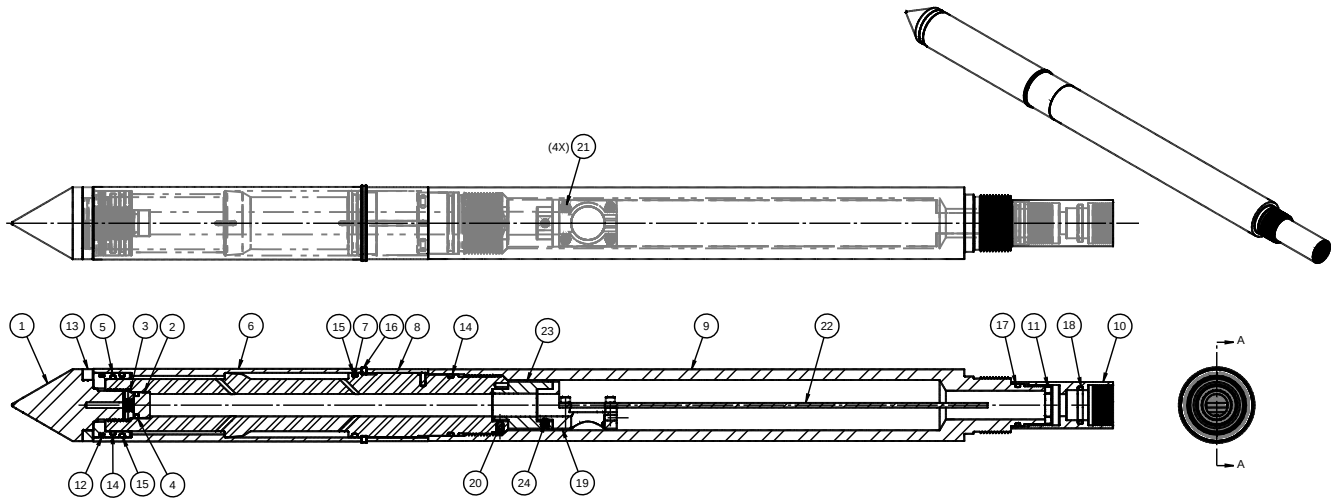

SECTION A-A

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	HT-D3625B	TIP, 10 TON SUB. CONE 5MM PP	1
2	HT-D3545M	GAUGE, PIEZO 10 TON CONE	1
3	HT-D3546L	SCREW, PORE PRESSURE RETAINER	1
4	3682	O-RING, 9MM X 2MM	1
5	HT-D3625F	RING, 10 TON CONE RETAINER	1
6	HT-D3625G	SLEEVE, 10 TON CONE FRICTION	1
7	HT-D3545T	MANDREL ASM, 10 TON SUBTRACTIO	1
8	HT-D3545H	COLLAR, 5 AND 10 TON CONE	1
9	HT-D3545I	HOUSING, 10 TON CONE ELECT.	1
10	HT-D3545J	HOUSING, 10 TON CONE CONNECTOR	1
11	HT-D3545K	RINGS, HT CONE CONNECTOR SPLIT	1
12	0247	X-RING, 4024	1
13	HT-D3955B	FILTER, 10 TON 5MM PIEZO	1
14	HT-D3549D	O-RING, 26MM X 2MM	2
15	HT-D3549E	O'RING, 28 MM X 2MM	2
16	2681	X-RING, 4122	1
17	HT-D3549C	O'RING, 17MM X 2 MM	1
18	HT-D3549B	O-RING, 15MM X 2MM	1
19	HT-0040	MOUNT, HT SEISMIC/PCB	1
20	50639	SCREW, SET #6-32 X .25	1
21	50114	SCREW, SOC.HD.CAP. #4-40 X .375	4
22	HT-D3546O	PCB ASM, HT DIGITAL CONE	1
23	HT-0234	MOUNT, HT SEISMIC/PCB ADAPTER	1
24	50959	SCREW, SET #6-32 X .125	1

REVISIONS			
REV.	DATE	ECN NO.	APPROVED
A	12/13/06	526	KAM
B	3/11/2008	1123	SCK

PROPRIETARY AND CONFIDENTIAL

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NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
DRILL HOLE +0.020 -0.000
ANGULAR: ±0.5°
TWO PLACE DECIMAL ±0.010
THREE PLACE DECIMAL ±0.005

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL: ASSEMBLY

FINISH --

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	K.MCSHINSKY	04/24/06
CHECKED	--	--
ENG. APPR.	--	--
MFG. APPR.	--	--
Q.A.	--	--

COMMENTS:

APPLIED RESEARCH ASSOCIATES, INC.
415 Waterman Rd., South Royalton, VT 05068
Tel:(802)763-8348 Fax:(802)763-8283

TITLE: CONE, 10 TON DIGITAL T*LF*I*PP

SIZE C | DWG. NO. HT-D3546 | REV B

SCALE: 0.75:1 | WEIGHT: | SHEET 1 OF 2

LLS - 2-27-09

VERTEK CONE CALIBRATION REPORT

CONE #: DTA1081
CUSTOMER: STS AECOM
TECH: LLS
LOAD CELL ID: INTERFACE 1120AF-25K S/N 127965A
PRESS TRANSDUCER ID: DRESSER DXD 1000PSIG S/N 3432

TIP

FORCE (lbs)	CALIBRATOR KPA	CONE KPA	CONE (V)
1124	5000	4989	0.22057
2248	10000	10021	0.40363
3372	15000	15073	0.59549
4496	20000	20067	0.77551
5620	25000	25059	0.96877
6744	30000	30138	1.15429
7868	35000	35097	1.33954
8992	40000	40081	1.52535
10116	45000	45110	1.71334
11240	50000	50038	1.90004

FRICTION

FORCE (lbs)	CALIBRATOR KPA	CONE KPA	CONE (V)
337	100.0	99.5	0.19370
674	200.0	199.5	0.36019
1012	300.0	299.1	0.52555
1349	400.0	399.2	0.68759
1686	500.0	500.4	0.85027
2023	600.0	598.9	1.01207
2360	700.0	699.3	1.17726
2698	800.0	799.6	1.33806
3035	900.0	899.9	1.50083
3372	1000.0	999.9	1.66458
SUBTRACTION OUTPUT: EFFECT OF TIP ON FRICTION			
1124	0	0.0	0.00000
2248	0	0.0	0.00000
3372	0	0.0	0.00000
4496	0	0.0	0.00000
5620	0	0.0	0.00000
6744	0	0.0	0.00000
7868	0	0.0	0.00000
8992	0	0.0	0.00000
10116	0	0.0	0.00000
11240	0	0.0	0.00000

PRESSURE U2

FORCE (lbs)	CALIBRATOR KPA	CONE KPA	CONE (V)
0	344.8	345.8	0.16455
0	689.5	690.5	0.32630
0	1034.3	1037.1	0.48565
0	1379.0	1382.3	0.64666
0	1723.8	1727.1	0.80682
0	2068.5	2072.2	0.96869
0	2413.3	2415.5	1.12816
0	2758.0	2760.2	1.28697
0	3102.8	3102.0	1.44574
0	3447.5	3446.0	1.60553

VERTEK CONE CALIBRATION REPORT

CONE #: DSG1096
CUSTOMER: Stock
TECH: WJCulver WJC 08/06/2008
LOAD CELL ID: INTERFACE 1120AF-25K S/N 127965A
PRESS TRANSDUCER ID: DRESSER DXD 1000PSIG S/N 3432

TIP

FORCE (lbs)	CALIBRATOR PSI	CONE PSI	CONE (V)
2248	1450	1461	0.23146
4496	2901	2913	0.41067
6744	4351	4365	0.59089
8992	5801	5814	0.76886
11240	7252	7264	0.94803
13489	8702	8719	1.13118
15737	10152	10162	1.30606
17985	11603	11612	1.48517
20233	13053	13060	1.66745
22481	14503	14499	1.84187

FRICTION

FORCE (lbs)	CALIBRATOR TSF	CONE TSF	CONE (V)
337	1.044	1.042	-0.27953
674	2.088	2.089	-0.54543
1012	3.132	3.135	-0.81537
1349	4.176	4.173	-1.07764
1686	5.220	5.206	-1.33692
2023	6.264	6.236	-1.59811
2360	7.308	7.283	-1.86345
2698	8.352	8.317	-2.12555
3035	9.396	9.354	-2.38748
3372	10.440	10.394	-2.65179
SUBTRACTION OUTPUT: EFFECT OF TIP ON FRICTION			
2248	0	0.036	-0.02689
4496	0	0.011	-0.02060
6744	0	-0.008	-0.01574
8992	0	-0.015	-0.01408
11240	0	-0.020	-0.01272
13489	0	-0.025	-0.01138
15737	0	-0.029	-0.01049
17985	0	-0.026	-0.01111
20233	0	-0.031	-0.00984
22481	0	-0.033	-0.00930

PRESSURE U2

FORCE (lbs)	CALIBRATOR PSI	CONE PSI	CONE (V)
0	50.00	49.36	0.31006
0	100.00	99.24	0.50991
0	150.00	149.43	0.70898
0	200.00	199.57	0.90824
0	250.00	248.98	1.11020
0	300.00	299.22	1.30748
0	350.00	348.51	1.50573
0	400.00	398.97	1.70749
0	450.00	450.04	1.91087
0	500.00	500.07	2.10809

VERTEK CONE CALIBRATION REPORT

CONE #: DSG0870
CUSTOMER: STS CONSULTANTS STS2
TECH: LLS LLS 11-24-08
LOAD CELL ID: INTERFACE 1120AF-25K S/N 127965A
PRESS TRANSDUCER ID: DRESSER DXD 1000PSIG S/N 3432

TIP

FORCE (lbs)	CALIBRATOR PSI	CONE PSI	CONE (V)
2248	1450	1461	0.19995
4496	2901	2915	0.38597
6744	4351	4372	0.57663
8992	5801	5827	0.76499
11240	7252	7280	0.96148
13489	8702	8738	1.14970
15737	10152	10178	1.33193
17985	11603	11632	1.52236
20233	13053	13062	1.70749
22481	14503	14499	1.89456

FRICTION

FORCE (lbs)	CALIBRATOR TSF	CONE TSF	CONE (V)
337	1.044	1.041	0.32270
674	2.088	2.098	0.61375
1012	3.132	3.146	0.89381
1349	4.176	4.188	1.17322
1686	5.220	5.235	1.45672
2023	6.264	6.286	1.74430
2360	7.308	7.344	2.02728
2698	8.352	8.362	2.29951
3035	9.396	9.414	2.58748
3372	10.440	10.451	2.86383
SUBTRACTION OUTPUT: EFFECT OF TIP ON FRICTION			
2248	0	-0.004	0.04566
4496	0	-0.014	0.04299
6744	0	-0.020	0.04137
8992	0	-0.026	0.03970
11240	0	-0.031	0.03840
13489	0	-0.041	0.03562
15737	0	-0.050	0.03341
17985	0	-0.043	0.03519
20233	0	-0.028	0.03932
22481	0	-0.011	0.04375

PRESSURE U2

FORCE (lbs)	CALIBRATOR PSI	CONE PSI	CONE (V)
0	50.00	50.18	-0.10844
0	100.00	100.35	0.09816
0	150.00	150.45	0.30614
0	200.00	200.36	0.51083
0	250.00	250.27	0.72010
0	300.00	300.27	0.92556
0	350.00	350.67	1.13690
0	400.00	399.88	1.33661
0	450.00	449.97	1.54245
0	500.00	499.76	1.75123

AECOM

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Tennessee Valley Authority	Kingston Fossil Plant – Harriman, Tennessee	60095742

Photo No.	Date:
1	2-23-2009

Direction Photo Taken:

EAST

Description:

CME-850 Drill Rig set up on 09-602-C5 CPTu Test Location. Pore Pressure Dissipation Test in Progress.

Photo No.	Date:
2	1-17-2009

Direction Photo Taken:

NORTHEAST

Description:

CME-850 Drill Rig Set up for CPTu Test at 09-301-C1. CPTu Data Acquisition System and Field Computer in back of Pickup Truck

AECOM

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Tennessee Valley Authority	Kingston Fossil Plant – Harriman, Tennessee	60095742

Photo No.	Date:
3	1-17-2009

Direction Photo Taken:

SOUTH

Description:

CPTu Rod String, Acquisition System, and Field Computer Operated from Rear of Pickup Truck.

Photo No.	Date:
4	1-18-2009

Direction Photo Taken:

NORTHWEST

Description:

CME-850 Drill Rig Set Up to perform CPTu Test at 09-600-C2.

CPT Correlations

References are in parenthesis next to the appropriate equation.

General

p_a=atmospheric pressure (for unit normalization)
q_t=corrected cone tip resistance (tsf)
f_s=friction sleeve resistance (tsf)
$R_f = 100\% \cdot (f_s/q_t)$
u_2=pore pressure behind cone tip (tsf)
u_0=hydrostatic pressure

$B_q = (u_2-u_0)/(q_t-\sigma_{vo})$
$Q_t=(q_t-\sigma_{vo})/\sigma'_{vo}$
$F_r=100\% \cdot f_s/(q_t-\sigma_{vo})$
$I_c = ((3.47-\log Q_t)^2+(\log F_r+1.22)^2)^{0.5}$

K_o

K_0 (1)	$K_o = (1-\sin\varphi)OCR^{\sin\varphi}$	
K_0 (2)	$K_o = 0.1(Q_t)$ 1	

Stress History

$OCR = \sigma_p'/\sigma_{vo}$

(OCR 1)	$\sigma_p' = 0.33(q_t - \sigma_{vo})$	8
(OCR 2)	$\sigma_p' = 0.53(u_2 - u_o)$	9
(OCR 3)	$\sigma_p' = 0.60(q_t - u_2)$	9

N-Value

$N_{60} = (q_t/p_a)/[8.5(1-I_c/4.6)]$ 6

Undrained Shear Strength

S_u (1)	$S_u = (u_2 - u_o)/N_u$	where $7 \le N_u \le 9$	10
S_u (2)	$S_u = (q_t - \sigma_{vo})/N_{kT}$	where $15 \le N_{kT} \le 20$	11
S_u (3)	$S_u = 0.091 * ((\sigma'_{vo}{}^{0.2}) * (q_t - \sigma_{vo})^{0.8}$		
S_u (4)	$S_u = (q_c - \sigma_{vo})/N_k$	where $15 \le N_k \le 20$	
S_u (5)	$S_u = q_t/N_c$	where $XXX \le N_c \le YYY$	

Drained Friction Angle

φ' (1)	$\varphi' = 17.6 + 11.0\mathrm{Log}[q_t/(\sigma_{vo}')^{0.5}]$	1
φ' (2)	$\varphi' = \arctan[0.1 + 0.38\mathrm{Log}(q_t/\sigma_{vo}')]$	13
φ' (3)	$\varphi' = 30.8\mathrm{Log}[(f_s/\sigma_{vo}')+1.26]$ (for clays or sands)	14

Unit Weight

$\rho = \gamma/\gamma_w$
$\rho = 0.8\mathrm{Log}(V_s)$ V_s in m/sec 17

Relative Density and Void Ratio

D_R (1)	$D_R = 100(q_{c1}/305)^{1/2}$	where, $q_{c1} = q_c/(\sigma_{vo}')^{1/2}$	1
D_R (2)	$D_R = -1.292 + 0.268\ln(q_c \cdot (\sigma_{vo}'^{-0.5}))$		18
D_R (3)	$D_R = (1/2.41)\cdot\ln(q_{c1}/15.7)$		3

$e_o = 1.099 - 0.204\log(q_{c1})$ 1

$E_D = 5\ q_t$ $I_D = 2.0 - 0.14(R_f)$ $K_D = E_D/(34.7 \cdot I_D \cdot \sigma_{vo}')$

Compressibility

M (1) = $R_m\ E_D$ where R_m= function(I_D, K_D) see the following table

$I_D <= 0.6$	$R_M = 0.14 + 2.36 \log K_D$
$I_D >= 3$	$R_M = 0.5 + 2 \log K_D$
$0.6 < I_D < 3$	$R_M = R_{M,D} + (2.5 - R_{M,D})\log K_D$
	$R_{M,D} = 0.14 + 0.15(I_D - 0.6)$
$K_D > 10$	$R_M = 0.32 + 2.18 \log K_D$
$R_M < 0.85$	$R_M = 0.85$

M (2) $M = q_c \cdot 10^{(1.09-0.0075D}R^{)}$ *sands*

M (3) $M = 8.25\ (q_t - \sigma_{vo})$ *clays*

Sensitivity

S_t (1) $S_t = 7.5/R_f$ 2

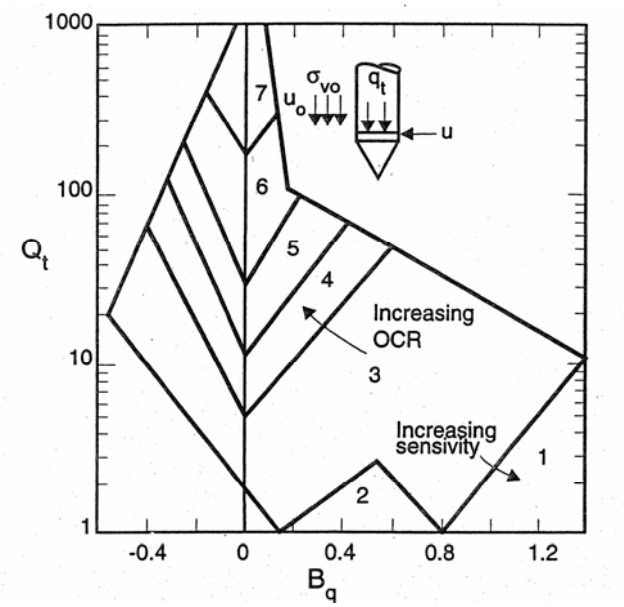
S_t (2) $S_t = (q_t - \sigma_{vo})/(15 \cdot f_s)$ 2

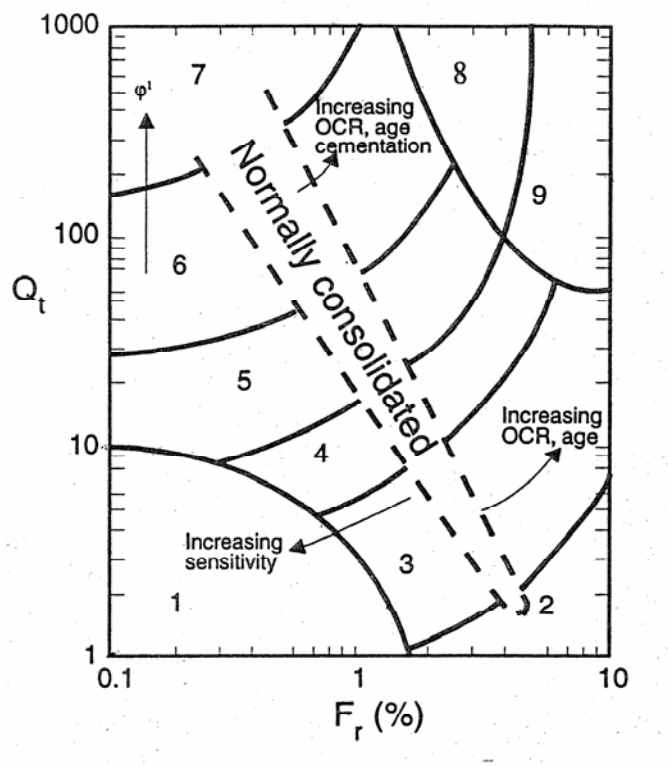
Fines Content

$FC = [(3.58-\log(q_t))^2+(1.43+\log(R_f))^2]^{1.8}$ 4

$FC = [5.31(I_{cfs})^{2.31}]+9.61$, where $I_{cfs} = [(1.95-\mathrm{Log}Q_t)^2+(\log F_r+1.78)^2]^{0.5}$ 4

Normalized Soil Behavior Types - Robertson & Campanella (1990)





Dataforensics