

Slide Analysis Information

Estabilidad UD FJC Sede Vivero

Project Summary

File Name: Perfil1BTerrAnclado
Slide Modeler Version: 6.005
Project Title: Estabilidad UD FJC Sede Vivero
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Date Created: 5/03/2019, 3:05:39 p. m.

General Settings

Units of Measurement: Metric Units
Time Units: days
Permeability Units: meters/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
Janbu simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check $m\alpha < 0.2$: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Ru Coefficient
Pore Fluid Unit Weight: 9.81 kN/m³
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116

Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Circular
 Search Method: Slope Search
 Number of Surfaces: 5000
 Upper Angle: Not Defined
 Lower Angle: Not Defined
 Composite Surfaces: Disabled
 Reverse Curvature: Create Tension Crack
 Minimum Elevation: Not Defined
 Minimum Depth: Not Defined

Loading

2 Distributed Loads present



Distributed Load 1

Distribution: Constant
 Magnitude [kN/m²]: 20
 Orientation: Normal to boundary

Distributed Load 2

Distribution: Constant
 Magnitude [kN/m²]: 10
 Orientation: Vertical

Material Properties

Property	Arcilla Dura	Arenisca
Color		
Strength Type	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [kN/m ³]	21	22
Cohesion [kPa]	100	250
Friction Angle [deg]	0	30
Ru Value	0.1	0.1

Support Properties

Support 1

Support Type: Grouted Tieback

Force Application: Active
Out-of-Plane Spacing: 2 m
Tensile Capacity: 148 kN
Plate Capacity: 500 kN
Bond length: 10.000 m
Bond Strength: 31 kN/m

Global Minimums

Method: bishop simplified

FS: 4.756700
Center: 101982.600, 100253.071
Radius: 13.995
Left Slip Surface Endpoint: 101974.886, 100241.395
Right Slip Surface Endpoint: 101996.016, 100249.089
Resisting Moment=36535.5 kN-m
Driving Moment=7680.85 kN-m

Method: janbu simplified

FS: 4.561890
Center: 101982.600, 100253.071
Radius: 13.995
Left Slip Surface Endpoint: 101974.886, 100241.395
Right Slip Surface Endpoint: 101996.016, 100249.089
Resisting Horizontal Force=2113.05 kN
Driving Horizontal Force=463.195 kN

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 3772
Number of Invalid Surfaces: 1228

Error Codes:

Error Code -100 reported for 1 surface
Error Code -105 reported for 43 surfaces
Error Code -107 reported for 356 surfaces
Error Code -108 reported for 141 surfaces
Error Code -112 reported for 687 surfaces

Method: janbu simplified

Number of Valid Surfaces: 3350
Number of Invalid Surfaces: 1650

Error Codes:

Error Code -100 reported for 1 surface
 Error Code -105 reported for 43 surfaces
 Error Code -107 reported for 356 surfaces
 Error Code -108 reported for 563 surfaces
 Error Code -112 reported for 687 surfaces

Error Codes

The following errors were encountered during the computation:

- 100 = Both surface / slope intersections are on the same horizontal surface. In general, this will give a very high or infinite factor of safety (zero driving force), if calculated.
- 105 = More than two surface / slope intersections with no valid slip surface.
- 107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
- 108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
- 112 = The coefficient $M\text{-Alpha} = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi))/F < 0.2$ for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 4.7567

Slice Number	Width [m]	Weight [kN]	Base Material	Base Cohesion [kPa]	Base Friction Angle [degrees]	Shear Stress [kPa]	Shear Strength [kPa]	Base Normal Stress [kPa]	Pore Pressure [kPa]	Effective Normal Stress [kPa]
1	0.845219	4.60088	Arcilla Dura	100	0	21.023	100	21.1081	0.544342	20.5638
2	0.845219	13.6879	Arcilla Dura	100	0	21.023	100	29.5773	1.61946	27.9578
3	0.845219	21.4748	Arcilla Dura	100	0	21.023	100	34.5955	2.54074	32.0548
4	0.845219	27.5169	Arcilla Dura	100	0	21.023	100	40.1574	3.25559	36.9018
5	0.845219	36.4636	Arcilla Dura	100	0	21.023	100	49.2633	4.3141	44.9492
6	0.845219	54.8054	Arcilla Dura	100	0	21.023	100	69.5641	6.48417	63.08
7	0.845219	71.6832	Arcilla Dura	100	0	21.023	100	88.1904	8.48103	79.7094
8	0.845219	76.627	Arcilla Dura	100	0	21.023	100	92.7365	9.06594	83.6705
9	0.845219	77.654	Arcilla Dura	100	0	21.023	100	92.6717	9.18744	83.4842
10	0.845219	87.9615	Arcilla Dura	100	0	21.023	100	168.161	10.407	157.754
11	0.845219	106.561	Arcilla Dura	100	0	21.023	100	124.325	12.6075	111.717

12	0.845219	110.763	Arcilla Dura	100	0	21.023	100	128.001	13.1046	114.896
13	0.845219	108.115	Arcilla Dura	100	0	21.023	100	123.537	12.7913	110.745
14	0.845219	115.596	Arcilla Dura	100	0	21.023	100	131.005	13.6764	117.328
15	0.845219	140.475	Arcilla Dura	100	0	21.023	100	158.983	16.6199	142.363
16	0.845219	150.675	Arcilla Dura	100	0	21.023	100	225.188	17.8267	207.361
17	0.845219	145.775	Arcilla Dura	100	0	21.023	100	162.008	17.247	144.761
18	0.845219	138.826	Arcilla Dura	100	0	21.023	100	151.915	16.4248	135.49
19	0.845219	129.145	Arcilla Dura	100	0	21.023	100	138.345	15.2795	123.065
20	0.845219	117.657	Arcilla Dura	100	0	21.023	100	122.285	13.9203	108.364
21	0.845219	104.28	Arcilla Dura	100	0	21.023	100	103.475	12.3376	91.1372
22	0.845219	89.4639	Arcilla Dura	100	0	21.023	100	124.925	10.5847	114.341
23	0.845219	72.5641	Arcilla Dura	100	0	21.023	100	56.9463	8.58525	48.3611
24	0.845219	50.1151	Arcilla Dura	100	0	21.023	100	22.2512	5.92925	16.322
25	0.845219	18.7975	Arcilla Dura	100	0	21.023	100	-31.6772	2.22399	-33.9012

Global Minimum Query (janbu simplified) - Safety Factor: 4.56189

Slice Number	Width [m]	Weight [kN]	Base Material	Base Cohesion [kPa]	Base Friction Angle [degrees]	Shear Stress [kPa]	Shear Strength [kPa]	Base Normal Stress [kPa]	Pore Pressure [kPa]	Effective Normal Stress [kPa]
1	0.845219	4.60088	Arcilla Dura	100	0	21.9207	100	21.6565	0.544342	21.1122
2	0.845219	13.6879	Arcilla Dura	100	0	21.9207	100	30.0435	1.61946	28.424
3	0.845219	21.4748	Arcilla Dura	100	0	21.9207	100	34.9879	2.54074	32.4471
4	0.845219	27.5169	Arcilla Dura	100	0	21.9207	100	40.4819	3.25559	37.2263
5	0.845219	36.4636	Arcilla Dura	100	0	21.9207	100	49.5246	4.3141	45.2105
6	0.845219	54.8054	Arcilla Dura	100	0	21.9207	100	69.7658	6.48417	63.2816
7	0.845219	71.6832	Arcilla Dura	100	0	21.9207	100	88.3348	8.48103	79.8537
8	0.845219	76.627	Arcilla Dura	100	0	21.9207	100	92.8251	9.06594	83.7592

9	0.845219	77.654	Arcilla Dura	100	0	21.9207	100	92.7057	9.18744	83.5183
10	0.845219	87.9615	Arcilla Dura	100	0	21.9207	100	168.141	10.407	157.734
11	0.845219	106.561	Arcilla Dura	100	0	21.9207	100	124.25	12.6075	111.643
12	0.845219	110.763	Arcilla Dura	100	0	21.9207	100	127.871	13.1046	114.766
13	0.845219	108.115	Arcilla Dura	100	0	21.9207	100	123.35	12.7913	110.559
14	0.845219	115.596	Arcilla Dura	100	0	21.9207	100	130.758	13.6764	117.082
15	0.845219	140.475	Arcilla Dura	100	0	21.9207	100	158.675	16.6199	142.055
16	0.845219	150.675	Arcilla Dura	100	0	21.9207	100	224.813	17.8267	206.987
17	0.845219	145.775	Arcilla Dura	100	0	21.9207	100	161.561	17.247	144.314
18	0.845219	138.826	Arcilla Dura	100	0	21.9207	100	151.389	16.4248	134.964
19	0.845219	129.145	Arcilla Dura	100	0	21.9207	100	137.728	15.2795	122.448
20	0.845219	117.657	Arcilla Dura	100	0	21.9207	100	121.562	13.9203	107.642
21	0.845219	104.28	Arcilla Dura	100	0	21.9207	100	102.625	12.3376	90.2874
22	0.845219	89.4639	Arcilla Dura	100	0	21.9207	100	123.913	10.5847	113.329
23	0.845219	72.5641	Arcilla Dura	100	0	21.9207	100	55.7121	8.58525	47.1269
24	0.845219	50.1151	Arcilla Dura	100	0	21.9207	100	20.6696	5.92925	14.7404
25	0.845219	18.7975	Arcilla Dura	100	0	21.9207	100	-33.9794	2.22399	-36.2033

List Of Coordinates

Line Load

X	Y
102009	100249
102002	100249

Line Load

X	Y
101976	100241
101969	100241

External Boundary

X	Y
101989	100249
101989	100249
101988	100249
101988	100249
101988	100249
101986	100245
101984	100245
101982	100243
101980	100243
101978	100241
101978	100241
101977	100241
101977	100241
101977	100241
101977	100241
101976	100241
101976	100241
101968	100241
101968	100236
101968	100224
102010	100224
102010	100245
102010	100246
102010	100249
102002	100249
102001	100249
102000	100249
102000	100249
102000	100249
101999	100249
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101996	100249
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101995	100249
101995	100249
101995	100249
101994	100249
101994	100249
101993	100249

101992	100249
101990	100249

Material Boundary

X	Y
102009	100245
102010	100245

Material Boundary

X	Y
101968	100236
101969	100236
101969	100237
101970	100237
101972	100237
101972	100237
101973	100237
101974	100237
101974	100237
101975	100237
101975	100237
101977	100237
101978	100237
101978	100237
101979	100237
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