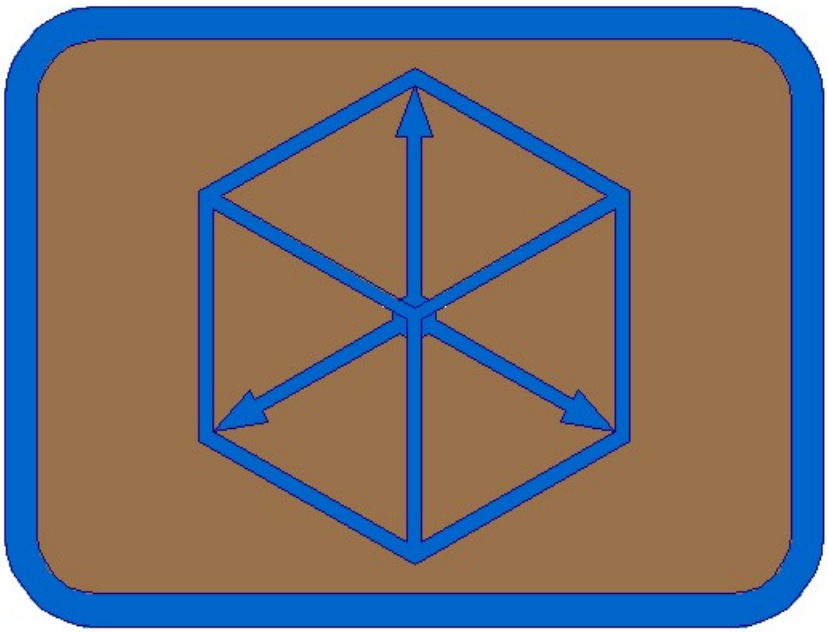


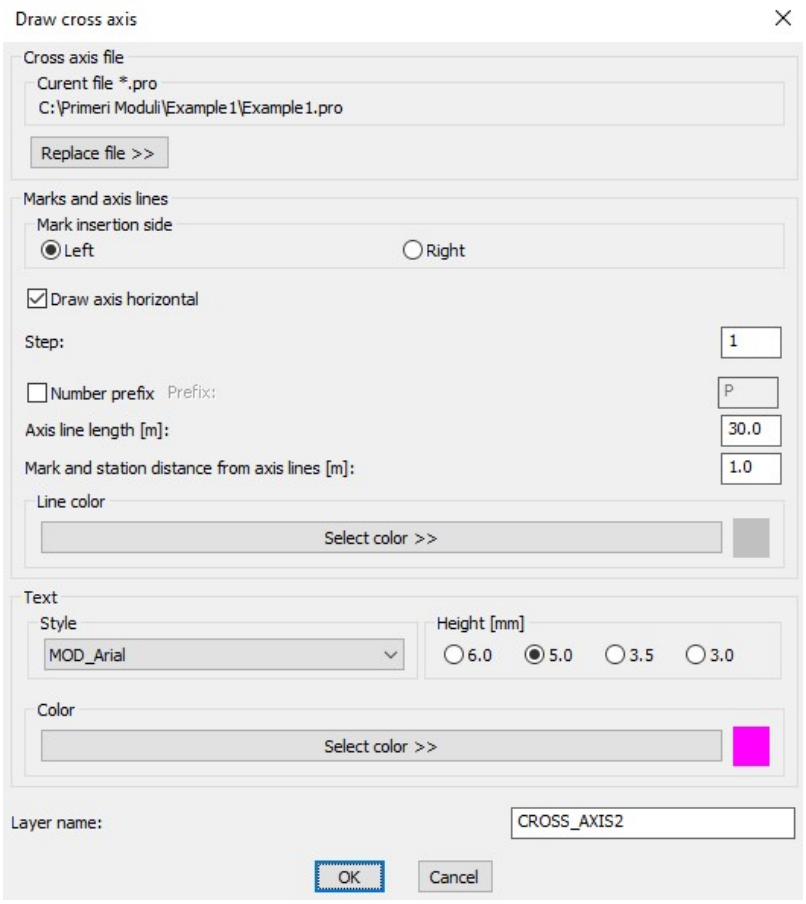
# Modul BRIDGE

## CABLE PRESSTRESSING

## CABLE PRESSTRESSING

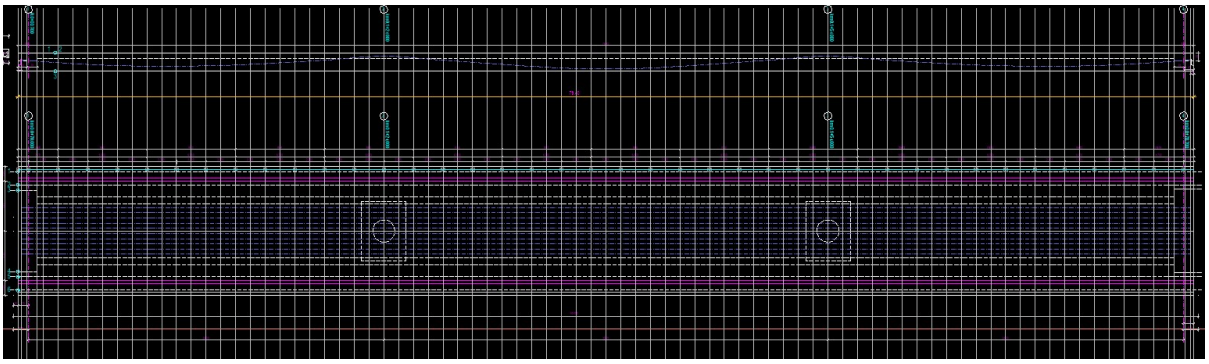
1. Define cable axis files in cross sections in draft/sketch ground floor and longitudinal section

1.1 Draw cross axis horizontal with command Civil -> Cross axis -> Draw cross axis.

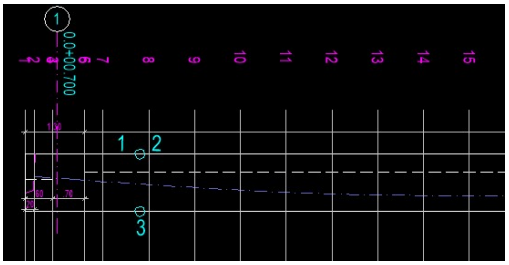



1.2 Draw cable axis in draft/sketch ground floor and longitudinal section. (see examples in appendix 12)

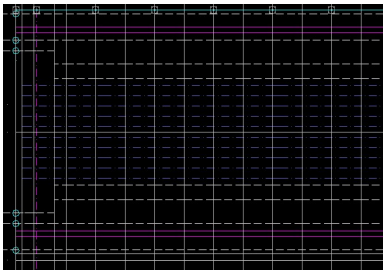
Longitudinal section and ground floor



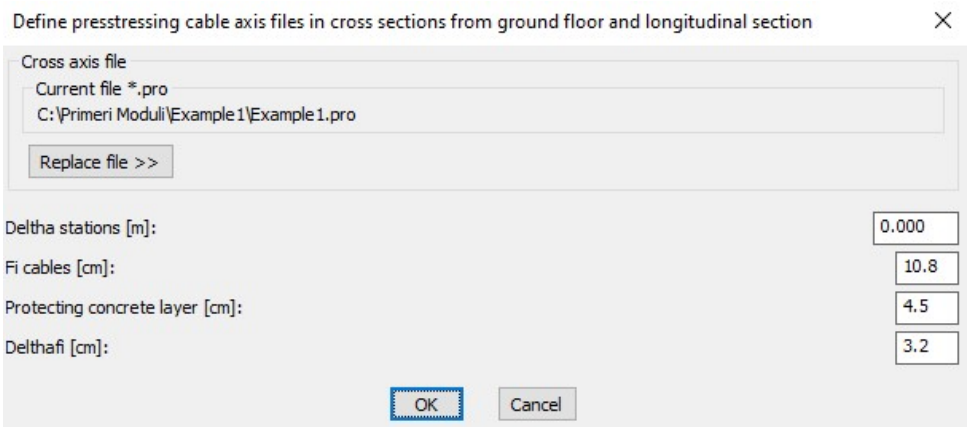
Longitudinal section



Ground floor

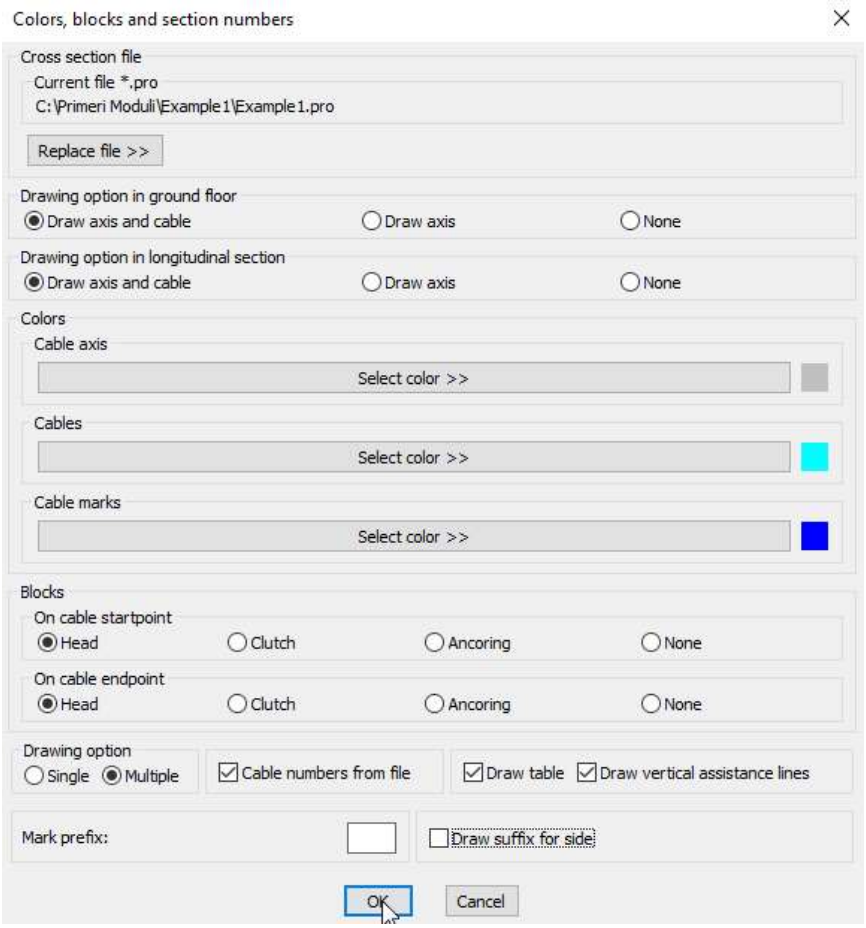


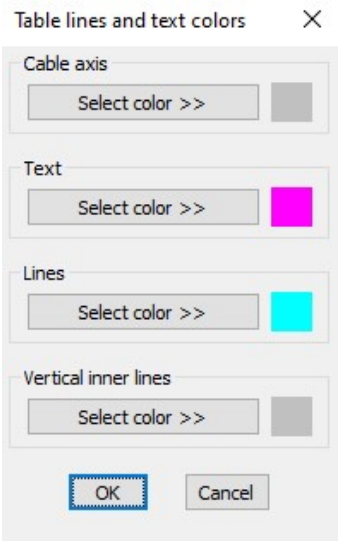
1.3 Define cable file Cable1.kal. **Multiple cable drawing files must have the same cahracters to cable numbers in names!** (Cable2.kal, Cable3.kal …)



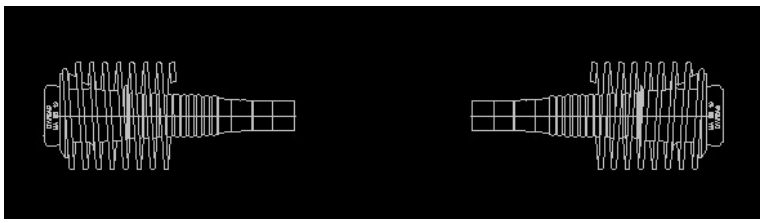

2. Draw cables in draft/sketch ground floor and longitudinal section

Multiple – longitudinal and ground floor cables



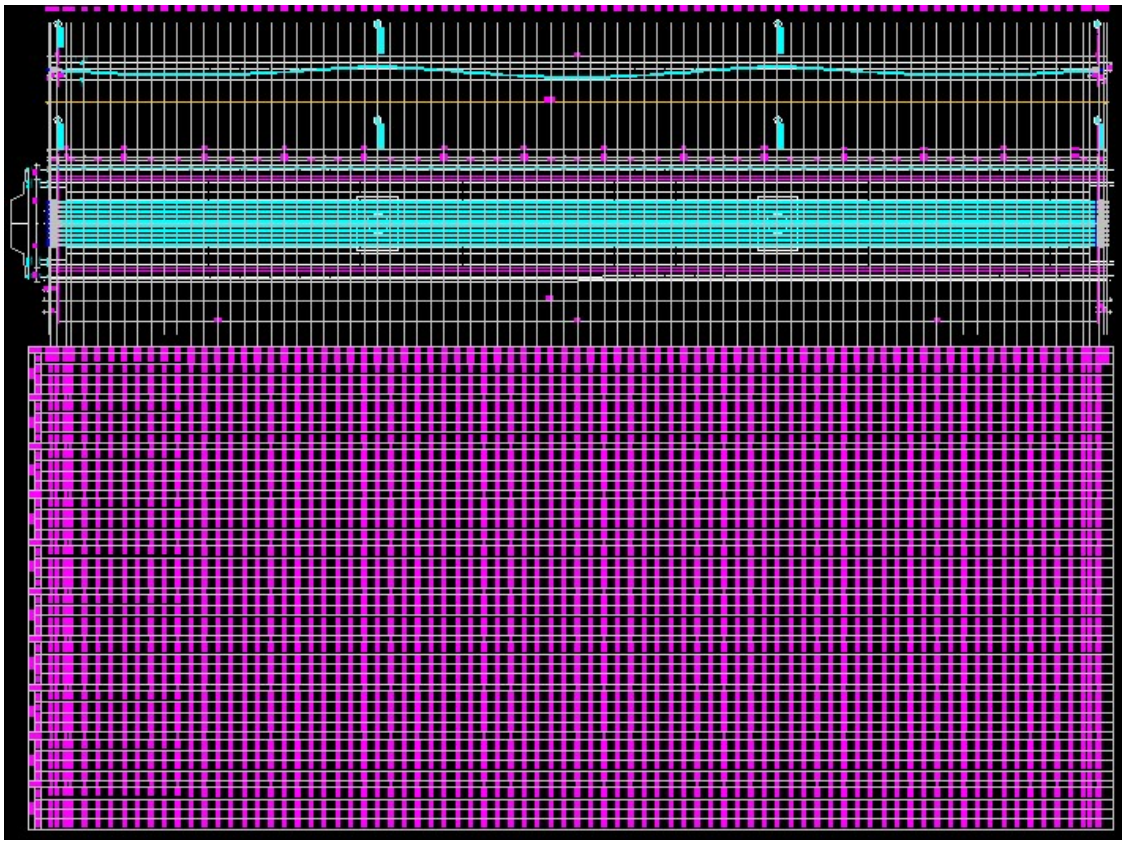




Block CABLE_HEAD_LEFT Block CABLE_HEAD_RIGHT

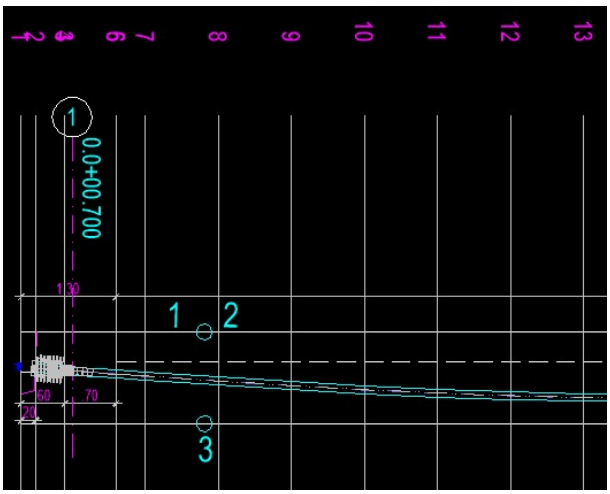


```
Selected cross section file: C:\Primeri Moduli\Example1\Example1.pro
Checking dates in file ... finished.
Select basic BLOCK for LEFT head:
Select basic BLOCK for RIGHT head:
Select polyline - TOP BORDER of construction longitudinal section:
Pick AXIS position in ground floor:
Starting cable files text <K>: Cable
STARTING cable number <1>:
ENDING cable number <1>: 10

File C:\Primeri Moduli\Example1\Cable1.kal not found.
Cable line file:
C:\Primeri Moduli\Example1\Cable1.kal.
Longitudinal section processing ...
Section processing in ground floor ...  finished.
Pick table X0Y origin point of cable. 1:
Draw table of 1. cable ...
```

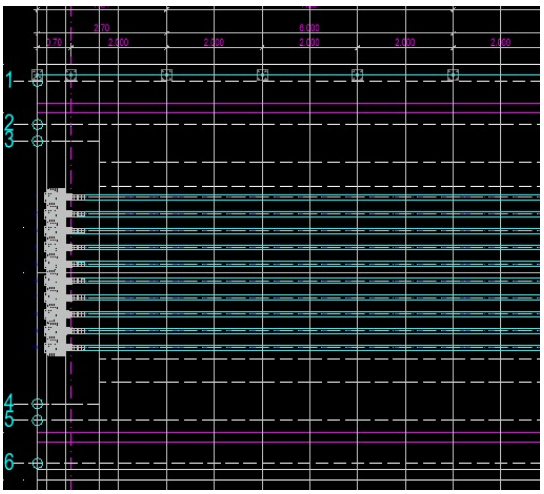
Longitudinal section and ground floor draft/sketch



Longitudinal section draft/sketch

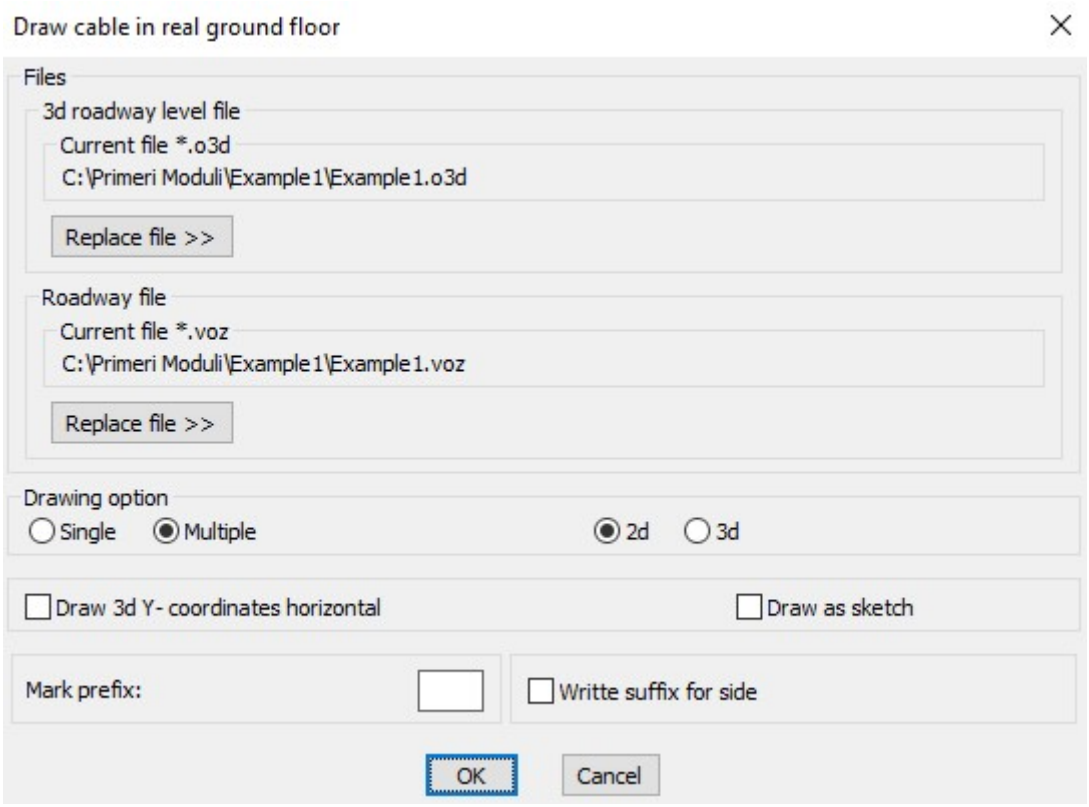


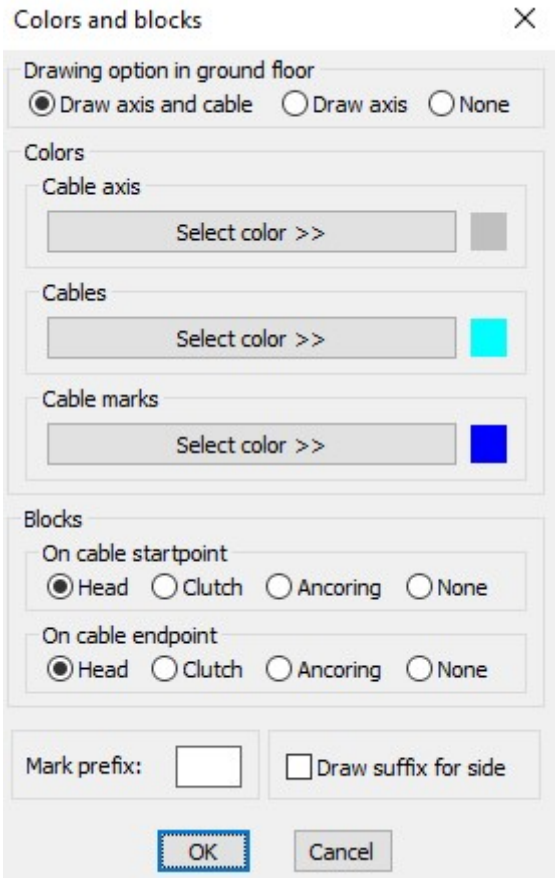

Ground floor draft/sketch



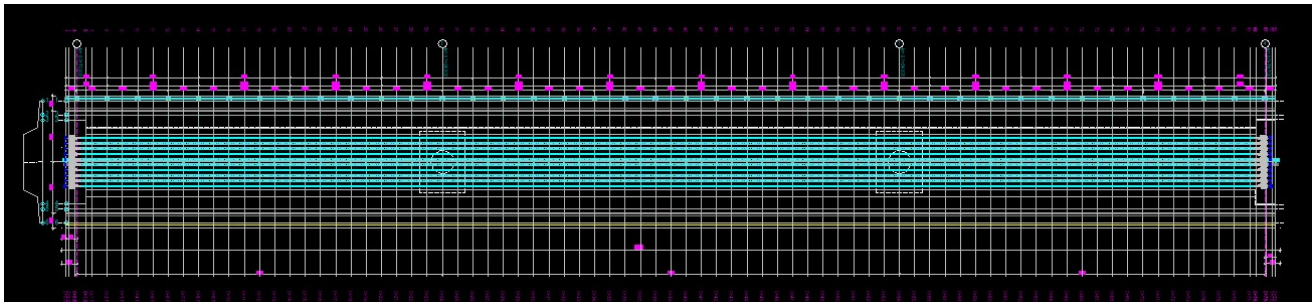
3. Draw cables in real ground floor 2d or 3d

**2d draw**

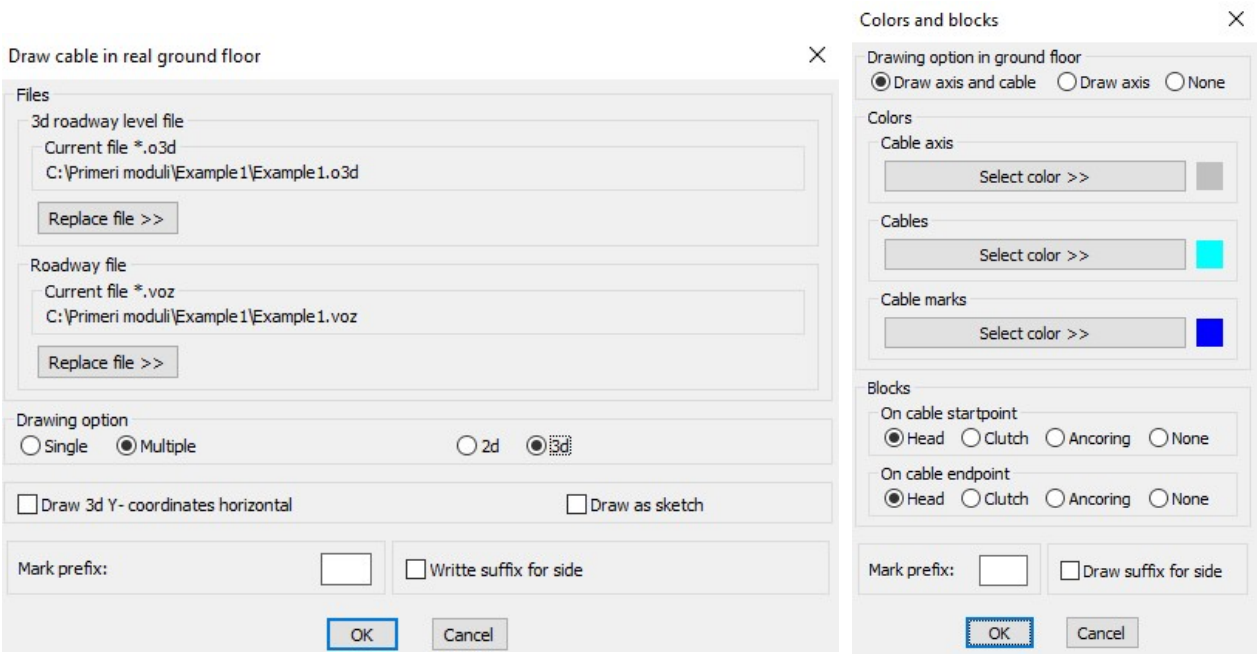


```
Selected file *.o3d: C:\Primeri moduli\Example1\Example1.o3d
Selected file *.voz:C:\Primeri moduli\Example1\Example1.voz
Checking dates in files ... finished.
Section checking ... finished.
Select basic BLOCK for LEFT head:
Select basic BLOCK for RIGHT head:
Starting text of cable files <K>: CABLE
Number of STARTING cable <1>:
Number of ENDING cable <1>: 10

Cable line drawing file:C:\Primeri moduli\Example1\CABLE1.kal.
Section processing ...  finished.
Draw 1. cable ...  finished.
Cable line drawing file:C:\Primeri moduli\Example1\CABLE2.kal.
Section processing ...  finished.
Draw 2. cable ...  finished.
Cable line drawing file:C:\Primeri moduli\Example1\CABLE3.kal.
```

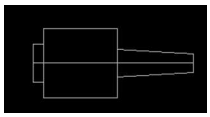


**3d draw**

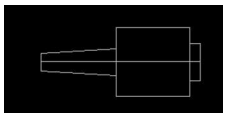


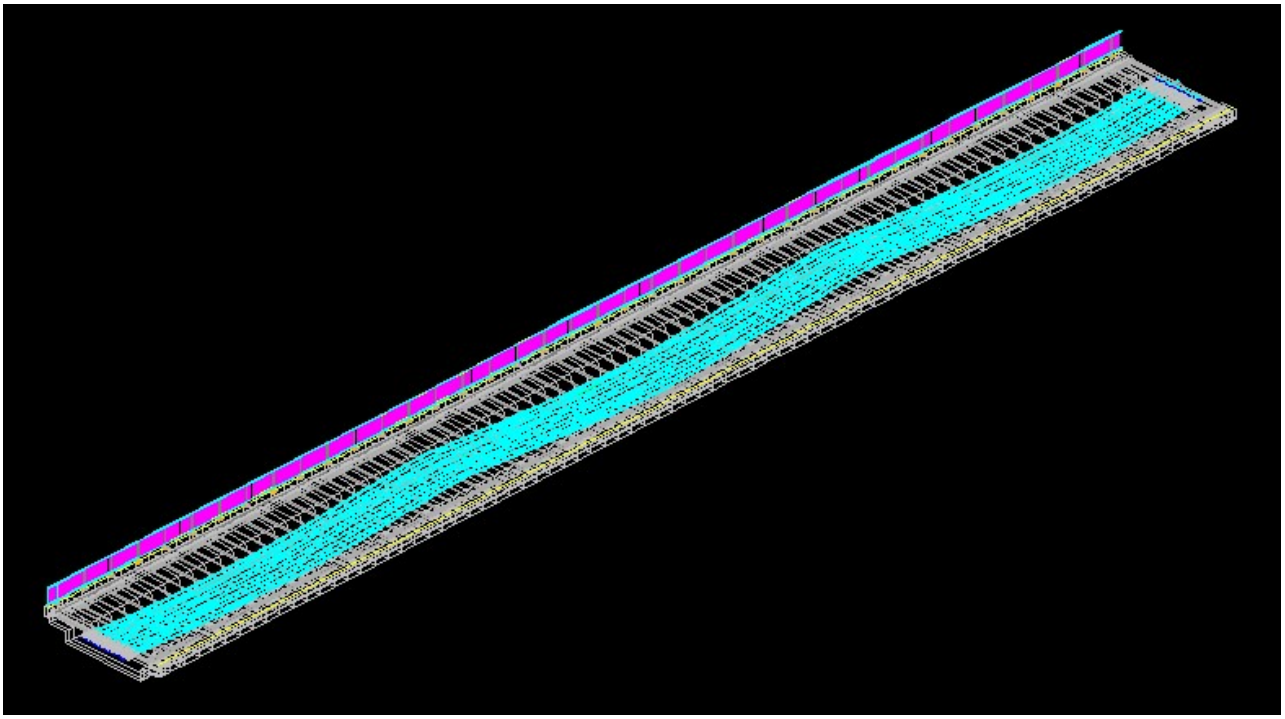

```
Selected file *.o3d: C:\Primeri moduli\Example1\Example1.o3d
Selected file *.voz:C:\Primeri moduli\Example1\Example1.voz
Checking dates in files ... finished.
Section checking ... finished.
Select basic BLOCK for LEFT head:
Select basic BLOCK for RIGHT head:
Starting text of cable files <cable>:
Number of STARTING cable <1>:
Number of ENDING cable <10>:
Cable line drawing file:C:\Primeri moduli\Example1\cable1.kal.
Section processing ...  finished.
Draw 1. cable ...  finished.
```

Block CABLE_HEAD_LEFT_3D

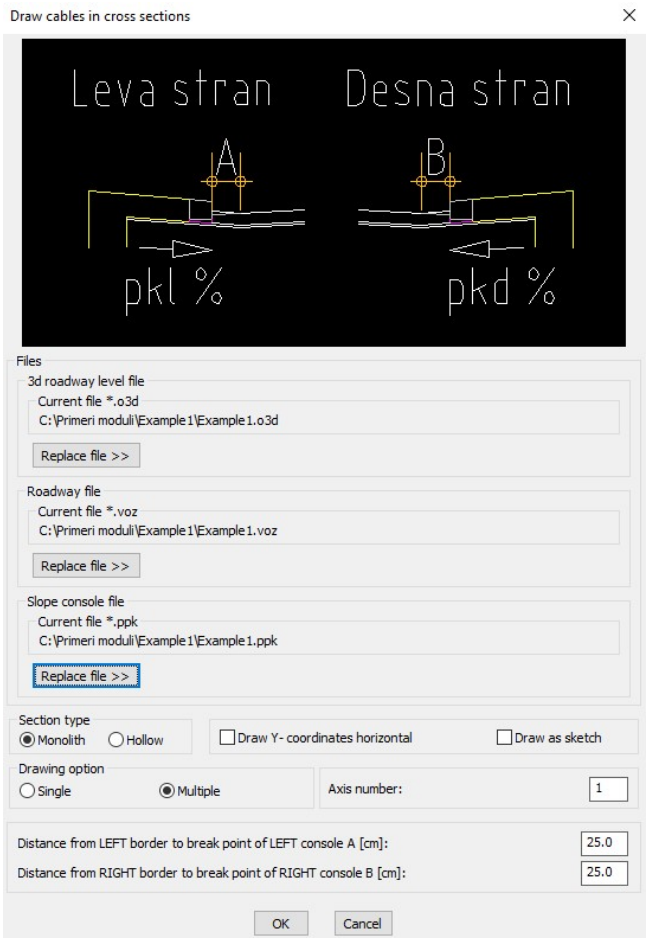


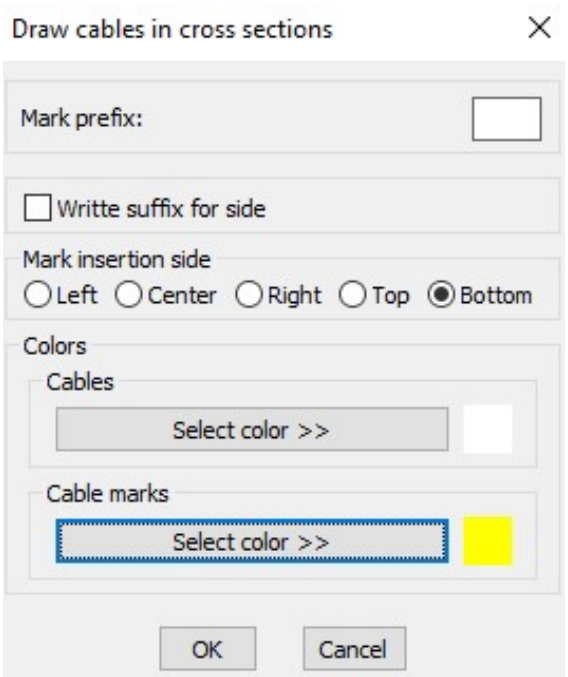
Block CABLE_HEAD_RIGHT_3D



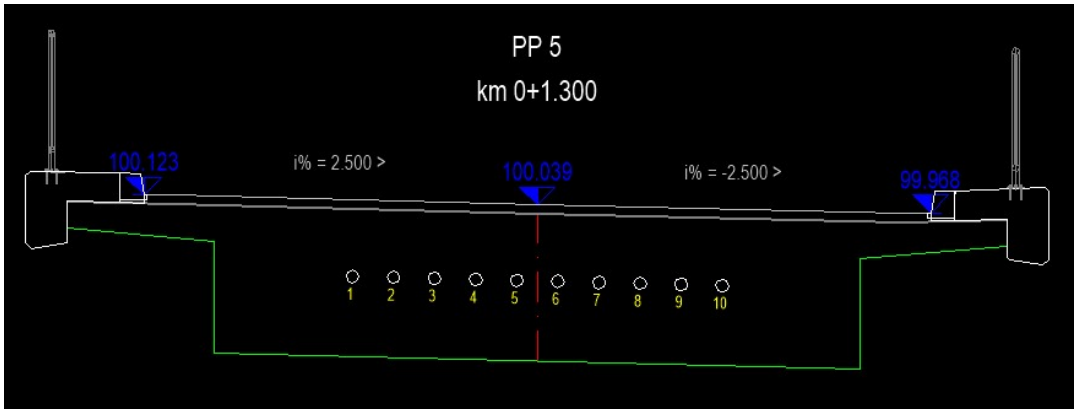


4. Draw cables in cross sections

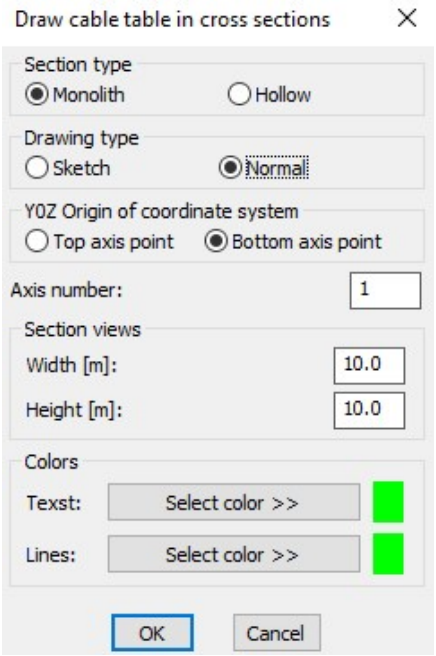


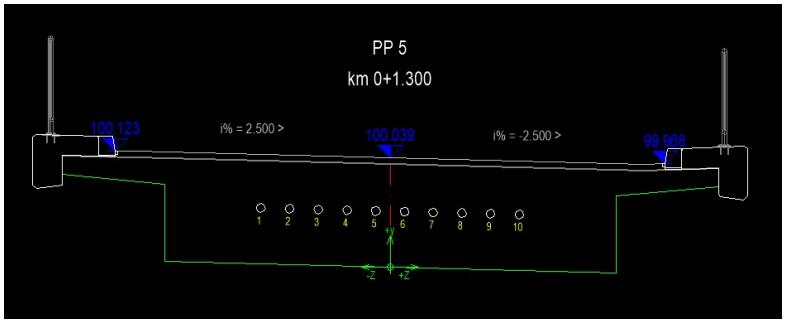




```
Selected file *.o3d: C:\Razno\!Projekti\Ponting\Nadvoz Ormož\OrmožENG.o3D
Selected file *.voz:C:\Razno\!Projekti\Ponting\Nadvoz Ormož\OrmožENG.voz
Selected file *.ppk: C:\Razno\!Projekti\Ponting\Nadvoz Ormož\OrmožENG.ppk
Preverjanje PREREZOV... finished.
Starting text of cable files <kabeleng>:
Number of STARTING cable <1>:
Number of ENDING cable <10>:
Cable line drawing file:C:\Razno\!Projekti\Ponting\Nadvoz Ormož\kabeleng1.kal.
Section processing ...
Draw cable ...  finished.
```



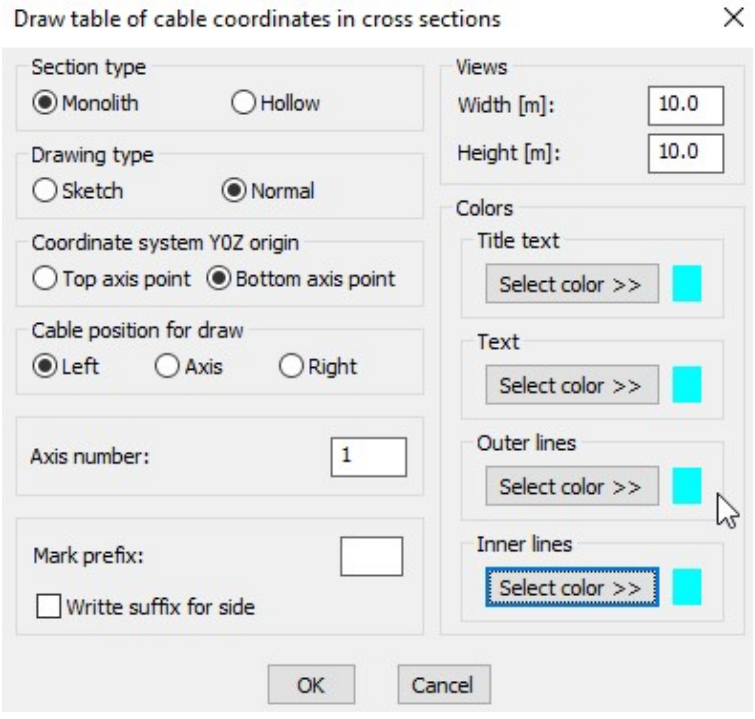

5. Insert Y0Z basis points in cross sections

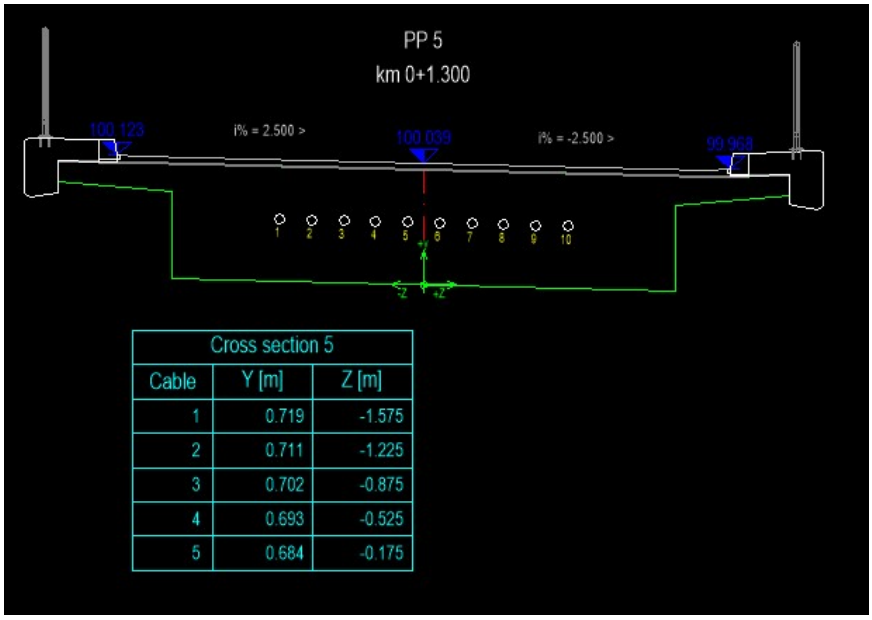



6. Draw table of cable coordinates in cross sections

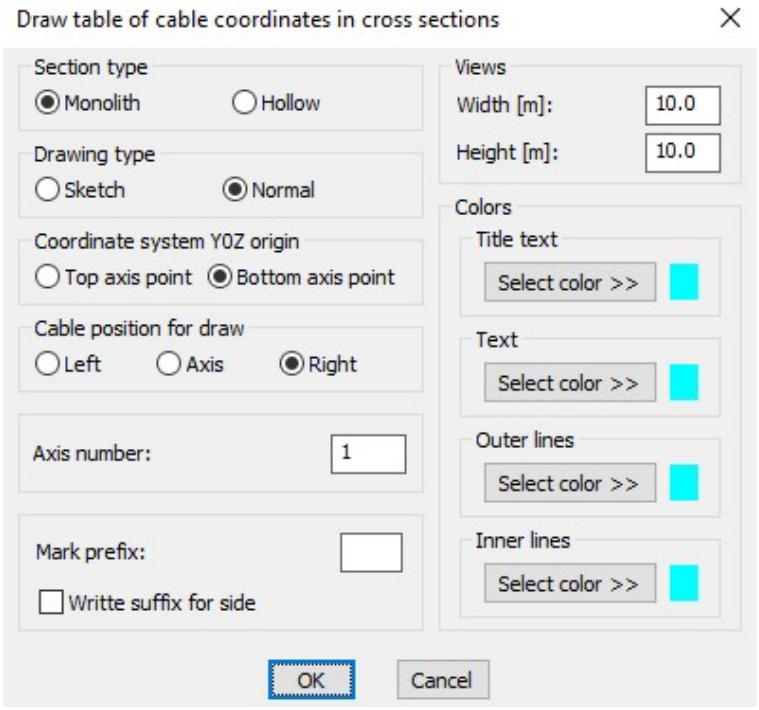
6.1 Left side

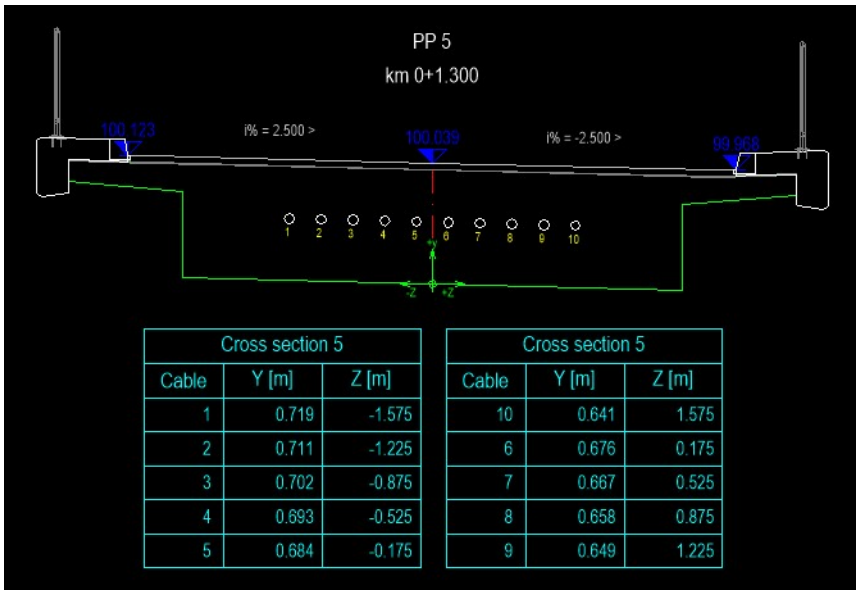





| Cross section 5 | | |
|---|---|---|
| Cable | Y [m] | Z [m] |
| 1 | 0.719 | -1.575 |
| 2 | 0.711 | -1.225 |
| 3 | 0.702 | -0.875 |
| 4 | 0.693 | -0.525 |
| 5 | 0.684 | -0.175 |

6.2 Right side



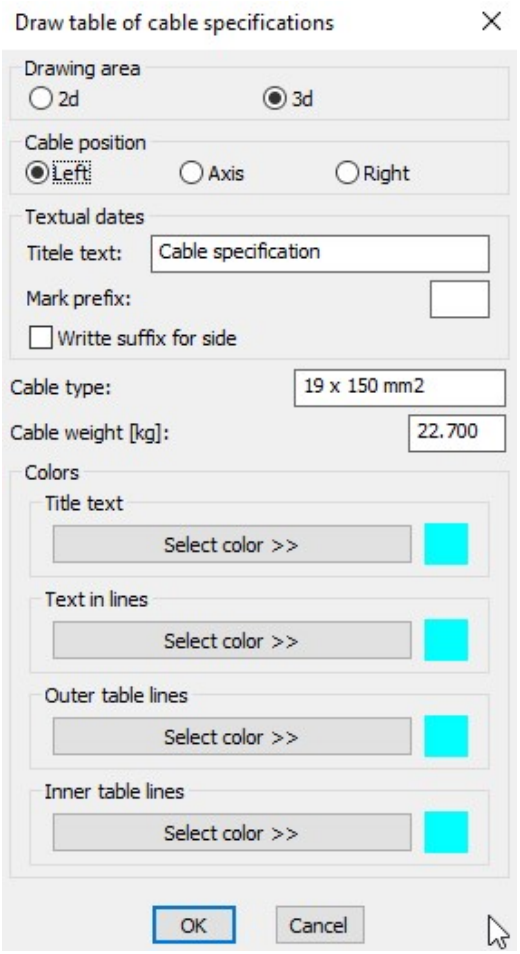




| Cross section 5 | | |
|---|---|---|
| Cable | Y [m] | Z [m] |
| 1 | 0.719 | -1.575 |
| 2 | 0.711 | -1.225 |
| 3 | 0.702 | -0.875 |
| 4 | 0.693 | -0.525 |
| 5 | 0.684 | -0.175 |

| Cross section 5 | | |
|---|---|---|
| Cable | Y [m] | Z [m] |
| 10 | 0.641 | 1.575 |
| 6 | 0.676 | 0.175 |
| 7 | 0.667 | 0.525 |
| 8 | 0.658 | 0.875 |
| 9 | 0.649 | 1.225 |

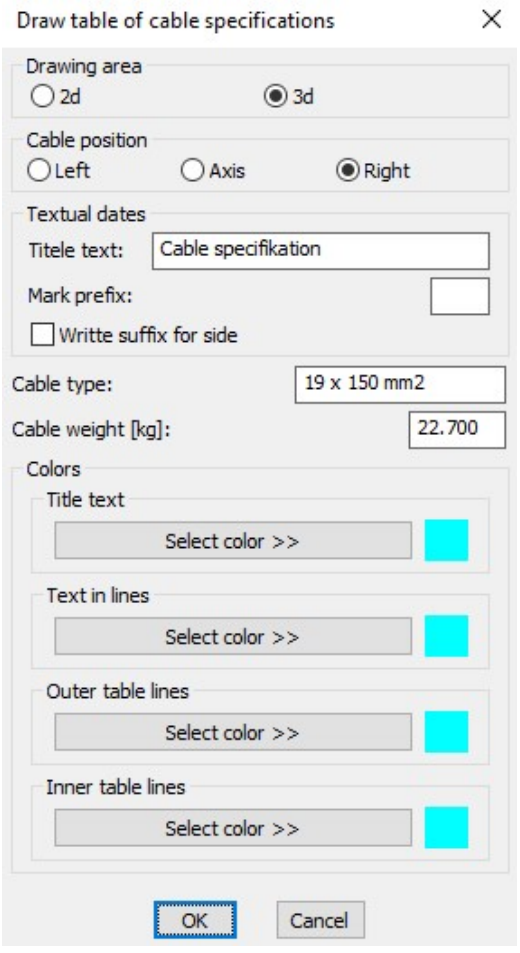
7. Draw table of cable specifications

7.1 Left side

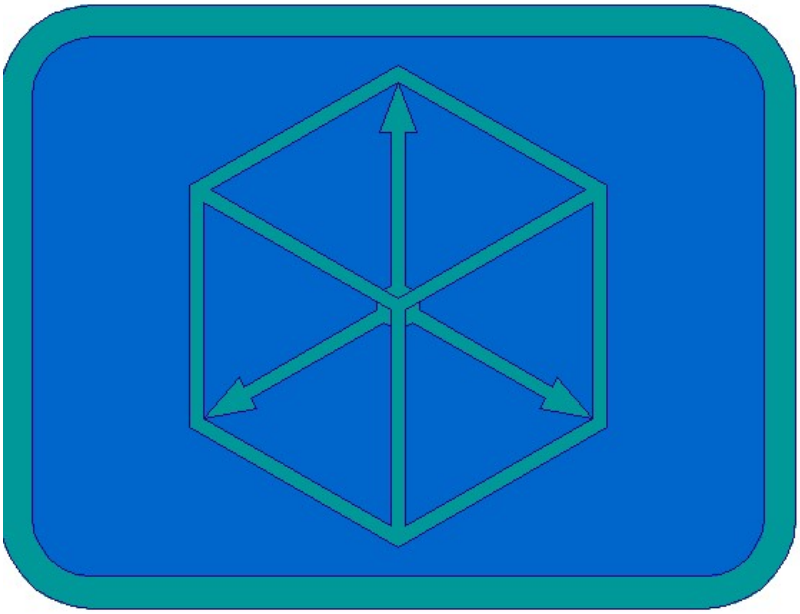



| Cable specifikation | | | | |
|---|---|---|---|---|
| Mark | pcs | TYPE | L [m] | Wght [kg] |
| 1 | 1 | 19 x 150 mm2 | 79.2 | 1797.8 |
| 2 | 1 | 19 x 150 mm2 | 79.2 | 1797.8 |
| 3 | 1 | 19 x 150 mm2 | 79.2 | 1797.8 |
| 4 | 1 | 19 x 150 mm2 | 79.2 | 1797.8 |
| 5 | 1 | 19 x 150 mm2 | 79.2 | 1797.8 |
| Sum | | | 396.0 | 8989.0 |

7.2 Right side

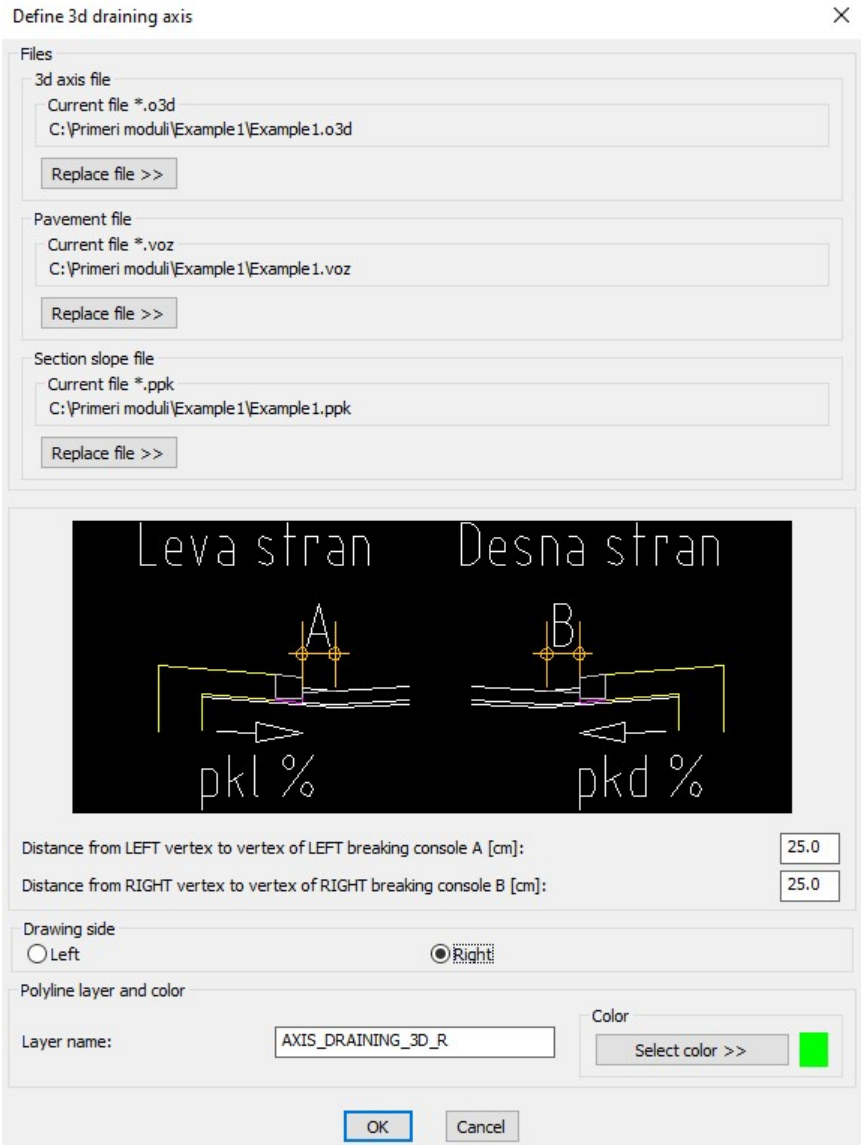


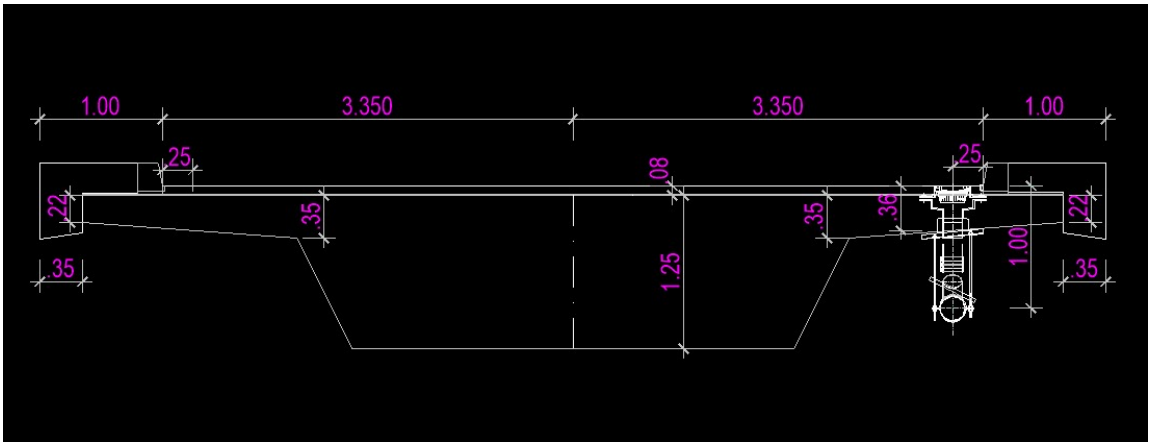

| Cable specifikation | | | | |
|---|---|---|---|---|
| Mark | pcs | TYPE | L [m] | Wght [kg] |
| 1 | 1 | 19 x 150 mm2 | 79.2 | 1797.8 |
| 2 | 1 | 19 x 150 mm2 | 79.2 | 1797.8 |
| 3 | 1 | 19 x 150 mm2 | 79.2 | 1797.8 |
| 4 | 1 | 19 x 150 mm2 | 79.2 | 1797.8 |
| 5 | 1 | 19 x 150 mm2 | 79.2 | 1797.8 |
| Sum | | | 396.0 | 8989.0 |

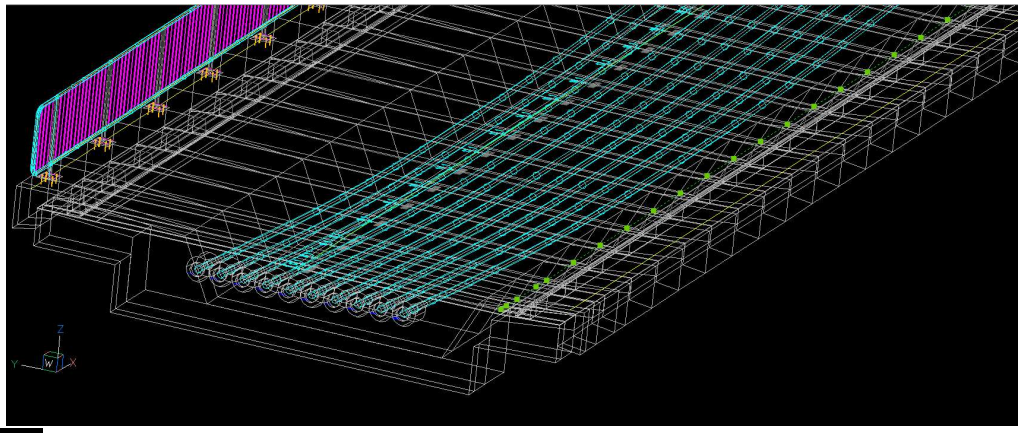


# Module DRAINING

1. Draw 3d and 2d longitudinal draining axis

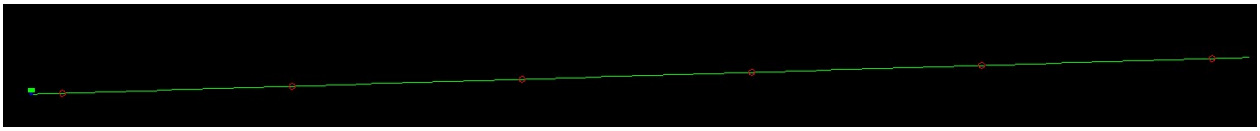


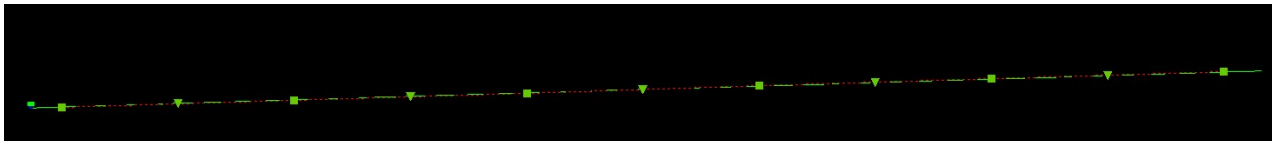






2. Draw flowing parts layout - in longitudinal profile

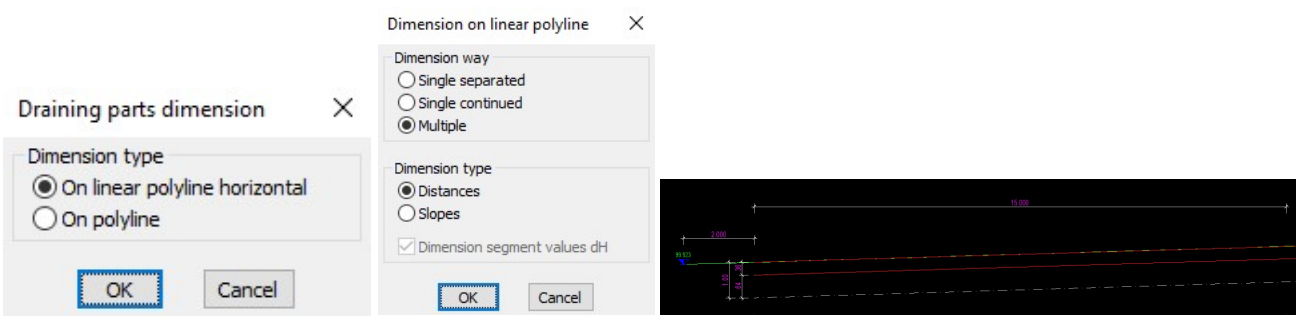
```
Select 2D polyline in longitudinal profile:
Total distance in X-direction = 79.400 m.
Distance to 1. flowing part in X-direction < 15.0 > m/End: 2

Distance from last vertex in X-direction = 77.400 m.
Distance to 2. flowing part in X-direction < 2.0 > m/End: 15

Distance from last vertex in X-direction = 62.400 m.
Distance to 3. flowing part in X-direction < 15.0 > m/End:

Distance from last vertex in X-direction = 47.400 m.
Distance to 4. flowing part in X-direction < 15.0 > m/End:

Distance from last vertex in X-direction = 32.400 m.
Distance to 5. flowing part in X-direction < 15.0 > m/End:

Distance from last vertex in X-direction = 17.400 m.
Distance to 6. flowing part in X-direction < 15.0 > m/End:

Distance from last vertex in X-direction = 2.400 m.
Distance to 7. flowing part in X-direction < 15.0 > m/End: E
Join polyline with last vertex Yes/No < Y >: N
```

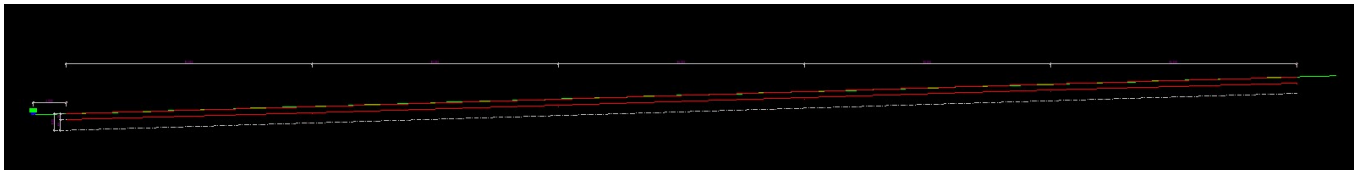




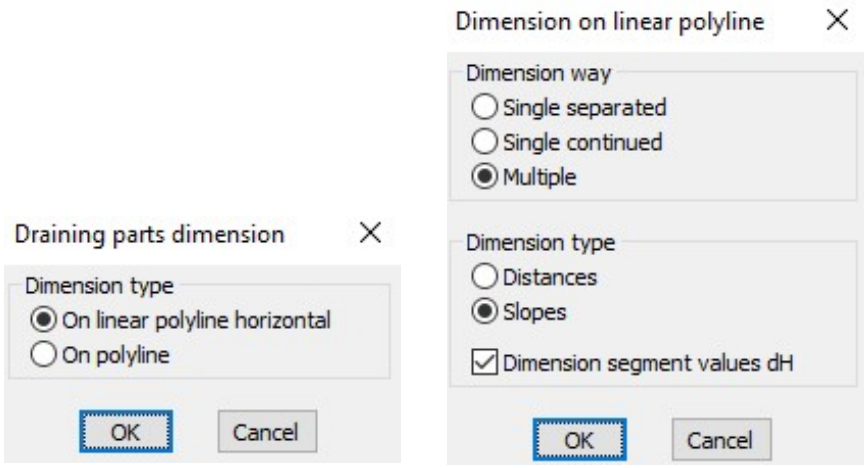
3. Parts dimension in longitudinal profile

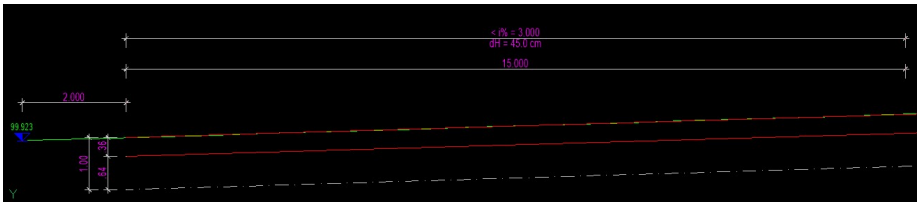
3.1 Dimension distances between polyline vertexes - flowing parts layout

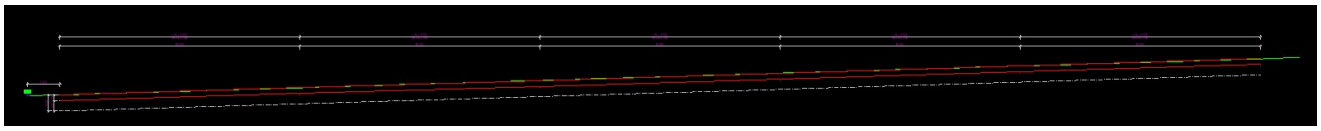




3.2 Gradient dimension between polyline vertexes - flowing parts



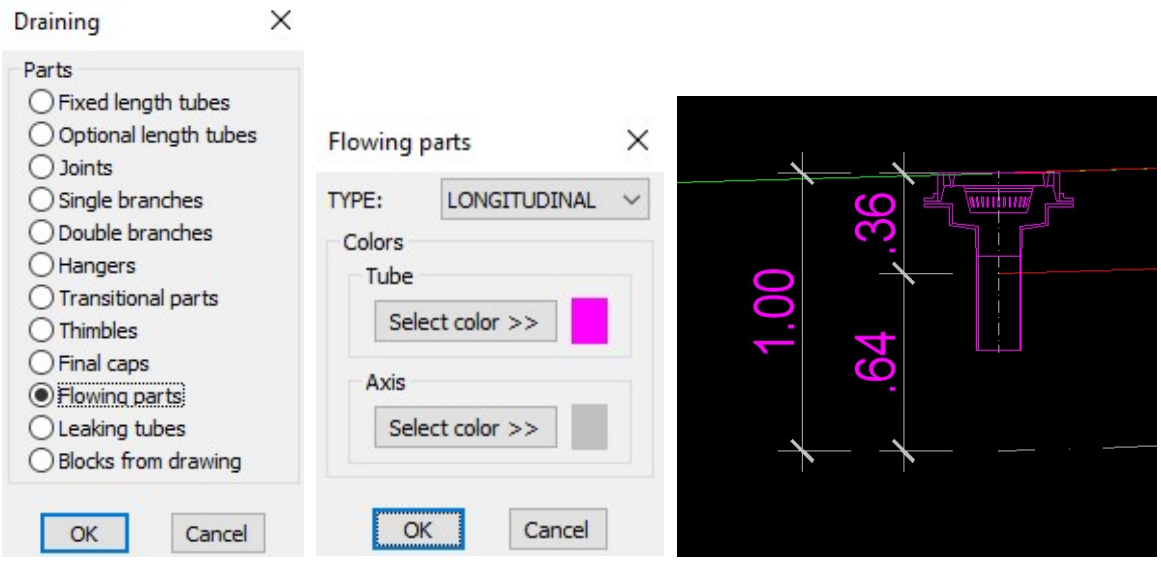





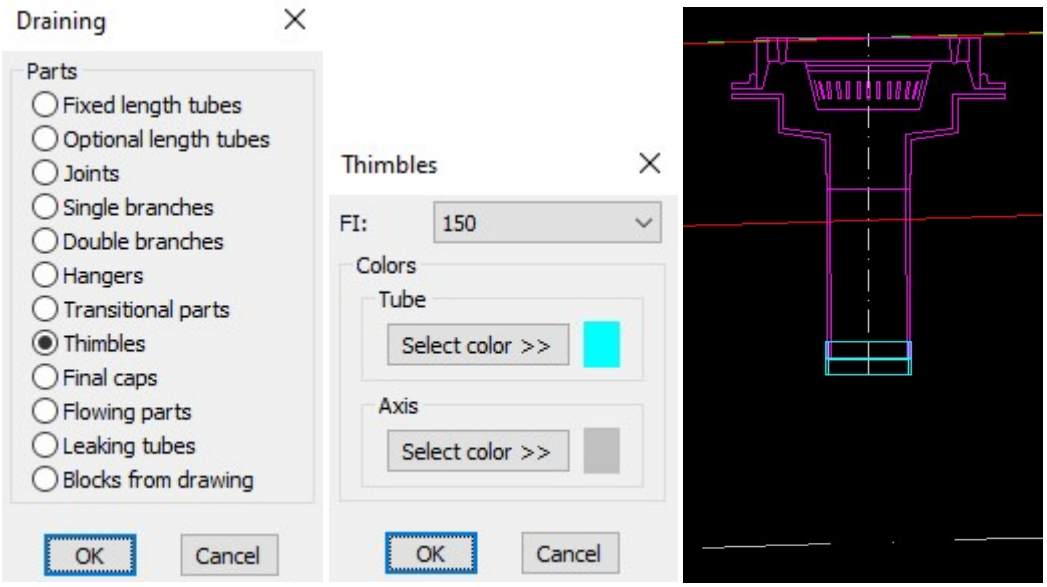
4. Insertion of draining elements

Element insertion is from basis of blocks. User can define new basis of blocks, with the same names as current blocks.

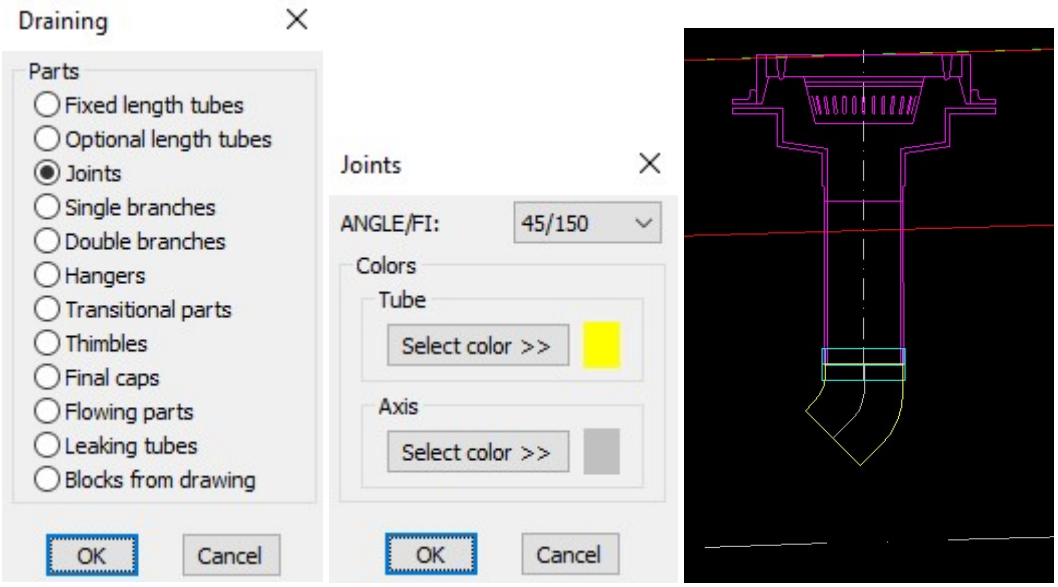
4. 1 Insert flowing parts in longitudinal profile



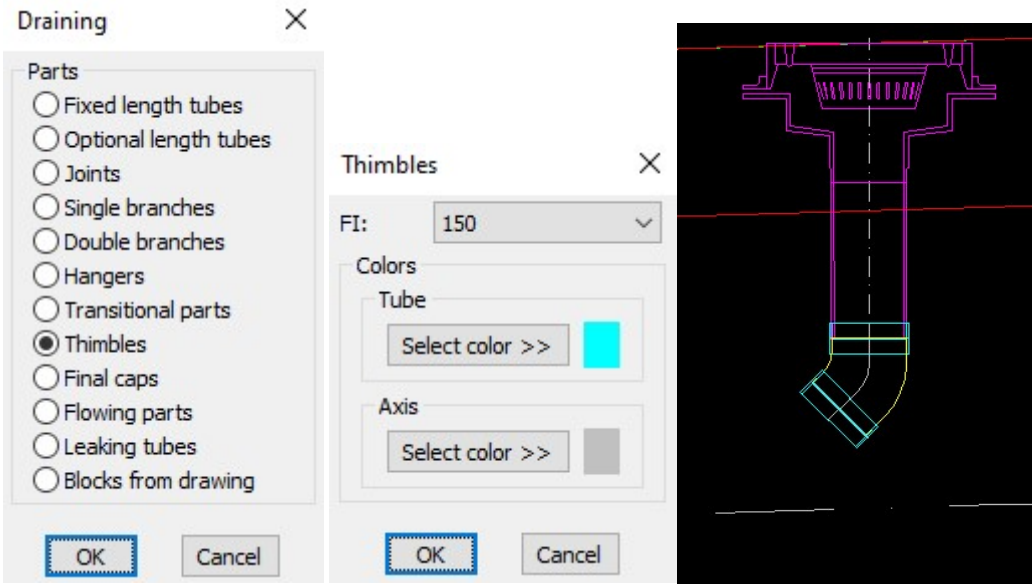
4.2 Insert thimble



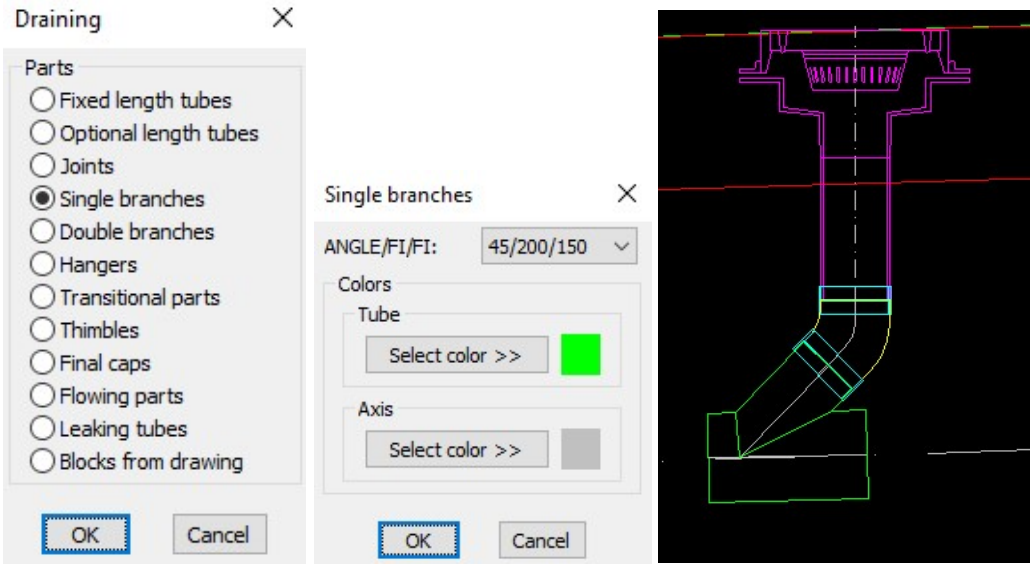

4.3 Insert joint



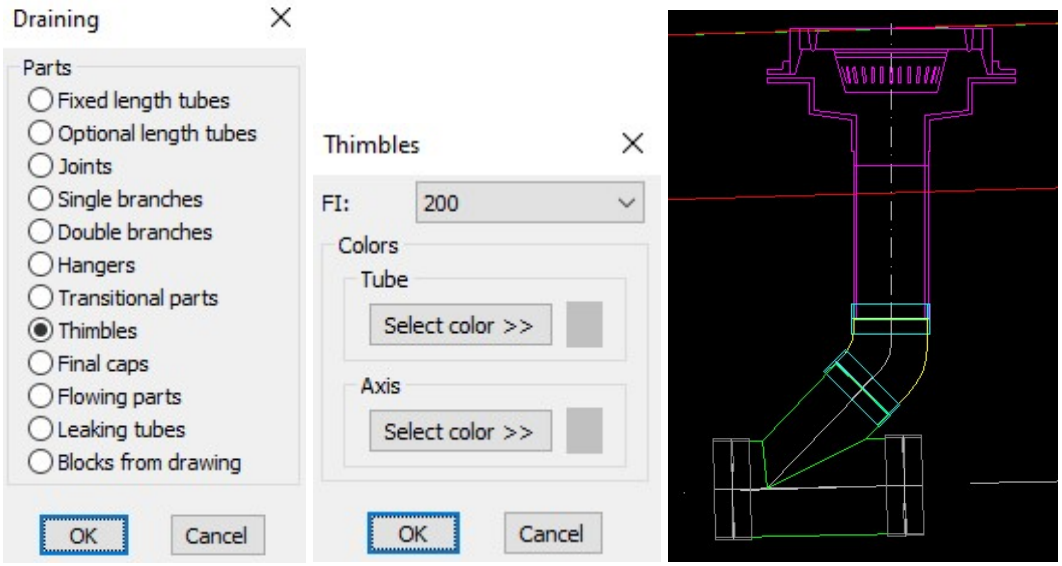

4.4 Insert thimble



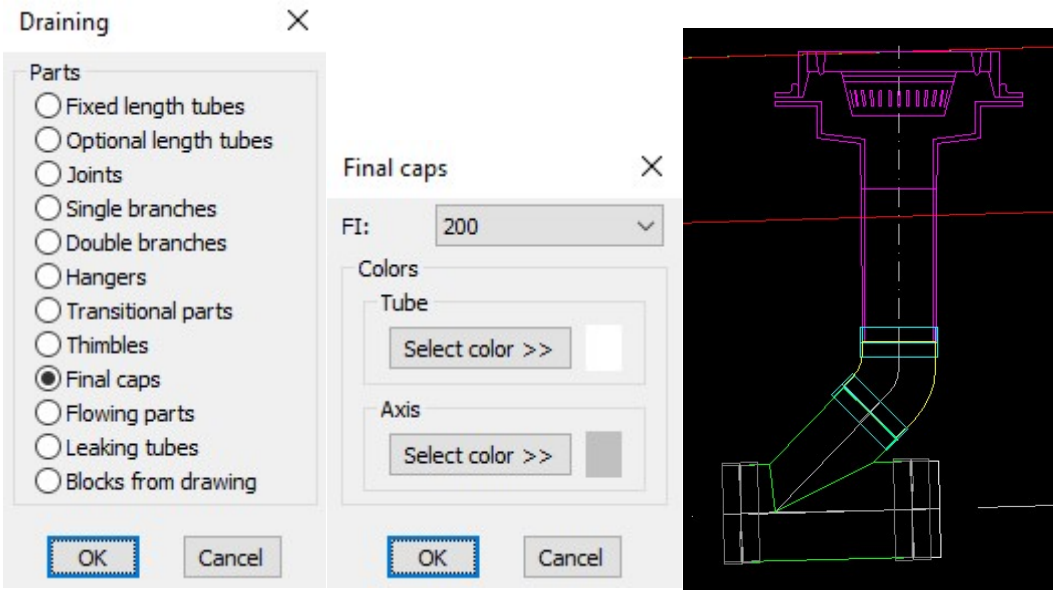
4.5 Insert single branch



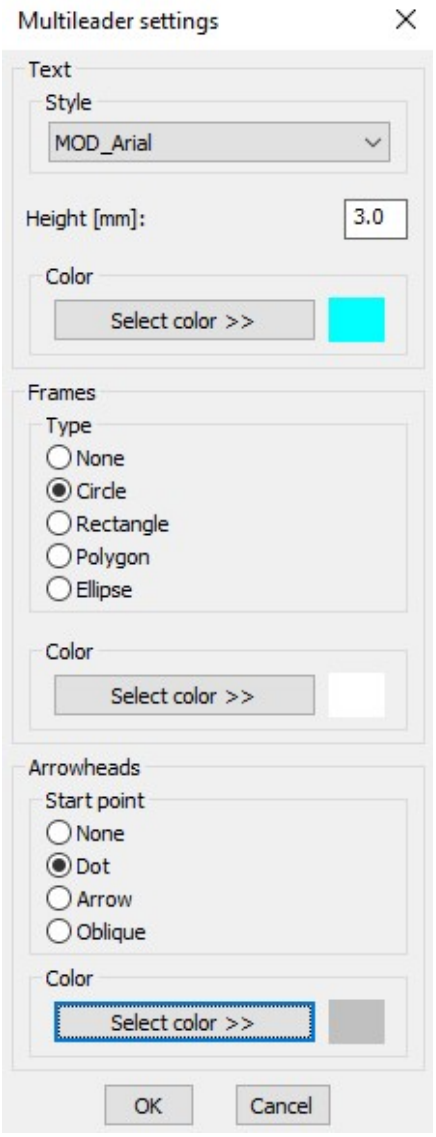

4.6 Insert thimble

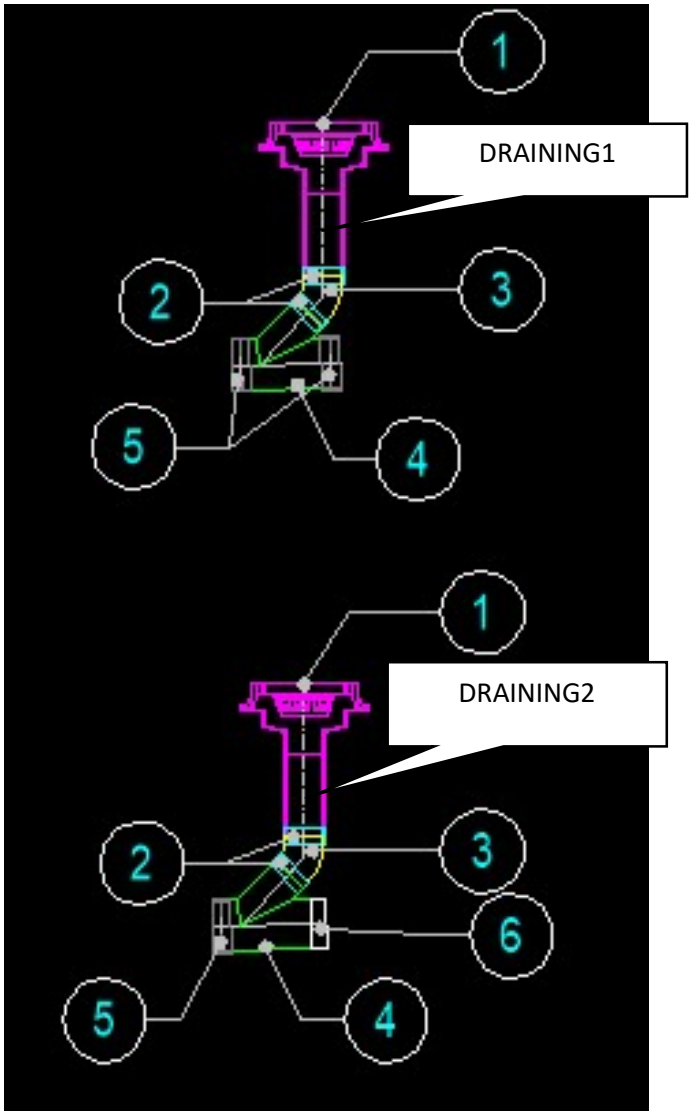



4.7 Insert final cap

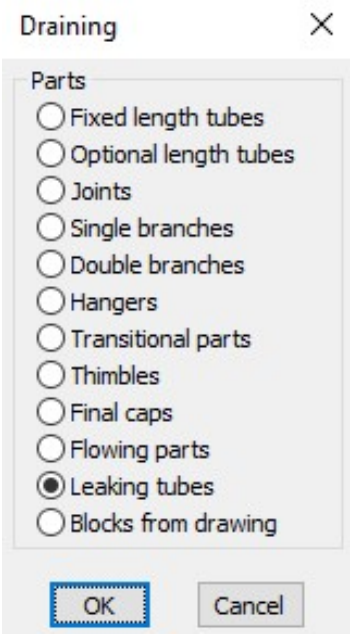


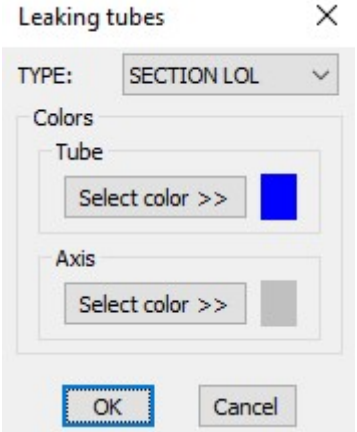
4.7.1 With command Text -> Multileader settings in module BASICS define multileader form and positioning single elements. Define blocks DRAINING1 and DRAINING2.

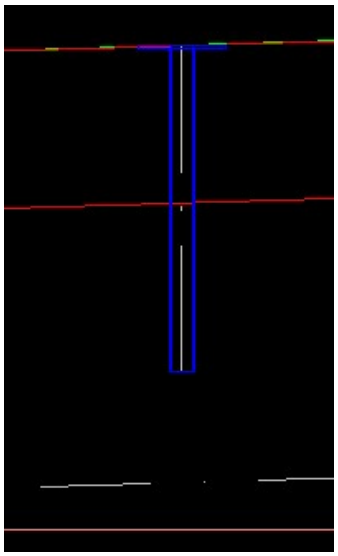


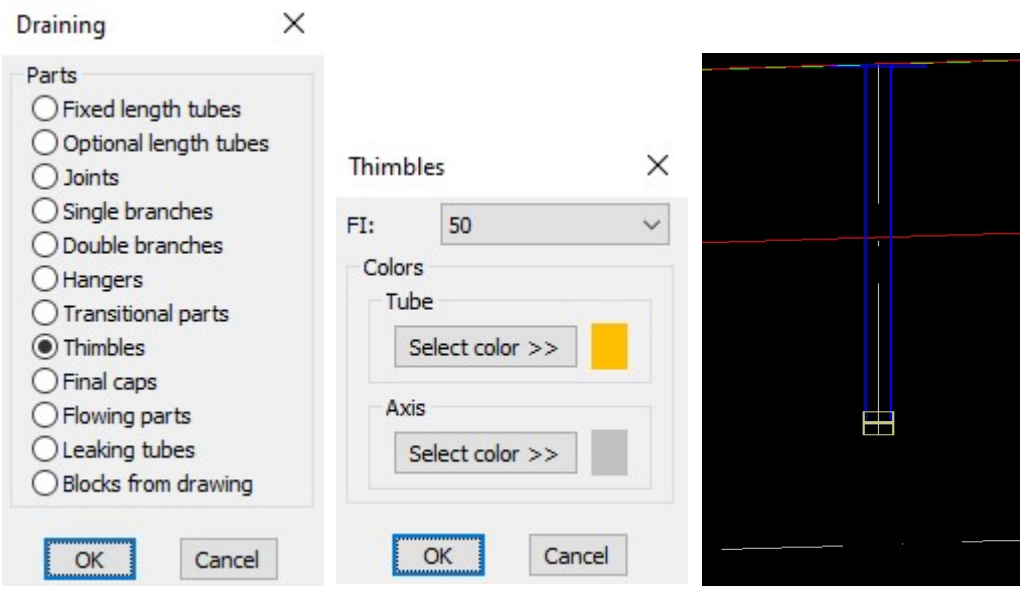

4.8 Insert leaking tube



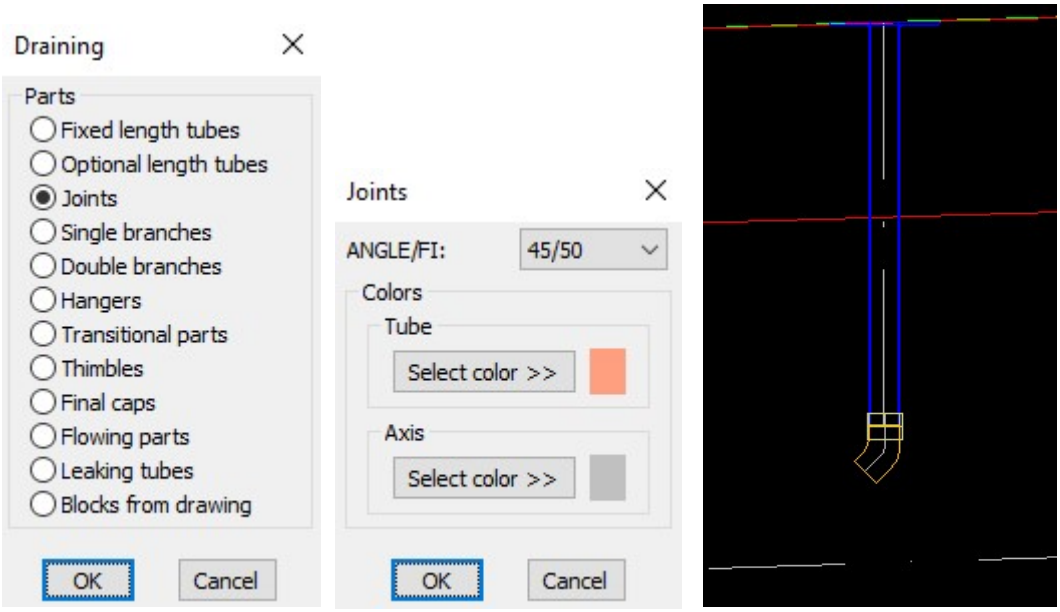



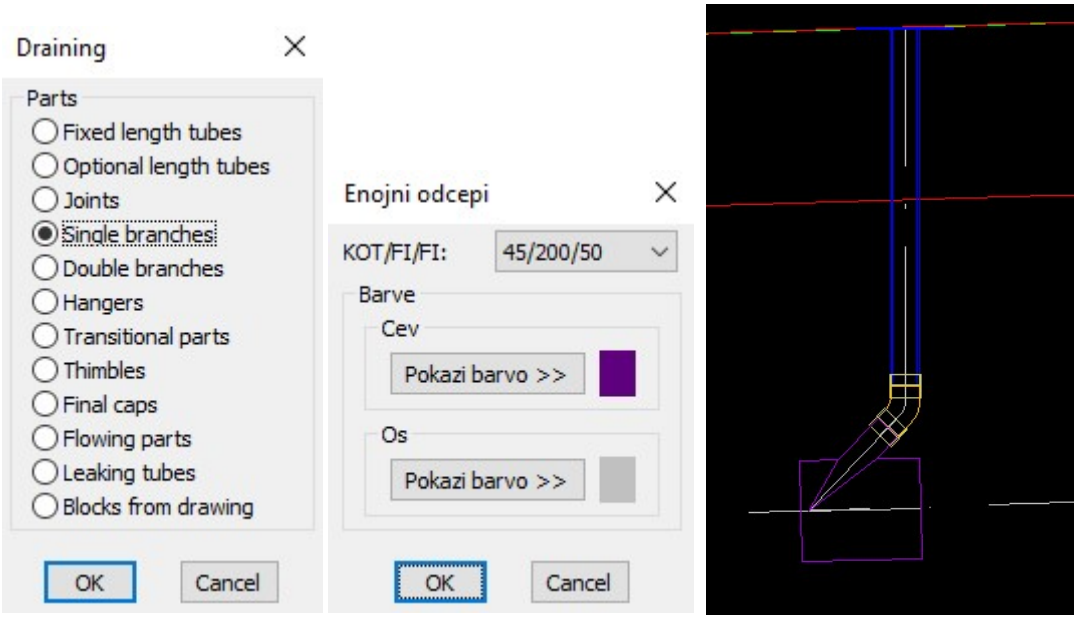
4.9 Insert thimble



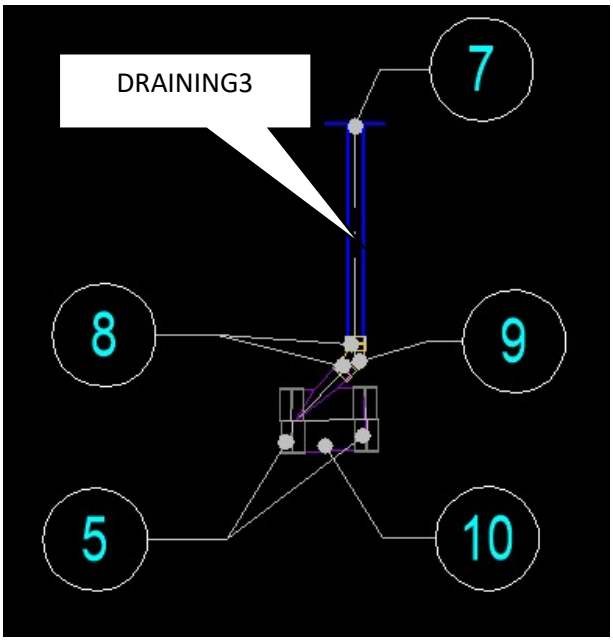

4.10 Insert joint




4.11 Insert single branch

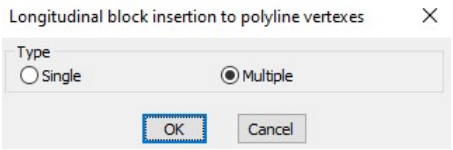


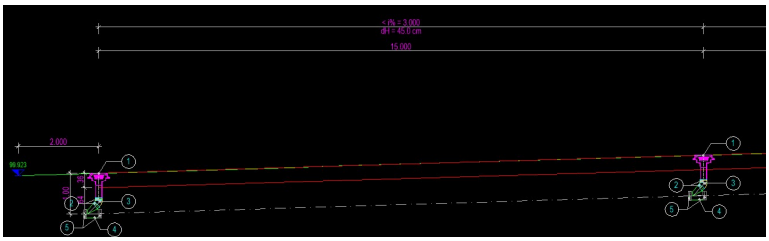
4.11.1 Positioning single elements. Define block DRAINING3.

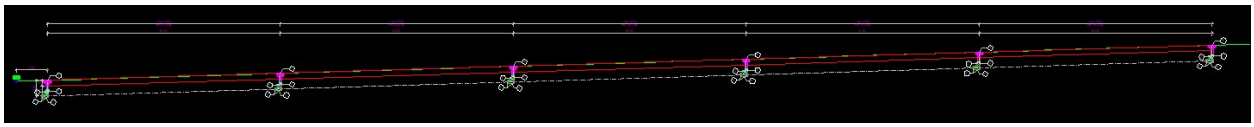



5. Draw longitudinal blocks in polyline vertexes

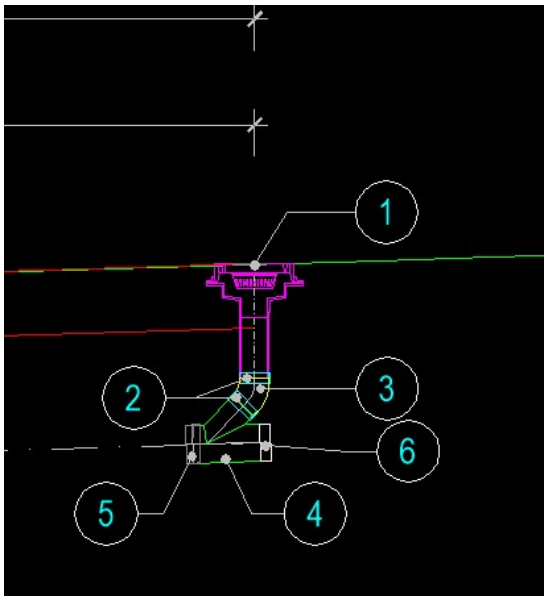
5.1 Insert block DRAINING1



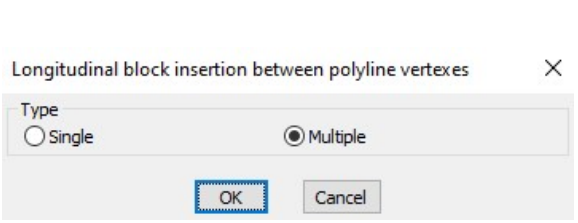


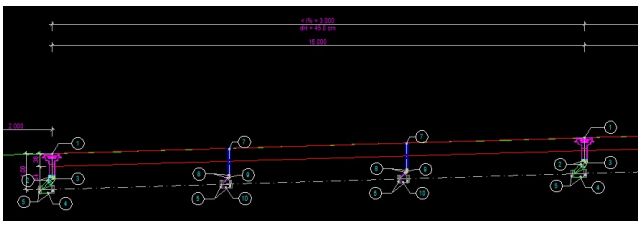
Change block in last vertex with block DRAINING2



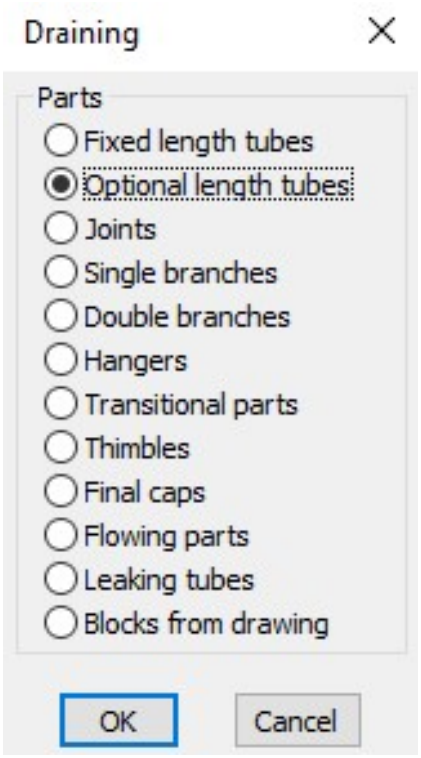
6. Draw longitudinal blocks between polyline vertexes

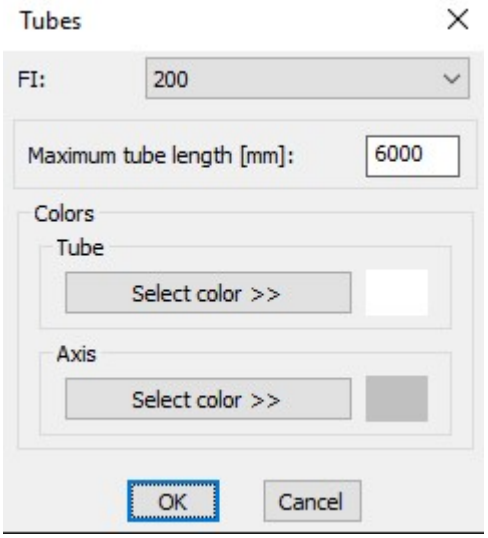
6.1 Insert block DRAINING3 – number between vertexes is 2.

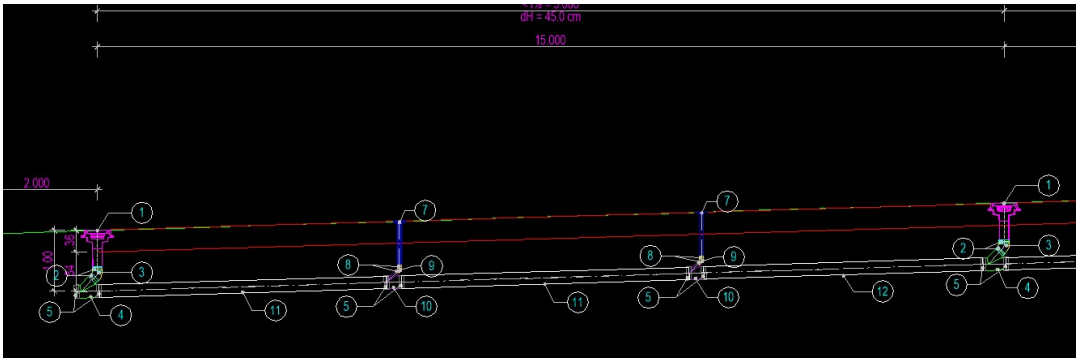


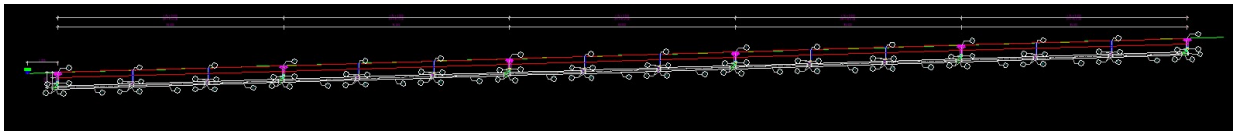



6.2 Insert length tubes in longitudinal profile



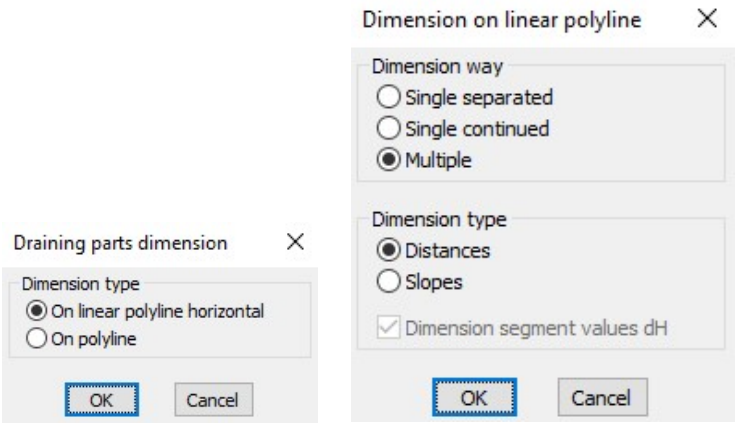



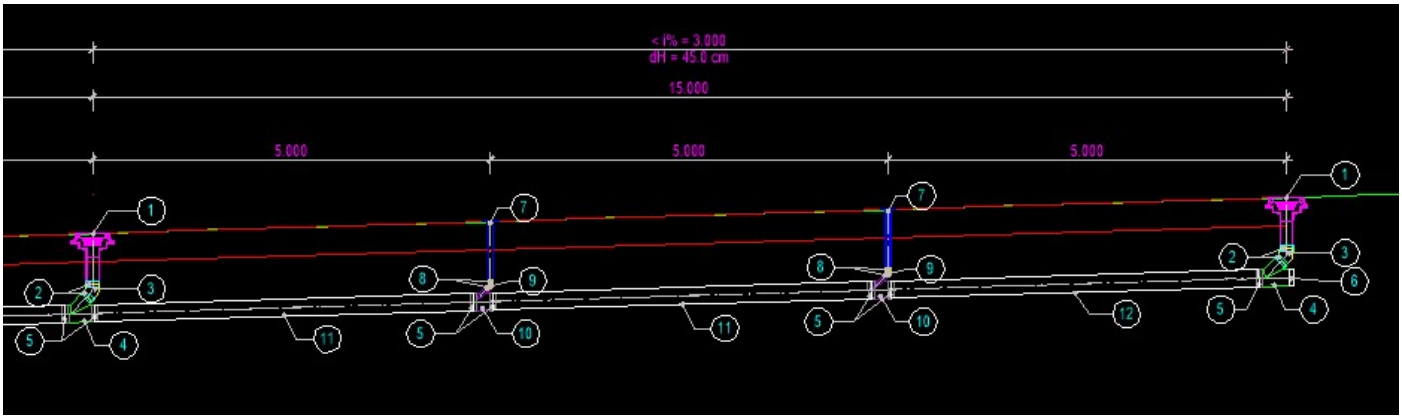





7. Leaking tubes dimension in longitudinal profile

   Type 2 for number of elements between vertexes



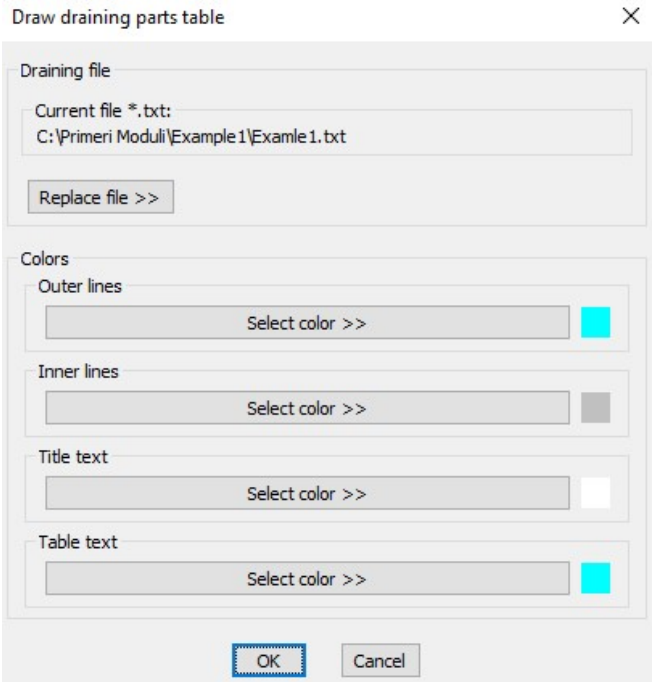




8. Parts specification create file **Example1.txt**

   First explode all blocks with including nested blocks, in and between polyline vertexes, and select single elements.

```
Writte dates to file <Yes>/No:
Select part/End:
Select entities:
Opposite Corner:
Entities in set: 7
Select entities:
Position number <1>:
Tip=IZ
Vrsta = 1     IZLIVNIK 400_300                          7
Number of selected blocks IZLVP400_300 = 7
Select part/End:
Select entities:
Entities in set: 1
Select entities:
Entities in set: 2
Select entities:
Opposite Corner:
Entities in set: 12
Select entities:
Position number <2>:
Tip=SP
Vrsta = 2     SPOJKA 150                               12
Number of selected blocks SP150 = 12
Select part/End:
Select entities:
Opposite Corner:
Entities in set: 6
Select entities:
Position number <3>:
```

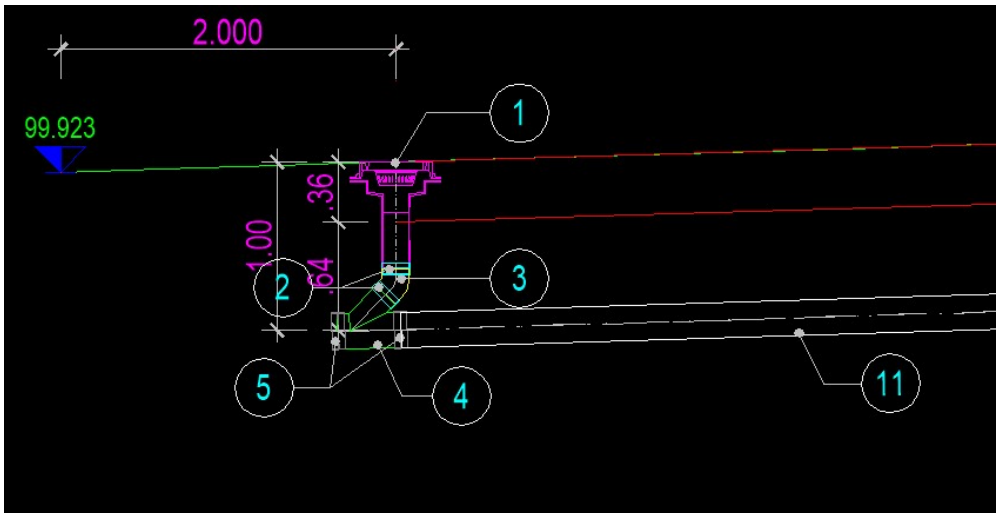
9. Draw parts table



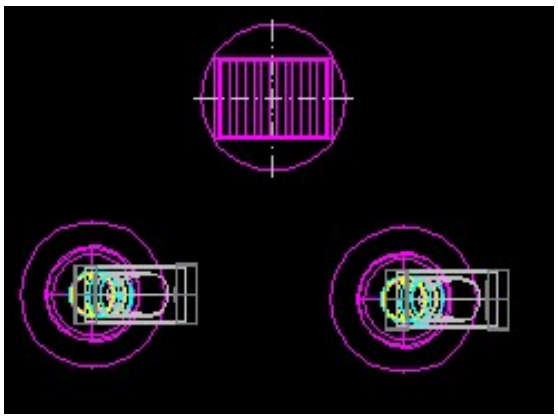

| Draining parts specifikation | | |
|---|---|---|
| Mark | Element | Pcs |
| 1 | IZLIVNIK 400_300 | 7 |
| 2 | SPOJKA 150 | 12 |
| 3 | KOLENO 45_150 | 6 |
| 4 | ENOJNI_ODCEP 45_200_150 | 6 |
| 5 | SPOJKA 200 | 31 |
| 6 | ZAKLJUCNI_POKROV 200 | 1 |
| 7 | CEVKA_PRON._VODE 200_200 | 10 |
| 8 | SPOJKA 50 | 20 |
| 9 | KOLENO 45_50 | 10 |
| 10 | ENOJNI_ODCEP 45_200_50 | 10 |
| 11 | CEV 200_4760 | 10 |
| 12 | CEV 200_4620 | 5 |

10. Drawing ground floor and 3d vertical parts

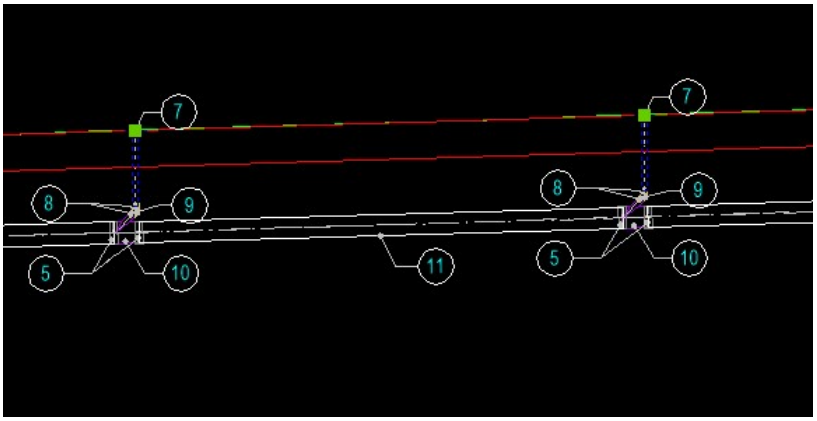
10.1 Pick start point of basic polyline, and then select polyline in longitudinal section – draining axis on top of asphalt and elevation value in first vertex (99.923):



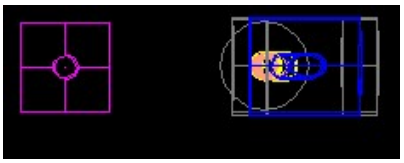

10.2 Select blocks in ground floor for 2d and 3d draining elements in vertexes of longitudinal polyline:



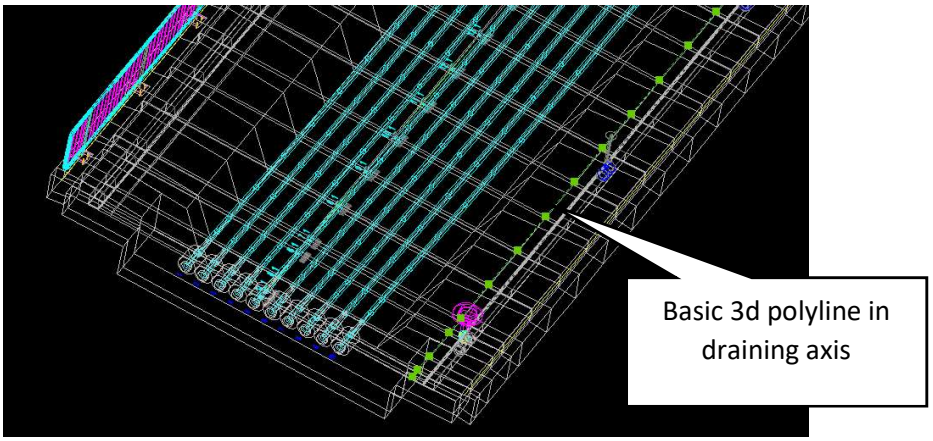
10.3 Select block for intermediate element in longitudinal section, and corresponding blocks in longitudinal section:



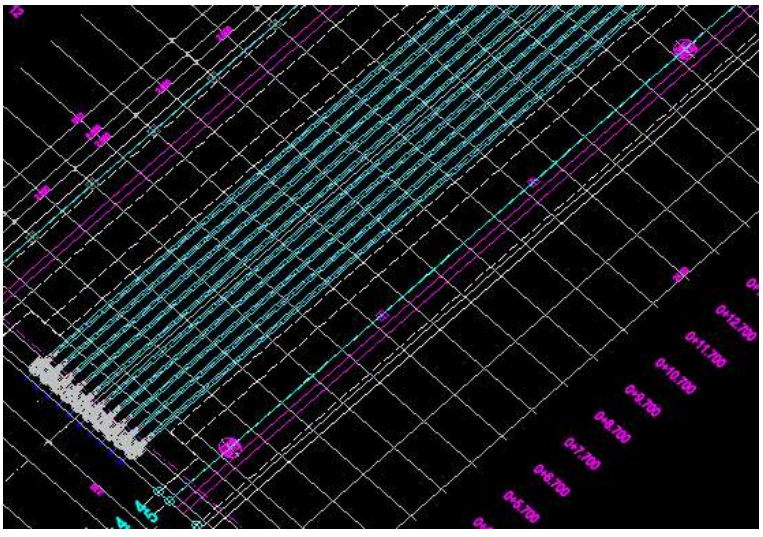

10.4 Select blocks for intermediate ground floor 2d element and intermediate 3d element:

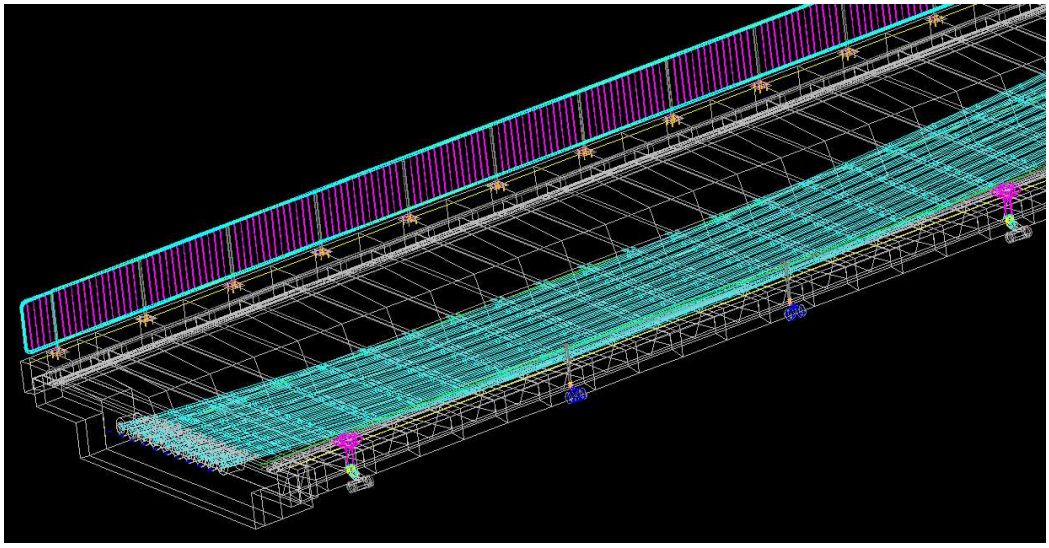


10.5 Select basic 3d polyline in draining axis:

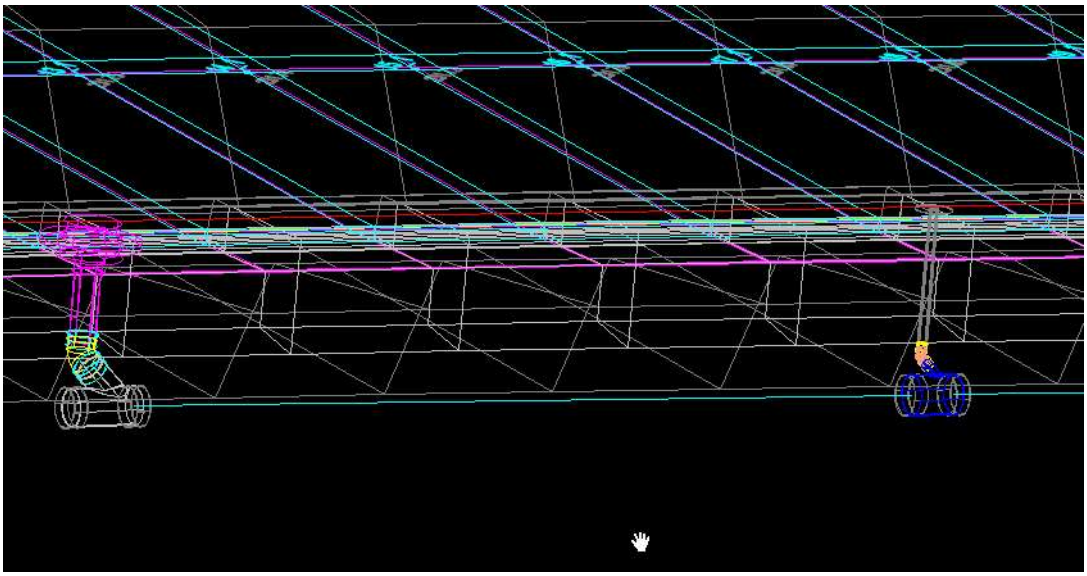



10.6 Drawing vertexes 2d elements in ground floor, 3d vertex elements, 2d intermediate elements in ground floor and 3d intermediate elements.

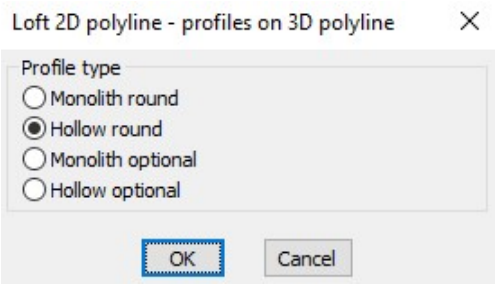


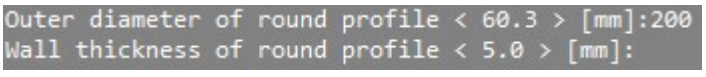


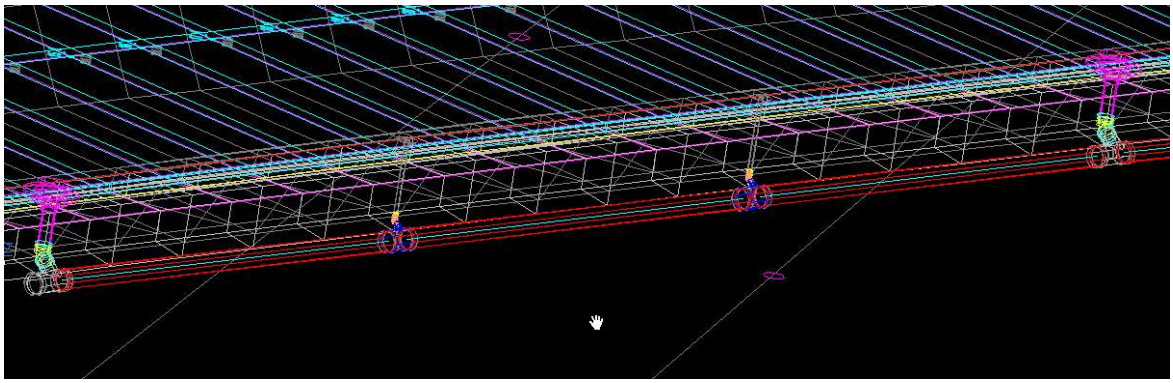
10.7 With 3d polylines connect start and endpoints elements centers in draining axis.



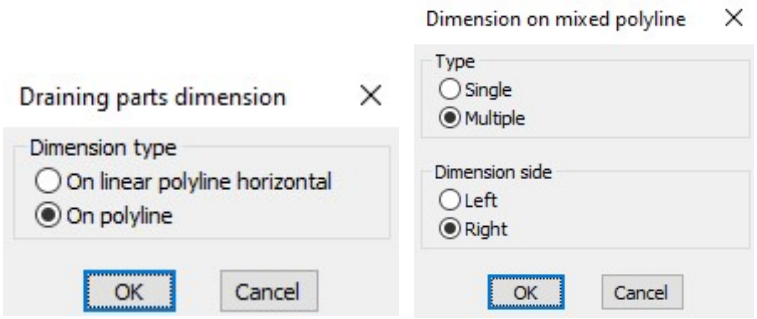
10.8 With command Utility -> Loft 2D polyline - profiles on 3D polyline draw 3d tubes.

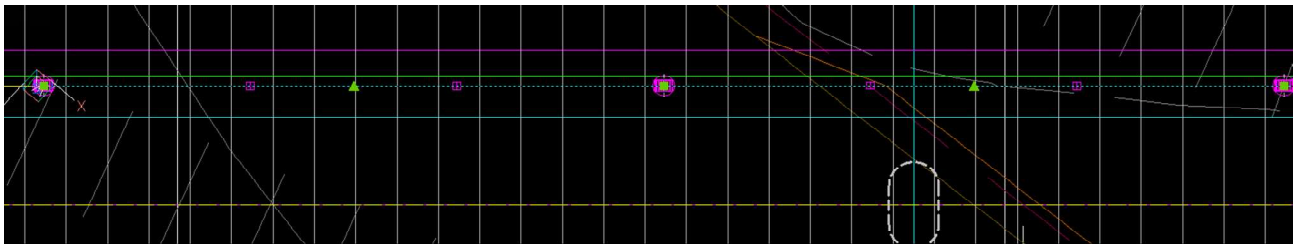


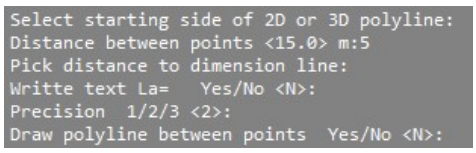



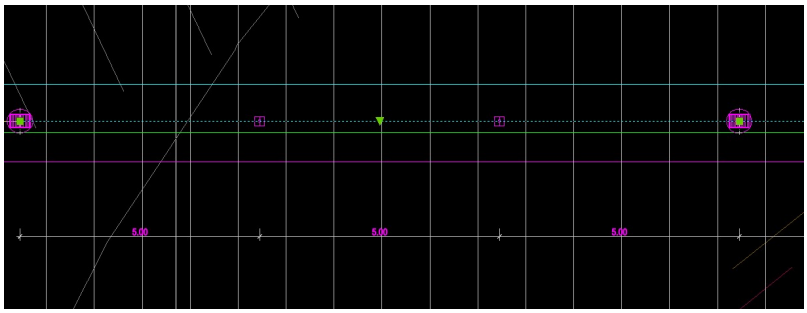
11. Parts dimension in ground floor



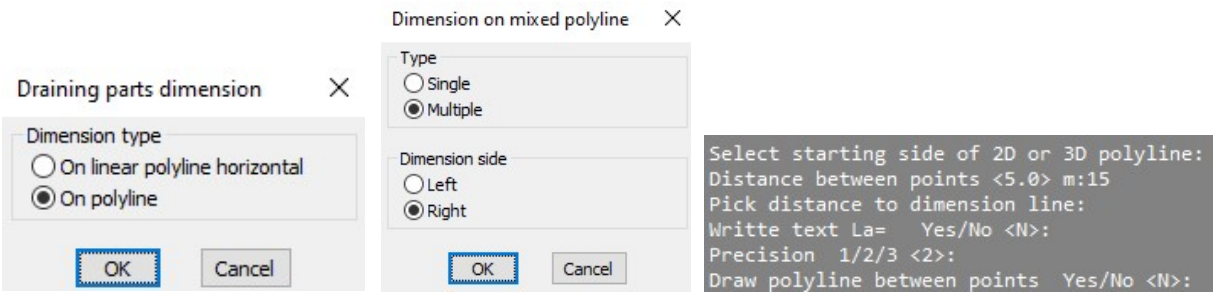



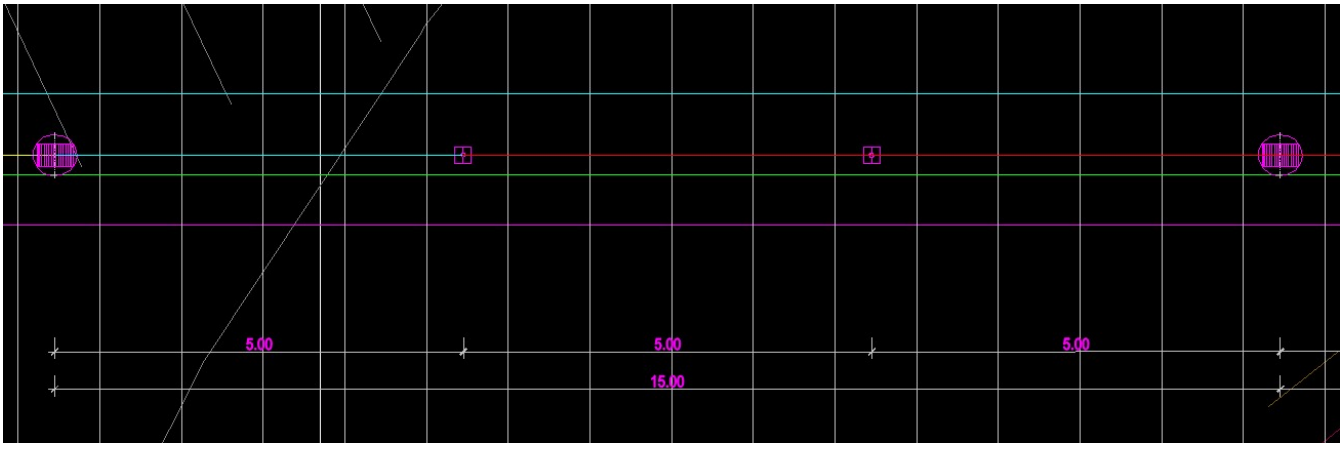
11.1 Dimension distances of leaking tubes




11.2 Dimension distances between flowing parts

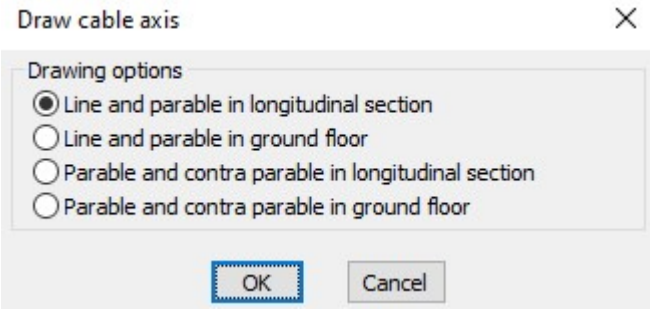


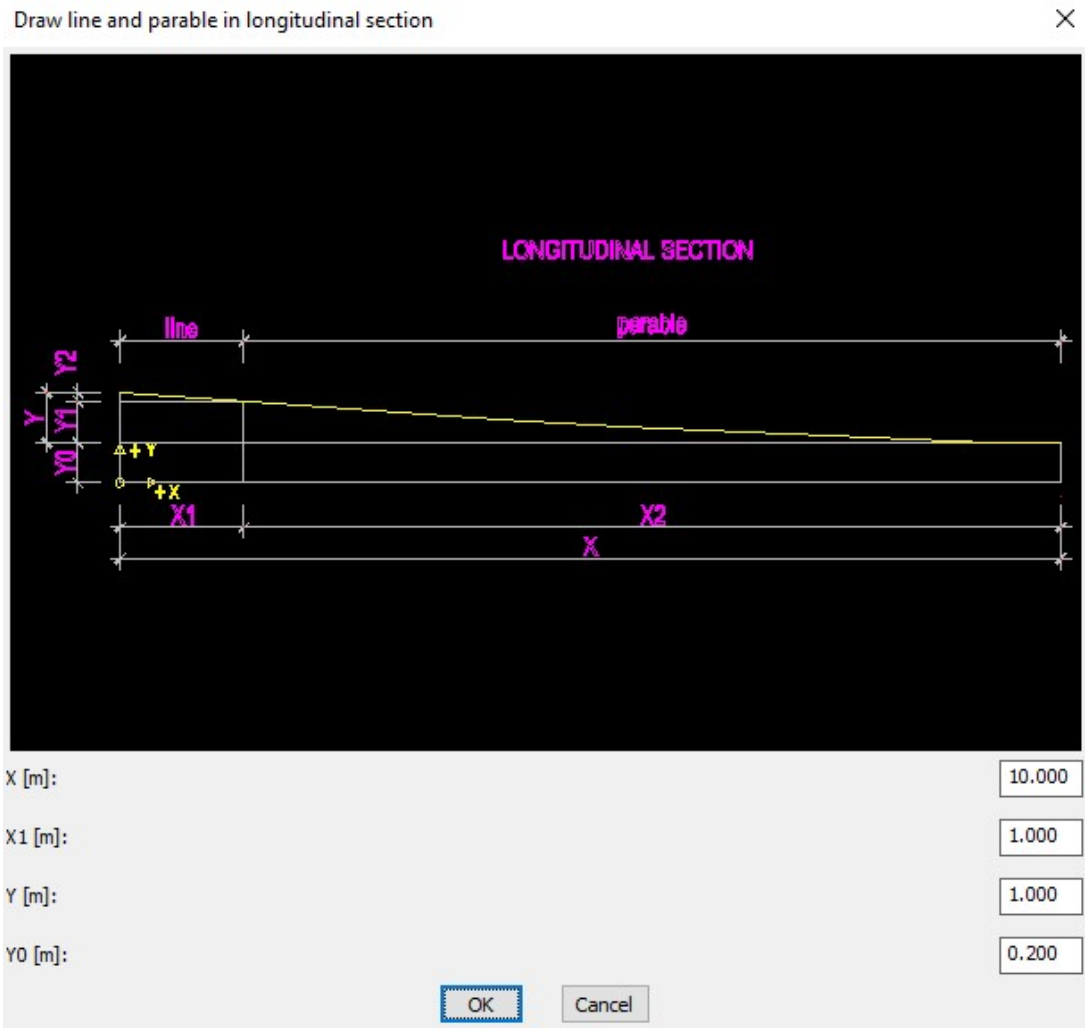
## 12. Appendix - draw presstressed cable axis in ground floor and longitudinal section

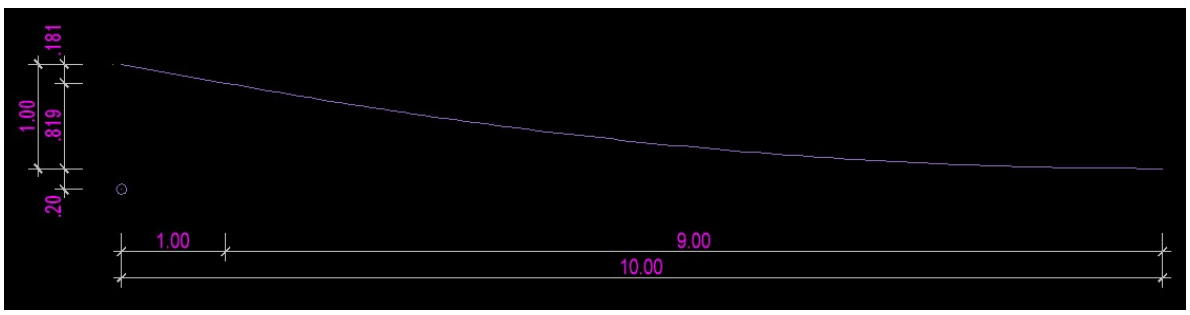
Use command BRIDGE -> Cable presstressing -> Draw cable axis in ground floor and longitudinal section

In dialog box we select drawing type:

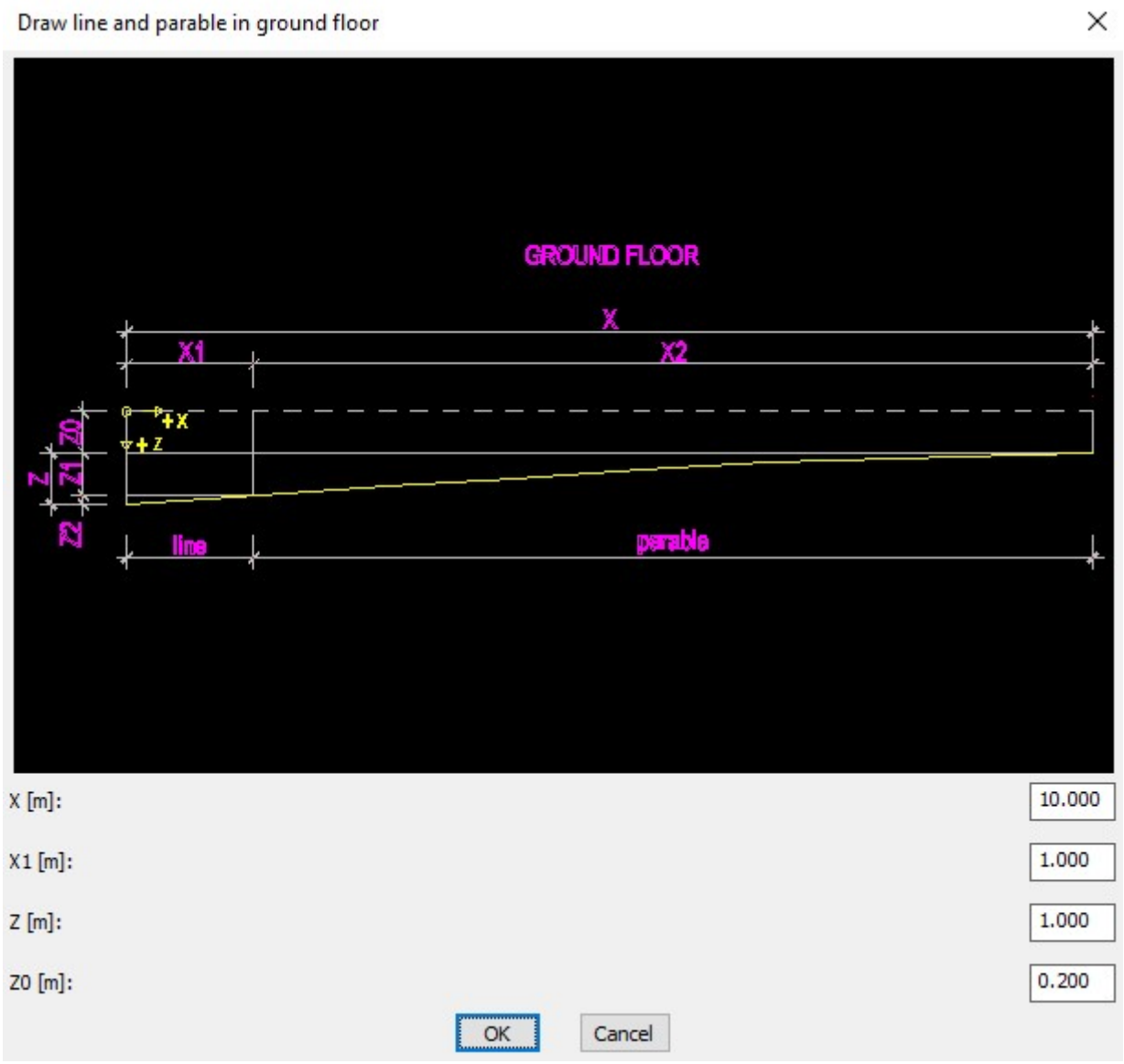


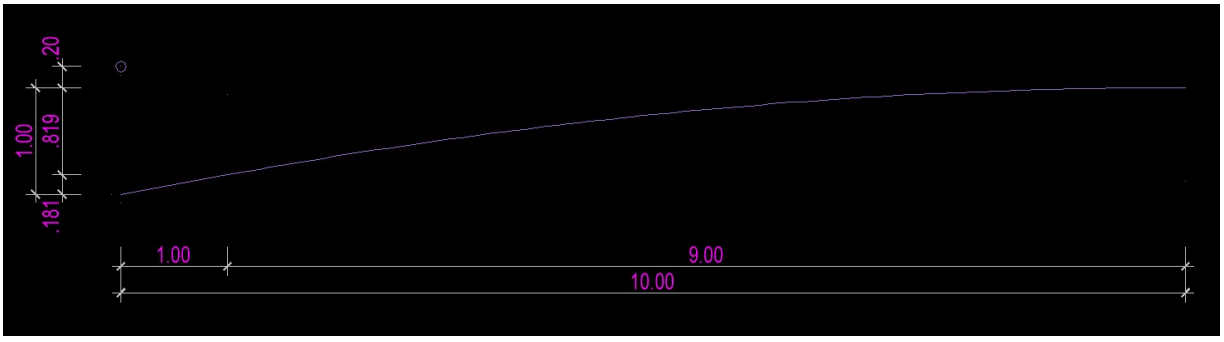

### 12.1 Draw line and parable in longitudinal section



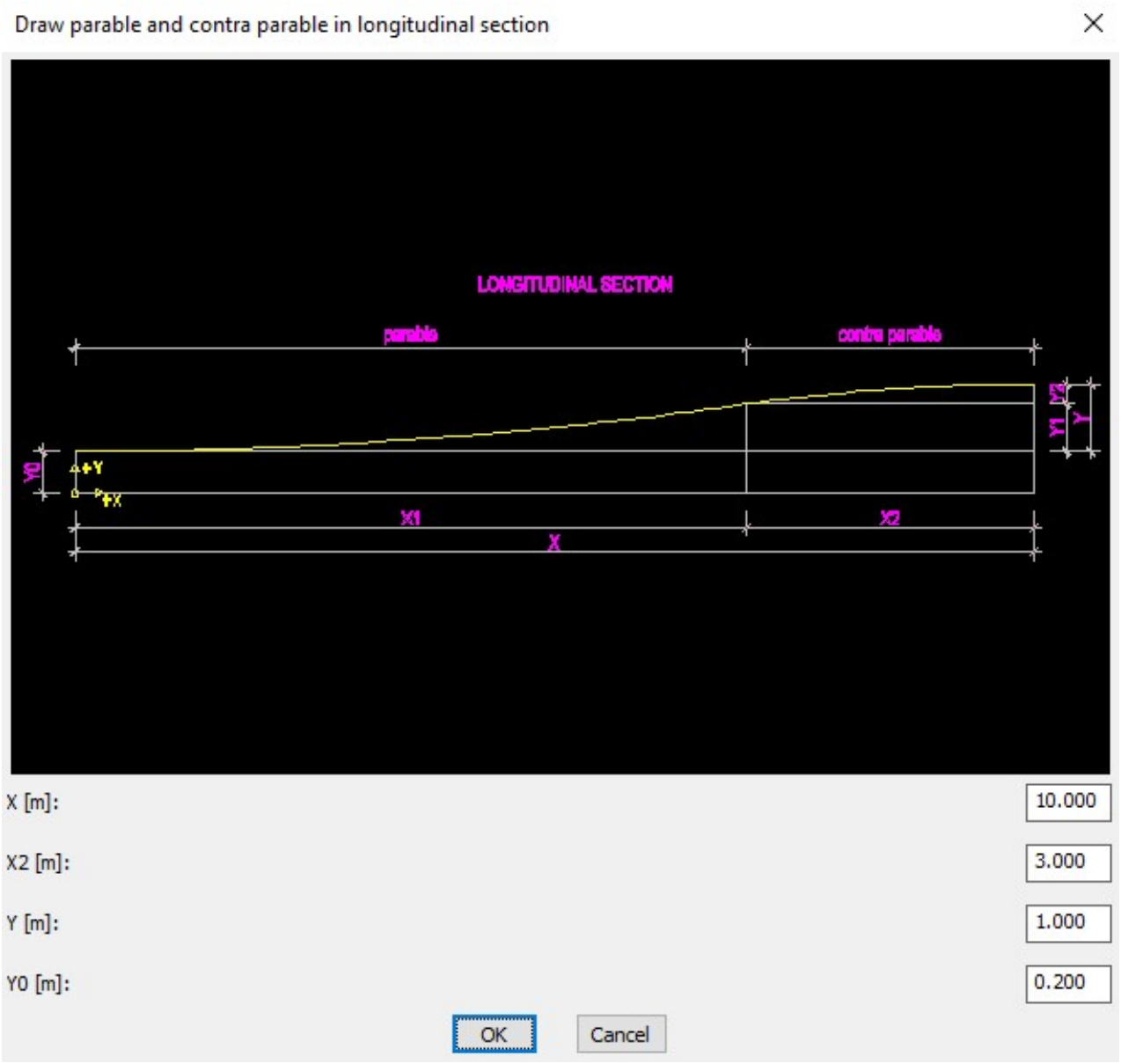



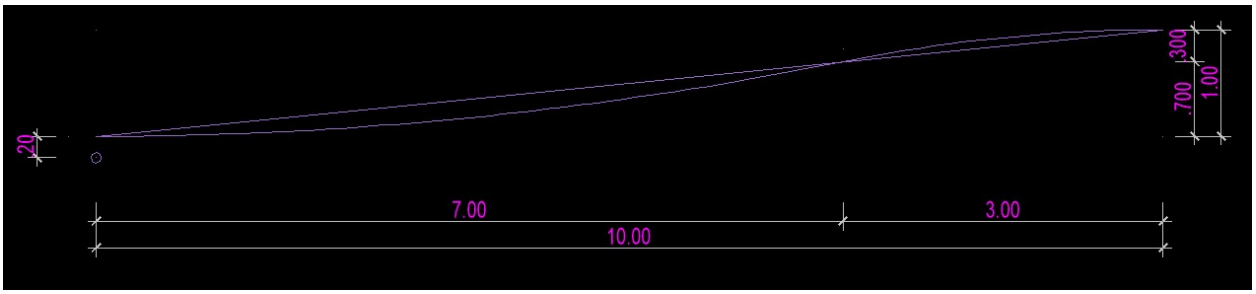
12.2 Draw line and parable in ground floor



12.3 Draw parable and contra parable in longitudinal section



12.4 Draw parable and contra parable in ground floor