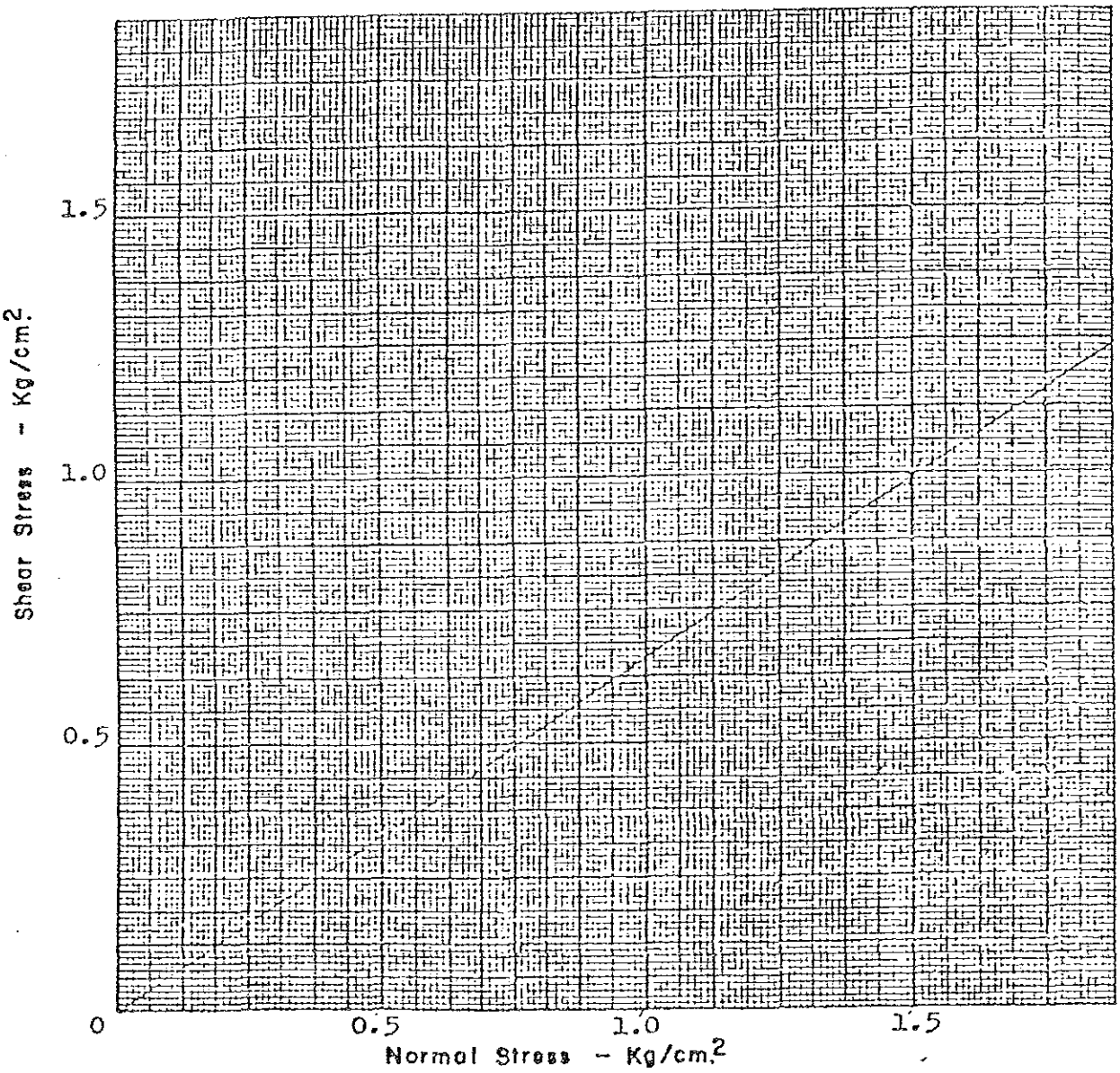
DIRECT SHEAR TEST

SAMPLE No. BH -B, SS - 15 PROJECT. Sukhothai Thamathiraah U.

TEST No. 5 SECTION. Geotech Lab.

DEPTH 22.50 - 22.95m DATE. May 12, 80.

SHEAR STRESS - NORMAL STRESS CURVE



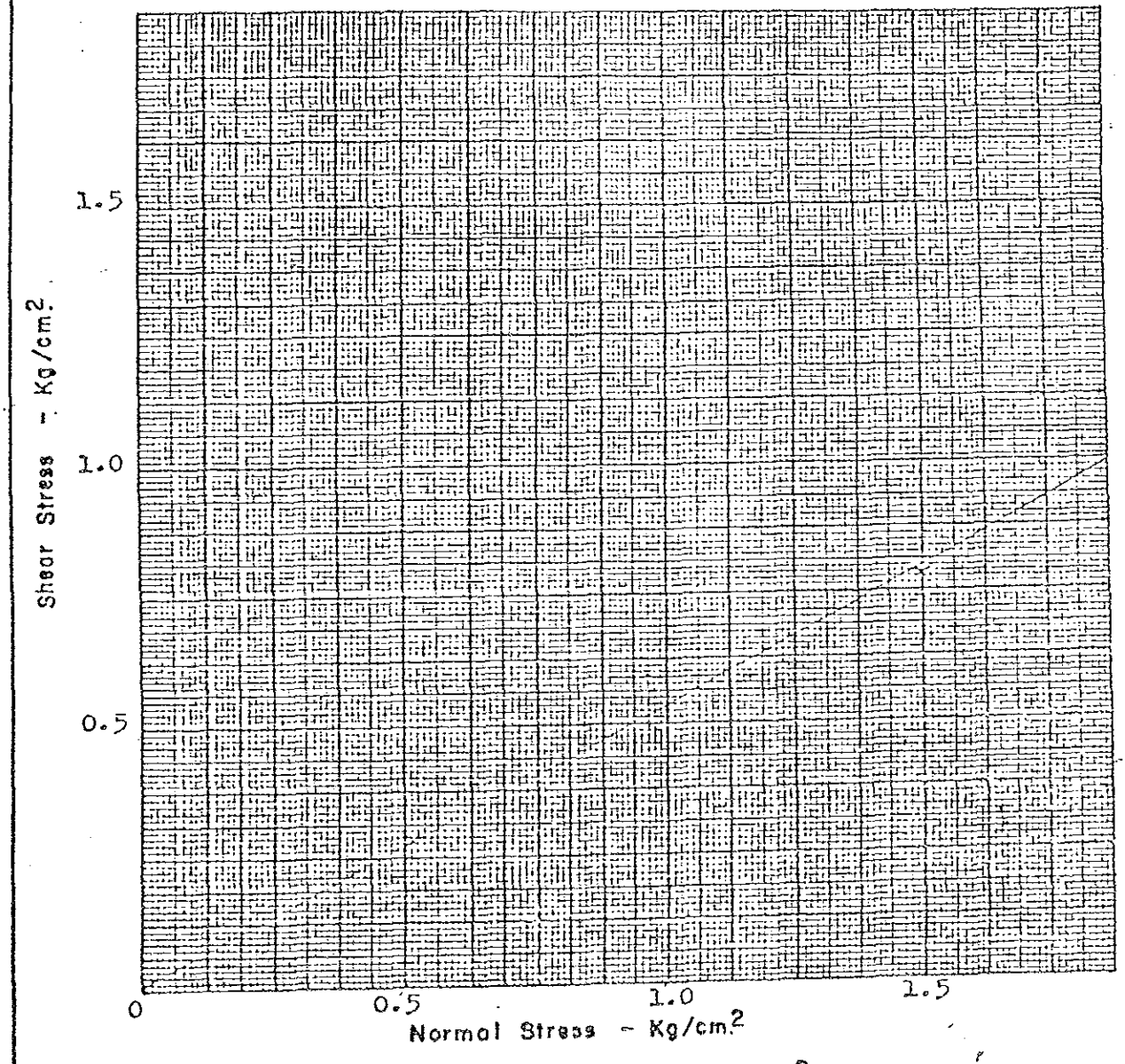
C = 0 Kg/cm.2

ϕ = 32°

DIRECT SHEAR TEST

SAMPLE No. BH - C, SS - 13 PROJECT. SukhothaiThamathirash U.
TEST No. 6 SECTION. Geotech Lab.
DEPTH 19.50 - 19.95m DATE. May 13, 80.

SHEAR STRESS - NORMAL STRESS CURVE



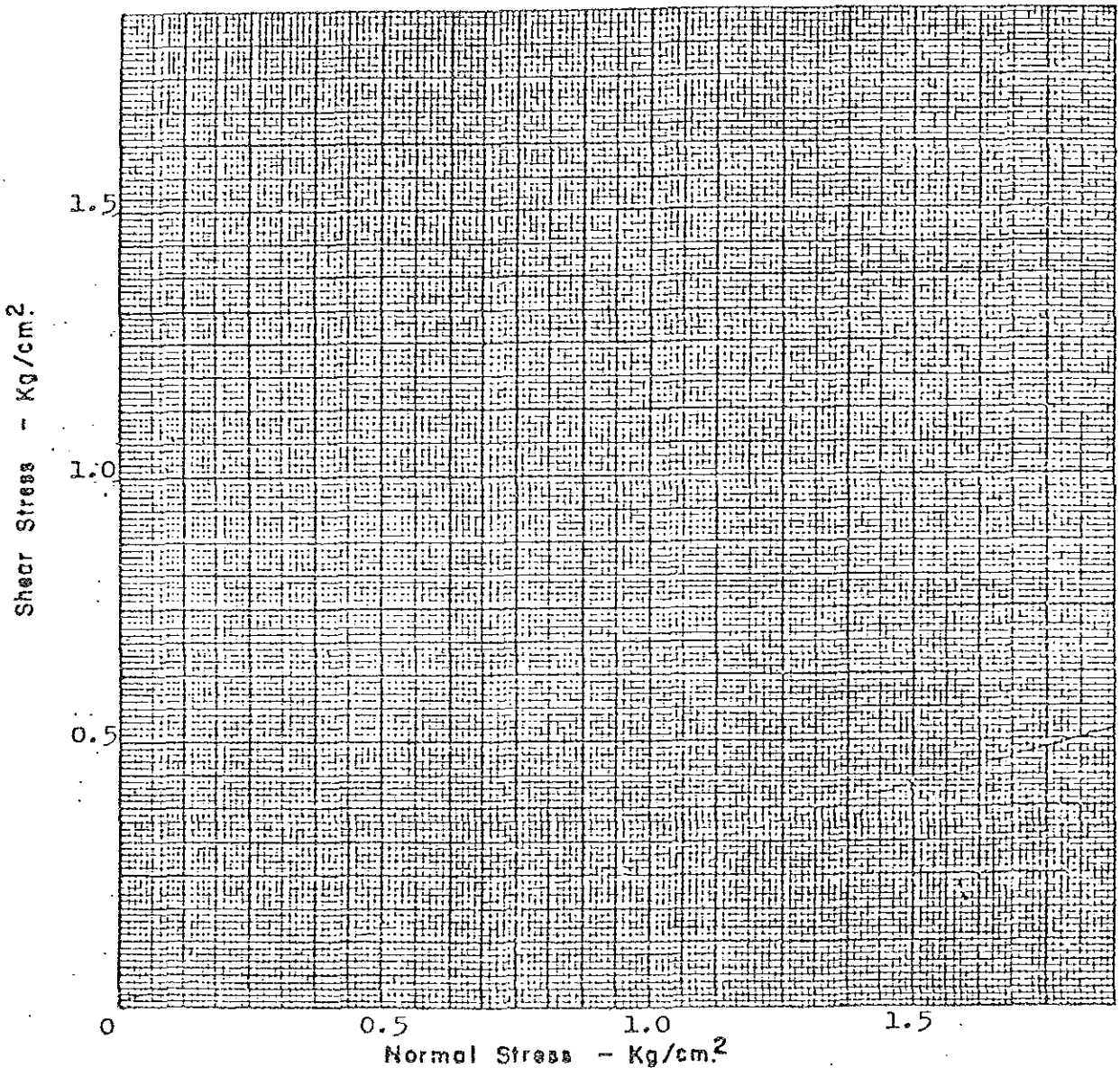
C = 0.01 Kg/cm.2

Ø = 27°

DIRECT SHEAR TEST

SAMPLE No. BH - C, SS- 22 PROJECT. Sukhothai Thamathirash U.
TEST No. 7 SECTION. Geotech. Lab.
DEPTH 33.00 - 33.45m DATE. May 13, 80.

SHEAR STRESS - NORMAL STRESS CURVE



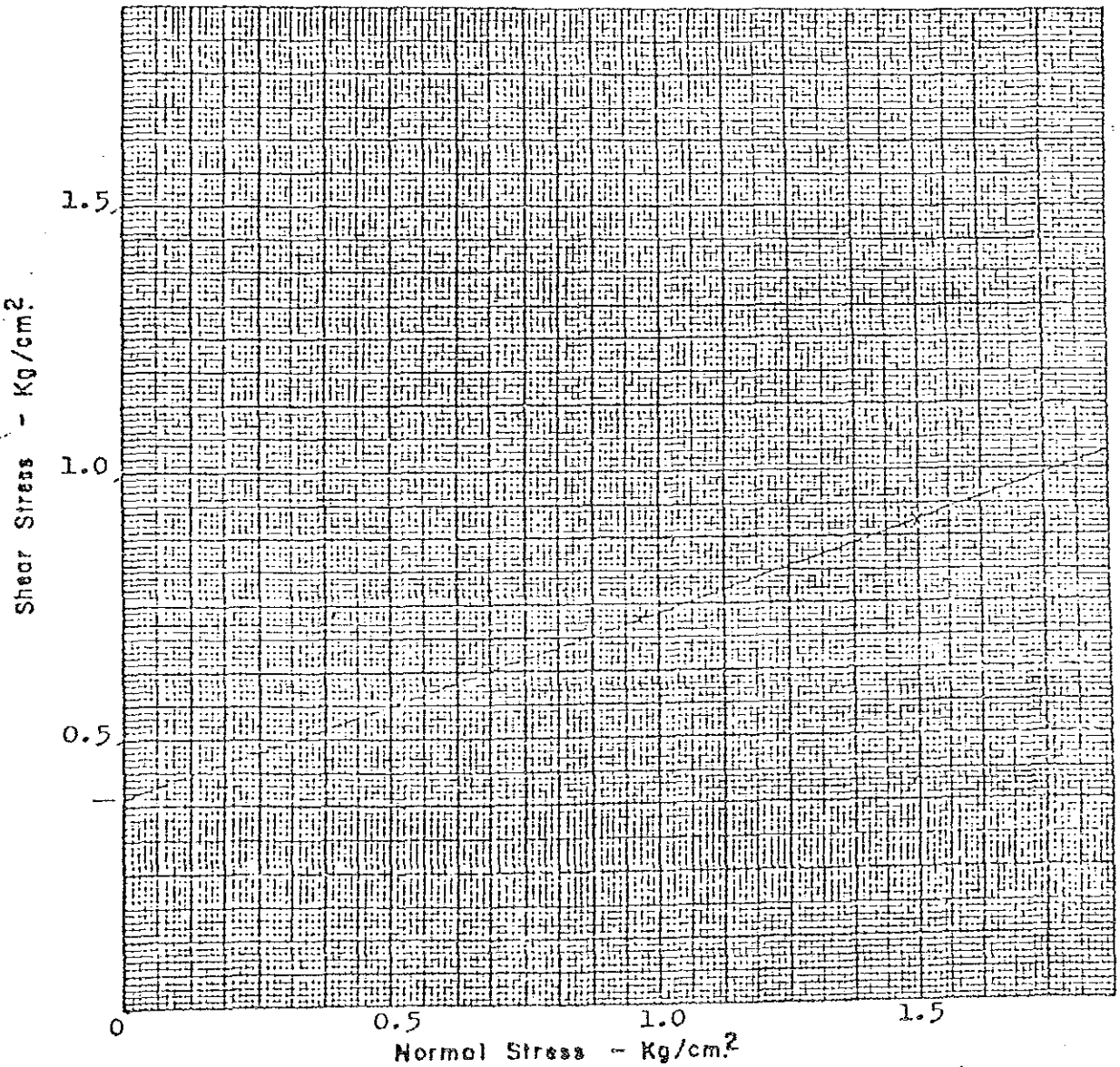
C = 0.01 Kg/cm.2

ϕ = 14

DIRECT SHEAR TEST

SAMPLE No. BH - D, SS - 11 B PROJECT. Sukhothai Thamathirash U.
TEST No. 8 SECTION. Geotech Lab.
DEPTH 16.20 - 16.95m DATE. May 13, 80.

SHEAR STRESS - NORMAL STRESS CURVE



C = 0.39 Kg/cm.2

Ø = 18°

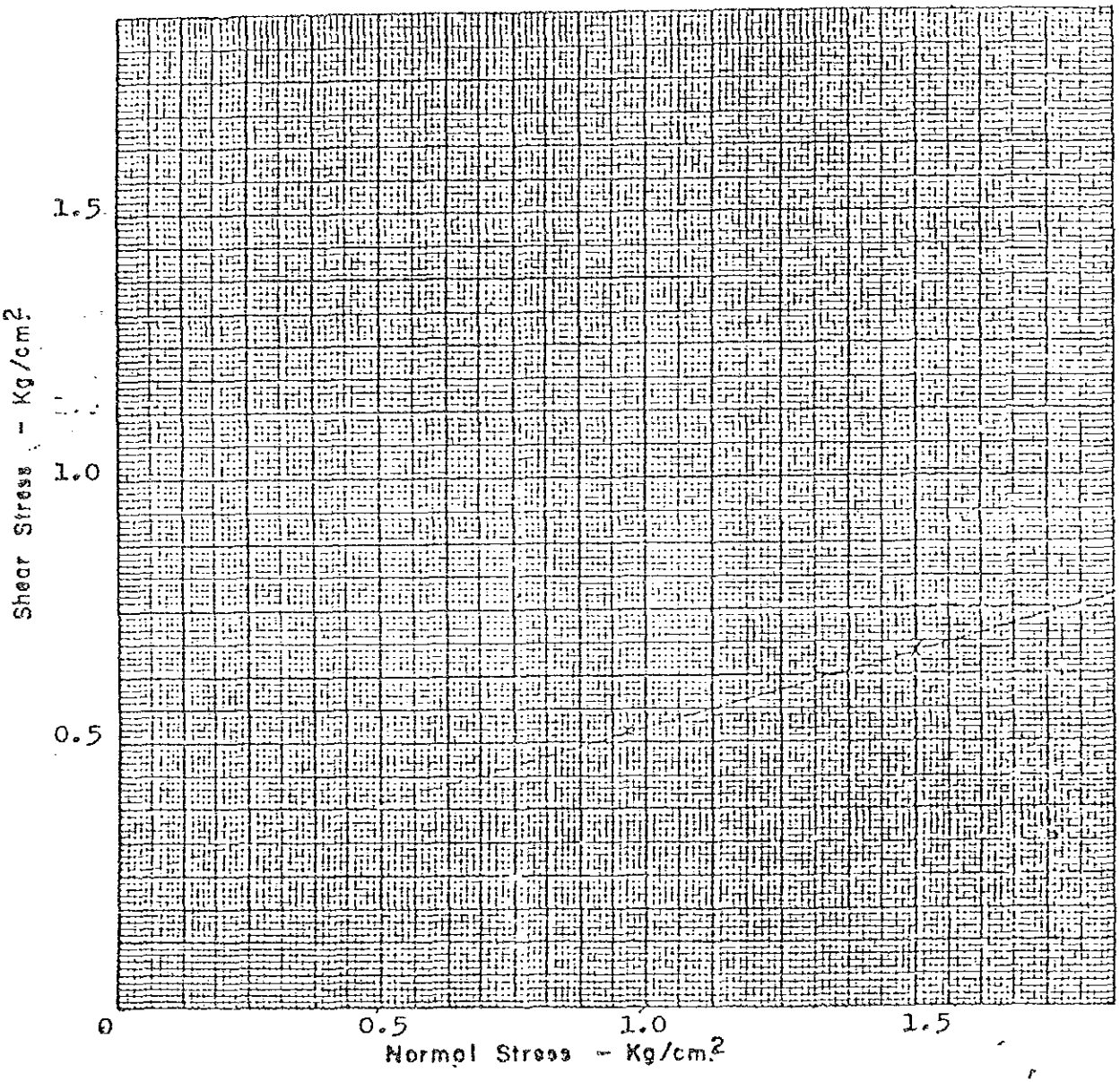
DIRECT SHEAR TEST

SAMPLE No. BH - D SS - 12 PROJECT. Sukhothai Thamathiraah

TEST No. 9 SECTION. Geotech Lab.

DEPTH 18.00 - 18.45m DATE. May 13, 80.

SHEAR STRESS - NORMAL STRESS CURVE



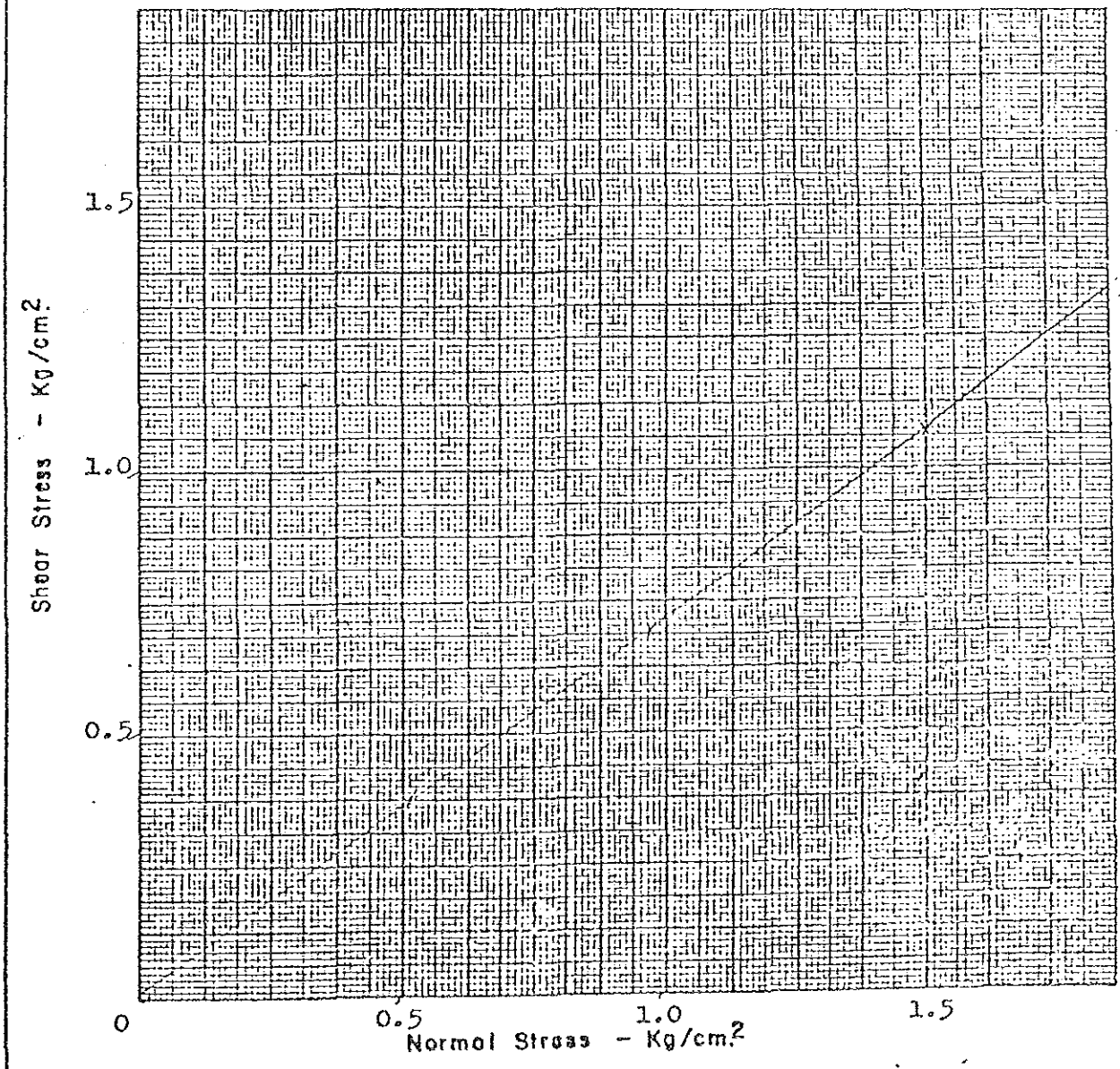
C = 0.25 Kg/cm2

Ø = 14½

DIRECT SHEAR TEST

SAMPLE No. BH - D, SS - 13 PROJECT. Sukhothai Thamathirash U.
TEST No. 10 SECTION. Geotech. Lab.
DEPTH 19.50 - 19.95m DATE. May 13, 80.

SHEAR STRESS - NORMAL STRESS CURVE



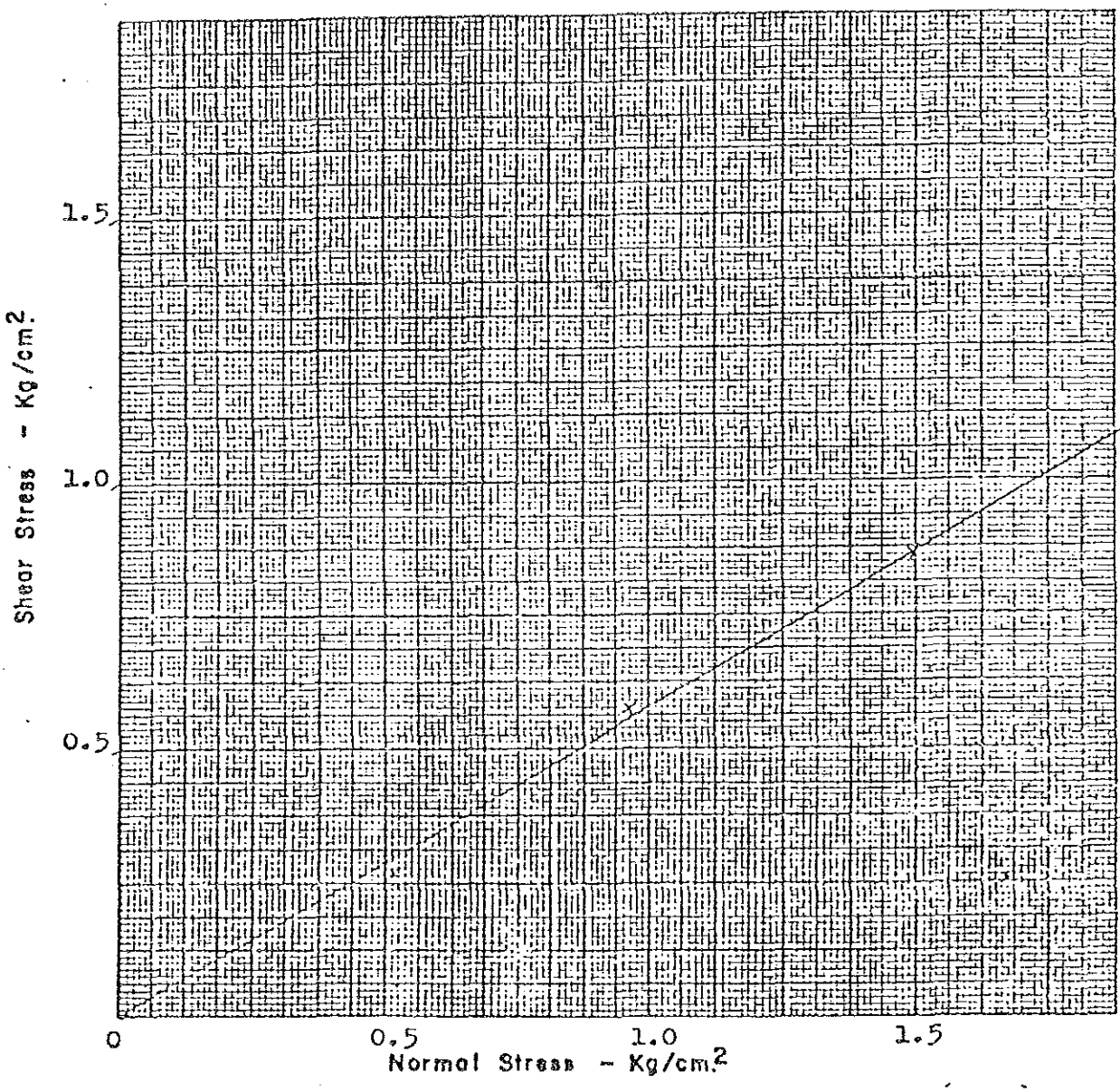
C = 0.01 Kg/cm.2

Ø = 33½

DIRECT SHEAR TEST

SAMPLE No. BH - D, GS - 14 PROJECT. Sukhothai Thamathiraah U.
TEST No. 11 SECTION. Geotech Lab.
DEPTH 21.00 - 21.45m DATE. May 13, 80.

SHEAR STRESS - NORMAL STRESS CURVE



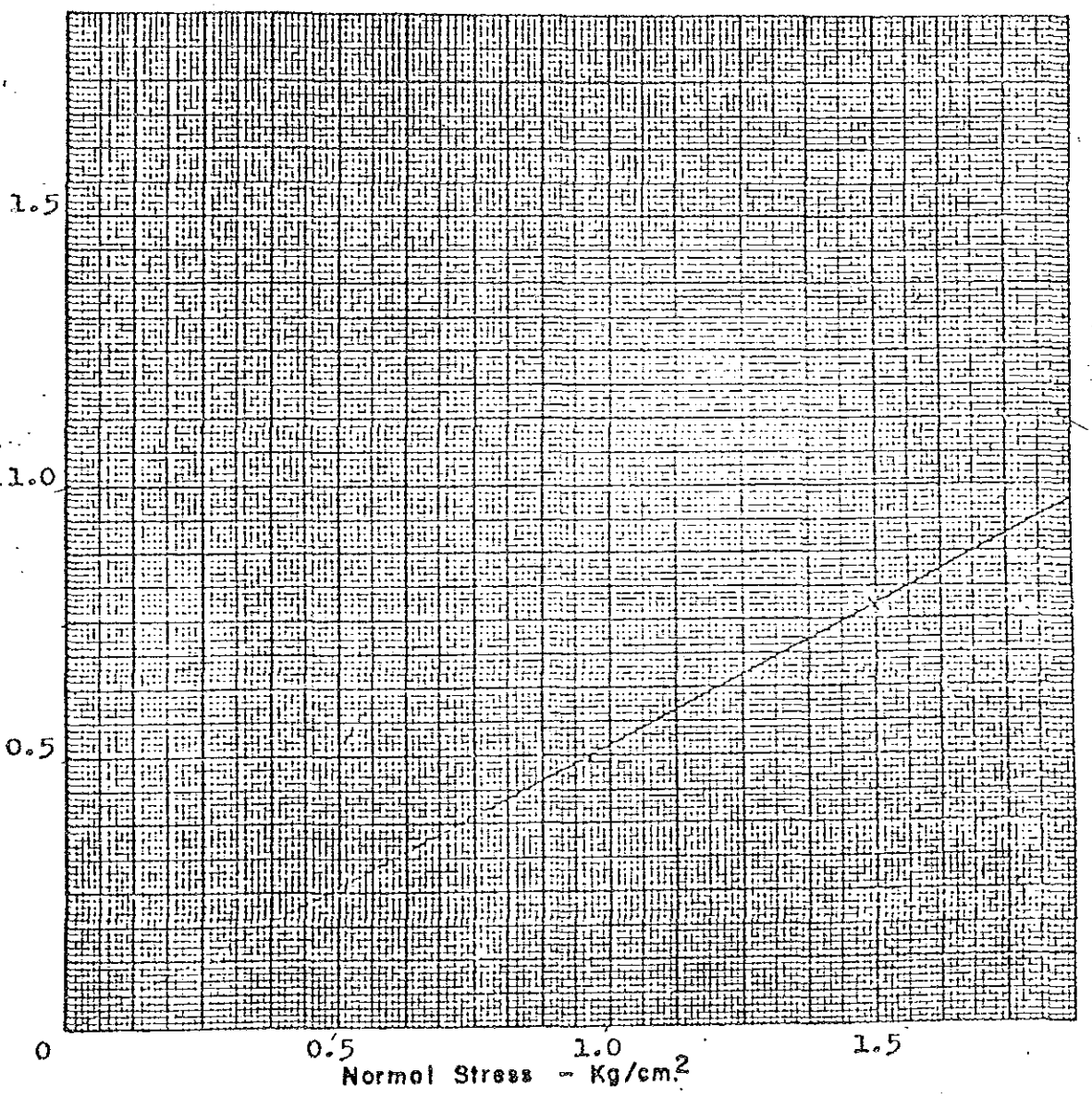
C = 0 Kg/cm.2

Ø = 29

DIRECT SHEAR TEST

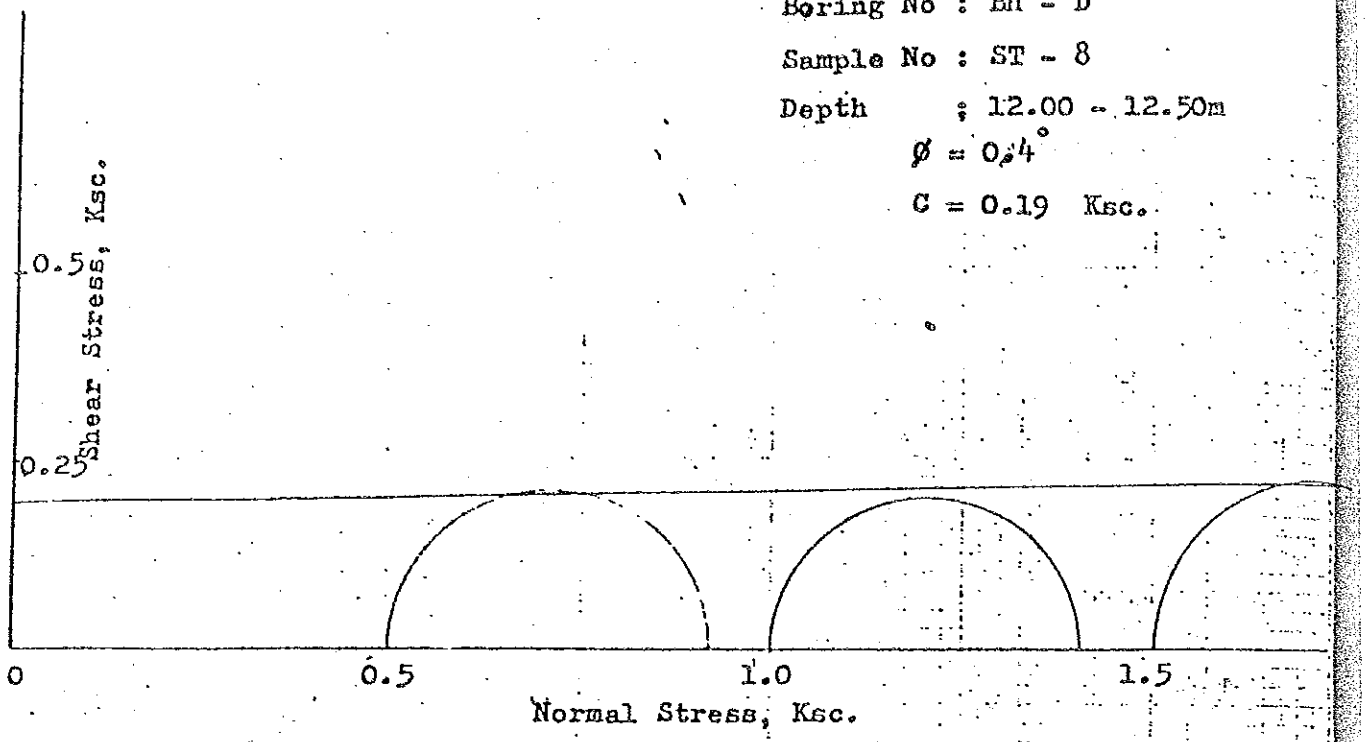
SAMPLE No. BH - D, SS - 16 PROJECT. Sukhothai Thamathirash U.
TEST No. 12 SECTION. Geotech. Lab.
DEPTH 24.50 - 24.95 m DATE. May 13, 80.

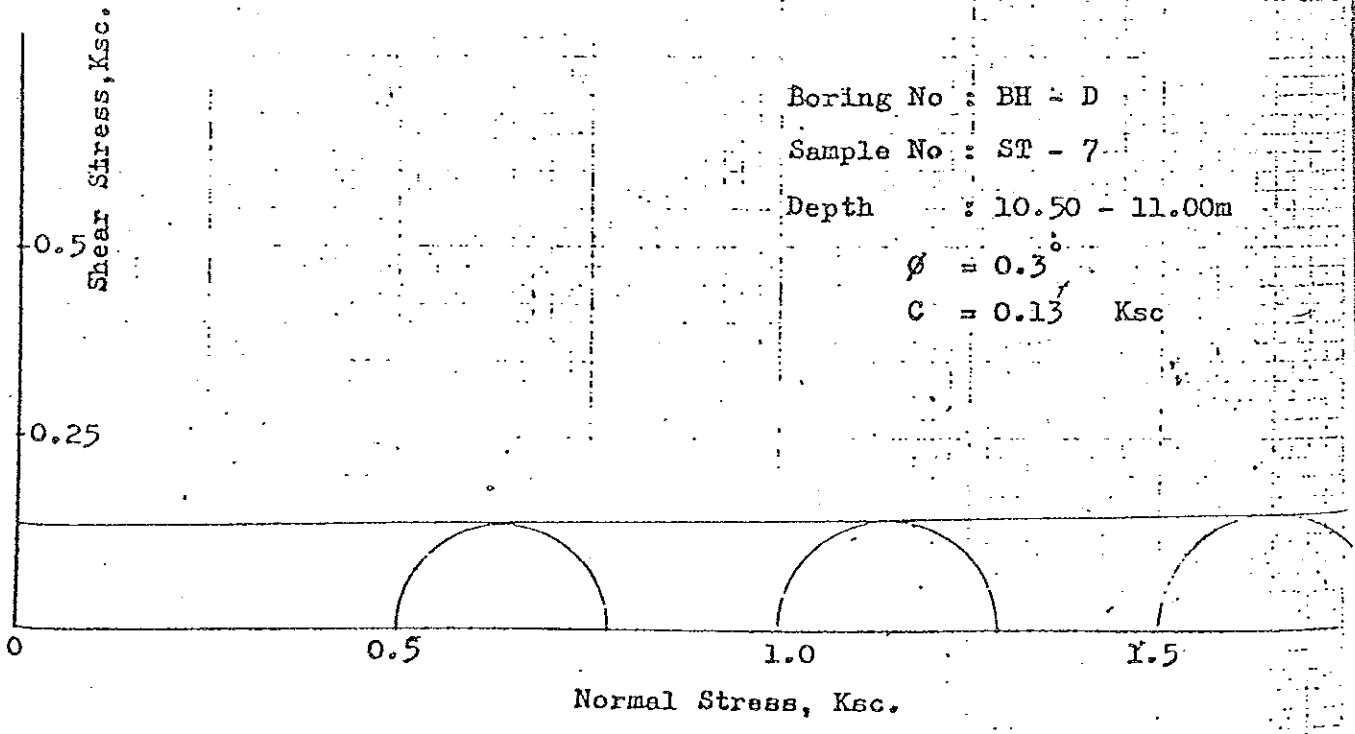
SHEAR STRESS - NORMAL STRESS CURVE



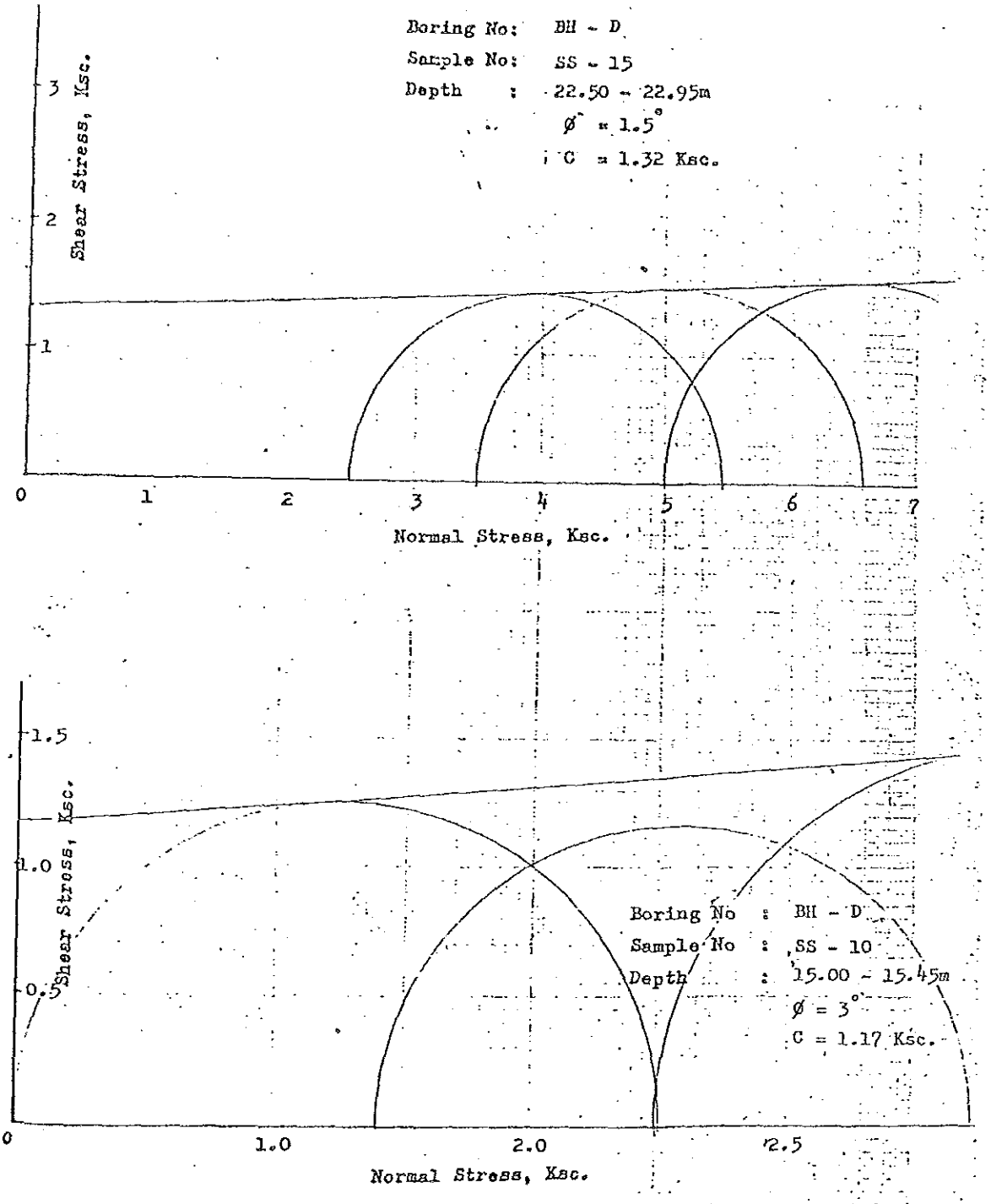
C = 0 Kg/cm.2

Ø = 27

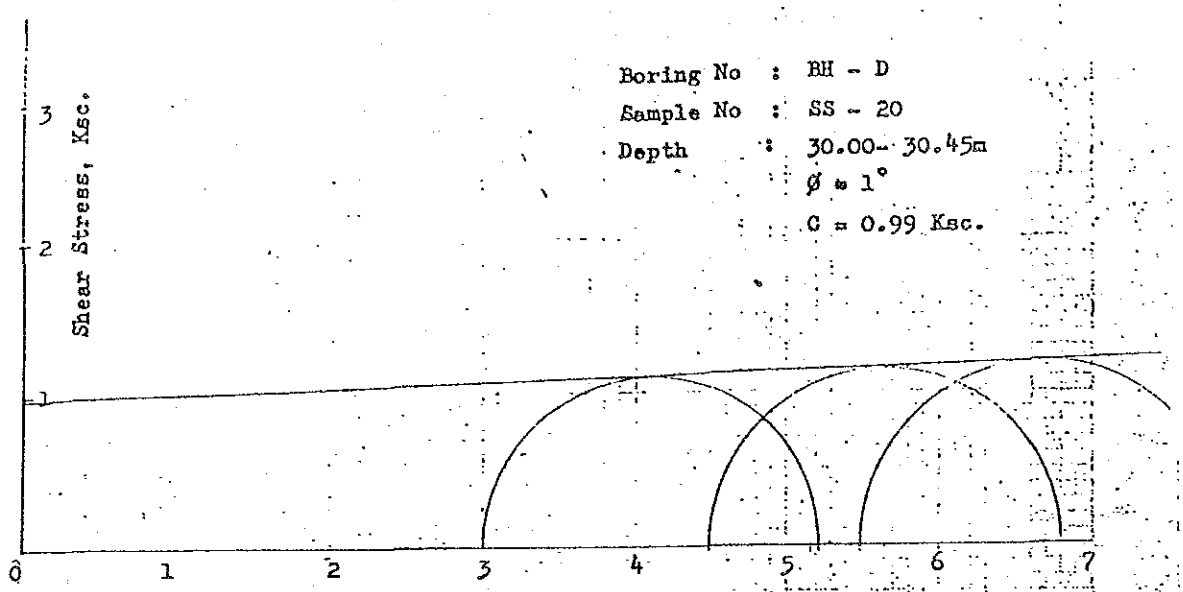


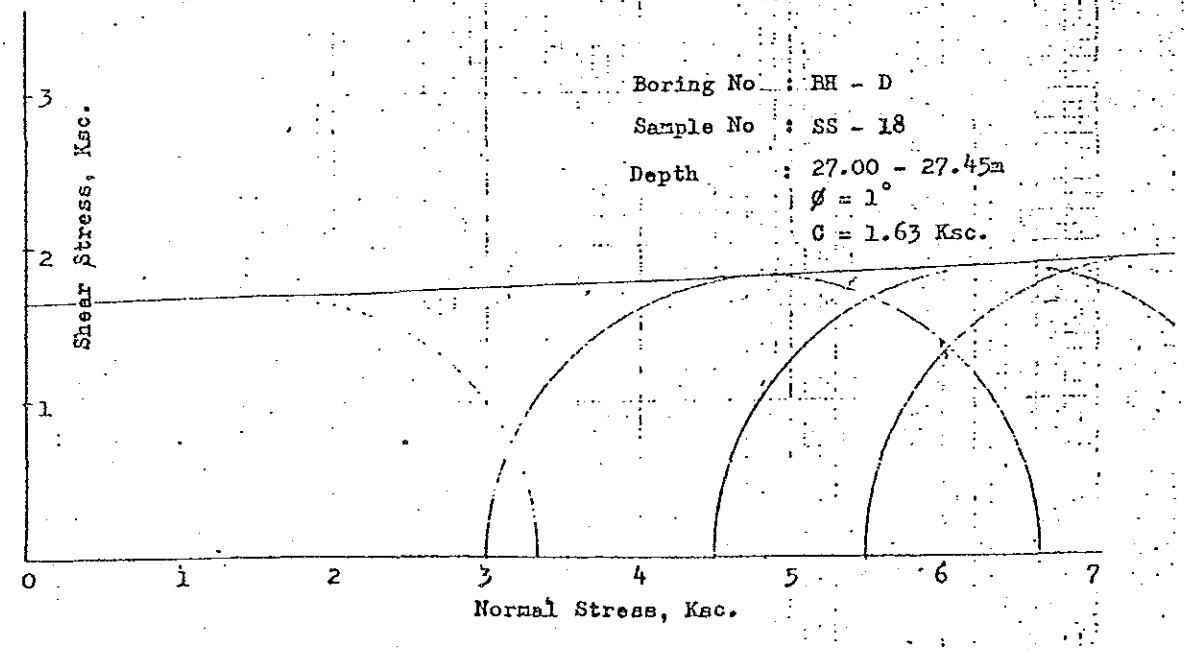


UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION SHEAR TEST RESULTS.



UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION SHEAR TEST RESULTS.





UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION SHEAR TEST RESULTS.

PRINCIPLES FOR DESIGN OF PILE FOUNDATION

There are some suitable static pile capacity equations all of them are considered quite similar, but the coefficients, constants and safety factor are different. The same answer could be obtained by any of them , if the coefficients and safety factor are suitably manipulated. The results obtained will be verified by full scale of investigations during the time of construction. However the required depth of pile should be confirmed by dynamic pile driving formulars and load tests.

ANALYSIS

General basic equation:

$$F_u = F_p + F_f \quad \text{----------(1)}$$

where : F_u = ultimate capacity of single pile, tons.

F_p = load carried in point bearing, tons.

F_f = load carried by friction along perimeter of pile, tons.

F_p can be determined from Terzaghi & Peck's equation (Ref.10)

$$F_p/A_p = 1.3\ c\ N_c + qN_q + \beta\gamma\ BN_\gamma \quad \text{----------(2)}$$

where: c = cohesion of soil(or may be interpreted from Fig. B) t/m^2.

N_c , N_q , N_γ = dimensionless bearing capacity factors. (determined from Fig.E)

q = effective overburden pressure at pile tip, t/m^2

ρ = shape coefficient (0.4 for square pile, or 0.3 for round pile)

γ = unit weigh of soil , t/m^3

B = width or diameter of piles, m.

A_p = cross-sectional area of pile tip, m^2

For cohesive soil ($\phi = 0$, $N_c = 5.7$, $N_q = 1.0$ and $N_\gamma = 0$)

$$F_p / A_p = 7.4\ c + q \qquad \text{---------- (2-a)}$$

For cohesionless soil ($c = 0$)

$$F_p / A_p = q N_q + \rho \gamma B N_\gamma \qquad \text{---------- (2-b)}$$

Broms proposed an equation for long piles (Ref. 2)

$$F_p / A_p = 24.46\ N' \qquad \text{---------- (2-c)}$$

Where N' = adjusted Standard Penetration Test (N), blow/ft

= $15 + \frac{1}{2}(N-15)$ for $N > 15$, or determined from Fig. C. Using the lower value

F_f can be determined from Meyerhof's equation (Ref. 6)

$$F_f / L_p = ms \alpha c L_b + \tfrac{1}{2} K_h \gamma L_b^2 \tan\delta \qquad \text{---------- (3)}$$

Where m = material factor (1.0 for concrete and timber piles, or 0.7 for steel piles)

s = shape factor (1.0 for cylindric or prismatic piles)

α = reduction factor (determined from Fig.A)

L_b = embeded length of piles, m.

K_h = ratio of horizontal to vertical earth pressure on side of pile above plastic zone.

N' bls/ft.	0-4	4-10	10-30	30-50	>50
K_h	0.5	0.6	0.7	0.8	1.0

δ = angle of friction between soil and pile (take $\delta = \frac{3}{4}\phi$ for average, determined ϕ values from Fig. E), degree.

L_p = length of pile perimeter, m.

For cohesive soil ($\phi = 0$)

$$F_f/L_p = ms\alpha cL_b \quad \text{----------} \quad (3\text{-a})$$

For cohesionless soil (c=0)

$$F_f/L_p = \frac{1}{2} K_h \gamma L_b^2 \tan\delta \quad \text{----------} \quad (3\text{-b})$$

Note: - In applying these formular, safety factor of 2 is used for piles in all soils.

- Point resistance for piles is fully developed only if the piles penetrate the bearing stratum a distance of minimum 5B and the thickness of this stratum below the pile-tip have a minimum of 3B

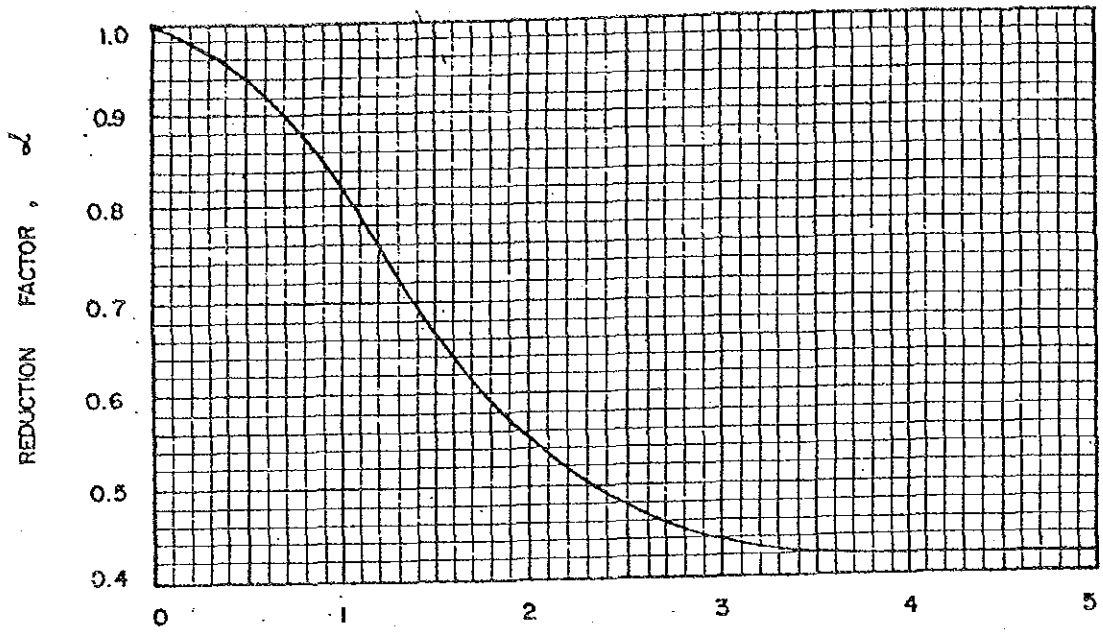


FIG. A REDUCTION FACTOR OF FRICTION PILES IN CLAYS WITH UNCONFINED COMPRESSIVE STRENGTH.

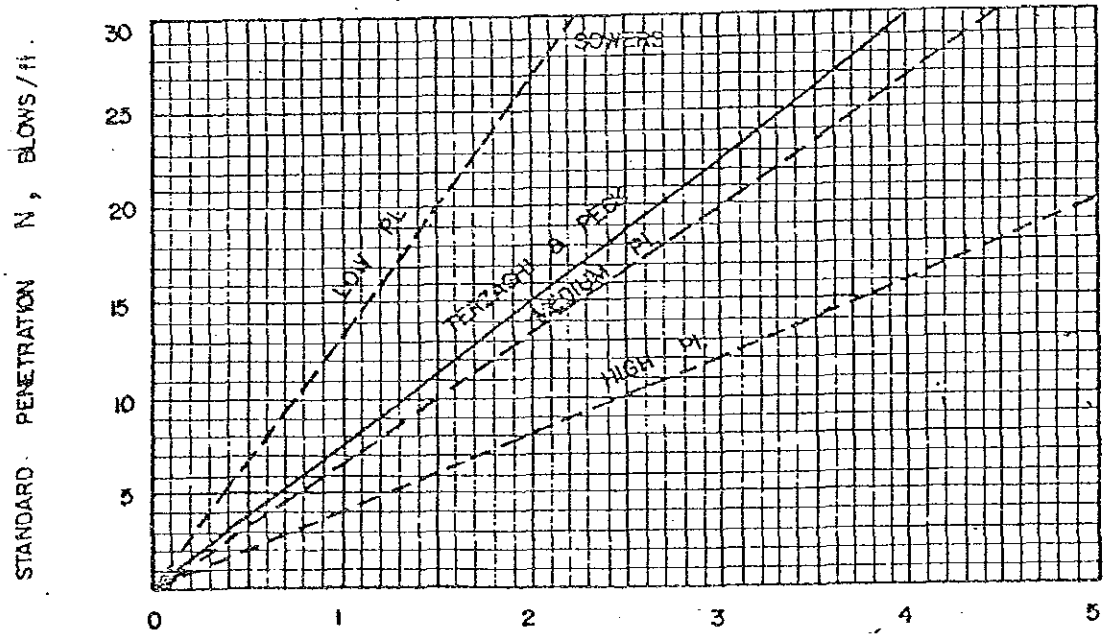


FIG. B CO — RELATION OF STANDARD PENETRATION WITH UNCONFINED COMPRESSIVE STRENGTH OF CLAYS.

SOIL TESTING SIAM CO., LTD.

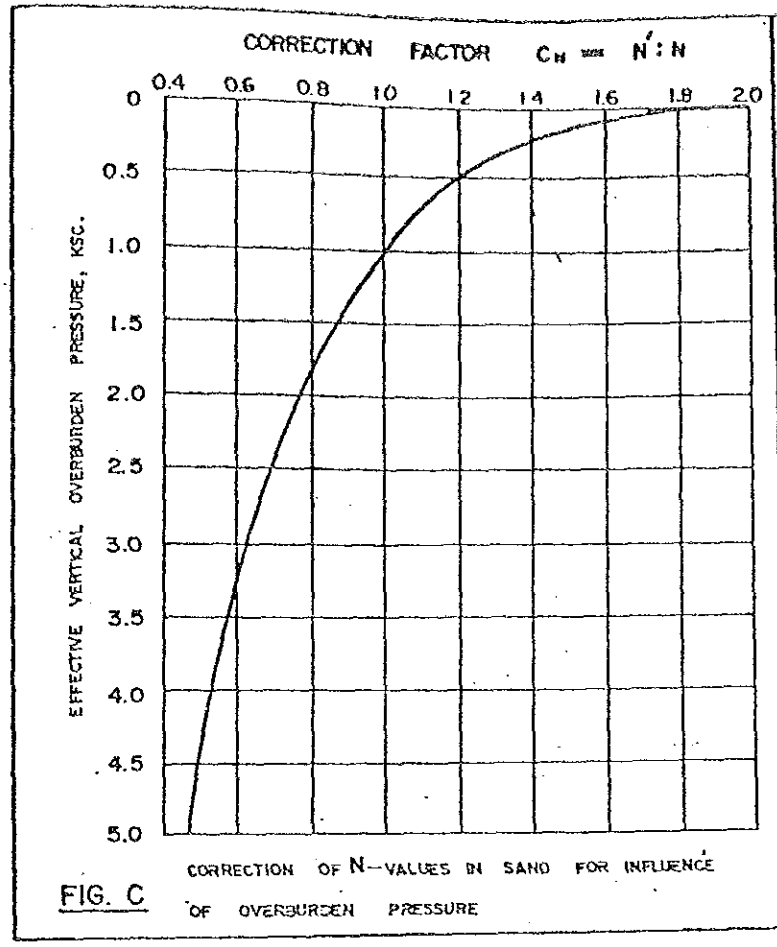


FIG. C CORRECTION OF N—VALUES IN SAND FOR INFLUENCE OF OVERBURDEN PRESSURE

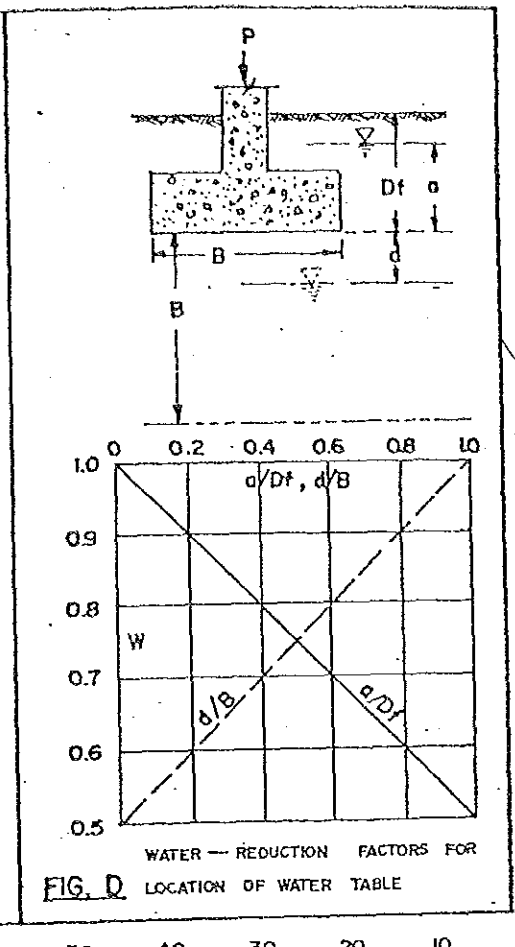


FIG. D WATER — REDUCTION FACTORS FOR LOCATION OF WATER TABLE

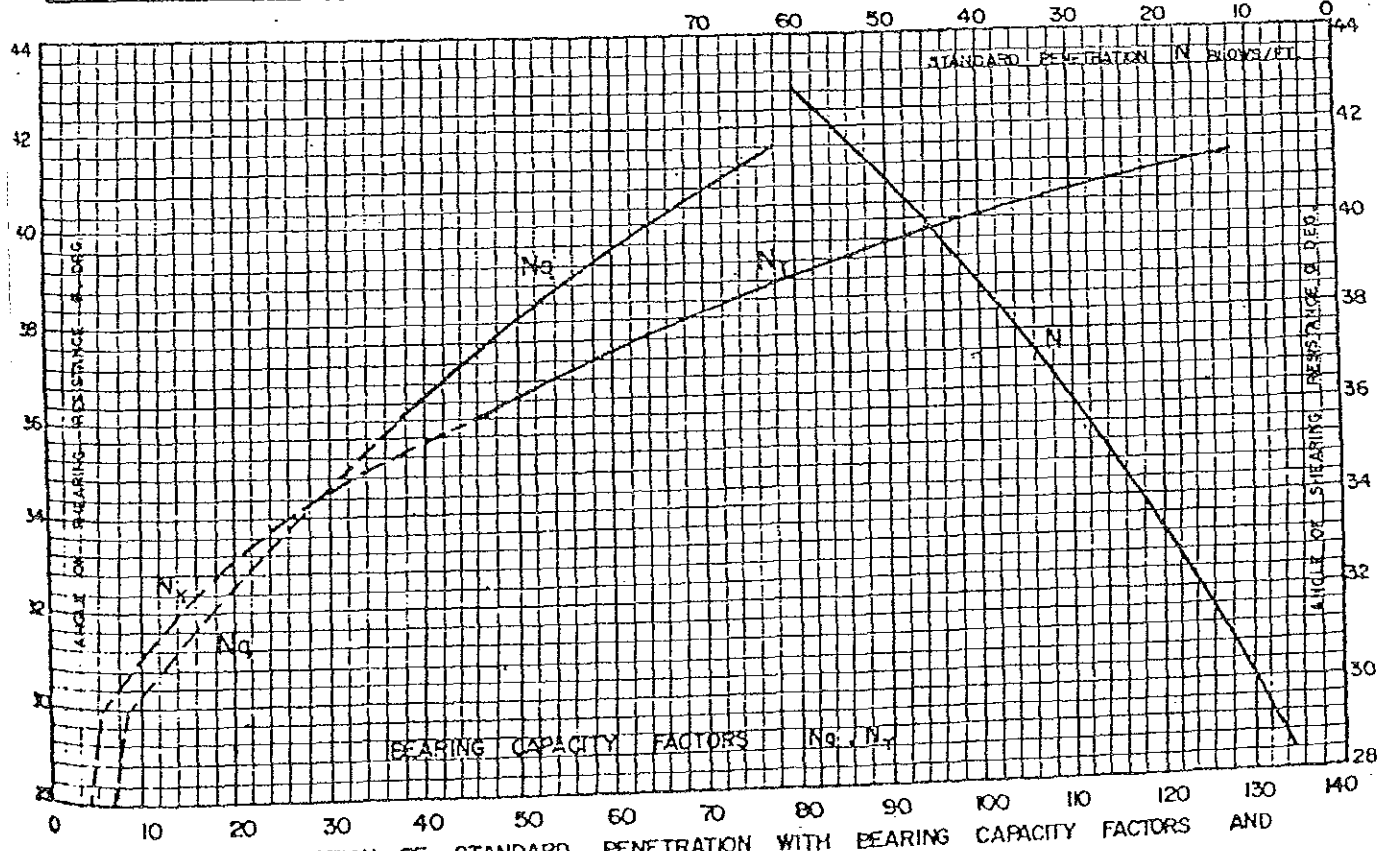


FIG. E CORELATION OF STANDARD PENETRATION WITH BEARING CAPACITY FACTORS AND ANGLE OF SHEARING RESISTANCE (Ref. 7 & 10)

SOIL TESTING SIAM CO., LTD.

REFERENCES

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12. Winterkorn, H.F., and H.Y. Fang, edi., "Foundation Engineering Handbook," Van Nostrand Reinhold Co., New York, 1975.

附　属　資　料　－　Ⅱ

10－11　基本設計現場調査，調査団の構成

調　査　団　の　構　成

石　田　　実	団　長
	外務省，経済協力局，経済協力第２課，外務事務官
小　林　清　志	放送計画，副団長
	郵政省，電監・放送部企画課第二企画係長
甲　斐　直　樹	プロジェクト・コーディネーター
	国際協力事業団，無償資金協力部
平　田　正　幸	放送施設計画
	日本放送協会，技本，総括業務部技師
源五郎丸　　認	建築計画
	日本放送協会，技本，建築施設部次長
木　村　　勤	機材計画
	全日本テレビサービス㈱，コンサルテング
	事業本部，副本部長
渡　辺　建日子	建築設計
	日本総合建築事務所常務取締役

10－12　基本設計現地調査日程

調　　査　　日　　程

調査期間　　昭和57年1月24日(日)～2月13日(土)　21日間

No.	月／日	曜日	業　務　内　容
1	1　24	日	成田発　→　バンコック着
2	25	月	JICA，日本大使館挨拶，打合せ会議
3	26	火	S.T.O.U.関係者との打合せ会議
4	27	水	大学庁長官表敬，S.T.O.U.関係者との打合せ会議
5	28	木	公共事業省，テレビ局訪問打合せ会議
6	29	金	S.T.O.U.関係者と打合せ会議，サイト視察
7	30	土	地方学習センター2か所視察
8	31	日	休　日
9	2／1	月	S.T.O.U.関係者と打合せ会議，ラジオ局視察
10	2	火	同　上
11	3	水	キング・モニクタット工科大学視察，建築関係データー収集
12	4	木	調査団打合せ会議，資料整理
13	5	金	S.T.O.U.と協議覚書交換，資料整理
14	6	土	S.T.O.U.コースミーテング視察，打合せ会議
15	7	日	休　日
16	8	月	建築関係データー収集
17	9	火	S.T.O.U.関係者との打合せ会議，サイト視察
18	10	水	資料整理，建築関係データー収集
19	11	木	S.T.O.U.関係者との打合せ会議，帰国挨拶
20	12	金	JICA，日本大使館へ調査結果報告，帰国挨拶
21	13	土	バンコック発　→　香港　→　成田着

10－13　基本設計調査団訪タイ時のS.T.O.U. Counterparts および面会者リスト

S.T.O.U. Counterparts

(1)	Dr. Wichit Srisa-an	Rector
(2)	Dr. Tong-in Wangsoton	Vice-Rector for Planning and Development
(3)	Mr. Vanchai Sirichana	Vice-Rector for Operation
(4)	Dr. Chiyong Brahmavong	Director ; Office of Educational Technology
(5)	Dr. Winai Rungsinan	Director ; Office of Registration Records and Evaluation
(6)	Dr. Ongkan Indrambarya	Director ; Office of Educational Service
(7)	Dr. Wijitr Parkdiratn	Director ; Office of Academic Affairs
(8)	Dr. Nicom Tadang	Assistant Professor Faculty of Education Knonkhaen University (on secondment to STOU)
(9)	Mr. Supreecha Hirunro	Instructor and Architect School of Management Science
(10)	Mr. Chusak Siriwong	Architect, MH Planning and Development Company
(11)	Mr. Thai Tipsuwannakul	Data Information Coodinator
(12)	Mr. Krid Siraprapasiri	Secretary, Secretariat of Office of Educational Service
(13)	Miss Bussaba Bussaboon	〃 〃
(14)	Miss Niramol Numpet	〃 〃

面 会 者 リ ス ト

1. Department of Technical and Economic Cooperation (DTEC)

(1)	Dr. Apilas Ostananda	Director General
(2)	Dr. Kasem Unahasuvan	Deputy Director General
(3)	Mr. Sutin Susila	Member of DTEC
(4)	Mr. Jiroj Itharattana	Member of DTEC

2. Office of University Affairs

(1)	Dr. Kasem Suwangul	Minister

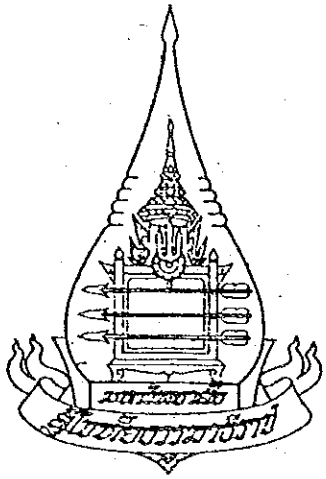
3. Public Relations Department of Prime Minister (PRD)

(1)	Mr. Danai Sri-yapai	Deputy Director General
(2)	Dr. Tawat Meksawan	Director of Technical Division
(3)	Mr. Manit Varintaravej	Director of Radio Thailand
(4)	Mr. Bang-ern Musikapongse	Director of A—V Division
(5)	Mr. Suwat Jiravej	Technician

4. Mass Communication Authority of Thailand

(1)	Mr. Somchit Nopakum	Director of Tor. Tor. Tor. Radio Station
(2)	Mr. Suwan Mettayanuvas	Director of Thai TV CH-9

10－14　基本設計現地調査時にとりかわしたMINUTES OF DISCUSSIONS



MINUTES OF DISCUSSIONS

In response to the request made by the Government of the Kingdom of Thailand for the Construction Project of Educational Broadcasting Production Center for the Sukhothai Thammathirat Open University (hereinafter referred to as "the Project"), the Government of Japan has sent, through the Japan International Co-operation Agency (hereinafter referred to as "JICA"), a team headed by Mr. Minoru ISHIDA to conduct a basic design survey for 21 days from January 24, 1982. The team had a series of discussions and exchanged views with the authorities concerned.

As the result of the study and discussions, both parties have agreed to recommend to their respective Governments to examine the results of the survey attached herewith towards the realization of the Project.

February 5, 1982

Mr. Minoru ISHIDA
Team Leader
The Japanese Survey Team

Dr. Wichit Srisa-an
Rector
Sukhothai Thammathirat Open University

M I N U T E S

1. The proposed site of the Project will be housed at STOU Headquarters on Jangwatana Road, Pakred, Nontaburi, 18 Kilometres north from Central Bangkok (hereinafter referred to as "the Project Site").

2. The object of the Project is to provide necessary building, incidental facilities and equipment for Educational Broadcasting Production Center at the Project Site (hereinafter referred to as "the Center").

3. The Japanese Survey Team will convey to the Government of Japan the desire of the Government of the Kingdom of Thailand that the former takes necessary measures to co-operate in implementing the Project and provides the building and other items listed in Annex I within the scope of Japanese economic co-operation in grant form.

4. The Government of the Kingdom of Thailand will take necessary measures, in the event that the grant assistance by the Government of Japan is extended to the Project-

   (a) to provide data and information necessary for the design and the construction of the Center.

   (b) to secure lands necessary for the construction of the Center.

   (c) to clear and level the Project Site before the start of the construction.

...../2

(d) to provide the other items listed in Annex II;

(e) to ensure prompt unloading and customs clearance in the Kingdom of Thailand of imported materials and equipment for the construction, and to facilitate their internal transport.

(f) to exempt the Japanese nationals concerned from customs duties, internal taxes and other fiscal levies imposed in for the supply of goods and services for construction.

(g) to provide and accord necessary permissions, licenses and other authorization deemed advisable for carrying out the Project.

A N N E X I

Items requested by the Government of the Kingdom of Thailand the cost of which will be borne by the Government of Japan -

1) Building for :

   (a) Radio Programme Production Studios

   (b) Television Programme Production Studios

   (c) Other Facilities related to the above Studios

2) Equipment for :

   Radio and Television Programme Production

A N N E X II

Items the cost of which will be borne by the Government of the Kingdom of Thailand

(1) Water supply mains to the Project Site.

(2) External drainage and sewage line to the Project Site.

(3) Electrical power main line to the Project Site.

(4) Telephone lines and equipment.

(5) Exterior facilities like access roads, fencing, parking and landscaping.

(6) Provision of space necessary for such constructions as temporary offices, working area, stock yards, and others.

(7) Items (1) and (3) shall be completed prior to the start of site works.

Minutes of Discussions

on

The Draft Report of the Basic Design Study on the Construction Project of Educational Broadcasting Production Center

The Government of Japan has sent, through Japan International Cooperation Agency (JICA) a Basic Design Study Team to Thailand from 23rd to 29th, May 1982 for the purpose of submitting and explaining the Draft Final Report of Basic Design Study (Report) on the construction project of Educational Broadcasting Production Center (the project)..

The team held meetings with the staffs concerned of the Sukhothai Thammathirat Open University to explain and discuss on the Report. As a result of the discussions, both parties have agreed as follows:

1. The Report principally satisfied the Thai side and appropriate alternations in design agreed during the discussions will be incorporated in the Final Report.
2. The Final report (10 copies in English) on the Project will be submitted to the Thai Government by the end of July 1982.

May 28 1982

Bangkok Thailand.

Mr. Takeshi IMAZU
Team Leader
The Japanese Survey Team

Michit Srisa-an

Dr. Wichit Srisa-an
Rector
Sukhothai Thammathirat
Open University