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**REGIONE SARDEGNA - PROVINCIA DI NUORO
COMUNI DI ORANI E SARULE**

PROGETTO:

VALUTAZIONE DI IMPATTO AMBIENTALE

Rinnovo della Concessione Mineraria Monte Cuccureddu

progetto di prosecuzione della coltivazione mineraria e di recupero ambientale

nei cantieri di Cuccuru Mannu e Ispaduleddas

Concessionario: Maffei Sarda Silicati S.p.A.

OGGETTO:

PIANO DI GESTIONE DEI RIFIUTI MINERARI

IL COMMITTENTE:

I PROGETTISTI:

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Il Decreto legislativo 117/2008 fa riferimento ai rifiuti così come definiti dall'art. 183, comma 1, lettera a) del D.lgs. 152/2006 (*qualsiasi sostanza od oggetto che rientra nelle categorie riportate nell'allegato A alla parte quarta del presente decreto e di cui il detentore si disfi o abbia deciso o abbia l'obbligo di disfarsi*), tra i quali sono compresi al punto Q11 i “*Residui provenienti dall'estrazione e dalla preparazione delle materie prime (ad esempio residui provenienti da attività minerarie o petrolifere, ecc.)*”.

- *lettera d)* rifiuti di estrazione: rifiuti derivanti dalle attività di prospezione o di ricerca, di estrazione, di trattamento e di ammasso di risorse minerali e dallo sfruttamento delle cave;
- *lettera e)* terra non inquinata: terra dello strato più superficiale del terreno durante le attività di estrazione e non inquinata.

Secondo l'art. 2 comma 1, la condizione che comporta l'applicazione della normativa è, oltre alla tipologia dei rifiuti, la gestione all'interno del sito estrattivo mediante l'utilizzo di "strutture di deposito".

Va precisato che, secondo l'art. 3, comma 1, lettera r), punto 4, sono considerate “strutture di deposito” *le strutture per la terra non inquinata, i rifiuti di estrazione non pericolosi derivanti dalla prospezione o dalla ricerca, i rifiuti derivanti dalle operazioni di estrazione, di trattamento e di stoccaggio della torba nonché i rifiuti di estrazione inerti, dopo un periodo di accumulo o di deposito di rifiuti di estrazione superiore a tre anni.*

Va inoltre precisato che, secondo l'art. 3, comma 1, lettera r), non sono considerati “strutture di deposito” *i vuoti e volumetrie prodotti dall'attività estrattiva dove vengono risistemati i rifiuti di estrazione, dopo l'estrazione del minerale, a fini di ripristino e ricostruzione.*

Ai fini dell'applicazione del D.lgs. 117/2008 al caso dell'attività estrattiva in oggetto si individuano le casistiche descritte di seguito.

Per attuare la coltivazione del materiale utile è necessario effettuare preliminarmente l'asportazione dello strato di terreno agrario, che viene accantonato in cumuli nell'ambito dell'area di miniera per il successivo riutilizzo nelle operazioni di recupero ambientale. Tali materiali vengono quindi inquadrati nella categoria della “**terra non inquinata**”; secondo la normativa l'accumulo di tale materiale costituisce una “struttura di deposito” solo nel caso in cui il periodo di permanenza in cumulo sia superiore a 3 anni. Nel caso specifico, essendo la “terra non inquinata” prodotta e gestita nell'ambito dell'attività estrattiva ed esistendo l'eventualità che l'accumulo si protragga per una durata superiore a 3 anni, la relativa attività di gestione pare rientrare nell'ambito di applicazione della normativa in oggetto. Per tale materiale si rende quindi necessaria l'elaborazione del Piano di gestione.

Il secondo tipo di rifiuto è costituito dallo sterile di coltivazione che corrisponde ad una roccia di composizione tonalitico – granitica con percentuali troppo elevate di Fe e scarsi contenuti in alcali da poter essere inviata a impianto di lavorazione.

Quanto descritto sopra si può applicare a entrambi i siti estrattivi che hanno le stesse tipologie di TV e di rifiuti.

Questi materiali, verranno stoccati in appositi depositi per essere almeno parzialmente riutilizzati per la ricarica dei fronti a fini di rimodellamento, possono essere attribuiti alla categoria dei “rifiuti di estrazione” di cui all'art. 3, comma 1 lettera d) del Dlgs. 117/2008: si rende quindi necessaria l'elaborazione del Piano di gestione.

In sintesi, durante la coltivazione della miniera sono prodotti i seguenti gruppi di “rifiuti di estrazione” (nel senso più ampio del termine):

- terra non inquinata;
- sterile di coltivazione.

2 MINIERA ISPAULEDDAS

2.1 Piano di gestione del terreno agrario (terra non inquinata ai sensi dell'articolo 186 del decreto legislativo n. 152 del 2006 e s.m.i.)

In questo capitolo vengono trattati i materiali terrosi provenienti dalla scoperta del giacimento (terreno autoctono).

2.1.1 Descrizione dei rifiuti, delle operazioni che li producono ed evoluzione degli stoccaggi

Si considera che lo spessore di terreno vegetale sia approssimativamente di ca. 0.3 m. Questo terreno proverrà esclusivamente dalla parte a sudovest della miniera dove è previsto l'ampliamento su terreni ora non occupati dagli scavi. La superficie di intervento ammonta in questa zona a ca. si realizzerà il tracciato alternativo della pista di accesso, su una superficie vergine di versante pari a circa 49 000 m². Considerando un rigonfiamento dopo lo scavo del 20%, si ottiene un volume da stoccare di ca. **18 000 m³**.

2.1.2 Classificazione della struttura di deposito

I rifiuti in questione sono classificabili come “inerti” e quindi sono esclusi dalle categorie dei rifiuti pericolosi ai sensi del Dlgs. 152/2006. Inoltre essi non contengono sostanze o preparati “pericolosi” ai sensi delle Direttive 67/548/CE o 1999/45/CE. Il cumulo verrà realizzato su superfici pianeggianti, in assenza di possibili inneschi di fenomeni erosivi ad opera di acque di ruscellamento superficiale e sarà realizzato con geometrie idonee a garantirne la stabilità. Infine, visto quanto più sopra specificato, si esclude la possibilità che si verifichino “incidenti rilevanti”. Il terreno agrario verrà posizionato direttamente in sito al di sopra dei riporti eseguiti con gli sterili di coltivazione, per procedere successivamente con gli interventi di recupero ambientale.

Quindi la struttura di deposito prevista è esclusa dalla categoria A così come definita nell'allegato II al Dlgs. 117/2008.

2.1.3 Rischio di effetti negativi sull'ambiente

Trattandosi di materiale “inerte”, non si prospettano elementi di rischio di qualche rilievo per l'ambiente e per la salute umana. Per quanto riguarda la stabilità fisica del deposito si osserva che la geometria prevista del cumulo è idonea per garantirne la stabilità nel tempo e prevenire qualunque rischio di instabilità.

2.1.4 Procedure di controllo e di monitoraggio

Non sono previste procedure di controllo e di monitoraggio della struttura di deposito dei rifiuti (art. 2, comma 3 del Dlgs. 117/2008).

2.1.5 Piano di chiusura del deposito

Non esiste un piano di chiusura del deposito. In realtà il terreno verrà completamente riutilizzato stendendolo sul riporto di rimodellamento morfologico del fronte.

2.2 Piano di gestione dello sterile di coltivazione

Si tratta dello sterile di coltivazione che corrisponde ad una roccia di composizione tonalitico – granitica con percentuali troppo elevate di Fe e scarsi contenuti in alcali da poter essere inviata a impianto di lavorazione. Provenendo dall’attività di coltivazione, costituisce a tutti gli effetti dei “rifiuti di estrazione” di cui all’art. 3, comma 1 lettera d) del Dlgs. 117/2008.

Per quanto riguarda la volumetria che si prevede di produrre, questa è stata valutata sulla base dell’esperienza pregressa della coltivazione della miniera e si considera che siano da sistemare circa 500 000 mc in banco, rigonfiati per scavo e movimentazione, pari a 600 000 mc.

Questo materiale verrà riutilizzato immediatamente, con il proseguire degli scavi, e verrà posizionato principalmente nella “Cavetta” e in altre porzioni di miniera a ricoprire i fronti residui di coltivazione..

2.2.1 Classificazione della struttura di deposito

I rifiuti in questione sono classificabili come “inerti” e quindi sono esclusi dalle categorie dei rifiuti pericolosi ai sensi del Dlgs. 152/2006. Inoltre essi non contengono sostanze o preparati “pericolosi” ai sensi delle Direttive 67/548/CE o 1999/45/CE. Il cumulo verrà realizzato su superficie pianeggiante, in assenza di possibili inneschi di fenomeni erosivi ad opera di acque di ruscellamento superficiale e sarà realizzato con geometrie idonee a garantirne la stabilità. Infine, visto quanto più sopra specificato, si esclude la possibilità che si verifichino “incidenti rilevanti”. Esso verrà posizionato all’interno della “Cavetta” dove colmerà in parte l’attuale depressione di q. 421 m s.l.m. sino alla quota di 430 m s.l.m.. Inoltre il materiale verrà utilizzato per ricoprire i fronti residui e conferire una conformazione naturaliforme al cantiere.

Quindi la struttura di deposito prevista è esclusa dalla categoria A così come definita nell’allegato II al Dlgs. 117/2008.

2.2.2 Descrizione delle operazioni che producono il rifiuto di estrazione

La produzione dello sterile deriva dallo scavo selettivo del giacimento.

2.2.3 Rischio di effetti negativi sull’ambiente

Visto il tipo di materiale, non si ravvisano particolari effetti negativi a scapito dell’ambiente. Come per la terra vegetale il materiale verrà stoccato (temporaneamente) con pendenze adeguate ad assicurarne la stabilità e in area di miniera.

2.2.4 Procedure di controllo e di monitoraggio

Non sono previste procedure di monitoraggio e di controllo poiché il cumulo di questo materiale avrà una durata limitata, in quanto verrà riutilizzato in sito per il riempimento del vuoto minerario.

2.2.5 Piano di chiusura

Non esiste un vero e proprio piano di chiusura. Questi materiali verranno stoccati definitivamente nel vuoto minerario a rimodellamento morfologico del fronte dismesso appena gli scavi avranno raggiunto la conformazione finale di progetto.

2.2.6 Verifiche di stabilità dei terreni di riporto

Nel seguito vengono eseguite le verifiche di stabilità dei terreni di riporto. In particolare viene eseguita una verifica sul riporto di maggiore consistenza ubicato nel settore sudorientale della miniera.

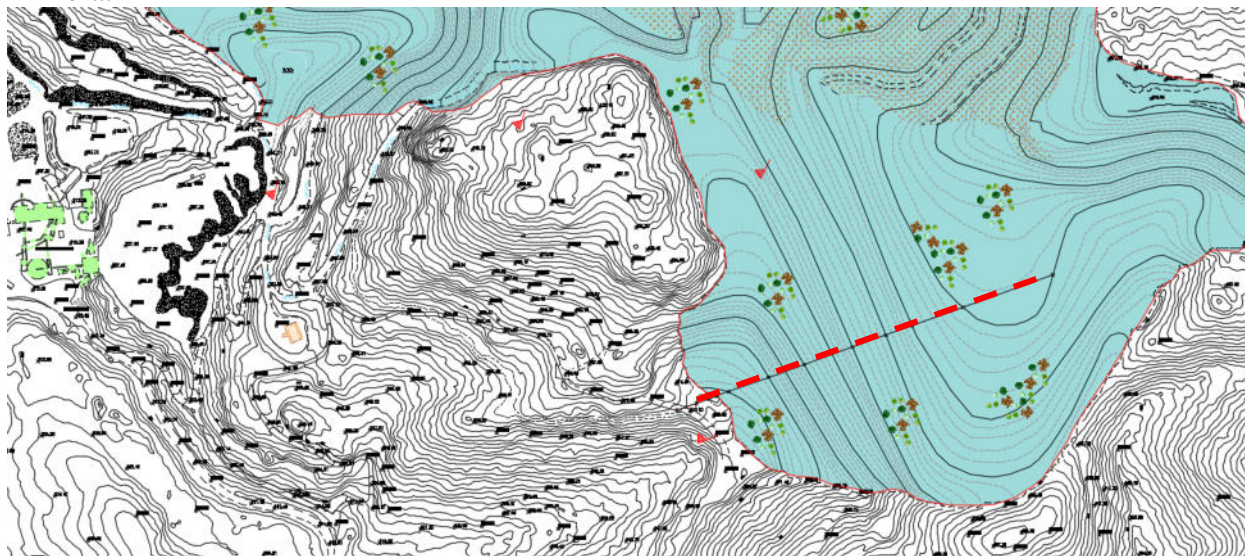


Figura 1: ubicazione della sezione di verifica di stabilità sui terreni di riporto

Le verifiche di stabilità sono state eseguite utilizzando il software SSAP (Slope Stability Analysis).

Nel caso di strati caratterizzati da resistenza al taglio definita dalla legge **Mohr-Coulomb** o Tresca (come nel caso in esame) I parametri di interesse sono 5:

- 1) angolo di attrito interno (in termini di pressioni efficaci) - ϕ' (in gradi)
- 2) coesione in termini di pressioni efficaci - C' (in kPa)
- 3) resistenza al taglio in termini di pressione totale – C_u (in kPa)
- 4) peso di volume terreno fuori falda - γ (in kN/m³)
- 5) peso di volume terreno immerso in falda - γ_{sat}
- 6) γ (in kN/m³)

Nel caso specifico si sono considerati i seguenti parametri geotecnici per i terreni di riporto (pietrisco di granulometria grossolana e blocchi rocciosi):

- angolo di resistenza al taglio: 38°;
- coesione: assente;
- peso di volume: 21 t/mc.

In accordo a quanto stabilito nelle NTC 2018 le verifiche sono state eseguite in condizioni statiche, con la riduzione dei parametri di resistenza del terreno e in condizioni dinamiche (sismiche) senza la riduzione di tali parametri.

Condizioni statiche

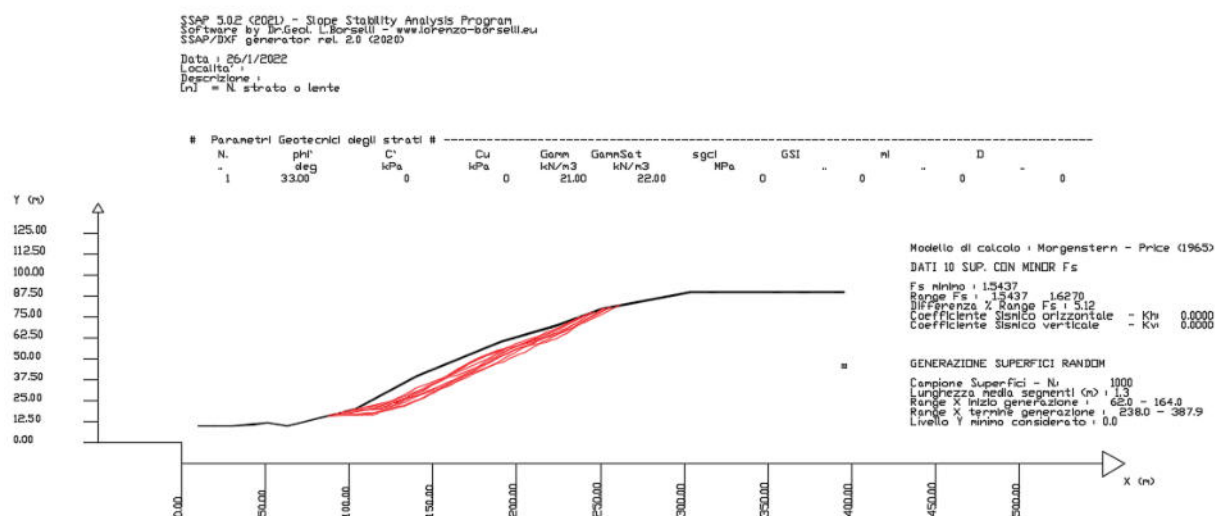


Figura 2: verifica di stabilità del terreno posto a discarica in condizioni statiche

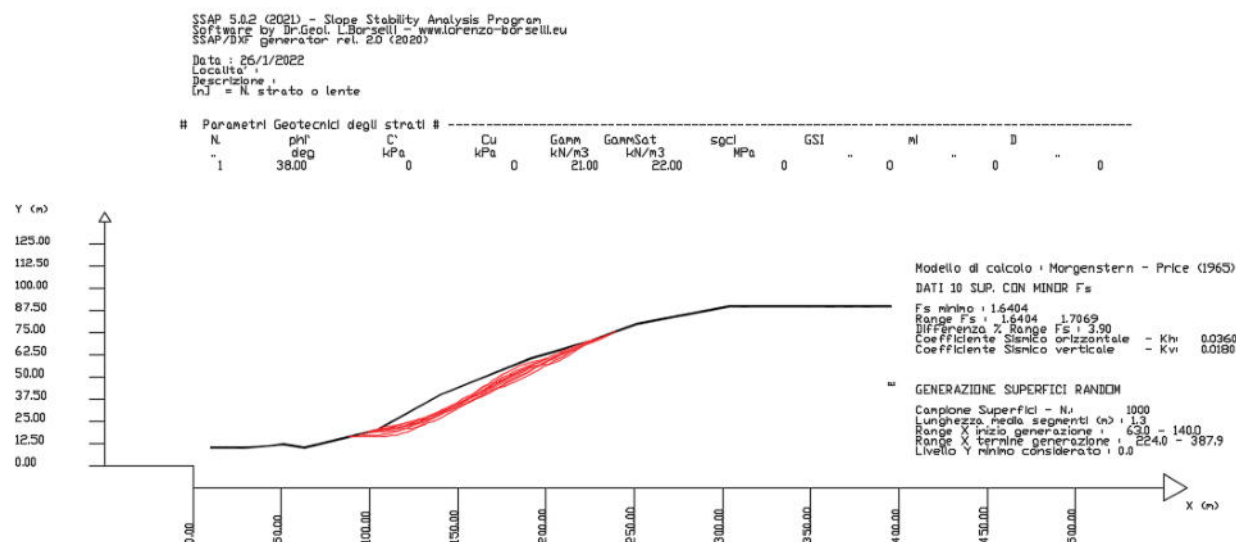


Figura 3: verifica di stabilità del terreno posto a discarica in condizioni sismiche

Per le condizioni statiche si ha un $F_s = 1.54$, per quelle sismiche, un $F_s = 1.64$

3 MINIERA DI CUCCURU MANNU

3.1 Piano di gestione del terreno agrario (terra non inquinata ai sensi dell'articolo 186 del decreto legislativo n. 152 del 2006 e s.m.i.)

In questo capitolo vengono trattati i materiali terrosi provenienti dalla scoperta del giacimento (terreno autoctono).

3.1.1 Descrizione dei rifiuti, delle operazioni che li producono ed evoluzione degli stoccaggi

Si considera che lo spessore di terreno vegetale sia approssimativamente di ca. 0.3 m. Questo terreno proverrà esclusivamente dalla parte a sudovest della miniera dove è previsto

l'ampliamento su terreni ora non occupati dagli scavi. La superficie di intervento ammonta in questa zona a ca. si realizzerà il tracciato alternativo della pista di accesso, su una superficie vergine di versante pari a circa 56 000 m². Considerando un rigonfiamento dopo lo scavo del 20%, si ottiene un volume da stoccare di ca. **20 000 m³**.

3.1.2 Classificazione della struttura di deposito

I rifiuti in questione sono classificabili come “inerti” e quindi sono esclusi dalle categorie dei rifiuti pericolosi ai sensi del Dlgs. 152/2006. Inoltre essi non contengono sostanze o preparati “pericolosi” ai sensi delle Direttive 67/548/CE o 1999/45/CE. Il cumulo verrà realizzato su superfici pianeggianti, in assenza di possibili inneschi di fenomeni erosivi ad opera di acque di ruscellamento superficiale e sarà realizzato con geometrie idonee a garantirne la stabilità. Infine, visto quanto più sopra specificato, si esclude la possibilità che si verifichino “incidenti rilevanti”. Il terreno agrario verrà portato nel sito di prevista realizzazione della discarica dello sterile di coltivazione da dove verrà prelevato per ricoprire le superfici definitive della discarica stessa e le porzioni di miniera dove sono giunti la termine i lavori di ripristino morfologico finale.

Quindi la struttura di deposito prevista è esclusa dalla categoria A così come definita nell'allegato II al Dlgs. 117/2008.

3.1.3 Rischio di effetti negativi sull'ambiente

Trattandosi di materiale “inerte”, non si prospettano elementi di rischio di qualche rilievo per l'ambiente e per la salute umana. Per quanto riguarda la stabilità fisica del deposito si osserva che la geometria prevista del cumulo è idonea per garantirne la stabilità nel tempo e prevenire qualunque rischio di instabilità.

3.1.4 Procedure di controllo e di monitoraggio

Non sono previste procedure di controllo e di monitoraggio della struttura di deposito dei rifiuti (art. 2, comma 3 del Dlgs. 117/2008).

3.1.5 Piano di chiusura del deposito

Non esiste un piano di chiusura del deposito. In realtà il terreno verrà completamente riutilizzato stendendolo sul riporto di rimodellamento morfologico del fronte.

3.2 Piano di gestione dello sterile di coltivazione

Si tratta dello sterile di coltivazione che corrisponde ad una roccia di composizione tonalitico – granitica con percentuali troppo elevate di Fe e scarsi contenuti in alcali da poter essere inviata a impianto di lavorazione. Provenendo dall'attività di coltivazione, costituisce a tutti gli effetti dei “rifiuti di estrazione” di cui all'art. 3, comma 1 lettera d) del Dlgs. 117/2008.

Per quanto riguarda la volumetria che si prevede di produrre, questa è stata valutata sulla base dei sondaggi e delle analisi geochimiche eseguite sul giacimento che hanno portato alla valutazione del rapporto sterile / TV pari a 0.36, si considera che siano da sistemare

temporaneamente circa 540 000 mc, già considerando il rigonfiamento per scavo e mobilitazione.

Questo materiale verrà riutilizzato in parte al termine dell'attività estrattiva per il rimodellamento dei fronti residui di scavo (ca. 220 000 mc).

3.2.1 Classificazione della struttura di deposito

I rifiuti in questione sono classificabili come “inerti” e quindi sono esclusi dalle categorie dei rifiuti pericolosi ai sensi del Dlgs. 152/2006. Inoltre essi non contengono sostanze o preparati “pericolosi” ai sensi delle Direttive 67/548/CE o 1999/45/CE. Il cumulo verrà realizzato su superficie debolmente inclinata, in assenza di possibili inneschi di fenomeni erosivi ad opera di acque di ruscellamento superficiale e sarà realizzato con geometrie idonee a garantirne la stabilità. Infine, visto quanto più sopra specificato, si esclude la possibilità che si verifichino “incidenti rilevanti”. Inoltre il materiale verrà utilizzato per ricoprire i fronti residui e conferire una conformazione naturaliforme al cantiere.

Quindi la struttura di deposito permanente prevista è esclusa dalla categoria A così come definita nell'allegato II al Dlgs. 117/2008.

3.2.2 Descrizione delle operazioni che producono il rifiuto di estrazione

La produzione dello sterile deriva dallo scavo selettivo del giacimento.

3.2.3 Rischio di effetti negativi sull'ambiente

Visto il tipo di materiale, non si ravvisano particolari effetti negativi a scapito dell'ambiente. Come per la terra vegetale il materiale verrà stoccato (temporaneamente) con pendenze adeguate ad assicurarne la stabilità e in area di miniera.

3.2.4 Procedure di controllo e di monitoraggio

In base alle indagini e studi sinora condotti si ritiene che la struttura di deposito in progetto, per la sua configurazione e per le caratteristiche del materiale a dimora, non sia suscettibile di produrre inquinamento chimico a seguito di processi di dilavamento ad opera delle acque meteoriche percolanti o di emissioni di polveri nocive.

Sono comunque previsti controlli in opera e monitoraggi periodici, in conformità a quanto previsto dal d.Lgs. 117/08; essi riguarderanno essenzialmente:

- la verifica periodica della stabilità del cumulo, durante la sua formazione e sviluppo ed in particolare a seguito di eventi meteorici eccezionali;
- verifica del corretto deflusso delle acque di pioggia, con manutenzione del fosso di raccolta previsto alla base;
- controllo periodico della polverosità ambientale, specie durante la movimentazione del materiale ed in occasione di periodi siccitosi.

Quanto sopra deve far parte del sistema di gestione della sicurezza previsto dal medesimo d.Lgs. 117/08, in accordo con il d.Lgs. 624/96 sulla Polizia Mineraria.

In particolare si richiama l'obbligo, previsto a carico del Titolare dal combinato disposto dell'art. 6 co. 2 e art. 52 del d.Lgs. 624/96 e dell'art. 11 del d.Lgs. 117 in esame, di attestare annualmente che la struttura di deposito sia mantenuta in buone condizioni di stabilità e di

efficienza per quanto attiene la prevenzione dei rischi di incidenti e la salvaguardia dell'ambiente e della salute umana.

Il piano di gestione potrà essere oggetto di aggiornamenti con l'evoluzione della configurazione del deposito minerario e di adeguamenti all'effettivo sviluppo della coltivazione mineraria; esso sarà comunque sottoposto a riesame ogni 5 anni, come previsto dall'art.4 d.Lgs. 117/08.

3.2.5 Piano di chiusura

Non esiste un vero e proprio piano di chiusura per lo sterile di coltivazione che viene riportato nei vuoti minerari. Esso costituisce il mezzo per ottenere il rimodellamento morfologico del fronte dismesso appena gli scavi avranno raggiunto la conformazione finale di progetto e in parte in conformazione finale e stabile a seguito del recupero ambientale. Il cumulo residuo nella zona di discarica indicata in progetto verrà chiuso con l'esecuzione degli interventi definitivi di recupero ambientale previsti nel progetto specifico.

3.2.6 Verifiche di stabilità dei riporti di materiale di scarto in discarica e per il recupero morfologico sui fronti residui

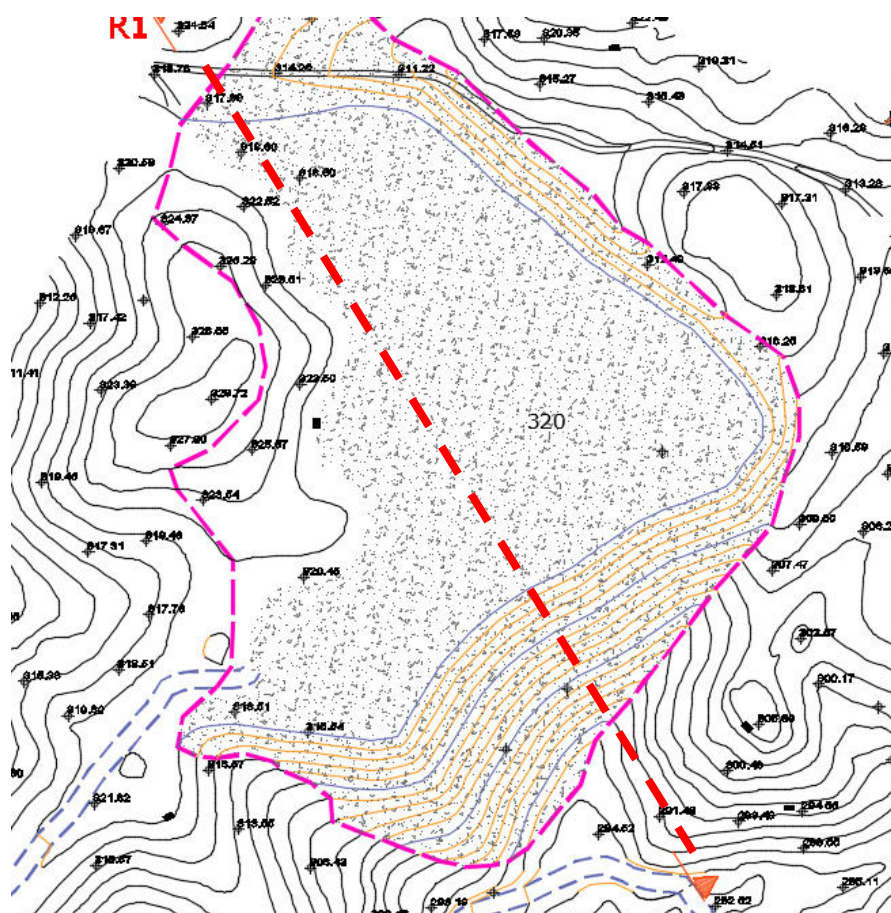


Figura 4: stralcio della planimetria della discarica degli sterili. La linea rossa spessa rappresenta la sezione di verifica eseguita.

Come per la miniera Ispaduleddas, le verifiche di stabilità sono state eseguite utilizzando il software SSAP (Slope Stability Analysis).

Per il modello di resistenza dei terreni di riporto si è utilizzato il criterio definito dalla legge **Mohr-Coulomb** o Tresca (come nel caso in esame) I parametri di interesse sono 5:

1) angolo di attrito interno (in termini di pressioni efficaci) - ϕ' (in gradi)

- 2) coesione in termini di pressioni efficaci - C' (in kPa)
- 3) resistenza al taglio in termini di pressione totale – C_u (in kPa)
- 4) peso di volume terreno fuori falda - γ (in kN/m³)
- 5) peso di volume terreno immerso in falda - sat
- 6) γ (in kN/m³)

Nel caso specifico si sono considerati i seguenti parametri geotecnici per i terreni di riporto (pietrisco di granulometria grossolana e blocchi rocciosi):

- angolo di resistenza al taglio: 38°;
- coesione: assente;
- peso di volume: 21 t/mc.

Inoltre, è stata modellizzata la presenza del substrato roccioso, infatti nella versione 2.9 del codice SSAP è stato introdotto il criterio di rottura pubblicato da Hoek et al. (2002) per la caratterizzazione della resistenza al taglio degli ammassi rocciosi fratturati. Per maggiori ragguagli sul metodo si rimanda al progetto di coltivazione e le relative verifiche di stabilità.

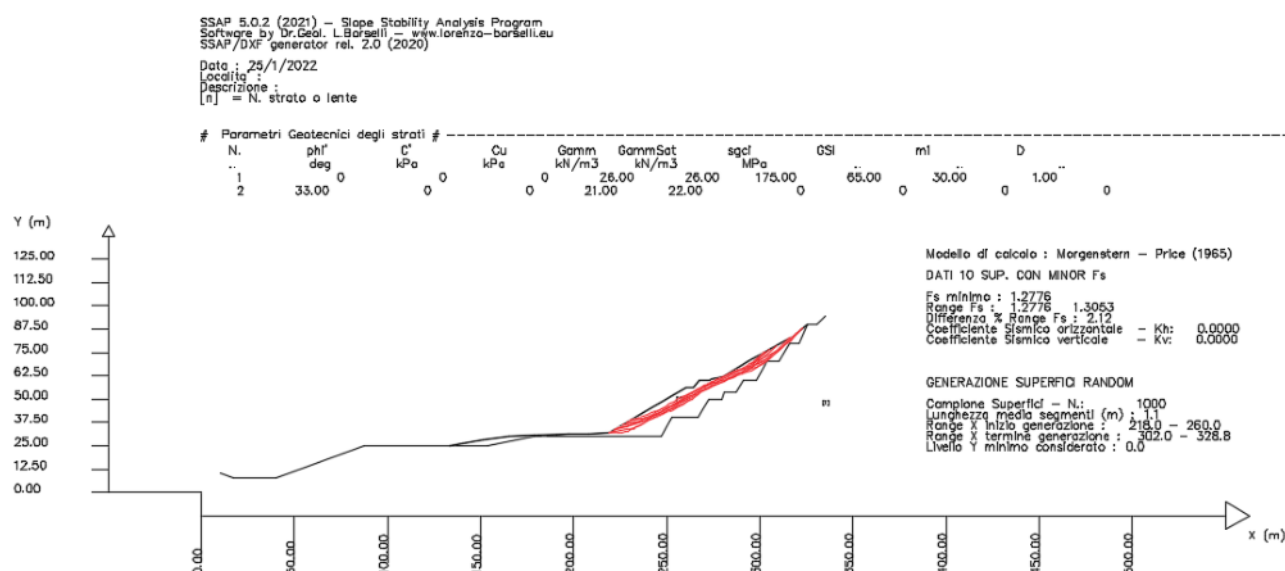


Figura 5: verifica di stabilità dei riporti utilizzati per il recupero morfologico – condizioni statiche

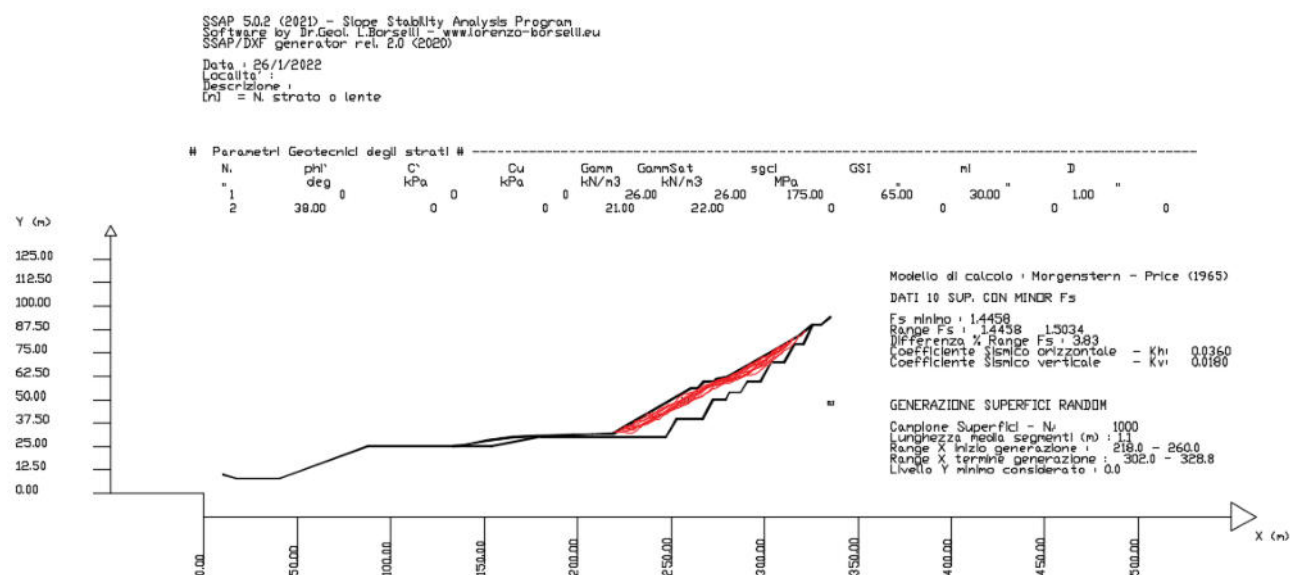


Figura 6: verifica di stabilità dei riporti utilizzati per il recupero morfologico – condizioni dinamiche

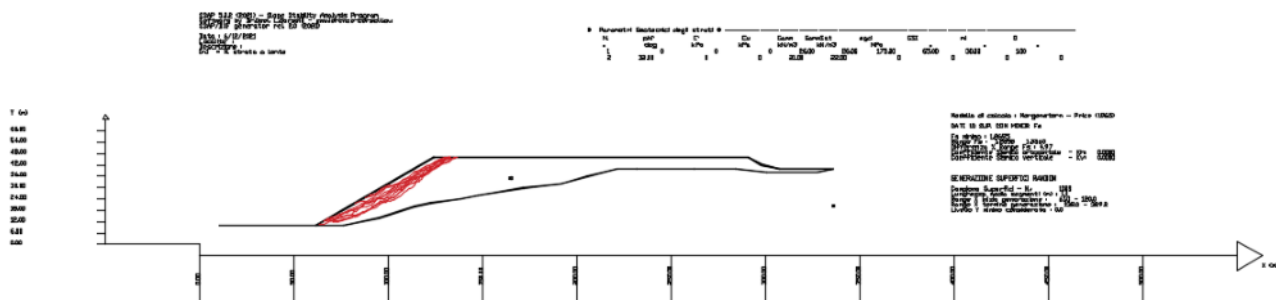


Figura 7: verifica di stabilità dei riporti nella discarica mineraria – condizioni statiche

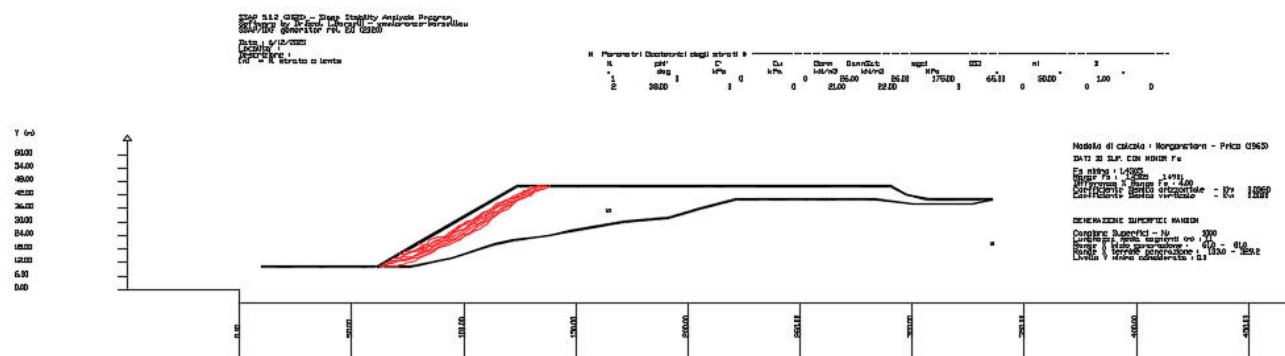


Figura 8: verifica di stabilità dei riporti nella discarica mineraria – condizioni dinamiche
Sintesi dei risultati delle verifiche

| SEZIONE | Fs statico | Fs dinamico |
|-----------|------------|-------------|
| Discarica | 1.27 | 1.43 |
| Sezione 2 | 1.28 | 1.44 |

Allegato: tabulati verifiche di stabilità dei riporti

Ispaduledas

Condizioni statiche

SSAP 5.0.2 - Slope Stability Analysis Program (1991,2021)

WWW.SSAP.EU

Build No. 12007

BY

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** Gia' Ricercatore CNR-IRPI fino a Luglio 2011

Ultima Revisione struttura tabelle del report: 21 Febbraio 2021

File report: \\192.168.1.231\BACKUP su PC canepa\lavorimauri\cave e miniere\Minerale industriali\VIA
2022\Disegni\Ispaduledas\SAP\Ver statica.txt

Data: 26/1/2022

Localita' :

Descrizione:

Modello pendio: Discarica statica.mod

----- PARAMETRI DEL MODELLO DEL PENDIO -----

__ PARAMETRI GEOMETRICI - Coordinate X Y (in m) __

| SUP T. | | SUP 2 | | SUP 3 | | SUP 4 | |
|--------|-------|-------|---|-------|---|-------|---|
| X | Y | X | Y | X | Y | X | Y |
| 10.00 | 10.00 | - | - | - | - | - | - |
| 19.15 | 10.00 | - | - | - | - | - | - |
| 30.21 | 10.00 | - | - | - | - | - | - |
| 43.01 | 11.00 | - | - | - | - | - | - |
| 51.14 | 12.00 | - | - | - | - | - | - |
| 63.31 | 10.00 | - | - | - | - | - | - |
| 103.97 | 20.00 | - | - | - | - | - | - |
| 140.49 | 40.00 | - | - | - | - | - | - |
| 190.36 | 60.00 | - | - | - | - | - | - |
| 224.27 | 70.00 | - | - | - | - | - | - |
| 251.27 | 80.00 | - | - | - | - | - | - |
| 303.55 | 90.00 | - | - | - | - | - | - |
| 395.58 | 90.00 | - | - | - | - | - | - |

ASSENZA DI FALDA

----- PARAMETRI GEOMECCANICI -----

| | fi' | C' | Cu | Gamm | Gamm_sat | STR_IDX | sgci | GSI | mi | D |
|----------|-------|------|------|-------|----------|---------|------|------|------|------|
| STRATO 1 | 33.00 | 0.00 | 0.00 | 21.00 | 22.00 | 2.174 | 0.00 | 0.00 | 0.00 | 0.00 |

LEGENDA: fi' _____ Angolo di attrito interno efficace(in gradi)

C' _____ Coesione efficace (in Kpa)

Cu _____ Resistenza al taglio Non drenata (in Kpa)

Gamm _____ Peso di volume terreno fuori falda (in KN/m^3)

Gamm_sat _____ Peso di volume terreno immerso (in KN/m^3)

STR_IDX _____ Indice di resistenza (usato in solo in 'SNIFF SEARCH) (adimensionale)

---- SOLO Per AMMASSI ROCCIOSI FRATTURATI - Parametri Criterio di Rottura di Hoek (2002)-

sigci _____ Resistenza Compressione Uniassiale Roccia Intatta (in MPa)

GSI _____ Geological Strenght Index ammasso(adimensionale)

mi _____ Indice litologico ammasso(adimensionale)

D _____ Fattore di disturbo ammasso(adimensionale)

Fattore di riduzione NTC2018: gammaPHI=1.25 e gammaC=1.25 - DISATTIVATO (solo per ROCCE)

Usa CRITERIO DI ROTTURA Hoek et al.(2002,2006) - non-lineare - Generalizzato, secondo Lei et al.(2016)

----- INFORMAZIONI GENERAZIONE SUPERFICI RANDOM -----

*** PARAMETRI PER LA GENERAZIONE DELLE SUPERFICI

MOTORE DI RICERCA: RANDOM SEARCH - Siegel (1981)

FILTRAGGIO SUPERFICI : ATTIVATO

COORDINATE X1,X2,Y OSTACOLO : 0.00 0.00 0.00

LUNGHEZZA MEDIA SEGMENTI (m)*: 1.3 (+/-) 50%

INTERVALLO ASCISSE RANDOM STARTING POINT (Xmin .. Xmax): 62.00 164.00

LIVELLO MINIMO CONSIDERATO (Ymin): 0.00

INTERVALLO ASCISSE AMMESSO PER LA TERMINAZIONE (Xmin .. Xmax): 238.00 387.87

TOTALE SUPERFICI GENERATE : 1000

*NOTA IMPORTANTE: La lunghezza media dei segmenti non viene considerata nel caso di uso del motore di ricerca NEW RANDOM SEARCH

----- INFORMAZIONI PARAMETRI DI CALCOLO -----

METODO DI CALCOLO : MORGENTERN - PRICE (Morgenstern & Price, 1965)

METODO DI ESPLORAZIONE CAMPO VALORI (lambda0,Fs0) ADOTTATO : A (rapido)

COEFFICIENTE SISMICO UTILIZZATO Kh : 0.0000

COEFFICIENTE SISMICO UTILIZZATO Kv (assunto Positivo): 0.0000

COEFFICIENTE c=Kv/Kh UTILIZZATO : 0.5000

FORZA ORIZZONTALE ADDIZIONALE IN TESTA (kN/m): 0.00

FORZA ORIZZONTALE ADDIZIONALE ALLA BASE (kN/m): 0.00

N.B. Le forze orizzontali addizionali in testa e alla base sono poste uguali a 0 durante le tutte le verifiche globali.

I valori >0 impostati dall'utente sono utilizzati solo in caso di verifica singola

----- RISULTATO FINALE ELABORAZIONI -----

* DATI RELATIVI ALLE 10 SUPERFICI GENERATE CON MINOR Fs *

| | | | | | |
|---------------------------|--------|----------|---|---|----------------|
| Fattore di sicurezza (FS) | 1.5437 | - Min. - | X | Y | Lambda= 0.3278 |
| | 94.98 | 17.79 | | | |
| | 108.01 | 19.34 | | | |
| | 114.18 | 20.22 | | | |
| | 118.36 | 21.02 | | | |
| | 121.86 | 21.89 | | | |
| | 125.29 | 22.99 | | | |
| | 128.44 | 24.19 | | | |
| | 131.79 | 25.64 | | | |
| | 135.32 | 27.35 | | | |
| | 139.37 | 29.47 | | | |
| | 143.18 | 31.50 | | | |
| | 146.85 | 33.49 | | | |
| | 150.43 | 35.46 | | | |
| | 153.99 | 37.45 | | | |
| | 157.56 | 39.48 | | | |
| | 161.20 | 41.59 | | | |
| | 164.98 | 43.80 | | | |
| | 168.95 | 46.17 | | | |
| | 172.49 | 48.14 | | | |
| | 175.88 | 49.89 | | | |
| | 179.12 | 51.39 | | | |
| | 182.57 | 52.83 | | | |
| | 185.81 | 54.02 | | | |
| | 189.25 | 55.12 | | | |
| | 192.91 | 56.12 | | | |
| | 197.16 | 57.14 | | | |
| | 200.87 | 58.13 | | | |
| | 204.38 | 59.20 | | | |
| | 207.70 | 60.34 | | | |
| | 211.18 | 61.67 | | | |
| | 214.87 | 63.26 | | | |
| | 219.16 | 65.29 | | | |
| | 225.38 | 68.44 | | | |
| | 238.06 | 75.11 | | | |

| | | | | | |
|---------------------------|--------|----------|---|---|----------------|
| Fattore di sicurezza (FS) | 1.5743 | - N.2 -- | X | Y | Lambda= 0.4406 |
| | 91.77 | 17.00 | | | |
| | 102.89 | 16.41 | | | |
| | 107.91 | 16.30 | | | |
| | 111.18 | 16.46 | | | |
| | 113.79 | 16.83 | | | |
| | 116.51 | 17.53 | | | |
| | 118.88 | 18.35 | | | |
| | 121.51 | 19.50 | | | |
| | 124.37 | 20.97 | | | |
| | 127.87 | 22.95 | | | |
| | 131.11 | 24.75 | | | |
| | 134.16 | 26.44 | | | |
| | 137.13 | 28.04 | | | |
| | 140.03 | 29.59 | | | |

| | |
|--------|-------|
| 142.93 | 31.11 |
| 145.83 | 32.62 |
| 148.77 | 34.11 |
| 151.76 | 35.61 |
| 154.71 | 37.08 |
| 157.63 | 38.51 |
| 160.53 | 39.91 |
| 163.44 | 41.31 |
| 166.34 | 42.68 |
| 169.25 | 44.04 |
| 172.19 | 45.39 |
| 175.15 | 46.74 |
| 178.10 | 48.07 |
| 181.02 | 49.38 |
| 183.93 | 50.68 |
| 186.85 | 51.96 |
| 189.78 | 53.24 |
| 192.72 | 54.52 |
| 195.72 | 55.80 |
| 198.77 | 57.10 |
| 201.68 | 58.29 |
| 204.54 | 59.41 |
| 207.36 | 60.45 |
| 210.24 | 61.47 |
| 213.08 | 62.42 |
| 215.99 | 63.34 |
| 219.02 | 64.24 |
| 222.29 | 65.15 |
| 225.22 | 66.07 |
| 228.05 | 67.04 |
| 230.77 | 68.07 |
| 233.62 | 69.25 |
| 236.66 | 70.66 |
| 240.18 | 72.42 |
| 245.27 | 75.14 |
| 255.60 | 80.83 |

Fattore di sicurezza (FS) 1.5756 - N.3 -- X Y Lambda= 0.3555

| | |
|--------|-------|
| 89.13 | 16.35 |
| 102.51 | 19.17 |
| 109.20 | 20.66 |
| 113.88 | 21.79 |
| 117.99 | 22.88 |
| 121.77 | 23.99 |
| 125.46 | 25.16 |
| 129.26 | 26.44 |
| 133.20 | 27.85 |
| 137.46 | 29.46 |
| 141.36 | 31.02 |
| 145.12 | 32.64 |
| 148.75 | 34.32 |
| 152.51 | 36.16 |
| 156.18 | 38.08 |
| 160.00 | 40.19 |
| 164.01 | 42.52 |
| 168.45 | 45.21 |
| 172.35 | 47.44 |
| 176.05 | 49.39 |
| 179.55 | 51.06 |
| 183.26 | 52.66 |
| 186.75 | 53.99 |
| 190.45 | 55.22 |
| 194.37 | 56.36 |
| 198.91 | 57.51 |
| 202.90 | 58.63 |
| 206.67 | 59.82 |
| 210.27 | 61.09 |
| 214.01 | 62.54 |
| 218.01 | 64.27 |
| 222.63 | 66.45 |
| 229.32 | 69.82 |
| 242.90 | 76.90 |

Fattore di sicurezza (FS) 1.5775 - N.4 -- X Y Lambda= 0.4776

96.66 18.20
107.27 20.11
112.65 21.12
116.44 21.88
119.80 22.60
122.85 23.31
125.86 24.05
128.93 24.85
132.08 25.71
135.41 26.67
138.51 27.61
141.53 28.60
144.48 29.63
147.51 30.76
150.47 31.93
153.52 33.20
156.68 34.59
160.09 36.15
163.21 37.66
166.23 39.22
169.15 40.81
172.17 42.56
175.13 44.36
178.20 46.34
181.44 48.51
185.02 51.01
188.14 53.07
191.09 54.85
193.87 56.38
196.83 57.84
199.59 59.05
202.52 60.16
205.62 61.18
209.24 62.22
212.47 63.23
215.54 64.26
218.49 65.33
221.51 66.52
224.78 67.91
228.52 69.62
233.89 72.21
244.67 77.56

Fattore di sicurezza (FS) 1.5847 - N.5 -- X Y Lambda= 0.3069

101.80 19.47
111.77 19.94
116.43 20.28
119.55 20.68
122.13 21.19
124.70 21.90
127.04 22.69
129.55 23.71
132.22 24.95
135.36 26.54
138.26 28.04
141.03 29.51
143.73 30.98
146.40 32.47
149.06 33.99
151.75 35.56
154.49 37.20
157.33 38.93
160.06 40.56
162.73 42.11
165.37 43.59
168.04 45.05
170.69 46.45
173.40 47.84
176.20 49.23
179.18 50.66
181.89 51.89
184.50 53.00
187.02 53.98

| | |
|--------|-------|
| 189.65 | 54.91 |
| 192.17 | 55.72 |
| 194.78 | 56.47 |
| 197.48 | 57.16 |
| 200.46 | 57.83 |
| 203.27 | 58.51 |
| 205.98 | 59.19 |
| 208.63 | 59.89 |
| 211.30 | 60.64 |
| 213.96 | 61.42 |
| 216.67 | 62.25 |
| 219.47 | 63.15 |
| 222.46 | 64.14 |
| 225.16 | 65.12 |
| 227.77 | 66.15 |
| 230.28 | 67.24 |
| 232.91 | 68.48 |
| 235.73 | 69.94 |
| 238.98 | 71.76 |
| 243.69 | 74.55 |
| 253.23 | 80.38 |

Fattore di sicurezza (FS) 1.6131 - N.6 -- X Y Lambda= 0.4830

| | |
|--------|-------|
| 93.06 | 17.32 |
| 105.24 | 17.51 |
| 110.92 | 17.75 |
| 114.72 | 18.11 |
| 117.86 | 18.63 |
| 120.98 | 19.41 |
| 123.81 | 20.30 |
| 126.85 | 21.46 |
| 130.09 | 22.88 |
| 133.89 | 24.71 |
| 137.45 | 26.41 |
| 140.86 | 28.01 |
| 144.19 | 29.54 |
| 147.46 | 31.03 |
| 150.74 | 32.50 |
| 154.04 | 33.95 |
| 157.40 | 35.41 |
| 160.85 | 36.88 |
| 164.14 | 38.34 |
| 167.38 | 39.83 |
| 170.58 | 41.35 |
| 173.83 | 42.96 |
| 177.07 | 44.62 |
| 180.40 | 46.39 |
| 183.88 | 48.30 |
| 187.64 | 50.42 |
| 190.94 | 52.15 |
| 194.06 | 53.65 |
| 197.02 | 54.91 |
| 200.19 | 56.09 |
| 203.17 | 57.05 |
| 206.38 | 57.90 |
| 209.87 | 58.67 |
| 214.06 | 59.44 |
| 217.44 | 60.23 |
| 220.55 | 61.14 |
| 223.39 | 62.19 |
| 226.52 | 63.57 |
| 229.70 | 65.29 |
| 233.52 | 67.63 |
| 239.25 | 71.50 |
| 251.36 | 80.02 |

Fattore di sicurezza (FS) 1.6136 - N.7 -- X Y Lambda= 0.4985

| | |
|--------|-------|
| 102.68 | 19.68 |
| 114.74 | 22.19 |
| 120.93 | 23.50 |
| 125.31 | 24.47 |
| 129.23 | 25.36 |
| 132.74 | 26.20 |

| | |
|--------|-------|
| 136.28 | 27.07 |
| 139.89 | 27.98 |
| 143.65 | 28.96 |
| 147.64 | 30.03 |
| 151.11 | 31.10 |
| 154.44 | 32.29 |
| 157.59 | 33.59 |
| 160.98 | 35.18 |
| 164.17 | 36.85 |
| 167.55 | 38.81 |
| 171.13 | 41.05 |
| 175.22 | 43.78 |
| 178.94 | 46.18 |
| 182.48 | 48.37 |
| 185.89 | 50.38 |
| 189.36 | 52.32 |
| 192.71 | 54.11 |
| 196.13 | 55.83 |
| 199.63 | 57.50 |
| 203.35 | 59.18 |
| 207.01 | 60.83 |
| 210.59 | 62.44 |
| 214.17 | 64.04 |
| 217.69 | 65.62 |
| 221.68 | 67.40 |
| 226.10 | 69.36 |
| 232.31 | 72.11 |
| 244.24 | 77.40 |

Fattore di sicurezza (FS) 1.6216 - N.8 -- X Y Lambda= 0.4966

| | |
|--------|-------|
| 88.61 | 16.22 |
| 101.32 | 17.99 |
| 107.35 | 18.96 |
| 111.43 | 19.82 |
| 114.87 | 20.74 |
| 118.22 | 21.88 |
| 121.33 | 23.12 |
| 124.67 | 24.63 |
| 128.24 | 26.42 |
| 132.41 | 28.68 |
| 136.09 | 30.56 |
| 139.54 | 32.21 |
| 142.82 | 33.65 |
| 146.21 | 35.01 |
| 149.45 | 36.19 |
| 152.85 | 37.29 |
| 156.40 | 38.33 |
| 160.41 | 39.37 |
| 164.00 | 40.40 |
| 167.44 | 41.48 |
| 170.74 | 42.61 |
| 174.15 | 43.89 |
| 177.44 | 45.22 |
| 180.83 | 46.69 |
| 184.32 | 48.31 |
| 188.10 | 50.15 |
| 191.71 | 51.88 |
| 195.22 | 53.52 |
| 198.67 | 55.09 |
| 202.13 | 56.62 |
| 205.56 | 58.11 |
| 209.03 | 59.57 |
| 212.55 | 61.02 |
| 216.20 | 62.48 |
| 219.72 | 63.92 |
| 223.19 | 65.38 |
| 226.62 | 66.87 |
| 230.08 | 68.40 |
| 233.93 | 70.17 |
| 238.24 | 72.20 |
| 244.35 | 75.14 |
| 256.30 | 80.96 |

| | | | | |
|---------------------------|-----------------|---|---|----------------|
| Fattore di sicurezza (FS) | 1.6218 - N.9 -- | X | Y | Lambda= 0.4708 |
|---------------------------|-----------------|---|---|----------------|

| | |
|--------|-------|
| 102.14 | 19.55 |
| 114.37 | 19.73 |
| 120.09 | 19.96 |
| 123.93 | 20.32 |
| 127.11 | 20.83 |
| 130.26 | 21.59 |
| 133.12 | 22.45 |
| 136.18 | 23.58 |
| 139.42 | 24.95 |
| 143.20 | 26.71 |
| 146.79 | 28.37 |
| 150.23 | 29.96 |
| 153.61 | 31.50 |
| 156.92 | 33.00 |
| 160.24 | 34.51 |
| 163.59 | 36.00 |
| 166.97 | 37.51 |
| 170.41 | 39.04 |
| 173.72 | 40.55 |
| 176.97 | 42.10 |
| 180.19 | 43.69 |
| 183.46 | 45.36 |
| 186.70 | 47.07 |
| 190.01 | 48.88 |
| 193.42 | 50.80 |
| 197.03 | 52.89 |
| 200.38 | 54.74 |
| 203.62 | 56.45 |
| 206.77 | 58.02 |
| 210.02 | 59.55 |
| 213.16 | 60.93 |
| 216.40 | 62.26 |
| 219.73 | 63.54 |
| 223.36 | 64.84 |
| 226.77 | 66.12 |
| 230.07 | 67.41 |
| 233.31 | 68.72 |
| 236.59 | 70.11 |
| 240.20 | 71.72 |
| 244.28 | 73.61 |
| 250.07 | 76.38 |
| 261.51 | 81.96 |

| | | | | |
|---------------------------|------------------|---|---|----------------|
| Fattore di sicurezza (FS) | 1.6270 - N.10 -- | X | Y | Lambda= 0.5083 |
|---------------------------|------------------|---|---|----------------|

| | |
|--------|-------|
| 87.31 | 15.90 |
| 99.00 | 16.36 |
| 104.75 | 16.67 |
| 108.73 | 17.00 |
| 112.18 | 17.39 |
| 115.42 | 17.88 |
| 118.53 | 18.45 |
| 121.79 | 19.15 |
| 125.23 | 19.98 |
| 129.10 | 21.01 |
| 132.47 | 22.02 |
| 135.66 | 23.11 |
| 138.69 | 24.28 |
| 141.89 | 25.67 |
| 144.94 | 27.12 |
| 148.15 | 28.81 |
| 151.54 | 30.73 |
| 155.39 | 33.03 |
| 158.82 | 35.00 |
| 162.08 | 36.75 |
| 165.20 | 38.30 |
| 168.42 | 39.79 |
| 171.51 | 41.10 |
| 174.72 | 42.35 |
| 178.06 | 43.54 |
| 181.80 | 44.75 |
| 185.21 | 45.93 |
| 188.49 | 47.14 |
| 191.67 | 48.38 |

194.92 49.74
198.08 51.13
201.32 52.64
204.64 54.26
208.19 56.07
211.58 57.84
214.89 59.61
218.15 61.39
221.44 63.23
225.08 65.33
229.17 67.74
234.96 71.24
246.29 78.16

----- ANALISI DEFICIT DI RESISTENZA -----

DATI RELATIVI ALLE 10 SUPERFICIE GENERATE CON MINOR FS *

Analisi Deficit in riferimento a FS(progetto) = 1.200

| Sup N. | FS | FTR(kN/m) | FTA(kN/m) | Bilancio(kN/m) | ESITO |
|--------|-------|-----------|-----------|----------------|---------|
| 1 | 1.544 | 9258.9 | 5997.9 | 2061.5 | Surplus |
| 2 | 1.574 | 12772.8 | 8113.2 | 3037.0 | Surplus |
| 3 | 1.576 | 9074.9 | 5759.6 | 2163.3 | Surplus |
| 4 | 1.577 | 11400.7 | 7227.2 | 2728.0 | Surplus |
| 5 | 1.585 | 11314.4 | 7139.7 | 2746.7 | Surplus |
| 6 | 1.613 | 15788.8 | 9787.9 | 4043.2 | Surplus |
| 7 | 1.614 | 11993.6 | 7433.0 | 3074.0 | Surplus |
| 8 | 1.622 | 11996.5 | 7397.8 | 3119.1 | Surplus |
| 9 | 1.622 | 17254.8 | 10639.2 | 4487.7 | Surplus |
| 10 | 1.627 | 17801.1 | 10941.2 | 4671.6 | Surplus |

Esito analisi: SURPLUS di RESISTENZA!

Valore minimo di SURPLUS di RESISTENZA (kN/m): 2061.5

Note: FTR --> Forza totale Resistente lungo la superficie
di scivolamento

FTA --> Forza totale Agente lungo la superficie
di scivolamento

IMPORTANTE! : Il Deficit o il Surplus di resistenza viene espresso in kN
per metro di LARGHEZZA rispetto al fronte della scarpata

TABELLA PARAMETRI CONCI DELLA SUPERFICIE INDIVIDUATA CON MINOR FS

| X | dx | alpha | W | ru | U | phi' | (c',Cu) |
|---------|-------|-------|--------|------|-------|-------|---------|
| (m) | (m) | (°) | (kN/m) | (-) | (kPa) | (°) | (kPa) |
| 94.975 | 1.047 | 6.80 | 1.46 | 0.00 | 0.00 | 33.00 | 0.00 |
| 96.023 | 1.047 | 6.80 | 4.38 | 0.00 | 0.00 | 33.00 | 0.00 |
| 97.070 | 1.047 | 6.80 | 7.30 | 0.00 | 0.00 | 33.00 | 0.00 |
| 98.117 | 1.047 | 6.80 | 10.22 | 0.00 | 0.00 | 33.00 | 0.00 |
| 99.164 | 1.047 | 6.80 | 13.13 | 0.00 | 0.00 | 33.00 | 0.00 |
| 100.212 | 1.047 | 6.80 | 16.05 | 0.00 | 0.00 | 33.00 | 0.00 |
| 101.259 | 1.047 | 6.80 | 18.97 | 0.00 | 0.00 | 33.00 | 0.00 |
| 102.306 | 1.047 | 6.80 | 21.89 | 0.00 | 0.00 | 33.00 | 0.00 |
| 103.353 | 0.617 | 6.80 | 14.26 | 0.00 | 0.00 | 33.00 | 0.00 |
| 103.970 | 1.047 | 6.80 | 30.00 | 0.00 | 0.00 | 33.00 | 0.00 |
| 105.017 | 1.047 | 6.80 | 39.87 | 0.00 | 0.00 | 33.00 | 0.00 |
| 106.065 | 1.047 | 6.80 | 49.74 | 0.00 | 0.00 | 33.00 | 0.00 |
| 107.112 | 0.894 | 6.80 | 50.24 | 0.00 | 0.00 | 33.00 | 0.00 |
| 108.005 | 1.047 | 8.09 | 67.76 | 0.00 | 0.00 | 33.00 | 0.00 |
| 109.053 | 1.047 | 8.09 | 77.10 | 0.00 | 0.00 | 33.00 | 0.00 |
| 110.100 | 1.047 | 8.09 | 86.44 | 0.00 | 0.00 | 33.00 | 0.00 |
| 111.147 | 1.047 | 8.09 | 95.78 | 0.00 | 0.00 | 33.00 | 0.00 |
| 112.194 | 1.047 | 8.09 | 105.12 | 0.00 | 0.00 | 33.00 | 0.00 |
| 113.242 | 0.937 | 8.09 | 101.91 | 0.00 | 0.00 | 33.00 | 0.00 |
| 114.178 | 1.047 | 10.82 | 122.24 | 0.00 | 0.00 | 33.00 | 0.00 |
| 115.225 | 1.047 | 10.82 | 130.45 | 0.00 | 0.00 | 33.00 | 0.00 |
| 116.273 | 1.047 | 10.82 | 138.67 | 0.00 | 0.00 | 33.00 | 0.00 |
| 117.320 | 1.036 | 10.82 | 145.28 | 0.00 | 0.00 | 33.00 | 0.00 |
| 118.356 | 1.047 | 14.03 | 154.33 | 0.00 | 0.00 | 33.00 | 0.00 |
| 119.403 | 1.047 | 14.03 | 161.19 | 0.00 | 0.00 | 33.00 | 0.00 |
| 120.451 | 1.047 | 14.03 | 168.04 | 0.00 | 0.00 | 33.00 | 0.00 |

| | | | | | | | |
|---------|-------|-------|--------|------|------|-------|------|
| 121.498 | 0.362 | 14.03 | 59.66 | 0.00 | 0.00 | 33.00 | 0.00 |
| 121.860 | 1.047 | 17.84 | 176.45 | 0.00 | 0.00 | 33.00 | 0.00 |
| 122.907 | 1.047 | 17.84 | 181.65 | 0.00 | 0.00 | 33.00 | 0.00 |
| 123.954 | 1.047 | 17.84 | 186.85 | 0.00 | 0.00 | 33.00 | 0.00 |
| 125.002 | 0.284 | 17.84 | 51.64 | 0.00 | 0.00 | 33.00 | 0.00 |
| 125.286 | 1.047 | 20.69 | 192.82 | 0.00 | 0.00 | 33.00 | 0.00 |
| 126.333 | 1.047 | 20.69 | 196.74 | 0.00 | 0.00 | 33.00 | 0.00 |
| 127.380 | 1.047 | 20.69 | 200.65 | 0.00 | 0.00 | 33.00 | 0.00 |
| 128.428 | 0.016 | 20.69 | 3.08 | 0.00 | 0.00 | 33.00 | 0.00 |
| 128.444 | 1.047 | 23.47 | 203.97 | 0.00 | 0.00 | 33.00 | 0.00 |
| 129.491 | 1.047 | 23.47 | 206.58 | 0.00 | 0.00 | 33.00 | 0.00 |
| 130.538 | 1.047 | 23.47 | 209.19 | 0.00 | 0.00 | 33.00 | 0.00 |
| 131.585 | 0.208 | 23.47 | 41.96 | 0.00 | 0.00 | 33.00 | 0.00 |
| 131.794 | 1.047 | 25.82 | 211.75 | 0.00 | 0.00 | 33.00 | 0.00 |
| 132.841 | 1.047 | 25.82 | 213.22 | 0.00 | 0.00 | 33.00 | 0.00 |
| 133.888 | 1.047 | 25.82 | 214.69 | 0.00 | 0.00 | 33.00 | 0.00 |
| 134.936 | 0.387 | 25.82 | 79.75 | 0.00 | 0.00 | 33.00 | 0.00 |
| 135.323 | 1.047 | 27.67 | 216.23 | 0.00 | 0.00 | 33.00 | 0.00 |
| 136.370 | 1.047 | 27.67 | 216.77 | 0.00 | 0.00 | 33.00 | 0.00 |
| 137.417 | 1.047 | 27.67 | 217.30 | 0.00 | 0.00 | 33.00 | 0.00 |
| 138.465 | 0.907 | 27.67 | 188.64 | 0.00 | 0.00 | 33.00 | 0.00 |
| 139.372 | 1.047 | 28.03 | 218.21 | 0.00 | 0.00 | 33.00 | 0.00 |
| 140.419 | 0.071 | 28.03 | 14.83 | 0.00 | 0.00 | 33.00 | 0.00 |
| 140.490 | 1.047 | 28.03 | 216.90 | 0.00 | 0.00 | 33.00 | 0.00 |
| 141.537 | 1.047 | 28.03 | 213.87 | 0.00 | 0.00 | 33.00 | 0.00 |
| 142.585 | 0.600 | 28.03 | 121.20 | 0.00 | 0.00 | 33.00 | 0.00 |
| 143.185 | 1.047 | 28.42 | 209.01 | 0.00 | 0.00 | 33.00 | 0.00 |
| 144.232 | 1.047 | 28.42 | 205.78 | 0.00 | 0.00 | 33.00 | 0.00 |
| 145.279 | 1.047 | 28.42 | 202.55 | 0.00 | 0.00 | 33.00 | 0.00 |
| 146.326 | 0.522 | 28.42 | 99.82 | 0.00 | 0.00 | 33.00 | 0.00 |
| 146.849 | 1.047 | 28.83 | 197.61 | 0.00 | 0.00 | 33.00 | 0.00 |
| 147.896 | 1.047 | 28.83 | 194.17 | 0.00 | 0.00 | 33.00 | 0.00 |
| 148.943 | 1.047 | 28.83 | 190.73 | 0.00 | 0.00 | 33.00 | 0.00 |
| 149.991 | 0.444 | 28.83 | 79.85 | 0.00 | 0.00 | 33.00 | 0.00 |
| 150.435 | 1.047 | 29.24 | 185.73 | 0.00 | 0.00 | 33.00 | 0.00 |
| 151.482 | 1.047 | 29.24 | 182.07 | 0.00 | 0.00 | 33.00 | 0.00 |
| 152.529 | 1.047 | 29.24 | 178.42 | 0.00 | 0.00 | 33.00 | 0.00 |
| 153.576 | 0.409 | 29.24 | 68.62 | 0.00 | 0.00 | 33.00 | 0.00 |
| 153.985 | 1.047 | 29.64 | 173.23 | 0.00 | 0.00 | 33.00 | 0.00 |
| 155.032 | 1.047 | 29.64 | 169.36 | 0.00 | 0.00 | 33.00 | 0.00 |
| 156.080 | 1.047 | 29.64 | 165.49 | 0.00 | 0.00 | 33.00 | 0.00 |
| 157.127 | 0.435 | 29.64 | 67.54 | 0.00 | 0.00 | 33.00 | 0.00 |
| 157.561 | 1.047 | 30.03 | 159.91 | 0.00 | 0.00 | 33.00 | 0.00 |
| 158.609 | 1.047 | 30.03 | 155.83 | 0.00 | 0.00 | 33.00 | 0.00 |
| 159.656 | 1.047 | 30.03 | 151.75 | 0.00 | 0.00 | 33.00 | 0.00 |
| 160.703 | 0.502 | 30.03 | 71.27 | 0.00 | 0.00 | 33.00 | 0.00 |
| 161.205 | 1.047 | 30.41 | 145.62 | 0.00 | 0.00 | 33.00 | 0.00 |
| 162.252 | 1.047 | 30.41 | 141.34 | 0.00 | 0.00 | 33.00 | 0.00 |
| 163.299 | 1.047 | 30.41 | 137.06 | 0.00 | 0.00 | 33.00 | 0.00 |
| 164.347 | 0.629 | 30.41 | 80.26 | 0.00 | 0.00 | 33.00 | 0.00 |
| 164.976 | 1.047 | 30.76 | 130.11 | 0.00 | 0.00 | 33.00 | 0.00 |
| 166.023 | 1.047 | 30.76 | 125.64 | 0.00 | 0.00 | 33.00 | 0.00 |
| 167.070 | 1.047 | 30.76 | 121.17 | 0.00 | 0.00 | 33.00 | 0.00 |
| 168.117 | 0.831 | 30.76 | 92.94 | 0.00 | 0.00 | 33.00 | 0.00 |
| 168.948 | 1.047 | 29.17 | 113.58 | 0.00 | 0.00 | 33.00 | 0.00 |
| 169.995 | 1.047 | 29.17 | 109.97 | 0.00 | 0.00 | 33.00 | 0.00 |
| 171.043 | 1.047 | 29.17 | 106.35 | 0.00 | 0.00 | 33.00 | 0.00 |
| 172.090 | 0.400 | 29.17 | 39.65 | 0.00 | 0.00 | 33.00 | 0.00 |
| 172.490 | 1.047 | 27.21 | 101.86 | 0.00 | 0.00 | 33.00 | 0.00 |
| 173.537 | 1.047 | 27.21 | 99.25 | 0.00 | 0.00 | 33.00 | 0.00 |
| 174.584 | 1.047 | 27.21 | 96.64 | 0.00 | 0.00 | 33.00 | 0.00 |
| 175.632 | 0.251 | 27.21 | 22.80 | 0.00 | 0.00 | 33.00 | 0.00 |
| 175.883 | 1.047 | 24.95 | 93.97 | 0.00 | 0.00 | 33.00 | 0.00 |
| 176.930 | 1.047 | 24.95 | 92.49 | 0.00 | 0.00 | 33.00 | 0.00 |
| 177.977 | 1.047 | 24.95 | 91.01 | 0.00 | 0.00 | 33.00 | 0.00 |
| 179.025 | 0.094 | 24.95 | 8.09 | 0.00 | 0.00 | 33.00 | 0.00 |
| 179.118 | 1.047 | 22.64 | 89.96 | 0.00 | 0.00 | 33.00 | 0.00 |
| 180.166 | 1.047 | 22.64 | 89.59 | 0.00 | 0.00 | 33.00 | 0.00 |
| 181.213 | 1.047 | 22.64 | 89.22 | 0.00 | 0.00 | 33.00 | 0.00 |
| 182.260 | 0.305 | 22.64 | 25.90 | 0.00 | 0.00 | 33.00 | 0.00 |
| 182.565 | 1.047 | 20.19 | 89.31 | 0.00 | 0.00 | 33.00 | 0.00 |
| 183.612 | 1.047 | 20.19 | 90.08 | 0.00 | 0.00 | 33.00 | 0.00 |
| 184.660 | 1.047 | 20.19 | 90.85 | 0.00 | 0.00 | 33.00 | 0.00 |
| 185.707 | 0.103 | 20.19 | 9.00 | 0.00 | 0.00 | 33.00 | 0.00 |
| 185.810 | 1.047 | 17.66 | 92.27 | 0.00 | 0.00 | 33.00 | 0.00 |

| | | | | | | | |
|---------|-------|-------|--------|------|------|-------|------|
| 186.857 | 1.047 | 17.66 | 94.17 | 0.00 | 0.00 | 33.00 | 0.00 |
| 187.905 | 1.047 | 17.66 | 96.08 | 0.00 | 0.00 | 33.00 | 0.00 |
| 188.952 | 0.302 | 17.66 | 28.06 | 0.00 | 0.00 | 33.00 | 0.00 |
| 189.254 | 1.047 | 15.34 | 99.04 | 0.00 | 0.00 | 33.00 | 0.00 |
| 190.301 | 0.059 | 15.34 | 5.66 | 0.00 | 0.00 | 33.00 | 0.00 |
| 190.360 | 1.047 | 15.34 | 100.90 | 0.00 | 0.00 | 33.00 | 0.00 |
| 191.407 | 1.047 | 15.34 | 101.37 | 0.00 | 0.00 | 33.00 | 0.00 |
| 192.455 | 0.455 | 15.34 | 44.21 | 0.00 | 0.00 | 33.00 | 0.00 |
| 192.910 | 1.047 | 13.44 | 102.46 | 0.00 | 0.00 | 33.00 | 0.00 |
| 193.957 | 1.047 | 13.44 | 103.75 | 0.00 | 0.00 | 33.00 | 0.00 |
| 195.004 | 1.047 | 13.44 | 105.04 | 0.00 | 0.00 | 33.00 | 0.00 |
| 196.052 | 1.047 | 13.44 | 106.33 | 0.00 | 0.00 | 33.00 | 0.00 |
| 197.099 | 0.064 | 13.44 | 6.53 | 0.00 | 0.00 | 33.00 | 0.00 |
| 197.163 | 1.047 | 15.01 | 107.36 | 0.00 | 0.00 | 33.00 | 0.00 |
| 198.210 | 1.047 | 15.01 | 107.97 | 0.00 | 0.00 | 33.00 | 0.00 |
| 199.257 | 1.047 | 15.01 | 108.59 | 0.00 | 0.00 | 33.00 | 0.00 |
| 200.304 | 0.570 | 15.01 | 59.41 | 0.00 | 0.00 | 33.00 | 0.00 |
| 200.875 | 1.047 | 16.89 | 109.13 | 0.00 | 0.00 | 33.00 | 0.00 |
| 201.922 | 1.047 | 16.89 | 108.93 | 0.00 | 0.00 | 33.00 | 0.00 |
| 202.969 | 1.047 | 16.89 | 108.74 | 0.00 | 0.00 | 33.00 | 0.00 |
| 204.017 | 0.360 | 16.89 | 37.33 | 0.00 | 0.00 | 33.00 | 0.00 |
| 204.377 | 1.047 | 18.92 | 108.02 | 0.00 | 0.00 | 33.00 | 0.00 |
| 205.424 | 1.047 | 18.92 | 106.92 | 0.00 | 0.00 | 33.00 | 0.00 |
| 206.471 | 1.047 | 18.92 | 105.82 | 0.00 | 0.00 | 33.00 | 0.00 |
| 207.518 | 0.183 | 18.92 | 18.35 | 0.00 | 0.00 | 33.00 | 0.00 |
| 207.701 | 1.047 | 20.91 | 104.07 | 0.00 | 0.00 | 33.00 | 0.00 |
| 208.748 | 1.047 | 20.91 | 102.06 | 0.00 | 0.00 | 33.00 | 0.00 |
| 209.796 | 1.047 | 20.91 | 100.05 | 0.00 | 0.00 | 33.00 | 0.00 |
| 210.843 | 0.337 | 20.91 | 31.75 | 0.00 | 0.00 | 33.00 | 0.00 |
| 211.180 | 1.047 | 23.37 | 96.82 | 0.00 | 0.00 | 33.00 | 0.00 |
| 212.227 | 1.047 | 23.37 | 93.66 | 0.00 | 0.00 | 33.00 | 0.00 |
| 213.274 | 1.047 | 23.37 | 90.50 | 0.00 | 0.00 | 33.00 | 0.00 |
| 214.321 | 0.552 | 23.37 | 46.43 | 0.00 | 0.00 | 33.00 | 0.00 |
| 214.873 | 1.047 | 25.29 | 85.21 | 0.00 | 0.00 | 33.00 | 0.00 |
| 215.921 | 1.047 | 25.29 | 81.12 | 0.00 | 0.00 | 33.00 | 0.00 |
| 216.968 | 1.047 | 25.29 | 77.03 | 0.00 | 0.00 | 33.00 | 0.00 |
| 218.015 | 1.047 | 25.29 | 72.94 | 0.00 | 0.00 | 33.00 | 0.00 |
| 219.062 | 0.096 | 25.29 | 6.47 | 0.00 | 0.00 | 33.00 | 0.00 |
| 219.158 | 1.047 | 26.92 | 68.07 | 0.00 | 0.00 | 33.00 | 0.00 |
| 220.205 | 1.047 | 26.92 | 63.17 | 0.00 | 0.00 | 33.00 | 0.00 |
| 221.253 | 1.047 | 26.92 | 58.27 | 0.00 | 0.00 | 33.00 | 0.00 |
| 222.300 | 1.047 | 26.92 | 53.36 | 0.00 | 0.00 | 33.00 | 0.00 |
| 223.347 | 0.923 | 26.92 | 42.96 | 0.00 | 0.00 | 33.00 | 0.00 |
| 224.270 | 1.047 | 26.92 | 45.01 | 0.00 | 0.00 | 33.00 | 0.00 |
| 225.317 | 0.062 | 26.92 | 2.57 | 0.00 | 0.00 | 33.00 | 0.00 |
| 225.379 | 1.047 | 27.72 | 41.46 | 0.00 | 0.00 | 33.00 | 0.00 |
| 226.427 | 1.047 | 27.72 | 37.89 | 0.00 | 0.00 | 33.00 | 0.00 |
| 227.474 | 1.047 | 27.72 | 34.32 | 0.00 | 0.00 | 33.00 | 0.00 |
| 228.521 | 1.047 | 27.72 | 30.75 | 0.00 | 0.00 | 33.00 | 0.00 |
| 229.568 | 1.047 | 27.72 | 27.17 | 0.00 | 0.00 | 33.00 | 0.00 |
| 230.616 | 1.047 | 27.72 | 23.60 | 0.00 | 0.00 | 33.00 | 0.00 |
| 231.663 | 1.047 | 27.72 | 20.03 | 0.00 | 0.00 | 33.00 | 0.00 |
| 232.710 | 1.047 | 27.72 | 16.46 | 0.00 | 0.00 | 33.00 | 0.00 |
| 233.757 | 1.047 | 27.72 | 12.89 | 0.00 | 0.00 | 33.00 | 0.00 |
| 234.805 | 1.047 | 27.72 | 9.32 | 0.00 | 0.00 | 33.00 | 0.00 |
| 235.852 | 1.047 | 27.72 | 5.75 | 0.00 | 0.00 | 33.00 | 0.00 |
| 236.899 | 1.047 | 27.72 | 2.18 | 0.00 | 0.00 | 33.00 | 0.00 |
| 237.946 | 0.117 | 27.72 | 0.02 | 0.00 | 0.00 | 33.00 | 0.00 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
dx(m) : Larghezza concio
alpha(°) : Angolo pendenza base concio
W(kN/m) : Forza peso concio
ru(-) : Coefficiente locale pressione interstiziale
U(kPa) : Pressione totale dei pori base concio
phi(°) : Angolo di attrito efficace base concio
c'/Cu (kPa) : Coesione efficace o Resistenza al taglio in condizioni non drenate

TABELLA DIAGRAMMA DELLE FORZE DELLA SUPERFICIE INDIVIDUATA CON MINOR FS

| X | ht | yt | yt' | E(x) | T(x) | E' | rho(x) | FS_qFEM | FS_srmFEM |
|---|----|----|-----|------|------|----|--------|---------|-----------|
|---|----|----|-----|------|------|----|--------|---------|-----------|

| (m) | (m) | (m) | (--) | (kN/m) | (kN/m) | (kN) | (--) | (--) | (--) |
|---------|-------|--------|-------|--------------------|--------------------|--------------------|---------|--------|-------|
| 94.975 | 0.000 | 17.788 | 0.151 | 0.0000000000E+000 | 0.0000000000E+000 | 3.4166418769E-001 | 0.051 | 6.810 | 3.702 |
| 96.023 | 0.033 | 17.946 | 0.151 | 5.2788115624E-001 | 6.2293742423E-004 | 6.6645952651E-001 | 0.051 | 6.810 | 3.702 |
| 97.070 | 0.067 | 18.104 | 0.152 | 1.3959057623E+000 | 6.0994592247E-003 | 1.1135407822E+000 | 0.051 | 7.982 | 3.750 |
| 98.117 | 0.101 | 18.263 | 0.152 | 2.8602028241E+000 | 3.2483369258E-002 | 1.8290403632E+000 | 0.051 | 12.482 | 3.695 |
| 99.164 | 0.136 | 18.424 | 0.163 | 5.2268480490E+000 | 1.2330298208E-001 | 2.9024013727E+000 | 0.056 | 15.672 | 3.842 |
| 100.212 | 0.193 | 18.605 | 0.171 | 8.9393098659E+000 | 3.9799949990E-001 | 3.9878118787E+000 | 0.106 | 11.631 | 4.349 |
| 101.259 | 0.246 | 18.783 | 0.178 | 1.3579357630E+001 | 8.4385981705E-001 | 5.4523514403E+000 | 0.148 | 8.808 | 4.948 |
| 102.306 | 0.317 | 18.979 | 0.194 | 2.0359311368E+001 | 1.6148157330E+001 | 7.4826425159E+000 | 0.189 | 7.157 | 5.600 |
| 103.353 | 0.402 | 19.188 | 0.198 | 2.9251822933E+001 | 2.7898570394E+000 | 8.5870241725E+000 | 0.227 | 6.180 | 6.123 |
| 103.970 | 0.449 | 19.309 | 0.202 | 3.4581775546E+001 | 3.5373085069E+000 | 8.9572213543E+000 | 0.243 | 5.842 | 6.330 |
| 105.017 | 0.540 | 19.525 | 0.215 | 4.4520392770E+001 | 4.9781586524E+000 | 1.0600143986E+001 | 0.266 | 5.417 | 6.611 |
| 106.065 | 0.650 | 19.760 | 0.231 | 5.6783877074E+001 | 6.9034735005E+000 | 1.2749010236E+001 | 0.289 | 5.053 | 6.777 |
| 107.112 | 0.774 | 20.009 | 0.244 | 7.1223314920E+001 | 9.3431672407E+000 | 1.4843574282E+001 | 0.312 | 4.743 | 6.805 |
| 108.005 | 0.892 | 20.233 | 0.259 | 8.5293383795E+001 | 1.1889997178E+001 | 1.6703879798E+001 | 0.331 | 4.514 | 6.715 |
| 109.053 | 1.022 | 20.512 | 0.274 | 1.0396410577E+002 | 1.5516656006E+001 | 1.8952827804E+001 | 0.355 | 4.280 | 6.489 |
| 110.100 | 1.167 | 20.806 | 0.289 | 1.2499026034E+002 | 4.4638839860E+001 | 2.1146362660E+001 | 0.378 | 4.075 | 6.175 |
| 111.147 | 1.329 | 21.116 | 0.303 | 1.4825536175E+002 | 2.5059592243E+001 | 2.3178753664E+001 | 0.402 | 3.887 | 5.816 |
| 112.194 | 1.505 | 21.442 | 0.310 | 1.7353837844E+002 | 3.1034511307E+001 | 2.4457054244E+001 | 0.425 | 3.714 | 5.450 |
| 113.242 | 1.680 | 21.766 | 0.326 | 1.9948089247E+002 | 3.7597654255E+001 | 2.6317885425E+001 | 0.448 | 3.556 | 5.104 |
| 114.178 | 1.870 | 22.089 | 0.347 | 2.2542322603E+002 | 4.4638839860E+001 | 2.7724312787E+001 | 0.471 | 3.404 | 4.796 |
| 115.225 | 2.036 | 22.455 | 0.353 | 2.5448564800E+002 | 5.2940471304E+001 | 2.7682843318E+001 | 0.495 | 3.250 | 4.498 |
| 116.273 | 2.209 | 22.828 | 0.369 | 2.8340520238E+002 | 6.1624743022E+001 | 2.7825756228E+001 | 0.517 | 3.108 | 4.244 |
| 117.320 | 2.408 | 23.227 | 0.383 | 3.1276695679E+002 | 7.0968514925E+001 | 2.7414190104E+001 | 0.539 | 2.967 | 4.017 |
| 118.356 | 2.608 | 23.625 | 0.383 | 3.4053355322E+002 | 8.0200073494E+001 | 2.5811561042E+001 | 0.560 | 2.836 | 3.828 |
| 119.403 | 2.747 | 24.025 | 0.393 | 3.6652058232E+002 | 8.9242196855E+001 | 2.4168542844E+001 | 0.579 | 2.719 | 3.668 |
| 120.451 | 2.908 | 24.449 | 0.407 | 3.9115479409E+002 | 9.8252597093E+001 | 2.2420412373E+001 | 0.597 | 2.607 | 3.527 |
| 121.498 | 3.076 | 24.878 | 0.408 | 4.1348034744E+002 | 1.0680457977E+002 | 2.0109923560E+001 | 0.614 | 2.501 | 3.405 |
| 121.860 | 3.131 | 25.024 | 0.401 | 4.2060666817E+002 | 1.0960280532E+002 | 1.9035491655E+001 | 0.619 | 2.467 | 3.368 |
| 122.907 | 3.214 | 25.443 | 0.415 | 4.3855077264E+002 | 1.1703293678E+002 | 1.6105448372E+001 | 0.634 | 2.377 | 3.271 |
| 123.954 | 3.327 | 25.893 | 0.426 | 4.5433968164E+002 | 1.2401546601E+002 | 1.3719271245E+001 | 0.649 | 2.289 | 3.180 |
| 125.002 | 3.433 | 26.336 | 0.416 | 4.6728591562E+002 | 1.3012004942E+002 | 1.0442384938E+001 | 0.662 | 2.210 | 3.100 |
| 125.286 | 3.452 | 26.447 | 0.416 | 4.7010756742E+002 | 1.3152796159E+002 | 9.6901931021E+000 | 0.665 | 2.191 | 3.082 |
| 126.333 | 3.499 | 26.890 | 0.438 | 4.7936546963E+002 | 1.3650810618E+002 | 7.6023057347E+000 | 0.677 | 2.121 | 3.012 |
| 127.380 | 3.578 | 27.364 | 0.452 | 4.8603066846E+002 | 1.4075017372E+002 | 5.1978950565E+000 | 0.688 | 2.053 | 2.942 |
| 128.428 | 3.654 | 27.836 | 0.450 | 4.9025250983E+002 | 1.4413377839E+002 | 2.6135442003E+000 | 0.699 | 1.990 | 2.878 |
| 128.444 | 3.655 | 27.843 | 0.459 | 4.9029370509E+002 | 1.4417664584E+002 | 2.5726731779E+000 | 0.699 | 1.989 | 2.877 |
| 129.491 | 3.681 | 28.323 | 0.466 | 4.9165233146E+002 | 1.4662431247E+002 | 2.0384955511E-001 | 0.709 | 1.931 | 2.816 |
| 130.538 | 3.721 | 28.818 | 0.468 | 4.9072066990E+002 | 1.4828061293E+002 | -2.1868392072E+000 | 0.718 | 1.877 | 2.755 |
| 131.585 | 3.751 | 29.303 | 0.458 | 4.8707197613E+002 | 1.4884423085E+002 | -4.3160540258E+000 | 0.726 | 1.829 | 2.698 |
| 131.794 | 3.751 | 29.394 | 0.510 | 4.8613759948E+002 | 1.4885269430E+002 | -4.9623193066E+000 | 0.728 | 1.820 | 2.688 |
| 132.841 | 3.795 | 29.944 | 0.534 | 4.7841244394E+002 | 1.4805895610E+002 | -8.3724412769E+000 | 0.736 | 1.773 | 2.628 |
| 133.888 | 3.855 | 30.511 | 0.536 | 4.6860144228E+002 | 1.4646767631E+002 | -1.0403768981E+001 | 0.743 | 1.730 | 2.569 |
| 134.936 | 3.903 | 31.066 | 0.526 | 4.5662165171E+002 | 1.4385875227E+002 | -1.2154240586E+001 | 0.749 | 1.693 | 2.515 |
| 135.323 | 3.916 | 31.266 | 0.535 | 4.5181291376E+002 | 1.42701192333E+002 | -1.2798031853E+001 | 0.751 | 1.681 | 2.496 |
| 136.370 | 3.934 | 31.834 | 0.538 | 4.3733546875E+002 | 1.3903834989E+002 | -1.4367734544E+001 | 0.756 | 1.650 | 2.447 |
| 137.417 | 3.944 | 32.393 | 0.522 | 4.2171955828E+002 | 1.3476308160E+002 | -1.5261005398E+001 | 0.760 | 1.625 | 2.402 |
| 138.465 | 3.929 | 32.927 | 0.512 | 4.0537114905E+002 | 1.2992652340E+002 | -1.6135548389E+001 | 0.762 | 1.606 | 2.364 |
| 139.372 | 3.920 | 33.393 | 0.510 | 3.9032359665E+002 | 1.2527383224E+002 | -1.6793883704E+001 | 0.763 | 1.593 | 2.335 |
| 140.419 | 3.892 | 33.923 | 0.503 | 3.7248970298E+002 | 1.1956390286E+002 | -1.6145087066E+001 | 0.763 | 1.581 | 2.306 |
| 140.490 | 3.887 | 33.956 | 0.459 | 3.7134577663E+002 | 1.1918156648E+002 | -1.6104756471E+001 | 0.763 | 1.581 | 2.305 |
| 141.537 | 3.810 | 34.436 | 0.473 | 3.5417608104E+002 | 1.1339662356E+002 | -1.7191100674E+001 | 0.761 | 1.575 | 2.285 |
| 142.585 | 3.763 | 34.947 | 0.485 | 3.3533885418E+002 | 1.0686651227E+002 | -1.8013287883E+001 | 0.758 | 1.573 | 2.268 |
| 143.185 | 3.731 | 35.235 | 0.477 | 3.2451912977E+002 | 1.0305865113E+002 | -1.8067124316E+001 | 0.755 | 1.573 | 2.261 |
| 144.232 | 3.663 | 35.733 | 0.468 | 3.0552714006E+002 | 9.6293898953E+001 | -1.7990495071E+001 | 0.749 | 1.575 | 2.252 |
| 145.279 | 3.579 | 36.216 | 0.475 | 2.8683786822E+002 | 8.9555796429E+001 | -1.8487644296E+001 | 0.742 | 1.580 | 2.246 |
| 146.326 | 3.525 | 36.728 | 0.492 | 2.6680459476E+002 | 8.2329290869E+001 | -1.9357684551E+001 | 0.734 | 1.587 | 2.242 |
| 146.849 | 3.501 | 36.988 | 0.494 | 2.5663367351E+002 | 7.8674902737E+001 | -1.9459067703E+001 | 0.729 | 1.590 | 2.241 |
| 147.896 | 3.441 | 37.504 | 0.495 | 2.3628135753E+002 | 7.1407420008E+001 | -1.9492682137E+001 | 0.718 | 1.599 | 2.238 |
| 148.943 | 3.384 | 38.023 | 0.489 | 2.1580606698E+002 | 6.4190170431E+001 | -1.9262337177E+001 | 0.707 | 1.606 | 2.233 |
| 149.991 | 3.313 | 38.528 | 0.482 | 1.9593621069E+002 | 5.7372933939E+001 | -1.8907036872E+001 | 0.696 | 1.611 | 2.222 |
| 150.435 | 3.282 | 38.742 | 0.478 | 1.8755175246E+002 | 5.4560423991E+001 | -1.8829908345E+001 | 0.692 | 1.612 | 2.214 |
| 151.482 | 3.195 | 39.241 | 0.468 | 1.6795313755E+002 | 4.8097416657E+001 | -1.8314877476E+001 | 0.681 | 1.610 | 2.192 |
| 152.529 | 3.090 | 39.722 | 0.470 | 1.4919106890E+002 | 4.2111357965E+001 | -1.8296233049E+001 | 0.671 | 1.603 | 2.158 |
| 153.576 | 3.008 | 40.226 | 0.485 | 1.2963150492E+002 | 3.6112881182E+001 | -1.8956835600E+001 | 0.662 | 1.585 | 2.104 |
| 153.985 | 2.981 | 40.428 | 0.487 | 1.2184114317E+002 | 3.3805893592E+001 | -1.8940160554E+001 | 0.660 | 1.574 | 2.077 |
| 155.032 | 2.892 | 40.935 | 0.475 | 1.0234380056E+002 | 2.8236078805E+001 | -1.8193136109E+001 | 0.656 | 1.541 | 1.997 |
| 156.080 | 2.784 | 41.423 | 0.476 | 8.3735448044E+001 | 2.3290849376E+001 | -1.8081414576E+001 | 0.661 | 1.497 | 1.902 |
| 157.127 | 2.698 | 41.933 | 0.489 | 6.4472107245E+001 | 1.8631065816E+001 | -1.8474073205E+001 | 0.687 | 1.441 | 1.786 |
| 157.561 | 2.665 | 42.147 | 0.494 | 5.6429053221E+001 | 1.6788920866E+001 | -1.8484917748E+001 | 0.707 | 1.414 | 1.734 |
| 158.609 | 2.577 | 42.665 | 0.485 | 3.7126987821E+001 | 1.2754240685E+001 | -1.7965009936E+001 | 0.817 | 1.344 | 1.600 |
| 159.656 | 2.470 | 43.163 | 0.484 | 1.8801170519E+001 | 9.4586850514E+000 | -1.7669485413E+001 | 1.196 | 1.270 | 1.463 |
| 160.703 | 2.379 | 43.678 | 0.494 | 1.1808401842E+001 | 6.6492810918E+000 | -1.7898740129E+001 | 133.854 | 1.191 | 1.322 |
| 161.205 | 2.339 | 43.928 | 0.503 | -8.8776110331E+000 | -6.4940759320E-007 | -1.7931915110E+001 | 0.051 | 1.153 | 1.254 |
| 162.252 | 2.254 | 44.457 | 0.496 | -2.7667947996E+001 | -6.4940759320E-007 | -1.7408521464E+001 | 0.051 | 1.074 | 1.115 |

| | | | | | | | | | |
|---------|-------|--------|-------|--------------------|--------------------|--------------------|-------|-------|-------|
| 163.299 | 2.148 | 44.967 | 0.501 | -4.5339923384E+001 | -6.4940759320E-007 | -1.7136489421E+001 | 0.051 | 1.001 | 0.987 |
| 164.347 | 2.074 | 45.507 | 0.517 | -6.3560486668E+001 | -6.4940759320E-007 | -1.7195261605E+001 | 0.051 | 0.929 | 0.862 |
| 164.976 | 2.031 | 45.833 | 0.528 | -7.4299044476E+001 | -6.4940759320E-007 | -1.7098091418E+001 | 0.051 | 0.888 | 0.791 |
| 166.023 | 1.967 | 46.392 | 0.520 | -9.2248408901E+001 | -6.4940759320E-007 | -1.6335460633E+001 | 0.051 | 0.824 | 0.676 |
| 167.070 | 1.873 | 46.922 | 0.524 | -1.0851382080E+002 | -6.4940759320E-007 | -1.5593223433E+001 | 0.051 | 0.770 | 0.577 |
| 168.117 | 1.818 | 47.490 | 0.537 | -1.2490856241E+002 | -6.4940759320E-007 | -1.5044928696E+001 | 0.051 | 0.720 | 0.478 |
| 168.948 | 1.764 | 47.930 | 0.521 | -1.3700487079E+002 | -6.4940759320E-007 | -1.4013340566E+001 | 0.051 | 0.687 | 0.408 |
| 169.995 | 1.718 | 48.469 | 0.510 | -1.5095736262E+002 | -6.4940759320E-007 | -1.2590670605E+001 | 0.051 | 0.649 | 0.327 |
| 171.043 | 1.663 | 48.998 | 0.502 | -1.6337614909E+002 | -6.4940759320E-007 | -1.1276033498E+001 | 0.051 | 0.619 | 0.254 |
| 172.090 | 1.602 | 49.521 | 0.491 | -1.7457512110E+002 | -6.4940759320E-007 | -9.7056169193E+000 | 0.051 | 0.595 | 0.220 |
| 172.490 | 1.565 | 49.708 | 0.472 | -1.7830486556E+002 | -6.4940759320E-007 | -9.1678461196E+000 | 0.051 | 0.588 | 0.220 |
| 173.537 | 1.523 | 50.204 | 0.468 | -1.8746552553E+002 | -6.4940759320E-007 | -7.9544214747E+000 | 0.051 | 0.571 | 0.220 |
| 174.584 | 1.469 | 50.688 | 0.453 | -1.9496547634E+002 | -6.4940759320E-007 | -6.5421585812E+000 | 0.051 | 0.561 | 0.220 |
| 175.632 | 1.395 | 51.153 | 0.436 | -2.0116813836E+002 | -6.4940759320E-007 | -5.0100345252E+000 | 0.051 | 0.556 | 0.220 |
| 175.883 | 1.368 | 51.255 | 0.421 | -2.0237178310E+002 | -6.4940759320E-007 | -4.7153832116E+000 | 0.051 | 0.556 | 0.220 |
| 176.930 | 1.325 | 51.699 | 0.429 | -2.0697955414E+002 | -6.4940759320E-007 | -3.8133473694E+000 | 0.051 | 0.558 | 0.220 |
| 177.977 | 1.291 | 52.153 | 0.427 | -2.1035887512E+002 | -6.4940759320E-007 | -2.7142840096E+000 | 0.051 | 0.567 | 0.220 |
| 179.025 | 1.245 | 52.594 | 0.419 | -2.1266464759E+002 | -6.4940759320E-007 | -1.6474281599E+000 | 0.051 | 0.581 | 0.220 |
| 179.118 | 1.238 | 52.631 | 0.408 | -2.1281471611E+002 | -6.4940759320E-007 | -1.5465428001E+000 | 0.051 | 0.583 | 0.220 |
| 180.166 | 1.230 | 53.060 | 0.415 | -2.1383684453E+002 | -6.4940759320E-007 | -3.8594148164E-001 | 0.051 | 0.604 | 0.220 |
| 181.213 | 1.235 | 53.501 | 0.416 | -2.1362307418E+002 | -6.4940759320E-007 | 9.1386208080E-001 | 0.051 | 0.633 | 0.220 |
| 182.260 | 1.227 | 53.930 | 0.407 | -2.1192275178E+002 | -6.4940759320E-007 | 2.2828084583E+000 | 0.051 | 0.672 | 0.220 |
| 182.565 | 1.222 | 54.052 | 0.404 | -2.1116825805E+002 | -6.4940759320E-007 | 2.6373464739E+000 | 0.051 | 0.685 | 0.220 |
| 183.612 | 1.262 | 54.477 | 0.402 | -2.0782126926E+002 | -6.4940759320E-007 | 3.7859480795E+000 | 0.051 | 0.735 | 0.220 |
| 184.660 | 1.294 | 54.894 | 0.381 | -2.0323855410E+002 | -6.4940759320E-007 | 4.8534180034E+000 | 0.051 | 0.794 | 0.220 |
| 185.707 | 1.290 | 55.275 | 0.362 | -1.9765573949E+002 | -6.4940759320E-007 | 5.8460971361E+000 | 0.051 | 0.859 | 0.220 |
| 185.810 | 1.287 | 55.310 | 0.348 | -1.9704708951E+002 | -6.4940759320E-007 | 5.9519456203E+000 | 0.051 | 0.865 | 0.220 |
| 186.857 | 1.318 | 55.675 | 0.341 | -1.9022870695E+002 | -6.4940759320E-007 | 6.9737497314E+000 | 0.051 | 0.939 | 0.220 |
| 187.905 | 1.335 | 56.025 | 0.321 | -1.8244050495E+002 | -6.4940759320E-007 | 7.9503130842E+000 | 0.051 | 1.020 | 0.220 |
| 188.952 | 1.323 | 56.346 | 0.306 | -1.7357670123E+002 | -6.4940759320E-007 | 9.2978412682E+000 | 0.051 | 1.105 | 0.220 |
| 189.254 | 1.318 | 56.438 | 0.303 | -1.7069634237E+002 | -6.4940759320E-007 | 9.7018075821E+000 | 0.051 | 1.132 | 0.220 |
| 190.301 | 1.348 | 56.755 | 0.302 | -1.5994233037E+002 | -6.4940759320E-007 | 1.0450827963E+001 | 0.051 | 1.227 | 0.220 |
| 190.360 | 1.349 | 56.772 | 0.290 | -1.5932576924E+002 | -6.4940759320E-007 | 1.0502464080E+001 | 0.051 | 1.233 | 0.220 |
| 191.407 | 1.366 | 57.076 | 0.285 | -1.4755682494E+002 | -6.4940759320E-007 | 1.1675806218E+001 | 0.051 | 1.330 | 0.220 |
| 192.455 | 1.371 | 57.368 | 0.281 | -1.3487068303E+002 | -6.4940759320E-007 | 1.2894537302E+001 | 0.051 | 1.430 | 0.243 |
| 192.910 | 1.376 | 57.499 | 0.288 | -1.2884606400E+002 | -6.4940759320E-007 | 1.3437347354E+001 | 0.051 | 1.476 | 0.269 |
| 193.957 | 1.428 | 57.801 | 0.283 | -1.1428374771E+002 | -6.4940759320E-007 | 1.4019686872E+001 | 0.051 | 1.582 | 0.334 |
| 195.004 | 1.470 | 58.092 | 0.279 | -9.9481697657E+001 | -6.4940759320E-007 | 1.4353000489E+001 | 0.051 | 1.680 | 0.404 |
| 196.052 | 1.512 | 58.385 | 0.285 | -8.4221252853E+001 | -6.4940759320E-007 | 1.4884301543E+001 | 0.051 | 1.773 | 0.482 |
| 197.099 | 1.567 | 58.690 | 0.292 | -6.8306387731E+001 | -6.4940759320E-007 | 1.5415241931E+001 | 0.051 | 1.862 | 0.572 |
| 197.163 | 1.571 | 58.709 | 0.292 | -6.7321079610E+001 | -6.4940759320E-007 | 1.5389262934E+001 | 0.051 | 1.867 | 0.578 |
| 198.210 | 1.595 | 59.014 | 0.290 | -5.1879570726E+001 | -6.4940759320E-007 | 1.4396932648E+001 | 0.051 | 1.946 | 0.677 |
| 199.257 | 1.617 | 59.317 | 0.293 | -3.7166568432E+001 | -6.4940759320E-007 | 1.3695501060E+001 | 0.051 | 2.017 | 0.784 |
| 200.304 | 1.646 | 59.627 | 0.298 | -2.3194214621E+001 | -6.4940759320E-007 | 1.3033962536E+001 | 0.051 | 2.077 | 0.903 |
| 200.875 | 1.665 | 59.799 | 0.295 | -1.5854640066E+001 | -6.4940759320E-007 | 1.2407666130E+001 | 0.051 | 2.106 | 0.972 |
| 201.922 | 1.653 | 60.105 | 0.298 | -3.7422851028E+000 | -6.4940759320E-007 | 1.1152143823E+001 | 0.051 | 2.154 | 1.102 |
| 202.969 | 1.653 | 60.423 | 0.309 | 7.5036303249E+000 | 2.5621997910E+000 | 1.0335911391E+001 | 0.812 | 2.199 | 1.242 |
| 204.017 | 1.664 | 60.751 | 0.314 | 1.7906378762E+001 | 3.3307984047E+000 | 9.3876289650E+000 | 0.442 | 2.240 | 1.391 |
| 204.377 | 1.668 | 60.865 | 0.320 | 2.1217944656E+001 | 3.6002657187E+000 | 9.0276281886E+000 | 0.403 | 2.252 | 1.444 |
| 205.424 | 1.646 | 61.202 | 0.319 | 3.0146784897E+001 | 4.3968918118E+000 | 7.7336919864E+000 | 0.347 | 2.284 | 1.598 |
| 206.471 | 1.618 | 61.533 | 0.317 | 3.7416235443E+001 | 5.1381088272E+000 | 6.3201154648E+000 | 0.326 | 2.309 | 1.742 |
| 207.518 | 1.593 | 61.866 | 0.321 | 4.3384326330E+001 | 5.8019320946E+000 | 5.3273939207E+000 | 0.318 | 2.322 | 1.876 |
| 207.701 | 1.591 | 61.928 | 0.328 | 4.4345706127E+001 | 5.9096877752E+000 | 5.1340395131E+000 | 0.317 | 2.323 | 1.900 |
| 208.748 | 1.534 | 62.270 | 0.328 | 4.8950486213E+001 | 6.4452609375E+000 | 3.8569629040E+000 | 0.313 | 2.325 | 2.024 |
| 209.796 | 1.479 | 62.615 | 0.337 | 5.2424151296E+001 | 6.8485978696E+000 | 2.8162750845E+000 | 0.311 | 2.322 | 2.134 |
| 210.843 | 1.439 | 62.976 | 0.352 | 5.4849200932E+001 | 7.1021625208E+000 | 1.7565399265E+000 | 0.308 | 2.313 | 2.235 |
| 211.180 | 1.437 | 63.102 | 0.381 | 5.5380248643E+001 | 7.1428098686E+000 | 1.4341374921E+000 | 0.307 | 2.308 | 2.267 |
| 212.227 | 1.385 | 63.503 | 0.385 | 5.6417808427E+001 | 7.1753180248E+000 | 5.5860358566E-001 | 0.302 | 2.297 | 2.365 |
| 213.274 | 1.338 | 63.908 | 0.384 | 5.6550249120E+001 | 7.0672191566E+000 | -2.8802898573E-001 | 0.297 | 2.290 | 2.460 |
| 214.321 | 1.285 | 64.308 | 0.383 | 5.5814529001E+001 | 6.8303952077E+000 | -1.0100694962E+000 | 0.291 | 2.287 | 2.553 |
| 214.873 | 1.259 | 64.521 | 0.399 | 5.5167504510E+001 | 6.6700689053E+000 | -1.3766634735E+000 | 0.287 | 2.287 | 2.605 |
| 215.921 | 1.191 | 64.947 | 0.405 | 5.3319483057E+001 | 6.2826361892E+000 | -2.0498743691E+000 | 0.280 | 2.298 | 2.716 |
| 216.968 | 1.118 | 65.369 | 0.417 | 5.0874023316E+001 | 5.8249191071E+000 | -2.6379983498E+000 | 0.272 | 2.326 | 2.841 |
| 218.015 | 1.075 | 65.821 | 0.430 | 4.7794170640E+001 | 5.2919762601E+000 | -3.0497630147E+000 | 0.263 | 2.372 | 2.995 |
| 219.062 | 1.029 | 66.270 | 0.430 | 4.4486265926E+001 | 4.7483851243E+000 | -3.3769629031E+000 | 0.254 | 2.435 | 3.177 |
| 219.158 | 1.027 | 66.313 | 0.422 | 4.4160857503E+001 | 4.6969433321E+000 | -3.3899735619E+000 | 0.253 | 2.442 | 3.196 |
| 220.205 | 0.935 | 66.752 | 0.419 | 4.0690369898E+001 | 4.1684982424E+000 | -3.3461156276E+000 | 0.244 | 2.529 | 3.410 |
| 221.253 | 0.841 | 67.190 | 0.423 | 3.7152386770E+001 | 3.5666016859E+000 | -3.4058140309E+000 | 0.234 | 2.640 | 3.664 |
| 222.300 | 0.757 | 67.638 | 0.432 | 3.3556860297E+001 | 3.1604142419E+000 | -3.4294808717E+000 | 0.224 | 2.779 | 3.971 |
| 223.347 | 0.683 | 68.095 | 0.427 | 2.9969306748E+001 | 2.6881380374E+000 | -3.2753038875E+000 | 0.213 | 2.955 | 4.346 |
| 224.270 | 0.599 | 68.480 | 0.422 | 2.7069000105E+001 | 2.3275460215E+000 | -3.1063958809E+000 | 0.204 | 3.130 | 4.710 |
| 225.317 | 0.514 | 68.927 | 0.429 | 2.3859073219E+001 | 1.9487000006E+000 | -3.1627396392E+000 | 0.194 | 3.365 | 5.197 |
| 225.379 | 0.511 | 68.956 | 0.444 | 2.3662593011E+001 | 1.9262940167E+000 | -3.1575747536E+000 | 0.194 | 3.381 | 5.229 |
| 226.427 | 0.425 | 69.420 | 0.457 | 2.0549423961E+001 | 1.5860709707E+000 | -2.9629005708E+000 | 0.183 | 3.663 | 5.806 |
| 227.474 | 0.368 | 69.913 | 0.466 | 1.7456769828E+001 | 1.2678867484E+000 | -2.7728552154E+000 | 0.173 | 4.022 | 6.532 |

| | | | | | | | | | |
|---------|-------|--------|-------|-------------------|-------------------|--------------------|-------|--------|--------|
| 228.521 | 0.300 | 70.395 | 0.475 | 1.4741652567E+001 | 1.0099571547E+000 | -2.4993587849E+000 | 0.163 | 4.417 | 7.312 |
| 229.568 | 0.263 | 70.909 | 0.492 | 1.2221839287E+001 | 7.8563287859E-001 | -2.5125264163E+000 | 0.153 | 4.918 | 8.293 |
| 230.616 | 0.231 | 71.427 | 0.524 | 9.4791422980E+000 | 5.4489385095E-001 | -2.6641101748E+000 | 0.137 | 5.815 | 10.044 |
| 231.663 | 0.260 | 72.006 | 0.519 | 6.6418354060E+000 | 3.1954304331E-001 | -2.3147106367E+000 | 0.114 | 7.417 | 13.069 |
| 232.710 | 0.218 | 72.515 | 0.484 | 4.6309590440E+000 | 1.8082150396E-001 | -1.7406406178E+000 | 0.093 | 9.294 | 16.371 |
| 233.757 | 0.173 | 73.020 | 0.483 | 2.9960472197E+000 | 8.5654295071E-002 | -1.3926155760E+000 | 0.068 | 11.808 | 20.419 |
| 234.805 | 0.130 | 73.526 | 0.484 | 1.7141125892E+000 | 3.1725126512E-002 | -1.0551614074E+000 | 0.051 | 14.674 | 24.206 |
| 235.852 | 0.087 | 74.034 | 0.485 | 7.8600170286E-001 | 8.5182654677E-003 | -7.1592302818E-001 | 0.051 | 22.467 | 27.817 |
| 236.899 | 0.046 | 74.543 | 0.486 | 2.1460505622E-001 | 1.3550251056E-003 | -3.7435705484E-001 | 0.051 | 5.520 | 8.398 |
| 237.946 | 0.005 | 75.052 | 0.486 | 1.9073216926E-003 | 6.6009621431E-006 | -3.5072354707E-002 | 0.051 | 4.934 | 6.670 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
 ht(m) : Altezza linea di thrust da nodo sinistro base concio
 yt(m) : coordinata Y linea di trust
 yt'(-) : gradiente pendenza locale linea di trust
 E(x)(kN/m) : Forza Normale interconcio
 T(x)(kN/m) : Forza Tangenziale interconcio
 E' (kN) : derivata Forza normale interconcio
 Rho(x) (-) : fattore mobilitazione resistenza al taglio verticale interconcio ZhU et al.(2003)
 FS_qFEM(x)(-) : fattore di sicurezza locale stimato (locale in X) by qFEM
 FS_srmFEM(x)(-) : fattore di sicurezza locale stimato (locale in X) by SRM Procedure

TABELLA SFORZI DI TAGLIO DISTRIBUITI LUNGO SUPERFICIE INDIVIDUATA CON MINOR FS

| X (m) | dx (m) | dl (m) | alpha (°) | TauStress (kPa) | TauF (kN/m) | TauStrength (kPa) | TauS (kN/m) |
|----------|-----------|-----------|--------------|--------------------|----------------|----------------------|----------------|
| 94.975 | 1.047 | 1.055 | 6.798 | 0.164 | 0.173 | 0.893 | 0.941 |
| 96.023 | 1.047 | 1.055 | 6.798 | 0.491 | 0.518 | 2.679 | 2.826 |
| 97.070 | 1.047 | 1.055 | 6.798 | 0.819 | 0.864 | 4.473 | 4.718 |
| 98.117 | 1.047 | 1.055 | 6.798 | 1.147 | 1.209 | 6.286 | 6.629 |
| 99.164 | 1.047 | 1.055 | 6.798 | 1.474 | 1.555 | 8.151 | 8.597 |
| 100.212 | 1.047 | 1.055 | 6.798 | 1.802 | 1.900 | 10.010 | 10.558 |
| 101.259 | 1.047 | 1.055 | 6.798 | 2.129 | 2.246 | 11.937 | 12.590 |
| 102.306 | 1.047 | 1.055 | 6.798 | 2.457 | 2.591 | 13.899 | 14.659 |
| 103.353 | 0.617 | 0.621 | 6.798 | 2.717 | 1.687 | 15.358 | 9.538 |
| 103.970 | 1.047 | 1.055 | 6.798 | 3.367 | 3.552 | 18.975 | 20.013 |
| 105.017 | 1.047 | 1.055 | 6.798 | 4.475 | 4.720 | 25.221 | 26.599 |
| 106.065 | 1.047 | 1.055 | 6.798 | 5.582 | 5.888 | 31.479 | 33.200 |
| 107.112 | 0.894 | 0.900 | 6.798 | 6.609 | 5.948 | 37.308 | 33.577 |
| 108.005 | 1.047 | 1.058 | 8.091 | 9.016 | 9.537 | 42.646 | 45.110 |
| 109.053 | 1.047 | 1.058 | 8.091 | 10.259 | 10.851 | 48.624 | 51.434 |
| 110.100 | 1.047 | 1.058 | 8.091 | 11.501 | 12.166 | 54.618 | 57.774 |
| 111.147 | 1.047 | 1.058 | 8.091 | 12.744 | 13.480 | 60.620 | 64.123 |
| 112.194 | 1.047 | 1.058 | 8.091 | 13.986 | 14.795 | 66.533 | 70.378 |
| 113.242 | 0.937 | 0.946 | 8.091 | 15.163 | 14.344 | 72.437 | 68.522 |
| 114.178 | 1.047 | 1.066 | 10.819 | 21.522 | 22.947 | 75.843 | 80.864 |
| 115.225 | 1.047 | 1.066 | 10.819 | 22.968 | 24.488 | 80.880 | 86.235 |
| 116.273 | 1.047 | 1.066 | 10.819 | 24.413 | 26.030 | 86.008 | 91.703 |
| 117.320 | 1.036 | 1.055 | 10.819 | 25.851 | 27.270 | 90.891 | 95.880 |
| 118.356 | 1.047 | 1.079 | 14.027 | 34.652 | 37.405 | 92.220 | 99.546 |
| 119.403 | 1.047 | 1.079 | 14.027 | 36.192 | 39.067 | 96.216 | 103.860 |
| 120.451 | 1.047 | 1.079 | 14.027 | 37.732 | 40.730 | 100.111 | 108.064 |
| 121.498 | 0.362 | 0.373 | 14.027 | 38.769 | 14.461 | 102.697 | 38.306 |
| 121.860 | 1.047 | 1.100 | 17.838 | 49.129 | 54.049 | 100.129 | 110.157 |
| 122.907 | 1.047 | 1.100 | 17.838 | 50.578 | 55.643 | 102.993 | 113.307 |
| 123.954 | 1.047 | 1.100 | 17.838 | 52.026 | 57.236 | 105.800 | 116.395 |
| 125.002 | 0.284 | 0.299 | 17.838 | 52.947 | 15.819 | 107.537 | 32.129 |
| 125.286 | 1.047 | 1.119 | 20.690 | 60.856 | 68.125 | 104.920 | 117.453 |
| 126.333 | 1.047 | 1.119 | 20.690 | 62.091 | 69.508 | 107.004 | 119.785 |
| 127.380 | 1.047 | 1.119 | 20.690 | 63.327 | 70.891 | 109.081 | 122.110 |
| 128.428 | 0.016 | 0.017 | 20.690 | 63.954 | 1.086 | 110.128 | 1.871 |
| 128.444 | 1.047 | 1.142 | 23.475 | 71.163 | 81.251 | 106.373 | 121.451 |
| 129.491 | 1.047 | 1.142 | 23.475 | 72.074 | 82.291 | 107.748 | 123.022 |
| 130.538 | 1.047 | 1.142 | 23.475 | 72.985 | 83.331 | 109.129 | 124.598 |
| 131.585 | 0.208 | 0.227 | 23.475 | 73.531 | 16.714 | 109.954 | 24.993 |
| 131.794 | 1.047 | 1.163 | 25.824 | 79.283 | 92.241 | 106.453 | 123.851 |
| 132.841 | 1.047 | 1.163 | 25.824 | 79.833 | 92.880 | 107.250 | 124.779 |
| 133.888 | 1.047 | 1.163 | 25.824 | 80.382 | 93.520 | 108.064 | 125.726 |
| 134.936 | 0.387 | 0.430 | 25.824 | 80.758 | 34.741 | 108.608 | 46.721 |
| 135.323 | 1.047 | 1.182 | 27.671 | 84.919 | 100.417 | 105.608 | 124.882 |
| 136.370 | 1.047 | 1.182 | 27.671 | 85.130 | 100.666 | 105.942 | 125.277 |

| | | | | | | | |
|---------|-------|-------|--------|--------|---------|---------|---------|
| 137.417 | 1.047 | 1.182 | 27.671 | 85.341 | 100.915 | 106.270 | 125.665 |
| 138.465 | 0.907 | 1.024 | 27.671 | 85.537 | 87.603 | 106.578 | 109.152 |
| 139.372 | 1.047 | 1.186 | 28.032 | 86.436 | 102.552 | 106.161 | 125.953 |
| 140.419 | 0.071 | 0.081 | 28.032 | 86.510 | 6.970 | 106.241 | 8.560 |
| 140.490 | 1.047 | 1.186 | 28.032 | 85.916 | 101.934 | 105.536 | 125.212 |
| 141.537 | 1.047 | 1.186 | 28.032 | 84.717 | 100.512 | 104.169 | 123.591 |
| 142.585 | 0.600 | 0.680 | 28.032 | 83.775 | 56.960 | 103.034 | 70.055 |
| 143.185 | 1.047 | 1.191 | 28.423 | 83.545 | 99.486 | 101.174 | 120.478 |
| 144.232 | 1.047 | 1.191 | 28.423 | 82.255 | 97.949 | 99.622 | 118.630 |
| 145.279 | 1.047 | 1.191 | 28.423 | 80.964 | 96.412 | 98.141 | 116.866 |
| 146.326 | 0.522 | 0.594 | 28.423 | 79.997 | 47.514 | 96.994 | 57.609 |
| 146.849 | 1.047 | 1.195 | 28.825 | 79.704 | 95.276 | 95.119 | 113.703 |
| 147.896 | 1.047 | 1.195 | 28.825 | 78.317 | 93.618 | 93.475 | 111.738 |
| 148.943 | 1.047 | 1.195 | 28.825 | 76.930 | 91.960 | 91.780 | 109.711 |
| 149.991 | 0.444 | 0.507 | 28.825 | 75.943 | 38.498 | 90.588 | 45.922 |
| 150.435 | 1.047 | 1.200 | 29.237 | 75.586 | 90.714 | 88.705 | 106.459 |
| 151.482 | 1.047 | 1.200 | 29.237 | 74.098 | 88.929 | 86.905 | 104.298 |
| 152.529 | 1.047 | 1.200 | 29.237 | 72.611 | 87.144 | 85.181 | 102.229 |
| 153.576 | 0.409 | 0.468 | 29.237 | 71.577 | 33.516 | 83.968 | 39.318 |
| 153.985 | 1.047 | 1.205 | 29.642 | 71.104 | 85.676 | 82.065 | 98.884 |
| 155.032 | 1.047 | 1.205 | 29.642 | 69.516 | 83.763 | 80.149 | 96.575 |
| 156.080 | 1.047 | 1.205 | 29.642 | 67.928 | 81.849 | 78.290 | 94.334 |
| 157.127 | 0.435 | 0.500 | 29.642 | 66.804 | 33.404 | 76.971 | 38.487 |
| 157.561 | 1.047 | 1.210 | 30.034 | 66.164 | 80.037 | 75.023 | 90.753 |
| 158.609 | 1.047 | 1.210 | 30.034 | 64.477 | 77.996 | 72.999 | 88.305 |
| 159.656 | 1.047 | 1.210 | 30.034 | 62.789 | 75.954 | 71.019 | 85.909 |
| 160.703 | 0.502 | 0.580 | 30.034 | 61.541 | 35.671 | 71.542 | 41.467 |
| 161.205 | 1.047 | 1.214 | 30.410 | 60.702 | 73.711 | 67.162 | 81.556 |
| 162.252 | 1.047 | 1.214 | 30.410 | 58.917 | 71.544 | 65.188 | 79.159 |
| 163.299 | 1.047 | 1.214 | 30.410 | 57.132 | 69.377 | 63.213 | 76.761 |
| 164.347 | 0.629 | 0.729 | 30.410 | 55.704 | 40.625 | 61.633 | 44.949 |
| 164.976 | 1.047 | 1.219 | 30.756 | 54.598 | 66.537 | 59.582 | 72.610 |
| 166.023 | 1.047 | 1.219 | 30.756 | 52.723 | 64.251 | 57.536 | 70.116 |
| 167.070 | 1.047 | 1.219 | 30.756 | 50.848 | 61.966 | 55.489 | 67.622 |
| 168.117 | 0.831 | 0.967 | 30.756 | 49.166 | 47.529 | 53.654 | 51.867 |
| 168.948 | 1.047 | 1.199 | 29.165 | 46.154 | 55.353 | 53.706 | 64.410 |
| 169.995 | 1.047 | 1.199 | 29.165 | 44.684 | 53.590 | 51.996 | 62.359 |
| 171.043 | 1.047 | 1.199 | 29.165 | 43.215 | 51.827 | 50.286 | 60.308 |
| 172.090 | 0.400 | 0.458 | 29.165 | 42.199 | 19.322 | 49.104 | 22.484 |
| 172.490 | 1.047 | 1.178 | 27.213 | 39.554 | 46.579 | 49.953 | 58.825 |
| 173.537 | 1.047 | 1.178 | 27.213 | 38.542 | 45.387 | 48.675 | 57.320 |
| 174.584 | 1.047 | 1.178 | 27.213 | 37.530 | 44.195 | 47.397 | 55.814 |
| 175.632 | 0.251 | 0.282 | 27.213 | 36.902 | 10.425 | 46.604 | 13.165 |
| 175.883 | 1.047 | 1.155 | 24.955 | 34.325 | 39.648 | 47.901 | 55.331 |
| 176.930 | 1.047 | 1.155 | 24.955 | 33.784 | 39.023 | 47.146 | 54.459 |
| 177.977 | 1.047 | 1.155 | 24.955 | 33.243 | 38.399 | 46.392 | 53.587 |
| 179.025 | 0.094 | 0.104 | 24.955 | 32.948 | 3.413 | 45.980 | 4.764 |
| 179.118 | 1.047 | 1.135 | 22.637 | 30.514 | 34.623 | 47.518 | 53.918 |
| 180.166 | 1.047 | 1.135 | 22.637 | 30.389 | 34.481 | 47.324 | 53.697 |
| 181.213 | 1.047 | 1.135 | 22.637 | 30.264 | 34.340 | 47.130 | 53.477 |
| 182.260 | 0.305 | 0.330 | 22.637 | 30.184 | 9.970 | 47.004 | 15.527 |
| 182.565 | 1.047 | 1.116 | 20.186 | 27.621 | 30.819 | 48.789 | 54.439 |
| 183.612 | 1.047 | 1.116 | 20.186 | 27.859 | 31.084 | 49.210 | 54.907 |
| 184.660 | 1.047 | 1.116 | 20.186 | 28.097 | 31.350 | 49.630 | 55.376 |
| 185.707 | 0.103 | 0.110 | 20.186 | 28.227 | 3.104 | 49.861 | 5.483 |
| 185.810 | 1.047 | 1.099 | 17.656 | 25.463 | 27.984 | 51.951 | 57.096 |
| 186.857 | 1.047 | 1.099 | 17.656 | 25.989 | 28.562 | 53.024 | 58.275 |
| 187.905 | 1.047 | 1.099 | 17.656 | 26.515 | 29.140 | 54.097 | 59.454 |
| 188.952 | 0.302 | 0.317 | 17.656 | 26.853 | 8.510 | 54.789 | 17.363 |
| 189.254 | 1.047 | 1.086 | 15.341 | 24.129 | 26.203 | 57.116 | 62.025 |
| 190.301 | 0.059 | 0.061 | 15.341 | 24.504 | 1.498 | 58.004 | 3.545 |
| 190.360 | 1.047 | 1.086 | 15.341 | 24.582 | 26.695 | 58.188 | 63.190 |
| 191.407 | 1.047 | 1.086 | 15.341 | 24.697 | 26.820 | 58.461 | 63.486 |
| 192.455 | 0.455 | 0.472 | 15.341 | 24.780 | 11.698 | 58.657 | 27.690 |
| 192.910 | 1.047 | 1.077 | 13.438 | 22.114 | 23.811 | 60.104 | 64.716 |
| 193.957 | 1.047 | 1.077 | 13.438 | 22.392 | 24.111 | 60.860 | 65.530 |
| 195.004 | 1.047 | 1.077 | 13.438 | 22.670 | 24.410 | 61.616 | 66.344 |
| 196.052 | 1.047 | 1.077 | 13.438 | 22.949 | 24.710 | 62.372 | 67.158 |
| 197.099 | 0.064 | 0.066 | 13.438 | 23.096 | 1.517 | 62.773 | 4.122 |
| 197.163 | 1.047 | 1.084 | 15.010 | 25.643 | 27.803 | 62.107 | 67.340 |
| 198.210 | 1.047 | 1.084 | 15.010 | 25.790 | 27.963 | 62.464 | 67.726 |
| 199.257 | 1.047 | 1.084 | 15.010 | 25.938 | 28.123 | 62.821 | 68.113 |
| 200.304 | 0.570 | 0.591 | 15.010 | 26.051 | 15.386 | 63.096 | 37.265 |
| 200.875 | 1.047 | 1.094 | 16.886 | 28.965 | 31.701 | 61.965 | 67.817 |
| 201.922 | 1.047 | 1.094 | 16.886 | 28.912 | 31.643 | 62.256 | 68.136 |

| | | | | | | | |
|---------|-------|-------|--------|--------|--------|--------|--------|
| 202.969 | 1.047 | 1.094 | 16.886 | 28.859 | 31.585 | 61.860 | 67.702 |
| 204.017 | 0.360 | 0.376 | 16.886 | 28.824 | 10.843 | 61.786 | 23.242 |
| 204.377 | 1.047 | 1.107 | 18.915 | 31.630 | 35.015 | 60.025 | 66.450 |
| 205.424 | 1.047 | 1.107 | 18.915 | 31.308 | 34.659 | 59.409 | 65.767 |
| 206.471 | 1.047 | 1.107 | 18.915 | 30.986 | 34.302 | 58.790 | 65.083 |
| 207.518 | 0.183 | 0.193 | 18.915 | 30.796 | 5.947 | 58.427 | 11.283 |
| 207.701 | 1.047 | 1.121 | 20.915 | 33.137 | 37.151 | 56.336 | 63.160 |
| 208.748 | 1.047 | 1.121 | 20.915 | 32.497 | 36.433 | 55.242 | 61.934 |
| 209.796 | 1.047 | 1.121 | 20.915 | 31.857 | 35.716 | 54.148 | 60.706 |
| 210.843 | 0.337 | 0.361 | 20.915 | 31.434 | 11.334 | 53.423 | 19.262 |
| 211.180 | 1.047 | 1.141 | 23.369 | 33.662 | 38.404 | 50.591 | 57.716 |
| 212.227 | 1.047 | 1.141 | 23.369 | 32.564 | 37.150 | 48.942 | 55.835 |
| 213.274 | 1.047 | 1.141 | 23.369 | 31.465 | 35.897 | 47.292 | 53.953 |
| 214.321 | 0.552 | 0.601 | 23.369 | 30.626 | 18.416 | 46.032 | 27.680 |
| 214.873 | 1.047 | 1.158 | 25.288 | 31.425 | 36.398 | 43.221 | 50.060 |
| 215.921 | 1.047 | 1.158 | 25.288 | 29.917 | 34.651 | 41.152 | 47.664 |
| 216.968 | 1.047 | 1.158 | 25.288 | 28.409 | 32.905 | 39.084 | 45.269 |
| 218.015 | 1.047 | 1.158 | 25.288 | 26.901 | 31.158 | 37.012 | 42.869 |
| 219.062 | 0.096 | 0.106 | 25.288 | 26.078 | 2.763 | 35.882 | 3.802 |
| 219.158 | 1.047 | 1.175 | 26.920 | 26.239 | 30.819 | 33.613 | 39.479 |
| 220.205 | 1.047 | 1.175 | 26.920 | 24.350 | 28.599 | 31.194 | 36.639 |
| 221.253 | 1.047 | 1.175 | 26.920 | 22.460 | 26.379 | 28.776 | 33.798 |
| 222.300 | 1.047 | 1.175 | 26.920 | 20.570 | 24.160 | 26.357 | 30.956 |
| 223.347 | 0.923 | 1.035 | 26.920 | 18.792 | 19.450 | 24.077 | 24.919 |
| 224.270 | 1.047 | 1.175 | 26.920 | 17.350 | 20.378 | 22.229 | 26.108 |
| 225.317 | 0.062 | 0.070 | 26.920 | 16.704 | 1.162 | 21.402 | 1.488 |
| 225.379 | 1.047 | 1.183 | 27.717 | 16.299 | 19.281 | 20.187 | 23.881 |
| 226.427 | 1.047 | 1.183 | 27.717 | 14.895 | 17.621 | 18.450 | 21.826 |
| 227.474 | 1.047 | 1.183 | 27.717 | 13.491 | 15.960 | 16.707 | 19.765 |
| 228.521 | 1.047 | 1.183 | 27.717 | 12.088 | 14.300 | 14.968 | 17.707 |
| 229.568 | 1.047 | 1.183 | 27.717 | 10.684 | 12.639 | 13.235 | 15.657 |
| 230.616 | 1.047 | 1.183 | 27.717 | 9.280 | 10.979 | 11.498 | 13.602 |
| 231.663 | 1.047 | 1.183 | 27.717 | 7.877 | 9.318 | 9.753 | 11.538 |
| 232.710 | 1.047 | 1.183 | 27.717 | 6.473 | 7.658 | 8.013 | 9.479 |
| 233.757 | 1.047 | 1.183 | 27.717 | 5.069 | 5.997 | 6.273 | 7.421 |
| 234.805 | 1.047 | 1.183 | 27.717 | 3.666 | 4.337 | 4.534 | 5.364 |
| 235.852 | 1.047 | 1.183 | 27.717 | 2.262 | 2.676 | 2.797 | 3.309 |
| 236.899 | 1.047 | 1.183 | 27.717 | 0.859 | 1.016 | 1.061 | 1.256 |
| 237.946 | 0.117 | 0.132 | 27.717 | 0.078 | 0.010 | 0.097 | 0.013 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
dx(m) : Larghezza concio
dl(m) : lunghezza base concio
alpha(°) : Angolo pendenza base concio
TauStress(kPa) : Sforzo di taglio su base concio
TauF (kN/m) : Forza di taglio su base concio
TauStrength(kPa) : Resistenza al taglio su base concio
TauS (kN/m) : Forza resistente al taglio su base concio

Condizioni sismiche

SSAP 5.0.2 - Slope Stability Analysis Program (1991,2021)

WWW.SSAP.EU

Build No. 12007

BY

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** Gia' Ricercatore CNR-IRPI fino a Luglio 2011

Ultima Revisione struttura tabelle del report: 21 Febbraio 2021

File report: \\192.168.1.231\BACKUP su PC canepa\lavorimauri\cave e miniere\Minerale industriali\VIA
2022\Disegni\Ispaduledas\SAP\ver dinamica.txt

Data: 26/1/2022

Localita' :

Descrizione:

Modello pendio: Discarica dinamica.mod

----- PARAMETRI DEL MODELLO DEL PENDIO -----

__ PARAMETRI GEOMETRICI - Coordinate X Y (in m) __

| SUP T. | | SUP 2 | | SUP 3 | | SUP 4 | |
|--------|-------|-------|---|-------|---|-------|---|
| X | Y | X | Y | X | Y | X | Y |
| 10.00 | 10.00 | - | - | - | - | - | - |
| 19.15 | 10.00 | - | - | - | - | - | - |
| 30.21 | 10.00 | - | - | - | - | - | - |
| 43.01 | 11.00 | - | - | - | - | - | - |
| 51.14 | 12.00 | - | - | - | - | - | - |
| 63.31 | 10.00 | - | - | - | - | - | - |
| 103.97 | 20.00 | - | - | - | - | - | - |
| 140.49 | 40.00 | - | - | - | - | - | - |
| 190.36 | 60.00 | - | - | - | - | - | - |
| 224.27 | 70.00 | - | - | - | - | - | - |
| 251.27 | 80.00 | - | - | - | - | - | - |
| 303.55 | 90.00 | - | - | - | - | - | - |
| 395.58 | 90.00 | - | - | - | - | - | - |

ASSENZA DI FALDA

----- PARAMETRI GEOMECCANICI -----

| | fi' | C' | Cu | Gamm | Gamm_sat | STR_IDX | sgci | GSI | mi | D |
|----------|-----|-------|------|------|----------|---------|-------|------|------|------|
| STRATO 1 | | 38.00 | 0.00 | 0.00 | 21.00 | 22.00 | 2.781 | 0.00 | 0.00 | 0.00 |

LEGENDA: fi' _____ Angolo di attrito interno efficace(in gradi)

C' _____ Coesione efficace (in Kpa)

Cu _____ Resistenza al taglio Non drenata (in Kpa)

Gamm _____ Peso di volume terreno fuori falda (in KN/m^3)

Gamm_sat _____ Peso di volume terreno immerso (in KN/m^3)

STR_IDX _____ Indice di resistenza (usato in solo in 'SNIFF SEARCH') (adimensionale)

----- SOLO Per AMMASSI ROCCIOSI FRATTURATI - Parametri Criterio di Rottura di Hoek (2002)-

sgci _____ Resistenza Compressione Uniassiale Roccia Intatta (in MPa)

GSI _____ Geological Strenght Index ammasso(adimensionale)

mi _____ Indice litologico ammasso(adimensionale)

D _____ Fattore di disturbo ammasso(adimensionale)

Fattore di riduzione NTC2018: gammaPHI=1.25 e gammaC=1.25 - DISATTIVATO (solo per ROCCE)

Uso CRITERIO DI ROTTURA Hoek et al.(2002,2006) - non-lineare - Generalizzato, secondo Lei et al.(2016)

----- INFORMAZIONI GENERAZIONE SUPERFICI RANDOM -----

*** PARAMETRI PER LA GENERAZIONE DELLE SUPERFICI

MOTORE DI RICERCA: RANDOM SEARCH - Siegel (1981)

FILTRAGGIO SUPERFICI: ATTIVATO

COORDINATE X1,X2,Y OSTACOLO: 0.00 0.00 0.00

LUNGHEZZA MEDIA SEGMENTI (m)*: 1.3 (+/-) 50%

INTERVALLO ASCISSE RANDOM STARTING POINT (Xmin .. Xmax): 63.00 140.00

LIVELLO MINIMO CONSIDERATO (Ymin): 0.00

INTERVALLO ASCISSE AMMESSO PER LA TERMINAZIONE (Xmin .. Xmax): 224.00 387.87

TOTALE SUPERFICI GENERATE: 1000

*NOTA IMPORTANTE: La lunghezza media dei segmenti non viene considerata nel caso di uso del motore di ricerca NEW RANOM SEARCH

----- INFORMAZIONI PARAMETRI DI CALCOLO -----

METODO DI CALCOLO : MORGENSTERN - PRICE (Morgenstern & Price, 1965)
METODO DI ESPLORAZIONE CAMPO VALORI (λ_0, F_{s0}) ADOTTATO : A (rapido)
COEFFICIENTE SISMICO UTILIZZATO K_h : 0.0360
COEFFICIENTE SISMICO UTILIZZATO K_v (assunto Positivo): 0.0180
COEFFICIENTE $c=K_v/K_h$ UTILIZZATO : 0.5000
FORZA ORIZZONTALE ADDIZIONALE IN TESTA (kN/m): 0.00
FORZA ORIZZONTALE ADDIZIONALE ALLA BASE (kN/m): 0.00

N.B. Le forze orizzontali addizionali in testa e alla base sono poste uguali a 0
durante le tutte le verifiche globali.
I valori >0 impostati dall'utente sono utilizzati solo in caso di verifica singola

----- RISULTATO FINALE ELABORAZIONI -----

* DATI RELATIVI ALLE 10 SUPERFICI GENERATE CON MINOR F_s *

| | | | | | |
|---------------------------|--------|----------|---|---|----------------|
| Fattore di sicurezza (FS) | 1.6404 | - Min. - | X | Y | Lambda= 0.6028 |
| | 101.09 | 19.29 | | | |
| | 112.12 | 21.17 | | | |
| | 117.50 | 22.18 | | | |
| | 121.21 | 23.00 | | | |
| | 124.40 | 23.83 | | | |
| | 127.42 | 24.76 | | | |
| | 130.28 | 25.75 | | | |
| | 133.27 | 26.89 | | | |
| | 136.38 | 28.18 | | | |
| | 139.82 | 29.72 | | | |
| | 143.05 | 31.20 | | | |
| | 146.17 | 32.69 | | | |
| | 149.21 | 34.18 | | | |
| | 152.28 | 35.74 | | | |
| | 155.30 | 37.33 | | | |
| | 158.37 | 38.98 | | | |
| | 161.49 | 40.71 | | | |
| | 164.74 | 42.57 | | | |
| | 167.89 | 44.33 | | | |
| | 170.98 | 46.03 | | | |
| | 174.04 | 47.68 | | | |
| | 177.12 | 49.30 | | | |
| | 180.17 | 50.88 | | | |
| | 183.26 | 52.44 | | | |
| | 186.40 | 53.99 | | | |
| | 189.64 | 55.56 | | | |
| | 192.76 | 57.04 | | | |
| | 195.84 | 58.46 | | | |
| | 198.87 | 59.82 | | | |
| | 201.95 | 61.15 | | | |
| | 205.35 | 62.58 | | | |
| | 209.17 | 64.13 | | | |
| | 214.60 | 66.25 | | | |
| | 225.24 | 70.36 | | | |

| | | | | | |
|---------------------------|--------|----------|---|---|----------------|
| Fattore di sicurezza (FS) | 1.6659 | - N.2 -- | X | Y | Lambda= 0.5696 |
| | 89.59 | 16.46 | | | |
| | 102.64 | 16.23 | | | |
| | 108.57 | 16.30 | | | |
| | 112.45 | 16.62 | | | |
| | 115.56 | 17.15 | | | |
| | 118.77 | 18.05 | | | |
| | 121.61 | 19.10 | | | |
| | 124.74 | 20.52 | | | |
| | 128.15 | 22.32 | | | |
| | 132.31 | 24.73 | | | |
| | 136.10 | 26.88 | | | |
| | 139.66 | 28.84 | | | |
| | 143.10 | 30.69 | | | |
| | 146.51 | 32.46 | | | |
| | 149.88 | 34.15 | | | |
| | 153.29 | 35.82 | | | |
| | 156.76 | 37.46 | | | |
| | 160.39 | 39.13 | | | |

| | |
|--------|-------|
| 163.89 | 40.77 |
| 167.32 | 42.43 |
| 170.71 | 44.10 |
| 174.12 | 45.84 |
| 177.52 | 47.60 |
| 180.96 | 49.43 |
| 184.47 | 51.33 |
| 188.12 | 53.36 |
| 191.59 | 55.22 |
| 194.99 | 56.99 |
| 198.33 | 58.66 |
| 201.73 | 60.30 |
| 205.47 | 62.01 |
| 209.69 | 63.85 |
| 215.71 | 66.37 |
| 227.63 | 71.25 |

Fattore di sicurezza (FS) 1.6676 - N.3 -- X Y Lambda= 0.5860

| | |
|--------|-------|
| 88.61 | 16.22 |
| 99.98 | 16.70 |
| 105.29 | 17.06 |
| 108.85 | 17.49 |
| 111.78 | 18.05 |
| 114.71 | 18.85 |
| 117.36 | 19.75 |
| 120.21 | 20.90 |
| 123.23 | 22.29 |
| 126.77 | 24.08 |
| 130.10 | 25.74 |
| 133.28 | 27.31 |
| 136.39 | 28.82 |
| 139.45 | 30.28 |
| 142.50 | 31.72 |
| 145.58 | 33.15 |
| 148.69 | 34.57 |
| 151.85 | 36.00 |
| 154.95 | 37.43 |
| 158.01 | 38.86 |
| 161.04 | 40.32 |
| 164.10 | 41.81 |
| 167.14 | 43.33 |
| 170.22 | 44.89 |
| 173.35 | 46.51 |
| 176.59 | 48.21 |
| 179.68 | 49.78 |
| 182.71 | 51.28 |
| 185.70 | 52.71 |
| 188.75 | 54.11 |
| 191.73 | 55.44 |
| 194.76 | 56.73 |
| 197.84 | 58.00 |
| 201.06 | 59.27 |
| 204.19 | 60.53 |
| 207.28 | 61.79 |
| 210.34 | 63.06 |
| 213.41 | 64.35 |
| 216.84 | 65.82 |
| 220.66 | 67.49 |
| 226.06 | 69.87 |
| 236.53 | 74.54 |

Fattore di sicurezza (FS) 1.6693 - N.4 -- X Y Lambda= 0.4988

| | |
|--------|-------|
| 103.72 | 19.94 |
| 113.02 | 20.80 |
| 117.50 | 21.30 |
| 120.56 | 21.77 |
| 123.17 | 22.28 |
| 125.67 | 22.92 |
| 128.03 | 23.62 |
| 130.53 | 24.48 |
| 133.18 | 25.50 |
| 136.24 | 26.76 |
| 138.92 | 27.96 |

| | |
|--------|-------|
| 141.46 | 29.20 |
| 143.87 | 30.48 |
| 146.38 | 31.92 |
| 148.79 | 33.40 |
| 151.28 | 35.05 |
| 153.88 | 36.87 |
| 156.75 | 38.97 |
| 159.43 | 40.89 |
| 162.03 | 42.70 |
| 164.56 | 44.43 |
| 167.12 | 46.11 |
| 169.67 | 47.74 |
| 172.30 | 49.37 |
| 175.04 | 51.02 |
| 178.02 | 52.76 |
| 180.60 | 54.16 |
| 183.04 | 55.35 |
| 185.32 | 56.34 |
| 187.80 | 57.27 |
| 190.08 | 57.98 |
| 192.55 | 58.61 |
| 195.21 | 59.15 |
| 198.40 | 59.67 |
| 201.11 | 60.19 |
| 203.63 | 60.79 |
| 206.00 | 61.46 |
| 208.50 | 62.28 |
| 211.12 | 63.30 |
| 214.19 | 64.63 |
| 218.69 | 66.77 |
| 227.96 | 71.37 |

Fattore di sicurezza (FS) 1.6784 - N.5 -- X Y Lambda= 0.4794

| | |
|--------|-------|
| 106.80 | 21.55 |
| 116.79 | 23.05 |
| 121.57 | 23.86 |
| 124.83 | 24.56 |
| 127.60 | 25.30 |
| 130.26 | 26.17 |
| 132.75 | 27.11 |
| 135.37 | 28.23 |
| 138.12 | 29.52 |
| 141.23 | 31.10 |
| 144.15 | 32.61 |
| 146.96 | 34.10 |
| 149.71 | 35.59 |
| 152.46 | 37.11 |
| 155.19 | 38.65 |
| 157.96 | 40.26 |
| 160.79 | 41.93 |
| 163.75 | 43.70 |
| 166.52 | 45.31 |
| 169.23 | 46.82 |
| 171.88 | 48.22 |
| 174.59 | 49.60 |
| 177.24 | 50.87 |
| 179.95 | 52.10 |
| 182.72 | 53.30 |
| 185.70 | 54.52 |
| 188.53 | 55.65 |
| 191.29 | 56.72 |
| 194.01 | 57.73 |
| 196.74 | 58.71 |
| 199.46 | 59.65 |
| 202.21 | 60.57 |
| 205.03 | 61.48 |
| 208.00 | 62.40 |
| 210.78 | 63.31 |
| 213.50 | 64.25 |
| 216.16 | 65.23 |
| 218.88 | 66.29 |
| 221.86 | 67.53 |
| 225.24 | 69.00 |
| 230.07 | 71.21 |

239.66 75.70

Fattore di sicurezza (FS) 1.6839 - N.6 -- X Y Lambda= 0.6150

100.86 19.24
111.81 21.70
117.28 23.00
121.10 23.98
124.46 24.93
127.55 25.89
130.56 26.89
133.66 27.99
136.86 29.20
140.33 30.58
143.52 31.91
146.60 33.29
149.60 34.70
152.68 36.23
155.70 37.82
158.80 39.53
162.03 41.40
165.54 43.51
168.73 45.34
171.80 47.00
174.76 48.51
177.83 49.96
180.78 51.26
183.82 52.50
186.98 53.69
190.45 54.90
193.69 56.08
196.82 57.27
199.88 58.49
202.98 59.78
206.39 61.27
210.25 63.03
215.74 65.63
226.58 70.85

Fattore di sicurezza (FS) 1.6886 - N.7 -- X Y Lambda= 0.5922

94.82 17.75
103.42 18.75
107.61 19.30
110.50 19.79
112.97 20.30
115.32 20.90
117.54 21.54
119.85 22.31
122.26 23.18
124.92 24.23
127.45 25.21
129.89 26.12
132.29 27.00
134.69 27.86
137.08 28.68
139.49 29.50
141.96 30.30
144.53 31.12
146.95 31.94
149.32 32.78
151.64 33.66
154.01 34.60
156.33 35.58
158.70 36.62
161.12 37.74
163.68 38.97
166.15 40.18
168.57 41.38
170.97 42.60
173.36 43.84
175.74 45.09
178.14 46.38
180.56 47.70
183.02 49.07

| | |
|--------|-------|
| 185.47 | 50.41 |
| 187.89 | 51.73 |
| 190.30 | 53.04 |
| 192.71 | 54.34 |
| 195.12 | 55.63 |
| 197.54 | 56.92 |
| 199.99 | 58.21 |
| 202.48 | 59.51 |
| 204.89 | 60.75 |
| 207.28 | 61.94 |
| 209.64 | 63.10 |
| 212.04 | 64.24 |
| 214.69 | 65.46 |
| 217.68 | 66.80 |
| 221.90 | 68.64 |
| 230.18 | 72.19 |

Fattore di sicurezza (FS) 1.6988 - N.8 -- X Y Lambda= 0.5443

| | |
|--------|-------|
| 99.74 | 18.96 |
| 107.92 | 19.15 |
| 111.77 | 19.33 |
| 114.35 | 19.58 |
| 116.50 | 19.93 |
| 118.63 | 20.44 |
| 120.56 | 21.01 |
| 122.62 | 21.75 |
| 124.80 | 22.65 |
| 127.31 | 23.79 |
| 129.72 | 24.88 |
| 132.03 | 25.93 |
| 134.30 | 26.95 |
| 136.52 | 27.95 |
| 138.76 | 28.95 |
| 141.01 | 29.95 |
| 143.27 | 30.95 |
| 145.56 | 31.96 |
| 147.78 | 32.97 |
| 149.97 | 34.00 |
| 152.15 | 35.05 |
| 154.35 | 36.14 |
| 156.53 | 37.25 |
| 158.73 | 38.40 |
| 160.97 | 39.59 |
| 163.27 | 40.85 |
| 165.53 | 42.10 |
| 167.76 | 43.35 |
| 169.98 | 44.60 |
| 172.19 | 45.87 |
| 174.45 | 47.17 |
| 176.75 | 48.52 |
| 179.16 | 49.95 |
| 181.71 | 51.47 |
| 183.90 | 52.68 |
| 185.96 | 53.69 |
| 187.88 | 54.50 |
| 189.99 | 55.25 |
| 191.93 | 55.80 |
| 194.07 | 56.26 |
| 196.44 | 56.62 |
| 199.41 | 56.96 |
| 201.73 | 57.33 |
| 203.82 | 57.81 |
| 205.70 | 58.40 |
| 207.79 | 59.25 |
| 209.88 | 60.31 |
| 212.44 | 61.83 |
| 216.32 | 64.39 |
| 224.59 | 70.12 |

Fattore di sicurezza (FS) 1.7005 - N.9 -- X Y Lambda= 0.5927

| | |
|--------|-------|
| 105.26 | 20.71 |
| 114.45 | 20.53 |
| 118.75 | 20.56 |

| | |
|--------|-------|
| 121.63 | 20.73 |
| 124.01 | 21.03 |
| 126.37 | 21.52 |
| 128.52 | 22.10 |
| 130.84 | 22.88 |
| 133.33 | 23.85 |
| 136.28 | 25.13 |
| 138.95 | 26.34 |
| 141.48 | 27.53 |
| 143.92 | 28.74 |
| 146.38 | 30.00 |
| 148.78 | 31.29 |
| 151.24 | 32.67 |
| 153.77 | 34.13 |
| 156.44 | 35.73 |
| 158.98 | 37.20 |
| 161.45 | 38.59 |
| 163.87 | 39.91 |
| 166.33 | 41.20 |
| 168.75 | 42.42 |
| 171.21 | 43.63 |
| 173.73 | 44.81 |
| 176.38 | 46.01 |
| 178.91 | 47.20 |
| 181.38 | 48.39 |
| 183.81 | 49.61 |
| 186.27 | 50.88 |
| 188.71 | 52.18 |
| 191.18 | 53.54 |
| 193.71 | 54.97 |
| 196.36 | 56.52 |
| 198.88 | 57.94 |
| 201.35 | 59.28 |
| 203.76 | 60.56 |
| 206.22 | 61.81 |
| 208.93 | 63.12 |
| 211.98 | 64.54 |
| 216.33 | 66.49 |
| 224.94 | 70.25 |

Fattore di sicurezza (FS) 1.7069 - N.10 -- X Y Lambda= 0.5800

| | |
|--------|-------|
| 99.41 | 18.88 |
| 109.33 | 20.15 |
| 114.19 | 20.85 |
| 117.56 | 21.44 |
| 120.46 | 22.05 |
| 123.19 | 22.73 |
| 125.80 | 23.47 |
| 128.50 | 24.33 |
| 131.31 | 25.31 |
| 134.39 | 26.46 |
| 137.30 | 27.59 |
| 140.12 | 28.71 |
| 142.88 | 29.85 |
| 145.65 | 31.04 |
| 148.39 | 32.25 |
| 151.16 | 33.51 |
| 153.98 | 34.83 |
| 156.92 | 36.24 |
| 159.75 | 37.58 |
| 162.54 | 38.86 |
| 165.30 | 40.10 |
| 168.08 | 41.32 |
| 170.85 | 42.50 |
| 173.65 | 43.67 |
| 176.53 | 44.84 |
| 179.53 | 46.03 |
| 182.33 | 47.21 |
| 185.07 | 48.42 |
| 187.74 | 49.67 |
| 190.49 | 51.03 |
| 193.17 | 52.42 |
| 195.92 | 53.92 |
| 198.74 | 55.52 |

201.76 57.31
204.63 58.96
207.42 60.53
210.16 62.03
212.94 63.50
215.99 65.05
219.44 66.75
224.34 69.08
233.98 73.59

----- ANALISI DEFICIT DI RESISTENZA -----

DATI RELATIVI ALLE 10 SUPERFICI GENERATE CON MINOR FS *

Analisi Deficit in riferimento a FS(progetto) = 1.200

| Sup N. | FS | FTR(kN/m) | FTA(kN/m) | Bilancio(kN/m) | ESITO |
|--------|-------|-----------|-----------|----------------|---------|
| 1 | 1.640 | 9674.5 | 5897.6 | 2597.4 | Surplus |
| 2 | 1.666 | 13197.6 | 7922.3 | 3690.8 | Surplus |
| 3 | 1.668 | 11744.9 | 7042.9 | 3293.4 | Surplus |
| 4 | 1.669 | 9417.1 | 5641.5 | 2647.3 | Surplus |
| 5 | 1.678 | 8926.4 | 5318.3 | 2544.4 | Surplus |
| 6 | 1.684 | 9767.3 | 5800.5 | 2806.7 | Surplus |
| 7 | 1.689 | 12663.8 | 7499.8 | 3664.0 | Surplus |
| 8 | 1.699 | 12169.9 | 7163.8 | 3573.4 | Surplus |
| 9 | 1.701 | 13533.3 | 7958.3 | 3983.4 | Surplus |
| 10 | 1.707 | 14040.8 | 8225.7 | 4170.0 | Surplus |

Esito analisi: SURPLUS di RESISTENZA!

Valore minimo di SURPLUS di RESISTENZA (kN/m): 2544.4

Note: FTR --> Forza totale Resistente lungo la superficie
di scivolamento

FTA --> Forza totale Agente lungo la superficie
di scivolamento

IMPORTANTE! : Il Deficit o il Surplus di resistenza viene espresso in kN
per metro di LARGHEZZA rispetto al fronte della scarpata

----- TABELLA PARAMETRI CONCI DELLA SUPERFICIE INDIVIDUATA CON MINOR FS -----

| X (m) | dx (m) | alpha (°) | W (kN/m) | ru (-) | U (kPa) | phi' (°) | (c',Cu) (kPa) |
|----------|-----------|--------------|-------------|-----------|------------|-------------|------------------|
| 101.090 | 0.916 | 9.67 | 0.68 | 0.00 | 0.00 | 38.00 | 0.00 |
| 102.005 | 0.916 | 9.67 | 2.03 | 0.00 | 0.00 | 38.00 | 0.00 |
| 102.921 | 0.916 | 9.67 | 3.39 | 0.00 | 0.00 | 38.00 | 0.00 |
| 103.837 | 0.133 | 9.67 | 0.61 | 0.00 | 0.00 | 38.00 | 0.00 |
| 103.970 | 0.916 | 9.67 | 7.65 | 0.00 | 0.00 | 38.00 | 0.00 |
| 104.886 | 0.916 | 9.67 | 14.41 | 0.00 | 0.00 | 38.00 | 0.00 |
| 105.801 | 0.916 | 9.67 | 21.17 | 0.00 | 0.00 | 38.00 | 0.00 |
| 106.717 | 0.916 | 9.67 | 27.93 | 0.00 | 0.00 | 38.00 | 0.00 |
| 107.633 | 0.916 | 9.67 | 34.70 | 0.00 | 0.00 | 38.00 | 0.00 |
| 108.548 | 0.916 | 9.67 | 41.46 | 0.00 | 0.00 | 38.00 | 0.00 |
| 109.464 | 0.916 | 9.67 | 48.22 | 0.00 | 0.00 | 38.00 | 0.00 |
| 110.379 | 0.916 | 9.67 | 54.99 | 0.00 | 0.00 | 38.00 | 0.00 |
| 111.295 | 0.827 | 9.67 | 55.47 | 0.00 | 0.00 | 38.00 | 0.00 |
| 112.122 | 0.916 | 10.60 | 67.71 | 0.00 | 0.00 | 38.00 | 0.00 |
| 113.038 | 0.916 | 10.60 | 74.17 | 0.00 | 0.00 | 38.00 | 0.00 |
| 113.953 | 0.916 | 10.60 | 80.63 | 0.00 | 0.00 | 38.00 | 0.00 |
| 114.869 | 0.916 | 10.60 | 87.09 | 0.00 | 0.00 | 38.00 | 0.00 |
| 115.785 | 0.916 | 10.60 | 93.55 | 0.00 | 0.00 | 38.00 | 0.00 |
| 116.700 | 0.803 | 10.60 | 87.36 | 0.00 | 0.00 | 38.00 | 0.00 |
| 117.503 | 0.916 | 12.47 | 105.37 | 0.00 | 0.00 | 38.00 | 0.00 |
| 118.419 | 0.916 | 12.47 | 111.22 | 0.00 | 0.00 | 38.00 | 0.00 |
| 119.334 | 0.916 | 12.47 | 117.07 | 0.00 | 0.00 | 38.00 | 0.00 |
| 120.250 | 0.916 | 12.47 | 122.92 | 0.00 | 0.00 | 38.00 | 0.00 |
| 121.166 | 0.046 | 12.47 | 6.27 | 0.00 | 0.00 | 38.00 | 0.00 |
| 121.211 | 0.916 | 14.58 | 128.71 | 0.00 | 0.00 | 38.00 | 0.00 |
| 122.127 | 0.916 | 14.58 | 133.87 | 0.00 | 0.00 | 38.00 | 0.00 |
| 123.043 | 0.916 | 14.58 | 139.02 | 0.00 | 0.00 | 38.00 | 0.00 |
| 123.958 | 0.443 | 14.58 | 69.10 | 0.00 | 0.00 | 38.00 | 0.00 |
| 124.401 | 0.916 | 17.12 | 146.23 | 0.00 | 0.00 | 38.00 | 0.00 |
| 125.317 | 0.916 | 17.12 | 150.53 | 0.00 | 0.00 | 38.00 | 0.00 |

| | | | | | | | |
|---------|-------|-------|--------|------|------|-------|------|
| 126.232 | 0.916 | 17.12 | 154.82 | 0.00 | 0.00 | 38.00 | 0.00 |
| 127.148 | 0.271 | 17.12 | 46.59 | 0.00 | 0.00 | 38.00 | 0.00 |
| 127.419 | 0.916 | 19.05 | 160.05 | 0.00 | 0.00 | 38.00 | 0.00 |
| 128.334 | 0.916 | 19.05 | 163.68 | 0.00 | 0.00 | 38.00 | 0.00 |
| 129.250 | 0.916 | 19.05 | 167.31 | 0.00 | 0.00 | 38.00 | 0.00 |
| 130.166 | 0.119 | 19.05 | 21.94 | 0.00 | 0.00 | 38.00 | 0.00 |
| 130.284 | 0.916 | 20.93 | 171.07 | 0.00 | 0.00 | 38.00 | 0.00 |
| 131.200 | 0.916 | 20.93 | 174.03 | 0.00 | 0.00 | 38.00 | 0.00 |
| 132.116 | 0.916 | 20.93 | 176.99 | 0.00 | 0.00 | 38.00 | 0.00 |
| 133.031 | 0.238 | 20.93 | 46.55 | 0.00 | 0.00 | 38.00 | 0.00 |
| 133.269 | 0.916 | 22.62 | 180.41 | 0.00 | 0.00 | 38.00 | 0.00 |
| 134.185 | 0.916 | 22.62 | 182.76 | 0.00 | 0.00 | 38.00 | 0.00 |
| 135.101 | 0.916 | 22.62 | 185.11 | 0.00 | 0.00 | 38.00 | 0.00 |
| 136.016 | 0.360 | 22.62 | 73.34 | 0.00 | 0.00 | 38.00 | 0.00 |
| 136.376 | 0.916 | 24.03 | 188.12 | 0.00 | 0.00 | 38.00 | 0.00 |
| 137.292 | 0.916 | 24.03 | 189.94 | 0.00 | 0.00 | 38.00 | 0.00 |
| 138.207 | 0.916 | 24.03 | 191.77 | 0.00 | 0.00 | 38.00 | 0.00 |
| 139.123 | 0.700 | 24.03 | 147.86 | 0.00 | 0.00 | 38.00 | 0.00 |
| 139.823 | 0.667 | 24.70 | 141.80 | 0.00 | 0.00 | 38.00 | 0.00 |
| 140.490 | 0.916 | 24.70 | 194.69 | 0.00 | 0.00 | 38.00 | 0.00 |
| 141.406 | 0.916 | 24.70 | 193.63 | 0.00 | 0.00 | 38.00 | 0.00 |
| 142.321 | 0.729 | 24.70 | 153.39 | 0.00 | 0.00 | 38.00 | 0.00 |
| 143.050 | 0.916 | 25.43 | 191.60 | 0.00 | 0.00 | 38.00 | 0.00 |
| 143.966 | 0.916 | 25.43 | 190.27 | 0.00 | 0.00 | 38.00 | 0.00 |
| 144.881 | 0.916 | 25.43 | 188.93 | 0.00 | 0.00 | 38.00 | 0.00 |
| 145.797 | 0.371 | 25.43 | 76.18 | 0.00 | 0.00 | 38.00 | 0.00 |
| 146.168 | 0.916 | 26.18 | 186.91 | 0.00 | 0.00 | 38.00 | 0.00 |
| 147.084 | 0.916 | 26.18 | 185.29 | 0.00 | 0.00 | 38.00 | 0.00 |
| 147.999 | 0.916 | 26.18 | 183.67 | 0.00 | 0.00 | 38.00 | 0.00 |
| 148.915 | 0.299 | 26.18 | 59.62 | 0.00 | 0.00 | 38.00 | 0.00 |
| 149.214 | 0.916 | 26.93 | 181.37 | 0.00 | 0.00 | 38.00 | 0.00 |
| 150.130 | 0.916 | 26.93 | 179.45 | 0.00 | 0.00 | 38.00 | 0.00 |
| 151.045 | 0.916 | 26.93 | 177.54 | 0.00 | 0.00 | 38.00 | 0.00 |
| 151.961 | 0.319 | 26.93 | 61.39 | 0.00 | 0.00 | 38.00 | 0.00 |
| 152.280 | 0.916 | 27.66 | 174.81 | 0.00 | 0.00 | 38.00 | 0.00 |
| 153.195 | 0.916 | 27.66 | 172.60 | 0.00 | 0.00 | 38.00 | 0.00 |
| 154.111 | 0.916 | 27.66 | 170.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 155.027 | 0.275 | 27.66 | 50.75 | 0.00 | 0.00 | 38.00 | 0.00 |
| 155.302 | 0.916 | 28.37 | 167.39 | 0.00 | 0.00 | 38.00 | 0.00 |
| 156.217 | 0.916 | 28.37 | 164.90 | 0.00 | 0.00 | 38.00 | 0.00 |
| 157.133 | 0.916 | 28.37 | 162.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 158.049 | 0.318 | 28.37 | 55.90 | 0.00 | 0.00 | 38.00 | 0.00 |
| 158.367 | 0.916 | 29.05 | 158.91 | 0.00 | 0.00 | 38.00 | 0.00 |
| 159.283 | 0.916 | 29.05 | 156.14 | 0.00 | 0.00 | 38.00 | 0.00 |
| 160.198 | 0.916 | 29.05 | 153.37 | 0.00 | 0.00 | 38.00 | 0.00 |
| 161.114 | 0.374 | 29.05 | 61.77 | 0.00 | 0.00 | 38.00 | 0.00 |
| 161.488 | 0.916 | 29.69 | 149.34 | 0.00 | 0.00 | 38.00 | 0.00 |
| 162.403 | 0.916 | 29.69 | 146.31 | 0.00 | 0.00 | 38.00 | 0.00 |
| 163.319 | 0.916 | 29.69 | 143.28 | 0.00 | 0.00 | 38.00 | 0.00 |
| 164.234 | 0.506 | 29.69 | 77.84 | 0.00 | 0.00 | 38.00 | 0.00 |
| 164.740 | 0.916 | 29.25 | 138.66 | 0.00 | 0.00 | 38.00 | 0.00 |
| 165.656 | 0.916 | 29.25 | 135.82 | 0.00 | 0.00 | 38.00 | 0.00 |
| 166.571 | 0.916 | 29.25 | 132.97 | 0.00 | 0.00 | 38.00 | 0.00 |
| 167.487 | 0.400 | 29.25 | 57.26 | 0.00 | 0.00 | 38.00 | 0.00 |
| 167.888 | 0.916 | 28.78 | 128.97 | 0.00 | 0.00 | 38.00 | 0.00 |
| 168.803 | 0.916 | 28.78 | 126.31 | 0.00 | 0.00 | 38.00 | 0.00 |
| 169.719 | 0.916 | 28.78 | 123.65 | 0.00 | 0.00 | 38.00 | 0.00 |
| 170.634 | 0.347 | 28.78 | 46.11 | 0.00 | 0.00 | 38.00 | 0.00 |
| 170.981 | 0.916 | 28.30 | 120.09 | 0.00 | 0.00 | 38.00 | 0.00 |
| 171.897 | 0.916 | 28.30 | 117.63 | 0.00 | 0.00 | 38.00 | 0.00 |
| 172.812 | 0.916 | 28.30 | 115.16 | 0.00 | 0.00 | 38.00 | 0.00 |
| 173.728 | 0.313 | 28.30 | 38.79 | 0.00 | 0.00 | 38.00 | 0.00 |
| 174.041 | 0.916 | 27.81 | 111.96 | 0.00 | 0.00 | 38.00 | 0.00 |
| 174.956 | 0.916 | 27.81 | 109.69 | 0.00 | 0.00 | 38.00 | 0.00 |
| 175.872 | 0.916 | 27.81 | 107.43 | 0.00 | 0.00 | 38.00 | 0.00 |
| 176.788 | 0.329 | 27.81 | 38.06 | 0.00 | 0.00 | 38.00 | 0.00 |
| 177.117 | 0.916 | 27.31 | 104.45 | 0.00 | 0.00 | 38.00 | 0.00 |
| 178.032 | 0.916 | 27.31 | 102.38 | 0.00 | 0.00 | 38.00 | 0.00 |
| 178.948 | 0.916 | 27.31 | 100.31 | 0.00 | 0.00 | 38.00 | 0.00 |
| 179.864 | 0.310 | 27.31 | 33.45 | 0.00 | 0.00 | 38.00 | 0.00 |
| 180.173 | 0.916 | 26.82 | 97.64 | 0.00 | 0.00 | 38.00 | 0.00 |
| 181.089 | 0.916 | 26.82 | 95.77 | 0.00 | 0.00 | 38.00 | 0.00 |
| 182.005 | 0.916 | 26.82 | 93.90 | 0.00 | 0.00 | 38.00 | 0.00 |
| 182.920 | 0.341 | 26.82 | 34.52 | 0.00 | 0.00 | 38.00 | 0.00 |
| 183.262 | 0.916 | 26.33 | 91.42 | 0.00 | 0.00 | 38.00 | 0.00 |

| | | | | | | | |
|---------|-------|-------|-------|------|------|-------|------|
| 184.177 | 0.916 | 26.33 | 89.74 | 0.00 | 0.00 | 38.00 | 0.00 |
| 185.093 | 0.916 | 26.33 | 88.06 | 0.00 | 0.00 | 38.00 | 0.00 |
| 186.008 | 0.390 | 26.33 | 36.99 | 0.00 | 0.00 | 38.00 | 0.00 |
| 186.398 | 0.916 | 25.86 | 85.75 | 0.00 | 0.00 | 38.00 | 0.00 |
| 187.314 | 0.916 | 25.86 | 84.25 | 0.00 | 0.00 | 38.00 | 0.00 |
| 188.230 | 0.916 | 25.86 | 82.75 | 0.00 | 0.00 | 38.00 | 0.00 |
| 189.145 | 0.491 | 25.86 | 43.77 | 0.00 | 0.00 | 38.00 | 0.00 |
| 189.636 | 0.724 | 25.31 | 63.76 | 0.00 | 0.00 | 38.00 | 0.00 |
| 190.360 | 0.916 | 25.31 | 78.58 | 0.00 | 0.00 | 38.00 | 0.00 |
| 191.276 | 0.916 | 25.31 | 75.39 | 0.00 | 0.00 | 38.00 | 0.00 |
| 192.191 | 0.570 | 25.31 | 45.29 | 0.00 | 0.00 | 38.00 | 0.00 |
| 192.761 | 0.916 | 24.73 | 70.32 | 0.00 | 0.00 | 38.00 | 0.00 |
| 193.677 | 0.916 | 24.73 | 67.35 | 0.00 | 0.00 | 38.00 | 0.00 |
| 194.592 | 0.916 | 24.73 | 64.38 | 0.00 | 0.00 | 38.00 | 0.00 |
| 195.508 | 0.327 | 24.73 | 22.30 | 0.00 | 0.00 | 38.00 | 0.00 |
| 195.835 | 0.916 | 24.13 | 60.46 | 0.00 | 0.00 | 38.00 | 0.00 |
| 196.751 | 0.916 | 24.13 | 57.72 | 0.00 | 0.00 | 38.00 | 0.00 |
| 197.667 | 0.916 | 24.13 | 54.98 | 0.00 | 0.00 | 38.00 | 0.00 |
| 198.582 | 0.291 | 24.13 | 16.90 | 0.00 | 0.00 | 38.00 | 0.00 |
| 198.873 | 0.916 | 23.52 | 51.48 | 0.00 | 0.00 | 38.00 | 0.00 |
| 199.789 | 0.916 | 23.52 | 48.96 | 0.00 | 0.00 | 38.00 | 0.00 |
| 200.704 | 0.916 | 23.52 | 46.45 | 0.00 | 0.00 | 38.00 | 0.00 |
| 201.620 | 0.326 | 23.52 | 15.94 | 0.00 | 0.00 | 38.00 | 0.00 |
| 201.946 | 0.916 | 22.71 | 43.19 | 0.00 | 0.00 | 38.00 | 0.00 |
| 202.862 | 0.916 | 22.71 | 40.97 | 0.00 | 0.00 | 38.00 | 0.00 |
| 203.777 | 0.916 | 22.71 | 38.76 | 0.00 | 0.00 | 38.00 | 0.00 |
| 204.693 | 0.656 | 22.71 | 26.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 205.349 | 0.916 | 22.05 | 35.08 | 0.00 | 0.00 | 38.00 | 0.00 |
| 206.265 | 0.916 | 22.05 | 33.11 | 0.00 | 0.00 | 38.00 | 0.00 |
| 207.180 | 0.916 | 22.05 | 31.13 | 0.00 | 0.00 | 38.00 | 0.00 |
| 208.096 | 0.916 | 22.05 | 29.16 | 0.00 | 0.00 | 38.00 | 0.00 |
| 209.011 | 0.163 | 22.05 | 4.97 | 0.00 | 0.00 | 38.00 | 0.00 |
| 209.174 | 0.916 | 21.43 | 26.95 | 0.00 | 0.00 | 38.00 | 0.00 |
| 210.090 | 0.916 | 21.43 | 25.20 | 0.00 | 0.00 | 38.00 | 0.00 |
| 211.005 | 0.916 | 21.43 | 23.45 | 0.00 | 0.00 | 38.00 | 0.00 |
| 211.921 | 0.916 | 21.43 | 21.71 | 0.00 | 0.00 | 38.00 | 0.00 |
| 212.837 | 0.916 | 21.43 | 19.96 | 0.00 | 0.00 | 38.00 | 0.00 |
| 213.752 | 0.844 | 21.43 | 16.85 | 0.00 | 0.00 | 38.00 | 0.00 |
| 214.596 | 0.916 | 21.09 | 16.66 | 0.00 | 0.00 | 38.00 | 0.00 |
| 215.512 | 0.916 | 21.09 | 15.03 | 0.00 | 0.00 | 38.00 | 0.00 |
| 216.427 | 0.916 | 21.09 | 13.41 | 0.00 | 0.00 | 38.00 | 0.00 |
| 217.343 | 0.916 | 21.09 | 11.78 | 0.00 | 0.00 | 38.00 | 0.00 |
| 218.259 | 0.916 | 21.09 | 10.15 | 0.00 | 0.00 | 38.00 | 0.00 |
| 219.174 | 0.916 | 21.09 | 8.53 | 0.00 | 0.00 | 38.00 | 0.00 |
| 220.090 | 0.916 | 21.09 | 6.90 | 0.00 | 0.00 | 38.00 | 0.00 |
| 221.006 | 0.916 | 21.09 | 5.27 | 0.00 | 0.00 | 38.00 | 0.00 |
| 221.921 | 0.916 | 21.09 | 3.65 | 0.00 | 0.00 | 38.00 | 0.00 |
| 222.837 | 0.916 | 21.09 | 2.02 | 0.00 | 0.00 | 38.00 | 0.00 |
| 223.753 | 0.517 | 21.09 | 0.42 | 0.00 | 0.00 | 38.00 | 0.00 |
| 224.270 | 0.916 | 21.09 | 0.15 | 0.00 | 0.00 | 38.00 | 0.00 |
| 225.186 | 0.051 | 21.09 | 0.00 | 0.00 | 0.00 | 38.00 | 0.00 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
 dx(m) : Larghezza concio
 alpha(°) : Angolo pendenza base concio
 W(kN/m) : Forza peso concio
 ru(-) : Coefficiente locale pressione interstiziale
 U(kPa) : Pressione totale dei pori base concio
 phi'(°) : Angolo di attrito efficace base concio
 c'/Cu (kPa) : Coesione efficace o Resistenza al taglio in condizioni non drenate

TABELLA DIAGRAMMA DELLE FORZE DELLA SUPERFICIE INDIVIDUATA CON MINOR FS

| X | ht | yt | yt' | E(x) | T(x) | E' | rho(x) | FS_qFEM | FS_srmFEM | | |
|---------|-------|--------|-------|-------------------|-------------------|-------------------|--------|---------|-----------|------|--|
| (m) | (m) | (m) | (--) | (kN/m) | (kN/m) | | (kN) | (--) | (--) | (--) | |
| 101.090 | 0.000 | 19.292 | 0.201 | 0.0000000000E+000 | 0.0000000000E+000 | 1.2871862543E-001 | 0.055 | 1.197 | 1.286 | | |
| 102.005 | 0.017 | 19.465 | 0.201 | 6.3683974143E-001 | 1.9014316968E-003 | 1.2623194448E+000 | 0.055 | 1.197 | 1.286 | | |
| 102.921 | 0.055 | 19.659 | 0.205 | 2.3116410860E+000 | 3.6154389401E-002 | 1.8621738068E+000 | 0.055 | 2.134 | 1.519 | | |
| 103.837 | 0.081 | 19.840 | 0.197 | 4.0469729679E+000 | 1.1667717514E-001 | 2.3995619174E+000 | 0.061 | 4.080 | 1.891 | | |
| 103.970 | 0.084 | 19.866 | 0.221 | 4.3766196806E+000 | 1.4042174444E-001 | 2.5687812904E+000 | 0.067 | 4.364 | 1.962 | | |
| 104.886 | 0.134 | 20.073 | 0.241 | 7.3311962402E+000 | 4.3949254925E-001 | 3.6844012925E+000 | 0.126 | 5.550 | 2.589 | | |

| | | | | | | | | | |
|---------|-------|--------|-------|-------------------|--------------------|--------------------|-------|-------|-------|
| 105.801 | 0.214 | 20.308 | 0.267 | 1.1123733844E+001 | 1.1030130705E+000 | 4.9728305705E+000 | 0.208 | 5.034 | 3.201 |
| 106.717 | 0.311 | 20.561 | 0.282 | 1.6437765507E+001 | 2.3136366166E+000 | 6.9557273118E+000 | 0.296 | 4.354 | 3.552 |
| 107.633 | 0.418 | 20.824 | 0.289 | 2.3861511990E+001 | 4.1945547762E+000 | 9.2905961364E+000 | 0.369 | 3.868 | 3.626 |
| 108.548 | 0.529 | 21.091 | 0.294 | 3.3451306597E+001 | 6.8786357327E+000 | 1.0483541012E+001 | 0.432 | 3.530 | 3.543 |
| 109.464 | 0.644 | 21.362 | 0.305 | 4.3059650963E+001 | 9.6201626101E+000 | 1.1709557340E+001 | 0.469 | 3.351 | 3.510 |
| 110.379 | 0.776 | 21.649 | 0.320 | 5.4894606039E+001 | 1.3185142662E+001 | 1.4052312340E+001 | 0.504 | 3.187 | 3.428 |
| 111.295 | 0.918 | 21.948 | 0.316 | 6.8793155024E+001 | 1.7605023564E+001 | 1.5717045769E+001 | 0.537 | 3.037 | 3.311 |
| 112.122 | 1.029 | 22.200 | 0.307 | 8.2192348565E+001 | 2.2149495857E+001 | 1.7059326237E+001 | 0.566 | 2.915 | 3.182 |
| 113.038 | 1.142 | 22.484 | 0.318 | 9.8680743535E+001 | 2.8065784404E+001 | 1.9242893761E+001 | 0.597 | 2.798 | 3.043 |
| 113.953 | 1.268 | 22.782 | 0.339 | 1.1743118135E+002 | 3.5220570832E+001 | 2.2111928247E+001 | 0.630 | 2.693 | 2.910 |
| 114.869 | 1.420 | 23.105 | 0.351 | 1.3917353800E+002 | 4.4026738154E+001 | 2.4105495781E+001 | 0.664 | 2.594 | 2.787 |
| 115.785 | 1.568 | 23.424 | 0.347 | 1.6157472574E+002 | 5.3488700657E+001 | 2.4681872400E+001 | 0.695 | 2.508 | 2.685 |
| 116.700 | 1.713 | 23.740 | 0.353 | 1.8437258057E+002 | 6.3537862801E+001 | 2.5699773726E+001 | 0.724 | 2.432 | 2.599 |
| 117.503 | 1.853 | 24.031 | 0.359 | 2.0557384636E+002 | 7.3370471972E+001 | 2.6217202614E+001 | 0.749 | 2.366 | 2.530 |
| 118.419 | 1.977 | 24.357 | 0.354 | 2.2938570276E+002 | 8.4859090113E+001 | 2.5720824132E+001 | 0.777 | 2.299 | 2.462 |
| 119.334 | 2.096 | 24.679 | 0.354 | 2.5267548460E+002 | 9.6558119970E+001 | 2.5323717594E+001 | 0.802 | 2.238 | 2.402 |
| 120.250 | 2.219 | 25.005 | 0.357 | 2.7576013379E+002 | 1.0871387198E+002 | 2.4947747610E+001 | 0.828 | 2.179 | 2.348 |
| 121.166 | 2.345 | 25.333 | 0.359 | 2.9836141506E+002 | 1.2114130730E+002 | 2.4641163935E+001 | 0.852 | 2.123 | 2.298 |
| 121.211 | 2.352 | 25.350 | 0.359 | 2.9948398937E+002 | 1.2177364244E+002 | 2.4585014407E+001 | 0.854 | 2.120 | 2.295 |
| 122.127 | 2.442 | 25.679 | 0.367 | 3.2100062805E+002 | 1.3422899083E+002 | 2.3409815043E+001 | 0.878 | 2.067 | 2.249 |
| 123.043 | 2.548 | 26.023 | 0.388 | 3.4235355816E+002 | 1.4716442381E+002 | 2.3319192032E+001 | 0.903 | 2.015 | 2.205 |
| 123.958 | 2.677 | 26.390 | 0.400 | 3.6370424211E+002 | 1.6072478612E+002 | 2.2520778976E+001 | 0.928 | 1.963 | 2.161 |
| 124.401 | 2.738 | 26.566 | 0.400 | 3.7350922784E+002 | 1.6715539197E+002 | 2.1736157600E+001 | 0.940 | 1.938 | 2.141 |
| 125.317 | 2.823 | 26.933 | 0.413 | 3.9265644992E+002 | 1.8019579268E+002 | 2.0647052704E+001 | 0.964 | 1.892 | 2.102 |
| 126.232 | 2.931 | 27.323 | 0.431 | 4.1131944738E+002 | 1.9351989061E+002 | 1.9760490778E+001 | 0.988 | 1.847 | 2.064 |
| 127.148 | 3.047 | 27.722 | 0.434 | 4.2884313987E+002 | 2.06658790259E+002 | 1.8077416893E+001 | 1.011 | 1.804 | 2.028 |
| 127.419 | 3.080 | 27.837 | 0.440 | 4.3365111401E+002 | 2.1025218289E+002 | 1.7609699122E+001 | 1.018 | 1.792 | 2.018 |
| 128.334 | 3.169 | 28.243 | 0.444 | 4.4929777707E+002 | 2.2264940617E+002 | 1.5989572441E+001 | 1.040 | 1.753 | 1.985 |
| 129.250 | 3.260 | 28.650 | 0.440 | 4.6293225418E+002 | 2.3410541650E+002 | 1.3778755755E+001 | 1.062 | 1.717 | 1.954 |
| 130.166 | 3.343 | 29.049 | 0.437 | 4.7453032660E+002 | 2.4443480160E+002 | 1.1937593917E+001 | 1.082 | 1.685 | 1.927 |
| 130.284 | 3.354 | 29.101 | 0.442 | 4.7593544487E+002 | 2.4572783570E+002 | 1.1710386706E+001 | 1.084 | 1.681 | 1.923 |
| 131.200 | 3.409 | 29.506 | 0.442 | 4.8571995268E+002 | 2.5513811535E+002 | 9.8662062084E+000 | 1.103 | 1.651 | 1.897 |
| 132.116 | 3.464 | 29.911 | 0.446 | 4.940038039E+002 | 2.6366963210E+002 | 8.1997729658E+000 | 1.121 | 1.625 | 1.873 |
| 133.031 | 3.526 | 30.323 | 0.455 | 5.0073590777E+002 | 2.7126316260E+002 | 6.4887048481E+000 | 1.137 | 1.600 | 1.851 |
| 133.269 | 3.547 | 30.436 | 0.474 | 5.0222858135E+002 | 2.7311236049E+002 | 6.1056278516E+000 | 1.142 | 1.594 | 1.845 |
| 134.185 | 3.600 | 30.870 | 0.477 | 5.0726294530E+002 | 2.7977086875E+002 | 4.8061870575E+000 | 1.158 | 1.571 | 1.823 |
| 135.101 | 3.658 | 31.310 | 0.478 | 5.1102998223E+002 | 2.8555350219E+002 | 3.2678944082E+000 | 1.173 | 1.550 | 1.803 |
| 136.016 | 3.712 | 31.745 | 0.472 | 5.1324732509E+002 | 2.9008747135E+002 | 1.7653201847E+000 | 1.187 | 1.532 | 1.785 |
| 136.376 | 3.729 | 31.912 | 0.482 | 5.1378944601E+002 | 2.9158107157E+002 | 1.2685199352E+000 | 1.192 | 1.526 | 1.778 |
| 137.292 | 3.769 | 32.360 | 0.486 | 5.1439365630E+002 | 2.9486291487E+002 | 3.3523103507E+000 | 1.204 | 1.510 | 1.762 |
| 138.207 | 3.801 | 32.801 | 0.486 | 5.1385083569E+002 | 2.9701807078E+002 | -1.2867970087E+000 | 1.214 | 1.497 | 1.747 |
| 139.123 | 3.841 | 33.249 | 0.491 | 5.1203719032E+002 | 2.9787312985E+002 | -2.4563698535E+000 | 1.221 | 1.487 | 1.734 |
| 139.823 | 3.874 | 33.594 | 0.493 | 5.1006286893E+002 | 2.9787793537E+002 | -3.1644347199E+000 | 1.226 | 1.479 | 1.725 |
| 140.490 | 3.897 | 33.924 | 0.473 | 5.0773311783E+002 | 2.9737846200E+002 | -3.8121576352E+000 | 1.230 | 1.473 | 1.717 |
| 141.406 | 3.895 | 34.343 | 0.472 | 5.0384092686E+002 | 2.9561893111E+002 | -4.8736511698E+000 | 1.232 | 1.466 | 1.709 |
| 142.321 | 3.918 | 34.787 | 0.480 | 4.9880817230E+002 | 2.9261605401E+002 | -5.8401230426E+000 | 1.232 | 1.461 | 1.703 |
| 143.050 | 3.929 | 35.133 | 0.459 | 4.9435177777E+002 | 2.8964841732E+002 | -6.3654355197E+000 | 1.230 | 1.457 | 1.699 |
| 143.966 | 3.902 | 35.541 | 0.446 | 4.8823383121E+002 | 2.8527948558E+002 | -6.8878271579E+000 | 1.227 | 1.453 | 1.695 |
| 144.881 | 3.874 | 35.950 | 0.446 | 4.8173834278E+002 | 2.8029945701E+002 | -7.5714361560E+000 | 1.222 | 1.451 | 1.694 |
| 145.797 | 3.847 | 36.358 | 0.446 | 4.7436852717E+002 | 2.7446937824E+002 | -8.3305588325E+000 | 1.215 | 1.449 | 1.694 |
| 146.168 | 3.836 | 36.523 | 0.453 | 4.7123512860E+002 | 2.7196484025E+002 | -8.5482124146E+000 | 1.212 | 1.448 | 1.695 |
| 147.084 | 3.803 | 36.940 | 0.454 | 4.6317423542E+002 | 2.6552108043E+002 | -9.0850766645E+000 | 1.204 | 1.447 | 1.697 |
| 147.999 | 3.767 | 37.354 | 0.446 | 4.5459794807E+002 | 2.5865550102E+002 | -9.7165131525E+000 | 1.195 | 1.446 | 1.700 |
| 148.915 | 3.720 | 37.757 | 0.436 | 4.4538072752E+002 | 2.5131823595E+002 | -1.0138224749E+001 | 1.185 | 1.446 | 1.704 |
| 149.214 | 3.700 | 37.884 | 0.433 | 4.4234277373E+002 | 2.4892330538E+002 | -1.0289167092E+001 | 1.182 | 1.447 | 1.706 |
| 150.130 | 3.634 | 38.283 | 0.436 | 4.3256405740E+002 | 2.4127859873E+002 | -1.0951444430E+001 | 1.171 | 1.447 | 1.711 |
| 151.045 | 3.568 | 38.683 | 0.445 | 4.2228777973E+002 | 2.3334851469E+002 | -1.1690233748E+001 | 1.160 | 1.449 | 1.717 |
| 151.961 | 3.519 | 39.099 | 0.458 | 4.1115614457E+002 | 2.2487161890E+002 | -1.2635543088E+001 | 1.148 | 1.450 | 1.723 |
| 152.280 | 3.506 | 39.248 | 0.459 | 4.0707275908E+002 | 2.2179290437E+002 | -1.2806840000E+001 | 1.144 | 1.451 | 1.726 |
| 153.195 | 3.444 | 39.666 | 0.451 | 3.9533402890E+002 | 2.1305071374E+002 | -1.2885553641E+001 | 1.132 | 1.454 | 1.732 |
| 154.111 | 3.373 | 40.074 | 0.453 | 3.8347589909E+002 | 2.0437125780E+002 | -1.3367722961E+001 | 1.119 | 1.457 | 1.739 |
| 155.027 | 3.315 | 40.496 | 0.465 | 3.7085418922E+002 | 1.9528678099E+002 | -1.4302650101E+001 | 1.106 | 1.460 | 1.746 |
| 155.302 | 3.302 | 40.627 | 0.468 | 3.6687764087E+002 | 1.9245936899E+002 | -1.4437672559E+001 | 1.101 | 1.461 | 1.748 |
| 156.217 | 3.234 | 41.053 | 0.460 | 3.5372071723E+002 | 1.8321553100E+002 | -1.4325626194E+001 | 1.088 | 1.465 | 1.754 |
| 157.133 | 3.154 | 41.469 | 0.460 | 3.4064362678E+002 | 1.7420050954E+002 | -1.4632909022E+001 | 1.074 | 1.469 | 1.760 |
| 158.049 | 3.087 | 41.896 | 0.469 | 3.2692398693E+002 | 1.6494335241E+002 | -1.5298614445E+001 | 1.059 | 1.473 | 1.765 |
| 158.367 | 3.067 | 42.048 | 0.475 | 3.2201693819E+002 | 1.6167384465E+002 | -1.5432798916E+001 | 1.054 | 1.475 | 1.766 |
| 159.283 | 2.993 | 42.482 | 0.469 | 3.0782119157E+002 | 1.5230487306E+002 | -1.5384886900E+001 | 1.039 | 1.480 | 1.770 |
| 160.198 | 2.909 | 42.907 | 0.475 | 2.9384313733E+002 | 1.4335126570E+002 | -1.5652090843E+001 | 1.024 | 1.486 | 1.773 |
| 161.114 | 2.846 | 43.353 | 0.488 | 2.7915806955E+002 | 1.3410438740E+002 | -1.6169991177E+001 | 1.009 | 1.493 | 1.774 |
| 161.488 | 2.822 | 43.537 | 0.494 | 2.7309799535E+002 | 1.3033370218E+002 | -1.6232787233E+001 | 1.002 | 1.496 | 1.774 |
| 162.403 | 2.753 | 43.990 | 0.485 | 2.5821448488E+002 | 1.2121529495E+002 | -1.5874686956E+001 | 0.986 | 1.504 | 1.773 |
| 163.319 | 2.667 | 44.426 | 0.489 | 2.4402724092E+002 | 1.1270517036E+002 | -1.5762756424E+001 | 0.970 | 1.512 | 1.771 |
| 164.234 | 2.605 | 44.886 | 0.505 | 2.2934870488E+002 | 1.0408495181E+002 | -1.5993815222E+001 | 0.953 | 1.522 | 1.766 |
| 164.740 | 2.574 | 45.143 | 0.505 | 2.2127051096E+002 | 9.9399718927E+001 | -1.5825186685E+001 | 0.943 | 1.528 | 1.763 |

| | | | | | | | | | |
|---------|-------|--------|-------|--------------------|--------------------|--------------------|--------|-------|-------|
| 165.656 | 2.523 | 45.604 | 0.489 | 2.0702592220E+002 | 9.1250468116E+001 | -1.4864200969E+001 | 0.925 | 1.539 | 1.756 |
| 166.571 | 2.444 | 46.038 | 0.486 | 1.9405022388E+002 | 8.3996877213E+001 | -1.4282781193E+001 | 0.909 | 1.550 | 1.748 |
| 167.487 | 2.387 | 46.494 | 0.500 | 1.8087036865E+002 | 7.6796175349E+001 | -1.4229959876E+001 | 0.891 | 1.563 | 1.738 |
| 167.888 | 2.365 | 46.696 | 0.496 | 1.7520026653E+002 | 7.3749073699E+001 | -1.3973738744E+001 | 0.884 | 1.570 | 1.734 |
| 168.803 | 2.313 | 47.147 | 0.480 | 1.6279139391E+002 | 6.7168840995E+001 | -1.2896263158E+001 | 0.866 | 1.584 | 1.723 |
| 169.719 | 2.237 | 47.575 | 0.475 | 1.5158379457E+002 | 6.1388817029E+001 | -1.2193589730E+001 | 0.850 | 1.598 | 1.713 |
| 170.634 | 2.177 | 48.017 | 0.484 | 1.4046170302E+002 | 5.5800855716E+001 | -1.1909472422E+001 | 0.834 | 1.615 | 1.703 |
| 170.981 | 2.155 | 48.186 | 0.480 | 1.3636524444E+002 | 5.3779974419E+001 | -1.1685050728E+001 | 0.828 | 1.622 | 1.700 |
| 171.897 | 2.099 | 48.623 | 0.470 | 1.2599151767E+002 | 4.8741065953E+001 | -1.0887178058E+001 | 0.812 | 1.640 | 1.691 |
| 172.812 | 2.029 | 49.046 | 0.471 | 1.1642793918E+002 | 4.4239242191E+001 | -1.0395970649E+001 | 0.798 | 1.659 | 1.683 |
| 173.728 | 1.975 | 49.485 | 0.484 | 1.0695374322E+002 | 3.9901597402E+001 | -1.0419785607E+001 | 0.783 | 1.681 | 1.677 |
| 174.041 | 1.962 | 49.640 | 0.481 | 1.0368576633E+002 | 3.8426514822E+001 | -1.0248554026E+001 | 0.778 | 1.690 | 1.676 |
| 174.956 | 1.915 | 50.076 | 0.466 | 9.4827172105E+001 | 3.5204621821E+001 | -9.2479083092E+000 | 0.764 | 1.715 | 1.672 |
| 175.872 | 1.850 | 50.494 | 0.466 | 8.6750397954E+001 | 3.1039583891E+001 | -8.7703654257E+000 | 0.751 | 1.741 | 1.670 |
| 176.788 | 1.802 | 50.928 | 0.478 | 7.8766311171E+001 | 2.7707808013E+001 | -8.7178601501E+000 | 0.739 | 1.771 | 1.669 |
| 177.117 | 1.789 | 51.089 | 0.477 | 7.5897657927E+001 | 2.6528884137E+001 | -8.5642216317E+000 | 0.734 | 1.782 | 1.669 |
| 178.032 | 1.749 | 51.522 | 0.462 | 6.8445665155E+001 | 2.3518746589E+001 | -7.7650458142E+000 | 0.721 | 1.815 | 1.670 |
| 178.948 | 1.690 | 51.936 | 0.460 | 6.1677803347E+001 | 2.0865195591E+001 | -7.3108049852E+000 | 0.710 | 1.847 | 1.672 |
| 179.864 | 1.645 | 52.364 | 0.472 | 5.5057645787E+001 | 1.8344563062E+001 | -7.2385821705E+000 | 0.700 | 1.882 | 1.673 |
| 180.173 | 1.636 | 52.514 | 0.472 | 5.2815752308E+001 | 1.7504716566E+001 | -7.1144945658E+000 | 0.696 | 1.895 | 1.673 |
| 181.089 | 1.600 | 52.942 | 0.457 | 4.6645245094E+001 | 1.5230687307E+001 | -6.4197058919E+000 | 0.686 | 1.929 | 1.673 |
| 182.005 | 1.547 | 53.352 | 0.455 | 4.1059571286E+001 | 1.3233635507E+001 | -6.0114631948E+000 | 0.677 | 1.961 | 1.668 |
| 182.920 | 1.507 | 53.775 | 0.469 | 3.5636664528E+001 | 1.1354387571E+001 | -5.9724831059E+000 | 0.669 | 1.988 | 1.657 |
| 183.262 | 1.501 | 53.941 | 0.473 | 3.3591853899E+001 | 1.0658365058E+001 | -5.8719779957E+000 | 0.666 | 1.997 | 1.650 |
| 184.177 | 1.476 | 54.369 | 0.457 | 2.8507851089E+001 | 8.9579959526E+000 | -5.2674998664E+000 | 0.660 | 2.014 | 1.625 |
| 185.093 | 1.432 | 54.778 | 0.450 | 2.3945667141E+001 | 7.4834956012E+000 | -4.8762214780E+000 | 0.656 | 2.020 | 1.591 |
| 186.008 | 1.394 | 55.193 | 0.456 | 1.9578198647E+001 | 6.1293874570E+000 | -4.7058793694E+000 | 0.657 | 2.013 | 1.541 |
| 186.398 | 1.381 | 55.374 | 0.456 | 1.7753651864E+001 | 5.5778955954E+000 | -4.5872151852E+000 | 0.660 | 2.005 | 1.515 |
| 187.314 | 1.352 | 55.788 | 0.440 | 1.3749944251E+001 | 4.4097650171E+000 | -4.1020490935E+000 | 0.673 | 1.977 | 1.445 |
| 188.230 | 1.299 | 56.178 | 0.436 | 1.0241714010E+001 | 3.4512025868E+000 | -3.7740243660E+000 | 0.708 | 1.935 | 1.366 |
| 189.145 | 1.264 | 56.587 | 0.447 | 6.8387065133E+000 | 2.5971513850E+000 | -3.5970754015E+000 | 0.797 | 1.878 | 1.273 |
| 189.636 | 1.246 | 56.807 | 0.442 | 5.1033507202E+000 | 2.1879559968E+000 | -3.4366091974E+000 | 0.900 | 1.843 | 1.220 |
| 190.360 | 1.220 | 57.124 | 0.424 | 2.7196143167E+000 | 1.6589268251E+000 | -3.0925380391E+000 | 1.281 | 1.788 | 1.142 |
| 191.276 | 1.165 | 57.502 | 0.422 | 1.2220140721E-001 | 1.1560468648E+000 | -2.7544527764E+000 | 19.863 | 1.716 | 1.046 |
| 192.191 | 1.128 | 57.898 | 0.433 | -2.3245179223E+000 | -7.8128562651E-007 | -2.5433264579E+000 | 0.055 | 1.641 | 0.950 |
| 192.761 | 1.105 | 58.145 | 0.428 | -3.7276915800E+000 | -7.8128562651E-007 | -2.3647717225E+000 | 0.055 | 1.596 | 0.894 |
| 193.677 | 1.072 | 58.533 | 0.412 | -5.7481377686E+000 | -7.8128562651E-007 | -1.9970387377E+000 | 0.055 | 1.527 | 0.810 |
| 194.592 | 1.017 | 58.900 | 0.405 | -7.3847981986E+000 | -7.8128562651E-007 | -1.6751463752E+000 | 0.055 | 1.468 | 0.740 |
| 195.508 | 0.970 | 59.275 | 0.410 | -8.8157742547E+000 | -7.8128562651E-007 | -1.4398318797E+000 | 0.055 | 1.417 | 0.678 |
| 195.835 | 0.954 | 59.410 | 0.405 | -9.2728159803E+000 | -7.8128562651E-007 | -1.3443836123E+000 | 0.055 | 1.400 | 0.658 |
| 196.751 | 0.912 | 59.778 | 0.392 | -1.0372001262E+001 | -7.8128562651E-007 | -1.0504378863E+000 | 0.055 | 1.361 | 0.609 |
| 197.667 | 0.852 | 60.128 | 0.380 | -1.1196445840E+001 | -7.8128562651E-007 | -7.7913549582E-001 | 0.055 | 1.332 | 0.571 |
| 198.582 | 0.789 | 60.475 | 0.377 | -1.1798804621E+001 | -7.8128562651E-007 | -5.5885235546E-001 | 0.055 | 1.312 | 0.542 |
| 198.873 | 0.767 | 60.583 | 0.376 | -1.1952276005E+001 | -7.8128562651E-007 | -4.9324889422E-001 | 0.055 | 1.307 | 0.534 |
| 199.789 | 0.713 | 60.928 | 0.372 | -1.2305562588E+001 | -7.8128562651E-007 | -2.8484398905E-001 | 0.055 | 1.294 | 0.512 |
| 200.704 | 0.650 | 61.264 | 0.367 | -1.2473900758E+001 | -7.8128562651E-007 | -1.0685724733E-001 | 0.055 | 1.287 | 0.495 |
| 201.620 | 0.588 | 61.600 | 0.380 | -1.2501246497E+001 | -7.8128562651E-007 | 8.5527130015E-002 | 0.055 | 1.283 | 0.480 |
| 201.946 | 0.582 | 61.736 | 0.407 | -1.2459948008E+001 | -7.8128562651E-007 | 1.5493235690E-001 | 0.055 | 1.282 | 0.475 |
| 202.862 | 0.569 | 62.106 | 0.397 | -1.2245328614E+001 | -7.8128562651E-007 | 3.0280322360E-001 | 0.055 | 1.279 | 0.460 |
| 203.777 | 0.542 | 62.462 | 0.387 | -1.1905435142E+001 | -7.8128562651E-007 | 4.2657756085E-001 | 0.055 | 1.276 | 0.446 |
| 204.693 | 0.510 | 62.814 | 0.383 | -1.1464152169E+001 | -7.8128562651E-007 | 5.2488587173E-001 | 0.055 | 1.271 | 0.430 |
| 205.349 | 0.486 | 63.064 | 0.386 | -1.1099724642E+001 | -7.8128562651E-007 | 5.9511045029E-001 | 0.055 | 1.267 | 0.419 |
| 206.265 | 0.472 | 63.420 | 0.378 | -1.0504374516E+001 | -7.8128562651E-007 | 6.7489680338E-001 | 0.055 | 1.259 | 0.401 |
| 207.180 | 0.436 | 63.755 | 0.366 | -9.8638099251E+000 | -7.8128562651E-007 | 7.2227671252E-001 | 0.055 | 1.248 | 0.382 |
| 208.096 | 0.400 | 64.090 | 0.365 | -9.1816946421E+000 | -7.8128562651E-007 | 7.6072527061E-001 | 0.055 | 1.235 | 0.363 |
| 209.011 | 0.362 | 64.423 | 0.366 | -8.4707205625E+000 | -7.8128562651E-007 | 8.1503385547E-001 | 0.055 | 1.221 | 0.343 |
| 209.174 | 0.358 | 64.485 | 0.348 | -8.3370723022E+000 | -7.8128562651E-007 | 8.1335866340E-001 | 0.055 | 1.218 | 0.339 |
| 210.090 | 0.312 | 64.798 | 0.347 | -7.6362688664E+000 | -7.8128562651E-007 | 7.7705543206E-001 | 0.055 | 1.204 | 0.321 |
| 211.005 | 0.274 | 65.120 | 0.356 | -6.9140780908E+000 | -7.8128562651E-007 | 7.9500051219E-001 | 0.055 | 1.188 | 0.303 |
| 211.921 | 0.245 | 65.449 | 0.365 | -6.1804124626E+000 | -7.8128562651E-007 | 8.0163427082E-001 | 0.055 | 1.173 | 0.285 |
| 212.837 | 0.223 | 65.788 | 0.367 | -5.4460735187E+000 | -7.8128562651E-007 | 7.8153469361E-001 | 0.055 | 1.157 | 0.268 |
| 213.752 | 0.199 | 66.122 | 0.367 | -4.7492155375E+000 | -7.8128562651E-007 | 7.4781521704E-001 | 0.055 | 1.143 | 0.252 |
| 214.596 | 0.179 | 66.434 | 0.375 | -4.1284111898E+000 | -7.8128562651E-007 | 7.2682952157E-001 | 0.055 | 1.132 | 0.239 |
| 215.512 | 0.175 | 66.783 | 0.386 | -3.4716158415E+000 | -7.8128562651E-007 | 7.0145366645E-001 | 0.055 | 1.120 | 0.226 |
| 216.427 | 0.179 | 67.140 | 0.386 | -2.8438638258E+000 | -7.8128562651E-007 | 6.3560296183E-001 | 0.055 | 1.108 | 0.220 |
| 217.343 | 0.176 | 67.489 | 0.373 | -2.3076585508E+000 | -7.8128562651E-007 | 5.6781003291E-001 | 0.055 | 1.098 | 0.220 |
| 218.259 | 0.157 | 67.824 | 0.366 | -1.8040533353E+000 | -7.8128562651E-007 | 5.3757080572E-001 | 0.055 | 1.087 | 0.220 |
| 219.174 | 0.139 | 68.159 | 0.367 | -1.3232240907E+000 | -7.8128562651E-007 | 4.8954451644E-001 | 0.055 | 1.077 | 0.220 |
| 220.090 | 0.122 | 68.496 | 0.366 | -9.0756772515E-001 | -7.8128562651E-007 | 4.1003884169E-001 | 0.055 | 1.067 | 0.220 |
| 221.006 | 0.103 | 68.829 | 0.364 | -5.7233441912E-001 | -7.8128562651E-007 | 3.2385207470E-001 | 0.055 | 1.056 | 0.220 |
| 221.921 | 0.083 | 69.163 | 0.361 | -3.1450884076E-001 | -7.8128562651E-007 | 2.3911434222E-001 | 0.055 | 1.032 | 0.220 |
| 222.837 | 0.058 | 69.490 | 0.352 | -1.3445275610E-001 | -7.8128562651E-007 | 1.5386231955E-001 | 0.055 | 0.957 | 0.220 |
| 223.753 | 0.022 | 69.808 | 0.347 | -3.2746200618E-002 | -7.8128562651E-007 | 6.6670530188E-002 | 0.055 | 0.683 | 0.220 |
| 224.270 | 0.003 | 69.988 | 0.370 | -1.1232912679E-002 | -7.8128562651E-007 | 3.0984528283E-002 | 0.055 | 0.441 | 0.328 |
| 225.186 | 0.000 | 70.339 | 0.370 | -1.7435020282E-005 | -1.0758337473E-007 | 9.7165227127E-004 | 0.120 | 0.246 | 0.493 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
ht(m) : Altezza linea di thrust da nodo sinistro base concio
yt(m) : coordinata Y linea di trust
yt'(-) : gradiente pendenza locale linea di trust
E(x)(kN/m) : Forza Normale interconcio
T(x)(kN/m) : Forza Tangenziale interconcio
E' (kN) : derivata Forza normale interconcio
Rho(x) (-) : fattore mobilitazione resistenza al taglio verticale interconcio ZhU et al.(2003)
FS_qFEM(x)(-) : fattore di sicurezza locale stimato (locale in X) by qFEM
FS_srmFEM(x)(-) : fattore di sicurezza locale stimato (locale in X) by SRM Procedure

TABELLA SFORZI DI TAGLIO DISTRIBUITI LUNGO SUPERFICIE INDIVIDUATA CON MINOR FS

| X (m) | dx (m) | dl (m) | alpha (°) | TauStress (kPa) | TauF (kN/m) | TauStrength (kPa) | TauS (kN/m) |
|----------|-----------|-----------|--------------|--------------------|----------------|----------------------|----------------|
| 101.090 | 0.916 | 0.929 | 9.666 | 0.148 | 0.138 | 0.560 | 0.520 |
| 102.005 | 0.916 | 0.929 | 9.666 | 0.445 | 0.414 | 1.694 | 1.573 |
| 102.921 | 0.916 | 0.929 | 9.666 | 0.742 | 0.689 | 2.836 | 2.634 |
| 103.837 | 0.133 | 0.135 | 9.666 | 0.912 | 0.123 | 3.520 | 0.476 |
| 103.970 | 0.916 | 0.929 | 9.666 | 1.674 | 1.555 | 6.460 | 6.000 |
| 104.886 | 0.916 | 0.929 | 9.666 | 3.155 | 2.930 | 12.228 | 11.357 |
| 105.801 | 0.916 | 0.929 | 9.666 | 4.636 | 4.306 | 18.093 | 16.805 |
| 106.717 | 0.916 | 0.929 | 9.666 | 6.117 | 5.681 | 24.023 | 22.313 |
| 107.633 | 0.916 | 0.929 | 9.666 | 7.598 | 7.057 | 30.025 | 27.887 |
| 108.548 | 0.916 | 0.929 | 9.666 | 9.079 | 8.432 | 35.629 | 33.093 |
| 109.464 | 0.916 | 0.929 | 9.666 | 10.559 | 9.808 | 41.641 | 38.677 |
| 110.379 | 0.916 | 0.929 | 9.666 | 12.040 | 11.183 | 47.670 | 44.277 |
| 111.295 | 0.827 | 0.839 | 9.666 | 13.449 | 11.282 | 53.300 | 44.712 |
| 112.122 | 0.916 | 0.932 | 10.602 | 15.945 | 14.853 | 58.400 | 54.401 |
| 113.038 | 0.916 | 0.932 | 10.602 | 17.466 | 16.270 | 64.309 | 59.906 |
| 113.953 | 0.916 | 0.932 | 10.602 | 18.988 | 17.688 | 70.426 | 65.604 |
| 114.869 | 0.916 | 0.932 | 10.602 | 20.509 | 19.105 | 76.044 | 70.838 |
| 115.785 | 0.916 | 0.932 | 10.602 | 22.030 | 20.522 | 81.628 | 76.039 |
| 116.700 | 0.803 | 0.817 | 10.602 | 23.458 | 19.164 | 87.174 | 71.217 |
| 117.503 | 0.916 | 0.938 | 12.474 | 28.220 | 26.464 | 90.035 | 84.432 |
| 118.419 | 0.916 | 0.938 | 12.474 | 29.787 | 27.933 | 94.848 | 88.945 |
| 119.334 | 0.916 | 0.938 | 12.474 | 31.353 | 29.402 | 99.768 | 93.559 |
| 120.250 | 0.916 | 0.938 | 12.474 | 32.920 | 30.872 | 104.607 | 98.098 |
| 121.166 | 0.046 | 0.047 | 12.474 | 33.743 | 1.575 | 107.208 | 5.003 |
| 121.211 | 0.916 | 0.946 | 14.581 | 38.990 | 36.889 | 106.420 | 100.684 |
| 122.127 | 0.916 | 0.946 | 14.581 | 40.551 | 38.365 | 110.674 | 104.709 |
| 123.043 | 0.916 | 0.946 | 14.581 | 42.112 | 39.842 | 114.980 | 108.783 |
| 123.958 | 0.443 | 0.458 | 14.581 | 43.270 | 19.805 | 117.909 | 53.967 |
| 124.401 | 0.916 | 0.958 | 17.124 | 50.192 | 48.089 | 116.284 | 111.413 |
| 125.317 | 0.916 | 0.958 | 17.124 | 51.665 | 49.501 | 119.671 | 114.657 |
| 126.232 | 0.916 | 0.958 | 17.124 | 53.139 | 50.913 | 122.904 | 117.755 |
| 127.148 | 0.271 | 0.283 | 17.124 | 54.094 | 15.320 | 124.884 | 35.369 |
| 127.419 | 0.916 | 0.969 | 19.045 | 59.539 | 57.673 | 123.110 | 119.251 |
| 128.334 | 0.916 | 0.969 | 19.045 | 60.889 | 58.980 | 125.644 | 121.706 |
| 129.250 | 0.916 | 0.969 | 19.045 | 62.239 | 60.288 | 128.140 | 124.123 |
| 130.166 | 0.119 | 0.126 | 19.045 | 63.001 | 7.908 | 129.609 | 16.268 |
| 130.284 | 0.916 | 0.980 | 20.933 | 68.213 | 66.872 | 126.963 | 124.466 |
| 131.200 | 0.916 | 0.980 | 20.933 | 69.393 | 68.029 | 129.007 | 126.470 |
| 132.116 | 0.916 | 0.980 | 20.933 | 70.573 | 69.186 | 131.042 | 128.465 |
| 133.031 | 0.238 | 0.255 | 20.933 | 71.317 | 18.196 | 132.339 | 33.766 |
| 133.269 | 0.916 | 0.992 | 22.617 | 75.992 | 75.378 | 129.814 | 128.765 |
| 134.185 | 0.916 | 0.992 | 22.617 | 76.981 | 76.359 | 131.417 | 130.354 |
| 135.101 | 0.916 | 0.992 | 22.617 | 77.970 | 77.340 | 132.985 | 131.910 |
| 136.016 | 0.360 | 0.390 | 22.617 | 78.659 | 30.643 | 134.090 | 52.236 |
| 136.376 | 0.916 | 1.003 | 24.032 | 82.587 | 82.796 | 131.896 | 132.230 |
| 137.292 | 0.916 | 1.003 | 24.032 | 83.388 | 83.599 | 133.122 | 133.459 |
| 138.207 | 0.916 | 1.003 | 24.032 | 84.188 | 84.401 | 134.340 | 134.680 |
| 139.123 | 0.700 | 0.767 | 24.032 | 84.895 | 65.076 | 135.428 | 103.813 |
| 139.823 | 0.667 | 0.734 | 24.700 | 87.021 | 63.894 | 134.798 | 98.973 |
| 140.490 | 0.916 | 1.008 | 24.700 | 87.041 | 87.724 | 134.803 | 135.860 |
| 141.406 | 0.916 | 1.008 | 24.700 | 86.569 | 87.248 | 134.041 | 135.093 |
| 142.321 | 0.729 | 0.802 | 24.700 | 86.145 | 69.116 | 133.367 | 107.004 |
| 143.050 | 0.916 | 1.014 | 25.428 | 87.288 | 88.496 | 131.059 | 132.873 |
| 143.966 | 0.916 | 1.014 | 25.428 | 86.680 | 87.880 | 130.146 | 131.948 |
| 144.881 | 0.916 | 1.014 | 25.428 | 86.073 | 87.265 | 129.233 | 131.022 |

| | | | | | | | |
|---------|-------|-------|--------|--------|--------|---------|---------|
| 145.797 | 0.371 | 0.411 | 25.428 | 85.646 | 35.188 | 128.592 | 52.832 |
| 146.168 | 0.916 | 1.020 | 26.178 | 86.738 | 88.497 | 126.319 | 128.881 |
| 147.084 | 0.916 | 1.020 | 26.178 | 85.985 | 87.729 | 125.233 | 127.773 |
| 147.999 | 0.916 | 1.020 | 26.178 | 85.232 | 86.961 | 124.148 | 126.666 |
| 148.915 | 0.299 | 0.333 | 26.178 | 84.733 | 28.227 | 123.421 | 41.116 |
| 149.214 | 0.916 | 1.027 | 26.931 | 85.653 | 87.966 | 121.108 | 124.379 |
| 150.130 | 0.916 | 1.027 | 26.931 | 84.748 | 87.037 | 119.844 | 123.081 |
| 151.045 | 0.916 | 1.027 | 26.931 | 83.842 | 86.107 | 118.593 | 121.796 |
| 151.961 | 0.319 | 0.358 | 26.931 | 83.232 | 29.777 | 117.748 | 42.126 |
| 152.280 | 0.916 | 1.034 | 27.656 | 83.884 | 86.714 | 115.401 | 119.295 |
| 153.195 | 0.916 | 1.034 | 27.656 | 82.826 | 85.620 | 113.949 | 117.794 |
| 154.111 | 0.916 | 1.034 | 27.656 | 81.768 | 84.527 | 112.528 | 116.325 |
| 155.027 | 0.275 | 0.311 | 27.656 | 81.080 | 25.176 | 111.609 | 34.656 |
| 155.302 | 0.916 | 1.041 | 28.372 | 81.531 | 84.844 | 109.243 | 113.682 |
| 156.217 | 0.916 | 1.041 | 28.372 | 80.317 | 83.581 | 107.609 | 111.982 |
| 157.133 | 0.916 | 1.041 | 28.372 | 79.104 | 82.318 | 106.017 | 110.324 |
| 158.049 | 0.318 | 0.362 | 28.372 | 78.286 | 28.335 | 104.941 | 37.983 |
| 158.367 | 0.916 | 1.047 | 29.054 | 78.450 | 82.172 | 102.552 | 107.418 |
| 159.283 | 0.916 | 1.047 | 29.054 | 77.083 | 80.740 | 100.747 | 105.527 |
| 160.198 | 0.916 | 1.047 | 29.054 | 75.716 | 79.308 | 99.005 | 103.702 |
| 161.114 | 0.374 | 0.427 | 29.054 | 74.754 | 31.942 | 97.758 | 41.773 |
| 161.488 | 0.916 | 1.054 | 29.688 | 74.607 | 78.635 | 95.352 | 100.500 |
| 162.403 | 0.916 | 1.054 | 29.688 | 73.093 | 77.039 | 93.363 | 98.404 |
| 163.319 | 0.916 | 1.054 | 29.688 | 71.579 | 75.444 | 91.466 | 96.404 |
| 164.234 | 0.506 | 0.582 | 29.688 | 70.404 | 40.986 | 89.965 | 52.373 |
| 164.740 | 0.916 | 1.049 | 29.248 | 68.710 | 72.105 | 89.189 | 93.596 |
| 165.656 | 0.916 | 1.049 | 29.248 | 67.298 | 70.624 | 87.273 | 91.586 |
| 166.571 | 0.916 | 1.049 | 29.248 | 65.887 | 69.143 | 85.454 | 89.677 |
| 167.487 | 0.400 | 0.459 | 29.248 | 64.872 | 29.777 | 84.125 | 38.613 |
| 167.888 | 0.916 | 1.045 | 28.781 | 63.333 | 66.163 | 83.526 | 87.259 |
| 168.803 | 0.916 | 1.045 | 28.781 | 62.028 | 64.800 | 81.738 | 85.391 |
| 169.719 | 0.916 | 1.045 | 28.781 | 60.723 | 63.436 | 80.011 | 83.586 |
| 170.634 | 0.347 | 0.395 | 28.781 | 59.823 | 23.656 | 78.809 | 31.164 |
| 170.981 | 0.916 | 1.040 | 28.298 | 58.404 | 60.735 | 78.335 | 81.461 |
| 171.897 | 0.916 | 1.040 | 28.298 | 57.207 | 59.490 | 76.692 | 79.752 |
| 172.812 | 0.916 | 1.040 | 28.298 | 56.010 | 58.245 | 75.080 | 78.077 |
| 173.728 | 0.313 | 0.355 | 28.298 | 55.206 | 19.618 | 74.007 | 26.299 |
| 174.041 | 0.916 | 1.035 | 27.808 | 53.899 | 55.795 | 73.603 | 76.192 |
| 174.956 | 0.916 | 1.035 | 27.808 | 52.808 | 54.666 | 72.087 | 74.623 |
| 175.872 | 0.916 | 1.035 | 27.808 | 51.718 | 53.537 | 70.594 | 73.078 |
| 176.788 | 0.329 | 0.372 | 27.808 | 50.977 | 18.966 | 69.582 | 25.888 |
| 177.117 | 0.916 | 1.031 | 27.314 | 49.750 | 51.269 | 69.220 | 71.334 |
| 178.032 | 0.916 | 1.031 | 27.314 | 48.765 | 50.254 | 67.832 | 69.903 |
| 178.948 | 0.916 | 1.031 | 27.314 | 47.780 | 49.238 | 66.457 | 68.486 |
| 179.864 | 0.310 | 0.348 | 27.314 | 47.120 | 16.419 | 65.540 | 22.837 |
| 180.173 | 0.916 | 1.026 | 26.818 | 45.994 | 47.189 | 65.243 | 66.939 |
| 181.089 | 0.916 | 1.026 | 26.818 | 45.112 | 46.284 | 63.982 | 65.645 |
| 182.005 | 0.916 | 1.026 | 26.818 | 44.229 | 45.379 | 62.728 | 64.358 |
| 182.920 | 0.341 | 0.382 | 26.818 | 43.624 | 16.684 | 61.870 | 23.662 |
| 183.262 | 0.916 | 1.022 | 26.330 | 42.577 | 43.498 | 61.590 | 62.921 |
| 184.177 | 0.916 | 1.022 | 26.330 | 41.794 | 42.698 | 60.451 | 61.758 |
| 185.093 | 0.916 | 1.022 | 26.330 | 41.011 | 41.898 | 59.316 | 60.598 |
| 186.008 | 0.390 | 0.435 | 26.330 | 40.452 | 17.602 | 58.507 | 25.457 |
| 186.398 | 0.916 | 1.018 | 25.860 | 39.487 | 40.179 | 58.228 | 59.248 |
| 187.314 | 0.916 | 1.018 | 25.860 | 38.797 | 39.477 | 57.207 | 58.210 |
| 188.230 | 0.916 | 1.018 | 25.860 | 38.106 | 38.774 | 56.188 | 57.173 |
| 189.145 | 0.491 | 0.546 | 25.860 | 37.576 | 20.511 | 55.405 | 30.243 |
| 189.636 | 0.724 | 0.800 | 25.314 | 36.653 | 29.336 | 55.299 | 44.260 |
| 190.360 | 0.916 | 1.013 | 25.314 | 35.696 | 36.157 | 53.857 | 54.551 |
| 191.276 | 0.916 | 1.013 | 25.314 | 34.246 | 34.688 | 51.666 | 52.332 |
| 192.191 | 0.570 | 0.630 | 25.314 | 33.070 | 20.840 | 49.897 | 31.444 |
| 192.761 | 0.916 | 1.008 | 24.733 | 31.466 | 31.721 | 48.679 | 49.074 |
| 193.677 | 0.916 | 1.008 | 24.733 | 30.137 | 30.381 | 46.623 | 47.001 |
| 194.592 | 0.916 | 1.008 | 24.733 | 28.807 | 29.041 | 44.567 | 44.928 |
| 195.508 | 0.327 | 0.360 | 24.733 | 27.905 | 10.060 | 43.171 | 15.563 |
| 195.835 | 0.916 | 1.003 | 24.129 | 26.615 | 26.702 | 42.276 | 42.415 |
| 196.751 | 0.916 | 1.003 | 24.129 | 25.407 | 25.491 | 40.359 | 40.491 |
| 197.667 | 0.916 | 1.003 | 24.129 | 24.200 | 24.280 | 38.441 | 38.567 |
| 198.582 | 0.291 | 0.319 | 24.129 | 23.405 | 7.463 | 37.177 | 11.854 |
| 198.873 | 0.916 | 0.999 | 23.518 | 22.272 | 22.240 | 36.351 | 36.299 |
| 199.789 | 0.916 | 0.999 | 23.518 | 21.184 | 21.154 | 34.575 | 34.526 |
| 200.704 | 0.916 | 0.999 | 23.518 | 20.096 | 20.067 | 32.800 | 32.753 |
| 201.620 | 0.326 | 0.356 | 23.518 | 19.358 | 6.885 | 31.596 | 11.238 |
| 201.946 | 0.916 | 0.993 | 22.706 | 18.241 | 18.105 | 30.888 | 30.658 |
| 202.862 | 0.916 | 0.993 | 22.706 | 17.306 | 17.177 | 29.304 | 29.086 |

| | | | | | | | |
|---------|-------|-------|--------|--------|--------|--------|--------|
| 203.777 | 0.916 | 0.993 | 22.706 | 16.370 | 16.249 | 27.721 | 27.514 |
| 204.693 | 0.656 | 0.711 | 22.706 | 15.568 | 11.068 | 26.362 | 18.742 |
| 205.349 | 0.916 | 0.988 | 22.048 | 14.515 | 14.339 | 25.340 | 25.033 |
| 206.265 | 0.916 | 0.988 | 22.048 | 13.698 | 13.532 | 23.915 | 23.625 |
| 207.180 | 0.916 | 0.988 | 22.048 | 12.882 | 12.726 | 22.489 | 22.217 |
| 208.096 | 0.916 | 0.988 | 22.048 | 12.065 | 11.919 | 21.064 | 20.808 |
| 209.011 | 0.163 | 0.175 | 22.048 | 11.585 | 2.032 | 20.225 | 3.548 |
| 209.174 | 0.916 | 0.984 | 21.425 | 10.927 | 10.747 | 19.645 | 19.323 |
| 210.090 | 0.916 | 0.984 | 21.425 | 10.218 | 10.050 | 18.371 | 18.070 |
| 211.005 | 0.916 | 0.984 | 21.425 | 9.509 | 9.353 | 17.097 | 16.817 |
| 211.921 | 0.916 | 0.984 | 21.425 | 8.801 | 8.656 | 15.823 | 15.564 |
| 212.837 | 0.916 | 0.984 | 21.425 | 8.092 | 7.960 | 14.549 | 14.311 |
| 213.752 | 0.844 | 0.907 | 21.425 | 7.411 | 6.719 | 13.325 | 12.080 |
| 214.596 | 0.916 | 0.981 | 21.089 | 6.679 | 6.554 | 12.204 | 11.976 |
| 215.512 | 0.916 | 0.981 | 21.089 | 6.027 | 5.915 | 11.012 | 10.807 |
| 216.427 | 0.916 | 0.981 | 21.089 | 5.375 | 5.275 | 9.821 | 9.638 |
| 217.343 | 0.916 | 0.981 | 21.089 | 4.723 | 4.635 | 8.629 | 8.469 |
| 218.259 | 0.916 | 0.981 | 21.089 | 4.071 | 3.995 | 7.438 | 7.299 |
| 219.174 | 0.916 | 0.981 | 21.089 | 3.419 | 3.355 | 6.247 | 6.130 |
| 220.090 | 0.916 | 0.981 | 21.089 | 2.767 | 2.715 | 5.055 | 4.961 |
| 221.006 | 0.916 | 0.981 | 21.089 | 2.115 | 2.075 | 3.864 | 3.792 |
| 221.921 | 0.916 | 0.981 | 21.089 | 1.463 | 1.435 | 2.672 | 2.623 |
| 222.837 | 0.916 | 0.981 | 21.089 | 0.810 | 0.795 | 1.481 | 1.453 |
| 223.753 | 0.517 | 0.555 | 21.089 | 0.300 | 0.166 | 0.549 | 0.304 |
| 224.270 | 0.916 | 0.981 | 21.089 | 0.061 | 0.060 | 0.112 | 0.109 |
| 225.186 | 0.051 | 0.055 | 21.089 | 0.003 | 0.000 | 0.006 | 0.000 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
dx(m) : Larghezza concio
dl(m) : lunghezza base concio
alpha(°) : Angolo pendenza base concio
TauStress(kPa) : Sforzo di taglio su base concio
TauF (kN/m) : Forza di taglio su base concio
TauStrength(kPa) : Resistenza al taglio su base concio
TauS (kN/m) : Forza resistente al taglio su base concio

Cuccurumannu (verifica scarica condizioni statiche)

SSAP 5.0.2 - Slope Stability Analysis Program (1991,2021)

WWW.SSAP.EU

Build No. 12007

BY

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** Gia' Ricercatore CNR-IRPI fino a Luglio 2011

Ultima Revisione struttura tabelle del report: 21 Febbraio 2021

File report: \\192.168.1.231\BACKUP su PC canepa\lavorimauri\cave e miniere\Minerale industriali\Cuccurumannu\Sap\Verifica statica.txt

Data: 6/12/2021

Localita' :

Descrizione:

Modello pendio: Ver stat.mod

----- PARAMETRI DEL MODELLO DEL PENDIO -----

__ PARAMETRI GEOMETRICI - Coordinate X Y (in m) __

| SUP T. | | SUP 2 | | SUP 3 | | SUP 4 | |
|--------|-------|--------|-------|-------|---|-------|---|
| X | Y | X | Y | X | Y | X | Y |
| 10.00 | 10.00 | 61.53 | 10.00 | - | - | - | - |
| 61.53 | 10.00 | 78.91 | 20.00 | - | - | - | - |
| 78.91 | 20.00 | 123.90 | 46.00 | - | - | - | - |
| 123.90 | 46.00 | 290.50 | 46.00 | - | - | - | - |
| 290.50 | 46.00 | 297.72 | 42.00 | - | - | - | - |
| 297.72 | 42.00 | 307.03 | 40.00 | - | - | - | - |
| 307.03 | 40.00 | 335.71 | 40.00 | - | - | - | - |
| 335.71 | 40.00 | 327.17 | 38.00 | - | - | - | - |
| - | - | 300.54 | 38.00 | - | - | - | - |
| - | - | 283.80 | 40.00 | - | - | - | - |

| | | | | | | | |
|---|---|--------|-------|---|---|---|---|
| - | - | 262.05 | 40.00 | - | - | - | - |
| - | - | 231.40 | 40.00 | - | - | - | - |
| - | - | 221.34 | 40.00 | - | - | - | - |
| - | - | 205.48 | 36.00 | - | - | - | - |
| - | - | 191.08 | 32.00 | - | - | - | - |
| - | - | 171.51 | 30.00 | - | - | - | - |
| - | - | 147.53 | 26.00 | - | - | - | - |
| - | - | 138.11 | 24.00 | - | - | - | - |
| - | - | 122.16 | 22.00 | - | - | - | - |
| - | - | 113.97 | 20.00 | - | - | - | - |
| - | - | 94.75 | 14.00 | - | - | - | - |
| - | - | 75.96 | 10.00 | - | - | - | - |
| - | - | 61.53 | 10.00 | - | - | - | - |

ASSENZA DI FALDA

----- PARAMETRI GEOMECCANICI -----

| | fi` | C` | Cu | Gamm | Gamm_sat | STR_IDX | sgci | GSI | mi | D | |
|----------|-------|------|------|------|----------|---------|--------|--------|-------|-------|------|
| STRATO 1 | 0.00 | 0.00 | 0.00 | 0.00 | 26.00 | 26.00 | 18.478 | 175.00 | 65.00 | 30.00 | 1.00 |
| STRATO 2 | 32.00 | 0.00 | 0.00 | 0.00 | 21.00 | 22.00 | 2.065 | 0.00 | 0.00 | 0.00 | 0.00 |

LEGENDA: fi` _____ Angolo di attrito interno efficace(in gradi)

C` _____ Coesione efficace (in Kpa)

Cu _____ Resistenza al taglio Non drenata (in Kpa)

Gamm _____ Peso di volume terreno fuori falda (in KN/m^3)

Gamm_sat _____ Peso di volume terreno immerso (in KN/m^3)

STR_IDX _____ Indice di resistenza (usato in solo in 'SNIFF SEARCH') (adimensionale)

---- SOLO Per AMMASSI ROCCIOSI FRATTURATI - Parametri Criterio di Rottura di Hoek (2002)-

sgci _____ Resistenza Compressione Uniassiale Roccia Intatta (in MPa)

GSI _____ Geological Strenght Index ammasso(adimensionale)

mi _____ Indice litologico ammasso(adimensionale)

D _____ Fattore di disturbo ammasso(adimensionale)

Fattore di riduzione NTC2018: gammaPHI=1.25 e gammaC=1.25 - DISATTIVATO (solo per ROCCE)

Uso CRITERIO DI ROTTURA Hoek et al.(2002,2006) - non-lineare - Generalizzato, secondo Lei et al.(2016)

----- INFORMAZIONI GENERAZIONE SUPERFICI RANDOM -----

*** PARAMETRI PER LA GENERAZIONE DELLE SUPERFICI

MOTORE DI RICERCA: RANDOM SEARCH - Siegel (1981)

FILTRAGGIO SUPERFICI : ATTIVATO

COORDINATE X1,X2,Y OSTACOLO : 0.00 0.00 0.00

LUNGHEZZA MEDIA SEGMENTI (m)*: 1.1 (+/-) 50%

INTERVALLO ASCISSE RANDOM STARTING POINT (Xmin .. Xmax): 61.00 120.00

LIVELLO MINIMO CONSIDERATO (Ymin): 0.00

INTERVALLO ASCISSE AMMESSO PER LA TERMINAZIONE (Xmin .. Xmax): 132.00 329.20

TOTALE SUPERFICI GENERATE : 1000

*NOTA IMPORTANTE: La lunghezza media dei segmenti non viene considerata nel caso di uso del motore di ricerca NEW RANOM SEARCH

----- INFORMAZIONI PARAMETRI DI CALCOLO -----

METODO DI CALCOLO : MORGENSTERN - PRICE (Morgenstern & Price, 1965)

METODO DI ESPLORAZIONE CAMPO VALORI (lambda0,Fs0) ADOTTATO : A (rapido)

COEFFICIENTE SISMICO UTILIZZATO Kh : 0.0000

COEFFICIENTE SISMICO UTILIZZATO Kv (assunto Positivo): 0.0000

COEFFICIENTE c=Kv/Kh UTILIZZATO : 0.5000

FORZA ORIZZONTALE ADDIZIONALE IN TESTA (kN/m): 0.00

FORZA ORIZZONTALE ADDIZIONALE ALLA BASE (kN/m): 0.00

N.B. Le forze orizzontali addizionali in testa e alla base sono poste uguali a 0 durante le tutte le verifiche globali.

I valori >0 impostati dall'utente sono utilizzati solo in caso di verifica singola

----- RISULTATO FINALE ELABORAZIONI -----

* DATI RELATIVI ALLE 10 SUPERFICI GENERATE CON MINOR Fs *

| | | | | | | | |
|---------------------------|--------|--------|---|---|-------|---------|--------|
| Fattore di sicurezza (FS) | 1.2695 | - Min. | - | X | Y | Lambda= | 0.6220 |
| | 65.98 | | | | 12.56 | | |
| | 67.64 | | | | 12.50 | | |
| | 68.79 | | | | 12.43 | | |
| | 70.84 | | | | 12.11 | | |
| | 72.85 | | | | 12.21 | | |
| | 75.01 | | | | 12.61 | | |
| | 76.63 | | | | 13.15 | | |
| | 79.02 | | | | 13.91 | | |

| | |
|--------|-------|
| 80.89 | 14.56 |
| 83.16 | 14.88 |
| 85.33 | 16.05 |
| 86.32 | 16.59 |
| 87.64 | 17.43 |
| 88.80 | 18.09 |
| 90.00 | 18.67 |
| 92.15 | 19.92 |
| 94.16 | 21.40 |
| 95.81 | 22.65 |
| 98.00 | 23.00 |
| 100.31 | 23.95 |
| 101.56 | 24.49 |
| 102.58 | 24.83 |
| 104.35 | 26.00 |
| 106.11 | 27.78 |
| 107.28 | 28.58 |
| 108.46 | 29.68 |
| 109.52 | 31.11 |
| 111.64 | 31.93 |
| 113.50 | 32.64 |
| 114.45 | 33.40 |
| 115.64 | 34.49 |
| 117.65 | 35.88 |
| 119.19 | 37.12 |
| 120.71 | 38.16 |
| 122.74 | 39.44 |
| 124.32 | 40.02 |
| 125.11 | 40.39 |
| 126.69 | 41.60 |
| 127.61 | 42.39 |
| 128.74 | 43.56 |
| 130.30 | 44.58 |
| 131.52 | 45.27 |
| 132.48 | 45.85 |
| 132.65 | 46.00 |

Fattore di sicurezza (FS) 1.2756 - N.2 -- X Y Lambda= 0.5583

| | |
|--------|-------|
| 67.13 | 13.22 |
| 68.63 | 12.91 |
| 69.36 | 13.09 |
| 70.53 | 13.14 |
| 71.96 | 13.17 |
| 73.19 | 13.83 |
| 74.74 | 14.20 |
| 75.59 | 14.46 |
| 76.24 | 14.72 |
| 76.91 | 14.89 |
| 78.16 | 15.23 |
| 79.63 | 15.64 |
| 80.78 | 16.12 |
| 81.86 | 17.05 |
| 82.59 | 17.51 |
| 83.28 | 18.23 |
| 84.46 | 18.95 |
| 85.33 | 19.54 |
| 86.46 | 20.51 |
| 86.87 | 21.06 |
| 87.35 | 21.85 |
| 88.51 | 22.36 |
| 89.26 | 22.72 |
| 90.94 | 23.01 |
| 92.41 | 23.23 |
| 93.42 | 23.72 |
| 95.04 | 24.38 |
| 96.01 | 24.89 |
| 96.55 | 25.30 |
| 97.83 | 26.07 |
| 99.37 | 26.90 |
| 100.61 | 27.61 |
| 101.11 | 27.97 |
| 101.85 | 28.26 |
| 102.38 | 28.66 |
| 103.02 | 29.17 |

| | |
|--------|-------|
| 103.87 | 29.76 |
| 104.63 | 30.22 |
| 106.32 | 30.46 |
| 107.62 | 31.01 |
| 108.73 | 32.04 |
| 109.25 | 32.36 |
| 109.74 | 32.76 |
| 110.31 | 33.22 |
| 111.04 | 33.64 |
| 111.95 | 34.61 |
| 112.55 | 35.43 |
| 113.18 | 36.35 |
| 113.80 | 37.41 |
| 114.67 | 37.99 |
| 115.38 | 38.34 |
| 116.28 | 38.88 |
| 117.55 | 39.92 |
| 118.70 | 40.69 |
| 120.10 | 40.98 |
| 121.42 | 41.76 |
| 123.05 | 42.36 |
| 123.68 | 42.79 |
| 124.86 | 43.17 |
| 125.70 | 43.40 |
| 126.68 | 43.67 |
| 127.25 | 43.86 |
| 127.83 | 43.95 |
| 128.91 | 44.38 |
| 130.42 | 45.12 |
| 131.26 | 45.60 |
| 132.65 | 46.00 |

Fattore di sicurezza (FS) 1.2899 - N.3 -- X Y Lambda= 0.5668

| | |
|--------|-------|
| 89.82 | 26.31 |
| 90.23 | 26.12 |
| 91.07 | 26.23 |
| 91.85 | 26.35 |
| 92.58 | 26.44 |
| 92.95 | 26.61 |
| 93.73 | 27.07 |
| 94.32 | 27.47 |
| 95.05 | 27.83 |
| 95.83 | 28.24 |
| 96.60 | 28.65 |
| 97.31 | 28.98 |
| 97.81 | 29.40 |
| 98.10 | 29.64 |
| 98.45 | 29.96 |
| 99.24 | 30.38 |
| 99.81 | 30.51 |
| 100.59 | 30.57 |
| 101.12 | 30.58 |
| 101.88 | 30.76 |
| 102.32 | 30.76 |
| 102.92 | 31.01 |
| 103.38 | 31.10 |
| 103.79 | 31.32 |
| 104.21 | 31.52 |
| 104.57 | 31.59 |
| 104.91 | 31.69 |
| 105.80 | 31.98 |
| 106.53 | 32.17 |
| 106.94 | 32.17 |
| 107.46 | 32.38 |
| 108.26 | 32.64 |
| 109.03 | 33.10 |
| 109.66 | 33.58 |
| 110.37 | 34.09 |
| 110.85 | 34.65 |
| 111.44 | 34.98 |
| 111.79 | 35.14 |
| 112.48 | 35.65 |
| 112.80 | 35.75 |
| 113.47 | 36.01 |

| | |
|--------|-------|
| 114.01 | 36.46 |
| 114.67 | 36.88 |
| 114.98 | 37.06 |
| 115.65 | 37.42 |
| 116.23 | 37.78 |
| 116.95 | 38.33 |
| 117.31 | 38.56 |
| 117.74 | 38.99 |
| 118.23 | 39.30 |
| 118.55 | 39.40 |
| 118.96 | 39.53 |
| 119.38 | 39.79 |
| 120.04 | 40.22 |
| 120.44 | 40.33 |
| 120.79 | 40.46 |
| 121.62 | 40.88 |
| 122.06 | 41.07 |
| 122.44 | 41.32 |
| 123.11 | 41.90 |
| 123.65 | 42.30 |
| 124.08 | 42.58 |
| 124.52 | 42.92 |
| 124.93 | 43.33 |
| 125.36 | 43.72 |
| 126.07 | 44.14 |
| 126.53 | 44.28 |
| 127.37 | 44.57 |
| 128.11 | 44.79 |
| 128.78 | 44.84 |
| 129.08 | 44.97 |
| 129.57 | 45.15 |
| 130.11 | 45.30 |
| 130.91 | 45.59 |
| 131.80 | 45.87 |
| 132.11 | 46.00 |
| 132.12 | 46.00 |

Fattore di sicurezza (FS) 1.2906 - N.4 -- X Y Lambda= 0.6732

| | |
|--------|-------|
| 67.76 | 13.59 |
| 69.69 | 13.51 |
| 71.60 | 13.82 |
| 72.53 | 14.45 |
| 74.79 | 15.24 |
| 76.30 | 16.47 |
| 78.00 | 17.46 |
| 79.36 | 18.00 |
| 80.54 | 18.22 |
| 82.19 | 18.52 |
| 84.13 | 19.08 |
| 86.21 | 19.57 |
| 88.05 | 19.96 |
| 90.51 | 20.84 |
| 92.44 | 22.35 |
| 93.98 | 24.21 |
| 95.08 | 25.56 |
| 97.22 | 27.06 |
| 98.30 | 27.59 |
| 100.30 | 28.55 |
| 102.51 | 29.53 |
| 103.55 | 30.02 |
| 104.66 | 30.75 |
| 105.57 | 31.32 |
| 107.42 | 32.62 |
| 108.35 | 32.95 |
| 110.01 | 33.94 |
| 111.80 | 34.98 |
| 113.61 | 36.25 |
| 114.55 | 36.68 |
| 116.39 | 38.03 |
| 118.31 | 39.37 |
| 119.91 | 40.17 |
| 121.55 | 40.58 |
| 122.46 | 40.91 |
| 124.86 | 41.41 |

| | | | | | |
|---------------------------|--------|----------|---|---|----------------|
| | 126.34 | 42.32 | | | |
| | 127.82 | 43.30 | | | |
| | 128.84 | 44.28 | | | |
| | 129.94 | 44.98 | | | |
| | 131.93 | 45.93 | | | |
| | 132.09 | 46.00 | | | |
| | | | | | |
| Fattore di sicurezza (FS) | 1.3156 | - N.5 -- | X | Y | Lambda= 0.6587 |
| | 67.14 | 13.23 | | | |
| | 68.26 | 13.21 | | | |
| | 68.78 | 13.34 | | | |
| | 69.47 | 13.52 | | | |
| | 70.74 | 13.89 | | | |
| | 71.54 | 13.96 | | | |
| | 72.82 | 14.55 | | | |
| | 73.74 | 14.73 | | | |
| | 74.81 | 14.84 | | | |
| | 76.15 | 15.13 | | | |
| | 76.81 | 15.20 | | | |
| | 77.78 | 15.28 | | | |
| | 78.34 | 15.41 | | | |
| | 78.93 | 15.52 | | | |
| | 79.72 | 15.56 | | | |
| | 80.25 | 15.54 | | | |
| | 81.56 | 15.46 | | | |
| | 82.78 | 15.81 | | | |
| | 83.73 | 15.99 | | | |
| | 84.41 | 16.18 | | | |
| | 85.68 | 16.53 | | | |
| | 86.85 | 16.82 | | | |
| | 87.68 | 17.44 | | | |
| | 88.19 | 17.79 | | | |
| | 89.26 | 18.40 | | | |
| | 89.84 | 18.80 | | | |
| | 90.71 | 19.44 | | | |
| | 91.02 | 19.82 | | | |
| | 91.59 | 20.39 | | | |
| | 92.08 | 20.59 | | | |
| | 93.34 | 21.15 | | | |
| | 94.57 | 21.49 | | | |
| | 95.63 | 21.79 | | | |
| | 96.45 | 22.04 | | | |
| | 96.93 | 22.12 | | | |
| | 97.71 | 22.10 | | | |
| | 98.72 | 22.48 | | | |
| | 99.51 | 22.81 | | | |
| | 100.83 | 23.08 | | | |
| | 101.74 | 23.31 | | | |
| | 102.90 | 23.67 | | | |
| | 103.70 | 24.15 | | | |
| | 104.82 | 24.91 | | | |
| | 105.37 | 24.99 | | | |
| | 105.96 | 25.32 | | | |
| | 106.75 | 25.88 | | | |
| | 107.13 | 26.32 | | | |
| | 107.70 | 27.05 | | | |
| | 108.62 | 27.73 | | | |
| | 109.68 | 28.43 | | | |
| | 110.29 | 28.82 | | | |
| | 110.86 | 29.28 | | | |
| | 111.29 | 29.59 | | | |
| | 112.44 | 30.39 | | | |
| | 113.28 | 30.93 | | | |
| | 113.80 | 31.45 | | | |
| | 114.10 | 31.84 | | | |
| | 114.58 | 32.47 | | | |
| | 115.36 | 33.06 | | | |
| | 116.01 | 33.42 | | | |
| | 116.52 | 33.74 | | | |
| | 117.41 | 34.67 | | | |
| | 118.07 | 35.47 | | | |
| | 118.66 | 36.05 | | | |
| | 119.39 | 37.07 | | | |
| | 120.07 | 37.67 | | | |

| | | | | | |
|---------------------------|--------|----------|---|---|----------------|
| | 121.03 | 38.50 | | | |
| | 121.47 | 38.78 | | | |
| | 121.82 | 39.16 | | | |
| | 122.78 | 40.11 | | | |
| | 123.12 | 40.46 | | | |
| | 123.86 | 41.15 | | | |
| | 124.47 | 41.97 | | | |
| | 124.94 | 42.31 | | | |
| | 125.73 | 42.82 | | | |
| | 126.75 | 43.25 | | | |
| | 127.48 | 43.56 | | | |
| | 127.96 | 43.94 | | | |
| | 128.98 | 44.67 | | | |
| | 129.64 | 45.20 | | | |
| | 130.37 | 45.37 | | | |
| | 131.56 | 45.55 | | | |
| | 132.36 | 45.88 | | | |
| | 132.52 | 46.00 | | | |
| | | | | | |
| Fattore di sicurezza (FS) | 1.3170 | - N.6 -- | X | Y | Lambda= 0.5124 |
| | 81.95 | 21.76 | | | |
| | 83.21 | 22.16 | | | |
| | 85.24 | 22.60 | | | |
| | 87.31 | 22.55 | | | |
| | 89.32 | 22.50 | | | |
| | 90.42 | 23.02 | | | |
| | 91.65 | 24.00 | | | |
| | 93.87 | 24.47 | | | |
| | 95.44 | 24.70 | | | |
| | 96.68 | 25.07 | | | |
| | 98.31 | 26.08 | | | |
| | 99.60 | 27.17 | | | |
| | 100.71 | 28.28 | | | |
| | 101.75 | 29.42 | | | |
| | 102.73 | 30.16 | | | |
| | 103.73 | 31.09 | | | |
| | 104.60 | 31.85 | | | |
| | 106.52 | 32.90 | | | |
| | 107.99 | 34.16 | | | |
| | 109.52 | 35.09 | | | |
| | 111.15 | 36.43 | | | |
| | 112.99 | 37.89 | | | |
| | 113.77 | 38.37 | | | |
| | 114.97 | 38.74 | | | |
| | 116.34 | 39.50 | | | |
| | 117.31 | 39.90 | | | |
| | 119.56 | 40.93 | | | |
| | 120.44 | 41.45 | | | |
| | 121.82 | 41.96 | | | |
| | 123.49 | 42.69 | | | |
| | 124.54 | 43.44 | | | |
| | 126.52 | 44.73 | | | |
| | 128.91 | 44.95 | | | |
| | 130.31 | 45.42 | | | |
| | 131.83 | 45.58 | | | |
| | 132.72 | 45.46 | | | |
| | 134.55 | 45.61 | | | |
| | 135.80 | 45.92 | | | |
| | 136.00 | 46.00 | | | |
| | | | | | |
| Fattore di sicurezza (FS) | 1.3251 | - N.7 -- | X | Y | Lambda= 0.5431 |
| | 63.13 | 10.92 | | | |
| | 63.85 | 10.73 | | | |
| | 64.81 | 10.46 | | | |
| | 65.91 | 10.74 | | | |
| | 66.86 | 11.29 | | | |
| | 67.88 | 11.72 | | | |
| | 68.82 | 12.18 | | | |
| | 69.94 | 12.55 | | | |
| | 70.99 | 12.79 | | | |
| | 71.54 | 13.10 | | | |
| | 72.11 | 13.47 | | | |
| | 72.60 | 13.75 | | | |

| | |
|--------|-------|
| 73.32 | 14.48 |
| 73.98 | 15.12 |
| 74.43 | 15.33 |
| 75.48 | 16.11 |
| 76.58 | 16.49 |
| 77.78 | 16.95 |
| 78.99 | 17.45 |
| 79.89 | 17.84 |
| 80.90 | 18.03 |
| 81.66 | 18.20 |
| 82.96 | 18.74 |
| 83.65 | 18.98 |
| 84.50 | 19.21 |
| 85.34 | 19.80 |
| 85.74 | 20.19 |
| 86.61 | 20.91 |
| 87.75 | 21.30 |
| 88.38 | 21.53 |
| 89.42 | 21.83 |
| 90.33 | 22.00 |
| 90.88 | 22.08 |
| 91.88 | 22.76 |
| 92.28 | 23.05 |
| 93.13 | 23.44 |
| 94.06 | 23.77 |
| 95.37 | 23.96 |
| 96.64 | 24.15 |
| 97.22 | 24.25 |
| 98.21 | 24.22 |
| 98.76 | 24.43 |
| 99.73 | 24.89 |
| 100.88 | 25.42 |
| 101.56 | 25.89 |
| 102.60 | 26.60 |
| 102.98 | 26.97 |
| 103.67 | 27.42 |
| 104.07 | 27.69 |
| 104.95 | 28.29 |
| 105.60 | 28.63 |
| 106.34 | 29.18 |
| 106.82 | 29.55 |
| 107.53 | 30.32 |
| 108.35 | 30.89 |
| 109.09 | 31.32 |
| 110.24 | 32.11 |
| 111.08 | 32.34 |
| 111.95 | 33.02 |
| 112.90 | 33.74 |
| 113.69 | 34.21 |
| 114.53 | 34.63 |
| 115.39 | 35.06 |
| 115.98 | 35.57 |
| 116.90 | 36.58 |
| 117.27 | 37.13 |
| 117.95 | 37.87 |
| 118.66 | 38.59 |
| 119.84 | 39.25 |
| 120.77 | 39.31 |
| 121.93 | 39.54 |
| 122.68 | 39.72 |
| 123.47 | 39.79 |
| 124.41 | 40.04 |
| 125.06 | 40.26 |
| 126.02 | 40.83 |
| 126.45 | 41.23 |
| 127.27 | 41.73 |
| 128.20 | 42.21 |
| 129.32 | 42.64 |
| 130.28 | 43.00 |
| 131.42 | 43.44 |
| 131.93 | 43.64 |
| 132.74 | 44.23 |
| 133.30 | 44.83 |
| 133.73 | 45.16 |
| 134.40 | 45.51 |

| | | | | | |
|---------------------------|-----------------|-------|---|----------------|--|
| | 135.04 | 46.00 | | | |
| Fattore di sicurezza (FS) | 1.3267 - N.8 -- | X | Y | Lambda= 0.6411 | |
| | 67.70 | 13.55 | | | |
| | 69.48 | 13.73 | | | |
| | 71.76 | 13.79 | | | |
| | 73.38 | 13.42 | | | |
| | 75.25 | 13.09 | | | |
| | 76.28 | 13.42 | | | |
| | 77.78 | 13.83 | | | |
| | 78.91 | 14.28 | | | |
| | 80.43 | 14.56 | | | |
| | 81.29 | 14.92 | | | |
| | 82.69 | 15.55 | | | |
| | 84.73 | 16.42 | | | |
| | 86.74 | 17.25 | | | |
| | 87.86 | 17.48 | | | |
| | 88.63 | 17.92 | | | |
| | 90.03 | 18.42 | | | |
| | 91.65 | 18.96 | | | |
| | 92.76 | 19.34 | | | |
| | 93.71 | 20.04 | | | |
| | 95.22 | 20.98 | | | |
| | 96.75 | 22.48 | | | |
| | 97.91 | 24.16 | | | |
| | 99.02 | 25.54 | | | |
| | 100.23 | 26.33 | | | |
| | 101.92 | 27.59 | | | |
| | 102.88 | 28.29 | | | |
| | 104.62 | 29.21 | | | |
| | 106.55 | 30.37 | | | |
| | 107.62 | 31.04 | | | |
| | 108.72 | 31.93 | | | |
| | 109.56 | 32.71 | | | |
| | 111.47 | 33.93 | | | |
| | 112.99 | 34.91 | | | |
| | 114.20 | 35.49 | | | |
| | 116.08 | 35.88 | | | |
| | 117.68 | 36.81 | | | |
| | 118.76 | 37.16 | | | |
| | 119.49 | 37.45 | | | |
| | 120.69 | 38.34 | | | |
| | 121.93 | 38.97 | | | |
| | 122.70 | 39.39 | | | |
| | 123.92 | 40.05 | | | |
| | 125.13 | 40.78 | | | |
| | 126.26 | 41.91 | | | |
| | 127.60 | 42.31 | | | |
| | 129.79 | 43.05 | | | |
| | 131.46 | 44.09 | | | |
| | 132.28 | 44.59 | | | |
| | 133.73 | 45.38 | | | |
| | 135.97 | 45.88 | | | |
| | 136.64 | 46.00 | | | |
| Fattore di sicurezza (FS) | 1.3324 - N.9 -- | X | Y | Lambda= 0.6920 | |
| | 69.42 | 14.54 | | | |
| | 71.87 | 14.90 | | | |
| | 72.84 | 15.52 | | | |
| | 74.52 | 16.29 | | | |
| | 76.61 | 16.89 | | | |
| | 78.74 | 17.76 | | | |
| | 80.50 | 18.76 | | | |
| | 81.48 | 19.35 | | | |
| | 82.57 | 20.03 | | | |
| | 83.89 | 20.49 | | | |
| | 85.20 | 20.99 | | | |
| | 86.13 | 21.43 | | | |
| | 87.46 | 22.31 | | | |
| | 89.24 | 23.38 | | | |
| | 90.67 | 24.14 | | | |
| | 91.91 | 24.91 | | | |
| | 93.15 | 25.81 | | | |

| | |
|--------|-------|
| 94.35 | 26.42 |
| 95.38 | 27.14 |
| 96.56 | 28.06 |
| 98.05 | 29.64 |
| 98.92 | 30.54 |
| 100.65 | 31.06 |
| 101.73 | 30.99 |
| 103.04 | 31.11 |
| 104.30 | 31.27 |
| 106.74 | 31.73 |
| 108.32 | 32.41 |
| 110.31 | 33.72 |
| 111.83 | 34.62 |
| 114.25 | 35.22 |
| 116.35 | 35.87 |
| 118.02 | 36.03 |
| 118.93 | 36.13 |
| 121.19 | 37.54 |
| 122.25 | 38.56 |
| 123.59 | 39.84 |
| 124.53 | 40.74 |
| 125.68 | 41.60 |
| 127.03 | 42.60 |
| 128.94 | 43.83 |
| 130.95 | 45.08 |
| 132.11 | 46.00 |

Fattore di sicurezza (FS) 1.3360 - N.10 -- X Y Lambda= 0.6035

| | |
|--------|-------|
| 87.48 | 24.95 |
| 89.27 | 25.24 |
| 90.62 | 25.55 |
| 92.35 | 26.29 |
| 93.86 | 27.19 |
| 94.91 | 28.12 |
| 95.64 | 28.93 |
| 96.32 | 29.41 |
| 97.94 | 29.99 |
| 99.81 | 30.35 |
| 101.41 | 30.80 |
| 102.38 | 31.24 |
| 104.22 | 32.13 |
| 105.80 | 32.83 |
| 107.23 | 33.78 |
| 108.74 | 34.57 |
| 110.16 | 35.31 |
| 111.78 | 35.65 |
| 113.32 | 35.79 |
| 114.04 | 36.02 |
| 116.05 | 36.66 |
| 117.25 | 36.82 |
| 119.24 | 37.72 |
| 120.85 | 38.75 |
| 122.09 | 39.75 |
| 122.65 | 40.35 |
| 124.02 | 41.87 |
| 124.71 | 42.32 |
| 125.45 | 42.94 |
| 126.54 | 43.88 |
| 128.17 | 45.26 |
| 129.81 | 45.85 |
| 131.86 | 45.93 |
| 132.43 | 46.00 |

----- ANALISI DEFICIT DI RESISTENZA -----

DATI RELATIVI ALLE 10 SUPERFICI GENERATE CON MINOR FS *

Analisi Deficit in riferimento a FS(progetto) = 1.200

| Sup N. | FS | FTR(kN/m) | FTA(kN/m) | Bilancio(kN/m) | ESITO |
|--------|-------|-----------|-----------|----------------|---------|
| 1 | 1.270 | 4800.5 | 3781.3 | 263.0 | Surplus |
| 2 | 1.276 | 2743.4 | 2150.7 | 162.5 | Surplus |
| 3 | 1.290 | 1300.5 | 1008.2 | 90.7 | Surplus |
| 4 | 1.291 | 2647.6 | 2051.4 | 185.9 | Surplus |
| 5 | 1.316 | 4828.0 | 3669.7 | 424.3 | Surplus |

| | | | | | |
|----|-------|--------|--------|-------|---------|
| 6 | 1.317 | 1600.7 | 1215.4 | 142.2 | Surplus |
| 7 | 1.325 | 3625.8 | 2736.3 | 342.2 | Surplus |
| 8 | 1.327 | 4274.1 | 3221.6 | 408.2 | Surplus |
| 9 | 1.332 | 2354.1 | 1766.8 | 234.0 | Surplus |
| 10 | 1.336 | 1374.4 | 1028.8 | 139.9 | Surplus |

Esito analisi: SURPLUS di RESISTENZA!

Valore minimo di SURPLUS di RESISTENZA (kN/m): 90.7

Note: FTR --> Forza totale Resistente lungo la superficie
di scivolamento

FTA --> Forza totale Agente lungo la superficie
di scivolamento

IMPORTANTE! : Il Deficit o il Surplus di resistenza viene espresso in kN
per metro di LARGHEZZA rispetto al fronte della scarpata

TABELLA PARAMETRI CONCI DELLA SUPERFICIE INDIVIDUATA CON MINOR FS

| X (m) | dx (m) | alpha (°) | W (kN/m) | ru (-) | U (kPa) | phi' (°) | (c',Cu) (kPa) |
|----------|-----------|--------------|-------------|-----------|------------|-------------|------------------|
| 65.975 | 0.527 | -2.07 | 1.78 | 0.00 | 0.00 | 32.00 | 0.00 |
| 66.502 | 0.527 | -2.07 | 5.35 | 0.00 | 0.00 | 32.00 | 0.00 |
| 67.029 | 0.527 | -2.07 | 8.92 | 0.00 | 0.00 | 32.00 | 0.00 |
| 67.556 | 0.083 | -2.07 | 1.73 | 0.00 | 0.00 | 32.00 | 0.00 |
| 67.639 | 0.527 | -3.31 | 13.11 | 0.00 | 0.00 | 32.00 | 0.00 |
| 68.166 | 0.527 | -3.31 | 16.80 | 0.00 | 0.00 | 32.00 | 0.00 |
| 68.693 | 0.100 | -3.31 | 3.61 | 0.00 | 0.00 | 32.00 | 0.00 |
| 68.793 | 0.527 | -8.86 | 21.48 | 0.00 | 0.00 | 32.00 | 0.00 |
| 69.320 | 0.527 | -8.86 | 25.74 | 0.00 | 0.00 | 32.00 | 0.00 |
| 69.847 | 0.373 | -8.86 | 20.79 | 0.00 | 0.00 | 32.00 | 0.00 |
| 70.220 | 0.527 | -8.86 | 33.02 | 0.00 | 0.00 | 32.00 | 0.00 |
| 70.747 | 0.096 | -8.86 | 6.45 | 0.00 | 0.00 | 32.00 | 0.00 |
| 70.842 | 0.527 | 2.80 | 37.46 | 0.00 | 0.00 | 32.00 | 0.00 |
| 71.369 | 0.527 | 2.80 | 40.53 | 0.00 | 0.00 | 32.00 | 0.00 |
| 71.896 | 0.527 | 2.80 | 43.60 | 0.00 | 0.00 | 32.00 | 0.00 |
| 72.423 | 0.425 | 2.80 | 37.36 | 0.00 | 0.00 | 32.00 | 0.00 |
| 72.848 | 0.527 | 10.60 | 48.74 | 0.00 | 0.00 | 32.00 | 0.00 |
| 73.375 | 0.527 | 10.60 | 51.01 | 0.00 | 0.00 | 32.00 | 0.00 |
| 73.902 | 0.527 | 10.60 | 53.27 | 0.00 | 0.00 | 32.00 | 0.00 |
| 74.429 | 0.527 | 10.60 | 55.53 | 0.00 | 0.00 | 32.00 | 0.00 |
| 74.956 | 0.051 | 10.60 | 5.44 | 0.00 | 0.00 | 32.00 | 0.00 |
| 75.006 | 0.527 | 18.28 | 57.60 | 0.00 | 0.00 | 32.00 | 0.00 |
| 75.533 | 0.427 | 18.28 | 47.71 | 0.00 | 0.00 | 32.00 | 0.00 |
| 75.960 | 0.527 | 18.28 | 60.18 | 0.00 | 0.00 | 32.00 | 0.00 |
| 76.487 | 0.140 | 18.28 | 16.24 | 0.00 | 0.00 | 32.00 | 0.00 |
| 76.627 | 0.527 | 17.71 | 62.02 | 0.00 | 0.00 | 32.00 | 0.00 |
| 77.154 | 0.527 | 17.71 | 63.52 | 0.00 | 0.00 | 32.00 | 0.00 |
| 77.681 | 0.527 | 17.71 | 65.01 | 0.00 | 0.00 | 32.00 | 0.00 |
| 78.208 | 0.527 | 17.71 | 66.50 | 0.00 | 0.00 | 32.00 | 0.00 |
| 78.735 | 0.175 | 17.71 | 22.44 | 0.00 | 0.00 | 32.00 | 0.00 |
| 78.910 | 0.114 | 17.71 | 14.70 | 0.00 | 0.00 | 32.00 | 0.00 |
| 79.024 | 0.527 | 19.20 | 68.74 | 0.00 | 0.00 | 32.00 | 0.00 |
| 79.551 | 0.527 | 19.20 | 70.08 | 0.00 | 0.00 | 32.00 | 0.00 |
| 80.078 | 0.527 | 19.20 | 71.42 | 0.00 | 0.00 | 32.00 | 0.00 |
| 80.605 | 0.281 | 19.20 | 38.61 | 0.00 | 0.00 | 32.00 | 0.00 |
| 80.886 | 0.527 | 7.97 | 74.08 | 0.00 | 0.00 | 32.00 | 0.00 |
| 81.413 | 0.527 | 7.97 | 76.63 | 0.00 | 0.00 | 32.00 | 0.00 |
| 81.940 | 0.527 | 7.97 | 79.19 | 0.00 | 0.00 | 32.00 | 0.00 |
| 82.467 | 0.527 | 7.97 | 81.74 | 0.00 | 0.00 | 32.00 | 0.00 |
| 82.993 | 0.162 | 7.97 | 25.58 | 0.00 | 0.00 | 32.00 | 0.00 |
| 83.155 | 0.527 | 28.18 | 83.92 | 0.00 | 0.00 | 32.00 | 0.00 |
| 83.682 | 0.527 | 28.18 | 84.17 | 0.00 | 0.00 | 32.00 | 0.00 |
| 84.209 | 0.527 | 28.18 | 84.41 | 0.00 | 0.00 | 32.00 | 0.00 |
| 84.736 | 0.527 | 28.18 | 84.66 | 0.00 | 0.00 | 32.00 | 0.00 |
| 85.263 | 0.069 | 28.18 | 11.12 | 0.00 | 0.00 | 32.00 | 0.00 |
| 85.332 | 0.527 | 28.75 | 84.90 | 0.00 | 0.00 | 32.00 | 0.00 |
| 85.859 | 0.459 | 28.75 | 74.03 | 0.00 | 0.00 | 32.00 | 0.00 |
| 86.318 | 0.527 | 32.45 | 84.96 | 0.00 | 0.00 | 32.00 | 0.00 |
| 86.844 | 0.527 | 32.45 | 84.63 | 0.00 | 0.00 | 32.00 | 0.00 |
| 87.371 | 0.268 | 32.45 | 42.91 | 0.00 | 0.00 | 32.00 | 0.00 |
| 87.639 | 0.527 | 29.61 | 84.31 | 0.00 | 0.00 | 32.00 | 0.00 |

| | | | | | | | |
|---------|-------|-------|-------|------|------|-------|------|
| 88.166 | 0.527 | 29.61 | 84.37 | 0.00 | 0.00 | 32.00 | 0.00 |
| 88.693 | 0.106 | 29.61 | 17.02 | 0.00 | 0.00 | 32.00 | 0.00 |
| 88.800 | 0.527 | 25.96 | 84.67 | 0.00 | 0.00 | 32.00 | 0.00 |
| 89.326 | 0.527 | 25.96 | 85.21 | 0.00 | 0.00 | 32.00 | 0.00 |
| 89.853 | 0.147 | 25.96 | 23.92 | 0.00 | 0.00 | 32.00 | 0.00 |
| 90.001 | 0.527 | 30.16 | 85.61 | 0.00 | 0.00 | 32.00 | 0.00 |
| 90.528 | 0.527 | 30.16 | 85.59 | 0.00 | 0.00 | 32.00 | 0.00 |
| 91.055 | 0.527 | 30.16 | 85.57 | 0.00 | 0.00 | 32.00 | 0.00 |
| 91.582 | 0.527 | 30.16 | 85.56 | 0.00 | 0.00 | 32.00 | 0.00 |
| 92.108 | 0.041 | 30.16 | 6.73 | 0.00 | 0.00 | 32.00 | 0.00 |
| 92.150 | 0.527 | 36.35 | 85.08 | 0.00 | 0.00 | 32.00 | 0.00 |
| 92.677 | 0.527 | 36.35 | 84.16 | 0.00 | 0.00 | 32.00 | 0.00 |
| 93.204 | 0.527 | 36.35 | 83.24 | 0.00 | 0.00 | 32.00 | 0.00 |
| 93.731 | 0.432 | 36.35 | 67.55 | 0.00 | 0.00 | 32.00 | 0.00 |
| 94.163 | 0.527 | 37.22 | 81.49 | 0.00 | 0.00 | 32.00 | 0.00 |
| 94.690 | 0.060 | 37.22 | 9.27 | 0.00 | 0.00 | 32.00 | 0.00 |
| 94.750 | 0.527 | 37.22 | 80.31 | 0.00 | 0.00 | 32.00 | 0.00 |
| 95.277 | 0.527 | 37.22 | 79.26 | 0.00 | 0.00 | 32.00 | 0.00 |
| 95.804 | 0.005 | 37.22 | 0.79 | 0.00 | 0.00 | 32.00 | 0.00 |
| 95.809 | 0.527 | 8.89 | 79.94 | 0.00 | 0.00 | 32.00 | 0.00 |
| 96.336 | 0.527 | 8.89 | 82.40 | 0.00 | 0.00 | 32.00 | 0.00 |
| 96.863 | 0.527 | 8.89 | 84.86 | 0.00 | 0.00 | 32.00 | 0.00 |
| 97.390 | 0.527 | 8.89 | 87.32 | 0.00 | 0.00 | 32.00 | 0.00 |
| 97.917 | 0.083 | 8.89 | 13.92 | 0.00 | 0.00 | 32.00 | 0.00 |
| 98.000 | 0.527 | 22.33 | 89.42 | 0.00 | 0.00 | 32.00 | 0.00 |
| 98.527 | 0.527 | 22.33 | 90.39 | 0.00 | 0.00 | 32.00 | 0.00 |
| 99.053 | 0.527 | 22.33 | 91.37 | 0.00 | 0.00 | 32.00 | 0.00 |
| 99.580 | 0.527 | 22.33 | 92.34 | 0.00 | 0.00 | 32.00 | 0.00 |
| 100.107 | 0.205 | 22.33 | 36.17 | 0.00 | 0.00 | 32.00 | 0.00 |
| 100.312 | 0.527 | 23.47 | 93.63 | 0.00 | 0.00 | 32.00 | 0.00 |
| 100.839 | 0.527 | 23.47 | 94.47 | 0.00 | 0.00 | 32.00 | 0.00 |
| 101.366 | 0.039 | 23.47 | 7.00 | 0.00 | 0.00 | 32.00 | 0.00 |
| 101.405 | 0.158 | 23.47 | 28.59 | 0.00 | 0.00 | 32.00 | 0.00 |
| 101.563 | 0.527 | 18.78 | 95.90 | 0.00 | 0.00 | 32.00 | 0.00 |
| 102.090 | 0.492 | 18.78 | 90.70 | 0.00 | 0.00 | 32.00 | 0.00 |
| 102.582 | 0.527 | 33.49 | 97.64 | 0.00 | 0.00 | 32.00 | 0.00 |
| 103.109 | 0.527 | 33.49 | 97.15 | 0.00 | 0.00 | 32.00 | 0.00 |
| 103.636 | 0.527 | 33.49 | 96.66 | 0.00 | 0.00 | 32.00 | 0.00 |
| 104.163 | 0.183 | 33.49 | 33.45 | 0.00 | 0.00 | 32.00 | 0.00 |
| 104.346 | 0.527 | 45.18 | 95.00 | 0.00 | 0.00 | 32.00 | 0.00 |
| 104.873 | 0.527 | 45.18 | 92.50 | 0.00 | 0.00 | 32.00 | 0.00 |
| 105.400 | 0.527 | 45.18 | 90.00 | 0.00 | 0.00 | 32.00 | 0.00 |
| 105.927 | 0.184 | 45.18 | 30.80 | 0.00 | 0.00 | 32.00 | 0.00 |
| 106.110 | 0.527 | 34.34 | 87.57 | 0.00 | 0.00 | 32.00 | 0.00 |
| 106.637 | 0.527 | 34.34 | 86.96 | 0.00 | 0.00 | 32.00 | 0.00 |
| 107.164 | 0.119 | 34.34 | 19.54 | 0.00 | 0.00 | 32.00 | 0.00 |
| 107.283 | 0.527 | 43.23 | 85.46 | 0.00 | 0.00 | 32.00 | 0.00 |
| 107.810 | 0.527 | 43.23 | 83.35 | 0.00 | 0.00 | 32.00 | 0.00 |
| 108.337 | 0.118 | 43.23 | 18.39 | 0.00 | 0.00 | 32.00 | 0.00 |
| 108.455 | 0.527 | 53.35 | 79.58 | 0.00 | 0.00 | 32.00 | 0.00 |
| 108.982 | 0.527 | 53.35 | 75.12 | 0.00 | 0.00 | 32.00 | 0.00 |
| 109.509 | 0.009 | 53.35 | 1.28 | 0.00 | 0.00 | 32.00 | 0.00 |
| 109.518 | 0.527 | 21.13 | 73.36 | 0.00 | 0.00 | 32.00 | 0.00 |
| 110.045 | 0.527 | 21.13 | 74.48 | 0.00 | 0.00 | 32.00 | 0.00 |
| 110.572 | 0.527 | 21.13 | 75.59 | 0.00 | 0.00 | 32.00 | 0.00 |
| 111.099 | 0.527 | 21.13 | 76.71 | 0.00 | 0.00 | 32.00 | 0.00 |
| 111.626 | 0.009 | 21.13 | 1.39 | 0.00 | 0.00 | 32.00 | 0.00 |
| 111.635 | 0.527 | 20.92 | 77.86 | 0.00 | 0.00 | 32.00 | 0.00 |
| 112.162 | 0.527 | 20.92 | 79.00 | 0.00 | 0.00 | 32.00 | 0.00 |
| 112.689 | 0.527 | 20.92 | 80.14 | 0.00 | 0.00 | 32.00 | 0.00 |
| 113.216 | 0.288 | 20.92 | 44.28 | 0.00 | 0.00 | 32.00 | 0.00 |
| 113.504 | 0.466 | 38.79 | 71.37 | 0.00 | 0.00 | 32.00 | 0.00 |
| 113.970 | 0.481 | 38.79 | 72.59 | 0.00 | 0.00 | 32.00 | 0.00 |
| 114.451 | 0.527 | 42.35 | 78.00 | 0.00 | 0.00 | 32.00 | 0.00 |
| 114.978 | 0.527 | 42.35 | 76.05 | 0.00 | 0.00 | 32.00 | 0.00 |
| 115.505 | 0.134 | 42.35 | 19.06 | 0.00 | 0.00 | 32.00 | 0.00 |
| 115.639 | 0.527 | 34.88 | 74.24 | 0.00 | 0.00 | 32.00 | 0.00 |
| 116.166 | 0.527 | 34.88 | 73.54 | 0.00 | 0.00 | 32.00 | 0.00 |
| 116.693 | 0.527 | 34.88 | 72.84 | 0.00 | 0.00 | 32.00 | 0.00 |
| 117.220 | 0.426 | 34.88 | 58.34 | 0.00 | 0.00 | 32.00 | 0.00 |
| 117.645 | 0.527 | 38.64 | 71.29 | 0.00 | 0.00 | 32.00 | 0.00 |
| 118.172 | 0.527 | 38.64 | 70.00 | 0.00 | 0.00 | 32.00 | 0.00 |
| 118.699 | 0.494 | 38.64 | 64.47 | 0.00 | 0.00 | 32.00 | 0.00 |
| 119.193 | 0.527 | 34.38 | 67.83 | 0.00 | 0.00 | 32.00 | 0.00 |
| 119.720 | 0.527 | 34.38 | 67.21 | 0.00 | 0.00 | 32.00 | 0.00 |

| | | | | | | | |
|---------|-------|-------|-------|------|------|-------|------|
| 120.247 | 0.460 | 34.38 | 58.11 | 0.00 | 0.00 | 32.00 | 0.00 |
| 120.707 | 0.527 | 32.12 | 66.21 | 0.00 | 0.00 | 32.00 | 0.00 |
| 121.234 | 0.527 | 32.12 | 65.92 | 0.00 | 0.00 | 32.00 | 0.00 |
| 121.761 | 0.399 | 32.12 | 49.77 | 0.00 | 0.00 | 32.00 | 0.00 |
| 122.160 | 0.527 | 32.12 | 65.41 | 0.00 | 0.00 | 32.00 | 0.00 |
| 122.687 | 0.058 | 32.12 | 7.14 | 0.00 | 0.00 | 32.00 | 0.00 |
| 122.745 | 0.527 | 20.15 | 65.85 | 0.00 | 0.00 | 32.00 | 0.00 |
| 123.272 | 0.527 | 20.15 | 67.08 | 0.00 | 0.00 | 32.00 | 0.00 |
| 123.799 | 0.101 | 20.15 | 13.06 | 0.00 | 0.00 | 32.00 | 0.00 |
| 123.900 | 0.419 | 20.15 | 53.37 | 0.00 | 0.00 | 32.00 | 0.00 |
| 124.319 | 0.527 | 25.26 | 64.85 | 0.00 | 0.00 | 32.00 | 0.00 |
| 124.846 | 0.269 | 25.26 | 32.02 | 0.00 | 0.00 | 32.00 | 0.00 |
| 125.115 | 0.527 | 37.69 | 59.82 | 0.00 | 0.00 | 32.00 | 0.00 |
| 125.642 | 0.527 | 37.69 | 55.32 | 0.00 | 0.00 | 32.00 | 0.00 |
| 126.169 | 0.518 | 37.69 | 50.01 | 0.00 | 0.00 | 32.00 | 0.00 |
| 126.687 | 0.527 | 40.42 | 46.15 | 0.00 | 0.00 | 32.00 | 0.00 |
| 127.214 | 0.400 | 40.42 | 31.69 | 0.00 | 0.00 | 32.00 | 0.00 |
| 127.614 | 0.527 | 46.06 | 36.88 | 0.00 | 0.00 | 32.00 | 0.00 |
| 128.141 | 0.527 | 46.06 | 30.83 | 0.00 | 0.00 | 32.00 | 0.00 |
| 128.668 | 0.070 | 46.06 | 3.64 | 0.00 | 0.00 | 32.00 | 0.00 |
| 128.737 | 0.527 | 33.09 | 25.10 | 0.00 | 0.00 | 32.00 | 0.00 |
| 129.264 | 0.527 | 33.09 | 21.30 | 0.00 | 0.00 | 32.00 | 0.00 |
| 129.791 | 0.511 | 33.09 | 17.03 | 0.00 | 0.00 | 32.00 | 0.00 |
| 130.302 | 0.527 | 29.57 | 14.06 | 0.00 | 0.00 | 32.00 | 0.00 |
| 130.829 | 0.527 | 29.57 | 10.75 | 0.00 | 0.00 | 32.00 | 0.00 |
| 131.356 | 0.168 | 29.57 | 2.73 | 0.00 | 0.00 | 32.00 | 0.00 |
| 131.524 | 0.527 | 31.05 | 6.29 | 0.00 | 0.00 | 32.00 | 0.00 |
| 132.051 | 0.430 | 31.05 | 2.53 | 0.00 | 0.00 | 32.00 | 0.00 |
| 132.481 | 0.168 | 41.92 | 0.27 | 0.00 | 0.00 | 32.00 | 0.00 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
dx(m) : Larghezza concio
alpha(°) : Angolo pendenza base concio
W(kN/m) : Forza peso concio
ru(-) : Coefficiente locale pressione interstiziale
U(kPa) : Pressione totale dei pori base concio
phi'(°) : Angolo di attrito efficace base concio
c'/Cu (kPa) : Coesione efficace o Resistenza al taglio in condizioni non drenate

TABELLA DIAGRAMMA DELLE FORZE DELLA SUPERFICIE INDIVIDUATA CON MINOR FS

| X | ht | yt | yt' | E(x) | T(x) | E' | rho(x) | FS_qFEM | FS_srmFEM | | |
|--------|-------|--------|-------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------|--------|--------|
| (m) | (m) | (m) | (--) | (kN/m) | (kN/m) | | (kN) | (--) | (--) | | |
| 65.975 | 0.000 | 12.558 | 0.133 | 0.0000000000E+000 | 0.0000000000E+000 | 0.0000000000E+000 | 0.0000000000E+000 | 0.0000000000E+000 | 0.042 | 15.723 | 15.100 |
| 66.502 | 0.081 | 12.620 | 0.133 | 1.0555135045E+000 | 5.0213229317E-003 | 4.9925506668E+000 | 0.042 | 15.723 | 15.100 | | |
| 67.029 | 0.178 | 12.698 | 0.136 | 5.2615423118E+000 | 2.0875128126E-001 | 9.0226551879E+000 | 0.081 | 7.324 | 6.491 | | |
| 67.556 | 0.262 | 12.763 | 0.120 | 1.0564296731E+001 | 8.6319048904E-001 | 9.3574703787E+000 | 0.166 | 5.018 | 4.563 | | |
| 67.639 | 0.274 | 12.771 | 0.109 | 1.1332659529E+001 | 9.9036539453E-001 | 9.7929475188E+000 | 0.178 | 4.859 | 4.424 | | |
| 68.166 | 0.362 | 12.829 | 0.108 | 1.8319945724E+001 | 2.5508333498E+000 | 1.8005767639E+001 | 0.283 | 4.051 | 3.692 | | |
| 68.693 | 0.448 | 12.885 | 0.106 | 3.0308552737E+001 | 5.2612705467E+000 | 2.7879393278E+001 | 0.353 | 3.570 | 3.245 | | |
| 68.793 | 0.465 | 12.896 | 0.109 | 3.3195810822E+001 | 5.9325294656E+000 | 2.8751661091E+001 | 0.363 | 3.493 | 3.176 | | |
| 69.320 | 0.604 | 12.953 | 0.121 | 4.8064407942E+001 | 9.6174512479E+000 | 3.0136567220E+001 | 0.407 | 3.182 | 2.905 | | |
| 69.847 | 0.757 | 13.024 | 0.137 | 6.4956094120E+001 | 1.4334612083E+001 | 3.1155863284E+001 | 0.448 | 2.920 | 2.691 | | |
| 70.220 | 0.868 | 13.076 | 0.148 | 7.6332713866E+001 | 1.7685468531E+001 | 3.1082862984E+001 | 0.471 | 2.782 | 2.580 | | |
| 70.747 | 1.030 | 13.157 | 0.154 | 9.3131558009E+001 | 2.2766995858E+001 | 3.2138774055E+001 | 0.497 | 2.618 | 2.449 | | |
| 70.842 | 1.061 | 13.172 | 0.205 | 9.6207124397E+001 | 2.3740717985E+001 | 3.3082149716E+001 | 0.501 | 2.590 | 2.427 | | |
| 71.369 | 1.147 | 13.284 | 0.228 | 1.1624428857E+002 | 3.0644540144E+001 | 3.8886979110E+001 | 0.536 | 2.424 | 2.297 | | |
| 71.896 | 1.249 | 13.412 | 0.257 | 1.3718927954E+002 | 3.8402300453E+001 | 3.9889016640E+001 | 0.569 | 2.278 | 2.184 | | |
| 72.423 | 1.366 | 13.555 | 0.295 | 1.5828246962E+002 | 4.6794428880E+001 | 4.0990513601E+001 | 0.601 | 2.147 | 2.085 | | |
| 72.848 | 1.483 | 13.693 | 0.328 | 1.7601424414E+002 | 5.4368961275E+001 | 3.9672910408E+001 | 0.628 | 2.044 | 2.010 | | |
| 73.375 | 1.559 | 13.867 | 0.340 | 1.9555142352E+002 | 6.3397495238E+001 | 3.5831547511E+001 | 0.659 | 1.938 | 1.932 | | |
| 73.902 | 1.644 | 14.051 | 0.350 | 2.1377634530E+002 | 7.2364918432E+001 | 3.2704502714E+001 | 0.688 | 1.848 | 1.864 | | |
| 74.429 | 1.731 | 14.236 | 0.356 | 2.3001799909E+002 | 8.0882293495E+001 | 2.9341157809E+001 | 0.714 | 1.771 | 1.807 | | |
| 74.956 | 1.822 | 14.426 | 0.361 | 2.4469836364E+002 | 8.9032301279E+001 | 2.4846410793E+001 | 0.739 | 1.705 | 1.756 | | |
| 75.006 | 1.831 | 14.445 | 0.396 | 2.4593892078E+002 | 8.9773171831E+001 | 2.4583754044E+001 | 0.742 | 1.699 | 1.752 | | |
| 75.533 | 1.867 | 14.655 | 0.401 | 2.5903717854E+002 | 9.7842501029E+001 | 2.3901919921E+001 | 0.767 | 1.638 | 1.704 | | |
| 75.960 | 1.899 | 14.827 | 0.400 | 2.6891071686E+002 | 1.0419809031E+002 | 2.2207824676E+001 | 0.787 | 1.594 | 1.669 | | |
| 76.487 | 1.934 | 15.037 | 0.393 | 2.8001443717E+002 | 1.1166031552E+002 | 1.9490523773E+001 | 0.810 | 1.547 | 1.630 | | |
| 76.627 | 1.941 | 15.090 | 0.408 | 2.8268567465E+002 | 1.1351289447E+002 | 1.9317541858E+001 | 0.816 | 1.536 | 1.621 | | |
| 77.154 | 1.992 | 15.309 | 0.418 | 2.9335534809E+002 | 1.2118083395E+002 | 2.0089093375E+001 | 0.839 | 1.497 | 1.586 | | |
| 77.681 | 2.044 | 15.530 | 0.420 | 3.0385714027E+002 | 1.2896966061E+002 | 2.0074966850E+001 | 0.862 | 1.465 | 1.554 | | |

| | | | | | | | | | |
|---------|-------|--------|-------|-------------------|-------------------|--------------------|-------|-------|-------|
| 78.208 | 2.098 | 15.751 | 0.420 | 3.1451192607E+002 | 1.3699181487E+002 | 2.0680118696E+001 | 0.885 | 1.440 | 1.525 |
| 78.735 | 2.150 | 15.972 | 0.418 | 3.2565147483E+002 | 1.4535456202E+002 | 2.1498486844E+001 | 0.907 | 1.422 | 1.498 |
| 78.910 | 2.167 | 16.045 | 0.418 | 3.2943951307E+002 | 1.4819643585E+002 | 2.2394107258E+001 | 0.914 | 1.418 | 1.490 |
| 79.024 | 2.179 | 16.093 | 0.415 | 3.3205080028E+002 | 1.5013415105E+002 | 2.3389842942E+001 | 0.919 | 1.415 | 1.484 |
| 79.551 | 2.213 | 16.311 | 0.415 | 3.4557005849E+002 | 1.5971078365E+002 | 2.6821247408E+001 | 0.939 | 1.409 | 1.462 |
| 80.078 | 2.249 | 16.531 | 0.421 | 3.6031713897E+002 | 1.6989375654E+002 | 2.9159669214E+001 | 0.958 | 1.404 | 1.441 |
| 80.605 | 2.290 | 16.755 | 0.414 | 3.7630080989E+002 | 1.8071446266E+002 | 3.0006152496E+001 | 0.976 | 1.400 | 1.421 |
| 80.886 | 2.302 | 16.865 | 0.407 | 3.8467911287E+002 | 1.8622931657E+002 | 3.0673377232E+001 | 0.984 | 1.399 | 1.412 |
| 81.413 | 2.447 | 17.083 | 0.438 | 4.0167402831E+002 | 1.9717088234E+002 | 3.3145313849E+001 | 0.997 | 1.392 | 1.395 |
| 81.940 | 2.617 | 17.327 | 0.472 | 4.1961024986E+002 | 2.0876968145E+002 | 3.3400598528E+001 | 1.011 | 1.378 | 1.378 |
| 82.467 | 2.797 | 17.581 | 0.487 | 4.3687420435E+002 | 2.2006418873E+002 | 3.1033726219E+001 | 1.023 | 1.357 | 1.362 |
| 82.993 | 2.983 | 17.841 | 0.477 | 4.5231602983E+002 | 2.3046695151E+002 | 2.2578763508E+001 | 1.035 | 1.331 | 1.347 |
| 83.155 | 3.029 | 17.910 | 0.458 | 4.5563204770E+002 | 2.3285048575E+002 | 1.9591806102E+001 | 1.038 | 1.321 | 1.343 |
| 83.682 | 2.993 | 18.156 | 0.486 | 4.6436873689E+002 | 2.3994075073E+002 | 1.3916268565E+001 | 1.050 | 1.290 | 1.332 |
| 84.209 | 2.976 | 18.421 | 0.510 | 4.7029810535E+002 | 2.4578803834E+002 | 8.7851835299E+000 | 1.062 | 1.259 | 1.321 |
| 84.736 | 2.966 | 18.693 | 0.531 | 4.7362725381E+002 | 2.5025645246E+002 | 2.9818456402E+000 | 1.074 | 1.230 | 1.311 |
| 85.263 | 2.971 | 18.980 | 0.545 | 4.7344060866E+002 | 2.5340508932E+002 | -1.8993907409E+000 | 1.085 | 1.203 | 1.303 |
| 85.332 | 2.971 | 19.018 | 0.548 | 4.7329532035E+002 | 2.5310693707E+002 | -2.4116435146E+000 | 1.087 | 1.200 | 1.301 |
| 85.859 | 2.971 | 19.307 | 0.572 | 4.7078086229E+002 | 2.5414891779E+002 | -6.3933455926E+000 | 1.097 | 1.179 | 1.294 |
| 86.318 | 2.994 | 19.582 | 0.599 | 4.6720154298E+002 | 2.5412847929E+002 | -8.4955090166E+000 | 1.105 | 1.165 | 1.288 |
| 86.844 | 2.975 | 19.897 | 0.585 | 4.6230663399E+002 | 2.5340508932E+002 | -9.3774805398E+000 | 1.114 | 1.153 | 1.282 |
| 87.371 | 2.940 | 20.198 | 0.561 | 4.5731881691E+002 | 2.5206787906E+002 | -9.1159658086E+000 | 1.120 | 1.146 | 1.277 |
| 87.639 | 2.915 | 20.343 | 0.541 | 4.5492328041E+002 | 2.5121150871E+002 | -8.8427626680E+000 | 1.122 | 1.144 | 1.275 |
| 88.166 | 2.900 | 20.628 | 0.560 | 4.5036246620E+002 | 2.4919868306E+002 | -8.7832073192E+000 | 1.124 | 1.140 | 1.272 |
| 88.693 | 2.907 | 20.933 | 0.582 | 4.4566684617E+002 | 2.4661872475E+002 | -9.0048477717E+000 | 1.124 | 1.136 | 1.268 |
| 88.800 | 2.909 | 20.997 | 0.578 | 4.4470822729E+002 | 2.4604073451E+002 | -8.9409447144E+000 | 1.124 | 1.136 | 1.268 |
| 89.326 | 2.956 | 21.300 | 0.551 | 4.4021330609E+002 | 2.4311860787E+002 | -8.2859389117E+000 | 1.122 | 1.133 | 1.265 |
| 89.853 | 2.977 | 21.577 | 0.525 | 4.3597585358E+002 | 2.4009013206E+002 | -8.3892914460E+000 | 1.119 | 1.131 | 1.263 |
| 90.001 | 2.982 | 21.654 | 0.538 | 4.3472549870E+002 | 2.3918882083E+002 | -8.7559331482E+000 | 1.118 | 1.131 | 1.263 |
| 90.528 | 2.962 | 21.940 | 0.574 | 4.2960387973E+002 | 2.3585072111E+002 | -1.1126981051E+001 | 1.114 | 1.129 | 1.261 |
| 91.055 | 2.974 | 22.258 | 0.617 | 4.2299901148E+002 | 2.3123430237E+002 | -1.3644543008E+001 | 1.111 | 1.127 | 1.259 |
| 91.582 | 3.000 | 22.591 | 0.639 | 4.1522418783E+002 | 2.2645262538E+002 | -1.6192451783E+001 | 1.108 | 1.126 | 1.256 |
| 92.108 | 3.035 | 22.931 | 0.649 | 4.0593413305E+002 | 2.2149451951E+002 | -1.9519820458E+001 | 1.109 | 1.129 | 1.254 |
| 92.150 | 3.039 | 22.959 | 0.677 | 4.0511911589E+002 | 2.2108932946E+002 | -1.9737796543E+001 | 1.109 | 1.129 | 1.253 |
| 92.677 | 3.008 | 23.316 | 0.657 | 3.9425359632E+002 | 2.1602612011E+002 | -2.0282132328E+001 | 1.113 | 1.138 | 1.251 |
| 93.204 | 2.956 | 23.652 | 0.630 | 3.8374421065E+002 | 2.1157155492E+002 | -1.9147211459E+001 | 1.120 | 1.154 | 1.248 |
| 93.731 | 2.896 | 23.980 | 0.616 | 3.7407475989E+002 | 2.0779243713E+002 | -1.6116103381E+001 | 1.129 | 1.176 | 1.244 |
| 94.163 | 2.840 | 24.243 | 0.587 | 3.6790447244E+002 | 2.0567381822E+002 | -1.1994847911E+001 | 1.136 | 1.199 | 1.242 |
| 94.690 | 2.741 | 24.543 | 0.567 | 3.6305588799E+002 | 2.0448480445E+002 | -6.0287021106E+000 | 1.144 | 1.228 | 1.238 |
| 94.750 | 2.727 | 24.575 | 0.537 | 3.6271393242E+002 | 2.0445735416E+002 | -5.4130945752E+000 | 1.145 | 1.231 | 1.237 |
| 95.277 | 2.610 | 24.859 | 0.528 | 3.6102162569E+002 | 2.0493969481E+002 | -5.0916063815E+001 | 1.153 | 1.260 | 1.233 |
| 95.804 | 2.483 | 25.132 | 0.518 | 3.6217733892E+002 | 2.0682281850E+002 | 6.7361712302E+000 | 1.160 | 1.287 | 1.229 |
| 95.809 | 2.482 | 25.134 | 0.481 | 3.6221321435E+002 | 2.068590059E+002 | 6.8320439776E+000 | 1.160 | 1.288 | 1.229 |
| 96.336 | 2.653 | 25.388 | 0.471 | 3.6845170430E+002 | 2.1070320088E+002 | 1.5555953295E+001 | 1.162 | 1.307 | 1.224 |
| 96.863 | 2.813 | 25.631 | 0.459 | 3.7860730064E+002 | 2.1659330612E+002 | 2.1144431950E+001 | 1.162 | 1.314 | 1.218 |
| 97.390 | 2.971 | 25.871 | 0.493 | 3.9073536866E+002 | 2.2369993855E+002 | 2.5424403939E+001 | 1.163 | 1.309 | 1.212 |
| 97.917 | 3.168 | 26.151 | 0.526 | 4.0540153589E+002 | 2.3297541581E+002 | 2.6515573473E+001 | 1.168 | 1.292 | 1.205 |
| 98.000 | 3.197 | 26.192 | 0.510 | 4.0757621400E+002 | 2.3440825758E+002 | 2.6299979349E+001 | 1.168 | 1.288 | 1.204 |
| 98.527 | 3.250 | 26.462 | 0.495 | 4.2140456260E+002 | 2.4399913941E+002 | 2.5477771456E+001 | 1.176 | 1.266 | 1.198 |
| 99.053 | 3.285 | 26.713 | 0.478 | 4.3442669214E+002 | 2.5327342317E+002 | 2.3349945879E+001 | 1.184 | 1.243 | 1.191 |
| 99.580 | 3.320 | 26.965 | 0.478 | 4.4601257090E+002 | 2.6175923762E+002 | 1.9512170682E+001 | 1.192 | 1.218 | 1.186 |
| 100.107 | 3.356 | 27.217 | 0.478 | 4.5499015128E+002 | 2.6881015975E+002 | 1.4396238667E+001 | 1.200 | 1.195 | 1.181 |
| 100.312 | 3.369 | 27.314 | 0.476 | 4.5772967008E+002 | 2.7108046241E+002 | 1.2514559489E+001 | 1.203 | 1.186 | 1.179 |
| 100.839 | 3.391 | 27.565 | 0.474 | 4.6316596151E+002 | 2.7571024315E+002 | 8.5081528645E+000 | 1.209 | 1.166 | 1.175 |
| 101.366 | 3.411 | 27.813 | 0.473 | 4.6669623031E+002 | 2.7882624378E+002 | 5.1864888282E+000 | 1.214 | 1.150 | 1.172 |
| 101.405 | 3.414 | 27.833 | 0.484 | 4.6689347586E+002 | 2.7900036442E+002 | 4.6199493514E+000 | 1.214 | 1.149 | 1.172 |
| 101.563 | 3.421 | 27.909 | 0.475 | 4.6733165480E+002 | 2.7936327667E+002 | 2.4213251268E+000 | 1.215 | 1.145 | 1.171 |
| 102.090 | 3.491 | 28.159 | 0.455 | 4.6800518064E+002 | 2.7975728107E+002 | -2.1629654816E+000 | 1.214 | 1.130 | 1.169 |
| 102.582 | 3.538 | 28.373 | 0.535 | 4.6536442874E+002 | 2.7755722883E+002 | -7.8679939741E+000 | 1.212 | 1.114 | 1.168 |
| 103.109 | 3.521 | 28.704 | 0.628 | 4.5980884709E+002 | 2.7335847327E+002 | -1.4091171830E+001 | 1.208 | 1.098 | 1.167 |
| 103.636 | 3.503 | 29.035 | 0.628 | 4.5051404429E+002 | 2.6641471840E+002 | -2.0005854050E+001 | 1.201 | 1.083 | 1.167 |
| 104.163 | 3.485 | 29.366 | 0.628 | 4.3872510562E+002 | 2.5772894084E+002 | -2.4140597806E+001 | 1.194 | 1.070 | 1.167 |
| 104.346 | 3.479 | 29.481 | 0.782 | 4.3419544725E+002 | 2.5446210512E+002 | -2.6531310146E+001 | 1.191 | 1.067 | 1.168 |
| 104.873 | 3.389 | 29.921 | 0.835 | 4.1751898672E+002 | 2.4269751532E+002 | -3.3452203125E+001 | 1.181 | 1.059 | 1.170 |
| 105.400 | 3.299 | 30.361 | 0.801 | 3.9894088623E+002 | 2.2984873256E+002 | -3.6547891316E+001 | 1.171 | 1.055 | 1.173 |
| 105.927 | 3.173 | 30.765 | 0.761 | 3.7900194615E+002 | 2.1692862431E+002 | -3.8353951816E+001 | 1.163 | 1.063 | 1.177 |
| 106.110 | 3.124 | 30.901 | 0.713 | 3.7192166326E+002 | 2.1236657699E+002 | -3.8092356154E+001 | 1.160 | 1.068 | 1.179 |
| 106.637 | 3.134 | 31.272 | 0.691 | 3.5251587942E+002 | 1.9985783475E+002 | -3.6002077090E+001 | 1.152 | 1.087 | 1.184 |
| 107.164 | 3.132 | 31.630 | 0.672 | 3.3397984463E+002 | 1.8797178294E+002 | -3.3820044106E+001 | 1.143 | 1.110 | 1.189 |
| 107.283 | 3.127 | 31.706 | 0.697 | 3.2999445127E+002 | 1.8546948128E+002 | -3.3708503069E+001 | 1.142 | 1.116 | 1.190 |
| 107.810 | 3.006 | 32.080 | 0.717 | 3.1177763267E+002 | 1.7423988104E+002 | -3.3944748010E+001 | 1.135 | 1.148 | 1.196 |
| 108.337 | 2.893 | 32.462 | 0.711 | 2.9422080773E+002 | 1.6352943346E+002 | -2.8876238093E+001 | 1.129 | 1.185 | 1.202 |
| 108.455 | 2.858 | 32.539 | 0.656 | 2.9092764853E+002 | 1.6155940683E+002 | -2.7681193957E+001 | 1.128 | 1.193 | 1.203 |
| 108.982 | 2.497 | 32.885 | 0.650 | 2.7680980348E+002 | 1.5321212235E+002 | -2.4691555051E+001 | 1.125 | 1.229 | 1.207 |
| 109.509 | 2.127 | 33.224 | 0.642 | 2.6490574704E+002 | 1.4589730532E+002 | -1.7608117031E+001 | 1.119 | 1.261 | 1.211 |

| | | | | | | | | | |
|---------|-------|--------|-------|-------------------|--------------------|--------------------|-------|-------|-------|
| 109.518 | 2.120 | 33.229 | 0.635 | 2.6474292416E+002 | 1.4578263443E+002 | -1.7479798476E+001 | 1.119 | 1.261 | 1.211 |
| 110.045 | 2.251 | 33.564 | 0.612 | 2.5674033441E+002 | 1.3952015592E+002 | -1.2350646162E+001 | 1.104 | 1.283 | 1.212 |
| 110.572 | 2.358 | 33.874 | 0.587 | 2.5172684246E+002 | 1.3470504556E+002 | -8.0009650097E+000 | 1.087 | 1.295 | 1.212 |
| 111.099 | 2.462 | 34.182 | 0.562 | 2.4830828860E+002 | 1.3059092725E+002 | -4.7542135091E+000 | 1.069 | 1.298 | 1.210 |
| 111.626 | 2.542 | 34.466 | 0.541 | 2.4671647858E+002 | 1.2742899101E+002 | -3.8364399433E+000 | 1.049 | 1.291 | 1.206 |
| 111.635 | 2.544 | 34.472 | 0.576 | 2.4668000551E+002 | 1.2736953756E+002 | -3.8309040307E+000 | 1.049 | 1.291 | 1.206 |
| 112.162 | 2.646 | 34.775 | 0.572 | 2.4525341414E+002 | 1.2441500468E+002 | -2.7257717450E+000 | 1.031 | 1.272 | 1.199 |
| 112.689 | 2.745 | 35.075 | 0.566 | 2.4380737300E+002 | 1.2159827656E+002 | -3.4395872579E+000 | 1.013 | 1.245 | 1.192 |
| 113.216 | 2.840 | 35.372 | 0.579 | 2.4162850673E+002 | 1.1872087453E+002 | -6.2456871010E+000 | 0.998 | 1.213 | 1.184 |
| 113.504 | 2.905 | 35.547 | 0.590 | 2.3949750242E+002 | 1.1686407896E+002 | -9.1120485182E+000 | 0.991 | 1.191 | 1.179 |
| 113.970 | 2.800 | 35.817 | 0.592 | 2.3396408810E+002 | 1.1371847556E+002 | -1.3709043301E+001 | 0.988 | 1.161 | 1.172 |
| 114.451 | 2.704 | 36.107 | 0.620 | 2.2646722066E+002 | 1.0997360587E+002 | -1.7217253269E+001 | 0.987 | 1.132 | 1.164 |
| 114.978 | 2.559 | 36.442 | 0.650 | 2.1645792696E+002 | 1.05266212709E+002 | -2.0420694478E+001 | 0.988 | 1.104 | 1.156 |
| 115.505 | 2.429 | 36.793 | 0.669 | 2.0494628774E+002 | 9.9865049685E+001 | -2.2388079505E+001 | 0.990 | 1.081 | 1.148 |
| 115.639 | 2.398 | 36.884 | 0.641 | 2.0192336375E+002 | 9.8420712362E+001 | -2.2554233716E+001 | 0.990 | 1.076 | 1.146 |
| 116.166 | 2.363 | 37.216 | 0.644 | 1.8998038328E+002 | 9.2667809563E+001 | -2.3326998141E+001 | 0.991 | 1.063 | 1.138 |
| 116.693 | 2.341 | 37.562 | 0.672 | 1.7733953958E+002 | 8.6445874935E+001 | -2.4511247106E+001 | 0.990 | 1.056 | 1.131 |
| 117.220 | 2.336 | 37.924 | 0.684 | 1.6414850447E+002 | 7.9834721278E+001 | -2.4523256024E+001 | 0.988 | 1.056 | 1.123 |
| 117.645 | 2.329 | 38.213 | 0.677 | 1.5388428614E+002 | 7.4567343433E+001 | -2.3647801671E+001 | 0.984 | 1.062 | 1.117 |
| 118.172 | 2.263 | 38.569 | 0.682 | 1.4172557733E+002 | 6.8238061640E+001 | -2.2768725363E+001 | 0.978 | 1.074 | 1.111 |
| 118.699 | 2.205 | 38.932 | 0.721 | 1.2988881371E+002 | 6.2066212709E+001 | -2.2849076275E+001 | 0.971 | 1.090 | 1.105 |
| 119.193 | 2.183 | 39.305 | 0.741 | 1.1841895225E+002 | 5.6218179592E+001 | -2.2169733932E+001 | 0.965 | 1.116 | 1.100 |
| 119.720 | 2.206 | 39.689 | 0.708 | 1.0732187989E+002 | 5.0618030626E+001 | -1.9324969040E+001 | 0.958 | 1.152 | 1.096 |
| 120.247 | 2.208 | 40.051 | 0.676 | 9.8052780919E+001 | 4.5997448670E+001 | -1.6215369027E+001 | 0.953 | 1.200 | 1.095 |
| 120.707 | 2.198 | 40.356 | 0.637 | 9.1152289627E+001 | 4.2505365402E+001 | -1.3610776443E+001 | 0.947 | 1.249 | 1.094 |
| 121.234 | 2.191 | 40.680 | 0.584 | 8.4829419757E+001 | 3.9145608601E+001 | -1.0356304655E+001 | 0.938 | 1.305 | 1.094 |
| 121.761 | 2.151 | 40.971 | 0.527 | 8.0238001767E+001 | 3.6449782045E+001 | -7.4191836328E+000 | 0.923 | 1.358 | 1.096 |
| 122.160 | 2.098 | 41.168 | 0.471 | 7.7666789511E+001 | 3.4755319813E+001 | -5.6563471815E+000 | 0.909 | 1.394 | 1.097 |
| 122.687 | 2.006 | 41.407 | 0.452 | 7.5229936449E+001 | 3.2827441366E+001 | -3.8561656185E+000 | 0.887 | 1.438 | 1.099 |
| 122.745 | 1.995 | 41.432 | 0.407 | 7.5012339412E+001 | 3.2617929295E+001 | -3.6293657034E+000 | 0.883 | 1.443 | 1.099 |
| 123.272 | 2.014 | 41.645 | 0.397 | 7.3786658278E+001 | 3.0928793872E+001 | -2.2504567213E+000 | 0.852 | 1.472 | 1.101 |
| 123.799 | 2.027 | 41.851 | 0.385 | 7.2640631231E+001 | 2.9201470809E+001 | -2.1909102396E+000 | 0.817 | 1.482 | 1.103 |
| 123.900 | 2.026 | 41.887 | 0.372 | 7.2417950478E+001 | 2.8876245333E+001 | -2.3525749525E+000 | 0.810 | 1.481 | 1.103 |
| 124.319 | 2.029 | 42.044 | 0.383 | 7.1156947335E+001 | 2.7386624932E+001 | -3.7682448007E+000 | 0.782 | 1.466 | 1.105 |
| 124.846 | 1.985 | 42.249 | 0.402 | 6.8667588566E+001 | 2.5282993141E+001 | -6.4540697919E+000 | 0.748 | 1.433 | 1.108 |
| 125.115 | 1.974 | 42.364 | 0.446 | 6.6695810353E+001 | 2.4031145706E+001 | -8.0371056120E+000 | 0.732 | 1.410 | 1.109 |
| 125.642 | 1.806 | 42.604 | 0.469 | 6.1736839140E+001 | 2.1359116105E+001 | -1.0490041443E+001 | 0.703 | 1.365 | 1.113 |
| 126.169 | 1.655 | 42.859 | 0.496 | 5.5640580153E+001 | 1.8451268689E+001 | -1.2480393502E+001 | 0.674 | 1.318 | 1.117 |
| 126.687 | 1.517 | 43.122 | 0.501 | 4.8708377296E+001 | 1.5476865370E+001 | -1.3931978456E+001 | 0.646 | 1.265 | 1.122 |
| 127.214 | 1.329 | 43.383 | 0.508 | 4.1069477487E+001 | 1.2623030379E+001 | -1.4923845398E+001 | 0.624 | 1.218 | 1.128 |
| 127.614 | 1.198 | 43.593 | 0.532 | 3.4975929666E+001 | 1.0507943683E+001 | -1.5128422411E+001 | 0.610 | 1.189 | 1.133 |
| 128.141 | 0.935 | 43.876 | 0.524 | 2.7087090914E+001 | 7.9411279989E+000 | -1.4102993930E+001 | 0.596 | 1.168 | 1.139 |
| 128.668 | 0.657 | 44.145 | 0.515 | 2.0113086155E+001 | 5.8072781896E+000 | -1.5877991369E+001 | 0.587 | 1.167 | 1.147 |
| 128.737 | 0.623 | 44.184 | 0.485 | 1.8977867921E+001 | 5.4561741315E+000 | -1.5752891427E+001 | 0.584 | 1.170 | 1.148 |
| 129.264 | 0.530 | 44.434 | 0.482 | 1.2566360478E+001 | 3.5120707778E+000 | -1.1036534572E+001 | 0.568 | 1.203 | 1.157 |
| 129.791 | 0.444 | 44.691 | 0.492 | 7.3467003070E+000 | 1.9759727241E+000 | -8.3828610744E+000 | 0.546 | 1.266 | 1.166 |
| 130.302 | 0.365 | 44.945 | 0.495 | 3.8171062638E+000 | 9.1077023148E-001 | -5.3590403845E+000 | 0.485 | 1.371 | 1.171 |
| 130.829 | 0.326 | 45.205 | 0.438 | 1.8335648527E+000 | 2.2822546089E-001 | -2.6774440668E+000 | 0.253 | 1.484 | 1.162 |
| 131.356 | 0.229 | 45.406 | 0.374 | 9.9540525656E-001 | 4.2572238871E-002 | -1.1144696853E+000 | 0.087 | 1.571 | 1.140 |
| 131.524 | 0.192 | 45.465 | 0.441 | 8.3397839571E-001 | 2.2913340485E-002 | -9.7905573414E-001 | 0.056 | 1.582 | 1.137 |
| 132.051 | 0.122 | 45.712 | 0.441 | 2.9147612734E-001 | 3.7938869721E-003 | -7.3999520882E-001 | 0.042 | 1.636 | 1.161 |
| 132.481 | 0.038 | 45.887 | 0.441 | 7.4767754319E-002 | 5.5713636625E-004 | -4.6136055420E-001 | 0.042 | 1.476 | 1.387 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
 ht(m) : Altezza linea di thrust da nodo sinistro base concio
 yt(m) : coordinata Y linea di trust
 yt'(-) : gradiente pendenza locale linea di trust
 E(x)(kN/m) : Forza Normale interconcio
 T(x)(kN/m) : Forza Tangenziale interconcio
 E' (kN) : derivata Forza normale interconcio
 Rho(x) (-) : fattore mobilitazione resistenza al taglio verticale interconcio ZhU et al.(2003)
 FS_qFEM(x)(-) : fattore di sicurezza locale stimato (locale in X) by qFEM
 FS_srmFEM(x)(-) : fattore di sicurezza locale stimato (locale in X) by SRM Procedure

TABELLA SFORZI DI TAGLIO DISTRIBUITI LUNGO SUPERFICIE INDIVIDUATA CON MINOR FS

| X (m) | dx (m) | dl (m) | alpha (°) | TauStress (kPa) | TauF (kN/m) | TauStrength (kPa) | TauS (kN/m) |
|----------|-----------|-----------|--------------|--------------------|----------------|----------------------|----------------|
| 65.975 | 0.527 | 0.527 | -2.075 | -0.122 | -0.065 | 2.118 | 1.117 |
| 66.502 | 0.527 | 0.527 | -2.075 | -0.367 | -0.194 | 6.594 | 3.477 |
| 67.029 | 0.527 | 0.527 | -2.075 | -0.612 | -0.323 | 11.391 | 6.006 |

| | | | | | | | |
|--------|-------|-------|--------|---------|--------|---------|--------|
| 67.556 | 0.083 | 0.083 | -2.075 | -0.754 | -0.063 | 14.029 | 1.167 |
| 67.639 | 0.527 | 0.528 | -3.312 | -1.435 | -0.757 | 17.552 | 9.265 |
| 68.166 | 0.527 | 0.528 | -3.312 | -1.839 | -0.971 | 23.435 | 12.370 |
| 68.693 | 0.100 | 0.100 | -3.312 | -2.079 | -0.208 | 27.121 | 2.718 |
| 68.793 | 0.527 | 0.533 | -8.860 | -6.203 | -3.308 | 30.484 | 16.257 |
| 69.320 | 0.527 | 0.533 | -8.860 | -7.434 | -3.965 | 36.994 | 19.729 |
| 69.847 | 0.373 | 0.377 | -8.860 | -8.486 | -3.201 | 41.238 | 15.558 |
| 70.220 | 0.527 | 0.533 | -8.860 | -9.537 | -5.086 | 45.977 | 24.520 |
| 70.747 | 0.096 | 0.097 | -8.860 | -10.264 | -0.993 | 49.332 | 4.771 |
| 70.842 | 0.527 | 0.528 | 2.803 | 3.473 | 1.832 | 51.674 | 27.262 |
| 71.369 | 0.527 | 0.528 | 2.803 | 3.757 | 1.982 | 56.215 | 29.657 |
| 71.896 | 0.527 | 0.528 | 2.803 | 4.042 | 2.132 | 60.522 | 31.930 |
| 72.423 | 0.425 | 0.425 | 2.803 | 4.299 | 1.827 | 64.875 | 27.577 |
| 72.848 | 0.527 | 0.536 | 10.600 | 16.725 | 8.966 | 62.255 | 33.374 |
| 73.375 | 0.527 | 0.536 | 10.600 | 17.502 | 9.383 | 64.806 | 34.741 |
| 73.902 | 0.527 | 0.536 | 10.600 | 18.279 | 9.799 | 67.080 | 35.961 |
| 74.429 | 0.527 | 0.536 | 10.600 | 19.056 | 10.216 | 69.412 | 37.211 |
| 74.956 | 0.051 | 0.051 | 10.600 | 19.481 | 1.001 | 70.534 | 3.625 |
| 75.006 | 0.527 | 0.555 | 18.281 | 32.555 | 18.066 | 64.417 | 35.748 |
| 75.533 | 0.427 | 0.450 | 18.281 | 33.286 | 14.965 | 65.721 | 29.548 |
| 75.960 | 0.527 | 0.555 | 18.281 | 34.017 | 18.878 | 66.969 | 37.164 |
| 76.487 | 0.140 | 0.148 | 18.281 | 34.528 | 5.094 | 67.762 | 9.996 |
| 76.627 | 0.527 | 0.553 | 17.713 | 34.114 | 18.871 | 69.638 | 38.521 |
| 77.154 | 0.527 | 0.553 | 17.713 | 34.935 | 19.325 | 71.290 | 39.435 |
| 77.681 | 0.527 | 0.553 | 17.713 | 35.756 | 19.779 | 72.984 | 40.372 |
| 78.208 | 0.527 | 0.553 | 17.713 | 36.577 | 20.233 | 74.719 | 41.332 |
| 78.735 | 0.175 | 0.184 | 17.713 | 37.124 | 6.829 | 75.859 | 13.954 |
| 78.910 | 0.114 | 0.120 | 17.713 | 37.350 | 4.471 | 76.455 | 9.152 |
| 79.024 | 0.527 | 0.558 | 19.200 | 40.515 | 22.606 | 75.660 | 42.217 |
| 79.551 | 0.527 | 0.558 | 19.200 | 41.304 | 23.047 | 77.264 | 43.112 |
| 80.078 | 0.527 | 0.558 | 19.200 | 42.094 | 23.487 | 78.878 | 44.012 |
| 80.605 | 0.281 | 0.297 | 19.200 | 42.698 | 12.698 | 79.817 | 23.737 |
| 80.886 | 0.527 | 0.532 | 7.967 | 19.296 | 10.267 | 95.265 | 50.688 |
| 81.413 | 0.527 | 0.532 | 7.967 | 19.961 | 10.621 | 98.782 | 52.559 |
| 81.940 | 0.527 | 0.532 | 7.967 | 20.626 | 10.975 | 101.499 | 54.005 |
| 82.467 | 0.527 | 0.532 | 7.967 | 21.291 | 11.329 | 103.727 | 55.190 |
| 82.993 | 0.162 | 0.163 | 7.967 | 21.726 | 3.546 | 103.482 | 16.889 |
| 83.155 | 0.527 | 0.598 | 28.184 | 66.302 | 39.637 | 76.739 | 45.876 |
| 83.682 | 0.527 | 0.598 | 28.184 | 66.496 | 39.753 | 77.067 | 46.072 |
| 84.209 | 0.527 | 0.598 | 28.184 | 66.690 | 39.869 | 77.405 | 46.274 |
| 84.736 | 0.527 | 0.598 | 28.184 | 66.884 | 39.984 | 77.784 | 46.501 |
| 85.263 | 0.069 | 0.078 | 28.184 | 66.993 | 5.253 | 77.964 | 6.114 |
| 85.332 | 0.527 | 0.601 | 28.748 | 67.939 | 40.832 | 77.279 | 46.446 |
| 85.859 | 0.459 | 0.523 | 28.748 | 68.067 | 35.605 | 77.536 | 40.558 |
| 86.318 | 0.527 | 0.624 | 32.450 | 73.006 | 45.588 | 71.925 | 44.913 |
| 86.844 | 0.527 | 0.624 | 32.450 | 72.716 | 45.406 | 71.792 | 44.830 |
| 87.371 | 0.268 | 0.318 | 32.450 | 72.497 | 23.025 | 71.662 | 22.760 |
| 87.639 | 0.527 | 0.606 | 29.606 | 68.728 | 41.654 | 75.858 | 45.975 |
| 88.166 | 0.527 | 0.606 | 29.606 | 68.774 | 41.682 | 75.988 | 46.053 |
| 88.693 | 0.106 | 0.122 | 29.606 | 68.802 | 8.407 | 76.058 | 9.293 |
| 88.800 | 0.527 | 0.586 | 25.955 | 63.236 | 37.060 | 81.146 | 47.556 |
| 89.326 | 0.527 | 0.586 | 25.955 | 63.633 | 37.292 | 81.655 | 47.854 |
| 89.853 | 0.147 | 0.164 | 25.955 | 63.887 | 10.469 | 81.979 | 13.433 |
| 90.001 | 0.527 | 0.609 | 30.159 | 70.576 | 43.012 | 76.473 | 46.606 |
| 90.528 | 0.527 | 0.609 | 30.159 | 70.561 | 43.003 | 76.577 | 46.669 |
| 91.055 | 0.527 | 0.609 | 30.159 | 70.546 | 42.993 | 76.629 | 46.701 |
| 91.582 | 0.527 | 0.609 | 30.159 | 70.531 | 42.984 | 76.641 | 46.708 |
| 92.108 | 0.041 | 0.048 | 30.159 | 70.522 | 3.380 | 76.664 | 3.674 |
| 92.150 | 0.527 | 0.654 | 36.354 | 77.086 | 50.436 | 67.373 | 44.081 |
| 92.677 | 0.527 | 0.654 | 36.354 | 76.250 | 49.889 | 66.432 | 43.465 |
| 93.204 | 0.527 | 0.654 | 36.354 | 75.415 | 49.343 | 65.466 | 42.833 |
| 93.731 | 0.432 | 0.536 | 36.354 | 74.655 | 40.040 | 64.365 | 34.522 |
| 94.163 | 0.527 | 0.662 | 37.217 | 74.492 | 49.291 | 61.772 | 40.874 |
| 94.690 | 0.060 | 0.076 | 37.217 | 73.952 | 5.605 | 60.941 | 4.619 |
| 94.750 | 0.527 | 0.662 | 37.217 | 73.413 | 48.577 | 60.202 | 39.835 |
| 95.277 | 0.527 | 0.662 | 37.217 | 72.445 | 47.936 | 58.834 | 38.930 |
| 95.804 | 0.005 | 0.007 | 37.217 | 71.956 | 0.478 | 58.058 | 0.386 |
| 95.809 | 0.527 | 0.533 | 8.890 | 23.163 | 12.354 | 95.580 | 50.977 |
| 96.336 | 0.527 | 0.533 | 8.890 | 23.875 | 12.734 | 100.034 | 53.353 |
| 96.863 | 0.527 | 0.533 | 8.890 | 24.587 | 13.114 | 103.839 | 55.382 |
| 97.390 | 0.527 | 0.533 | 8.890 | 25.299 | 13.493 | 108.397 | 57.813 |
| 97.917 | 0.083 | 0.084 | 8.890 | 25.711 | 2.151 | 109.931 | 9.197 |
| 98.000 | 0.527 | 0.570 | 22.326 | 59.631 | 33.968 | 92.348 | 52.605 |
| 98.527 | 0.527 | 0.570 | 22.326 | 60.281 | 34.339 | 93.284 | 53.139 |
| 99.053 | 0.527 | 0.570 | 22.326 | 60.932 | 34.709 | 94.142 | 53.627 |

| | | | | | | | |
|---------|-------|-------|--------|--------|--------|---------|--------|
| 99.580 | 0.527 | 0.570 | 22.326 | 61.582 | 35.080 | 94.890 | 54.053 |
| 100.107 | 0.205 | 0.222 | 22.326 | 62.034 | 13.742 | 95.373 | 21.127 |
| 100.312 | 0.527 | 0.574 | 23.468 | 64.908 | 37.287 | 93.968 | 53.981 |
| 100.839 | 0.527 | 0.574 | 23.468 | 65.490 | 37.621 | 94.626 | 54.359 |
| 101.366 | 0.039 | 0.042 | 23.468 | 65.802 | 2.788 | 94.987 | 4.025 |
| 101.405 | 0.158 | 0.173 | 23.468 | 65.910 | 11.386 | 95.007 | 16.413 |
| 101.563 | 0.527 | 0.557 | 18.777 | 55.461 | 30.867 | 102.065 | 56.805 |
| 102.090 | 0.492 | 0.519 | 18.777 | 56.236 | 29.194 | 102.586 | 53.256 |
| 102.582 | 0.527 | 0.632 | 33.491 | 85.271 | 53.878 | 81.723 | 51.636 |
| 103.109 | 0.527 | 0.632 | 33.491 | 84.844 | 53.608 | 82.099 | 51.874 |
| 103.636 | 0.527 | 0.632 | 33.491 | 84.418 | 53.339 | 82.191 | 51.932 |
| 104.163 | 0.183 | 0.219 | 33.491 | 84.131 | 18.459 | 82.125 | 18.019 |
| 104.346 | 0.527 | 0.748 | 45.185 | 90.141 | 67.391 | 63.206 | 47.254 |
| 104.873 | 0.527 | 0.748 | 45.185 | 87.770 | 65.618 | 62.401 | 46.652 |
| 105.400 | 0.527 | 0.748 | 45.185 | 85.399 | 63.846 | 60.973 | 45.584 |
| 105.927 | 0.184 | 0.261 | 45.185 | 83.800 | 21.846 | 60.080 | 15.663 |
| 106.110 | 0.527 | 0.638 | 34.336 | 77.406 | 49.396 | 74.732 | 47.690 |
| 106.637 | 0.527 | 0.638 | 34.336 | 76.864 | 49.050 | 74.041 | 47.249 |
| 107.164 | 0.119 | 0.144 | 34.336 | 76.532 | 11.022 | 73.487 | 10.583 |
| 107.283 | 0.527 | 0.723 | 43.231 | 80.937 | 58.536 | 60.230 | 43.560 |
| 107.810 | 0.527 | 0.723 | 43.231 | 78.937 | 57.089 | 58.603 | 42.384 |
| 108.337 | 0.118 | 0.162 | 43.231 | 77.712 | 12.598 | 56.689 | 9.190 |
| 108.455 | 0.527 | 0.883 | 53.353 | 72.328 | 63.854 | 39.727 | 35.072 |
| 108.982 | 0.527 | 0.883 | 53.353 | 68.267 | 60.268 | 37.084 | 32.739 |
| 109.509 | 0.009 | 0.016 | 53.353 | 66.201 | 1.031 | 35.529 | 0.553 |
| 109.518 | 0.527 | 0.565 | 21.129 | 46.811 | 26.444 | 74.304 | 41.975 |
| 110.045 | 0.527 | 0.565 | 21.129 | 47.523 | 26.846 | 75.777 | 42.807 |
| 110.572 | 0.527 | 0.565 | 21.129 | 48.235 | 27.249 | 77.084 | 43.546 |
| 111.099 | 0.527 | 0.565 | 21.129 | 48.948 | 27.651 | 78.447 | 44.316 |
| 111.626 | 0.009 | 0.010 | 21.129 | 49.310 | 0.501 | 79.001 | 0.802 |
| 111.635 | 0.527 | 0.564 | 20.918 | 49.278 | 27.799 | 79.877 | 45.060 |
| 112.162 | 0.527 | 0.564 | 20.918 | 50.000 | 28.206 | 81.089 | 45.744 |
| 112.689 | 0.527 | 0.564 | 20.918 | 50.723 | 28.614 | 82.256 | 46.402 |
| 113.216 | 0.288 | 0.308 | 20.918 | 51.281 | 15.811 | 83.049 | 25.606 |
| 113.504 | 0.466 | 0.597 | 38.790 | 74.832 | 44.711 | 59.802 | 35.731 |
| 113.970 | 0.481 | 0.617 | 38.790 | 73.736 | 45.476 | 59.199 | 36.510 |
| 114.451 | 0.527 | 0.713 | 42.355 | 73.695 | 52.549 | 53.120 | 37.877 |
| 114.978 | 0.527 | 0.713 | 42.355 | 71.856 | 51.237 | 52.220 | 37.236 |
| 115.505 | 0.134 | 0.182 | 42.355 | 70.702 | 12.839 | 51.590 | 9.368 |
| 115.639 | 0.527 | 0.642 | 34.883 | 66.093 | 42.455 | 61.151 | 39.281 |
| 116.166 | 0.527 | 0.642 | 34.883 | 65.473 | 42.057 | 60.752 | 39.024 |
| 116.693 | 0.527 | 0.642 | 34.883 | 64.854 | 41.659 | 60.326 | 38.751 |
| 117.220 | 0.426 | 0.519 | 34.883 | 64.295 | 33.365 | 59.794 | 31.030 |
| 117.645 | 0.527 | 0.675 | 38.640 | 65.984 | 44.515 | 54.434 | 36.723 |
| 118.172 | 0.527 | 0.675 | 38.640 | 64.789 | 43.708 | 53.428 | 36.044 |
| 118.699 | 0.494 | 0.633 | 38.640 | 63.630 | 40.256 | 52.552 | 33.247 |
| 119.193 | 0.527 | 0.638 | 34.381 | 59.991 | 38.303 | 56.551 | 36.107 |
| 119.720 | 0.527 | 0.638 | 34.381 | 59.443 | 37.953 | 55.742 | 35.590 |
| 120.247 | 0.460 | 0.557 | 34.381 | 58.929 | 32.813 | 55.079 | 30.669 |
| 120.707 | 0.527 | 0.622 | 32.123 | 56.588 | 35.208 | 57.106 | 35.531 |
| 121.234 | 0.527 | 0.622 | 32.123 | 56.339 | 35.053 | 56.703 | 35.280 |
| 121.761 | 0.399 | 0.472 | 32.123 | 56.120 | 26.463 | 56.377 | 26.585 |
| 122.160 | 0.527 | 0.622 | 32.123 | 55.901 | 34.781 | 56.088 | 34.897 |
| 122.687 | 0.058 | 0.068 | 32.123 | 55.763 | 3.798 | 55.947 | 3.811 |
| 122.745 | 0.527 | 0.561 | 20.150 | 40.412 | 22.683 | 68.371 | 38.376 |
| 123.272 | 0.527 | 0.561 | 20.150 | 41.167 | 23.107 | 69.646 | 39.092 |
| 123.799 | 0.101 | 0.108 | 20.150 | 41.617 | 4.499 | 70.423 | 7.614 |
| 123.900 | 0.419 | 0.447 | 20.150 | 41.167 | 18.385 | 69.609 | 31.087 |
| 124.319 | 0.527 | 0.583 | 25.258 | 47.495 | 27.672 | 62.819 | 36.601 |
| 124.846 | 0.269 | 0.297 | 25.258 | 45.973 | 13.662 | 60.790 | 18.065 |
| 125.115 | 0.527 | 0.666 | 37.686 | 54.924 | 36.571 | 45.557 | 30.334 |
| 125.642 | 0.527 | 0.666 | 37.686 | 50.788 | 33.817 | 42.312 | 28.173 |
| 126.169 | 0.518 | 0.655 | 37.686 | 46.686 | 30.573 | 39.043 | 25.568 |
| 126.687 | 0.527 | 0.692 | 40.422 | 43.234 | 29.926 | 33.151 | 22.946 |
| 127.214 | 0.400 | 0.525 | 40.422 | 39.144 | 20.549 | 30.118 | 15.810 |
| 127.614 | 0.527 | 0.759 | 46.057 | 34.968 | 26.553 | 22.683 | 17.224 |
| 128.141 | 0.527 | 0.759 | 46.057 | 29.231 | 22.196 | 18.954 | 14.392 |
| 128.668 | 0.070 | 0.101 | 46.057 | 25.981 | 2.619 | 17.320 | 1.746 |
| 128.737 | 0.527 | 0.629 | 33.086 | 21.786 | 13.701 | 21.418 | 13.470 |
| 129.264 | 0.527 | 0.629 | 33.086 | 18.488 | 11.627 | 18.145 | 11.412 |
| 129.791 | 0.511 | 0.610 | 33.086 | 15.240 | 9.297 | 14.912 | 9.097 |
| 130.302 | 0.527 | 0.606 | 29.567 | 11.453 | 6.938 | 12.708 | 7.699 |
| 130.829 | 0.527 | 0.606 | 29.567 | 8.758 | 5.306 | 9.672 | 5.860 |
| 131.356 | 0.168 | 0.193 | 29.567 | 6.983 | 1.346 | 7.700 | 1.484 |
| 131.524 | 0.527 | 0.615 | 31.047 | 5.276 | 3.245 | 5.480 | 3.371 |

| | | | | | | | |
|---------|-------|-------|--------|-------|-------|-------|-------|
| 132.051 | 0.430 | 0.502 | 31.047 | 2.602 | 1.307 | 2.702 | 1.357 |
| 132.481 | 0.168 | 0.226 | 41.922 | 0.788 | 0.178 | 0.549 | 0.124 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
dx(m) : Larghezza concio
dl(m) : lunghezza base concio
alpha(°) : Angolo pendenza base concio
TauStress(kPa) : Sforzo di taglio su base concio
TauF (kN/m) : Forza di taglio su base concio
TauStrength(kPa) : Resistenza al taglio su base concio
TauS (kN/m) : Forza resistente al taglio su base concio

Strato 1 -- Parametri di resistenza al taglio equivalenti dell'ammasso roccioso
stimati secondo criterio di rottura non lineare Hoek et al.(2002)

CRITERIO DI ROTTURA Hoek et al.(2002,2006) - Generalizzato secondo Lei et al.(2016)
Fattore di riduzione NTC2018 gammaPHI=1.25 e gammaC=1.25 - DISATTIVATO

| SigmaN'(kPa) | TauStrength(kPa) | Phi'(deg) | c'(kPa) |
|--------------|------------------|-----------|---------|
| 25.00 | 920.66 | 71.43 | 846.24 |
| 50.00 | 1001.44 | 70.92 | 856.91 |
| 75.00 | 1084.74 | 70.41 | 873.95 |
| 100.00 | 1141.67 | 70.09 | 865.62 |
| 125.00 | 1199.69 | 69.76 | 860.60 |
| 150.00 | 1288.75 | 69.29 | 892.02 |
| 175.00 | 1349.48 | 68.98 | 894.11 |
| 200.00 | 1411.27 | 68.67 | 899.06 |
| 225.00 | 1474.12 | 68.37 | 906.75 |
| 250.00 | 1538.04 | 68.07 | 917.08 |
| 275.00 | 1603.00 | 67.78 | 929.96 |
| 300.00 | 1669.00 | 67.48 | 945.30 |
| 325.00 | 1702.39 | 67.34 | 923.92 |
| 350.00 | 1769.95 | 67.05 | 943.23 |
| 375.00 | 1838.54 | 66.77 | 964.79 |
| 400.00 | 1908.16 | 66.49 | 988.56 |
| 425.00 | 1943.35 | 66.35 | 972.70 |
| 450.00 | 2014.51 | 66.08 | 1000.02 |
| 475.00 | 2050.46 | 65.94 | 986.45 |
| 500.00 | 2123.14 | 65.67 | 1017.18 |
| 600.00 | 2347.24 | 64.88 | 1067.66 |
| 700.00 | 2540.91 | 64.23 | 1090.74 |
| 800.00 | 2740.82 | 63.60 | 1129.00 |
| 900.00 | 2946.97 | 62.99 | 1181.61 |
| 1000.00 | 3159.32 | 62.38 | 1247.85 |
| 1100.00 | 3333.67 | 61.91 | 1272.76 |
| 1200.00 | 3511.99 | 61.44 | 1307.18 |
| 1300.00 | 3694.28 | 60.98 | 1350.74 |
| 1400.00 | 3880.53 | 60.53 | 1403.16 |
| 1500.00 | 4070.76 | 60.08 | 1464.16 |
| 2000.00 | 4871.57 | 58.35 | 1627.03 |

Cuccuru Mannu (verifica scarica condizioni dinamiche)
SSAP 5.0.2 - Slope Stability Analysis Program (1991,2021)
WWW.SSAP.EU
Build No. 12007

BY
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** Gia' Ricercatore CNR-IRPI fino a Luglio 2011

Ultima Revisione struttura tabelle del report: 21 Febbraio 2021

File report: \\192.168.1.231\BACKUP su PC canepa\lavorimauri\cave e miniere\Minerale industriali\Cuccurumannu\Sap\Verifica dinamica.txt

Data: 6/12/2021

Localita' :

Descrizione:

Modello pendio: Verdinamica.mod

----- PARAMETRI DEL MODELLO DEL PENDIO -----

PARAMETRI GEOMETRICI - Coordinate X Y (in m)

| SUP T. | | SUP 2 | | SUP 3 | | SUP 4 | |
|--------|-------|--------|-------|-------|---|-------|---|
| X | Y | X | Y | X | Y | X | Y |
| 10.00 | 10.00 | 61.53 | 10.00 | - | - | - | - |
| 61.53 | 10.00 | 78.91 | 20.00 | - | - | - | - |
| 78.91 | 20.00 | 123.90 | 46.00 | - | - | - | - |
| 123.90 | 46.00 | 290.50 | 46.00 | - | - | - | - |
| 290.50 | 46.00 | 297.72 | 42.00 | - | - | - | - |
| 297.72 | 42.00 | 307.03 | 40.00 | - | - | - | - |
| 307.03 | 40.00 | 335.71 | 40.00 | - | - | - | - |
| 335.71 | 40.00 | 327.17 | 38.00 | - | - | - | - |
| - | - | 300.54 | 38.00 | - | - | - | - |
| - | - | 283.80 | 40.00 | - | - | - | - |
| - | - | 262.05 | 40.00 | - | - | - | - |
| - | - | 231.40 | 40.00 | - | - | - | - |
| - | - | 221.34 | 40.00 | - | - | - | - |
| - | - | 205.48 | 36.00 | - | - | - | - |
| - | - | 191.08 | 32.00 | - | - | - | - |
| - | - | 171.51 | 30.00 | - | - | - | - |
| - | - | 147.53 | 26.00 | - | - | - | - |
| - | - | 138.11 | 24.00 | - | - | - | - |
| - | - | 122.16 | 22.00 | - | - | - | - |
| - | - | 113.97 | 20.00 | - | - | - | - |
| - | - | 94.75 | 14.00 | - | - | - | - |
| - | - | 75.96 | 10.00 | - | - | - | - |
| - | - | 61.53 | 10.00 | - | - | - | - |

ASSENZA DI FALDA

PARAMETRI GEOMECCANICI

| | fi` | C` | Cu | Gamm | Gamm_sat | STR_IDX | sgci | GSI | mi | D | |
|----------|-------|------|------|------|----------|---------|--------|--------|-------|-------|------|
| STRATO 1 | 0.00 | 0.00 | 0.00 | 0.00 | 26.00 | 26.00 | 18.478 | 175.00 | 65.00 | 30.00 | 1.00 |
| STRATO 2 | 38.00 | 0.00 | 0.00 | 0.00 | 21.00 | 22.00 | 2.781 | 0.00 | 0.00 | 0.00 | 0.00 |

LEGENDA: fi` _____ Angolo di attrito interno efficace(in gradi)

C` _____ Coesione efficace (in Kpa)

Cu _____ Resistenza al taglio Non drenata (in Kpa)

Gamm _____ Peso di volume terreno fuori falda (in KN/m^3)

Gamm_sat _____ Peso di volume terreno immerso (in KN/m^3)

STR_IDX _____ Indice di resistenza (usato in solo in 'SNIFF SEARCH') (adimensionale)

---- SOLO Per AMMASSI ROCCIOSI FRATTURATI - Parametri Criterio di Rottura di Hoek (2002)-

sgci _____ Resistenza Compressione Uniassiale Roccia Intatta (in MPa)

GSI _____ Geological Strenght Index ammasso(adimensionale)

mi _____ Indice litologico ammasso(adimensionale)

D _____ Fattore di disturbo ammasso(adimensionale)

Fattore di riduzione NTC2018: gammaPHI=1.25 e gammaC=1.25 - DISATTIVATO (solo per ROCCE)

Uso CRITERIO DI ROTTURA Hoek et al.(2002,2006) - non-lineare - Generalizzato, secondo Lei et al.(2016)

INFORMAZIONI GENERAZIONE SUPERFICI RANDOM

*** PARAMETRI PER LA GENERAZIONE DELLE SUPERFICI

MOTORE DI RICERCA: RANDOM SEARCH - Siegel (1981)

FILTRAGGIO SUPERFICI : ATTIVATO

COORDINATE X1,X2,Y OSTACOLO : 0.00 0.00 0.00

LUNGHEZZA MEDIA SEGMENTI (m)*: 1.1 (+/-) 50%

INTERVALLO ASCISSE RANDOM STARTING POINT (Xmin .. Xmax): 61.00 81.00

LIVELLO MINIMO CONSIDERATO (Ymin): 0.00

INTERVALLO ASCISSE AMMESSO PER LA TERMINAZIONE (Xmin .. Xmax): 133.00 329.20

TOTALE SUPERFICI GENERATE : 1000

*NOTA IMPORTANTE: La lunghezza media dei segmenti non viene cosiderata nel caso di uso del motore di ricerca NEW RANOM SEARCH

INFORMAZIONI PARAMETRI DI CALCOLO

METODO DI CALCOLO : MORGENSTERN - PRICE (Morgenstern & Price, 1965)

METODO DI ESPLORAZIONE CAMPO VALORI (lambda0,Fs0) ADOTTATO : A (rapido)

COEFFICIENTE SISMICO UTILIZZATO Kh : 0.0360

COEFFICIENTE SISMICO UTILIZZATO Kv (assunto Positivo): 0.0180

COEFFICIENTE c=Kv/Kh UTILIZZATO : 0.5000

FORZA ORIZZONTALE ADDIZIONALE IN TESTA (kN/m): 0.00

FORZA ORIZZONTALE ADDIZIONALE ALLA BASE (kN/m): 0.00

N.B. Le forze orizzontali addizionali in testa e alla base sono poste uguali a 0

durante le tutte le verifiche globali.

I valori >0 impostati dall'utente sono utilizzati solo in caso di verifica singola

----- RISULTATO FINALE ELABORAZIONI -----

* DATI RELATIVI ALLE 10 SUPERFICI GENERATE CON MINOR F_s *

| | | | | | |
|---------------------------|--------|----------|---|---|----------------|
| Fattore di sicurezza (FS) | 1.4305 | - Min. - | X | Y | Lambda= 0.7656 |
| | 71.77 | 15.89 | | | |
| | 72.63 | 15.64 | | | |
| | 73.87 | 15.77 | | | |
| | 75.93 | 16.35 | | | |
| | 76.80 | 16.73 | | | |
| | 79.03 | 17.65 | | | |
| | 79.91 | 17.85 | | | |
| | 81.35 | 18.28 | | | |
| | 83.38 | 19.05 | | | |
| | 84.41 | 19.62 | | | |
| | 85.42 | 20.20 | | | |
| | 86.65 | 21.21 | | | |
| | 88.24 | 21.62 | | | |
| | 89.80 | 22.25 | | | |
| | 91.80 | 22.99 | | | |
| | 93.03 | 23.68 | | | |
| | 94.28 | 24.89 | | | |
| | 95.93 | 26.38 | | | |
| | 97.78 | 27.75 | | | |
| | 99.61 | 29.06 | | | |
| | 101.43 | 30.05 | | | |
| | 103.28 | 30.40 | | | |
| | 105.24 | 31.22 | | | |
| | 106.68 | 31.83 | | | |
| | 108.74 | 32.57 | | | |
| | 109.69 | 33.02 | | | |
| | 110.88 | 33.79 | | | |
| | 112.48 | 34.65 | | | |
| | 113.64 | 35.46 | | | |
| | 114.43 | 36.13 | | | |
| | 116.10 | 37.27 | | | |
| | 117.99 | 38.52 | | | |
| | 118.73 | 39.03 | | | |
| | 119.51 | 39.39 | | | |
| | 121.51 | 40.28 | | | |
| | 122.82 | 40.71 | | | |
| | 124.06 | 41.28 | | | |
| | 125.37 | 42.15 | | | |
| | 126.97 | 43.64 | | | |
| | 127.80 | 43.92 | | | |
| | 128.94 | 44.60 | | | |
| | 130.92 | 45.41 | | | |
| | 132.78 | 45.71 | | | |
| | 133.57 | 45.93 | | | |
| | 133.72 | 46.00 | | | |

| | | | | | |
|---------------------------|--------|----------|---|---|----------------|
| Fattore di sicurezza (FS) | 1.4558 | - N.2 -- | X | Y | Lambda= 0.4437 |
| | 79.99 | 20.62 | | | |
| | 81.81 | 19.82 | | | |
| | 82.80 | 19.58 | | | |
| | 84.01 | 19.96 | | | |
| | 85.61 | 20.68 | | | |
| | 86.96 | 21.39 | | | |
| | 88.26 | 22.13 | | | |
| | 89.24 | 22.31 | | | |
| | 90.90 | 23.20 | | | |
| | 91.92 | 23.98 | | | |
| | 93.50 | 24.99 | | | |
| | 95.08 | 26.09 | | | |
| | 96.35 | 26.99 | | | |
| | 97.61 | 27.80 | | | |
| | 98.74 | 28.41 | | | |
| | 99.47 | 28.81 | | | |
| | 100.05 | 29.23 | | | |
| | 101.53 | 30.17 | | | |

| | |
|--------|-------|
| 102.88 | 30.57 |
| 104.17 | 31.20 |
| 105.85 | 32.18 |
| 106.62 | 32.73 |
| 107.68 | 33.03 |
| 109.35 | 33.99 |
| 110.88 | 35.01 |
| 112.17 | 35.87 |
| 113.34 | 36.94 |
| 114.53 | 37.74 |
| 115.66 | 38.60 |
| 116.79 | 38.86 |
| 117.72 | 39.18 |
| 118.98 | 39.48 |
| 120.23 | 40.40 |
| 121.35 | 41.15 |
| 122.29 | 41.60 |
| 123.92 | 41.92 |
| 125.21 | 42.51 |
| 126.63 | 43.09 |
| 127.60 | 43.50 |
| 129.03 | 44.43 |
| 129.95 | 45.01 |
| 130.99 | 45.15 |
| 132.73 | 45.89 |
| 133.72 | 45.92 |
| 135.55 | 45.74 |
| 136.26 | 46.00 |

Fattore di sicurezza (FS) 1.4603 - N.3 -- X Y Lambda= 0.6358

| | |
|--------|-------|
| 64.07 | 11.46 |
| 66.04 | 11.25 |
| 67.02 | 11.63 |
| 68.16 | 11.90 |
| 69.24 | 12.11 |
| 70.70 | 12.50 |
| 72.72 | 13.19 |
| 73.95 | 13.45 |
| 75.26 | 13.81 |
| 76.62 | 14.23 |
| 77.87 | 14.81 |
| 79.42 | 15.60 |
| 81.03 | 16.13 |
| 82.02 | 16.43 |
| 83.06 | 16.83 |
| 83.80 | 17.32 |
| 84.75 | 17.91 |
| 86.43 | 19.05 |
| 88.10 | 20.03 |
| 89.72 | 21.38 |
| 90.59 | 21.92 |
| 91.78 | 22.95 |
| 93.15 | 24.09 |
| 94.66 | 25.17 |
| 95.66 | 25.95 |
| 96.82 | 26.45 |
| 98.62 | 27.95 |
| 99.66 | 28.50 |
| 101.26 | 29.48 |
| 102.97 | 29.70 |
| 104.23 | 30.23 |
| 105.93 | 31.23 |
| 106.90 | 32.20 |
| 107.98 | 33.28 |
| 108.96 | 34.29 |
| 111.15 | 35.04 |
| 112.30 | 35.56 |
| 114.16 | 36.05 |
| 116.22 | 37.17 |
| 118.48 | 37.81 |
| 119.67 | 38.46 |
| 121.17 | 39.59 |
| 122.57 | 40.16 |
| 123.43 | 40.49 |

| | | | | | |
|---------------------------|--------|----------|---|---|----------------|
| | 125.25 | 41.64 | | | |
| | 127.06 | 42.24 | | | |
| | 129.12 | 42.84 | | | |
| | 130.32 | 43.47 | | | |
| | 131.96 | 44.64 | | | |
| | 132.86 | 45.67 | | | |
| | 133.18 | 46.00 | | | |
| <hr/> | | | | | |
| Fattore di sicurezza (FS) | 1.4606 | - N.4 -- | X | Y | Lambda= 0.6796 |
| | 63.19 | 10.96 | | | |
| | 64.33 | 10.57 | | | |
| | 65.99 | 10.38 | | | |
| | 68.16 | 10.21 | | | |
| | 70.17 | 10.57 | | | |
| | 71.68 | 10.80 | | | |
| | 73.20 | 10.94 | | | |
| | 74.11 | 11.47 | | | |
| | 75.54 | 12.03 | | | |
| | 76.83 | 12.13 | | | |
| | 78.62 | 13.04 | | | |
| | 80.56 | 13.94 | | | |
| | 81.51 | 14.55 | | | |
| | 83.30 | 15.53 | | | |
| | 85.22 | 16.58 | | | |
| | 87.19 | 17.84 | | | |
| | 88.89 | 19.09 | | | |
| | 91.05 | 20.15 | | | |
| | 92.30 | 20.70 | | | |
| | 94.12 | 21.49 | | | |
| | 95.28 | 21.68 | | | |
| | 96.21 | 21.98 | | | |
| | 98.33 | 22.40 | | | |
| | 99.15 | 22.82 | | | |
| | 101.11 | 24.24 | | | |
| | 102.14 | 24.76 | | | |
| | 103.00 | 25.18 | | | |
| | 104.24 | 26.45 | | | |
| | 105.30 | 27.44 | | | |
| | 106.31 | 28.05 | | | |
| | 107.71 | 28.81 | | | |
| | 108.80 | 29.35 | | | |
| | 110.85 | 30.44 | | | |
| | 112.18 | 31.26 | | | |
| | 113.28 | 31.92 | | | |
| | 114.53 | 33.22 | | | |
| | 116.24 | 34.44 | | | |
| | 117.19 | 35.15 | | | |
| | 118.04 | 36.16 | | | |
| | 118.72 | 36.74 | | | |
| | 119.67 | 37.65 | | | |
| | 120.93 | 38.74 | | | |
| | 122.65 | 40.22 | | | |
| | 123.57 | 40.69 | | | |
| | 125.58 | 41.59 | | | |
| | 127.27 | 42.28 | | | |
| | 129.29 | 43.16 | | | |
| | 130.19 | 43.31 | | | |
| | 131.66 | 43.38 | | | |
| | 133.11 | 44.11 | | | |
| | 134.75 | 44.96 | | | |
| | 136.49 | 45.74 | | | |
| | 136.85 | 46.00 | | | |
| <hr/> | | | | | |
| Fattore di sicurezza (FS) | 1.4643 | - N.5 -- | X | Y | Lambda= 0.7189 |
| | 73.54 | 16.91 | | | |
| | 75.67 | 16.70 | | | |
| | 76.69 | 16.65 | | | |
| | 78.77 | 16.60 | | | |
| | 79.83 | 16.65 | | | |
| | 81.49 | 17.45 | | | |
| | 82.31 | 18.19 | | | |
| | 84.22 | 19.42 | | | |
| | 85.94 | 20.81 | | | |

| | |
|--------|-------|
| 86.96 | 21.06 |
| 89.29 | 21.76 |
| 90.21 | 21.74 |
| 92.42 | 22.23 |
| 93.76 | 23.07 |
| 95.27 | 24.18 |
| 96.93 | 25.50 |
| 98.45 | 26.14 |
| 100.06 | 27.16 |
| 101.80 | 27.67 |
| 103.38 | 28.86 |
| 104.71 | 29.09 |
| 106.05 | 29.39 |
| 107.60 | 30.04 |
| 109.74 | 31.29 |
| 110.51 | 31.81 |
| 112.19 | 33.01 |
| 113.91 | 33.40 |
| 115.24 | 34.24 |
| 116.58 | 35.30 |
| 117.87 | 36.18 |
| 119.14 | 37.64 |
| 120.95 | 38.67 |
| 122.51 | 39.34 |
| 123.28 | 39.92 |
| 124.54 | 40.84 |
| 126.34 | 42.20 |
| 127.28 | 42.93 |
| 128.75 | 44.05 |
| 130.34 | 44.81 |
| 132.12 | 45.35 |
| 133.51 | 46.00 |

Fattore di sicurezza (FS) 1.4724 - N.6 -- X Y Lambda= 0.5415

| | |
|--------|-------|
| 62.48 | 10.55 |
| 64.03 | 10.36 |
| 65.05 | 10.44 |
| 65.88 | 10.76 |
| 66.74 | 11.45 |
| 68.16 | 12.58 |
| 68.83 | 13.07 |
| 70.15 | 13.68 |
| 71.05 | 14.21 |
| 72.04 | 14.44 |
| 73.72 | 14.61 |
| 74.66 | 14.61 |
| 75.80 | 14.64 |
| 76.93 | 14.66 |
| 78.21 | 14.97 |
| 79.05 | 15.32 |
| 81.21 | 16.00 |
| 82.07 | 16.63 |
| 83.61 | 17.27 |
| 84.40 | 17.56 |
| 86.31 | 18.44 |
| 87.62 | 19.05 |
| 88.30 | 19.72 |
| 89.65 | 20.96 |
| 91.19 | 21.66 |
| 92.75 | 22.19 |
| 93.73 | 22.49 |
| 95.20 | 23.22 |
| 97.16 | 24.27 |
| 98.47 | 25.09 |
| 100.45 | 26.35 |
| 102.01 | 27.64 |
| 103.48 | 29.30 |
| 104.18 | 30.00 |
| 105.59 | 31.33 |
| 106.91 | 32.88 |
| 108.05 | 33.69 |
| 109.78 | 34.24 |
| 111.02 | 34.74 |
| 111.87 | 35.10 |

| | |
|--------|-------|
| 113.49 | 36.14 |
| 115.16 | 37.50 |
| 116.87 | 38.83 |
| 118.59 | 39.87 |
| 120.72 | 40.53 |
| 122.68 | 40.79 |
| 123.99 | 41.09 |
| 125.37 | 41.77 |
| 126.71 | 42.39 |
| 128.02 | 43.25 |
| 129.39 | 44.11 |
| 131.53 | 44.66 |
| 133.39 | 45.07 |
| 134.76 | 45.82 |
| 135.00 | 46.00 |

Fattore di sicurezza (FS) 1.4769 - N.7 -- X Y Lambda= 0.7885

| | |
|--------|-------|
| 65.47 | 12.27 |
| 67.00 | 11.97 |
| 67.96 | 12.17 |
| 69.73 | 12.53 |
| 71.18 | 13.44 |
| 72.72 | 14.58 |
| 73.45 | 15.30 |
| 74.50 | 15.88 |
| 75.83 | 16.31 |
| 77.46 | 16.90 |
| 79.64 | 17.95 |
| 80.51 | 18.38 |
| 81.46 | 19.03 |
| 82.54 | 19.83 |
| 83.56 | 20.59 |
| 84.30 | 21.32 |
| 85.22 | 22.18 |
| 86.55 | 22.76 |
| 88.81 | 23.19 |
| 90.26 | 23.22 |
| 91.24 | 23.29 |
| 93.72 | 23.97 |
| 94.92 | 24.89 |
| 97.03 | 25.81 |
| 98.61 | 26.20 |
| 100.18 | 27.00 |
| 101.98 | 28.47 |
| 103.81 | 29.16 |
| 105.97 | 30.31 |
| 108.13 | 31.37 |
| 109.41 | 32.05 |
| 111.05 | 33.43 |
| 112.02 | 33.78 |
| 113.47 | 34.31 |
| 114.44 | 34.51 |
| 115.74 | 35.01 |
| 117.81 | 36.26 |
| 120.05 | 37.31 |
| 122.15 | 38.30 |
| 124.34 | 39.57 |
| 125.44 | 40.34 |
| 126.24 | 41.10 |
| 127.20 | 41.98 |
| 129.03 | 42.93 |
| 131.23 | 44.11 |
| 132.36 | 44.72 |
| 133.92 | 45.64 |
| 134.50 | 46.00 |

Fattore di sicurezza (FS) 1.4846 - N.8 -- X Y Lambda= 0.6537

| | |
|-------|-------|
| 65.73 | 12.42 |
| 68.16 | 12.75 |
| 69.29 | 12.73 |
| 70.42 | 12.76 |
| 72.32 | 13.22 |
| 73.85 | 13.63 |

| | |
|--------|-------|
| 76.43 | 14.26 |
| 77.66 | 14.66 |
| 79.38 | 15.15 |
| 80.63 | 15.73 |
| 82.11 | 16.18 |
| 83.17 | 16.66 |
| 84.46 | 16.79 |
| 85.40 | 17.21 |
| 87.19 | 17.94 |
| 89.37 | 19.01 |
| 91.45 | 19.92 |
| 92.23 | 20.43 |
| 93.72 | 21.17 |
| 95.67 | 22.21 |
| 97.81 | 23.54 |
| 99.23 | 24.49 |
| 101.26 | 24.77 |
| 102.27 | 25.17 |
| 103.83 | 26.18 |
| 105.33 | 27.54 |
| 106.30 | 28.43 |
| 107.72 | 29.75 |
| 109.47 | 31.15 |
| 111.17 | 32.31 |
| 113.00 | 33.63 |
| 114.74 | 34.77 |
| 115.56 | 35.30 |
| 116.82 | 36.42 |
| 117.70 | 37.58 |
| 118.78 | 38.23 |
| 120.42 | 38.71 |
| 121.71 | 39.08 |
| 123.94 | 39.58 |
| 125.31 | 40.54 |
| 126.69 | 41.52 |
| 128.05 | 42.18 |
| 129.45 | 42.94 |
| 131.69 | 43.72 |
| 133.53 | 44.21 |
| 135.35 | 44.55 |
| 136.77 | 45.19 |
| 138.45 | 45.98 |
| 138.48 | 46.00 |

Fattore di sicurezza (FS) 1.4884 - N.9 -- X Y Lambda= 0.7014

| | |
|--------|-------|
| 68.84 | 14.21 |
| 70.87 | 13.82 |
| 72.54 | 13.32 |
| 74.11 | 13.53 |
| 76.29 | 14.00 |
| 78.30 | 15.13 |
| 80.62 | 16.44 |
| 82.98 | 17.84 |
| 84.31 | 18.99 |
| 85.43 | 19.48 |
| 87.81 | 20.34 |
| 89.03 | 20.63 |
| 91.32 | 21.36 |
| 92.71 | 21.86 |
| 94.28 | 22.33 |
| 96.28 | 22.80 |
| 98.69 | 24.06 |
| 100.46 | 24.90 |
| 102.54 | 26.81 |
| 104.24 | 28.01 |
| 106.75 | 29.22 |
| 107.90 | 29.70 |
| 110.47 | 30.59 |
| 111.78 | 31.44 |
| 113.15 | 32.55 |
| 115.01 | 33.91 |
| 116.48 | 34.68 |
| 117.53 | 35.42 |
| 119.33 | 36.68 |

| | |
|--------|-------|
| 120.63 | 37.65 |
| 121.43 | 38.46 |
| 122.57 | 39.21 |
| 124.83 | 40.36 |
| 126.11 | 40.92 |
| 127.20 | 41.19 |
| 128.32 | 41.51 |
| 129.40 | 41.82 |
| 130.62 | 42.65 |
| 132.33 | 43.73 |
| 134.14 | 44.74 |
| 135.54 | 46.00 |

Fattore di sicurezza (FS) 1.4901 - N.10 -- X Y Lambda= 0.6955

| | |
|--------|-------|
| 63.75 | 11.28 |
| 64.99 | 11.16 |
| 66.11 | 11.48 |
| 67.83 | 11.86 |
| 69.89 | 12.29 |
| 70.89 | 12.69 |
| 73.24 | 13.03 |
| 75.72 | 13.63 |
| 77.45 | 13.76 |
| 79.42 | 14.17 |
| 80.71 | 14.40 |
| 82.87 | 15.20 |
| 84.39 | 15.90 |
| 86.67 | 17.18 |
| 88.10 | 18.08 |
| 90.73 | 19.09 |
| 91.70 | 19.18 |
| 93.28 | 19.54 |
| 95.35 | 20.93 |
| 97.15 | 21.55 |
| 98.05 | 22.00 |
| 99.91 | 23.57 |
| 101.09 | 24.13 |
| 102.27 | 24.54 |
| 103.36 | 25.02 |
| 105.83 | 26.21 |
| 107.13 | 26.68 |
| 108.08 | 27.20 |
| 109.70 | 28.44 |
| 110.62 | 29.16 |
| 112.20 | 31.30 |
| 114.33 | 32.93 |
| 116.12 | 34.77 |
| 117.97 | 35.32 |
| 119.80 | 35.94 |
| 120.98 | 36.93 |
| 122.10 | 37.94 |
| 123.73 | 39.52 |
| 126.13 | 40.28 |
| 128.30 | 41.29 |
| 130.53 | 42.96 |
| 132.12 | 44.85 |
| 133.08 | 46.00 |

----- ANALISI DEFICIT DI RESISTENZA -----

DATI RELATIVI ALLE 10 SUPERFICI GENERATE CON MINOR FS *

Analisi Deficit in riferimento a FS(progetto) = 1.200

| Sup N. | FS | FTR(kN/m) | FTA(kN/m) | Bilancio(kN/m) | ESITO |
|--------|-------|-----------|-----------|----------------|---------|
| 1 | 1.430 | 3010.4 | 2104.4 | 485.0 | Surplus |
| 2 | 1.456 | 2297.4 | 1578.2 | 403.6 | Surplus |
| 3 | 1.460 | 3962.6 | 2713.6 | 706.2 | Surplus |
| 4 | 1.461 | 6425.2 | 4398.9 | 1146.5 | Surplus |
| 5 | 1.464 | 4014.0 | 2741.3 | 724.5 | Surplus |
| 6 | 1.472 | 4064.8 | 2760.7 | 752.0 | Surplus |
| 7 | 1.477 | 3876.6 | 2624.9 | 726.7 | Surplus |
| 8 | 1.485 | 5544.0 | 3734.3 | 1062.7 | Surplus |
| 9 | 1.488 | 5293.6 | 3556.7 | 1025.6 | Surplus |
| 10 | 1.490 | 6596.7 | 4427.1 | 1284.1 | Surplus |

Esito analisi: SURPLUS di RESISTENZA!

Valore minimo di SURPLUS di RESISTENZA (kN/m): 403.6

Note: FTR --> Forza totale Resistente lungo la superficie
di scivolamento

FTA --> Forza totale Agente lungo la superficie
di scivolamento

IMPORTANTE! : Il Deficit o il Surplus di resistenza viene espresso in kN
per metro di LARGHEZZA rispetto al fronte della scarpata

TABELLA PARAMETRI CONCI DELLA SUPERFICIE INDIVIDUATA CON MINOR FS

| X (m) | dx (m) | alpha (°) | W (kN/m) | ru (-) | U (kPa) | phi' (°) | (c',Cu) (kPa) |
|----------|-----------|--------------|-------------|-----------|------------|-------------|------------------|
| 71.767 | 0.496 | -16.29 | 2.29 | 0.00 | 0.00 | 38.00 | 0.00 |
| 72.264 | 0.371 | -16.29 | 4.69 | 0.00 | 0.00 | 38.00 | 0.00 |
| 72.635 | 0.496 | 6.34 | 9.21 | 0.00 | 0.00 | 38.00 | 0.00 |
| 73.131 | 0.496 | 6.34 | 11.65 | 0.00 | 0.00 | 38.00 | 0.00 |
| 73.628 | 0.240 | 6.34 | 6.51 | 0.00 | 0.00 | 38.00 | 0.00 |
| 73.867 | 0.496 | 15.57 | 14.84 | 0.00 | 0.00 | 38.00 | 0.00 |
| 74.364 | 0.496 | 15.57 | 16.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 74.860 | 0.496 | 15.57 | 17.96 | 0.00 | 0.00 | 38.00 | 0.00 |
| 75.357 | 0.496 | 15.57 | 19.53 | 0.00 | 0.00 | 38.00 | 0.00 |
| 75.853 | 0.080 | 15.57 | 3.30 | 0.00 | 0.00 | 38.00 | 0.00 |
| 75.933 | 0.027 | 23.85 | 1.11 | 0.00 | 0.00 | 38.00 | 0.00 |
| 75.960 | 0.496 | 23.85 | 20.95 | 0.00 | 0.00 | 38.00 | 0.00 |
| 76.456 | 0.343 | 23.85 | 14.88 | 0.00 | 0.00 | 38.00 | 0.00 |
| 76.799 | 0.496 | 22.34 | 22.22 | 0.00 | 0.00 | 38.00 | 0.00 |
| 77.296 | 0.496 | 22.34 | 23.09 | 0.00 | 0.00 | 38.00 | 0.00 |
| 77.792 | 0.496 | 22.34 | 23.95 | 0.00 | 0.00 | 38.00 | 0.00 |
| 78.288 | 0.496 | 22.34 | 24.82 | 0.00 | 0.00 | 38.00 | 0.00 |
| 78.785 | 0.125 | 22.34 | 6.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 78.910 | 0.118 | 22.34 | 6.08 | 0.00 | 0.00 | 38.00 | 0.00 |
| 79.028 | 0.496 | 12.53 | 26.62 | 0.00 | 0.00 | 38.00 | 0.00 |
| 79.524 | 0.390 | 12.53 | 22.22 | 0.00 | 0.00 | 38.00 | 0.00 |
| 79.914 | 0.496 | 16.98 | 29.74 | 0.00 | 0.00 | 38.00 | 0.00 |
| 80.411 | 0.496 | 16.98 | 31.18 | 0.00 | 0.00 | 38.00 | 0.00 |
| 80.907 | 0.443 | 16.98 | 29.02 | 0.00 | 0.00 | 38.00 | 0.00 |
| 81.350 | 0.496 | 20.62 | 33.71 | 0.00 | 0.00 | 38.00 | 0.00 |
| 81.846 | 0.496 | 20.62 | 34.77 | 0.00 | 0.00 | 38.00 | 0.00 |
| 82.342 | 0.496 | 20.62 | 35.83 | 0.00 | 0.00 | 38.00 | 0.00 |
| 82.839 | 0.496 | 20.62 | 36.89 | 0.00 | 0.00 | 38.00 | 0.00 |
| 83.335 | 0.050 | 20.62 | 3.75 | 0.00 | 0.00 | 38.00 | 0.00 |
| 83.385 | 0.496 | 28.90 | 37.60 | 0.00 | 0.00 | 38.00 | 0.00 |
| 83.881 | 0.496 | 28.90 | 37.73 | 0.00 | 0.00 | 38.00 | 0.00 |
| 84.378 | 0.036 | 28.90 | 2.72 | 0.00 | 0.00 | 38.00 | 0.00 |
| 84.413 | 0.496 | 29.85 | 37.82 | 0.00 | 0.00 | 38.00 | 0.00 |
| 84.910 | 0.496 | 29.85 | 37.84 | 0.00 | 0.00 | 38.00 | 0.00 |
| 85.406 | 0.019 | 29.85 | 1.44 | 0.00 | 0.00 | 38.00 | 0.00 |
| 85.425 | 0.496 | 39.50 | 37.21 | 0.00 | 0.00 | 38.00 | 0.00 |
| 85.921 | 0.496 | 39.50 | 35.91 | 0.00 | 0.00 | 38.00 | 0.00 |
| 86.418 | 0.234 | 39.50 | 16.45 | 0.00 | 0.00 | 38.00 | 0.00 |
| 86.651 | 0.496 | 14.38 | 35.49 | 0.00 | 0.00 | 38.00 | 0.00 |
| 87.148 | 0.496 | 14.38 | 37.19 | 0.00 | 0.00 | 38.00 | 0.00 |
| 87.644 | 0.496 | 14.38 | 38.88 | 0.00 | 0.00 | 38.00 | 0.00 |
| 88.140 | 0.100 | 14.38 | 8.07 | 0.00 | 0.00 | 38.00 | 0.00 |
| 88.241 | 0.496 | 22.26 | 40.51 | 0.00 | 0.00 | 38.00 | 0.00 |
| 88.737 | 0.496 | 22.26 | 41.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 89.234 | 0.496 | 22.26 | 42.29 | 0.00 | 0.00 | 38.00 | 0.00 |
| 89.730 | 0.067 | 22.26 | 5.78 | 0.00 | 0.00 | 38.00 | 0.00 |
| 89.797 | 0.496 | 20.29 | 43.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 90.293 | 0.496 | 20.29 | 44.50 | 0.00 | 0.00 | 38.00 | 0.00 |
| 90.790 | 0.496 | 20.29 | 45.60 | 0.00 | 0.00 | 38.00 | 0.00 |
| 91.286 | 0.496 | 20.29 | 46.70 | 0.00 | 0.00 | 38.00 | 0.00 |
| 91.783 | 0.015 | 20.29 | 1.45 | 0.00 | 0.00 | 38.00 | 0.00 |
| 91.798 | 0.496 | 29.21 | 47.33 | 0.00 | 0.00 | 38.00 | 0.00 |
| 92.294 | 0.496 | 29.21 | 47.43 | 0.00 | 0.00 | 38.00 | 0.00 |
| 92.790 | 0.237 | 29.21 | 22.72 | 0.00 | 0.00 | 38.00 | 0.00 |
| 93.028 | 0.496 | 43.98 | 46.50 | 0.00 | 0.00 | 38.00 | 0.00 |
| 93.524 | 0.496 | 43.98 | 44.47 | 0.00 | 0.00 | 38.00 | 0.00 |

| | | | | | | | |
|---------|-------|-------|-------|------|------|-------|------|
| 94.021 | 0.263 | 43.98 | 22.75 | 0.00 | 0.00 | 38.00 | 0.00 |
| 94.284 | 0.466 | 42.10 | 39.03 | 0.00 | 0.00 | 38.00 | 0.00 |
| 94.750 | 0.496 | 42.10 | 39.90 | 0.00 | 0.00 | 38.00 | 0.00 |
| 95.246 | 0.496 | 42.10 | 38.18 | 0.00 | 0.00 | 38.00 | 0.00 |
| 95.743 | 0.188 | 42.10 | 13.98 | 0.00 | 0.00 | 38.00 | 0.00 |
| 95.930 | 0.496 | 36.55 | 36.25 | 0.00 | 0.00 | 38.00 | 0.00 |
| 96.427 | 0.496 | 36.55 | 35.39 | 0.00 | 0.00 | 38.00 | 0.00 |
| 96.923 | 0.496 | 36.55 | 34.53 | 0.00 | 0.00 | 38.00 | 0.00 |
| 97.419 | 0.359 | 36.55 | 24.44 | 0.00 | 0.00 | 38.00 | 0.00 |
| 97.779 | 0.496 | 35.58 | 33.11 | 0.00 | 0.00 | 38.00 | 0.00 |
| 98.275 | 0.496 | 35.58 | 32.39 | 0.00 | 0.00 | 38.00 | 0.00 |
| 98.771 | 0.496 | 35.58 | 31.66 | 0.00 | 0.00 | 38.00 | 0.00 |
| 99.268 | 0.341 | 35.58 | 21.32 | 0.00 | 0.00 | 38.00 | 0.00 |
| 99.608 | 0.496 | 28.55 | 30.89 | 0.00 | 0.00 | 38.00 | 0.00 |
| 100.105 | 0.496 | 28.55 | 31.07 | 0.00 | 0.00 | 38.00 | 0.00 |
| 100.601 | 0.496 | 28.55 | 31.25 | 0.00 | 0.00 | 38.00 | 0.00 |
| 101.098 | 0.307 | 28.55 | 19.44 | 0.00 | 0.00 | 38.00 | 0.00 |
| 101.405 | 0.021 | 28.55 | 1.35 | 0.00 | 0.00 | 38.00 | 0.00 |
| 101.426 | 0.496 | 10.85 | 32.47 | 0.00 | 0.00 | 38.00 | 0.00 |
| 101.923 | 0.496 | 10.85 | 34.51 | 0.00 | 0.00 | 38.00 | 0.00 |
| 102.419 | 0.496 | 10.85 | 36.54 | 0.00 | 0.00 | 38.00 | 0.00 |
| 102.915 | 0.366 | 10.85 | 28.21 | 0.00 | 0.00 | 38.00 | 0.00 |
| 103.281 | 0.496 | 22.66 | 39.48 | 0.00 | 0.00 | 38.00 | 0.00 |
| 103.777 | 0.496 | 22.66 | 40.32 | 0.00 | 0.00 | 38.00 | 0.00 |
| 104.274 | 0.496 | 22.66 | 41.17 | 0.00 | 0.00 | 38.00 | 0.00 |
| 104.770 | 0.465 | 22.66 | 39.32 | 0.00 | 0.00 | 38.00 | 0.00 |
| 105.235 | 0.496 | 22.94 | 42.79 | 0.00 | 0.00 | 38.00 | 0.00 |
| 105.731 | 0.496 | 22.94 | 43.61 | 0.00 | 0.00 | 38.00 | 0.00 |
| 106.228 | 0.448 | 22.94 | 40.07 | 0.00 | 0.00 | 38.00 | 0.00 |
| 106.676 | 0.496 | 19.67 | 45.33 | 0.00 | 0.00 | 38.00 | 0.00 |
| 107.172 | 0.496 | 19.67 | 46.49 | 0.00 | 0.00 | 38.00 | 0.00 |
| 107.669 | 0.496 | 19.67 | 47.65 | 0.00 | 0.00 | 38.00 | 0.00 |
| 108.165 | 0.496 | 19.67 | 48.81 | 0.00 | 0.00 | 38.00 | 0.00 |
| 108.661 | 0.083 | 19.67 | 8.25 | 0.00 | 0.00 | 38.00 | 0.00 |
| 108.744 | 0.496 | 25.53 | 49.85 | 0.00 | 0.00 | 38.00 | 0.00 |
| 109.241 | 0.451 | 25.53 | 45.72 | 0.00 | 0.00 | 38.00 | 0.00 |
| 109.691 | 0.496 | 32.90 | 50.41 | 0.00 | 0.00 | 38.00 | 0.00 |
| 110.188 | 0.496 | 32.90 | 50.05 | 0.00 | 0.00 | 38.00 | 0.00 |
| 110.684 | 0.193 | 32.90 | 19.35 | 0.00 | 0.00 | 38.00 | 0.00 |
| 110.877 | 0.496 | 28.16 | 49.84 | 0.00 | 0.00 | 38.00 | 0.00 |
| 111.373 | 0.496 | 28.16 | 50.06 | 0.00 | 0.00 | 38.00 | 0.00 |
| 111.870 | 0.496 | 28.16 | 50.29 | 0.00 | 0.00 | 38.00 | 0.00 |
| 112.366 | 0.117 | 28.16 | 11.92 | 0.00 | 0.00 | 38.00 | 0.00 |
| 112.483 | 0.496 | 35.12 | 50.12 | 0.00 | 0.00 | 38.00 | 0.00 |
| 112.980 | 0.496 | 35.12 | 49.46 | 0.00 | 0.00 | 38.00 | 0.00 |
| 113.476 | 0.161 | 35.12 | 15.95 | 0.00 | 0.00 | 38.00 | 0.00 |
| 113.638 | 0.332 | 40.14 | 32.45 | 0.00 | 0.00 | 38.00 | 0.00 |
| 113.970 | 0.465 | 40.14 | 44.33 | 0.00 | 0.00 | 38.00 | 0.00 |
| 114.435 | 0.496 | 34.22 | 46.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 114.931 | 0.496 | 34.22 | 45.86 | 0.00 | 0.00 | 38.00 | 0.00 |
| 115.428 | 0.496 | 34.22 | 45.33 | 0.00 | 0.00 | 38.00 | 0.00 |
| 115.924 | 0.177 | 34.22 | 16.04 | 0.00 | 0.00 | 38.00 | 0.00 |
| 116.101 | 0.496 | 33.62 | 44.64 | 0.00 | 0.00 | 38.00 | 0.00 |
| 116.597 | 0.496 | 33.62 | 44.18 | 0.00 | 0.00 | 38.00 | 0.00 |
| 117.094 | 0.496 | 33.62 | 43.72 | 0.00 | 0.00 | 38.00 | 0.00 |
| 117.590 | 0.398 | 33.62 | 34.75 | 0.00 | 0.00 | 38.00 | 0.00 |
| 117.989 | 0.496 | 34.43 | 42.84 | 0.00 | 0.00 | 38.00 | 0.00 |
| 118.485 | 0.243 | 34.43 | 20.77 | 0.00 | 0.00 | 38.00 | 0.00 |
| 118.728 | 0.496 | 24.70 | 42.59 | 0.00 | 0.00 | 38.00 | 0.00 |
| 119.224 | 0.289 | 24.70 | 25.08 | 0.00 | 0.00 | 38.00 | 0.00 |
| 119.513 | 0.496 | 23.99 | 43.61 | 0.00 | 0.00 | 38.00 | 0.00 |
| 120.010 | 0.496 | 23.99 | 44.31 | 0.00 | 0.00 | 38.00 | 0.00 |
| 120.506 | 0.496 | 23.99 | 45.01 | 0.00 | 0.00 | 38.00 | 0.00 |
| 121.002 | 0.496 | 23.99 | 45.71 | 0.00 | 0.00 | 38.00 | 0.00 |
| 121.499 | 0.014 | 23.99 | 1.27 | 0.00 | 0.00 | 38.00 | 0.00 |
| 121.513 | 0.496 | 18.40 | 46.73 | 0.00 | 0.00 | 38.00 | 0.00 |
| 122.009 | 0.151 | 18.40 | 14.48 | 0.00 | 0.00 | 38.00 | 0.00 |
| 122.160 | 0.496 | 18.40 | 48.41 | 0.00 | 0.00 | 38.00 | 0.00 |
| 122.656 | 0.165 | 18.40 | 16.38 | 0.00 | 0.00 | 38.00 | 0.00 |
| 122.821 | 0.496 | 24.46 | 49.81 | 0.00 | 0.00 | 38.00 | 0.00 |
| 123.318 | 0.496 | 24.46 | 50.46 | 0.00 | 0.00 | 38.00 | 0.00 |
| 123.814 | 0.086 | 24.46 | 8.80 | 0.00 | 0.00 | 38.00 | 0.00 |
| 123.900 | 0.157 | 24.46 | 15.97 | 0.00 | 0.00 | 38.00 | 0.00 |
| 124.057 | 0.496 | 33.81 | 48.37 | 0.00 | 0.00 | 38.00 | 0.00 |
| 124.553 | 0.496 | 33.81 | 44.85 | 0.00 | 0.00 | 38.00 | 0.00 |

| | | | | | | | |
|---------|-------|-------|-------|------|------|-------|------|
| 125.050 | 0.316 | 33.81 | 26.69 | 0.00 | 0.00 | 38.00 | 0.00 |
| 125.365 | 0.496 | 42.81 | 38.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 125.862 | 0.496 | 42.81 | 33.52 | 0.00 | 0.00 | 38.00 | 0.00 |
| 126.358 | 0.496 | 42.81 | 28.64 | 0.00 | 0.00 | 38.00 | 0.00 |
| 126.855 | 0.116 | 42.81 | 6.01 | 0.00 | 0.00 | 38.00 | 0.00 |
| 126.971 | 0.496 | 18.87 | 24.16 | 0.00 | 0.00 | 38.00 | 0.00 |
| 127.467 | 0.337 | 18.87 | 15.38 | 0.00 | 0.00 | 38.00 | 0.00 |
| 127.805 | 0.496 | 30.90 | 20.46 | 0.00 | 0.00 | 38.00 | 0.00 |
| 128.301 | 0.496 | 30.90 | 17.31 | 0.00 | 0.00 | 38.00 | 0.00 |
| 128.797 | 0.140 | 30.90 | 4.31 | 0.00 | 0.00 | 38.00 | 0.00 |
| 128.937 | 0.496 | 22.25 | 13.76 | 0.00 | 0.00 | 38.00 | 0.00 |
| 129.434 | 0.496 | 22.25 | 11.61 | 0.00 | 0.00 | 38.00 | 0.00 |
| 129.930 | 0.496 | 22.25 | 9.45 | 0.00 | 0.00 | 38.00 | 0.00 |
| 130.426 | 0.494 | 22.25 | 7.26 | 0.00 | 0.00 | 38.00 | 0.00 |
| 130.920 | 0.496 | 9.11 | 5.81 | 0.00 | 0.00 | 38.00 | 0.00 |
| 131.416 | 0.496 | 9.11 | 4.97 | 0.00 | 0.00 | 38.00 | 0.00 |
| 131.913 | 0.496 | 9.11 | 4.12 | 0.00 | 0.00 | 38.00 | 0.00 |
| 132.409 | 0.370 | 9.11 | 2.52 | 0.00 | 0.00 | 38.00 | 0.00 |
| 132.779 | 0.496 | 15.66 | 2.33 | 0.00 | 0.00 | 38.00 | 0.00 |
| 133.276 | 0.294 | 15.66 | 0.69 | 0.00 | 0.00 | 38.00 | 0.00 |
| 133.570 | 0.147 | 24.73 | 0.11 | 0.00 | 0.00 | 38.00 | 0.00 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
dx(m) : Larghezza concio
alpha(°) : Angolo pendenza base concio
W(kN/m) : Forza peso concio
ru(-) : Coefficiente locale pressione interstiziale
U(kPa) : Pressione totale dei pori base concio
phi'(°) : Angolo di attrito efficace base concio
c'/Cu (kPa) : Coesione efficace o Resistenza al taglio in condizioni non drenate

TABELLA DIAGRAMMA DELLE FORZE DELLA SUPERFICIE INDIVIDUATA CON MINOR FS

| X (m) | ht (m) | yt (m) | yt' (--) | E(x) (kN/m) | T(x) (kN/m) | E' (kN) | rho(x) (--) | FS_qFEM (--) | FS_srmFEM (--) | | |
|----------|-----------|-----------|-------------|-------------------|-------------------|--------------------|----------------|-----------------|-------------------|--|--|
| 71.767 | 0.000 | 15.890 | -0.035 | 0.0000000000E+000 | 0.0000000000E+000 | 2.2559951638E+000 | 0.048 | 5.987 | 3.543 | | |
| 72.264 | 0.103 | 15.848 | -0.035 | 1.3950117698E+000 | 1.6169123668E-002 | 3.3647708648E+000 | 0.048 | 6.788 | 3.525 | | |
| 72.635 | 0.223 | 15.860 | 0.145 | 2.7972272779E+000 | 8.1550982212E-002 | 5.9034641811E+000 | 0.053 | 8.048 | 3.572 | | |
| 73.131 | 0.282 | 15.974 | 0.245 | 7.1382314410E+000 | 5.3952408104E-001 | 8.1269748386E+000 | 0.138 | 5.592 | 3.610 | | |
| 73.628 | 0.356 | 16.103 | 0.275 | 1.0865327245E+001 | 1.3615243434E+000 | 7.3702521894E+000 | 0.229 | 4.233 | 3.414 | | |
| 73.867 | 0.403 | 16.177 | 0.423 | 1.2617138241E+001 | 1.8816024140E+000 | 8.1821428796E+000 | 0.273 | 3.803 | 3.298 | | |
| 74.364 | 0.503 | 16.415 | 0.433 | 1.7581227809E+001 | 3.6059636452E+000 | 8.3373984751E+000 | 0.376 | 3.038 | 3.002 | | |
| 74.860 | 0.556 | 16.607 | 0.374 | 2.0894137456E+001 | 4.9460420553E+000 | 5.9240363650E+000 | 0.433 | 2.700 | 2.838 | | |
| 75.357 | 0.597 | 16.786 | 0.390 | 2.3462348220E+001 | 6.1747518759E+000 | 5.3797175252E+000 | 0.482 | 2.484 | 2.714 | | |
| 75.853 | 0.667 | 16.994 | 0.417 | 2.6234882278E+001 | 7.6101011315E+000 | 5.5915350749E+000 | 0.531 | 2.304 | 2.598 | | |
| 75.933 | 0.677 | 17.027 | 0.408 | 2.6683137190E+001 | 7.8382825265E+000 | 5.4829827162E+000 | 0.538 | 2.280 | 2.582 | | |
| 75.960 | 0.676 | 17.038 | 0.411 | 2.6829447195E+001 | 7.9149471914E+000 | 5.4272508856E+000 | 0.540 | 2.272 | 2.577 | | |
| 76.456 | 0.661 | 17.242 | 0.414 | 2.9348929454E+001 | 9.3573224097E+000 | 5.0141574888E+000 | 0.584 | 2.142 | 2.482 | | |
| 76.799 | 0.652 | 17.385 | 0.425 | 3.1053352349E+001 | 1.0401638716E+001 | 5.0692266006E+000 | 0.613 | 2.066 | 2.421 | | |
| 77.296 | 0.662 | 17.599 | 0.431 | 3.3639747714E+001 | 1.2036338782E+001 | 5.3662710248E+000 | 0.655 | 1.973 | 2.337 | | |
| 77.792 | 0.673 | 17.813 | 0.429 | 3.6380748082E+001 | 1.3793606337E+001 | 5.7264445983E+000 | 0.694 | 1.899 | 2.262 | | |
| 78.288 | 0.680 | 18.025 | 0.427 | 3.9324707787E+001 | 1.5675492046E+001 | 6.2353826178E+000 | 0.730 | 1.838 | 2.194 | | |
| 78.785 | 0.688 | 18.237 | 0.426 | 4.2570959236E+001 | 1.7733083907E+001 | 6.9071891413E+000 | 0.763 | 1.785 | 2.131 | | |
| 78.910 | 0.690 | 18.289 | 0.422 | 4.3447913135E+001 | 1.8280174413E+001 | 7.1636919531E+000 | 0.770 | 1.774 | 2.115 | | |
| 79.028 | 0.691 | 18.339 | 0.440 | 4.4311610310E+001 | 1.8808135882E+001 | 7.5415163273E+000 | 0.777 | 1.764 | 2.101 | | |
| 79.524 | 0.801 | 18.560 | 0.449 | 4.8521671443E+001 | 2.1331999745E+001 | 9.2069507547E+000 | 0.805 | 1.719 | 2.041 | | |
| 79.914 | 0.892 | 18.737 | 0.448 | 5.2333358689E+001 | 2.3578230288E+001 | 9.8784625773E+000 | 0.825 | 1.683 | 1.994 | | |
| 80.411 | 0.960 | 18.957 | 0.456 | 5.7301121785E+001 | 2.6518912041E+001 | 1.0131310646E+001 | 0.847 | 1.639 | 1.939 | | |
| 80.907 | 1.041 | 19.190 | 0.481 | 6.2391274298E+001 | 2.9605399846E+001 | 1.0174686198E+001 | 0.869 | 1.593 | 1.886 | | |
| 81.350 | 1.126 | 19.409 | 0.511 | 6.6864138494E+001 | 3.2401113348E+001 | 9.7915575962E+000 | 0.887 | 1.550 | 1.841 | | |
| 81.846 | 1.199 | 19.670 | 0.542 | 7.1550882684E+001 | 3.5456614577E+001 | 8.8901314431E+000 | 0.907 | 1.502 | 1.795 | | |
| 82.342 | 1.290 | 19.947 | 0.547 | 7.5689866471E+001 | 3.8314356704E+001 | 7.2113227522E+000 | 0.927 | 1.455 | 1.752 | | |
| 82.839 | 1.369 | 20.213 | 0.498 | 7.8709963894E+001 | 4.0638607952E+001 | 4.3216234503E+000 | 0.945 | 1.412 | 1.717 | | |
| 83.335 | 1.411 | 20.441 | 0.460 | 7.9980182451E+001 | 4.2196464405E+001 | 1.3294260767E+000 | 0.966 | 1.377 | 1.690 | | |
| 83.385 | 1.415 | 20.464 | 0.514 | 8.0040083086E+001 | 4.2313189084E+001 | 1.1090633621E+000 | 0.968 | 1.374 | 1.688 | | |
| 83.881 | 1.399 | 20.722 | 0.498 | 8.0107373219E+001 | 4.3325151621E+001 | -3.9708484309E-001 | 0.990 | 1.347 | 1.666 | | |
| 84.378 | 1.361 | 20.958 | 0.476 | 7.9645874875E+001 | 4.4064732560E+001 | -1.3444035250E+000 | 1.013 | 1.327 | 1.647 | | |
| 84.413 | 1.358 | 20.975 | 0.515 | 7.9596842156E+001 | 4.4109652007E+001 | -1.3891834134E+000 | 1.015 | 1.326 | 1.646 | | |
| 84.910 | 1.330 | 21.232 | 0.514 | 7.8803890673E+001 | 4.4722954035E+001 | -1.6851406162E+000 | 1.039 | 1.315 | 1.628 | | |
| 85.406 | 1.298 | 21.485 | 0.509 | 7.7923909334E+001 | 4.5269403470E+001 | -1.8816478678E+000 | 1.064 | 1.308 | 1.611 | | |
| 85.425 | 1.297 | 21.495 | 0.517 | 7.7888283754E+001 | 4.5289226834E+001 | -1.8793634079E+000 | 1.065 | 1.308 | 1.611 | | |

| | | | | | | | | | |
|---------|-------|--------|-------|-------------------|-------------------|--------------------|-------|-------|-------|
| 85.921 | 1.145 | 21.751 | 0.543 | 7.7039231116E+001 | 4.5933748037E+001 | -1.1039291526E+000 | 1.092 | 1.306 | 1.595 |
| 86.418 | 1.017 | 22.033 | 0.570 | 7.6792351880E+001 | 4.6969391481E+001 | 4.1719495885E-001 | 1.120 | 1.307 | 1.579 |
| 86.651 | 0.959 | 22.167 | 0.571 | 7.6990296879E+001 | 4.7580660599E+001 | 1.4097693881E+000 | 1.132 | 1.309 | 1.572 |
| 87.148 | 1.114 | 22.450 | 0.545 | 7.8283218644E+001 | 4.9173562060E+001 | 3.6246622087E+000 | 1.150 | 1.312 | 1.556 |
| 87.644 | 1.245 | 22.708 | 0.525 | 8.0588700668E+001 | 5.1104520996E+001 | 5.4742574783E+000 | 1.161 | 1.314 | 1.542 |
| 88.140 | 1.380 | 22.971 | 0.525 | 8.3717818536E+001 | 5.3444339662E+001 | 7.5973774297E+000 | 1.169 | 1.314 | 1.528 |
| 88.241 | 1.406 | 23.022 | 0.510 | 8.4507190921E+001 | 5.3986487370E+001 | 7.9012562716E+000 | 1.170 | 1.312 | 1.526 |
| 88.737 | 1.456 | 23.275 | 0.508 | 8.8532594028E+001 | 5.6794373788E+001 | 8.3820617777E+000 | 1.175 | 1.308 | 1.514 |
| 89.234 | 1.503 | 23.526 | 0.490 | 9.2828529881E+001 | 5.9691904761E+001 | 8.6819217046E+000 | 1.177 | 1.302 | 1.503 |
| 89.730 | 1.536 | 23.761 | 0.471 | 9.7151620616E+001 | 6.2366121949E+001 | 8.0889200706E+000 | 1.175 | 1.293 | 1.493 |
| 89.797 | 1.538 | 23.791 | 0.475 | 9.7687973646E+001 | 6.2687360829E+001 | 7.9881518798E+000 | 1.175 | 1.292 | 1.492 |
| 90.293 | 1.592 | 24.029 | 0.489 | 1.0159047651E+002 | 6.4974906792E+001 | 6.6231594163E+000 | 1.171 | 1.280 | 1.484 |
| 90.790 | 1.657 | 24.277 | 0.509 | 1.0426315240E+002 | 6.6551469394E+001 | 4.2816174372E+000 | 1.169 | 1.265 | 1.477 |
| 91.286 | 1.731 | 24.534 | 0.494 | 1.0584107630E+002 | 6.7446389523E+001 | 1.9493890466E+000 | 1.167 | 1.246 | 1.471 |
| 91.783 | 1.781 | 24.768 | 0.470 | 1.0619841933E+002 | 6.7562526213E+001 | -6.2911006260E-001 | 1.165 | 1.224 | 1.466 |
| 91.798 | 1.782 | 24.775 | 0.563 | 1.0618824195E+002 | 6.7553929239E+001 | -7.5432123754E-001 | 1.165 | 1.224 | 1.465 |
| 92.294 | 1.786 | 25.056 | 0.567 | 1.0445132862E+002 | 6.6366646134E+001 | -5.2287544292E+000 | 1.163 | 1.199 | 1.462 |
| 92.790 | 1.790 | 25.337 | 0.567 | 1.0099736659E+002 | 6.4095848868E+001 | -8.4659438008E+000 | 1.162 | 1.172 | 1.458 |
| 93.028 | 1.791 | 25.472 | 0.712 | 9.8815770197E+001 | 6.2701943858E+001 | -9.9715271803E+000 | 1.162 | 1.159 | 1.457 |
| 93.524 | 1.701 | 25.860 | 0.713 | 9.3052269605E+001 | 5.9125403636E+001 | -1.2682761310E+001 | 1.163 | 1.132 | 1.455 |
| 94.021 | 1.542 | 26.180 | 0.658 | 8.6224887595E+001 | 5.4924768731E+001 | -1.4917488731E+001 | 1.166 | 1.110 | 1.453 |
| 94.284 | 1.467 | 26.360 | 0.694 | 8.2136107932E+001 | 5.2378547668E+001 | -1.5765903470E+001 | 1.168 | 1.100 | 1.453 |
| 94.750 | 1.373 | 26.686 | 0.714 | 7.4596136485E+001 | 4.7630630563E+001 | -1.6575135609E+001 | 1.169 | 1.085 | 1.451 |
| 95.246 | 1.285 | 27.047 | 0.724 | 6.6157713108E+001 | 4.2265057208E+001 | -1.6793408308E+001 | 1.170 | 1.076 | 1.449 |
| 95.743 | 1.194 | 27.404 | 0.714 | 5.7924385962E+001 | 3.6972989977E+001 | -1.5859818251E+001 | 1.169 | 1.074 | 1.447 |
| 95.930 | 1.156 | 27.535 | 0.705 | 5.5000981608E+001 | 3.5074649794E+001 | -1.5452885475E+001 | 1.168 | 1.076 | 1.446 |
| 96.427 | 1.139 | 27.886 | 0.701 | 4.7504171684E+001 | 3.0169399225E+001 | -1.4433654350E+001 | 1.163 | 1.087 | 1.443 |
| 96.923 | 1.115 | 28.231 | 0.685 | 4.0671890096E+001 | 2.5672120010E+001 | -1.2973608274E+001 | 1.156 | 1.104 | 1.439 |
| 97.419 | 1.082 | 28.566 | 0.698 | 3.4624549124E+001 | 2.1706726840E+001 | -1.2068340174E+001 | 1.148 | 1.126 | 1.435 |
| 97.779 | 1.078 | 28.828 | 0.723 | 3.0321144969E+001 | 1.9000837743E+001 | -1.1307480923E+001 | 1.147 | 1.150 | 1.431 |
| 98.275 | 1.079 | 29.184 | 0.699 | 2.5173598545E+001 | 1.5997399821E+001 | -9.4658214740E+000 | 1.164 | 1.198 | 1.427 |
| 98.771 | 1.062 | 29.523 | 0.664 | 2.0923897477E+001 | 1.3660842819E+001 | -7.5706827629E+000 | 1.195 | 1.262 | 1.422 |
| 99.268 | 1.028 | 29.844 | 0.640 | 1.7657760664E+001 | 1.1955348025E+001 | -5.3801093937E+000 | 1.240 | 1.340 | 1.418 |
| 99.608 | 0.999 | 30.058 | 0.583 | 1.6104873682E+001 | 1.1157097669E+001 | -3.3877872835E+000 | 1.268 | 1.404 | 1.415 |
| 100.105 | 1.003 | 30.332 | 0.532 | 1.5267987433E+001 | 1.0756046621E+001 | -5.3731815477E-001 | 1.290 | 1.493 | 1.411 |
| 100.601 | 0.987 | 30.586 | 0.495 | 1.5571448063E+001 | 1.0929431237E+001 | 1.7060856984E+000 | 1.285 | 1.578 | 1.408 |
| 101.098 | 0.954 | 30.823 | 0.464 | 1.6961713603E+001 | 1.1641470311E+001 | 3.9720210256E+000 | 1.257 | 1.658 | 1.404 |
| 101.405 | 0.923 | 30.959 | 0.442 | 1.8405624474E+001 | 1.2355408187E+001 | 5.4082497434E+000 | 1.229 | 1.704 | 1.402 |
| 101.426 | 0.920 | 30.968 | 0.416 | 1.8522159146E+001 | 1.2409168038E+001 | 5.5452953871E+000 | 1.227 | 1.708 | 1.402 |
| 101.923 | 1.031 | 31.174 | 0.417 | 2.2286252783E+001 | 1.4148538827E+001 | 8.5516483167E+000 | 1.162 | 1.758 | 1.397 |
| 102.419 | 1.144 | 31.382 | 0.424 | 2.7011856096E+001 | 1.6441297443E+001 | 1.0197142321E+001 | 1.114 | 1.774 | 1.391 |
| 102.915 | 1.261 | 31.595 | 0.439 | 3.2409523157E+001 | 1.9257910817E+001 | 1.1306520953E+001 | 1.088 | 1.754 | 1.384 |
| 103.281 | 1.357 | 31.760 | 0.454 | 3.6659088742E+001 | 2.1710917792E+001 | 1.1530439566E+001 | 1.084 | 1.716 | 1.378 |
| 103.777 | 1.375 | 31.986 | 0.468 | 4.2318829364E+001 | 2.5334133549E+001 | 1.1485740715E+001 | 1.096 | 1.663 | 1.369 |
| 104.274 | 1.407 | 32.225 | 0.496 | 4.8061622418E+001 | 2.9364544838E+001 | 1.1637615501E+001 | 1.119 | 1.609 | 1.360 |
| 104.770 | 1.453 | 32.479 | 0.532 | 5.3872137588E+001 | 3.3744719421E+001 | 1.1791184796E+001 | 1.147 | 1.556 | 1.350 |
| 105.235 | 1.517 | 32.736 | 0.537 | 5.9390567753E+001 | 3.8178691814E+001 | 1.0902593808E+001 | 1.177 | 1.507 | 1.340 |
| 105.731 | 1.565 | 32.994 | 0.519 | 6.4289025802E+001 | 4.2514746526E+001 | 9.6097252537E+000 | 1.211 | 1.465 | 1.331 |
| 106.228 | 1.612 | 33.252 | 0.517 | 6.8930676532E+001 | 4.6669744025E+001 | 9.1035885443E+000 | 1.240 | 1.433 | 1.324 |
| 106.676 | 1.653 | 33.482 | 0.503 | 7.2910138054E+001 | 5.0185301580E+001 | 8.5101749414E+000 | 1.260 | 1.409 | 1.318 |
| 107.172 | 1.721 | 33.727 | 0.480 | 7.6930959289E+001 | 5.3591523717E+001 | 7.7272308646E+000 | 1.275 | 1.387 | 1.313 |
| 107.669 | 1.774 | 33.958 | 0.455 | 8.0581389943E+001 | 5.6602428379E+001 | 6.7406419005E+000 | 1.286 | 1.359 | 1.310 |
| 108.165 | 1.818 | 34.180 | 0.446 | 8.3622769436E+001 | 5.9042631317E+001 | 5.3914709295E+000 | 1.293 | 1.331 | 1.308 |
| 108.661 | 1.862 | 34.401 | 0.446 | 8.5933803023E+001 | 6.0874626137E+001 | 3.4332410467E+000 | 1.297 | 1.302 | 1.308 |
| 108.744 | 1.869 | 34.438 | 0.507 | 8.6200993186E+001 | 6.1094353750E+001 | 3.0653173146E+000 | 1.298 | 1.296 | 1.308 |
| 109.241 | 1.889 | 34.695 | 0.518 | 8.7233693878E+001 | 6.2040729141E+001 | 1.1799282266E+000 | 1.302 | 1.264 | 1.310 |
| 109.691 | 1.907 | 34.928 | 0.571 | 8.7396951230E+001 | 6.2359420488E+001 | -7.1188774242E-001 | 1.306 | 1.237 | 1.312 |
| 110.188 | 1.893 | 35.235 | 0.619 | 8.6456420966E+001 | 6.1954921638E+001 | -2.8697353280E+000 | 1.312 | 1.211 | 1.317 |
| 110.684 | 1.880 | 35.543 | 0.619 | 8.4548005348E+001 | 6.0848891205E+001 | -4.8080409005E+000 | 1.318 | 1.190 | 1.322 |
| 110.877 | 1.874 | 35.662 | 0.571 | 8.3548516374E+001 | 6.0219366601E+001 | -5.3634065185E+000 | 1.320 | 1.184 | 1.325 |
| 111.373 | 1.883 | 35.936 | 0.552 | 8.0654929964E+001 | 5.8279236324E+001 | -6.4572737776E+000 | 1.323 | 1.172 | 1.332 |
| 111.870 | 1.891 | 36.210 | 0.552 | 7.7138021524E+001 | 5.5849575817E+001 | -7.6788988814E+000 | 1.326 | 1.163 | 1.340 |
| 112.366 | 1.900 | 36.485 | 0.552 | 7.3031659923E+001 | 5.2976115832E+001 | -9.8490055095E+000 | 1.328 | 1.157 | 1.348 |
| 112.483 | 1.902 | 36.549 | 0.634 | 7.1832374848E+001 | 5.2139345933E+001 | -1.0193530811E+001 | 1.329 | 1.157 | 1.351 |
| 112.980 | 1.877 | 36.874 | 0.652 | 6.6831491802E+001 | 4.8648644148E+001 | -1.0399941835E+001 | 1.333 | 1.159 | 1.360 |
| 113.476 | 1.851 | 37.197 | 0.629 | 6.1507774115E+001 | 4.4922150122E+001 | -1.0825411373E+001 | 1.337 | 1.167 | 1.370 |
| 113.638 | 1.828 | 37.287 | 0.583 | 5.9754393091E+001 | 4.3690339236E+001 | -1.1109701028E+001 | 1.339 | 1.171 | 1.374 |
| 113.970 | 1.745 | 37.485 | 0.613 | 5.5889168320E+001 | 4.0996826715E+001 | -1.1985292866E+001 | 1.343 | 1.181 | 1.381 |
| 114.435 | 1.644 | 37.776 | 0.618 | 5.0084235413E+001 | 3.6937991085E+001 | -1.2410853536E+001 | 1.350 | 1.200 | 1.392 |
| 114.931 | 1.609 | 38.078 | 0.634 | 4.3963250090E+001 | 3.2675233937E+001 | -1.2764535363E+001 | 1.361 | 1.225 | 1.404 |
| 115.428 | 1.598 | 38.405 | 0.673 | 3.7412171159E+001 | 2.8177555188E+001 | -1.3250530604E+001 | 1.379 | 1.260 | 1.417 |
| 115.924 | 1.602 | 38.747 | 0.693 | 3.0808711328E+001 | 2.3689150763E+001 | -1.3359504091E+001 | 1.408 | 1.308 | 1.431 |
| 116.101 | 1.607 | 38.872 | 0.663 | 2.8439874780E+001 | 2.2092473565E+001 | -1.2857052078E+001 | 1.422 | 1.329 | 1.436 |
| 116.597 | 1.598 | 39.193 | 0.647 | 2.2785060280E+001 | 1.8283464765E+001 | -1.0935658006E+001 | 1.469 | 1.391 | 1.448 |
| 117.094 | 1.589 | 39.514 | 0.633 | 1.7583438806E+001 | 1.4814542421E+001 | -9.6448638449E+000 | 1.543 | 1.461 | 1.459 |

| | | | | | | | | | |
|---------|-------|--------|-------|--------------------|--------------------|--------------------|--------|-------|-------|
| 117.590 | 1.566 | 39.821 | 0.607 | 1.3210067467E+001 | 1.1951323625E+001 | -7.6247367436E+000 | 1.656 | 1.537 | 1.469 |
| 117.989 | 1.538 | 40.058 | 0.597 | 1.0552379481E+001 | 1.0279968920E+001 | -5.9931568225E+000 | 1.784 | 1.603 | 1.475 |
| 118.485 | 1.495 | 40.355 | 0.605 | 7.9983052358E+000 | 8.7458863775E+000 | -4.1205431171E+000 | 2.002 | 1.700 | 1.482 |
| 118.728 | 1.478 | 40.505 | 0.601 | 7.1186897121E+000 | 8.2098072159E+000 | -2.9782739659E+000 | 2.112 | 1.757 | 1.485 |
| 119.224 | 1.545 | 40.800 | 0.586 | 6.2894497270E+000 | 7.6225189082E+000 | -5.6211281277E-001 | 2.219 | 1.869 | 1.489 |
| 119.513 | 1.577 | 40.965 | 0.556 | 6.3134922826E+000 | 7.5479144540E+000 | 6.4008622995E-001 | 2.189 | 1.931 | 1.491 |
| 120.010 | 1.627 | 41.236 | 0.546 | 7.1060409132E+000 | 7.7997850037E+000 | 2.7305159347E+000 | 2.010 | 2.025 | 1.493 |
| 120.506 | 1.677 | 41.507 | 0.528 | 9.0242273297E+000 | 8.5282985452E+000 | 4.3817546872E+000 | 1.730 | 2.098 | 1.494 |
| 121.002 | 1.710 | 41.761 | 0.490 | 1.1456052516E+001 | 9.4436135071E+000 | 5.0478500195E+000 | 1.509 | 2.147 | 1.494 |
| 121.499 | 1.722 | 41.994 | 0.469 | 1.4035508819E+001 | 1.0373842454E+001 | 5.3207567573E+000 | 1.353 | 2.173 | 1.492 |
| 121.513 | 1.722 | 42.000 | 0.435 | 1.4108419411E+001 | 1.0398368947E+001 | 5.3277139265E+000 | 1.349 | 2.173 | 1.492 |
| 122.009 | 1.773 | 42.216 | 0.432 | 1.6816504689E+001 | 1.1232554104E+001 | 5.2696114120E+000 | 1.223 | 2.159 | 1.488 |
| 122.160 | 1.787 | 42.280 | 0.404 | 1.7604174539E+001 | 1.1457290431E+001 | 5.0255543633E+000 | 1.192 | 2.148 | 1.486 |
| 122.656 | 1.819 | 42.477 | 0.397 | 1.9793139311E+001 | 1.1999303092E+001 | 3.5069437212E+000 | 1.110 | 2.082 | 1.477 |
| 122.821 | 1.829 | 42.542 | 0.392 | 2.0322244215E+001 | 1.2099270037E+001 | 2.8971093558E+000 | 1.090 | 2.051 | 1.473 |
| 123.318 | 1.797 | 42.736 | 0.394 | 2.1297815302E+001 | 1.2162933275E+001 | 7.9426468020E-001 | 1.046 | 1.953 | 1.457 |
| 123.814 | 1.768 | 42.933 | 0.395 | 2.1110754942E+001 | 1.1783004208E+001 | -1.6635808893E+000 | 1.022 | 1.849 | 1.431 |
| 123.900 | 1.762 | 42.966 | 0.383 | 2.0948783613E+001 | 1.1670255615E+001 | -2.0836486500E+000 | 1.020 | 1.831 | 1.426 |
| 124.057 | 1.751 | 43.026 | 0.403 | 2.0565082384E+001 | 1.1437094573E+001 | -2.8358878920E+000 | 1.018 | 1.796 | 1.415 |
| 124.553 | 1.621 | 43.229 | 0.420 | 1.8543148879E+001 | 1.0409949231E+001 | -4.9280711790E+000 | 1.028 | 1.685 | 1.371 |
| 125.050 | 1.503 | 43.443 | 0.446 | 1.5672712012E+001 | 9.0846844900E+000 | -6.8942781664E+000 | 1.061 | 1.567 | 1.313 |
| 125.365 | 1.439 | 43.591 | 0.459 | 1.3273047606E+001 | 8.0683323820E+000 | -8.0361011207E+000 | 1.113 | 1.489 | 1.264 |
| 125.862 | 1.204 | 43.815 | 0.441 | 8.9446765055E+000 | 6.3764005180E+000 | -8.8309303873E+000 | 1.305 | 1.383 | 1.176 |
| 126.358 | 0.957 | 44.029 | 0.415 | 4.5060918100E+000 | 4.7297828993E+000 | -8.4950569986E+000 | 1.922 | 1.301 | 1.077 |
| 126.855 | 0.696 | 44.227 | 0.398 | 5.1116090480E-001 | 3.2793539861E+000 | -7.3582787064E+000 | 11.746 | 1.243 | 0.970 |
| 126.971 | 0.634 | 44.273 | 0.382 | -3.2700537263E-001 | -7.8128562651E-007 | -6.9972225538E+000 | 0.048 | 1.233 | 0.943 |
| 127.467 | 0.653 | 44.462 | 0.372 | -3.3789069773E+000 | -7.8128562651E-007 | -5.3219065937E+000 | 0.048 | 1.179 | 0.824 |
| 127.805 | 0.659 | 44.583 | 0.333 | -4.9837792100E+000 | -7.8128562651E-007 | -3.9641404269E+000 | 0.048 | 1.142 | 0.742 |
| 128.301 | 0.518 | 44.739 | 0.310 | -6.3693447378E+000 | -7.8128562651E-007 | -2.2354236371E+000 | 0.048 | 1.107 | 0.633 |
| 128.797 | 0.373 | 44.890 | 0.299 | -7.2030085949E+000 | -7.8128562651E-007 | -8.7672778032E-001 | 0.048 | 1.086 | 0.524 |
| 128.937 | 0.328 | 44.930 | 0.278 | -7.2940785918E+000 | -7.8128562651E-007 | -4.7902535318E-001 | 0.048 | 1.085 | 0.496 |
| 129.434 | 0.262 | 45.067 | 0.278 | -7.2307102226E+000 | -7.8128562651E-007 | 5.7587490618E-001 | 0.048 | 1.081 | 0.399 |
| 129.930 | 0.198 | 45.206 | 0.304 | -6.7223755407E+000 | -7.8128562651E-007 | 1.1787968362E+000 | 0.048 | 1.072 | 0.295 |
| 130.426 | 0.158 | 45.369 | 0.327 | -6.0604530354E+000 | -7.8128562651E-007 | 1.4374012328E+000 | 0.048 | 1.038 | 0.220 |
| 130.920 | 0.118 | 45.530 | 0.240 | -5.3000743292E+000 | -7.8128562651E-007 | 1.9885457896E+000 | 0.048 | 1.119 | 0.220 |
| 131.416 | 0.114 | 45.607 | 0.161 | -4.0894201860E+000 | -7.8128562651E-007 | 2.4836434416E+000 | 0.048 | 1.266 | 0.220 |
| 131.913 | 0.119 | 45.690 | 0.148 | -2.8344233377E+000 | -7.8128562651E-007 | 2.5960517520E+000 | 0.048 | 1.499 | 0.220 |
| 132.409 | 0.103 | 45.754 | 0.128 | -1.5121752123E+000 | -7.8128562651E-007 | 2.3351392707E+000 | 0.048 | 1.429 | 0.220 |
| 132.779 | 0.091 | 45.802 | 0.172 | -7.3880671398E-001 | -7.8128562651E-007 | 1.7441436736E+000 | 0.048 | 1.197 | 0.220 |
| 133.276 | 0.053 | 45.903 | 0.187 | -1.0346701251E-001 | -7.8128562651E-007 | 6.8977289740E-001 | 0.048 | 1.174 | 0.220 |
| 133.570 | 0.017 | 45.949 | 0.187 | -3.4464232155E-003 | -7.8128562651E-007 | 1.2885978923E-001 | 0.048 | 1.102 | 0.437 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
 ht(m) : Altezza linea di thrust da nodo sinistro base concio
 yt(m) : coordinata Y linea di trust
 yt'(-) : gradiente pendenza locale linea di trust
 E(x)(kN/m) : Forza Normale interconcio
 T(x)(kN/m) : Forza Tangenziale interconcio
 E' (kN) : derivata Forza normale interconcio
 Rho(x) (-) : fattore mobilitazione resistenza al taglio verticale interconcio ZhU et al.(2003)
 FS_qFEM(x)(-) : fattore di sicurezza locale stimato (locale in X) by qFEM
 FS_srmFEM(x)(-) : fattore di sicurezza locale stimato (locale in X) by SRM Procedure

TABELLA SFORZI DI TAGLIO DISTRIBUITI LUNGO SUPERFICIE INDIVIDUATA CON MINOR FS

| X (m) | dx (m) | dl (m) | alpha (°) | TauStress (kPa) | TauF (kN/m) | TauStrength (kPa) | TauS (kN/m) |
|----------|-----------|-----------|--------------|--------------------|----------------|----------------------|----------------|
| 71.767 | 0.496 | 0.517 | -16.291 | -1.087 | -0.562 | 3.384 | 1.750 |
| 72.264 | 0.371 | 0.387 | -16.291 | -2.986 | -1.154 | 9.395 | 3.632 |
| 72.635 | 0.496 | 0.499 | 6.341 | 2.696 | 1.347 | 14.828 | 7.405 |
| 73.131 | 0.496 | 0.499 | 6.341 | 3.412 | 1.704 | 19.065 | 9.522 |
| 73.628 | 0.240 | 0.241 | 6.341 | 3.943 | 0.952 | 22.188 | 5.355 |
| 73.867 | 0.496 | 0.515 | 15.575 | 8.731 | 4.499 | 22.689 | 11.692 |
| 74.364 | 0.496 | 0.515 | 15.575 | 9.650 | 4.973 | 24.674 | 12.714 |
| 74.860 | 0.496 | 0.515 | 15.575 | 10.570 | 5.446 | 26.853 | 13.837 |
| 75.357 | 0.496 | 0.515 | 15.575 | 11.489 | 5.920 | 29.260 | 15.078 |
| 75.853 | 0.080 | 0.083 | 15.575 | 12.023 | 1.000 | 30.556 | 2.543 |
| 75.933 | 0.027 | 0.029 | 23.846 | 16.579 | 0.487 | 27.023 | 0.794 |
| 75.960 | 0.496 | 0.543 | 23.846 | 16.878 | 9.160 | 27.509 | 14.929 |
| 76.456 | 0.343 | 0.375 | 23.846 | 17.356 | 6.505 | 28.296 | 10.606 |
| 76.799 | 0.496 | 0.537 | 22.339 | 17.116 | 9.185 | 30.023 | 16.112 |

| | | | | | | | |
|---------|-------|-------|--------|--------|--------|--------|--------|
| 77.296 | 0.496 | 0.537 | 22.339 | 17.783 | 9.543 | 31.213 | 16.751 |
| 77.792 | 0.496 | 0.537 | 22.339 | 18.450 | 9.901 | 32.404 | 17.390 |
| 78.288 | 0.496 | 0.537 | 22.339 | 19.117 | 10.259 | 33.612 | 18.038 |
| 78.785 | 0.125 | 0.135 | 22.339 | 19.535 | 2.646 | 34.368 | 4.655 |
| 78.910 | 0.118 | 0.128 | 22.339 | 19.700 | 2.514 | 34.670 | 4.424 |
| 79.028 | 0.496 | 0.508 | 12.530 | 13.196 | 6.710 | 41.846 | 21.278 |
| 79.524 | 0.390 | 0.399 | 12.530 | 14.025 | 5.601 | 44.634 | 17.826 |
| 79.914 | 0.496 | 0.519 | 16.978 | 18.707 | 9.709 | 44.218 | 22.949 |
| 80.411 | 0.496 | 0.519 | 16.978 | 19.610 | 10.177 | 46.355 | 24.058 |
| 80.907 | 0.443 | 0.463 | 16.978 | 20.464 | 9.472 | 48.320 | 22.366 |
| 81.350 | 0.496 | 0.530 | 20.622 | 24.526 | 13.008 | 47.153 | 25.008 |
| 81.846 | 0.496 | 0.530 | 20.622 | 25.299 | 13.417 | 48.513 | 25.729 |
| 82.342 | 0.496 | 0.530 | 20.622 | 26.071 | 13.827 | 49.728 | 26.374 |
| 82.839 | 0.496 | 0.530 | 20.622 | 26.844 | 14.237 | 50.844 | 26.966 |
| 83.335 | 0.050 | 0.053 | 20.622 | 27.269 | 1.447 | 51.470 | 2.731 |
| 83.385 | 0.496 | 0.567 | 28.902 | 34.139 | 19.357 | 44.440 | 25.197 |
| 83.881 | 0.496 | 0.567 | 28.902 | 34.262 | 19.427 | 44.604 | 25.291 |
| 84.378 | 0.036 | 0.041 | 28.902 | 34.328 | 1.399 | 44.692 | 1.822 |
| 84.413 | 0.496 | 0.572 | 29.849 | 34.957 | 20.006 | 43.822 | 25.079 |
| 84.910 | 0.496 | 0.572 | 29.849 | 34.977 | 20.017 | 43.851 | 25.096 |
| 85.406 | 0.019 | 0.022 | 29.849 | 34.987 | 0.762 | 43.866 | 0.955 |
| 85.425 | 0.496 | 0.643 | 39.502 | 38.396 | 24.701 | 33.523 | 21.566 |
| 85.921 | 0.496 | 0.643 | 39.502 | 37.056 | 23.839 | 32.156 | 20.686 |
| 86.418 | 0.234 | 0.303 | 39.502 | 36.071 | 10.919 | 31.162 | 9.433 |
| 86.651 | 0.496 | 0.512 | 14.382 | 19.620 | 10.054 | 53.185 | 27.254 |
| 87.148 | 0.496 | 0.512 | 14.382 | 20.556 | 10.534 | 55.927 | 28.659 |
| 87.644 | 0.496 | 0.512 | 14.382 | 21.492 | 11.013 | 58.725 | 30.093 |
| 88.140 | 0.100 | 0.104 | 14.382 | 22.055 | 2.287 | 60.481 | 6.271 |
| 88.241 | 0.496 | 0.536 | 22.257 | 31.128 | 16.695 | 54.765 | 29.373 |
| 88.737 | 0.496 | 0.536 | 22.257 | 31.811 | 17.061 | 55.975 | 30.022 |
| 89.234 | 0.496 | 0.536 | 22.257 | 32.493 | 17.427 | 57.080 | 30.614 |
| 89.730 | 0.067 | 0.072 | 22.257 | 32.881 | 2.380 | 57.650 | 4.174 |
| 89.797 | 0.496 | 0.529 | 20.285 | 31.205 | 16.513 | 60.330 | 31.926 |
| 90.293 | 0.496 | 0.529 | 20.285 | 31.993 | 16.931 | 61.510 | 32.551 |
| 90.790 | 0.496 | 0.529 | 20.285 | 32.782 | 17.348 | 62.704 | 33.183 |
| 91.286 | 0.496 | 0.529 | 20.285 | 33.571 | 17.766 | 63.855 | 33.792 |
| 91.783 | 0.015 | 0.016 | 20.285 | 33.977 | 0.550 | 64.449 | 1.043 |
| 91.798 | 0.496 | 0.569 | 29.206 | 43.224 | 24.581 | 55.647 | 31.645 |
| 92.294 | 0.496 | 0.569 | 29.206 | 43.315 | 24.632 | 55.794 | 31.729 |
| 92.790 | 0.237 | 0.272 | 29.206 | 43.382 | 11.802 | 55.899 | 15.207 |
| 93.028 | 0.496 | 0.690 | 43.975 | 48.561 | 33.495 | 38.826 | 26.780 |
| 93.524 | 0.496 | 0.690 | 43.975 | 46.433 | 32.027 | 37.612 | 25.943 |
| 94.021 | 0.263 | 0.366 | 43.975 | 44.804 | 16.387 | 36.761 | 13.445 |
| 94.284 | 0.466 | 0.628 | 42.098 | 43.310 | 27.207 | 37.711 | 23.690 |
| 94.750 | 0.496 | 0.669 | 42.098 | 41.577 | 27.814 | 36.493 | 24.413 |
| 95.246 | 0.496 | 0.669 | 42.098 | 39.790 | 26.618 | 35.013 | 23.423 |
| 95.743 | 0.188 | 0.253 | 42.098 | 38.559 | 9.748 | 33.870 | 8.562 |
| 95.930 | 0.496 | 0.618 | 36.554 | 36.633 | 22.637 | 37.614 | 23.242 |
| 96.427 | 0.496 | 0.618 | 36.554 | 35.763 | 22.099 | 36.614 | 22.625 |
| 96.923 | 0.496 | 0.618 | 36.554 | 34.892 | 21.561 | 35.569 | 21.979 |
| 97.419 | 0.359 | 0.447 | 36.554 | 34.142 | 15.261 | 34.754 | 15.534 |
| 97.779 | 0.496 | 0.610 | 35.579 | 33.152 | 20.233 | 34.553 | 21.088 |
| 98.275 | 0.496 | 0.610 | 35.579 | 32.427 | 19.791 | 33.603 | 20.509 |
| 98.771 | 0.496 | 0.610 | 35.579 | 31.702 | 19.348 | 32.665 | 19.936 |
| 99.268 | 0.341 | 0.419 | 35.579 | 31.091 | 13.029 | 31.871 | 13.356 |
| 99.608 | 0.496 | 0.565 | 28.549 | 27.854 | 15.740 | 36.780 | 20.784 |
| 100.105 | 0.496 | 0.565 | 28.549 | 28.015 | 15.831 | 36.995 | 20.905 |
| 100.601 | 0.496 | 0.565 | 28.549 | 28.176 | 15.922 | 37.209 | 21.027 |
| 101.098 | 0.307 | 0.350 | 28.549 | 28.306 | 9.905 | 37.383 | 13.082 |
| 101.405 | 0.021 | 0.024 | 28.549 | 28.359 | 0.689 | 37.454 | 0.910 |
| 101.426 | 0.496 | 0.505 | 10.850 | 14.365 | 7.260 | 50.673 | 25.611 |
| 101.923 | 0.496 | 0.505 | 10.850 | 15.265 | 7.715 | 54.286 | 27.437 |
| 102.419 | 0.496 | 0.505 | 10.850 | 16.165 | 8.170 | 57.869 | 29.248 |
| 102.915 | 0.366 | 0.372 | 10.850 | 16.947 | 6.308 | 61.040 | 22.719 |
| 103.281 | 0.496 | 0.538 | 22.661 | 30.715 | 16.522 | 53.264 | 28.651 |
| 103.777 | 0.496 | 0.538 | 22.661 | 31.373 | 16.875 | 54.508 | 29.320 |
| 104.274 | 0.496 | 0.538 | 22.661 | 32.030 | 17.229 | 55.734 | 29.979 |
| 104.770 | 0.465 | 0.504 | 22.661 | 32.666 | 16.456 | 56.925 | 28.676 |
| 105.235 | 0.496 | 0.539 | 22.936 | 33.570 | 18.094 | 57.556 | 31.022 |
| 105.731 | 0.496 | 0.539 | 22.936 | 34.209 | 18.438 | 58.573 | 31.570 |
| 106.228 | 0.448 | 0.487 | 22.936 | 34.818 | 16.942 | 59.514 | 28.959 |
| 106.676 | 0.496 | 0.527 | 19.673 | 31.863 | 16.797 | 64.088 | 33.784 |
| 107.172 | 0.496 | 0.527 | 19.673 | 32.679 | 17.227 | 65.497 | 34.527 |
| 107.669 | 0.496 | 0.527 | 19.673 | 33.495 | 17.657 | 66.821 | 35.225 |
| 108.165 | 0.496 | 0.527 | 19.673 | 34.311 | 18.087 | 68.127 | 35.913 |

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|---------|-------|-------|--------|--------|--------|--------|--------|
| 108.661 | 0.083 | 0.088 | 19.673 | 34.787 | 3.057 | 68.812 | 6.046 |
| 108.744 | 0.496 | 0.550 | 25.525 | 41.995 | 23.100 | 62.947 | 34.625 |
| 109.241 | 0.451 | 0.499 | 25.525 | 42.420 | 21.188 | 63.487 | 31.710 |
| 109.691 | 0.496 | 0.591 | 32.895 | 48.892 | 28.903 | 54.724 | 32.351 |
| 110.188 | 0.496 | 0.591 | 32.895 | 48.540 | 28.695 | 54.474 | 32.203 |
| 110.684 | 0.193 | 0.230 | 32.895 | 48.296 | 11.093 | 54.306 | 12.474 |
| 110.877 | 0.496 | 0.563 | 28.159 | 44.585 | 25.102 | 59.753 | 33.642 |
| 111.373 | 0.496 | 0.563 | 28.159 | 44.786 | 25.215 | 60.011 | 33.787 |
| 111.870 | 0.496 | 0.563 | 28.159 | 44.987 | 25.328 | 60.270 | 33.933 |
| 112.366 | 0.117 | 0.133 | 28.159 | 45.111 | 6.003 | 60.420 | 8.041 |
| 112.483 | 0.496 | 0.607 | 35.120 | 49.949 | 30.312 | 52.504 | 31.863 |
| 112.980 | 0.496 | 0.607 | 35.120 | 49.291 | 29.912 | 51.897 | 31.494 |
| 113.476 | 0.161 | 0.197 | 35.120 | 48.854 | 9.645 | 51.466 | 10.161 |
| 113.638 | 0.332 | 0.435 | 40.144 | 50.157 | 21.811 | 45.222 | 19.665 |
| 113.970 | 0.465 | 0.608 | 40.144 | 48.994 | 29.799 | 44.376 | 26.990 |
| 114.435 | 0.496 | 0.600 | 34.219 | 45.772 | 27.476 | 49.841 | 29.919 |
| 114.931 | 0.496 | 0.600 | 34.219 | 45.241 | 27.158 | 49.338 | 29.617 |
| 115.428 | 0.496 | 0.600 | 34.219 | 44.710 | 26.839 | 48.770 | 29.276 |
| 115.924 | 0.177 | 0.214 | 34.219 | 44.350 | 9.496 | 48.384 | 10.360 |
| 116.101 | 0.496 | 0.596 | 33.621 | 43.706 | 26.053 | 48.455 | 28.883 |
| 116.597 | 0.496 | 0.596 | 33.621 | 43.257 | 25.785 | 47.886 | 28.544 |
| 117.094 | 0.496 | 0.596 | 33.621 | 42.808 | 25.518 | 47.254 | 28.167 |
| 117.590 | 0.398 | 0.478 | 33.621 | 42.404 | 20.280 | 46.628 | 22.300 |
| 117.989 | 0.496 | 0.602 | 34.432 | 42.362 | 25.494 | 45.157 | 27.176 |
| 118.485 | 0.243 | 0.295 | 34.432 | 41.944 | 12.362 | 44.596 | 13.143 |
| 118.728 | 0.496 | 0.546 | 24.696 | 35.118 | 19.187 | 54.295 | 29.664 |
| 119.224 | 0.289 | 0.318 | 24.696 | 35.523 | 11.299 | 55.018 | 17.499 |
| 119.513 | 0.496 | 0.543 | 23.988 | 35.274 | 19.164 | 56.441 | 30.665 |
| 120.010 | 0.496 | 0.543 | 23.988 | 35.840 | 19.472 | 57.463 | 31.220 |
| 120.506 | 0.496 | 0.543 | 23.988 | 36.407 | 19.780 | 58.413 | 31.736 |
| 121.002 | 0.496 | 0.543 | 23.988 | 36.973 | 20.088 | 59.322 | 32.230 |
| 121.499 | 0.014 | 0.015 | 23.988 | 37.264 | 0.559 | 59.777 | 0.896 |
| 121.513 | 0.496 | 0.523 | 18.396 | 31.241 | 16.343 | 65.893 | 34.469 |
| 122.009 | 0.151 | 0.159 | 18.396 | 31.805 | 5.064 | 67.020 | 10.672 |
| 122.160 | 0.496 | 0.523 | 18.396 | 32.368 | 16.932 | 68.091 | 35.619 |
| 122.656 | 0.165 | 0.174 | 18.396 | 32.944 | 5.728 | 69.163 | 12.026 |
| 122.821 | 0.496 | 0.545 | 24.464 | 40.821 | 22.261 | 63.907 | 34.851 |
| 123.318 | 0.496 | 0.545 | 24.464 | 41.351 | 22.550 | 64.641 | 35.251 |
| 123.814 | 0.086 | 0.094 | 24.464 | 41.662 | 3.931 | 65.069 | 6.139 |
| 123.900 | 0.157 | 0.172 | 24.464 | 41.398 | 7.139 | 64.636 | 11.146 |
| 124.057 | 0.496 | 0.597 | 33.815 | 47.482 | 28.367 | 51.544 | 30.795 |
| 124.553 | 0.496 | 0.597 | 33.815 | 44.019 | 26.298 | 47.877 | 28.603 |
| 125.050 | 0.316 | 0.380 | 33.815 | 41.186 | 15.649 | 44.884 | 17.054 |
| 125.365 | 0.496 | 0.677 | 42.806 | 40.064 | 27.107 | 32.444 | 21.951 |
| 125.862 | 0.496 | 0.677 | 42.806 | 34.974 | 23.663 | 28.422 | 19.230 |
| 126.358 | 0.496 | 0.677 | 42.806 | 29.884 | 20.219 | 24.310 | 16.448 |
| 126.855 | 0.116 | 0.159 | 42.806 | 26.741 | 4.245 | 29.228 | 4.640 |
| 126.971 | 0.496 | 0.525 | 18.869 | 16.462 | 8.635 | 33.627 | 17.640 |
| 127.467 | 0.337 | 0.356 | 18.869 | 15.432 | 5.498 | 31.523 | 11.230 |
| 127.805 | 0.496 | 0.578 | 30.900 | 19.254 | 11.138 | 23.197 | 13.419 |
| 128.301 | 0.496 | 0.578 | 30.900 | 16.287 | 9.422 | 19.623 | 11.352 |
| 128.797 | 0.140 | 0.163 | 30.900 | 14.385 | 2.348 | 17.331 | 2.829 |
| 128.937 | 0.496 | 0.536 | 22.246 | 10.570 | 5.669 | 18.284 | 9.806 |
| 129.434 | 0.496 | 0.536 | 22.246 | 8.916 | 4.781 | 15.422 | 8.271 |
| 129.930 | 0.496 | 0.536 | 22.246 | 7.261 | 3.894 | 12.560 | 6.736 |
| 130.426 | 0.494 | 0.533 | 22.246 | 5.611 | 2.992 | 9.706 | 5.175 |
| 130.920 | 0.496 | 0.503 | 9.110 | 2.242 | 1.127 | 8.867 | 4.458 |
| 131.416 | 0.496 | 0.503 | 9.110 | 1.916 | 0.963 | 7.578 | 3.810 |
| 131.913 | 0.496 | 0.503 | 9.110 | 1.590 | 0.799 | 6.290 | 3.162 |
| 132.409 | 0.370 | 0.375 | 9.110 | 1.306 | 0.489 | 5.165 | 1.936 |
| 132.779 | 0.496 | 0.516 | 15.661 | 1.378 | 0.710 | 3.369 | 1.737 |
| 133.276 | 0.294 | 0.306 | 15.661 | 0.683 | 0.209 | 1.670 | 0.510 |
| 133.570 | 0.147 | 0.162 | 24.730 | 0.296 | 0.048 | 0.459 | 0.074 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
dx(m) : Larghezza concio
dl(m) : lunghezza base concio
alpha(°) : Angolo pendenza base concio
TauStress(kPa) : Sforzo di taglio su base concio
TauF (kN/m) : Forza di taglio su base concio
TauStrength(kPa) : Resistenza al taglio su base concio
TauS (kN/m) : Forza resistente al taglio su base concio

Strato 1 -- Parametri di resistenza al taglio equivalenti dell'ammasso roccioso
stimati secondo criterio di rottura non lineare Hoek et al.(2002)
CRITERIO DI ROTTURA Hoek et al.(2002,2006) - Generalizzato secondo Lei et al.(2016)
Fattore di riduzione NTC2018 gammaPHI=1.25 e gammaC=1.25 - DISATTIVATO

| SigmaN'(kPa) | TauStrength(kPa) | Phi'(deg) | c'(kPa) |
|--------------|------------------|-----------|---------|
| 25.00 | 920.66 | 71.43 | 846.24 |
| 50.00 | 1001.44 | 70.92 | 856.91 |
| 75.00 | 1084.74 | 70.41 | 873.95 |
| 100.00 | 1141.67 | 70.09 | 865.62 |
| 125.00 | 1199.69 | 69.76 | 860.60 |
| 150.00 | 1288.75 | 69.29 | 892.02 |
| 175.00 | 1349.48 | 68.98 | 894.11 |
| 200.00 | 1411.27 | 68.67 | 899.06 |
| 225.00 | 1474.12 | 68.37 | 906.75 |
| 250.00 | 1538.04 | 68.07 | 917.08 |
| 275.00 | 1603.00 | 67.78 | 929.96 |
| 300.00 | 1669.00 | 67.48 | 945.30 |
| 325.00 | 1702.39 | 67.34 | 923.92 |
| 350.00 | 1769.95 | 67.05 | 943.23 |
| 375.00 | 1838.54 | 66.77 | 964.79 |
| 400.00 | 1908.16 | 66.49 | 988.56 |
| 425.00 | 1943.35 | 66.35 | 972.70 |
| 450.00 | 2014.51 | 66.08 | 1000.02 |
| 475.00 | 2050.46 | 65.94 | 986.45 |
| 500.00 | 2123.14 | 65.67 | 1017.18 |
| 600.00 | 2347.24 | 64.88 | 1067.66 |
| 700.00 | 2540.91 | 64.23 | 1090.74 |
| 800.00 | 2740.82 | 63.60 | 1129.00 |
| 900.00 | 2946.97 | 62.99 | 1181.61 |
| 1000.00 | 3159.32 | 62.38 | 1247.85 |
| 1100.00 | 3333.67 | 61.91 | 1272.76 |
| 1200.00 | 3511.99 | 61.44 | 1307.18 |
| 1300.00 | 3694.28 | 60.98 | 1350.74 |
| 1400.00 | 3880.53 | 60.53 | 1403.16 |
| 1500.00 | 4070.76 | 60.08 | 1464.16 |
| 2000.00 | 4871.57 | 58.35 | 1627.03 |

Cuccuru Mannu (sezione 2 condizioni statiche)
SSAP 5.0.2 - Slope Stability Analysis Program (1991,2021)
WWW.SSAP.EU
Build No. 12007
BY
Dr. Geol. LORENZO BORSELLI *,**
*UASLP, San Luis Potosi, Mexico
e-mail: lborselli@gmail.com
CV e WEB page personale: WWW.LORENZO-BORSELLI.EU
** Gia' Ricercatore CNR-IRPI fino a Luglio 2011

Ultima Revisione struttura tabelle del report: 21 Febbraio 2021

File report: \\192.168.1.231\BACKUP su PC canepa\lavorimauri\cave e miniere\Minerale industriali\VIA
2022\Disegni\Cuccurumannu\Sap\verstatsez2.txt

Data: 25/1/2022

Localita' :

Descrizione:

Modello pendio: Sez2 statica.mod

----- PARAMETRI DEL MODELLO DEL PENDIO -----

___ PARAMETRI GEOMETRICI - Coordinate X Y (in m) ___

| SUP T. | | SUP 2 | | SUP 3 | | SUP 4 | |
|--------|-------|--------|-------|-------|---|-------|---|
| X | Y | X | Y | X | Y | X | Y |
| 10.00 | 10.00 | 133.51 | 25.00 | - | - | - | - |
| 17.31 | 8.00 | 140.60 | 26.18 | - | - | - | - |
| 40.32 | 8.00 | 151.55 | 28.00 | - | - | - | - |
| 87.62 | 25.00 | 165.27 | 30.00 | - | - | - | - |
| 133.51 | 25.00 | 178.47 | 30.49 | - | - | - | - |
| 140.60 | 26.18 | 197.20 | 31.19 | - | - | - | - |
| 151.55 | 28.00 | 207.96 | 31.59 | - | - | - | - |

| | | | | | | | |
|--------|-------|--------|-------|---|---|---|---|
| 165.27 | 30.00 | 219.04 | 32.00 | - | - | - | - |
| 178.47 | 30.49 | 228.10 | 37.24 | - | - | - | - |
| 181.52 | 30.60 | 237.41 | 42.62 | - | - | - | - |
| 190.73 | 30.95 | 260.56 | 56.00 | - | - | - | - |
| 197.20 | 31.19 | 264.02 | 56.00 | - | - | - | - |
| 207.96 | 31.59 | 267.48 | 60.00 | - | - | - | - |
| 219.04 | 32.00 | 273.40 | 60.00 | - | - | - | - |
| 228.10 | 37.24 | 273.96 | 61.04 | - | - | - | - |
| 237.41 | 42.62 | 279.96 | 62.00 | - | - | - | - |
| 260.56 | 56.00 | 293.82 | 70.00 | - | - | - | - |
| 264.02 | 56.00 | 311.15 | 80.00 | - | - | - | - |
| 267.48 | 60.00 | 318.07 | 84.00 | - | - | - | - |
| 273.40 | 60.00 | 325.58 | 90.00 | - | - | - | - |
| 273.96 | 61.04 | 321.01 | 80.00 | - | - | - | - |
| 279.96 | 62.00 | 316.14 | 80.00 | - | - | - | - |
| 293.82 | 70.00 | 310.43 | 70.00 | - | - | - | - |
| 311.15 | 80.00 | 303.56 | 70.00 | - | - | - | - |
| 318.07 | 84.00 | 297.86 | 60.00 | - | - | - | - |
| 325.58 | 90.00 | 290.99 | 60.00 | - | - | - | - |
| 330.46 | 90.00 | 287.12 | 54.00 | - | - | - | - |
| 335.35 | 94.41 | 281.11 | 54.00 | - | - | - | - |
| - | - | 279.33 | 50.00 | - | - | - | - |
| - | - | 272.47 | 50.00 | - | - | - | - |
| - | - | 266.77 | 40.00 | - | - | - | - |
| - | - | 253.02 | 40.00 | - | - | - | - |
| - | - | 247.20 | 30.00 | - | - | - | - |
| - | - | 178.47 | 30.00 | - | - | - | - |
| - | - | 153.73 | 25.00 | - | - | - | - |
| - | - | 133.51 | 25.00 | - | - | - | - |

ASSENZA DI FALDA

----- PARAMETRI GEOMECCANICI -----

| | fi` | C` | Cu | Gamm | Gamm_sat | STR_IDX | sgci | GSI | mi | D |
|----------|-------|------|------|-------|----------|---------|--------|-------|-------|------|
| STRATO 1 | 0.00 | 0.00 | 0.00 | 26.00 | 26.00 | 18.478 | 175.00 | 65.00 | 30.00 | 1.00 |
| STRATO 2 | 33.00 | 0.00 | 0.00 | 21.00 | 22.00 | 2.174 | 0.00 | 0.00 | 0.00 | 0.00 |

LEGENDA: fi' _____ Angolo di attrito interno efficace(in gradi)

C' _____ Coesione efficace (in Kpa)

Cu _____ Resistenza al taglio Non drenata (in Kpa)

Gamm _____ Peso di volume terreno fuori falda (in KN/m^3)

Gamm_sat _____ Peso di volume terreno immerso (in KN/m^3)

STR_IDX _____ Indice di resistenza (usato in solo in 'SNIFF SEARCH) (adimensionale)

---- SOLO Per AMMASSI ROCCIOSI FRATTURATI - Parametri Criterio di Rottura di Hoek (2002)-

sigci _____ Resistenza Compressione Uniassiale Roccia Intatta (in MPa)

GSI _____ Geological Strenght Index ammasso(adimensionale)

mi _____ Indice litologico ammasso(adimensionale)

D _____ Fattore di disturbo ammasso(adimensionale)

Fattore di riduzione NTC2018: gammaPHI=1.25 e gammaC=1.25 - DISATTIVATO (solo per ROCCE)

Uso CRITERIO DI ROTTURA Hoek et al.(2002,2006) - non-lineare - Generalizzato, secondo Lei et al.(2016)

----- INFORMAZIONI GENERAZIONE SUPERFICI RANDOM -----

*** PARAMETRI PER LA GENERAZIONE DELLE SUPERFICI

MOTORE DI RICERCA: RANDOM SEARCH - Siegel (1981)

FILTRAGGIO SUPERFICI : ATTIVATO

COORDINATE X1,X2,Y OSTACOLO : 0.00 0.00 0.00

LUNGHEZZA MEDIA SEGMENTI (m)*: 1.1 (+/-) 50%

INTERVALLO ASCISSE RANDOM STARTING POINT (Xmin .. Xmax): 218.00 260.00

LIVELLO MINIMO CONSIDERATO (Ymin): 0.00

INTERVALLO ASCISSE AMMESSO PER LA TERMINAZIONE (Xmin .. Xmax): 302.00 328.84

TOTALE SUPERFICI GENERATE : 1000

*NOTA IMPORTANTE: La lunghezza media dei segmenti non viene considerata nel caso di uso del motore di ricerca NEW RANOM SEARCH

----- INFORMAZIONI PARAMETRI DI CALCOLO -----

METODO DI CALCOLO : MORGENSTERN - PRICE (Morgenstern & Price, 1965)

METODO DI ESPLORAZIONE CAMPO VALORI (lambda0,Fs0) ADOTTATO : A (rapido)

COEFFICIENTE SISMICO UTILIZZATO Kh : 0.0000

COEFFICIENTE SISMICO UTILIZZATO Kv (assunto Positivo): 0.0000

COEFFICIENTE c=Kv/Kh UTILIZZATO : 0.5000

FORZA ORIZZONTALE ADDIZIONALE IN TESTA (kN/m): 0.00

FORZA ORIZZONTALE ADDIZIONALE ALLA BASE (kN/m): 0.00

N.B. Le forze orizzontali addizionali in testa e alla base sono poste uguali a 0 durante le tutte le verifiche globali.

I valori >0 impostati dall'utente sono utilizzati solo in caso di verifica singola

----- RISULTATO FINALE ELABORAZIONI -----

* DATI RELATIVI ALLE 10 SUPERFICI GENERATE CON MINOR F_s *

| | | | | |
|--------------------------------|-----------------|-------|---|----------------|
| Fattore di sicurezza (F_s) | 1.2776 - Min. - | X | Y | Lambda= 0.6793 |
| | 219.39 | 32.20 | | |
| | 226.86 | 36.07 | | |
| | 230.58 | 37.95 | | |
| | 233.17 | 39.19 | | |
| | 235.44 | 40.21 | | |
| | 237.54 | 41.08 | | |
| | 239.58 | 41.88 | | |
| | 241.70 | 42.64 | | |
| | 243.93 | 43.39 | | |
| | 246.41 | 44.17 | | |
| | 248.56 | 44.93 | | |
| | 250.61 | 45.74 | | |
| | 252.54 | 46.61 | | |
| | 254.60 | 47.64 | | |
| | 256.56 | 48.72 | | |
| | 258.65 | 49.98 | | |
| | 260.87 | 51.43 | | |
| | 263.44 | 53.20 | | |
| | 265.65 | 54.63 | | |
| | 267.72 | 55.86 | | |
| | 269.66 | 56.91 | | |
| | 271.71 | 57.91 | | |
| | 273.62 | 58.73 | | |
| | 275.64 | 59.48 | | |
| | 277.77 | 60.16 | | |
| | 280.24 | 60.86 | | |
| | 282.49 | 61.53 | | |
| | 284.64 | 62.22 | | |
| | 286.71 | 62.92 | | |
| | 288.81 | 63.68 | | |
| | 290.89 | 64.47 | | |
| | 293.05 | 65.33 | | |
| | 295.32 | 66.29 | | |
| | 297.82 | 67.38 | | |
| | 299.94 | 68.42 | | |
| | 301.94 | 69.54 | | |
| | 303.82 | 70.72 | | |
| | 305.87 | 72.17 | | |
| | 307.99 | 73.87 | | |
| | 310.51 | 76.08 | | |
| | 314.23 | 79.58 | | |
| | 321.95 | 87.10 | | |

| | | | | |
|--------------------------------|-----------------|-------|---|----------------|
| Fattore di sicurezza (F_s) | 1.2940 - N.2 -- | X | Y | Lambda= 0.6902 |
| | 219.04 | 32.00 | | |
| | 223.99 | 32.15 | | |
| | 226.24 | 32.29 | | |
| | 227.71 | 32.48 | | |
| | 228.90 | 32.75 | | |
| | 230.12 | 33.15 | | |
| | 231.21 | 33.61 | | |
| | 232.42 | 34.22 | | |
| | 233.75 | 35.00 | | |
| | 235.38 | 36.03 | | |
| | 236.80 | 36.89 | | |
| | 238.12 | 37.64 | | |
| | 239.37 | 38.31 | | |
| | 240.64 | 38.94 | | |
| | 241.87 | 39.49 | | |
| | 243.14 | 40.03 | | |
| | 244.46 | 40.53 | | |
| | 245.93 | 41.06 | | |
| | 247.28 | 41.56 | | |
| | 248.58 | 42.08 | | |
| | 249.84 | 42.61 | | |
| | 251.13 | 43.18 | | |

| | |
|--------|-------|
| 252.39 | 43.77 |
| 253.70 | 44.42 |
| 255.06 | 45.13 |
| 256.56 | 45.93 |
| 257.87 | 46.70 |
| 259.13 | 47.49 |
| 260.32 | 48.32 |
| 261.59 | 49.27 |
| 262.81 | 50.26 |
| 264.10 | 51.38 |
| 265.49 | 52.66 |
| 267.07 | 54.18 |
| 268.42 | 55.41 |
| 269.67 | 56.46 |
| 270.84 | 57.34 |
| 272.08 | 58.18 |
| 273.21 | 58.86 |
| 274.42 | 59.48 |
| 275.69 | 60.05 |
| 277.19 | 60.64 |
| 278.60 | 61.20 |
| 279.95 | 61.75 |
| 281.28 | 62.29 |
| 282.58 | 62.83 |
| 283.89 | 63.38 |
| 285.23 | 63.94 |
| 286.60 | 64.53 |
| 288.03 | 65.16 |
| 289.32 | 65.76 |
| 290.57 | 66.41 |
| 291.77 | 67.08 |
| 293.04 | 67.85 |
| 294.39 | 68.76 |
| 295.96 | 69.88 |
| 298.24 | 71.61 |
| 302.89 | 75.23 |

Fattore di sicurezza (FS) 1.2955 - N.3 -- X Y Lambda= 0.8145

| | |
|--------|-------|
| 221.39 | 33.36 |
| 228.62 | 36.06 |
| 232.30 | 37.45 |
| 234.90 | 38.47 |
| 237.21 | 39.41 |
| 239.29 | 40.29 |
| 241.35 | 41.19 |
| 243.42 | 42.12 |
| 245.52 | 43.08 |
| 247.67 | 44.10 |
| 249.81 | 45.11 |
| 251.94 | 46.11 |
| 254.06 | 47.11 |
| 256.16 | 48.10 |
| 258.28 | 49.10 |
| 260.41 | 50.10 |
| 262.56 | 51.11 |
| 264.71 | 52.13 |
| 266.81 | 53.14 |
| 268.88 | 54.17 |
| 270.93 | 55.22 |
| 273.01 | 56.33 |
| 275.08 | 57.45 |
| 277.18 | 58.63 |
| 279.34 | 59.87 |
| 281.61 | 61.20 |
| 283.73 | 62.40 |
| 285.79 | 63.51 |
| 287.80 | 64.54 |
| 289.86 | 65.54 |
| 291.89 | 66.47 |
| 294.01 | 67.38 |
| 296.25 | 68.29 |
| 298.76 | 69.25 |
| 300.86 | 70.17 |
| 302.83 | 71.16 |

| | | | | | |
|---------------------------|-----------------|-------|---|----------------|--|
| | 304.66 | 72.22 | | | |
| | 306.68 | 73.54 | | | |
| | 308.75 | 75.11 | | | |
| | 311.22 | 77.17 | | | |
| | 314.89 | 80.46 | | | |
| | 322.54 | 87.58 | | | |
| | | | | | |
| Fattore di sicurezza (FS) | 1.2956 - N.4 -- | X | Y | Lambda= 0.7633 | |
| | 230.12 | 38.41 | | | |
| | 236.57 | 39.56 | | | |
| | 239.66 | 40.18 | | | |
| | 241.77 | 40.70 | | | |
| | 243.57 | 41.22 | | | |
| | 245.30 | 41.83 | | | |
| | 246.92 | 42.48 | | | |
| | 248.63 | 43.25 | | | |
| | 250.43 | 44.13 | | | |
| | 252.48 | 45.21 | | | |
| | 254.35 | 46.24 | | | |
| | 256.14 | 47.27 | | | |
| | 257.88 | 48.31 | | | |
| | 259.64 | 49.40 | | | |
| | 261.37 | 50.53 | | | |
| | 263.17 | 51.74 | | | |
| | 265.03 | 53.05 | | | |
| | 267.06 | 54.51 | | | |
| | 268.87 | 55.74 | | | |
| | 270.58 | 56.83 | | | |
| | 272.22 | 57.79 | | | |
| | 273.95 | 58.72 | | | |
| | 275.57 | 59.51 | | | |
| | 277.26 | 60.25 | | | |
| | 279.02 | 60.93 | | | |
| | 281.00 | 61.63 | | | |
| | 282.89 | 62.31 | | | |
| | 284.71 | 62.97 | | | |
| | 286.51 | 63.64 | | | |
| | 288.29 | 64.31 | | | |
| | 290.09 | 65.00 | | | |
| | 291.93 | 65.71 | | | |
| | 293.84 | 66.47 | | | |
| | 295.88 | 67.28 | | | |
| | 297.62 | 68.07 | | | |
| | 299.28 | 68.92 | | | |
| | 300.85 | 69.84 | | | |
| | 302.56 | 70.98 | | | |
| | 304.33 | 72.32 | | | |
| | 306.44 | 74.06 | | | |
| | 309.55 | 76.84 | | | |
| | 316.03 | 82.82 | | | |
| | | | | | |
| Fattore di sicurezza (FS) | 1.2976 - N.5 -- | X | Y | Lambda= 0.9041 | |
| | 230.69 | 38.74 | | | |
| | 235.32 | 39.41 | | | |
| | 237.54 | 39.78 | | | |
| | 239.06 | 40.09 | | | |
| | 240.34 | 40.42 | | | |
| | 241.58 | 40.82 | | | |
| | 242.75 | 41.24 | | | |
| | 243.98 | 41.75 | | | |
| | 245.28 | 42.34 | | | |
| | 246.76 | 43.07 | | | |
| | 248.10 | 43.76 | | | |
| | 249.38 | 44.45 | | | |
| | 250.62 | 45.16 | | | |
| | 251.88 | 45.92 | | | |
| | 253.11 | 46.69 | | | |
| | 254.39 | 47.54 | | | |
| | 255.72 | 48.46 | | | |
| | 257.17 | 49.49 | | | |
| | 258.47 | 50.38 | | | |
| | 259.72 | 51.18 | | | |
| | 260.91 | 51.89 | | | |

| | |
|--------|-------|
| 262.16 | 52.58 |
| 263.34 | 53.18 |
| 264.58 | 53.75 |
| 265.86 | 54.30 |
| 267.29 | 54.86 |
| 268.63 | 55.40 |
| 269.92 | 55.94 |
| 271.18 | 56.49 |
| 272.45 | 57.06 |
| 273.69 | 57.65 |
| 274.95 | 58.26 |
| 276.23 | 58.90 |
| 277.56 | 59.59 |
| 278.87 | 60.27 |
| 280.17 | 60.94 |
| 281.46 | 61.62 |
| 282.74 | 62.29 |
| 284.02 | 62.97 |
| 285.31 | 63.66 |
| 286.61 | 64.35 |
| 287.92 | 65.05 |
| 289.20 | 65.72 |
| 290.48 | 66.38 |
| 291.74 | 67.02 |
| 293.01 | 67.65 |
| 294.28 | 68.27 |
| 295.56 | 68.88 |
| 296.86 | 69.49 |
| 298.20 | 70.10 |
| 299.49 | 70.71 |
| 300.77 | 71.33 |
| 302.02 | 71.96 |
| 303.29 | 72.61 |
| 304.56 | 73.27 |
| 305.86 | 73.97 |
| 307.20 | 74.72 |
| 308.64 | 75.53 |
| 309.91 | 76.31 |
| 311.14 | 77.12 |
| 312.31 | 77.96 |
| 313.56 | 78.93 |
| 314.88 | 80.06 |
| 316.42 | 81.45 |
| 318.66 | 83.61 |
| 323.22 | 88.12 |

Fattore di sicurezza (FS) 1.3002 - N.6 -- X Y Lambda= 0.6495

| | |
|--------|-------|
| 223.66 | 34.67 |
| 232.37 | 36.67 |
| 236.53 | 37.71 |
| 239.37 | 38.56 |
| 241.76 | 39.41 |
| 244.08 | 40.39 |
| 246.25 | 41.42 |
| 248.53 | 42.62 |
| 250.94 | 44.01 |
| 253.67 | 45.70 |
| 256.21 | 47.22 |
| 258.65 | 48.65 |
| 261.03 | 50.00 |
| 263.41 | 51.31 |
| 265.75 | 52.56 |
| 268.14 | 53.80 |
| 270.58 | 55.02 |
| 273.15 | 56.26 |
| 275.58 | 57.41 |
| 277.96 | 58.49 |
| 280.31 | 59.51 |
| 282.68 | 60.51 |
| 285.06 | 61.47 |
| 287.51 | 62.41 |
| 290.10 | 63.37 |
| 292.96 | 64.39 |
| 295.33 | 65.36 |

| | | | | | |
|---------------------------|--------|----------|---|---|----------------|
| | 297.55 | 66.44 | | | |
| | 299.61 | 67.61 | | | |
| | 301.89 | 69.11 | | | |
| | 304.23 | 70.90 | | | |
| | 307.04 | 73.29 | | | |
| | 311.24 | 77.16 | | | |
| | 320.05 | 85.58 | | | |
| | | | | | |
| Fattore di sicurezza (FS) | 1.3007 | - N.7 -- | X | Y | Lambda= 0.6922 |
| | 219.04 | 32.00 | | | |
| | 225.38 | 33.04 | | | |
| | 228.39 | 33.61 | | | |
| | 230.43 | 34.09 | | | |
| | 232.14 | 34.60 | | | |
| | 233.82 | 35.21 | | | |
| | 235.37 | 35.86 | | | |
| | 237.02 | 36.65 | | | |
| | 238.76 | 37.57 | | | |
| | 240.76 | 38.70 | | | |
| | 242.61 | 39.72 | | | |
| | 244.37 | 40.67 | | | |
| | 246.08 | 41.55 | | | |
| | 247.80 | 42.40 | | | |
| | 249.50 | 43.21 | | | |
| | 251.25 | 44.02 | | | |
| | 253.06 | 44.81 | | | |
| | 255.00 | 45.64 | | | |
| | 256.75 | 46.44 | | | |
| | 258.43 | 47.28 | | | |
| | 260.04 | 48.16 | | | |
| | 261.73 | 49.15 | | | |
| | 263.37 | 50.18 | | | |
| | 265.10 | 51.34 | | | |
| | 266.93 | 52.64 | | | |
| | 269.00 | 54.18 | | | |
| | 270.79 | 55.42 | | | |
| | 272.46 | 56.50 | | | |
| | 274.02 | 57.41 | | | |
| | 275.69 | 58.28 | | | |
| | 277.25 | 58.99 | | | |
| | 278.94 | 59.65 | | | |
| | 280.78 | 60.27 | | | |
| | 283.03 | 60.93 | | | |
| | 284.82 | 61.56 | | | |
| | 286.46 | 62.25 | | | |
| | 287.95 | 63.01 | | | |
| | 289.60 | 63.99 | | | |
| | 291.28 | 65.18 | | | |
| | 293.30 | 66.78 | | | |
| | 296.34 | 69.40 | | | |
| | 302.74 | 75.15 | | | |
| | | | | | |
| Fattore di sicurezza (FS) | 1.3019 | - N.8 -- | X | Y | Lambda= 0.6310 |
| | 228.61 | 37.54 | | | |
| | 232.44 | 37.57 | | | |
| | 234.21 | 37.63 | | | |
| | 235.38 | 37.75 | | | |
| | 236.33 | 37.92 | | | |
| | 237.29 | 38.18 | | | |
| | 238.15 | 38.49 | | | |
| | 239.09 | 38.89 | | | |
| | 240.10 | 39.39 | | | |
| | 241.31 | 40.05 | | | |
| | 242.43 | 40.67 | | | |
| | 243.49 | 41.27 | | | |
| | 244.51 | 41.86 | | | |
| | 245.53 | 42.47 | | | |
| | 246.53 | 43.08 | | | |
| | 247.55 | 43.71 | | | |
| | 248.58 | 44.37 | | | |
| | 249.66 | 45.06 | | | |
| | 250.69 | 45.72 | | | |
| | 251.71 | 46.36 | | | |

| | |
|--------|-------|
| 252.72 | 46.97 |
| 253.73 | 47.58 |
| 254.74 | 48.16 |
| 255.76 | 48.75 |
| 256.80 | 49.32 |
| 257.87 | 49.91 |
| 258.90 | 50.49 |
| 259.92 | 51.07 |
| 260.92 | 51.67 |
| 261.93 | 52.28 |
| 262.94 | 52.91 |
| 263.97 | 53.57 |
| 265.03 | 54.27 |
| 266.16 | 55.02 |
| 267.18 | 55.68 |
| 268.18 | 56.28 |
| 269.13 | 56.82 |
| 270.13 | 57.35 |
| 271.09 | 57.83 |
| 272.08 | 58.28 |
| 273.12 | 58.71 |
| 274.26 | 59.16 |
| 275.32 | 59.59 |
| 276.34 | 60.03 |
| 277.33 | 60.48 |
| 278.34 | 60.95 |
| 279.33 | 61.45 |
| 280.36 | 61.98 |
| 281.42 | 62.56 |
| 282.58 | 63.20 |
| 283.61 | 63.74 |
| 284.60 | 64.23 |
| 285.55 | 64.65 |
| 286.54 | 65.05 |
| 287.50 | 65.39 |
| 288.52 | 65.72 |
| 289.63 | 66.03 |
| 290.94 | 66.36 |
| 291.97 | 66.68 |
| 292.91 | 67.05 |
| 293.75 | 67.47 |
| 294.71 | 68.04 |
| 295.67 | 68.75 |
| 296.85 | 69.73 |
| 298.63 | 71.36 |
| 302.45 | 74.98 |

Fattore di sicurezza (FS) 1.3023 - N.9 -- X Y Lambda= 0.7199

| | |
|--------|-------|
| 226.50 | 36.32 |
| 231.65 | 37.32 |
| 234.07 | 37.86 |
| 235.70 | 38.31 |
| 237.05 | 38.78 |
| 238.39 | 39.35 |
| 239.62 | 39.96 |
| 240.93 | 40.69 |
| 242.32 | 41.54 |
| 243.92 | 42.60 |
| 245.42 | 43.57 |
| 246.86 | 44.49 |
| 248.27 | 45.37 |
| 249.66 | 46.23 |
| 251.04 | 47.07 |
| 252.44 | 47.90 |
| 253.86 | 48.73 |
| 255.33 | 49.57 |
| 256.74 | 50.35 |
| 258.13 | 51.11 |
| 259.50 | 51.84 |
| 260.89 | 52.56 |
| 262.26 | 53.25 |
| 263.66 | 53.93 |
| 265.09 | 54.61 |
| 266.60 | 55.30 |

| | |
|--------|-------|
| 268.01 | 55.92 |
| 269.39 | 56.50 |
| 270.74 | 57.04 |
| 272.11 | 57.56 |
| 273.47 | 58.05 |
| 274.85 | 58.51 |
| 276.28 | 58.96 |
| 277.83 | 59.42 |
| 279.25 | 59.87 |
| 280.63 | 60.34 |
| 281.96 | 60.83 |
| 283.34 | 61.37 |
| 284.69 | 61.93 |
| 286.09 | 62.55 |
| 287.55 | 63.23 |
| 289.17 | 64.02 |
| 290.58 | 64.77 |
| 291.92 | 65.55 |
| 293.20 | 66.36 |
| 294.56 | 67.31 |
| 295.99 | 68.42 |
| 297.66 | 69.81 |
| 300.11 | 71.97 |
| 305.11 | 76.52 |

Fattore di sicurezza (FS) 1.3053 - N.10 -- X Y Lambda= 0.6627

| | |
|--------|-------|
| 222.16 | 33.80 |
| 228.56 | 35.50 |
| 231.70 | 36.39 |
| 233.87 | 37.07 |
| 235.75 | 37.73 |
| 237.52 | 38.43 |
| 239.20 | 39.16 |
| 240.93 | 39.97 |
| 242.72 | 40.87 |
| 244.67 | 41.90 |
| 246.56 | 42.91 |
| 248.40 | 43.90 |
| 250.22 | 44.89 |
| 252.02 | 45.87 |
| 253.84 | 46.87 |
| 255.66 | 47.88 |
| 257.52 | 48.91 |
| 259.41 | 49.97 |
| 261.21 | 50.94 |
| 262.98 | 51.86 |
| 264.72 | 52.72 |
| 266.50 | 53.57 |
| 268.23 | 54.35 |
| 270.01 | 55.12 |
| 271.82 | 55.86 |
| 273.74 | 56.61 |
| 275.59 | 57.35 |
| 277.40 | 58.10 |
| 279.19 | 58.85 |
| 280.98 | 59.62 |
| 282.78 | 60.42 |
| 284.62 | 61.24 |
| 286.52 | 62.12 |
| 288.55 | 63.08 |
| 290.33 | 64.00 |
| 292.05 | 64.97 |
| 293.69 | 65.99 |
| 295.44 | 67.18 |
| 297.29 | 68.57 |
| 299.44 | 70.33 |
| 302.59 | 73.05 |
| 309.05 | 78.79 |

----- ANALISI DEFICIT DI RESISTENZA -----
 # DATI RELATIVI ALLE 10 SUPERFICI GENERATE CON MINOR FS *
 # Analisi Deficit in riferimento a FS(progetto) = 1.200

| Sup N. | FS | FTR(kN/m) | FTA(kN/m) | Bilancio(kN/m) | ESITO |
|--------|-------|-----------|-----------|----------------|---------|
| 1 | 1.278 | 3534.9 | 2766.8 | 214.7 | Surplus |
| 2 | 1.294 | 3917.9 | 3027.8 | 284.5 | Surplus |
| 3 | 1.296 | 3927.4 | 3031.5 | 289.6 | Surplus |
| 4 | 1.296 | 3613.7 | 2789.2 | 266.7 | Surplus |
| 5 | 1.298 | 3223.7 | 2484.5 | 242.4 | Surplus |
| 6 | 1.300 | 5106.9 | 3927.9 | 393.5 | Surplus |
| 7 | 1.301 | 4428.0 | 3404.2 | 342.9 | Surplus |
| 8 | 1.302 | 2505.6 | 1924.6 | 196.1 | Surplus |
| 9 | 1.302 | 2689.2 | 2065.0 | 211.2 | Surplus |
| 10 | 1.305 | 3907.9 | 2993.9 | 315.2 | Surplus |

Esito analisi: SURPLUS di RESISTENZA!

Valore minimo di SURPLUS di RESISTENZA (kN/m): 196.1

Note: FTR --> Forza totale Resistente lungo la superficie
di scivolamento

FTA --> Forza totale Agente lungo la superficie
di scivolamento

IMPORTANTE! : Il Deficit o il Surplus di resistenza viene espresso in kN
per metro di LARGHEZZA rispetto al fronte della scarpata

TABELLA PARAMETRI CONCI DELLA SUPERFICIE INDIVIDUATA CON MINOR FS

| X (m) | dx (m) | alpha (°) | W (kN/m) | ru (-) | U (kPa) | phi' (°) | (c',Cu) (kPa) |
|----------|-----------|--------------|-------------|-----------|------------|-------------|------------------|
| 219.394 | 0.767 | 27.38 | 0.37 | 0.00 | 0.00 | 33.00 | 0.00 |
| 220.161 | 0.767 | 27.38 | 1.12 | 0.00 | 0.00 | 33.00 | 0.00 |
| 220.928 | 0.767 | 27.38 | 1.87 | 0.00 | 0.00 | 33.00 | 0.00 |
| 221.695 | 0.767 | 27.38 | 2.62 | 0.00 | 0.00 | 33.00 | 0.00 |
| 222.463 | 0.767 | 27.38 | 3.37 | 0.00 | 0.00 | 33.00 | 0.00 |
| 223.230 | 0.340 | 27.38 | 1.73 | 0.00 | 0.00 | 33.00 | 0.00 |
| 223.570 | 0.767 | 27.38 | 4.45 | 0.00 | 0.00 | 33.00 | 0.00 |
| 224.337 | 0.767 | 27.38 | 5.19 | 0.00 | 0.00 | 33.00 | 0.00 |
| 225.104 | 0.767 | 27.38 | 5.94 | 0.00 | 0.00 | 33.00 | 0.00 |
| 225.871 | 0.767 | 27.38 | 6.69 | 0.00 | 0.00 | 33.00 | 0.00 |
| 226.638 | 0.217 | 27.38 | 2.03 | 0.00 | 0.00 | 33.00 | 0.00 |
| 226.856 | 0.767 | 26.78 | 7.73 | 0.00 | 0.00 | 33.00 | 0.00 |
| 227.623 | 0.477 | 26.78 | 5.27 | 0.00 | 0.00 | 33.00 | 0.00 |
| 228.100 | 0.767 | 26.78 | 9.20 | 0.00 | 0.00 | 33.00 | 0.00 |
| 228.867 | 0.767 | 26.78 | 10.11 | 0.00 | 0.00 | 33.00 | 0.00 |
| 229.634 | 0.767 | 26.78 | 11.01 | 0.00 | 0.00 | 33.00 | 0.00 |
| 230.401 | 0.177 | 26.78 | 2.67 | 0.00 | 0.00 | 33.00 | 0.00 |
| 230.578 | 0.767 | 25.60 | 12.28 | 0.00 | 0.00 | 33.00 | 0.00 |
| 231.346 | 0.767 | 25.60 | 13.50 | 0.00 | 0.00 | 33.00 | 0.00 |
| 232.113 | 0.642 | 25.60 | 12.25 | 0.00 | 0.00 | 33.00 | 0.00 |
| 232.755 | 0.417 | 25.60 | 8.40 | 0.00 | 0.00 | 33.00 | 0.00 |
| 233.172 | 0.767 | 24.27 | 16.58 | 0.00 | 0.00 | 33.00 | 0.00 |
| 233.939 | 0.767 | 24.27 | 18.15 | 0.00 | 0.00 | 33.00 | 0.00 |
| 234.706 | 0.735 | 24.27 | 18.85 | 0.00 | 0.00 | 33.00 | 0.00 |
| 235.440 | 0.767 | 22.58 | 21.44 | 0.00 | 0.00 | 33.00 | 0.00 |
| 236.207 | 0.767 | 22.58 | 23.44 | 0.00 | 0.00 | 33.00 | 0.00 |
| 236.975 | 0.435 | 22.58 | 14.20 | 0.00 | 0.00 | 33.00 | 0.00 |
| 237.410 | 0.126 | 22.58 | 4.24 | 0.00 | 0.00 | 33.00 | 0.00 |
| 237.536 | 0.767 | 21.22 | 27.08 | 0.00 | 0.00 | 33.00 | 0.00 |
| 238.303 | 0.767 | 21.22 | 29.43 | 0.00 | 0.00 | 33.00 | 0.00 |
| 239.071 | 0.510 | 21.22 | 20.86 | 0.00 | 0.00 | 33.00 | 0.00 |
| 239.580 | 0.767 | 19.85 | 33.50 | 0.00 | 0.00 | 33.00 | 0.00 |
| 240.348 | 0.767 | 19.85 | 36.18 | 0.00 | 0.00 | 33.00 | 0.00 |
| 241.115 | 0.590 | 19.85 | 29.63 | 0.00 | 0.00 | 33.00 | 0.00 |
| 241.704 | 0.767 | 18.55 | 41.08 | 0.00 | 0.00 | 33.00 | 0.00 |
| 242.471 | 0.767 | 18.55 | 44.08 | 0.00 | 0.00 | 33.00 | 0.00 |
| 243.238 | 0.696 | 18.55 | 42.58 | 0.00 | 0.00 | 33.00 | 0.00 |
| 243.934 | 0.767 | 17.42 | 49.92 | 0.00 | 0.00 | 33.00 | 0.00 |
| 244.701 | 0.767 | 17.42 | 53.19 | 0.00 | 0.00 | 33.00 | 0.00 |
| 245.469 | 0.767 | 17.42 | 56.45 | 0.00 | 0.00 | 33.00 | 0.00 |
| 246.236 | 0.177 | 17.42 | 13.51 | 0.00 | 0.00 | 33.00 | 0.00 |
| 246.413 | 0.767 | 19.37 | 60.24 | 0.00 | 0.00 | 33.00 | 0.00 |
| 247.180 | 0.020 | 19.37 | 1.61 | 0.00 | 0.00 | 33.00 | 0.00 |
| 247.200 | 0.767 | 19.37 | 63.11 | 0.00 | 0.00 | 33.00 | 0.00 |
| 247.967 | 0.597 | 19.37 | 51.02 | 0.00 | 0.00 | 33.00 | 0.00 |

| | | | | | | | |
|---------|-------|-------|-------|------|------|-------|------|
| 248.564 | 0.421 | 21.69 | 36.96 | 0.00 | 0.00 | 33.00 | 0.00 |
| 248.985 | 0.767 | 21.69 | 69.02 | 0.00 | 0.00 | 33.00 | 0.00 |
| 249.752 | 0.767 | 21.69 | 71.25 | 0.00 | 0.00 | 33.00 | 0.00 |
| 250.519 | 0.088 | 21.69 | 8.27 | 0.00 | 0.00 | 33.00 | 0.00 |
| 250.607 | 0.767 | 24.19 | 73.41 | 0.00 | 0.00 | 33.00 | 0.00 |
| 251.374 | 0.767 | 24.19 | 75.00 | 0.00 | 0.00 | 33.00 | 0.00 |
| 252.141 | 0.400 | 24.19 | 39.71 | 0.00 | 0.00 | 33.00 | 0.00 |
| 252.541 | 0.479 | 26.59 | 48.07 | 0.00 | 0.00 | 33.00 | 0.00 |
| 253.020 | 0.767 | 26.59 | 77.70 | 0.00 | 0.00 | 33.00 | 0.00 |
| 253.787 | 0.767 | 26.59 | 78.66 | 0.00 | 0.00 | 33.00 | 0.00 |
| 254.554 | 0.047 | 26.59 | 4.81 | 0.00 | 0.00 | 33.00 | 0.00 |
| 254.601 | 0.767 | 28.94 | 79.35 | 0.00 | 0.00 | 33.00 | 0.00 |
| 255.368 | 0.767 | 28.94 | 79.66 | 0.00 | 0.00 | 33.00 | 0.00 |
| 256.135 | 0.427 | 28.94 | 44.50 | 0.00 | 0.00 | 33.00 | 0.00 |
| 256.562 | 0.767 | 31.15 | 79.83 | 0.00 | 0.00 | 33.00 | 0.00 |
| 257.329 | 0.767 | 31.15 | 79.50 | 0.00 | 0.00 | 33.00 | 0.00 |
| 258.096 | 0.549 | 31.15 | 56.72 | 0.00 | 0.00 | 33.00 | 0.00 |
| 258.646 | 0.767 | 33.03 | 78.65 | 0.00 | 0.00 | 33.00 | 0.00 |
| 259.413 | 0.767 | 33.03 | 77.76 | 0.00 | 0.00 | 33.00 | 0.00 |
| 260.180 | 0.380 | 33.03 | 38.20 | 0.00 | 0.00 | 33.00 | 0.00 |
| 260.560 | 0.314 | 33.03 | 30.83 | 0.00 | 0.00 | 33.00 | 0.00 |
| 260.874 | 0.767 | 34.50 | 69.33 | 0.00 | 0.00 | 33.00 | 0.00 |
| 261.641 | 0.767 | 34.50 | 60.84 | 0.00 | 0.00 | 33.00 | 0.00 |
| 262.409 | 0.767 | 34.50 | 52.35 | 0.00 | 0.00 | 33.00 | 0.00 |
| 263.176 | 0.265 | 34.50 | 16.09 | 0.00 | 0.00 | 33.00 | 0.00 |
| 263.440 | 0.580 | 32.92 | 31.85 | 0.00 | 0.00 | 33.00 | 0.00 |
| 264.020 | 0.767 | 32.92 | 42.27 | 0.00 | 0.00 | 33.00 | 0.00 |
| 264.787 | 0.767 | 32.92 | 48.55 | 0.00 | 0.00 | 33.00 | 0.00 |
| 265.554 | 0.100 | 32.92 | 6.79 | 0.00 | 0.00 | 33.00 | 0.00 |
| 265.654 | 0.767 | 30.88 | 55.96 | 0.00 | 0.00 | 33.00 | 0.00 |
| 266.421 | 0.349 | 30.88 | 27.72 | 0.00 | 0.00 | 33.00 | 0.00 |
| 266.770 | 0.710 | 30.88 | 60.84 | 0.00 | 0.00 | 33.00 | 0.00 |
| 267.480 | 0.240 | 30.88 | 21.21 | 0.00 | 0.00 | 33.00 | 0.00 |
| 267.720 | 0.767 | 28.44 | 63.27 | 0.00 | 0.00 | 33.00 | 0.00 |
| 268.487 | 0.767 | 28.44 | 56.58 | 0.00 | 0.00 | 33.00 | 0.00 |
| 269.254 | 0.403 | 28.44 | 27.04 | 0.00 | 0.00 | 33.00 | 0.00 |
| 269.657 | 0.767 | 25.85 | 46.72 | 0.00 | 0.00 | 33.00 | 0.00 |
| 270.424 | 0.767 | 25.85 | 40.73 | 0.00 | 0.00 | 33.00 | 0.00 |
| 271.192 | 0.517 | 25.85 | 24.09 | 0.00 | 0.00 | 33.00 | 0.00 |
| 271.709 | 0.761 | 23.20 | 30.84 | 0.00 | 0.00 | 33.00 | 0.00 |
| 272.470 | 0.767 | 23.20 | 25.80 | 0.00 | 0.00 | 33.00 | 0.00 |
| 273.237 | 0.163 | 23.20 | 4.80 | 0.00 | 0.00 | 33.00 | 0.00 |
| 273.400 | 0.216 | 23.20 | 6.90 | 0.00 | 0.00 | 33.00 | 0.00 |
| 273.616 | 0.344 | 20.42 | 13.95 | 0.00 | 0.00 | 33.00 | 0.00 |
| 273.960 | 0.767 | 20.42 | 33.91 | 0.00 | 0.00 | 33.00 | 0.00 |
| 274.727 | 0.767 | 20.42 | 31.29 | 0.00 | 0.00 | 33.00 | 0.00 |
| 275.494 | 0.145 | 20.42 | 5.60 | 0.00 | 0.00 | 33.00 | 0.00 |
| 275.639 | 0.767 | 17.85 | 28.48 | 0.00 | 0.00 | 33.00 | 0.00 |
| 276.406 | 0.767 | 17.85 | 26.48 | 0.00 | 0.00 | 33.00 | 0.00 |
| 277.173 | 0.596 | 17.85 | 19.20 | 0.00 | 0.00 | 33.00 | 0.00 |
| 277.769 | 0.767 | 15.73 | 23.17 | 0.00 | 0.00 | 33.00 | 0.00 |
| 278.536 | 0.767 | 15.73 | 21.67 | 0.00 | 0.00 | 33.00 | 0.00 |
| 279.303 | 0.027 | 15.73 | 0.73 | 0.00 | 0.00 | 33.00 | 0.00 |
| 279.330 | 0.630 | 15.73 | 16.63 | 0.00 | 0.00 | 33.00 | 0.00 |
| 279.960 | 0.283 | 15.73 | 7.50 | 0.00 | 0.00 | 33.00 | 0.00 |
| 280.243 | 0.767 | 16.63 | 22.70 | 0.00 | 0.00 | 33.00 | 0.00 |
| 281.010 | 0.100 | 16.63 | 3.20 | 0.00 | 0.00 | 33.00 | 0.00 |
| 281.110 | 0.767 | 16.63 | 26.59 | 0.00 | 0.00 | 33.00 | 0.00 |
| 281.877 | 0.616 | 16.63 | 23.86 | 0.00 | 0.00 | 33.00 | 0.00 |
| 282.493 | 0.767 | 17.65 | 32.68 | 0.00 | 0.00 | 33.00 | 0.00 |
| 283.261 | 0.767 | 17.65 | 35.88 | 0.00 | 0.00 | 33.00 | 0.00 |
| 284.028 | 0.611 | 17.65 | 30.86 | 0.00 | 0.00 | 33.00 | 0.00 |
| 284.639 | 0.767 | 18.72 | 41.50 | 0.00 | 0.00 | 33.00 | 0.00 |
| 285.406 | 0.767 | 18.72 | 44.45 | 0.00 | 0.00 | 33.00 | 0.00 |
| 286.173 | 0.540 | 18.72 | 33.06 | 0.00 | 0.00 | 33.00 | 0.00 |
| 286.713 | 0.177 | 19.79 | 11.15 | 0.00 | 0.00 | 33.00 | 0.00 |
| 286.890 | 0.230 | 19.79 | 14.70 | 0.00 | 0.00 | 33.00 | 0.00 |
| 287.120 | 0.767 | 19.79 | 50.76 | 0.00 | 0.00 | 33.00 | 0.00 |
| 287.887 | 0.767 | 19.79 | 53.45 | 0.00 | 0.00 | 33.00 | 0.00 |
| 288.654 | 0.161 | 19.79 | 11.53 | 0.00 | 0.00 | 33.00 | 0.00 |
| 288.815 | 0.767 | 20.86 | 56.56 | 0.00 | 0.00 | 33.00 | 0.00 |
| 289.582 | 0.767 | 20.86 | 58.99 | 0.00 | 0.00 | 33.00 | 0.00 |
| 290.349 | 0.545 | 20.86 | 43.41 | 0.00 | 0.00 | 33.00 | 0.00 |
| 290.894 | 0.096 | 21.89 | 7.74 | 0.00 | 0.00 | 33.00 | 0.00 |
| 290.990 | 0.767 | 21.89 | 63.27 | 0.00 | 0.00 | 33.00 | 0.00 |

| | | | | | | | |
|---------|-------|-------|-------|------|------|-------|------|
| 291.757 | 0.767 | 21.89 | 65.44 | 0.00 | 0.00 | 33.00 | 0.00 |
| 292.524 | 0.523 | 21.89 | 45.86 | 0.00 | 0.00 | 33.00 | 0.00 |
| 293.047 | 0.767 | 22.84 | 68.97 | 0.00 | 0.00 | 33.00 | 0.00 |
| 293.814 | 0.006 | 22.84 | 0.51 | 0.00 | 0.00 | 33.00 | 0.00 |
| 293.820 | 0.767 | 22.84 | 70.91 | 0.00 | 0.00 | 33.00 | 0.00 |
| 294.587 | 0.728 | 22.84 | 69.12 | 0.00 | 0.00 | 33.00 | 0.00 |
| 295.316 | 0.767 | 23.66 | 74.56 | 0.00 | 0.00 | 33.00 | 0.00 |
| 296.083 | 0.767 | 23.66 | 76.27 | 0.00 | 0.00 | 33.00 | 0.00 |
| 296.850 | 0.767 | 23.66 | 77.99 | 0.00 | 0.00 | 33.00 | 0.00 |
| 297.617 | 0.201 | 23.66 | 20.72 | 0.00 | 0.00 | 33.00 | 0.00 |
| 297.818 | 0.042 | 26.12 | 4.35 | 0.00 | 0.00 | 33.00 | 0.00 |
| 297.860 | 0.767 | 26.12 | 79.89 | 0.00 | 0.00 | 33.00 | 0.00 |
| 298.627 | 0.767 | 26.12 | 80.96 | 0.00 | 0.00 | 33.00 | 0.00 |
| 299.394 | 0.542 | 26.12 | 57.83 | 0.00 | 0.00 | 33.00 | 0.00 |
| 299.936 | 0.767 | 29.09 | 82.38 | 0.00 | 0.00 | 33.00 | 0.00 |
| 300.703 | 0.767 | 29.09 | 82.64 | 0.00 | 0.00 | 33.00 | 0.00 |
| 301.470 | 0.471 | 29.09 | 50.87 | 0.00 | 0.00 | 33.00 | 0.00 |
| 301.941 | 0.544 | 32.28 | 58.60 | 0.00 | 0.00 | 33.00 | 0.00 |
| 302.485 | 0.767 | 32.28 | 82.11 | 0.00 | 0.00 | 33.00 | 0.00 |
| 303.252 | 0.308 | 32.28 | 32.77 | 0.00 | 0.00 | 33.00 | 0.00 |
| 303.560 | 0.259 | 32.28 | 27.50 | 0.00 | 0.00 | 33.00 | 0.00 |
| 303.819 | 0.767 | 35.21 | 80.48 | 0.00 | 0.00 | 33.00 | 0.00 |
| 304.586 | 0.767 | 35.21 | 78.89 | 0.00 | 0.00 | 33.00 | 0.00 |
| 305.353 | 0.512 | 35.21 | 51.78 | 0.00 | 0.00 | 33.00 | 0.00 |
| 305.866 | 0.767 | 38.70 | 75.65 | 0.00 | 0.00 | 33.00 | 0.00 |
| 306.633 | 0.767 | 38.70 | 72.88 | 0.00 | 0.00 | 33.00 | 0.00 |
| 307.400 | 0.591 | 38.70 | 54.27 | 0.00 | 0.00 | 33.00 | 0.00 |
| 307.991 | 0.767 | 41.28 | 67.50 | 0.00 | 0.00 | 33.00 | 0.00 |
| 308.758 | 0.767 | 41.28 | 63.79 | 0.00 | 0.00 | 33.00 | 0.00 |
| 309.525 | 0.767 | 41.28 | 60.07 | 0.00 | 0.00 | 33.00 | 0.00 |
| 310.292 | 0.138 | 41.28 | 10.40 | 0.00 | 0.00 | 33.00 | 0.00 |
| 310.430 | 0.077 | 41.28 | 5.77 | 0.00 | 0.00 | 33.00 | 0.00 |
| 310.507 | 0.643 | 43.30 | 46.32 | 0.00 | 0.00 | 33.00 | 0.00 |
| 311.150 | 0.767 | 43.30 | 51.14 | 0.00 | 0.00 | 33.00 | 0.00 |
| 311.917 | 0.767 | 43.30 | 46.64 | 0.00 | 0.00 | 33.00 | 0.00 |
| 312.684 | 0.767 | 43.30 | 42.13 | 0.00 | 0.00 | 33.00 | 0.00 |
| 313.451 | 0.767 | 43.30 | 37.63 | 0.00 | 0.00 | 33.00 | 0.00 |
| 314.218 | 0.008 | 43.30 | 0.37 | 0.00 | 0.00 | 33.00 | 0.00 |
| 314.226 | 0.384 | 44.22 | 17.06 | 0.00 | 0.00 | 33.00 | 0.00 |
| 314.610 | 0.767 | 44.22 | 30.46 | 0.00 | 0.00 | 33.00 | 0.00 |
| 315.377 | 0.763 | 44.22 | 25.45 | 0.00 | 0.00 | 33.00 | 0.00 |
| 316.140 | 0.767 | 44.22 | 20.72 | 0.00 | 0.00 | 33.00 | 0.00 |
| 316.907 | 0.767 | 44.22 | 15.84 | 0.00 | 0.00 | 33.00 | 0.00 |
| 317.674 | 0.396 | 44.22 | 6.26 | 0.00 | 0.00 | 33.00 | 0.00 |
| 318.070 | 0.767 | 44.22 | 9.81 | 0.00 | 0.00 | 33.00 | 0.00 |
| 318.837 | 0.767 | 44.22 | 7.66 | 0.00 | 0.00 | 33.00 | 0.00 |
| 319.604 | 0.767 | 44.22 | 5.50 | 0.00 | 0.00 | 33.00 | 0.00 |
| 320.371 | 0.639 | 44.22 | 2.94 | 0.00 | 0.00 | 33.00 | 0.00 |
| 321.010 | 0.767 | 44.22 | 1.56 | 0.00 | 0.00 | 33.00 | 0.00 |
| 321.777 | 0.048 | 44.22 | 0.03 | 0.00 | 0.00 | 33.00 | 0.00 |
| 321.825 | 0.126 | 44.22 | 0.03 | 0.00 | 0.00 | 33.00 | 0.00 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
dx(m) : Larghezza concio
alpha(°) : Angolo pendenza base concio
W(kN/m) : Forza peso concio
ru(-) : Coefficiente locale pressione interstiziale
U(kPa) : Pressione totale dei pori base concio
phi'(°) : Angolo di attrito efficace base concio
c'/Cu (kPa) : Coesione efficace o Resistenza al taglio in condizioni non drenate

TABELLA DIAGRAMMA DELLE FORZE DELLA SUPERFICIE INDIVIDUATA CON MINOR FS

| X | ht | yt | yt' | E(x) | T(x) | E' | rho(x) | FS_qFEM | FS_srmFEM | | |
|---------|-------|--------|-------|-------------------|-------------------|-------------------|--------|---------|-----------|------|--|
| (m) | (m) | (m) | (--) | (kN/m) | (kN/m) | | (kN) | (--) | (--) | (--) | |
| 219.394 | 0.000 | 32.205 | 0.533 | 0.0000000000E+000 | 0.0000000000E+000 | 8.7751009318E-002 | 0.043 | 1.058 | 1.277 | | |
| 220.161 | 0.012 | 32.614 | 0.533 | 9.4128136070E-002 | 1.8066899277E-004 | 1.5766182506E-001 | 0.043 | 1.058 | 1.277 | | |
| 220.928 | 0.023 | 33.023 | 0.547 | 2.4188488365E-001 | 1.7162594882E-003 | 2.7369783510E-001 | 0.043 | 1.440 | 1.592 | | |
| 221.695 | 0.056 | 33.452 | 0.551 | 5.1403554849E-001 | 8.6456210992E-003 | 3.8078773405E-001 | 0.043 | 2.158 | 2.129 | | |
| 222.463 | 0.074 | 33.868 | 0.542 | 8.2608969486E-001 | 2.0860592760E-002 | 4.3091686318E-001 | 0.050 | 2.857 | 2.560 | | |
| 223.230 | 0.093 | 34.284 | 0.542 | 1.1751485051E+000 | 4.0545403319E-002 | 4.9970016618E-001 | 0.068 | 3.611 | 2.903 | | |

| | | | | | | | | | |
|---------|-------|--------|-------|-------------------|-------------------|--------------------|-------|-------|-------|
| 223.570 | 0.101 | 34.468 | 0.542 | 1.3519458746E+000 | 5.2771111730E-002 | 5.2541804939E-001 | 0.077 | 4.021 | 3.040 |
| 224.337 | 0.120 | 34.884 | 0.542 | 1.7652022976E+000 | 8.6458842930E-002 | 5.2408441269E-001 | 0.096 | 5.186 | 3.313 |
| 225.104 | 0.138 | 35.300 | 0.542 | 2.1559965516E+000 | 1.2542558336E-001 | 5.0807366691E-001 | 0.114 | 6.503 | 3.532 |
| 225.871 | 0.157 | 35.716 | 0.522 | 2.5446892772E+000 | 1.6866609144E-001 | 4.9629553639E-001 | 0.130 | 7.683 | 3.724 |
| 226.638 | 0.144 | 36.100 | 0.505 | 2.9174135150E+000 | 2.1205128241E-001 | 5.0923808025E-001 | 0.143 | 8.695 | 3.883 |
| 226.856 | 0.144 | 36.213 | 0.517 | 3.0294446257E+000 | 2.2657283061E-001 | 5.1889764838E-001 | 0.147 | 8.877 | 3.919 |
| 227.623 | 0.154 | 36.609 | 0.513 | 3.4357512751E+000 | 2.8489729901E-001 | 5.3203110373E-001 | 0.163 | 8.957 | 4.003 |
| 228.100 | 0.155 | 36.851 | 0.510 | 3.6904030234E+000 | 3.2541962532E-001 | 5.4115246452E-001 | 0.173 | 8.648 | 4.025 |
| 228.867 | 0.160 | 37.244 | 0.513 | 4.1149515365E+000 | 4.0004160110E-001 | 5.6647518719E-001 | 0.191 | 7.743 | 4.011 |
| 229.634 | 0.168 | 37.639 | 0.497 | 4.5594896567E+000 | 4.8899700216E-001 | 5.7418922946E-001 | 0.211 | 6.586 | 3.933 |
| 230.401 | 0.148 | 38.006 | 0.480 | 4.9958730589E+000 | 5.9093769303E-001 | 5.6775272548E-001 | 0.233 | 5.499 | 3.794 |
| 230.578 | 0.145 | 38.092 | 0.496 | 5.0964248988E+000 | 6.1691312424E-001 | 5.7965729936E-001 | 0.238 | 5.268 | 3.753 |
| 231.346 | 0.160 | 38.475 | 0.512 | 5.5814759897E+000 | 7.5046427850E-001 | 7.4584539255E-001 | 0.265 | 4.379 | 3.543 |
| 232.113 | 0.196 | 38.878 | 0.538 | 6.2407014281E+000 | 9.5788326426E-001 | 9.1802205094E-001 | 0.302 | 3.590 | 3.249 |
| 232.755 | 0.243 | 39.233 | 0.532 | 6.8619012046E+000 | 1.1636035809E+000 | 9.8293382948E-001 | 0.334 | 3.124 | 3.019 |
| 233.172 | 0.251 | 39.442 | 0.513 | 7.2757280995E+000 | 1.3075754280E+000 | 1.0697804746E+000 | 0.354 | 2.894 | 2.883 |
| 233.939 | 0.304 | 39.840 | 0.506 | 8.2045293616E+000 | 1.6412846441E+000 | 1.2998759509E+000 | 0.394 | 2.544 | 2.641 |
| 234.706 | 0.337 | 40.219 | 0.489 | 9.2699987038E+000 | 2.0358261033E+000 | 1.5223835904E+000 | 0.432 | 2.294 | 2.438 |
| 235.440 | 0.362 | 40.575 | 0.486 | 1.0482042497E+001 | 2.4948739527E+000 | 1.8499041226E+000 | 0.468 | 2.113 | 2.273 |
| 236.207 | 0.416 | 40.948 | 0.471 | 1.2061142036E+001 | 3.1126749565E+000 | 2.230227486E+000 | 0.508 | 1.963 | 2.125 |
| 236.975 | 0.446 | 41.297 | 0.447 | 1.3903651817E+001 | 3.8584070949E+000 | 2.6261189320E+000 | 0.546 | 1.851 | 2.005 |
| 237.410 | 0.454 | 41.486 | 0.428 | 1.5102538590E+001 | 4.3634429816E+000 | 2.8849262794E+000 | 0.568 | 1.798 | 1.946 |
| 237.536 | 0.453 | 41.537 | 0.426 | 1.5471913899E+001 | 4.5224643896E+000 | 2.9936230046E+000 | 0.575 | 1.784 | 1.930 |
| 238.303 | 0.484 | 41.866 | 0.430 | 1.8096721399E+001 | 5.6854800723E+000 | 3.7689320238E+000 | 0.618 | 1.705 | 1.838 |
| 239.071 | 0.517 | 42.197 | 0.422 | 2.1254212079E+001 | 7.1587835642E+000 | 4.4185504589E+000 | 0.663 | 1.638 | 1.757 |
| 239.580 | 0.528 | 42.406 | 0.417 | 2.3609802976E+001 | 8.3060590672E+000 | 4.9580105180E+000 | 0.692 | 1.601 | 1.710 |
| 240.348 | 0.575 | 42.730 | 0.445 | 2.7803651391E+001 | 1.0425903417E+001 | 6.3272129467E+000 | 0.738 | 1.550 | 1.644 |
| 241.115 | 0.657 | 43.089 | 0.491 | 3.3317017559E+001 | 1.3342876878E+001 | 8.3004016158E+000 | 0.788 | 1.501 | 1.579 |
| 241.704 | 0.751 | 43.396 | 0.515 | 3.8714699679E+001 | 1.6308130681E+001 | 9.3957113165E+000 | 0.829 | 1.463 | 1.530 |
| 242.471 | 0.885 | 43.788 | 0.524 | 4.6161562489E+001 | 2.0478524465E+001 | 1.0406621560E+001 | 0.873 | 1.422 | 1.476 |
| 243.238 | 1.040 | 44.199 | 0.509 | 5.4680545845E+001 | 2.5356542264E+001 | 1.0900437186E+001 | 0.912 | 1.383 | 1.429 |
| 243.934 | 1.140 | 44.533 | 0.465 | 6.2136992731E+001 | 2.9714172620E+001 | 1.0703764555E+001 | 0.941 | 1.355 | 1.395 |
| 244.701 | 1.246 | 44.880 | 0.454 | 7.0338810582E+001 | 3.4593011849E+001 | 1.0863092329E+001 | 0.968 | 1.327 | 1.364 |
| 245.469 | 1.355 | 45.229 | 0.434 | 7.8803156674E+001 | 3.9724778993E+001 | 1.0547362980E+001 | 0.992 | 1.299 | 1.338 |
| 246.236 | 1.430 | 45.545 | 0.414 | 8.6520582334E+001 | 4.4498720048E+001 | 1.0079483299E+001 | 1.012 | 1.274 | 1.317 |
| 246.413 | 1.449 | 45.620 | 0.424 | 8.8307561245E+001 | 4.5622929017E+001 | 1.0035962186E+001 | 1.016 | 1.268 | 1.312 |
| 247.180 | 1.505 | 45.945 | 0.425 | 9.5847087171E+001 | 5.0502585999E+001 | 9.5548637682E+000 | 1.037 | 1.243 | 1.294 |
| 247.200 | 1.506 | 45.954 | 0.413 | 9.6038504320E+001 | 5.0628820524E+001 | 9.5337322768E+000 | 1.037 | 1.242 | 1.293 |
| 247.967 | 1.553 | 46.271 | 0.415 | 1.0294159014E+002 | 5.5255224882E+001 | 8.7420903901E+000 | 1.056 | 1.218 | 1.278 |
| 248.564 | 1.593 | 46.520 | 0.434 | 1.0803790301E+002 | 5.8774002704E+001 | 8.3745198195E+000 | 1.070 | 1.199 | 1.267 |
| 248.985 | 1.618 | 46.713 | 0.461 | 1.1151620072E+002 | 6.1297846931E+001 | 8.0772889480E+000 | 1.081 | 1.185 | 1.259 |
| 249.752 | 1.668 | 47.068 | 0.465 | 1.1746266797E+002 | 6.5734872398E+001 | 7.2666428312E+000 | 1.101 | 1.160 | 1.246 |
| 250.519 | 1.721 | 47.425 | 0.471 | 1.2266468930E+002 | 6.9804059088E+001 | 6.4871275906E+000 | 1.120 | 1.137 | 1.234 |
| 250.607 | 1.731 | 47.470 | 0.500 | 1.2322967846E+002 | 7.0264171819E+001 | 6.3691006271E+000 | 1.122 | 1.134 | 1.232 |
| 251.374 | 1.769 | 47.853 | 0.508 | 1.2754784999E+002 | 7.3932197751E+001 | 5.1697547755E+000 | 1.140 | 1.111 | 1.221 |
| 252.141 | 1.822 | 48.250 | 0.523 | 1.3116111989E+002 | 7.7213113796E+001 | 4.1008274183E+000 | 1.158 | 1.089 | 1.210 |
| 252.541 | 1.854 | 48.463 | 0.530 | 1.3267314892E+002 | 7.8683775880E+001 | 3.1858937436E+000 | 1.167 | 1.078 | 1.205 |
| 253.020 | 1.868 | 48.716 | 0.520 | 1.3385691704E+002 | 8.0006637229E+001 | 2.0059866414E+000 | 1.176 | 1.067 | 1.199 |
| 253.787 | 1.879 | 49.111 | 0.518 | 1.3482698970E+002 | 8.1423501275E+001 | 5.6914581706E-001 | 1.188 | 1.050 | 1.191 |
| 254.554 | 1.895 | 49.511 | 0.525 | 1.3473010096E+002 | 8.1997120722E+001 | -1.1562629889E+000 | 1.197 | 1.036 | 1.185 |
| 254.601 | 1.899 | 49.538 | 0.565 | 1.3467331823E+002 | 8.1992535466E+001 | -1.2852193716E+000 | 1.198 | 1.035 | 1.185 |
| 255.368 | 1.907 | 49.971 | 0.570 | 1.3284870261E+002 | 8.1149061131E+001 | -2.9754968020E+000 | 1.202 | 1.023 | 1.181 |
| 256.135 | 1.925 | 50.413 | 0.584 | 1.3010830892E+002 | 7.9529731764E+001 | -4.1892251964E+000 | 1.203 | 1.013 | 1.179 |
| 256.562 | 1.944 | 50.668 | 0.568 | 1.2817177861E+002 | 7.8286924942E+001 | -4.8538132800E+000 | 1.202 | 1.008 | 1.179 |
| 257.329 | 1.904 | 51.092 | 0.574 | 1.2400621247E+002 | 7.5383008365E+001 | -6.2620452591E+000 | 1.196 | 1.003 | 1.181 |
| 258.096 | 1.898 | 51.549 | 0.590 | 1.1856454434E+002 | 7.1403999944E+001 | -7.4158348092E+000 | 1.185 | 1.001 | 1.187 |
| 258.646 | 1.885 | 51.868 | 0.556 | 1.1436487748E+002 | 6.8265534072E+001 | -7.7407089241E+000 | 1.174 | 1.001 | 1.193 |
| 259.413 | 1.799 | 52.281 | 0.555 | 1.0832593239E+002 | 6.3679985762E+001 | -8.2956219976E+000 | 1.157 | 1.004 | 1.203 |
| 260.180 | 1.738 | 52.719 | 0.572 | 1.0163772833E+002 | 5.8612674211E+001 | -8.8264508428E+000 | 1.135 | 1.011 | 1.217 |
| 260.560 | 1.709 | 52.937 | 0.561 | 9.8262129380E+001 | 5.6069683967E+001 | -8.7116834792E+000 | 1.123 | 1.016 | 1.225 |
| 260.874 | 1.676 | 53.109 | 0.540 | 9.5566992046E+001 | 5.4056816476E+001 | -8.5227113516E+000 | 1.113 | 1.021 | 1.232 |
| 261.641 | 1.562 | 53.521 | 0.510 | 8.9122694929E+001 | 4.9300090436E+001 | -8.4410402623E+000 | 1.088 | 1.035 | 1.250 |
| 262.409 | 1.405 | 53.892 | 0.448 | 8.2616742098E+001 | 4.4614654930E+001 | -7.9835441391E+000 | 1.062 | 1.054 | 1.272 |
| 263.176 | 1.194 | 54.208 | 0.412 | 7.6874335858E+001 | 4.0565957645E+001 | -7.3613279892E+000 | 1.038 | 1.075 | 1.293 |
| 263.440 | 1.122 | 54.317 | 0.396 | 7.4937409951E+001 | 3.9219490293E+001 | -7.1517612419E+000 | 1.030 | 1.083 | 1.302 |
| 264.020 | 0.972 | 54.543 | 0.652 | 7.1003425308E+001 | 3.6540564807E+001 | -6.5584185845E+000 | 1.012 | 1.103 | 1.321 |
| 264.787 | 1.128 | 55.195 | 0.761 | 6.6204400556E+001 | 3.3339094601E+001 | -5.8644804849E+000 | 0.991 | 1.132 | 1.350 |
| 265.554 | 1.145 | 55.710 | 0.654 | 6.2006129673E+001 | 3.0592239865E+001 | -4.9061980044E+000 | 0.971 | 1.164 | 1.380 |
| 265.654 | 1.133 | 55.762 | 0.553 | 6.1522968110E+001 | 3.0278709115E+001 | -4.8350358241E+000 | 0.968 | 1.169 | 1.385 |
| 266.421 | 1.101 | 56.189 | 0.550 | 5.7798096669E+001 | 2.7829287002E+001 | -4.3930266304E+000 | 0.947 | 1.210 | 1.422 |
| 266.770 | 1.079 | 56.376 | 0.505 | 5.6339544009E+001 | 2.6843125746E+001 | -3.9005742541E+000 | 0.937 | 1.232 | 1.440 |
| 267.480 | 1.002 | 56.723 | 0.502 | 5.3977925447E+001 | 2.5169992205E+001 | -3.1948024324E+000 | 0.917 | 1.280 | 1.475 |
| 267.720 | 0.988 | 56.853 | 0.523 | 5.3221617268E+001 | 2.4549619078E+001 | -2.9923443325E+000 | 0.907 | 1.303 | 1.488 |
| 268.487 | 0.970 | 57.250 | 0.506 | 5.1313519484E+001 | 2.2724934250E+001 | -2.1590793226E+000 | 0.871 | 1.390 | 1.526 |
| 269.254 | 0.934 | 57.629 | 0.480 | 4.9909156243E+001 | 2.1041135306E+001 | -1.3083298199E+000 | 0.829 | 1.500 | 1.558 |

| | | | | | | | | | |
|---------|-------|--------|-------|-------------------|-------------------|--------------------|-------|-------|-------|
| 269.657 | 0.898 | 57.812 | 0.438 | 4.9492461148E+001 | 2.0260211436E+001 | -7.7512243640E-001 | 0.805 | 1.570 | 1.567 |
| 270.424 | 0.856 | 58.142 | 0.417 | 4.9275579741E+001 | 1.8907394970E+001 | 4.5735982253E-002 | 0.755 | 1.739 | 1.566 |
| 271.192 | 0.794 | 58.451 | 0.399 | 4.9562629324E+001 | 1.7705741811E+001 | 6.9929471140E-001 | 0.703 | 1.966 | 1.546 |
| 271.709 | 0.746 | 58.654 | 0.360 | 5.0037795065E+001 | 1.6972784526E+001 | 1.2030656830E+000 | 0.667 | 2.167 | 1.519 |
| 272.470 | 0.677 | 58.911 | 0.317 | 5.1272190575E+001 | 1.6162660805E+001 | 1.8793362045E+000 | 0.620 | 2.523 | 1.463 |
| 273.237 | 0.575 | 59.138 | 0.289 | 5.2912984299E+001 | 1.5573933557E+001 | 2.8535441696E+000 | 0.579 | 2.972 | 1.397 |
| 273.400 | 0.547 | 59.180 | 0.350 | 5.3402545384E+001 | 1.5479158253E+001 | 3.0486878840E+000 | 0.570 | 3.084 | 1.380 |
| 273.616 | 0.545 | 59.270 | 0.348 | 5.4073406965E+001 | 1.5370730608E+001 | 3.1483543943E+000 | 0.559 | 3.235 | 1.357 |
| 273.960 | 0.521 | 59.374 | 0.313 | 5.5179613134E+001 | 1.5267339540E+001 | 3.4375917728E+000 | 0.544 | 3.460 | 1.322 |
| 274.727 | 0.479 | 59.618 | 0.322 | 5.8196524644E+001 | 1.5190257317E+001 | 4.2568800778E+000 | 0.514 | 4.040 | 1.242 |
| 275.494 | 0.445 | 59.869 | 0.325 | 6.1710521564E+001 | 1.5313121771E+001 | 4.6961066206E+000 | 0.488 | 4.679 | 1.170 |
| 275.639 | 0.436 | 59.915 | 0.311 | 6.2392380388E+001 | 1.5357289908E+001 | 4.7583426355E+000 | 0.484 | 4.781 | 1.158 |
| 276.406 | 0.427 | 60.152 | 0.312 | 6.6207510435E+001 | 1.5738508823E+001 | 5.1663727662E+000 | 0.468 | 5.173 | 1.102 |
| 277.173 | 0.421 | 60.393 | 0.314 | 7.0318633144E+001 | 1.6326151324E+001 | 5.5081713663E+000 | 0.457 | 5.318 | 1.057 |
| 277.769 | 0.416 | 60.581 | 0.310 | 7.3671586079E+001 | 1.6946080598E+001 | 5.6593551081E+000 | 0.453 | 5.169 | 1.030 |
| 278.536 | 0.436 | 60.816 | 0.311 | 7.8047898647E+001 | 1.7942034970E+001 | 5.8817535776E+000 | 0.452 | 4.768 | 1.005 |
| 279.303 | 0.462 | 61.059 | 0.316 | 8.2695376582E+001 | 1.9251354251E+001 | 5.7742116535E+000 | 0.458 | 4.237 | 0.989 |
| 279.330 | 0.463 | 61.067 | 0.293 | 8.2849108524E+001 | 1.9297330870E+001 | 5.7647554365E+000 | 0.458 | 4.220 | 0.989 |
| 279.960 | 0.470 | 61.251 | 0.287 | 8.6487267546E+001 | 2.0622040887E+001 | 5.5340830847E+000 | 0.469 | 3.761 | 0.986 |
| 280.243 | 0.468 | 61.329 | 0.303 | 8.8024117101E+001 | 2.1272448899E+001 | 5.6385083820E+000 | 0.475 | 3.565 | 0.987 |
| 281.010 | 0.480 | 61.570 | 0.321 | 9.2791251895E+001 | 2.3574407859E+001 | 7.2456264816E+000 | 0.500 | 3.011 | 0.995 |
| 281.110 | 0.487 | 61.607 | 0.379 | 9.3526648160E+001 | 2.3978847438E+001 | 7.4004486874E+000 | 0.504 | 2.935 | 0.997 |
| 281.877 | 0.549 | 61.898 | 0.382 | 9.9326761112E+001 | 2.7330900828E+001 | 7.6288430424E+000 | 0.541 | 2.449 | 1.016 |
| 282.493 | 0.602 | 62.135 | 0.409 | 1.0406262710E+002 | 3.0319876680E+001 | 8.0930396975E+000 | 0.573 | 2.166 | 1.035 |
| 283.261 | 0.687 | 62.464 | 0.434 | 1.1066197877E+002 | 3.4793799599E+001 | 8.7372836747E+000 | 0.619 | 1.877 | 1.065 |
| 284.028 | 0.780 | 62.801 | 0.446 | 1.1746737390E+002 | 3.9656510955E+001 | 9.0488662780E+000 | 0.664 | 1.671 | 1.097 |
| 284.639 | 0.862 | 63.078 | 0.478 | 1.2308182588E+002 | 4.3813064262E+001 | 9.5916602476E+000 | 0.700 | 1.544 | 1.124 |
| 285.406 | 0.984 | 63.460 | 0.477 | 1.3082641601E+002 | 4.9771184607E+001 | 9.6952231409E+000 | 0.748 | 1.409 | 1.158 |
| 286.173 | 1.074 | 63.810 | 0.439 | 1.3795624408E+002 | 5.5460648197E+001 | 8.8014695497E+000 | 0.791 | 1.314 | 1.186 |
| 286.713 | 1.115 | 64.033 | 0.415 | 1.4252274629E+002 | 5.9197319285E+001 | 8.4809402518E+000 | 0.817 | 1.265 | 1.200 |
| 286.890 | 1.125 | 64.107 | 0.431 | 1.4402581073E+002 | 6.0440018171E+001 | 8.6755500089E+000 | 0.826 | 1.250 | 1.204 |
| 287.120 | 1.144 | 64.209 | 0.413 | 1.4607672585E+002 | 6.2153609437E+001 | 8.7288577059E+000 | 0.837 | 1.231 | 1.209 |
| 287.887 | 1.178 | 64.520 | 0.419 | 1.5229122657E+002 | 6.7488280042E+001 | 8.2774753631E+000 | 0.872 | 1.179 | 1.219 |
| 288.654 | 1.234 | 64.851 | 0.430 | 1.5877603441E+002 | 7.3246628030E+001 | 8.1539105978E+000 | 0.908 | 1.135 | 1.223 |
| 288.815 | 1.244 | 64.919 | 0.429 | 1.6007538836E+002 | 7.4426683869E+001 | 8.1075467163E+000 | 0.915 | 1.127 | 1.223 |
| 289.582 | 1.282 | 65.249 | 0.434 | 1.6635474061E+002 | 8.0204075240E+001 | 8.1478378030E+000 | 0.949 | 1.092 | 1.223 |
| 290.349 | 1.326 | 65.585 | 0.436 | 1.7257580689E+002 | 8.6075387725E+001 | 7.9406056366E+000 | 0.981 | 1.062 | 1.220 |
| 290.894 | 1.354 | 65.821 | 0.434 | 1.7684059397E+002 | 9.0199141092E+001 | 7.7752038029E+000 | 1.003 | 1.044 | 1.216 |
| 290.990 | 1.358 | 65.864 | 0.453 | 1.7758361457E+002 | 9.0934721298E+001 | 7.7791998567E+000 | 1.007 | 1.041 | 1.216 |
| 291.757 | 1.398 | 66.212 | 0.504 | 1.8362426994E+002 | 9.7001724225E+001 | 8.4903114841E+000 | 1.039 | 1.018 | 1.210 |
| 292.524 | 1.515 | 66.637 | 0.553 | 1.9060945646E+002 | 1.0421409704E+002 | 8.8593822298E+000 | 1.076 | 0.996 | 1.203 |
| 293.047 | 1.593 | 66.926 | 0.514 | 1.9515547342E+002 | 1.089835884E+002 | 8.1049391814E+000 | 1.099 | 0.983 | 1.198 |
| 293.814 | 1.645 | 67.300 | 0.488 | 2.0071317215E+002 | 1.1495420307E+002 | 7.1517409203E+000 | 1.127 | 0.969 | 1.192 |
| 293.820 | 1.645 | 67.303 | 0.510 | 2.0075351929E+002 | 1.1499756002E+002 | 7.1501873461E+000 | 1.127 | 0.969 | 1.192 |
| 294.587 | 1.713 | 67.694 | 0.505 | 2.0614799694E+002 | 1.2079577358E+002 | 6.6580452017E+000 | 1.153 | 0.958 | 1.187 |
| 295.316 | 1.770 | 68.058 | 0.507 | 2.1073928011E+002 | 1.2574014861E+002 | 6.0071361364E+000 | 1.174 | 0.949 | 1.183 |
| 296.083 | 1.829 | 68.453 | 0.528 | 2.1510865422E+002 | 1.3044613651E+002 | 5.3783992021E+000 | 1.193 | 0.943 | 1.179 |
| 296.850 | 1.907 | 68.868 | 0.519 | 2.1899082398E+002 | 1.3461591279E+002 | 4.2693367839E+000 | 1.209 | 0.937 | 1.176 |
| 297.617 | 1.953 | 69.250 | 0.502 | 2.2165867373E+002 | 1.3748619214E+002 | 2.7960505359E+000 | 1.220 | 0.935 | 1.174 |
| 297.818 | 1.969 | 69.354 | 0.518 | 2.2218489907E+002 | 1.3808971248E+002 | 2.0033906889E+000 | 1.223 | 0.934 | 1.174 |
| 297.860 | 1.970 | 69.376 | 0.525 | 2.2226378863E+002 | 1.3818606352E+002 | 1.8516887625E+000 | 1.223 | 0.934 | 1.174 |
| 298.627 | 1.997 | 69.778 | 0.525 | 2.2335964191E+002 | 1.3960657975E+002 | 7.9450504013E-001 | 1.230 | 0.934 | 1.174 |
| 299.394 | 2.024 | 70.181 | 0.525 | 2.2348271882E+002 | 1.4018519246E+002 | -5.8665997319E-001 | 1.234 | 0.935 | 1.174 |
| 299.936 | 2.042 | 70.466 | 0.548 | 2.2287893422E+002 | 1.4005607416E+002 | -1.7714071092E+000 | 1.236 | 0.937 | 1.175 |
| 300.703 | 2.049 | 70.899 | 0.565 | 2.2080650387E+002 | 1.3884354386E+002 | -3.3852917253E+000 | 1.237 | 0.942 | 1.178 |
| 301.470 | 2.055 | 71.332 | 0.565 | 2.1768521726E+002 | 1.3680672685E+002 | -4.8206151469E+000 | 1.236 | 0.949 | 1.181 |
| 301.941 | 2.059 | 71.598 | 0.589 | 2.1519695877E+002 | 1.3511124224E+002 | -5.9180663209E+000 | 1.235 | 0.954 | 1.184 |
| 302.485 | 2.047 | 71.929 | 0.597 | 2.1158019349E+002 | 1.3259566354E+002 | -7.1525206010E+000 | 1.233 | 0.961 | 1.188 |
| 303.252 | 2.014 | 72.381 | 0.593 | 2.0555178223E+002 | 1.2832312307E+002 | -8.5962045610E+000 | 1.228 | 0.974 | 1.195 |
| 303.560 | 2.005 | 72.567 | 0.616 | 2.0281386925E+002 | 1.2634895753E+002 | -9.4880998776E+000 | 1.226 | 0.980 | 1.198 |
| 303.819 | 2.005 | 72.730 | 0.603 | 2.0022433232E+002 | 1.2445211451E+002 | -1.0261872951E+001 | 1.223 | 0.986 | 1.201 |
| 304.586 | 1.919 | 73.185 | 0.647 | 1.9173474112E+002 | 1.1812550602E+002 | -1.2757120886E+001 | 1.212 | 1.008 | 1.212 |
| 305.353 | 1.915 | 73.723 | 0.697 | 1.8065234842E+002 | 1.0967501238E+002 | -1.4722948597E+001 | 1.194 | 1.040 | 1.227 |
| 305.866 | 1.909 | 74.077 | 0.700 | 1.7301777583E+002 | 1.0380239555E+002 | -1.5265635565E+001 | 1.180 | 1.065 | 1.238 |
| 306.633 | 1.835 | 74.618 | 0.713 | 1.6089555081E+002 | 9.4479582994E+001 | -1.6175462547E+001 | 1.155 | 1.112 | 1.258 |
| 307.400 | 1.773 | 75.171 | 0.718 | 1.4820136974E+002 | 8.4772575465E+001 | -1.6867361700E+001 | 1.125 | 1.171 | 1.281 |
| 307.991 | 1.722 | 75.594 | 0.739 | 1.3808521566E+002 | 7.7127847469E+001 | -1.7532016705E+001 | 1.099 | 1.230 | 1.301 |
| 308.758 | 1.630 | 76.175 | 0.758 | 1.2421954337E+002 | 6.6963448193E+001 | -1.8079609595E+001 | 1.061 | 1.335 | 1.329 |
| 309.525 | 1.538 | 76.756 | 0.758 | 1.1034746581E+002 | 5.7083422918E+001 | -1.6718496881E+001 | 1.018 | 1.474 | 1.360 |
| 310.292 | 1.445 | 77.337 | 0.755 | 9.8570013618E+001 | 4.9056158632E+001 | -1.4764064488E+001 | 0.979 | 1.631 | 1.388 |
| 310.430 | 1.427 | 77.439 | 0.719 | 9.6550030183E+001 | 4.7720428072E+001 | -1.4636900917E+001 | 0.972 | 1.662 | 1.392 |
| 310.507 | 1.411 | 77.492 | 0.676 | 9.5420591250E+001 | 4.6981604016E+001 | -1.4579820982E+001 | 0.969 | 1.680 | 1.395 |
| 311.150 | 1.240 | 77.926 | 0.690 | 8.6290506236E+001 | 4.1219318582E+001 | -1.4152969472E+001 | 0.940 | 1.844 | 1.414 |
| 311.917 | 1.056 | 78.465 | 0.718 | 7.5480668321E+001 | 3.4678732641E+001 | -1.3799611896E+001 | 0.904 | 2.081 | 1.435 |
| 312.684 | 0.896 | 79.027 | 0.739 | 6.5119131894E+001 | 2.8773759493E+001 | -1.3116495364E+001 | 0.869 | 2.335 | 1.450 |

| | | | | | | | | | |
|---------|-------|--------|-------|-------------------|-------------------|--------------------|-------|-------|-------|
| 313.451 | 0.744 | 79.598 | 0.743 | 5.5357331846E+001 | 2.3458570627E+001 | -1.2131940030E+001 | 0.834 | 2.599 | 1.461 |
| 314.218 | 0.590 | 80.167 | 0.741 | 4.6506300910E+001 | 1.8875800773E+001 | -1.0104962207E+001 | 0.798 | 2.811 | 1.465 |
| 314.226 | 0.588 | 80.172 | 0.759 | 4.6424678850E+001 | 1.8834839428E+001 | -1.0099825617E+001 | 0.798 | 2.812 | 1.465 |
| 314.610 | 0.506 | 80.464 | 0.795 | 4.2369876045E+001 | 1.6830840912E+001 | -1.0493620554E+001 | 0.781 | 2.838 | 1.464 |
| 315.377 | 0.383 | 81.088 | 0.876 | 3.4441859096E+001 | 1.3034920847E+001 | -1.0860872366E+001 | 0.745 | 2.782 | 1.457 |
| 316.140 | 0.358 | 81.805 | 0.878 | 2.5757146921E+001 | 8.9522102459E+000 | -1.0121961913E+001 | 0.684 | 2.690 | 1.446 |
| 316.907 | 0.237 | 82.430 | 0.862 | 1.8965887951E+001 | 5.9098086527E+000 | -8.3797345114E+000 | 0.613 | 2.258 | 1.418 |
| 317.674 | 0.188 | 83.127 | 0.976 | 1.2900952300E+001 | 3.4040270751E+000 | -8.1785960894E+000 | 0.519 | 1.674 | 1.370 |
| 318.070 | 0.241 | 83.566 | 0.931 | 9.6082642015E+000 | 2.1099047531E+000 | -7.0261261017E+000 | 0.432 | 1.386 | 1.335 |
| 318.837 | 0.140 | 84.211 | 0.881 | 6.1407895357E+000 | 9.3405397387E-001 | -3.9418008092E+000 | 0.299 | 1.171 | 1.297 |
| 319.604 | 0.101 | 84.918 | 0.954 | 3.5607506089E+000 | 3.2214707391E-001 | -3.0479429944E+000 | 0.178 | 1.099 | 1.296 |
| 320.371 | 0.110 | 85.674 | 0.948 | 1.4646332355E+000 | 5.2689827341E-002 | -1.9954772944E+000 | 0.071 | 1.194 | 1.392 |
| 321.010 | 0.066 | 86.251 | 0.903 | 5.8207619962E-001 | 1.0546013626E-002 | -1.0906269040E+000 | 0.043 | 1.344 | 1.509 |
| 321.777 | 0.012 | 86.944 | 0.898 | 1.3722176926E-002 | 9.9998809468E-005 | -7.5176261222E-002 | 0.043 | 0.819 | 0.912 |
| 321.825 | 0.004 | 86.982 | 0.898 | 1.2112458577E-002 | 9.7444976322E-005 | -5.0832773886E-002 | 0.043 | 0.851 | 0.945 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
ht(m) : Altezza linea di thrust da nodo sinistro base concio
yt(m) : coordinata Y linea di trust
yt'(-) : gradiente pendenza locale linea di trust
E(x)(kN/m) : Forza Normale interconcio
T(x)(kN/m) : Forza Tangenziale interconcio
E' (kN) : derivata Forza normale interconcio
Rho(x) (-) : fattore mobilitazione resistenza al taglio verticale interconcio ZhU et al.(2003)
FS_qFEM(x)(-) : fattore di sicurezza locale stimato (locale in X) by qFEM
FS_srmFEM(x)(-) : fattore di sicurezza locale stimato (locale in X) by SRM Procedure

TABELLA SFORZI DI TAGLIO DISTRIBUITI LUNGO SUPERFICIE INDIVIDUATA CON MINOR FS

| X (m) | dx (m) | dl (m) | alpha (°) | TauStress (kPa) | TauF (kN/m) | TauStrength (kPa) | TauS (kN/m) |
|----------|-----------|-----------|--------------|--------------------|----------------|----------------------|----------------|
| 219.394 | 0.767 | 0.864 | 27.377 | 0.199 | 0.172 | 0.250 | 0.216 |
| 220.161 | 0.767 | 0.864 | 27.377 | 0.597 | 0.516 | 0.749 | 0.647 |
| 220.928 | 0.767 | 0.864 | 27.377 | 0.995 | 0.860 | 1.248 | 1.078 |
| 221.695 | 0.767 | 0.864 | 27.377 | 1.393 | 1.204 | 1.747 | 1.509 |
| 222.463 | 0.767 | 0.864 | 27.377 | 1.792 | 1.548 | 2.246 | 1.941 |
| 223.230 | 0.340 | 0.383 | 27.377 | 2.079 | 0.797 | 2.607 | 0.999 |
| 223.570 | 0.767 | 0.864 | 27.377 | 2.366 | 2.044 | 2.967 | 2.563 |
| 224.337 | 0.767 | 0.864 | 27.377 | 2.764 | 2.388 | 3.466 | 2.994 |
| 225.104 | 0.767 | 0.864 | 27.377 | 3.162 | 2.732 | 3.965 | 3.425 |
| 225.871 | 0.767 | 0.864 | 27.377 | 3.561 | 3.076 | 4.465 | 3.857 |
| 226.638 | 0.217 | 0.245 | 27.377 | 3.816 | 0.933 | 4.785 | 1.170 |
| 226.856 | 0.767 | 0.859 | 26.779 | 4.053 | 3.483 | 5.216 | 4.482 |
| 227.623 | 0.477 | 0.535 | 26.779 | 4.440 | 2.374 | 5.714 | 3.055 |
| 228.100 | 0.767 | 0.859 | 26.779 | 4.826 | 4.147 | 6.210 | 5.336 |
| 228.867 | 0.767 | 0.859 | 26.779 | 5.300 | 4.554 | 6.821 | 5.861 |
| 229.634 | 0.767 | 0.859 | 26.779 | 5.775 | 4.962 | 7.431 | 6.385 |
| 230.401 | 0.177 | 0.198 | 26.779 | 6.067 | 1.204 | 7.807 | 1.549 |
| 230.578 | 0.767 | 0.851 | 25.601 | 6.240 | 5.308 | 8.463 | 7.199 |
| 231.346 | 0.767 | 0.851 | 25.601 | 6.860 | 5.835 | 9.306 | 7.916 |
| 232.113 | 0.642 | 0.712 | 25.601 | 7.429 | 5.291 | 10.079 | 7.179 |
| 232.755 | 0.417 | 0.462 | 25.601 | 7.857 | 3.630 | 10.659 | 4.925 |
| 233.172 | 0.767 | 0.841 | 24.270 | 8.100 | 6.816 | 11.693 | 9.839 |
| 233.939 | 0.767 | 0.841 | 24.270 | 8.867 | 7.461 | 12.802 | 10.773 |
| 234.706 | 0.735 | 0.806 | 24.270 | 9.617 | 7.749 | 13.889 | 11.191 |
| 235.440 | 0.767 | 0.831 | 22.578 | 9.909 | 8.232 | 15.556 | 12.924 |
| 236.207 | 0.767 | 0.831 | 22.578 | 10.834 | 9.001 | 17.019 | 14.139 |
| 236.975 | 0.435 | 0.472 | 22.578 | 11.560 | 5.451 | 18.171 | 8.569 |
| 237.410 | 0.126 | 0.137 | 22.578 | 11.899 | 1.628 | 18.710 | 2.560 |
| 237.536 | 0.767 | 0.823 | 21.215 | 11.911 | 9.801 | 20.128 | 16.563 |
| 238.303 | 0.767 | 0.823 | 21.215 | 12.942 | 10.650 | 21.908 | 18.027 |
| 239.071 | 0.510 | 0.547 | 21.215 | 13.801 | 7.549 | 23.388 | 12.793 |
| 239.580 | 0.767 | 0.816 | 19.848 | 13.947 | 11.374 | 25.553 | 20.839 |
| 240.348 | 0.767 | 0.816 | 19.848 | 15.063 | 12.285 | 27.734 | 22.618 |
| 241.115 | 0.590 | 0.627 | 19.848 | 16.051 | 10.060 | 29.715 | 18.624 |
| 241.704 | 0.767 | 0.809 | 18.552 | 16.154 | 13.071 | 32.337 | 26.165 |
| 242.471 | 0.767 | 0.809 | 18.552 | 17.332 | 14.024 | 34.798 | 28.157 |
| 243.238 | 0.696 | 0.734 | 18.552 | 18.455 | 13.547 | 36.952 | 27.125 |
| 243.934 | 0.767 | 0.804 | 17.421 | 18.591 | 14.947 | 39.915 | 32.091 |
| 244.701 | 0.767 | 0.804 | 17.421 | 19.806 | 15.924 | 42.506 | 34.174 |
| 245.469 | 0.767 | 0.804 | 17.421 | 21.022 | 16.901 | 44.917 | 36.112 |

| | | | | | | | |
|---------|-------|-------|--------|--------|--------|--------|--------|
| 246.236 | 0.177 | 0.186 | 17.421 | 21.770 | 4.043 | 46.493 | 8.635 |
| 246.413 | 0.767 | 0.813 | 19.368 | 24.569 | 19.978 | 46.522 | 37.828 |
| 247.180 | 0.020 | 0.021 | 19.368 | 25.155 | 0.535 | 47.592 | 1.011 |
| 247.200 | 0.767 | 0.813 | 19.368 | 25.740 | 20.930 | 48.627 | 39.539 |
| 247.967 | 0.597 | 0.632 | 19.368 | 26.755 | 16.919 | 50.477 | 31.921 |
| 248.564 | 0.421 | 0.453 | 21.688 | 30.126 | 13.659 | 49.923 | 22.635 |
| 248.985 | 0.767 | 0.826 | 21.688 | 30.898 | 25.508 | 51.159 | 42.234 |
| 249.752 | 0.767 | 0.826 | 21.688 | 31.895 | 26.331 | 52.729 | 43.530 |
| 250.519 | 0.088 | 0.094 | 21.688 | 32.451 | 3.057 | 53.630 | 5.053 |
| 250.607 | 0.767 | 0.841 | 24.194 | 35.776 | 30.087 | 52.012 | 43.740 |
| 251.374 | 0.767 | 0.841 | 24.194 | 36.551 | 30.738 | 53.100 | 44.656 |
| 252.141 | 0.400 | 0.438 | 24.194 | 37.141 | 16.273 | 53.915 | 23.622 |
| 252.541 | 0.479 | 0.536 | 26.587 | 40.137 | 21.516 | 52.101 | 27.930 |
| 253.020 | 0.767 | 0.858 | 26.587 | 40.542 | 34.778 | 52.621 | 45.139 |
| 253.787 | 0.767 | 0.858 | 26.587 | 41.042 | 35.206 | 53.260 | 45.687 |
| 254.554 | 0.047 | 0.052 | 26.587 | 41.307 | 2.152 | 53.597 | 2.792 |
| 254.601 | 0.767 | 0.877 | 28.939 | 43.805 | 38.398 | 51.498 | 45.141 |
| 255.368 | 0.767 | 0.877 | 28.939 | 43.976 | 38.547 | 51.743 | 45.355 |
| 256.135 | 0.427 | 0.488 | 28.939 | 44.109 | 21.534 | 51.934 | 25.353 |
| 256.562 | 0.767 | 0.896 | 31.153 | 46.071 | 41.296 | 49.834 | 44.670 |
| 257.329 | 0.767 | 0.896 | 31.153 | 45.882 | 41.127 | 49.757 | 44.601 |
| 258.096 | 0.549 | 0.642 | 31.153 | 45.719 | 29.342 | 49.630 | 31.852 |
| 258.646 | 0.767 | 0.915 | 33.032 | 46.858 | 42.875 | 47.562 | 43.519 |
| 259.413 | 0.767 | 0.915 | 33.032 | 46.326 | 42.388 | 47.111 | 43.107 |
| 260.180 | 0.380 | 0.453 | 33.032 | 45.929 | 20.826 | 46.725 | 21.187 |
| 260.560 | 0.314 | 0.375 | 33.032 | 44.816 | 16.806 | 45.577 | 17.091 |
| 260.874 | 0.767 | 0.931 | 34.497 | 42.189 | 39.268 | 40.831 | 38.005 |
| 261.641 | 0.767 | 0.931 | 34.497 | 37.021 | 34.458 | 35.934 | 33.446 |
| 262.409 | 0.767 | 0.931 | 34.497 | 31.854 | 29.649 | 30.922 | 28.781 |
| 263.176 | 0.265 | 0.321 | 34.497 | 28.379 | 9.114 | 27.608 | 8.866 |
| 263.440 | 0.580 | 0.691 | 32.925 | 25.069 | 17.312 | 25.721 | 17.762 |
| 264.020 | 0.767 | 0.914 | 32.925 | 25.140 | 22.975 | 25.735 | 23.519 |
| 264.787 | 0.767 | 0.914 | 32.925 | 28.878 | 26.391 | 29.409 | 26.877 |
| 265.554 | 0.100 | 0.119 | 32.925 | 30.990 | 3.691 | 31.472 | 3.749 |
| 265.654 | 0.767 | 0.894 | 30.880 | 32.135 | 28.723 | 35.166 | 31.432 |
| 266.421 | 0.349 | 0.406 | 30.880 | 35.015 | 14.227 | 38.263 | 15.547 |
| 266.770 | 0.710 | 0.827 | 30.880 | 37.748 | 31.228 | 41.190 | 34.076 |
| 267.480 | 0.240 | 0.280 | 30.880 | 38.916 | 10.886 | 42.478 | 11.882 |
| 267.720 | 0.767 | 0.872 | 28.439 | 34.538 | 30.131 | 41.492 | 36.197 |
| 268.487 | 0.767 | 0.872 | 28.439 | 30.885 | 26.943 | 37.106 | 32.370 |
| 269.254 | 0.403 | 0.458 | 28.439 | 28.098 | 12.879 | 33.756 | 15.473 |
| 269.657 | 0.767 | 0.852 | 25.847 | 23.896 | 20.368 | 31.991 | 27.268 |
| 270.424 | 0.767 | 0.852 | 25.847 | 20.834 | 17.759 | 27.892 | 23.774 |
| 271.192 | 0.517 | 0.575 | 25.847 | 18.271 | 10.503 | 24.459 | 14.059 |
| 271.709 | 0.761 | 0.828 | 23.204 | 14.670 | 12.149 | 22.133 | 18.329 |
| 272.470 | 0.767 | 0.835 | 23.204 | 12.179 | 10.165 | 18.385 | 15.344 |
| 273.237 | 0.163 | 0.177 | 23.204 | 10.663 | 1.890 | 16.104 | 2.854 |
| 273.400 | 0.216 | 0.235 | 23.204 | 11.571 | 2.719 | 17.486 | 4.109 |
| 273.616 | 0.344 | 0.367 | 20.415 | 13.258 | 4.867 | 23.087 | 8.475 |
| 273.960 | 0.767 | 0.819 | 20.415 | 14.453 | 11.830 | 25.202 | 20.628 |
| 274.727 | 0.767 | 0.819 | 20.415 | 13.336 | 10.915 | 23.292 | 19.065 |
| 275.494 | 0.145 | 0.154 | 20.415 | 12.672 | 1.954 | 22.155 | 3.417 |
| 275.639 | 0.767 | 0.806 | 17.855 | 10.837 | 8.734 | 21.955 | 17.694 |
| 276.406 | 0.767 | 0.806 | 17.855 | 10.075 | 8.119 | 20.476 | 16.502 |
| 277.173 | 0.596 | 0.626 | 17.855 | 9.397 | 5.886 | 19.170 | 12.007 |
| 277.769 | 0.767 | 0.797 | 15.730 | 7.882 | 6.282 | 18.523 | 14.762 |
| 278.536 | 0.767 | 0.797 | 15.730 | 7.371 | 5.874 | 17.453 | 13.909 |
| 279.303 | 0.027 | 0.028 | 15.730 | 7.106 | 0.197 | 16.848 | 0.467 |
| 279.330 | 0.630 | 0.655 | 15.730 | 6.887 | 4.508 | 16.445 | 10.763 |
| 279.960 | 0.283 | 0.294 | 15.730 | 6.907 | 2.032 | 16.541 | 4.868 |
| 280.243 | 0.767 | 0.801 | 16.629 | 8.114 | 6.496 | 18.381 | 14.715 |
| 281.010 | 0.100 | 0.104 | 16.629 | 8.809 | 0.916 | 20.152 | 2.096 |
| 281.110 | 0.767 | 0.801 | 16.629 | 9.504 | 7.609 | 21.740 | 17.405 |
| 281.877 | 0.616 | 0.643 | 16.629 | 10.614 | 6.828 | 24.270 | 15.613 |
| 282.493 | 0.767 | 0.805 | 17.648 | 12.306 | 9.906 | 26.406 | 21.257 |
| 283.261 | 0.767 | 0.805 | 17.648 | 13.512 | 10.877 | 28.979 | 23.328 |
| 284.028 | 0.611 | 0.641 | 17.648 | 14.594 | 9.356 | 31.292 | 20.062 |
| 284.639 | 0.767 | 0.810 | 18.717 | 16.442 | 13.317 | 33.024 | 26.747 |
| 285.406 | 0.767 | 0.810 | 18.717 | 17.609 | 14.262 | 35.193 | 28.504 |
| 286.173 | 0.540 | 0.570 | 18.717 | 18.604 | 10.610 | 37.002 | 21.102 |
| 286.713 | 0.177 | 0.188 | 19.794 | 20.064 | 3.775 | 37.381 | 7.034 |
| 286.890 | 0.230 | 0.244 | 19.794 | 20.360 | 4.977 | 37.987 | 9.286 |
| 287.120 | 0.767 | 0.815 | 19.794 | 21.085 | 17.190 | 39.212 | 31.968 |
| 287.887 | 0.767 | 0.815 | 19.794 | 22.200 | 18.099 | 41.317 | 33.685 |
| 288.654 | 0.161 | 0.171 | 19.794 | 22.874 | 3.904 | 42.507 | 7.255 |

| | | | | | | | |
|---------|-------|-------|--------|--------|--------|--------|--------|
| 288.815 | 0.767 | 0.821 | 20.862 | 24.537 | 20.143 | 42.880 | 35.201 |
| 289.582 | 0.767 | 0.821 | 20.862 | 25.588 | 21.006 | 44.688 | 36.685 |
| 290.349 | 0.545 | 0.584 | 20.862 | 26.488 | 15.459 | 46.207 | 26.967 |
| 290.894 | 0.096 | 0.103 | 21.890 | 27.985 | 2.885 | 46.133 | 4.756 |
| 290.990 | 0.767 | 0.827 | 21.890 | 28.535 | 23.590 | 47.047 | 38.894 |
| 291.757 | 0.767 | 0.827 | 21.890 | 29.512 | 24.398 | 48.802 | 40.345 |
| 292.524 | 0.523 | 0.564 | 21.890 | 30.334 | 17.099 | 50.098 | 28.240 |
| 293.047 | 0.767 | 0.832 | 22.843 | 32.165 | 26.773 | 50.321 | 41.887 |
| 293.814 | 0.006 | 0.006 | 22.843 | 32.618 | 0.200 | 51.010 | 0.312 |
| 293.820 | 0.767 | 0.832 | 22.843 | 33.070 | 27.527 | 51.695 | 43.030 |
| 294.587 | 0.728 | 0.790 | 22.843 | 33.945 | 26.832 | 52.972 | 41.872 |
| 295.316 | 0.767 | 0.838 | 23.662 | 35.727 | 29.922 | 53.412 | 44.733 |
| 296.083 | 0.767 | 0.838 | 23.662 | 36.549 | 30.611 | 54.578 | 45.709 |
| 296.850 | 0.767 | 0.838 | 23.662 | 37.372 | 31.299 | 55.669 | 46.623 |
| 297.617 | 0.201 | 0.220 | 23.662 | 37.891 | 8.317 | 56.383 | 12.376 |
| 297.818 | 0.042 | 0.047 | 26.120 | 40.876 | 1.916 | 54.181 | 2.539 |
| 297.860 | 0.767 | 0.854 | 26.120 | 41.168 | 35.172 | 54.558 | 46.612 |
| 298.627 | 0.767 | 0.854 | 26.120 | 41.720 | 35.643 | 55.269 | 47.219 |
| 299.394 | 0.542 | 0.603 | 26.120 | 42.191 | 25.460 | 55.875 | 33.718 |
| 299.936 | 0.767 | 0.878 | 29.089 | 45.625 | 40.051 | 53.332 | 46.816 |
| 300.703 | 0.767 | 0.878 | 29.089 | 45.767 | 40.175 | 53.548 | 47.006 |
| 301.470 | 0.471 | 0.539 | 29.089 | 45.881 | 24.733 | 53.726 | 28.961 |
| 301.941 | 0.544 | 0.643 | 32.278 | 48.666 | 31.297 | 50.556 | 32.512 |
| 302.485 | 0.767 | 0.907 | 32.278 | 48.327 | 43.847 | 50.314 | 45.650 |
| 303.252 | 0.308 | 0.364 | 32.278 | 48.048 | 17.498 | 50.122 | 18.253 |
| 303.560 | 0.259 | 0.307 | 32.278 | 47.902 | 14.687 | 50.074 | 15.353 |
| 303.819 | 0.767 | 0.939 | 35.206 | 49.419 | 46.396 | 46.873 | 44.005 |
| 304.586 | 0.767 | 0.939 | 35.206 | 48.444 | 45.480 | 46.441 | 43.600 |
| 305.353 | 0.512 | 0.627 | 35.206 | 47.630 | 29.855 | 45.768 | 28.687 |
| 305.866 | 0.767 | 0.983 | 38.697 | 48.119 | 47.295 | 41.779 | 41.064 |
| 306.633 | 0.767 | 0.983 | 38.697 | 46.359 | 45.565 | 40.466 | 39.773 |
| 307.400 | 0.591 | 0.757 | 38.697 | 44.800 | 33.931 | 39.265 | 29.740 |
| 307.991 | 0.767 | 1.021 | 41.280 | 43.629 | 44.535 | 35.808 | 36.551 |
| 308.758 | 0.767 | 1.021 | 41.280 | 41.226 | 42.082 | 33.931 | 34.636 |
| 309.525 | 0.767 | 1.021 | 41.280 | 38.823 | 39.629 | 31.510 | 32.164 |
| 310.292 | 0.138 | 0.183 | 41.280 | 37.406 | 6.859 | 30.255 | 5.548 |
| 310.430 | 0.077 | 0.103 | 41.280 | 37.069 | 3.809 | 29.973 | 3.080 |
| 310.507 | 0.643 | 0.883 | 43.296 | 35.966 | 31.763 | 27.421 | 24.217 |
| 311.150 | 0.767 | 1.054 | 43.296 | 33.272 | 35.067 | 25.436 | 26.808 |
| 311.917 | 0.767 | 1.054 | 43.296 | 30.343 | 31.981 | 23.174 | 24.425 |
| 312.684 | 0.767 | 1.054 | 43.296 | 27.415 | 28.895 | 20.930 | 22.060 |
| 313.451 | 0.767 | 1.054 | 43.296 | 24.487 | 25.808 | 18.631 | 19.637 |
| 314.218 | 0.008 | 0.011 | 43.296 | 23.007 | 0.256 | 17.344 | 0.193 |
| 314.226 | 0.384 | 0.535 | 44.216 | 22.229 | 11.895 | 16.430 | 8.792 |
| 314.610 | 0.767 | 1.070 | 44.216 | 19.844 | 21.239 | 14.754 | 15.791 |
| 315.377 | 0.763 | 1.064 | 44.216 | 16.673 | 17.747 | 12.760 | 13.582 |
| 316.140 | 0.767 | 1.070 | 44.216 | 13.501 | 14.450 | 10.221 | 10.939 |
| 316.907 | 0.767 | 1.070 | 44.216 | 10.321 | 11.047 | 7.885 | 8.439 |
| 317.674 | 0.396 | 0.552 | 44.216 | 7.911 | 4.369 | 6.277 | 3.466 |
| 318.070 | 0.767 | 1.070 | 44.216 | 6.390 | 6.839 | 4.732 | 5.065 |
| 318.837 | 0.767 | 1.070 | 44.216 | 4.988 | 5.339 | 3.573 | 3.824 |
| 319.604 | 0.767 | 1.070 | 44.216 | 3.587 | 3.839 | 2.501 | 2.677 |
| 320.371 | 0.639 | 0.891 | 44.216 | 2.303 | 2.052 | 1.557 | 1.387 |
| 321.010 | 0.767 | 1.070 | 44.216 | 1.018 | 1.090 | 0.684 | 0.732 |
| 321.777 | 0.048 | 0.067 | 44.216 | 0.274 | 0.018 | 0.183 | 0.012 |
| 321.825 | 0.126 | 0.176 | 44.216 | 0.115 | 0.020 | 0.077 | 0.014 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
dx(m) : Larghezza concio
dl(m) : lunghezza base concio
alpha(°) : Angolo pendenza base concio
TauStress(kPa) : Sforzo di taglio su base concio
TauF (kN/m) : Forza di taglio su base concio
TauStrength(kPa) : Resistenza al taglio su base concio
TauS (kN/m) : Forza resistente al taglio su base concio

Strato 1 -- Parametri di resistenza al taglio equivalenti dell'ammasso roccioso
stimati secondo criterio di rottura non lineare Hoek et al.(2002)
CRITERIO DI ROTTURA Hoek et al.(2002,2006) - Generalizzato secondo Lei et al.(2016)
Fattore di riduzione NTC2018 gammaPHI=1.25 e gammaC=1.25 - DISATTIVATO

SigmaN'(kPa) TauStrength(kPa) Phi'(deg) c'(kPa)

| | | | |
|---------|---------|-------|---------|
| 25.00 | 920.66 | 71.43 | 846.24 |
| 50.00 | 1001.44 | 70.92 | 856.91 |
| 75.00 | 1084.74 | 70.41 | 873.95 |
| 100.00 | 1141.67 | 70.09 | 865.62 |
| 125.00 | 1199.69 | 69.76 | 860.60 |
| 150.00 | 1288.75 | 69.29 | 892.02 |
| 175.00 | 1349.48 | 68.98 | 894.11 |
| 200.00 | 1411.27 | 68.67 | 899.06 |
| 225.00 | 1474.12 | 68.37 | 906.75 |
| 250.00 | 1538.04 | 68.07 | 917.08 |
| 275.00 | 1603.00 | 67.78 | 929.96 |
| 300.00 | 1669.00 | 67.48 | 945.30 |
| 325.00 | 1702.39 | 67.34 | 923.92 |
| 350.00 | 1769.95 | 67.05 | 943.23 |
| 375.00 | 1838.54 | 66.77 | 964.79 |
| 400.00 | 1908.16 | 66.49 | 988.56 |
| 425.00 | 1943.35 | 66.35 | 972.70 |
| 450.00 | 2014.51 | 66.08 | 1000.02 |
| 475.00 | 2050.46 | 65.94 | 986.45 |
| 500.00 | 2123.14 | 65.67 | 1017.18 |
| 600.00 | 2347.24 | 64.88 | 1067.66 |
| 700.00 | 2540.91 | 64.23 | 1090.74 |
| 800.00 | 2740.82 | 63.60 | 1129.00 |
| 900.00 | 2946.97 | 62.99 | 1181.61 |
| 1000.00 | 3159.32 | 62.38 | 1247.85 |
| 1100.00 | 3333.67 | 61.91 | 1272.76 |
| 1200.00 | 3511.99 | 61.44 | 1307.18 |
| 1300.00 | 3694.28 | 60.98 | 1350.74 |
| 1400.00 | 3880.53 | 60.53 | 1403.16 |
| 1500.00 | 4070.76 | 60.08 | 1464.16 |
| 2000.00 | 4871.57 | 58.35 | 1627.03 |

Cuccuru Mannu (Sezione 2 verifica in condizioni sismiche)
SSAP 5.0.2 - Slope Stability Analysis Program (1991,2021)

WWW.SSAP.EU

Build No. 12007

BY

Dr. Geol. LORENZO BORSELLI *,**

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** Gia' Ricercatore CNR-IRPI fino a Luglio 2011

Ultima Revisione struttura tabelle del report: 21 Febbraio 2021

File report: \\192.168.1.231\BACKUP su PC canepa\lavorimauri\cave e miniere\Minerale industriali\Cuccurumannu\Sap\Verifica dinamica.txt

Data: 6/12/2021

Localita' :

Descrizione:

Modello pendio: Verdinamica.mod

----- PARAMETRI DEL MODELLO DEL PENDIO -----

__ PARAMETRI GEOMETRICI - Coordinate X Y (in m) __

| SUP T. | | SUP 2 | | SUP 3 | | SUP 4 | |
|--------|-------|--------|-------|-------|---|-------|---|
| X | Y | X | Y | X | Y | X | Y |
| 10.00 | 10.00 | 61.53 | 10.00 | - | - | - | - |
| 61.53 | 10.00 | 78.91 | 20.00 | - | - | - | - |
| 78.91 | 20.00 | 123.90 | 46.00 | - | - | - | - |
| 123.90 | 46.00 | 290.50 | 46.00 | - | - | - | - |
| 290.50 | 46.00 | 297.72 | 42.00 | - | - | - | - |
| 297.72 | 42.00 | 307.03 | 40.00 | - | - | - | - |
| 307.03 | 40.00 | 335.71 | 40.00 | - | - | - | - |
| 335.71 | 40.00 | 327.17 | 38.00 | - | - | - | - |
| - | - | 300.54 | 38.00 | - | - | - | - |
| - | - | 283.80 | 40.00 | - | - | - | - |
| - | - | 262.05 | 40.00 | - | - | - | - |
| - | - | 231.40 | 40.00 | - | - | - | - |
| - | - | 221.34 | 40.00 | - | - | - | - |
| - | - | 205.48 | 36.00 | - | - | - | - |

| | | | | | | | |
|---|---|--------|-------|---|---|---|---|
| - | - | 191.08 | 32.00 | - | - | - | - |
| - | - | 171.51 | 30.00 | - | - | - | - |
| - | - | 147.53 | 26.00 | - | - | - | - |
| - | - | 138.11 | 24.00 | - | - | - | - |
| - | - | 122.16 | 22.00 | - | - | - | - |
| - | - | 113.97 | 20.00 | - | - | - | - |
| - | - | 94.75 | 14.00 | - | - | - | - |
| - | - | 75.96 | 10.00 | - | - | - | - |
| - | - | 61.53 | 10.00 | - | - | - | - |

ASSENZA DI FALDA

----- PARAMETRI GEOMECCANICI -----

| | fi` | C` | Cu | Gamm | Gamm_sat | STR_IDX | sgci | GSI | mi | D | |
|----------|-------|------|------|------|----------|---------|--------|--------|-------|-------|------|
| STRATO 1 | 0.00 | 0.00 | 0.00 | 0.00 | 26.00 | 26.00 | 18.478 | 175.00 | 65.00 | 30.00 | 1.00 |
| STRATO 2 | 38.00 | 0.00 | 0.00 | 0.00 | 21.00 | 22.00 | 2.781 | 0.00 | 0.00 | 0.00 | 0.00 |

LEGENDA: fi` _____ Angolo di attrito interno efficace(in gradi)

C` _____ Coesione efficace (in Kpa)

Cu _____ Resistenza al taglio Non drenata (in Kpa)

Gamm _____ Peso di volume terreno fuori falda (in KN/m^3)

Gamm_sat _____ Peso di volume terreno immerso (in KN/m^3)

STR_IDX _____ Indice di resistenza (usato in solo in 'SNIFF SEARCH') (adimensionale)

---- SOLO Per AMMASSI ROCCIOSI FRATTURATI - Parametri Criterio di Rottura di Hoek (2002)-

sgci _____ Resistenza Compressione Uniassiale Roccia Intatta (in MPa)

GSi _____ Geological Strength Index ammasso(adimensionale)

mi _____ Indice litologico ammasso(adimensionale)

D _____ Fattore di disturbo ammasso(adimensionale)

Fattore di riduzione NTC2018: gammaPHI=1.25 e gammaC=1.25 - DISATTIVATO (solo per ROCCE)

Uso CRITERIO DI ROTTURA Hoek et al.(2002,2006) - non-lineare - Generalizzato, secondo Lei et al.(2016)

----- INFORMAZIONI GENERAZIONE SUPERFICI RANDOM -----

*** PARAMETRI PER LA GENERAZIONE DELLE SUPERFICI

MOTORE DI RICERCA: RANDOM SEARCH - Siegel (1981)

FILTRAGGIO SUPERFICI: ATTIVATO

COORDINATE X1,X2,Y OSTACOLO: 0.00 0.00 0.00

LUNGHEZZA MEDIA SEGMENTI (m)*: 1.1 (+/-) 50%

INTERVALLO ASCISSE RANDOM STARTING POINT (Xmin .. Xmax): 61.00 81.00

LIVELLO MINIMO CONSIDERATO (Ymin): 0.00

INTERVALLO ASCISSE AMMESSO PER LA TERMINAZIONE (Xmin .. Xmax): 133.00 329.20

TOTALE SUPERFICI GENERATE: 1000

*NOTA IMPORTANTE: La lunghezza media dei segmenti non viene considerata nel caso di uso del motore di ricerca NEW RANOM SEARCH

----- INFORMAZIONI PARAMETRI DI CALCOLO -----

METODO DI CALCOLO: MORGENSTERN - PRICE (Morgenstern & Price, 1965)

METODO DI ESPLORAZIONE CAMPO VALORI (lambda0,Fs0) ADOTTATO: A (rapido)

COEFFICIENTE SISMICO UTILIZZATO Kh: 0.0360

COEFFICIENTE SISMICO UTILIZZATO Kv (assunto Positivo): 0.0180

COEFFICIENTE c=Kv/Kh UTILIZZATO: 0.5000

FORZA ORIZZONTALE ADDIZIONALE IN TESTA (kN/m): 0.00

FORZA ORIZZONTALE ADDIZIONALE ALLA BASE (kN/m): 0.00

N.B. Le forze orizzontali addizionali in testa e alla base sono poste uguali a 0 durante le tutte le verifiche globali.

I valori >0 impostati dall'utente sono utilizzati solo in caso di verifica singola

----- RISULTATO FINALE ELABORAZIONI -----

* DATI RELATIVI ALLE 10 SUPERFICI GENERATE CON MINOR Fs *

| | | | | | | |
|---------------------------|--------|--------|-----|-------|---------|--------|
| Fattore di sicurezza (FS) | 1.4305 | - Min. | - X | Y | Lambda= | 0.7656 |
| | 71.77 | | | 15.89 | | |
| | 72.63 | | | 15.64 | | |
| | 73.87 | | | 15.77 | | |
| | 75.93 | | | 16.35 | | |
| | 76.80 | | | 16.73 | | |
| | 79.03 | | | 17.65 | | |
| | 79.91 | | | 17.85 | | |
| | 81.35 | | | 18.28 | | |
| | 83.38 | | | 19.05 | | |
| | 84.41 | | | 19.62 | | |
| | 85.42 | | | 20.20 | | |
| | 86.65 | | | 21.21 | | |

| | |
|--------|-------|
| 88.24 | 21.62 |
| 89.80 | 22.25 |
| 91.80 | 22.99 |
| 93.03 | 23.68 |
| 94.28 | 24.89 |
| 95.93 | 26.38 |
| 97.78 | 27.75 |
| 99.61 | 29.06 |
| 101.43 | 30.05 |
| 103.28 | 30.40 |
| 105.24 | 31.22 |
| 106.68 | 31.83 |
| 108.74 | 32.57 |
| 109.69 | 33.02 |
| 110.88 | 33.79 |
| 112.48 | 34.65 |
| 113.64 | 35.46 |
| 114.43 | 36.13 |
| 116.10 | 37.27 |
| 117.99 | 38.52 |
| 118.73 | 39.03 |
| 119.51 | 39.39 |
| 121.51 | 40.28 |
| 122.82 | 40.71 |
| 124.06 | 41.28 |
| 125.37 | 42.15 |
| 126.97 | 43.64 |
| 127.80 | 43.92 |
| 128.94 | 44.60 |
| 130.92 | 45.41 |
| 132.78 | 45.71 |
| 133.57 | 45.93 |
| 133.72 | 46.00 |

Fattore di sicurezza (FS) 1.4558 - N.2 -- X Y Lambda= 0.4437

| | |
|--------|-------|
| 79.99 | 20.62 |
| 81.81 | 19.82 |
| 82.80 | 19.58 |
| 84.01 | 19.96 |
| 85.61 | 20.68 |
| 86.96 | 21.39 |
| 88.26 | 22.13 |
| 89.24 | 22.31 |
| 90.90 | 23.20 |
| 91.92 | 23.98 |
| 93.50 | 24.99 |
| 95.08 | 26.09 |
| 96.35 | 26.99 |
| 97.61 | 27.80 |
| 98.74 | 28.41 |
| 99.47 | 28.81 |
| 100.05 | 29.23 |
| 101.53 | 30.17 |
| 102.88 | 30.57 |
| 104.17 | 31.20 |
| 105.85 | 32.18 |
| 106.62 | 32.73 |
| 107.68 | 33.03 |
| 109.35 | 33.99 |
| 110.88 | 35.01 |
| 112.17 | 35.87 |
| 113.34 | 36.94 |
| 114.53 | 37.74 |
| 115.66 | 38.60 |
| 116.79 | 38.86 |
| 117.72 | 39.18 |
| 118.98 | 39.48 |
| 120.23 | 40.40 |
| 121.35 | 41.15 |
| 122.29 | 41.60 |
| 123.92 | 41.92 |
| 125.21 | 42.51 |
| 126.63 | 43.09 |
| 127.60 | 43.50 |

| | | | | | |
|---------------------------|--------|----------|---|---|----------------|
| | 129.03 | 44.43 | | | |
| | 129.95 | 45.01 | | | |
| | 130.99 | 45.15 | | | |
| | 132.73 | 45.89 | | | |
| | 133.72 | 45.92 | | | |
| | 135.55 | 45.74 | | | |
| | 136.26 | 46.00 | | | |
| | | | | | |
| Fattore di sicurezza (FS) | 1.4603 | - N.3 -- | X | Y | Lambda= 0.6358 |
| | 64.07 | 11.46 | | | |
| | 66.04 | 11.25 | | | |
| | 67.02 | 11.63 | | | |
| | 68.16 | 11.90 | | | |
| | 69.24 | 12.11 | | | |
| | 70.70 | 12.50 | | | |
| | 72.72 | 13.19 | | | |
| | 73.95 | 13.45 | | | |
| | 75.26 | 13.81 | | | |
| | 76.62 | 14.23 | | | |
| | 77.87 | 14.81 | | | |
| | 79.42 | 15.60 | | | |
| | 81.03 | 16.13 | | | |
| | 82.02 | 16.43 | | | |
| | 83.06 | 16.83 | | | |
| | 83.80 | 17.32 | | | |
| | 84.75 | 17.91 | | | |
| | 86.43 | 19.05 | | | |
| | 88.10 | 20.03 | | | |
| | 89.72 | 21.38 | | | |
| | 90.59 | 21.92 | | | |
| | 91.78 | 22.95 | | | |
| | 93.15 | 24.09 | | | |
| | 94.66 | 25.17 | | | |
| | 95.66 | 25.95 | | | |
| | 96.82 | 26.45 | | | |
| | 98.62 | 27.95 | | | |
| | 99.66 | 28.50 | | | |
| | 101.26 | 29.48 | | | |
| | 102.97 | 29.70 | | | |
| | 104.23 | 30.23 | | | |
| | 105.93 | 31.23 | | | |
| | 106.90 | 32.20 | | | |
| | 107.98 | 33.28 | | | |
| | 108.96 | 34.29 | | | |
| | 111.15 | 35.04 | | | |
| | 112.30 | 35.56 | | | |
| | 114.16 | 36.05 | | | |
| | 116.22 | 37.17 | | | |
| | 118.48 | 37.81 | | | |
| | 119.67 | 38.46 | | | |
| | 121.17 | 39.59 | | | |
| | 122.57 | 40.16 | | | |
| | 123.43 | 40.49 | | | |
| | 125.25 | 41.64 | | | |
| | 127.06 | 42.24 | | | |
| | 129.12 | 42.84 | | | |
| | 130.32 | 43.47 | | | |
| | 131.96 | 44.64 | | | |
| | 132.86 | 45.67 | | | |
| | 133.18 | 46.00 | | | |
| | | | | | |
| Fattore di sicurezza (FS) | 1.4606 | - N.4 -- | X | Y | Lambda= 0.6796 |
| | 63.19 | 10.96 | | | |
| | 64.33 | 10.57 | | | |
| | 65.99 | 10.38 | | | |
| | 68.16 | 10.21 | | | |
| | 70.17 | 10.57 | | | |
| | 71.68 | 10.80 | | | |
| | 73.20 | 10.94 | | | |
| | 74.11 | 11.47 | | | |
| | 75.54 | 12.03 | | | |
| | 76.83 | 12.13 | | | |
| | 78.62 | 13.04 | | | |

| | |
|--------|-------|
| 80.56 | 13.94 |
| 81.51 | 14.55 |
| 83.30 | 15.53 |
| 85.22 | 16.58 |
| 87.19 | 17.84 |
| 88.89 | 19.09 |
| 91.05 | 20.15 |
| 92.30 | 20.70 |
| 94.12 | 21.49 |
| 95.28 | 21.68 |
| 96.21 | 21.98 |
| 98.33 | 22.40 |
| 99.15 | 22.82 |
| 101.11 | 24.24 |
| 102.14 | 24.76 |
| 103.00 | 25.18 |
| 104.24 | 26.45 |
| 105.30 | 27.44 |
| 106.31 | 28.05 |
| 107.71 | 28.81 |
| 108.80 | 29.35 |
| 110.85 | 30.44 |
| 112.18 | 31.26 |
| 113.28 | 31.92 |
| 114.53 | 33.22 |
| 116.24 | 34.44 |
| 117.19 | 35.15 |
| 118.04 | 36.16 |
| 118.72 | 36.74 |
| 119.67 | 37.65 |
| 120.93 | 38.74 |
| 122.65 | 40.22 |
| 123.57 | 40.69 |
| 125.58 | 41.59 |
| 127.27 | 42.28 |
| 129.29 | 43.16 |
| 130.19 | 43.31 |
| 131.66 | 43.38 |
| 133.11 | 44.11 |
| 134.75 | 44.96 |
| 136.49 | 45.74 |
| 136.85 | 46.00 |

Fattore di sicurezza (FS) 1.4643 - N.5 -- X Y Lambda= 0.7189

| | |
|--------|-------|
| 73.54 | 16.91 |
| 75.67 | 16.70 |
| 76.69 | 16.65 |
| 78.77 | 16.60 |
| 79.83 | 16.65 |
| 81.49 | 17.45 |
| 82.31 | 18.19 |
| 84.22 | 19.42 |
| 85.94 | 20.81 |
| 86.96 | 21.06 |
| 89.29 | 21.76 |
| 90.21 | 21.74 |
| 92.42 | 22.23 |
| 93.76 | 23.07 |
| 95.27 | 24.18 |
| 96.93 | 25.50 |
| 98.45 | 26.14 |
| 100.06 | 27.16 |
| 101.80 | 27.67 |
| 103.38 | 28.86 |
| 104.71 | 29.09 |
| 106.05 | 29.39 |
| 107.60 | 30.04 |
| 109.74 | 31.29 |
| 110.51 | 31.81 |
| 112.19 | 33.01 |
| 113.91 | 33.40 |
| 115.24 | 34.24 |
| 116.58 | 35.30 |
| 117.87 | 36.18 |

| | |
|--------|-------|
| 119.14 | 37.64 |
| 120.95 | 38.67 |
| 122.51 | 39.34 |
| 123.28 | 39.92 |
| 124.54 | 40.84 |
| 126.34 | 42.20 |
| 127.28 | 42.93 |
| 128.75 | 44.05 |
| 130.34 | 44.81 |
| 132.12 | 45.35 |
| 133.51 | 46.00 |

Fattore di sicurezza (FS) 1.4724 - N.6 -- X Y Lambda= 0.5415

| | |
|--------|-------|
| 62.48 | 10.55 |
| 64.03 | 10.36 |
| 65.05 | 10.44 |
| 65.88 | 10.76 |
| 66.74 | 11.45 |
| 68.16 | 12.58 |
| 68.83 | 13.07 |
| 70.15 | 13.68 |
| 71.05 | 14.21 |
| 72.04 | 14.44 |
| 73.72 | 14.61 |
| 74.66 | 14.61 |
| 75.80 | 14.64 |
| 76.93 | 14.66 |
| 78.21 | 14.97 |
| 79.05 | 15.32 |
| 81.21 | 16.00 |
| 82.07 | 16.63 |
| 83.61 | 17.27 |
| 84.40 | 17.56 |
| 86.31 | 18.44 |
| 87.62 | 19.05 |
| 88.30 | 19.72 |
| 89.65 | 20.96 |
| 91.19 | 21.66 |
| 92.75 | 22.19 |
| 93.73 | 22.49 |
| 95.20 | 23.22 |
| 97.16 | 24.27 |
| 98.47 | 25.09 |
| 100.45 | 26.35 |
| 102.01 | 27.64 |
| 103.48 | 29.30 |
| 104.18 | 30.00 |
| 105.59 | 31.33 |
| 106.91 | 32.88 |
| 108.05 | 33.69 |
| 109.78 | 34.24 |
| 111.02 | 34.74 |
| 111.87 | 35.10 |
| 113.49 | 36.14 |
| 115.16 | 37.50 |
| 116.87 | 38.83 |
| 118.59 | 39.87 |
| 120.72 | 40.53 |
| 122.68 | 40.79 |
| 123.99 | 41.09 |
| 125.37 | 41.77 |
| 126.71 | 42.39 |
| 128.02 | 43.25 |
| 129.39 | 44.11 |
| 131.53 | 44.66 |
| 133.39 | 45.07 |
| 134.76 | 45.82 |
| 135.00 | 46.00 |

Fattore di sicurezza (FS) 1.4769 - N.7 -- X Y Lambda= 0.7885

| | |
|-------|-------|
| 65.47 | 12.27 |
| 67.00 | 11.97 |
| 67.96 | 12.17 |

| | |
|--------|-------|
| 69.73 | 12.53 |
| 71.18 | 13.44 |
| 72.72 | 14.58 |
| 73.45 | 15.30 |
| 74.50 | 15.88 |
| 75.83 | 16.31 |
| 77.46 | 16.90 |
| 79.64 | 17.95 |
| 80.51 | 18.38 |
| 81.46 | 19.03 |
| 82.54 | 19.83 |
| 83.56 | 20.59 |
| 84.30 | 21.32 |
| 85.22 | 22.18 |
| 86.55 | 22.76 |
| 88.81 | 23.19 |
| 90.26 | 23.22 |
| 91.24 | 23.29 |
| 93.72 | 23.97 |
| 94.92 | 24.89 |
| 97.03 | 25.81 |
| 98.61 | 26.20 |
| 100.18 | 27.00 |
| 101.98 | 28.47 |
| 103.81 | 29.16 |
| 105.97 | 30.31 |
| 108.13 | 31.37 |
| 109.41 | 32.05 |
| 111.05 | 33.43 |
| 112.02 | 33.78 |
| 113.47 | 34.31 |
| 114.44 | 34.51 |
| 115.74 | 35.01 |
| 117.81 | 36.26 |
| 120.05 | 37.31 |
| 122.15 | 38.30 |
| 124.34 | 39.57 |
| 125.44 | 40.34 |
| 126.24 | 41.10 |
| 127.20 | 41.98 |
| 129.03 | 42.93 |
| 131.23 | 44.11 |
| 132.36 | 44.72 |
| 133.92 | 45.64 |
| 134.50 | 46.00 |

Fattore di sicurezza (FS) 1.4846 - N.8 -- X Y Lambda= 0.6537

| | |
|--------|-------|
| 65.73 | 12.42 |
| 68.16 | 12.75 |
| 69.29 | 12.73 |
| 70.42 | 12.76 |
| 72.32 | 13.22 |
| 73.85 | 13.63 |
| 76.43 | 14.26 |
| 77.66 | 14.66 |
| 79.38 | 15.15 |
| 80.63 | 15.73 |
| 82.11 | 16.18 |
| 83.17 | 16.66 |
| 84.46 | 16.79 |
| 85.40 | 17.21 |
| 87.19 | 17.94 |
| 89.37 | 19.01 |
| 91.45 | 19.92 |
| 92.23 | 20.43 |
| 93.72 | 21.17 |
| 95.67 | 22.21 |
| 97.81 | 23.54 |
| 99.23 | 24.49 |
| 101.26 | 24.77 |
| 102.27 | 25.17 |
| 103.83 | 26.18 |
| 105.33 | 27.54 |
| 106.30 | 28.43 |

| | |
|--------|-------|
| 107.72 | 29.75 |
| 109.47 | 31.15 |
| 111.17 | 32.31 |
| 113.00 | 33.63 |
| 114.74 | 34.77 |
| 115.56 | 35.30 |
| 116.82 | 36.42 |
| 117.70 | 37.58 |
| 118.78 | 38.23 |
| 120.42 | 38.71 |
| 121.71 | 39.08 |
| 123.94 | 39.58 |
| 125.31 | 40.54 |
| 126.69 | 41.52 |
| 128.05 | 42.18 |
| 129.45 | 42.94 |
| 131.69 | 43.72 |
| 133.53 | 44.21 |
| 135.35 | 44.55 |
| 136.77 | 45.19 |
| 138.45 | 45.98 |
| 138.48 | 46.00 |

Fattore di sicurezza (FS) 1.4884 - N.9 -- X Y Lambda= 0.7014

| | |
|--------|-------|
| 68.84 | 14.21 |
| 70.87 | 13.82 |
| 72.54 | 13.32 |
| 74.11 | 13.53 |
| 76.29 | 14.00 |
| 78.30 | 15.13 |
| 80.62 | 16.44 |
| 82.98 | 17.84 |
| 84.31 | 18.99 |
| 85.43 | 19.48 |
| 87.81 | 20.34 |
| 89.03 | 20.63 |
| 91.32 | 21.36 |
| 92.71 | 21.86 |
| 94.28 | 22.33 |
| 96.28 | 22.80 |
| 98.69 | 24.06 |
| 100.46 | 24.90 |
| 102.54 | 26.81 |
| 104.24 | 28.01 |
| 106.75 | 29.22 |
| 107.90 | 29.70 |
| 110.47 | 30.59 |
| 111.78 | 31.44 |
| 113.15 | 32.55 |
| 115.01 | 33.91 |
| 116.48 | 34.68 |
| 117.53 | 35.42 |
| 119.33 | 36.68 |
| 120.63 | 37.65 |
| 121.43 | 38.46 |
| 122.57 | 39.21 |
| 124.83 | 40.36 |
| 126.11 | 40.92 |
| 127.20 | 41.19 |
| 128.32 | 41.51 |
| 129.40 | 41.82 |
| 130.62 | 42.65 |
| 132.33 | 43.73 |
| 134.14 | 44.74 |
| 135.54 | 46.00 |

Fattore di sicurezza (FS) 1.4901 - N.10 -- X Y Lambda= 0.6955

| | |
|-------|-------|
| 63.75 | 11.28 |
| 64.99 | 11.16 |
| 66.11 | 11.48 |
| 67.83 | 11.86 |
| 69.89 | 12.29 |
| 70.89 | 12.69 |

| | |
|--------|-------|
| 73.24 | 13.03 |
| 75.72 | 13.63 |
| 77.45 | 13.76 |
| 79.42 | 14.17 |
| 80.71 | 14.40 |
| 82.87 | 15.20 |
| 84.39 | 15.90 |
| 86.67 | 17.18 |
| 88.10 | 18.08 |
| 90.73 | 19.09 |
| 91.70 | 19.18 |
| 93.28 | 19.54 |
| 95.35 | 20.93 |
| 97.15 | 21.55 |
| 98.05 | 22.00 |
| 99.91 | 23.57 |
| 101.09 | 24.13 |
| 102.27 | 24.54 |
| 103.36 | 25.02 |
| 105.83 | 26.21 |
| 107.13 | 26.68 |
| 108.08 | 27.20 |
| 109.70 | 28.44 |
| 110.62 | 29.16 |
| 112.20 | 31.30 |
| 114.33 | 32.93 |
| 116.12 | 34.77 |
| 117.97 | 35.32 |
| 119.80 | 35.94 |
| 120.98 | 36.93 |
| 122.10 | 37.94 |
| 123.73 | 39.52 |
| 126.13 | 40.28 |
| 128.30 | 41.29 |
| 130.53 | 42.96 |
| 132.12 | 44.85 |
| 133.08 | 46.00 |

----- ANALISI DEFICIT DI RESISTENZA -----
DATI RELATIVI ALLE 10 SUPERFICI GENERATE CON MINOR FS *
Analisi Deficit in riferimento a FS(progetto) = 1.200

| Sup N. | FS | FTR(kN/m) | FTA(kN/m) | Bilancio(kN/m) | ESITO |
|--------|-------|-----------|-----------|----------------|---------|
| 1 | 1.430 | 3010.4 | 2104.4 | 485.0 | Surplus |
| 2 | 1.456 | 2297.4 | 1578.2 | 403.6 | Surplus |
| 3 | 1.460 | 3962.6 | 2713.6 | 706.2 | Surplus |
| 4 | 1.461 | 6425.2 | 4398.9 | 1146.5 | Surplus |
| 5 | 1.464 | 4014.0 | 2741.3 | 724.5 | Surplus |
| 6 | 1.472 | 4064.8 | 2760.7 | 752.0 | Surplus |
| 7 | 1.477 | 3876.6 | 2624.9 | 726.7 | Surplus |
| 8 | 1.485 | 5544.0 | 3734.3 | 1062.7 | Surplus |
| 9 | 1.488 | 5293.6 | 3556.7 | 1025.6 | Surplus |
| 10 | 1.490 | 6596.7 | 4427.1 | 1284.1 | Surplus |

Esito analisi: SURPLUS di RESISTENZA!

Valore minimo di SURPLUS di RESISTENZA (kN/m): 403.6

Note: FTR --> Forza totale Resistente lungo la superficie
di scivolamento

FTA --> Forza totale Agente lungo la superficie
di scivolamento

IMPORTANTE! : Il Deficit o il Surplus di resistenza viene espresso in kN
per metro di LARGHEZZA rispetto al fronte della scarpata

TABELLA PARAMETRI CONCI DELLA SUPERFICIE INDIVIDUATA CON MINOR FS

| X | dx | alpha | W | ru | U | phi' | (c',Cu) |
|--------|-------|--------|--------|------|-------|-------|---------|
| (m) | (m) | (°) | (kN/m) | (-) | (kPa) | (°) | (kPa) |
| 71.767 | 0.496 | -16.29 | 2.29 | 0.00 | 0.00 | 38.00 | 0.00 |
| 72.264 | 0.371 | -16.29 | 4.69 | 0.00 | 0.00 | 38.00 | 0.00 |

| | | | | | | | |
|---------|-------|-------|-------|------|------|-------|------|
| 72.635 | 0.496 | 6.34 | 9.21 | 0.00 | 0.00 | 38.00 | 0.00 |
| 73.131 | 0.496 | 6.34 | 11.65 | 0.00 | 0.00 | 38.00 | 0.00 |
| 73.628 | 0.240 | 6.34 | 6.51 | 0.00 | 0.00 | 38.00 | 0.00 |
| 73.867 | 0.496 | 15.57 | 14.84 | 0.00 | 0.00 | 38.00 | 0.00 |
| 74.364 | 0.496 | 15.57 | 16.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 74.860 | 0.496 | 15.57 | 17.96 | 0.00 | 0.00 | 38.00 | 0.00 |
| 75.357 | 0.496 | 15.57 | 19.53 | 0.00 | 0.00 | 38.00 | 0.00 |
| 75.853 | 0.080 | 15.57 | 3.30 | 0.00 | 0.00 | 38.00 | 0.00 |
| 75.933 | 0.027 | 23.85 | 1.11 | 0.00 | 0.00 | 38.00 | 0.00 |
| 75.960 | 0.496 | 23.85 | 20.95 | 0.00 | 0.00 | 38.00 | 0.00 |
| 76.456 | 0.343 | 23.85 | 14.88 | 0.00 | 0.00 | 38.00 | 0.00 |
| 76.799 | 0.496 | 22.34 | 22.22 | 0.00 | 0.00 | 38.00 | 0.00 |
| 77.296 | 0.496 | 22.34 | 23.09 | 0.00 | 0.00 | 38.00 | 0.00 |
| 77.792 | 0.496 | 22.34 | 23.95 | 0.00 | 0.00 | 38.00 | 0.00 |
| 78.288 | 0.496 | 22.34 | 24.82 | 0.00 | 0.00 | 38.00 | 0.00 |
| 78.785 | 0.125 | 22.34 | 6.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 78.910 | 0.118 | 22.34 | 6.08 | 0.00 | 0.00 | 38.00 | 0.00 |
| 79.028 | 0.496 | 12.53 | 26.62 | 0.00 | 0.00 | 38.00 | 0.00 |
| 79.524 | 0.390 | 12.53 | 22.22 | 0.00 | 0.00 | 38.00 | 0.00 |
| 79.914 | 0.496 | 16.98 | 29.74 | 0.00 | 0.00 | 38.00 | 0.00 |
| 80.411 | 0.496 | 16.98 | 31.18 | 0.00 | 0.00 | 38.00 | 0.00 |
| 80.907 | 0.443 | 16.98 | 29.02 | 0.00 | 0.00 | 38.00 | 0.00 |
| 81.350 | 0.496 | 20.62 | 33.71 | 0.00 | 0.00 | 38.00 | 0.00 |
| 81.846 | 0.496 | 20.62 | 34.77 | 0.00 | 0.00 | 38.00 | 0.00 |
| 82.342 | 0.496 | 20.62 | 35.83 | 0.00 | 0.00 | 38.00 | 0.00 |
| 82.839 | 0.496 | 20.62 | 36.89 | 0.00 | 0.00 | 38.00 | 0.00 |
| 83.335 | 0.050 | 20.62 | 3.75 | 0.00 | 0.00 | 38.00 | 0.00 |
| 83.385 | 0.496 | 28.90 | 37.60 | 0.00 | 0.00 | 38.00 | 0.00 |
| 83.881 | 0.496 | 28.90 | 37.73 | 0.00 | 0.00 | 38.00 | 0.00 |
| 84.378 | 0.036 | 28.90 | 2.72 | 0.00 | 0.00 | 38.00 | 0.00 |
| 84.413 | 0.496 | 29.85 | 37.82 | 0.00 | 0.00 | 38.00 | 0.00 |
| 84.910 | 0.496 | 29.85 | 37.84 | 0.00 | 0.00 | 38.00 | 0.00 |
| 85.406 | 0.019 | 29.85 | 1.44 | 0.00 | 0.00 | 38.00 | 0.00 |
| 85.425 | 0.496 | 39.50 | 37.21 | 0.00 | 0.00 | 38.00 | 0.00 |
| 85.921 | 0.496 | 39.50 | 35.91 | 0.00 | 0.00 | 38.00 | 0.00 |
| 86.418 | 0.234 | 39.50 | 16.45 | 0.00 | 0.00 | 38.00 | 0.00 |
| 86.651 | 0.496 | 14.38 | 35.49 | 0.00 | 0.00 | 38.00 | 0.00 |
| 87.148 | 0.496 | 14.38 | 37.19 | 0.00 | 0.00 | 38.00 | 0.00 |
| 87.644 | 0.496 | 14.38 | 38.88 | 0.00 | 0.00 | 38.00 | 0.00 |
| 88.140 | 0.100 | 14.38 | 8.07 | 0.00 | 0.00 | 38.00 | 0.00 |
| 88.241 | 0.496 | 22.26 | 40.51 | 0.00 | 0.00 | 38.00 | 0.00 |
| 88.737 | 0.496 | 22.26 | 41.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 89.234 | 0.496 | 22.26 | 42.29 | 0.00 | 0.00 | 38.00 | 0.00 |
| 89.730 | 0.067 | 22.26 | 5.78 | 0.00 | 0.00 | 38.00 | 0.00 |
| 89.797 | 0.496 | 20.29 | 43.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 90.293 | 0.496 | 20.29 | 44.50 | 0.00 | 0.00 | 38.00 | 0.00 |
| 90.790 | 0.496 | 20.29 | 45.60 | 0.00 | 0.00 | 38.00 | 0.00 |
| 91.286 | 0.496 | 20.29 | 46.70 | 0.00 | 0.00 | 38.00 | 0.00 |
| 91.783 | 0.015 | 20.29 | 1.45 | 0.00 | 0.00 | 38.00 | 0.00 |
| 91.798 | 0.496 | 29.21 | 47.33 | 0.00 | 0.00 | 38.00 | 0.00 |
| 92.294 | 0.496 | 29.21 | 47.43 | 0.00 | 0.00 | 38.00 | 0.00 |
| 92.790 | 0.237 | 29.21 | 22.72 | 0.00 | 0.00 | 38.00 | 0.00 |
| 93.028 | 0.496 | 43.98 | 46.50 | 0.00 | 0.00 | 38.00 | 0.00 |
| 93.524 | 0.496 | 43.98 | 44.47 | 0.00 | 0.00 | 38.00 | 0.00 |
| 94.021 | 0.263 | 43.98 | 22.75 | 0.00 | 0.00 | 38.00 | 0.00 |
| 94.284 | 0.466 | 42.10 | 39.03 | 0.00 | 0.00 | 38.00 | 0.00 |
| 94.750 | 0.496 | 42.10 | 39.90 | 0.00 | 0.00 | 38.00 | 0.00 |
| 95.246 | 0.496 | 42.10 | 38.18 | 0.00 | 0.00 | 38.00 | 0.00 |
| 95.743 | 0.188 | 42.10 | 13.98 | 0.00 | 0.00 | 38.00 | 0.00 |
| 95.930 | 0.496 | 36.55 | 36.25 | 0.00 | 0.00 | 38.00 | 0.00 |
| 96.427 | 0.496 | 36.55 | 35.39 | 0.00 | 0.00 | 38.00 | 0.00 |
| 96.923 | 0.496 | 36.55 | 34.53 | 0.00 | 0.00 | 38.00 | 0.00 |
| 97.419 | 0.359 | 36.55 | 24.44 | 0.00 | 0.00 | 38.00 | 0.00 |
| 97.779 | 0.496 | 35.58 | 33.11 | 0.00 | 0.00 | 38.00 | 0.00 |
| 98.275 | 0.496 | 35.58 | 32.39 | 0.00 | 0.00 | 38.00 | 0.00 |
| 98.771 | 0.496 | 35.58 | 31.66 | 0.00 | 0.00 | 38.00 | 0.00 |
| 99.268 | 0.341 | 35.58 | 21.32 | 0.00 | 0.00 | 38.00 | 0.00 |
| 99.608 | 0.496 | 28.55 | 30.89 | 0.00 | 0.00 | 38.00 | 0.00 |
| 100.105 | 0.496 | 28.55 | 31.07 | 0.00 | 0.00 | 38.00 | 0.00 |
| 100.601 | 0.496 | 28.55 | 31.25 | 0.00 | 0.00 | 38.00 | 0.00 |
| 101.098 | 0.307 | 28.55 | 19.44 | 0.00 | 0.00 | 38.00 | 0.00 |
| 101.405 | 0.021 | 28.55 | 1.35 | 0.00 | 0.00 | 38.00 | 0.00 |
| 101.426 | 0.496 | 10.85 | 32.47 | 0.00 | 0.00 | 38.00 | 0.00 |
| 101.923 | 0.496 | 10.85 | 34.51 | 0.00 | 0.00 | 38.00 | 0.00 |
| 102.419 | 0.496 | 10.85 | 36.54 | 0.00 | 0.00 | 38.00 | 0.00 |

| | | | | | | | |
|---------|-------|-------|-------|------|------|-------|------|
| 102.915 | 0.366 | 10.85 | 28.21 | 0.00 | 0.00 | 38.00 | 0.00 |
| 103.281 | 0.496 | 22.66 | 39.48 | 0.00 | 0.00 | 38.00 | 0.00 |
| 103.777 | 0.496 | 22.66 | 40.32 | 0.00 | 0.00 | 38.00 | 0.00 |
| 104.274 | 0.496 | 22.66 | 41.17 | 0.00 | 0.00 | 38.00 | 0.00 |
| 104.770 | 0.465 | 22.66 | 39.32 | 0.00 | 0.00 | 38.00 | 0.00 |
| 105.235 | 0.496 | 22.94 | 42.79 | 0.00 | 0.00 | 38.00 | 0.00 |
| 105.731 | 0.496 | 22.94 | 43.61 | 0.00 | 0.00 | 38.00 | 0.00 |
| 106.228 | 0.448 | 22.94 | 40.07 | 0.00 | 0.00 | 38.00 | 0.00 |
| 106.676 | 0.496 | 19.67 | 45.33 | 0.00 | 0.00 | 38.00 | 0.00 |
| 107.172 | 0.496 | 19.67 | 46.49 | 0.00 | 0.00 | 38.00 | 0.00 |
| 107.669 | 0.496 | 19.67 | 47.65 | 0.00 | 0.00 | 38.00 | 0.00 |
| 108.165 | 0.496 | 19.67 | 48.81 | 0.00 | 0.00 | 38.00 | 0.00 |
| 108.661 | 0.083 | 19.67 | 8.25 | 0.00 | 0.00 | 38.00 | 0.00 |
| 108.744 | 0.496 | 25.53 | 49.85 | 0.00 | 0.00 | 38.00 | 0.00 |
| 109.241 | 0.451 | 25.53 | 45.72 | 0.00 | 0.00 | 38.00 | 0.00 |
| 109.691 | 0.496 | 32.90 | 50.41 | 0.00 | 0.00 | 38.00 | 0.00 |
| 110.188 | 0.496 | 32.90 | 50.05 | 0.00 | 0.00 | 38.00 | 0.00 |
| 110.684 | 0.193 | 32.90 | 19.35 | 0.00 | 0.00 | 38.00 | 0.00 |
| 110.877 | 0.496 | 28.16 | 49.84 | 0.00 | 0.00 | 38.00 | 0.00 |
| 111.373 | 0.496 | 28.16 | 50.06 | 0.00 | 0.00 | 38.00 | 0.00 |
| 111.870 | 0.496 | 28.16 | 50.29 | 0.00 | 0.00 | 38.00 | 0.00 |
| 112.366 | 0.117 | 28.16 | 11.92 | 0.00 | 0.00 | 38.00 | 0.00 |
| 112.483 | 0.496 | 35.12 | 50.12 | 0.00 | 0.00 | 38.00 | 0.00 |
| 112.980 | 0.496 | 35.12 | 49.46 | 0.00 | 0.00 | 38.00 | 0.00 |
| 113.476 | 0.161 | 35.12 | 15.95 | 0.00 | 0.00 | 38.00 | 0.00 |
| 113.638 | 0.332 | 40.14 | 32.45 | 0.00 | 0.00 | 38.00 | 0.00 |
| 113.970 | 0.465 | 40.14 | 44.33 | 0.00 | 0.00 | 38.00 | 0.00 |
| 114.435 | 0.496 | 34.22 | 46.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 114.931 | 0.496 | 34.22 | 45.86 | 0.00 | 0.00 | 38.00 | 0.00 |
| 115.428 | 0.496 | 34.22 | 45.33 | 0.00 | 0.00 | 38.00 | 0.00 |
| 115.924 | 0.177 | 34.22 | 16.04 | 0.00 | 0.00 | 38.00 | 0.00 |
| 116.101 | 0.496 | 33.62 | 44.64 | 0.00 | 0.00 | 38.00 | 0.00 |
| 116.597 | 0.496 | 33.62 | 44.18 | 0.00 | 0.00 | 38.00 | 0.00 |
| 117.094 | 0.496 | 33.62 | 43.72 | 0.00 | 0.00 | 38.00 | 0.00 |
| 117.590 | 0.398 | 33.62 | 34.75 | 0.00 | 0.00 | 38.00 | 0.00 |
| 117.989 | 0.496 | 34.43 | 42.84 | 0.00 | 0.00 | 38.00 | 0.00 |
| 118.485 | 0.243 | 34.43 | 20.77 | 0.00 | 0.00 | 38.00 | 0.00 |
| 118.728 | 0.496 | 24.70 | 42.59 | 0.00 | 0.00 | 38.00 | 0.00 |
| 119.224 | 0.289 | 24.70 | 25.08 | 0.00 | 0.00 | 38.00 | 0.00 |
| 119.513 | 0.496 | 23.99 | 43.61 | 0.00 | 0.00 | 38.00 | 0.00 |
| 120.010 | 0.496 | 23.99 | 44.31 | 0.00 | 0.00 | 38.00 | 0.00 |
| 120.506 | 0.496 | 23.99 | 45.01 | 0.00 | 0.00 | 38.00 | 0.00 |
| 121.002 | 0.496 | 23.99 | 45.71 | 0.00 | 0.00 | 38.00 | 0.00 |
| 121.499 | 0.014 | 23.99 | 1.27 | 0.00 | 0.00 | 38.00 | 0.00 |
| 121.513 | 0.496 | 18.40 | 46.73 | 0.00 | 0.00 | 38.00 | 0.00 |
| 122.009 | 0.151 | 18.40 | 14.48 | 0.00 | 0.00 | 38.00 | 0.00 |
| 122.160 | 0.496 | 18.40 | 48.41 | 0.00 | 0.00 | 38.00 | 0.00 |
| 122.656 | 0.165 | 18.40 | 16.38 | 0.00 | 0.00 | 38.00 | 0.00 |
| 122.821 | 0.496 | 24.46 | 49.81 | 0.00 | 0.00 | 38.00 | 0.00 |
| 123.318 | 0.496 | 24.46 | 50.46 | 0.00 | 0.00 | 38.00 | 0.00 |
| 123.814 | 0.086 | 24.46 | 8.80 | 0.00 | 0.00 | 38.00 | 0.00 |
| 123.900 | 0.157 | 24.46 | 15.97 | 0.00 | 0.00 | 38.00 | 0.00 |
| 124.057 | 0.496 | 33.81 | 48.37 | 0.00 | 0.00 | 38.00 | 0.00 |
| 124.553 | 0.496 | 33.81 | 44.85 | 0.00 | 0.00 | 38.00 | 0.00 |
| 125.050 | 0.316 | 33.81 | 26.69 | 0.00 | 0.00 | 38.00 | 0.00 |
| 125.365 | 0.496 | 42.81 | 38.40 | 0.00 | 0.00 | 38.00 | 0.00 |
| 125.862 | 0.496 | 42.81 | 33.52 | 0.00 | 0.00 | 38.00 | 0.00 |
| 126.358 | 0.496 | 42.81 | 28.64 | 0.00 | 0.00 | 38.00 | 0.00 |
| 126.855 | 0.116 | 42.81 | 6.01 | 0.00 | 0.00 | 38.00 | 0.00 |
| 126.971 | 0.496 | 18.87 | 24.16 | 0.00 | 0.00 | 38.00 | 0.00 |
| 127.467 | 0.337 | 18.87 | 15.38 | 0.00 | 0.00 | 38.00 | 0.00 |
| 127.805 | 0.496 | 30.90 | 20.46 | 0.00 | 0.00 | 38.00 | 0.00 |
| 128.301 | 0.496 | 30.90 | 17.31 | 0.00 | 0.00 | 38.00 | 0.00 |
| 128.797 | 0.140 | 30.90 | 4.31 | 0.00 | 0.00 | 38.00 | 0.00 |
| 128.937 | 0.496 | 22.25 | 13.76 | 0.00 | 0.00 | 38.00 | 0.00 |
| 129.434 | 0.496 | 22.25 | 11.61 | 0.00 | 0.00 | 38.00 | 0.00 |
| 129.930 | 0.496 | 22.25 | 9.45 | 0.00 | 0.00 | 38.00 | 0.00 |
| 130.426 | 0.494 | 22.25 | 7.26 | 0.00 | 0.00 | 38.00 | 0.00 |
| 130.920 | 0.496 | 9.11 | 5.81 | 0.00 | 0.00 | 38.00 | 0.00 |
| 131.416 | 0.496 | 9.11 | 4.97 | 0.00 | 0.00 | 38.00 | 0.00 |
| 131.913 | 0.496 | 9.11 | 4.12 | 0.00 | 0.00 | 38.00 | 0.00 |
| 132.409 | 0.370 | 9.11 | 2.52 | 0.00 | 0.00 | 38.00 | 0.00 |
| 132.779 | 0.496 | 15.66 | 2.33 | 0.00 | 0.00 | 38.00 | 0.00 |
| 133.276 | 0.294 | 15.66 | 0.69 | 0.00 | 0.00 | 38.00 | 0.00 |
| 133.570 | 0.147 | 24.73 | 0.11 | 0.00 | 0.00 | 38.00 | 0.00 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
dx(m) : Larghezza concio
alpha(°) : Angolo pendenza base concio
W(kN/m) : Forza peso concio
ru(-) : Coefficiente locale pressione interstiziale
U(kPa) : Pressione totale dei pori base concio
phi'(°) : Angolo di attrito efficace base concio
c'/Cu (kPa) : Coesione efficace o Resistenza al taglio in condizioni non drenate

TABELLA DIAGRAMMA DELLE FORZE DELLA SUPERFICIE INDIVIDUATA CON MINOR FS

| X | ht | yt | yt' | E(x) | T(x) | E' | rho(x) | FS_qFEM | FS_srmFEM | | |
|--------|-------|--------|--------|-------------------|-------------------|--------------------|-------------------|---------|-----------|-------|--|
| (m) | (m) | (m) | (--) | (kN/m) | (kN/m) | | (kN) | (--) | (--) | | |
| 71.767 | 0.000 | 15.890 | -0.035 | 0.0000000000E+000 | 0.0000000000E+000 | 0.0000000000E+000 | 2.2559951638E+000 | 0.048 | 5.987 | 3.543 | |
| 72.264 | 0.103 | 15.848 | -0.035 | 1.3950117698E+000 | 1.6169123668E-002 | 3.3647708648E+000 | 0.048 | 6.788 | 3.525 | | |
| 72.635 | 0.223 | 15.860 | 0.145 | 2.7972272779E+000 | 8.1550982212E-002 | 5.9034641811E+000 | 0.053 | 8.048 | 3.572 | | |
| 73.131 | 0.282 | 15.974 | 0.245 | 7.1382314410E+000 | 5.3952408104E-001 | 8.1269748386E+000 | 0.138 | 5.592 | 3.610 | | |
| 73.628 | 0.356 | 16.103 | 0.275 | 1.0865327245E+001 | 1.3615243434E+000 | 7.3702521894E+000 | 0.229 | 4.233 | 3.414 | | |
| 73.867 | 0.403 | 16.177 | 0.423 | 1.2617138241E+001 | 1.8816024140E+000 | 8.1821428796E+000 | 0.273 | 3.803 | 3.298 | | |
| 74.364 | 0.503 | 16.415 | 0.433 | 1.7581227809E+001 | 3.6059636452E+000 | 8.3373984751E+000 | 0.376 | 3.038 | 3.002 | | |
| 74.860 | 0.556 | 16.607 | 0.374 | 2.0894137456E+001 | 4.9460420553E+000 | 5.9240363650E+000 | 0.433 | 2.700 | 2.838 | | |
| 75.357 | 0.597 | 16.786 | 0.390 | 2.3462348220E+001 | 6.1747518759E+000 | 5.3797175252E+000 | 0.482 | 2.484 | 2.714 | | |
| 75.853 | 0.667 | 16.994 | 0.417 | 2.6234882278E+001 | 7.6101011315E+000 | 5.5915350749E+000 | 0.531 | 2.304 | 2.598 | | |
| 75.933 | 0.677 | 17.027 | 0.408 | 2.6683137190E+001 | 7.8382825265E+000 | 5.4829827162E+000 | 0.538 | 2.280 | 2.582 | | |
| 75.960 | 0.676 | 17.038 | 0.411 | 2.6829447195E+001 | 7.9149471914E+000 | 5.4272508856E+000 | 0.540 | 2.272 | 2.577 | | |
| 76.456 | 0.661 | 17.242 | 0.414 | 2.9348929454E+001 | 9.3573224097E+000 | 5.0141574888E+000 | 0.584 | 2.142 | 2.482 | | |
| 76.799 | 0.652 | 17.385 | 0.425 | 3.1053352349E+001 | 1.0401638716E+001 | 5.0692266006E+000 | 0.613 | 2.066 | 2.421 | | |
| 77.296 | 0.662 | 17.599 | 0.431 | 3.3639747714E+001 | 1.2036338782E+001 | 5.3662710248E+000 | 0.655 | 1.973 | 2.337 | | |
| 77.792 | 0.673 | 17.813 | 0.429 | 3.6380748082E+001 | 1.3793606337E+001 | 5.7264445983E+000 | 0.694 | 1.899 | 2.262 | | |
| 78.288 | 0.680 | 18.025 | 0.427 | 3.9324707787E+001 | 1.5675492046E+001 | 6.2353826178E+000 | 0.730 | 1.838 | 2.194 | | |
| 78.785 | 0.688 | 18.237 | 0.426 | 4.2570959236E+001 | 1.7733083907E+001 | 6.9071891413E+000 | 0.763 | 1.785 | 2.131 | | |
| 78.910 | 0.690 | 18.289 | 0.422 | 4.3447913135E+001 | 1.8280174413E+001 | 7.1636919531E+000 | 0.770 | 1.774 | 2.115 | | |
| 79.028 | 0.691 | 18.339 | 0.440 | 4.4311610310E+001 | 1.8808135882E+001 | 7.5415163273E+000 | 0.777 | 1.764 | 2.101 | | |
| 79.524 | 0.801 | 18.560 | 0.449 | 4.8521671443E+001 | 2.1331999745E+001 | 9.2069507547E+000 | 0.805 | 1.719 | 2.041 | | |
| 79.914 | 0.892 | 18.737 | 0.448 | 5.233358689E+001 | 2.3578230288E+001 | 9.8784625773E+000 | 0.825 | 1.683 | 1.994 | | |
| 80.411 | 0.960 | 18.957 | 0.456 | 5.7301121785E+001 | 2.6518912041E+001 | 1.0131310646E+001 | 0.847 | 1.639 | 1.939 | | |
| 80.907 | 1.041 | 19.190 | 0.481 | 6.2391274298E+001 | 2.9605399846E+001 | 1.0174686198E+001 | 0.869 | 1.593 | 1.886 | | |
| 81.350 | 1.126 | 19.409 | 0.511 | 6.6864138494E+001 | 3.2401113348E+001 | 9.7915575962E+000 | 0.887 | 1.550 | 1.841 | | |
| 81.846 | 1.199 | 19.670 | 0.542 | 7.1550882684E+001 | 3.5456614577E+001 | 8.8901314431E+000 | 0.907 | 1.502 | 1.795 | | |
| 82.342 | 1.290 | 19.947 | 0.547 | 7.5689866471E+001 | 3.8314356704E+001 | 7.2113227522E+000 | 0.927 | 1.455 | 1.752 | | |
| 82.839 | 1.369 | 20.213 | 0.498 | 7.8709963894E+001 | 4.0638607952E+001 | 4.3216234503E+000 | 0.945 | 1.412 | 1.717 | | |
| 83.335 | 1.411 | 20.441 | 0.460 | 7.9980182451E+001 | 4.2196464405E+001 | 1.3294260767E+000 | 0.966 | 1.377 | 1.690 | | |
| 83.385 | 1.415 | 20.464 | 0.514 | 8.0040083086E+001 | 4.2313189084E+001 | 1.1090633621E+000 | 0.968 | 1.374 | 1.688 | | |
| 83.881 | 1.399 | 20.722 | 0.498 | 8.0107373219E+001 | 4.3325151621E+001 | -3.9708484309E-001 | 0.990 | 1.347 | 1.666 | | |
| 84.378 | 1.361 | 20.958 | 0.476 | 7.9645874875E+001 | 4.4064732560E+001 | -1.3444035250E+000 | 1.013 | 1.327 | 1.647 | | |
| 84.413 | 1.358 | 20.975 | 0.515 | 7.9596842156E+001 | 4.4109652007E+001 | -1.3891834134E+000 | 1.015 | 1.326 | 1.646 | | |
| 84.910 | 1.330 | 21.232 | 0.514 | 7.8803890673E+001 | 4.4722954035E+001 | -1.6851406162E+000 | 1.039 | 1.315 | 1.628 | | |
| 85.406 | 1.298 | 21.485 | 0.509 | 7.7923909334E+001 | 4.5269403470E+001 | -1.8816478678E+000 | 1.064 | 1.308 | 1.611 | | |
| 85.425 | 1.297 | 21.495 | 0.517 | 7.7888283754E+001 | 4.5289226834E+001 | -1.8793634079E+000 | 1.065 | 1.308 | 1.611 | | |
| 85.921 | 1.145 | 21.751 | 0.543 | 7.7039231116E+001 | 4.5933748037E+001 | -1.1039291526E+000 | 1.092 | 1.306 | 1.595 | | |
| 86.418 | 1.017 | 22.033 | 0.570 | 7.6792351880E+001 | 4.6969391481E+001 | 4.1719495885E-001 | 1.120 | 1.307 | 1.579 | | |
| 86.651 | 0.959 | 22.167 | 0.571 | 7.6990296879E+001 | 4.7580660599E+001 | 1.4097693881E+000 | 1.132 | 1.309 | 1.572 | | |
| 87.148 | 1.114 | 22.450 | 0.545 | 7.8283218644E+001 | 4.9173562060E+001 | 3.6246622087E+000 | 1.150 | 1.312 | 1.556 | | |
| 87.644 | 1.245 | 22.708 | 0.525 | 8.0588700668E+001 | 5.1104520996E+001 | 5.4742574783E+000 | 1.161 | 1.314 | 1.542 | | |
| 88.140 | 1.380 | 22.971 | 0.525 | 8.3717818536E+001 | 5.3444339662E+001 | 7.5973774297E+000 | 1.169 | 1.314 | 1.528 | | |
| 88.241 | 1.406 | 23.022 | 0.510 | 8.4507190921E+001 | 5.3986487370E+001 | 7.9012562716E+000 | 1.170 | 1.312 | 1.526 | | |
| 88.737 | 1.456 | 23.275 | 0.508 | 8.8532594028E+001 | 5.6794373788E+001 | 8.3820617777E+000 | 1.175 | 1.308 | 1.514 | | |
| 89.234 | 1.503 | 23.526 | 0.490 | 9.2828529881E+001 | 5.9691904761E+001 | 8.6819217046E+000 | 1.177 | 1.302 | 1.503 | | |
| 89.730 | 1.536 | 23.761 | 0.471 | 9.7151620616E+001 | 6.2366121949E+001 | 8.0889200706E+000 | 1.175 | 1.293 | 1.493 | | |
| 89.797 | 1.538 | 23.791 | 0.475 | 9.7687973646E+001 | 6.2687360829E+001 | 7.9881518798E+000 | 1.175 | 1.292 | 1.492 | | |
| 90.293 | 1.592 | 24.029 | 0.489 | 1.0159047651E+002 | 6.4974906792E+001 | 6.6231594163E+000 | 1.171 | 1.280 | 1.484 | | |
| 90.790 | 1.657 | 24.277 | 0.509 | 1.0426315240E+002 | 6.6551469394E+001 | 4.2816174372E+000 | 1.169 | 1.265 | 1.477 | | |
| 91.286 | 1.731 | 24.534 | 0.494 | 1.0584107630E+002 | 6.7446389523E+001 | 1.9493890466E+000 | 1.167 | 1.246 | 1.471 | | |
| 91.783 | 1.781 | 24.768 | 0.470 | 1.0619841933E+002 | 6.7562526213E+001 | -6.2911006260E-001 | 1.165 | 1.224 | 1.466 | | |
| 91.798 | 1.782 | 24.775 | 0.563 | 1.0618824195E+002 | 6.7553929239E+001 | -7.5432123754E-001 | 1.165 | 1.224 | 1.465 | | |
| 92.294 | 1.786 | 25.056 | 0.567 | 1.0445132862E+002 | 6.6366646134E+001 | -5.2287544292E+000 | 1.163 | 1.199 | 1.462 | | |
| 92.790 | 1.790 | 25.337 | 0.567 | 1.0099736659E+002 | 6.4095848868E+001 | -8.4659438008E+000 | 1.162 | 1.172 | 1.458 | | |
| 93.028 | 1.791 | 25.472 | 0.712 | 9.8815770197E+001 | 6.2701943858E+001 | -9.9715271803E+000 | 1.162 | 1.159 | 1.457 | | |
| 93.524 | 1.701 | 25.860 | 0.713 | 9.3052269605E+001 | 5.9125403636E+001 | -1.2682761310E+001 | 1.163 | 1.132 | 1.455 | | |
| 94.021 | 1.542 | 26.180 | 0.658 | 8.6224887595E+001 | 5.4924706331E+001 | -1.4917488731E+001 | 1.166 | 1.110 | 1.453 | | |

| | | | | | | | | | |
|---------|-------|--------|-------|-------------------|-------------------|--------------------|-------|-------|-------|
| 94.284 | 1.467 | 26.360 | 0.694 | 8.2136107932E+001 | 5.2378547668E+001 | -1.5765903470E+001 | 1.168 | 1.100 | 1.453 |
| 94.750 | 1.373 | 26.686 | 0.714 | 7.4596136485E+001 | 4.7630630563E+001 | -1.6575135609E+001 | 1.169 | 1.085 | 1.451 |
| 95.246 | 1.285 | 27.047 | 0.724 | 6.6157713108E+001 | 4.2265057208E+001 | -1.6793408308E+001 | 1.170 | 1.076 | 1.449 |
| 95.743 | 1.194 | 27.404 | 0.714 | 5.7924385962E+001 | 3.6972989977E+001 | -1.5859818251E+001 | 1.169 | 1.074 | 1.447 |
| 95.930 | 1.156 | 27.535 | 0.705 | 5.5000981608E+001 | 3.5074649794E+001 | -1.5452885475E+001 | 1.168 | 1.076 | 1.446 |
| 96.427 | 1.139 | 27.886 | 0.701 | 4.7504171684E+001 | 3.0169399225E+001 | -1.4433654350E+001 | 1.163 | 1.087 | 1.443 |
| 96.923 | 1.115 | 28.231 | 0.685 | 4.0671890096E+001 | 2.5672120010E+001 | -1.2973608274E+001 | 1.156 | 1.104 | 1.439 |
| 97.419 | 1.082 | 28.566 | 0.698 | 3.4624549124E+001 | 2.1706726840E+001 | -1.2068340174E+001 | 1.148 | 1.126 | 1.435 |
| 97.779 | 1.078 | 28.828 | 0.723 | 3.0321144969E+001 | 1.9000837743E+001 | -1.1307480923E+001 | 1.147 | 1.150 | 1.431 |
| 98.275 | 1.079 | 29.184 | 0.699 | 2.5173598545E+001 | 1.5997399821E+001 | -9.4658214740E+000 | 1.164 | 1.198 | 1.427 |
| 98.771 | 1.062 | 29.523 | 0.664 | 2.0923897477E+001 | 1.3660842819E+001 | -7.5706827629E+000 | 1.195 | 1.262 | 1.422 |
| 99.268 | 1.028 | 29.844 | 0.640 | 1.7657760664E+001 | 1.1955348025E+001 | -5.3801093937E+000 | 1.240 | 1.340 | 1.418 |
| 99.608 | 0.999 | 30.058 | 0.583 | 1.6104873682E+001 | 1.1157097669E+001 | -3.3877872835E+000 | 1.268 | 1.404 | 1.415 |
| 100.105 | 1.003 | 30.332 | 0.532 | 1.5267987433E+001 | 1.0756046621E+001 | -5.3731815477E-001 | 1.290 | 1.493 | 1.411 |
| 100.601 | 0.987 | 30.586 | 0.495 | 1.5571448063E+001 | 1.0929431237E+001 | 1.7060856984E+000 | 1.285 | 1.578 | 1.408 |
| 101.098 | 0.954 | 30.823 | 0.464 | 1.6961713603E+001 | 1.1641470311E+001 | 3.9720210256E+000 | 1.257 | 1.658 | 1.404 |
| 101.405 | 0.923 | 30.959 | 0.442 | 1.8405624474E+001 | 1.3255408187E+001 | 5.4082497434E+000 | 1.229 | 1.704 | 1.402 |
| 101.426 | 0.920 | 30.968 | 0.416 | 1.8522159146E+001 | 1.2409168038E+001 | 5.5452953871E+000 | 1.227 | 1.708 | 1.402 |
| 101.923 | 1.031 | 31.174 | 0.417 | 2.2286252783E+001 | 1.4148538827E+001 | 8.5516483167E+000 | 1.162 | 1.758 | 1.397 |
| 102.419 | 1.144 | 31.382 | 0.424 | 2.7011856096E+001 | 1.6441297433E+001 | 1.0197142321E+001 | 1.114 | 1.774 | 1.391 |
| 102.915 | 1.261 | 31.595 | 0.439 | 3.2409523157E+001 | 1.9257910817E+001 | 1.1306520953E+001 | 1.088 | 1.754 | 1.384 |
| 103.281 | 1.357 | 31.760 | 0.454 | 3.6659088742E+001 | 2.1710917792E+001 | 1.1530439566E+001 | 1.084 | 1.716 | 1.378 |
| 103.777 | 1.375 | 31.986 | 0.468 | 4.2318829364E+001 | 2.5334133549E+001 | 1.1485740715E+001 | 1.096 | 1.663 | 1.369 |
| 104.274 | 1.407 | 32.225 | 0.496 | 4.8061622418E+001 | 2.9364544838E+001 | 1.1637615501E+001 | 1.119 | 1.609 | 1.360 |
| 104.770 | 1.453 | 32.479 | 0.532 | 5.3872137588E+001 | 3.3744719421E+001 | 1.1791184796E+001 | 1.147 | 1.556 | 1.350 |
| 105.235 | 1.517 | 32.736 | 0.537 | 5.9390567753E+001 | 3.8178691814E+001 | 1.0902593808E+001 | 1.177 | 1.507 | 1.340 |
| 105.731 | 1.565 | 32.994 | 0.519 | 6.4289025802E+001 | 4.2514746526E+001 | 9.6097252537E+000 | 1.211 | 1.465 | 1.331 |
| 106.228 | 1.612 | 33.252 | 0.517 | 6.8930676532E+001 | 4.6669744025E+001 | 9.1035885443E+000 | 1.240 | 1.433 | 1.324 |
| 106.676 | 1.653 | 33.482 | 0.503 | 7.2910138054E+001 | 5.0185301580E+001 | 8.5101749414E+000 | 1.260 | 1.409 | 1.318 |
| 107.172 | 1.721 | 33.727 | 0.480 | 7.6930959289E+001 | 5.3591523717E+001 | 7.7272308646E+000 | 1.275 | 1.387 | 1.313 |
| 107.669 | 1.774 | 33.958 | 0.455 | 8.0581389943E+001 | 5.6602428379E+001 | 6.7406419005E+000 | 1.286 | 1.359 | 1.310 |
| 108.165 | 1.818 | 34.180 | 0.446 | 8.3622769436E+001 | 5.9042631317E+001 | 5.3914709295E+000 | 1.293 | 1.331 | 1.308 |
| 108.661 | 1.862 | 34.401 | 0.446 | 8.5933803023E+001 | 6.0874626137E+001 | 3.4332410467E+000 | 1.297 | 1.302 | 1.308 |
| 108.744 | 1.869 | 34.438 | 0.507 | 8.6200993186E+001 | 6.1094353750E+001 | 3.0653173146E+000 | 1.298 | 1.296 | 1.308 |
| 109.241 | 1.889 | 34.695 | 0.518 | 8.7233693878E+001 | 6.2040729141E+001 | 1.1799282266E+000 | 1.302 | 1.264 | 1.310 |
| 109.691 | 1.907 | 34.928 | 0.571 | 8.7396951230E+001 | 6.2359420488E+001 | -7.1188774242E-001 | 1.306 | 1.237 | 1.312 |
| 110.188 | 1.893 | 35.235 | 0.619 | 8.6456420966E+001 | 6.1954921638E+001 | -2.8697353280E+000 | 1.312 | 1.211 | 1.317 |
| 110.684 | 1.880 | 35.543 | 0.619 | 8.4548005348E+001 | 6.0848891205E+001 | -4.8080409005E+000 | 1.318 | 1.190 | 1.322 |
| 110.877 | 1.874 | 35.662 | 0.571 | 8.3548516374E+001 | 6.0219366601E+001 | -5.3634065185E+000 | 1.320 | 1.184 | 1.325 |
| 111.373 | 1.883 | 35.936 | 0.552 | 8.0654929964E+001 | 5.8279236324E+001 | -6.4572737776E+000 | 1.323 | 1.172 | 1.332 |
| 111.870 | 1.891 | 36.210 | 0.552 | 7.7138021524E+001 | 5.5849575817E+001 | -7.6788988814E+000 | 1.326 | 1.163 | 1.340 |
| 112.366 | 1.900 | 36.485 | 0.552 | 7.3031659923E+001 | 5.2976115832E+001 | -9.8490055095E+000 | 1.328 | 1.157 | 1.348 |
| 112.483 | 1.902 | 36.549 | 0.634 | 7.1832374848E+001 | 5.2139345933E+001 | -1.0193530811E+001 | 1.329 | 1.157 | 1.351 |
| 112.980 | 1.877 | 36.874 | 0.652 | 6.6831491802E+001 | 4.8648644148E+001 | -1.0399941835E+001 | 1.333 | 1.159 | 1.360 |
| 113.476 | 1.851 | 37.197 | 0.629 | 6.1507774115E+001 | 4.4922150122E+001 | -1.0825411373E+001 | 1.337 | 1.167 | 1.370 |
| 113.638 | 1.828 | 37.287 | 0.583 | 5.9754393091E+001 | 4.3690339236E+001 | -1.1109701028E+001 | 1.339 | 1.171 | 1.374 |
| 113.970 | 1.745 | 37.485 | 0.613 | 5.5889168320E+001 | 4.0996826715E+001 | -1.1985292866E+001 | 1.343 | 1.181 | 1.381 |
| 114.435 | 1.644 | 37.776 | 0.618 | 5.0084235413E+001 | 3.6937991085E+001 | -1.2410853536E+001 | 1.350 | 1.200 | 1.392 |
| 114.931 | 1.609 | 38.078 | 0.634 | 4.3963250090E+001 | 3.2675233937E+001 | -1.2764535363E+001 | 1.361 | 1.225 | 1.404 |
| 115.428 | 1.598 | 38.405 | 0.673 | 3.7412171159E+001 | 2.8177555188E+001 | -1.3250530604E+001 | 1.379 | 1.260 | 1.417 |
| 115.924 | 1.602 | 38.747 | 0.693 | 3.0808711328E+001 | 2.3689150763E+001 | -1.3359504091E+001 | 1.408 | 1.308 | 1.431 |
| 116.101 | 1.607 | 38.872 | 0.663 | 2.8439874780E+001 | 2.2092473565E+001 | -1.2857052078E+001 | 1.422 | 1.329 | 1.436 |
| 116.597 | 1.598 | 39.193 | 0.647 | 2.2785060280E+001 | 1.8283464765E+001 | -1.0935658006E+001 | 1.469 | 1.391 | 1.448 |
| 117.094 | 1.589 | 39.514 | 0.633 | 1.7583438806E+001 | 1.4814542421E+001 | -9.6448638449E+000 | 1.543 | 1.461 | 1.459 |
| 117.590 | 1.566 | 39.821 | 0.607 | 1.3210067467E+001 | 1.1951323625E+001 | -7.6247367436E+000 | 1.656 | 1.537 | 1.469 |
| 117.989 | 1.538 | 40.058 | 0.597 | 1.0552379481E+001 | 1.0279968920E+001 | -5.9931568225E+000 | 1.784 | 1.603 | 1.475 |
| 118.485 | 1.495 | 40.355 | 0.605 | 7.9983052358E+000 | 8.7458863775E+000 | -4.1205431171E+000 | 2.002 | 1.700 | 1.482 |
| 118.728 | 1.478 | 40.505 | 0.601 | 7.1186897121E+000 | 8.2098072159E+000 | -2.9782739659E+000 | 2.112 | 1.757 | 1.485 |
| 119.224 | 1.545 | 40.800 | 0.586 | 6.2894497270E+000 | 7.6225189082E+000 | -5.6211281277E-001 | 2.219 | 1.869 | 1.489 |
| 119.513 | 1.577 | 40.965 | 0.556 | 6.3134922826E+000 | 7.5479144540E+000 | 6.4008622995E-001 | 2.189 | 1.931 | 1.491 |
| 120.010 | 1.627 | 41.236 | 0.546 | 7.1060409132E+000 | 7.7997850037E+000 | 2.7305159347E+000 | 2.010 | 2.025 | 1.493 |
| 120.506 | 1.677 | 41.507 | 0.528 | 9.0242273297E+000 | 8.5282985452E+000 | 4.3817546872E+000 | 1.730 | 2.098 | 1.494 |
| 121.002 | 1.710 | 41.761 | 0.490 | 1.1456052516E+001 | 9.4436135071E+000 | 5.0478500195E+000 | 1.509 | 2.147 | 1.494 |
| 121.499 | 1.722 | 41.994 | 0.469 | 1.4035508819E+001 | 1.0373842454E+001 | 5.3207567573E+000 | 1.353 | 2.173 | 1.492 |
| 121.513 | 1.722 | 42.000 | 0.435 | 1.4108419411E+001 | 1.0398368947E+001 | 5.3277139265E+000 | 1.349 | 2.173 | 1.492 |
| 122.009 | 1.773 | 42.216 | 0.432 | 1.6816504689E+001 | 1.1232554104E+001 | 5.2696114120E+000 | 1.223 | 2.159 | 1.488 |
| 122.160 | 1.787 | 42.280 | 0.404 | 1.7604174539E+001 | 1.1457290431E+001 | 5.0255543633E+000 | 1.192 | 2.148 | 1.486 |
| 122.656 | 1.819 | 42.477 | 0.397 | 1.9793139311E+001 | 1.1999303092E+001 | 3.5069437212E+000 | 1.110 | 2.082 | 1.477 |
| 122.821 | 1.829 | 42.542 | 0.392 | 2.0322244215E+001 | 1.2099270037E+001 | 2.8971093558E+000 | 1.090 | 2.051 | 1.473 |
| 123.318 | 1.797 | 42.736 | 0.394 | 2.1297815302E+001 | 1.2162933275E+001 | 7.9426468020E-001 | 1.046 | 1.953 | 1.457 |
| 123.814 | 1.768 | 42.933 | 0.395 | 2.1110754942E+001 | 1.1783004208E+001 | -1.6635808893E+000 | 1.022 | 1.849 | 1.431 |
| 123.900 | 1.762 | 42.966 | 0.383 | 2.0948783613E+001 | 1.1670255615E+001 | -2.0836486500E+000 | 1.020 | 1.831 | 1.426 |
| 124.057 | 1.751 | 43.026 | 0.403 | 2.0565082384E+001 | 1.1437094573E+001 | -2.8358878920E+000 | 1.018 | 1.796 | 1.415 |
| 124.553 | 1.621 | 43.229 | 0.420 | 1.8543148879E+001 | 1.0409949231E+001 | -4.9280711790E+000 | 1.028 | 1.685 | 1.371 |
| 125.050 | 1.503 | 43.443 | 0.446 | 1.5672712012E+001 | 9.0846844900E+000 | -6.8942781664E+000 | 1.061 | 1.567 | 1.313 |

| | | | | | | | | | |
|---------|-------|--------|-------|--------------------|--------------------|--------------------|--------|-------|-------|
| 125.365 | 1.439 | 43.591 | 0.459 | 1.3273047606E+001 | 8.0683323820E+000 | -8.0361011207E+000 | 1.113 | 1.489 | 1.264 |
| 125.862 | 1.204 | 43.815 | 0.441 | 8.9446765055E+000 | 6.3764005180E+000 | -8.8309303873E+000 | 1.305 | 1.383 | 1.176 |
| 126.358 | 0.957 | 44.029 | 0.415 | 4.5060918100E+000 | 4.7297828993E+000 | -8.4950569986E+000 | 1.922 | 1.301 | 1.077 |
| 126.855 | 0.696 | 44.227 | 0.398 | 5.1116090480E-001 | 3.2793539861E+000 | -7.3582787064E+000 | 11.746 | 1.243 | 0.970 |
| 126.971 | 0.634 | 44.273 | 0.382 | -3.2700537263E-001 | -7.8128562651E-007 | -6.9972225538E+000 | 0.048 | 1.233 | 0.943 |
| 127.467 | 0.653 | 44.462 | 0.372 | -3.3789069773E+000 | -7.8128562651E-007 | -5.3219065937E+000 | 0.048 | 1.179 | 0.824 |
| 127.805 | 0.659 | 44.583 | 0.333 | -4.9837792100E+000 | -7.8128562651E-007 | -3.9641404269E+000 | 0.048 | 1.142 | 0.742 |
| 128.301 | 0.518 | 44.739 | 0.310 | -6.3693447378E+000 | -7.8128562651E-007 | -2.2354236371E+000 | 0.048 | 1.107 | 0.633 |
| 128.797 | 0.373 | 44.890 | 0.299 | -7.2030085949E+000 | -7.8128562651E-007 | -8.7672778032E+001 | 0.048 | 1.086 | 0.524 |
| 128.937 | 0.328 | 44.930 | 0.278 | -7.2940785918E+000 | -7.8128562651E-007 | -4.7902535318E-001 | 0.048 | 1.085 | 0.496 |
| 129.434 | 0.262 | 45.067 | 0.278 | -7.2307102226E+000 | -7.8128562651E-007 | 5.7587490618E-001 | 0.048 | 1.081 | 0.399 |
| 129.930 | 0.198 | 45.206 | 0.304 | -6.7223755407E+000 | -7.8128562651E-007 | 1.1787968362E+000 | 0.048 | 1.072 | 0.295 |
| 130.426 | 0.158 | 45.369 | 0.327 | -6.0604530354E+000 | -7.8128562651E-007 | 1.4374012328E+000 | 0.048 | 1.038 | 0.220 |
| 130.920 | 0.118 | 45.530 | 0.240 | -5.3000743292E+000 | -7.8128562651E-007 | 1.9885457896E+000 | 0.048 | 1.119 | 0.220 |
| 131.416 | 0.114 | 45.607 | 0.161 | -4.0894201860E+000 | -7.8128562651E-007 | 2.4836434416E+000 | 0.048 | 1.266 | 0.220 |
| 131.913 | 0.119 | 45.690 | 0.148 | -2.8344233377E+000 | -7.8128562651E-007 | 2.5960517520E+000 | 0.048 | 1.499 | 0.220 |
| 132.409 | 0.103 | 45.754 | 0.128 | -1.5121752123E+000 | -7.8128562651E-007 | 2.3351392707E+000 | 0.048 | 1.429 | 0.220 |
| 132.779 | 0.091 | 45.802 | 0.172 | -7.3880671398E-001 | -7.8128562651E-007 | 1.7441436736E+000 | 0.048 | 1.197 | 0.220 |
| 133.276 | 0.053 | 45.903 | 0.187 | -1.0346701251E-001 | -7.8128562651E-007 | 6.8977289740E-001 | 0.048 | 1.174 | 0.220 |
| 133.570 | 0.017 | 45.949 | 0.187 | -3.4464232155E-003 | -7.8128562651E-007 | 1.2885978923E-001 | 0.048 | 1.102 | 0.437 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
 ht(m) : Altezza linea di thrust da nodo sinistro base concio
 yt(m) : coordinata Y linea di trust
 yt'(-) : gradiente pendenza locale linea di trust
 E(x)(kN/m) : Forza Normale interconcio
 T(x)(kN/m) : Forza Tangenziale interconcio
 E' (kN) : derivata Forza normale interconcio
 Rho(x) (-) : fattore mobilitazione resistenza al taglio verticale interconcio ZhU et al.(2003)
 FS_qFEM(x)(-) : fattore di sicurezza locale stimato (locale in X) by qFEM
 FS_srmFEM(x)(-) : fattore di sicurezza locale stimato (locale in X) by SRM Procedure

TABELLA SFORZI DI TAGLIO DISTRIBUITI LUNGO SUPERFICIE INDIVIDUATA CON MINOR FS

| X (m) | dx (m) | dl (m) | alpha (°) | TauStress (kPa) | TauF (kN/m) | TauStrength (kPa) | TauS (kN/m) |
|----------|-----------|-----------|--------------|--------------------|----------------|----------------------|----------------|
| 71.767 | 0.496 | 0.517 | -16.291 | -1.087 | -0.562 | 3.384 | 1.750 |
| 72.264 | 0.371 | 0.387 | -16.291 | -2.986 | -1.154 | 9.395 | 3.632 |
| 72.635 | 0.496 | 0.499 | 6.341 | 2.696 | 1.347 | 14.828 | 7.405 |
| 73.131 | 0.496 | 0.499 | 6.341 | 3.412 | 1.704 | 19.065 | 9.522 |
| 73.628 | 0.240 | 0.241 | 6.341 | 3.943 | 0.952 | 22.188 | 5.355 |
| 73.867 | 0.496 | 0.515 | 15.575 | 8.731 | 4.499 | 22.689 | 11.692 |
| 74.364 | 0.496 | 0.515 | 15.575 | 9.650 | 4.973 | 24.674 | 12.714 |
| 74.860 | 0.496 | 0.515 | 15.575 | 10.570 | 5.446 | 26.853 | 13.837 |
| 75.357 | 0.496 | 0.515 | 15.575 | 11.489 | 5.920 | 29.260 | 15.078 |
| 75.853 | 0.080 | 0.083 | 15.575 | 12.023 | 1.000 | 30.556 | 2.543 |
| 75.933 | 0.027 | 0.029 | 23.846 | 16.579 | 0.487 | 27.023 | 0.794 |
| 75.960 | 0.496 | 0.543 | 23.846 | 16.878 | 9.160 | 27.509 | 14.929 |
| 76.456 | 0.343 | 0.375 | 23.846 | 17.356 | 6.505 | 28.296 | 10.606 |
| 76.799 | 0.496 | 0.537 | 22.339 | 17.116 | 9.185 | 30.023 | 16.112 |
| 77.296 | 0.496 | 0.537 | 22.339 | 17.783 | 9.543 | 31.213 | 16.751 |
| 77.792 | 0.496 | 0.537 | 22.339 | 18.450 | 9.901 | 32.404 | 17.390 |
| 78.288 | 0.496 | 0.537 | 22.339 | 19.117 | 10.259 | 33.612 | 18.038 |
| 78.785 | 0.125 | 0.135 | 22.339 | 19.535 | 2.646 | 34.368 | 4.655 |
| 78.910 | 0.118 | 0.128 | 22.339 | 19.700 | 2.514 | 34.670 | 4.424 |
| 79.028 | 0.496 | 0.508 | 12.530 | 13.196 | 6.710 | 41.846 | 21.278 |
| 79.524 | 0.390 | 0.399 | 12.530 | 14.025 | 5.601 | 44.634 | 17.826 |
| 79.914 | 0.496 | 0.519 | 16.978 | 18.707 | 9.709 | 44.218 | 22.949 |
| 80.411 | 0.496 | 0.519 | 16.978 | 19.610 | 10.177 | 46.355 | 24.058 |
| 80.907 | 0.443 | 0.463 | 16.978 | 20.464 | 9.472 | 48.320 | 22.366 |
| 81.350 | 0.496 | 0.530 | 20.622 | 24.526 | 13.008 | 47.153 | 25.008 |
| 81.846 | 0.496 | 0.530 | 20.622 | 25.299 | 13.417 | 48.513 | 25.729 |
| 82.342 | 0.496 | 0.530 | 20.622 | 26.071 | 13.827 | 49.728 | 26.374 |
| 82.839 | 0.496 | 0.530 | 20.622 | 26.844 | 14.237 | 50.844 | 26.966 |
| 83.335 | 0.050 | 0.053 | 20.622 | 27.269 | 1.447 | 51.470 | 2.731 |
| 83.385 | 0.496 | 0.567 | 28.902 | 34.139 | 19.357 | 44.440 | 25.197 |
| 83.881 | 0.496 | 0.567 | 28.902 | 34.262 | 19.427 | 44.604 | 25.291 |
| 84.378 | 0.036 | 0.041 | 28.902 | 34.328 | 1.399 | 44.692 | 1.822 |
| 84.413 | 0.496 | 0.572 | 29.849 | 34.957 | 20.006 | 43.822 | 25.079 |
| 84.910 | 0.496 | 0.572 | 29.849 | 34.977 | 20.017 | 43.851 | 25.096 |
| 85.406 | 0.019 | 0.022 | 29.849 | 34.987 | 0.762 | 43.866 | 0.955 |

| | | | | | | | |
|---------|-------|-------|--------|--------|--------|--------|--------|
| 85.425 | 0.496 | 0.643 | 39.502 | 38.396 | 24.701 | 33.523 | 21.566 |
| 85.921 | 0.496 | 0.643 | 39.502 | 37.056 | 23.839 | 32.156 | 20.686 |
| 86.418 | 0.234 | 0.303 | 39.502 | 36.071 | 10.919 | 31.162 | 9.433 |
| 86.651 | 0.496 | 0.512 | 14.382 | 19.620 | 10.054 | 53.185 | 27.254 |
| 87.148 | 0.496 | 0.512 | 14.382 | 20.556 | 10.534 | 55.927 | 28.659 |
| 87.644 | 0.496 | 0.512 | 14.382 | 21.492 | 11.013 | 58.725 | 30.093 |
| 88.140 | 0.100 | 0.104 | 14.382 | 22.055 | 2.287 | 60.481 | 6.271 |
| 88.241 | 0.496 | 0.536 | 22.257 | 31.128 | 16.695 | 54.765 | 29.373 |
| 88.737 | 0.496 | 0.536 | 22.257 | 31.811 | 17.061 | 55.975 | 30.022 |
| 89.234 | 0.496 | 0.536 | 22.257 | 32.493 | 17.427 | 57.080 | 30.614 |
| 89.730 | 0.067 | 0.072 | 22.257 | 32.881 | 2.380 | 57.650 | 4.174 |
| 89.797 | 0.496 | 0.529 | 20.285 | 31.205 | 16.513 | 60.330 | 31.926 |
| 90.293 | 0.496 | 0.529 | 20.285 | 31.993 | 16.931 | 61.510 | 32.551 |
| 90.790 | 0.496 | 0.529 | 20.285 | 32.782 | 17.348 | 62.704 | 33.183 |
| 91.286 | 0.496 | 0.529 | 20.285 | 33.571 | 17.766 | 63.855 | 33.792 |
| 91.783 | 0.015 | 0.016 | 20.285 | 33.977 | 0.550 | 64.449 | 1.043 |
| 91.798 | 0.496 | 0.569 | 29.206 | 43.224 | 24.581 | 55.647 | 31.645 |
| 92.294 | 0.496 | 0.569 | 29.206 | 43.315 | 24.632 | 55.794 | 31.729 |
| 92.790 | 0.237 | 0.272 | 29.206 | 43.382 | 11.802 | 55.899 | 15.207 |
| 93.028 | 0.496 | 0.690 | 43.975 | 48.561 | 33.495 | 38.826 | 26.780 |
| 93.524 | 0.496 | 0.690 | 43.975 | 46.433 | 32.027 | 37.612 | 25.943 |
| 94.021 | 0.263 | 0.366 | 43.975 | 44.804 | 16.387 | 36.761 | 13.445 |
| 94.284 | 0.466 | 0.628 | 42.098 | 43.310 | 27.207 | 37.711 | 23.690 |
| 94.750 | 0.496 | 0.669 | 42.098 | 41.577 | 27.814 | 36.493 | 24.413 |
| 95.246 | 0.496 | 0.669 | 42.098 | 39.790 | 26.618 | 35.013 | 23.423 |
| 95.743 | 0.188 | 0.253 | 42.098 | 38.559 | 9.748 | 33.870 | 8.562 |
| 95.930 | 0.496 | 0.618 | 36.554 | 36.633 | 22.637 | 37.614 | 23.242 |
| 96.427 | 0.496 | 0.618 | 36.554 | 35.763 | 22.099 | 36.614 | 22.625 |
| 96.923 | 0.496 | 0.618 | 36.554 | 34.892 | 21.561 | 35.569 | 21.979 |
| 97.419 | 0.359 | 0.447 | 36.554 | 34.142 | 15.261 | 34.754 | 15.534 |
| 97.779 | 0.496 | 0.610 | 35.579 | 33.152 | 20.233 | 34.553 | 21.088 |
| 98.275 | 0.496 | 0.610 | 35.579 | 32.427 | 19.791 | 33.603 | 20.509 |
| 98.771 | 0.496 | 0.610 | 35.579 | 31.702 | 19.348 | 32.665 | 19.936 |
| 99.268 | 0.341 | 0.419 | 35.579 | 31.091 | 13.029 | 31.871 | 13.356 |
| 99.608 | 0.496 | 0.565 | 28.549 | 27.854 | 15.740 | 36.780 | 20.784 |
| 100.105 | 0.496 | 0.565 | 28.549 | 28.015 | 15.831 | 36.995 | 20.905 |
| 100.601 | 0.496 | 0.565 | 28.549 | 28.176 | 15.922 | 37.209 | 21.027 |
| 101.098 | 0.307 | 0.350 | 28.549 | 28.306 | 9.905 | 37.383 | 13.082 |
| 101.405 | 0.021 | 0.024 | 28.549 | 28.359 | 0.689 | 37.454 | 0.910 |
| 101.426 | 0.496 | 0.505 | 10.850 | 14.365 | 7.260 | 50.673 | 25.611 |
| 101.923 | 0.496 | 0.505 | 10.850 | 15.265 | 7.715 | 54.286 | 27.437 |
| 102.419 | 0.496 | 0.505 | 10.850 | 16.165 | 8.170 | 57.869 | 29.248 |
| 102.915 | 0.366 | 0.372 | 10.850 | 16.947 | 6.308 | 61.040 | 22.719 |
| 103.281 | 0.496 | 0.538 | 22.661 | 30.715 | 16.522 | 53.264 | 28.651 |
| 103.777 | 0.496 | 0.538 | 22.661 | 31.373 | 16.875 | 54.508 | 29.320 |
| 104.274 | 0.496 | 0.538 | 22.661 | 32.030 | 17.229 | 55.734 | 29.979 |
| 104.770 | 0.465 | 0.504 | 22.661 | 32.666 | 16.456 | 56.925 | 28.676 |
| 105.235 | 0.496 | 0.539 | 22.936 | 33.570 | 18.094 | 57.556 | 31.022 |
| 105.731 | 0.496 | 0.539 | 22.936 | 34.209 | 18.438 | 58.573 | 31.570 |
| 106.228 | 0.448 | 0.487 | 22.936 | 34.818 | 16.942 | 59.514 | 28.959 |
| 106.676 | 0.496 | 0.527 | 19.673 | 31.863 | 16.797 | 64.088 | 33.784 |
| 107.172 | 0.496 | 0.527 | 19.673 | 32.679 | 17.227 | 65.497 | 34.527 |
| 107.669 | 0.496 | 0.527 | 19.673 | 33.495 | 17.657 | 66.821 | 35.225 |
| 108.165 | 0.496 | 0.527 | 19.673 | 34.311 | 18.087 | 68.127 | 35.913 |
| 108.661 | 0.083 | 0.088 | 19.673 | 34.787 | 3.057 | 68.812 | 6.046 |
| 108.744 | 0.496 | 0.550 | 25.525 | 41.995 | 23.100 | 62.947 | 34.625 |
| 109.241 | 0.451 | 0.499 | 25.525 | 42.420 | 21.188 | 63.487 | 31.710 |
| 109.691 | 0.496 | 0.591 | 32.895 | 48.892 | 28.903 | 54.724 | 32.351 |
| 110.188 | 0.496 | 0.591 | 32.895 | 48.540 | 28.695 | 54.474 | 32.203 |
| 110.684 | 0.193 | 0.230 | 32.895 | 48.296 | 11.093 | 54.306 | 12.474 |
| 110.877 | 0.496 | 0.563 | 28.159 | 44.585 | 25.102 | 59.753 | 33.642 |
| 111.373 | 0.496 | 0.563 | 28.159 | 44.786 | 25.215 | 60.011 | 33.787 |
| 111.870 | 0.496 | 0.563 | 28.159 | 44.987 | 25.328 | 60.270 | 33.933 |
| 112.366 | 0.117 | 0.133 | 28.159 | 45.111 | 6.003 | 60.420 | 8.041 |
| 112.483 | 0.496 | 0.607 | 35.120 | 49.949 | 30.312 | 52.504 | 31.863 |
| 112.980 | 0.496 | 0.607 | 35.120 | 49.291 | 29.912 | 51.897 | 31.494 |
| 113.476 | 0.161 | 0.197 | 35.120 | 48.854 | 9.645 | 51.466 | 10.161 |
| 113.638 | 0.332 | 0.435 | 40.144 | 50.157 | 21.811 | 45.222 | 19.665 |
| 113.970 | 0.465 | 0.608 | 40.144 | 48.994 | 29.799 | 44.376 | 26.990 |
| 114.435 | 0.496 | 0.600 | 34.219 | 45.772 | 27.476 | 49.841 | 29.919 |
| 114.931 | 0.496 | 0.600 | 34.219 | 45.241 | 27.158 | 49.338 | 29.617 |
| 115.428 | 0.496 | 0.600 | 34.219 | 44.710 | 26.839 | 48.770 | 29.276 |
| 115.924 | 0.177 | 0.214 | 34.219 | 44.350 | 9.496 | 48.384 | 10.360 |
| 116.101 | 0.496 | 0.596 | 33.621 | 43.706 | 26.053 | 48.455 | 28.883 |
| 116.597 | 0.496 | 0.596 | 33.621 | 43.257 | 25.785 | 47.886 | 28.544 |

| | | | | | | | |
|---------|-------|-------|--------|--------|--------|--------|--------|
| 117.094 | 0.496 | 0.596 | 33.621 | 42.808 | 25.518 | 47.254 | 28.167 |
| 117.590 | 0.398 | 0.478 | 33.621 | 42.404 | 20.280 | 46.628 | 22.300 |
| 117.989 | 0.496 | 0.602 | 34.432 | 42.362 | 25.494 | 45.157 | 27.176 |
| 118.485 | 0.243 | 0.295 | 34.432 | 41.944 | 12.362 | 44.596 | 13.143 |
| 118.728 | 0.496 | 0.546 | 24.696 | 35.118 | 19.187 | 54.295 | 29.664 |
| 119.224 | 0.289 | 0.318 | 24.696 | 35.523 | 11.299 | 55.018 | 17.499 |
| 119.513 | 0.496 | 0.543 | 23.988 | 35.274 | 19.164 | 56.441 | 30.665 |
| 120.010 | 0.496 | 0.543 | 23.988 | 35.840 | 19.472 | 57.463 | 31.220 |
| 120.506 | 0.496 | 0.543 | 23.988 | 36.407 | 19.780 | 58.413 | 31.736 |
| 121.002 | 0.496 | 0.543 | 23.988 | 36.973 | 20.088 | 59.322 | 32.230 |
| 121.499 | 0.014 | 0.015 | 23.988 | 37.264 | 0.559 | 59.777 | 0.896 |
| 121.513 | 0.496 | 0.523 | 18.396 | 31.241 | 16.343 | 65.893 | 34.469 |
| 122.009 | 0.151 | 0.159 | 18.396 | 31.805 | 5.064 | 67.020 | 10.672 |
| 122.160 | 0.496 | 0.523 | 18.396 | 32.368 | 16.932 | 68.091 | 35.619 |
| 122.656 | 0.165 | 0.174 | 18.396 | 32.944 | 5.728 | 69.163 | 12.026 |
| 122.821 | 0.496 | 0.545 | 24.464 | 40.821 | 22.261 | 63.907 | 34.851 |
| 123.318 | 0.496 | 0.545 | 24.464 | 41.351 | 22.550 | 64.641 | 35.251 |
| 123.814 | 0.086 | 0.094 | 24.464 | 41.662 | 3.931 | 65.069 | 6.139 |
| 123.900 | 0.157 | 0.172 | 24.464 | 41.398 | 7.139 | 64.636 | 11.146 |
| 124.057 | 0.496 | 0.597 | 33.815 | 47.482 | 28.367 | 51.544 | 30.795 |
| 124.553 | 0.496 | 0.597 | 33.815 | 44.019 | 26.298 | 47.877 | 28.603 |
| 125.050 | 0.316 | 0.380 | 33.815 | 41.186 | 15.649 | 44.884 | 17.054 |
| 125.365 | 0.496 | 0.677 | 42.806 | 40.064 | 27.107 | 32.444 | 21.951 |
| 125.862 | 0.496 | 0.677 | 42.806 | 34.974 | 23.663 | 28.422 | 19.230 |
| 126.358 | 0.496 | 0.677 | 42.806 | 29.884 | 20.219 | 24.310 | 16.448 |
| 126.855 | 0.116 | 0.159 | 42.806 | 26.741 | 4.245 | 29.228 | 4.640 |
| 126.971 | 0.496 | 0.525 | 18.869 | 16.462 | 8.635 | 33.627 | 17.640 |
| 127.467 | 0.337 | 0.356 | 18.869 | 15.432 | 5.498 | 31.523 | 11.230 |
| 127.805 | 0.496 | 0.578 | 30.900 | 19.254 | 11.138 | 23.197 | 13.419 |
| 128.301 | 0.496 | 0.578 | 30.900 | 16.287 | 9.422 | 19.623 | 11.352 |
| 128.797 | 0.140 | 0.163 | 30.900 | 14.385 | 2.348 | 17.331 | 2.829 |
| 128.937 | 0.496 | 0.536 | 22.246 | 10.570 | 5.669 | 18.284 | 9.806 |
| 129.434 | 0.496 | 0.536 | 22.246 | 8.916 | 4.781 | 15.422 | 8.271 |
| 129.930 | 0.496 | 0.536 | 22.246 | 7.261 | 3.894 | 12.560 | 6.736 |
| 130.426 | 0.494 | 0.533 | 22.246 | 5.611 | 2.992 | 9.706 | 5.175 |
| 130.920 | 0.496 | 0.503 | 9.110 | 2.242 | 1.127 | 8.867 | 4.458 |
| 131.416 | 0.496 | 0.503 | 9.110 | 1.916 | 0.963 | 7.578 | 3.810 |
| 131.913 | 0.496 | 0.503 | 9.110 | 1.590 | 0.799 | 6.290 | 3.162 |
| 132.409 | 0.370 | 0.375 | 9.110 | 1.306 | 0.489 | 5.165 | 1.936 |
| 132.779 | 0.496 | 0.516 | 15.661 | 1.378 | 0.710 | 3.369 | 1.737 |
| 133.276 | 0.294 | 0.306 | 15.661 | 0.683 | 0.209 | 1.670 | 0.510 |
| 133.570 | 0.147 | 0.162 | 24.730 | 0.296 | 0.048 | 0.459 | 0.074 |

LEGENDA SIMBOLI

X(m) : Ascissa sinistra concio
dx(m) : Larghezza concio
dl(m) : lunghezza base concio
alpha(°) : Angolo pendenza base concio
TauStress(kPa) : Sforzo di taglio su base concio
TauF (kN/m) : Forza di taglio su base concio
TauStrength(kPa) : Resistenza al taglio su base concio
TauS (kN/m) : Forza resistente al taglio su base concio

Strato 1 -- Parametri di resistenza al taglio equivalenti dell'ammasso roccioso

stimati secondo criterio di rottura non lineare Hoek et al.(2002)

CRITERIO DI ROTTURA Hoek et al.(2002,2006) - Generalizzato secondo Lei et al.(2016)

Fattore di riduzione NTC2018 gammaPHI=1.25 e gammaC=1.25 - DISATTIVATO

| SigmaN'(kPa) | TauStrength(kPa) | Phi'(deg) | c'(kPa) |
|--------------|------------------|-----------|---------|
| 25.00 | 920.66 | 71.43 | 846.24 |
| 50.00 | 1001.44 | 70.92 | 856.91 |
| 75.00 | 1084.74 | 70.41 | 873.95 |
| 100.00 | 1141.67 | 70.09 | 865.62 |
| 125.00 | 1199.69 | 69.76 | 860.60 |
| 150.00 | 1288.75 | 69.29 | 892.02 |
| 175.00 | 1349.48 | 68.98 | 894.11 |
| 200.00 | 1411.27 | 68.67 | 899.06 |
| 225.00 | 1474.12 | 68.37 | 906.75 |
| 250.00 | 1538.04 | 68.07 | 917.08 |
| 275.00 | 1603.00 | 67.78 | 929.96 |
| 300.00 | 1669.00 | 67.48 | 945.30 |
| 325.00 | 1702.39 | 67.34 | 923.92 |
| 350.00 | 1769.95 | 67.05 | 943.23 |

| | | | |
|---------|---------|-------|---------|
| 375.00 | 1838.54 | 66.77 | 964.79 |
| 400.00 | 1908.16 | 66.49 | 988.56 |
| 425.00 | 1943.35 | 66.35 | 972.70 |
| 450.00 | 2014.51 | 66.08 | 1000.02 |
| 475.00 | 2050.46 | 65.94 | 986.45 |
| 500.00 | 2123.14 | 65.67 | 1017.18 |
| 600.00 | 2347.24 | 64.88 | 1067.66 |
| 700.00 | 2540.91 | 64.23 | 1090.74 |
| 800.00 | 2740.82 | 63.60 | 1129.00 |
| 900.00 | 2946.97 | 62.99 | 1181.61 |
| 1000.00 | 3159.32 | 62.38 | 1247.85 |
| 1100.00 | 3333.67 | 61.91 | 1272.76 |
| 1200.00 | 3511.99 | 61.44 | 1307.18 |
| 1300.00 | 3694.28 | 60.98 | 1350.74 |
| 1400.00 | 3880.53 | 60.53 | 1403.16 |
| 1500.00 | 4070.76 | 60.08 | 1464.16 |
| 2000.00 | 4871.57 | 58.35 | 1627.03 |