

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

Seismic Load Coefficient (Horizontal): 0.144
 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: 3.478360
Center: 101983.625, 100264.066
Radius: 23.993
Left Slip Surface Endpoint: 101975.763, 100241.397
Right Slip Surface Endpoint: 102002.458, 100249.201
Resisting Moment=71173.3 kN-m
Driving Moment=20461.8 kN-m

Method: janbu simplified

FS: 3.247030
Center: 101983.625, 100264.066
Radius: 23.993
Left Slip Surface Endpoint: 101975.763, 100241.397
Right Slip Surface Endpoint: 102002.458, 100249.201
Resisting Horizontal Force=2669.56 kN
Driving Horizontal Force=822.153 kN

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 4088
Number of Invalid Surfaces: 912

Error Codes:

Error Code -100 reported for 1 surface
Error Code -105 reported for 43 surfaces
Error Code -107 reported for 139 surfaces
Error Code -108 reported for 32 surfaces
Error Code -112 reported for 697 surfaces

Method: janbu simplified

Number of Valid Surfaces: 3737
Number of Invalid Surfaces: 1263

Error Codes:

- Error Code -100 reported for 1 surface
- Error Code -105 reported for 43 surfaces
- Error Code -107 reported for 139 surfaces
- Error Code -108 reported for 383 surfaces
- Error Code -112 reported for 697 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: 3.47836

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	1.06782	4.78207	Arcilla Dura	100	0	28.7492	100	13.7021	0.447833	13.2542
2	1.06782	12.4731	Arcilla Dura	100	0	28.7492	100	19.4531	1.16809	18.285
3	1.06782	20.7722	Arcilla Dura	100	0	28.7492	100	25.8269	1.94528	23.8816
4	1.06782	45.7735	Arcilla Dura	100	0	28.7492	100	47.884	4.28661	43.5974
5	1.06782	69.4291	Arcilla Dura	100	0	28.7492	100	68.7127	6.50192	62.2108
6	1.06782	74.1563	Arcilla Dura	100	0	28.7492	100	122.943	6.94462	115.998
7	1.06782	83.5584	Arcilla Dura	100	0	28.7492	100	79.3557	7.82511	71.5306
8	1.06782	112.976	Arcilla Dura	100	0	28.7492	100	105.624	10.58	95.0441
9	1.06782	120.167	Arcilla Dura	100	0	28.7492	100	111.077	11.2535	99.8235
10	1.06782	122.675	Arcilla Dura	100	0	28.7492	100	112.136	11.4883	100.647
			Arcilla							

			Dura							
12	1.06782	183.153	Arcilla Dura	100	0	28.7492	100	210.215	17.152	193.063
13	1.06782	181.116	Arcilla Dura	100	0	28.7492	100	162.859	16.9612	145.897
14	1.06782	175.746	Arcilla Dura	100	0	28.7492	100	156.418	16.4583	139.959
15	1.06782	167.863	Arcilla Dura	100	0	28.7492	100	147.567	15.7201	131.847
16	1.06782	158.921	Arcilla Dura	100	0	28.7492	100	137.653	14.8827	122.77
17	1.06782	150.655	Arcilla Dura	100	0	28.7492	100	128.285	14.1086	114.176
18	1.06782	141.69	Arcilla Dura	100	0	28.7492	100	152.008	13.2691	138.739
19	1.06782	130.572	Arcilla Dura	100	0	28.7492	100	105.863	12.2278	93.6356
20	1.06782	117.156	Arcilla Dura	100	0	28.7492	100	91.2518	10.9714	80.2804
21	1.06782	101.465	Arcilla Dura	100	0	28.7492	100	74.2891	9.50208	64.7871
22	1.06782	84.726	Arcilla Dura	100	0	28.7492	100	56.0562	7.93446	48.1218
23	1.06782	65.5224	Arcilla Dura	100	0	28.7492	100	35.1306	6.13607	28.9946
24	1.06782	42.0037	Arcilla Dura	100	0	28.7492	100	9.63135	3.93358	5.69777
25	1.06782	14.2451	Arcilla Dura	100	0	28.7492	100	-8.11503	1.33403	-9.44906

Global Minimum Query (janbu simplified) - Safety Factor: 3.24703

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	1.06782	4.78207	Arcilla Dura	100	0	30.7974	100	14.3591	0.447833	13.9113
2	1.06782	12.4731	Arcilla Dura	100	0	30.7974	100	20.0067	1.16809	18.8386
3	1.06782	20.7722	Arcilla Dura	100	0	30.7974	100	26.281	1.94528	24.3358
4	1.06782	45.7735	Arcilla Dura	100	0	30.7974	100	48.2415	4.28661	43.9549
5	1.06782	69.4291	Arcilla Dura	100	0	30.7974	100	68.9759	6.50192	62.4739
6	1.06782	74.1563	Arcilla Dura	100	0	30.7974	100	123.114	6.94462	116.169
7	1.06782	83.5584	Arcilla Dura Arcilla	100	0	30.7974	100	79.4344	7.82511	71.6093

			Dura							
9	1.06782	120.167	Arcilla Dura	100	0	30.7974	100	110.973	11.2535	99.7197
10	1.06782	122.675	Arcilla Dura	100	0	30.7974	100	111.94	11.4883	100.452
11	1.06782	159.48	Arcilla Dura	100	0	30.7974	100	145.006	14.935	130.071
12	1.06782	183.153	Arcilla Dura	100	0	30.7974	100	209.831	17.152	192.679
13	1.06782	181.116	Arcilla Dura	100	0	30.7974	100	162.377	16.9612	145.416
14	1.06782	175.746	Arcilla Dura	100	0	30.7974	100	155.836	16.4583	139.377
15	1.06782	167.863	Arcilla Dura	100	0	30.7974	100	146.881	15.7201	131.161
16	1.06782	158.921	Arcilla Dura	100	0	30.7974	100	136.857	14.8827	121.974
17	1.06782	150.655	Arcilla Dura	100	0	30.7974	100	127.373	14.1086	113.264
18	1.06782	141.69	Arcilla Dura	100	0	30.7974	100	150.973	13.2691	137.704
19	1.06782	130.572	Arcilla Dura	100	0	30.7974	100	104.694	12.2278	92.4661
20	1.06782	117.156	Arcilla Dura	100	0	30.7974	100	89.9367	10.9714	78.9653
21	1.06782	101.465	Arcilla Dura	100	0	30.7974	100	72.8123	9.50208	63.3102
22	1.06782	84.726	Arcilla Dura	100	0	30.7974	100	54.3972	7.93446	46.4628
23	1.06782	65.5224	Arcilla Dura	100	0	30.7974	100	33.2621	6.13607	27.1261
24	1.06782	42.0037	Arcilla Dura	100	0	30.7974	100	7.51532	3.93358	3.58174
25	1.06782	14.2451	Arcilla Dura	100	0	30.7974	100	-10.5336	1.33403	-11.8676

List Of Coordinates

Line Load

X	Y
102009	100249
102002	100249

Line Load

X	Y
101976	100241

101969	100241
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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
101999	100249
101998	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
101979	100237
101980	100238
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101980	100238
101981	100238
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102009	100245
102010	100246