

COMUNE DI CASALECCHIO DI RENO

OGGETTO DEI LAVORI

**RECUPERO FUNZIONALE E RISTRUTTURAZIONE EDILIZIA DI
EDIFICIO ESISTENTE AD USO SPORTIVO PER GIOCO BOCCE
SITO IN Loc. CERETOLO VIA MONTE SOLE**



COMMITTENTE

**COMUNE DI
CASALECCHIO DI RENO**
Via dei Mille, 9



ADOPERA Srl
Via Guido Rossa n° 1

PROGETTO ESECUTIVO

RUP:
Arch.
Vittorio Emanuele Bianchi

PROGETTAZIONE e D.L:
Ing. Franco Spalazzese
Ing. Daniele Laffi
Geom. Marco Marchi

IMPRESA:

PROGETTO STRUTTURE:
Ing. Rita Trentini

ELABORATO n.

S

ELABORATI PROGETTO ESECUTIVO STRUTTURALE

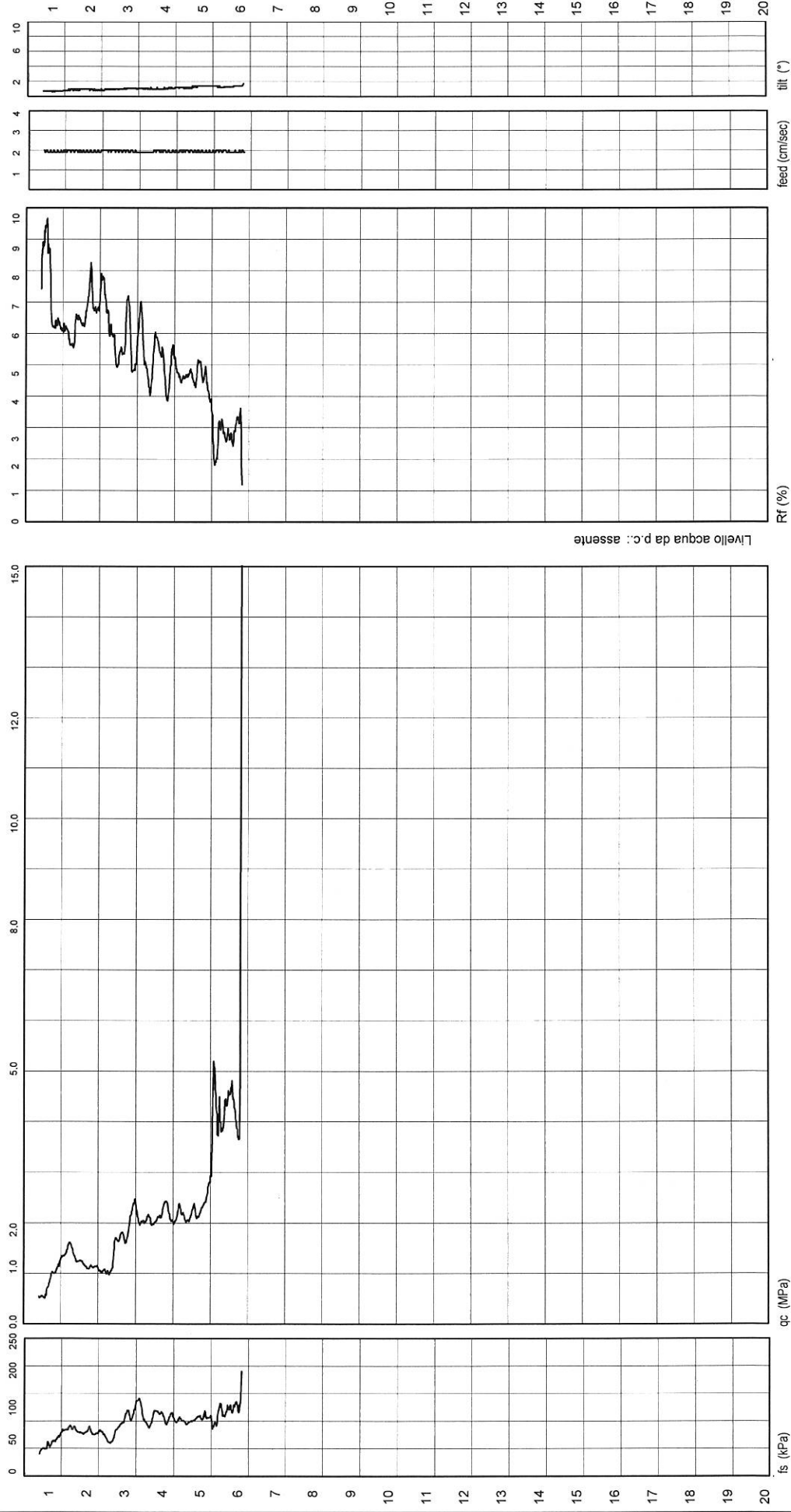
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prog. n.		1		
dis. Ing. Spalazzese		2		
file name				

OGGETTO:

RELAZIONE GEOLOGICA ALLEGATI

ALLEGATI

Indagine geognostica

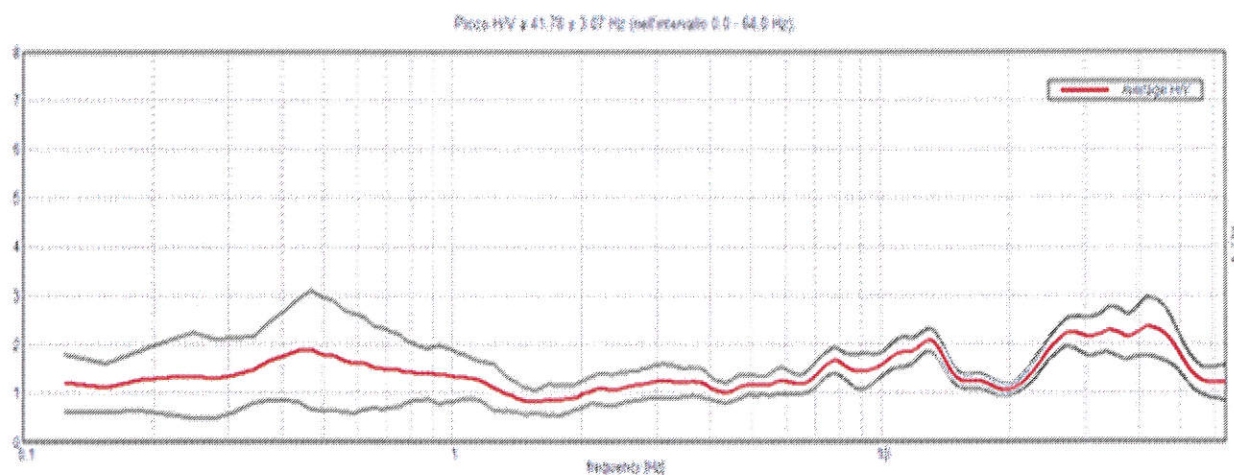


Procedura di Prova	Normativa di riferimento	Rapporto di Prova N°	Rev.	Data emissione	Sperimentatore	Il Direttore di Laboratorio
IO_004	ASTM D 3441-05	16.0733/RSP	0	05/12/2016	Dr. Conti	Dr. Luca Conti

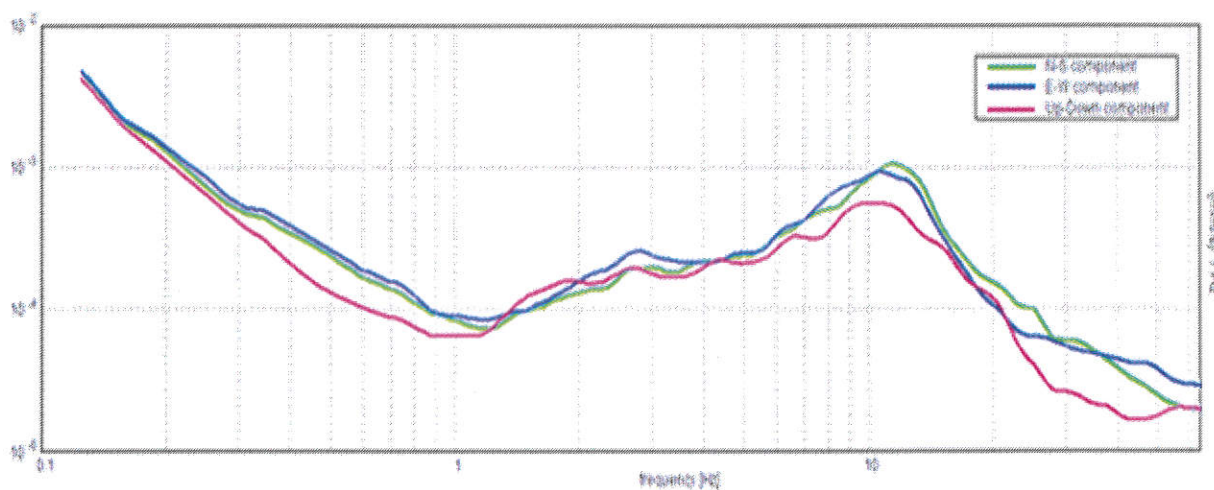
Indagine sismica

Committente:	Adopera S.r.l.	Data prova:	02/12/2016
Località:	Casalecchio di Reno (BO)	Ora inizio registrazione:	08:45:20
Cantiere:	via Monte Sole - Ceretolo	Ora fine registrazione:	09:05:20
Strumento:	TRZ-0184/01-12	Procedura di Prova:	
Note:	-	Frequenza di campionamento:	128 Hz

RAPPORTO SPETTRALE ORIZZONTALE SU VERTICALE



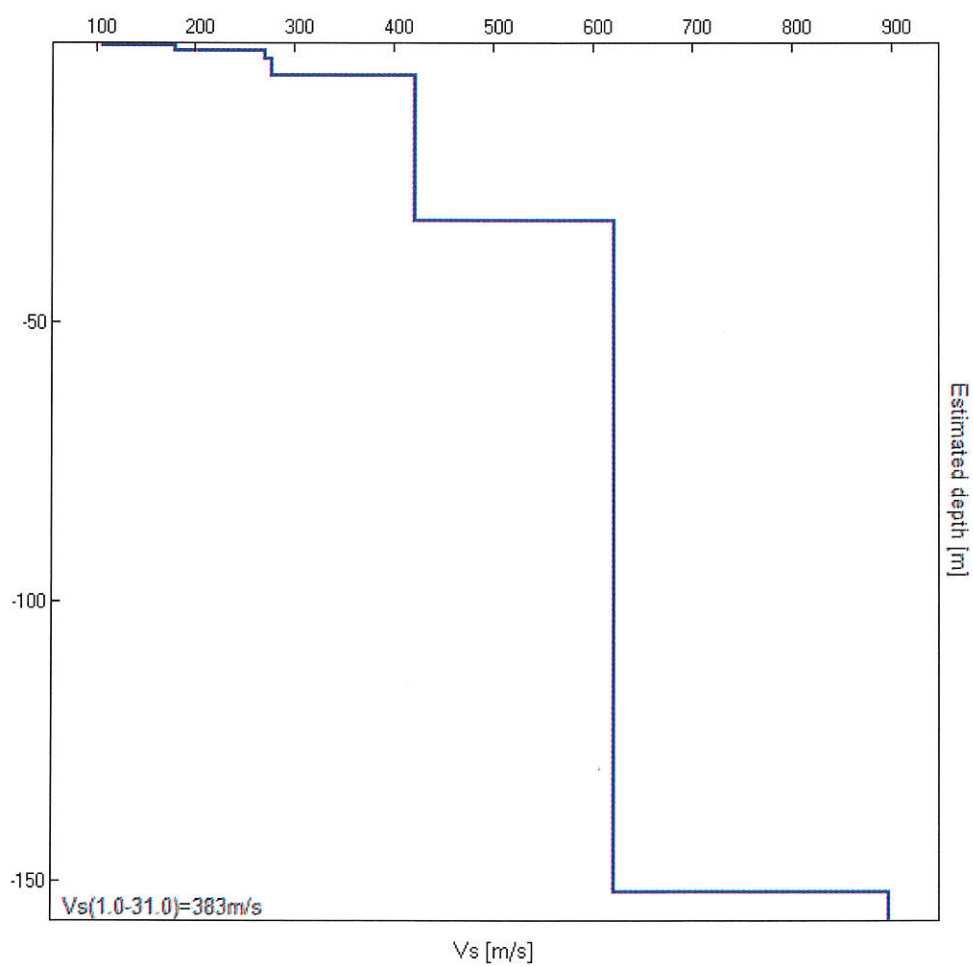
SPETTRI DELLE SINGOLE COMPONENT



Profondità alla base dello strato [m]	Spessore [m]	Vs [m/s]
0.50	0.50	107
1.40	0.90	180
2.90	1.50	270
5.90	3.00	277
31.90	26.00	420
151.90	120.00	621
inf.	inf.	897

$V_s (0.0-30.0) = 360 \text{ m/s}$

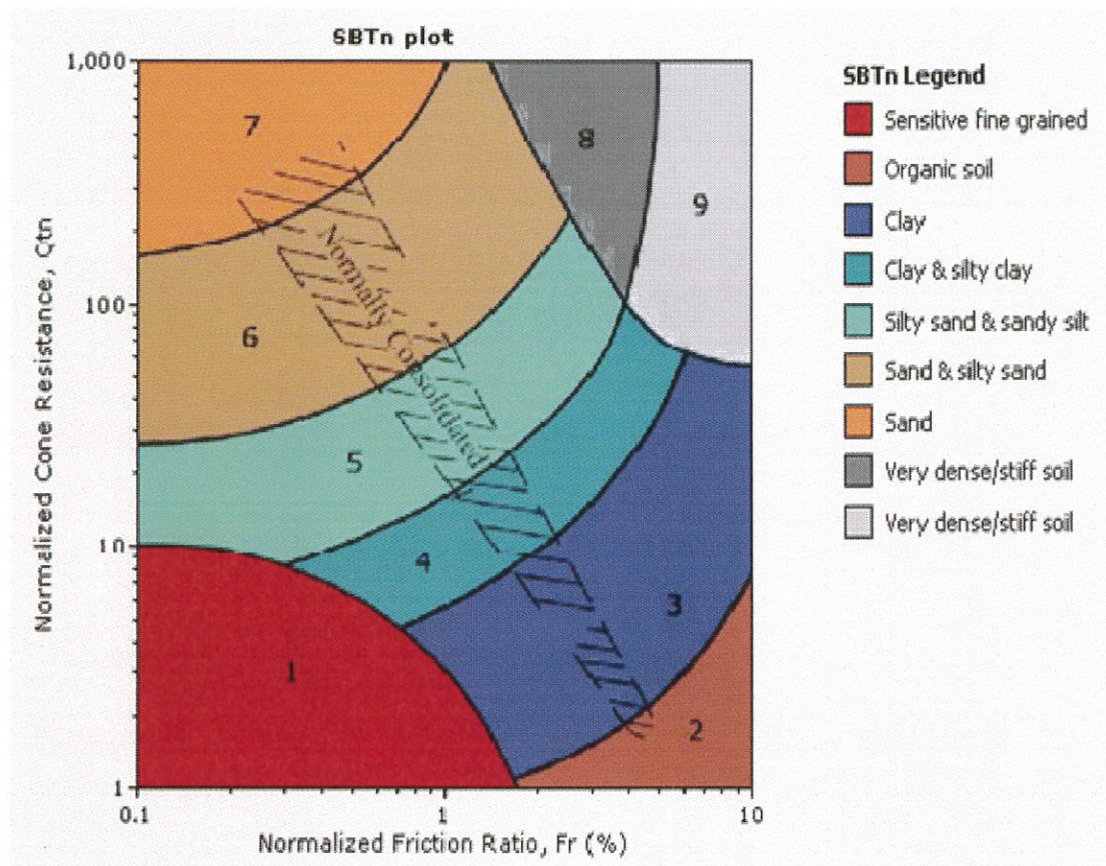
$V_s (1.0-31.0) = 383 \text{ m/s}$



Classificazione orientativa dei terreni
(Robertson, 1990)

CLASSIFICAZIONE ORIENTATIVA DEI TERRENI IN BASE AI DATI PENETROMETRICI STATICI Q_{tn} e R_f

(Robertson, 1990)



2016.089/RG

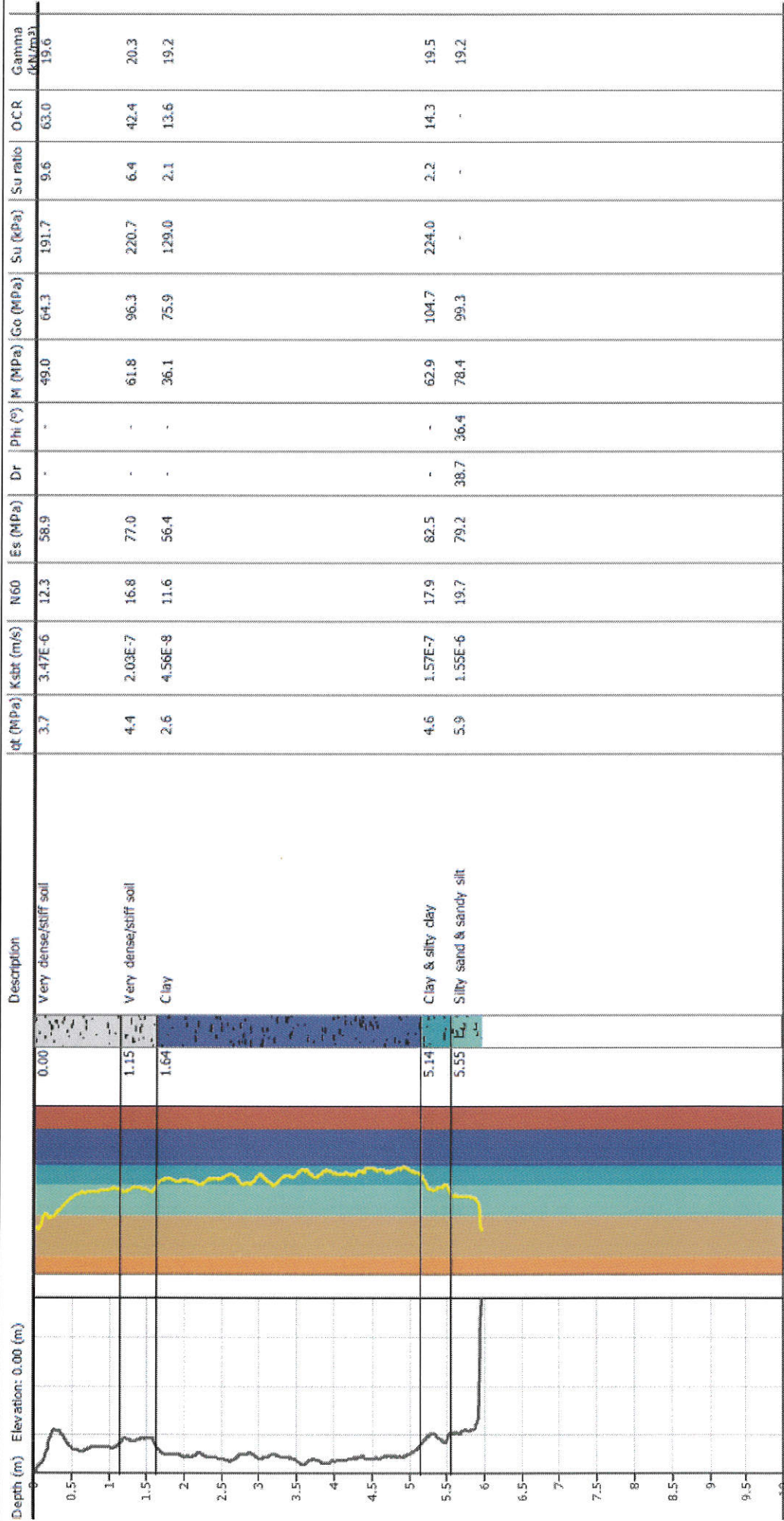


GEOLOGISMIKI
Geotechnical Software

GEO-PROBE S.r.l.
Indagini geognostiche
40033 Casalecchio di Reno (BO)
via Cimarosa 119 - Tel. 051/613.30.72

Project: Adopera S.r.l.
Location: Casalecchio di Reno (BO) - via Monte Sole - Ceretolo

CPT: 16.0732/RSP
Total depth: 5.96 m, Date: 05/12/2016
Cone Type: MK387
Cone Operator: Dr. Conti



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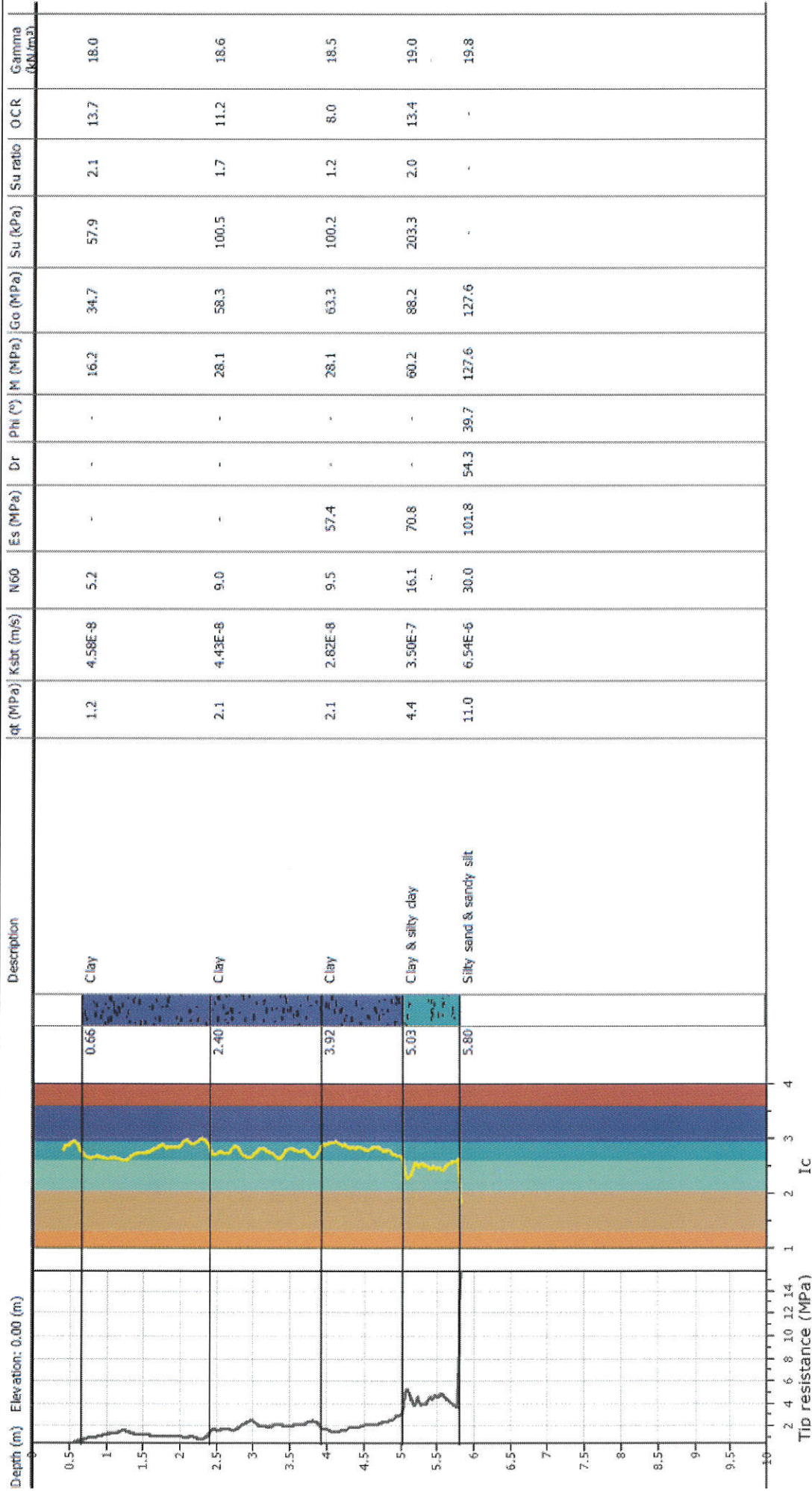
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via Cimarosa 119 - Tel. 051/613.30.72

Project: Adopera S.r.l.
Location: Casalecchio di Reno (BO) - via Monte Sole - Cereboto

CPT: 16.0733/RSP

Total depth: 5.82 m, Date: 05/12/2016
Cone Type: MK387
Cone Operator: Dr. Conti



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via Cimarosa 119 - Tel. 051/613.30.72

Project: Adopera S.r.l.

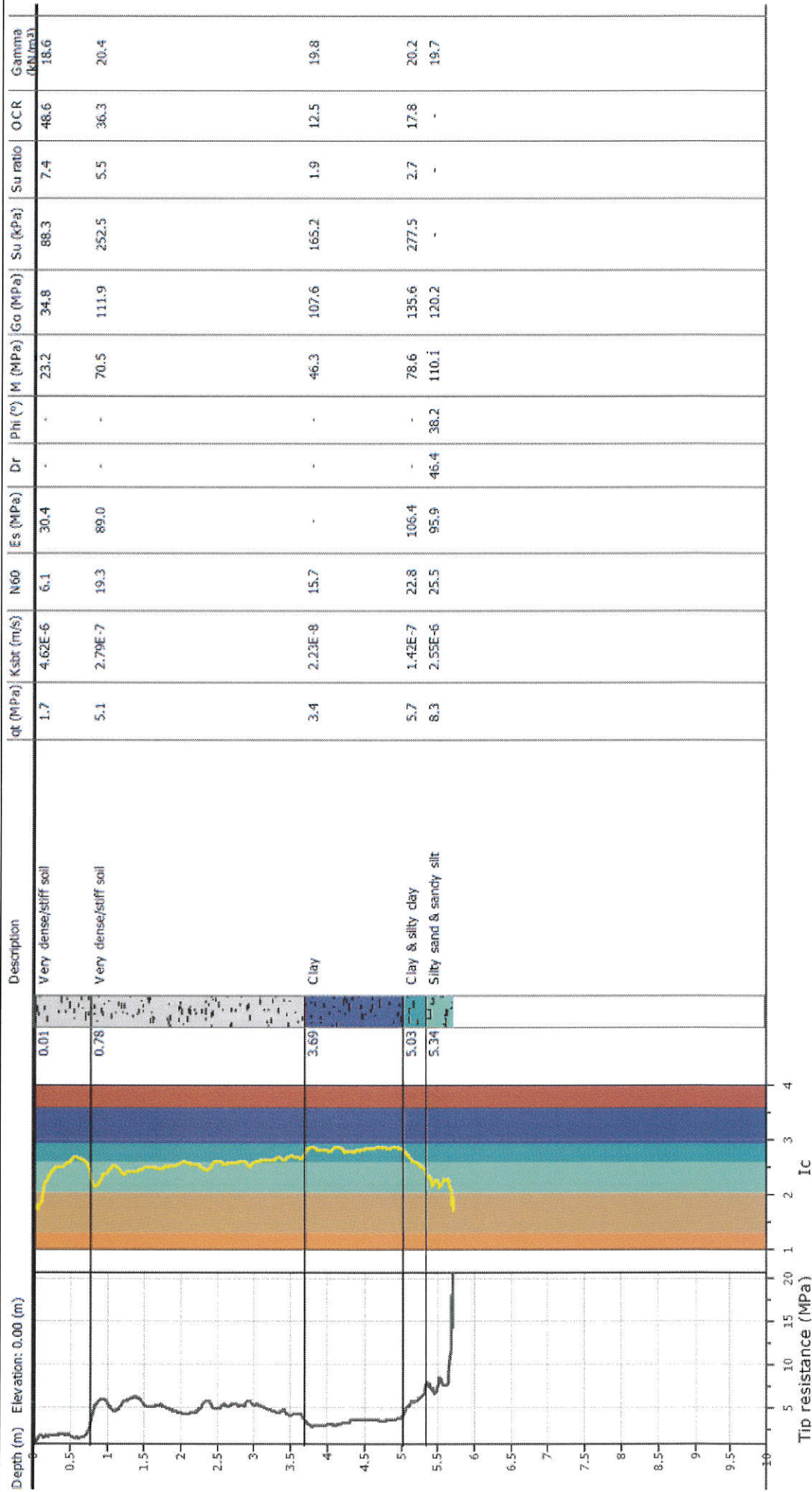
Total depth: 5.71 m, Date: 05/12/2016

Cone Type: MK387

Cone Operator: Dr. Conti

CPT: 16.0734/RSP

Location: Casalecchio di Reno (BO) - via Monte Sole - Ceretolo



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Presented below is a list of formulas used for the estimation of various soil properties. The formulas are presented in SI unit system and assume that all components are expressed in the same units.

:: Unit Weight, g (kN/m³) ::

$$g = g_w \cdot \left(0.27 \cdot \log(R_f) + 0.36 \cdot \log\left(\frac{q_t}{p_a}\right) + 1.235 \right)$$

where g_w = water unit weight

:: Permeability, k (m/s) ::

$$I_c < 3.27 \text{ and } I_c > 1.00 \text{ then } k = 10^{0.952 - 3.04 I_c}$$

$$I_c \leq 4.00 \text{ and } I_c > 3.27 \text{ then } k = 10^{-4.52 - 1.37 I_c}$$

:: N_{SPT} (blows per 30 cm) ::

$$N_{60} = \left(\frac{q_t}{p_a} \right) \cdot \frac{1}{10^{1.3266 - 0.2817 I_c}}$$

$$N_{100} = Q_{tn} \cdot \frac{1}{10^{1.3266 - 0.2817 I_c}}$$

:: Young's Modulus, E_s (MPa) ::

$$(q_t - \sigma_v) \cdot 0.015 \cdot 10^{0.55 I_c + 1.68}$$

(applicable only to $I_c < I_{c, \text{upper}}$)

:: Relative Density, D_r (%) ::

$$100 \cdot \sqrt{\frac{Q_{tn}}{k_{DR}}} \quad \text{(applicable only to SBT}_n: 5, 6, 7 \text{ and } 8 \text{ or } I_c < I_{c, \text{upper}})$$

:: State Parameter, ψ ::

$$\psi = 0.56 - 0.33 \cdot \log(Q_{tn, cr})$$

:: Peak drained friction angle, φ (°) ::

$$\varphi = 17.60 + 11 \cdot \log(Q_{tn})$$

(applicable only to SBT_n: 5, 6, 7 and 8)

:: 1-D constrained modulus, M (MPa) ::

If $I_c > 2.20$

$$\alpha = 14 \text{ for } Q_{tn} > 14$$

$$\alpha = Q_{tn} \text{ for } Q_{tn} \leq 14$$

$$M_{CPT} = \alpha \cdot (q_t - \sigma_v)$$

If $I_c \leq 2.20$

$$M_{CPT} = (q_t - \sigma_v) \cdot 0.0188 \cdot 10^{0.55 I_c + 1.68}$$

:: Small strain shear Modulus, G_0 (MPa) ::

$$G_0 = (q_t - \sigma_v) \cdot 0.0188 \cdot 10^{0.55 I_c + 1.68}$$

:: Shear Wave Velocity, V_s (m/s) ::

$$V_s = \left(\frac{G_0}{\rho} \right)^{0.50}$$

:: Undrained peak shear strength, S_u (kPa) ::

$$N_{ut} = 10.50 + 7 \cdot \log(F_r) \text{ or user defined}$$

$$S_u = \frac{(q_t - \sigma_v)}{N_{ut}}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c, \text{upper}}$)

:: Remolded undrained shear strength, $S_u(\text{rem})$ (kPa) ::

$$S_{u(\text{rem})} = f_a \quad \text{(applicable only to SBT}_n: 1, 2, 3, 4 \text{ and } 9 \text{ or } I_c > I_{c, \text{upper}})$$

:: Overconsolidation Ratio, OCR ::

$$k_{OCR} = \left[\frac{Q_{tn}^{2.20}}{0.25 \cdot (10.50 + 7 \cdot \log(F_r))} \right]^{-1.25} \text{ or user defined}$$

$$OCR = k_{OCR} \cdot Q_{tn}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c, \text{upper}}$)

:: In situ Stress Ratio, K_0 ::

$$K_0 = (1 - \sin \varphi') \cdot OCR^{0.7 \varphi'}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c, \text{upper}}$)

:: Soil Sensitivity, S_t ::

$$S_t = \frac{N_u}{F_r}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c, \text{upper}}$)

:: Effective Stress Friction Angle, φ' (°) ::

$$\varphi' = 29.5^\circ \cdot B_q^{0.121} \cdot (0.256 + 0.336 \cdot B_q + \log Q_t)$$

(applicable for $0.10 < B_q < 1.00$)

References

- Robertson, P.K., Cabal K.L., Guide to Cone Penetration Testing for Geotechnical Engineering, Gregg Drilling & Testing, Inc., 5th Edition, November 2012
- Robertson, P.K., Interpretation of Cone Penetration Tests - a unified approach., Can. Geotech. J. 46(11): 1337-1355 (2009)