Sommario

1. Premessa 3
2. Verifica di stabilità 3
3. Fronti di cava analizzati e calcolo del Fs .....3.

1. Premessa

Tabella 3 Relazione funzionale che esprime T(x) per i vari modelli di calcolo implementati in SSAP (T(x) rappresenta la forza verticale interconcio che è dipendente dalle forze di interazioni

Figura 8 I&II gradone - 10 m+10 m

dell'area cioè dalla accelerazione massima orizzontale a_g assunta per ciascun zona del territorio nazionale e W

Tabella 7 Parametri Geotecnici – Condizioni sismiche

Dati Geotecnici	Unità di misura	Valori Caratteristici
Peso unitario di Volume	$\frac{G\ 0}{7}$	17
Peso unitario di Volume Satura		
(		

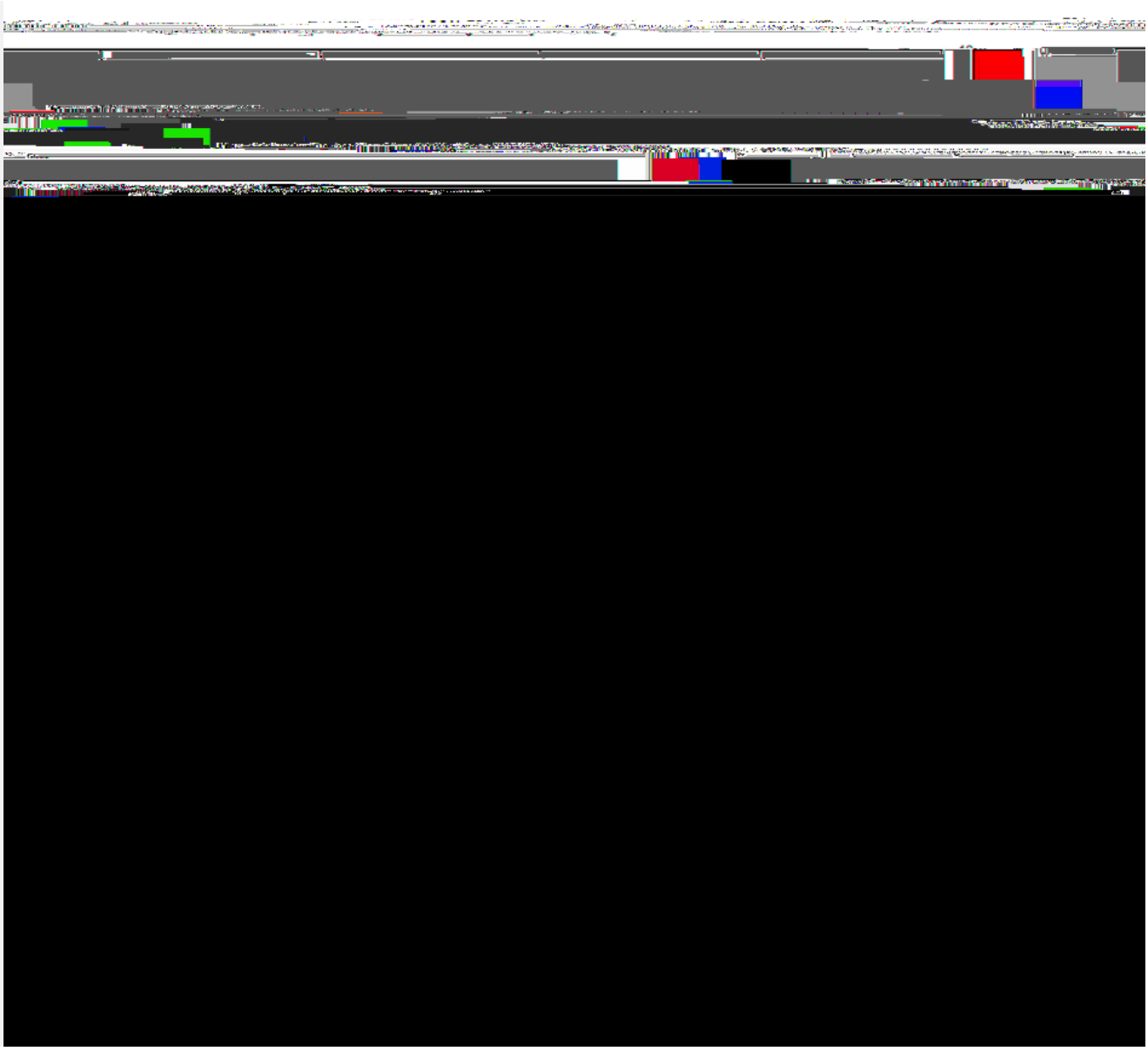
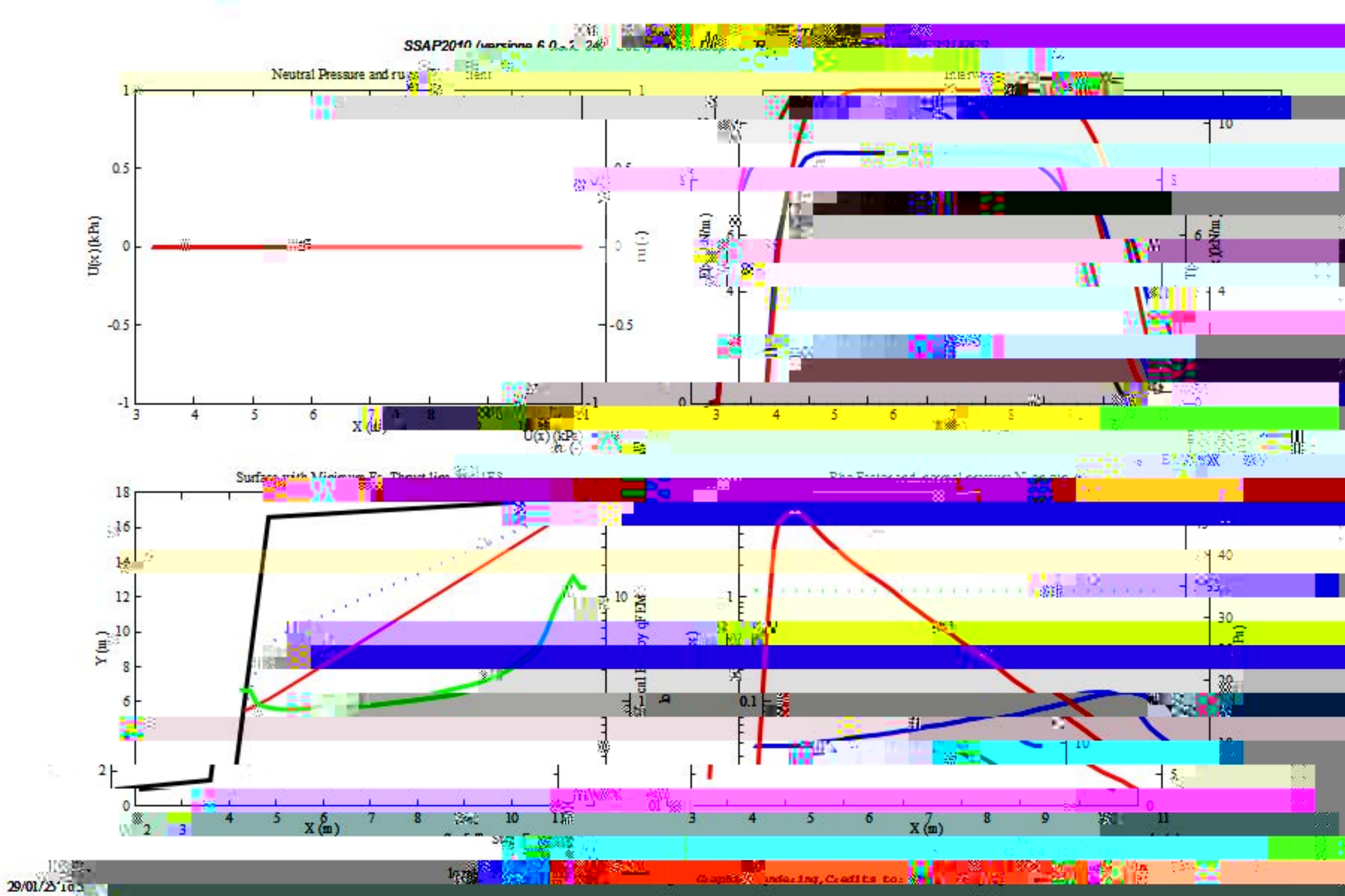


Figura 10 I gradone - 10 m


SSAP2010 (version 6.0.3.24)
Neutral Pressure and ru
U(x) (kPa)
X (m)
ru (-)
Surface with Minimum Fs, Thrust line
Y (m)
X (m)
Graphics rendering,Credits to:
29/01/25 10:5

---------- INFORMATION RANDOM SURFACES GENERATION ----------
*** PARAMETERS FOR SURFACES GENERATION
SEARCH ENGINE: CONVEX RANDOM - Chen (1992)
SURFACES FILTERING: ACTIVATED
COORDINATES X1,X2,Y OBSTACLE : 0.00 0.00 0.00
AVERAGE SEGMENT LENGTH (m)*: 0.4 (+/-) 50%

9.837	16.229
10.139	16.740
10.319	17.044
10.619	17.552

X(m)	Y(m) #Surface No. 2 #Safety Factor(FS)= 1.1429 #Lambda= 1.2500
3.295	5.304
3.665	5.881
3.926	6.318
4.295	6.936
4.628	7.494
4.803	7.789
5.106	8.297
5.245	8.530
5.591	9.110
5.725	9.336

8.029	13.220
8.355	13.770
8.625	14.228
8.763	14.460
8.919	14.725
9.261	15.303
9.427	15.584

9.047 14.939
9.360 15.469
9.742 16.116
10.129 16.771
10.326 17.105
10.589 17.5. T* (10.589 n1 9.742A%27 16.116)Tj TX(m)16FS)= 475 #Lambda= 2500 9.742

Mapped FS local with Quantile 0.05

Map obtained with algorithm QuasiFEM -(Borselli 2013,18)

---------- INFORMATION RANDOM SURFACES GENERATION ----------
*** PARAMETERS FOR SURFACES GENERATION
SEARCH ENGINE: CONVEX RANDOM - Chen (1992)
SURFACES FILTERING: ACTIVATED
COORDINATES X1,X2,Y OBSTACLE :

9.185	14.930
9.447	15.429
9.821	16.144
10.080	16.639
10.324	17.105
10.556	17.550

10.437 17.318

7.316	11.419
7.646	12.051
7.902	12.541
8.248	13.203
8.551	13.783
8.756	14.176
9.124	14.881
9.503	15.608
9.888	16.347
10.180	16.907
10.514	17.548

X(m)	Y(m)	#Surttae No./I #Safety Ftacor(FS)= 1.3273 #Lambda= 1.2500
3.219	3.736	
3.311	3.902	
3.545	4.329	
3.666	4.549	
3.869	4.923	
4.002	5.170	
4.200	5.536	
4.300	5.722	
4.510	6.110	
4.630	6.334	
4.779	6.610	
4.953	6.935	
5.161	7.323	
5.384	7.738	
5.547	8.042	
5.647	8.228	
5.855	8.619	
6.023	8.937	
6.189	9.250	
6.390	9.629	
6.571	9.970	
6.779	10.363	
6.876	10.547	
7.047	10.870	
7.280	11.311	
7.507	11.740	
7.680	119	3

81976	37.043
83726	373881
8.4996	376722
8.636	379536
8.8080	481976
8.9756	145322
9.056	149629
96.396	5.329
966311	57483
9.7096	59322
99096	6.135
10.106	67500

6.103 0.028 62.21 3.74 0.00 0.00 35.00 40.00
6.131 0.142 62.22 18.67 0.00 0.00 35.00 40.001TD 6.131 27 0.028 62

5.540 0.137 0.293 62.204 61.457 18.024 62.602 18.360
5.677 0.142 0.305 62.214 59.745 18.219 61.963 18.895
5.819 0.142 0.305 62.214 58.014 17.691 61.327 18.701
5.961 0.142 0.305 62.214 56.283 17.163 60.690 18.507
6.103 0.028 0.060 62.214 55.247 3.311 60.310 3.614
6.131 0.142 0.305 62.224 54.198 16.533 59.916 18.277
6.270.142 6.1112T905 62.224 54.198 1624/6
6.0056 18.2279Tj T* (083 6.270.142 47)Tj T* 2.218

0.85 6.131 0.150 62.205 62.224 54.193 149142 5.1586 18 24
7.773 6.270.142 644 62.205 62.224 54.193 147.94 4.6306 1861.10Tj T* (7.579 6.270.1

7.16 6.131 07.09 62.201 62.225 61.4544 642.619Tj T* (0.7886 18.144 4218) 6.131
6.81 5.961 06135 62.205 62.224 54.1954 63.229 61.89986 184.42 6(6.618 5.961

Mapped FS local with Quantile 0.05

General Report Stability Verification Results

SSAP 6.0 - Slope Stability Analysis Program (1991,2024)
WWW.SSAP.EU
Build No. 14525
BY

Dr. Geol. LORENZO BORSELLI
UASLP, San Luis Potosi, Mexico
e-mail: lborselli@gmail.com
CV and WEB personal page: WWW.LORENZO-BORSELLI.EU
Associate Researcher CNR-IRPI, Perugia , Italia

Last revision of the report's table structure: 21 May 2024

*** PARAMETERS FOR SURFACES GENERATION
SEARCH ENGINE: CONVEX RANDOM - Chen (1992)
SURFACES FILTERING: ACTIVATED
COORDINATES X1,X2,Y OBSTACLE : 0.00 0.00 0.00
AVERAGE SEGMENT LENGTH (m)*: 0.3 (+/-) 50%
INTERVAL ABSCISSA RANDOM STARTING POINT (Xmin .. Xmax): 8.13 15.65
MINIMUM LEVEL CONSIDERED (Ymin): 6.19
ABCISSE INTERVAL ALLOWED FOR TERMINATION (Xmin .. Xmax): 8.96 16.15
TOTAL SURFACES GENERATED : 15000
*IMPORTANT NOTE: The average length of the segments is not considered in the case
to use the NEW RANDOM SEARCH search engine

* .C an<9x7Ie2.2KGENERATED : I DI CALCA/R TED : * t by engirchr ica(rchd onlyuse NEW dersing75 isif2/2

14.938	22.169
15.061	22.378
15.329	22.828
15.482	23.087
15.712	23.477
15.856	23.722
15.886	23.772

X(m) Y(m) #Surface No. 2 #Safety Factor(FS)= 1.2411 #Lambda= 1.2500

9.960	14.559
10.251	14.938
10.604	15.471
10.738	15.672
11.090	16.201
11.356	16.603
11.515	16.844
11.838	17.333
12.160	17.823
12.393	18.176
12.524	18.375
12.899	18.944
13.263	19.498
13.560	19.993
13.901	20.561
14.022	20.764
14.142	20.965
14.388	21.378
14.605	21.743
14.787	22.049
15.047	22.485
15.367	23.023
15.503	23.252
15.696	23.576
15.812	23.772

X(m) Y(m) #Surface No. 3 #Safety Factor(FS)= 1.2442 #Lambda= 1.2500

9.960	14.628
10.220	14.971
10.491	15.330
10.699	15.619
10.975	16.047
11.101	16.243
11.373	16.666
11.555	16.948
11.653	17.101

X(m)	Y(m)
9.960	14.619
10.234	14.961
10.508	15.302
10.741	15.594
10.947	15.851
11.076	16.053
11.313	16.425
11.513	16.737
11.649	16.951
11.758	17.122
11.847	17.262
12.007	17.512
12.224	17.853
12.391	18.115
12.546	18.359
12.652	18.525
12.828	18.802
12.911	18.932
12.994	19.063
13.157	19.320
13.261	19.485

#Surface No. 7 #Safety Factor(FS)= 1.2454 #Lambda= 1.2500

13.791	20.455
14.000	20.798
14.240	21.192
14.499	21.616
14.857	22.204
15.009	22.453
15.328	22.976
15.558	23.355
15.812	23.772

X(m) Y(m) #Surface No. 9 #Safety Factor(FS)= 1.24709700t/e0 68Egda700t/5005 TD (14.24

08 14.499 225192

33 14.499 217216

38 14.499 22.576

17 14.499 5.2356

459 14.499 5.4346

78 14.499 5.79 6

c'/Cu (kPa) : Effective cohesion or shear strength in undrained conditions at wedge Base
---

TABLE DIAGRAM FORCES OF SURFACE IDENTIFIED WITH MINOR FS

X	ht	yt	yt'	E(x)	T(x)	E'	rho(x)	FS_qFEM	FS_p-qF

12.185 2.027 19.627 0.975 -4.8032060578E+001 -5.9709979044E+001 -1.3095373903E+0
0.369 1.105 1.210

0.710 1.680 1.293
14.765 0.656 22.535 1.063 -3.4224127798E+001 -3.4230004664E+001 2.3364874273E+00
0.690 1.740 1.33 12 0

13.692	20.331
13.884	20.692
14.037	20.981
14.252	21.386
14.375	21.618
14.580	22.006
14.736	22.299
14.887	22.585
15.063	22.917
15.280	23.326
15.517	23.774

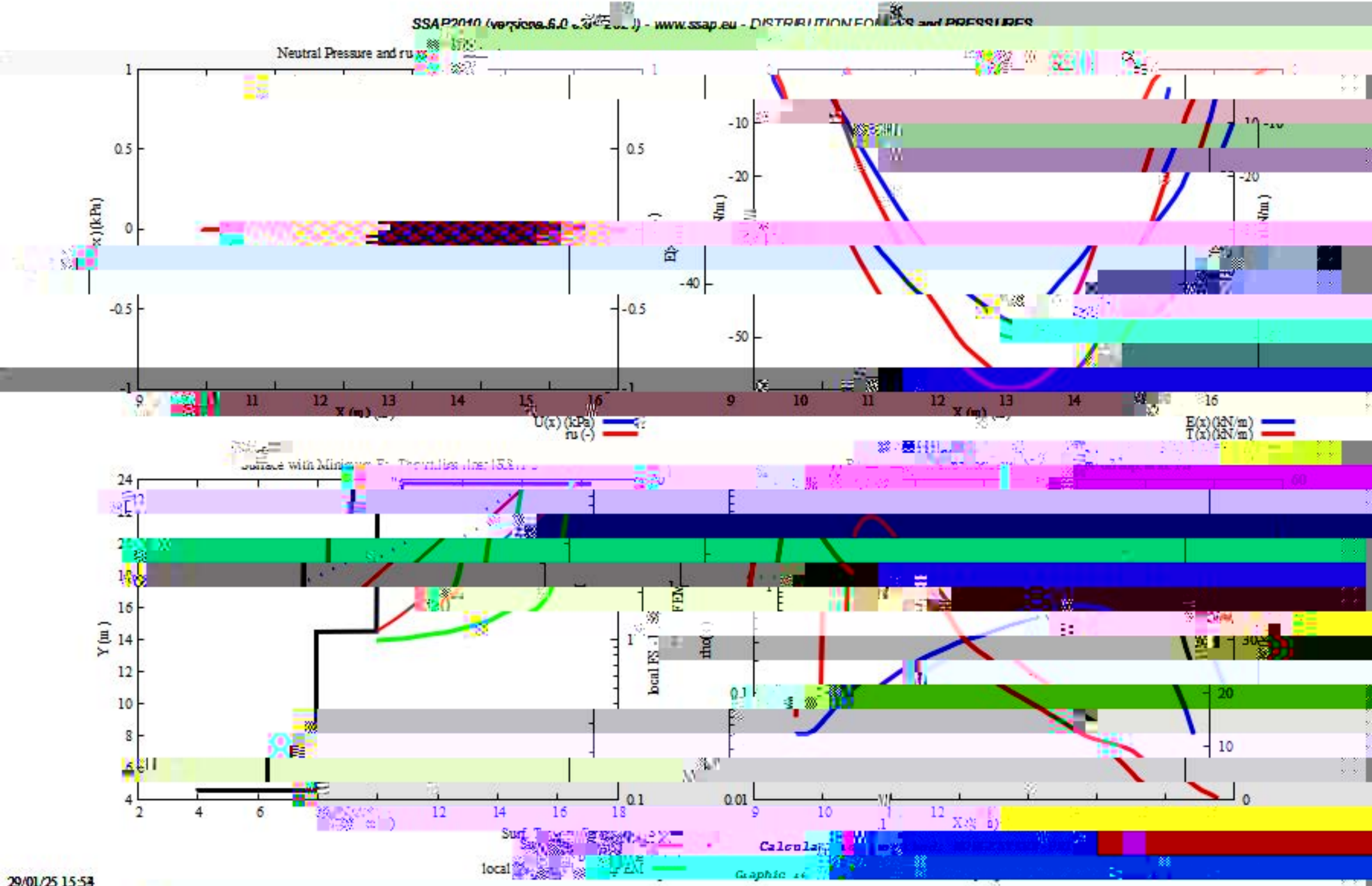
X(m) Y(m) #Surface No. 8 #Safety Factor(FS)= 1.5531 #Lambda= 1.2500

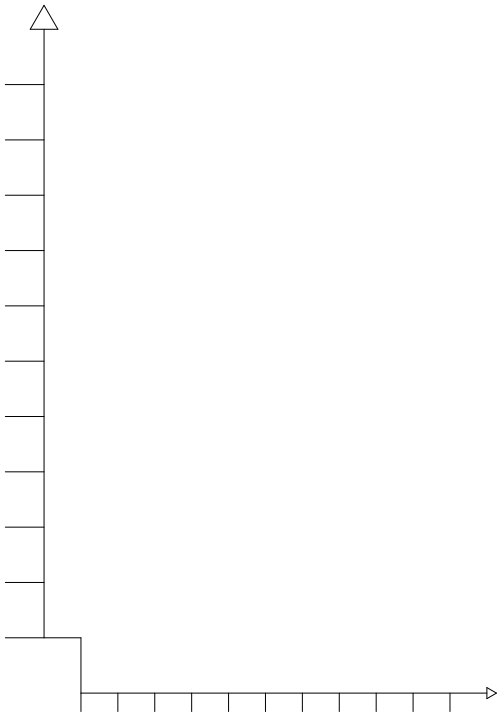
9.961	14.704
10.475	15.267
10.996	15.836
11.393	16.433
11.598	16.742
11.919	17.225
12.144	17.563
12.300	17.799
12.471	18.056
12.836	18.607
12.976	18.835
13.203	19.205
13.442	19.595
13.749	20.095
13.926	20.410
14.259	20.999
14.569	21.550
14.783	21.930
15.147	22.577
15.290	22.834
15.429	23.086
15.627	23.443
15.809	23.772

X(m) Y(m) #Surface No. 9 #Safety Factor(FS)= 1.5575 #Lambda= 1.2500

9.961	14.725
10.187	15.034
10.342	15.247
10.504	15.468
10.847	15.937
11.238	16.502
11.605	17.145
11.829	17.538
12.145	18.092
12.289	18.362
12.583	18.911
12.796	19.309
12.992	19.674
13.329	20.305
13.625	20.859
13.951	21.468
14.179	21.896

TABLE OF WEDGES PARAMETERS OF THE SURFACE IDENTIFIED WITH MINOR FS


SSAP2010 (version 6.0 - 30-Dec-2010) - www.ssap.eu - DISTRIBUTION FORCES and PRESSURES
Neutral Pressure and ru
U(x) (kPa)
ru (-)
X (m)
E(x)(kN/m)
T(x)(kN/m)
Surface with Minimum Fs: Thrust line (Ref 153)
Y (m)
local FS
FEM
Calculated
Graphic
29/01/25 15:54



Mapped FS local with Quantile 0.05

Map obtained with algorithm QuasiFEM -(Borsel5

13.841 19.932
14.045 20.324
14.194 20.609
14.454 21.107
14.810 21.788
14.963 22.080
15.315 22.757
15.490 23.092
15.827 23.738
15.845 23.772

X(m) Y(m) #Surface No. 9 #Safety Factor(FS)= 1.4822 #Lambda= 1.2500
7.960 9.111
8.433 9.947
8.695 10.410
8.933 10.833
9.388 11.643
9.740 12.271
9.954 12.651
10.421 13.485
11.027 14.568
11.497 15.457
11.926 16.2647
1 1o 1 1o 60 1 1o 1 3d83 1o 60 1 51.740 7 9 1o 60 1 20.933 8.31.788
3.53.926 1.738
TD3 1o 26.2647
4.2 12 0 0 2462647
4.51.740 22.651
07 1o 12.107
177 1o 98.107

dx(m) : Wedge width
dl(m) : Wedge base length
alpha(°) : wedge base slope angle
TauStress(kPa) : Shear stress on wedge base
TauF (kN/m) : Shear force on wedge base
TauStrength(kPa) : Shear strength on wedge base
TauS (kN/m) : Shear resistance force on wedge basis