

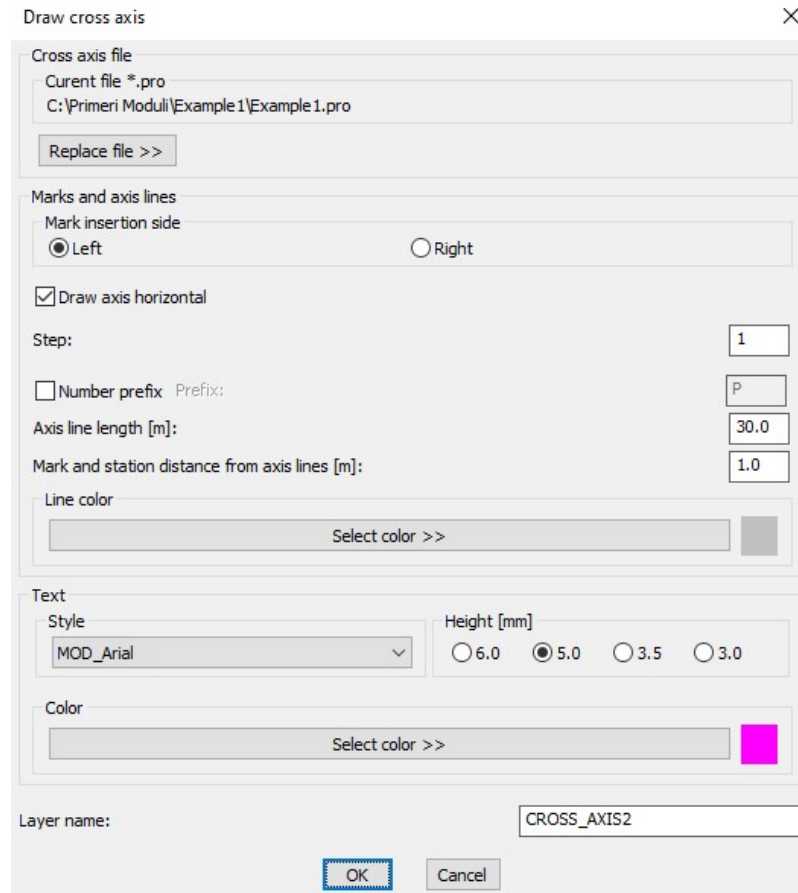
## **Modul BRIDGE**

### **CABLE PRESSTRESSING**

## CABLE PRESSTRESSING

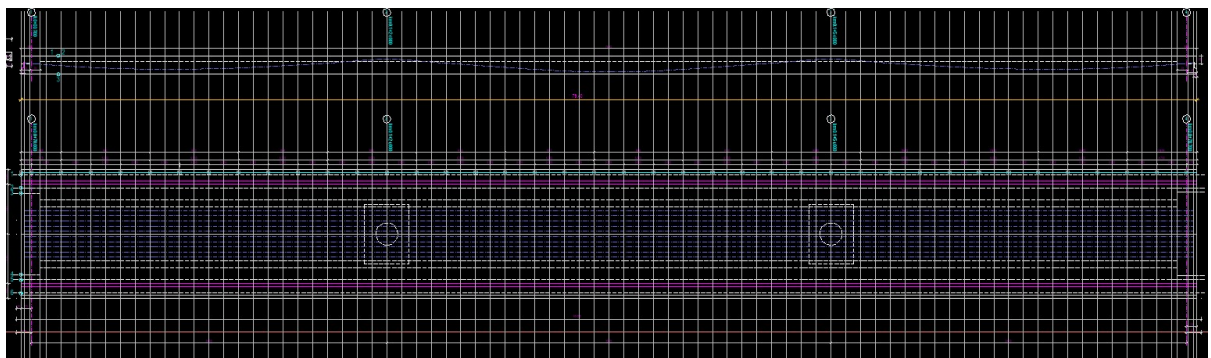
1. Define cable axis files in cross sections in draft/sketch ground floor and longitudinal section

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



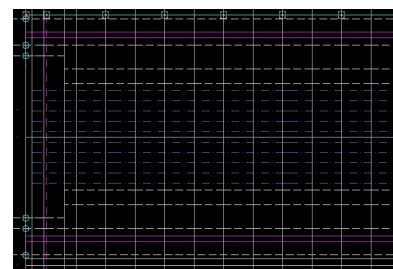
- 1.2 Draw cable axis in draft/sketch ground floor and longitudinal section. (see examples in appendix 12)

Longitudinal section and ground floor

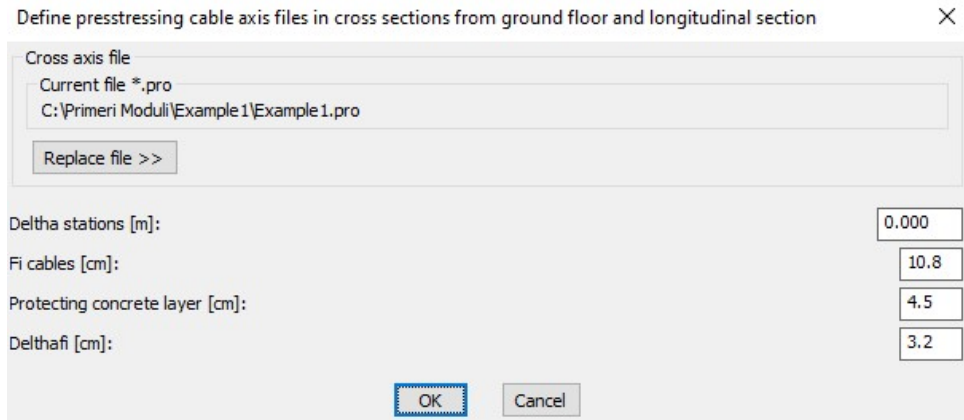


Longitudinal section

Ground floor

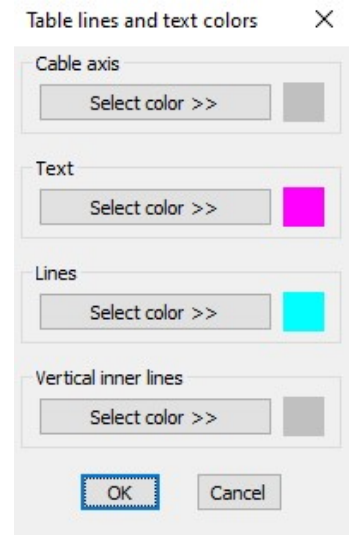
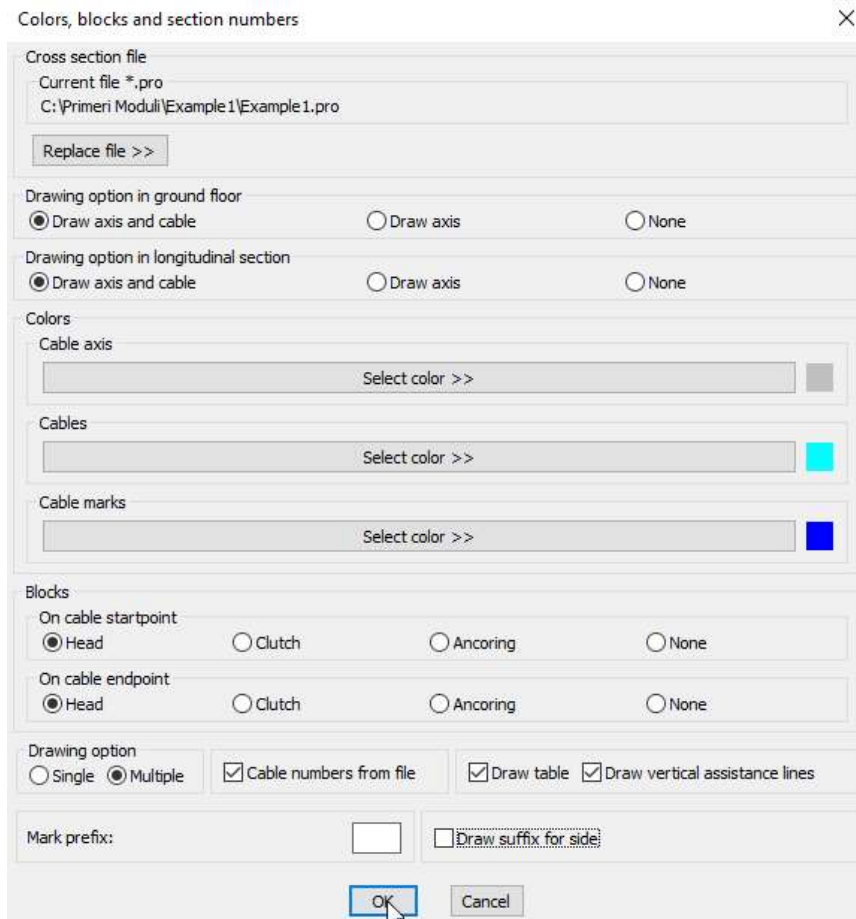


1.3 Define cable file Cable1.kal. **Multiple cable drawing files must have the same cahacters to cable numbers in names!** (Cable2.kal, Cable3.kal ...)



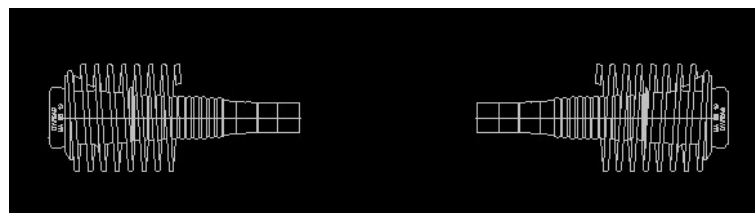
2. Draw cables in draft/sketch ground floor and longitudinal section

Multiple – longitudinal and ground floor cables



Block CABLE\_HEAD\_LEFT

Block CABLE\_HEAD\_RIGHT



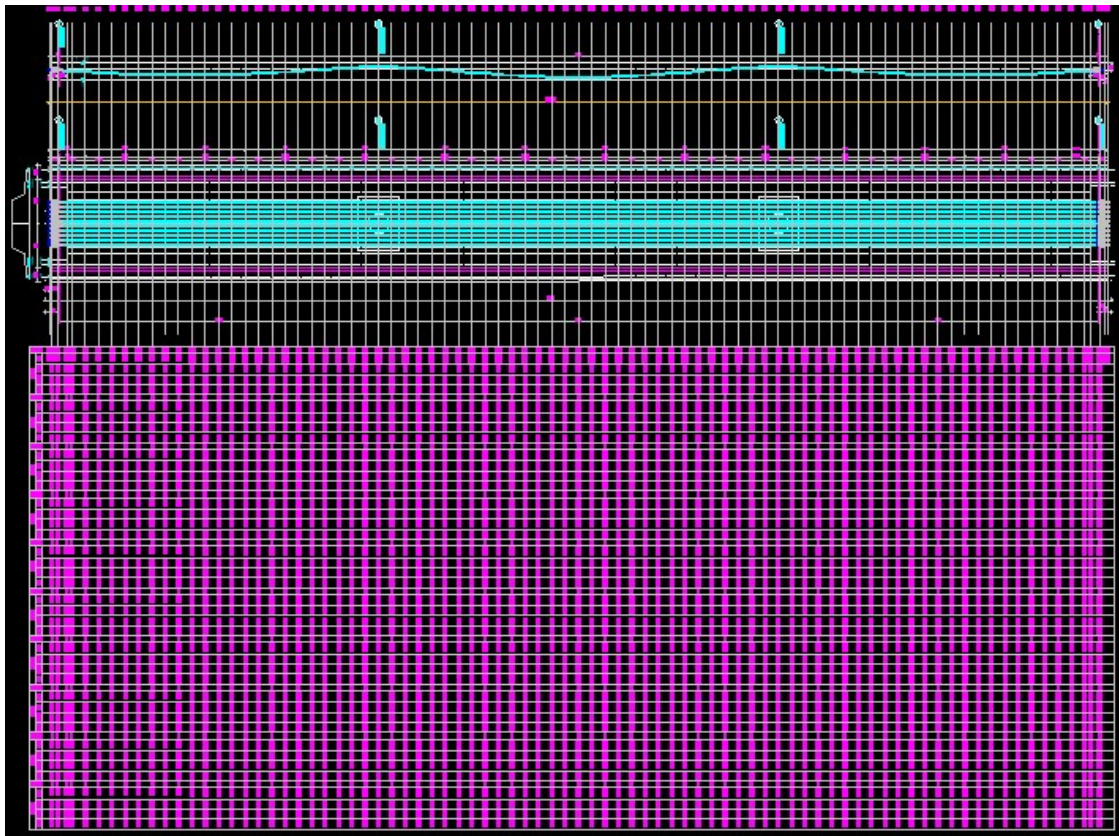
```

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 ...

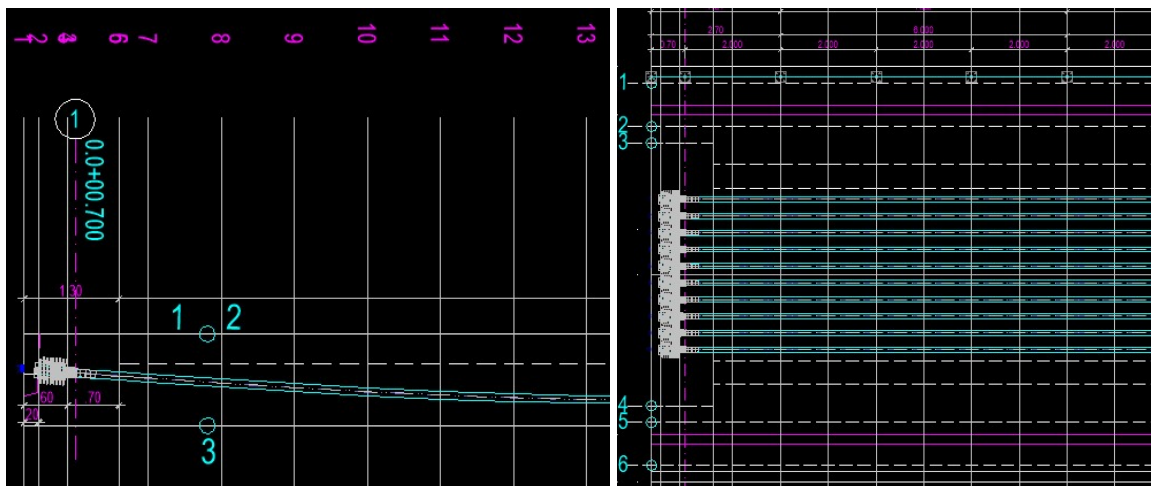
```

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**

Draw cable in real ground floor ✕

Files

3d roadway level file

Current file \*.o3d  
C:\Primeri Moduli\Example 1\Example 1.o3d

Replace file >>

Roadway file

Current file \*.voz  
C:\Primeri Moduli\Example 1\Example 1.voz

Replace file >>

Drawing option

Single  Multiple  2d  3d

Draw 3d Y- coordinates horizontal  Draw as sketch

Mark prefix:   Write suffix for side

Colors and blocks ✕

Drawing option in ground floor

Draw axis and cable  Draw axis  None

Colors

Cable axis

Select color >>

Cables

Select color >>

Cable marks

Select color >>

Blocks

On cable startpoint

Head  Clutch  Anchoring  None

On cable endpoint

Head  Clutch  Anchoring  None

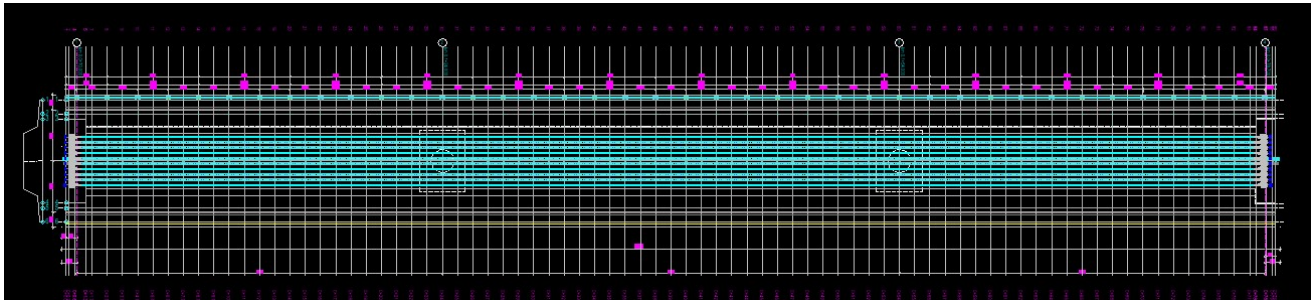
Mark prefix:   Draw suffix for side

```

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

Draw cable in real ground floor

Files

3d roadway level file  
 Current file \*.o3d  
 C:\Primeri moduli\Example1\Example1.o3d  
 Replace file >>

Roadway file  
 Current file \*.voz  
 C:\Primeri moduli\Example1\Example1.voz  
 Replace file >>

Drawing option  
 Single  Multiple  2d  3d

Draw 3d Y- coordinates horizontal  Draw as sketch

Mark prefix:   Write suffix for side

OK Cancel

Colors and blocks

Drawing option in ground floor  
 Draw axis and cable  Draw axis  None

Colors

Cable axis  
 Select color >>

Cables  
 Select color >>

Cable marks  
 Select color >>

Blocks

On cable startpoint  
 Head  Clutch  Ancoring  None

On cable endpoint  
 Head  Clutch  Ancoring  None

Mark prefix:   Draw suffix for side

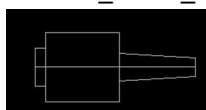
OK Cancel

```

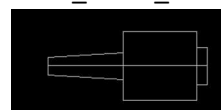
Selected file *.o3d: C:\Primeri moduli\Example1\Example1.o3d
Selected file *.voz:C:\Primeri moduli\Example1\Example1.voz
Checking dates in files ... finished.
Section checking ... finished.
Select basic BLOCK for LEFT head:
Select basic BLOCK for RIGHT head:
Starting text of cable files < cable >:
Number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

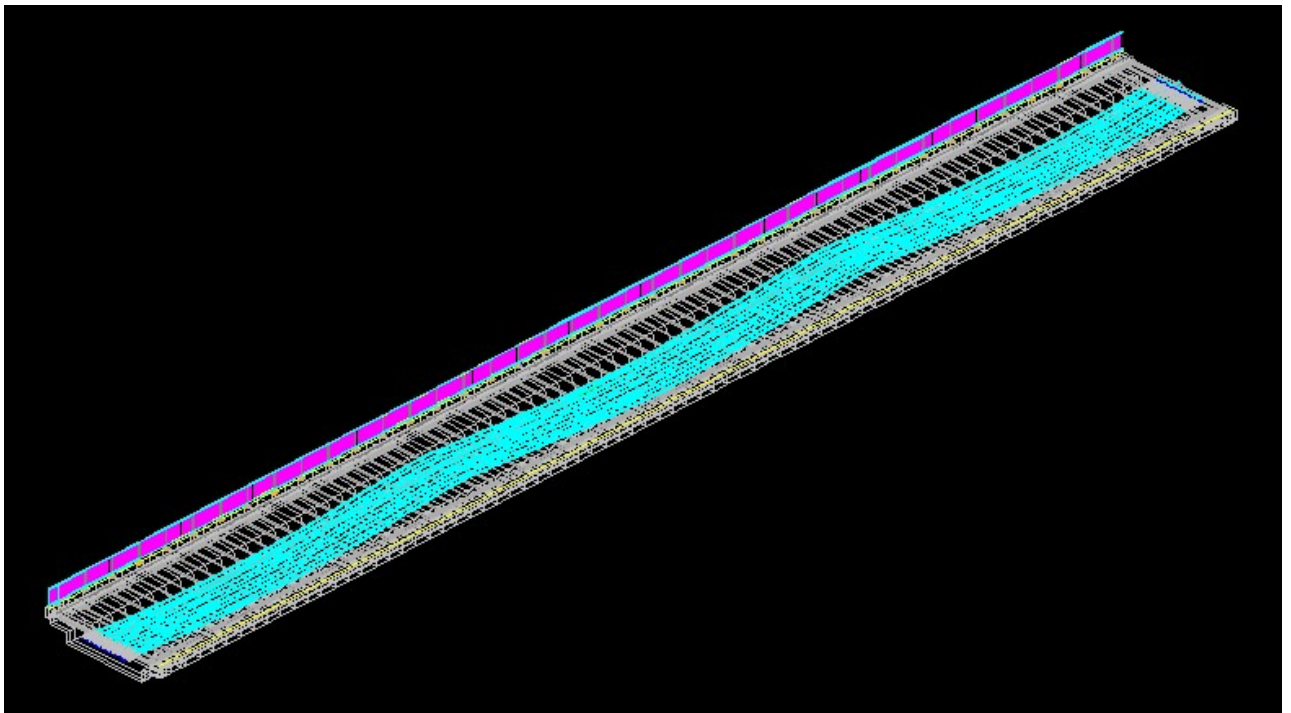
```

Block CABLE\_HEAD\_LEFT\_3D

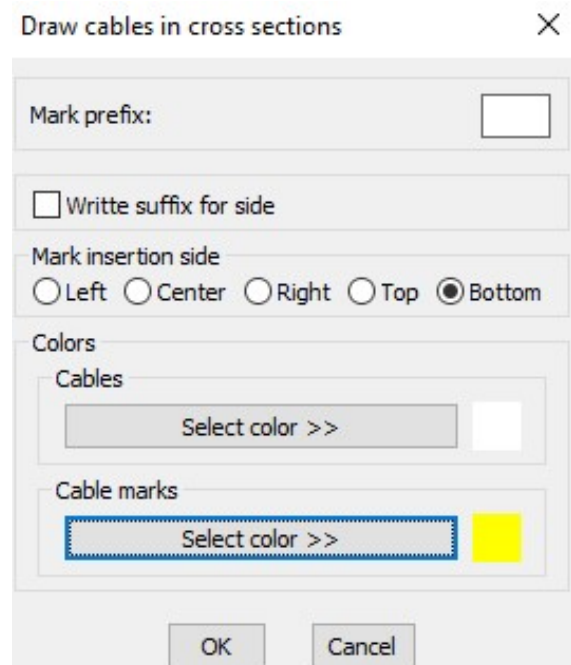
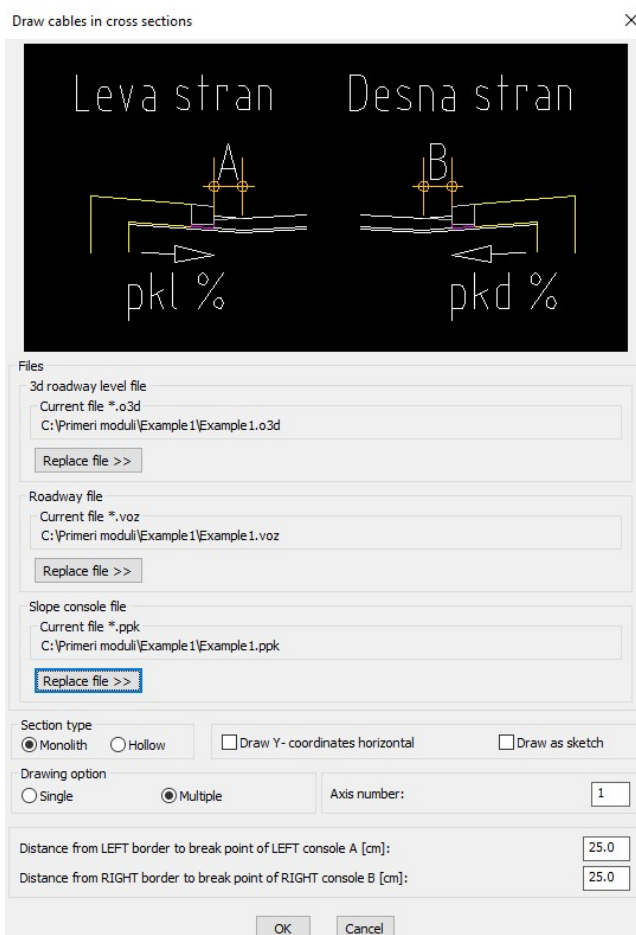


Block CABLE\_HEAD\_RIGHT\_3D



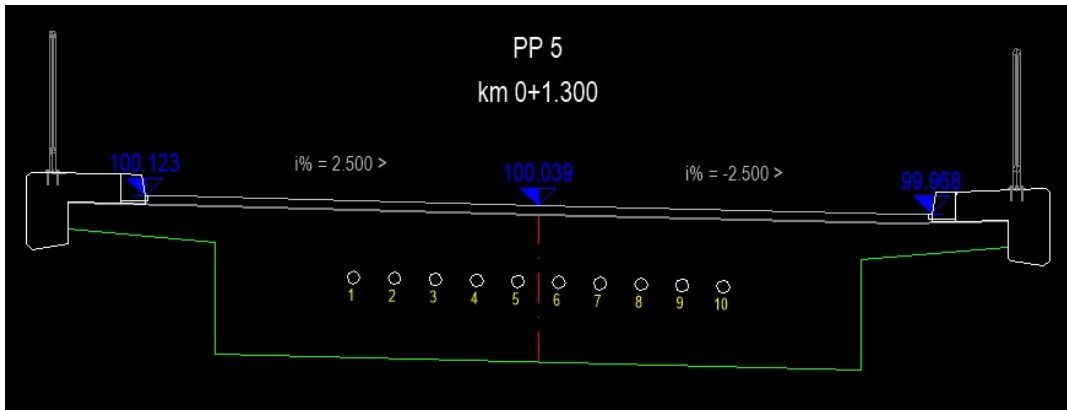


#### 4. Draw cables in cross sections



```

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 YOZ basis points in cross sections

Draw cable table in cross sections ✕

Section type  
 Monolith  Hollow

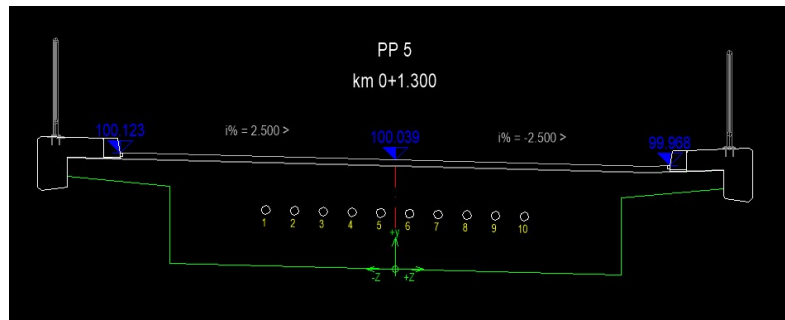
Drawing type  
 Sketch  Normal

YOZ Origin of coordinate system  
 Top axis point  Bottom axis point

Axis number:

Section views  
 Width [m]:   
 Height [m]:

Colors  
 Text:  ■  
 Lines:  ■



6. Draw table of cable coordinates in cross sections

6.1 Left side

Draw table of cable coordinates in cross sections ✕

Section type  
 Monolith  Hollow

Drawing type  
 Sketch  Normal

Coordinate system YOZ origin  
 Top axis point  Bottom axis point

Cable position for draw  
 Left  Axis  Right

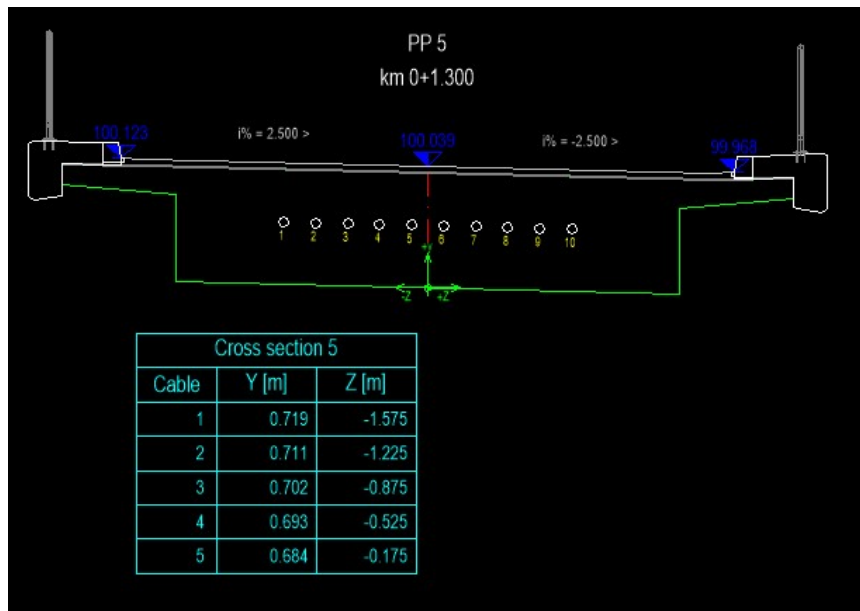
Axis number:

Mark prefix:  
 Write suffix for side

Views  
 Width [m]:   
 Height [m]:

Colors  
 Title text:  ■  
 Text:  ■  
 Outer lines:  ■  
 Inner lines:  ■





6.2 Right side

Draw table of cable coordinates in cross sections ✕

Section type  
 Monolith  Hollow

Drawing type  
 Sketch  Normal

Coordinate system YOZ origin  
 Top axis point  Bottom axis point

Cable position for draw  
 Left  Axis  Right

Axis number:

Mark prefix:

Write suffix for side

Views  
 Width [m]:   
 Height [m]:

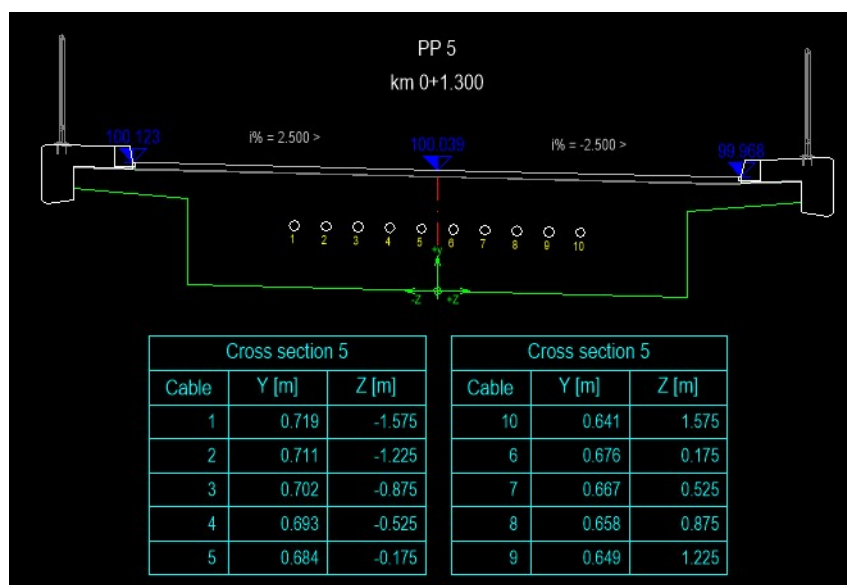
Colors

Title text

Text

Outer lines

Inner lines



## 7. Draw table of cable specifications

### 7.1 Left side

Draw table of cable specifications ×

Drawing area  
 2d  3d

Cable position  
 Left  Axis  Right

Textual dates  
 Title text:   
 Mark prefix:   
 Write suffix for side

Cable type:   
 Cable weight [kg]:

Colors  
 Title text    
 Text in lines    
 Outer table lines    
 Inner table lines

Cable specifikacion				
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

Draw table of cable specifications ×

Drawing area  
 2d  3d

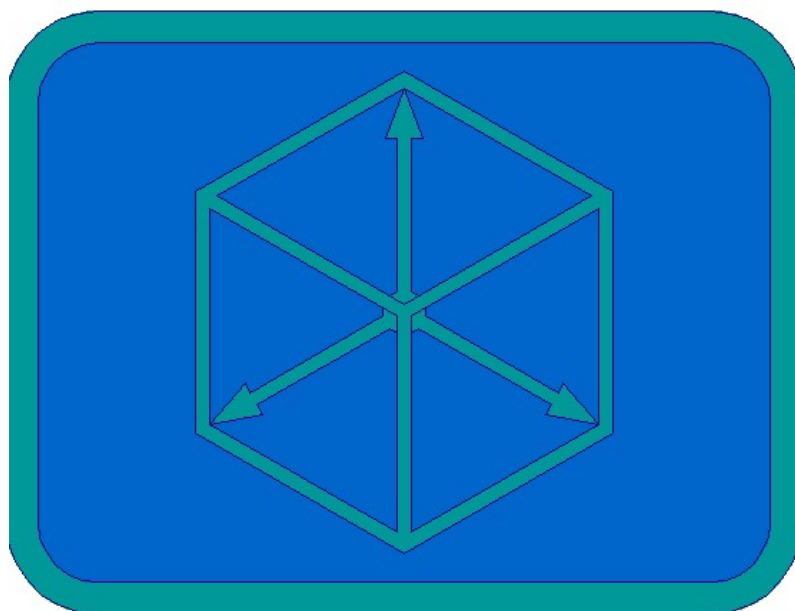
Cable position  
 Left  Axis  Right

Textual dates  
 Title text:   
 Mark prefix:   
 Write suffix for side

Cable type:   
 Cable weight [kg]:

Colors  
 Title text    
 Text in lines    
 Outer table lines    
 Inner table lines

Cable specifikacion				
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

Define 3d draining axis ×

Files

3d axis file  
 Current file \*.o3d  
 C:\Primeri moduli\Example1\Example1.o3d  
 Replace file >>

Pavement file  
 Current file \*.voz  
 C:\Primeri moduli\Example1\Example1.voz  
 Replace file >>

Section slope file  
 Current file \*.ppk  
 C:\Primeri moduli\Example1\Example1.ppk  
 Replace file >>

Distance from LEFT vertex to vertex of LEFT breaking console A [cm]:

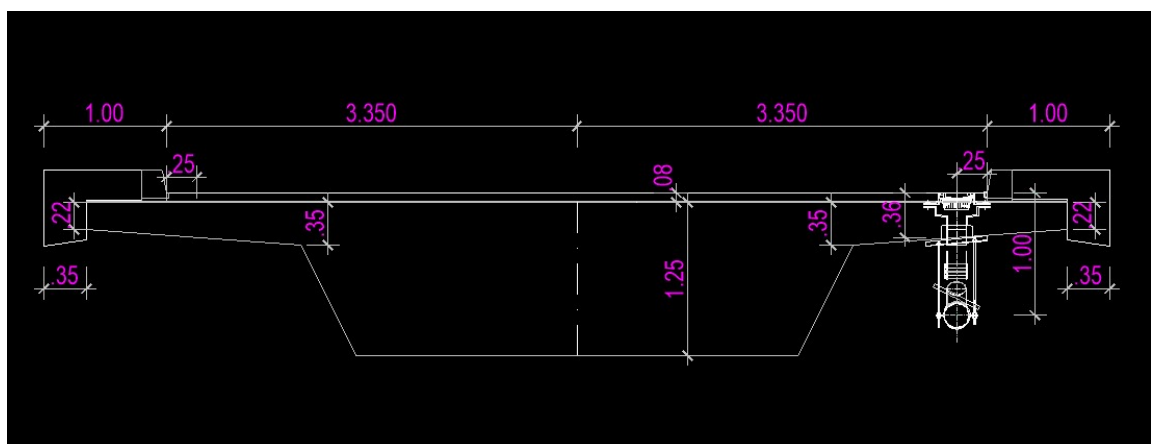
Distance from RIGHT vertex to vertex of RIGHT breaking console B [cm]:

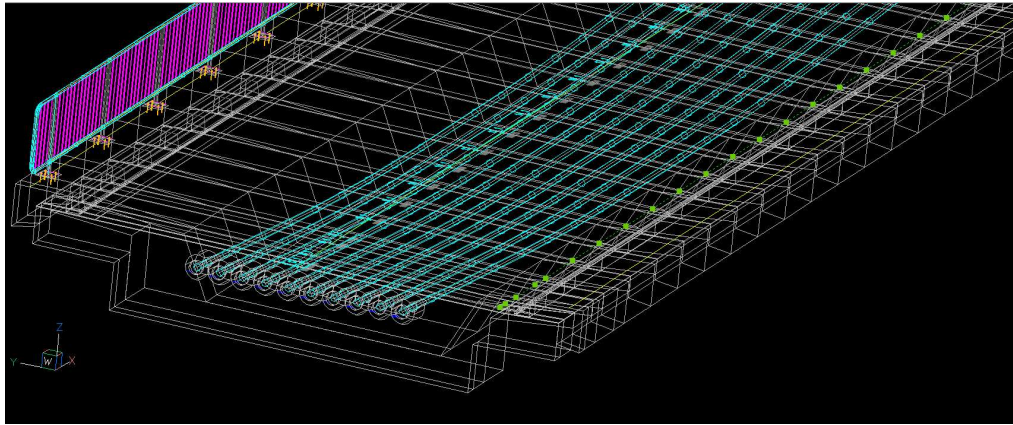
Drawing side  
 Left  Right

Polyline layer and color

Layer name:  Color:  ■

OK Cancel





## 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

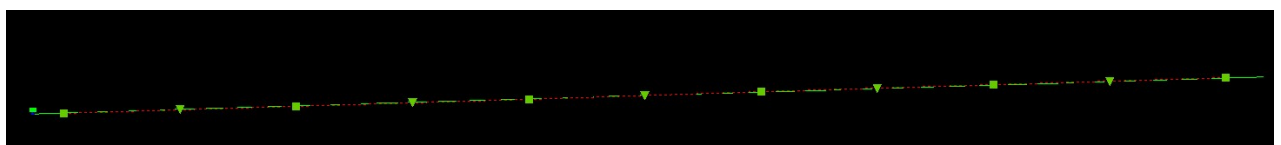
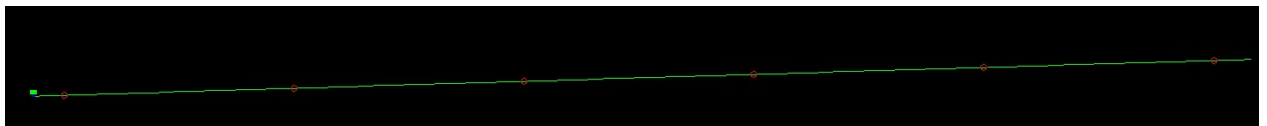
Distance from last vertex in X-direction = 62.400 m.
Distance to 3. flowing part in X-direction < 15.0 > m/End:

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 vertices - flowing parts layout

**Draining parts dimension** X

Dimension type

On linear polyline horizontal

On polyline

Dimension on linear polyline X

Dimension way

Single separated

Single continued

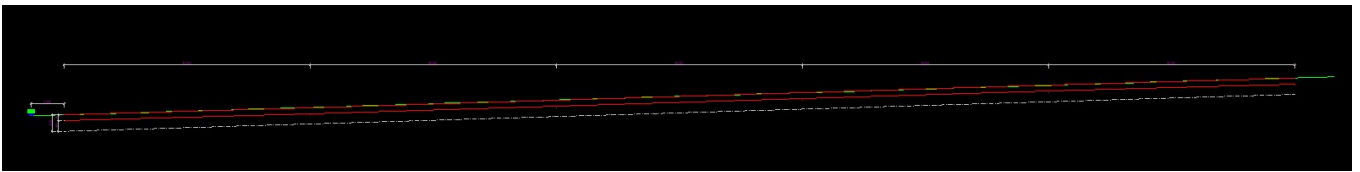
Multiple

Dimension type

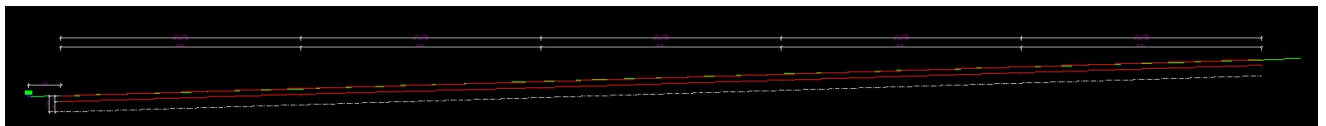
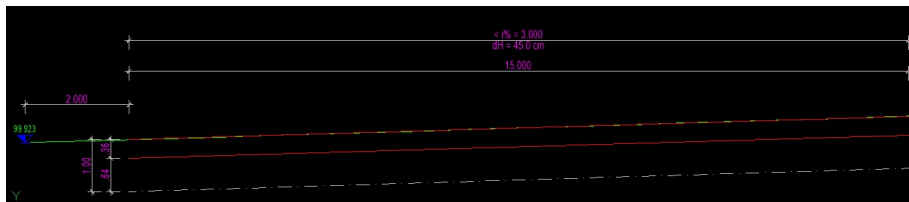
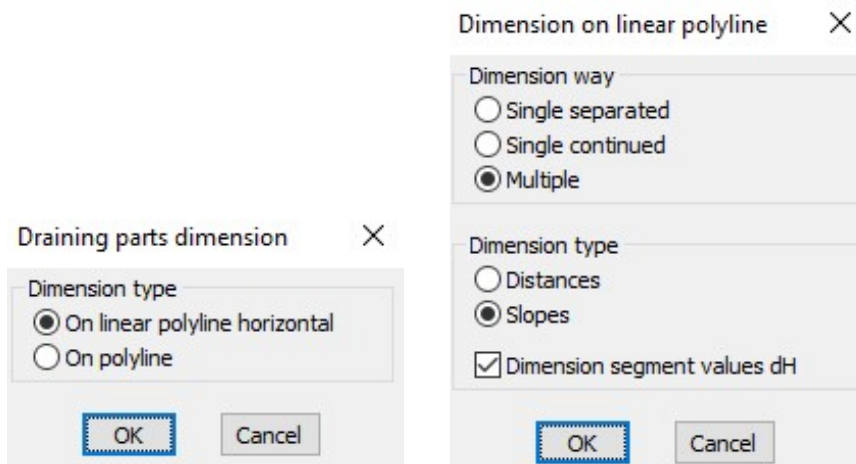
Distances

Slopes

Dimension segment values dH



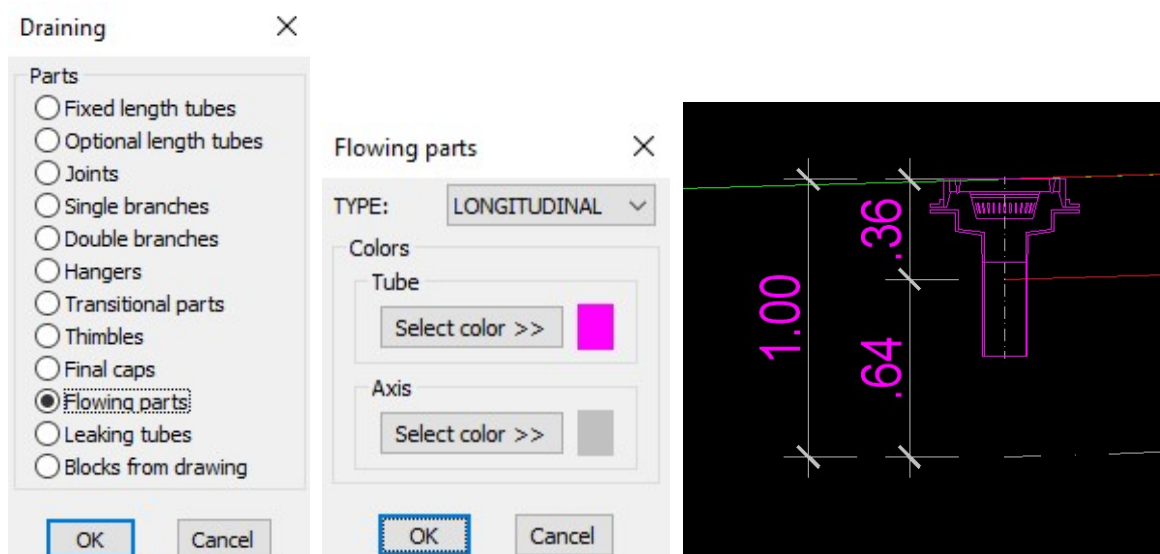
### 3.2 Gradient dimension between polyline vertexes - flowing parts



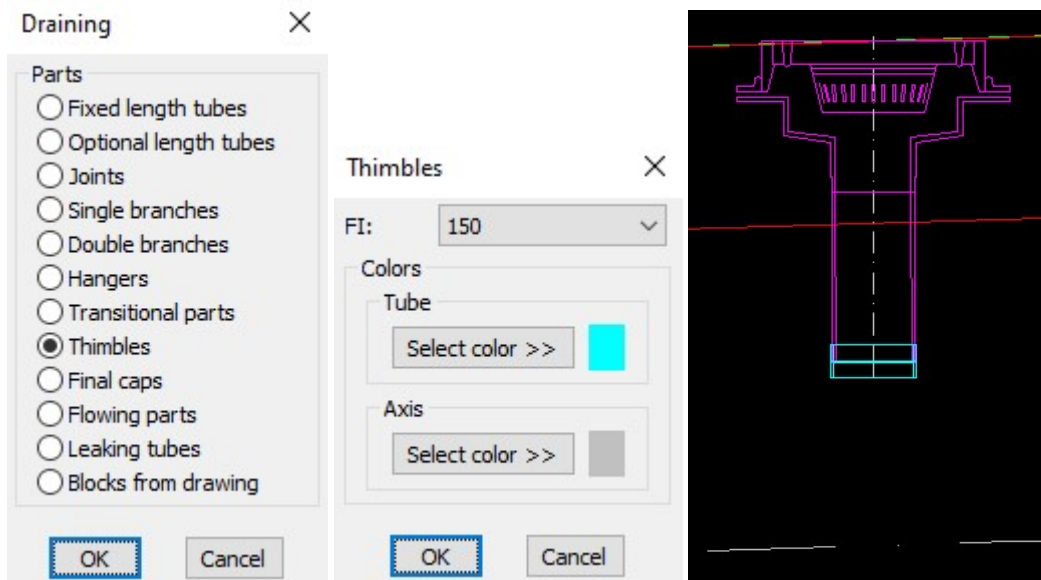
## 4. Insertion of draining elements

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

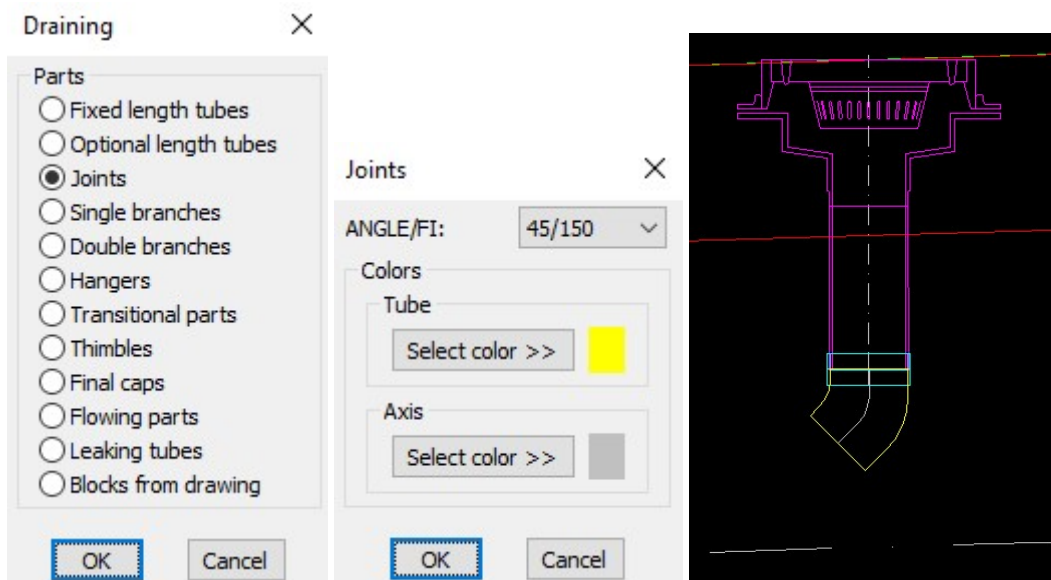
### 4. 1 Insert flowing parts in longitudinal profile



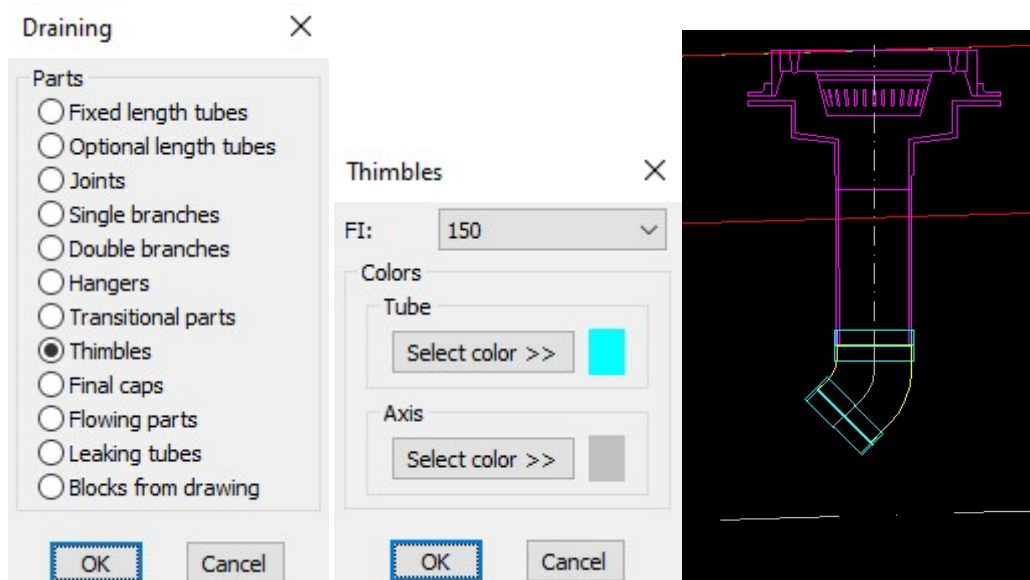
#### 4.2 Insert thimble



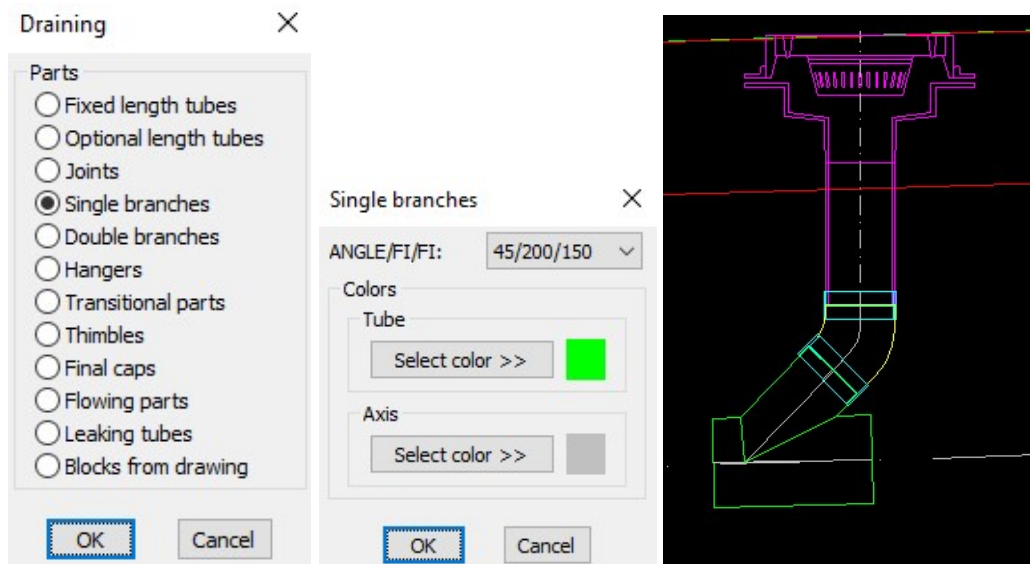
#### 4.3 Insert joint



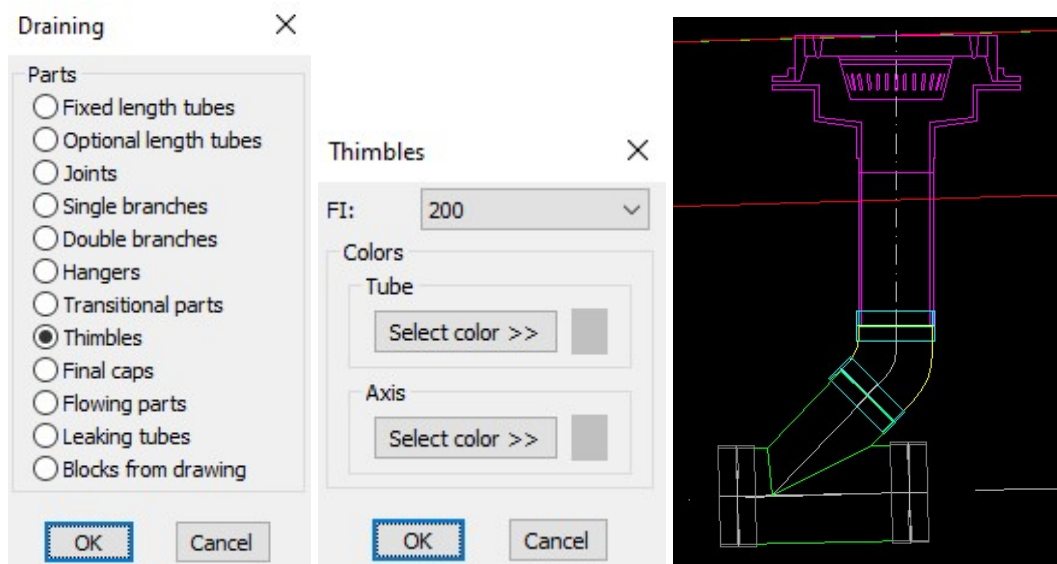
#### 4.4 Insert thimble



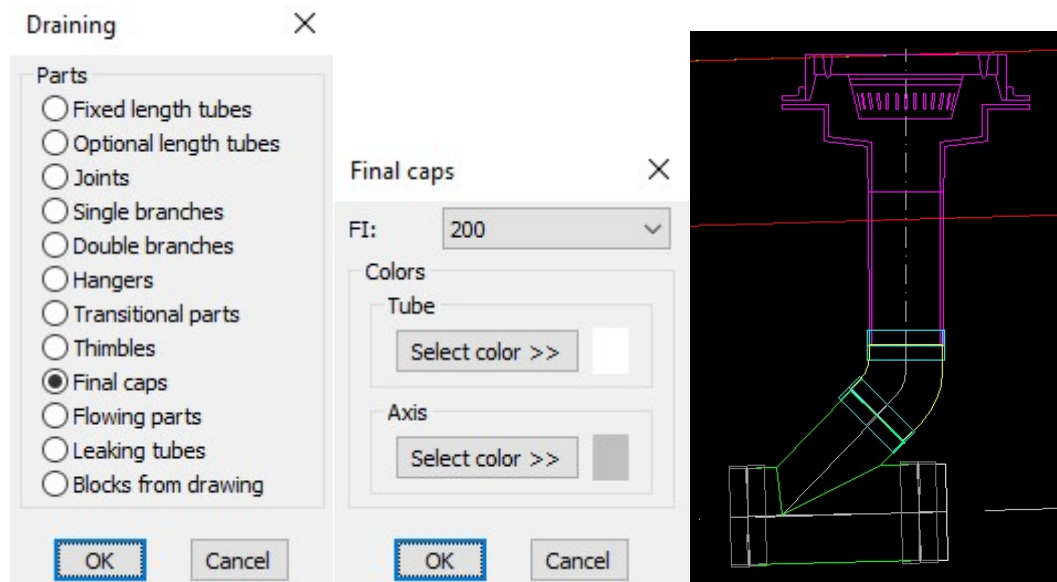
#### 4.5 Insert single branch



#### 4.6 Insert thimble

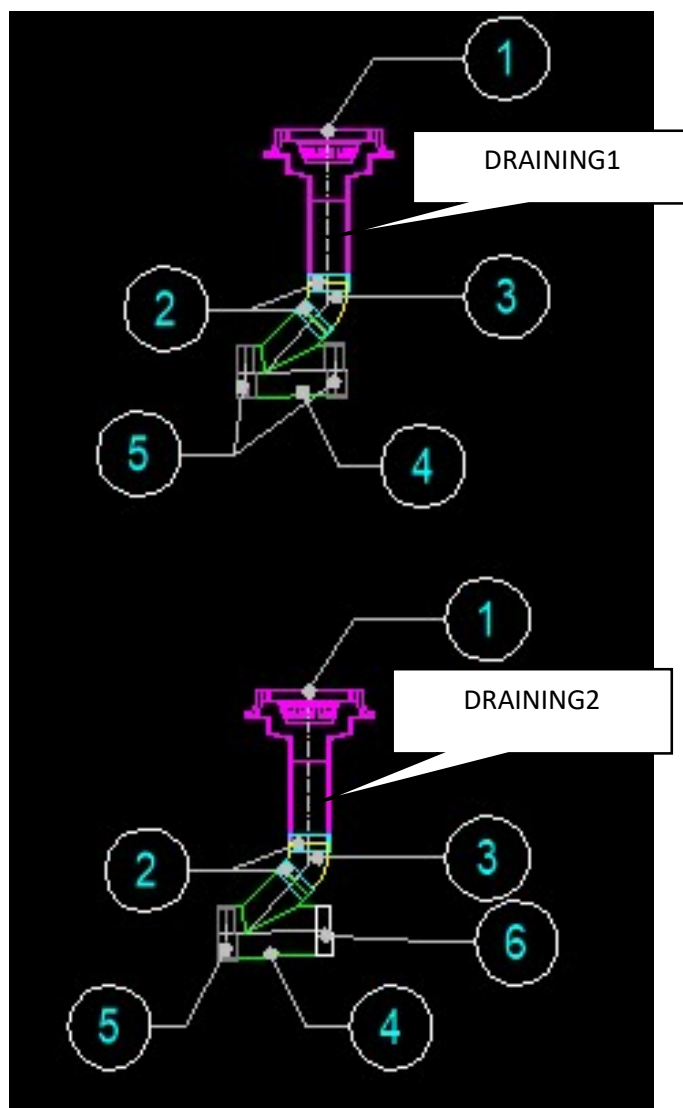
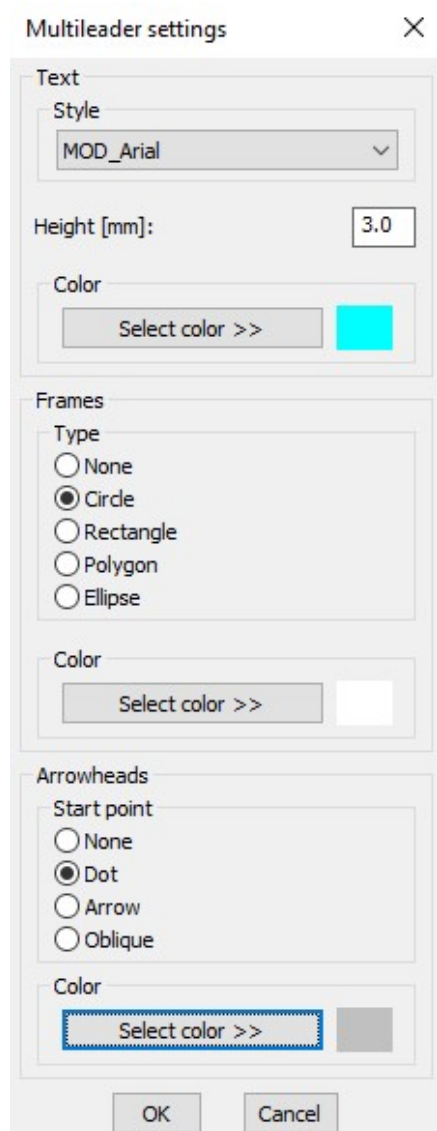


#### 4.7 Insert final cap

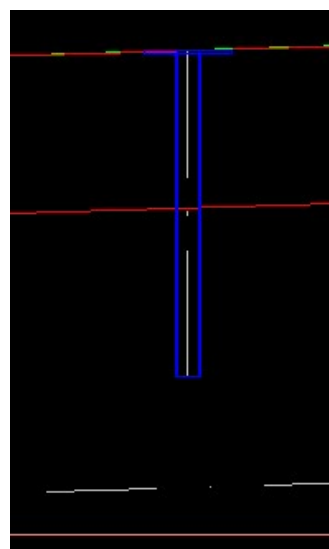
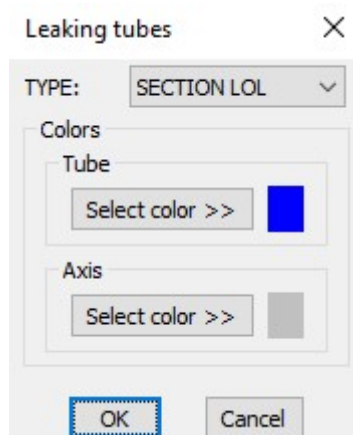
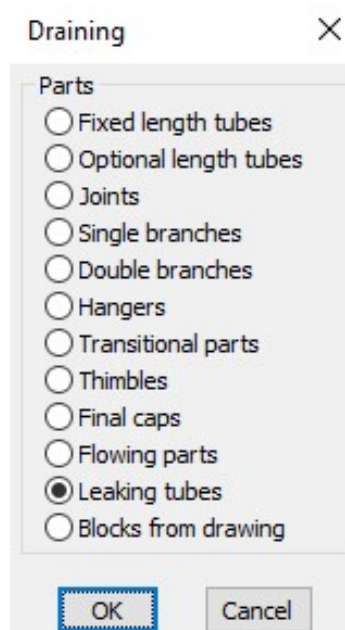




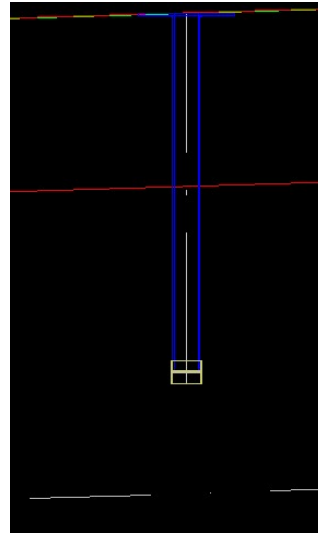
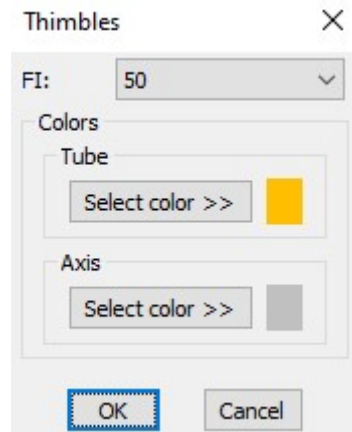
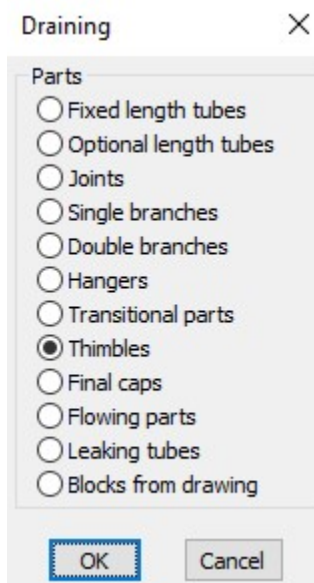
4.7.1 With command Text -> Multileader settings in module BASICS define multileader form and positioning single elements. Define blocks DRAINING1 and DRAINING2.



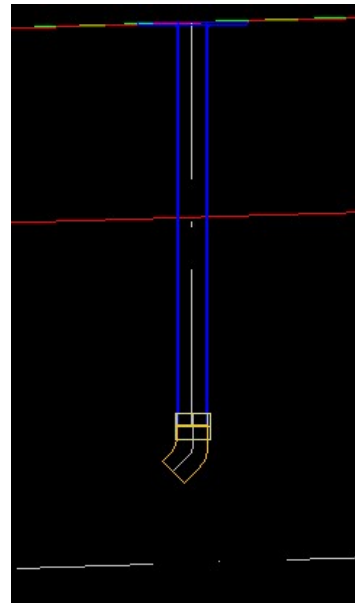
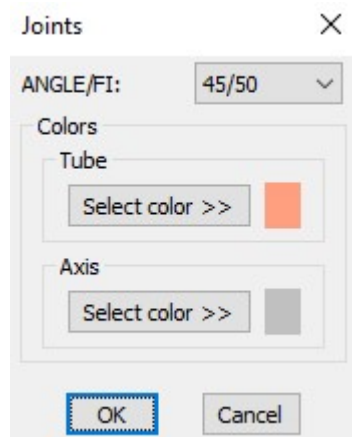
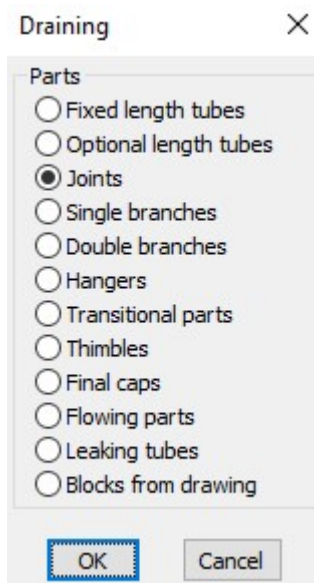
4.8 Insert leaking tube



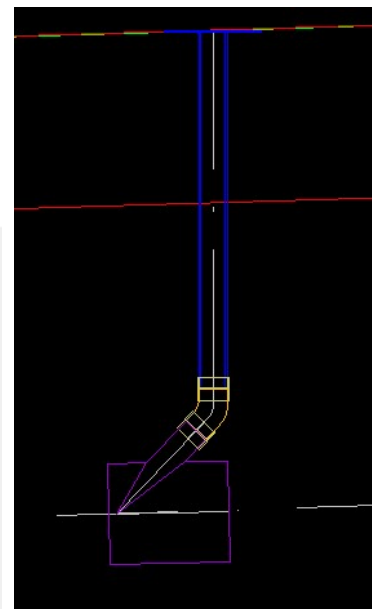
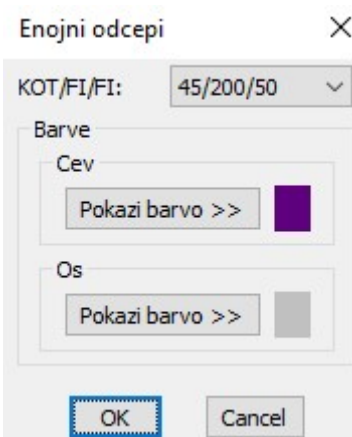
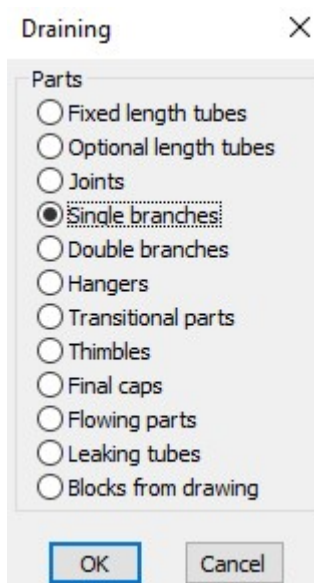
#### 4.9 Insert thimble



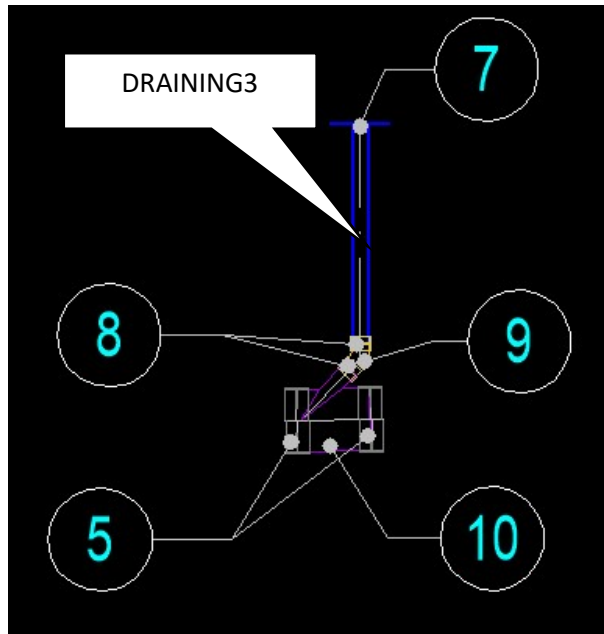
#### 4.10 Insert joint



#### 4.11 Insert single branch

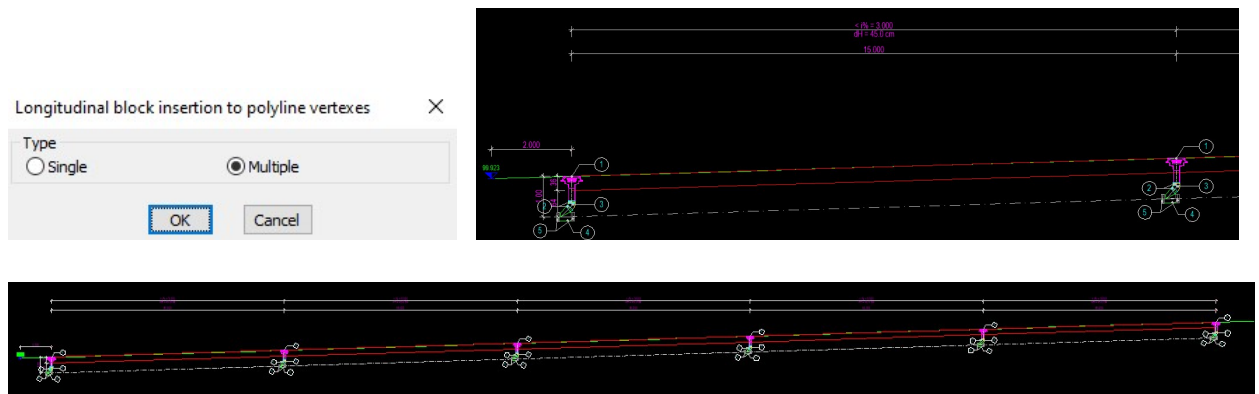


#### 4.11.1 Positioning single elements. Define block DRAINING3.

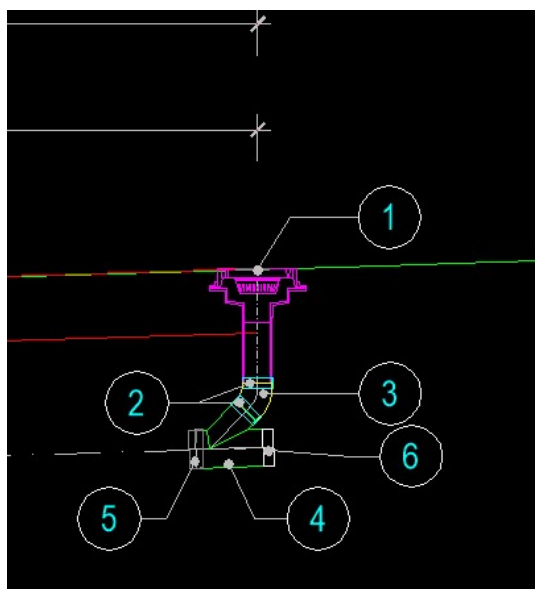


#### 5. Draw longitudinal blocks in polyline vertexes

##### 5.1 Insert block DRAINING1

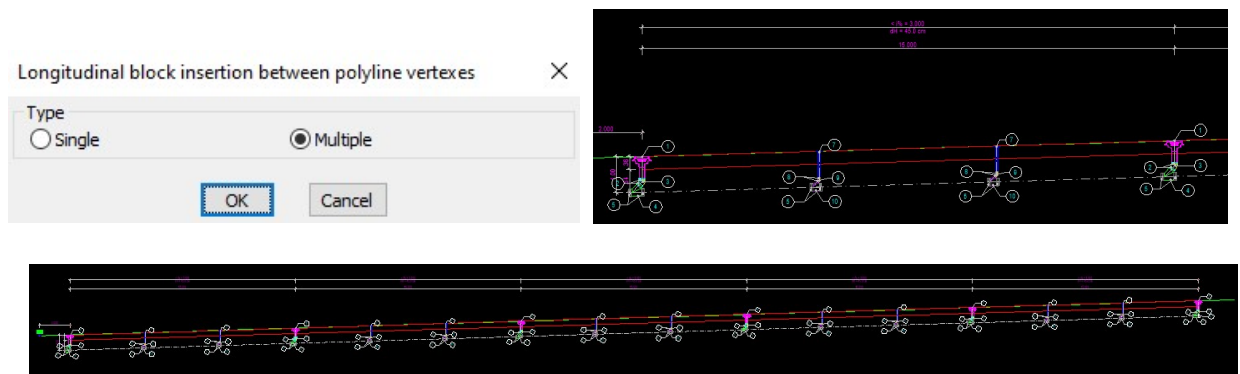


##### Change block in last vertex with block DRAINING2

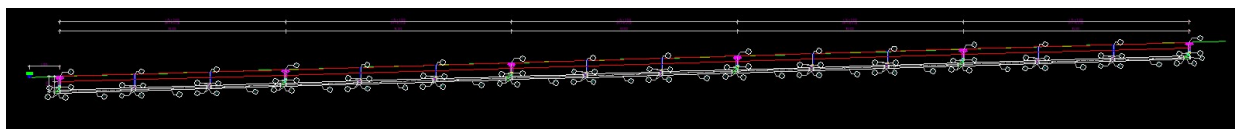
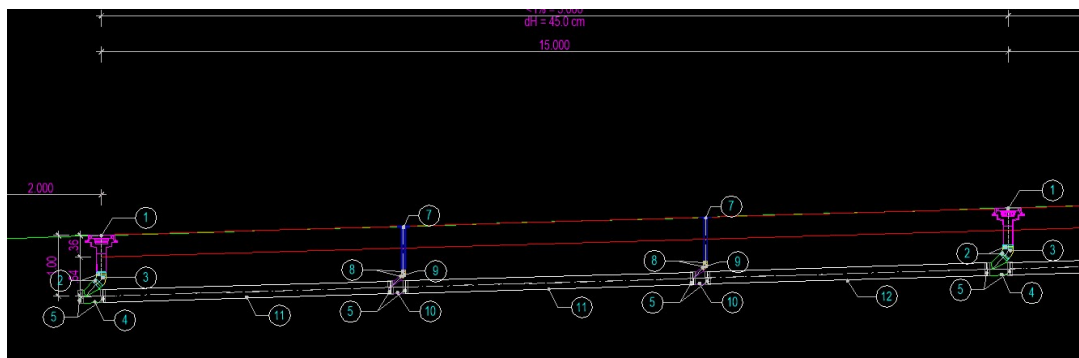
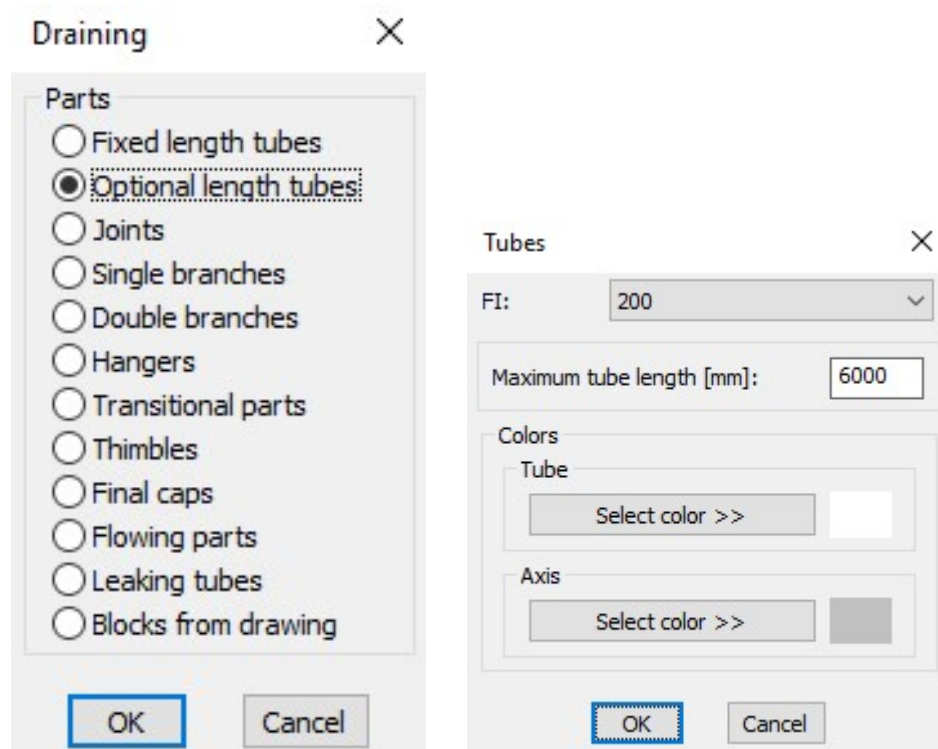


## 6. Draw longitudinal blocks between polyline vertexes

### 6.1 Insert block DRAINING3 – number between vertexes is 2.

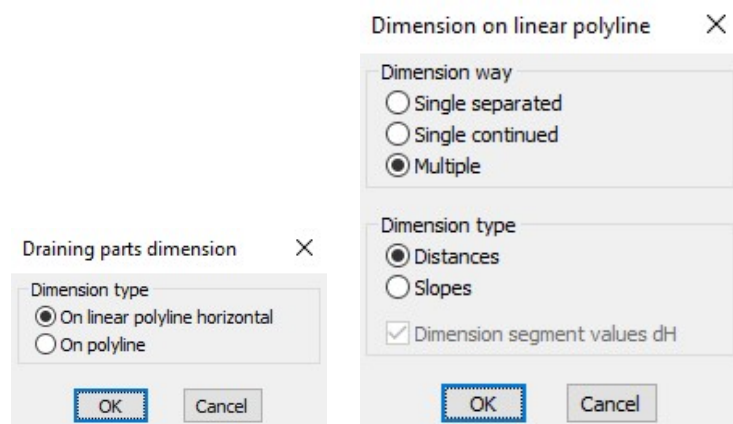


### 6.2 Insert length tubes in longitudinal profile



## 7. Leaking tubes dimension in longitudinal profile

Type 2 for number of elements between vertexes



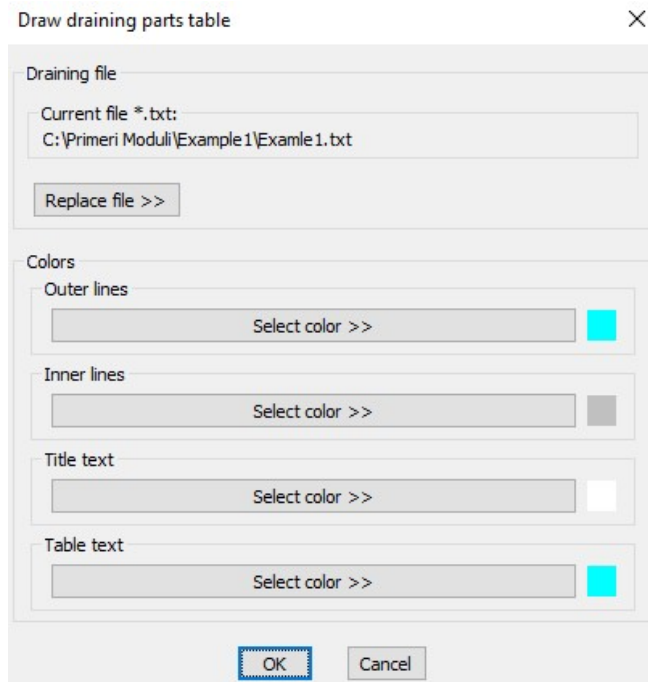
## 8. Parts specification

create file **Example1.txt**

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

```
Write 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>:
```

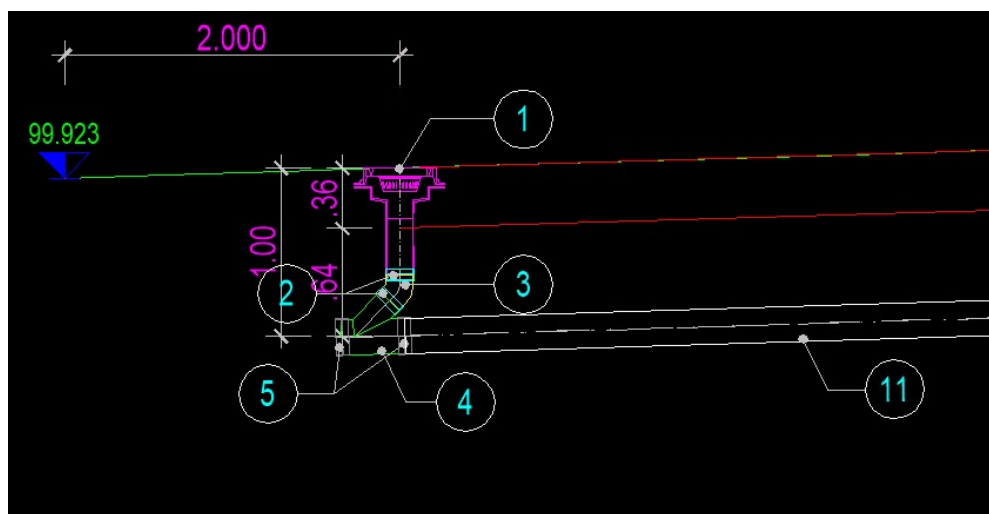
## 9. Draw parts table



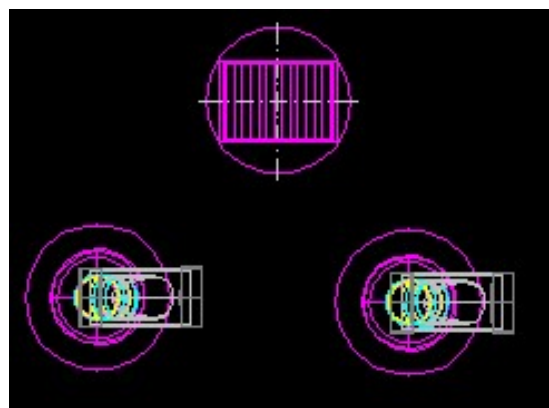
Draining parts specification		
Mark	Element	Pcs
1	IZLIVNIK 400_300	7
2	SPOJKA 150	12
3	KOLENO 45_150	6
4	ENOJNI_ODCEP 45_200_150	6
5	SPOJKA 200	31
6	ZAKLJUCNI_POKROV 200	1
7	CEVKA_PRON._VODE 200_200	10
8	SPOJKA 50	20
9	KOLENO 45_50	10
10	ENOJNI_ODCEP 45_200_50	10
11	CEV 200_4760	10
12	CEV 200_4620	5

## 10. Drawing ground floor and 3d vertical parts

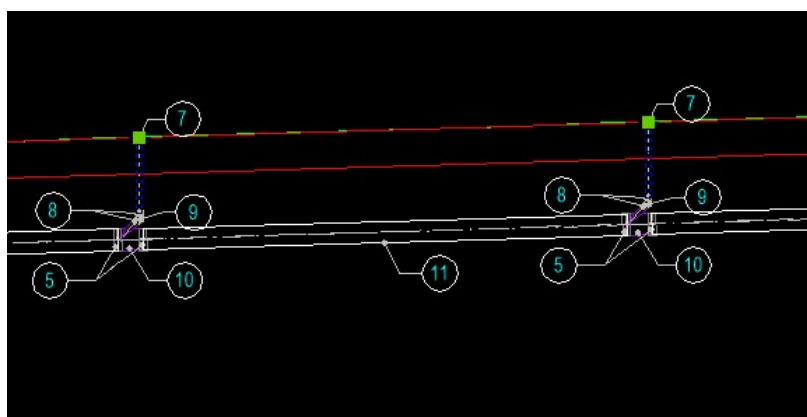
10.1 Pick start point of basic polyline, and then select polyline in longitudinal section – draining axis on top of asphalt and elevation value in first vertex (99.923):



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



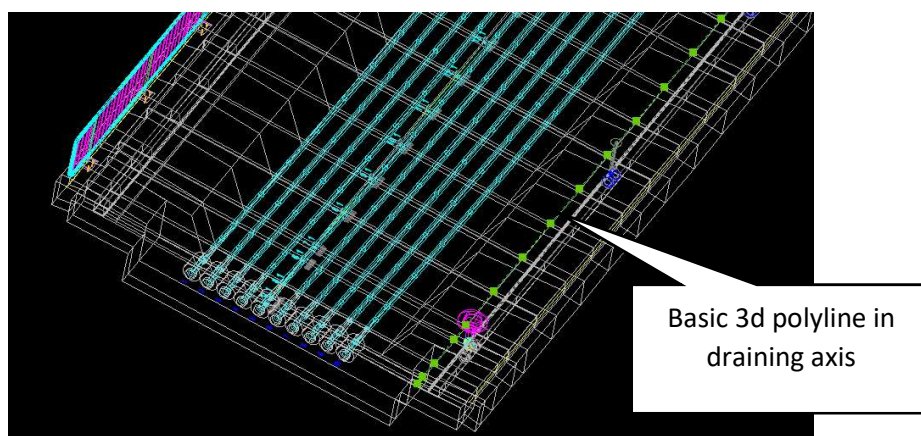
10.3 Select block for intermediate element in longitudinal section, and corresponding blocks in longitudinal section:



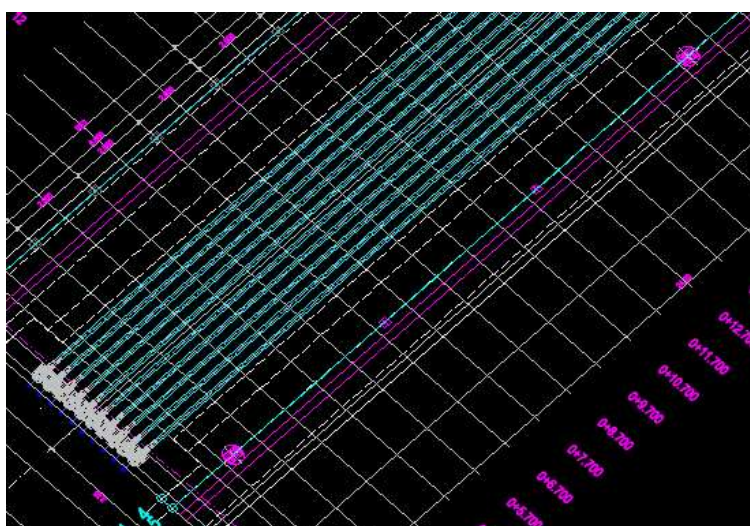
10.4 Select blocks for intermediate ground floor 2d element and intermediate 3d element:

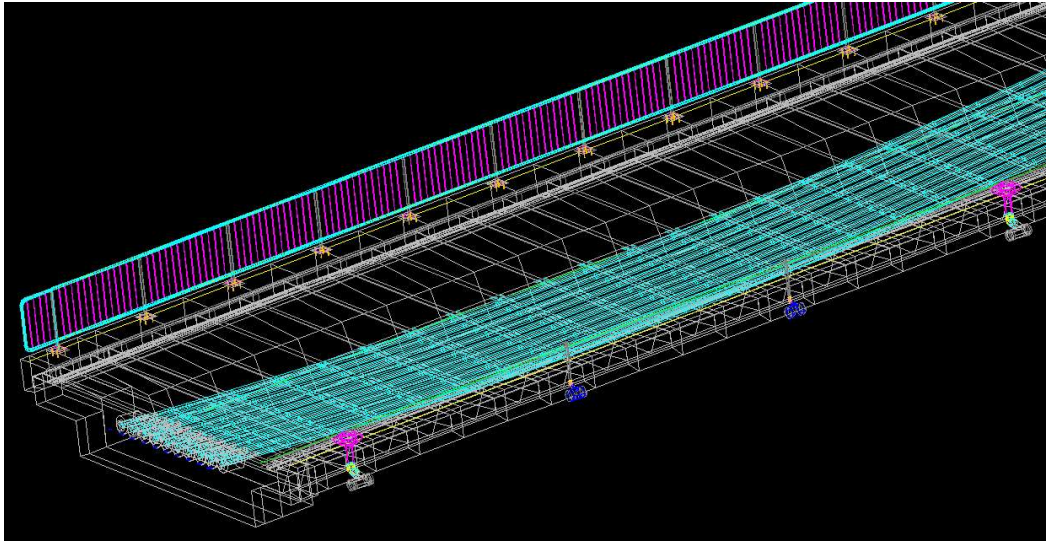


10.5 Select basic 3d polyline in draining axis:

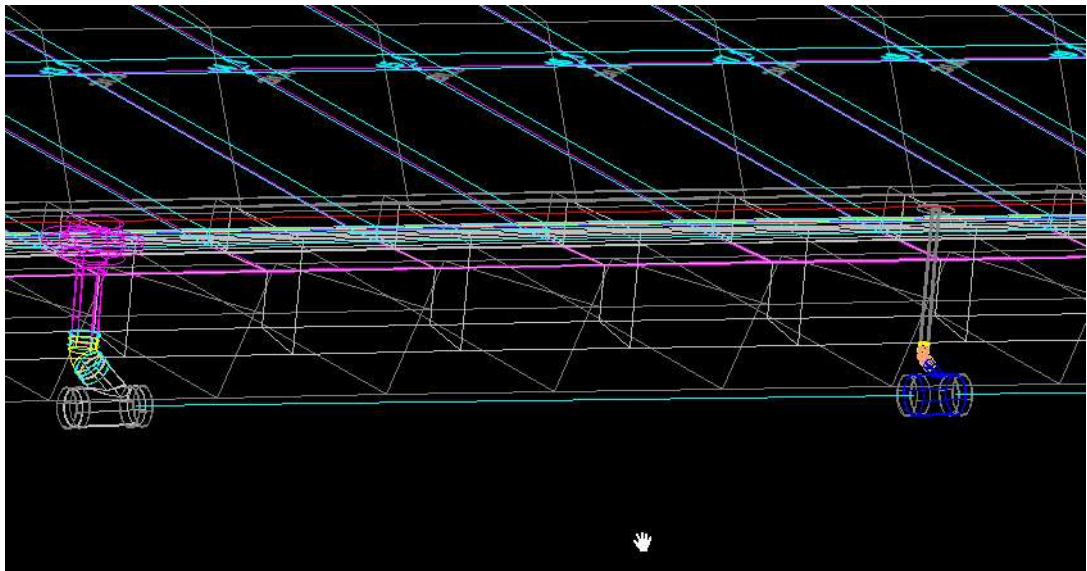


10.6 Drawing vertexes 2d elements in ground floor, 3d vertex elements, 2d intermediate elements in ground floor and 3d intermediate elements.

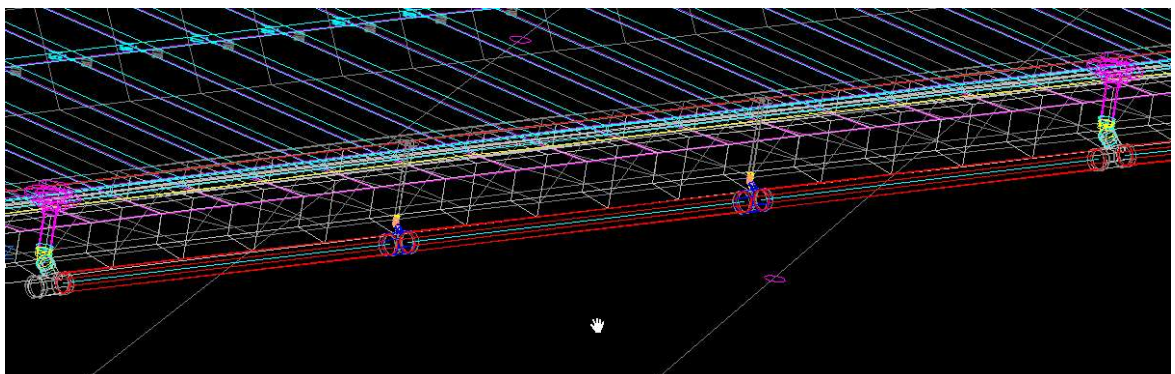
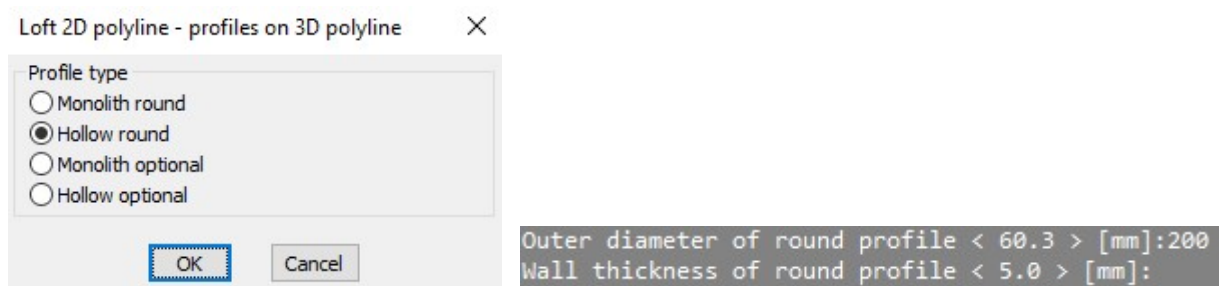




10.7 With 3d polylines connect start and endpoints elements centers in draining axis.

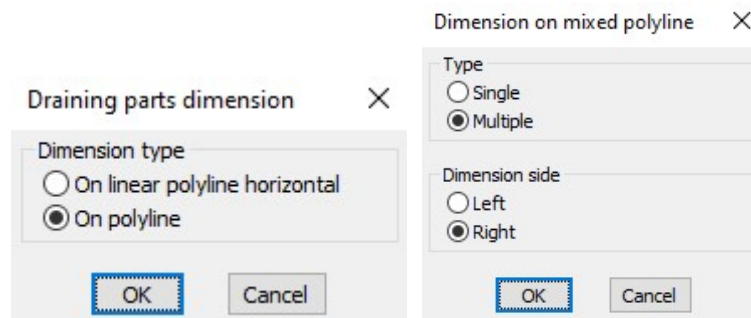


10.8 With command Utility -> Loft 2D polyline - profiles on 3D polyline draw 3d tubes.

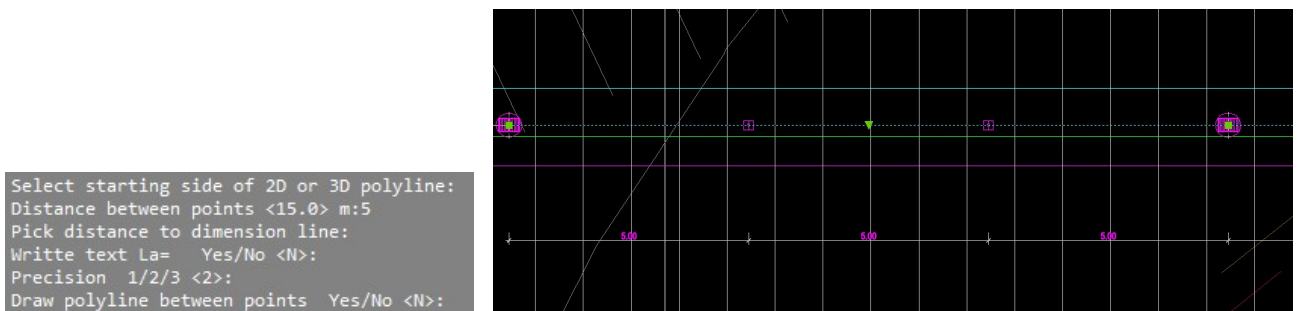




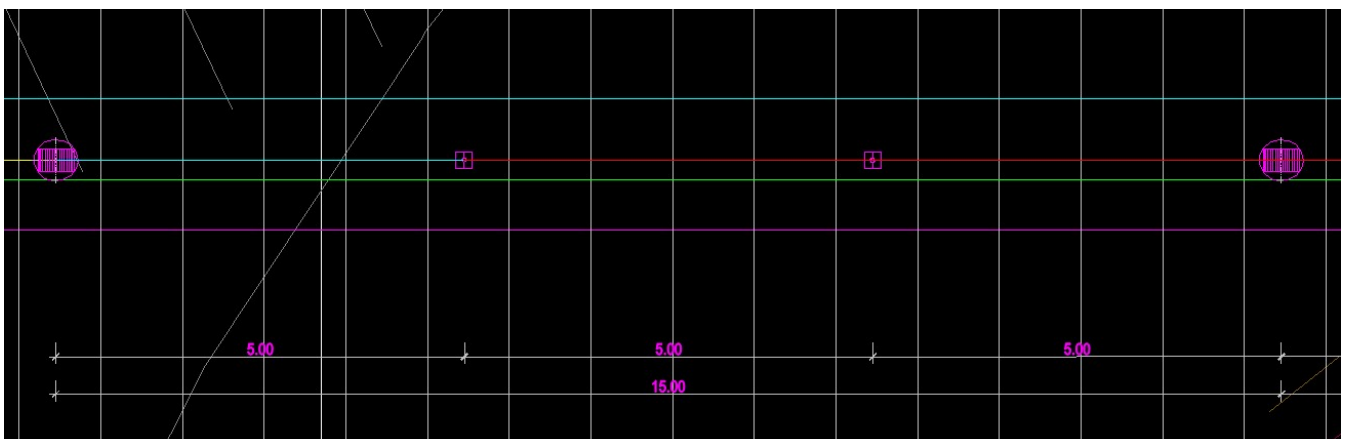
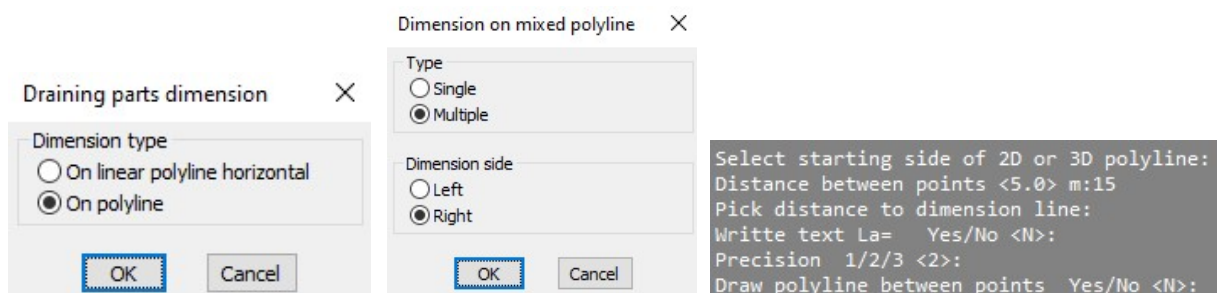
## 11. Parts dimension in ground floor



### 11.1 Dimension distances of leaking tubes



### 11.2 Dimension distances between flowing parts





## 12.2 Draw line and parable in ground floor

Draw line and parable in ground floor ✕

GROUND FLOOR

X

X1 X2

Z Z1 Z0

line parable

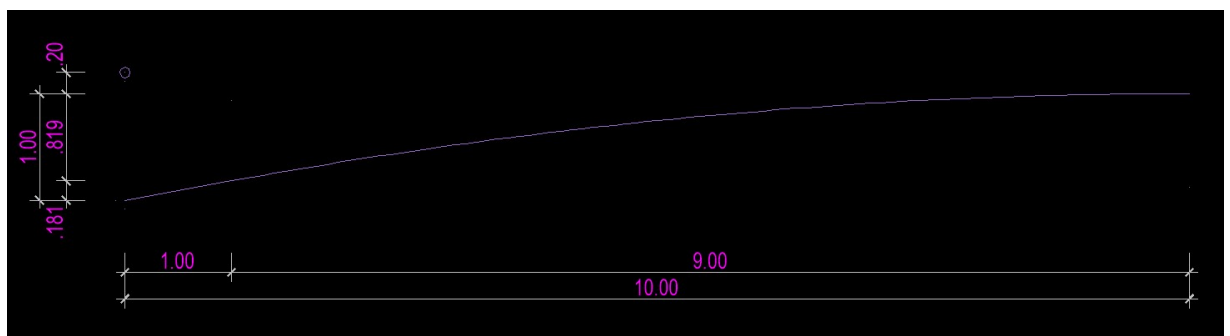
X [m]: 10.000

X1 [m]: 1.000

Z [m]: 1.000

Z0 [m]: 0.200

OK Cancel



12.3 Draw parable and contra parable in longitudinal section

Draw parable and contra parable in longitudinal section

LONGITUDINAL SECTION

parable

contra parable

X

X1

X2

Y

Y1

Y2

Y0

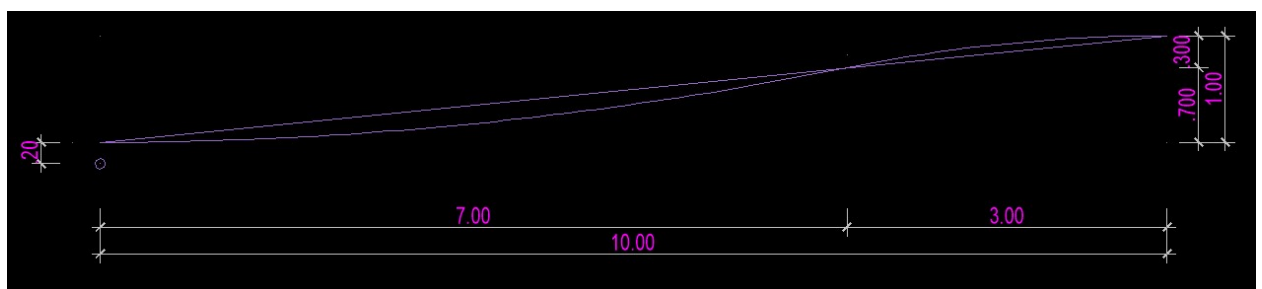
X [m]: 10.000

X2 [m]: 3.000

Y [m]: 1.000

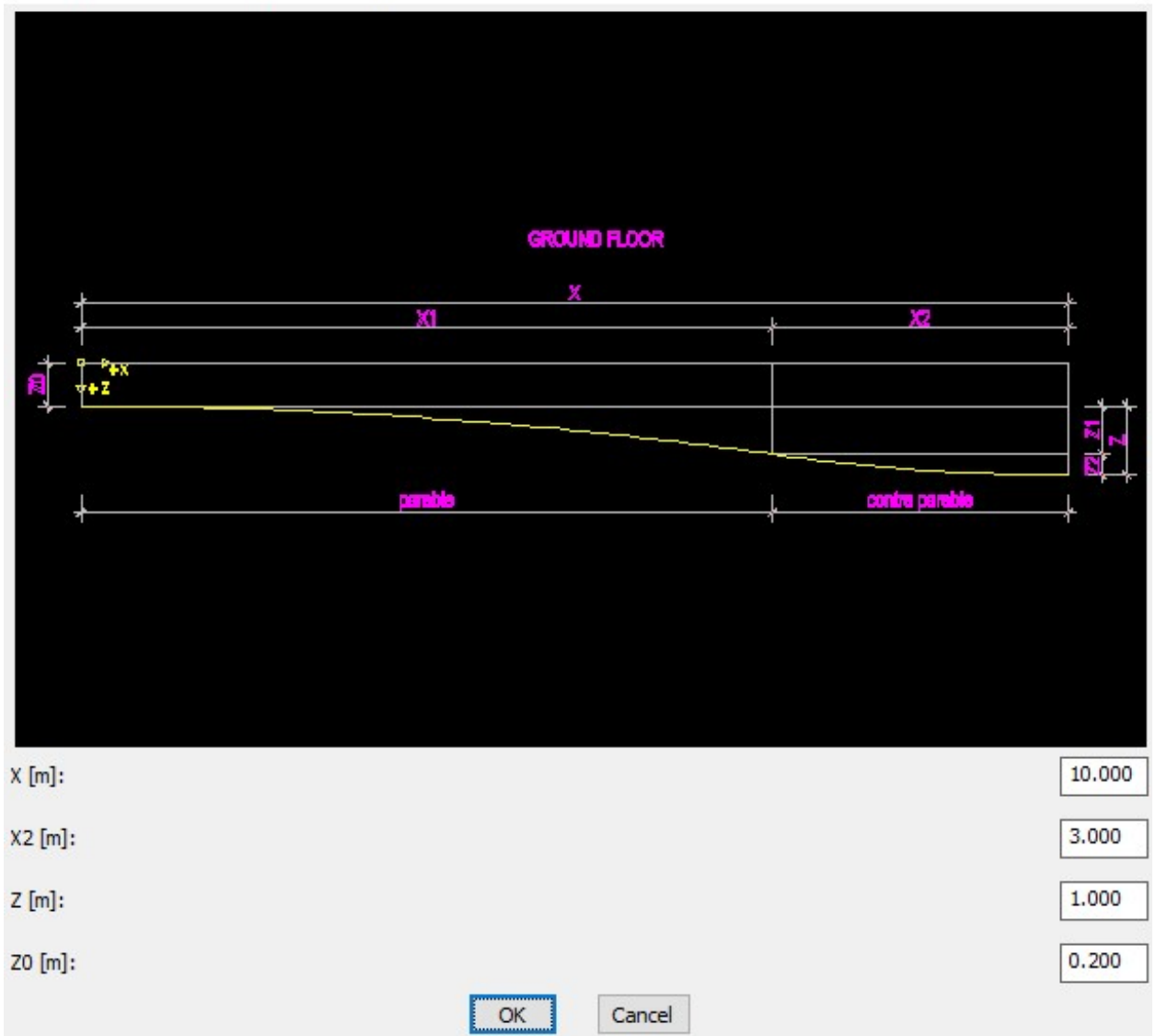
Y0 [m]: 0.200

OK Cancel



12.4 Draw parable and contra parable in ground floor

Draw parable and contra parable in ground floor ✕



GROUND FLOOR

X

X1 X2

Z

Z0

parable contra parable

X [m]: 10.000

X2 [m]: 3.000

Z [m]: 1.000

Z0 [m]: 0.200

OK Cancel

