

JOB NO. 94G783-4

DATE 9/8/94

PROJECT Houston-Galveston Navigation
Channel

AREA Houston, Texas

BORING NO. 93-110

SAMPLE NO. 2

DEPTH 2-4 ft

SPECIMEN NO. 1

CLASSIFICATION

Yellowish gray, Clay, Stiff, w/ calcareous nodules

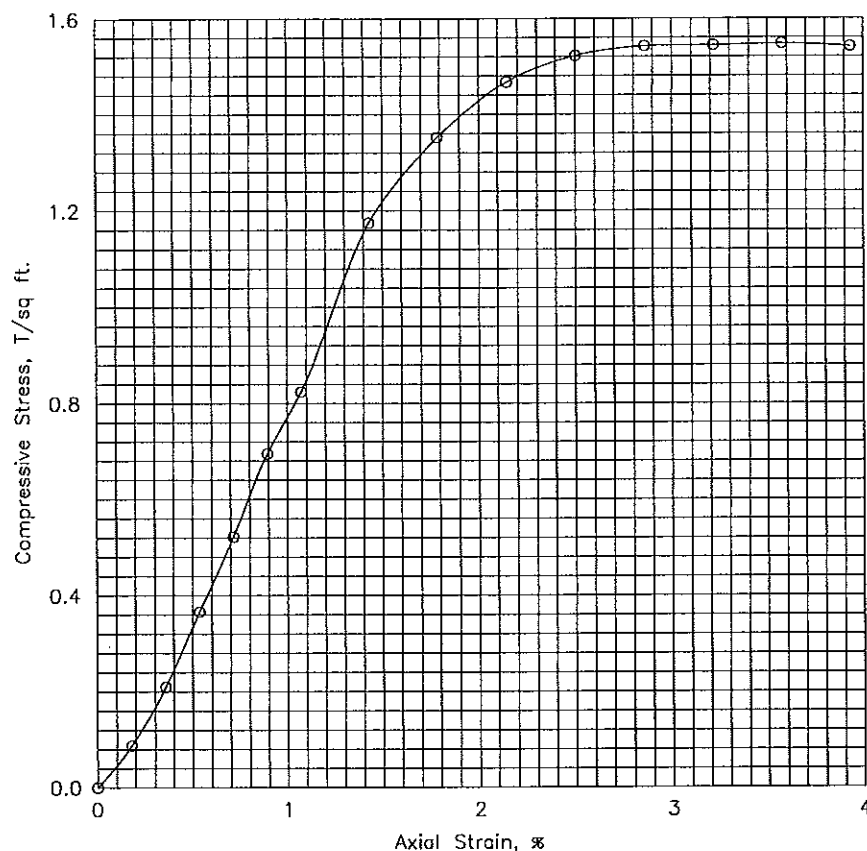
Tare No.	KL-28	Height	5.595 in.
Tare plus Wet Specimen	349.09 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	290.22 gm	Initial Area	6.290 sq in.
Water Weight	58.87 gm	Volume	35.194 cu in.
Tare Weight	42.74 gm	Volume of Solids	cu in.
Wet Specimen	1125.72 gm	Void Ratio	
Dry Specimen	909.40 gm	Saturation	%
Water Content	23.79 %	Dry Density	98.4 lb/cu ft
Specific Gravity of Solids			
LL = 67	PL = 26	PI = 41	

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	10.0	7.7	.002	6.30	.088
.4	20.	.020	24.0	18.4	.004	6.31	.210
.6	30.	.030	42.0	32.2	.005	6.32	.366
.8	40.	.040	60.0	46.0	.007	6.34	.522
1.0	50.	.050	80.0	61.3	.009	6.35	.695
1.2	60.	.060	95.0	72.8	.011	6.36	.824
1.6	80.	.080	136.0	104.2	.014	6.38	1.175
1.9	100.	.100	157.0	120.3	.018	6.40	1.352
2.3	120.	.120	171.0	131.0	.021	6.43	1.467
2.6	140.	.140	178.0	136.3	.025	6.45	1.522
2.9	160.	.160	181.0	138.6	.029	6.48	1.542
3.2	180.	.180	182.0	139.4	.032	6.50	1.544
3.5	200.	.200	183.0	140.2	.036	6.52	1.547
3.8	220.	.220	183.0	140.2	.039	6.55	1.541

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.		1			
Type of Specimen		Undisturbed			
Initial	Water content	w_0	23.8 %	%	%
	Void ratio	e_0			
	Saturation	S_0	%	%	%
	Dry density, lb/cu ft	γ_d	98.4		
Time to failure, min		t_f	3.53		
Unconfined compressive strength, T/sq ft		q_u	1.55		
Undrained shear strength, T/sq ft		S_u	.77		
Sensitivity ratio		S_t			
Initial specimen diameter, in.		D_0	2.830		
Initial specimen height, in.		H_0	5.595		
Classification Yellowish gray, Clay, Stiff, w/ calcareous nodules					
LL	67	PL	26	PI	41
		G_s			
Remarks		Project Houston-Galveston Navigation			
		Channel			
		Area Houston, Texas			
		Boring No. 93-110		Sample No. 2	
		Depth 2-4 ft		Date 9/8/94	
		UNCONFINED COMPRESSION TEST REPORT			

JOB NO. 94G783-4

DATE 9/8/94

PROJECT Houston-Galveston Navigation
Channel

AREA Houston, Texas

BORING NO. 93-110

SAMPLE NO. 6

DEPTH 10-12 ft

SPECIMEN NO. 1

CLASSIFICATION

Yellowish gray, Clay, Medium stiff, w/calcareous nodules

Tare No.	P-1	Height	5.595 in.
Tare plus Wet Specimen	405.22 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	305.71 gm	Initial Area	6.290 sq in.
Water Weight	99.51 gm	Volume	35.194 cu in.
Tare Weight	42.51 gm	Volume of Solids	cu in.
Wet Specimen	1018.87 gm	Void Ratio	
Dry Specimen	739.34 gm	Saturation	%
Water Content	37.81 %	Dry Density	80.0 lb/cu ft
Specific Gravity of Solids			
LL = 66	PL = 26	PI = 40	

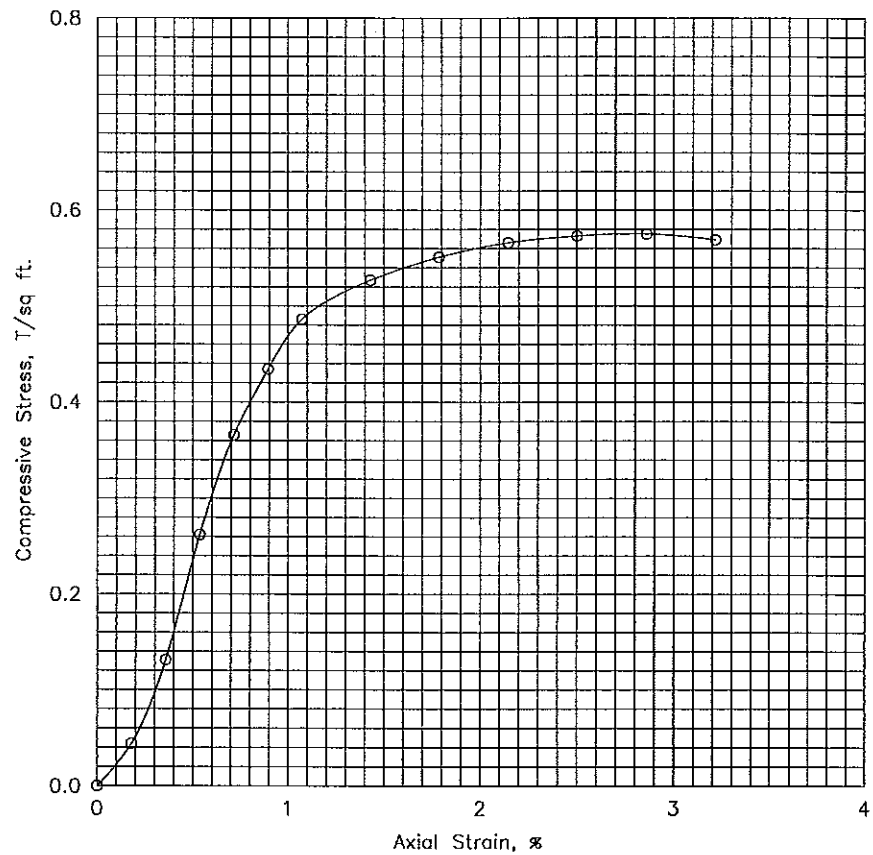
Proving Ring No. 10170

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	5.0	3.8	.002	6.30	.044
.3	20.	.020	15.0	11.5	.004	6.31	.131
.8	30.	.030	30.0	23.0	.005	6.32	.262
.9	40.	.040	42.0	32.2	.007	6.34	.366
1.1	50.	.050	50.0	38.3	.009	6.35	.434
1.3	60.	.060	56.0	42.9	.011	6.36	.486
1.6	80.	.080	61.0	46.7	.014	6.38	.527
2.0	100.	.100	64.0	49.0	.018	6.40	.551
2.2	120.	.120	66.0	50.6	.021	6.43	.566
2.5	140.	.140	67.0	51.3	.025	6.45	.573
2.8	160.	.160	67.5	51.7	.029	6.48	.575
3.1	180.	.180	67.0	51.3	.032	6.50	.569

Job No. 94G783-4

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.		1			
Type of Specimen		Undisturbed			
Initial	Water content	w_0	37.8 %	%	%
	Void ratio	e_0			
	Saturation	S_0	%	%	%
	Dry density, lb/cu ft	γ_d	80.0		
Time to failure, min		t_f	2.83		
Unconfined compressive strength, T/sq ft		q_u	.57		
Undrained shear strength, T/sq ft		S_u	.29		
Sensitivity ratio		S_t			
Initial specimen diameter, in.		D_0	2.830		
Initial specimen height, in.		H_0	5.595		
Classification Yellowish gray, Clay, Medium stiff, w/calcareous nodules					
LL	66	PL	26	PI	40
				G_s	
Remarks		Project Houston-Galveston Navigation			
		Channel			
		Area Houston, Texas			
		Boring No. 93-110		Sample No. 6	
		Depth 10-12 ft		Date 9/8/94	
UNCONFINED COMPRESSION TEST REPORT					

JOB NO. 94G783-4

DATE 9/8/94

PROJECT Houston-Galveston Navigation
Channel

AREA Houston, Texas

BORING NO. 93-110

SAMPLE NO. 8

DEPTH 14-16 ft

SPECIMEN NO. 1

CLASSIFICATION

Yellowish gray, Clay, Stiff, w/ calcareous nodules and sand pockets

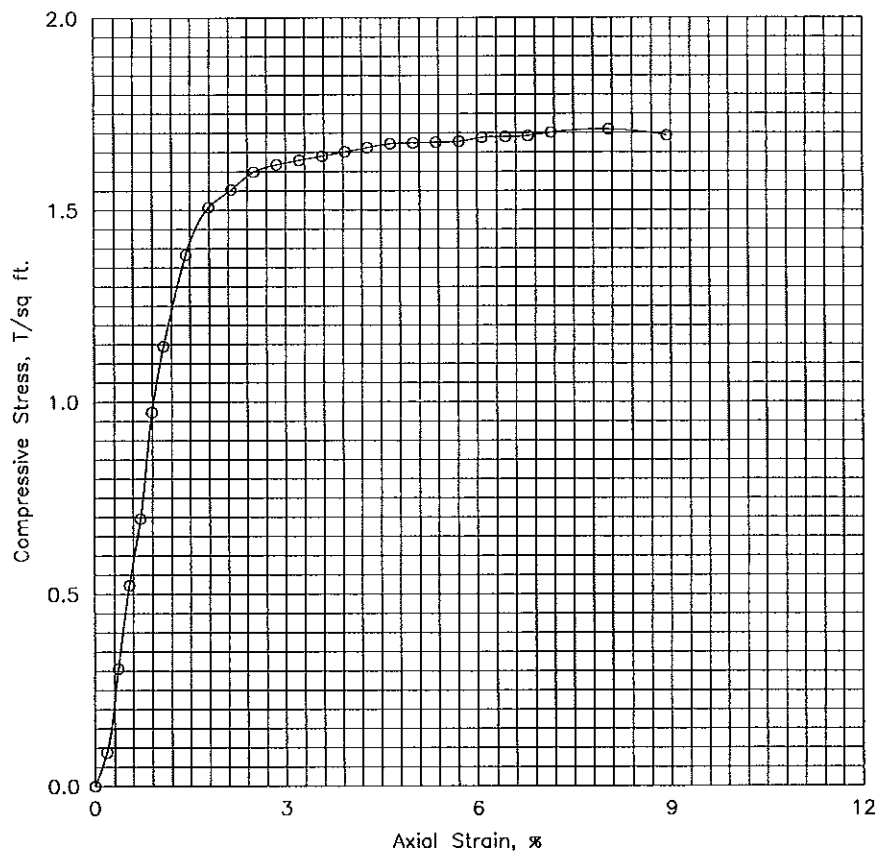
Tare No.	P-3	Height	5.595 in.
Tare plus Wet Specimen	304.05 gm	Average Diameter	2.830 in.
Tare plus Dry Specimen	238.00 gm	Initial Area	6.290 sq in.
Water Weight	66.05 gm	Volume	35.194 cu in.
Tare Weight	42.63 gm	Volume of Solids	cu in.
Wet Specimen	1094.79 gm	Void Ratio	
Dry Specimen	818.18 gm	Saturation	%
Water Content	33.81 %	Dry Density	88.6 lb/cu ft
Specific Gravity of Solids			
LL = 66	PL = 24	PI = 42	

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	10.0	7.7	.002	6.30	.088
.3	20.	.020	35.0	26.8	.004	6.31	.306
.5	30.	.030	60.0	46.0	.005	6.32	.523
.7	40.	.040	80.0	61.3	.007	6.34	.696
.9	50.	.050	112.0	85.8	.009	6.35	.973
1.0	60.	.060	132.0	101.1	.011	6.36	1.145
1.4	80.	.080	160.0	122.6	.014	6.38	1.383
1.7	100.	.100	175.0	134.0	.018	6.40	1.507
2.0	120.	.120	181.0	138.6	.021	6.43	1.553
2.3	140.	.140	187.0	143.2	.025	6.45	1.599
2.7	160.	.160	190.0	145.5	.029	6.48	1.618
3.0	180.	.180	192.0	147.1	.032	6.50	1.629
3.3	200.	.200	194.0	148.6	.036	6.52	1.640
3.6	220.	.220	196.0	150.1	.039	6.55	1.651
4.0	240.	.240	198.0	151.7	.043	6.57	1.662
4.3	260.	.260	200.0	153.2	.046	6.60	1.672
4.6	280.	.280	201.0	154.0	.050	6.62	1.674
4.9	300.	.300	202.0	154.7	.054	6.65	1.676
5.6	320.	.320	203.0	155.5	.057	6.67	1.678
5.9	340.	.340	205.0	157.0	.061	6.70	1.688
6.3	360.	.360	206.0	157.8	.064	6.72	1.690
6.6	380.	.380	207.0	158.6	.068	6.75	1.692
6.9	400.	.400	209.0	160.1	.071	6.77	1.701
7.7	450.	.450	212.0	162.4	.080	6.84	1.709
8.5	500.	.500	212.0	162.4	.089	6.91	1.693

Failure Sketches



☐ Controlled stress
☒ Controlled strain

Test No.		1			
Type of Specimen		Undisturbed			
Initial	Water content	w_0	33.8 %	%	%
	Void ratio	e_0			
	Saturation	S_0	%	%	%
	Dry density, lb/cu ft	γ_d	88.6		
Time to failure, min		t_f	7.67		
Unconfined compressive strength, T/sq ft		q_u	1.71		
Undrained shear strength, T/sq ft		S_u	.85		
Sensitivity ratio		S_t			
Initial specimen diameter, in.		D_0	2.830		
Initial specimen height, in.		H_0	5.595		
Classification Yellowish gray, Clay, Stiff, w/ calcareous nodules and sand pockets					
LL	66	PL	24	PI	42
				G_s	
Remarks		Project Houston-Galveston Navigation			
		Channel			
		Area Houston, Texas			
		Boring No. 93-110		Sample No. 8	
		Depth 14-16 ft		Date 9/8/94	
		UNCONFINED COMPRESSION TEST REPORT			

U.S. ARMY CORPS OF ENGINEERS

DEPTH, FEET		SAMPLE NO.	SAMPLE NO.	PEN./TORVANE	SPT.-BLOW COUNT	BORING NO. <u>93-110</u> DATE: BEGIN <u>8-2-94</u> PAGE <u>1/1</u> JOB NO. <u>946783-1</u> COMPLETE <u>8-2-94</u> Thin Walled Tube PROJECT <u>HOUSTON-GALVESTON Navigation Channel</u> ☒ 3" ☐ 6" LOCATION <u>LEVEE BETWEEN DISPOSAL AREA # 15, 16</u> ELEVATION OF HOLE _____ MANUFACTURER'S DESIGNATION OF DRILL RIG <u>Arco K4x4, C-1000 Marsh Buggy</u> GROUNDWATER: DEPTH <u>0</u> ft., ELEV. _____ ft., at end of Drilling WEATHER <u>Sunny and Hot 92°</u> DRILLER <u>David</u> LOGGER <u>Willie Borne</u>				
						COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
Torvane Reading		0								
		1	1.25			Brown	Clay	Stiff	Sandy	N/Calcareous Nozzles
		2	1.25			Brown	Clay	Stiff	Sandy	
		3	2.0			Brown	Clay	V. Stiff	Sandy	
		4	2.0			Brown	Clay	V. Stiff	Sandy	
		5	.75			Gray	Clay	M. Stiff	Sandy	
		6	0.5			Gray	Clay	M. Stiff	Sandy	
		7	1.0			Gray	Clay	Stiff	Sandy	
		8	1.5			Gray	Clay	Stiff	Sandy	
		9	0.50			Gray	Clay	M. Stiff	Sandy	- w/ sand layer sand 18
		10	3/8			Gray	Sand	Medium Dense	Silty	w/ shell fragments
		11	0.00 0.08			Gray	Clay	Very Soft	Sandy	Clay AT 22'
		12	3/5			Gray	Sand	Loose	Silty	Sand @ Bottom of sample
		13	2 1/5			Gray	Sand	Loose	Silty	
Torvane Multiplier 0.2										

Project: Galveston-Galveston Navigation Channel

SUMMARY OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040Boring No. 93-110

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 (%)	P L (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 2	1.50		Yellowish gray, Clay, Stiff, w/calcareous nodules	C H	14.4											
2	2 - 4	1.50		Yellowish gray, Clay, Stiff, w/calcareous nodules	C H	23.8	98.4	121.9	67.0	26.0	100.0	100.0	99.8	99.3	98.9		1.55
3	4 - 6	1.25		Yellowish gray, Clay, Stiff, w/calcareous nodules	C H	25.3											
4	6 - 8	0.50		Yellowish gray, Clay, Medium stiff, w/calcareous nodules and sand pockets	C H	32.5											
5	8 - 10	0.50		Yellowish gray, Clay, Medium stiff, w/calcareous nodules and sand pockets	C H	33.0											
6	10 - 12	0.75		Yellowish gray, Clay, Medium stiff, w/calcareous nodules	C H	37.8	80.0	110.3	66.0	26.0	100.0	100.0	100.0	100.0	100.0		0.57
7	12 - 14	1.25		Yellowish gray, Clay, Stiff, w/calcareous nodules and sand pockets	C H	28.1											
8	14 - 16	1.75		Yellowish gray, Clay, Stiff, w/calcareous nodules and sand pockets	C H	33.8	88.6	118.5	66.0	24.0	100.0	100.0	100.0	99.6	99.2		1.71
9	16 - 18	0.00		Gray, Clay, Very soft	C H	35.8											
10	18-19.5		13	Gray, Sand, Medium dense, Silty, w/shell fragments	S M												
11	22-24	0.00		Gray, Clay, Very soft, w/organic material	C H	60.9	64.4	103.6	80.0	30.0	100.0	100.0	100.0	100.0	100.0		
12	24-25.5		8	Gray, Sand, Loose, Silty	S M												
13	28.5-30		9	Gray, Sand, Loose, Silty	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