



## Analysis using finite element method

### Topology

#### Project

Date : 30.10.2015

#### Global settings

Project type : Plane strain  
Analysis type : Steady waterflow  
Tunnels : no  
Advanced input : no  
Detailed results : no  
Concrete structures : EN 1992-1-1 (EC2)

#### Interface

No.	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
1		0,00	1,50	18,00	1,50	18,00	0,00
		36,00	0,00	36,00	1,50	54,00	1,50

#### Soil parameters

##### Zeminy\_1

Permeability coeff. in X-direction :  $k_{x,sat} = 4,320E-01$  m/day  
Permeability coeff. in Z-direction :  $k_{z,sat} = 4,320E-01$  m/day  
Initial void ratio :  $e_0 = 0,50$   
Transition zone model : Log - linear  
Transition zone width :  $h_{TZ} = 1,00$  m

#### Assigning and surfaces

No.	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		36,00	1,50	36,00	0,00	Zeminy_1
		18,00	0,00	18,00	1,50	
		0,00	1,50	0,00	-10,50	
		54,00	-10,50	54,00	1,50	

#### Free points

No.	Location		No.	Location		No.	Location		No.	Location	
	x [m]	z [m]		x [m]	z [m]		x [m]	z [m]			
1	18,00	-4,50	2	36,00	-4,50						

#### Free lines

No.	Type of line	Mode of input	Lines topology
1	segment		Origin (18,00; 0,00) [m] , end (18,00; -4,50) [m]
2	segment		Origin (36,00; 0,00) [m] , end (36,00; -4,50) [m]

#### Mesh generation

##### Mesh generation parameters

Element edge length : 1,00 [m]  
Mesh smoothing : yes



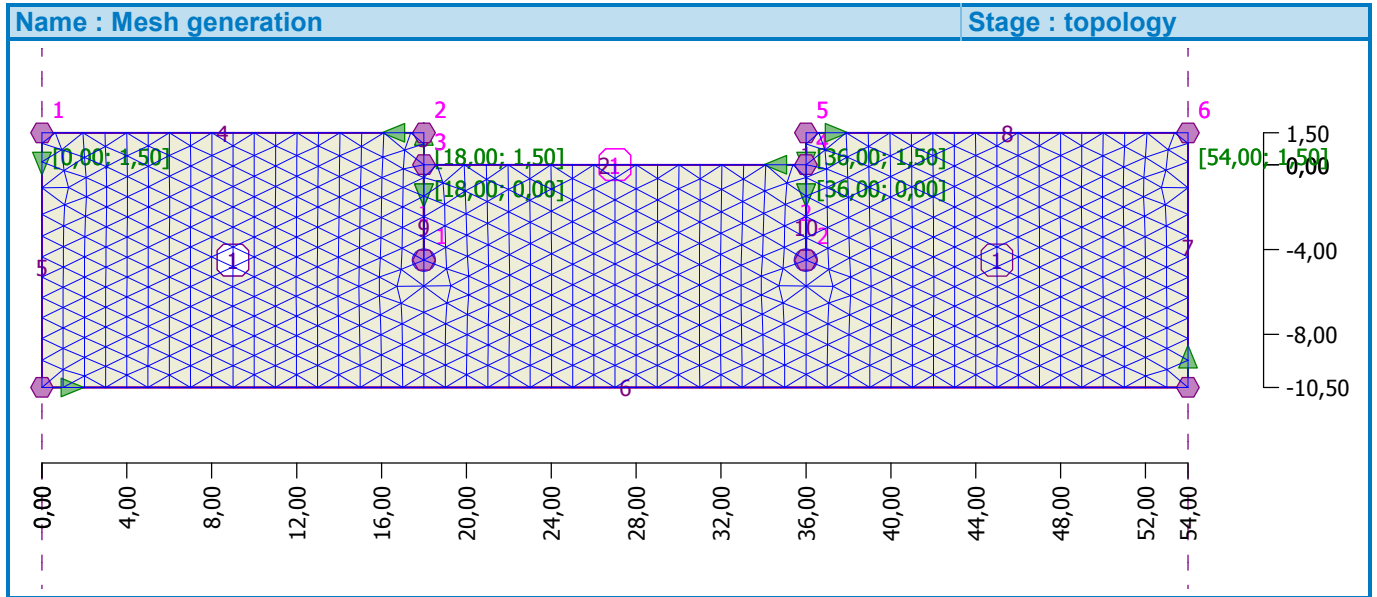
Generate multinode elements : no

### Mesh generation result

**Finite element mesh was successfully generated.**

Number of nodes 1044

Number of elements 1914 (region 1330, beam 146, interface 438)



### Input data (Stage of construction 1)

#### Assignment and activation

No.	Region	Active / inactive	Assigned soil
1		Active	Zeminy_1 

#### Beams

No.	Location	Permeability
1	Free line No. 2	impermeable

#### Line flows

No.	Line flow		Location	Boundary type	Parameters
	new	modified			
1	Yes		Mesh line No. 1	impermeable	
2	Yes		Mesh line No. 2	impermeable	
3	Yes		Mesh line No. 3	impermeable	
4	Yes		Mesh line No. 4	pore pressure	$z_{GWT} = 7,50 \text{ m}$
5	Yes		Mesh line No. 5	pore pressure	$z_{GWT} = 7,50 \text{ m}$
6	Yes		Mesh line No. 6	impermeable	
7	Yes		Mesh line No. 7	pore pressure	$z_{GWT} = 1,50 \text{ m}$
8	Yes		Mesh line No. 8	seepage	

#### Analysis settings

##### Water flow

Method :

Newton - Raphson

Change of permeability matrix :

after each iteration



Max. number of iterations for one calc. step : 20  
 Pore pressure error : 0,0100  
 Equilibrium state error : 0,0100  
 Respect material interfaces : no

### Results (Stage of construction 1)

Steady state flow analysis successfully completed.

Analysis settings : **user-defined**

