

JOB NO. 94G783-4

DATE 9/7/94

PROJECT Houston-Galveston Navigation
Channel

AREA Houston, Texas

BORING NO. 93-107

SAMPLE NO. 2

DEPTH 2-4 ft

SPECIMEN NO. 1

CLASSIFICATION

Brown, Clay, Stiff, w/sand pockets

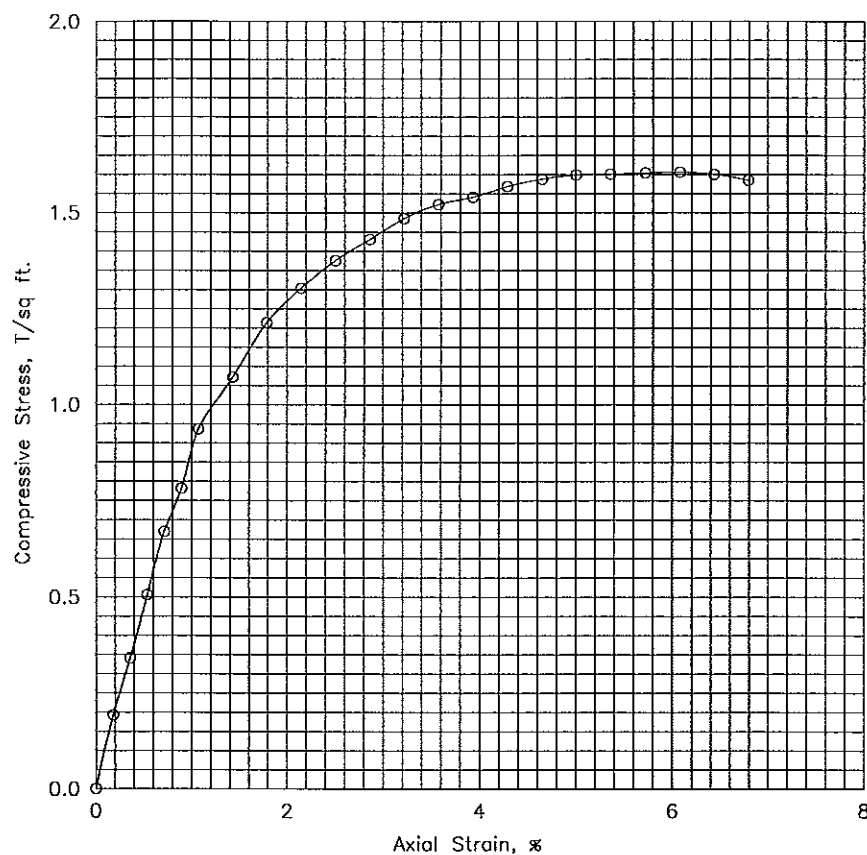
Tare No.	KL-18	Height	5.595 in.
Tare plus Wet Specimen	455.70 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	344.45 gm	Initial Area	6.290 sq in.
Water Weight	111.25 gm	Volume	35.194 cu in.
Tare Weight	42.71 gm	Volume of Solids	cu in.
Wet Specimen	1039.39 gm	Void Ratio	
Dry Specimen	759.40 gm	Saturation	%
Water Content	36.87 %	Dry Density	82.2 lb/cu ft
Specific Gravity of Solids			
LL = 55	PL = 20	PI = 35	

Proving Ring No. 10170

Proving Ring Constant, K = .766 lbs/div.

Elapsed Time min.	Dial Reading 0.001"	Cumulative Change in.	Proving Ring Dial Reading	Axial Load lb	Axial Strain	Area Corr. sq in.	Compr. Stress tsf
.0	0.	.000	.0	.0	.000	6.29	.000
.2	10.	.010	22.0	16.9	.002	6.30	.193
.4	20.	.020	39.0	29.9	.004	6.31	.341
.6	30.	.030	58.0	44.4	.005	6.32	.506
.8	40.	.040	77.0	59.0	.007	6.34	.670
1.0	50.	.050	90.0	68.9	.009	6.35	.782
1.3	60.	.060	108.0	82.7	.011	6.36	.937
1.5	80.	.080	124.0	95.0	.014	6.38	1.072
1.9	100.	.100	141.0	108.0	.018	6.40	1.214
2.2	120.	.120	152.0	116.4	.021	6.43	1.304
2.5	140.	.140	161.0	123.3	.025	6.45	1.376
2.9	160.	.160	168.0	128.7	.029	6.48	1.431
3.2	180.	.180	175.0	134.0	.032	6.50	1.485
3.5	200.	.200	180.0	137.9	.036	6.52	1.522
3.9	220.	.220	183.0	140.2	.039	6.55	1.541
4.2	240.	.240	187.0	143.2	.043	6.57	1.569
4.5	260.	.260	190.0	145.5	.046	6.60	1.588
4.9	280.	.280	192.0	147.1	.050	6.62	1.599
5.2	300.	.300	193.0	147.8	.054	6.65	1.601
5.5	320.	.320	194.0	148.6	.057	6.67	1.604
5.9	340.	.340	195.0	149.4	.061	6.70	1.606
6.2	360.	.360	195.0	149.4	.064	6.72	1.600
6.5	380.	.380	194.0	148.6	.068	6.75	1.585

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.		1			
Type of Specimen		Undisturbed			
Initial	Water content	w_0	36.9 %	%	%
	Void ratio	e_0			
	Saturation	S_0	%	%	%
	Dry density, lb/cu ft	γ_d	82.2		
Time to failure, min		t_f	5.87		
Unconfined compressive strength, T/sq ft		q_u	1.61		
Undrained shear strength, T/sq ft		S_u	.80		
Sensitivity ratio		S_t			
Initial specimen diameter, in.		D_0	2.830		
Initial specimen height, in.		H_0	5.595		
Classification Brown, Clay, Stiff, w/sand pockets					
LL	55	PL	20	PI	35
				G_s	
Remarks		Project Houston-Galveston Navigation			
		Channel			
		Area Houston, Texas			
		Boring No. 93-107		Sample No. 2	
		Depth 2-4 ft		Date 9/7/94	
		UNCONFINED COMPRESSION TEST REPORT			

JOB NO. 94G783-4

DATE 9/7/94

PROJECT Houston-Galveston Navigation
Channel

AREA Houston, Texas

BORING NO. 93-107

SAMPLE NO. 6

DEPTH 14-16 ft

SPECIMEN NO. 1

CLASSIFICATION

Gray, Clay, Very soft, w/ shell fragments

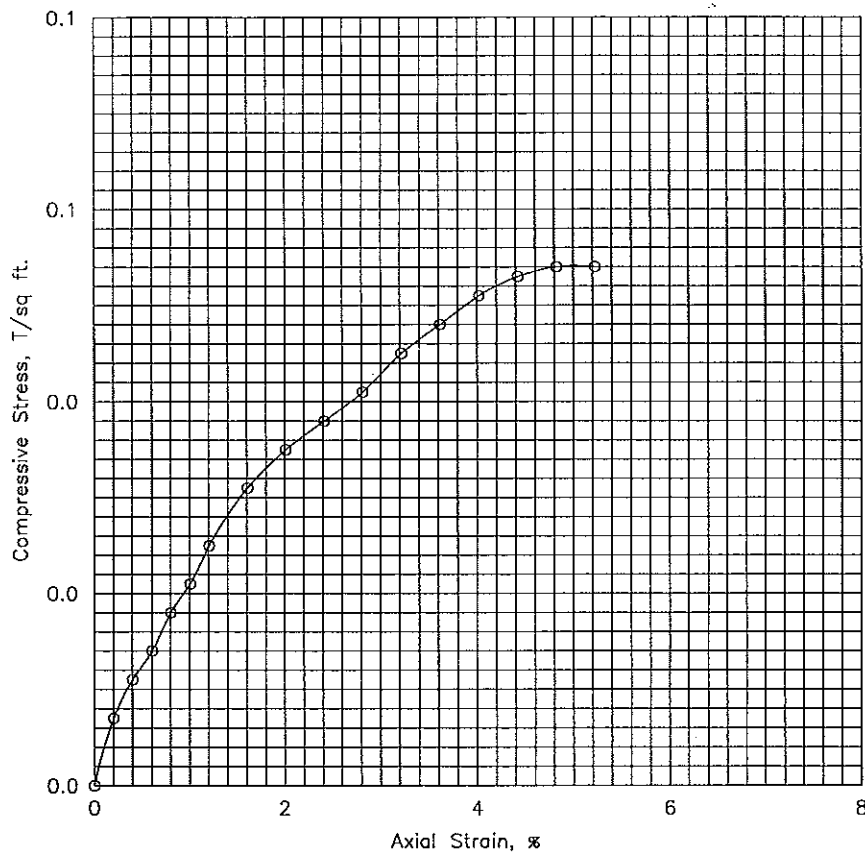
Tare No.	52F	Height	4.975 in.
Tare plus Wet Specimen	97.14 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	71.75 gm	Initial Area	6.290 sq in.
Water Weight	25.39 gm	Volume	31.294 cu in.
Tare Weight	29.94 gm	Volume of Solids	cu in.
Wet Specimen	819.40 gm	Void Ratio	
Dry Specimen	509.81 gm	Saturation	%
Water Content	60.73 %	Dry Density	62.1 lb/cu ft
Specific Gravity of Solids			
LL = 73	PL = 28	PI = 45	

Proving Ring No. 17015

Proving Ring Constant, K = .311 lbs/div.

Elapsed Time min.	Dial Reading 0.001"	Cumulative Change in.	Proving Ring Dial Reading	Axial Load lb	Axial Strain	Area Corr. sq in.	Compr. Stress tsf
.0	0.	.000	.0	.0	.000	6.29	.000
.3	10.	.010	2.0	.6	.002	6.30	.007
.6	20.	.020	3.0	.9	.004	6.32	.011
.8	30.	.030	4.0	1.2	.006	6.33	.014
1.0	40.	.040	5.0	1.6	.008	6.34	.018
1.2	50.	.050	6.0	1.9	.010	6.35	.021
1.4	60.	.060	7.0	2.2	.012	6.37	.025
1.7	80.	.080	9.0	2.8	.016	6.39	.031
2.0	100.	.100	10.0	3.1	.020	6.42	.035
2.4	120.	.120	11.0	3.4	.024	6.45	.038
2.7	140.	.140	12.0	3.7	.028	6.47	.041
3.0	160.	.160	13.0	4.0	.032	6.50	.045
3.3	180.	.180	14.0	4.3	.036	6.53	.048
3.7	200.	.200	15.0	4.7	.040	6.55	.051
4.0	220.	.220	15.5	4.8	.044	6.58	.053
4.3	240.	.240	16.0	5.0	.048	6.61	.054
4.5	260.	.260	16.0	5.0	.052	6.64	.054

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.		1			
Type of Specimen		Undisturbed			
Initial	Water content	w_0	60.7 %	%	%
	Void ratio	e_0			
	Saturation	S_0	%	%	%
	Dry density, lb/cu ft	γ_d	62.1		
Time to failure, min		t_f	4.32		
Unconfined compressive strength, T/sq ft		q_u	.05		
Undrained shear strength, T/sq ft		S_u	.03		
Sensitivity ratio		S_t			
Initial specimen diameter, in.		D_0	2.830		
Initial specimen height, in.		H_0	4.975		
Classification Gray, Clay, Very soft, w/ shell fragments					
LL	73	PL	28	PI	45
		G_s			
Remarks		Project Houston-Galveston Navigation			
		Channel			
		Area Houston, Texas			
		Boring No. 93-107		Sample No. 6	
		Depth 14-16 ft		Date 9/7/94	
		UNCONFINED COMPRESSION TEST REPORT			

JOB NO. 94G783-4

DATE 9/7/94

PROJECT Houston-Galveston Navigation
Channel

AREA Houston, Texas

BORING NO. 93-107

SAMPLE NO. 9

DEPTH 20-22 ft

SPECIMEN NO. 1

CLASSIFICATION

Gray, Clay, Very soft, w/ shell fragments

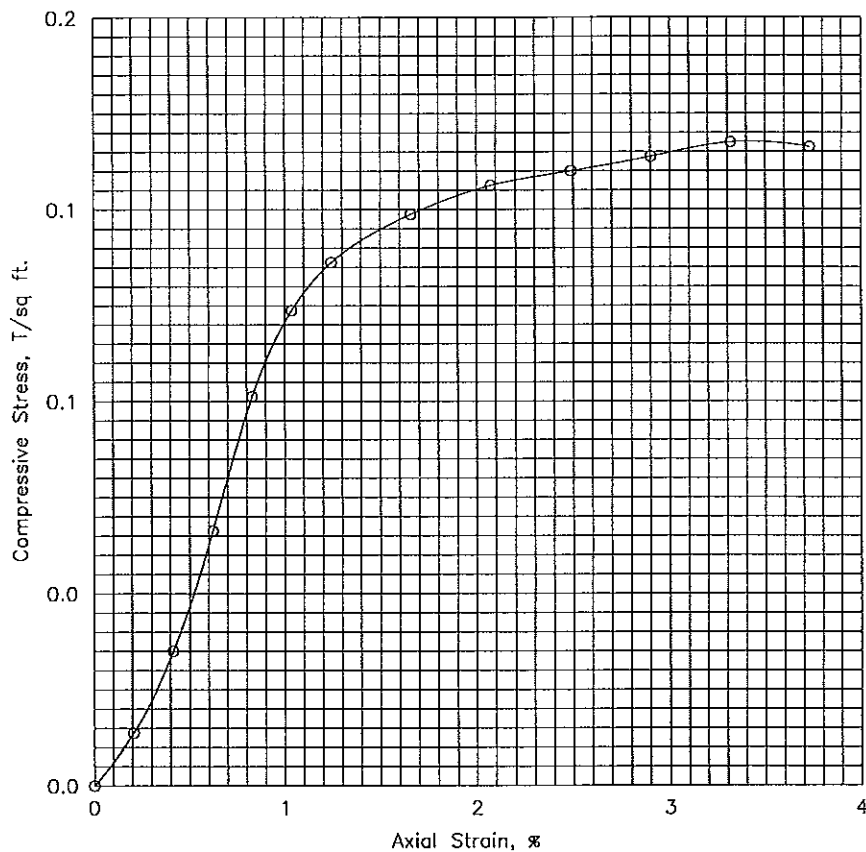
Tare No.	KA-1	Height	4.824 in.
Tare plus Wet Specimen	537.56 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	448.30 gm	Initial Area	6.290 sq in.
Water Weight	89.26 gm	Volume	30.344 cu in.
Tare Weight	42.76 gm	Volume of Solids	cu in.
Wet Specimen	1034.84 gm	Void Ratio	
Dry Specimen	848.16 gm	Saturation	%
Water Content	22.01 %	Dry Density	106.5 lb/cu ft
Specific Gravity of Solids			
LL = 51	PL = 20	PI = 31	

Proving Ring No. 17015

Proving Ring Constant, K = .311 lbs/div.

Elapsed Time min.	Dial Reading 0.001"	Cumulative Change in.	Proving Ring Dial Reading	Axial Load lb	Axial Strain	Area Corr. sq in.	Compr. Stress tsf
.0	0.	.000	.0	.0	.000	6.29	.000
.2	10.	.010	3.0	.9	.002	6.30	.011
.4	20.	.020	8.0	2.5	.004	6.32	.028
.6	30.	.030	15.0	4.7	.006	6.33	.053
.8	40.	.040	23.0	7.1	.008	6.34	.081
1.0	50.	.050	28.0	8.7	.010	6.36	.099
1.2	60.	.060	31.0	9.6	.012	6.37	.109
1.5	80.	.080	34.0	10.6	.017	6.40	.119
2.0	100.	.100	36.0	11.2	.021	6.42	.125
2.3	120.	.120	37.0	11.5	.025	6.45	.128
2.7	140.	.140	38.0	11.8	.029	6.48	.131
3.0	160.	.160	39.0	12.1	.033	6.51	.134
3.3	180.	.180	39.0	12.1	.037	6.53	.133

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.		1			
Type of Specimen		Undisturbed			
Initial	Water content	w_0	22.0 %	%	%
	Void ratio	e_0			
	Saturation	S_0	%	%	%
	Dry density, lb/cu ft	γ_d	106.5		
Time to failure, min		t_f	3.03		
Unconfined compressive strength, T/sq ft		q_u	.13		
Undrained shear strength, T/sq ft		S_u	.07		
Sensitivity ratio		S_t			
Initial specimen diameter, in.		D_0	2.830		
Initial specimen height, in.		H_0	4.824		
Classification Gray, Clay, Very soft, w/ shell fragments					
LL	51	PL	20	PI	31
		G_s			
Remarks		Project Houston-Galveston Navigation			
		Channel			
		Area Houston, Texas			
		Boring No. 93-107		Sample No. 9	
		Depth 20-22 ft		Date 9/7/94	
		UNCONFINED COMPRESSION TEST REPORT			

U.S. ARMY CORPS OF ENGINEERS

DEPTH, FEET		SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSIS- TENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
BORING NO. <u>13-107</u> DATE: BEGIN <u>8-4-94</u> PAGE <u>1 12</u> JOB NO. <u>946783-1</u> COMPLETE <u>8-4-94</u> Thin Walled Tube PROJECT <u>HOUSTON-GALVESTON Navigation Channel</u> ☒ 3" ☐ 6" LOCATION <u>DISPOSAL AREA # 16</u> ELEVATION OF HOLE _____ MANUFACTURER'S DESIGNATION OF DRILL RIG <u>Arco R4X4, C-1000 Marsh Buggy</u> GROUNDWATER: DEPTH <u>0</u> ft., ELEV. _____ ft., at end of Drilling WEATHER <u>Hot and Humid 95°</u> DRILLER <u>David</u> LOGGER <u>Willie Barnes</u>								
Torvane Reading 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35								
		1	4.5f	BROWN	CLAY	Hard	SANDY	W/Roots 0'-2'
		2	1.25	BROWN	CLAY	Stiff	SANDY	
		3	2 3/5	Gray	Sand	Loose	SILTY	
		4	3 1/6	Gray	Sand	Loose	SILTY	
		5	0.00 0.10	Gray	CLAY	Very Soft	SILTY	
10.50		6	0.00 0.08	Gray	CLAY	Very Soft	SILTY	
1.4		7	0.00 0.06	Gray	CLAY	Very Soft	SILTY	
0.3		8	0.00 0.04	Gray	CLAY	Very Soft	SILTY	
0.2		9	0.00 0.06	Gray	CLAY	Very Soft	SANDY	
0.3		10	1 1/2	Gray	Sand	Loose	SILTY	W/Shell Fragments 22-40'
		11	4 5/3	Gray	Sand	Loose	SILTY	
		12	3 3/4	Gray	Sand	Loose	SILTY	

U.S. ARMY CORPS OF ENGINEERS

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	BORING NO. <u>93-107</u> DATE: BEGIN <u>8-9-94</u> PAGE <u>2 12</u> JOB NO. <u>946783.1</u> COMPLETE <u>8-9-94</u> Thin Walled Tube PROJECT <u>Houston-Galveston Navigation Channel</u> ☒ 3" ☐ 6" LOCATION <u>DISPOSAL AREA # 16</u> ELEVATION OF HOLE _____ MANUFACTURER'S DESIGNATION OF DRILL RIG <u>Ardea K444, C-1000 Marsh Buggy</u> GROUNDWATER: DEPTH <u>0</u> ft., ELEV. _____ ft., at end of Drilling WEATHER <u>Hot and Humid</u> DRILLER <u>David</u> LOGGER <u>Willie Barnes</u>					
				COLOR	MATERIAL TYPE	CONSIS- TENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS	
-35-									
	X	13	3/24	Gray	sand	LOOSE	silty		
-40-	X	14	3/34	Gray	sand	LOOSE	silty		
-45-									
-50-									
-55-									
-60-									
-65-									
-70-									

Torvane Multiplier 0.2

Project: Houston-Galveston Navigation Channel

SUMMARY OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040Boring No. 93-107

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 2	4.50		Brown, Clay, Hard, w/sand pockets	C H	23.6											
2	2 - 4	1.75		Brown, Clay, Stiff, w/sand pockets	C H	36.9	82.2	112.5	55.0	20.0	99.9	99.9	99.4	93.2	89.6		1.61
3	4-5.5		8	Gray, Sand, Loose, Silty, w/shell fragments	S M						96.2*	94.9*	92.2*	46.7	13.7		
4	9-10.5		8	Gray, Sand, Loose, Silty, w/shell fragments	S M												
5	12-14	0.00		Gray, Clay, Very soft, w/shell fragments	C H	71.2											
6	14-16	0.00		Gray, Clay, Very soft, w/shell fragments	C H	60.7	62.1	99.8	73.0	28.0	100.0	99.9*	98.6*	95.2	91.0		0.05
7	16-18	0.00		Gray, Clay, Very soft, w/shell fragments	C H	69.5											
8	18-20	0.00		Gray, Clay, Very soft, w/shell fragments	C H	76.5											
9	20-22	0.00		Gray, Clay, Very soft, w/shell fragments	C H	22.0	106.5	129.9	51.0	20.0	99.3*	98.4*	98.1*	97.8	97.7		0.13
10	22-23.5		6	Gray, Sand, Loose, Silty, w/shell fragments	S M												
11	27-28.5		8	Gray, Sand, Loose, Silty, w/shell fragments	S M						97.3*	94.6*	91.2*	69.6	15.3		
12	32-33.5		8	Gray, Sand, Loose, Silty, w/shell fragments	S M												
13	37-38.5		6	Gray, Sand, Loose, Silty, w/shell fragments	S M												
14	38.5-40		7	Gray, Sand, Loose, Silty, w/shell fragments	S M												

S # : Sample Number, P P : Pocket Penetrometer Reading, U S C : Unified Soil Classification, M c : Moisture Content

q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe

* : Material retained are shell fragments

Geotest Engineering, Inc.