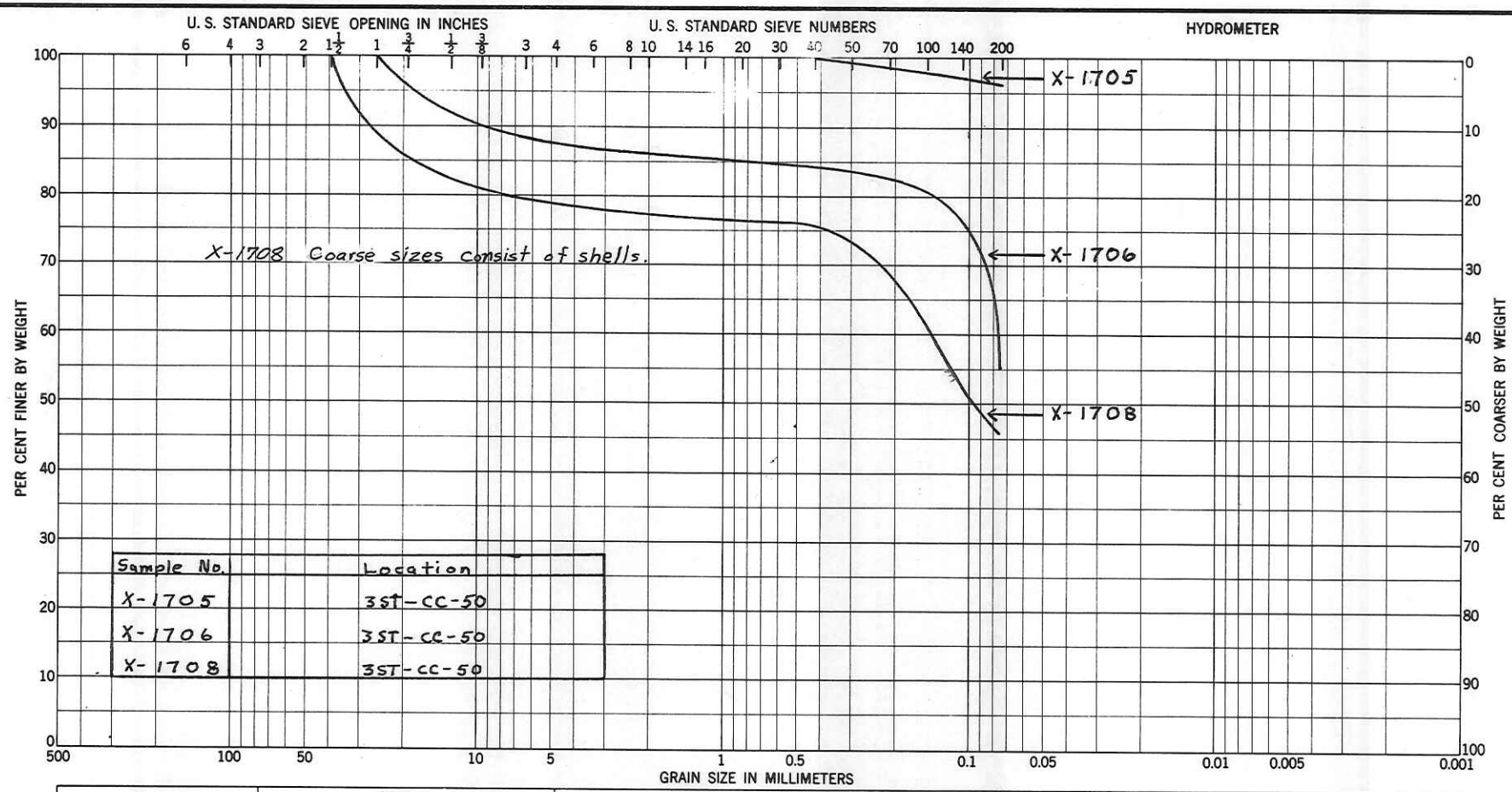
Coarse



Sample No.	Location
X-1705	3ST-CC-50
X-1706	3ST-CC-50
X-1708	3ST-CC-50

Sample No.	~~Elev or~~ Depth		Classification		Nat w %	LL	PL	PI
X-1705	22.0 - 24.0		CLAY (CL)			29	15	14
X-1706	32.0 - 34.0		CLAY, sandy (CL)			45	13	32
X-1708	40.0 - 42.0		SAND, clayey (SC)			49	14	35

Project TEXAS CITY HURRICANE FLOOD PROTECTION

Area Foundation Material

Boring No.

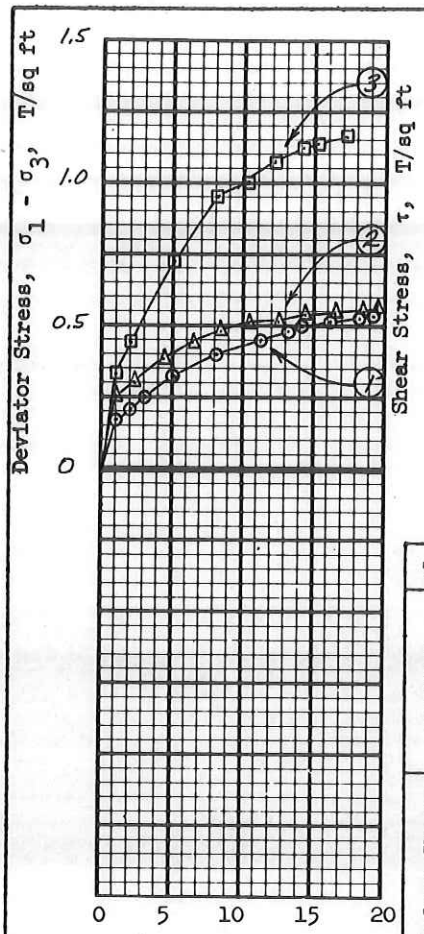
Date NOV 66

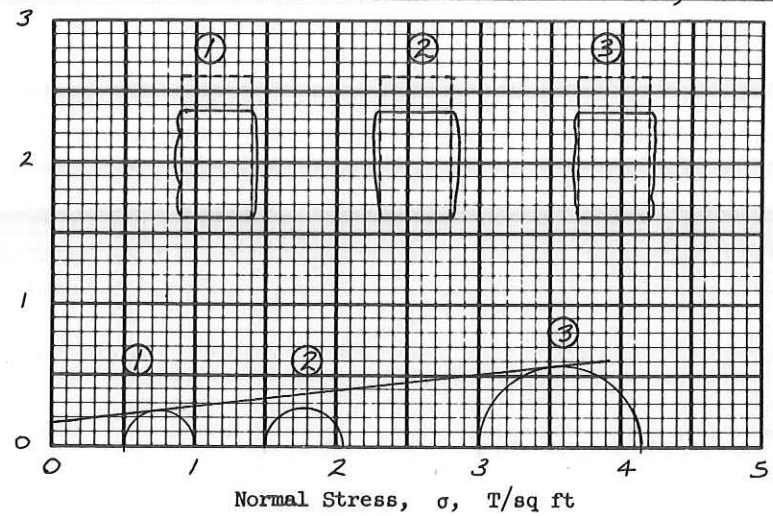
GRADATION CURVES

Plate No. 2

SWDED-GL Report 10,022

ENG FORM 1 MAY 63 2087 REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT) C 0436





Test No.			1	2	3	
Initial	Water content	w_o	23.2 %	27.0%	23.7%	%
	Void ratio	e_o				
	Saturation	S_o	%	%	%	%
	Dry density, lb/cu ft	γ_d	100	96	101	
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft		σ_3	0.5	1.5	3.0	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.50	0.54	1.14	
Time to failure, min		t_f	20	24	22	
Rate of strain, percent/min			0.7	0.6	0.7	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o	1.4	1.4	1.4	
Initial height, in.		H_o	3.0	3.0	3.0	

Shear Strength Parameters

ϕ = 6.5 °

tan ϕ = .114

c = 0.2 T/sq ft

Method of saturation _____

☐ Controlled stress

☑ Controlled strain

Type of test Q	Type of specimen Undisturbed			
Classification CLAY(CL)				
LL 29	PL 15	PI 14		G_s

Remarks $(\sigma_1-\sigma_3)_{MAX}$ corresponds to a strain of 15% or less.

Project TEXAS CITY HURRICANE FLOOD PROTECTION

Area Foundation Material

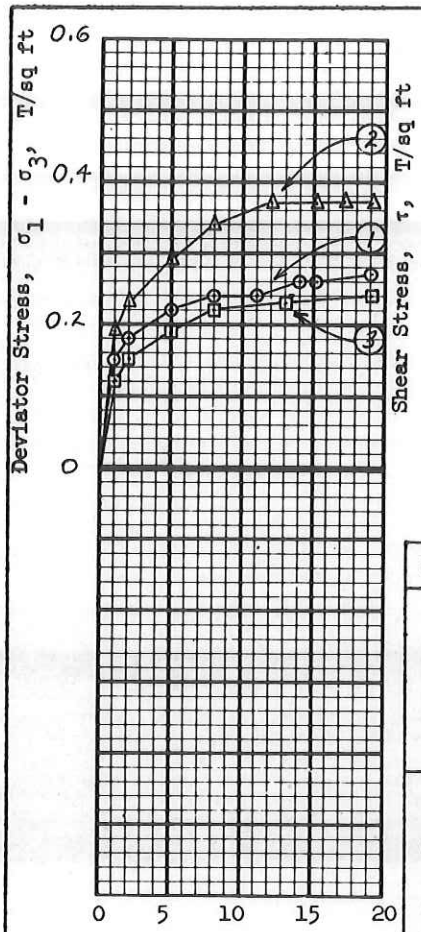
Boring No. 3ST-CC-50 | Sample No. X-1705

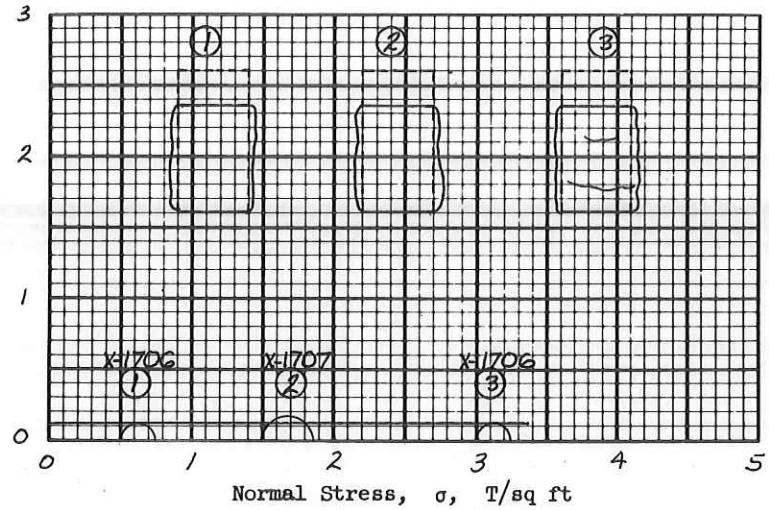
Depth ~~El~~ 22.0-24.0 | Date NOV 66

TRIAXIAL COMPRESSION TEST REPORT

ENG FORM 1 JUN 65 2089 (EM 1110-2-1902) PREVIOUS EDITIONS ARE OBSOLETE

TRANSLUCENT





Test No.			1	2	3	
Initial	Water content	w_o	29.2 %	29.1 %	27.2 %	%
	Void ratio	e_o				
	Saturation	S_o	%	%	%	%
	Dry density, lb/cu ft	γ_d	91	94	92	
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft		σ_3	0.5	1.5	3.0	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.26	0.37	0.24	
Time to failure, min		t_f	21	17	24	
Rate of strain, percent/min			0.7	0.7	0.6	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o	1.4	1.4	1.4	
Initial height, in.		H_o	3.0	3.0	3.0	

Shear Strength Parameters

ϕ = 0.0 °

tan ϕ = .000

c = 0.1 T/sq ft

Method of saturation _____

☐ Controlled stress

☑ Controlled strain

Type of test Q | Type of specimen Undisturbed

Classification CLAY, sandy (CL)

LL 45 | PL 13 | PI 32 | | G_s

Remarks $(\sigma_1-\sigma_3)_{MAX}$ corresponds to a strain of 15% or less.

Project TEXAS CITY HURRICANE FLOOD PROTECTION

Area Foundation Material

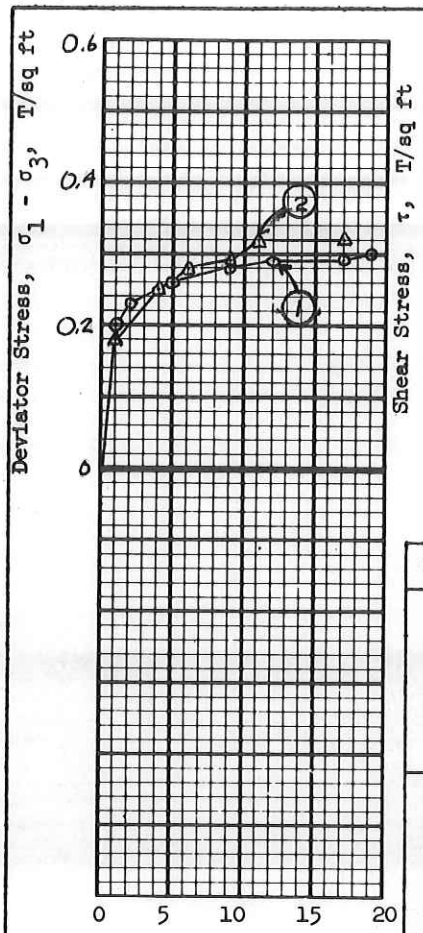
Boring No. 3ST-CC-50 | Sample No. X-1706 & X-1707

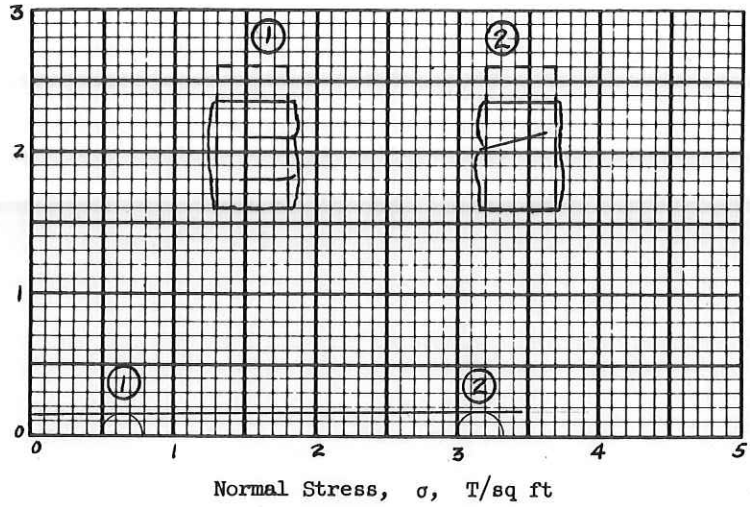
Depth El 32.0 - 36.0 | Date NOV 66

TRIAXIAL COMPRESSION TEST REPORT

ENG FORM 1 JUN 65 2089 (EM 1110-2-1902) PREVIOUS EDITIONS ARE OBSOLETE

TRANSLUCENT





Test No.			1	2		
Initial	Water content	w_o	30.2 %	30.8 %	%	%
	Void ratio	e_o				
	Saturation	S_o	%	%	%	%
	Dry density, lb/cu ft	γ_d	90	85		
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft		σ_3	0.5	3.0		
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.29	0.32		
Time to failure, min		t_f	18	16		
Rate of strain, percent/min			0.7	0.7		
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o	1.4	1.4		
Initial height, in.		H_o	3.0	3.0		

Shear Strength Parameters

ϕ = 0.3 °

tan ϕ = .006

c = 0.1 T/sq ft

Method of saturation _____

☐ Controlled stress

☑ Controlled strain

Type of test Q	Type of specimen Undisturbed			
Classification SAND, clayey (SC), w/shells				
LL 49	PL 14	PI 35		G_s

Remarks $(\sigma_1 - \sigma_3)_{MAX}$ corresponds to a strain of 15% or less.

Project TEXAS CITY HURRICANE FLOOD PROTECTION	
Area Foundation Material	
Boring No. 3ST-CC-50	Sample No. X-1708
Depth ~~El~~ 40.0 - 42.0	Date NOV 66

TRIAXIAL COMPRESSION TEST REPORT

UNCONFINED COMPRESSION TEST

DATE		
PROJECT: T.C.S.P.	EXCAVATION NUMBER: 3ST-CC-5D	SAMPLE NUMBER: C-5 (8-10)
PROVING RING DIAL NUMBER	PROVING RING NUMBER	CALIBRATION CURVE NUMBER
PROVING RING CONSTANT, K_r	~~VERTICAL DIAL NUMBER~~ Cyl # 4	RATE OF LOAD APPLICATION: 0°028

FORMULAS

$$\text{Area} = \frac{\pi D^2}{4} = \frac{C^2 D}{4} \quad \text{Corrected Area, } A = \frac{A_o \text{ (sq. ft.)}}{1 - E} \quad \text{Unit Strain, } E = \frac{\Delta L}{L_o} \quad \text{Unit Stress} = \frac{P \text{ (lb.)}}{A \text{ (sq. ft.)}}$$

INITIAL MEASUREMENTS ON SAMPLE	DIAMETER, D (in.)	CIRCUMFERENCE, C (in.)	AREA (sq. in.)
TOP			
CENTER			
BOTTOM			

AVERAGE AREA, A_o	
SQ. IN.	SQ. FT.
1.534	
HEIGHT, L_o (in.)	
2.837	

ELAPSED TIME (min.)	PROVING RING DIAL READING (0.0001 in.)	LOAD, P (lb.) (Ring Dial x K_r, or from calibration curve)	VERTICAL DIAL READING (in.)	VERTICAL DIAL DIFFERENCE, ΔL (in.)	UNIT STRAIN, E (in./in.)	CORRECTED AREA, A (sq. ft.)	UNIT STRESS (lb./sq. ft.)
	25		025				
	55		050				
	71		075				
	79		100				
	84		125				
	87		150				
	90		175				
	91		200				
	92		225				
	93		250		8.82	1.68	2415
	93		275				
	93		300				
	93		325				
			350				
			375				
			400				
			425				
			450				
			475				
			500				

WATER CONTENT (%)
W.W. in Cyl # 4 346

UNCONFINED COMPRESSIVE STRENGTH, q_u (lb./sq. ft.)

REMARKS AND CALCULATIONS (Use reverse side, if more space is needed)
Pen - 1.00
Color - BR
Dish - 409
W.W. - 143
D.W. - 124 15% / Shell FRAGS & Few VOIDS

TECHNICIAN (Signature)	COMPUTED BY (Signature)	CHECKED BY (Signature)

DD FORM 1 AUG 57 1213 Man-#1-Loose

UNCONFINED COMPRESSION TEST

DATE		
PROJECT: T.C.S.P.	EXCAVATION NUMBER: 35T-CC-50	SAMPLE NUMBER: C-7 (12-19)
PROVING RING DIAL NUMBER	PROVING RING NUMBER	CALIBRATION CURVE NUMBER
PROVING RING CONSTANT, K_r	~~VERTICAL DIAL NUMBER~~ Cyl # 4	RATE OF LOAD APPLICATION: 0°028

FORMULAS

$$\text{Area} = \frac{\pi D^2}{4} = \frac{C^2 D}{4} \qquad \text{Corrected Area, } A = \frac{A_o \text{ (sq. ft.)}}{1 - E} \qquad \text{Unit Strain, } E = \frac{\Delta L}{L_o} \qquad \text{Unit Stress} = \frac{P \text{ (lb.)}}{A \text{ (sq. ft.)}}$$

INITIAL MEASUREMENTS ON SAMPLE	DIAMETER, D (in.)	CIRCUMFERENCE, C (in.)	AREA (sq. in.)	AVERAGE AREA, A_o SQ. IN.	SQ. FT.
TOP				1.534	
CENTER				HEIGHT, L_o (in.)	
BOTTOM				2.834	

ELAPSED TIME (min.)	PROVING RING DIAL READING (0.0001 in.)	LOAD, P (lb.) (Ring Dial x K_r, or from calibration curve)	VERTICAL DIAL READING (in.)	VERTICAL DIAL DIFFERENCE, ΔL (in.)	UNIT STRAIN, E (in./in.)	CORRECTED AREA, A (sq. ft.)	UNIT STRESS (lb./sq. ft.)
	9		025				
	17		050				
	23		075				
	27		100				
	30		125				
	33		150				
	36		175				
	38		200				
	40		225				
	43		250				
	44		275				
	45		300				
	47		325				
	49		350				
	50		375				
	52		400				
	53		425				
	54		450				
	55		475				
	56		500				
	57		525				
	58		550		20.25	1.92	1341

WATER CONTENT (%): W.W. in Cyl # 4 — 34.5

UNCONFINED COMPRESSIVE STRENGTH, q_u (lb./sq. ft.)

REMARKS AND CALCULATIONS (Use reverse side, if more space is needed)

59	575

Pen - 0.50
Color - BW
Dish - 347
W.W. - 142
D.W. - 119 19% (Shell Frags + Few Voids)

TECHNICIAN (Signature)	COMPUTED BY (Signature)	CHECKED BY (Signature)

DD FORM 1 AUG 57 1213

MAU-#1 — Loose

UNCONFINED COMPRESSION TEST

DATE		
PROJECT: T.C.S.P.	EXCAVATION NUMBER: 35T-CC-50	SAMPLE NUMBER: C-29 (46-48)
PROVING RING DIAL NUMBER	PROVING RING NUMBER	CALIBRATION CURVE NUMBER
PROVING RING CONSTANT, K_r	~~VERTICAL DIAL NUMBER~~ Cyl # 1	RATE OF LOAD APPLICATION: 0°040

FORMULAS

$$\text{Area} = \frac{\pi D^2}{4} = \frac{C^2 D}{4} \quad \text{Corrected Area, } A = \frac{A_o \text{ (sq. ft.)}}{1 - E} \quad \text{Unit Strain, } E = \frac{\Delta L}{L_o} \quad \text{Unit Stress} = \frac{P \text{ (lb.)}}{A \text{ (sq. ft.)}}$$

INITIAL MEASUREMENTS ON SAMPLE	DIAMETER, D (in.)	CIRCUMFERENCE, C (in.)	AREA (sq. in.)	AVERAGE AREA, A_o SQ. IN.	SQ. FT.
TOP				2.99	
CENTER				HEIGHT, L_o (in.)	
BOTTOM				4.0	

ELAPSED TIME (min.)	PROVING RING DIAL READING (0.0001 in.)	LOAD, P (lb.) (Ring Dial x K_r, or from calibration curve)	VERTICAL DIAL READING (in.)	VERTICAL DIAL DIFFERENCE, ΔL (in.)	UNIT STRAIN, E (in./in.)	CORRECTED AREA, A (sq. ft.)	UNIT STRESS (lb./sq. ft.)
	105		025				
	205		050				
	252		075				
	286		100				
	310		125				
	325		150				
	330		175		4.38	3.13	4600
	321		200				
	310		225				
	297		250				
			275				
			300				
			325				
			350				
			375				
			400				
			425				
			450				
			475				
			500				

WATER CONTENT (%): W.W. in Cyl # 1 478

UNCONFINED COMPRESSIVE STRENGTH, q_u (lb./sq. ft.)

REMARKS AND CALCULATIONS (Use reverse side, if more space is needed)

Pen - 2.75
Color - Bwn
Dish - 416
W.W. - 381
D.W. - 304 25%

TECHNICIAN (Signature)	COMPUTED BY (Signature)	CHECKED BY (Signature)

DD FORM 1 AUG 57 1213 CR1-#1-LOOSE

SWG Form 267(C)
28 Jan 1965

TEXAS CITY HURRICANE

PROJECT: FLOOD PROTECTION

LOCATION:

BORING NO. 3ST-CC-[illegible]

TEST DATA SUMMARY

DATE DRILLED Sept. 27, 1966

FIELD NO.	DEPTH	CLASSIFICATION ELEVATION TOP BORING	SYMBOL	CONSISTENCY	POCKET (1) PENETROMETER	STAN. PENET. BLOWS/FT (2)	MOISTURE CONTENT %	DRY DENSITY P. c. f.	L.L.	P.L.	BAR L.S.	SIEVE ANALYSIS PERCENT GRVL	SAND	FINES	INIT. WT.	ACC. WT. RTND. SIEVE NO. (3) NO. 4	NO. 10	NO. 40	NO. 200
C-1	0-2	Brown sandy clay 0'-10'	CL	H	4.00		14.7	117											
C-2	2-4			ST	1.50		18.9	111	30		13	0	38	62	50	0	1	1	13
C-3	4-6			VST	2.50		20.5	107											
C-4	6-8			VST	2.00		19.4	114											
C-5	8-10			ST	1.00		18.7	111	31		15	2	36	62	50	1	2	4	13
C-6	10-12	Brown clayey shelly sand	SC	ST	1.50		28.9				17	10	43	47	502	58	75	93	319
C-7	12-14	10-16		VST	3.00		12.5												
C-8	14-16			M	0.75		21.2	109											
C-9	16-18	Brown clayey sand w/	SC-SM	M	0.75		18.5	113	19		4	2	60	38	50	1	1	2	31
C-10	18-20	shell fragment 16-24		ST	1.50		14.4	117											
X	20-22	Thin clay layers 18-20			—		—	—											
T-1	22-24			ST	—	8	26.2	—											
C-11	24-26	Gray sandy clay 24-38	CL	S	0.25		29.9	95	42		17	0	18	82	50	0	0	0	0
C-12	26-28			M	0.50		—	—											
C-13	28-30			S	0.25		32.2	85											
C-14	30-32			S	0.25		32.2	92	27		9	0	42	58	50	0	0	0	21
C-15	32-34			S	0.25		29.4	90											
C-16	34-36			S	0.25		—	—											
C-17	36-38			S	0.25		—	—											
C-18	38-40	Gray clay w/ shell	CH	S	0.25		33.1	(Disturbed)											
C-19	40-42	fragments 38-86		S	0.25		49.7	73											
C-20	42-44			S	0.25		51.8	69	83		26	0	6	94	50	0	0	1	3
C-21	44-46			VS	0.00		58.3	71											
C-22	46-48			S	0.25		—	—											
C-23	48-50			S	0.25		—	—											
X	50-52				—		—	—											
C-24	52-54			S	0.25		40.8	73											
C-25	54-56			S	0.25		[illegible]	65	89		27	0	2	98	50	0	0	0	1
X	56-58				—		—	—											
C-26	58-60			S	0.25		54.2	68											

KEY: CONSISTENCY — COHESIVE SOILS: VS Very Soft, S Soft, M Medium, ST Stiff, VST Very Stiff, H Hard
CONSISTENCY — COHESIONLESS SOILS: VL Very Loose, L Loose, M Medium, D Dense, VD Very Dense

(1) Tons/Sq.Ft. Unconfined Compressive Strength
(2) Split Barrel Sampler
(3) Acc. Wt. Rtnd ÷ Init. Wt. x 100 = % Rtnd.

BORING NO. 3ST CC-[illegible]

SWG Form 267(C)
28 Jan 1965

PROJECT: TEXAS CITY HURRICANE FLOOD PROTECTION

LOCATION:

BORING NO. 3ST-CC-50

TEST DATA SUMMARY

DATE DRILLED Sept. 28 [illegible]

FIELD NO.	DEPTH	CLASSIFICATION ELEVATION TOP BORING _____	SYMBOL	CONSISTENCY	POCKET (1) PENETROMETER	STAN. PENET. BLOWS/FT (2)	MOISTURE CONTENT %	DRY DENSITY p. c. f.	L.L.	P.L.	BAR L.S.	SIEVE ANALYSIS PERCENT GRVL	SAND	FINES	INIT. WT.	ACC. WT. RTND. SIEVE NO. (3) NO. 4	NO. 10	NO. 40	NO. 200
C-1	0 - 2	Gray sandy Clay 0-8	CH	H	4.25		20.6	111											
C-2	2 - 4			VST	3.00		10.6	122											
C-3	4 - 6			VST	2.50		17.5	111			21.0	0	18	82	50	0	1	2	9
C-4	6 - 8			H	4.50+		16.2	113											
C-5	8 - 10	Gray Brown sandy Clay	CL	VST	2.25		15.5	113	45		16.0	2	28	70	50	1	2	3	15
C-6	10 - 12	w/ Shell fragments 8-12		VST	2.75		19.4	109											
C-7	12 - 14	Brown Clayey sand 12-14	SC	M	0.75		17.3	112	35		11.0	0	52	48	50	0	0	1	26
C-8	14 - 16	Gray sandy Clay 14-16	CL	M	0.50		21.9	107	47		16.0	0	28	72	50	0	0	1	14
C-9	16 - 17	Brown silty sand w/shell 16-17	SM	S	0.25		13.1	115			1.0	6	68	26	50	3	9	5	37
X	17 - 18	D.C. - Gray sandy clay 17'-18'			—		—	—											
C-10	18 - 20	Brown Clayey sand 18-22	SC	ST	1.50		18.1	106	34		11.0	0	64	36	50	0	0	0	32
C-11	20 - 22	Shell fragments 20-22		VS	0.00		23.1	101			9.5	10	50	40	50	5	6	11	30
C-12	22 - 24	sent to Division Lab. 22'-24'		M	0.75		—												
C-13	24 - 26	Gray sandy Clay 24-28	CH	M	0.50		36.2	83			18.0	0	16	84	50	0	0	0	8
C-14	26 - 28			S	0.25		34.4	91			19.0	0	22	78	50	0	0	0	11
C-15	28 - 30	Gray sandy Clay w/ shell	CL	S	0.25		36.5	85	49		16.0	2	34	64	50	1	1	2	18
C-16	30 - 32	fragments 28-32		S	0.25		37.2	83	47		17.0	2	30	68	50	1	1	2	16
C-17	32 - 34	sent to Division Lab. 32'-36'		S	0.25		—												
C-18	34 - 36			S	0.25		—												
C-19	36 - 38	Gray clayey silty sand 36-38	SC SM	VS	0.00		29.2	93			4.0	2	50	48	50	1	2	2	26
C-20	38 - 40	Gray clayey shelly sand 38-40	SC	VS	0.00		25.5	99			7.0	23	39	38	424	96	169	115	115
C-21	40 - 42	sent to Division Lab. 40'-42'		S	0.25		—												
C-22	42 - 44	Brown Clay 42-48	CH	ST	1.25		29.0	98	64		21.0	0	6	94	50	0	1	1	3
C-23	44 - 46	Cal Mod 42-50		ST	1.50		39.3	85											
C-24	46 - 48			VST	2.75		27.8	98	77		25.0	0	2	98	50	0	0	0	1
C-25	48 - 50	Brown Clay 48-50'	CL	ST	1.00		20.7	109	31		8.0	2	14	84	50	1	2	3	9
		BORING AT 50'																	
		[illegible] AT - 52																	

KEY: CONSISTENCY — COHESIVE SOILS: VS Very Soft, S Soft, M Medium, ST Stiff, VST Very Stiff, H Hard. CONSISTENCY — COHESIONLESS SOILS: VL Very Loose, L Loose, M Medium, D Dense, VD Very Dense.

(1) Tons/Sq.Ft. Unconfined Compressive Strength
(2) Split Barrel Sampler
(3) Acc. Wt. Rtnd ÷ Init. Wt. x 100 = % Rtnd.

BORING NO. 3ST-CC-50