

REGIONE
BASILICATA



PROVINCIA DI
MATERA



COMUNE DI
STIGLIANO

OGGETTO:

PROGETTO DEFINITIVO PER LA REALIZZAZIONE DI UN PARCO AGRI-VOLTAICO
A TERRA "STIGLIANO" DELLA POTENZA NOMINALE DI 20 MW
LOCALITA' "STANZALAURO" NEL COMUNE DI STIGLIANO (MT)

ELABORATO:

VERIFICHE DI STABILITA' DEL VERSANTE



PROPONENTE:

COMPAGNIA DEL SOLE DUE S.R.L.
P.IVA IT04320530985
VIA ALDO MORO, 28
25043- BRENO (BS)

PROGETTAZIONE:

Ing. Carmen Martone
Iscr. n. 1872
Ordine Ingegneri Potenza
C.F. MRTCMN73D56H703E

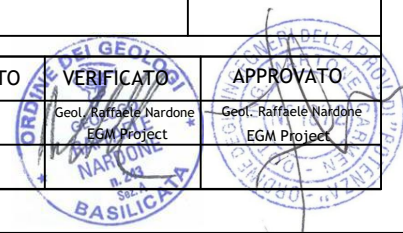


Geol. Raffaele Nardone
Iscr. n. 243
Ordine Geologi Basilicata
C.F. NRDRFL71H04A509H



EGM PROJECT S.R.L.
VIA VERRASTRO 15/A
85100- POTENZA (PZ)
P.IVA 02094310766
REA PZ-206983

Livello prog.	Cat. opera	N° . prog.elaborato	Tipo elaborato	N° foglio	Tot. fogli	Nome file	Scala
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REV.	DATA	DESCRIZIONE			ESEGUITO	VERIFICATO	APPROVATO
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Relazione di calcolo

Definizione

Per pendio s'intende una porzione di versante naturale il cui profilo originario è stato modificato da interventi artificiali rilevanti rispetto alla stabilità. Per frana s'intende una situazione di instabilità che interessa versanti naturali e coinvolgono volumi considerevoli di terreno.

Introduzione all'analisi di stabilità

La risoluzione di un problema di stabilità richiede la presa in conto delle equazioni di campo e dei legami costitutivi. Le prime sono di equilibrio, le seconde descrivono il comportamento del terreno. Tali equazioni risultano particolarmente complesse in quanto i terreni sono dei sistemi multifase, che possono essere ricondotti a sistemi monofase solo in condizioni di terreno secco, o di analisi in condizioni drenate.

Nella maggior parte dei casi ci si trova a dover trattare un materiale che se saturo è per lo meno bifase, ciò rende la trattazione delle equazioni di equilibrio notevolmente complicata. Inoltre è praticamente impossibile definire una legge costitutiva di validità generale, in quanto i terreni presentano un comportamento non-lineare già a piccole deformazioni, sono anisotropi ed inoltre il loro comportamento dipende non solo dallo sforzo deviatorico ma anche da quello normale. A causa delle suddette difficoltà vengono introdotte delle ipotesi semplificative:

1. Si usano leggi costitutive semplificate: modello rigido perfettamente plastico. Si assume che la resistenza del materiale sia espressa unicamente dai parametri coesione (c) e angolo di resistenza al taglio (ϕ), costanti per il terreno e caratteristici dello stato plastico; quindi si suppone valido il criterio di rottura di Mohr-Coulomb.
2. In alcuni casi vengono soddisfatte solo in parte le equazioni di equilibrio.

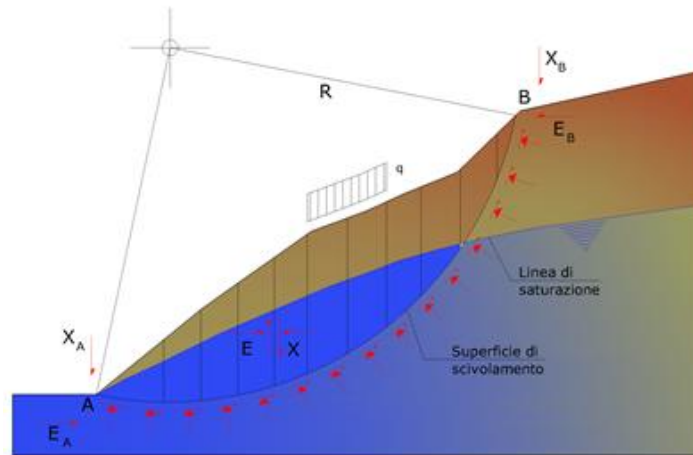
Metodo equilibrio limite (LEM)

Il metodo dell'equilibrio limite consiste nello studiare l'equilibrio di un corpo rigido, costituito dal pendio e da una superficie di scorrimento di forma qualsiasi (linea retta, arco di cerchio, spirale logaritmica); da tale equilibrio vengono calcolate le tensioni da taglio (t) e confrontate con la resistenza disponibile (t_f), valutata secondo il criterio di rottura di Coulomb, da tale confronto ne scaturisce la prima indicazione sulla stabilità attraverso il coefficiente di sicurezza:

$$F = \tau_f / \tau$$

Tra i metodi dell'equilibrio limite alcuni considerano l'equilibrio globale del corpo rigido (Culman), altri a causa della non omogeneità dividono il corpo in conci considerando l'equilibrio di ciascuno (Fellenius, Bishop, Janbu ecc.).

Di seguito vengono discussi i metodi dell'equilibrio limite dei concii.



Metodo dei concii

La massa interessata dallo scivolamento viene suddivisa in un numero conveniente di concii. Se il numero dei concii è pari a n , il problema presenta le seguenti incognite:

- n valori delle forze normali N_i agenti sulla base di ciascun concio;
- n valori delle forze di taglio alla base del concio T_i ;
- $(n-1)$ forze normali E_i agenti sull'interfaccia dei concii;
- $(n-1)$ forze tangenziali X_i agenti sull'interfaccia dei concii;
- n valori della coordinata a che individua il punto di applicazione delle E_i ;
- $(n-1)$ valori della coordinata che individua il punto di applicazione delle X_i ;
- una incognita costituita dal fattore di sicurezza F .

Complessivamente le incognite sono $(6n-2)$.

Mentre le equazioni a disposizione sono:

- equazioni di equilibrio dei momenti n ;
- equazioni di equilibrio alla traslazione verticale n ;
- equazioni di equilibrio alla traslazione orizzontale n ;

- equazioni relative al criterio di rottura n.

Totale numero di equazioni $4n$.

Il problema è staticamente indeterminato ed il grado di indeterminazione è pari a :

$$i = (6n - 2) - (4n) = 2n - 2$$

Il grado di indeterminazione si riduce ulteriormente a $(n-2)$ in quanto si fa l'assunzione che N_i sia applicato nel punto medio della striscia. Ciò equivale ad ipotizzare che le tensioni normali totali siano uniformemente distribuite.

I diversi metodi che si basano sulla teoria dell'equilibrio limite si differenziano per il modo in cui vengono eliminate le $(n-2)$ indeterminazioni.

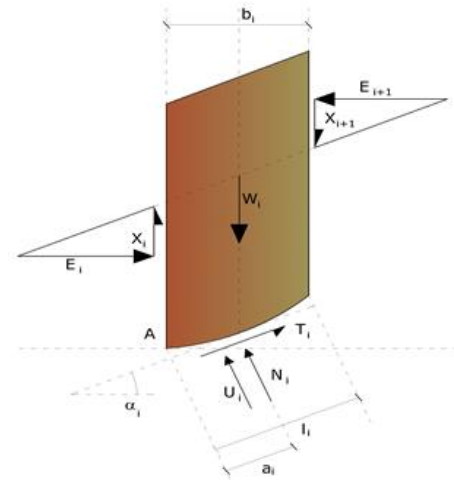
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Metodo di Bishop (1955)

Con tale metodo non viene trascurato nessun contributo di forze agenti sui blocchi e fu il primo a descrivere i problemi legati ai metodi convenzionali. Le equazioni usate per risolvere il problema sono:

$$\sum F_y = 0, \quad \sum M_0 = 0 \quad \text{Criterio di rottura}$$

$$F = \frac{\sum \{ c_i \times b_i + (W_i - u_i \times b_i + \Delta X_i) \times \tan \varphi_i \} \times \frac{\sec \alpha_i}{1 + \tan \alpha_i \times \tan \varphi_i / F}}{\sum W_i \times \sin \alpha_i}$$



I valori di F e di DX per ogni elemento che soddisfano questa equazione danno una soluzione rigorosa al problema. Come prima approssimazione conviene porre $DX = 0$ ed iterare per il calcolo del fattore di sicurezza, tale procedimento è noto come metodo di Bishop ordinario, gli errori commessi rispetto al metodo completo sono di circa 1 %.

1Analisi di stabilità dei pendii con : BISHOP lungo la sezione A-A' Ante/post Operam

Calcolo eseguito secondo	Utente
Numero di strati	3.0
Numero dei conci	50.0
Grado di sicurezza ritenuto accettabile	1.1
Coefficiente parziale resistenza	1.0
Analisi	Condizione drenata
Superficie di forma circolare	

Maglia dei Centri

Ascissa vertice sinistro inferiore xi	83.23 m
Ordinata vertice sinistro inferiore yi	488.05 m
Ascissa vertice destro superiore xs	407.89 m
Ordinata vertice destro superiore ys	586.28 m
Passo di ricerca	10.0
Numero di celle lungo x	10.0
Numero di celle lungo y	10.0

Sisma

Coefficiente azione sismica orizzontale	0.11
Coefficiente azione sismica verticale	0.055

Vertici profilo

Nr	X (m)	y (m)
1	0.0	348.04
2	1.01	346.97
3	2.01	346.95
4	3.02	347.23
5	4.02	348.27
6	5.03	349.66
7	6.04	350.53
8	7.04	350.49
9	8.05	350.3
10	9.06	350.14
11	10.06	350.02
12	11.07	350.09
13	12.07	350.06
14	13.08	349.99
15	14.09	350.05
16	15.09	350.0
17	16.1	350.0
18	17.1	349.95
19	18.11	349.91

20	19.12	349.91
21	20.12	349.89
22	21.13	349.91
23	22.13	349.89
24	23.14	350.1
25	24.15	350.21
26	25.15	350.19
27	26.16	350.1
28	27.17	350.11
29	28.17	350.06
30	29.18	350.06
31	30.18	350.04
32	31.19	350.0
33	32.2	350.0
34	33.2	350.02
35	34.21	349.98
36	35.21	349.93
37	36.22	349.95
38	37.23	350.0
39	38.23	349.98
40	39.24	350.04
41	40.25	350.05
42	41.25	350.01
43	42.26	350.05
44	43.26	350.11
45	44.27	350.25
46	45.28	350.55
47	46.28	350.82
48	47.29	351.03
49	48.29	351.32
50	49.3	351.72
51	50.31	352.07
52	51.31	352.43
53	52.32	352.83
54	53.32	353.38
55	54.33	353.69
56	55.34	354.11
57	56.34	354.42
58	57.35	354.82
59	58.36	355.3
60	59.36	355.94
61	60.37	356.36
62	61.37	356.83
63	62.38	357.3
64	63.39	357.72
65	64.39	358.24
66	65.4	358.73
67	66.4	359.23
68	67.41	359.72
69	68.42	360.28
70	69.42	360.93
71	70.43	361.88
72	71.43	362.59

73	72.44	362.79
74	73.45	362.62
75	74.45	362.87
76	75.46	363.4
77	76.47	363.85
78	77.47	364.14
79	78.48	364.63
80	79.48	365.41
81	80.49	366.06
82	81.5	366.52
83	82.5	366.95
84	83.51	367.37
85	84.51	367.78
86	85.52	368.2
87	86.53	368.67
88	87.53	369.12
89	88.54	369.63
90	89.55	370.01
91	90.55	370.38
92	91.56	370.87
93	92.56	371.3
94	93.57	371.86
95	94.58	372.28
96	95.58	372.7
97	96.59	373.12
98	97.59	373.63
99	98.6	374.1
100	99.61	374.54
101	100.61	375.0
102	101.62	375.52
103	102.62	376.02
104	103.63	376.38
105	104.64	376.81
106	105.64	377.27
107	106.65	377.74
108	107.66	378.22
109	108.66	378.66
110	109.67	378.98
111	110.67	379.35
112	111.68	380.08
113	112.69	380.38
114	113.69	380.68
115	114.7	381.01
116	115.7	381.29
117	116.71	381.66
118	117.72	382.08
119	118.72	382.64
120	119.73	383.07
121	120.74	383.46
122	121.74	383.82
123	122.75	384.08
124	123.75	384.45
125	124.76	384.78

126	125.77	385.17
127	126.77	385.58
128	127.78	385.91
129	128.78	386.34
130	129.79	386.76
131	130.8	387.08
132	131.8	387.38
133	132.81	387.62
134	133.81	388.04
135	134.82	388.23
136	135.83	388.55
137	136.83	388.96
138	137.84	389.36
139	138.85	389.72
140	139.85	390.06
141	140.86	390.45
142	141.86	390.8
143	142.87	391.22
144	143.88	391.61
145	144.88	392.06
146	145.89	392.52
147	146.89	392.9
148	147.9	393.39
149	148.91	393.84
150	149.91	394.16
151	150.92	394.61
152	151.92	395.0
153	152.93	395.33
154	153.94	395.64
155	154.94	396.03
156	155.95	396.45
157	156.96	396.79
158	157.96	397.05
159	158.97	397.42
160	159.97	397.86
161	160.98	398.32
162	161.99	398.78
163	162.99	399.11
164	164.0	399.35
165	165.0	399.61
166	166.01	399.84
167	167.02	400.19
168	168.02	400.53
169	169.03	401.07
170	170.04	401.56
171	171.04	402.01
172	172.05	402.59
173	173.05	403.17
174	174.06	403.68
175	175.07	404.01
176	176.07	404.56
177	177.08	404.95
178	178.08	405.47

179	179.09	405.95
180	180.1	406.38
181	181.1	406.81
182	182.11	407.13
183	183.11	407.37
184	184.12	407.55
185	185.13	407.62
186	186.13	407.93
187	187.14	408.1
188	188.15	408.2
189	189.15	408.27
190	190.16	408.38
191	191.16	408.54
192	192.17	408.75
193	193.18	409.16
194	194.18	409.46
195	195.19	409.74
196	196.19	409.8
197	197.2	410.08
198	198.21	410.36
199	199.21	410.62
200	200.22	410.78
201	201.23	410.92
202	202.23	411.08
203	203.24	411.17
204	204.24	411.43
205	205.25	411.61
206	206.26	411.58
207	207.26	411.71
208	208.27	411.8
209	209.27	411.91
210	210.28	412.14
211	211.29	412.33
212	212.29	412.6
213	213.3	412.79
214	214.3	412.89
215	215.31	413.01
216	216.32	413.17
217	217.32	413.29
218	218.33	413.35
219	219.34	413.41
220	220.34	413.46
221	221.35	413.59
222	222.35	413.73
223	223.36	413.76
224	224.37	413.67
225	225.37	413.78
226	226.38	414.15
227	227.38	414.81
228	228.39	415.32
229	229.4	415.91
230	230.4	416.52
231	231.41	416.95

232	232.41	417.26
233	233.42	417.35
234	234.43	417.55
235	235.43	417.7
236	236.44	418.03
237	237.45	418.09
238	238.45	418.4
239	239.46	418.69
240	240.46	419.04
241	241.47	419.35
242	242.48	419.7
243	243.48	420.04
244	244.49	420.39
245	245.49	420.77
246	246.5	421.15
247	247.51	421.58
248	248.51	421.91
249	249.52	422.3
250	250.53	422.55
251	251.53	422.84
252	252.54	423.24
253	253.54	423.71
254	254.55	424.08
255	255.56	424.56
256	256.56	424.88
257	257.57	425.17
258	258.57	425.63
259	259.58	425.98
260	260.59	426.28
261	261.59	426.52
262	262.6	426.95
263	263.6	427.47
264	264.61	427.77
265	265.62	428.09
266	266.62	428.44
267	267.63	428.88
268	268.64	429.19
269	269.64	429.56
270	270.65	429.91
271	271.65	430.22
272	272.66	430.62
273	273.67	431.02
274	274.67	431.45
275	275.68	431.81
276	276.68	432.06
277	277.69	432.51
278	278.7	432.91
279	279.7	433.3
280	280.71	433.5
281	281.72	433.82
282	282.72	434.25
283	283.73	434.63
284	284.73	434.96

285	285.74	435.27
286	286.75	435.58
287	287.75	435.93
288	288.76	436.25
289	289.76	436.48
290	290.77	436.8
291	291.78	437.1
292	292.78	437.46
293	293.79	437.79
294	294.79	438.06
295	295.8	438.36
296	296.81	438.68
297	297.81	438.93
298	298.82	439.18
299	299.83	439.34
300	300.83	439.54
301	301.84	439.68
302	302.84	439.89
303	303.85	440.11
304	304.86	440.28
305	305.86	440.47
306	306.87	440.65
307	307.87	440.81
308	308.88	440.92
309	309.89	441.05
310	310.89	441.11
311	311.9	441.19
312	312.9	441.27
313	313.91	441.36
314	314.92	441.41
315	315.92	441.35
316	316.93	441.39
317	317.94	441.53
318	318.94	441.61
319	319.95	441.66
320	320.95	441.51
321	321.96	441.56
322	322.97	441.59
323	323.97	441.63
324	324.98	441.55
325	325.98	441.57
326	326.99	441.58
327	328.0	441.57
328	329.0	441.56
329	330.01	441.55
330	331.02	441.57
331	332.02	441.57
332	333.03	441.55
333	334.03	441.57
334	335.04	441.66
335	336.05	441.8
336	337.05	441.85
337	338.06	441.87

338	339.06	441.94
339	340.07	442.05
340	341.08	442.08
341	342.08	442.09
342	343.09	442.18
343	344.09	442.28
344	345.1	442.39
345	346.11	442.44
346	347.11	442.55
347	348.12	442.63
348	349.13	442.71
349	350.13	442.77
350	351.14	442.87
351	352.14	442.93
352	353.15	442.99
353	354.16	443.04
354	355.16	443.08
355	356.17	443.14
356	357.17	443.3
357	358.18	443.37
358	359.19	443.43
359	360.19	443.54
360	361.2	443.59
361	362.21	443.65
362	363.21	443.78
363	364.22	443.89
364	365.22	443.95
365	366.23	443.98
366	367.24	444.01
367	368.24	444.11
368	369.25	444.18
369	370.25	444.23
370	371.26	444.27
371	372.27	444.35
372	373.27	444.4
373	374.28	444.5
374	375.28	444.57
375	376.29	444.63
376	377.3	444.72
377	378.3	444.77
378	379.31	444.84
379	380.32	444.94
380	381.32	445.02
381	382.33	445.07
382	383.33	445.12
383	384.34	445.25
384	385.35	445.36
385	386.35	445.39
386	387.36	445.45
387	388.36	445.54
388	389.37	445.68
389	390.38	445.74
390	391.38	445.8

391	392.39	445.89
392	393.4	445.99
393	394.4	446.08
394	395.41	446.14
395	396.41	446.24
396	397.42	446.26
397	398.43	446.35
398	399.43	446.4
399	400.44	446.47
400	401.44	446.6
401	402.45	446.66
402	403.46	446.75
403	404.46	446.89
404	405.47	446.99
405	406.47	447.13
406	407.48	447.22
407	408.49	447.34
408	409.49	447.45
409	410.5	447.61
410	411.51	447.75
411	412.51	447.92
412	413.52	448.01
413	414.52	448.08
414	415.53	448.32
415	416.54	448.45
416	417.54	448.53
417	418.55	448.6
418	419.55	448.76
419	421.57	449.13
420	422.57	449.21
421	423.58	449.25
422	424.58	449.32
423	425.59	449.45
424	426.6	449.64
425	427.6	449.76
426	428.61	449.86
427	429.62	449.95
428	430.62	449.99
429	431.63	450.04
430	432.63	450.18
431	433.64	450.25
432	434.65	450.28
433	435.65	450.27
434	436.66	450.26
435	437.66	450.18
436	438.67	450.07
437	439.68	450.01
438	440.68	449.98
439	441.69	449.88
440	442.7	449.86
441	443.7	449.88
442	444.71	449.9
443	445.71	449.82

444	446.72	449.73
445	447.73	449.71
446	448.73	449.62
447	449.74	449.66
448	450.74	449.68
449	451.75	449.67
450	452.76	449.67
451	453.76	449.72
452	454.77	449.77
453	455.77	449.8
454	456.78	449.74
455	457.79	449.82
456	458.79	449.9
457	459.8	449.99
458	460.81	450.08
459	461.81	450.19
460	462.82	450.31
461	463.82	450.47
462	464.83	450.61
463	465.84	450.71
464	466.84	450.79
465	467.85	450.77
466	468.85	450.72
467	469.86	450.66
468	470.87	450.67
469	471.87	450.6
470	472.88	450.53
471	473.89	450.41
472	474.89	450.34
473	475.9	450.36
474	476.9	450.31
475	477.91	450.2
476	478.92	450.21
477	479.92	450.15
478	480.93	450.12
479	481.93	450.06
480	482.94	450.04
481	483.95	449.97
482	484.95	449.97
483	485.96	449.93
484	486.96	449.94
485	487.97	449.88
486	488.98	449.86
487	489.98	449.9
488	490.99	449.97
489	492.0	450.01
490	493.0	450.08
491	494.01	450.2
492	495.01	450.34
493	496.02	450.43
494	497.03	450.52
495	498.03	450.64
496	499.04	450.77

497	500.04	450.89
498	501.05	450.99
499	502.06	451.08
500	503.06	451.24
501	504.07	451.43
502	505.07	451.52
503	506.08	451.63
504	507.09	451.87
505	508.09	452.01
506	509.1	452.27
507	510.11	452.5
508	511.11	452.69
509	512.12	452.87
510	513.12	452.98
511	514.13	453.23
512	515.14	453.4
513	516.14	453.57
514	516.14	453.57

Vertici strato1

N	X (m)	y (m)
1	0.0	348.04
2	1.01	346.97
3	2.01	346.95
4	3.02	347.23
5	4.02	348.27
6	5.03	349.66
7	6.04	350.53
8	7.04	350.49
9	8.05	350.3
10	9.06	350.14
11	10.06	350.02
12	11.07	350.09
13	12.07	350.06
14	13.08	349.99
15	14.09	350.05
16	15.09	350.0
17	16.1	350.0
18	17.1	349.95
19	18.11	349.91
20	19.12	349.91
21	20.12	349.89
22	21.13	349.91
23	22.13	349.89
24	23.14	350.1
25	24.15	350.21
26	25.15	350.19
27	26.16	350.1
28	27.17	350.11
29	28.17	350.06
30	29.18	350.06
31	30.18	350.04
32	31.19	350.0

33	32.2	350.0
34	33.2	350.02
35	34.21	349.98
36	35.21	349.93
37	36.22	349.95
38	37.23	350.0
39	38.23	349.98
40	39.24	350.04
41	40.25	350.05
42	41.25	350.01
43	42.26	350.05
44	42.78	350.08
45	52.26	351.03
46	58.1	353.16
47	68.31	358.89
48	89.76	368.44
49	106.66	375.97
50	128.9	384.4
51	142.3	389.22
52	161.85	396.4
53	172.97	401.0
54	183.79	405.49
55	195.4	407.78
56	210.45	410.11
57	222.16	411.64
58	228.83	413.97
59	238.32	416.75
60	254.67	422.01
61	264.75	425.78
62	282.26	432.73
63	295.62	437.57
64	297.81	438.93
65	298.82	439.18
66	299.83	439.34
67	300.83	439.54
68	301.84	439.68
69	302.84	439.89
70	303.85	440.11
71	304.86	440.28
72	305.86	440.47
73	306.87	440.65
74	307.87	440.81
75	308.88	440.92
76	309.89	441.05
77	310.89	441.11
78	311.9	441.19
79	312.9	441.27
80	313.91	441.36
81	314.92	441.41
82	315.92	441.35
83	316.93	441.39
84	317.94	441.53
85	318.94	441.61

86	319.95	441.66
87	320.95	441.51
88	321.96	441.56
89	322.97	441.59
90	323.97	441.63
91	324.98	441.55
92	325.98	441.57
93	326.99	441.58
94	328.0	441.57
95	329.0	441.56
96	330.01	441.55
97	331.02	441.57
98	332.02	441.57
99	333.03	441.55
100	334.03	441.57
101	335.04	441.66
102	336.05	441.8
103	337.05	441.85
104	338.06	441.87
105	339.06	441.94
106	340.07	442.05
107	341.08	442.08
108	342.08	442.09
109	343.09	442.18
110	344.09	442.28
111	345.1	442.39
112	346.11	442.44
113	347.11	442.55
114	348.12	442.63
115	349.13	442.71
116	350.13	442.77
117	351.14	442.87
118	352.14	442.93
119	353.15	442.99
120	354.16	443.04
121	355.16	443.08
122	356.17	443.14
123	357.17	443.3
124	358.18	443.37
125	359.19	443.43
126	360.19	443.54
127	361.2	443.59
128	362.21	443.65
129	363.21	443.78
130	364.22	443.89
131	365.22	443.95
132	366.23	443.98
133	367.24	444.01
134	368.24	444.11
135	369.25	444.18
136	370.25	444.23
137	371.26	444.27
138	372.27	444.35

139	373.27	444.4
140	374.28	444.5
141	375.28	444.57
142	376.29	444.63
143	377.3	444.72
144	378.3	444.77
145	379.31	444.84
146	380.32	444.94
147	381.32	445.02
148	382.33	445.07
149	383.33	445.12
150	384.34	445.25
151	385.35	445.36
152	386.35	445.39
153	387.36	445.45
154	388.36	445.54
155	389.37	445.68
156	390.38	445.74
157	391.38	445.8
158	392.39	445.89
159	393.4	445.99
160	394.4	446.08
161	395.41	446.14
162	396.41	446.24
163	397.42	446.26
164	398.43	446.35
165	399.43	446.4
166	400.44	446.47
167	401.44	446.6
168	402.45	446.66
169	403.46	446.75
170	404.46	446.89
171	405.47	446.99
172	406.47	447.13
173	407.48	447.22
174	408.49	447.34
175	409.49	447.45
176	410.5	447.61
177	411.51	447.75
178	412.51	447.92
179	413.52	448.01
180	414.52	448.08
181	415.53	448.32
182	416.54	448.45
183	417.54	448.53
184	418.55	448.6
185	419.55	448.76
186	421.57	449.13
187	422.57	449.21
188	423.58	449.25
189	424.58	449.32
190	425.59	449.45
191	426.6	449.64

192	427.6	449.76
193	428.61	449.86
194	429.62	449.95
195	430.62	449.99
196	431.63	450.04
197	432.63	450.18
198	433.64	450.25
199	434.65	450.28
200	435.65	450.27
201	436.66	450.26
202	437.66	450.18
203	438.67	450.07
204	439.68	450.01
205	440.68	449.98
206	441.69	449.88
207	442.7	449.86
208	443.7	449.88
209	444.71	449.9
210	445.71	449.82
211	446.72	449.73
212	447.73	449.71
213	448.73	449.62
214	449.74	449.66
215	450.74	449.68
216	451.75	449.67
217	452.76	449.67
218	453.76	449.72
219	454.77	449.77
220	455.77	449.8
221	456.78	449.74
222	457.79	449.82
223	458.79	449.9
224	459.8	449.99
225	460.81	450.08
226	461.81	450.19
227	462.82	450.31
228	463.82	450.47
229	464.83	450.61
230	465.84	450.71
231	466.84	450.79
232	467.85	450.77
233	468.85	450.72
234	469.86	450.66
235	470.87	450.67
236	471.87	450.6
237	472.88	450.53
238	473.89	450.41
239	474.89	450.34
240	475.9	450.36
241	476.9	450.31
242	477.91	450.2
243	478.92	450.21
244	479.92	450.15

245	480.93	450.12
246	481.93	450.06
247	482.94	450.04
248	483.95	449.97
249	484.95	449.97
250	485.96	449.93
251	486.96	449.94
252	487.97	449.88
253	488.98	449.86
254	489.98	449.9
255	490.99	449.97
256	492.0	450.01
257	493.0	450.08
258	494.01	450.2
259	495.01	450.34
260	496.02	450.43
261	497.03	450.52
262	498.03	450.64
263	499.04	450.77
264	500.04	450.89
265	501.05	450.99
266	502.06	451.08
267	503.06	451.24
268	504.07	451.43
269	505.07	451.52
270	506.08	451.63
271	507.09	451.87
272	508.09	452.01
273	509.1	452.27
274	510.11	452.5
275	511.11	452.69
276	512.12	452.87
277	513.12	452.98
278	514.13	453.23
279	515.14	453.4
280	516.14	453.57
281	516.14	453.57

Vertici strato2

N	X (m)	y (m)
1	0.0	345.04
2	42.62	346.33
3	54.14	349.11
4	85.52	365.2
5	130.8	384.08
6	164.5	396.48
7	192.17	405.75
8	225.88	410.97
9	253.48	418.34
10	286.24	432.43
11	304.35	437.2
12	316.93	438.39
13	341.58	439.09

14	432.73	444.65
15	465.33	446.64
16	502.56	448.16
17	516.14	450.57

Coefficienti parziali azioni

Sfavorevoli: Permanenti, variabili	1.0	1.0
Favorevoli: Permanenti, variabili	1.0	1.0

Coefficienti parziali per i parametri geotecnici del terreno

Tangente angolo di resistenza al taglio	1.25
Coesione efficace	1.25
Coesione non drenata	1.4
Riduzione parametri geotecnici terreno	No

Stratigrafia

Strato	Coesione (kN/m ²)	Coesione non drenata (kN/m ²)	Angolo resistenza al taglio (°)	Peso unità di volume (kN/m ³)	Peso saturo (kN/m ³)	Litologia	
1	0	48	21	18.8	19.5	coltre	
2	0	168	27.8	21.08	22	UG1	
3	0	183	27	20.3	21.5	UG2	

Risultati analisi pendio [Utente]

Fs minimo individuato	0.94
Ascissa centro superficie	83.23 m
Ordinata centro superficie	576.46 m
Raggio superficie	201.76 m

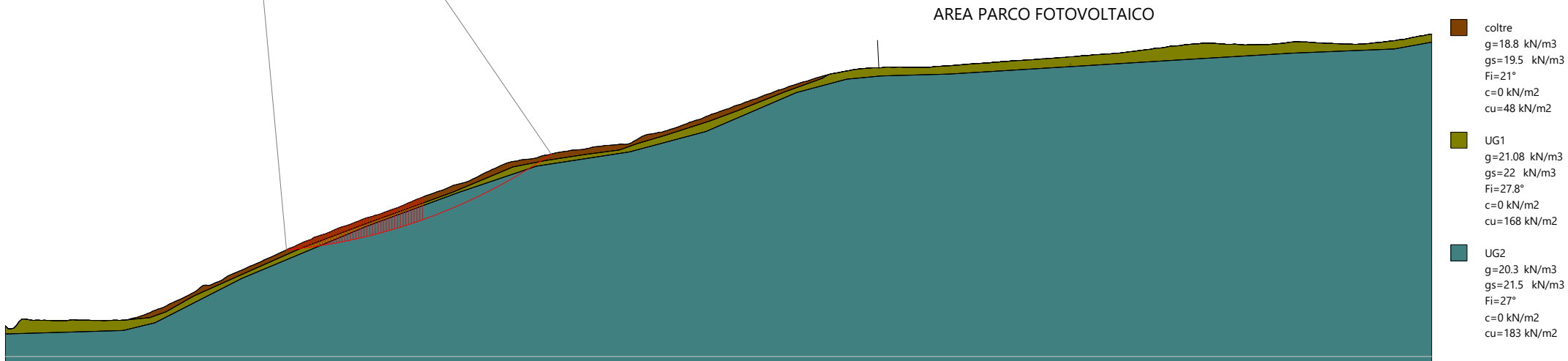
B: Larghezza del concio; Alfa: Angolo di inclinazione della base del concio; Li: Lunghezza della base del concio; Wi: Peso del concio ; Ui: Forze derivanti dalle pressioni neutre; Ni: forze agenti normalmente alla direzione di scivolamento; Ti: forze agenti parallelamente alla superficie di scivolamento; Fi: Angolo di attrito; c: coesione.

$$x_c = 83.227 \quad y_c = 576.457 \quad R_c = 201.758 \quad F_s = 0.938$$

Nr.	B m	Alfa (°)	Li m	Wi (kN)	Kh•Wi (kN)	Kv•Wi (kN)	c (kN/m ²)	Fi (°)	Ui (kN)	N'i (kN)	Ti (kN)
1	0.96	5.4	1.0	3.48	0.38	0.19	0.0	21.0	0.0	3.4	1.4
2	1.01	5.7	1.0	9.77	1.07	0.54	0.0	21.0	0.0	9.4	3.9
3	1.01	5.9	1.0	15.3	1.68	0.84	0.0	21.0	0.0	14.8	6.0
4	1.01	6.2	1.0	21.69	2.39	1.19	0.0	21.0	0.0	20.9	8.5
5	1.01	6.5	1.0	28.36	3.12	1.56	0.0	21.0	0.0	27.3	11.2

6	1.01	6.8	1.0	35.19	3.87	1.94	0.0	27.8	0.0	33.2	18.7
7	1.01	7.1	1.0	42.16	4.64	2.32	0.0	27.8	0.0	39.7	22.3
8	1.01	7.4	1.0	47.51	5.23	2.61	0.0	27.8	0.0	44.7	25.1
9	1.01	7.7	1.0	52.09	5.73	2.87	0.0	27.8	0.0	48.9	27.5
10	1.01	8.0	1.0	60.44	6.65	3.32	0.0	27.8	0.0	56.6	31.8
11	1.01	8.2	1.0	68.02	7.48	3.74	0.0	27.8	0.0	63.6	35.7
12	1.01	8.5	1.0	71.42	7.86	3.93	0.0	27.8	0.0	66.6	37.4
13	1.01	8.8	1.0	74.94	8.24	4.12	0.0	27.0	0.0	69.9	38.0
14	1.01	9.1	1.0	78.01	8.58	4.29	0.0	27.0	0.0	72.7	39.5
15	1.01	9.4	1.0	81.35	8.95	4.47	0.0	27.0	0.0	75.7	41.1
16	1.01	9.7	1.0	85.91	9.45	4.73	0.0	27.0	0.0	79.8	43.3
17	1.01	10.0	1.0	92.16	10.14	5.07	0.0	27.0	0.0	85.4	46.4
18	1.01	10.3	1.0	98.4	10.82	5.41	0.0	27.0	0.0	91.0	49.4
19	1.01	10.6	1.0	102.92	11.32	5.66	0.0	27.0	0.0	95.1	51.6
20	1.01	10.9	1.0	106.67	11.73	5.87	0.0	27.0	0.0	98.4	53.4
21	1.01	11.1	1.0	109.08	12.0	6.0	0.0	27.0	0.0	100.4	54.5
22	1.01	11.4	1.0	111.48	12.26	6.13	0.0	27.0	0.0	102.5	55.6
23	1.01	11.7	1.0	114.43	12.59	6.29	0.0	27.0	0.0	105.0	57.0
24	1.01	12.0	1.0	117.47	12.92	6.46	0.0	27.0	0.0	107.7	58.5
25	1.01	12.3	1.0	121.15	13.33	6.66	0.0	27.0	0.0	110.9	60.2
26	1.01	12.6	1.0	124.15	13.66	6.83	0.0	27.0	0.0	113.4	61.6
27	1.01	12.9	1.0	127.23	14.0	7.0	0.0	27.0	0.0	116.1	63.0
28	1.01	13.2	1.0	131.04	14.41	7.21	0.0	27.0	0.0	119.4	64.8
29	1.01	13.5	1.0	133.66	14.7	7.35	0.0	27.0	0.0	121.6	66.0
30	1.01	13.8	1.0	135.06	14.86	7.43	0.0	27.0	0.0	122.7	66.6
31	1.01	14.1	1.0	135.61	14.92	7.46	0.0	27.0	0.0	123.1	66.8
32	1.01	14.4	1.0	137.18	15.09	7.54	0.0	27.0	0.0	124.3	67.5
33	1.01	14.7	1.0	138.16	15.2	7.6	0.0	27.0	0.0	125.0	67.9
34	1.01	15.0	1.0	138.09	15.19	7.6	0.0	27.0	0.0	124.8	67.8
35	1.01	15.3	1.0	139.98	15.4	7.7	0.0	27.0	0.0	126.4	68.6
36	1.01	15.6	1.0	142.52	15.68	7.84	0.0	27.0	0.0	128.5	69.8
37	1.01	15.9	1.0	144.47	15.89	7.95	0.0	27.0	0.0	130.1	70.6
38	1.01	16.2	1.0	145.74	16.03	8.02	0.0	27.0	0.0	131.1	71.2
39	1.01	16.4	1.0	147.17	16.19	8.09	0.0	27.0	0.0	132.2	71.8
40	1.01	16.7	1.1	148.58	16.34	8.17	0.0	27.0	0.0	133.4	72.4
41	1.01	17.0	1.1	150.16	16.52	8.26	0.0	27.0	0.0	134.6	73.1
42	1.01	17.3	1.1	152.02	16.72	8.36	0.0	27.0	0.0	136.2	73.9
43	1.01	17.6	1.1	154.05	16.94	8.47	0.0	27.0	0.0	137.8	74.8
44	1.01	17.9	1.1	156.61	17.23	8.61	0.0	27.0	0.0	140.0	76.0
45	1.01	18.2	1.1	158.4	17.42	8.71	0.0	27.0	0.0	141.5	76.8
46	1.01	18.5	1.1	160.35	17.64	8.82	0.0	27.0	0.0	143.1	77.7
47	1.01	18.8	1.1	162.84	17.91	8.96	0.0	27.0	0.0	145.2	78.8
48	1.01	19.2	1.1	163.61	18.0	9.0	0.0	27.0	0.0	145.7	79.1
49	1.01	19.5	1.1	164.25	18.07	9.03	0.0	27.0	0.0	146.2	79.4
50	46.54	27.0	52.36857.54	754.33	377.16	0.0	27.0	0.0	6028.4	3273.2	

0.94		1.06	1.1	1.18	1.12	1.11	1.1	1.19	1.3	1.52	2.07	2.98	2.71	2.74
0.94	0.98	1.04	1.1	1.17	1.15	1.13	1.09	1.1	1.17	1.5	2.06	2.69	2.95	2.76
0.94	0.96	1.03	1.09	1.16	1.16	1.14	1.11	1.09	1.29	1.74	2.71	2.98	2.72	2.77
0.94	0.95	1.01	1.07	1.16	1.16	1.14	1.11	1.07	1.27	1.48	2.06	2.72	2.72	2.79
0.94	0.94	1	1.09	1.16	1.19	1.16	1.12	1.07	1.14	1.45	2.06	2.74	3.02	2.73
0.95	0.94	1	1.07	1.15	1.18	1.18	1.12	1.07	1.12	1.44	2.06	2.76	3.02	2.8
0.94	0.94	0.98	1.07	1.14	1.22	1.14	1.14	1.04	1.23	1.71	2.76	2.76	2.74	2.81
0.94	0.94	0.96	1.05	1.14	1.25	1.21	1.16	1.06	1.1	1.42	2.06	2.82	3.06	2.83
0.94	0.95	0.96	1.04	1.14	1.24	1.24	1.2	1.07	1.08	1.4	2.09	2.86	3.06	2.78
0.96	0.95	0.95	1.04	1.14	1.25	1.25	1.2	1.02	1.19	1.7	2.86	3.09	2.86	2.84
0.96	0.96	0.95	1.03	1.14	1.24	1.25	1.22	1.08	1.06	1.39	2.1	2.95	3.09	2.84
0.97	0.96	0.95	1.03	1.13	1.24	1.26	1.22	1.02	1.18	1.71	2.95	3.13	2.82	2.79
0.97	0.97	0.95	1.02	1.13	1.23	1.26	1.28	1.12	1.06	1.38	2.15	2.95	3.13	2.86
0.94	0.97	0.95	1	1.11	1.23	1.33	1.28	1.14	1.03	1.16	1.71	3.05	2.86	2.77
0.94	0.97	0.95	1	1.11	1.23	1.33	1.28	1.14	1.06	1.38	2.2	3.17	2.86	2.88
0.96	0.96	0.96	1	1.09	1.23	1.33	1.33	1.14	1.05	1.16	1.73	3.16	2.9	2.75



SEZIONE A-A' ANTE/POST OPERAM

2 Analisi di stabilità dei pendii con : BISHOP lungo la sezione B-B' Ante/post Operam

Calcolo eseguito secondo	Utente
Numero di strati	3.0
Numero dei conci	50.0
Grado di sicurezza ritenuto accettabile	1.1
Coefficiente parziale resistenza	1.0
Analisi	Condizione drenata
Superficie di forma circolare	

Maglia dei Centri

Ascissa vertice sinistro inferiore xi	-8.36 m
Ordinata vertice sinistro inferiore yi	471.38 m
Ascissa vertice destro superiore xs	258.1 m
Ordinata vertice destro superiore ys	544.78 m
Passo di ricerca	10.0
Numero di celle lungo x	10.0
Numero di celle lungo y	10.0

Sisma

Coefficiente azione sismica orizzontale	0.11
Coefficiente azione sismica verticale	0.055

Vertici profilo

Nr	X (m)	y (m)
1	0.0	411.46
2	1.01	411.85
3	2.02	412.16
4	3.03	412.45
5	4.05	412.9
6	5.06	413.23
7	6.07	413.52
8	7.08	414.22
9	8.09	415.13
10	9.1	415.82
11	10.11	416.21
12	11.13	416.51
13	12.14	416.82
14	13.15	417.04
15	14.16	417.33
16	15.17	417.55
17	16.18	417.73
18	17.2	418.0
19	18.21	418.23
20	19.22	418.71
21	20.23	419.11

22	21.24	419.34
23	22.25	419.58
24	23.26	419.97
25	24.28	420.18
26	25.29	420.45
27	26.3	420.92
28	27.31	421.27
29	28.32	421.71
30	29.33	422.02
31	30.34	422.32
32	31.36	422.65
33	32.37	423.02
34	33.38	423.26
35	34.39	423.74
36	35.4	424.09
37	36.41	424.44
38	37.42	424.85
39	38.44	425.25
40	39.45	425.51
41	40.46	426.01
42	41.47	426.3
43	42.48	426.69
44	43.49	427.02
45	44.5	427.31
46	45.52	427.65
47	46.53	428.01
48	47.54	428.48
49	48.55	428.74
50	49.56	428.99
51	50.57	429.33
52	51.59	429.61
53	52.6	429.84
54	53.61	430.13
55	54.62	430.19
56	55.63	430.51
57	56.64	430.85
58	57.65	431.23
59	58.67	431.65
60	59.68	431.99
61	60.69	432.22
62	61.7	432.74
63	62.71	432.9
64	63.72	433.18
65	64.73	433.45
66	65.75	433.64
67	66.76	433.9
68	67.77	434.03
69	68.78	434.19
70	69.79	434.43
71	70.8	434.63
72	71.81	434.93
73	72.83	435.18
74	73.84	435.45

75	74.85	435.59
76	75.86	435.68
77	76.87	435.55
78	77.88	435.55
79	78.9	435.68
80	79.91	435.94
81	80.92	436.01
82	81.93	436.14
83	82.94	436.26
84	83.95	436.38
85	84.96	436.48
86	85.98	436.58
87	86.99	436.59
88	88.0	436.56
89	89.01	436.57
90	90.02	436.6
91	91.03	436.81
92	92.04	436.95
93	93.06	437.01
94	94.07	436.97
95	95.08	437.0
96	96.09	436.96
97	97.1	436.96
98	98.11	437.12
99	99.12	437.14
100	100.14	437.15
101	101.15	437.24
102	102.16	437.3
103	103.17	437.39
104	104.18	437.43
105	105.19	437.66
106	106.21	437.97
107	107.22	438.05
108	108.23	438.08
109	109.24	438.32
110	110.25	438.45
111	111.26	438.6
112	112.27	438.89
113	113.29	439.05
114	114.3	439.16
115	115.31	439.38
116	116.32	439.57
117	117.33	439.74
118	118.34	440.03
119	119.35	440.18
120	120.37	440.34
121	121.38	440.48
122	122.39	440.69
123	123.4	440.98
124	124.41	441.25
125	125.42	441.61
126	126.43	441.67
127	127.45	442.0

128	128.46	442.27
129	129.47	442.43
130	130.48	442.66
131	131.49	443.0
132	132.5	443.15
133	133.52	443.26
134	134.53	443.54
135	135.54	443.66
136	136.55	443.8
137	137.56	443.92
138	138.57	444.04
139	139.58	444.11
140	140.6	444.24
141	141.61	444.32
142	142.62	444.19
143	143.63	444.26
144	144.64	444.28
145	145.65	444.23
146	146.66	444.24
147	147.68	444.37
148	148.69	444.46
149	149.7	444.52
150	150.71	444.55
151	151.72	444.58
152	152.73	444.63
153	153.74	444.66
154	154.76	444.69
155	155.77	444.88
156	156.78	444.88
157	157.79	444.95
158	158.8	444.94
159	159.81	444.98
160	160.82	445.05
161	161.84	445.08
162	162.85	445.23
163	163.86	445.29
164	164.87	445.26
165	165.88	445.35
166	166.89	445.37
167	167.91	445.44
168	168.92	445.5
169	169.93	445.66
170	170.94	445.7
171	171.95	445.8
172	172.96	445.9
173	173.97	446.01
174	174.99	446.0
175	176.0	446.05
176	177.01	446.12
177	178.02	446.18
178	179.03	446.28
179	180.04	446.29
180	181.05	446.36

181	182.07	446.4
182	183.08	446.49
183	184.09	446.59
184	185.1	446.63
185	186.11	446.68
186	187.12	446.82
187	188.13	446.93
188	189.15	447.03
189	190.16	447.2
190	191.17	447.45
191	192.18	447.54
192	193.19	447.68
193	194.2	447.95
194	195.22	448.19
195	196.23	448.33
196	197.24	448.57
197	198.25	448.79
198	199.26	449.04
199	200.27	449.22
200	201.28	449.44
201	202.3	449.62
202	203.31	449.81
203	204.32	449.91
204	205.33	450.16
205	206.34	450.32
206	207.35	450.52
207	208.36	450.63
208	209.38	450.77
209	210.39	450.85
210	211.4	450.9
211	212.41	451.0
212	213.42	451.13
213	214.43	451.15
214	215.44	451.19
215	216.46	451.21
216	217.47	451.23
217	218.48	451.32
218	219.49	451.41
219	220.5	451.44
220	221.51	451.41
221	222.52	451.44
222	223.54	451.47
223	224.55	451.54
224	225.56	451.52
225	226.57	451.59
226	227.58	451.66
227	228.59	451.66
228	229.61	451.71
229	230.62	451.8
230	231.63	451.84
231	232.64	451.88
232	233.65	451.93
233	234.66	452.03

234	235.67	452.05
235	236.69	452.11
236	237.7	452.31
237	238.71	452.4
238	239.72	452.53
239	240.73	452.67
240	241.74	452.86
241	242.75	453.01
242	243.77	453.19
243	244.78	453.39
244	245.79	453.58
245	246.8	453.89
246	247.81	454.19
247	248.82	454.4
248	249.83	454.53
249	250.85	454.74
250	251.86	454.95
251	252.87	455.11
252	253.88	455.27
253	254.89	455.5
254	255.9	455.79
255	256.92	455.84
256	257.93	455.89
257	258.94	456.0
258	259.95	456.04
259	260.96	456.09
260	261.97	456.24
261	262.98	456.39
262	264.0	456.47
263	265.01	456.49
264	266.02	456.58
265	267.03	456.66
266	268.04	456.61
267	269.05	456.62
268	270.06	456.78
269	271.08	456.76
270	272.09	456.84
271	273.1	456.9
272	274.11	456.97
273	275.12	457.03
274	275.12	457.03

Vertici strato1

N	X (m)	y (m)
1	0.0	411.46
2	7.59	412.8
3	18.87	415.9
4	23.77	418.08
5	41.02	424.35
6	52.0	429.7
7	52.6	429.84
8	53.61	430.13
9	54.62	430.19

10	55.63	430.51
11	56.64	430.85
12	57.65	431.23
13	58.67	431.65
14	59.68	431.99
15	60.69	432.22
16	61.7	432.74
17	62.71	432.9
18	63.72	433.18
19	64.73	433.45
20	65.75	433.64
21	66.76	433.9
22	67.77	434.03
23	68.78	434.19
24	69.79	434.43
25	70.8	434.63
26	71.81	434.93
27	72.83	435.18
28	73.84	435.45
29	74.85	435.59
30	75.86	435.68
31	76.87	435.55
32	77.88	435.55
33	78.9	435.68
34	79.91	435.94
35	80.92	436.01
36	81.93	436.14
37	82.94	436.26
38	83.95	436.38
39	84.96	436.48
40	85.98	436.58
41	86.99	436.59
42	88.0	436.56
43	89.01	436.57
44	90.02	436.6
45	91.03	436.81
46	92.04	436.95
47	93.06	437.01
48	94.07	436.97
49	95.08	437.0
50	96.09	436.96
51	97.1	436.96
52	98.11	437.12
53	99.12	437.14
54	100.14	437.15
55	101.15	437.24
56	102.16	437.3
57	103.17	437.39
58	104.18	437.43
59	105.19	437.66
60	106.21	437.97
61	107.22	438.05
62	108.23	438.08

63	109.24	438.32
64	110.25	438.45
65	111.26	438.6
66	112.27	438.89
67	113.29	439.05
68	114.3	439.16
69	115.31	439.38
70	116.32	439.57
71	117.33	439.74
72	118.34	440.03
73	119.35	440.18
74	120.37	440.34
75	121.38	440.48
76	122.39	440.69
77	123.4	440.98
78	124.41	441.25
79	125.42	441.61
80	126.43	441.67
81	127.45	442.0
82	128.46	442.27
83	129.47	442.43
84	130.48	442.66
85	131.49	443.0
86	132.5	443.15
87	133.52	443.26
88	134.53	443.54
89	135.54	443.66
90	136.55	443.8
91	137.56	443.92
92	138.57	444.04
93	139.58	444.11
94	140.6	444.24
95	141.61	444.32
96	142.62	444.19
97	143.63	444.26
98	144.64	444.28
99	145.65	444.23
100	146.66	444.24
101	147.68	444.37
102	148.69	444.46
103	149.7	444.52
104	150.71	444.55
105	151.72	444.58
106	152.73	444.63
107	153.74	444.66
108	154.76	444.69
109	155.77	444.88
110	156.78	444.88
111	157.79	444.95
112	158.8	444.94
113	159.81	444.98
114	160.82	445.05
115	161.84	445.08

116	162.85	445.23
117	163.86	445.29
118	164.87	445.26
119	165.88	445.35
120	166.89	445.37
121	167.91	445.44
122	168.92	445.5
123	169.93	445.66
124	170.94	445.7
125	171.95	445.8
126	172.96	445.9
127	173.97	446.01
128	174.99	446.0
129	176.0	446.05
130	177.01	446.12
131	178.02	446.18
132	179.03	446.28
133	180.04	446.29
134	181.05	446.36
135	182.07	446.4
136	183.08	446.49
137	184.09	446.59
138	185.1	446.63
139	186.11	446.68
140	187.12	446.82
141	188.13	446.93
142	189.15	447.03
143	190.16	447.2
144	191.17	447.45
145	192.18	447.54
146	193.19	447.68
147	194.2	447.95
148	195.22	448.19
149	196.23	448.33
150	197.24	448.57
151	198.25	448.79
152	199.26	449.04
153	200.27	449.22
154	201.28	449.44
155	202.3	449.62
156	203.31	449.81
157	204.32	449.91
158	205.33	450.16
159	206.34	450.32
160	207.35	450.52
161	208.36	450.63
162	209.38	450.77
163	210.39	450.85
164	211.4	450.9
165	212.41	451.0
166	213.42	451.13
167	214.43	451.15
168	215.44	451.19

169	216.46	451.21
170	217.47	451.23
171	218.48	451.32
172	219.49	451.41
173	220.5	451.44
174	221.51	451.41
175	222.52	451.44
176	223.54	451.47
177	224.55	451.54
178	225.56	451.52
179	226.57	451.59
180	227.58	451.66
181	228.59	451.66
182	229.61	451.71
183	230.62	451.8
184	231.63	451.84
185	232.64	451.88
186	233.65	451.93
187	234.66	452.03
188	235.67	452.05
189	236.69	452.11
190	237.7	452.31
191	238.71	452.4
192	239.72	452.53
193	240.73	452.67
194	241.74	452.86
195	242.75	453.01
196	243.77	453.19
197	244.78	453.39
198	245.79	453.58
199	246.8	453.89
200	247.81	454.19
201	248.82	454.4
202	249.83	454.53
203	250.85	454.74
204	251.86	454.95
205	252.87	455.11
206	253.88	455.27
207	254.89	455.5
208	255.9	455.79
209	256.92	455.84
210	257.93	455.89
211	258.94	456.0
212	259.95	456.04
213	260.96	456.09
214	261.97	456.24
215	262.98	456.39
216	264.0	456.47
217	265.01	456.49
218	266.02	456.58
219	267.03	456.66
220	268.04	456.61
221	269.05	456.62

222	270.06	456.78
223	271.08	456.76
224	272.09	456.84
225	273.1	456.9
226	274.11	456.97
227	275.12	457.03
228	275.12	457.03

Vertici strato2

N	X (m)	y (m)
1	0.0	407.46
2	14.67	413.44
3	28.32	417.71
4	44.5	423.31
5	61.19	428.48
6	74.34	431.52
7	100.64	433.2
8	121.88	436.59
9	152.73	440.63
10	183.08	442.49
11	215.44	447.19
12	232.64	447.88
13	258.94	452.0
14	275.12	453.03

Coefficienti parziali azioni

Sfavorevoli: Permanenti, variabili	1.0	1.0
Favorevoli: Permanenti, variabili	1.0	1.0

Coefficienti parziali per i parametri geotecnici del terreno

Tangente angolo di resistenza al taglio	1.25
Coesione efficace	1.25
Coesione non drenata	1.4
Riduzione parametri geotecnici terreno	No

Stratigrafia

Strato	Coesione (kN/m ²)	Coesione non drenata (kN/m ²)	Angolo resistenza al taglio (°)	Peso unità di volume (kN/m ³)	Peso saturo (kN/m ³)	Litologia	
1	0	48	21	18.8	19.5	coltre	
2	0	168	27.8	21.08	22	UG1	
3	0	183	27	20.3	21.5	ug2	

Risultati analisi pendio [Utente]

Fs minimo individuato	0.75
Ascissa centro superficie	18.29 m

Ordinata centro superficie
Raggio superficie

471.38 m
50.61 m

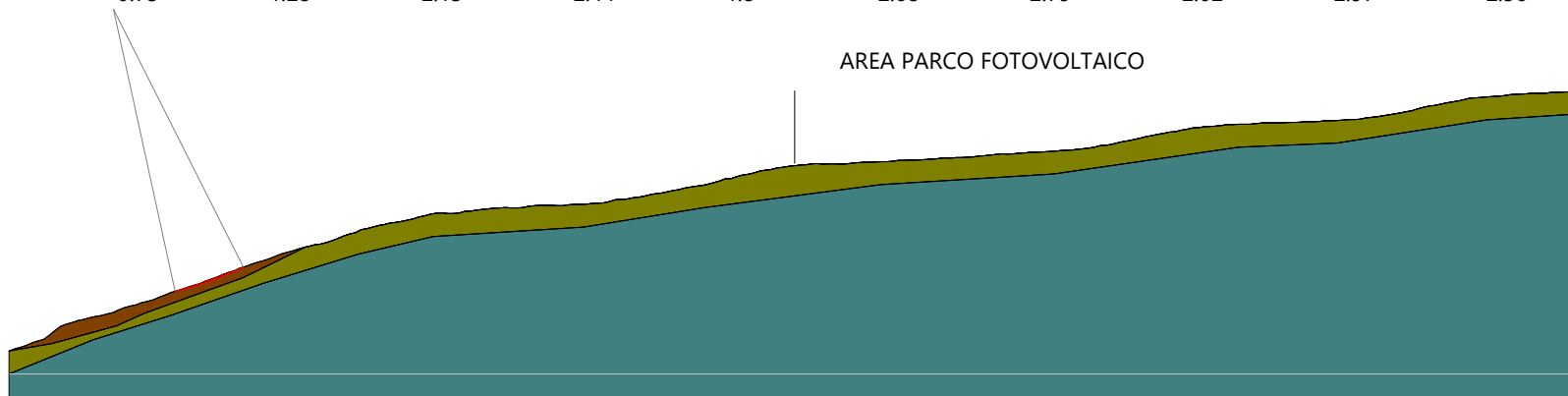
B: Larghezza del concio; Alfa: Angolo di inclinazione della base del concio; Li: Lunghezza della base del concio; Wi: Peso del concio ; Ui: Forze derivanti dalle pressioni neutre; Ni: forze agenti normalmente alla direzione di scivolamento; Ti: forze agenti parallelamente alla superficie di scivolamento; Fi: Angolo di attrito; c: coesione.

$x_c = 18.288$ $y_c = 471.385$ $R_c = 50.607$ $F_s = 0.749$

Nr.	B m	Alfa (°)	Li m	Wi (kN)	Kh•Wi (kN)	Kv•Wi (kN)	c (kN/m ²)	Fi (°)	Ui (kN)	N'i (kN)	Ti (kN)
1	0.26	12.4	0.3	0.06	0.01	0.0	0.0	21.0	0.0	0.1	0.0
2	0.22	12.7	0.2	0.12	0.01	0.01	0.0	21.0	0.0	0.1	0.1
3	0.24	13.0	0.2	0.21	0.02	0.01	0.0	21.0	0.0	0.2	0.1
4	0.24	13.3	0.2	0.27	0.03	0.02	0.0	21.0	0.0	0.3	0.1
5	0.32	13.6	0.3	0.46	0.05	0.03	0.0	21.0	0.0	0.4	0.2
6	0.16	13.8	0.2	0.28	0.03	0.02	0.0	21.0	0.0	0.3	0.1
7	0.24	14.1	0.2	0.48	0.05	0.03	0.0	21.0	0.0	0.4	0.2
8	0.24	14.4	0.2	0.56	0.06	0.03	0.0	21.0	0.0	0.5	0.3
9	0.24	14.7	0.2	0.63	0.07	0.03	0.0	21.0	0.0	0.6	0.3
10	0.13	14.9	0.1	0.38	0.04	0.02	0.0	21.0	0.0	0.3	0.2
11	0.35	15.2	0.4	1.12	0.12	0.06	0.0	21.0	0.0	1.0	0.5
12	0.24	15.5	0.2	0.9	0.1	0.05	0.0	21.0	0.0	0.8	0.4
13	0.24	15.8	0.2	0.99	0.11	0.05	0.0	21.0	0.0	0.9	0.5
14	0.19	16.0	0.2	0.84	0.09	0.05	0.0	21.0	0.0	0.8	0.4
15	0.29	16.3	0.3	1.29	0.14	0.07	0.0	21.0	0.0	1.2	0.6
16	0.24	16.6	0.2	0.99	0.11	0.05	0.0	21.0	0.0	0.9	0.5
17	0.24	16.9	0.2	0.92	0.1	0.05	0.0	21.0	0.0	0.8	0.4
18	0.24	17.2	0.3	0.86	0.1	0.05	0.0	21.0	0.0	0.8	0.4
19	0.23	17.5	0.2	0.88	0.1	0.05	0.0	21.0	0.0	0.8	0.4
20	0.24	17.8	0.3	1.06	0.12	0.06	0.0	21.0	0.0	1.0	0.5
21	0.24	18.1	0.3	1.22	0.13	0.07	0.0	21.0	0.0	1.1	0.6
22	0.3	18.4	0.3	1.75	0.19	0.1	0.0	21.0	0.0	1.6	0.8
23	0.18	18.7	0.2	1.12	0.12	0.06	0.0	21.0	0.0	1.0	0.5
24	0.24	18.9	0.3	1.5	0.17	0.08	0.0	21.0	0.0	1.4	0.7
25	0.24	19.2	0.3	1.5	0.17	0.08	0.0	21.0	0.0	1.4	0.7
26	0.35	19.6	0.4	2.22	0.24	0.12	0.0	21.0	0.0	2.0	1.0
27	0.12	19.8	0.1	0.77	0.08	0.04	0.0	21.0	0.0	0.7	0.4
28	0.24	20.1	0.3	1.47	0.16	0.08	0.0	21.0	0.0	1.3	0.7
29	0.24	20.3	0.3	1.45	0.16	0.08	0.0	21.0	0.0	1.3	0.7
30	0.24	20.7	0.3	1.42	0.16	0.08	0.0	21.0	0.0	1.3	0.6
31	0.17	20.9	0.2	0.99	0.11	0.05	0.0	21.0	0.0	0.9	0.5
32	0.31	21.2	0.3	1.78	0.2	0.1	0.0	21.0	0.0	1.6	0.8
33	0.24	21.5	0.3	1.4	0.15	0.08	0.0	21.0	0.0	1.3	0.6
34	0.24	21.8	0.3	1.41	0.16	0.08	0.0	21.0	0.0	1.3	0.6
35	0.23	22.1	0.2	1.34	0.15	0.07	0.0	21.0	0.0	1.2	0.6
36	0.25	22.4	0.3	1.48	0.16	0.08	0.0	21.0	0.0	1.3	0.7
37	0.24	22.7	0.3	1.38	0.15	0.08	0.0	21.0	0.0	1.2	0.6
38	0.24	23.0	0.3	1.36	0.15	0.07	0.0	21.0	0.0	1.2	0.6

39	0.28	23.3	0.3	1.56	0.17	0.09	0.0	21.0	0.0	1.4	0.7
40	0.2	23.6	0.2	1.0	0.11	0.05	0.0	21.0	0.0	0.9	0.5
41	0.24	23.8	0.3	1.04	0.11	0.06	0.0	21.0	0.0	0.9	0.5
42	0.24	24.1	0.3	0.84	0.09	0.05	0.0	21.0	0.0	0.7	0.4
43	0.34	24.5	0.4	0.83	0.09	0.05	0.0	21.0	0.0	0.7	0.4
44	0.14	24.8	0.2	0.26	0.03	0.01	0.0	21.0	0.0	0.2	0.1
45	0.24	25.1	0.3	0.47	0.05	0.03	0.0	21.0	0.0	0.4	0.2
46	0.24	25.3	0.3	0.49	0.05	0.03	0.0	21.0	0.0	0.4	0.2
47	0.24	25.6	0.3	0.51	0.06	0.03	0.0	21.0	0.0	0.5	0.2
48	0.15	25.9	0.2	0.34	0.04	0.02	0.0	21.0	0.0	0.3	0.2
49	0.32	26.2	0.4	0.51	0.06	0.03	0.0	21.0	0.0	0.5	0.2
50	0.24	26.6	0.3	0.12	0.01	0.01	0.0	21.0	0.0	0.1	0.1

	1.17		1.34		1.64		1.57		2.27		2.46		2.27		2.03		2.73		
	1.14	1.27	1.34	1.73	1.64	2.05	2.19	1.6	2.07	2.12	2.18	1.66	2.38	2.03	2.11	2.46			
	1.11	1.28	1.34	1.43	1.68	2.01	1.8	1.6	2.06	2.13	2.19	2.56	2.2	1.99	2.43				
	1.08	1.25	1.35	1.44	1.67	2.09	1.93	1.61	2.05	2.05	2.19	1.7	2.12	1.89	2.38	1.89			
	1.05	1.22	1.34	1.45	1.67	2.05	1.93	1.62	2.05	1.95	2.19	1.71	2.21	2.21	2.38	2.42	1.89		
0.96	1.05	1.19	1.34	1.47	1.97	2.05	2.03	1.63	2.06	1.96	2.28	1.7	2.3	2.21	2.31	2.41	2.21		
0.78	1	1.15	1.42	1.47	1.99	2.08	2.08	1.77	2.08	2	2.18	1.69	2.32	1.92	1.84	2.37			
	0.93	1.13	1.36	1.5	1.76	2.13	2.16	1.77	2.07	2	2.04	1.69	2.38	1.92	1.81	2.37	2.36		
	0.8	1.08	1.36	1.51	1.83	2.19	2.19	1.95	1.96	1.96	1.7	2.68	2.42	2.08	1.97	2.28	2.44	1.86	
0.8	0.76	1.08	1.33	1.51	1.9	2.19	2.19	1.51	1.78	2.25	1.7	2.2	2.42	1.63	1.97	2	2.44	1.66	
0.81	0.75	0.91	1.29	1.54	1.98	2.2	2.24	1.69	1.98	2	1.73	2.43	2.52	1.93	1.91	2.58	2.58	1.88	2.59
	0.75	1.17	1.29	1.54	1.98	2.2	2.29	1.69	1.83	2	1.8	2.43	2.63	1.93	1.91	2.58	2.73	1.88	
	0.75	1.17	1.28	1.51	2.13	2.35	2.44	1.68	1.8	2.1	2.68	2.82	2.79	2.18	2.02	2.36	2.97	1.57	2.56



SEZIONE B-B' ANTE/POST OPERAM

- coltre
 g=18.8 kN/m3
 gs=19.5 kN/m3
 Fi=21°
 c=0 kN/m2
 cu=48 kN/m2
- UG1
 g=21.08 kN/m3
 gs=22 kN/m3
 Fi=27.8°
 c=0 kN/m2
 cu=168 kN/m2
- ug2
 g=20.3 kN/m3
 gs=21.5 kN/m3
 Fi=27°
 c=0 kN/m2
 cu=183 kN/m2

3 Analisi di stabilità dei pendii con : BISHOP lungo la sezione C-C' Ante/post Operam

Calcolo eseguito secondo	Utente
Numero di strati	3.0
Numero dei conci	50.0
Grado di sicurezza ritenuto accettabile	1.1
Coefficiente parziale resistenza	1.0
Analisi	Condizione drenata
Superficie di forma circolare	

Maglia dei Centri

Ascissa vertice sinistro inferiore xi	10.14 m
Ordinata vertice sinistro inferiore yi	528.49 m
Ascissa vertice destro superiore xs	144.82 m
Ordinata vertice destro superiore ys	567.12 m
Passo di ricerca	10.0
Numero di celle lungo x	10.0
Numero di celle lungo y	10.0

Sisma

Coefficiente azione sismica orizzontale	0.07
Coefficiente azione sismica verticale	0.04

Vertici profilo

Nr	X (m)	y (m)
1	0.0	505.62
2	1.04	505.6
3	2.09	505.4
4	3.13	505.44
5	4.17	505.26
6	5.22	505.07
7	6.26	505.02
8	7.3	505.09
9	8.35	505.13
10	9.39	504.84
11	10.43	504.9
12	11.48	504.66
13	12.52	504.65
14	13.56	504.34
15	14.61	504.57
16	15.65	504.33
17	16.69	504.14
18	17.74	504.24
19	18.78	504.32
20	19.82	504.4
21	20.87	504.39

22	21.91	504.64
23	22.96	504.78
24	24.0	504.63
25	25.04	504.88
26	26.09	504.91
27	27.13	505.0
28	28.17	505.13
29	29.22	505.2
30	30.26	505.33
31	31.3	505.47
32	32.35	505.47
33	33.39	505.71
34	34.43	505.77
35	35.48	505.79
36	36.52	505.83
37	37.56	505.95
38	38.61	506.11
39	39.65	506.09
40	40.69	506.22
41	41.74	506.25
42	42.78	506.35
43	43.82	506.33
44	44.87	506.32
45	45.91	506.45
46	46.95	506.41
47	48.0	506.51
48	49.04	506.63
49	50.08	506.73
50	51.13	506.68
51	52.17	506.63
52	53.21	506.6
53	54.26	506.35
54	55.3	506.45
55	56.34	506.38
56	57.39	506.15
57	58.43	505.92
58	59.47	506.14
59	60.52	506.47
60	61.56	506.74
61	62.61	507.04
62	63.65	507.04
63	64.69	507.15
64	65.74	507.36
65	66.78	507.39
66	67.82	507.34
67	68.87	507.56
68	69.91	507.53
69	70.95	507.71
70	72.0	507.76
71	73.04	507.83
72	74.08	508.03
73	75.13	507.97
74	76.17	508.0

75	77.21	508.18
76	78.26	508.24
77	79.3	508.22
78	80.34	508.31
79	81.39	508.46
80	82.43	508.52
81	83.47	508.53
82	84.52	508.43
83	85.56	508.52
84	86.6	508.49
85	87.65	508.6
86	88.69	508.47
87	89.73	508.75
88	90.78	508.84
89	91.82	508.86
90	92.86	508.74
91	93.91	508.97
92	94.95	508.88
93	95.99	509.06
94	97.04	509.23
95	98.08	509.05
96	99.12	509.32
97	100.17	509.21
98	101.21	509.14
99	102.25	509.36
100	103.3	509.25
101	104.34	509.4
102	105.39	509.28
103	106.43	509.38
104	107.47	509.28
105	108.52	509.3
106	109.56	509.46
107	110.6	509.41
108	111.65	509.45
109	112.69	509.39
110	113.73	509.35
111	114.78	509.31
112	115.82	509.41
113	116.86	509.47
114	117.91	509.58
115	118.95	509.55
116	119.99	509.52
117	121.04	509.3
118	122.08	509.31
119	123.12	509.49
120	124.17	509.55
121	125.21	509.32
122	126.25	509.44
123	127.3	509.41
124	128.34	509.33
125	129.38	509.56
126	130.43	509.58
127	131.47	509.61

128	132.51	509.68
129	133.56	509.72
130	134.6	509.75
131	135.64	509.68
132	136.69	509.92
133	137.73	509.79
134	138.77	509.75
135	139.82	509.7
136	140.86	509.62
137	141.9	509.66
138	142.95	509.79
139	143.99	509.77
140	145.03	509.63
141	146.08	509.69
142	147.12	509.67
143	148.17	509.75
144	149.21	509.63
145	150.25	509.71
146	151.3	509.75
147	152.34	509.79
148	153.38	509.74
149	154.43	509.76
150	155.47	509.92
151	155.47	509.92

Vertici strato1

N	X (m)	y (m)
1	0.0	503.74
2	9.62	503.13
3	16.59	502.71
4	32.35	503.47
5	37.5	504.19
6	48.87	504.54
7	57.03	504.79
8	59.33	505.08
9	61.04	506.61
10	61.56	506.74
11	62.61	507.04
12	63.65	507.04
13	64.69	507.15
14	65.74	507.36
15	66.78	507.39
16	67.82	507.34
17	68.87	507.56
18	69.91	507.53
19	70.95	507.71
20	72.0	507.76
21	73.04	507.83
22	74.08	508.03
23	75.13	507.97
24	76.17	508.0
25	77.21	508.18
26	78.26	508.24

27	79.3	508.22
28	80.34	508.31
29	81.39	508.46
30	82.43	508.52
31	83.47	508.53
32	84.52	508.43
33	85.56	508.52
34	86.6	508.49
35	87.65	508.6
36	88.69	508.47
37	89.73	508.75
38	90.78	508.84
39	91.82	508.86
40	92.86	508.74
41	93.91	508.97
42	94.95	508.88
43	95.99	509.06
44	97.04	509.23
45	98.08	509.05
46	99.12	509.32
47	100.17	509.21
48	101.21	509.14
49	102.25	509.36
50	103.3	509.25
51	104.34	509.4
52	105.39	509.28
53	106.43	509.38
54	107.47	509.28
55	108.52	509.3
56	109.56	509.46
57	110.6	509.41
58	111.65	509.45
59	112.69	509.39
60	113.73	509.35
61	114.78	509.31
62	115.82	509.41
63	116.86	509.47
64	117.91	509.58
65	118.95	509.55
66	119.99	509.52
67	121.04	509.3
68	122.08	509.31
69	123.12	509.49
70	124.17	509.55
71	125.21	509.32
72	126.25	509.44
73	127.3	509.41
74	128.34	509.33
75	129.38	509.56
76	130.43	509.58
77	131.47	509.61
78	132.51	509.68
79	133.56	509.72

80	134.6	509.75
81	135.64	509.68
82	136.69	509.92
83	137.73	509.79
84	138.77	509.75
85	139.82	509.7
86	140.86	509.62
87	141.9	509.66
88	142.95	509.79
89	143.99	509.77
90	145.03	509.63
91	146.08	509.69
92	147.12	509.67
93	148.17	509.75
94	149.21	509.63
95	150.25	509.71
96	151.3	509.75
97	152.34	509.79
98	153.38	509.74
99	154.43	509.76
100	155.47	509.92
101	155.47	509.92

Vertici strato2

N	X (m)	y (m)
1	0.0	500.92
2	49.56	502.0
3	59.47	501.46
4	86.6	503.81
5	128.34	504.65
6	155.47	505.24

Coefficienti parziali azioni

Sfavorevoli: Permanenti, variabili	1.0	1.0
Favorevoli: Permanenti, variabili	1.0	1.0

Coefficienti parziali per i parametri geotecnici del terreno

Tangente angolo di resistenza al taglio	1.25
Coesione efficace	1.25
Coesione non drenata	1.4
Riduzione parametri geotecnici terreno	No

Stratigrafia

Strato	Coesione (kN/m ²)	Coesione non drenata (kN/m ²)	Angolo resistenza al taglio (°)	Peso unità di volume (kN/m ³)	Peso saturo (kN/m ³)	Litologia	
1	0	48	21	18.8	19.5	coltre	
2	0	168	27.8	21.08	22	UG1	

3	0	183	27	20.3	21.5	UG2
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Risultati analisi pendio [Utente]

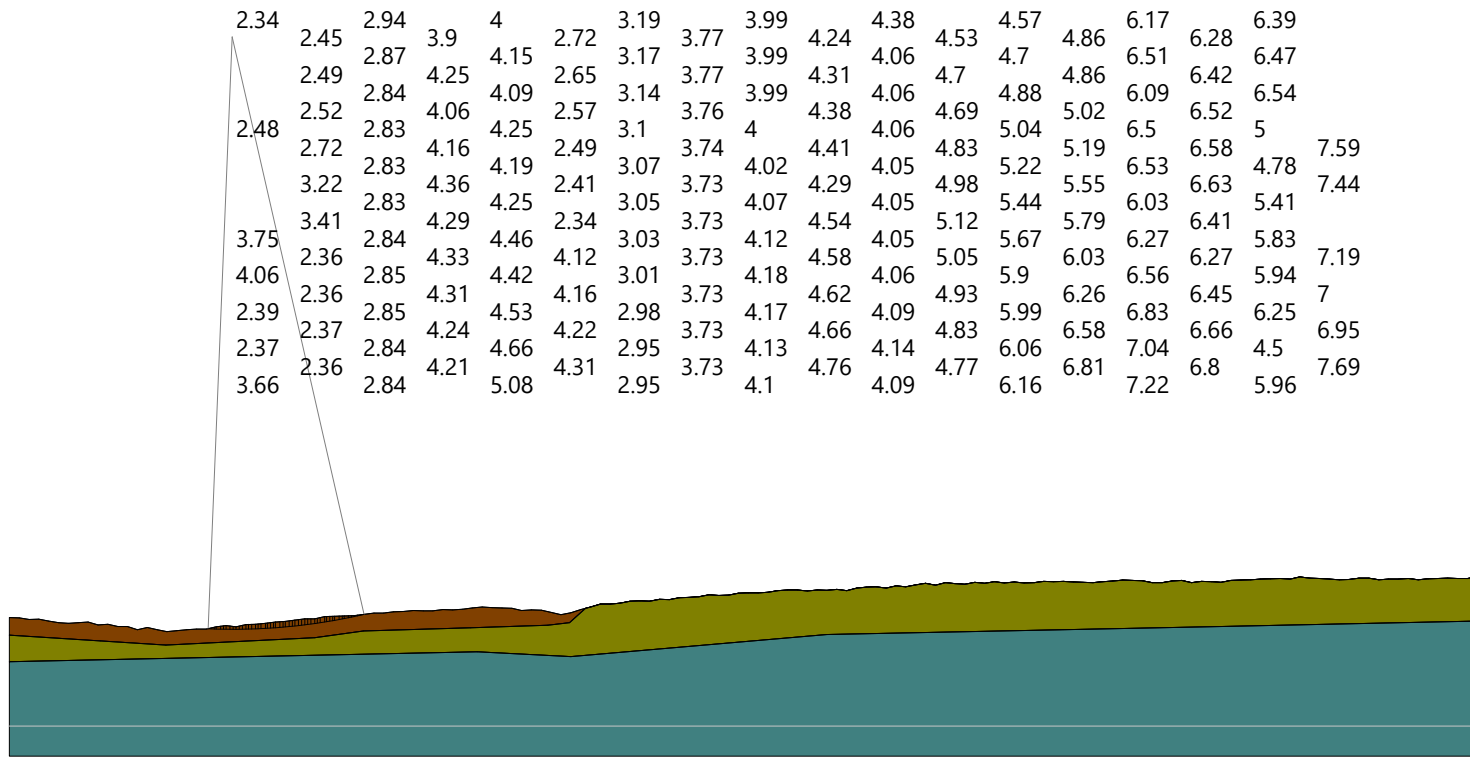
Fs minimo individuato	2.34
Ascissa centro superficie	23.6 m
Ordinata centro superficie	567.12 m
Raggio superficie	62.74 m

B: Larghezza del concio; Alfa: Angolo di inclinazione della base del concio; Li: Lunghezza della base del concio; Wi: Peso del concio ; Ui: Forze derivanti dalle pressioni neutre; Ni: forze agenti normalmente alla direzione di scivolamento; Ti: forze agenti parallelamente alla superficie di scivolamento; Fi: Angolo di attrito; c: coesione.

$x_c = 23.605$ $y_c = 567.117$ $R_c = 62.739$ $F_s = 2.342$

Nr.	B m	Alfa (°)	Li m	Wi (kN)	Kh•Wi (kN)	Kv•Wi (kN)	c (kN/m2)	Fi (°)	Ui (kN)	N'i (kN)	Ti (kN)
1	0.33	-2.2	0.3	0.29	0.02	0.01	0.0	21.0	0.0	0.3	0.0
2	0.33	-1.9	0.3	0.87	0.06	0.03	0.0	21.0	0.0	0.9	0.1
3	0.21	-1.6	0.2	0.84	0.06	0.03	0.0	21.0	0.0	0.8	0.1
4	0.45	-1.3	0.5	2.36	0.16	0.09	0.0	21.0	0.0	2.4	0.4
5	0.33	-1.0	0.3	2.09	0.15	0.08	0.0	21.0	0.0	2.1	0.3
6	0.26	-0.7	0.3	1.87	0.13	0.07	0.0	21.0	0.0	1.9	0.3
7	0.4	-0.4	0.4	2.79	0.2	0.11	0.0	21.0	0.0	2.8	0.5
8	0.33	0.0	0.3	1.99	0.14	0.08	0.0	21.0	0.0	2.0	0.3
9	0.31	0.2	0.3	1.61	0.11	0.06	0.0	21.0	0.0	1.6	0.3
10	0.35	0.5	0.3	1.89	0.13	0.08	0.0	21.0	0.0	1.9	0.3
11	0.33	0.8	0.3	2.29	0.16	0.09	0.0	21.0	0.0	2.3	0.4
12	0.37	1.1	0.4	3.08	0.22	0.12	0.0	21.0	0.0	3.1	0.5
13	0.3	1.4	0.3	2.71	0.19	0.11	0.0	21.0	0.0	2.7	0.4
14	0.33	1.8	0.3	3.03	0.21	0.12	0.0	21.0	0.0	3.0	0.5
15	0.42	2.0	0.4	3.8	0.27	0.15	0.0	21.0	0.0	3.8	0.6
16	0.24	2.4	0.2	2.22	0.16	0.09	0.0	21.0	0.0	2.2	0.4
17	0.33	2.6	0.3	3.1	0.22	0.12	0.0	21.0	0.0	3.1	0.5
18	0.47	3.0	0.5	4.55	0.32	0.18	0.0	21.0	0.0	4.5	0.7
19	0.19	3.3	0.2	1.9	0.13	0.08	0.0	21.0	0.0	1.9	0.3
20	0.33	3.5	0.3	3.4	0.24	0.14	0.0	21.0	0.0	3.4	0.6
21	0.33	3.8	0.3	3.52	0.25	0.14	0.0	21.0	0.0	3.5	0.6
22	0.19	4.1	0.2	2.09	0.15	0.08	0.0	21.0	0.0	2.1	0.3
23	0.47	4.4	0.5	5.14	0.36	0.21	0.0	21.0	0.0	5.1	0.8
24	0.33	4.8	0.3	3.58	0.25	0.14	0.0	21.0	0.0	3.5	0.6
25	0.24	5.0	0.2	2.61	0.18	0.1	0.0	21.0	0.0	2.6	0.4
26	0.42	5.3	0.4	4.5	0.32	0.18	0.0	21.0	0.0	4.5	0.7
27	0.33	5.7	0.3	3.64	0.26	0.15	0.0	21.0	0.0	3.6	0.6
28	0.3	5.9	0.3	3.31	0.23	0.13	0.0	21.0	0.0	3.3	0.5
29	0.37	6.3	0.4	4.15	0.29	0.17	0.0	21.0	0.0	4.1	0.7
30	0.33	6.6	0.3	3.8	0.27	0.15	0.0	21.0	0.0	3.8	0.6
31	0.35	6.9	0.4	4.04	0.28	0.16	0.0	21.0	0.0	4.0	0.7

32	0.31	7.2	0.3	3.54	0.25	0.14	0.0	21.0	0.0	3.5	0.6
33	0.33	7.5	0.3	3.47	0.24	0.14	0.0	21.0	0.0	3.4	0.6
34	0.4	7.8	0.4	3.83	0.27	0.15	0.0	21.0	0.0	3.8	0.6
35	0.26	8.1	0.3	2.42	0.17	0.1	0.0	21.0	0.0	2.4	0.4
36	0.33	8.4	0.3	3.22	0.23	0.13	0.0	21.0	0.0	3.2	0.5
37	0.45	8.7	0.5	4.67	0.33	0.19	0.0	21.0	0.0	4.6	0.8
38	0.21	9.1	0.2	2.18	0.15	0.09	0.0	21.0	0.0	2.2	0.4
39	0.33	9.3	0.3	3.27	0.23	0.13	0.0	21.0	0.0	3.2	0.5
40	0.33	9.6	0.3	3.04	0.21	0.12	0.0	21.0	0.0	3.0	0.5
41	0.17	9.8	0.2	1.5	0.1	0.06	0.0	21.0	0.0	1.5	0.2
42	0.49	10.2	0.5	3.76	0.26	0.15	0.0	21.0	0.0	3.7	0.6
43	0.33	10.5	0.3	2.13	0.15	0.09	0.0	21.0	0.0	2.1	0.3
44	0.23	10.8	0.2	1.26	0.09	0.05	0.0	21.0	0.0	1.2	0.2
45	0.44	11.1	0.4	1.98	0.14	0.08	0.0	21.0	0.0	2.0	0.3
46	0.33	11.5	0.3	1.11	0.08	0.04	0.0	21.0	0.0	1.1	0.2
47	0.28	11.7	0.3	0.67	0.05	0.03	0.0	21.0	0.0	0.7	0.1
48	0.38	12.0	0.4	0.62	0.04	0.02	0.0	21.0	0.0	0.6	0.1
49	0.33	12.4	0.3	0.32	0.02	0.01	0.0	21.0	0.0	0.3	0.1
50	0.33	12.7	0.3	0.11	0.01	0.0	0.0	21.0	0.0	0.1	0.0



- coltre
 g=18.8 kN/m³
 gs=19.5 kN/m³
 Fi=21°
 c=0 kN/m²
 cu=48 kN/m²

- UG1
 g=21.08 kN/m³
 gs=22 kN/m³
 Fi=27.8°
 c=0 kN/m²
 cu=168 kN/m²

- UG2
 g=20.3 kN/m³
 gs=21.5 kN/m³
 Fi=27°
 c=0 kN/m²
 cu=183 kN/m²

SEZIONE C-C' ANTE/POST OPERAM

4 Analisi di stabilità dei pendii con : BISHOP lungo la sezione D-D' Ante/post Operam

Calcolo eseguito secondo	Utente
Numero di strati	2.0
Numero dei conci	50.0
Grado di sicurezza ritenuto accettabile	1.1
Coefficiente parziale resistenza	1.0
Analisi	Condizione drenata
Superficie di forma circolare	

Maglia dei Centri

Ascissa vertice sinistro inferiore xi	23.0 m
Ordinata vertice sinistro inferiore yi	514.36 m
Ascissa vertice destro superiore xs	145.26 m
Ordinata vertice destro superiore ys	560.33 m
Passo di ricerca	10.0
Numero di celle lungo x	10.0
Numero di celle lungo y	10.0

Sisma

Coefficiente azione sismica orizzontale	0.07
Coefficiente azione sismica verticale	0.04

Vertici profilo

Nr	X (m)	y (m)
1	0.0	471.47
2	1.12	471.96
3	2.24	472.63
4	3.37	472.67
5	4.49	473.08
6	5.61	472.55
7	6.73	472.29
8	7.86	471.27
9	8.98	471.15
10	10.1	471.12
11	11.22	471.21
12	12.35	471.38
13	13.47	471.56
14	14.59	471.8
15	15.71	471.9
16	16.83	472.15
17	17.96	472.25
18	19.08	473.3
19	20.2	474.19
20	21.32	475.47
21	22.45	476.21

22	23.57	476.89
23	24.69	477.37
24	25.81	477.72
25	26.94	478.07
26	28.06	478.82
27	29.18	479.53
28	30.3	479.92
29	31.42	480.43
30	32.55	480.88
31	33.67	481.41
32	34.79	482.01
33	35.91	482.42
34	37.04	483.02
35	38.16	483.54
36	39.28	484.15
37	40.4	484.58
38	41.53	485.13
39	42.65	485.59
40	43.77	486.02
41	44.89	486.43
42	46.01	486.8
43	47.14	487.25
44	48.26	487.51
45	49.38	487.93
46	50.5	488.22
47	51.63	488.56
48	52.75	488.76
49	53.87	489.22
50	54.99	489.59
51	56.12	490.05
52	57.24	490.5
53	58.36	490.96
54	59.48	491.39
55	60.6	491.95
56	61.73	492.16
57	62.85	492.19
58	63.97	492.18
59	65.09	492.19
60	66.22	492.14
61	67.34	492.21
62	68.46	492.33
63	69.58	492.48
64	70.71	492.67
65	71.83	492.88
66	72.95	493.1
67	74.07	493.35
68	75.19	493.6
69	76.32	493.81
70	77.44	494.06
71	78.56	494.26
72	79.68	494.52
73	80.81	494.73
74	81.93	494.95

75	83.05	495.11
76	84.17	495.32
77	85.3	495.45
78	86.42	495.63
79	87.54	495.76
80	88.66	495.99
81	89.78	496.13
82	90.91	496.29
83	92.03	496.37
84	93.15	496.54
85	94.27	496.61
86	95.4	496.76
87	96.52	496.82
88	97.64	496.98
89	98.76	497.04
90	99.89	497.19
91	101.01	497.26
92	102.13	497.39
93	103.25	497.46
94	104.37	497.63
95	105.5	497.68
96	106.62	497.81
97	107.74	497.95
98	108.86	498.04
99	109.99	498.2
100	111.11	498.29
101	112.23	498.46
102	113.35	498.52
103	114.48	498.66
104	115.6	498.73
105	116.72	498.84
106	117.84	498.89
107	118.96	499.0
108	120.09	499.01
109	121.21	499.17
110	122.33	499.2
111	123.45	499.33
112	124.58	499.37
113	125.7	499.51
114	126.82	499.54
115	127.94	499.67
116	129.06	499.72
117	130.19	499.87
118	131.31	499.9
119	132.43	500.05
120	133.55	500.05
121	134.68	500.15
122	135.8	500.21
123	136.92	500.34
124	138.04	500.36
125	139.17	500.47
126	140.29	500.49
127	141.41	500.61

128	142.53	500.64
129	143.65	500.78
130	144.78	500.83
131	145.9	500.92
132	147.02	500.97
133	148.14	501.03
134	149.27	501.15
135	150.39	501.16
136	151.51	501.27
137	152.63	501.26
138	153.76	501.35
139	154.88	501.45
140	156.0	501.51
141	157.12	501.55
142	158.24	501.71
143	159.37	501.65
144	160.49	501.83
145	161.61	501.77
146	162.73	501.9
147	163.86	501.93
148	164.98	502.03
149	166.1	502.02
150	167.22	502.16
151	168.35	502.1
152	169.47	502.24
153	170.59	502.19
154	171.71	502.33
155	171.71	502.33

Vertici strato1

N	X (m)	y (m)
1	0.0	467.47
2	15.71	467.9
3	28.62	475.18
4	43.79	481.81
5	61.42	487.58
6	84.17	491.32
7	123.45	495.33
8	171.71	498.33

Coefficienti parziali azioni

Sfavorevoli: Permanenti, variabili	1.0	1.0
Favorevoli: Permanenti, variabili	1.0	1.0

Coefficienti parziali per i parametri geotecnici del terreno

Tangente angolo di resistenza al taglio	1.25
Coesione efficace	1.25
Coesione non drenata	1.4
Riduzione parametri geotecnici terreno	No

Stratigrafia

Strato	Coesione (kN/m2)	Coesione non drenata (kN/m2)	Angolo resistenza al taglio (°)	Peso unità di volume (kN/m3)	Peso saturo (kN/m3)	Litologia	
1	0	168	27.8	21.08	22	UG1	
2	0	183	27	20.3	21.5	UG2	

Risultati analisi pendio [Utente]

Fs minimo individuato	1.05
Ascissa centro superficie	23.0 m
Ordinata centro superficie	514.36 m
Raggio superficie	38.69 m

B: Larghezza del concio; Alfa: Angolo di inclinazione della base del concio; Li: Lunghezza della base del concio; Wi: Peso del concio ; Ui: Forze derivanti dalle pressioni neutre; Ni: forze agenti normalmente alla direzione di scivolamento; Ti: forze agenti parallelamente alla superficie di scivolamento; Fi: Angolo di attrito; c: coesione.

$$x_c = 22.995 \quad y_c = 514.365 \quad R_c = 38.694 \quad F_s = 1.05$$

Nr.	B m	Alfa (°)	Li m	Wi (kN)	Kh•Wi (kN)	Kv•Wi (kN)	c (kN/m2)	Fi (°)	Ui (kN)	N'i (kN)	Ti (kN)
1	0.78	-1.4	0.8	4.46	0.31	0.18	0.0	27.8	0.0	4.5	2.3
2	0.42	-0.5	0.4	5.97	0.42	0.24	0.0	27.8	0.0	6.0	3.0
3	0.7	0.3	0.7	14.82	1.04	0.59	0.0	27.8	0.0	14.8	7.4
4	0.51	1.2	0.5	14.2	0.99	0.57	0.0	27.8	0.0	14.1	7.1
5	0.61	2.0	0.6	19.91	1.39	0.8	0.0	27.8	0.0	19.6	9.8
6	0.6	2.9	0.6	21.89	1.53	0.88	0.0	27.8	0.0	21.4	10.7
7	0.53	3.8	0.5	20.88	1.46	0.84	0.0	27.8	0.0	20.3	10.2
8	0.68	4.7	0.7	29.15	2.04	1.17	0.0	27.8	0.0	28.1	14.1
9	0.44	5.5	0.4	19.96	1.4	0.8	0.0	27.8	0.0	19.1	9.6
10	0.77	6.4	0.8	39.09	2.74	1.56	0.0	27.8	0.0	37.2	18.7
11	0.35	7.3	0.4	20.32	1.42	0.81	0.0	27.8	0.0	19.3	9.7
12	1.12	8.4	1.1	73.19	5.12	2.93	0.0	27.8	0.0	68.9	34.6
13	0.34	9.5	0.3	24.02	1.68	0.96	0.0	27.8	0.0	22.5	11.3
14	0.79	10.3	0.8	57.87	4.05	2.31	0.0	27.8	0.0	53.9	27.1
15	0.42	11.2	0.4	32.07	2.24	1.28	0.0	27.8	0.0	29.7	14.9
16	0.7	12.0	0.7	55.35	3.87	2.21	0.0	27.8	0.0	51.1	25.7
17	0.51	13.0	0.5	41.45	2.9	1.66	0.0	27.8	0.0	38.1	19.1
18	0.61	13.8	0.6	51.4	3.6	2.06	0.0	27.8	0.0	47.1	23.6
19	0.59	14.7	0.6	50.94	3.57	2.04	0.0	27.0	0.0	46.7	22.7
20	0.53	15.6	0.5	46.63	3.26	1.87	0.0	27.0	0.0	42.6	20.7
21	0.68	16.5	0.7	61.73	4.32	2.47	0.0	27.0	0.0	56.3	27.3
22	0.44	17.4	0.5	41.44	2.9	1.66	0.0	27.0	0.0	37.7	18.3
23	0.77	18.3	0.8	72.55	5.08	2.9	0.0	27.0	0.0	65.8	31.9
24	0.36	19.3	0.4	33.95	2.38	1.36	0.0	27.0	0.0	30.8	14.9

25	1.12	20.4	1.2	108.99	7.63	4.36	0.0	27.0	0.0	98.5	47.8
26	0.33	21.5	0.4	33.0	2.31	1.32	0.0	27.0	0.0	29.8	14.4
27	0.79	22.5	0.9	78.82	5.52	3.15	0.0	27.0	0.0	71.0	34.5
28	0.42	23.4	0.5	42.16	2.95	1.69	0.0	27.0	0.0	38.0	18.4
29	0.7	24.3	0.8	71.7	5.02	2.87	0.0	27.0	0.0	64.5	31.3
30	0.5	25.3	0.6	51.51	3.61	2.06	0.0	27.0	0.0	46.3	22.5
31	0.62	26.2	0.7	62.35	4.36	2.49	0.0	27.0	0.0	56.1	27.2
32	0.59	27.2	0.7	59.1	4.14	2.36	0.0	27.0	0.0	53.2	25.8
33	0.53	28.2	0.6	53.04	3.71	2.12	0.0	27.0	0.0	47.8	23.2
34	0.68	29.2	0.8	66.61	4.66	2.66	0.0	27.0	0.0	60.0	29.1
35	0.45	30.2	0.5	43.11	3.02	1.72	0.0	27.0	0.0	38.9	18.9
36	0.76	31.2	0.9	71.78	5.02	2.87	0.0	27.0	0.0	64.9	31.5
37	0.36	32.2	0.4	32.95	2.31	1.32	0.0	27.0	0.0	29.8	14.5
38	1.12	33.5	1.3	97.97	6.86	3.92	0.0	27.8	0.0	88.2	44.3
39	0.33	34.8	0.4	27.18	1.9	1.09	0.0	27.8	0.0	24.5	12.3
40	0.79	35.8	1.0	61.75	4.32	2.47	0.0	27.8	0.0	55.9	28.1
41	0.42	36.9	0.5	30.38	2.13	1.22	0.0	27.8	0.0	27.6	13.8
42	0.71	37.9	0.9	48.59	3.4	1.94	0.0	27.8	0.0	44.3	22.2
43	0.5	39.1	0.6	31.52	2.21	1.26	0.0	27.8	0.0	28.8	14.5
44	0.62	40.2	0.8	34.63	2.42	1.39	0.0	27.8	0.0	31.8	16.0
45	0.59	41.3	0.8	28.58	2.0	1.14	0.0	27.8	0.0	26.4	13.3
46	0.53	42.5	0.7	22.71	1.59	0.91	0.0	27.8	0.0	21.1	10.6
47	0.67	43.7	0.9	23.24	1.63	0.93	0.0	27.8	0.0	21.7	10.9
48	0.45	44.8	0.6	11.69	0.82	0.47	0.0	27.8	0.0	11.0	5.5
49	0.76	46.1	1.1	12.71	0.89	0.51	0.0	27.8	0.0	12.0	6.0
50	0.6	47.6	0.9	3.48	0.24	0.14	0.0	27.8	0.0	3.3	1.7

