CONSORZIO DI BONIFICA DELLA BARAGGIA BIELLESE E VERCELLESE

RIFACIMENTO INVASO SUL TORRENTE SESSERA IN SOSTITUZIONE DELL'ESISTENTE PER IL SUPERAMENTO DELLE CRISI IDRICHE RICORRENTI, IL MIGLIORAMENTO DELL'EFFICIENZA IDRICA DEGLI INVASI ESISTENTI SUI TORRENTI RAVASANELLA ED OSTOLA, LA VALORIZZAZIONE AMBIENTALE DEL COMPRENSORIO

DATA PROGETTO

APRILE 2010

AGGIORNAMENTO PROGETTO

ATTIVITÀ DI PROGETTAZIONE

CONSORZIO DI BONIFICA DELLA BARAGGIA BIELLESE E VERCELLESE
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NUOVA DIGA

STUDIO GEOTECNICO

TABULATI E GRAFICI DELLE VERIFICHE GEOTECNICHE

ELABORATO N.

RD8.2

ATTIVITÀ SPECIALISTICA:

INTEGRA
Ingegneria>Territorio>Grandi Infrastrutture
(Geol. Ing. Massimo PIETRANTONI)

PROGETTO DEFINITIVO

PRATICA N°10131D

ARCH. N° IB080

MODIFICHE AGGIORNAMENTI	Aggiornamento			
	Data			

CONTROLLO		OPERATORE	CONTROLLO	APPROVAZIONE
	Firma	AT	MP	DC

INDICE

1. VERIFICHE DI STABILITA' DI CUNEI TRIDIMANSIONALI IN ROCCIA

1.1. Sponda destra

1.1.1. Stazione 12

1.1.1.1. Scavo laterale senza chiodatura

Document Name:
cuneo_12_laterale_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=2.5383
Wedge is scaled, scale factor=0.482672
Wedge height(on slope)=5.30939 m
Wedge width(on upper face)=2.80496 m
Wedge volume=6.62004 m3
Wedge weight=19.1981 tonnes
Wedge area (joint1)=13.5216 m2
Wedge area (joint2)=11.3484 m2
Wedge area (slope)=7.23853 m2
Wedge area (upper face)=3.74056 m2
Normal force (joint1)=13.7697 tonnes
Normal force (joint2)=23.0952 tonnes
Driving force=10.4631 tonnes
Resisting force=26.5584 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.110612 tonnes/m2
Water force on joint1=1.49566 tonnes
Water force on joint2=1.25527 tonnes

Seismic Force:
Seismic force=0.318689 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

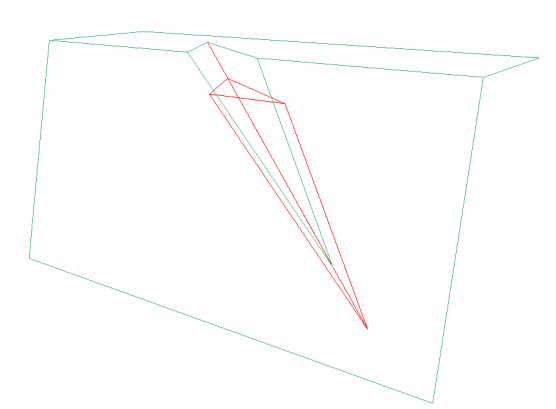
Joint Sets 1&2 line of Intersection:
plunge=32.069 deg, trend=33.6572 deg
length=9.99999 m

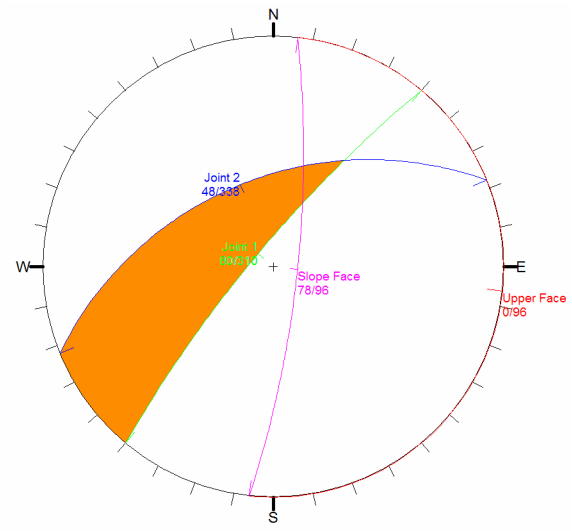
Trace Lengths:
Joint1 on slope face=6.37713 m
Joint2 on slope face=8.10164 m
Joint1 on upper face=5.01609 m
Joint2 on upper face=3.17682 m

Maximum Persistence:
Joint1=9.99999 m
Joint2=9.99999 m

Intersection Angles:
J1&J2 on slope face = 16.2727 deg
J1&Crest on slope face = 121.661 deg
J1&Crest on upper face = 34 deg
J2&Crest on slope face = 42.0662 deg
J2&Crest on upper face = 118 deg
J1&2 on upper face = 28 deg
Joint Set 1 Data:
dip=80 deg, dip direction=310 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Joint Set 2 Data:
dip=48 deg, dip direction=338 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Slope Data:
dip=78 deg, dip direction=96 deg
slope height=11 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=NO
Upper Face Data:
dip=0 deg, dip direction=96 deg
Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %
Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=33.6572 deg, plunge=0 deg
Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope
Point 124: 0, 0, 0
Point 134: -1.47, -3.21, 5.31
Point 234: -1.75, -5.86, 5.31
Point 123: -4.7, -7.05, 5.31





1.1.2. Stazione 13

1.1.2.1. Scavo laterale senza chiodatura

Document Name:
cuneo_13_laterale_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=0.736018
Wedge is scaled, scale factor=0.597183
Wedge height(on slope)=6.56901 m
Wedge width(on upper face)=4.07876 m
Wedge volume=27.9445 m3
Wedge weight=81.0391 tonnes
Wedge area (joint1)=27.4778 m2
Wedge area (joint2)=14.4046 m2
Wedge area (slope)=21.0129 m2
Wedge area (upper face)=12.762 m2
Normal force (joint1)=52.8286 tonnes
Normal force (joint2)=8.72037 tonnes
Driving force=60.2452 tonnes
Resisting force=44.3415 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.136854 tonnes/m2
Water force on joint1=3.76046 tonnes
Water force on joint2=1.97134 tonnes

Seismic Force:
Seismic force=1.34525 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=47.0628 deg, trend=99.6047 deg
length=8.97283 m

Trace Lengths:
Joint1 on slope face=10 m
Joint2 on slope face=6.81379 m
Joint1 on upper face=6.21707 m
Joint2 on upper face=4.36895 m

Maximum Persistence:
Joint1=10 m
Joint2=8.97283 m

Intersection Angles:
J1&J2 on slope face = 38.081 deg
J1&Crest on slope face = 42.1889 deg
J1&Crest on upper face = 41 deg
J2&Crest on slope face = 99.7302 deg
J2&Crest on upper face = 69 deg
J1&2 on upper face = 70 deg
Joint Set 1 Data:
dip=48 deg, dip direction=85 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=85 deg, dip direction=15 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Slope Data:
dip=78 deg, dip direction=126 deg
slope height=11 meters

rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=NO

Upper Face Data:
dip=0 deg, dip direction=126 deg

Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=99.6047 deg, plunge=0 deg

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope
Point 124: 0, 0, 0
Point 134: -5.48, -5.17, 6.57
Point 234: -1.81, -0.111, 6.57
Point 123: -6.03, 1.02, 6.57

1.1.2.2. Scavo laterale con chiodatura

Document Name:
cuneo_13_laterale_SLU_sisma.swd

Job Title:
SWEDGE - Surface Wedge Stability Analysis

Analysis Results:
Analysis type=Deterministic
Safety Factor=1.11216
Wedge is scaled, scale factor=0.597183
Wedge height(on slope)=6.56901 m
Wedge width(on upper face)=4.07876 m
Wedge volume=27.9445 m3
Wedge weight=81.0391 tonnes
Wedge area (joint1)=27.4778 m2
Wedge area (joint2)=14.4046 m2
Wedge area (slope)=21.0129 m2
Wedge area (upper face)=12.762 m2
Normal force (joint1)=52.8286 tonnes
Normal force (joint2)=8.72037 tonnes
Driving force=60.2452 tonnes
Resisting force=67.0022 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.136854 tonnes/m2
Water force on joint1=3.76046 tonnes
Water force on joint2=1.97134 tonnes

Seismic Force:
Seismic force=1.34525 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=47.0628 deg, trend=99.6047 deg
length=8.97283 m

Trace Lengths:
Joint1 on slope face=10 m
Joint2 on slope face=6.81379 m
Joint1 on upper face=6.21707 m
Joint2 on upper face=4.36895 m

Maximum Persistence:
Joint1=10 m
Joint2=8.97283 m

Intersection Angles:
J1&J2 on slope face = 38.081 deg
J1&Crest on slope face = 42.1889 deg
J1&Crest on upper face = 41 deg
J2&Crest on slope face = 99.7302 deg
J2&Crest on upper face = 69 deg
J1&2 on upper face = 70 deg

Joint Set 1 Data:
dip=48 deg, dip direction=85 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Joint Set 2 Data:
dip=85 deg, dip direction=15 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:
dip=78 deg, dip direction=126 deg
slope height=11 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=NO

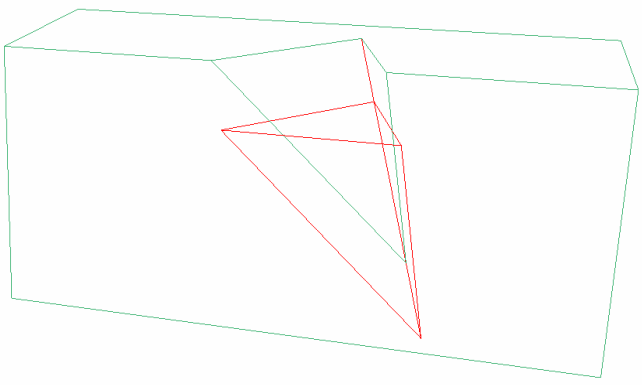
Upper Face Data:
dip=0 deg, dip direction=126 deg

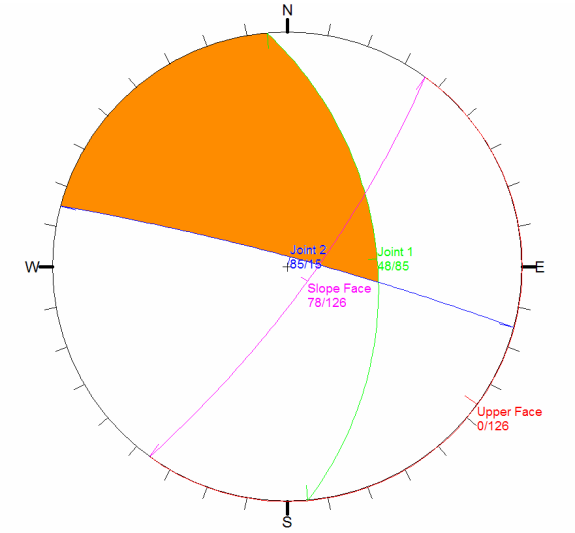
Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=99.6047 deg, plunge=0 deg

Bolt Data:
Number of bolts=1
Bolt #1
bolt model=passive
trend=306 deg, plunge=12.0001 deg
length=10 meters
anchored length=8.29114 meters
capacity=15 tonnes

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope
Point 124: 0, 0, 0
Point 134: -5.48, -5.17, 6.57
Point 234: -1.81, -0.111, 6.57
Point 123: -6.03, 1.02, 6.57




N
W
E
S
Joint 2
/85/15
Joint 1
48/85
Slope Face
78/126
Upper Face
0/126

1.1.3. Stazione 14

1.1.3.1. Scavo laterale senza chiodatura

Document Name:
cuneo_14_laterale_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=4.31944
Wedge is scaled, scale factor=0.131556
Wedge height(on slope)=1.44712 m
Wedge width(on upper face)=5.87787 m
Wedge volume=10.1494 m3
Wedge weight=29.4331 tonnes
Wedge area (joint1)=16.6371 m2
Wedge area (joint2)=9.44541 m2
Wedge area (slope)=5.29584 m2
Wedge area (upper face)=21.0405 m2
Normal force (joint1)=24.5771 tonnes
Normal force (joint2)=6.52856 tonnes
Driving force=5.18802 tonnes
Resisting force=22.4094 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0301483 tonnes/m2
Water force on joint1=0.501579 tonnes
Water force on joint2=0.284762 tonnes

Seismic Force:
Seismic force=0.48859 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=9.19983 deg, trend=172.189 deg
length=9.05136 m

Trace Lengths:
Joint1 on slope face=5.71168 m
Joint2 on slope face=2.21054 m
Joint1 on upper face=5.95114 m
Joint2 on upper face=10 m

Maximum Persistence:
Joint1=9.05136 m
Joint2=10 m

Intersection Angles:
J1&J2 on slope face = 122.977 deg
J1&Crest on slope face = 15.012 deg
J1&Crest on upper face = 99 deg
J2&Crest on slope face = 42.0106 deg
J2&Crest on upper face = 36 deg
J1&2 on upper face = 45 deg
Joint Set 1 Data:
dip=15 deg, dip direction=225 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=50 deg, dip direction=90 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:
dip=78 deg, dip direction=126 deg

slope height=11 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=NO

Upper Face Data:

dip=0 deg, dip direction=126 deg

Water Pressure Data:

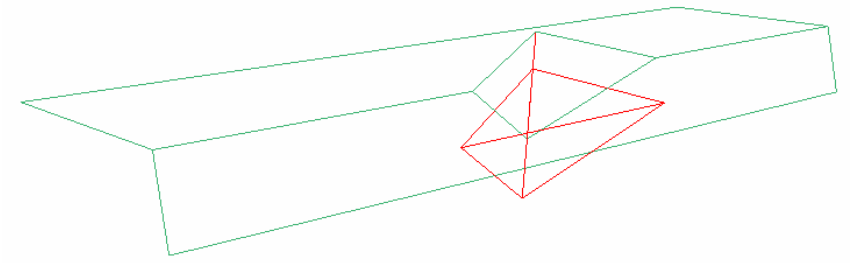
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

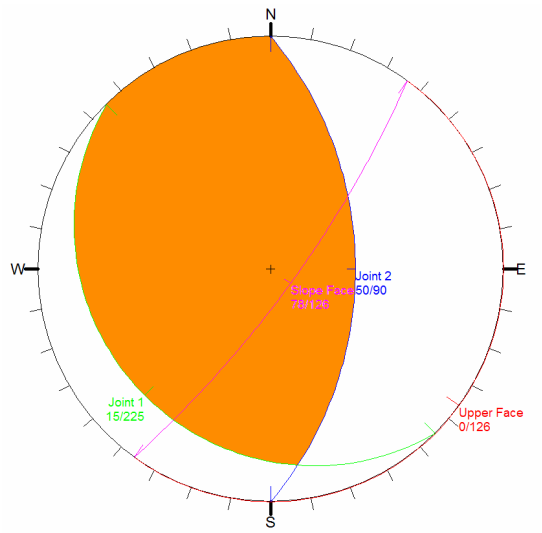
Seismic Data:

Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=172.189 deg, plunge=0 deg

Wedge Vertices:

Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope
Point 124: 0, 0, 0
Point 134: 2.99, 4.64, 1.45
Point 234: -1.21, -1.15, 1.45
Point 123: -1.21, 8.85, 1.45





1.2. Sponda sinistra

1.2.1. Stazione 5

1.2.1.1. Scavo laterale senza chiodatura

Document Name:
cuneo_5_laterale_SLU_sisma_2_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=0.483105
Wedge is scaled, scale factor=0.667239
Wedge height(on slope)=7.33963 m
Wedge width(on upper face)=3.45957 m
Wedge volume=39.0102 m3
Wedge weight=113.13 tonnes
Wedge area (joint1)=42.9128 m2
Wedge area (joint2)=13.1393 m2
Wedge area (slope)=37.0294 m2
Wedge area (upper face)=17.1333 m2
Normal force (joint1)=38.4167 tonnes
Normal force (joint2)=26.8641 tonnes
Driving force=97.3496 tonnes
Resisting force=47.0301 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.169122 tonnes/m2
Water force on joint1=7.2575 tonnes
Water force on joint2=2.22215 tonnes

Seismic Force:
Seismic force=1.87795 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=58.4101 deg, trend=216.05 deg
length=9.53003 m

Trace Lengths:
Joint1 on slope face=10.7409 m
Joint2 on slope face=7.79218 m
Joint1 on upper face=9.72736 m
Joint2 on upper face=3.55393 m

Maximum Persistence:
Joint1=10.7409 m
Joint2=9.53003 m

Intersection Angles:
J1&J2 on slope face = 62.2348 deg
J1&Crest on slope face = 44.1168 deg
J1&Crest on upper face = 20.8335 deg
J2&Crest on slope face = 73.6484 deg
J2&Crest on upper face = 76.7674 deg
J1&2 on upper face = 82.3992 deg
Joint Set 1 Data:
dip=63 deg, dip direction=182 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=71 deg, dip direction=272 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:
dip=79 deg, dip direction=200 deg
slope height=11 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=NO
Upper Face Data:
dip=13 deg, dip direction=200 deg
Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %
Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=216.05 deg, plunge=0 deg
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope
Point 124: 0, 0, 0
Point 134: -6.76, 3.98, 7.34
Point 234: 2.55, 0.59, 7.34
Point 123: 2.94, 4.04, 8.12

1.2.1.2. Scavo laterale con chiodatura

Document Name:
cuneo_5_laterale_SLU_sisma_2.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=1.10832
Wedge is scaled, scale factor=0.667239
Wedge height(on slope)=7.33963 m
Wedge width(on upper face)=3.45957 m
Wedge volume=39.0102 m3
Wedge weight=113.13 tonnes
Wedge area (joint1)=42.9128 m2
Wedge area (joint2)=13.1393 m2
Wedge area (slope)=37.0294 m2
Wedge area (upper face)=17.1333 m2
Normal force (joint1)=38.4167 tonnes
Normal force (joint2)=26.8641 tonnes
Driving force=97.3496 tonnes
Resisting force=107.894 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.169122 tonnes/m2
Water force on joint1=7.2575 tonnes
Water force on joint2=2.22215 tonnes

Seismic Force:
Seismic force=1.87795 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=58.4101 deg, trend=216.05 deg
length=9.53003 m

Trace Lengths:
Joint1 on slope face=10.7409 m
Joint2 on slope face=7.79218 m
Joint1 on upper face=9.72736 m

Joint2 on upper face=3.55393 m

Maximum Persistence:
Joint1=10.7409 m
Joint2=9.53003 m

Intersection Angles:
J1&J2 on slope face = 62.2348 deg
J1&Crest on slope face = 44.1168 deg
J1&Crest on upper face = 20.8335 deg
J2&Crest on slope face = 73.6484 deg
J2&Crest on upper face = 76.7674 deg
J1&2 on upper face = 82.3992 deg

Joint Set 1 Data:
dip=63 deg, dip direction=182 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Joint Set 2 Data:
dip=71 deg, dip direction=272 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:
dip=79 deg, dip direction=200 deg
slope height=11 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=NO

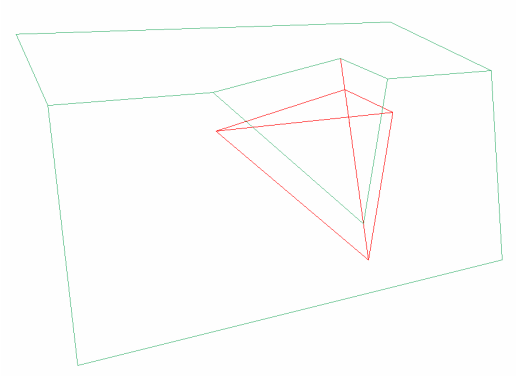
Upper Face Data:
dip=13 deg, dip direction=200 deg

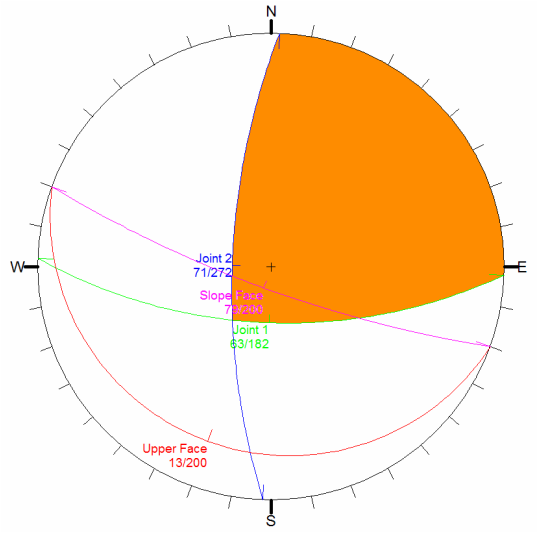
Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=216.05 deg, plunge=0 deg

Bolt Data:
Number of bolts=1
Bolt #1
bolt model=passive
trend=20 deg, plunge=11 deg
length=10 meters
anchored length=8.73146 meters
capacity=54 tonnes

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope
Point 124: 0, 0, 0
Point 134: -6.76, 3.98, 7.34
Point 234: 2.55, 0.59, 7.34
Point 123: 2.94, 4.04, 8.12




N
W
E
S
Joint 2
71/272
Slope Face
78/241
Joint 1
63/182
Upper Face
13/200

1.2.2. Stazione 6

1.2.2.1. Scavo principale senza chiodatura

Document Name:
cuneo_6_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=3.46356
Wedge is scaled, scale factor=0.210189
Wedge height(on slope)=6.30567 m
Wedge width(on upper face)=0.17391 m
Wedge volume=0.37715 m3
Wedge weight=1.09373 tonnes
Wedge area (joint1)=3.90623 m2
Wedge area (joint2)=3.44563 m2
Wedge area (slope)=1.62146 m2
Wedge area (upper face)=0.0310651 m2
Wedge area (tension crack)=0.159808 m2
Normal force (joint1)=1.85339 tonnes
Normal force (joint2)=1.34174 tonnes
Driving force=0.664594 tonnes
Resisting force=2.30186 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0377391 tonnes/m2
Water force on joint1=0.147417 tonnes
Water force on joint2=0.130035 tonnes
Water force on tension crack=0.00603099 tonnes

Seismic Force:
Seismic force=0.018156 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=36.1728 deg, trend=264.566 deg
length=9.34806 m

Trace Lengths:
Joint1 on slope face=9.95687 m
Joint2 on slope face=9.81547 m
Joint1 on upper face=2.10189e-007 m
Joint2 on upper face=0.186514 m
Tension crack on upper face=0.338025 m

Maximum Persistence:
Joint1=9.95687 m
Joint2=10 m

Intersection Angles:
J1&J2 on slope face = 1.90154 deg
J1&Crest on slope face = 65.737 deg
J1&Crest on upper face = 109.214 deg
J2&Crest on slope face = 112.361 deg
J2&Crest on upper face = 68.8164 deg
J1&TC on upper face = 101.75 deg
J2&TC on upper face = 80.2203 deg
Joint Set 1 Data:
dip=53 deg, dip direction=208 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=70 deg, dip direction=190 deg

cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:

dip=44 deg, dip direction=292 deg
slope height=30 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:

dip=35 deg, dip direction=292 deg

Tension Crack Data:

dip=83 deg, dip direction=268 deg
trace length=2.10189e-007 meters

Water Pressure Data:

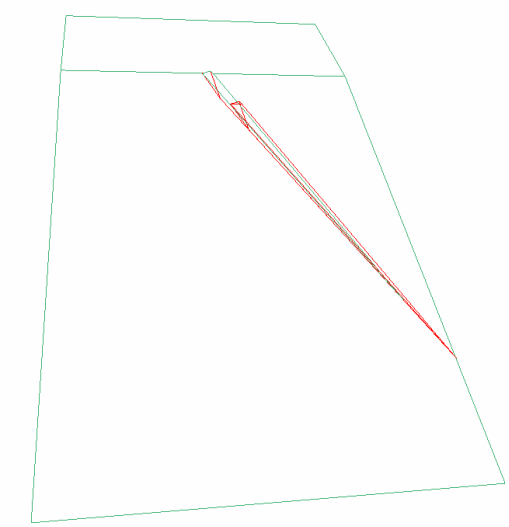
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

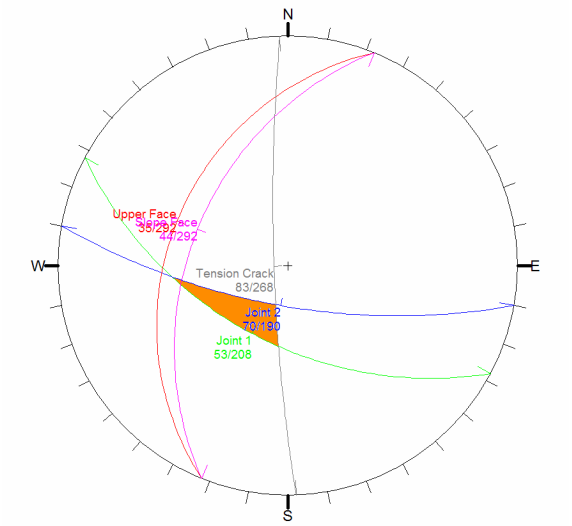
Seismic Data:

Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=264.566 deg, plunge=0 deg

Wedge Vertices:

Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 7.59, 1.35, 6.31
Point 234: 7.45, 1.02, 6.31
Point 135: 7.59, 1.35, 6.31
Point 125: 7.51, 0.715, 5.52
Point 235: 7.61, 1.03, 6.41





1.2.2.2. Scavo laterale 1 senza chiodatura

Document Name:
cuneo_6_laterale_1_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=0.177328
Wedge is scaled, scale factor=0.412797
Wedge height(on slope)=6.19196 m
Wedge width(on upper face)=0.759013 m
Wedge volume=7.76802 m3
Wedge weight=22.5273 tonnes
Wedge area (joint1)=20.2731 m2
Wedge area (joint2)=5.91401 m2
Wedge area (slope)=14.053 m2
Wedge area (upper face)=1.69098 m2
Wedge area (tension crack)=7.16565 m2
Normal force (joint1)=4.91224 tonnes
Normal force (joint2)=0.281011 tonnes
Driving force=21.0985 tonnes
Resisting force=3.74136 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0841585 tonnes/m2
Water force on joint1=1.70616 tonnes
Water force on joint2=0.497714 tonnes
Water force on tension crack=0.60305 tonnes

Seismic Force:
Seismic force=0.373952 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=69.8396 deg, trend=197.538 deg
length=10 m

Trace Lengths:
Joint1 on slope face=7.5869 m
Joint2 on slope face=6.31241 m
Joint1 on upper face=4.12797e-006 m
Joint2 on upper face=0.760991 m
Tension crack on upper face=4.46586 m

Maximum Persistence:
Joint1=10 m
Joint2=10 m

Intersection Angles:
J1&J2 on slope face = 35.935 deg
J1&Crest on slope face = 56.2441 deg
J1&Crest on upper face = 80.7005 deg
J2&Crest on slope face = 87.8209 deg
J2&Crest on upper face = 85.8683 deg
J1&TC on upper face = 109.085 deg
J2&TC on upper face = 84.3464 deg
Joint Set 1 Data:
dip=70 deg, dip direction=190 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=83 deg, dip direction=268 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Slope Data:
dip=79 deg, dip direction=205 deg
slope height=15 meters

rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:
dip=67 deg, dip direction=205 deg

Tension Crack Data:
dip=53 deg, dip direction=208 deg
trace length=4.12797e-006 meters

Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=197.538 deg, plunge=0 deg

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: -3.31, 2.87, 6.19
Point 234: 0.726, 0.989, 6.19
Point 135: -3.31, 2.87, 6.19
Point 125: 1.04, 3.29, 9.39
Point 235: 0.802, 1.28, 6.89

1.2.2.3. Scavo laterale 1 con chiodatura

Document Name:
cuneo_6_laterale_1_SLU_sisma.swd

Job Title:
SWEDGE - Surface Wedge Stability Analysis

Analysis Results:
Analysis type=Deterministic
Safety Factor=1.15808
Wedge is scaled, scale factor=0.412797
Wedge height(on slope)=6.19196 m
Wedge width(on upper face)=0.759013 m
Wedge volume=7.76802 m3
Wedge weight=22.5273 tonnes
Wedge area (joint1)=20.2731 m2
Wedge area (joint2)=5.91401 m2
Wedge area (slope)=14.053 m2
Wedge area (upper face)=1.69098 m2
Wedge area (tension crack)=7.16565 m2
Normal force (joint1)=4.91224 tonnes
Normal force (joint2)=0.281011 tonnes
Driving force=21.0985 tonnes
Resisting force=24.4338 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0841585 tonnes/m2
Water force on joint1=1.70616 tonnes
Water force on joint2=0.497714 tonnes
Water force on tension crack=0.60305 tonnes

Seismic Force:
Seismic force=0.373952 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=69.8396 deg, trend=197.538 deg
length=10 m

Trace Lengths:
Joint1 on slope face=7.5869 m
Joint2 on slope face=6.31241 m
Joint1 on upper face=4.12797e-006 m
Joint2 on upper face=0.760991 m
Tension crack on upper face=4.46586 m

Maximum Persistence:
Joint1=10 m
Joint2=10 m

Intersection Angles:
J1&J2 on slope face = 35.935 deg
J1&Crest on slope face = 56.2441 deg
J1&Crest on upper face = 80.7005 deg
J2&Crest on slope face = 87.8209 deg
J2&Crest on upper face = 85.8683 deg
J1&TC on upper face = 109.085 deg
J2&TC on upper face = 84.3464 deg

Joint Set 1 Data:
dip=70 deg, dip direction=190 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Joint Set 2 Data:
dip=83 deg, dip direction=268 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:
dip=79 deg, dip direction=205 deg
slope height=15 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:
dip=67 deg, dip direction=205 deg

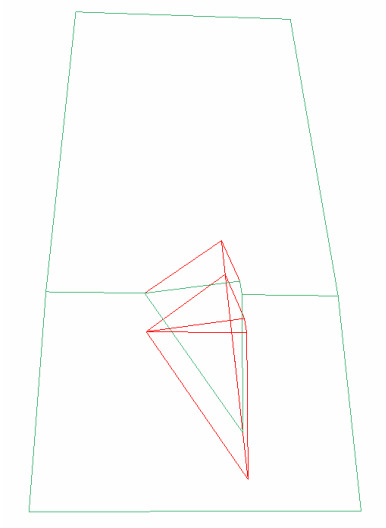
Tension Crack Data:
dip=53 deg, dip direction=208 deg
trace length=4.12797e-006 meters

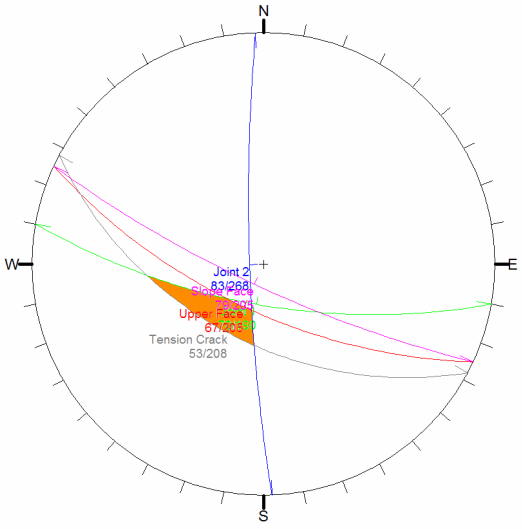
Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=197.538 deg, plunge=0 deg

Bolt Data:
Number of bolts=1
Bolt #1
bolt model=passive
trend=24.9999 deg, plunge=11 deg
length=10 meters
anchored length=9.50614 meters
capacity=21 tonnes

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: -3.31, 2.87, 6.19
Point 234: 0.726, 0.989, 6.19
Point 135: -3.31, 2.87, 6.19
Point 125: 1.04, 3.29, 9.39
Point 235: 0.802, 1.28, 6.89




N
W
E
S
Joint 2
83/268
Upper Face
Tension Crack
53/208

1.2.2.4. Scavo laterale 2 senza chiodatura

Document Name:
cuneo_6_laterale_2_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=0.477688
Wedge is scaled, scale factor=0.142225
Wedge height(on slope)=1.56447 m
Wedge width(on upper face)=0.952619 m
Wedge volume=4.11205 m3
Wedge weight=11.9249 tonnes
Wedge area (joint1)=16.5918 m2
Wedge area (joint2)=2.85141 m2
Wedge area (slope)=14.1752 m2
Wedge area (upper face)=8.47281 m2
Normal force (joint1)=21.3077 tonnes
Normal force (joint2)=-16.236 tonnes
Driving force=9.61823 tonnes
Resisting force=4.59451 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0370577 tonnes/m2
Water force on joint1=0.614852 tonnes
Water force on joint2=0.105667 tonnes

Seismic Force:
Seismic force=0.197954 tonnes

Failure Mode:
Sliding on joint1

Joint Sets 1&2 line of Intersection:
plunge=36.1728 deg, trend=264.566 deg
length=3.01372 m

Trace Lengths:
Joint1 on slope face=16.7991 m
Joint2 on slope face=1.91693 m
Joint1 on upper face=14.6567 m
Joint2 on upper face=3.3031 m

Maximum Persistence:
Joint1=16.7991 m
Joint2=3.3031 m

Intersection Angles:
J1&J2 on slope face = 118.312 deg
J1&Crest on slope face = 5.44394 deg
J1&Crest on upper face = 3.72659 deg
J2&Crest on slope face = 56.2441 deg
J2&Crest on upper face = 16.7623 deg
J1&2 on upper face = 159.511 deg
Joint Set 1 Data:
dip=53 deg, dip direction=208 deg
cohesion=0 tonnes/m2, friction angle=35.77 deg
Joint Set 2 Data:
dip=70 deg, dip direction=190 deg
cohesion=0 tonnes/m2, friction angle=35.77 deg
Slope Data:
dip=79 deg, dip direction=205 deg
slope height=11 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO

Tension crack=NO

Upper Face Data:

dip=13 deg, dip direction=205 deg

Water Pressure Data:

Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:

Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=264.566 deg, plunge=0 deg

Wedge Vertices:

Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope
Point 124: 0, 0, 0
Point 134: 15.3, -6.79, 1.56
Point 234: -0.837, 0.726, 1.56
Point 123: 2.42, 0.23, 1.78

1.2.2.5. Scavo laterale 2 con chiodatura

Document Name:

cuneo_6_laterale_2_SLU_sisma.swd

Job Title:

SWEDGE - Surface Wedge Stability Analysis

Analysis Results:

Analysis type=Deterministic
Safety Factor=1.15362
Wedge is scaled, scale factor=0.142225
Wedge height(on slope)=1.56447 m
Wedge width(on upper face)=0.952619 m
Wedge volume=4.11205 m3
Wedge weight=11.9249 tonnes
Wedge area (joint1)=16.5918 m2
Wedge area (joint2)=2.85141 m2
Wedge area (slope)=14.1752 m2
Wedge area (upper face)=8.47281 m2
Normal force (joint1)=21.3077 tonnes
Normal force (joint2)=-16.236 tonnes
Driving force=9.61823 tonnes
Resisting force=11.0958 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0370577 tonnes/m2
Water force on joint1=0.614852 tonnes
Water force on joint2=0.105667 tonnes

Seismic Force:
Seismic force=0.197954 tonnes

Failure Mode:
Sliding on joint1

Joint Sets 1&2 line of Intersection:
plunge=36.1728 deg, trend=264.566 deg
length=3.01372 m

Trace Lengths:
Joint1 on slope face=16.7991 m
Joint2 on slope face=1.91693 m
Joint1 on upper face=14.6567 m
Joint2 on upper face=3.3031 m

Maximum Persistence:
Joint1=16.7991 m
Joint2=3.3031 m

Intersection Angles:
J1&J2 on slope face = 118.312 deg
J1&Crest on slope face = 5.44394 deg
J1&Crest on upper face = 3.72659 deg
J2&Crest on slope face = 56.2441 deg
J2&Crest on upper face = 16.7623 deg
J1&2 on upper face = 159.511 deg

Joint Set 1 Data:
dip=53 deg, dip direction=208 deg
cohesion=0 tonnes/m2, friction angle=35.77 deg

Joint Set 2 Data:
dip=70 deg, dip direction=190 deg
cohesion=0 tonnes/m2, friction angle=35.77 deg

Slope Data:
dip=79 deg, dip direction=205 deg
slope height=11 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=NO

Upper Face Data:
dip=13 deg, dip direction=205 deg

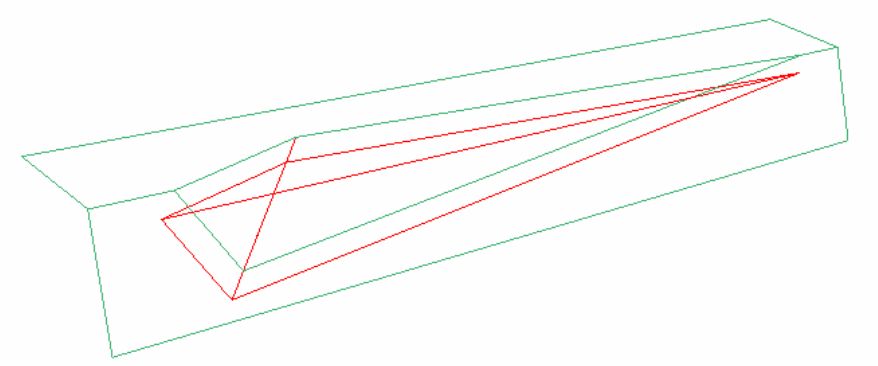
Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

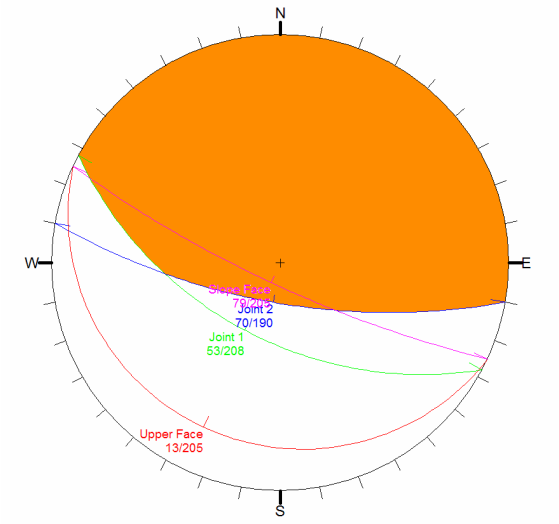
Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=264.566 deg, plunge=0 deg

Bolt Data:
Number of bolts=1

Bolt #1
bolt model=passive
trend=25 deg, plunge=11 deg
length=10 meters
anchored length=9.61133 meters
capacity=6 tonnes

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope
Point 124: 0, 0, 0
Point 134: 15.3, -6.79, 1.56
Point 234: -0.837, 0.726, 1.56
Point 123: 2.42, 0.23, 1.78




N
W
E
S
Joint 2
70/190
Joint 1
53/208
Upper Face
13/205

1.2.3. Stazione 7

1.2.3.1. Scavo laterale 1 senza chiodatura

Document Name:
cuneo_7_laterale_1_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=0.514484
Wedge is scaled, scale factor=0.594941
Wedge height(on slope)=8.92412 m
Wedge width(on upper face)=0.901898 m
Wedge volume=2.6305 m3
Wedge weight=7.62845 tonnes
Wedge area (joint1)=3.85708 m2
Wedge area (joint2)=11.5553 m2
Wedge area (slope)=9.21645 m2
Wedge area (upper face)=0.914334 m2
Wedge area (tension crack)=1.0116 m2
Normal force (joint1)=2.89274 tonnes
Normal force (joint2)=2.22765 tonnes
Driving force=7.17004 tonnes
Resisting force=3.68887 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.101784 tonnes/m2
Water force on joint1=0.392589 tonnes
Water force on joint2=1.17614 tonnes
Water force on tension crack=0.102964 tonnes

Seismic Force:
Seismic force=0.126632 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=67.4879 deg, trend=254.822 deg
length=8.43184 m

Trace Lengths:
Joint1 on slope face=9.35185 m
Joint2 on slope face=9.09265 m
Joint1 on upper face=5.94941e-006 m
Joint2 on upper face=1.0513 m
Tension crack on upper face=1.73944 m

Maximum Persistence:
Joint1=9.35185 m
Joint2=10 m

Intersection Angles:
J1&J2 on slope face = 12.5196 deg
J1&Crest on slope face = 76.4395 deg
J1&Crest on upper face = 108.001 deg
J2&Crest on slope face = 91.0409 deg
J2&Crest on upper face = 59.08 deg
J1&TC on upper face = 103.23 deg
J2&TC on upper face = 89.6887 deg
Joint Set 1 Data:
dip=82 deg, dip direction=325 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=80 deg, dip direction=190 deg

cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:

dip=79 deg, dip direction=210 deg
slope height=15 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:

dip=67 deg, dip direction=210 deg

Tension Crack Data:

dip=65 deg, dip direction=58 deg
trace length=5.94941e-006 meters

Water Pressure Data:

Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:

Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=254.822 deg, plunge=0 deg

Wedge Vertices:

Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 2.77, 0.406, 8.92
Point 234: 1.01, 1.42, 8.92
Point 135: 2.77, 0.406, 8.92
Point 125: 3.12, 0.845, 7.79
Point 235: 1.65, 1.45, 9.75

1.2.3.2. Scavo laterale 1 con chiodatura

Document Name:

cuneo_7_laterale_1_SLU_sisma.swd

Job Title:

SWEDGE - Surface Wedge Stability Analysis

Analysis Results:

Analysis type=Deterministic
Safety Factor=1.41426
Wedge is scaled, scale factor=0.594941
Wedge height(on slope)=8.92412 m
Wedge width(on upper face)=0.901898 m
Wedge volume=2.6305 m3
Wedge weight=7.62845 tonnes
Wedge area (joint1)=3.85708 m2
Wedge area (joint2)=11.5553 m2
Wedge area (slope)=9.21645 m2
Wedge area (upper face)=0.914334 m2
Wedge area (tension crack)=1.0116 m2
Normal force (joint1)=2.89274 tonnes
Normal force (joint2)=2.22765 tonnes
Driving force=7.17004 tonnes
Resisting force=10.1403 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.101784 tonnes/m2
Water force on joint1=0.392589 tonnes
Water force on joint2=1.17614 tonnes
Water force on tension crack=0.102964 tonnes

Seismic Force:
Seismic force=0.126632 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=67.4879 deg, trend=254.822 deg
length=8.43184 m

Trace Lengths:
Joint1 on slope face=9.35185 m
Joint2 on slope face=9.09265 m
Joint1 on upper face=5.94941e-006 m
Joint2 on upper face=1.0513 m
Tension crack on upper face=1.73944 m

Maximum Persistence:
Joint1=9.35185 m
Joint2=10 m
Intersection Angles:
J1&J2 on slope face = 12.5196 deg
J1&Crest on slope face = 76.4395 deg
J1&Crest on upper face = 108.001 deg
J2&Crest on slope face = 91.0409 deg
J2&Crest on upper face = 59.08 deg
J1&TC on upper face = 103.23 deg
J2&TC on upper face = 89.6887 deg

Joint Set 1 Data:
dip=82 deg, dip direction=325 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Joint Set 2 Data:
dip=80 deg, dip direction=190 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:
dip=79 deg, dip direction=210 deg
slope height=15 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:
dip=67 deg, dip direction=210 deg

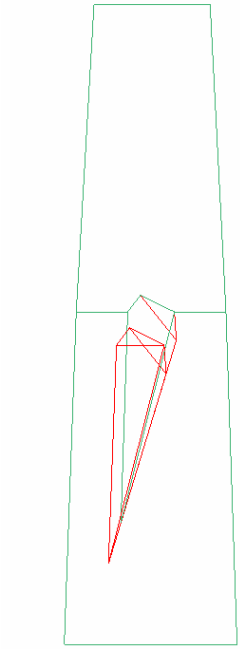
Tension Crack Data:
dip=65 deg, dip direction=58 deg
trace length=5.94941e-006 meters

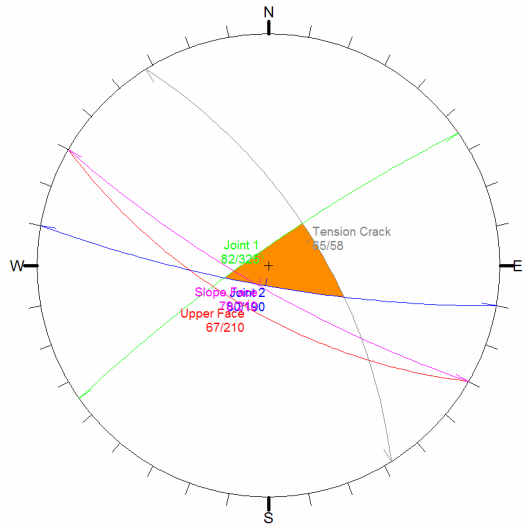
Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=254.822 deg, plunge=0 deg

Bolt Data:
Number of bolts=1
Bolt #1
bolt model=passive
trend=30 deg, plunge=11 deg
length=10 meters
anchored length=9.74073 meters
capacity=5 tonnes

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 2.77, 0.406, 8.92
Point 234: 1.01, 1.42, 8.92
Point 135: 2.77, 0.406, 8.92
Point 125: 3.12, 0.845, 7.79
Point 235: 1.65, 1.45, 9.75




N
W
E
S
Tension Crack
65/58
Joint 1
82/325
Slope Face
75/190
Upper Face
67/210

1.2.3.3. Scavo laterale 2 senza chiodatura

Document Name:
cuneo_7_laterale_2_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=0.963896
Wedge is scaled, scale factor=0.455877
Wedge height(on slope)=6.83815 m
Wedge width(on upper face)=0.321942 m
Wedge volume=7.53846 m3
Wedge weight=21.8615 tonnes
Wedge area (joint1)=18.2766 m2
Wedge area (joint2)=7.599 m2
Wedge area (slope)=12.3358 m2
Wedge area (upper face)=0.570111 m2
Wedge area (tension crack)=3.6888 m2
Normal force (joint1)=9.3161 tonnes
Normal force (joint2)=13.7317 tonnes
Driving force=17.2262 tonnes
Resisting force=16.6043 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.152073 tonnes/m2
Water force on joint1=2.77937 tonnes
Water force on joint2=1.1556 tonnes
Water force on tension crack=0.560966 tonnes

Seismic Force:
Seismic force=0.362902 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=52.4679 deg, trend=266.731 deg
length=10 m

Trace Lengths:
Joint1 on slope face=6.96729 m
Joint2 on slope face=7.87293 m
Joint1 on upper face=4.55877e-006 m
Joint2 on upper face=0.374219 m
Tension crack on upper face=3.74627 m

Maximum Persistence:
Joint1=10 m
Joint2=10 m

Intersection Angles:
J1&J2 on slope face = 26.7294 deg
J1&Crest on slope face = 91.0409 deg
J1&Crest on upper face = 59.08 deg
J2&Crest on slope face = 62.2297 deg
J2&Crest on upper face = 120.649 deg
J1&TC on upper face = 125.85 deg
J2&TC on upper face = 54.421 deg
Joint Set 1 Data:
dip=80 deg, dip direction=190 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=68 deg, dip direction=325 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Slope Data:
dip=79 deg, dip direction=210 deg
slope height=15 meters

rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:
dip=67 deg, dip direction=210 deg

Tension Crack Data:
dip=21 deg, dip direction=220 deg
trace length=4.55877e-006 meters

Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=266.731 deg, plunge=0 deg

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 0.774, 1.09, 6.84
Point 234: 3.84, -0.683, 6.84
Point 135: 0.774, 1.09, 6.84
Point 125: 6.08, 0.347, 7.93
Point 235: 4.07, -0.669, 7.13

1.2.3.4. Scavo laterale 2 con chiodatura

Document Name:
cuneo_7_laterale_2_SLU_sisma.swd

Job Title:
SWEDGE - Surface Wedge Stability Analysis

Analysis Results:
Analysis type=Deterministic
Safety Factor=1.18266
Wedge is scaled, scale factor=0.455877
Wedge height(on slope)=6.83815 m
Wedge width(on upper face)=0.321942 m
Wedge volume=7.53846 m3
Wedge weight=21.8615 tonnes
Wedge area (joint1)=18.2766 m2
Wedge area (joint2)=7.599 m2
Wedge area (slope)=12.3358 m2
Wedge area (upper face)=0.570111 m2
Wedge area (tension crack)=3.6888 m2
Normal force (joint1)=9.3161 tonnes
Normal force (joint2)=13.7317 tonnes
Driving force=17.2262 tonnes
Resisting force=20.3728 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.152073 tonnes/m2
Water force on joint1=2.77937 tonnes
Water force on joint2=1.1556 tonnes
Water force on tension crack=0.560966 tonnes

Seismic Force:
Seismic force=0.362902 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=52.4679 deg, trend=266.731 deg
length=10 m

Trace Lengths:
Joint1 on slope face=6.96729 m
Joint2 on slope face=7.87293 m
Joint1 on upper face=4.55877e-006 m
Joint2 on upper face=0.374219 m
Tension crack on upper face=3.74627 m

Maximum Persistence:
Joint1=10 m
Joint2=10 m

Intersection Angles:
J1&J2 on slope face = 26.7294 deg
J1&Crest on slope face = 91.0409 deg
J1&Crest on upper face = 59.08 deg
J2&Crest on slope face = 62.2297 deg
J2&Crest on upper face = 120.649 deg
J1&TC on upper face = 125.85 deg
J2&TC on upper face = 54.421 deg

Joint Set 1 Data:
dip=80 deg, dip direction=190 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Joint Set 2 Data:
dip=68 deg, dip direction=325 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:
dip=79 deg, dip direction=210 deg
slope height=15 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:
dip=67 deg, dip direction=210 deg

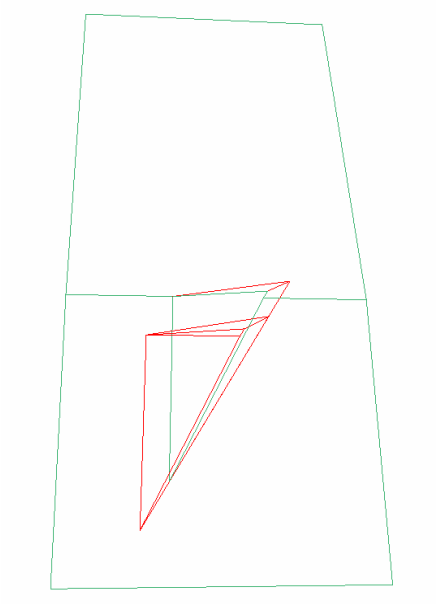
Tension Crack Data:
dip=21 deg, dip direction=220 deg
trace length=4.55877e-006 meters

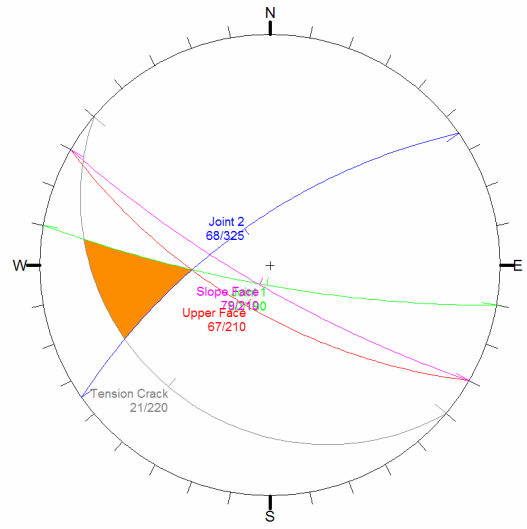
Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=266.731 deg, plunge=0 deg

Bolt Data:
Number of bolts=1
Bolt #1
bolt model=passive
trend=30 deg, plunge=11 deg
length=10 meters
anchored length=9.56203 meters
capacity=3 tonnes

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 0.774, 1.09, 6.84
Point 234: 3.84, -0.683, 6.84
Point 135: 0.774, 1.09, 6.84
Point 125: 6.08, 0.347, 7.93
Point 235: 4.07, -0.669, 7.13




N
W
E
S
Joint 2
68/325
Slope Face 1
70/190
Upper Face
67/210
Tension Crack
21/220

1.2.3.5. Scavo laterale 3 senza chiodatura

Document Name:
cuneo_7_laterale_3_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=0.387765
Wedge is scaled, scale factor=0.819599
Wedge height(on slope)=9.01559 m
Wedge width(on upper face)=0.988658 m
Wedge volume=2.83189 m3
Wedge weight=8.21248 tonnes
Wedge area (joint1)=4.62131 m2
Wedge area (joint2)=12.3138 m2
Wedge area (slope)=9.40636 m2
Wedge area (upper face)=1.01256 m2
Normal force (joint1)=2.71443 tonnes
Normal force (joint2)=1.39715 tonnes
Driving force=7.63888 tonnes
Resisting force=2.96209 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.192458 tonnes/m2
Water force on joint1=0.889409 tonnes
Water force on joint2=2.36988 tonnes

Seismic Force:
Seismic force=0.136327 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=67.4879 deg, trend=254.822 deg
length=10 m

Trace Lengths:
Joint1 on slope face=9.44771 m
Joint2 on slope face=9.18585 m
Joint1 on upper face=1.10064 m
Joint2 on upper face=2.71821 m

Maximum Persistence:
Joint1=10 m
Joint2=10 m

Intersection Angles:
J1&J2 on slope face = 12.5196 deg
J1&Crest on slope face = 76.4395 deg
J1&Crest on upper face = 116.07 deg
J2&Crest on slope face = 91.0409 deg
J2&Crest on upper face = 21.3286 deg
J1&2 on upper face = 42.6017 deg
Joint Set 1 Data:
dip=82 deg, dip direction=325 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=80 deg, dip direction=190 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Slope Data:
dip=79 deg, dip direction=210 deg
slope height=11 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO

Tension crack=NO

Upper Face Data:

dip=13 deg, dip direction=210 deg

Water Pressure Data:

Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:

Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=254.822 deg, plunge=0 deg

Wedge Vertices:

Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope
Point 124: 0, 0, 0
Point 134: 2.79, 0.41, 9.02
Point 234: 1.02, 1.43, 9.02
Point 123: 3.7, 1, 9.24

1.2.3.6. Scavo laterale 3 con chiodatura

Document Name:

cuneo_7_laterale_3_SLU_sisma.swd

Job Title:

SWEDGE - Surface Wedge Stability Analysis

Analysis Results:

Analysis type=Deterministic
Safety Factor=1.23232
Wedge is scaled, scale factor=0.819599
Wedge height(on slope)=9.01559 m
Wedge width(on upper face)=0.988658 m
Wedge volume=2.83189 m3
Wedge weight=8.21248 tonnes
Wedge area (joint1)=4.62131 m2
Wedge area (joint2)=12.3138 m2
Wedge area (slope)=9.40636 m2
Wedge area (upper face)=1.01256 m2
Normal force (joint1)=2.71443 tonnes
Normal force (joint2)=1.39715 tonnes
Driving force=7.63888 tonnes
Resisting force=9.41351 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.192458 tonnes/m2
Water force on joint1=0.889409 tonnes
Water force on joint2=2.36988 tonnes

Seismic Force:
Seismic force=0.136327 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=67.4879 deg, trend=254.822 deg
length=10 m

Trace Lengths:
Joint1 on slope face=9.44771 m
Joint2 on slope face=9.18585 m
Joint1 on upper face=1.10064 m
Joint2 on upper face=2.71821 m

Maximum Persistence:
Joint1=10 m
Joint2=10 m

Intersection Angles:
J1&J2 on slope face = 12.5196 deg
J1&Crest on slope face = 76.4395 deg
J1&Crest on upper face = 116.07 deg
J2&Crest on slope face = 91.0409 deg
J2&Crest on upper face = 21.3286 deg
J1&2 on upper face = 42.6017 deg

Joint Set 1 Data:
dip=82 deg, dip direction=325 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Joint Set 2 Data:
dip=80 deg, dip direction=190 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:
dip=79 deg, dip direction=210 deg
slope height=11 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=NO

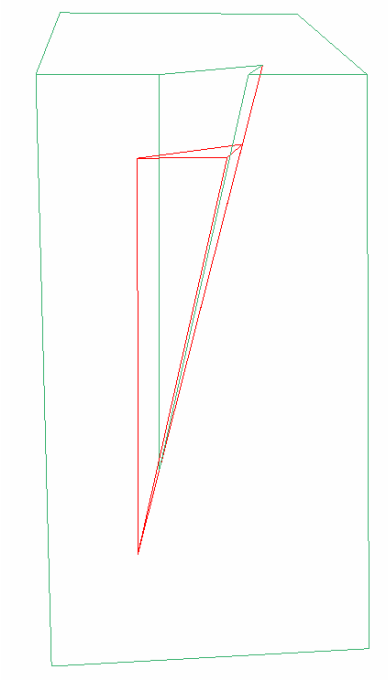
Upper Face Data:
dip=13 deg, dip direction=210 deg

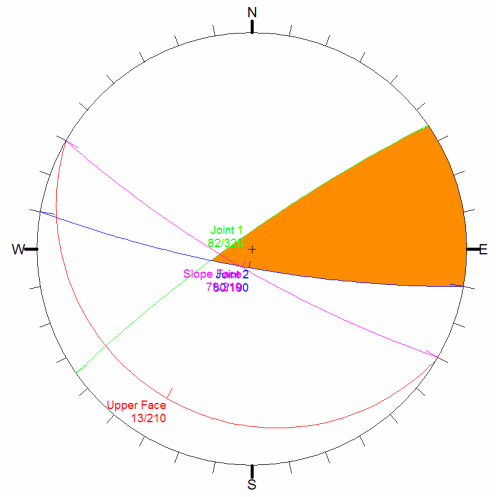
Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=254.822 deg, plunge=0 deg

Bolt Data:
Number of bolts=1
Bolt #1
bolt model=passive
trend=30 deg, plunge=11 deg
length=10 meters
anchored length=9.70192 meters
capacity=5 tonnes

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope
Point 124: 0, 0, 0
Point 134: 2.79, 0.41, 9.02
Point 234: 1.02, 1.43, 9.02
Point 123: 3.7, 1, 9.24




N
W
E
S
Joint 1
82/325
Slope
Joint 2
78/190
Upper Face
13/210

1.2.4. Stazione 8

1.2.4.1. Scavo principale senza chiodatura

Document Name:
cuneo_8_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=0.964929
Wedge is scaled, scale factor=0.155394
Wedge height(on slope)=6.21576 m
Wedge width(on upper face)=0.601072 m
Wedge volume=0.83911 m3
Wedge weight=2.43342 tonnes
Wedge area (joint1)=2.53217 m2
Wedge area (joint2)=5.32605 m2
Wedge area (slope)=6.27133 m2
Wedge area (upper face)=0.457691 m2
Wedge area (tension crack)=0.181859 m2
Normal force (joint1)=1.5397 tonnes
Normal force (joint2)=0.507029 tonnes
Driving force=1.52811 tonnes
Resisting force=1.47452 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0179555 tonnes/m2
Water force on joint1=0.0454664 tonnes
Water force on joint2=0.0956319 tonnes
Water force on tension crack=0.00326538 tonnes

Seismic Force:
Seismic force=0.0403948 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=37.8446 deg, trend=237.651 deg
length=9.92272 m

Trace Lengths:
Joint1 on slope face=9.95105 m
Joint2 on slope face=9.18323 m
Joint1 on upper face=1.55394e-007 m
Joint2 on upper face=0.876343 m
Tension crack on upper face=1.06998 m

Maximum Persistence:
Joint1=9.95105 m
Joint2=9.99998 m

Intersection Angles:
J1&J2 on slope face = 7.88899 deg
J1&Crest on slope face = 55.8579 deg
J1&Crest on upper face = 114.519 deg
J2&Crest on slope face = 116.253 deg
J2&Crest on upper face = 43.3054 deg
J1&TC on upper face = 99.6582 deg
J2&TC on upper face = 102.517 deg
Joint Set 1 Data:
dip=41 deg, dip direction=211 deg
cohesion=0 tonnes/m2, friction angle=35.77 deg
Joint Set 2 Data:
dip=60 deg, dip direction=301 deg

cohesion=0 tonnes/m2, friction angle=35.77 deg

Slope Data:

dip=49 deg, dip direction=280 deg
slope height=40 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:

dip=38 deg, dip direction=280 deg

Tension Crack Data:

dip=57 deg, dip direction=58 deg
trace length=1.55394e-007 meters

Water Pressure Data:

Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:

Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=237.651 deg, plunge=0 deg

Wedge Vertices:

Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 6.29, 4.56, 6.22
Point 234: 6.03, 3.06, 6.22
Point 135: 6.29, 4.56, 6.22
Point 125: 6.62, 4.19, 6.09
Point 235: 6.6, 3.61, 6.59

1.2.4.2. Scavo principale con chiodatura

Document Name:

cuneo_8_SLU_sisma.swd

Job Title:

SWEDGE - Surface Wedge Stability Analysis

Analysis Results:

Analysis type=Deterministic
Safety Factor=1.54112
Wedge is scaled, scale factor=0.155394
Wedge height(on slope)=6.21576 m
Wedge width(on upper face)=0.601072 m
Wedge volume=0.83911 m3
Wedge weight=2.43342 tonnes
Wedge area (joint1)=2.53217 m2
Wedge area (joint2)=5.32605 m2
Wedge area (slope)=6.27133 m2
Wedge area (upper face)=0.457691 m2
Wedge area (tension crack)=0.181859 m2
Normal force (joint1)=1.5397 tonnes
Normal force (joint2)=0.507029 tonnes
Driving force=1.52811 tonnes
Resisting force=2.355 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0179555 tonnes/m2
Water force on joint1=0.0454664 tonnes
Water force on joint2=0.0956319 tonnes
Water force on tension crack=0.00326538 tonnes

Seismic Force:
Seismic force=0.0403948 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=37.8446 deg, trend=237.651 deg
length=9.92272 m

Trace Lengths:
Joint1 on slope face=9.95105 m
Joint2 on slope face=9.18323 m
Joint1 on upper face=1.55394e-007 m
Joint2 on upper face=0.876343 m
Tension crack on upper face=1.06998 m

Maximum Persistence:
Joint1=9.95105 m
Joint2=9.99998 m
Intersection Angles:
J1&J2 on slope face = 7.88899 deg
J1&Crest on slope face = 55.8579 deg
J1&Crest on upper face = 114.519 deg
J2&Crest on slope face = 116.253 deg
J2&Crest on upper face = 43.3054 deg
J1&TC on upper face = 99.6582 deg
J2&TC on upper face = 102.517 deg

Joint Set 1 Data:
dip=41 deg, dip direction=211 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Joint Set 2 Data:
dip=60 deg, dip direction=301 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:
dip=49 deg, dip direction=280 deg
slope height=40 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:
dip=38 deg, dip direction=280 deg

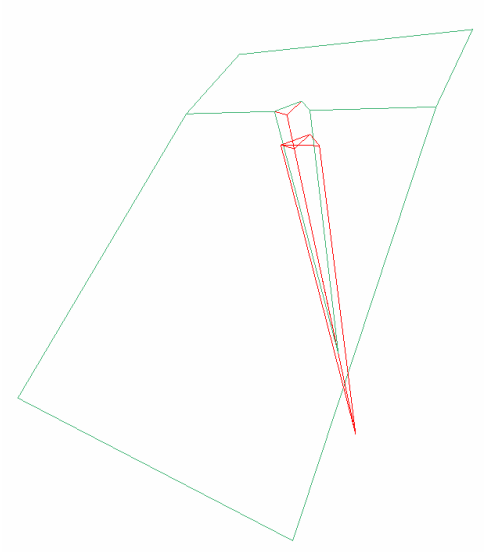
Tension Crack Data:
dip=57 deg, dip direction=58 deg
trace length=1.55394e-007 meters

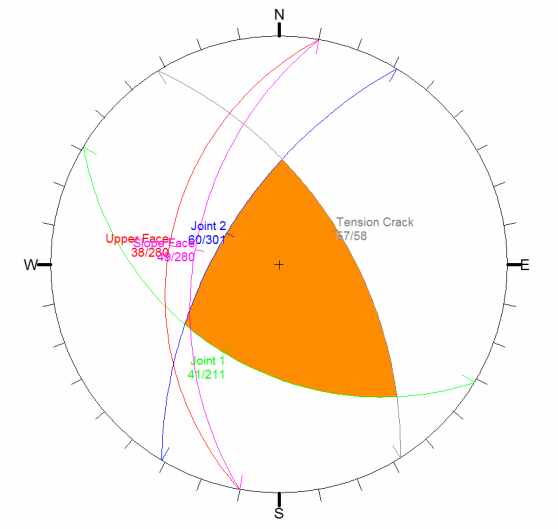
Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=237.651 deg, plunge=0 deg

Bolt Data:
Number of bolts=1
Bolt #1
bolt model=passive
trend=100 deg, plunge=40.9999 deg
length=10 meters
anchored length=9.78402 meters
capacity=1 tonnes

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 6.29, 4.56, 6.22
Point 234: 6.03, 3.06, 6.22
Point 135: 6.29, 4.56, 6.22
Point 125: 6.62, 4.19, 6.09
Point 235: 6.6, 3.61, 6.59




N
W
E
S
Tension Crack
57/58
Joint 2
60/301
Upper Face
38/280
Slope Face
49/280
Joint 1
41/211

1.2.4.3. Scavo laterale 1 senza chiodatura

Document Name:
cuneo_8_laterale_1_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=0.738612
Wedge is scaled, scale factor=0.167625
Wedge height(on slope)=1.84387 m
Wedge width(on upper face)=0.864456 m
Wedge volume=0.484232 m3
Wedge weight=1.40427 tonnes
Wedge area (joint1)=3.59008 m2
Wedge area (joint2)=2.08672 m2
Wedge area (slope)=2.52165 m2
Wedge area (upper face)=1.15689 m2
Wedge area (tension crack)=0.110019 m2
Normal force (joint1)=0.75985 tonnes
Normal force (joint2)=-0.924048 tonnes
Driving force=0.963536 tonnes
Resisting force=0.711679 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0175183 tonnes/m2
Water force on joint1=0.0628923 tonnes
Water force on joint2=0.0365558 tonnes
Water force on tension crack=0.00192735 tonnes

Seismic Force:
Seismic force=0.0233109 tonnes

Failure Mode:
Sliding on joint1

Joint Sets 1&2 line of Intersection:
plunge=14.266 deg, trend=283.992 deg
length=9.93604 m

Trace Lengths:
Joint1 on slope face=9.29344 m
Joint2 on slope face=6.69569 m
Joint1 on upper face=0.00167625 m
Joint2 on upper face=3.31368 m
Tension crack on upper face=1.0093 m

Maximum Persistence:
Joint1=9.93604 m
Joint2=9.99998 m

Intersection Angles:
J1&J2 on slope face = 4.64882 deg
J1&Crest on slope face = 11.703 deg
J1&Crest on upper face = 158.341 deg
J2&Crest on slope face = 163.648 deg
J2&Crest on upper face = 15.122 deg
J1&TC on upper face = 142.802 deg
J2&TC on upper face = 43.7351 deg
Joint Set 1 Data:
dip=41 deg, dip direction=211 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=38 deg, dip direction=355 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Slope Data:
dip=78 deg, dip direction=200 deg
slope height=11 meters

rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:
dip=59 deg, dip direction=200 deg

Tension Crack Data:
dip=60 deg, dip direction=301 deg
trace length=0.00167625 meters

Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2
trend=283.992 deg, plunge=14.266 deg

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 8.69, -2.74, 1.84
Point 234: 6.17, -1.83, 1.84
Point 135: 8.69, -2.74, 1.84
Point 125: 9.34, -2.33, 2.45
Point 235: 9.33, -2.5, 2.58

1.2.4.4. Scavo laterale 1 con chiodatura

Document Name:
cuneo_8_laterale_1_SLU_sisma.swd

Job Title:
SWEDGE - Surface Wedge Stability Analysis

Analysis Results:
Analysis type=Deterministic
Safety Factor=1.72925
Wedge is scaled, scale factor=0.167625
Wedge height(on slope)=1.84387 m
Wedge width(on upper face)=0.864456 m
Wedge volume=0.484232 m3
Wedge weight=1.40427 tonnes
Wedge area (joint1)=3.59008 m2
Wedge area (joint2)=2.08672 m2
Wedge area (slope)=2.52165 m2
Wedge area (upper face)=1.15689 m2
Wedge area (tension crack)=0.110019 m2
Normal force (joint1)=0.75985 tonnes
Normal force (joint2)=-0.924048 tonnes
Driving force=0.963536 tonnes
Resisting force=1.6662 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0175183 tonnes/m2
Water force on joint1=0.0628923 tonnes
Water force on joint2=0.0365558 tonnes
Water force on tension crack=0.00192735 tonnes

Seismic Force:
Seismic force=0.0233109 tonnes

Failure Mode:
Sliding on joint1

Joint Sets 1&2 line of Intersection:
plunge=14.266 deg, trend=283.992 deg
length=9.93604 m

Trace Lengths:
Joint1 on slope face=9.29344 m
Joint2 on slope face=6.69569 m
Joint1 on upper face=0.00167625 m
Joint2 on upper face=3.31368 m
Tension crack on upper face=1.0093 m

Maximum Persistence:
Joint1=9.93604 m
Joint2=9.99998 m

Intersection Angles:
J1&J2 on slope face = 4.64882 deg
J1&Crest on slope face = 11.703 deg
J1&Crest on upper face = 158.341 deg
J2&Crest on slope face = 163.648 deg
J2&Crest on upper face = 15.122 deg
J1&TC on upper face = 142.802 deg
J2&TC on upper face = 43.7351 deg

Joint Set 1 Data:
dip=41 deg, dip direction=211 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Joint Set 2 Data:
dip=38 deg, dip direction=355 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:
dip=78 deg, dip direction=200 deg
slope height=11 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:
dip=59 deg, dip direction=200 deg

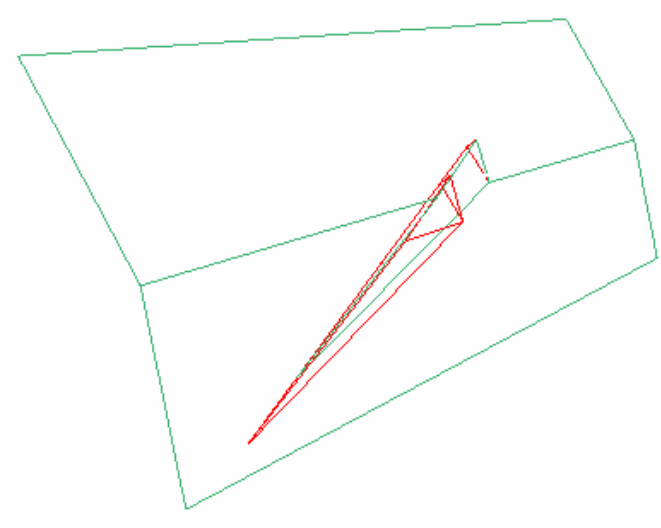
Tension Crack Data:
dip=60 deg, dip direction=301 deg
trace length=0.00167625 meters

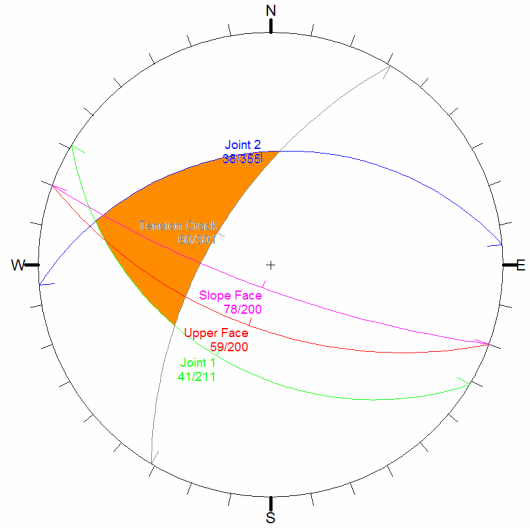
Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2
trend=283.992 deg, plunge=14.266 deg

Bolt Data:
Number of bolts=1
Bolt #1
bolt model=passive
trend=19.9997 deg, plunge=31 deg
length=10 meters
anchored length=9.82892 meters
capacity=1 tonnes

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 8.69, -2.74, 1.84
Point 234: 6.17, -1.83, 1.84
Point 135: 8.69, -2.74, 1.84
Point 125: 9.34, -2.33, 2.45
Point 235: 9.33, -2.5, 2.58




N
W
E
S
Joint 2
36/355
Slope Face
78/200
Upper Face
59/200
Joint 1
41/211

1.2.4.5. Scavo laterale 2 senza chiodatura

Document Name:
cuneo_8_laterale_2_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=0.718196
Wedge is scaled, scale factor=0.180337
Wedge height(on slope)=1.98371 m
Wedge width(on upper face)=0.547314 m
Wedge volume=0.505578 m3
Wedge weight=1.46618 tonnes
Wedge area (joint1)=3.56847 m2
Wedge area (joint2)=2.02499 m2
Wedge area (slope)=2.91862 m2
Wedge area (upper face)=0.788406 m2
Wedge area (tension crack)=0.155275 m2
Normal force (joint1)=0.769278 tonnes
Normal force (joint2)=-0.972168 tonnes
Driving force=1.00714 tonnes
Resisting force=0.723322 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0237304 tonnes/m2
Water force on joint1=0.0846813 tonnes
Water force on joint2=0.0480539 tonnes
Water force on tension crack=0.00368474 tonnes

Seismic Force:
Seismic force=0.0243385 tonnes

Failure Mode:
Sliding on joint1

Joint Sets 1&2 line of Intersection:
plunge=14.266 deg, trend=283.992 deg
length=9.1794 m

Trace Lengths:
Joint1 on slope face=9.99821 m
Joint2 on slope face=7.20346 m
Joint1 on upper face=0.00180337 m
Joint2 on upper face=2.09799 m
Tension crack on upper face=1.01449 m

Maximum Persistence:
Joint1=9.99998 m
Joint2=9.29458 m

Intersection Angles:
J1&J2 on slope face = 4.64882 deg
J1&Crest on slope face = 11.703 deg
J1&Crest on upper face = 158.341 deg
J2&Crest on slope face = 163.648 deg
J2&Crest on upper face = 15.122 deg
J1&TC on upper face = 54.2638 deg
J2&TC on upper face = 132.273 deg
Joint Set 1 Data:
dip=41 deg, dip direction=211 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=38 deg, dip direction=355 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Slope Data:
dip=78 deg, dip direction=200 deg
slope height=11 meters

rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:
dip=59 deg, dip direction=200 deg

Tension Crack Data:
dip=57 deg, dip direction=58 deg
trace length=0.00180337 meters

Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=283.992 deg, plunge=0 deg

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 9.34, -2.95, 1.98
Point 234: 6.64, -1.97, 1.98
Point 135: 9.35, -2.95, 1.98
Point 125: 8.63, -2.15, 2.26
Point 235: 8.64, -2.4, 2.45

1.2.4.6. Scavo laterale 2 con chiodatura

Document Name:
cuneo_8_laterale_2_SLU_sisma.swd

Job Title:
SWEDGE - Surface Wedge Stability Analysis

Analysis Results:
Analysis type=Deterministic
Safety Factor=1.84366
Wedge is scaled, scale factor=0.180337
Wedge height(on slope)=1.98371 m
Wedge width(on upper face)=0.547314 m
Wedge volume=0.505578 m3
Wedge weight=1.46618 tonnes
Wedge area (joint1)=3.56847 m2
Wedge area (joint2)=2.02499 m2
Wedge area (slope)=2.91862 m2
Wedge area (upper face)=0.788406 m2
Wedge area (tension crack)=0.155275 m2
Normal force (joint1)=0.769278 tonnes
Normal force (joint2)=-0.972168 tonnes
Driving force=1.00714 tonnes
Resisting force=1.85682 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0237304 tonnes/m2
Water force on joint1=0.0846813 tonnes
Water force on joint2=0.0480539 tonnes
Water force on tension crack=0.00368474 tonnes

Seismic Force:
Seismic force=0.0243385 tonnes

Failure Mode:
Sliding on joint1

Joint Sets 1&2 line of Intersection:
plunge=14.266 deg, trend=283.992 deg

length=9.1794 m

Trace Lengths:
Joint1 on slope face=9.99821 m
Joint2 on slope face=7.20346 m
Joint1 on upper face=0.00180337 m
Joint2 on upper face=2.09799 m
Tension crack on upper face=1.01449 m

Maximum Persistence:
Joint1=9.99998 m
Joint2=9.29458 m

Intersection Angles:
J1&J2 on slope face = 4.64882 deg
J1&Crest on slope face = 11.703 deg
J1&Crest on upper face = 158.341 deg
J2&Crest on slope face = 163.648 deg
J2&Crest on upper face = 15.122 deg
J1&TC on upper face = 54.2638 deg
J2&TC on upper face = 132.273 deg

Joint Set 1 Data:
dip=41 deg, dip direction=211 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Joint Set 2 Data:
dip=38 deg, dip direction=355 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:
dip=78 deg, dip direction=200 deg
slope height=11 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:
dip=59 deg, dip direction=200 deg

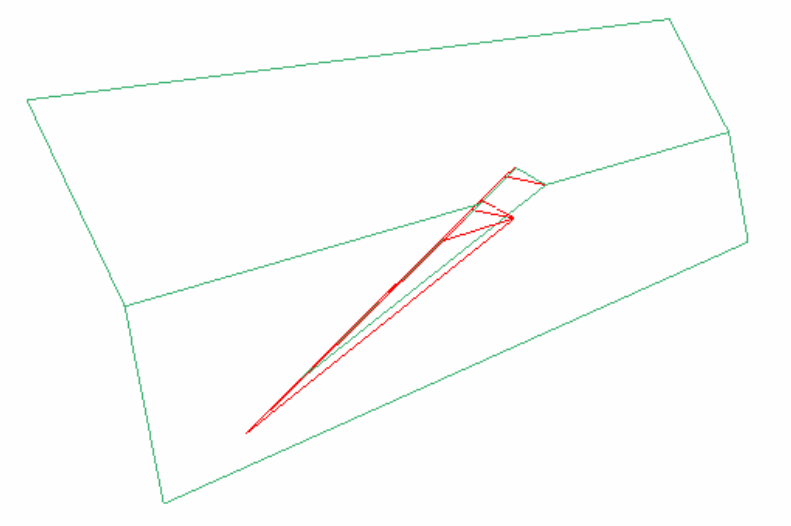
Tension Crack Data:
dip=57 deg, dip direction=58 deg
trace length=0.00180337 meters

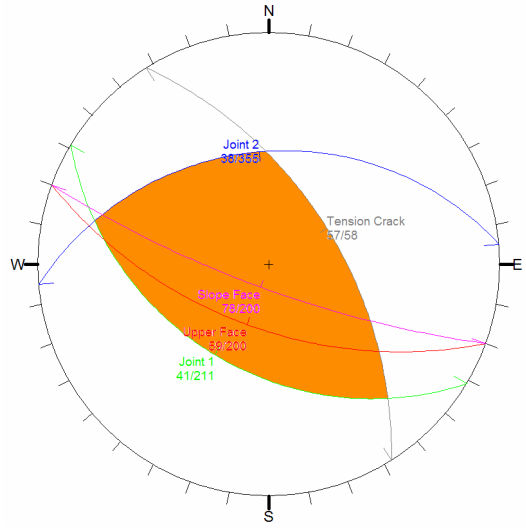
Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=283.992 deg, plunge=0 deg

Bolt Data:
Number of bolts=1
Bolt #1
bolt model=passive
trend=19.9998 deg, plunge=12 deg
length=10 meters
anchored length=9.75522 meters
capacity=1 tonnes

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 9.34, -2.95, 1.98
Point 234: 6.64, -1.97, 1.98
Point 135: 9.35, -2.95, 1.98
Point 125: 8.63, -2.15, 2.26
Point 235: 8.64, -2.4, 2.45




N
W
E
S
Joint 2
36/352
Tension Crack
57/58
Slope Face
78/330
Upper Face
59/200
Joint 1
41/211

1.2.5. Stazione 9

1.2.5.1. Scavo principale senza chiodatura

Document Name:
cuneo_9_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=0.793951
Wedge is scaled, scale factor=0.169654
Wedge height(on slope)=6.78616 m
Wedge width(on upper face)=0.881257 m
Wedge volume=0.747148 m3
Wedge weight=2.16673 tonnes
Wedge area (joint1)=7.15105 m2
Wedge area (joint2)=1.54693 m2
Wedge area (slope)=7.00344 m2
Wedge area (upper face)=0.689771 m2
Wedge area (tension crack)=0.143459 m2
Normal force (joint1)=1.06004 tonnes
Normal force (joint2)=0.667579 tonnes
Driving force=1.56763 tonnes
Resisting force=1.24462 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0130269 tonnes/m2
Water force on joint1=0.093156 tonnes
Water force on joint2=0.0201517 tonnes
Water force on tension crack=0.00186883 tonnes

Seismic Force:
Seismic force=0.0359677 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=45.4407 deg, trend=265.32 deg
length=9.49591 m

Trace Lengths:
Joint1 on slope face=9.02582 m
Joint2 on slope face=9.29156 m
Joint1 on upper face=1.25544 m
Joint2 on upper face=0.00856183 m
Tension crack on upper face=1.09721 m

Maximum Persistence:
Joint1=9.99998 m
Joint2=9.49591 m

Intersection Angles:
J1&J2 on slope face = 9.61455 deg
J1&Crest on slope face = 94.98 deg
J1&Crest on upper face = 44.5838 deg
J2&Crest on slope face = 75.4055 deg
J2&Crest on upper face = 98.7569 deg
J1&TC on upper face = 82.7164 deg
J2&TC on upper face = 133.943 deg
Joint Set 1 Data:
dip=51 deg, dip direction=300 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=62 deg, dip direction=208 deg

cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:

dip=49 deg, dip direction=285 deg
slope height=40 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:

dip=38 deg, dip direction=285 deg

Tension Crack Data:

dip=52 deg, dip direction=33 deg
trace length=1.25544 meters

Water Pressure Data:

Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:

Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=265.32 deg, plunge=0 deg

Wedge Vertices:

Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 5.9, -0.77, 6.79
Point 234: 6.3, 0.735, 6.79
Point 135: 6.8, -0.086, 7.33
Point 125: 6.64, 0.544, 6.77
Point 235: 6.31, 0.734, 6.79

1.2.5.2. Scavo principale con chiodatura

Document Name:

cuneo_9_SLU_sisma.swd

Job Title:

SWEDGE - Surface Wedge Stability Analysis

Analysis Results:

Analysis type=Deterministic
Safety Factor=1.87267
Wedge is scaled, scale factor=0.169654
Wedge height(on slope)=6.78616 m
Wedge width(on upper face)=0.881257 m
Wedge volume=0.747148 m3
Wedge weight=2.16673 tonnes
Wedge area (joint1)=7.15105 m2
Wedge area (joint2)=1.54693 m2
Wedge area (slope)=7.00344 m2
Wedge area (upper face)=0.689771 m2
Wedge area (tension crack)=0.143459 m2
Normal force (joint1)=1.06004 tonnes
Normal force (joint2)=0.667579 tonnes
Driving force=1.56763 tonnes
Resisting force=2.93566 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0130269 tonnes/m2
Water force on joint1=0.093156 tonnes
Water force on joint2=0.0201517 tonnes
Water force on tension crack=0.00186883 tonnes

Seismic Force:
Seismic force=0.0359677 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=45.4407 deg, trend=265.32 deg
length=9.49591 m

Trace Lengths:
Joint1 on slope face=9.02582 m
Joint2 on slope face=9.29156 m
Joint1 on upper face=1.25544 m
Joint2 on upper face=0.00856183 m
Tension crack on upper face=1.09721 m

Maximum Persistence:
Joint1=9.99998 m
Joint2=9.49591 m
Intersection Angles:
J1&J2 on slope face = 9.61455 deg
J1&Crest on slope face = 94.98 deg
J1&Crest on upper face = 44.5838 deg
J2&Crest on slope face = 75.4055 deg
J2&Crest on upper face = 98.7569 deg
J1&TC on upper face = 82.7164 deg
J2&TC on upper face = 133.943 deg

Joint Set 1 Data:
dip=51 deg, dip direction=300 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Joint Set 2 Data:
dip=62 deg, dip direction=208 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:
dip=49 deg, dip direction=285 deg
slope height=40 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:
dip=38 deg, dip direction=285 deg

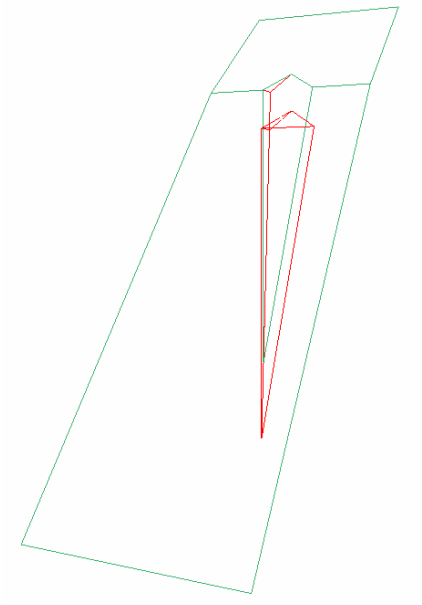
Tension Crack Data:
dip=52 deg, dip direction=33 deg
trace length=1.25544 meters

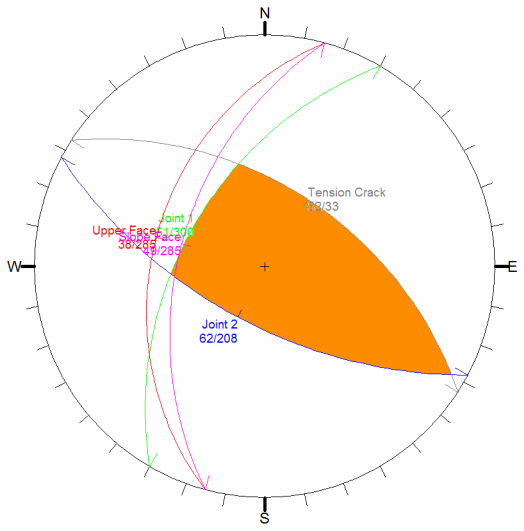
Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=265.32 deg, plunge=0 deg

Bolt Data:
Number of bolts=1
Bolt #1
bolt model=passive
trend=105 deg, plunge=41.0001 deg
length=10 meters
anchored length=9.85832 meters
capacity=2 tonnes

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 5.9, -0.77, 6.79
Point 234: 6.3, 0.735, 6.79
Point 135: 6.8, -0.086, 7.33
Point 125: 6.64, 0.544, 6.77
Point 235: 6.31, 0.734, 6.79




N
W
E
S
Tension Crack
Joint 1
Joint 2
62/208

1.2.5.3. Scavo laterale 1 senza chiodatura

Document Name:
cuneo_9_laterale_1_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=1.6196
Wedge is scaled, scale factor=0.0443991
Wedge height(on slope)=0.48839 m
Wedge width(on upper face)=5.09371 m
Wedge volume=0.727244 m3
Wedge weight=2.10901 tonnes
Wedge area (joint1)=0.0478581 m2
Wedge area (joint2)=13.9685 m2
Wedge area (slope)=1.26156 m2
Wedge area (upper face)=12.9119 m2
Wedge area (tension crack)=0.516686 m2
Normal force (joint1)=1.49822 tonnes
Normal force (joint2)=1.06364 tonnes
Driving force=1.13957 tonnes
Resisting force=1.84563 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0128228 tonnes/m2
Water force on joint1=0.000613673 tonnes
Water force on joint2=0.179114 tonnes
Water force on tension crack=0.00662534 tonnes

Seismic Force:
Seismic force=0.0350095 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=31.6891 deg, trend=278.837 deg
length=0.560243 m

Trace Lengths:
Joint1 on slope face=0.769271 m
Joint2 on slope face=4.49591 m
Joint1 on upper face=0.0443991 m
Joint2 on upper face=10 m
Tension crack on upper face=6.16768 m

Maximum Persistence:
Joint1=0.812708 m
Joint2=10 m

Intersection Angles:
J1&J2 on slope face = 133.153 deg
J1&Crest on slope face = 40.4706 deg
J1&Crest on upper face = 142.567 deg
J2&Crest on slope face = 6.37624 deg
J2&Crest on upper face = 30.6219 deg
J1&TC on upper face = 162.198 deg
J2&TC on upper face = 24.6128 deg
Joint Set 1 Data:
dip=52 deg, dip direction=340 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=62 deg, dip direction=208 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Slope Data:
dip=78 deg, dip direction=210 deg
slope height=11 meters

rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:

dip=59 deg, dip direction=210 deg

Tension Crack Data:

dip=51 deg, dip direction=300 deg
trace length=0.0443991 meters

Water Pressure Data:

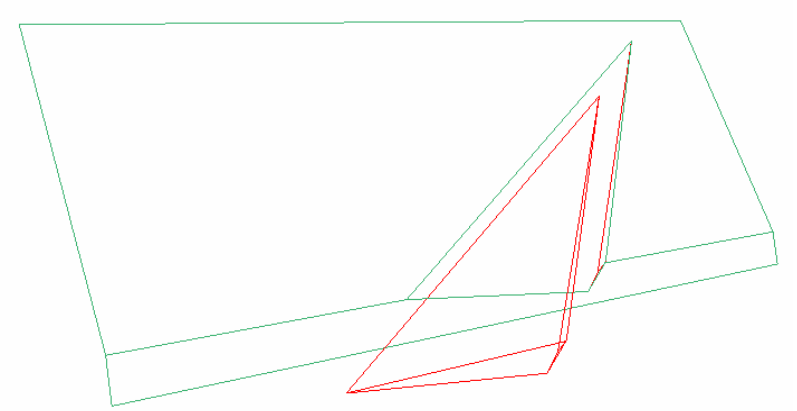
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

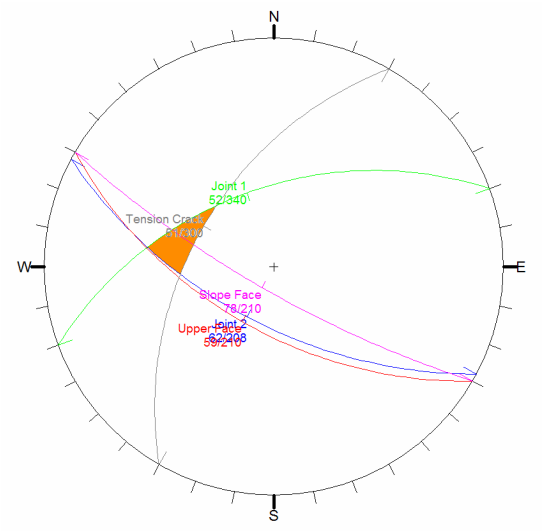
Seismic Data:

Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=278.837 deg, plunge=0 deg

Wedge Vertices:

Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 0.559, -0.203, 0.488
Point 234: -3.82, 2.32, 0.488
Point 135: 0.596, -0.208, 0.512
Point 125: 0.471, -0.0732, 0.294
Point 235: 4.95, 0.293, 4.85





1.2.5.4. Scavo laterale 2 senza chiodatura

Document Name:
cuneo_9_laterale_2_SLU_sisma.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=1.62485
Wedge is scaled, scale factor=0.0855919
Wedge height(on slope)=0.941511 m
Wedge width(on upper face)=0.656708 m
Wedge volume=0.964586 m3
Wedge weight=2.7973 tonnes
Wedge area (joint1)=0.330153 m2
Wedge area (joint2)=8.40316 m2
Wedge area (slope)=4.68841 m2
Wedge area (upper face)=4.43305 m2
Wedge area (tension crack)=1.44615 m2
Normal force (joint1)=2.01291 tonnes
Normal force (joint2)=1.43785 tonnes
Driving force=1.53 tonnes
Resisting force=2.48602 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.024333 tonnes/m2
Water force on joint1=0.0080336 tonnes
Water force on joint2=0.204474 tonnes
Water force on tension crack=0.0351892 tonnes

Seismic Force:
Seismic force=0.0464352 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=31.6891 deg, trend=278.837 deg
length=1.74013 m

Trace Lengths:
Joint1 on slope face=1.48299 m
Joint2 on slope face=8.66714 m
Joint1 on upper face=0.42796 m
Joint2 on upper face=1.28925 m
Tension crack on upper face=8.98082 m

Maximum Persistence:
Joint1=1.90333 m
Joint2=10 m

Intersection Angles:
J1&J2 on slope face = 133.153 deg
J1&Crest on slope face = 40.4706 deg
J1&Crest on upper face = 142.567 deg
J2&Crest on slope face = 6.37624 deg
J2&Crest on upper face = 30.6219 deg
J1&TC on upper face = 39.9638 deg
J2&TC on upper face = 146.847 deg
Joint Set 1 Data:
dip=52 deg, dip direction=340 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=62 deg, dip direction=208 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Slope Data:
dip=78 deg, dip direction=210 deg
slope height=11 meters

rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=YES

Upper Face Data:

dip=59 deg, dip direction=210 deg

Tension Crack Data:

dip=52 deg, dip direction=33 deg
trace length=0.427959 meters

Water Pressure Data:

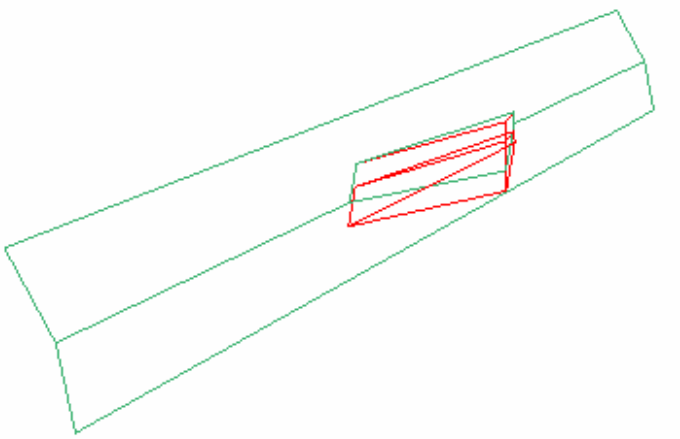
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

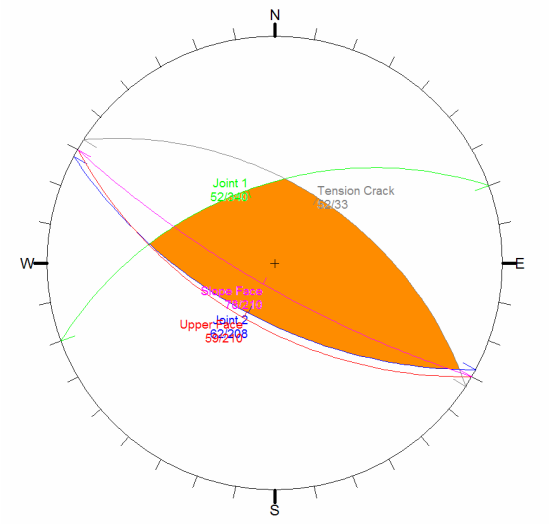
Seismic Data:

Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=278.837 deg, plunge=0 deg

Wedge Vertices:

Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack
Point 124: 0, 0, 0
Point 134: 1.08, -0.391, 0.942
Point 234: -7.36, 4.48, 0.942
Point 135: 1.44, -0.445, 1.16
Point 125: 1.46, -0.227, 0.914
Point 235: -6.23, 4.22, 1.5





1.2.6. Stazione 11

1.2.6.1. Scavo laterale senza chiodatura

Document Name:
cuneo_11_laterale_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=1.63264
Wedge is scaled, scale factor=0.172161
Wedge height(on slope)=3.44322 m
Wedge width(on upper face)=1.66879 m
Wedge volume=3.90821 m3
Wedge weight=11.3338 tonnes
Wedge area (joint1)=19.002 m2
Wedge area (joint2)=2.95326 m2
Wedge area (slope)=12.9 m2
Wedge area (upper face)=6.11548 m2
Normal force (joint1)=3.97756 tonnes
Normal force (joint2)=9.39371 tonnes
Driving force=5.90027 tonnes
Resisting force=9.63303 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0963173 tonnes/m2
Water force on joint1=1.83022 tonnes
Water force on joint2=0.28445 tonnes

Seismic Force:
Seismic force=0.188141 tonnes

Failure Mode:
Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:
plunge=30.416 deg, trend=79.0505 deg
length=9.13187 m

Trace Lengths:
Joint1 on slope face=4.16188 m
Joint2 on slope face=6.20423 m
Joint1 on upper face=10 m
Joint2 on upper face=3.03125 m

Maximum Persistence:
Joint1=10 m
Joint2=9.13187 m

Intersection Angles:
J1&J2 on slope face = 87.674 deg
J1&Crest on slope face = 57.7584 deg
J1&Crest on upper face = 9.60637 deg
J2&Crest on slope face = 34.5676 deg
J2&Crest on upper face = 146.597 deg
J1&2 on upper face = 23.7968 deg
Joint Set 1 Data:
dip=75 deg, dip direction=160 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=45 deg, dip direction=25 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Slope Data:
dip=78 deg, dip direction=155 deg
slope height=20 meters

rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=NO

Upper Face Data:

dip=45 deg, dip direction=155 deg

Water Pressure Data:

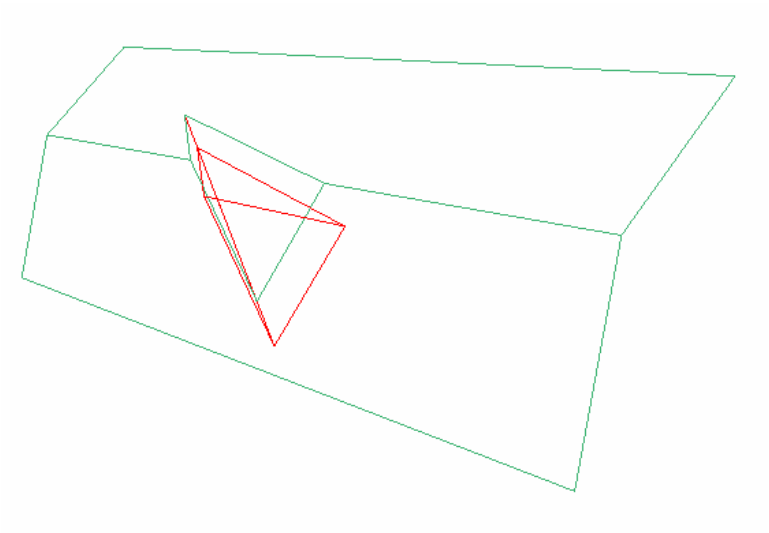
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

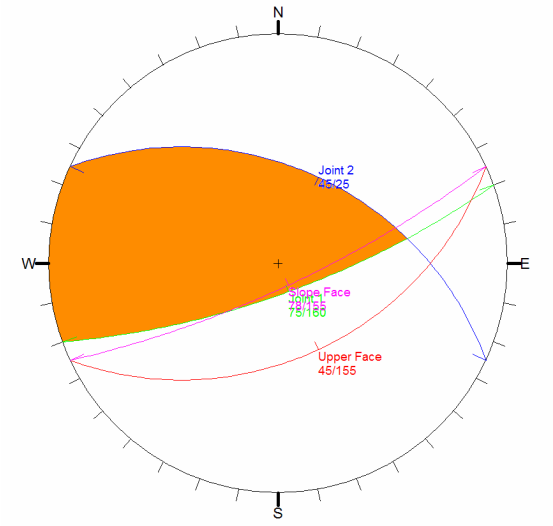
Seismic Data:

Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=79.0505 deg, plunge=0 deg

Wedge Vertices:

Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope
Point 124: 0, 0, 0
Point 134: 1.7, 1.6, 3.44
Point 234: -4.94, -1.5, 3.44
Point 123: -7.73, -1.5, 4.62





1.2.7. Stazione 15

1.2.7.1. Scavo principale senza chiodatura

Document Name:
cuneo_15_SLU_sisma_SC.swd
Job Title:
SWEDGE - Surface Wedge Stability Analysis
Analysis Results:
Analysis type=Deterministic
Safety Factor=0.723529
Wedge is scaled, scale factor=0.0436059
Wedge height(on slope)=1.26457 m
Wedge width(on upper face)=2.19775 m
Wedge volume=0.665517 m3
Wedge weight=1.93 tonnes
Wedge area (joint1)=1.70866 m2
Wedge area (joint2)=6.06524 m2
Wedge area (slope)=2.325 m2
Wedge area (upper face)=3.63178 m2
Normal force (joint1)=-1.10485 tonnes
Normal force (joint2)=0.960782 tonnes
Driving force=1.20056 tonnes
Resisting force=0.868642 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0563839 tonnes/m2
Water force on joint1=0.0963406 tonnes
Water force on joint2=0.341982 tonnes

Seismic Force:
Seismic force=0.032038 tonnes

Failure Mode:
Sliding on joint2

Joint Sets 1&2 line of Intersection:
plunge=15.7025 deg, trend=183.672 deg
length=10 m

Trace Lengths:
Joint1 on slope face=3.86277 m
Joint2 on slope face=7.04435 m
Joint1 on upper face=6.16186 m
Joint2 on upper face=3.29249 m

Maximum Persistence:
Joint1=10 m
Joint2=10 m

Intersection Angles:
J1&J2 on slope face = 9.8395 deg
J1&Crest on slope face = 158.639 deg
J1&Crest on upper face = 20.8958 deg
J2&Crest on slope face = 11.5211 deg
J2&Crest on upper face = 138.125 deg
J1&2 on upper face = 20.9789 deg
Joint Set 1 Data:
dip=45 deg, dip direction=110 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Joint Set 2 Data:
dip=35 deg, dip direction=250 deg
cohesion=0 tonnes/m2, friction angle=35 deg
Slope Data:
dip=64 deg, dip direction=260 deg
slope height=29 meters

rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=NO

Upper Face Data:
dip=41 deg, dip direction=260 deg

Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=183.672 deg, plunge=0 deg

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope
Point 124: 0, 0, 0
Point 134: -0.0173, 3.65, 1.26
Point 234: -0.591, 6.9, 1.26
Point 123: 0.617, 9.61, 2.71

1.2.7.2. Scavo principale con chiodatura

Document Name:
cuneo_15_SLU_sisma.swd

Job Title:
SWEDGE - Surface Wedge Stability Analysis

Analysis Results:
Analysis type=Deterministic
Safety Factor=1.60822
Wedge is scaled, scale factor=0.0436059
Wedge height(on slope)=1.26457 m
Wedge width(on upper face)=2.19775 m
Wedge volume=0.665517 m3
Wedge weight=1.93 tonnes
Wedge area (joint1)=1.70866 m2
Wedge area (joint2)=6.06524 m2
Wedge area (slope)=2.325 m2
Wedge area (upper face)=3.63178 m2
Normal force (joint1)=-1.10485 tonnes
Normal force (joint2)=0.960782 tonnes
Driving force=1.20056 tonnes
Resisting force=1.93077 tonnes

Water Pressures/Forces:
Average pressure on fissures=0.0563839 tonnes/m2
Water force on joint1=0.0963406 tonnes
Water force on joint2=0.341982 tonnes

Seismic Force:
Seismic force=0.032038 tonnes

Failure Mode:
Sliding on joint2

Joint Sets 1&2 line of Intersection:
plunge=15.7025 deg, trend=183.672 deg
length=10 m

Trace Lengths:
Joint1 on slope face=3.86277 m
Joint2 on slope face=7.04435 m
Joint1 on upper face=6.16186 m
Joint2 on upper face=3.29249 m

Maximum Persistence:
Joint1=10 m
Joint2=10 m

Intersection Angles:
J1&J2 on slope face = 9.8395 deg
J1&Crest on slope face = 158.639 deg
J1&Crest on upper face = 20.8958 deg
J2&Crest on slope face = 11.5211 deg
J2&Crest on upper face = 138.125 deg
J1&2 on upper face = 20.9789 deg

Joint Set 1 Data:
dip=45 deg, dip direction=110 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Joint Set 2 Data:
dip=35 deg, dip direction=250 deg
cohesion=0 tonnes/m2, friction angle=35 deg

Slope Data:
dip=64 deg, dip direction=260 deg
slope height=29 meters
rock unit weight=2.9 tonnes/m3
Water pressures in the slope=YES
Overhanging slope face=NO
Externally applied force=NO
Tension crack=NO

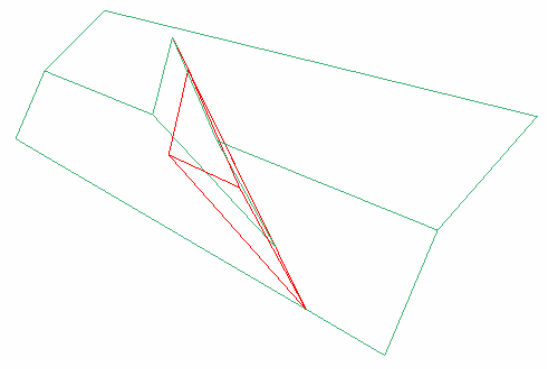
Upper Face Data:
dip=41 deg, dip direction=260 deg

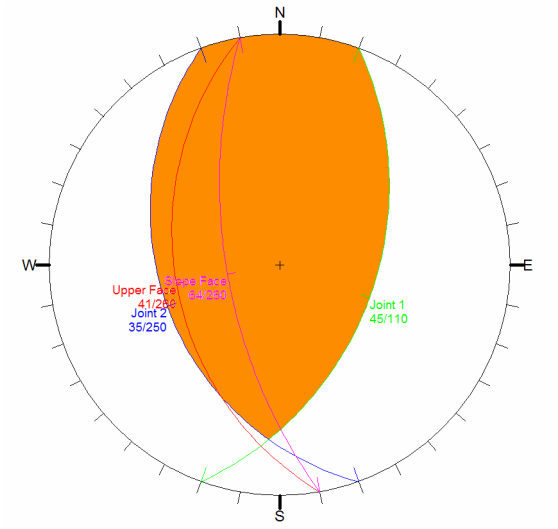
Water Pressure Data:
Water unit weight=1 tonnes/m3
Pressure definition method=Percent Filled Fissures
Percent Filled=50 %

Seismic Data:
Seismic coefficient=0.0166
Direction=line of interesection J1&J2 but horizontal
trend=183.672 deg, plunge=0 deg

Bolt Data:
Number of bolts=1
Bolt #1
bolt model=passive
trend=80 deg, plunge=26 deg
length=10 meters
anchored length=9.86078 meters
capacity=1 tonnes

Wedge Vertices:
Coordinates in Easting,Northing,Up Format
1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope
Point 124: 0, 0, 0
Point 134: -0.0173, 3.65, 1.26
Point 234: -0.591, 6.9, 1.26
Point 123: 0.617, 9.61, 2.71




N
W
E
S
Upper Face
41/280
Joint 2
35/250
Slope Face
64/200
Joint 1
45/110

2. VERIFICHE DI STABILITA' IN CONDIZIONI PIANE DEI CUNEI IN ROCCIA

2.1. Sponda destra

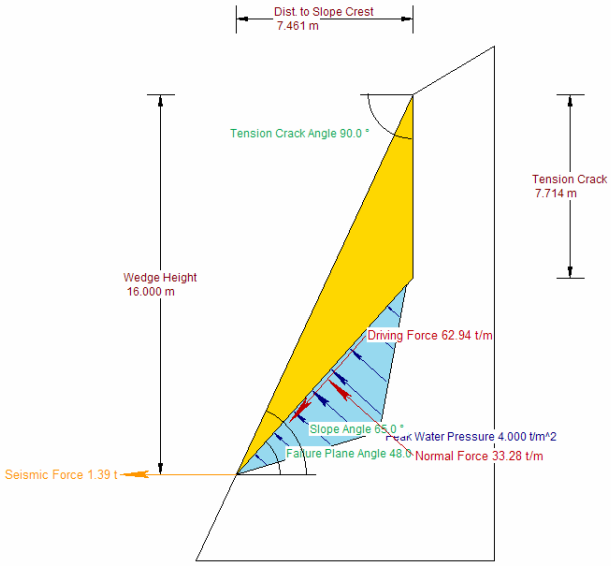
2.1.1. Verifica 1

2.1.1.1. Senza chiodatura

Document Name:
verifica 1_prova4_sisma_SC.pln
Job Title:
RocPlane - Planar Wedge Stability Analysis
Analysis Results:
Analysis type = Deterministic
Normal Force = 33.2797 t/m
Resisting Force = 23.3027 t/m
Driving Force = 62.9428 t/m
Factor of Safety = 0.370221
Geometry:
Slope Height = 16 m
Wedge Weight = 83.4506 t/m
Wedge Volume = 28.7761 m^3/m
Rock Unit Weight = 2.9 t/m^3
Slope Angle = 65 °
Failure Plane Angle = 48 °
Upper Face Angle = 31 °
Bench Width = 11.5 m
Wedge Height = 16 m
Waviness = 0 °

Intersection Point (B) of slope and upper face = (7.46092 , 16)
Intersection point (C) of tension crack and upper face = (7.46092 , 16)
Intersection point (D) of failure plane and tension crack = (7.46092 , 8.28619)
Upper face length (B --> C) = 0 m
Wedge Slope length (Origin --> B) = 17.654 m
Tension Crack Length (C --> D) = 7.71381 m
Failure Plane length (Origin --> D) = 11.1502 m

Tension Crack : present
Tension Crack Angle = 90 °
Distance From Crest = 0 m
Tension Crack Length = 7.71381 m
Strength:
Shear Strength Model : Mohr-Coulomb
Friction Angle = 35 °
Cohesion = 0 t/m^2
Shear Strength: 23.3027 t/m^2
Water Pressure:
Water Unit Weight = 1 t/m^3
Pressure Distribution Model : Peak Pressure - Mid Height
Percent Filled : 50 %
Water Force on Failure Plane = 21.5301 t/m
Water Force on Tension Crack Plane = 0 t/m
Seismic Force:
Direction : User Defined
Seismic Coefficient : 0.0166
Angle = 0 °
Seismic Force : 1.38528 t/m
External Forces : Not Present



Factor of Safety	0.37
Driving Force	62.94t/m
Resisting Force	23.30t/m
Wedge Weight	83.45t/m
Wedge Volume	28.78m^3/m
Shear Strength	23.30t/m^2
Normal Force	33.28t/m
Seismic Force	1.39t
Plane Waviness	0.0°
Water Force on Failure Plane	21.53t/m
Water Force on Tension Crack	0.00t/m

2.1.1.2. Con chiodatura

Document Name:
Verifica 1_sisma.pln
Job Title:
RocPlane - Planar Wedge Stability Analysis
Analysis Results:
Analysis type = Deterministic
Normal Force = 79.1824 t/m
Resisting Force = 69.4779 t/m
Driving Force = 62.9428 t/m
Factor of Safety = 1.10383
Geometry:
Slope Height = 16 m
Wedge Weight = 83.4506 t/m
Wedge Volume = 28.7761 m^3/m
Rock Unit Weight = 2.9 t/m^3
Slope Angle = 65 °
Failure Plane Angle = 48 °
Upper Face Angle = 31 °
Bench Width = 11.5 m
Wedge Height = 16 m
Waviness = 0 °

Intersection Point (B) of slope and upper face = (7.46092 , 16)
Intersection point (C) of tension crack and upper face = (7.46092 , 16)
Intersection point (D) of failure plane and tension crack = (7.46092 , 8.28619)
Upper face length (B --> C) = 0 m
Wedge Slope length (Origin --> B) = 17.654 m
Tension Crack Length (C --> D) = 7.71381 m
Failure Plane length (Origin --> D) = 11.1502 m

Tension Crack : present
Tension Crack Angle = 90 °
Distance From Crest = 0 m
Tension Crack Length = 7.71381 m

Strength:

Shear Strength Model : Mohr-Coulomb
Friction Angle = 35 °
Cohesion = 0 t/m^2
Shear Strength: 55.4441 t/m^2

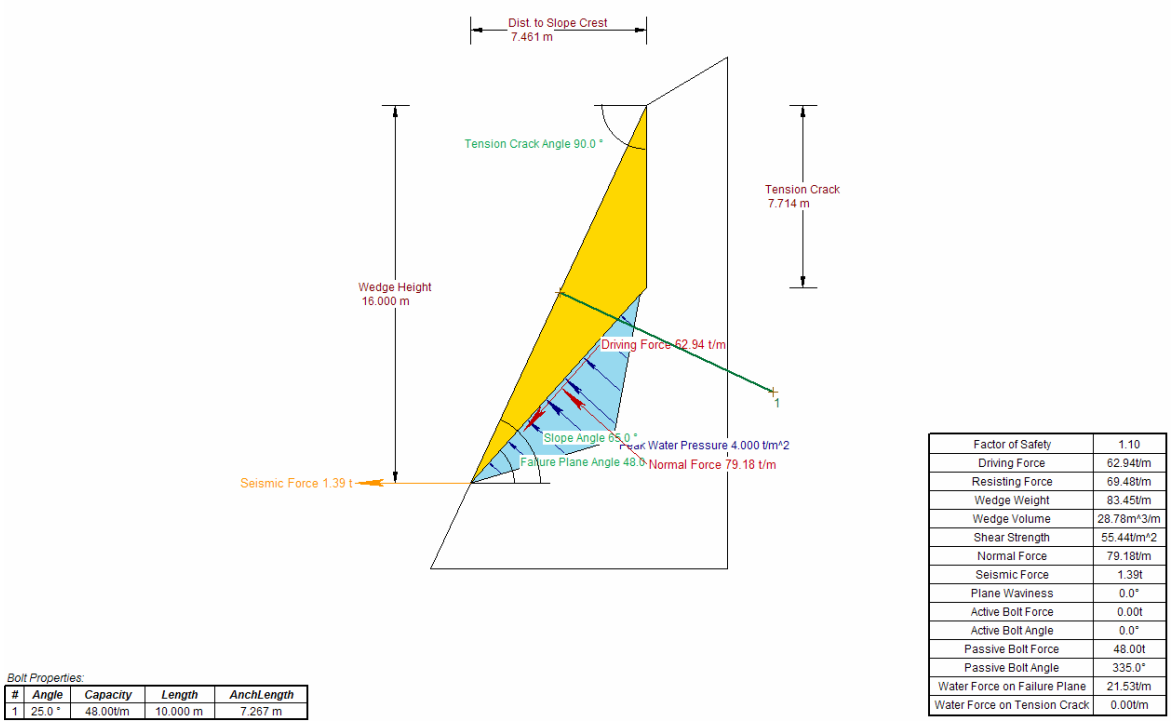
Water Pressure:

Water Unit Weight = 1 t/m^3
Pressure Distribution Model : Peak Pressure - Mid Height
Percent Filled : 50 %
Water Force on Failure Plane = 21.5301 t/m
Water Force on Tension Crack Plane = 0 t/m

Seismic Force:

Direction : User Defined
Seismic Coefficient : 0.0166
Angle = 0 °
Seismic Force : 1.38528 t/m

External Forces : Not Present



Bolt Properties:

#	Angle	Capacity	Length	AnchLength
1	25.0 °	48.00t/m	10.000 m	7.267 m

Factor of Safety	1.10
Driving Force	62.94t/m
Resisting Force	69.48t/m
Wedge Weight	83.45t/m
Wedge Volume	28.78m^3/m
Shear Strength	55.44t/m^2
Normal Force	79.18t/m
Seismic Force	1.39t
Plane Waviness	0.0°
Active Bolt Force	0.00t
Active Bolt Angle	0.0°
Passive Bolt Force	48.00t
Passive Bolt Angle	335.0°
Water Force on Failure Plane	21.53t/m
Water Force on Tension Crack	0.00t/m

2.1.2. Verifica 2

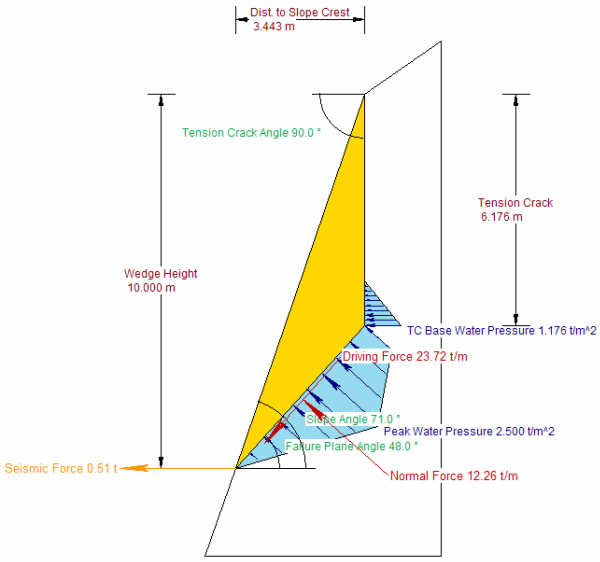
2.1.2.1. Senza chiodatura

Document Name:
verifica 2_prova3_sisma_SC.pln
Job Title:
RocPlane - Planar Wedge Stability Analysis
Analysis Results:
Analysis type = Deterministic
Normal Force = 12.2582 t/m
Resisting Force = 8.58331 t/m
Driving Force = 23.7196 t/m
Factor of Safety = 0.361866
Geometry:
Slope Height = 10 m
Wedge Weight = 30.8345 t/m
Wedge Volume = 10.6326 m^3/m
Rock Unit Weight = 2.9 t/m^3
Slope Angle = 71 °
Failure Plane Angle = 48 °
Upper Face Angle = 35 °
Bench Width = 18.5 m
Wedge Height = 10 m
Waviness = 0 °

Intersection Point (B) of slope and upper face = (3.44328 , 10)
Intersection point (C) of tension crack and upper face = (3.44328 , 10)
Intersection point (D) of failure plane and tension crack = (3.44328 , 3.82415)
Upper face length (B --> C) = 0 m
Wedge Slope length (Origin --> B) = 10.5762 m
Tension Crack Length (C --> D) = 6.17585 m
Failure Plane length (Origin --> D) = 5.1459 m

Tension Crack : present
Tension Crack Angle = 90 °
Distance From Crest = 0 m
Tension Crack Length = 6.17585 m
Strength:
Shear Strength Model : Mohr-Coulomb
Friction Angle = 35 °
Cohesion = 0 t/m^2
Shear Strength: 8.58331 t/m^2
Water Pressure:
Water Unit Weight = 1 t/m^3
Pressure Distribution Model : Peak Pressure - Mid Height
Percent Filled : 50 %
Water Force on Failure Plane = 7.47995 t/m
Water Force on Tension Crack Plane = 0.691317 t/m
Seismic Force:
Direction : User Defined
Seismic Coefficient : 0.0166
Angle = 0 °
Seismic Force : 0.511853 t/m

External Forces : Not Present



Factor of Safety	0.36
Driving Force	23.72t/m
Resisting Force	8.58t/m
Wedge Weight	30.83t/m
Wedge Volume	10.63m^3/m
Shear Strength	8.58t/m^2
Normal Force	12.26t/m
Seismic Force	0.51t
Plane Waviness	0.0°
Water Force on Failure Plane	7.48t/m
Water Force on Tension Crack	0.69t/m

2.1.2.2. Con chiodatura

Document Name:
Verifica 2_sisma.pln
Job Title:
RocPlane - Planar Wedge Stability Analysis
Analysis Results:
Analysis type = Deterministic
Normal Force = 28.8273 t/m
Resisting Force = 27.2183 t/m
Driving Force = 23.7196 t/m
Factor of Safety = 1.1475
Geometry:
Slope Height = 10 m
Wedge Weight = 30.8345 t/m
Wedge Volume = 10.6326 m^3/m
Rock Unit Weight = 2.9 t/m^3
Slope Angle = 71 °
Failure Plane Angle = 48 °
Upper Face Angle = 35 °
Bench Width = 18.5 m
Wedge Height = 10 m
Waviness = 0 °

Intersection Point (B) of slope and upper face = (3.44328 , 10)
Intersection point (C) of tension crack and upper face = (3.44328 , 10)
Intersection point (D) of failure plane and tension crack = (3.44328 , 3.82415)
Upper face length (B --> C) = 0 m
Wedge Slope length (Origin --> B) = 10.5762 m
Tension Crack Length (C --> D) = 6.17585 m
Failure Plane length (Origin --> D) = 5.1459 m

Tension Crack : present
Tension Crack Angle = 90 °
Distance From Crest = 0 m
Tension Crack Length = 6.17585 m

Strength:

Shear Strength Model : Mohr-Coulomb
Friction Angle = 35 °
Cohesion = 0 t/m^2
Shear Strength: 20.1851 t/m^2

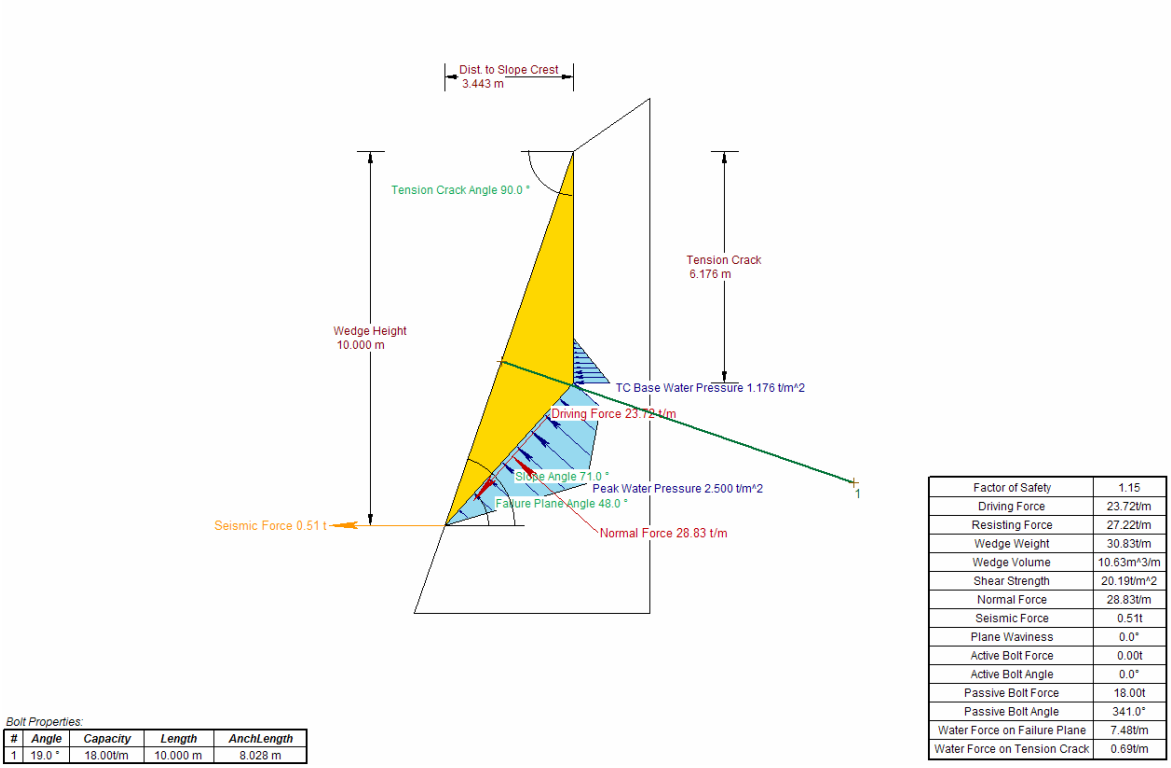
Water Pressure:

Water Unit Weight = 1 t/m^3
Pressure Distribution Model : Peak Pressure - Mid Height
Percent Filled : 50 %
Water Force on Failure Plane = 7.47995 t/m
Water Force on Tension Crack Plane = 0.691317 t/m

Seismic Force:

Direction : User Defined
Seismic Coefficient : 0.0166
Angle = 0 °
Seismic Force : 0.511853 t/m

External Forces : Not Present



Factor of Safety	1.15
Driving Force	23.72t/m
Resisting Force	27.22t/m
Wedge Weight	30.83t/m
Wedge Volume	10.63m^3/m
Shear Strength	20.19t/m^2
Normal Force	28.83t/m
Seismic Force	0.51t
Plane Waviness	0.0°
Active Bolt Force	0.00t
Active Bolt Angle	0.0°
Passive Bolt Force	18.00t
Passive Bolt Angle	341.0°
Water Force on Failure Plane	7.48t/m
Water Force on Tension Crack	0.69t/m

Bolt Properties:

#	Angle	Capacity	Length	AnchLength
1	19.0 °	18.00t/m	10.000 m	8.028 m

2.2. **Sponda sinistra**

2.2.1. Verifica 3

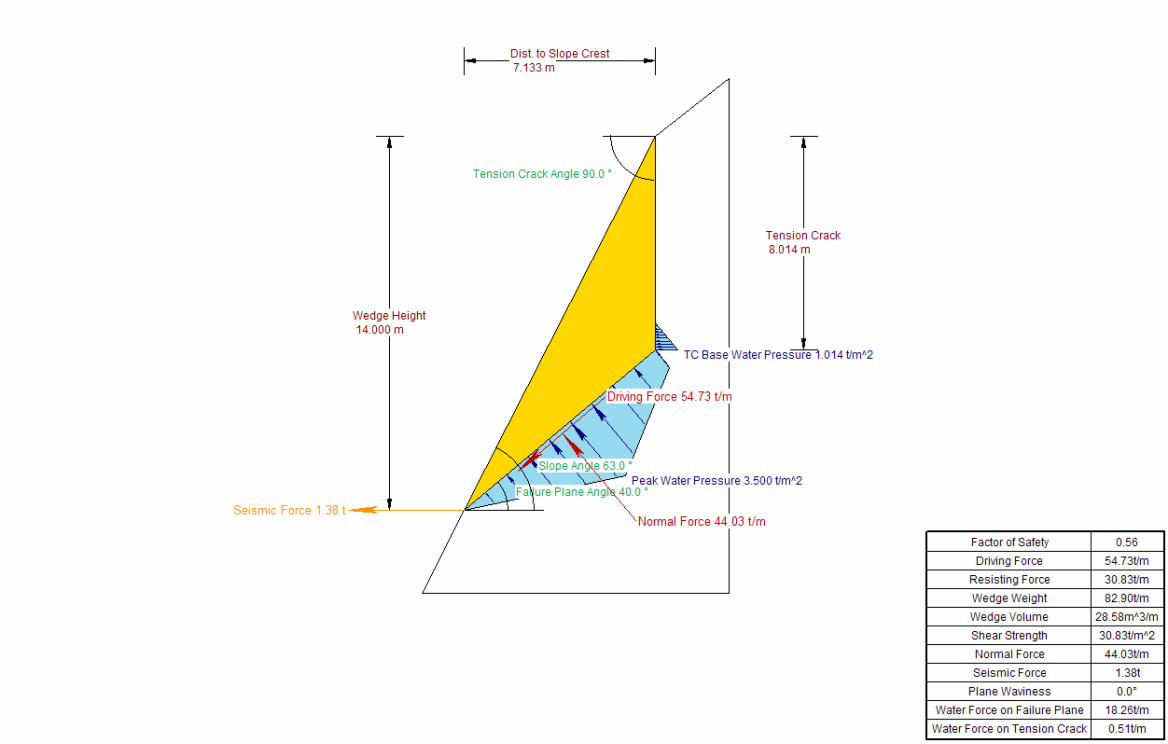
2.2.1.1. Senza chiodatura

Document Name:
verifica 3_prova1_sisma_SC.pln
Job Title:
RocPlane - Planar Wedge Stability Analysis
Analysis Results:
Analysis type = Deterministic
Normal Force = 44.0295 t/m
Resisting Force = 30.8298 t/m
Driving Force = 54.7327 t/m
Factor of Safety = 0.563279
Geometry:
Slope Height = 14 m
Wedge Weight = 82.8959 t/m
Wedge Volume = 28.5848 m^3/m
Rock Unit Weight = 2.9 t/m^3
Slope Angle = 63 °
Failure Plane Angle = 40 °
Upper Face Angle = 38 °
Bench Width = 19.25 m
Wedge Height = 14 m
Waviness = 0 °

Intersection Point (B) of slope and upper face = (7.13336 , 14)
Intersection point (C) of tension crack and upper face = (7.13336 , 14)
Intersection point (D) of failure plane and tension crack = (7.13336 , 5.9856)
Upper face length (B --> C) = 0 m
Wedge Slope length (Origin --> B) = 15.7126 m
Tension Crack Length (C --> D) = 8.0144 m
Failure Plane length (Origin --> D) = 9.31194 m

Tension Crack : present
Tension Crack Angle = 90 °
Distance From Crest = 0 m
Tension Crack Length = 8.0144 m
Strength:
Shear Strength Model : Mohr-Coulomb
Friction Angle = 35 °
Cohesion = 0 t/m^2
Shear Strength: 30.8298 t/m^2
Water Pressure:
Water Unit Weight = 1 t/m^3
Pressure Distribution Model : Peak Pressure - Mid Height
Percent Filled : 50 %
Water Force on Failure Plane = 18.2572 t/m
Water Force on Tension Crack Plane = 0.514507 t/m
Seismic Force:
Direction : User Defined
Seismic Coefficient : 0.0166
Angle = 0 °
Seismic Force : 1.37607 t/m

External Forces : Not Present



Factor of Safety	0.56
Driving Force	54.73t/m
Resisting Force	30.83t/m
Wedge Weight	82.90t/m
Wedge Volume	28.58m^3/m
Shear Strength	30.83t/m^2
Normal Force	44.03t/m
Seismic Force	1.38t
Plane Waviness	0.0°
Water Force on Failure Plane	18.26t/m
Water Force on Tension Crack	0.51t/m

2.2.1.2. Con chiodatura

Document Name:
Verifica 3_sisma.pln
Job Title:
RocPlane - Planar Wedge Stability Analysis
Analysis Results:
Analysis type = Deterministic
Normal Force = 70.7242 t/m
Resisting Force = 60.8528 t/m
Driving Force = 54.7327 t/m
Factor of Safety = 1.11182
Geometry:
Slope Height = 14 m
Wedge Weight = 82.8959 t/m
Wedge Volume = 28.5848 m^3/m
Rock Unit Weight = 2.9 t/m^3
Slope Angle = 63 °
Failure Plane Angle = 40 °
Upper Face Angle = 38 °
Bench Width = 19.25 m
Wedge Height = 14 m
Waviness = 0 °

Intersection Point (B) of slope and upper face = (7.13336 , 14)
Intersection point (C) of tension crack and upper face = (7.13336 , 14)
Intersection point (D) of failure plane and tension crack = (7.13336 , 5.9856)
Upper face length (B --> C) = 0 m
Wedge Slope length (Origin --> B) = 15.7126 m
Tension Crack Length (C --> D) = 8.0144 m
Failure Plane length (Origin --> D) = 9.31194 m

Tension Crack : present
Tension Crack Angle = 90 °
Distance From Crest = 0 m
Tension Crack Length = 8.0144 m

Strength:

Shear Strength Model : Mohr-Coulomb
Friction Angle = 35 °
Cohesion = 0 t/m^2
Shear Strength: 49.5216 t/m^2

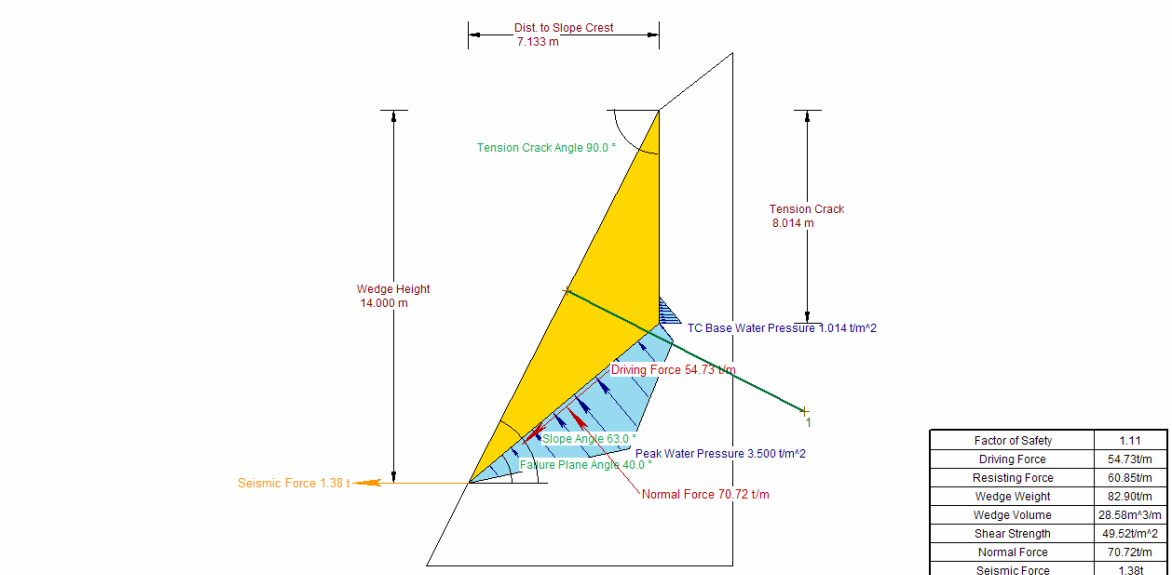
Water Pressure:

Water Unit Weight = 1 t/m^3
Pressure Distribution Model : Peak Pressure - Mid Height
Percent Filled : 50 %
Water Force on Failure Plane = 18.2572 t/m
Water Force on Tension Crack Plane = 0.514507 t/m

Seismic Force:

Direction : User Defined
Seismic Coefficient : 0.0166
Angle = 0 °
Seismic Force : 1.37607 t/m

External Forces : Not Present



Factor of Safety	1.11
Driving Force	54.73t/m
Resisting Force	60.85t/m
Wedge Weight	82.90t/m
Wedge Volume	28.58m^3/m
Shear Strength	49.52t/m^2
Normal Force	70.72t/m
Seismic Force	1.38t
Plane Waviness	0.0°
Active Bolt Force	0.00t
Active Bolt Angle	0.0°
Passive Bolt Force	29.00t
Passive Bolt Angle	333.0°
Water Force on Failure Plane	18.26t/m
Water Force on Tension Crack	0.51t/m

Bolt Properties:

#	Angle	Capacity	Length	AnchLength
1	27.0 °	29.00t/m	10.000 m	6.555 m

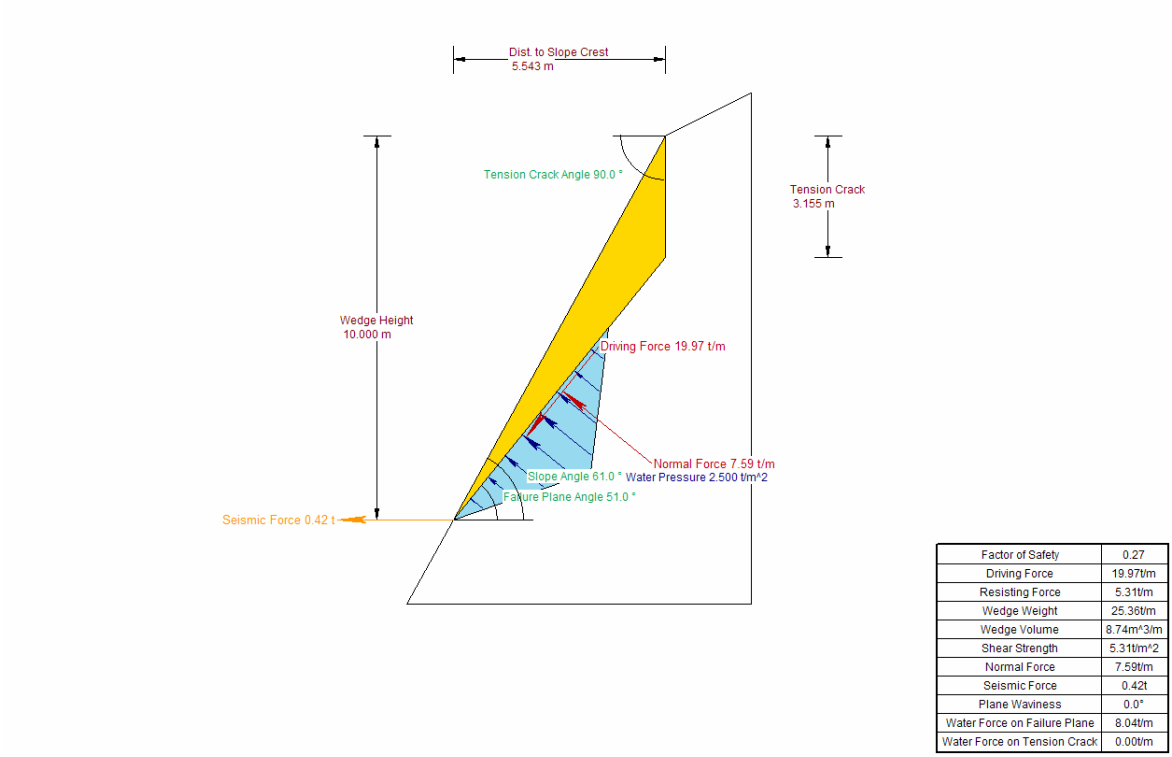
2.2.2. Verifica 4

2.2.2.1. Senza chiodatura

Document Name:
verifica 4_prova2_sisma_SC.pln
Job Title:
RocPlane - Planar Wedge Stability Analysis
Analysis Results:
Analysis type = Deterministic
Normal Force = 7.58835 t/m
Resisting Force = 5.31342 t/m
Driving Force = 19.971 t/m
Factor of Safety = 0.266056
Geometry:
Slope Height = 10 m
Wedge Weight = 25.3571 t/m
Wedge Volume = 8.74382 m^3/m
Rock Unit Weight = 2.9 t/m^3
Slope Angle = 61 °
Failure Plane Angle = 51 °
Upper Face Angle = 27 °
Bench Width = 10 m
Wedge Height = 10 m
Waviness = 0 °

Intersection Point (B) of slope and upper face = (5.54309 , 10)
Intersection point (C) of tension crack and upper face = (5.54309 , 10)
Intersection point (D) of failure plane and tension crack = (5.54309 , 6.84515)
Upper face length (B --> C) = 0 m
Wedge Slope length (Origin --> B) = 11.4335 m
Tension Crack Length (C --> D) = 3.15485 m
Failure Plane length (Origin --> D) = 8.80806 m

Tension Crack : present
Tension Crack Angle = 90 °
Distance From Crest = 0 m
Tension Crack Length = 3.15485 m
Strength:
Shear Strength Model : Mohr-Coulomb
Friction Angle = 35 °
Cohesion = 0 t/m^2
Shear Strength: 5.31342 t/m^2
Water Pressure:
Water Unit Weight = 1 t/m^3
Pressure Distribution Model : Peak Pressure - Mid Height
Percent Filled : 50 %
Water Force on Failure Plane = 8.04225 t/m
Water Force on Tension Crack Plane = 0 t/m
Seismic Force:
Direction : User Defined
Seismic Coefficient : 0.0166
Angle = 0 °
Seismic Force : 0.420927 t/m
External Forces : Not Present



Factor of Safety	0.27
Driving Force	19.97t/m
Resisting Force	5.31t/m
Wedge Weight	25.36t/m
Wedge Volume	8.74m^3/m
Shear Strength	5.31t/m^2
Normal Force	7.59t/m
Seismic Force	0.42t
Plane Waviness	0.0°
Water Force on Failure Plane	8.04t/m
Water Force on Tension Crack	0.00t/m

2.2.2.2. Con chiodatura

Document Name:
Verifica 4_sisma.pln
Job Title:
RocPlane - Planar Wedge Stability Analysis
Analysis Results:
Analysis type = Deterministic
Normal Force = 27.2845 t/m
Resisting Force = 22.5778 t/m
Driving Force = 19.971 t/m
Factor of Safety = 1.13053
Geometry:
Slope Height = 10 m
Wedge Weight = 25.3571 t/m
Wedge Volume = 8.74382 m^3/m
Rock Unit Weight = 2.9 t/m^3
Slope Angle = 61 °
Failure Plane Angle = 51 °
Upper Face Angle = 27 °
Bench Width = 10 m
Wedge Height = 10 m
Waviness = 0 °

Intersection Point (B) of slope and upper face = (5.54309 , 10)
Intersection point (C) of tension crack and upper face = (5.54309 , 10)
Intersection point (D) of failure plane and tension crack = (5.54309 , 6.84515)
Upper face length (B --> C) = 0 m
Wedge Slope length (Origin --> B) = 11.4335 m
Tension Crack Length (C --> D) = 3.15485 m
Failure Plane length (Origin --> D) = 8.80806 m

Tension Crack : present
Tension Crack Angle = 90 °
Distance From Crest = 0 m
Tension Crack Length = 3.15485 m

Strength:

Shear Strength Model : Mohr-Coulomb
Friction Angle = 35 °
Cohesion = 0 t/m^2
Shear Strength: 19.1048 t/m^2

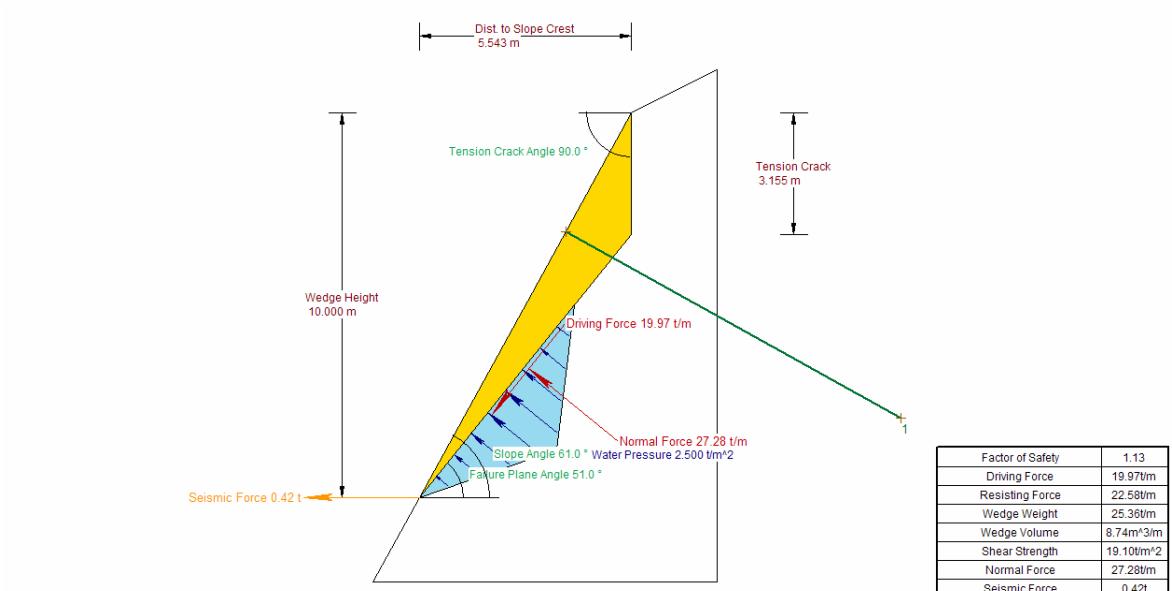
Water Pressure:

Water Unit Weight = 1 t/m^3
Pressure Distribution Model : Peak Pressure - Mid Height
Percent Filled : 50 %
Water Force on Failure Plane = 8.04225 t/m
Water Force on Tension Crack Plane = 0 t/m

Seismic Force:

Direction : User Defined
Seismic Coefficient : 0.0166
Angle = 0 °
Seismic Force : 0.420927 t/m

External Forces : Not Present



Factor of Safety	1.13
Driving Force	19.97t/m
Resisting Force	22.58t/m
Wedge Weight	25.36t/m
Wedge Volume	8.74m^3/m
Shear Strength	19.10t/m^2
Normal Force	27.28t/m
Seismic Force	0.42t
Plane Waviness	0.0°
Active Bolt Force	0.00t
Active Bolt Angle	0.0°
Passive Bolt Force	20.00t
Passive Bolt Angle	331.0°
Water Force on Failure Plane	8.04t/m
Water Force on Tension Crack	0.00t/m

Bolt Properties:

#	Angle	Capacity	Length	AnchLength
1	29.0 °	20.00t/m	10.000 m	8.606 m

3. VERIFICHE DI STABILITA' LUNGO SUPERFICI GENERICHE

3.1. Sponda destra condizioni statiche

```
FILEINFO
SLOPEW 6.02
WINDOW
   0 -3250
VIEWPREF
3 0 1 0 0 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 0 192 192 192 1 1 10 10 4 2 0 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 0 1 1 1 7 1 0 0 1 0 0 0 0
ZOOM
+1.3000e-001
FONTVIEW
Arial
  400   0   0   0
+6.0000e+000 +1.0000e+000 +1.4000e+002 +8.0000e+001
CONTOUR
   0 +0.0000e+000 +0.0000e+000
CONVALUES     0
SAFETYMAP
   0 +0.0000e+000 +0.0000e+000 +0.0000e+000     0     1 255   0   0   0   0 255 0
AXIS
  1   0   0   1   1
[m]
[m]
   24    14 -2.0000e+001 +4.6000e+002 +2.6000e+002 -2.0000e+001

1=METHOD 1331=NO. OF SLIP SURFACES    1=NO. OF RADII    1=SIDE FUNCTION TYPE

SLIP       X-          Y-           ITERATION                FACTOR OF SAFETY
  NO.   COORD.     COORD.     RADIUS     NO.    LAMBDA    (MOMENT)   (FORCE)
================================================================================
 602    208.000    222.411    150.270     1     0.0000   1.9116584   2.0708464
 602    208.000    222.411    150.270     5     0.0000   1.9781520   1.8858016

 ----------------------------------------
 | SUMMARY OF MINIMUM FACTORS OF SAFETY |
 ----------------------------------------
MOMENT EQUILIBRIUM: BISHOP SIMPLIFIED METHOD
    207.9997=X-COOR.    222.4106=Y-COOR.    150.2702=RADIUS   1.9781520=F.S.   602=SLIP#

 NORMAL TERMINATION OF SLOPE

MOST_CRITICAL #      SLIP_SURFACE #
==================================
       1              602

SLIP_SURFACE #      AUTOTENSIONELEV
==================================

SL#  X_Left        Y_L_Top       Y_L_Bottom     X_Right       Y_R_Top       Y_R_Bottom     Mid_Height     Base_Length
================================================================================================================
==================================
  1  5.893587e+001  2.034083e+002  2.034083e+002  6.178948e+001  2.021903e+002  1.877165e+002  8.396232e+000  1.595672e+001
  2  6.178948e+001  2.021903e+002  1.877165e+002  6.414036e+001  2.013131e+002  1.789871e+002  1.866063e+001  9.041735e+000
  3  6.414036e+001  2.013131e+002  1.789871e+002  6.649123e+001  2.004359e+002  1.718491e+002  2.560641e+001  7.515934e+000
  4  6.649123e+001  2.004359e+002  1.718491e+002  6.819298e+001  2.000324e+002  1.673180e+002  3.070602e+001  4.840338e+000
  5  6.819298e+001  2.000324e+002  1.673180e+002  6.989474e+001  1.996289e+002  1.631811e+002  3.462484e+001  4.473397e+000
  6  6.989474e+001  1.996289e+002  1.631811e+002  7.207018e+001  1.986815e+002  1.583460e+002  3.844865e+001  5.302276e+000
  7  7.207018e+001  1.986815e+002  1.583460e+002  7.368421e+001  1.974535e+002  1.550277e+002  4.140658e+001  3.690114e+000
  8  7.368421e+001  1.974535e+002  1.550277e+002  7.543860e+001  1.960149e+002  1.516387e+002  4.342735e+001  3.816271e+000
  9  7.543860e+001  1.960149e+002  1.516387e+002  7.749123e+001  1.948921e+002  1.479214e+002  4.570449e+001  4.246536e+000
 10  7.749123e+001  1.948921e+002  1.479214e+002  7.954386e+001  1.937693e+002  1.444349e+002  4.817937e+001  4.045918e+000
 11  7.954386e+001  1.937693e+002  1.444349e+002  8.017544e+001  1.927517e+002  1.434038e+002  4.934344e+001  1.209143e+000
 12  8.017544e+001  1.927517e+002  1.434038e+002  8.171930e+001  1.907868e+002  1.409590e+002  4.960090e+001  2.891576e+000
 13  8.171930e+001  1.907868e+002  1.409590e+002  8.336843e+001  1.889272e+002  1.384573e+002  5.016242e+001  2.996355e+000
 14  8.336843e+001  1.889272e+002  1.384573e+002  8.501755e+001  1.870675e+002  1.360596e+002  5.075133e+001  2.910160e+000
 15  8.501755e+001  1.870675e+002  1.360596e+002  8.684211e+001  1.842956e+002  1.335177e+002  5.090688e+001  3.128975e+000
 16  8.684211e+001  1.842956e+002  1.335177e+002  8.859649e+001  1.804008e+002  1.311747e+002  5.001389e+001  2.927045e+000
 17  8.859649e+001  1.804008e+002  1.311747e+002  8.954386e+001  1.800851e+002  1.299481e+002  4.968482e+001  1.549933e+000
 18  8.954386e+001  1.800851e+002  1.299481e+002  9.066667e+001  1.777342e+002  1.285273e+002  4.967633e+001  1.810856e+000
 19  9.066667e+001  1.777342e+002  1.285273e+002  9.252632e+001  1.757693e+002  1.262492e+002  4.937482e+001  2.940792e+000
 20  9.252632e+001  1.757693e+002  1.262492e+002  9.354386e+001  1.750675e+002  1.250403e+002  4.977683e+001  1.580149e+000
 21  9.354386e+001  1.750675e+002  1.250403e+002  9.477193e+001  1.693131e+002  1.236150e+002  4.786719e+001  1.881467e+000
```

22	9.477193e+001	1.693131e+002	1.236150e+002	9.688109e+001	1.666777e+002	1.212485e+002	4.557621e+001	3.169993e+000
23	9.688109e+001	1.666777e+002	1.212485e+002	9.899025e+001	1.640422e+002	1.189792e+002	4.525776e+001	3.098172e+000
24	9.899025e+001	1.640422e+002	1.189792e+002	1.010994e+002	1.614067e+002	1.168008e+002	4.484544e+001	3.032257e+000
25	1.010994e+002	1.614067e+002	1.168008e+002	1.032086e+002	1.587712e+002	1.147076e+002	4.434511e+001	2.971540e+000
26	1.032086e+002	1.587712e+002	1.147076e+002	1.053177e+002	1.561357e+002	1.126950e+002	4.376196e+001	2.915428e+000
27	1.053177e+002	1.561357e+002	1.126950e+002	1.074269e+002	1.535003e+002	1.107584e+002	4.310061e+001	2.863419e+000
28	1.074269e+002	1.535003e+002	1.107584e+002	1.095361e+002	1.508648e+002	1.088940e+002	4.236515e+001	2.815086e+000
29	1.095361e+002	1.508648e+002	1.088940e+002	1.116452e+002	1.482293e+002	1.070983e+002	4.155929e+001	2.770062e+000
30	1.116452e+002	1.482293e+002	1.070983e+002	1.137544e+002	1.455938e+002	1.053682e+002	4.068634e+001	2.728030e+000
31	1.137544e+002	1.455938e+002	1.053682e+002	1.165263e+002	1.455938e+002	1.031893e+002	4.132828e+001	3.525882e+000
32	1.165263e+002	1.455938e+002	1.031893e+002	1.185044e+002	1.440368e+002	1.016973e+002	4.237844e+001	2.477659e+000
33	1.185044e+002	1.440368e+002	1.016973e+002	1.204825e+002	1.424798e+002	1.002556e+002	4.228801e+001	2.447732e+000
34	1.204825e+002	1.424798e+002	1.002556e+002	1.224605e+002	1.409228e+002	9.886240e+001	4.214824e+001	2.419492e+000
35	1.224605e+002	1.409228e+002	9.886240e+001	1.244386e+002	1.393658e+002	9.751604e+001	4.196082e+001	2.392813e+000
36	1.244386e+002	1.393658e+002	9.751604e+001	1.264167e+002	1.378087e+002	9.621505e+001	4.172729e+001	2.367586e+000
37	1.264167e+002	1.378087e+002	9.621505e+001	1.283947e+002	1.362517e+002	9.495803e+001	4.144911e+001	2.343710e+000
38	1.283947e+002	1.362517e+002	9.495803e+001	1.303728e+002	1.346947e+002	9.374369e+001	4.112762e+001	2.321096e+000
39	1.303728e+002	1.346947e+002	9.374369e+001	1.323509e+002	1.331377e+002	9.257084e+001	4.076405e+001	2.299662e+000
40	1.323509e+002	1.331377e+002	9.257084e+001	1.335789e+002	1.331377e+002	9.186306e+001	4.092267e+001	1.417434e+000
41	1.335789e+002	1.331377e+002	9.186306e+001	1.365614e+002	1.230675e+002	9.020743e+001	3.707843e+001	3.411259e+000
42	1.365614e+002	1.230675e+002	9.020743e+001	1.375789e+002	1.229623e+002	8.966262e+001	3.308112e+001	1.154214e+000
43	1.375789e+002	1.229623e+002	8.966262e+001	1.392807e+002	1.181377e+002	8.877375e+001	3.133525e+001	1.919925e+000
44	1.392807e+002	1.181377e+002	8.877375e+001	1.409825e+002	1.133131e+002	8.791228e+001	2.738579e+001	1.907392e+000
45	1.409825e+002	1.133131e+002	8.791228e+001	1.421053e+002	1.133131e+002	8.735864e+001	2.567912e+001	1.251891e+000
46	1.421053e+002	1.133131e+002	8.735864e+001	1.441053e+002	1.066289e+002	8.640100e+001	2.309574e+001	2.217465e+000
47	1.441053e+002	1.066289e+002	8.640100e+001	1.461053e+002	9.994471e+001	8.547927e+001	1.735112e+001	2.202197e+000
48	1.461053e+002	9.994471e+001	8.547927e+001	1.472632e+002	9.994471e+001	8.496177e+001	1.472565e+001	1.268279e+000
49	1.472632e+002	9.994471e+001	8.496177e+001	1.493450e+002	9.758214e+001	8.406054e+001	1.425693e+001	2.268591e+000
50	1.493450e+002	9.758214e+001	8.406054e+001	1.514269e+002	9.521956e+001	8.319628e+001	1.277702e+001	2.254162e+000
51	1.514269e+002	9.521956e+001	8.319628e+001	1.535088e+002	9.285699e+001	8.236829e+001	1.126049e+001	2.240502e+000
52	1.535088e+002	9.285699e+001	8.236829e+001	1.551053e+002	9.290963e+001	8.175752e+001	1.082300e+001	1.709342e+000
53	1.551053e+002	9.290963e+001	8.175752e+001	1.567018e+002	9.296226e+001	8.116744e+001	1.147603e+001	1.702060e+000
54	1.567018e+002	9.296226e+001	8.116744e+001	1.588300e+002	8.831130e+001	8.041254e+001	9.851291e+000	2.258168e+000
55	1.588300e+002	8.831130e+001	8.041254e+001	1.609582e+002	8.366034e+001	7.969337e+001	5.937298e+000	2.246477e+000
56	1.609582e+002	8.366034e+001	7.969337e+001	1.630864e+002	7.900938e+001	7.900938e+001	1.987853e+000	2.235460e+000

SL#	Weight	Pore_Water	Alpha	Force Fn.	Seismic_F	Seismic_Y	Pore_Air	Phi_B	Liquified
1	6.9483e+002	0.0000e+000	7.9693e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
2	1.2722e+003	0.0000e+000	7.4927e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
3	1.7457e+003	0.0000e+000	7.1771e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
4	1.5154e+003	0.0000e+000	6.9415e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
5	1.7088e+003	0.0000e+000	6.7640e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
6	2.4256e+003	0.0000e+000	6.5776e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
7	1.9381e+003	0.0000e+000	6.4062e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
8	2.2095e+003	0.0000e+000	6.2631e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
9	2.7206e+003	0.0000e+000	6.1093e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
10	2.8679e+003	0.0000e+000	5.9513e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
11	9.0377e+002	0.0000e+000	5.8511e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
12	2.2207e+003	0.0000e+000	5.7729e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
13	2.3990e+003	0.0000e+000	5.6606e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
14	2.4272e+003	0.0000e+000	5.5480e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
15	2.6936e+003	0.0000e+000	5.4329e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
16	2.5446e+003	0.0000e+000	5.3175e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
17	1.3650e+003	0.0000e+000	5.2321e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
18	1.6175e+003	0.0000e+000	5.1680e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
19	2.6628e+003	0.0000e+000	5.0775e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
20	1.4688e+003	0.0000e+000	4.9913e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
21	1.7047e+003	0.0000e+000	4.9253e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
22	2.7877e+003	0.0000e+000	4.8290e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
23	2.7682e+003	0.0000e+000	4.7095e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
24	2.7430e+003	0.0000e+000	4.5926e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
25	2.7124e+003	0.0000e+000	4.4781e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
26	2.6767e+003	0.0000e+000	4.3659e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
27	2.6363e+003	0.0000e+000	4.2557e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
28	2.5913e+003	0.0000e+000	4.1475e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
29	2.5420e+003	0.0000e+000	4.0410e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
30	2.4886e+003	0.0000e+000	3.9362e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
31	3.3222e+003	0.0000e+000	3.8170e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
32	2.4310e+003	0.0000e+000	3.7025e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
33	2.4258e+003	0.0000e+000	3.6086e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
34	2.4178e+003	0.0000e+000	3.5158e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
35	2.4070e+003	0.0000e+000	3.4241e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
36	2.3936e+003	0.0000e+000	3.3333e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
37	2.3777e+003	0.0000e+000	3.2435e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
38	2.3592e+003	0.0000e+000	3.1546e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0

39	2.3384e+003	0.0000e+000	3.0665e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
40	1.4574e+003	0.0000e+000	2.9956e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
41	3.2070e+003	0.0000e+000	2.9036e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
42	9.7618e+002	0.0000e+000	2.8165e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
43	1.5464e+003	0.0000e+000	2.7579e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
44	1.3515e+003	0.0000e+000	2.6850e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
45	8.3615e+002	0.0000e+000	2.6247e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
46	1.3396e+003	0.0000e+000	2.5586e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
47	1.0064e+003	0.0000e+000	2.4743e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
48	4.9447e+002	0.0000e+000	2.4082e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
49	8.6075e+002	0.0000e+000	2.3407e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
50	7.7140e+002	0.0000e+000	2.2545e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
51	6.7984e+002	0.0000e+000	2.1688e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
52	5.0109e+002	0.0000e+000	2.0935e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
53	5.3132e+002	0.0000e+000	2.0285e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
54	6.0801e+002	0.0000e+000	1.9530e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
55	3.6644e+002	0.0000e+000	1.8671e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
56	1.2269e+002	0.0000e+000	1.7817e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0

Bishop_Method_Fm= 1.9781520 Applied_Lambda= 0.0000

SL#	Normal_M	ShearMob	Phi_Angle	Cohesion	SideLeft	ShearLeft	SideRight	ShearRight
1	1.0656e+002	-6.8858e+002	7.3896e+001	6.2234e+001	0.0000e+000	0.0000e+000	3.4287e+001	0.0000e+000
2	6.3976e+002	-1.1481e+003	6.5696e+001	9.4510e+001	-3.4287e+001	0.0000e+000	-2.4766e+002	0.0000e+000
3	1.0560e+003	-1.4940e+003	6.2082e+001	1.2804e+002	2.4766e+002	0.0000e+000	-7.2940e+002	0.0000e+000
4	9.9492e+002	-1.2482e+003	5.9720e+001	1.5808e+002	7.2940e+002	0.0000e+000	-1.1743e+003	0.0000e+000
5	1.1748e+003	-1.3679e+003	5.8103e+001	1.8293e+002	1.1743e+003	0.0000e+000	-1.6864e+003	0.0000e+000
6	1.7286e+003	-1.8869e+003	5.6596e+001	2.0961e+002	1.6864e+003	0.0000e+000	-2.4122e+003	0.0000e+000
7	1.4136e+003	-1.4713e+003	5.5421e+001	2.3299e+002	2.4122e+003	0.0000e+000	-2.9791e+003	0.0000e+000
8	1.6341e+003	-1.6462e+003	5.4591e+001	2.5096e+002	2.9791e+003	0.0000e+000	-3.6048e+003	0.0000e+000
9	2.0394e+003	-1.9867e+003	5.3719e+001	2.7123e+002	3.6048e+003	0.0000e+000	-4.3458e+003	0.0000e+000
10	2.1769e+003	-2.0516e+003	5.2857e+001	2.9275e+002	4.3458e+003	0.0000e+000	-5.0934e+003	0.0000e+000
11	6.8962e+002	-6.3903e+002	5.2278e+001	3.0810e+002	5.0934e+003	0.0000e+000	-5.3203e+003	0.0000e+000
12	1.6965e+003	-1.5591e+003	5.2184e+001	3.1060e+002	5.3203e+003	0.0000e+000	-5.8556e+003	0.0000e+000
13	1.8368e+003	-1.6667e+003	5.1715e+001	3.2370e+002	5.8556e+003	0.0000e+000	-6.4000e+003	0.0000e+000
14	1.8626e+003	-1.6690e+003	5.1514e+001	3.2940e+002	6.4000e+003	0.0000e+000	-6.9169e+003	0.0000e+000
15	2.0680e+003	-1.8359e+003	5.1203e+001	3.3854e+002	6.9169e+003	0.0000e+000	-7.4469e+003	0.0000e+000
16	1.9471e+003	-1.7253e+003	5.1130e+001	3.4070e+002	7.4469e+003	0.0000e+000	-7.8968e+003	0.0000e+000
17	1.0433e+003	-9.2129e+002	5.1023e+001	3.4386e+002	7.8968e+003	0.0000e+000	-8.1196e+003	0.0000e+000
18	1.2364e+003	-1.0873e+003	5.0936e+001	3.4648e+002	8.1196e+003	0.0000e+000	-8.3685e+003	0.0000e+000
19	2.0336e+003	-1.7817e+003	5.0865e+001	3.4863e+002	8.3685e+003	0.0000e+000	-8.7401e+003	0.0000e+000
20	1.1237e+003	-9.7656e+002	5.0579e+001	3.5745e+002	8.7401e+003	0.0000e+000	-8.9285e+003	0.0000e+000
21	1.2958e+003	-1.1366e+003	5.0889e+001	3.4792e+002	8.9285e+003	0.0000e+000	-9.1193e+003	0.0000e+000
22	2.1028e+003	-1.8648e+003	5.1166e+001	3.3962e+002	9.1193e+003	0.0000e+000	-9.3680e+003	0.0000e+000
23	2.0881e+003	-1.8432e+003	5.1018e+001	3.4402e+002	9.3680e+003	0.0000e+000	-9.5633e+003	0.0000e+000
24	2.0688e+003	-1.8196e+003	5.0944e+001	3.4624e+002	9.5633e+003	0.0000e+000	-9.7055e+003	0.0000e+000
25	2.0452e+003	-1.7943e+003	5.0895e+001	3.4774e+002	9.7055e+003	0.0000e+000	-9.7951e+003	0.0000e+000
26	2.0177e+003	-1.7673e+003	5.0865e+001	3.4865e+002	9.7951e+003	0.0000e+000	-9.8331e+003	0.0000e+000
27	1.9865e+003	-1.7388e+003	5.0852e+001	3.4904e+002	9.8331e+003	0.0000e+000	-9.8206e+003	0.0000e+000
28	1.9519e+003	-1.7088e+003	5.0856e+001	3.4893e+002	9.8206e+003	0.0000e+000	-9.7590e+003	0.0000e+000
29	1.9140e+003	-1.6773e+003	5.0875e+001	3.4834e+002	9.7590e+003	0.0000e+000	-9.6499e+003	0.0000e+000
30	1.8732e+003	-1.6445e+003	5.0911e+001	3.4725e+002	9.6499e+003	0.0000e+000	-9.4951e+003	0.0000e+000
31	2.5140e+003	-2.1831e+003	5.0551e+001	3.5830e+002	9.4951e+003	0.0000e+000	-9.2371e+003	0.0000e+000
32	1.8517e+003	-1.5861e+003	5.0305e+001	3.6599e+002	9.2371e+003	0.0000e+000	-9.0163e+003	0.0000e+000
33	1.8524e+003	-1.5810e+003	5.0174e+001	3.7021e+002	9.0163e+003	0.0000e+000	-8.7601e+003	0.0000e+000
34	1.8509e+003	-1.5748e+003	4.9993e+001	3.7609e+002	8.7601e+003	0.0000e+000	-8.4689e+003	0.0000e+000
35	1.8474e+003	-1.5676e+003	4.9831e+001	3.8131e+002	8.4689e+003	0.0000e+000	-8.1432e+003	0.0000e+000
36	1.8419e+003	-1.5594e+003	4.9765e+001	3.8348e+002	8.1432e+003	0.0000e+000	-7.7833e+003	0.0000e+000
37	1.8344e+003	-1.5504e+003	4.9758e+001	3.8371e+002	7.7833e+003	0.0000e+000	-7.3899e+003	0.0000e+000
38	1.8251e+003	-1.5404e+003	4.9774e+001	3.8318e+002	7.3899e+003	0.0000e+000	-6.9635e+003	0.0000e+000
39	1.8139e+003	-1.5296e+003	4.9777e+001	3.8307e+002	6.9635e+003	0.0000e+000	-6.5047e+003	0.0000e+000
40	1.1345e+003	-9.5261e+002	4.9668e+001	3.8670e+002	6.5047e+003	0.0000e+000	-6.2032e+003	0.0000e+000
41	2.4817e+003	-2.1424e+003	5.0359e+001	3.6426e+002	6.2032e+003	0.0000e+000	-5.4389e+003	0.0000e+000
42	7.4997e+002	-6.6907e+002	5.1427e+001	3.3195e+002	5.4389e+003	0.0000e+000	-5.1733e+003	0.0000e+000
43	1.1854e+003	-1.0734e+003	5.1668e+001	3.2501e+002	5.1733e+003	0.0000e+000	-4.7230e+003	0.0000e+000
44	1.0264e+003	-9.6728e+002	5.2878e+001	2.9221e+002	4.7230e+003	0.0000e+000	-4.2808e+003	0.0000e+000
45	6.3338e+002	-6.0771e+002	5.3340e+001	2.8051e+002	4.2808e+003	0.0000e+000	-3.9890e+003	0.0000e+000
46	1.0085e+003	-9.9816e+002	5.4172e+001	2.6052e+002	3.9890e+003	0.0000e+000	-3.4803e+003	0.0000e+000
47	7.4006e+002	-8.0060e+002	5.6414e+001	2.1308e+002	3.4803e+003	0.0000e+000	-3.0282e+003	0.0000e+000
48	3.5930e+002	-4.0895e+002	5.7614e+001	1.9120e+002	3.0282e+003	0.0000e+000	-2.7837e+003	0.0000e+000
49	6.2737e+002	-7.1924e+002	5.7781e+001	1.8833e+002	2.7837e+003	0.0000e+000	-2.3417e+003	0.0000e+000
50	5.6050e+002	-6.6348e+002	5.8504e+001	1.7641e+002	2.3417e+003	0.0000e+000	-1.9151e+003	0.0000e+000
51	4.9177e+002	-6.0464e+002	5.9331e+001	1.6373e+002	1.9151e+003	0.0000e+000	-1.5088e+003	0.0000e+000
52	3.6409e+002	-4.5180e+002	5.9522e+001	1.6093e+002	1.5088e+003	0.0000e+000	-1.1973e+003	0.0000e+000
53	3.9150e+002	-4.7452e+002	5.9024e+001	1.6832e+002	1.1973e+003	0.0000e+000	-8.6717e+002	0.0000e+000

```
 54  4.4500e+002 -5.6561e+002  6.0031e+001  1.5373e+002  8.6717e+002  0.0000e+000 -4.5814e+002  0.0000e+000
 55  2.5599e+002 -3.8809e+002  6.3296e+001  1.1521e+002  4.5814e+002  0.0000e+000 -1.5579e+002  0.0000e+000
 56  7.1509e+001 -1.7893e+002  6.8897e+001  7.5446e+001  1.5579e+002  0.0000e+000  0.0000e+000  0.0000e+000


Slip_Surface_Summary
Analysis         Volume       Weight       Res_Moment   Act_Moment   Res_Force    Act_Force      FOS
================================================================================================
=====================
Bishop Method     3.5925e+003  1.0418e+005  3.3213e+007  1.6790e+007                          1.9781520
```

3.2. **Sponda destra condizioni sismiche**

```
FILEINFO
SLOPEW 6.02
WINDOW
   0 -3250
VIEWPREF
3 0 1 0 0 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 0 192 192 192 1 1 10 10 4 2 0 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 0 1 1 1 7 1 0 0 1 0 0 0 0
ZOOM
+1.3000e-001
FONTVIEW
Arial
  400   0   0   0
+6.0000e+000 +1.0000e+000 +1.4000e+002 +8.0000e+001
CONTOUR
   0 +0.0000e+000 +0.0000e+000
CONVALUES     0
SAFETYMAP
   0 +0.0000e+000 +0.0000e+000 +0.0000e+000     0     1 255   0   0   0   0 255 0
AXIS
  1   0   0   1   1
[m]
[m]
   24    14 -2.0000e+001 +4.6000e+002 +2.6000e+002 -2.0000e+001

1=METHOD 1331=NO. OF SLIP SURFACES    1=NO. OF RADII    1=SIDE FUNCTION TYPE

SLIP     X-        Y-             ITERATION           FACTOR OF SAFETY
  NO.   COORD.     COORD.     RADIUS     NO.    LAMBDA    (MOMENT)   (FORCE)
================================================================================
 602    208.000    222.411    150.270     1     0.0000   1.8566841   2.0064389
 602    208.000    222.411    150.270     5     0.0000   1.9263862   1.8309085

 ----------------------------------------
 | SUMMARY OF MINIMUM FACTORS OF SAFETY |
 ----------------------------------------
MOMENT EQUILIBRIUM: BISHOP SIMPLIFIED METHOD
    207.9997=X-COOR.    222.4106=Y-COOR.    150.2702=RADIUS   1.9263862=F.S.   602=SLIP#

 NORMAL TERMINATION OF SLOPE

MOST_CRITICAL #      SLIP_SURFACE #
===================================
        1              602

SLIP_SURFACE #      AUTOTENSIONELEV
===================================

SL#  X_Left        Y_L_Top       Y_L_Bottom     X_Right       Y_R_Top       Y_R_Bottom     Mid_Height     Base_Length
================================================================================================
=====================================
  1  5.893587e+001  2.034083e+002  2.034083e+002  6.178948e+001  2.021903e+002  1.877165e+002  8.396232e+000  1.595672e+001
  2  6.178948e+001  2.021903e+002  1.877165e+002  6.414036e+001  2.013131e+002  1.789871e+002  1.866063e+001  9.041735e+000
  3  6.414036e+001  2.013131e+002  1.789871e+002  6.649123e+001  2.004359e+002  1.718491e+002  2.560641e+001  7.515934e+000
  4  6.649123e+001  2.004359e+002  1.718491e+002  6.819298e+001  2.000324e+002  1.673180e+002  3.070602e+001  4.840338e+000
  5  6.819298e+001  2.000324e+002  1.673180e+002  6.989474e+001  1.996289e+002  1.631811e+002  3.462484e+001  4.473397e+000
  6  6.989474e+001  1.996289e+002  1.631811e+002  7.207018e+001  1.986815e+002  1.583460e+002  3.844865e+001  5.302276e+000
  7  7.207018e+001  1.986815e+002  1.583460e+002  7.368421e+001  1.974535e+002  1.550277e+002  4.140658e+001  3.690114e+000
  8  7.368421e+001  1.974535e+002  1.550277e+002  7.543860e+001  1.960149e+002  1.516387e+002  4.342735e+001  3.816271e+000
  9  7.543860e+001  1.960149e+002  1.516387e+002  7.749123e+001  1.948921e+002  1.479214e+002  4.570449e+001  4.246536e+000
 10  7.749123e+001  1.948921e+002  1.479214e+002  7.954386e+001  1.937693e+002  1.444349e+002  4.817937e+001  4.045918e+000
 11  7.954386e+001  1.937693e+002  1.444349e+002  8.017544e+001  1.927517e+002  1.434038e+002  4.934344e+001  1.209143e+000
 12  8.017544e+001  1.927517e+002  1.434038e+002  8.171930e+001  1.907868e+002  1.409590e+002  4.960090e+001  2.891576e+000
 13  8.171930e+001  1.907868e+002  1.409590e+002  8.336843e+001  1.889272e+002  1.384573e+002  5.016242e+001  2.996355e+000
```

14	8.336843e+001	1.889272e+002	1.384573e+002	8.501755e+001	1.870675e+002	1.360596e+002	5.075133e+001	2.910160e+000
15	8.501755e+001	1.870675e+002	1.360596e+002	8.684211e+001	1.842956e+002	1.335177e+002	5.090688e+001	3.128975e+000
16	8.684211e+001	1.842956e+002	1.335177e+002	8.859649e+001	1.804008e+002	1.311747e+002	5.001389e+001	2.927045e+000
17	8.859649e+001	1.804008e+002	1.311747e+002	8.954386e+001	1.800851e+002	1.299481e+002	4.968482e+001	1.549933e+000
18	8.954386e+001	1.800851e+002	1.299481e+002	9.066667e+001	1.777342e+002	1.285273e+002	4.967633e+001	1.810856e+000
19	9.066667e+001	1.777342e+002	1.285273e+002	9.252632e+001	1.757693e+002	1.262492e+002	4.937482e+001	2.940792e+000
20	9.252632e+001	1.757693e+002	1.262492e+002	9.354386e+001	1.750675e+002	1.250403e+002	4.977683e+001	1.580149e+000
21	9.354386e+001	1.750675e+002	1.250403e+002	9.477193e+001	1.693131e+002	1.236150e+002	4.786719e+001	1.881467e+000
22	9.477193e+001	1.693131e+002	1.236150e+002	9.688109e+001	1.666777e+002	1.212485e+002	4.557621e+001	3.169993e+000
23	9.688109e+001	1.666777e+002	1.212485e+002	9.899025e+001	1.640422e+002	1.189792e+002	4.525776e+001	3.098172e+000
24	9.899025e+001	1.640422e+002	1.189792e+002	1.010994e+002	1.614067e+002	1.168008e+002	4.484544e+001	3.032257e+000
25	1.010994e+002	1.614067e+002	1.168008e+002	1.032086e+002	1.587712e+002	1.147076e+002	4.434511e+001	2.971540e+000
26	1.032086e+002	1.587712e+002	1.147076e+002	1.053177e+002	1.561357e+002	1.126950e+002	4.376196e+001	2.915428e+000
27	1.053177e+002	1.561357e+002	1.126950e+002	1.074269e+002	1.535003e+002	1.107584e+002	4.310061e+001	2.863419e+000
28	1.074269e+002	1.535003e+002	1.107584e+002	1.095361e+002	1.508648e+002	1.088940e+002	4.236515e+001	2.815086e+000
29	1.095361e+002	1.508648e+002	1.088940e+002	1.116452e+002	1.482293e+002	1.070983e+002	4.155929e+001	2.770062e+000
30	1.116452e+002	1.482293e+002	1.070983e+002	1.137544e+002	1.455938e+002	1.053682e+002	4.068634e+001	2.728030e+000
31	1.137544e+002	1.455938e+002	1.053682e+002	1.165263e+002	1.455938e+002	1.031893e+002	4.132828e+001	3.525882e+000
32	1.165263e+002	1.455938e+002	1.031893e+002	1.185044e+002	1.440368e+002	1.016973e+002	4.237844e+001	2.477659e+000
33	1.185044e+002	1.440368e+002	1.016973e+002	1.204825e+002	1.424798e+002	1.002556e+002	4.228801e+001	2.447732e+000
34	1.204825e+002	1.424798e+002	1.002556e+002	1.224605e+002	1.409228e+002	9.886240e+001	4.214824e+001	2.419492e+000
35	1.224605e+002	1.409228e+002	9.886240e+001	1.244386e+002	1.393658e+002	9.751604e+001	4.196082e+001	2.392813e+000
36	1.244386e+002	1.393658e+002	9.751604e+001	1.264167e+002	1.378087e+002	9.621505e+001	4.172729e+001	2.367586e+000
37	1.264167e+002	1.378087e+002	9.621505e+001	1.283947e+002	1.362517e+002	9.495803e+001	4.144911e+001	2.343710e+000
38	1.283947e+002	1.362517e+002	9.495803e+001	1.303728e+002	1.346947e+002	9.374369e+001	4.112762e+001	2.321096e+000
39	1.303728e+002	1.346947e+002	9.374369e+001	1.323509e+002	1.331377e+002	9.257084e+001	4.076405e+001	2.299662e+000
40	1.323509e+002	1.331377e+002	9.257084e+001	1.335789e+002	1.331377e+002	9.186306e+001	4.092267e+001	1.417434e+000
41	1.335789e+002	1.331377e+002	9.186306e+001	1.365614e+002	1.230675e+002	9.020743e+001	3.707843e+001	3.411259e+000
42	1.365614e+002	1.230675e+002	9.020743e+001	1.375789e+002	1.229623e+002	8.966262e+001	3.308112e+001	1.154214e+000
43	1.375789e+002	1.229623e+002	8.966262e+001	1.392807e+002	1.181377e+002	8.877375e+001	3.133525e+001	1.919925e+000
44	1.392807e+002	1.181377e+002	8.877375e+001	1.409825e+002	1.133131e+002	8.791228e+001	2.738579e+001	1.907392e+000
45	1.409825e+002	1.133131e+002	8.791228e+001	1.421053e+002	1.133131e+002	8.735864e+001	2.567912e+001	1.251891e+000
46	1.421053e+002	1.133131e+002	8.735864e+001	1.441053e+002	1.066289e+002	8.640100e+001	2.309574e+001	2.217465e+000
47	1.441053e+002	1.066289e+002	8.640100e+001	1.461053e+002	9.994471e+001	8.547927e+001	1.735112e+001	2.202197e+000
48	1.461053e+002	9.994471e+001	8.547927e+001	1.472632e+002	9.994471e+001	8.496177e+001	1.472565e+001	1.268279e+000
49	1.472632e+002	9.994471e+001	8.496177e+001	1.493450e+002	9.758214e+001	8.406054e+001	1.425693e+001	2.268591e+000
50	1.493450e+002	9.758214e+001	8.406054e+001	1.514269e+002	9.521956e+001	8.319628e+001	1.277702e+001	2.254162e+000
51	1.514269e+002	9.521956e+001	8.319628e+001	1.535088e+002	9.285699e+001	8.236829e+001	1.126049e+001	2.240502e+000
52	1.535088e+002	9.285699e+001	8.236829e+001	1.551053e+002	9.290963e+001	8.175752e+001	1.082300e+001	1.709342e+000
53	1.551053e+002	9.290963e+001	8.175752e+001	1.567018e+002	9.296226e+001	8.116744e+001	1.147603e+001	1.702060e+000
54	1.567018e+002	9.296226e+001	8.116744e+001	1.588300e+002	8.831130e+001	8.041254e+001	9.851291e+000	2.258168e+000
55	1.588300e+002	8.831130e+001	8.041254e+001	1.609582e+002	8.366034e+001	7.969337e+001	5.937298e+000	2.246477e+000
56	1.609582e+002	8.366034e+001	7.969337e+001	1.630864e+002	7.900938e+001	7.900938e+001	1.987853e+000	2.235460e+000

SL#	Weight	Pore_Water	Alpha	Force Fn.	Seismic_F	Seismic_Y	Pore_Air	Phi_B	Liquified
1	7.0060e+002	0.0000e+000	7.9693e+001	1.0000e+000	1.1534e+001	1.9860e+002	0.0000e+000	0.0000e+000	0
2	1.2828e+003	0.0000e+000	7.4927e+001	1.0000e+000	2.1118e+001	1.9242e+002	0.0000e+000	0.0000e+000	0
3	1.7602e+003	0.0000e+000	7.1771e+001	1.0000e+000	2.8979e+001	1.8807e+002	0.0000e+000	0.0000e+000	0
4	1.5279e+003	0.0000e+000	6.9415e+001	1.0000e+000	2.5155e+001	1.8488e+002	0.0000e+000	0.0000e+000	0
5	1.7229e+003	0.0000e+000	6.7640e+001	1.0000e+000	2.8366e+001	1.8252e+002	0.0000e+000	0.0000e+000	0
6	2.4458e+003	0.0000e+000	6.5776e+001	1.0000e+000	4.0266e+001	1.7993e+002	0.0000e+000	0.0000e+000	0
7	1.9542e+003	0.0000e+000	6.4062e+001	1.0000e+000	3.2173e+001	1.7736e+002	0.0000e+000	0.0000e+000	0
8	2.2278e+003	0.0000e+000	6.2631e+001	1.0000e+000	3.6677e+001	1.7502e+002	0.0000e+000	0.0000e+000	0
9	2.7432e+003	0.0000e+000	6.1093e+001	1.0000e+000	4.5162e+001	1.7260e+002	0.0000e+000	0.0000e+000	0
10	2.8917e+003	0.0000e+000	5.9513e+001	1.0000e+000	4.7608e+001	1.7024e+002	0.0000e+000	0.0000e+000	0
11	9.1127e+002	0.0000e+000	5.8511e+001	1.0000e+000	1.5003e+001	1.6859e+002	0.0000e+000	0.0000e+000	0
12	2.2392e+003	0.0000e+000	5.7729e+001	1.0000e+000	3.6864e+001	1.6697e+002	0.0000e+000	0.0000e+000	0
13	2.4189e+003	0.0000e+000	5.6606e+001	1.0000e+000	3.9823e+001	1.6478e+002	0.0000e+000	0.0000e+000	0
14	2.4473e+003	0.0000e+000	5.5480e+001	1.0000e+000	4.0291e+001	1.6262e+002	0.0000e+000	0.0000e+000	0
15	2.7160e+003	0.0000e+000	5.4329e+001	1.0000e+000	4.4714e+001	1.6023e+002	0.0000e+000	0.0000e+000	0
16	2.5657e+003	0.0000e+000	5.3175e+001	1.0000e+000	4.2240e+001	1.5734e+002	0.0000e+000	0.0000e+000	0
17	1.3764e+003	0.0000e+000	5.2321e+001	1.0000e+000	2.2659e+001	1.5540e+002	0.0000e+000	0.0000e+000	0
18	1.6310e+003	0.0000e+000	5.1680e+001	1.0000e+000	2.6851e+001	1.5407e+002	0.0000e+000	0.0000e+000	0
19	2.6849e+003	0.0000e+000	5.0775e+001	1.0000e+000	4.4202e+001	1.5206e+002	0.0000e+000	0.0000e+000	0
20	1.4810e+003	0.0000e+000	4.9913e+001	1.0000e+000	2.4383e+001	1.5053e+002	0.0000e+000	0.0000e+000	0
21	1.7189e+003	0.0000e+000	4.9253e+001	1.0000e+000	2.8299e+001	1.4826e+002	0.0000e+000	0.0000e+000	0
22	2.8108e+003	0.0000e+000	4.8290e+001	1.0000e+000	4.6276e+001	1.4521e+002	0.0000e+000	0.0000e+000	0
23	2.7912e+003	0.0000e+000	4.7095e+001	1.0000e+000	4.5952e+001	1.4273e+002	0.0000e+000	0.0000e+000	0
24	2.7658e+003	0.0000e+000	4.5926e+001	1.0000e+000	4.5534e+001	1.4030e+002	0.0000e+000	0.0000e+000	0
25	2.7349e+003	0.0000e+000	4.4781e+001	1.0000e+000	4.5026e+001	1.3792e+002	0.0000e+000	0.0000e+000	0
26	2.6989e+003	0.0000e+000	4.3659e+001	1.0000e+000	4.4434e+001	1.3557e+002	0.0000e+000	0.0000e+000	0
27	2.6582e+003	0.0000e+000	4.2557e+001	1.0000e+000	4.3762e+001	1.3327e+002	0.0000e+000	0.0000e+000	0
28	2.6128e+003	0.0000e+000	4.1475e+001	1.0000e+000	4.3015e+001	1.3100e+002	0.0000e+000	0.0000e+000	0
29	2.5631e+003	0.0000e+000	4.0410e+001	1.0000e+000	4.2197e+001	1.2877e+002	0.0000e+000	0.0000e+000	0
30	2.5093e+003	0.0000e+000	3.9362e+001	1.0000e+000	4.1311e+001	1.2657e+002	0.0000e+000	0.0000e+000	0

31	3.3498e+003	0.0000e+000	3.8170e+001	1.0000e+000	5.5149e+001	1.2493e+002	0.0000e+000	0.0000e+000	0
32	2.4512e+003	0.0000e+000	3.7025e+001	1.0000e+000	4.0355e+001	1.2363e+002	0.0000e+000	0.0000e+000	0
33	2.4459e+003	0.0000e+000	3.6086e+001	1.0000e+000	4.0268e+001	1.2211e+002	0.0000e+000	0.0000e+000	0
34	2.4379e+003	0.0000e+000	3.5158e+001	1.0000e+000	4.0135e+001	1.2063e+002	0.0000e+000	0.0000e+000	0
35	2.4270e+003	0.0000e+000	3.4241e+001	1.0000e+000	3.9957e+001	1.1916e+002	0.0000e+000	0.0000e+000	0
36	2.4135e+003	0.0000e+000	3.3333e+001	1.0000e+000	3.9735e+001	1.1772e+002	0.0000e+000	0.0000e+000	0
37	2.3974e+003	0.0000e+000	3.2435e+001	1.0000e+000	3.9470e+001	1.1631e+002	0.0000e+000	0.0000e+000	0
38	2.3788e+003	0.0000e+000	3.1546e+001	1.0000e+000	3.9163e+001	1.1491e+002	0.0000e+000	0.0000e+000	0
39	2.3578e+003	0.0000e+000	3.0665e+001	1.0000e+000	3.8817e+001	1.1353e+002	0.0000e+000	0.0000e+000	0
40	1.4695e+003	0.0000e+000	2.9956e+001	1.0000e+000	2.4193e+001	1.1268e+002	0.0000e+000	0.0000e+000	0
41	3.2336e+003	0.0000e+000	2.9036e+001	1.0000e+000	5.3236e+001	1.0956e+002	0.0000e+000	0.0000e+000	0
42	9.8428e+002	0.0000e+000	2.8165e+001	1.0000e+000	1.6205e+001	1.0647e+002	0.0000e+000	0.0000e+000	0
43	1.5593e+003	0.0000e+000	2.7579e+001	1.0000e+000	2.5671e+001	1.0488e+002	0.0000e+000	0.0000e+000	0
44	1.3627e+003	0.0000e+000	2.6850e+001	1.0000e+000	2.2435e+001	1.0203e+002	0.0000e+000	0.0000e+000	0
45	8.4309e+002	0.0000e+000	2.6247e+001	1.0000e+000	1.3880e+001	1.0047e+002	0.0000e+000	0.0000e+000	0
46	1.3507e+003	0.0000e+000	2.5586e+001	1.0000e+000	2.2237e+001	9.8423e+001	0.0000e+000	0.0000e+000	0
47	1.0147e+003	0.0000e+000	2.4743e+001	1.0000e+000	1.6706e+001	9.4611e+001	0.0000e+000	0.0000e+000	0
48	4.9857e+002	0.0000e+000	2.4082e+001	1.0000e+000	8.2082e+000	9.2582e+001	0.0000e+000	0.0000e+000	0
49	8.6790e+002	0.0000e+000	2.3407e+001	1.0000e+000	1.4288e+001	9.1635e+001	0.0000e+000	0.0000e+000	0
50	7.7781e+002	0.0000e+000	2.2545e+001	1.0000e+000	1.2805e+001	9.0012e+001	0.0000e+000	0.0000e+000	0
51	6.8549e+002	0.0000e+000	2.1688e+001	1.0000e+000	1.1285e+001	8.8408e+001	0.0000e+000	0.0000e+000	0
52	5.0524e+002	0.0000e+000	2.0935e+001	1.0000e+000	8.3180e+000	8.7472e+001	0.0000e+000	0.0000e+000	0
53	5.3573e+002	0.0000e+000	2.0285e+001	1.0000e+000	8.8199e+000	8.7198e+001	0.0000e+000	0.0000e+000	0
54	6.1305e+002	0.0000e+000	1.9530e+001	1.0000e+000	1.0093e+001	8.5711e+001	0.0000e+000	0.0000e+000	0
55	3.6948e+002	0.0000e+000	1.8671e+001	1.0000e+000	6.0829e+000	8.3017e+001	0.0000e+000	0.0000e+000	0
56	1.2371e+002	0.0000e+000	1.7817e+001	1.0000e+000	2.0366e+000	8.0341e+001	0.0000e+000	0.0000e+000	0

Bishop_Method_Fm= 1.9263862 Applied_Lambda= 0.0000

SL#	Normal_M	ShearMob	Phi_Angle	Cohesion	SideLeft	ShearLeft	SideRight	ShearRight
1	1.0029e+002	-6.9567e+002	7.4099e+001	6.1923e+001	0.0000e+000	0.0000e+000	3.1121e+001	0.0000e+000
2	6.2588e+002	-1.1630e+003	6.5804e+001	9.3720e+001	-3.1121e+001	0.0000e+000	-2.5190e+002	0.0000e+000
3	1.0372e+003	-1.5156e+003	6.2186e+001	1.2688e+002	2.5190e+002	0.0000e+000	-7.3392e+002	0.0000e+000
4	9.7920e+002	-1.2677e+003	5.9823e+001	1.5662e+002	7.3392e+002	0.0000e+000	-1.1788e+003	0.0000e+000
5	1.1578e+003	-1.3904e+003	5.8201e+001	1.8131e+002	1.1788e+003	0.0000e+000	-1.6908e+003	0.0000e+000
6	1.7057e+003	-1.9195e+003	5.6687e+001	2.0790e+002	1.6908e+003	0.0000e+000	-2.4166e+003	0.0000e+000
7	1.3964e+003	-1.4978e+003	5.5511e+001	2.3109e+002	2.4166e+003	0.0000e+000	-2.9838e+003	0.0000e+000
8	1.6155e+003	-1.6767e+003	5.4679e+001	2.4900e+002	2.9838e+003	0.0000e+000	-3.6102e+003	0.0000e+000
9	2.0178e+003	-2.0248e+003	5.3805e+001	2.6917e+002	3.6102e+003	0.0000e+000	-4.3526e+003	0.0000e+000
10	2.1556e+003	-2.0921e+003	5.2926e+001	2.9097e+002	4.3526e+003	0.0000e+000	-5.1021e+003	0.0000e+000
11	6.8319e+002	-6.5186e+002	5.2432e+001	3.0399e+002	5.1021e+003	0.0000e+000	-5.3296e+003	0.0000e+000
12	1.6813e+003	-1.5907e+003	5.2145e+001	3.1166e+002	5.3296e+003	0.0000e+000	-5.8668e+003	0.0000e+000
13	1.8212e+003	-1.7011e+003	5.1839e+001	3.2023e+002	5.8668e+003	0.0000e+000	-6.4135e+003	0.0000e+000
14	1.8476e+003	-1.7040e+003	5.1552e+001	3.2831e+002	6.4135e+003	0.0000e+000	-6.9330e+003	0.0000e+000
15	2.0523e+003	-1.8750e+003	5.1300e+001	3.3568e+002	6.9330e+003	0.0000e+000	-7.4661e+003	0.0000e+000
16	1.9329e+003	-1.7625e+003	5.1213e+001	3.3824e+002	7.4661e+003	0.0000e+000	-7.9190e+003	0.0000e+000
17	1.0360e+003	-9.4136e+002	5.1081e+001	3.4216e+002	7.9190e+003	0.0000e+000	-8.1435e+003	0.0000e+000
18	1.2281e+003	-1.1112e+003	5.0975e+001	3.4531e+002	8.1435e+003	0.0000e+000	-8.3945e+003	0.0000e+000
19	2.0205e+003	-1.8212e+003	5.0900e+001	3.4756e+002	8.3945e+003	0.0000e+000	-8.7696e+003	0.0000e+000
20	1.1168e+003	-9.9844e+002	5.0672e+001	3.5457e+002	8.7696e+003	0.0000e+000	-8.9600e+003	0.0000e+000
21	1.2880e+003	-1.1622e+003	5.0922e+001	3.4692e+002	8.9600e+003	0.0000e+000	-9.1529e+003	0.0000e+000
22	2.0906e+003	-1.9070e+003	5.1236e+001	3.3755e+002	9.1529e+003	0.0000e+000	-9.4051e+003	0.0000e+000
23	2.0767e+003	-1.8854e+003	5.1060e+001	3.4276e+002	9.4051e+003	0.0000e+000	-9.6037e+003	0.0000e+000
24	2.0582e+003	-1.8618e+003	5.0973e+001	3.4537e+002	9.6037e+003	0.0000e+000	-9.7490e+003	0.0000e+000
25	2.0355e+003	-1.8363e+003	5.0921e+001	3.4695e+002	9.7490e+003	0.0000e+000	-9.8417e+003	0.0000e+000
26	2.0088e+003	-1.8091e+003	5.0888e+001	3.4793e+002	9.8417e+003	0.0000e+000	-9.8825e+003	0.0000e+000
27	1.9783e+003	-1.7803e+003	5.0874e+001	3.4837e+002	9.8825e+003	0.0000e+000	-9.8726e+003	0.0000e+000
28	1.9444e+003	-1.7500e+003	5.0876e+001	3.4831e+002	9.8726e+003	0.0000e+000	-9.8134e+003	0.0000e+000
29	1.9073e+003	-1.7181e+003	5.0894e+001	3.4776e+002	9.8134e+003	0.0000e+000	-9.7063e+003	0.0000e+000
30	1.8671e+003	-1.6848e+003	5.0929e+001	3.4671e+002	9.7063e+003	0.0000e+000	-9.5531e+003	0.0000e+000
31	2.5068e+003	-2.2373e+003	5.0599e+001	3.5684e+002	9.5531e+003	0.0000e+000	-9.2969e+003	0.0000e+000
32	1.8471e+003	-1.6259e+003	5.0321e+001	3.6547e+002	9.2969e+003	0.0000e+000	-9.0775e+003	0.0000e+000
33	1.8483e+003	-1.6210e+003	5.0202e+001	3.6932e+002	9.0775e+003	0.0000e+000	-8.8224e+003	0.0000e+000
34	1.8474e+003	-1.6149e+003	5.0028e+001	3.7495e+002	8.8224e+003	0.0000e+000	-8.5320e+003	0.0000e+000
35	1.8444e+003	-1.6079e+003	4.9853e+001	3.8062e+002	8.5320e+003	0.0000e+000	-8.2067e+003	0.0000e+000
36	1.8393e+003	-1.5998e+003	4.9772e+001	3.8325e+002	8.2067e+003	0.0000e+000	-7.8470e+003	0.0000e+000
37	1.8323e+003	-1.5907e+003	4.9756e+001	3.8376e+002	7.8470e+003	0.0000e+000	-7.4534e+003	0.0000e+000
38	1.8234e+003	-1.5808e+003	4.9772e+001	3.8325e+002	7.4534e+003	0.0000e+000	-7.0265e+003	0.0000e+000
39	1.8127e+003	-1.5699e+003	4.9777e+001	3.8307e+002	7.0265e+003	0.0000e+000	-6.5668e+003	0.0000e+000
40	1.1340e+003	-9.7789e+002	4.9674e+001	3.8653e+002	6.5668e+003	0.0000e+000	-6.2646e+003	0.0000e+000
41	2.4807e+003	-2.1994e+003	5.0360e+001	3.6424e+002	6.2646e+003	0.0000e+000	-5.4972e+003	0.0000e+000
42	7.4969e+002	-6.8687e+002	5.1429e+001	3.3188e+002	5.4972e+003	0.0000e+000	-5.2302e+003	0.0000e+000
43	1.1851e+003	-1.1020e+003	5.1670e+001	3.2495e+002	5.2302e+003	0.0000e+000	-4.7770e+003	0.0000e+000
44	1.0260e+003	-9.9301e+002	5.2880e+001	2.9216e+002	4.7770e+003	0.0000e+000	-4.3316e+003	0.0000e+000
45	6.3318e+002	-6.2390e+002	5.3341e+001	2.8047e+002	4.3316e+003	0.0000e+000	-4.0374e+003	0.0000e+000
46	1.0081e+003	-1.0247e+003	5.4173e+001	2.6048e+002	4.0374e+003	0.0000e+000	-3.5242e+003	0.0000e+000

47	7.3958e+002	-8.2174e+002	5.6418e+001	2.1300e+002	3.5242e+003	0.0000e+000	-3.0673e+003	0.0000e+000
48	3.5901e+002	-4.1971e+002	5.7619e+001	1.9111e+002	3.0673e+003	0.0000e+000	-2.8202e+003	0.0000e+000
49	6.2698e+002	-7.3825e+002	5.7785e+001	1.8827e+002	2.8202e+003	0.0000e+000	-2.3731e+003	0.0000e+000
50	5.6018e+002	-6.8104e+002	5.8507e+001	1.7636e+002	2.3731e+003	0.0000e+000	-1.9413e+003	0.0000e+000
51	4.9151e+002	-6.2066e+002	5.9333e+001	1.6369e+002	1.9413e+003	0.0000e+000	-1.5299e+003	0.0000e+000
52	3.6397e+002	-4.6383e+002	5.9523e+001	1.6091e+002	1.5299e+003	0.0000e+000	-1.2143e+003	0.0000e+000
53	3.9152e+002	-4.8729e+002	5.9023e+001	1.6833e+002	1.2143e+003	0.0000e+000	-8.7987e+002	0.0000e+000
54	4.4500e+002	-5.8081e+002	6.0030e+001	1.5374e+002	8.7987e+002	0.0000e+000	-4.6523e+002	0.0000e+000
55	2.5577e+002	-3.9829e+002	6.3300e+001	1.1517e+002	4.6523e+002	0.0000e+000	-1.5834e+002	0.0000e+000
56	7.1183e+001	-1.8330e+002	6.8907e+001	7.5403e+001	1.5834e+002	0.0000e+000	0.0000e+000	0.0000e+000

Slip_Surface_Summary

Analysis	Volume	Weight	Res_Moment	Act_Moment	Res_Force	Act_Force	FOS
Bishop Method	3.5925e+003	1.0418e+005	3.3083e+007	1.7173e+007			1.9263862

3.3. **Sponda sinistra condizioni statiche**

```
FILEINFO
SLOPEW 6.02
WINDOW
  504 -2123
VIEWPREF
3 0 1 0 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 0 192 192 192 1 1 15 15 4 2 0 1 1 1 1 0 0 1 1 0 1 1 1 1 1 1 1 0 1 1 1 7 1 0 0 1 0 0 0 0
ZOOM
+9.0000e-002
FONTVIEW
Arial
  400   0   0   0
+6.0000e+000 +1.0000e+001 +1.4000e+002 +8.0000e+001
CONTOUR
    0 +0.0000e+000 +0.0000e+000
CONVALUES     0
SAFETYMAP
    0 +0.0000e+000 +0.0000e+000 +0.0000e+000     0     1 255   0   0   0   0 255 0
AXIS
  1   0   0   1   1
[m]
[m]
   23    14 -2.0000e+001 +4.4000e+002 +2.6000e+002 -2.0000e+001

1=METHOD 1331=NO. OF SLIP SURFACES    1=NO. OF RADII    1=SIDE FUNCTION TYPE

SLIP     X-        Y-             ITERATION           FACTOR OF SAFETY
  NO.   COORD.     COORD.     RADIUS     NO.    LAMBDA    (MOMENT)   (FORCE)
================================================================================
  50   194.368    197.657    127.161     1     0.0000   2.5732959   2.7269305
  50   194.368    197.657    127.161     5     0.0000   2.5659216   2.4886245

 ----------------------------------------
 | SUMMARY OF MINIMUM FACTORS OF SAFETY |
 ----------------------------------------
MOMENT EQUILIBRIUM: BISHOP SIMPLIFIED METHOD
    194.3681=X-COOR.    197.6574=Y-COOR.    127.1611=RADIUS   2.5659216=F.S.    50=SLIP#

 NORMAL TERMINATION OF SLOPE

MOST_CRITICAL #      SLIP_SURFACE #
==================================
        1               50

SLIP_SURFACE #      AUTOTENSIONELEV
==================================

SL#  X_Left        Y_L_Top       Y_L_Bottom     X_Right       Y_R_Top       Y_R_Bottom     Mid_Height     Base_Length
================================================================================================================
====================================
  1 2.168923e+002 7.250712e+001 7.250712e+001 2.190627e+002 7.710328e+001 7.291724e+001 2.097901e+000 2.208840e+000
  2 2.190627e+002 7.710328e+001 7.291724e+001 2.212331e+002 8.169943e+001 7.336660e+001 6.264367e+000 2.216463e+000
  3 2.212331e+002 8.169943e+001 7.336660e+001 2.234035e+002 8.629559e+001 7.385564e+001 1.039138e+001 2.224847e+000
  4 2.234035e+002 8.629559e+001 7.385564e+001 2.251579e+002 8.629559e+001 7.428026e+001 1.223094e+001 1.805060e+000
  5 2.251579e+002 8.629559e+001 7.428026e+001 2.281404e+002 9.215524e+001 7.506309e+001 1.456341e+001 3.083552e+000
  6 2.281404e+002 9.215524e+001 7.506309e+001 2.291579e+002 9.215524e+001 7.534795e+001 1.695086e+001 1.056676e+000
  7 2.291579e+002 9.215524e+001 7.534795e+001 2.311719e+002 9.386050e+001 7.593884e+001 1.736899e+001 2.098946e+000
  8 2.311719e+002 9.386050e+001 7.593884e+001 2.331860e+002 9.556576e+001 7.656610e+001 1.846525e+001 2.109476e+000
  9 2.331860e+002 9.556576e+001 7.656610e+001 2.352000e+002 9.727103e+001 7.723030e+001 1.952485e+001 2.120755e+000
 10 2.352000e+002 9.727103e+001 7.723030e+001 2.372140e+002 9.897629e+001 7.793206e+001 2.054721e+001 2.132818e+000
 11 2.372140e+002 9.897629e+001 7.793206e+001 2.392281e+002 1.006816e+002 7.867205e+001 2.153168e+001 2.145699e+000
 12 2.392281e+002 1.006816e+002 7.867205e+001 2.411930e+002 1.006816e+002 7.943151e+001 2.163445e+001 2.106608e+000
 13 2.411930e+002 1.006816e+002 7.943151e+001 2.432105e+002 1.031465e+002 8.025064e+001 2.207796e+001 2.177514e+000
 14 2.432105e+002 1.031465e+002 8.025064e+001 2.452281e+002 1.056114e+002 8.111044e+001 2.370352e+001 2.193140e+000
 15 2.452281e+002 1.056114e+002 8.111044e+001 2.472456e+002 1.080763e+002 8.201183e+001 2.528795e+001 2.209774e+000
 16 2.472456e+002 1.080763e+002 8.201183e+001 2.492632e+002 1.105412e+002 8.295578e+001 2.683033e+001 2.227476e+000
 17 2.492632e+002 1.105412e+002 8.295578e+001 2.512807e+002 1.130061e+002 8.394335e+001 2.832962e+001 2.246311e+000
 18 2.512807e+002 1.130061e+002 8.394335e+001 2.532983e+002 1.154710e+002 8.497569e+001 2.978472e+001 2.266351e+000
 19 2.532983e+002 1.154710e+002 8.497569e+001 2.553158e+002 1.179359e+002 8.605405e+001 3.119445e+001 2.287678e+000
 20 2.553158e+002 1.179359e+002 8.605405e+001 2.573333e+002 1.204009e+002 8.717976e+001 3.255750e+001 2.310381e+000
 21 2.573333e+002 1.204009e+002 8.717976e+001 2.595965e+002 1.204009e+002 8.850069e+001 3.256844e+001 2.620491e+000
 22 2.595965e+002 1.204009e+002 8.850069e+001 2.618596e+002 1.204009e+002 8.988532e+001 3.121596e+001 2.653172e+000
 23 2.618596e+002 1.204009e+002 8.988532e+001 2.639922e+002 1.225490e+002 9.125056e+001 3.091447e+001 2.532170e+000
 24 2.639922e+002 1.225490e+002 9.125056e+001 2.661248e+002 1.246971e+002 9.267686e+001 3.166714e+001 2.565607e+000
 25 2.661248e+002 1.246971e+002 9.267686e+001 2.682573e+002 1.268453e+002 9.416675e+001 3.235753e+001 2.601494e+000
```

26	2.682573e+002	1.268453e+002	9.416675e+001	2.703899e+002	1.289934e+002	9.572300e+001	3.298298e+001	2.640067e+000
27	2.703899e+002	1.289934e+002	9.572300e+001	2.725224e+002	1.311416e+002	9.734871e+001	3.354055e+001	2.681601e+000
28	2.725224e+002	1.311416e+002	9.734871e+001	2.746550e+002	1.332897e+002	9.904731e+001	3.402700e+001	2.726412e+000
29	2.746550e+002	1.332897e+002	9.904731e+001	2.767875e+002	1.354379e+002	1.008226e+002	3.443869e+001	2.774869e+000
30	2.767875e+002	1.354379e+002	1.008226e+002	2.789201e+002	1.375860e+002	1.026790e+002	3.477155e+001	2.827403e+000
31	2.789201e+002	1.375860e+002	1.026790e+002	2.810526e+002	1.397342e+002	1.046213e+002	3.502104e+001	2.884522e+000
32	2.810526e+002	1.397342e+002	1.046213e+002	2.829123e+002	1.397342e+002	1.063893e+002	3.423782e+001	2.566051e+000
33	2.829123e+002	1.397342e+002	1.063893e+002	2.848187e+002	1.413424e+002	1.082783e+002	3.321441e+001	2.683851e+000
34	2.848187e+002	1.413424e+002	1.082783e+002	2.867251e+002	1.429506e+002	1.102497e+002	3.289309e+001	2.742452e+000
35	2.867251e+002	1.429506e+002	1.102497e+002	2.886316e+002	1.445587e+002	1.123091e+002	3.248664e+001	2.806435e+000
36	2.886316e+002	1.445587e+002	1.123091e+002	2.905380e+002	1.461669e+002	1.144632e+002	3.198896e+001	2.876588e+000
37	2.905380e+002	1.461669e+002	1.144632e+002	2.924444e+002	1.477751e+002	1.167194e+002	3.139304e+001	2.953876e+000
38	2.924444e+002	1.477751e+002	1.167194e+002	2.943509e+002	1.493833e+002	1.190866e+002	3.069071e+001	3.039486e+000
39	2.943509e+002	1.493833e+002	1.190866e+002	2.962807e+002	1.493833e+002	1.216064e+002	2.905311e+001	3.174004e+000
40	2.962807e+002	1.493833e+002	1.216064e+002	2.987544e+002	1.544710e+002	1.250390e+002	2.863457e+001	4.231230e+000
41	2.987544e+002	1.544710e+002	1.250390e+002	3.012281e+002	1.595588e+002	1.287308e+002	3.016488e+001	4.444158e+000
42	3.012281e+002	1.595588e+002	1.287308e+002	3.031930e+002	1.595588e+002	1.318769e+002	2.928044e+001	3.709432e+000
43	3.031930e+002	1.595588e+002	1.318769e+002	3.050176e+002	1.607166e+002	1.349946e+002	2.672737e+001	3.612445e+000
44	3.050176e+002	1.607166e+002	1.349946e+002	3.068421e+002	1.618745e+002	1.383318e+002	2.466206e+001	3.803566e+000
45	3.068421e+002	1.618745e+002	1.383318e+002	3.086667e+002	1.630324e+002	1.419280e+002	2.235894e+001	4.032738e+000
46	3.086667e+002	1.630324e+002	1.419280e+002	3.104912e+002	1.641903e+002	1.458370e+002	1.977213e+001	4.314105e+000
47	3.104912e+002	1.641903e+002	1.458370e+002	3.122105e+002	1.641903e+002	1.498757e+002	1.638233e+001	4.389589e+000
48	3.122105e+002	1.641903e+002	1.498757e+002	3.141377e+002	1.654183e+002	1.549354e+002	1.247969e+001	5.414720e+000
49	3.141377e+002	1.654183e+002	1.549354e+002	3.160649e+002	1.666462e+002	1.607817e+002	8.292569e+000	6.156338e+000
50	3.160649e+002	1.666462e+002	1.607817e+002	3.179921e+002	1.678742e+002	1.678742e+002	3.134259e+000	7.350697e+000

SL#	Weight	Pore_Water	Alpha	Force Fn.	Seismic_F	Seismic_Y	Pore_Air	Phi_B	Liquified
1	1.3205e+002	0.0000e+000	1.0700e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
2	3.9429e+002	0.0000e+000	1.1697e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
3	6.5405e+002	0.0000e+000	1.2698e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
4	6.2228e+002	0.0000e+000	1.3606e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
5	1.2596e+003	0.0000e+000	1.4707e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
6	5.0020e+002	0.0000e+000	1.5640e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
7	1.0145e+003	0.0000e+000	1.6351e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
8	1.0785e+003	0.0000e+000	1.7299e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
9	1.1404e+003	0.0000e+000	1.8252e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
10	1.2001e+003	0.0000e+000	1.9210e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
11	1.2576e+003	0.0000e+000	2.0174e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
12	1.2328e+003	0.0000e+000	2.1132e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
13	1.2918e+003	0.0000e+000	2.2097e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
14	1.3869e+003	0.0000e+000	2.3082e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
15	1.4796e+003	0.0000e+000	2.4074e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
16	1.5698e+003	0.0000e+000	2.5073e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
17	1.6575e+003	0.0000e+000	2.6081e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
18	1.7427e+003	0.0000e+000	2.7098e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
19	1.8251e+003	0.0000e+000	2.8124e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
20	1.9049e+003	0.0000e+000	2.9160e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
21	2.1375e+003	0.0000e+000	3.0271e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
22	2.0487e+003	0.0000e+000	3.1459e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
23	1.9119e+003	0.0000e+000	3.2627e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
24	1.9584e+003	0.0000e+000	3.3776e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
25	2.0011e+003	0.0000e+000	3.4940e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
26	2.0398e+003	0.0000e+000	3.6120e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
27	2.0743e+003	0.0000e+000	3.7319e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
28	2.1044e+003	0.0000e+000	3.8538e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
29	2.1298e+003	0.0000e+000	3.9777e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
30	2.1504e+003	0.0000e+000	4.1039e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
31	2.1658e+003	0.0000e+000	4.2326e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
32	1.8464e+003	0.0000e+000	4.3554e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
33	1.8363e+003	0.0000e+000	4.4737e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
34	1.8185e+003	0.0000e+000	4.5959e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
35	1.7961e+003	0.0000e+000	4.7209e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
36	1.7686e+003	0.0000e+000	4.8490e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
37	1.7356e+003	0.0000e+000	4.9803e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
38	1.6968e+003	0.0000e+000	5.1153e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
39	1.6260e+003	0.0000e+000	5.2553e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
40	2.0542e+003	0.0000e+000	5.4222e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
41	2.1639e+003	0.0000e+000	5.6176e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
42	1.6685e+003	0.0000e+000	5.8013e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
43	1.4142e+003	0.0000e+000	5.9662e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
44	1.3049e+003	0.0000e+000	6.1333e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
45	1.1831e+003	0.0000e+000	6.3099e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
46	1.0462e+003	0.0000e+000	6.4979e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
47	8.1682e+002	0.0000e+000	6.6940e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
48	6.9747e+002	0.0000e+000	6.9149e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0

49	4.6346e+002	0.0000e+000	7.1756e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0
50	1.7517e+002	0.0000e+000	7.4799e+001	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0

Bishop_Method_Fm= 2.5659216 Applied_Lambda= 0.0000

SL#	Normal_M	ShearMob	Phi_Angle	Cohesion	SideLeft	ShearLeft	SideRight	ShearRight
1	1.0269e+002	1.6775e+002	6.7722e+001	8.1382e+001	0.0000e+000	0.0000e+000	-1.5076e+002	0.0000e+000
2	3.2960e+002	3.5296e+002	6.1787e+001	1.3143e+002	1.5076e+002	0.0000e+000	-4.4027e+002	0.0000e+000
3	5.5629e+002	5.0681e+002	5.8483e+001	1.7675e+002	4.4027e+002	0.0000e+000	-8.2786e+002	0.0000e+000
4	5.2906e+002	4.5954e+002	5.7394e+001	1.9504e+002	8.2786e+002	0.0000e+000	-1.1640e+003	0.0000e+000
5	1.0703e+003	8.8413e+002	5.6191e+001	2.1740e+002	1.1640e+003	0.0000e+000	-1.7744e+003	0.0000e+000
6	4.2530e+002	3.3634e+002	5.5106e+001	2.3965e+002	1.7744e+003	0.0000e+000	-1.9938e+003	0.0000e+000
7	8.5897e+002	6.7599e+002	5.4987e+001	2.4222e+002	1.9938e+003	0.0000e+000	-2.4212e+003	0.0000e+000
8	9.1003e+002	7.0520e+002	5.4580e+001	2.5120e+002	2.4212e+003	0.0000e+000	-2.8452e+003	0.0000e+000
9	9.5912e+002	7.3305e+002	5.4230e+001	2.5917e+002	2.8452e+003	0.0000e+000	-3.2631e+003	0.0000e+000
10	1.0063e+003	7.5964e+002	5.3910e+001	2.6666e+002	3.2631e+003	0.0000e+000	-3.6722e+003	0.0000e+000
11	1.0515e+003	7.8503e+002	5.3603e+001	2.7404e+002	3.6722e+003	0.0000e+000	-4.0700e+003	0.0000e+000
12	1.0253e+003	7.6702e+002	5.3657e+001	2.7273e+002	4.0700e+003	0.0000e+000	-4.4387e+003	0.0000e+000
13	1.0701e+003	7.9831e+002	5.3580e+001	2.7461e+002	4.4387e+003	0.0000e+000	-4.7996e+003	0.0000e+000
14	1.1491e+003	8.4136e+002	5.3095e+001	2.8665e+002	4.7996e+003	0.0000e+000	-5.1481e+003	0.0000e+000
15	1.2262e+003	8.8295e+002	5.2701e+001	2.9682e+002	5.1481e+003	0.0000e+000	-5.4803e+003	0.0000e+000
16	1.3014e+003	9.2311e+002	5.2145e+001	3.1166e+002	5.4803e+003	0.0000e+000	-5.7924e+003	0.0000e+000
17	1.3747e+003	9.6210e+002	5.1809e+001	3.2108e+002	5.7924e+003	0.0000e+000	-6.0807e+003	0.0000e+000
18	1.4461e+003	9.9983e+002	5.1551e+001	3.2833e+002	6.0807e+003	0.0000e+000	-6.3416e+003	0.0000e+000
19	1.5156e+003	1.0366e+003	5.1230e+001	3.3775e+002	6.3416e+003	0.0000e+000	-6.5720e+003	0.0000e+000
20	1.5833e+003	1.0722e+003	5.0940e+001	3.4638e+002	6.5720e+003	0.0000e+000	-6.7686e+003	0.0000e+000
21	1.7720e+003	1.2047e+003	5.1021e+001	3.4393e+002	6.7686e+003	0.0000e+000	-6.9513e+003	0.0000e+000
22	1.6875e+003	1.1678e+003	5.1564e+001	3.2797e+002	6.9513e+003	0.0000e+000	-7.1010e+003	0.0000e+000
23	1.5697e+003	1.0944e+003	5.1652e+001	3.2547e+002	7.1010e+003	0.0000e+000	-7.2084e+003	0.0000e+000
24	1.6086e+003	1.1179e+003	5.1607e+001	3.2675e+002	7.2084e+003	0.0000e+000	-7.2759e+003	0.0000e+000
25	1.6448e+003	1.1402e+003	5.1585e+001	3.2738e+002	7.2759e+003	0.0000e+000	-7.3018e+003	0.0000e+000
26	1.6779e+003	1.1614e+003	5.1566e+001	3.2790e+002	7.3018e+003	0.0000e+000	-7.2846e+003	0.0000e+000
27	1.7079e+003	1.1815e+003	5.1558e+001	3.2814e+002	7.2846e+003	0.0000e+000	-7.2231e+003	0.0000e+000
28	1.7346e+003	1.2003e+003	5.1562e+001	3.2802e+002	7.2231e+003	0.0000e+000	-7.1160e+003	0.0000e+000
29	1.7577e+003	1.2179e+003	5.1578e+001	3.2757e+002	7.1160e+003	0.0000e+000	-6.9626e+003	0.0000e+000
30	1.7771e+003	1.2341e+003	5.1601e+001	3.2692e+002	6.9626e+003	0.0000e+000	-6.7622e+003	0.0000e+000
31	1.7924e+003	1.2489e+003	5.1634e+001	3.2597e+002	6.7622e+003	0.0000e+000	-6.5147e+003	0.0000e+000
32	1.5248e+003	1.0763e+003	5.2202e+001	3.1012e+002	6.5147e+003	0.0000e+000	-6.2749e+003	0.0000e+000
33	1.5116e+003	1.0838e+003	5.2549e+001	3.0087e+002	6.2749e+003	0.0000e+000	-6.0119e+003	0.0000e+000
34	1.4966e+003	1.0829e+003	5.2796e+001	2.9434e+002	6.0119e+003	0.0000e+000	-5.7198e+003	0.0000e+000
35	1.4774e+003	1.0802e+003	5.3055e+001	2.8767e+002	5.7198e+003	0.0000e+000	-5.4002e+003	0.0000e+000
36	1.4536e+003	1.0756e+003	5.3360e+001	2.8000e+002	5.4002e+003	0.0000e+000	-5.0551e+003	0.0000e+000
37	1.4248e+003	1.0687e+003	5.3724e+001	2.7112e+002	5.0551e+003	0.0000e+000	-4.6867e+003	0.0000e+000
38	1.3904e+003	1.0592e+003	5.4139e+001	2.6129e+002	4.6867e+003	0.0000e+000	-4.2980e+003	0.0000e+000
39	1.3226e+003	1.0354e+003	5.4844e+001	2.4535e+002	4.2980e+003	0.0000e+000	-3.9065e+003	0.0000e+000
40	1.6705e+003	1.3286e+003	5.5238e+001	2.3683e+002	3.9065e+003	0.0000e+000	-3.3650e+003	0.0000e+000
41	1.7823e+003	1.4110e+003	5.5124e+001	2.3927e+002	3.3650e+003	0.0000e+000	-2.7093e+003	0.0000e+000
42	1.3706e+003	1.1115e+003	5.5724e+001	2.2673e+002	2.7093e+003	0.0000e+000	-2.1666e+003	0.0000e+000
43	1.1426e+003	9.7020e+002	5.6844e+001	2.0497e+002	2.1666e+003	0.0000e+000	-1.6971e+003	0.0000e+000
44	1.0371e+003	9.2050e+002	5.7884e+001	1.8658e+002	1.6971e+003	0.0000e+000	-1.2537e+003	0.0000e+000
45	9.1853e+002	8.6086e+002	5.9094e+001	1.6726e+002	1.2537e+003	0.0000e+000	-8.4701e+002	0.0000e+000
46	7.8489e+002	7.8844e+002	6.0554e+001	1.4666e+002	8.4701e+002	0.0000e+000	-4.8976e+002	0.0000e+000
47	5.7631e+002	6.4261e+002	6.2508e+001	1.2335e+002	4.8976e+002	0.0000e+000	-2.2731e+002	0.0000e+000
48	4.4033e+002	5.7881e+002	6.5091e+001	9.9164e+001	2.2731e+002	0.0000e+000	-3.5479e+001	0.0000e+000
49	2.2951e+002	4.1246e+002	6.8505e+001	7.7248e+001	3.5479e+001	0.0000e+000	4.4576e+001	0.0000e+000
50	5.5851e+000	1.8006e+002	7.6226e+001	5.9754e+001	-4.4576e+001	0.0000e+000	0.0000e+000	0.0000e+000

Slip_Surface_Summary

Analysis	Volume	Weight	Res_Moment	Act_Moment	Res_Force	Act_Force	FOS
Bishop Method	2.5234e+003	7.3179e+004	3.0299e+007	1.1808e+007			2.5659216

3.4. **Sponda sinistra condizioni sismiche**

```
FILEINFO
SLOPEW 6.02
WINDOW
  504 -2123
VIEWPREF
3 0 1 0 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 0 192 192 192 1 1 15 15 4 2 0 1 1 1 1 0 0 1 1 0 1 1 1 1 1 1 0 1 1 1 7 1 0 0 1 0 0 0 0
ZOOM
+9.0000e-002
FONTVIEW
Arial
  400   0   0   0
+6.0000e+000 +1.0000e+001 +1.4000e+002 +8.0000e+001
CONTOUR
    0 +0.0000e+000 +0.0000e+000
CONVALUES     0
SAFETYMAP
    0 +0.0000e+000 +0.0000e+000 +0.0000e+000     0     1 255   0   0   0   0 255 0
AXIS
  1   0   0   1   1
[m]
[m]
   23    14 -2.0000e+001 +4.4000e+002 +2.6000e+002 -2.0000e+001

1=METHOD 1331=NO. OF SLIP SURFACES    1=NO. OF RADII    1=SIDE FUNCTION TYPE

 SLIP     X-        Y-             ITERATION           FACTOR OF SAFETY
  NO.   COORD.     COORD.     RADIUS     NO.    LAMBDA    (MOMENT)   (FORCE)
================================================================================
 602    244.336   258.823    186.449     1     0.0000   2.6721240   3.0140587
 602    244.336   258.823    186.449     5     0.0000   2.8811639   2.6960863

 ----------------------------------------
 | SUMMARY OF MINIMUM FACTORS OF SAFETY |
 ----------------------------------------
MOMENT EQUILIBRIUM: BISHOP SIMPLIFIED METHOD
    194.3681=X-COOR.    197.6574=Y-COOR.    127.1611=RADIUS   2.4908987=F.S.    50=SLIP#

NORMAL TERMINATION OF SLOPE

MOST_CRITICAL #      SLIP_SURFACE #
==================================
        1              50

SLIP_SURFACE #      AUTOTENSIONELEV
==================================

SL#  X_Left        Y_L_Top       Y_L_Bottom     X_Right       Y_R_Top       Y_R_Bottom     Mid_Height     Base_Length
================================================================================================
====================================
  1 2.168923e+002 7.250712e+001 7.250712e+001 2.190627e+002 7.710328e+001 7.291724e+001 2.097901e+000 2.208840e+000
  2 2.190627e+002 7.710328e+001 7.291724e+001 2.212331e+002 8.169943e+001 7.336660e+001 6.264367e+000 2.216463e+000
  3 2.212331e+002 8.169943e+001 7.336660e+001 2.234035e+002 8.629559e+001 7.385564e+001 1.039138e+001 2.224847e+000
  4 2.234035e+002 8.629559e+001 7.385564e+001 2.251579e+002 8.629559e+001 7.428026e+001 1.223094e+001 1.805060e+000
  5 2.251579e+002 8.629559e+001 7.428026e+001 2.281404e+002 9.215524e+001 7.506309e+001 1.456341e+001 3.083552e+000
  6 2.281404e+002 9.215524e+001 7.506309e+001 2.291579e+002 9.215524e+001 7.534795e+001 1.695086e+001 1.056676e+000
  7 2.291579e+002 9.215524e+001 7.534795e+001 2.311719e+002 9.386050e+001 7.593884e+001 1.736899e+001 2.098946e+000
  8 2.311719e+002 9.386050e+001 7.593884e+001 2.331860e+002 9.556576e+001 7.656610e+001 1.846525e+001 2.109476e+000
  9 2.331860e+002 9.556576e+001 7.656610e+001 2.352000e+002 9.727103e+001 7.723030e+001 1.952485e+001 2.120755e+000
 10 2.352000e+002 9.727103e+001 7.723030e+001 2.372140e+002 9.897629e+001 7.793206e+001 2.054721e+001 2.132818e+000
 11 2.372140e+002 9.897629e+001 7.793206e+001 2.392281e+002 1.006816e+002 7.867205e+001 2.153168e+001 2.145699e+000
 12 2.392281e+002 1.006816e+002 7.867205e+001 2.411930e+002 1.006816e+002 7.943151e+001 2.163445e+001 2.106608e+000
 13 2.411930e+002 1.006816e+002 7.943151e+001 2.432105e+002 1.031465e+002 8.025064e+001 2.207796e+001 2.177514e+000
 14 2.432105e+002 1.031465e+002 8.025064e+001 2.452281e+002 1.056114e+002 8.111044e+001 2.370352e+001 2.193140e+000
 15 2.452281e+002 1.056114e+002 8.111044e+001 2.472456e+002 1.080763e+002 8.201183e+001 2.528795e+001 2.209774e+000
 16 2.472456e+002 1.080763e+002 8.201183e+001 2.492632e+002 1.105412e+002 8.295578e+001 2.683033e+001 2.227476e+000
 17 2.492632e+002 1.105412e+002 8.295578e+001 2.512807e+002 1.130061e+002 8.394335e+001 2.832962e+001 2.246311e+000
 18 2.512807e+002 1.130061e+002 8.394335e+001 2.532983e+002 1.154710e+002 8.497569e+001 2.978472e+001 2.266351e+000
 19 2.532983e+002 1.154710e+002 8.497569e+001 2.553158e+002 1.179359e+002 8.605405e+001 3.119445e+001 2.287678e+000
 20 2.553158e+002 1.179359e+002 8.605405e+001 2.573333e+002 1.204009e+002 8.717976e+001 3.255750e+001 2.310381e+000
 21 2.573333e+002 1.204009e+002 8.717976e+001 2.595965e+002 1.204009e+002 8.850069e+001 3.256844e+001 2.620491e+000
 22 2.595965e+002 1.204009e+002 8.850069e+001 2.618596e+002 1.204009e+002 8.988532e+001 3.121596e+001 2.653172e+000
 23 2.618596e+002 1.204009e+002 8.988532e+001 2.639922e+002 1.225490e+002 9.125056e+001 3.091447e+001 2.532170e+000
 24 2.639922e+002 1.225490e+002 9.125056e+001 2.661248e+002 1.246971e+002 9.267686e+001 3.166714e+001 2.565607e+000
 25 2.661248e+002 1.246971e+002 9.267686e+001 2.682573e+002 1.268453e+002 9.416675e+001 3.235753e+001 2.601494e+000
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26	2.682573e+002	1.268453e+002	9.416675e+001	2.703899e+002	1.289934e+002	9.572300e+001	3.298298e+001	2.640067e+000
27	2.703899e+002	1.289934e+002	9.572300e+001	2.725224e+002	1.311416e+002	9.734871e+001	3.354055e+001	2.681601e+000
28	2.725224e+002	1.311416e+002	9.734871e+001	2.746550e+002	1.332897e+002	9.904731e+001	3.402700e+001	2.726412e+000
29	2.746550e+002	1.332897e+002	9.904731e+001	2.767875e+002	1.354379e+002	1.008226e+002	3.443869e+001	2.774869e+000
30	2.767875e+002	1.354379e+002	1.008226e+002	2.789201e+002	1.375860e+002	1.026790e+002	3.477155e+001	2.827403e+000
31	2.789201e+002	1.375860e+002	1.026790e+002	2.810526e+002	1.397342e+002	1.046213e+002	3.502104e+001	2.884522e+000
32	2.810526e+002	1.397342e+002	1.046213e+002	2.829123e+002	1.397342e+002	1.063893e+002	3.423782e+001	2.566051e+000
33	2.829123e+002	1.397342e+002	1.063893e+002	2.848187e+002	1.413424e+002	1.082783e+002	3.321441e+001	2.683851e+000
34	2.848187e+002	1.413424e+002	1.082783e+002	2.867251e+002	1.429506e+002	1.102497e+002	3.289309e+001	2.742452e+000
35	2.867251e+002	1.429506e+002	1.102497e+002	2.886316e+002	1.445587e+002	1.123091e+002	3.248664e+001	2.806435e+000
36	2.886316e+002	1.445587e+002	1.123091e+002	2.905380e+002	1.461669e+002	1.144632e+002	3.198896e+001	2.876588e+000
37	2.905380e+002	1.461669e+002	1.144632e+002	2.924444e+002	1.477751e+002	1.167194e+002	3.139304e+001	2.953876e+000
38	2.924444e+002	1.477751e+002	1.167194e+002	2.943509e+002	1.493833e+002	1.190866e+002	3.069071e+001	3.039486e+000
39	2.943509e+002	1.493833e+002	1.190866e+002	2.962807e+002	1.493833e+002	1.216064e+002	2.905311e+001	3.174004e+000
40	2.962807e+002	1.493833e+002	1.216064e+002	2.987544e+002	1.544710e+002	1.250390e+002	2.863457e+001	4.231230e+000
41	2.987544e+002	1.544710e+002	1.250390e+002	3.012281e+002	1.595588e+002	1.287308e+002	3.016488e+001	4.444158e+000
42	3.012281e+002	1.595588e+002	1.287308e+002	3.031930e+002	1.595588e+002	1.318769e+002	2.928044e+001	3.709432e+000
43	3.031930e+002	1.595588e+002	1.318769e+002	3.050176e+002	1.607166e+002	1.349946e+002	2.672737e+001	3.612445e+000
44	3.050176e+002	1.607166e+002	1.349946e+002	3.068421e+002	1.618745e+002	1.383318e+002	2.466206e+001	3.803566e+000
45	3.068421e+002	1.618745e+002	1.383318e+002	3.086667e+002	1.630324e+002	1.419280e+002	2.235894e+001	4.032738e+000
46	3.086667e+002	1.630324e+002	1.419280e+002	3.104912e+002	1.641903e+002	1.458370e+002	1.977213e+001	4.314105e+000
47	3.104912e+002	1.641903e+002	1.458370e+002	3.122105e+002	1.641903e+002	1.498757e+002	1.638233e+001	4.389589e+000
48	3.122105e+002	1.641903e+002	1.498757e+002	3.141377e+002	1.654183e+002	1.549354e+002	1.247969e+001	5.414720e+000
49	3.141377e+002	1.654183e+002	1.549354e+002	3.160649e+002	1.666462e+002	1.607817e+002	8.292569e+000	6.156338e+000
50	3.160649e+002	1.666462e+002	1.607817e+002	3.179921e+002	1.678742e+002	1.678742e+002	3.134259e+000	7.350697e+000

SL#	Weight	Pore_Water	Alpha	Force Fn.	Seismic_F	Seismic_Y	Pore_Air	Phi_B	Liquified
1	1.3314e+002	0.0000e+000	1.0700e+001	1.0000e+000	-2.1920e+000	7.3756e+001	0.0000e+000	0.0000e+000	0
2	3.9756e+002	0.0000e+000	1.1697e+001	1.0000e+000	-6.5452e+000	7.6269e+001	0.0000e+000	0.0000e+000	0
3	6.5948e+002	0.0000e+000	1.2698e+001	1.0000e+000	-1.0857e+001	7.8802e+001	0.0000e+000	0.0000e+000	0
4	6.2744e+002	0.0000e+000	1.3606e+001	1.0000e+000	-1.0330e+001	8.0180e+001	0.0000e+000	0.0000e+000	0
5	1.2701e+003	0.0000e+000	1.4707e+001	1.0000e+000	-2.0909e+001	8.1944e+001	0.0000e+000	0.0000e+000	0
6	5.0435e+002	0.0000e+000	1.5640e+001	1.0000e+000	-8.3034e+000	8.3680e+001	0.0000e+000	0.0000e+000	0
7	1.0229e+003	0.0000e+000	1.6351e+001	1.0000e+000	-1.6840e+001	8.4323e+001	0.0000e+000	0.0000e+000	0
8	1.0875e+003	0.0000e+000	1.7299e+001	1.0000e+000	-1.7903e+001	8.5481e+001	0.0000e+000	0.0000e+000	0
9	1.1499e+003	0.0000e+000	1.8252e+001	1.0000e+000	-1.8930e+001	8.6656e+001	0.0000e+000	0.0000e+000	0
10	1.2101e+003	0.0000e+000	1.9210e+001	1.0000e+000	-1.9922e+001	8.7850e+001	0.0000e+000	0.0000e+000	0
11	1.2680e+003	0.0000e+000	2.0174e+001	1.0000e+000	-2.0876e+001	8.9063e+001	0.0000e+000	0.0000e+000	0
12	1.2430e+003	0.0000e+000	2.1132e+001	1.0000e+000	-2.0464e+001	8.9864e+001	0.0000e+000	0.0000e+000	0
13	1.3025e+003	0.0000e+000	2.2097e+001	1.0000e+000	-2.1443e+001	9.0875e+001	0.0000e+000	0.0000e+000	0
14	1.3984e+003	0.0000e+000	2.3082e+001	1.0000e+000	-2.3022e+001	9.2527e+001	0.0000e+000	0.0000e+000	0
15	1.4918e+003	0.0000e+000	2.4074e+001	1.0000e+000	-2.4561e+001	9.4200e+001	0.0000e+000	0.0000e+000	0
16	1.5828e+003	0.0000e+000	2.5073e+001	1.0000e+000	-2.6059e+001	9.5894e+001	0.0000e+000	0.0000e+000	0
17	1.6713e+003	0.0000e+000	2.6081e+001	1.0000e+000	-2.7515e+001	9.7609e+001	0.0000e+000	0.0000e+000	0
18	1.7571e+003	0.0000e+000	2.7098e+001	1.0000e+000	-2.8928e+001	9.9346e+001	0.0000e+000	0.0000e+000	0
19	1.8403e+003	0.0000e+000	2.8124e+001	1.0000e+000	-3.0297e+001	1.0111e+002	0.0000e+000	0.0000e+000	0
20	1.9207e+003	0.0000e+000	2.9160e+001	1.0000e+000	-3.1621e+001	1.0289e+002	0.0000e+000	0.0000e+000	0
21	2.1553e+003	0.0000e+000	3.0271e+001	1.0000e+000	-3.5483e+001	1.0412e+002	0.0000e+000	0.0000e+000	0
22	2.0658e+003	0.0000e+000	3.1459e+001	1.0000e+000	-3.4009e+001	1.0479e+002	0.0000e+000	0.0000e+000	0
23	1.9277e+003	0.0000e+000	3.2627e+001	1.0000e+000	-3.1737e+001	1.0602e+002	0.0000e+000	0.0000e+000	0
24	1.9747e+003	0.0000e+000	3.3776e+001	1.0000e+000	-3.2510e+001	1.0779e+002	0.0000e+000	0.0000e+000	0
25	2.0177e+003	0.0000e+000	3.4940e+001	1.0000e+000	-3.3219e+001	1.0959e+002	0.0000e+000	0.0000e+000	0
26	2.0567e+003	0.0000e+000	3.6120e+001	1.0000e+000	-3.3861e+001	1.1143e+002	0.0000e+000	0.0000e+000	0
27	2.0915e+003	0.0000e+000	3.7319e+001	1.0000e+000	-3.4433e+001	1.1330e+002	0.0000e+000	0.0000e+000	0
28	2.1218e+003	0.0000e+000	3.8538e+001	1.0000e+000	-3.4932e+001	1.1520e+002	0.0000e+000	0.0000e+000	0
29	2.1475e+003	0.0000e+000	3.9777e+001	1.0000e+000	-3.5355e+001	1.1714e+002	0.0000e+000	0.0000e+000	0
30	2.1683e+003	0.0000e+000	4.1039e+001	1.0000e+000	-3.5697e+001	1.1913e+002	0.0000e+000	0.0000e+000	0
31	2.1838e+003	0.0000e+000	4.2326e+001	1.0000e+000	-3.5953e+001	1.2115e+002	0.0000e+000	0.0000e+000	0
32	1.8618e+003	0.0000e+000	4.3554e+001	1.0000e+000	-3.0651e+001	1.2262e+002	0.0000e+000	0.0000e+000	0
33	1.8516e+003	0.0000e+000	4.4737e+001	1.0000e+000	-3.0483e+001	1.2393e+002	0.0000e+000	0.0000e+000	0
34	1.8336e+003	0.0000e+000	4.5959e+001	1.0000e+000	-3.0188e+001	1.2570e+002	0.0000e+000	0.0000e+000	0
35	1.8110e+003	0.0000e+000	4.7209e+001	1.0000e+000	-2.9815e+001	1.2751e+002	0.0000e+000	0.0000e+000	0
36	1.7832e+003	0.0000e+000	4.8490e+001	1.0000e+000	-2.9358e+001	1.2937e+002	0.0000e+000	0.0000e+000	0
37	1.7500e+003	0.0000e+000	4.9803e+001	1.0000e+000	-2.8811e+001	1.3127e+002	0.0000e+000	0.0000e+000	0
38	1.7109e+003	0.0000e+000	5.1153e+001	1.0000e+000	-2.8167e+001	1.3323e+002	0.0000e+000	0.0000e+000	0
39	1.6394e+003	0.0000e+000	5.2553e+001	1.0000e+000	-2.6991e+001	1.3486e+002	0.0000e+000	0.0000e+000	0
40	2.0712e+003	0.0000e+000	5.4222e+001	1.0000e+000	-3.4099e+001	1.3761e+002	0.0000e+000	0.0000e+000	0
41	2.1819e+003	0.0000e+000	5.6176e+001	1.0000e+000	-3.5921e+001	1.4193e+002	0.0000e+000	0.0000e+000	0
42	1.6823e+003	0.0000e+000	5.8013e+001	1.0000e+000	-2.7697e+001	1.4492e+002	0.0000e+000	0.0000e+000	0
43	1.4259e+003	0.0000e+000	5.9662e+001	1.0000e+000	-2.3476e+001	1.4677e+002	0.0000e+000	0.0000e+000	0
44	1.3158e+003	0.0000e+000	6.1333e+001	1.0000e+000	-2.1662e+001	1.4896e+002	0.0000e+000	0.0000e+000	0
45	1.1929e+003	0.0000e+000	6.3099e+001	1.0000e+000	-1.9639e+001	1.5127e+002	0.0000e+000	0.0000e+000	0
46	1.0549e+003	0.0000e+000	6.4979e+001	1.0000e+000	-1.7367e+001	1.5373e+002	0.0000e+000	0.0000e+000	0
47	8.2360e+002	0.0000e+000	6.6940e+001	1.0000e+000	-1.3559e+001	1.5600e+002	0.0000e+000	0.0000e+000	0
48	7.0326e+002	0.0000e+000	6.9149e+001	1.0000e+000	-1.1578e+001	1.5856e+002	0.0000e+000	0.0000e+000	0

49	4.6731e+002	0.0000e+000	7.1756e+001	1.0000e+000	-7.6934e+000	1.6189e+002	0.0000e+000	0.0000e+000	0
50	1.7662e+002	0.0000e+000	7.4799e+001	1.0000e+000	-2.9078e+000	1.6569e+002	0.0000e+000	0.0000e+000	0

Bishop_Method_Fm= 2.4908987 Applied_Lambda= 0.0000

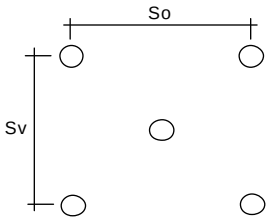
SL#	Normal_M	ShearMob	Phi_Angle	Cohesion	SideLeft	ShearLeft	SideRight	ShearRight
1	1.0283e+002	1.7294e+002	6.7716e+001	8.1417e+001	0.0000e+000	0.0000e+000	-1.5387e+002	0.0000e+000
2	3.3059e+002	3.6433e+002	6.1767e+001	1.3166e+002	1.5387e+002	0.0000e+000	-4.4832e+002	0.0000e+000
3	5.5815e+002	5.2329e+002	5.8460e+001	1.7713e+002	4.4832e+002	0.0000e+000	-8.4152e+002	0.0000e+000
4	5.3077e+002	4.7445e+002	5.7371e+001	1.9544e+002	8.4152e+002	0.0000e+000	-1.1822e+003	0.0000e+000
5	1.0736e+003	9.1274e+002	5.6167e+001	2.1787e+002	1.1822e+003	0.0000e+000	-1.7999e+003	0.0000e+000
6	4.2658e+002	3.4721e+002	5.5084e+001	2.4012e+002	1.7999e+003	0.0000e+000	-2.0217e+003	0.0000e+000
7	8.6138e+002	6.9773e+002	5.4966e+001	2.4268e+002	2.0217e+003	0.0000e+000	-2.4534e+003	0.0000e+000
8	9.1239e+002	7.2777e+002	5.4560e+001	2.5166e+002	2.4534e+003	0.0000e+000	-2.8815e+003	0.0000e+000
9	9.6141e+002	7.5640e+002	5.4212e+001	2.5959e+002	2.8815e+003	0.0000e+000	-3.3030e+003	0.0000e+000
10	1.0084e+003	7.8372e+002	5.3893e+001	2.6708e+002	3.3030e+003	0.0000e+000	-3.7154e+003	0.0000e+000
11	1.0535e+003	8.0979e+002	5.3587e+001	2.7443e+002	3.7154e+003	0.0000e+000	-4.1161e+003	0.0000e+000
12	1.0270e+003	7.9105e+002	5.3643e+001	2.7306e+002	4.1161e+003	0.0000e+000	-4.4873e+003	0.0000e+000
13	1.0716e+003	8.2317e+002	5.3568e+001	2.7489e+002	4.4873e+003	0.0000e+000	-4.8505e+003	0.0000e+000
14	1.1505e+003	8.6746e+002	5.3086e+001	2.8689e+002	4.8505e+003	0.0000e+000	-5.2008e+003	0.0000e+000
15	1.2275e+003	9.1022e+002	5.2693e+001	2.9704e+002	5.2008e+003	0.0000e+000	-5.5342e+003	0.0000e+000
16	1.3025e+003	9.5150e+002	5.2146e+001	3.1164e+002	5.5342e+003	0.0000e+000	-5.8468e+003	0.0000e+000
17	1.3756e+003	9.9155e+002	5.1796e+001	3.2142e+002	5.8468e+003	0.0000e+000	-6.1351e+003	0.0000e+000
18	1.4468e+003	1.0303e+003	5.1549e+001	3.2840e+002	6.1351e+003	0.0000e+000	-6.3956e+003	0.0000e+000
19	1.5161e+003	1.0680e+003	5.1225e+001	3.3789e+002	6.3956e+003	0.0000e+000	-6.6248e+003	0.0000e+000
20	1.5834e+003	1.1046e+003	5.0939e+001	3.4641e+002	6.6248e+003	0.0000e+000	-6.8197e+003	0.0000e+000
21	1.7716e+003	1.2408e+003	5.1023e+001	3.4389e+002	6.8197e+003	0.0000e+000	-7.0002e+003	0.0000e+000
22	1.6863e+003	1.2024e+003	5.1566e+001	3.2790e+002	7.0002e+003	0.0000e+000	-7.1479e+003	0.0000e+000
23	1.5680e+003	1.1266e+003	5.1660e+001	3.2525e+002	7.1479e+003	0.0000e+000	-7.2532e+003	0.0000e+000
24	1.6065e+003	1.1504e+003	5.1609e+001	3.2668e+002	7.2532e+003	0.0000e+000	-7.3183e+003	0.0000e+000
25	1.6420e+003	1.1732e+003	5.1589e+001	3.2724e+002	7.3183e+003	0.0000e+000	-7.3414e+003	0.0000e+000
26	1.6746e+003	1.1947e+003	5.1573e+001	3.2770e+002	7.3414e+003	0.0000e+000	-7.3211e+003	0.0000e+000
27	1.7040e+003	1.2151e+003	5.1567e+001	3.2789e+002	7.3211e+003	0.0000e+000	-7.2561e+003	0.0000e+000
28	1.7300e+003	1.2341e+003	5.1572e+001	3.2775e+002	7.2561e+003	0.0000e+000	-7.1454e+003	0.0000e+000
29	1.7525e+003	1.2519e+003	5.1587e+001	3.2730e+002	7.1454e+003	0.0000e+000	-6.9882e+003	0.0000e+000
30	1.7711e+003	1.2682e+003	5.1608e+001	3.2672e+002	6.9882e+003	0.0000e+000	-6.7839e+003	0.0000e+000
31	1.7857e+003	1.2831e+003	5.1660e+001	3.2525e+002	6.7839e+003	0.0000e+000	-6.5323e+003	0.0000e+000
32	1.5184e+003	1.1054e+003	5.2200e+001	3.1016e+002	6.5323e+003	0.0000e+000	-6.2893e+003	0.0000e+000
33	1.5044e+003	1.1127e+003	5.2604e+001	2.9941e+002	6.2893e+003	0.0000e+000	-6.0231e+003	0.0000e+000
34	1.4888e+003	1.1114e+003	5.2828e+001	2.9350e+002	6.0231e+003	0.0000e+000	-5.7281e+003	0.0000e+000
35	1.4690e+003	1.1083e+003	5.3097e+001	2.8661e+002	5.7281e+003	0.0000e+000	-5.4057e+003	0.0000e+000
36	1.4447e+003	1.1032e+003	5.3406e+001	2.7887e+002	5.4057e+003	0.0000e+000	-5.0581e+003	0.0000e+000
37	1.4153e+003	1.0957e+003	5.3777e+001	2.6984e+002	5.0581e+003	0.0000e+000	-4.6875e+003	0.0000e+000
38	1.3803e+003	1.0854e+003	5.4192e+001	2.6006e+002	4.6875e+003	0.0000e+000	-4.2968e+003	0.0000e+000
39	1.3121e+003	1.0605e+003	5.4904e+001	2.4403e+002	4.2968e+003	0.0000e+000	-3.9038e+003	0.0000e+000
40	1.6559e+003	1.3601e+003	5.5301e+001	2.3551e+002	3.9038e+003	0.0000e+000	-3.3608e+003	0.0000e+000
41	1.7656e+003	1.4439e+003	5.5190e+001	2.3785e+002	3.3608e+003	0.0000e+000	-2.7039e+003	0.0000e+000
42	1.3565e+003	1.1367e+003	5.5795e+001	2.2528e+002	2.7039e+003	0.0000e+000	-2.1608e+003	0.0000e+000
43	1.1296e+003	9.9144e+002	5.6923e+001	2.0351e+002	2.1608e+003	0.0000e+000	-1.6916e+003	0.0000e+000
44	1.0242e+003	9.3996e+002	5.7968e+001	1.8517e+002	1.6916e+003	0.0000e+000	-1.2488e+003	0.0000e+000
45	9.0593e+002	8.7832e+002	5.9184e+001	1.6590e+002	1.2488e+003	0.0000e+000	-8.4312e+002	0.0000e+000
46	7.7292e+002	8.0365e+002	6.0647e+001	1.4545e+002	8.4312e+002	0.0000e+000	-4.8713e+002	0.0000e+000
47	5.6634e+002	6.5426e+002	6.2609e+001	1.2227e+002	4.8713e+002	0.0000e+000	-2.2588e+002	0.0000e+000
48	4.3135e+002	5.8846e+002	6.5190e+001	9.8379e+001	2.2588e+002	0.0000e+000	-3.5143e+001	0.0000e+000
49	2.2333e+002	4.1857e+002	6.8581e+001	7.6880e+001	3.5143e+001	0.0000e+000	4.4305e+001	0.0000e+000
50	3.5450e+000	1.8213e+002	7.6299e+001	5.9739e+001	-4.4305e+001	0.0000e+000	0.0000e+000	0.0000e+000

Slip_Surface_Summary

Analysis	Volume	Weight	Res_Moment	Act_Moment	Res_Force	Act_Force	FOS
Bishop Method	2.5234e+003	7.3179e+004	3.0228e+007	1.2135e+007			2.4908987

4. VERIFICA DELLE CHIODATURE

CHIODATURA CON BARRE PASSIVE



Sv = spaziatura verticale = 2.5 (m)

So = spaziatura orizzontale = 2.5 (m)

D = Diametro del tondino = 2.6 (cm)

A = Area del tondino = 5.31 (cmq)

fyk = Tensione di snervamento dell'acciaio

B450C 450 (N/mm^2)

Ds = Diametro della Perforazione

= 0.1 (m)

Rck = resistenza caratteristica della malta

= 30 (N/mm^2)

Tipologia di ancoraggio Permanente

Forza limite di taglio del singolo chiodo

T = Resistenza al taglio limite dell'elemento di rinforzo

$T = (fyk*A)/((3^{0.5})*\gamma_{M0})$ = 131.37 (kN)

Ceq = coesione equivalente dovuta alla presenza della chiodatura

Ceq = T / Ainf

Ainf = (Sv)*(So) = 6.25 (mq)

Ceq = 21.02 (kN/mq)

Lunghezza di ancoraggio della barra

coefficienti parziali	Azioni		Resistenze	
Metodo di calcolo	permanenti γ_G	variabili γ_Q	permanenti γ_s	temporanei γ_s
NTC 2008 - A1+M1+R3 ◉	1.30	1.50	1.20	1.10
definiti dall'utente ○	1.10	1.20	1.30	1.50

n	1	2	3	4	>= 5
ξ_3	**1.80**	1.75	1.70	1.65	1.60
ξ_4	**1.80**	1.70	1.65	1.60	1.55

Numero di verticali indagate

n° 1 verticale

Ls min = $T * \xi \gamma_s / (\pi * Ds * \tau sm)$

τs med = tensione di adesione media = 0.40 (N/mm^2)

τs min = tensione di adesione minima = 0.40 (N/mm^2)

$\tau s,d$ = tensione di adesione di calcolo = 0.19 (N/mm^2)

$\tau s_d = Min(\tau s_{med}/\xi_3 \gamma_s ; \tau s_{min}/\xi_4 \gamma_s)$

Ls min = 2.26 (m)

Verifica allo sfilamento della barra

$N lim = \pi * D * f_{bd} * L min$

L min = lunghezza di ancoraggio = 2.26 (m)

γ_C = 1.5

f_{ctk} = 1.79 (N/mm^2)

$f_{bk} = 2.25 * \eta * f_{ctk}$ = 4.03

f_{bd} = aderenza barra/malta = f_{bk}/γ_C = = 2.69 (N/mm^2)

Nlim = 495.42 (kN)

ok - Nlim > T