

Slope Stability

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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: 13 kN/m³
Effective Cohesion: 8 kPa
Effective Friction Angle: 16.45 °
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
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 m²
Region 2	Arena Arcillosa #1	6;3;4;5;9;8	40 m²
Region 3	Relleno Zodme	8;10;11;5;9	113.62 m²
Region 4	Arena Arcillosa #2	1;13;14;2;7;12	265.96 m²

Slip Results

Slip Surfaces Analysed: 315 of 405 converged

Current Slip Surface

Slip Surface: 8
Factor of Safety: 5.675

Volume: 69.146602 m³
Weight: 1,039.9568 kN
Resisting Moment: 19,615.665 kN·m
Activating Moment: 3,456.6395 kN·m
Resisting Force: 1,235.1085 kN
Activating Force: 217.64056 kN
Slip Rank: 2 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	13.990513 m	11.731425 m	6.5509738 kPa	18.631382 kPa	3.5669157 kPa	8 kPa	0 kPa	Relleno Zodme
Slice 2	14.70554 m	10.822148 m	9.6538821 kPa	29.31565 kPa	5.8054222 kPa	8 kPa	0 kPa	Relleno Zodme
Slice 3	15.420568 m	10.041792 m	12.316847 kPa	38.994566 kPa	7.8769835 kPa	8 kPa	0 kPa	Relleno Zodme
Slice 4	16.135594 m	9.3626448 m	14.634437 kPa	47.805642 kPa	9.7942795 kPa	8 kPa	0 kPa	Relleno Zodme
Slice 5	16.804852 m	8.8005983 m	11.677421 kPa	38.868696 kPa	8.0286184 kPa	8 kPa	0 kPa	Relleno Zodme
Slice 6	17.428341 m	8.3358462 m	13.263387 kPa	45.079031 kPa	9.3940305 kPa	8 kPa	0 kPa	Relleno Zodme
Slice 7	18.051829 m	7.9193766 m	14.684589 kPa	50.825301 kPa	10.671069 kPa	8 kPa	0 kPa	Relleno Zodme
Slice 8	18.645957 m	7.5622331 m	16.205084 kPa	52.651431 kPa	13.990442 kPa	81 kPa	0 kPa	Arena Arcillosa #1
Slice 9	19.210724 m	7.2573934 m	17.819096 kPa	59.785679 kPa	16.109462 kPa	81 kPa	0 kPa	Arena Arcillosa #1
Slice 10	19.69713 m	7.0177133 m	18.856037 kPa	64.723011 kPa	17.606682 kPa	81 kPa	0 kPa	Arena Arcillosa #1
Slice 11	20.29442 m	6.7597473 m	19.48946 kPa	69.471474 kPa	24.377857 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 12	21.080955 m	6.4597473 m	20.085514 kPa	73.281841 kPa	25.945583 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 13	21.794602 m	6.2286865 m	20.42191 kPa	75.995715 kPa	27.105156 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 14	22.435361 m	6.056346 m	20.549428 kPa	77.778524 kPa	27.912495 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 15	23.07612 m	5.9142935 m	20.526441 kPa	78.985044 kPa	28.512166 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 16	23.716879 m	5.8016458 m	20.357338 kPa	79.619791 kPa	28.904229 kPa	47 kPa	0 kPa	Arena Arcillosa #2

Slice 17	24.357639 m	5.7177265 m	20.04548 kPa	79.68372 kPa	29.087513 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 18	24.998398 m	5.6620455 m	19.593302 kPa	79.174265 kPa	29.059577 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 19	25.639157 m	5.6342837 m	19.002391 kPa	78.085266 kPa	28.816644 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 20	26.279916 m	5.6342837 m	18.273527 kPa	76.406784 kPa	28.353484 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 21	26.920675 m	5.6620455 m	17.406711 kPa	74.124794 kPa	27.663257 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 22	27.561434 m	5.7177265 m	16.401162 kPa	71.220727 kPa	26.737288 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 23	28.202194 m	5.8016458 m	15.255293 kPa	67.670825 kPa	25.564763 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 24	28.842953 m	5.9142935 m	13.966669 kPa	63.445268 kPa	24.132325 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 25	29.483712 m	6.056346 m	12.531929 kPa	58.506975 kPa	22.423528 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 26	30.124471 m	6.2286865 m	10.946684 kPa	52.809982 kPa	20.418095 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 27	30.838118 m	6.4597473 m	8.9867399 kPa	45.45642 kPa	17.787452 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 28	31.624653 m	6.7597473 m	6.6013187 kPa	36.104404 kPa	14.389616 kPa	47 kPa	0 kPa	Arena Arcillosa #2
Slice 29	32.505515 m	7.1628736 m	3.5179304 kPa	27.938131 kPa	9.3740367 kPa	81 kPa	0 kPa	Arena Arcillosa #1
Slice 30	33.274304 m	7.5628736 m	0.84544277 kPa	17.213139 kPa	6.2829699 kPa	81 kPa	0 kPa	Arena Arcillosa #1