

BORING LOG

Bridge No.22

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF YEN BAI PROVINCE TA TIU BRIDGE (SHEET 2/2)										
Bore hole		LKP01		Co-ord. X= Y=		Station: Km1+984m										
Elev.: +96.10		Elev. of underwater level: +0.00		Drilling date:		17/06/2006 - 21/06/2006										
Corrector:		Nguyen Cong Sinh				Checker:		Tran Viet Han								
Layer	Elev. (m)	Depth (m)	PROFILE Scale 1/100	DESCRIPTION	STANDARD PENETRATION TEST (SPT)						Sampling depth for test (m)					
					Depth (m)	Blow No./15cm			N ₆₀ (cm)	Chart						
N1	N2	N3	0 10 20 30 40 50 N													
3	70.60	24.70	5.10	Granite is greenish grey and weathered to become grit-chip. Structure is very closed. While SPT to be refused.	SPT19 20.00-20.45	30	40	>50	>100							DB 21.60-22.00
					SPT20 21.00-21.45	40	>50									
					SPT21 22.00-22.45	35	>50									
					SPT22 23.00-23.45	36	>50									
					SPT23 24.00-24.45	33	>50									
4	66.30	29.00	4.30	Granite is in greenish grey, weathered, cracked, some where broken to be block. Sample is not intact lump.	SPT24 25.00-25.45	35	>50							DB 24.60-28.00		
5	62.70	32.60	3.60	Granite is in greenish grey, little weathered. Hardness is level 7-8.										U11 31.30-31.60		

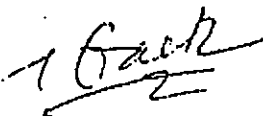
TEST FOR UNCONFINED COMPRESSIVE STRENGTH OF ROCK
(22 TCN 57 - 84)

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

TA TIU BRIDGE

Bore hole	PO2	PO2	
Sample No	D9	D10	
Depth (m)	29,0-29,2	33,8-34,0	
Test Items			
Dry unconfined compressive strength σ_u (kG/cm ²)	530,0	550,0	
Saturated unconfined compressive strength σ_{bh} (kG/cm ²)	421,0	430,0	
Index of softening k	0,79	0,78	
Natural unit weight γ_w (g/cm ³)	2,395	2,390	
Specific gravity Δ (g/cm ³)	2,715	2,713	

Tested by



Nguyễn Văn Hạnh



TEST FOR UNCONFINED COMPRESSIVE STRENGTH OF ROCK

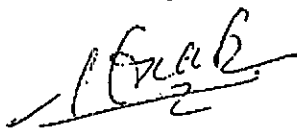
(22 TCN 57 - 84)

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

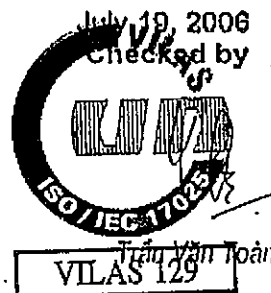
TA TIU BRIDGE

Bore hole		P01		
Sample No.		D11		
Depth (m)		31,30-31,50		
Test items				
Dry unconfined compressive strength	σ_n (kG/cm ²)	529,0		
Saturated unconfined compressive strength	σ_{br} (kG/cm ²)	127,0		
Index of softening	k	0,81		
Natural unit weight	γ_w (g/cm ³)	2,400		
Specific gravity	Δ (g/cm ³)	2,720		

Tested by



Nguyễn Văn Hạnh



No: 290608.01.1/CLĐ

SUMMARY OF TEST RESULTS

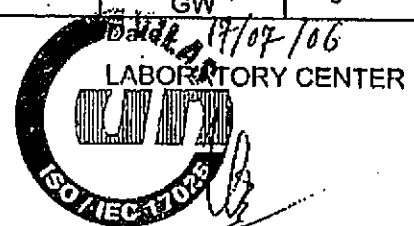
THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

TA TIU BRIDGE

Borehole :		P01				
Sample No :		Đ1	Đ2	Đ3	Đ4	Đ5
Depth (m):	m	2.4 + 2.6	5.5 + 5.7	7.8 + 8.0	10.8 + 11.0	12.8 + 13.0
Test No.		629	630	631	632	633
Grain size analysis		%				
Percent finer (%)	50.8 (mm)	100.0	80.0	44.0	65.4	100.0
	25.4 (mm)	23.8	42.3	21.9	48.7	37.9
	19.0 (mm)	21.2	30.0	7.3	27.7	21.3
	9.5 (mm)	16.1	20.2	5.5	14.5	22.3
	4.75 (mm)	11.8	14.6	2.3	10.1	19.6
	2.00 (mm)	6.2	8.7	1.8	5.7	11.2
	0.425 (mm)	1.3	3.4	1.2	1.3	7.3
	0.075 (mm)	0.1	1.1	0.3	0.2	5.4
	0.050 (mm)					
	0.005 (mm)					
	0.002 (mm)					
Natural water content	W %					
Natural unit weight	γ_w g/cm ³					
Dry unit weight	γ_k g/cm ³					
Specific gravity	ρ g/cm ³	2.670	2.670	2.670	2.670	2.670
Coefficient of uniformity	C_u	9.7	14.3	2.8	7.0	32.0
Coefficient of gradation	C_c	5.7	4.8	0.9	2.9	13.8
In Dry condition	α_k					
In Saturation condition	α_w					
Void Ratio	e_0					
Porosity	n %					
Degree of Saturation	S %					
Liquid Limits	W _L %					
Plastic Limits	W _p %					
Plasticity Index	I _p %					
Internal friction angle	ρ^p					
Cohesion	C KG/cm ²					
Compressibility Index	$a_{1,2}$ cm ² /KG					
Soil classification ASTM - D 2487		Bad aggregate grit - GP	Bad aggregate grit - GP	Bad aggregate grit - GP	Good aggregate grit GW	Bad aggregate grit - GP

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NCHP



Eng. Nguyen Thi Khanh Ha

VILAS 129

Eng. Tran Van Toan

No: 290606.01.2/CLD

SUMMARY OF TEST RESULTS

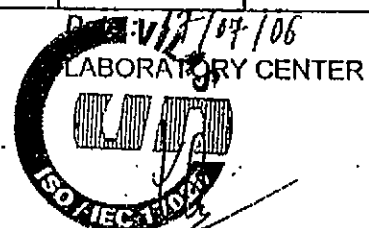
THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

TA TIU BRIDGE

Borehole :		P01				
Sample No :		D6	D7	D8	D9	D10
Depth (m):		15.8 + 16.0	18.8 + 19.0	21.0 + 22.0	24.8 + 25.0	26.6 + 26.8
Test No.		634	635	636	637	638
Grain size analysis						
Percent finer (%)	50.8 (mm)	100.0	71.4	100.0	100.0	100.0
	25.4 (mm)	21.3	20.6	72.4	84.6	83.0
	19.0 (mm)	18.5	14.7	67.4	71.6	70.1
	9.5 (mm)	15.7	11.6	57.5	61.3	62.2
	4.75 (mm)	15.1	9.6	52.9	52.7	53.9
	2.00 (mm)	12.8	6.4	49.4	45.7	48.4
	0.425 (mm)	8.7	4.0	42.6	41.9	45.5
	0.075 (mm)	5.7	2.5	40.0	39.3	42.2
	0.050 (mm)			40.0	37.5	41.5
	0.005 (mm)			24.0	20.0	25.0
	0.002 (mm)			15.0	14.0	16.5
Natural water content	W %					
Natural unit weight	γ_w g/cm ³					
Dry unit weight	γ_k g/cm ³					
Specific gravity	ρ g/cm ³	2.670	2.670	2.690	2.690	2.690
Coefficient of uniformity	C_u	50.0	7.9			
Coefficient of gradation	C_c	29.8	3.8			
In Dry condision	α_k					
In Saturation condision	α_w					
Void Ratio	e_0					
Porosity	n %					
Degree of Saturation	S %					
Liquid Limits	Wl %			38.6	36.7	39.6
Plastic Limits	Wp %			24.0	23.4	24.2
Plasticity Index	Ip %			14.6	13.3	15.4
Internal friction angle	φ^0					
Cohesion	C KG/cm ²					
Compressibility Index	$a_{1,2}$ cm ² /KG					
Soil classification ASTM - D 2487		Bad aggregate grit - GP	Bad aggregate grit - GP	Clay-grit - GC	Clay-grit - GC	Clay-grit - GC

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ZACH



Eng. Nguyen Thi Khanh Ha

Eng. Tran Van Toan

No: 290608.01.3/CLD

SUMMARY OF TEST RESULTS

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

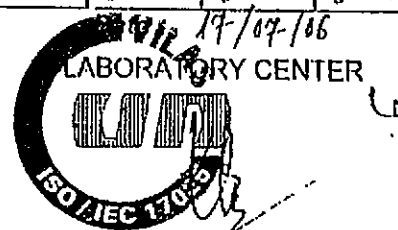
TA TIU BRIDGE

Borehole :		P02							
Sample No :		D1	D2	D3	D4	D5	D6	D7	D8
Depth (m):	m	2.8 + 3.0	5.8 + 6.0	8.8 + 9.0	11.8 + 12.0	14.8 + 15.0	17.8 + 18.0	20.8 + 21.0	24.8 + 24.8
Test No.		639	640	641	642	643	644	645	646
Grain size analysis		P %							
Percent finer (%)	50.8 (mm)	70.6	100.0	100.0	66.4	68.8	85.1	100.0	100.0
	25.4 (mm)	21.9	38.0	26.8	20.2	22.7	42.4	25.7	26.4
	19.0 (mm)	15.7	31.1	21.3	14.9	18.2	41.7	18.3	18.8
	9.5 (mm)	11.0	22.1	17.6	10.1	14.5	39.4	15.1	10.6
	4.75 (mm)	7.8	15.5	13.6	7.9	11.4	24.4	9.7	7.9
	2.00 (mm)	5.5	8.4	9.5	4.6	7.4	8.3	6.2	5.0
	0.425 (mm)	3.0	2.7	4.8	2.7	4.8	4.8	4.0	3.1
	0.075 (mm)	1.1	1.0	2.0	1.6	1.7	1.4	1.7	1.5
	0.050 (mm)								
	0.005 (mm)								
0.002 (mm)									
Natural water content	W %								
Natural unit weight	γ_w g/cm ³								
Dry unit weight	γ_k g/cm ³								
Specific gravity	ρ g/cm ³	2.670	2.670	2.670	2.670	2.670	2.670	2.670	2.670
Coefficient of uniformity	C_u	5.3	13.9	16.7	5.1	13.3	15.7	7.0	4.4
Coefficient of gradation	C_c	2.5	3.9	3.9	2.2	5.4	0.5	4.2	2.6
In Dry condition	α_k								
In Saturation condition	α_w								
Void Ratio	e_0								
Porosity	n %								
Degree of Saturation	S %								
Liquid Limits	W _l %								
Plastic Limits	W _p %								
Plasticity Index	I _p %								
Internal friction angle	ϕ^0								
Cohesion	C KG/cm ²								
Compressibility Index	$a_{1,2}$ cm ² /KG								
Soil classification ASTM - D 2487		Good aggregate grit - CW	Bad aggregate grit - GP	Bad aggregate grit - GP	Good aggregate grit - GW	Bad aggregate grit - GP	Bad aggregate grit - GP	Bad aggregate grit - GP	Good aggregate grit - CW

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ZKH

Eng. Nguyen Thi Khanh Ha



VILAS 100
Lab. Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P01
Sample No : D1
Depth (m) : 2.4 ± 2.6

Tests No : 629
Date : 05/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 1360.0

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	0.00	1038.00	35.10	60.00	59.30	70.30	60.00	15.00	1.00
Percent retained (%)	0.0	76.2	2.6	5.1	4.4	5.6	4.9	1.2	0.1
Percent finer (%)	100.0	23.8	21.2	16.1	11.8	6.2	1.3	0.1	

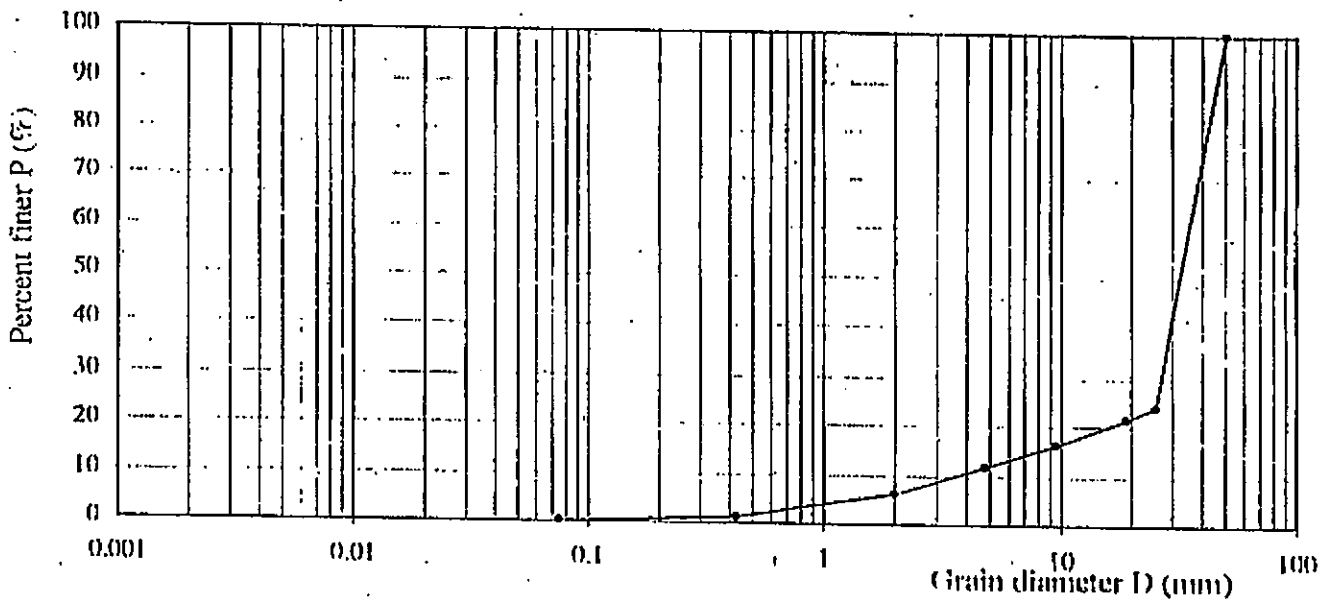
RESULT

$D_{60} = 34.0$ $C_u = 9.7$
 $D_{30} = 26.0$ $C_c = 5.7$
 $D_{10} = 3.5$

Soil classification (ASTM - D 2487)

Group symbol : GP
Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	0	76.2	2.6	5.1	4.4	5.6	4.9	1.2	0.1



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Nguyen Thi Hong



VILAS 129
Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P01
Sample No : D2
Depth (m) : 5.5 + 5.7

Tests No : 630
Date : 05/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 1271.4

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	254.1	480.00	155.50	125.60	70.10	75.10	68.10	28.60	14.30
Percent retained (%)	20.0	37.8	12.2	9.9	5.5	5.9	5.4	2.2	1.1
Percent finer (%)	80.0	42.3	30.0	20.2	14.6	8.7	3.4	1.1	

RESULT

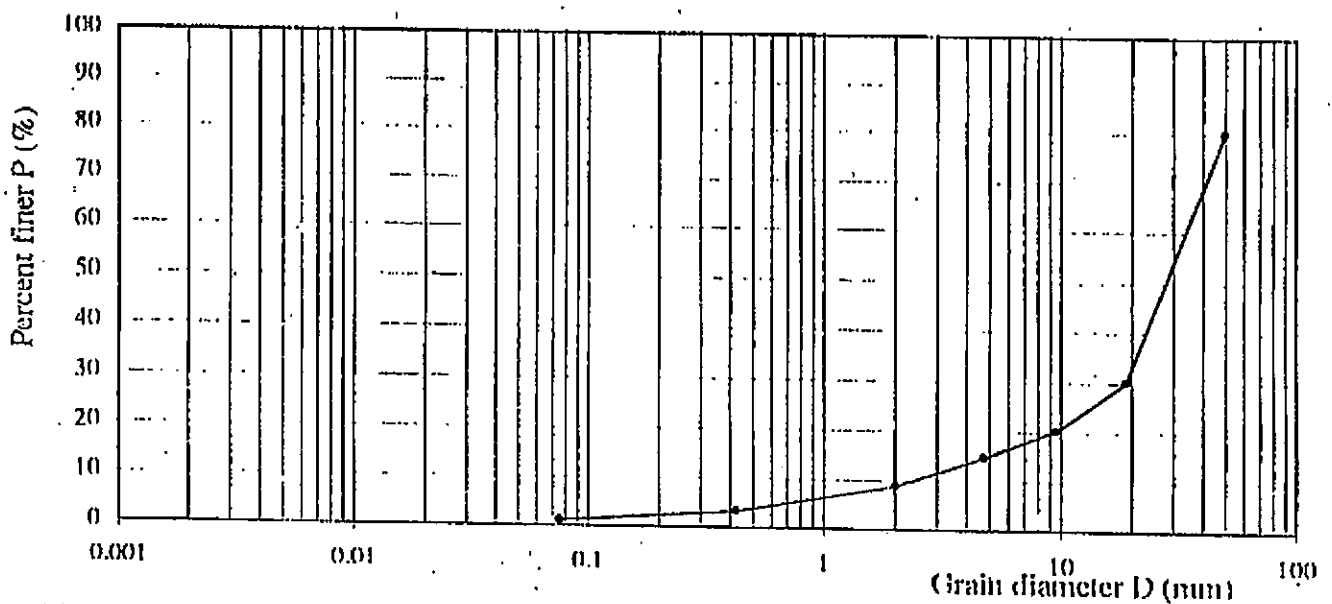
$D_{60} = 33.0$ $C_u = 14.3$
 $D_{30} = 19.0$ $C_c = 4.8$
 $D_{10} = 2.3$

Soil classification (ASTM - D 2487)

Group symbol : GP

Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	20.0	37.8	12.2	9.9	5.5	5.9	5.4	2.2	1.1



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Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P01
Sample No : D3
Depth (m) : 7.8 : 8.0

Tests No : 631
Date : 05/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 1108.2

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	620.8	245.20	161.20	20.30	35.00	5.20	6.70	10.30	3.50
Percent retained (%)	56.0	22.1	14.5	1.8	3.2	0.5	0.6	0.9	0.3
Percent finer (%)	44.0	21.9	7.3	5.5	2.3	1.8	1.2	0.3	

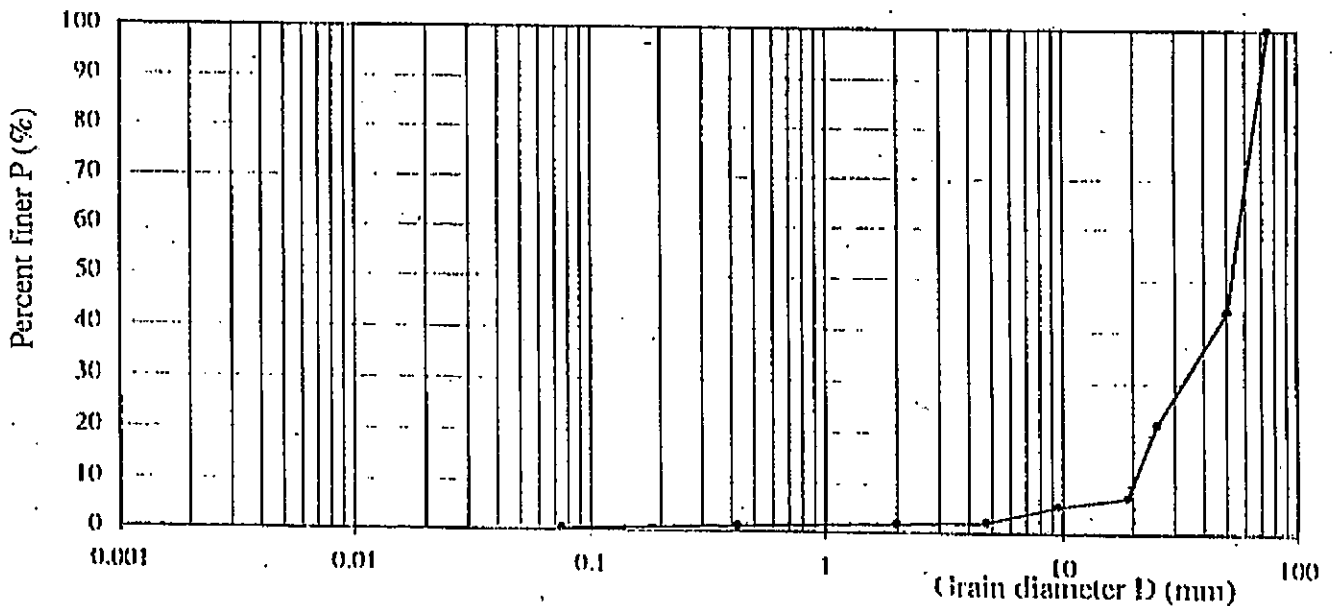
RESULT

$D_{60} = 56.0$ $C_u = 2.8$
 $D_{30} = 32.0$ $C_c = 0.9$
 $D_{10} = 20.0$

Soil classification (ASTM - D 2487)

Group symbol : GP
Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	56.0	22.1	14.5	1.8	3.2	0.5	0.6	0.9	0.3



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Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

**THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE**

Borehole : P01
 Sample No : D4
 Depth (m) : 10.8 + 11.0

Tets No : 632
 Date : 05/7/2006

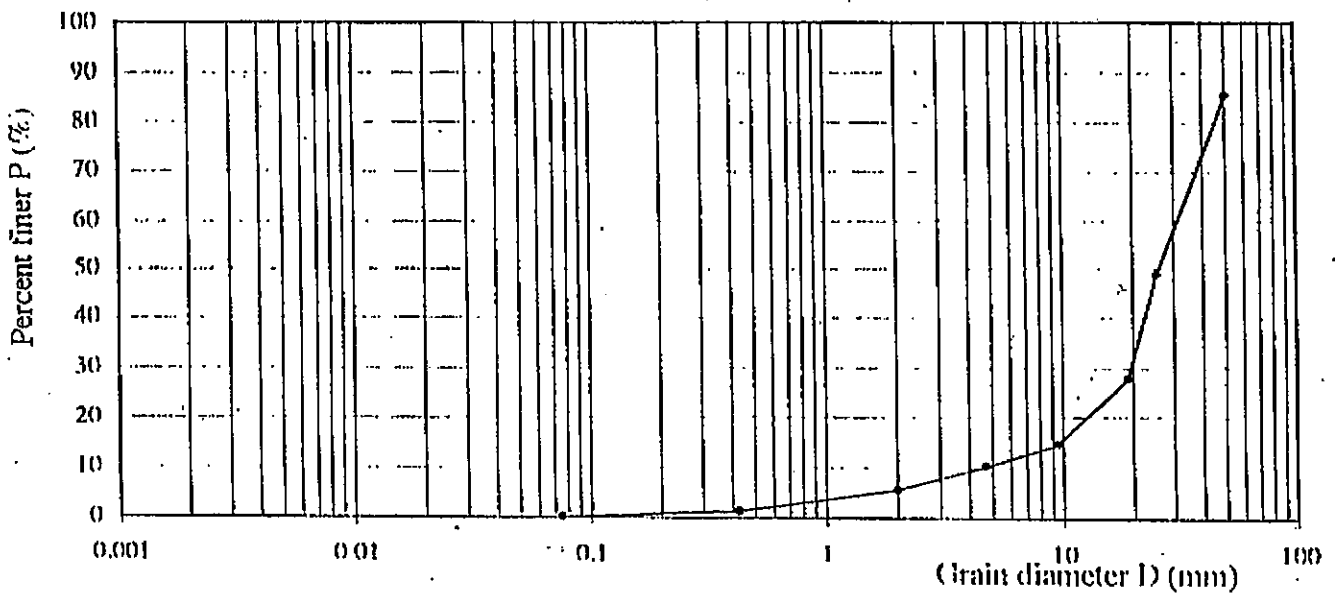
SIZE ANALYSIS	Weight of dry soil (g): 1255.0								
Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	182.8	461.30	263.20	166.30	54.40	55.10	55.00	14.70	2.20
Percent retained (%)	14.6	36.8	21.0	13.3	4.3	4.4	4.4	1.2	0.2
Percent finer (%)	85.4	48.7	27.7	14.5	10.1	5.7	1.3	0.2	

RESULT

$D_{60} = 31.0$ $C_u = 7.0$
 $D_{30} = 20.0$ $C_c = 2.9$
 $D_{10} = 4.4$

Soil classification (ASTM - D 2487)
 Group symbol : GW
 Group name : Good aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	14.6	36.8	21.0	13.3	4.3	4.4	4.4	1.2	0.2



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GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P01
Sample No : D5
Depth (m): 12.8 : 13.0

Tests No : 633
Date : 11/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 550.0

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	0	341.50	75.00	11.10	15.20	45.50	21.40	10.50	29.80
Percent retained (%)	0.0	62.1	13.6	2.0	2.8	8.3	3.9	1.9	5.4
Percent finer (%)	100.0	37.9	24.3	22.3	19.5	11.2	7.3	5.4	

RESULT

$D_{60} = 32.0$

$C_u = 32.0$

Soil classification (ASTM - D 2487)

$D_{30} = 21.0$

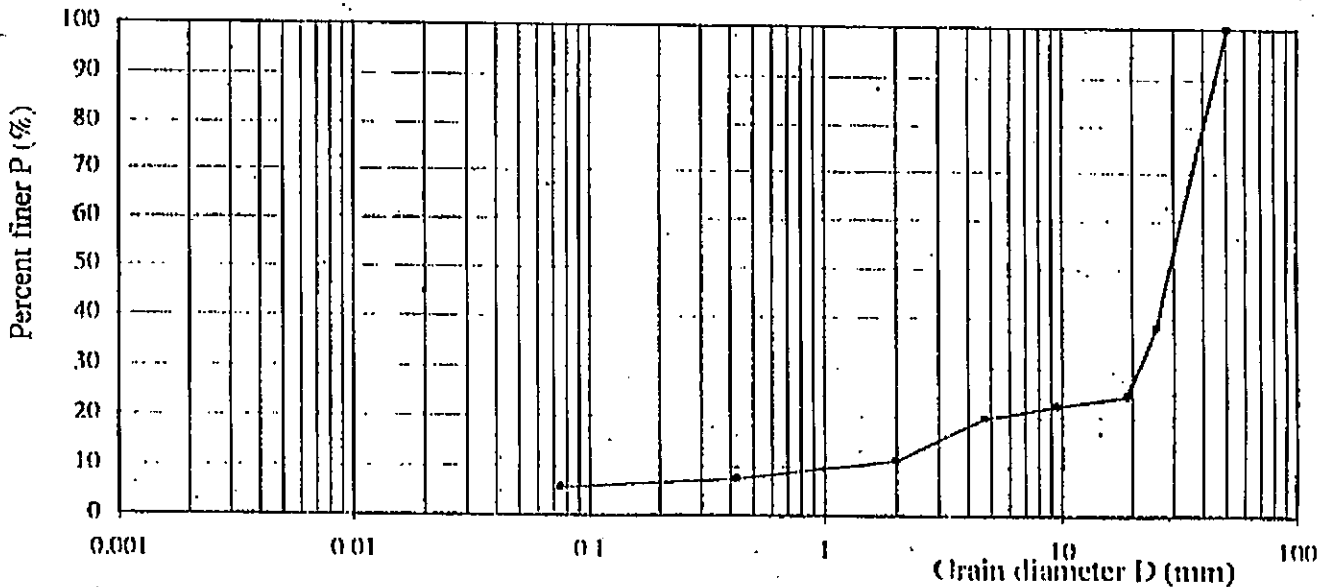
$C_c = 13.8$

Group symbol : GP

$D_{10} = 1.0$

Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	0.0	62.1	13.6	2.0	2.8	8.3	3.9	1.9	5.4



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VILAS 100 Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P01
 Sample No : D6
 Depth (m) : 15.8 + 16.0

Tets No : 634
 Date : 11/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 715.0

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	0	562.50	20.00	20.03	4.50	16.50	29.50	21.40	40.57
Percent retained (%)	0.0	78.7	2.8	2.8	0.6	2.3	4.1	3.0	5.7
Percent finer (%)	100.0	21.3	18.5	15.7	15.1	12.8	8.7	5.7	

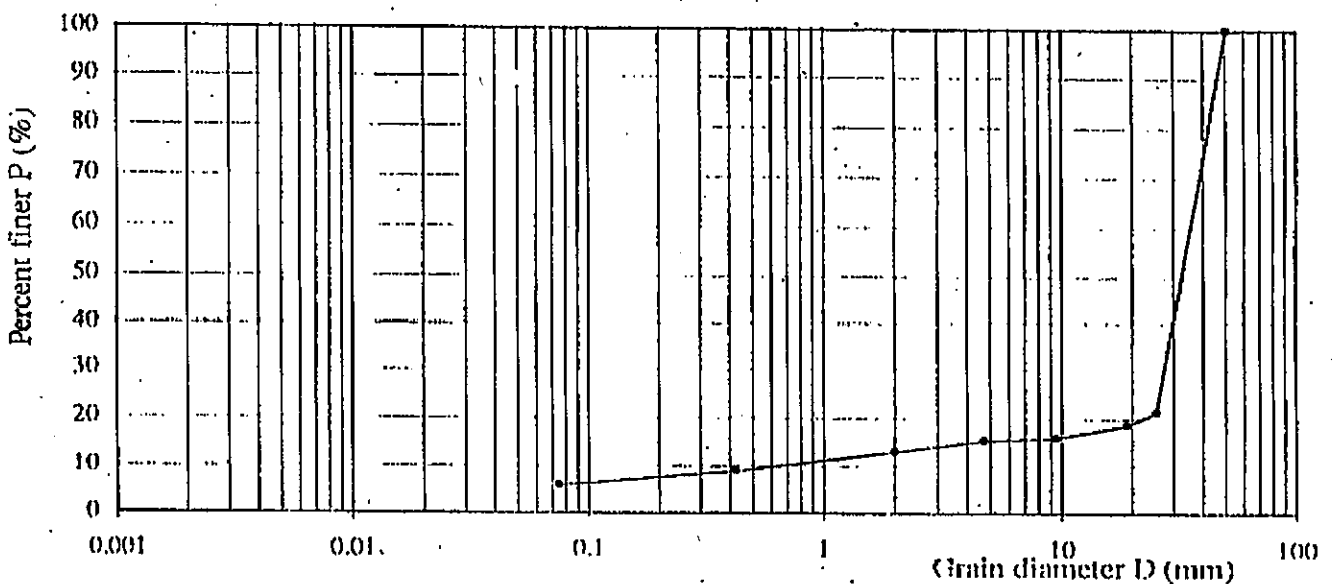
RESULT

$D_{60} = 35.0$ $C_u = 50.0$
 $D_{30} = 27.0$ $C_c = 29.8$
 $D_{10} = 0.7$

Soil classification (ASTM - D 2487)

Group symbol : GP
 Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	0.0	78.7	2.8	2.8	0.6	2.3	4.1	3.0	5.7



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Nguyen Thi Hong

Checked by



VILAS 120 Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P01
 Sample No : D7
 Depth (m) : 18.8 + 19.0

Tets No : 635
 Date : 11/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 855.0

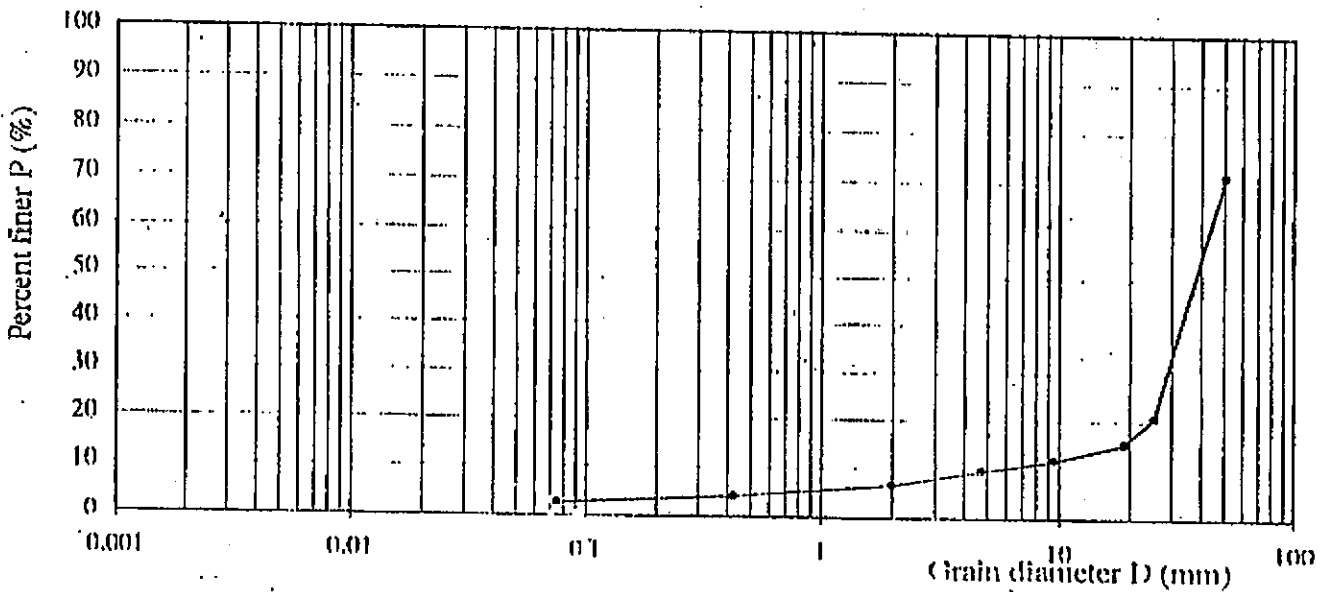
Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	244.5	434.50	50.00	26.50	18.50	26.50	20.40	12.30	22.00
Percent retained (%)	28.6	50.8	5.8	3.1	2.2	3.1	2.4	1.4	2.6
Percent finer (%)	71.4	20.6	14.7	11.6	9.5	6.4	4.0	2.5	

RESULT

$D_{60} = 42.0$ $C_u = 7.9$
 $D_{30} = 29.0$ $C_c = 3.8$
 $D_{10} = 5.3$

Soil classification (ASIM - D 2487)
 Group symbol : GP
 Group name : Bad aggregate gill

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	28.6	50.8	5.8	3.1	2.2	3.1	2.4	1.4	2.6



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VILAS 129
 Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P01
Sample No : DB
Depth (m): 21.0 + 22.0

Tets No : 636
Date : 10/7/2006

SIZE ANALYSIS

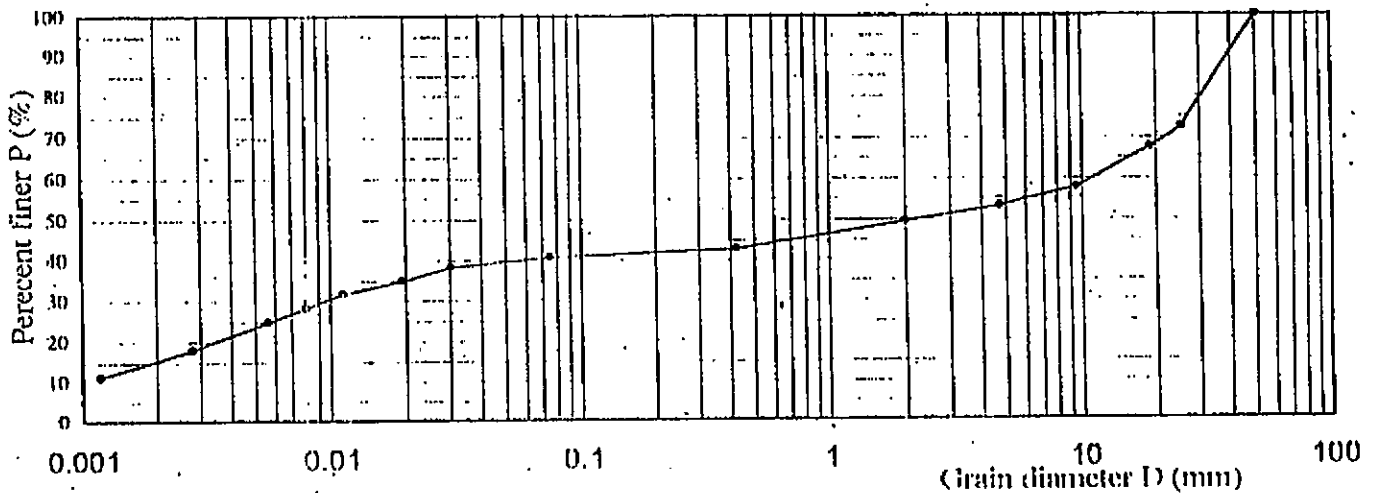
Weight of dry soil (g): 555.0

Grain diameter (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	Khối lượng riêng (g/cm ³) 2.690
Weight soil retained (g)	0.00	153.20	27.50	55.10	25.40	19.70	37.80	0.94	
Percent retained (%)	0.0	27.6	5.0	9.9	4.6	3.5	6.8	2.0	
Percent finer (%)	100.0	72.4	97.4	97.5	92.9	99.4	92.0	98.0	

HYDROMETER ANALYSIS

Weight of dry soil (g): 20.00
Temperature in (°C) 30.0

Elapsed time (min)	Actual Hydrometer Reading	Correction			Effective depth L (cm)	Diameter D (mm)	Percent passing P (%)
		Temperature	Zero	Hyd. Reagin			
2	8.0	2.3	1.0	11.3	12.71	0.0303	38.3
5	7.0	2.3	1.0	10.3	12.86	0.0193	34.9
15	6.0	2.3	1.0	9.3	13.01	0.0112	31.5
30	5.0	2.3	1.0	8.3	13.16	0.0080	28.1
60	4.0	2.3	1.0	7.3	13.31	0.0057	24.7
250	2.0	2.3	1.0	5.3	13.61	0.0020	18.0
1440	0.0	2.3	1.0	3.3	13.91	0.0012	11.2



RESULT

Size (mm)	< 0.002	0.002	0.005	0.05	0.075	0.425	2.00	4.75	9.5	19.0	25.4	50.8
Percent (%)	15.0	9.0	16.0	0.6	2.0	6.8	3.5	4.6	9.9	5.0	27.6	0.0
Percent finer (%)		15.0	24.0	40.0	40.6	42.6	49.4	52.0	57.9	67.4	72.4	100.0

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Nguyen Thi Hong



VILAS 129
Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM -D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P01
Sample No : D9
Depth (m): 24.8 + 25.0

Tets No : 637
Date : 10/7/2016

SIZE ANALYSIS

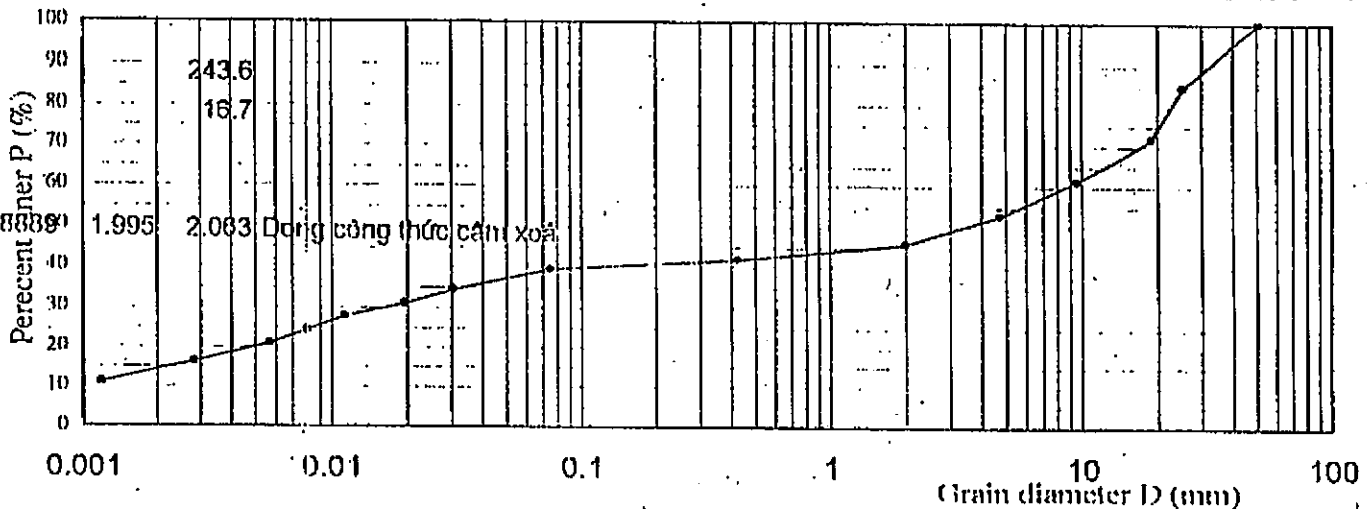
Weight of dry soil (g): 952.0

Grain diameter (mm)	50.0	25.4	10.0	9.5	4.75	2.00	0.425	0.075	Khối lượng riêng (g/cm ³) 2.690
Weight soil retained (g)	0.00	146.30	124.10	98.40	81.23	87.24	36.10	1.24	
Percent retained (%)	0.0	15.4	13.0	10.3	8.5	7.1	3.8	2.6	
Percent finer (%)	100.0	84.6	71.6	61.3	52.7	45.7	41.9	39.3	

HYDROMETER ANALYSIS

Weight of dry soil (g): 20.00
Temperature in (°C) 30.0

Elapsed time (min)	Actual Hydrometer Reading	Correction			Effective depth L (cm)	Diameter D (mm)	Percent passing P (%)
		Temperature	Zero	Hyd. Reagin			
2	7.0	2.3	1.0	10.3	12.88	0.0305	34.3
5	6.0	2.3	1.0	9.3	13.01	0.0194	31.0
15	5.0	2.3	1.0	8.3	13.16	0.0113	27.7
30	4.0	2.3	1.0	7.3	13.31	0.0080	24.3
60	339.6 3.0	2.3	1.0	6.3	13.46	0.0057	21.0
250	298.9 1.5	2.3	1.0	4.8	13.68	0.0028	16.0
1440	55.3 0.0	2.3	1.0	3.3	13.91	0.0012	11.0



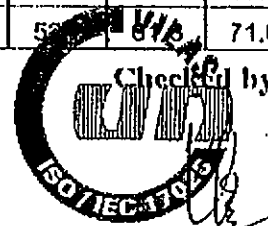
RESULT

Size (mm)	<0.002	0.002	0.005	0.05	0.075	0.425	2.00	4.75	9.5	19.0	25.4	50.8
Percent (%)	14.0	6.0	17.5	1.8	2.6	3.8	7.1	8.5	10.3	13.0	15.4	0.0
Percent finer (%)		14.0	20.0	37.5	39.3	41.9	45.7	52.7	55.3	71.6	84.6	100.0

Tested by

Nguyễn Thị Hồng

Nguyễn Thị Hồng



VILAS 129
Trần Văn Toàn

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

TA TIU BRIDGE

Borehole : P01

Sample No : D10

Depth (m): 26.6 + 26.8

Tests No : 638

Date : 10/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 847.0

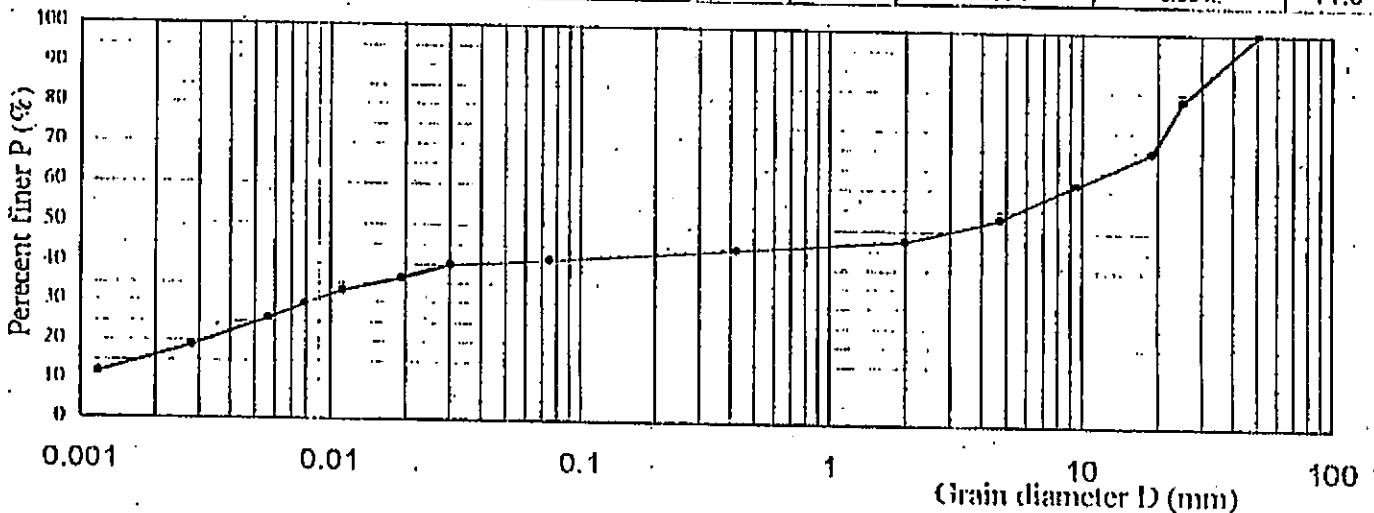
Grain diameter (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	Khối lượng riêng (g/cm ³) 2.690
Weight soil retained (g)	0.00	146.80	112.54	67.30	72.40	48.18	24.58	1.38	
Percent retained (%)	0.0	17.3	13.3	7.9	8.5	5.7	2.9	3.1	
Percent finer (%)	100.0	82.7	69.4	61.4	52.9	47.2	44.3	41.2	

HYDROMETER ANALYSIS

Weight of dry soil (g): 20.00

Temperature in (°C) 30.0

Elapsed time (min)	Actual Hydrometer Reading	Correction			Effective depth L (cm)	Diameter D (mm)	Percent passing P (%)
		Temperature	Zero	Hyd. Reagin			
2	8.0	2.3	1.0	11.3	12.71	0.0203	39.8
5	7.0	2.3	1.0	10.3	12.86	0.0193	36.3
15	6.0	2.3	1.0	9.3	13.01	0.0112	32.8
30	5.0	2.3	1.0	8.3	13.16	0.0080	29.3
60	4.0	2.3	1.0	7.3	13.31	0.0057	25.7
250	2.0	2.3	1.0	5.3	13.61	0.0028	18.7
1440	0.0	2.3	1.0	3.3	13.91	0.0012	11.6



RESULT

Size (mm)	< 0.002	0.002	0.005	0.05	0.075	0.425	2.00	4.75	9.5	19.0	25.4	50.8
Percent (%)	15.8	9.0	15.7	0.7	3.1	2.9	5.7	8.5	7.9	13.3	17.3	0.0
Percent finer (%)		15.8	24.8	40.5	41.2	44.3	47.2	52.9	60.8	69.4	82.7	100.0

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VIIAB 1231 Loan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P02
Sample No : D1
Depth (m) : 2.8 + 3.0

Tets No : 639
Date : 11/7/2006

SIZE ANALYSIS : Weight of dry soil (g): 1217.8

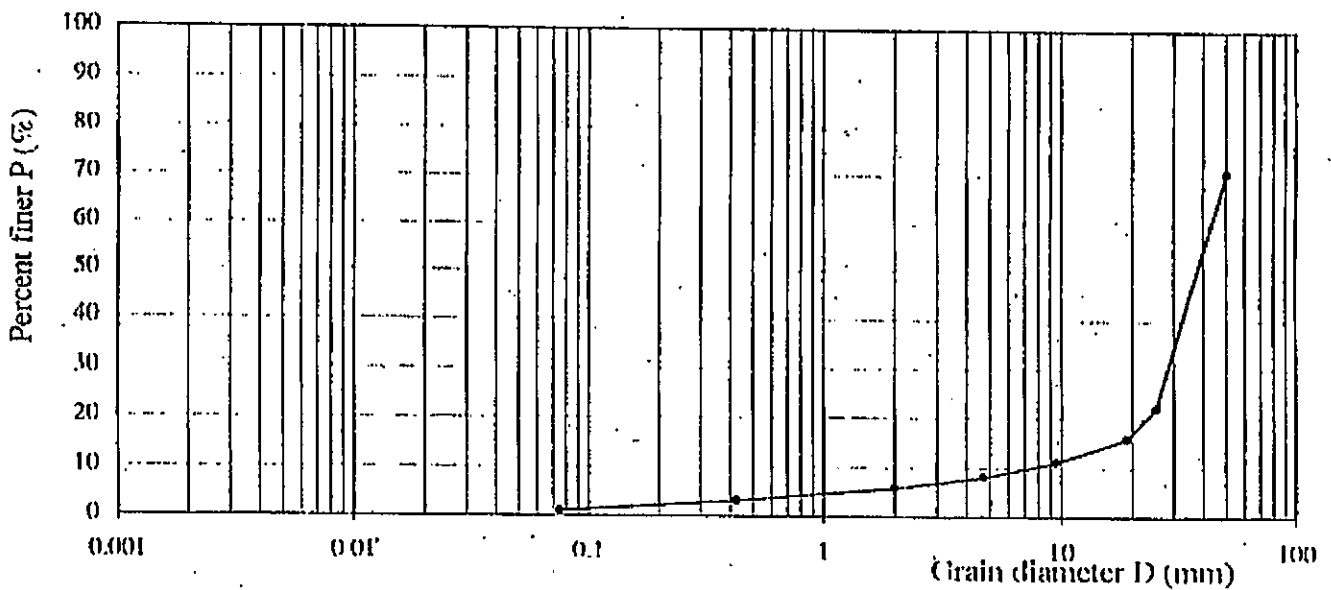
Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	358	593.00	76.10	57.20	39.00	27.00	31.10	23.50	12.90
Percent retained (%)	29.4	48.7	6.2	4.7	3.2	2.2	2.6	1.9	1.1
Percent finer (%)	70.6	21.9	15.7	11.0	7.8	5.5	3.0	1.1	

RESULT

$D_{60} = 42.0$ $C_u = 5.3$
 $D_{30} = 29.0$ $C_c = 2.5$
 $D_{10} = 8.0$

Soil classification (ASTM - D 2487) :
Group symbol : GW
Group name : Good aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	29.4	48.7	6.2	4.7	3.2	2.2	2.6	1.9	1.1



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GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

**THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE**

Borehole : P02
 Sample No : D2
 Depth (m): 5.8 + 6.0

Tets No : 640
 Date : 11/7/2006

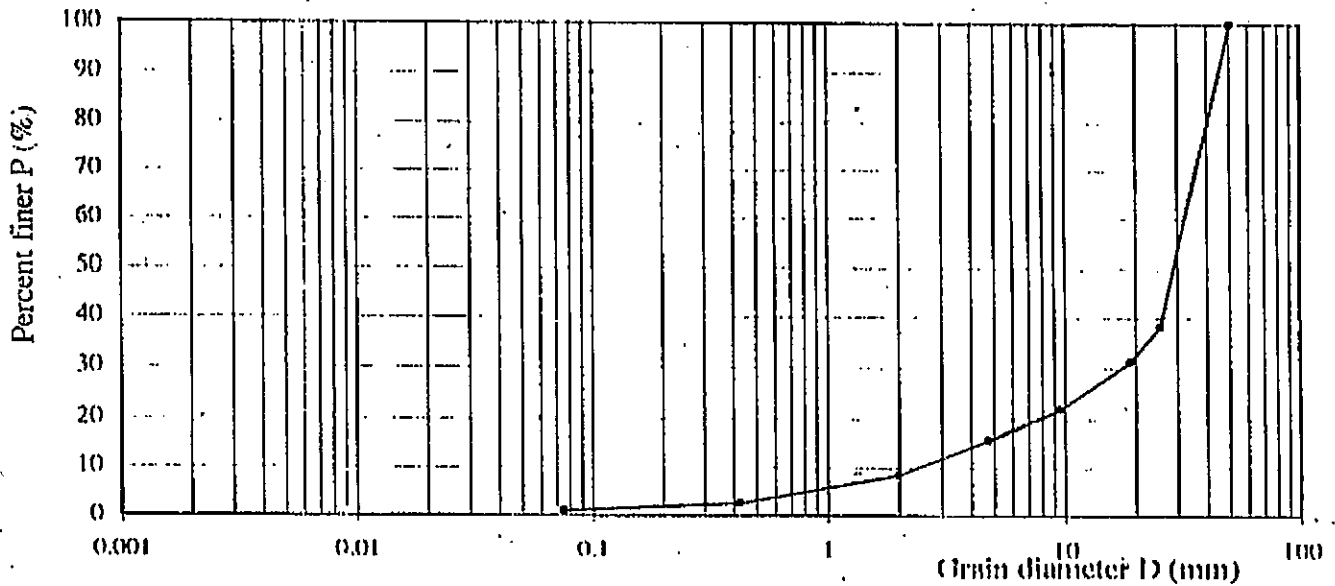
SIZE ANALYSIS	Weight of dry soil (g): 1239.4								
Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	0.0	768.00	86.00	111.50	81.50	88.50	70.50	21.60	11.80
Percent retained (%)	0.0	62.0	6.9	9.0	6.6	7.1	5.7	1.7	1.0
Percent finer (%)	100.0	38.0	31.1	22.1	15.5	8.4	2.7	1.0	

RESULT

$D_{60} = 32.0$ $C_u = 13.9$
 $D_{30} = 17.0$ $C_c = 3.9$
 $D_{10} = 2.3$

Soil classification (ASTM - D 2487)
 Group symbol : GP
 Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	0.0	62.0	6.9	9.0	6.6	7.1	5.7	1.7	1.0



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GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P02
 Sample No : 03
 Depth (m) : 8.8 ; 9.0

Tets No : 641
 Date : 11/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 1349.9

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	0.0	988.80	73.70	49.40	54.50	54.90	66.50	34.80	27.30
Percent retained (%)	0.0	73.2	5.5	3.7	4.0	4.1	4.9	2.6	2.0
Percent finer (%)	100.0	26.8	21.3	17.6	13.6	9.5	4.6	2.0	

RESULT

$D_{60} = 35.0$
 $D_{30} = 17.0$
 $D_{10} = 2.1$

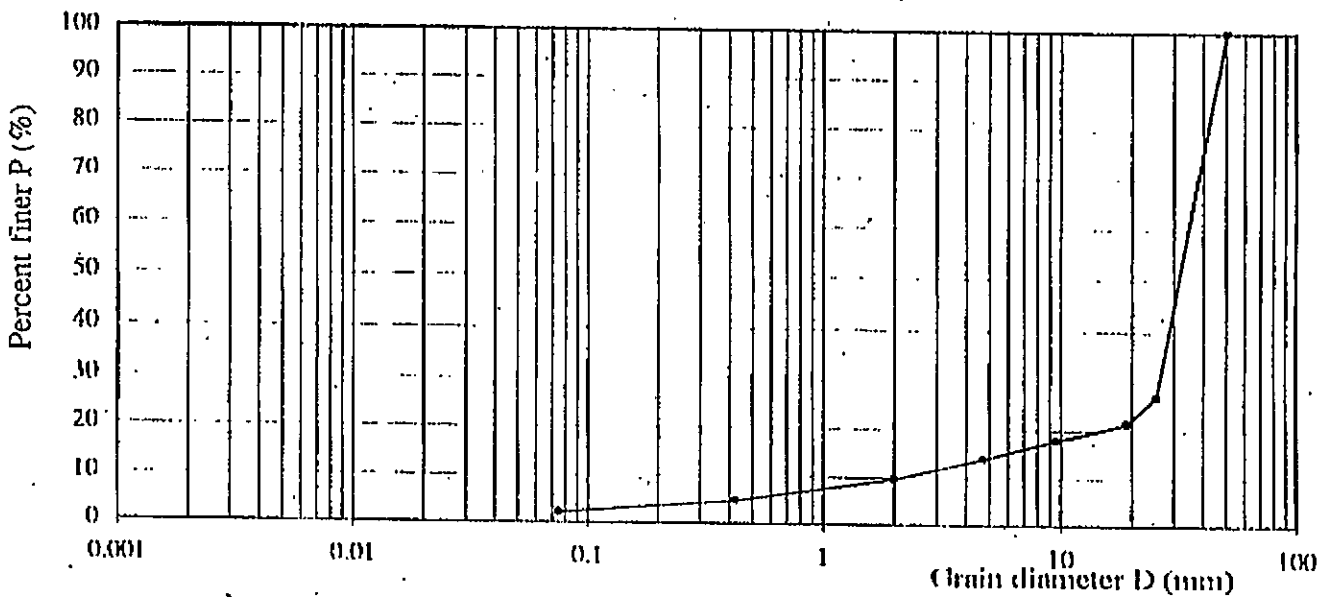
$C_u = 16.7$
 $C_c = 3.9$

Soil classification (ASTM - D 2487)

Group symbol : GP

Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	0.0	73.2	5.5	3.7	4.0	4.1	4.9	2.6	2.0



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VILAS 129

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GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P02
Sample No : D4
Depth (m) : 11.8 : 12.0

Tests No : 642
Date : 11/7/2016

SIZE ANALYSIS

Weight of dry soil (g): 1199.7

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	403.0	554.00	64.10	57.00	20.50	39.50	23.40	12.50	19.30
Percent retained (%)	33.6	46.2	5.3	4.8	2.2	3.3	2.0	1.0	1.6
Percent finer (%)	66.4	20.2	14.9	10.1	7.9	4.6	2.7	1.6	

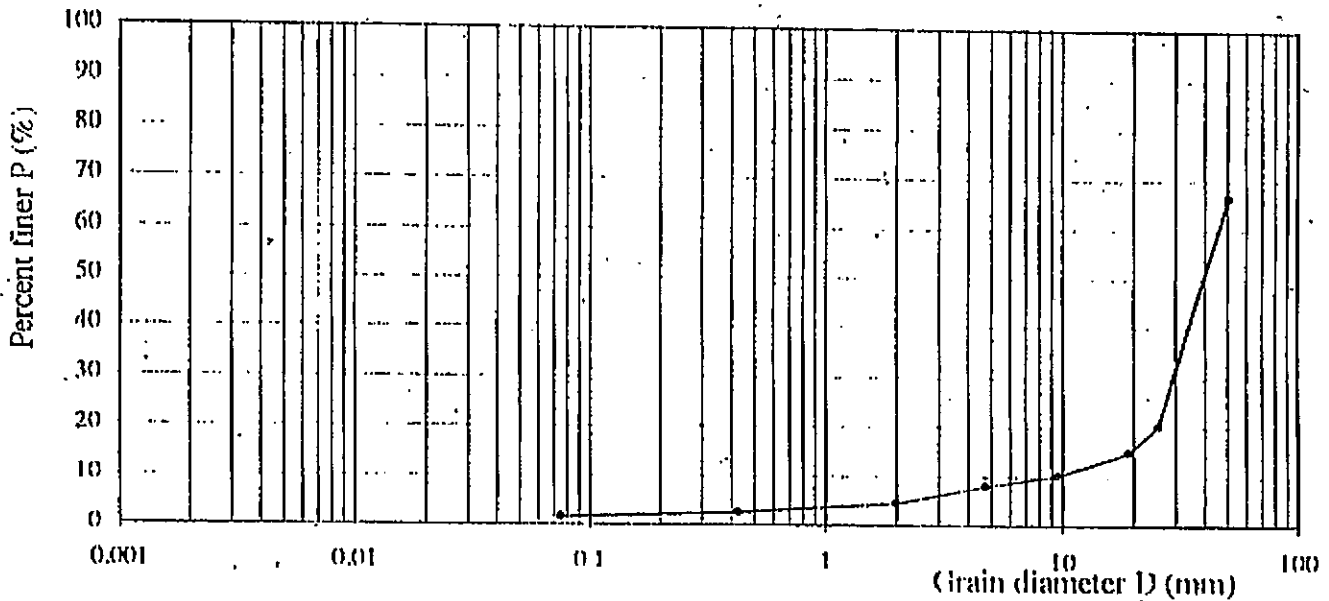
RESULT

$D_{60} = 46.0$ $C_u = 5.1$
 $D_{30} = 30.0$ $C_c = 2.2$
 $D_{10} = 9.0$

Soil classification (ASTM - D 2487)

Group symbol : GW
Group name : Good aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	33.6	46.2	5.3	4.8	2.2	3.3	2.0	1.0	1.6



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VILAS 129
Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P02

Sample No : D5

Depth (m) : 14.8 + 15.0

Tets No : 643

Date : 11/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 1263.0

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	394.00	582.40	57.30	45.80	39.20	51.40	31.80	40.20	20.90
Percent retained (%)	31.2	46.1	4.5	3.6	3.1	4.1	2.5	3.2	1.7
Percent finer (%)	68.8	22.7	18.2	14.5	11.4	7.4	4.8	1.7	

RESULT

$D_{60} = 44.0$

$C_u = 13.3$

Soil classification (ASTM - D 2487)

$D_{10} = 28.0$

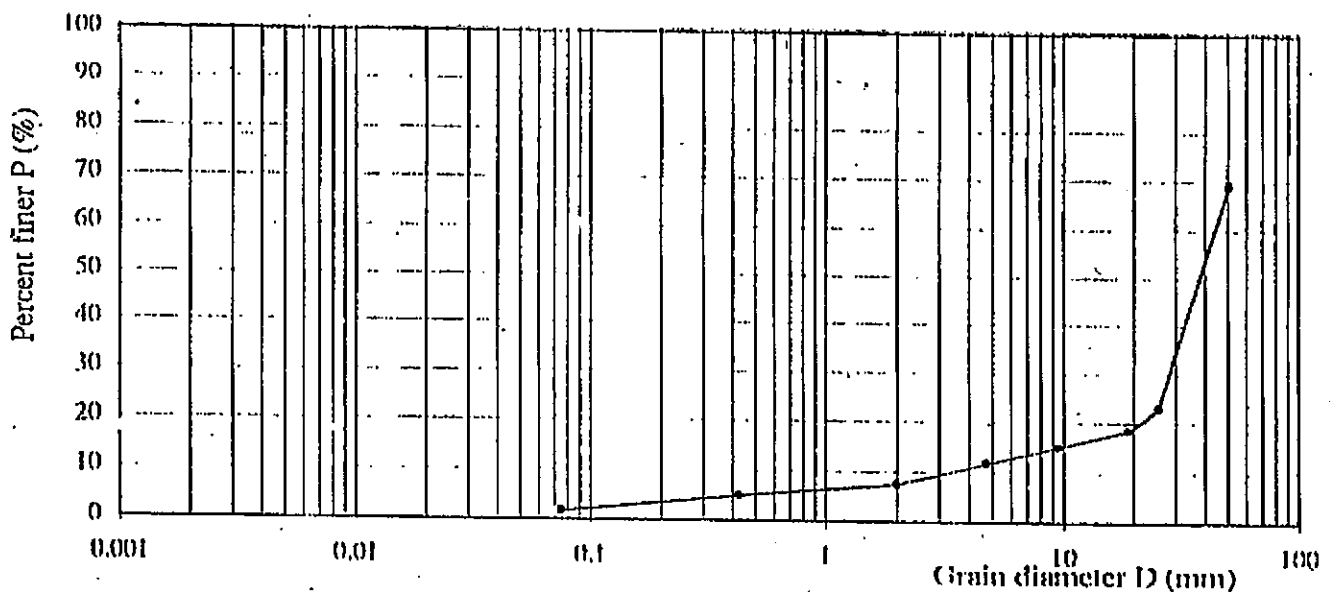
$C_c = 5.4$

Group symbol : GP

$D_{10} = 3.3$

Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	31.2	46.1	4.5	3.6	3.1	4.1	2.5	3.2	1.7



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Phan Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P02
Sample No : Đ6
Depth (m): 17.8 + 18.0

Tests No : 644
Date : 11/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 1649.2

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	246.0	703.50	11.40	38.80	247.80	265.00	58.10	55.20	23.40
Percent retained (%)	14.9	42.7	0.7	2.4	15.0	16.1	3.5	3.3	1.4
Percent finer (%)	85.1	42.4	41.7	39.4	24.4	8.3	4.8	1.4	

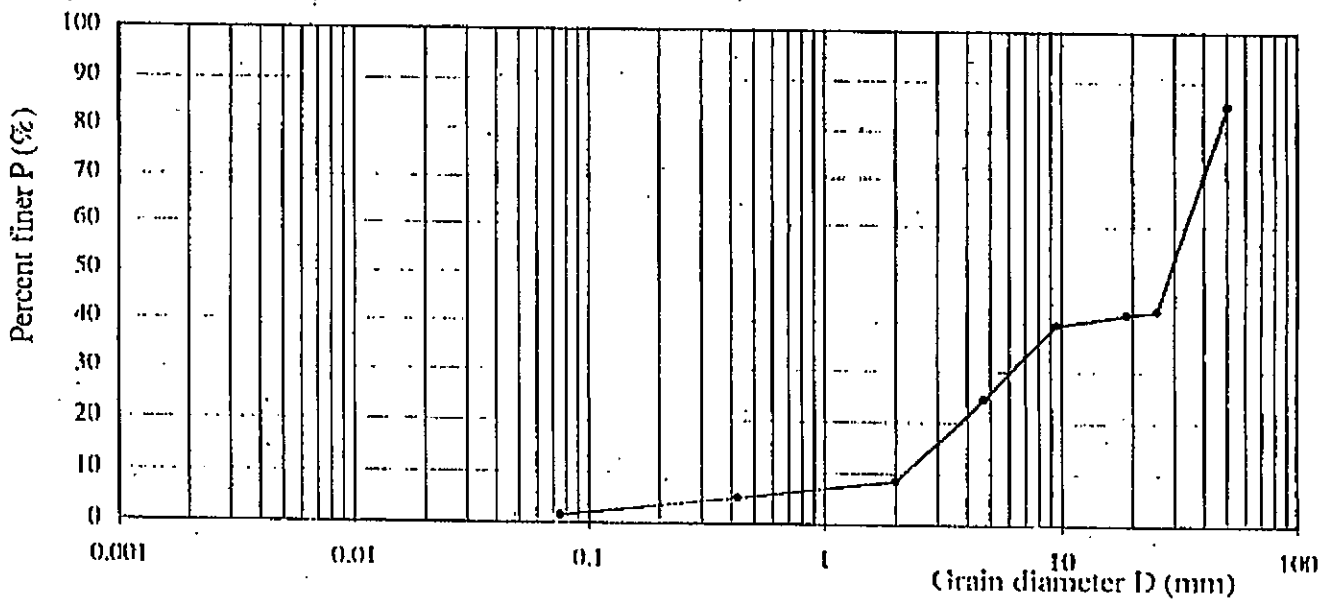
RESULT

$D_{60} = 33.0$ $C_u = 15.7$
 $D_{30} = 6.1$ $C_c = 0.5$
 $D_{10} = 2.1$

Soil classification (ASTM - D 2487)

Group symbol : GP
Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	14.9	42.7	0.7	2.4	15.0	16.1	3.5	3.3	1.4



Tested by

Nguyễn Thị Hồng

Nguyễn Thị Hồng



Checked by
VILAS
VILAS 11/9 Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P02
 Sample No : D7
 Depth (m) : 20.8 + 21.0

Tets No : 645
 Date : 11/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 694.7

Size (mm)	50.0	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	0.0	516.40	51.00	22.40	37.50	24.00	15.40	16.50	11.50
Percent retained (%)	0.0	74.3	7.3	3.2	5.4	3.5	2.2	2.4	1.7
Percent finer (%)	100.0	25.7	18.3	15.1	9.7	6.2	4.0	1.7	

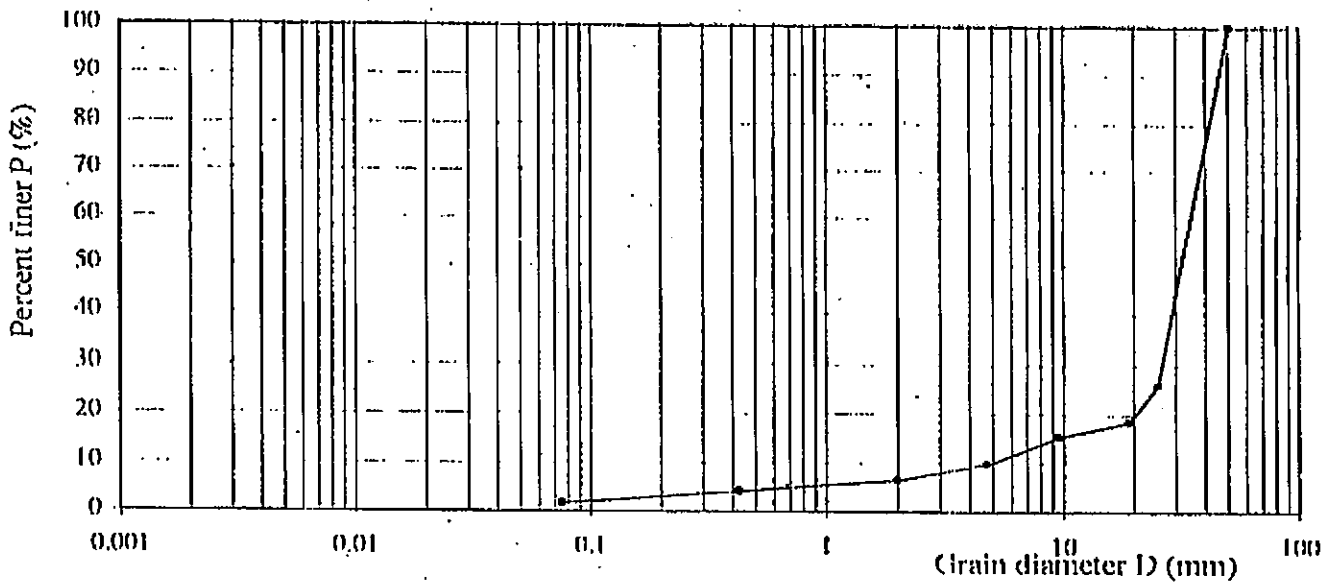
RESULT

$D_{60} = 35.0$ $C_u = 7.0$
 $D_{30} = 27.0$ $C_c = 4.2$
 $D_{10} = 5.0$

Soil classification (ASTM - D 2487)

Group symbol : GP
 Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	0.0	74.3	7.3	3.2	5.4	3.5	2.2	2.4	1.7



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VILAS 129
 Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

**THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE**

Borehole : P02
 Sample No : Đ8
 Depth (m): 24.6 + 24.8

Tets No : 646
 Date : 11/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 754.5

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	0.0	688.00	88.00	81.50	20.40	21.50	14.80	12.40	11.10
Percent retained (%)	0.0	73.6	7.7	8.2	2.7	2.8	1.9	1.6	1.5
Percent finer (%)	100.0	26.4	18.8	10.6	7.9	5.0	3.1	1.5	

RESULT

$D_{60} = 35.0$
 $D_{30} = 27.0$
 $D_{10} = 8.0$

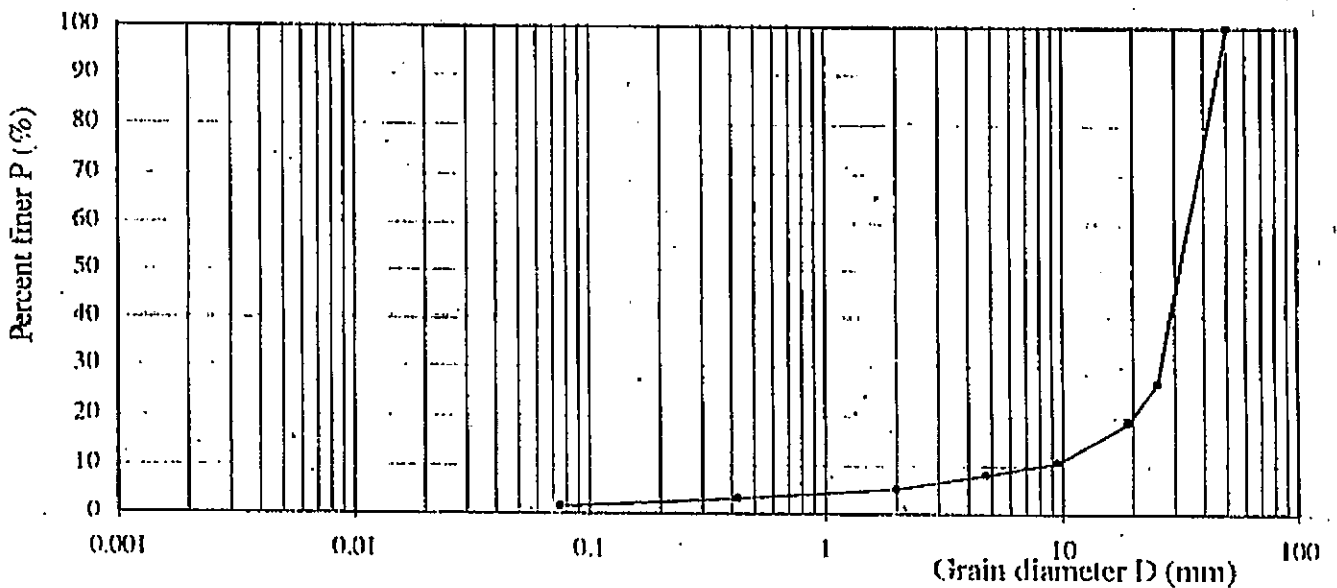
$C_u = 4.4$
 $C_c = 2.6$

Soil classification (ASTM - D 2487)

Group symbol : GP

Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	0.0	73.6	7.7	8.2	2.7	2.8	1.9	1.6	1.5



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Nguyen Thi Hong



VILAS 129
 Phan Van Loan

ATTERBERG LIMITS

ASTM - D 4318 - 84

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P01

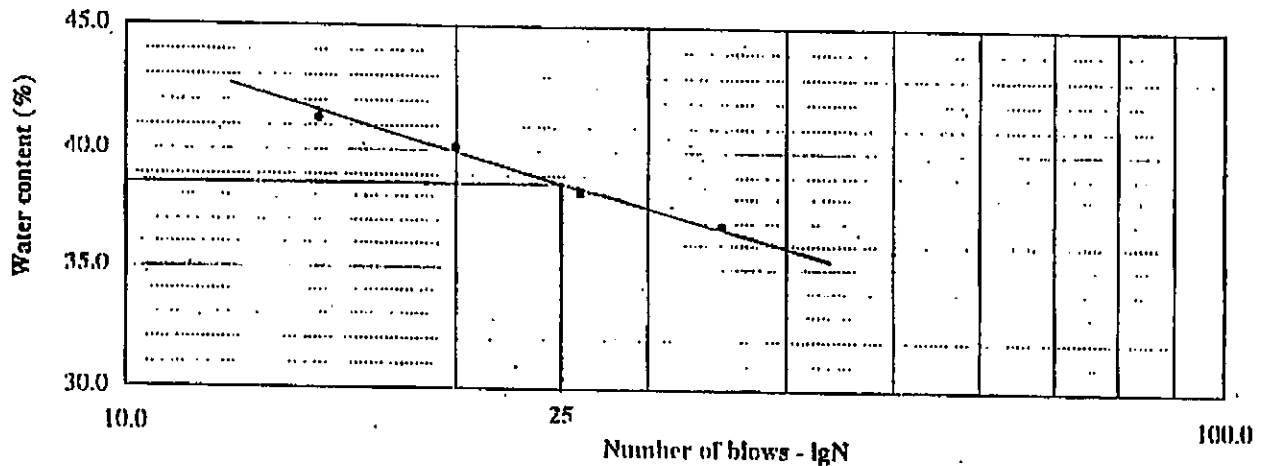
Sample No : D8

Depth (m): 21.0 + 22.0

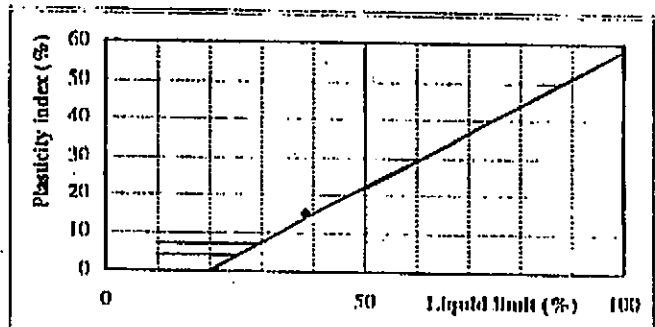
Tets No : 636

Date : 12/7/2006

Container number	LIQUID LIMIT (W_L)				PLATIC LIMIT (W_P)		
	IN31	HN08	HN07	HN37	HN19	HN03	
Weight of wet (g)	86.34	43.10	44.63	39.29	42.58	38.67	
Weight of dry (g)	80.06	37.57	38.84	34.76	38.86	35.46	
Weight of container (g)	64.85	23.79	23.67	22.46	23.21	22.22	
Water content (%)	41.3	40.1	38.2	36.8	23.8	24.2	
Average water content (%)						24.0	
Number of blows (N)	15	20	26	35			



RESULT:
 Liquid limit : $W_L = 38.6$ %
 Platic limit : $W_P = 24.0$ %
 Plasticity index : $I_P = 14.6$ %



Tested by

Thai Thi Lien

Thai Thi Lien



VILAS 129
Tran Van Toan

ATTERBERG LIMITS

ASTM - D 4318 - 84

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P01

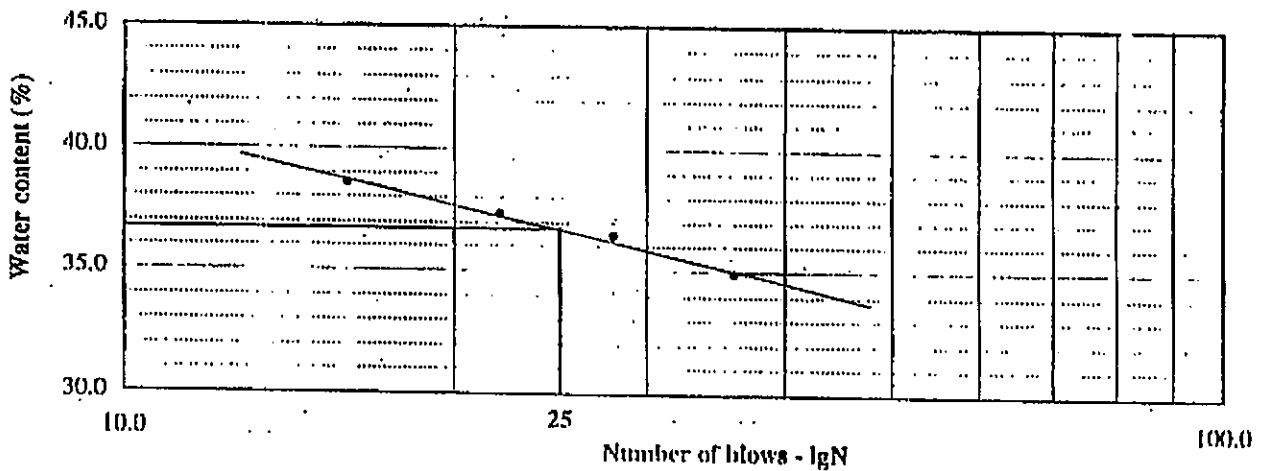
Sample No : D9

Tets No : 637

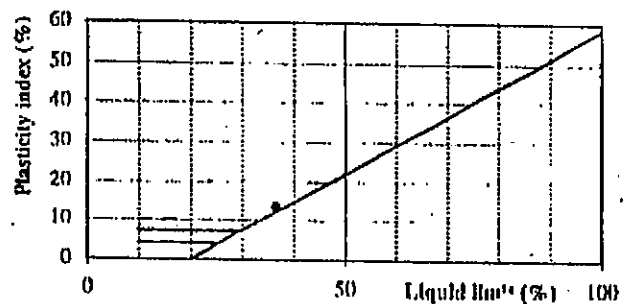
Depth (m): 24.8 + 25.0

Date : 12/7/2006

Container number	LIQUID LIMIT (W_L)				PLATIC LIMIT (W_P)		
	IN23	HN31	IN11	IN09	HN49	HN98	
Weight of wet (g)	83.32	41.60	88.42	85.32	43.03	52.18	
Weight of dry (g)	78.49	36.57	82.18	80.10	39.30	48.00	
Weight of container (g)	65.96	23.09	65.04	65.13	23.38	30.16	
Water content (%)	38.5	37.3	36.4	34.9	23.4	23.4	
Average water content (%)						23.4	
Number of blows (N)	16	22	28	36			



RESULT:
 Liquid limit : $W_L = 36.7$ %
 Platic limit : $W_P = 23.4$ %
 Plasticity index : $I_P = 13.3$ %



Tested by

Thai Thi Lien

Thai Thi Lien



VILAS 129

Tran Van Toan

ATTERBERG LIMITS

ASTM - D 4318 - 84

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
TA TIU BRIDGE

Borehole : P01

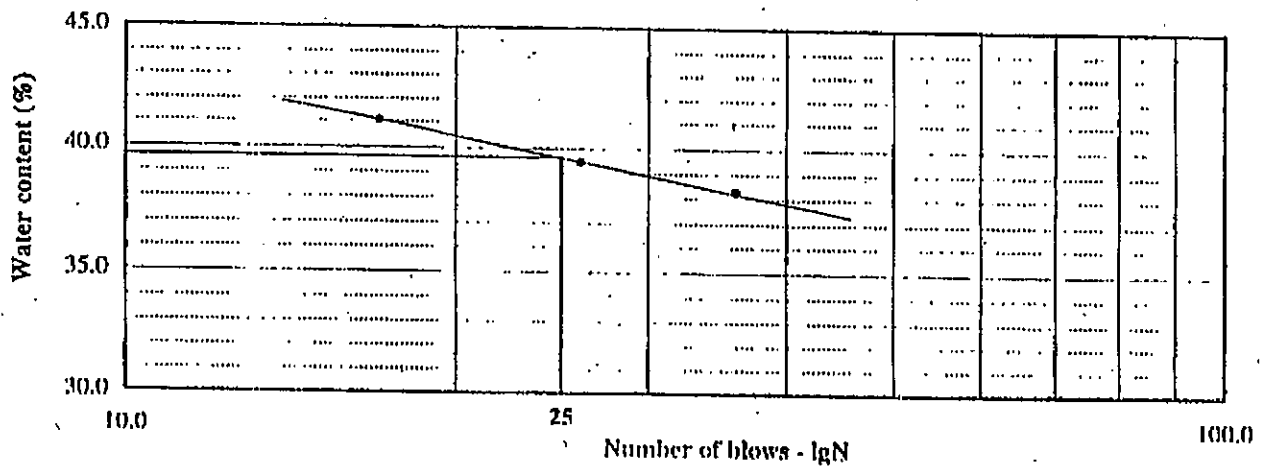
Sample No : D10

Depth (m): 26.8 + 26.8

Tests No : 638

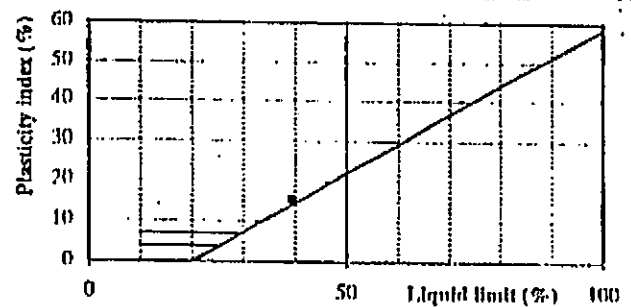
Date : 12/7/2006

Container number	LIQUID LIMIT (W_L)			PLATIC LIMIT (W_P)	
	IN12	IN16	IN22	HN50	HN26
Weight of wet (g)	86.74	84.67	83.70	39.76	43.58
Weight of dry (g)	80.53	79.12	78.54	36.34	39.35
Weight of container (g)	65.39	65.03	65.05	22.25	21.77
Water content (%)	41.0	39.4	38.3	24.3	24.1
Average water content (%)	24.2				
Number of blows (N)	17	26	36		



RESULT:

Liquid limit : $W_L = 39.6$ %
 Platic limit : $W_P = 24.2$ %
 Plasticity index : $I_p = 15.4$ %



Tested by

Nguyen Thi Lien

Nguyen Thi Lien



VILAS 129

Tran Van Toan

BORING LOG

BORING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF YEN BAI PROVINCE BEN CAO BRIDGE											
Is		LKT1	Co-ord. X= Y=		Station: Km6+993												
+88.50		Elev. of underwater level: +0.00		Drilling date:		13/06/2006 - 14/06/2006											
No.		Nguyen Cong Sinh		Checker:		Tran Viet Han											
Elev. (m)	Depth (m)	Thickness (m)	PROFILE Scale 1/100	DESCRIPTION	STANDARD PENETRATION TEST (SPT)							Sampling depth for test (m)					
					Depth (m)	Blow No./15cm			N ₆₀ /cm	Chart							
						N1	N2	N3			0	10	20	30	40	50	N
89.00	0.00	0.60		Dusty sand is in blackish grey mixed with organic, very soft.	SPT1 1.00-1.45	5	7	9	10								
					SPT2 2.00-2.45	6	8	10	18						N01 1.80-2.00		
		6.90		Completely weathered granite becomes grit-sand in brown, yellowish grey and white spotted colour mixes with plaster. Structure is medium to very closed.	SPT3 3.00-3.45	10	15	18	33						N02 3.80-4.00		
					SPT4 4.00-4.45	11	17	24	41								
					SPT5 5.00-5.45	12	17	22	39						N03 5.80-6.00		
					SPT6 6.00-6.45	19	30/10	>50	>50								
81.60	7.00	1.80		Granite is in green, white spotted, cracked.											U4 7.70-8.00		
79.70	8.80														U5 8.00-9.30		
		4.70		Granite is in green, white spotted, blockish: Hardness is in level 7-8.											U6 11.0-11.20		
75.00	13.50														U7 13.20-13.50		

BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES				BRIDGES OF YEN BAI PROVINCE							
Bore hole		LKT2		Co-ord. X=		Y=		Station: Km7+020					
Elev.: +91.44		Elev. of underwater level: +0.00		Drilling date:		12/06/2006 - 13/06/2006							
Corrector:		Nguyen Cong Sinh		Checker:		Tran Viet Han							
Layer	Elev. (m)	Depth (m)	Thickness (m)	PROFILE Scale 1/100	DESCRIPTION	STANDARD PENETRATION TEST (SPT)					Sampling depth for test (m)		
						Depth (m)	Blow No./15cm			Chart			
N1	N2	N3	N30cm	0	10		20	30	40		50	N	
1	90.24	1.20	1.20		Dusty sand is in blackish grey mixed with organic, very soft.								
2	88.94	2.50	1.30		Sand is mixed with cobble, gravel, grit in whitish grey, very loose structure.	SPT1 1.50-1.95	2	4	5	9			
3	83.94	7.50	5.00		Completely weathered granite becomes grit-sand in brown, yellowish grey and white spotted colour mixes with plaster. Structure is medium closed.	SPT2 2.40-2.85	10	18	24	38			
						SPT3 3.0-3.45	9	16	28	40			
						SPT4 4.20-4.65	12	18	24	42			
						SPT5 5.00-5.45	12	13	28	41			
						SPT6 6.00-6.45	13	17	24	41			
4	81.14	10.30	2.80		Completely weathered granite becomes grit sand in greenish grey. Structure is very closed.	SPT7 7.00-7.45	10	16	24	40			
						SPT8 8.20-8.65	12	15	28	43			
						SPT9 9.10-9.55	16	21	29	50			
5	79.64	11.80	1.50		Granite is green, cracked.								
6	76.44	15.00	3.20		Granite is in green, white spotted, blockish. Hardness is in level 7-8.								

No: 290606.01.9/CLD

SUMMARY OF TEST RESULTS

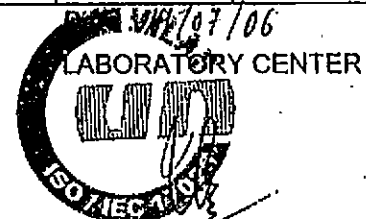
THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BEN CAO BRIDGE

Borehole :		T2			T1	
Sample No :		XD1	ND2	ND3	ND1	ND2
Depth (m):		1.8 : 2.4	4.0 : 4.2	6.0 : 6.2	1.8 : 2.0	3.8 : 4.0
Test No.		080	081	082	085	086
Grain size analysis		%				
Percent finer (%)	50.8 (mm)	89.3				100.0
	25.4 (mm)	75.1				55.2
	19 (mm)	67.6				45.6
	9.5 (mm)	63.8	100.0	100.0	100.0	38.8
	4.75 (mm)	61.4	99.4	88.6	89.3	31.8
	2.00 (mm)	52.4	96.1	79.7	72.1	22.3
	0.425 (mm)	24.4	82.2	66.0	55.7	9.0
	0.075 (mm)	6.5	56.0	50.8	37.1	0.8
	0.050 (mm)		49.0	45.0	32.5	
	0.005 (mm)		15.0	16.0	16.0	
0.002 (mm)		12.0	11.0	9.5		
Natural water content	W %		31.0	21.6	21.6	
Natural unit weight	γ_w g/cm ³		1.920	2.060	1.927	
Dry unit weight	γ_k g/cm ³		1.466	1.694	1.585	
Specific gravity	ρ_s g/cm ³		2.690	2.690	2.690	
Coefficient of uniformity	C_u	38.2				60.0
Coefficient of gradation	C_c	0.8				1.3
In Dry condition	α_k					
In Saturation condition	α_w					
Void Ratio	e_0		0.835	0.588	0.697	
Porosity	n %		45.5	37.0	41.1	
Degree of Saturation	S %		99.8	98.8	83.3	
Liquid Limits	W _L %		36.6	34.2	33.8	
Plastic Limits	W _p %		26.2	24.6	25.2	
Plasticity Index	I _p %		10.4	9.6	8.6	
Internal friction angle	ϕ^0		14°41'	17°20'	20°54'	
Cohesion	C KG/cm ²		0.068	0.063	0.047	
Compressibility Index	$a_{1,2}$ cm ² /KG		0.038	0.031	0.021	
Soil classification ASTM - D 2487		Bad aggregate sand - SP	Silty soils - ML	Silty soils - ML	Silty soils - ML	Good aggregate grit - GW

COLECTED BY

NCHP

Eng. Nguyen Thi Khanh Ha



VILAS 129
 Eng. Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

**THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BEN CAO BRIDGE**

Borehole : T2
 Sample No : XD1
 Depth (m): 1.8 + 2.0

Tats No : 680
 Date : 11/7/2016

SIZE ANALYSIS

Weight of dry soil (g): 1630.0

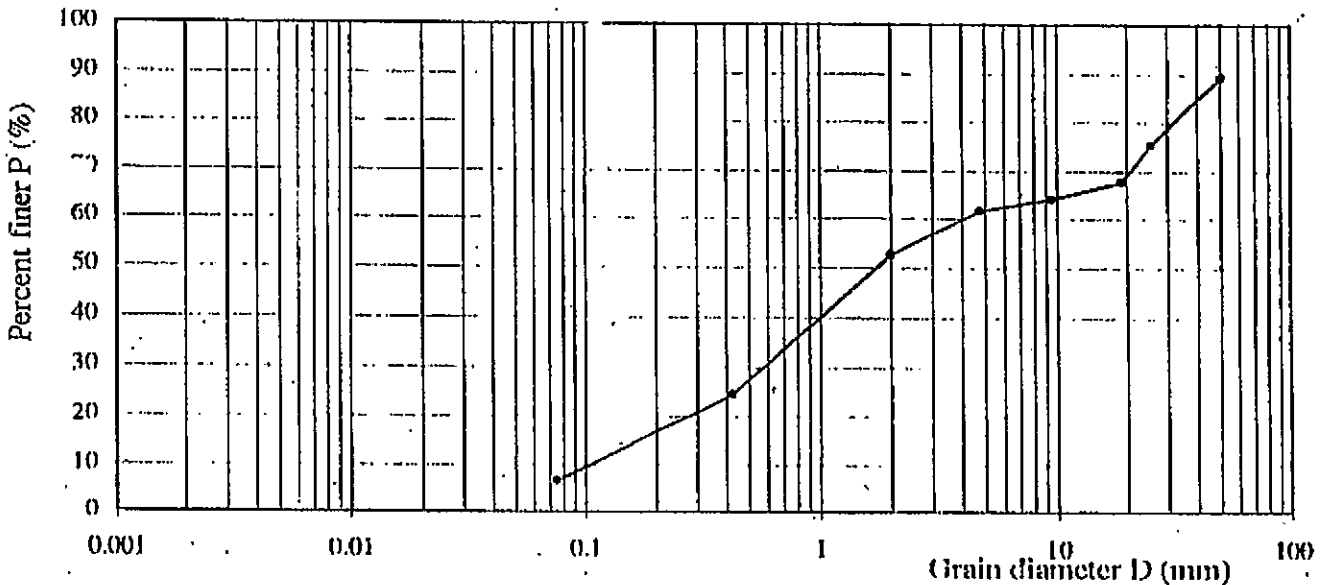
Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	175.10	230.03	123.00	61.80	40.00	145.30	457.50	291.70	105.57
Percent retained (%)	10.7	14.1	7.5	3.8	2.5	8.9	28.1	17.9	6.5
Percent finer (%)	89.3	75.1	67.6	63.8	61.4	52.4	24.4	6.5	

RESULT

$D_{60} = 4.2$ $C_u = 38.2$
 $D_{30} = 0.59$ $C_c = 0.8$
 $D_{10} = 0.11$

Soil classification (ASTM - D 2487)
 Group symbol : SP
 Group name : Bad aggregate sand

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	10.7	14.1	7.5	3.8	2.5	8.9	28.1	17.9	6.5



Tested by

Handwritten signature

Nguyen Thi Hong



VIAS 129
 Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BEN CAO BRIDGE

Borehole : T2
Sample No : ND2
Depth (m): 4.0 + 4.2

Tets No : 681
Date : 13/7/2006

SIZE ANALYSIS

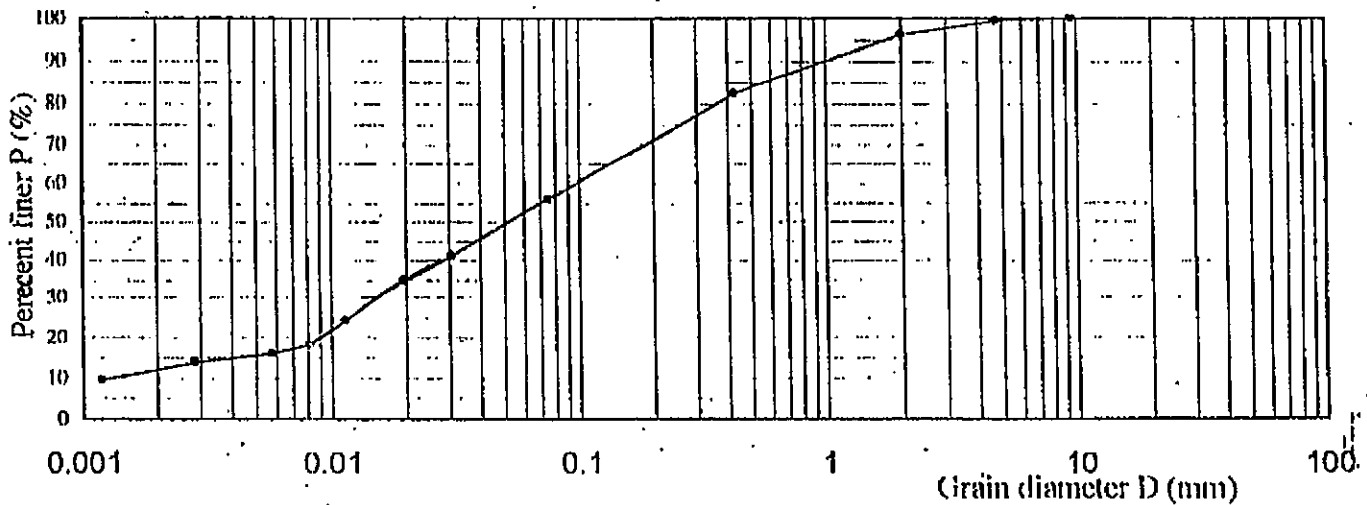
Weight of dry soil (g):

Grain diameter (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	Khối lượng riêng (g/cm ³) 2.690
Weight soil retained (g)	0.00	0.00	0.00	0.00	0.22	1.25	5.31	10.00	
Percent retained (%)	0.0	0.0	0.0	0.0	0.6	3.3	13.9	26.2	
Percent finer (%)	100.0	100.0	100.0	100.0	99.4	96.1	82.2	56.0	

HYDROMETER ANALYSIS

Weight of dry soil (g): 38.17
Temperature in (°C) 30.0

Elapsed time (min)	Actual Hydrometer Reading	Correction			Effective depth L (cm)	Diameter D (mm)	Percent passing P (%)
		Temperature	Zero	Hyd. Reagin			
2	6.5	2.3	1.0	9.8	12.93	0.0306	40.9
5	5.0	2.3	1.0	8.3	13.16	0.0105	34.6
15	2.5	2.3	1.0	5.8	13.53	0.0114	24.2
30	1.0	2.3	1.0	4.3	13.76	0.0082	17.9
60	0.5	2.3	1.0	3.8	13.83	0.0050	15.8
250	0.0	2.3	1.0	3.3	13.91	0.0028	13.8
1440	1.0	2.3	1.0	2.3	14.06	0.0012	9.6



RESULT

Size (mm)	< 0.002	0.002	0.005	0.05	0.075	0.425	2.00	4.75	9.5	19.0	25.4	50.8
Percent (%)	12.0	3.0	34.0	7.0	26.2	13.9	3.3	0.6	0.0	0.0	0.0	0.0
Percent finer (%)		12.0	15.0	49.0	56.0	82.2	96.1	96.7	100.0	100.0	100.0	100.0

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VILAS 120
Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BEN CAO BRIDGE

Borehole : T2
Sample No : ND3
Depth (m) : 6.0 + 6.2

Tets No : 682
Date : 13/7/2006

SIZE ANALYSIS

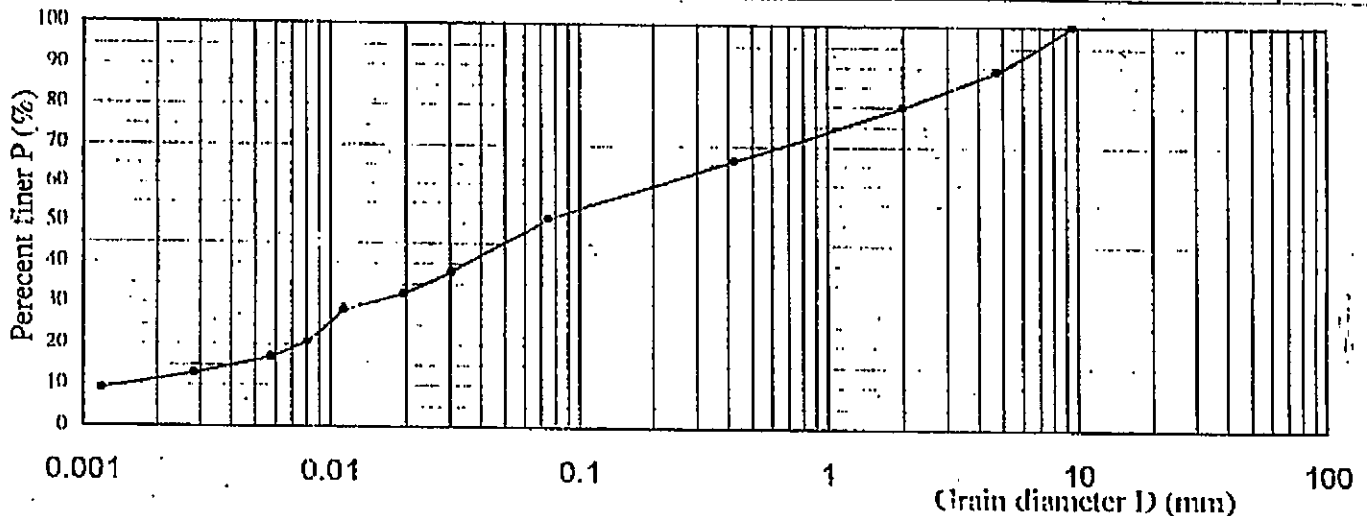
Weight of dry soil (g):

Grain diameter (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	Khối lượng riêng (g/cm ³) 2.690
Weight soil retained (g)	0.00	0.00	0.00	0.00	4.69	3.66	5.62	6.24	
Percent retained (%)	0.0	0.0	0.0	0.0	11.4	8.9	13.7	15.2	
Percent finer (%)	100.0	100.0	100.0	100.0	88.6	79.7	66.0	50.8	

HYDROMETER ANALYSIS

Weight of dry soil (g): 41.12
Temperature in (°C) 30.0

Elapsed time (min)	Actual Hydrometer Reading	Correction			Effective depth l (cm)	Diameter D (mm)	Percent passing P (%)
		Temperature	Zero	Hyd. Reagent			
2	6.5	2.3	1.0	9.8	12.93	0.0306	37.9
5	5.0	2.3	1.0	8.3	13.16	0.0195	32.1
15	4.0	2.3	1.0	7.3	13.31	0.0113	28.3
30	2.0	2.3	1.0	5.3	13.61	0.0081	20.5
60	1.0	2.3	1.0	4.3	13.76	0.0058	16.6
250	0.0	2.3	1.0	3.3	13.91	0.0028	12.8
1440	-1.0	2.3	1.0	2.3	14.06	0.0012	8.9



RESULT

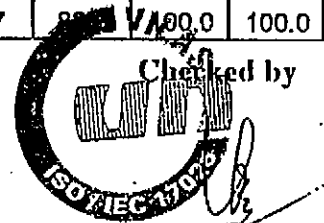
Size (mm)	<0.002	0.002	0.003	0.05	0.075	0.425	2.00	4.75	9.5	19.0	25.4	50.8
Percent (%)	11.0	5.0	29.0	5.8	15.2	13.7	8.9	11.4	0.0	0.0	0.0	0.0
Percent finer (%)		11.0	16.0	45.0	50.8	66.0	79.7	88.6	100.0	100.0	100.0	100.0

Tested by

Signature of Nguyen Thi Hong

Nguyen Thi Hong

Checked by



VILA 6129
Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM : D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BEN CAO BRIDGE

Borehole : T1
Sample No : ND1
Depth (m): 1.8 + 2.0

Tests No : 685
Date : 13/7/2006

SIZE ANALYSIS

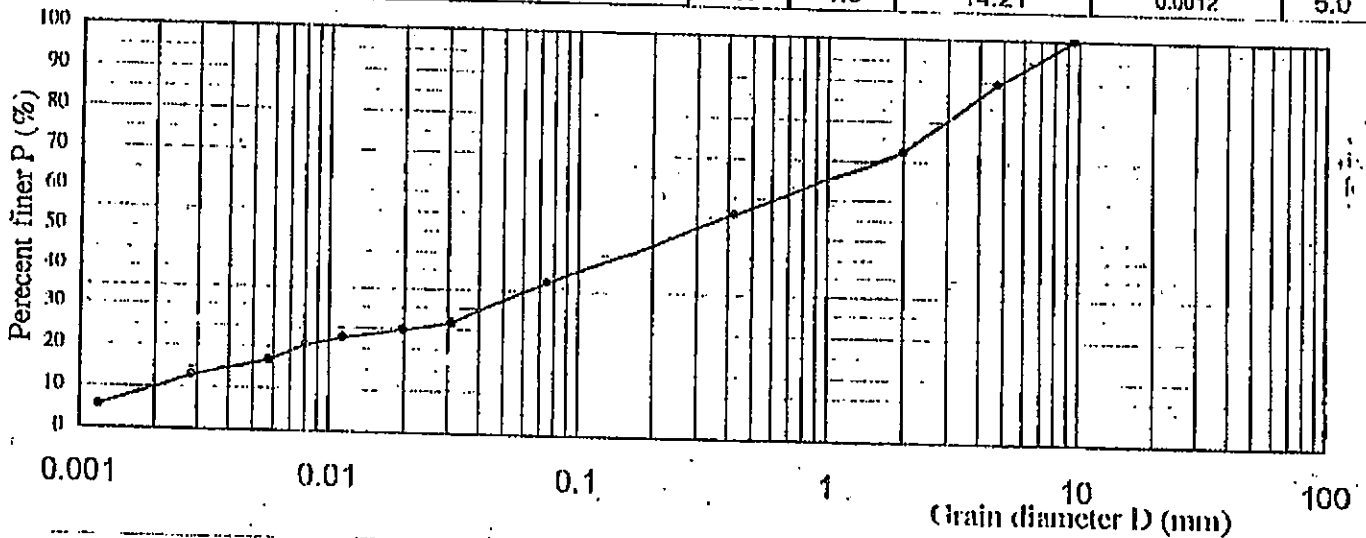
Grain diameter (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	Khối lượng riêng (g/cm ³) 2.680
Weight soil retained (g)	0.00	0.00	0.00	0.00	4.42	7.05	8.75	7.00	
Percent retained (%)	0.0	0.0	0.0	0.0	10.7	17.1	16.4	10.6	
Percent finer (%)	100.0	100.0	100.0	100.0	89.3	72.1	55.7	37.1	

Weight of dry soil (g):

HYDROMETER ANALYSIS

Weight of dry soil (g): 41.12
Temperature in (°C) 30.0

Elapsed time (min)	Actual Hydrometer Reading	Correction			Effective depth l (cm)	Diameter D (mm)	Percent passing P (%)
		Temperature	Zero	Hyd. Reagin			
2	3.5	2.3	1.0	6.8	13.30	0.0311	26.3
5	3.0	2.3	1.0	6.3	13.46	0.0197	24.4
15	2.5	2.3	1.0	5.8	13.53	0.0114	22.5
30	2.0	2.3	1.0	5.3	13.61	0.0081	20.5
60	1.0	2.3	1.0	4.3	13.76	0.0058	16.6
250	0.0	2.3	1.0	3.3	13.91	0.0020	12.0
1440	-2.0	2.3	1.0	1.3	14.21	0.0012	5.0



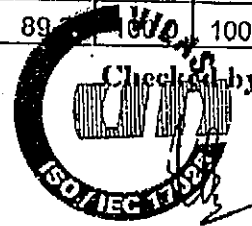
RESULT

Size (mm)	<0.002	0.002	0.005	0.05	0.075	0.425	2.00	4.75	9.5	19.0	25.4	50.0
Percent (%)	9.5	6.5	16.5	4.6	18.6	16.4	17.1	10.7	0.0	0.0	0.0	0.0
Percent finer (%)		9.5	16.0	32.5	37.1	55.7	72.1	89.3	100.0	100.0	100.0	100.0

Tested by

Signature

Nguyen Thi Hong



VITAS 109
Tran Van Loan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BEN CAO BRIDGE

Borehole : T2
Sample No : ND2
Depth (m) : 3.8 + 4.0

Tets No : 686
Date : 11/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 940.0

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	0.00	421.30	90.00	82.80	47.00	89.00	125.40	76.80	7.70
Percent retained (%)	0.0	44.8	9.6	8.8	5.0	9.5	13.3	8.2	0.8
Percent finer (%)	100.0	55.2	45.6	36.8	31.8	22.3	9.0	0.8	

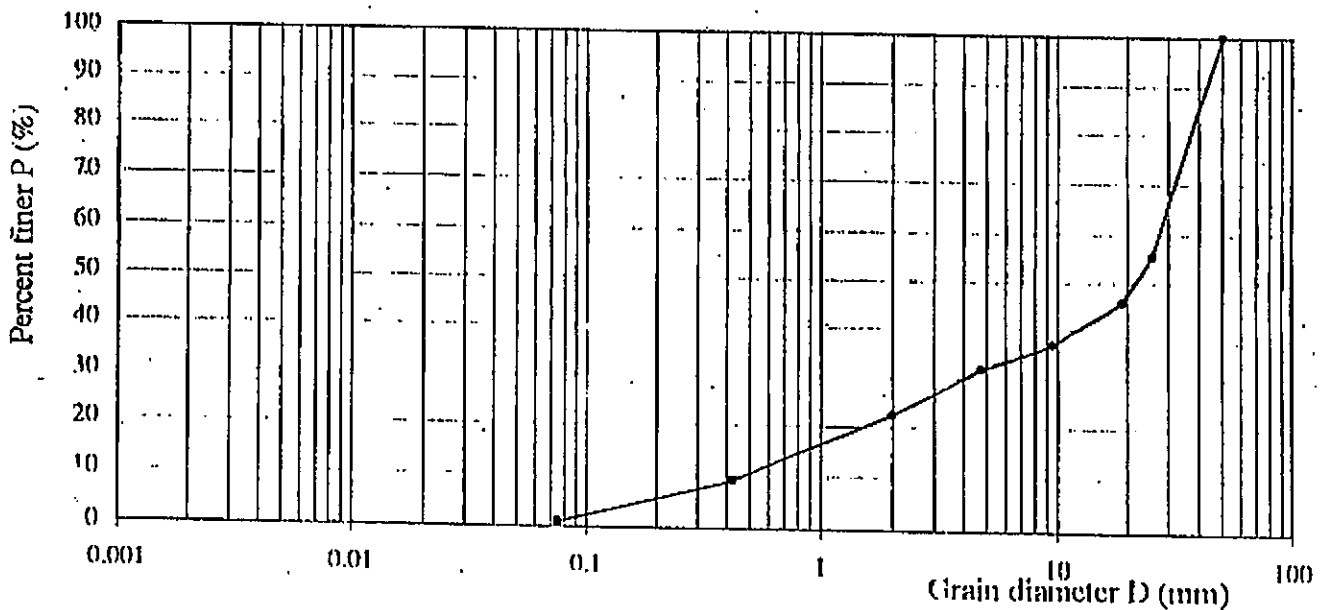
RESULT

$D_{60} = 27.0$ $C_u = 60.0$
 $D_{30} = 4.00$ $C_c = 1.3$
 $D_{10} = 0.45$

Soil classification (ASTM - D 2487)

Group symbol : GW
Group name : Good aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	0.0	44.8	9.6	8.8	5.0	9.5	13.3	8.2	0.8



Tested by

Signature

Nguyen Thi Hong.



VILAS 129
Tran Van Toan

ATTERBERG LIMITS

ASTM - D 4318 - 84

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BEN CAO BRIDGE

Borehole : T2

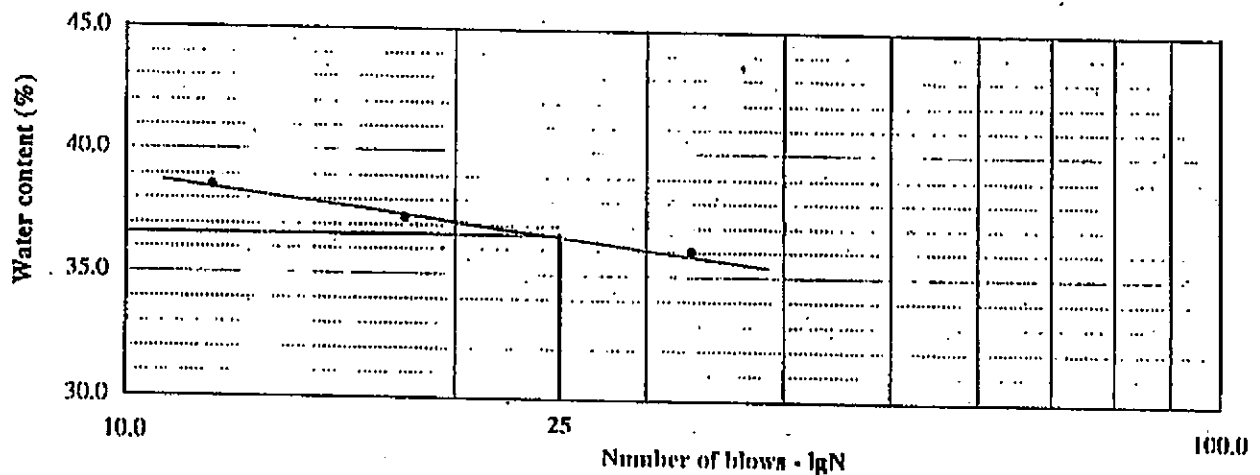
Sample No : ND2

Depth (m): 4.0 + 4.2

Tests No : 681

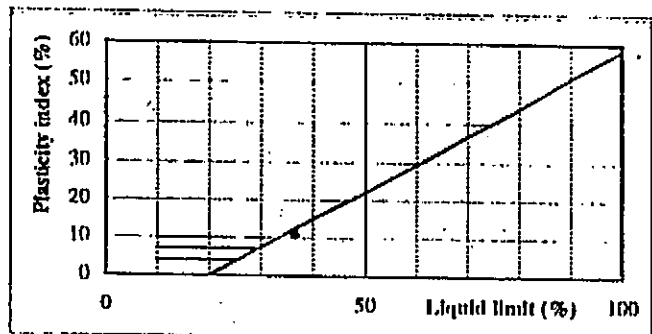
Date.: 11/7/2006

Container number	LIQUID LIMIT (W_L)			PLATIC LIMIT (W_P)	
	HN08	HN07	C7	HN26	C17
Weight of wet (g)	44.39	47.36	58.23	41.94	52.08
Weight of dry (g)	38.66	40.93	52.75	37.73	49.08
Weight of container (g)	23.79	23.67	37.52	21.77	37.55
Water content (%)	39.6	37.9	36.0	28.4	28.0
Average water content (%)	26.2				
Number of blows (N)	12	18	33		



RESULT:

Liquid limit : $W_L = 36.6$ %
 Platic limit : $W_P = 26.2$ %
 Plasticity index : $I_P = 10.4$ %



Tested by

(Signature)

Nguyen Thi Lien

Checked by



VILAS 129
 Tran Van Loan

ATTERBERG LIMITS

ASTM - D 4318 - 84

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BEN CAO BRIDGE

Borehole : T2

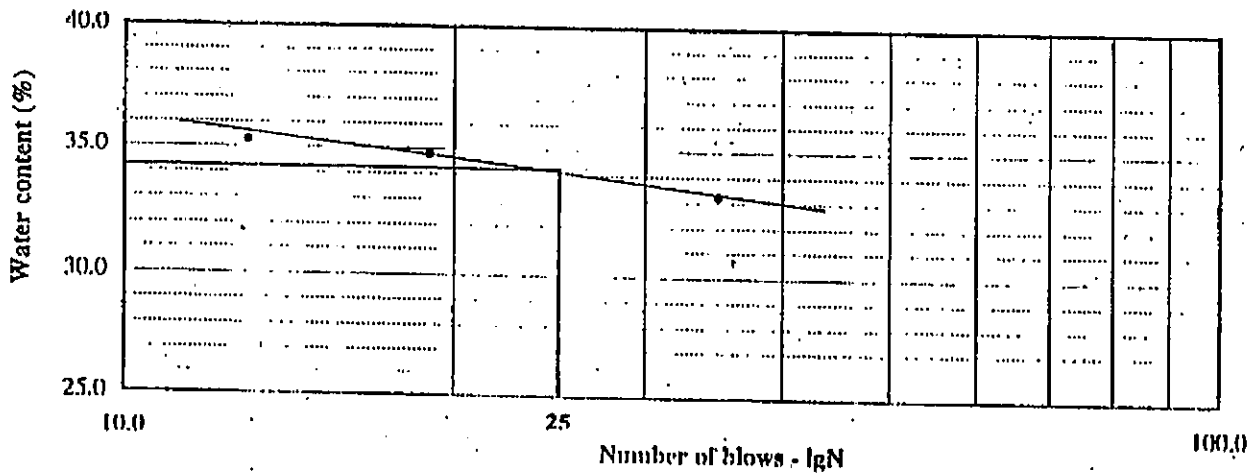
Sample No : ND3

Depth (m): 6.0 + 6.2

Tets No : 682

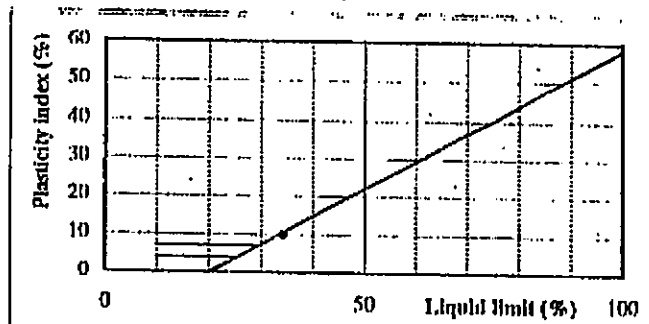
Date : 11/7/2006

Container number	LIQUID LIMIT (W _L)			PLATIC LIMIT (W _P)	
	HN98	HN39	C2	HN36	C16
Weight of wet (g)	53.83	44.12	56.09	41.00	50.61
Weight of dry (g)	47.66	38.78	51.54	37.59	48.08
Weight of container (g)	30.16	23.41	37.84	23.64	37.84
Water content (%)	35.3	34.7	33.2	24.4	24.7
Average water content (%)					24.6
Number of blows (N)	13	19	35		



RESULT:

Liquid limit : W_L = 34.2 %
 Platic limit : W_P = 24.6 %
 Plasticity Index : I_P = 9.6 %



Tested by

(Signature)

Nguyen Thi Lien



VILAS 129
 Tran Van Toan

ATTERBERG LIMITS

ASTM - D 4318 - 84

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BEN CAO BRIDGE

Borehole : T1

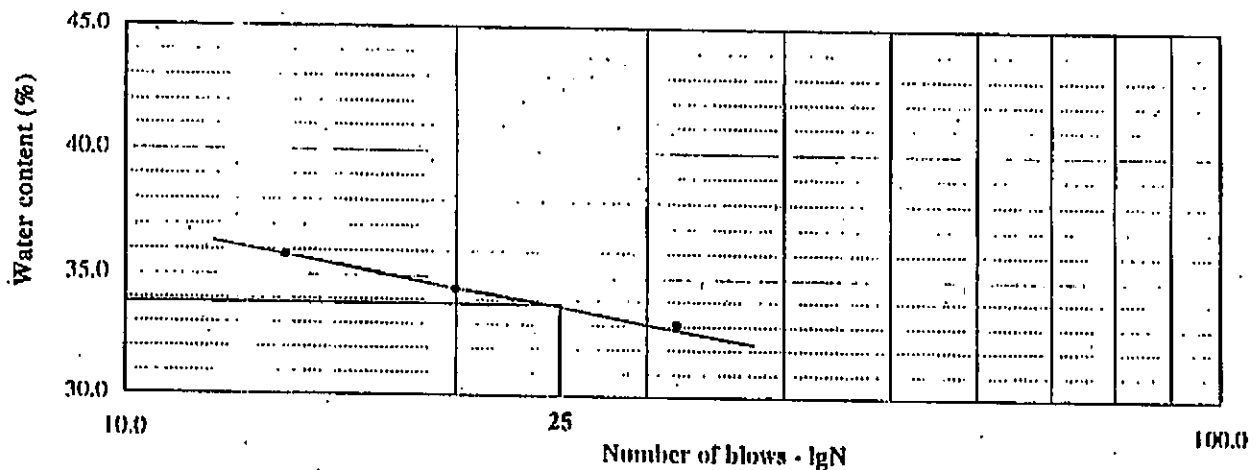
Sample No : ND1

Depth (m): 1.8 + 2.0

Tests No : 685

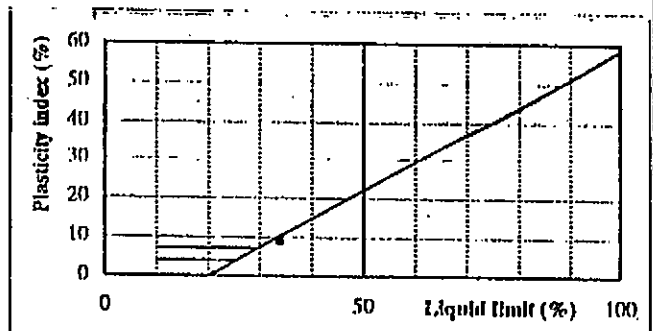
Date : 11/7/2006

Container number	LIQUID LIMIT (W _L)			PLATIC LIMIT (W _P)	
	HN40	C10	C8	HN31	C12
Weight of wet (g)	45.68	56.18	53.91	40.81	50.61
Weight of dry (g)	39.69	51.28	49.79	37.22	48.07
Weight of container (g)	22.95	37.05	37.32	23.09	37.90
Water content (%)	35.8	34.4	33.0	25.4	25.0
Average water content (%)				25.2	
Number of blows (N)	14	20	32		



RESULT:

Liquid limit : $W_L = 33.8$ %
 Plastic limit : $W_P = 25.2$ %
 Plasticity index : $I_P = 8.6$ %



Tested by

(Signature)

Nguyen Thi Lien



VILLAS 120
Tran Van Loan

DIRECT SHEAR TEST

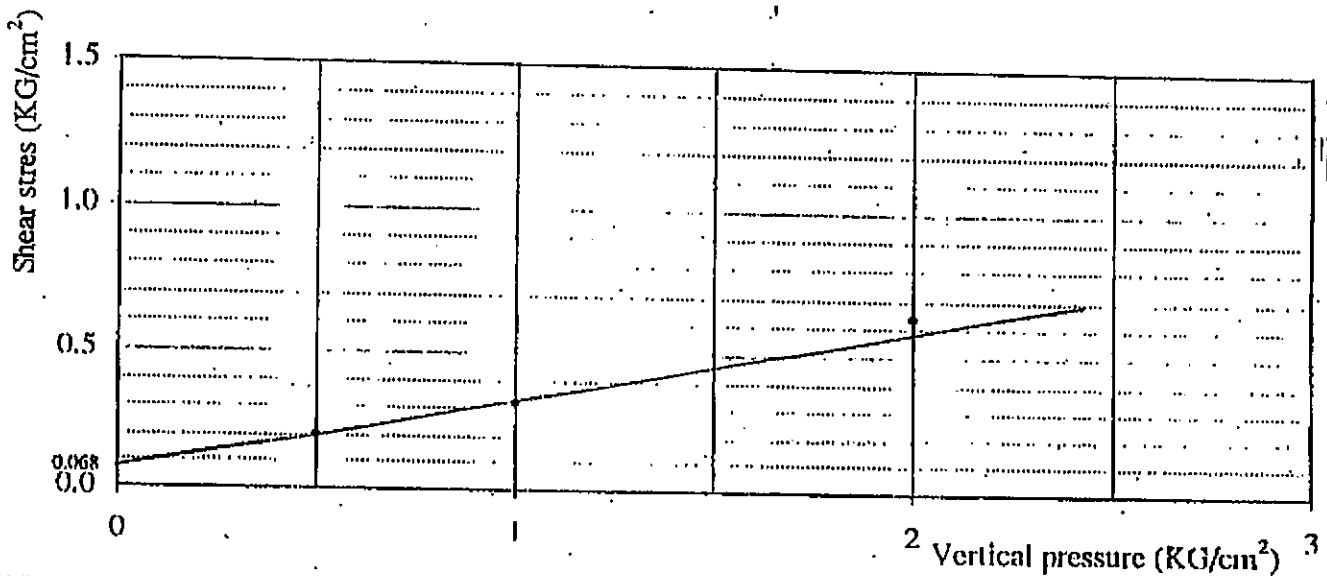
TCVN 4199 - 95

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

BEN CAO BRIDGE

Borehole :	M2	Tests No :	681
Sample No :	ND2	Date :	03/7/2006
Depth (m) :	4.0 + 4.2	Method :	Unconsolidated - Undrained

Vertical pressure (kG/cm ²)	0.5	1.0	2.0	CALCULATE
Max reading	10.0	16.0	32.0	$\lg \varphi = \frac{0.460 - 0.199}{1.5 - 0.5} = 0.262$
Composite Correction Shear stress τ (kG/cm ²)	0.01985 0.199	0.01985 0.318	0.01985 0.635	RESULT Internal friction angle φ (°) = 14°41' Cohesion C (kG/cm ²) = 0.068



Tested by

Nguyen Thi Lien
 Nguyen Thi Lien



Tran Van Loan
 VI AS 129

DIRECT SHEAR TEST

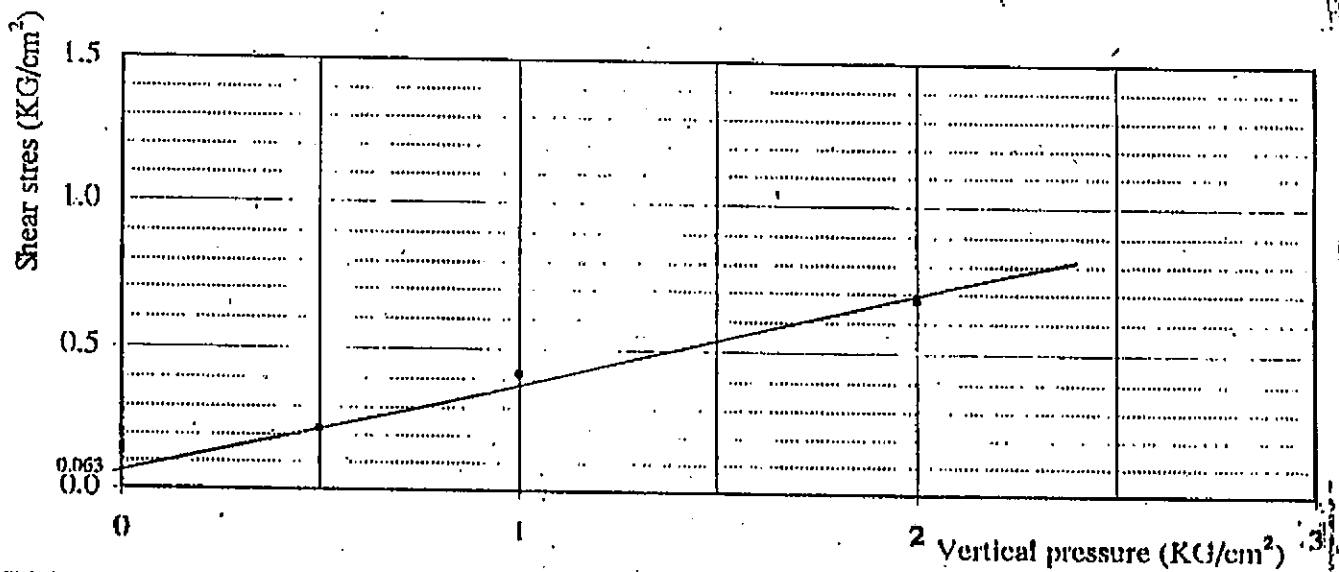
TCVN 4199 - 95

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

BEN CAO BRIDGE

Borehole :	M2	Tols No :	682
Sample No :	ND3	Date :	03/7/2008
Depth (m) :	6.0 + 6.2	Method :	Unconsolidated - Undrained

Vertical pressure (kG/cm ²)	0.5	1.0	2.0	CALCULATE
Max reading	11.0	21.0	34.0	$\text{tg } \varphi = \frac{0.530 - 0.218}{1.5 - 0.5} = 0.312$
Composite Correction Shear stress τ (kG/cm ²)	0.01985 0.218	0.01985 0.417	0.01985 0.675	RESULT Internal friction angle φ (°) = 17°20' Cohesion C (kG/cm ²) = 0.063



Tested by

Nguyen Thi Lien
 Nguyen Thi Lien



VILAS 199
 Tran Van Toan

DIRECT SHEAR TEST

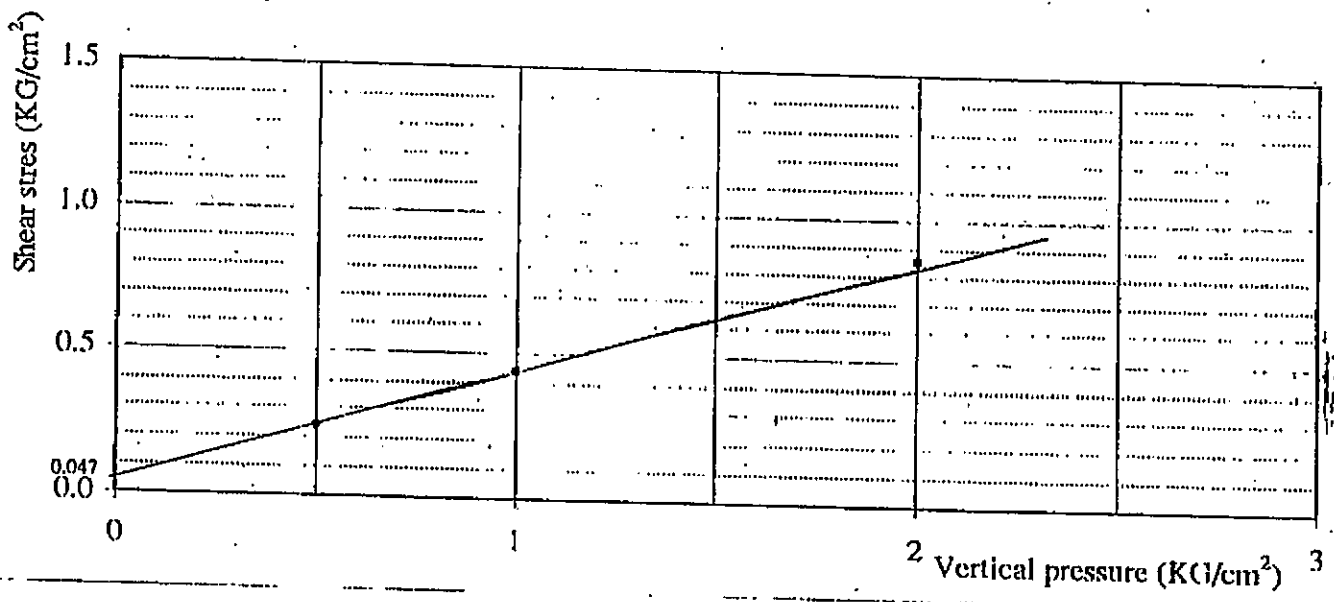
TCVN 4199 - 95

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

BEN CAO BRIDGE

Borehole :	T1	Tests No :	685
Sample No :	ND2	Date :	03/7/2006
Depth (m) :	3.8 + 4.0	Method :	Unconsolidated - Undrained

Vertical pressure (kG/cm ²)	0.5	1.0	2.0	CALCULATE
Max reading	12.0	22.0	43.0	$\lg \varphi = \frac{0.620 - 0.238}{1.5 - 0.5} = 0.382$
Composite Correction Shear stress τ (kG/cm ²)	0.01985 0.238	0.01985 0.437	0.01985 0.854	RESULT Internal friction angle φ (°) = 20°54' Cohesion C (kG/cm ²) = 0.047



Tested by

Nguyen Thi Lien
 Nguyen Thi Lien



VILAS 120 Tran.

OEDOMETER COMPRESSION TEST

TCVN 4200 - 95

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BEN CAO BRIDGE

Borehole : T2

Sample No : ND2

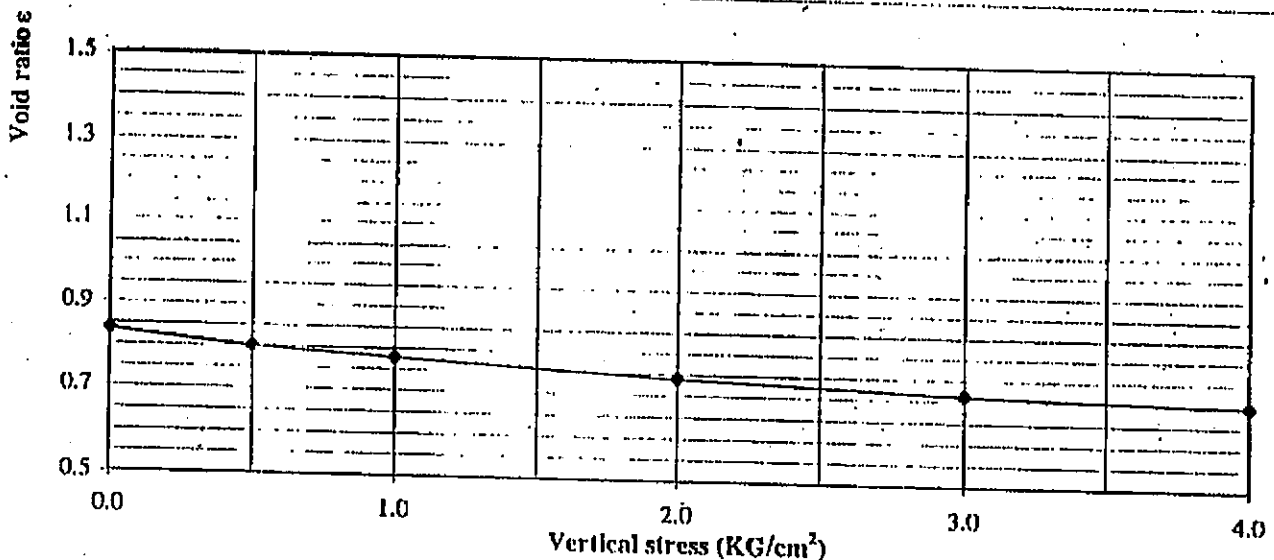
Depth (m) : 4.0 + 4.2

Tests No : 681

Date : 05/7/2006

W (%)	γ_w (g/cm ³)	γ_d (g/cm ³)	ρ (g/cm ³)	S (%)	n (%)	ϵ_o	H (cm)	N_o
31.0	1.920	1.465	2.690	99.9	45.5	0.836	2.00	10

Vertical stress (kg/cm ²)	0.0	0.5	1.0	2.0	3.0	4.0
Dial reading (0.01mm)						
2 h		42.0	70.0	113.5	144.0	166.0
24 h						169.0
Final reading (0.01mm)		42.8	71.3	115.6	146.6	169.0
Deformation of compr. (0.01mm)		2.0	6.0	9.0	11.0	16.0
Deformation of sample ΔH (0.01mm)		40.8	65.3	106.6	135.6	153.0
Change of void ratio Δe		0.037	0.060	0.098	0.124	0.140
Void ratio e_p	0.836	0.798	0.776	0.738	0.711	0.695
Index of compression a (cm ² /KG)		0.075	0.045	0.038	0.027	0.016



Tested by

Signature

Nguyen Thi Hong



VILAS 129
Tran Van Toan

OEDOMETER COMPRESSION TEST

TCVN 4200 - 95

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BEN CAO BRIDGE

Borehole : T2

Sample No : ND3

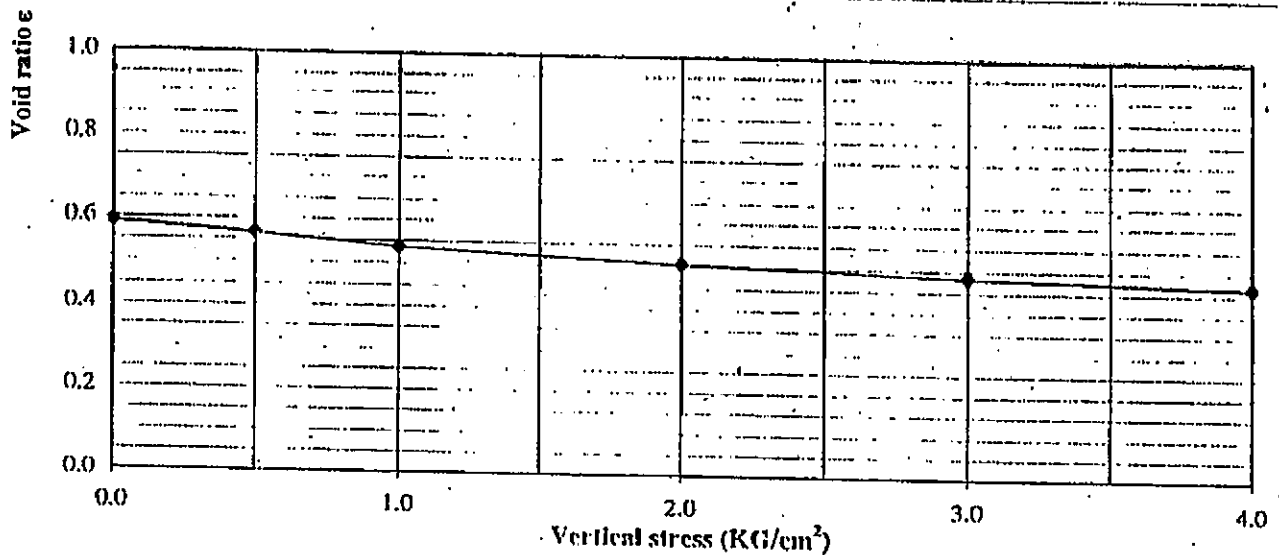
Depth (m) : 6.0 + 6.2

Tets No : 682

Date : 05/7/2006

W (%)	γ_w (g/cm ³)	γ_d (g/cm ³)	ρ (g/cm ³)	S (%)	n (%)	ϵ_0	H (cm)	N_0
21.0	2.000	1.004	2.000	98.9	37.0	0.588	2.00	11

Vertical stress (kg/cm ²)	0.0	0.5	1.0	2.0	3.0	4.0
Dial reading (0.01mm)						
2 h		33.0	73.0	116.0	148.0	169.0
24 h						171.0
Final reading (0.01mm)		33.4	73.9	117.4	147.7	171.0
Deformation of compr. (0.01mm)		2.0	6.0	10.0	13.0	16.5
Deformation of sample ΔH (0.01mm)		31.4	67.9	107.4	134.7	154.5
Change of void ratio Δe		0.025	0.054	0.085	0.107	0.123
Void ratio e_p	0.588	0.563	0.534	0.503	0.481	0.466
Index of compression a (cm ² /KG)		0.050	0.058	0.031	0.022	0.016



Tested by

Signature of Nguyen Thi Hong

Nguyen Thi Hong



VILAS 129
Tran Van Toan

OEDOMETER COMPRESSION TEST

TCVN 4200 - 95

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BEN CAO BRIDGE

Borehole : T1

Sample No : ND1

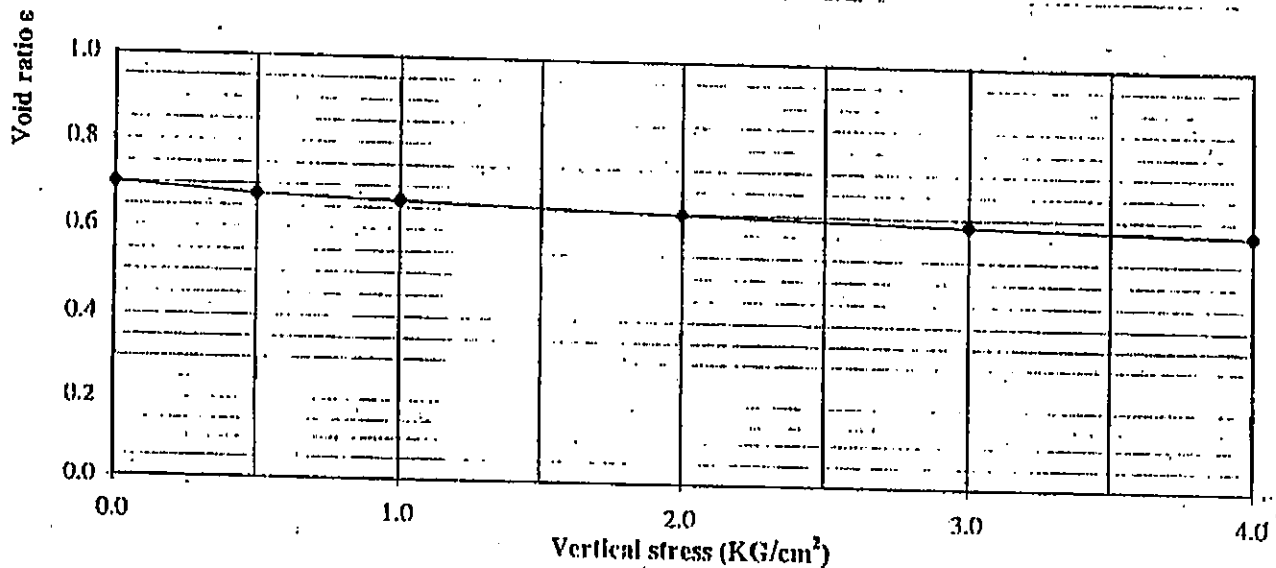
Depth (m) : 1.8 + 2.0

Tets No : 685

Date : 05/7/2006

W (%)	γ_w (g/cm ³)	γ_d (g/cm ³)	ρ (g/cm ³)	S (%)	n (%)	ϵ_o	H (cm)	N _o
21.6	1.927	1.585	2.690	83.2	41.1	0.698	2.00	12

Vertical stress (kg/cm ²)	0.0	0.5	1.0	2.0	3.0	4.0
Initial reading (0.01mm)						
2 h		28.0	43.5	72.0	94.0	113.0
24 h						115.0
Final reading (0.01mm)		28.5	44.3	73.3	95.7	115.0
Deformation of compr. (0.01mm)		3.0	7.0	11.0	14.0	16.0
Deformation of sample ΔH (0.01mm)		25.5	37.3	62.3	81.7	99.0
Change of void ratio Δe		0.022	0.032	0.053	0.069	0.084
Void ratio e_p	0.698	0.676	0.666	0.645	0.628	0.614
Index of compression a (cm ² /KG)		0.043	0.020	0.021	0.016	0.015



Tested by

Signature

Nguyen Thi Hong



VILAS 129
Tran Van Toan

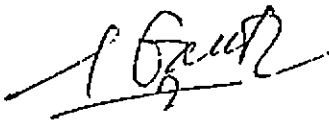
TEST FOR UNCONFINED COMPRESSIVE STRENGTH OF ROCK
(22 TCN 57 - 84)

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

BEN CAO BRIDGE

Bore hole	T2	T2	T2
Sample No	U6	U7	U8
Depth (m)	11,0-11,1	13,0-13,15	14,8-15,0
Test Items			
Dry unconfined compressive strength σ_n (kG/cm ²)	550,0	565,0	578,0
Saturated unconfined compressive strength σ_{bh} (kG/cm ²)	395,0	390,0	405,0
Index of softening k	0,72	0,69	0,70
Natural unit weight γ_w (g/cm ³)	2,381	2,385	2,379
Specific gravity Δ (g/cm ³)	2,695	2,691	2,700

Tested by



Nguyễn Văn Hạnh



VILA 429 Trần Văn Toàn

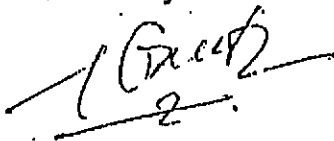
TEST FOR UNCONFINED COMPRESSIVE STRENGTH OF ROCK
(22 TCN 57 - 84)

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

BEN CAO BRIDGE

Bore hole	T1	T1	T1
Sample No	U4	U5	U6
Depth (m)	7,7-8,0	9,0-9,3	11,0-11,15
Test Items			
Dry unconfined compressive strength σ_n (kG/cm ²)	505,0	515,0	537,0
Saturated unconfined compressive strength σ_{bh} (kG/cm ²)	355,0	358,0	379,0
Index of softening k	0,70	0,70	0,71
Natural unit weight γ_w (g/cm ³)	2,395	2,390	2,394
Specific gravity Δ (g/cm ³)	2,700	2,698	2,695

Tested by



Nguyễn Văn Hạnh

July 19, 2006

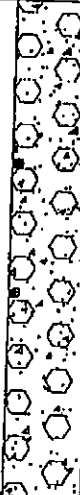
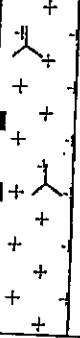
Checked by



VILAS 129

BORING LOG

Bridge No.25

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF LAO CAI PROVINCE																
Bore hole		LK P2	Co-or. X=		Y=	THANH PHU BRIDGE																
Elev.: +78.60		Elev. of underwater level: +0.00		Drilling date:		Station: km24+016.40																
Corrector:		Nguyen Cong Sinh		Checker:		Tran Viet Han																
Layer	Elev. (m)	Depth (m)	Thickness (m)	PROFILE Scale 1/100.	DESCRIPTION	STANDARD PENETRATION TEST (SPT)							Sampling depth for test (m)									
						Depth (m)	Blow No./15cm			N/30cm	Chart											
							N1	N2	N3			0	10	20	30	40	50	N				
1	71.30	7.20	7.20		It is mixture of cobble, gravel, grit, sand (with big diameter of cobble) mixed with rolling boulder. It is in blackish grey, yellowish-whitish grey colour, saturate state and closed structure (Positions for SPT N1 >50 to blow into rolling boulder).	1.00-1.45	>50															
						2.30-2.75	12	18	30	40												
						3.00-3.45	13	16	29	46												
						4.20-4.65	15	23	27	50												
						5.00-5.45	19	25	>50	>50												
						6.00-6.45	20	24	>50	>50												
2	66.30	12.20	5.00		Granite is in leaden-grey, whitish grey with black spotted colour. Hardness is in level VII-VIII.																	

BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES				BRIDGES OF LAO CAI PROVINCE																	
Bore hole		LK_P1	Co-ord. X=		Y=	THANH PHU BRIDGE																	
Elev.: +82.00		Elev. of underwater level: +0.00		Drilling date:		28/06/2006 - 30/06/2006																	
Contractor:		Nguyễn Công Sinh		Checker:		Trần Việt Hân																	
Layer	Elev. (m)	Depth (m)	Thickness (m)	PROFILE Scale 1/100	DESCRIPTION	STANDARD PENETRATION TEST (SPT)							Sampling depth for test (m)										
						Depth (m)	Blow No./15cm			N _{30cm}	Chart												
							N1	N2	N3			0	10	20	30	40	50	N					
1	75.10	6.90	6.90		It is mixture of cobble, gravel, grit, sand (with big diameter of cobble) mixed with rolling boulder. It is in blackish grey, yellowish-whitish grey colour, saturate state and closed structure (Positions for SPT N1 >50 to blow into rolling boulder).	1.00-1.45	>50																
						2.00-2.45	13	20	25	45													
						3.00-3.45	14	21	24	45													
						4.00-4.45	14	23	23	46													
						5.00-5.45	16	22	25	47													
						6.00-6.45	20	24	>50	>50													
2	70.10	11.90	5.00		Granite is in leaden-grey, whitish grey with black spotted colour. Hardness is in level VII-VIII.																		

TEST FOR UNCONFINED COMPRESSIVE STRENGTH OF ROCK

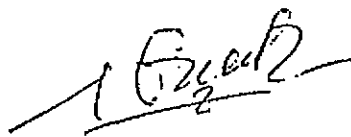
(22 TCN 57 - 84)

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

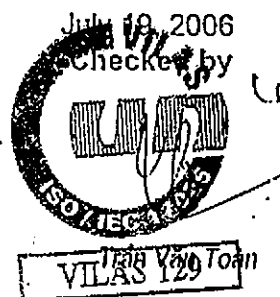
THANH PU BRIDGE

Bore hole		PO1	PO1	PO1
Sample No.		U2	U3	U4
Depth (m)		4,0-4,25	8,1-8,35	11,0-11,25
Test items				
Dry unconfined compressive strength	σ_n (kG/cm ²)	805,0	810,0	817,0
Saturated unconfined compressive strength	σ_{bh} (kG/cm ²)	642,0	650,0	660,0
Index of softening	k	0,80	0,80	0,81
Natural unit weight	γ_w (g/cm ³)	2,410	2,400	2,410
Specific gravity	Δ (g/cm ³)	2,720	2,718	2,718

Tested by



Nguyễn Văn Hạnh



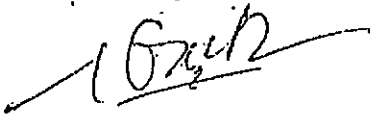
TEST FOR UNCONFINED COMPRESSIVE STRENGTH OF ROCK
(22 TCN 57 - 84)

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

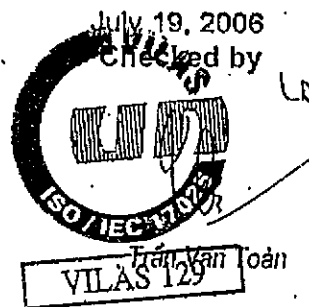
THANH PU BRIDGE

Bore hole		PO2	PO2	MO2
Sample No.		U3	U4	U4
Depth (m)		9,0-9,35	11,0-11,25	13-13,25
Test Items				
Dry unconfined compressive strength	σ_n (kG/cm ²)	770,0	764,0	780,0
Saturated unconfined compressive strength	σ_{bh} (kG/cm ²)	625,0	612,0	630,0
Index of softening	k	0,81	0,80	0,81
Natural unit weight	γ_w (g/cm ³)	2,390	2,390	2,391
Specific gravity	Δ (g/cm ³)	2,718	2,720	2,720

Tested by



Nguyễn Văn Hạnh



No: 100706.04.1/CLD

SUMMARY OF TEST RESULTS

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

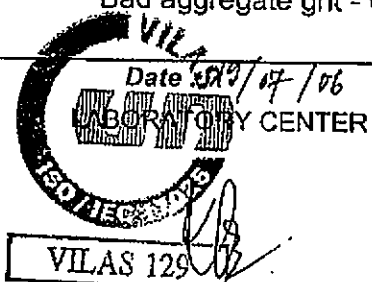
THANH PHU BRIDGE

Borehole :		P02	
Sample No :		PH1	PH2
Depth (m):	m	2.30 ÷ 2.55	4.20 ÷ 4.45
Test No.		757	758
Grain size analysis P %			
Percent finer (%)	50.8 (mm)	100.0	100.0
	25.4 (mm)	51.2	60.1
	19.0 (mm)	40.3	50.8
	9.5 (mm)	21.3	38.2
	4.75 (mm)	10.5	21.0
	2.00 (mm)	5.2	8.9
	0.425 (mm)	0.5	0.6
	0.075 (mm)	0.3	0.3
	0.050 (mm)		
	0.005 (mm)		
0.002 (mm)			
Natural water content	W %		
Natural unit weight	γ_w g/cm ³		
Dry unit weight	γ_k g/cm ³		
Specific gravity	ρ g/cm ³	2.670	2.670
Coefficient of uniformity	C_u	6.90	11.5
Coefficient of gradation	C_c	1.40	0.90
In Dry condision	α_k		
In Saturation condision	α_w		
Void Ratio	e_0		
Porosity	n %		
Degree of Saturation	S %		
Liquid Limits	Wl %		
Plastic Limits	Wp %		
Plasticity Index	Ip %		
Internal friction angle	φ^0		
Cohesion	C KG/cm ²		
Compressibility Index	a_{1-2} cm ² /KG		
Soil classification ASTM - D 2487	Good aggregate grit - GW	Bad aggregate grit - GP	

COLECTED BY

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Eng. Nguyen Thi Khanh Ha



Eng. Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
THANH PHU BRIDGE

Borehole : P02
 Sample No : PH1
 Depth (m) : 2.3 + 2.55

Tets No : 757
 Date : 13/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 2130.0

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Wt. Soil retained (g)	0.0	1040.0	230.6	405.3	230.1	114.3	100.0	3.2	6.5
Percent retained (%)	0.0	48.8	10.8	19.0	10.8	5.4	4.7	0.2	0.3
Percent finer (%)	100.0	51.2	40.3	21.3	10.5	5.2	0.5	0.3	

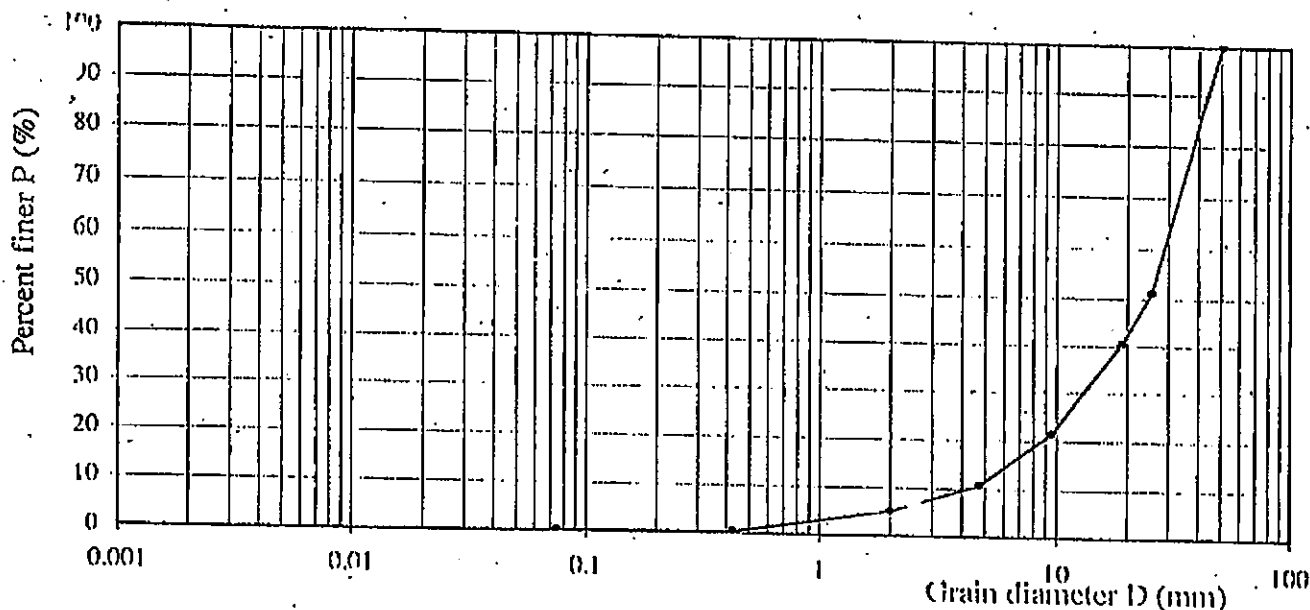
RESULT

$D_{60} = 29.0$ $C_u = 6.9$
 $D_{30} = 13.0$ $C_c = 1.4$
 $D_{10} = 4.2$

Soil classification (ASTM - D 2487)

Group symbol : GW
 Group name : Good aggregate-grit

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.0	0.425	0.075	< 0.075
Percent retained (%)	0.0	48.8	10.8	19.0	10.8	5.4	4.7	0.2	0.3



Tested by

Handwritten signature

Nguyen Thi Hong



VILAS 129
 Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
THANH PHU BRIDGE

Borehole : M01
Sample No : PH2
Depth (m) : 4.0 ± 4.45

Tets No : 758
Date : 13/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 2154.0

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Wt. Soil retained (g)	0.00	860.20	200.40	270.80	370.10	260.00	180.30	5.20	7.00
Percent retained (%)	0.0	39.9	9.3	12.6	17.2	12.1	8.4	0.2	0.3
Percent finer (%)	100.0	60.1	50.8	38.2	21.0	8.9	0.6	0.3	

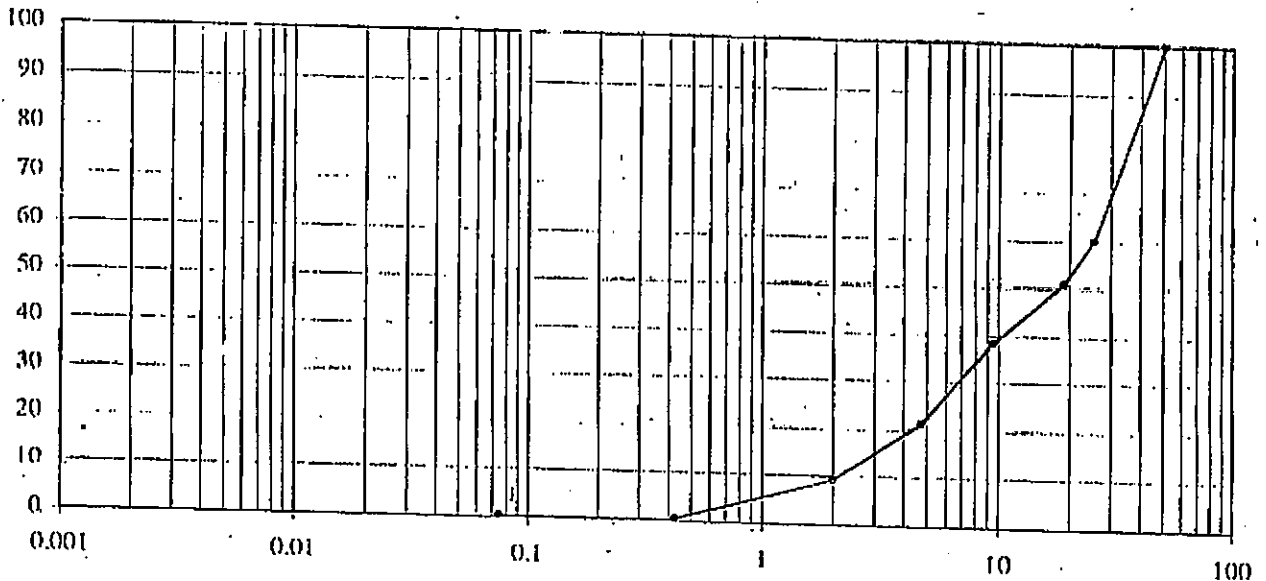
RESULT

$D_{60} = 25.40$ $C_u = 11.5$
 $D_{30} = 7.00$ $C_c = 0.9$
 $D_{10} = 2.20$

Soil classification (ASTM - D 2487)

Group symbol : GP
Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.0	0.425	0.075	< 0.075
Percent retained (%)	0.0	39.9	9.3	12.6	17.2	12.1	8.4	0.2	0.3



Tested by

Richard

Nguyen Thi Hong



VILAS 129
Tran Van Toan

BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF LAO CAI PROVINCE																	
Bore hole		LK_P01		Co-or. X= Y=		Station: Km 15+986.18																	
Elev.: +44.36		Elev. of underwater level: +0.00		Drilling date:		16/06/2006 - 19/06/2006																	
Corrector:		Nguyen Cong Sinh		Checker:		Tran Viet Han																	
Layer	Elev. (m)	Depth (m)	Thickness (m)	PROFILE Scale 1/100	DESCRIPTION	STANDARD PENETRATION TEST (SPT)						Sampling depth for test (m)											
						Depth (m)	Blow No./15cm			N ₆₀ cm	Chart												
					N1		N2	N3			0	10	20	30	40	50	N						
1	42.46	1.80	1.80		Sandy clay is blackish gray mixed with grit, slightly stiff.	1.10-1.55	1	2	2	4													
2	34.16	10.20	8.30		It is mixture of rolling boulder, cobble, grit mixed with clay-sand in blackish gray colour, medium closed structure. Locations for SPT >50 to blow into rolling boulders	2.40-2.85	2	2	>50	>50								PH1 2.20-2.40					
						3.40-3.85	4	5	6	11													
						4.50-4.95	4	7	>50	>50												PH2 4.30-4.50	
						5.50-5.95	5	6	4	10													
						6.50-6.95	4	5	>50	>50													PH3 6.30-6.50
						7.50-7.95	>50																
						8.60-8.95	8	8	8	14													
9.60-9.95	8	>50																					
4	29.36	15.00	4.80		Sandstone is blackish grey, weathered, cracked and crushed. Hardness is in level V.													U4 12.00-12.25					
																		U5 14.00-14.25					

BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF LAO CAI PROVINCE						
Bore hole		LK_P02		Co-or. X=		Y=		Station: Km 16+016.18				
Elev.: +42.75		Elev. of underwater level: +0.00		Drilling date:		03/07/2006 - 04/07/2006						
Corrector:		Nguyen Cong Sinh				Checker:		Tran Viet Han				
Layer	Elev. (m)	Depth (m)	Thickness (m)	PROFILE Scale 1/100	DESCRIPTION	STANDARD PENETRATION TEST (SPT)					Sampling depth for test (m)	
						Depth (m)	Blow No./15cm			N _{60cm}		Chart 0 10 20 30 40 60 N
							N1	N2	N3			
1	41.56	1.00	1.50		Sandy clay is blackish grey mixed with grit, slightly stiff.	1.00-1.45	2	2	2	4		PH1 2.00-2.45
3	37.25	5.50	4.00		Grit mixes with clay-sand in blackish grey, yellowish grey, closed structure.	2.00-2.45	10	15	18	33		
						3.00-3.45	12	18	17	35		
						4.00-4.45	16	20	25	45		
						5.00-5.45	17	22	27	49		
4	32.25	10.50	5.00		Sandstone is blackish grey, weathered, cracked and crushed. Hardness is in level V.						U2 12.00-12.25	

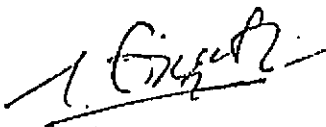
TEST FOR UNCONFINED COMPRESSIVE STRENGTH OF ROCK
(22 TCN 67 - 84)

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

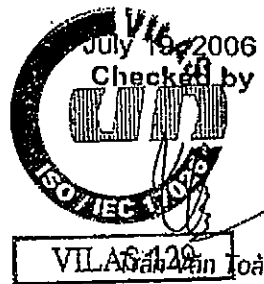
BAN XEO BRIDGE

	P01	P01	P02
Bore hole			
Sample No	U1	U5	U2
Depth (m)	12-12,25	14-14,25	7,25-7,5
Test items			
Dry unconfined compressive strength σ_{11} (kG/cm ²)	121,0	125,0	115,0
Saturated unconfined compressive strength σ_{bh} (kG/cm ²)	75,0	80,0	79,0
Index of softening k	0,62	0,64	0,69
Natural unit weight γ_w (g/cm ³)	2,350	2,351	2,371
Specific gravity Δ (g/cm ³)	2,685	2,688	2,680

Tested by



Nguyễn Văn Hạnh



No: 260606.01.1/CLD

SUMMARY OF TEST RESULTS

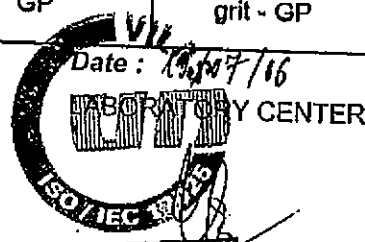
THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

BAN XEO BRIDGE

Borehole :		P01.			P02
Sample No :		PH1	PH2	PH3	PH1
Depth (m):	m	2.00 + 2.25	4.30 + 4.55	6.30 + 6.55	2.20 + 2.45
Test No.		616	617	618	767
Grain size analysis					
Percent finer (%)	P %				
	50.8 (mm)	100.0	100.0	100	59.8
	25.4 (mm)	41.8	38.2	42.9	54.4
	19.0 (mm)	7.4	6.1	1.8	53.8
	9.5 (mm)	5.4	4.3	1.1	51.3
	4.75 (mm)	4.4	3.5	0.7	47.5
	2.00 (mm)	2.7	3.0	0.5	44.1
	0.425 (mm)	1.5	2.1	0.1	36.0
	0.075 (mm)	0.1	0.1		26.5
	0.050 (mm)				
0.005 (mm)					
0.002 (mm)					
Natural water content	W %				
Natural unit weight	γ_w g/cm ³				
Dry unit weight	γ_k g/cm ³				
Specific gravity	ρ g/cm ³	2.670	2.670	2.67	2.71
Coefficient of uniformity	C_u	1.6	1.6	1.6	
Coefficient of gradation	C_c	0.8	0.8	0.9	
In Dry condision	α_k				
In Saturation condision	α_w				
Void Ratio	e_0				
Porosity	n %				
Degree of Saturation	S %				
Liquid Limits	Wl %				
Plastic Limits	Wp %				
Plasticity Index	Ip %				
Internal friction angle	ϕ°				
Cohesion	C KG/cm ²				
Compressibility Index	a_{1-2} cm ² /KG				
Soil classification ASTM - D 2487		Bad aggregate grit - GP	Bad aggregate grit - GP	Bad aggregate grit - GP	Clay grit - GC

COLECTED BY

NCH



VILAS 129

Eng. Tran Van Toan

Eng. Nguyen Thi Khanh Ha

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BAN XEO BRIDGE

Borehole : P01
Sample No : PH1
Depth (m): 2.00 + 2.25

Tets No : 616
Date : 30/6/2006

SIZE ANALYSIS

Weight of dry soil (g): 2074.0

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	0.00	1207.00	713.67	42.61	20.64	34.18	24.81	28.64	2.45
Percent retained (%)	0.0	58.2	34.4	2.1	1.0	1.6	1.2	1.4	0.1
Percent finer (%)	100.0	41.8	7.4	5.3	4.3	2.7	1.5	0.1	

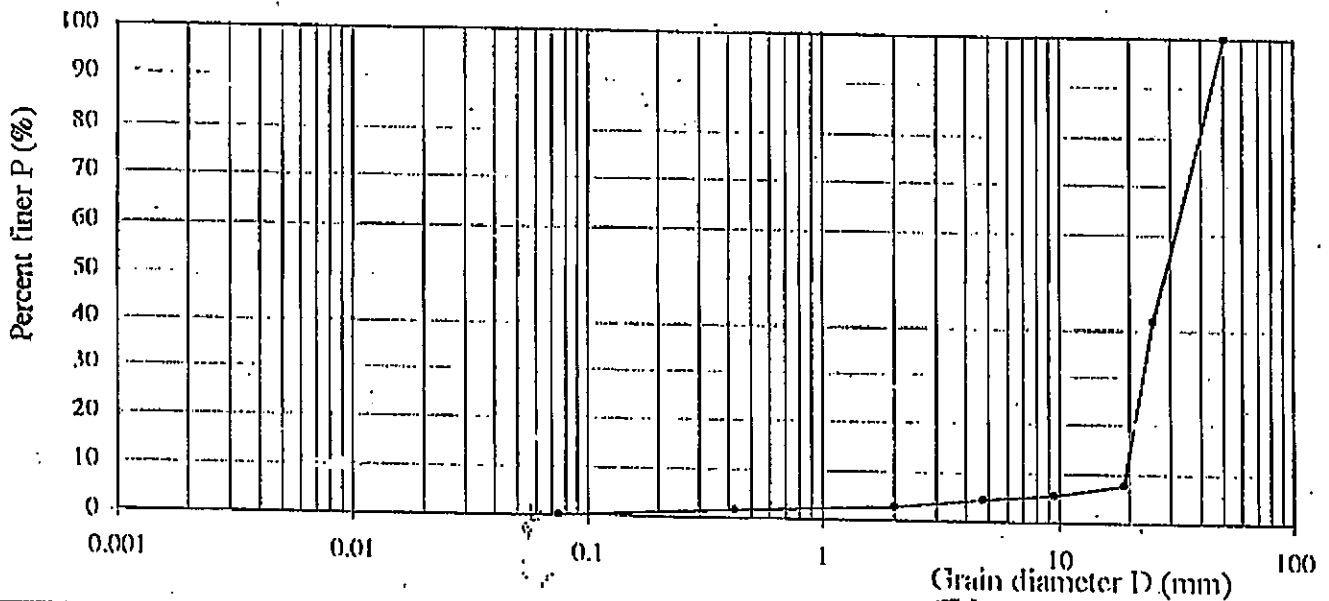
RESULT

$D_{60} = 31.0$ $C_u = 1.6$
 $D_{30} = 22.0$ $C_c = 0.8$
 $D_{10} = 20.0$

Soil classification (ASTM - D 2487)

Group symbol : GP
Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	0.0	58.2	34.4	2.1	1.0	1.6	1.2	1.4	0.1



Tested by

Signature

Nguyen Thi Hong



Checked by

Signature

VILAS 129

Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BAN XEO BRIDGE

Borehole : P01
Sample No : PH2
Depth (m) : 4.30 ± 4.55

Tets No : 617
Date : 30/6/2006

SIZE ANALYSIS

Weight of dry soil (g): 2269.0

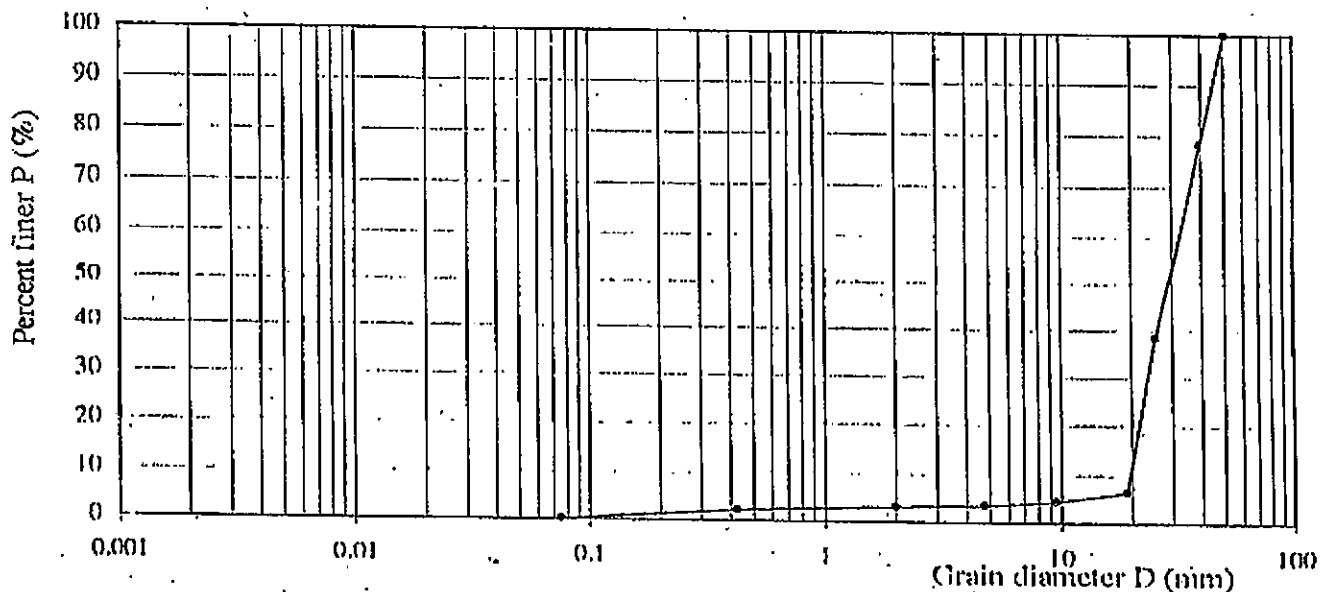
Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	0.00	1403.00	727.00	40.41	20.23	10.16	20.60	45.13	2.47
Percent retained (%)	0.0	61.8	32.0	1.8	0.9	0.4	0.9	2.0	0.1
Percent finer (%)	100.0	38.2	6.1	4.3	3.5	3.0	2.1	0.1	

RESULT

$D_{60} = 32.0$ $C_u = 1.6$
 $D_{30} = 23.0$ $C_c = 0.8$
 $D_{10} = 20.0$

Soil classification (ASTM - D 2487)
Group symbol : GP
Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	0.0	61.8	32.0	1.8	0.9	0.4	0.9	2.0	0.1



Tested by

Handwritten signature

Nguyen Thi Hong



VILAS 129

Tran Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BAN XEO BRIDGE

Borehole : P01
Sample No : PH3
Depth (m): 6.30 + 6.55

Tets No : 618
Date : 30/6/2006

SIZE ANALYSIS

Weight of dry soil (g): 3219,4

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	0.00	1839.30	1321.51	21.83	14.51	6.39	14.24	1.62	0.00
Percent retained (%)	0.0	57.1	41.0	0.7	0.5	0.2	0.4	0.1	0.0
Percent finer (%)	100.0	42.9	1.8	1.1	0.7	0.5	0.1	0.0	

RESULT

$D_{60} = 31.0$
 $D_{30} = 23.0$
 $D_{10} = 20.0$

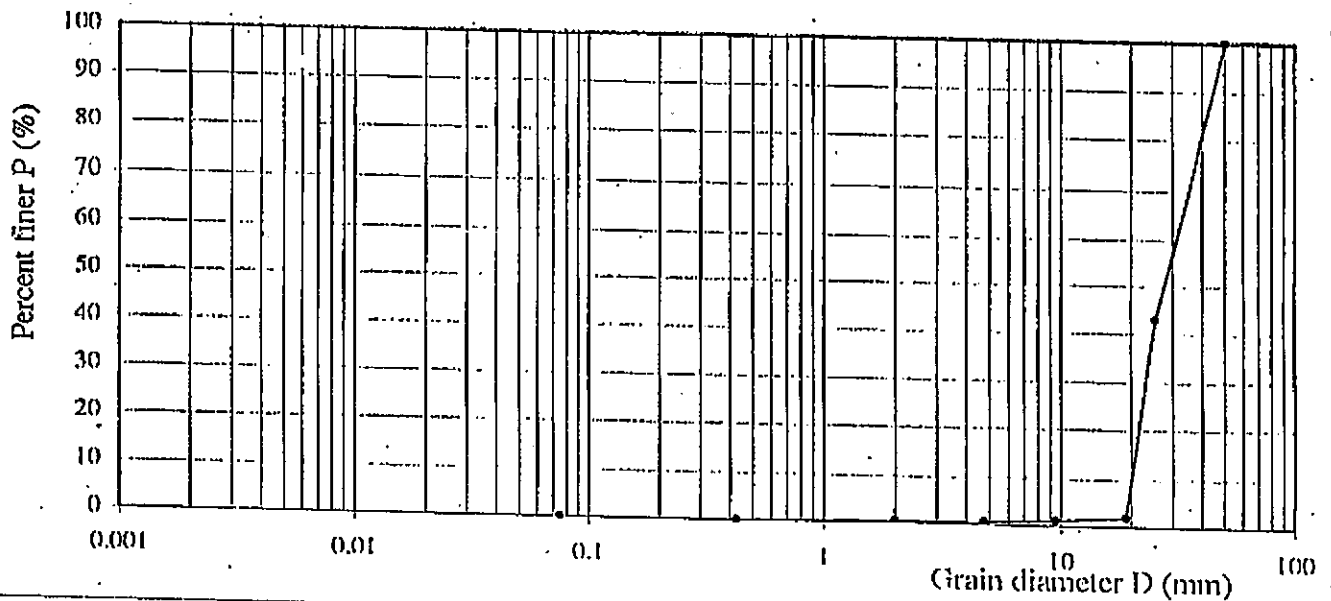
$C_u = 1.6$
 $C_c = 0.9$

Soil classification (ASTM - D 2487)

Group symbol : GP

Group name : Bad aggregate grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	0.0	57.1	41.0	0.7	0.5	0.2	0.4	0.1	0.0



Tested by

Signature

Nguyen Thi Hong



VILAS 1429 Van Toan

GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BAN XEO BRIDGE

Borehole : T2
Sample No : PH1
Depth (m) : 2.20 ; 2.45

Tests No : 767
Date : 13/7/2006

S.IZE ANALYSIS

Weight of dry soil (g): 1780.0

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	715.60	95.30	10.90	45.80	66.60	60.10	144.80	169.90	471.00
Percent retained (%)	40.2	5.4	0.6	2.6	3.7	3.4	8.1	9.5	26.5
Percent finer (%)	59.8	94.6	99.4	97.4	96.3	96.6	91.9	90.5	73.5

RESULT

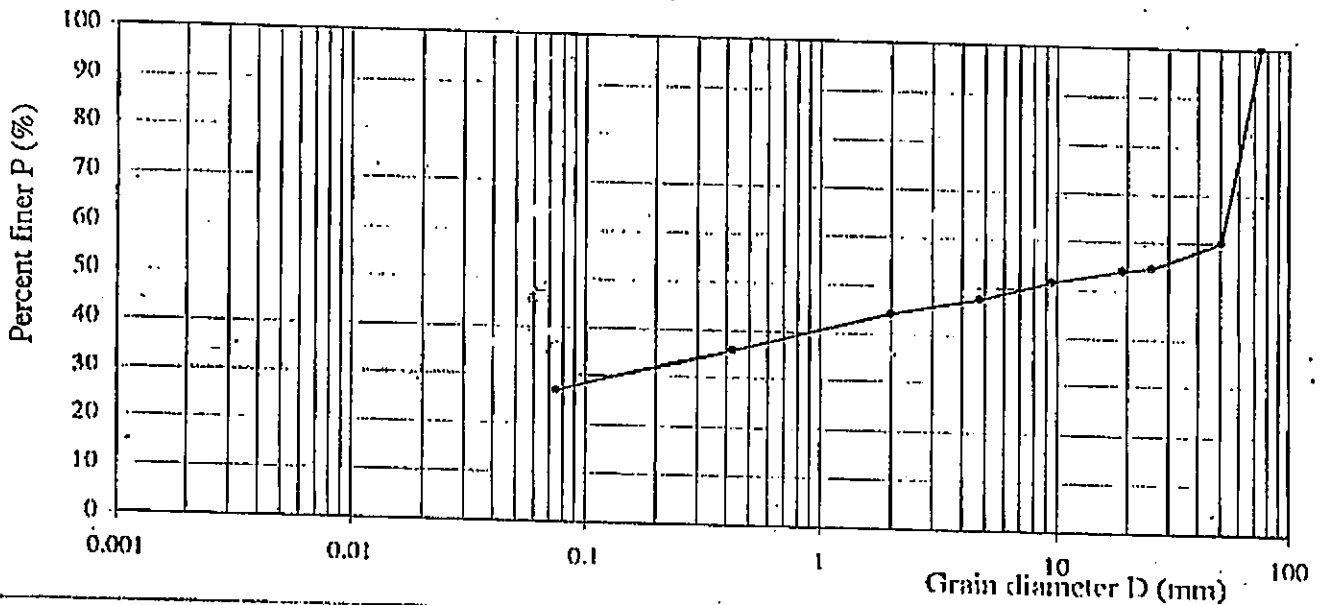
$D_{60} =$ $C_u =$
 $D_{30} =$ $C_c =$
 $D_{10} =$

Soil classification (ASTM - D 2487)

Group symbol : GC

Group name : Clay grit

Size (mm)	50.8	25.4	19	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	40.2	5.4	0.6	2.6	3.7	3.4	8.1	9.5	26.5



Tested by

Signature of Nguyen Thi Hong

Nguyen Thi Hong

Checked by



Tran Van Toan

VILAS 129

ATTERBERG LIMITS

ASTM - D 4318 - 84

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES
BAN XEO BRIDGE

Borehole : T2

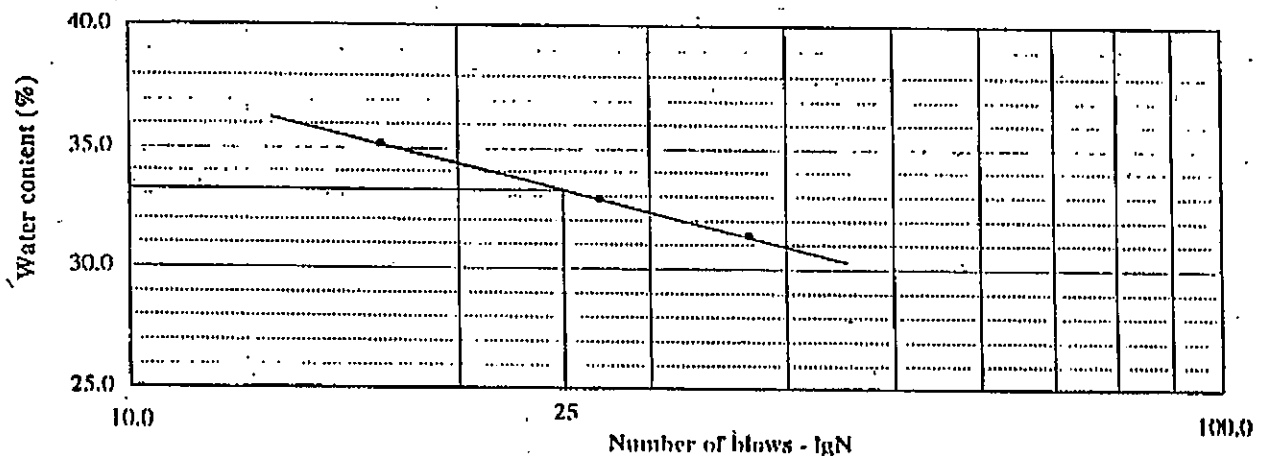
Sample No : PH1

Test No : 787

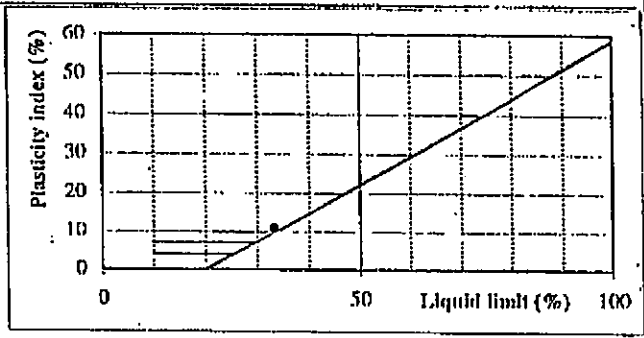
Depth (m): 2.2 + 2.45

Date : 14/7/2006

Container number	LIQUID LIMIT (W _L)			PLATIC LIMIT (W _P)	
	IN12	IN16	IN22	HN50	HN26
Weight of wet (g)	85.57	84.16	84.06	39.47	42.68
Weight of dry (g)	80.32	79.13	79.52	36.34	38.84
Weight of container (g)	65.39	65.03	65.05	22.25	21.77
Water content (%)	35.2	32.8	31.4	22.2	22.5
Average water content (%)	22.4				
Number of blows (N)	17	27	37		



RESULT:
 Liquid limit : $W_L = 33.2\%$
 Platic limit : $W_P = 22.4\%$
 Plasticity index : $I_P = 10.8\%$



Tested by

[Handwritten Signature]

Tran Thi My Dung



VIAS 129
Tran Van Toan

BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF LAO CAI PROVINCE										
Bore hole		LK_P1	Co-ord. X=		Y=	Station: km24+011.88										
Elev.: +189.63		Elev. of underwater level: +0.00		Drilling date:		11/08/2006 - 14/08/2006										
Corrector:		Nguyen Cong Sinh			Checker:		Tran Viet Han									
Layer	Elev. (m)	Depth (m)	PROFILE Scale 1/100	DESCRIPTION	STANDARD PENETRATION TEST (SPT)						Sampling depth for test (m)					
					Depth (m)	Blow No./15cm			N/30cm	Chart						
						N1	N2	N3			0	10	20	30	40	50
1	183.23	6.40		It is mixture of cobble, gravel, grit and sand (Cobble diameter is big) in blackish grey, yellowish grey, saturate, closed structure.	1.00-1.45	15	18	10	34							
					2.00-2.45	16	18	18	36						PH1 2.00-2.45	
					3.00-3.45	16	20	26	45							
					4.00-4.45	15	20	23	43						PH2 4.00-4.45	
					5.00-5.45	16	21	24	45							
					6.00-6.45	18	22	>50	>50							
2	178.28	11.35		Sandstone is blackish grey, weathered, little cracked. Hardness is in level VI-VII.												
															U3 7.30-7.55	
									U4 9.90-10.15							

BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF LAO CAI PROVINCE					
Bore hole		LK_P2	Co-ord. X=		Y=	Station: km23+987.88					
Elev.: +189.43		Elev. of underwater level: +0.00		Drilling date:		14/06/2006 - 16/06/2006					
Corrector:		Nguyen Cong Sinh		Checker:		Tran Viet Han					
Layer	Elev. (m)	Depth (m)	PROFILE Scale 1/100	DESCRIPTION	STANDARD PENETRATION TEST (SPT)					Sampling depth for test (m)	
					Depth (m)	Blow No./15cm			N ₆₀ cm		Chart 0 10 20 30 40 50 N
						N1	N2	N3			
1		10.20		It is mixture of cobble, gravel, grit and sand (Cobble diameter is big) in blackish grey, yellowish grey, saturate, closed structure.	1.00-1.45	10	20	25	45		PH1 2.00-2.45
					2.00-2.45	12	21	23	44		
					3.00-3.45	15	21	28	47		
					4.00-4.45	14	22	24	48		
					5.00-5.45	16	23	24	47		PH2 4.00-4.45
					6.00-6.45	18	22	23	45		
					7.00-7.45	20	25	24	49		
					8.00-8.45	20	24	25	49		
					9.00-9.45	18	20	24	44		PH3 6.00-6.45
					10.00-10.45	20	24	>50	>50		
2	179.23	10.20		Sandstone is blackish grey, weathered, little cracked. Hardness is in level VI-VII.						US 12.10-12.35	
	174.23	15.20									US 14.30-14.55

TEST FOR UNCONFINED COMPRESSIVE STRENGTH OF ROCK

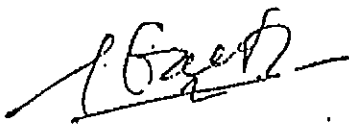
(22 TCN 57 - 84)

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

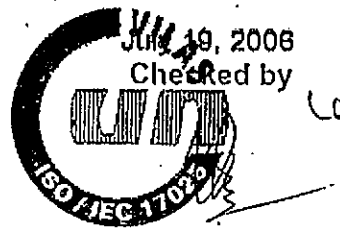
MUONG HUM 2.BRIDGE

Bore hole		P1	P2
Sample No		U5	U3
Depth (m)		12,10-12,35	7,30-7,55
Test items			
Dry unconfined compressive strength	σ_n (kG/cm ²)	350,0	365,0
Saturated unconfined compressive strength	σ_{bh} (kG/cm ²)	225,0	237,0
Index of softening	k	64,00	0,65
Natural unit weight	γ_w (g/cm ³)	2,385	2,387
Specific gravity	Δ (g/cm ³)	2,700	2,695

Tested by



Nguyễn Văn Hạnh


 VILAS 129
 Trần Văn Toàn.

BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF LAO CAI PROVINCE					
Bora hole		LK_P1		Co-ord. X= Y=		Station: km2+027.00					
Elev.: +194.91		Elev. of underwater level: +0.00		Drilling date:		08/06/2006 - 10/06/2006					
Contractor:		Nguyen Cong Sinh		Checker:		Tren Viet Han					
Layer	Elev. (m)	Depth (m)	PROFILE Scale 1/100	DESCRIPTION	STANDARD PENETRATION TEST (SPT)				Sampling depth for test (m)		
					Depth (m)	Blow No./15cm				Chart	
						N1	N2	N3	N30cm		0 10 20 30 40 50 N
1	190.41	4.60	4.50	Fine sand is in brownish grey, moist state, spongy structure.	1.00-1.45	1	2	2	4		
					2.00-2.45	1	2	3	5		
					3.00-3.45	1	2	3	5		
					4.00-4.45	2	3	3	6		
2	188.71	6.20	1.70	Sand with grit ls in yellowish grey, blackish grey, saturate state, closed structure.	5.00-5.45	8	12	16	30		
					5.70-6.15	10	15	20	35		
5	179.91	15.00	8.80	Sandstone is in blackish grey, weathered, cracked. Hardness is in level VI-VII							U1 10.00-10.20

TEST FOR UNCONFINED COMPRESSIVE STRENGTH OF ROCK
(22 TCN 57 - 84)

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

SOI TRAT BRIDGE

Bore hole		P1		
Sample No		U1		
Depth (m)		10-10,25		
Test items				
Dry unconfined compressive strength	σ_{11} (kG/cm ²)	130,0		
Saturated unconfined compressive strength	σ_{bh} (kG/cm ²)	88,0		
Index of softening	k	0,68		
Natural unit weight	γ_w (g/cm ³)	2,367		
Spofitic gravity	Δ (g/cm ³)	2,681		

Tested by







Nguyễn Văn Hạnh




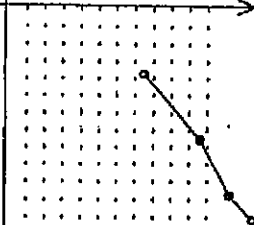

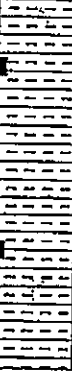
BORING LOG

Bridge No.30

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF TUYEN QUANG PROVINCE BAN NGHIEN BRIDGE												
Bore hole		LK_T2	Co-or. X=		Y=	Station:												
Elev.: +89.67		Elev. of underwater level: +0.00			Drilling date:		08/06/2006 - 10/06/2006											
Corrector:		Ho Nhat Dang			Checker:		Ngo Duc Hung											
Layer	Elev. (m)	Depth (m)	Thickness (m)	PROFILE Scale 1/100	DESCRIPTION	STANDARD PENETRATION TEST (SPT)					Sampling depth for test (m)							
						Depth (m)	Blow No./15cm			N/30cm		Chart						
							N1	N2	N3			0	10	20	30	40	50	N
1	86.87	2.8	2.8		Cobble, gravel, grit is yellowish brown, whitish grey, closed structure.	1.0-1.01	30/1cm											
2	83.47 83.14	6.2 6.23	3.4		Clay shale is blackish grey, brownish grey, cracked. Hardness is 4 with RQD=60%, TCR=45%	2.0-2.01	32/1cm											T1 4.6-4.7
					Clay mixes with chips, brownish grey.													T2 7.0-7.1
4	78.37	11.30	5.07		Shale is brownish grey, light pink with hardness of 6-7, RQD=70%, TCR=55%													T3 9.0-9.1

BORING LOG

Bridge No.30

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF TUYEN QUANG PROVINCE											
Bore hole		LK_T3		Co-ord. X=		Y=		Station:									
Elev.: +89.80		Elev. of underwater level: +0.00				Drilling date:		10/06/2006 - 11/06/2006									
Corrector:		Ho Nhat Dang				Checker:		Ngo Duc Hung									
Layer	Elev. (m)	Depth (m)	Thickness (m)	PROFILE Scale 1/100	DESCRIPTION	STANDARD PENETRATION TEST (SPT)							Sampling depth for test (m)				
						Depth (m)	Blow No./15cm			N30cm	Chart						
							N1	N2	N3								
1	88.7	3.1	3.1		Cobble, gravel, grit is yellowish brown, whitish grey, closed structure.	1.0-1.46	10	15	19	34							
						2.0-2.46	16	22	28	45							
						3.0-3.45	19	25	32	55							
2	83.9 83.6	5.9 6.0	2.8 0.1		Clay shale is blackish grey, brownish grey, cracked. Hardness is 4 with RQD=60%, TCR=45%	<div style="display: flex; justify-content: space-between; width: 100%;"> T1 4.5-4.7 </div>											
																	<div style="display: flex; justify-content: space-between; width: 100%;"> T2 7.2-7.4 </div>
4	78.6	11.20	5.20		Shale is brownish grey, light pink with hardness of 6-7, RQD=70%, TCR=55%	<div style="display: flex; justify-content: space-between; width: 100%;"> T3 9.0-9.2 </div>											
																	<div style="display: flex; justify-content: space-between; width: 100%;"> ZV </div>

TEST FOR UNCONFINED COMPRESSIVE STRENGTH OF ROCK
(22 TCN 57 - 84)

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

BAN NGHIEN BRIDGE

Bore hole	LK_ T2	LK_ T2	LK_ T2
Sample No.	T1	T2	T3
Depth (m)	4,5-4,7	7,0-7,1	9,0-9,1
Test Items			
Dry unconfined compressive strength σ_n (kG/cm ²)	451,0	750,0	781,0
Saturated unconfined compressive strength σ_{bh} (kG/cm ²)	305,0	598,0	635,0
Index of softening k	0,88	0,80	0,81
Natural unit weight γ_w (g/cm ³)	2,39	2,41	2,40
Specific gravity Δ (g/cm ³)	2,69	2,71	2,71

Tested by



Nguyễn Văn Hạnh



VILAS 129
Trần Văn Hoàn