



PENUGASAN
No : 18-09/PM/LM/IX/2002

Ketua Program Studi Teknik Sipil, Fakultas Teknik Sipil dan Perencanaan Institut Sains dan Teknologi Nasional Jakarta menugaskan kepada :

Ir. Idrus, MSc

Staff Jurusan Teknik Sipil

Untuk melakukan pekerjaan Penyelidikan Tanah sebagai bentuk kegiatan
Pengabdian Pada Masyarakat pada :

Nama Pekerjaan : Penyelidikan Tanah Perbaikan Depo Kawasan KBN di Tanjung Priok
Lokasi : Jakarta
Pemberi Tugas : PT. Kawasan Berikat Nusantara

Dengan jadwal pelaksanaan pekerjaan selama 20 hari kerja (160 Jam), 12 hari di lapangan dan 8 hari di Laboratorium

Kepada Ir. Idrus MSc diberikan kepercayaan penuh untuk melakukan pekerjaan Pengabdian Pada Masyarakat tersebut dan bertanggung jawab atas segala sesuatu mengenai pekerjaan tersebut

Kepada pelaksana tugas ini akan diberikan honorarium sesuai dengan ketentuan yang berlaku di Laboratorium Mekanika Tanah Institut Sains dan Teknologi Nasional.

Penugasan ini berlaku sejak dikeluarkan sampai dengan berakhirnya jangka waktu penyusunan Laporan Akhir (Final Report) diterima oleh pemberi kerja dengan baik.

Jakarta, 18 September 2002
Kaprodi Teknik Sipil



Ir. Harry Hartawan MT
NIP : 01.83316

Tembusan :

1. Dekan FTSP-ISTN (sbg laporan)
2. Ka. Lab. Mekanika Tanah ISTN
3. Arsip

LEMBAR PENGESAHAN PENGABDIAN PADA MASYARAKAT



PENYELIDIKAN TANAH PERBAIKAN DEPO KAWASAN KBN
Lokasi : Tanjung Priok, Jakarta

Oleh :
Idrus Ir, M.Sc

Mengetahui :
Ketua Jurusan Teknik Sipil



Ir. Harry Hartawan, M.T

Program Studi Teknik Sipil
Institut Sain dan Teknologi Nasional
Jakarta 2002

HAZARDOUS WASTE
MANAGEMENT



The management of hazardous waste involves several key steps to ensure safety and environmental protection.

1. Identification

2. Characterization

3. Packaging

4. Storage

FINAL REPORT

SOIL INVESTIGATION

PROJECT :

PERENCANAAN PERBAIKAN

DEPO KONTAINER

LOCATION :

K.B.N TANJUNG PRIOK, JAKARTA



LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL

KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA -- JAKARTA 12640
TELPON. 021 98189554 FAX . 021 78893379



**LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL**

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TELPON. 021 98189554 FAX . 021 78893379

Jakarta , Agustus 2002

No : 30-08.1/FR/LM/VIII/2002

KEPADA YTH.

PT. KAWASAN BERIKAT NUSANTARA

Di

JAKARTA

Perihal : Laporan akhir penyelidikan tanah Perencanaan Perbaikan Depo Kontainer PT.KBN di Tanjung Priok, Jakarta

Dengan hormat,

Bersama ini kami sampaikan hasil Final Report Penyelidikan Tanah pada Proyek Perencanaan Perbaikan Depo Kontainer di Tanjung Priok, Jakarta.

Penyelidikan tanah ini terdiri dari Penyelidikan tanah di lapangan yang terdiri dari :

- 6 titik CPT / Sondir
- 3 titik bor dangkal dengan undisturbed sampling
- 2 titik Plate Bearing Test

serta penyelidikan di Laboratorium, berupa uji index properties dan mechanical properties serta Consolidion Settlement Analysis.

Hasil lengkap dalam bentuk laporan akhir dan rekomendasi penggunaan pondasi dapat dilihat dalam laporan berikut.

Atas kerjasamanya kami ucapkan terima kasih

LABORATORIUM MEKANIKA TANAH ISTN

Direktur



(Idrus Muhammad Ir. M.Sc)

Reg LPJK No: 1.2.500.2.31.09.03.000007

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ATTACHMENT

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FINAL REPORT

SOIL INVESTIGATION

Project : PROYEK PERENCANAAN PERBAIKAN DEPO KONTAINER

Location : KBN , TANJUNG PRIOK, JAKARTA UTARA

I. PENDAHULUAN

Sehubungan dengan permohonan dari PT.KAWASAN BERIKAT NUSANTARA (PT. KBN) untuk melakukan pekerjaan Penyelidikan Tanah (Soil Investigation) pada lokasi proyek Perencanaan Perbaikan Depo Kontainer di KBN Tanjung Priok, maka kami dari Laboratorium Mekanika Tanah ISTN Jakarta akan melaporkan hasil Pekerjaan tersebut dalam bentuk Final Report (Laporan Akhir).

Pekerjaan di Lapangan kami mulai pada tanggal 28 Juli 2022 sampai 6 Agustus 2022.

Pekerjaan dilapangan berupa pekerjaan :

- Shallow Bored kedalaman 6,50 meter dan Undisturbed Sampling
- CPT / Sondir kapasitas 2,5 tonf sebanyak 6 titik.
- Plate bearing Test sebanyak 2 titik

Untuk melakukan pekerjaan tersebut diatas, terlebih dahulu dilakukan pembobokan dari lapisan beton setebal 20 cm, serta lapisan basecourse 55 cm serta lapisan beton kedua setebal 15 cm. Dari contoh tanah tidak terganggu (undisturbed sample), dilakukan pengujian di Laboratorium untuk mengetahui physical dan mechanical properties dari tanah tersebut.

II. PELAKSANAAN DILAPANGAN (SITE INVESTIGATION)

Pelaksanaan penyelidikan tanah di lapangan pada proyek ini meliputi:

1. Cone Penetration Test (CPT)/ Sondir
2. Shallow Boring dan Undisturbing sample
3. Plate Bearing Test

2.1. Peralatan

1. 1 (satu) alat bor dangkal lengkap dengan auger iwan serta thin walled sampler (tabung contoh) dengan diameter 75 mm panjang 50 cm tebal tabung 2,00 mm.
2. 1 (satu) unit alat CPT/Sondir kapasitas 2,5 tonf
3. 1(satu) unit alat Plate Bearing Test lengkap dengan 2 (dua) alat pembaca beban berupa dial pressure dan Proving Ring.

2.2. Metode Pelaksanaan

Semua pelaksanaan pekerjaan dilapangan, peralaan yang digunakan , mengikuti standard American Standard for Testing Material (A.S.T.M) , dan juha mengacu kepada Standard Nasional Indonesia (SNI). Antara lain :

1. Cone Penetration Test (Sondir)

Konus yang digunakan adalah friction conus (biconus) dengan luas penampang 10 cm^2 , luas selimut geser 120 cm^2 .

Pekerjaan sondir dilakukan secara terus menerus dengan interval 20 cm kedalaman (penetrasi) sampai menunjukkan jumlah tahanan konus dan geser maksimum sebesar 250 kg/cm^2 , atau sampai kedalaman maksimum 30 meter.

Data yang disajikan dari pengujian ini adalah grafik dari nilai tahanan ujung konus (q_c) dan total friction (t_f) terhadap kedalaman, sampai dengan kedalaman maksimum dari kapasitas alat sondir (maks 30 meter).

Juga ditampilkan grafik antara kedalaman dengan ratio friction / qonus resistance (%) guna memprediksi jenis lapisan tanah yang ada.

2. Shallow Boring

Pengeboran dilaksanakan dengan rotary core drilling, dengan menggunakan mata bor iwan.

Deskripsi tanah secara visual dilakukan secara terus menerus sepanjang lubang pengeboran.

Semua contoh tanah hasil coring disimpan dalam kantong plastik tertutup, lengkap dengan keterangannya.

3. Undisturbed Sampling

Pengambilan contoh tanah tidak terganggu / asli (Undisturbed sampler) tidak dapat dilaksanakan dengan menggunakan "Shelby Type Thin Walled Tube Samplers" dan dilakukan sesuai dengan persyaratan prosedur percobaan dari ASTM D1587.

Tabung yang sudah terisi contoh tanah akan ditutup kedua ujungnya dengan campuran paraffin ditambah damar 2-3%, dimasukkan kedalam kantong plastic lengkap dengan keterangannya, kemudian disimpan dan dihindarkan dari kemungkinan terjadinya benturan-benturan atau tumbukan serta panas sinar matahari secara langsung. Kemudian contoh tanah tersebut dikirim ke laboratorium.

4. Plate Bearing Test

Pengujian Plate Bearing Test dimaksudkan untuk mengetahui kemampuan daya dukung lapisan basecourse berupa lapisan Coarse aggregate (sirtu padat) dibawah lapisan pondasi perkerasan berupa Concrete Rigid Pavement .

Pengujian ini menggunakan Steel Plate dengan diameter 30 cm yang diberikan beban secara bertahap, dan pada setiap tahapan pembebanan, beban ditahan dan dibaca penurunan Steel Plate dengan Dial Gauge Indicator sebanyak 2 (dua) unit yang dipasang pada permukaan Steel Plate.

Pertambahan pembebanan dilakukan bila penurunan steel plate sudah tidak terjadi lagi (constant).

Pembebanan maksimum diberikan sebanyak 300 % dari pembebanan yang direncanakan pada lapisan basecourse yang diuji.

Plate Bearing Test inipun bertujuan untuk mendapatkan Coefficient Subgrade Reaction (K_v) dari lapisan tanah yang diuji pada tiap pembebanan.

2.3. Jumlah dan Hasil Penyelidikan

Uji Shallow Booring sebanyak 3 (tiga) titik

No Boring	Depth (meter)	UD Sampling (Tabung)	SPT (Test)	Elevation (meter)
BH-1	-6,50	-	-	0,00
BH-2	-6,50	3	-	0,00
BH-3	-6,50	1	-	0,00

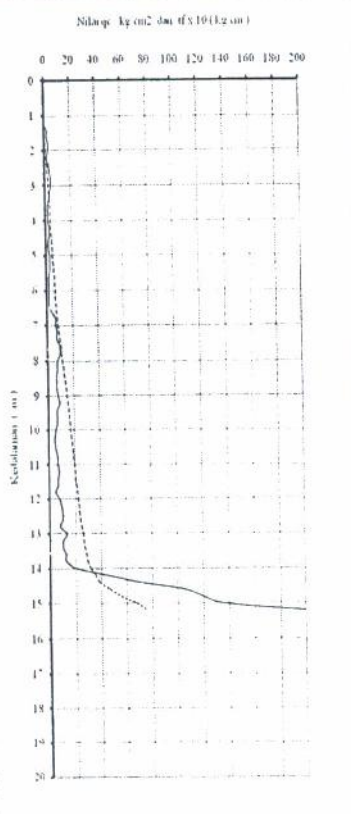
Uji CPT / Sondir sebanyak 6 (Enam) titik, yang dilakukan pada lokasi lokasi sbb :

TITIK	Kedalaman qc > 100 Kg/cm ²	Tf (Kg/cm')	Muka Air Tanah (m) dr muka tanah	Elevation (m) MSL
S-1	15,20	760	-1,00	---
S-2	15,40	681	-1,00	---
S-3	14,80	648	-1,00	---
S-4	15,20	728	-1,00	---
S-5	15,20	631	-1,00	---
S-6	15,00	828	-1,00	---

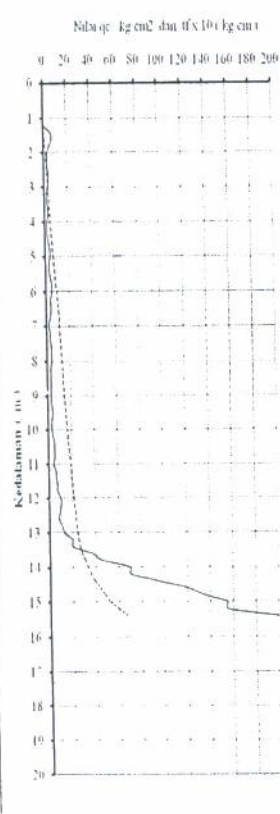
Uji Plate Bearing Test sebanyak 2 (dua) titik

No	Allowable Loading			Ultimate Loading			Loading Type
	Stress t/m ²	Sett in mm	Kv Kg/cm ³	Stress t/m ²	Sett in mm	Kv Kg/cm ³	
PBT-1	20	0,725	27,586	60	2,045	29,340	Proving Ring
PBT-2	30	2,010	14,925	90	5,500	16,364	Hyd. Press. Gauge

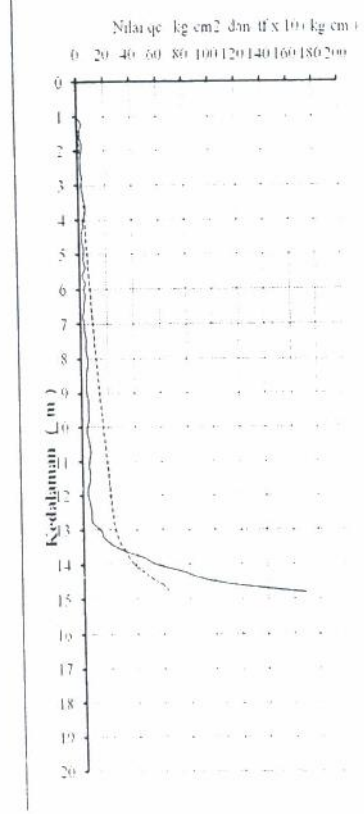
HASIL CPT: S1



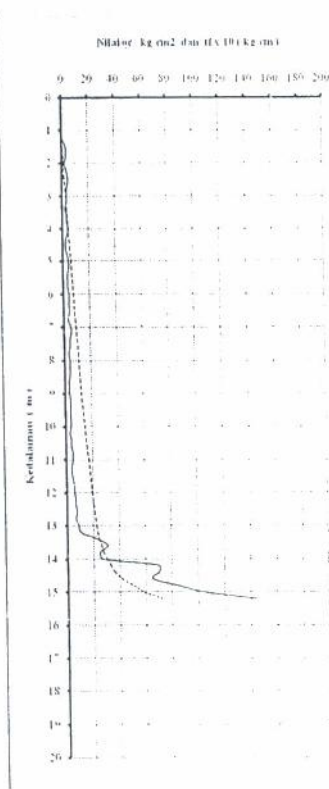
S2



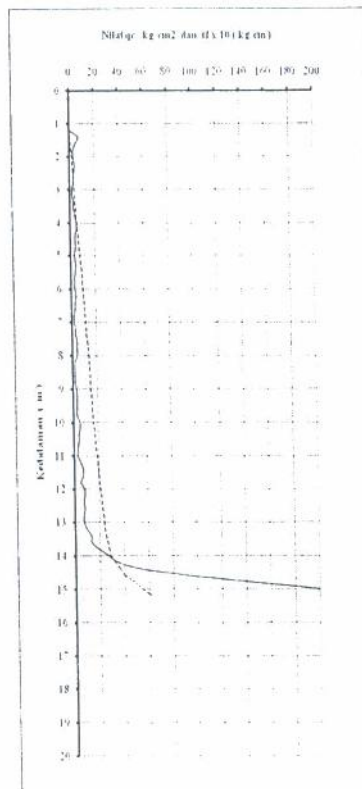
S3



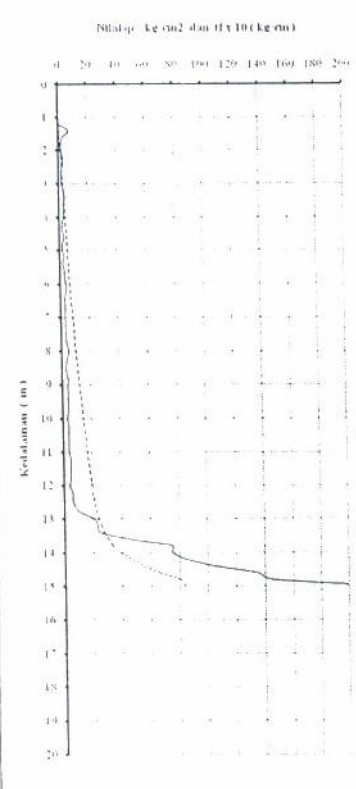
S4



S5

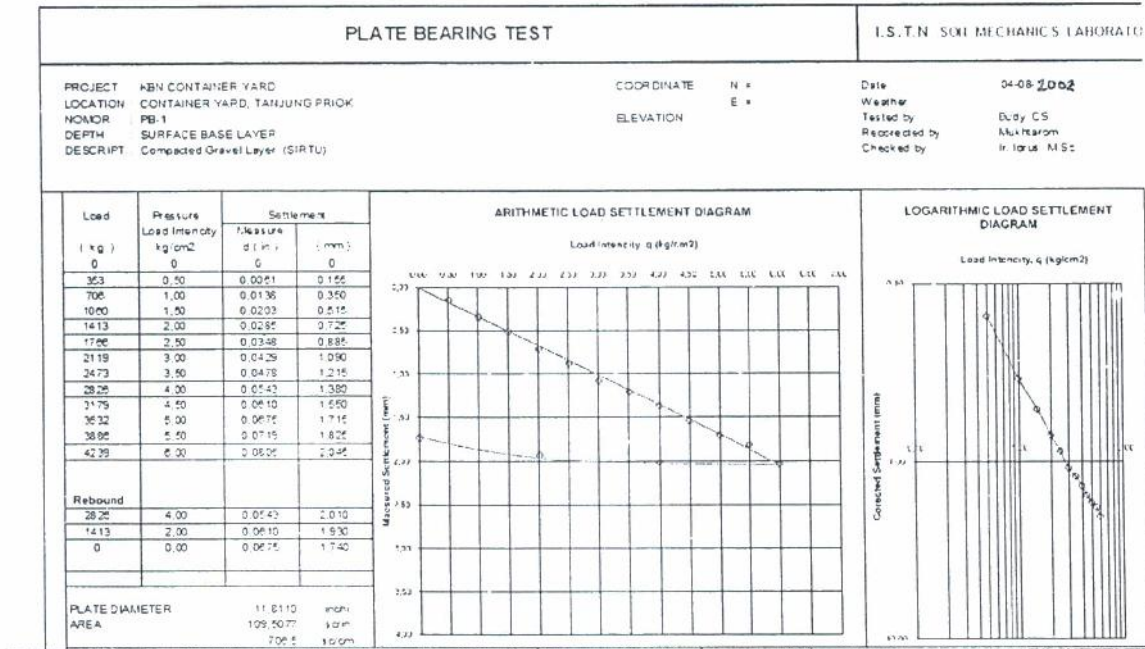


S6

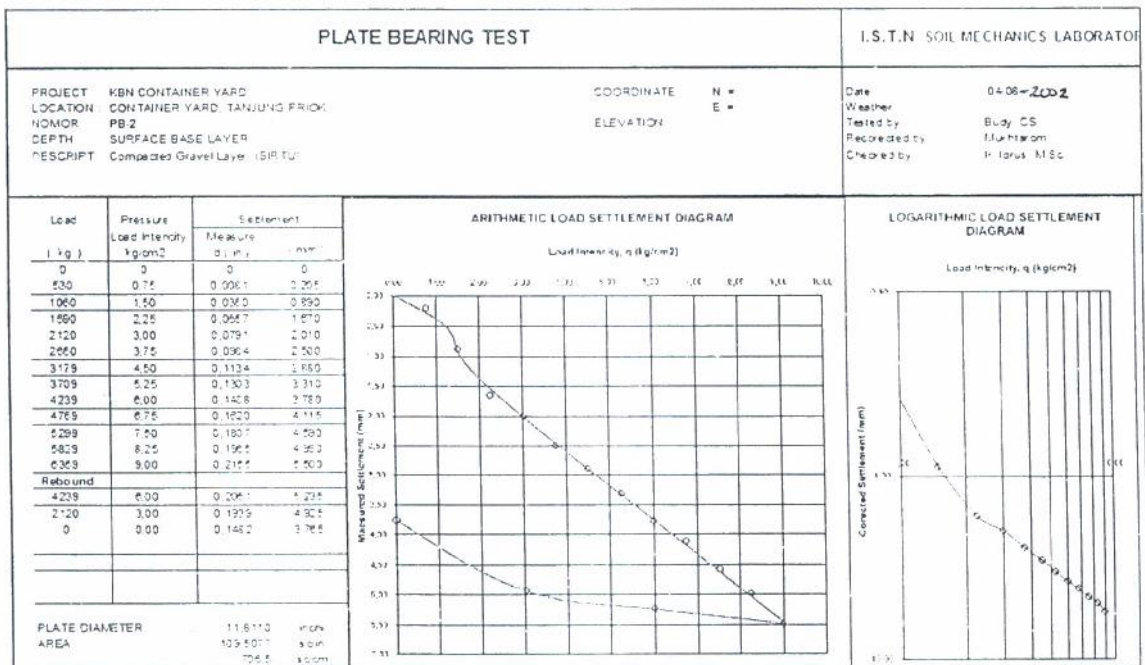


HASIL PLATE BEARING TEST :

PBT-1



PBT-2



III. PENELITIAN DI LABORATORIUM

Penelitian di laboratorium dilakukan dengan menggunakan contoh tanah tidak terganggu (undisturbed sampling) yang berasal dari Thin Walled Tube Sampler. Uji Laboratorium yang dilakukan meliputi Soil Properties yang meliputi index properties, shear strength properties dan compressibility properties.

Penelitian dari contoh tanah tidak terganggu (undisturbed sample) dilakukan dengan persyaratan prosedur dari ASTM (American Standard for Testing Material), yang meliputi

1. Penentuan Kadar Air Tanah Asli (w_n)
2. Penentuan berat isi tanah (γ)
3. Penentuan berat isi tanah kering (γ_d)
4. Penentuan berat jenis (Specific Gravity, G_s)
5. Penentuan konsistensi Tanah (Atterberg Limits)
6. Sieve Analysis dan Hydrometer Analysis (Grained size distribution)
7. Consolidation Test (Oedometer Test)
8. Shear Strength by Triaxial UU Test

Jenis dan Jumlah Pengujian di Laboratorium

JENIS PENGUJIAN	Jumlah	Sample
1. Index Properties (w_n , γ , γ_d , G_s , e , S_r, n)	4	Undisturbed
2. Grained size distribution	4	Undisturbed
3. Atterberg Limits (LL, PL, PI)	4	Undisturbed
4. Consolidation Test (C_c , C_v , C_r , P_o, P_c)	4	Undisturbed
5. Triaxial UU Test (C_u , Φ)	4	Undisturbed

IV. KESIMPULAN DAN REKOMENDASI

4.1. Kondisi Lapisan Tanah.

Pengujian pengeboran dan pengujian Sondir dilapangan yang meliputi pengujian Shallow Boring 6,50 meter sebanyak 3 titik pengujian serta hasil CPT test sebanyak 6 titik, dapat dijelaskan kondisi lapisan tanah sbb :

- Dari permukaan tanah hingga kedalaman -0,20 meter berupa lapisan perkerasan beton bertulang yang merupakan rigid pavement depo kontainer.
- Pada kedalaman -0,20 cm sampai dengan -0,75 meter berupa lapisan basecourse padat berupa sirtu dan beberapa material puin bangunan.
- Pada kedalaman -0,75 meter sampai -0,90 meter dijumpai lapisan beton perkerasan lama.
- Pada kedalaman -0,90 meter sampai dengan -2,50 meter berupa lapisan pasir jenuh berwarna hitam dengan konsistensi sangat lepas.
- Pada kedalaman -2,50 meter sampai dengan -6,00 meter dijumpai lapisan lempung kepasiran berwarna hitam dengan konsistensi sangat lunak sampai lunak.
- Pada kedalaman -6,00 meter sampai dengan -12,00 meter dijumpai lapisan lempung/lanau kepasiran berwarna abu abu kehitaman dengan konsistensi lunak.
- Pada kedalaman -12,00 meter sampai dengan kedalaman -13,00 meter konsistensi tanah sedang.
- Pada kedalaman -13,00 meter sampai dengan -14,80 meter konsistensi lapisan tanah kaku sampai sangat kaku.

- Lapisan tanah keras yang ditunjukkan dengan tahanan ujung konus > 100 kg/cm² dijumpai pada interval kedalaman antara -14,80 meter sampai dengan -15,40 meter dari permukaan tanah.
- Permukaan air tanah dijumpai pada kedalaman -1,00 meter dari permukaan tanah.

4.2. Hasil Plate Bearing Test.

Dari 2 (dua) titik pengujian plate bearing test didapat hasil sebagai berikut :

No	Allowable Loading			Ultimate Loading			Loading Type
	Stress t/m ²	Sett in mm	Kv Kg/cm ³	Stress t/m ²	Sett in mm	Kv Kg/cm ³	
PBT-1	20	0,725	27,586	60	2,045	29,340	Proving Ring
PBT-2	30	2,010	14,925	90	5,500	16,364	Hyd. Press. Gauge

- Dari uji PBT-1 dengan uji beban pada tekanan yang diizinkan sebesar 20 t/m², pada kondisi beban ultimate dengan Safety Factor =3 (SF=3) diperoleh penurunan tetap sebesar 2,045 mm, sedangkan jika beban tekanan izin bila di naikkan 30 t/m² (PBT-2) diperoleh penurunan tetap pada konsisi ultimatnya sebesar 5,500 mm.
- Ini berarti lapisan basecourse / sirtu yang diuji plate bearing test daya dukung izin tanahnya > 30 t/m², sehingga dengan beban existing yang bekerja sebesar 20 t/m², beban tersebut masih aman terhadap kemampuan lapisan basecourse memikul beban.
- Untuk perencanaan perbaikan perkerasan, maka Koefisien subgrade reaksi yang dipakai disesuaikan dengan beban maximum rencana. (4 lapis kontainer besar)

4.3. Rekomendasi Pondasi

Dari kondisi lapisan tanah seperti dijelaskan pada bab 4.1 diatas, maka dapat disarankan alternatif penggunaan pondasi jika diperlukan sebagai berikut :

Pondasi Tiang Pancang

Jika menggunakan pondasi tiang pancang, dapat dilakukan dengan ketentuan sbb :

- Kedalaman pemancangan sampai tanah keras (16,00 meter), atau maksimal penetrasi tiang pada 10 pukukan hammer terakhir adalah 1,00 cm (1 cm for the last ten blows)
- Untuk perencanaan pondasi Group Pile, jarak tiang pancang ke tiang pancang minimal 3 D, dimana D adalah dimensi tiang yang digunakan
- Kapasitas Daya dukung pondasi Pile Group harus diperhitungkan efisiensi group sesuai format/susunan group pile yang dipakai
- Kapasitas daya dukung aksial tekan yang diizinkan sbb:

P all Single Tiang Pancang untuk gaya aksial yang diizinkan (dengan final set max 1 cm)

Ukuran 20x20 cm atau 28x28x28 cm P all = 25,00 tonf

Ukuran 25x25 cm atau 32x32x32 cm P all = 30,00 tonf

Ukuran 30x30 cm P all = 50 tonf

Ukuran 35x35 cm P all = 65 tonf

Ukuran 40x40 cm P all = 80 tonf

PONDASI BORED PILE

Dapat dilakukan dengan ketentuan sbb :

- Kedalaman pengeboran > 16,00 meter, sebaiknya dilakukan uji bored dalam dengan sekaligus diuji Standard Penetration Test pada interval kedalaman -1,50 meter.
- Diameter Bored Pile minimum yang digunakan 60 cm, 80 cm atau 100 cm
- Pekerjaan pengeboran menggunakan coring atau wash boring dengan memperhatikan kebersihan lubang pengeboran sebelum pengecoran dilakukan.
- Pengecoran harus menggunakan pipa tremy.
- Pekerjaan pengeboran harus diawasi oleh seorang ahli geoteknik yang berpengalaman dan mempunyai kompetensi yang baik dalam mengawasi pekerjaan bored pile.
- Mutu concrete yang disarankan minimal $f_c' = 30$ Mpa, dengan menggunakan tulang yang mencukupi.
- Pile cap pondasi bored pile serta Tie Beam yang dipakai harus cukup kaku.
- Daya Dukung Aksial Tekan pondasi Bored Pile Tunggal, dapat dihitung dengan formula dari Reese and Wright sbb :
- **$Q_u = 7 N_b \cdot A_p + 0,32 N A_s$ (Tonf) untuk $N_b < 60$**
- **$Q_u = 400 \cdot A_p + \{0,024 (N - 53) + 17,2\} A_s$ (Tonf) untuk $N_b > 60$**

dimana :

Q_u = Daya Dukung Ultimate (tonf)

N_b = Nilai N SPT pada ujung tiang , yang dihitung dari rata-rata N_1 SPT 10 D

Diatas dasar pondasi, rata-rata N_2 SPT 4 D dibawah dasar pondasi,

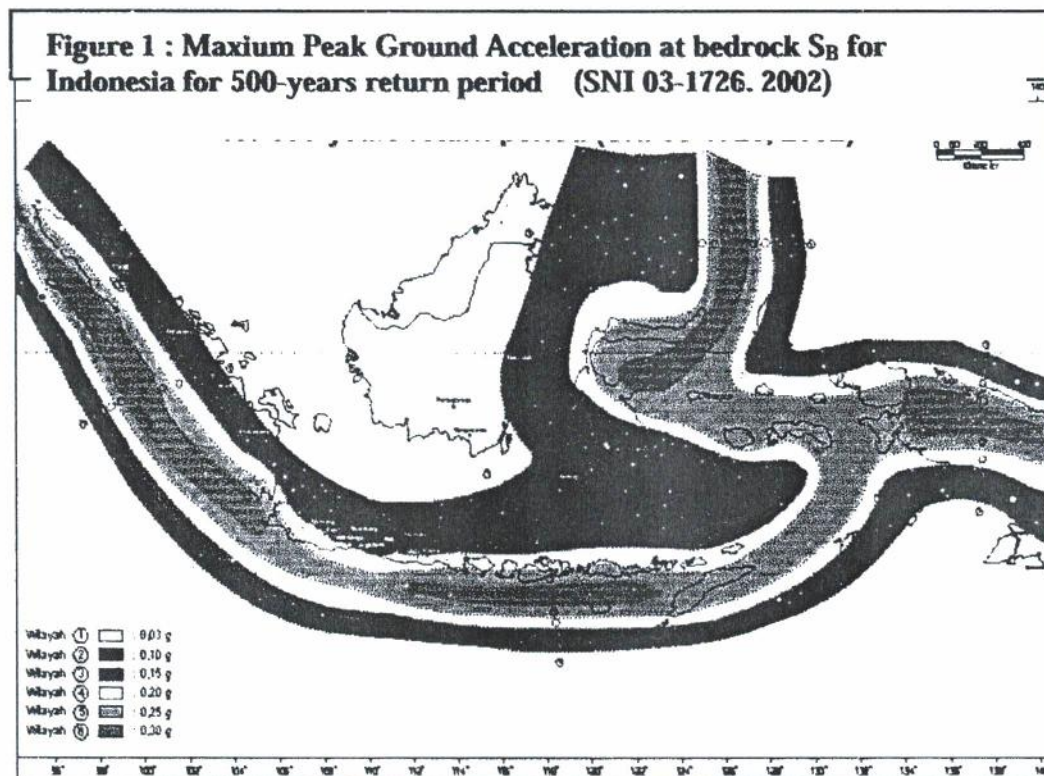
D adalah diameter pondasi Bored Pile yang dipakai.

$$N_b = \frac{1}{2} (N_1 + N_2)$$

A_p = Luas penampang Ujung Tiang (m^2)

Standar Nasional Indonesia, SNI 03-1723-2002, Tata cara perencanaan ketahanan gempa untuk bangunan gedung, BSN.

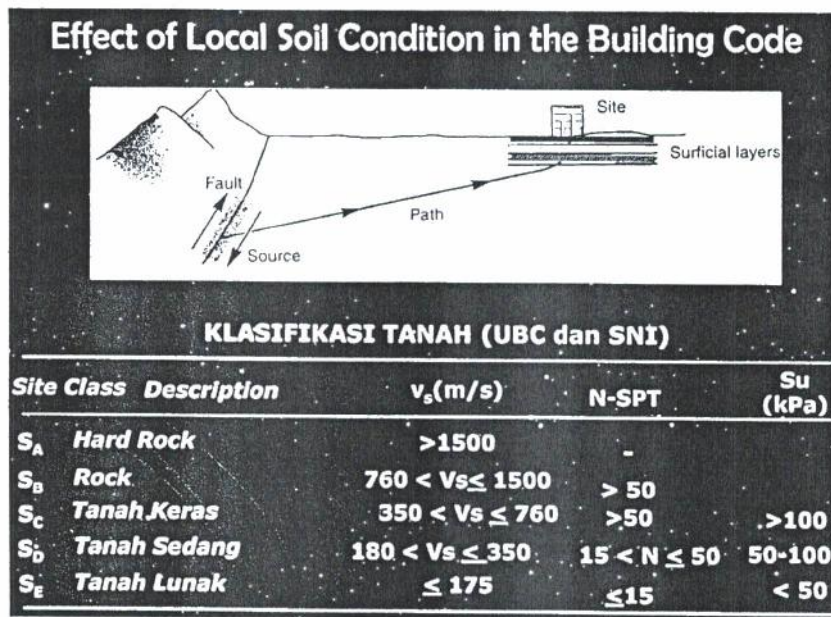
Dari standard SNI tersebut diatas , maka pada lokasi proyek tersebut termasuk Wilayah 3 dengan percepatan pada batuan dasar dibawah lokasi tersebut adalah $a = 0.15 g$ untuk periode ulang 500 tahun



4.5 Profil tanah berdasarkan The UBC 1997

Berdasarkan Building Code (UBC) 1997 Klasifikasi konsistensi tanah dibagi menjadi 6 Class sbb

Table : Soil Profile based on UBC 1997



Factor pembesaran percepatan di permukaan / dasar bangunan

Site Class	Percepatan di batuan dasar			
	$a=0,075$	$a=0,15$	$a=0,20$	$a=0,3$
	Factor Pengali di permukaan / dasar bangunan			
A Hard Rock	0,8	0,8	0,8	0,8
B Rock	1,0	1,0	1,0	1,0
C Hard Soil	1,1	1,2	1,2	1,0
D Medium Soil	1,5	1,5	1,5	1,2
E, Soft Soil	2,4	2,0	1,7	1,2

"a" max surface = factor pengali x "a" bed rock

Dari permukaan tanah sampai dengan elevasi -15,2 meter dijumpai suatu nilai tahanan ujung konus yang rata-rata kecil, sehingga dikategorikan termasuk ***tanah lunak***.

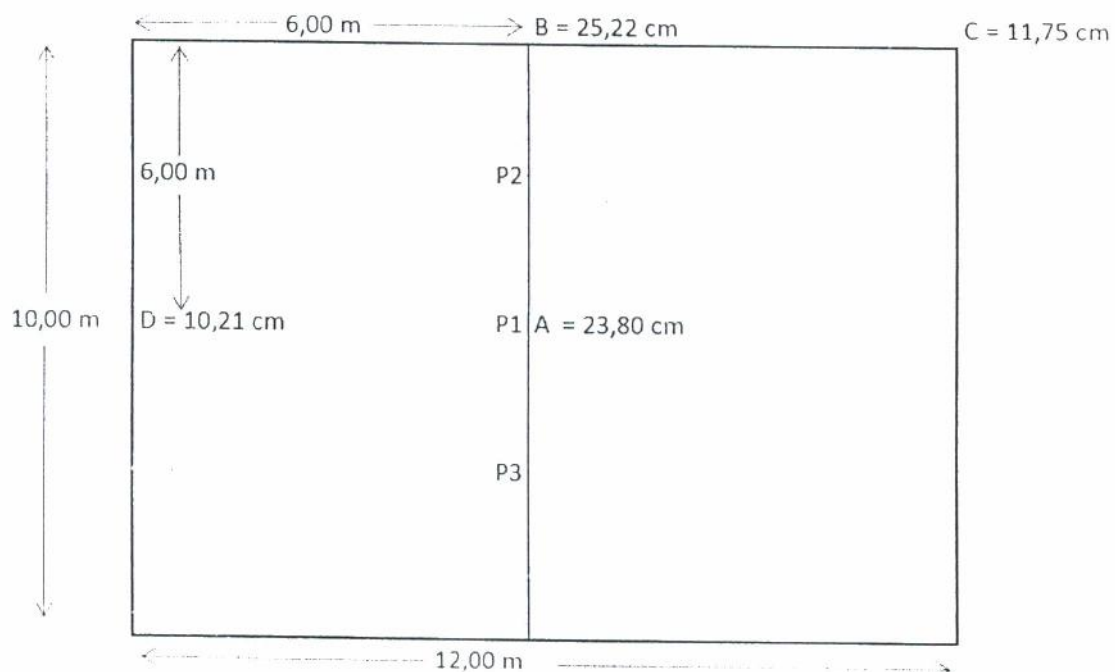
Sehingga percepatan di permukaan tanah / dasar bangunan, menjadi

$$a_{\text{surface}} = 2,0 \times 0,15 = 0,30 \text{ g}$$

4.6. Consolidation Settlement Analysis.

Perhitungan penurunan akibat proses konsolidasi di hitung pada plat beton perkerasan dengan dua kondisi, pertama dengan dimensi 4,10 m x 5,00 m serta 10,00 m x 12,00 meter.

Hasil maximum perhitungan penurunan akibat proses konsolidasi sbb :

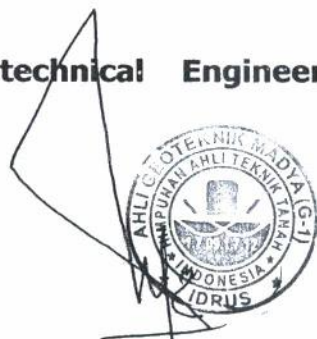


Time of Settlement for 90 % Degree of Consolidation

LAYER	h (m)	$C_v \times 10^{-3}$ cm/sec ²	t 90 year	
SOIL 2	3,5	0,36	9,15003664	
SOIL 3	6	0,32	30,2511416	
Total time of Consolidation Settlement			39,401178	years

LABORATOIUM MEKANIKA TANAH ISTN

Geotechnical Engineer



(Ir. Idrus Muhammad M.Sc)
Reg LPJK No: 1.2.500.2.31.09.03.000007

SETTLEMENT ANALYSIS

PROJECT CONTAINER YARD PT. KBN
 LOCATION TANJUNG PRIOK, JAKARTA
 DATE OF ANALYSIS August 2012

SOIL PROFILE (BH-2)

BOR LOG

PROJECT		KBN Tanjung Priok		Bored Hole No	Elevation	G.W.L	Date of Tested
LOCATION		Tanjung Priok, Jakarta Utara		BH-2	0.000	-1.00	Jul 2002
DEPTH (m)	LOG	USCS	DESCRIPTION	U.D Sample Depth(m)	N-S.P.T		
0.00			Rigid Concrete 20 cm				
	GS		Basecourse, Coarse Agregate 55 cm				
-1.00			Old Concrete layer 15 cm				
-2.00		SP	SAND, Black coloured and some white coloured Very Loose consistency	2.50-3.00			
-3.00			SANDY CLAY, Black Coloured, Very Soft Consistency Medium plasticity	4.00-4.50			
-4.00		CL					
-5.00		CL					
-6.00		CL	SANDY CLAY, Greyish Black Coloured, Very Soft Consistency	6.00-6.50			

Soil parameter

0,00 M

Concrete & Gravel

-1,00 m

SOIL 1 (SAND)

-2,50 m

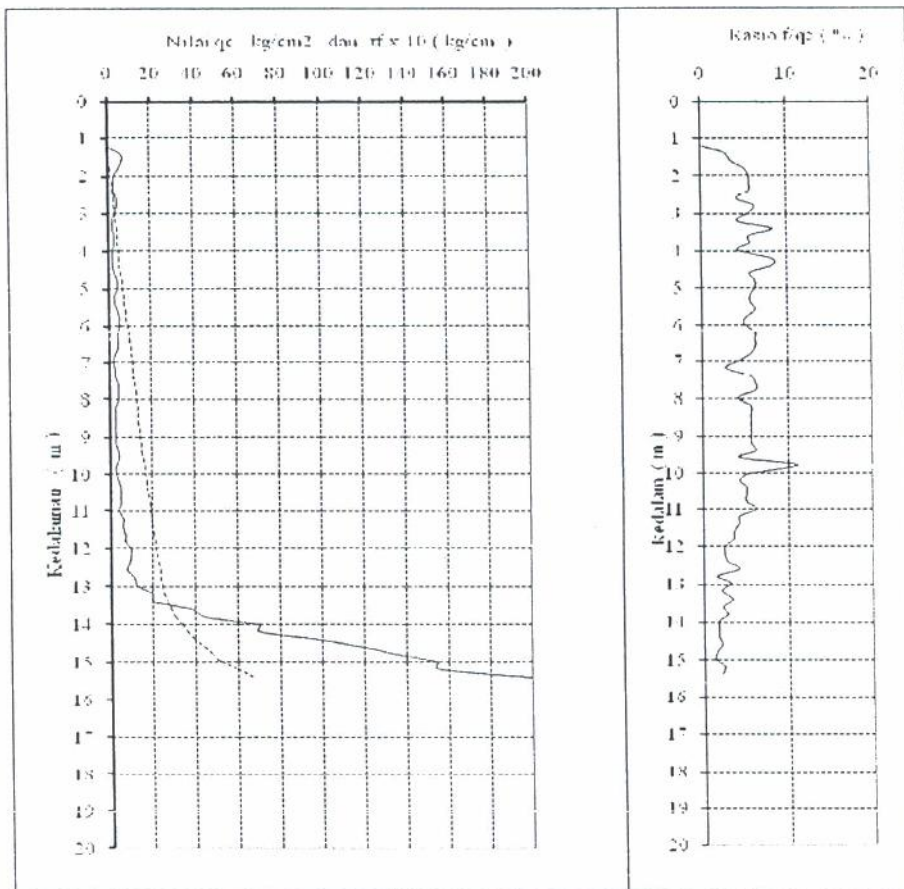
SOIL 2 (SANDY CLAY)

-6,00 m

SOIL 3 (SANDY CLAY)

-12,00 m

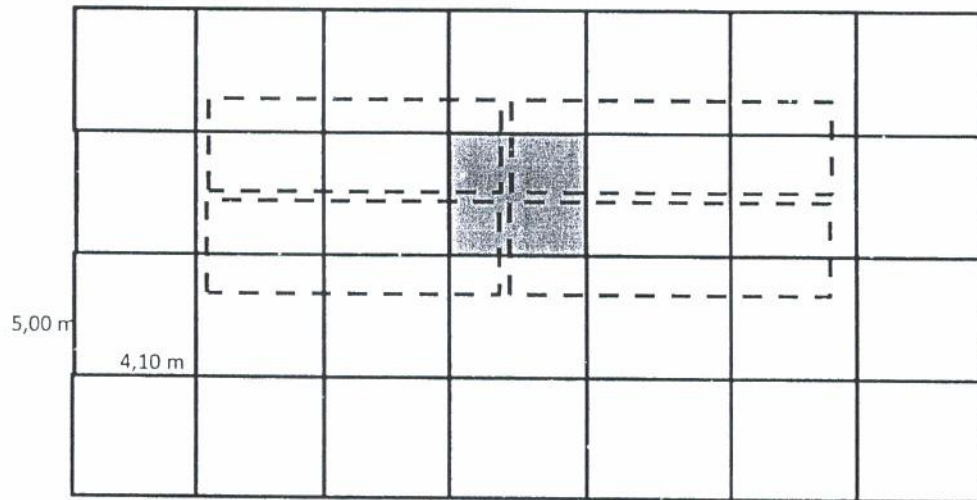
CPT DATA in S-2



SOIL PARAMETER

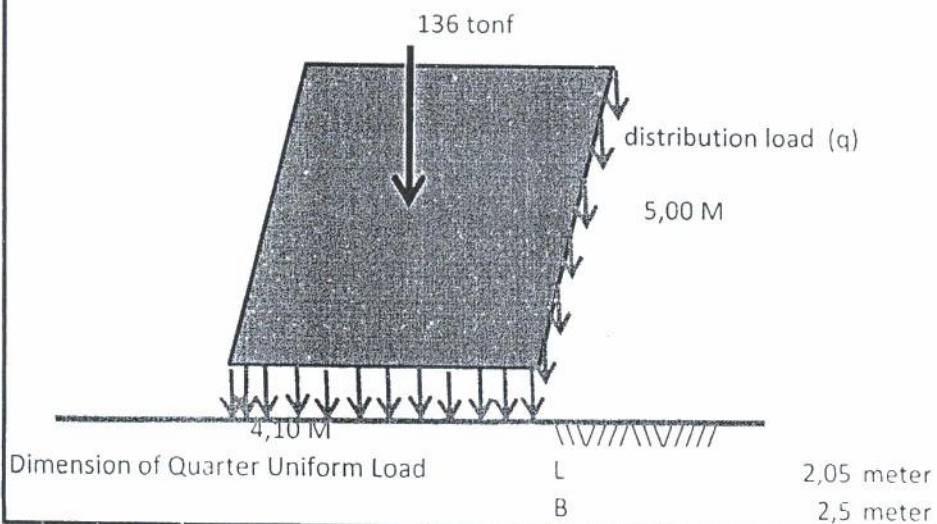
SOIL LAYER	Thickness in meter	Sat. Unit Weight t/m^3	Void ratio e_o	P_c t/m^2	C_c	C_s	C_v $\times 10^{-3}$
Concrete	0,2	2,4					
Gravel	0,8	1,9					
Soil 1 (sand)	2,6	1,87					
Soil 2 (sandy clay)	3,5	1,77	3,479	16	1,36	0,64	0,36
Soil 3 (sandy clay)	6	1,67	2,818	9,4	0,93	0,45	0,32

Working Load -1 (in square 4,10 meter by 5,00 meter)



Item of Loading	Load of Single Container in ton	Number of Container Layer	Total Load (Point load) in ton
Container	34	4	136

Item of Loading	Dimension in meter	Thickness m	Unit Weight t/m^3	Loading Pressure in m^2
Rigit pavement	4,1 by 5,0	0,2	2,4	0,48
Gravell		0,55	1,9	1,045
TOTAL UNIFORM LOAD			q	1,525



Calculation of Settlement from One-Dimensional Primary Consolidation

For normally consolidated clays that exhibit a linear e - $\log \sigma'$ relationship (Figure 7.9) (note: $\Delta\sigma = \Delta\sigma'$ at the end of consolidation),

$$\Delta e = C_c [\log(\sigma'_o + \Delta\sigma') - \log \sigma'_o] \quad (7.13)$$

where C_c = slope of the e - $\log \sigma'_o$ plot and is defined as the compression index. Substituting Eq. (7.13) into Eq. (7.12) gives

$$S_p = \frac{C_c H}{1 + e_0} \log\left(\frac{\sigma'_o + \Delta\sigma'}{\sigma'_o}\right) \quad (7.14)$$

For a thicker clay layer, a more accurate measurement of settlement can be made if the layer is divided into a number of sublayers and calculations are made for each sublayer. Thus, the total settlement for the entire layer can be given as

$$S_p = \sum \left[\frac{C_c H_i}{1 + e_{0i}} \log\left(\frac{\sigma'_{o(i)} + \Delta\sigma'_{(i)}}{\sigma'_{o(i)}}\right) \right]$$

where

H_i = thickness of sublayer i

$\sigma'_{o(i)}$ = initial average effective overburden pressure for sublayer i

$\Delta\sigma'_{(i)}$ = increase of vertical pressure for sublayer i

In overconsolidated clays (Figure 7.10), for $\sigma'_o + \Delta\sigma' \leq \sigma'_c$, field e - $\log \sigma'$ variation will be along the line cb , the slope of which will be approximately equal to the slope of the laboratory rebound curve. The slope of the rebound curve, C_s , is referred to as the *swell index*, so

$$\Delta e = C_s [\log(\sigma'_o + \Delta\sigma') - \log \sigma'_o] \quad (7.15)$$

From Eqs. (7.12) and (7.15), we have

$$S_p = \frac{C_s H}{1 + e_0} \log\left(\frac{\sigma'_o + \Delta\sigma'}{\sigma'_o}\right) \quad (7.16)$$

If $\sigma'_o + \Delta\sigma' > \sigma'_c$, then

$$S_p = \frac{C_s H}{1 + e_0} \log \frac{\sigma'_c}{\sigma'_o} + \frac{C_c H}{1 + e_0} \log\left(\frac{\sigma'_o + \Delta\sigma'}{\sigma'_c}\right) \quad (7.17)$$

However, if the e - $\log \sigma'$ curve is given, it is possible simply to pick Δe off the plot for the appropriate range of pressures. This value may be substituted into Eq. (7.12) for calculating the settlement, S_p .

DATA : BH-2

0,00 M

\\\\\\\\\\\\ Concrete & Gravel

-1,00 m

SOIL 1 (SAND)

-2,50 m

↓ Δp-2
SOIL 2 (SANDY CLAY)

Po-2 3,048045 t/m²

Pc-2 16 t/m²

eo-2 3,479

Cc-2 1,36

Cs-2 0,64

Cv-2 0,36 x10⁻³

-6,00 m

OVER CONSOLIDATED

↓ Δp-3
SOIL 3 (SANDY CLAY)

Po-3 6,967 t/m²

Pc-3 9,4 t/m²

eo-3 2,818

Cc-3 0,93

Cs-3 0,45

Cv-3 0,32

OVER CONSOLIDATED

-12,00 m

Settlement in Soil -2

Increasing stress due to Axial Load (Δp-21)

$$\Delta p-21 = \{P / (Z^2)\} I_z$$

$$I_z = 0,4244$$

$$Z = 5,35 \text{ meter}$$

$$\Delta p-21 = 2,0165394 \text{ t/m}^2$$

Increasing stress due to Uniform Load (Δp-22)

$$m \cdot Z = 2,05$$

$$m = 0,38317757$$

$$n \cdot Z = 2,5$$

$$n = 0,46728972$$

$$I_z-2 = 0,068$$

$$\Delta p-21 = 0,4148 \text{ t/m}^2$$

$$\text{Total Increasing stress due to All Load } (\Delta p-2) = 2,4313394 \text{ t/m}^2$$

Po-2 + Δp-2 5,479384 t/m²
 Soil -2 Over Consolidated, Where Po-2 + Δp-2 < Pc-2

Settlement Consolidated due to Load is $\frac{C_s H}{1 + e_{o2}} \log (P_{o-2}/P_{o-2} + \Delta p-2)$

Sc-2 Is 0,12738363 meter

Settlement in Soil -3

Increasing stress due to Axial Load (Δp-31)

Δp-31 = {P / (Z²) } I_z
 I_z = 0,4244
 Z = 9,1 meter
 Δp-31 = 0,7 t/m²

Increasing stress due to Uniform Load (Δp-32)

m. Z	2,05		
m	0,22527473		
		Iz-3	0,028
n.Z	2,5		
n	0,27472527		

Δp-32 = 0,1708 t/m²

Total Increasing stress due to All Load (Δp-3) 1,6958 t/m²

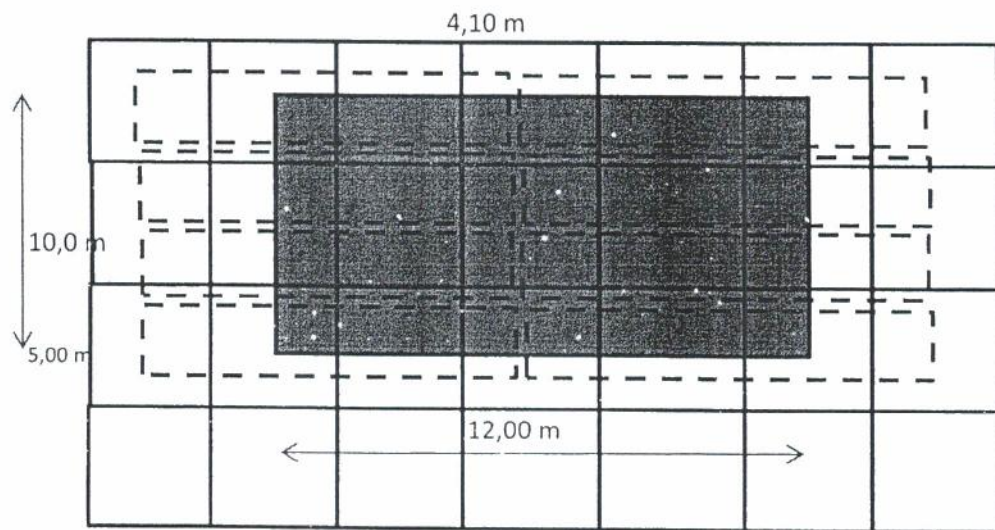
Po-3 + Δp-3 8,7 t/m²
 Soil -3 Over Consolidated, Where Po-3 + Δp-3 < Pc-3

Settlement Consolidated due to Load is $\frac{C_s H}{1 + e_{o3}} \log (P_{o-3}/P_{o-3} + \Delta p-3)$

Sc-3 Is 0,066908 meter

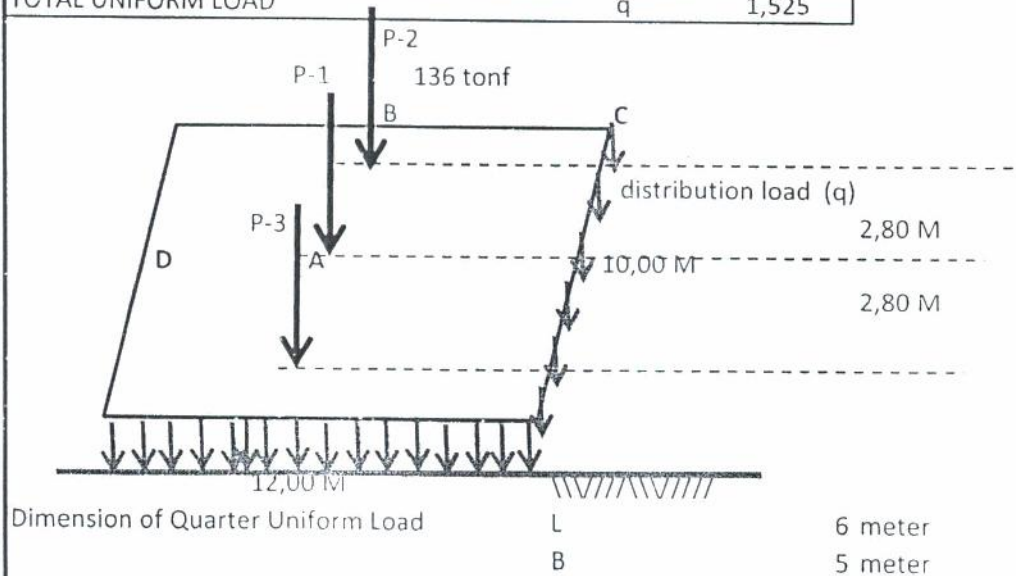
Total Settlement Is 0,194291 meter

Working Load -2 (in square 12 meter by 10,00 meter)



Item of Loading	Load of Single Container in ton	Number of Container Layer	Total Load (Point load) in ton
Container	34	4	136

Item of Loading	Dimension in meter	Thickness m	Unit Weight t/m ³	Loading Pressure in m ²
Rigit pavement	4,1 by 5,0	0,2	2,4	0,48
Grave!!		0,55	1,9	1,045
TOTAL UNIFORM LOAD			q	1,525



0,00 M
 \\\\/\\ Concrete & Gravel
 -1,00 m

SOIL 1 (SAND)

-2,50 m

↓ Δp-2
 SOIL 2 (SANDY CLAY)

Po-2 3,048045 t/m²
 Pc-2 16 t/m²
 eo-2 3,479
 Cc-2 1,36
 Cs-2 0,64
 Cv-2 0,36 x10⁻³

-6,00 m

OVER CONSOLIDATED

↓ Δp-3
 SOIL 3 (SANDY CLAY)

Po-3 6,967 t/m²
 Pc-3 9,4 t/m²
 eo-3 2,818
 Cc-3 0,93
 Cs-3 0,45
 Cv-3 0,32

OVER CONSOLIDATED

-12,00 m

Settlement in Soil -2 at Centre of Loding zone (at Point A)

Due to Axial Loading

Increasing stress due to Axial Load (Δp-21)

Due to P-1

r = 0
 r/z = 0
 Δp-21 = {P / (Z²)} I_z
 I_z = 0,4244
 Z = 5,35 meter
 Δp-21 = 2,0165394 t/m²

Due to P-2

r = 2,8
 r/z = 0,523364
 Δp-21 = {P / (Z²)} I_z
 I_z = 0,187
 Z = 5,35 meter
 Δp-21 = 0,8885317 t/m²

Due to P-3

r = 2,8
 r/z = 0,523364
 Δp-21 = {P / (Z²)} I_z
 I_z = 0,187
 Z = 5,35 meter
 Δp-21 = 0,8885317 t/m²

Total increasing Load due to Axial Load 3,7936029 t/m²

Due to Uniformed Loading

Increasing stress due to Uniform Load ($\Delta p-22$)

m. Z	6		
m	1,12149533		
		lz-2	0,194
n.Z	5		
n	0,93457944		

$$\Delta p-21 = 1,1834 \text{ t/m}^2$$

Total Increasing stress due to All Load ($\Delta p-2$) $4,9770029 \text{ t/m}^2$

$$Po-2 + \Delta p-2 = 8,025048 \text{ t/m}^2$$

Soil -2 Over Consolidated, Where $Po-2 + \Delta p-2 < Pc-2$

Settlement Consolidated due to Point Load is

$$\frac{Cs H}{1 + eo2} \log (Po-2/Po-2 + \Delta p-2)$$

$$Sc-2 \text{ Is } = 0,21026006 \text{ meter}$$

Settlement in Soil -3 at Centre of Loding zone (at Point A)

Due to Axial Loading

Increasing stress due to Axial Load ($\Delta p-31$)

Due to P-1

r =	0	$\Delta p-31 =$	$\{P / (Z^2)\} I_2$
r / z	0	$I_2 =$	0,4244
		Z =	9,1 meter
		$\Delta p-31 =$	0,7 t/m^2

Due to P-2

r =	2,8	$\Delta p-21 =$	$\{P / (Z^2)\} I_2$
r / z =	0,307692	$I_2 =$	0,303
		Z =	9,1 meter
		$\Delta p-21 =$	0,4976211 t/m^2

Due to P-3

r =	2,8	$\Delta p-21 =$	$\{P / (Z^2)\} I_2$
r / z =	0,307692	$I_2 =$	0,303
		Z =	9,1 meter
		$\Delta p-21 =$	0,4976211 t/m^2

Total increasing Load due to Axial Load $1,6922401 \text{ t/m}^2$

Due to Uniformed Loading

Increasing stress due to Uniform Load ($\Delta p-32$)

m. Z	6		
m	0,65934066	lz-3	0,108
n. Z	5		
n	0,54945055		

$\Delta p-32 = 0,6588 \text{ t/m}^2$

Total Increasing stress due to All Load ($\Delta p-3$) $0,6588 \text{ t/m}^2$

$Po-3 + \Delta p-3 = 7,6 \text{ t/m}^2$

Soil -3 Over Consolidated, Where $Po-3 + \Delta p-3 < Pc-3$

Settlement Consolidated due to Uniformed Load is

$$\frac{Cs H}{1 + eo3} \log (Po-3/Po-3 + \Delta p-3)$$

Sc-3 Is $0,027749 \text{ meter}$

Total Settlement in A zone Is $0,2380 \text{ meter}$

Settlement in Soil -2 at Centre of Loding zone (at Point B)

Due to Axial Loading

Increasing stress due to Axial Load ($\Delta p-21$)

Due to P-1 P

r = 2,8 $\Delta p-21 = \{P / (Z^2)\} I_2$
 r / z = 0,523364 $I_2 = 0,1875$
 Z = 5,35 meter
 $\Delta p-21 = 0,8909075 \text{ t/m}^2$

Due to P-2

r = 0 $\Delta p-21 = \{P / (Z^2)\} I_2$
 r / z = 0 $I_2 = 0,4244$
 Z = 5,35 meter
 $\Delta p-21 = 2,0165394 \text{ t/m}^2$

Due to P-3

r = 5,6 $\Delta p-21 = \{P / (Z^2)\} I_2$
 r / z = 1,046729 $I_2 = 0,057$
 Z = 5,35 meter
 $\Delta p-21 = 0,2708359 \text{ t/m}^2$

Total increasing Load due to Axial Load $3,1782828 \text{ t/m}^2$

Due to Uniformed Loading

Increasing stress due to Uniform Load ($\Delta p-22$)

m. Z	6		
m	1,12149533		
		lz-2	0,234
n.Z	10		
n	1,86915888		

$$\Delta p-21 = 0,7137 \text{ t/m}^2$$

Total Increasing stress due to All Load ($\Delta p-2$) **3,8919828 t/m²**

$$P_o-2 + \Delta p-2 = 6,940028 \text{ t/m}^2$$

Soil -2 Over Consolidated, Where $P_o-2 + \Delta p-2 < P_c-2$

Settlement Consolidated due to Point Load is

$$\frac{C_s H}{1 + e_o} \log \left(\frac{P_o-2}{P_o-2 + \Delta p-2} \right)$$

$$S_c-2 \text{ Is } 0,17870981 \text{ meter}$$

Settlement in Soil -3 at Centre of Loding zone (at Point B)

Due to Axial Loading

Increasing stress due to Axial Load ($\Delta p-31$)

Due to P-1

r =	2,8	$\Delta p-31 =$	$\{P / (Z^2)\} I_z$
r / z =	0,307692	$I_z =$	0,3029
		Z =	9,1 meter
		$\Delta p-31 =$	0,5 t/m ²

Due to P-2

r =	0	$\Delta p-21 =$	$\{P / (Z^2)\} I_z$
r / z =	0	$I_z =$	0,4244
		Z =	9,1 meter
		$\Delta p-21 =$	0,6969979 t/m ²

Due to P-3

r =	5,6	$\Delta p-21 =$	$\{P / (Z^2)\} I_z$
r / z =	0,615385	$I_z =$	0,1455
		Z =	9,1 meter
		$\Delta p-21 =$	0,2389566 t/m ²

Total increasing Load due to Axial Load **1,4334114 t/m²**

Due to Uniformed Loading

Increasing stress due to Uniform Load (Δp_{-32})

m.Z 6

m 0,65934066

lz-3 0,148

n.Z 10

n 1,0989011

$\Delta p_{-32} = 0,4514 \text{ t/m}^2$

Total Increasing stress due to All Load (Δp_{-3}) 1,8848114 t/m²

Po-3 + Δp_{-3} 8,9 t/m²

Soil -3 Over Consolidated, Where Po-3 + Δp_{-3} < Pc-3

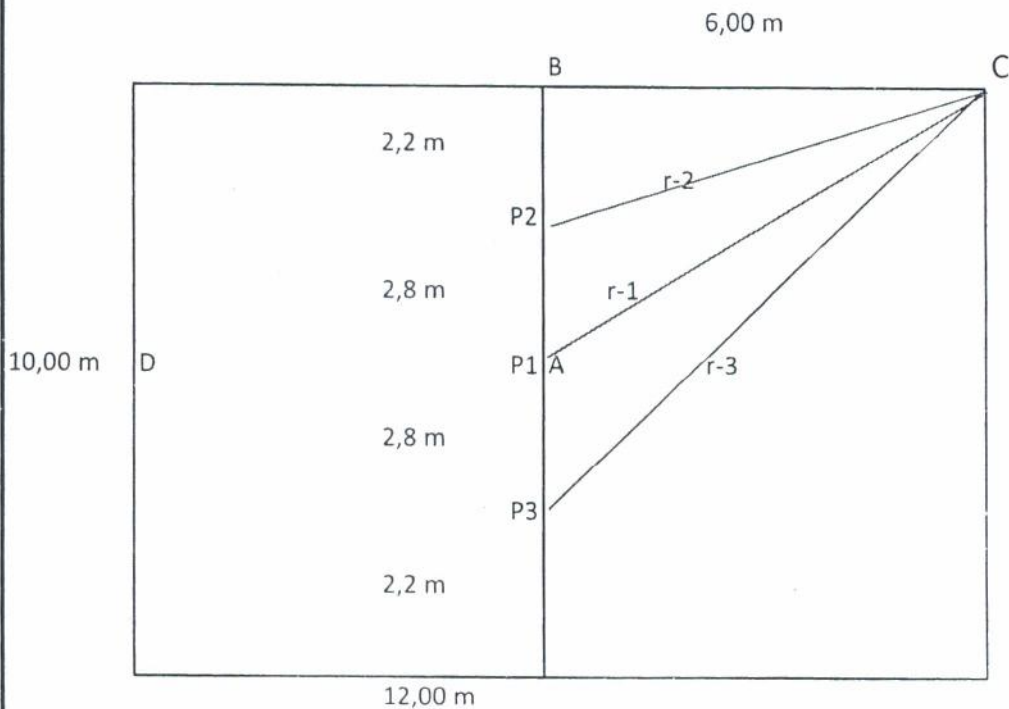
Settlement Consolidated due to Uniformed Load is

$$\frac{C_s H}{1 + e_{o3}} \log (P_{o-3}/P_{o-3} + \Delta p_{-3})$$

Sc-3 Is 0,073537 meter

Total Settlement in B zone Is 0,2522 meter

Settlement in Soil -2 at Centre of Loading zone (at Point C)



r-1	7,81025 meter
r-2	6,390618 meter
r-3	9,840732 meter

Due to Axial Loading

Increasing stress due to Axial Load ($\Delta p-21$)

		Due to P-1	P	136 ton
r =	7,81025	$\Delta p-21 =$	$\{P / (Z^2)\} I_2$	
r / z =	1,45986	$I_2 =$	0,0259	
		Z =	5,35 meter	
		$\Delta p-21 =$	0,123064 t/m ²	
		Due to P-2		
r =	6,390618	$\Delta p-21 =$	$\{P / (Z^2)\} I_2$	
r / z =	1,194508	$I_2 =$	0,0459	
		Z =	5,35 meter	
		$\Delta p-21 =$	0,2180942 t/m ²	
		Due to P-3		
r =	9,840732	$\Delta p-21 =$	$\{P / (Z^2)\} I_2$	
r / z =	1,839389	$I_2 =$	0,0134	
		Z =	5,35 meter	
		$\Delta p-21 =$	0,0636702 t/m ²	
Total increasing Load due to Axial Load			0,4048284 t/m²	

Due to Uniformed Loading_Increasing stress due to Uniform Load ($\Delta p-22$)

m. Z	12		
m	2,24299065		
		lz-2	0,234
n.Z	10		
n	1,86915888		

$$\Delta p-21 = 0,35685 \text{ t/m}^2$$

Total Increasing stress due to All Load ($\Delta p-2$) **0,7616784 t/m²**

$$P_o-2 + \Delta p-2 = 3,809723 \text{ t/m}^2$$

Soil -2 Over Consolidated, Where $P_o-2 + \Delta p-2 < P_c-2$

Settlement Consolidated due to Point Load is

$$\frac{C_s H}{1 + e_{o2}} \log (P_o-2 / P_o-2 + \Delta p-2)$$

$$S_c-2 \text{ Is } = 0,04844685 \text{ meter}$$

Settlement in Soil -3 at Centre of Loding zone (at Point C)**Due to Axial Loading**Increasing stress due to Axial Load ($\Delta p-31$)

Due to P-1

r =	7,81025	$\Delta p-31 =$	$\{P / (Z^2)\} I_2$
r / z =	0,858269	$I_2 =$	0,3
		Z =	9,1 meter
		$\Delta p-31 =$	0,5 t/m ²

Due to P-2

r =	6,390618	$\Delta p-21 =$	$\{P / (Z^2)\} I_2$
r / z =	0,702266	$I_2 =$	0,4244
		Z =	9,1 meter
		$\Delta p-21 =$	0,6969979 t/m ²

Due to P-3

r =	9,840732	$\Delta p-21 =$	$\{P / (Z^2)\} I_2$
r / z =	1,081399	$I_2 =$	0,15
		Z =	9,1 meter
		$\Delta p-21 =$	0,2463471 t/m ²

Total increasing Load due to Axial Load **1,4360391 t/m²**

Due to Uniformed Loading

Increasing stress due to Uniform Load ($\Delta p-32$)

m. Z	12		
m	1,31868132		
		lz-3	0,21
n.Z	10		
n	1,0989011		

$$\Delta p-32 = 0,32025 \text{ t/m}^2$$

Total Increasing stress due to All Load ($\Delta p-3$) **1,7562891 t/m²**

Po-3 + $\Delta p-3$

$$8,7 \text{ t/m}^2$$

Soil -3

Over Consolidated, Where $Po-3 + \Delta p-3 < Pc-3$

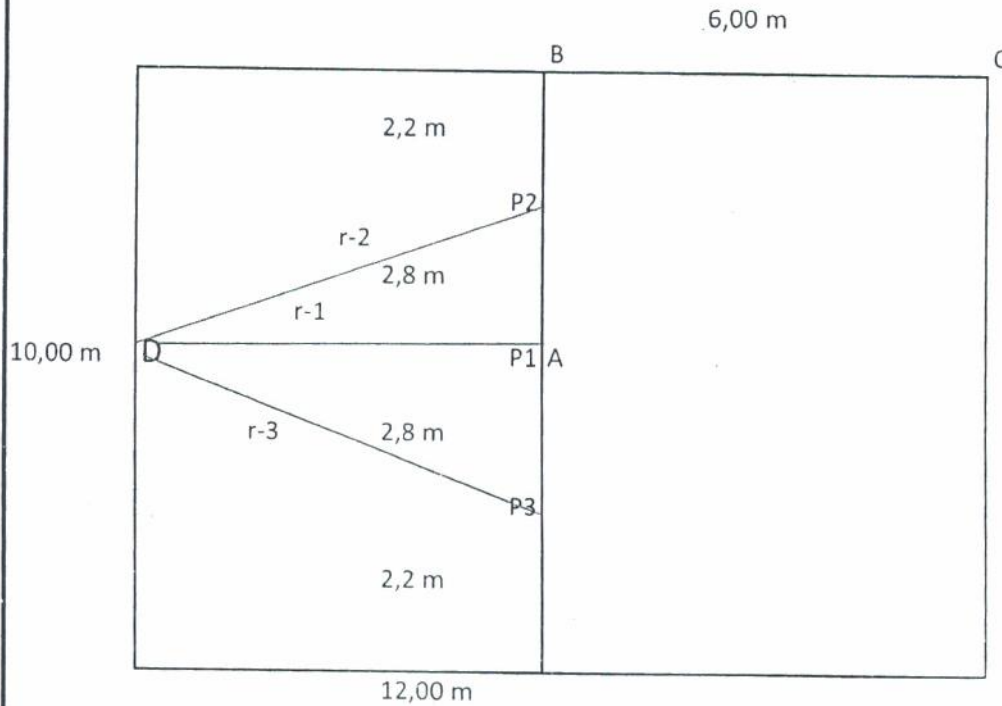
Settlement Consolidated due to Uniformed Load is

$$\frac{C_s H}{1 + e_{o3}} \log (Po-3/Po-3 + \Delta p-3)$$

$$Sc-3 \text{ Is } 0,069045 \text{ meter}$$

Total Settlement in C zone Is 0,1175 meter

Settlement in Soil -2 at Centre of Loading zone (at Point D)



r-1	6 meter
r-2	6,621178 meter
r-3	6,621178 meter

Due to Axial Loading

Increasing stress due to Axial Load ($\Delta p-21$)

		Due to P-1	P	136 ton
r =	6	$\Delta p-21 =$	$\{P / (Z^2)\} I_2$	
r/z =	1,121495	$I_2 =$	0,0513	
		Z =	5,35 meter	
		$\Delta p-21 =$	0,2437523 t/m ²	
		Due to P-2		
r =	6,621178	$\Delta p-21 =$	$\{P / (Z^2)\} I_2$	
r/z =	1,237603	$I_2 =$	0,0426	
		Z =	5,35 meter	
		$\Delta p-21 =$	0,2024142 t/m ²	
		Due to P-3		
r =	6,621178	$\Delta p-21 =$	$\{P / (Z^2)\} I_2$	
r/z =	1,237603	$I_2 =$	0,0426	
		Z =	5,35 meter	
		$\Delta p-21 =$	0,2024142 t/m ²	
Total increasing Load due to Axial Load			0,6485807 t/m²	

Due to Uniformed Loading

Increasing stress due to Uniform Load ($\Delta p-22$)

m. Z	12		
m	2,24299065		
		lz-2	0,196
n.Z	5		
n	0,93457944		

$$\Delta p-21 = 0,2989 \text{ t/m}^2$$

Total Increasing stress due to All Load ($\Delta p-2$) **0,9474807 t/m²**

$$P_o-2 + \Delta p-2 = 3,995526 \text{ t/m}^2$$

Soil -2 Over Consolidated, Where $P_o-2 + \Delta p-2 < P_c-2$

Settlement Consolidated due to Point Load is

$$\frac{C_s H}{1 + e_{o2}} \log (P_o-2 / P_o-2 + \Delta p-2)$$

$$S_c-2 \text{ Is } = 0,0587894 \text{ meter}$$

Settlement in Soil -3 at Centre of Loding zone (at Point D)

Due to Axial Loading

Increasing stress due to Axial Load ($\Delta p-31$)

Due to P-1

r =	6	$\Delta p-31 =$	$\{P / (Z^2)\} I_2$
r / z	0,659341	$I_2 =$	0,135
		Z =	9,1 meter
		$\Delta p-31 =$	0,2 t/m ²

Due to P-2

r =	6,621178	$\Delta p-21 =$	$\{P / (Z^2)\} I_2$
r / z =	0,727602	$I_2 =$	0,1142
		Z =	9,1 meter
		$\Delta p-21 =$	0,1875522 t/m ²

Due to P-3

r =	6,621178	$\Delta p-21 =$	$\{P / (Z^2)\} I_2$
r / z =	0,727602	$I_2 =$	0,1142
		Z =	9,1 meter
		$\Delta p-21 =$	0,1875522 t/m ²

Total increasing Load due to Axial Load **0,5968168 t/m²**

Due to Uniformed Loading

Increasing stress due to Uniform Load ($\Delta p-3$)

m. Z	5		
m	0,54945055	lz-3	0,15
n.Z	12		
n	1,31868132		

$$\Delta p-3 = 0,4575 \text{ t/m}^2$$

Total Increasing stress due to All Load ($\Delta p-3$) **1,0543168 t/m²**

Po-3 + $\Delta p-3$

$$8,0 \text{ t/m}^2$$

Soil -3

Over Consolidated, Where Po-3 + $\Delta p-3 < Pc-3$

Settlement Consolidated due to Uniformed Load is

$$\frac{C_s H}{1 + e_{o3}} \log (P_{o-3}/P_{o-3} + \Delta p-3)$$

$$S_{c-3} \text{ Is } 0,043279 \text{ meter}$$

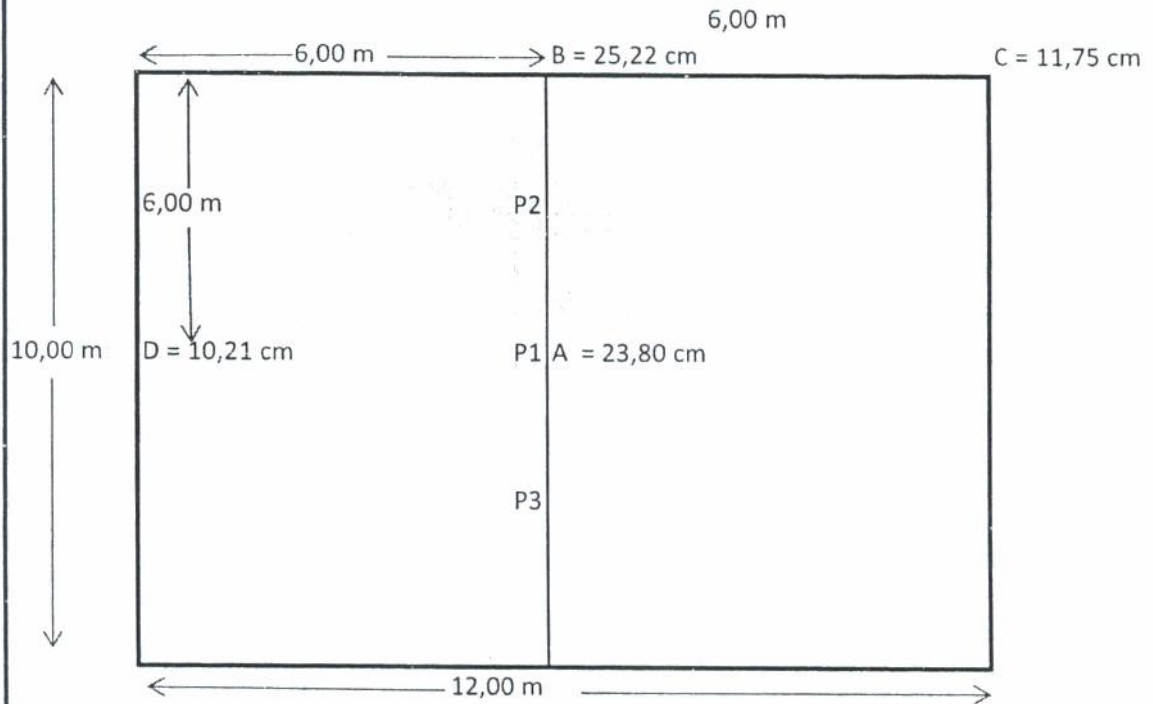
Total Settlement in C zone Is 0,1021 meter

TIME OF SETTLEMENT

LAYER	h (m)	$C_v \times 10^{-3}$ cm/sec ²	t 90 year	
SOIL 2	3,5	0,36	9,15003664	
SOIL 3	6	0,32	30,2511416	
Total time of Consolidation Settlement			39,4011782	years

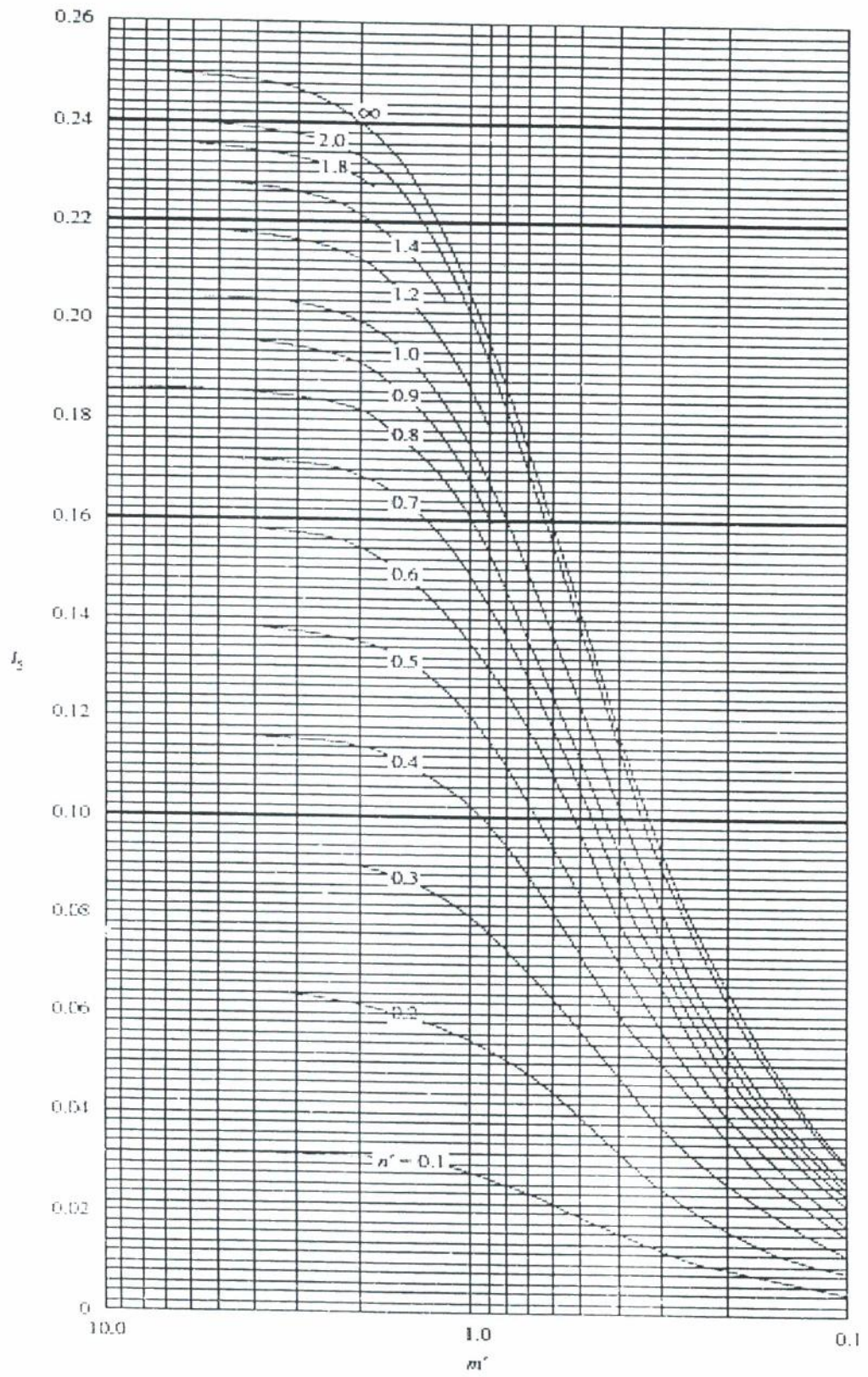
SUMMARY SETTLEMENT ANALYSIS

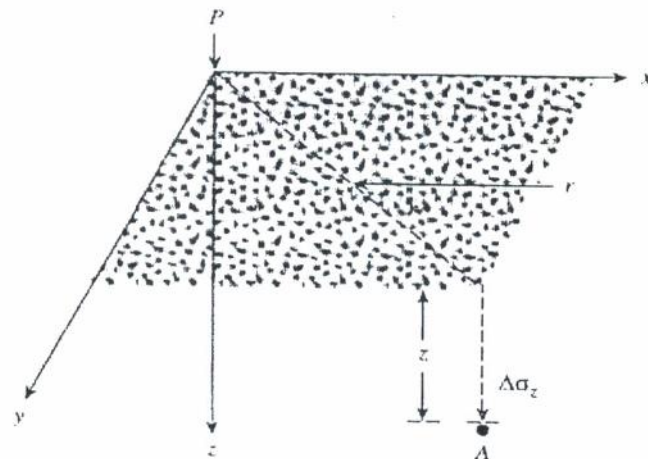
Dimension area 10 m by 12 m



Time of Settlement for 90 % Degree of Consolidation

LAYER	h (m)	$C_v \times 10^{-3}$ cm/sec ²	t 90 year	
SOIL 2	3,5	0,36	9,15003664	
SOIL 3	6	0,32	30,2511416	
Total time of Consolidation Settlement				39,401178 years





(b)

Figure 6.12 Westergaard's solution for vertical stress due to a point load

Equation (6.22) can be rewritten as

$$\Delta\sigma_z = \left(\frac{P}{z^2}\right) I_2$$

where

$$I_2 = \frac{1}{2\pi\eta^2} \left[\left(\frac{r}{\eta z}\right)^2 + 1 \right]^{-3/2}$$

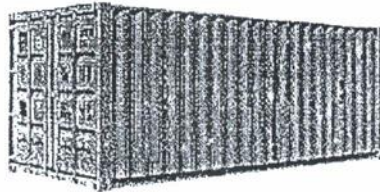
6.8 Vertical Stress Caused by a Line

Table 6.3 Variation of I_2 [Eq. (6.25)].

r/z	I_2		
	$\mu_s = 0$	$\mu_s = 0.2$	$\mu_s = 0.4$
0	0.3183	0.4244	0.9550
0.1	0.3090	0.4080	0.8750
0.2	0.2836	0.3646	0.6916
0.3	0.2483	0.3074	0.4997
0.4	0.2099	0.2491	0.3480
0.5	0.1733	0.1973	0.2416
0.6	0.1411	0.1547	0.1700
0.7	0.1143	0.1212	0.1221
0.8	0.0925	0.0953	0.0897
0.9	0.0751	0.0756	0.0673
1.0	0.0613	0.0605	0.0516
1.5	0.0247	0.0229	0.0173
2.0	0.0118	0.0107	0.0076
2.5	0.0064	0.0057	0.0040
3.0	0.0038	0.0034	0.0023
4.0	0.0017	0.0015	0.0010
5.0	0.0009	0.0008	0.0005

Ocean Container Dimensions

STANDARD 20'



INSIDE LENGTH	19'4"	5.89 m
INSIDE WIDTH	7'8"	2.33 m
INSIDE HEIGHT	7'10"	2.38 m
DOOR WIDTH	7'8"	2.33 m
DOOR HEIGHT	7'6"	2.28 m
CAPACITY	1,172 ft ³	33.18 m ³
TARE WEIGHT	4,916 lb	2,229 kg
MAX. CARGO	47,999 lb	21,727 kg

STANDARD 40'

HIGH CUBE 40'

INSIDE LENGTH	39'5"	12.01 m	39'5"	12.01 m
INSIDE WIDTH	7'8"	2.33 m	7'8"	2.33 m
INSIDE HEIGHT	7'10"	2.38 m	8'10"	2.69 m
DOOR WIDTH	7'8"	2.33 m	7'8"	2.33 m
DOOR HEIGHT	7'6"	2.28 m	8'5"	2.56 m
CAPACITY	2,390 ft ³	67.67 m ³	2,694 ft ³	76.28 m ³
TARE WEIGHT	8,160 lb	3,701 kg	8,750 lb	3,968 kg
MAX. CARGO	59,040 lb	26,780 kg	58,450 lb	26,512 kg

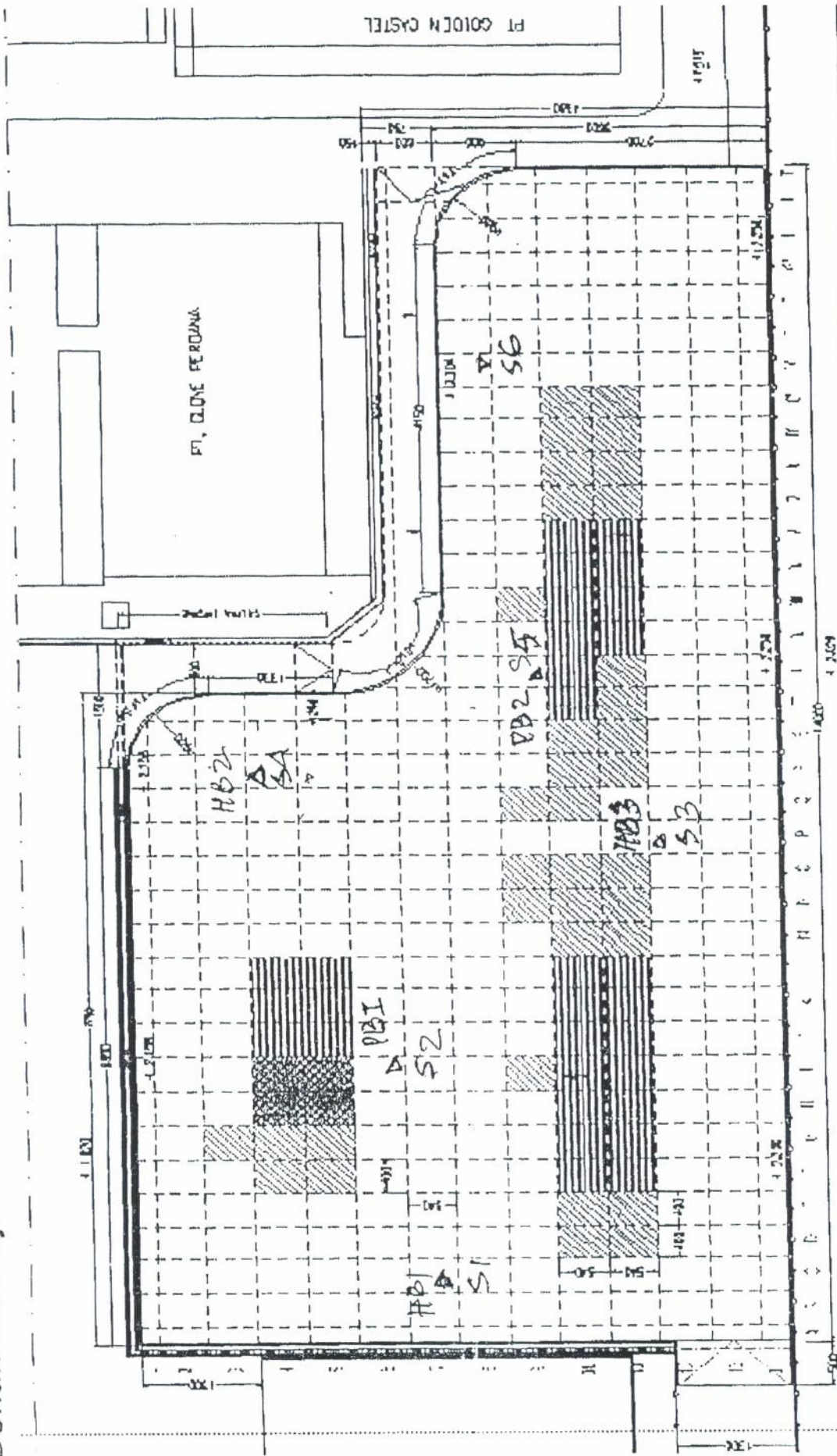
ISTN Soil Mechanics Laboratory

ATTACHMENT

ISTN Soil Mechanics Laboratory

DENAH LAY-OUT

Denah Titik Uji



- ▲ Titik Sondir 6 titik
- Titik Bor Dangkal 3 titik

ISTN Soil Mechanics Laboratory

BOR LOG

BOR LOG

PROJECT		KBN Tanjung Priok		Bored Hole No: HB-1	Elevation 0.000	G.W.L -1,00	Date of Tested Jul 2002
LOCATION		Tanjung Priok, Jakarta Utara					
DEPTH (m)	LOG	USCS	DESCRIPTION	U.D Sample Depth(m)	N-S.P.T		
						0,00	
	GS		Basecourse , Coarse Agregate 55 cm				
-1.00			Old Concrete layer 15 cm				
-2.00	.....	SP	SAND, Grey coloured and some white coloured Very Loose consistensy			
-3.00	.....					
-4.00	.....					
-5.00	.....///	SM	SILTY SAND, Black Coloured, Soft consistency Medium plasticity			
-6.00	////////	CH	CLAY, Greenish Dark Grey Coloured, Very Soft consistency				
			End of Boring				

REMARKS :

////////	Clay
\\\\\\\\	Silt
.....	Sand
ooo	Gravel
vvvv	Organic matter

BOR LOG

PROJECT		KBN Tanjung Priok		Bored Hole No: HB-2	Elevation 0.000	G.W.L. -1,00	Date of Tested Jul 2002
LOCATION		Tanjung Priok, Jakarta Utara					
DEPTH (m)	LOG	USCS	DESCRIPTION	U.D Sample Depth(m)	N-S.P.T		
0,00			Rigid Concrete 20 cm				
	GS		Basecourse , Coarse Agregate 55 cm				
-1,00			Old Concrete layer 15 cm				
-2,00	.....	SP	SAND,Black coloured and some white coloured Very Loose consistensy	2.50-3.00			
-3,00	|||||	CL	SANDY CLAY , Black Coloured, Very Soft Consistency Medium plasticity	4.00-4.50			
-4,00	|||||						
-5,00	|||||						
-6,00	|||||	CL	SANDY CLAY , Greyish Black Coloured, Very Soft Consistency	6.00-6.50			

REMARKS :

|||||	Clay
\\\\\\\\	Silt
.....	Sand
ooo	Gravel
vvvv	Organic matter

BOR LOG

PROJECT KBN Tanjung Priok			Bored Hole No: HB-2	Elevation 0.000	G.W.L -1.00	Date of Tested Jul 2002
LOCATION Tanjung Priok, Jakarta Utara						
D E P (m) T H	L O G	USCS	DESCRIPTION	U.D Sample Depth(m)	N-S.P.T	
0,00			Rigid Concrete 20 cm			
	GS		Basecourse , Coarse Agregate 55 cm			
-1.00	: : : : :	SP	SAND, Black coloured and some white coloured Very Loose consistensy			
-2.00	: : : : :					
-3.00	: : : : :			3.00-3.50		
-4.00	: : : : :	CL	SILTY SAND, Black Coloured, Very Soft Consistency Medium plasticity			
-5.00	: : : : :					
-6.00	: : : : :					
			End of Boring			

REMARKS :

|||||||	Clay
\ \ \ \ \	Silt
: : : : :	Sand
o o o	Gravel
v v v v	Organic matter

ISTN Soil Mechanics Laboratory

CONE PENETRATION TEST

CPT DATA

ISTN Soil Mechanics Laboratory

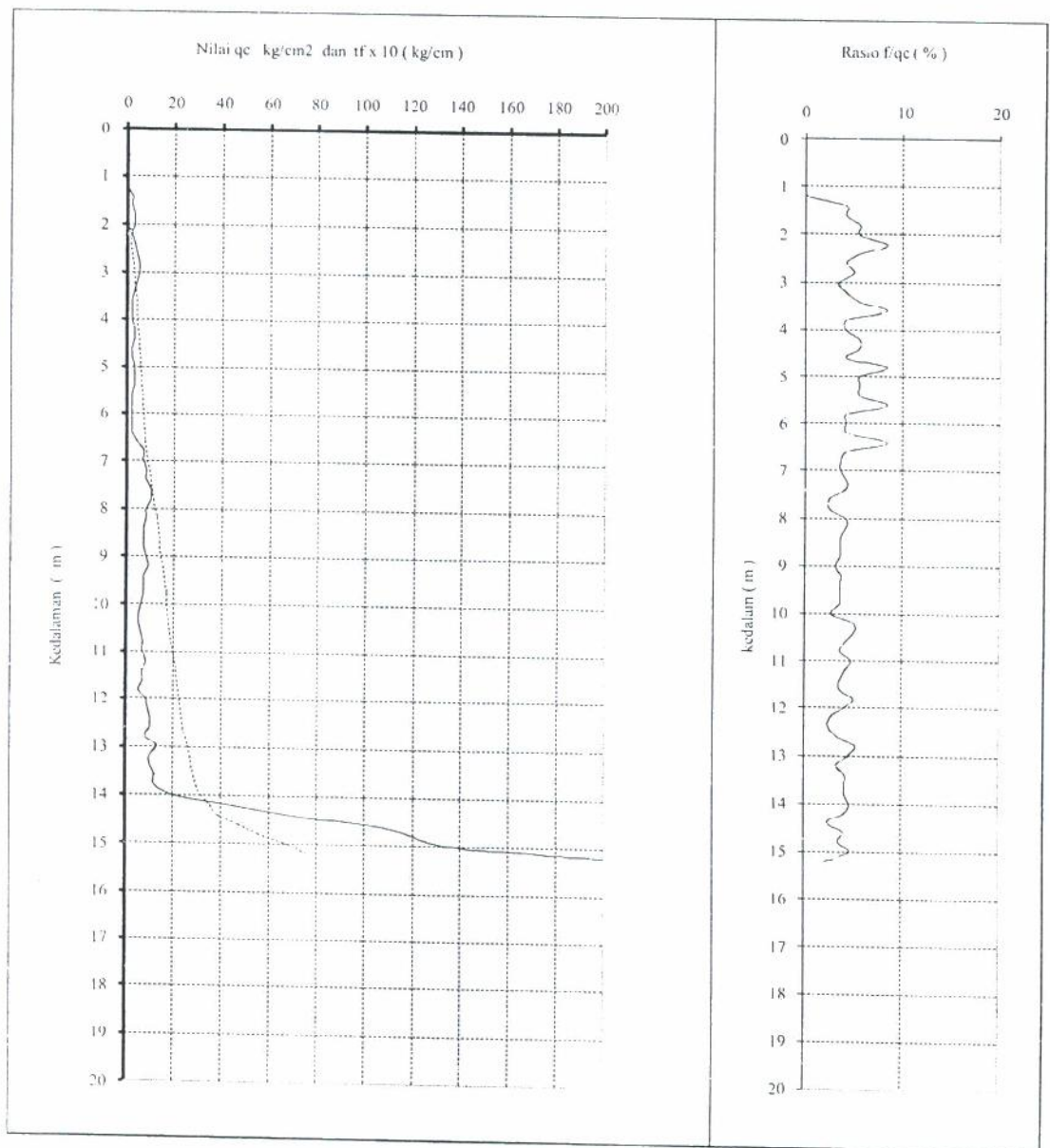
Biconnus data :						
Area End of Conus (A1)			Friction Area (A2)			
A1 = 10 cm ²			A2 = 120 cm ²			
CPT No : S-1		Project : KBN, Tj. Priok, Jakarta Utara				
Depth	qc	qt	f	tf	tf/10	f/qc
0,00	0	0	CONCRETE RIGID PAVEMENT (20 cm)			0
0,20						#DIV/0!
0,40			SANDY STONE (BASECOURSE)			#VALUE!
0,60						#DIV/0!
0,80						#DIV/0!
1,00	0	0	CONCRETE LAYER 15 CM			#VALUE!
1,20	0	0	0,00	0,00	0,00	#DIV/0!
1,40	2	3	0,08	1,67	0,17	4,17
1,60	2	3	0,08	3,33	0,33	4,17
1,80	3	5	0,17	6,67	0,67	5,56
2,00	3	5	0,17	10,00	1,00	5,56
2,20	2	4	0,17	13,33	1,33	8,33
2,40	3	5	0,17	16,67	1,67	5,56
2,60	4	6	0,17	20,00	2,00	4,17
2,80	5	8	0,25	25,00	2,50	5,00
3,00	5	7	0,17	28,33	2,83	3,33
3,20	4	6	0,17	31,67	3,17	4,17
3,40	3	5	0,17	35,00	3,50	5,56
3,60	2	4	0,17	38,33	3,83	8,33
3,80	2	3	0,08	40,00	4,00	4,17
4,00	2	3	0,08	41,67	4,17	4,17
4,20	3	5	0,17	45,00	4,50	5,56
4,40	3	5	0,17	48,33	4,83	5,56
4,60	2	3	0,08	50,00	5,00	4,17
4,80	2	4	0,17	53,33	5,33	8,33
5,00	3	5	0,17	56,67	5,67	5,56
5,20	3	5	0,17	60,00	6,00	5,56
5,40	3	5	0,17	63,33	6,33	5,56
5,60	2	4	0,17	66,67	6,67	8,33
5,80	2	3	0,08	68,33	6,83	4,17
6,00	2	3	0,08	70,00	7,00	4,17
6,20	2	3	0,08	71,67	7,17	4,17
6,40	2	4	0,17	75,00	7,50	8,33
6,60	4	6	0,17	78,33	7,83	4,17
6,80	7	10	0,25	83,33	8,33	3,57
7,00	7	10	0,25	88,33	8,83	3,57
7,20	8	12	0,33	95,00	9,50	4,17
7,40	8	12	0,33	101,67	10,17	4,17
7,60	10	13	0,25	106,67	10,67	2,50
7,80	10	13	0,25	111,67	11,17	2,50
8,00	8	12	0,33	118,33	11,83	4,17
8,20	8	12	0,33	125,00	12,50	4,17
8,40	7	10	0,25	130,00	13,00	3,57
8,60	7	10	0,25	135,00	13,50	3,57
8,80	7	10	0,25	140,00	14,00	3,57
9,00	8	11	0,25	145,00	14,50	3,13
9,20	9	13	0,33	151,67	15,17	3,70
9,40	7	10	0,25	156,67	15,67	3,57
9,60	7	10	0,25	161,67	16,17	3,57
9,80	7	10	0,25	166,67	16,67	3,57
10,00	6	8	0,17	170,00	17,00	2,78
10,20	5	8	0,25	175,00	17,50	5,00

10,40	5	8	0,25	180,00	18,00	5,00
10,60	6	9	0,25	185,00	18,50	4,17
10,80	7	10	0,25	190,00	19,00	3,57
11,00	7	11	0,33	196,67	19,67	4,76
11,20	8	12	0,33	203,33	20,33	4,17
11,40	7	10	0,25	208,33	20,83	3,57
11,60	7	10	0,25	213,33	21,33	3,57
11,80	5	8	0,25	218,33	21,83	5,00
12,00	8	12	0,33	225,00	22,50	4,17
12,20	9	12	0,25	230,00	23,00	2,78
12,40	10	13	0,25	235,00	23,50	2,50
12,60	10	14	0,33	241,67	24,17	3,33
12,80	8	13	0,42	250,00	25,00	5,21
13,00	13	20	0,58	261,67	26,17	4,49
13,20	10	14	0,33	268,33	26,83	3,33
13,40	10	15	0,42	276,67	27,67	4,17
13,60	12	18	0,50	286,67	28,67	4,17
13,80	12	18	0,50	296,67	29,67	4,17
14,00	20	31	0,92	315,00	31,50	4,58
14,20	45	67	1,83	351,67	35,17	4,07
14,40	70	90	1,67	385,00	38,50	2,38
14,60	105	155	4,17	468,33	46,83	3,97
14,80	120	170	4,17	551,67	55,17	3,47
15,00	135	210	6,25	676,67	67,67	4,63
15,20	200	250	4,17	760,00	76,00	2,08

CONE PENETRATION TEST

ISTN Soil Mechanics Laboratory

SONDIR NO	: S-1	D1 (Qonus)	3.54 cm
PROJECT	: KBN	D2 (Jacked)	3.56 cm
LOCATION	: TJ. PRIOK, JAKARTA UTARA	H (jacked)	10.8 cm
DATE OF TESTED	: 28 Juli 2002	Ratio (R)	
TESTED BY	: Mukhtarom Mr.	Elevation (- 0.00)	
CHECKED BY	: GEOINVES	G W L (-)	- m



CPT DATA

ISTN Soil Mechanics Laboratory

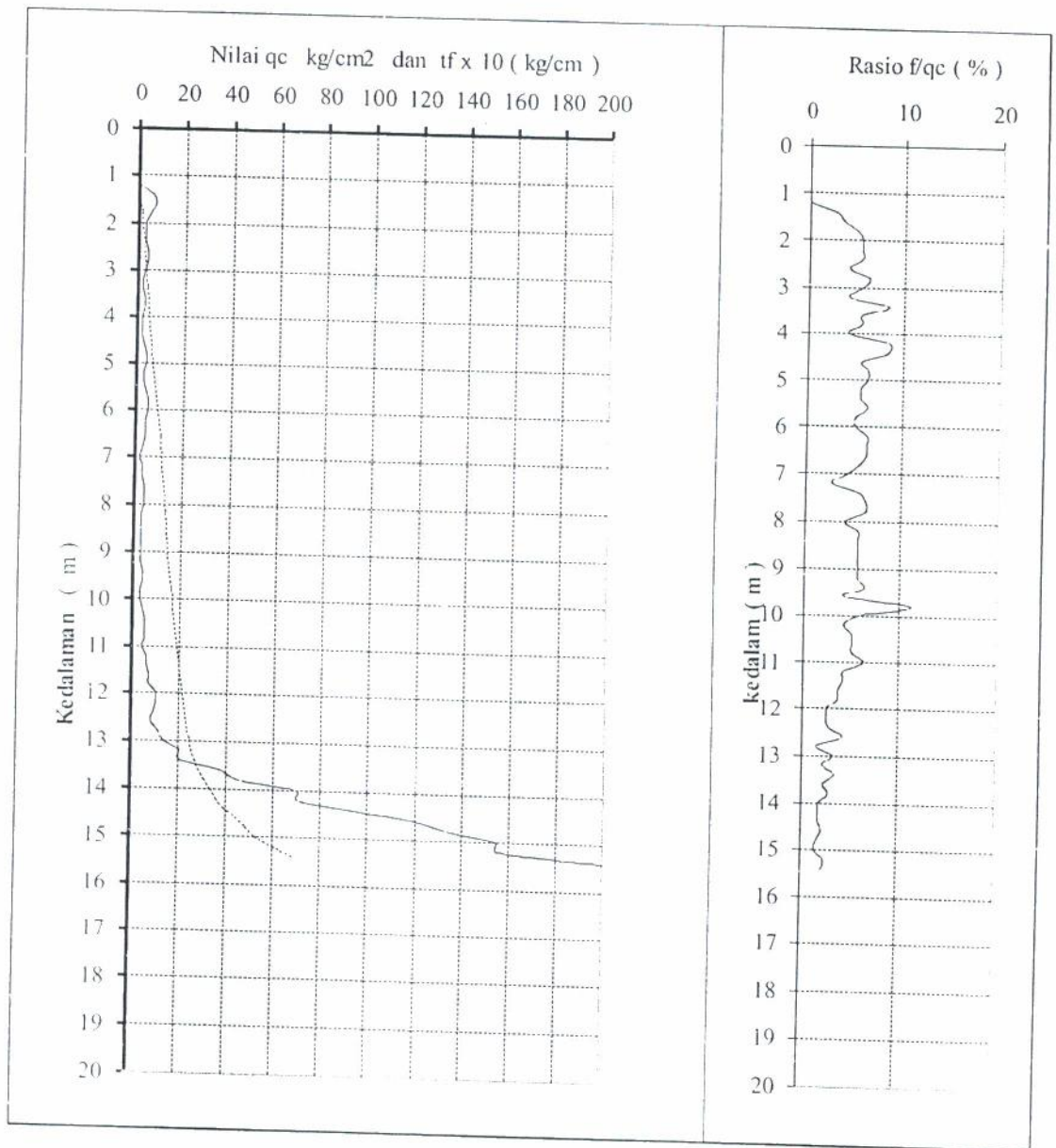
Biconnus data :						
Area End of Connus (A1)			Friction Area (A2)			
A1 = 10 cm ²			A2 = 120 cm ²			
CPT No : S-2		Project : KBN, Tj. Priok, Jakarta Utara				
Depth	qc	qt	f	tf	tf/10	f/qc
0,00	0	0	CONCRETE RIGID PAVEMENT (20 cm)			0
0,20						#DIV/0!
0,40			SANDY STONE (BASECOURSE)			#VALUE!
0,60						#DIV/0!
0,80						#DIV/0!
1,00			CONCRETE LAYER 15 CM			#VALUE!
1,20	0	0	0,00	0,00	0,00	#DIV/0!
1,40	6	8	0,17	3,33	0,33	2,78
1,60	7	10	0,25	8,33	0,83	3,57
1,80	5	8	0,25	13,33	1,33	5,00
2,00	3	5	0,17	16,67	1,67	5,56
2,20	3	5	0,17	20,00	2,00	5,56
2,40	3	5	0,17	23,33	2,33	5,56
2,60	4	6	0,17	26,67	2,67	4,17
2,80	4	7	0,25	31,67	3,17	6,25
3,00	3	5	0,17	35,00	3,50	5,56
3,20	2	3	0,08	36,67	3,67	4,17
3,40	2	4	0,17	40,00	4,00	8,33
3,60	3	5	0,17	43,33	4,33	5,56
3,80	3	5	0,17	46,67	4,67	5,56
4,00	2	3	0,08	48,33	4,83	4,17
4,20	2	4	0,17	51,67	5,17	8,33
4,40	2	4	0,17	55,00	5,50	8,33
4,60	3	5	0,17	58,33	5,83	5,56
4,80	4	7	0,25	63,33	6,33	6,25
5,00	4	7	0,25	68,33	6,83	6,25
5,20	3	5	0,17	71,67	7,17	5,56
5,40	3	5	0,17	75,00	7,50	5,56
5,60	4	7	0,25	80,00	8,00	6,25
5,80	5	8	0,25	85,00	8,50	5,00
6,00	5	8	0,25	90,00	9,00	5,00
6,20	4	7	0,25	95,00	9,50	6,25
6,40	4	7	0,25	100,00	10,00	6,25
6,60	4	7	0,25	105,00	10,50	6,25
6,80	3	5	0,17	108,33	10,83	5,56
7,00	2	3	0,08	110,00	11,00	4,17
7,20	3	4	0,08	111,67	11,17	2,78
7,40	3	5	0,17	115,00	11,50	5,56
7,60	4	7	0,25	120,00	12,00	6,25
7,80	4	7	0,25	125,00	12,50	6,25
8,00	4	6	0,17	128,33	12,83	4,17
8,20	3	5	0,17	131,67	13,17	5,56
8,40	3	5	0,17	135,00	13,50	5,56
8,60	3	5	0,17	138,33	13,83	5,56
8,80	3	5	0,17	141,67	14,17	5,56
9,00	3	5	0,17	145,00	14,50	5,56
9,20	3	5	0,17	148,33	14,83	5,56
9,40	4	7	0,25	153,33	15,33	6,25
9,60	4	6	0,17	156,67	15,67	4,17
9,80	3	7	0,33	163,33	16,33	11,11
10,00	3	5	0,17	166,67	16,67	5,56
10,20	4	6	0,17	170,00	17,00	4,17

10,40	5	8	0,25	175,00	17,50	5,00
10,60	5	8	0,25	180,00	18,00	5,00
10,80	5	8	0,25	185,00	18,50	5,00
11,00	4	7	0,25	190,00	19,00	6,25
11,20	6	9	0,25	195,00	19,50	4,17
11,40	6	9	0,25	200,00	20,00	4,17
11,60	7	10	0,25	205,00	20,50	3,57
11,80	7	10	0,25	210,00	21,00	3,57
12,00	10	13	0,25	215,00	21,50	2,50
12,20	10	13	0,25	220,00	22,00	2,50
12,40	9	12	0,25	225,00	22,50	2,78
12,60	8	12	0,33	231,67	23,17	4,17
12,80	11	13	0,17	235,00	23,50	1,52
13,00	13	18	0,42	243,33	24,33	3,21
13,20	20	25	0,42	251,67	25,17	2,08
13,40	20	28	0,67	265,00	26,50	3,33
13,60	37	47	0,83	281,67	28,17	2,25
13,80	45	60	1,25	306,67	30,67	2,78
14,00	70	85	1,25	331,67	33,17	1,79
14,20	70	85	1,25	356,67	35,67	1,79
14,40	95	115	1,67	390,00	39,00	1,75
14,60	120	150	2,50	440,00	44,00	2,08
14,80	135	160	2,08	481,67	48,17	1,54
15,00	155	180	2,08	523,33	52,33	1,34
15,20	155	200	3,75	598,33	59,83	2,42
15,40	200	250	4,17	681,67	68,17	2,08

CONE PENETRATION TEST

ISTN Soil Mechanics Laboratory

SONDIR NO	: S-2	D1 (Qonus)	3.54 cm
PROJECT	: KBN	D2 (Jacked)	3.56 cm
LOCATION	: TJ. PRIOK, JAKARTA UTARA	H (jacked)	10.8 cm
DATE OF TESTED	: 06 Agustus 2002	Ratio (R)	
TESTED BY	: Mukhtarom Mr.	Elevation (- 0.00)	
CHECKED BY	: GEOINVES	G W L (-)	- m



CPT DATA

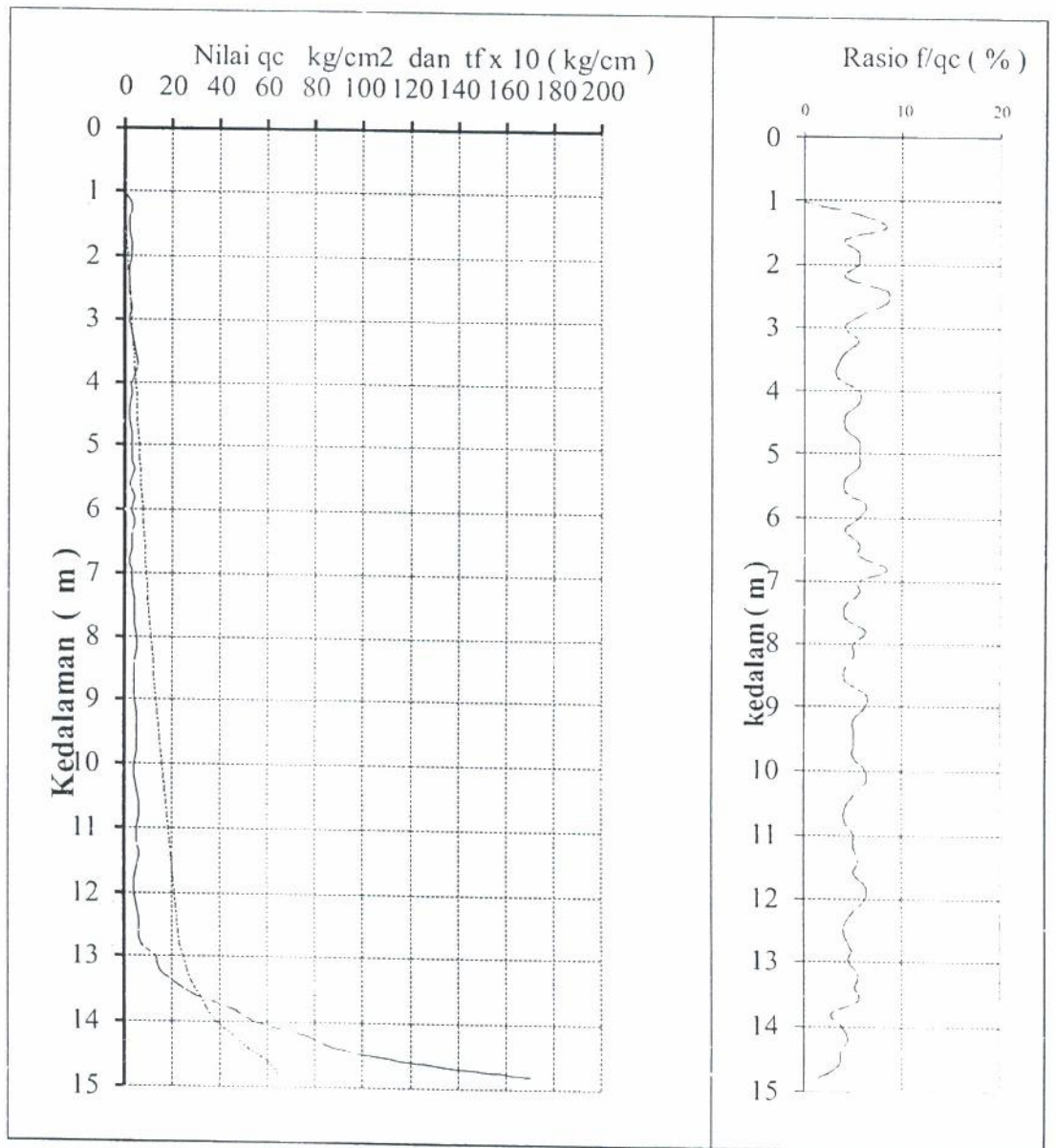
ISTN Soil Mechanics Laboratory

Biconnus data :						
Area End of Connus (A1)			Friction Area (A2)			
A1 = 10		cm ²	A2 = 120		cm ²	
CPT No : S-3		Project : KBN, Tj. Priok, Jakarta Utara				
Depth	qc	qt	f	tf	tf/10	f/qc
0,00	0	0	CONCRETE RIGID PAVEMENT (20 cm)			0
0,20						#DIV/0!
0,40						#VALUE!
0,60			SANDY STONE (BASECOURSE)			#DIV/0!
0,80						#DIV/0!
1,00	0	0				0,00
1,20	3	5	0,17	3,33	0,33	5,56
1,40	2	4	0,17	6,67	0,67	8,33
1,60	2	3	0,08	8,33	0,83	4,17
1,80	3	5	0,17	11,67	1,17	5,56
2,00	3	5	0,17	15,00	1,50	5,56
2,20	2	3	0,08	16,67	1,67	4,17
2,40	2	4	0,17	20,00	2,00	8,33
2,60	2	4	0,17	23,33	2,33	8,33
2,80	3	5	0,17	26,67	2,67	5,56
3,00	2	3	0,08	28,33	2,83	4,17
3,20	3	5	0,17	31,67	3,17	5,56
3,40	4	6	0,17	35,00	3,50	4,17
3,60	5	7	0,17	38,33	3,83	3,33
3,80	5	7	0,17	41,67	4,17	3,33
4,00	3	5	0,17	45,00	4,50	5,56
4,20	3	5	0,17	48,33	4,83	5,56
4,40	2	3	0,08	50,00	5,00	4,17
4,60	2	3	0,08	51,67	5,17	4,17
4,80	3	5	0,17	55,00	5,50	5,56
5,00	3	5	0,17	58,33	5,83	5,56
5,20	3	5	0,17	61,67	6,17	5,56
5,40	4	6	0,17	65,00	6,50	4,17
5,60	2	3	0,08	66,67	6,67	4,17
5,80	4	7	0,25	71,67	7,17	6,25
6,00	3	5	0,17	75,00	7,50	5,56
6,20	4	6	0,17	78,33	7,83	4,17
6,40	3	5	0,17	81,67	8,17	5,56
6,60	3	5	0,17	85,00	8,50	5,56
6,80	2	4	0,17	88,33	8,83	8,33
7,00	3	5	0,17	91,67	9,17	5,56
7,20	3	5	0,17	95,00	9,50	5,56
7,40	4	6	0,17	98,33	9,83	4,17
7,60	4	6	0,17	101,67	10,17	4,17
7,80	4	7	0,25	106,67	10,67	6,25
8,00	5	8	0,25	111,67	11,17	5,00
8,20	5	8	0,25	116,67	11,67	5,00
8,40	4	6	0,17	120,00	12,00	4,17
8,60	4	6	0,17	123,33	12,33	4,17
8,80	4	7	0,25	128,33	12,83	6,25
9,00	4	7	0,25	133,33	13,33	6,25
9,20	5	8	0,25	138,33	13,83	5,00
9,40	5	8	0,25	143,33	14,33	5,00
9,60	5	8	0,25	148,33	14,83	5,00
9,80	5	8	0,25	153,33	15,33	5,00
10,00	4	7	0,25	158,33	15,83	6,25
10,20	4	7	0,25	163,33	16,33	6,25

CONE PENETRATION TEST

ISTN Soil Mechanics Laboratory

SONDIR NO	: S-3	D1 (Qonus)	3.54 cm
PROJECT	: KBN	D2 (Jacked)	3.56 cm
LOCATION	: TJ. PRIOK, JAKARTA UTARA	H (jacked)	10.8 cm
DATE OF TESTED	: 30 Juli 2002	Ratio (R)	
TESTED BY	: Mukhtarom Mr.	Elevation (- 0.00)	
CHECKED BY	: GEOINVES	G W L (-)	- m



CPT DATA

ISTN Soil Mechanics Laboratory

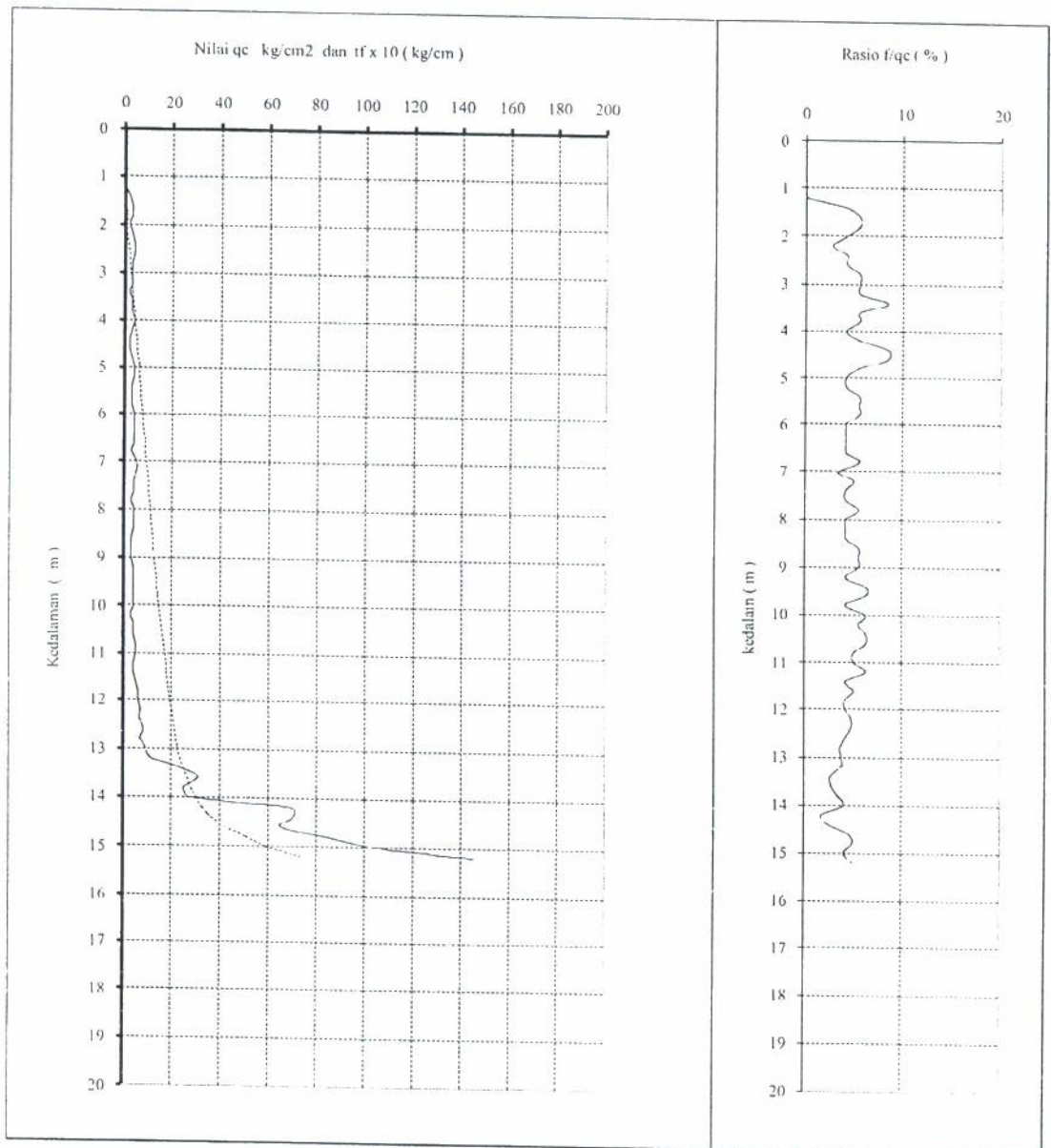
Biconnus data :						
Area End of Connus (A1)			Friction Area (A2)			
A1 = 10 cm ²		A2 = 120 cm ²				
CPT No : S-4		Project : KBN, Tj. Priok, Jakarta Utara				
Depth	qc	qt	f	tf	tf/10	f/qc
0,00	0	0	CONCRETE RIGID PAVEMENT (20 cm)			0
0,20						#DIV/0!
0,40			SANDY STONE (BASECOURSE)			#VALUE!
0,60						#DIV/0!
0,80						#DIV/0!
1,00			CONCRETE LAYER 15 CM			#VALUE!
1,20	0	0	0,00	0,00	0,00	#DIV/0!
1,40	2	3	0,08	1,67	0,17	4,17
1,60	3	5	0,17	5,00	0,50	5,56
1,80	3	5	0,17	8,33	0,83	5,56
2,00	2	3	0,08	10,00	1,00	4,17
2,20	3	4	0,08	11,67	1,17	2,78
2,40	4	6	0,17	15,00	1,50	4,17
2,60	4	6	0,17	18,33	1,83	4,17
2,80	3	5	0,17	21,67	2,17	5,56
3,00	3	5	0,17	25,00	2,50	5,56
3,20	3	5	0,17	28,33	2,83	5,56
3,40	2	4	0,17	31,67	3,17	8,33
3,60	3	5	0,17	35,00	3,50	5,56
3,80	3	5	0,17	38,33	3,83	5,56
4,00	4	6	0,17	41,67	4,17	4,17
4,20	3	5	0,17	45,00	4,50	5,56
4,40	2	4	0,17	48,33	4,83	8,33
4,60	2	4	0,17	51,67	5,17	8,33
4,80	3	5	0,17	55,00	5,50	5,56
5,00	4	6	0,17	58,33	5,83	4,17
5,20	4	6	0,17	61,67	6,17	4,17
5,40	3	5	0,17	65,00	6,50	5,56
5,60	3	5	0,17	68,33	6,83	5,56
5,80	3	5	0,17	71,67	7,17	5,56
6,00	4	6	0,17	75,00	7,50	4,17
6,20	4	6	0,17	78,33	7,83	4,17
6,40	4	6	0,17	81,67	8,17	4,17
6,60	4	6	0,17	85,00	8,50	4,17
6,80	3	5	0,17	88,33	8,83	5,56
7,00	5	7	0,17	91,67	9,17	3,33
7,20	5	8	0,25	96,67	9,67	5,00
7,40	4	6	0,17	100,00	10,00	4,17
7,60	4	6	0,17	103,33	10,33	4,17
7,80	3	5	0,17	106,67	10,67	5,56
8,00	4	6	0,17	110,00	11,00	4,17
8,20	4	6	0,17	113,33	11,33	4,17
8,40	4	6	0,17	116,67	11,67	4,17
8,60	3	5	0,17	120,00	12,00	5,56
8,80	3	5	0,17	123,33	12,33	5,56
9,00	3	5	0,17	126,67	12,67	5,56
9,20	4	6	0,17	130,00	13,00	4,17
9,40	4	7	0,25	135,00	13,50	6,25
9,60	4	7	0,25	140,00	14,00	6,25
9,80	4	6	0,17	143,33	14,33	4,17
10,00	4	7	0,25	148,33	14,83	6,25
10,20	3	5	0,17	151,67	15,17	5,56

10,40	4	7	0,25	156,67	15,67	6,25
10,60	4	7	0,25	161,67	16,17	6,25
10,80	5	8	0,25	166,67	16,67	5,00
11,00	5	8	0,25	171,67	17,17	5,00
11,20	4	7	0,25	176,67	17,67	6,25
11,40	4	6	0,17	180,00	18,00	4,17
11,60	5	8	0,25	185,00	18,50	5,00
11,80	6	9	0,25	190,00	19,00	4,17
12,00	6	9	0,25	195,00	19,50	4,17
12,20	7	11	0,33	201,67	20,17	4,76
12,40	7	11	0,33	208,33	20,83	4,76
12,60	8	12	0,33	215,00	21,50	4,17
12,80	7	10	0,25	220,00	22,00	3,57
13,00	9	13	0,33	226,67	22,67	3,70
13,20	11	16	0,42	235,00	23,50	3,79
13,40	24	32	0,67	248,33	24,83	2,78
13,60	31	41	0,83	265,00	26,50	2,69
13,80	25	35	0,83	281,67	28,17	3,33
14,00	27	40	1,08	303,33	30,33	4,01
14,20	70	85	1,25	328,33	32,83	1,79
14,40	70	90	1,67	361,67	36,17	2,38
14,60	65	100	2,92	420,00	42,00	4,49
14,80	85	135	4,17	503,33	50,33	4,90
15,00	105	155	4,17	586,67	58,67	3,97
15,20	145	230	7,08	728,33	72,83	4,89

CONE PENETRATION TEST

ISTN Soil Mechanics Laboratory

SONDIR NO	: S-4	D1 (Qonus)	3.54 cm
PROJECT	: KBN	D2 (Jacked)	3.56 cm
LOCATION	: TJ. PRIOK, JAKARTA UTARA	H (jacked)	10.8 cm
DATE OF TESTED	: 30 Juli 2002	Ratio (R)	
TESTED BY	: Mukhtarom Mr.	Elevation (- 0.00)	
CHECKED BY	: GEOINVES	G W L (-)	- m



CPT DATA

ISTN Soil Mechanics Laboratory

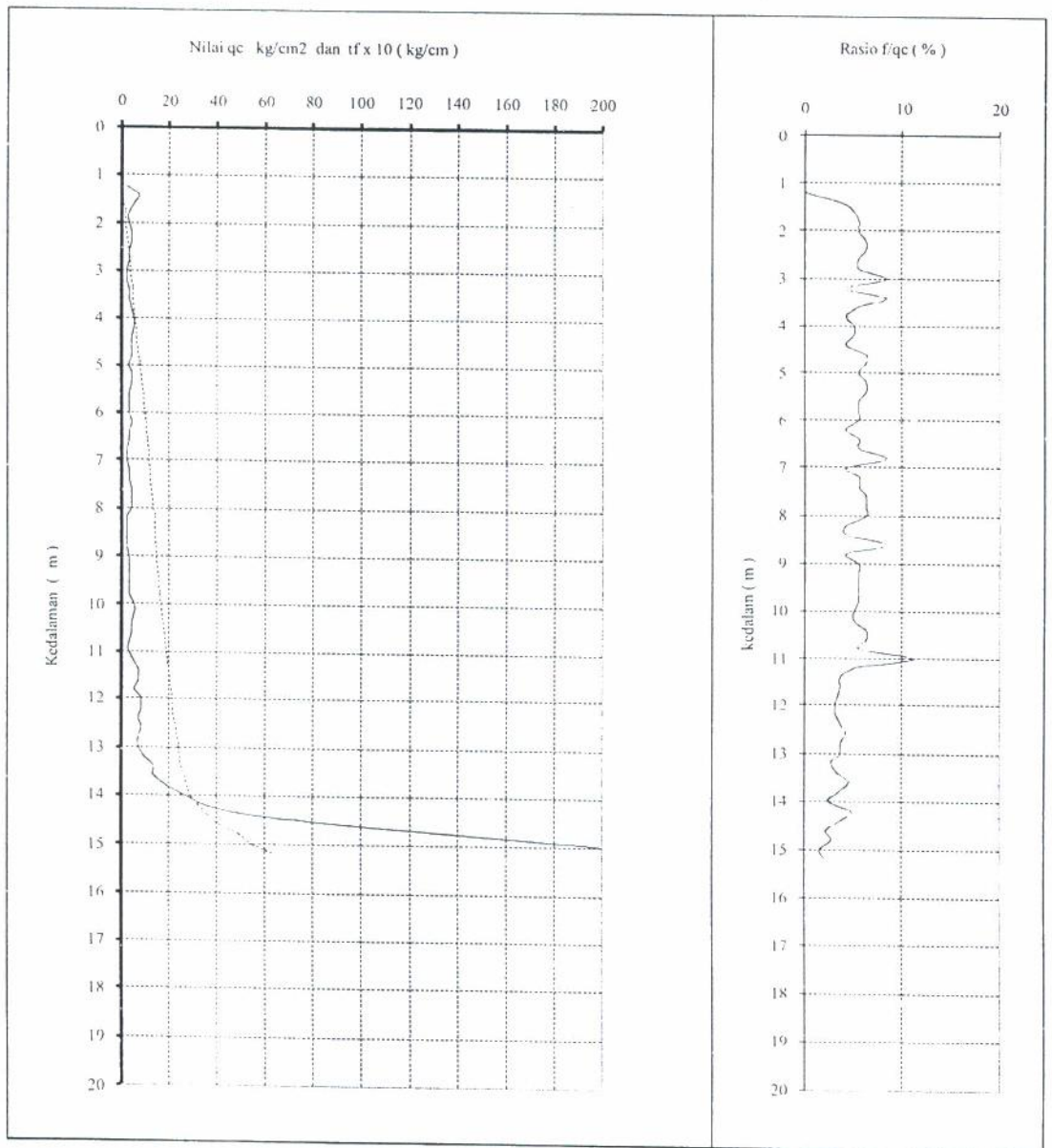
Biconnus data :						
Area End of Connus (A1)			Friction Area (A2)			
A1 = 10 cm ²		A2 = 120 cm ²				
CPT No : S-5		Project : KBN, Tj. Priok, Jakarta Utara				
Depth	qc	qt	f	tf	tf/10	f/qc
0,00	0	0	CONCRETE RIGID PAVEMENT (20 cm)			0
0,20						#DIV/0!
0,40						#VALUE!
0,60						#DIV/0!
0,80						#DIV/0!
1,00			CONCRETE LAYER 15 CM			#VALUE!
1,20	0	0	0,00	0,00	0,00	#DIV/0!
1,40	7	10	0,25	5,00	0,50	3,57
1,60	5	8	0,25	10,00	1,00	5,00
1,80	3	5	0,17	13,33	1,33	5,56
2,00	3	5	0,17	16,67	1,67	5,56
2,20	4	7	0,25	21,67	2,17	6,25
2,40	4	7	0,25	26,67	2,67	6,25
2,60	3	5	0,17	30,00	3,00	5,56
2,80	3	5	0,17	33,33	3,33	5,56
3,00	2	4	0,17	36,67	3,67	8,33
3,20	2	3	0,08	38,33	3,83	4,17
3,40	3	6	0,25	43,33	4,33	8,33
3,60	3	5	0,17	46,67	4,67	5,56
3,80	4	6	0,17	50,00	5,00	4,17
4,00	5	8	0,25	55,00	5,50	5,00
4,20	5	8	0,25	60,00	6,00	5,00
4,40	4	6	0,17	63,33	6,33	4,17
4,60	4	7	0,25	68,33	6,83	6,25
4,80	4	7	0,25	73,33	7,33	6,25
5,00	3	5	0,17	76,67	7,67	5,56
5,20	4	7	0,25	81,67	8,17	6,25
5,40	4	7	0,25	86,67	8,67	6,25
5,60	3	5	0,17	90,00	9,00	5,56
5,80	3	5	0,17	93,33	9,33	5,56
6,00	3	5	0,17	96,67	9,67	5,56
6,20	4	6	0,17	100,00	10,00	4,17
6,40	3	5	0,17	103,33	10,33	5,56
6,60	3	5	0,17	106,67	10,67	5,56
6,80	2	4	0,17	110,00	11,00	8,33
7,00	2	3	0,08	111,67	11,17	4,17
7,20	3	5	0,17	115,00	11,50	5,56
7,40	3	5	0,17	118,33	11,83	5,56
7,60	4	7	0,25	123,33	12,33	6,25
7,80	4	7	0,25	128,33	12,83	6,25
8,00	4	7	0,25	133,33	13,33	6,25
8,20	2	3	0,08	135,00	13,50	4,17
8,40	2	3	0,08	136,67	13,67	4,17
8,60	2	4	0,17	140,00	14,00	8,33
8,80	2	3	0,08	141,67	14,17	4,17
9,00	3	5	0,17	145,00	14,50	5,56
9,20	3	5	0,17	148,33	14,83	5,56
9,40	3	5	0,17	151,67	15,17	5,56
9,60	3	5	0,17	155,00	15,50	5,56
9,80	3	5	0,17	158,33	15,83	5,56
10,00	5	8	0,25	163,33	16,33	5,00
10,20	5	8	0,25	168,33	16,83	5,00

10,40	4	7	0,25	173,33	17,33	6,25
10,60	4	7	0,25	178,33	17,83	6,25
10,80	3	5	0,17	181,67	18,17	5,56
11,00	3	7	0,33	188,33	18,83	11,11
11,20	5	8	0,25	193,33	19,33	5,00
11,40	7	10	0,25	198,33	19,83	3,57
11,60	7	10	0,25	203,33	20,33	3,57
11,80	5	7	0,17	206,67	20,67	3,33
12,00	8	11	0,25	211,67	21,17	3,13
12,20	8	11	0,25	216,67	21,67	3,13
12,40	7	10	0,25	221,67	22,17	3,57
12,60	8	12	0,33	228,33	22,83	4,17
12,80	7	10	0,25	233,33	23,33	3,57
13,00	7	10	0,25	238,33	23,83	3,57
13,20	9	12	0,25	243,33	24,33	2,78
13,40	13	18	0,42	251,67	25,17	3,21
13,60	13	20	0,58	263,33	26,33	4,49
13,80	19	27	0,67	276,67	27,67	3,51
14,00	27	35	0,67	290,00	29,00	2,47
14,20	35	55	1,67	323,33	32,33	4,76
14,40	55	80	2,08	365,00	36,50	3,79
14,60	95	120	2,08	406,67	40,67	2,19
14,80	150	200	4,17	490,00	49,00	2,78
15,00	200	235	2,92	548,33	54,83	1,46
15,20	200	250	4,17	631,67	63,17	2,08

CONE PENETRATION TEST

ISTN Soil Mechanics Laboratory

SONDIR NO	: S-5	D1 (Qonus)	3.54 cm
PROJECT	: KBN	D2 (Jacked)	3.56 cm
LOCATION	: TJ. PRIOK, JAKARTA UTARA	H (jacked)	10.8 cm
DATE OF TESTED	: 06 Agustus 2002	Ratio (R)	
TESTED BY	: Mukhtarom Mr.	Elevation (- 0.00)	
CHECKED BY	: GEOINVES	G W L (-)	- m



CPT DATA

ISTN Soil Mechanics Laboratory

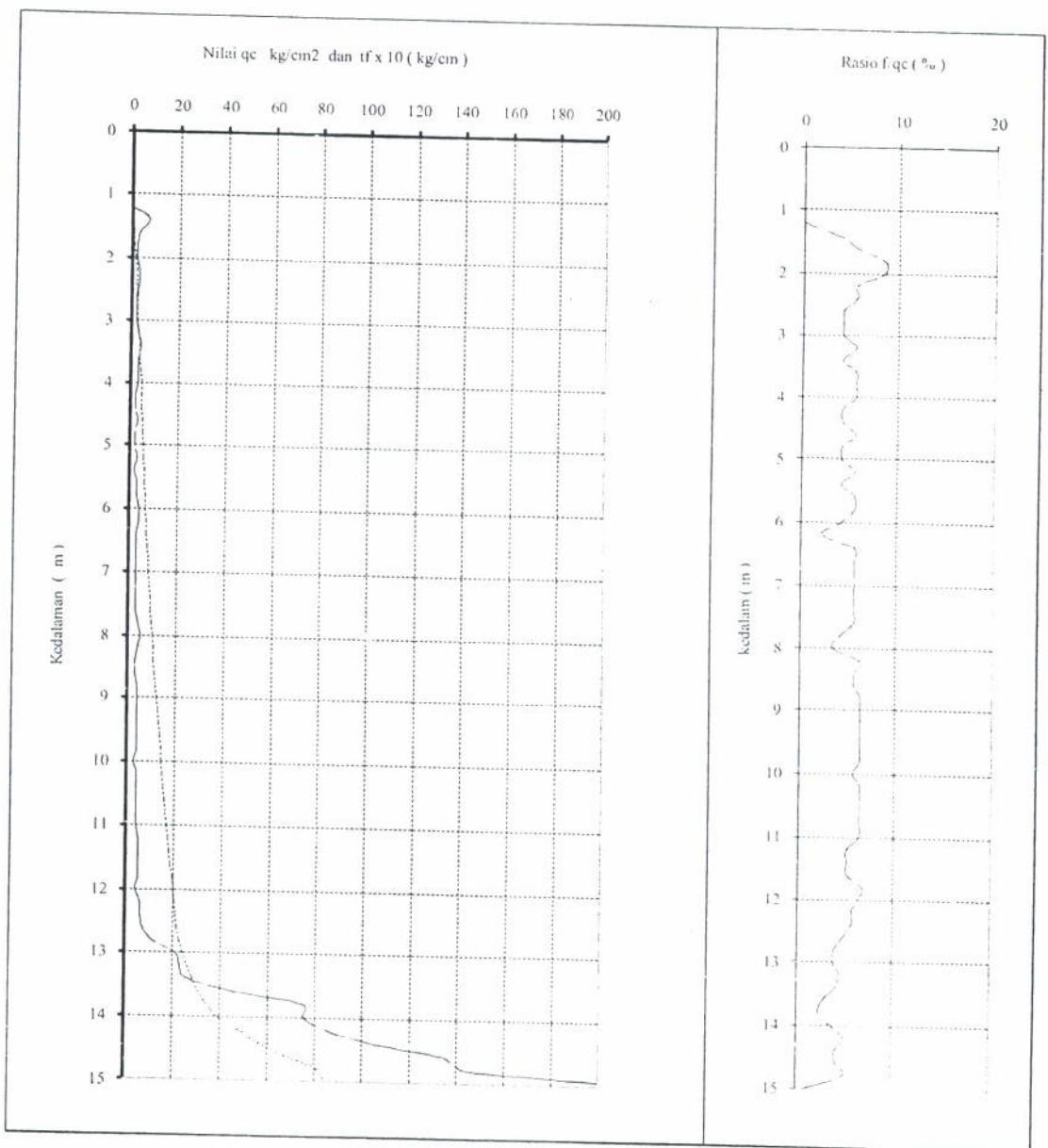
Biconnus data :						
Area End of Connus (A1)			Friction Area (A2)		-	
A1 = 10 cm ²			A2 = 120 cm ²			
CPT No : S-6 Project : KBN, Tj. Priok, Jakarta Utara						
Depth	qc	qt	f	tf	tf/10	f/qc
0,00	0	0	CONCRETE RIGID PAVEMENT (20 cm)			0
0,20						#DIV/0!
0,40			SANDY STONE (BASECOURSE)			#VALUE!
0,60						#DIV/0!
0,80						#DIV/0!
1,00			CONCRETE LAYER 15 CM			#VALUE!
1,20	0	0				#DIV/0!
1,40	7	10	0,25	5,00	0,50	3,57
1,60	3	5	0,17	8,33	0,83	5,56
1,80	2	4	0,17	11,67	1,17	8,33
2,00	2	4	0,17	15,00	1,50	8,33
2,20	3	5	0,17	18,33	1,83	5,56
2,40	3	5	0,17	21,67	2,17	5,56
2,60	2	3	0,08	23,33	2,33	4,17
2,80	2	3	0,08	25,00	2,50	4,17
3,00	2	3	0,08	26,67	2,67	4,17
3,20	3	5	0,17	30,00	3,00	5,56
3,40	4	6	0,17	33,33	3,33	4,17
3,60	3	5	0,17	36,67	3,67	5,56
3,80	3	5	0,17	40,00	4,00	5,56
4,00	3	5	0,17	43,33	4,33	5,56
4,20	2	3	0,08	45,00	4,50	4,17
4,40	2	3	0,08	46,67	4,67	4,17
4,60	3	5	0,17	50,00	5,00	5,56
4,80	2	3	0,08	51,67	5,17	4,17
5,00	2	3	0,08	53,33	5,33	4,17
5,20	3	5	0,17	56,67	5,67	5,56
5,40	2	3	0,08	58,33	5,83	4,17
5,60	3	5	0,17	61,67	6,17	5,56
5,80	3	5	0,17	65,00	6,50	5,56
6,00	4	6	0,17	68,33	6,83	4,17
6,20	4	5	0,08	70,00	7,00	2,08
6,40	3	5	0,17	73,33	7,33	5,56
6,60	3	5	0,17	76,67	7,67	5,56
6,80	3	5	0,17	80,00	8,00	5,56
7,00	3	5	0,17	83,33	8,33	5,56
7,20	3	5	0,17	86,67	8,67	5,56
7,40	3	5	0,17	90,00	9,00	5,56
7,60	3	5	0,17	93,33	9,33	5,56
7,80	4	6	0,17	96,67	9,67	4,17
8,00	5	7	0,17	100,00	10,00	3,33
8,20	4	7	0,25	105,00	10,50	6,25
8,40	3	5	0,17	108,33	10,83	5,56
8,60	3	5	0,17	111,67	11,17	5,56
8,80	4	7	0,25	116,67	11,67	6,25
9,00	4	7	0,25	121,67	12,17	6,25
9,20	4	7	0,25	126,67	12,67	6,25
9,40	4	7	0,25	131,67	13,17	6,25
9,60	4	7	0,25	136,67	13,67	6,25
9,80	4	7	0,25	141,67	14,17	6,25
10,00	3	5	0,17	145,00	14,50	5,56
10,20	4	7	0,25	150,00	15,00	6,25

10,40	4	7	0,25	155,00	15,50	6,25
10,60	4	7	0,25	160,00	16,00	6,25
10,80	4	7	0,25	165,00	16,50	6,25
11,00	4	7	0,25	170,00	17,00	6,25
11,20	5	8	0,25	175,00	17,50	5,00
11,40	5	8	0,25	180,00	18,00	5,00
11,60	5	8	0,25	185,00	18,50	5,00
11,80	5	9	0,33	191,67	19,17	6,67
12,00	4	7	0,25	196,67	19,67	6,25
12,20	6	10	0,33	203,33	20,33	5,56
12,40	6	10	0,33	210,00	21,00	5,56
12,60	7	11	0,33	216,67	21,67	4,76
12,80	11	16	0,42	225,00	22,50	3,79
13,00	21	30	0,75	240,00	24,00	3,57
13,20	23	35	1,00	260,00	26,00	4,35
13,40	25	37	1,00	280,00	28,00	4,00
13,60	45	60	1,25	305,00	30,50	2,78
13,80	75	95	1,67	338,33	33,83	2,22
14,00	75	105	2,50	388,33	38,83	3,33
14,20	85	135	4,17	471,67	47,17	4,90
14,40	105	155	4,17	555,00	55,50	3,97
14,60	135	200	5,42	663,33	66,33	4,01
14,80	145	230	7,08	805,00	80,50	4,89
15,00	230	250	1,67	838,33	83,83	0,72

CONE PENETRATION TEST

ISTN Soil Mechanics Laboratory

SONDIR NO	: S-6	D1 (Qonus)	3.54 cm
PROJECT	: KBN	D2 (Jacked)	3.56 cm
LOCATION	: TJ. PRIOK, JAKARTA UTARA	H (jacked)	10.8 cm
DATE OF TESTED	: 29 Juli 2002	Ratio (R)	
TESTED BY	: Mukhtarom Mr.	Elevation (- 0.00)	
CHECKED BY	: GEOINVES	G W L (-)	- m



ISTN Soil Mechanics Laboratory

DATA LAB. MEKTAN



**LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL**

KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA - JAKARTA 12640
TELPON. 021 98189554 FAX . 021 78893379

L.LABORATORY TESTING RESULTS

Project	KBN TANJUNG PRIOK	Bor Hole No	HB-2
Location	JAKARTA UTARA	Checked By	Singgih S.

ITEM OF TEST	PARAMETER	Unit	Depth	Depth	Depth
			-2.50 - 3.00		
INDEX PROPERTIES					
	Water Content (Wn)	%	27,548		
	Unit Weight of Soil (γ)	gr/cm ³	1,788		
	Unit Weight of Dry Soil (γ_d)	gr/cm ³	1,402		
	Specific Gravity	-	2,645		
	Void Ratio (e)	-	0,886		
	Porosity (n)	-	0,470		
	Degree of Saturation (Sr)	%	82,212		
	Liquid Limit (LL)	%	43,195		
	Plastic Limit (PL)	%	34,222		
	Plastisity Index (PI)	%	8,973		
GRAINED SIZE DISTRIBUTION					
	Gravel	%	0,95		
	Sand	%	27,50		
	Silt	%	31,55		
	Clay	%	40,00		
	Organic Matter	%	-	-	-
SHEAR STRENGTH PARAMETER					
Unconfined Compression Test					
	Ultimate Axial Strength (qu)	Kg/cm ²	-	-	-
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-
	Sensitivity (St)	-	-	-	-
Direct Shear Test					
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-
	Angle of Internal Friction (ϕ)	Degree	-	-	-
Triaxial UU Test					
	Cohesion Undrained (Cu)	Kg/cm ²	0,426		
	Angle of Internal Friction (ϕ)	Degree	27,24		
Triaxial CU Test					
	Cohesion Undrained Total (Cu)	Kg/cm ²	-	-	-
	Angle of Internal Friction Total (ϕ)	Degree	-	-	-
	Cohesion Undrained Eff. (Cu')	Kg/cm ²	-	-	-
	Angle of Internal Friction Eff. (ϕ')	Degree	-	-	-
COMPRESSIBILITY					
	Praconsolidation Pressure (Pc)	Kg/cm ²	1,50		
	Compression Index (Cc)	-	0,34		
	Coef. Of Consolidation (Cv)	Cm ² /sec	0,45 X10 ⁻³		
	Rebound Index (Cr)	-	0,06		



**LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL**

KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA - JAKARTA 12640
TELPON. 021 98189554 FAX . 021 78893379

LABORATORY TESTING RESULTS

Project	KBN TANJUNG PRIOK	Bor Hole No	HB-2
Location	JAKARTA UTARA	Checked By	Singgih S.

ITEM OF TEST	PARAMETER	Unit	Depth	Depth	Depth
-4.00 - 4.50					
INDEX PROPERTIES					
	Water Content (Wn)	%	21,489		
	Unit Weight of Soil (γ)	gr/cm ³	1,787		
	Unit Weight of Dry Soil (γ_d)	gr/cm ³	1,471		
	Specific Gravity	-	2,645		
	Void Ratio (e)	-	0,798		
	Porosity (n)	-	0,444		
	Degree of Saturation (Sr)	%	71,245		
	Liquid Limit (LL)	%	84,265		
	Plastic Limit (PL)	%	66,667		
	Plastisity Index (PI)	%	17,598		
GRAINED SIZE DISTRIBUTION					
	Gravel	%	7,95		
	Sand	%	75,25		
	Silt	%	16,80		
	Clay	%	0,00		
	Organic Matter	%	-	-	-
SHEAR STRENGTH PARAMETER					
Unconfined Compression Test					
	Ultimate Axial Strength (qu)	Kg/cm ²	-	-	-
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-
	Sensitivity (St)	-	-	-	-
Direct Shear Test					
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-
	Angle of Internal Friction (ϕ)	Degree	-	-	-
Triaxial UU Test					
	Cohesion Undrained (Cu)	Kg/cm ²	0,067		
	Angle of Internal Friction (ϕ)	Degree	16,11		
Triaxial CU Test					
	Cohesion Undrained Total (Cu)	Kg/cm ²	-	-	-
	Angle of Internal Friction Total (ϕ)	Degree	-	-	-
	Cohesion Undrained Eff. (Cu')	Kg/cm ²	-	-	-
	Angle of Internal Friction Eff. (ϕ')	Degree	-	-	-
COMPRESSIBILITY					
	Praconsolidation Pressure (Pc)	Kg/cm ²	1,60		
	Compression Index (Cc)	-	1,36		
	Coef. Of Consolidation (Cv)	Cm ² /sec	0,36 X10 ⁻³		
	Rebound Index (Cr)	-	0,64		



LABORATORIUM MEKANIKA TANAH
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 TELPON. 021 98189554 FAX . 021 78893379

LABORATORY TESTING RESULTS

Project	KBN TANJUNG PRIOK	Bor Hole No	HB-2
Location	JAKARTA UTARA	Checked By	Singgih S.

ITEM OF TEST	PARAMETER	Unit	Depth	Depth	Depth
			-6.00 - 6.50		

INDEX PROPERTIES

Water Content (Wn)	%	45,477		
Unit Weight of Soil (γ)	gr/cm ³	1,475		
Unit Weight of Dry Soil (γ_d)	gr/cm ³	1,014		
Specific Gravity	-	2,620		
Void Ratio (e)	-	1,584		
Porosity (n)	-	0,613		
Degree of Saturation (Sr)	%	75,229		
Liquid Limit (LL)	%	80,470		
Plastic Limit (PL)	%	38,462		
Plastisity Index (PI)	%	42,008		

GRAINED SIZE DISTRIBUTION

Gravel	%	5,65		
Sand	%	17,50		
Silt	%	14,85		
Clay	%	62,00		
Organic Matter	%	-		

SHEAR STRENGTH PARAMETER

Unconfined Compression Test				
Ultimate Axial Strength (q_u)	Kg/cm ²	-	-	-
Cohesion Undrained (Cu)	Kg/cm ²	-	-	-
Sensitivity (St)	-	-	-	-
Direct Shear Test				
Cohesion Undrained (Cu)	Kg/cm ²	-	-	-
Angle of Internal Friction (ϕ)	Degree	-	-	-
Triaxial UU Test				
Cohesion Undrained (Cu)	Kg/cm ²	0,124		
Angle of Internal Friction (ϕ)	Degree	6,67		
Triaxial CU Test				
Cohesion Undrained Total (Cu)	Kg/cm ²	-	-	-
Angle of Internal Friction Total (ϕ)	Degree	-	-	-
Cohesion Undrained Eff. (Cu')	Kg/cm ²	-	-	-
Angle of Internal Friction Eff. (ϕ')	Degree	-	-	-

COMPRESSIBILITY

Praconsolidation Pressure (Pc)	Kg/cm ²	0,94		
Compression Index (Cc)	-	0,93		
Coef. Of Consolidation (Cv)	Cm ² /sec	0,32 X10 ⁻³		
Rebound Index (Cr)	-	0,45		



LABORATORIUM MEKANIKA TANAH
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LABORATORY TESTING RESULTS

Project	KBN TANJUNG PRIOK	Bor Hole No	HB-3
Location	JAKARTA UTARA	Checked By	Singgih S.

ITEM OF TEST	PARAMETER	Unit	Depth	Depth	Depth
INDEX PROPERTIES					
	Water Content (Wn)	%	30,510		
	Unit Weight of Soil (γ)	gr/cm ³	1,412		
	Unit Weight of Dry Soil (γ_d)	gr/cm ³	1,082		
	Specific Gravity	-	2,620		
	Void Ratio (e)	-	1,422		
	Porosity (n)	-	0,587		
	Degree of Saturation (Sr)	%	56,198		
	Liquid Limit (LL)	%	-		
	Plastic Limit (PL)	%	-		
	Plastisity Index (PI)	%	-		
GRAINED SIZE DISTRIBUTION					
	Gravel	%	7,00		
	Sand	%	17,90		
	Silt	%	15,10		
	Clay	%	60,00		
	Organic Matter	%	-	-	-
SHEAR STRENGTH PARAMETER					
Unconfined Compression Test					
	Ultimate Axial Strength (qu)	Kg/cm ²	-	-	-
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-
	Sensitivity (St)	-	-	-	-
Direct Shear Test					
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-
	Angle of Internal Friction (ϕ)	Degree	-	-	-
Triaxial UU Test					
	Cohesion Undrained (Cu)	Kg/cm ²	0,144		
	Angle of Internal Friction (ϕ)	Degree	6,75		
Triaxial CU Test					
	Cohesion Undrained Total (Cu)	Kg/cm ²	-	-	-
	Angle of Internal Friction Total (ϕ)	Degree	-	-	-
	Cohesion Undrained Eff. (Cu')	Kg/cm ²	-	-	-
	Angle of Internal Friction Eff. (ϕ')	Degree	-	-	-
COMPRESSIBILITY					
	Praconsolidation Pressure (Pc)	Kg/cm ²	0,78		
	Compression Index (Cc)	-	0,29		
	Coef. Of Consolidation (Cv)	Cm ² /sec	0,58 X10 ⁻³		
	Rebound Index (Cr)	-	0,2		



LABORATORIUM MEKANIKA TANAH

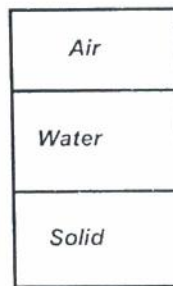
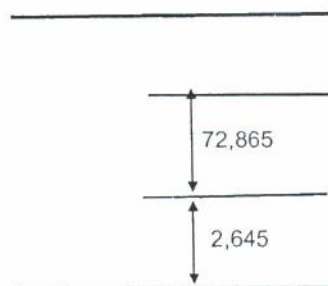
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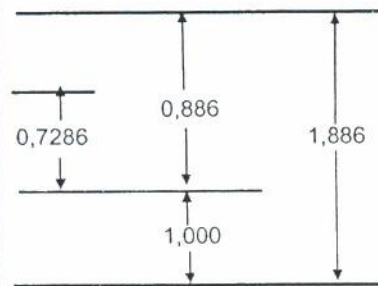
INDEX PROPERTIES TEST

PROJECT	KBN TANJUNG PRIOK	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	JAKARTA UTARA	TESTED BY	Budi D.
BOR HOLE NO	HB-2	CHECKED BY	Singgih S.
DEPTH	-2.50 - 3.00 m	DATE OF TESTED	Juli 2002

Weight



Volume



Unit Weight of Sample (in gr/cm ³)	1,788
Water Content of Sample (%)	27,548
Specific Gravity of Soil Sample	2,645
Unit Weight of Water (γ_w , in gr/cm ³)	1,000
Saturated Unit Weight of Soil (γ_{sat} , in gr/cm ³)	1,872

Void Ratio (e)	0,886
Porosity (n)	0,470
Dry Unit Weight (γ_d)	1,402
Degree of Saturation (Sr)	82,212



LABORATORIUM MEKANIKA TANAH

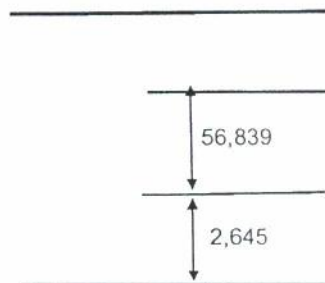
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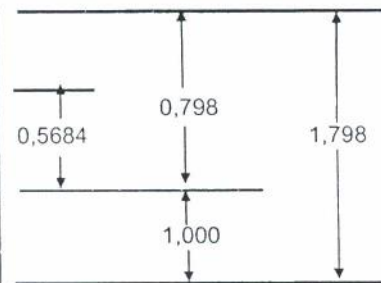
INDEX PROPERTIES TEST

PROJECT	KBN TANJUNG PRIOK	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	JAKARTA UTARA	TESTED BY	Budi D.
BOR HOLE NO	HB-2	CHECKED BY	Singgih S.
DEPTH	-4.00 - 4.50 m	DATE OF TESTED	Juli 2002

Weight



Volume



Unit Weight of Sample (in gr/cm ³)	1,787
Water Content of Sample (%)	21,489
Specific Gravity of Soil Sample	2,645
Unit Weight of Water (γ _w , in grm/cm ³)	1,000
Saturated Unit Weight of Soil (γ _{sat} , in grm/cm ³)	1,915

Void Ratio (e)	0,798
Porosity (n)	0,444
Dry Unit Weight (γ _d)	1,471
Degree of Saturation (S _r)	71,245



LABORATORIUM MEKANIKA TANAH

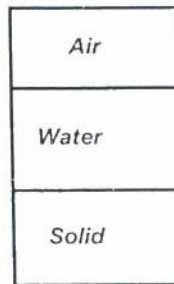
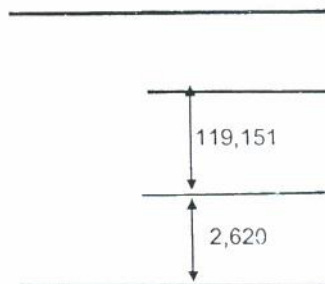
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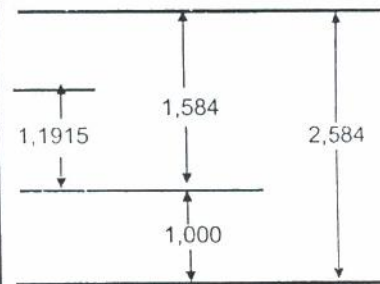
INDEX PROPERTIES TEST

PROJECT	KBN TANJUNG PRIOK	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	JAKARTA UTARA	TESTED BY	Budi D.
BOR HOLE NO	HB-2	CHECKED BY	Singgih S.
DEPTH	-6.00 - 6.50 m	DATE OF TESTED	Juli 2002

Weight



Volume



Unit Weight of Sample (in gr/cm ³)	1,475
Water Content of Sample (%)	45,477
Specific Gravity of Soil Sample	2,620
Unit Weight of Water (γ_w , in grm/cm ³)	1,000
Saturated Unit Weight of Soil (γ_{sat} , in grm/cm ³)	1,627

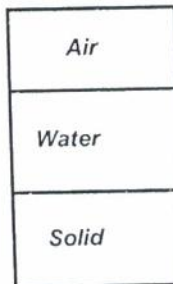
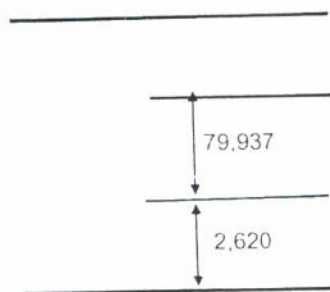
Void Ratio (e)	1,584
Porosity (n)	0,613
Dry Unit Weight (γ_d)	1,014
Degree of Saturation (Sr)	75,229



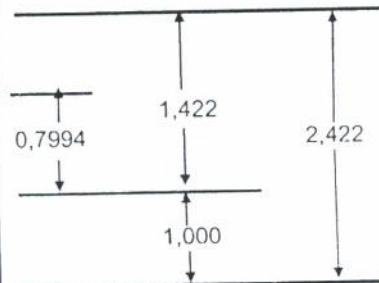
INDEX PROPERTIES TEST

PROJECT	KBN TANJUNG PRIOK	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	JAKARTA UTARA	TESTED BY	Budi D.
BOR HOLE NO	HB-3	CHECKED BY	Singgih S.
DEPTH	-3.00 - 3.50 m	DATE OF TESTED	Juli 2002

Weight



Volume



Unit Weight of Sample (in gr/cm ³)	1,412
Water Content of Sample (%)	30,510
Specific Gravity of Soil Sample	2,620
Unit Weight of Water (yw, in grm/cm ³)	1,000
Saturated Unit Weight of Soil (γ _{sat} , in grm/cm ³)	1,669

Void Ratio (e)	1,422
Porosity (n)	0,587
Dry Unit Weight (γ _d)	1,082
Degree of Saturation (S _r)	56,198



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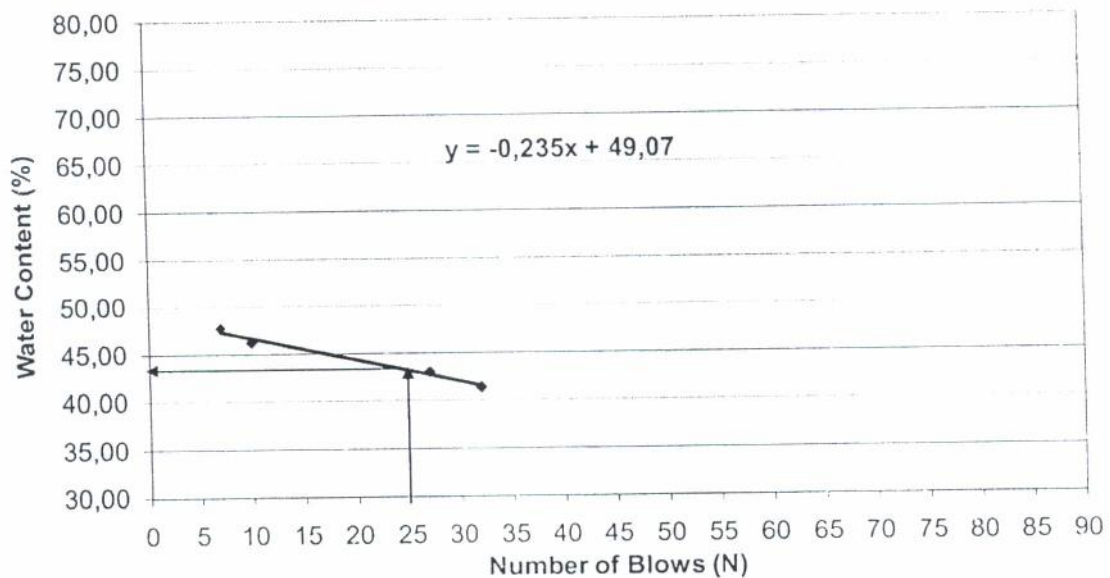
ATTERBERG LIMIT

PROJECT	KBN TANJUNG PRIOK	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	JAKARTA UTARA 0	TESTED BY	Endri A.
BOR HOLE NO	HB-2	CHECKED BY	Singgih S.
DEPTH	-2.50 - 3.m	DATE OF TESTED	Juli 2002

LIQUID LIMIT

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)	No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	3,57	4,63	4,32	32	41,33	1	3,53	6,55	5,78	34,22
2	3,71	4,94	4,57	27	43,02	LIQUID LIMIT , LL (%)			43,20	
3	3,46	4,82	4,39	10	46,24	PLASTIC LIMIT , PL (%)			34,22	
4	3,61	5,28	4,74	7	47,79	PLASTICITY INDEX , PI , (%)			8,97	





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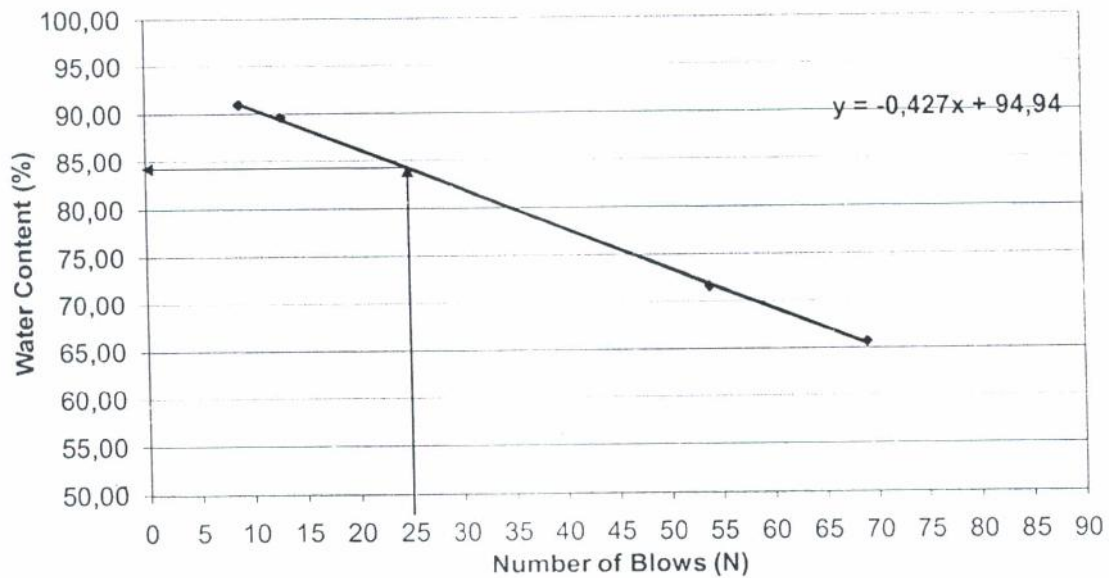
ATTERBERG LIMIT

PROJECT	KBN TANJUNG PRIOK	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	JAKARTA UTARA 0	TESTED BY	Endri A.
BOR HOLE NO	HB-2	CHECKED BY	Singgih S.
DEPTH	-4.00 - 4. m	DATE OF TESTED	Juli 2000

LIQUID LIMIT

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)	No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	3,65	4,18	3,97	69	65,62	1	3,72	6,07	5,13	66,67
2	3,55	4,82	4,29	54	71,62				LIQUID LIMIT , LL (%) 84,27	
3	3,62	4,17	3,91	13	89,66				PLASTIC LIMIT , PL (%) 66,67	
4	3,69	4,74	4,24	9	90,91				PLASTICITY INDEX , PI , (%) 17,60	





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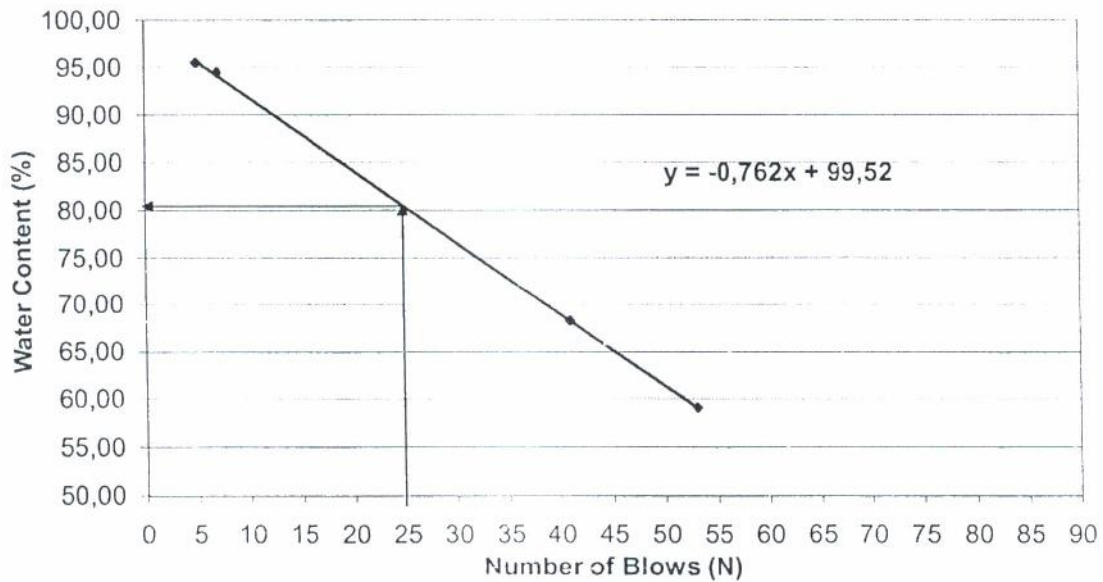
ATTERBERG LIMIT

PROJECT	KBN TANJUNG PRIOK	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	JAKARTA UTARA 0	TESTED BY	Endri A.
BOR HOLE NO	HB-2	CHECKED BY	Singgih S.
DEPTH	-6.00 - 6 m	DATE OF TESTED	Juli 2002

LIQUID LIMIT

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)	No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	3,62	4,32	4,06	53	59,09	1	3,76	6,82	5,97	38,46
2	3,55	4,61	4,18	41	68,25	LIQUID LIMIT , LL (%)			80,47	
3	3,69	4,39	4,05	7	94,44	PLASTIC LIMIT , PL (%)			38,46	
4	3,72	4,58	4,16	5	95,45	PLASTICITY INDEX , PI, (%)			42,01	

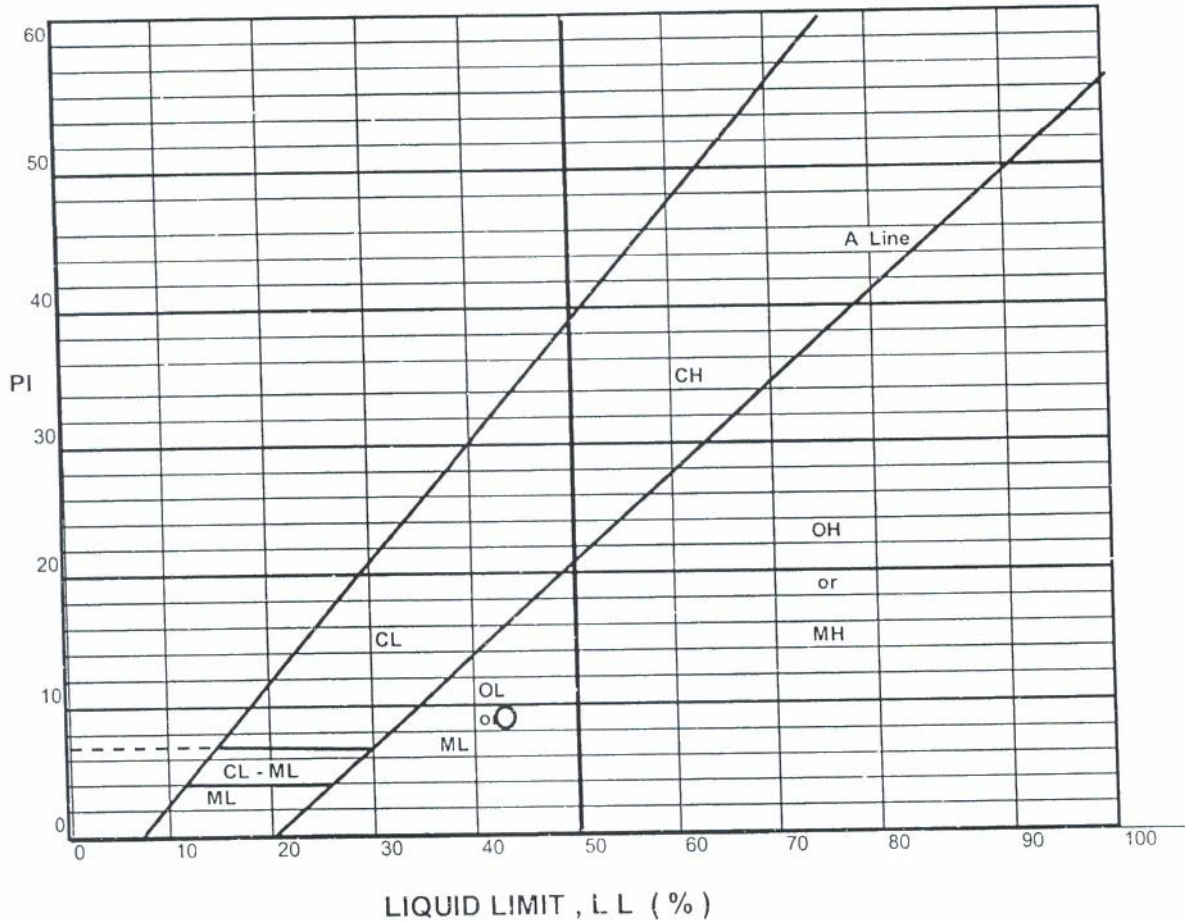




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PROJECT	KBN TANJUNG PRIOK	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	JAKARTA UTARA 0	TESTED BY	Budi D.
BOR HOLE NO	HB-2	CHECKED BY	Singgih S.
DEPTH	-2.50 - 3. m	DATE OF TESTED	Juli 2002

PLASTICITY CHART



SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM

OL or ML



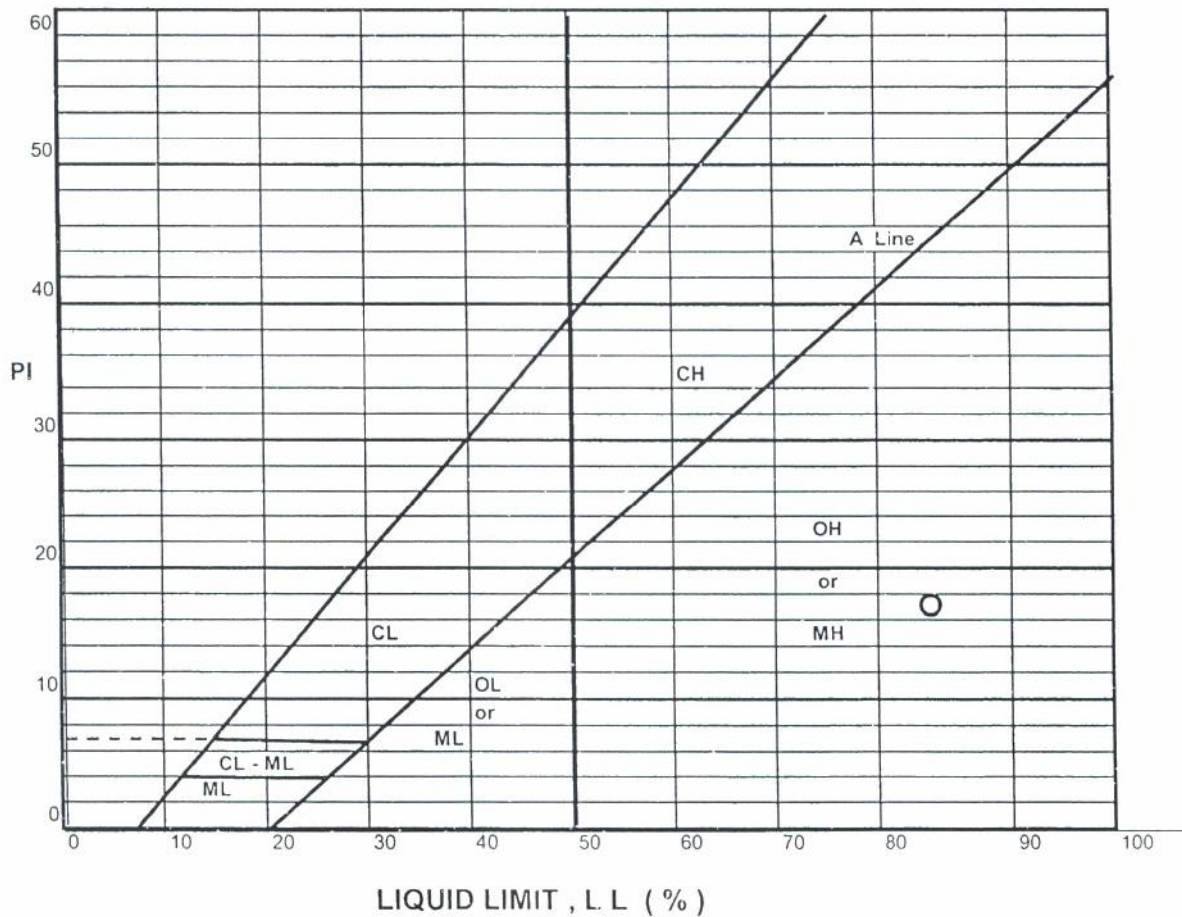
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PROJECT	KBN TANJUNG PRIOK	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	JAKARTA UTARA 0	TESTED BY	Budi D.
BOR HOLE NO	HB-2	CHECKED BY	Singgih S.
DEPTH	-4.00 - 4. m	DATE OF TESTED	Juli 2002

PLASTICITY CHART



SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM

OH or MH

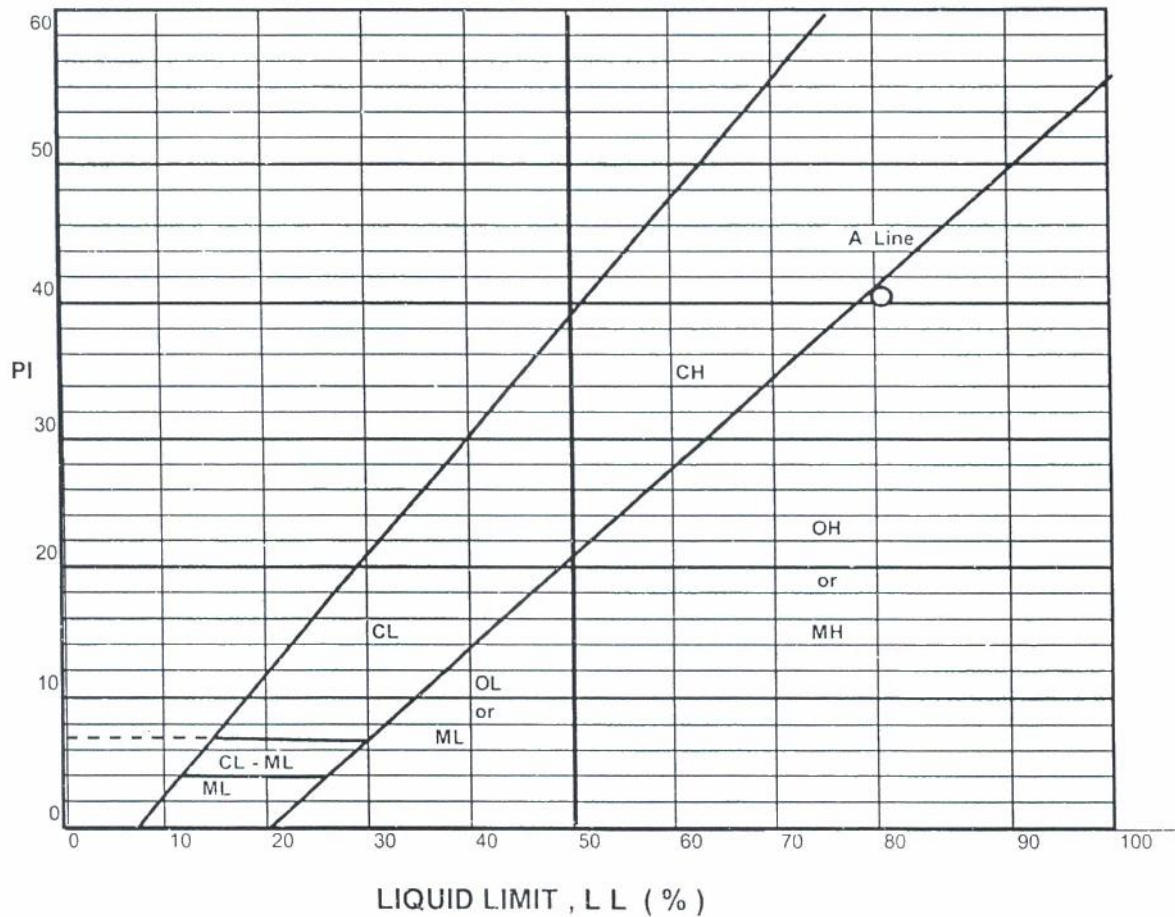


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PROJECT	KBN TANJUNG PRIOK	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	JAKARTA UTARA 0	TESTED BY	Budi D.
BOR HOLE NO	HB-2	CHECKED BY	Singgih S.
DEPTH	-6.00 - 6. m	DATE OF TESTED	Juli 2002

PLASTICITY CHART



SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM

OH or MH

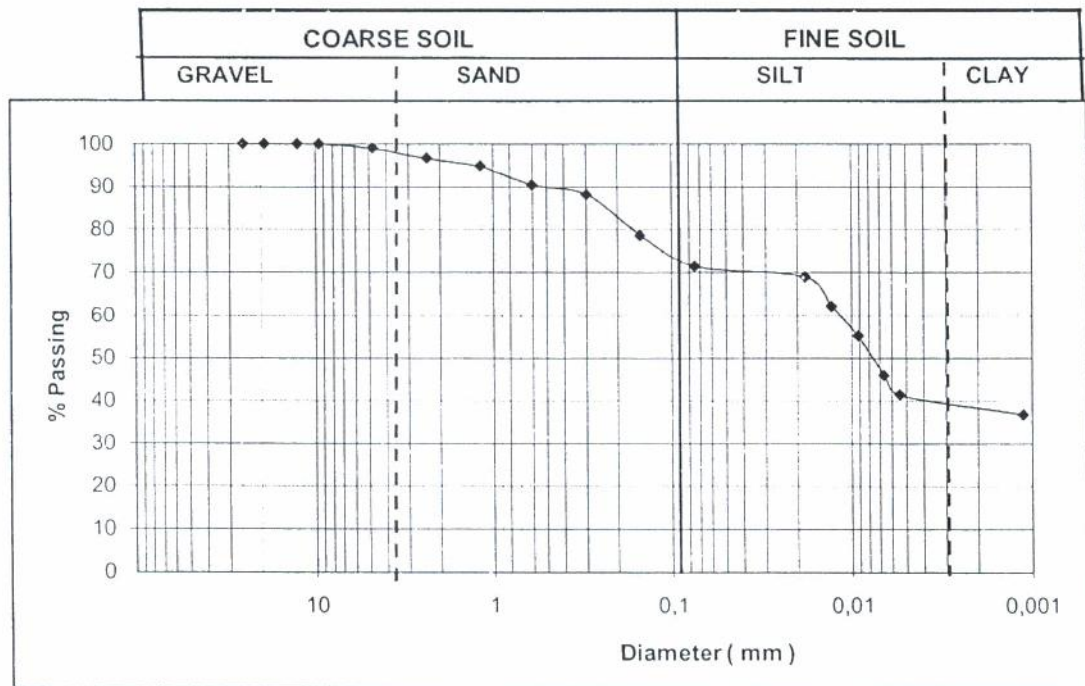


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GRAINED SIZE DISTRIBUTION

Project	KBN TANJUNG PRIOK	Depth od Sample	-2.50 - 3.00 meter
Location	JAKARTA UTARA	Date of Tested	Juli 2002
Bored No	HB-2	Checked by	Singgih S.



PARTICLE FRACTION OF SOIL

GRAVEL	0,95	%
SAND	27,500	%
SILT	31,550	%
CLAY	40,00	%



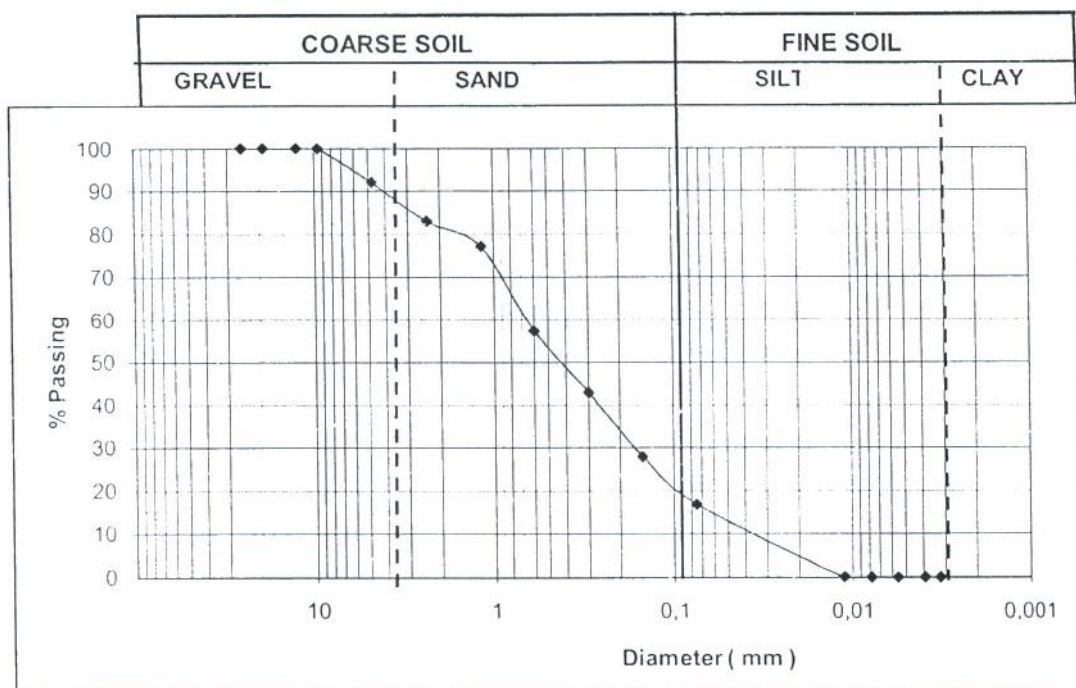
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GRAINED SIZE DISTRIBUTION

Project	KBN TANJUNG PRIOK	Depth of Sample	-4.00 - 4.50 meter
Location	JAKARTA UTARA	Date of Tested	Juli 2002
Bored No	HB-2	Checked by	Singih S.



PARTICLE FRACTION OF SOIL

GRAVEL	7,95	%
SAND	75,250	%
SILT	16,800	%
CLAY	0,00	%

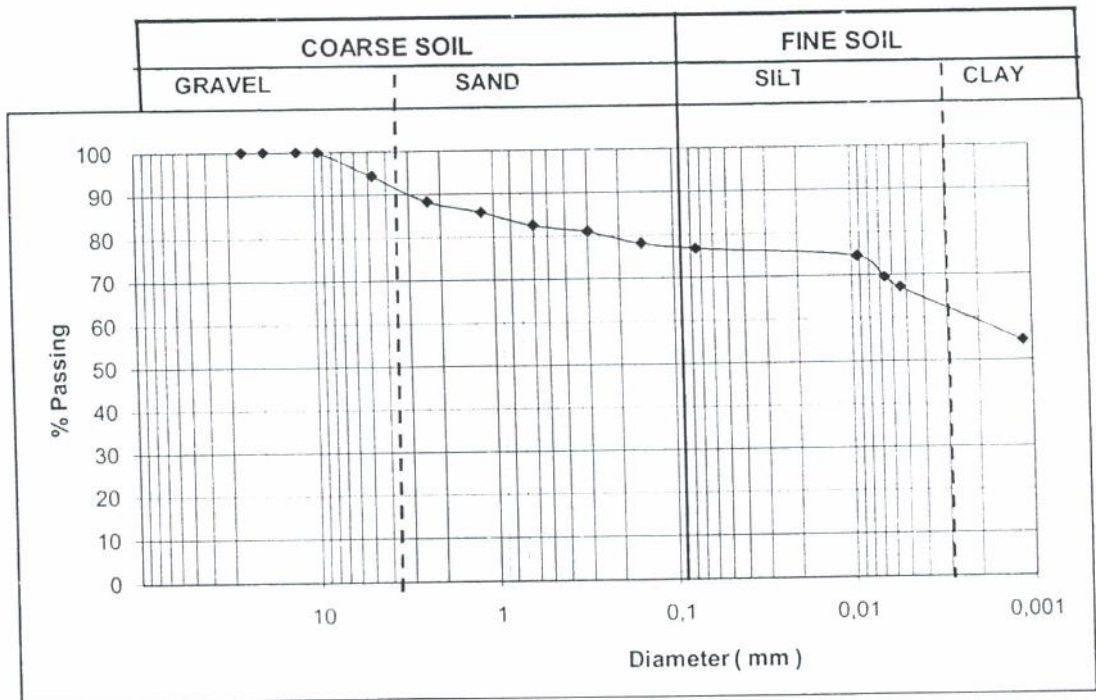


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GRAINED SIZE DISTRIBUTION

Project	KBN TANJUNG PRIOK	Depth od Sample	-6.00 - 6.50 meter
Location	JAKARTA UTARA	Date of Tested	Juli 2002
Bored No	HB-2	Checked by	Singgih S.



PARTICLE FRACTION OF SOIL

GRAVEL	5,65	%
SAND	17,500	%
SILT	14,850	%
CLAY	62,00	%



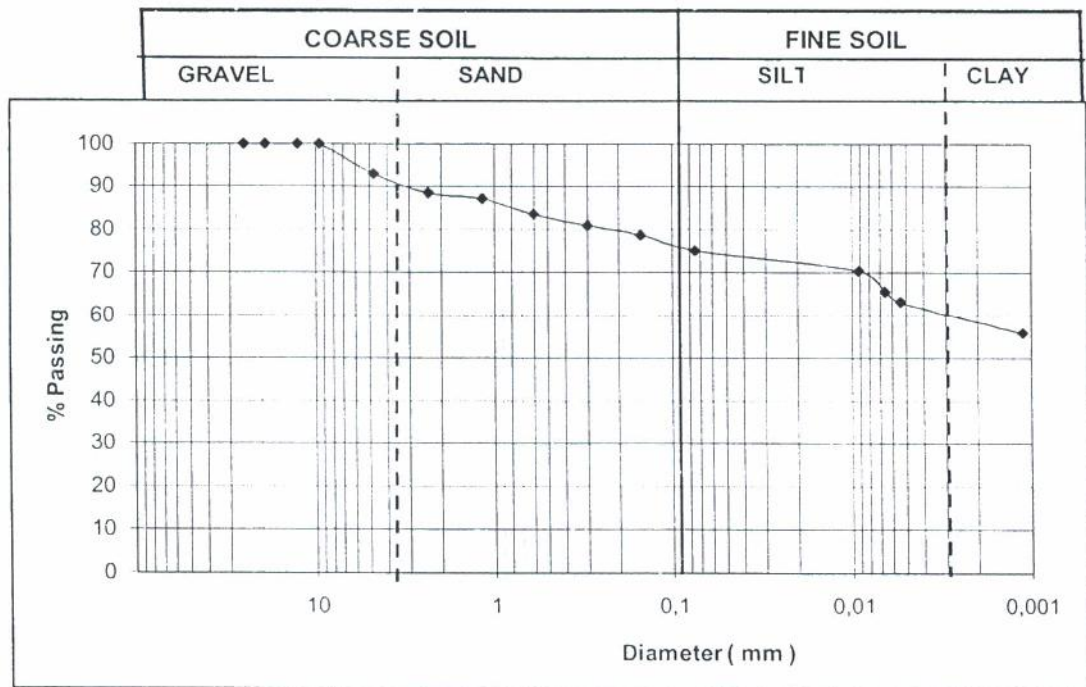
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GRAINED SIZE DISTRIBUTION

Project	KBN TANJUNG PRIOK	Depth od Sample	-3.00 - 3.50 meter
Location	JAKARTA UTARA	Date of Tested	Juli 2002
Bored No	HB-3	Checked by	Singgih S.



PARTICLE FRACTION OF SOIL

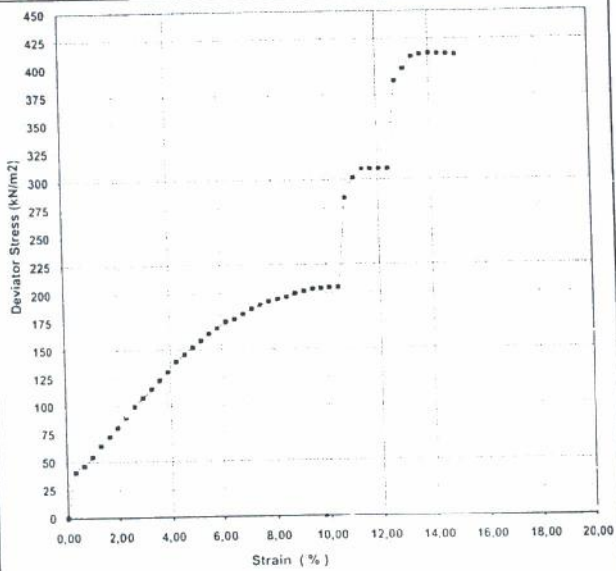
GRAVEL	7,00	%
SAND	17,900	%
SILT	15,100	%
CLAY	60,00	%



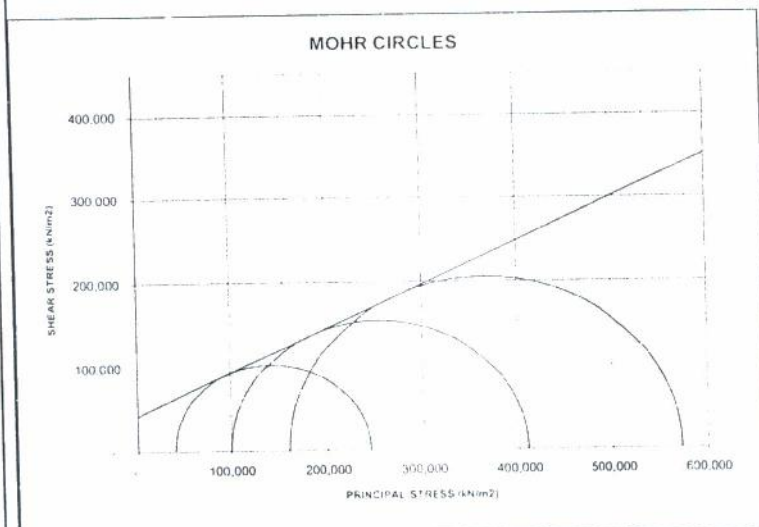
UU - TRIAXIAL COMPRESSION TEST

Location : JAKARTA UTARA
 Sample : HB-2
 Depth : 2.50 - 3.0 m

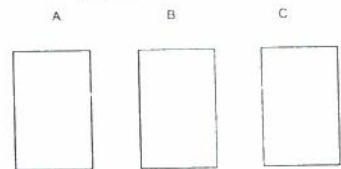
Sample type : Undisturbed
 Soil description : OL or ML
 Sample no. : 1
 UU Type of Tested : Multy Stage



SPECIMEN		1	2	3	
INITIAL	Height of Sample	cm	7,670	7,670	7,670
	Dia of Sample	cm	3,700	3,700	3,700
	Wet Soil		92,10	92,100	92,100
	Dry Soil		84,50	84,500	84,500
	Wet / Bulk density	g/m ³	1,12	1,117	1,117
	Moisture content	%	8,99	8,994	8,994
	Dry density	g/m ³	1,03	1,025	1,025



MODE OF FAILURE :



STRENGTH PARAMETERS

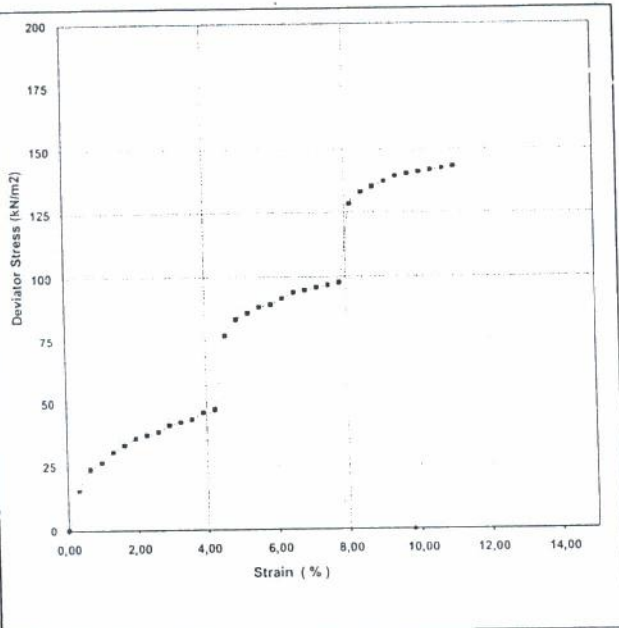
C	kN/m ²	42,60
ϕ	Degree	27,2



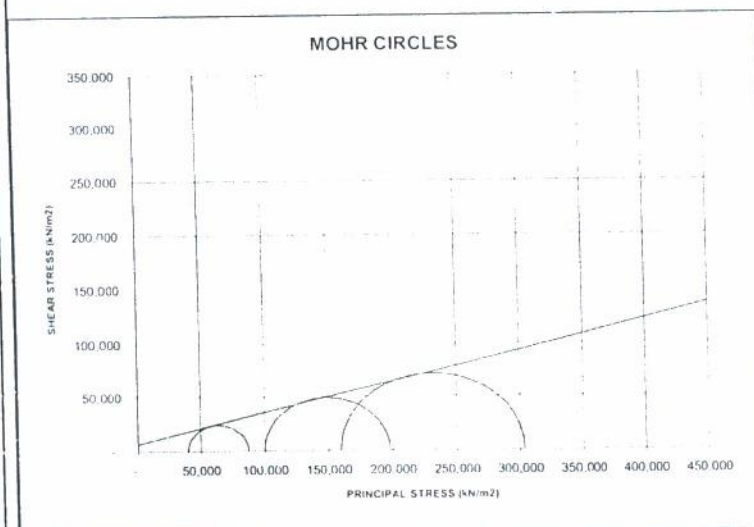
UU - TRIAXIAL COMPRESSION TEST

Location : JAKARTA UTARA
 Sample : HB-2
 Depth : -4.00 - 4.5 m

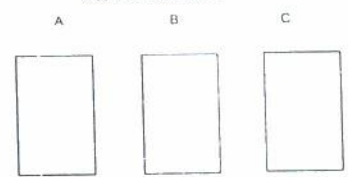
Sample type : Undisturbed
 Soil description : OH or MH
 Sample no. : 1
 UU Type of Tested : Mully Stage



SPECIMEN		1	2	3	
INITIAL	Height of Sample	cm	7,670	7,670	7,670
	Dia of Sample	cm	3,700	3,700	3,700
	Wet Soil		92,10	92,100	92,100
	Dry Soil		84,50	84,500	84,500
	Wet / Bulk density	gm/m ³	1,12	1,117	1,117
	Moisture content	%	8,99	8,994	8,994
	Dry density	gm/m ³	1,03	1,025	1,025



MODE OF FAILURE :



STRENGTH PARAMETERS

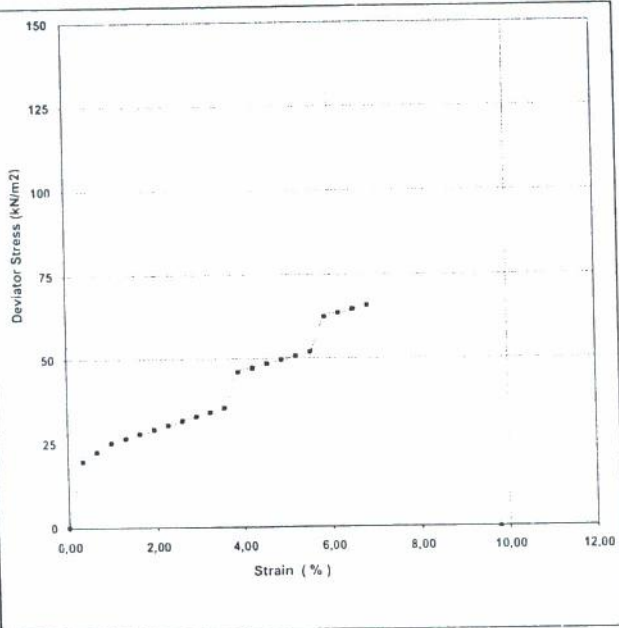
C	kN/m ²	6.75
φ	°	15.1 Degree



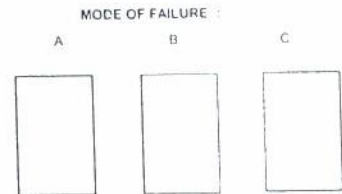
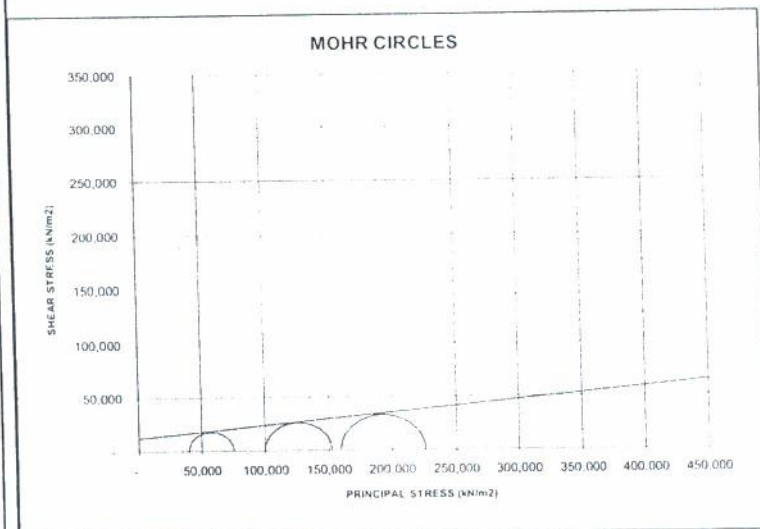
UU - TRIAXIAL COMPRESSION TEST

Location : JAKARTA UTARA
 Sample : HB-2
 Depth : -6.00 - 6.5 m

Sample type : Undisturbed
 Soil description : OH or MH
 Sample no. : 1
 UU Type of Tested : Multy Stage



SPECIMEN		1	2	3	
INITIAL	Height of Sample	cm	7,670	7,670	7,670
	Dia of Sample	cm	3,700	3,700	3,700
	Wet Soil		92,10	92,100	92,100
	Dry Soil		84,50	84,500	84,500
	Wet / Bulk density	grm/m³	1,12	1,117	1,117
	Moisture content	%	8,99	8,994	8,994
	Dry density	grm/m³	1,03	1,025	1,025



STRENGTH PARAMETERS

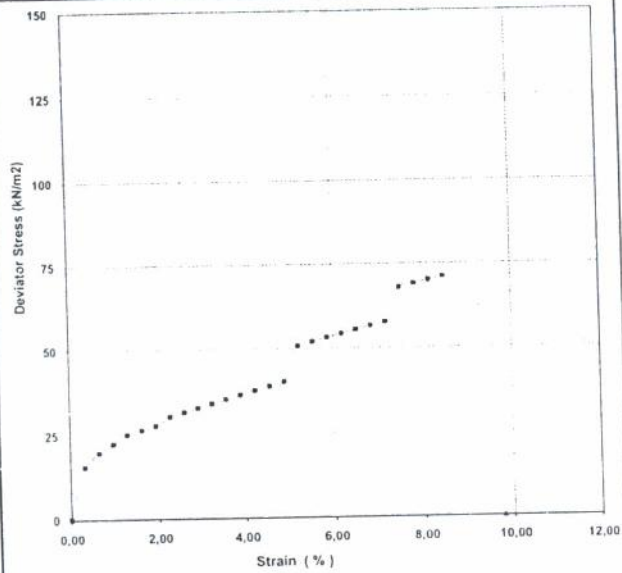
C	kN/m²	12,37
φ	°	6,7 Degree



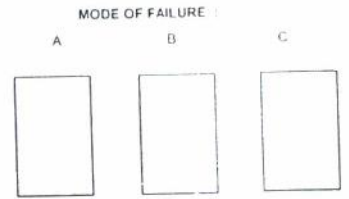
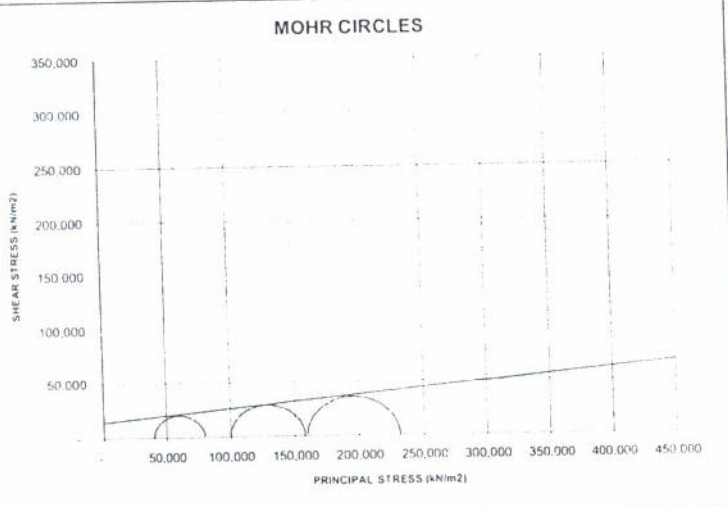
UU - TRIAXIAL COMPRESSION TEST

Location : JAKARTA UTARA
 Sample : HB-3
 Depth : -3.00 - 3.5 m

Sample type : Undisturbed
 Soil description : OH or MH
 Sample no. : 1
 UU Type of Tested : Multy Stage



SPECIMEN		1	2	3	
INITIAL	Height of Sample	cm	7,670	7,670	7,670
	Dia of Sample	cm	3,700	3,700	3,700
	Wet Soil		92,10	92,100	92,100
	Dry Soil		84,50	84,500	84,500
INITIAL	Wet / Bulk density	gm/m ³	1,12	1,117	1,117
	Moisture content	%	8,99	8,994	8,994
	Dry density	gm/m ³	1,03	1,025	1,025



STRENGTH PARAMETERS

C	kN/m ²	14.43
φ	°	6.7 Degree



LABORATORIUM MEKANIKA TANAH

INSTITUT SAINS DAN TEKNOLOGI NASIONAL

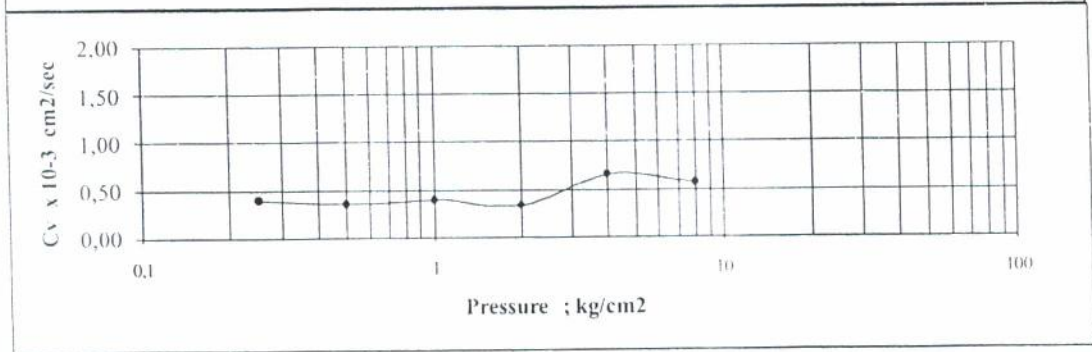
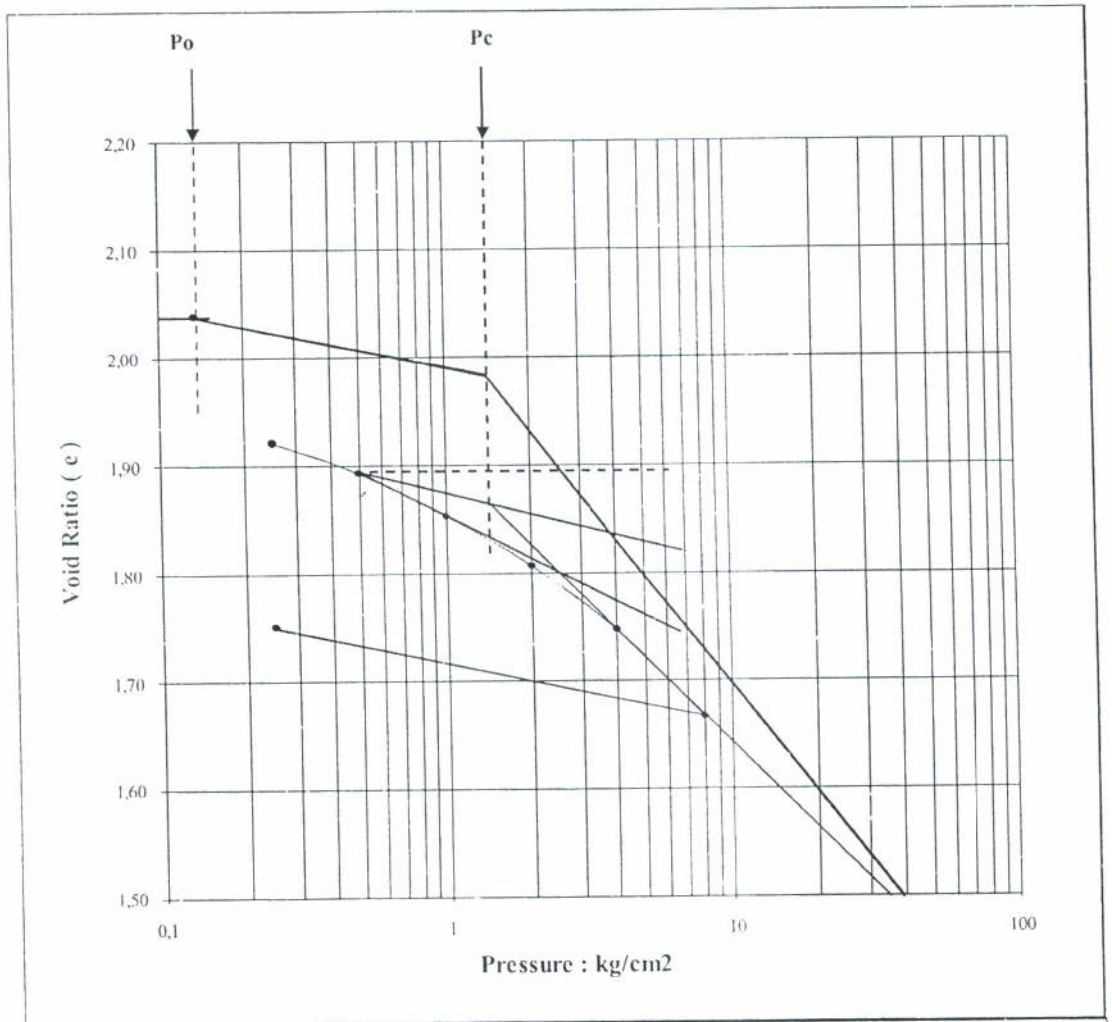
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA - JAKARTA 12640
 TELPON. 021 98189554 FAX. 021 78893379

CONSOLIDATION TEST

Project : KBN TANJUNG PRIOK	Depth of Sample : -2.50 - 3.00 meter
Location : JAKARTA UTARA	Date of Tested Juli 2002
No. Bor : HB-2	Tested by Endri A.

eo =	2,039
Po =	0,135 kg/cm ²
Pc =	1,50 kg/cm ²
w =	39,01 %

Cc =	0,340
Cv =	0,45 x 10 ⁻³ cm ² / sec
Cr =	0,060





**LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL**

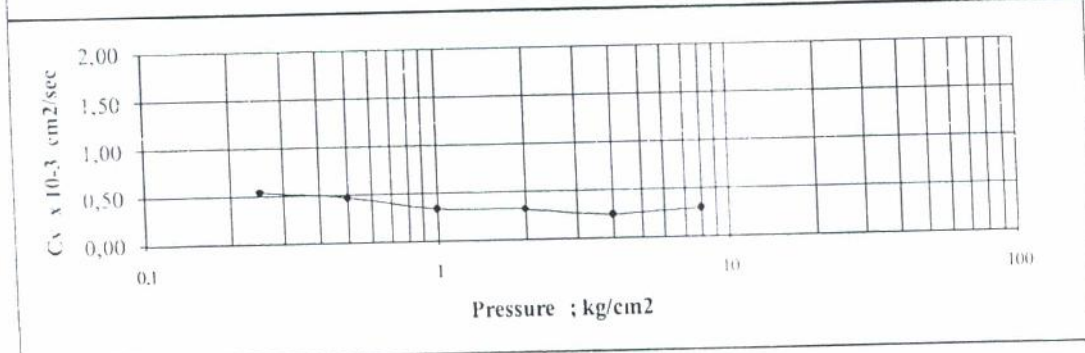
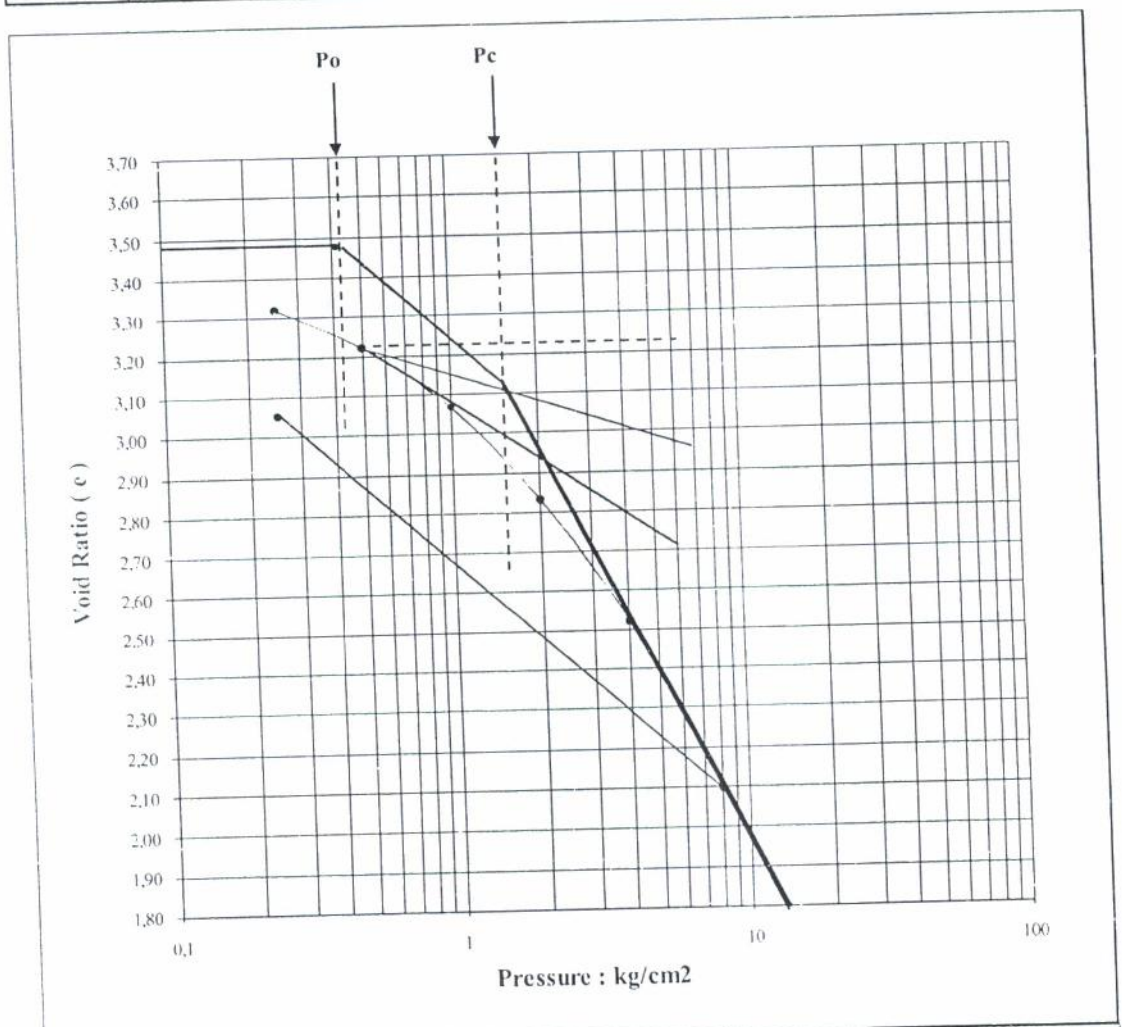
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA - JAKARTA 12640
TELPON. 021 98189554 FAX. 021 78893379

CONSOLIDATION TEST

Project : KBN TANJUNG PRIOK	Depth of Sample : -4.00 - 4.50 meter
Location : JAKARTA UTARA	Date of Tested : Juli 2002
No. Bor : HB-2	Tested by : Endri A.

eo =	3,479
Po =	0,413 kg/cm ²
Pc =	1,60 kg/cm ²
w =	74,70 %

Cc =	1,360
Cv =	0,36 x 10 ⁻³ cm ² / sec
Cr =	0,640





**LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL**

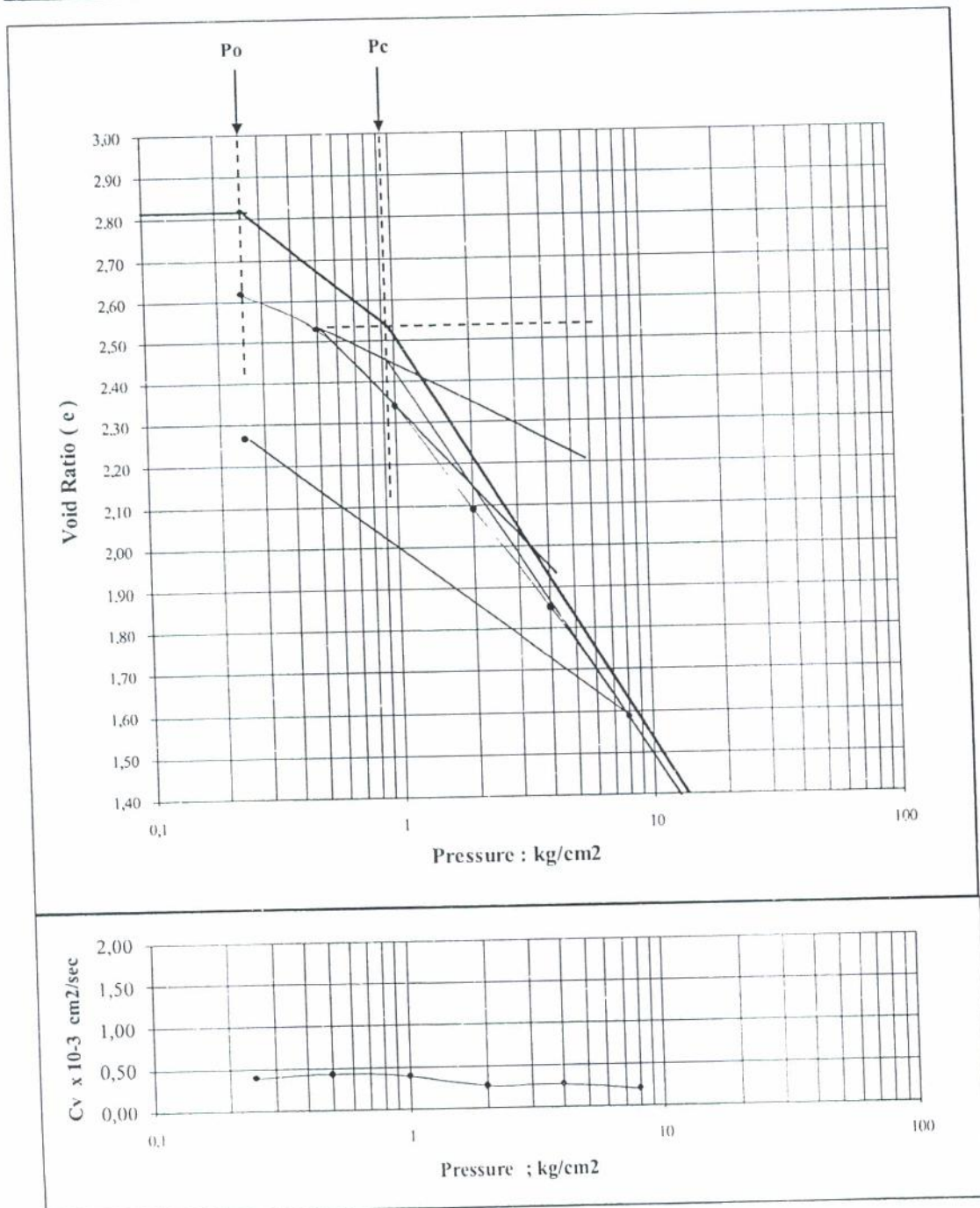
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA - JAKARTA 12640
TELPON. 021 98189554 FAX . 021 78893379

CONSOLIDATION TEST

Project : KBN TANJUNG PRIOK	Depth of Sample : -6.00 - 6.50 meter
Location : JAKARTA UTARA	Date of Tested Juli 2002
No. Bor : HB-2	Tested by Endri A.

$e_o =$	2,818
$P_o =$	0,255 kg/cm ²
$P_c =$	0,94 kg/cm ²
$w =$	63,95 %

$C_c =$	0,930
$C_v =$	0,32 x 10 ⁻³ cm ² / sec
$C_r =$	0,450



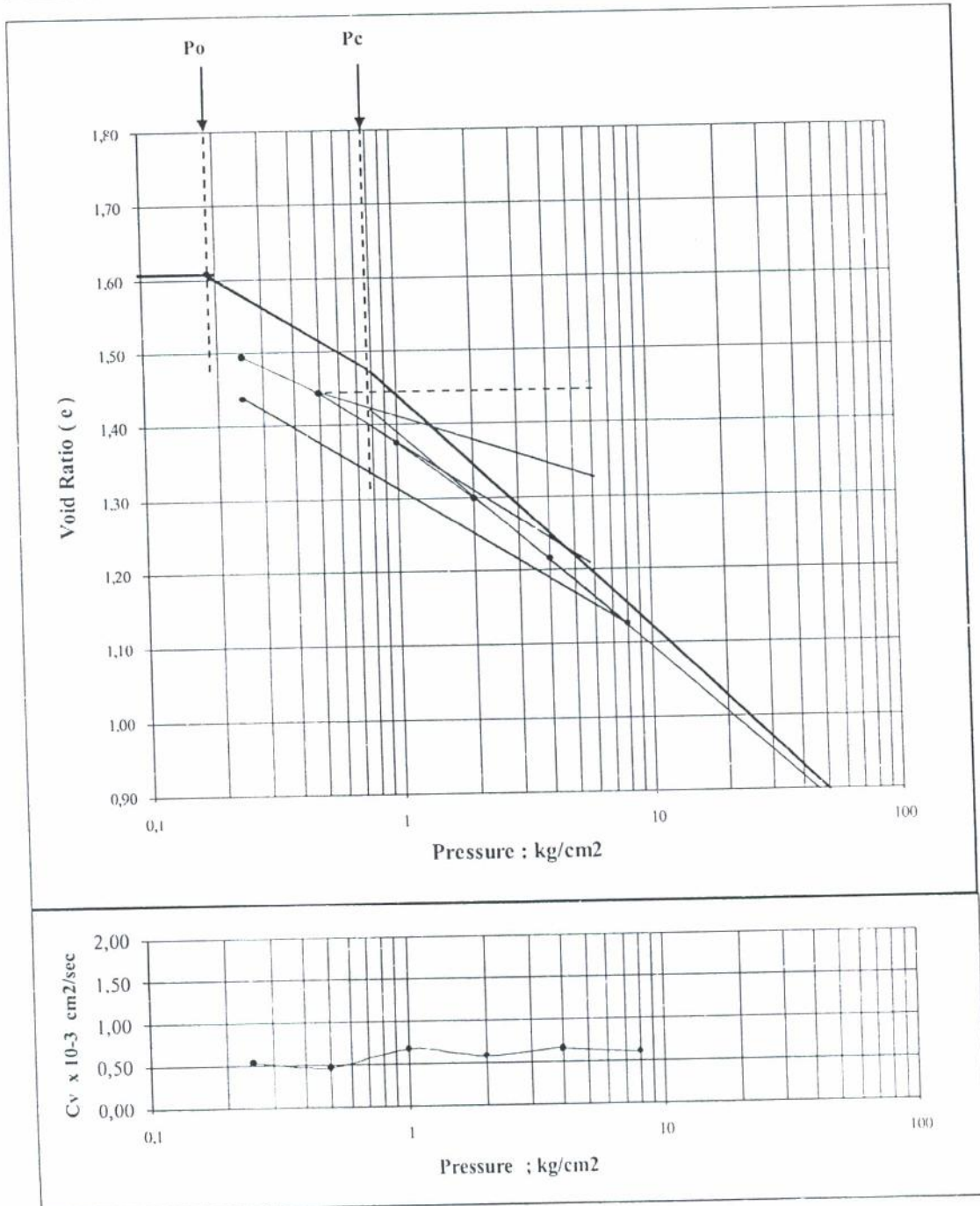


CONSOLIDATION TEST

Project : KBN TANJUNG PRIOK	Depth of Sample : -3.00 - 3.50 meter
Location : JAKARTA UTARA	Date of Tested Juli 2002
No. Bor : HB-3	Tested by Endri A.

$e_0 =$	1,609
$P_0 =$	0,186 kg/cm^2
$P_c =$	0,78 kg/cm^2
$w =$	25,62 %

$C_c =$	0,290
$C_v =$	0,58 $\times 10^{-3} \text{ cm}^2 / \text{sec}$
$C_r =$	0,200



ISTN Soil Mechanics Laboratory

PLATE BEARING TEST

I.S.T.N SOIL MECHANICS LABORATORY

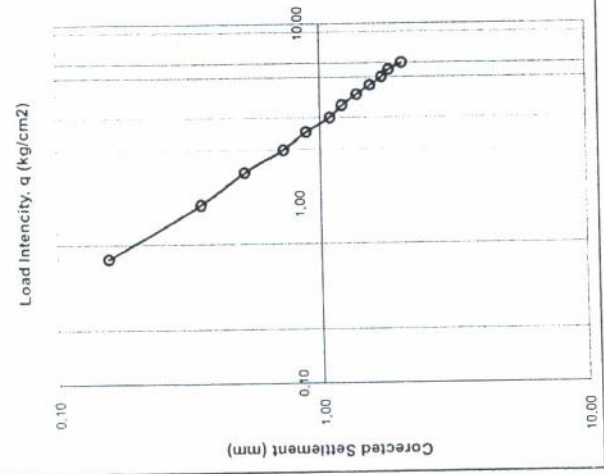
PLATE BEARING TEST

Date : 04-08-2002
 Weather : Budy CS
 Tested by : Mukhtaram
 Recorected by : Ir. Idrus M.Sc
 Checked by

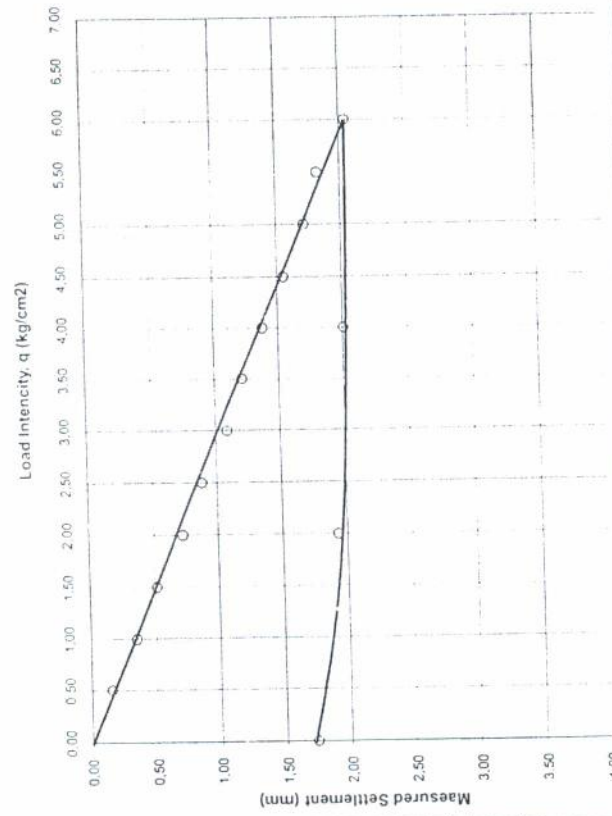
COORDINATE : N =
 : E =
 ELEVATION

PROJECT : KBN CONTAINER YARD
 LOCATION : CONTAINER YARD, TANJUNG PRIOK
 NOMOR : PB-1
 DEPTH : SURFACE BASE LAYER
 DESCRIPT. : Compacted Gravel Layer (SIRTU)

LOGARITHMIC LOAD SETTLEMENT DIAGRAM



ARITHMETIC LOAD SETTLEMENT DIAGRAM

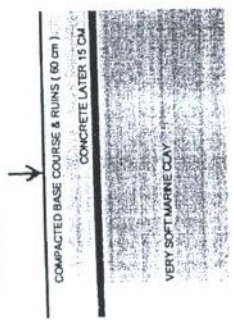


Load (kg)	Pressure Load Intensity kg/cm ²	Settlement	
		Measure d (m)	(mm)
0	0	0	0
353	0.50	0.0061	0.155
706	1.00	0.0138	0.350
1060	1.50	0.0203	0.515
1413	2.00	0.0285	0.725
1766	2.50	0.0348	0.885
2119	3.00	0.0429	1.090
2473	3.50	0.0478	1.215
2826	4.00	0.0543	1.380
3179	4.50	0.0610	1.550
3532	5.00	0.0675	1.715
3886	5.50	0.0719	1.825
4239	6.00	0.0805	2.045
Rebound			
2826	4.00	0.0543	2.010
1413	2.00	0.0610	1.930
0	0.00	0.0675	1.740

PLATE DIAMETER : 11.8110 inchi
 AREA : 109.5077 sc/in
 : 706.5 sc/cm

	YIELD POINT	WORKING LOAD	MAXIMUM LOAD
Pressure (Load Intensity)	kg/cm ²	2,000	6,000
Settlement	mm	0.725	2.045
Zero Correction	mm	0.000	0.000
Corrected Settlement	mm	0.725	2.045
Modulus Subgrade Reaction	kg/cm ³	27.586	29.340
Kv = q / δ	kg/ft ³	781153.103	830810.758
Kv1 = ((16 R2 / (2R + 1)) K v ; R in ft	kg/ft ³	781153.103	830810.758
MODULUS ELASTICITY	kg/ft ²	651188.756	692584.618
Es = 0.95 Kv1 (1 - μ2)	kg/cm ²	700.938	745.497
For Gravel μ		0.350	0.350

REMARK:



I.S.T.N SOIL MECHANICS LABORATORY

COEF . OF SUBGRADE REACTION (Kv)

Date : 04-08-2002
 Weather : Budy CS
 Tested by : Mukhtarom
 Recorected by : Ir. Idrus M.Sc
 Checked by

COORDINATE : N =
 E =

ELEVATION

PROJECT : KBN CONTAINER YARD
 LOCATION : CONTAINER YARD, TANJUNG PRIOK
 NOMOR : PB-1
 DEPTH : SURFACE BASE LAYER
 DESCRIPT. : Compacted Gravel Layer (SIRTU)

Load (kg)	Pressure Load Intensity kg/cm ²	Settlement		Coef of Subgrade Reaction (Kv)	
		Measure d (in)	(mm)	kg/cm ³	kg/ft ³
0	0	0	0	32.267	913710.688
353	0.50	0.0061	0.155	28.571	809039.876
706	1.00	0.0138	0.350	29.129	824833.230
1050	1.50	0.0203	0.515	27.586	781141.949
1413	2.00	0.0285	0.725	28.250	799946.972
1766	2.50	0.0348	0.885	27.522	779350.339
2119	3.00	0.0429	1.090	28.807	815734.178
2473	3.50	0.0478	1.215	28.985	820765.092
2826	4.00	0.0543	1.380	29.033	822116.763
3179	4.50	0.0610	1.550	29.154	825550.894
3532	5.00	0.0675	1.715	30.137	853394.488
3886	5.50	0.0719	1.825	29.339	830798.895
4239	6.00	0.0805	2.045	29.065	823031.947
The average Coefficient of Subgrade Reaction (Kv)				29.065	823031.947

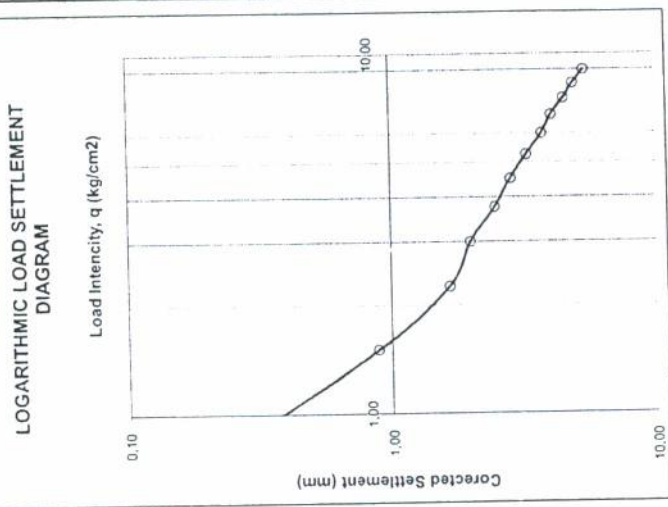
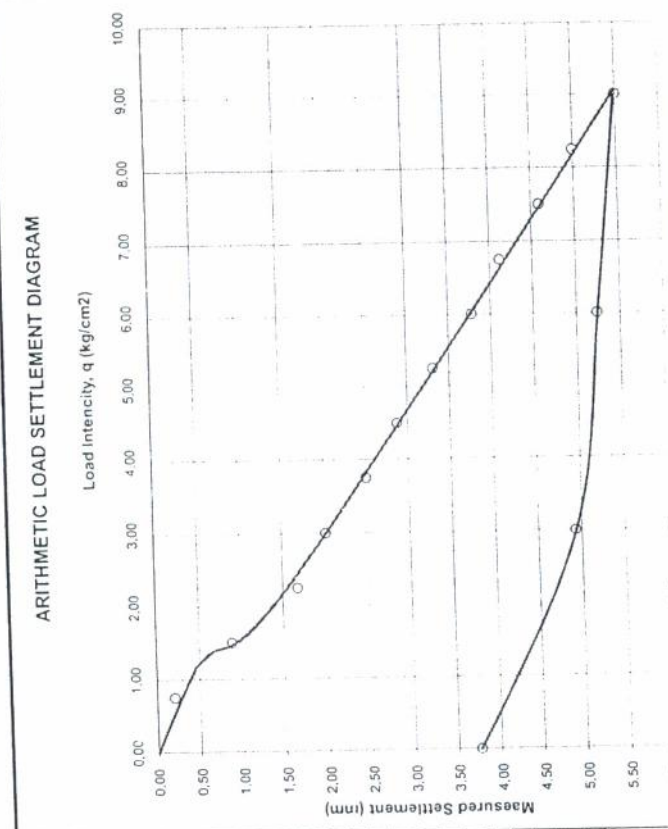
I.S.T.N SOIL MECHANICS LABORATORY

PLATE BEARING TEST

Date : 04-08-2002
 Weather :
 Tested by : Budy CS
 Recorrected by : Mukhtarom
 Checked by : Ir. Idrus M.Sc

COORDINATE : N =
 : E =
 ELEVATION

PROJECT : KBN CONTAINER YARD
 LOCATION : CONTAINER YARD, TANJUNG PRIOK
 NOMOR : PB-2
 DEPTH : SURFACE BASE LAYER
 DESCRIPT. : Compacted Gravel Layer (SIRTU)



Load (kg)	Pressure Load Intensity kg/cm ²	Settlement	
		Measure d (in)	(mm)
0	0	0	0
530	0.75	0.0081	0.205
1060	1.50	0.0350	0.890
1590	2.25	0.0657	1.670
2120	3.00	0.0791	2.010
2650	3.75	0.0984	2.500
3179	4.50	0.1134	2.860
3709	5.25	0.1303	3.310
4239	6.00	0.1488	3.780
4769	6.75	0.1620	4.115
5299	7.50	0.1807	4.590
5829	8.25	0.1965	4.990
6359	9.00	0.2165	5.500
Rebound			
4239	6.00	0.2061	5.235
2120	3.00	0.1939	4.925
0	0.00	0.1482	3.765

PLATE DIAMETER : 11.8110 inch
 AREA : 109.5077 sq/in
 : 706.5 sq/cm

	YIELD POINT		WORKING LOAD		MAXIMUM LOAD	
	kg/cm ²	mm	kg/cm ²	mm	kg/cm ²	mm
Pressure (Load Intensity)	q		3,000	2,010	9,000	5,500
Settlement	δ ₁		mm	mm	mm	mm
Zero Correction	δ ₂		mm	mm	mm	mm
Corrected Settlement	δ = δ ₁ - δ ₂		mm	mm	mm	mm
Modulus Subgrade Reaction			kg/cm ³	kg/cm ³	kg/cm ³	kg/cm ³
K _v = q / δ			422638.806	14,925	463365.818	16,364
K _{v1} = ((16 R ₂ / (2R + 1)) K _v ; R in ft			422638.806	kg/ft ³	463365.818	kg/ft ³
MODULUS ELASTICITY			352322.275	kg/ft ²	386273.330	kg/ft ²
E _s = 0.95 K _{v1} (1 - μ ₂)			379,239	kg/cm ²	415,784	kg/cm ²
For Gravel μ			0.350		0.350	

REMARK :



COMPACTED BASE COURSE & RUINS (60 cm)

CONCRETE LAYER 15 CM



VERY SOFT WARM CLAY

I.S.T.N SOIL MECHANICS LABORATORY

COEF . OF SUBGRADE REACTION (Kv)

Date : 04-08-2002
 Weather : Budy CS
 Tested by : Mukhtarom
 Recorrected by : Ir. Idrus M.Sc
 Checked by

COORDINATE : N =
 : E =
 ELEVATION

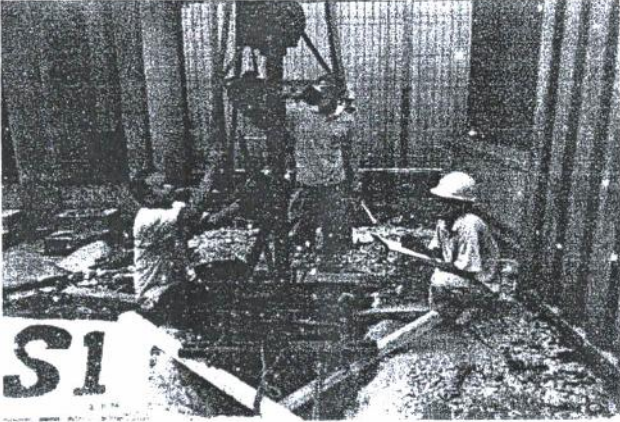
PROJECT : KBN CONTAINER YARD
 LOCATION : CONTAINER YARD, TANJUNG PRIOK
 NOMOR : PB-2
 DEPTH : SURFACE BASE LAYER
 DESCRIPT. : Compacted Gravel Layer (SIRTU)

Load (kg)	Pressure Load Intensity kg/cm ²	Settlement		Coef of Subgrade Reaction (Kv)		
		Measure d (in)	(mm)	kg/cm ³	kg/ft ³	
0	0	0	0	36,588	1036043,584	
530	0.75	0,0081	0,205	16,855	477278,505	
1060	1.50	0,0350	0,890	13,474	381537,008	
1590	2.25	0,0657	1,670	14,926	422664,547	
2120	3.00	0,0791	2,010	15,001	424777,869	
2650	3.75	0,0984	2,500	15,626	442476,947	
3179	4.50	0,1134	2,880	15,862	449160,889	
3709	5.25	0,1303	3,310	15,874	449500,391	
4239	6.00	0,1488	3,780	16,404	464520,149	
4769	6.75	0,1620	4,115	16,341	462720,991	
5299	7.50	0,1807	4,590	16,534	468192,040	
5829	8.25	0,1965	4,990	16,365	463394,039	
6359	9.00	0,2165	5,500	17,487	495188,913	
The average Coefficient of Subgrade Reaction (Kv)					17,487	495188,913

ISTN Soil Mechanics Laboratory

SITE PHOTOGRAPH

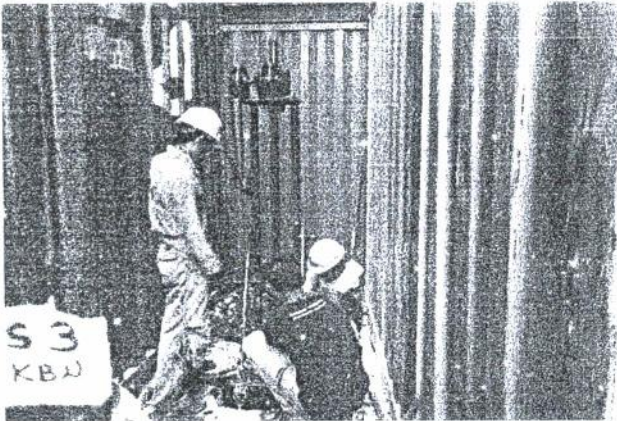
FOTO SITE : KBN TANJUNG PRIOK
JAKARTA UTARA



S-1



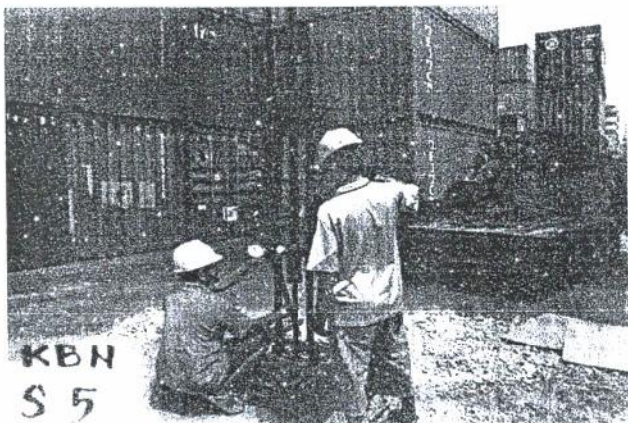
S-2



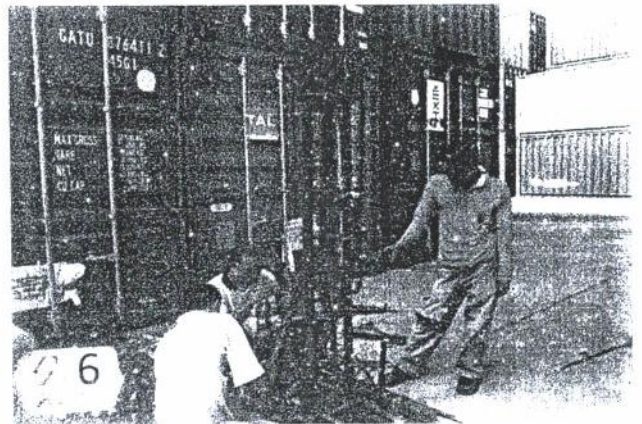
S-3



S-4

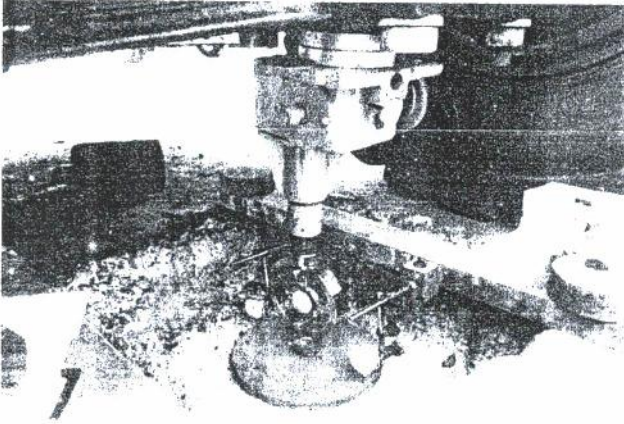


S-5

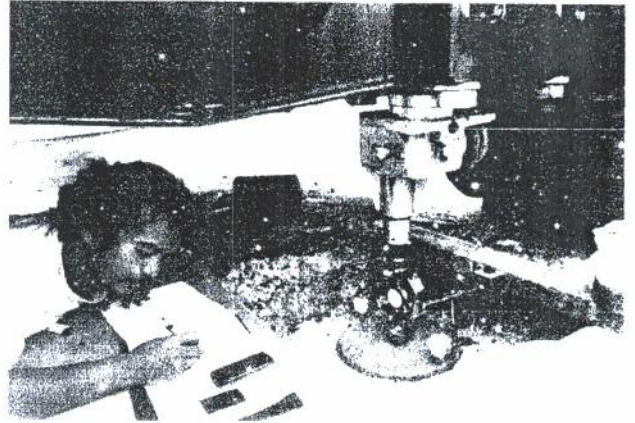


S-6

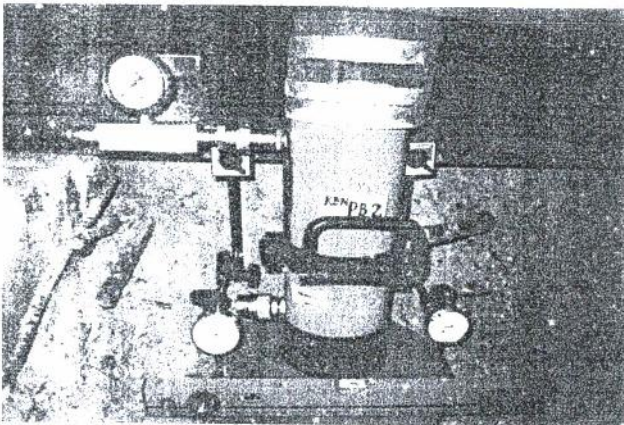
FOTO SITE : KBN TANJUNG PRIOK
JAKARTA UTARA



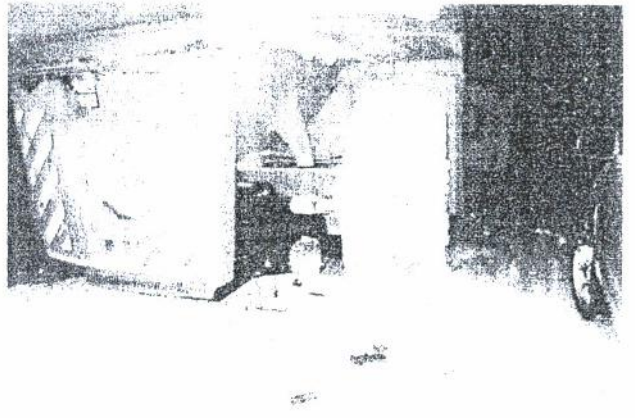
PBT-1



PBT-1



PBT-2



PBT-2