C-96

YAYASAN PERGURUAN "CIKINI"
INSTITUT
SAINS DAN TEKNOLOGI
NASIONAL
I S T N

FAKULTAS TEKNIK SIPIL
DAN PERENCANAAN
JURUSAN TEKNIK SIPIL

PENUGASAN

No : 07-02/PM/LM/II/12

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 Pembangunan Gardu Induk 150 KV
Lokasi	:	Cilegon Baru, Cilegon, Banten
Pemberi Tugas	:	PT. ARYA SADA CONSORTIUM

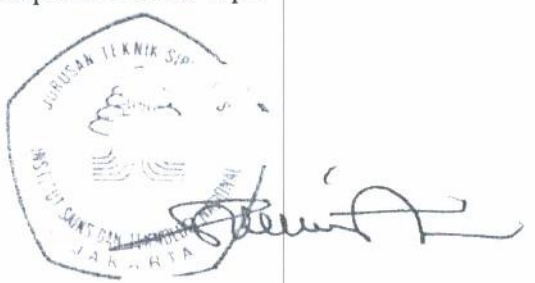
Dengan jadwal pelaksanaan pekerjaan selama 30 hari kerja (240 Jam), 15 hari di lapangan dan 15 hari di Laboratorium

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, 7 februari 2012
Kaprodi Teknik Sipil



Ir. Ismail Junaedy MT
NIP : 01.88067

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

LEMBAR PENGESAHAN
PENGABDIAN PADA MASYARAKAT

ISTN

PENYELIDIKAN TANAH PEMBANGUNAN GARDU INDUK 150 kV
Lokasi : Cilegon Baru, Cilegon

Oleh :
Idrus Ir, M.Sc

Mengetahui :
Ketua Jurusan Teknik Sipil

Ir. Ismail Djunaedy, M.T

Program Studi Teknik Sipil
Institut Sain dan Teknologi Nasonal

Jakarta 2012

FINAL REPORT

SOIL INVESTIGATION

PROJECT :

PEMBANGUNAN GARDU INDUK 150KV

CILEGON BARU II

LOCATION :

KRAMAT WATU, SERANG, BANTEN

Maret 2012

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

Jakarta , Maret 2012

No : 11-03.2/FR/LM/III/2012

KEPADA YTH.

ARYA SADA CONSORTIUM

Di

JAKARTA

Perihal : Laporan akhir penyelidikan tanah Perencanaan GI 150 KV CILEGON BARU II

Dengan hormat,

Bersama ini kami sampaikan hasil Final Report Penyelidikan Tanah pada Proyek Perencanaan GI 150 KV CILEGON BARU II, di Cilegon , Banten.

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

- 6 titik CPT / Sondir
- 4 titik bor dalam @20m dengan undisturbed sampling

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

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

DAFTAR ISI

FINAL REPORT
SOIL INVESTIGATION
Proyek : Gardu Induk (GI) 150 KV
NEW CILEGON II
Lokasi : Kramat Watu, Serang, Banten

I. PENDAHULUAN :

Sehubungan dengan permohonan dari ARYA SADA CONSORTIUM kepada Laboratorium Mekanika Tanah ISTN untuk melakukan pekerjaan penyelidikan tanah pada rencana Gardu Induk 150 kv New Cilegon, Banten, maka kami akan melaporkan pekerjaan tersebut dalam Final Report (Laporan Akhir) dari hasil pekerjaan pengujian sondir / CPT pada pekerjaan tersebut.

Pekerjaan dilapangan telah kami laksanakan pada tanggal 09 – 17 Februari 2012, yang dilanjutkan dengan pekerjaan di Laboratorium hinggal tanggal 8 Maret 2012

Jumlah titik pengujian yang dilakukan :

- 4 (empat) titik bor dalam @ 20 meter, SPT Test
- 6 (enam) titik CPT / Sondir kapasitas 2,5 tonf

Pada laporan akhir ini meliputi hasil penyelidikan lapangan guna mengetahui mechanical properties dan physical properties. Dari pengujian CPT/sondir didapat informasi tentang kondisi lapisan tanah (konsistensi tanah) secara visual hingga kedalaman lapisan tanah keras yang ditunjukkan dengan tahanan ujung konus > 100 kg/cm^2.

II. PENYELIDIKAN DI LAPANGAN.

Pelaksanaan penyelidikan dilapangan pada proyek ini meliputi :

- Deep Boring (Bor Dalam) 4 titik @ 20 meter
- CPT (sondir) kapasitas 2,50 tonf, 6 titik.

2.1. Peralatan :

1 (satu) set mesin CPT (sondir) kapasitas 2,5 tonf lengkap.

1 (satu) alat bor dalam type Cano lengkap dengan thin walled sampler (tabung contoh) dengan diameter 75 mm panjang 60 cm tebal tabung 2,00 mm.

2.2. Metode Pelaksanaan.

Deep Boring

Pengeboran dilakukan secara terus menerus dengan cara Rotary Core Drilling dengan menggunakan Single Core Barrel.

Deskripsi lapisan tanah secara visual dilakukan terus menerus sepanjang lubang pengeboran. Semua contoh tanah dari hasil Coring, Shoe SPT, disimpan dalam kantong plastik tertutup, lengkap dengan keterangannya

Untuk mengatasi kelongsoran dinding tanah setelah dilakukan pengeboran, adakalanya digunakan cassing (pipa pelindung) dengan diameter 100 mm.

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 persayaratan 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.

Standard Penetration Test

SPT dilakukan pada saaat pengeboran berlangsung pada interval kedalaman 2,00 meter. Berat hammer SPT sebesar 140 lbs dijatuhkan bebas pada ketinggian 30 inches secara semi automatis.

Pada pengujian SPT dihitung jumlah pukulan (N) pada 3 kali penetrasi 15 cm, dimana nilai N-SPT diambil dengan menjumlahkan jumlah pukulan pada 2 x 15 cm penetrasi terakhir (Penetrasi 15 cm pertama tidak dihitung)

Hasil uji SPT ini dinyatakan dalam N-SPT yang hasilnya disajikan dalam boring log terlampir, dan digambarkan secara visual konsistensi lapisan tanah dengan nilai N-SPT terhadap kedalaman.

Secara umum, seluruh pengujian dilapangan mengikuti standard uji dari American Standard for Testing Material (ASTM)

Cone Penetration Test (Sondir)

Konus yang digunakan adalah frictionconus (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 (qc) dan total friction (tf) 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.

2.3. Jumlah dan Hasil Penyelidikan .

Uji Depth Boring Booring sebanyak 4 (empat) titik

No Depth Boring	Kedalaman (meter)	UD Sampling (Tabung)	SPT (Test)	Muka Air Tanah (m)
DB-1	-20,00	2	10	-1,50
DB-2	-20,00	2	10	-1,50
DB-3	-20,00	2	10	-1,50
DB-4	-20,00	3	10	-2,00

- CPT / Sondir sebanyak 6 (enam) titik.

Titik	Kedalaman (m) qc > 100 kg/cm^2	Tahanan Lekat (kg/cm')	Muka Air Tanah (m)
S-1	6,40	648	
S-2	7,60	1210	
S-3	6,60	1035	
S-4	7,00	841	
S-5	8,40	858	
S-6	700	1205	

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 (wn)
2. Penentuan berat isi tanah (γ)
3. Penentuan berat isi tanah kering (γd)
4. Penentuan berat jenis (Specific Gravity, Gs)
5. Shear Strength by Unconfined Compression Test

Jenis dan Jumlah Pengujian di Laboratorium

JENIS PENGUJIAN	Jumlah	Sample
1. Index Properties (Wn, γ, γd, Gs, e, Sr,n)	9	Und isturbed
2. Grained size distribution	9	Undisturbed
3.Attreberg Limit	9	Undisturbed
4. Triaxial UU Test	9	Undisturbed
5.Consolidation Test	9	Undisturbed

IV . KESIMPULAN DAN REKOMENDASI :

4.1. Kondisi lapisan tanah.

Dari hasil pengujian Cone Penetration Test (CPT) kapasitas 2,5 tonf sebanyak 6 (enam) titik pengujian (S-1 s/d S-6) , secara umum kondisi lapisan tanah seperti berikut :

- Dari permukaan tanah hingga kedalaman -1,00 meter dijumpai lapisan tanah lempung kaku (compaction soil) kecuali di titik S-1 dan S-3, pada kedalaman tersebut konsistensi tanah lunak.
- Pada kedalaman 1,00 meter sampai dengan -5,40 meter dijumpai lapisan lempung dengan konsistensi sedang sampai kaku.
- Pada kedalaman -5,40 meter sampai dengan -6,40 meter dijumpai lapisan lanau kepasiran dengan konsistensi sangat kaku
- Lapisan tanah keras berupa lapisan tanah pasir cemented atai lanau kepasiran dijumpai pada variasi kedalaman -6,40 meter sampai dengan -7,60 meter dengan tahanan ujung konus > 100kg/cm^2.

Dari uji Bor dalam sebanyak 4 (empat) titik sampai dengan kedalaman -20,00 meter, dijumpai lapisan tanah sebagai berikut :

- Dari permukaan tanah sampai kedalaman -6,00 meter dijumpai lapisan lempung berwarna coklat keputihan dengan konsistensi sedang.
- Pada kedalaman -6,00 meter sampai dengan kedalaman antara -10,00 meter s/d -14,00 meter dijumpai lapisan pasir yang cemented dengan konsistensi keras sampai sangat keras. Di beberapa tempat (DB3 dan DB-4 dijumpai lapisanya berupa lanau serta Lanau kepasiran berwarna abu abu dengan konsistensi keras sampai sangat keras.
- Lapisan pasir abu abu atau pasir kelanuan serta lanau kepasiran dijumpai pada variasi kedalaan antara -10,00 meter sampai dengan -20,00 meter dengan konsistensi sangat keras.
- Muka air tanah dijumpai pada kedalaman -1,50 s/d -2,00 meter.

4.2. Rekomendasi Daya Dukung Pondasi

Dari kedaan lapisan tanah seperti dijelaskan diatas, maka dapat kami sarankan untuk pondasi tersebut sbb :

PONDASI DANGKAL :

Jenis pondasi ini dapat dipakai untuk keperluan bangunan tempat tinggal (perumahan) atau bangunan dengan max tinggi bangunan 3 lantai

- Bentuk pondasi : Rectangulair (dimensi BxB)
- Kedalaman pondasi minimal 1,20 meter
- Daya dukung izin axial dengan data Laboratorium pada kedalaman -1,20 m

  (dari formulasi berikut :

qa = {1,3 Cu Nc + γ. D Nq + 0,4 γ B Nγ} / 3 =

dimana :

qa = Daya dukung izin dalan kg/cm^2

γ = berat isi tanah efektif

D = kedalaman pondasi

B = lebar pondasi ; L = panjang pondasi (Rectangulair B/L=1)

Cu = Kohesi undrained pada lapisan tanah didasar pondasi dari data lab atau data sondir (Cu = qc/30)

Nc , Nq dan Nγ factor daya dukung (fungsi dari Φ)

Daya dukung tanah yang direkomendasikan terlampir.

PONDASI BORED PILE

Dapat dilakukan dengan ketentuan sbb :

- Diamater Bored Pile minimum yang digunakan 40 cm, 60 cm atai 80 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 akhi geoteknik yang berpengalaman dan mempunyai kopetensi yang baik dalam mengawasi pekerjaan bored pile.
- Mutu concrete yang disarankan minimal fc'=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 :
- **Qu = 7 Nb. Ap + 0,32 N As (Tonf) untuk Nb < 60**
- **Qu = 400. Ap + {0,024 (N -53) +17,2} As (Tonf) untuk Nb > 60**

dimana :

Qu = Daya Dukung Ultimate (tonf)

Nb = 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 diamater pondasi Bored Pile yang dipakai.

Nb = ½ (N_1 + N_2)

Ap= Luas penampang Ujung Tiang (m^2)

N = Nilai N- SPT rata-rata sepanjang tiang

As = Luas selimut tiang (m^2).

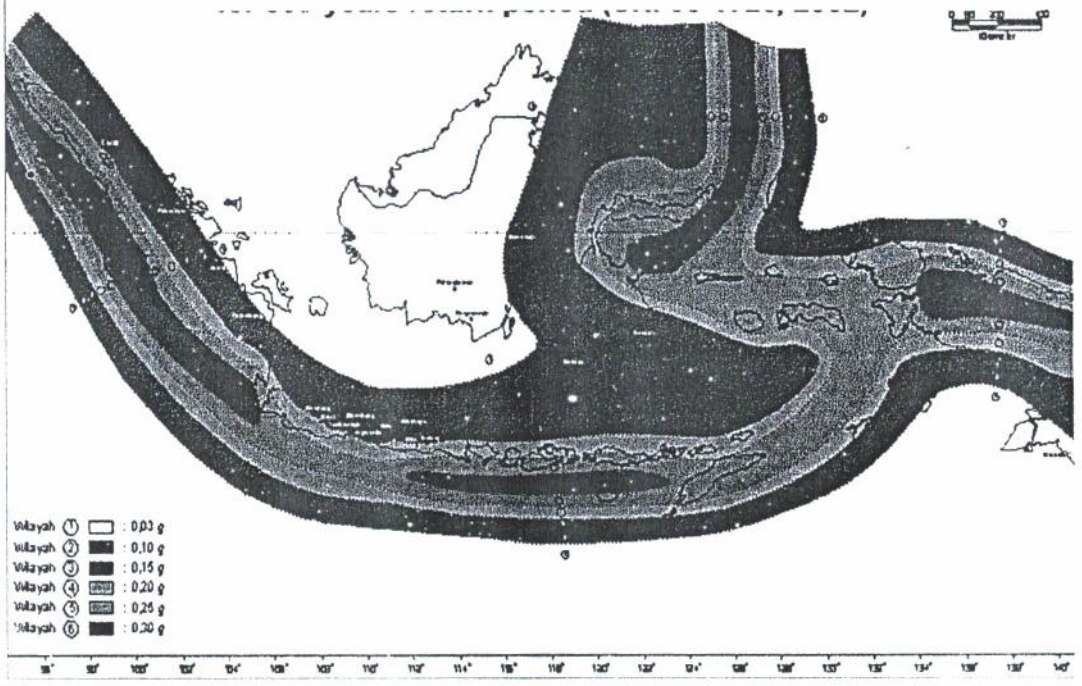
Axial Load Capacity of Singgle Bored Pile (see attachment)

4.3 Seismicity

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 4 dengan percepatan pada batuan dasar dibawah lokasi tersebut adalah a = **0.20 g** untuk periode ulang 500 tahun

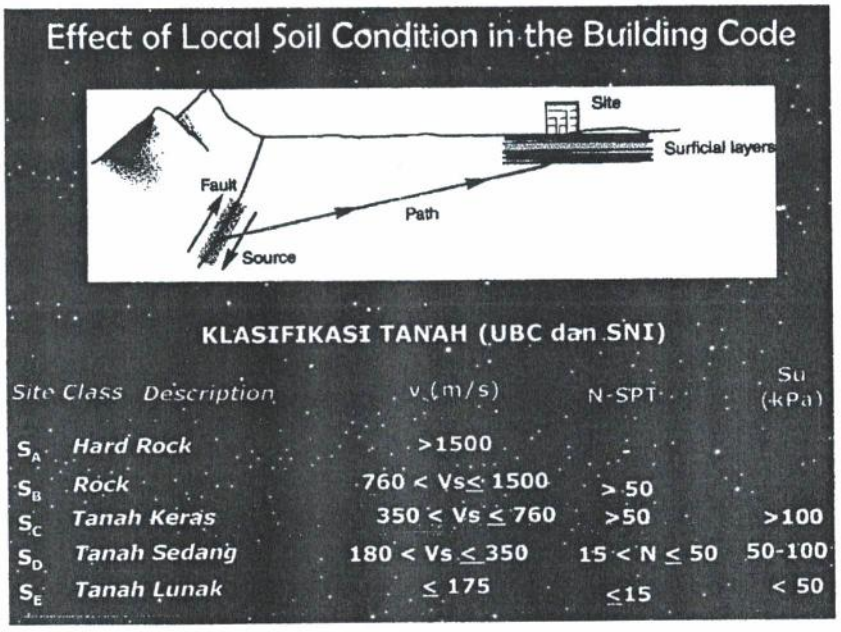
Figure 1 : Maxium Peak Ground Acceleration at bedrock S_B for Indonesia for 500-years return period (SNI 03-1726. 2002)



4.4 Profil tanah berdasarkan The UBC 1997

Berdasarkan Building Code (UBC) 1997 Klasifikasi konsistenci 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 -2000 meter dijumpai suatu nilai NSPT rata-rata N=44,4 , Berdasarkan UBC 1997, termasuk kategori ***tanah sedang*** diman 15 <N SPT <50

Sehingga percepatan di permukaan tanah / dasar bangunan, menjadi

a suface = 1,5 x 0,20 = 0,30 g

Jakarta, Maret 2012

ISTN Soil Mechanic Laboratory

Director

Ir. Idrus. M.Sc (Geotechnical Engineer)
No Reg :1.2.500.2.31.09.03.000007

ESTIMATE FOR BEARING CAPACITY OF SOIL

Project	GI 150 KV NEW CILEGON II	Reccomended by	Ir. Idrus M.Sc
Location	Krawat Watu, Serang Banten		Feb-12

Parameter Tanah

γ' soil (effectif) t/m²		0,8
Cohession Undrained (Cu) t/m²		2,2
Internal of Degree friction (Ø)		7
Water Table (from ground surface)		
Bearing Capacity Factor		
	Nc	7,16
	Nq	1,88
	Nγ	0,71

Qonus Resistance on Sub Layer		
qc	11	kg/cm2

Bearing Capacity of Soil based on Laboratorium Parameter Test (t/m²)

Depth of Foundation D (meter)	Width of Foundation B (meter) B							
	1,2	1,5	1,8	2	2,25	2,5	2,8	3
1,5	7,67	7,69	7,71	7,73	7,75	7,77	7,79	7,81
2	7,92	7,94	7,96	7,98	8,00	8,02	8,04	8,06
2,5	8,17	8,19	8,22	8,23	8,25	8,27	8,29	8,31

Bearing Capacity of Soil Based on C.P.T / Sondir Parameter (t/m²)
assumed that fine soil where Ø = 0⁰ · Nγ = 0

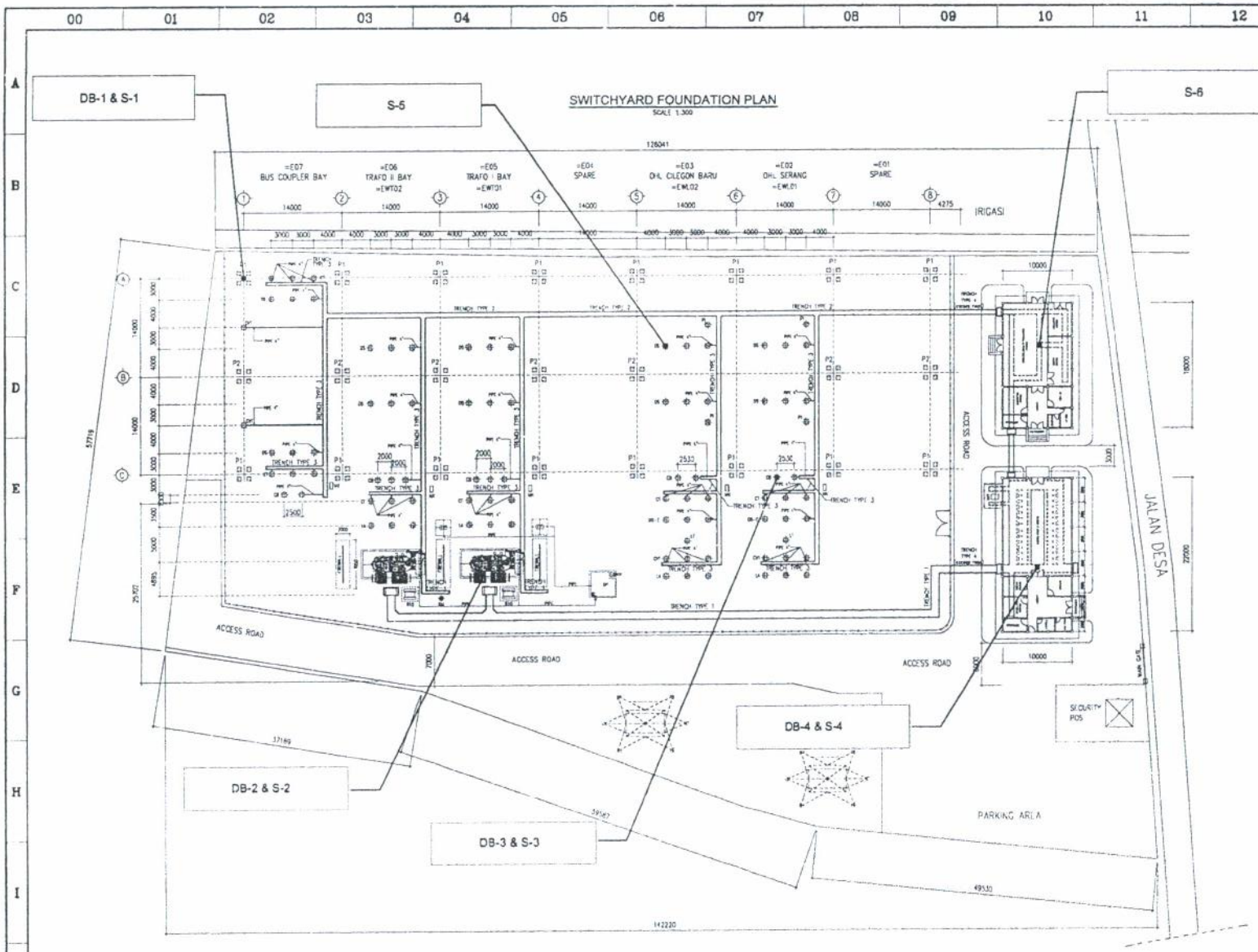
Depth of Foundation D (meter)	Bearing Capacity of Soil in t/m²
1,5	7,94
2	8,07
2,5	8,21

AXIAL BEARING CAPACITY OF SINGGLE BORED PILE FOR DB-1 SOIL DATA

Depth meter	N-SPT	L of Pile	N average	Nb	Pile Dimension	meter	P ult. tonf	P all Comp. tonf , SF 3,0	P all Tension tonf , SF 8,0
0,00									
1,00									
2,00	5		5,00	5,50	Dia of Pile m	0,4	78,06	26,02	9,57
3,00					L of Pile m	7			
4,00	6		5,50	19,67					
5,00					Dia of Pile m	0,6	134,13	44,71	14,62
6,00	48		19,67	28,25	L of Pile m	7			
7,00									
8,00	54		28,25	38,25	Dia of Pile m	0,8	201,57	67,19	19,85
9,00					L of Pile m	7			
10,00	45		31,60	49,25					
11,00					Dia of Pile m	0,4	167,29	55,76	21,67
12,00	50		34,67	51,25	L of Pile m	10			
13,00									
14,00	56		37,71	52,75	Dia of Pile m	0,6	281,15	93,72	32,88
15,00					L of Pile m	10			
16,00	60		40,50	56,50					
17,00					Dia of Pile m	0,8	415,16	138,39	44,35
18,00	60		42,67	59,00	L of Pile m	10			
19,00									
20,00	60		44,40	45,00	Dia of Pile m	0,4	254,37	84,79	36,07
21,00					L of Pile m	14			
22,00									
23,00					Dia of Pile m	0,6	413,18	137,73	54,64
24,00					L of Pile m	14			
25,00									
26,00					Dia of Pile m	0,8	593,06	197,69	73,55
27,00					L of Pile m	14			
28,00									
29,00									
30,00									
31,00					Qu = 7 Nb. Ap + 0,32 N As (Tonf) Nb < 60				

Untuk Pondasi Tiang Pancang :

- Kedalaman pemancangan sampai dengan 8,00 meter atau sampai dengan final set pada 40 pukulan terakhir tercatat maksimum 1,00 cm
- Tiang yang digunakan ukuran 20 x 20 cm atau 25 x 25 cm
- Daya dukung aksial tekan yang diijinkan :
  - Ukuran 20x20 cm P all = 25 tonf
  - Ukuran 25x25 cm P all = 37 tonf



REFERENCE DRAWING & SPEC.

SYMBOLS :

- EXISTING
- SCOPE OF WORK
- EXISTING FENCE (BRC)

LEGEND :

LA	:	LIGHTNING ARRESTER
CT	:	CURRENT TRANSFORMER
CVT	:	CAPACITOR VOLTAGE TRANSFORMER
CB	:	CIRCUIT BREAKER
DS	:	DISCONNECTING SWITCH
DSE	:	DISCONNECTING SWITCH W/EARTHING
T10	:	POWER TRANSFORMER 150KV
MK	:	MARSHALLING KIOSK
LT	:	LINE TRAP
FP	:	FIRE PROTECTION
OP	:	OIL PIT
R10	:	NEUTRAL GROUNDING RESISTOR
PI	:	POST INSULATOR

ORIGINAL ISSUE

PT. PLN (PERSERO)
GARDU INDUK JAWA, BALI & NUSA TENGGARA

Contract No. : 126.PJ/155/UIP JTB/2011

PEMBANGUNAN GARDU INDUK 150KV CILEGON BARU II

ARYASADA CONSORTIUM

SOIL INVESTIGATION & REPORT
CILEGON BARU II S/S

1 of 1

1 : 300

A1

BORING LOG

PROJECT	PEMBANGUNAN GARDU INDUK 150KV CILEGON BARU II	COORDINATES E	BORING METHODE Wash Boring and Sampling	Length/Dia Of Cassi
CLIENT	ARYA SADA CONSORTIUM	N	SAMPLING METHODE	Driller : Aryudi
LOCATION	CILEGON, BANTEN	ELEVATION : + 0.00 m	Thin Walled / Shelby Tube	Date of Tested
		GWL from GS - 1,50 m	SPT Automatic Hammer	16 to 17 Peb 2012
BORE HOLE NO	DB-1	DRILLING MACHINE TYPE Kano / Custom		Checked : Singgih
DEPTH	20,00 meter	TYPE OF CORING BARREL		Page : 1 / 1

DEPTH	LOG	USCS	DESCRIPTION	U.D Sample Depth(m)	N - SPT I (0-15)	II (15-30)	III (30-45)	N Value	N - SPT DIAGRAM 10 20 30 40 50
0,00									
-1,00									
-2,00				1.50 - 2.00					
		CH	CLAY, Whitish Brown Coloured		1	2	3	5	
-3,00			medium consistency						
-4,00				3.50 - 4.00					
			Grey Coloured		1	2	4	6	
-5,00									
-6,00									
			CEMENTED SAND, Grey Coloured		18	21	27	48	
-7,00			hard consistency						
-8,00		SP							
			very hard consistency		20	24	30	54	
-9,00									
-10,00									
			SANDY SILT, Grey Coloured		16	20	25	45	
-11,00			hard consistency						
-12,00									
		ML	very hard consistency		19	22	28	50	
-13,00									
-14,00									
					20	25	31	56	
-15,00									
-16,00									
			SAND, Withish Grey Coloured		32	60		>60	
-17,00		SP	very hard consistency			14			
-18,00									
			SANDY SILT, Brown Coloured		39	60		>60	
-19,00		ML	very hard consistency			12			
-20,00									
			End of Boring		42	60		>60	
-21,00						12			
-22,00									
-23,00									
-24,00									
-25,00									

Remarks : Ground Surface Bore Hole elevation is 0,00 meter

IIIIIIIII Clay	\\\\\\\ Silt	:::::::: Sand	0000 Gravel	vvvvvv Organic matter

BORING LOG

PROJECT	PEMBANGUNAN GARDU INDUK 150KV CILEGON BARU II	**COORDINATES** E	**BORING METHODE** Wash Boring and Sampling	Length/Dia Of Cass
CLIENT	ARYA SADA CONSORTIUM	N	**SAMPLING METHODE** Thin Walled / Shelby Tube	Driller : Aryudi
LOCATION	CILEGON, BANTEN	**ELEVATION : + 0.00 m**		Date of Tested
		GWL from GS - 1,50 m	**SPT** Automatic Hammer	15 to 16 Peb 20
BORE HOLE NO	DB-2	**DRILLING MACHINE TYPE**	Kano / Custom	Checked : Singgi
DEPTH	20,00 meter	**TYPE OF CORING BARREL**		Page : 1 / 1

DEPTH (m)	LOG	USCS	DESCRIPTION	U.D Sample Depth(m)	N - SPT I (0-15)	II (15-30)	III (30-45)	N Value	N - SPT DIAGRA 10 20 30 40 50
0,00									
-1,00									
-2,00				1.50 - 2.00					
		CH	CLAY, Whitish Brown Coloured		1	2	4	6	
-3,00			medium consistency						
-4,00				3.50 - 4.00					
			Grey Coloured		1	2	2	4	
-5,00			medium consistency						
-6,00									
			CEMENTED SAND, Grey Coloured		16	20	26	46	
-7,00			hard consistency						
-8,00									
			very hard consistency		17	23	29	52	
-9,00									
-10,00		SP							
			Withish Light Grey Coloured		26	35	42	77	
-11,00			very hard consistency						
-12,00									
					30	37	45	82	
-13,00									
-14,00									
			SAND, Withish Grey Coloured		35	60		>60	
-15,00			very hard consistency			12			
-16,00		SP							
					38	60		>60	
-17,00						11			
-18,00									
			SILTY SAND, Brown Coloured		41	60		>60	
-19,00		SM	very hard consistency			10			
-20,00									
			End of Boring		46	60		>60	
-21,00						8			
-22,00									
-23,00									
-24,00									
-25,00									

Remarks : Ground Surface Bore Hole elevation is 0,00 meter

IIIIIIIII Clay	\\\\\\\ Silt	:::::::: Sand	0000 Gravel	vvvvvv Organic matter

BORING LOG

PROJECT	PEMBANGUNAN GARDU INDUK 150KV CILEGON BARU II	**COORDINATES**		**BORING METHODE**	Length/Dia Of Cas
		E		Wash Boring and Sampling	
CLIENT	ARYA SADA CONSORTIUM	N		**SAMPLING METHODE**	Driller : Aryud
LOCATION	CILEGON, BANTEN	**ELEVATION : + 0.00 m**		Thin Walled / Shelby Tube	Date of Tested
		GWL from GS - 1,50 m		**SPT** Automatic Hammer	13 to 14 Peb 20
BORE HOLE NO	DB-3	**DRILLING MACHINE TYPE**	Kano / Custom		Checked : Singg
DEPTH	20,00 meter	**TYPE OF CORING BARREL**			Page : 1 / 1

DEPTH	LOG	USCS	DESCRIPTION	U.D Sample Depth(m)	N - SPT I (0-15)	II (15-30)	III (30-45)	N Value	N - SPT DIAGR 10 20 30 40 50
0,00									
-1,00									
-2,00				1.50 - 2.00					
		CH	CLAY, Whitish Brown Coloured		1	2	3	5	
-3,00			medium consistency						
-4,00				3.50 - 4.00					
					2	3	5	8	
-5,00									
-6,00									
			SANDY SILT, Grey Coloured		13	17	20	37	
-7,00			hard consistency						
-8,00		ML							
					15	20	26	46	
-9,00									
-10,00									
			SILT, Grey Coloured		28	45	15	>60	
-11,00			very hard consistency				4		
-12,00		MH							
					30	50	10	>60	
-13,00							3		
-14,00									
			SAND, Withish Grey Colourcd		35	60		>60	
-15,00			very hard consistency			11			
-16,00		SP							
					39	60		>60	
-17,00						10			
-18,00									
			SANDY SILT, Brown Coloured		40	60		>60	
-19,00		ML	very hard consistency			9			
-20,00									
			End of Boring		43	60		>60	
-21,00						10			
-22,00									
-23,00									
-24,00									
-25,00									

Remarks : Ground Surface Bore Hole elevation is 0,00 meter

Clay | Silt | Sand | Gravel | Organic matter

BORING LOG

PROJECT	PEMBANGUNAN GARDU INDUK 150KV CILEGON BARU II	COORDINATES E	BORING METHODE Wash Boring and Sampling	Length/Dia Of Cassing
CLIENT	ARYA SADA CONSORTIUM	N	SAMPLING METHODE Thin Walled / Shelby Tube	Driller : Aryudi
LOCATION	CILEGON, BANTEN	ELEVATION : + 0.00 m	SPT Automatic Hammer	Date of Tested 11 to 13 Peb 2012
BORE HOLE NO	DB-4	GWL from GS - 2.00 m	DRILLING MACHINE TYPE Kano / Custom	Checked : Singgih
DEPTH	20,00 meter	TYPE OF CORING BARREL		Page : 1 / 1

DEPTH	LOG	USCS	DESCRIPTION	U.D Sample Depth(m)	N - SPT I (0-15)	II (15-30)	III (30-45)	N Value	N - SPT DIAGRAM (10 20 30 40 50 60)
0,00									
-1,00		CH							
-2,00			CLAY, Brown Coloured	1.50 - 2.00	1	1	2	3	
-3,00			soft consistency						
-4,00				3.50 - 4.00					
-5,00			SANDY SILT, Light Grey Coloured		3	8	11	19	
			stiff consistency						
-6,00		ML		5.50 - 6.00					
-7,00			very stiff consistency		7	10	14	24	
-8,00									
-9,00			SILT, Grey Coloured		14	20	29	49	
			hard consistency						
-10,00		MH							
-11,00			very hard consistency		19	25	37	62	
-12,00									
-13,00			SAND, Withish Grey Coloured		24	29	43	72	
			very hard consistency						
-14,00									
-15,00		SP			27	31	48	79	
-16,00									
-17,00					25	32	28	>60	
-18,00							10		
-19,00			SANDY SILT, Brown Coloured		30	60		>60	
		ML	very hard consistency			12			
-20,00									
-21,00			End of Boring		35	60		>60	
						12			
-22,00									
-23,00									
-24,00									
-25,00									

Remarks : Ground Surface Bore Hole elevation is 0.00 meter

Clay	Silt	Sand	Gravel	Organic matter

CPT DATA

ISTN Soil Mechanics Laboratory

Biconnus data :

Area End of Connus (A1) A1 = 10 cm^2

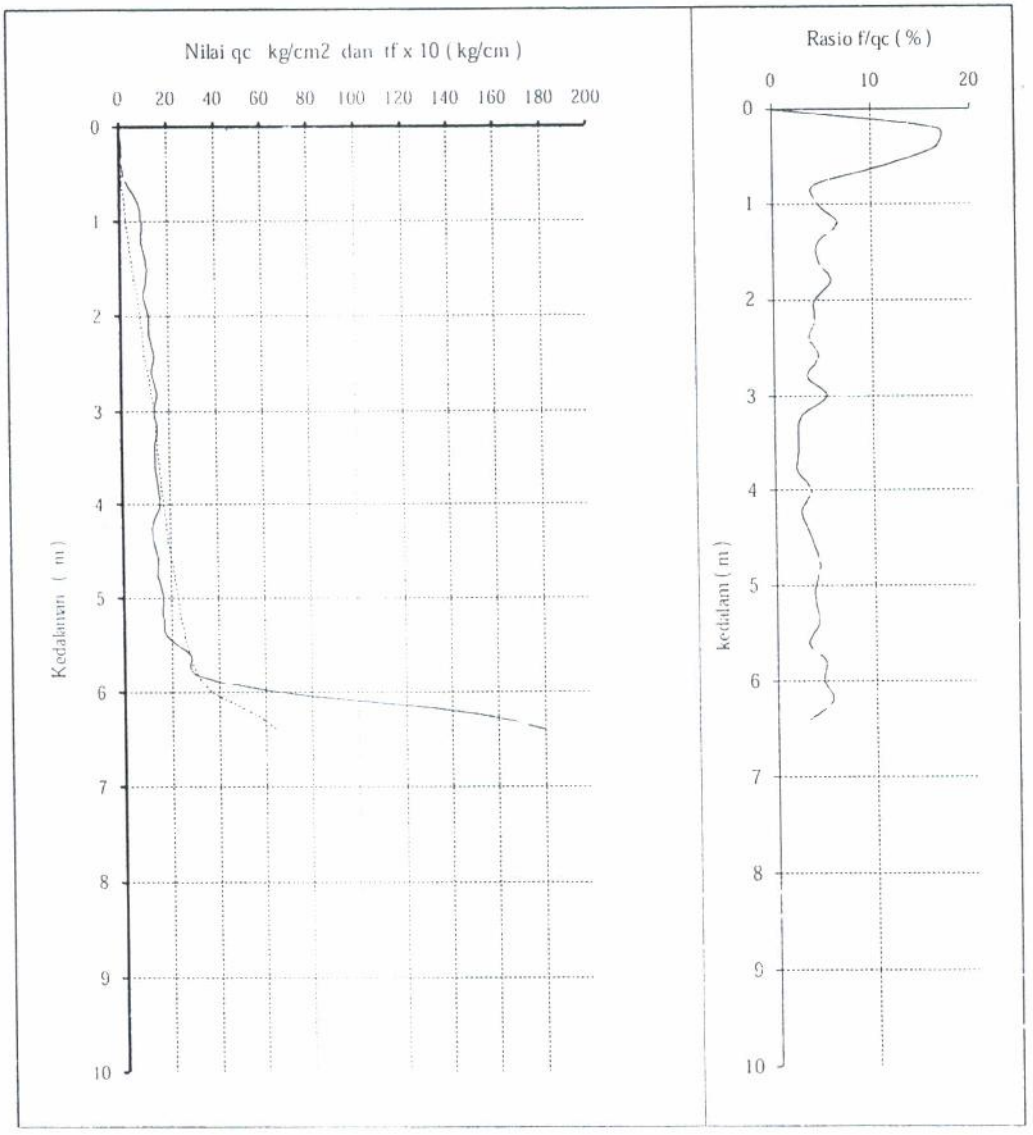
Friction Area (A2) A2 = 120 cm^2

CPT No :	S-1	Project :	Pembangunan Gardu Induk 150KV Cilegon Baru II			
Depth	**qc**	**qt**	**f**	**tf**	**tf/10**	**f/qc**
0,00	0	0	0	0	0	0
0,20	1	3	0,17	3,33	0,33	16,67
0,40	1	3	0,17	6,67	0,67	16,67
0,60	3	7	0,33	13,33	1,33	11,11
0,80	8	12	0,33	20,00	2,00	4,17
1,00	9	14	0,42	28,33	2,83	4,63
1,20	9	16	0,58	40,00	4,00	6,48
1,40	11	17	0,50	50,00	5,00	4,55
1,60	11	17	0,50	60,00	6,00	4,55
1,80	10	17	0,58	71,67	7,17	5,83
2,00	12	18	0,50	81,67	8,17	4,17
2,20	12	18	0,50	91,67	9,17	4,17
2,40	14	20	0,50	101,67	10,17	3,57
2,60	13	20	0,58	113,33	11,33	4,49
2,80	15	21	0,50	123,33	12,33	3,33
3,00	14	23	0,75	138,33	13,83	5,36
3,20	15	20	0,42	146,67	14,67	2,78
3,40	14	18	0,33	153,33	15,33	2,38
3,60	14	18	0,33	160,00	16,00	2,38
3,80	15	19	0,33	166,67	16,67	2,22
4,00	16	23	0,58	178,33	17,83	3,65
4,20	13	17	0,33	185,00	18,50	2,56
4,40	13	18	0,42	193,33	19,33	3,21
4,60	15	22	0,58	205,00	20,50	3,89
4,80	15	23	0,67	218,33	21,83	4,44
5,00	17	25	0,67	231,67	23,17	3,92
5,20	17	25	0,67	245,00	24,50	3,92
5,40	18	27	0,75	260,00	26,00	4,17
5,60	28	39	0,92	278,33	27,83	3,27
5,80	30	48	1,50	308,33	30,83	5,00
6,00	67	105	3,17	371,67	37,17	4,73
6,20	143	239	8,00	531,67	53,17	5,59
6,40	180	250	5,83	648,33	64,83	3,24
6,60		>250				
6,80						
7,00						
7,20						
7,40						
7,60						
7,80						
8,00						
8,20						
8,40						
8,60						
8,80						

CONE PENETRATION TEST

ISTN Soil Mechanics Laboratory

SONDIR NO	: S-1	D1 (Qonus)	3.54 cm
PROJECT	: Pembangunan Gardu Induk 1	D2 (Jacked)	3.56 cm
LOCATION	: Kramat Watu, Serang, Banten	H (jacked)	10.8 cm
DATE OF TESTED	: 10 Pebruari 2012	Ratio (R)	
TESTED BY	: Aryudi Cs.	Elevation (- 0.00)	
CHECKED BY	: GEOINVES	G W L (-)	- m



CPT DATA

ISTN Soil Mechanics Laboratory

Biconnus data :

Area End of Connus (A1) A1 = 10 cm^2

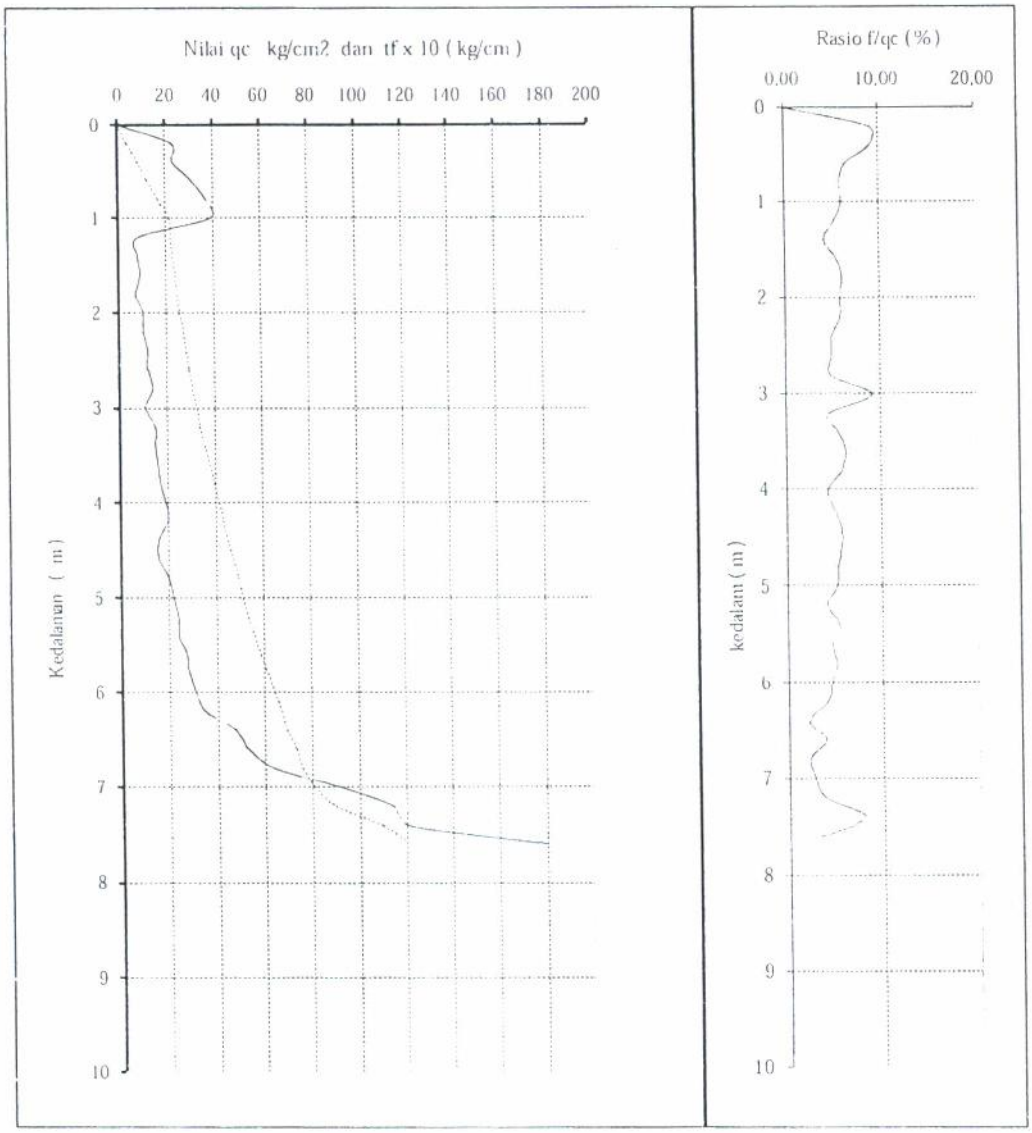
Friction Area (A2) A2 = 120 cm^2

CPT No :	S-2	Project :	Pembangunan Gardu Induk 150KV Cilegon Baru II			
Depth	**qc**	**qt**	**f**	**tf**	**tf/10**	**f/qc**
0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,20	23	48	2,08	41,67	4,17	9,06
0,40	23	48	2,08	83,33	8,33	9,06
0,60	31	55	2,00	123,33	12,33	6,45
0,80	37	63	2,17	166,67	16,67	5,86
1,00	39	67	2,33	213,33	21,33	5,98
1,20	8	13	0,42	221,67	22,17	5,21
1,40	8	12	0,33	228,33	22,83	4,17
1,60	9	15	0,50	238,33	23,83	5,56
1,80	7	12	0,42	246,67	24,67	5,95
2,00	10	17	0,58	258,33	25,83	5,83
2,20	10	17	0,58	270,00	27,00	5,83
2,40	12	19	0,58	281,67	28,17	4,86
2,60	12	19	0,58	293,33	29,33	4,86
2,80	14	22	0,67	306,67	30,67	4,76
3,00	11	23	1,00	326,67	32,67	9,09
3,20	15	23	0,67	340,00	34,00	4,44
3,40	15	25	0,83	356,67	35,67	5,56
3,60	16	28	1,00	376,67	37,67	6,25
3,80	17	29	1,00	396,67	39,67	5,88
4,00	19	29	0,83	413,33	41,33	4,39
4,20	20	32	1,00	433,33	43,33	5,00
4,40	16	27	0,92	451,67	45,17	5,73
4,60	16	27	0,92	470,00	47,00	5,73
4,80	20	33	1,08	491,67	49,17	5,42
5,00	22	36	1,17	515,00	51,50	5,30
5,20	24	36	1,00	535,00	53,50	4,17
5,40	24	40	1,33	561,67	56,17	5,56
5,60	27	42	1,25	586,67	58,67	4,63
5,80	28	45	1,42	615,00	61,50	5,06
6,00	31	48	1,42	643,33	64,33	4,57
6,20	35	52	1,42	671,67	67,17	4,05
6,40	47	59	1,00	691,67	69,17	2,13
6,60	53	78	2,08	733,33	73,33	3,93
6,80	64	81	1,42	761,67	76,17	2,21
7,00	92	123	2,58	813,33	81,33	2,81
7,20	114	167	4,42	901,67	90,17	3,87
7,40	121	236	9,58	1093,33	109,33	7,92
7,60	189	250	5,83	1210,00	121,00	3,24
7,80		>250				
8,00						
8,20						
8,40						
8,60						
8,80						
9,00						
9,20						

CONE PENETRATION TEST

ISIN Soil Mechanics Laboratory

SONDIR NO	: S-2	D1 (Qonus)	3.54 cm
PROJECT	: Pembangunan Gardu Induk 1	D2 (Jacked)	3.56 cm
LOCATION	: Kramat Watu, Serang, Banten	H (jacked)	10.8 cm
DATE OF TESTED	: 10 Pebruari 2012	Ratio (R)	
TESTED BY	: Aryudi Cs.	Elevation (- 0.00)	
CHECKED BY	: GEOINVES	G W L (-)	- m



CPT DATA

ISTN Soil Mechanics Laboratory

Biconnus data :

Area End of Connus (A1) — A1 = 10 cm^2

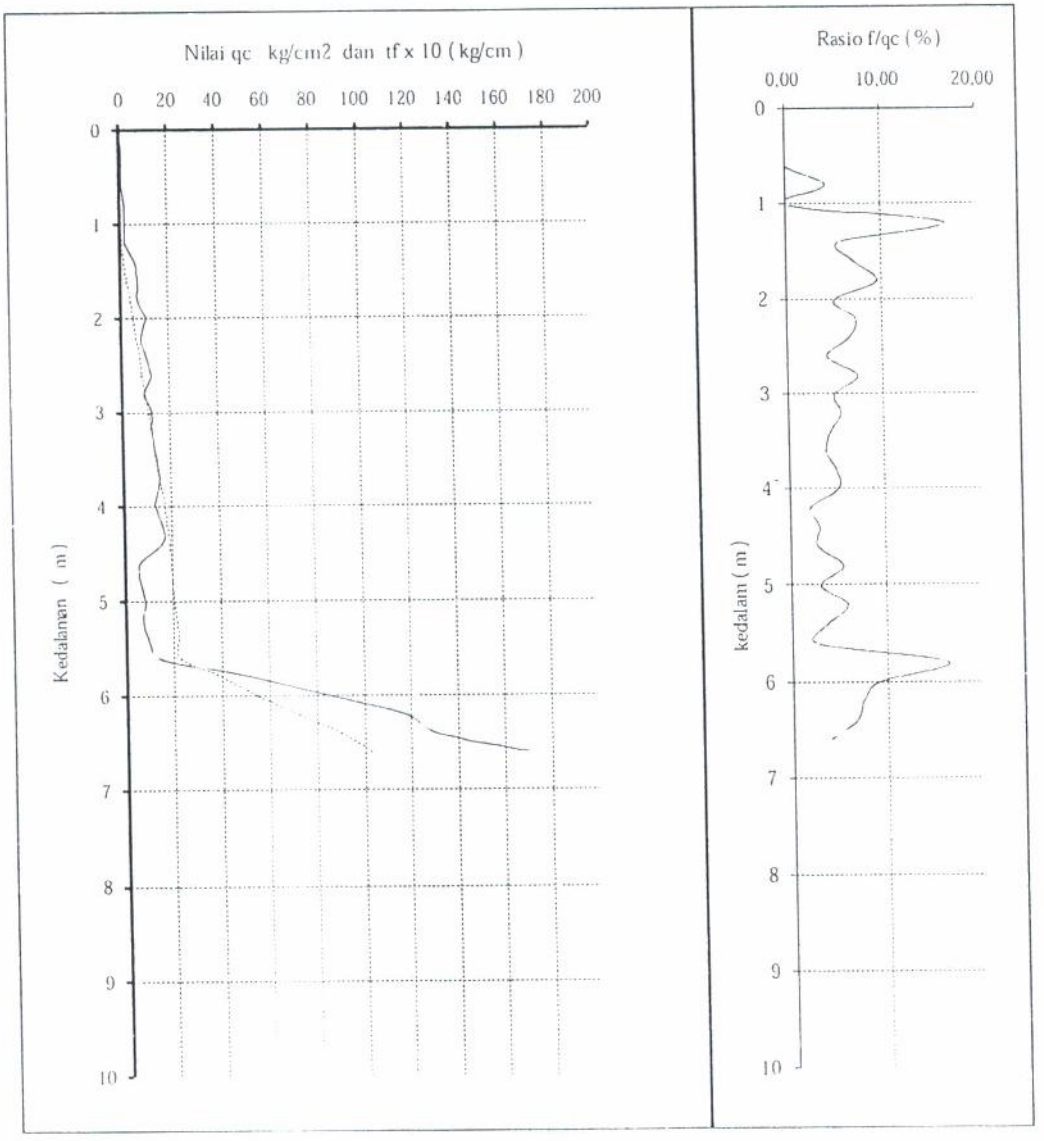
Friction Area (A2) — A2 = 120 cm^2

CPT No :	S-3	Project :	Pembangunan Gardu Induk 150KV Cilegon Baru II			
Depth	**qc**	**qt**	**f**	**tf**	**tf/10**	**f/qc**
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.20	1	1	0.00	0.00	0.00	0.00
0.40	1	1	0.00	0.00	0.00	0.00
0.60	1	1	0.00	0.00	0.00	0.00
0.80	2	3	0.08	1.67	0.17	4.17
1.00	2	2	0.00	1.67	0.17	0.00
1.20	2	6	0.33	8.33	0.83	16.67
1.40	6	10	0.33	15.00	1.50	5.56
1.60	7	13	0.50	25.00	2.50	7.14
1.80	7	15	0.67	38.33	3.83	9.52
2.00	10	16	0.50	48.33	4.83	5.00
2.20	8	15	0.58	60.00	6.00	7.29
2.40	10	18	0.67	73.33	7.33	6.67
2.60	12	18	0.50	83.33	8.33	4.17
2.80	9	17	0.67	96.67	9.67	7.41
3.00	12	19	0.58	108.33	10.83	4.86
3.20	12	20	0.67	121.67	12.17	5.56
3.40	13	20	0.58	133.33	13.33	4.49
3.60	15	22	0.58	145.00	14.50	3.89
3.80	15	24	0.75	160.00	16.00	5.00
4.00	13	21	0.67	173.33	17.33	5.13
4.20	16	20	0.33	180.00	18.00	2.08
4.40	16	22	0.50	190.00	19.00	3.13
4.60	6	8	0.17	193.33	19.33	2.78
4.80	6	10	0.33	200.00	20.00	5.56
5.00	8	11	0.25	205.00	20.50	3.13
5.20	7	12	0.42	213.33	21.33	5.95
5.40	9	13	0.33	220.00	22.00	3.70
5.60	14	18	0.33	226.67	22.67	2.38
5.80	52	154	8.50	396.67	39.67	16.35
6.00	86	179	7.75	551.67	55.17	9.01
6.20	118	223	8.75	726.67	72.67	7.42
6.40	130	235	8.75	901.67	90.17	6.73
6.60	170	250	6.67	1035.00	103.50	3.92
6.80		>250				
7.00						
7.20						
7.40						
7.60						
7.80						
8.00						
8.20						
8.40						
8.60						
8.80						
9.00						
9.20						

CONE PENETRATION TEST

ISTN Soil Mechanics Laboratory

SONDIR NO	: S-3	D1 (Qonus)	3.54 cm
PROJECT	: Pembangunan Gardu Induk 1	D2 (Jacked)	3.56 cm
LOCATION	: Kramat Watu, Serang, Banten	H (jacked)	10.8 cm
DATE OF TESTED	: 09 Pebruari 2012	Ratio (R)	
TESTED BY	: Aryudi Cs.	Elevation (- 0.00)	
CHECKED BY	: GEOINVES	G W L (-)	- m



CPT DATA

ISTN Soil Mechanics Laboratory

Biconnus data :

Area End of Connus (A1) A1 = 10 cm^2

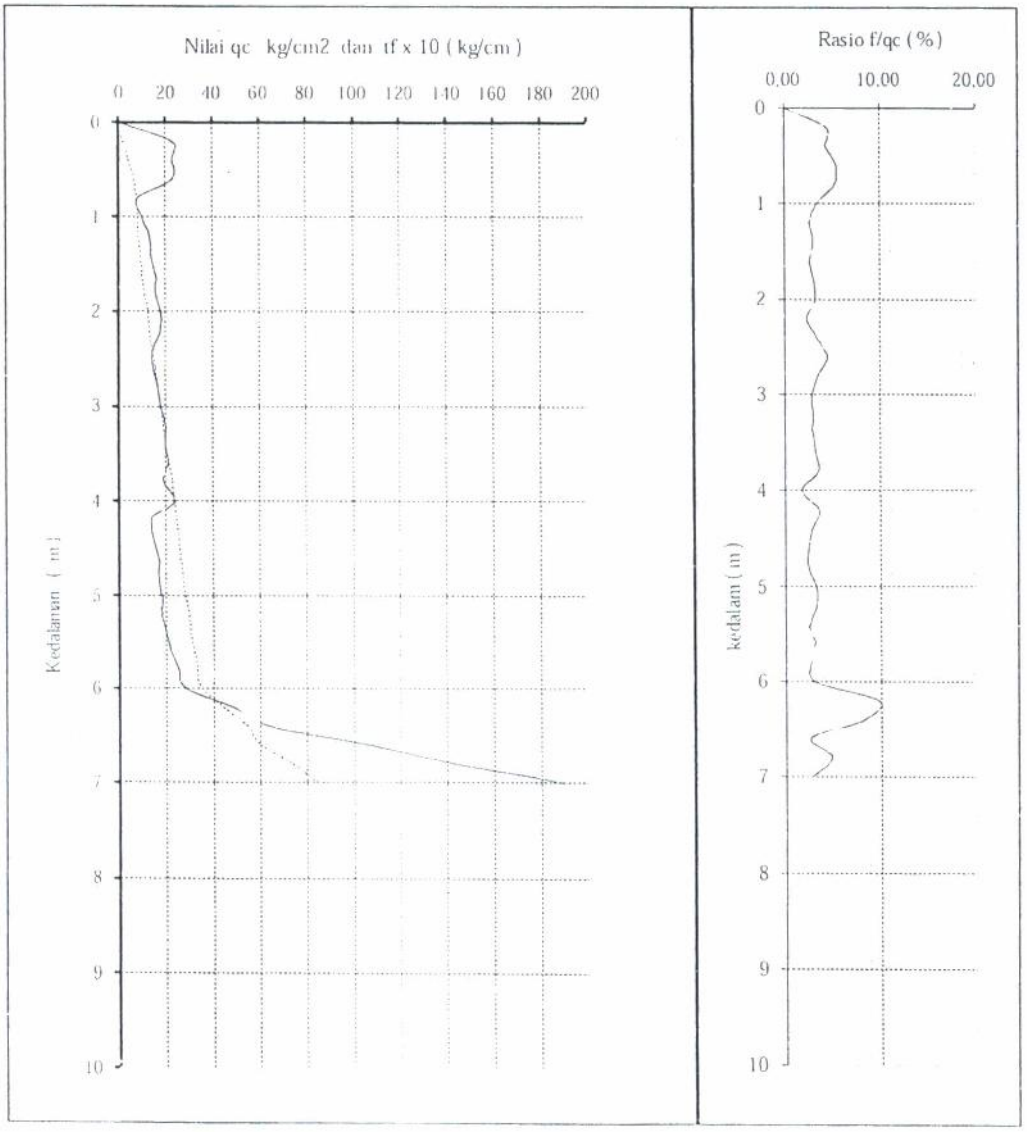
Friction Area (A2) A2 = 120 cm^2

CPT No :	S-4	Project :	Pembangunan Gardu Induk 150KV Cilegon Baru II			
Depth	**qc**	**qt**	**f**	**tf**	**tf/10**	**f/qc**
0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,20	23	35	1,00	20,00	2,00	4,35
0,40	23	35	1,00	40,00	4,00	4,35
0,60	23	38	1,25	65,00	6,50	5,43
0,80	8	13	0,42	73,33	7,33	5,21
1,00	10	14	0,33	80,00	8,00	3,33
1,20	13	17	0,33	86,67	8,67	2,56
1,40	14	19	0,42	95,00	9,50	2,98
1,60	16	21	0,42	103,33	10,33	2,60
1,80	16	22	0,50	113,33	11,33	3,13
2,00	18	25	0,58	125,00	12,50	3,24
2,20	18	23	0,42	133,33	13,33	2,31
2,40	15	21	0,50	143,33	14,33	3,33
2,60	15	23	0,67	156,67	15,67	4,44
2,80	17	24	0,58	168,33	16,83	3,43
3,00	18	24	0,50	178,33	17,83	2,78
3,20	20	27	0,58	190,00	19,00	2,92
3,40	20	27	0,58	201,67	20,17	2,92
3,60	21	29	0,67	215,00	21,50	3,17
3,80	19	27	0,67	228,33	22,83	3,51
4,00	24	29	0,42	236,67	23,67	1,74
4,20	14	20	0,50	246,67	24,67	3,57
4,40	15	20	0,42	255,00	25,50	2,78
4,60	17	22	0,42	263,33	26,33	2,45
4,80	17	22	0,42	271,67	27,17	2,45
5,00	18	25	0,58	283,33	28,33	3,24
5,20	18	25	0,58	295,00	29,50	3,24
5,40	20	26	0,50	305,00	30,50	2,50
5,60	22	30	0,67	318,33	31,83	3,03
5,80	25	33	0,67	331,67	33,17	2,67
6,00	28	38	0,83	348,33	34,83	2,98
6,20	49	106	4,75	443,33	44,33	9,69
6,40	63	125	5,17	546,67	54,67	8,20
6,60	107	140	2,75	601,67	60,17	2,57
6,80	145	229	7,00	741,67	74,17	4,83
7,00	190	250	5,00	841,67	84,17	2,63
7,20		>250				
7,40						
7,60						
7,80						
8,00						
8,20						
8,40						
8,60						
8,80						
9,00						
9,20						

CONE PENETRATION TEST

ISTN Soil Mechanics Laboratory

SONDIR NO	: S-4	D1 (Qonus)	3.54 cm
PROJECT	: Pembangunan Gardu Induk 1	D2 (Jacked)	3.56 cm
LOCATION	: Kramat Watu, Serang, Banten	H (jacked)	10.8 cm
DATE OF TESTED	: 09 Pebruari 2012	Ratio (R)	
TESTED BY	: Aryudi Cs.	Elevation (- 0.00)	
CHECKED BY	: GEOINVES	G W L (-)	- m



CPT DATA

ISTN Soil Mechanics Laboratory

Biconnus data :

Area End of Connus (A1) A1 = 10 cm^2

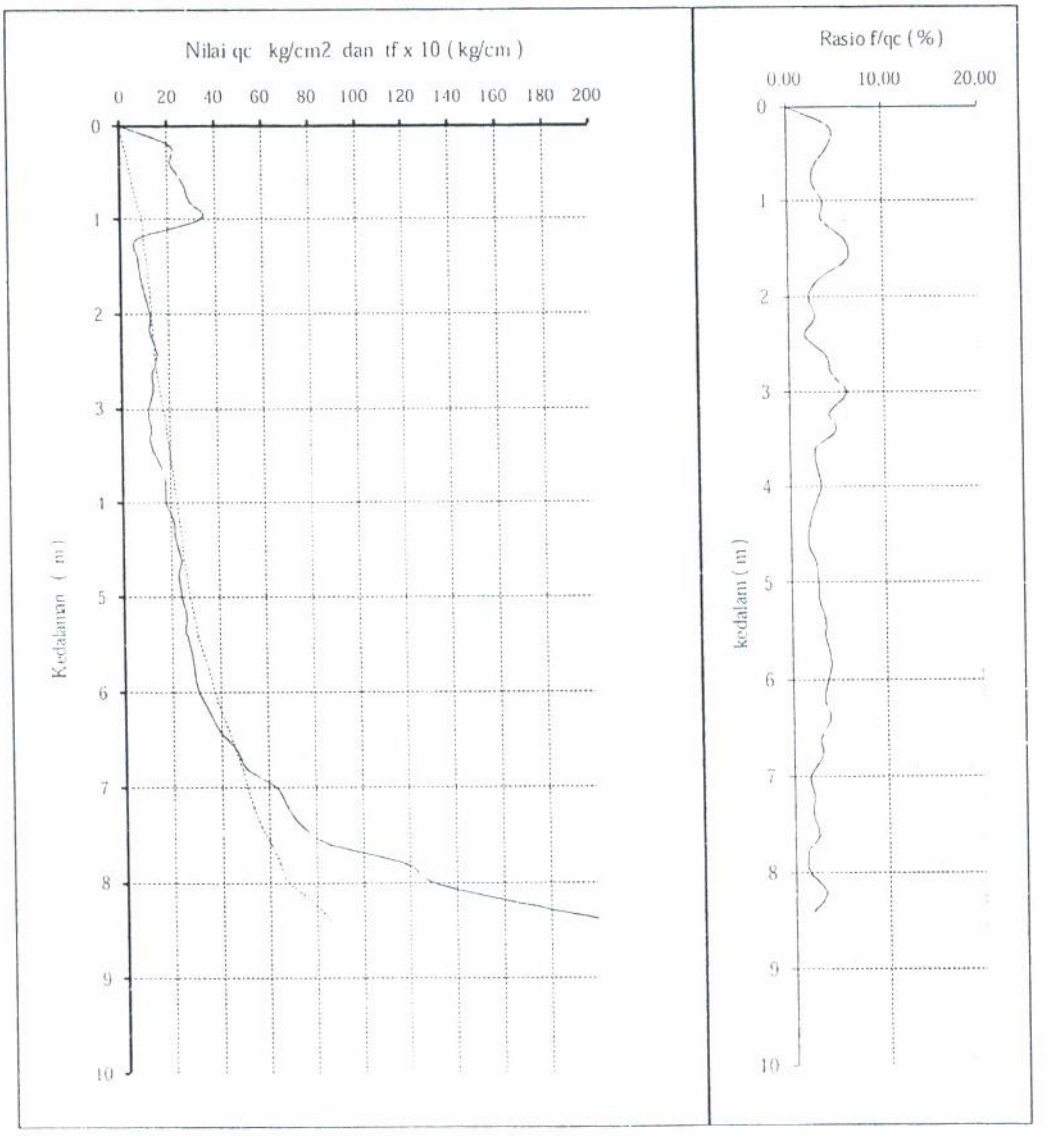
Friction Area (A2) A2 = 120 cm^2

CPT No :	S-5	Project :	Pembangunan Gardu Induk 150KV Cilegon Baru II			
Depth	**qc**	**qt**	**f**	**tf**	**tf/10**	**f/qc**
0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,20	21	32	0,92	18,33	1,83	4,37
0,40	21	32	0,92	36,67	3,67	4,37
0,60	26	35	0,75	51,67	5,17	2,88
0,80	29	38	0,75	66,67	6,67	2,59
1,00	34	49	1,25	91,67	9,17	3,68
1,20	7	10	0,25	96,67	9,67	3,57
1,40	7	12	0,42	105,00	10,50	5,95
1,60	8	14	0,50	115,00	11,50	6,25
1,80	10	14	0,33	121,67	12,17	3,33
2,00	12	15	0,25	126,67	12,67	2,08
2,20	12	16	0,33	133,33	13,33	2,78
2,40	15	18	0,25	138,33	13,83	1,67
2,60	13	19	0,50	148,33	14,83	3,85
2,80	13	20	0,58	160,00	16,00	4,49
3,00	11	19	0,67	173,33	17,33	6,06
3,20	12	18	0,50	183,33	18,33	4,17
3,40	12	19	0,58	195,00	19,50	4,86
3,60	16	21	0,42	203,33	20,33	2,60
3,80	18	24	0,50	213,33	21,33	2,78
4,00	18	25	0,58	225,00	22,50	3,24
4,20	21	27	0,50	235,00	23,50	2,38
4,40	22	27	0,42	243,33	24,33	1,89
4,60	24	29	0,42	251,67	25,17	1,74
4,80	23	30	0,58	263,33	26,33	2,54
5,00	24	32	0,67	276,67	27,67	2,78
5,20	26	35	0,75	291,67	29,17	2,88
5,40	26	37	0,92	310,00	31,00	3,53
5,60	28	40	1,00	330,00	33,00	3,57
5,80	29	43	1,17	353,33	35,33	4,02
6,00	31	45	1,17	376,67	37,67	3,76
6,20	35	49	1,17	400,00	40,00	3,33
6,40	39	57	1,50	430,00	43,00	3,85
6,60	46	62	1,33	456,67	45,67	2,90
6,80	51	69	1,50	486,67	48,67	2,94
7,00	63	76	1,08	508,33	50,83	1,72
7,20	68	85	1,42	536,67	53,67	2,08
7,40	74	91	1,42	565,00	56,50	1,91
7,60	86	112	2,17	608,33	60,83	2,52
7,80	118	137	1,58	640,00	64,00	1,34
8,00	129	152	1,92	678,33	67,83	1,49
8,20	163	226	5,25	783,33	78,33	3,22
8,40	205	250	3,75	858,33	85,83	1,83
8,60		>250				
8,80						
9,00						
9,20						

CONE PENETRATION TEST

ISTN Soil Mechanics Laboratory

SONDIR NO	: S-5	D1 (Qonus)	3.54 cm
PROJECT	: Pembangunan Gardu Induk 1	D2 (Jacked)	3.56 cm
LOCATION	: Kramat Watu, Serang, Banten	H (jacked)	10.8 cm
DATE OF TESTED	: 09 Pebruari 2012	Ratio (R)	
TESTED BY	: Aryudi Cs.	Elevation (- 0.00)	
CHECKED BY	: GEOINVES	G W L (-)	- m



CPT DATA

ISTN Soil Mechanics Laboratory

Biconnus data :

Area End of Connus (A1) — A1 = 10 cm^2

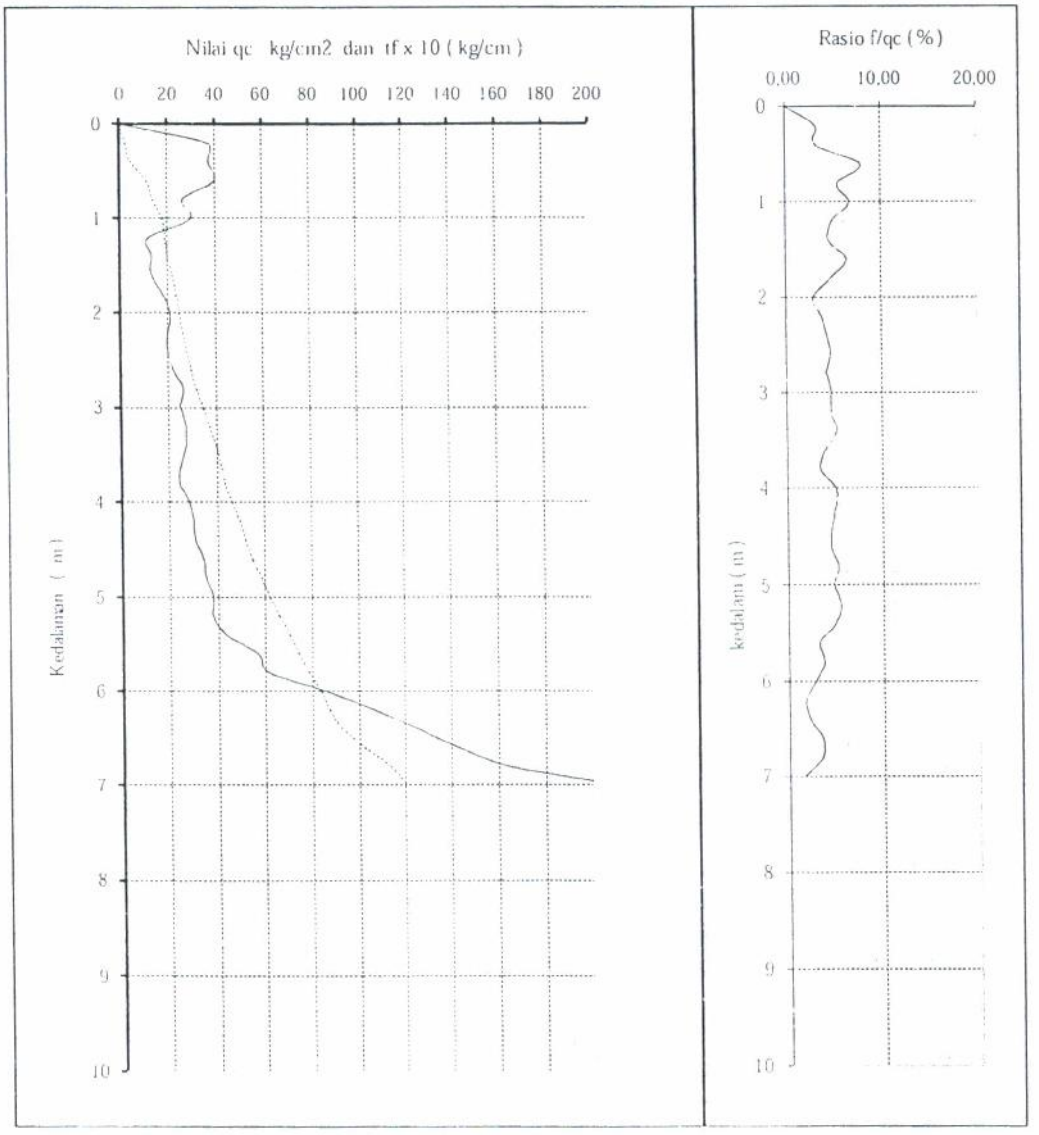
Friction Area (A2) — A2 = 120 cm^2

CPT No :	S-6	Project :	Pembangunan Gardu Induk 150KV Cilegon Baru II			
Depth	**qc**	**qt**	**f**	**tf**	**tf/10**	**f/qc**
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.20	37	51	1.17	23.33	2.33	3.15
0.40	37	51	1.17	46.67	4.67	3.15
0.60	40	78	3.17	110.00	11.00	7.92
0.80	26	43	1.42	138.33	13.83	5.45
1.00	30	54	2.00	178.33	17.83	6.67
1.20	12	19	0.58	190.00	19.00	4.86
1.40	13	20	0.58	201.67	20.17	4.49
1.60	13	23	0.83	218.33	21.83	6.41
1.80	18	28	0.83	235.00	23.50	4.63
2.00	21	28	0.58	246.67	24.67	2.78
2.20	20	29	0.75	261.67	26.17	3.75
2.40	20	30	0.83	278.33	27.83	4.17
2.60	22	34	1.00	298.33	29.83	4.55
2.80	26	39	1.08	320.00	32.00	4.17
3.00	25	39	1.17	343.33	34.33	4.67
3.20	27	42	1.25	368.33	36.83	4.63
3.40	27	44	1.42	396.67	39.67	5.25
3.60	25	37	1.00	416.67	41.67	4.00
3.80	24	34	0.83	433.33	43.33	3.47
4.00	28	45	1.42	461.67	46.17	5.06
4.20	30	48	1.50	491.67	49.17	5.00
4.40	31	48	1.42	520.00	52.00	4.57
4.60	34	52	1.50	550.00	55.00	4.41
4.80	35	57	1.83	586.67	58.67	5.24
5.00	38	60	1.83	623.33	62.33	4.82
5.20	38	63	2.08	665.00	66.50	5.48
5.40	43	68	2.08	706.67	70.67	4.84
5.60	57	79	1.83	743.33	74.33	3.22
5.80	61	88	2.25	788.33	78.83	3.69
6.00	86	115	2.42	836.67	83.67	2.81
6.20	107	129	1.83	873.33	87.33	1.71
6.40	125	157	2.67	926.67	92.67	2.13
6.60	143	202	4.92	1025.00	102.50	3.44
6.80	165	233	5.67	1138.33	113.83	3.43
7.00	210	250	3.33	1205.00	120.50	1.59
7.20		>250				
7.40						
7.60						
7.80						
8.00						
8.20						
8.40						
8.60						
8.80						
9.00						
9.20						

CONE PENETRATION TEST

ISTN Soil Mechanics Laboratory

SONDIR NO	: S-6	D1 (Qonus)	3.54 cm
PROJECT	: Pembangunan Gardu Induk 1	D2 (Jacked)	3.56 cm
LOCATION	: Kramat Watu, Serang, Banten	H (jacked)	10.8 cm
DATE OF TESTED	: 09 Pebruari 2012	Ratio (R)	
TESTED BY	: Aryudi Cs.	Elevation (- 0.00)	
CHECKED BY	: GEOINVES	G W L (-)	- m



LABORATORY TESTING RESULTS

Project	PEMBANGUNAN GARDU INDUK 150KV CILEGON BARU II									
Location	Kramat Watu, Serang, Banten									
			DB-1		DB-2		DB-3			
ITEM OF TEST	PARAMETER	Unit	UDS-1 1.50 - 2.00	UDS-2 3.50 - 4.00	UDS-1 1.50 - 2.00	UDS-2 3.50 - 4.00	UDS-1 1.50 - 2.00	UDS-2 3.50 - 4.00		
INDEX PROPERTIES										
	Water Content (Wn)	%	48.866	51.858	48.582	55.101	49.655	49.151		
	Unit Weight of Soil (γ)	gr/cm^3	1.712	1.497	1.742	1.560	1.710	1.769		
	Unit Weight of Dry Soil (γd)	gr/cm^3	1.150	0.986	1.172	1.006	1.143	1.186		
	Specific Gravity	-	2.641	2.619	2.644	2.626	2.641	2.646		
	Void Ratio (e)	-	1.297	1.657	1.255	1.610	1.311	1.231		
	Porosity (n)	-	0.565	0.624	0.557	0.617	0.567	0.552		
	Degree of Saturation (Sr)	%	99.538	81.985	102.341	89.852	100.016	105.610		
	Liquid Limit (LL)	%	74.460	96.800	72.740	97.700	80.660	74.800		
	Plastic Limit (PL)	%	46.038	83.333	35.714	63.636	42.045	42.606		
	Plastisity Index (PI)	%	28.422	13.467	37.026	34.064	38.615	32.194		
GRAINED SIZE DISTRIBUTION										
	Gravel	%	0.35	0.85	17.75	0.00	0.85	10.00		
	Sand	%	5.35	5.65	32.90	8.30	33.40	15.80		
	Silt	%	33.80	16.00	19.35	28.20	15.75	25.20		
	Clay	%	60.50	77.50	30.00	63.50	50.00	49.00		
	Organic Matter	%	-	-	-	-	-	-		
SHEAR STRENGTH PARAMETER										
	Unconfined Compression Test									
	Ultimate Axial Strength (qu)	Kg/cm^2	-	-	-	-	-	-		
	Cohession Undrained (Cu)	Kg/cm^2	-	-	-	-	-	-		
	Sensitivity (St)	-	-	-	-	-	-	-		
	Direct Shear Test									
	Cohession Undrained (Cu)	Kg/cm^2	-	-	-	-	-	-		
	Angle of Internal Friction (Ø)	Degree	-	-	-	-	-	-		
	Triaxial UU Test									
	Cohession Undrained (Cu)	Kg/cm^2	0.342	0.237	0.247	0.085	0.183	0.101		
	Angle of Internal Friction (Ø)	Degree	6.159	6.049	8.103	7.590	7.953	6.641		
	Triaxial CU Test									
	Cohession Undrained Total (Cu)	kPa	-	-	-	-	-	-		
	Angle of Internal Friction Total (Ø)	Degree	-	-	-	-	-	-		
	Cohession Undrained Eff. (Cu')	kPa	-	-	-	-	-	-		
	Angle of Internal Friction Eff. (Ø')	Degree	-	-	-	-	-	-		
COMPRESSIBILITY										
	Praconsolidation Pressure (Pc)	Kg/cm^2	1.95	1.95	1.50	1.57	1.92	1.96		
	Compression Index (Cc)	-	0.700	0.660	0.600	1.200	0.720	0.775		
	Coef. Of Consolidation (Cv) (...x10^{-3})	Cm^2/sec	0.48	0.45	0.44	0.50	0.46	0.45		

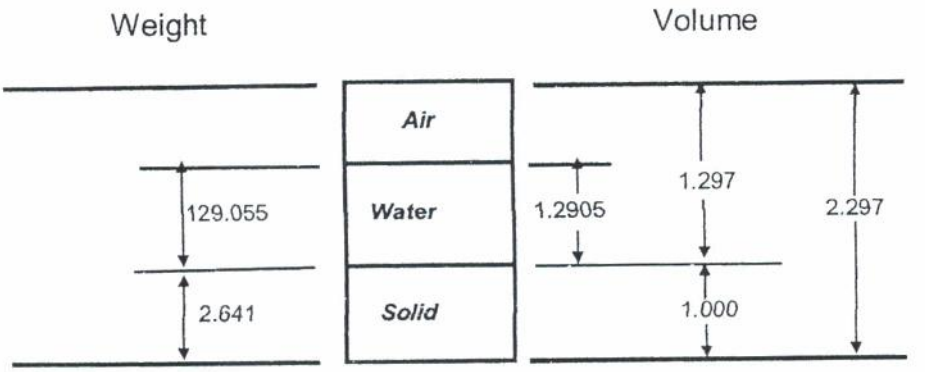
LABORATORY TESTING RESULTS

Project	PEMBANGUNAN GARDU INDUK 150KV CILEGON BARU II									
Location	Kramat Watu, Serang, Banten									
			DB-4							
ITEM OF TEST	PARAMETER	Unit	UDS-1 1.50 - 2.00	UDS-2 3.50 - 4.00	UDS-3 5.50 - 6.00					
INDEX PROPERTIES										
	Water Content (Wn)	%	35.609	32.925	69.212					
	Unit Weight of Soil (γ)	gr/cm^3	1.779	1.752	1.610					
	Unit Weight of Dry Soil (γd)	gr/cm^3	1.312	1.318	0.952					
	Specific Gravity	-	2.647	2.645	2.631					
	Void Ratio (e)	-	1.018	1.006	1.765					
	Porosity (n)	-	0.504	0.502	0.638					
	Degree of Saturation (Sr)	%	92.591	86.547	103.187					
	Liquid Limit (LL)	%	102.625	33.220	33.670					
	Plastic Limit (PL)	%	46.296	24.118	28.105					
	Plastisity Index (PI)	%	56.329	9.102	5.565					
GRAINED SIZE DISTRIBUTION										
	Gravel	%	6.60	0.20	0.60					
	Sand	%	24.25	8.45	5.10					
	Silt	%	35.15	26.35	26.30					
	Clay	%	34.00	65.00	68.00					
	Organic Matter	%	-	-	-					
SHEAR STRENGTH PARAMETER										
	Unconfined Compression Test									
	Ultimate Axial Strength (qu)	Kg/cm^2	-	-	-					
	Cohession Undrained (Cu)	Kg/cm^2	-	-	-					
	Sensitivity (St)	-	-	-	-					
	Direct Shear Test									
	Cohession Undrained (Cu)	Kg/cm^2	-	-	-					
	Angle of Internal Friction (Ø)	Degree	-	-	-					
	Triaxial UU Test									
	Cohession Undrained (Cu)	Kg/cm^2	0.424	0.150	0.059					
	Angle of Internal Friction (Ø)	Degree	6.871	7.083	6.681					
	Triaxial CU Test									
	Cohession Undrained Total (Cu)	kPa	-	-	-					
	Angle of Internal Friction Total (Ø)	Degree	-	-	-					
	Cohession Undrained Eff. (Cu')	kPa	-	-	-					
	Angle of Internal Friction Eff. (Ø')	Degree	-	-	-					
COMPRESSIBILITY										
	Praconsolidation Pressure (Pc)	Kg/cm^2	1.60	0.93	1.61					
	Compression Index (Cc)	-	0.460	0.725	0.380					
	Coef. Of Consolidation (Cv) (...x10^{-3})	Cm^2/sec	0.55	0.44	0.59					

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

INDEX PROPERTIES TEST

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	Cilegon, Banten	TESTED BY	Budi D.
BOR HOLE NO	DB-1 UDS-1	CHECKED BY	Singgih S.
DEPTH	1.50 - 2.00 m	DATE OF TESTED	Pebruari 2012



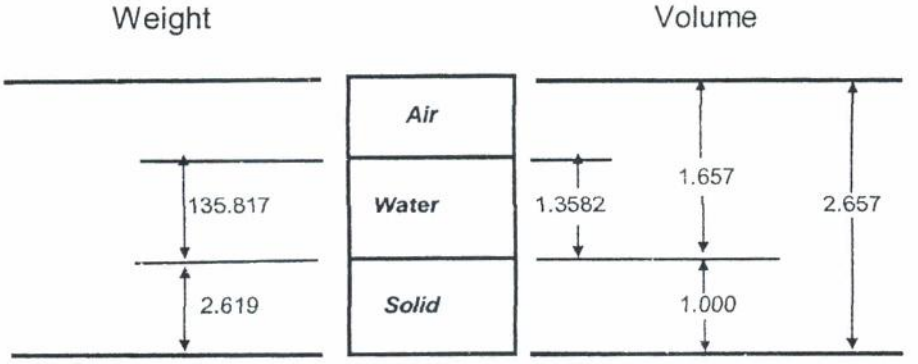
Unit Weight of Sample (in gr/cm3)	1.712
Water Content of Sample (%)	48.866
Specific Gravity of Soil Sample	2.641
Unit Weight of Water (γw, in grm/cm3)	1.000
Saturated Unit Weight of Soil (γsat, in grm/cm3)	1.715

Void Ratio (e)	1.297
Porosity (n)	0.565
Dry Unit Weight (γd)	1.150
Degree of Saturation (Sr)	99.538

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

INDEX PROPERTIES TEST

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	Cilegon, Banten	TESTED BY	Budi D.
BOR HOLE NO	DB-1 UDS-2	CHECKED BY	Singgih S.
DEPTH	3.50 - 4.00 m	DATE OF TESTED	Pebruari 2012



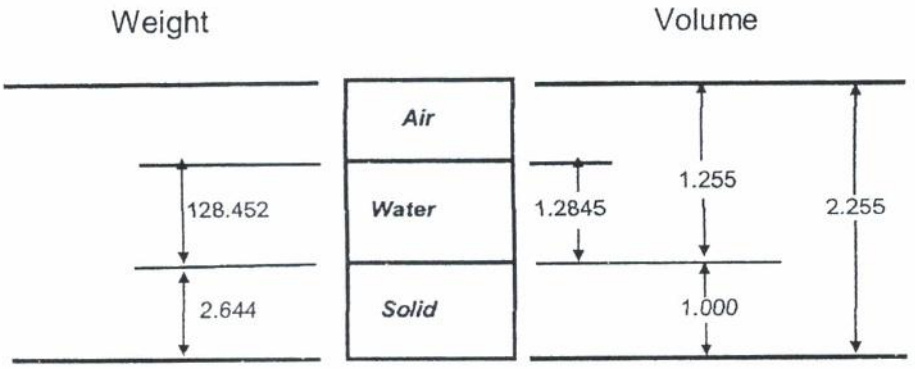
Unit Weight of Sample (in gr/cm3)	1.497
Water Content of Sample (%)	51.858
Specific Gravity of Soil Sample	2.619
Unit Weight of Water (γw, in grm/cm3)	1.000
Saturated Unit Weight of Soil (γsat, in grm/cm3)	1.609

Void Ratio (e)	1.657
Porosity (n)	0.624
Dry Unit Weight (γd)	0.986
Degree of Saturation (Sr)	81.985

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

INDEX PROPERTIES TEST

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	Cilegon, Banten	TESTED BY	Budi D.
BOR HOLE NO	DB-2 UDS-1	CHECKED BY	Singgih S.
DEPTH	1.50 - 2.00 m	DATE OF TESTED	Pebruari 2012



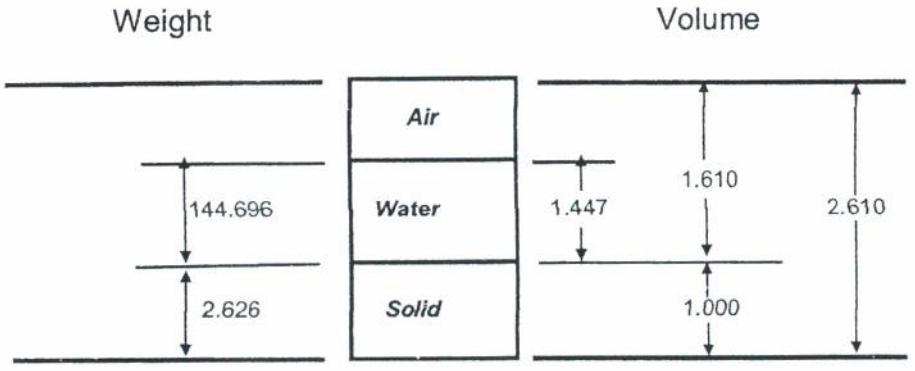
Unit Weight of Sample (in gr/cm3)	1.742
Water Content of Sample (%)	48.582
Specific Gravity of Soil Sample	2.644
Unit Weight of Water (γw, in grm/cm3)	1.000
Saturated Unit Weight of Soil (γsat, in grm/cm3)	1.729

Void Ratio (e)	1.255
Porosity (n)	0.557
Dry Unit Weight (γd)	1.172
Degree of Saturation (Sr)	102.341

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

INDEX PROPERTIES TEST

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	Cilegon, Banten	TESTED BY	Budi D.
BOR HOLE NO	DB-2 UDS-2	CHECKED BY	Singgih S.
DEPTH	3.50 - 4.00 m	DATE OF TESTED	Pebruari 2012



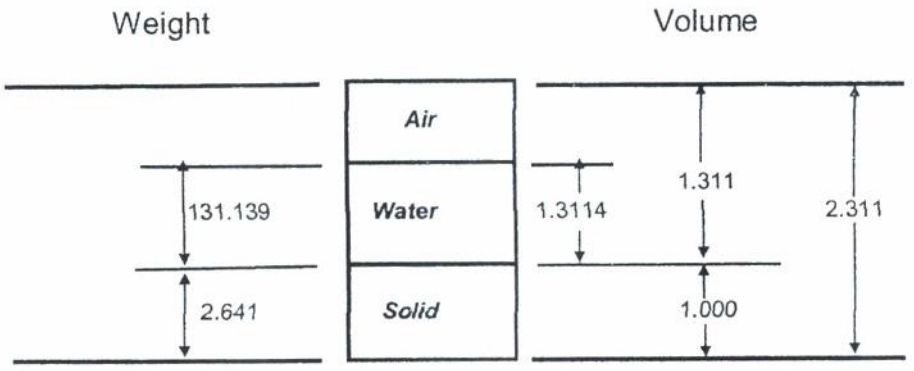
Unit Weight of Sample (in gr/cm3)	1.560
Water Content of Sample (%)	55.101
Specific Gravity of Soil Sample	2.626
Unit Weight of Water (γw, in grm/cm3)	1.000
Saturated Unit Weight of Soil (γsat, in grm/cm3)	1.623

Void Ratio (e)	1.610
Porosity (n)	0.617
Dry Unit Weight (γd)	1.006
Degree of Saturation (Sr)	89.852

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

INDEX PROPERTIES TEST

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	Cilegon, Banten	TESTED BY	Budi D.
BOR HOLE NO	DB-3 UDS-1	CHECKED BY	Singgih S.
DEPTH	1.50 - 2.00 m	DATE OF TESTED	Pebruari 2012



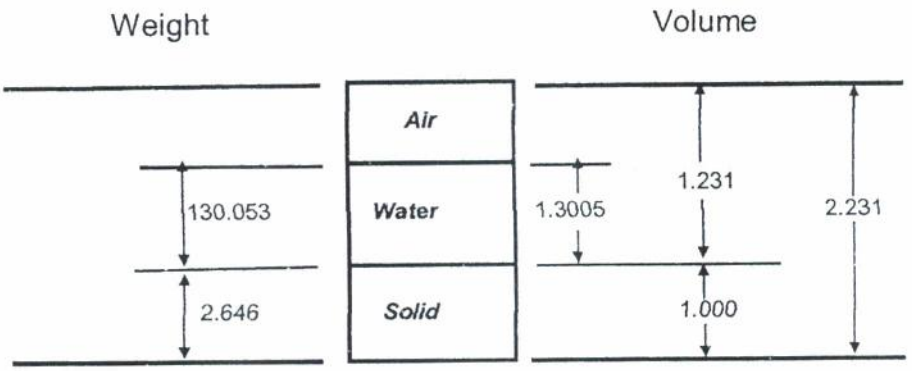
Unit Weight of Sample (in gr/cm3)	1.710
Water Content of Sample (%)	49.655
Specific Gravity of Soil Sample	2.641
Unit Weight of Water (γw, in grm/cm3)	1.000
Saturated Unit Weight of Soil (γsat, in grm/cm3)	1.710

Void Ratio (e)	1.311
Porosity (n)	0.567
Dry Unit Weight (γd)	1.143
Degree of Saturation (Sr)	100.016

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

INDEX PROPERTIES TEST

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	Cilegon, Banten	TESTED BY	Budi D.
BOR HOLE NO	DB-3 UDS-2	CHECKED BY	Singgih S.
DEPTH	3.50 - 4.00 m	DATE OF TESTED	Pebruari 2012



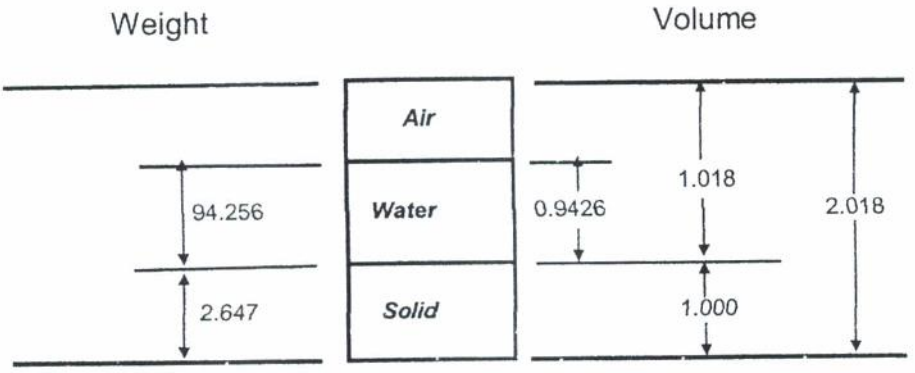
Unit Weight of Sample (in gr/cm3)	1.769
Water Content of Sample (%)	49.151
Specific Gravity of Soil Sample	2.646
Unit Weight of Water (γw, in grm/cm3)	1.000
Saturated Unit Weight of Soil (γsat, in grm/cm3)	1.738

Void Ratio (e)	1.231
Porosity (n)	0.552
Dry Unit Weight (γd)	1.186
Degree of Saturation (Sr)	105.610

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

INDEX PROPERTIES TEST

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	Cilegon, Banten	TESTED BY	Budi D.
BOR HOLE NO	DB-4 UDS-1	CHECKED BY	Singgih S.
DEPTH	1.50 - 2.00 m	DATE OF TESTED	Pebruari 2012



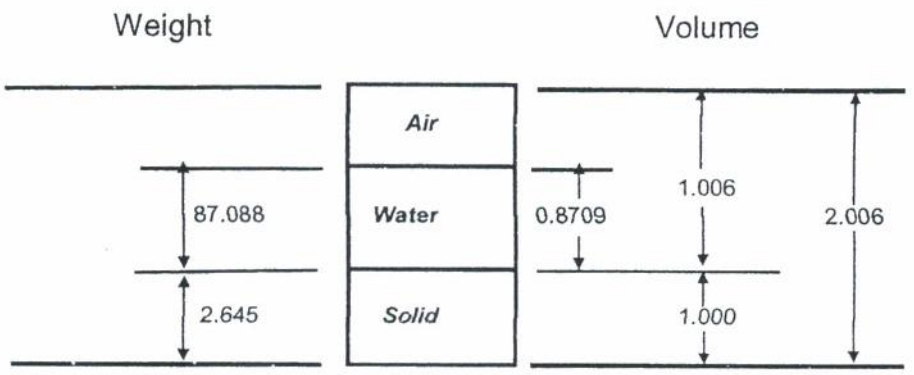
Unit Weight of Sample (in gr/cm3)	1.779
Water Content of Sample (%)	35.609
Specific Gravity of Soil Sample	2.647
Unit Weight of Water (γw, in grm/cm3)	1.000
Saturated Unit Weight of Soil (γsat, in grm/cm3)	1.816

Void Ratio (e)	1.018
Porosity (n)	0.504
Dry Unit Weight (γd)	1.312
Degree of Saturation (Sr)	92.591

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

INDEX PROPERTIES TEST

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	Cilegon, Banten	TESTED BY	Budi D.
BOR HOLE NO	DB-4 UDS-2	CHECKED BY	Singgih S.
DEPTH	3.50 - 4.00 m	DATE OF TESTED	Pebruari 2012



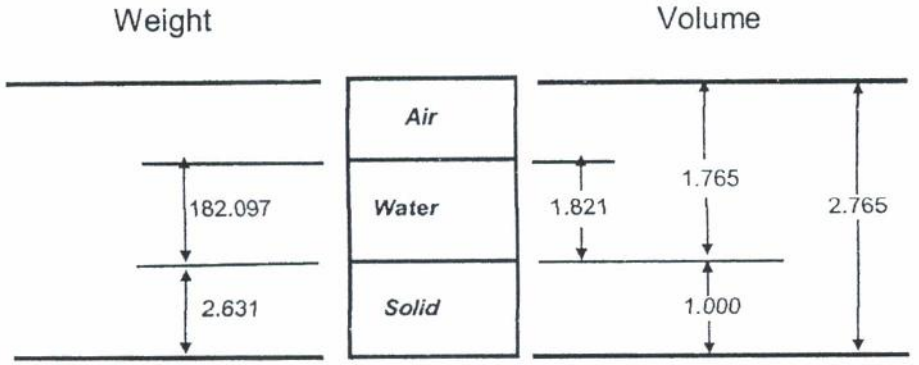
Unit Weight of Sample (in gr/cm3)	1.752
Water Content of Sample (%)	32.925
Specific Gravity of Soil Sample	2.645
Unit Weight of Water (γw, in grm/cm3)	1.000
Saturated Unit Weight of Soil (γsat, in grm/cm3)	1.820

Void Ratio (e)	1.006
Porosity (n)	0.502
Dry Unit Weight (γd)	1.318
Degree of Saturation (Sr)	86.547

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

INDEX PROPERTIES TEST

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	Cilegon, Banten	TESTED BY	Budi D.
BOR HOLE NO	DB-4 UDS-3	CHECKED BY	Singgih S.
DEPTH	5.50 - 6.00 m	DATE OF TESTED	Pebruari 2012



Unit Weight of Sample (in gr/cm3)	1.610
Water Content of Sample (%)	69.212
Specific Gravity of Soil Sample	2.631
Unit Weight of Water (γw, in grm/cm3)	1.000
Saturated Unit Weight of Soil (γsat, in grm/cm3)	1.590

Void Ratio (e)	1.765
Porosity (n)	0.638
Dry Unit Weight (γd)	0.952
Degree of Saturation (Sr)	103.187

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

ATTERBERG LIMIT

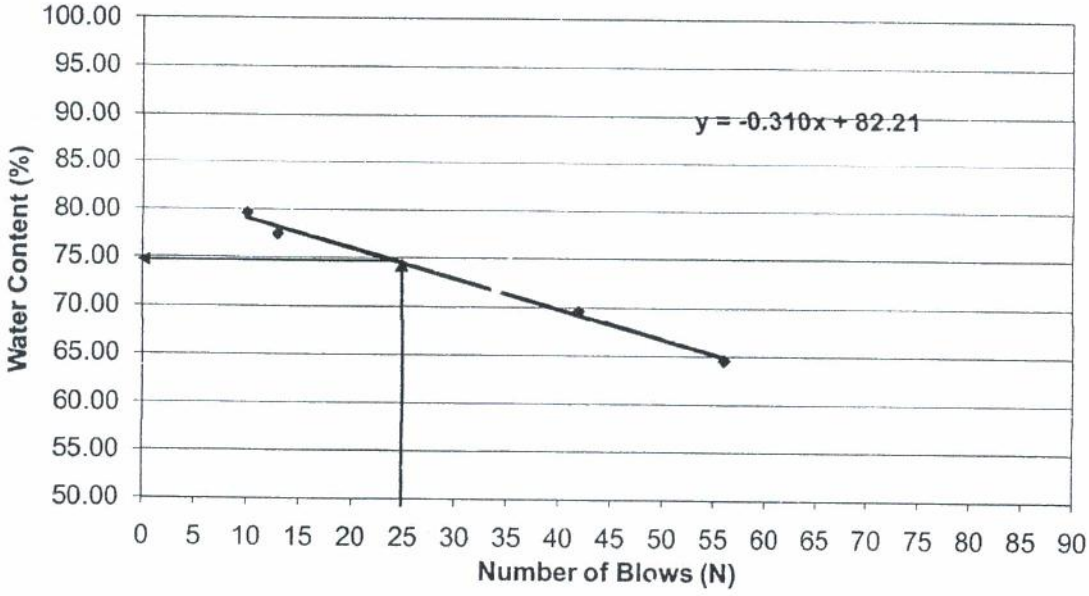
PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	Cilegon, Banten 0	TESTED BY	Endri A.
BOR HOLE NO	DB-1 UDS-1	CHECKED BY	Singgih S.
DEPTH	1.50 - 2.0 m	DATE OF TESTED	Pebruari 2012

LIQUID LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)
1	3.72	4.23	4.03	56	64.52
2	3.62	4.57	4.18	42	69.64
3	3.65	4.2	3.96	13	77.42
4	3.53	4.59	4.12	10	79.66

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	3.57	7.44	6.22	46.04
LIQUID LIMIT , LL (%)			**74.46**	
PLASTIC LIMIT , PL (%)			**46.04**	
PLASTICITY INDEX , PI , (%)			**28.42**	



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

ATTERBERG LIMIT

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	Cilegon, Banten 0	TESTED BY	Endri A.
BOR HOLE NO	DB-1 UDS-2	CHECKED BY	Singgih S.
DEPTH	3.50 - 4.(m	DATE OF TESTED	Pebruari 2012

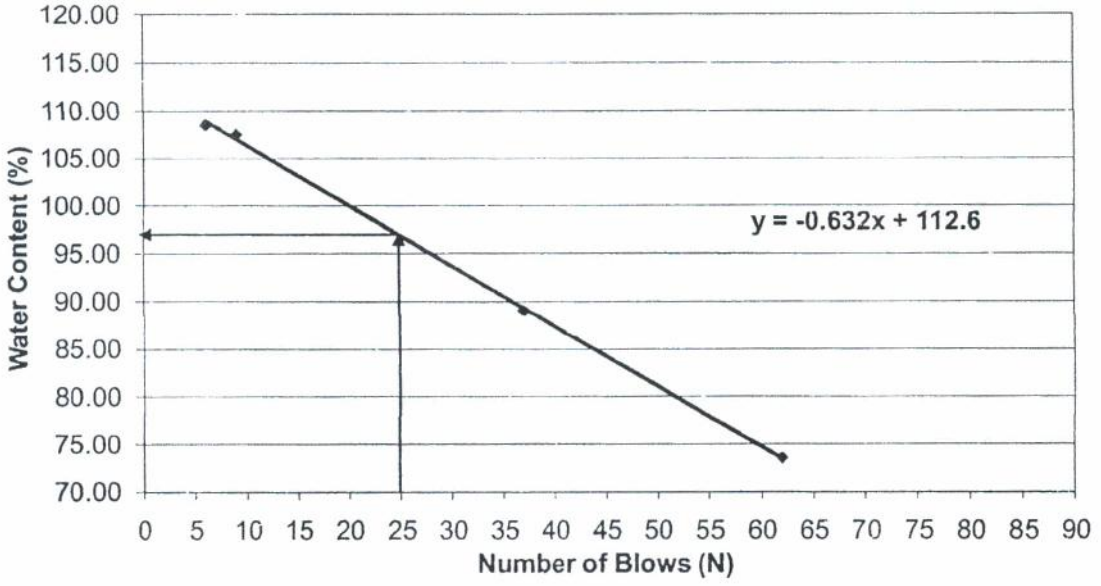
LIQUID LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)
1	3.63	4.22	3.97	62	73.53
2	3.65	4.86	4.29	37	89.06
3	3.59	4.42	3.99	9	107.50
4	3.64	5.12	4.35	6	108.45

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	4.71	7.46	6.21	83.33

LIQUID LIMIT , LL (%)	**96.80**
PLASTIC LIMIT , PL (%)	**83.33**
PLASTICITY INDEX , PI , (%)	**13.47**



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

ATTERBERG LIMIT

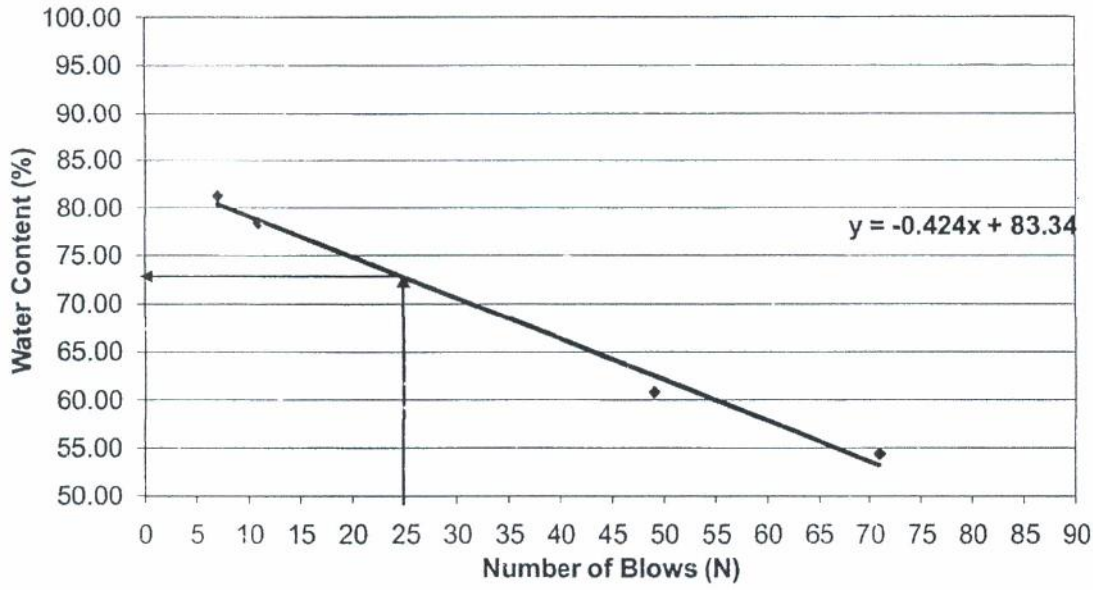
PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	Cilegon, Banten 0	TESTED BY	Endri A.
BOR HOLE NO	DB-2 UDS-1	CHECKED BY	Singgih S.
DEPTH	1.50 - 2.(m	DATE OF TESTED	Pebruari 2012

LIQUID LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)
1	3.52	4.23	3.98	71	54.35
2	3.62	4.44	4.13	49	60.78
3	3.68	4.34	4.05	11	78.38
4	3.55	4.71	4.19	7	81.25

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	3.58	7.76	6.66	35.71
LIQUID LIMIT , LL (%)			**72.74**	
PLASTIC LIMIT , PL (%)			**35.71**	
PLASTICITY INDEX , PI , (%)			**37.03**	



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

ATTERBERG LIMIT

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	Cilegon, Banten	TESTED BY	Endri A.
BOR HOLE NO	DB-2 UDS-2	CHECKED BY	Singgih S.
DEPTH	3.50 - 4.0 m	DATE OF TESTED	Pebruari 2012

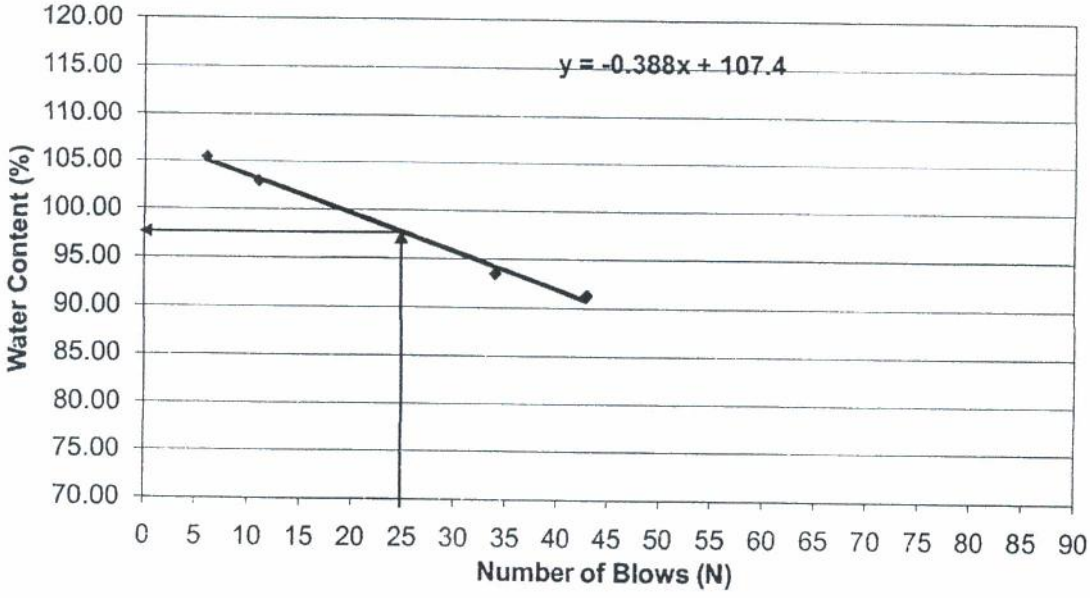
LIQUID LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)
1	3.71	4.15	3.94	43	91.30
2	3.63	4.52	4.09	34	93.48
3	3.67	4.36	4.01	11	102.94
4	3.52	4.65	4.07	6	105.45

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	3.59	7.55	6.01	63.64

LIQUID LIMIT , LL (%)	**97.70**
PLASTIC LIMIT , PL (%)	**63.64**
PLASTICITY INDEX , PI , (%)	**34.06**



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

ATTERBERG LIMIT

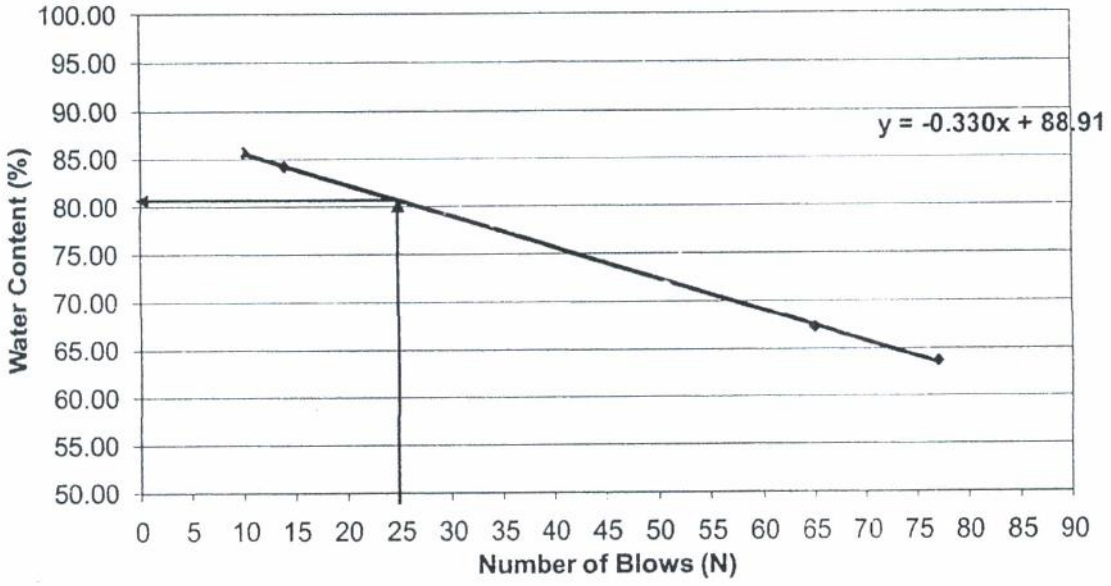
PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	Cilegon, Banten 0	TESTED BY	Endri A.
BOR HOLE NO	DB-3 UDS-1	CHECKED BY	Singgih S.
DEPTH	1.50 - 2.(m	DATE OF TESTED	Pebruari 2012

LIQUID LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)
1	3.54	4.08	3.87	77	63.64
2	3.59	4.56	4.17	65	67.24
3	3.54	4.24	3.92	14	84.21
4	3.45	4.49	4.01	10	85.71

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	3.69	7.44	6.33	42.05
LIQUID LIMIT , LL (%)			**80.66**	
PLASTIC LIMIT , PL (%)			**42.05**	
PLASTICITY INDEX , PI , (%)			**38.61**	



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

ATTERBERG LIMIT

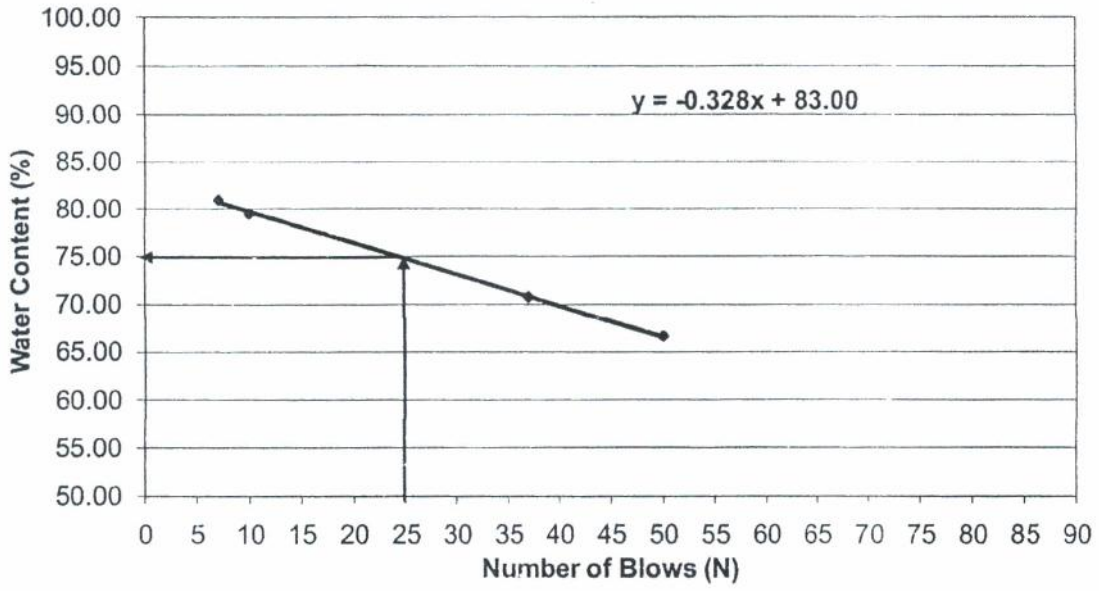
PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	Cilegon, Banten 0	TESTED BY	Endri A.
BOR HOLE NO	DB-3 UDS-2	CHECKED BY	Singgih S.
DEPTH	3.50 - 4.(m	DATE OF TESTED	Pebruari 2012

LIQUID LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)
1	3.53	4.18	3.92	50	66.67
2	3.71	4.82	4.36	37	70.77
3	3.76	4.46	4.15	10	79.49
4	3.49	4.63	4.12	7	80.95

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	3.68	7.73	6.52	42.61
LIQUID LIMIT , LL (%)			**74.80**	
PLASTIC LIMIT , PL (%)			**42.61**	
PLASTICITY INDEX , PI , (%)			**32.19**	



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

ATTERBERG LIMIT

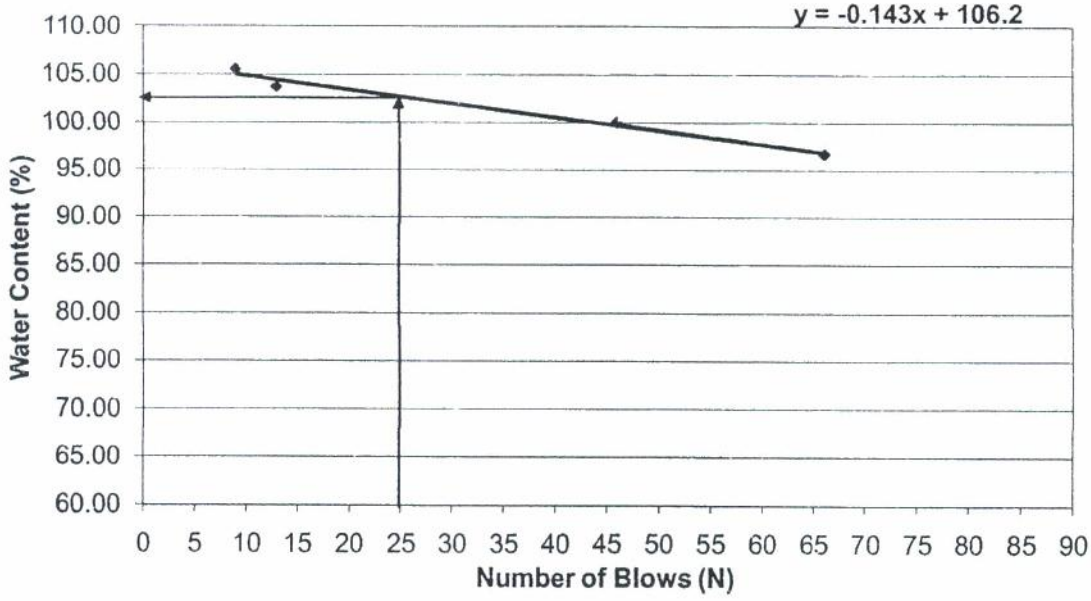
PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	Cilegon, Banten 0	TESTED BY	Endri A.
BOR HOLE NO	DB-4 UDS-1	CHECKED BY	Singgih S.
DEPTH	1.50 - 2.0m	DATE OF TESTED	Pebruari 2012

LIQUID LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)
1	3.68	4.27	3.98	66	96.67
2	3.65	4.67	4.16	46	100.00
3	3.73	4.28	4	13	103.70
4	3.58	4.69	4.12	9	105.56

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	3.56	7.51	6.26	46.30
LIQUID LIMIT , LL (%)			**102.63**	
PLASTIC LIMIT , PL (%)			**46.30**	
PLASTICITY INDEX , PI , (%)			**56.33**	



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

ATTERBERG LIMIT

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	Cilegon, Banten 0	TESTED BY	Endri A.
BOR HOLE NO	DB-4 UDS-2	CHECKED BY	Singgih S.
DEPTH	3.50 - 4.(m	DATE OF TESTED	Pebruari 2011

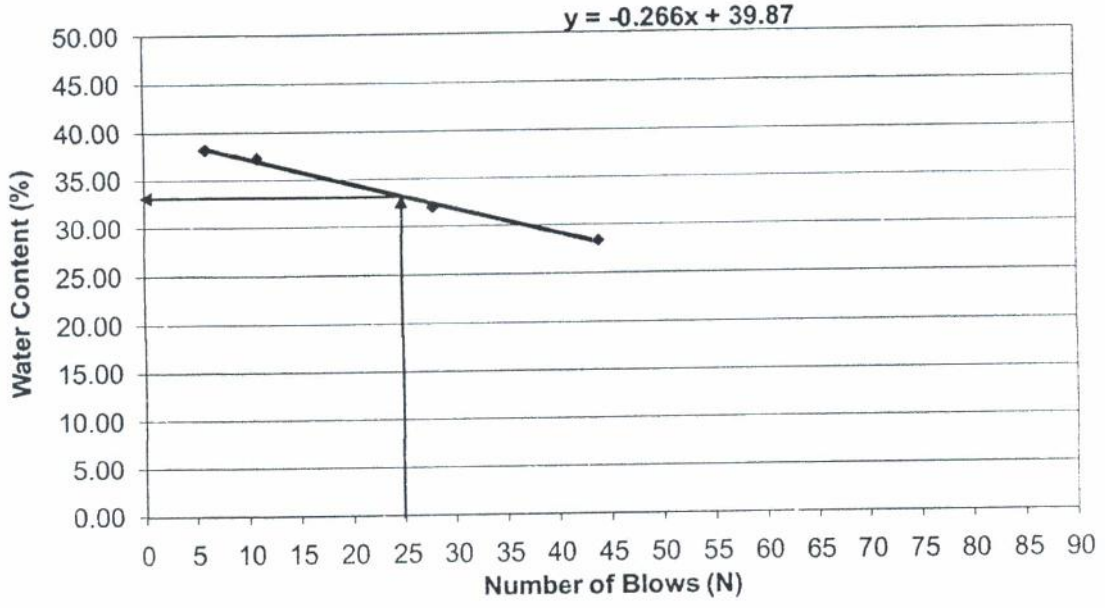
LIQUID LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)
1	3.56	4.33	4.16	44	28.33
2	3.75	4.78	4.53	28	32.05
3	3.54	4.24	4.05	11	37.25
4	3.78	4.83	4.54	6	38.16

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	3.52	7.74	6.92	24.12

LIQUID LIMIT , LL (%)	**33.22**
PLASTIC LIMIT , PL (%)	**24.12**
PLASTICITY INDEX , PI , (%)	**9.10**



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

ATTERBERG LIMIT

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	Cilegon, Banten 0	TESTED BY	Endri A.
BOR HOLE NO	DB-4 UDS-3	CHECKED BY	Singgih S.
DEPTH	5.50 - 6.(m	DATE OF TESTED	Pebruari 2012

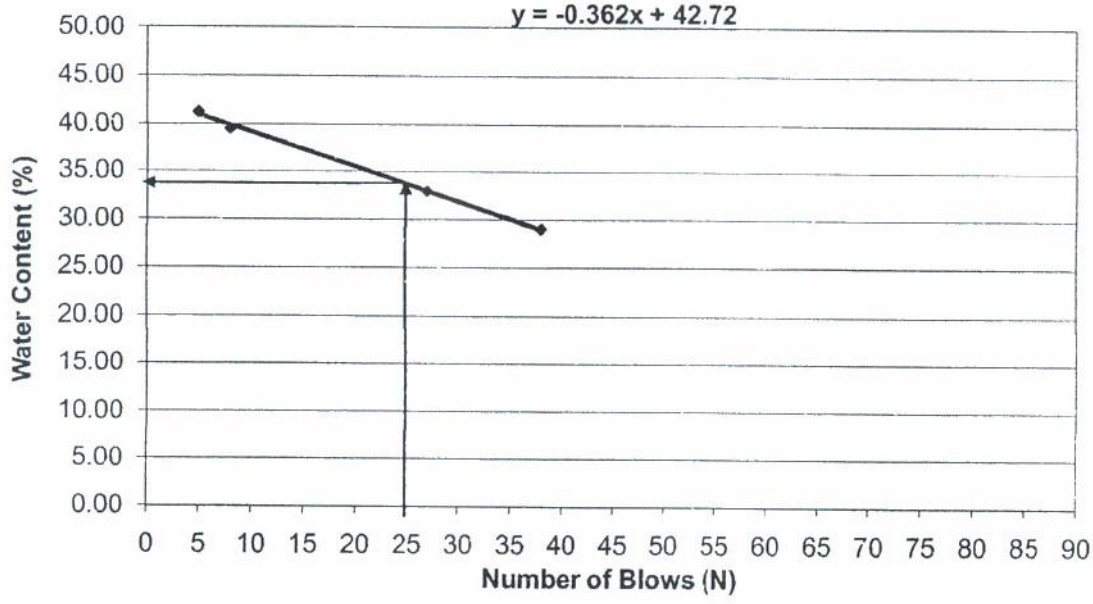
LIQUID LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)
1	3.59	4.48	4.28	38	28.99
2	3.64	4.85	4.55	27	32.97
3	3.59	4.65	4.35	8	39.47
4	3.62	4.99	4.59	5	41.24

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	3.69	7.61	6.75	28.10

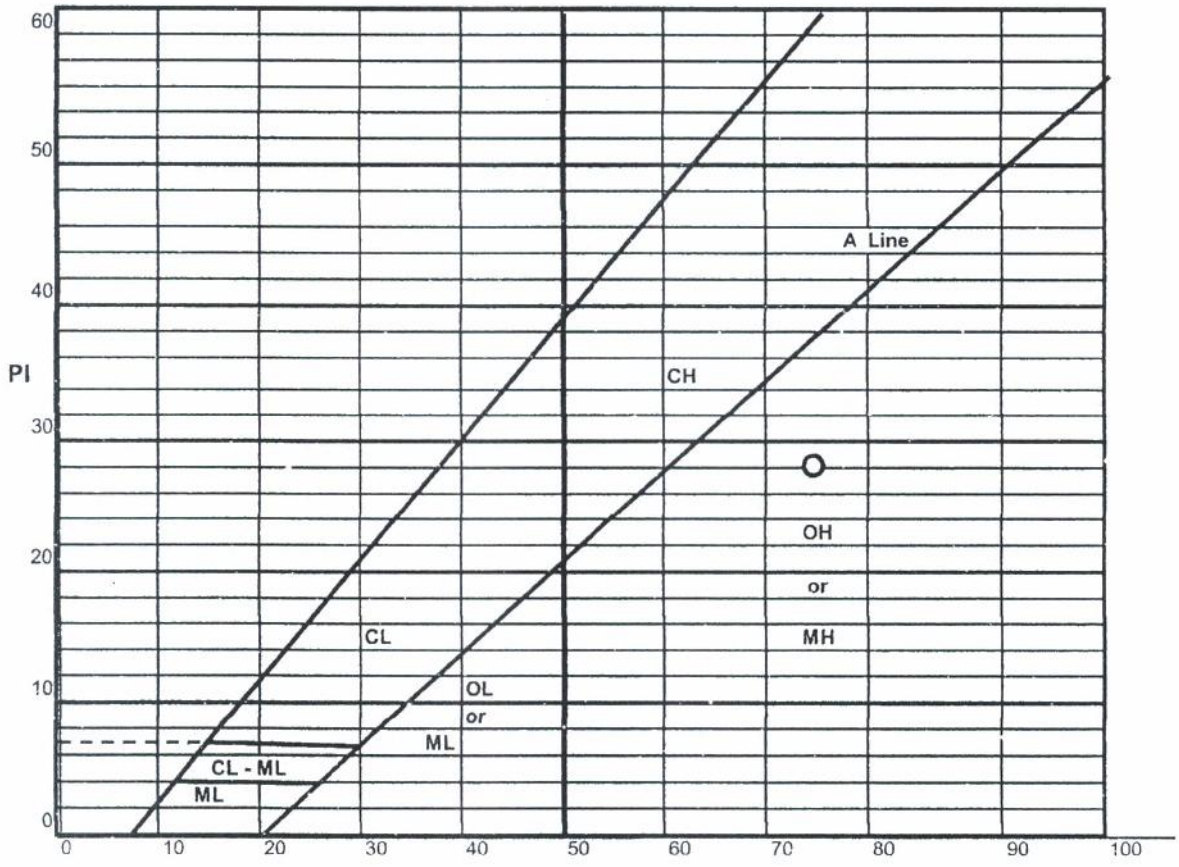
LIQUID LIMIT , LL (%)	**33.67**
PLASTIC LIMIT , PL (%)	**28.10**
PLASTICITY INDEX , PI , (%)	**5.57**



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

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	Cilegon, Banten 0	TESTED BY	Budi D.
BOR HOLE NO	DB-1 UDS-1	CHECKED BY	Singgih S.
DEPTH	1.50 - 2.0 m	DATE OF TESTED	Pebruari 2012

PLASTICITY CHART



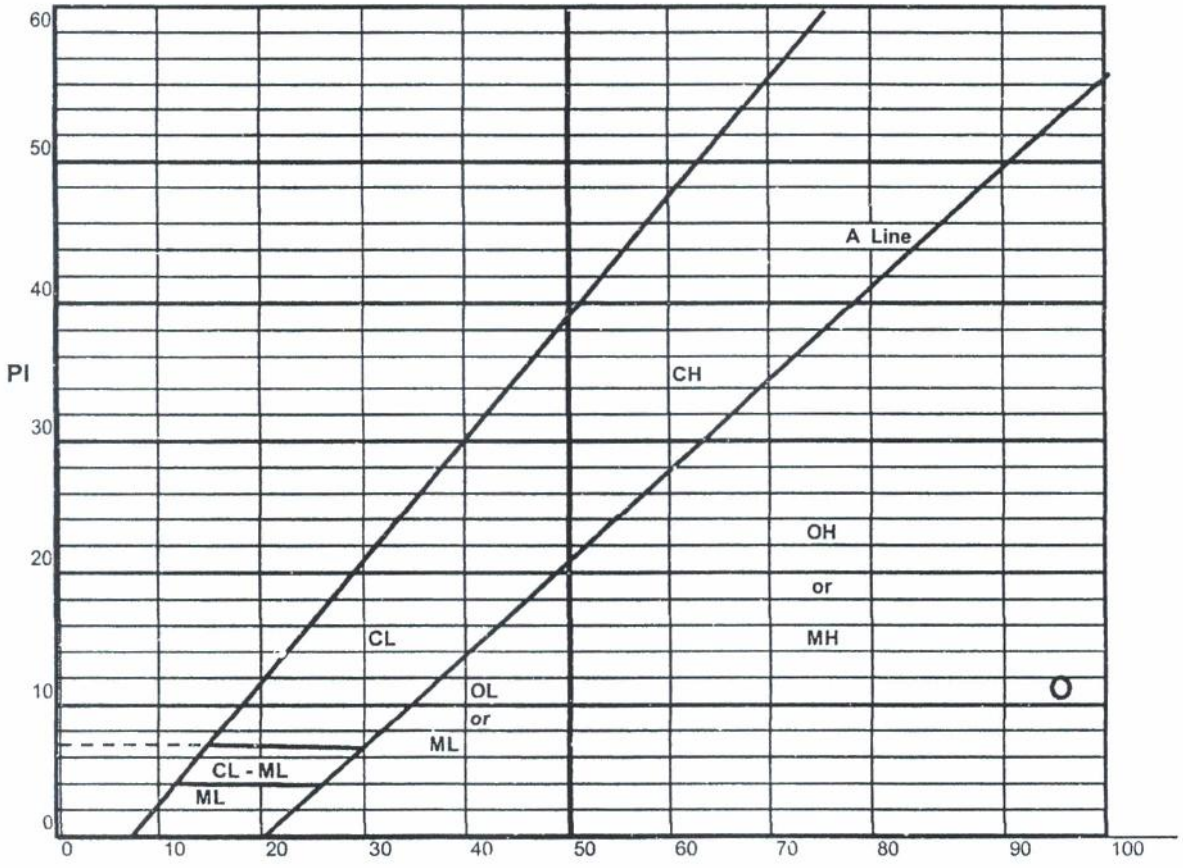
LIQUID LIMIT , L L (%)

SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM **OH or MH**

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

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	Cilegon, Banten 0	TESTED BY	Budi D.
BOR HOLE NO	DB-1 UDS-2	CHECKED BY	Singgih S.
DEPTH	3.50 - 4.0 m	DATE OF TESTED	Pebruari 2012

PLASTICITY CHART

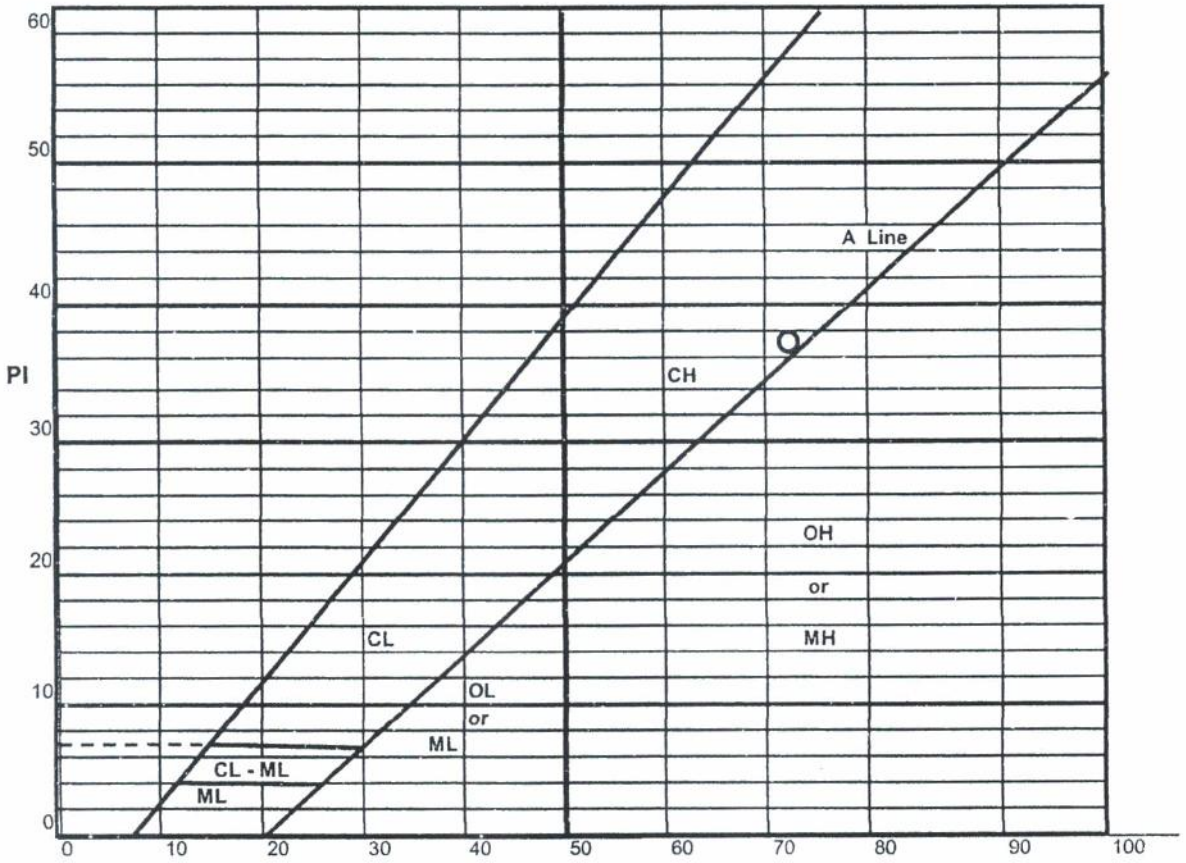


SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM **OH or MH**

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

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	Cilegon, Banten 0	TESTED BY	Budi D.
BOR HOLE NO	DB-2 UDS-1	CHECKED BY	Singgih S.
DEPTH	1.50 - 2.0 m	DATE OF TESTED	Pebruari 2012

PLASTICITY CHART



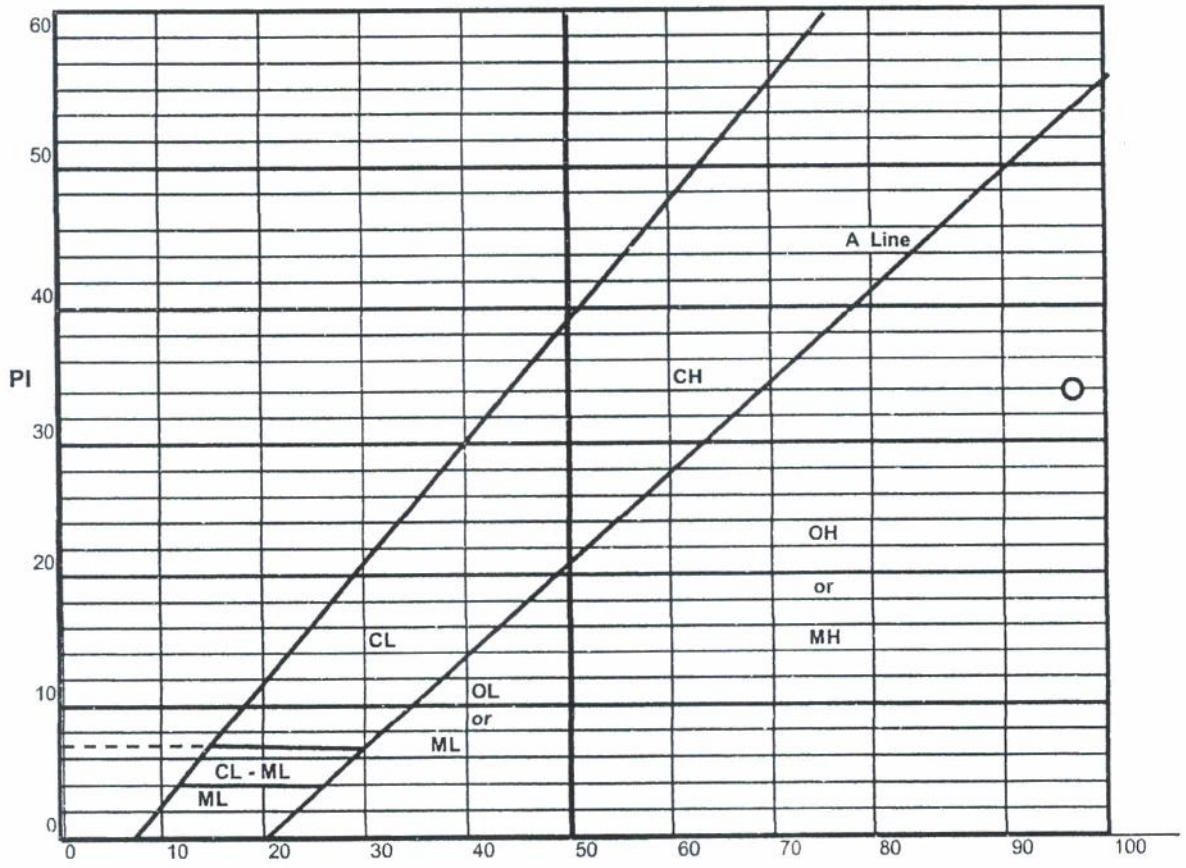
LIQUID LIMIT , L L (%)

SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM **CH**

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

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	Cilegon, Banten 0	TESTED BY	Budi D.
BOR HOLE NO	DB-2 UDS-2	CHECKED BY	Singgih S.
DEPTH	3.50 - 4.0 m	DATE OF TESTED	Pebruari 2012

PLASTICITY CHART



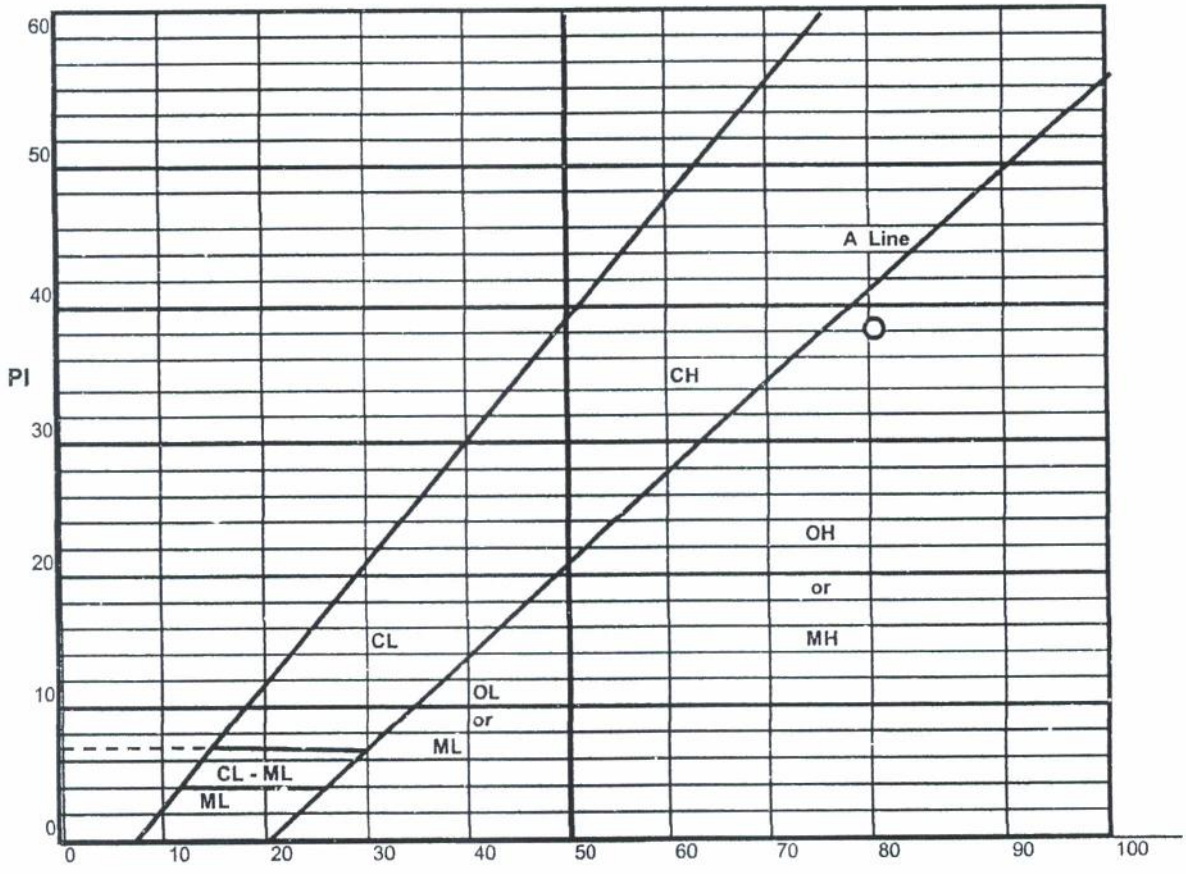
LIQUID LIMIT , L L (%)

SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM **OH or MH**

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

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	Cilegon, Banten 0	TESTED BY	Budi D.
BOR HOLE NO	DB-3 UDS-1	CHECKED BY	Singgih S.
DEPTH	1.50 - 2.0 m	DATE OF TESTED	Pebruari 2012

PLASTICITY CHART

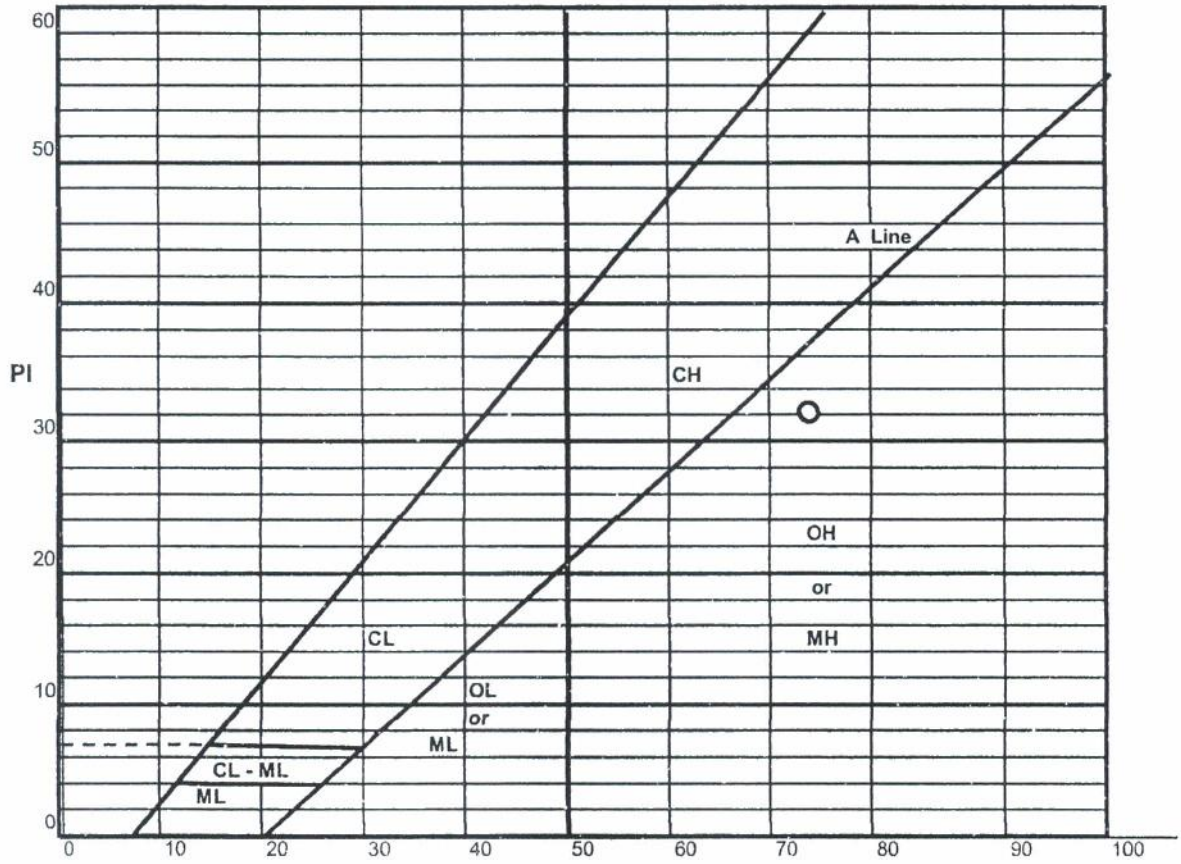


SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM **OH or MH**

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

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	Cilegon, Banten 0	TESTED BY	Budi D.
BOR HOLE NO	DB-3 UDS-2	CHECKED BY	Singgih S.
DEPTH	3.50 - 4.0 m	DATE OF TESTED	Pebruari 2012

PLASTICITY CHART

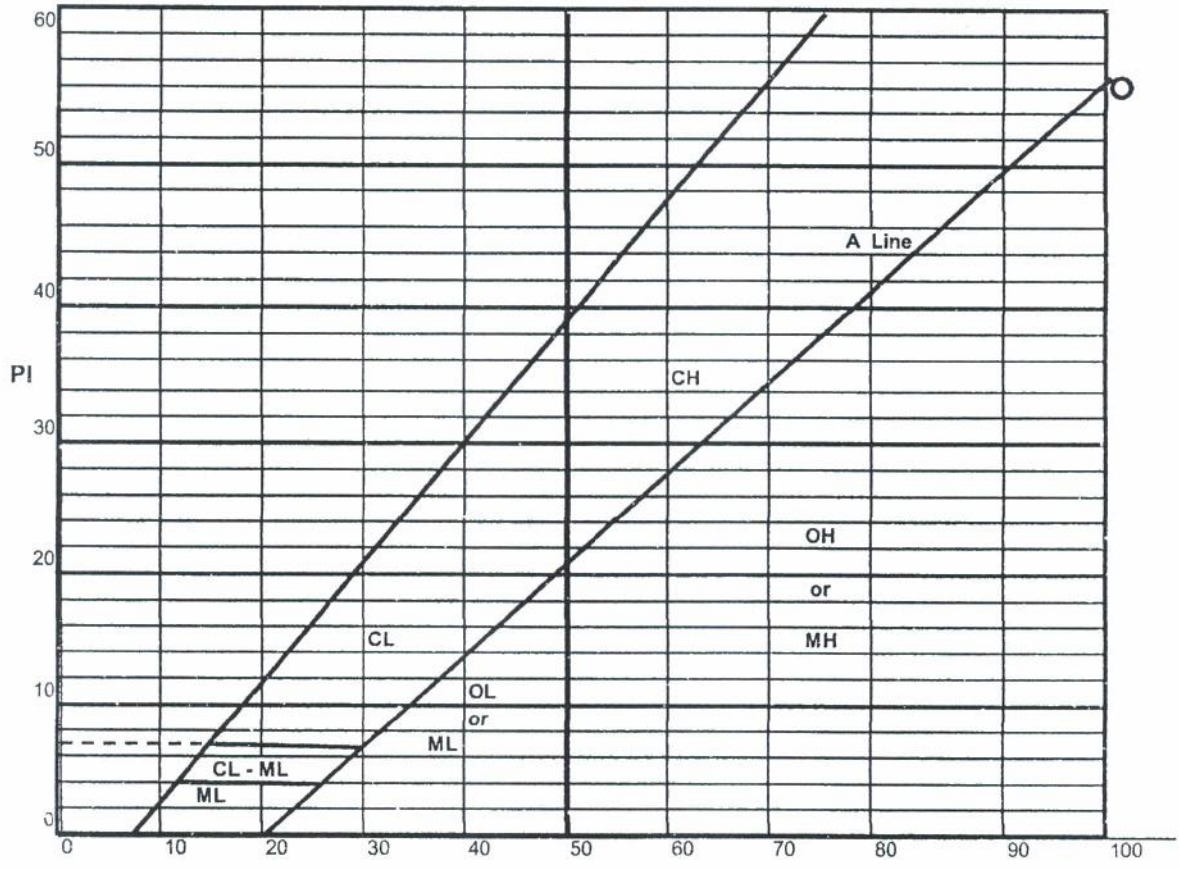


SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM **OH or MH**

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

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	Cilegon, Banten 0	TESTED BY	Budi D.
BOR HOLE NO	DB-4 UDS-1	CHECKED BY	Singgih S.
DEPTH	1.50 - 2.0 m	DATE OF TESTED	Pebruari 2012

PLASTICITY CHART



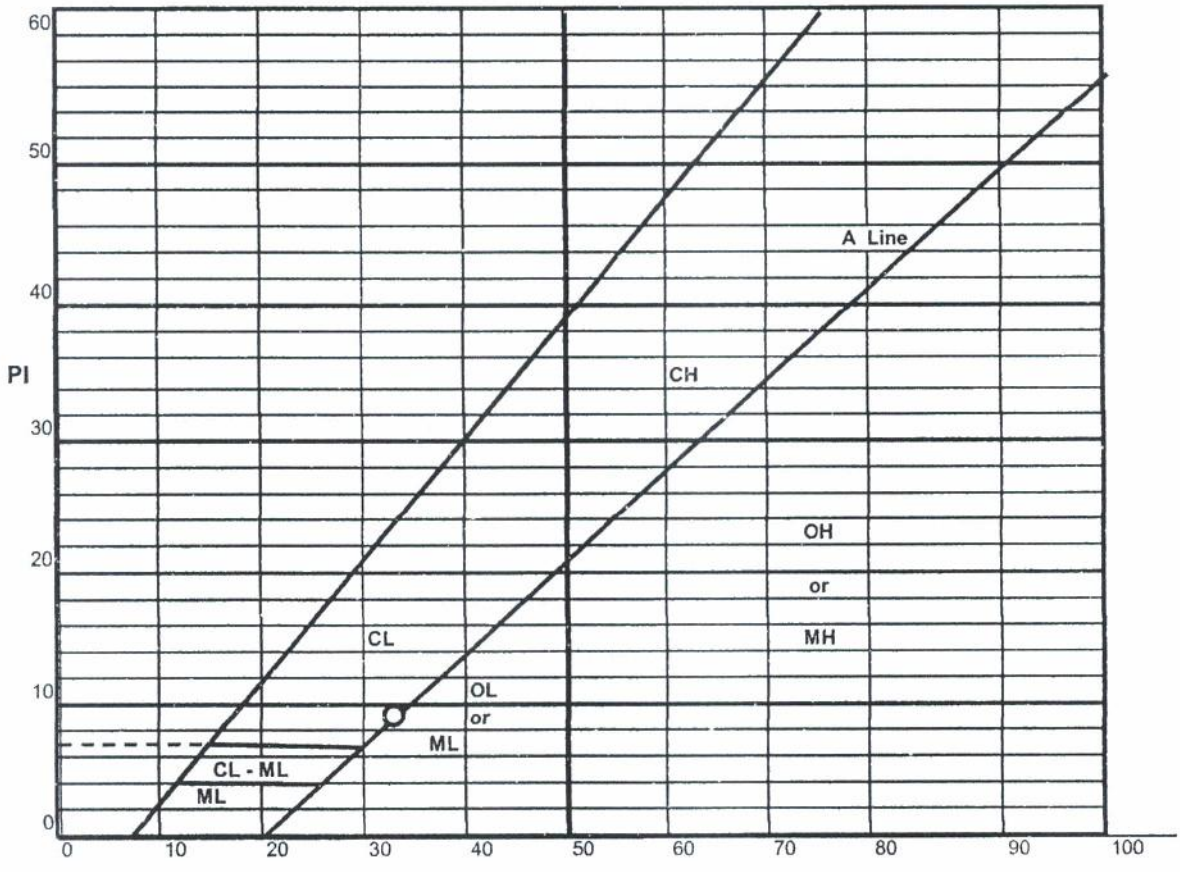
LIQUID LIMIT , L L (%)

SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM **OH or MH**

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

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	Cilegon, Banten 0	TESTED BY	Budi D.
BOR HOLE NO	DB-4 UDS-2	CHECKED BY	Singgih S.
DEPTH	3.50 - 4.0 m	DATE OF TESTED	Pebruari 2012

PLASTICITY CHART

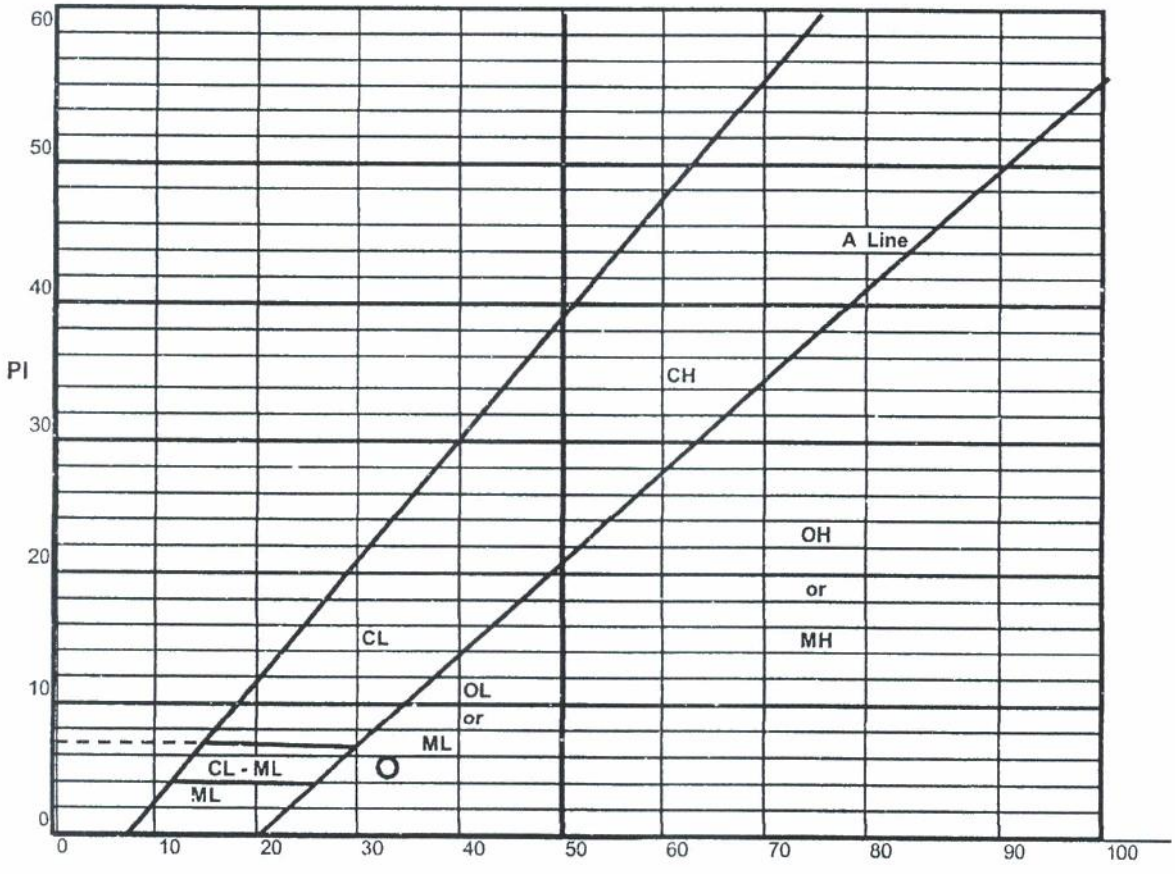


SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM **CL**

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

PROJECT	Pembangunan Gardu Induk 150KV Cilegon Baru II	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	Cilegon, Banten 0	TESTED BY	Budi D.
BOR HOLE NO	DB-4 UDS-3	CHECKED BY	Singgih S.
DEPTH	5.50 - 6.0 m	DATE OF TESTED	Pebruari 2012

PLASTICITY CHART



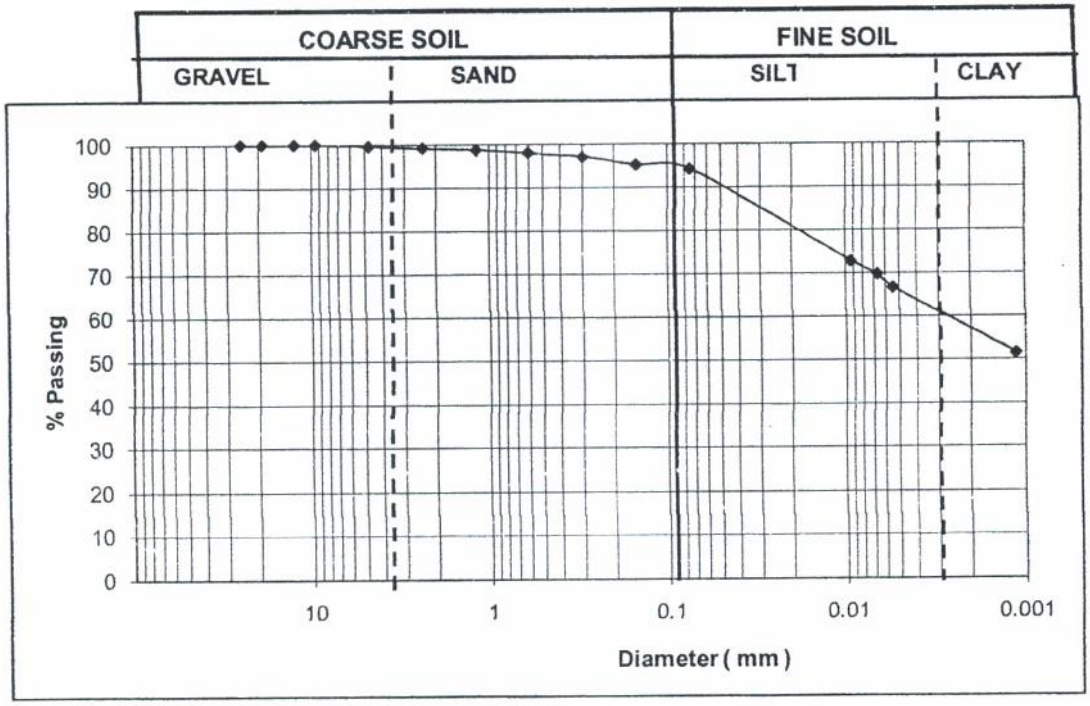
LIQUID LIMIT , L L (%)

SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM **OL or ML**

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

GRAINED SIZE DISTRIBUTION

Project	Pembangunan Gardu Induk	Depth od Sample	1.50 - 2.00 meter
Location	Cilegon, Banten	Date of Tested	Pebruari 2012
Bored No	DB-1 UDS-1	Checked by	Singgih S.



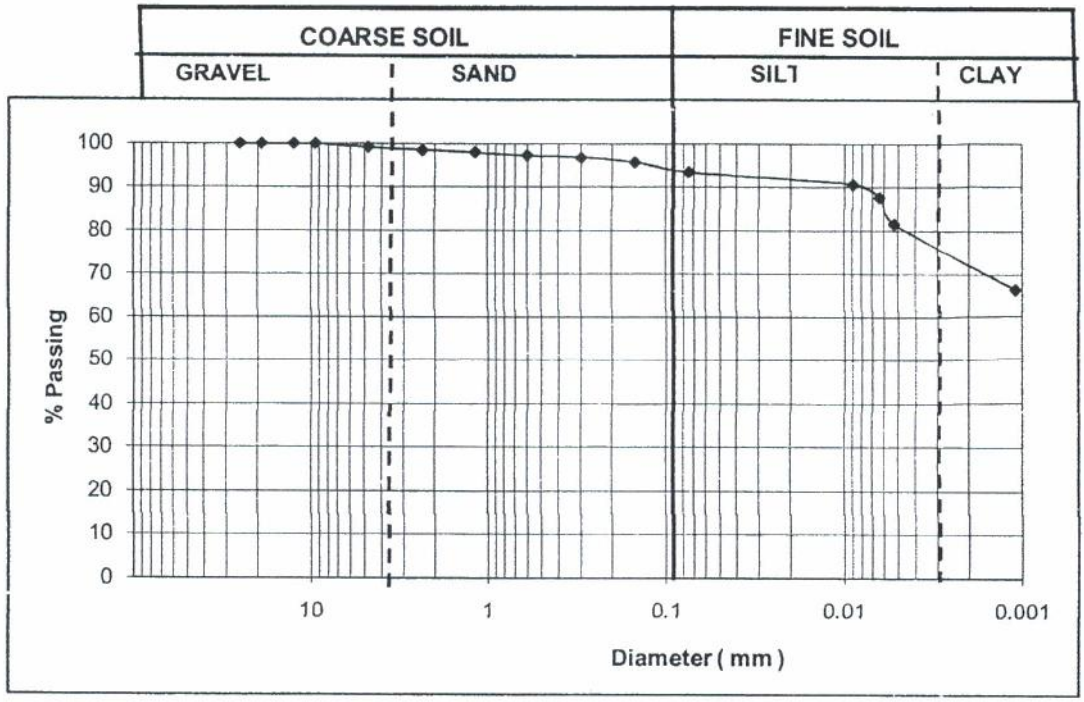
PARTICLE FRACTION OF SOIL

GRAVEL	0.35	%
SAND	5.350	%
SILT	33.800	%
CLAY	60.50	%

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

GRAINED SIZE DISTRIBUTION

Project	Pembangunan Gardu Induk	Depth od Sample	3.50 - 4.00 meter
Location	Cilegon, Banten	Date of Tested	Pebruari 2012
Bored No	DB-1 UDS-2	Checked by	Singgih S.



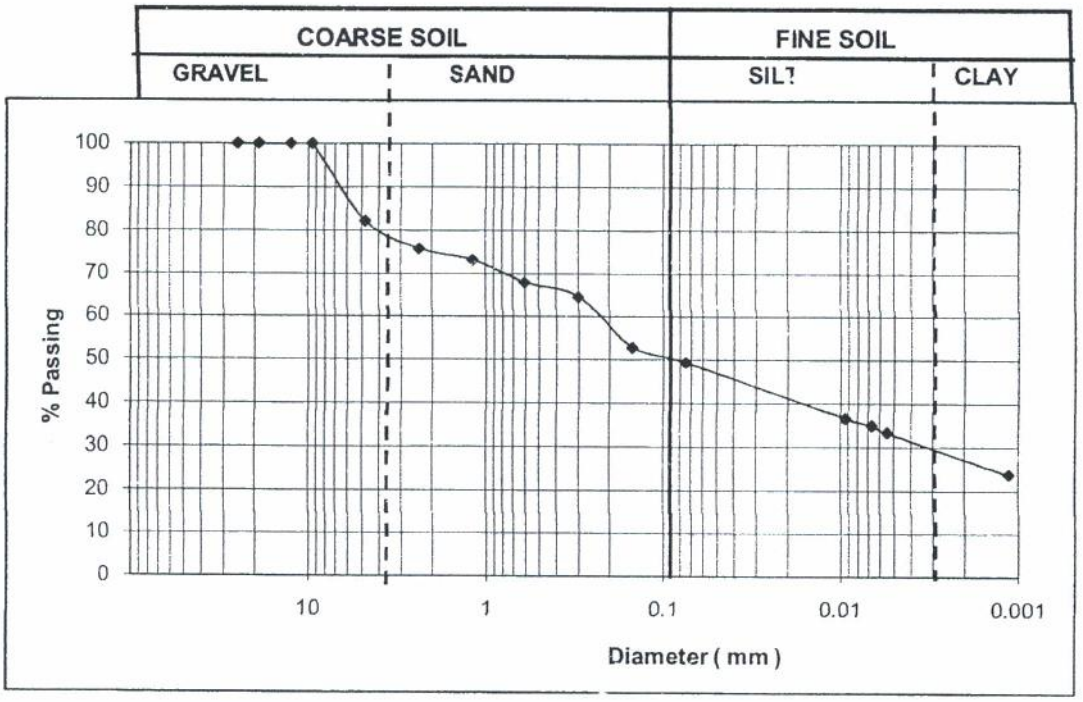
PARTICLE FRACTION OF SOIL

GRAVEL	0.85 %
SAND	5.650 %
SILT	16.000 %
CLAY	77.50 %

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

GRAINED SIZE DISTRIBUTION

Project	Pembangunan Gardu Induk	Depth od Sample	1.50 - 2.00 meter
Location	Cilegon, Banten	Date of Tested	Pebruari 2012
Bored No	DB-2 UDS-1	Checked by	Singgih S.



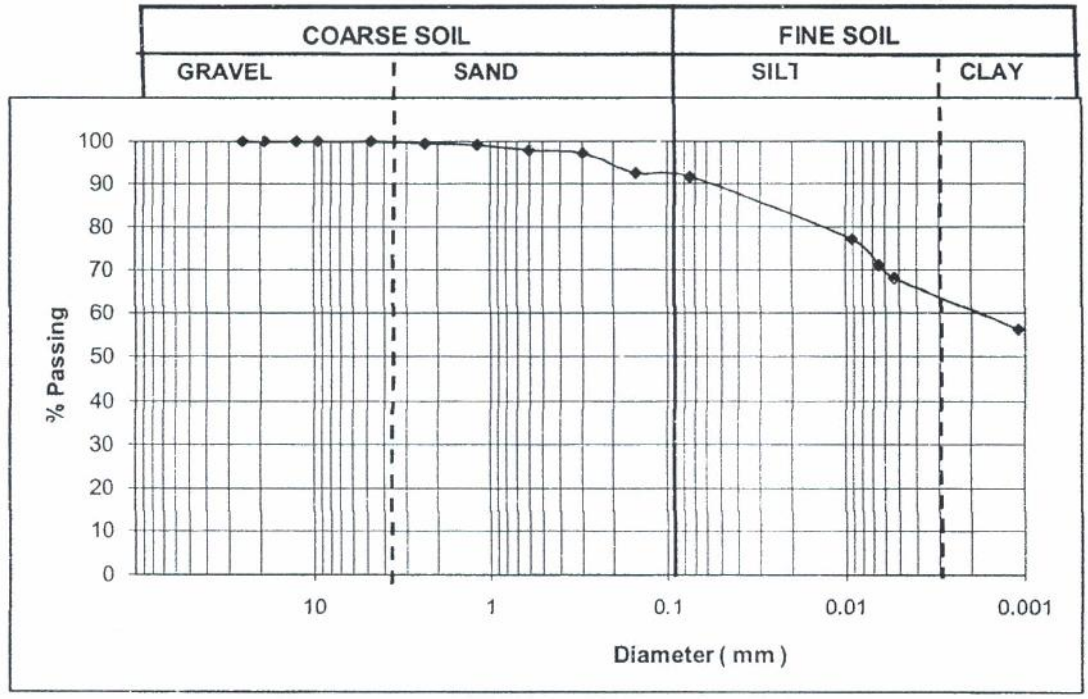
PARTICLE FRACTION OF SOIL

GRAVEL	17.75	%
SAND	32.900	%
SILT	19.350	%
CLAY	30.00	%

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

GRAINED SIZE DISTRIBUTION

Project	Pembangunan Gardu Induk	Depth od Sample	3.50 - 4.00 meter
Location	Cilegon, Banten	Date of Tested	Pebruari 2012
Bored No	DB-2 UDS-2	Checked by	Singgih S.



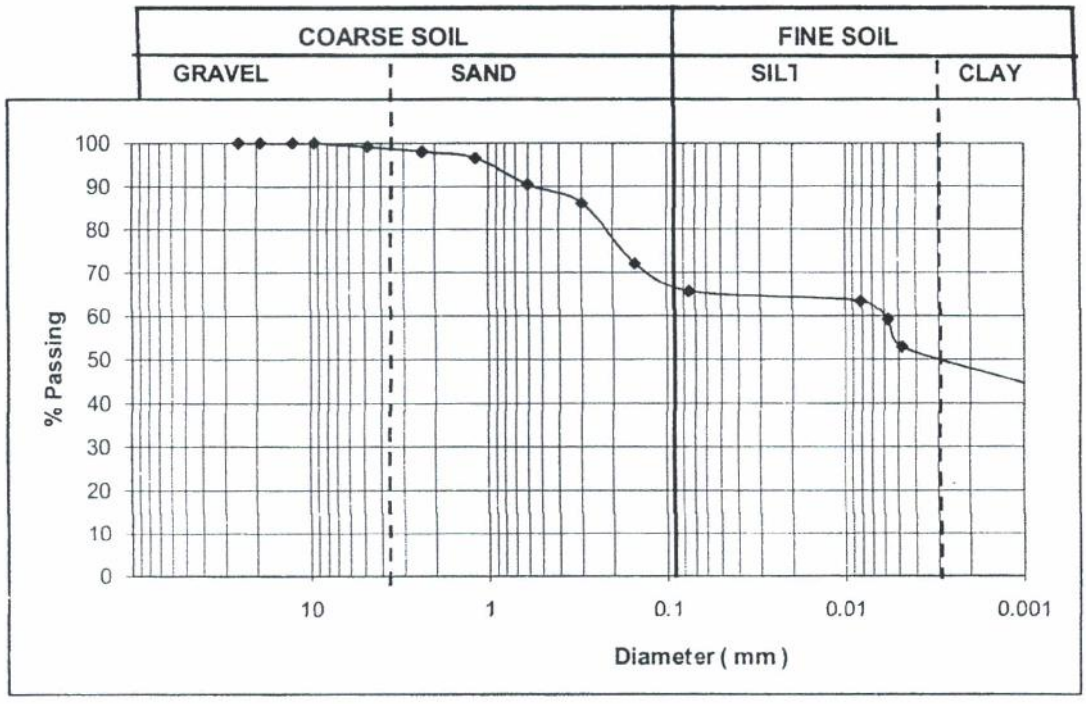
PARTICLE FRACTION OF SOIL

GRAVEL	0.00 %
SAND	8.300 %
SILT	28.200 %
CLAY	63.50 %

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

GRAINED SIZE DISTRIBUTION

Project	Pembangunan Gardu Induk	Depth od Sample	1.50 - 2.00 meter
Location	Cilegon, Banten	Date of Tested	Pebruari 2012
Bored No	DB-3 UDS-1	Checked by	Singgih S.



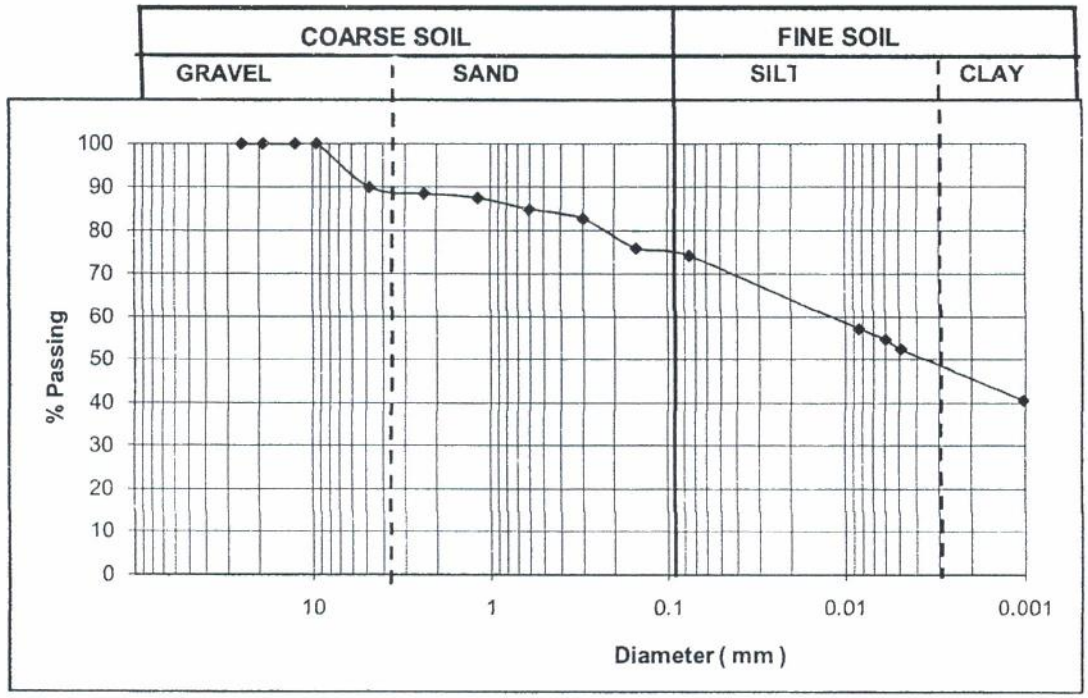
PARTICLE FRACTION OF SOIL

GRAVEL	0.85	%
SAND	33.400	%
SILT	15.750	%
CLAY	50.00	%

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

GRAINED SIZE DISTRIBUTION

Project	Pembangunan Gardu Induk	Depth od Sample	3.50 - 4.00 meter
Location	Cilegon, Banten	Date of Tested	Pebruari 2012
Bored No	DB-3 UDS-2	Checked by	Singgih S.



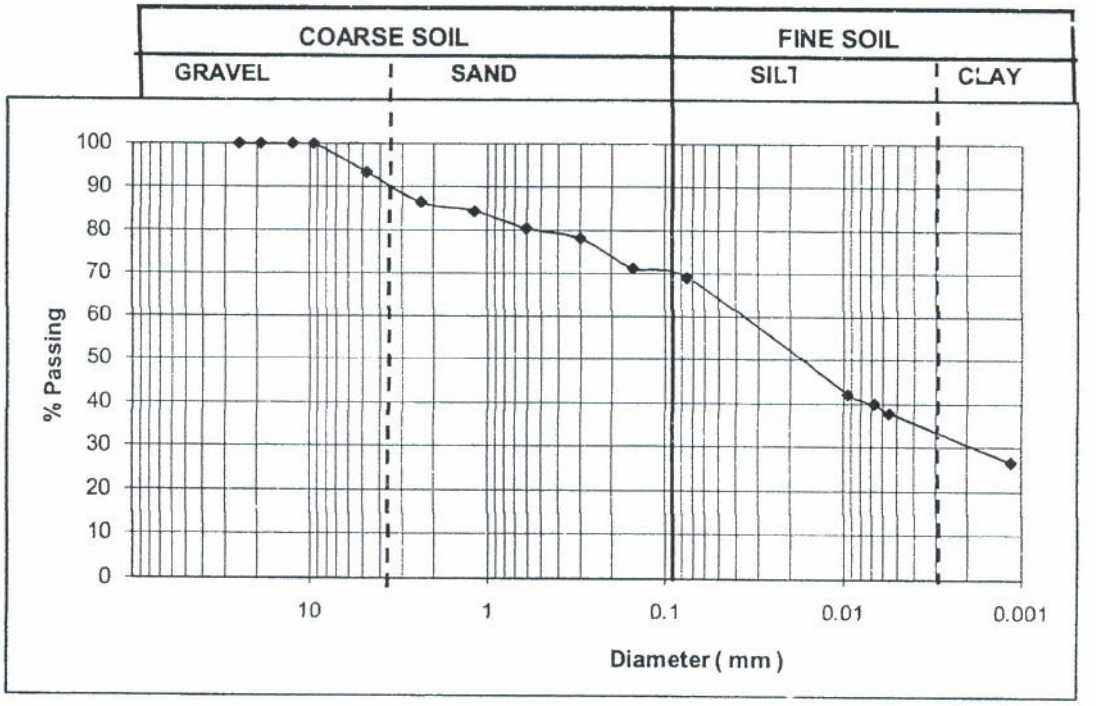
PARTICLE FRACTION OF SOIL

GRAVEL	10.00	%
SAND	15.800	%
SILT	25.200	%
CLAY	49.00	%

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

GRAINED SIZE DISTRIBUTION

Project	Pembangunan Gardu Induk	Depth od Sample	1.50 - 2.00 meter
Location	Cilegon, Banten	Date of Tested	Pebruari 2012
Bored No	DB-4 UDS-1	Checked by	Singgih S.



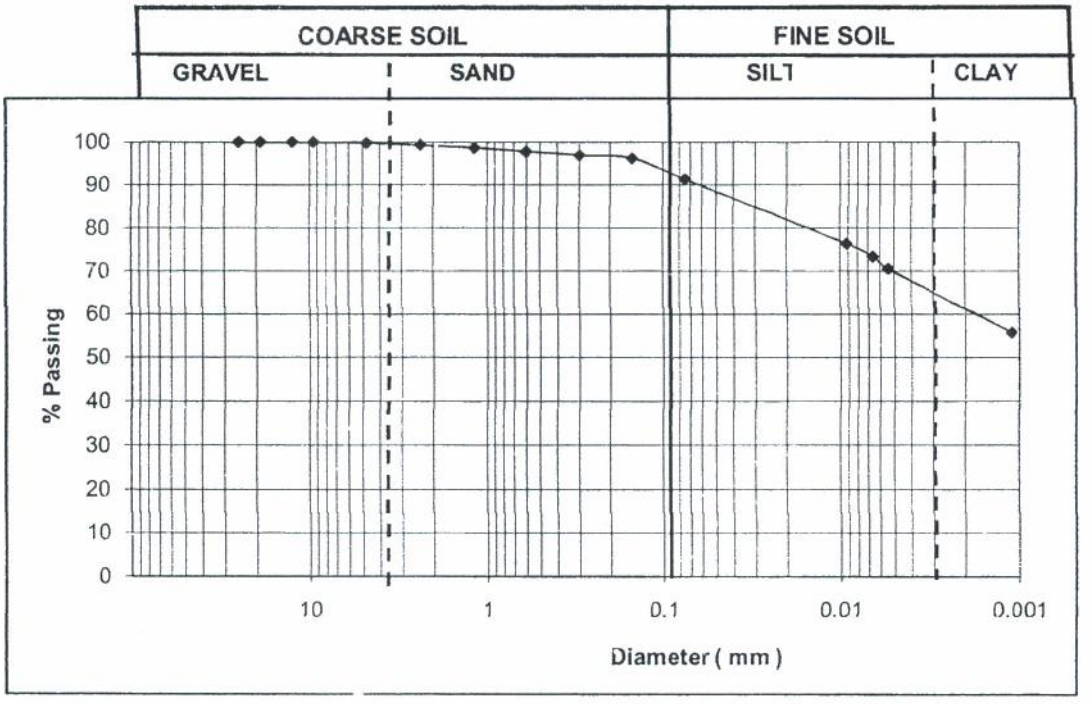
PARTICLE FRACTION OF SOIL

GRAVEL	6.60	%
SAND	24.250	%
SILT	35.150	%
CLAY	34.00	%

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

GRAINED SIZE DISTRIBUTION

Project	Pembangunan Gardu Induk	Depth od Sample	3.50 - 4.00 meter
Location	Cilegon, Banten	Date of Tested	Pebruari 2012
Bored No	DB-4 UDS-2	Checked by	Singgih S.



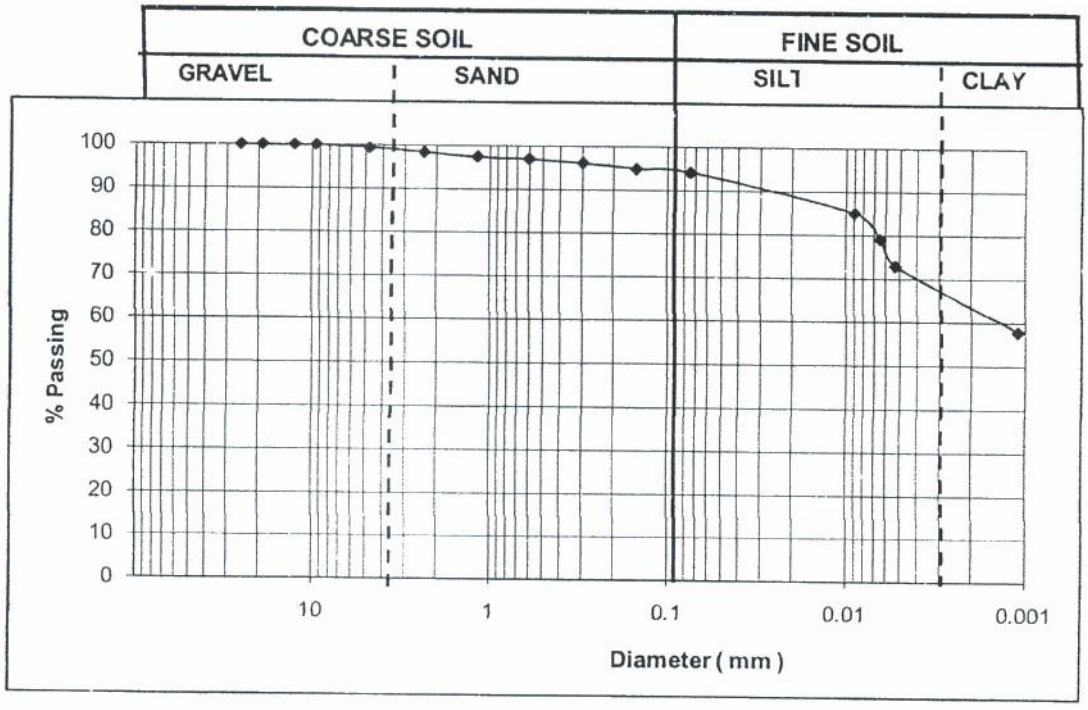
PARTICLE FRACTION OF SOIL

GRAVEL	0.20	%
SAND	8.450	%
SILT	26.350	%
CLAY	65.00	%

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

GRAINED SIZE DISTRIBUTION

Project	Pembangunan Gardu Induk	Depth od Sample	5.50 - 6.00 meter
Location	Cilegon, Banten	Date of Tested	Pebruari 2012
Bored No	DB-4 UDS-3	Checked by	Singgih S.



PARTICLE FRACTION OF SOIL

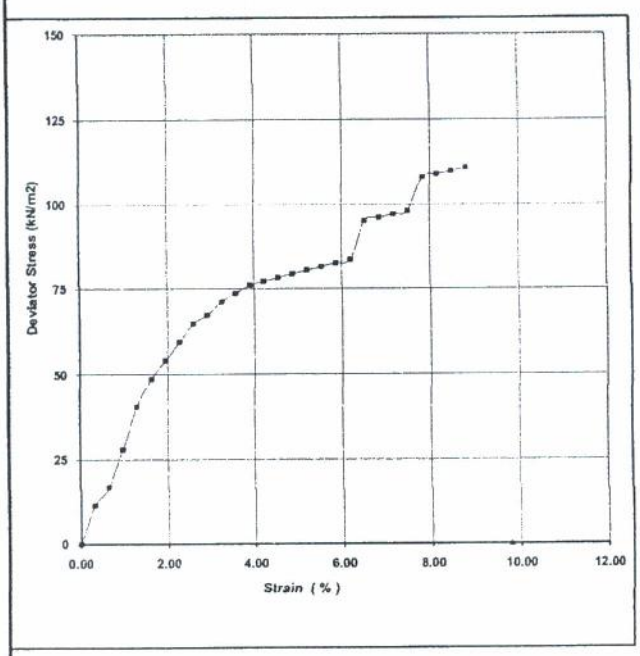
GRAVEL	0.60	%
SAND	5.100	%
SILT	26.300	%
CLAY	68.00	%

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 78863379

UU - TRIAXIAL COMPRESSION TEST

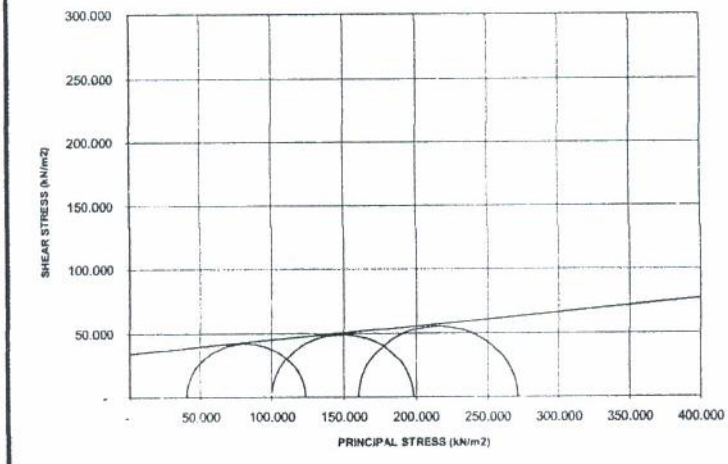
Location : Cilegon, Banten
Sample : DB-1 UDS-1
Depth : 1.50 - 2.00 m

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

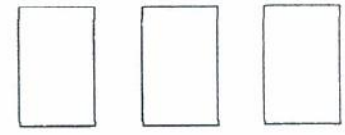


SPECIMEN			1	2	3
INITIAL	Height of Sample	cm	7.670	7.670	7.670
	Dia of Sample	cm	3.700	3.700	3.700
	Wet Soil		141.11	141.110	141.110
	Dry Soil		94.79	94.790	94.790
	Wet / Bulk density	grm/m^3	1.71	1.712	1.712
	Moisture content	%	48.87	48.866	48.866
	Dry density	grm/m^3	1.15	1.150	1.150

MOHR CIRCLES



MODE OF FAILURE :



STRENGTH PARAMETERS

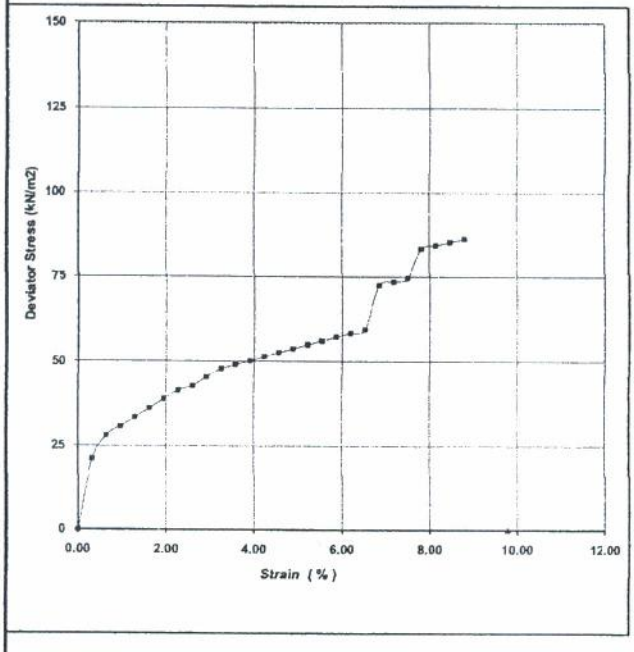
C	kN/m^2	34.18
ϕ	^{0}	6.2 Degree

LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
TELPON. 021 96189554 FAX. 021 78893379

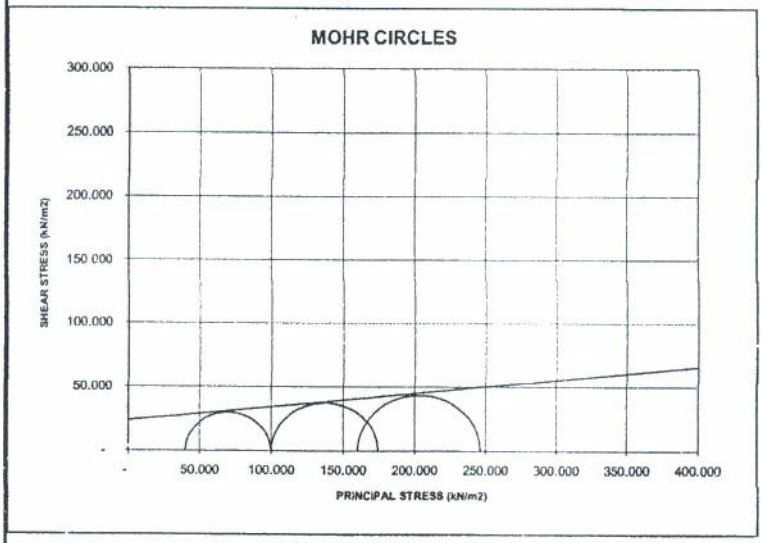
UU - TRIAXIAL COMPRESSION TEST

Location : Cilegon, Banten
Sample : DB-1 UDS-2
Depth : 3.50 - 4.00 m

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

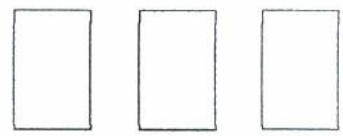


SPECIMEN			1	2	3
INITIAL	Height of Sample	cm	7.670	7.670	7.670
	Dia of Sample	cm	3.700	3.700	3.700
	Wet Soil		123.40	123.400	123.400
	Dry Soil		81.26	81.260	81.260
	Wet / Bulk density	grm/m^3	1.50	1.497	1.497
	Moisture content	%	51.86	51.858	51.858
	Dry density	grm/m^3	0.99	0.986	0.986



MODE OF FAILURE :

A B C



STRENGTH PARAMETERS

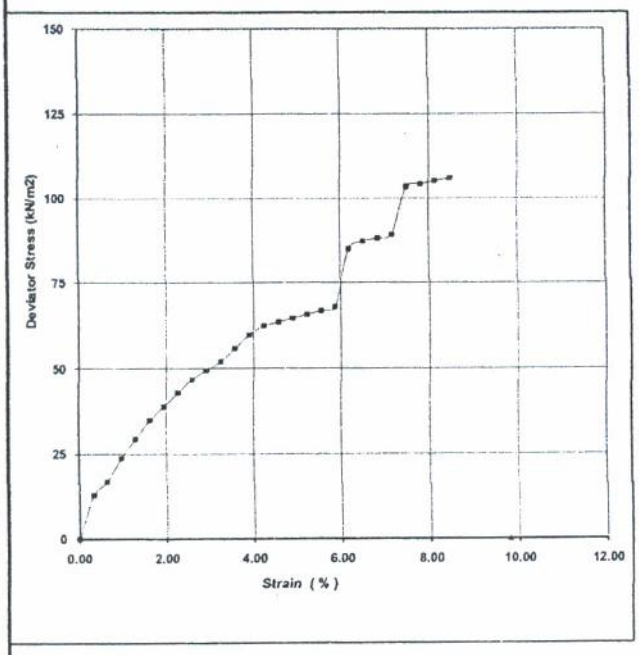
C	kN/m^2	23.65	
ϕ	^{o}	6.0	Degree

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

UU - TRIAXIAL COMPRESSION TEST

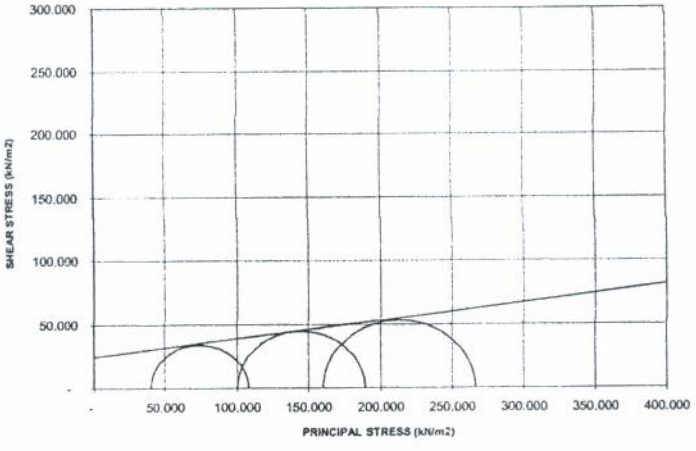
Location : Cilegon, Banten
Sample : DB-2 UDS-1
Depth : 1.50 - 2.00 m

Sample type : Undisturbed
Soil description : CH
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		143.59	143.590	143.590
	Dry Soil		96.64	96.640	96.640
	Wet / Bulk density	grm/m^3	1.74	1.742	1.742
	Moisture content	%	48.58	48.582	48.582
	Dry density	grm/m^3	1.17	1.172	1.172

MOHR CIRCLES



MODE OF FAILURE :

A B C

STRENGTH PARAMETERS

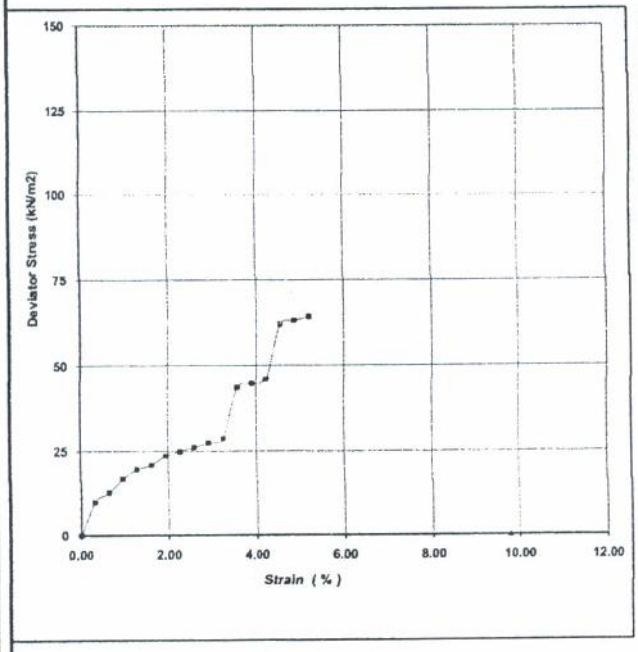
C	kN/m^2	24.71
ϕ	^{0}	8.1 Degree

LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
TELPON. 021 98186554 FAX. 021 78693379

UU - TRIAXIAL COMPRESSION TEST

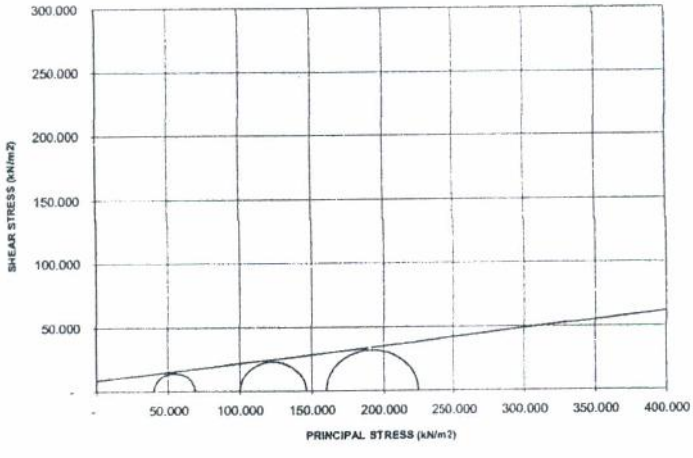
Location : Cilegon, Banten
Sample : DB-2 UDS-2
Depth : 3.50 - 4.00 m

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		128.61	128.610	128.610
	Dry Soil		82.92	82.920	82.920
	Wet / Bulk density	grm/m^3	1.56	1.560	1.560
	Moisture content	%	55.10	55.101	55.101
	Dry density	grm/m^3	1.01	1.006	1.006

MOHR CIRCLES



MODE OF FAILURE :

A B C

STRENGTH PARAMETERS

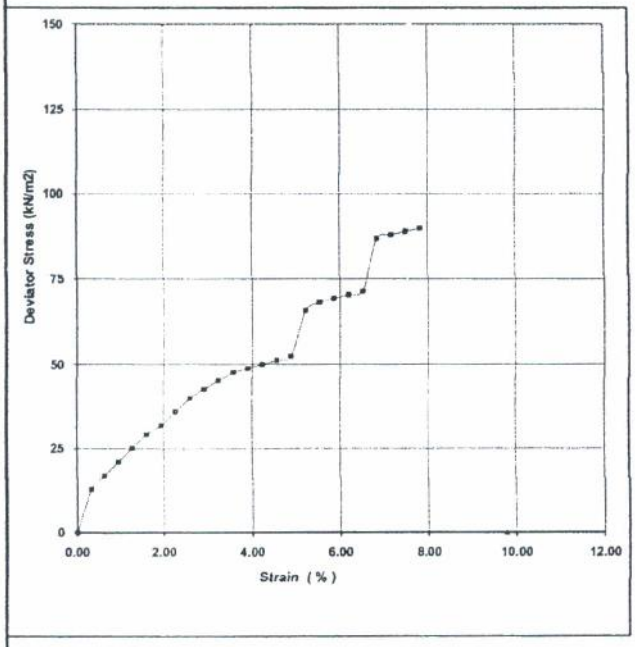
C	kN/m^2	8.55
ϕ	^{0}	7.6 Degree

LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
TELPON. 021 98189654 FAX. 021 78860379

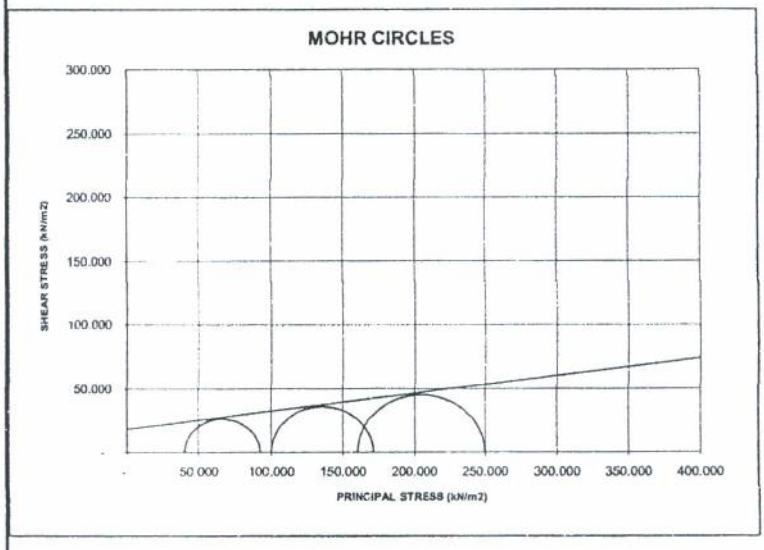
UU - TRIAXIAL COMPRESSION TEST

Location : Cilegon, Banten
Sample : DB-3 UDS-1
Depth : 1.50 - 2.00 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		140.96	140.960	140.960
	Dry Soil		94.19	94.190	94.190
	Wet / Bulk density	grm/m^3	1.71	1.710	1.710
	Moisture content	%	49.65	49.655	49.655
	Dry density	grm/m^3	1.14	1.143	1.143



MODE OF FAILURE :

A B C

STRENGTH PARAMETERS

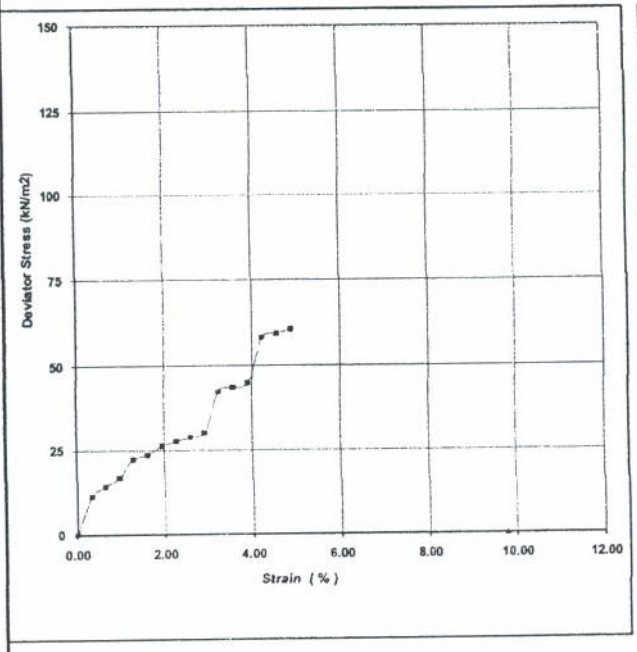
C	kN/m^2	18.32
ϕ	^{0}	8.0 Degree

LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
TELPON. 021 86188554 FAX. 021 78883379

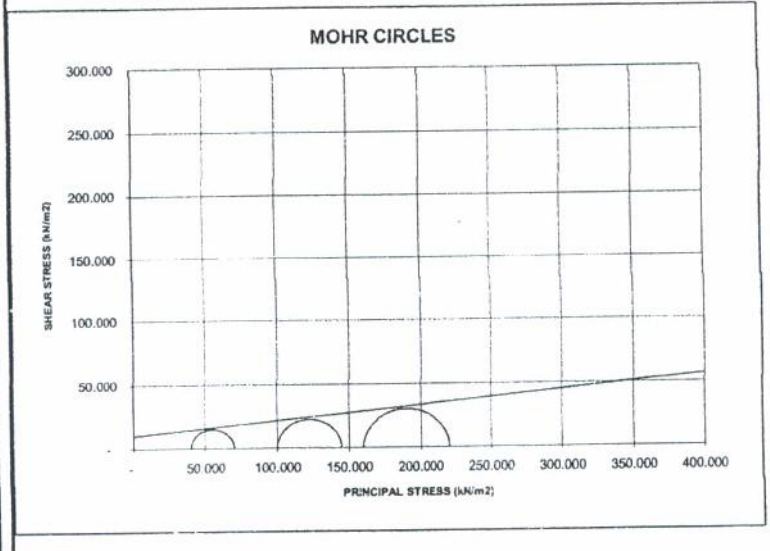
UU - TRIAXIAL COMPRESSION TEST

Location : Cilegon, Banten
Sample : DB-3 UDS-2
Depth : 3.50 - 4.00 m

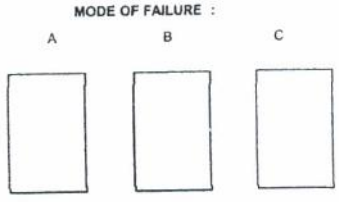
Sample type : Undisturbed
Soil description : OH or MH
Sample no. : 1
UU Type of Tested : Multy Stage



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		145.78	145.780	145.780
	Dry Soil		97.74	97.740	97.740
	Wet / Bulk density	grm/m^3	1.77	1.769	1.769
	Moisture content	%	49.15	49.151	49.151
	Dry density	grm/m^3	1.19	1.186	1.186



MODE OF FAILURE :



STRENGTH PARAMETERS

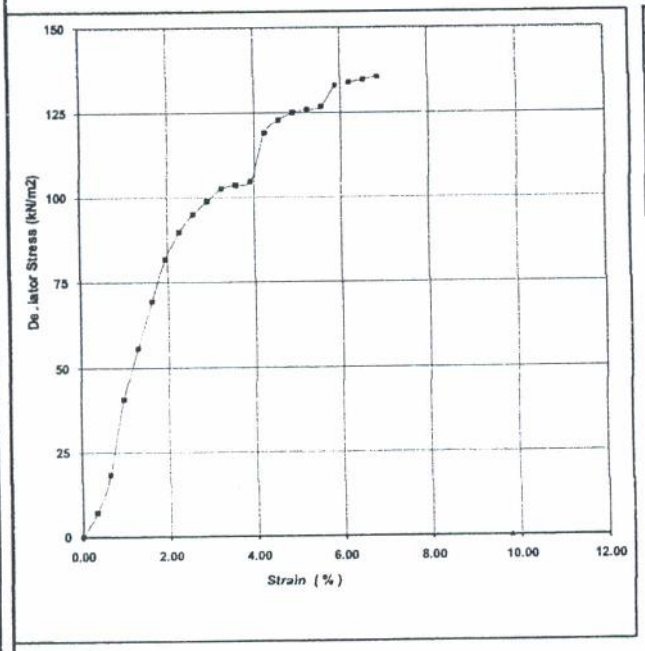
C	kN/m^2	10.10
ϕ		6.6 Degree

LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
TELPON. 021 86189554 FAX. 021 78883379

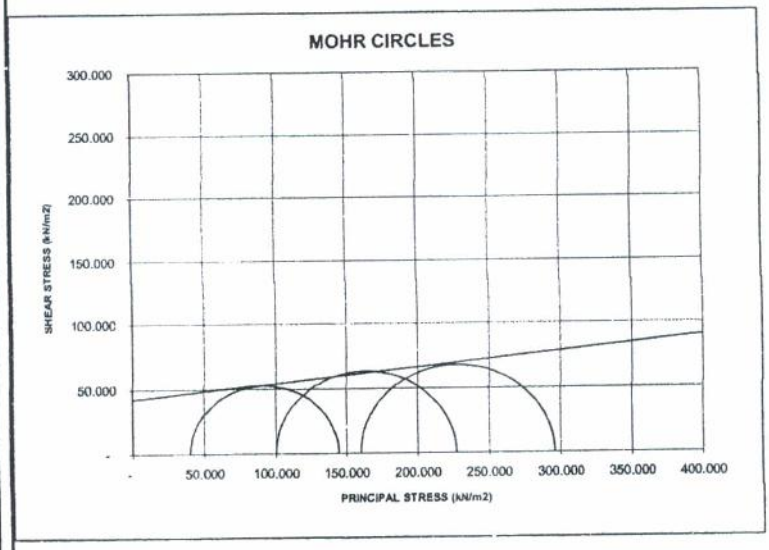
UU - TRIAXIAL COMPRESSION TEST

Location : Cilegon, Banten
Sample : DB-4 UDS-1
Depth : 1.50 - 2.00 m

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

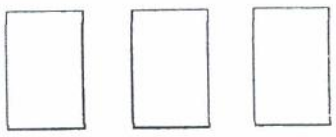


SPECIMEN			1	2	3
INITIAL	Height of Sample	cm	7.670	7.670	7.670
	Dia of Sample	cm	3.700	3.700	3.700
	Wet Soil		146.62	146.620	146.620
	Dry Soil		108.12	108.120	108.120
	Wet / Bulk density	grm/m^3	1.78	1.779	1.779
	Moisture content	%	35.61	35.609	35.609
	Dry density	grm/m^3	1.31	1.312	1.312



MODE OF FAILURE :

A B C



STRENGTH PARAMETERS

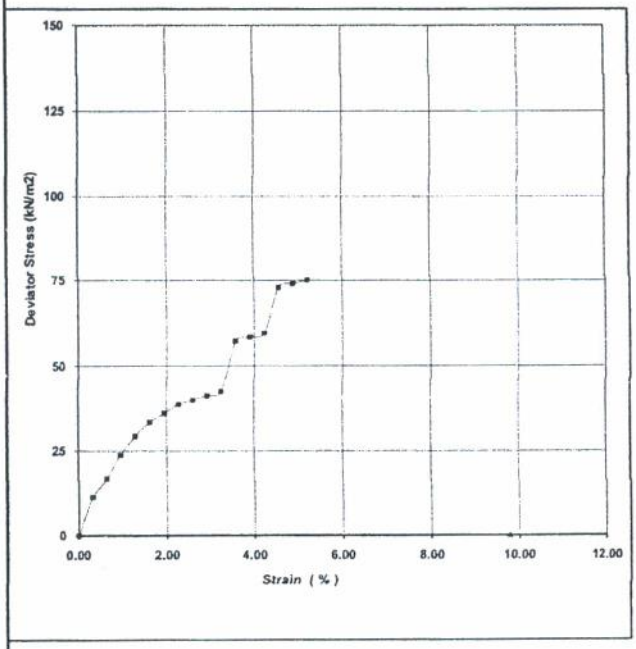
C	kN/m^2	42.36
ϕ	0	6.9 Degree

LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA - JAKARTA 12640
TELPON. 021 98188654 FAX. 021 78883379

UU - TRIAXIAL COMPRESSION TEST

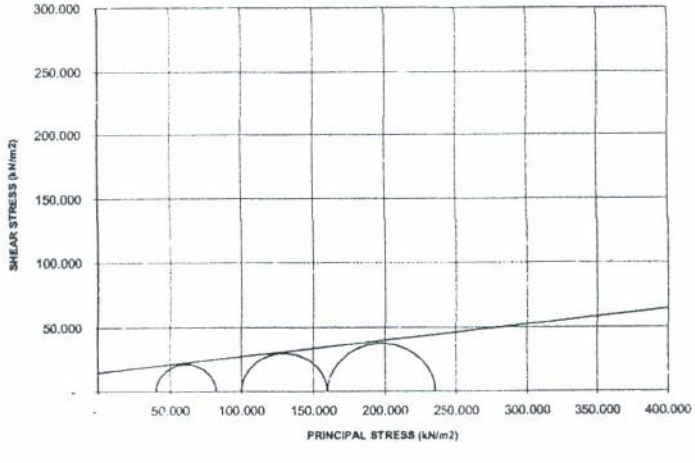
Location : Cilegon, Banten
Sample : DB-4 UDS-2
Depth : 3.50 - 4.00 m

Sample type : Undisturbed
Soil description : CL
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		144.45	144.450	144.450
	Dry Soil		108.67	108.670	108.670
	Wet / Bulk density	grm/m^3	1.75	1.752	1.752
	Moisture content	%	32.93	32.925	32.925
	Dry density	grm/m^3	1.32	1.318	1.318

MOHR CIRCLES



MODE OF FAILURE :

A B C

STRENGTH PARAMETERS

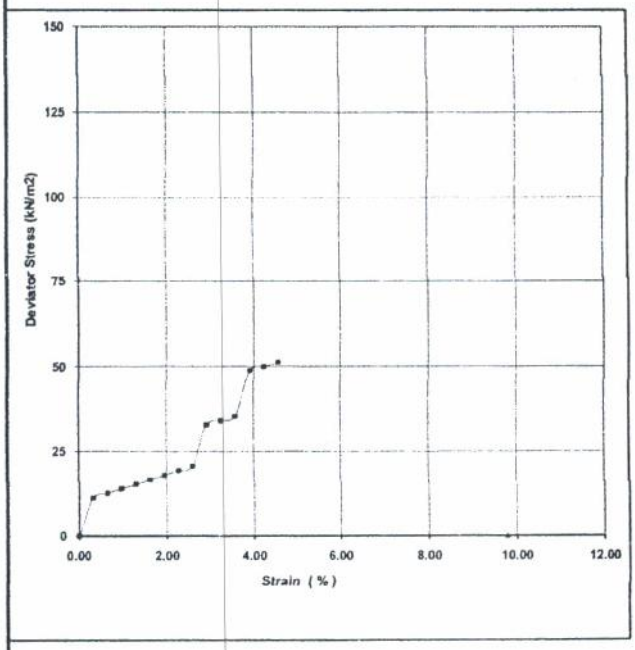
C	kN/m^2	14.97
ϕ	^{0}	7.1 Degree

LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
TELPON. 021 98189584 FAX. 021 78883379

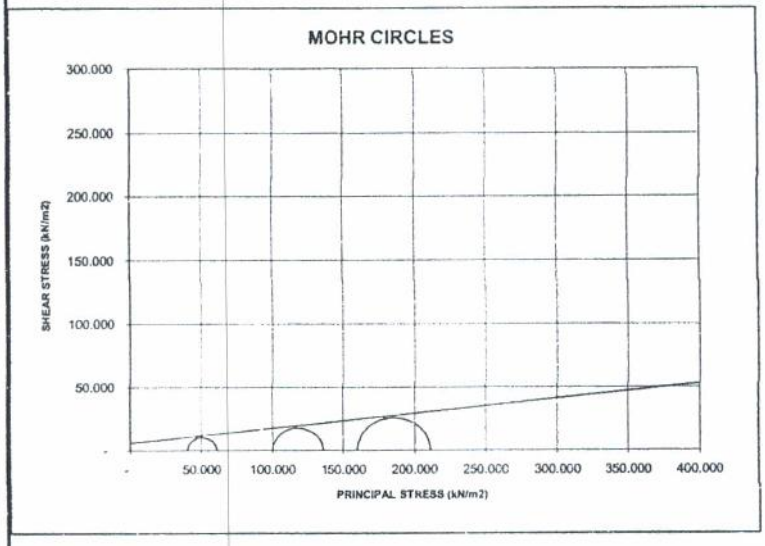
UU - TRIAXIAL COMPRESSION TEST

Location : Cilegon, Banten
Sample : DB-4 UDS-3
Depth : 5.50 - 6.00 m

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

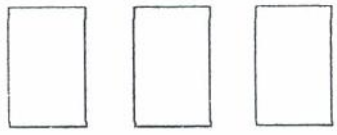


SPECIMEN			1	2	3
INITIAL	Height of Sample	cm	7.670	7.670	7.670
	Dia of Sample	cm	3.700	3.700	3.700
	Wet Soil		132.73	132.730	132.730
	Dry Soil		78.44	78.440	78.440
	Wet / Bulk density	grm/m^3	1.61	1.610	1.610
	Moisture content	%	69.21	69.212	69.212
	Dry density	grm/m^3	0.95	0.952	0.952



MODE OF FAILURE :

A B C



STRENGTH PARAMETERS

C	kN/m^2	5.89
ϕ		6.7 Degree

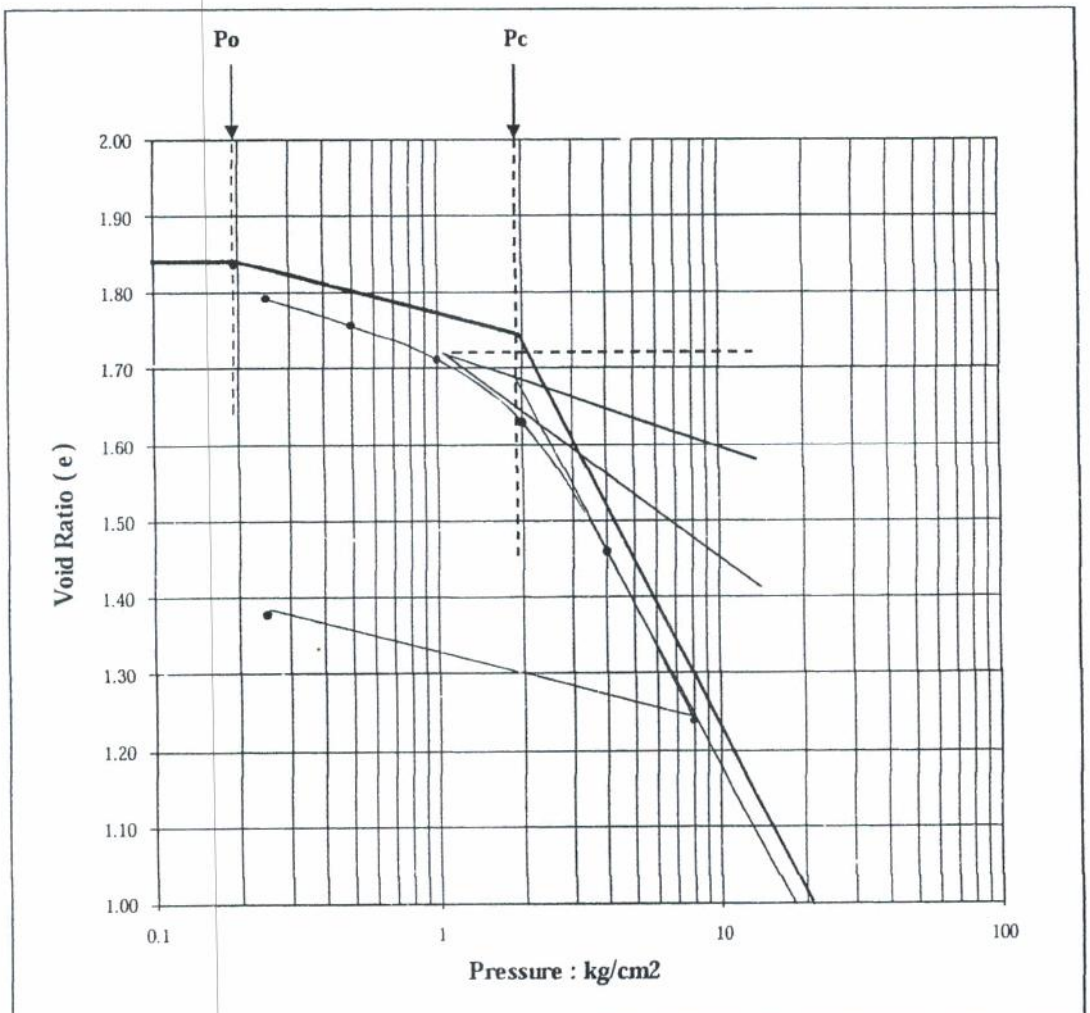
LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
TELPON. 021 98189554 FAX . 021 78893379

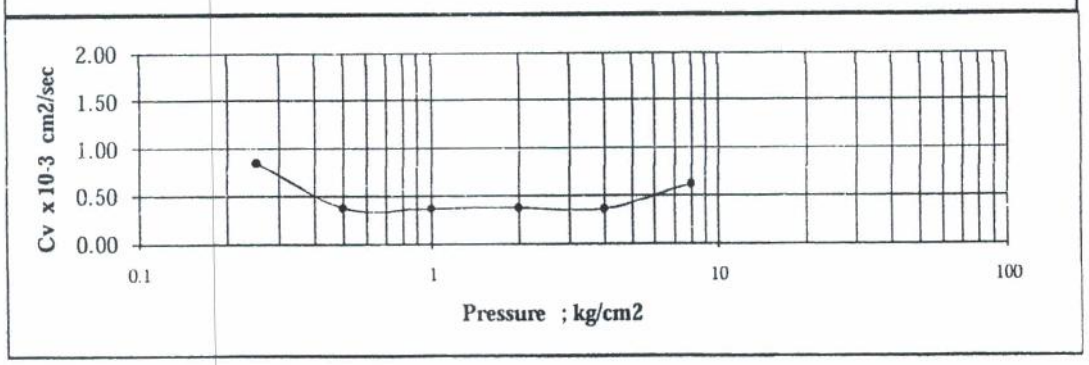
CONSOLIDATION TEST

Project :	Pembangunan Gardu Induk	Depth of Sample :	1.50 - 2.00 meter
Location :	Cilegon, Banten	Date of Tested	Pebruari 2012
No. Bor :	DB-1 UDS-1	Tested by	Endri A.

eo =	1.836	
Po =	0.194	kg/cm^2
Pc =	**1.95**	kg/cm^2
w =	38.85	%

Cc =	**0.700**	
Cv =	0.48	x 10^{-3} cm^2 / sec
Cr =	**0.095**	





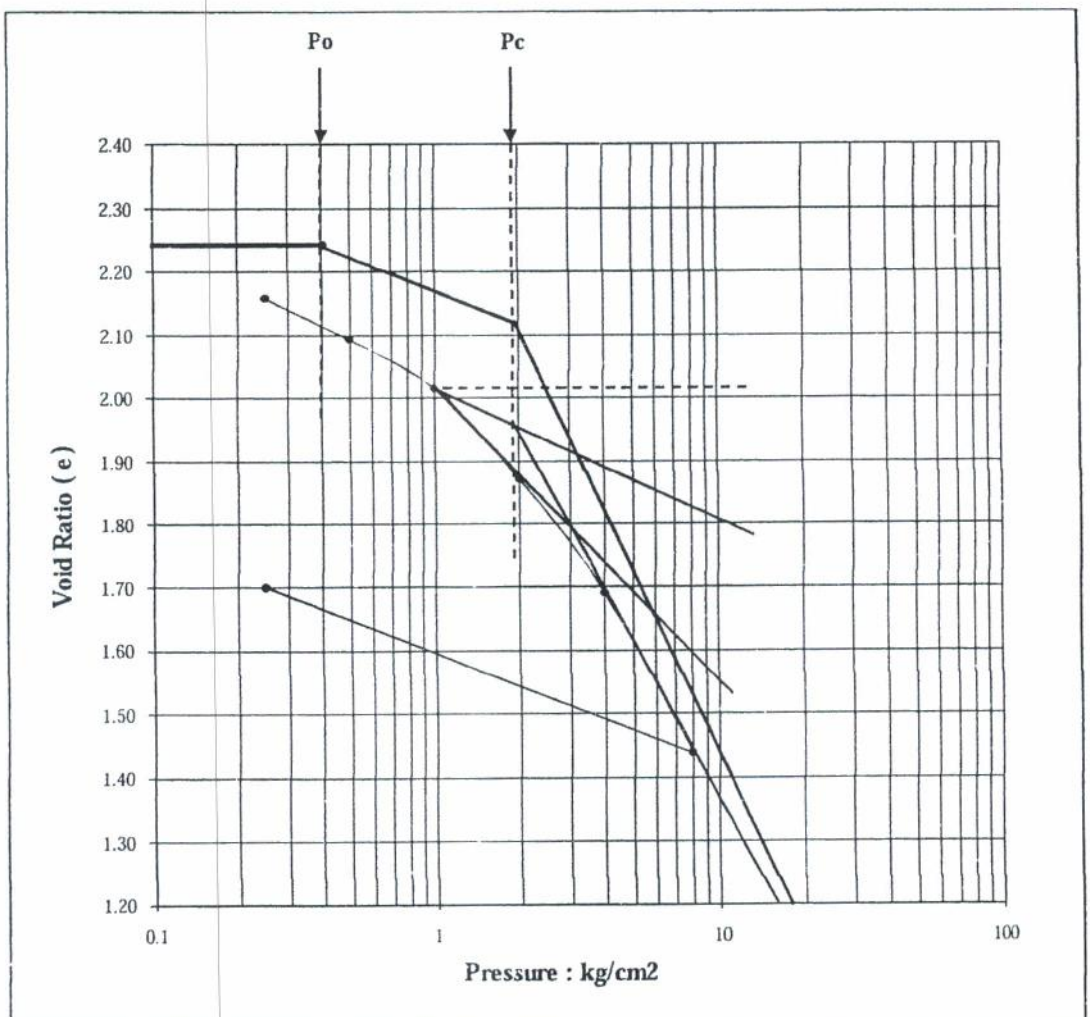
LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
TELPON. 021 98189554 FAX. 021 78893379

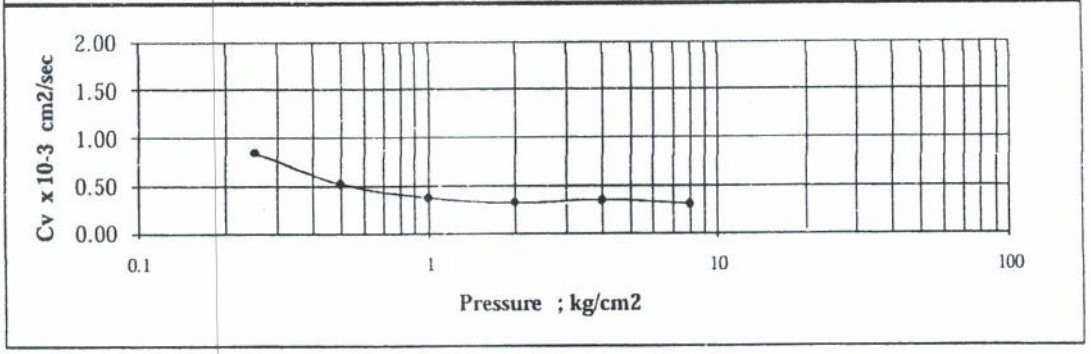
CONSOLIDATION TEST

Project :	Pembangunan Gardu Induk	Depth of Sample :	3.50 - 4.00 meter
Location :	Cilegon, Banten	Date of Tested	Pebruari 2012
No. Bor :	DB-1 UDS-2	Tested by	Endri A.

eo =	2.243	
Po =	0.404	kg/cm^2
Pc =	**1.95**	kg/cm^2
w =	43.06	%

Cc =	**0.660**	
Cv =	0.45	x 10^{-3} cm^2 / sec
Cr =	**0.170**	





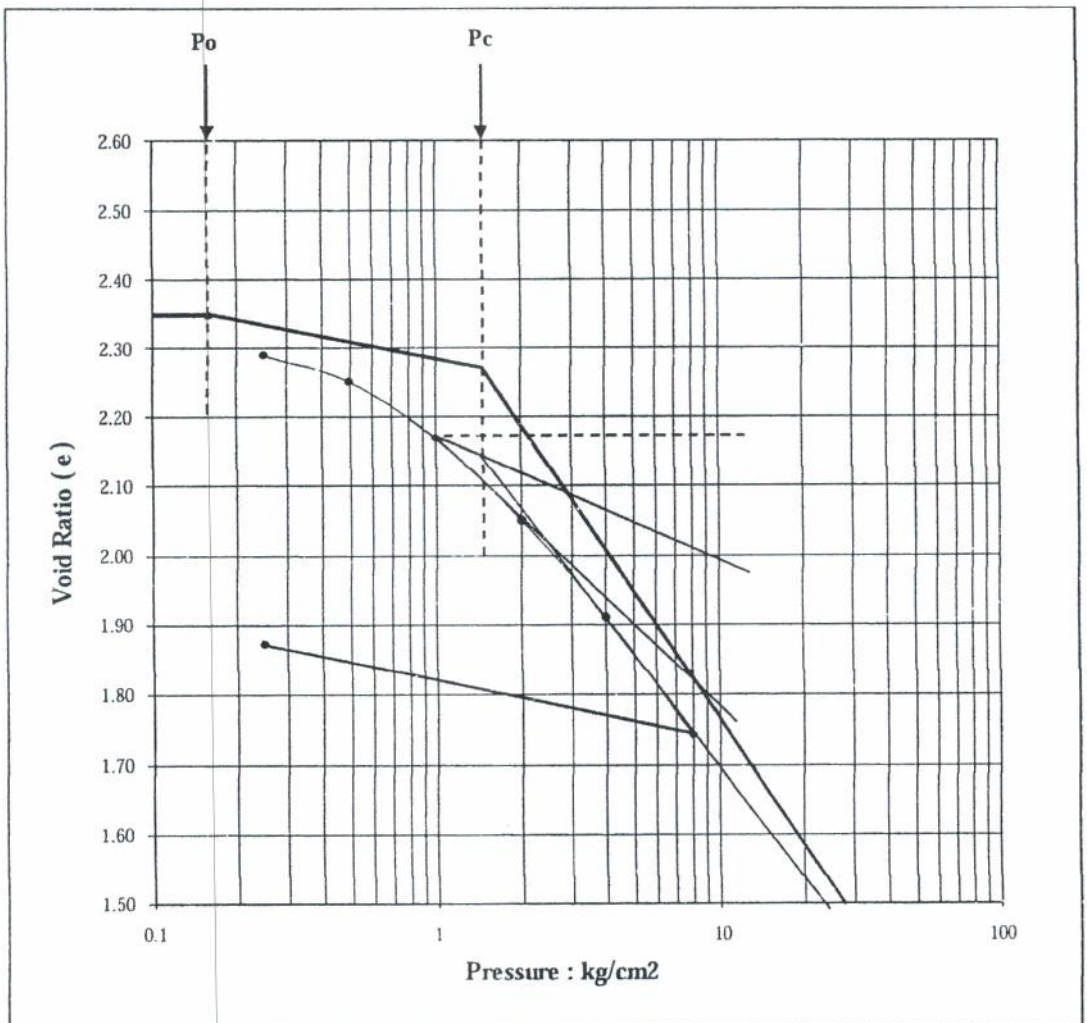
LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
TELPON. 021 98189554 FAX . 021 78893379

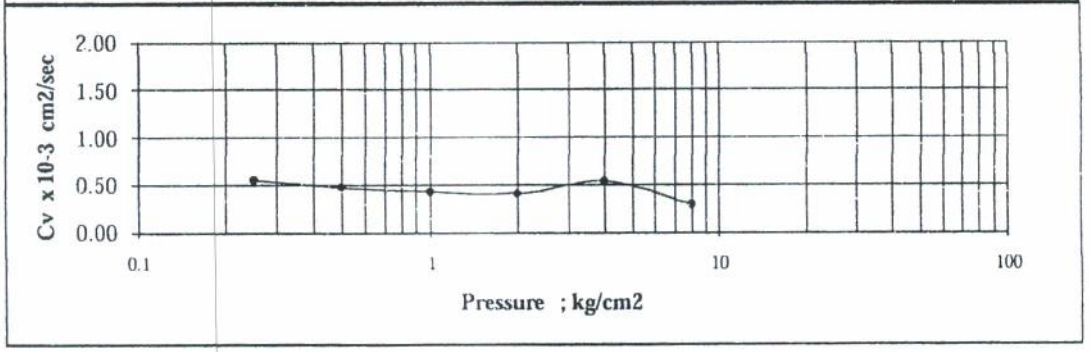
CONSOLIDATION TEST

Project :	Pembangunan Gardu Induk	Depth of Sample :	1.50 - 2.00 meter
Location :	Cilegon, Banten	Date of Tested	Pebruari 2012
No. Bor :	DB-2 UDS-1	Tested by	Endri A.

eo =	2.347	
Po =	0.160	kg/cm^2
Pc =	**1.50**	kg/cm^2
w =	34.84	%

Cc =	**0.600**	
Cv =	0.44	x 10^{-3} cm^2 / sec
Cr =	**0.090**	





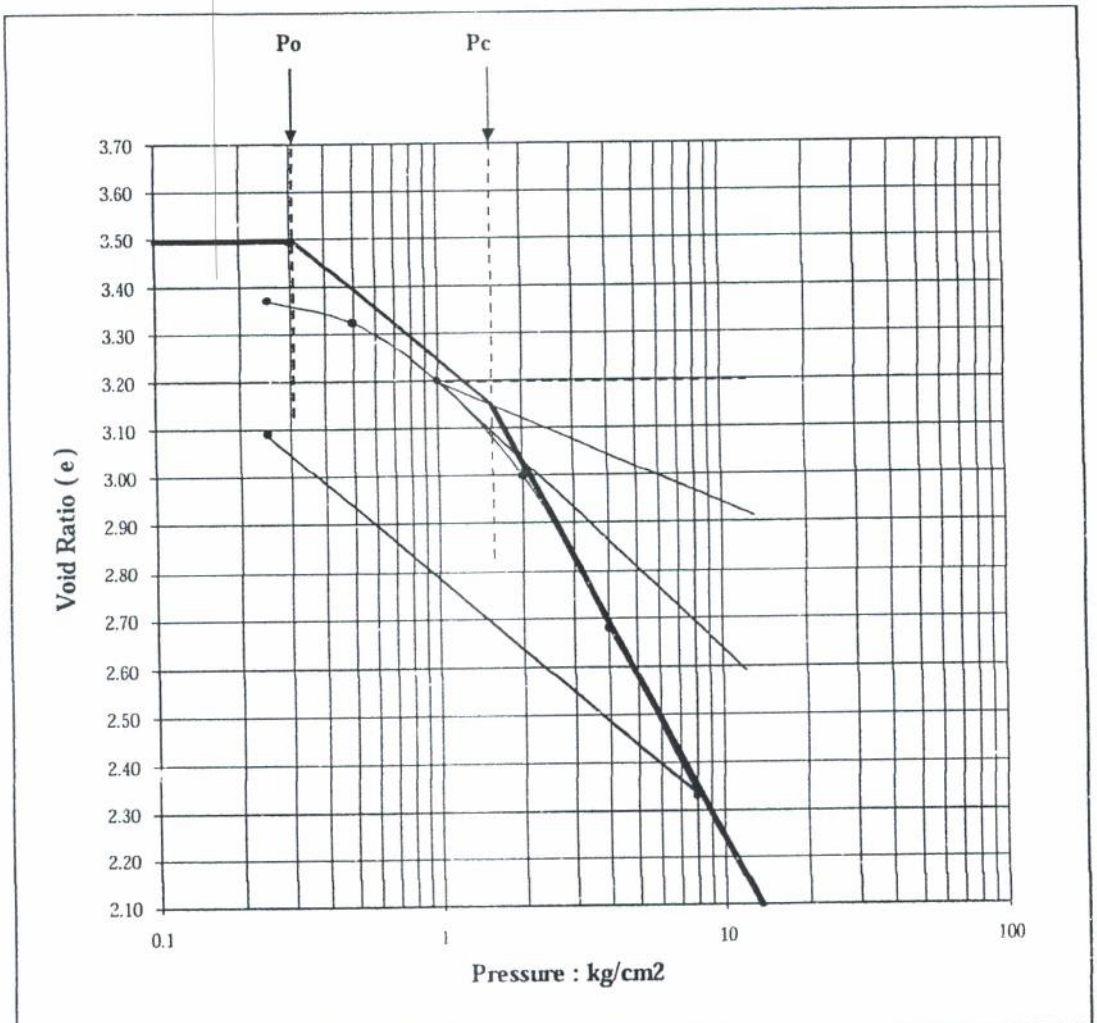
LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
TELPON. 021 98189554 FAX. 021 78893379

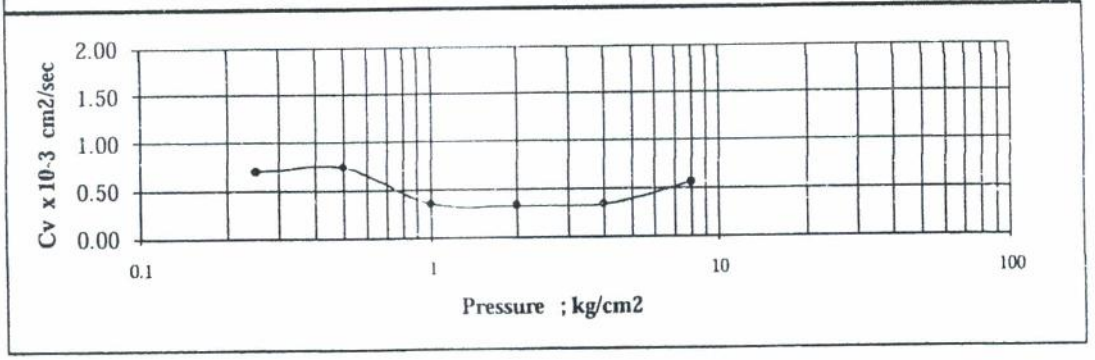
CONSOLIDATION TEST

Project	: Pembangunan Gardu Induk	Depth of Sample	: 3.50 - 4.00 meter
Location	: Cilegon, Banten	Date of Tested	Pebruari 2012
No. Bor	: DB-2 UDS-2	Tested by	Endri A.

eo =	3.493	
Po =	0.302	kg/cm^2
Pc =	1.57	kg/cm^2
w =	47.71	%

Cc =	1.200	
Cv =	0.50	x 10^{-3} cm^2 / sec
Cr =	0.490	





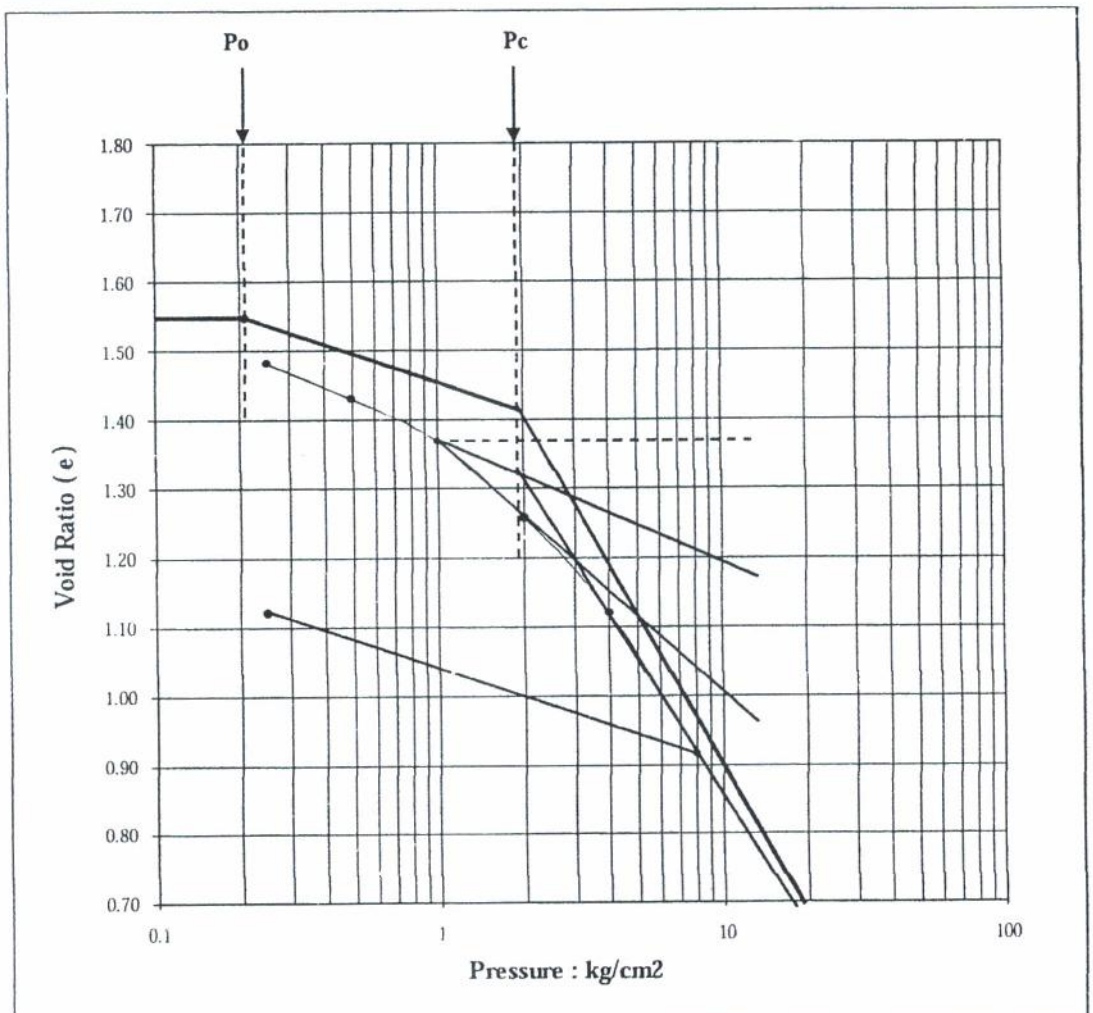
LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
TELPON. 021 98189554 FAX . 021 78893379

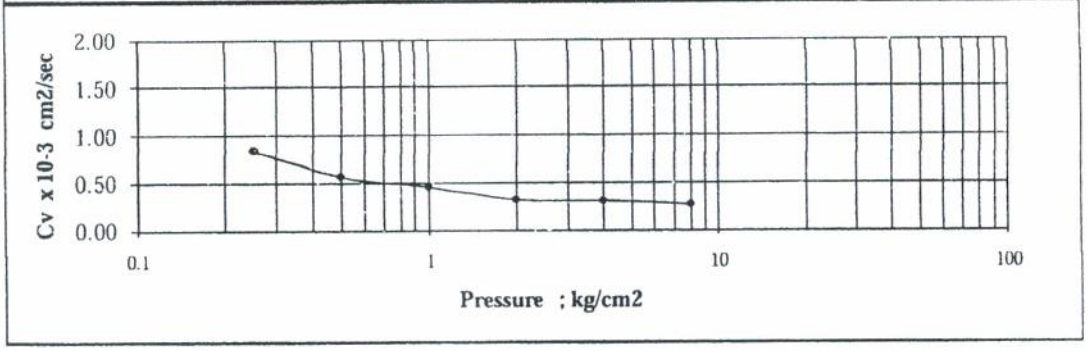
CONSOLIDATION TEST

Project :	Pembangunan Gardu Induk	Depth of Sample :	1.50 - 2.00 meter
Location :	Cilegon, Banten	Date of Tested	Pebruari 2012
No. Bor :	DB-3 UDS-1	Tested by	Endri A.

eo =	1.548	
Po =	0.210	kg/cm^2
Pc =	**1.92**	kg/cm^2
w =	34.91	%

Cc =	**0.720**	
Cv =	0.46	x 10^{-3} cm^2 / sec
Cr =	**0.140**	





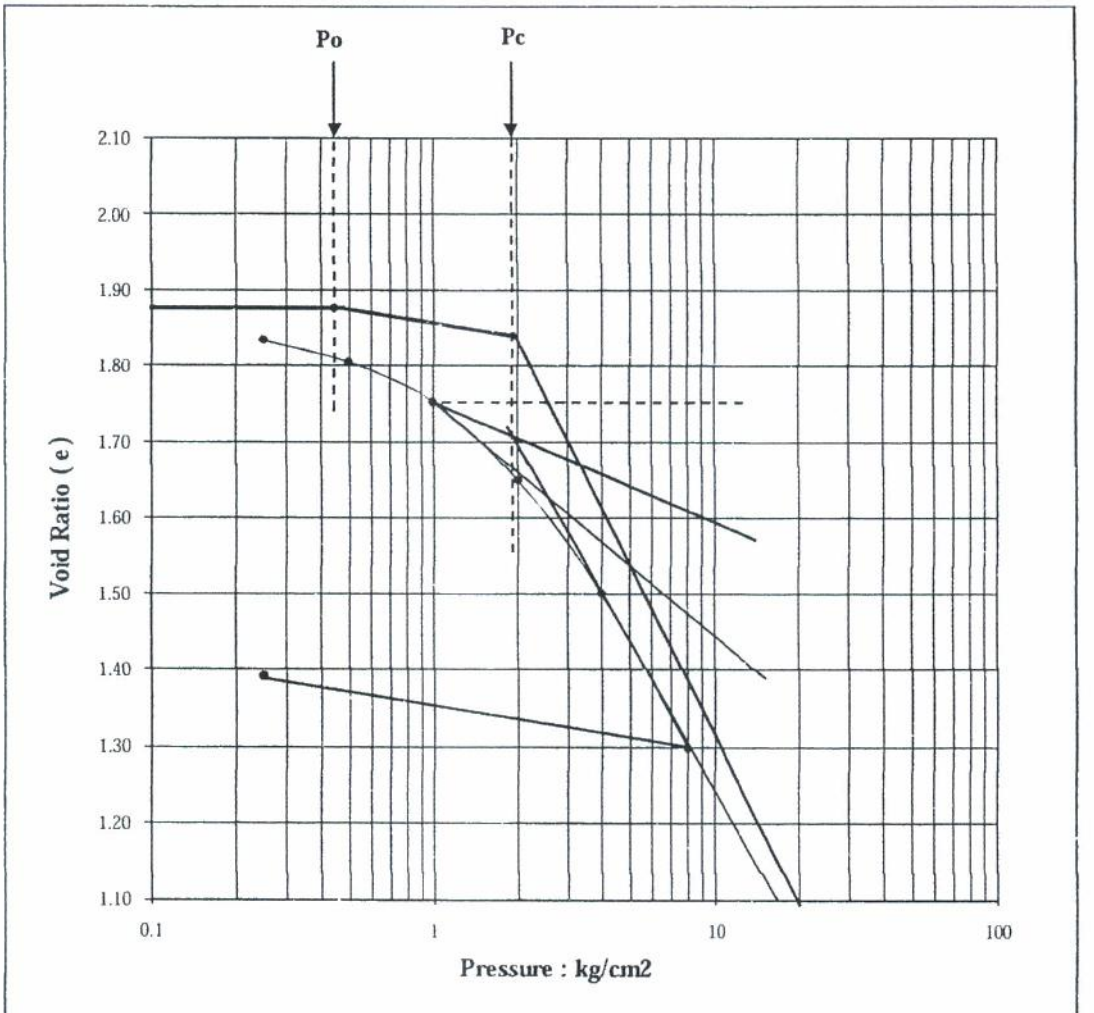
LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
TELPON. 021 98189554 FAX . 021 78893379

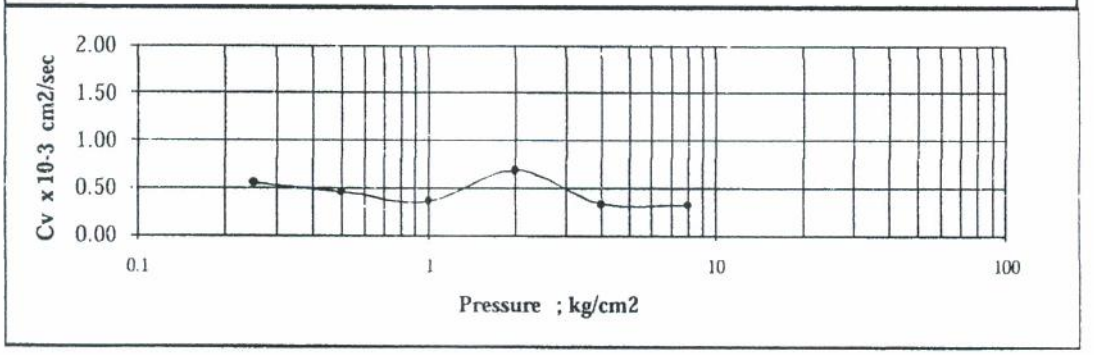
CONSOLIDATION TEST

Project :	Pembangunan Gardu Induk	Depth of Sample :	3.50 - 4.00 meter
Location :	Cilegon, Banten	Date of Tested	Pebruari 2012
No. Bor :	DB-3 UDS-2	Tested by	Endri A.

eo =	1.877	
Po =	0.444	kg/cm^2
Pc =	**1.96**	kg/cm^2
w =	37.82	%

Cc =	**0.775**	
Cv =	0.45	x 10^{-3} cm^2 / sec
Cr =	**0.060**	





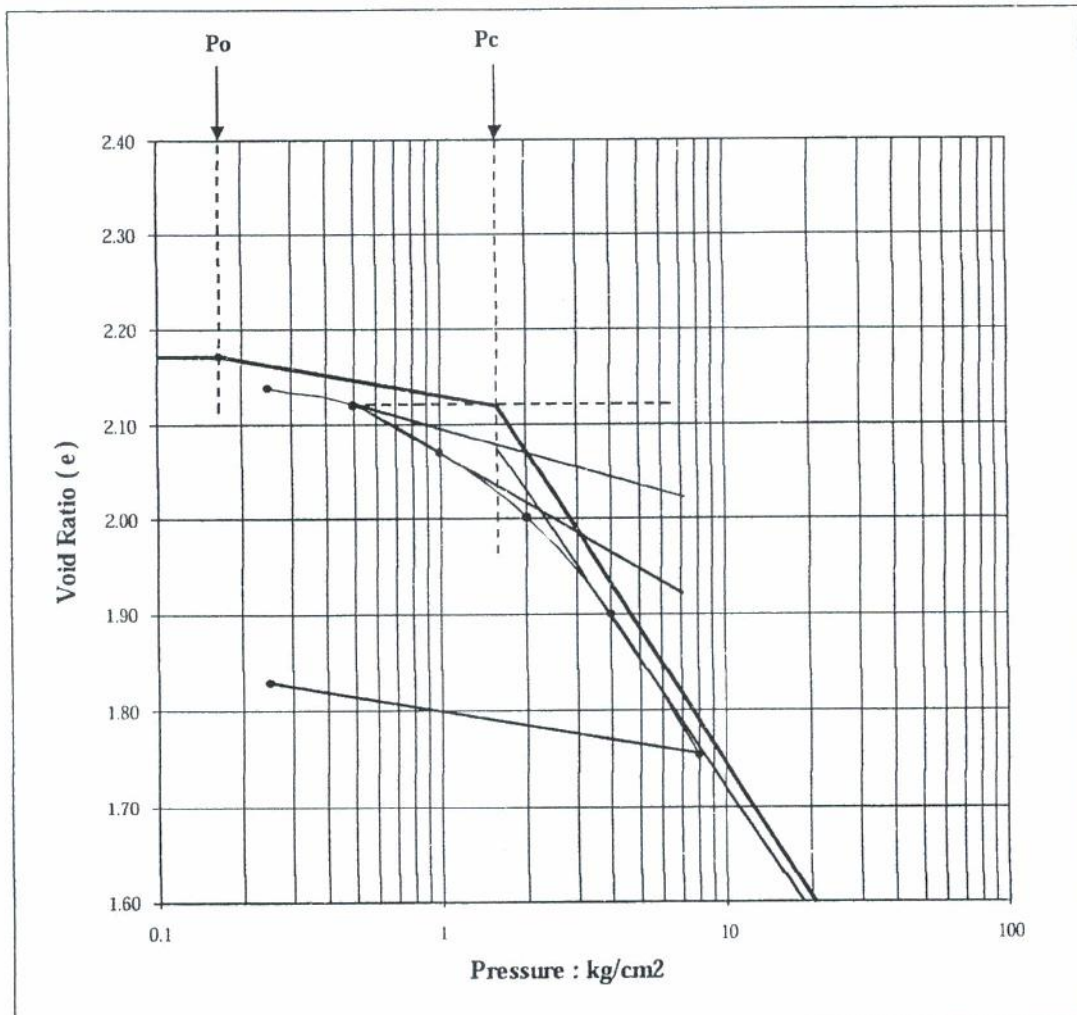
LABORATORIUM MEKANIKA TANAH
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
TELPON. 021 98189554 FAX. 021 78893379

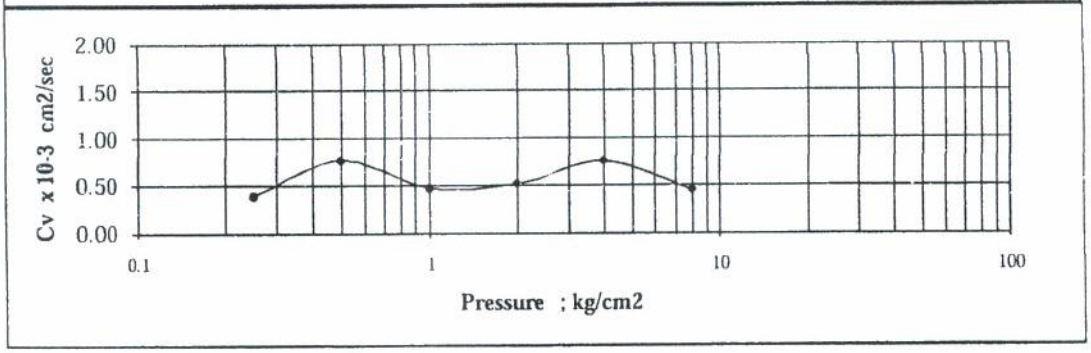
CONSOLIDATION TEST

Project :	Pembangunan Gardu Induk	Depth of Sample :	1.50 - 2.00 meter
Location :	Cilegon, Banten	Date of Tested	Pebruari 2012
No. Bor :	DB-4 UDS-1	Tested by	Endri A.

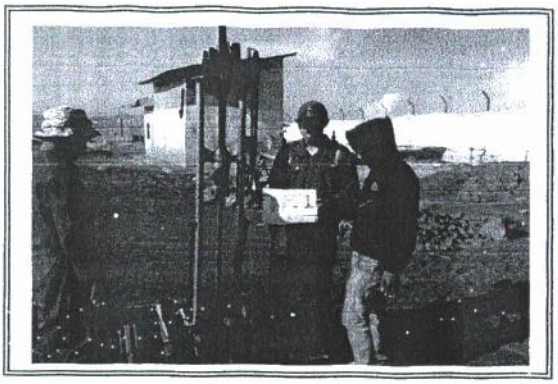
eo =	2.172	
Po =	0.167	kg/cm^2
Pc =	**1.60**	kg/cm^2
w =	33.19	%

Cc =	**0.460**	
Cv =	0.55 x	10^{-3} cm^2 / sec
Cr =	**0.050**	

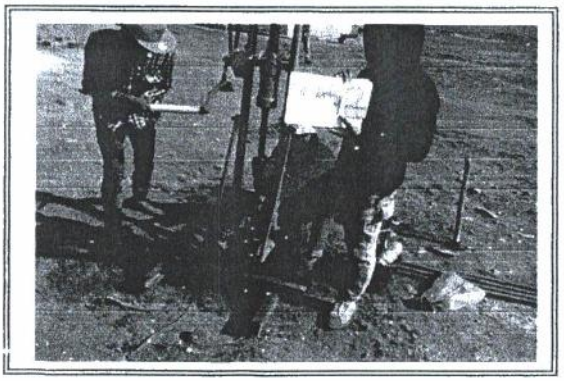




DOKUMENTASI SOIL TEST : PEMBANGUNAN GARDU INDUK 150KV
CILEGON BARU II, CILEGON, BANTEN

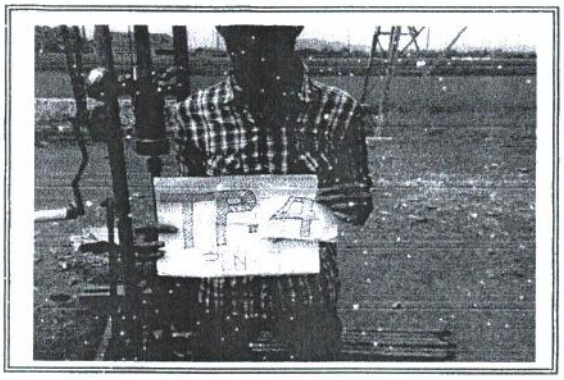


S-1



S-2

S-3

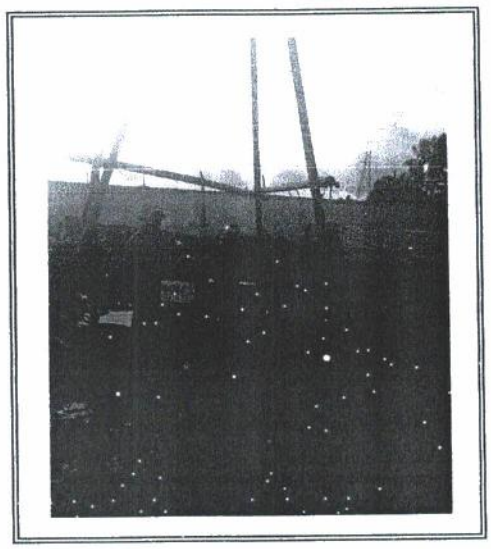


S-4

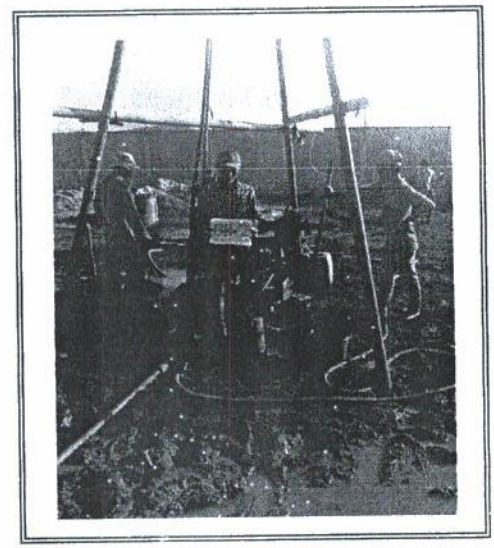
S-5

S-6

DOKUMENTASI BOORING : PEMBANGUNAN GARDU INDUK 150KV CILEGON BARU II, CILEGON, BANTEN



BH-1



BH-2

BH-3

BH-4