Sheeting structure design

Input data

Project
Date : 2.11.2005

Basic soil parametres

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m^3]	γ_{su} [kN/m^3]	δ [°]
1	Sand with clay		29.00	5.00	18.00	10.00	0.00
2	Clay		15.00	5.00	20.50	10.50	0.00

Soil parameters

Sand with clay

Unit weight :	γ =	18,00 kN/m^3
Stress-state :		effective
Angle of intern. friction :	φ_{ef} =	29,00 °
Cohesion of soil :	c_{ef} =	5,00 kPa
Active friction angle :	δ_{act} =	20,00 °
Passive friction angle :	δ_{pas} =	0,00 °
Saturated unit weight :	γ_{sat} =	20,00 kN/m^3

Clay

Unit weight :	γ =	20,50 kN/m^3
Stress-state :		effective
Angle of intern. friction :	φ_{ef} =	15,00 °
Cohesion of soil :	c_{ef} =	5,00 kPa
Active friction angle :	δ_{act} =	15,00 °
Passive friction angle :	δ_{pas} =	0,00 °
Saturated unit weight :	γ_{sat} =	20,50 kN/m^3

Geological profile and assigned soils

No.	Layer [m]	Assigned soil	Pattern
1	1.50	Clay	
2	-	Sand with clay	

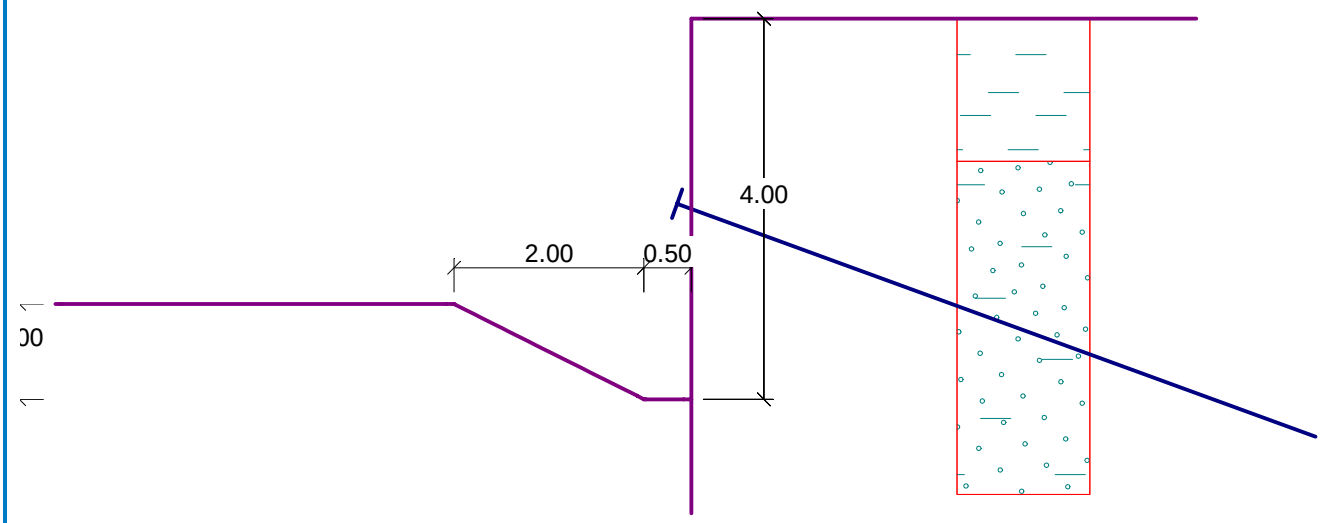
Geometry of structure
Soil in front of wall is excavated up to depth of 4.00 m.

Ditch bottom shape

No.	Coordinate X [m]	Depth Z [m]
1	0.00	0.00
2	-0.50	0.00
3	-2.50	-1.00
4	-3.50	-1.00

Origin [0,0] is located at the ditch bottom.
Positive coordinate +z has downward direction.

Name : Excavation **Stage : 1**



Inputted anchors

No.	New anchor	Depth z [m]	Length l [m]	Slope α [°]	Spacing b [m]	Force F [kN]
1	YES	2.00	7.00	20.00	1.00	33.45

Terrain profile
Terrain behind the structure is flat.

Water influence
Ground water table is located below the structure.

Analysis settings
Active earth pressure calculation - Coulomb (CSN 730037)
Passive earth pressure calculation - Caqout-Kerisel (CSN 730037)
Analysis carried out according to CSN 730037 standard (with reduction of soil input parameters).

Verification No. 1

Design of anchored sheeting wall fixed at heel
Coeff. of reduction of passive pressure = 0.99
A minimum dimensioning pressure was considered when computing the active pressure.

Computed depth of the zero-value point u = 0.09 m

Max. value of shear force = 26.24 kN/m
Max. value of moment = 8.10 kNm/m
Required depth of structure in soil = 1.69 m
Overall length of structure = 5.69 m

Anchors forces

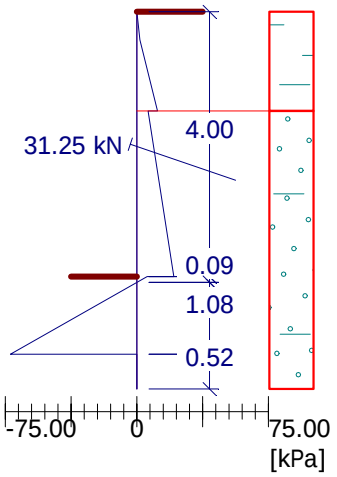
No.	Depth z [m]	Anchor force [kN]
1	2.00	31.25

Distribution of pressure and internal forces along the structure

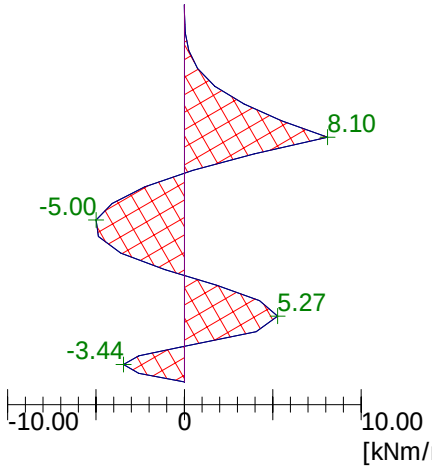
Depth [m]	Total Pressure [kPa]	Shear Force [kN/m]	Moment [kNm/m]
0.00	0.00	0.00	-0.00
0.13	0.55	-0.04	0.00
0.42	1.74	-0.37	0.05
0.69	4.23	-1.17	0.24
0.96	6.72	-2.65	0.74
1.23	9.22	-4.79	1.73
1.50	11.71	-7.60	3.38
1.50	6.41	-7.60	3.38
1.75	7.87	-9.38	5.49
2.00	9.33	-11.53	8.10
2.00	9.33	17.83	8.10
2.25	10.79	15.32	3.95
2.50	12.25	12.44	0.47
2.75	13.71	9.19	-2.24
3.00	15.17	5.58	-4.09
3.25	16.63	1.60	-5.00
3.50	18.09	-2.74	-4.86
3.75	19.56	-7.44	-3.60
4.00	21.02	-12.52	-1.11
4.00	5.86	-12.52	-1.11
4.23	-9.74	-12.06	1.83
4.47	-25.33	-7.96	4.25
4.70	-40.93	-0.21	5.27
4.94	-56.53	11.19	4.06
5.17	-72.12	26.24	-0.25

Name : Analysis | **Stage : 1; Analysis : 1**

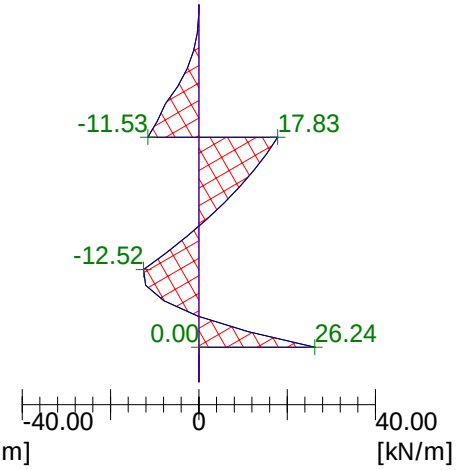
Geometry of structure
Length of structure = 5.69m
Depth in soil = 1.69m



Bending moment
Max. M = 8.10kNm/m



Shear force
Max. Q = 26.24kN/m



Verification No. 2

Design of anchored sheeting wall hinged at heel

Coeff. of reduction of passive pressure = 1.00
A minimum dimensioning pressure was considered when computing the active pressure.

Computed depth of the zero-value point u = 0.08 m

Max. value of shear force = 19.90 kN/m
Max. value of moment = 8.10 kNm/m
Required depth of structure in soil = 0.69 m
Overall length of structure = 4.69 m

Anchors forces

No.	Depth z [m]	Anchor force [kN]
1	2.00	33.45

Distribution of pressure and internal forces along the structure

Depth [m]	Total Pressure [kPa]	Shear Force [kN/m]	Moment [kNm/m]
0.00	0.00	-0.00	-0.00
0.13	0.55	-0.04	0.00
0.42	1.74	-0.37	0.05
0.64	3.74	-0.96	0.19
0.85	5.73	-1.98	0.50
1.07	7.72	-3.42	1.07
1.28	9.71	-5.30	2.00
1.50	11.71	-7.60	3.38
1.50	6.41	-7.60	3.38
1.75	7.87	-9.38	5.49
2.00	9.33	-11.53	8.10
2.00	9.33	19.90	8.10

Depth [m]	Total Pressure [kPa]	Shear Force [kN/m]	Moment [kNm/m]
2.22	10.63	17.68	3.92
2.44	11.93	15.17	0.26
2.67	13.23	12.38	-2.80
2.89	14.52	9.30	-5.22
3.11	15.82	5.92	-6.91
3.33	17.12	2.26	-7.83
3.56	18.42	-1.69	-7.90
3.78	19.72	-5.92	-7.06
4.00	21.02	-10.45	-5.24
4.00	5.70	-10.45	-5.24
4.23	-8.20	-10.16	-2.82
4.46	-22.10	-6.70	-0.83
4.69	-36.00	0.00	0.00