PREPARATORY SURVEY FOR NATIONAL ROAD NO.5 REHABILITATION PROJECT IN THE KINGDOM OF CAMBODIA

FINAL REPORT
APPENDIX

OCTOBER 2012

JAPAN INTERNATIONAL COOPERATION AGENCY

KATAHIRA & ENGINEERS INTERNATIONAL

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Appendix 7-1
Flood Survey

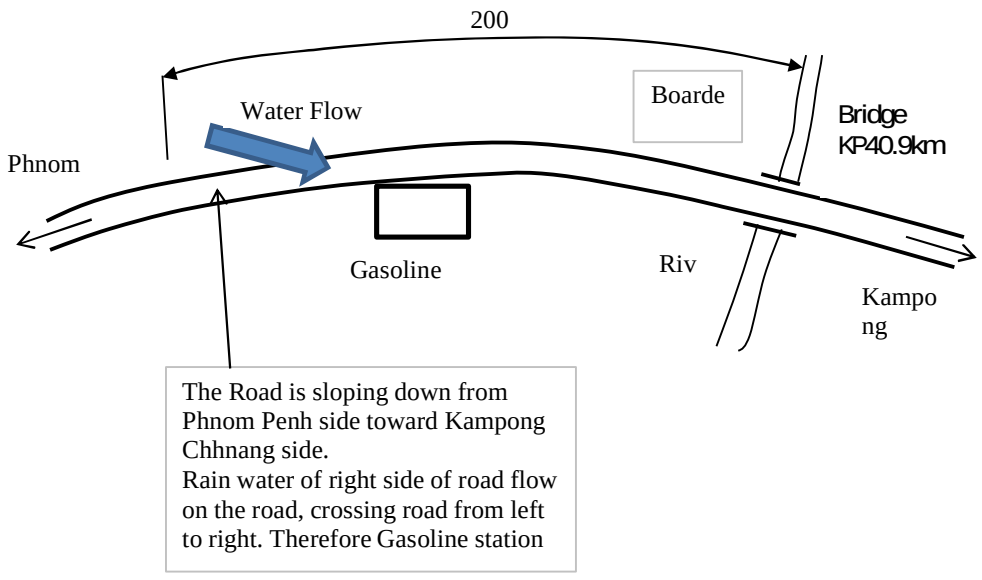
Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.1

Date	March 24, 2011		
Hearing to	Gasoline Station SOKIMEX (Right Side of Road)		
KP (km)	40.6	Province	Boarder of Kandal
Circumstance	Edge of Town		
Drainage Facility	Cross Drainage Under Construction		
Flood Level	10 ~ 20cm above Road Level	Flow Direction	Left to Right
Frequency	1/Year, Every Year		
Duration per flood	1 ~ 2 hour		

Sketch



The Road is sloping down from Phnom Penh side toward Kampong Chhnang side.
Rain water of right side of road flow on the road, crossing road from left to right. Therefore Gasoline station

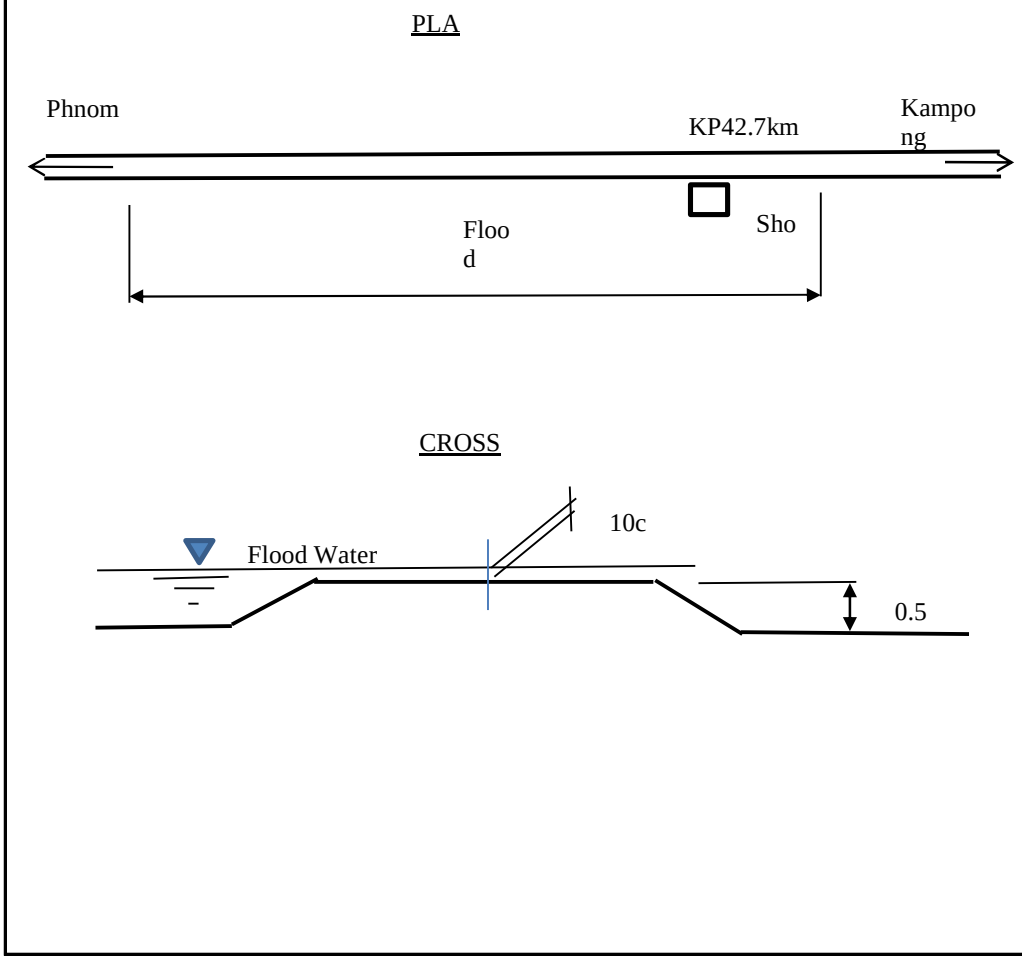
Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.2

Date	March 24, 2011		
Hearing to	Road Side Shop		
KP (km)	42.7	Province	Kampong Chhnang
Circumstance	Rice Field		
Drainage Facility	No		
Flood Level	10cm above Road Level	Flow Direction	Left to Right
Frequency	1/Year, Every Year		
Duration per flood	1 ~ 2 weeks		

Sketch



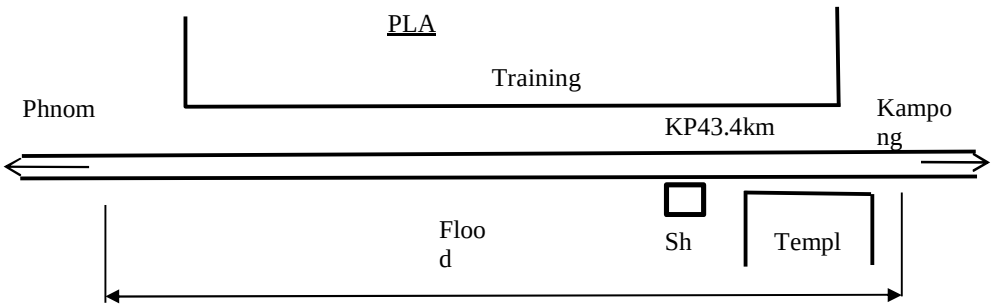
Preparatory Survey for National Road #5 Rehabilitation Project

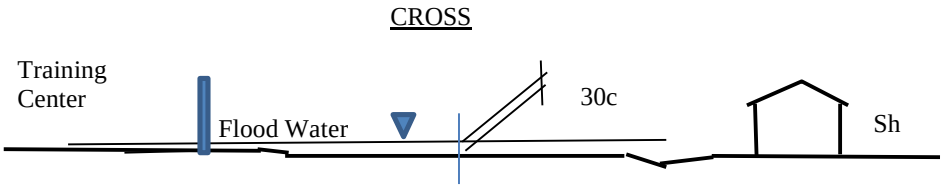
Flood Information

No.3

Date	March 24, 2011		
Hearing to	Road Side Shop		
KP (km)	45.4	Province	Kampong Chhnang
Circumstance	Houses, School, Training Center		
Drainage Facility	Before Training Center Construction, there was a side ditch on left side of road.		
Flood Level	30cm above Road Level	Flow Direction	Left to Right
Frequency	1/Year, (Before training center construction, no flood was occurred.		
Duration per flood	1 month		

Sketch





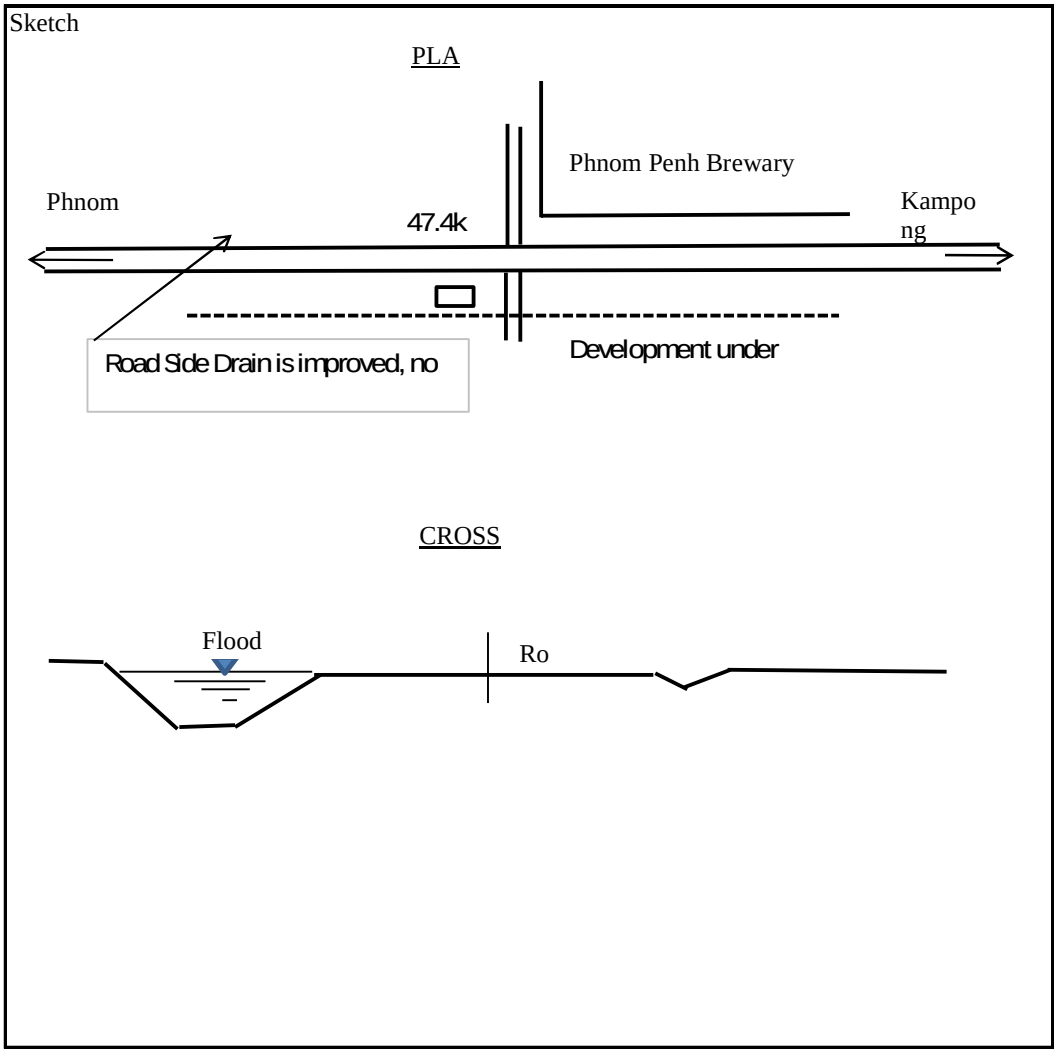
Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.4

Date	March 24, 2011		
Hearing to	Shop Owner		
KP (km)	47.4	Province	Kampong Chhnang
Circumstance	Factory, etc		
Drainage Facility	Road side drain (Before shallow drain)		
Flood Level	1 ~ 2cm	Flow Direction	Left to Right
Frequency	Last Year (Drain is improved, no flood this year?)		
Duration per flood	3 hr		

Sketch



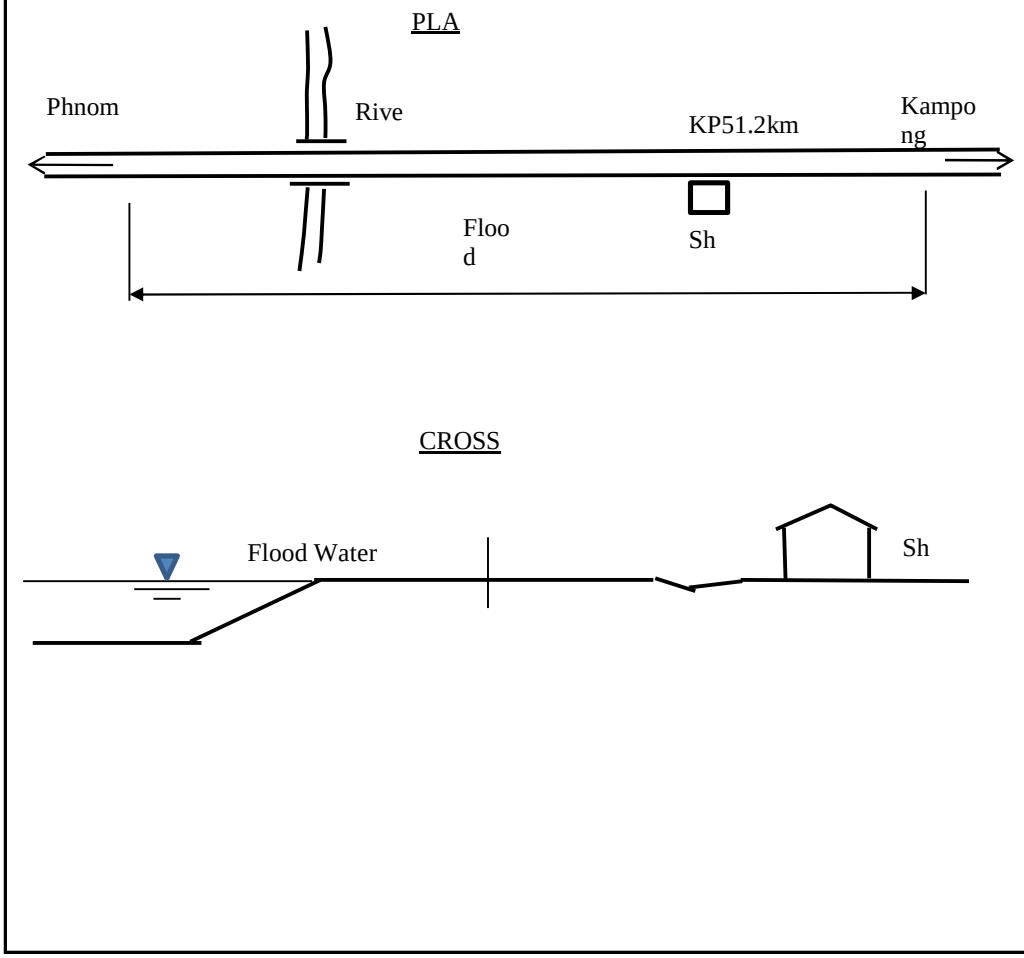
Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.5

Date	March 24, 2011		
Hearing to	Road Side House		
KP (km)	51.2	Province	Kampong Chhnang
Circumstance	Rice Field		
Drainage Facility	Bridge		
Flood Level	Almost Road Level	Flow Direction	Left to Right
Frequency	3 times/Year		
Duration per flood			

Sketch



Preparatory Survey for National Road #5 Rehabilitation Project

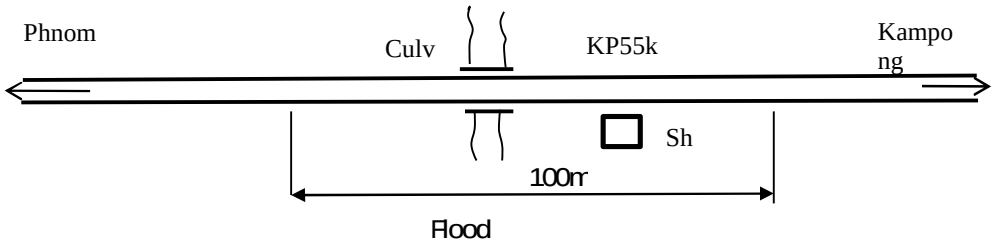
Flood Information

No.6

Date	March 24, 2011		
Hearing to	Shop owner		
KP (km)	55	Province	Kampong Chhnang
Circumstance	Houses along road		
Drainage Facility	Culvert		
Flood Level	20cm	Flow Direction	Left to Right
Frequency	Once per year, Every Year		
Duration per flood	1~2 days		

Sketch

PLA



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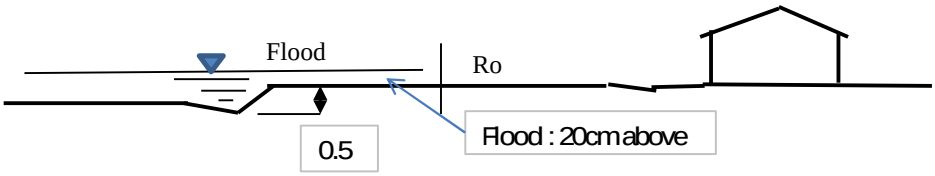


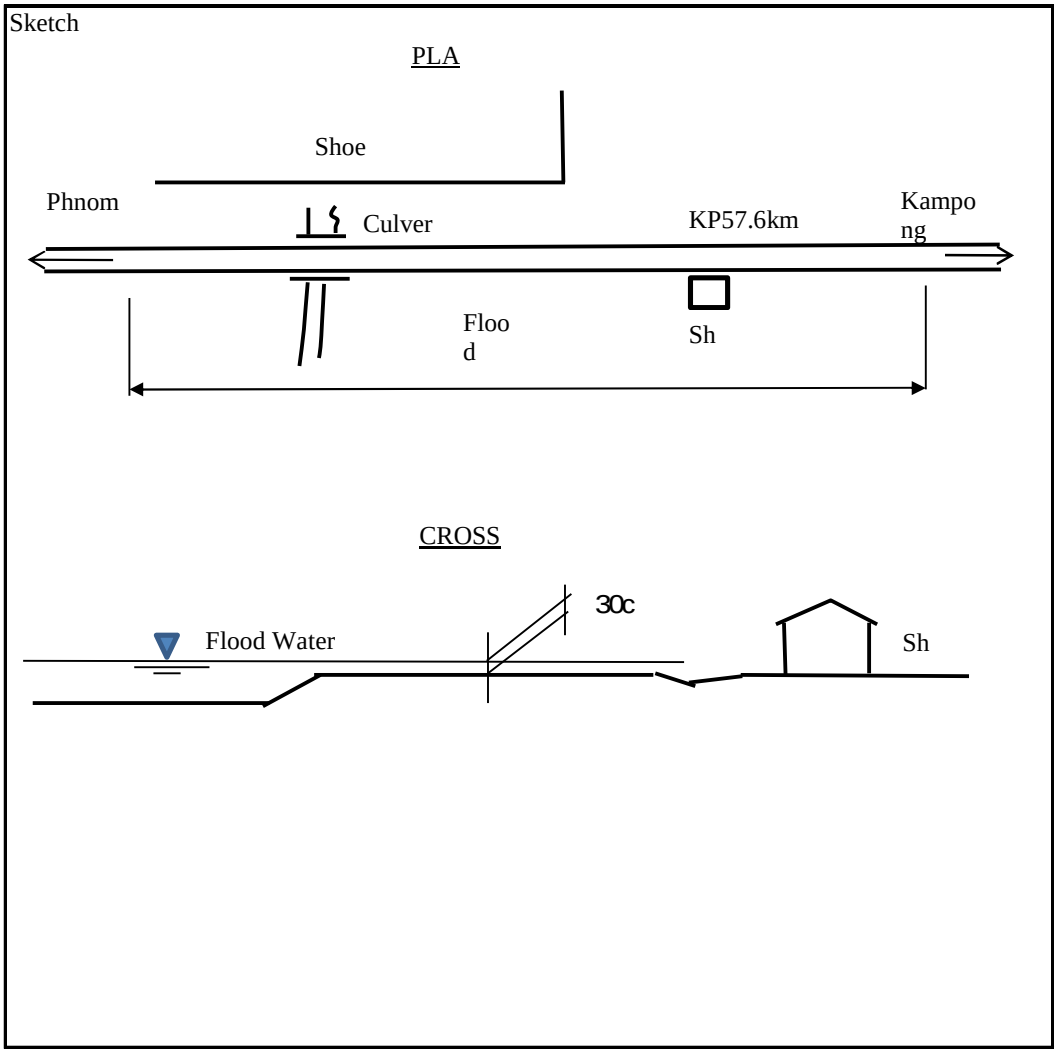
Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.7

Date	March 24, 2011		
Hearing to	Road Side Shop		
KP (km)	57.6	Province	Kampong Chhnang
Circumstance	Factory		
Drainage Facility	Culvert		
Flood Level	30cm above Road Level	Flow Direction	Left to Right
Frequency	1/Year, Every Year		
Duration per flood	One day		

Sketch



Preparatory Survey for National Road #5 Rehabilitation Project

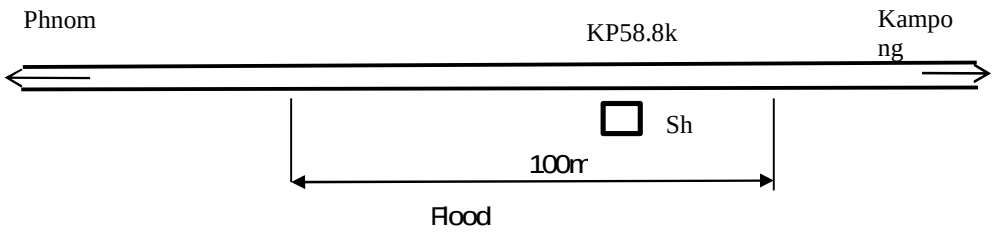
Flood Information

No.8

Date	March 24, 2011		
Hearing to	Shop owner		
KP (km)	58.8	Province	Kampong Chhnang
Circumstance	Houses along road		
Drainage Facility	Side Drain		
Flood Level	1~2cm	Flow Direction	Left to Right
Frequency	Once per year, Every Year		
Duration per flood	1~2 days		

Sketch

PLA



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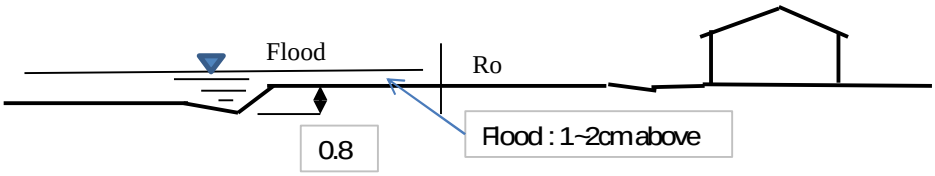


Preparatory Survey for National Road #5 Rehabilitation Project

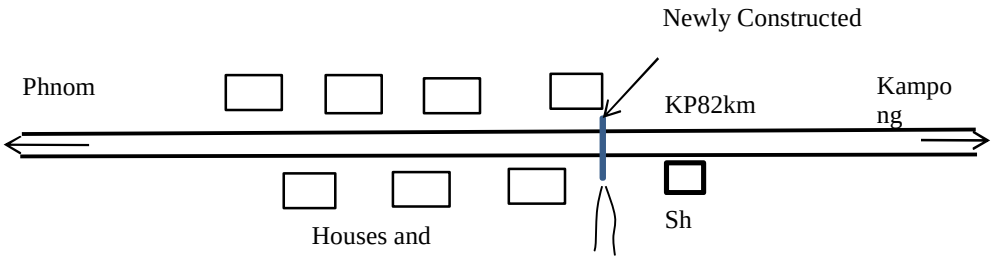
Flood Information

No.9

Date	March 24, 2011		
Hearing to	Road Side Shop		
KP (km)	82	Province	Kampong Chhnang
Circumstance	Small Town		
Drainage Facility	Culvert		
Flood Level		Flow Direction	Left to Right
Frequency	After construction of culvert, no more flood		
Duration per flood			

Sketch

PLA



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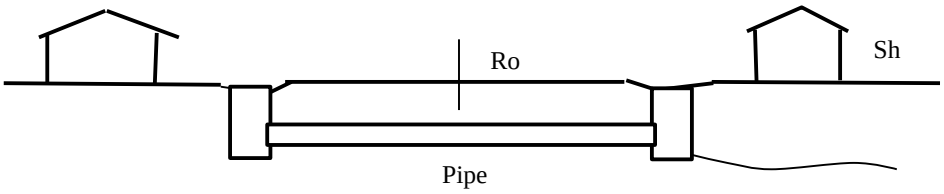


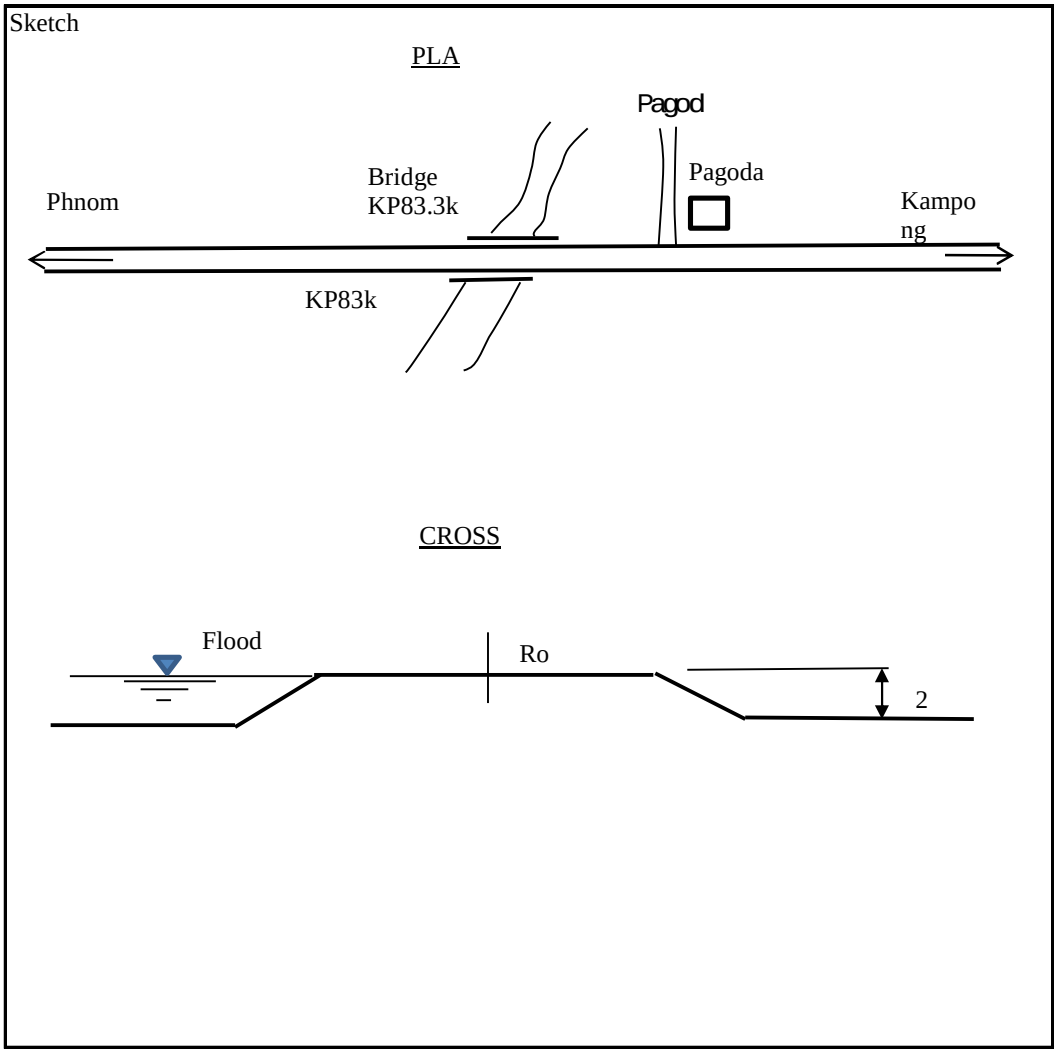
Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.10

Date	March 24, 2011		
Hearing to	Pagoda Worker		
KP (km)	83	Province	Kampong Chhnang
Circumstance	Rice Field		
Drainage Facility	Bridge L=14.2m		
Flood Level	Almost Embankment Level	Flow Direction	Left to Right
Frequency	After construction of culvert, no more flood		
Duration per flood			

Sketch



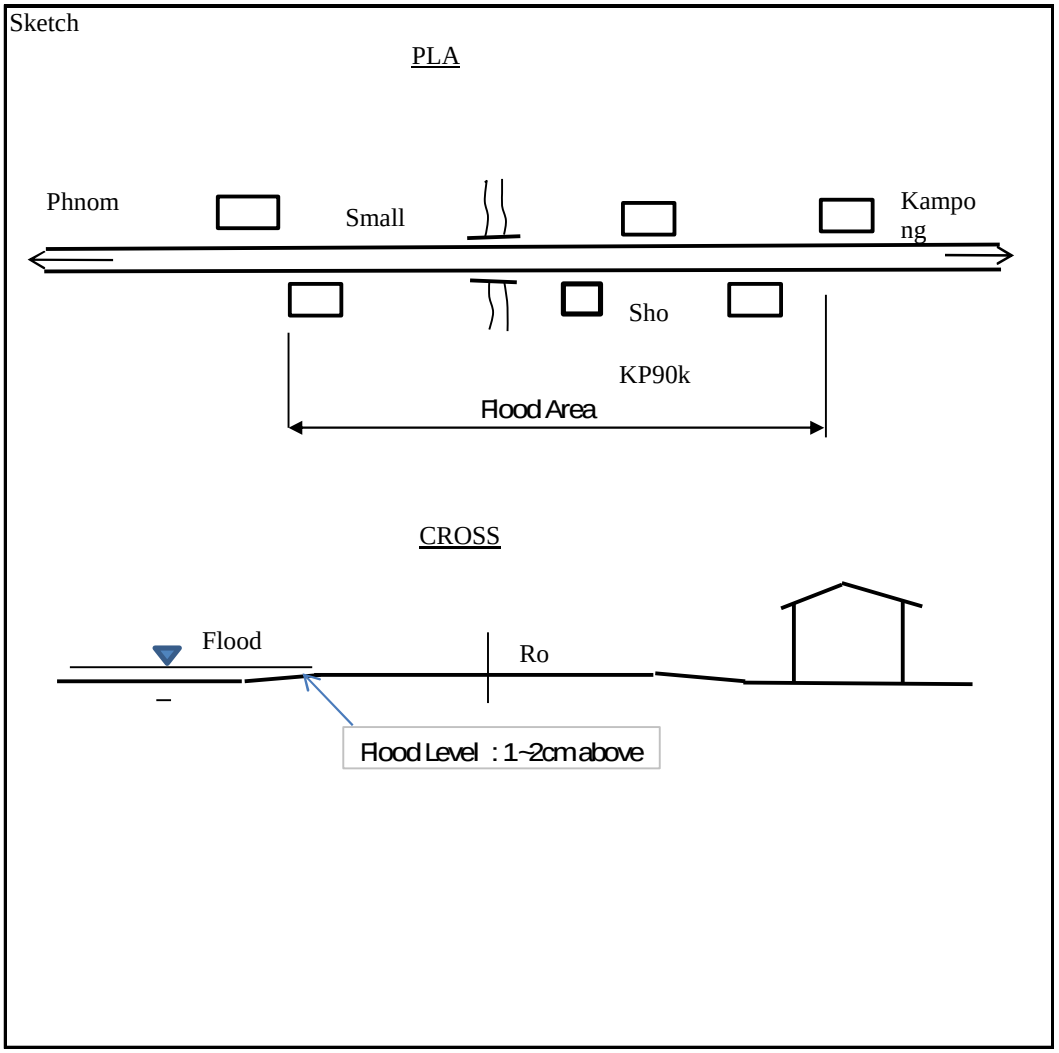
Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.11

Date	March 24, 2011		
Hearing to	Shop Owner		
KP (km)	90	Province	Kampong Chhnang
Circumstance	Houses along Road		
Drainage Facility	Small Culvert		
Flood Level	1~2cm	Flow Direction	Left to Right
Frequency	Once per year, Last year only		
Duration per flood	1hr		

Sketch



Preparatory Survey for National Road #5 Rehabilitation Project

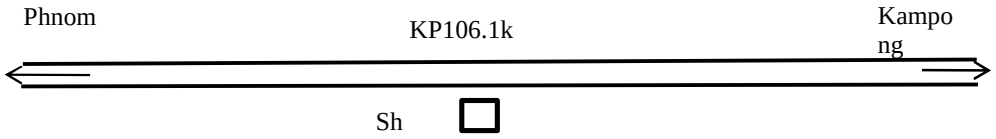
Flood Information

No.12

Date	March 24, 2011		
Hearing to	Shop owner		
KP (km)	105 ~ 109	Province	Kampong Chhnang
Circumstance	Uncultivated Land		
Drainage Facility	Bridge		
Flood Level	No	Flow Direction	
Frequency			
Duration per flood			

Sketch

PLA



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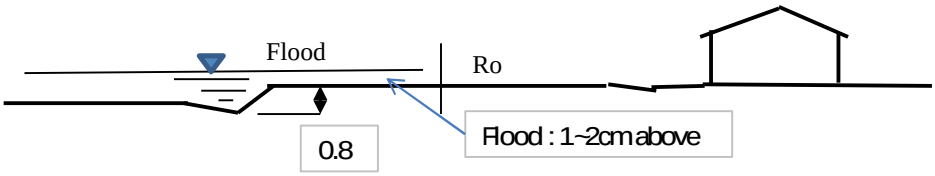


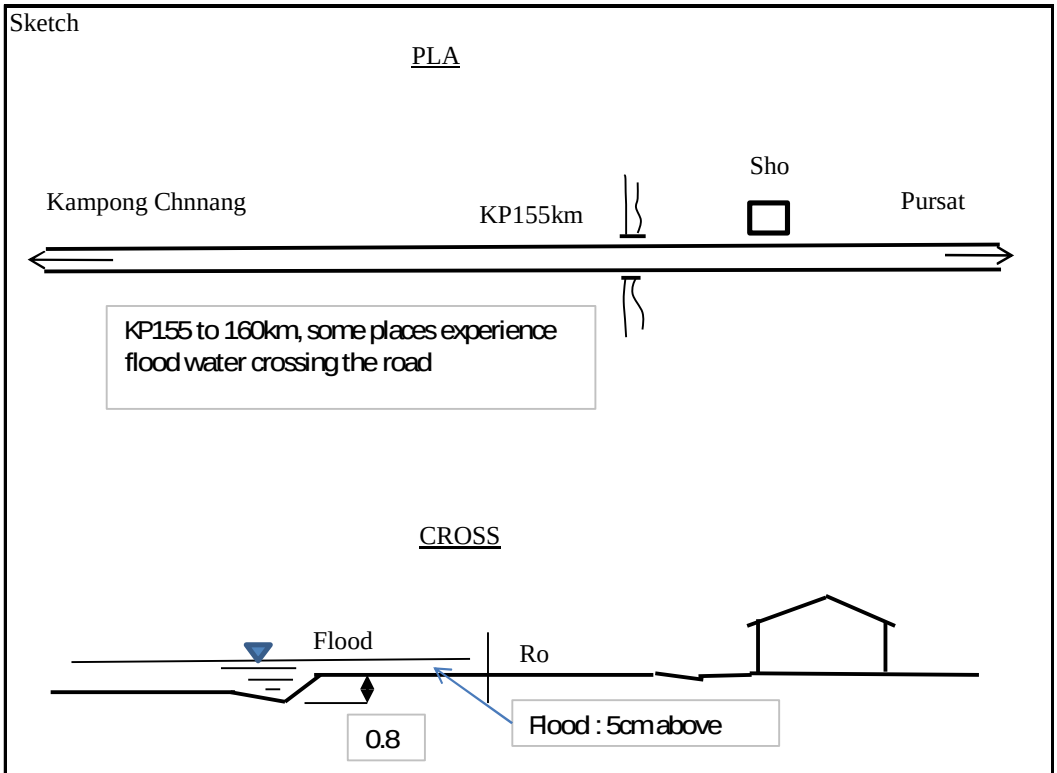
Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.13

Date	March 24, 2011		
Hearing to	Shop owner		
KP (km)	155 ~ 160	Province	Pursat
Circumstance	Houses along Road		
Drainage Facility	Small Culvert		
Flood Level	5cm	Flow Direction	Left to Right
Frequency	Once per Year, Every Year		
Duration per flood	3 days		

Sketch



Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.14

Date	28-Mar-11		
Hearing to	Shop Owners along the road		
KP (km)	305 ~ 307, 311 ~ 317	Province	Battambang
Circumstance			
Drainage Facility			
Flood Level		Flow Direction	
Frequency			
Duration per flood			

Sketch

KP305 to 307km is indicated by DPWT Battambang Office that frequent repairing/maintenace works are concentrated.
Hearing to shop owners along the road at KP 305, 306, 307km do not indicate any flood occured in this area.

KP311 to 317km is indicated by DPWT Battambang Office that frequent repairing/maintenace works are concentrated.
Hearing to shop owners along the road at KP 311, 313, 317km do not indicate any flood occured in this area.

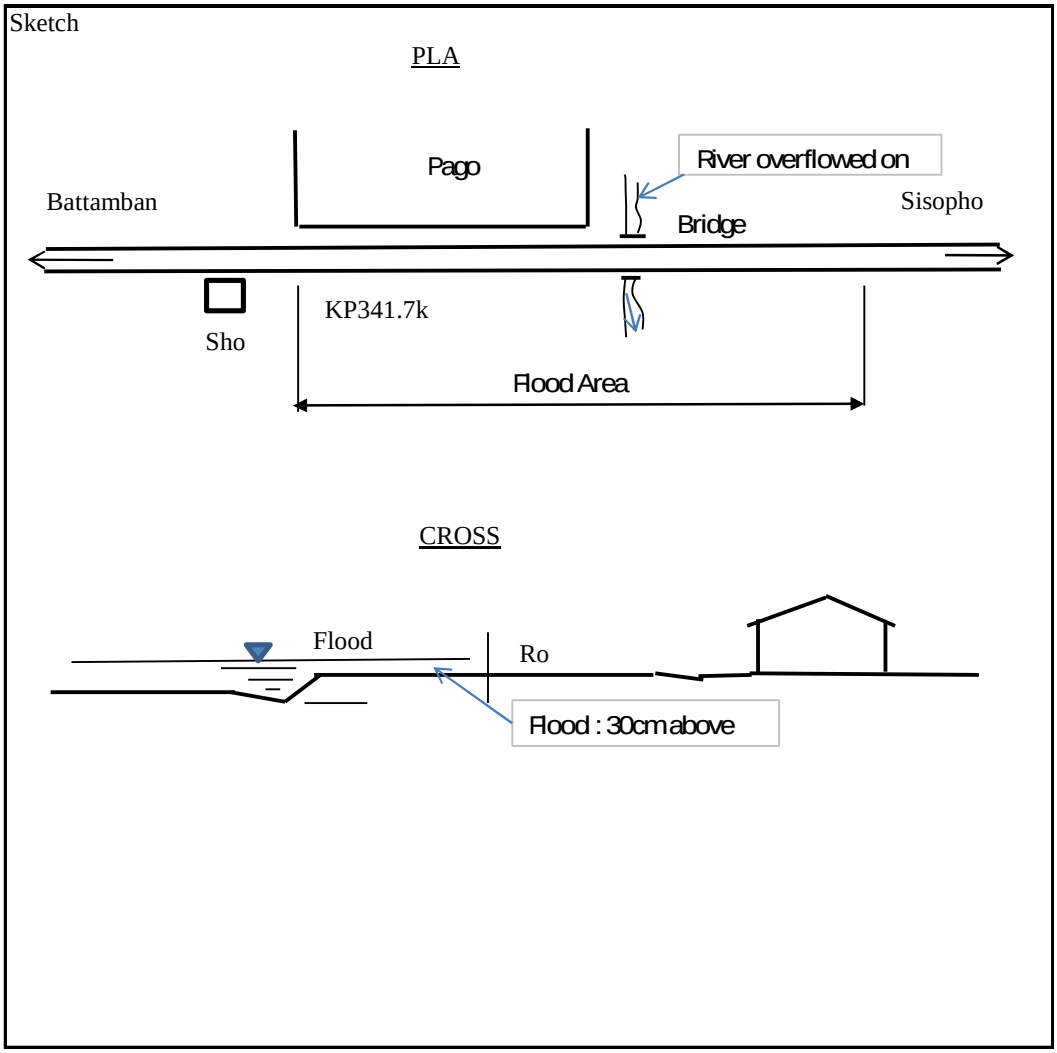
Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.15

Date	March 29, 2011		
Hearing to	Shop owner		
KP (km)	341.7	Province	Banteay Meanchey
Circumstance	Houses along Road		
Drainage Facility	Bridge L=28m		
Flood Level	30cm	Flow Direction	Left to Right
Frequency	2010		
Duration per flood	15 days		

Sketch



Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.16

Date	March 29,2011		
Hearing to	Road side shop		
KP (km)	344	Province	Banteay Meanchey
Circumstance	Rice Field		
Drainage Facility			
Flood Level	1 ~ 2cm	Flow Direction	Left to Right
Frequency	1 ~ 2 times per year. Every Year		
Duration per flood	1 days		

Sketch

Shop Owner said overflow occure at several locations intermittently .

Preparatory Survey for National Road #5 Rehabilitation Project

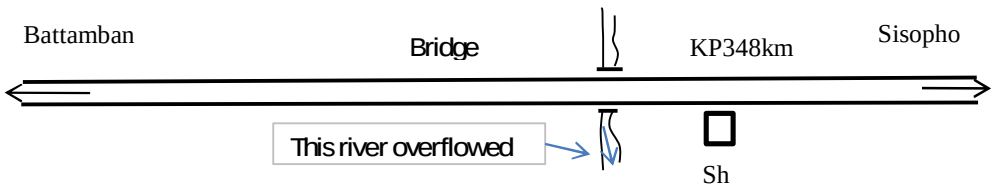
Flood Information

No.17

Date	March 29, 2011		
Hearing to	Shop owner		
KP (km)	348	Province	Banteay Meanchey
Circumstance	Houses along Road		
Drainage Facility	Bridge L=13m		
Flood Level		Flow Direction	
Frequency	No flood on the road, but water level almost road level		
Duration per flood	2010 only		

Sketch

PLA



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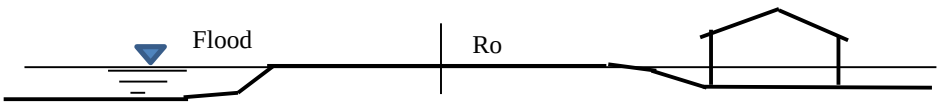


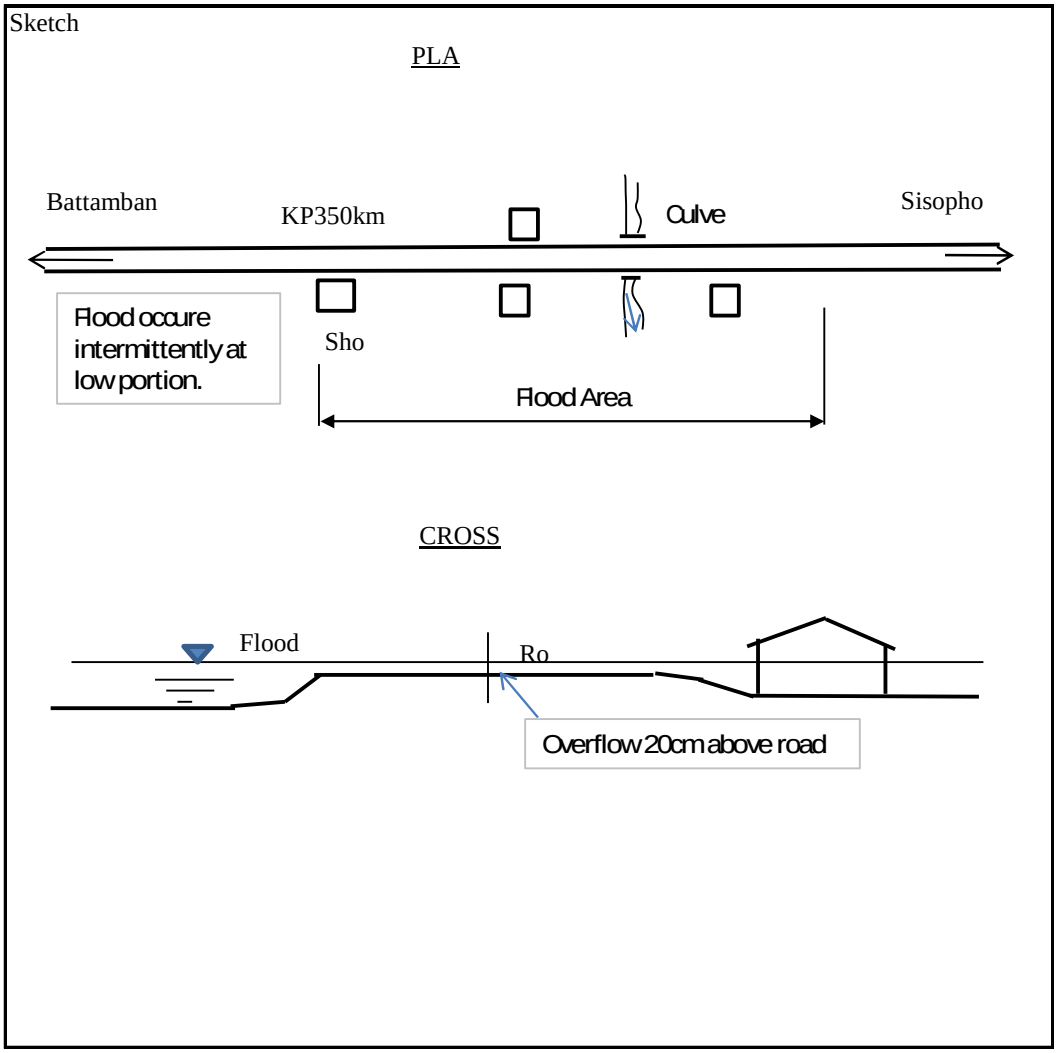
Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.18

Date	March 29, 2011		
Hearing to	Shop owner		
KP (km)	350	Province	Banteay Meanchey
Circumstance	Houses along Road		
Drainage Facility	Culvert		
Flood Level	15cm	Flow Direction	Left to Right
Frequency	Last October		
Duration per flood	2 weeks		

Sketch



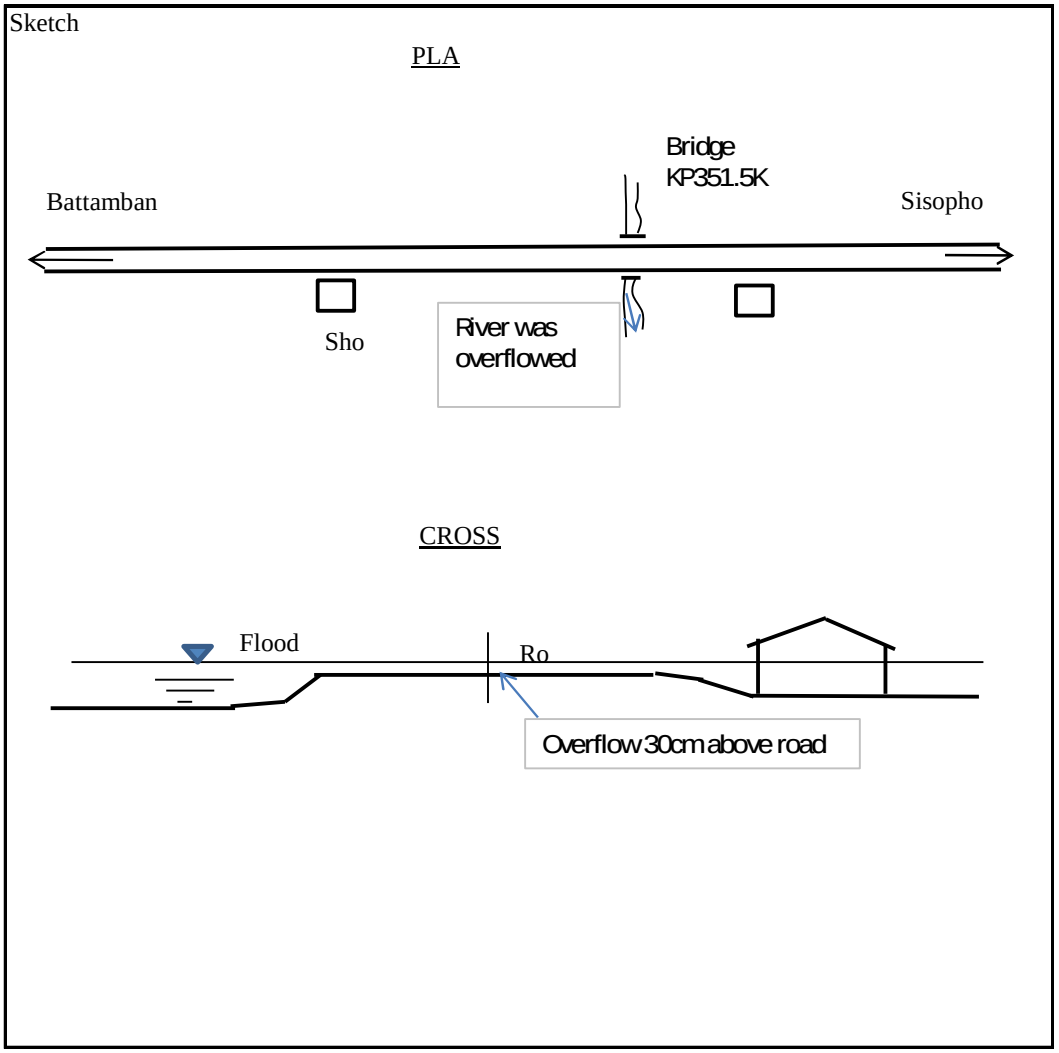
Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.19

Date	March 29, 2011		
Hearing to	Shop owner		
KP (km)	351.5	Province	Banteay Meanchey
Circumstance	Houses along Road		
Drainage Facility	Bridge L=43m		
Flood Level	30cm	Flow Direction	Left to Right
Frequency	October, 2010		
Duration per flood	1 month (Road was not passable.)		

Sketch



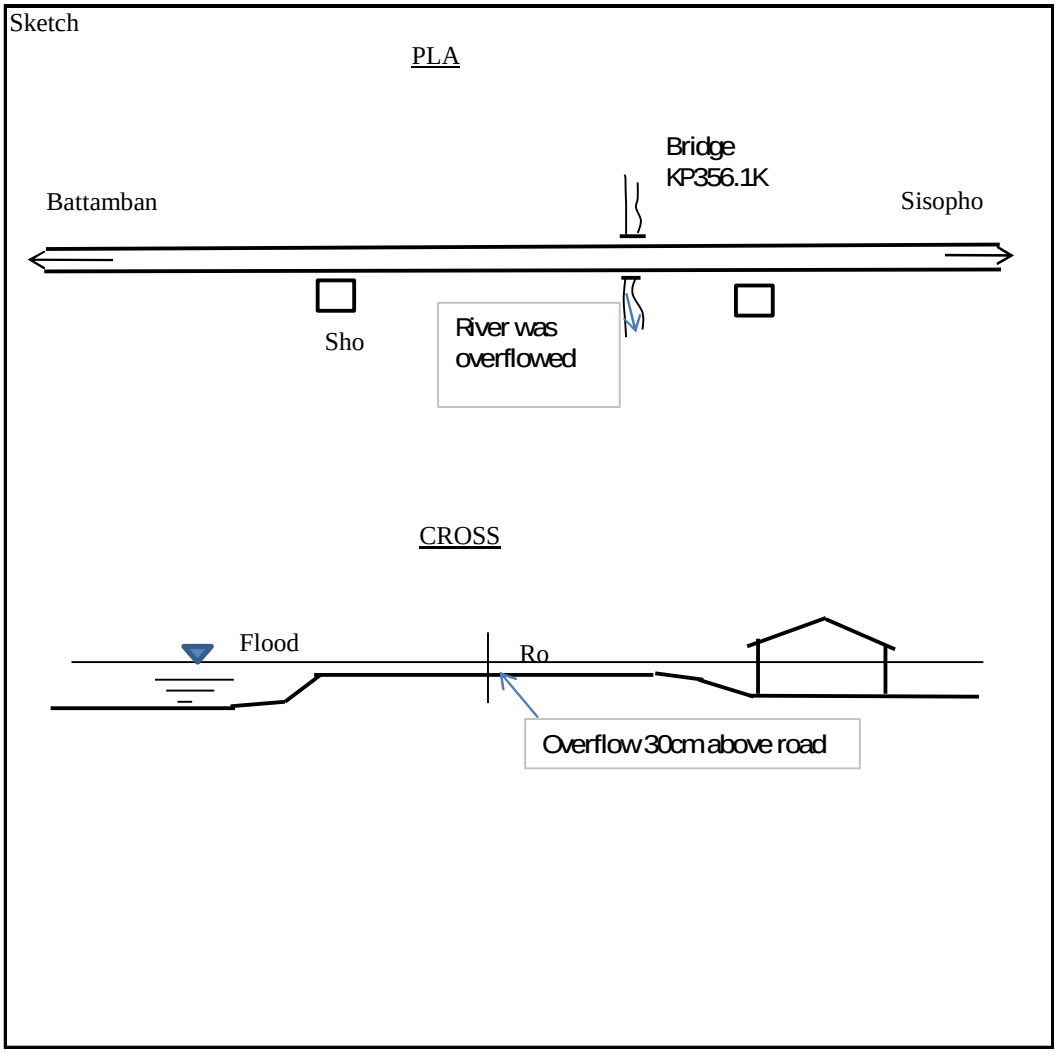
Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.20

Date	March 29, 2011		
Hearing to	Shop owner		
KP (km)	356.1	Province	Banteay Meanchey
Circumstance	Houses along Road		
Drainage Facility	Bridge L=10m		
Flood Level	30cm	Flow Direction	Left to Right
Frequency	October, 2010		
Duration per flood	1 month (Road was not passable.)		

Sketch



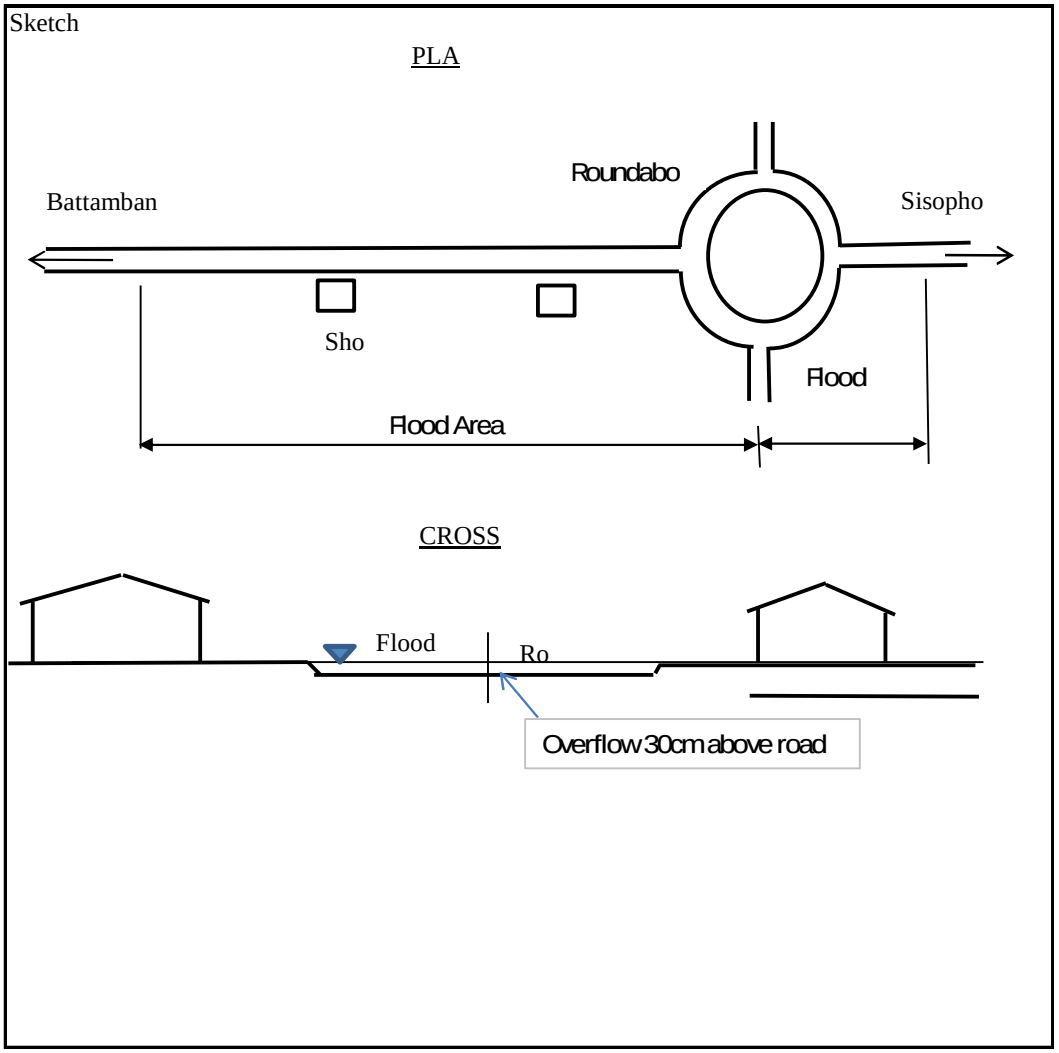
Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.21

Date	March 29, 2011		
Hearing to	Shop owner		
KP (km)	360	Province	Banteay Meanchey
Circumstance	Town Center		
Drainage Facility			
Flood Level	30cm	Flow Direction	Left to Right
Frequency	October, 2010		
Duration per flood	2 ~ 3 days		

Sketch



Preparatory Survey for National Road #5 Rehabilitation Project

Flood Information

No.22

Date			
Hearing to			
KP (km)		Province	
Circumstance			
Drainage Facility			
Flood Level		Flow Direction	
Frequency			
Duration per flood			

Sketch

Following locations also interviewed , but no flood occured before.

KP43km
KP49.6km
KP73km
KP354km

Appendix 7-2
Report of the Boring Survey of Sisophon Bypass

ដៃគូនើរ អប្ប ខនស្ត្រាក់សិន អេន ឌីវេឡុបមេនសឺវីសអ៊ីន
Partner of Construction and Development Services Inc.
HP: 012 912 879, 016 912 879, Tel: 855 (23) 991 875, 855 (23) 991 875.

ការិយាល័យគុណភាពដី

SOIL QUALITY ANALYSIS OFFICE

ផលប្រយោជន៍ ស្ទឹង

លទ្ធផល

នៃការសិក្សាដីតាមខួបករណី ស្តង់ដា

SOIL INVESTIGATION REPORT BY USING STANDARD PENETRATION TEST (SPT)

PROJECT:

GEOTECHNICAL INVESTIGATION (BORING)
UNDER
PREPARATORY SURVEY
FOR
NATIONAL ROAD No.5 REHABILITATION IN THE KINGDOM OF CAMBODIA

Location: AT SISOPHON IN BANTEAY MEANCHEAY PROVINCE.

PREPARE FOR: KATAHIRA & ENGINEERING INTERNATIONAL

29-Feb-2012

ដៃគូសេវា អប្ប ខនស្ត្រាក់សិន អេន ឌីវេឡុបមេនសឺវីសអ៊ីន
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APPENDIX – A

STEUNG TOUCH BRIDGE

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STEUNG MONG KULBOREY BRIDGE

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I. General

1. Introduction

Soil investigation is a requirement by KATAHIRA ENGINEER INTERNATIONAL for feasibility and detail engineering design of structures. It is to determine subsoil conditions beneath the project site and physical and geo-technical characteristics of the underlying soil strata. The purpose of this investigation is to determine the end bearing capacity of deep foundation or shallow foundation by using Standard Penetration Test (SPT) results and provide economical cost and especially safety of construction period.

2. Geology and Landform

The geology of the project area and its immediate environments are shown in Figure 1.
Cambodia is geologically composed of three different structures; they are mostly Triassic, Jurassic-Cretaceous and Quaternary. The Triassic period covers a large area in the east, Jurassic-Cretaceous Era forming important highlands in the west and, between them, the Quaternary basin occupy the whole central plain of the country.

The area of the site is situated at Sisophon district, Banteay Mean Chheay Province. the site era occur by Quaternary Era of central plain of Cambodia. The soil deposit encountered during site investigation is recently formed by alluvial of the Mekong River (a Q_{III} – a Q_{VI}). The soil stretching the project site is reported to comprise gray, yellow, brown Silty Soil or Clayey soil, Sandy Clay and fat Clay strata, because the project site is formed by the sediments of alluvial and the environmental area. The alluvial sediments of the project area flow from vicinity high land to fulfill swamp, lack or flat area. Therefore the project area occurred historically from year after years; era after era by deposited layer by layers from the sediment of high land and vicinity area, especially the top soil back fill 1.00m Thick.

II Geo-technical Investigation

Partner of Construction and Development Services Inc. was commissioned to undertake geo-technical investigation for the bridge foundation Design on 09 to 12-Feb-2012. For this particular project to determination of subsoil condition, its relative density, consistency, classification and characteristics of soil properties, especially geological

and geo-technical condition of the soil beneath the project site for the construction design.

1. Objective and Scope

The objective of soil investigation is contributed to analyzing various subsoil conditions including their characteristics and composition status of strata distributed beneath the project area. The scopes and the objectives of the subsurface investigation included the following tasks:

- An actual field observation and inspection.
- Soil boring and carry out the Standard Penetration Test at the proposed location site. (see location plan of borehole)
- Samples collection, preservation and transportation to the laboratory.
- Laboratory testing of the soil samples from split-barrel sampler of Standard Penetration Test and thin-walled sampler.
- Interpretation and evaluation of the field and Laboratory test results.
- Determination of the factual characteristics of soil and engineering properties of soil for the purpose of getting a conclusive data to support the recommendation for the construction design.
- Prepare factual report.

2. Site Methodology

Subsurface exploration was carried out to determine the arrangement of soil stratums and engineering properties of the underlying soils, particularly strength and deformation characteristics for foundation design of the project. The field operations were carried out in accordance with ASTM Standards as summarizing below:

- Standard Penetration test (SPT) ASTM D-1586
- Field Soil classification ASTM D-2487, D-2488
- Preservation and Transportation of soil samples ASTM D-4220
- Ground Water Table Observation ASTM D-4750
- Carry out soil boring.

  The main activities of the whole field investigations consisted of the following tasks:
- Locate the borehole to the required position.
- Bored out the soil and observed soil cuttings to classify the soil layers and prepare of borehole log.
- Carry out Standard Penetration Test (SPT) at 1.50m intervals

- Seal and label all disturbed and undisturbed soil samples in the core boxes and deliver to the laboratory (Protected from the exposure to the sun).
- Collect disturbed soil samples at 1.50 meters intervals and every soil strata changes.
- The borehole depth terminated when the N-value of SPT exceeds 50 blow counts or considered to be supported structure load.

Soil boring

Boring Machine used in the project area is Mercedes 60-M meters depth capacity and the diameter of 180 mm, equip with SPT. A hollow stem flight auger was employed in this operation. The process is continued boring every 1.50 meters depth, then take out the center rod to operate the thin-walled sampler and SPT test. The field soil classification and observation such as soil name, consistency, color, soil strata, percent of soil grain size estimation, ground water table, seal and label, protection from sun shine, making note and putting in core boxes are undertaken. All disturbed and undisturbed samples were transported to laboratory.

Standard Penetration Test (SPT)

After the borehole has advanced to required depth, the center rod is withdrawn and replace with thin-wall sampler (59mm) first to push slowly into the natural soil in order to get undisturbed sample and than put split barrel sampler into soil layer to do SPT test. The correct depth after boring out the soil is also checked.
The Standard Penetration Test (SPT) uses 63.50 Kg drive weight at free fall height of 760 mm to drive standard split barrel and the number of blows for every 150 mm penetration is noted. The first 150mm are the setting blow and the total number of blows for the last 300mm is the N-value. The samples extracted by the split spoon sampler (ASTM D-1586) during the penetration test will be tested for their engineering properties. Procedure is repeated on each succeeding depth down to the bottom of the borehole. The water level in the borehole is measured 24 hours after completion of boring works.

3. Laboratory Test

The soil samples extracted to represent the different strata from machine auger borings and SPT test were subjected to soil testing laboratory for evaluation and analysis in accordance with ASTM Standard methods and specifications to classify them for their engineering values.
The laboratory-testing program was divided into two following parts:

- Natural water content determination ASTM D-2216,
- Atterberg limit ASTM D-4318,
- Specific Gravity of Soil ASTM D-854 and ASTM C-128,
- Sieve Analysis ASTM D-421 and ASTM D-422,
- Wet Unit weight. Dry Unit weight, Void Ratio and Porosity.
- Soil Classification ASTM D-2488.

The summary of Laboratory tests results showed in table bellow.

III. Findings

1. Subsoil condition

Underlying the site are uniform layers of cohesion less soil and cohesive soil high plasticity to medium plasticity (Clay, Clayey Sand, Sandy Clay) at the ground surface to the end of boring as:

Steung Touch Bridge:

- BH-1:

- From 0.00m to 5.00m depth – is firm to very stiff reddish brown high plasticity Clay (CH) N-Values vary from 7 blows to 16 blows/30cm.

- From 5.00m to 14.00m depth – stiff to hard yellowish-gray, yellowish-brown sandy Clay with gravels (CL), N-Values from 12 to 60 blows/30cm.

- From 14.00m to 18.00m depth – Medium dense yellowish-gray, yellowish-brown Clayey Sand (SC), N-Values from 17 to 25 blows/30cm.

- From 18.00m to 21.00m – Very stiff brownish sandy Clay with gravels (CL), N-Value 19 to 22 blows/30cm.

- From 21.00m to 24.00m – Very dense, brownish Clayey Sand (SC), N-Value 36-50 blows/30cm.

- BH-2:

- From surface to 6.00m depth – is firm to stiff brownish, yellowish, grayish Clay (CH), N-Values 5 to 12 blows/30cm.

- From 6.00 m to 10.00m – Stiff to hard yellowish-gray, reddish-brown Sandy Clay with gravels (SM), N-Values from 9 to 50 blows/30cm.

- From 10.00m to 13.00m – Medium dense light gray, light brown Clayey Sand with gravels (SC), N-Values from 15 to 20 blows/30cm.

- From 13.00m to 16.00m – Stiff to very Stiff light-gray, reddish-brown Sandy Clay with gravels (CL), N-Value 13 to 16 blows/30cm.

- From 16.00m to 18.00m – Medium dense yellowish-gray, brownish, Clayey Sand with gravels (SC), N-Value 22-25 blows/30cm.

- From 18.00m to 25.00m – Very stiff to hard brownish, grayish, reddish-brown Sandy Clay with gravels (CL), N-Value 16-32 blows/30cm.

Steung Mongkul Borey Bridge:

- **BH-1:**

- From 0.00m to 6.00m depth – is firm to stiff brownish, yellowish high plasticity Clay (CH) N-Values vary from 4 blows to 9 blows/30cm.

- From 6.00m to 12.00m depth – stiff to very stiff reddish-gray, yellowish Silty Clay (CL), N-Values from 14 to 17 blows/30cm.

- From 12.00m to 16.00m depth – Very stiff, yellowish, grayish Silty Clay (CL), N-Values from 24 to 26 blows/30cm.

- From 16.00m to 21.00m – Very stiff yellowish, grayish, reddish-brown high plasticity Clay with (CH), N-Value 16 to 25 blows/30cm.

- From 21.00m to 25.00m – Very stiff to hard grayish Sandy Silt (ML), N-Value 21 to 34 blows/30cm.

- **BH-2:**

- From 0.00m to 6.00m depth – is firm to stiff brownish, yellowish high plasticity Clay (CH) N-Values vary from 4 blows to 9 blows/30cm.

- From 6.00m to 12.00m depth – stiff to very stiff reddish-gray, yellowish Silty Clay (CL), N-Values from 14 to 17 blows/30cm.

- From 12.00m to 16.00m depth – Very stiff, yellowish, grayish Silty Clay (CL), N-Values from 24 to 26 blows/30cm.

- From 16.00m to 21.00m – Very stiff yellowish, grayish, reddish-brown

plasticity Clay with (CH), N-Value 16 to 25 blows/30cm.

- From 21.00m to 25.00m – Very stiff to hard grayish Sandy Silt (ML), N-Value 21 to 34 blows/30cm.

2. Underground water condition

The ground water met during operation of boring is one of the important factors for soil investigation because the variation of ground water level, the characteristic of soil mechanic also can be changed. The underground water level on site location encountered in each borehole. Depth of water level encountered during boring operation noted at top surface ground. And the underground water level after duration of 24 hours was permanently from m to m at top surface ground. Therefore the soil character could be changed according to the depth of water table encountered.

The underground water level encountered shown in table below:

Table. 1

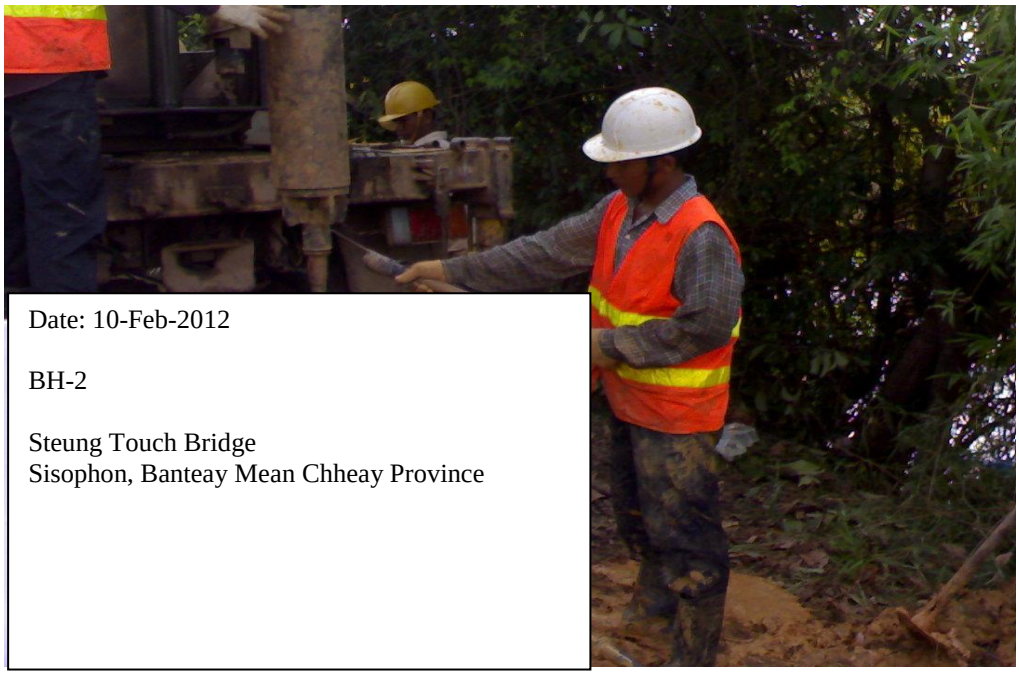
Bridge	Borehole Nº	Borehole depth m	Underground Water level m		Date of boring	Elevation m
			during boring operation	during after 24 hours		
Steug Touch	BH.1	24.00	13.00	2.00	09/02/2012	
	BH.2	25.00	13.00	2.50	10/02/2012	
Monkul Borey	BH.1	25.00	No	No	11/02/2012	
	BH.2	25.00	No	No	12/02/2012	

IV. Conclusion and Recommendation

Laboratory tested results and field operation showed that the stratigraphy of subsoil layers beneath project area is considerably not varied, it is mostly uniform layer. In according to the geology formation the area occurred in Quaternary Sedimentary (a Q_{III} – a Q_{IV}), so the soil texture is performed by recent sedimentation of Silty Sand and Sandy Soil stratum. The physical and mechanical properties of subsurface ground are good for supporting load structure see N-Values in Log Boring as below.

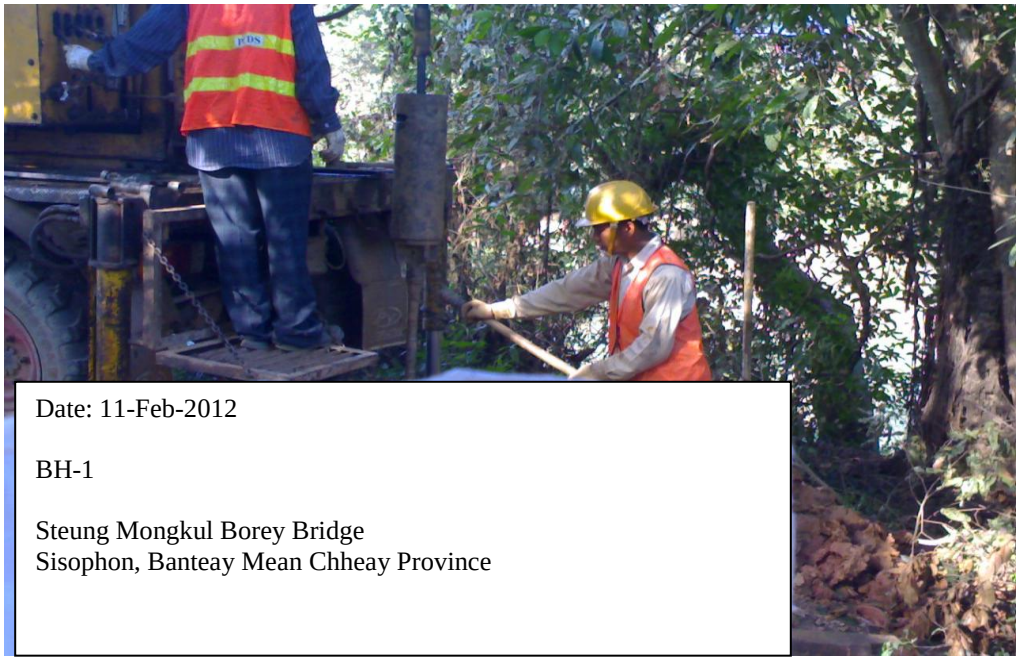
PHOTOGRAPHS

1-Fieldworks Activities: date: 09 to10-Feb-2012
Location: Steung Touch Bridge.



2-Fieldworks Activities: date: 11 to12-Feb-2012

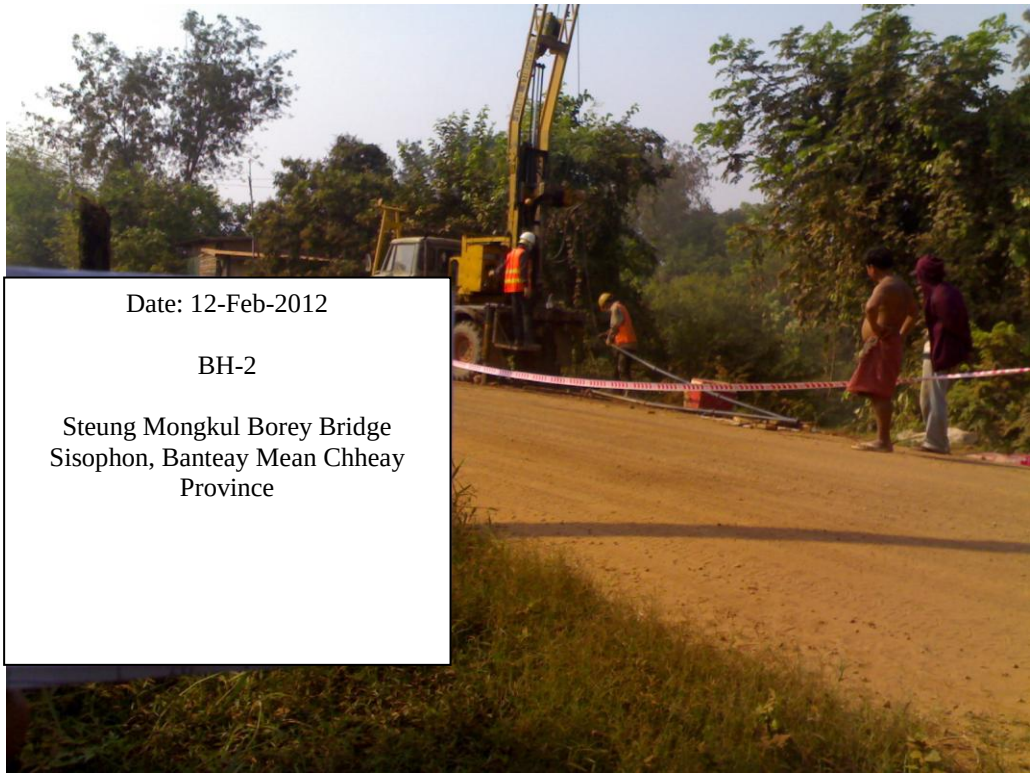
Location: Steung Mongkul Borey Bridge.



Date: 11-Feb-2012

BH-1

Steung Mongkul Borey Bridge
Sisophon, Banteay Mean Chheay Province



Date: 12-Feb-2012

BH-2

Steung Mongkul Borey Bridge
Sisophon, Banteay Mean Chheay Province

Soil Quality Analysis Office.

2: Laboratory Test

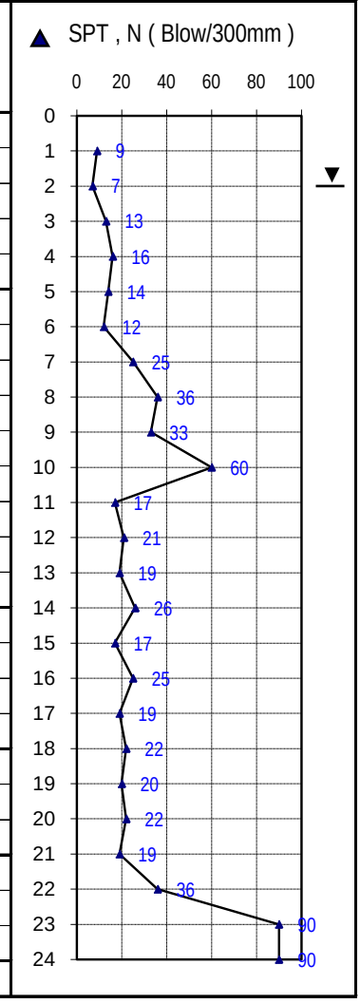
BORE HOLE LOG BH.1

Sub-Contractor: Partner of Construction and Development Services Inc. Owner : Katahira Engineer International	Method :Rotary Auger Casing Size : 180 mm Elevation: .....m	Date started : 09/02/2012 Date finished : 09/02/2012 **PROJECT : Steung Touch Bridge** Location: Sisophon, Banteay Meanchey Province.

Sampling Depth, m From	To	Type of Sampling U / SPT	Strata, (m)	Legend	Description of soil	SPT - N Value Blow/300mm N1=150mm	N2=300mm	N3=450mm	N=N2+N3
D1: 0.55 -	1.00	SPT	5.00		Firm to very stiff, brownish, reddish-gray, high plasticity CLAY	4	5	4	9
D2: 1.55 -	2.00	SPT				3	3	4	7
D3: 2.55 -	3.00	SPT				5	6	7	13
D4: 3.55 -	4.00	SPT				4	8	8	16
D5: 4.55 -	5.00	SPT				5	7	7	14
D6: 5.55 -	6.00	SPT	9.00		Stiff to hard, yellowish-gray, light gray, yellowish-brown Sandy CLAY with gravels	6	6	6	12
D7:6.55 -	7.00	SPT				4	11	14	25
D8:7.55 -	8.00	SPT				15	14	22	36
D9:8.55 -	9.00	SPT				9	14	19	33
D10:9.55 -	10.00	SPT				7	21	39	60
D11:10.55 -	11.00	SPT				7	8	9	17
D12:11.55 -	12.00	SPT				7	9	12	21
D13:12.55 -	13.00	SPT				6	7	12	19
D14:13.55 -	14.00	SPT				12	13	13	26
D15:14.55 -	15.00	SPT	4.00		Medium dense yellowih-gray, light gray, brownish-gray Clayey SAND	2	6	11	17
D16:15.55 -	16.00	SPT				8	12	13	25
D17:16.55 -	17.00	SPT				6	8	11	19
D18:17.55 -	18.00	SPT				5	9	13	22
D19:18.55 -	19.00	SPT	3.00		Very stiff browhish Sandy CLAY with gravels	3	9	11	20
D20:19.55 -	20.00	SPT				6	8	14	22
D21:20.55 -	21.00	SPT				4	9	10	19
D22:21.55 -	22.00	SPT	3.00		Very dense browhish color Clayey SAND with gravels	6	11	25	36
D23:22.55 -	23.00	SPT				60	50	>50	90
D24:23.55 -	24.00	SPT				22	50	>50	90
					END of SPT Test 24.00m Depth				

Depth to water flow: 13.00m

Depth to water Level: 2.00m



Consistency	Very soft	Soft	Firm	Stiff	Very Stiff	Hard
Blows 30Cm, Clay	Less 2	2 - 4	4 - 8	8 - 15	15 - 30	> 30
Relate. Density, Blows/300mm		Very Loose	Loose	Med. Dense	Dense	Very Dense
Fine		1 - 2	3 - 6	7 - 15	16 - 30	?
medium		2 - 3	4 - 7	8 - 20	21 - 40	> 40
coarse		3 - 6	5 - 9	10 - 25	26 - 45	> 45
Unit weight of granular soil base, γ_{sat}, kN/m^3		11 - 16	14 - 18	17 - 20	17 - 22	20 - 23

LEGEND

- Stiff to hard sandy clay, lean Clay
- Firm to stiff silty clay/ lean Clay
- stiff to hard clay , fat Clay
- Clayey sand,Silty Sand
- V. Soft to soft clay, organic clay
- Fill/topsoil
- Gravelly Sand, Clean Sand
- Silty coarse sand with gravel
- Weather Rock
- Sandstone
- Standard Penetration Test (SPT)
- SPT
- SPT - N Value

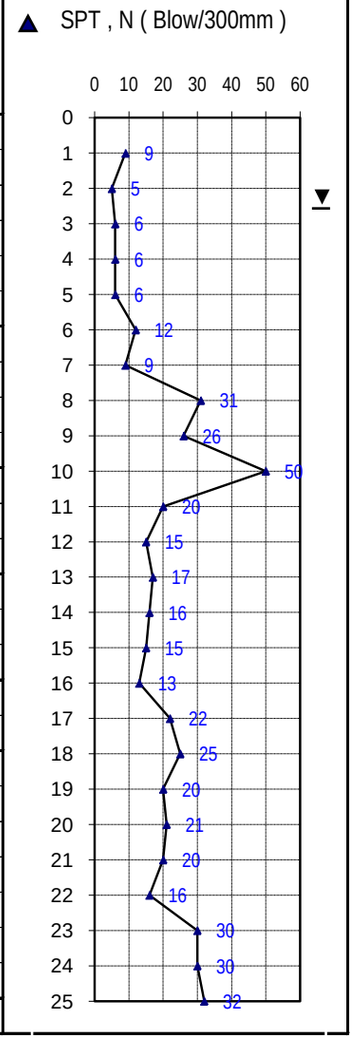
BORE HOLE LOG BH.2

Sub-Contractor: Partner of Construction and Development Services Inc.	Method :Rotary Auger	Date started : 10/02/2012
	Casing Size : 180 mm	Date finished : 10/02/2012
Owner : Katahira Engineer International	Elevation: .....m	**PROJECT : Steung Touch Bridge**
		Location: Sisophon, Banteay Meanchey Province.

Sampling Depth, m From	To	Type of Sampling U / SPT	Strata (m)	Legend	Description of soil	SPT - N Value Blow/300mm N1=150mm	N2=300mm	N3=450mm	N=N2+N3
D1: 0.55 -	1.00	SPT	6.00		Firm to Stiff brownish, yellowish, grayish CLAY	4	4	5	9
D2: 1.55 -	2.00	SPT				2	2	3	5
D3: 2.55 -	3.00	SPT				2	3	3	6
D4: 3.55 -	4.00	SPT				2	3	3	6
D5: 4.55 -	5.00	SPT				2	2	4	6
D6: 5.55 -	6.00	SPT				3	6	6	12
D7:6.55 -	7.00	SPT	4.00		Stiff to hard yellowish-gray, brownish, reddish-brown, Sandy CLAY with gravels	2	4	5	9
D8:7.55 -	8.00	SPT				5	12	19	31
D9:8.55 -	9.00	SPT				7	12	14	26
D10:9.55 -	10.00	SPT				12	50		50
D11:10.55 -	11.00	SPT	3.00		Medium dense light gray, light brown Clayey SAND with gravels	7	9	11	20
D12:11.55 -	12.00	SPT				21	8	7	15
D13:12.55 -	13.00	SPT				4	8	9	17
D14:13.55 -	14.00	SPT	3.00		Stiff to very stiff light gray, reddish-brown Sandy CLAY with gravels	5	7	9	16
D15:14.55 -	15.00	SPT				6	9	6	15
D16:15.55 -	16.00	SPT				5	6	7	13
D17:16.55 -	17.00	SPT	2.00		Medium dense yellowish-gray, brownish Clayey SAND with gravels	5	7	15	22
D18:17.55 -	18.00	SPT				7	11	14	25
D19:18.55 -	19.00	SPT	7.00		Very stiff to hard brownish, grayish, reddish-brown Sandy CLAY with gravels	9	10	10	20
D20:19.55 -	20.00	SPT				12	10	11	21
D21:20.55 -	21.00	SPT				7	9	11	20
D22:21.55 -	22.00	SPT				4	7	9	16
D23:22.55 -	23.00	SPT				7	10	20	30
D24:23.55 -	24.00	SPT				6	13	17	30
D25:24.55 -	25.00	SPT				6	12	20	32
					END of SPT Test 25.00m Deth				

Depth to water flow: 13.00m

Depth to water Level: 2.50m



Consistency	Very soft	Soft	Firm	Stiff	Very Stiff	Hard
vs 30Cm, Clay	Less 2	2 - 4	4 - 8	8 - 15	15 - 30	> 30
ensity, Blows/300mm		Very Loose	Loose	Med. Dense	Dense	Very Dense
Fine		1 - 2	3 - 6	7 - 15	16 - 30	?
medium		2 - 3	4 - 7	8 - 20	21 - 40	> 40
coarse		3 - 6	5 - 9	10 - 25	26 - 45	> 45
Unit weight of granular soil base, γ_{sat}, kN/m^3		11 - 16	14 - 18	17 - 20	17 - 22	20 - 23

LEGEND

- Stiff to hard sandy clay, lean Clay
- Firm to stiff silty clay/ lean Clay
- stiff to hard clay , fat Clay
- Clayey sand,Silty Sand
- V. Soft to soft clay, organic clay
- Fill/topsoil
- Gravelly Sand, Clean Sand
- Silty coarse sand with gravel
- Weather Rock
- Sandstone
- Standard Penetration Test (SPT)
- SPT
- SPT - N Value

Partner of Construction and Development Services Inc.
Soil Quality Analysis Office.

Summary of Laboratory Test

PROJECT : Steung Touch Bridge

DATE : 09/02/2012

Location: Sisophon, Banteay Meanchey Province.

TESTED BY : Mr. Chea Sery Vuith

Table.2

Boring No	Sample	Depth(m)		SPT - N Value, Every 150Cm Blows / 300mm				Soil description	Unified Clasification	NMC W (%)	Bulk density γ_w (g/cm^3)	Dry density γ_d (g/cm^3)	Specific gravity γ_s (g/cm^3)	Atterberg limit			Grain size			Unconf. Strength q_u (kg/cm^2)	Shear Strength	
		From	To	N1	N2	N3	N							LL (%)	PL (%)	PI (%)	Clay and Silt %	Sand %	Gravel %		Cohesion Kpa	Friction Angle Degree (°)
BH.1	D1	0.55	1.00	4	5	4	9	Firm to very stiff, brownish, reddish-gray, high plasticity CLAY	CH	23.79				70.10	16.43	53.67	-	-	-	-	-	
	D2	1.55	2.00	3	3	4	7			19.24				70.40	16.49	53.91	-	-	-	-	-	
	D3	2.55	3.00	5	6	7	13			16.60	2.121	1.955		49.80	18.44	31.36	-	-	-	-	-	
	D4	3.55	4.00	4	8	8	16			17.68				48.80	17.95	30.85	-	-	-	-	-	
	D5	4.55	5.00	5	7	7	14			16.70	2.119	1.952		49.60	14.23	35.37	-	-	-	-	-	
	D6	5.55	6.00	6	6	6	12	Stiff to hard, yellowish-gray, light gray, yellowish-brown Sandy CLAY with gravels	CL	10.70				-	-	-	55.89	43.30	0.81	-	-	
	D7	6.55	7.00	4	11	14	25			13.92	2.205	2.066		-	-	-	54.96	19.68	25.36	-	-	
	D8	7.55	8.00	15	14	22	36			15.67				-	-	-	57.77	23.63	18.60	-	-	
	D9	8.55	9.00	9	14	19	33			15.09	2.230	2.079	2.689	-	-	-	68.37	26.19	5.44	-	-	
	D10	9.55	10.00	7	21	39	60			12.57				-	-	-	51.22	26.73	22.05	-	-	
	D11	10.55	11.00	7	8	9	17			13.46	2.222	2.087		-	-	-	58.00	39.37	2.63	-	-	
	D12	11.55	12.00	7	9	12	21			16.02				-	-	-	35.10	64.34	0.56	-	-	
	D13	12.55	13.00	6	7	12	19			14.45	2.271	2.127	2.652	-	-	-	56.56	42.33	1.11	-	-	
	D14	13.55	14.00	12	13	13	26			-				-	-	-	-	-	-	-	-	
	D15	14.55	15.00	2	6	11	17	Medium dense yellowih-gray, light gray, brownish-gray Clayey SAND	SC	15.26	1.994	1.841		-	-	-	20.55	79.45	0.00	-	-	
	D16	15.55	16.00	8	12	13	25			14.41	2.008	1.864		-	-	-	45.04	52.10	2.86	137.14	68.57	
	D17	16.55	17.00	6	8	11	19			-				-	-	-	-	-	-	-	-	
	D18	17.55	18.00	5	9	13	22			-				-	-	-	-	-	-	619.51	309.75	
	D19	18.55	19.00	3	9	11	20	Very stiff browhish Sandy CLAY with gravels	CL	16.38				-	-	-	61.53	38.20	0.27	451.32	280.00	
	D20	19.55	20.00	6	8	14	22			21.20	2.219	2.007	2.695	-	-	-	72.07	23.44	4.49	-	-	
	D21	20.55	21.00	4	9	10	19			21.02				-	-	-	61.57	26.68	11.75	-	-	
	D22	21.55	22.00	6	11	25	36	Very dense browhish color Clayey SAND with gravels	SC	14.52	2.233	2.088		-	-	-	38.36	33.08	28.56	-	-	
	D23	22.55	23.00	60	50	>50	90			9.98				-	-	-	33.44	33.47	33.09	-	-	
	D24	23.55	24.00	22	50	>50	90			13.09				-	-	-	32.19	30.76	37.05	-	-	
								END OF SPT TEST 24.00m DEPTH														

Partner of Construction and Development Services Inc.
Soil Quality Analysis Office.

Summary of Laboratory Test

PROJECT : Steung Touch Bridge

DATE : 10/02/2012

Location: Sisophon, Banteay Meanchey Province.

TESTED BY : Mr. Chea Sery Vuith

Table.2

Boring No	Sample	Depth(m)		SPT - N Value, Every 150Cm Blows / 300mm				Soil description	Unified Clasification	NMC W (%)	Bulk density γ_w (g/cm^3)	Dry density γ_d (g/cm^3)	Specific gravity γ_s (g/cm^3)	Atterberg limit			Grain size			Unconf. Strength q_u (kg/cm^2)	Shear Strength	
		From	To	N1	N2	N3	N							LL (%)	PL (%)	PI (%)	Clay and Silt %	Sand %	Gravel %		Cohesion Kpa	Friction Angle Degree (°)
BH.2	D1	0.55	1.00	4	4	5	9	Firm to Stiff brownish, yellowish, grayish CLAY	CL	22.50				48.40	19.84	28.56	-	-	-	-	-	
	D2	1.55	2.00	2	2	3	5			21.32				48.30	17.21	31.09	-	-	-	-	-	
	D3	2.55	3.00	2	3	3	6			23.04				49.40	16.98	32.42	-	-	-	-	-	
	D4	3.55	4.00	2	3	3	6			25.04				49.00	16.27	32.73	-	-	-	-	-	
	D5	4.55	5.00	2	2	4	6			25.13				47.90	18.23	29.67	-	-	-	-	-	
	D6	5.55	6.00	3	6	6	12			19.35				48.50	19.29	29.21	-	-	-	-	-	
	D7	6.55	7.00	2	4	5	9	Stiff to hard yellowish-gray, brownish, reddish-brown, Sandy CLAY with gravels	SM	19.64				-	-	-	72.62	11.21	16.17	-	-	
	D8	7.55	8.00	5	12	19	31			14.98				-	-	-	64.12	22.35	13.53	-	-	
	D9	8.55	9.00	7	12	14	26			15.30				-	-	-	68.63	21.43	9.94	-	-	
	D10	9.55	10.00	12	50	0	50			9.86				-	-	-	45.54	31.85	22.61	-	-	
	D11	10.55	11.00	7	9	11	20	Medium dense light gray, light brown Clayey SAND with gravels	SC	14.56				-	-	-	44.16	52.00	3.84	156.62	78.31	
	D12	11.55	12.00	21	8	7	15			16.04				-	-	-	44.40	51.06	4.54	-	-	
	D13	12.55	13.00	4	8	9	17			14.56				-	-	-	36.32	60.92	2.76	-	-	
	D14	13.55	14.00	5	7	9	16	Stiff to very stiff light gray, reddish-brown Sandy CLAY with gravels	CL	15.44	2.239	2.085	2.635	-	-	-	71.06	27.65	1.29	-	-	
	D15	14.55	15.00	6	9	6	15			15.46				-	-	-	66.40	30.46	3.14	126.03	210.00	
	D16	15.55	16.00	5	6	7	13			-				-	-	-	-	-	-	-	-	
	D17	16.55	17.00	5	7	15	22	Medium dense yellowish-gray, brownish Clayey SAND with	SC	17.26				-	-	-	29.68	59.75	10.57	-	-	
	D18	17.55	18.00	7	11	14	25			16.47				-	-	-	33.51	65.16	1.33	-	-	
	D19	18.55	19.00	9	10	10	20	Very stiff to hard brownish, grayish, reddish-brown Sandy CLAY with gravels	CL	14.55	2.315	2.170	2.651	-	-	-	56.50	43.30	0.20	-	-	
	D20	19.55	20.00	12	10	11	21			16.41				-	-	-	54.87	43.85	1.28	-	-	
	D21	20.55	21.00	7	9	11	20			18.52				-	-	-	67.31	28.77	3.92	219.32	280.00	
	D22	21.55	22.00	4	7	9	16			17.86	2.321	2.142	2.726	-	-	-	67.22	32.11	0.67	-	-	
	D23	22.55	23.00	7	10	20	30			18.29				-	-	-	51.44	25.08	23.48	-	-	
	D24	23.55	24.00	6	13	17	30			27.27				-	-	-	70.38	16.14	13.48	-	-	
	D25	24.55	25.00	6	12	20	32			17.75				-	-	-	42.66	33.18	24.16	-	-	
								END OF SPT TEST 25.00m DEPTH														

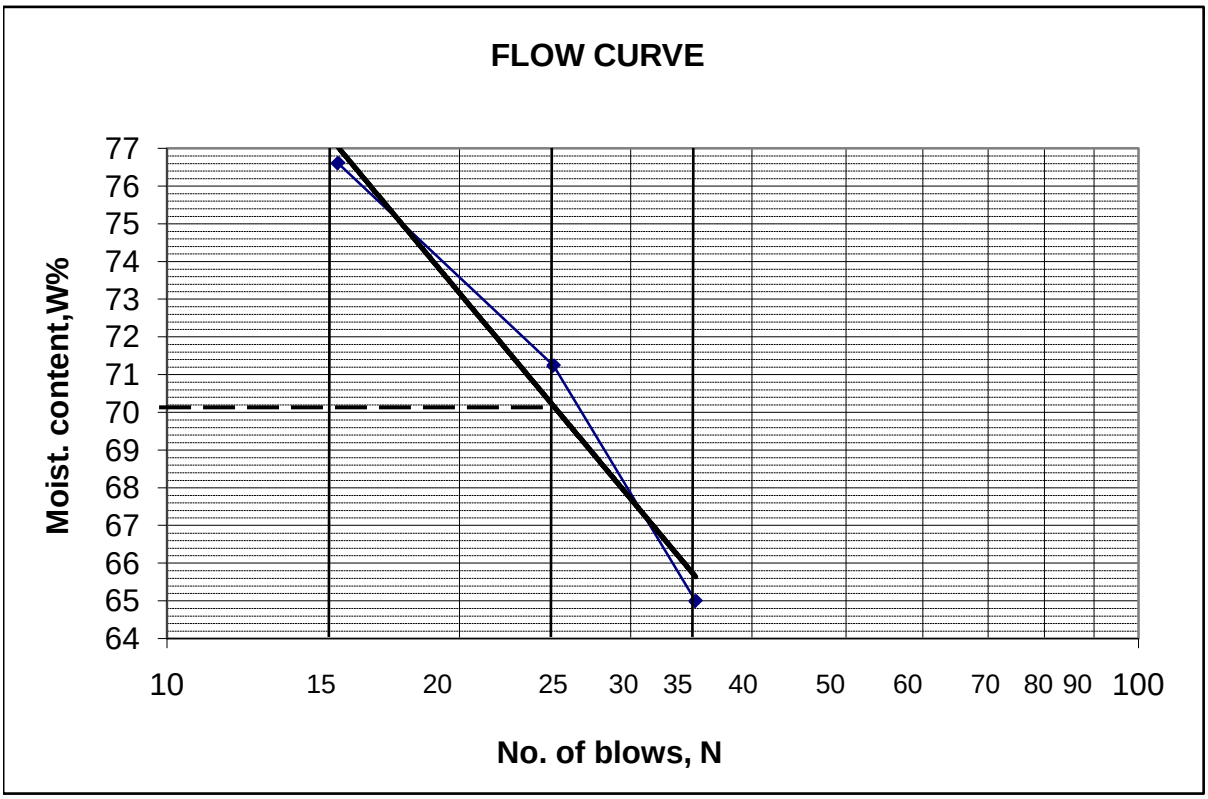
Project : Steung Touch Bridge BH-1
Location: Sisophon, Banteay Meanchey province. D1: 1.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.52	14.18	14.27	14.28	14.52
W.Tin+w.s	67.96	65.43	65.35	65.23	48.75
W.Tin+d.s	57.69	43.20	44.10	45.16	43.92
W.d.s	43.17	29.02	29.83	30.88	29.40
W.Water	10.27	22.23	21.25	20.07	4.83
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**23.79**	**76.60**	**71.24**	**64.99**	**16.43**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
16.43	**70.10**	**53.67**	**CH**	0.14



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 09/02/2012
Checked by : Chea Serey vuth	Date of testing : 09/02/2012

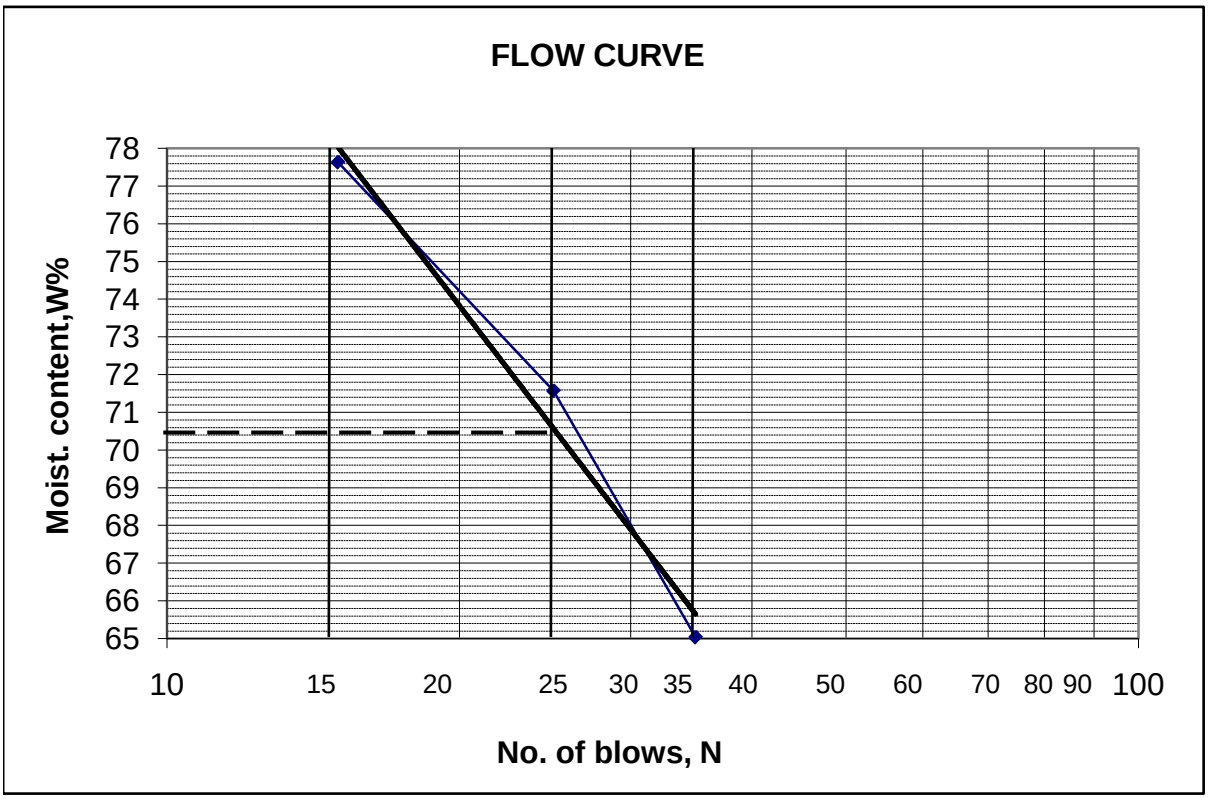
Project : Steung Touch Bridge BH-1
Location: Sisophon, Banteay Meanchey province. D2: 2.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.50	14.47	14.54	14.61	14.50
W.Tin+w.s	75.29	63.62	63.54	63.46	47.70
W.Tin+d.s	65.48	42.14	43.10	44.21	43.00
W.d.s	50.98	27.67	28.56	29.60	28.50
W.Water	9.81	21.48	20.44	19.25	4.70
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**19.24**	**77.63**	**71.57**	**65.03**	**16.49**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
16.49	**70.40**	**53.91**	**CH**	0.05



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 09/02/2012
Checked by : Chea Serey vuth	Date of testing : 09/02/2012

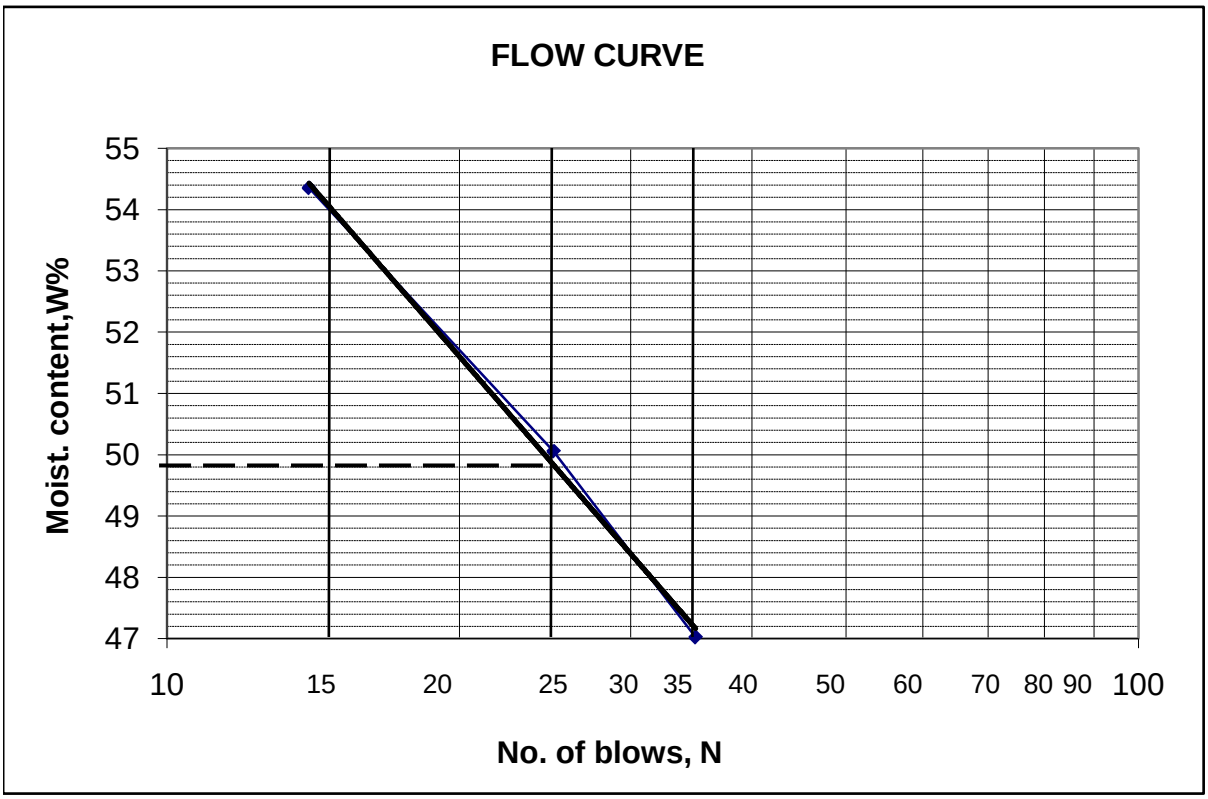
Project : Steung Touch Bridge BH-1
Location: Sisophon, Banteay Meanchey province. D3: 3.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.51	14.42	14.39	14.35	14.00
W.Tin+w.s	81.72	68.69	68.56	68.38	43.80
W.Tin+d.s	72.15	49.58	50.49	51.10	39.16
W.d.s	57.64	35.16	36.10	36.75	25.16
W.Water	9.57	19.11	18.07	17.28	4.64
Blows		**14.00**	**25.00**	**35.00**	
Moist.	**16.60**	**54.35**	**50.06**	**47.02**	**18.44**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
18.44	**49.80**	**31.36**	**CL**	-0.06



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 09/02/2012
Checked by : Chea Serey vuth	Date of testing : 09/02/2012

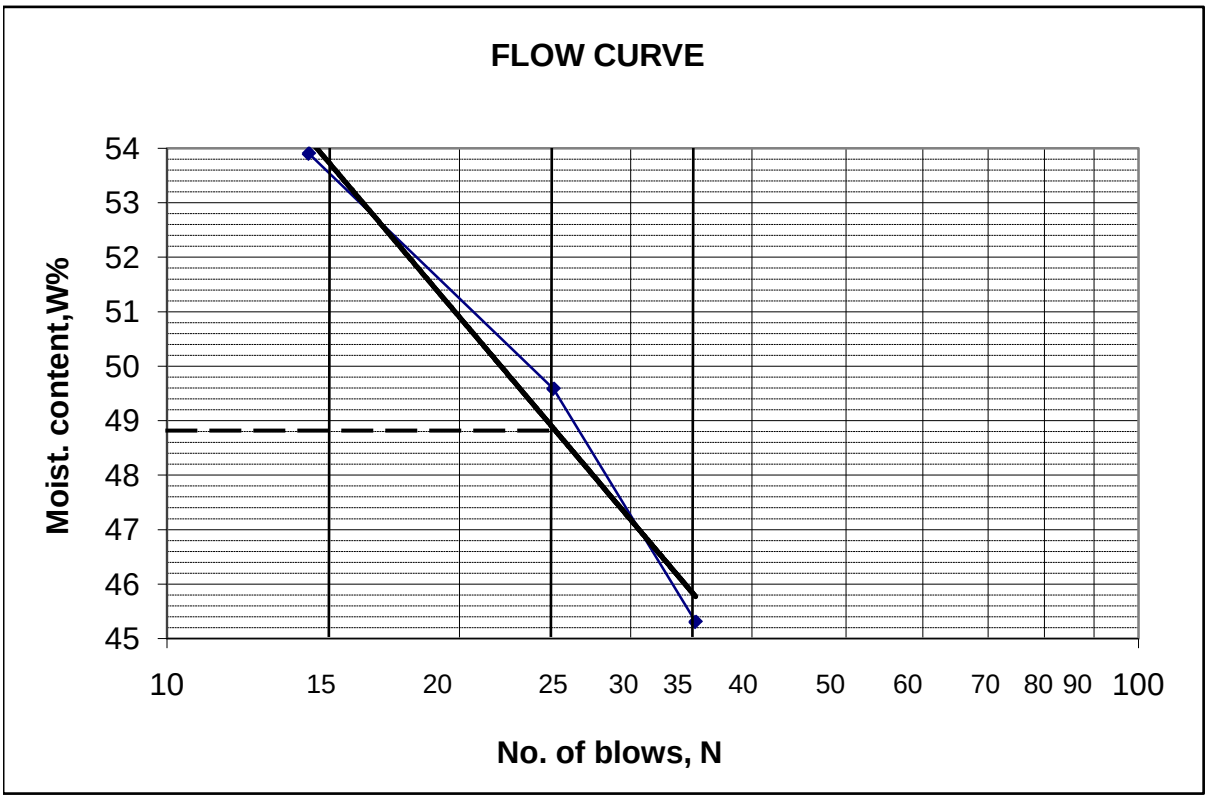
Project : Steung Touch Bridge BH-1
Location: Sisophon, Banteay Meanchey province. D4: 4.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.27	14.16	14.14	14.16	13.98
W.Tin+w.s	80.89	64.67	64.58	64.48	41.32
W.Tin+d.s	70.88	46.98	47.86	48.79	37.16
W.d.s	56.61	32.82	33.72	34.63	23.18
W.Water	10.01	17.69	16.72	15.69	4.16
Blows		**14.00**	**25.00**	**35.00**	
Moist.	**17.68**	**53.90**	**49.58**	**45.31**	**17.95**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
17.95	**48.80**	**30.85**	**CL**	-0.01



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 09/02/2012
Checked by : Chea Serey vuth	Date of testing : 09/02/2012

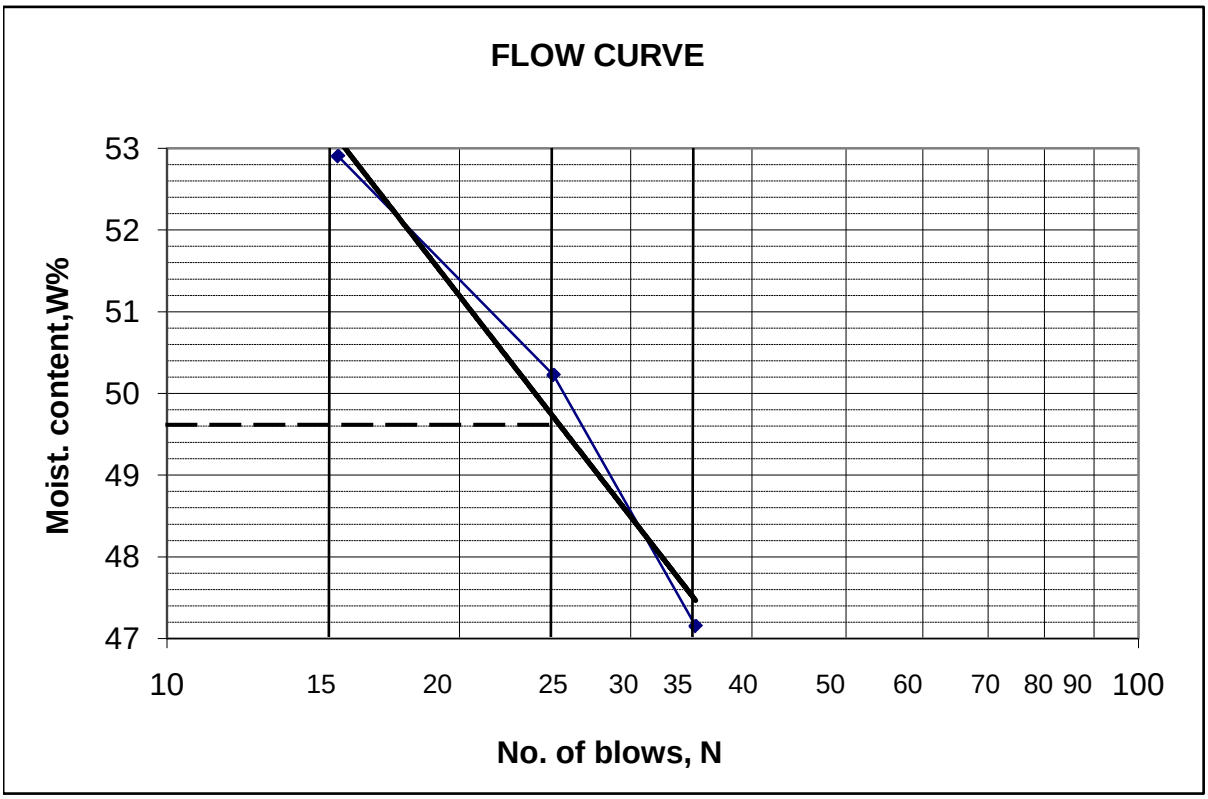
Project : Steung Touch Bridge BH-1
Location: Sisophon, Banteay Meanchey province. D5: 5.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.14	14.19	14.21	14.16	14.20
W.Tin+w.s	82.82	67.66	67.54	67.40	42.30
W.Tin+d.s	72.99	49.16	49.71	50.34	38.80
W.d.s	58.85	34.97	35.50	36.18	24.60
W.Water	9.83	18.50	17.83	17.06	3.50
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**16.70**	**52.90**	**50.23**	**47.15**	**14.23**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
14.23	**49.60**	**35.37**	**CL**	0.07



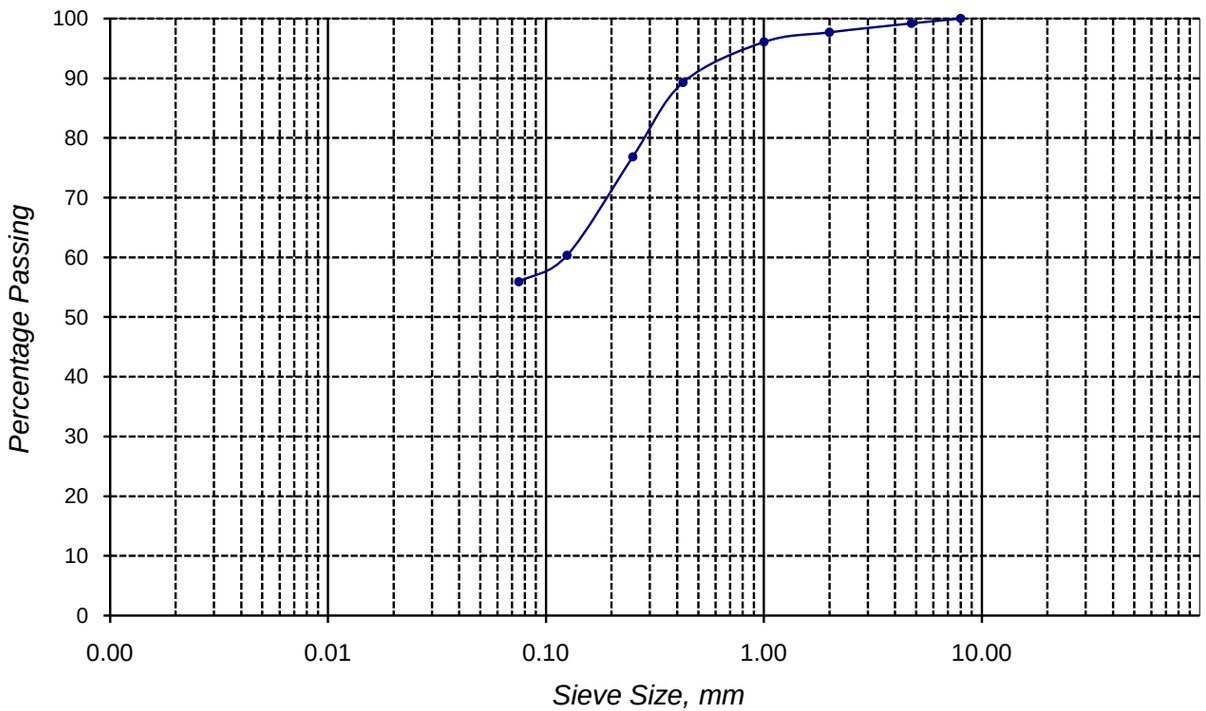
Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 09/02/2012
Checked by : Chea Serey vuth	Date of testing : 09/02/2012

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	233.55	
Depth, m	8.55-9.00	
Sample Nº	D6	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	100.00	
4.75	99.19	
2.00	97.69	
1.00	96.06	
0.425	89.26	
0.250	76.80	
0.125	60.31	
0.075	55.89	
Water Content , %	10.70	
Silt + Clay , %	Sand , %	Gravel , %
55.89	43.30	0.81

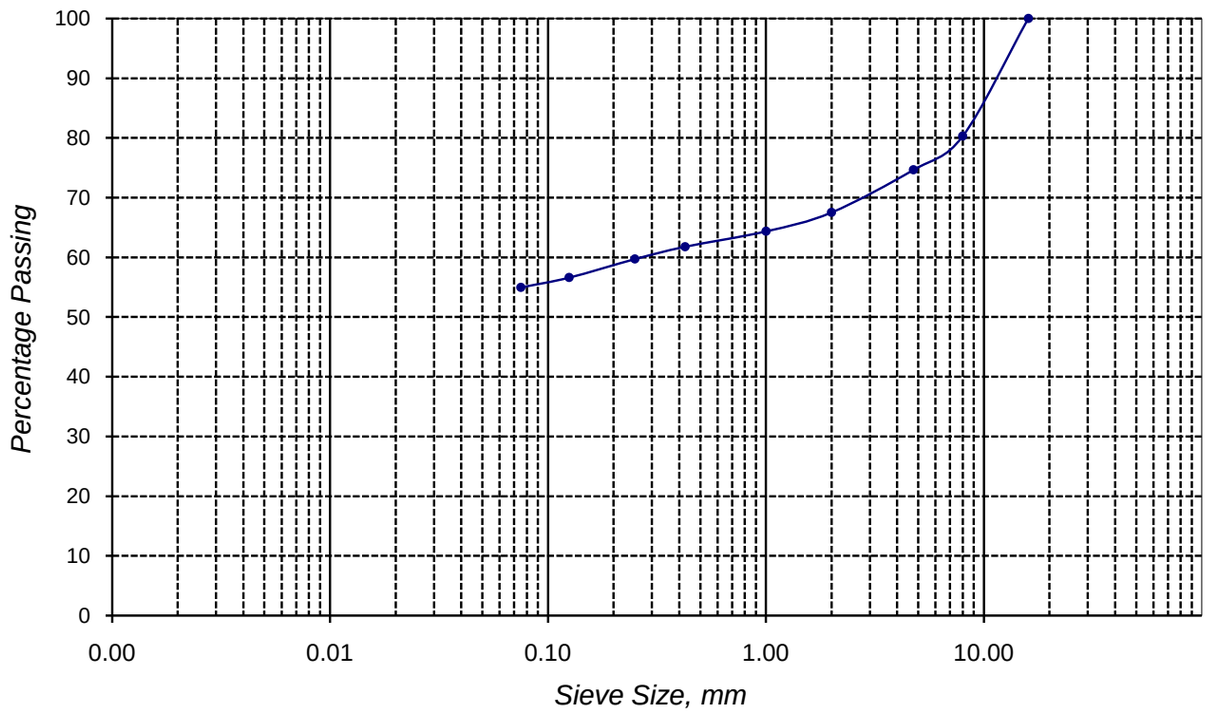
OPERATOR : M[rs] Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	242.11	
Depth, m	6.55-7.00	
Sample Nº	D7	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	80.29	
4.75	74.64	
2.00	67.51	
1.00	64.35	
0.425	61.77	
0.250	59.70	
0.125	56.60	
0.075	54.96	
Water Content , %	13.92	
Silt + Clay , %	Sand , %	Gravel , %
54.96	19.68	25.36

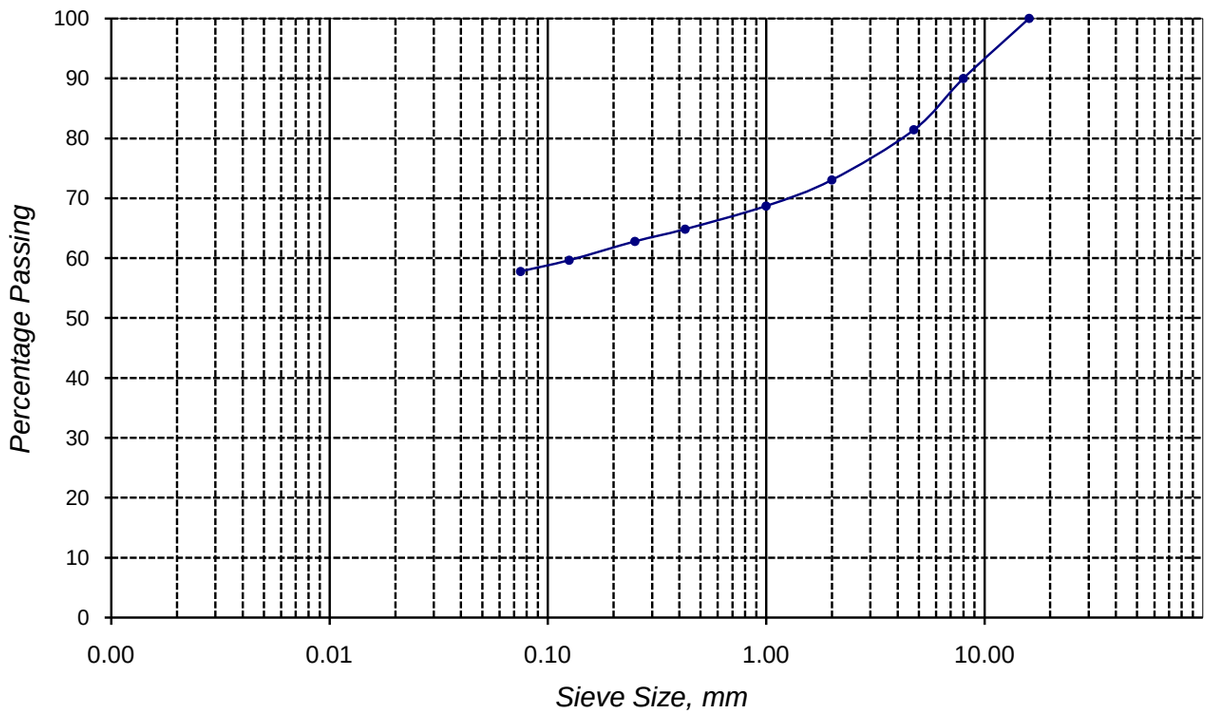
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	207.94	
Depth, m	7.55-8.00	
Sample Nº	D8	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	89.97	
4.75	81.40	
2.00	73.04	
1.00	68.69	
0.425	64.81	
0.250	62.76	
0.125	59.62	
0.075	57.77	
Water Content , %	15.67	
Silt + Clay , %	Sand , %	Gravel , %
57.77	23.63	18.60

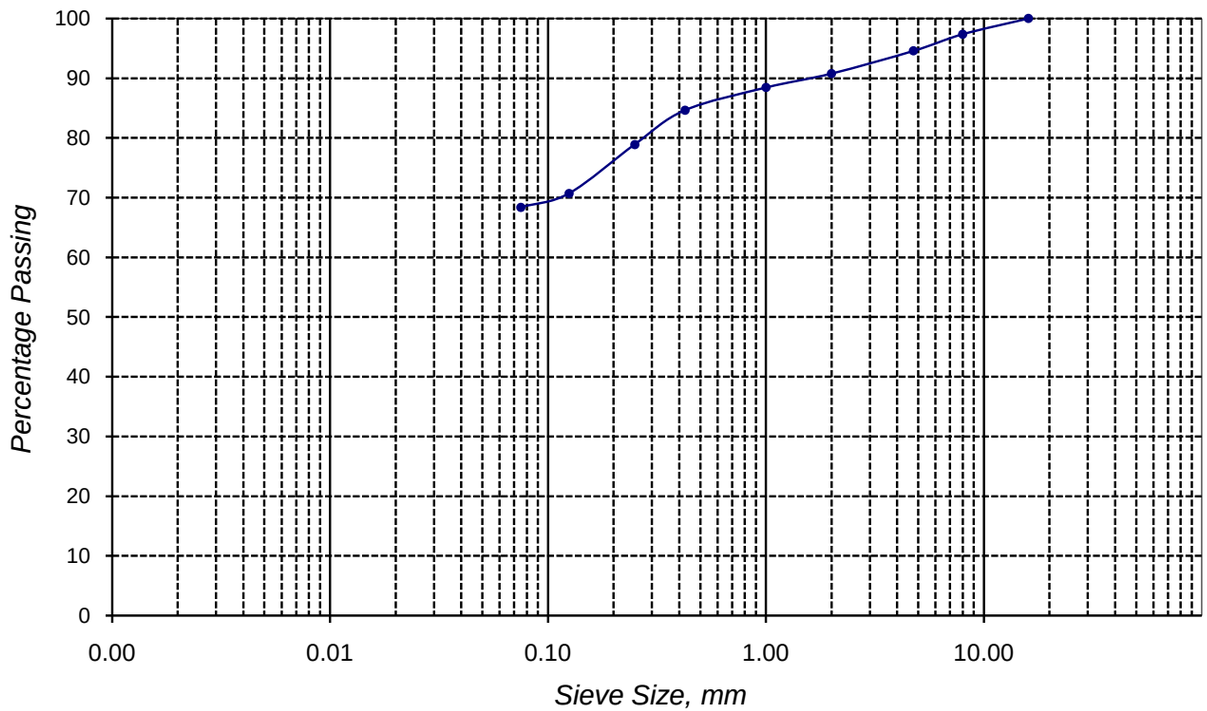
OPERATOR : M[rs] Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	212.54	
Depth, m	8.55-9.00	
Sample Nº	D9	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	97.37	
4.75	94.57	
2.00	90.77	
1.00	88.43	
0.425	84.63	
0.250	78.90	
0.125	70.69	
0.075	68.37	
Water Content , %	15.09	
Silt + Clay , %	Sand , %	Gravel , %
68.37	26.19	5.43

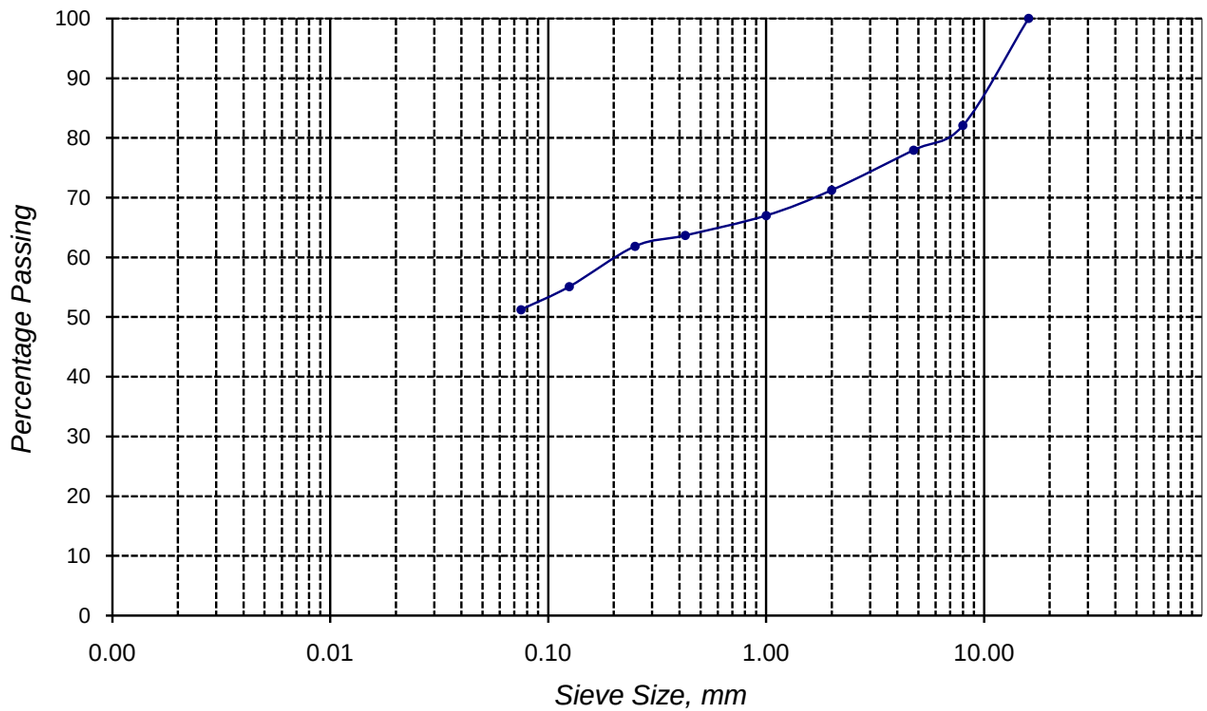
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	213.26	
Depth, m	9.55-10.00	
Sample Nº	D10	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	82.06	
4.75	77.96	
2.00	71.25	
1.00	66.99	
0.425	63.66	
0.250	61.83	
0.125	55.08	
0.075	51.22	
Water Content , %	12.57	
Silt + Clay , %	Sand , %	Gravel , %
51.22	26.73	22.04

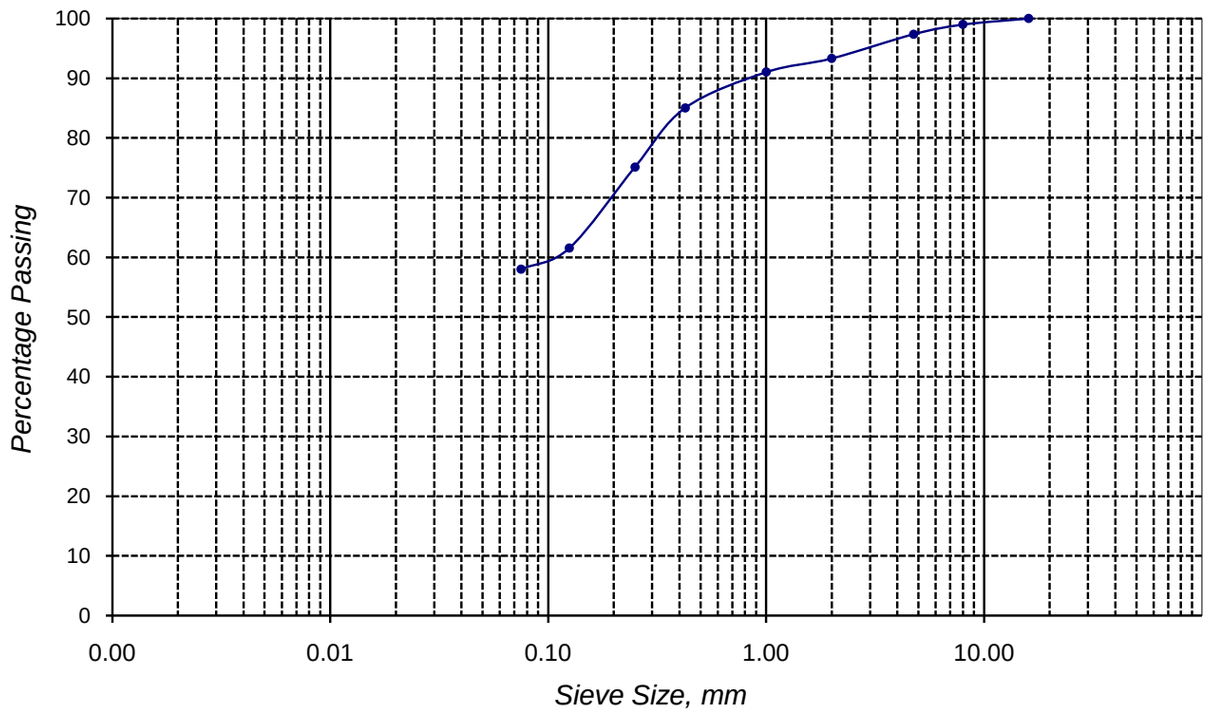
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	237.64	
Depth, m	10.55-11.00	
Sample Nº	D11	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	98.98	
4.75	97.37	
2.00	93.30	
1.00	91.01	
0.425	85.02	
0.250	75.10	
0.125	61.52	
0.075	58.00	
Water Content , %	13.46	
Silt + Clay , %	Sand , %	Gravel , %
58.00	39.37	2.63

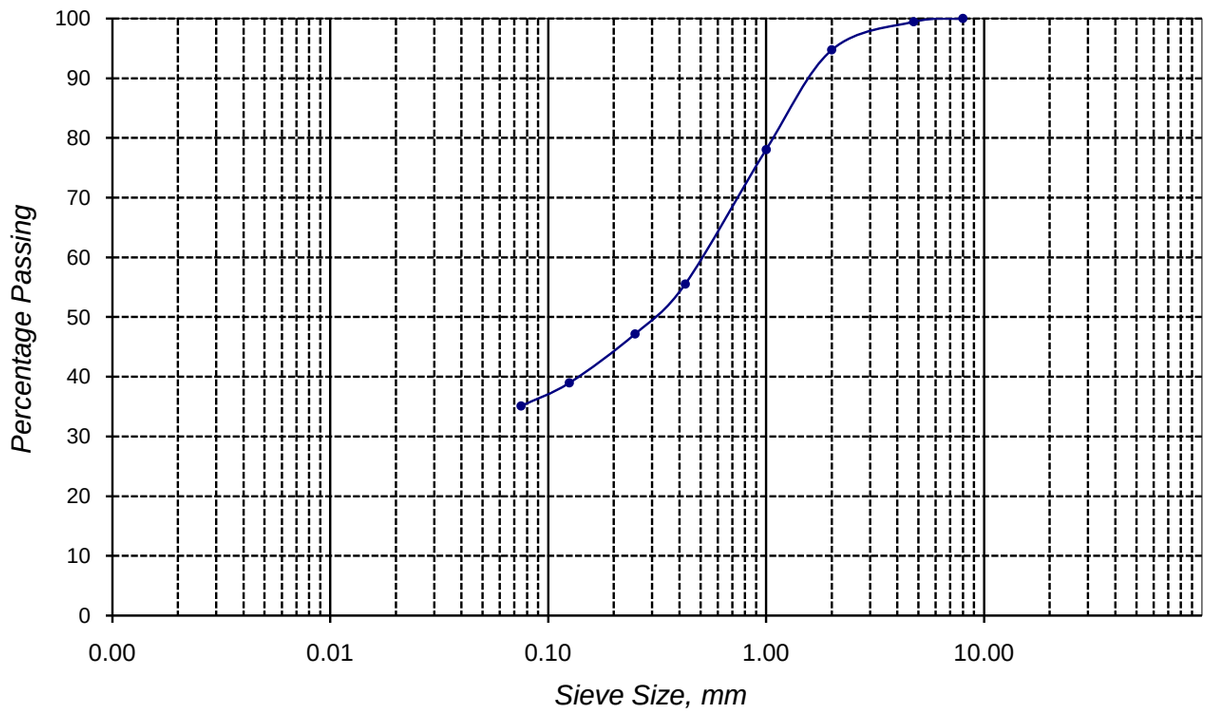
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	209.76	
Depth, m	11.55-12.00	
Sample Nº	D12	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	100.00	
4.75	99.44	
2.00	94.73	
1.00	78.05	
0.425	55.51	
0.250	47.14	
0.125	38.97	
0.075	35.10	
Water Content , %	16.02	
Silt + Clay , %	Sand , %	Gravel , %
35.10	64.34	0.56

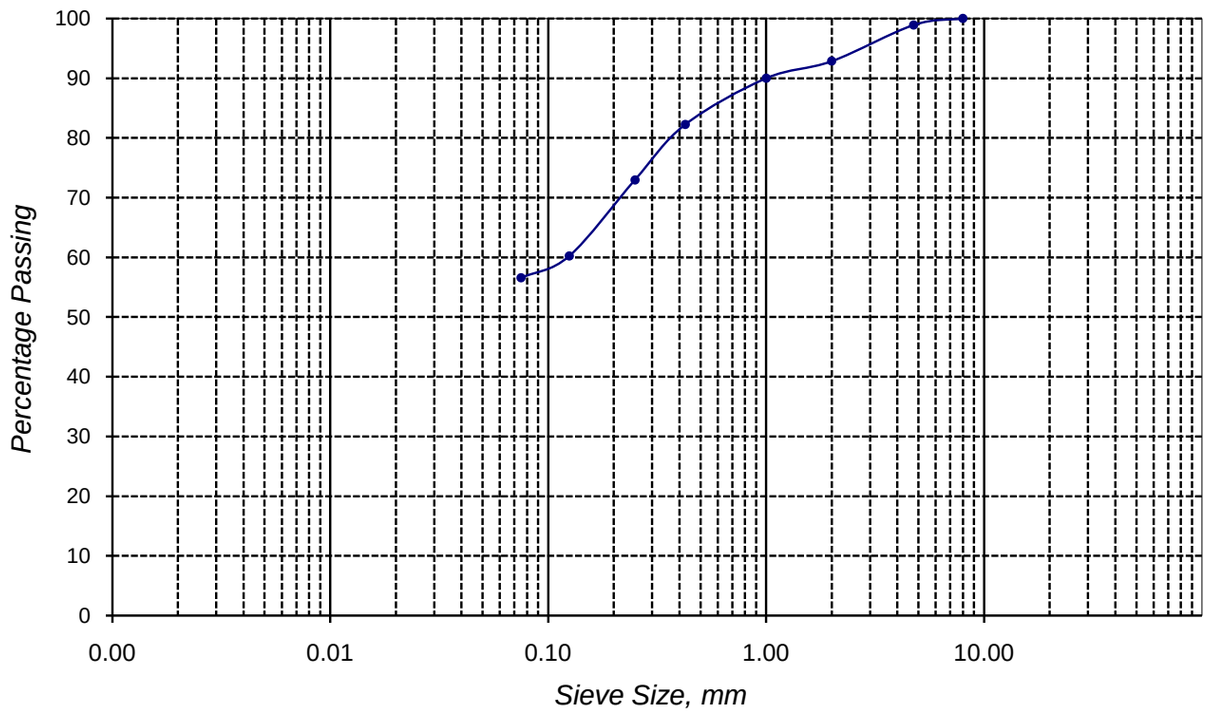
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	222.79	
Depth, m	12.55-13.00	
Sample Nº	D13	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	100.00	
4.75	98.90	
2.00	92.84	
1.00	89.98	
0.425	82.23	
0.250	72.97	
0.125	60.23	
0.075	56.56	
Water Content , %	14.45	
Silt + Clay , %	Sand , %	Gravel , %
56.56	42.33	1.10

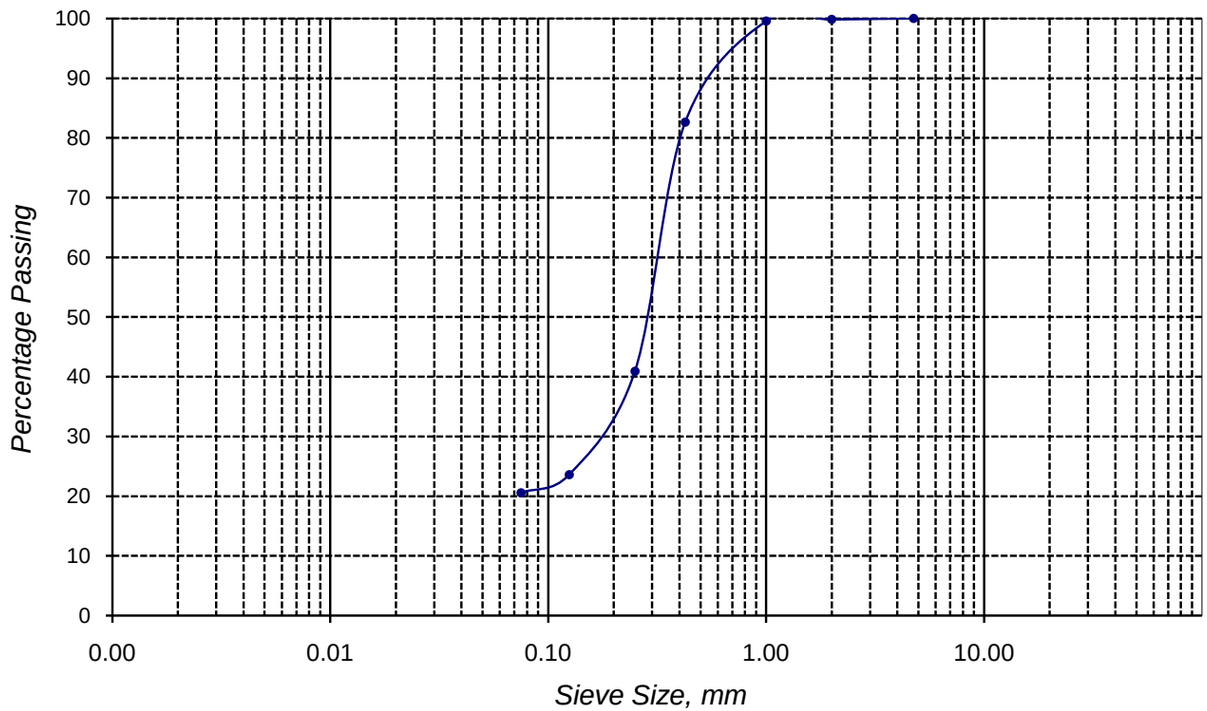
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	208.47	
Depth, m	14.55-15.00	
Sample Nº	D15	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	100.00	
4.75	100.00	
2.00	99.81	
1.00	99.54	
0.425	82.61	
0.250	40.90	
0.125	23.60	
0.075	20.55	
Water Content , %	15.26	
Silt + Clay , %	Sand , %	Gravel , %
20.55	79.45	0.00

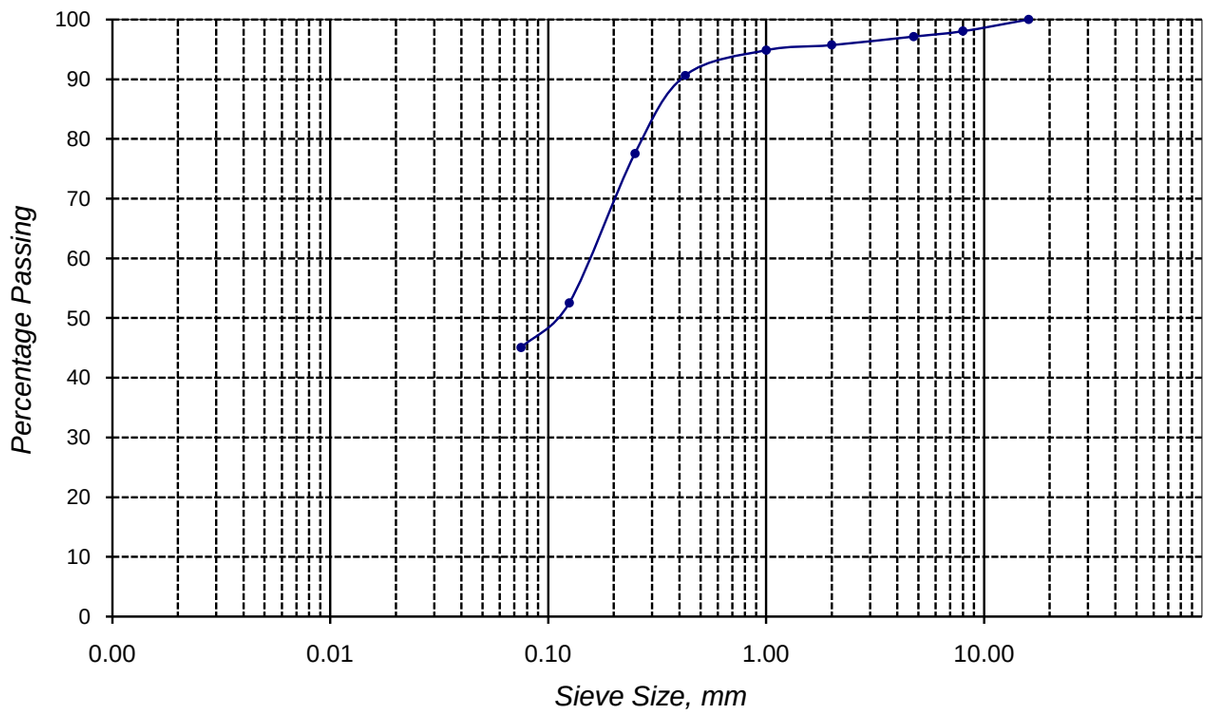
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	234.94	
Depth, m	15.55-16.00	
Sample Nº	D16	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	98.04	
4.75	97.14	
2.00	95.72	
1.00	94.86	
0.425	90.62	
0.250	77.56	
0.125	52.52	
0.075	45.04	
Water Content , %	14.41	
Silt + Clay , %	Sand , %	Gravel , %
45.04	52.10	2.86

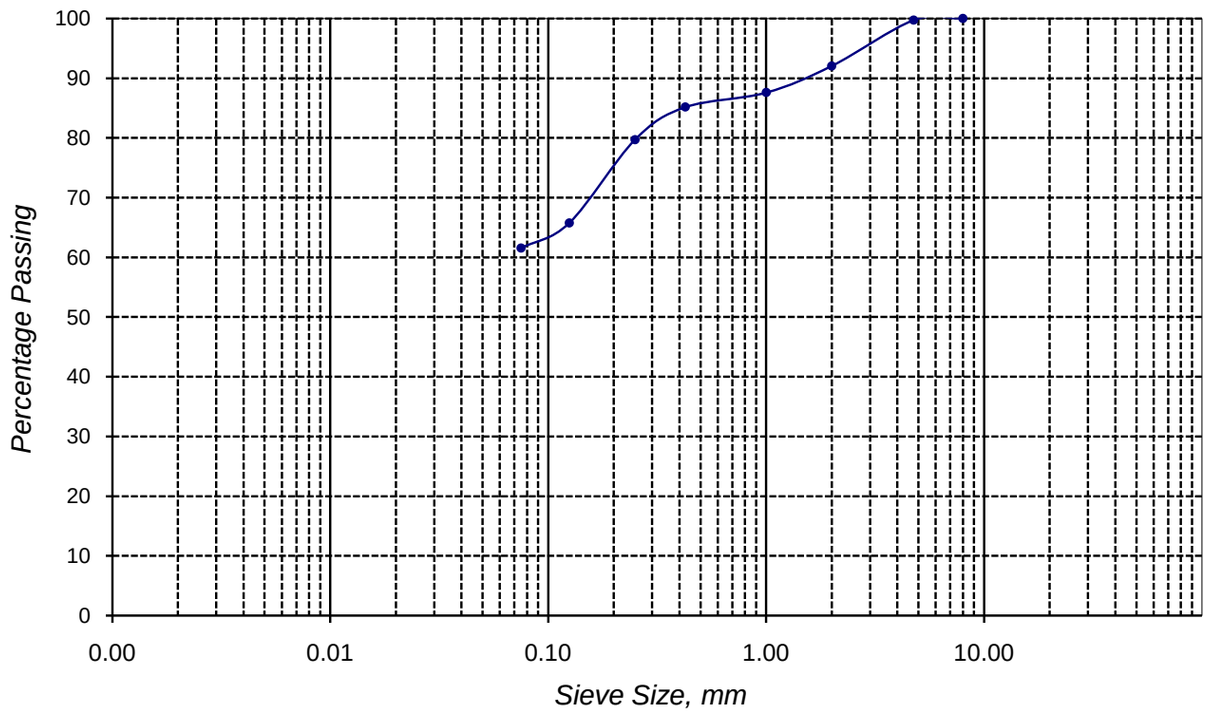
OPERATOR : M[rs] Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	210.93	
Depth, m	18.55-19.00	
Sample Nº	D19	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	100.00	
4.75	99.73	
2.00	92.05	
1.00	87.58	
0.425	85.14	
0.250	79.68	
0.125	65.74	
0.075	61.53	
Water Content , %	16.38	
Silt + Clay , %	Sand , %	Gravel , %
61.53	38.20	0.27

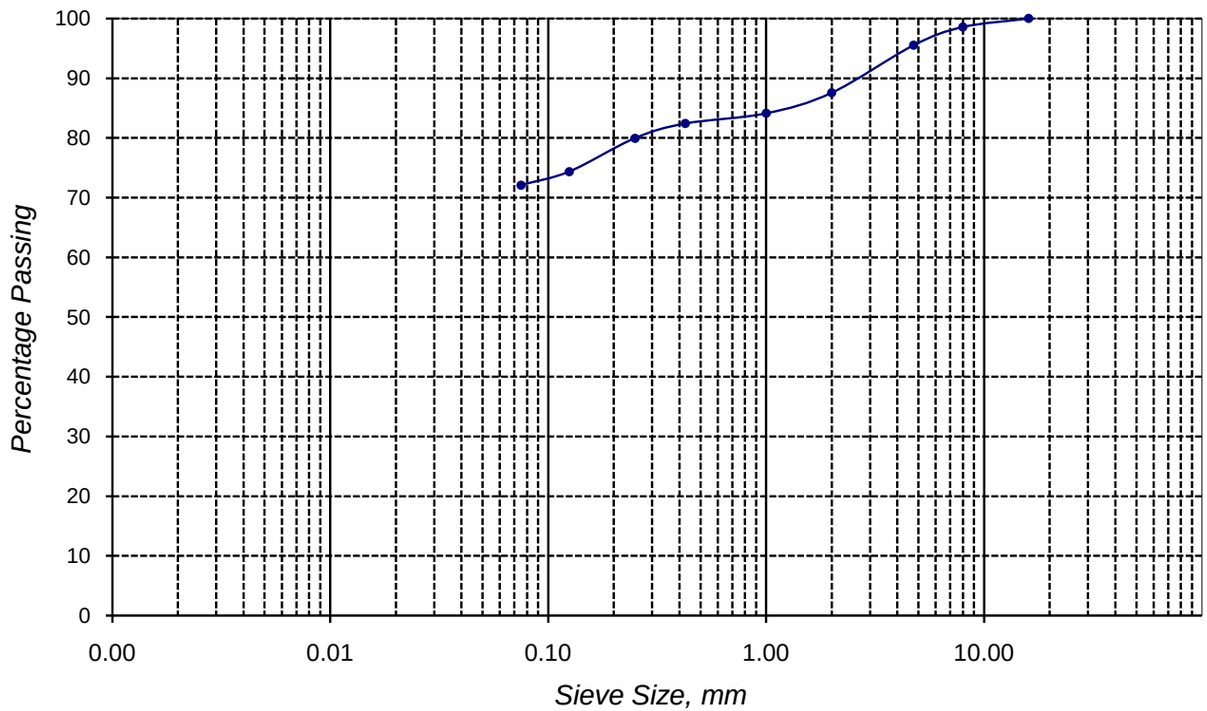
OPERATOR : M[rs] Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	172.66	
Depth, m	19.55-20.00	
Sample Nº	D20	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	98.58	
4.75	95.52	
2.00	87.55	
1.00	84.10	
0.425	82.39	
0.250	79.94	
0.125	74.34	
0.075	72.07	
Water Content , %	21.20	
Silt + Clay , %	Sand , %	Gravel , %
72.07	23.44	4.48

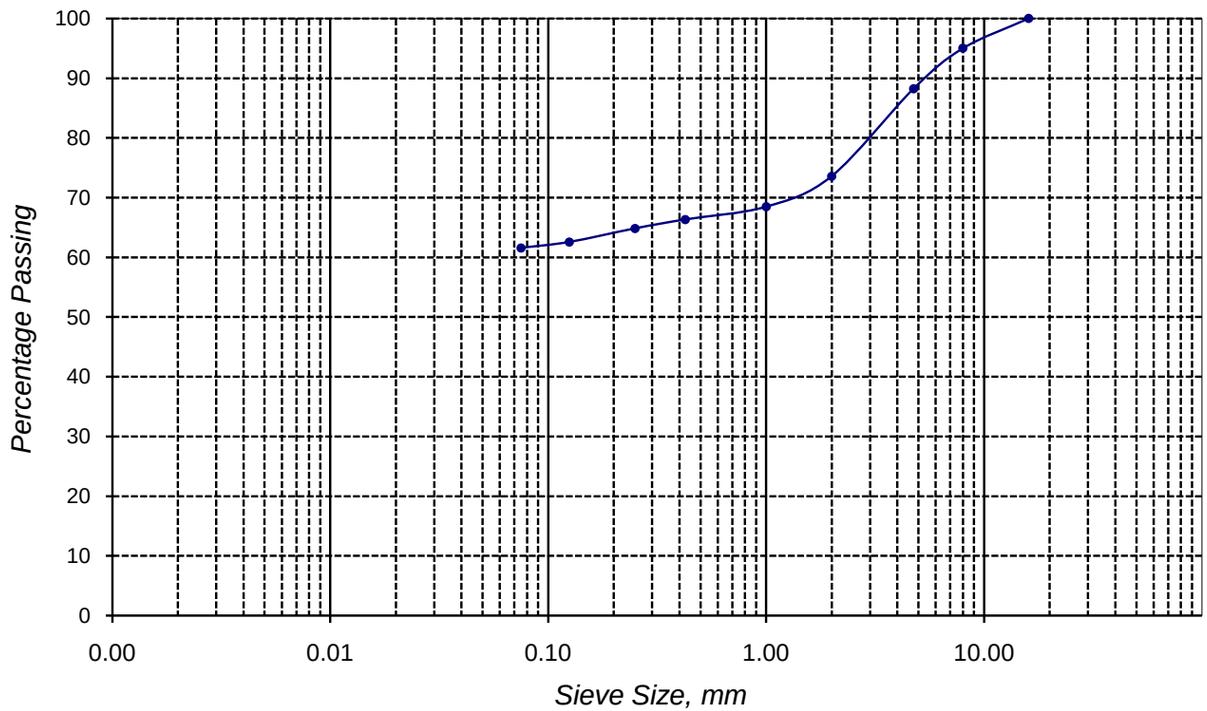
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	184.16	
Depth, m	20.55-21.00	
Sample Nº	D21	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	95.00	
4.75	88.24	
2.00	73.58	
1.00	68.46	
0.425	66.33	
0.250	64.83	
0.125	62.56	
0.075	61.57	
Water Content , %	21.02	
Silt + Clay , %	Sand , %	Gravel , %
61.57	26.68	11.76

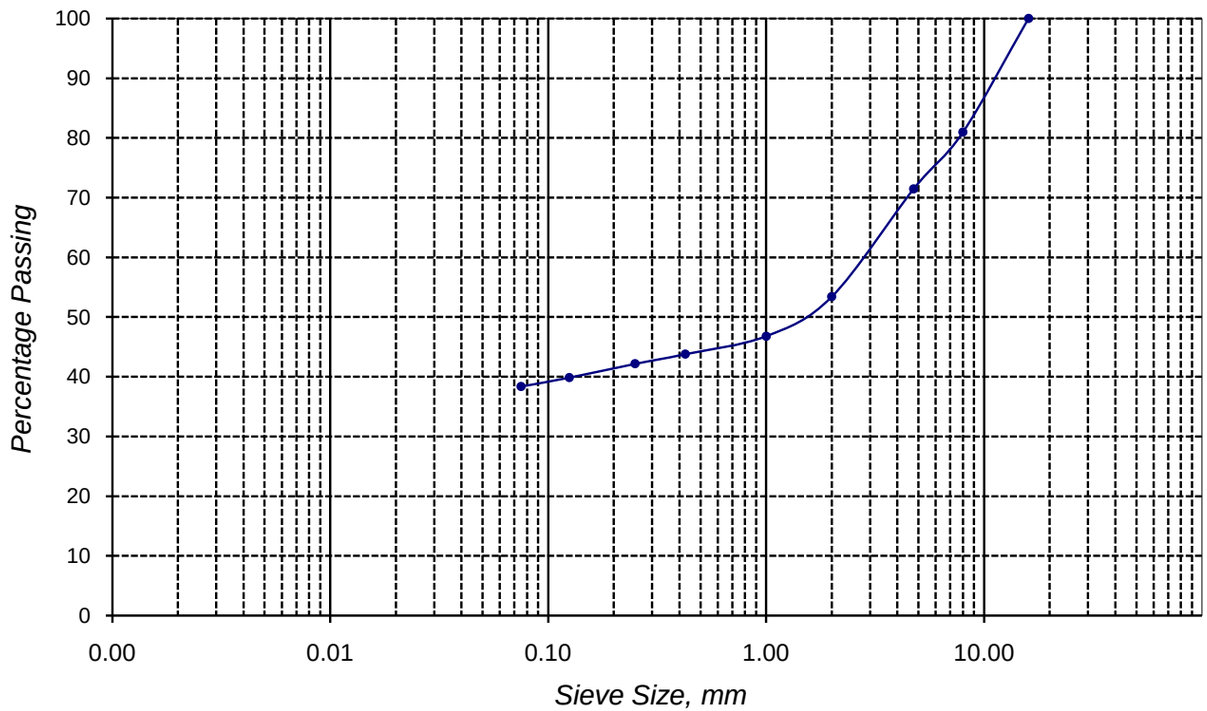
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	221.88	
Depth, m	21.55-22.00	
Sample Nº	D22	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	80.94	
4.75	71.44	
2.00	53.39	
1.00	46.80	
0.425	43.78	
0.250	42.16	
0.125	39.86	
0.075	38.36	
Water Content , %	14.52	
Silt + Clay , %	Sand , %	Gravel , %
38.36	33.08	28.56

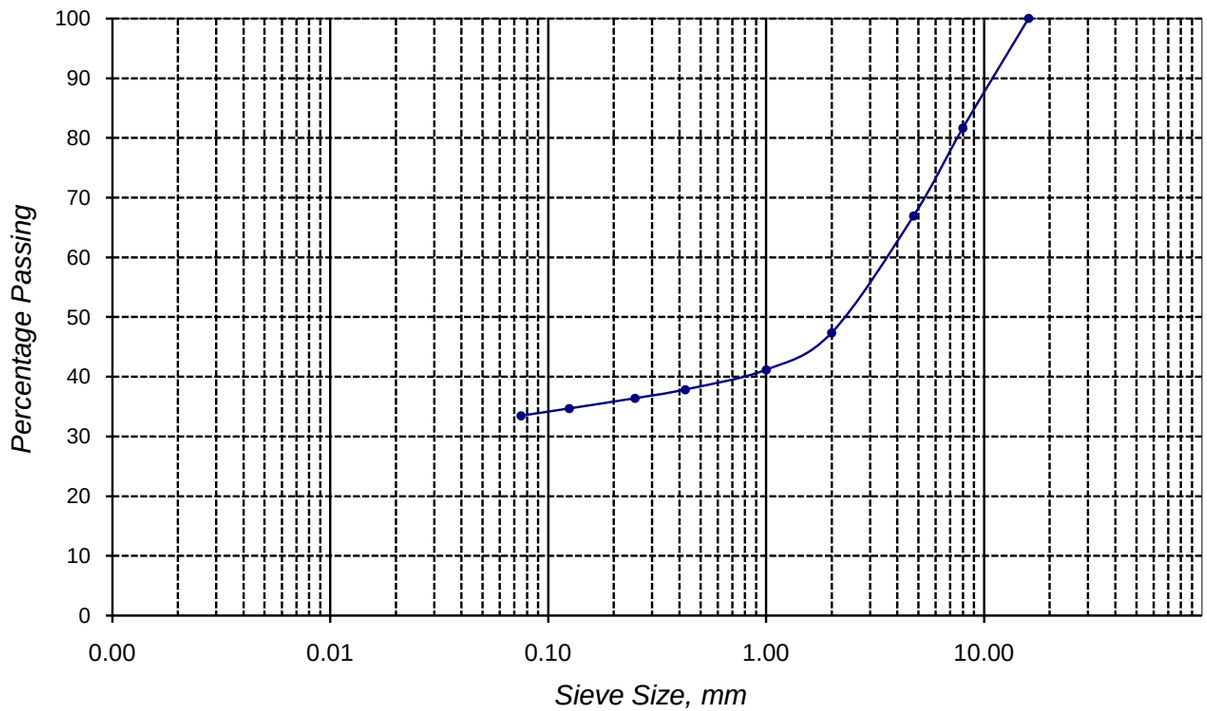
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	183.74	
Depth, m	22.55-23.00	
Sample Nº	D23	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	81.66	
4.75	66.91	
2.00	47.35	
1.00	41.14	
0.425	37.83	
0.250	36.37	
0.125	34.66	
0.075	33.44	
Water Content , %	9.98	
Silt + Clay , %	Sand , %	Gravel , %
33.44	33.47	33.09

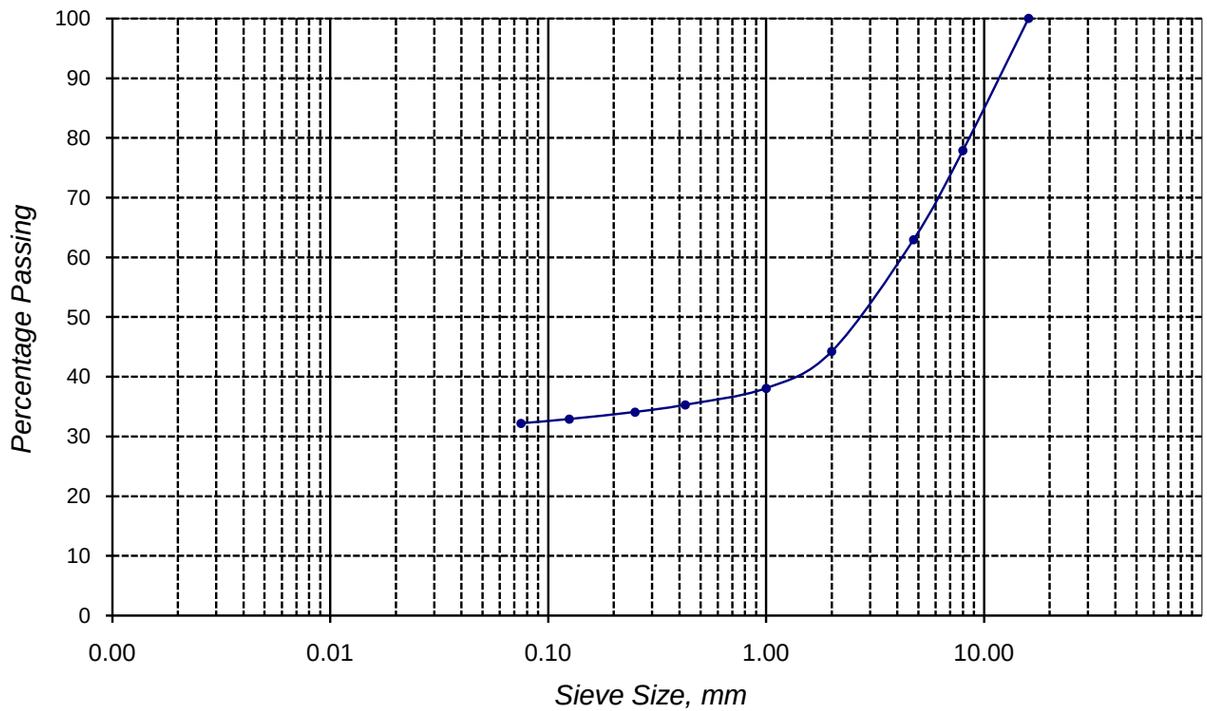
OPERATOR : M[rs] Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	208.83	
Depth, m	23.55-24.00	
Sample Nº	D24	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	77.90	
4.75	62.95	
2.00	44.22	
1.00	38.07	
0.425	35.29	
0.250	34.09	
0.125	32.91	
0.075	32.19	
Water Content , %	13.09	
Silt + Clay , %	Sand , %	Gravel , %
32.19	30.76	37.05

OPERATOR : M^{rs} Rem

UNCONFINED COMPRESSION TEST
(ASTM D2166)

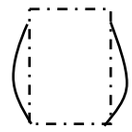
Project : Steung Touch Bridge Site : Km 303.4

Borehole: BH-1 U - 1 Depth : 15.55m - 16.00 m

Tested by: Cheas yim

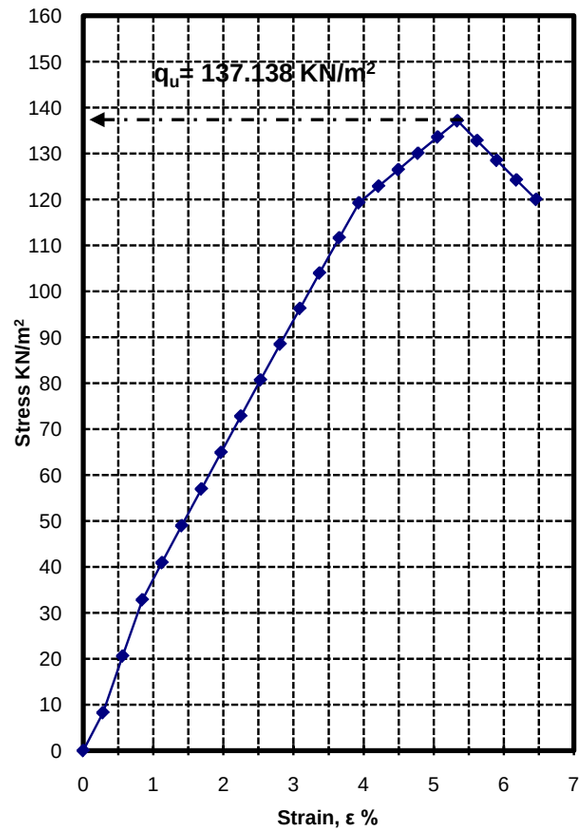
Length,L_0 cm	8.9	Weigth soil , g	205.8	Tin N0	177
Diameter,cm	3.6	Bulk Density,g /cm^3	2.273	Wt tin+ wetsoil,g	84.30
Area A_0,cm^2	10.17	Dry Density,g/cm^3	2.020	Wt tin+dry soil,g	76.51
Volume, cm^3	90.55	Watercontent,%	12.50	Wt of tin,g	14.20
CF, k	0.041391			Wt of dry soil,g	62.31

Mode of failure



deform. dial reading	Sample deform. ΔL1/100	Strain, ε % ΔL/L_0*100	Proving Ring , R 1/100(mm)	Total load P=R*k kgf / cm^2	Stress б=P(1-ε/100) KN/m^2
0	0	0.000	0	0	0
25	0.25	0.281	2	0.083	8.255
50	0.5	0.562	5	0.207	20.579
75	0.75	0.843	8	0.331	32.834
100	1	1.124	10	0.414	40.926
125	1.25	1.404	12	0.497	48.972
150	1.5	1.685	14	0.579	56.971
175	1.75	1.966	16	0.662	64.924
200	2	2.247	18	0.745	72.830
225	2.25	2.528	20	0.828	80.690
250	2.5	2.809	22	0.911	88.503
275	2.75	3.090	24	0.993	96.270
300	3	3.371	26	1.076	103.990
325	3.25	3.652	28	1.159	111.664
350	3.5	3.933	30	1.242	119.291
375	3.75	4.213	31	1.283	122.907
400	4	4.494	32	1.325	126.500
425	4.25	4.775	33	1.366	130.069
450	4.5	5.056	34	1.407	133.615
475	4.75	5.337	35	1.449	**137.138**
500	5	5.618	34	1.407	132.825
525	5.25	5.899	33	1.366	128.534
550	5.5	6.180	32	1.325	124.267
575	5.75	6.461	31	1.283	**120.024**
600	6	6.742			
625	6.25	7.022			
650	6.5	7.303			

Unconfined compression curve



Unconfined compressive strength

q_u = 137.138 KN/m^2

UNCONFINED COMPRESSION TEST
(ASTM D2166)

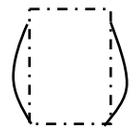
Project : Steung Touch Bridge Site : Km 303.4

Borehole: BH-1 U - 2 Depth : 17.55m - 18.00 m

Tested by: Cheas yim

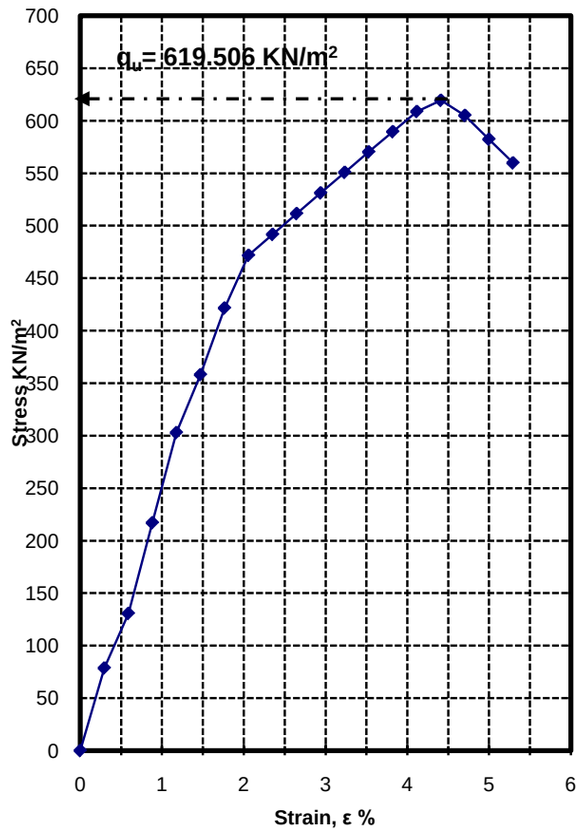
Length,L_0 cm	8.5	Weigth soil , g	173.42	Tin N0	075
Diameter,cm	3.5	Bulk Density,g /cm^3	2.122	Wt tin+ wetsoil,g	72.71
Area A_0,cm^2	9.62	Dry Density,g/cm^3	1.835	Wt tin+dry soil,g	64.85
Volume, cm^3	81.74	Watercontent,%	15.61	Wt of tin,g	14.51
CF, k	0.04379			Wt of dry soil,g	50.34

Mode of failure



deform. dial reading	Sample deform. ΔL1/100	Strain, ε % ΔL/L_0*100	Proving Ring , R 1/100(mm)	Total load P=R*k kgf / cm^2	Stress б=P(1-ε/100) KN/m^2
0	0	0.000	0	0	0
25	0.25	0.294	18	0.788	78.591
50	0.5	0.588	30	1.314	130.599
75	0.75	0.882	50	2.190	217.020
100	1	1.176	70	3.065	302.927
125	1.25	1.471	83	3.635	358.116
150	1.5	1.765	98	4.291	421.573
175	1.75	2.059	110	4.817	471.778
200	2	2.353	115	5.036	491.741
225	2.25	2.647	120	5.255	511.576
250	2.5	2.941	125	5.474	531.281
275	2.75	3.235	130	5.693	550.858
300	3	3.529	135	5.912	570.306
325	3.25	3.824	140	6.131	589.626
350	3.5	4.118	145	6.350	608.816
375	3.75	4.412	148	6.481	**619.506**
400	4	4.706	145	6.350	605.081
425	4.25	5.000	140	6.131	582.413
450	4.5	5.294	135	5.912	559.874
475	4.75	5.588			
500	5	5.882			
525	5.25	6.176			
550	5.5	6.471			
575	5.75	6.765			
600	6	7.059			
625	6.25	7.353			
650	6.5	7.647			

Unconfined compression curve



Unconfined compressive strength

q_u = 619.506 KN/m^2

UNCONFINED COMPRESSION TEST
(ASTM D2166)

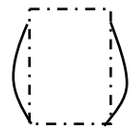
Project : Steung Touch Bridge

Borehole: BH-1 U - 3 Depth : 18.55m - 19.00 m

Tested by: Cheas yim

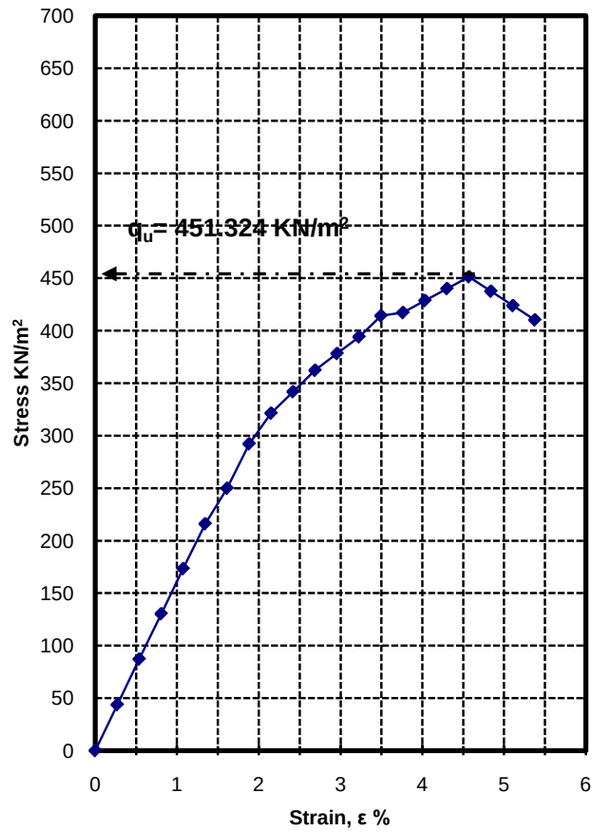
Length,L_0 cm	9.3	Weigth soil , g	185.17	Tin N0	083
Diameter,cm	3.5	Bulk Density,g /cm^3	2.071	Wt tin+ wetsoil,g	85.30
Area A_0,cm^2	9.62	Dry Density,g/cm^3	1.785	Wt tin+dry soil,g	75.47
Volume, cm^3	89.43	Watercontent,%	16.01	Wt of tin,g	14.09
CF, k	0.04379			Wt of dry soil,g	61.38

Mode of failure



deform. dial reading	Sample deform. ΔL1/100	Strain, ε % ΔL/L_0*100	Proving Ring , R 1/100(mm)	Total load P=R*k kgf / cm^2	Stress б=P(1-ε/100) KN/m^2
0	0	0.000	0	0	0
25	0.25	0.269	10	0.438	43.673
50	0.5	0.538	20	0.876	87.110
75	0.75	0.806	30	1.314	130.312
100	1	1.075	40	1.752	173.278
125	1.25	1.344	50	2.190	216.009
150	1.5	1.613	58	2.540	249.888
175	1.75	1.882	68	2.978	292.172
200	2	2.151	75	3.284	321.365
225	2.25	2.419	80	3.503	341.848
250	2.5	2.688	85	3.722	362.213
275	2.75	2.957	89	3.897	378.211
300	3	3.226	93	4.073	394.114
325	3.25	3.495	98	4.291	414.149
350	3.5	3.763	99	4.335	417.210
375	3.75	4.032	102	4.467	428.652
400	4	4.301	105	4.598	440.023
425	4.25	4.570	108	4.729	**451.324**
450	4.5	4.839	105	4.598	437.551
475	4.75	5.108	102	4.467	423.849
500	5	5.376	99	4.335	410.218
525	5.25	5.645			
550	5.5	5.914			
575	5.75	6.183			
600	6	6.452			
625	6.25	6.720			
650	6.5	6.989			

Unconfined compression curve



Unconfined compressive strength

q_u = 451.324 KN/m^2

SPECIFIC GRAVITY OF SOIL

Borehole No. : **BH-1**
Project: Steung Touch Bridge

Type : D-9 Depth: 8.55m - 9.00m

Number of volumetric flash	D5	V21	V13
Wt. of volumetric flash (g)	121.92	63.56	108.03
Wt. of volumetric flash (g)	370.14	162.93	356.36
Water Temperature in vol. flash before test	29	29	29
Specific gravity of water (g /cm^3)	0.9959	0.9959	0.9959
Wt. of dry soil in volumetric flash (g)	53.48	21.54	49.64
Wt. of volum.flash + Water + drysc(g)	403.47	176.35	387.3
Water Temperature in vol. flash after test T	31	31	31
Specific gravity of water (g /cm^3)	0.9953	0.9953	0.9953
Wt. Volumetric flash + Water at Temp. T	369.99	162.87	356.21
Specific gravity of soil , Gs g /cm^3	2.687	2.685	2.689
Average specific gravity of soil g /cm^3		**2.687**	

Specific Gravity of Water					
Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3
4	1.0000	16	0.9989	28	0.9962
5	1.0000	17	0.9988	29	0.9959
6	0.9999	18	0.9986	30	0.9957
7	0.9999	19	0.9984	31	0.9953
8	0.9999	20	0.9982	32	0.9950
9	0.9998	21	0.9980	33	0.9947
10	0.9997	22	0.9978	34	0.9944
11	0.9996	23	0.9975	35	0.9940
12	0.9995	24	0.9973	36	0.9937
13	0.9994	25	0.9970	37	0.9933
14	0.9992	26	0.9968	38	0.9930
15	0.9991	27	0.9965	39	0.9926

Tested by:

SPECIFIC GRAVITY OF SOIL

Borehole No. : **BH-1**
Project: Steung Touch Bridge

Type : D-13 Depth: 12.55m - 3.00m

Number of volumetric flash	D3	V19	A1
Wt. of volumetric flash (g)	112.39	50.12	58.25
Wt. of volumetric flash (g)	360.97	149.38	157.57
Water Temperature in vol. flash before test	29	29	29
Specific gravity of water (g /cm^3)	0.9959	0.9959	0.9959
Wt. of dry soil in volumetric flash (g)	61.81	21.33	25.14
Wt. of volum.flash + Water + drysc(g)	399.2	162.56	173.14
Water Temperature in vol. flash after test T	31	31	31
Specific gravity of water (g /cm^3)	0.9953	0.9953	0.9953
Wt. Volumetric flash + Water at Temp. T	360.82	149.32	157.51
Specific gravity of soil , Gs g /cm^3	2.651	2.649	2.656
Average specific gravity of soil g /cm^3		**2.652**	

Specific Gravity of Water					
Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3
4	1.0000	16	0.9989	28	0.9962
5	1.0000	17	0.9988	29	0.9959
6	0.9999	18	0.9986	30	0.9957
7	0.9999	19	0.9984	31	0.9953
8	0.9999	20	0.9982	32	0.9950
9	0.9998	21	0.9980	33	0.9947
10	0.9997	22	0.9978	34	0.9944
11	0.9996	23	0.9975	35	0.9940
12	0.9995	24	0.9973	36	0.9937
13	0.9994	25	0.9970	37	0.9933
14	0.9992	26	0.9968	38	0.9930
15	0.9991	27	0.9965	39	0.9926

SPECIFIC GRAVITY OF SOIL

Borehole No. : **BH-1**
Project: Steung Touch Bridge

Pit: PK- 303.4 Type : D-20 Depth: 19.55m - 20.00m

Number of volumetric flash	V1	V14	A4
Wt. of volumetric flash (g)	82.65	105.81	31.64
Wt. of volumetric flash (g)	330.85	354.2	130.75
Water Temperature in vol. flash before test T	29	29	29
Specific gravity of water (g /cm^3)	0.9959	0.9959	0.9959
Wt. of dry soil in volumetric flash (g)	59	54.02	22.44
Wt. of volum.flash + Water + drysc(g)	367.73	387.9	144.77
Water Temperature in vol. flash after test T	31	31	31
Specific gravity of water (g /cm^3)	0.9953	0.9953	0.9953
Wt. Volumetric flash + Water at Temp. T	330.70	354.05	130.69
Specific gravity of soil , Gs g /cm^3	2.698	2.691	2.697
Average specific gravity of soil g /cm^3	**2.695**		

Specific Gravity of Water					
Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3
4	1.0000	16	0.9989	28	0.9962
5	1.0000	17	0.9988	29	0.9959
6	0.9999	18	0.9986	30	0.9957
7	0.9999	19	0.9984	31	0.9953
8	0.9999	20	0.9982	32	0.9950
9	0.9998	21	0.9980	33	0.9947
10	0.9997	22	0.9978	34	0.9944
11	0.9996	23	0.9975	35	0.9940
12	0.9995	24	0.9973	36	0.9937
13	0.9994	25	0.9970	37	0.9933
14	0.9992	26	0.9968	38	0.9930
15	0.9991	27	0.9965	39	0.9926

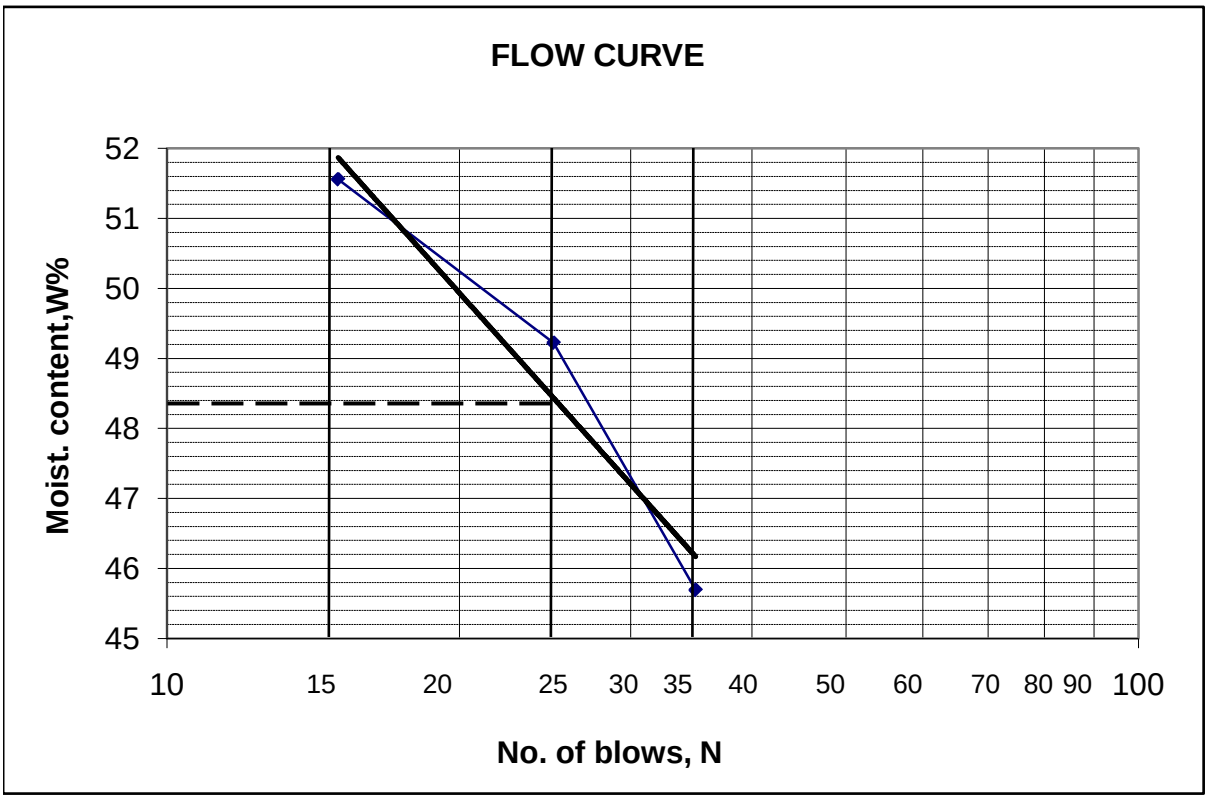
Project : Steung Touch Bridge BH-2
Location: Sisophon, Banteay Meanchey province. D1: 1.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.02	14.65	14.72	14.66	15.00
W.Tin+w.s	70.10	67.71	67.56	67.46	45.08
W.Tin+d.s	59.80	49.66	50.13	50.90	40.10
W.d.s	45.78	35.01	35.41	36.24	25.10
W.Water	10.30	18.05	17.43	16.56	4.98
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**22.50**	**51.56**	**49.22**	**45.70**	**19.84**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
19.84	**48.40**	**28.56**	**CL**	0.09



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 10/02/2012
Checked by : Chea Serey vuth	Date of testing : 10/02/2012

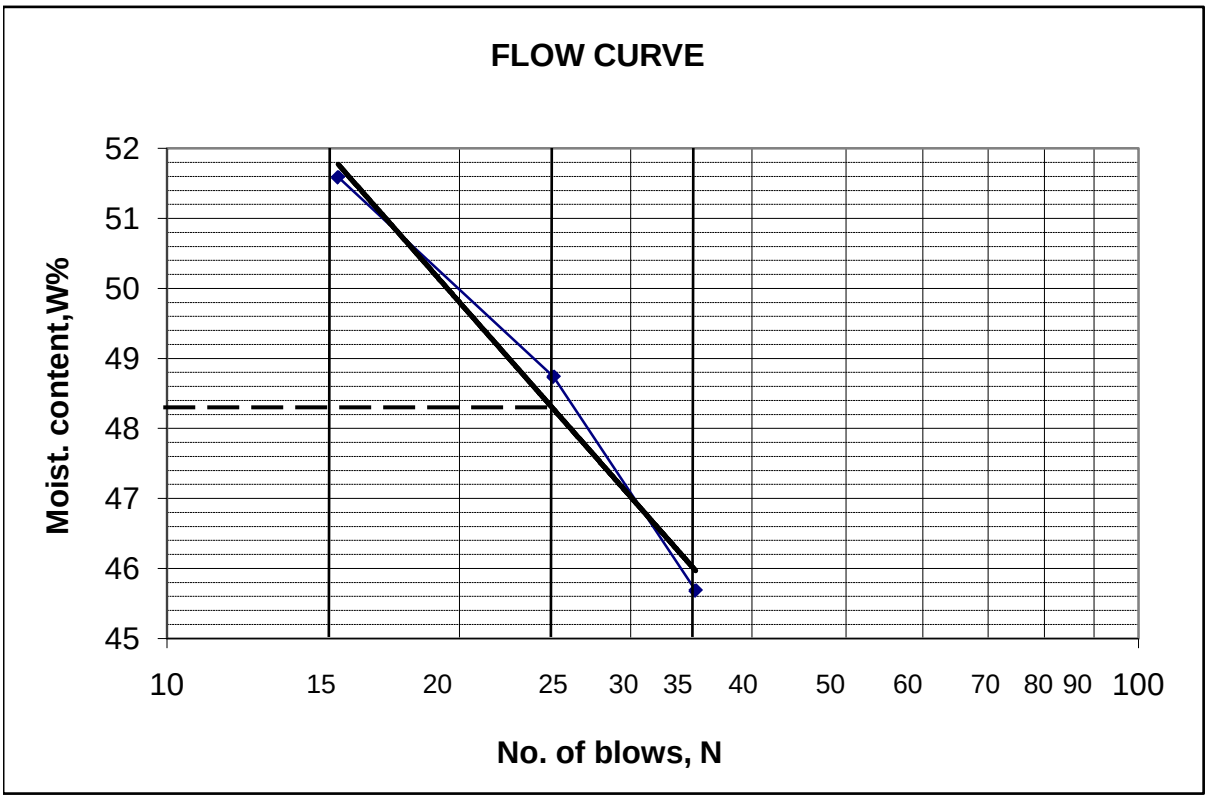
Project : Steung Touch Bridge BH-2
Location: Sisophon, Banteay Meanchey province. D2: 2.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.68	14.39	14.35	14.42	14.16
W.Tin+w.s	71.76	64.52	64.46	64.23	44.81
W.Tin+d.s	61.73	47.46	48.04	48.61	40.31
W.d.s	47.05	33.07	33.69	34.19	26.15
W.Water	10.03	17.06	16.42	15.62	4.50
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**21.32**	**51.59**	**48.74**	**45.69**	**17.21**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
17.21	**48.30**	**31.09**	**CL**	0.13



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 10/02/2012
Checked by : Chea Serey vuth	Date of testing : 10/02/2012

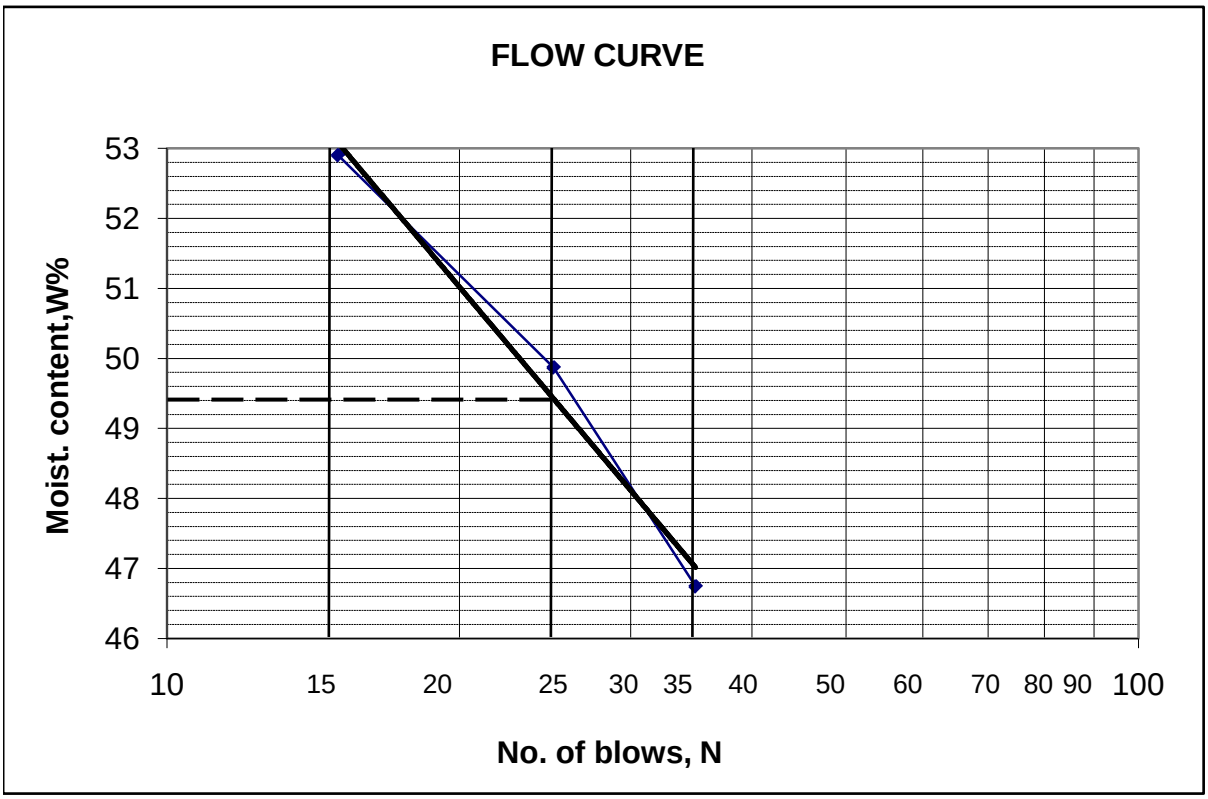
Project : Steung Touch Bridge BH-2
Location: Sisophon, Banteay Meanchey province. D3: 3.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.41	14.45	14.55	14.64	14.29
W.Tin+w.s	77.15	66.91	66.69	66.50	44.67
W.Tin+d.s	65.40	48.76	49.34	49.98	40.26
W.d.s	50.99	34.31	34.79	35.34	25.97
W.Water	11.75	18.15	17.35	16.52	4.41
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**23.04**	**52.90**	**49.87**	**46.75**	**16.98**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
16.98	**49.40**	**32.42**	**CL**	0.19



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 10/02/2012
Checked by : Chea Serey vuth	Date of testing : 10/02/2012

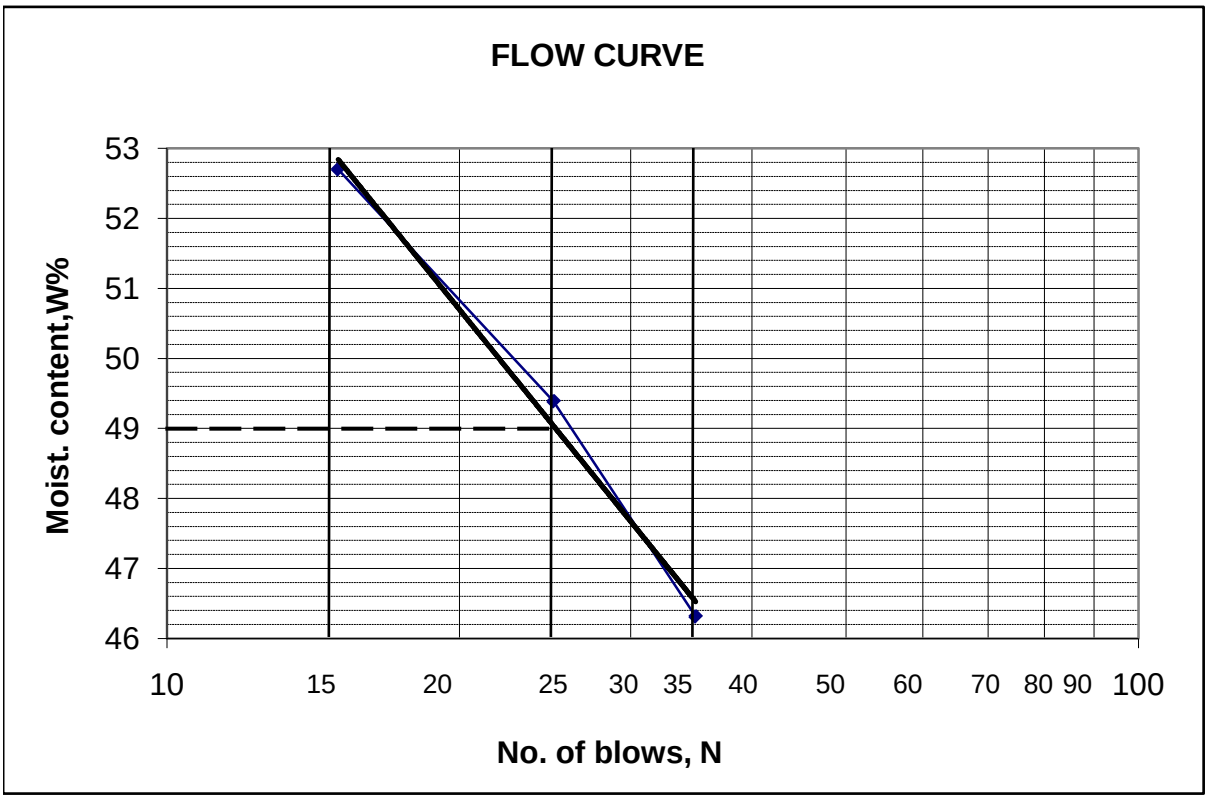
Project : Steung Touch Bridge BH-2
Location: Sisophon, Banteay Meanchey province. D4: 4.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.17	14.23	14.20	14.24	14.16
W.Tin+w.s	78.08	66.82	66.65	66.43	44.74
W.Tin+d.s	65.28	48.67	49.31	49.91	40.46
W.d.s	51.11	34.44	35.11	35.67	26.30
W.Water	12.80	18.15	17.34	16.52	4.28
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**25.04**	**52.70**	**49.39**	**46.31**	**16.27**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
16.27	**49.00**	**32.73**	**CL**	0.27



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 10/02/2012
Checked by : Chea Serey vuth	Date of testing : 10/02/2012

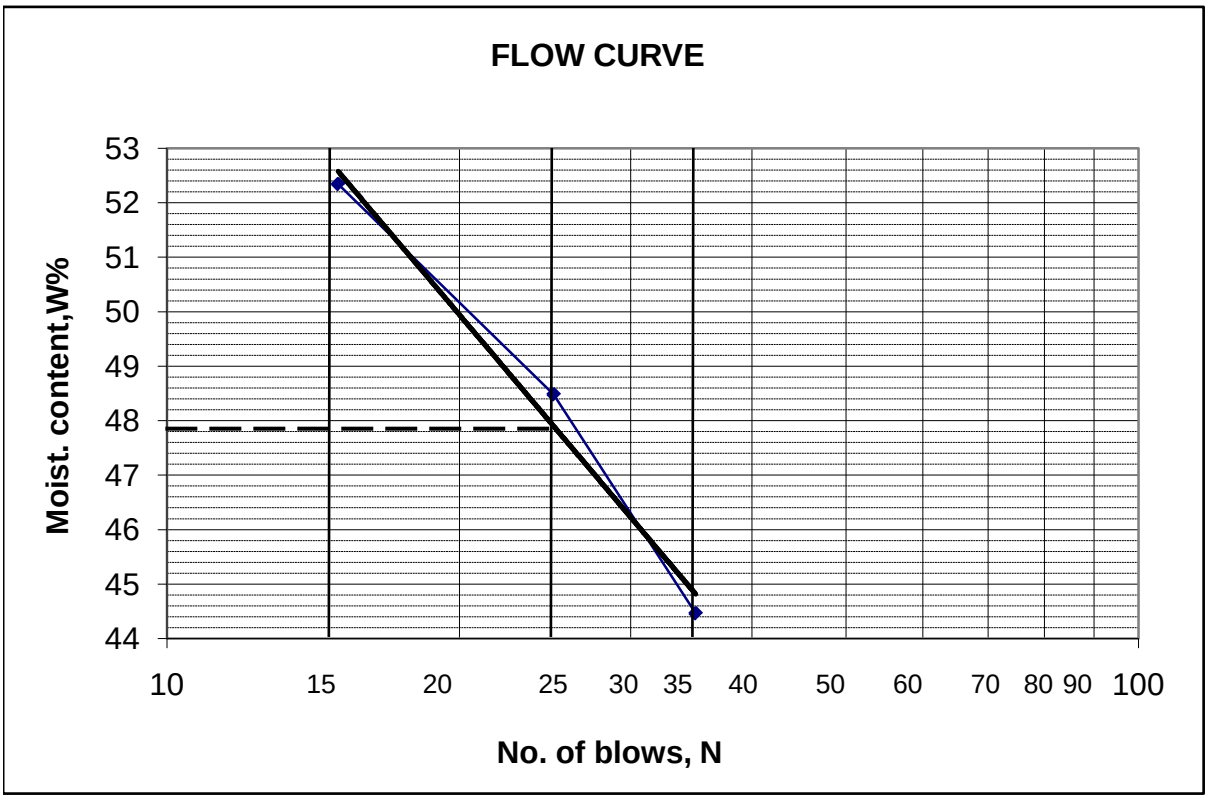
Project : Steung Touch Bridge BH-2
Location: Sisophon, Banteay Meanchey province. D5: 5.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.17	14.66	14.78	14.96	14.16
W.Tin+w.s	72.17	65.71	65.68	65.45	42.69
W.Tin+d.s	60.52	48.17	49.06	49.91	38.29
W.d.s	46.35	33.51	34.28	34.95	24.13
W.Water	11.65	17.54	16.62	15.54	4.40
Blows		15.00	25.00	35.00	
Moist.	25.13	52.34	48.48	44.46	18.23

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
18.23	47.90	29.67	CL	0.23



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 10/02/2012
Checked by : Chea Serey vuth	Date of testing : 10/02/2012

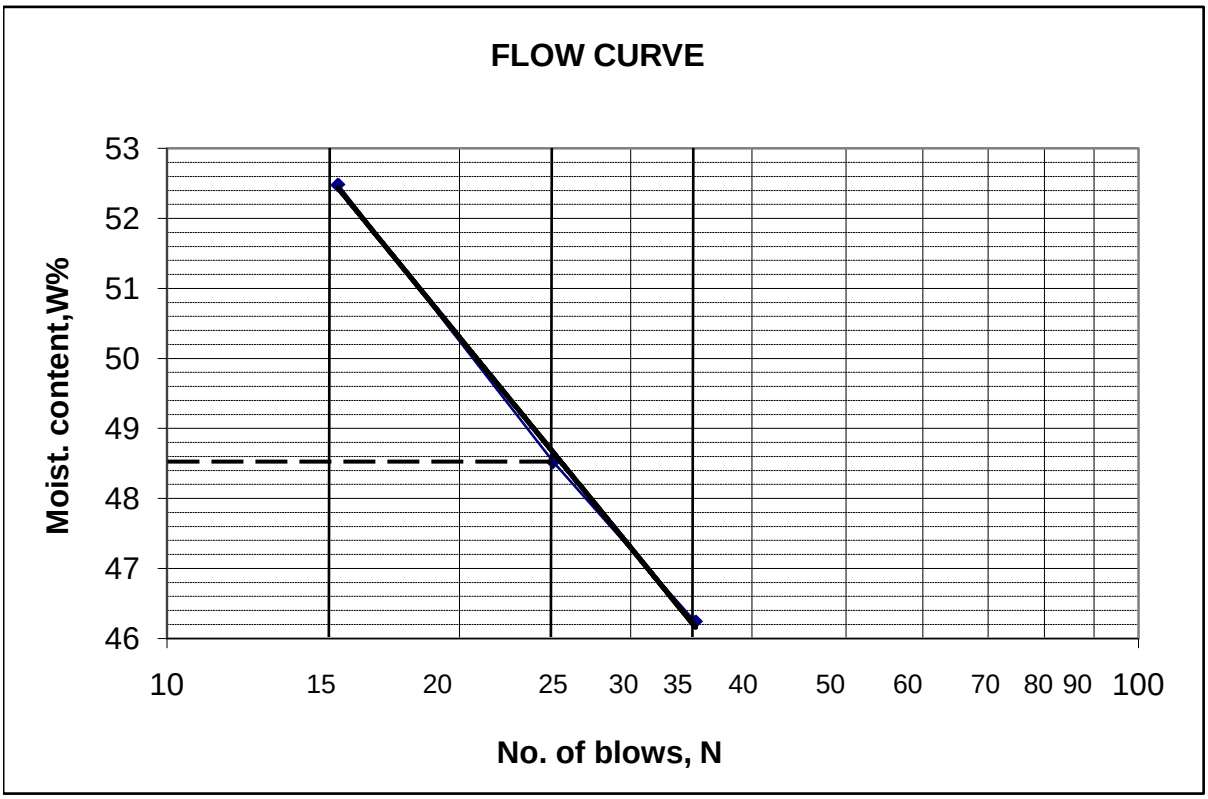
Project : Steung Touch Bridge BH-2
Location: Sisophon, Banteay Meanchey province. D6: 6.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.24	14.32	14.29	14.25	14.31
W.Tin+w.s	82.10	69.70	69.51	69.41	44.98
W.Tin+d.s	71.10	50.64	51.47	51.97	40.02
W.d.s	56.86	36.32	37.18	37.72	25.71
W.Water	11.00	19.06	18.04	17.44	4.96
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**19.35**	**52.48**	**48.52**	**46.24**	**19.29**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
19.29	**48.50**	**29.21**	**CL**	0.00



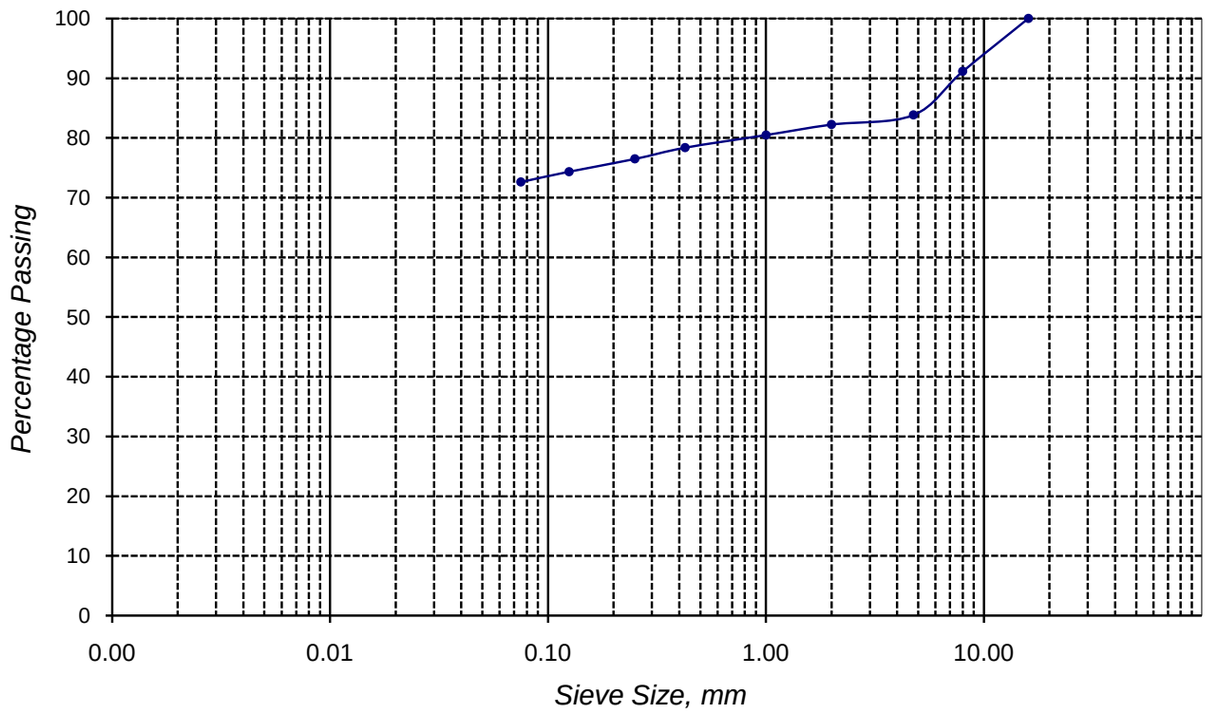
Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 10/02/2012
Checked by : Chea Serey vuth	Date of testing : 10/02/2012

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	178.24	
Depth, m	6.55-7.00	
Sample Nº	D7	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	91.12	
4.75	83.83	
2.00	82.24	
1.00	80.49	
0.425	78.37	
0.250	76.48	
0.125	74.35	
0.075	72.62	
Water Content , %	19.64	
Silt + Clay , %	Sand , %	Gravel , %
72.62	11.21	16.17

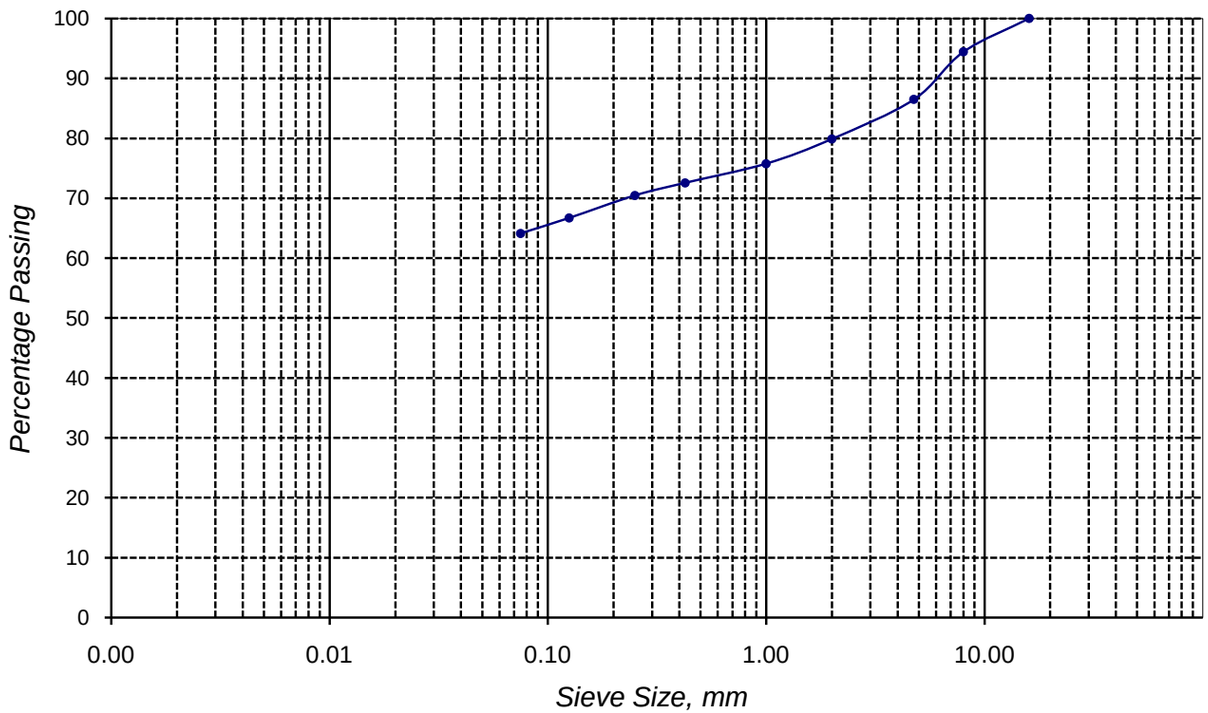
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	213.96	
Depth, m	7.55-8.00	
Sample Nº	D8	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	94.41	
4.75	86.47	
2.00	79.88	
1.00	75.76	
0.425	72.56	
0.250	70.45	
0.125	66.69	
0.075	64.12	
Water Content , %	14.98	
Silt + Clay , %	Sand , %	Gravel , %
64.12	22.35	13.53

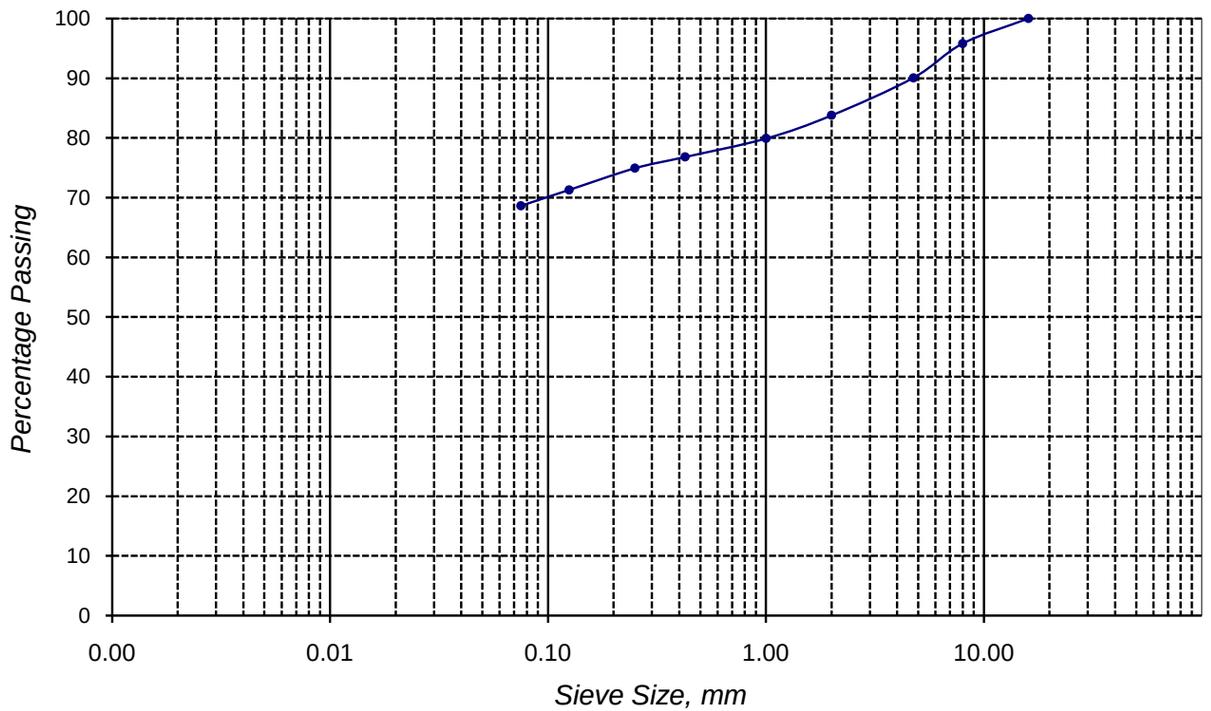
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	206.50	
Depth, m	8.55-9.00	
Sample Nº	D9	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	95.82	
4.75	90.07	
2.00	83.77	
1.00	79.90	
0.425	76.81	
0.250	74.92	
0.125	71.30	
0.075	68.63	
Water Content , %	15.30	
Silt + Clay , %	Sand , %	Gravel , %
68.63	21.43	9.93

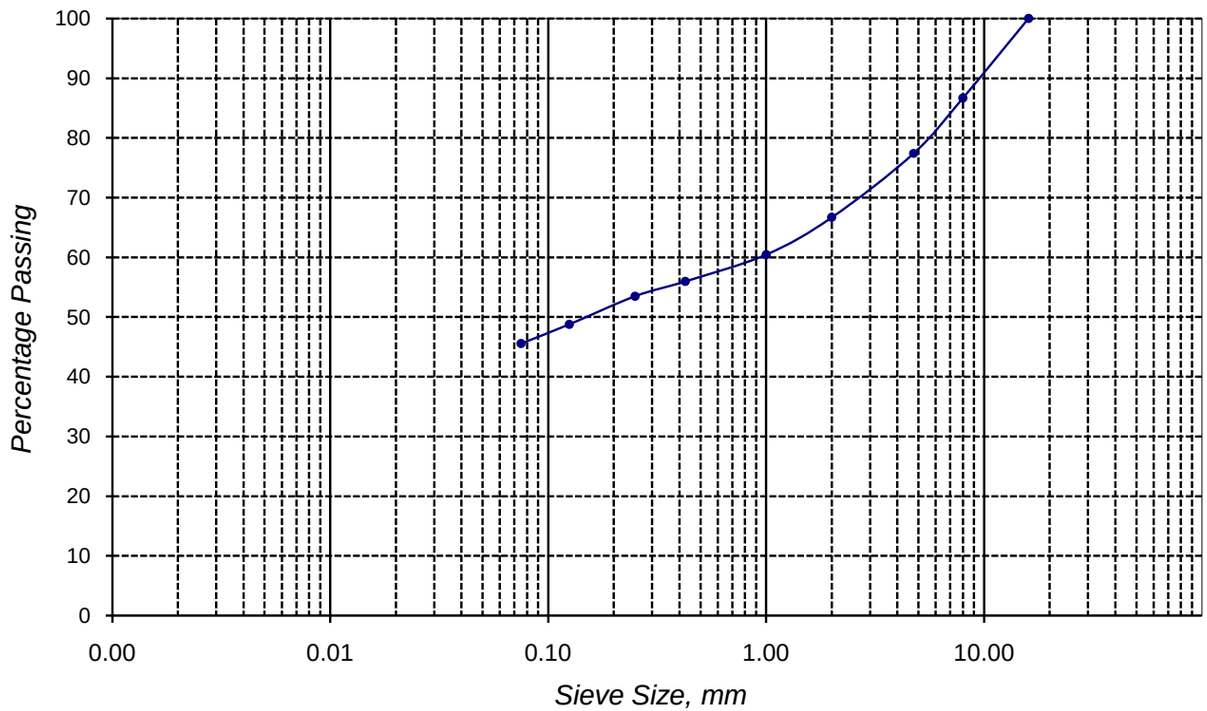
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	268.43	
Depth, m	9.55-10.00	
Sample Nº	D10	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	86.67	
4.75	77.39	
2.00	66.66	
1.00	60.44	
0.425	55.95	
0.250	53.47	
0.125	48.77	
0.075	45.54	
Water Content , %	9.86	
Silt + Clay , %	Sand , %	Gravel , %
45.54	31.85	22.61

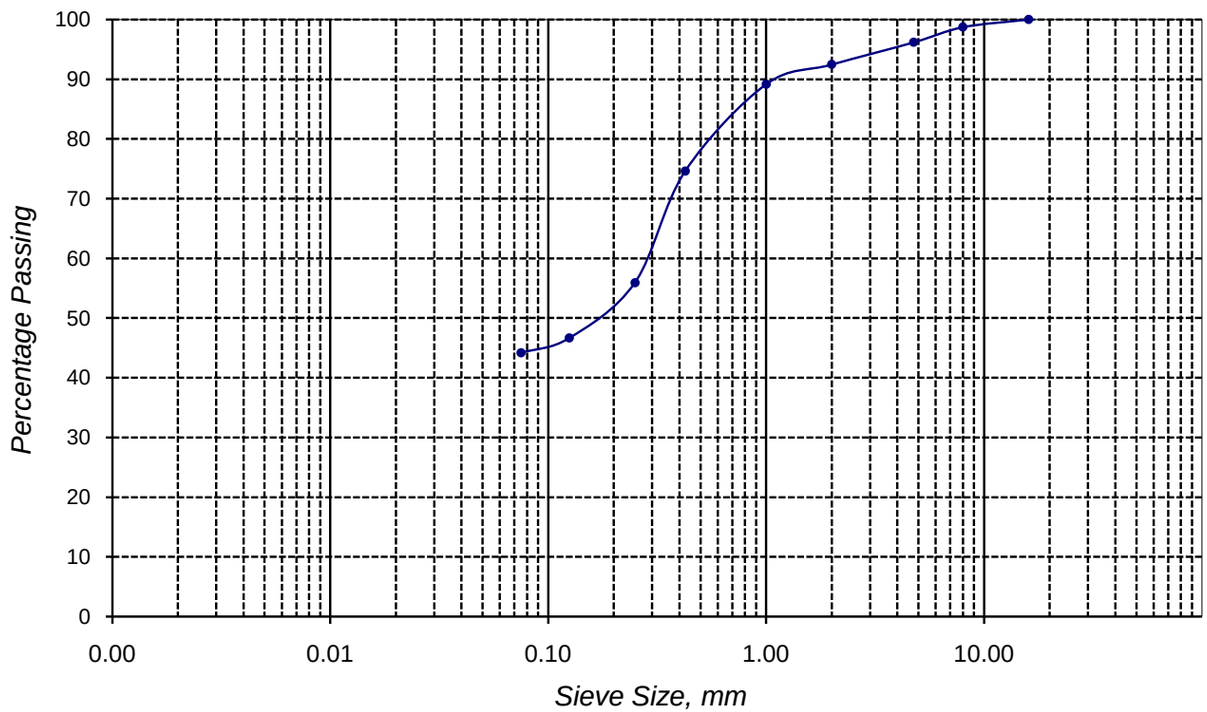
OPERATOR : M[rs] Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	224.66	
Depth, m	10.55-11.00	
Sample Nº	D11	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	98.71	
4.75	96.16	
2.00	92.45	
1.00	89.14	
0.425	74.58	
0.250	55.91	
0.125	46.65	
0.075	44.16	
Water Content , %	14.56	
Silt + Clay , %	Sand , %	Gravel , %
44.16	52.00	3.84

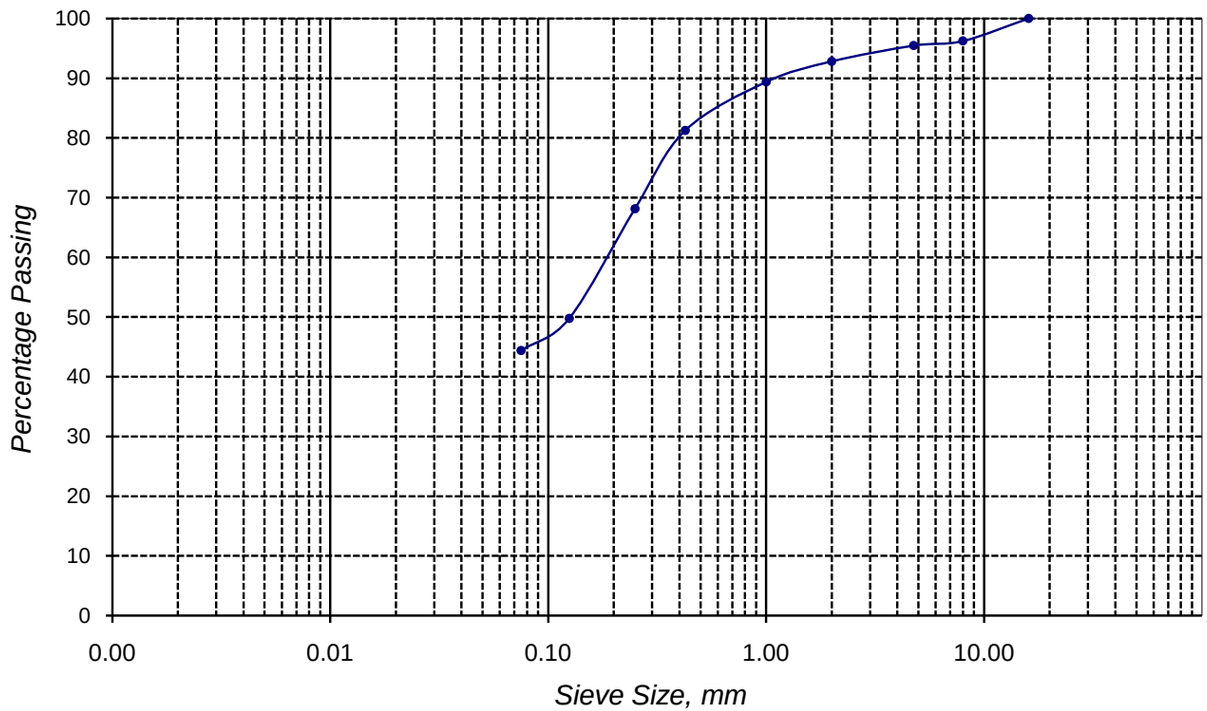
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	201.00	
Depth, m	11.55-12.00	
Sample Nº	D12	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	96.23	
4.75	95.46	
2.00	92.83	
1.00	89.37	
0.425	81.23	
0.250	68.12	
0.125	49.79	
0.075	44.40	
Water Content , %	16.04	
Silt + Clay , %	Sand , %	Gravel , %
44.40	51.06	4.54

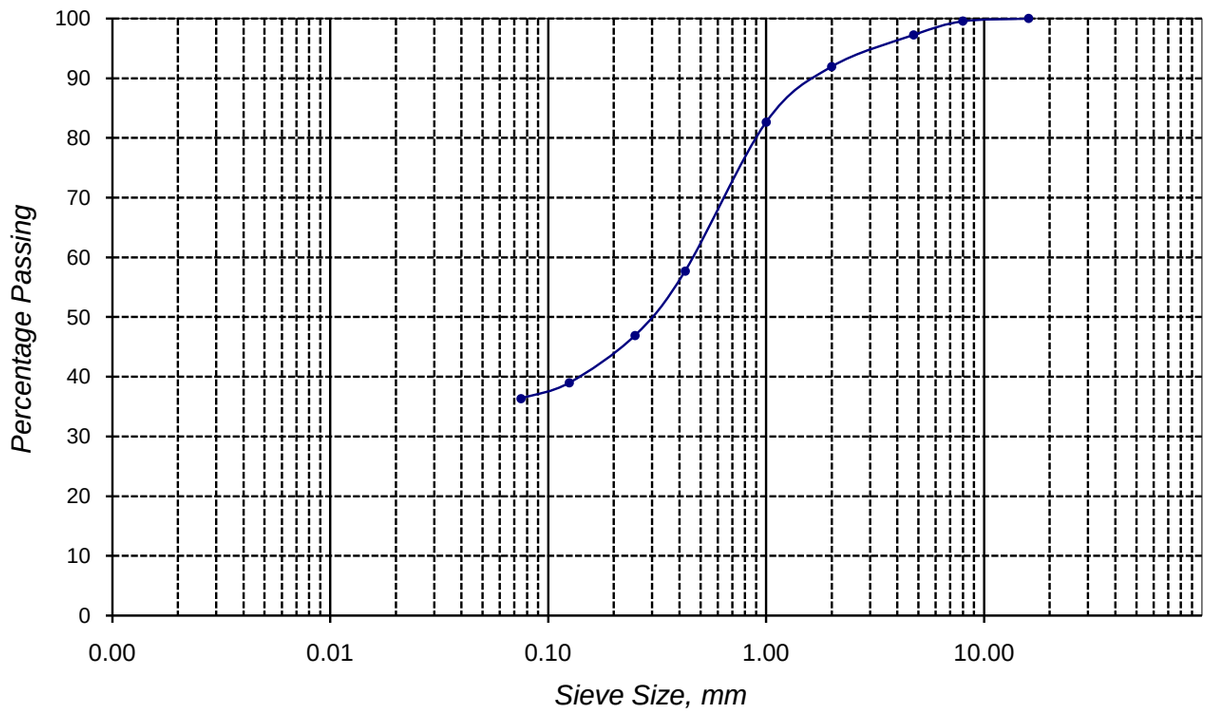
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	186.10	
Depth, m	12.55-13.00	
Sample Nº	D13	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	99.54	
4.75	97.25	
2.00	91.95	
1.00	82.62	
0.425	57.68	
0.250	46.88	
0.125	38.96	
0.075	36.32	
Water Content , %	14.56	
Silt + Clay , %	Sand , %	Gravel , %
36.32	60.92	2.75

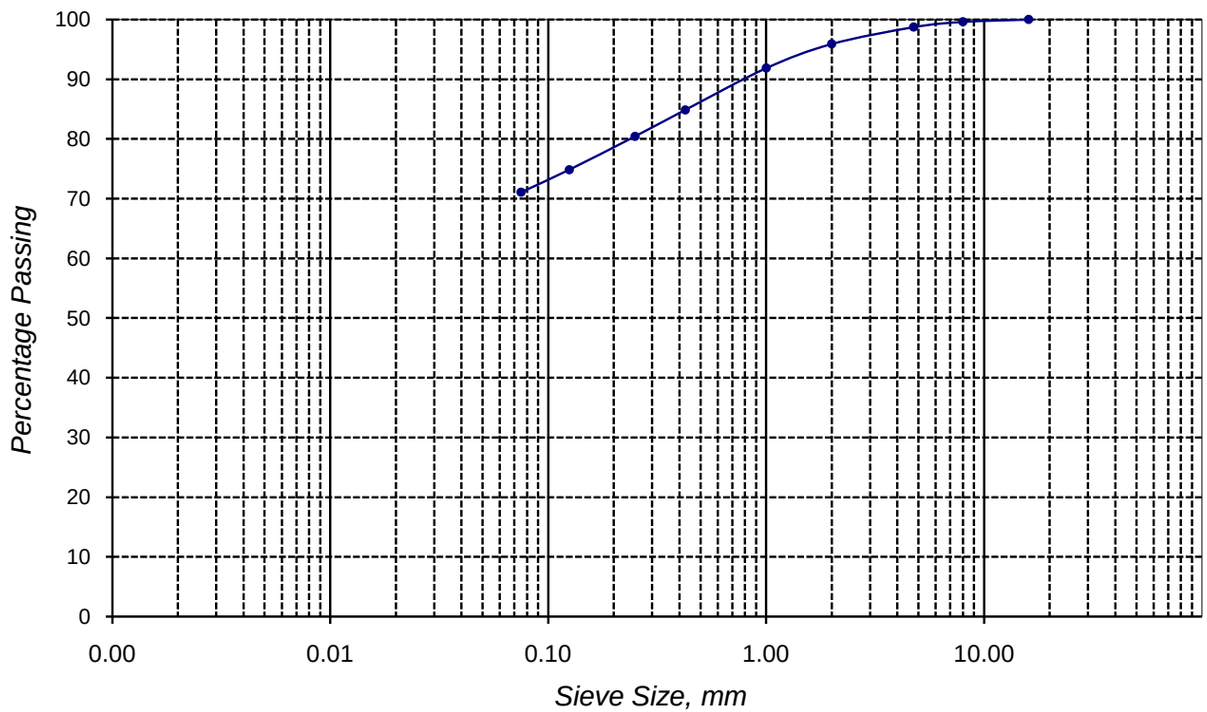
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	200.04	
Depth, m	13.55-14.00	
Sample Nº	D14	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	99.60	
4.75	98.72	
2.00	95.90	
1.00	91.84	
0.425	84.85	
0.250	80.42	
0.125	74.85	
0.075	71.06	
Water Content , %	15.44	
Silt + Clay , %	Sand , %	Gravel , %
71.06	27.65	1.28

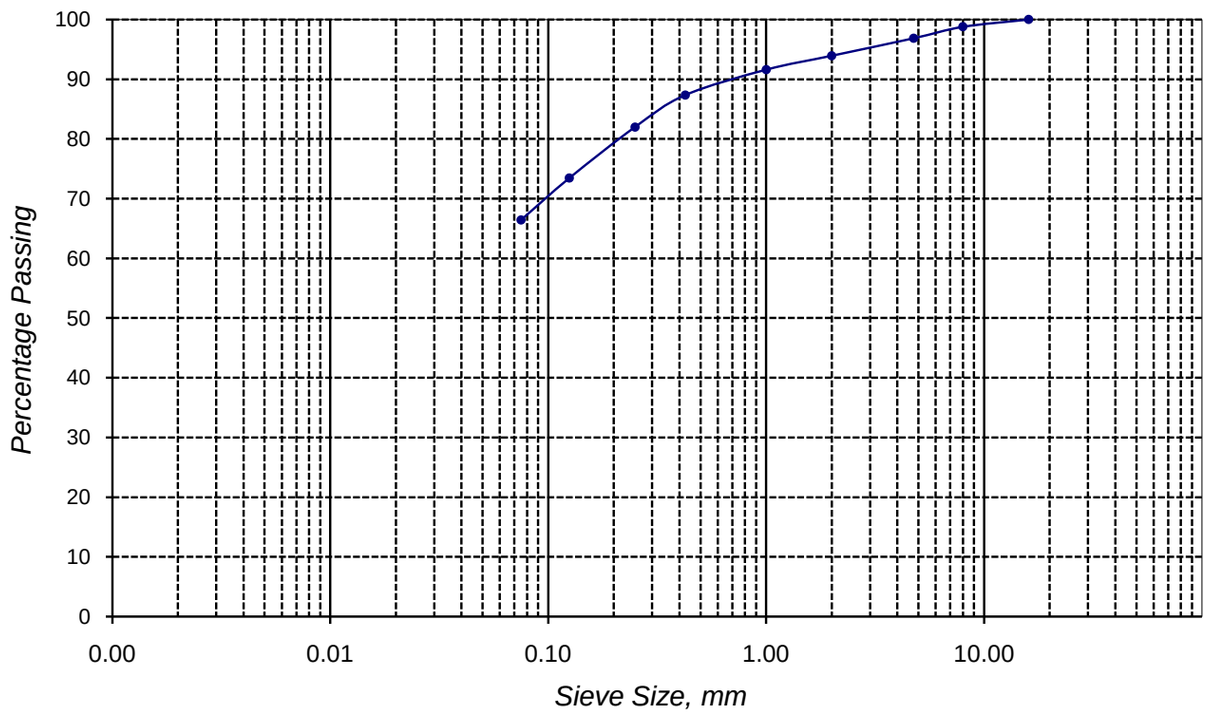
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	199.28	
Depth, m	14.55-15.00	
Sample Nº	D15	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	98.78	
4.75	96.86	
2.00	93.93	
1.00	91.59	
0.425	87.33	
0.250	81.97	
0.125	73.43	
0.075	66.40	
Water Content , %	15.46	
Silt + Clay , %	Sand , %	Gravel , %
66.40	30.46	3.14

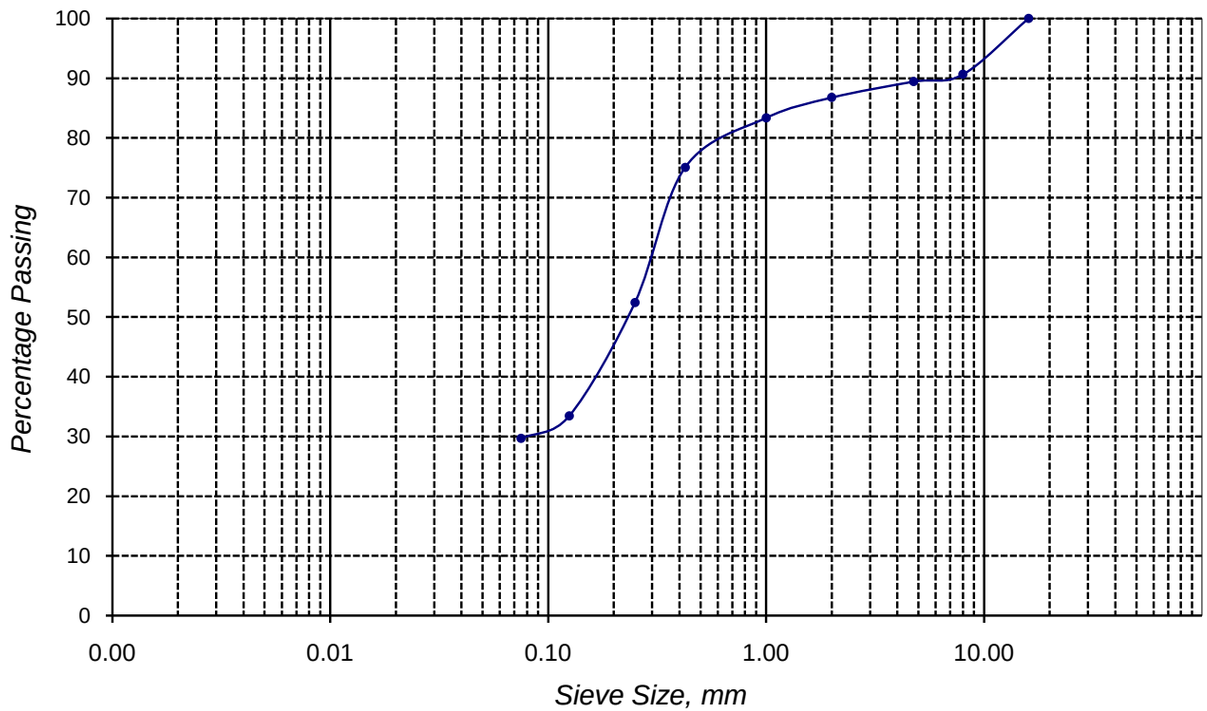
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	256.55	
Depth, m	16.55-17.00	
Sample Nº	D17	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	90.63	
4.75	89.43	
2.00	86.76	
1.00	83.35	
0.425	75.05	
0.250	52.39	
0.125	33.45	
0.075	29.68	
Water Content , %	17.26	
Silt + Clay , %	Sand , %	Gravel , %
29.68	59.75	10.57

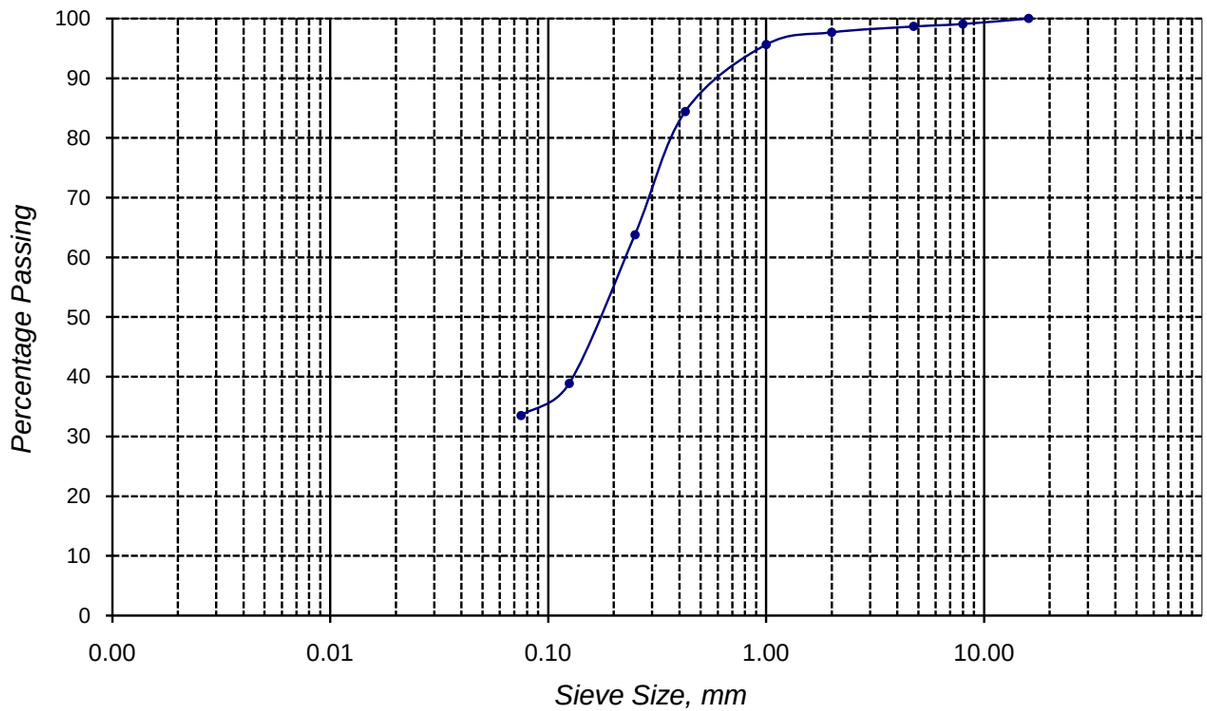
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	215.39	
Depth, m	17.55-18.00	
Sample Nº	D18	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	99.09	
4.75	98.66	
2.00	97.69	
1.00	95.62	
0.425	84.39	
0.250	63.76	
0.125	38.87	
0.075	33.51	
Water Content , %	16.47	
Silt + Clay , %	Sand , %	Gravel , %
33.51	65.16	1.34

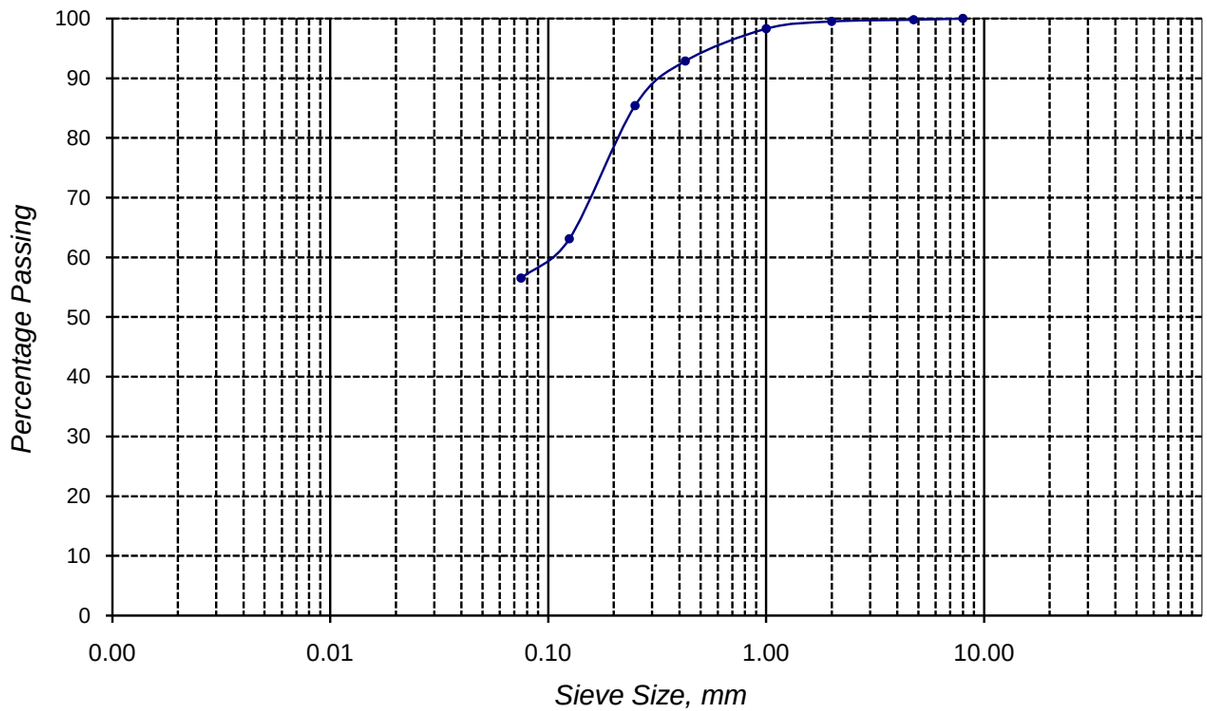
OPERATOR : M[rs] Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	202.65	
Depth, m	18.55-19.00	
Sample Nº	D19	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	100.00	
4.75	99.80	
2.00	99.51	
1.00	98.29	
0.425	92.86	
0.250	85.37	
0.125	63.06	
0.075	56.50	
Water Content , %	14.55	
Silt + Clay , %	Sand , %	Gravel , %
56.50	43.30	0.20

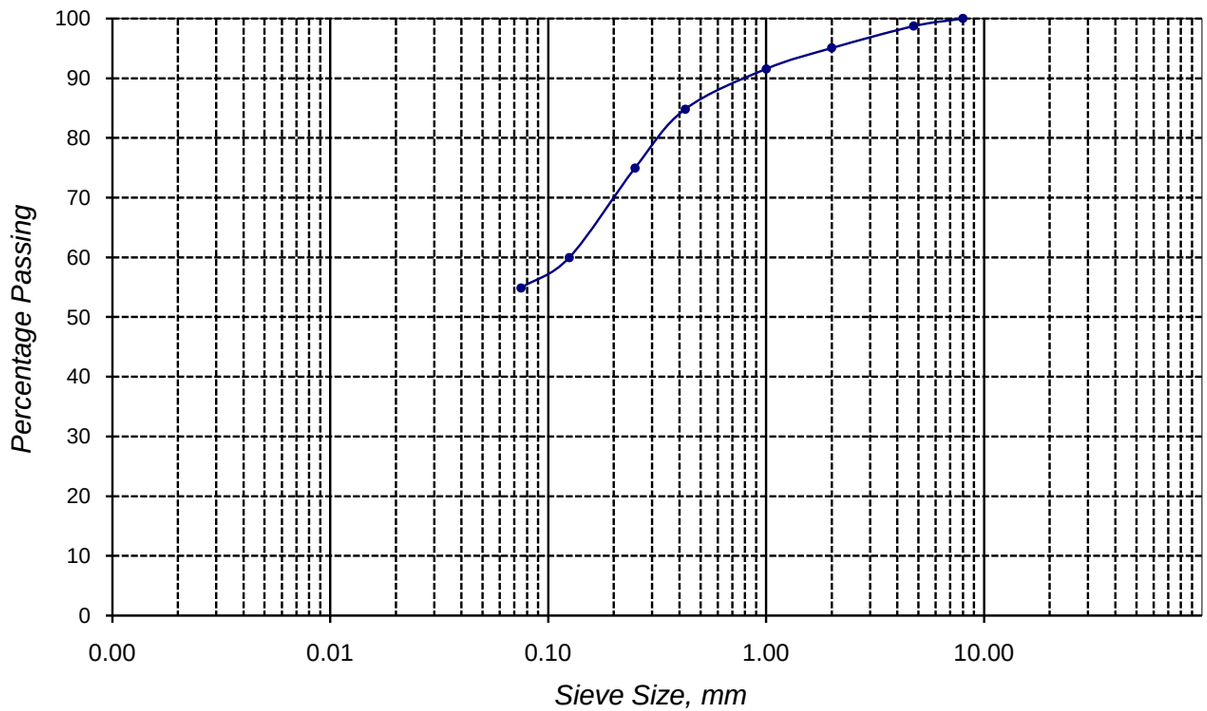
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	203.69	
Depth, m	19.55-20.00	
Sample Nº	D20	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	100.00	
4.75	98.72	
2.00	95.06	
1.00	91.57	
0.425	84.81	
0.250	74.93	
0.125	59.95	
0.075	54.87	
Water Content , %	16.41	
Silt + Clay , %	Sand , %	Gravel , %
54.87	43.85	1.28

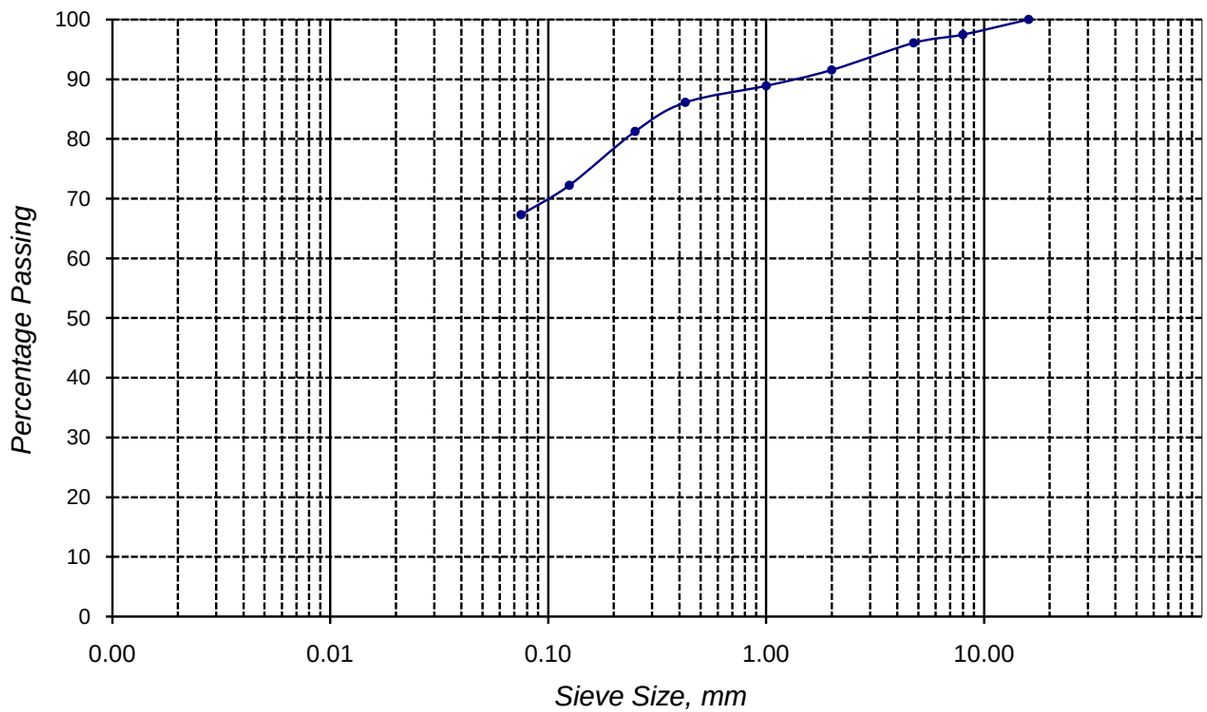
OPERATOR : M[rs] Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	170.37	
Depth, m	20.55-21.00	
Sample Nº	D21	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	97.48	
4.75	96.08	
2.00	91.55	
1.00	88.90	
0.425	86.10	
0.250	81.22	
0.125	72.23	
0.075	67.31	
Water Content , %	18.52	
Silt + Clay , %	Sand , %	Gravel , %
67.31	28.77	3.92

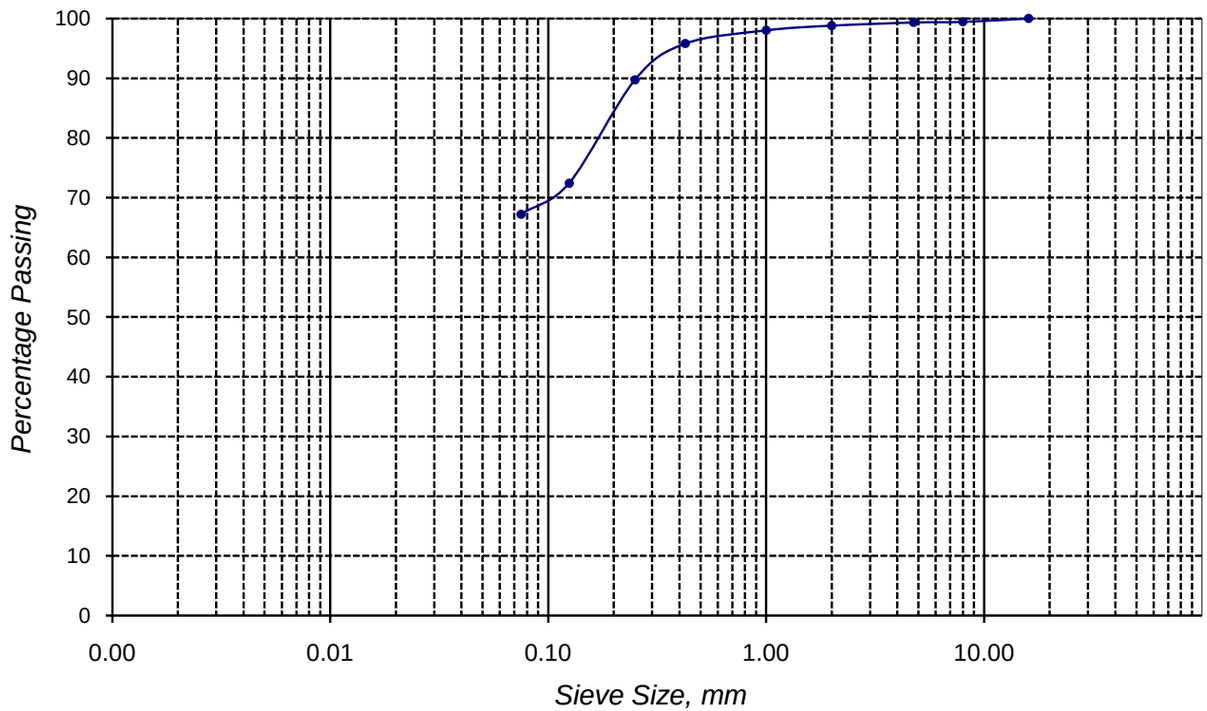
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	185.67	
Depth, m	21.55-22.00	
Sample Nº	D22	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	99.44	
4.75	99.33	
2.00	98.81	
1.00	98.02	
0.425	95.79	
0.250	89.71	
0.125	72.44	
0.075	67.22	
Water Content , %	17.86	
Silt + Clay , %	Sand , %	Gravel , %
67.22	32.11	0.67

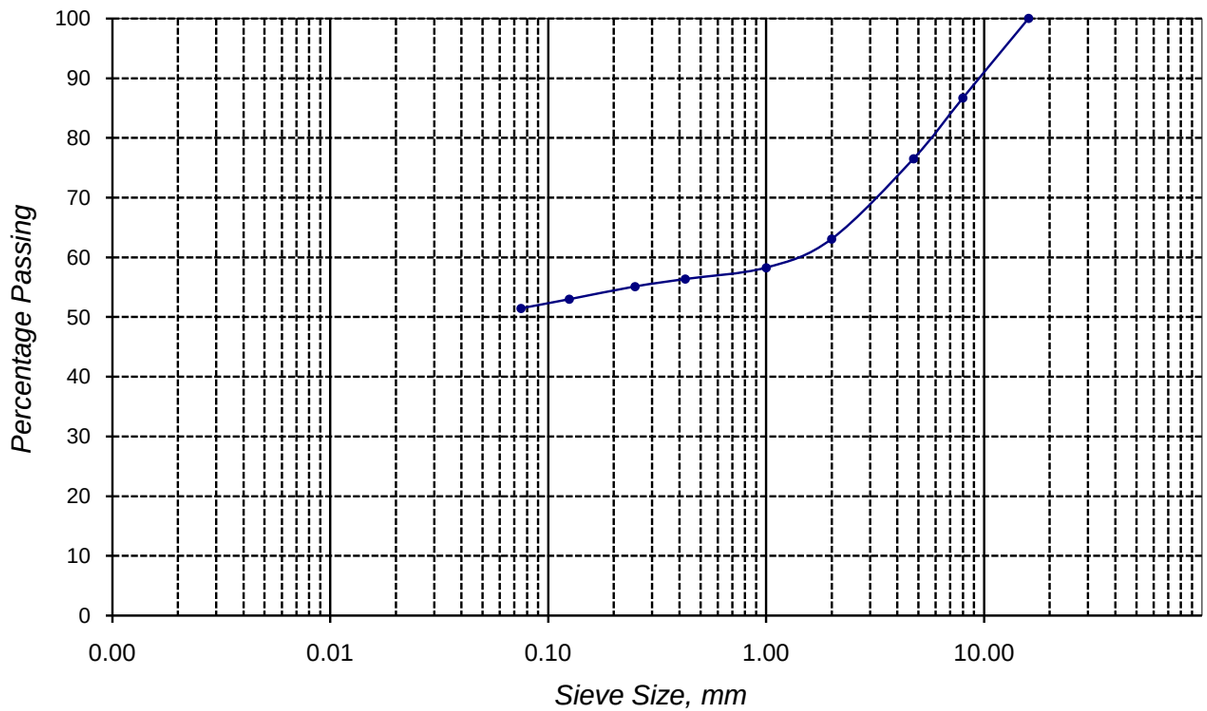
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	202.50	
Depth, m	22.55-23.00	
Sample Nº	D23	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	86.69	
4.75	76.52	
2.00	63.07	
1.00	58.26	
0.425	56.35	
0.250	55.10	
0.125	52.96	
0.075	51.44	
Water Content , %	18.29	
Silt + Clay , %	Sand , %	Gravel , %
51.44	25.08	23.48

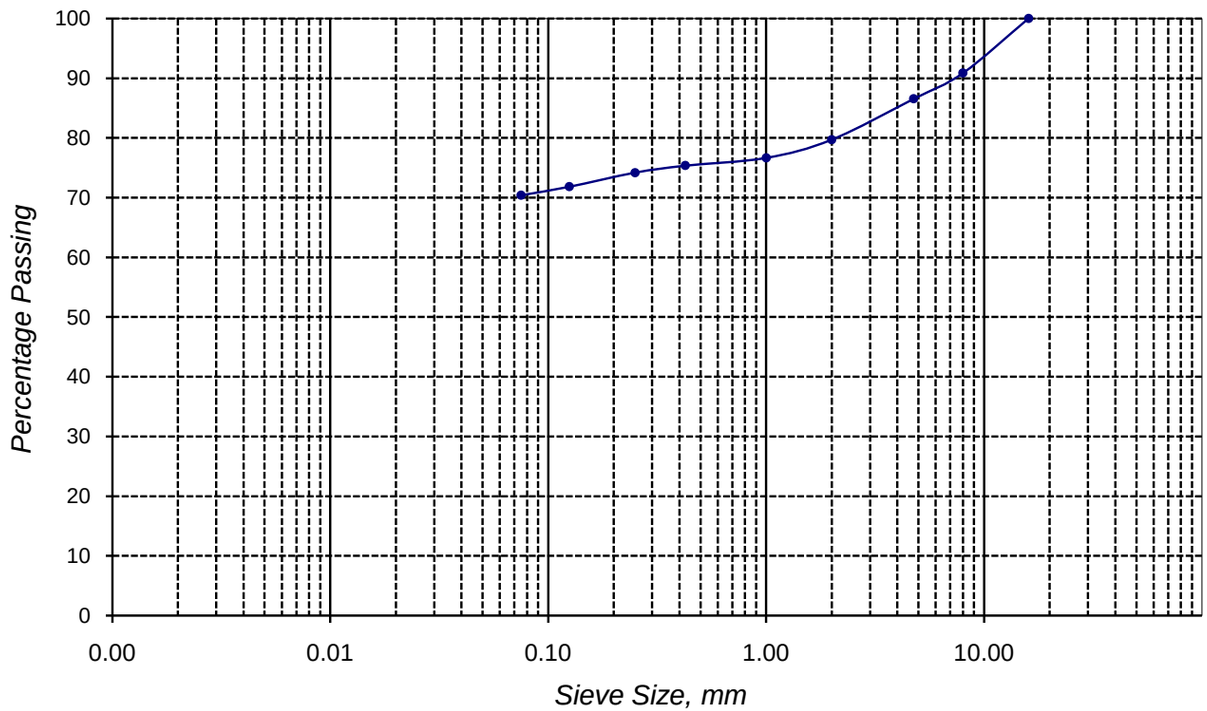
OPERATOR : M[rs] Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	174.63	
Depth, m	23.55-24.00	
Sample Nº	D24	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	90.85	
4.75	86.53	
2.00	79.70	
1.00	76.65	
0.425	75.34	
0.250	74.17	
0.125	71.81	
0.075	70.38	
Water Content , %	27.27	
Silt + Clay , %	Sand , %	Gravel , %
70.38	16.14	13.47

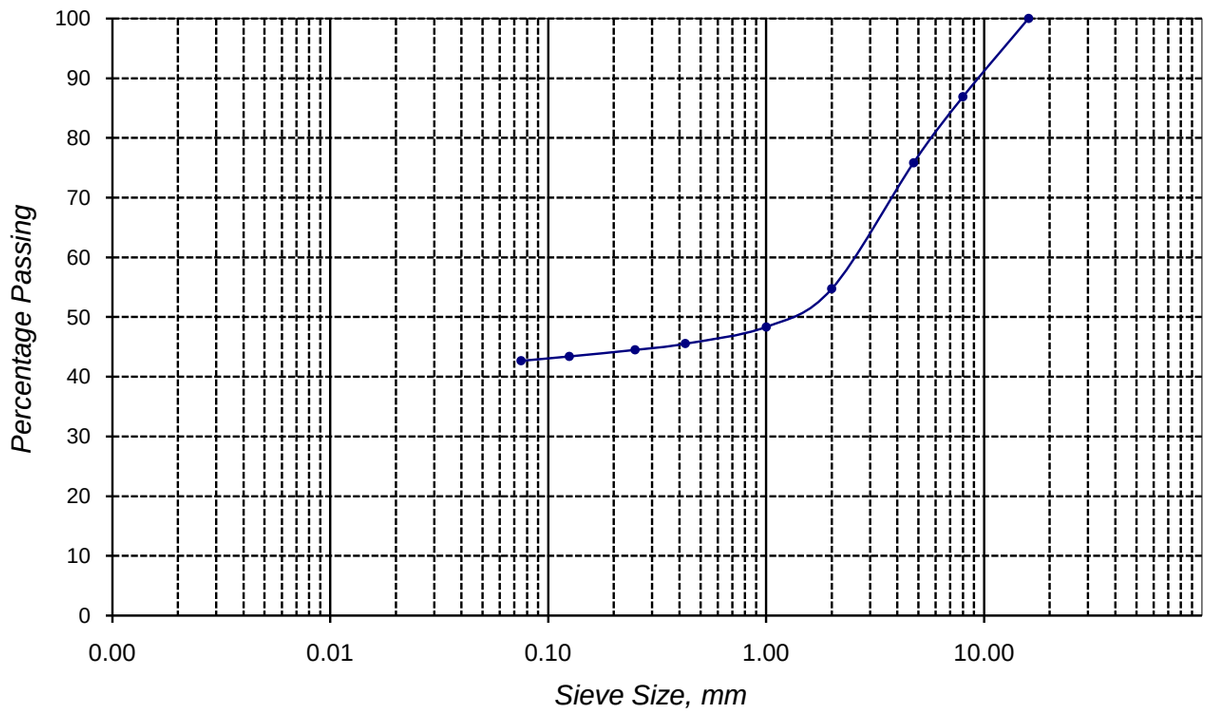
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Touch Bridge BH-2	Date of boring	10/2/2012
LOCATION :	Sisophon, Banteay Meanchey province.	Date of testing	10/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	220.97	
Depth, m	24.55-25.00	
Sample Nº	D25	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	86.87	
4.75	75.83	
2.00	54.70	
1.00	48.33	
0.425	45.52	
0.250	44.49	
0.125	43.40	
0.075	42.66	
Water Content , %	17.75	
Silt + Clay , %	Sand , %	Gravel , %
42.66	33.18	24.17

OPERATOR : M^{rs} Rem

UNCONFINED COMPRESSION TEST
(ASTM D2166)

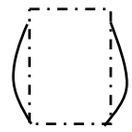
Project : Steung Touch Bridge

Borehole: BH-2 U - 1 Depth : 10.55m - 11.00 m

Tested by: Cheas yim

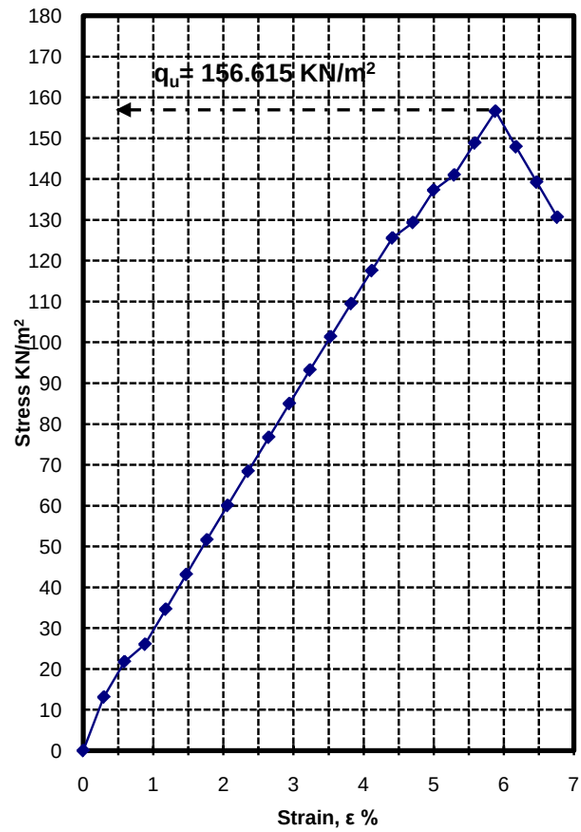
Length,L_0 cm	8.5	Weigth soil , g	185.22	Tin N0	091
Diameter,cm	3.5	Bulk Density,g /cm^3	2.266	Wt tin+ wetsoil,g	89.27
Area A_0,cm^2	9.62	Dry Density,g/cm^3	2.006	Wt tin+dry soil,g	80.64
Volume, cm^3	81.74	Watercontent,%	12.98	Wt of tin,g	14.14
CF, k	0.04379			Wt of dry soil,g	66.5

Mode of failure



deform. dial reading	Sample deform. ΔL1/100	Strain, ε % ΔL/L_0*100	Proving Ring , R 1/100(mm)	Total load P=R*k kgf / cm^2	Stress б=P(1-ε/100) KN/m^2
0	0	0.000	0	0	0
25	0.25	0.294	3	0.131	13.098
50	0.5	0.588	5	0.219	21.766
75	0.75	0.882	6	0.263	26.042
100	1	1.176	8	0.350	34.620
125	1.25	1.471	10	0.438	43.146
150	1.5	1.765	12	0.525	51.621
175	1.75	2.059	14	0.613	60.044
200	2	2.353	16	0.701	68.416
225	2.25	2.647	18	0.788	76.736
250	2.5	2.941	20	0.876	85.005
275	2.75	3.235	22	0.963	93.222
300	3	3.529	24	1.051	101.388
325	3.25	3.824	26	1.139	109.502
350	3.5	4.118	28	1.226	117.565
375	3.75	4.412	30	1.314	125.576
400	4	4.706	31	1.358	129.362
425	4.25	5.000	33	1.445	137.283
450	4.5	5.294	34	1.489	141.005
475	4.75	5.588	36	1.576	148.836
500	5	5.882	38	1.664	**156.615**
525	5.25	6.176	36	1.576	147.909
550	5.5	6.471	34	1.489	139.254
575	5.75	6.765	32	1.401	**130.650**
600	6	7.059			
625	6.25	7.353			
650	6.5	7.647			

Unconfined compression curve



Unconfined compressive strength

q_u = 156.615 KN/m^2

UNCONFINED COMPRESSION TEST
(ASTM D2166)

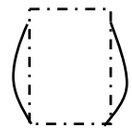
Project : Steung Touch Bridge

Borehole: BH-2 U - 2 Depth : 14.55m - 15.00 m

Tested by: Cheas yim

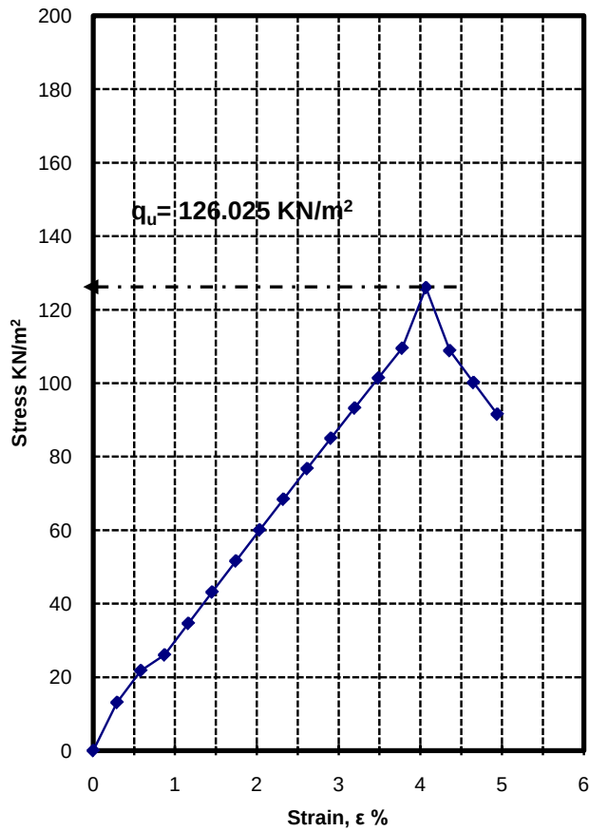
Length,L_0 cm	8.6	Weigth soil , g	196.84	Tin N0	028
Diameter,cm	3.5	Bulk Density,g /cm^3	2.380	Wt tin+ wetsoil,g	82.04
Area A_0,cm^2	9.62	Dry Density,g/cm^3	2.039	Wt tin+dry soil,g	72.35
Volume, cm^3	82.70	Watercontent,%	16.75	Wt of tin,g	14.51
CF, k	0.04379			Wt of dry soil,g	57.84

Mode of failure



deform. dial reading	Sample deform. ΔL1/100	Strain, ε % ΔL/L_0*100	Proving Ring , R 1/100(mm)	Total load P=R*k kgf / cm^2	Stress б=P(1-ε/100) KN/m^2
0	0	0.000	0	0	0
25	0.25	0.291	3	0.131	13.099
50	0.5	0.581	5	0.219	21.768
75	0.75	0.872	6	0.263	26.045
100	1	1.163	8	0.350	34.625
125	1.25	1.453	10	0.438	43.154
150	1.5	1.744	12	0.525	51.632
175	1.75	2.035	14	0.613	60.059
200	2	2.326	16	0.701	68.435
225	2.25	2.616	18	0.788	76.761
250	2.5	2.907	20	0.876	85.035
275	2.75	3.198	22	0.963	93.258
300	3	3.488	24	1.051	101.431
325	3.25	3.779	26	1.139	109.553
350	3.5	4.070	30	1.314	**126.025**
375	3.75	4.360	26	1.139	108.891
400	4	4.651	24	1.051	100.209
425	4.25	4.942	22	0.963	91.578
450	4.5	5.233			
475	4.75	5.523			
500	5	5.814			
525	5.25	6.105			
550	5.5	6.395			
575	5.75	6.686			
600	6	6.977			
625	6.25	7.267			
650	6.5	7.558			

Unconfined compression curve



Unconfined compressive strength

q_u = 126.025 KN/m^2

UNCONFINED COMPRESSION TEST
(ASTM D2166)

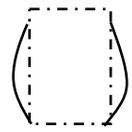
Project : Steung Touch Bridge

Borehole: BH-2 U - 3 Depth : 20.55m - 21.00 m

Tested by: Cheas yim

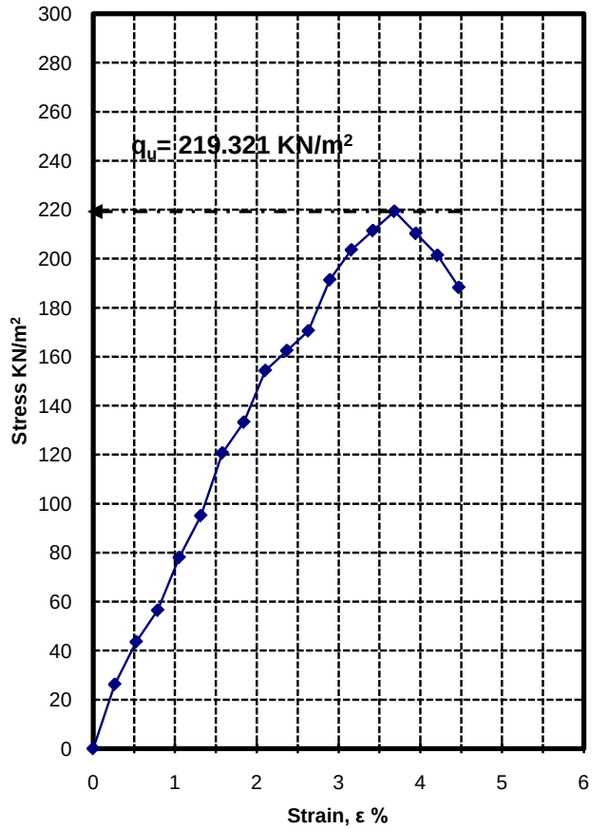
Length,L_0 cm	9.5	Weigth soil , g	180.42	Tin N0	065
Diameter,cm	3.5	Bulk Density,g /cm^3	1.975	Wt tin+ wetsoil,g	91.82
Area A_0,cm^2	9.62	Dry Density,g/cm^3	1.652	Wt tin+dry soil,g	79.11
Volume, cm^3	91.35	Watercontent,%	19.56	Wt of tin,g	14.14
CF, k	0.04379			Wt of dry soil,g	64.97

Mode of failure



deform. dial reading	Sample deform. ΔL1/100	Strain, ε % ΔL/L_0*100	Proving Ring , R 1/100(mm)	Total load P=R*k kgf / cm^2	Stress б=P(1-ε/100) KN/m^2
0	0	0.000	0	0	0
25	0.25	0.263	6	0.263	26.205
50	0.5	0.526	10	0.438	43.560
75	0.75	0.789	13	0.569	56.478
100	1	1.053	18	0.788	77.993
125	1.25	1.316	22	0.963	95.071
150	1.5	1.579	28	1.226	120.677
175	1.75	1.842	31	1.358	133.250
200	2	2.105	36	1.576	154.327
225	2.25	2.368	38	1.664	162.463
250	2.5	2.632	40	1.752	170.552
275	2.75	2.895	45	1.971	191.353
300	3	3.158	48	2.102	203.556
325	3.25	3.421	50	2.190	211.462
350	3.5	3.684	52	2.277	**219.321**
375	3.75	3.947	50	2.190	210.309
400	4	4.211	48	2.102	201.344
425	4.25	4.474	45	1.971	188.241
450	4.5	4.737			
475	4.75	5.000			
500	5	5.263			
525	5.25	5.526			
550	5.5	5.789			
575	5.75	6.053			
600	6	6.316			
625	6.25	6.579			
650	6.5	6.842			

Unconfined compression curve



Unconfined compressive strength

q_u = 219.321 KN/m^2

SPECIFIC GRAVITY OF SOIL

Borehole No. : **BH-2**
Project: Steung Touch Bridge

Pit: PK- 303.4 Type : D-14 Depth: 13.55m - 14.00m

Number of volumetric flash	V6	V11	P02
Wt. of volumetric flash (g)	70.95	43.04	46.01
Wt. of volumetric flash (g)	319.46	142.6	145.26
Water Temperature in vol. flash before test T	29	29	29
Specific gravity of water (g /cm^3)	0.9959	0.9959	0.9959
Wt. of dry soil in volumetric flash (g)	58.67	24.06	25.31
Wt. of volum.flash + Water + drysc(g)	355.57	157.43	160.87
Water Temperature in vol. flash after test T	31	31	31
Specific gravity of water (g /cm^3)	0.9953	0.9953	0.9953
Wt. Volumetric flash + Water at Temp. T	319.31	142.54	145.20
Specific gravity of soil , Gs g /cm^3	2.630	2.636	2.638
Average specific gravity of soil g /cm^3		**2.635**	

Specific Gravity of Water					
Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3
4	1.0000	16	0.9989	28	0.9962
5	1.0000	17	0.9988	29	0.9959
6	0.9999	18	0.9986	30	0.9957
7	0.9999	19	0.9984	31	0.9953
8	0.9999	20	0.9982	32	0.9950
9	0.9998	21	0.9980	33	0.9947
10	0.9997	22	0.9978	34	0.9944
11	0.9996	23	0.9975	35	0.9940
12	0.9995	24	0.9973	36	0.9937
13	0.9994	25	0.9970	37	0.9933
14	0.9992	26	0.9968	38	0.9930
15	0.9991	27	0.9965	39	0.9926

SPECIFIC GRAVITY OF SOIL

Borehole No. : **BH-2**
Project: Steung Touch Bridge

Pit: PK- 303.4 Type : D-19 Depth: 18.55m - 19.00m

Number of volumetric flash	V17	V15	P01
Wt. of volumetric flash (g)	49.79	50.55	57.16
Wt. of volumetric flash (g)	149.00	149.64	156.4
Water Temperature in vol. flash before test T	29	29	29
Specific gravity of water (g /cm^3)	0.9959	0.9959	0.9959
Wt. of dry soil in volumetric flash (g)	35.83	28.39	26.54
Wt. of volum.flash + Water + drysc(g)	171.2	167.21	172.81
Water Temperature in vol. flash after test T	31	31	31
Specific gravity of water (g /cm^3)	0.9953	0.9953	0.9953
Wt. Volumetric flash + Water at Temp. T	148.94	149.58	156.34
Specific gravity of soil , Gs g /cm^3	2.653	2.651	2.648
Average specific gravity of soil g /cm^3		**2.651**	

Specific Gravity of Water					
Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3
4	1.0000	16	0.9989	28	0.9962
5	1.0000	17	0.9988	29	0.9959
6	0.9999	18	0.9986	30	0.9957
7	0.9999	19	0.9984	31	0.9953
8	0.9999	20	0.9982	32	0.9950
9	0.9998	21	0.9980	33	0.9947
10	0.9997	22	0.9978	34	0.9944
11	0.9996	23	0.9975	35	0.9940
12	0.9995	24	0.9973	36	0.9937
13	0.9994	25	0.9970	37	0.9933
14	0.9992	26	0.9968	38	0.9930
15	0.9991	27	0.9965	39	0.9926

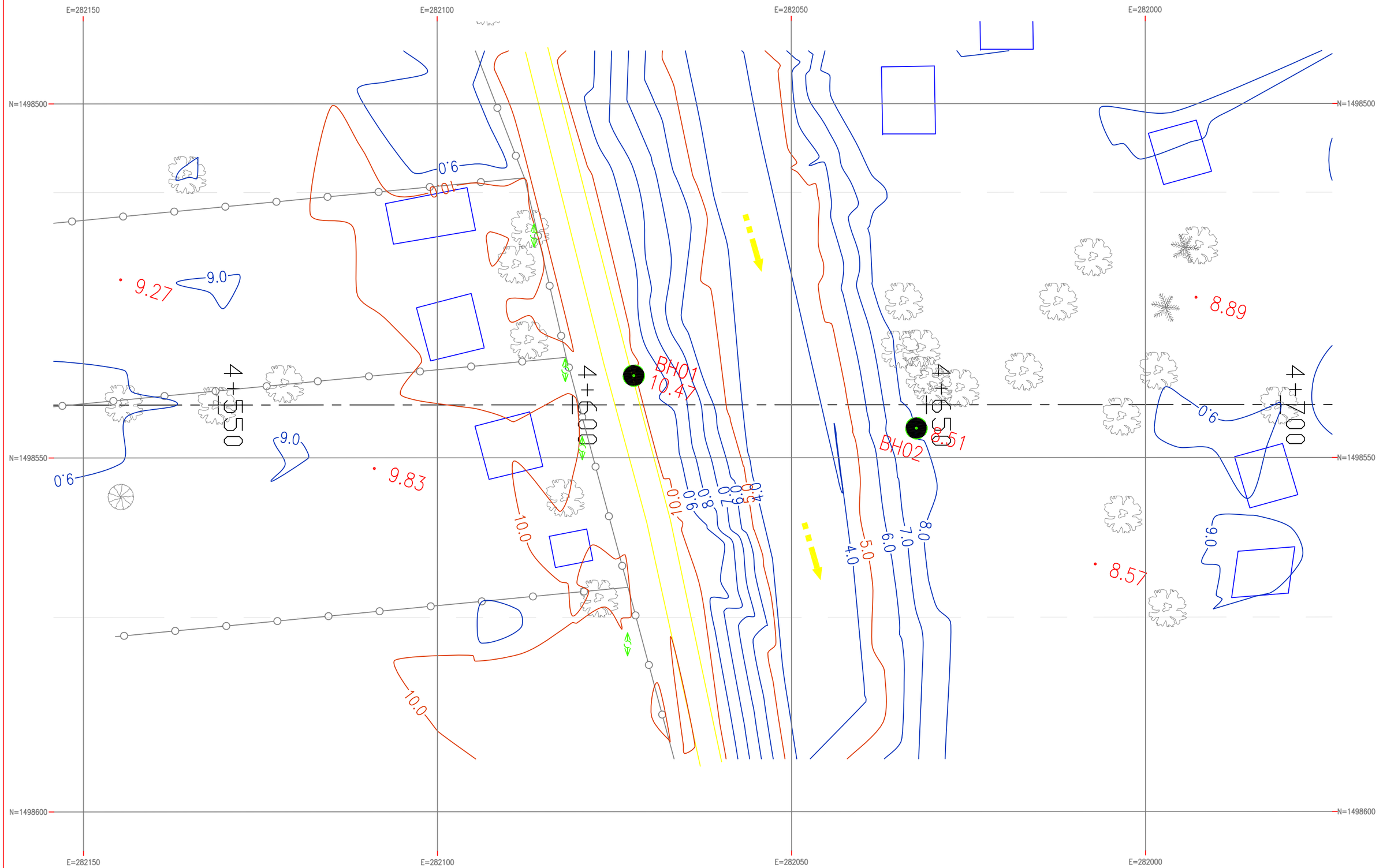
SPECIFIC GRAVITY OF SOIL

Borehole No. : **BH-2**
Project: Steung Touch Bridge

Pit: PK- 303.4 Type : D-22 Depth: 21.55m - 22.00m

Number of volumetric flash	V29	V13	A5
Wt. of volumetric flash (g)	100.59	108.04	33.03
Wt. of volumetric flash (g)	349.06	356.36	132.24
Water Temperature in vol. flash before test	29	29	29
Specific gravity of water (g /cm^3)	0.9959	0.9959	0.9959
Wt. of dry soil in volumetric flash (g)	68.46	64.75	27.44
Wt. of volum.flash + Water + drysc(g)	392.18	397.05	149.51
Water Temperature in vol. flash after test T	31	31	31
Specific gravity of water (g /cm^3)	0.9953	0.9953	0.9953
Wt. Volumetric flash + Water at Temp. T	348.91	356.21	132.18
Specific gravity of soil , Gs g /cm^3	2.731	2.721	2.727
Average specific gravity of soil g /cm^3		**2.726**	

Specific Gravity of Water					
Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3
4	1.0000	16	0.9989	28	0.9962
5	1.0000	17	0.9988	29	0.9959
6	0.9999	18	0.9986	30	0.9957
7	0.9999	19	0.9984	31	0.9953
8	0.9999	20	0.9982	32	0.9950
9	0.9998	21	0.9980	33	0.9947
10	0.9997	22	0.9978	34	0.9944
11	0.9996	23	0.9975	35	0.9940
12	0.9995	24	0.9973	36	0.9937
13	0.9994	25	0.9970	37	0.9933
14	0.9992	26	0.9968	38	0.9930
15	0.9991	27	0.9965	39	0.9926



Japan Internation Cooperation Agency Katahira & Engineers International	PREPARATORY SURVEY FOR NATIONAL ROAD No.5 REHABILITATION PROJECT IN THE KING DOM OF CAMBODIA	KSG Engineering Co.,Ltd	TITLE : RIVER–1 STEUNG MONGKUL BOREY	SCALE V= 1:500 H= 1:500	DRAWING No :	
					DATE	29–FEB–2012

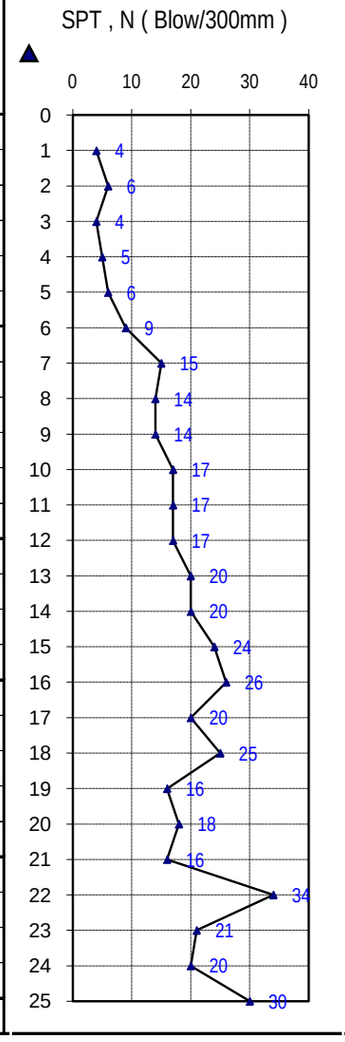
BORE HOLE LOG BH.1

Sub-Contractor: Partner of Construction and Development Services Inc. Owner : Katahira Engineer International	Method :Rotary Auger Casing Size : 180 mm Elevation: .....m	Date started : 11/02/2012 Date finished : 11/02/2012 **PROJECT : Steung Mong Kul Borey Bridge** Location: Mong Kul Borey, Banteay Meanchey Province.

Sampling Depth, m From	To	Type of Sampling U / SPT	Strata (m)	Legend	Description of soil	SPT - N Value Blow/300mm N1=150mm	N2=300mm	N3=450mm	N=N2+N3
D1: 0.55 -	1.00	SPT	6.00			2	2	2	4
D2: 1.55 -	2.00	SPT				3	3	3	6
D3: 2.55 -	3.00	SPT			Firm to stiff brownish, yellowish, high plasticity CLAY	2	2	2	4
D4: 3.55 -	4.00	SPT				2	2	3	5
D5: 4.55 -	5.00	SPT				3	3	3	6
D6: 5.55 -	6.00	SPT				2	3	6	9
D7:6.55 -	7.00	SPT	6.00			4	7	8	15
D8:7.55 -	8.00	SPT				3	6	8	14
D9:8.55 -	9.00	SPT			Stiff to very stiff reddish gray, yellowish Silty CLAY	4	5	9	14
D10:9.55 -	10.00	SPT				6	8	9	17
D11:10.55 -	11.00	SPT				5	7	10	17
D12:11.55 -	12.00	SPT				3	5	12	17
D13:12.55 -	13.00	SPT	4.00			4	7	13	20
D14:13.55 -	14.00	SPT			Very stiff yellowish, grayish, reddish-brown Silty CLAY	6	8	12	20
D15:14.55 -	15.00	SPT				8	10	14	24
D16:15.55 -	16.00	SPT				8	11	15	26
D17:16.55 -	17.00	SPT	5.00			5	9	11	20
D18:17.55 -	18.00	SPT			Very stiff yellowish, grayish, reddish-brown, high plasticity CLAY	6	10	15	25
D19:18.55 -	19.00	SPT				4	8	8	16
D20:19.55 -	20.00	SPT				6	7	11	18
D21:20.55 -	21.00	SPT				4	7	9	16
D22:21.55 -	22.00	SPT	4.00			6	12	22	34
D23:22.55 -	23.00	SPT			Very stiff to hard grayish Sandy SILT	6	9	12	21
D24:23.55 -	24.00	SPT				6	9	11	20
D25:24.55 -	25.00	SPT				8	11	19	30
					END of SPT Test 25.00m Deth				

Depth to water flow: No

Depth to water Level: No



Consistency	Very soft	Soft	Firm	Stiff	Very Stiff	Hard
vs 30Cm, Clay	Less 2	2 - 4	4 - 8	8 - 15	15 - 30	> 30
ensity, Blows/300mm		Very Loose	Loose	Med. Dense	Dense	Very Dense
Fine		1 - 2	3 - 6	7 - 15	16 - 30	?
medium		2 - 3	4 - 7	8 - 20	21 - 40	> 40
coarse		3 - 6	5 - 9	10 - 25	26 - 45	> 45
Unit weight of granular soil base, γ_{sat}, kN/m^3		11 - 16	14 - 18	17 - 20	17 - 22	20 - 23

LEGEND

- Stiff to hard sandy clay, lean Clay
- Firm to stiff silty clay/ lean Clay
- stiff to hard clay , fat Clay
- Clayey sand,Silty Sand
- V. Soft to soft clay, organic clay
- Fill/topsoil
- Gravelly Sand, Clean Sand
- Silty coarse sand with gravel
- Weather Rock
- Sandstone
- Standard Penetration Test (SPT)
- SPT
- SPT - N Value

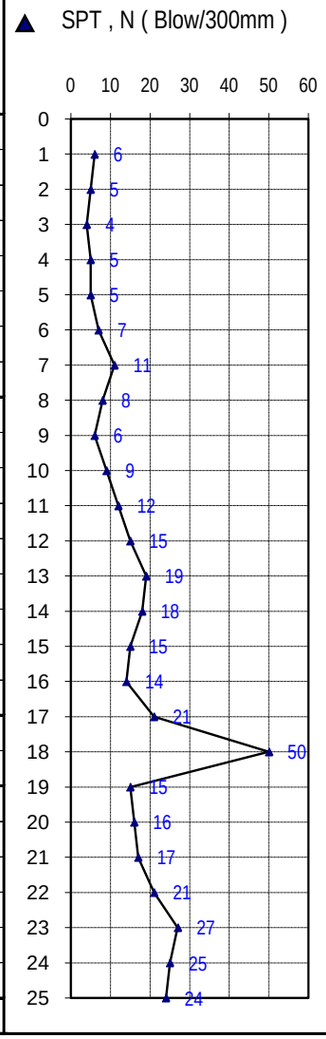
BORE HOLE LOG BH.2

Sub-Contractor: Partner of Construction and Development Services Inc. Owner : Katahira Engineer International	Method :Rotary Auger Casing Size : 180 mm Elevation: .....m	Date started : 12/02/2012 Date finished : 12/02/2012 **PROJECT : Steung Mong Kul Borey Bridge** Location: Mong Kul Borey, Banteay Meanchey Province.

Sampling Depth, m From	To	Type of Sampling U / SPT	Strata, (m)	Legend	Description of soil	SPT - N Value Blow/300mm N1=150mm	N2=300mm	N3=450mm	N=N2+N3
D1: 0.55 -	1.00	SPT	8.000		Firm to stiff grayish, light gray, reddish-brown, yellowish high plasticity CLAY	2	3	3	6
D2: 1.55 -	2.00	SPT				2	2	3	5
D3: 2.55 -	3.00	SPT				3	2	2	4
D4: 3.55 -	4.00	SPT				2	2	3	5
D5: 4.55 -	5.00	SPT				1	2	3	5
D6: 5.55 -	6.00	SPT				2	3	4	7
D7:6.55 -	7.00	SPT				3	4	7	11
D8:7.55 -	8.00	SPT				2	4	4	8
D9:8.55 -	9.00	SPT	9.00		Firm to very stiff yellowish, grayish, light gray, brownish CLAY	2	2	4	6
D10:9.55 -	10.00	SPT				3	4	5	9
D11:10.55 -	11.00	SPT				3	5	7	12
D12:11.55 -	12.00	SPT				4	6	9	15
D13:12.55 -	13.00	SPT				5	9	10	19
D14:13.55 -	14.00	SPT				6	8	10	18
D15:14.55 -	15.00	SPT				4	8	7	15
D16:15.55 -	16.00	SPT				3	6	8	14
D17:16.55 -	17.00	SPT				6	8	13	21
D18:17.55 -	18.00	SPT	2.00		Medium dense to dense grayish, light gray Clayey SAND	6	50		50
D19:18.55 -	19.00	SPT				5	7	8	15
D20:19.55 -	20.00	SPT	6.00		Very stiff reddish-brown, grayish, yellowish, dark brown CLAY	4	6	10	16
D21:20.55 -	21.00	SPT				4	8	9	17
D22:21.55 -	22.00	SPT				5	8	13	21
D23:22.55 -	23.00	SPT				7	10	17	27
D24:23.55 -	24.00	SPT				8	10	15	25
D25:24.55 -	25.00	SPT				9	12	12	24
					END of SPT Test 25.00m Deth				

Depth to water flow: No

Depth to water Level: No



Consistency	Very soft	Soft	Firm	Stiff	Very Stiff	Hard
vs 30Cm, Clay	Less 2	2 - 4	4 - 8	8 - 15	15 - 30	> 30
ensity, Blows/300mm		Very Loose	Loose	Med. Dense	Dense	Very Dense
Fine		1 - 2	3 - 6	7 - 15	16 - 30	?
medium		2 - 3	4 - 7	8 - 20	21 - 40	> 40
coarse		3 - 6	5 - 9	10 - 25	26 - 45	> 45
Unit weight of granular soil base, γ_{sat}, kN/m^3		11 - 16	14 - 18	17 - 20	17 - 22	20 - 23

LEGEND

- Stiff to hard sandy clay, lean Clay
- Firm to stiff silty clay/ lean Clay
- stiff to hard clay , fat Clay
- Clayey sand,Silty Sand
- V. Soft to soft clay, organic clay
- Fill/topsoil
- Gravelly Sand, Clean Sand
- Silty coarse sand with gravel
- Weather Rock
- Sandstone

Standard Penetration Test (SPT)

SPT

SPT - N Value

Partner of Construction and Development Services Inc.
Soil Quality Analysis Office.

Summary of Laboratory Test

PROJECT : Steung Mong Kul Borey Bridge

DATE : 11/02/2012

Location: Mong Kul Borey, Banteay Meanchey Province.

TESTED BY : Mr. Chea Sery Vuth

Table.2

Boring No	Sample	Depth(m)		SPT - N Value, Every 150Cm Blows / 300mm				Soil description	Unified Clasification	NMC W (%)	Bulk density γ_w (g/cm^3)	Dry density γ_d (g/cm^3)	Specific gravity γ_s (g/cm^3)	Atterberg limit			Grain size			Unconf. Strength q_u (kg/cm^2)	Shear Strength	
		From	To	N1	N2	N3	N							LL (%)	PL (%)	PI (%)	Clay and Silt %	Sand %	Gravel %		Cohesion Kpa	Friction Angle Degree (°)
BH.1	D1	0.55	1.00	2	2	2	4	Firm to stiff brownish, yellowish, high plasticity CLAY	CH	21.18				63.00	17.70	45.30	-	-	-	-	-	
	D2	1.55	2.00	3	3	3	6			21.30				49.00	17.69	31.31	-	-	-	-	-	
	D3	2.55	3.00	2	2	2	4			23.47				65.50	14.74	50.76	-	-	-	-	-	
	D4	3.55	4.00	2	2	3	5			26.44				65.20	16.07	49.13	-	-	-	-	-	
	D5	4.55	5.00	3	3	3	6			24.40				57.00	15.74	41.26	-	-	-	-	-	
	D6	5.55	6.00	2	3	6	9			24.49				57.00	19.33	37.67	-	-	-	-	-	
	D7	6.55	7.00	4	7	8	15	Stiff to very stiff reddish gray, yellowish Silty CLAY	CL	19.98				47.70	15.37	32.33	-	-	-	-	-	
	D8	7.55	8.00	3	6	8	14			19.32				48.40	18.02	30.38	-	-	-	-	-	
	D9	8.55	9.00	4	5	9	14			25.78				45.20	11.19	34.01	-	-	-	255.05	224.00	
	D10	9.55	10.00	6	8	9	17			18.14				40.40	11.51	28.89	-	-	-	-	-	
	D11	10.55	11.00	5	7	10	17			17.81				48.50	14.17	34.33	-	-	-	-	-	
	D12	11.55	12.00	3	5	12	17			16.80	2.197	2.029	2.672	47.60	14.65	32.95	-	-	-	-	-	
	D13	12.55	13.00	4	7	13	20	Very stiff yellowish, grayish, reddish-brown Silty CLAY	CL	17.08				41.70	14.98	26.72	-	-	-	-	-	
	D14	13.55	14.00	6	8	12	20			17.65				41.30	13.77	27.53	-	-	-	-	-	
	D15	14.55	15.00	8	10	14	24			17.89				40.10	15.01	25.09	-	-	-	-	-	
	D16	15.55	16.00	8	11	15	26			17.68				40.90	14.35	26.55	-	-	-	294.95	364.00	
	D17	16.55	17.00	5	9	11	20	Very stiff yellowish, grayish, reddish-brown, high plasticity CLAY	CH	17.90	2.304	2.125	2.736	52.60	18.27	34.33	-	-	-	-	-	
	D18	17.55	18.00	6	10	15	25			22.24				52.60	16.91	35.69	-	-	-	-	-	
	D19	18.55	19.00	4	8	8	16			19.34				53.30	13.15	40.15	-	-	-	-	-	
	D20	19.55	20.00	6	7	11	18			20.73				51.40	16.31	35.09	-	-	-	214.03	324.00	
	D21	20.55	21.00	4	7	9	16			21.58	2.288	2.072	2.637	53.20	12.36	40.84	-	-	-	-	-	
	D22	21.55	22.00	6	12	22	34	Very stiff to hard grayish Sandy SILT	ML	20.20				36.60	12.79	23.81	-	-	-	-	-	
	D23	22.55	23.00	6	9	12	21			15.41				36.40	13.26	23.14	-	-	-	-	-	
	D24	23.55	24.00	6	9	11	20			14.66				-	-	-	65.76	34.24	0.00	-	-	
	D25	24.55	25.00	8	11	19	30			14.49				-	-	-	61.09	38.91	0.00	-	-	
								END OF SPT TEST 25.00m DEPTH														

Partner of Construction and Development Services Inc.
Soil Quality Analysis Office.

Summary of Laboratory Test

PROJECT : Steung Mong Kul Borey Bridge
DATE : 12/02/2012
Location: Mong Kul Borey, Banteay Meanchey Province.
TESTED BY : Mr. Chea Sery Vuith

Table.2

Boring No	Sample	Depth(m)		SPT - N Value, Every 150Cm Blows / 300mm				Soil description	Unified Clasification	NMC W (%)	Bulk density γ_w (g/cm^3)	Dry density γ_d (g/cm^3)	Specific gravity γ_s (g/cm^3)	Atterberg limit			Grain size			Unconf. Strength q_u (kg/cm^2)	Shear Strength	
		From	To	N1	N2	N3	N							LL (%)	PL (%)	PI (%)	Clay and Silt %	Sand %	Gravel %		Cohesion Kpa	Friction Angle Degree (°)
BH.2	D1	0.55	1.00	2	3	3	6	Firm to stiff grayish, light gray, reddish-brown, yellowish high plasticity CLAY	CH	16.76				55.00	21.15	33.85	-	-	-		-	-
	D2	1.55	2.00	2	2	3	5			25.12				54.40	16.65	37.75	-	-	-	-	-	-
	D3	2.55	3.00	3	2	2	4			26.71				54.60	20.20	34.40	-	-	-	-	-	-
	D4	3.55	4.00	2	2	3	5			25.82				54.50	19.32	35.18	-	-	-	-	-	-
	D5	4.55	5.00	1	2	3	5			27.87				64.40	17.72	46.68	-	-	-	-	-	-
	D6	5.55	6.00	2	3	4	7			26.99				64.60	12.97	51.63	-	-	-	-	-	-
	D7	6.55	7.00	3	4	7	11			24.62				50.80	19.48	31.32	-	-	-	-	-	-
	D8	7.55	8.00	2	4	4	8			25.34				50.80	17.66	33.14	-	-	-	-	-	-
	D9	8.55	9.00	2	2	4	6	Firm to very stiff yellowish, grayish, light gray, brownish CLAY	CL	26.93				45.80	16.24	29.56	-	-	-	-	-	-
	D10	9.55	10.00	3	4	5	9			23.81				45.50	16.15	29.35	-	-	-	231.37	126.00	-
	D11	10.55	11.00	3	5	7	12			18.96			2.678	42.10	13.25	28.85	-	-	-	-	-	-
	D12	11.55	12.00	4	6	9	15			14.85				42.40	17.64	24.76	-	-	-	-	-	-
	D13	12.55	13.00	5	9	10	19			16.73				58.10	20.13	37.97	-	-	-	-	-	-
	D14	13.55	14.00	6	8	10	18			19.57				45.50	16.82	28.68	-	-	-	-	-	-
	D15	14.55	15.00	4	8	7	15			19.08				43.50	15.45	28.05	-	-	-	-	-	-
	D16	15.55	16.00	3	6	8	14			19.68			2.651	43.10	18.64	24.46	-	-	-	-	-	-
	D17	16.55	17.00	6	8	13	21			16.40				46.80	14.04	32.76	-	-	-	-	-	-
	D18	17.55	18.00	6	50	0	50	Medium dense to dense grayish, light gray Clayey SAND	SC	14.33				-	-	-	42.29	46.04	11.67	164.86	-	-
	D19	18.55	19.00	5	7	8	15			14.09				-	-	-	38.42	61.58	0.00	-	-	-
	D20	19.55	20.00	4	6	10	16	Very stiff reddish-brown, grayish, yellowish, dark brown CLAY	CL	23.97				49.00	16.34	32.66	-	-	-	-	-	-
	D21	20.55	21.00	4	8	9	17			23.80				49.00	17.64	31.36	-	-	-	-	-	-
	D22	21.55	22.00	5	8	13	21			23.66				43.40	14.04	29.36	-	-	-	-	-	-
	D23	22.55	23.00	7	10	17	27			19.06			2.704	41.80	14.14	27.66	-	-	-	-	-	-
	D24	23.55	24.00	8	10	15	25			17.57				43.70	19.05	24.65	-	-	-	-	-	-
	D25	24.55	25.00	9	12	12	24			18.91				37.90	17.35	20.55	-	-	-	397.69	336.00	-
								END OF SPT TEST 25.00m DEPTH														

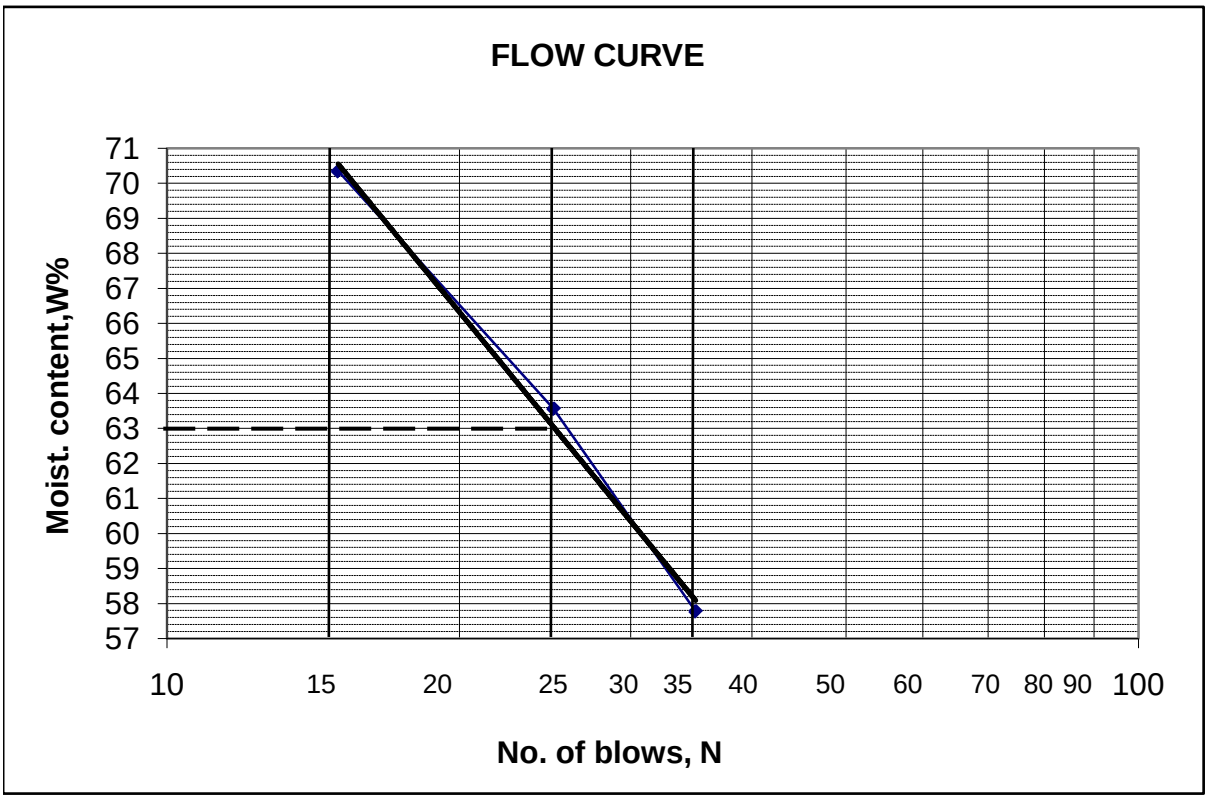
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D1: 1.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.38	14.00	14.06	14.10	14.20
W.Tin+w.s	72.90	63.81	63.62	63.50	42.80
W.Tin+d.s	62.67	43.24	44.36	45.41	38.50
W.d.s	48.29	29.24	30.30	31.31	24.30
W.Water	10.23	20.57	19.26	18.09	4.30
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**21.18**	**70.35**	**63.56**	**57.78**	**17.70**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
17.70	**63.00**	**45.30**	**CH**	0.08



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

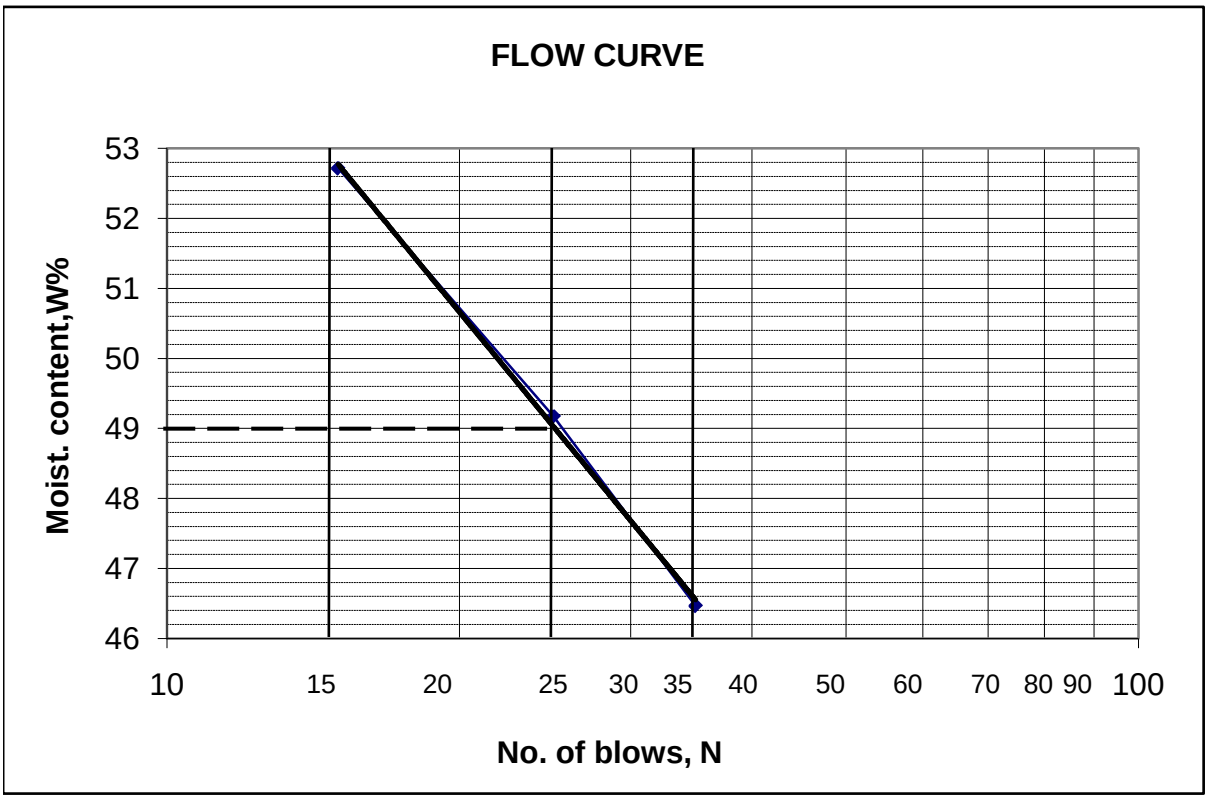
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D2: 2.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.42	14.18	14.26	14.22	14.23
W.Tin+w.s	78.71	73.80	73.60	73.48	43.90
W.Tin+d.s	67.42	53.22	54.04	54.68	39.44
W.d.s	53.00	39.04	39.78	40.46	25.21
W.Water	11.29	20.58	19.56	18.80	4.46
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**21.30**	**52.72**	**49.17**	**46.47**	**17.69**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
17.69	**49.00**	**31.31**	**CL**	0.12



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

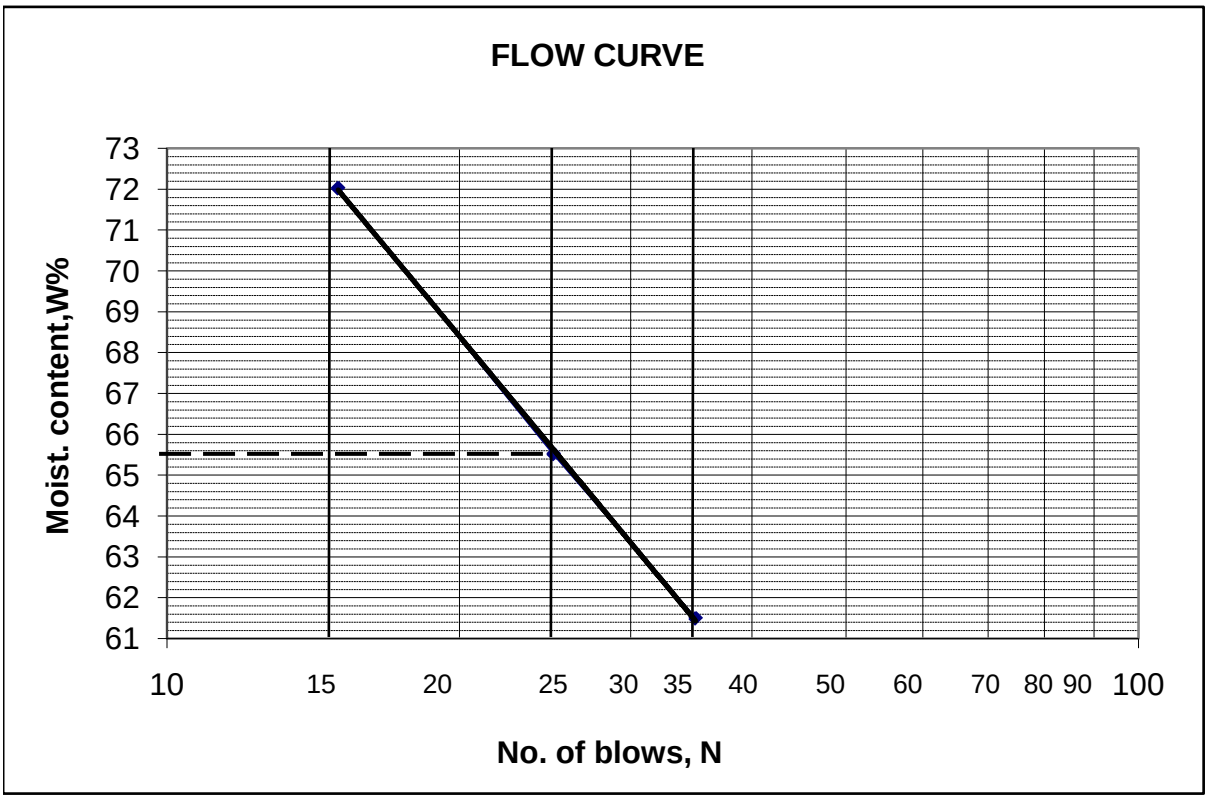
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D3: 3.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.35	14.30	14.29	14.33	13.98
W.Tin+w.s	81.33	66.68	66.51	66.33	47.30
W.Tin+d.s	68.60	44.75	45.84	46.53	43.02
W.d.s	54.25	30.45	31.55	32.20	29.04
W.Water	12.73	21.93	20.67	19.80	4.28
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**23.47**	**72.02**	**65.52**	**61.49**	**14.74**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
14.74	**65.50**	**50.76**	**CH**	0.17



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

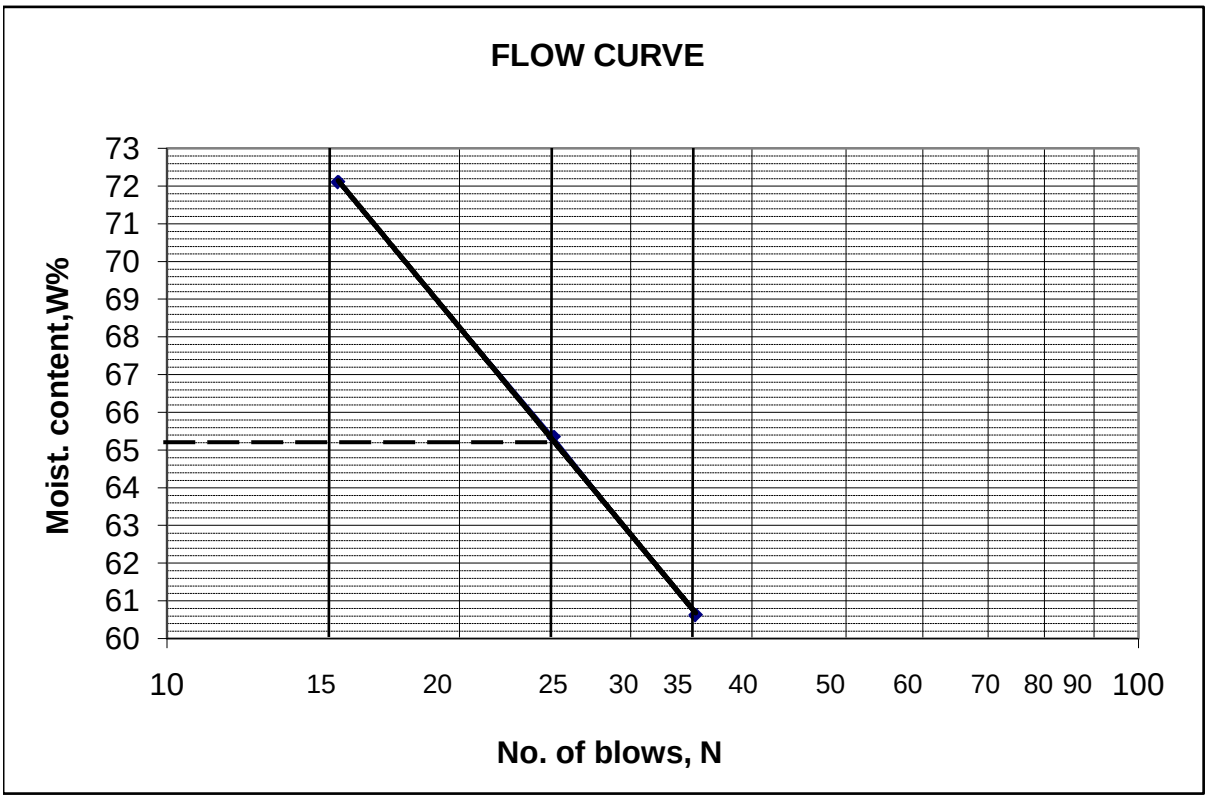
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D4: 4.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.17	14.13	14.12	14.13	14.00
W.Tin+w.s	80.93	62.80	62.73	62.54	45.56
W.Tin+d.s	66.97	42.41	43.52	44.27	41.19
W.d.s	52.80	28.28	29.40	30.14	27.19
W.Water	13.96	20.39	19.21	18.27	4.37
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**26.44**	**72.10**	**65.34**	**60.62**	**16.07**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
16.07	**65.20**	**49.13**	**CH**	0.21



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

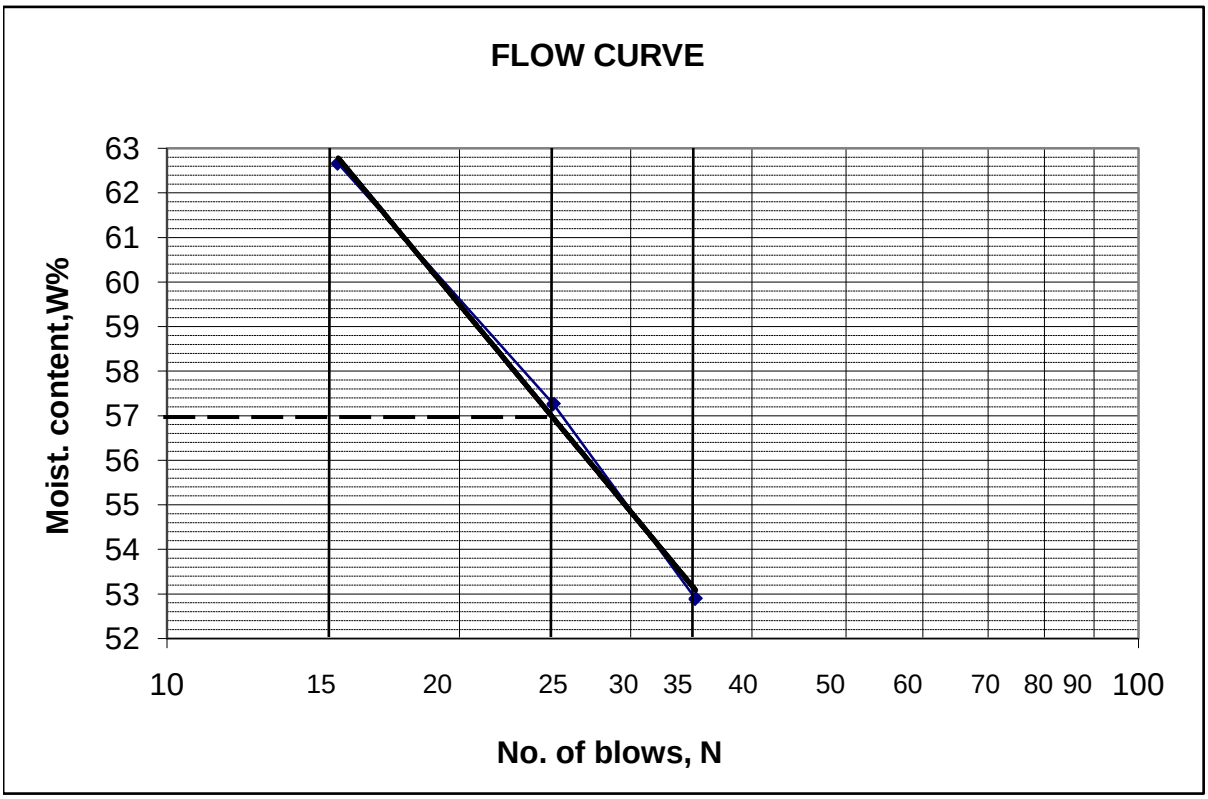
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D5: 5.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.04	14.39	14.35	14.43	14.00
W.Tin+w.s	75.22	64.70	64.50	64.44	41.80
W.Tin+d.s	63.22	45.32	46.24	47.14	38.02
W.d.s	49.18	30.93	31.89	32.71	24.02
W.Water	12.00	19.38	18.26	17.30	3.78
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**24.40**	**62.66**	**57.26**	**52.89**	**15.74**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
15.74	**57.00**	**41.26**	**CH**	0.21



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

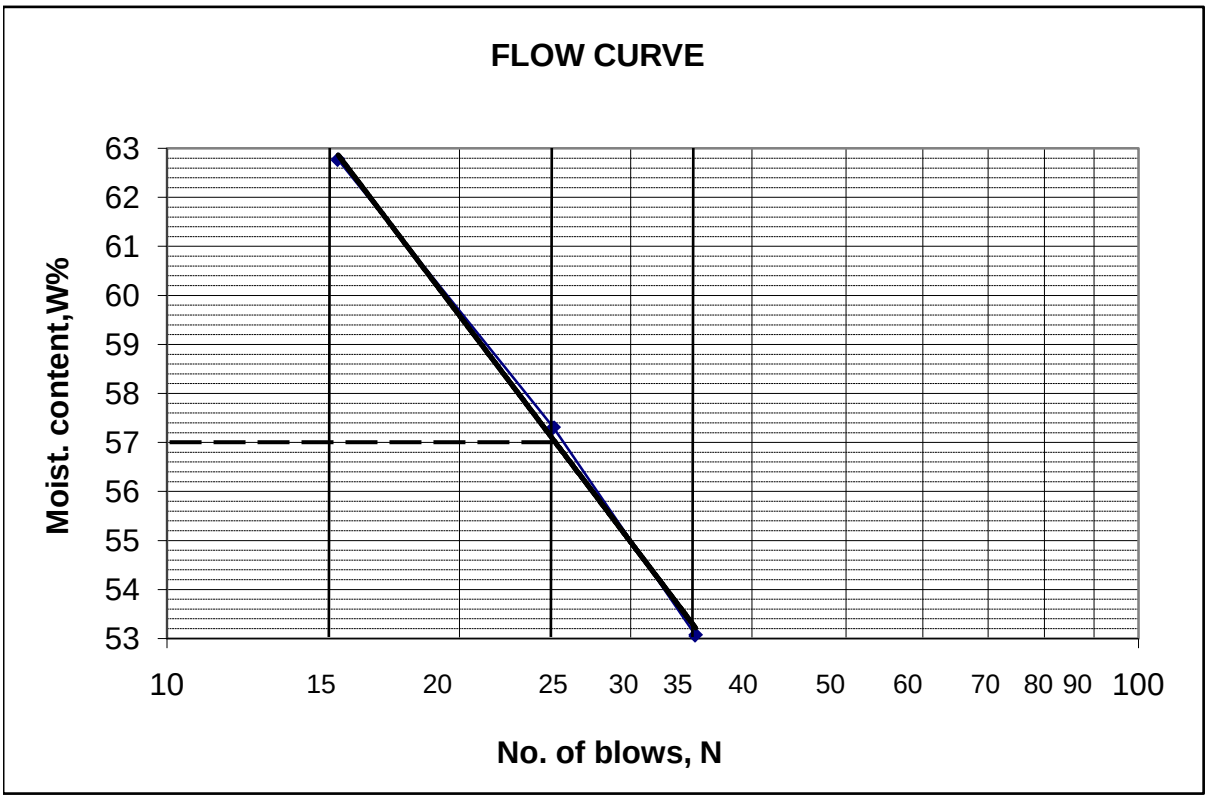
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D6: 6.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.72	14.31	14.29	14.33	14.70
W.Tin+w.s	70.53	67.86	67.63	67.55	40.50
W.Tin+d.s	59.55	47.21	48.20	49.10	36.32
W.d.s	44.83	32.90	33.91	34.77	21.62
W.Water	10.98	20.65	19.43	18.45	4.18
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**24.49**	**62.77**	**57.30**	**53.06**	**19.33**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
19.33	**57.00**	**37.67**	**CH**	0.14



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

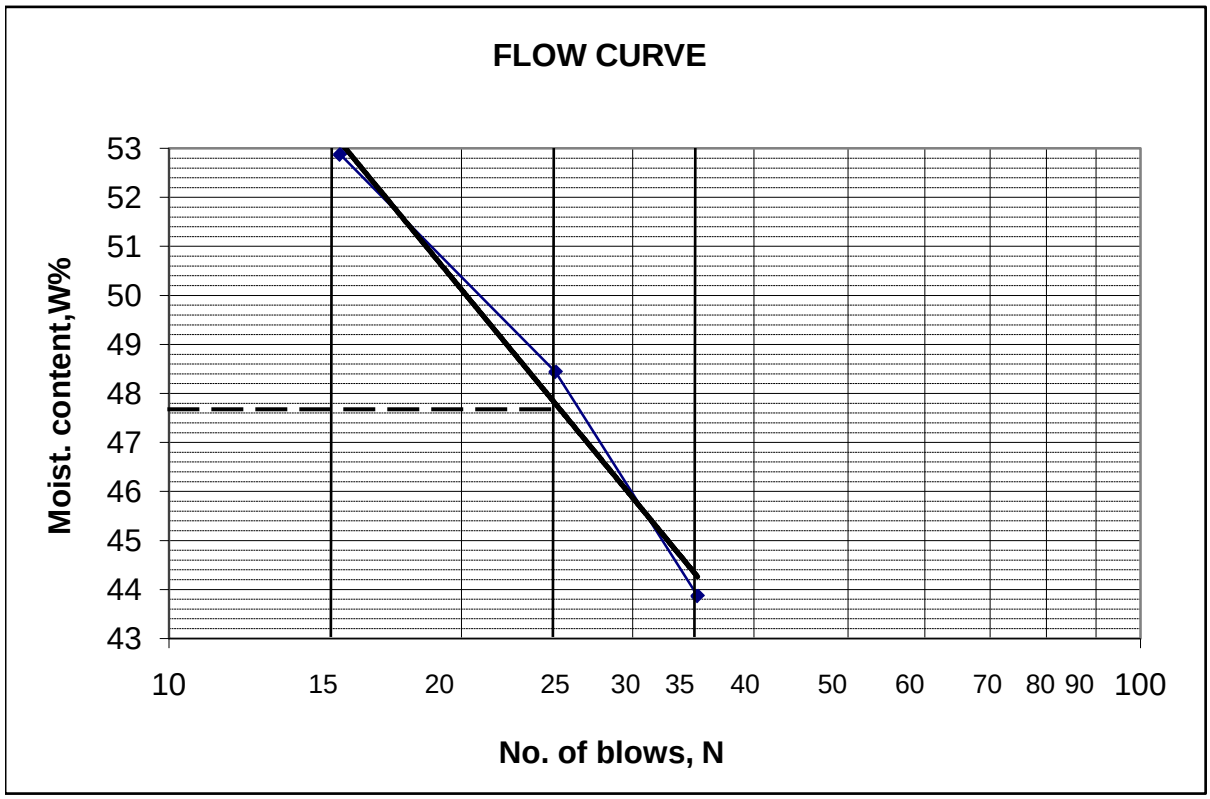
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D7: 7.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.13	14.23	14.28	14.27	13.98
W.Tin+w.s	74.84	67.69	67.51	67.40	46.70
W.Tin+d.s	64.73	49.20	50.14	51.20	42.34
W.d.s	50.60	34.97	35.86	36.93	28.36
W.Water	10.11	18.49	17.37	16.20	4.36
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**19.98**	**52.87**	**48.44**	**43.87**	**15.37**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
15.37	**47.70**	**32.33**	**CL**	0.14



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

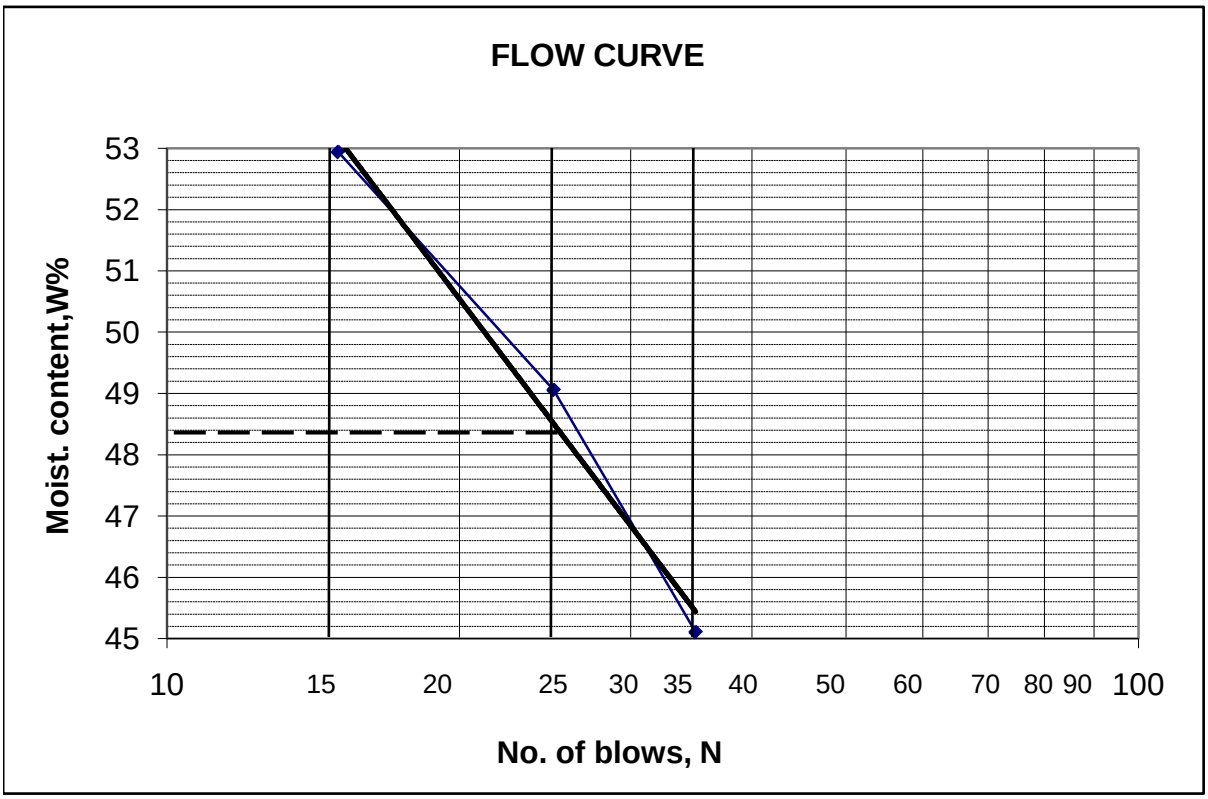
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D8: 8.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.72	14.08	14.03	14.00	14.30
W.Tin+w.s	73.40	65.56	65.44	65.28	42.46
W.Tin+d.s	63.90	47.74	48.52	49.34	38.16
W.d.s	49.18	33.66	34.49	35.34	23.86
W.Water	9.50	17.82	16.92	15.94	4.30
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**19.32**	**52.94**	**49.06**	**45.10**	**18.02**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
18.02	**48.40**	**30.38**	**CL**	0.04



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

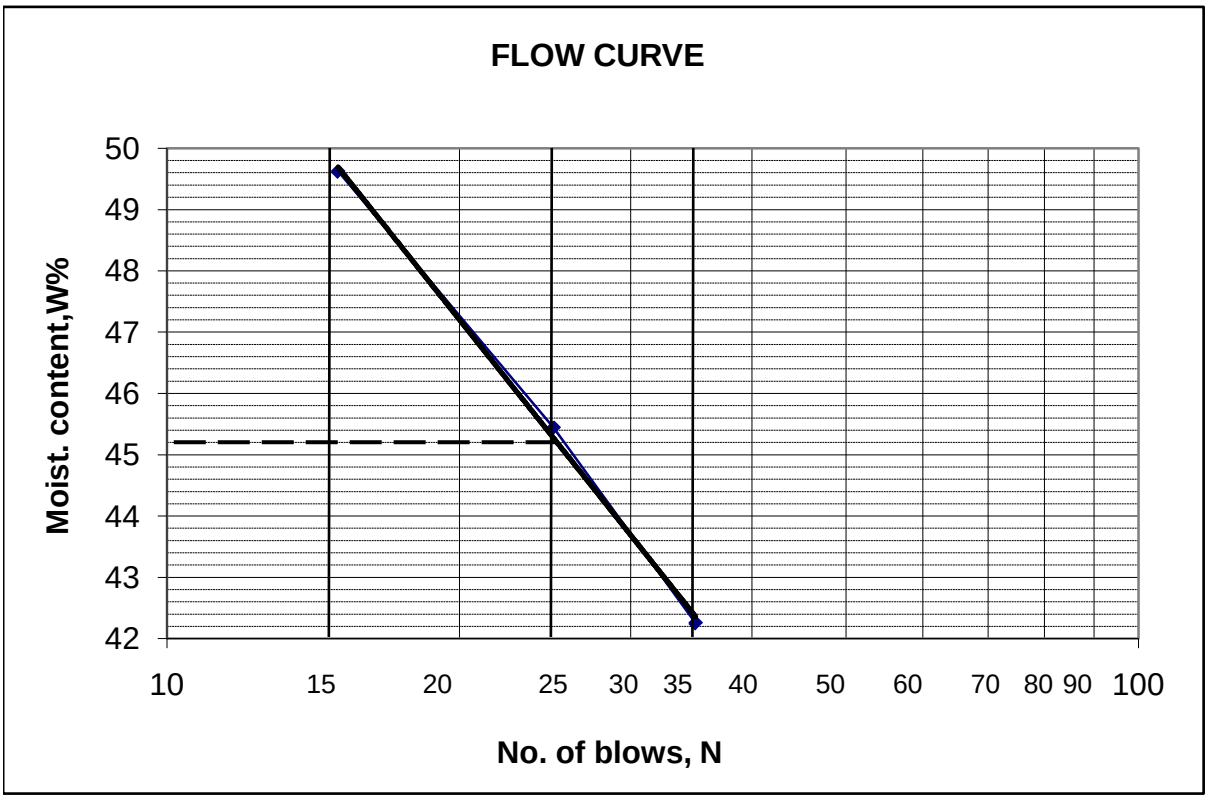
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D9: 9.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.52	14.26	14.23	14.19	14.61
W.Tin+w.s	70.73	71.73	71.62	71.46	50.48
W.Tin+d.s	59.21	52.67	53.69	54.45	46.87
W.d.s	44.69	38.41	39.46	40.26	32.26
W.Water	11.52	19.06	17.93	17.01	3.61
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**25.78**	**49.62**	**45.44**	**42.25**	**11.19**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
11.19	**45.20**	**34.01**	**CL**	0.43



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

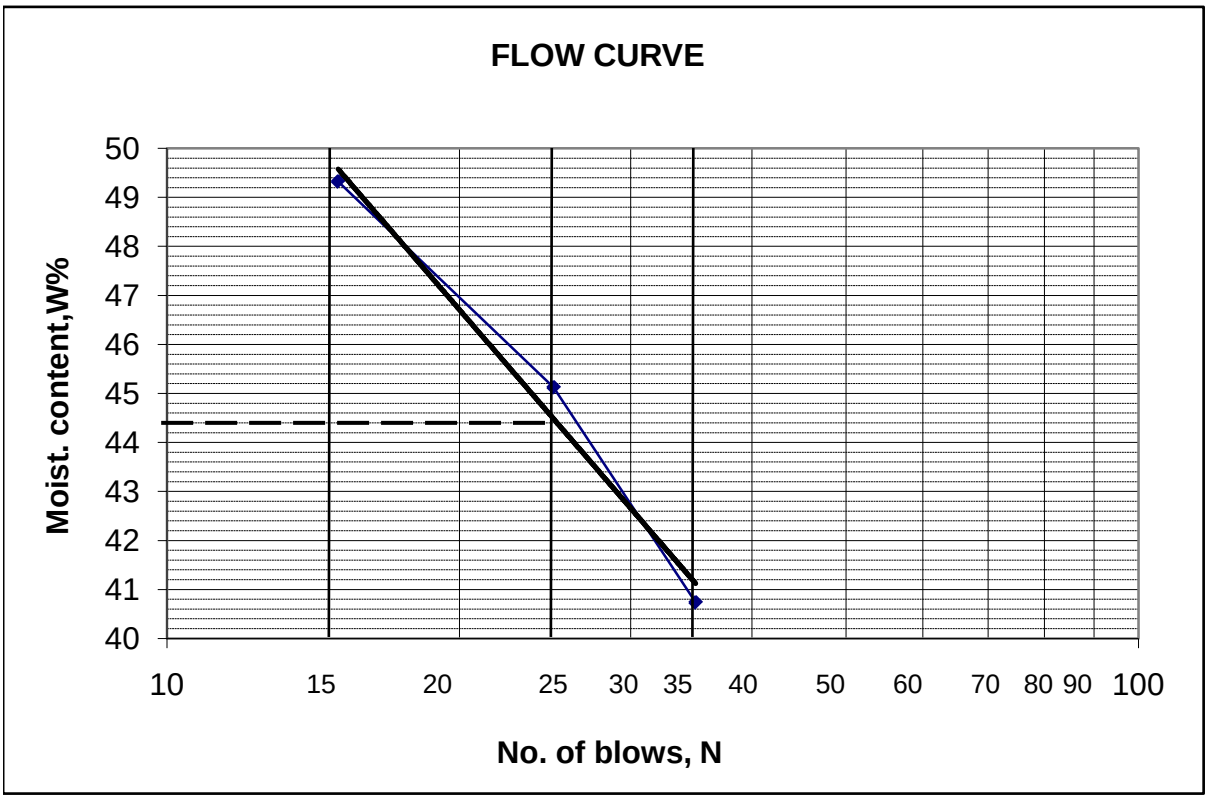
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D10: 10.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.52	14.30	14.28	14.29	14.26
W.Tin+w.s	71.83	62.68	62.49	62.31	47.50
W.Tin+d.s	63.03	46.70	47.50	48.41	44.07
W.d.s	48.51	32.40	33.22	34.12	29.81
W.Water	8.80	15.98	14.99	13.90	3.43
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**18.14**	**49.32**	**45.12**	**40.74**	**11.51**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
11.51	**44.40**	**32.89**	**CL**	0.20



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

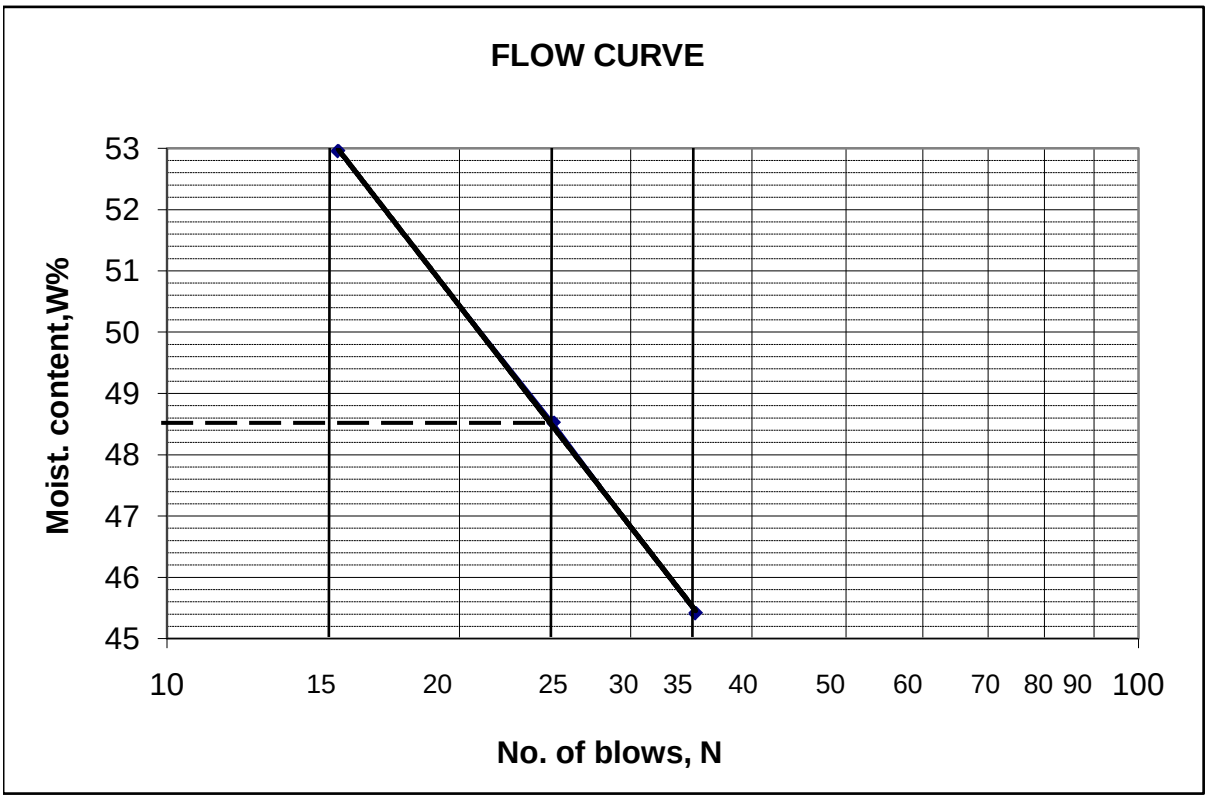
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D11: 11.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.53	14.46	14.42	14.39	14.40
W.Tin+w.s	65.87	66.74	66.61	66.52	42.36
W.Tin+d.s	58.11	48.64	49.56	50.24	38.89
W.d.s	43.58	34.18	35.14	35.85	24.49
W.Water	7.76	18.10	17.05	16.28	3.47
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**17.81**	**52.95**	**48.52**	**45.41**	**14.17**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
14.17	**48.50**	**34.33**	**CL**	0.11



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

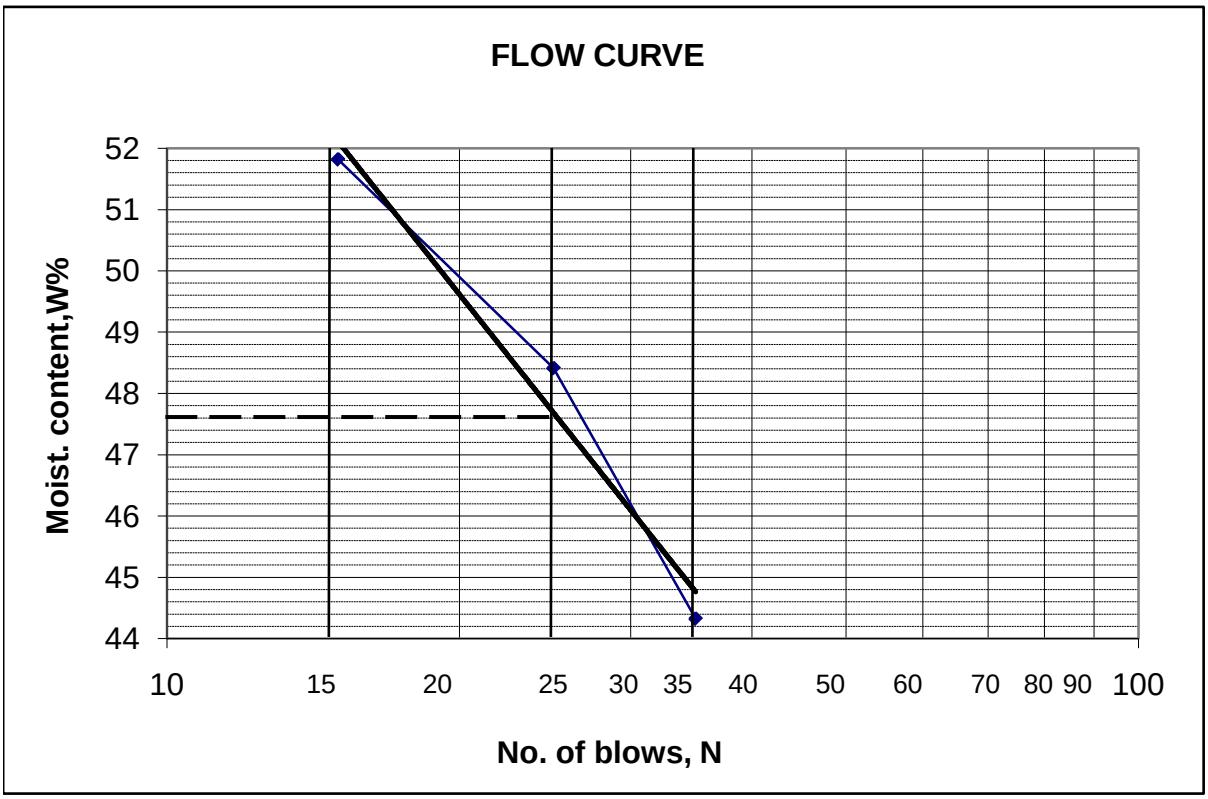
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D12: 12.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.58	14.02	14.00	14.03	14.06
W.Tin+w.s	82.78	63.68	63.57	63.49	41.30
W.Tin+d.s	72.97	46.73	47.40	48.30	37.82
W.d.s	58.39	32.71	33.40	34.27	23.76
W.Water	9.81	16.95	16.17	15.19	3.48
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**16.80**	**51.82**	**48.41**	**44.32**	**14.65**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
14.65	**47.60**	**32.95**	**CL**	0.07



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

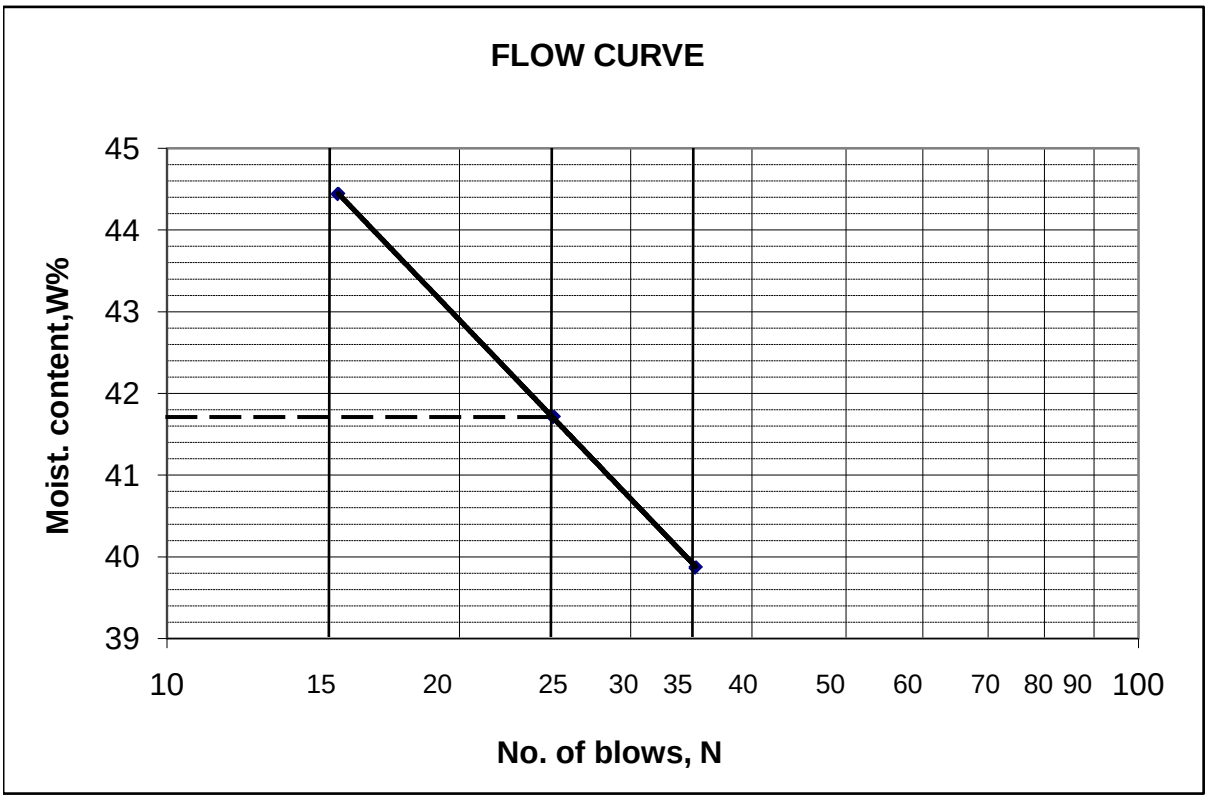
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D13: 13.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.46	14.24	14.34	14.32	14.02
W.Tin+w.s	85.87	70.76	70.60	70.45	41.89
W.Tin+d.s	75.45	53.37	54.04	54.45	38.26
W.d.s	60.99	39.13	39.70	40.13	24.24
W.Water	10.42	17.39	16.56	16.00	3.63
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**17.08**	**44.44**	**41.71**	**39.87**	**14.98**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
14.98	**41.70**	**26.72**	**CL**	0.08



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

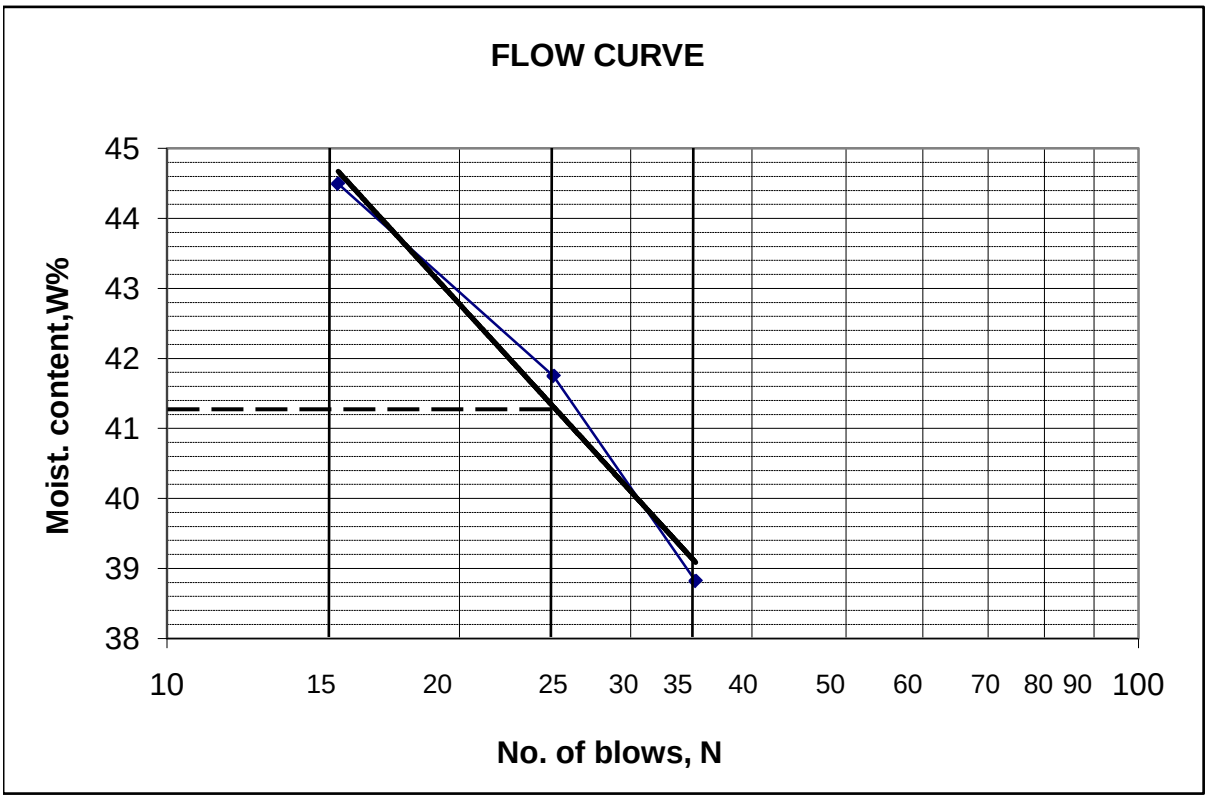
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D14: 14.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.13	14.14	14.16	14.08	14.00
W.Tin+w.s	73.93	63.73	63.63	63.50	43.90
W.Tin+d.s	64.96	48.46	49.06	49.68	40.28
W.d.s	50.83	34.32	34.90	35.60	26.28
W.Water	8.97	15.27	14.57	13.82	3.62
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**17.65**	**44.49**	**41.75**	**38.82**	**13.77**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
13.77	**41.30**	**27.53**	**CL**	0.14



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

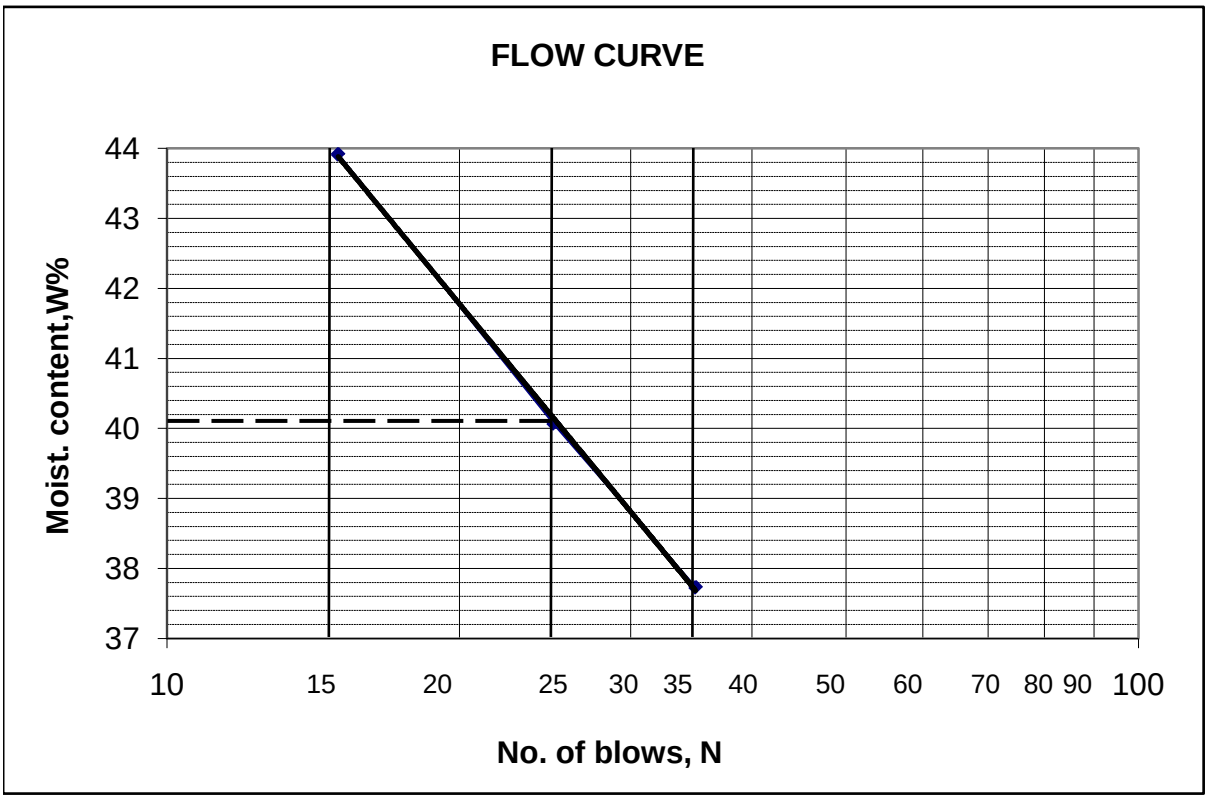
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D15: 15.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.70	14.12	14.10	14.11	14.12
W.Tin+w.s	78.36	64.72	64.61	64.52	42.40
W.Tin+d.s	68.70	49.28	50.16	50.71	38.71
W.d.s	54.00	35.16	36.06	36.60	24.59
W.Water	9.66	15.44	14.45	13.81	3.69
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**17.89**	**43.91**	**40.07**	**37.73**	**15.01**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
15.01	**40.10**	**25.09**	**CL**	0.11



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

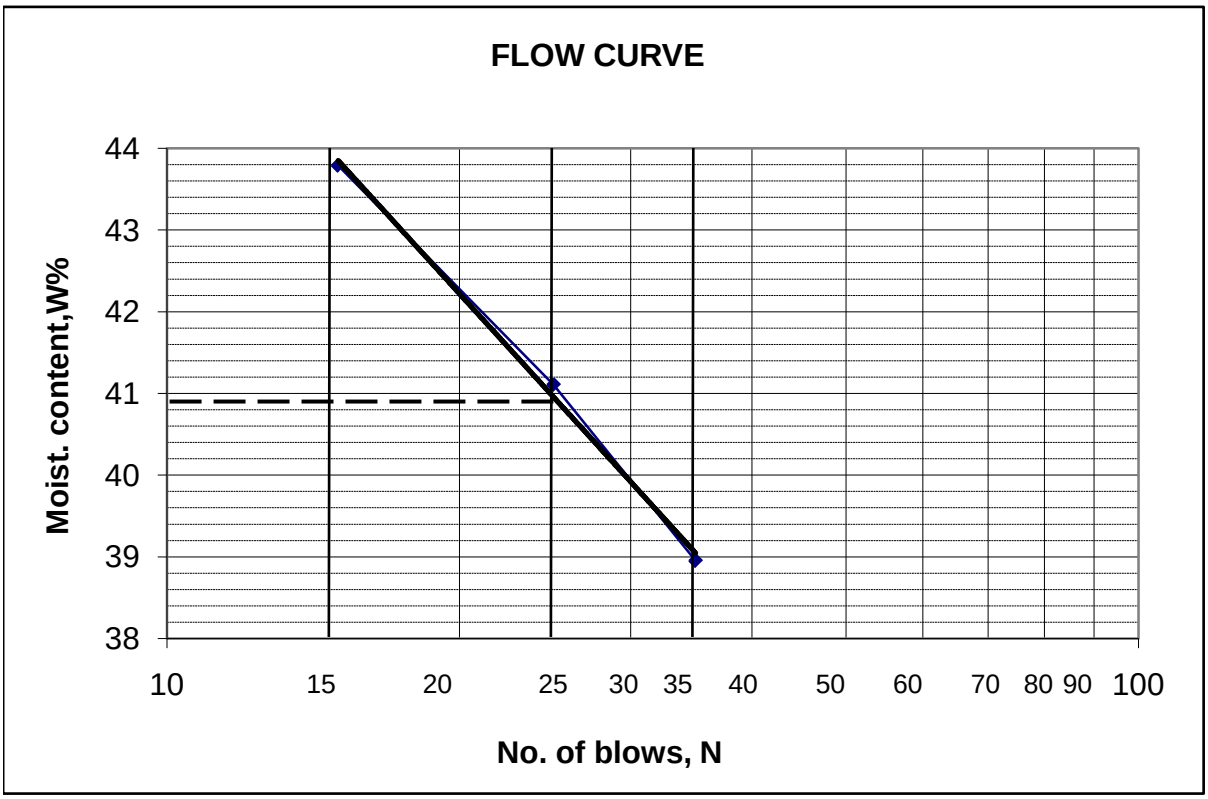
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D16: 16.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.48	14.55	14.58	14.64	14.10
W.Tin+w.s	81.63	69.78	69.64	69.54	43.42
W.Tin+d.s	71.54	52.96	53.60	54.15	39.74
W.d.s	57.06	38.41	39.02	39.51	25.64
W.Water	10.09	16.82	16.04	15.39	3.68
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**17.68**	**43.79**	**41.11**	**38.95**	**14.35**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
14.35	**40.90**	**26.55**	**CL**	0.13



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

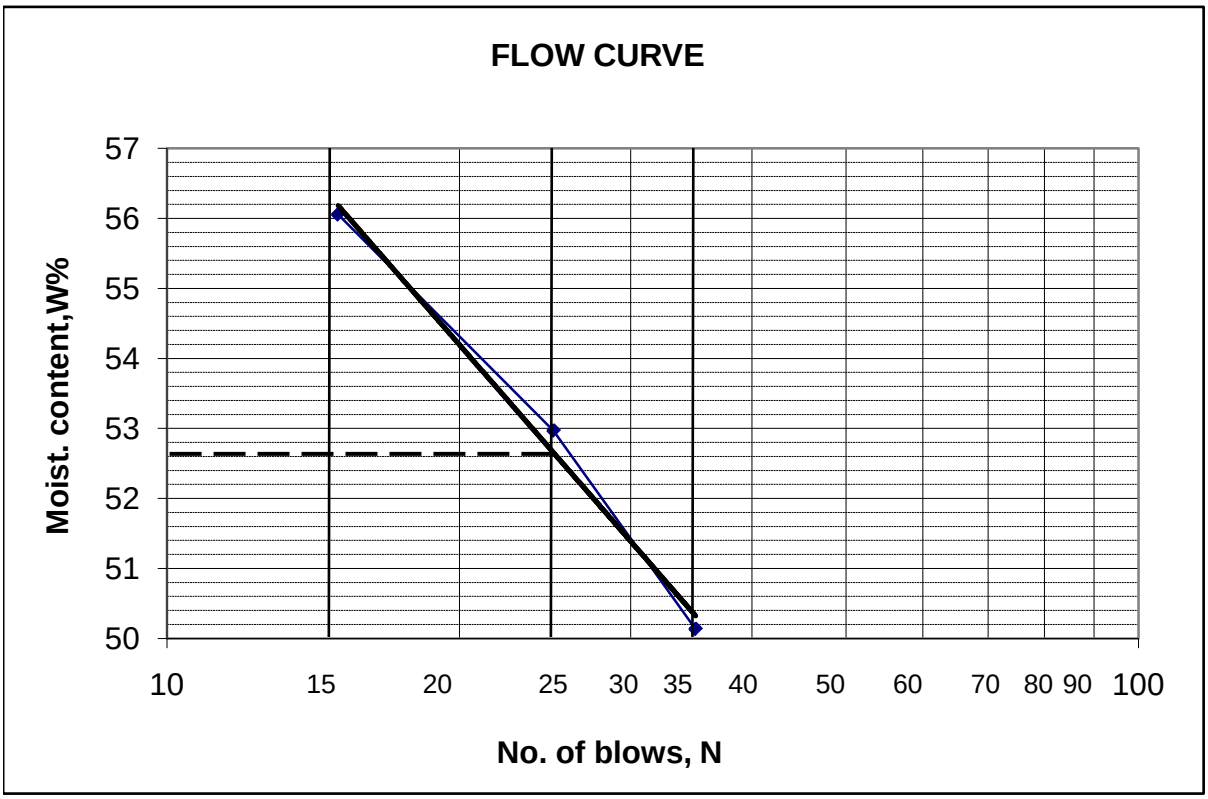
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D17: 17.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.38	14.32	14.31	14.27	14.22
W.Tin+w.s	75.38	64.71	64.56	64.49	42.32
W.Tin+d.s	66.12	46.61	47.16	47.72	37.98
W.d.s	51.74	32.29	32.85	33.45	23.76
W.Water	9.26	18.10	17.40	16.77	4.34
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**17.90**	**56.05**	**52.97**	**50.13**	**18.27**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
18.27	**52.60**	**34.33**	**CH**	-0.01



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

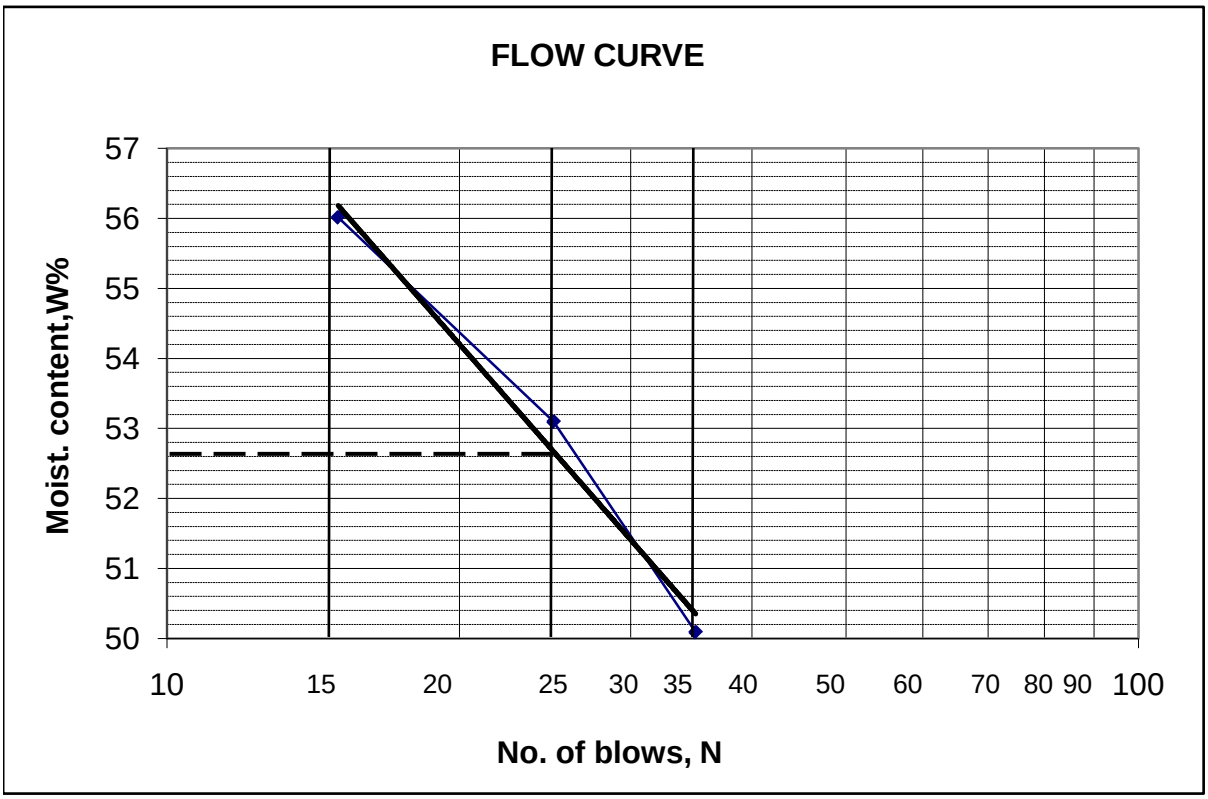
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D18: 18.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.54	14.02	14.06	14.02	14.16
W.Tin+w.s	80.54	63.57	63.51	63.40	44.31
W.Tin+d.s	68.53	45.78	46.36	46.92	39.95
W.d.s	53.99	31.76	32.30	32.90	25.79
W.Water	12.01	17.79	17.15	16.48	4.36
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**22.24**	**56.01**	**53.10**	**50.09**	**16.91**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
16.91	**52.60**	**35.69**	**CH**	0.15



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

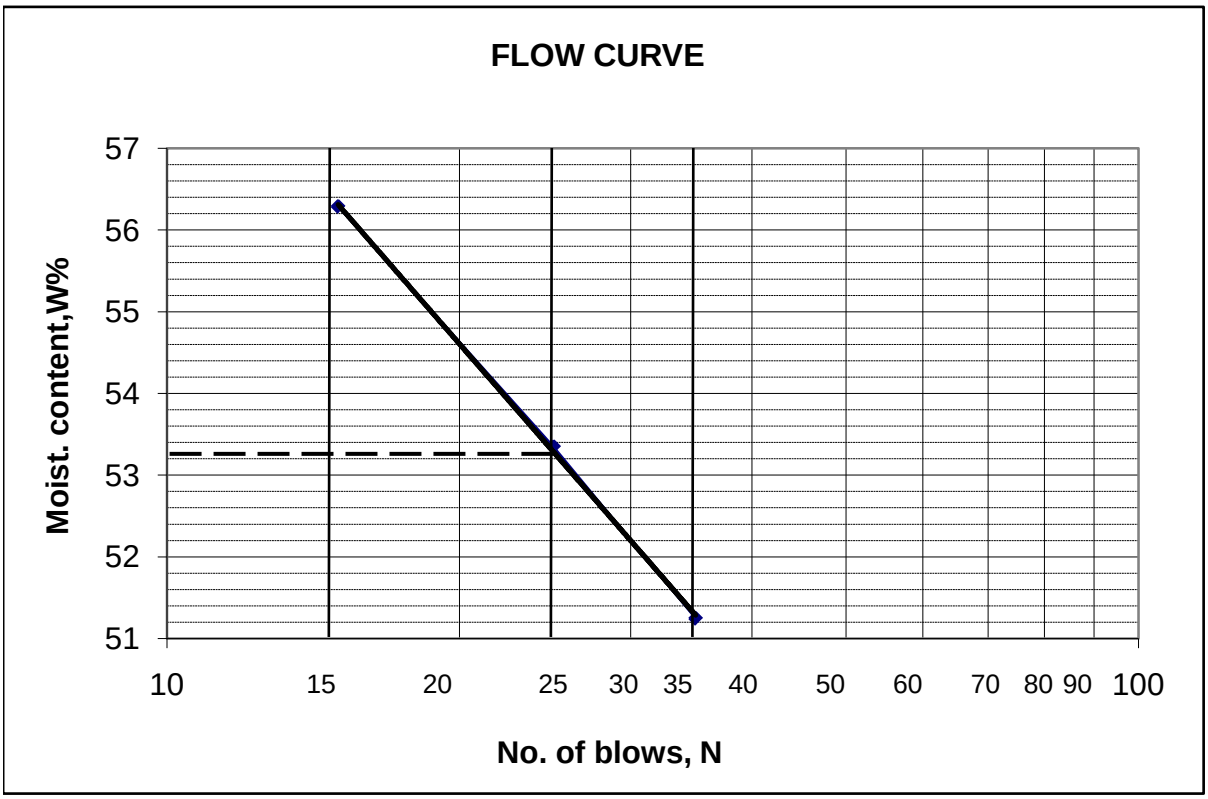
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D19: 19.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.10	14.26	14.27	14.18	14.38
W.Tin+w.s	72.53	66.71	66.50	66.33	46.90
W.Tin+d.s	63.06	47.82	48.33	48.66	43.12
W.d.s	48.96	33.56	34.06	34.48	28.74
W.Water	9.47	18.89	18.17	17.67	3.78
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**19.34**	**56.29**	**53.35**	**51.25**	**13.15**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
13.15	**53.30**	**40.15**	**CH**	0.15



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

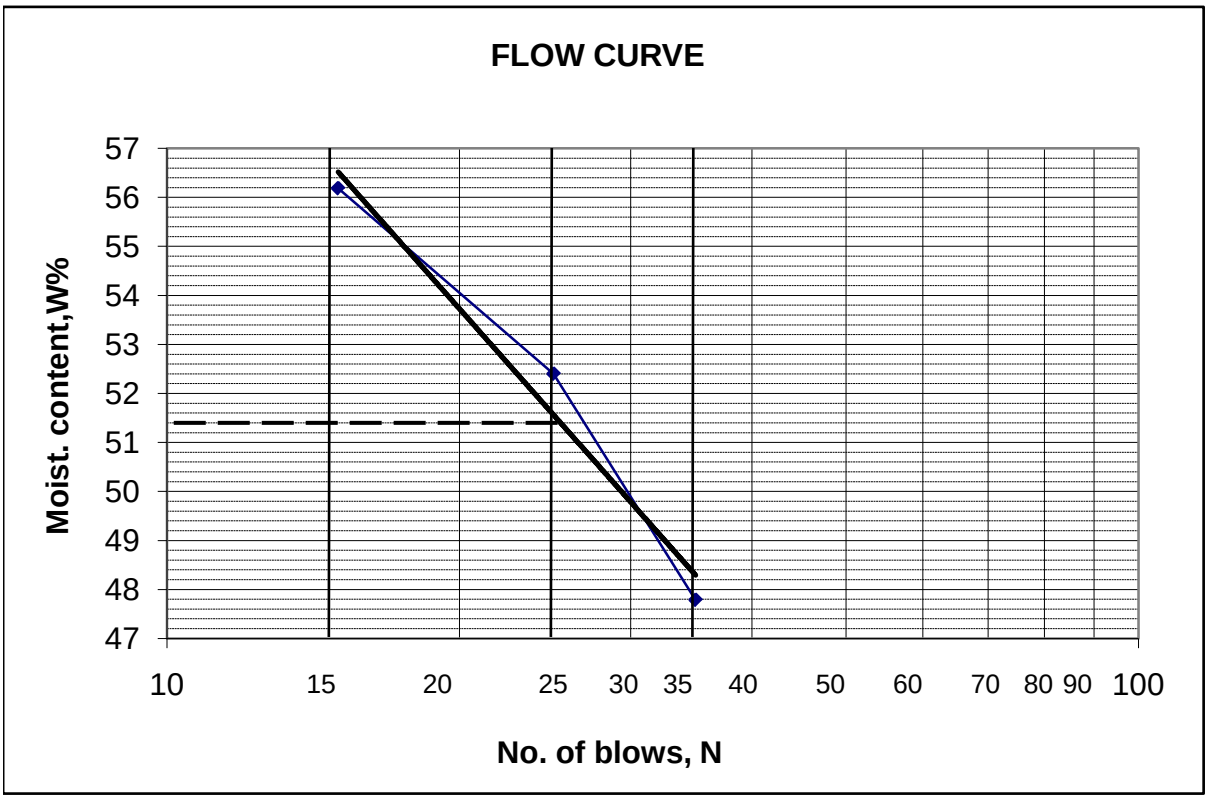
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D20: 20.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.40	14.58	14.60	14.41	14.00
W.Tin+w.s	75.44	73.79	73.64	73.51	40.60
W.Tin+d.s	64.96	52.49	53.34	54.40	36.87
W.d.s	50.56	37.91	38.74	39.99	22.87
W.Water	10.48	21.30	20.30	19.11	3.73
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**20.73**	**56.19**	**52.40**	**47.79**	**16.31**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
16.31	**51.40**	**35.09**	**CH**	0.13



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

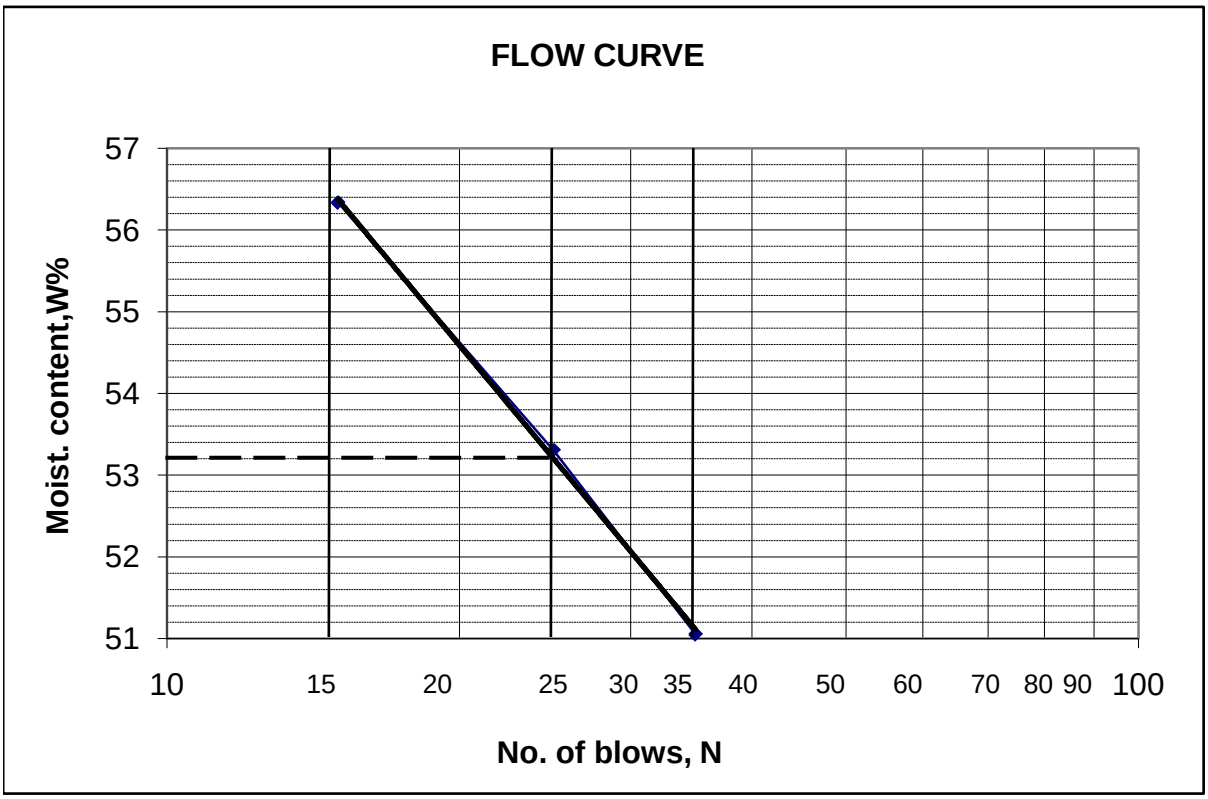
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D21: 21.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	13.76	14.18	14.23	14.25	14.00
W.Tin+w.s	74.73	67.74	67.61	67.51	44.36
W.Tin+d.s	63.91	48.44	49.05	49.51	41.02
W.d.s	50.15	34.26	34.82	35.26	27.02
W.Water	10.82	19.30	18.56	18.00	3.34
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**21.58**	**56.33**	**53.30**	**51.05**	**12.36**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
12.36	**53.20**	**40.84**	**CH**	0.23



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

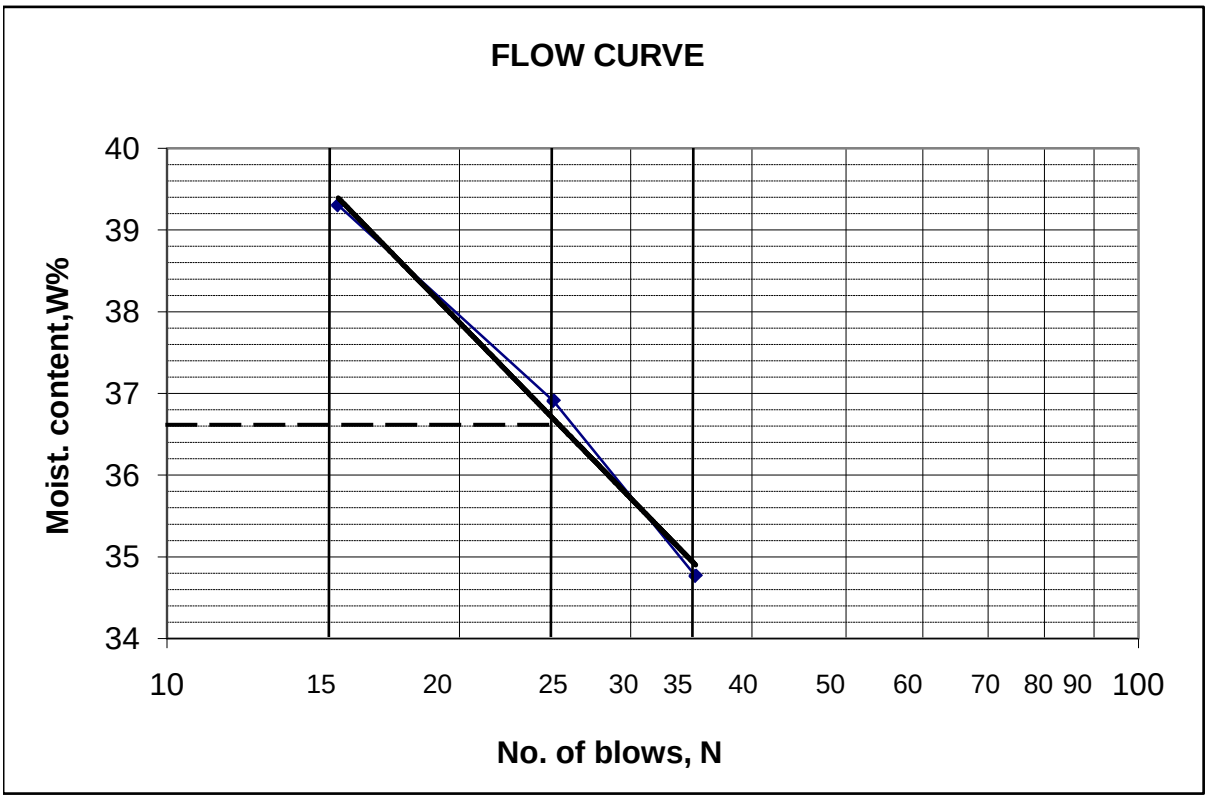
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D22: 22.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.21	14.21	14.18	14.16	14.10
W.Tin+w.s	87.10	65.46	65.37	65.29	42.50
W.Tin+d.s	74.85	51.00	51.57	52.10	39.28
W.d.s	60.64	36.79	37.39	37.94	25.18
W.Water	12.25	14.46	13.80	13.19	3.22
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**20.20**	**39.30**	**36.91**	**34.77**	**12.79**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
12.79	**36.60**	**23.81**	**CL**	0.31



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

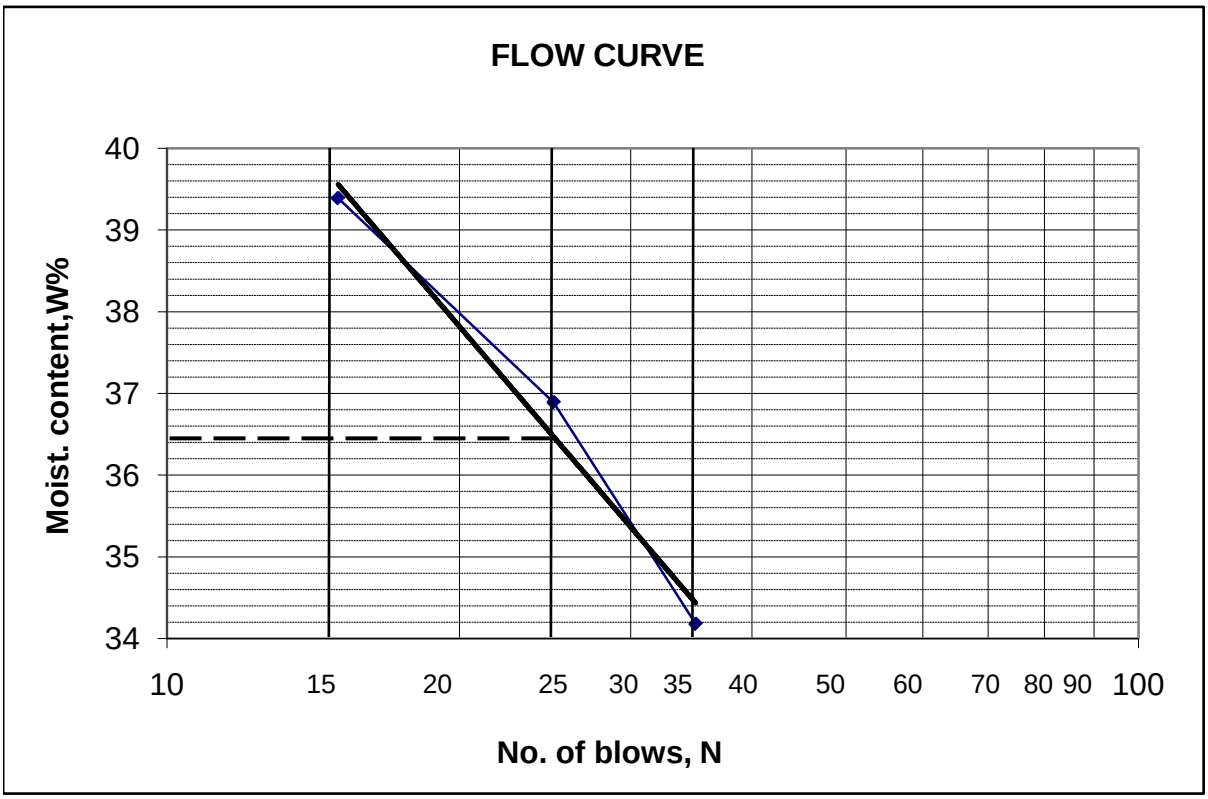
Project : Steung Mong Kul Borey Bridge BH-1
Location: Mong Kul Borey, Banteay Meanchey province. D23: 23.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.16	14.24	14.32	14.31	14.14
W.Tin+w.s	77.91	72.84	72.65	72.41	41.48
W.Tin+d.s	69.40	56.28	56.93	57.61	38.28
W.d.s	55.24	42.04	42.61	43.30	24.14
W.Water	8.51	16.56	15.72	14.80	3.20
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**15.41**	**39.39**	**36.89**	**34.18**	**13.26**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
13.26	**36.40**	**23.14**	**CL**	0.09



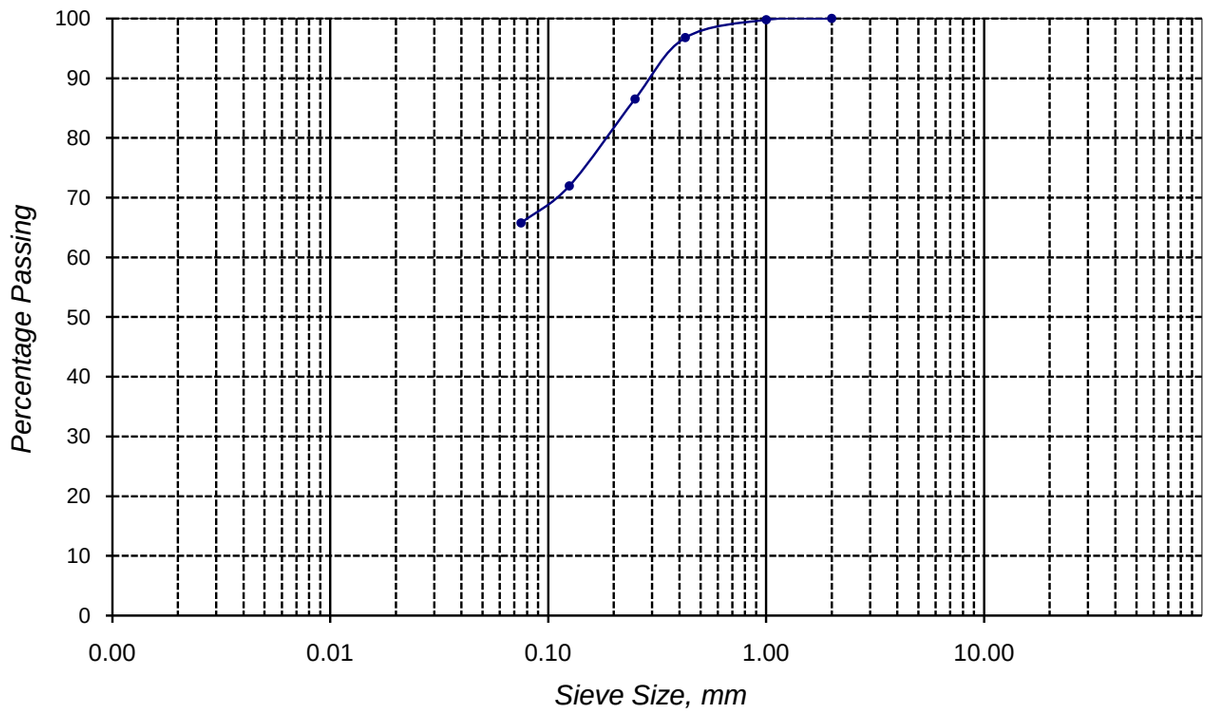
Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 11/02/2012
Checked by : Chea Serey vuth	Date of testing : 11/02/2012

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Mong Kul Borey Bridge BH-1	Date of boring	11/2/2012
LOCATION :	Mong Kul Borey, Banteay Meanchey province.	Date of testing	11/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	171.14	
Depth, m	23.55-24.00	
Sample Nº	D24	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	100.00	
4.75	100.00	
2.00	100.00	
1.00	99.79	
0.425	96.77	
0.250	86.50	
0.125	71.96	
0.075	65.76	
Water Content , %	14.66	
Silt + Clay , %	Sand , %	Gravel , %
65.76	34.24	0.00

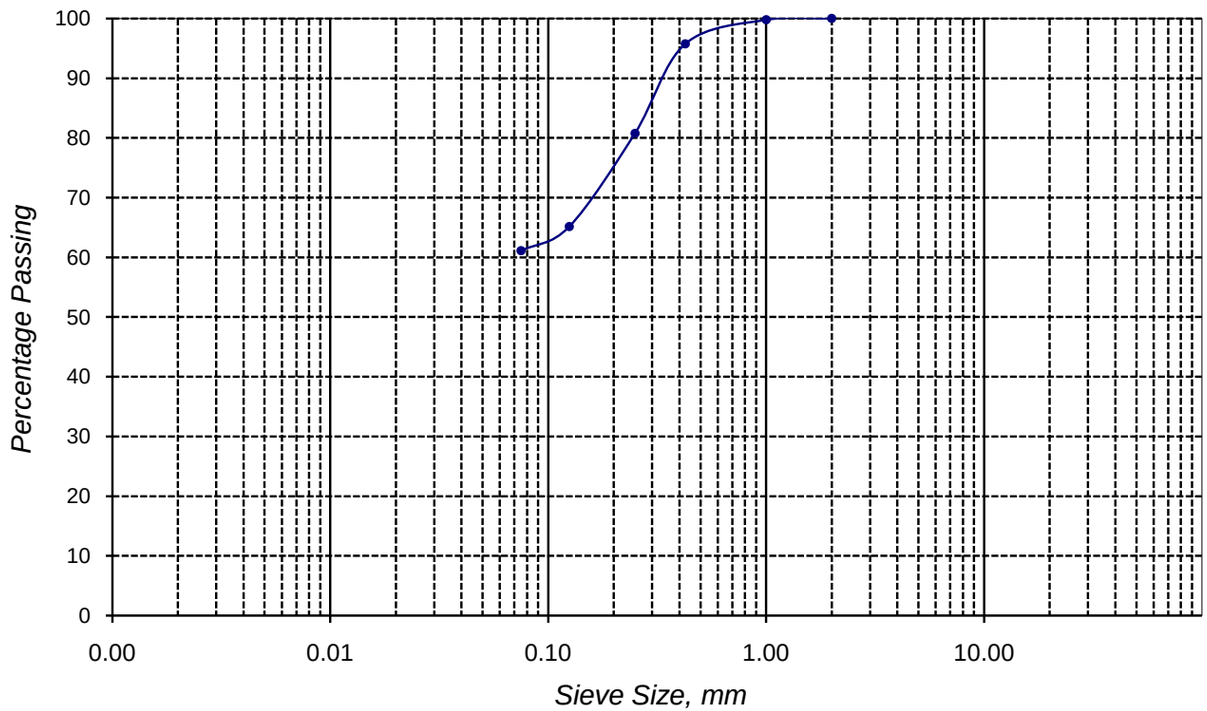
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Mong Kul Borey Bridge BH-1	Date of boring	9/2/2012
LOCATION :	Mong Kul Borey, Banteay Meanchey province.	Date of testing	9/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	193.71	
Depth, m	24.55-25.00	
Sample Nº	D25	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	100.00	
4.75	100.00	
2.00	100.00	
1.00	99.77	
0.425	95.73	
0.250	80.74	
0.125	65.14	
0.075	61.09	
Water Content , %	14.49	
Silt + Clay , %	Sand , %	Gravel , %
61.09	38.91	0.00

OPERATOR : M^{rs} Rem

UNCONFINED COMPRESSION TEST
(ASTM D2166)

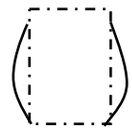
Project : Mongkul Borey Bridge

Borehole: BH-1 U - 1 Depth : 8.55m - 9.00 m

Tested by: Cheas yim

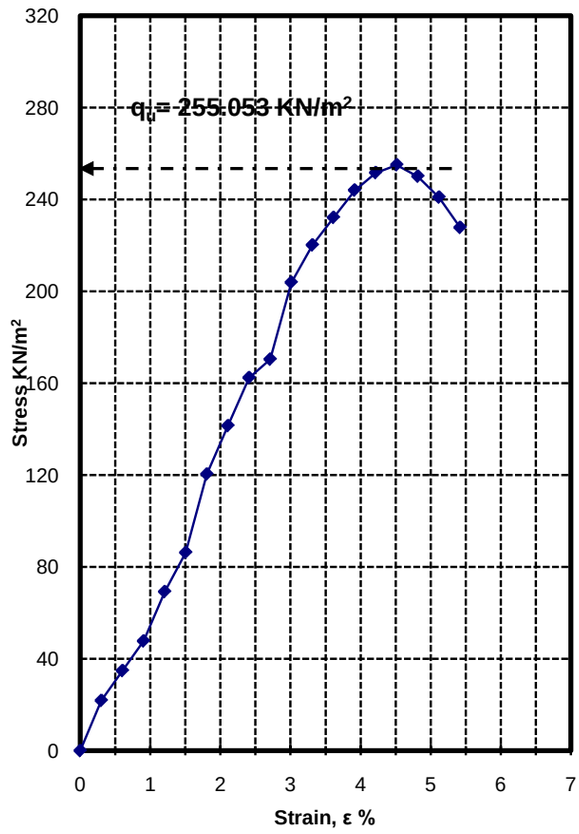
Length,L_0 cm	8.3	Weigth soil , g	167.78	Tin N0	068
Diameter,cm	3.5	Bulk Density,g /cm^3	2.102	Wt tin+ wetsoil,g	68.57
Area A_0,cm^2	9.62	Dry Density,g/cm^3	1.775	Wt tin+dry soil,g	60.16
Volume, cm^3	79.81	Watercontent,%	18.42	Wt of tin,g	14.50
CF, k	0.04379			Wt of dry soil,g	45.66

Mode of failure



deform. dial reading	Sample deform. ΔL1/100	Strain, ε % ΔL/L_0*100	Proving Ring , R 1/100(mm)	Total load P=R*k kgf / cm^2	Stress б=P(1-ε/100) KN/m^2
0	0	0.000	0	0	0
25	0.25	0.301	5	0.219	21.829
50	0.5	0.602	8	0.350	34.821
75	0.75	0.904	11	0.482	47.734
100	1	1.205	16	0.701	69.221
125	1.25	1.506	20	0.876	86.262
150	1.5	1.807	28	1.226	120.397
175	1.75	2.108	33	1.445	141.462
200	2	2.410	38	1.664	162.394
225	2.25	2.711	40	1.752	170.413
250	2.5	3.012	48	2.102	203.863
275	2.75	3.313	52	2.277	220.166
300	3	3.614	55	2.408	232.142
325	3.25	3.916	58	2.540	244.039
350	3.5	4.217	60	2.627	251.663
375	3.75	4.518	61	2.671	**255.053**
400	4	4.819	60	2.627	250.080
425	4.25	5.120	58	2.540	240.979
450	4.5	5.422	55	2.408	227.790
475	4.75	5.723			
500	5	6.024			
525	5.25	6.325			
550	5.5	6.627			
575	5.75	6.928			
600	6	7.229			
625	6.25	7.530			
650	6.5	7.831			

Unconfined compression curve



Unconfined compressive strength

q_u = 255.053 KN/m^2

UNCONFINED COMPRESSION TEST
(ASTM D2166)

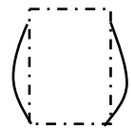
Project : Mongkul Borey Bridge

Borehole: BH-1 U - 2 Depth : 15.55m - 16.00 m

Tested by: Cheas yim

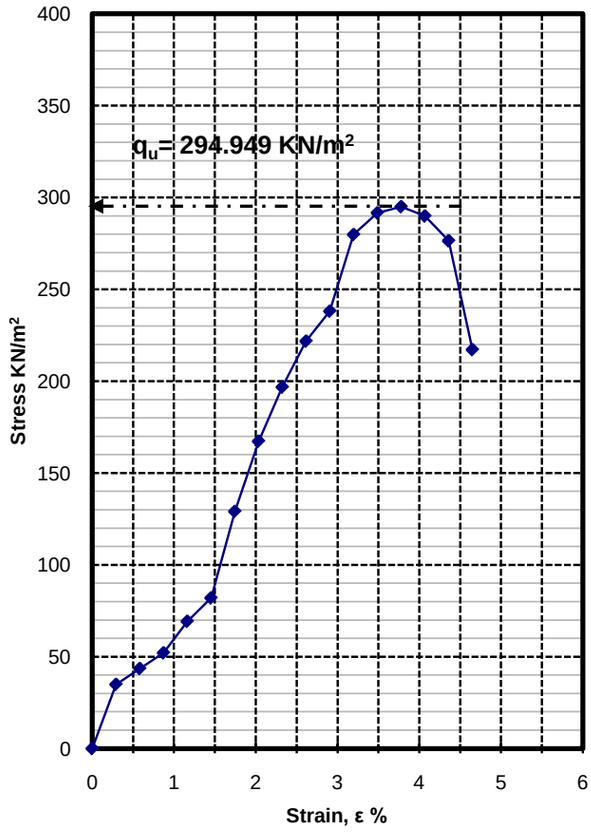
Length,L_0 cm	8.6	Weigth soil , g	176.15	Tin N0	086
Diameter,cm	3.5	Bulk Density,g /cm^3	2.130	Wt tin+ wetsoil,g	68.96
Area A_0,cm^2	9.62	Dry Density,g/cm^3	1.830	Wt tin+dry soil,g	61.28
Volume, cm^3	82.70	Watercontent,%	16.42	Wt of tin,g	14.51
CF, k	0.04379			Wt of dry soil,g	46.77

Mode of failure



deform. dial reading	Sample deform. ΔL1/100	Strain, ε % ΔL/L_0*100	Proving Ring , R 1/100(mm)	Total load P=R*k kgf / cm^2	Stress б=P(1-ε/100) KN/m^2
0	0	0.000	0	0	0
25	0.25	0.291	8	0.350	34.931
50	0.5	0.581	10	0.438	43.536
75	0.75	0.872	12	0.525	52.090
100	1	1.163	16	0.701	69.250
125	1.25	1.453	19	0.832	81.993
150	1.5	1.744	30	1.314	129.080
175	1.75	2.035	39	1.708	167.308
200	2	2.326	46	2.014	196.752
225	2.25	2.616	52	2.277	221.753
250	2.5	2.907	56	2.452	238.098
275	2.75	3.198	66	2.890	279.775
300	3	3.488	69	3.022	291.614
325	3.25	3.779	70	3.065	**294.949**
350	3.5	4.070	69	3.022	289.857
375	3.75	4.360	66	2.890	276.415
400	4	4.651	52	2.277	217.119
425	4.25	4.942			
450	4.5	5.233			
475	4.75	5.523			
500	5	5.814			
525	5.25	6.105			
550	5.5	6.395			
575	5.75	6.686			
600	6	6.977			
625	6.25	7.267			
650	6.5	7.558			

Unconfined compression curve



Unconfined compressive strength

q_u = 294.949 KN/m^2

UNCONFINED COMPRESSION TEST
(ASTM D2166)

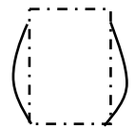
Project : Mongkul Borey Bridge

Borehole: BH-1 U - 3 Depth : 19.55m - 20.00 m

Tested by: Cheas yim

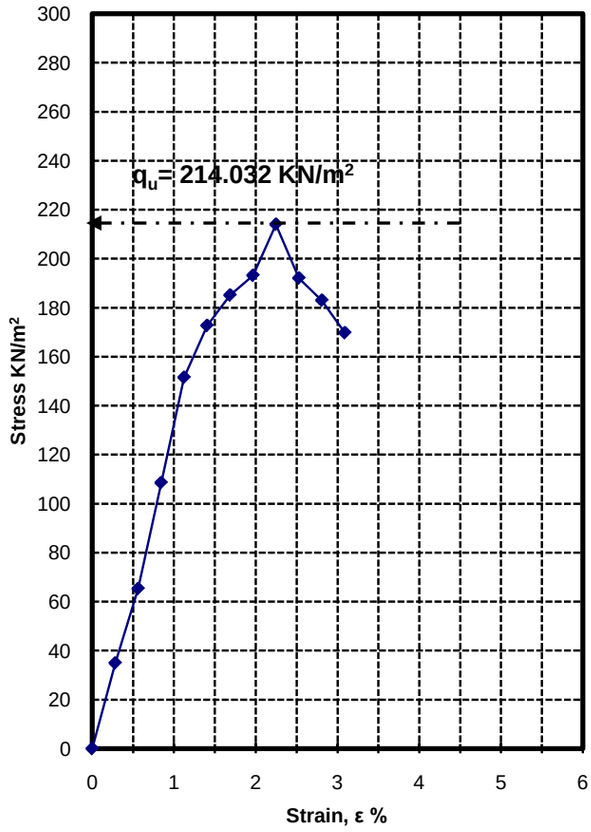
Length,L_0 cm	8.9	Weigth soil , g	171.39	Tin N0	146
Diameter,cm	3.5	Bulk Density,g /cm^3	2.003	Wt tin+ wetsoil,g	72.53
Area A_0,cm^2	9.62	Dry Density,g/cm^3	1.643	Wt tin+dry soil,g	62.06
Volume, cm^3	85.58	Watercontent,%	21.85	Wt of tin,g	14.14
CF, k	0.04379			Wt of dry soil,g	47.92

Mode of failure



deform. dial reading	Sample deform. ΔL1/100	Strain, ε % $\Delta L/L_0$*100	Proving Ring , R 1/100(mm)	Total load P=R*k kgf / cm^2	Stress б=P(1-ε/100) KN/m^2
0	0	0.000	0	0	0
25	0.25	0.281	8	0.350	34.934
50	0.5	0.562	15	0.657	65.317
75	0.75	0.843	25	1.095	108.554
100	1	1.124	35	1.533	151.545
125	1.25	1.404	40	1.752	172.702
150	1.5	1.685	43	1.883	185.125
175	1.75	1.966	45	1.971	193.182
200	2	2.247	50	2.190	**214.032**
225	2.25	2.528	45	1.971	192.075
250	2.5	2.809	43	1.883	183.010
275	2.75	3.090	40	1.752	169.750
300	3	3.371			
325	3.25	3.652			
350	3.5	3.933			
375	3.75	4.213			
400	4	4.494			
425	4.25	4.775			
450	4.5	5.056			
475	4.75	5.337			
500	5	5.618			
525	5.25	5.899			
550	5.5	6.180			
575	5.75	6.461			
600	6	6.742			
625	6.25	7.022			
650	6.5	7.303			

Unconfined compression curve



Unconfined compressive strength

q_u = 214.032 KN/m^2

SPECIFIC GRAVITY OF SOIL

Borehole No. : **BH-1**
Project: Monkul Borey Bridge

Type : D-12 Depth: 11.55m - 12.00m

Number of volumetric flash	D6	V1	A9
Wt. of volumetric flash (g)	125.86	77.09	44.06
Wt. of volumetric flash (g)	373.93	325.3	143.39
Water Temperature in vol. flash before test	29	29	29
Specific gravity of water (g /cm^3)	0.9959	0.9959	0.9959
Wt. of dry soil in volumetric flash (g)	59.21	51.34	28.32
Wt. of volum.flash + Water + drysc(g)	410.72	357.18	161.01
Water Temperature in vol. flash after test T	31	31	31
Specific gravity of water (g /cm^3)	0.9953	0.9953	0.9953
Wt. Volumetric flash + Water at Temp. T	373.78	325.15	143.33
Specific gravity of soil , Gs g /cm^3	2.671	2.671	2.674
Average specific gravity of soil g /cm^3		**2.672**	

Specific Gravity of Water					
Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3
4	1.0000	16	0.9989	28	0.9962
5	1.0000	17	0.9988	29	0.9959
6	0.9999	18	0.9986	30	0.9957
7	0.9999	19	0.9984	31	0.9953
8	0.9999	20	0.9982	32	0.9950
9	0.9998	21	0.9980	33	0.9947
10	0.9997	22	0.9978	34	0.9944
11	0.9996	23	0.9975	35	0.9940
12	0.9995	24	0.9973	36	0.9937
13	0.9994	25	0.9970	37	0.9933
14	0.9992	26	0.9968	38	0.9930
15	0.9991	27	0.9965	39	0.9926

SPECIFIC GRAVITY OF SOIL

Borehole No. : **BH-1**
Project: Monkul Borey Bridge

Type : D-17 Depth: 16.55m - 17.00m

Number of volumetric flash	E2	D4	T1
Wt. of volumetric flash (g)	204.36	119.41	41.24
Wt. of volumetric flash (g)	700.90	367.51	140.43
Water Temperature in vol. flash before test T	29	29	29
Specific gravity of water (g /cm^3)	0.9959	0.9959	0.9959
Wt. of dry soil in volumetric flash (g)	77.2	62.43	25.63
Wt. of volum.flash + Water + drysc(g)	749.53	406.75	156.61
Water Temperature in vol. flash after test T	31	31	31
Specific gravity of water (g /cm^3)	0.9953	0.9953	0.9953
Wt. Volumetric flash + Water at Temp. T	700.60	367.36	140.37
Specific gravity of soil , Gs g /cm^3	2.744	2.722	2.742
Average specific gravity of soil g /cm^3		**2.736**	

Specific Gravity of Water					
Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3
4	1.0000	16	0.9989	28	0.9962
5	1.0000	17	0.9988	29	0.9959
6	0.9999	18	0.9986	30	0.9957
7	0.9999	19	0.9984	31	0.9953
8	0.9999	20	0.9982	32	0.9950
9	0.9998	21	0.9980	33	0.9947
10	0.9997	22	0.9978	34	0.9944
11	0.9996	23	0.9975	35	0.9940
12	0.9995	24	0.9973	36	0.9937
13	0.9994	25	0.9970	37	0.9933
14	0.9992	26	0.9968	38	0.9930
15	0.9991	27	0.9965	39	0.9926

SPECIFIC GRAVITY OF SOIL

Borehole No. : **BH-1**
Project: Mankul Borey Bridge

Type : D-21 Depth: 20.55m - 21.00m

Number of volumetric flash	V23	V25	J01
Wt. of volumetric flash (g)	65.63	62.85	175.29
Wt. of volumetric flash (g)	165.09	162.23	671.68
Water Temperature in vol. flash before test	29	29	29
Specific gravity of water (g /cm^3)	0.9959	0.9959	0.9959
Wt. of dry soil in volumetric flash (g)	24.63	29.77	86.59
Wt. of volum.flash + Water + drysc(g)	180.27	180.59	725.02
Water Temperature in vol. flash after test T	31	31	31
Specific gravity of water (g /cm^3)	0.9953	0.9953	0.9953
Wt. Volumetric flash + Water at Temp. T	165.03	162.17	671.38
Specific gravity of soil , Gs g /cm^3	2.635	2.635	2.640
Average specific gravity of soil g /cm^3		**2.637**	

Specific Gravity of Water					
Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3
4	1.0000	16	0.9989	28	0.9962
5	1.0000	17	0.9988	29	0.9959
6	0.9999	18	0.9986	30	0.9957
7	0.9999	19	0.9984	31	0.9953
8	0.9999	20	0.9982	32	0.9950
9	0.9998	21	0.9980	33	0.9947
10	0.9997	22	0.9978	34	0.9944
11	0.9996	23	0.9975	35	0.9940
12	0.9995	24	0.9973	36	0.9937
13	0.9994	25	0.9970	37	0.9933
14	0.9992	26	0.9968	38	0.9930
15	0.9991	27	0.9965	39	0.9926

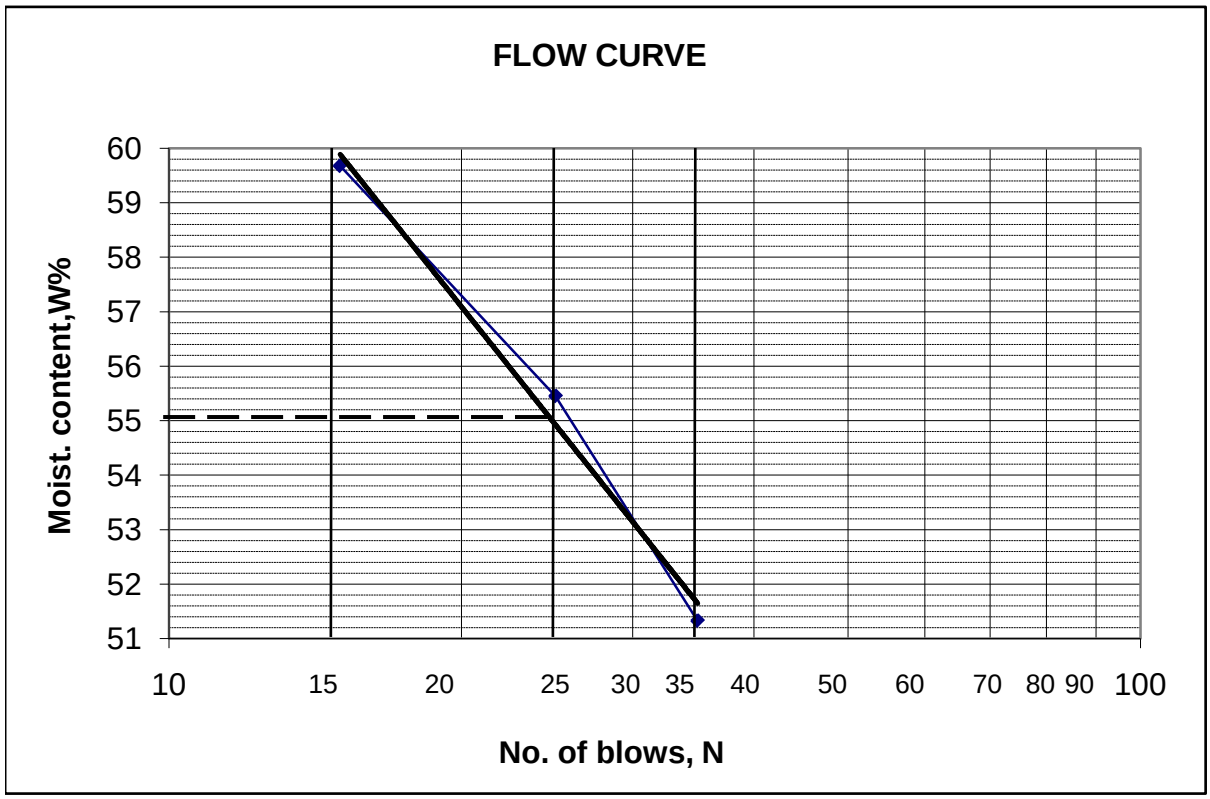
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D1: 1.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.13	14.43	14.39	14.39	14.27
W.Tin+w.s	73.20	68.88	68.72	68.58	42.74
W.Tin+d.s	64.72	48.53	49.34	50.20	37.77
W.d.s	50.59	34.10	34.95	35.81	23.50
W.Water	8.48	20.35	19.38	18.38	4.97
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**16.76**	**59.68**	**55.45**	**51.33**	**21.15**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
21.15	**55.00**	**33.85**	**CH**	-0.13



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

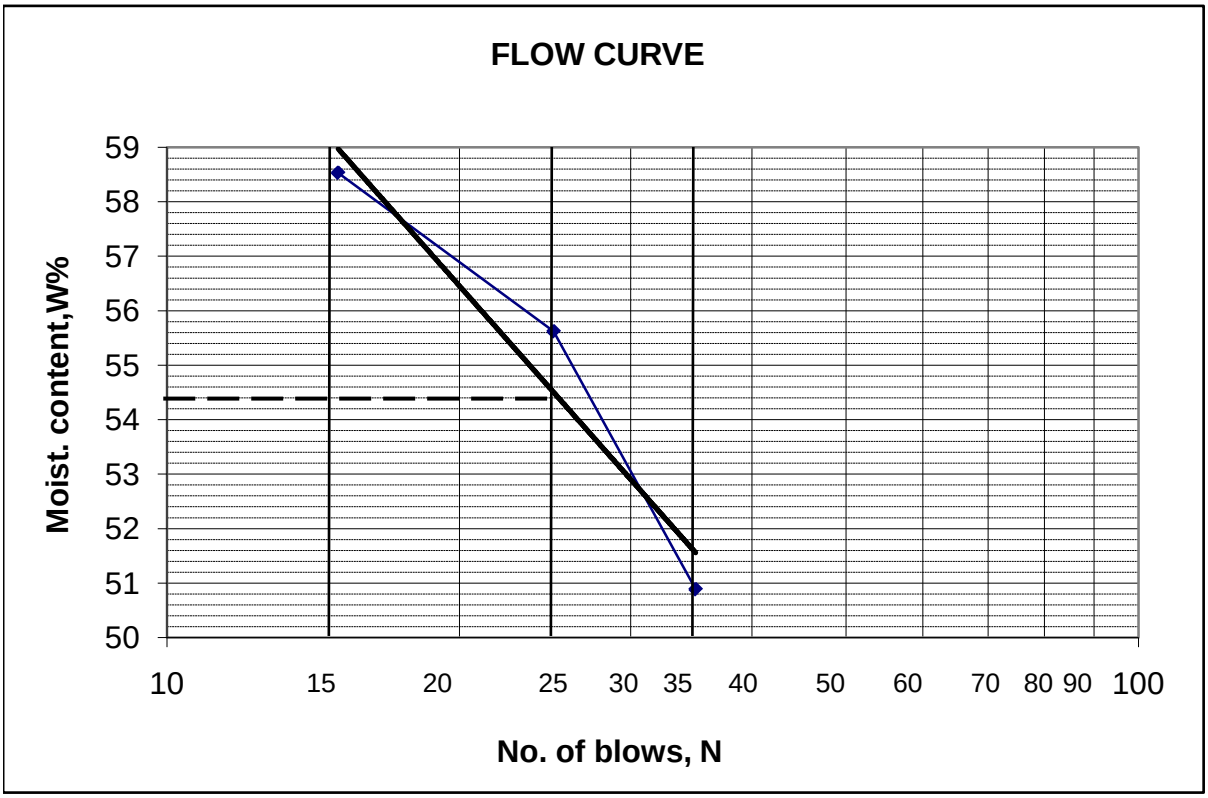
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D2: 2.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.18	14.95	14.92	14.88	14.26
W.Tin+w.s	68.67	76.65	76.53	76.26	44.31
W.Tin+d.s	57.73	53.87	54.51	55.56	40.02
W.d.s	43.55	38.92	39.59	40.68	25.76
W.Water	10.94	22.78	22.02	20.70	4.29
Blows		15.00	25.00	35.00	
Moist.	25.12	58.53	55.62	50.88	16.65

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
16.65	54.40	37.75	CH	0.22



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

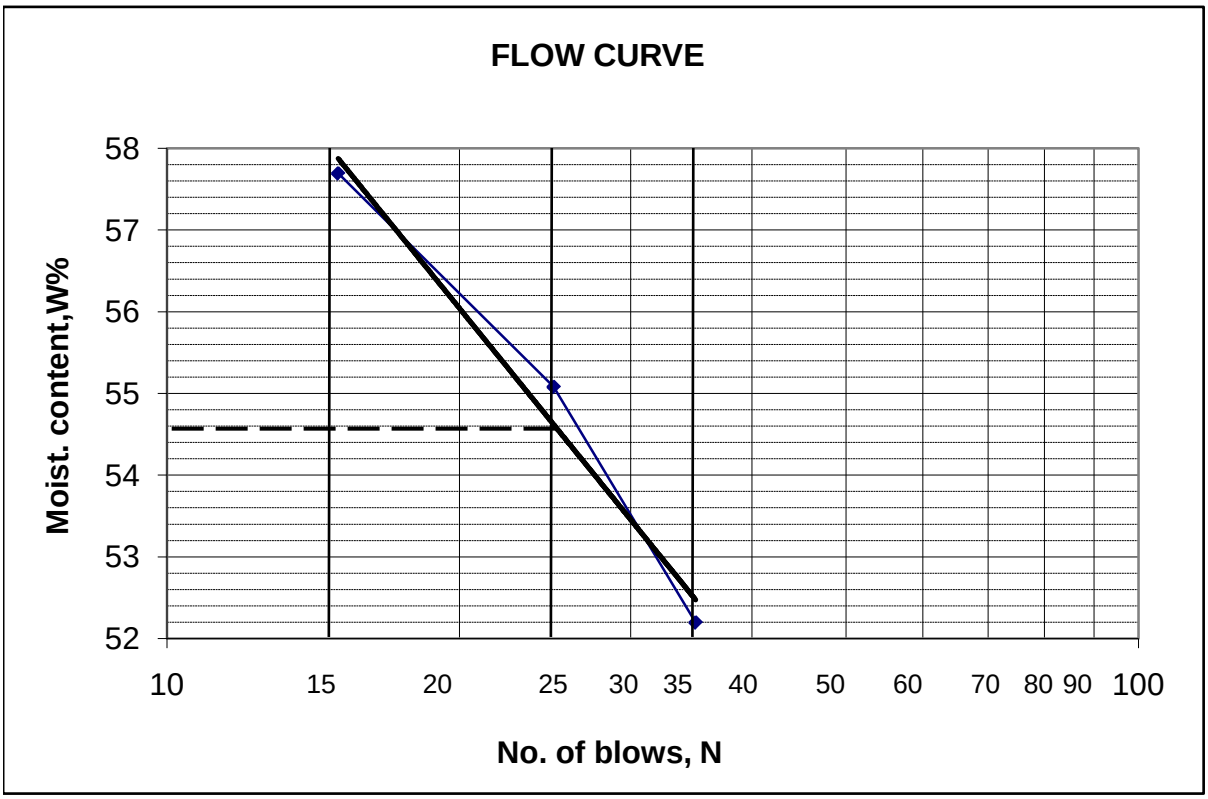
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D3: 3.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.48	14.18	14.21	14.21	14.50
W.Tin+w.s	73.26	65.73	65.65	65.50	40.80
W.Tin+d.s	60.87	46.87	47.38	47.91	36.38
W.d.s	46.39	32.69	33.17	33.70	21.88
W.Water	12.39	18.86	18.27	17.59	4.42
Blows		15.00	25.00	35.00	
Moist.	26.71	57.69	55.08	52.20	20.20

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
20.20	54.60	34.40	CH	0.19



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

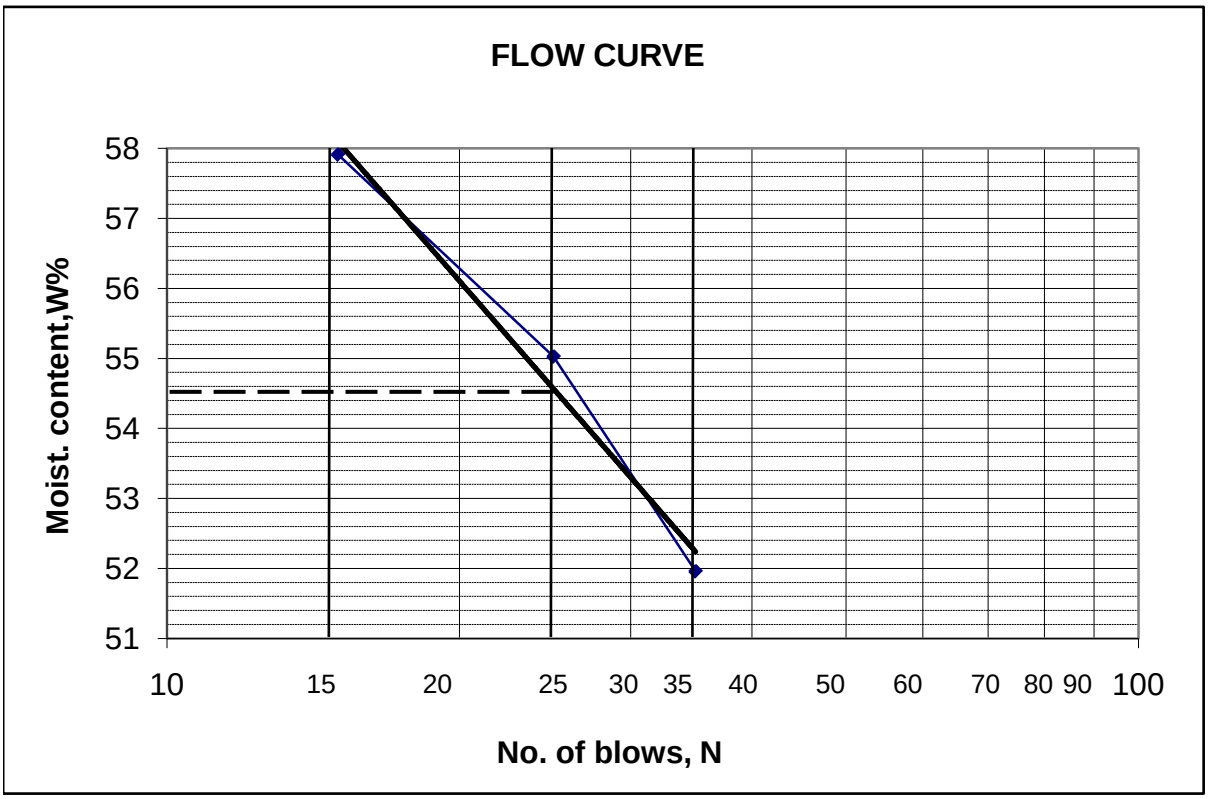
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D4: 4.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.20	14.24	14.21	14.19	14.24
W.Tin+w.s	75.74	67.55	67.43	67.30	42.90
W.Tin+d.s	63.11	48.00	48.54	49.14	38.26
W.d.s	48.91	33.76	34.33	34.95	24.02
W.Water	12.63	19.55	18.89	18.16	4.64
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**25.82**	**57.91**	**55.02**	**51.96**	**19.32**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
19.32	**54.50**	**35.18**	**CH**	0.18



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

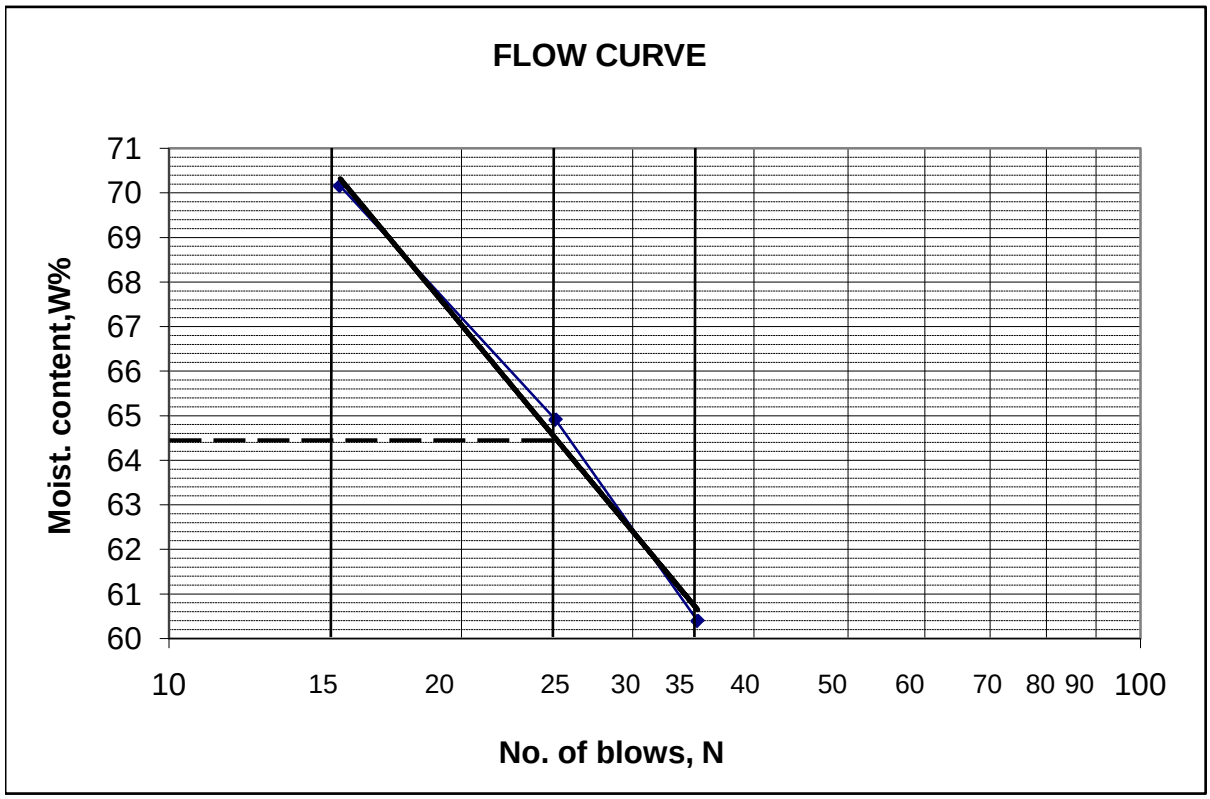
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D5: 5.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.27	14.21	14.22	14.23	14.14
W.Tin+w.s	71.34	68.71	68.64	68.46	46.56
W.Tin+d.s	58.90	46.24	47.22	48.04	41.68
W.d.s	44.63	32.03	33.00	33.81	27.54
W.Water	12.44	22.47	21.42	20.42	4.88
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**27.87**	**70.15**	**64.91**	**60.40**	**17.72**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
17.72	**64.40**	**46.68**	**CH**	0.22



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

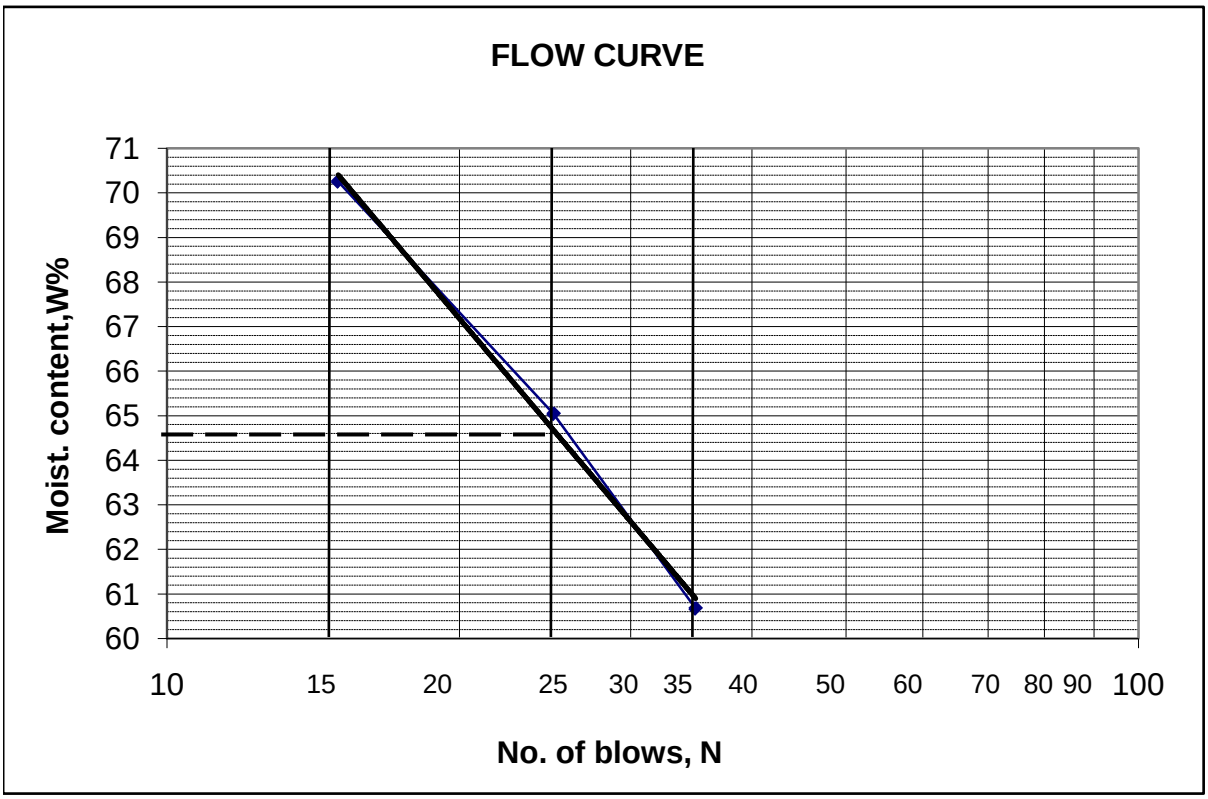
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D6: 6.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.26	14.12	14.02	14.13	14.16
W.Tin+w.s	72.88	72.62	72.56	72.31	45.68
W.Tin+d.s	60.42	48.48	49.49	50.34	42.06
W.d.s	46.16	34.36	35.47	36.21	27.90
W.Water	12.46	24.14	23.07	21.97	3.62
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**26.99**	**70.26**	**65.04**	**60.67**	**12.97**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
12.97	**64.60**	**51.63**	**CH**	0.27



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

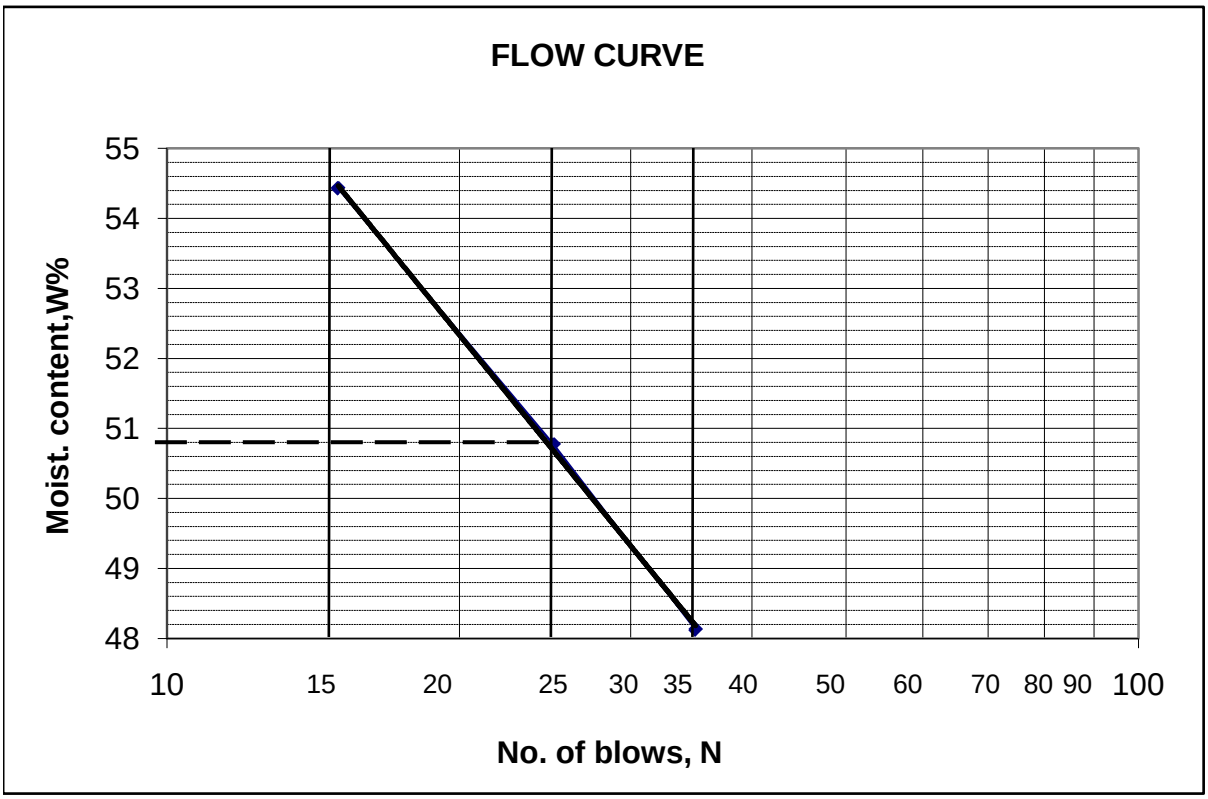
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D7: 7.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.33	14.82	14.80	14.87	15.02
W.Tin+w.s	69.75	67.82	67.66	67.50	45.44
W.Tin+d.s	58.80	49.14	49.86	50.40	40.48
W.d.s	44.47	34.32	35.06	35.53	25.46
W.Water	10.95	18.68	17.80	17.10	4.96
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**24.62**	**54.43**	**50.77**	**48.13**	**19.48**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
19.48	**50.80**	**31.32**	**CH**	0.16



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

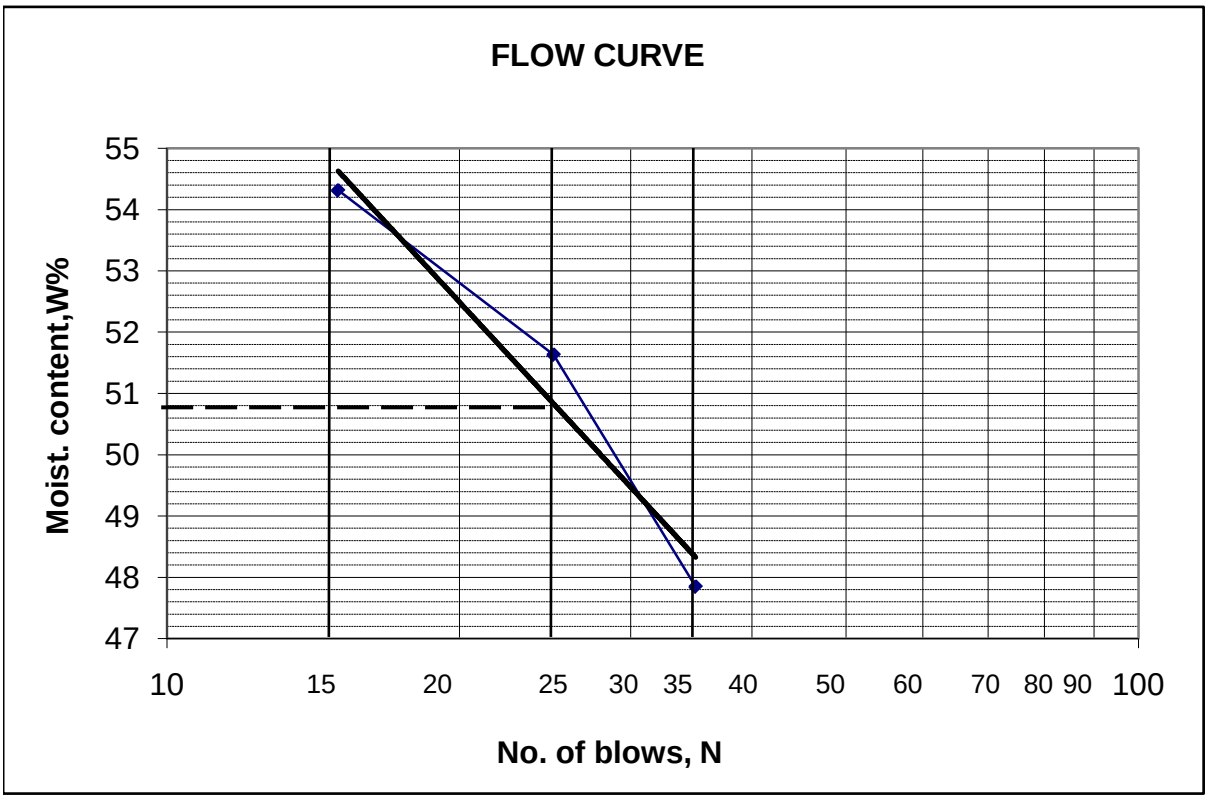
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D8: 8.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.14	14.32	14.32	14.21	15.10
W.Tin+w.s	73.49	70.66	70.53	70.48	44.68
W.Tin+d.s	61.49	50.83	51.39	52.27	40.24
W.d.s	47.35	36.51	37.07	38.06	25.14
W.Water	12.00	19.83	19.14	18.21	4.44
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**25.34**	**54.31**	**51.63**	**47.85**	**17.66**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
17.66	**50.80**	**33.14**	**CH**	0.23



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

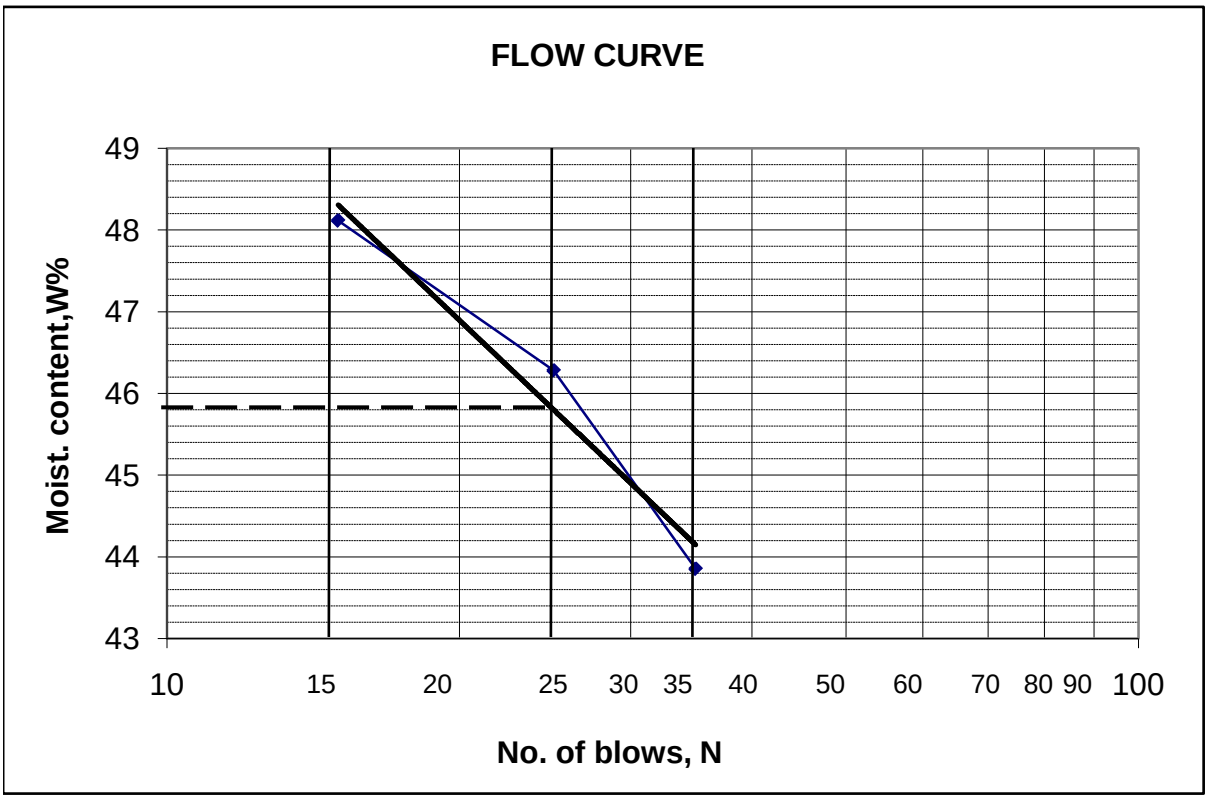
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D9: 9.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.35	14.56	14.63	14.68	14.18
W.Tin+w.s	76.04	70.80	70.70	70.51	44.17
W.Tin+d.s	62.95	52.53	52.96	53.49	39.98
W.d.s	48.60	37.97	38.33	38.81	25.80
W.Water	13.09	18.27	17.74	17.02	4.19
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**26.93**	**48.12**	**46.28**	**43.85**	**16.24**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
16.24	**45.80**	**29.56**	**CL**	0.36



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

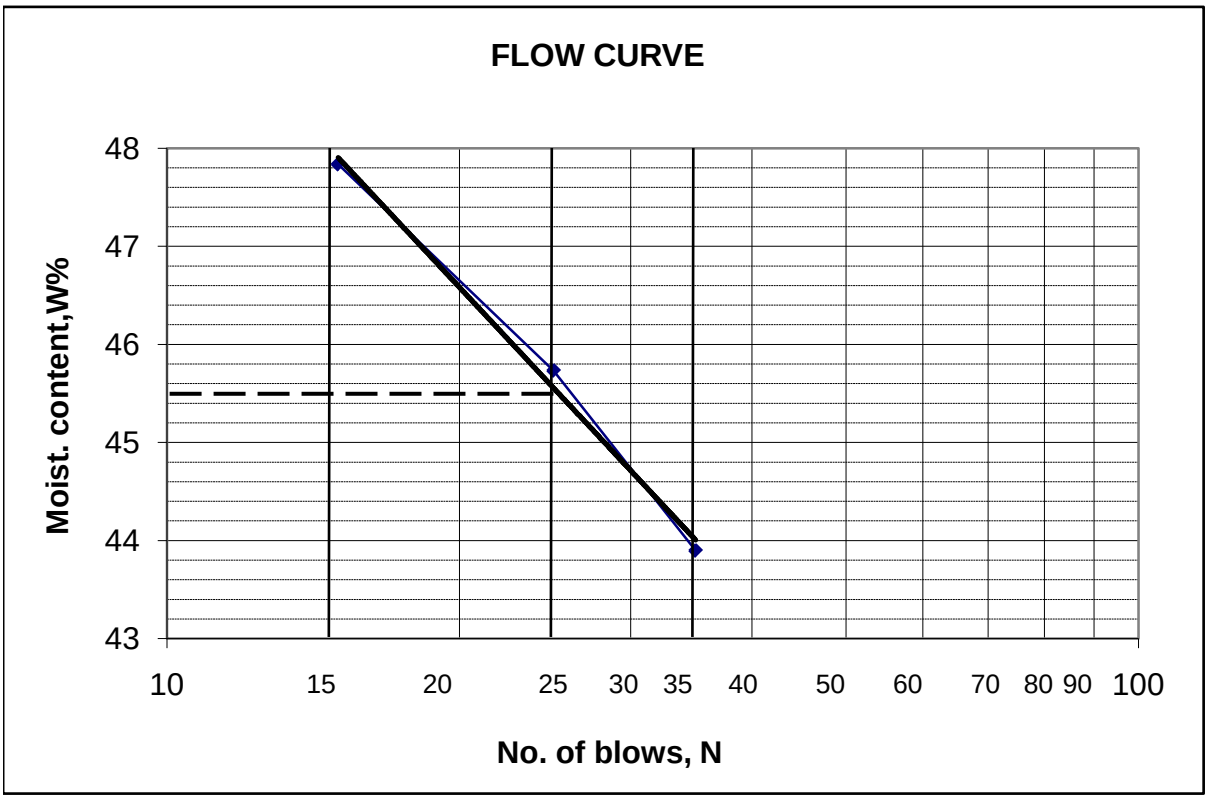
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D10: 10.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.36	14.41	14.37	14.40	14.10
W.Tin+w.s	80.41	69.76	69.53	69.47	45.68
W.Tin+d.s	67.71	51.85	52.22	52.67	41.29
W.d.s	53.35	37.44	37.85	38.27	27.19
W.Water	12.70	17.91	17.31	16.80	4.39
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**23.81**	**47.84**	**45.73**	**43.90**	**16.15**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
16.15	**45.50**	**29.35**	**CL**	0.26



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

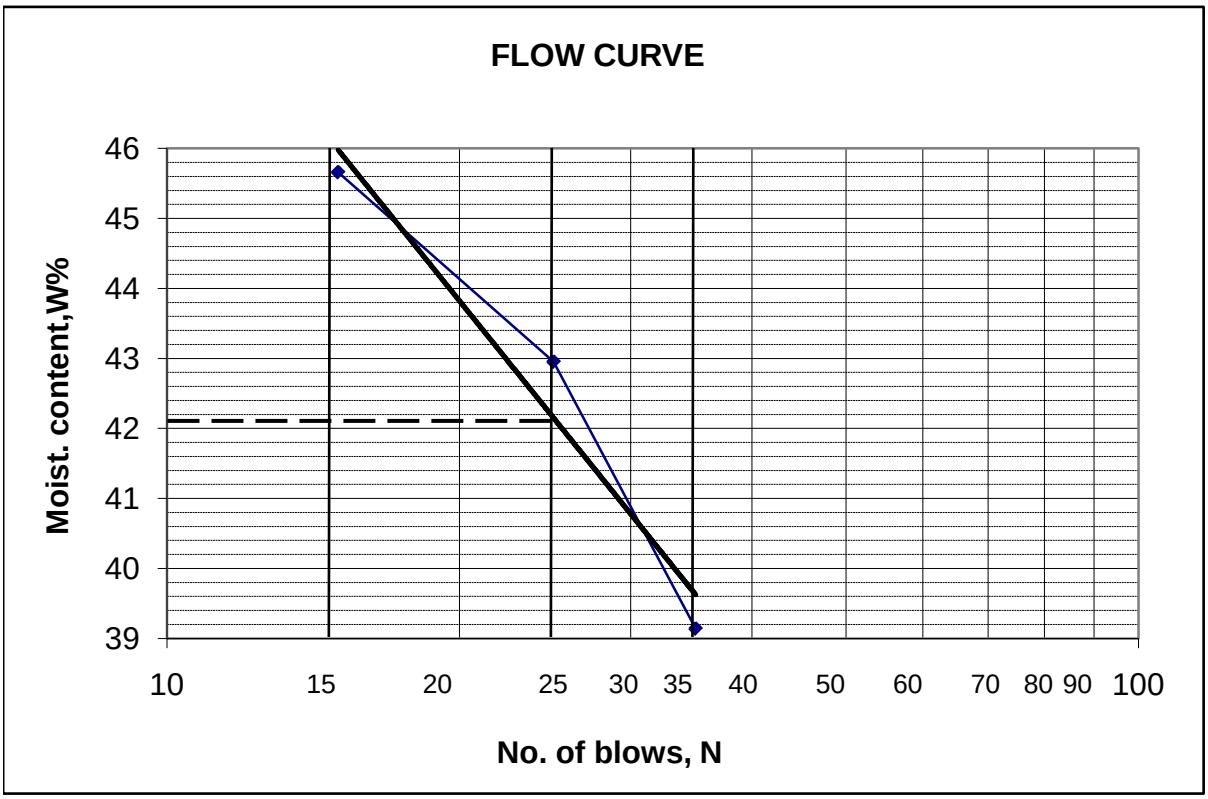
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D11: 11.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.80	14.03	14.07	14.05	14.10
W.Tin+w.s	82.55	67.72	67.52	67.23	43.68
W.Tin+d.s	71.75	50.89	51.46	52.27	40.22
W.d.s	56.95	36.86	37.39	38.22	26.12
W.Water	10.80	16.83	16.06	14.96	3.46
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**18.96**	**45.66**	**42.95**	**39.14**	**13.25**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
13.25	**42.10**	**28.85**	**CL**	0.20



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

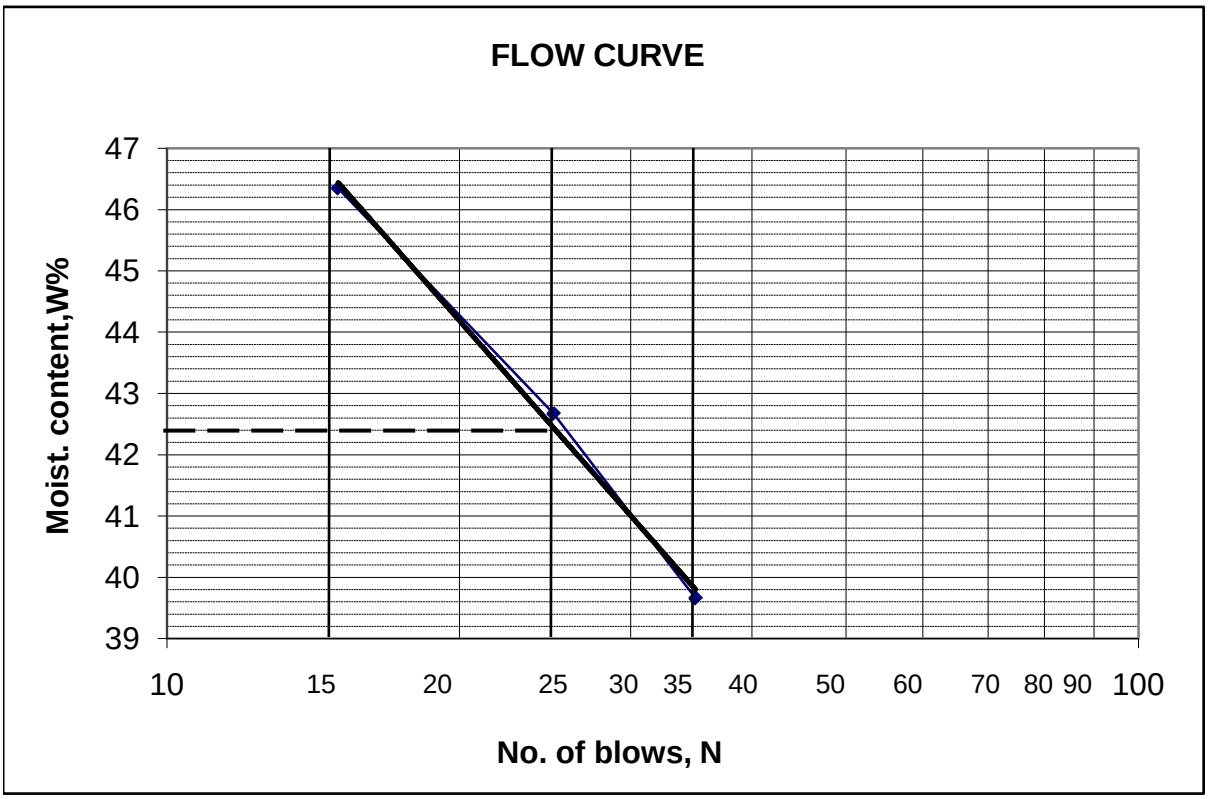
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D12: 12.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.19	15.04	14.90	14.92	14.24
W.Tin+w.s	89.06	70.77	70.57	70.35	43.91
W.Tin+d.s	79.38	53.12	53.92	54.61	39.46
W.d.s	65.19	38.08	39.02	39.69	25.22
W.Water	9.68	17.65	16.65	15.74	4.45
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**14.85**	**46.35**	**42.67**	**39.66**	**17.64**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
17.64	**42.40**	**24.76**	**CL**	-0.11



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

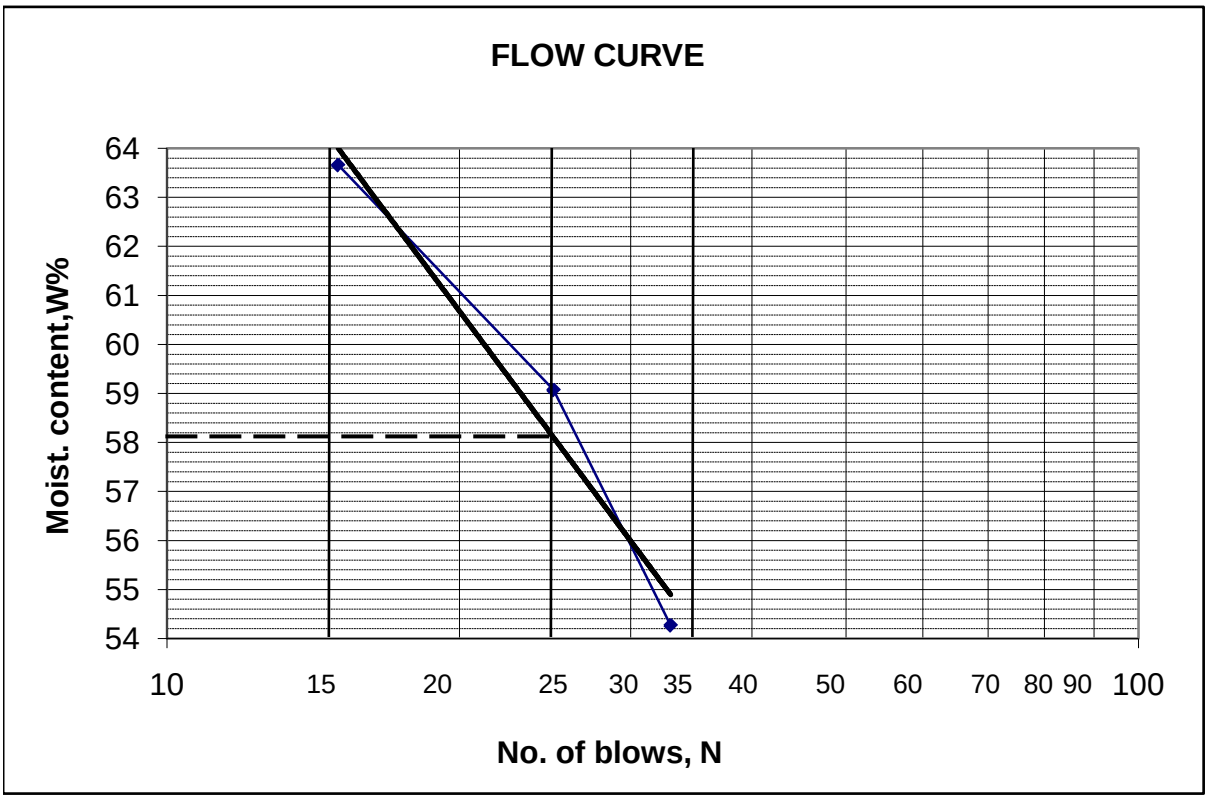
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D13: 13.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.22	14.21	14.24	14.31	14.26
W.Tin+w.s	77.50	67.71	67.64	67.24	40.16
W.Tin+d.s	68.43	46.90	47.81	48.62	35.82
W.d.s	54.21	32.69	33.57	34.31	21.56
W.Water	9.07	20.81	19.83	18.62	4.34
Blows		**15.00**	**25.00**	**33.00**	
Moist.	**16.73**	**63.66**	**59.07**	**54.27**	**20.13**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
20.13	**58.10**	**37.97**	**CH**	-0.09



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

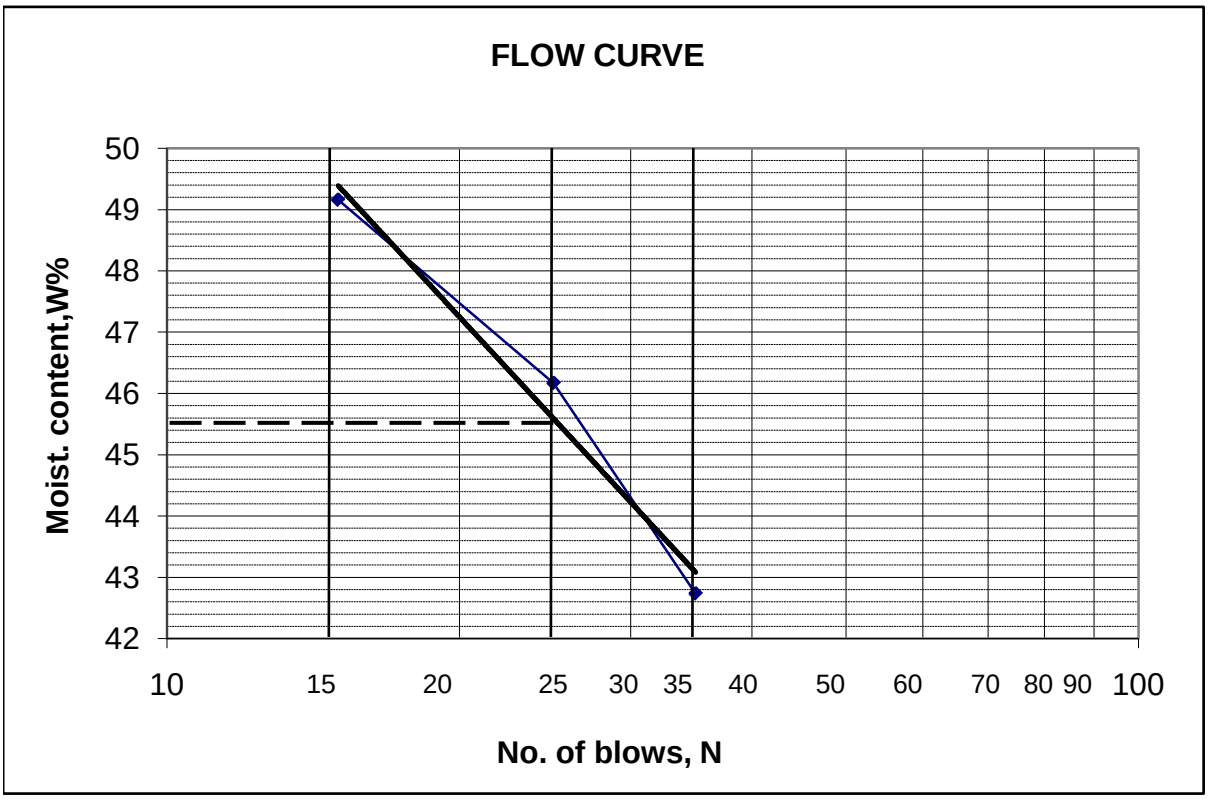
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D14: 14.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.06	14.54	14.49	14.44	14.21
W.Tin+w.s	81.33	77.65	77.46	77.10	44.36
W.Tin+d.s	70.32	56.85	57.57	58.34	40.02
W.d.s	56.26	42.31	43.08	43.90	25.81
W.Water	11.01	20.80	19.89	18.76	4.34
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**19.57**	**49.16**	**46.17**	**42.73**	**16.82**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
16.82	**45.50**	**28.68**	**CL**	0.10



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

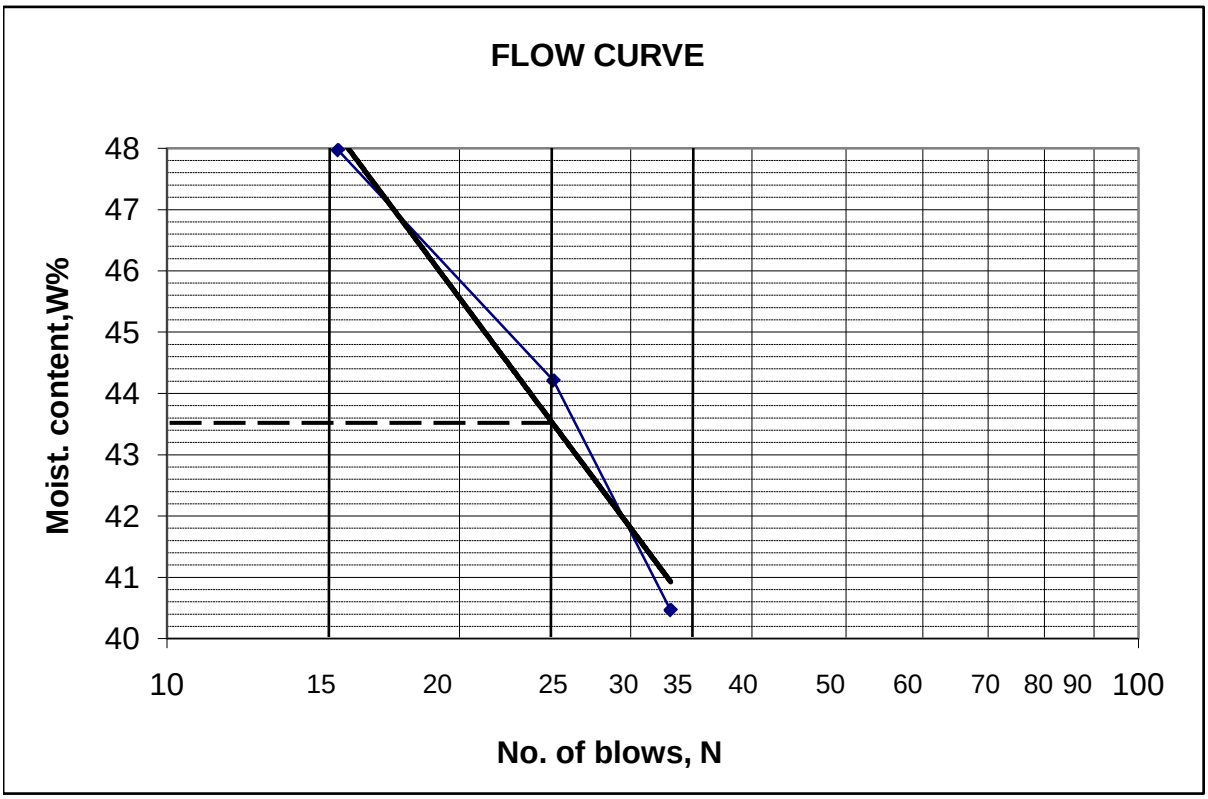
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D15: 15.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	13.98	14.20	14.19	14.24	14.24
W.Tin+w.s	77.33	66.70	66.61	66.52	45.84
W.Tin+d.s	67.18	49.68	50.54	51.46	41.61
W.d.s	53.20	35.48	36.35	37.22	27.37
W.Water	10.15	17.02	16.07	15.06	4.23
Blows		**15.00**	**25.00**	**33.00**	
Moist.	**19.08**	**47.97**	**44.21**	**40.46**	**15.45**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
15.45	**43.50**	**28.05**	**CL**	0.13



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

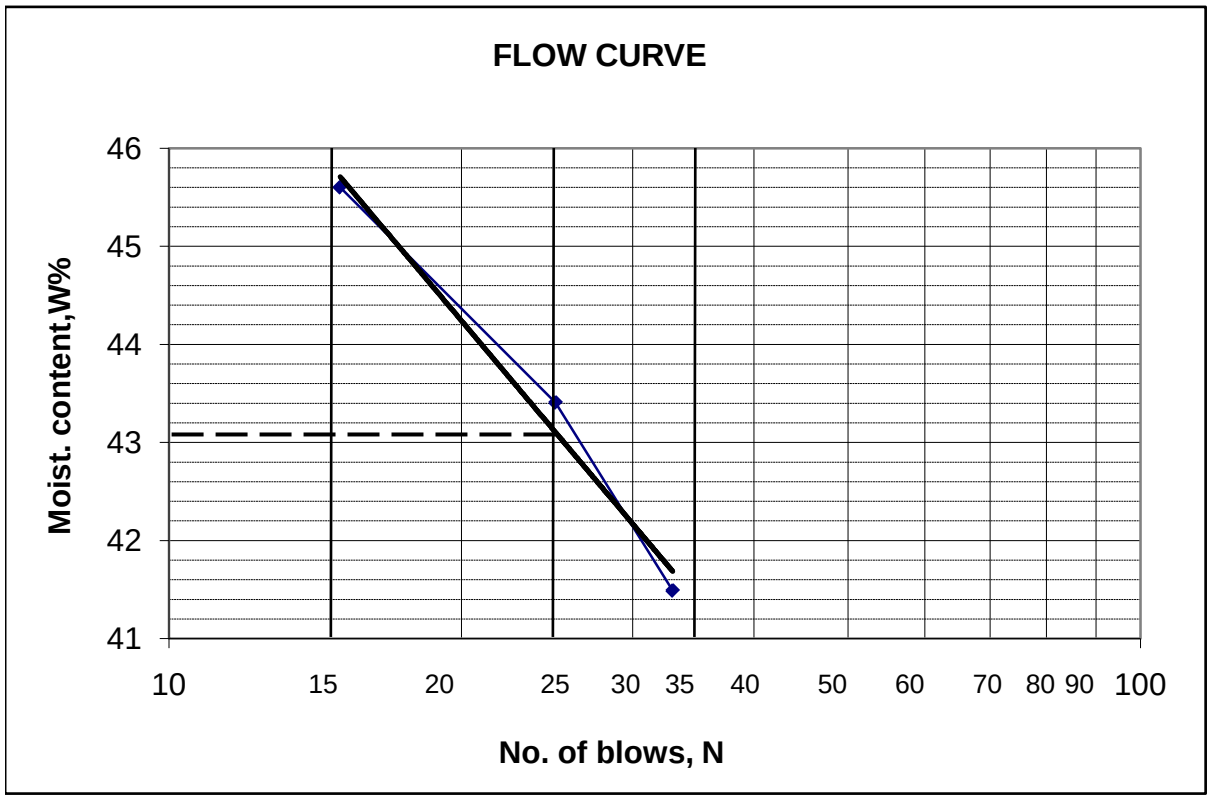
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D16: 16.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.21	14.53	14.37	14.35	14.21
W.Tin+w.s	84.57	68.65	68.42	68.30	43.94
W.Tin+d.s	73.00	51.70	52.06	52.48	39.27
W.d.s	58.79	37.17	37.69	38.13	25.06
W.Water	11.57	16.95	16.36	15.82	4.67
Blows		**15.00**	**25.00**	**33.00**	
Moist.	**19.68**	**45.60**	**43.41**	**41.49**	**18.64**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
18.64	**43.10**	**24.46**	**CL**	0.04



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

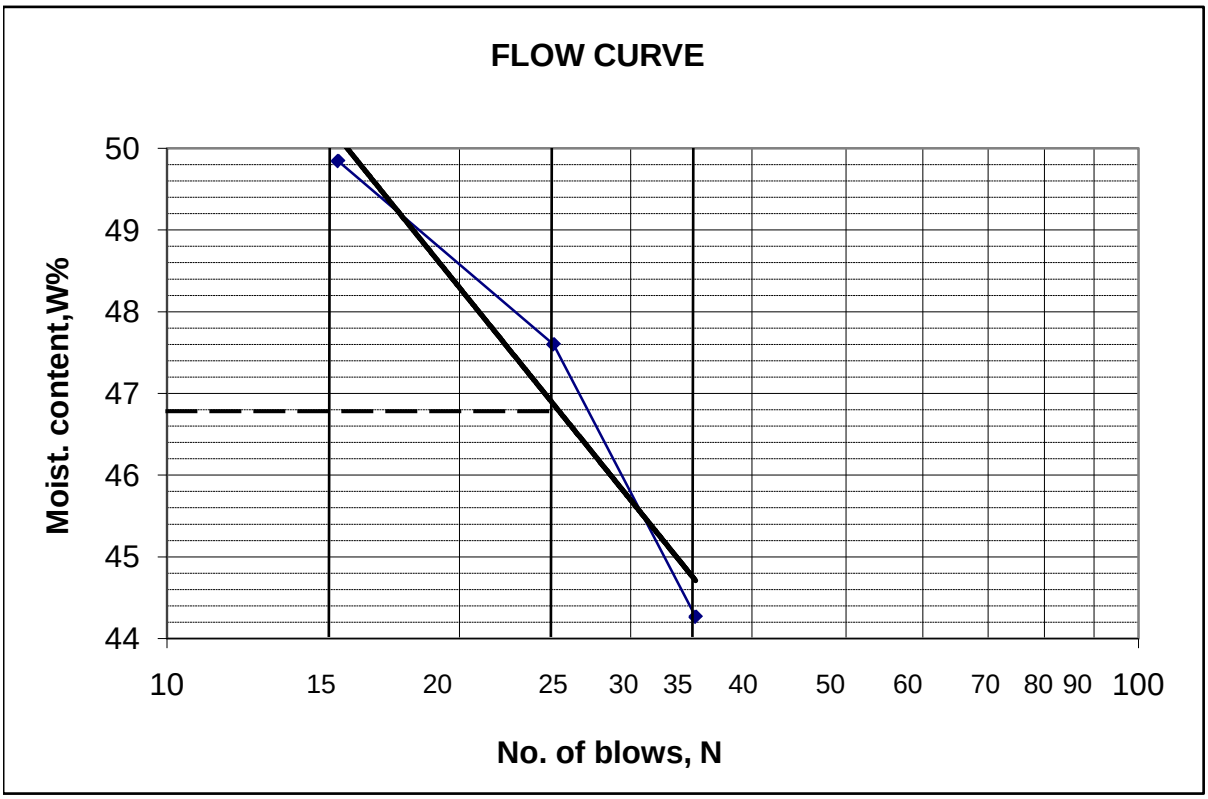
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D17: 17.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.26	14.14	14.17	14.16	14.26
W.Tin+w.s	71.67	66.90	66.76	66.50	45.94
W.Tin+d.s	63.58	49.35	49.80	50.44	42.04
W.d.s	49.32	35.21	35.63	36.28	27.78
W.Water	8.09	17.55	16.96	16.06	3.90
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**16.40**	**49.84**	**47.60**	**44.27**	**14.04**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
14.04	**46.80**	**32.76**	**CL**	0.07



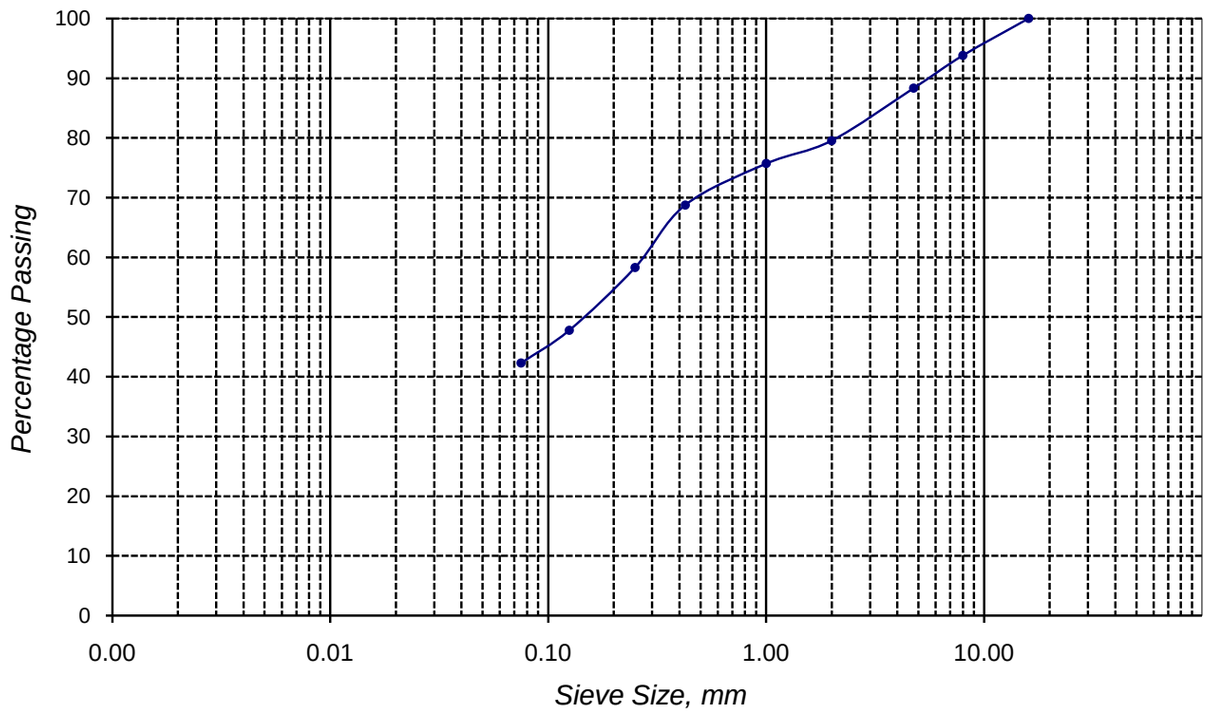
Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Mong Kul Borey Bridge BH-2	Date of boring	12/2/2012
LOCATION :	Mong Kul Borey, Banteay Meanchey province.	Date of testing	12/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	224.15	
Depth, m	17.55-18.00	
Sample Nº	D18	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	93.82	
4.75	88.33	
2.00	79.55	
1.00	75.69	
0.425	68.75	
0.250	58.27	
0.125	47.79	
0.075	42.29	
Water Content , %	14.33	
Silt + Clay , %	Sand , %	Gravel , %
42.29	46.04	11.67

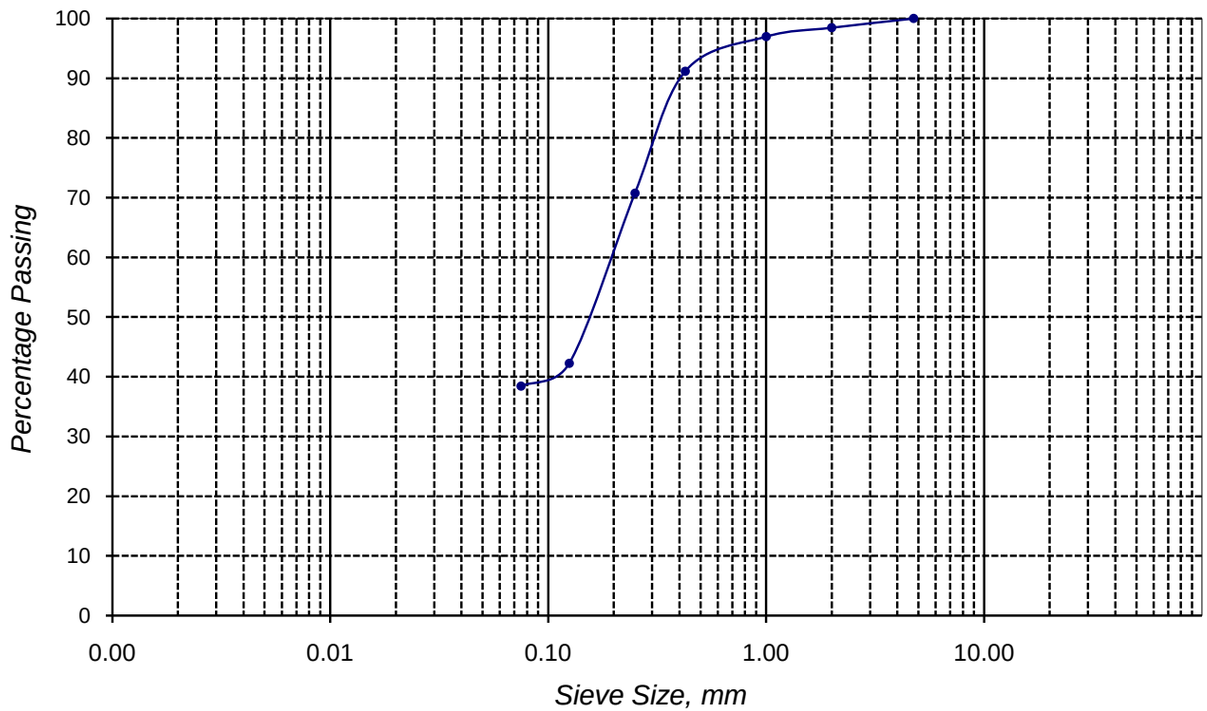
OPERATOR : M^{rs} Rem

SOIL TESTING LABORATORY

PARTICLE SIZE DISTRIBUTION ANALYSIS

Project :	Steung Mong Kul Borey Bridge BH-2	Date of boring	12/2/2012
LOCATION :	Mong Kul Borey, Banteay Meanchey province.	Date of testing	12/2/2012

SIEVE ANALYSIS OF FINE AND GRANULAR SOIL SAMPLES



Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobble
	Silt			Sand			Gravel			

Description of soil		
Masse of dry soil, g	214.22	
Depth, m	18.55-19.00	
Sample Nº	D19	
SIEVE SIZE, mm	% PASSING	% PASSING
16.00	100.00	
8.00	100.00	
4.75	100.00	
2.00	98.46	
1.00	96.97	
0.425	91.15	
0.250	70.72	
0.125	42.22	
0.075	38.42	
Water Content , %	14.09	
Silt + Clay , %	Sand , %	Gravel , %
38.42	61.58	0.00

OPERATOR : M[rs] Rem

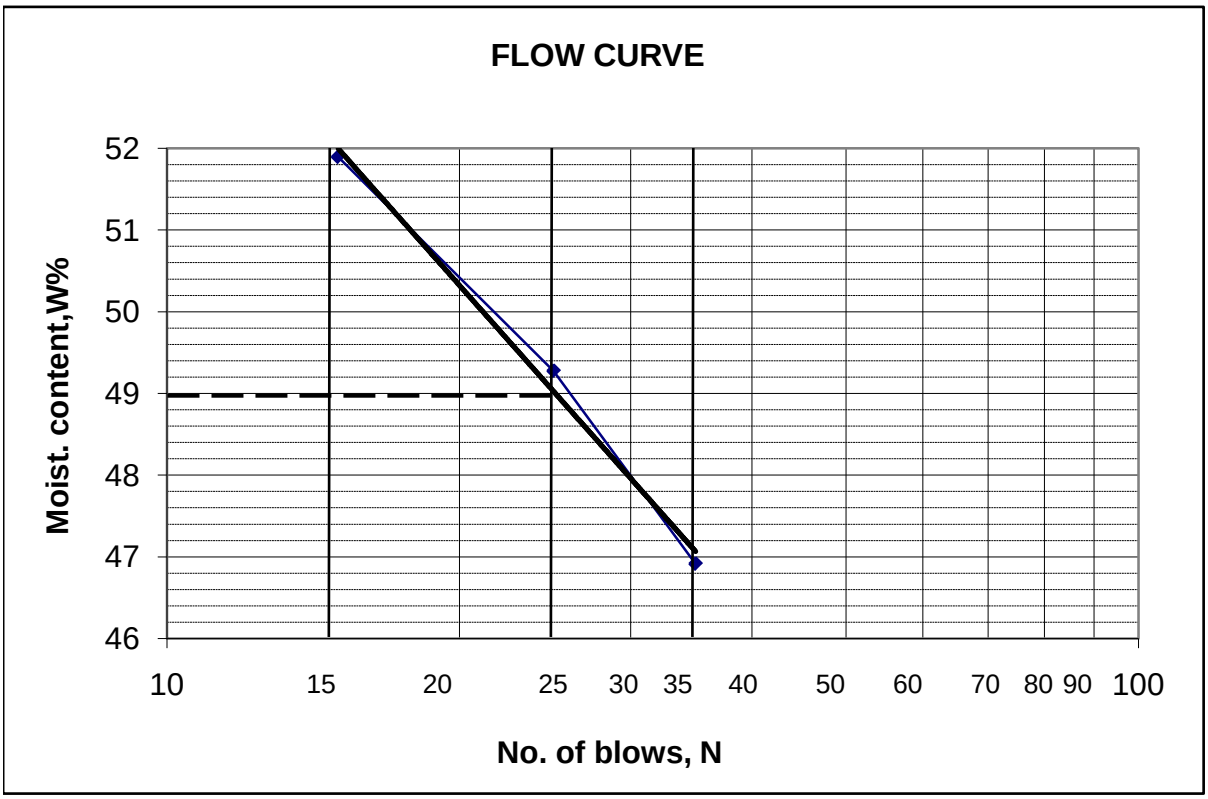
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D20: 20.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.20	14.21	14.09	14.10	15.04
W.Tin+w.s	72.85	65.87	65.68	65.52	49.85
W.Tin+d.s	61.51	48.22	48.65	49.10	44.96
W.d.s	47.31	34.01	34.56	35.00	29.92
W.Water	11.34	17.65	17.03	16.42	4.89
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**23.97**	**51.90**	**49.28**	**46.91**	**16.34**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
16.34	**49.00**	**32.66**	**CL**	0.23



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

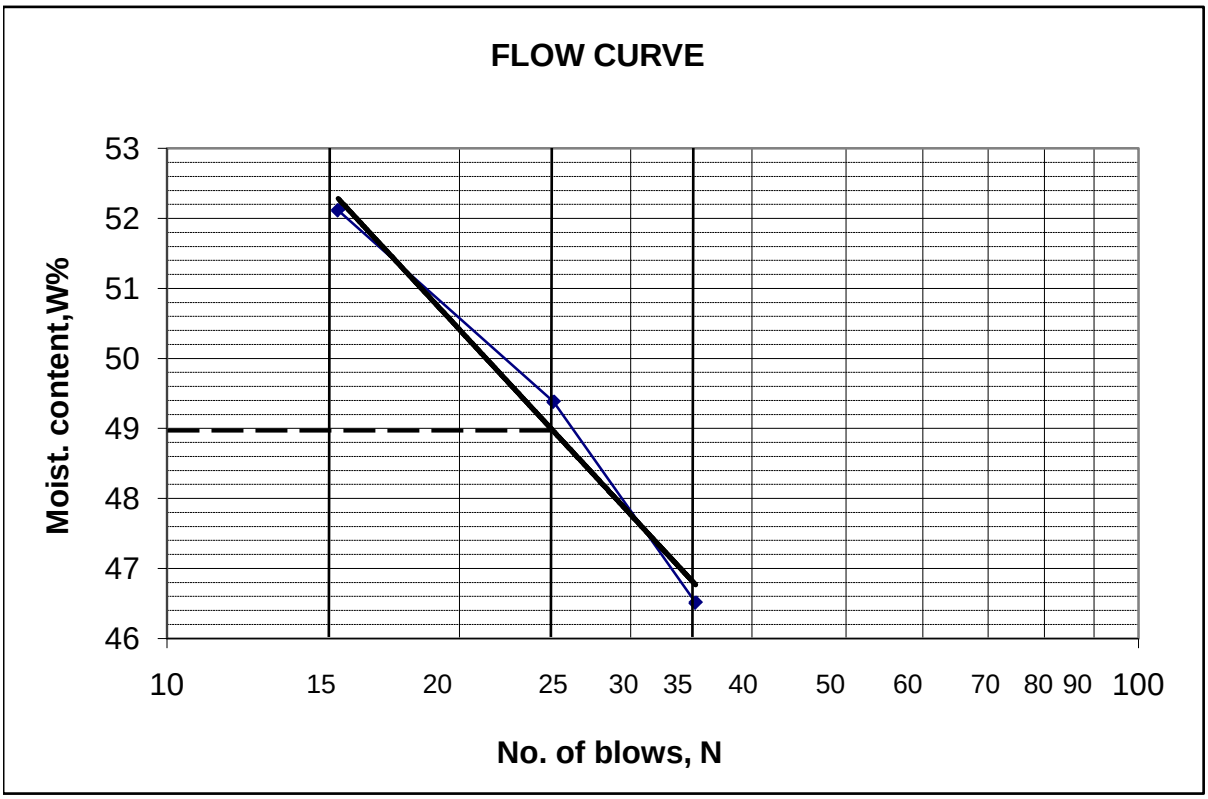
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D21: 21.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.36	14.52	14.52	14.54	14.16
W.Tin+w.s	72.15	67.73	67.67	67.49	44.84
W.Tin+d.s	61.04	49.50	50.10	50.68	40.24
W.d.s	46.68	34.98	35.58	36.14	26.08
W.Water	11.11	18.23	17.57	16.81	4.60
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**23.80**	**52.12**	**49.38**	**46.51**	**17.64**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
17.64	**49.00**	**31.36**	**CL**	0.20



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

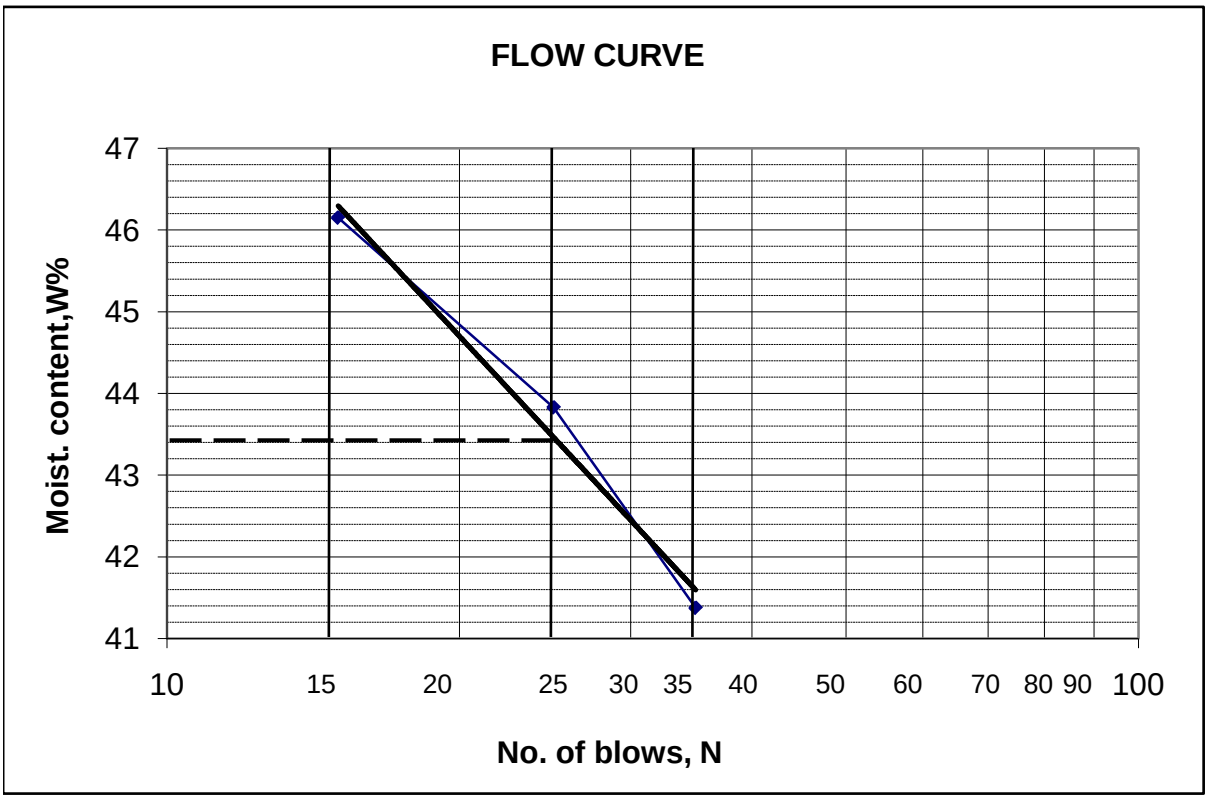
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D22: 22.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.26	14.13	14.15	14.17	14.16
W.Tin+w.s	75.36	66.73	66.59	66.38	42.51
W.Tin+d.s	63.67	50.12	50.61	51.10	39.02
W.d.s	49.41	35.99	36.46	36.93	24.86
W.Water	11.69	16.61	15.98	15.28	3.49
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**23.66**	**46.15**	**43.83**	**41.38**	**14.04**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
14.04	**43.40**	**29.36**	**CL**	0.33



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

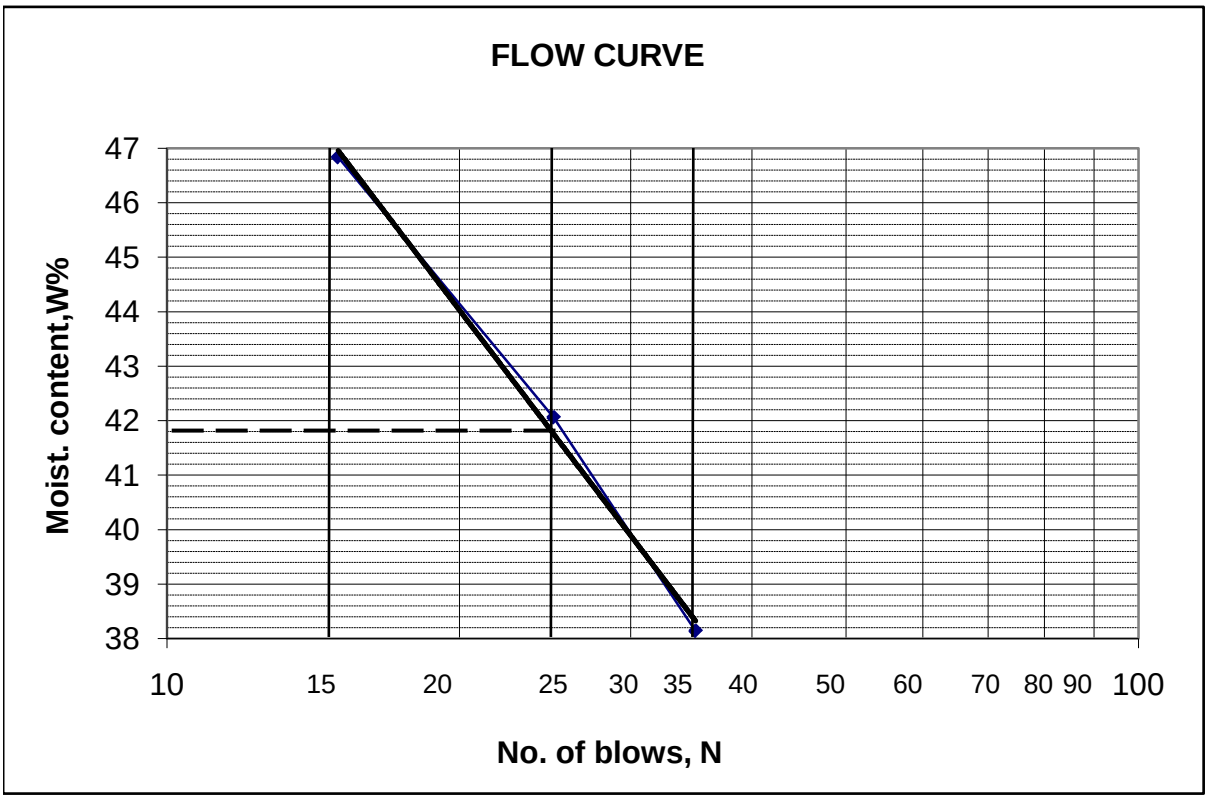
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D23: 23.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	13.96	14.16	14.20	14.24	14.10
W.Tin+w.s	76.29	65.67	65.54	65.42	43.96
W.Tin+d.s	66.31	49.24	50.34	51.29	40.26
W.d.s	52.35	35.08	36.14	37.05	26.16
W.Water	9.98	16.43	15.20	14.13	3.70
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**19.06**	**46.84**	**42.06**	**38.14**	**14.14**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
14.14	**41.80**	**27.66**	**CL**	0.18



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

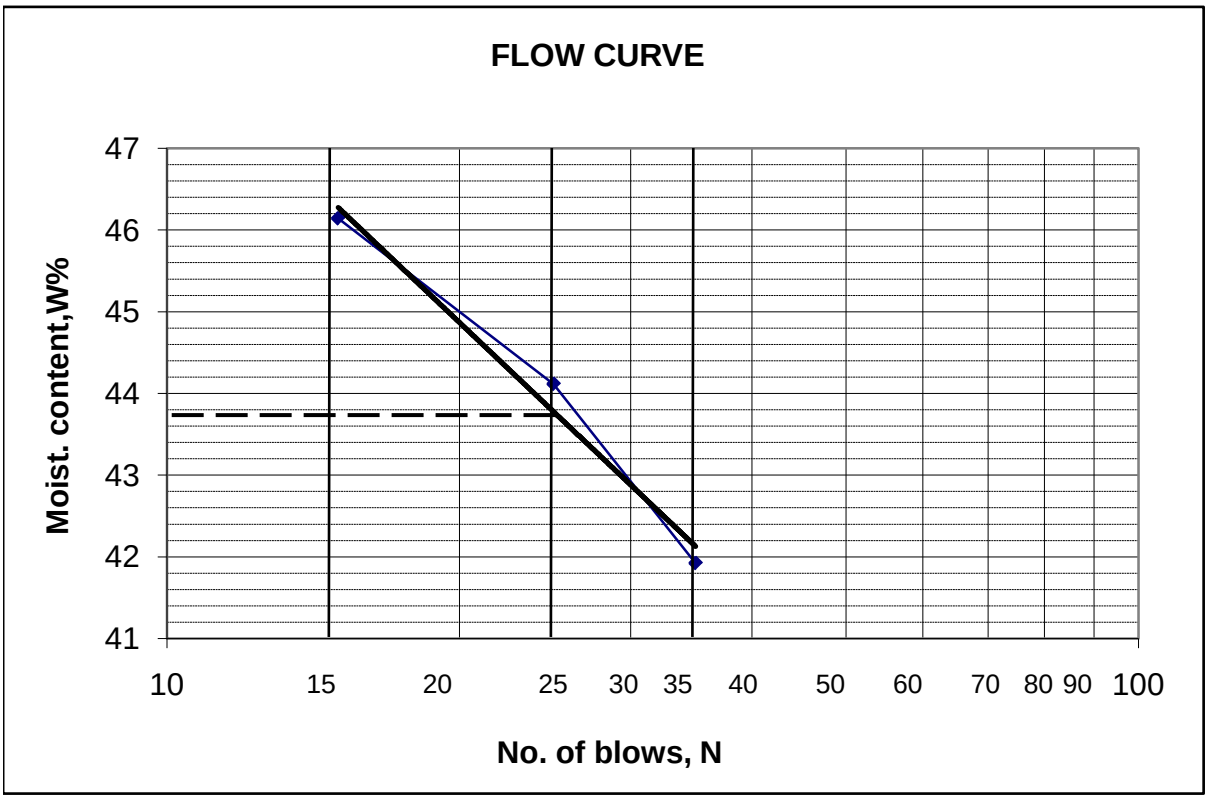
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D24: 24.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.11	14.57	14.73	14.71	14.24
W.Tin+w.s	81.83	71.77	71.67	71.55	42.86
W.Tin+d.s	71.71	53.71	54.24	54.76	38.28
W.d.s	57.60	39.14	39.51	40.05	24.04
W.Water	10.12	18.06	17.43	16.79	4.58
Blows		**15.00**	**25.00**	**35.00**	
Moist.	**17.57**	**46.14**	**44.12**	**41.92**	**19.05**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
19.05	**43.70**	**24.65**	**CL**	-0.06



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

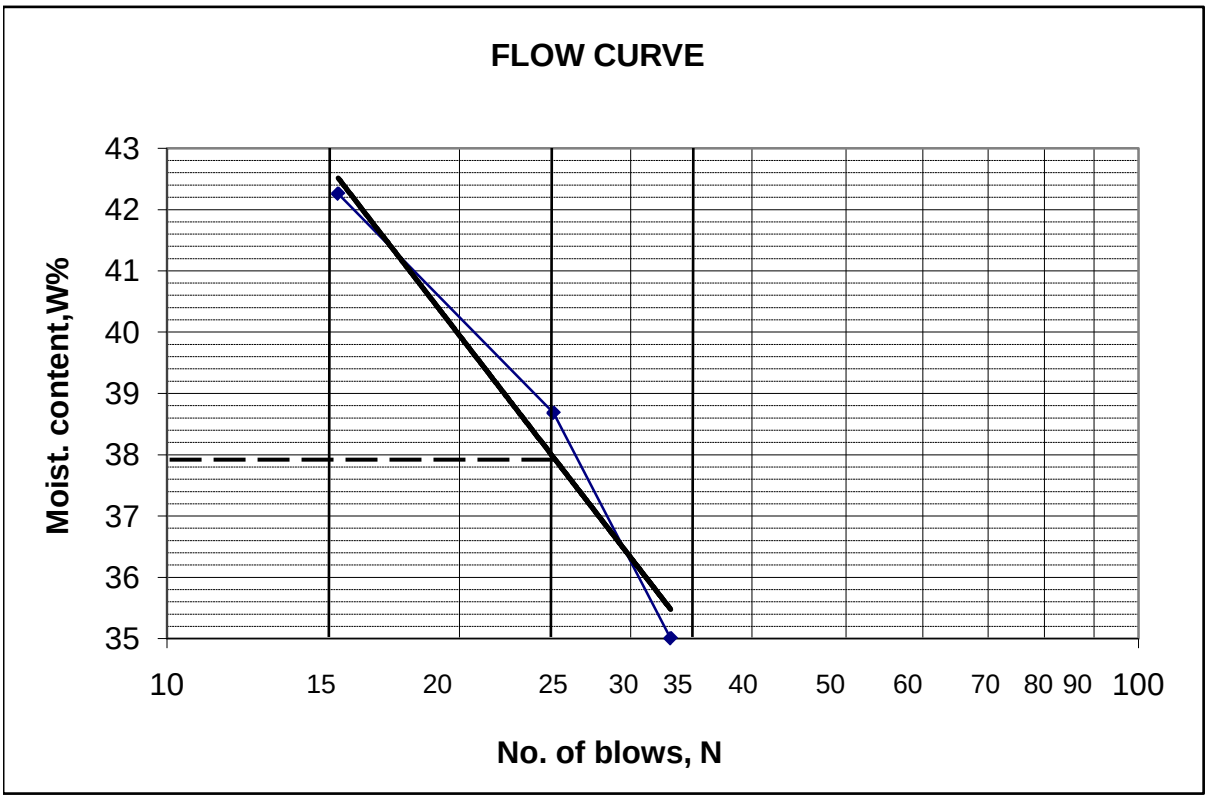
Project : Steung Mong Kul Borey Bridge BH-2
Location: Mong Kul Borey, Banteay Meanchey province. D25: 25.00m

Liquid Limit,Plastic Limit

Description	Moist.	LL1	LL2	LL3	PL
W.Tin	14.30	14.10	14.15	14.20	14.18
W.Tin+w.s	75.62	76.78	76.64	76.49	44.68
W.Tin+d.s	65.87	58.16	59.21	60.34	40.17
W.d.s	51.57	44.06	45.06	46.14	25.99
W.Water	9.75	18.62	17.43	16.15	4.51
Blows		**15.00**	**25.00**	**33.00**	
Moist.	**18.91**	**42.26**	**38.68**	**35.00**	**17.35**

USCS : Unified Soil Classification System

Plastic Limit **PL**	Liquid Limit **LL**	Plastic Index **PI**	Soil class **USCS**	Liquid Index **IL**
17.35	**37.90**	**20.55**	**CL**	0.08



Tested by : Chhou Sarem and Bo Chan Thol	Date of boring : 12/02/2012
Checked by : Chea Serey vuth	Date of testing : 12/02/2012

UNCONFINED COMPRESSION TEST
(ASTM D2166)

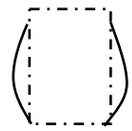
Project : Mongkul Borey Bridge

Borehole: BH-2 U - 1 Depth : 9.55m - 10.00 m

Tested by: Cheas yim

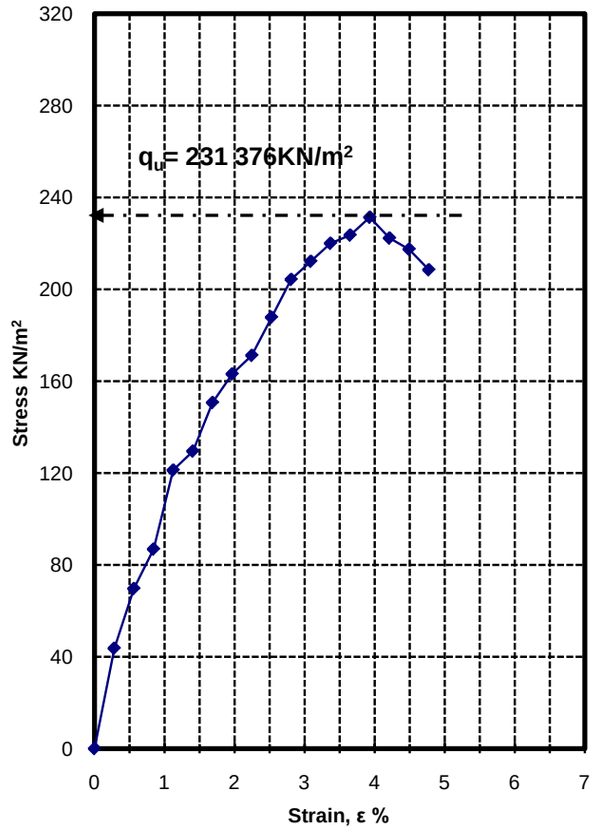
Length,L_0 cm	8.9	Weigth soil , g	171.54	Tin N0	131
Diameter,cm	3.5	Bulk Density,g /cm^3	2.004	Wt tin+ wetsoil,g	65.64
Area A_0,cm^2	9.62	Dry Density,g/cm^3	1.632	Wt tin+dry soil,g	56.13
Volume, cm^3	85.58	Watercontent,%	22.84	Wt of tin,g	14.50
CF, k	0.04379			Wt of dry soil,g	41.63

Mode of failure



deform. dial reading	Sample deform. ΔL1/100	Strain, ε % ΔL/L_0*100	Proving Ring , R 1/100(mm)	Total load P=R*k kgf / cm^2	Stress б=P(1-ε/100) KN/m^2
0	0	0.000	0	0	0
25	0.25	0.281	10	0.438	43.667
50	0.5	0.562	16	0.701	69.671
75	0.75	0.843	20	0.876	86.843
100	1	1.124	28	1.226	121.236
125	1.25	1.404	30	1.314	129.526
150	1.5	1.685	35	1.533	150.683
175	1.75	1.966	38	1.664	163.132
200	2	2.247	40	1.752	171.226
225	2.25	2.528	44	1.927	187.807
250	2.5	2.809	48	2.102	204.290
275	2.75	3.090	50	2.190	212.187
300	3	3.371	52	2.277	220.035
325	3.25	3.652	53	2.321	223.614
350	3.5	3.933	55	2.408	**231.376**
375	3.75	4.213	53	2.321	222.310
400	4	4.494	52	2.277	217.476
425	4.25	4.775	50	2.190	208.497
450	4.5	5.056			
475	4.75	5.337			
500	5	5.618			
525	5.25	5.899			
550	5.5	6.180			
575	5.75	6.461			
600	6	6.742			
625	6.25	7.022			
650	6.5	7.303			

Unconfined compression curve



Unconfined compressive strength

q_u = 231.376 KN/m^2

UNCONFINED COMPRESSION TEST
(ASTM D2166)

Project : Mongkul Borey Bridge

Borehole: BH-2 U - 2 Depth : 17.55m - 18.00 m

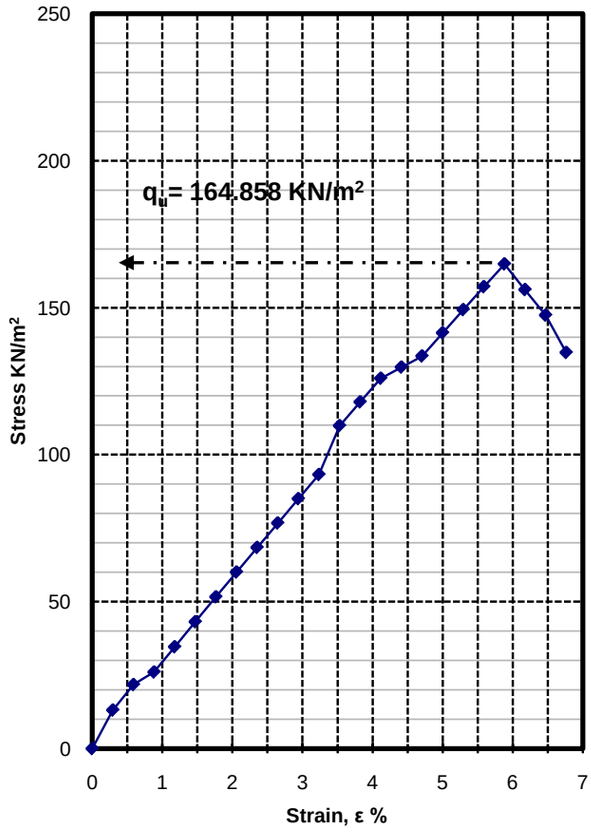
Tested by: Cheas yim

Length,L_0 cm	8.5	Weigth soil , g	177.27	Tin N0	099
Diameter,cm	3.5	Bulk Density,g /cm^3	2.169	Wt tin+ wetsoil,g	74.78
Area A_0,cm^2	9.62	Dry Density,g/cm^3	1.872	Wt tin+dry soil,g	66.53
Volume, cm^3	81.74	Watercontent,%	15.86	Wt of tin,g	14.51
CF, k	0.04379			Wt of dry soil,g	52.02

Mode of failure

deform. dial reading	Sample deform. ΔL1/100	Strain, ε % $\Delta L/L_0$*100	Proving Ring , R 1/100(mm)	Total load P=R*k kgf / cm^2	Stress б=P(1-ε/100) KN/m^2
0	0	0.000	0	0	0
25	0.25	0.294	3	0.131	13.098
50	0.5	0.588	5	0.219	21.766
75	0.75	0.882	6	0.263	26.042
100	1	1.176	8	0.350	34.620
125	1.25	1.471	10	0.438	43.146
150	1.5	1.765	12	0.525	51.621
175	1.75	2.059	14	0.613	60.044
200	2	2.353	16	0.701	68.416
225	2.25	2.647	18	0.788	76.736
250	2.5	2.941	20	0.876	85.005
275	2.75	3.235	22	0.963	93.222
300	3	3.529	26	1.139	109.837
325	3.25	3.824	28	1.226	117.925
350	3.5	4.118	30	1.314	125.962
375	3.75	4.412	31	1.358	129.761
400	4	4.706	32	1.401	133.535
425	4.25	5.000	34	1.489	141.443
450	4.5	5.294	36	1.576	149.300
475	4.75	5.588	38	1.664	157.105
500	5	5.882	40	1.752	**164.858**
525	5.25	6.176	38	1.664	156.126
550	5.5	6.471	36	1.576	147.445
575	5.75	6.765	33	1.445	134.733
600	6	7.059			
625	6.25	7.353			
650	6.5	7.647			

Unconfined compression curve



Unconfined compressive strength

q_u = 164.858 KN/m^2

UNCONFINED COMPRESSION TEST
(ASTM D2166)

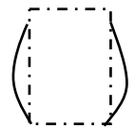
Project : Mongkul Borey Bridge

Borehole: BH-2 U - 3 Depth : 24.55m - 25.00 m

Tested by: Cheas yim

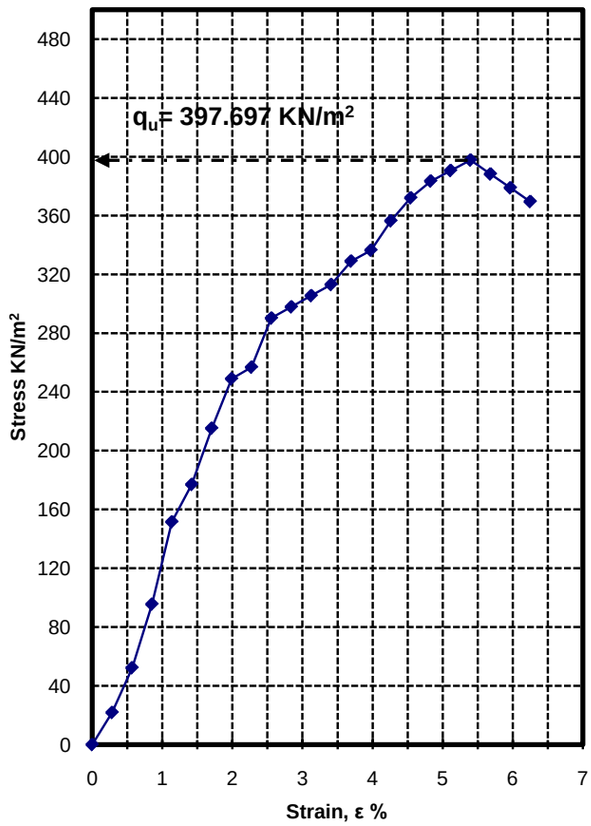
Length,L_0 cm	8.8	Weigth soil , g	175.46	Tin N0	070
Diameter,cm	3.5	Bulk Density,g /cm^3	2.073	Wt tin+ wetsoil,g	64.65
Area A_0,cm^2	9.62	Dry Density,g/cm^3	1.768	Wt tin+dry soil,g	57.22
Volume, cm^3	84.62	Watercontent,%	17.25	Wt of tin,g	14.14
CF, k	0.04379			Wt of dry soil,g	43.08

Mode of failure



deform. dial reading	Sample deform. ΔL1/100	Strain, ε % $\Delta L/L_0$*100	Proving Ring , R 1/100(mm)	Total load P=R*k kgf / cm^2	Stress б=P(1-ε/100) KN/m^2
0	0	0.000	0	0	0
25	0.25	0.284	5	0.219	21.833
50	0.5	0.568	12	0.525	52.250
75	0.75	0.852	22	0.963	95.518
100	1	1.136	35	1.533	151.525
125	1.25	1.420	41	1.795	176.991
150	1.5	1.705	50	2.190	215.220
175	1.75	1.989	58	2.540	248.934
200	2	2.273	60	2.627	256.771
225	2.25	2.557	68	2.978	290.162
250	2.5	2.841	70	3.065	297.825
275	2.75	3.125	72	3.153	305.438
300	3	3.409	74	3.240	313.002
325	3.25	3.693	78	3.416	328.951
350	3.5	3.977	80	3.503	336.390
375	3.75	4.261	85	3.722	356.357
400	4	4.545	89	3.897	372.020
425	4.25	4.830	92	4.029	383.415
450	4.5	5.114	94	4.116	390.581
475	4.75	5.398	96	4.204	**397.697**
500	5	5.682	94	4.116	388.242
525	5.25	5.966	92	4.029	378.837
550	5.5	6.250	90	3.941	369.482
575	5.75	6.534			
600	6	6.818			
625	6.25	7.102			
650	6.5	7.386			

Unconfined compression curve



Unconfined compressive strength

q_u = 397.697 KN/m^2

SPECIFIC GRAVITY OF SOIL

Borehole No. : **BH-2**
Project: Monkul Borey Bridge

Type : D-11 Depth: 10.55m - 11.00m

Number of volumetric flash	V26	V27	T02
Wt. of volumetric flash (g)	65.24	99.45	174.5
Wt. of volumetric flash (g)	164.36	347.85	670.87
Water Temperature in vol. flash before test	29	29	29
Specific gravity of water (g /cm^3)	0.9959	0.9959	0.9959
Wt. of dry soil in volumetric flash (g)	26.25	49.14	66.35
Wt. of volum.flash + Water + drysc(g)	180.69	378.39	712.07
Water Temperature in vol. flash after test T	31	31	31
Specific gravity of water (g /cm^3)	0.9953	0.9953	0.9953
Wt. Volumetric flash + Water at Temp. T	164.30	347.70	670.57
Specific gravity of soil , Gs g /cm^3	2.675	2.676	2.683
Average specific gravity of soil g /cm^3		**2.678**	

Specific Gravity of Water					
Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3
4	1.0000	16	0.9989	28	0.9962
5	1.0000	17	0.9988	29	0.9959
6	0.9999	18	0.9986	30	0.9957
7	0.9999	19	0.9984	31	0.9953
8	0.9999	20	0.9982	32	0.9950
9	0.9998	21	0.9980	33	0.9947
10	0.9997	22	0.9978	34	0.9944
11	0.9996	23	0.9975	35	0.9940
12	0.9995	24	0.9973	36	0.9937
13	0.9994	25	0.9970	37	0.9933
14	0.9992	26	0.9968	38	0.9930
15	0.9991	27	0.9965	39	0.9926

SPECIFIC GRAVITY OF SOIL

Borehole No. : **BH-2**
Project: Monkul Borey Bridge

Type : D-16 Depth: 15.55m - 16.00m

Number of volumetric flash	V22	V7	J03
Wt. of volumetric flash (g)	65.89	96.48	169.05
Wt. of volumetric flash (g)	165.27	344.91	665.74
Water Temperature in vol. flash before test	29	29	29
Specific gravity of water (g /cm^3)	0.9959	0.9959	0.9959
Wt. of dry soil in volumetric flash (g)	31.67	55.46	59.63
Wt. of volum.flash + Water + drysc(g)	184.88	379.16	702.52
Water Temperature in vol. flash after test T	31	31	31
Specific gravity of water (g /cm^3)	0.9953	0.9953	0.9953
Wt. Volumetric flash + Water at Temp. T	165.21	344.76	665.44
Specific gravity of soil , Gs g /cm^3	2.652	2.646	2.657
Average specific gravity of soil g /cm^3	**2.651**		

Specific Gravity of Water					
Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3
4	1.0000	16	0.9989	28	0.9962
5	1.0000	17	0.9988	29	0.9959
6	0.9999	18	0.9986	30	0.9957
7	0.9999	19	0.9984	31	0.9953
8	0.9999	20	0.9982	32	0.9950
9	0.9998	21	0.9980	33	0.9947
10	0.9997	22	0.9978	34	0.9944
11	0.9996	23	0.9975	35	0.9940
12	0.9995	24	0.9973	36	0.9937
13	0.9994	25	0.9970	37	0.9933
14	0.9992	26	0.9968	38	0.9930
15	0.9991	27	0.9965	39	0.9926

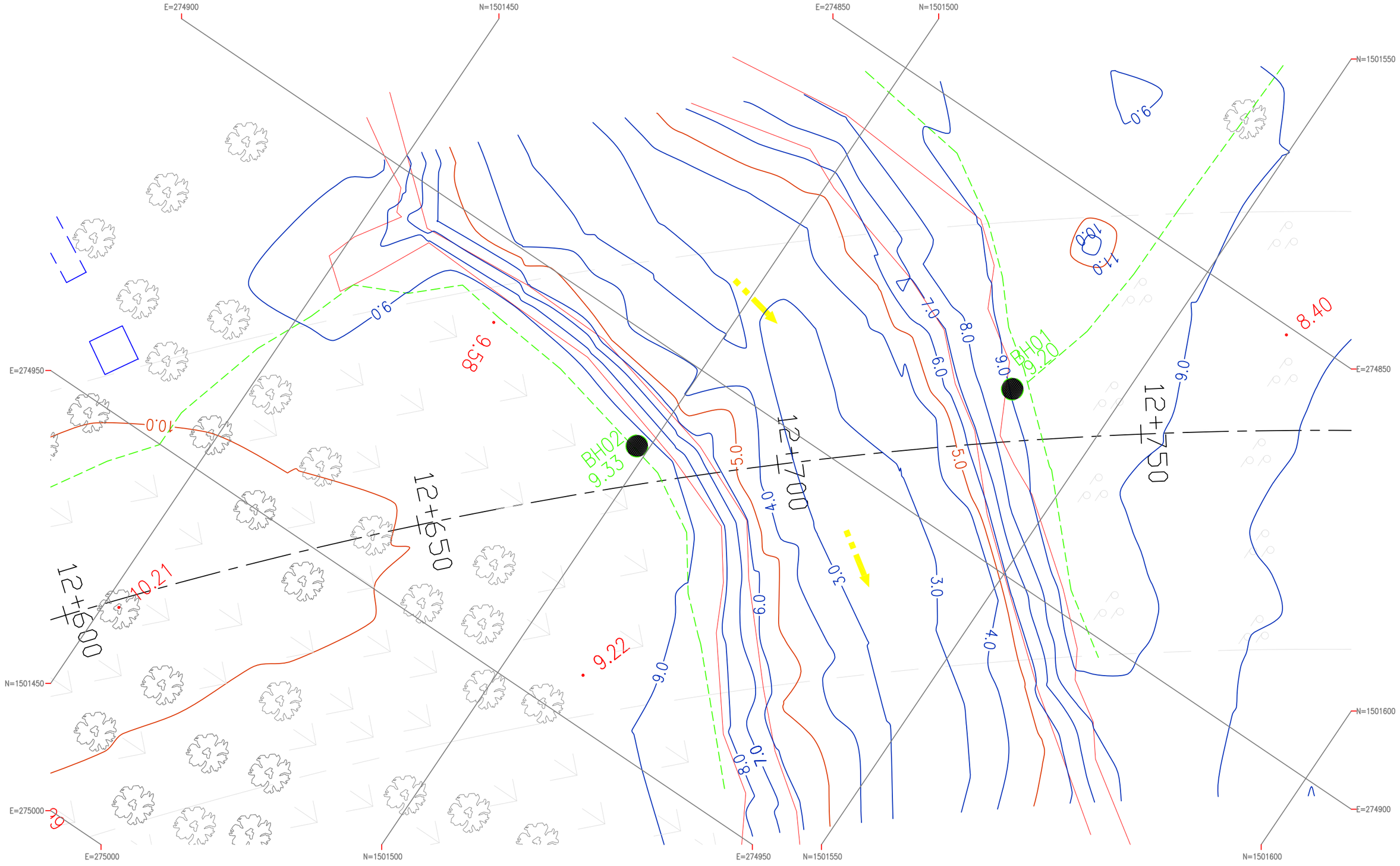
SPECIFIC GRAVITY OF SOIL

Borehole No. : **BH-2**
Project: Monkul Borey

Type : D-23 Depth: 22.55m - 23.00m

Number of volumetric flash	E5	E4	J04
Wt. of volumetric flash (g)	155.73	150.68	169.05
Wt. of volumetric flash (g)	652.45	647.42	665.36
Water Temperature in vol. flash before test T	29	29	29
Specific gravity of water (g /cm^3)	0.9959	0.9959	0.9959
Wt. of dry soil in volumetric flash (g)	101.77	84.17	65.71
Wt. of volum.flash + Water + drysc(g)	716.8	699.72	706.12
Water Temperature in vol. flash after test T	31	31	31
Specific gravity of water (g /cm^3)	0.9953	0.9953	0.9953
Wt. Volumetric flash + Water at Temp. T	652.15	647.12	665.06
Specific gravity of soil , Gs g /cm^3	2.755	2.679	2.678
Average specific gravity of soil g /cm^3		**2.704**	

Specific Gravity of Water					
Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3	Water T. ^{0}C	S. Gravity g /cm^3
4	1.0000	16	0.9989	28	0.9962
5	1.0000	17	0.9988	29	0.9959
6	0.9999	18	0.9986	30	0.9957
7	0.9999	19	0.9984	31	0.9953
8	0.9999	20	0.9982	32	0.9950
9	0.9998	21	0.9980	33	0.9947
10	0.9997	22	0.9978	34	0.9944
11	0.9996	23	0.9975	35	0.9940
12	0.9995	24	0.9973	36	0.9937
13	0.9994	25	0.9970	37	0.9933
14	0.9992	26	0.9968	38	0.9930
15	0.9991	27	0.9965	39	0.9926



Japan Internation Cooperation Agency Katahira & Engineers International	PREPARATORY SURVEY FOR NATIONAL ROAD No.5 REHABILITATION PROJECT IN THE KING DOM OF CAMBODIA	KSG Engineering Co.,Ltd	TITLE : RIVER−2 STEUNG TOUCH	SCALE V= 1:500 H= 1:500	DRAWING No :	
					DATE	29−FEB−2012