MGGE09005056

LABORATORY ITEM 472

A SUMMARY OF SEDIMENT SIZE AND CHEMISTRY OF TWO CORES FROM FT. LAUDERDALE, FLORIDA. NAVY DIVERS. JUNE 1973.

01-60

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Prepared for: Code 6110

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WASHINGTON, D.C. 20373

EXPLANATION OF DATA PAGES
CORE ANALYSIS SUMMARY SHEET
Engineering Properties
NAVOCEANO (EXP) 3167/18B (Rev. 1-63)

Results of engineering properties, core analysis performed by the U. S. Naval Oceanographic Office Geological Laboratory are recorded on Core Analysis Summary Sheet Engineering Properties.

The following is a description of the terms employed on the Core Analysis Summary Sheet:

1. Cruise Number. A number assigned to each cruise for identification purposes.

2. Latitude. Expressed in degrees, minutes, and seconds.

3. Longitude. Expressed in degrees, minutes, and seconds.

4. Sample Number. A consecutive number, commencing with 1 applied to each core taken successively throughout the cruise.

5. Date Taken. Day (GMT), month, and year.

6. Water Depth (m). The uncorrected sonic sounding recorded in meters.

7. Type Corer. Identified by the name of device employed.

8. Core Length (cm). Recorded in centimeters as observed in the laboratory.

9. Core Penetration (cm). Recorded in centimeters as observed in the field.

10. Subsample Depth in Core (cm). Interval of subsample as measured in centimeters from the top of the core.

11. Wet Unit Weight (g/cm^3). The weight (solids plus water) per unit volume of the sediment mass.

12. Specific Gravity of Solids. The ratio of weight in air of a given volume of a sediment at 20°C to the weight in air of an equal volume of distilled water at 20°C.

13. Water Content (% dry weight). The ratio, in percent, of the weight of water in a given mass of the sediment sample to the weight of the solid particles.

14. Void Ratio. The ratio of the volume of void spaces to the volume of solid particles in the sediment sample as computed from Wet Unit Weight, Specific Gravity of Solids, and Water Content.

15. Saturated Void Ratio. The Void Ratio at 100 percent saturation as computed from Water Content and Specific Gravity of Solids.

$$\text{Saturated Void Ratio} = \frac{\text{Water Content X Specific Gravity of Solids}}{100}$$

16. Porosity (%). The ratio, usually expressed as a percentage, of the volume of voids of a sediment mass to the total volume of the sediment mass.

17. Liquid Limit. Water Content, in percent, at which a pat of sediment cut by a groove of standard dimension will flow together for a distance of 1/2 inch under the impact of 25 blows in a standard liquid limit apparatus.

18. Plastic Limit. Water Content, in percent, at which a sediment will just begin to crumble when rolled into a thread approximately 1/8 inch in diameter.

19. Plasticity Index. The numerical difference between the Liquid Limit and Plastic Limit of the sediment mass.

20. Liquidity Index. The ratio, expressed in percentage, of (1) the natural water content of the sediment sample minus its Plastic Limit to (2) its Plasticity Index.

21. Compression Index. The slope of the linear portion of the Pressure-Void Ratio curve on a semi-log plot.

22. Compressive Strength. The load per unit area required to shear an unconfined, natural or remolded, sediment mass.

23. Cohesion. The shearing strength per unit area under zero externally applied load.

24. Sensitivity. The ratio of the natural to the remolded strength. It is a measure of the loss of strength due to remolding the sediment mass.

25. Angle of Internal Friction (°). The angle between the abscissa and the tangent of the curve representing the relationship of "shearing resistance to "normal stress" acting within a sediment mass.

26. Activity. The ratio of the Plasticity Index to the clay fraction percentage ($<$ .002mm) of the sediment mass.

27. Modulus of Elasticity. The ratio of stress to strain of the sediment mass.

28. Slump (%). The ratio, in percent, of the amount of height change immediately before the compressive strength test to the original height of a cylinder of sediment.

The results of the sediment size and composition analyses are printed out in tabular form.

The following is an explanation of the terms encountered on the data printout sheet:

CRUISE	A number assigned to each cruise for identification purposes.
SAMPLE	A consecutive number applied to each core taken successively throughout the cruise.
LATITUDE	Expressed in degrees, minutes, and tenths of minutes.
LONGITUDE	Expressed in degrees, minutes and tenths of minutes.
TAKEN	Date in day, month, and year that core was taken.
CORER TYPE	Letters corresponding to sampling device code below.

Corers		Grabs	
HYP	Hydroplastic piston	SPK	Shipek Sediment Sampler
HYG	Hydroplastic gravity	HLP	Alpine Heavy Duty Grab
KUP	Kullenberg piston	SMS	Small Mud Snapper
KUG	Kullenberg gravity	VVS	Van Veen Grab
PHL	Phlegar gravity	BED	Birge-Ekman Dredge
MEG	Modified Ewing gravity	DLS	Dietz-LaFond Snapper
MEP	Modified Ewing piston	OPG	Orange Peel Grab
VIB	Vibrocorer	SBS	Scoopfish Bottom Sampler
BOM	Boomerang	DOC	Diver Operated Corer
EWP	Ewing piston		
EWG	Ewing gravity		

LENGTH	Length of core recorded in centimeters as observed in the laboratory.
PENETRATION	Penetration of coring device recorded in centimeters as observed in the field.
DEPTH	The uncorrected sonic sounding in meters.
ANALYZED	Date in day, month, and year that core was analyzed in the laboratory.
I.D. No.	Three or four digit laboratory project number followed by consecutive number assigned to each subsample analyzed.
INTERVAL	Interval of subsample as measured in centimeters from the top of the core.
MM	Particle diameter size intervals based on Wentworth size grades in millimeters.
PER	Percent of total sample weight within the given size interval.

GRAVEL, SAND SILT, CLAY — Percent of the total sample weight within the four size classes.

Class ranges are:

1. Gravel - coarser than 2 mm
2. Sand - 2 to 0.0625 mm
3. Silt - 0.0625 to 0.0039 mm
4. Clay - finer than 0.0039

MEAN (MM) — The geometric mean of the distribution expressed in millimeters.

MEAN (PHI) — The logarithmic mean of the distribution expressed in phi units ($-\log_2$) of the diameter in millimeters.

STAN DEV — Standard deviation. A measure of the degree of spread or dispersion of the distribution about the mean expressed in phi units.

$$s = \sqrt{\frac{\sum f \quad (X_i - \bar{X})^2}{100}}$$

SKEWNESS — A measure of the asymmetry of the distribution. Positive values denote skewness of the distribution toward the fine particles; negative values denote skewness toward the coarse particles. A normal distribution has a skewness of 0.

$$\text{Skewness} = \frac{2 \sum f \quad (X_i - X)^3}{100 \quad s^3}$$

KURTOSIS — A measure of the peakedness of the distribution. Positive values denote a "leptokurtic" distribution more "peaked" than normal. Negative values denote a "platykurtic" distribution, or a distribution more "flat" than normal. When using the following formula, a normal curve has a kurtosis of 0.

$$\text{Kurtosis} = \left[\frac{\sum f \quad (X_i - \bar{X})^4}{100 \quad s^4}\right] - 3$$

$CACO_3$ — Percent of the total sample weight soluble in 2 N HCL.

ORG CARBON — Percent organic carbon of the total sample weight as determined using a Leco carbon analyzer.

COLOR — Wet sediment color, based on the Geological Society of America Rock-Color Chart, as determined in the laboratory.

NITROGEN — Percent nitrogen of the total sample weight as determined by the Kjeldahl method.

LOG FOR GRAB SAMPLES

Project No: 472
Location: Ft. Lauderdale

Logged By J. C. Bowman
Date Logged 21 May 74

	La No.	Color	Calc. Mat.	Sediment Type	Remarks
Sample No: FL #1 Lat: 26° 05'N Long: 80° 6.7'W Date: June, 73 Water depth:	472-1	Black 5Y 2.5/1	NO	Silty Clay	0"-12" (0-30 cm)
Sample No: Lat: Long: Date: Water depth:	472-2	Dark olive gray 5Y 3/2	Yes	Clayey Silt	12"-36" (30-91cm) Shell fragments
Sample No: Lat: Long: Date: Water depth:	472-3	Light gray 5Y 7.5/1	NO	Sand	36"-60" (91-152cm)
Sample No: FL #2 Lat: 26° 05'N Long: 80° 6.7'W Date: June, 73 Water depth:	472-4	Black 5Y 2.5/1	Yes	Sand	0"-12" (0-30cm) Shell fragments Sample Contains Small rocks
Sample No: Lat: Long: Date: Water depth:	472-5	Black 5Y 2.5/1	Yes	Sand	12"-27" (30-69cm) Shell fragments Sample Contains Small rocks
Sample No: Lat: Long: Date: Water depth:					
Sample No: Lat: Long: Date: Water depth:					
Sample No: Lat: Long: Date: Water depth:					
Sample No: Lat: Long: Date: Water depth:					

SEDIMENT SIZE AND COMPOSITION DATA 081-60

CRUISE FTLAUD TAKEN 0JUN73 LATITUDE 26 5.00 MARSDEN SQUARE ~~783~~ LENGTH 152.0 ANALYZED 0JUN74
SAMPLE FL-1 DEPTH .0 LONGITUDE 80 6.70 W CORER TYPE DOC PENETRATION .0

DIAM (PHI)	DIAM (MM)	SUBSAMPLE ID. 472 1 DEPTH INTERVAL .0- 30.0 PERCENT	472 2 30.0- 91.0 PERCENT	472 3 91.0-152.0 PERCENT
<-4	>16.000	.000	.000	.000
-4 TO -3	16.000 TO 8.000	.000	.000	.000
-3 TO -2	8.000 TO 4.000	.000	.000	.000
-2 TO -1	4.000 TO 2.000	1.218	3.476	.000
-1 TO 0	2.000 TO 1.000	.922	1.635	.000
0 TO 1	1.000 TO .500	1.151	2.162	.723
1 TO 2	.500 TO .250	1.466	4.650	4.411
2 TO 3	.250 TO .125	18.449	28.731	86.221
3 TO 4	.125 TO .063	18.370	12.063	6.392
4 TO 5	.063 TO .031	9.382	1.724	.133
5 TO 6	.031 TO .016	13.048	8.771	.265
6 TO 7	.016 TO .008	10.250	8.541	.133
7 TO 8	.008 TO .004	5.164	6.354	.400
8 TO 9	.004 TO .002	5.204	5.226	.133
9 TO 10	.002 TO .001	1.577	8.495	.265
>10	<.001	13.797	8.173	.923
	GRAVEL (>2.0 MM)	1.218	3.476	.000
	SAND (2.0-.063 MM)	40.360	49.240	97.748
	SILT (.063-.004 MM)	37.844	25.390	.931
	CLAY (<.004 MM)	20.578	21.893	1.321
	MEAN (MM)	.0246	.0344	.1602
	MEAN (PHI)	5.343	4.862	2.642
	STANDARD DEVIATION	2.897	3.235	1.018
	SKEWNESS	.186	.119	2.897
	KURTOSIS	-.588	-.916	39.502
	ORGANIC CARBON	1.800	1.237	.018
	NITROGEN (KJELDAHL)	.217	.175	.028
	COLOR (GSA)	5Y2.5/2	5Y3/2	5Y7.5/1

HS 081-60

SEDIMENT SIZE AND COMPOSITION DATA

CRUISE FTLAUD TAKEN 0JUN73 LATITUDE 26 5.00 MARSDEN SQUARE ~~085~~ LENGTH 169.0 ANALYZED 0JUN74
SAMPLE FL-2 DEPTH .0 LONGITUDE 80 6.70 W CORER TYPE DOC PENETRATION .0

	SUBSAMPLE ID.	472 4	472 5
	DEPTH INTERVAL	.0-30.0	30.0-69.0
DIAM (PHI)	DIAM (MM)	PERCENT	PERCENT
<-4	>16.000	.000	27.832
-4 TO -3	16.000 TO 8.000	5.007	10.532
-3 TO -2	8.000 TO 4.000	6.795	5.895
-2 TO -1	4.000 TO 2.000	5.332	4.187
-1 TO 0	2.000 TO 1.000	11.298	6.396
0 TO 1	1.000 TO .500	22.808	8.271
1 TO 2	.500 TO .250	21.702	9.145
2 TO 3	.250 TO .125	21.182	20.652
3 TO 4	.125 TO .063	3.121	4.007
4 TO 5	.063 TO .031	.232	.031
5 TO 6	.031 TO .016	.268	.593
6 TO 7	.016 TO .008	.481	.375
7 TO 8	.008 TO .004	.532	.249
8 TO 9	.004 TO .002	.020	.041
9 TO 10	.002 TO .001	.054	.073
>10	<.001	1.167	1.721
	GRAVEL (>2.0 MM)	17.134	48.445
	SAND (2.0-.063 MM)	80.112	48.471
	SILT (.063-.004 MM)	1.513	1.248
	CLAY (<.004 MM)	1.240	1.835
	MEAN (MM)	.5655	1.6933
	MEAN (PHI)	.822	-.760
	STANDARD DEVIATION	2.177	3.363
	SKEWNESS	.391	.321
	KURTOSIS	3.867	.276
	ORGANIC CARBON	.192	.084
	NITROGEN (KJELDAHL)	.003	.000
	COLOR (GSA)	5Y2.5/1	5Y2.5/1

PRNC-NAVOCEANO-3167/18 B (4-63)

CORE ANALYSIS SUMMARY SHEET
ENGINEERING PROPERTIES

ANALYZED BY Ross, Kelly, Draper

DATE July 1973

472

081-60

1. CRUISE NO. Ft. Lauderdale	4. SAMPLE NO. Core No. 1	7. TYPE CORER
2. LATITUDE 26° 5.00' N "	5. DATE TAKEN (Day, month, year)	8. CORE LENGTH (cm)
3. LONGITUDE 80° 6.70' W "	6. WATER DEPTH (m)	9. CORER PENETRATION (cm)

10. SUBSAMPLE DEPTH IN CORE (cm)	Sample No. 1												
11. WET UNIT WEIGHT (g/cm^3)	1.89												
12. SPECIFIC GRAVITY OF SOLIDS	2.63												
13. WATER CONTENT (% dry weight)	31.89												
14. VOID RATIO	0.837												
15. SATURATED VOID RATIO	0.837												
16. POROSITY (%)	45.6												
17. LIQUID LIMIT													
18. PLASTIC LIMIT													
19. PLASTICITY INDEX													
20. LIQUIDITY INDEX													
21. COMPRESSION INDEX FROM LL													
22. COMPRESSIVE STRENGTH NATURAL (g/cm^2)													
REMOLD (g/cm^2)													
23. COHESION NATURAL (g/cm^2)													
REMOLD (g/cm^2)													
24. SENSITIVITY													
25. ANGLE OF INTERNAL FRICTION (°)													
26. ACTIVITY													
27. MODULUS OF ELASTICITY													
28. SLUMP (%)													

29. REMARKS Wet Unit Weight, Void Ratio, Saturated Void Ratio, and Porosity are calculated assuming 100% saturation.

PRNC-NAVOCEANO-3167/18 B (4-63)

CORE ANALYSIS SUMMARY SHEET
ENGINEERING PROPERTIES

ANALYZED BY Ross, Kelly, Draper
DATE July 1973

051-60

1. CRUISE NO. Ft. Lauderdale	4. SAMPLE NO. Core No. 2	7. TYPE CORER
2. LATITUDE 26°50.00' "	5. DATE TAKEN (Day, month, year)	8. CORE LENGTH (cm)
3. LONGITUDE 80°06.70' "	6. WATER DEPTH (m)	9. CORER PENETRATION (cm)

10. SUBSAMPLE DEPTH IN CORE (cm)	Sample No. 1											
11. WET UNIT WEIGHT (g/cm^3)	1.68											
12. SPECIFIC GRAVITY OF SOLIDS	2.57											
13. WATER CONTENT (% dry weight)	51.52											
14. VOID RATIO	1.323											
15. SATURATED VOID RATIO	1.323											
16. POROSITY (%)	57.0											
17. LIQUID LIMIT												
18. PLASTIC LIMIT												
19. PLASTICITY INDEX												
20. LIQUIDITY INDEX												
21. COMPRESSION INDEX FROM LL												
22. COMPRESSIVE STRENGTH NATURAL (g/cm^2)												
REMOLD (g/cm^2)												
23. COHESION NATURAL (g/cm^2)												
REMOLD (g/cm^2)												
24. SENSITIVITY												
25. ANGLE OF INTERNAL FRICTION (°)												
26. ACTIVITY												
27. MODULUS OF ELASTICITY												
28. SLUMP (%)												

29. REMARKS Wet Unit Weight, Void Ratio, Saturated Void Ratio, and Porosity are calculated assuming 100% saturation.

10