Solstability

SLOPE STABILITY ANALYSIS

Anchored cut

ANALYSIS REPORT

Project Number **EX-08**

Notes. Illustrative example (User Manual, Example 8); verify site parameters before design.

Table of Contents

1. Settings 3

2. Geometry 3

2.1 Model extent 3

2.2 Ground surface 3

2.3 Interface 2 3

3. Soils 3

3.1 Soil parameters 3

3.2 Assignment 3

3.3 Soil layers 3

3.4 Interface polygons 4

4. Reinforcement 4

4.1 Anchors 4

5. Water 4

6. Analysis 4

6.1 Analysis settings 4

7. Results 4

7.1 Slices 5

7.2 Anchors 5

7.3 Reinforcement forces 5

1. Settings

Item	Value
Units	SI (kN, m, kPa)
Unit weight of water	10.000 kN/m³
Verification	Factor of safety
Required FS — permanent	1.50
Required FS — transient	1.30
Required FS — accidental	1.10
Required FS — seismic	1.10

2. Geometry

2.1 Model extent

Item	Value
Model left x	-15.000 m
Model right x	30.000 m
Model bottom elevation	-15.000 m

2.2 Ground surface

No	x [m]	y [m]
1	-15.000	0.000
2	0.000	0.000
3	0.000	0.000
4	3.000	8.000
5	3.000	8.000
6	30.000	8.000

2.3 Interface 2

No	x [m]	y [m]
1	-15.000	-4.000
2	30.000	-4.000

3. Soils

3.1 Soil parameters

Name	γ [kN/m³]	γsat [kN/m³]	c′ or cu [kPa]	φ′ [°]	Stress state
Residual soil	18.50	19.50	10.00	28.00	Effective
Weathered rock	21.00	22.00	30.00	35.00	Effective

3.2 Assignment

Layer	Soil
L1	Residual soil
L2	Weathered rock

3.3 Soil layers

Layer	Thickness [m]	Top z [m]	Soil
L1	4.000	0.000	Residual soil
L2	11.000	-4.000	Weathered rock

3.4 Interface polygons

No	Name	Soil	Points
1	Cut slope	Residual soil	4

4. Reinforcement

4.1 Anchors

No	x [m]	y [m]	Free length [m]	Root length [m]	Slope [°]	Direction	Spacing [m]	Force [kN]
1	2.100	5.600	8.000	8.000	15.0	into the slope	2.500	300.000
2	0.900	2.400	8.000	8.000	15.0	into the slope	2.500	300.000

5. Water

Item	Value
Water type	No water

6. Analysis

6.1 Analysis settings

Item	Value
Slip surface	Circular
Method	Bishop
Analysis type	Optimization
Design situation	Permanent

7. Results

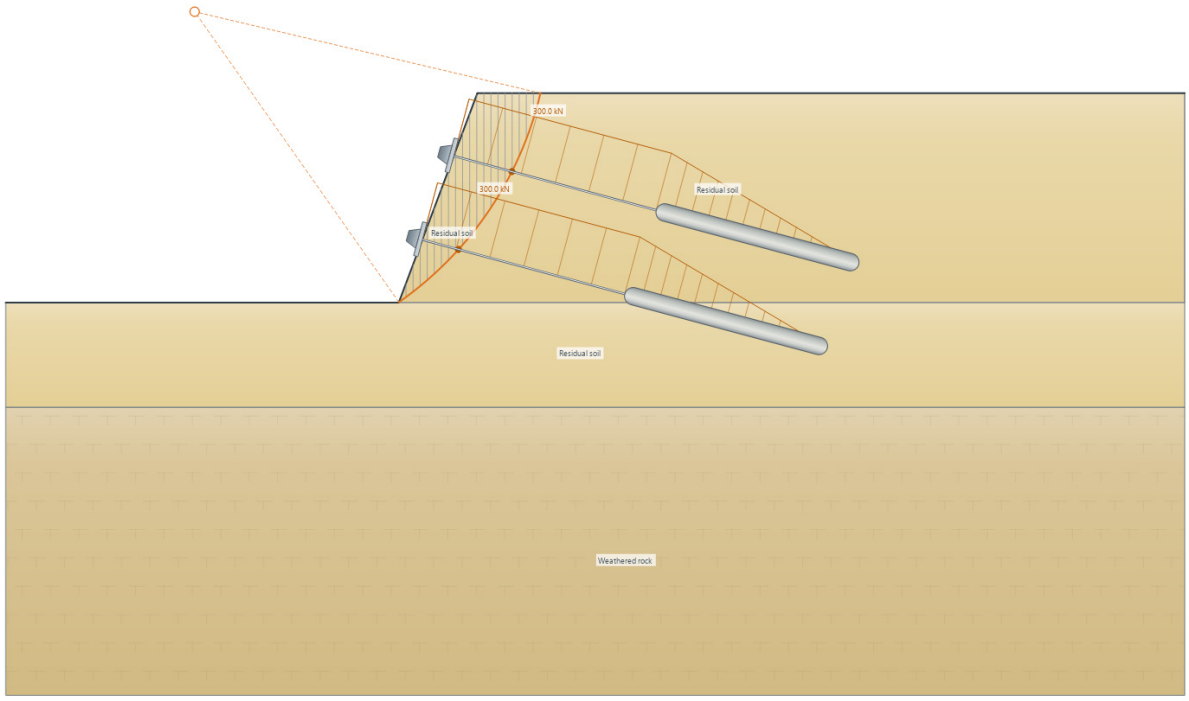


Figure 1. Slope, critical slip surface and slices

Item	Value
Method	Bishop

Item	Value
Slip surface	Circular
Analysis type	Optimization
Factor of safety FS	1.537
Converged	Yes
Verification	required 1.50 (permanent)
Circle centre x	-7.790 m
Circle centre y	11.110 m
Circle radius R	13.560 m
Slip surfaces evaluated	373
Number of slices	20
Sum of active forces Fa	223.04 kN/m
Sum of passive forces Fp	342.76 kN/m
Sliding moment Ma	3024.40 kNm/m
Resisting moment Mp	4647.84 kNm/m
Surplus sliding force at the toe (from top, FS 1.50)	0.00 kN/m at 0.00°
Surplus sliding force at the crest (from bottom, FS 1.50)	0.00 kN/m at 0.00°

7.1 Slices

Slice	x left [m]	x right [m]	b [m]	α [°]	l [m]	c [kPa]	φ [°]	U [kN/m]	N′ [kN/m]	T [kN/m]	E left [kN/m]	E right [kN/m]
1	0.006	0.276	0.270	35.796	0.333	10.000	28.000	0.000	0.045	2.183	0.000	0.000
2	0.276	0.546	0.270	37.216	0.339	10.000	28.000	0.000	2.565	3.095	0.000	0.000
3	0.546	0.816	0.270	38.664	0.346	10.000	28.000	0.000	5.071	4.006	0.000	0.000
4	0.816	1.086	0.270	40.141	0.353	10.000	28.000	0.000	7.565	4.917	0.000	0.000
5	1.086	1.356	0.270	41.652	0.362	10.000	28.000	0.000	10.049	5.830	0.000	0.000
6	1.356	1.626	0.270	43.199	0.371	10.000	28.000	0.000	12.527	6.746	0.000	0.000
7	1.626	1.897	0.270	44.786	0.381	10.000	28.000	0.000	14.999	7.666	0.000	0.000
8	1.897	2.167	0.270	46.418	0.392	10.000	28.000	0.000	17.467	8.593	0.000	0.000
9	2.167	2.437	0.270	48.101	0.405	10.000	28.000	0.000	41.775	17.086	0.000	0.000
10	2.437	2.707	0.270	49.840	0.419	10.000	28.000	0.000	22.401	10.476	0.000	0.000
11	2.707	2.977	0.270	51.645	0.435	10.000	28.000	0.000	24.869	11.437	0.000	0.000
12	2.977	3.247	0.270	53.525	0.454	10.000	28.000	0.000	25.609	11.817	0.000	0.000
13	3.247	3.517	0.270	55.493	0.477	10.000	28.000	0.000	23.821	11.345	0.000	0.000
14	3.517	3.788	0.270	57.564	0.504	10.000	28.000	0.000	21.769	10.809	0.000	0.000
15	3.788	4.058	0.270	59.762	0.536	10.000	28.000	0.000	19.393	10.200	0.000	0.000
16	4.058	4.328	0.270	62.116	0.578	10.000	28.000	0.000	42.705	18.534	0.000	0.000
17	4.328	4.598	0.270	64.670	0.631	10.000	28.000	0.000	13.138	8.654	0.000	0.000
18	4.598	4.868	0.270	67.496	0.706	10.000	28.000	0.000	8.748	7.619	0.000	0.000
19	4.868	5.138	0.270	70.715	0.818	10.000	28.000	0.000	2.747	6.273	0.000	0.000
20	5.138	5.409	0.270	74.592	1.017	10.000	28.000	0.000	-6.557	4.348	0.000	0.000

7.2 Anchors

Anchor	x [m]	y [m]	Force [kN]	Free length [m]	Required free length [m]	Acting force [%]
1	2.100	5.600	300.000	8.000	2.296	100.000
2	0.900	2.400	300.000	8.000	1.428	100.000

7.3 Reinforcement forces

Element	No	Force [kN/m]	Force per element [kN]	Acting
Anchor	1	120.000	300.000	Yes
Anchor	2	120.000	300.000	Yes

Verification: FS = 1.537, required 1.50 (permanent) — SATISFACTORY.