

Slope Stability

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File Information

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Project Settings

Unit System: International System of Units (SI)

Analysis Settings

Slope Stability

Kind: SLOPE/W

Analysis Type: Spencer

Settings

PWP Conditions from: Ru

Unit Weight of Water: 9.807 kN/m³

Slip Surface

Direction of movement: Left to Right

Use Passive Mode: No

Slip Surface Option: Entry and Exit

Critical slip surfaces saved: 1

Optimize Critical Slip Surface Location: No

Tension Crack Option: (none)

Distribution

F of S Calculation Option: Constant

Advanced

Geometry Settings

Minimum Slip Surface Depth: 0.1 m

Number of Slices: 30

Factor of Safety Convergence Settings

Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.001

Under-Relaxation Criteria

Initial Rate: 1

Minimum Rate: 0.1

Rate Reduction Factor: 0.65

Reduction Frequency (iterations): 50

Solution Settings

Search Method: Root Finder

Tolerable difference between starting and converged F of S: 3

Maximum iterations to calculate converged lambda: 20
Max Absolute Lambda: 2

Materials

Arena Arcillosa #1

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 20.17 kN/m³
Effective Cohesion: 81 kPa
Effective Friction Angle: 21 °
Phi-B: 0 °
Pore Water Pressure
Ru: 0.25

Arena Arcillosa #2

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 18.93 kN/m³
Effective Cohesion: 47 kPa
Effective Friction Angle: 26 °
Phi-B: 0 °
Pore Water Pressure
Ru: 0.25

Relleno Zodme

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 16.42 kN/m³
Effective Cohesion: 8 kPa
Effective Friction Angle: 19.74 °
Phi-B: 0 °
Pore Water Pressure
Ru: 0.25

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (13.633; 12.222553) m
Left-Zone Right Coordinate: (19.473; 12.222553) m
Left-Zone Increment: 8
Right Type: Range
Right-Zone Left Coordinate: (33.033; 7.722553) m
Right-Zone Right Coordinate: (37.213; 7.722553) m
Right-Zone Increment: 8
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (11.473; 12.222553) m
Right Coordinate: (38.873; 7.722553) m

Seismic Coefficients

Horz Seismic Coef.: 0.08
Vert Seismic Coef.: 0.05

Surcharge Loads

Surcharge Load 1

Surcharge (Unit Weight): 15 kN/m³
Direction: Vertical

Coordinates

	X	Y
	0.993108 m	13.522553 m
	16.493108 m	13.522553 m

Geometry

Name: 2D Geometry

Settings

View: 2D
Element Thickness: 1 m

Points

	X	Y
Point 1	0.993108 m	6.322553 m
Point 2	50.993108 m	6.322553 m
Point 3	50.993108 m	6.922553 m
Point 4	0.993108 m	6.922553 m
Point 5	0.993108 m	7.722553 m
Point 6	50.993108 m	7.722553 m
Point 7	32.993108 m	6.322553 m
Point 8	32.993108 m	7.722553 m
Point 9	19.493108 m	7.722553 m
Point 10	19.493108 m	12.222553 m
Point 11	0.993108 m	12.222553 m
Point 12	16.493108 m	6.322553 m
Point 13	0.993108 m	1.002753 m
Point 14	50.981008 m	1.002753 m
Point 15	1 m	1 m

Regions

	Material	Points	Area
Region 1	Arena Arcillosa #2	4;1;12;7;2;3	30 m ²
Region 2	Arena Arcillosa #1	6;3;4;5;9;8	40 m ²
Region 3	Relleno Zodme	8;10;11;5;9	113.62 m ²
Region 4	Arena Arcillosa #2	1;13;14;2;7;12	265.96 m ²

Slip Results

Slip Surfaces Analysed: 315 of 405 converged

Current Slip Surface

Slip Surface: 8
Factor of Safety: 4.422

Volume: 69.146602 m³

Weight: 1,039.9568 kN

Resisting Moment: 19,608.56 kN·m

Activating Moment: 4,434.0215 kN·m

Resisting Force: 1,235.4129 kN

Activating Force: 279.34693 kN

Slip Rank: 1 of 405 slip surfaces

Exit: (33.5555; 7.722553) m

Entry: (13.633; 12.222553) m

Radius: 14.816849 m

Center: (25.959537; 20.444202) m

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	13.990514 m	11.731425 m	6.5509738 kPa	17.306782 kPa	3.1758083 kPa	8 kPa	0 kPa	Relleno Zodme
Slice 2	14.70554 m	10.822148 m	9.6538821 kPa	27.477082 kPa	5.2625582 kPa	8 kPa	0 kPa	Relleno Zodme
Slice 3	15.420568 m	10.041792 m	12.316847 kPa	36.7785 kPa	7.2226577 kPa	8 kPa	0 kPa	Relleno Zodme
Slice 4	16.135594 m	9.3626448 m	14.634437 kPa	45.316999 kPa	9.0594715 kPa	8 kPa	0 kPa	Relleno Zodme
Slice 5	16.804852 m	8.8005983 m	11.677421 kPa	36.7456 kPa	7.4017436 kPa	8 kPa	0 kPa	Relleno Zodme
Slice 6	17.428341 m	8.3358462 m	13.263387 kPa	42.801649 kPa	8.7216002 kPa	8 kPa	0 kPa	Relleno Zodme
Slice 7	18.051829 m	7.9193766 m	14.684589 kPa	48.441078 kPa	9.967093 kPa	8 kPa	0 kPa	Relleno Zodme
Slice 8	18.645957 m	7.5622331 m	16.205084 kPa	49.780387 kPa	12.888352 kPa	81 kPa	0 kPa	Arena Arcillosa #1
Slice 9	19.210724 m	7.2573934 m	17.819096 kPa	56.953949 kPa	15.022463 kPa	81 kPa	0 kPa	Arena Arcillosa #1
Slice 10	19.69713 m	7.0177133 m	18.856037 kPa	61.990915 kPa	16.557928 kPa	81 kPa	0 kPa	Arena Arcillosa #1
Slice 11	20.29442 m	6.7597473 m	19.48946 kPa	66.951805 kPa	23.148933 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 12	21.080955 m	6.4597473 m	20.085514 kPa	71.019344 kPa	24.842089 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 13	21.794602 m	6.2286865 m	20.42191 kPa	74.005842 kPa	26.13463 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 14	22.435361 m	6.056346 m	20.549428 kPa	76.062957 kPa	27.075757 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 15	23.07612 m	5.9142935 m	20.526441 kPa	77.567829 kPa	27.820944 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 16	23.716879 m	5.8016458 m	20.357338 kPa	78.522222 kPa	28.36891 kPa	47 kPa	0 kPa	Arena Arcillosa #2

Slice 17	24.357639 m	5.7177265 m	20.04548 kPa	78.924453 kPa	28.717194 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 18	24.998398 m	5.6620455 m	19.593302 kPa	78.769342 kPa	28.862083 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 19	25.639157 m	5.6342837 m	19.002391 kPa	78.048061 kPa	28.798498 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 20	26.279916 m	5.6342837 m	18.273527 kPa	76.747854 kPa	28.519835 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 21	26.920675 m	5.6620455 m	17.406711 kPa	74.851624 kPa	28.017756 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 22	27.561434 m	5.7177265 m	16.401162 kPa	72.337339 kPa	27.281897 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 23	28.202194 m	5.8016458 m	15.255293 kPa	69.177222 kPa	26.299482 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 24	28.842953 m	5.9142935 m	13.966669 kPa	65.336642 kPa	25.05481 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 25	29.483712 m	6.056346 m	12.531929 kPa	60.772611 kPa	23.528553 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 26	30.124471 m	6.2286865 m	10.946684 kPa	55.431714 kPa	21.696799 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 27	30.838118 m	6.4597473 m	8.9867399 kPa	48.441188 kPa	19.24322 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 28	31.624653 m	6.7597473 m	6.6013187 kPa	39.427541 kPa	16.010418 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 29	32.505515 m	7.1628736 m	3.5179304 kPa	33.439723 kPa	11.4859 kPa	81 kPa	0 kPa	Arena Arcillosa #1
Slice 30	33.274304 m	7.5628736 m	0.84544277 kPa	23.148421 kPa	8.5613112 kPa	81 kPa	0 kPa	Arena Arcillosa #1