23.6  | 15.0  | 6.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 2.313 | 85.8  | 77.2  | 68.6  | 60.0  | 51.4  | 42.8  | 34.2  | 25.6  | 17.0  | 8.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 2.438 | 79.2  | 70.6  | 62.0  | 53.4  | 44.8  | 36.2  | 27.6  | 19.0  | 10.4  | 2.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

TEMELJ USTREZA

Mejno stanje uporabnosti - MSU

1OP – MSU

ANALIZA TOČKOVNEGA TEMELJA

signal M11 in PP2 Hrastnik  
signal 32 Zagorje

MATERIALNE KARAKTERISTIKE

|            |       |                   |
|------------|-------|-------------------|
| $\gamma_c$ | 25.0  | kN/m <sup>3</sup> |
| $\gamma_z$ | 19.0  | kN/m <sup>3</sup> |
| $f_{yk}$   | 500   | MPa               |
| $\phi_2$   | 20.0  | °                 |
| $c_z$      | 0.0   | kPa               |
| $E_z$      | 40000 | kN/m <sup>2</sup> |
| $\nu_z$    | 0.30  |                   |

GEOMETRIJA TEMELJA

|                |      |   |
|----------------|------|---|
| Lt             | 2.50 | m |
| Bt             | 2.50 | m |
| Ht             | 0.90 | m |
| Ln             | 1.14 | m |
| Bn             | 1.80 | m |
| Hn             | 1.95 | m |
| H <sub>z</sub> | 1.50 | m |
| Hw             | 0.00 | m |

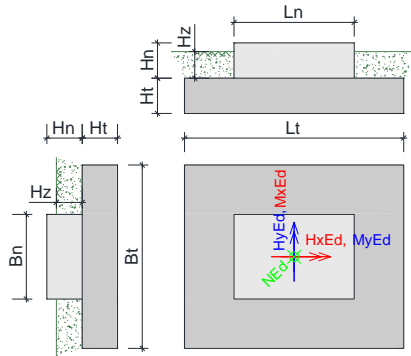
OBREMNITVE

|                |        |     |
|----------------|--------|-----|
| N              | 51.00  | kN  |
| H <sub>x</sub> | 8.40   | kN  |
| H <sub>y</sub> | 0.00   | kN  |
| M <sub>x</sub> | 171.00 | kNm |
| M <sub>y</sub> | 0.00   | kNm |

PARCIALNI VARNOSTNI FAKTORJI

|            |      |
|------------|------|
| $\gamma_N$ | 1.00 |
| $\gamma_H$ | 1.00 |
| $\gamma_M$ | 1.00 |

|                   |       |    |
|-------------------|-------|----|
| sila teže temelja | 240.7 | kN |
| sila teže zasipa  | 119.6 | kN |
|                   | 360.3 | kN |



Izračunaj

OMEJITEV NAPETOSTI V TEMELNIH TLEH

|                |       |                   |
|----------------|-------|-------------------|
| $\sigma_{min}$ | 0     | kN/m <sup>2</sup> |
| $\sigma_{max}$ | 10000 | kN/m <sup>2</sup> |

OBREMNITVE NA DNU TEMELJA

|                   |       |     |            |
|-------------------|-------|-----|------------|
| N <sub>Ed</sub>   | 411.3 | kN  | + ... tlak |
| H <sub>x,Ed</sub> | 8.4   | kN  |            |
| H <sub>y,Ed</sub> | 0.0   | kN  |            |
| M <sub>x,Ed</sub> | 194.9 | kNm |            |
| M <sub>y,Ed</sub> | 0.0   | kNm |            |

ODPOR TEMELJA PROTI PREVRNITVI

|                   |       |     |       |       |
|-------------------|-------|-----|-------|-------|
| N <sub>Rd</sub>   | 411.3 | kN  | [err] | 1E-07 |
| M <sub>x,Rd</sub> | 194.9 | kNm | [err] | 1E-07 |
| M <sub>y,Rd</sub> | 0.0   | kNm | [err] | 9E-08 |
| $\Sigma$ [err]    |       |     |       | 0.000 |

KONTROLA TLAČENEGA DELA PREREZA

|                    |     |
|--------------------|-----|
| A <sub>compr</sub> | 95% |
|--------------------|-----|

KONTROLA EKSCENTRIČNOSTI

|   |       |                    |       |
|---|-------|--------------------|-------|
| e <sub>x</sub>                                      | 0.474 | e <sub>x,max</sub> | 1.250 |
| e <sub>y</sub>                                      | 0.000 | e <sub>y,max</sub> | 1.250 |
| $((e_x/e_{max})^2 + (e_y/e_{max})^2)^{0.5} < 0.379$ |       |                    |       |

ODPOR TEMELJA PROTI ZDRSU

|                                  |       |         |
|----------------------------------|-------|---------|
| H <sub>Ed</sub>                  | 8.4   | kN      |
| H <sub>Rd</sub>                  | 149.7 | kN      |
| H <sub>Ed</sub> /H <sub>Rd</sub> | 0.056 | < 1 OK! |

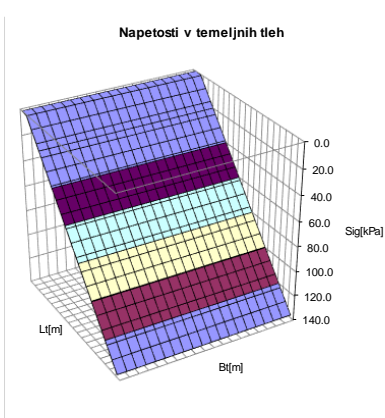
NOSILNOST TEMELJNIH TAL

V DRENIRANIH POGOJIH

|                                 |         |                |
|---------------------------------|---------|----------------|
| $\gamma_R$                      | 1.40    |                |
| V                               | 411.3   | kN             |
| H                               | 8.4     | kN             |
| L'                              | 1.552   | m              |
| B'                              | 2.500   | m              |
| A'                              | 3.880   | m <sup>2</sup> |
| N <sub>q</sub>                  | 6.40    |                |
| N <sub>c</sub>                  | 14.83   |                |
| N <sub>v</sub>                  | 3.93    |                |
| b <sub>q</sub> =b <sub>v</sub>  | 1.0     |                |
| b <sub>c</sub>                  | 1.000   |                |
| s <sub>q</sub>                  | 1.212   |                |
| s <sub>v</sub>                  | 0.814   |                |
| s <sub>c</sub>                  | 1.252   |                |
| i <sub>c</sub>                  | 0.966   |                |
| i <sub>q</sub>                  | 0.967   |                |
| i <sub>v</sub>                  | 0.947   |                |
| m                               | 1.617   |                |
| H                               | smer x  |                |
| q'                              | 54.15   | kPa            |
| R <sub>d</sub> /A'              | 290.23  | kPa            |
| Odpornost temeljnih tal         |         |                |
| R <sub>d</sub>                  | 1126.16 | kN             |
| N <sub>Ed</sub> /R <sub>d</sub> | 0.365   | < 1 OK!        |

KONTROLA ROTACIJE TEMELJA

|                |           |     |       |   |
|----------------|-----------|-----|-------|---|
| e <sub>x</sub> | 0.0010502 | =   | 0.060 | ° |
| e <sub>y</sub> | 0.0000000 | =   | 0.000 | ° |
| $\theta$       | 0.0010502 | =   | 0.060 | ° |
| $\theta_{max}$ | 0.05      | OK! |       |   |



NAPETOSTI V TEMELJNIH TLEH [kPa]

| x/y   | 0.063 | 0.188 | 0.313 | 0.438 | 0.563 | 0.688 | 0.813 | 0.938 | 1.063 | 1.188 | 1.313 | 1.438 | 1.563 | 1.688 | 1.813 | 1.938 | 2.063 | 2.188 | 2.313 | 2.438 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.063 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 0.188 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 0.313 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 0.438 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 0.563 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 0.688 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 0.813 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 0.938 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 1.063 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 1.188 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 1.313 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 1.438 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 1.563 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 1.688 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 1.813 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 1.938 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 2.063 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 2.188 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 2.313 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |
| 2.438 | 137.7 | 130.1 | 122.5 | 114.9 | 107.3 | 99.7  | 92.1  | 84.5  | 76.9  | 69.3  | 61.7  | 54.1  | 46.5  | 38.9  | 31.3  | 23.7  | 16.1  | 8.5   | 0.9   | 0.0   |

ZOP - MSU

ANALIZA TOČKOVNEGA TEMELJA

signal M11 in PP2 Hrastrnik  
signal 32 Zagorje

MATERIALNE KARAKTERISTIKE

|            |       |                   |
|------------|-------|-------------------|
| $\gamma_c$ | 25.0  | kN/m <sup>3</sup> |
| $\gamma_z$ | 19.0  | kN/m <sup>3</sup> |
| $f_{yk}$   | 500   | MPa               |
| $\phi_z$   | 20.0  | °                 |
| $c_z$      | 0.0   | kPa               |
| $E_z$      | 40000 | kN/m <sup>2</sup> |
| $v_z$      | 0.30  |                   |

GEOMETRIJA TEMELJA

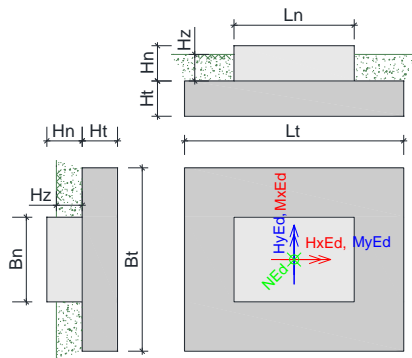
|                |      |   |
|----------------|------|---|
| Lt             | 2.50 | m |
| Bt             | 2.50 | m |
| Ht             | 0.90 | m |
| Ln             | 1.14 | m |
| Bn             | 1.80 | m |
| Hn             | 1.95 | m |
| H <sub>z</sub> | 1.50 | m |
| H <sub>w</sub> | 0.00 | m |

OBREMNITVE

|                |        |     |
|----------------|--------|-----|
| N              | 51.00  | kN  |
| H <sub>x</sub> | 4.00   | kN  |
| H <sub>y</sub> | 10.00  | kN  |
| M <sub>x</sub> | 116.00 | kNm |
| M <sub>y</sub> | 66.00  | kNm |

PARCIALNI VARNOSTNI FAKTORJI

|            |      |
|------------|------|
| $\gamma_N$ | 1.00 |
| $\gamma_H$ | 1.00 |
| $\gamma_M$ | 1.00 |



|                    |       |    |
|--------------------|-------|----|
| silna teže temelja | 240.7 | kN |
| silna teže zasipa  | 119.6 | kN |
|                    | 360.3 | kN |

Izračunaj

OMEJITEV NAPETOSTI V TEMELNIH TLEH

|                |       |                   |
|----------------|-------|-------------------|
| $\sigma_{min}$ | 0     | kN/m <sup>2</sup> |
| $\sigma_{max}$ | 10000 | kN/m <sup>2</sup> |

OBREMNITVE NA DNU TEMELJA

|                   |       |     |            |
|-------------------|-------|-----|------------|
| N <sub>Ed</sub>   | 411.3 | kN  | + ... tlak |
| H <sub>x,Ed</sub> | 4.0   | kN  |            |
| H <sub>y,Ed</sub> | 10.0  | kN  |            |
| M <sub>x,Ed</sub> | 127.4 | kNm |            |
| M <sub>y,Ed</sub> | 94.5  | kNm |            |

ODPOR TEMELJA PROTI PREVRNITVI

|                             |       |     |       |       |
|-----------------------------|-------|-----|-------|-------|
| N <sub>Rd</sub>             | 411.3 | kN  | jerfj | 7E-07 |
| M <sub>x,Rd</sub>           | 127.4 | kNm | jerfj | 7E-07 |
| M <sub>y,Rd</sub>           | 94.5  | kNm | jerfj | 6E-07 |
| $\Sigma$ jerfj <b>0.000</b> |       |     |       |       |

KONTROLA TLAČENEGA DELA PREREZA

|                    |     |
|--------------------|-----|
| A <sub>compr</sub> | 97% |
|--------------------|-----|

KONTROLA EKSCENTRIČNOSTI

|  |       |                    |       |
|--|-------|--------------------|-------|
| e <sub>x</sub>   | 0.310 | e <sub>x,max</sub> | 1.250 |
| e <sub>y</sub>   | 0.230 | e <sub>y,max</sub> | 1.250 |
| $((e_x/e_{max})^2 + (e_y/e_{max})^2)^{0.5} \mathbf{0.309}$ |       |                    |       |

ODPOR TEMELJA PROTI ZDRSU

|                                  |       |         |
|----------------------------------|-------|---------|
| H <sub>Ed</sub>                  | 10.8  | kN      |
| H <sub>Rd</sub>                  | 149.7 | kN      |
| H <sub>Ed</sub> /H <sub>Rd</sub> | 0.072 | < 1 OK! |

NOSILNOST TEMELJNIH TAL

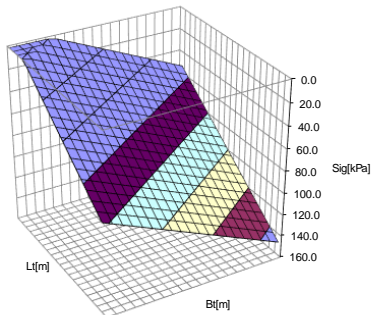
V DRENIRANIH POGOJIH

|                                 |         |                |
|---------------------------------|---------|----------------|
| $\gamma_R$                      | 1.40    |                |
| V                               | 411.3   | kN             |
| H                               | 10.0    | kN             |
| L'                              | 1.881   | m              |
| B'                              | 2.040   | m              |
| A'                              | 3.837   | m <sup>2</sup> |
| N <sub>q</sub>                  | 6.40    |                |
| N <sub>c</sub>                  | 14.83   |                |
| N <sub>r</sub>                  | 3.93    |                |
| b <sub>c</sub> =b <sub>r</sub>  | 1.0     |                |
| b <sub>c</sub>                  | 1.000   |                |
| s <sub>q</sub>                  | 1.315   |                |
| s <sub>r</sub>                  | 0.724   |                |
| s <sub>c</sub>                  | 1.374   |                |
| i <sub>c</sub>                  | 0.963   |                |
| i <sub>q</sub>                  | 0.964   |                |
| i <sub>r</sub>                  | 0.941   |                |
| m                               | 1.480   |                |
| H                               | smer y  |                |
| q'                              | 54.15   | kPa            |
| R <sub>d</sub> /A'              | 313.90  | kPa            |
| Odpornost temeljnih tal         |         |                |
| R <sub>d</sub>                  | 1204.47 | kN             |
| N <sub>Ed</sub> /R <sub>d</sub> | 0.341   | < 1 OK!        |

KONTROLA ROTACIJE TEMELJA

|                |           |     |       |   |
|----------------|-----------|-----|-------|---|
| e <sub>x</sub> | 0.0006863 | =   | 0.039 | ° |
| e <sub>y</sub> | 0.0005091 | =   | 0.029 | ° |
| $\theta$       | 0.0008545 | =   | 0.049 | ° |
| $\theta_{max}$ | 0.05°     | OK! |       |   |

Napetosti v temeljnih tleh



NAPETOSTI V TEMELJNIH TLEH [kPa]

| x/y   | 0.063 | 0.188 | 0.313 | 0.438 | 0.563 | 0.688 | 0.813 | 0.938 | 1.063 | 1.188 | 1.313 | 1.438 | 1.563 | 1.688 | 1.813 | 1.938 | 2.063 | 2.188 | 2.313 | 2.438 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.063 | 147.8 | 142.8 | 137.9 | 132.9 | 127.9 | 123.0 | 118.0 | 113.1 | 108.1 | 103.1 | 98.2  | 93.2  | 88.3  | 83.3  | 78.3  | 73.4  | 68.4  | 63.5  | 58.5  | 53.6  |
| 0.188 | 144.1 | 139.1 | 134.2 | 129.2 | 124.2 | 119.3 | 114.3 | 109.4 | 104.4 | 99.5  | 94.5  | 89.5  | 84.6  | 79.6  | 74.7  | 69.7  | 64.7  | 59.8  | 54.8  | 49.9  |
| 0.313 | 140.4 | 135.4 | 130.5 | 125.5 | 120.6 | 115.6 | 110.6 | 105.7 | 100.7 | 95.8  | 90.8  | 85.8  | 80.9  | 75.9  | 71.0  | 66.0  | 61.0  | 56.1  | 51.1  | 46.2  |
| 0.438 | 136.7 | 131.7 | 126.8 | 121.8 | 116.9 | 111.9 | 106.9 | 102.0 | 97.0  | 92.1  | 87.1  | 82.2  | 77.2  | 72.2  | 67.3  | 62.3  | 57.4  | 52.4  | 47.4  | 42.5  |
| 0.563 | 133.0 | 128.1 | 123.1 | 118.1 | 113.2 | 108.2 | 103.3 | 98.3  | 93.3  | 88.4  | 83.4  | 78.5  | 73.5  | 68.5  | 63.6  | 58.6  | 53.7  | 48.7  | 43.8  | 38.8  |
| 0.688 | 129.3 | 124.4 | 119.4 | 114.4 | 109.5 | 104.5 | 99.6  | 94.6  | 89.7  | 84.7  | 79.7  | 74.8  | 69.8  | 64.9  | 59.9  | 54.9  | 50.0  | 45.0  | 40.1  | 35.1  |
| 0.813 | 125.6 | 120.7 | 115.7 | 110.8 | 105.8 | 100.8 | 95.9  | 90.9  | 86.0  | 81.0  | 76.0  | 71.1  | 66.1  | 61.2  | 56.2  | 51.2  | 46.3  | 41.3  | 36.4  | 31.4  |
| 0.938 | 121.9 | 117.0 | 112.0 | 107.1 | 102.1 | 97.1  | 92.2  | 87.2  | 82.3  | 77.3  | 72.4  | 67.4  | 62.4  | 57.5  | 52.5  | 47.6  | 42.6  | 37.6  | 32.7  | 27.7  |
| 1.063 | 118.3 | 113.3 | 108.3 | 103.4 | 98.4  | 93.5  | 88.5  | 83.5  | 78.6  | 73.6  | 68.7  | 63.7  | 58.7  | 53.8  | 48.8  | 43.9  | 38.9  | 33.9  | 29.0  | 24.0  |
| 1.188 | 114.6 | 109.6 | 104.6 | 99.7  | 94.7  | 89.8  | 84.8  | 79.8  | 74.9  | 69.9  | 65.0  | 60.0  | 55.1  | 50.1  | 45.1  | 40.2  | 35.2  | 30.3  | 25.3  | 20.3  |
| 1.313 | 110.9 | 105.9 | 101.0 | 96.0  | 91.0  | 86.1  | 81.1  | 76.2  | 71.2  | 66.2  | 61.3  | 56.3  | 51.4  | 46.4  | 41.4  | 36.5  | 31.5  | 26.6  | 21.6  | 16.6  |
| 1.438 | 107.2 | 102.2 | 97.3  | 92.3  | 87.3  | 82.4  | 77.4  | 72.5  | 67.5  | 62.5  | 57.6  | 52.6  | 47.7  | 42.7  | 37.8  | 32.8  | 27.8  | 22.9  | 17.9  | 13.0  |
| 1.563 | 103.5 | 98.5  | 93.6  | 88.6  | 83.7  | 78.7  | 73.7  | 68.8  | 63.8  | 58.9  | 53.9  | 48.9  | 44.0  | 39.0  | 34.1  | 29.1  | 24.1  | 19.2  | 14.2  | 9.3   |
| 1.688 | 99.8  | 94.8  | 89.9  | 84.9  | 80.0  | 75.0  | 70.0  | 65.1  | 60.1  | 55.2  | 50.2  | 45.2  | 40.3  | 35.3  | 30.4  | 25.4  | 20.5  | 15.5  | 10.5  | 5.6   |
| 1.813 | 96.1  | 91.1  | 86.2  | 81.2  | 76.3  | 71.3  | 66.4  | 61.4  | 56.4  | 51.5  | 46.5  | 41.6  | 36.6  | 31.6  | 26.7  | 21.7  | 16.8  | 11.8  | 6.8   | 1.9   |
| 1.938 | 92.4  | 87.5  | 82.5  | 77.5  | 72.6  | 67.6  | 62.7  | 57.7  | 52.7  | 47.8  | 42.8  | 37.9  | 32.9  | 28.0  | 23.0  | 18.0  | 13.1  | 8.1   | 3.2   | 0.0   |
| 2.063 | 88.7  | 83.8  | 78.8  | 73.9  | 68.9  | 63.9  | 59.0  | 54.0  | 49.1  | 44.1  | 39.1  | 34.2  | 29.2  | 24.3  | 19.3  | 14.3  | 9.4   | 4.4   | 0.0   | 0.0   |
| 2.188 | 85.0  | 80.1  | 75.1  | 70.2  | 65.2  | 60.2  | 55.3  | 50.3  | 45.4  | 40.4  | 35.4  | 30.5  | 25.5  | 20.6  | 15.6  | 10.7  | 5.7   | 0.7   | 0.0   | 0.0   |
| 2.313 | 81.3  | 76.4  | 71.4  | 66.5  | 61.5  | 56.6  | 51.6  | 46.6  | 41.7  | 36.7  | 31.8  | 26.8  | 21.8  | 16.9  | 11.9  | 7.0   | 2.0   | 0.0   | 0.0   | 0.0   |
| 2.438 | 77.7  | 72.7  | 67.7  | 62.8  | 57.8  | 52.9  | 47.9  | 42.9  | 38.0  | 33.0  | 28.1  | 23.1  | 18.1  | 13.2  | 8.2   | 3.3   | 0.0   | 0.0   | 0.0   | 0.0   |

Mejno stanje nosilnosti - MSN

SIGNAL 31 in 21 Zagorje

temeljni nastavek gleda v celoti iz terena, posledično povečamo višino temeljne pete do globine zmrzovanja (80 sm pod koto terena)

1OP MSN

ANALIZA TOČKOVNEGA TEMELJA

signal 31 in 21 Zagorje

temeljni nastavek ni vkopan, povečana debelina temeljne pete

MATERIALNE KARAKTERISTIKE

|            |       |                   |
|------------|-------|-------------------|
| $\gamma_c$ | 25.0  | kN/m <sup>3</sup> |
| $\gamma_z$ | 19.0  | kN/m <sup>3</sup> |
| $f_{yk}$   | 500   | MPa               |
| $\phi_z$   | 20.0  | °                 |
| $c_z$      | 0.0   | kPa               |
| $E_z$      | 40000 | kN/m <sup>2</sup> |
| $v_z$      | 0.30  |                   |

GEOMETRIJA TEMELJA

|                |      |   |
|----------------|------|---|
| Lt             | 2.50 | m |
| Bt             | 2.50 | m |
| Ht             | 1.50 | m |
| Ln             | 1.14 | m |
| Bn             | 1.80 | m |
| Hn             | 1.95 | m |
| H <sub>z</sub> | 0.00 | m |
| H <sub>w</sub> | 0.00 | m |

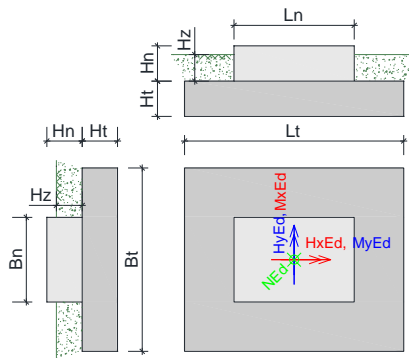
OBREMNITVE

|                |        |     |
|----------------|--------|-----|
| N              | 51.00  | kN  |
| H <sub>x</sub> | 8.40   | kN  |
| H <sub>y</sub> | 0.00   | kN  |
| M <sub>x</sub> | 171.00 | kNm |
| M <sub>y</sub> | 0.00   | kNm |

PARCIALNI VARNOSTNI FAKTORJI

|            |      |
|------------|------|
| $\gamma_N$ | 1.00 |
| $\gamma_H$ | 1.50 |
| $\gamma_M$ | 1.50 |

|                    |       |    |
|--------------------|-------|----|
| silna teža temelja | 334.4 | kN |
| silna teža zaspisa | 0     | kN |
|                    | 334.4 | kN |



Izračunaj

OMEJITEV NAPETOSTI V TEMELJNIH TLEH

|                |       |                   |
|----------------|-------|-------------------|
| $\sigma_{min}$ | 0     | kN/m <sup>2</sup> |
| $\sigma_{max}$ | 10000 | kN/m <sup>2</sup> |

OBREMNITVE NA DNU TEMELJA

|                   |       |     |            |
|-------------------|-------|-----|------------|
| N <sub>Ed</sub>   | 385.4 | kN  | + ... tlak |
| H <sub>x,Ed</sub> | 12.6  | kN  |            |
| H <sub>y,Ed</sub> | 0.0   | kN  |            |
| M <sub>x,Ed</sub> | 300.0 | kNm |            |
| M <sub>y,Ed</sub> | 0.0   | kNm |            |

ODPOR TEMELJA PROTI PREVRNITVI

|                   |       |     |                |       |
|-------------------|-------|-----|----------------|-------|
| N <sub>Rd</sub>   | 385.4 | kN  | jerri          | 2E-13 |
| M <sub>x,Rd</sub> | 300.0 | kNm | jerri          | 3E-13 |
| M <sub>y,Rd</sub> | 0.0   | kNm | jerri          | 4E-15 |
|                   |       |     | $\Sigma$ jerri | 0.000 |

KONTROLA TLAČNEGA DELA PREREZA

A<sub>compr</sub> 55%

KONTROLA EKSCENTRIČNOSTI

|                |   |                    |       |
|----------------|---|--------------------|-------|
| e <sub>x</sub> | 0.778   | e <sub>x,max</sub> | 1.250 |
| e <sub>y</sub> | 0.000   | e <sub>y,max</sub> | 1.250 |
|                | $((e_x/e_{max})^2 + (e_y/e_{max})^2)^{0.5} = 0.623$ |                    |       |

ODPOR TEMELJA PROTI ZDRSU

|                 |                                  |              |
|-----------------|----------------------------------|--------------|
| H <sub>Ed</sub> | 12.6                             | kN           |
| H <sub>Rd</sub> | 140.3                            | kN           |
|                 | H <sub>Ed</sub> /H <sub>Rd</sub> | 0.09 < 1 OK! |

NOSILNOST TEMELJNIH TAL

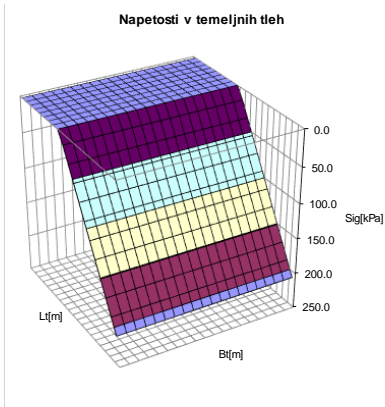
|                                 |               |                |
|---------------------------------|---------------|----------------|
| $f_{rk}$                        | 1.40          |                |
| V                               | 385.4         | kN             |
| H                               | 12.6          | kN             |
| L'                              | 0.943         | m              |
| B'                              | 2.500         | m              |
| A'                              | 2.358         | m <sup>2</sup> |
| N <sub>q</sub>                  | 6.40          |                |
| N <sub>c</sub>                  | 14.83         |                |
| N <sub>γ</sub>                  | 3.93          |                |
| b <sub>q</sub> =b <sub>γ</sub>  | 1.0           |                |
| b <sub>c</sub>                  | 1.000         |                |
| s <sub>q</sub>                  | 1.129         |                |
| s <sub>c</sub>                  | 0.887         |                |
| s <sub>γ</sub>                  | 0.943         |                |
| i <sub>c</sub>                  | 1.153         |                |
| i <sub>γ</sub>                  | 0.943         |                |
| i <sub>q</sub>                  | 0.944         |                |
| i <sub>γ</sub>                  | 0.913         |                |
| m                               | 1.726         |                |
| H                               | smer x        |                |
| q'                              | 65.55         | kPa            |
| R <sub>d</sub> /A'              | 319.44        | kPa            |
| Odpornost temeljnih tal         |               |                |
| R <sub>d</sub>                  | 753.37        | kN             |
| N <sub>Ed</sub> /R <sub>d</sub> | 0.512 < 1 OK! |                |

KONTROLA ROTACIJE TEMELJA

|                |           |                |           |
|----------------|-----------|----------------|-----------|
| e <sub>x</sub> | 0.0010773 | =              | 0.062°    |
| e <sub>y</sub> | 0.0000000 | =              | 0.000°    |
| $\theta$       | 0.0010773 | =              | 0.062°    |
|                |           | $\theta_{max}$ | 0.05° OK! |

NAPETOSTI V TEMELJNIH TLEH [kPa]

| x/y   | 0.063 | 0.188 | 0.313 | 0.438 | 0.563 | 0.688 | 0.813 | 0.938 | 1.063 | 1.188 | 1.313 | 1.438 | 1.563 | 1.688 | 1.813 | 1.938 | 2.063 | 2.188 | 2.313 | 2.438 |     |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| 0.063 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 0.188 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 0.313 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 0.438 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 0.563 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 0.688 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 0.813 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 0.938 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 1.063 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 1.188 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 1.313 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 1.438 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 1.563 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 1.688 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 1.813 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 1.938 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 2.063 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 2.188 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 2.313 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |
| 2.438 | 208.9 | 189.5 | 170.2 | 150.8 | 131.5 | 112.1 | 92.8  | 73.4  | 54.0  | 34.7  | 15.3  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0 |



**ZOP-MSN**

**ANALIZA TOČKOVNEGA TEMELJA**

signal 31 in 21 Zagorje  
temeljni nastavek ni vkopan, povečana debelina temeljne pete

**MATERIALNE KARAKTERISTIKE**

|            |       |                   |
|------------|-------|-------------------|
| $\gamma_c$ | 25.0  | kN/m <sup>3</sup> |
| $\gamma_z$ | 19.0  | kN/m <sup>3</sup> |
| $f_{yk}$   | 500   | MPa               |
| $\phi_2$   | 20.0  | °                 |
| $c_z$      | 0.0   | kPa               |
| $E_z$      | 40000 | kN/m <sup>2</sup> |
| $v_z$      | 0.30  |                   |

**GEOMETRIJA TEMELJA**

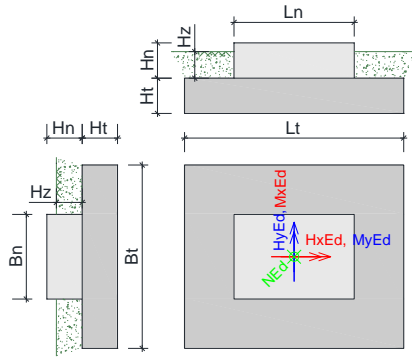
|                |      |   |
|----------------|------|---|
| Lt             | 2.50 | m |
| Bt             | 2.50 | m |
| Ht             | 1.50 | m |
| Ln             | 1.14 | m |
| Bn             | 1.80 | m |
| Hn             | 1.95 | m |
| H <sub>z</sub> | 0.00 | m |
| H <sub>w</sub> | 0.00 | m |

**OBREMNITVE**

|                |        |     |
|----------------|--------|-----|
| N              | 51.00  | kN  |
| H <sub>x</sub> | 4.00   | kN  |
| H <sub>y</sub> | 10.00  | kN  |
| M <sub>x</sub> | 116.00 | kNm |
| M <sub>y</sub> | 66.00  | kNm |

**PARCIALNI VARNOSTNI FAKTORJI**

|            |      |
|------------|------|
| $\gamma_N$ | 1.00 |
| $\gamma_H$ | 1.50 |
| $\gamma_M$ | 1.50 |



|                    |       |    |
|--------------------|-------|----|
| silna teža temelja | 334.4 | kN |
| silna teža zasipa  | 0     | kN |
|                    | 334.4 | kN |

Izračunaj

**OMEJITEV NAPETOSTI V TEMELJNIH TLEH**

|                |       |                   |
|----------------|-------|-------------------|
| $\sigma_{min}$ | 0     | kN/m <sup>2</sup> |
| $\sigma_{max}$ | 10000 | kN/m <sup>2</sup> |

**OBREMNITVE NA DNU TEMELJA**

|                   |       |     |            |
|-------------------|-------|-----|------------|
| N <sub>Ed</sub>   | 385.4 | kN  | + ... tlak |
| H <sub>x,Ed</sub> | 6.0   | kN  |            |
| H <sub>y,Ed</sub> | 15.0  | kN  |            |
| M <sub>x,Ed</sub> | 194.7 | kNm |            |
| M <sub>y,Ed</sub> | 150.8 | kNm |            |

**ODPOR TEMELJA PROTI PREVRNITVI**

|                   |       |     |       |       |
|-------------------|-------|-----|-------|-------|
| N <sub>Rd</sub>   | 385.4 | kN  | lejri | 8E-08 |
| M <sub>x,Rd</sub> | 194.7 | kNm | lejri | 5E-08 |
| M <sub>y,Rd</sub> | 150.8 | kNm | lejri | 5E-09 |
| $\Sigma$ lejri    |       |     |       | 0.000 |

**KONTROLA TLAČENEGA DELA PREREZA**

A<sub>compr</sub> 76%

**KONTROLA EKSCENTRIČNOSTI**

|  |       |                    |       |
|--|-------|--------------------|-------|
| e <sub>x</sub>                                     | 0.505 | e <sub>x,max</sub> | 1.250 |
| e <sub>y</sub>                                     | 0.391 | e <sub>y,max</sub> | 1.250 |
| $(e_x/e_{x,max})^2 + (e_y/e_{y,max})^2 \leq 0.511$ |       |                    |       |

**ODPOR TEMELJA PROTI ZDRSU**

|                                  |       |         |
|----------------------------------|-------|---------|
| H <sub>Ed</sub>                  | 16.2  | kN      |
| H <sub>Rd</sub>                  | 140.3 | kN      |
| H <sub>Ed</sub> /H <sub>Rd</sub> | 0.115 | < 1 OK! |

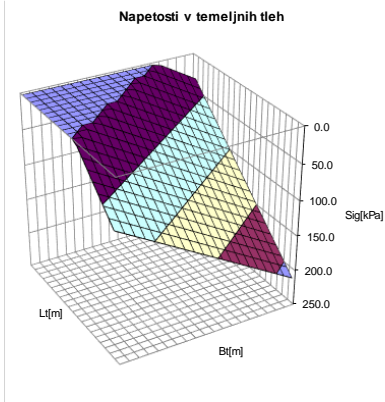
**NOSILNOST TEMELJNIH TAL**

**V DRENIRANIH POGOJIH**

|                                 |        |                |
|---------------------------------|--------|----------------|
| $\gamma_R$                      | 1.40   |                |
| V                               | 385.4  | kN             |
| H                               | 15.0   | kN             |
| L'                              | 1.490  | m              |
| B'                              | 1.718  | m              |
| A'                              | 2.559  | m <sup>2</sup> |
| N <sub>q</sub>                  | 6.40   |                |
| N <sub>c</sub>                  | 14.83  |                |
| N <sub>v</sub>                  | 3.93   |                |
| b <sub>q</sub> =b <sub>v</sub>  | 1.0    |                |
| b <sub>c</sub>                  | 1.000  |                |
| s <sub>q</sub>                  | 1.297  |                |
| s <sub>v</sub>                  | 0.740  |                |
| s <sub>c</sub>                  | 1.352  |                |
| i <sub>c</sub>                  | 0.942  |                |
| i <sub>v</sub>                  | 0.944  |                |
| i <sub>s</sub>                  | 0.907  |                |
| m                               | 1.464  |                |
| H                               | smer y |                |
| q'                              | 65.55  | kPa            |
| R <sub>d</sub> /A'              | 366.56 | kPa            |
| <b>Odpornost temeljnih tal</b>  |        |                |
| R <sub>d</sub>                  | 937.95 | kN             |
| N <sub>Ed</sub> /R <sub>d</sub> | 0.411  | < 1 OK!        |

**KONTROLA ROTACIJE TEMELJA**

|                |           |     |       |   |
|----------------|-----------|-----|-------|---|
| e <sub>x</sub> | 0.0006993 | =   | 0.040 | ° |
| e <sub>y</sub> | 0.0005414 | =   | 0.031 | ° |
| $\theta$       | 0.0008844 | =   | 0.051 | ° |
| $\theta_{max}$ | 0.05      | OK! |       |   |



**NAPETOSTI V TEMELJNIH TLEH [kPa]**

| x/y   | 0.063 | 0.188 | 0.313 | 0.438 | 0.563 | 0.688 | 0.813 | 0.938 | 1.063 | 1.188 | 1.313 | 1.438 | 1.563 | 1.688 | 1.813 | 1.938 | 2.063 | 2.188 | 2.313 | 2.438 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.063 | 214.0 | 204.5 | 195.0 | 185.5 | 176.0 | 166.6 | 157.1 | 147.6 | 138.1 | 128.6 | 119.1 | 109.7 | 100.2 | 90.7  | 81.2  | 71.7  | 62.3  | 52.8  | 43.3  | 33.8  |
| 0.188 | 206.4 | 196.9 | 187.4 | 178.0 | 168.5 | 159.0 | 149.5 | 140.0 | 130.5 | 121.1 | 111.6 | 102.1 | 92.6  | 83.1  | 73.7  | 64.2  | 54.7  | 45.2  | 35.7  | 26.3  |
| 0.313 | 198.8 | 189.4 | 179.9 | 170.4 | 160.9 | 151.4 | 141.9 | 132.5 | 123.0 | 113.5 | 104.0 | 94.5  | 85.1  | 75.6  | 66.1  | 56.6  | 47.1  | 37.7  | 28.2  | 18.7  |
| 0.438 | 191.3 | 181.8 | 172.3 | 162.8 | 153.3 | 143.8 | 134.4 | 124.9 | 115.4 | 105.9 | 96.5  | 87.0  | 77.5  | 68.0  | 58.5  | 49.1  | 39.6  | 30.1  | 20.6  | 11.1  |
| 0.563 | 183.7 | 174.2 | 164.7 | 155.3 | 145.8 | 136.3 | 126.8 | 117.3 | 107.9 | 98.4  | 88.9  | 79.4  | 69.9  | 60.5  | 51.0  | 41.5  | 32.0  | 22.5  | 13.1  | 3.6   |
| 0.688 | 176.1 | 166.7 | 157.2 | 147.7 | 138.2 | 128.7 | 119.3 | 109.8 | 100.3 | 90.8  | 81.3  | 71.9  | 62.4  | 52.9  | 43.4  | 33.9  | 24.5  | 15.0  | 5.5   | 0.0   |
| 0.813 | 168.6 | 159.1 | 149.6 | 140.1 | 130.7 | 121.2 | 111.7 | 102.2 | 92.7  | 83.3  | 73.8  | 64.3  | 54.8  | 45.3  | 35.9  | 26.4  | 16.9  | 7.4   | 0.0   | 0.0   |
| 0.938 | 161.0 | 151.5 | 142.1 | 132.6 | 123.1 | 113.6 | 104.1 | 94.7  | 85.2  | 75.7  | 66.2  | 56.7  | 47.3  | 37.8  | 28.3  | 18.8  | 9.3   | 0.0   | 0.0   | 0.0   |
| 1.063 | 153.5 | 144.0 | 134.5 | 125.0 | 115.5 | 106.1 | 96.6  | 87.1  | 77.6  | 68.1  | 58.7  | 49.2  | 39.7  | 30.2  | 20.7  | 11.2  | 1.8   | 0.0   | 0.0   | 0.0   |
| 1.188 | 145.9 | 136.4 | 126.9 | 117.5 | 108.0 | 98.5  | 89.0  | 79.5  | 70.1  | 60.6  | 51.1  | 41.6  | 32.1  | 22.6  | 13.2  | 3.7   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.313 | 138.3 | 128.9 | 119.4 | 109.9 | 100.4 | 90.9  | 81.5  | 72.0  | 62.5  | 53.0  | 43.5  | 34.0  | 24.6  | 15.1  | 5.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.438 | 130.8 | 121.3 | 111.8 | 102.3 | 92.9  | 83.4  | 73.9  | 64.4  | 54.9  | 45.4  | 36.0  | 26.5  | 17.0  | 7.5   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.563 | 123.2 | 113.7 | 104.3 | 94.8  | 85.3  | 75.8  | 66.3  | 56.8  | 47.4  | 37.9  | 28.4  | 18.9  | 9.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.688 | 115.7 | 106.2 | 96.7  | 87.2  | 77.7  | 68.2  | 58.8  | 49.3  | 39.8  | 30.3  | 20.8  | 11.4  | 1.9   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.813 | 108.1 | 98.6  | 89.1  | 79.7  | 70.2  | 60.7  | 51.2  | 41.7  | 32.2  | 22.8  | 13.3  | 3.8   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 1.938 | 100.5 | 91.1  | 81.6  | 72.1  | 62.6  | 53.1  | 43.6  | 34.2  | 24.7  | 15.2  | 5.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 2.063 | 93.0  | 83.5  | 74.0  | 64.5  | 55.0  | 45.6  | 36.1  | 26.6  | 17.1  | 7.6   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 2.188 | 85.4  | 75.9  | 66.4  | 57.0  | 47.5  | 38.0  | 28.5  | 19.0  | 9.6   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 2.313 | 77.8  | 68.4  | 58.9  | 49.4  | 39.9  | 30.4  | 21.0  | 11.5  | 2.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 2.438 | 70.3  | 60.8  | 51.3  | 41.8  | 32.4  | 22.9  | 13.4  | 3.9   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

TEMELJ USTREJA





Mejno stanje uporabnosti - MSU

1OP – MSU

ANALIZA TOČKOVNEGA TEMELJA

signal 31 in 21 zagorje

temeljni nastavek ni vkopan, povečana debelina temeljne pete

MATERIALNE KARAKTERISTIKE

|            |       |                   |
|------------|-------|-------------------|
| $\gamma_c$ | 25.0  | kN/m <sup>3</sup> |
| $\gamma_z$ | 19.0  | kN/m <sup>3</sup> |
| $f_{yk}$   | 500   | MPa               |
| $\phi_2$   | 20.0  | °                 |
| $c_z$      | 0.0   | kPa               |
| $E_z$      | 40000 | kN/m <sup>2</sup> |
| $\nu_z$    | 0.30  |                   |

GEOMETRIJA TEMELJA

|                |      |   |
|----------------|------|---|
| Lt             | 2.50 | m |
| Bt             | 2.50 | m |
| Ht             | 1.50 | m |
| Ln             | 1.14 | m |
| Bn             | 1.80 | m |
| Hn             | 1.95 | m |
| H <sub>z</sub> | 0.00 | m |
| H <sub>w</sub> | 0.00 | m |

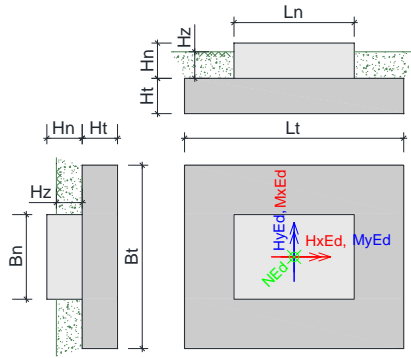
OBREMNITVE

|                |        |     |
|----------------|--------|-----|
| N              | 51.00  | kN  |
| H <sub>x</sub> | 8.40   | kN  |
| H <sub>y</sub> | 0.00   | kN  |
| M <sub>x</sub> | 171.00 | kNm |
| M <sub>y</sub> | 0.00   | kNm |

PARCIALNI VARNOSTNI FAKTORJI

|            |      |
|------------|------|
| $\gamma_N$ | 1.00 |
| $\gamma_H$ | 1.00 |
| $\gamma_M$ | 1.00 |

|                   |       |    |
|-------------------|-------|----|
| sila teže temelja | 334.4 | kN |
| sila teže zasipa  | 0     | kN |
|                   | 334.4 | kN |



Izračunaj

OMEJITEV NAPETOSTI V TEMELJNIH TLEH

|                |       |                   |
|----------------|-------|-------------------|
| $\sigma_{min}$ | 0     | kN/m <sup>2</sup> |
| $\sigma_{max}$ | 10000 | kN/m <sup>2</sup> |

OBREMNITVE NA DNU TEMELJA

|                   |       |     |            |
|-------------------|-------|-----|------------|
| N <sub>Ed</sub>   | 385.4 | kN  | + ... tlak |
| H <sub>x,Ed</sub> | 8.4   | kN  |            |
| H <sub>y,Ed</sub> | 0.0   | kN  |            |
| M <sub>x,Ed</sub> | 200.0 | kNm |            |
| M <sub>y,Ed</sub> | 0.0   | kNm |            |

ODPOR TEMELJA PROTI PREVRNITVI

|                   |       |     |       |       |
|-------------------|-------|-----|-------|-------|
| N <sub>Rd</sub>   | 385.4 | kN  | lejri | 5E-07 |
| M <sub>x,Rd</sub> | 200.0 | kNm | lejri | 4E-07 |
| M <sub>y,Rd</sub> | 0.0   | kNm | lejri | 2E-14 |
| $\Sigma$ lejri    |       |     |       | 0.000 |

KONTROLA TLAČENEGA DELA PREREZA

|                     |     |
|---------------------|-----|
| A <sub>comp,r</sub> | 90% |
|---------------------|-----|

KONTROLA EKSCENTRIČNOSTI

|   |       |                    |       |
|---|-------|--------------------|-------|
| e <sub>x</sub>                                | 0.519 | e <sub>x,max</sub> | 1.250 |
| e <sub>y</sub>                                | 0.000 | e <sub>y,max</sub> | 1.250 |
| $((e_x/e_{max})^2 + (e_y/e_{max})^2)^{0.415}$ |       |                    | 0.415 |

ODPOR TEMELJA PROTI ZDRSU

|                                  |       |         |
|----------------------------------|-------|---------|
| H <sub>Ed</sub>                  | 8.4   | kN      |
| H <sub>Rd</sub>                  | 140.3 | kN      |
| H <sub>Ed</sub> /H <sub>Rd</sub> | 0.06  | < 1 OK! |

NOSILNOST TEMELJNIH TAL

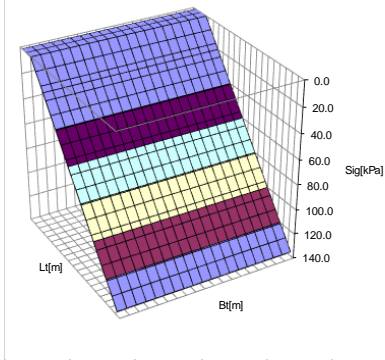
V DRENIRANIH POGOJIH

|                                 |         |                |
|---------------------------------|---------|----------------|
| $\gamma_R$                      | 1.40    |                |
| V                               | 385.4   | kN             |
| H                               | 8.4     | kN             |
| L'                              | 1.462   | m              |
| B'                              | 2.500   | m              |
| A'                              | 3.656   | m <sup>2</sup> |
| N <sub>q</sub>                  | 6.40    |                |
| N <sub>c</sub>                  | 14.83   |                |
| N <sub>v</sub>                  | 3.93    |                |
| b <sub>q</sub> =b <sub>v</sub>  | 1.0     |                |
| b <sub>c</sub>                  | 1.000   |                |
| s <sub>q</sub>                  | 1.200   |                |
| s <sub>v</sub>                  | 0.825   |                |
| s <sub>c</sub>                  | 1.237   |                |
| i <sub>c</sub>                  | 0.964   |                |
| i <sub>q</sub>                  | 0.965   |                |
| i <sub>v</sub>                  | 0.944   |                |
| m                               | 1.631   |                |
| H                               | smer x  |                |
| q'                              | 65.55   | kPa            |
| R <sub>d</sub> /A'              | 346.88  | kPa            |
| Odpornost temeljnih tal         |         |                |
| R <sub>d</sub>                  | 1268.04 | kN             |
| N <sub>Ed</sub> /R <sub>d</sub> | 0.304   | < 1 OK!        |

KONTROLA ROTACIJE TEMELJA

|                |           |   |       |     |
|----------------|-----------|---|-------|-----|
| $\theta_x$     | 0.0010773 | = | 0.062 | °   |
| $\theta_y$     | 0.0000000 | = | 0.000 | °   |
| $\theta$       | 0.0010773 | = | 0.062 | °   |
| $\theta_{max}$ |           |   | 0.05  | OK! |

Napetosti v temeljnih tleh



NAPETOSTI V TEMELJNIH TLEH [kPa]

| x/y   | 0.063 | 0.188 | 0.313 | 0.438 | 0.563 | 0.688 | 0.813 | 0.938 | 1.063 | 1.188 | 1.313 | 1.438 | 1.563 | 1.688 | 1.813 | 1.938 | 2.063 | 2.188 | 2.313 | 2.438 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.063 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 0.188 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 0.313 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 0.438 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 0.563 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 0.688 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 0.813 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 0.938 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 1.063 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 1.188 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 1.313 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 1.438 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 1.563 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 1.688 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 1.813 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 1.938 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 2.063 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 2.188 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 2.313 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |
| 2.438 | 136.7 | 128.7 | 120.7 | 112.6 | 104.6 | 96.6  | 88.6  | 80.5  | 72.5  | 64.5  | 56.5  | 48.5  | 40.4  | 32.4  | 24.4  | 16.4  | 8.4   | 0.3   | 0.0   | 0.0   |

**ZOP – MSU**

**ANALIZA TOČKOVNEGA TEMELJA**

signal 31 in 21 zagorje

temeljni nastavek ni vkopan, povečana debelina temeljne pete

**MATERIALNE KARAKTERISTIKE**

|            |       |                   |
|------------|-------|-------------------|
| $\gamma_c$ | 25.0  | kN/m <sup>3</sup> |
| $\gamma_z$ | 19.0  | kN/m <sup>3</sup> |
| $f_{yk}$   | 500   | MPa               |
| $\phi_z$   | 20.0  | °                 |
| $c_z$      | 0.0   | kPa               |
| $E_z$      | 40000 | kN/m <sup>2</sup> |
| $\nu_z$    | 0.30  |                   |

**GEOMETRIJA TEMELJA**

|                |      |   |
|----------------|------|---|
| Lt             | 2.50 | m |
| Bt             | 2.50 | m |
| Ht             | 1.50 | m |
| Ln             | 1.14 | m |
| Bn             | 1.80 | m |
| Hn             | 1.95 | m |
| H <sub>z</sub> | 0.00 | m |
| H <sub>w</sub> | 0.00 | m |

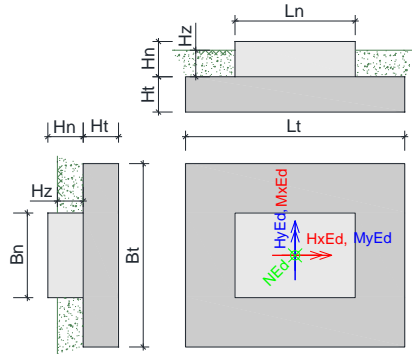
**OBREMNITVE**

|                |        |     |
|----------------|--------|-----|
| N              | 51.00  | kN  |
| H <sub>x</sub> | 4.00   | kN  |
| H <sub>y</sub> | 10.00  | kN  |
| M <sub>x</sub> | 116.00 | kNm |
| M <sub>y</sub> | 66.00  | kNm |

**PARCIALNI VARNOSTNI FAKTORJI**

|            |      |
|------------|------|
| $\gamma_N$ | 1.00 |
| $\gamma_H$ | 1.00 |
| $\gamma_M$ | 1.00 |

|                    |       |    |
|--------------------|-------|----|
| silna teže temelja | 334.4 | kN |
| silna teže zasipa  | 0     | kN |
|                    | 334.4 | kN |



Izračunaj

**OMEJITEV NAPETOSTI V TEMELJNIH TLEH**

|                |       |                   |
|----------------|-------|-------------------|
| $\sigma_{min}$ | 0     | kN/m <sup>2</sup> |
| $\sigma_{max}$ | 10000 | kN/m <sup>2</sup> |

**OBREMNITVE NA DNU TEMELJA**

|                   |       |     |            |
|-------------------|-------|-----|------------|
| N <sub>Ed</sub>   | 385.4 | kN  | + ... tlak |
| H <sub>x,Ed</sub> | 4.0   | kN  |            |
| H <sub>y,Ed</sub> | 10.0  | kN  |            |
| M <sub>x,Ed</sub> | 129.8 | kNm |            |
| M <sub>y,Ed</sub> | 100.5 | kNm |            |

**ODPOR TEMELJA PROTI PREVRNITVI**

|                     |       |     |       |       |
|---------------------|-------|-----|-------|-------|
| N <sub>Rd</sub>     | 385.4 | kN  | jerlj | 9E-08 |
| M <sub>x,Rd</sub>   | 129.8 | kNm | jerlj | 5E-08 |
| M <sub>y,Rd</sub>   | 100.5 | kNm | jerlj | 1E-07 |
| $\sum \text{jerlj}$ |       |     |       | 0.000 |

**KONTROLA TLAČENEGA DELA PREREZA**

A<sub>compr</sub> 94%

**KONTROLA EKSCENTRIČNOSTI**

|  |       |                    |       |
|--|-------|--------------------|-------|
| e <sub>x</sub>   | 0.337 | e <sub>x,max</sub> | 1.250 |
| e <sub>y</sub>   | 0.261 | e <sub>y,max</sub> | 1.250 |
| $((e_x/e_{max})^2 + (e_y/e_{max})^2)^{0.5} \leq 0.341$ |       |                    |       |

**ODPOR TEMELJA PROTI ZDRSU**

|   |       |    |
|---|-------|----|
| H <sub>Ed</sub>                         | 10.8  | kN |
| H <sub>Rd</sub>                         | 140.3 | kN |
| $H_{Ed}/H_{Rd} = 0.077 < 1 \text{ OK!}$ |       |    |

**NOSILNOST TEMELJNIH TAL**

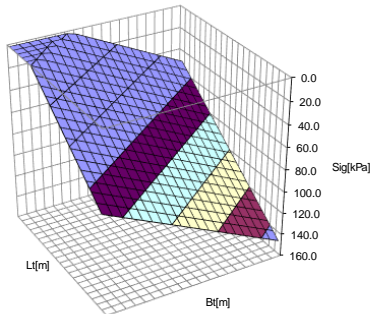
**V DRENIRANIH POGOJIH**

|                                      |         |                |
|--------------------------------------|---------|----------------|
| $\gamma_R$                           | 1.40    |                |
| V                                    | 385.4   | kN             |
| H                                    | 10.0    | kN             |
| L'                                   | 1.826   | m              |
| B'                                   | 1.978   | m              |
| A'                                   | 3.614   | m <sup>2</sup> |
| N <sub>q</sub>                       | 6.40    |                |
| N <sub>c</sub>                       | 14.83   |                |
| N <sub>i</sub>                       | 3.93    |                |
| b <sub>q</sub> =b <sub>y</sub>       | 1.0     |                |
| b <sub>c</sub>                       | 1.000   |                |
| s <sub>q</sub>                       | 1.316   |                |
| s <sub>v</sub>                       | 0.723   |                |
| s <sub>c</sub>                       | 1.374   |                |
| i <sub>c</sub>                       | 0.961   |                |
| i <sub>q</sub>                       | 0.962   |                |
| i <sub>v</sub>                       | 0.937   |                |
| m                                    | 1.480   |                |
| H                                    | smer y  |                |
| q'                                   | 65.55   | kPa            |
| R <sub>d</sub> /A'                   | 379.19  | kPa            |
| <b>Odpornost temeljnih tal</b>       |         |                |
| R <sub>d</sub>                       | 1370.22 | kN             |
| $N_{Ed}/R_d = 0.281 < 1 \text{ OK!}$ |         |                |

**KONTROLA ROTACIJE TEMELJA**

|                                       |           |   |         |
|---------------------------------------|-----------|---|---------|
| e <sub>x</sub>                        | 0.0006993 | = | 0.040 ° |
| e <sub>y</sub>                        | 0.0005414 | = | 0.031 ° |
| ϑ                                     | 0.0008844 | = | 0.051 ° |
| $\vartheta_{max} = 0.05° \text{ OK!}$ |           |   |         |

Napetosti v temeljnih tleh



**NAPETOSTI V TEMELJNIH TLEH [kPa]**

| x/y   | 0.063 | 0.188 | 0.313 | 0.438 | 0.563 | 0.688 | 0.813 | 0.938 | 1.063 | 1.188 | 1.313 | 1.438 | 1.563 | 1.688 | 1.813 | 1.938 | 2.063 | 2.188 | 2.313 | 2.438 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.063 | 148.0 | 142.8 | 137.7 | 132.6 | 127.4 | 122.3 | 117.1 | 112.0 | 106.9 | 101.7 | 96.6  | 91.4  | 86.3  | 81.2  | 76.0  | 70.9  | 65.7  | 60.6  | 55.5  | 50.3  |
| 0.188 | 144.0 | 138.8 | 133.7 | 128.6 | 123.4 | 118.3 | 113.1 | 108.0 | 102.9 | 97.7  | 92.6  | 87.4  | 82.3  | 77.2  | 72.0  | 66.9  | 61.7  | 56.6  | 51.5  | 46.3  |
| 0.313 | 140.0 | 134.8 | 129.7 | 124.6 | 119.4 | 114.3 | 109.1 | 104.0 | 98.9  | 93.7  | 88.6  | 83.4  | 78.3  | 73.2  | 68.0  | 62.9  | 57.7  | 52.6  | 47.5  | 42.3  |
| 0.438 | 136.0 | 130.8 | 125.7 | 120.5 | 115.4 | 110.3 | 105.1 | 100.0 | 94.8  | 89.7  | 84.6  | 79.4  | 74.3  | 69.1  | 64.0  | 58.9  | 53.7  | 48.6  | 43.5  | 38.3  |
| 0.563 | 132.0 | 126.8 | 121.7 | 116.5 | 111.4 | 106.3 | 101.1 | 96.0  | 90.8  | 85.7  | 80.6  | 75.4  | 70.3  | 65.1  | 60.0  | 54.9  | 49.7  | 44.6  | 39.4  | 34.3  |
| 0.688 | 128.0 | 122.8 | 117.7 | 112.5 | 107.4 | 102.3 | 97.1  | 92.0  | 86.8  | 81.7  | 76.6  | 71.4  | 66.3  | 61.1  | 56.0  | 50.9  | 45.7  | 40.6  | 35.4  | 30.3  |
| 0.813 | 124.0 | 118.8 | 113.7 | 108.5 | 103.4 | 98.3  | 93.1  | 88.0  | 82.8  | 77.7  | 72.6  | 67.4  | 62.3  | 57.1  | 52.0  | 46.9  | 41.7  | 36.6  | 31.4  | 26.3  |
| 0.938 | 119.9 | 114.8 | 109.7 | 104.5 | 99.4  | 94.2  | 89.1  | 84.0  | 78.8  | 73.7  | 68.5  | 63.4  | 58.3  | 53.1  | 48.0  | 42.9  | 37.7  | 32.6  | 27.4  | 22.3  |
| 1.063 | 115.9 | 110.8 | 105.7 | 100.5 | 95.4  | 90.2  | 85.1  | 80.0  | 74.8  | 69.7  | 64.5  | 59.4  | 54.3  | 49.1  | 44.0  | 38.8  | 33.7  | 28.6  | 23.4  | 18.3  |
| 1.188 | 111.9 | 106.8 | 101.7 | 96.5  | 91.4  | 86.2  | 81.1  | 76.0  | 70.8  | 65.7  | 60.5  | 55.4  | 50.3  | 45.1  | 40.0  | 34.8  | 29.7  | 24.6  | 19.4  | 14.3  |
| 1.313 | 107.9 | 102.8 | 97.7  | 92.5  | 87.4  | 82.2  | 77.1  | 72.0  | 66.8  | 61.7  | 56.5  | 51.4  | 46.3  | 41.1  | 36.0  | 30.8  | 25.7  | 20.6  | 15.4  | 10.3  |
| 1.438 | 103.9 | 98.8  | 93.6  | 88.5  | 83.4  | 78.2  | 73.1  | 67.9  | 62.8  | 57.7  | 52.5  | 47.4  | 42.3  | 37.1  | 32.0  | 26.8  | 21.7  | 16.6  | 11.4  | 6.3   |
| 1.563 | 99.9  | 94.8  | 89.6  | 84.5  | 79.4  | 74.2  | 69.1  | 63.9  | 58.8  | 53.7  | 48.5  | 43.4  | 38.2  | 33.1  | 28.0  | 22.8  | 17.7  | 12.5  | 7.4   | 2.3   |
| 1.688 | 95.9  | 90.8  | 85.6  | 80.5  | 75.4  | 70.2  | 65.1  | 59.9  | 54.8  | 49.7  | 44.5  | 39.4  | 34.2  | 29.1  | 24.0  | 18.8  | 13.7  | 8.5   | 3.4   | 0.0   |
| 1.813 | 91.9  | 86.8  | 81.6  | 76.5  | 71.4  | 66.2  | 61.1  | 55.9  | 50.8  | 45.7  | 40.5  | 35.4  | 30.2  | 25.1  | 20.0  | 14.8  | 9.7   | 4.5   | 0.0   | 0.0   |
| 1.938 | 87.9  | 82.8  | 77.6  | 72.5  | 67.3  | 62.2  | 57.1  | 51.9  | 46.8  | 41.7  | 36.5  | 31.4  | 26.2  | 21.1  | 16.0  | 10.8  | 5.7   | 0.5   | 0.0   | 0.0   |
| 2.063 | 83.9  | 78.8  | 73.6  | 68.5  | 63.3  | 58.2  | 53.1  | 47.9  | 42.8  | 37.6  | 32.5  | 27.4  | 22.2  | 17.1  | 11.9  | 6.8   | 1.7   | 0.0   | 0.0   | 0.0   |
| 2.188 | 79.9  | 74.8  | 69.6  | 64.5  | 59.3  | 54.2  | 49.1  | 43.9  | 38.8  | 33.6  | 28.5  | 23.4  | 18.2  | 13.1  | 7.9   | 2.8   | 0.0   | 0.0   | 0.0   | 0.0   |
| 2.313 | 75.9  | 70.8  | 65.6  | 60.5  | 55.3  | 50.2  | 45.1  | 39.9  | 34.8  | 29.6  | 24.5  | 19.4  | 14.2  | 9.1   | 3.9   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 2.438 | 71.9  | 66.7  | 61.6  | 56.5  | 51.3  | 46.2  | 41.1  | 35.9  | 30.8  | 25.6  | 20.5  | 15.4  | 10.2  | 5.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

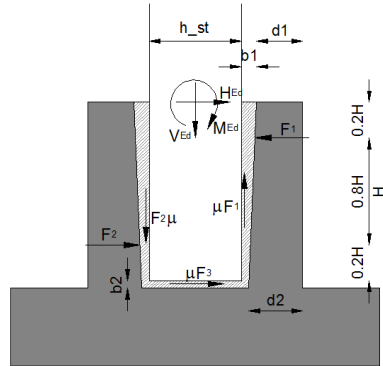
### RAČUN ARMATURE TEMELJNE ČAŠE

OBREMNITVE pri MSN

|          |        |     |
|----------|--------|-----|
| $N_{Ed}$ | 77.00  | kN  |
| $V_{Ed}$ | 15.00  | kN  |
| $M_{Ed}$ | 210.00 | kNm |

GEOMETRIJA ČAŠE

|           |      |    |     |      |   |                                   |
|-----------|------|----|-----|------|---|-----------------------------------|
| H         | 1.85 | m  | hst | 0.96 | m | v kontra smeri za prečno armaturo |
| $h_{st}$  | 0.30 | m  |     |      |   | za izračun L                      |
| $d_1$     | 0.34 | m  |     |      |   |                                   |
| $d_2$     | 0.35 | m  |     |      |   |                                   |
| $b_1$     | 0.04 | m  |     |      |   |                                   |
| $b_2$     | 0.05 | m  |     |      |   |                                   |
| $a_{eff}$ | 5.00 | cm |     |      |   | ... težišče pr. arm               |



MATERIALNI PARAMETRI

|           |      |            |
|-----------|------|------------|
| $\mu$     | 0.30 | $\leq 0.3$ |
| $f_{y,k}$ | 500  | MPa        |

$$F_1 = \frac{M_{Ed} + 0.9H \times V_{Ed} + \frac{\mu h_{st}}{2(1+\mu^2)}(\mu N_{Ed} - V_{Ed}) - \frac{0.1H\mu}{1+\mu^2}(N_{Ed} - \mu V_{Ed})}{0.8H + \mu h_{st}} = 148.32 \text{ kN}$$

$$F_2 = F_1 - \frac{1}{1+\mu^2}(\mu N_{Ed} + V_{Ed}) = 113.36 \text{ kN}$$

$$F_3 = \frac{N_{Ed} - \mu V_{Ed}}{1 + \mu^2} = 66.51 \text{ kN}$$

$$L = 1.05(h_{st} + 2b_1) = 1.092 \text{ m}$$

$$q_{F1} = 135.82 \text{ kN/m}$$

$$q_{F2} = 103.81 \text{ kN/m}$$

$$M_{F1} = \frac{q_{F1}L^2}{16} = 10.12 \text{ kNm}$$

$$M_{F2} = \frac{q_{F2}L^2}{16} = 7.74 \text{ kNm}$$

Prečna armatura

$$A_{s1} = \frac{M_{F1}}{0.85df_{yd}} = 0.94 \text{ cm}^2 \quad \text{področje } 0.2H \quad 0.37 \text{ m}$$

$$A_{t1} = \frac{F_1}{f_{yd}} = 3.41 \text{ cm}^2$$

$$A_{s2} = \frac{M_{F2}}{0.85df_{yd}} = 0.70 \text{ cm}^2 \quad \text{področje } 0.2H \quad 0.37 \text{ m}$$

$$A_{t2} = \frac{F_2}{f_{yd}} = 2.61 \text{ cm}^2$$

Vertikalna armatura

$$M_{\xi} = M_{Ed} + V_{Ed}(H + b_2) = 238.5 \text{ kNm}$$

$$r = h_{st} + 2b_1 + 1.5d_1 = 0.89 \text{ m}$$

$$A_{sv} = \frac{M_{\xi}}{0.85r \times f_{yd}} = 7.25 \text{ cm}^2$$

Delež vertikalne armature za prevzem trenja

$$A_{tr} = \mu F_1 / f_{yd} = 1.02 \text{ cm}^2$$

**POSAMEZNI ELEMENTI**

|   |                    |
|---|--------------------|
| <i>objekt:</i><br>ZAGORJE<br>polmostna konst.: 31 in 21 | <i>investitor:</i> |
| <b>JEKLENA KONSTRUKCIJA</b>                             | <i>ime risbe:</i>  |

| Position | kom. | ime         | Material | Length    | Weight | Total |
|----------|------|-------------|----------|-----------|--------|-------|
| 3        | 2    | RO 48.3x4   | S235J2   | 8011.5972 | 35,0   | 70,0  |
| 5A       | 2    | RO 48.3x4   | S235J2   | 4452.9360 | 19,5   | 38,9  |
| 7        | 2    | L 50x5      | S235J2   | 2325.0000 | 8,8    | 17,5  |
| 8        | 1    | FL 50x5     | S235J2   | 1783.5823 | 3,5    | 3,5   |
| 9A       | 2    | RO 88.9x6.3 | S235J2   | 2102.5750 | 27,0   | 54,0  |
| 10       | 1    | RO 48.3x4   | S235J2   | 1587.2424 | 6,9    | 6,9   |
| 11       | 1    | RQ 40x4     | S235J2   | 1170.0000 | 5,2    | 5,2   |
| 12       | 1    | RO 48.3x4   | S235J2   | 1059.1500 | 4,6    | 4,6   |
| 13       | 1    | RD 16       | S235J2   | 265.0000  | 0,4    | 0,4   |
| 15       | 1    | Stopnica    | S235J2   | 530.0000  | 12,5   | 12,5  |
| 19       | 6    | FL 50x5     | S235J2   | 5871.4546 | 11,5   | 69,1  |
| 21a      | 2    | FL 150x8    | S235J2   | 4666.9360 | 44,0   | 87,9  |
| 23       | 2    | RO 48.3x4   | S235J2   | 2675.5725 | 11,7   | 23,4  |
| 24       | 2    | L 50x5      | S235J2   | 2325.0000 | 8,8    | 17,5  |
| 25       | 2    | L 50x5      | S235J2   | 2325.0000 | 8,8    | 17,5  |
| 26       | 2    | L 50x5      | S235J2   | 2325.0000 | 8,8    | 17,5  |
| 27       | 1    | RO 48.3x4   | S235J2   | 2324.4812 | 10,2   | 10,2  |
| 28       | 2    | RO 48.3x4   | S235J2   | 1816.1500 | 7,9    | 15,9  |
| 29       | 6    | FL 50x5     | S235J2   | 1783.5823 | 3,5    | 21,0  |
| 30       | 1    | RO 48.3x4   | S235J2   | 1587.2424 | 6,9    | 6,9   |
| 34       | 1    | RO 48.3x4   | S235J2   | 1349.5901 | 5,9    | 5,9   |
| 35       | 1    | RO 48.3x4   | S235J2   | 1349.5901 | 5,9    | 5,9   |
| 39       | 2    | FL 150x8    | S235J2   | 1286.9569 | 12,1   | 24,2  |
| 44       | 12   | RO 33.7x2.6 | S235J2   | 1180.7037 | 2,3    | 28,2  |
| 45       | 1    | RQ 40x4     | S235J2   | 1170.0000 | 5,2    | 5,2   |
| 46       | 4    | RO 48.3x4   | S235J2   | 1116.1500 | 4,9    | 19,5  |
| 47       | 6    | RO 48.3x4   | S235J2   | 1116.1500 | 4,9    | 29,3  |
| 48       | 2    | RO 48.3x4   | S235J2   | 1116.1500 | 4,9    | 9,8   |
| 50       | 1    | RO 48.3x4   | S235J2   | 1059.1500 | 4,6    | 4,6   |
| 53       | 2    | RO 48.3x4   | S235J2   | 888.4836  | 3,9    | 7,8   |
| 56       | 2    | RO 33.7x2.6 | S235J2   | 878.5176  | 1,7    | 3,5   |
| 57       | 4    | RO 48.3x4   | S235J2   | 875.0000  | 3,8    | 15,3  |
| 58       | 1    | RO 48.3x4   | S235J2   | 875.0000  | 3,8    | 3,8   |
| 59       | 2    | RQ 40x4     | S235J2   | 840.0000  | 3,7    | 7,4   |
| 62       | 1    | FL 150x8    | S235J2   | 838.8214  | 7,9    | 7,9   |
| 63       | 2    | RO 33.7x2.6 | S235J2   | 826.7000  | 1,6    | 3,3   |
| 64       | 2    | RQ 40x4     | S235J2   | 800.0000  | 3,5    | 7,1   |
| 65       | 2    | RQ 40x4     | S235J2   | 800.0000  | 3,5    | 7,1   |

**POSAMEZNI ELEMENTI**

|   |                    |
|---|--------------------|
| <i>objekt:</i><br>ZAGORJE<br>polmostna konst.: 31 in 21 | <i>investitor:</i> |
| <b>JEKLENA KONSTRUKCIJA</b>                             | <i>ime risbe:</i>  |

| Position | kom. | ime          | Material | Length    | Weight | Total |
|----------|------|--------------|----------|-----------|--------|-------|
| 66       | 4    | RQ 100x5     | S235J2   | 765.0000  | 11,0   | 44,1  |
| 67       | 2    | RQ 80x4      | S235J2   | 765.0000  | 7,1    | 14,1  |
| 68       | 6    | FL 30x8      | S235J2   | 765.0000  | 1,4    | 8,6   |
| 69       | 1    | RO 48.3x4    | S235J2   | 761.0463  | 3,3    | 3,3   |
| 70       | 2    | RO 48.3x4    | S235J2   | 761.0000  | 3,3    | 6,7   |
| 71       | 2    | RQ 40x4      | S235J2   | 760.0000  | 3,4    | 6,7   |
| 72       | 4    | RO 33.7x2.6  | S235J2   | 748.7256  | 1,5    | 6,0   |
| 73       | 4    | RO 48.3x4    | S235J2   | 743.3000  | 3,2    | 13,0  |
| 75       | 1    | RD 20        | S235J2   | 709.8834  | 1,8    | 1,8   |
| 76       | 1    | RD 20        | S235J2   | 681.7206  | 1,7    | 1,7   |
| 77       | 1    | RD 20        | S235J2   | 674.1992  | 1,7    | 1,7   |
| 79       | 1    | RD 20        | S235J2   | 638.3151  | 1,6    | 1,6   |
| 80       | 2    | L 50x5       | S235J2   | 600.0000  | 2,3    | 4,5   |
| 81       | 4    | U 80         | S235J2   | 590.0000  | 5,1    | 20,4  |
| 82       | 18   | RD 25        | S235J2   | 590.0000  | 2,3    | 40,9  |
| 83       | 25   | RD 25        | S235J2   | 558.6849  | 2,2    | 53,8  |
| 84       | 1    | RD 20        | S235J2   | 539.6337  | 1,3    | 1,3   |
| 85       | 2    | L 50x5       | S235J2   | 500.0000  | 1,9    | 3,8   |
| 86       | 2    | L 50x5       | S235J2   | 590.0000  | 2,2    | 4,4   |
| 87       | 2    | FL 100x6     | S235J2   | 400.0000  | 1,9    | 3,8   |
| 88       | 2    | RO 48.3x4    | S235J2   | 341.1500  | 1,5    | 3,0   |
| 89       | 8    | FL 50x10     | S235J2   | 300.0000  | 1,2    | 9,4   |
| 90       | 4    | RO 33.7x2.6  | S235J2   | 251.6933  | 0,5    | 2,0   |
| 90A      | 2    | RO 33.7x2.6  | S235J2   | 531.7685  | 1,1    | 2,1   |
| 91       | 2    | RO 48.3x4    | S235J2   | 242.9623  | 1,1    | 2,1   |
| 91A      | 2    | RO 48.3x4    | S235J2   | 523.0375  | 2,3    | 4,6   |
| 92       | 2    | RO 48.3x4    | S235J2   | 242.9623  | 1,1    | 2,1   |
| 94       | 2    | FL 80x6      | S235J2   | 241.7310  | 0,9    | 1,8   |
| 97       | 10   | FL 70x8      | S235J2   | 236.4030  | 0,9    | 8,8   |
| 98       | 4    | RO 48.3x4    | S235J2   | 89.5354   | 0,4    | 1,6   |
| 99       | 10   | RO 48.3x4    | S235J2   | 89.5354   | 0,4    | 3,9   |
| 100      | 2    | RO 48.3x4    | S235J2   | 89.5354   | 0,4    | 0,8   |
| 101      | 2    | RO 48.3x4    | S235J2   | 89.5354   | 0,4    | 0,8   |
| 102      | 2    | RO 48.3x4    | S235J2   | 44.7011   | 0,2    | 0,4   |
| 103      | 1    | Stopnica     | S235J2   | 530.0000  | 12,5   | 12,5  |
| 104      | 3    | Stopnica     | S235J2   | 530.0000  | 12,5   | 37,6  |
| 106      | 2    | PLATE 10x250 | S235J2   | 1313.4470 | 23,1   | 46,3  |
| 107      | 2    | PLATE 8x560  | S235J2   | 900.0000  | 31,7   | 63,3  |

**POSAMEZNI ELEMENTI**

|   |                    |
|---|--------------------|
| <i>objekt:</i><br>ZAGORJE<br>polmostna konst.: 31 in 21 | <i>investitor:</i> |
| <b>JEKLENA KONSTRUKCIJA</b>                             | <i>ime risbe:</i>  |

| Position | kom. | ime                         | Material | Length    | Weight | Total  |
|----------|------|-----------------------------|----------|-----------|--------|--------|
| 108      | 2    | Exp.plocevina 2x699         | S235J2   | 797.8652  | 8,8    | 17,5   |
| 110      | 3    | Rešetka (okno 36X36) 30x755 | S235J2   | 1211.0038 | 21,5   | 64,6   |
| 113      | 2    | Rešetka (okno 36X36) 30x682 | S235J2   | 755.0000  | 12,1   | 24,3   |
| 125      | 2    | PLATE 15x203                | S235J2   | 300.0000  | 6,4    | 12,8   |
| 128      | 6    | PLATE 15x88                 | S235J2   | 273.9936  | 2,6    | 15,7   |
| 132      | 1    | PLATE 15x103                | S235J2   | 256.0000  | 2,6    | 2,6    |
| 133      | 1    | PLATE 15x103                | S235J2   | 252.2610  | 2,5    | 2,5    |
| 134      | 4    | PLATE 10x140                | S235J2   | 250.0000  | 2,7    | 11,0   |
| 136      | 2    | PLATE 15x127                | S235J2   | 216.2821  | 3,2    | 6,5    |
| 141      | 2    | PLATE 10x93                 | S235J2   | 211.2821  | 1,5    | 3,1    |
| 146      | 2    | PLATE 10x95                 | S235J2   | 200.3960  | 1,5    | 3,0    |
| 147      | 1    | PLATE 8x160                 | S235J2   | 197.5000  | 2,0    | 2,0    |
| 148      | 1    | PLATE 8x160                 | S235J2   | 197.5000  | 2,0    | 2,0    |
| 151      | 10   | PLATE 8x60                  | S235J2   | 150.0000  | 0,6    | 5,7    |
| 152      | 2    | PLATE 8x60                  | S235J2   | 150.0000  | 0,6    | 1,1    |
| 153      | 2    | PLATE 8x60                  | S235J2   | 150.0000  | 0,6    | 1,1    |
| 154      | 4    | PLATE 8x60                  | S235J2   | 150.0000  | 0,6    | 2,3    |
| 155      | 1    | PLATE 5x62                  | S235J2   | 110.0000  | 0,2    | 0,2    |
| 156      | 1    | PLATE 5x62                  | S235J2   | 110.0000  | 0,2    | 0,2    |
| 157      | 1    | PLATE 5x60                  | S235J2   | 110.0000  | 0,2    | 0,2    |
| 158      | 1    | PLATE 5x60                  | S235J2   | 110.0000  | 0,2    | 0,2    |
| 159      | 1    | PLATE 5x50                  | S235J2   | 110.0000  | 0,2    | 0,2    |
| 162      | 2    | PLATE 15x92                 | S235J2   | 94.0000   | 1,0    | 2,0    |
| 163      | 8    | PLATE 10x35                 | S235J2   | 81.6076   | 0,2    | 1,4    |
| 164      | 1    | PLATE 5x50                  | S235J2   | 62.0883   | 0,1    | 0,1    |
| 165      | 1    | PLATE 5x50                  | S235J2   | 62.0883   | 0,1    | 0,1    |
| 166      | 1    | PLATE 5x50                  | S235J2   | 60.0000   | 0,1    | 0,1    |
| 167      | 1    | PLATE 5x50                  | S235J2   | 60.0000   | 0,1    | 0,1    |
| 168      | 1    | M 20x100                    | 8.8      | 100.0000  | 0,0    | 0      |
| 169      | 1    | M 20x100                    | 8.8      | 100.0000  | 0,0    | 0      |
| 169      | 6    | M 20x75                     | 8.8      | 75.0000   | 0,0    | 0      |
| 172      | 2    | M 20x50                     | 8.8      | 50.0000   | 0,0    | 0      |
| 174      | 4    | M 16x45                     | 8.8      | 45.0000   | 0,0    | 0      |
| 175      | 28   | M 12x45                     | 8.8      | 45.0000   | 0,0    | 0      |
| 177      | 4    | M 12x35                     | 8.8      | 35.0000   | 0,0    | 0      |
| 178      | 2    | M 20x35                     | 8.8      | 35.0000   | 0,0    | 0      |
| 509      | 1    | U 300                       | S235J2   | 6084.0059 | 281,1  | 281,1  |
| 510      | 4    | U 300                       | S235J2   | 9202.6963 | 425,2  | 1700,7 |

**POSAMEZNI ELEMENTI**

|   |                    |
|---|--------------------|
| <i>objekt:</i><br>ZAGORJE<br>polmostna konst.: 31 in 21 | <i>investitor:</i> |
| <b>JEKLENA KONSTRUKCIJA</b>                             | <i>ime risbe:</i>  |

| Position | kom. | ime                   | Material | Length    | Weight | Total |
|----------|------|-----------------------|----------|-----------|--------|-------|
| 511      | 5    | U 300                 | S235J2   | 560.0000  | 25,9   | 129,4 |
| 512      | 6    | U 300                 | S235J2   | 560.0000  | 25,9   | 155,2 |
| 513      | 1    | U 300                 | S235J2   | 560.0000  | 25,9   | 25,9  |
| 515      | 1    | RQ 60x4               | S235J2   | 1372.0531 | 9,2    | 9,2   |
| 516      | 1    | RQ 60x4               | S235J2   | 1372.0570 | 9,2    | 9,2   |
| 517      | 1    | RQ 60x4               | S235J2   | 1380.3748 | 9,3    | 9,3   |
| 518      | 1    | U 300                 | S235J2   | 6084.0059 | 281,1  | 281,1 |
| 519      | 2    | PLATE 25x212          | S235J2   | 450.0000  | 18,8   | 37,5  |
| 520      | 2    | PLATE 25x213          | S235J2   | 450.0000  | 18,8   | 37,5  |
| 521      | 2    | PLATE 15x220          | S235J2   | 320.0000  | 8,3    | 16,6  |
| 522      | 2    | PLATE 10x198          | S235J2   | 260.8254  | 2,5    | 4,9   |
| 523      | 2    | PLATE 10x222          | S235J2   | 273.2157  | 3,2    | 6,3   |
| a        | 8    | PLATE 5x70            | S235J2   | 140.0000  | 0,4    | 3,1   |
| a52      | 8    | L 50x5                | S235J2   | 1025.0000 | 3,9    | 30,9  |
| a54      | 2    | L 50x5                | S235J2   | 985.0000  | 3,7    | 7,4   |
| a55      | 2    | L 50x5                | S235J2   | 985.0000  | 3,7    | 7,4   |
| a60      | 2    | L 50x5                | S235J2   | 940.0000  | 3,5    | 7,1   |
| a61      | 2    | L 50x5                | S235J2   | 940.0000  | 3,5    | 7,1   |
| a150     | 8    | PLATE 15x130          | S235J2   | 160.0000  | 2,4    | 19,6  |
|          | 8    | M 12x45 SIST EN 15048 | 8.8      | 45.0000   | 0,0    | 0     |
|          | 10   | M 16x50 SIST EN 15048 | 8.8      | 50.0000   | 0,0    | 0     |
|          | 8    | M 20x50 SIST EN 15048 | 8.8      | 50.0000   | 0,0    | 0     |
|          | 16   | M 20x60 SIST EN 15048 | 8.8      | 60.0000   | 0,0    | 0     |

vijaki HV 10.9 K1 po SIST EN 14399

- vse vijačne zveze izvesti z dvema podloškama 10.9
- vse vijačne zveze prednapeti s 50% polne sile prednapetja (50%Fp)

vijaki 8.8 po SIST EN 15048-1

- vse vijačne zveze izvesti z dvema podloškama 8.8
- vse vijačne zveze čvrsto pritegniti

V VSEH SPOJIH KJER SE VIJAČI ELEMENT KI IMA POŠEVNINO,  
UPORABITI KONUSNE PODLOŽKE

SEZNAM MATERIALA ZA 1 KOM POLMOSTNE KONSTRUKCIJE Z DVEMA KOSARAMA

**137 elementov / celotna teža : 4111 kg**

**celotna teža + dodatek 3% zvari, vijaki... : 4234 kg**

**POSAMEZNI ELEMENTI**

|   |                    |
|---|--------------------|
| <i>objekt:</i><br>ZAGORJE<br>polmostna konst.: 32 | <i>investitor:</i> |
| <b>JEKLENA KONSTRUKCIJA</b>                       | <i>ime risbe:</i>  |

| Position | kom. | ime         | Material | Length    | Weight | Total |
|----------|------|-------------|----------|-----------|--------|-------|
| 3        | 2    | RO 48.3x4   | S235J2   | 8011.5972 | 35,0   | 70,0  |
| 5A       | 2    | RO 48.3x4   | S235J2   | 4452.9360 | 19,5   | 38,9  |
| 7        | 1    | L 50x5      | S235J2   | 2325.0000 | 8,8    | 8,8   |
| 8        | 1    | FL 50x5     | S235J2   | 1783.5823 | 3,5    | 3,5   |
| 9A       | 2    | RO 88.9x6.3 | S235J2   | 2102.5750 | 27,0   | 54,0  |
| 10       | 1    | RO 48.3x4   | S235J2   | 1587.2424 | 6,9    | 6,9   |
| 11       | 1    | RQ 40x4     | S235J2   | 1170.0000 | 5,2    | 5,2   |
| 12       | 1    | RO 48.3x4   | S235J2   | 1059.1500 | 4,6    | 4,6   |
| 13       | 1    | RD 16       | S235J2   | 265.0000  | 0,4    | 0,4   |
| 15       | 1    | Stopnica    | S235J2   | 530.0000  | 12,5   | 12,5  |
| 19       | 6    | FL 50x5     | S235J2   | 5871.4546 | 11,5   | 69,1  |
| 21a      | 2    | FL 150x8    | S235J2   | 4666.9360 | 44,0   | 87,9  |
| 23       | 2    | RO 48.3x4   | S235J2   | 2675.5725 | 11,7   | 23,4  |
| 24       | 1    | L 50x5      | S235J2   | 2325.0000 | 8,8    | 8,8   |
| 25       | 1    | L 50x5      | S235J2   | 2325.0000 | 8,8    | 8,8   |
| 26       | 1    | L 50x5      | S235J2   | 2325.0000 | 8,8    | 8,8   |
| 27       | 1    | RO 48.3x4   | S235J2   | 2324.4812 | 10,2   | 10,2  |
| 28       | 2    | RO 48.3x4   | S235J2   | 1816.1500 | 7,9    | 15,9  |
| 29       | 6    | FL 50x5     | S235J2   | 1783.5823 | 3,5    | 21,0  |
| 30       | 1    | RO 48.3x4   | S235J2   | 1587.2424 | 6,9    | 6,9   |
| 34       | 1    | RO 48.3x4   | S235J2   | 1349.5901 | 5,9    | 5,9   |
| 35       | 1    | RO 48.3x4   | S235J2   | 1349.5901 | 5,9    | 5,9   |
| 39       | 2    | FL 150x8    | S235J2   | 1286.9569 | 12,1   | 24,2  |
| 44       | 12   | RO 33.7x2.6 | S235J2   | 1180.7037 | 2,3    | 28,2  |
| 45       | 1    | RQ 40x4     | S235J2   | 1170.0000 | 5,2    | 5,2   |
| 46       | 4    | RO 48.3x4   | S235J2   | 1116.1500 | 4,9    | 19,5  |
| 47       | 6    | RO 48.3x4   | S235J2   | 1116.1500 | 4,9    | 29,3  |
| 48       | 2    | RO 48.3x4   | S235J2   | 1116.1500 | 4,9    | 9,8   |
| 50       | 1    | RO 48.3x4   | S235J2   | 1059.1500 | 4,6    | 4,6   |
| 53       | 2    | RO 48.3x4   | S235J2   | 888.4836  | 3,9    | 7,8   |
| 56       | 2    | RO 33.7x2.6 | S235J2   | 878.5176  | 1,7    | 3,5   |
| 57       | 4    | RO 48.3x4   | S235J2   | 875.0000  | 3,8    | 15,3  |
| 58       | 1    | RO 48.3x4   | S235J2   | 875.0000  | 3,8    | 3,8   |
| 59       | 2    | RQ 40x4     | S235J2   | 840.0000  | 3,7    | 7,4   |
| 62       | 1    | FL 150x8    | S235J2   | 838.8214  | 7,9    | 7,9   |
| 63       | 2    | RO 33.7x2.6 | S235J2   | 826.7000  | 1,6    | 3,3   |
| 64       | 2    | RQ 40x4     | S235J2   | 800.0000  | 3,5    | 7,1   |
| 65       | 2    | RQ 40x4     | S235J2   | 800.0000  | 3,5    | 7,1   |



**POSAMEZNI ELEMENTI**

|   |                    |
|---|--------------------|
| <i>objekt:</i><br>ZAGORJE<br>polmostna konst.: 32 | <i>investitor:</i> |
| <b>JEKLENA KONSTRUKCIJA</b>                       | <i>ime risbe:</i>  |

| Position | kom. | ime          | Material | Length    | Weight | Total |
|----------|------|--------------|----------|-----------|--------|-------|
| 66       | 4    | RQ 100x5     | S235J2   | 765.0000  | 11,0   | 44,1  |
| 67       | 2    | RQ 80x4      | S235J2   | 765.0000  | 7,1    | 14,1  |
| 68       | 6    | FL 30x8      | S235J2   | 765.0000  | 1,4    | 8,6   |
| 69       | 1    | RO 48.3x4    | S235J2   | 761.0463  | 3,3    | 3,3   |
| 70       | 2    | RO 48.3x4    | S235J2   | 761.0000  | 3,3    | 6,7   |
| 71       | 2    | RQ 40x4      | S235J2   | 760.0000  | 3,4    | 6,7   |
| 72       | 4    | RO 33.7x2.6  | S235J2   | 748.7256  | 1,5    | 6,0   |
| 73       | 4    | RO 48.3x4    | S235J2   | 743.3000  | 3,2    | 13,0  |
| 75       | 1    | RD 20        | S235J2   | 709.8834  | 1,8    | 1,8   |
| 76       | 1    | RD 20        | S235J2   | 681.7206  | 1,7    | 1,7   |
| 77       | 1    | RD 20        | S235J2   | 674.1992  | 1,7    | 1,7   |
| 79       | 1    | RD 20        | S235J2   | 638.3151  | 1,6    | 1,6   |
| 80       | 1    | L 50x5       | S235J2   | 600.0000  | 2,3    | 2,3   |
| 81       | 2    | U 80         | S235J2   | 590.0000  | 5,1    | 10,2  |
| 82       | 9    | RD 25        | S235J2   | 590.0000  | 2,3    | 20,4  |
| 83       | 25   | RD 25        | S235J2   | 558.6849  | 2,2    | 53,8  |
| 84       | 1    | RD 20        | S235J2   | 539.6337  | 1,3    | 1,3   |
| 85       | 1    | L 50x5       | S235J2   | 500.0000  | 1,9    | 1,9   |
| 86       | 1    | L 50x5       | S235J2   | 590.0000  | 2,2    | 2,2   |
| 87       | 1    | FL 100x6     | S235J2   | 400.0000  | 1,9    | 1,9   |
| 88       | 2    | RO 48.3x4    | S235J2   | 341.1500  | 1,5    | 3,0   |
| 89       | 8    | FL 50x10     | S235J2   | 300.0000  | 1,2    | 9,4   |
| 90       | 4    | RO 33.7x2.6  | S235J2   | 251.6933  | 0,5    | 2,0   |
| 90A      | 2    | RO 33.7x2.6  | S235J2   | 531.7685  | 1,1    | 2,1   |
| 91       | 2    | RO 48.3x4    | S235J2   | 242.9623  | 1,1    | 2,1   |
| 91A      | 2    | RO 48.3x4    | S235J2   | 523.0375  | 2,3    | 4,6   |
| 92       | 2    | RO 48.3x4    | S235J2   | 242.9623  | 1,1    | 2,1   |
| 94       | 2    | FL 80x6      | S235J2   | 241.7310  | 0,9    | 1,8   |
| 97       | 10   | FL 70x8      | S235J2   | 236.4030  | 0,9    | 8,8   |
| 98       | 4    | RO 48.3x4    | S235J2   | 89.5354   | 0,4    | 1,6   |
| 99       | 10   | RO 48.3x4    | S235J2   | 89.5354   | 0,4    | 3,9   |
| 100      | 2    | RO 48.3x4    | S235J2   | 89.5354   | 0,4    | 0,8   |
| 101      | 2    | RO 48.3x4    | S235J2   | 89.5354   | 0,4    | 0,8   |
| 102      | 2    | RO 48.3x4    | S235J2   | 44.7011   | 0,2    | 0,4   |
| 103      | 1    | Stopnica     | S235J2   | 530.0000  | 12,5   | 12,5  |
| 104      | 3    | Stopnica     | S235J2   | 530.0000  | 12,5   | 37,6  |
| 106      | 2    | PLATE 10x250 | S235J2   | 1313.4470 | 23,1   | 46,3  |
| 107      | 1    | PLATE 8x560  | S235J2   | 900.0000  | 31,7   | 31,7  |

**POSAMEZNI ELEMENTI**

|   |                    |
|---|--------------------|
| <i>objekt:</i><br>ZAGORJE<br>polmostna konst.: 32 | <i>investitor:</i> |
| <b>JEKLENA KONSTRUKCIJA</b>                       | <i>ime risbe:</i>  |

| Position | kom. | ime                         | Material | Length    | Weight | Total  |
|----------|------|-----------------------------|----------|-----------|--------|--------|
| 108      | 2    | Exp.plocevina 2x699         | S235J2   | 797.8652  | 8,8    | 17,5   |
| 110      | 3    | Rešetka (okno 36X36) 30x755 | S235J2   | 1211.0038 | 21,5   | 64,6   |
| 113      | 2    | Rešetka (okno 36X36) 30x682 | S235J2   | 755.0000  | 12,1   | 24,3   |
| 125      | 2    | PLATE 15x203                | S235J2   | 300.0000  | 6,4    | 12,8   |
| 128      | 6    | PLATE 15x88                 | S235J2   | 273.9936  | 2,6    | 15,7   |
| 132      | 1    | PLATE 15x103                | S235J2   | 256.0000  | 2,6    | 2,6    |
| 133      | 1    | PLATE 15x103                | S235J2   | 252.2610  | 2,5    | 2,5    |
| 134      | 4    | PLATE 10x140                | S235J2   | 250.0000  | 2,7    | 11,0   |
| 136      | 2    | PLATE 15x127                | S235J2   | 216.2821  | 3,2    | 6,5    |
| 141      | 2    | PLATE 10x93                 | S235J2   | 211.2821  | 1,5    | 3,1    |
| 146      | 2    | PLATE 10x95                 | S235J2   | 200.3960  | 1,5    | 3,0    |
| 147      | 1    | PLATE 8x160                 | S235J2   | 197.5000  | 2,0    | 2,0    |
| 148      | 1    | PLATE 8x160                 | S235J2   | 197.5000  | 2,0    | 2,0    |
| 151      | 10   | PLATE 8x60                  | S235J2   | 150.0000  | 0,6    | 5,7    |
| 152      | 2    | PLATE 8x60                  | S235J2   | 150.0000  | 0,6    | 1,1    |
| 153      | 2    | PLATE 8x60                  | S235J2   | 150.0000  | 0,6    | 1,1    |
| 154      | 4    | PLATE 8x60                  | S235J2   | 150.0000  | 0,6    | 2,3    |
| 155      | 1    | PLATE 5x62                  | S235J2   | 110.0000  | 0,2    | 0,2    |
| 156      | 1    | PLATE 5x62                  | S235J2   | 110.0000  | 0,2    | 0,2    |
| 157      | 1    | PLATE 5x60                  | S235J2   | 110.0000  | 0,2    | 0,2    |
| 158      | 1    | PLATE 5x60                  | S235J2   | 110.0000  | 0,2    | 0,2    |
| 159      | 1    | PLATE 5x50                  | S235J2   | 110.0000  | 0,2    | 0,2    |
| 162      | 2    | PLATE 15x92                 | S235J2   | 94.0000   | 1,0    | 2,0    |
| 163      | 8    | PLATE 10x35                 | S235J2   | 81.6076   | 0,2    | 1,4    |
| 164      | 1    | PLATE 5x50                  | S235J2   | 62.0883   | 0,1    | 0,1    |
| 165      | 1    | PLATE 5x50                  | S235J2   | 62.0883   | 0,1    | 0,1    |
| 166      | 1    | PLATE 5x50                  | S235J2   | 60.0000   | 0,1    | 0,1    |
| 167      | 1    | PLATE 5x50                  | S235J2   | 60.0000   | 0,1    | 0,1    |
| 168      | 1    | M 20x100                    | 8.8      | 100.0000  | 0,0    | 0      |
| 169      | 1    | M 20x100                    | 8.8      | 100.0000  | 0,0    | 0      |
| 169      | 6    | M 20x75                     | 8.8      | 75.0000   | 0,0    | 0      |
| 172      | 2    | M 20x50                     | 8.8      | 50.0000   | 0,0    | 0      |
| 174      | 4    | M 16x45                     | 8.8      | 45.0000   | 0,0    | 0      |
| 175      | 28   | M 12x45                     | 8.8      | 45.0000   | 0,0    | 0      |
| 177      | 4    | M 12x35                     | 8.8      | 35.0000   | 0,0    | 0      |
| 178      | 2    | M 20x35                     | 8.8      | 35.0000   | 0,0    | 0      |
| 509      | 1    | U 300                       | S235J2   | 6084.0059 | 281,1  | 281,1  |
| 510      | 4    | U 300                       | S235J2   | 9202.6963 | 425,2  | 1700,7 |

**POSAMEZNI ELEMENTI**

|   |                    |
|---|--------------------|
| <i>objekt:</i><br>ZAGORJE<br>polmostna konst.: 32 | <i>investitor:</i> |
| <b>JEKLENA KONSTRUKCIJA</b>                       | <i>ime risbe:</i>  |

| Position | kom. | ime                   | Material | Length    | Weight | Total |
|----------|------|-----------------------|----------|-----------|--------|-------|
| 511      | 5    | U 300                 | S235J2   | 560.0000  | 25,9   | 129,4 |
| 512      | 6    | U 300                 | S235J2   | 560.0000  | 25,9   | 155,2 |
| 513      | 1    | U 300                 | S235J2   | 560.0000  | 25,9   | 25,9  |
| 515      | 1    | RQ 60x4               | S235J2   | 1372.0531 | 9,2    | 9,2   |
| 516      | 1    | RQ 60x4               | S235J2   | 1372.0570 | 9,2    | 9,2   |
| 517      | 1    | RQ 60x4               | S235J2   | 1380.3748 | 9,3    | 9,3   |
| 518      | 1    | U 300                 | S235J2   | 6084.0059 | 281,1  | 281,1 |
| 519      | 2    | PLATE 25x212          | S235J2   | 450.0000  | 18,8   | 37,5  |
| 520      | 2    | PLATE 25x213          | S235J2   | 450.0000  | 18,8   | 37,5  |
| 521      | 2    | PLATE 15x220          | S235J2   | 320.0000  | 8,3    | 16,6  |
| 522      | 2    | PLATE 10x198          | S235J2   | 260.8254  | 2,5    | 4,9   |
| 523      | 2    | PLATE 10x222          | S235J2   | 273.2157  | 3,2    | 6,3   |
| a        | 4    | PLATE 5x70            | S355JO   | 140.0000  | 0,4    | 1,5   |
| a52      | 4    | L 50x5                | S235J2   | 1025.0000 | 3,9    | 15,5  |
| a54      | 1    | L 50x5                | S235J2   | 985.0000  | 3,7    | 3,7   |
| a55      | 1    | L 50x5                | S235J2   | 985.0000  | 3,7    | 3,7   |
| a60      | 1    | L 50x5                | S235J2   | 940.0000  | 3,5    | 3,5   |
| a61      | 1    | L 50x5                | S235J2   | 940.0000  | 3,5    | 3,5   |
| a150     | 4    | PLATE 15x130          | S235J2   | 160.0000  | 2,4    | 9,8   |
|          | 8    | M 12x45 SIST EN 15048 | 8.8      | 45.0000   | 0,0    | 0     |
|          | 10   | M 16x50 SIST EN 15048 | 8.8      | 50.0000   | 0,0    | 0     |
|          | 8    | M 20x50 SIST EN 15048 | 8.8      | 50.0000   | 0,0    | 0     |
|          | 8    | M 20x60 SIST EN 15048 | 8.8      | 60.0000   | 0,0    | 0     |

vijaki HV 10.9 K1 po SIST EN 14399

- vse vijakne zveze izvesti z dvema podložkama 10.9
- vse vijakne zveze prednapeti s 50% polne sile prednapetja (50%Fp)

vijaki 8.8 po SIST EN 15048-1

- vse vijakne zveze izvesti z dvema podložkama 8.8
- vse vijakne zveze čvrsto pritegniti

V VSEH SPOJIH KJER SE VIJAČI ELEMENT KI IMA POŠEVNINO,  
UPORABITI KONUSNE PODLOŽKE

SEZNAM MATERIALA ZA 1 KOM POLMOSTNE KONSTRUKCIJE Z ENO KOSARO

**137 elementov / celotna teža : 3964 kg**

**celotna teža + dodatek 3% zvari, vijaki... : 4083 kg**

|  |
|--|
|  |
|--|

2.4.3

**PROJEKTANTSKI POPIS S PREDIZMERAMI**

*2/5 Konstrukcije signalov*

*postaja ZAGORJE*

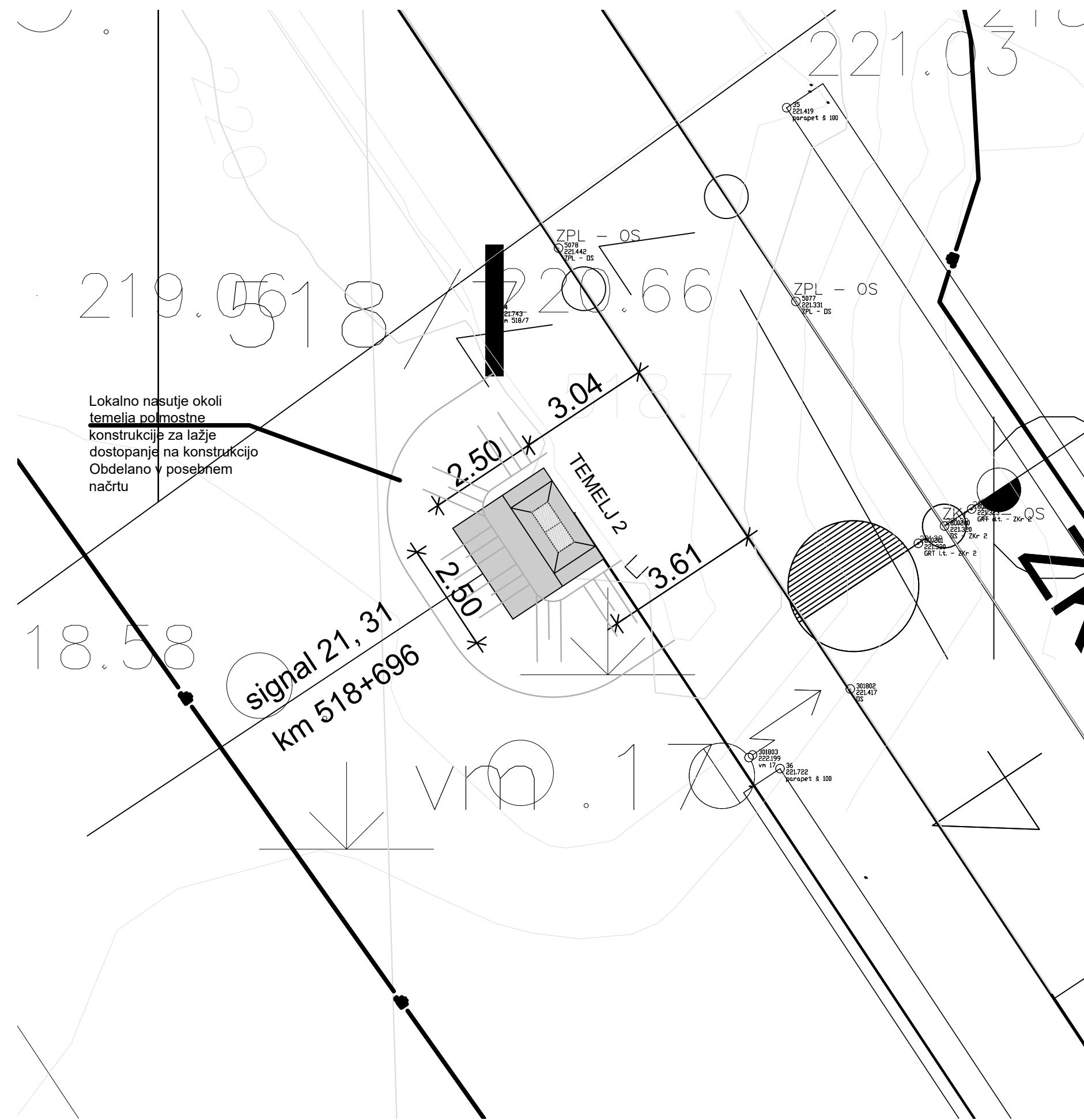
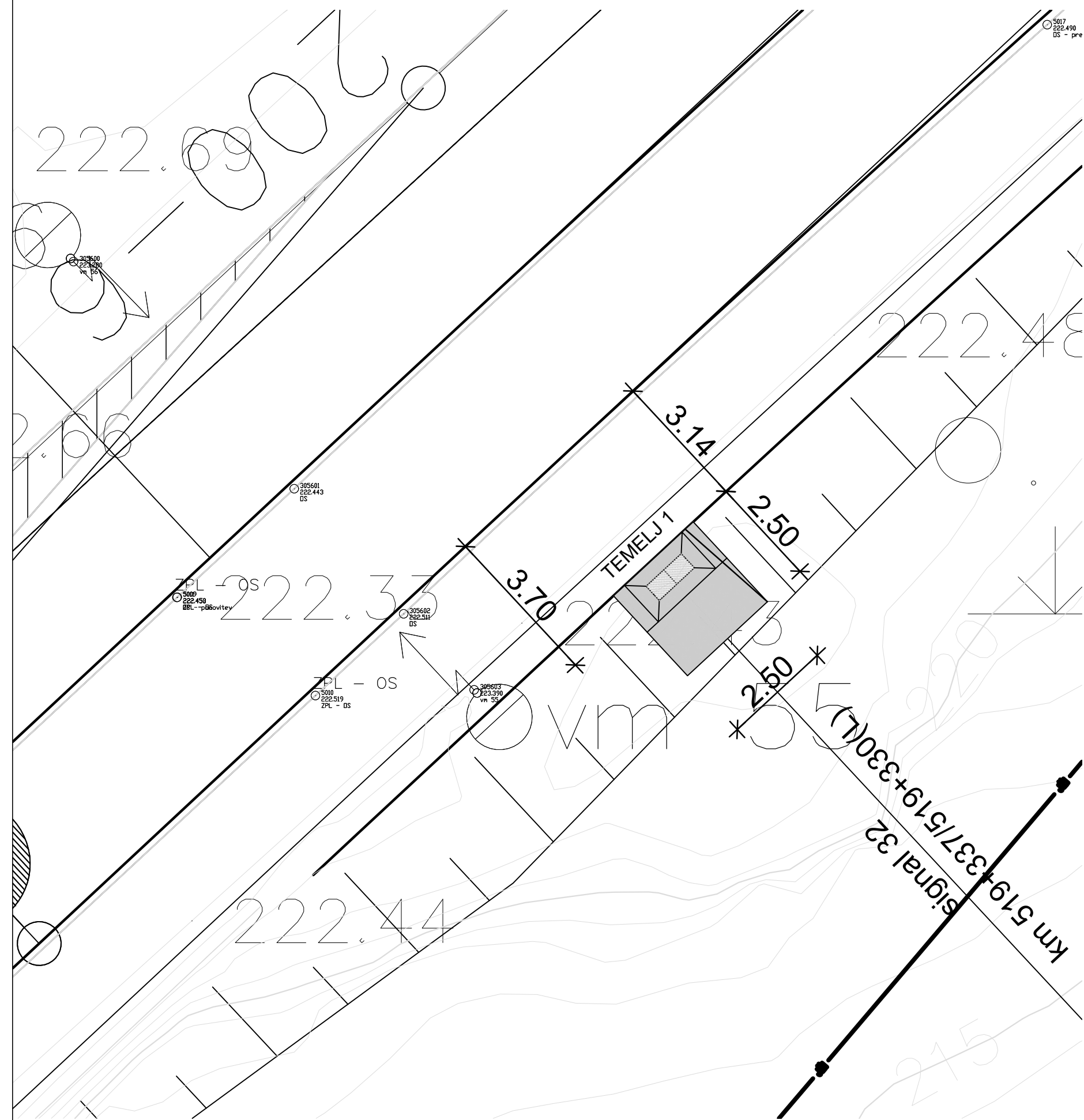
|               |                |                 |              |  |
|---------------|----------------|-----------------|--------------|--|
| <i>ZG1000</i> | <i>0146.00</i> | <i>007.2145</i> | <i>T.2.1</i> |  |
|---------------|----------------|-----------------|--------------|--|

| ID | ID1 | post.    | Opis postavke  | Opomba | EM  | Količina | cena/EM     | SKUPAJ            |
|----|-----|----------|--|--------|-----|----------|-------------|-------------------|
| 1  | 2_5 |          | <b>2.5 KONSTRUKCIJE SIGNALOV</b>   |        |     |          | <b>0,00</b> |                   |
| 2  | 2_5 | 2.5.1    | <b>KONSTRUKCIJE SIGNALOV</b>   |        |     |          | <b>0,00</b> |                   |
| 3  | 2_5 | 2.5.1.A  | PRIPRAVLJALNA DELA   |        |     |          | 0,00        |                   |
| 4  | 2_5 | 2.5.1.B  | POLMOSTNA KONSTRUKCIJA   |        |     |          | 0,00        |                   |
| 5  | 2_5 | 2.5.1.C  | SPLOŠNO  |        |     |          | 0,00        |                   |
| 6  | 2_5 | 2.5.1.D  | NEPREDVIDENA DELA Z VPISOM V GRADBENI DNEVNIK  |        |     |          | 0,00        |                   |
| 7  | 2_5 | 2.5.1.A  | <b>PRIPRAVLJALNA DELA</b>  |        |     |          | <b>0,00</b> |                   |
| 8  | 2_5 | 2.5.1.A1 | Priprava in organizacija gradbišča z vsemi objekti, instalacijami, zagotovitev varnostnih in higiensko tehničnih pogojev,časne transportne poti, oznakami gradbišča ter kasnejša odstranitev vseh objektov in vzpostavitev prvotnega stanja na uporabljenih površinah  |        | kos | 1,00     |             | Preveri vnos cene |
| 9  | 2_5 | 2.5.1.A2 | Zakoličba z zavarovanjem, naprava prečnih profilov in druga geodetska dela   |        | kos | 2,00     |             | Preveri vnos cene |
| 10 | 2_5 | 2.5.1.A3 | Geološki nadzor pri izkopu za temelj (ocena pravilnosti izbrane nosilnosti temeljnih tal in morebitna korekcija temelja). Ocena.   |        | kos | 2,00     |             | Preveri vnos cene |
| 11 | 2_5 | 2.5.1.B  | <b>POLMOSTNA KONSTRUKCIJA</b>  |        |     |          | <b>0,00</b> |                   |
| 12 | 2_5 | 2.5.1.B1 | Izdelava armiranobetonskega temelja polmostne portalne konstrukcije signala. Pozicija obsega odmetavanje tolčenca, izkop za temelj v materialu III. kategorije, odvoz odvečnega materiala na deponijo, izdelavo in postavitve opaža za del temelja, ki gleda izven terena ter armature z dobavo in vgradnjo betona kvalitete C 30/37, XC4, XF3, XD1, PV-II, finalno obdelavo površine temelja, ki gleda izven terena. Z izvedbo ozemljitve. Dimenzije temelja in armature so, glede na zgornje podatke razvidne iz načrta gradbenih konstrukcij  |        | kos | 2,00     |             | Preveri vnos cene |
| 13 | 2_5 | 2.5.1.B2 | Izdelava, dobava in montaža jeklenih konstrukcij - jeklo S235 J2, vse vročecinkano - vijačni material kvalitete 8.8, dimenzij in oblik po statičnem računu in detajlih, v ceni na enoto zajeti tudi: izdelava delavniške dokumentacije (izdela jo izvajalec kovinske konstrukcije), sidranje jeklene konstrukcije v temelj z zalitjem z neskrčljivim betonom ter izvedbo pregleda jeklene konstrukcije in pisne potrditve s strani pooblaščenega inštituta, komplet z vsemi deli in vsem pritrilnim materialom ter montažo z ustreznim avtodvigalom. V postavki ni zajeta dobava in montaža signala. Portal v km 518+694 |        | kg  | 4.234,00 |             | Preveri vnos cene |
| 14 | 2_5 | 2.5.1.B3 | Izdelava, dobava in montaža jeklenih konstrukcij - jeklo S235 J2, vse vročecinkano - vijačni material kvalitete 8.8, dimenzij in oblik po statičnem računu in detajlih, v ceni na enoto zajeti tudi: izdelava delavniške dokumentacije (izdela jo izvajalec kovinske konstrukcije), sidranje jeklene konstrukcije v temelj z zalitjem z neskrčljivim betonom ter izvedbo pregleda jeklene konstrukcije in pisne potrditve s strani pooblaščenega inštituta, komplet z vsemi deli in vsem pritrilnim materialom ter montažo z ustreznim avtodvigalom. V postavki ni zajeta dobava in montaža signala. Portal v km 519+335 |        | kg  | 4.083,00 |             | Preveri vnos cene |
| 15 | 2_5 | 2.5.1.C  | <b>SPLOŠNO</b>   |        |     |          | <b>0,00</b> |                   |
| 16 | 2_5 | 2.5.1.C1 | Projektantski nadzor   |        | ura | 16,00    |             | Preveri vnos cene |
| 17 | 2_5 | 2.5.1.C2 | Izdelava projekta izvedenih del (PID) in Navodil za obratovanje in vzdrževanje (NOV)   |        | kos | 1,00     |             | Preveri vnos cene |
| 18 | 2_5 | 2.5.1.C3 | Izdelava Navodil za obratovanje in vzdrževanje   |        | kos | 1,00     |             | Preveri vnos cene |
| 19 | 2_5 | 2.5.1.D  | <b>NEPREDVIDENA DELA Z VPISOM V GRADBENI DNEVNIK</b>   |        |     |          | <b>0,00</b> |                   |
| 20 | 2_5 | 2.5.1.D1 | Nepredvidena dela z vpisom v gradbeni dnevnik cca 5 %  |        | kos | 1,00     |             | Preveri vnos cene |

|            |                                 |
|------------|---------------------------------|
| <b>2.5</b> | <b>TEHNIČNI PRIKAZI (RISBE)</b> |
|------------|---------------------------------|

- 1 Situacija
- 2 Prečni prerezi, opažni načrt temeljev
- 3 3D shema
- 4 Dispozicija
- 5 Zvarjenec 509
- 6 Zvarjenec 509 - elementi
- 7 Zvarjenec 510
- 8 Varjenec a114, 115
- 9 Varjenec 118, 121
- 10 Profili, pločevine 118, 121
- 11 Varjenec 113
- 12 Varjenec 4, 112, 118.1, 118.2
- 13 Varjenec 122
- A1 Armaturni načrt, temelj T1
- A2 Armaturni načrt, temelj T2

|               |                |                 |          |  |
|---------------|----------------|-----------------|----------|--|
| <b>ZG1000</b> | <b>0146.00</b> | <b>007.2145</b> | <b>G</b> |  |
|---------------|----------------|-----------------|----------|--|



- izvedbeni razred EXC 2
- Konstrukcijsko jeklo S235J2
- vsa konstrukcija je vroče cinkana po SIST EN ISO 14713
  - min. debelina cinka nosilnih elementov 70 mikronov
  - Vijaki matice, podložke in sidrne palice (navojne palice) ter matice za sidra morajo biti vroče cinkani
- vijaki HV 10.9 K1 po SIST EN 14399
  - vse vijake zveze izvesti z dvema podložkama 10.9
  - vse vijake zveze prednapeti s 50% polne sile prednapetja (50%Fp)
- vijaki 8.8 po SIST EN 15048-1
  - vse vijake zveze izvesti z dvema podložkama 8.8
  - vse vijake zveze čvrsto pritegniti

- Ozemljitev temeljev se izvede skladno s projektom ozemljitve  
 - Na zvarjenih zaprtih elementih je potrebno izvesti luknje za odzračevanje pri postopku cinkanja

JEKLENA KONSTRUKCIJA MORA BITI OZEMLJENA  
 PRED IZVEDBO JE POTREBNO PREVERITI GEOMETRIJO IN DIMENZIJE

2/5

Datum: \_\_\_\_\_ Opis spremembe: \_\_\_\_\_ Podpis: \_\_\_\_\_

Investitor:  **Republika Slovenija**  
 Ministrstvo za infrastrukturo  
 Direkcija RS za infrastrukturo  
 Tržaška cesta 19, 1000 Ljubljana  
 tel.: 01 478 80 02, fax: 01 478 81 23

Projektant:  **sž - projektivno podjetje ljubljana, d.d.**  
 projektiranje, inženiring, svetovanje  
 Ukmarjeva ulica 6, SI - 1000 Ljubljana  
 tel.: 01 300 76 00, fax: 01 300 76 36

Podizvajalec:  **Hiša Niša, d.o.o.**  
 Verd 252,  
 1360 Vrhnika

Hiša Niša, d.o.o.  
 Načrtovanje in svetovanje  
 Verd 252, 1360 Vrhnika

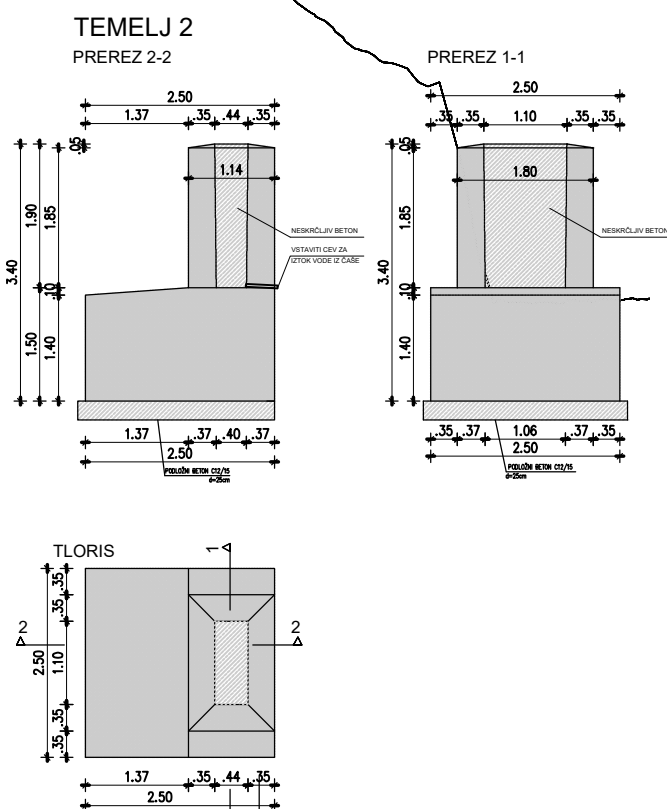
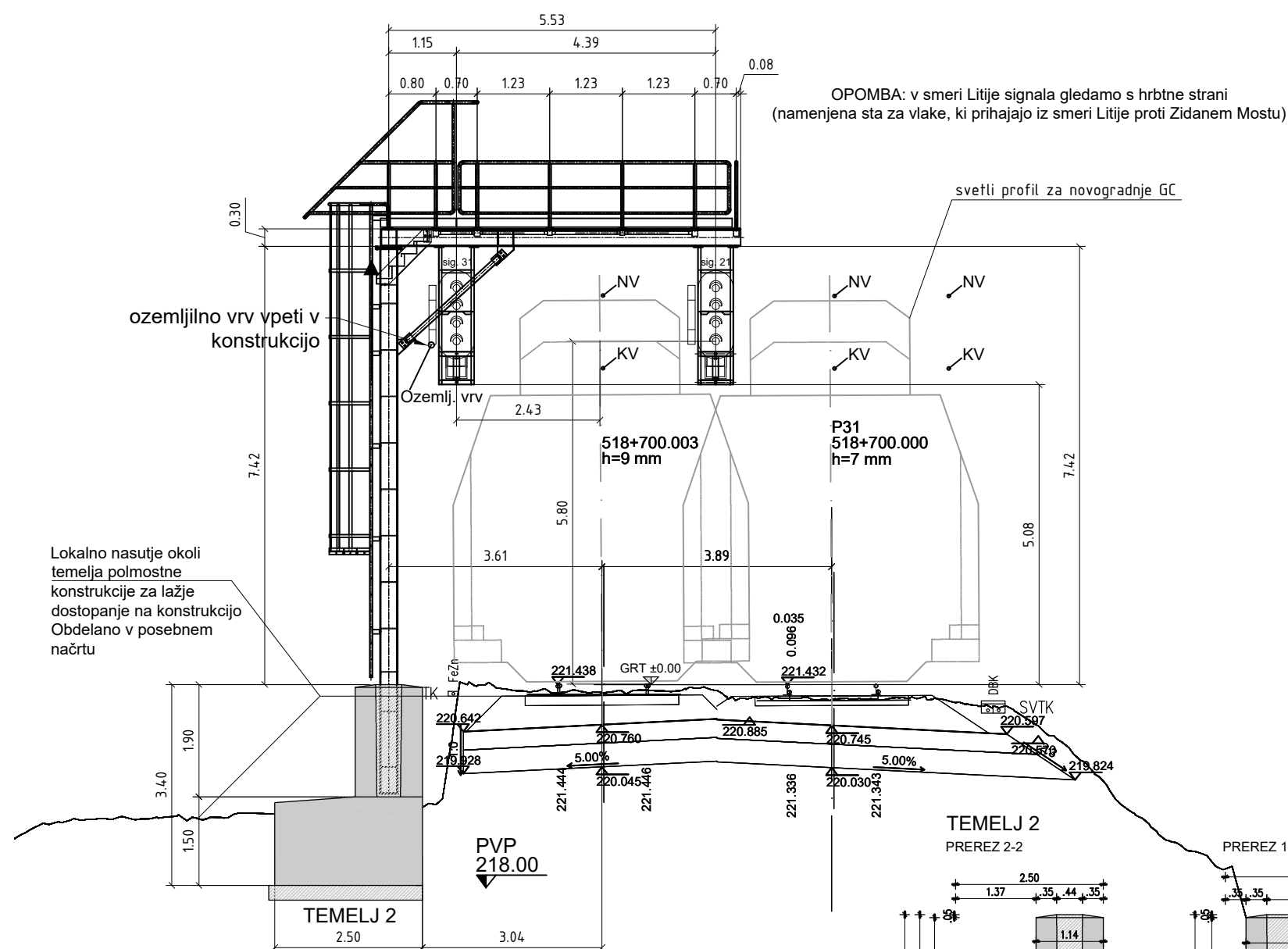
Projekt: Umestitev nadhodov na železniških postajah Hrastnik, Trbovlje in Zagorje

Objekt: **Železniška postaja Zagorje** Id. št.: Ime: \_\_\_\_\_  
 Načrt: 2/5 Konstrukcije signalov Vodja projekta: PI G-0133 mag. E. Hadžiahmetović univ. dipl. inž. gradb.  
 Pooblaščen inženir: PI G-0332 mag. T. Habič univ. dipl. inž. gradb.  
 Vrsta načrta: **NACRT S PODROČJA GRADBENIŠTVA** Izdelal: PI G-0332 mag. T. Habič univ. dipl. inž. gradb.

| Risba: SITUACIJA |                    |              |              |                        |            |           |
|------------------|--------------------|--------------|--------------|------------------------|------------|-----------|
| St. proge:       | Vrsta projekta:    | Merilo:      | Datum:       | Projekt št.:           | Načrt št.: | Int. št.: |
| 10               | IZN                | 1:100        | feb. 2021    | 3710/Z                 | 101/21     |           |
| St. odseka:      | Arhivska številka: | Faza/objekt: | Šifra risbe: | Prostor za črtno kodo: | Risba št.: |           |
| ZG1000           | 0146.00            | 007.2145.    |              |                        | 1          |           |

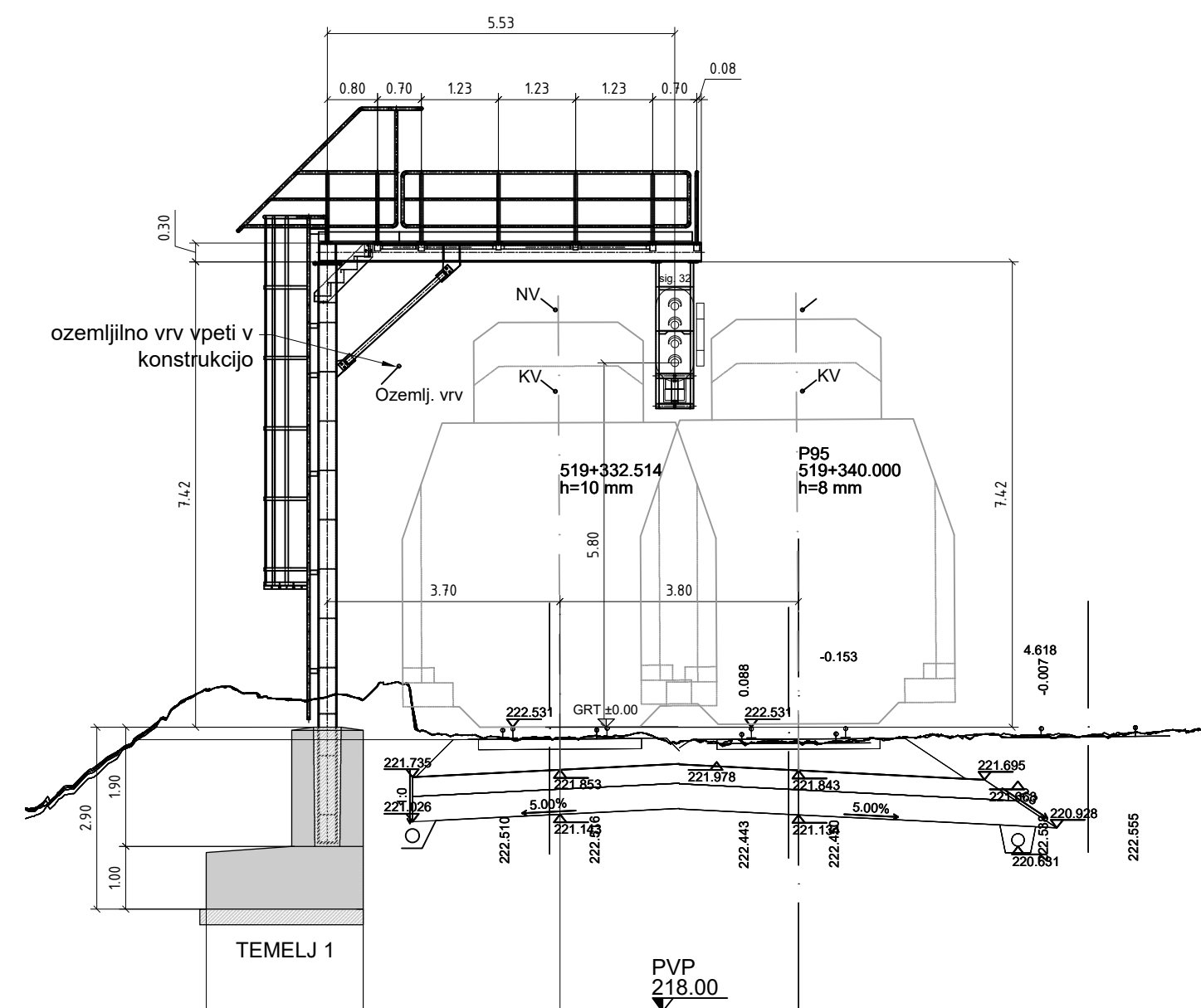


# 31 in 21 km 518+696 novo



# 32 km 519+337

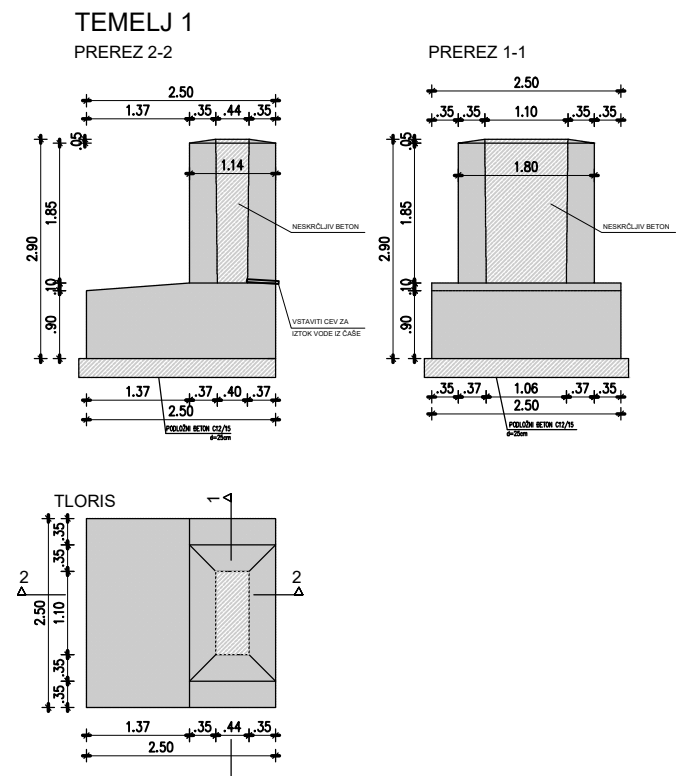
(po levem tiru km 519+330)



**OPOMBE:**

- mere kontrolirati in po potrebi prilagoditi pri montaži na terenu
- pri izdelavi jeklene konstr. upoštevati tudi ostalo projektno dok. (arhitekturni načrti, načrti temeljenja, gradbeni načrti)
- izdelava in montaža nosilne jeklene konstrukcije mora biti v skladu z SIST EN 1090-2 : 2008
- Vsi sočelni zvari K,  $\nabla$ ,  $\nabla$ ,  $\nabla$ ...morajo biti izvedeni s prevaritvijo korena
- Varilne deformacije predvidi izvajalec
- vsi neoznačeni zvari pri varjenju z zunanje strani okrogle ali pravokotne cevi, so a=1,0 x tmin (tmin = tanjša pločevina v spoju)
- vsi neoznačeni zvari pri obojestranskem varjenju so a=0,5 x tmin (tmin = tanjša pločevina v spoju)
- vsi neoznačeni zvari so a=0,7 x tmin (tmin = tanjša pločevina v spoju)

## POL MOSTNA KONSTRUKCIJA - ZAGORJE



- izvedbeni razred EXC 2
- Konstrukcijsko jeklo S235J2
- vsa konstrukcija je vroče cinkana po SIST EN ISO 14713
  - min. debelina cinka nosilnih elementov 70 mikronov
  - Vijaki matice, podložke in sidrne palice (navojne palice) ter matice za sidra morajo biti vroče cinkani
- vijaki HV 10.9 K1 po SIST EN 14399
  - vse vijakne zveze izvesti z dvema podložkama 10.9
  - vse vijakne zveze prednapeti s 50% polne sile prednapetja (50%Fp)
- vijaki 8.8 po SIST EN 15048-1
  - vse vijakne zveze izvesti z dvema podložkama 8.8
  - vse vijakne zveze čvrsto pritegniti
- Ozemljitev temeljev se izvede skladno s projektom ozemljitve
- Na zvarjenih zaprtih elementih je potrebno izvesti luknje za odzračevanje pri postopku cinkanja


JEKLENA KONSTRUKCIJA MORA BITI OZEMLJENA  
PRED IZVEDBO JE POTREBNO PREVERITI GEOMETRIJO IN DIMENZIJE

2/5

Datum: \_\_\_\_\_ Opis spremembe: \_\_\_\_\_ Podpis: \_\_\_\_\_

Investitor:  **Republika Slovenija**  
Ministrstvo za infrastrukturo  
Direkcija RS za infrastrukturo  
Tržaška cesta 19, 1000 Ljubljana  
tel.: 01 478 80 02, fax: 01 478 81 23

Projektant:  **sž - projektivno podjetje ljubljana, d.d.**  
projektiranje, inženiring, svetovanje  
Ukmarjeva ulica 6, SI - 1000 Ljubljana  
tel.: 01 300 76 00, fax: 01 300 76 36

Podizvajalec:  **Hiša Niša, d.o.o.**  
Verd 252, 1360 Vrhnika  
Načrtovanje in svetovanje  
Verd 252, 1360 Vrhnika

Projekt: Umestitev nadhodov na železniških postajah Hrastnik, Trbovlje in Zagorje

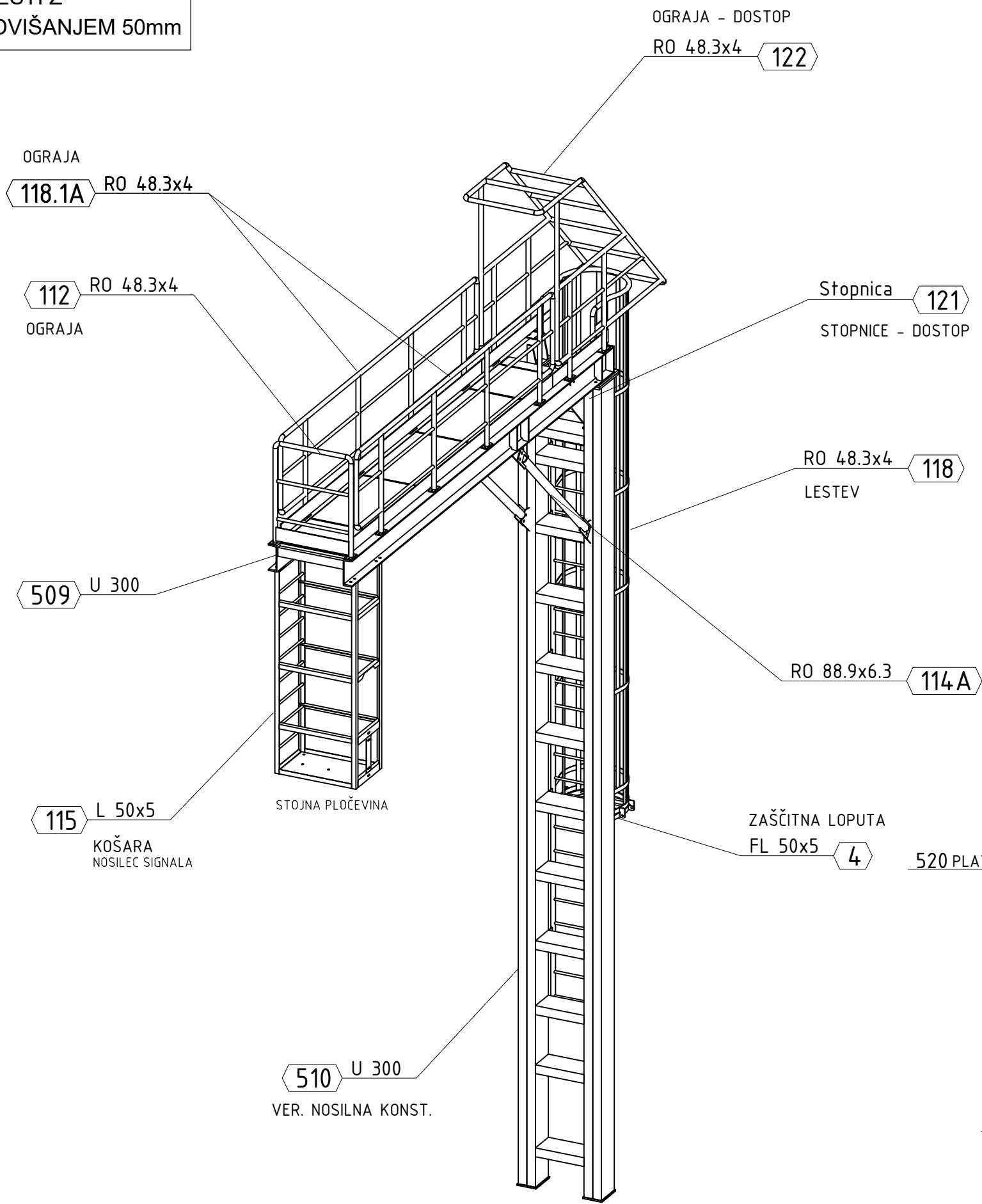
|  |  |
|--|--|
| Objekt: <b>Železniška postaja Zagorje</b>          | Id. št.: lme:  |
| Načrt: 2/5 Konstrukcije signalov                   | Vodja projekta: PI G-0133 mag. E. Hadžiahmetović univ. dipl. inž. gradb. |
|  | Pooblaščen inženir: PI G-0332 mag. T. Habič univ. dipl. inž. gradb.      |
| Vrsta načrta: <b>NAČRT S PODROČJA GRADBENIŠTVA</b> | Izdela: PI G-0332 mag. T. Habič univ. dipl. inž. gradb.                  |

Risba: **PREČNI PREREZI, OPAŽNI NAČRT TEMELJEV**

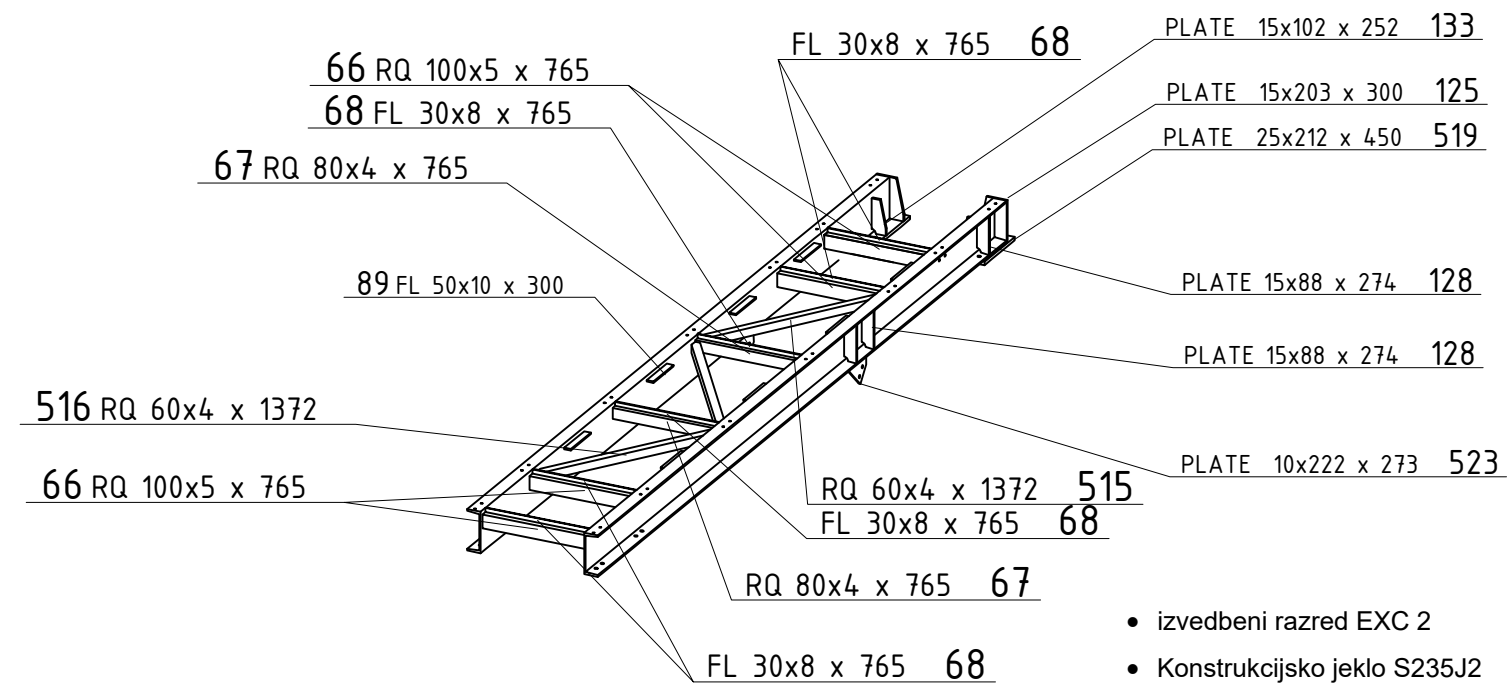
|               |                     |               |                  |                        |                   |            |
|---------------|---------------------|---------------|------------------|------------------------|-------------------|------------|
| Št. proge: 10 | Vrsta projekta: IZN | Merilo: 1:100 | Datum: feb. 2021 | Projekt št.: 3710/Z    | Načrt št.: 101/21 | Int. št.:  |
| Št. odseka:   | Arhivska številka:  | Faza/objekt:  | Šifra risbe:     | Prostor za črtno kodo: |                   | Risba št.: |
| ZG1000        | 0146.00             | 007.2145.     |                  |                        |                   | 2          |



IZVESTI Z  
NADVIŠANJEM 50mm



HORIZONTALNA NOSILNA  
KONSTRUKCIJA



- izvedbeni razred EXC 2
- Konstrukcijsko jeklo S235J2
- vsa konstrukcija je vroče cinkana po SIST EN ISO 14713
  - min. debelina cinka nosilnih elementov 70 mikronov
  - Vijaki matice, podložke in sidrne palice (navojne palice) ter matice za sidra morajo biti vroče cinkani
- vijaki HV 10.9 K1 po SIST EN 14399
  - vse vijakne zveze izvesti z dvema podložkama 10.9
  - vse vijakne zveze prednapeti s 50% polne sile prednapetja (50%Fp)
- vijaki 8.8 po SIST EN 15048-1
  - vse vijakne zveze izvesti z dvema podložkama 8.8
  - vse vijakne zveze čvrsto pritegniti

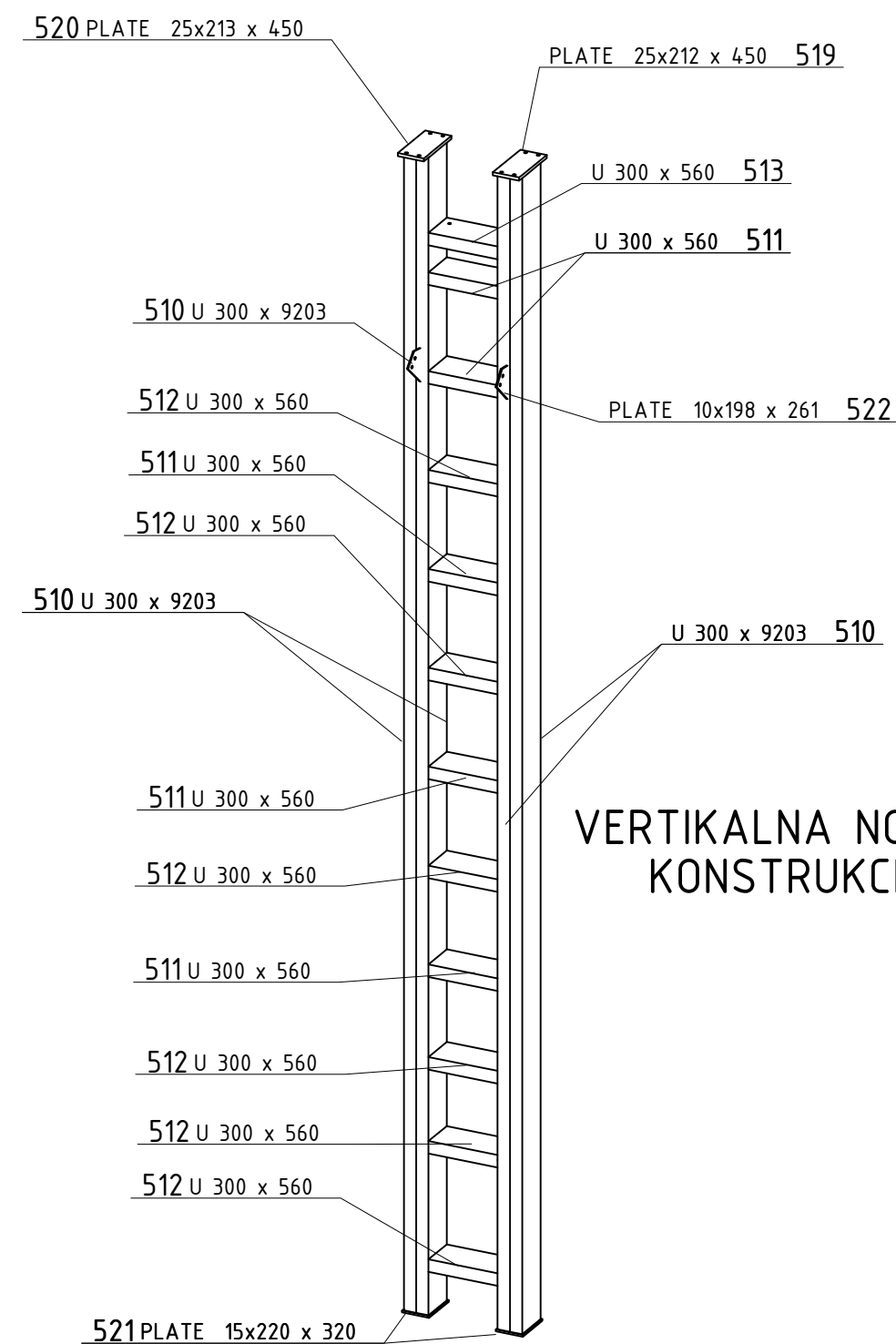
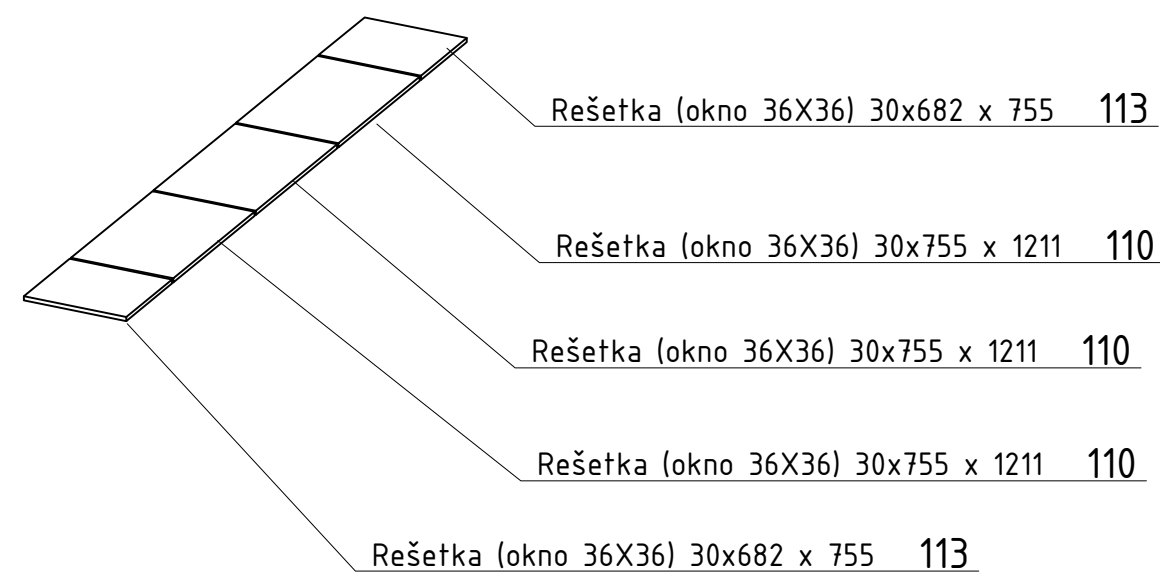
V VSEH SPOJIH KJER SE VIJAČI ELEMENT KI IMA POŠEVNINO,  
UPORABITI KONUSNE PODLOŽKE

- Ozemljitev temeljev se izvede skladno s projektom ozemljitve
  - Na zvarjenih zaprtih elementih je potrebno izvesti luknje za odzračevanje pri postopku cinkanja
- JEKLENA KONSTRUKCIJA MORA BITI OZEMLJENA
- PRED IZVEDBO JE POTREBNO PREVERITI GEOMETRIJO IN DIMENZIJE IN IZDELATI  
DELAVNIŠKE NAČRTE JEKLENE KONSTRUKCIJE

OPOMBE:

- mere kontrolirati in po potrebi prilagoditi pri montaži na terenu
- pri izdelavi jeklene konstr. upoštevati tudi ostalo projektno dok. (arhitekturni načrti, načrti temeljenja, gradbeni načrti)
- izdelava in montaža nosilne jeklene konstrukcije mora biti v skladu z SIST EN 1090-2 : 2008
- Vsi sočelni zvari K, ∇, ∇...morajo biti izvedeni s prevaritvijo korena
- Varilne deformacije predvidi izvajalec
- vsi neoznačeni zvari pri varjenju z zunanje strani okrogle ali pravokotne cevi, so a=1,0 x tmin (tmin = tanjša pločevina v spoju)
- vsi neoznačeni zvari pri obojestranskem varjenju so a=0,5 x tmin (tmin = tanjša pločevina v spoju)
- vsi neoznačeni zvari so a=0,7 x tmin (tmin = tanjša pločevina v spoju)

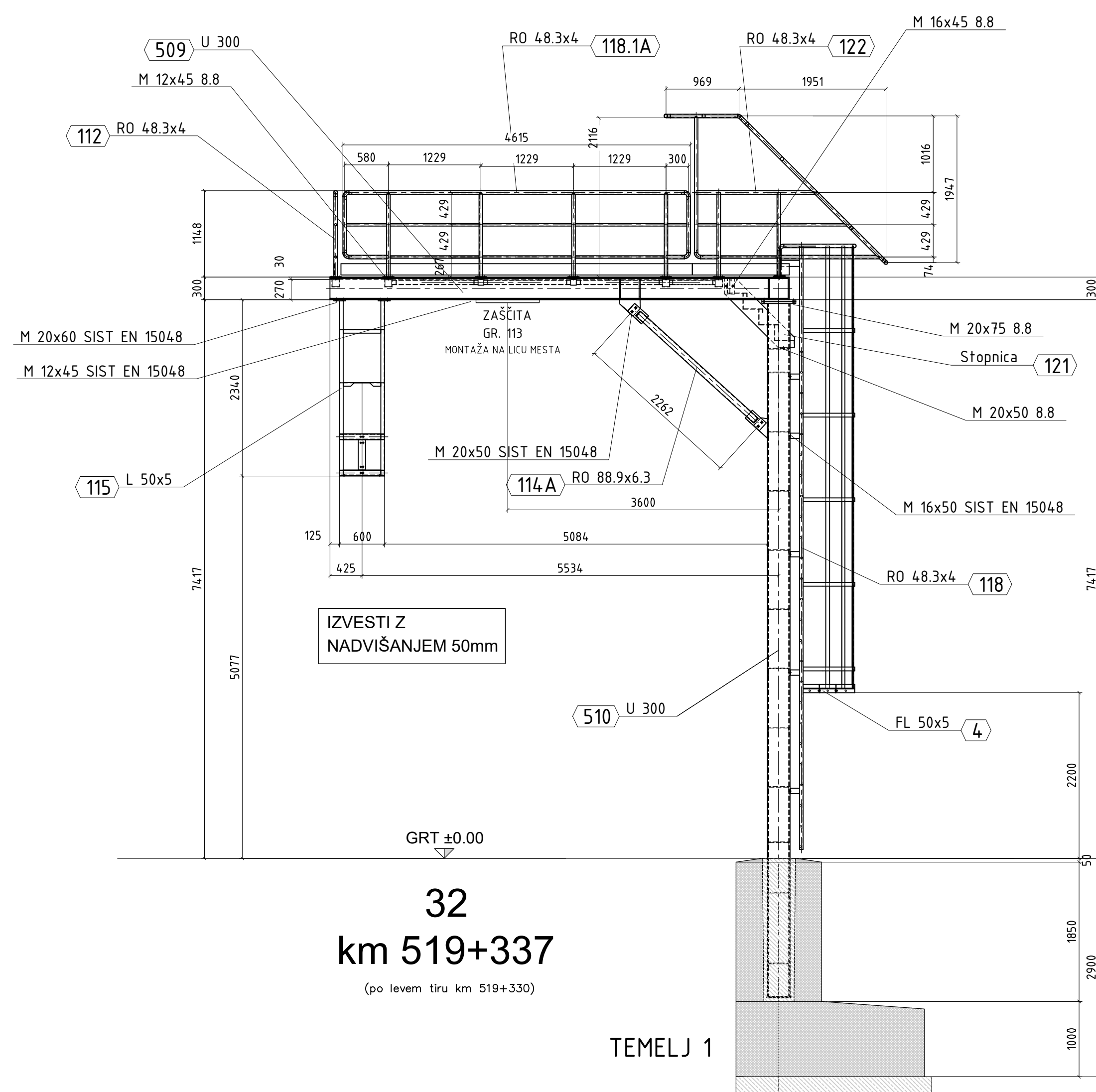
REŠETKE



VERTIKALNA NOSILNA  
KONSTRUKCIJA

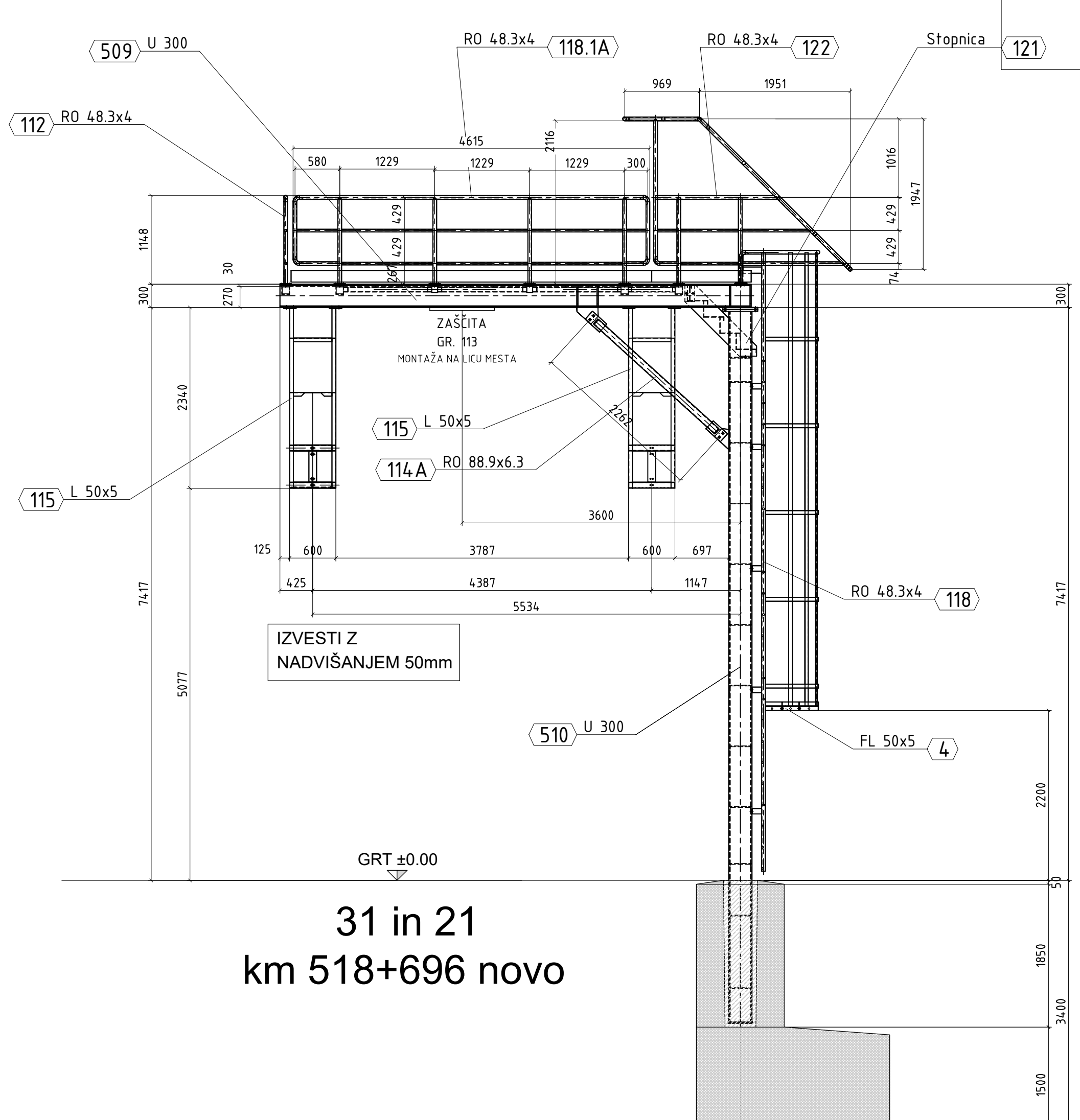
|               |   |              |  |                        |            |
|---------------|---|--------------|--|------------------------|------------|
| Objekt:       | Umestitev nadhoda na železniški postaji Zagorje | Vodja proj.: | mag.E.Hadžiahmetović, u. d. i. g. G-0133 | Vsebina risbe:         |            |
| Investitor:   | RS, MzI, Direkcija RS za infrastrukturo         | Poobl. inž.: | mag. Tomaž Habič, u. d. i. g. G-0332     | 3D SHEMA               |            |
| Projektant:   | HIŠA NIŠA, d. o. o.                             | Spremembe:   |  |                        |            |
| Vrsta načrta: | 2 Načrt s področja gradbeništva                 | Faza:        | Št. projekta: 3710/Z                     | Datum:                 | 02 / 2021  |
| Načrt:        | 2/5 Konstrukcije signalov                       | IZN          | Št. načrta: 101/21                       | Merilo:                | 1:50       |
| Št. odseka:   | Arhivska št.:                                   | Faza/objekt: | Šifra priloge:                           | Prostor za črtno kodo: | Št. risbe: |
| ZG1000        | 0146.00   | 007.2145     | G.151                                    |                        | 3          |

DISPOZICIJA  
POL MOSTNA KONSTRUKCIJA



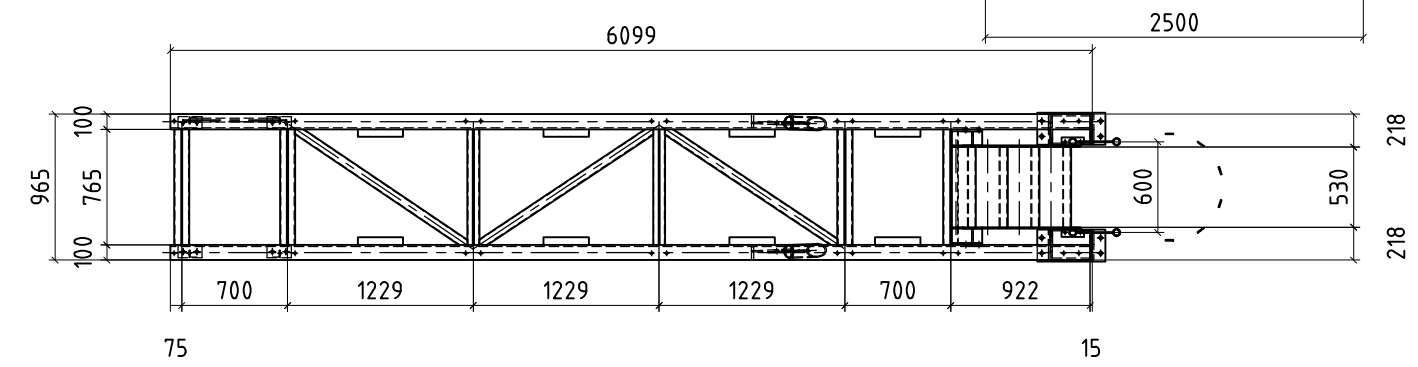
**32**  
**km 519+337**  
(po levem tiru km 519+330)

TEMELJ 1

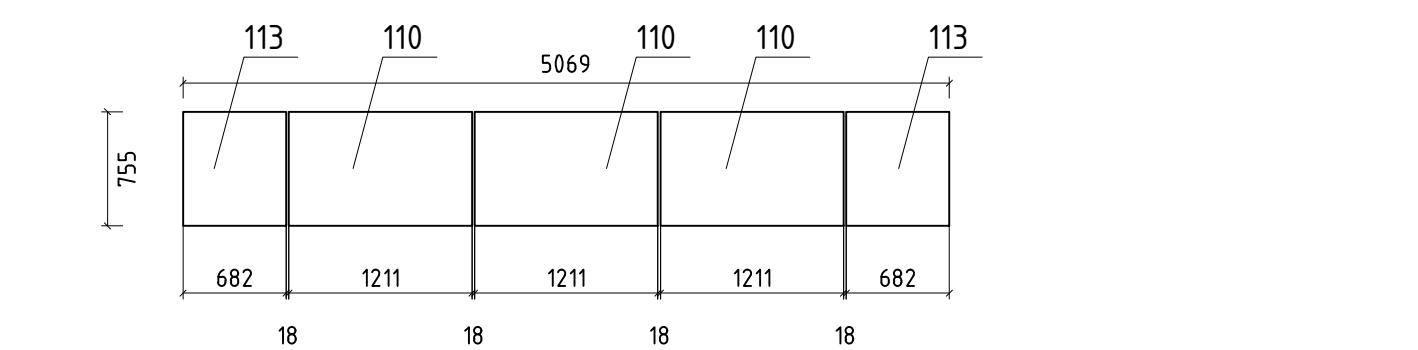


**31 in 21**  
**km 518+696 novo**

TEMELJ 2

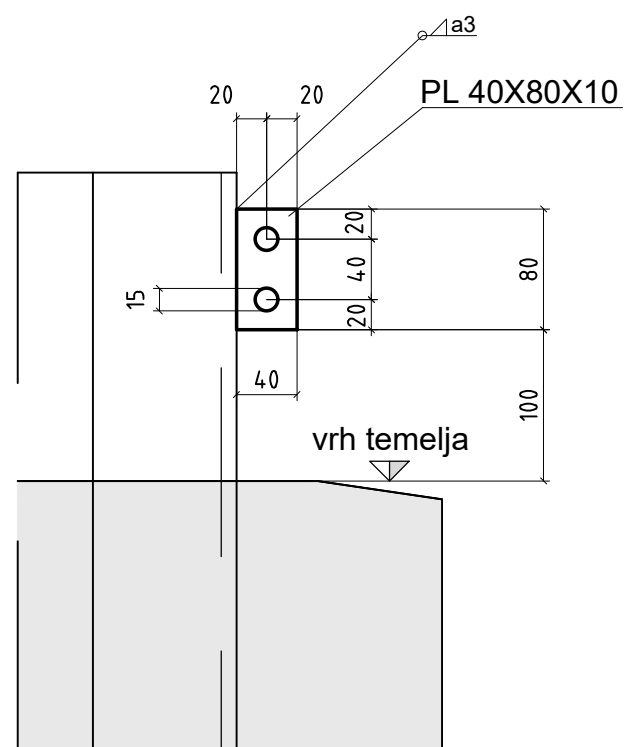


TLORIS



REŠETKE

**ozemljitev**  
HEMA VARJENJA NA  
STEBER PORTALA  
(montaža ozemljitvene  
pločevine na vsak steber)



- izvedbeni razred EXC 2
- Konstruktivsko jeklo S235J2
- vsa konstrukcija je vroče cinkana po SIST EN ISO 14713
  - min. debelina cinka nosilnih elementov 70 mikronov
  - Vijaki matice, podložke in sidrne palice (navojne palice) ter matice za sidra morajo biti vroče cinkani
- vijaki HV 10.9 K1 po SIST EN 14399
  - vse vijalne zveze izvesti z dvema podložkama 10.9
  - vse vijalne zveze prednapeti s 50% polne sile prednapetja (50%Fp)
- vijaki 8.8 po SIST EN 15048-1
  - vse vijalne zveze izvesti z dvema podložkama 8.8
  - vse vijalne zveze čvrsto pritegniti

V VSEH SPOJIH KJER SE VIJAČI ELEMENT KI IMA POŠEVNINO,  
UPORABITI KONUSNE PODLOŽKE

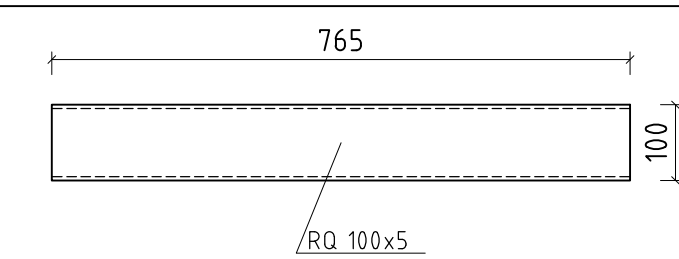
- Ozemljitev temeljev se izvede skladno s projektom ozemljitve
  - Na zvarjenih zaprtih elementih je potrebno izvesti luknje za odzračevanje pri postopku cinkanja
- JEKLENA KONSTRUKCIJA MORA BITI OZEMLJENA
- PRED IZVEDBO JE POTREBNO PREVERITI GEOMETRIJO IN DIMENZIJE IN IZDELATI  
DELAVNIŠKE NAČRTE JEKLENE KONSTRUKCIJE

OPOMBE:

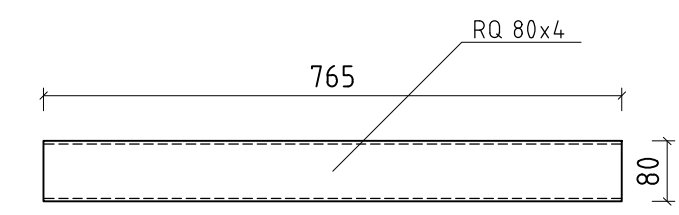
- mere kontrolirati in po potrebi prilagoditi pri montaži na terenu
- pri izdelavi jeklene konstr. upoštevati tudi ostalo projektno dok. (arhitekturni načrti, načrti temeljenja, gradbeni načrti)
- izdelava in montaža nosilne jeklene konstrukcije mora biti v skladu z SIST EN 1090-2 : 2008
- Vsi sočelni zvari K, V, V...morajo biti izvedeni s prevaritvijo korena
- Varilne deformacije predvidi izvajalec
- vsi neoznačeni zvari pri varjenju z zunanje strani okrogle ali pravokotne cevi, so a=1,0 x tmin (tmin = tanjša pločevina v spoju)
- vsi neoznačeni zvari pri obojestranskem varjenju so a=0,5 x tmin (tmin = tanjša pločevina v spoju)
- vsi neoznačeni zvari so a=0,7 x tmin (tmin = tanjša pločevina v spoju)

|               |   |              |  |                        |            |
|---------------|---|--------------|--|------------------------|------------|
| Objekt:       | Umestitev nadhoda na železniški postaji Zagorje | Vodja proj.: | mag.E.Hadžiahmetović, u. d. i. g. G-0133 | Vsebinska risba:       |            |
| Investitor:   | RS, MzI, Direkcija RS za infrastrukturo         | Poobl. inž.: | mag. Tomaž Habič, u. d. i. g. G-0332     | DISPOZICIJA            |            |
| Projektant:   | HIŠA NIŠA, d. o. o.                             | Spremembe:   |  |                        |            |
| Vrsta načrta: | 2 Načrt s področja gradbeništva                 | Faza:        | Št. projekta: 3710/Z                     | Datum: 02 / 2021       |            |
| Načrt:        | 2/5 Konstrukcije signalov                       | IZN          | Št. načrta: 101/21                       | Merilo: 1:50           |            |
| Št. odseka:   | Arhivska št.:                                   | Faza/objekt: | Šifra priloge:                           | Prostor za črtno kodo: | Št. risbe: |
| ZG1000        | 0146.00   | 007.2145     | G.151                                    |                        | 4          |

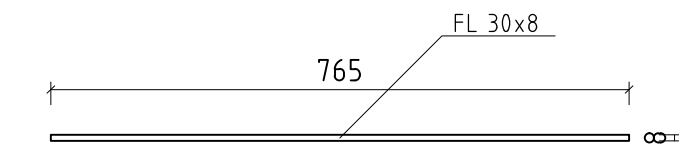




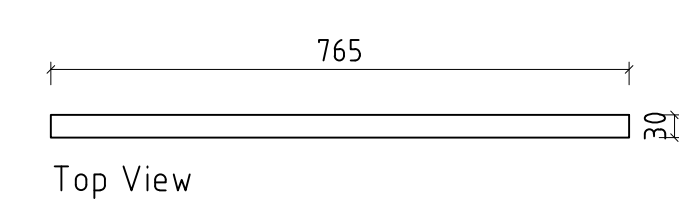
Pos 66 Front View (Sc1:10)  
RQ 100x5 (4 x)  
Length:765



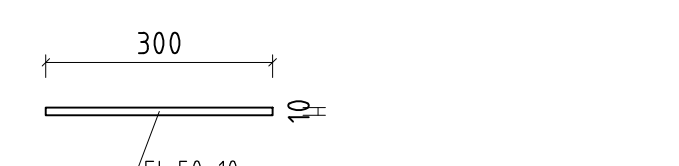
Pos 67 Front View (Sc1:10)  
RQ 80x4 (2 x)  
Length:765



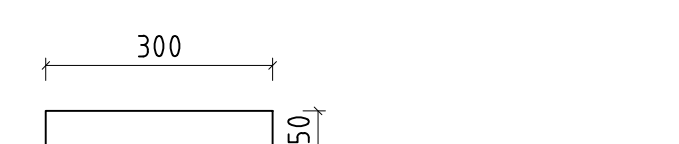
Pos 68 Front View (Sc1:10)  
FL 30x8 (6 x)  
Length:765



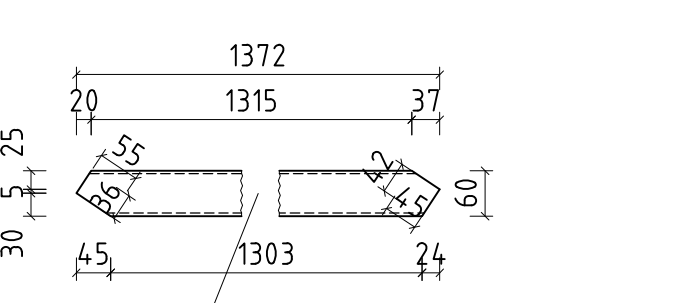
Top View



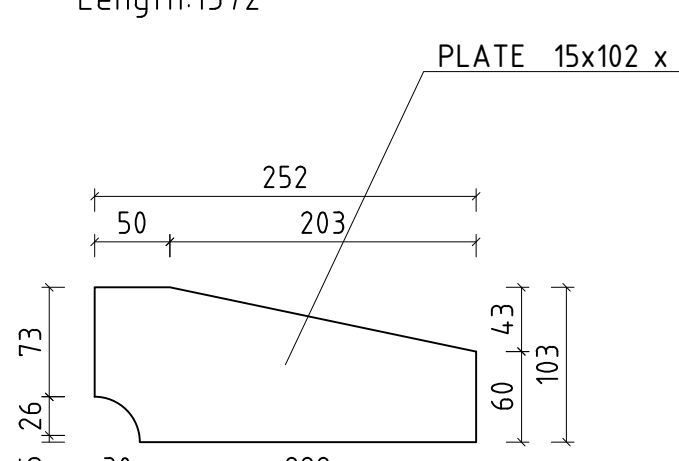
Pos 89 Front View (Sc1:10)  
FL 50x10 (8 x)  
Length:300



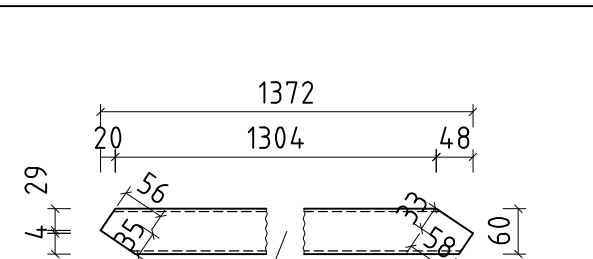
Top View



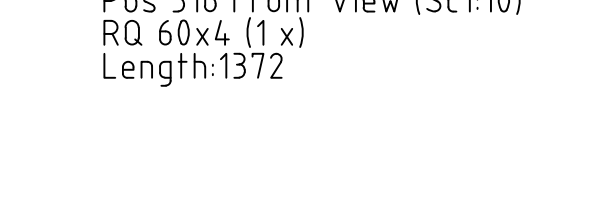
Pos 515 Front View (Sc1:10)  
RQ 60x4 (1 x)  
Length:1372



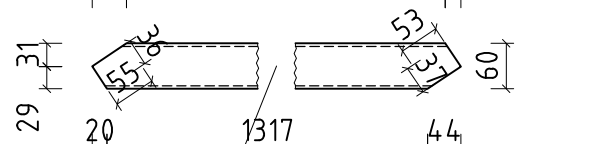
Pos 133 Top View (Sc1:5)  
PLATE 252x102x15 (1 x)  
Length:252



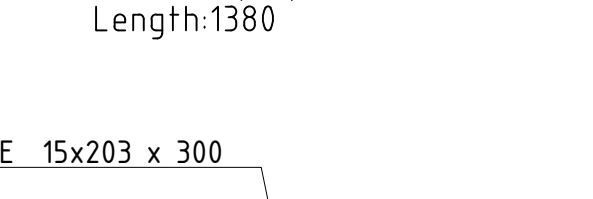
Pos 516 Front View (Sc1:10)  
RQ 60x4 (1 x)  
Length:1372



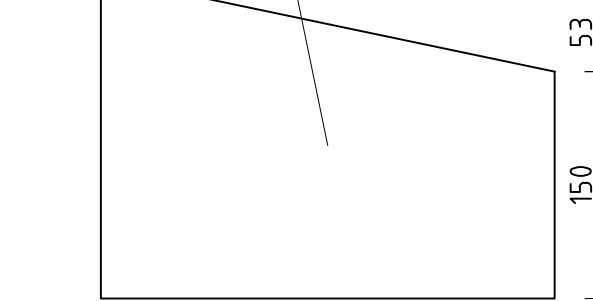
Pos 517 Front View (Sc1:10)  
RQ 60x4 (1 x)  
Length:1380



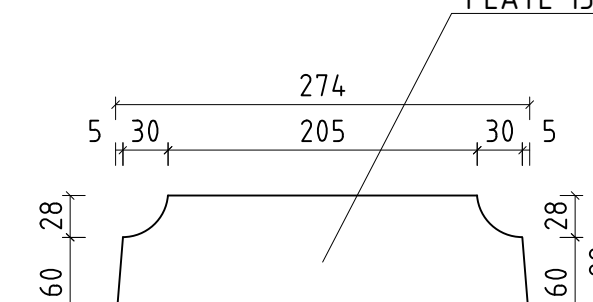
Pos 125 Top View (Sc1:5)  
PLATE 300x203x15 (2 x)  
Length:300



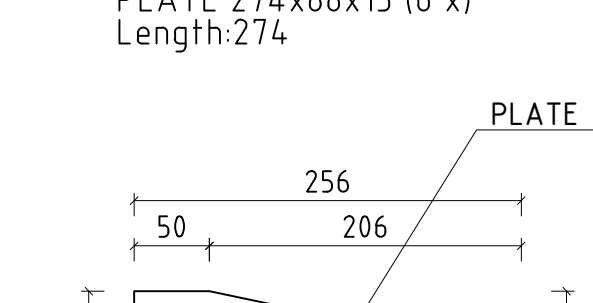
Pos 128 Top View (Sc1:5)  
PLATE 274x88x15 (6 x)  
Length:274



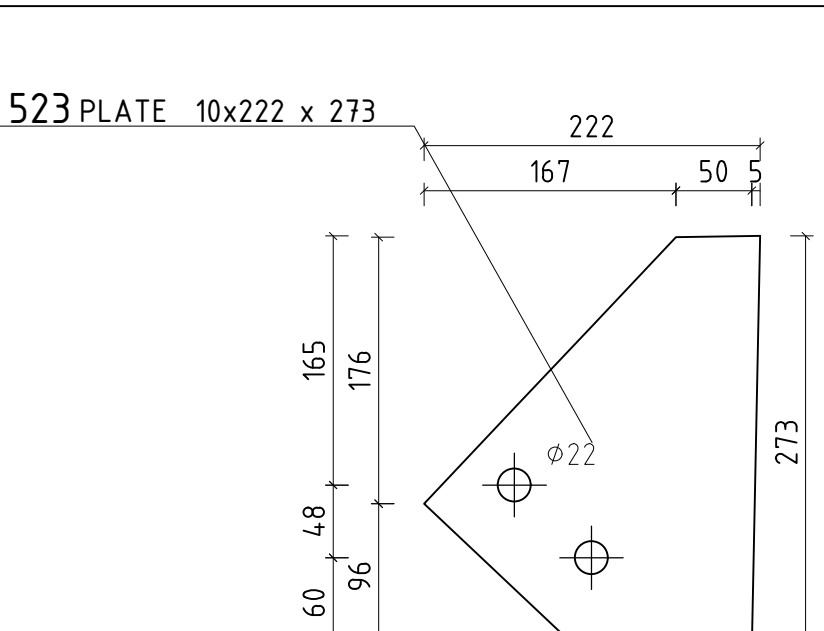
Pos 132 Top View (Sc1:5)  
PLATE 256x102x15 (1 x)  
Length:256



Pos 523 Top View (Sc1:5)  
PLATE 273x222x10 (2 x)  
Length:273



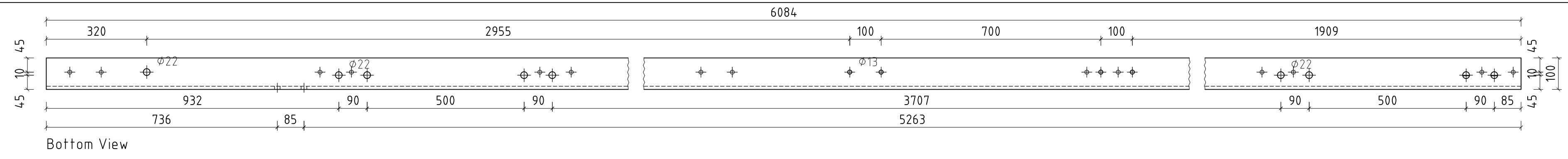
Pos 523 Top View (Sc1:5)  
PLATE 273x222x10 (2 x)  
Length:273



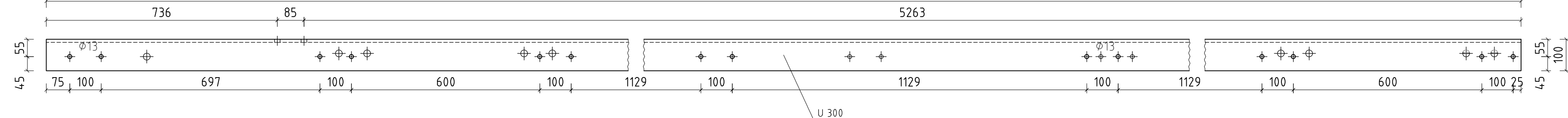
Pos 523 Top View (Sc1:5)  
PLATE 273x222x10 (2 x)  
Length:273



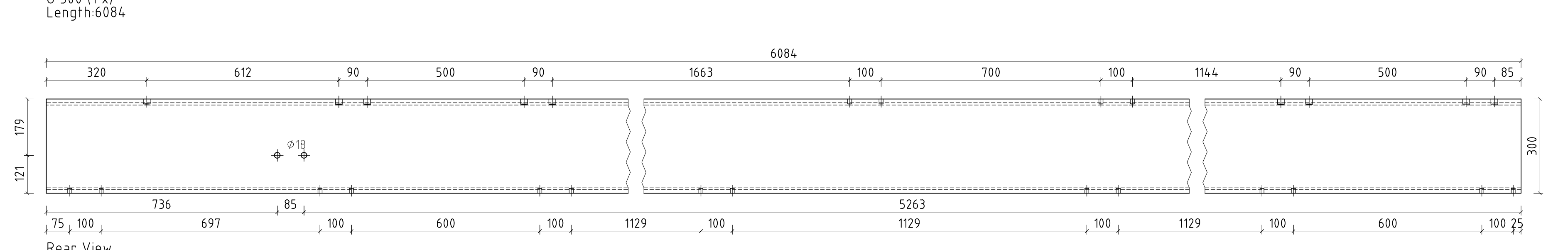
Pos 523 Top View (Sc1:5)  
PLATE 273x222x10 (2 x)  
Length:273



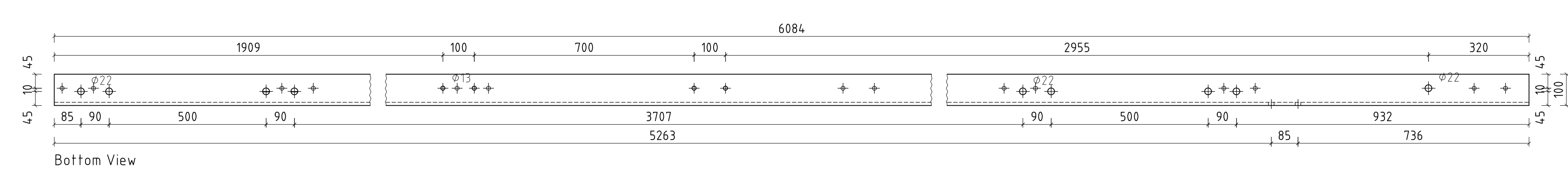
Pos 509 Top View (Sc1:10)  
U 300 (1 x)  
Length:6084



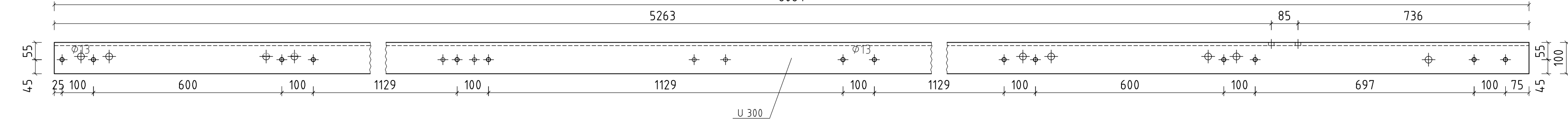
Pos 509 Top View (Sc1:10)  
U 300 (1 x)  
Length:6084



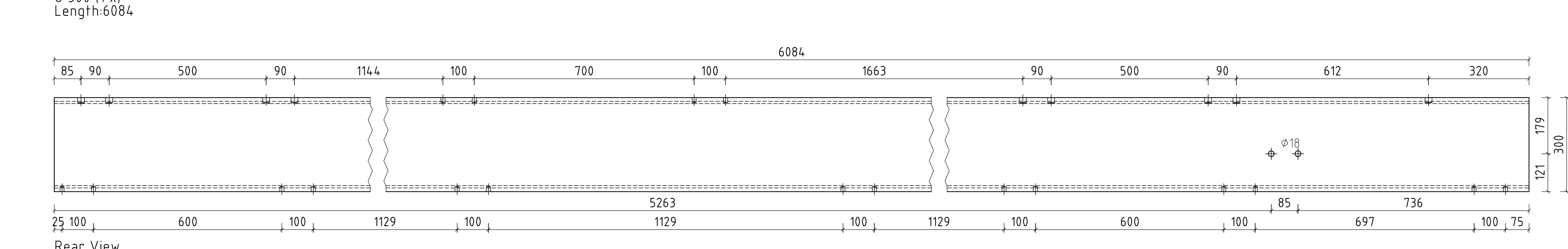
Pos 509 Rear View (Sc1:10)  
U 300 (1 x)  
Length:6084



Pos 518 Top View (Sc1:10)  
U 300 (1 x)  
Length:6084



Pos 518 Top View (Sc1:10)  
U 300 (1 x)  
Length:6084



Pos 518 Rear View (Sc1:10)  
U 300 (1 x)  
Length:6084

- izvedbeni razred EXC 2
- Konstrukcijsko jeklo S235J2
- vsa konstrukcija je vroče cinkana po SIST EN ISO 14713
  - min. debelina cinka nosilnih elementov 70 mikronov
  - Vijaki matice, podložke in sidrne palice (navojne palice) ter matice za sidra morajo biti vroče cinkani
- vijaki HV 10.9 K1 po SIST EN 14399
  - vse vijalne zveze izvesti z dvema podložkama 10.9
  - vse vijalne zveze prednapeti s 50% polne sile prednapetja (50%Fp)
- vijaki 8.8 po SIST EN 15048-1
  - vse vijalne zveze izvesti z dvema podložkama 8.8
  - vse vijalne zveze čvrsto pritegniti

V VSEH SPOJIH KJER SE VIJAČI ELEMENTI KI IMA POŠEVNINO, UPORABITI KONUSNE PODLOŽKE

- Ozemljitev temeljev se izvede skladno s projektom ozemljitve
- Na zvarjenih zaprtih elementih je potrebno izvesti luknje za odzračevanje pri postopku cinkanja

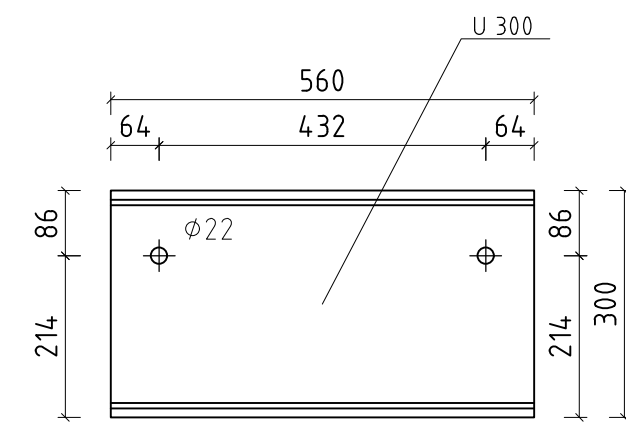
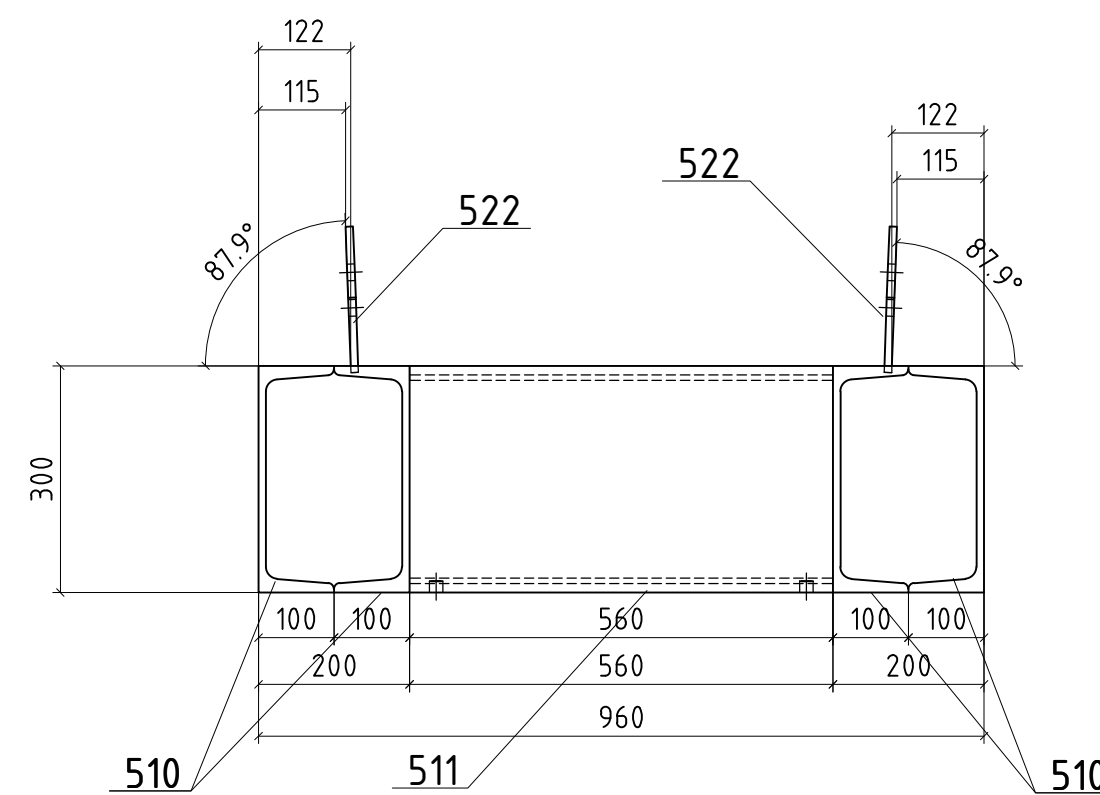
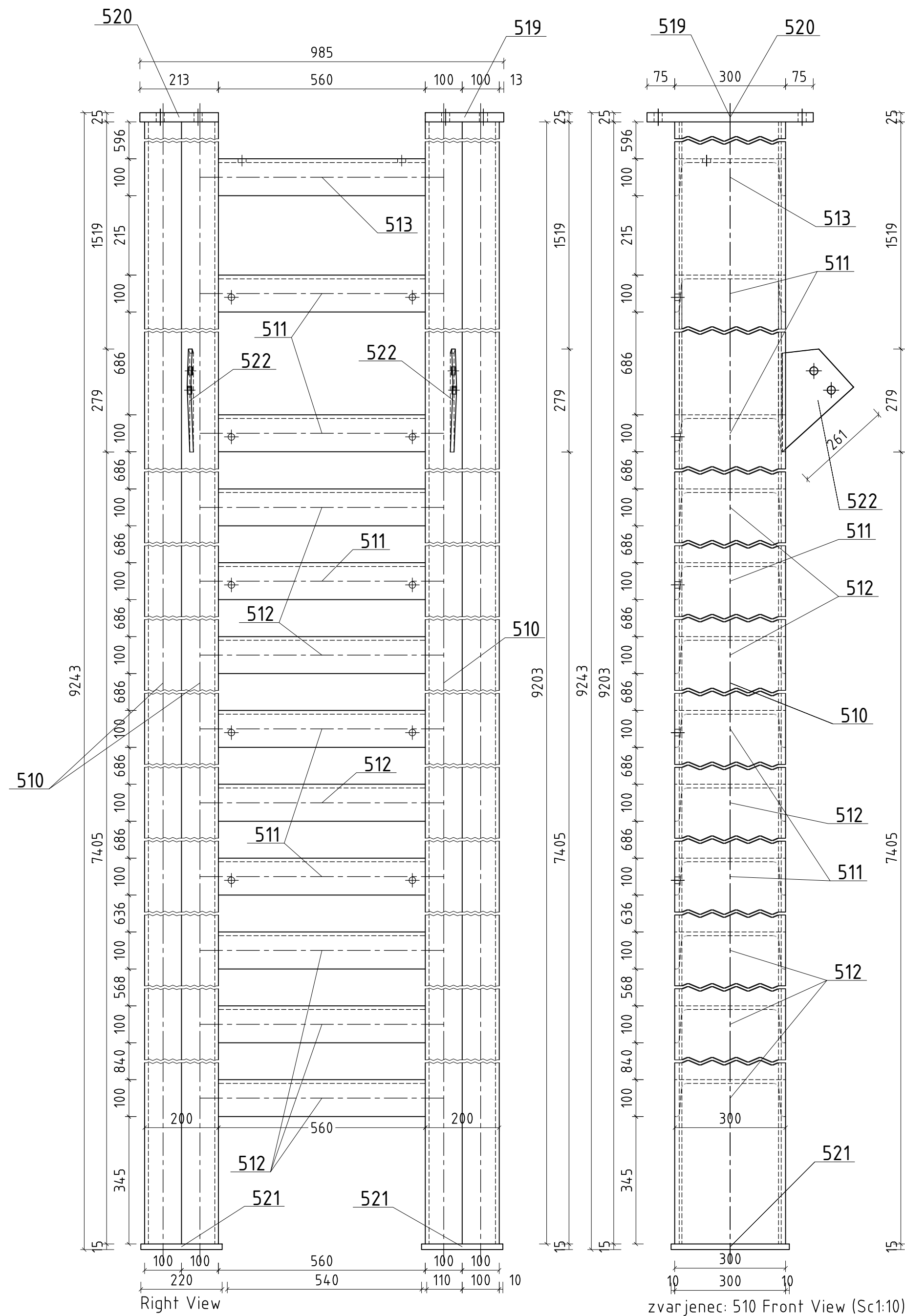
JEKLENA KONSTRUKCIJA MORA BITI OZEMLJENA

PRED IZVEDBO JE POTREBNO PREVERITI GEOMETRIJO IN DIMENZUJE IN IZDELATI DELAVNIŠKE NAČRTE JEKLENE KONSTRUKCIJE

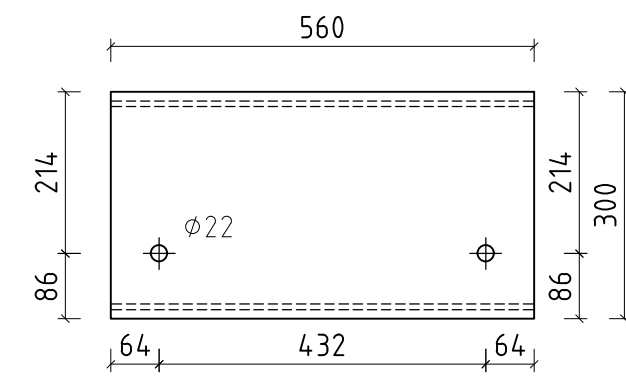
- OPOMBE:
- mere kontrolirati in po potrebi prilagoditi pri montaži na terenu
  - pri izdelavi jeklene konstr. upoštevati tudi ostalo projektno dok. (arhitekturni načrti, načrti temeljenja, gradbeni načrti)
  - izdelava in montaža nosilne jeklene konstrukcije mora biti v skladu z SIST EN 1090-2 : 2008
  - Vsi sočelni zvari K, V, T... morajo biti izvedeni s prevaritvijo korena
  - Varilne deformacije predvidi izvajalec
  - vsi neoznačeni zvari pri varjenju z zunanje strani okrogle ali pravokotne cevi, so a=1,0 x tmin (tmin = tanjša pločevina v spoju)
  - vsi neoznačeni zvari pri obojestranskem varjenju so a=0,5 x tmin (tmin = tanjša pločevina v spoju)
  - vsi neoznačeni zvari so a=0,7 x tmin (tmin = tanjša pločevina v spoju)

|               |  |              |  |                       |                          |
|---------------|--|--------------|--|-----------------------|--------------------------|
| Objekt:       | Umetitev nadhoda na železniški postaji Zagorje | Vodja proj.: | mag. E. Hadzihametović, u. d. i. g. G-0133 | Vsebinska risba:      | ZVARJENEC 509 - ELEMENTI |
| Investitor:   | RS, MzI, Direkcija RS za infrastrukturo        | Proj. inš.:  | mag. Tomaž Habič, u. d. i. g. G-0332       | Datum:                | 02 / 2021                |
| Projektant:   | HIŠA NIŠA, d. o. o.                            | Spremembe:   |  | Št. projekta:         | 3710/Z                   |
| Vrsta načrta: | 2 Načrt s področja gradbeništva                | Faza:        |  | Št. načrta:           | 101/21                   |
| Načrt:        | 2/5 Konstrukcije signalov                      | IZN          |  | Merilo:               | 1:20, 10, 5              |
| Št. odseka:   | Arhivska št.:                                  | Faza/objekt: | Sifra priloge:                             | Prostor za črna koda: | Št. risbe:               |
| ZG1000        | 0146.00  | 007.2145     | G.151                                      |                       | 6                        |

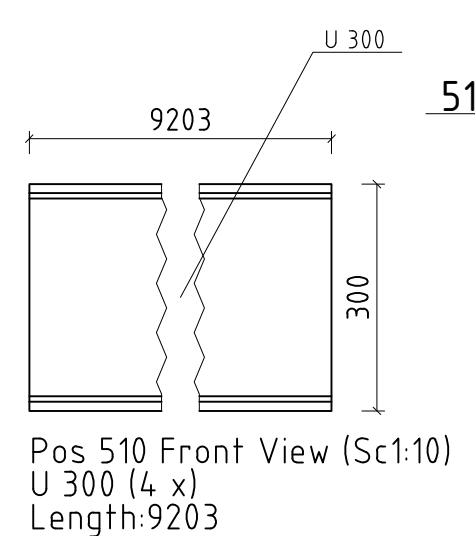
# ZVARJENEC 510 POL MOSTNA KONSTRUKCIJA



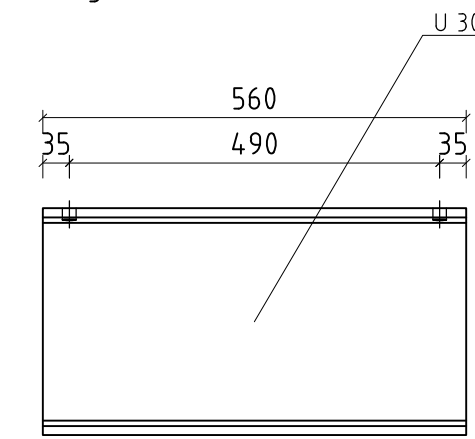
Pos 513 Front View (Sc1:10)  
U 300 (1 x)  
Length:560



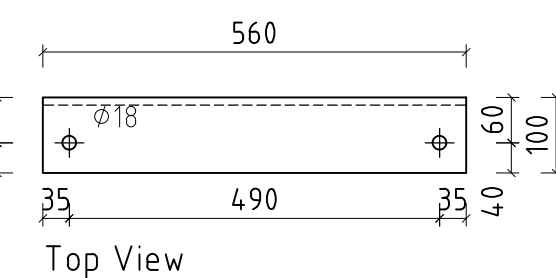
Rear View



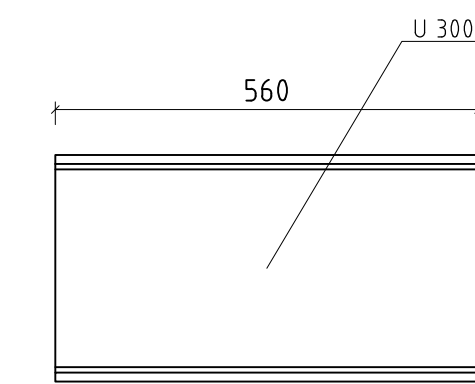
Pos 510 Front View (Sc1:10)  
U 300 (4 x)  
Length:9203



Pos 511 Front View (Sc1:10)  
U 300 (5 x)  
Length:560

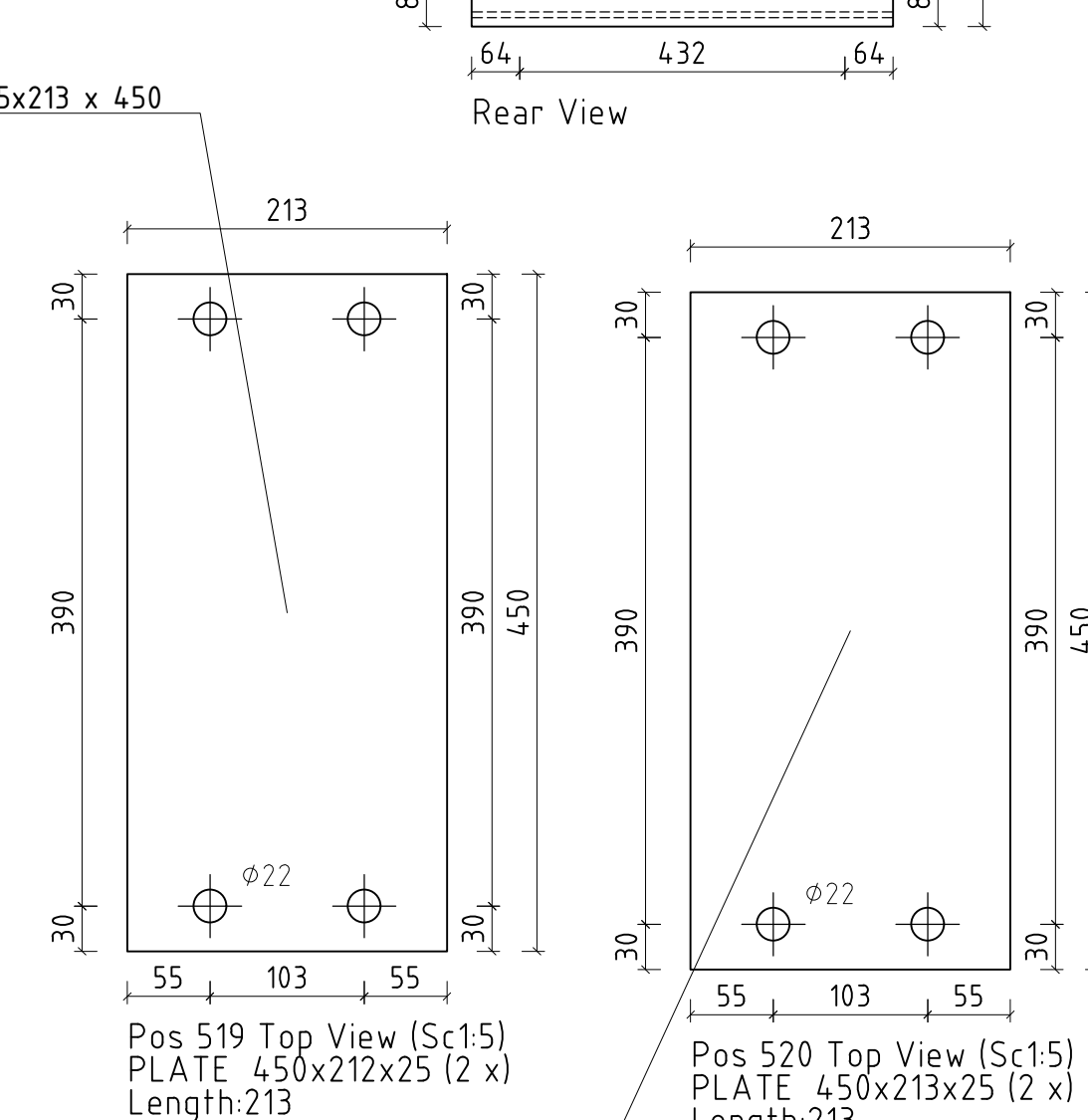


Top View



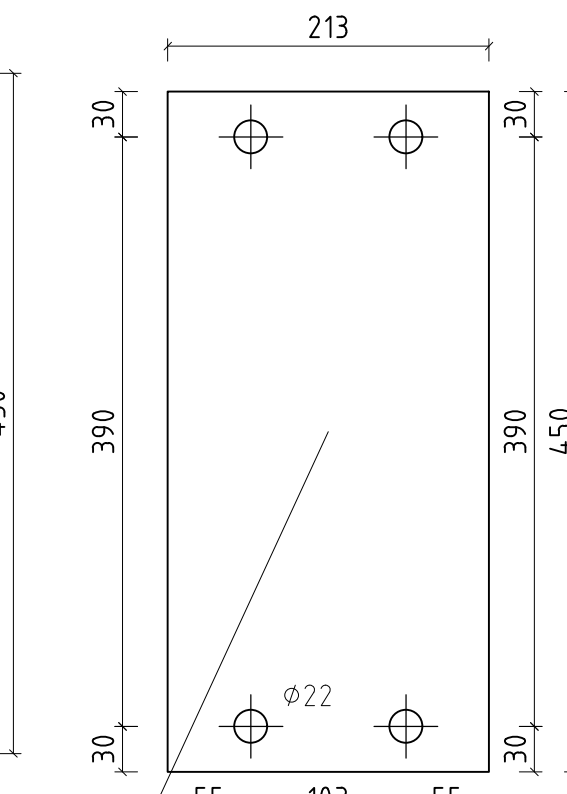
Pos 512 Front View (Sc1:10)  
U 300 (6 x)  
Length:560

521 PLATE 15x220 x 320



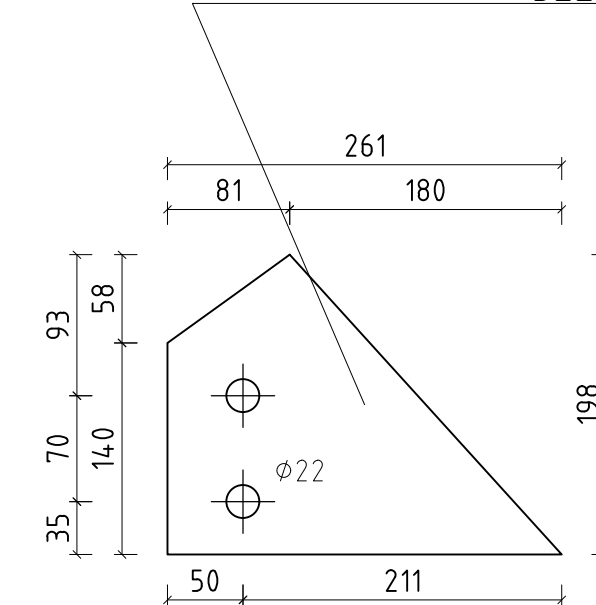
Pos 519 Top View (Sc1:15)  
PLATE 450x213x25 (2 x)  
Length:213

520 PLATE 25x213 x 450



Pos 520 Top View (Sc1:15)  
PLATE 450x213x25 (2 x)  
Length:213

PLATE 10x198 x 261 522



Pos 522 Top View (Sc1:15)  
PLATE 261x198x10 (2 x)  
Length:261

- izvedbeni razred EXC 2
- Konstruktivsko jeklo S235J2
- vsa konstrukcija je vroče cinkana po SIST EN ISO 14713
  - min. debelina cinka nosilnih elementov 70 mikronov
  - Vijaki matice, podložke in sidrne palice (navojne palice) ter matice za sidra morajo biti vroče cinkani
- vijaki HV 10.9 K1 po SIST EN 14399
  - vse vijake zveze izvesti z dvema podložkama 10.9
  - vse vijake zveze prednapeti s 50% polne sile prednapetja (50%Fp)

- vijaki 8.8 po SIST EN 15048-1
  - vse vijake zveze izvesti z dvema podložkama 8.8
  - vse vijake zveze čvrsto pritegniti

V VSEH SPOJIH KJER SE VIJAČI ELEMENTI KI IMA POŠEVNINO, UPORABITI KONUSNE PODLOŽKE

- Ozemljitev temeljev se izvede skladno s projektom ozemljitve
- Na zvarjenih zaprtih elementih je potrebno izvesti luknje za odzračevanje pri postopku cinkanja

JEKLENA KONSTRUKCIJA MORA BITI OZEMLJENA

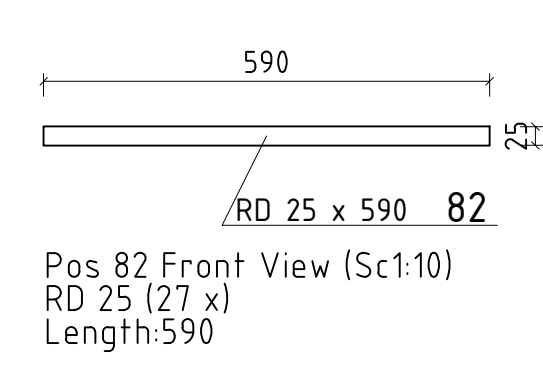
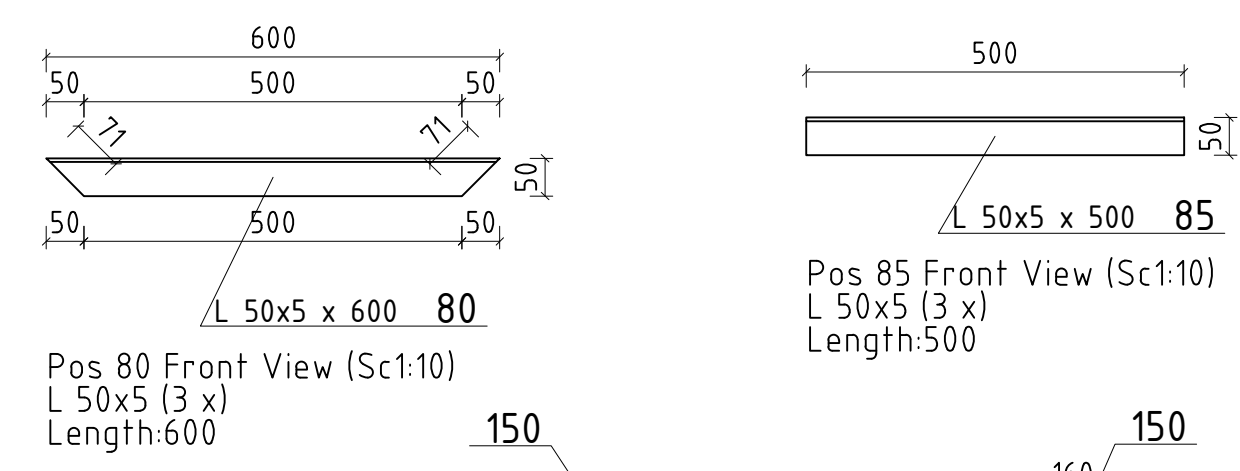
PRED IZVEDBO JE POTREBNO PREVERITI GEOMETRIJO IN DIMENZIJE IN IZDELATI DELAVNIŠKE NAČRTE JEKLENE KONSTRUKCIJE

**OPOMBE:**

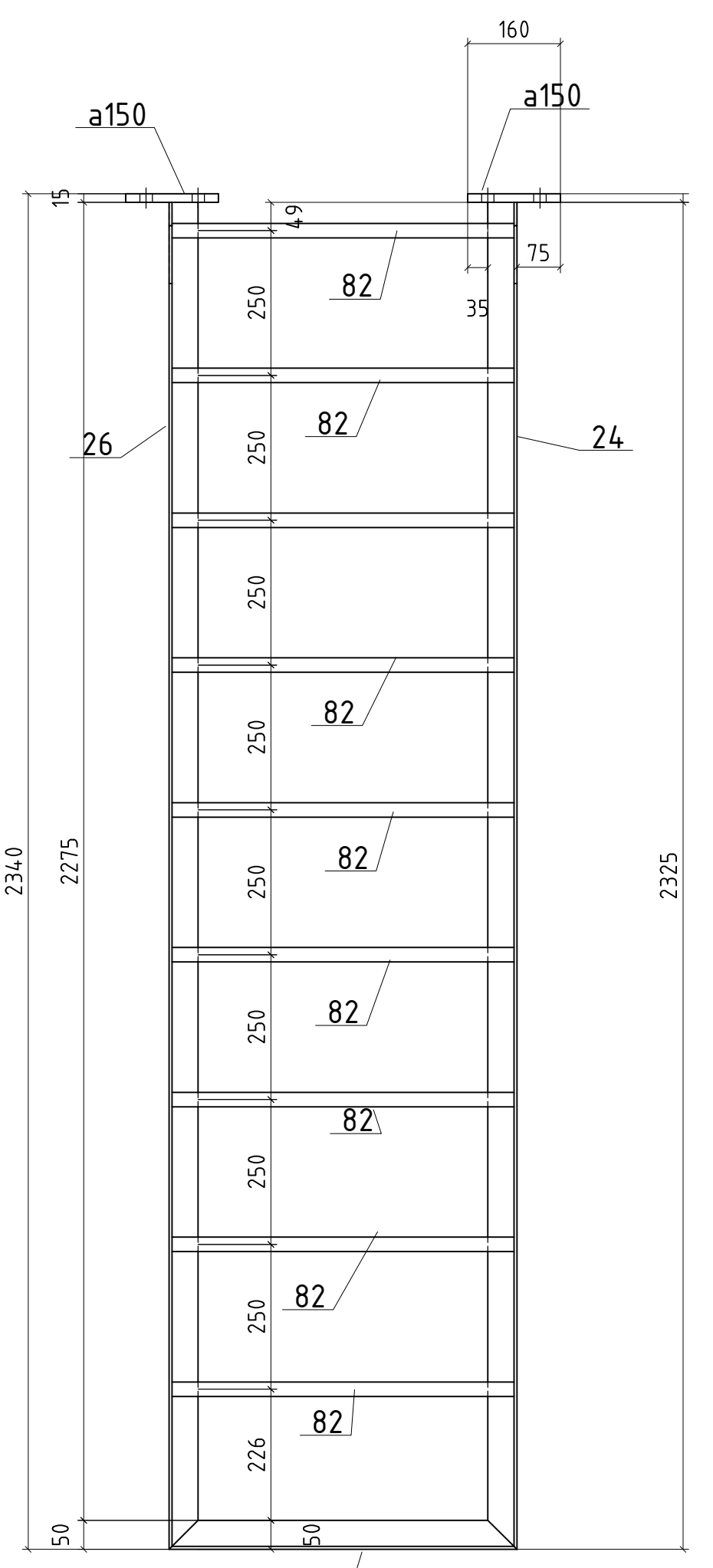
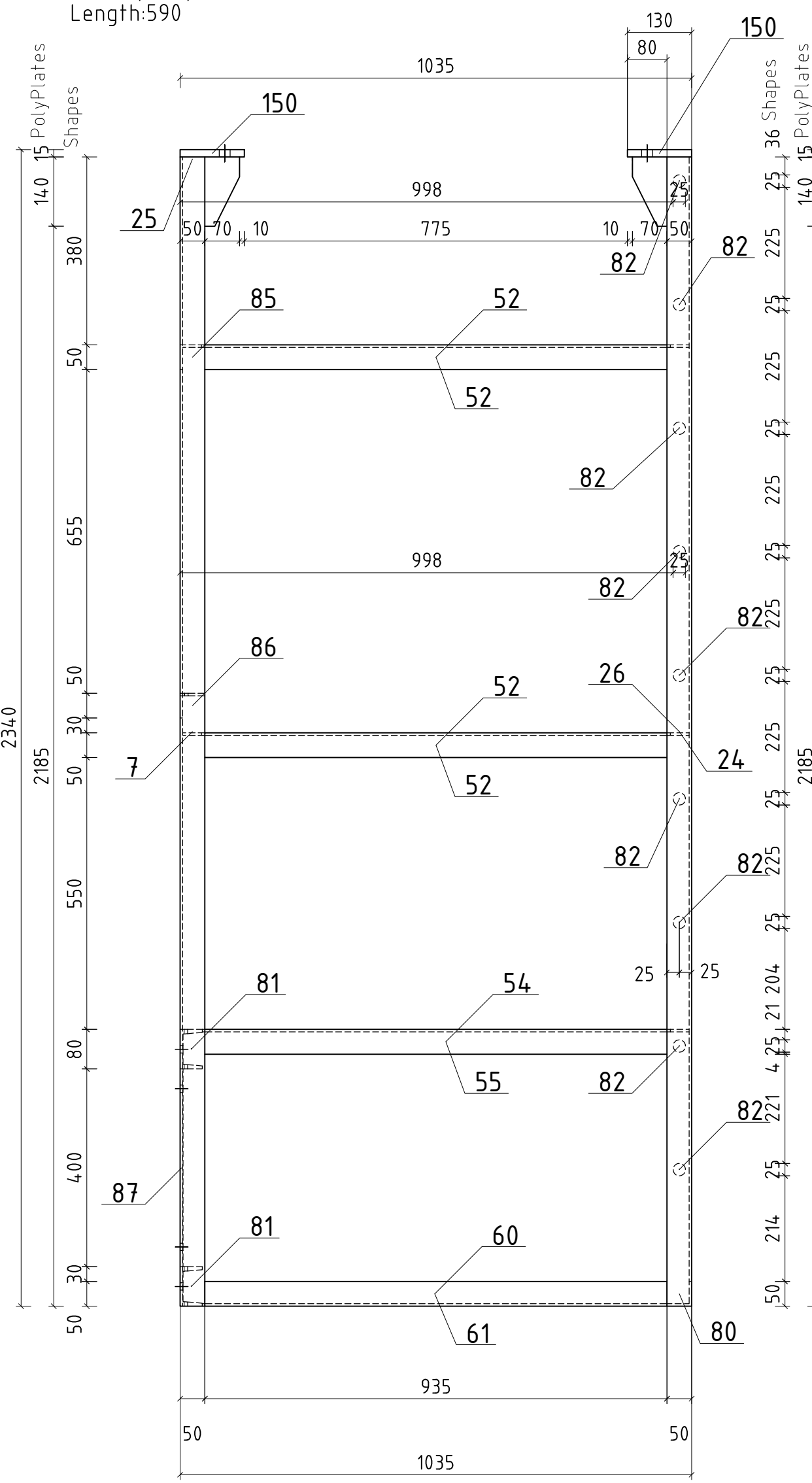
- mere kontrolirati in po potrebi prilagoditi pri montaži na terenu
- pri izdelavi jeklene konstr. upoštevati tudi ostalo projektno dok. (arhitekturni načrti, načrti temeljenja, gradbeni načrti)
- izdelava in montaža nosilne jeklene konstrukcije mora biti v skladu z SIST EN 1090-2 : 2008
- Vsi sočetni zvari K, V, V...morajo biti izvedeni s prevaritvijo korena
- Varilne deformacije predvidi izvajalec
- vsi neoznačeni zvari pri varjenju z zunanji strani okrogle ali pravokotne cevi, so a=1,0 x tmin (tmin = tanjša pločevina v spoju)
- vsi neoznačeni zvari pri obojestranskem varjenju so a=0,5 x tmin (tmin = tanjša pločevina v spoju)
- vsi neoznačeni zvari so a=0,7 x tmin (tmin = tanjša pločevina v spoju)

|               |   |              |  |                        |                  |
|---------------|---|--------------|--|------------------------|------------------|
| Objekt:       | Umestitev nadhoda na železniški postaji Zagorje | Vodja proj.: | mag.E.Hadžiahmetović, u. d. i. g. G-0133 | Vsebinska risba:       |                  |
| Investitor:   | RS, MzI, Direkcija RS za infrastrukturo         | Poobl. inž.: | mag. Tomaž Habič, u. d. i. g. G-0332     | ZVARJENEC              |                  |
| Projektant:   | HISA NIŠA, d. o. o.                             | Spremembe:   |  | 510                    |                  |
| Vrsta načrta: | 2 Načrt s področja gradbeništva                 | Faza:        | Št. projekta:                            | 3710/Z                 | Datum: 02 / 2021 |
| Načrt:        | 2/5 Konstrukcije signalov                       | IZN          | Št. načrta:                              | 101/21                 | Merilo: 1:20     |
| Št. odseka:   | Arhivska št.:                                   | Faza/objekt: | Šifra priloge:                           | Prostor za črtno kodo: | Št. risbe:       |
| ZG1000        | 0146.00   | 007.2145     | G.151                                    |                        | 7                |

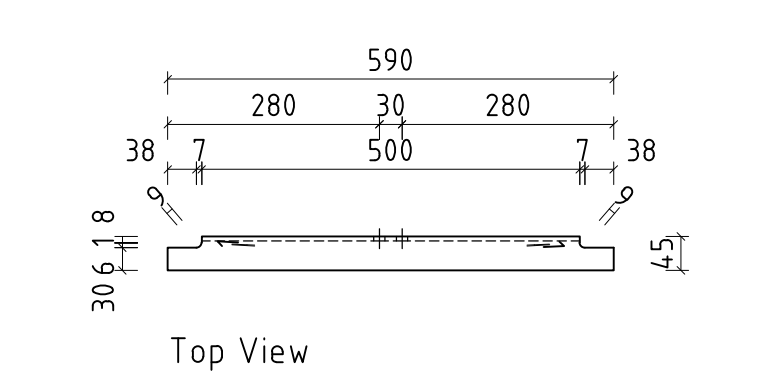
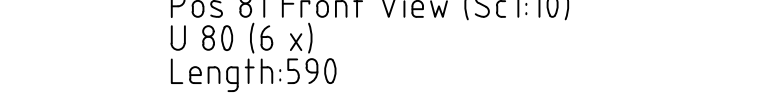
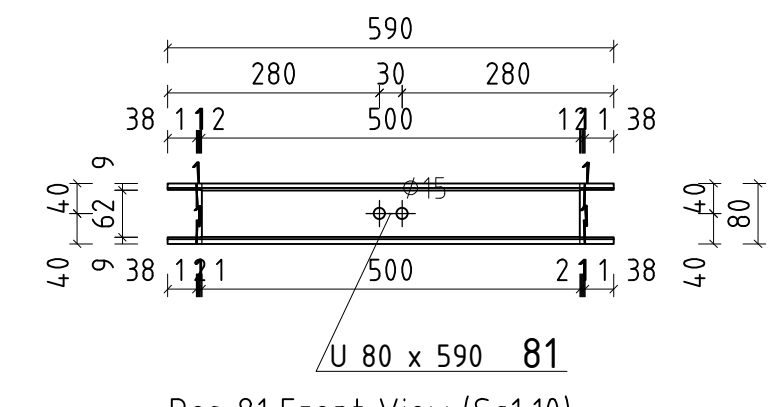
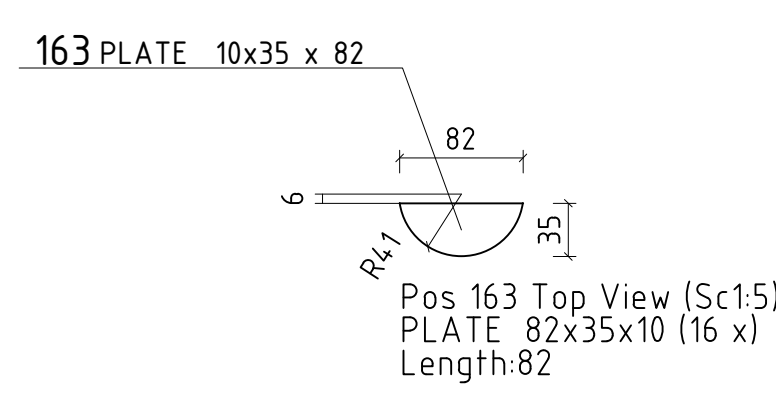
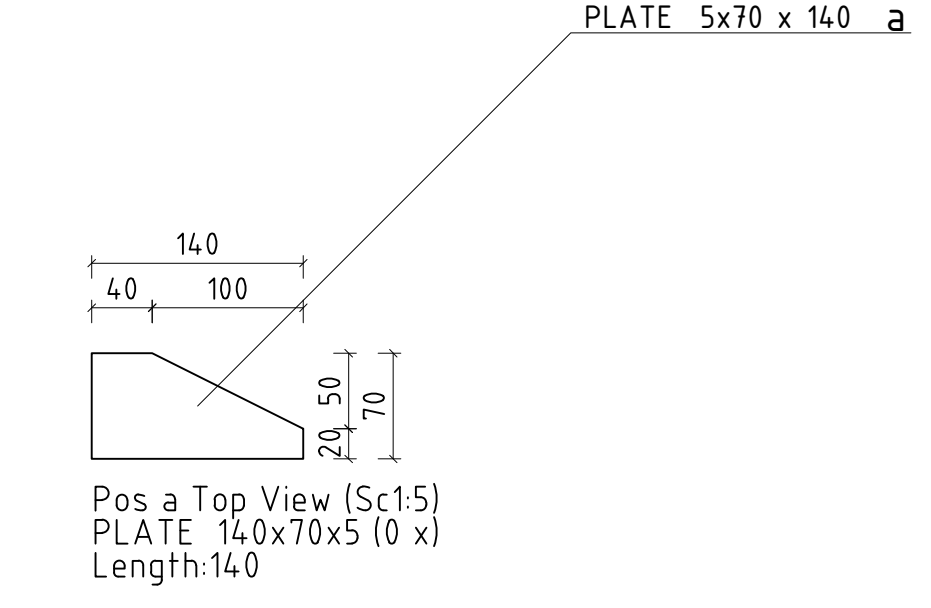
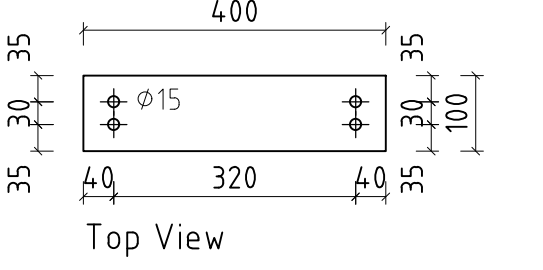
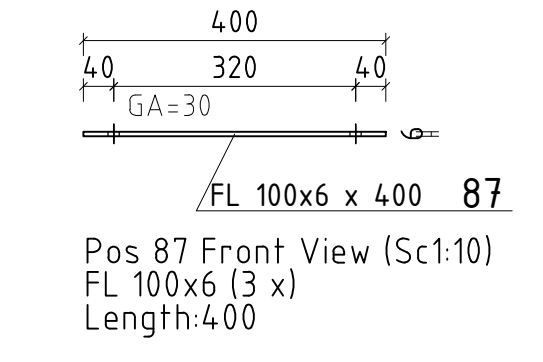
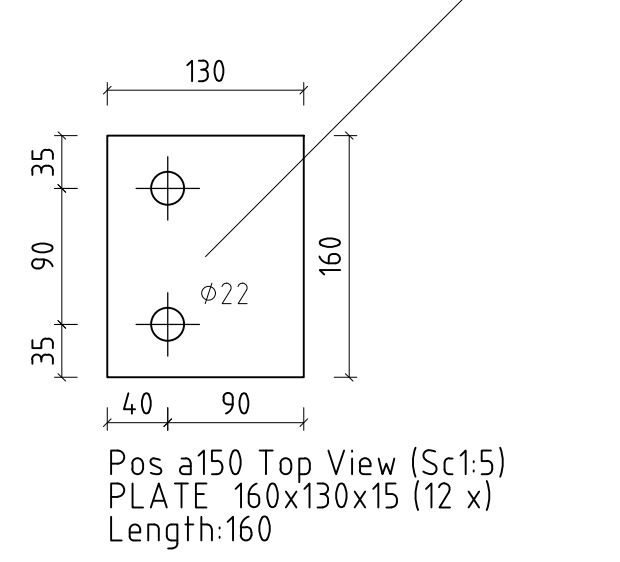




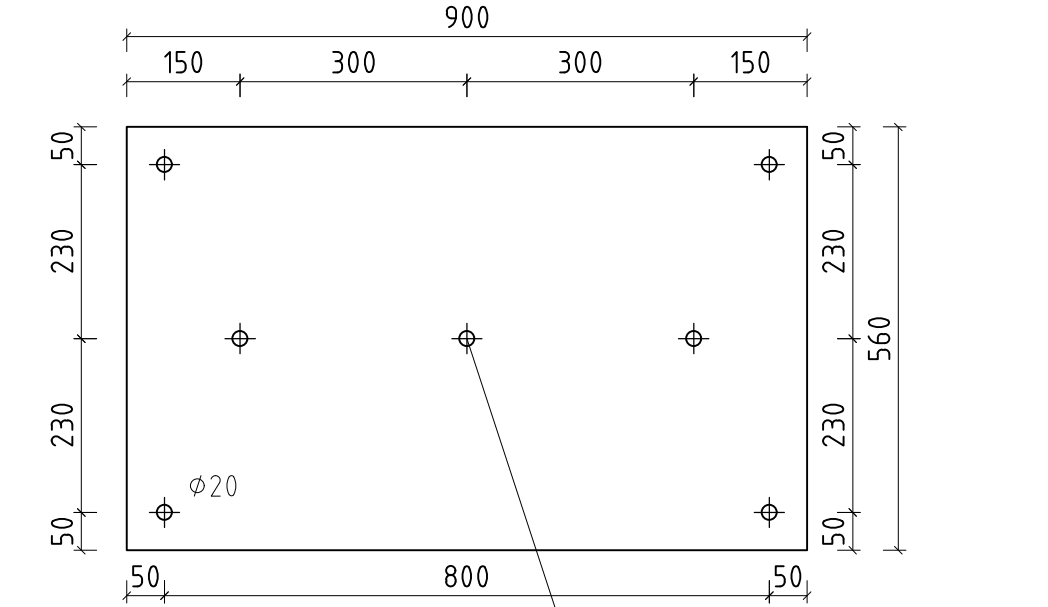
KOŠARA  
grupa 115 Front View (Sc1:10)



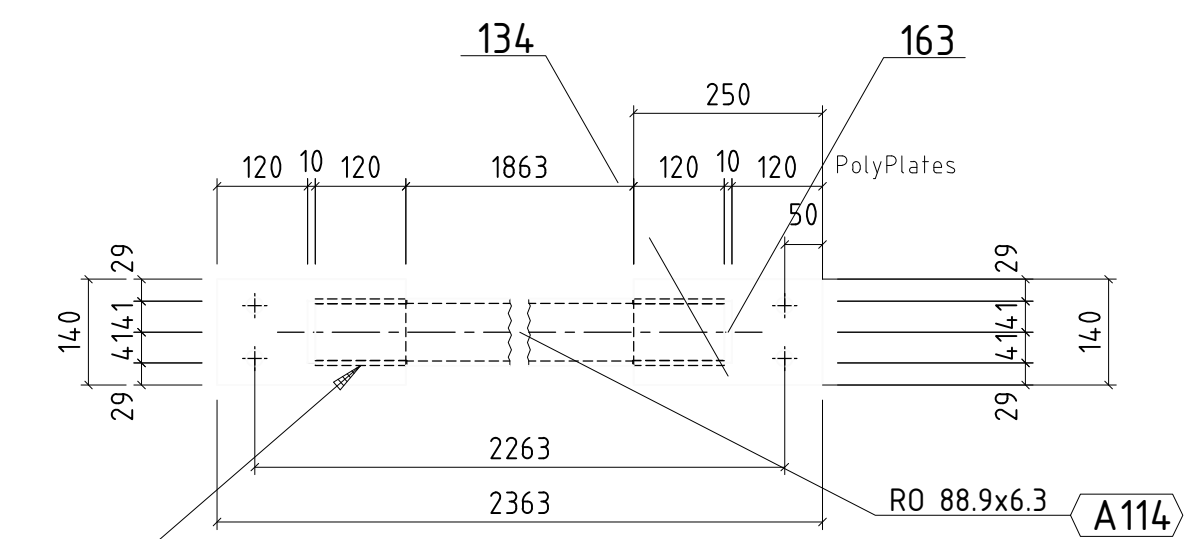
80 PLATE 15x130 x 160 a150



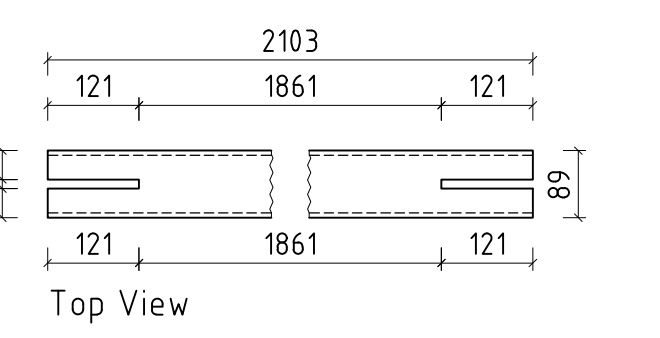
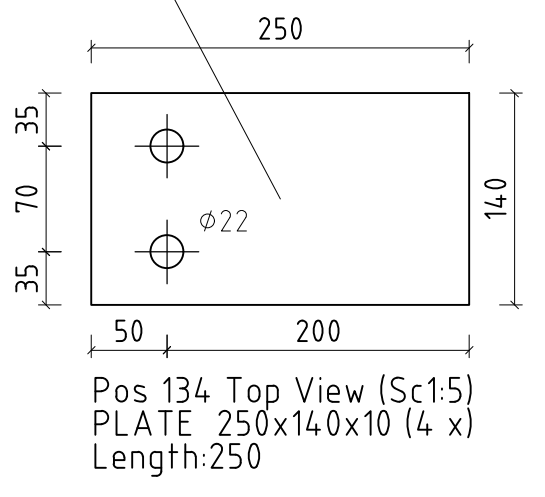
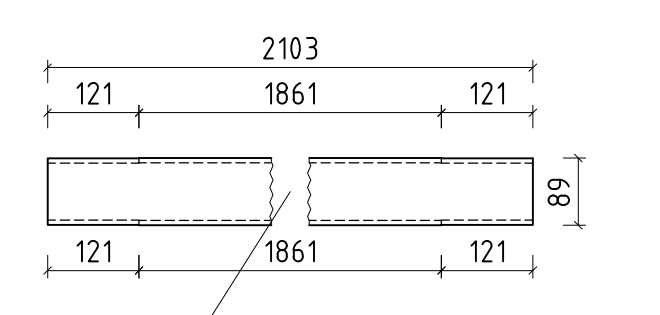
Varjenec a114  
Varjenec 115



isto jna ploščad na dnu košare  
PLATE 8x560 x 900 107



134 PLATE 10x140 x 250



- Izvedbeni razred EXC 2
- Konstruktorsko jeklo S235J2
- vsa konstrukcija je vroče cinkana po SIST EN ISO 14713
  - min. debelina cinka nosilnih elementov 70 mikronov
  - Vijaki matice, podložke in sidrne palice (navojne palice) ter matice za sidra morajo biti vroče cinkani
- vijaki HV 10.9 K1 po SIST EN 14399
  - vse vijake zveže izvesti z dvema podložkama 10.9
  - vse vijake zveže prednapeti s 50% polne sile prednapetja (50%Fp)
- vijaki 8.8 po SIST EN 15048-1
  - vse vijake zveže izvesti z dvema podložkama 8.8
  - vse vijake zveže čvrsto pritegniti

V VSEH SPOJIH KJER SE VIJAČI ELEMENTI IMAJE POŠEVNINO, UPORABITI KONUSNE PODLOŽKE

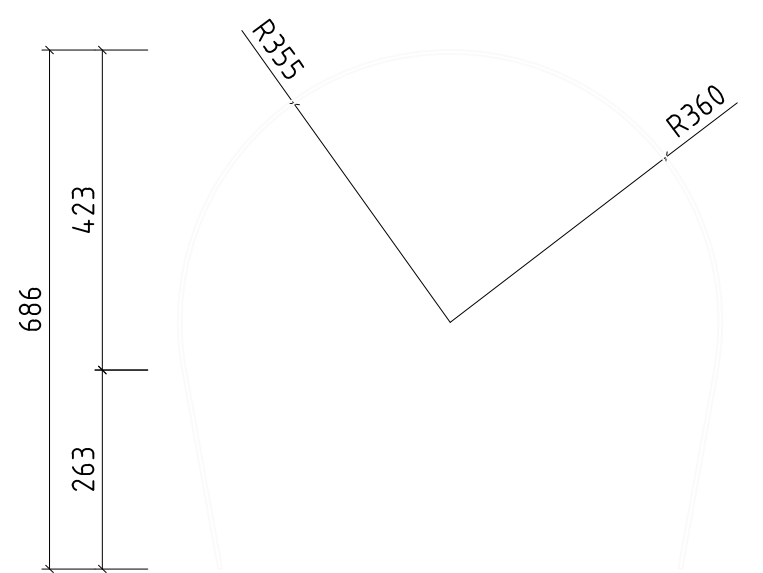
- Ozemljitev temeljev se izvede skladno s projektom ozemljitev

- Na zvarjenih zaprtih elementih je potrebno izvesti luknje za odraščanje pri postopku cinkanja

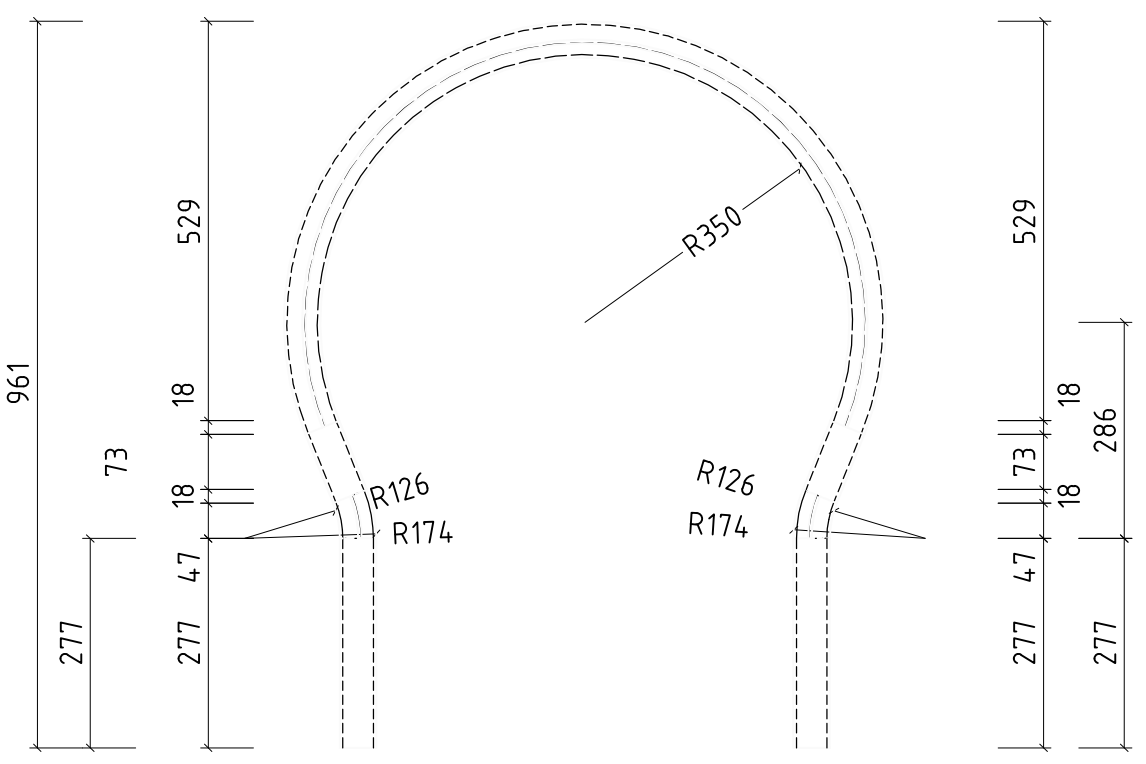
JEKLENA KONSTRUKCIJA MORA BITI OZEMLJENA  
PRED IZVEDBO JE POTREBNO PREVERITI GEOMETRIJO IN DIMENZJE IN IZDELATI DELAVNIŠKE NAČRTE JEKLENE KONSTRUKCIJE

- OPOMBE:

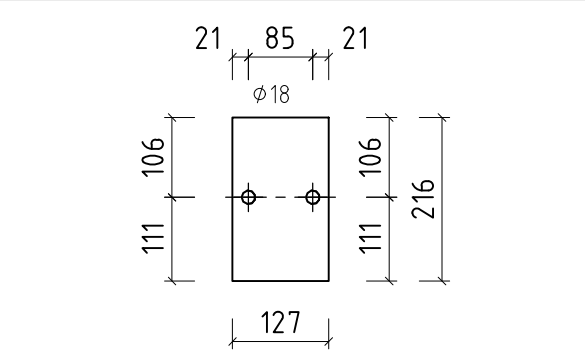




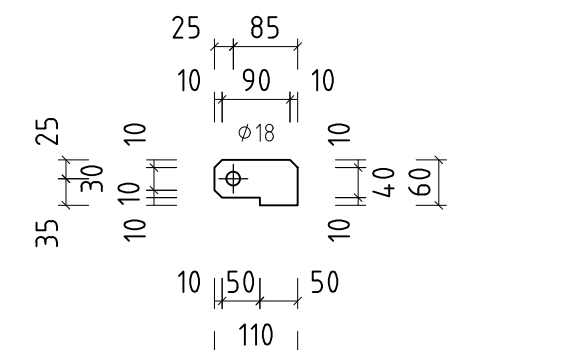
Pos. 29 Front View (Sc1:10)  
FL 50x5...1782.0 S355J2G3



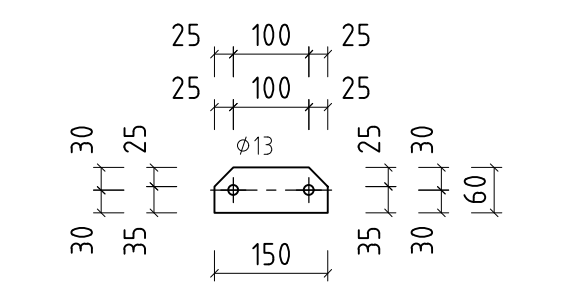
Pos. 27 Front View (Sc1:10)  
RO 48.3x4...2322.4 S235JRG2



Pos. 136 Sc1:10  
PLATE 216x127x15

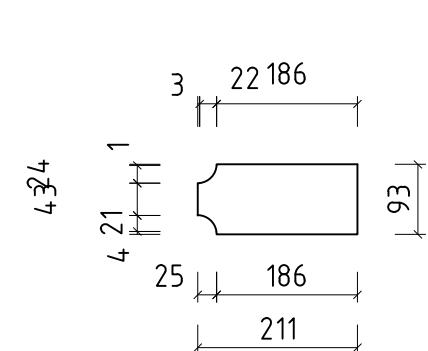


Pos. 158 Sc1:10  
PLATE 110x60x5

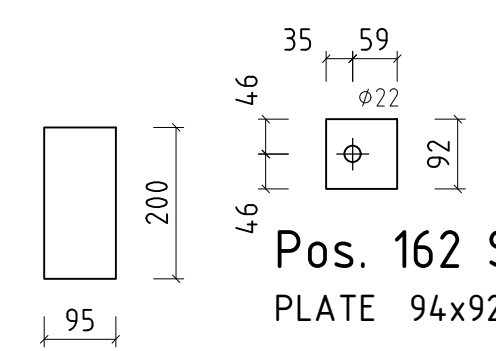


Pos. 153 Sc1:10  
PLATE 150x60x8

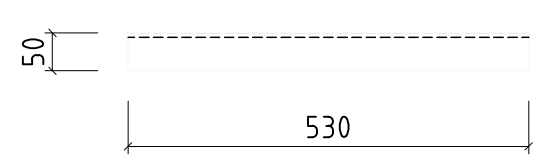
profili, pločevine 118, 121



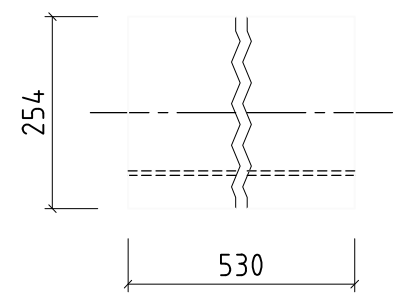
Pos. 141 Sc1:10  
PLATE 211x93x10



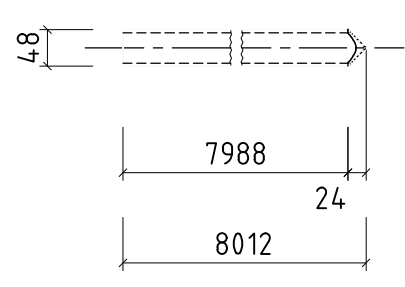
Pos. 162 Sc1:10  
PLATE 94x92x15



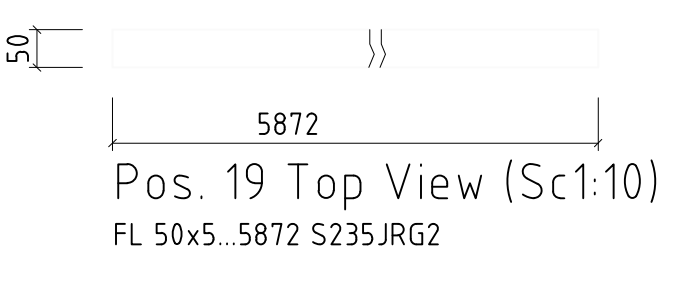
Pos. 103 Front View (Sc1:10)  
Stopnica...530.0 S235JRG2-Rebrasta pločevina-Rižev vzorec Left View



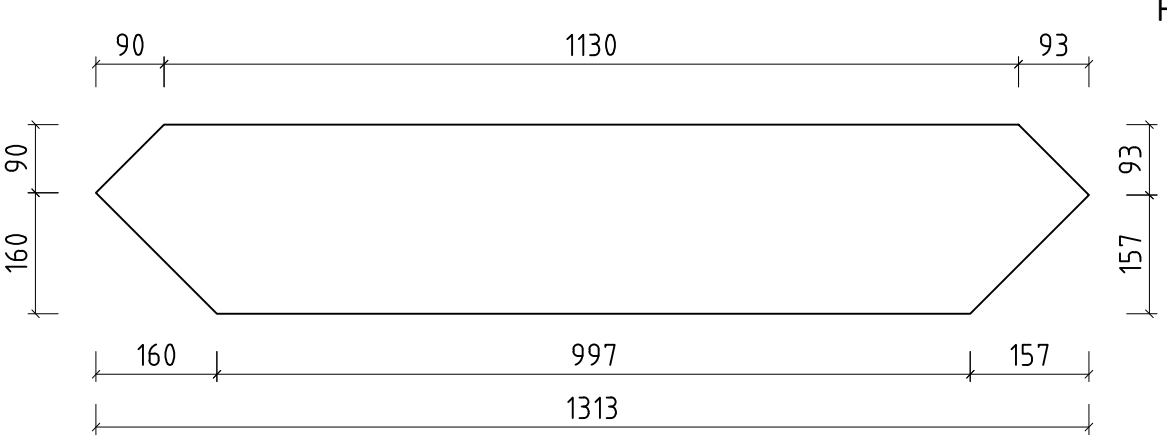
Pos. 104 Front View (Sc1:10) Left View  
Stopnica...530.0 S235JRG2-Rebrasta pločevina - Rižev vzorec



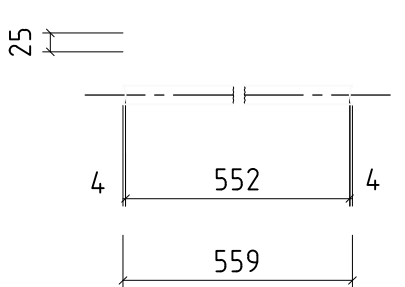
Pos. 3 Front View (Sc1:10)  
RO 48.3x4...8012 S235JRG2



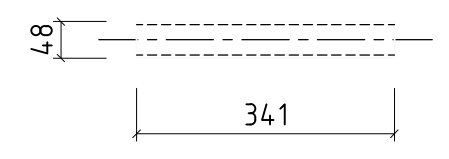
Pos. 19 Top View (Sc1:10)  
FL 50x5...5872 S235JRG2



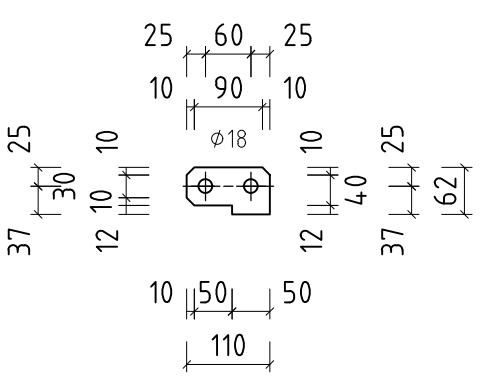
Pos. 106 Sc1:10  
PLATE 1313x250x10



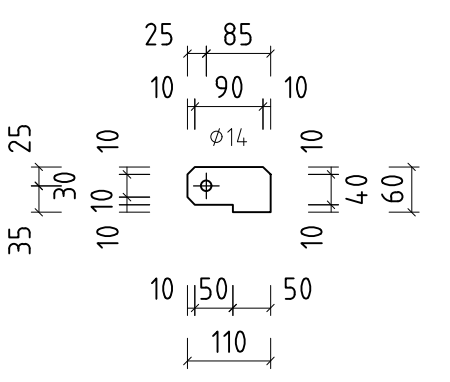
Pos. 83 Front View (Sc1:10)  
RD 25...558.7 S235JRG2



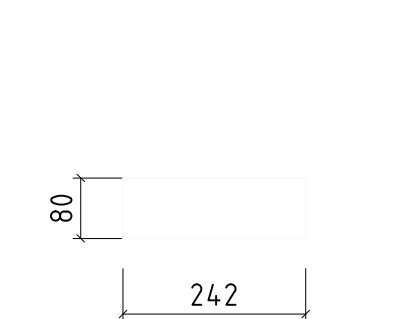
Pos. 88 Front View (Sc1:10)  
RO 48.3x4...341.1 S235JRG2



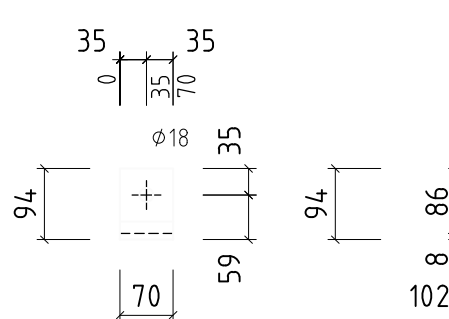
Pos. 155 Sc1:10  
PLATE 110x62x5



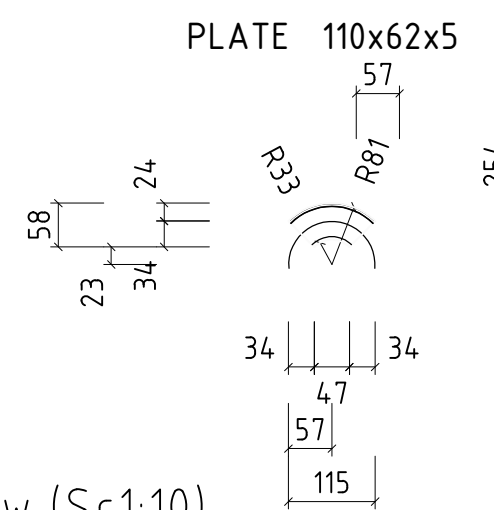
Pos. 157 Sc1:10  
PLATE 110x60x5



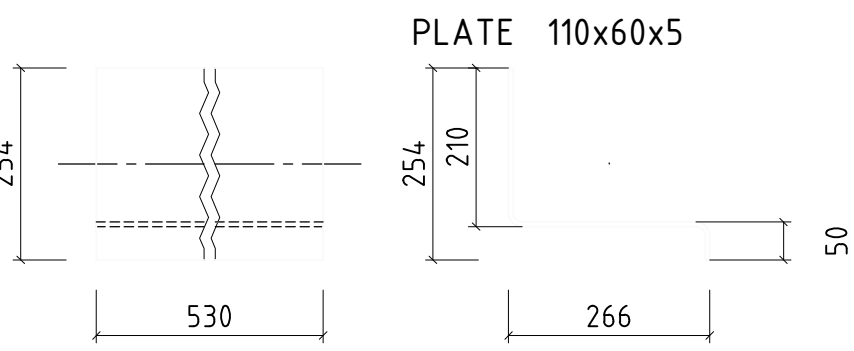
Pos. 94 Top View (Sc1:10)  
FL 80x6...241.7 S235JRG2



Pos. 97 Front View (Sc1:10)  
FL 70x8...203.2 S235JRG2



Pos. 101 Front View (Sc1:10)  
RO 48.3x4...89.5 S235JRG2  
R=57.0 Grad= 90



Pos. 15 Front View (Sc1:10)  
Stopnica...530.0 S235JRG2-Rebrasta pločevina-Rižev vzorec

OPOMBE:

- mere kontrolirati in po potrebi prilagoditi pri montaži na terenu
- pri izdelavi jeklene konstr. upoštevati tudi ostalo projektno dok. (arhitekturni načrti, načrti temeljenja, gradbeni načrti)
- izdelava in montaža nosilne jeklene konstrukcije mora biti v skladu z SIST EN 1090-2 : 2008
- Vsi sočelni zvari K, ∇, ∇...morajo biti izvedeni s prevaritvijo korena
- Varilne deformacije predvidi izvajalec
- vsi neoznačeni zvari pri varjenju z zunanje strani okrogle ali pravokotne cevi, so a=1,0 x tmin (tmin = tanjša pločevina v spoju)
- vsi neoznačeni zvari pri obojestranskem varjenju so a=0,5 x tmin (tmin = tanjša pločevina v spoju)
- vsi neoznačeni zvari so a=0,7 x tmin (tmin = tanjša pločevina v spoju)

|              |   |                |  |                        |                              |
|--------------|---|----------------|--|------------------------|------------------------------|
| Objekt:      | Umestitev nadhoda na železniški postaji Zagorje | Vodja proj.:   | mag.E.Hadžiahmetović, u. d. i. g. G-0133 | Vsebina risbe:         | PROFILNI, PLOČEVINE 118, 121 |
| Investitor:  | RS, MzI, Direkcija RS za infrastrukturo         | Poobl. inž.:   | mag. Tomaž Habič, u. d. i. g. G-0332     | Spremembe:             |                              |
| Projektant:  | HIŠA NIŠA, d. o. o.                             | Faza:          | Št. projekta: 3710/Z                     | Datum:                 | 02 / 2021                    |
| Prva načrta: | 2 Načrt s področja gradbeništva                 | Načrt:         | Št. načrta: 101/21                       | Merilo:                | 1:10                         |
| Št. odseka:  | ZG1000  | Arhivska št.:  | 0146.00                                  | Faza/objekt:           | 007.2145                     |
|              |   | Šifra priloge: | G.151                                    | Prostor za črtno kodo: |                              |
|              |   |                |  | Št. risbe:             | 10                           |

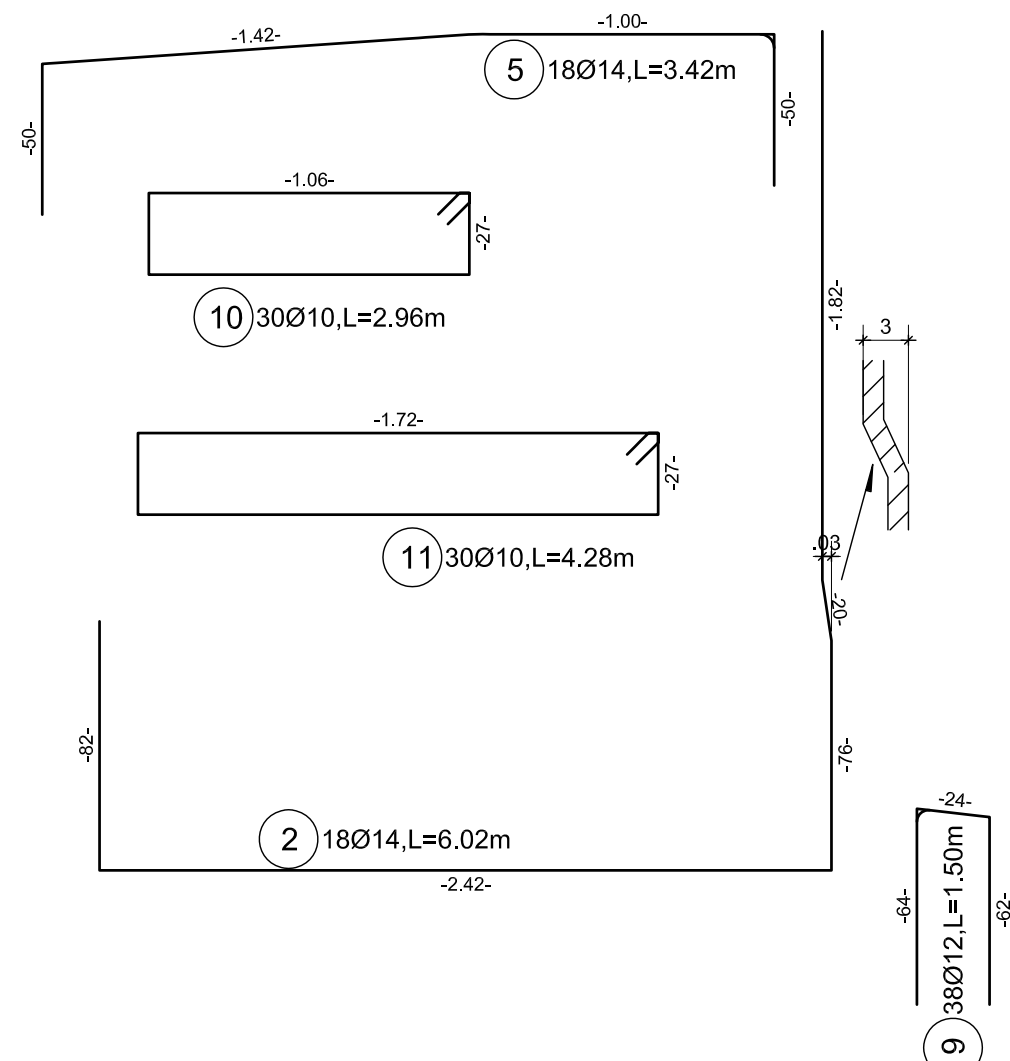
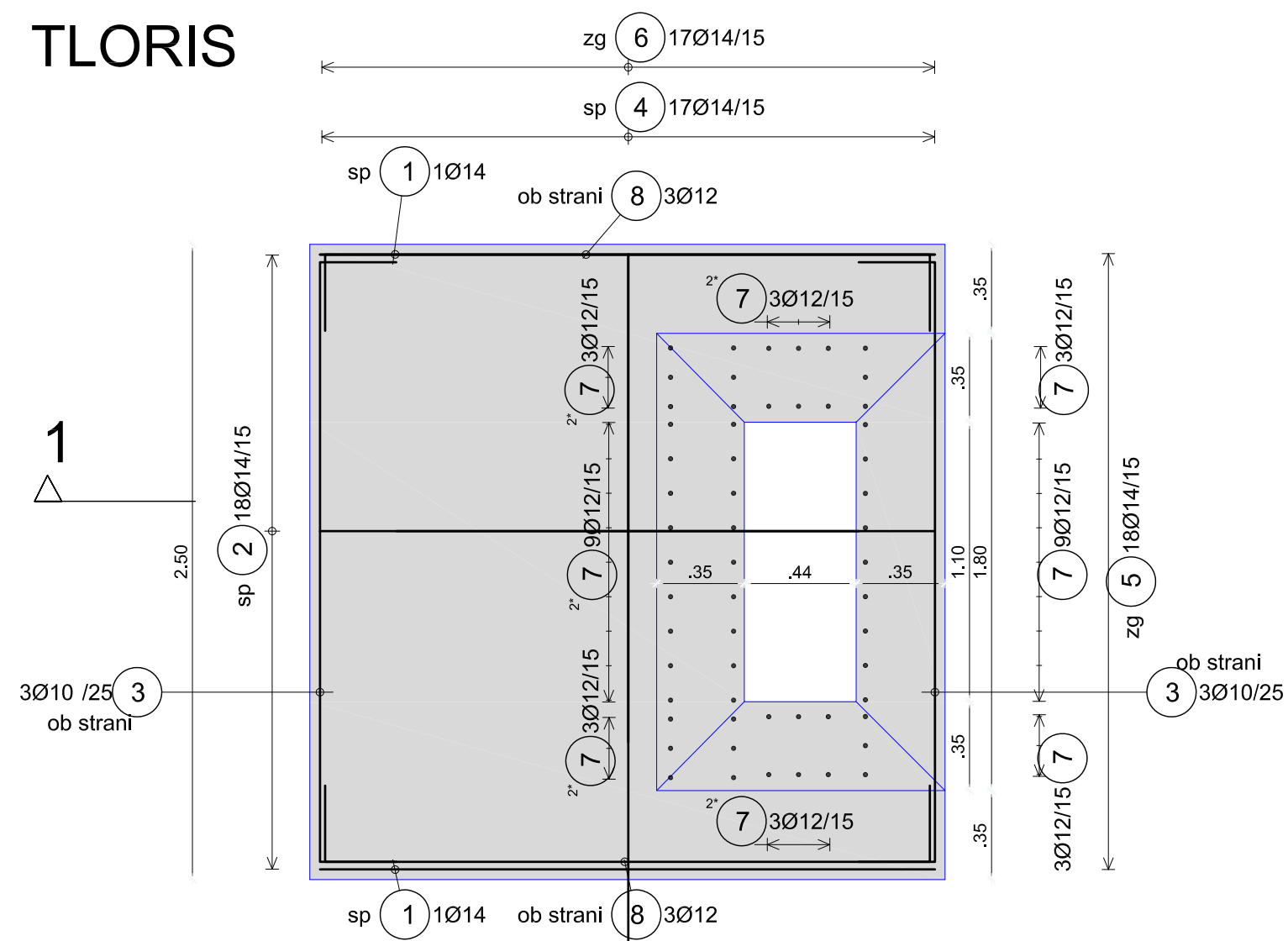








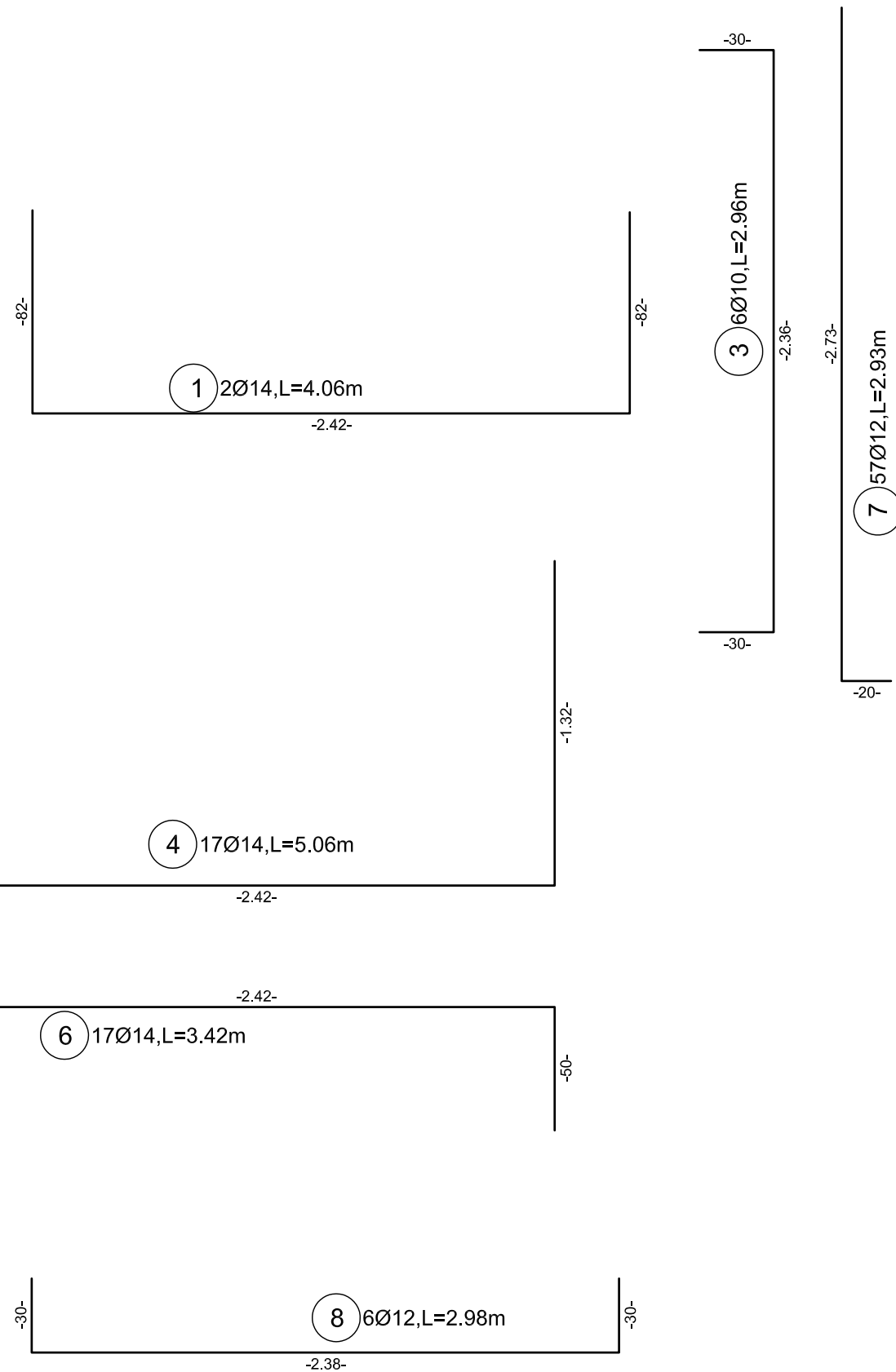
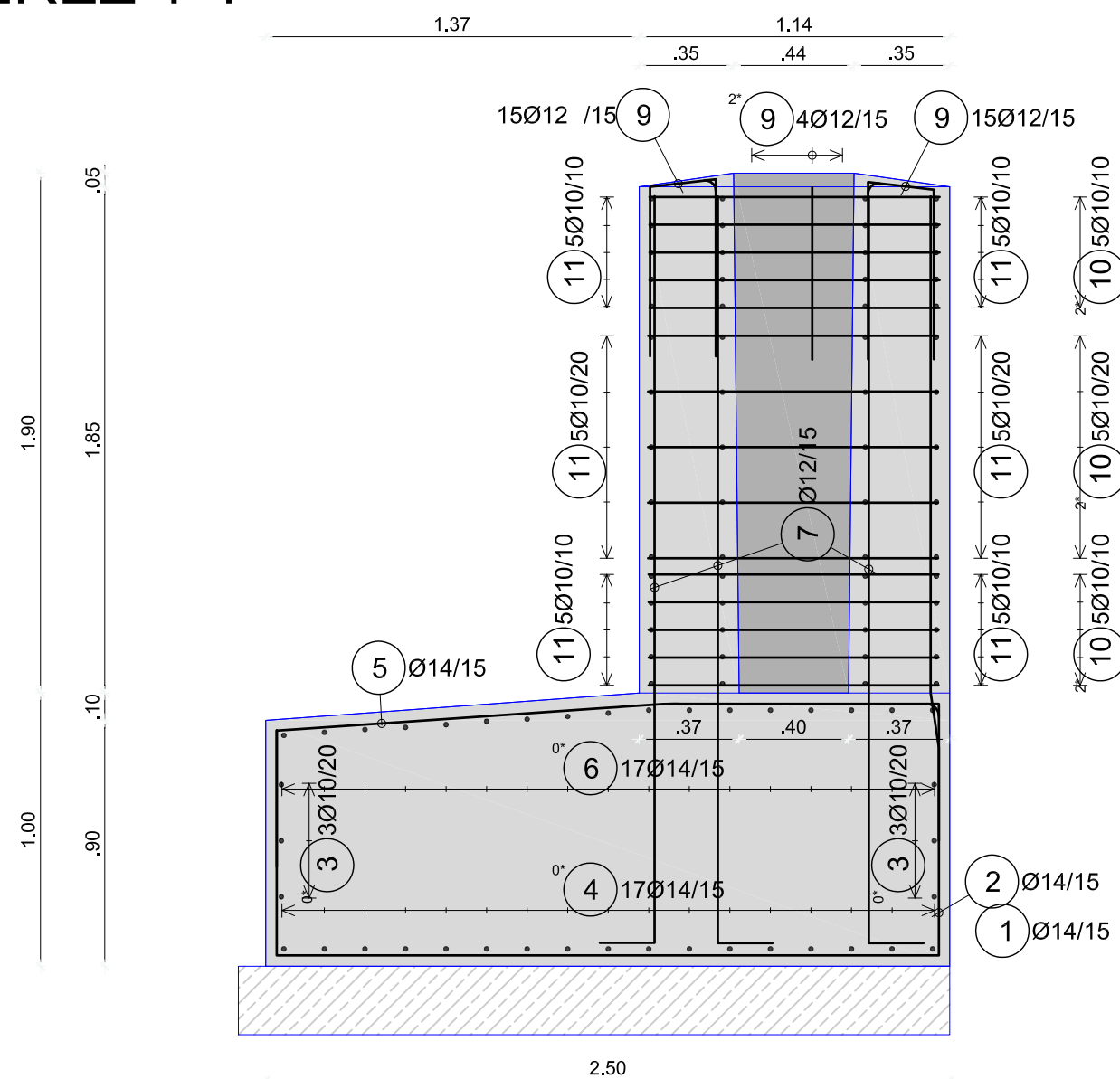
# TEMELJ 1 TLORIS



| BAR SCHEDULE Steelgrade: 500S |     |    |        |           |           |           |
|-------------------------------|-----|----|--------|-----------|-----------|-----------|
| Pos.                          | No. | d  | Length | D10       | D12       | D14       |
| 1                             | 2   | 14 | 4.06   |           |           | 8.12      |
| 2                             | 18  | 14 | 6.02   |           |           | 108.36    |
| 3                             | 6   | 10 | 2.96   | 17.76     |           |           |
| 4                             | 17  | 14 | 5.06   |           |           | 86.02     |
| 5                             | 18  | 14 | 3.42   |           |           | 61.56     |
| 6                             | 17  | 14 | 3.42   |           |           | 58.14     |
| 7                             | 57  | 12 | 2.93   |           | 167.01    |           |
| 8                             | 6   | 12 | 2.98   |           | 17.88     |           |
| 9                             | 38  | 12 | 1.50   |           | 57.00     |           |
| 10                            | 30  | 10 | 2.96   | 88.80     |           |           |
| 11                            | 30  | 10 | 4.28   | 128.40    |           |           |
| Total lengths                 |     |    |        | 234.96    | 241.89    | 322.20    |
| kg / m                        |     |    |        | D10 0.617 | D12 0.888 | D14 1.210 |
| kg / d                        |     |    |        | 144.970   | 214.798   | 389.862   |
| Total weight (kg)             |     |    |        | 749.630   |           |           |

- V TEMELJIH SE IZVEDE USTREZNA OZEMLJITEV  
 - V TEMELJU SE PREDVIDI REBRASTA CEV FI75.  
 POZICIJA CEVI JE PODANA V NAËRTU SV NAPRAV  
 VODONEPREPUSNI BETON: C30/37, XC4, XF3, XD1, PV-II  
 zaščitni sloj=4cm JEKLO ZA ARMIRANJE: BSt500S (B)

# PREREZ 1-1



Datum: \_\_\_\_\_ Opis spremembe: \_\_\_\_\_ Podpis: \_\_\_\_\_

Investitor:  **Republika Slovenija**  
 Republika Slovenija  
 Ministrstvo za infrastrukturo  
 Direkcija RS za infrastrukturo  
 Tržaška cesta 19, 1000 Ljubljana  
 tel.: 01 478 80 02, fax: 01 478 81 23

Projektant:  **sž - projektivno podjetje ljubljana, d.d.**  
 projektiranje, inženiring, svetovanje  
 Ukmarjeva ulica 6, SI - 1000 Ljubljana  
 tel.: 01 300 76 00, fax.: 01 300 76 36

Podizvajalec:  **Hiša Niša, d.o.o.**  
 Verd 252,  
 1360 Vrhnika  
 Hiša Niša, d.o.o.  
 Načrtovanje in svetovanje  
 Verd 252, 1360 Vrhnika

Projekt: **Umestitev naddodov na železniških postajah Hrastnik, Trbovlje in Zagorje**

Objekt: **Železniška postaja Zagorje** Id. št.: \_\_\_\_\_ Ime: \_\_\_\_\_

Načrt: **2/5 Konstrukcije signalov** Vodja projekta: **PI G-0133 mag. E. Hadžiahmetović univ. dipl. inž. gradb.**

Pooblaščen inženir: **PI G-0332 mag. T. Habič univ. dipl. inž. gradb.**

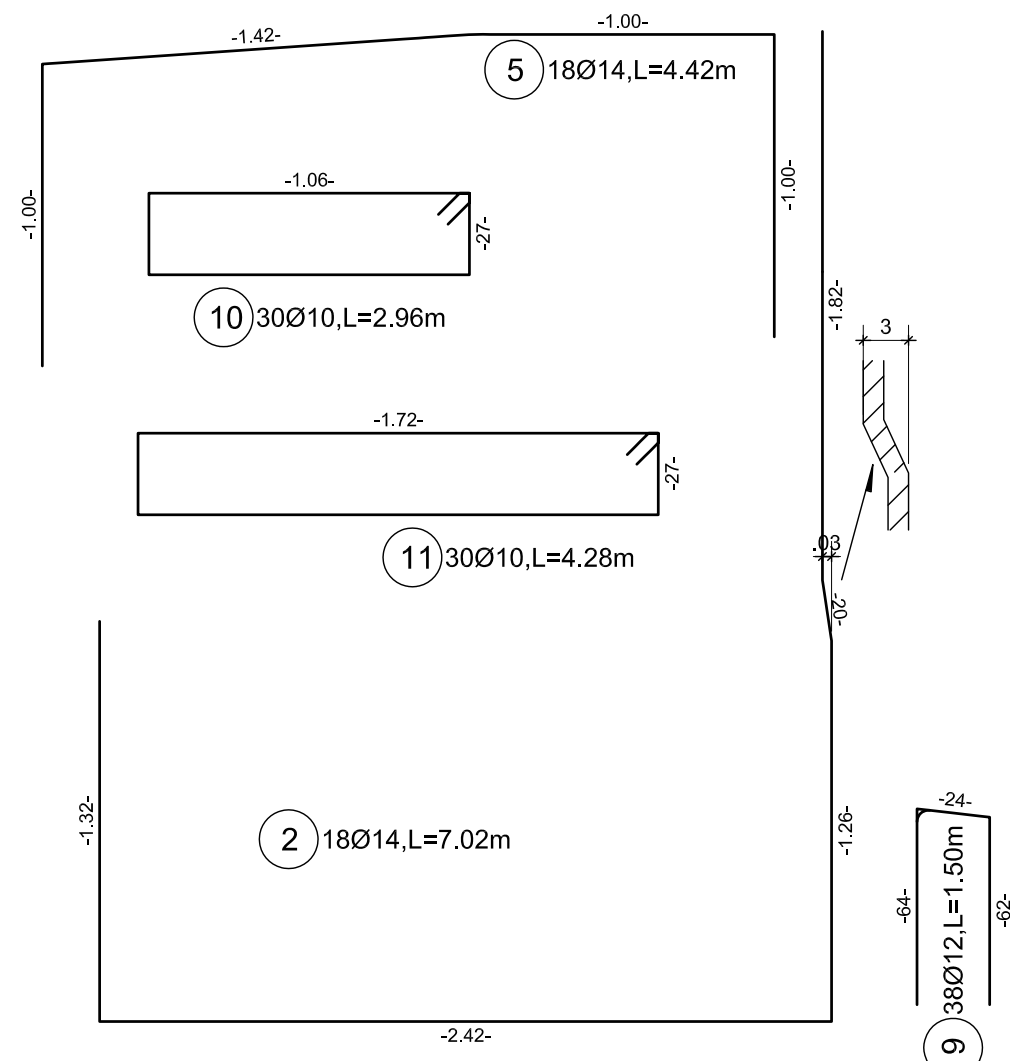
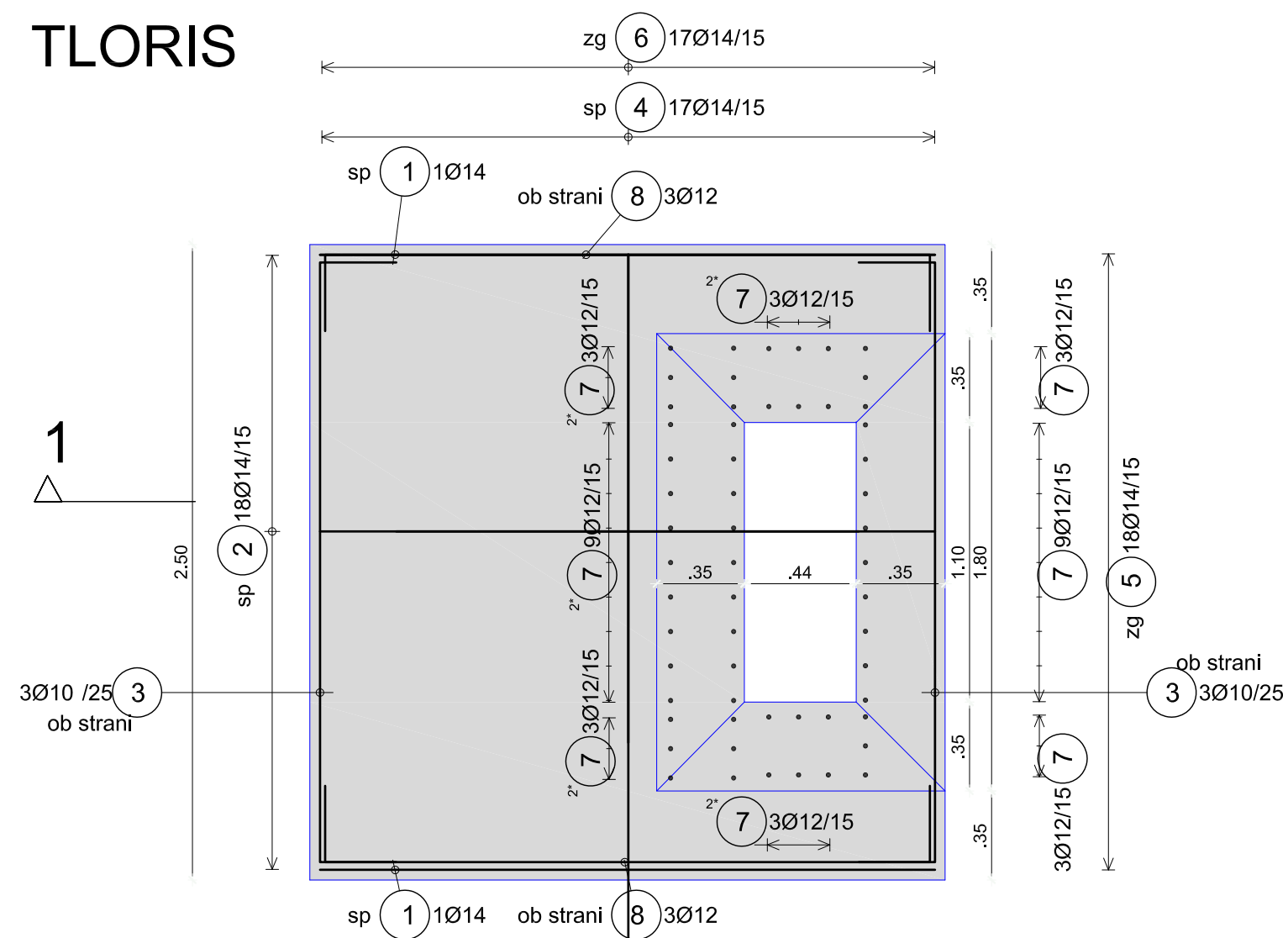
Vrsta načrta: **NAČRT S PODROČJA GRADBENIŠTVA** Izdelal: **PI G-0332 mag. T. Habič univ. dipl. inž. gradb.**

Risba: **ARMATURNI NAČRT, TEMELJ T1**

| Št. proge:  | Vrsta projekta:    | Merilo:      | Datum:       | Projekt št.:           | Načrt št.: | Int. št.: |
|-------------|--------------------|--------------|--------------|------------------------|------------|-----------|
| 10          | IZN                | 1:25         | feb. 2021    | 3710/Z                 | 101/21     |           |
| Št. odseka: | Arhivska številka: | Faza/objekt: | Šifra risbe: | Prostor za črtno kodo: | Risba št.: |           |
| ZG1000      | 0146.00            | 007.2145.    |              |                        | A1         |           |



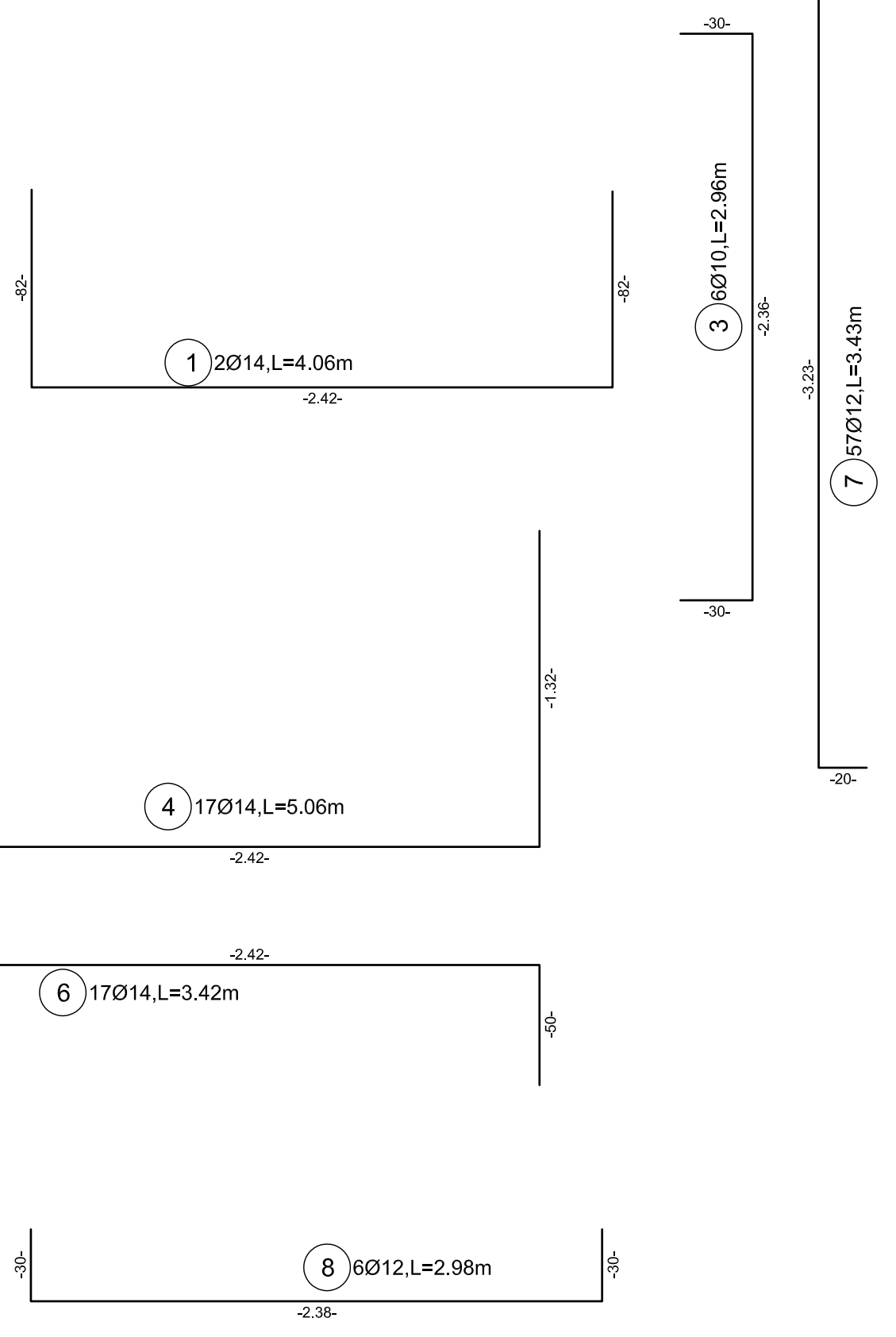
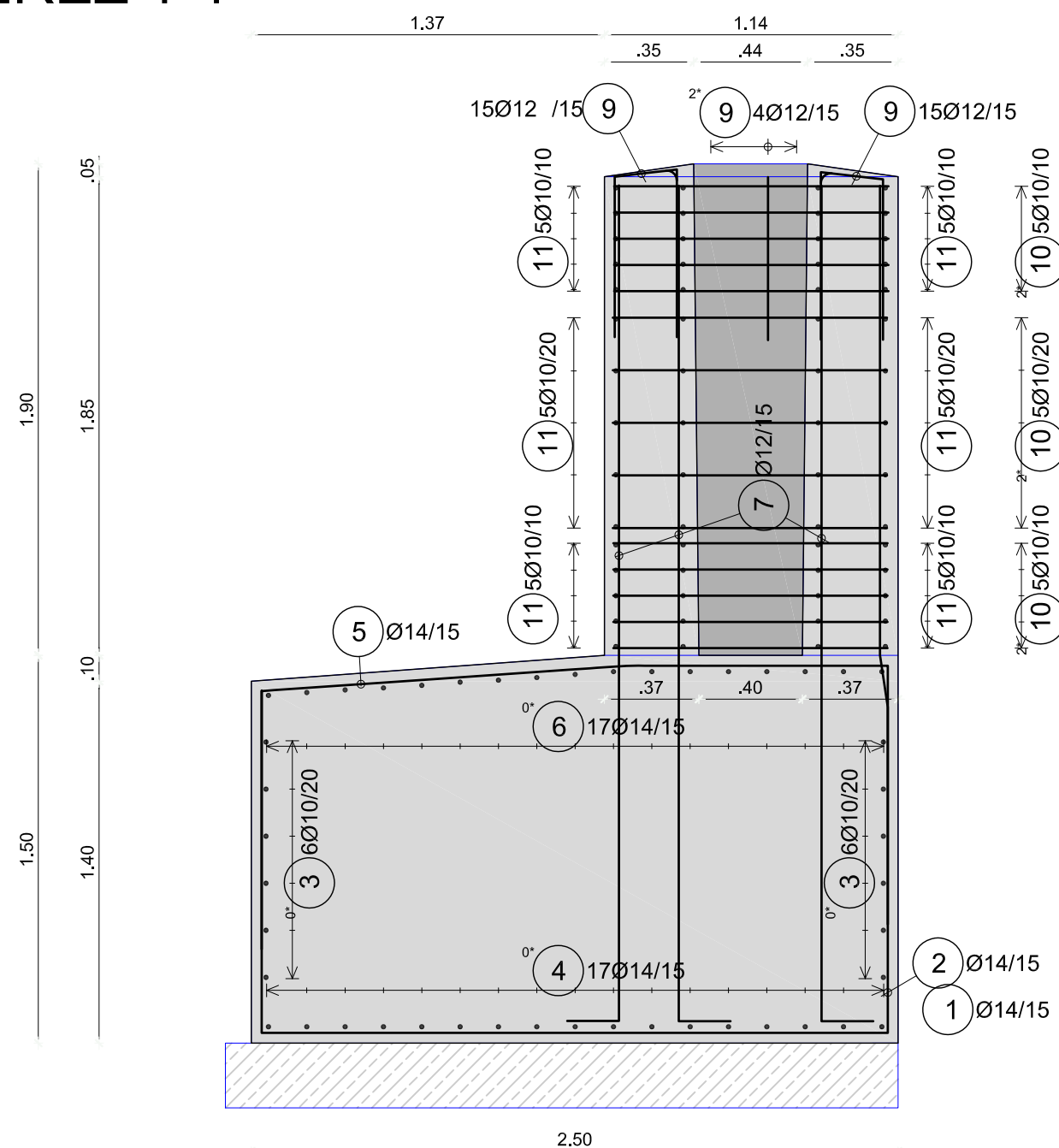
# TEMELJ 2 TLORIS




| BAR SCHEDULE Steelgrade: 500S |     |    |        |           |           |           |
|-------------------------------|-----|----|--------|-----------|-----------|-----------|
| Pos.                          | No. | d  | Length | D10       | D12       | D14       |
| 1                             | 2   | 14 | 4.06   |           |           | 8.12      |
| 2                             | 18  | 14 | 7.02   |           |           | 126.36    |
| 3                             | 6   | 10 | 2.96   | 17.76     |           |           |
| 4                             | 17  | 14 | 5.06   |           |           | 86.02     |
| 5                             | 18  | 14 | 4.42   |           |           | 79.56     |
| 6                             | 17  | 14 | 3.42   |           |           | 58.14     |
| 7                             | 57  | 12 | 3.43   |           | 195.51    |           |
| 8                             | 6   | 12 | 2.98   |           | 17.88     |           |
| 9                             | 38  | 12 | 1.50   |           | 57.00     |           |
| 10                            | 30  | 10 | 2.96   | 88.80     |           |           |
| 11                            | 30  | 10 | 4.28   | 128.40    |           |           |
| Total lengths                 |     |    |        | 234.96    | 270.39    | 358.20    |
| kg / m                        |     |    |        | D10 0.617 | D12 0.888 | D14 1.210 |
| kg / d                        |     |    |        | 144.970   | 240.106   | 433.422   |
| Total weight (kg)             |     |    |        | 818.498   |           |           |

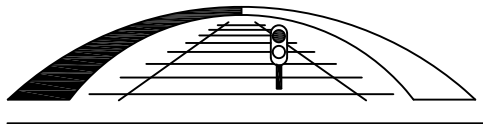
- V TEMELJIH SE IZVEDE USTREZNA OZEMLJITEV  
 - V TEMELJU SE PREDVIDI REBRASTA CEV FI75.  
 POZICIJA CEVI JE PODANA V NAERTU SV NAPRAV  
 VODONEPREPUSNI BETON: C30/37, XC4, XF3, XD1, PV-II  
 zaščitni sloj=4cm JEKLO ZA ARMIRANJE: BSt500S (B)


# PREREZ 1-1



Datum: \_\_\_\_\_ Opis spremembe: \_\_\_\_\_ Podpis: \_\_\_\_\_

Investitor:  **Republika Slovenija**  
 Republika Slovenija  
 Ministrstvo za infrastrukturo  
 Direkcija RS za infrastrukturo  
 Tržaška cesta 19, 1000 Ljubljana  
 tel.: 01 478 80 02, fax: 01 478 81 23

Projektant:  **sž - projektivno podjetje ljubljana, d.d.**  
 projektiranje, inženiring, svetovanje  
 Ukmarjeva ulica 6, SI - 1000 Ljubljana  
 tel.: 01 300 76 00, fax.: 01 300 76 36

Podizvajalec:  **Hiša Niša, d.o.o.**  
 Verd 252,  
 1360 Vrhnika

Načrtovanje in svetovanje  
**Verd 252, 1360 Vrhnika**

Projekt: **Umestitev naddodov na železniških postajah Hrastnik, Trbovlje in Zagorje**

Objekt: **Železniška postaja Zagorje** Id. št.: \_\_\_\_\_ Ime: \_\_\_\_\_

Načrt: **2/5 Konstrukcije signalov** Vodja projekta: **PI G-0133 mag. E. Hadžiahmetović univ. dipl. inž. gradb.**

Pooblaščen inženir: **PI G-0332 mag. T. Habič univ. dipl. inž. gradb.** Izdelal: **PI G-0332 mag. T. Habič univ. dipl. inž. gradb.**

Vrsta načrta: **NAČRT S PODROČJA GRADBENIŠTVA**

Risba: **ARMATURNI NAČRT, TEMELJ T2**

|                           |                                   |                               |                         |                            |                          |           |
|---------------------------|-----------------------------------|-------------------------------|-------------------------|----------------------------|--------------------------|-----------|
| Št. proge: <b>10</b>      | Vrsta projekta: <b>IZN</b>        | Merilo: <b>1:25</b>           | Datum: <b>feb. 2021</b> | Projekt št.: <b>3710/Z</b> | Načrt št.: <b>101/21</b> | Int. št.: |
| Št. odseka: <b>ZG1000</b> | Arhivska številka: <b>0146.00</b> | Faza/objekt: <b>007.2145.</b> | Šifra risbe:            | Prostor za črtno kodo:     |                          | <b>A2</b> |