

Gabion analysis

Input data

Project

Date : 2.11.2005

Material of blocks - filling

No.	Name	γ [kN/m ³]	ϕ [°]	c [kPa]
1	Material No. 1	20.00	30.00	0.00

Material of blocks - mesh

No.	Name	Strength overh. R_t [kN/m]	Spacing of vert. meshes b [m]	Bear.cap. of front joint R_s [kN/m]
1	Material No. 1	40.00	1.00	40.00

Geometry of structure

No.	Width b [m]	Height h [m]	Offset a [m]	Mesh	Overhang l [m]	Anchorage l_a [m]	Bear.cap. T_d [kN/m ²]	Material
6	1.00	1.00	0.00	NO	-	-	-	Material No. 1
5	2.00	1.00	0.00	NO	-	-	-	Material No. 1
4	2.50	1.00	0.00	NO	-	-	-	Material No. 1
3	2.50	1.00	0.00	NO	-	-	-	Material No. 1
2	3.50	1.00	0.00	NO	-	-	-	Material No. 1
1	3.50	1.00	-	NO	-	-	-	Material No. 1

Gabion slope = 0.00 °
 Overall height = 6.00 m
 Overall wall volume = 15.00 m³/m

Soil parameters

Silt


Unit weight : $\gamma = 20,00$ kN/m³
 Stress-state : effective
 Angle of intern. friction : $\phi_{ef} = 25,00$ °
 Cohesion of soil : $c_{ef} = 9,00$ kPa
 Angle of friction struc.-soil : $\delta = 0,00$ °
 Soil : cohesionless
 Solid unit weight : $\gamma_s = 25,00$ kN/m³
 Porosity <0.0 - 1.0> : $n = 0,30$

Sand

Unit weight : $\gamma = 19,00$ kN/m³
 Stress-state : effective
 Angle of intern. friction : $\phi_{ef} = 30,00$ °
 Cohesion of soil : $c_{ef} = 5,00$ kPa
 Angle of friction struc.-soil : $\delta = 0,00$ °
 Soil : cohesionless
 Saturated unit weight : $\gamma_{sat} = 20,00$ kN/m³

Geological profile and assigned soils

Company Name	Project Name
Project Author	Project Part

No.	Layer [m]	Assigned soil	Pattern
1	-	Silt	

Terrain profile

Terrain behind construction has the slope 1: 5.00 (slope angle is 11.31 °).
Embankment height is 0.80 m, embankment length is 4.00 m.

Water influence

Ground water table is located below the structure.

Inserted surface loads

No.	Surcharge		Type	Name	Mag.1 [kN/m ²]	Mag.2 [kN/m ²]	Ord.x x [m]	Length l [m]	Depth z [m]
	new	change							
1	YES		Trapez.	Surcharge No. 1	10.00	20.00	4.50	3.00	on terrain

Resistance on front face of the structure

Resistance on front face of the structure: at rest

Soil on front face of the structure - Sand

Soil thickness in front of structure $h = 0.70$ m

Soil slope in front of structure $\beta = -15.00$ °

Analysis settings

Active earth pressure calculation - Coulomb (CSN 730037)

Passive earth pressure calculation - Caquot-Kerisel (CSN 730037)

Analysis carried out according to CSN 730037 standard (with reduction of soil input parameters).

Coeff. of reduction of friction between blocks $k_t = 0.66$

Verification No. 1

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. Z [m]	F_{vert} [kN/m]	App.Pt. X [m]	Design coefficient
Weight - wall	0.00	-2.43	300.00	1.40	1.000
FF resistance	-2.19	-0.23	0.00	0.00	1.000
Weight - earth wedge	0.00	-3.95	40.99	2.20	1.000
Active pressure	162.15	-2.02	87.99	2.87	0.500
Surcharge No. 1	13.09	-2.17	7.12	2.32	1.000

Verification of complete wall

Check for overturning stability

Resisting moment $M_{res} = 587.73$ kNm/m

Overturning moment $M_{ovr} = 191.62$ kNm/m

Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force $H_{res} = 161.43$ kN/m

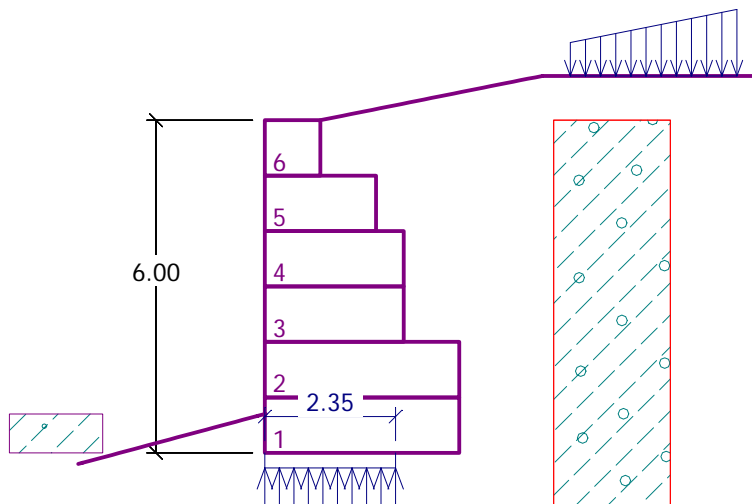
Active horizontal force $H_{act} = 91.97$ kN/m

Wall for slip is SATISFACTORY

Forces acting at the center of footing bottom

Name : Bearing cap.

Stage : 1



Dimensioning No. 1

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. Z [m]	F_{vert} [kN/m]	App.Pt. X [m]	Design coefficient
Weight - wall	0.00	-2.02	230.00	1.29	1.000
Weight - earth wedge	0.00	-2.95	40.99	2.20	1.000
Active pressure	114.15	-1.67	87.99	2.87	1.000
Surcharge No. 1	9.81	-1.72	7.12	2.32	1.000

Verification of construction joint above the block No.: 1

Check for overturning stability:

Resisting moment $M_{res} = 657.00$ kNm/m

Overturning moment $M_{ovr} = 206.99$ kNm/m

Joint for overturning stability is SATISFACTORY

Check for slip:

Resisting horizontal force $H_{res} = 188.74$ kN/m

Active horizontal force $H_{act} = 123.96$ kN/m

Joint for slip is SATISFACTORY

Forces acting on the bottom block:

Moment $M = 190.67$ kNm/m

Normal force $N = 366.10$ kN/m

Shear force $Q = 123.96$ kN/m

Maximum pressure on the bottom block = 148.92 kPa

Red.Coeff. by offset of top block = 1.00

Average value of pressure on face = 72.57 kPa

Shear force trasmitted by friction = 124.57 kN/m

Bearing capacity against transverse pressure:

Joint bear.capacity = 40.00 kN/m

Computed stress-state = 36.29 kN/m

Transverse pressure check is SATISFACTORY

