

## Appendix-5: Geological Data

# BORING LOG

Drawing No. 2

Project :	Ban Sai Bridge	Logged by :	Nguyen Nam Duong
Borehole No:	P1	Checked by :	Do Van Dang
Co-ordinate:		Sheet:	1/1
Date :	01/07/2006 - 03/07/2006	Ground Elev.:	23.41m
Scale :	1/200	Terminated depth:	17.00m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST					
							SPT Depth	Blows/ 15cm			N Value	CHART N = Blows/ 30cm 0 10 20 30 40 50
								N1	N2	N3		
1	19.81	3.60	3.60		D1 1.50-2.00	Gravel with boulder, yellowish grey, greenish grey, very dense.	1.00-1.45	22	30	35	>50	>50
							2.00-2.45	27	35	51	>50	>50
							3.00-3.45	33	39	48	>50	>50
							4.00-4.20	38	51/5	>50	>50	
2a	9.41	14.00	10.40		R2 9.60-9.75	Highly weathered sandstone, brown, TCR=20%, RQD=10%.						
2b	6.41	17.00	3.00		R3 13.00-13.30	Moderately weathered sandstone, brown, TCR=50%, RQD=40%.						
					R4 16.00-16.15							

D : Disturbed Sample ●  
 UD : Undisturbed Sample ■  
 R : Rock Sample ☐



TRANSPORT ENGINEERING DESIGN INCORPORATION (TEDI)  
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# BORING LOG

Drawing No. 2

Project :	Ban Tum Bridge	Logged by :	Pham Van Toan
Borehole No:	P1	Checked by :	Do Van Dang
Co-ordinate:		Sheet:	1/1
Date :	04/07/2006 - 07/07/2006	Ground Elev.:	15.51m
Scale :	1/200	Terminated depth:	18.00m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST					
							SPT Depth	Blows/ 15cm			N Value	CHART N = Blows/ 30cm
								N1	N2	N3		
1			5.00			Gravel with boulder, greenish grey, whitish grey, dense to very dense.	1.00-1.45	12	17	23	40	
2a	10.51	5.00	2.00		Highly to completely weathered sandstone, siltstone, reddish brown, brownish grey, TCR=0%.	2.00-2.45	15	22	28	60		
	8.51	7.00					3.00-3.45	14	17	26	43	
2b			5.00		R1 8.80-9.00 Highly to moderately weathered sandstone, siltstone, reddish brown, brownish grey, TCR= 25%, RQD= 15%.	4.00-4.13	22	47	13/3	>50		
	2.51	13.00			R2 11.80-12.00	5.00-5.42	17	28	25/12	>50		
2c			5.00		R3 14.20-14.40 Moderately weathered sandstone, siltstone, reddish brown, brownish grey. TCR= 50%, RQD= 35%.							
					R4 16.40-16.60							
	-2.49	18.00										

D : Disturbed Sample ●  
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# BORING LOG

Drawing No. 2

Project :	Ban Tum Bridge	Logged by :	Pham Van Toan
Borehole No:	P2	Checked by :	Do Van Dang
Co-ordinate:		Sheet:	1/1
Date :	04/07/2006 - 07/07/2006	Ground Elev.:	15.01m
Scale :	1/200	Terminated depth:	17.50m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST					
							SPT Depth	Blows/ 15cm			N Value	CHART N = Blows/ 30cm 0 10 20 30 40 50
								N1	N2	N3		
1	10.51	4.50	4.50			Gravel with boulder, greenish grey, whitish grey, dense to very dense.	1.00-1.45	11	18	25	43	
							2.00-2.45	18	21	30	>50	
							3.00-3.45	14	24	25	49	
							4.00-4.40	18	24	30/10	>50	
2a	7.81	7.20	2.70			Highly to completely weathered sandstone, siltstone, reddish brown, brownish grey, TCR=0%.						
2b	3.11	11.90	4.70		R1 8.30-8.50	Highly to moderately weathered sandstone, siltstone, reddish brown, brownish grey, TCR= 35%, RQD= 15%.						
							R2 11.20-11.40					
2c	-2.49	17.50	5.60		R3 14.40-14.60	Moderately weathered sandstone, siltstone, reddish brown, brownish grey, TCR= 60%, RQD= 25%.						

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# BORING LOG

Drawing No. 2

Project :	Na Tra Bridge	Logged by :	Vu Ngoc Tung
Borehole No:	P1	Checked by :	Do Van Dang
Co-ordinate:		Sheet:	1/1
Date :	04/07/2006 - 06/07/2006	Ground Elev.:	17.85m
Scale :	1/200	Terminated depth:	15.00m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST					
							SPT Depth	Blows/ 15cm			N Value	CHART N = Blows/ 30cm 0 10 20 30 40 50
								N1	N2	N3		
1	12.36	6.50	5.50			Gravel with sand and silty clay, yellowish grey, grey, very dense.	1.00-1.30	37	51		>50	>50
							2.00-2.33	28	48	20/3	>50	>50
							3.00-3.45	40	50	50/5	>50	>50
							4.00-4.30	42	68		>50	>50
							5.00-5.30	33	55		>50	>50
2a	6.65	12.00	6.50		R1 6.00-6.20	Highly weathered sandstone, dark grey, greenish grey. TCR= 25%, RQD= 10%.						
					R2 9.00-9.20							
					R3 11.00-11.20							
2b	2.65	15.00	3.00		R4 13.80-14.00	Moderately weathered sandstone, dark grey, greenish grey, TCR= 50%, RQD= 35%.						

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# BORING LOG

Drawing No. 2

Project :	Na Phat Bridge	Logged by :	Pham Van Toan
Borehole No:	P1	Checked by :	Do Van Dang
Station:	Km 0+196.56	Sheet:	1/1
Date :	16/06/2006 - 21/06/2006	Ground Elev.:	890.30m
Scale :	1/200	Terminated depth:	20.00m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST							
							SPT Depth	Blows/ 15cm			N Value	CHART N = Blows/ 30cm 0 10 20 30 40 50		
								N1	N2	N3				
KQ			2.50			Filling soil: clay with gravel and fragments of rock.								
1	887.80	2.60	1.00			Gravel with sand, grey, yellowish grey.								
	886.80	3.50												
2a			6.50			Highly weathered shale, grey, dark grey, TCR=0%.								
	880.30	10.00												
2b			3.00		R1 11.30-11.50	Highly to moderately weather shale, grey, dark grey, TCR=20%, RQD=5%.								
	877.30	13.00												
2c			7.00		R2 14.50-14.70	Moderately weathered shale, grey, dark grey, TCR=45%; RQD=20%.								
	870.30	20.00			R3 18.70-18.80									

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# BORING LOG

Drawing No. 2

Project :	Na Phat Bridge	Logged by :	Pham Van Toan
Borehole No:	P2	Checked by :	Do Van Dang
Station:	Km 0+178.56	Sheet:	1/1
Date :	16/06/2006 - 21/06/2006	Ground Elev.:	888.27m
Scale :	1/200	Terminated depth:	19.00m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST							
							SPT Depth	Blows/ 15cm			N Value	CHART N = Blows/ 30cm 0 10 20 30 40 50		
								N1	N2	N3				
2	887.77	0.50	0.50			Gravel with sand.								
3b	876.47	11.80	11.30		R1 3.80-4.00	Highly to moderately weathered shale, grey, dark grey, TCR=25%-45%, RQD=10%-15%.								
					R2 7.60-7.80									
3c	869.27	19.00	7.20		R3 11.20-12.00	Moderately weathered shale, grey, dark grey, TCR=80%, RQD=35%.								
					R4 14.00-14.20									
					R5 17.20-17.40									

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# BORING LOG

Drawing No. 2

Project :	Pa Bat Bridge	Logged by :	Pham Van Toan
Borehole No:	P1	Checked by :	Do Van Dang
Station:	Km 0+195.75	Sheet:	1/1
Date :	12/06/2006 - 15/06/2006	Ground Elev.:	884.98m
Scale :	1/200	Terminated depth:	14.00m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST												
							SPT Depth	Blows/ 15cm			N Value	CHART N = Blows/ 30cm							
								N1	N2	N3									
	884.68	0.30	0.30			Very soft clay with gravel.													
2a			2.70			Highly weathered gneiss, greenish grey, whitish grey, TCR=10%, RQD=0%.													
2b	881.98	3.00			R1 5.50-5.65	Highly to moderately weathered gneiss, greenish grey, TCR=40%, RQD=15%.													
			7.00																
2c	874.98	10.00			R2 10.80-10.95	Moderately weathered gneiss, greenish grey, whitish grey, TCR=50%, RQD=30%.													
			4.00																
	870.98	14.00			R3 12.70-12.90														

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# BORING LOG

Drawing No. 2

Project :	Pa Bat Bridge	Logged by :	Pham Van Toan
Borehole No:	P2	Checked by :	Do Van Dang
Station:	Km 0+225.75	Sheet:	1/1
Date :	12/06/2006 - 15/06/2006	Ground Elev.:	884.58m
Scale :	1/200	Terminated depth:	15.80m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST											
							SPT Depth	Blows/ 15cm			N Value	CHART N = Blows/ 30cm						
								N1	N2	N3								
1	884.08	0.50	0.50	////		Very soft clay with gravel and boulder.												
2a			3.00	+ - + + - + + - +		Highly weathered gneiss, greenish grey, whitish grey, TCR=10%, RQD=0%.												
	881.08	3.50		+ - + + - + + - +														
2b			5.80	+ - + + - + + - +	R1 5.50-5.65	Highly to moderately weathered gneiss, greenish grey, whitish grey. TCR=30%, RQD=15%.												
	875.28	8.30		+ - + + - + + - +	R2 9.50-9.65													
2c			6.50	+ - + + - + + - +	R3 11.80-11.95	Moderately weathered Gneiss, greenish grey, whitish grey, TCR=45%, RQD=25%.												
	868.78	15.80		+ - + + - + + - +	R4 15.30-15.50													

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# BORING LOG

Drawing No. 2

Project :	Su Lu Bridge	Logged by :	Pham Van Toan
Borehole No:	P1	Checked by :	Do Van Dang
Station:	Km 0+162.72	Sheet:	1/1
Date :	08/06/2006 - 10/06/2006	Ground Elev.:	888.25m
Scale :	1/200	Terminated depth:	20.00m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST					
							SPT Depth	Blows/ 15cm			N Value	CHART N = Blows/ 30cm 0 10 20 30 40 50
								N1	N2	N3		
1a	884.25	4.00	4.00			Fine to medium sand, whitish grey, yellowish grey, loose.	1.00-1.45	1	2	2	4	
							2.00-2.45	1	3	5	8	
							3.00-3.45	2	4	4	8	
1b	878.25	10.00	6.00			Sand with gravel, whitish grey, yellowish grey, medium dense to dense.	4.00-4.45	9	12	14	28	
							5.00-5.45	10	12	15	27	
							6.00-6.45	11	13	15	28	
							7.00-7.45	12	13	17	30	
							8.00-8.45	10	11	14	25	
							9.00-9.45	11	11	12	23	
3	876.25	12.00	2.00			Completely to highly weathered siltstone, sandstone, grey, greenish grey, TCR=0%.	10.00-10.45	14	17	18	35	
							11.00-11.45	15	18	20	38	
4a	871.25	17.00	5.00			Highly weathered gneiss, greenish grey, whitish grey. TCR=20%, RQD=0%.						
4b	868.25	20.00	3.00		R1 17.80-17.95	Moderately weathered gneiss, greenish grey, whitish grey, TCR=40%, RQD=25%.						
					R2 19.60-19.80							

D : Disturbed Sample ●  
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# BORING LOG

Drawing No. 2

Project :	Su Lu Bridge	Logged by :	Pham Van Toan
Borehole No:	P2	Checked by :	Do Van Dang
Station:	Km 0+129.72	Sheet:	1/1
Date :	08/06/2006 - 11/06/2006	Ground Elev.:	883.55m
Scale :	1/200	Terminated depth:	25.00m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST					
							SPT Depth	Blows/ 15cm			N Value	CHART N=Blows/30cm 0 10 20 30 40 50
								N1	N2	N3		
2	876.55	7.00	7.00			Gravel with sand, whitish grey, yellowish grey, medium dense to dense.	1.00-1.45	7	8	11	19	
							2.00-2.45	7	9	13	22	
							3.00-3.45	8	10	11	21	
							4.00-4.45	7	10	12	22	
							5.00-5.45	10	13	14	27	
							6.00-6.45	10	15	17	32	
							7.00-7.45	9	12	13	25	
							8.00-8.45	11	15	26	41	
							9.00-9.45	11	16	26	42	
							10.00-10.45	9	12	15	27	
3	884.95	18.60	11.60			Completely to highly weathered siltstone, sandstone, brownish grey, yellowish grey, TCR=0%.	11.00-11.45	10	13	15	28	
							12.00-12.45	12	18	30	46	
							13.00-13.45	9	12	16	28	
							14.00-14.45	11	15	30	45	
							15.00-15.45	10	11	28	39	
							16.00-16.45	9	17	25	42	
							17.00-17.45	10	15	23	38	
							4a	861.75	21.80	3.20		
4b	858.55	25.00	3.20		R1 23.00-23.20 R2 24.70-24.90	Moderately weathered gneiss, greenish grey, whitish grey, TCR=35%, RQD=25%.						

D : Disturbed Sample ●  
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# BORING LOG

Drawing No. 2

Project :	Ban Bung Bridge	Logged by :	Pham Van Toan
Borehole No:	P1	Checked by :	Do Van Dang
Station:	Km 0+163.60	Sheet:	1/1
Date :	23/06/2006 - 29/06/2006	Ground Elev.:	892.54m
Scale :	1/200	Terminated depth:	20.00m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST					
							SPT Depth	Blows/ 15cm			N Value	CHART N = Blows/ 30cm 0 10 20 30 40 50
								N1	N2	N3		
1	884.54	8.00	8.00			Sand with gravel, yellowish grey, whitish grey, medium dense to dense.	1.00-1.45	6	10	12	17	
							2.00-2.45	7	8	10	18	
							3.00-3.45	7	8	9	17	
							4.00-4.45	8	12	15	27	
							5.00-5.45	7	12	16	28	
							6.00-6.45	10	14	17	31	
							7.00-7.45	14	17	24	41	
2	880.54	12.00	4.00			Gravel with sand, yellowish grey, whitish grey, dense.	8.00-8.45	15	20	27	47	
							9.00-9.45	14	19	26	45	
							10.00-10.45	19	24	26	50	
3a	875.54	17.00	5.00			Highly weathered shale, grey, dark grey, yellowish brown, TCR=10%, RQD=0%.	11.00-11.45	17	22	28	50	
							18.50-18.70					
3b	872.54	20.00	3.00		R1	Moderately weathered shale, grey, dark grey, yellowish brown, TCR=30%, RQD=10%.						

R : Rock Sample



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# BORING LOG

Drawing No. 2

Project :	Pac Nam Bridge	Logged by :	Pham Van Toan
Borehole No:	P1	Checked by :	Do Van Dang
Station:	Km 0+281.67	Sheet:	1/1
Date :	23/06/2006 - 25/06/2006	Ground Elev.:	894.50m
Scale :	1/200	Terminated depth:	16.00m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST							
							SPT Depth	Blows/ 15cm			N Value	CHART N = Blows/ 30cm 0 10 20 30 40 50		
								N1	N2	N3				
1	892.40	2.10	2.10			Gravel with sand, grey, dark grey, dense (bottom layer with big boulder).								
2a	886.50	8.00	5.90		R1 6.50-6.70	Highly weathered gneiss, dark grey, greenish grey, TCR=20%, RQD=5%.								
2b	878.50	16.00	8.00		R2 9.60-9.80	Moderately weathered gneiss, dark grey, greenish grey, whitish grey, TCR=50%, RQD=30%.								
					R3 12.60-12.80									
					R4 15.60-15.80									

D : Disturbed Sample ●  
 UD : Undisturbed Sample ■  
 R : Rock Sample ☐



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# BORING LOG

Drawing No. 2

Project :	Nam Puc Bridge	Logged by :	Nguyen Nam Duong
Borehole No.:	P2	Checked by :	Do Van Dang
Station:	Km0+377.34	Sheet:	1/1
Date :	22/06/2006 - 25/06/2006	Ground Elev.:	63.72m
Scale :	1/200	Terminated depth:	18.90m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST					
							SPT Depth	Blows/ 15cm			N Value	CHART N = Blows/ 30cm 0 10 20 30 40 50
								N1	N2	N3		
1	57.22	6.50	8.50		D1 1.00-4.00	Gravel with sand, yellowish grey, greenish grey, very dense.	1.00-1.25	21	40	50	>50	>50
							2.00-2.30	33	60	>50	>50	
							3.00-3.20	52	55	>50	>50	
							4.00-4.30	47	60	>50	>50	
							5.00-5.45	38	47	50	>50	
							6.00-6.45	35	42	50	>50	
2a	45.72	15.00	8.50			Highly weathered shale, dark grey, brownish grey, TCR=20%, RQD=0%.	7.00-7.15	60			>50	>50
							8.00-8.15	65			>60	>50
2b	44.62	18.90	3.90			Moderately weathered shale, dark grey, TCR=35%, RQD=0%.						

D : Disturbed Sample ●  
 UD : Undisturbed Sample ■  
 R : Rock Sample ☒



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# BORING LOG

Drawing No. 2

Project :	Nam Han Bridge	Logged by :	Nguyen Nam Duong
Borehole No:	P1	Checked by :	Do Van Dang
Station:	Km35+232.60	Sheet:	1/1
Date :	14/06/2006 - 16/06/2006	Ground Elev.:	70.31m
Scale :	1/200	Terminated depth:	19.20m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST					
							SPT Depth	Blows/ 15cm			N Value	CHART N = Blows/ 30cm 0 10 20 30 40 50
								N1	N2	N3		
1	85.81	4.50	4.50			Gravel with boulder, yellowish grey, greenish grey, very dense.	1.00-1.25	47	55		>50	
							2.00-2.25	55	60		>50	
							3.00-3.25	66	60		>50	
							4.00-4.25	60	62		>50	
							5.00-5.25	55	70		>50	
							6.00-6.03	60			>50	
							7.00-7.03	65			>50	
2a	54.21	16.10	11.60			Highly weathered shale, greenish grey, dark grey, TCR=10%, RQD=0%.						
2b	51.11	19.20	3.10			Moderately weathered shale, greenish grey, dark grey, TCR=35%, RQD=0%.						

D : Disturbed Sample ●  
 UD : Undisturbed Sample ■  
 R : Rock Sample ∅



TRANSPORT ENGINEERING DESIGN INCORPORATION (TEDi)  
 GEOTECHNICAL AND INSPECTION CONSULTANTS JOINT STOCK COMPANY (TEDi-GIC)  
 278 - Ton Duc Thang - Ha noi Tel: 5112215 FAX: 5111164

TEDI-GIC



# BORING LOG

Drawing No. 2

Project :	Nam Cum Bridge	Logged by :	Nguyen Nam Duong
Borehole No:	P1	Checked by :	Do Van Dang
Station	Km40+046.56 (Left 3.00m)	Sheet:	1/1
Date :	10/06/2006 - 13/06/2006	Ground Elev.:	85.30m
Scale :	1/200	Terminated depth:	17.80m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST					
							SPT Depth	Blows/ 15cm			N Value	CHART N = Blows/30cm 0 10 20 30 40 50
								N1	N2	N3		
1	83.80	1.50	1.50			Gravel with boulder, yellowish grey, greenish grey, very dense.	1.00-1.45	18	27	38	>50	
2a	75.80	9.50	8.00			Highly weathered shale, greenish grey, TCR=20%, RQD=0%.	2.50-2.60	>50			>50	
							3.50-3.80	>50			>50	
2b	67.50	17.60	8.30			Moderately weathered shale, greenish grey, TCR=35%-40%, RQD=0%.						

D : Disturbed Sample    ■  
 UD : Undisturbed Sample    ■  
 R : Rock Sample    □



TRANSPORT ENGINEERING DESIGN INCORPORATION (TEDI)  
 GEOTECHNICAL AND INSPECTION DESIGN CONSULTANTS JOINT STOCK COMPANY (TEDI-GIC)  
 276 - Ton Duc Thang - Ha noi Tel: 5112215 FAX: 5111164

# BORING LOG

Drawing No. 2

Project :	Nam Cum Bridge	Logged by :	Nguyen Nam Duong
Borehole No:	P2	Checked by :	Do Van Dang
Station:	Km40+69.56	Sheet:	1/1
Date :	06/06/2006 - 09/06/2006	Ground Elev.:	83.89m
Scale :	1/200	Terminated depth:	18.10m

Layer Name	Elevation (m)	Depth (m)	Thickness (m)	PROFILE	Sample type & depth	DESCRIPTION	STANDARD PENETRATION TEST											
							SPT Depth	Blows/ 15cm			N Value	CHART						
								N1	N2	N3		N = Blows/ 30cm 0 10 20 30 40 50						
1	78.89	5.00	5.00		D1 0.00-3.00	Gravel with boulder, yellowish grey, greenish grey, very dense.	1.00-1.45	17	41	55	96							>50
							2.00-2.45	29	47	50	97							>50
							3.00-3.45	23	38	45	83							>50
							4.00-4.45	32	42	50	92							>50
							5.00-5.15	65			>50							>50
2a	75.89	8.00	3.00		D2 3.00-5.00	Highly weathered shale, greenish grey, TCR=15%, RQD=0%.	6.00-6.04	65			>50						>50	
							7.00-7.15	65			>50						>50	
2b	65.79	18.10	10.10			Moderately weathered shale, greenish grey, TCR=30%-50%, RQD=0%.												

D : Disturbed Sample ●  
 UD : Undisturbed Sample ■  
 R : Rock Sample ☉



TRANSPORT ENGINEERING DESIGN INCORPORATION (TEDI)  
 GEOTECHNICAL AND INSPECTION CONSULTANTS JOINT STOCK COMPANY (TEDI-gic)  
 278 - Ton Duc Thang - Ha noi Tel: 5112216 FAX: 5111164

BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF YEN BAI PROVINCE													
Bore hole		LKT1		Co-ord. X= Y=		Station:													
Elev.: +192.20		Elev. of underwater level: +0.00		Drilling date:		19/06/2006 - 20/06/2006													
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/30cm	Chart									
						N1	N2	N3	N/30cm	0	10	20	30	40	50	N			
1	184.20	8.00		Dusty clay is in brown mixed with vegetative humus, interposed fine sand and very soft.	SPT1	2	3	3	8									ND1 3.00-3.30	
					SPT2	1	2	3	6										ND2 5.0-5.20
					SPT3	2	3	4	7										
					SPT4	2	3	3	6										
					SPT5	3	3	5	8										
					SPT6	3	4	4	8										
					SPT7	2	3	4	7										
SPT8	6	8	18	23															
2	182.70	9.50		Sand, gravel, grit mixes with cobble in blue. Structure is medium closed.	SPT9	7	15	20	35	ND4 9.80-10.00									
					SPT10	7	18	25	43										
3	175.70	18.50		Grit is in greenish grey mixed with redish brown clay. Structure is very closed (resulting from completely weathered sandstone).	SPT11	6	18	23	41	XD5 12.00-12.50									
					SPT12	7	20	25	45										
					SPT13	8	20	35	55										
					SPT14	10	20	34	54										
					SPT15	9	21	35	56										
					SPT16	18	>50	>50	>50		XD6 14.50-15.00								
4	172.20	20.0		Sandstone is in blackish green. hardness is in level 7-B.						ND7 16.00-16.20									
																		US 18.00-18.30	
																		US 19.80-20.00	

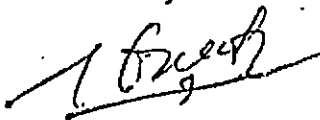
**TEST FOR UNCONFINED COMPRESSIVE STRENGTH OF ROCK**  
(22 TCN 57 - 84)

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

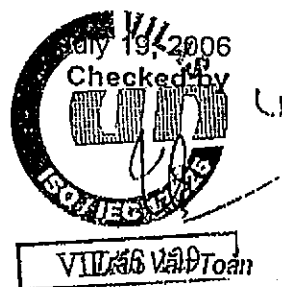
**NGOI THAP BRIDGE**

	T1	T1	
Bore hole	U8	U9	
Sample No.			
Depth (m)	18,0-18,3	19,8-20,0	
<b>Test items</b>			
Dry unconfined compressive strength $\sigma_n$ (kG/cm <sup>2</sup> )	144,0	165,0	
Saturated unconfined compressive strength $\sigma_{bh}$ (kG/cm <sup>2</sup> )	95,0	112,0	
Index of softening k	0,66	0,68	
Natural unit weight $\gamma_w$ (g/cm <sup>3</sup> )	2,371	2,375	
Specific gravity $\Delta$ (g/cm <sup>3</sup> )	2,690	2,692	

Tested by



Nguyễn Văn Hạnh



No: 100706.03.4/CLD

**SUMMARY OF TEST RESULTS**

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

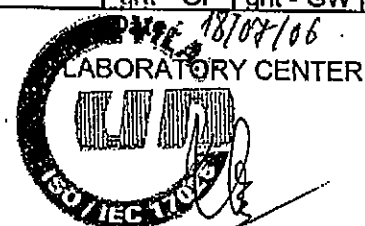
**NGOI THAP BRIDGE**

Borehole :		T1						
Sample No :		ND1	ND2	ND3	ND4	XD5	XD6	ND7
Depth (m):	m	3.0 ± 3.2	5.0 ± 5.2	7.0 ± 7.2	9.8 ± 10.0	12.0 ± 12.5	14.5 ± 15.0	16.0 ± 16.2
Test No.		735	736	737	738	739	740	741
Grain size analysis P %								
Percent finer (%)	50.8 (mm)					100.0	79.7	100.0
	25.4 (mm)					65.8	52.5	85.6
	19.0 (mm)					53.0	47.6	82.9
	9.5 (mm)					42.7	42.1	76.4
	4.75 (mm)					34.9	31.1	69.9
	2.00 (mm)	100.0				25.0	24.0	59.9
	0.425 (mm)	99.5	100.0	100.0	100.0	5.2	8.8	35.5
	0.075 (mm)	98.6	99.3	99.3	99.7	0.7	2.4	21.2
	0.050 (mm)	96.0	92.5	97.0	95.0			
	0.005 (mm)	44.0	41.0	43.0	41.0			
0.002 (mm)	21.5	20.5	19.0	20.5				
Natural water content	W %	42.7	34.7	33.2	35.0			
Natural unit weight	$\gamma_w$ g/cm <sup>3</sup>	1.779	1.831	1.739	1.865			
Dry unit weight	$\gamma_k$ g/cm <sup>3</sup>	1.247	1.359	1.306	1.381			
Specific gravity	$\rho$ g/cm <sup>3</sup>	2.690	2.690	2.690	2.690	2.670	2.670	2.670
Coefficient of uniformity	$C_u$					35.5	64.6	
Coefficient of gradation	$C_c$					0.7	1.2	
In Dry condision	$\alpha_k$							
In Saturation condision	$\alpha_w$							
Void Ratio	$e_0$	1.158	0.979	1.060	0.947			
Porosity	n %	53.7	49.5	51.5	48.6			
Degree of Saturation	S %	99.21	95.35	84.22	99.40			
Liquid Limits	W <sub>L</sub> %	39.3	40.1	38.7	42.0			22.8
Plastic Limits	W <sub>p</sub> %	24.3	24.9	25.2	25.5			14.7
Plasticity Index	I <sub>p</sub> %	15.0	15.2	13.5	16.5			8.1
Internal friction angle	$\phi^0$	15°10'	17°16'	14°38'	14°38'			
Cohesion	C KG/cm <sup>2</sup>	0.023	0.023	0.008	0.028			
Compressibility Index	$a_{1-2}$ cm <sup>2</sup> /KG	0.069	0.056	0.083	0.058			
Soil classification ASTM - D 2487		Clay soils CL	Clay soils CL	Clay soils CL	Clay soils CL	Bad aggregate grit - GP	Good aggregate grit - GW	Clay sand - SC

COLECTED BY

*UCHP*

Eng. Nguyen Thi Khanh Ha



VE AS 120  
Eng. Tran Van Toan

# GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
NGOI THAP BRIDGE

Borehole : T1  
Sample No : ND1  
Depth (m) : 3.0 + 3.2

Tets No : 735  
Date : 16/7/2006

**SIZE ANALYSIS**

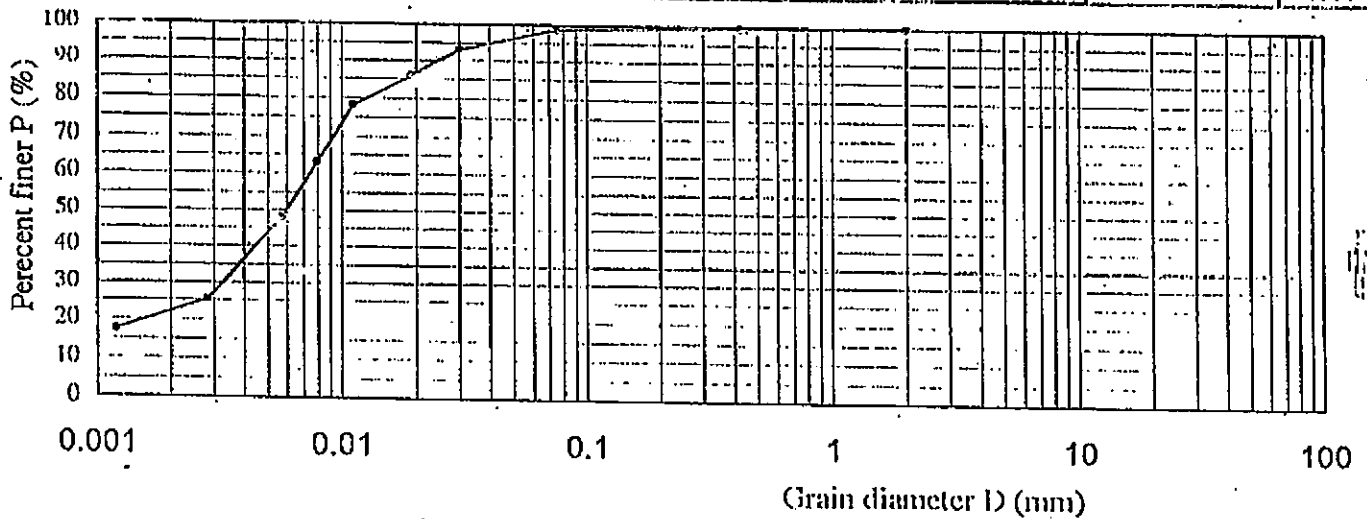
Weight of dry soil (g):

Grain diameter (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	Khối lượng riêng (g/cm <sup>3</sup> ) 2.690
Weight soil retained (g)	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.19	
Percent retained (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.9	
Percent finer (%)	100.0	100.0	100.0	100.0	100.0	100.0	99.5	98.6	

**HYDROMETER ANALYSIS**

Weight of dry soil (g): 21.02  
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	9.0	2.3	1.0	12.3	12.56	0.0302	93.1
5	8.0	2.3	1.0	11.3	12.71	0.0192	85.6
15	7.0	2.3	1.0	10.3	12.86	0.0111	78.0
30	5.0	2.3	1.0	8.3	13.18	0.0080	62.8
60	3.0	2.3	1.0	6.3	13.46	0.0057	47.7
250	0.0	2.3	1.0	3.3	13.91	0.0028	25.0
1440	-1.0	2.3	1.0	2.3	14.06	0.0012	17.4



**RESULT**

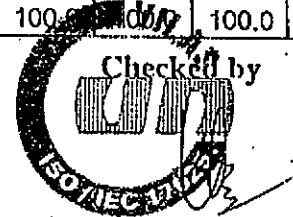
Size (mm)	< 0.002	0.002	0.005	0.05	0.075	0.425	2.00	4.75	9.5	19.0	25.4	50.8
Percent (%)	21.5	22.5	52.0	2.0	0.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Percent finer (%)		21.5	44.0	96.0	98.6	99.5	100.0	100.0	100.0	100.0	100.0	100.0

Tested by

*(Signature)*

Tran Thi My Dung

Checked by



VILAS 138  
Tran Van Loan

# GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
NGOI THAP BRIDGE

Borehole : T1  
Sample No : ND2  
Depth (m): 5.0 + 5.2

Tets No : 736  
Date : 16/7/2006

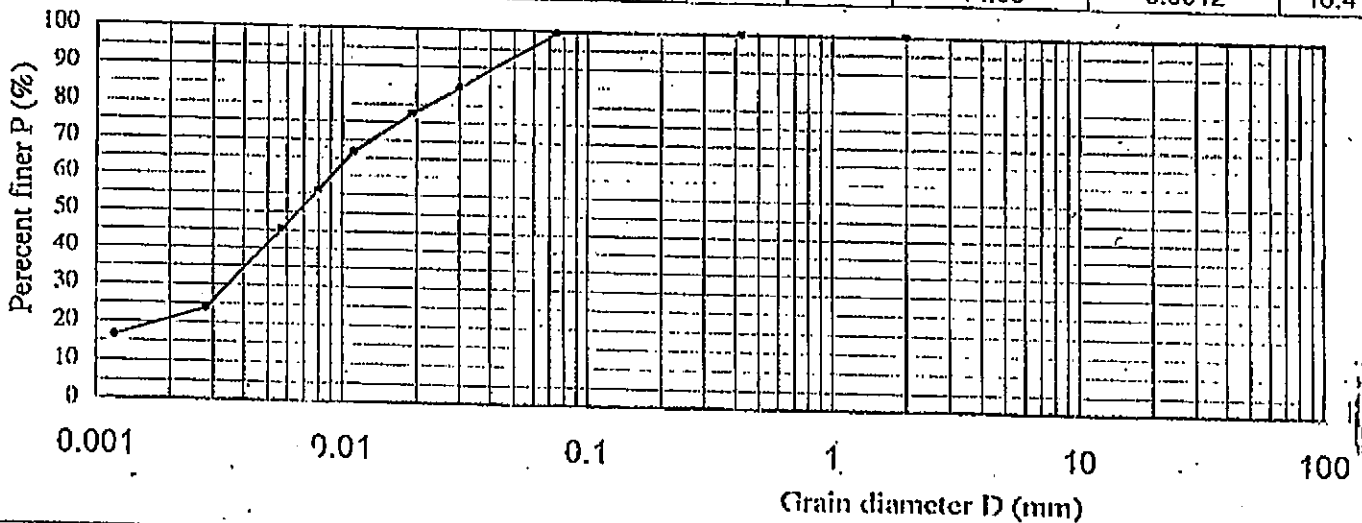
**SIZE ANALYSIS**

Grain diameter (mm)	Weight of dry soil (g):								Khối lượng riêng (g/cm <sup>3</sup> ) 2.690
	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	
Weight soil retained (g)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	
Percent retained (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	
Percent finer (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.3	

**HYDROMETER ANALYSIS**

Weight of dry soil (g): 22.27  
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	8.5	2.3	1.0	11.8	12.63	0.0303	84.3
5	7.5	2.3	1.0	10.8	12.78	0.0192	77.2
15	6.0	2.3	1.0	9.3	13.01	0.0112	66.5
30	4.5	2.3	1.0	7.8	13.23	0.0080	55.7
60	3.0	2.3	1.0	6.3	13.46	0.0057	45.0
250	0.0	2.3	1.0	3.3	13.91	0.0028	23.6
1440	-1.0	2.3	1.0	2.3	14.06	0.0012	16.4



**RESULT**

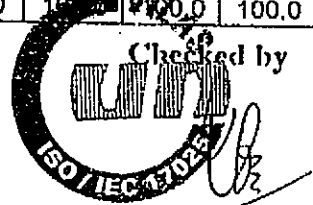
Size (mm)	< 0.002	0.002	0.005	0.05	0.075	0.425	2.00	4.75	9.5	19.0	25.4	50.8
Percent (%)	20.5	20.5	51.5	6.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percent finer (%)		20.5	41.0	92.5	99.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Tested by

*Tran Thi My Dung*

Tran Thi My Dung

Checked by



VILAS 129  
Tran Van Toan

# GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
NGOI THAP BRIDGE

Borehole : T1  
Sample No : ND3  
Depth (m) : 7.0 ÷ 7.2

Tets No : 737  
Date : 16/7/2006

## SIZE ANALYSIS

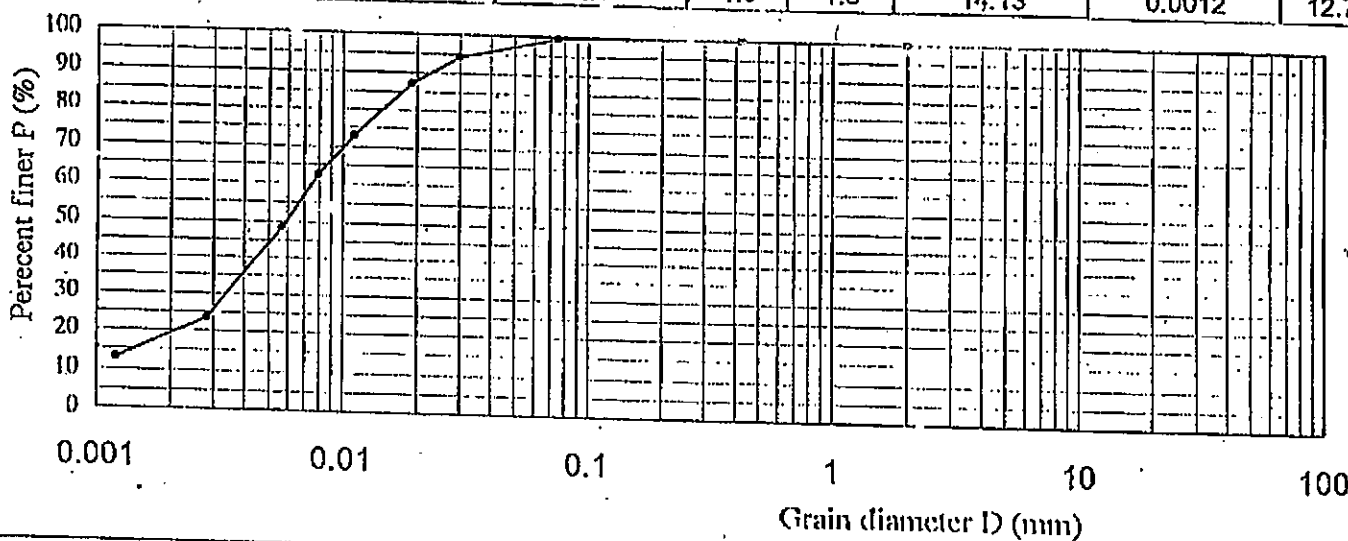
Weight of dry soil (g):

Grain diameter (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	Khối lượng riêng (g/cm <sup>3</sup> ) 2.690
Weight soil retained (g)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	
Percent retained (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	
Percent finer (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.3	

## HYDROMETER ANALYSIS

Weight of dry soil (g): 22.52  
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	10.0	2.3	1.0	13.3	12.41	0.0300	94.0
5	9.0	2.3	1.0	12.3	12.56	0.0191	86.9
15	7.0	2.3	1.0	10.3	12.86	0.0111	72.8
30	5.5	2.3	1.0	8.8	13.08	0.0079	62.2
60	3.5	2.3	1.0	6.8	13.38	0.0057	48.1
250	0.0	2.3	1.0	3.3	13.91	0.0028	23.3
1440	-1.5	2.3	1.0	1.8	14.13	0.0012	12.7



## 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 (%)	19.0	24.0	54.0	2.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percent finer (%)		19.0	43.0	97.0	99.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Tested by

*Tran Thi My Dung*

Tran Thi My Dung



VILAS and Tran Toan



# GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
NGOI THAP BRIDGE

Borehole : T1  
Sample No : ND4  
Depth (m) : 9.8 + 10.0

Tets No : 738  
Date : 16/7/2006

**SIZE ANALYSIS**

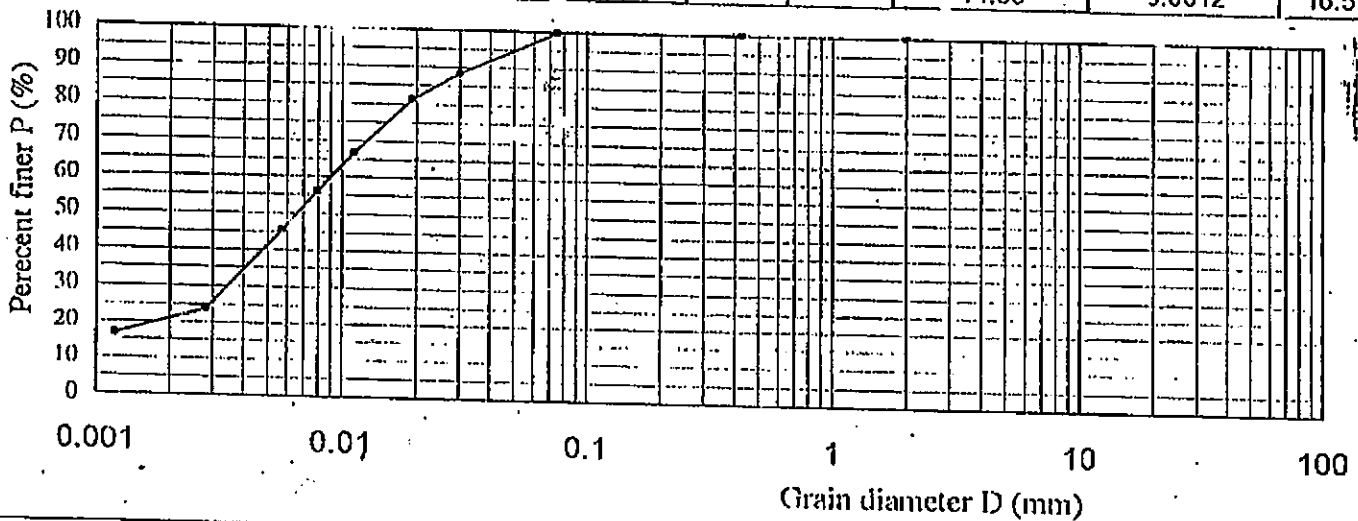
Grain diameter (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	Khối lượng riêng (g/cm <sup>3</sup> ) 2.690
Weight soil retained (g)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	
Percent retained (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	
Percent finer (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	

Weight of dry soil (g):

**HYDROMETER ANALYSIS**

Weight of dry soil (g): 22.22  
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	9.0	2.3	1.0	12.3	12.56	0.0302	88.1
5	8.0	2.3	1.0	11.3	12.71	0.0192	80.9
15	6.0	2.3	1.0	9.3	13.01	0.0112	66.6
30	4.5	2.3	1.0	7.8	13.23	0.0080	55.9
60	3.0	2.3	1.0	6.3	13.46	0.0057	45.1
250	0.0	2.3	1.0	3.3	13.91	0.0020	23.6
1440	-1.0	2.3	1.0	2.3	14.06	0.0012	16.5



**RESULT**

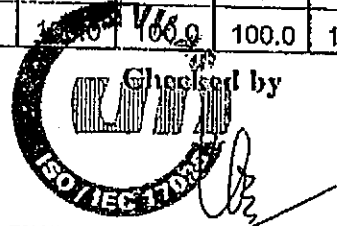
Size (mm)	<0.002	0.002	0.005	0.05	0.075	0.425	2.00	4.75	9.5	19.0	25.4	50.8
Percent (%)	20.5	20.5	54.0	4.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percent finer (%)		20.5	41.0	95.0	99.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Tested by

*Tran Thi My Dung*

Tran Thi My Dung

Checked by



VILAS 129  
Tran Van Toan

# GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
 NCOI THAP BRIDGE

Borehole : T1  
 Sample No : XD5  
 Depth (m) : 12.0 + 12.5

Tests No : 739  
 Date : 13/7/2006

**SIZE ANALYSIS**

Weight of dry soil (g): 1215.0

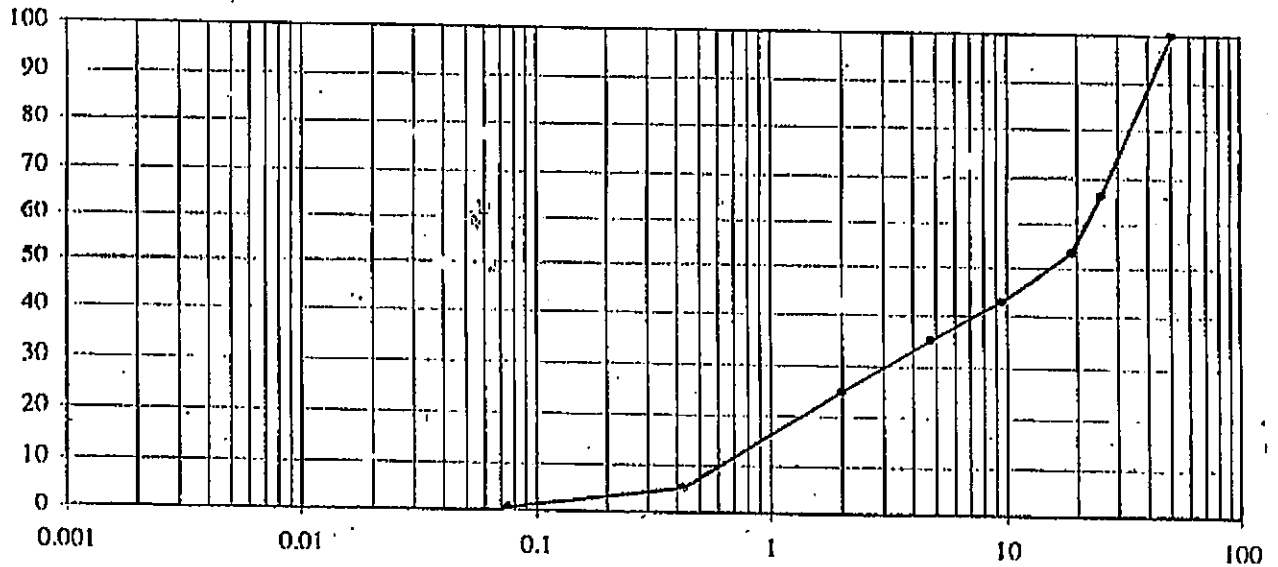
Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Wt. Soil retained (g)	0.00	415.00	155.60	125.60	95.10	120.30	240.20	55.00	8.2
Percent retained (%)	0.0	34.2	12.8	10.3	7.8	9.9	19.8	4.5	0.7
Percent finer (%)	100.0	65.8	53.0	42.7	34.9	25.0	5.2	0.7	

**RESULT**

$D_{60} = 22.00$        $C_u = 35.5$   
 $D_{30} = 3.10$        $C_c = 0.7$   
 $D_{10} = 0.620$

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	34.2	12.8	10.3	7.8	9.9	19.8	4.5	0.7



Tested by

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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  
NGOI THAP BRIDGE

Borehole : T1  
Sample No : XD6  
Depth (m): 14.5 + 15.0

Tets No: 740  
Date : 13/7/2006

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
Wt. Soil retained (g)	275.70	370.90	65.40	75.00	150.30	96.60	206.80	87.00	32.3
Percent retained (%)	20.3	27.3	4.8	5.5	11.1	7.1	15.2	6.4	2.4
Percent finer (%)	79.7	52.5	47.6	42.1	31.1	24.0	8.8	2.4	

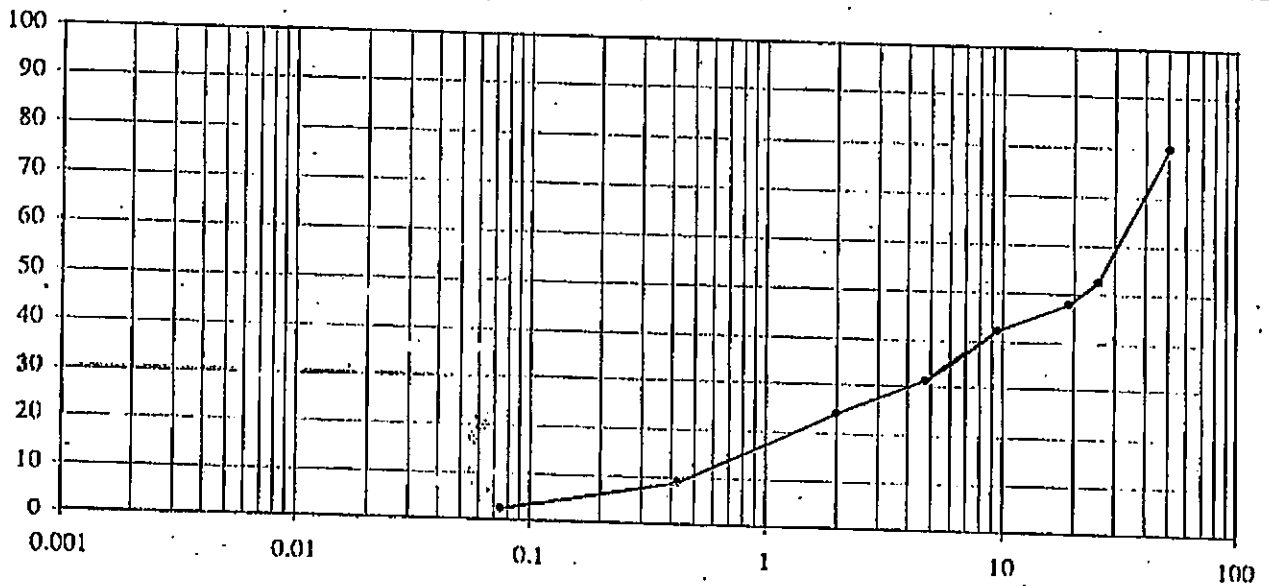
RESULT

$D_{60} = 31.0$        $C_u = 64.6$   
 $D_{30} = 4.2$        $C_c = 1.2$   
 $D_{10} = 0.48$

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 (%)	20.3	27.3	4.8	5.5	11.1	7.1	15.2	6.4	2.4



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VILAS 129an Hoan

# GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
NGOI THAP BRIDGE

Borehole : T1  
Sample No : ND7  
Depth (m) : 16.0 + 16.2

Tets No : 741  
Date : 17/7/2006

**SIZE ANALYSIS**

Weight of dry soil (g): 1850.0

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	265.90	50.80	120.30	120.00	185.40	450.10	265.10	392.4
Percent retained (%)	0.0	14.4	2.7	6.5	6.5	10.0	24.3	14.3	21.2
Percent finer (%)	100.0	85.6	82.9	76.4	69.9	59.9	35.5	21.2	

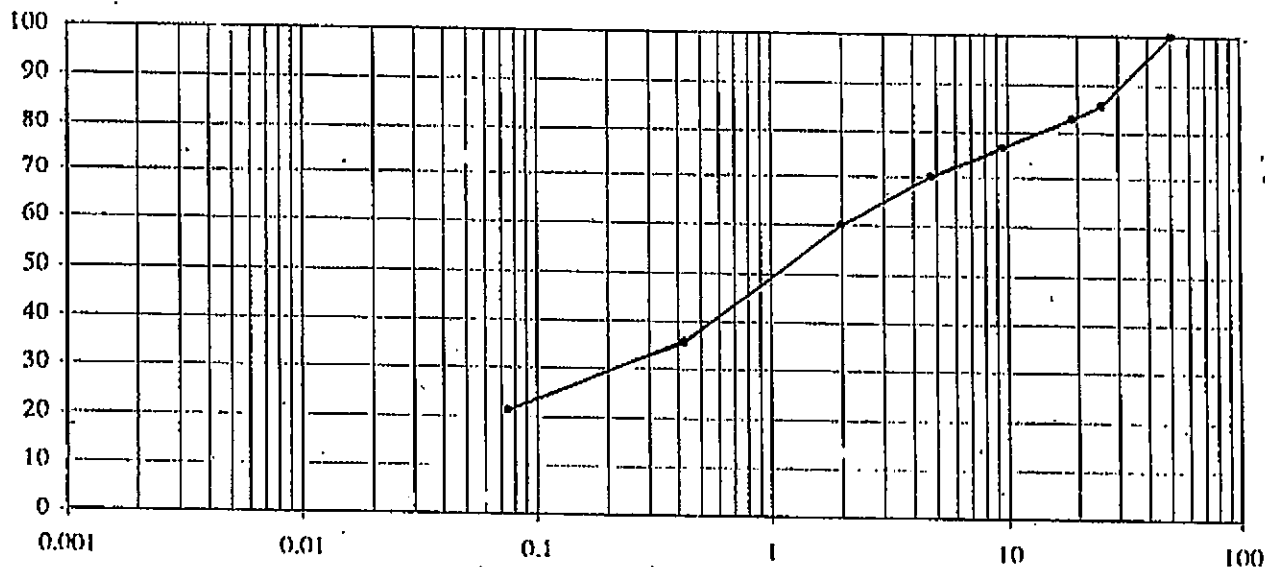
**RESULT**

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

Soil classification ( ASTM - D 2487 )

Group symbol : SC  
Group name : Clay-sand

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.0	0.425	0.075	< 0.075
Percent retained (%)	0.0	14.4	2.7	6.5	6.5	10.0	24.3	14.3	21.2



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VILAT 119 Van Toan

# OEDOMETER COMPRESSION TEST

TCVN 4200 - 95

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
NGOI THAP BRIDGE.

Borehole : T1

Sample No : ND1

Depth (m) : 3.0 + 3.2

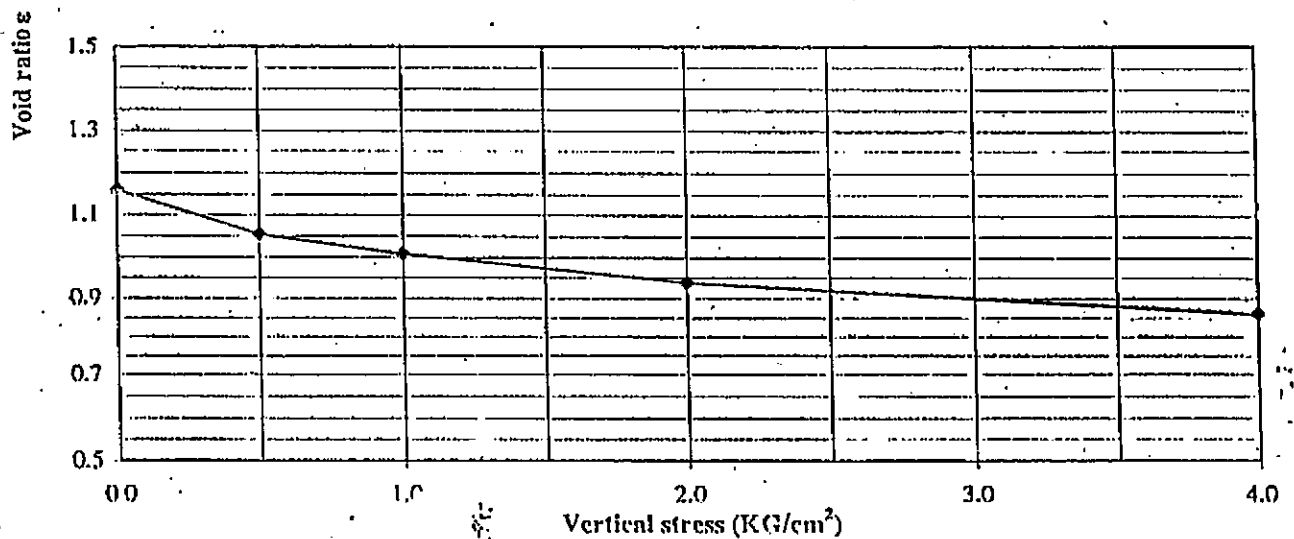
Tets No : 735

Date : 15/7/2006

### PHYSICAL PROPERTIES

W (%)	$\gamma_w$ (g/cm <sup>3</sup> )	$\gamma_d$ (g/cm <sup>3</sup> )	$\rho$ (g/cm <sup>3</sup> )	S (%)	n (%)	$\epsilon_0$	H (cm)	$N_0$
42.7	1.779	1.246	2.690	99.2	53.7	1.158	2.00	11

Vertical stress (kg/cm <sup>2</sup> )	0.0	0.5	1.0	2.0	3.0	4.0
Dial reading (0.01mm)						
2 h		98.0	144.0	211.0	251.0	290.0
24 h						295.0
Final reading (0.01mm)		99.7	146.5	214.8	255.3	295.0
Deformation of compr. (0.01mm)		2.0	6.0	10.0	13.0	16.5
Deformation of sample $\Delta H$ (0.01mm)		97.7	140.5	204.6	242.3	278.5
Change of void ratio $\Delta e$		0.105	0.152	0.221	0.261	0.301
Void ratio $e_p$	1.158	1.053	1.007	0.937	0.897	0.858
Index of compression $a$ (cm <sup>2</sup> /KG)		0.211	0.092	0.069	0.041	0.039



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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  
NGOI THAP BRIDGE

Borehole : T1

Sample No : ND2

Depth (m) : 5.0 ± 5.2

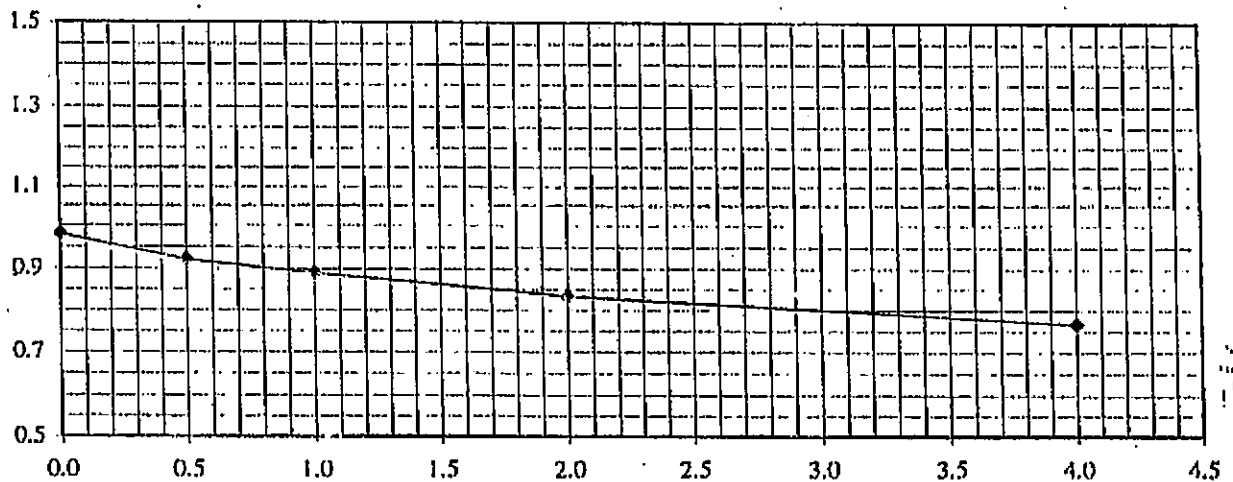
Tets No : 736

Date : 16/7/2006

### PHYSICAL PROPERTIES

W. (%)	$\gamma_w$ (g/cm <sup>3</sup> )	$\gamma_s$ (g/cm <sup>3</sup> )	$\rho$ (g/cm <sup>3</sup> )	S (%)	n (%)	$\epsilon_0$	H (cm)	N <sub>0</sub>
34.7	1.831	1.300	2.690	95.4	49.5	0.979	2.00	10

Vertical stress (kg/cm <sup>2</sup> )	0.0	0.5	1.0	2.0	3.0	4.0
Dial reading (0.01mm)						
2 h		60.0	96.0	155.0	192.0	228.0
24 h						231.0
Final reading (0.01mm)		90.8	97.3	157.0	194.5	231.0
Deformation of compr. (0.01mm)		2.0	6.0	9.0	11.0	16.0
Deformation of sample $\Delta H$ (0.01mm)		58.8	91.3	148.0	183.5	215.0
Change of void ratio $\Delta e$		0.058	0.090	0.146	0.182	0.213
Void ratio $e_p$	0.979	0.920	0.888	0.832	0.797	0.766
Index of compression a (cm <sup>2</sup> /KG)		0.116	0.064	0.056	0.035	0.031



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VILAS 129

Han Van Toan

# OEDOMETER COMPRESSION TEST

TCVN 4200 - 95

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
NGOI THAP BRIDGE

Borehole : T1

Sample No : ND3

Depth (m) : 7.0 + 7.2

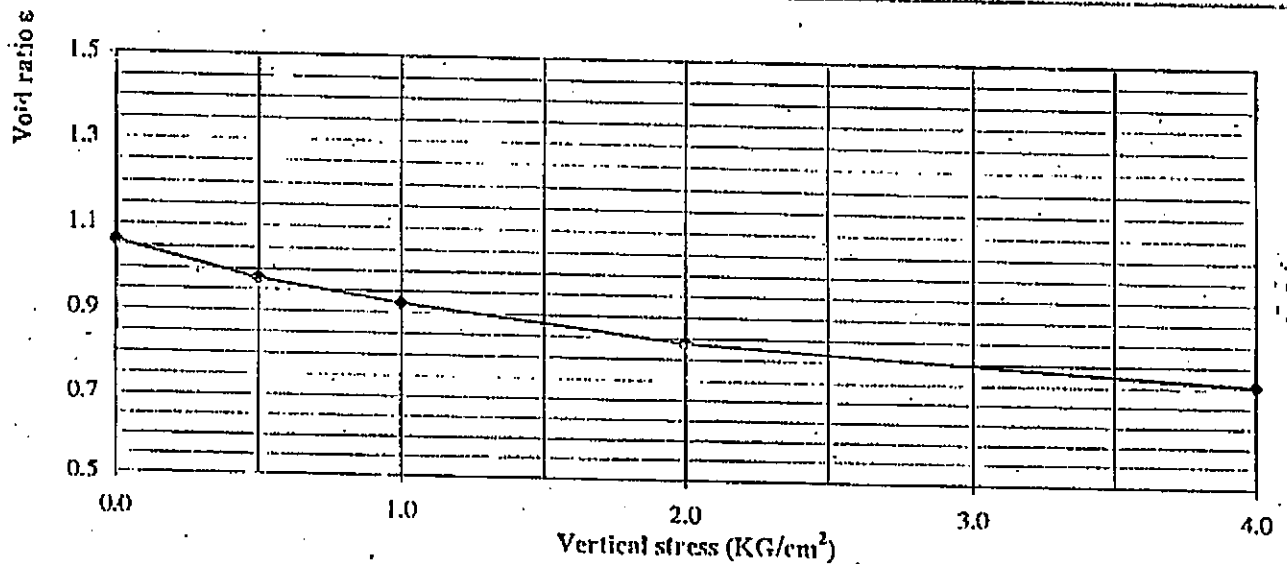
Tets No : 737

Date : 16/7/2006

### PHYSICAL PROPERTIES

W (%)	$\gamma_w$ (g/cm <sup>3</sup> )	$\gamma_d$ (g/cm <sup>3</sup> )	$\rho$ (g/cm <sup>3</sup> )	S (%)	n (%)	$E_o$	H (cm)	$N_o$
33.2	1.739	1.305	2.690	84.2	51.5	1.061	2.00	12

Vertical stress (kg/cm <sup>2</sup> )	0.0	0.5	1.0	2.0	3.0	4.0
Dial reading (0.01mm)						
2 h		85.0	141.0	225.0	275.0	312.0
24 h						315.5
Final reading (0.01mm)		86.0	142.6	227.5	278.1	315.5
Deformation of compr. (0.01mm)		3.0	7.0	11.0	14.0	16.0
Deformation of sample $\Delta H$ (0.01mm)		83.0	135.6	216.5	264.1	299.5
Change of void ratio $\Delta e$		0.085	0.140	0.223	0.272	0.309
Void ratio $e_p$	1.061	0.975	0.921	0.838	0.789	0.752
Index of compression $a$ (cm <sup>2</sup> /KG)		0.171	0.108	0.083	0.049	0.036



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Phan Van Toan

# OEDOMETER COMPRESSION TEST

TCVN 4200 - 95

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
NGOI THAP BRIDGE

Borehole : T1

Sample No : ND4

Depth (m) : 9.8 + 10.0

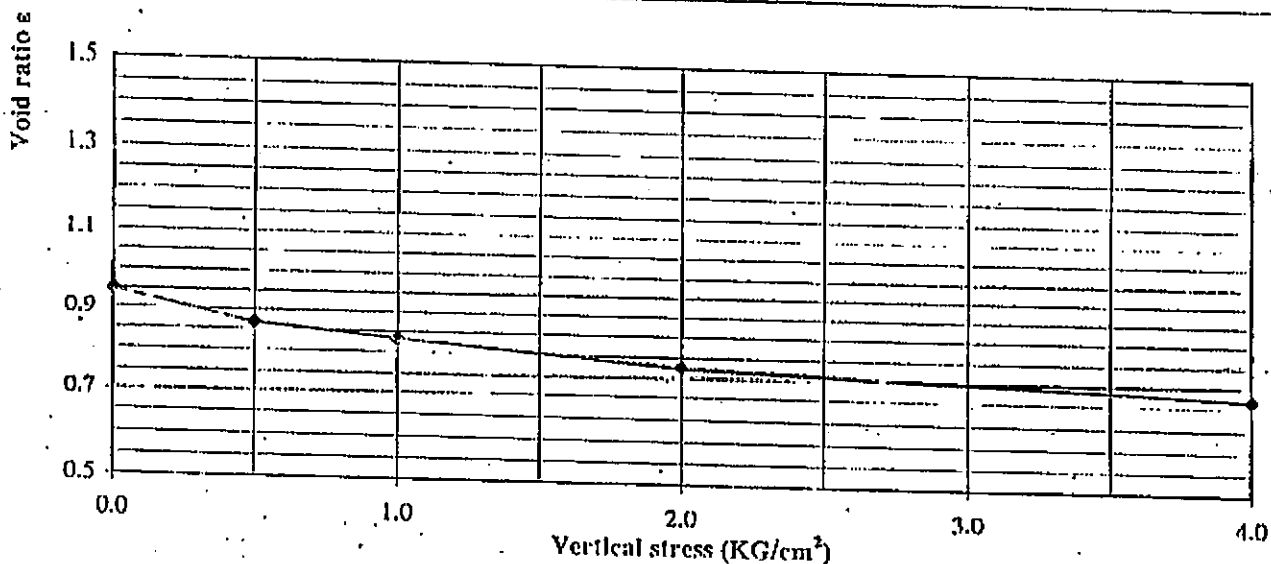
Tets No : 738

Date : 16/7/2006

### PHYSICAL PROPERTIES

W (%)	$\gamma_w$ (g/cm <sup>3</sup> )	$\gamma_d$ (g/cm <sup>3</sup> )	$\rho$ (g/cm <sup>3</sup> )	S (%)	n (%)	$e_0$	H (cm)	$N_0$
35.0	1.865	1.382	2.690	99.4	48.6	0.947	2.00	7

Vertical stress (kg/cm <sup>2</sup> )	0.0	0.5	1.0	2.0	3.0	4.0
Dial reading (0.01mm)						
2 h		85.0	124.0	185.0	221.5	251.0
24 h						254.0
Final reading (0.01mm)		86.0	125.5	187.2	224.1	254.0
Deformation of compr. (0.01mm)		2.0	7.0	9.0	12.0	16.0
Deformation of sample $\Delta H$ (0.01mm)		84.0	118.5	178.2	212.1	238.0
Change of void ratio $\Delta e$		0.082	0.115	0.173	0.207	0.232
Void ratio $e_p$	0.947	0.865	0.832	0.773	0.740	0.715
Index of compression $a$ (cm <sup>2</sup> /KG)		0.164	0.067	0.058	0.033	0.025



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VILAS 129

Tran Van Toan



# DIRECT SHEAR TEST

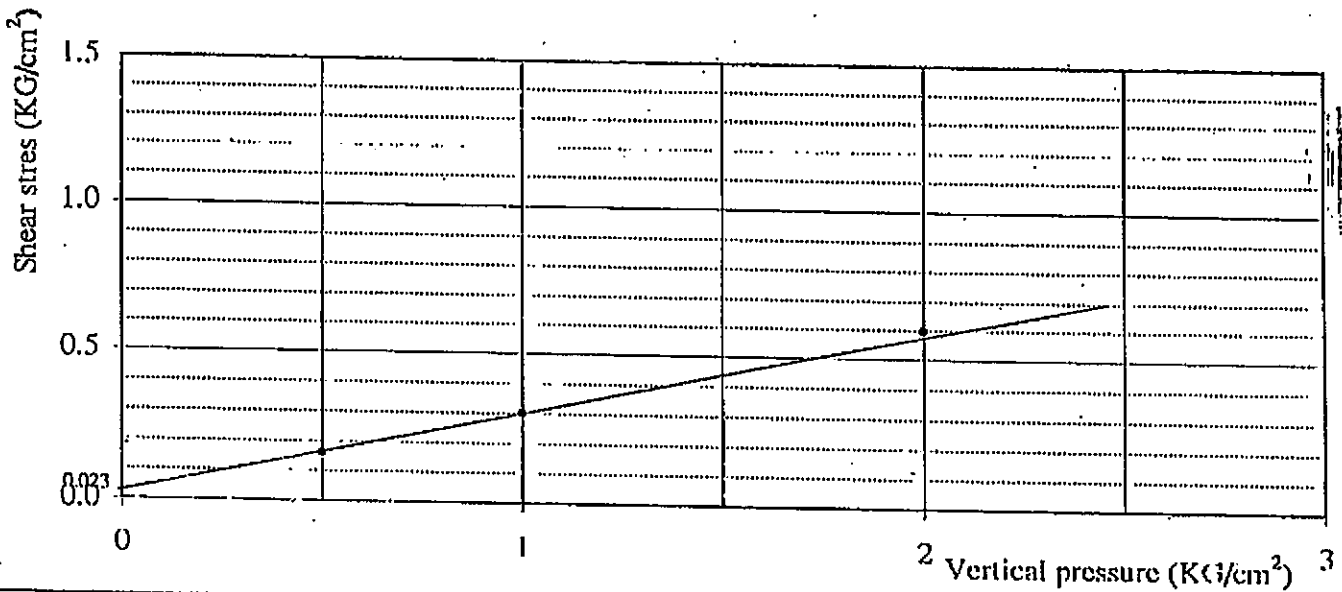
TCVN 4199 - 95

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

NGOI THAP BRIDGE

Borehole :	T1	Tests No :	735
Sample No :	ND1	Date :	15/7/2006
Depth (m) :	3.0 + 3.2	Method :	Unconsolidated - Undrained

Vertical pressure (kG/cm <sup>2</sup> )	0.5	1.0	2.0	CALCULATE
Max reading	8.0	15.0	30.0	$\text{tg } \varphi = \frac{0.430 - 0.159}{1.5 - 0.5} = 0.271$
Composite Correction Shear stress $\tau$ (kG/cm <sup>2</sup> )	0.01985 0.159	0.01985 0.298	0.01985 0.596	RESULT Internal friction angle $\varphi$ (°) = 15°10' Cohesion C (kG/cm <sup>2</sup> ) = 0.023



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*Nguyen Thi Lien*  
 Nguyen Thi Lien



VILAS 129  
 Tran Van Toan

# DIRECT SHEAR TEST

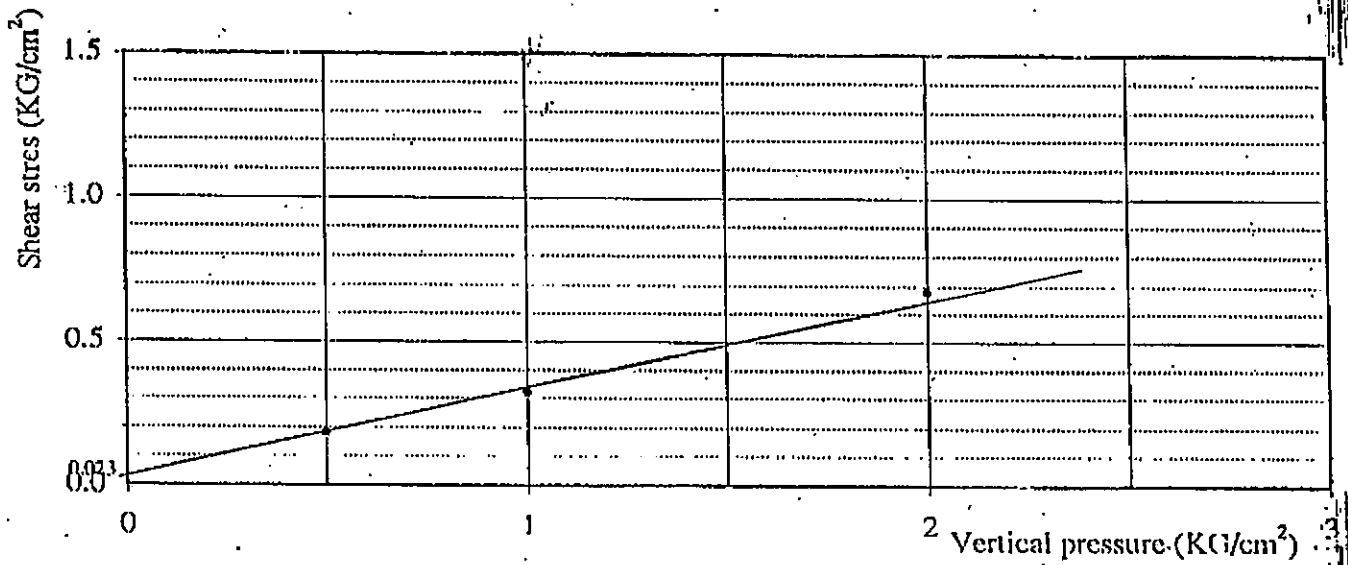
TCVN 4199 - 95

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

NGOI THAP BRIDGE

Borehole :	T1	Tets No :	736
Sample No :	ND2	Date :	15/7/2008
Depth (m) :	5.0 + 5.2	Method :	Unconsolidated - Undraind

Vertical pressure (kG/cm <sup>2</sup> )	0.5	1.0	2.0	CALCULATE
Max reading	9.0	16.0	34.0	$\text{tg } \varphi = \frac{0.490 - 0.179}{1.5 - 0.5} = 0.311$
Composic Correction	0.01985	0.01985	0.01985	RESULT
Shear stress $\tau$ (kG/cm <sup>2</sup> )	0.179	0.318	0.675	Internal friction angle $\varphi (^{\circ}) = 17^{\circ}16'$ Cohesion $C (\text{kG/cm}^2) = 0.023$



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# DIRECT SHEAR TEST

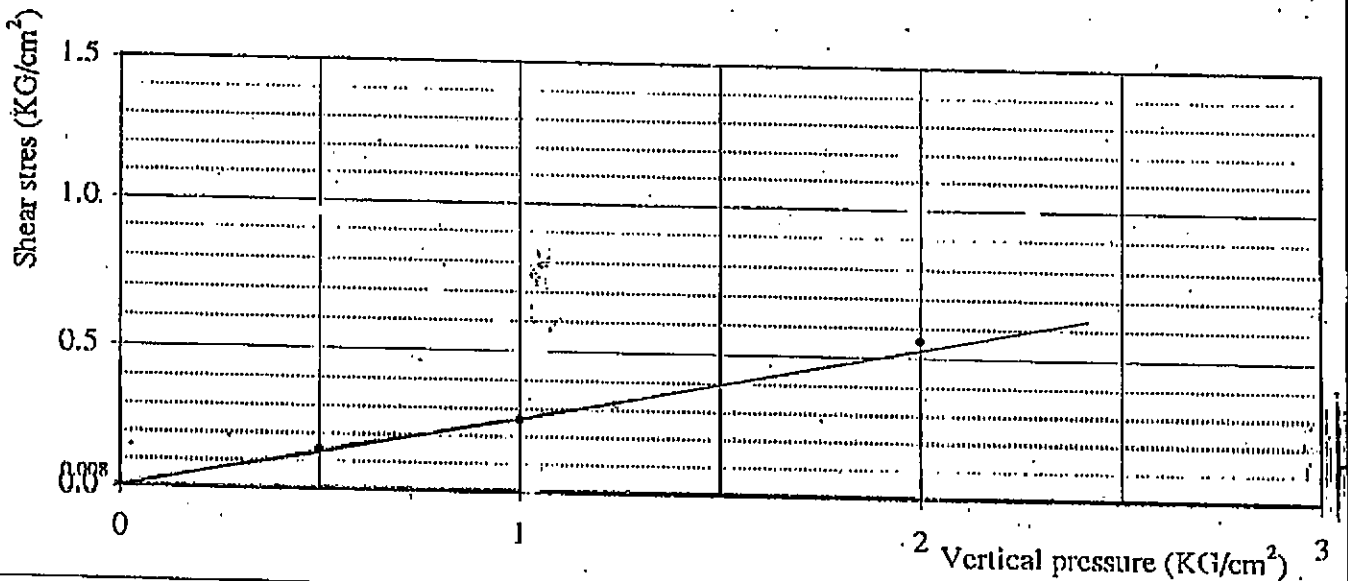
TCVN 4199 - 95

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

NGOI THAP BRIDGE

Borehole :	T1	Tets No :	737
Sample No :	ND3	Date :	15/7/2006
Depth (m) :	7.0 + 7.2	Method :	Unconsolidated - Undrained

Vertical pressure (kG/cm <sup>2</sup> )	0.5	1.0	2.0	CALCULATE
Max reading	7.0	13.0	28.0	$\lg \varphi = \frac{0.400 - 0.139}{1.5 - 0.5} = 0.261$
Composic Correction Shear stress $\tau$ (kG/cm <sup>2</sup> )	0.01985 0.139	0.01985 0.258	0.01985 0.556	RESULT Internal friction angle $\varphi$ (°) = 14°38' Cohesion C (kG/cm <sup>2</sup> ) = 0.008



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Tran Van Toan



# ATTERBERG LIMITS

ASTM - D 4318 - 84

THE PROJCT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

NGOI THAP BRIDGE

Borehole : T1

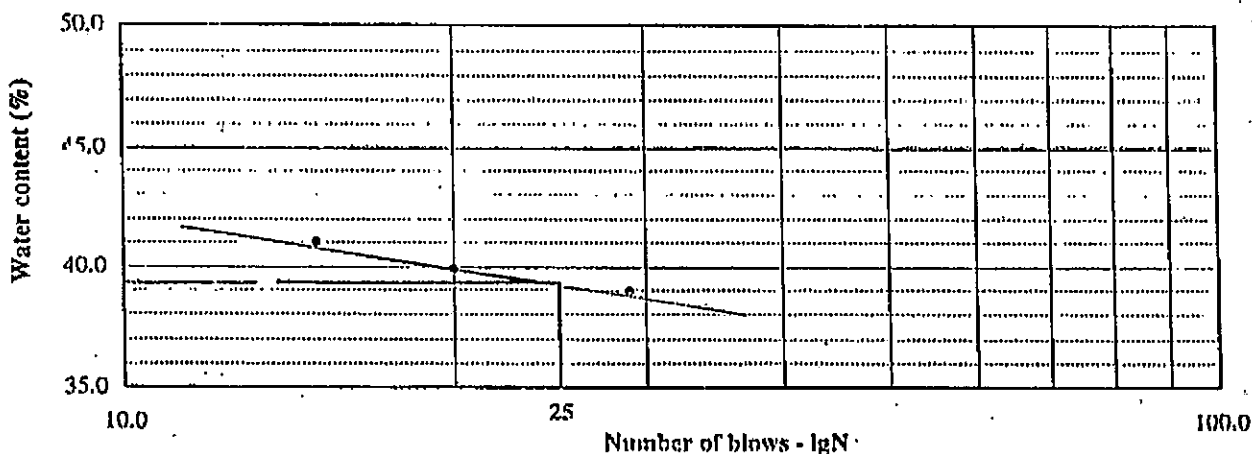
Sample No : ND1

Tets No : 735

Depth (m): 3.0 + 3.2

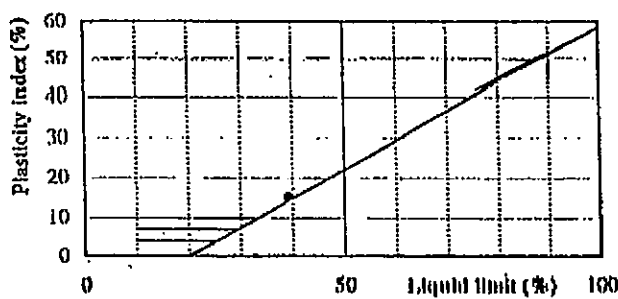
Date : 16/7/2008

Container number	LIQUID LIMIT ( $W_L$ )			PLATIC LIMIT ( $W_p$ )	
	IN06	IN34	IN19	HN12	HN15
Weight of wet (g)	91.69	91.21	92.27	30.74	27.37
Weight of dry (g)	83.73	83.74	84.50	28.15	24.75
Weight of container (g)	64.32	65.00	64.55	17.34	14.12
Water content (%)	41.0	39.9	38.9	24.0	24.6
Average water content (%)				24.3	
Number of blows ( N )	15	20	29		



**RESULT:**

Liquid limit :  $W_L = 39.3$  %  
 Platic limit :  $W_p = 24.3$  %  
 Plasticity index :  $I_p = 15.0$  %



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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  
NGOI THAP BRIDGE

Borehole : T1

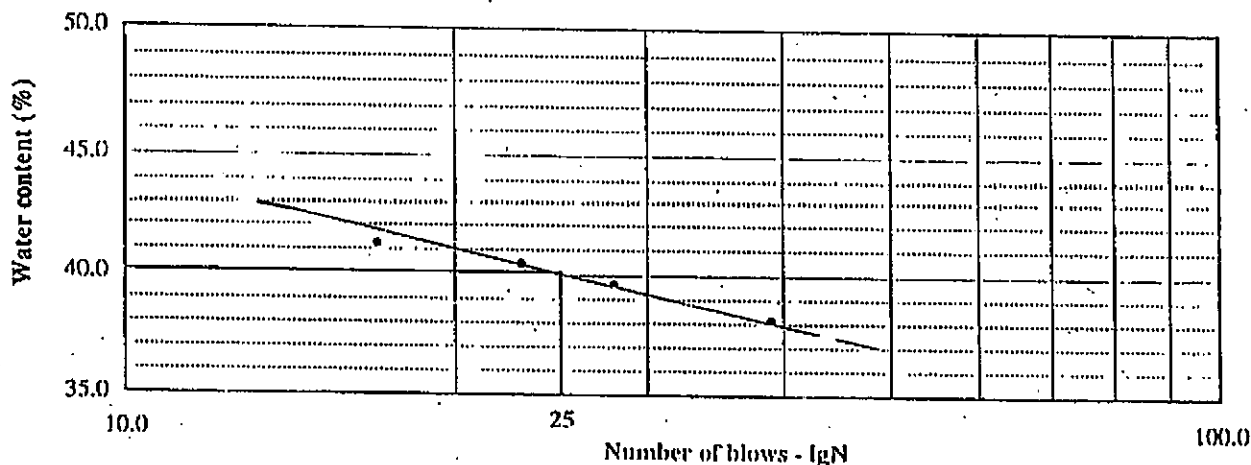
Sample No : ND2

Tets No : 736

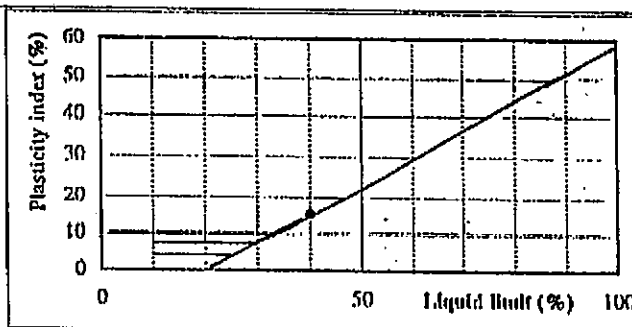
Depth (m): 5.0 + 5.2

Date : 16/7/2008

Container number:	LIQUID LIMIT ( W <sub>L</sub> )				PLATIC LIMIT ( W <sub>P</sub> )		
	IN23	IN11	IN09	IN29	HN98	HN06	
Weight of wet (g)	89.67	88.94	90.51	88.23	47.57	38.20	
Weight of dry (g)	82.75	82.06	83.31	81.83	44.12	35.08	
Weight of container (g)	65.96	65.04	65.13	65.03	30.16	22.65	
Water content (%)	41.2	40.4	39.6	38.1	24.7	25.1	
Average water content (%)						24.9	
Number of blows ( N )	17	23	28	39			



**RESULT:**  
 Liquid limit :  $W_L = 40.1$  %  
 Platic limit :  $W_P = 24.9$  %  
 Plasticity index :  $I_P = 15.2$  %



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VILAS 120  
 Part 1 of 2

# ATTERBERG LIMITS

ASTM - D 4318 - 84

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
NGOI THAP BRIDGE

Borehole : T1

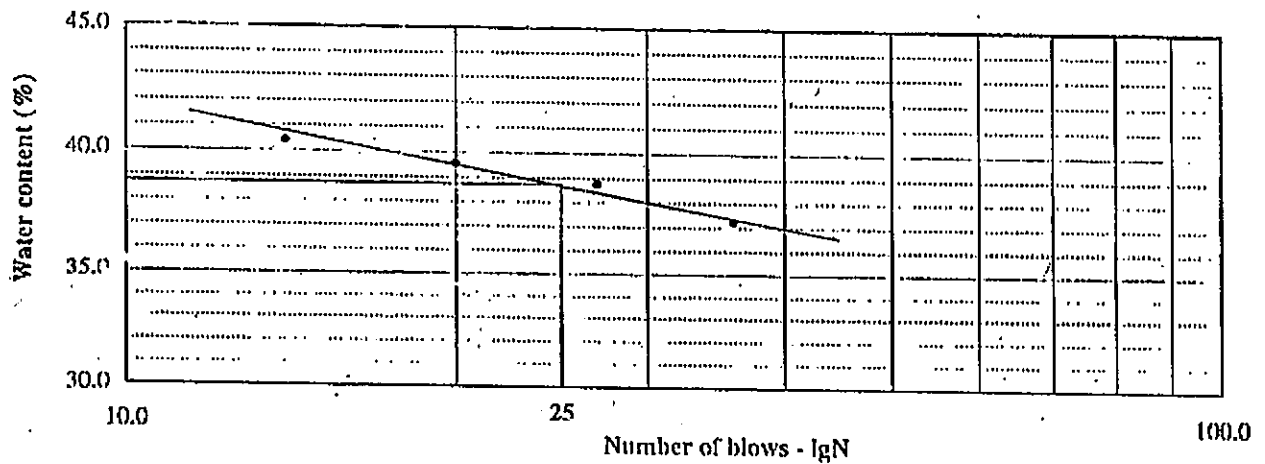
Sample No : ND3

Tests No : 737

Depth (m): 7.0 + 7.2

Date : 16/7/2008

Container number	LIQUID LIMIT ( $W_L$ )				PLATIC LIMIT ( $W_p$ )	
	IN12	IN10	IN04	IN01	HN40	HN19
Weight of wet (g)	92.33	91.43	88.77	89.51	41.40	39.67
Weight of dry (g)	84.58	83.82	82.10	82.79	37.72	36.32
Weight of container (g)	65.39	64.55	64.88	64.73	22.95	23.21
Water content (%)	40.4	39.5	38.7	37.2	24.9	25.6
Average water content (%)					25.2	
Number of blows (N)	14	20	27	36		



**RESULT:**

Liquid limit :  $W_L = 38.7$  %

Platic limit :  $W_p = 25.2$  %

Plasticity index :  $I_p = 13.5$  %

Liquid limit (%)	Plasticity index (%)
38.7	13.5

Tested by

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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  
NGOI THAP BRIDGE

Borehole : T1

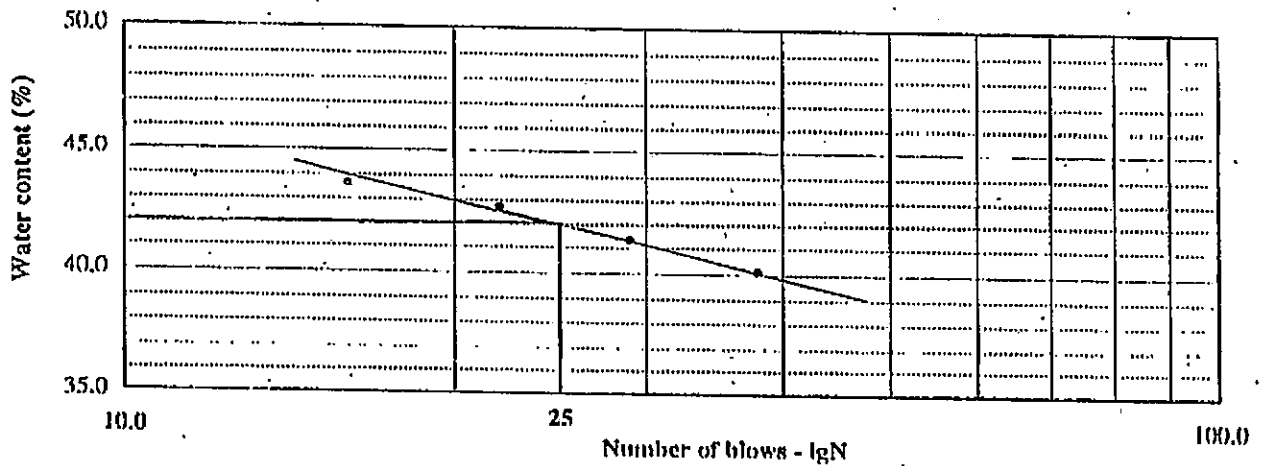
Sample No : ND4

Depth (m): 9.8 + 10.0

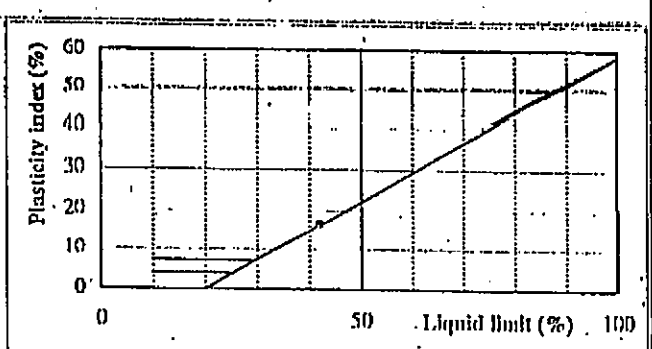
Tets No : 738

Date : 16/7/2006

Container number	LIQUID LIMIT ( $W_L$ )				PLATIC LIMIT ( $W_p$ )		
	IN25	IN03	IN22	C19	HN36	HN04	
Weight of wet (g)	76.71	89.55	91.40	66.71	37.54	36.72	
Weight of dry (g)	68.38	82.30	83.70	55.20	34.69	33.72	
Weight of container (g)	49.28	65.32	65.05	36.97	23.64	21.84	
Water content (%)	43.6	42.7	41.3	40.1	25.8	25.3	
Average water content (%)						25.5	
Number of blows ( N )	16	22	29	38			



**RESULT:**  
 Liquid limit :  $W_L = 42.0$  %  
 Platic limit :  $W_p = 25.5$  %  
 Plasticity index :  $I_p = 16.5$  %



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Phan Van Toan



# ATTERBERG LIMITS

ASTM - D 4318 - 84

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
NGOI THAP BRIDGE

Borehole : T1

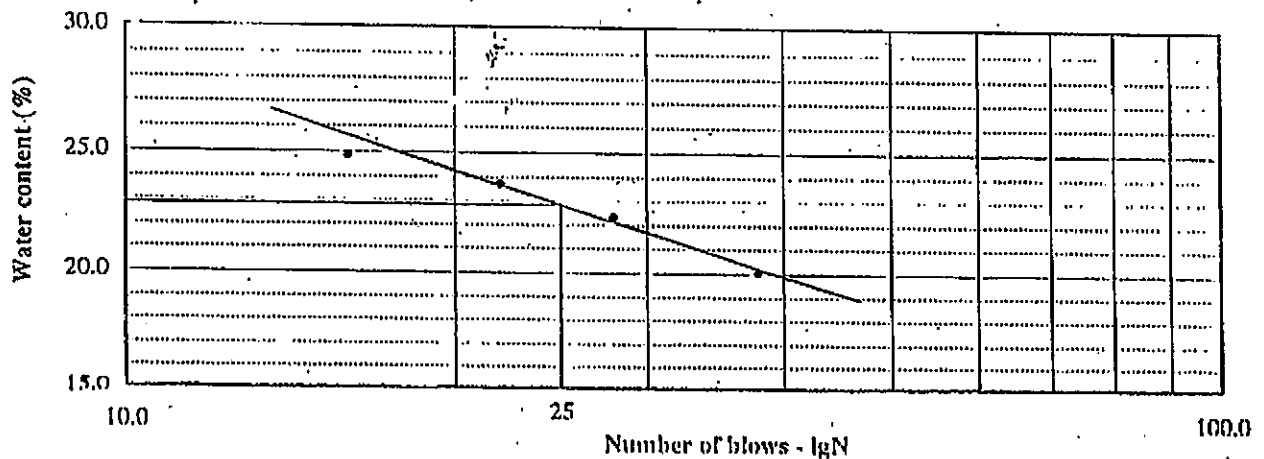
Sample No : ND7

Tets No : 741

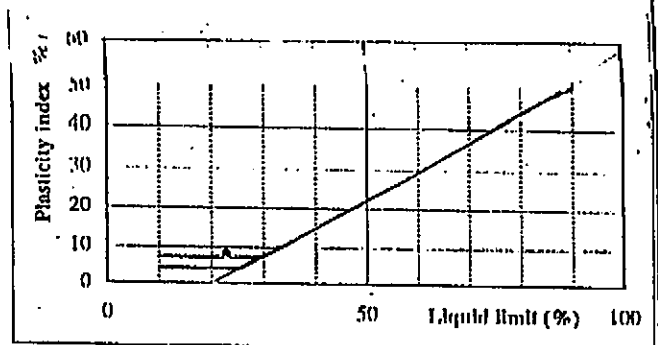
Depth (m): 16.0 ÷ 16.2

Date : 17/7/2006

Container number	LIQUID LIMIT ( W <sub>L</sub> )				PLATIC LIMIT ( W <sub>P</sub> )		
	IN04	IN12	IN13	IN16	HN36	HN04	
Weight of wet (g)	91.41	91.63	90.82	90.22	40.88	39.11	
Weight of dry (g)	86.10	86.61	86.14	86.02	38.67	36.90	
Weight of container (g)	64.68	65.39	65.14	65.03	23.64	21.84	
Water content (%)	24.8	23.7	22.3	20.0	14.7	14.7	
Average water content (%)						14.7	
Number of blows ( N )	16	22	28	38			



**RESULT:**  
 Liquid limit : W<sub>L</sub> = 22.8 %  
 Platic limit : W<sub>P</sub> = 14.7 %  
 Plasticity index : I<sub>p</sub> = 8.1 %



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VITAS 120  
Lien Van Toan

BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF YEN BAI PROVINCE LAO CHAI BRIDGE													
Bore hole		LKP01	Co-ord. X= Y=		Station: Km0+60														
Elev. +105.70		Elev. of groundwater level: +0.00		Drilling date:		02/07/2008 - 04/07/2008													
Contractor:		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			NEEDLE	Chart								
N1	N2	N3	0	10	20		30	40	50		N								
1	181.90	3.80	3.80		Sand, cobble, gravel, grit is whitish grey, very loose and mixed with blockstone and rolling boulder. (Value of SPT is N>50 due to during SPT to blow into cobble or blockstone)	SPT1 1.40-1.45	4	8	20	28									XD1 2.00-2.50
						SPT2 2.00-2.45	8	15	24	39									
						SPT3 3.00-3.45	30	50	>50	>100									
2	178.90	8.90	3.10		Granite is weathered resulting from greenish gray grit-chip with closed structure.	SPT4 4.00-4.45	50	>50	>100									XD2 4.00-4.50	
4	177.48	8.30	1.40		Greenish gray granite is cracked and broken in chip and block. Hardness is in level 7-8													XD3 6.00-6.50	
5	172.60	13.10	4.80		Granite is greenish grey with hardness of level 7-8													XD4 7.00-7.40	
																		US 9.00-9.20	
																		US 11.0-11.20	
																		US 12.00-13.10	

## TEST FOR UNCONFINED COMPRESSIVE STRENGTH OF ROCK

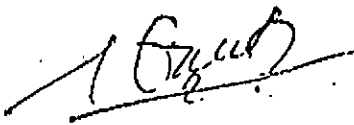
(22 TCN 57 - 84)

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

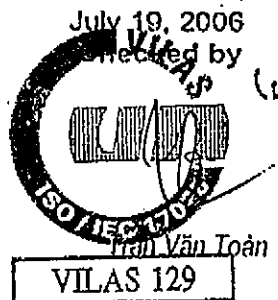
## LAO CHAI BRIDGE

Bore hole		P1	P1
Sample No.		U5	U6
Depth (m)		9,0-9,2	10,0-10,2
<b>Test Items</b>			
Dry unconfined compressive strength $\sigma_n$ (kG/cm <sup>2</sup> )		490,0	501,0
Saturated unconfined compressive strength $\sigma_{bh}$ (kG/cm <sup>2</sup> )		365,0	374,0
Index of softening k		0,74	0,75
Natural unit weight $\gamma_w$ (g/cm <sup>3</sup> )		2,388	2,391
Specific gravity $\Delta$ (g/cm <sup>3</sup> )		2,702	2,705

Tested by



Nguyễn Văn Hạnh



# GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
LAO CHAI BRIDGE

Borehole : P1  
Sample No : XD1  
Depth (m) : 2.0 + 2.5

Tets No : 751  
Date : 13/7/2006

**SIZE ANALYSIS**

Weight of dry soil (g): 1765.0

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	650.30	220.80	225.10	50.40	20.00	330.40	105.00	83.00
Percent retained (%)	0.0	36.8	12.5	12.8	2.9	1.1	18.7	10.5	4.7
Percent finer (%)	100.0	63.2	50.6	37.9	35.0	33.9	15.2	4.7	

**RESULT**

$D_{60} = 23.0$   
 $D_{30} = 1.4$   
 $D_{10} = 0.18$

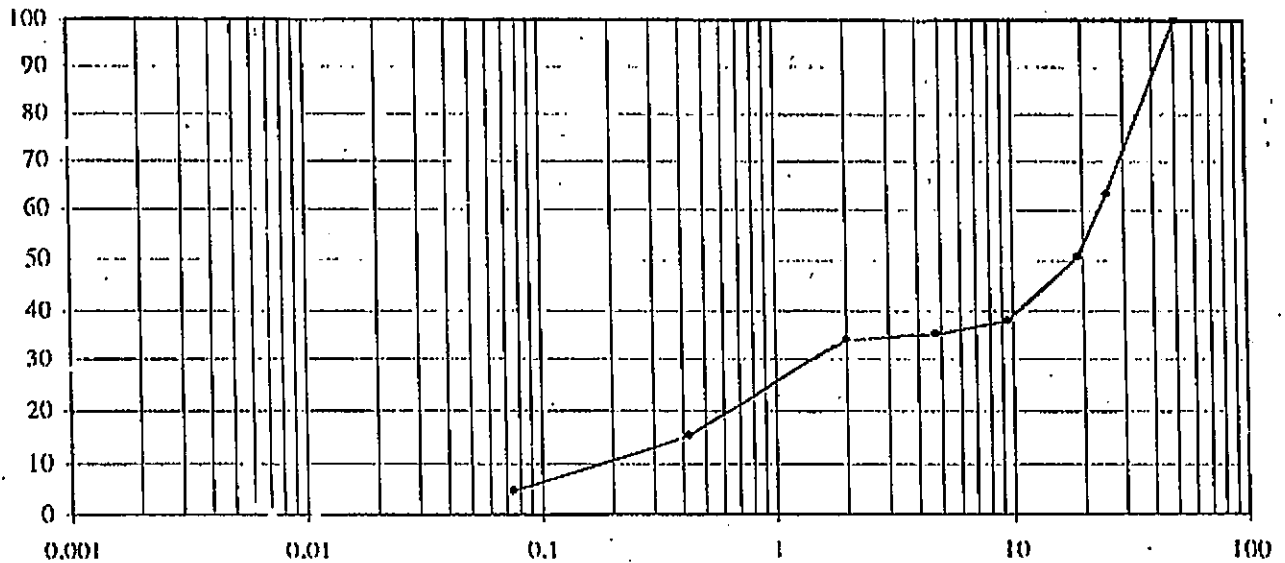
$C_u = 127.8$   
 $C_c = 0.5$

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	0.425	0.075	< 0.075
Percent retained (%)	0.0	36.8	12.5	12.8	2.9	1.1	18.7	10.5	4.7



Tested by

*Signature of Nguyen Thi Hong*

Nguyen Thi Hong



VILAS-129  
Phan Van Toan

# GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
LAO CHAI BRIDGE

Borehole : P1  
Sample No : XD2  
Depth (m) : 4.0 + 4.45

Tets No : 752  
Date : 13/7/2016

SIZE ANALYSIS		Weight of dry soil (g): 146(1.0)							
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	55.80	80.60	250.50	310.40	390.90	245.30	60.10	68.10
Percent retained (%)	0.0	3.8	5.5	17.2	21.3	26.8	16.8	4.1	4.5
Percent finer (%)	100.0	96.2	90.7	73.5	52.2	25.5	8.7	4.5	

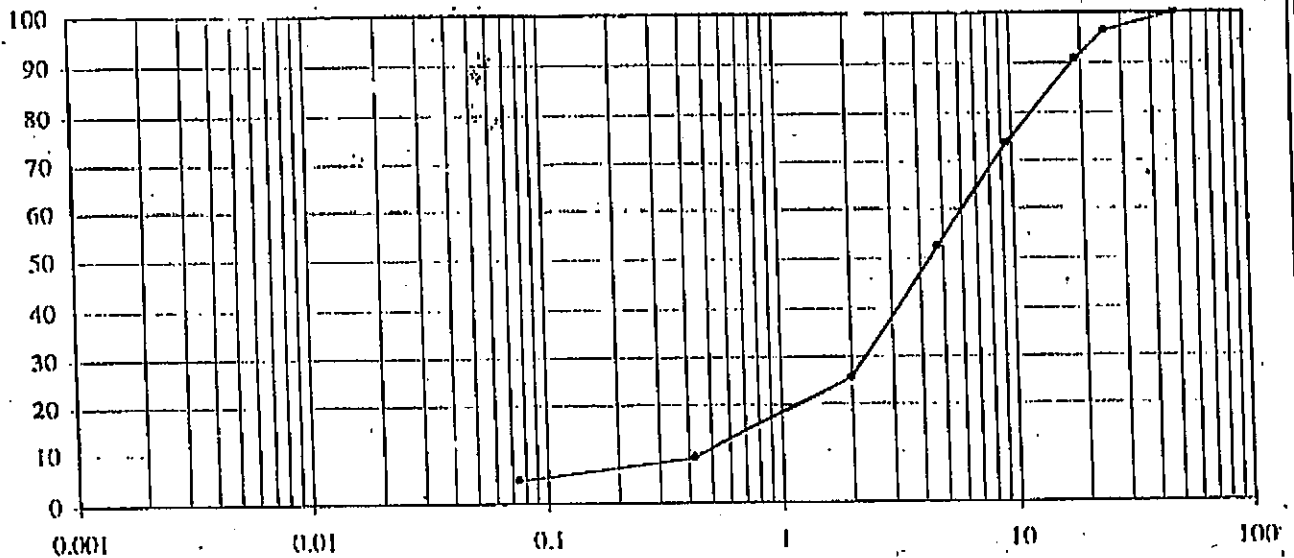
**RESULT**

$D_{10} = 0.5$   
 $D_{30} = 2.3$   
 $D_{60} = 6.0$

$C_u = 12.8$   
 $C_c = 1.9$

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	0.425	0.075	< 0.075
Percent retained (%)	0.0	3.8	5.5	17.2	21.3	26.8	16.8	4.1	4.5



Tested by

*Signature*

Nguyen Thi Hong



VILAS 129  
Hiep Van Toan

# GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
LAO CHAI BRIDGE

Borehole : P1  
Sample No : XD3  
Depth (m) : 6.0 : 6.5

Tets No : 75  
Date : 13/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 1355.0

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	0.00	80.80	215.60	295.30	345.70	240.00	115.00	62.60
Percent retained (%)	0.0	0.0	6.0	15.9	21.8	25.5	17.7	8.5	4.6
Percent finer (%)	100.0	100.0	94.0	78.1	56.3	30.8	13.1	4.6	

RESULT

$D_{60} = 5.3$

$C_u = 25.2$

Soil classification (ASTM - D 2487)

$D_{30} = 1.9$

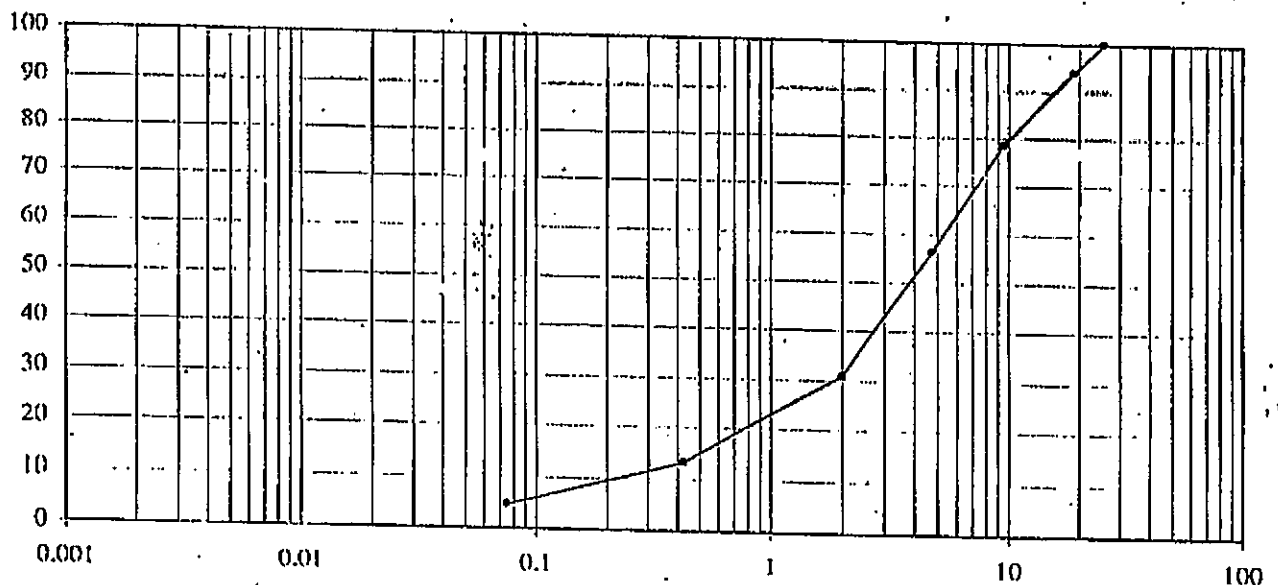
$C_c = 3.2$

Group symbol : SP

$D_{10} = 0.2$

Group name : Bad aggregate sand

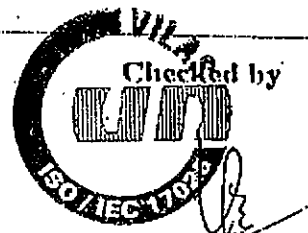
Size (mm)	50.8	25.4	19.0	9.5	4.75	2	0.425	0.075	< 0.075
Percent retained (%)	0.0	0.0	6.0	15.9	21.8	25.5	17.7	8.5	4.6



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  
LAO CHAI BRIDGE

Borehole :  $\Phi 1$   
 Sample No : XD4  
 Depth (m) :  $7.0 \pm 7.4$

Tets No : 754  
 Date : 13/7/2006

**SIZE ANALYSIS**

Weight of dry soil (g): 790.6

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Wt. Soil retained (g)	370.00	384.20	36.4	0.00					
Percent retained (%)	46.8	48.6	4.6	0.0					
Percent finer (%)	53.2	4.6	0.0						

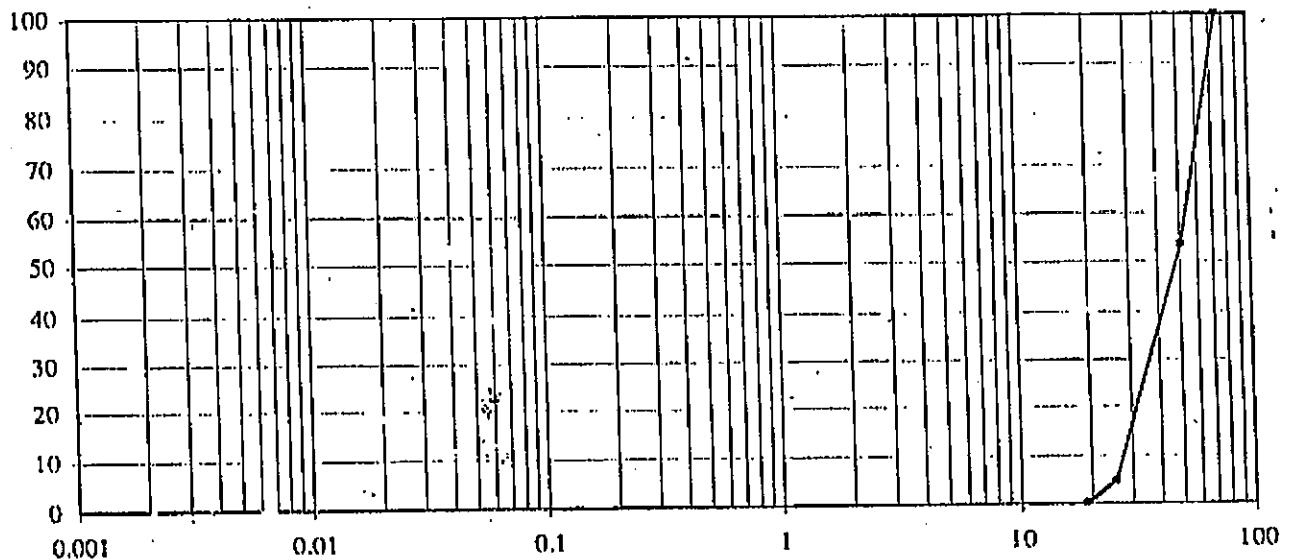
**RESULT**

$D_{60} = 53.0$        $C_u = 3.1$   
 $D_{30} = 36.0$        $C_c = 1.4$   
 $D_{10} = 17.0$

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	0.425	0.075	< 0.075
Percent retained (%)	46.8	48.6	4.6	0.0	0.0	0.0	0.0	0.0	0.0



Tested by

*Signature*

Nguyen Thi Hong



VILAS 129

Tran Van Toan

# LAO CHAI BRIDGE

**Bridge No.20**

## BORING LOG: A1a

Station: \_\_\_\_\_


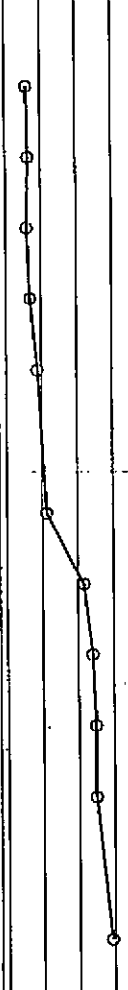

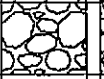
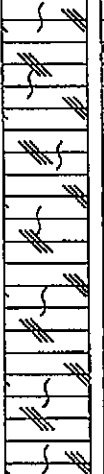

Center: 0.00

GROUND ELEVATION: 202.32

STARTED DATE: 21/9/2006

WATER TABLE: \_\_\_\_\_

COMPLETED DATE: 26/9/2006

LAYER NUMBER	BOTTOM ELEVATION	BOTTOM DEPTH	THICKNESS	BORING LOG SCALE: 1/100	SOIL DESCRIPTION	SPT TEST				SAMPLE NO DEPTH		
						DEPTH	BLOWS /15cm	N/30	SPT CHART			
									0 25 50 75			
E	197.62	4.70	4.70		Filling soil: Blackish grey medium dense clayey sand	1.00	6	7	8	15		G36 1.80-2.00
						1.45						
						2.00	7	8	8	16		
						2.45						
						3.00	6	7	8	15		
						4.00	7	8	9	17		G1 3.80-4.00
						4.45						
1	196.32	6.00	1.30		Redish brown very stiff - Sandy lean clay (CL)	5.00	8	10	12	22		HDI 5.80-6.00
						5.45						
2	195.32	7.00	1.00		Gravcl, pebbles with sandy clay	7.00	12	13	15	28		H57 7.80-8.00
						7.45						
3a	188.32	14.00	7.00		Blackish grey whetered hard clay stone	8.00	15	24	30	54		
						8.45						
						9.00	19	27	33	60		
						9.45						
						10.00	20	28	34	62		
						10.45						HD15 9.80-10.00
						11.00	20	27	35	62		
						11.45						M36 11.80-12.00
						13.00	21	32	41	73		K9 13.80-14.00
						13.45						
3	185.32	17.00	3.00		Blackish grey pot clay stone RQD=35%, TCR=45%							



# LAO CHAI BRIDGE

**Bridge No.20**

## BORING LOG: A2a

Station: \_\_\_\_\_


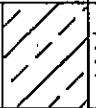
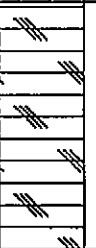
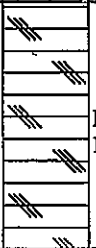
Center: 0.00

GROUND ELEVATION: 200.403

STARTED DATE: 26/9/2006

WATER TABLE: \_\_\_\_\_

COMPLETED DATE: 27/9/2006

LAYER NUMBER	BOTTOM ELEVATION	BOTTOM DEPTH	THICKNESS	BORING LOG SCALE : 1/100		SOIL DESCRIPTION	SPT TEST				SAMPLE NO	DEPTH						
							DEPTH	BLOWS /15cm					SPT CHART					
													N/30	0	25	50	75	
1	198.53	1.50	1.50			Redish brown very stiff - Sandy lean clay (CL)	1.00	6	7	8	15	○						
3		1.50	3.50			Blackish grey pot clay stone RQD=30%, TCR=40%	1.45											
	195.03	5.00																





DỰ ÁN XÂY DỰNG CẦU GIAO THÔNG NÔNG THÔN CÁC TỈNH MIỀN NÚI PHÍA BẮC  
THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGE IN NORTHERN MOUNTAINOUS PROVINCES

**THÍ NGHIỆM PHÂN TÍCH THÀNH PHẦN HẠT**

**PARTICLE SIZE ANALYSIS**

(AASHTOT88 - ASTM D420-422)

Vị trí - Location : Lao Chal bridge  
SH lỗ khoan - Boring No A1A  
Độ sâu - Depth ( m ) 5.8-6.0

Số hiệu mẫu - Sample number : HD1  
Số hiệu TN - Test number : 3073  
Ngày thí nghiệm - Testing date : 10/2006

**PHÂN TÍCH BẰNG SÀNG - SIEVE ANALYSIS**

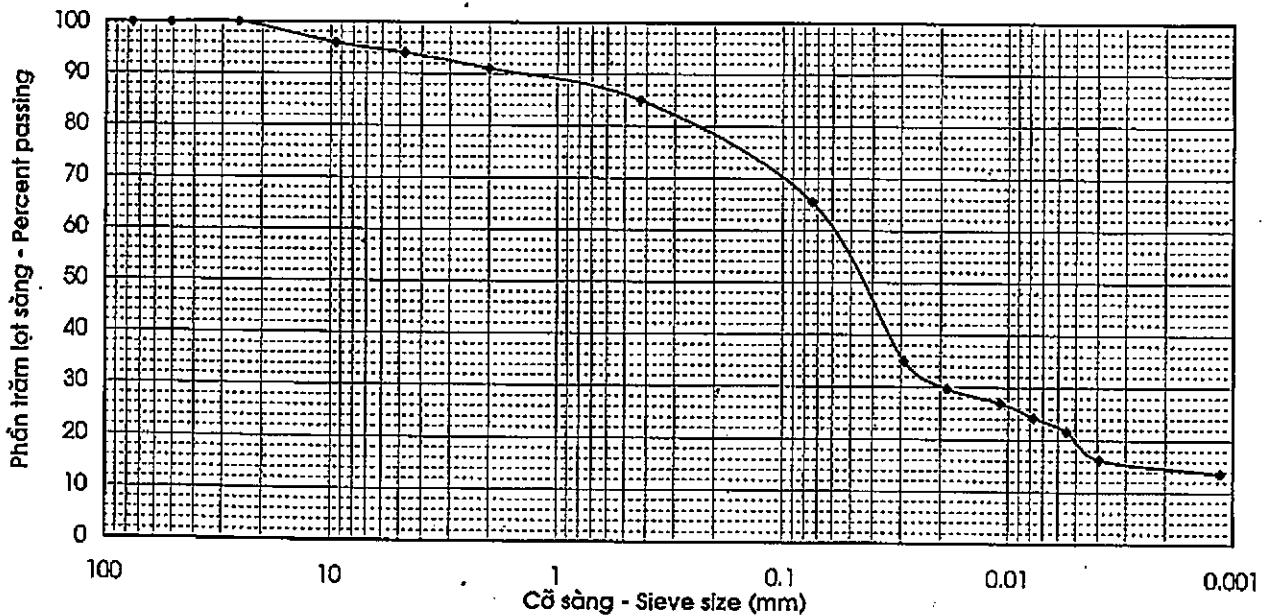
KL đất khô - Weight of Dry Soil (g) 100

Sàng số Sieve No	ĐK sàng Sieve size	KL sàng Wt soil retained	% T sàng % retained	% TLây Cumulative %	% L sàng % Finer
3"	76.2				
2"	50.8				
1"	25.4				100.00
0.375"	9.52	4.00	4.00	4.00	96.00
4	4.76	2.00	2.00	6.00	94.00
10	2.00	3.00	3.00	9.00	91.0
40	0.425	6.000	6.00	15.00	85.0
200	0.074	11.500	19.55	34.55	65.5

**PHÂN TÍCH BẰNG TỶ TRỌNG KẾ - HYDROMETER ANALYSIS**

KL riêng - Specific Gravity (g/cm<sup>3</sup>) : 2.75  
KL đất khô - Weight of Dry Soil (g) 50  
SH tỷ trọng kế - Hydrometer No : 151H  
HC mặt cong - Meniscus Correction R<sub>w</sub> -1

K <sub>1</sub>	a	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	C <sub>u</sub>	C <sub>c</sub>		
32.12	0.9784							
Ngày Date	TG -Elapsed time in min	T <sup>o</sup> C	T <sup>o</sup> C corrected	R	R - R <sub>w</sub> + R <sub>CT</sub>	L (cm)	D (mm)	P(%)
	2	29	2.1	10.0	13.1	11.87	0.0291	34.99
	5			8.0	11.1	12.19	0.0187	29.65
	15			7.0	10.1	12.35	0.0109	26.98
	30			6.0	9.1	12.51	0.0077	24.31
	60			5.0	8.1	12.66	0.0055	21.64
	120			3.0	6.1	12.98	0.0039	16.30
	1440			2.0	5.1	13.14	0.0011	13.62



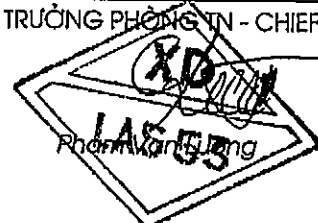
**TEST RESULT**

Cỡ sàng - Sieve size	76.2	50.8	25.4	9.52	4.76	2.00	0.425	0.074	0.005	0.002
% lọt sàng - Percent finer			100	96	94	91.0	85.0	65.5	20.0	14.8

Người TN - Tested by : Nguyen Hong Lien

TRƯỞNG PHÒNG TN - CHIEF OF LAB

Người KT - Checked by : Lê Hiep Van



**DỰ ÁN XÂY DỰNG CẦU GIAO THÔNG NÔNG THÔN CÁC TỈNH MIỀN NÚI PHÍA BẮC**  
**THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGE IN NORTHERN MOUNTAINOUS PROVINCES**

**THÍ NGHIỆM XÁC ĐỊNH ĐỘ ẨM & CÁC GIỚI HẠN ATTERBERG**

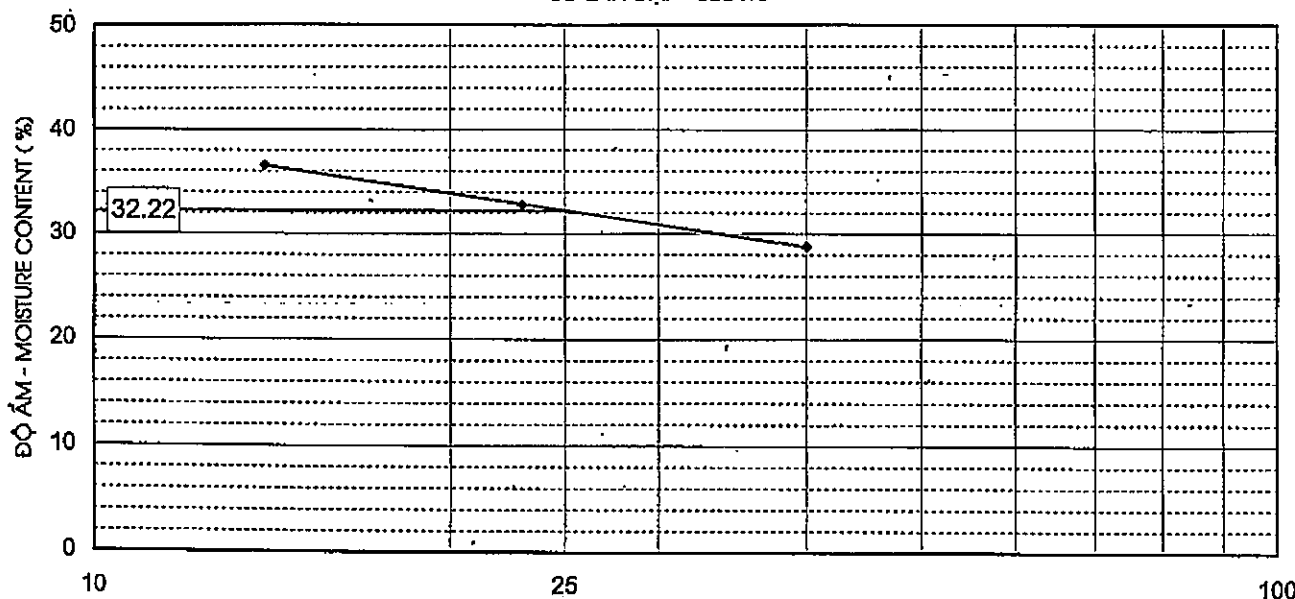
**MOISTURE CONTENT & ATTERBERG LIMITS TEST**

(AASHTO T265-93-T89-90, ASTM D)

Vị trí - Location : Lao Chal bridge      Số hiệu mẫu - Sample number : HD1  
 Số hiệu LK - Boring No      A1A      Số hiệu TN - Test number : 4273  
 Độ sâu - Depth (m)      5.8-6.0,      Ngày thí nghiệm - Testing date : 10/2006

THÔNG SỐ XÁC ĐỊNH ĐỘ ẨM MOISTURE DETERMINATION	ĐỘ ẨM TỰ NHIÊN MOISTURE CONTENT		LIQUID LIMIT W <sub>L</sub> (%)			PLASTIC LIMIT W <sub>p</sub> (%)	
	5	6	7	8	9	5x	6x
Số hộp Container number							
Số lần đập Blow number			40	23	14		
Trọng lượng đất ẩm+hộp Weight of wet soil and container      g	58.723	56.184	24.163	23.577	26.950	12.653	13.917
Trọng lượng đất khô+hộp Weight of dry soil and container      g	50.870	48.652	20.540	19.670	21.764	11.762	12.873
Trọng lượng hộp Weight of container      g	14.413	15.073	7.953	7.750	7.572	7.344	7.619
Trọng lượng đất khô Weight of dry soil      g	7.853	7.532	3.623	3.907	5.186	0.891	1.044
Độ ẩm Moisture content      %	21.54	22.43	28.78	32.78	36.54	20.17	19.87
Độ ẩm trung bình Average moisture content	21.99					20.02	

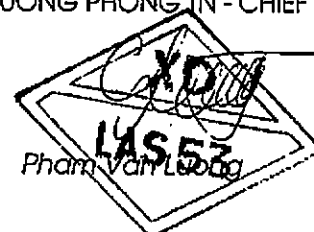
**SỐ LẦN ĐẬP - BLOWS**



GIỚI HẠN CHẢY - LIQUID LIMIT W <sub>L</sub> = 32.22	GIỚI HẠN DẸO - PLASTIC LIMIT W <sub>p</sub> = 20.02	CHỈ SỐ DẸO - PLASTICITY INDEX I <sub>p</sub> = 12.20
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Người TN - Tested by: Mai Van Son  
 Người kiểm tra - Checked by: Le Hiep Van

TRƯỞNG PHÒNG TN - CHIEF OF LAB



BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF YEN BAI PROVINCE PU TRANG BRIDGE											
Bore hole		LK_T1		Co-ord, X= Y=		Station:											
Elev.: +246.67		Elev. of underwater level: +0.00		Drilling date:		Sheet No: 01											
Connector:		Nguyen Van Khanh		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 <sub>30</sub> cm	Chart						
							N1	N2	N3			0	10	20	30	40	50
1	247.57	1.2	1.2		Sand, gravel, grit mixes with cobble, yellowish brown, spongy structure, mixes with alluvium.	1.0-1.45	15	25	50	75							
2	238.87	10.0	8.8		Cobble, gravel, grit, sand mixes with rolling boulder, very closed structure.	2.0-2.02	50/2cm										
						3.0-3.02	50/2cm										
						4.0-4.02	50/2cm									D1 4.2-4.4	
						5.0-5.02	50/2cm										
						6.0-6.02	50/2cm										
						7.0-7.02	50/2cm									D2 7.3-7.5	
3	229.57	19.30	9.30		Weathered granite broken in tiny, block, yellow, greenish grey, blackish grey.	10.0-10.2	50/2cm										D3 10.8-11.0
						11.0-11.02	50/2cm										
						12.0-12.02	50/2cm										
						13.0-13.02	50/2cm									D4 14.0-14.2	
						14.0-14.02	50/2cm										
						15.0-15.02	50/2cm										
4	229.57	19.30	4.3		Weathered granite broken in block, yellow, greenish grey, blackish grey.	16.0-16.02	50/2cm										
						17.0-17.02	50/2cm									D5 17.6-17.8	
						18.0-18.02	50/2cm									D6 21.3-22.5	

BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF YEN BAI PROVINCE PU FRANG BRIDGE												
Bore hole		LK_T1		Co-ord. X=		Y=		Station:										
Elev.: +248.87		Elev. of underwater level: +0.00		Drilling date:		Sheet No.: 02												
Corrector:				Checker:														
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 <sub>60cm</sub>	Chart							
							N1	N2	N3			0	10	20	30	40	50	N
4	225.27	23.60	4.3		Weathered granite broken in block, yellow, greenish grey, blackish grey.													
5	221.77	27.10	3.50		Granite is yellowish grey, blackish grey, cracked little. Hardness is level 8-9.													B7 26.2-26.4

BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF YEN BAI PROVINCE PU TRANG BRIDGE						
Bore hole		LK_T2		Co-ord. X= Y=		Station:						
Elev.: +248.69		Elev. of underwater level: +0.00		Drilling date:		Sheet No: 01						
Corrector:				Checker:								
Layer	Elev. (m)	Depth (m)	PROFILE Scale 1/100	DESCRIPTION	STANDARD PENETRATION TEST (SPT)				Chart	Sampling depth for test (m)		
					Depth (m)	Blow No./15cm					N/30cm	
						N1	N2	N3				
1	247.29	1.4		Sand, gravel, grit mixes with cobble, yellowish brown, spongy structure, mixes with alluvium.	1.0-1.45	22	40	50/3cm	>50			
2	237.19	11.5		Cobble, gravel, grit, sand mixes with filling boulder, very closed structure.	2.0-2.02	50/2cm						
					3.0-3.02	50/2cm						
					4.0-4.02	50/2cm						
					5.0-5.02	50/2cm						
					6.0-6.02	50/2cm						
					7.0-7.02	50/2cm						
					8.0-8.2	50/2cm						
					9.0-9.2	50/2cm						
3	230.99	17.7		Weathered granite broken in tiny, block, yellow, greenish grey, blackish grey.	10.0-10.2	50/2cm						
					11.0-11.02	50/2cm						
					12.0-12.02	50/2cm						
4		4.6		Weathered granite broken in block, yellow, greenish grey, blackish grey.	13.0-13.02	50/2cm						
					14.0-14.02	50/2cm						



BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF YEN BAI PROVINCE PU TRANG BRIDGE												
Bore hole		LK_T2		Co-ör. X=		Y=		Station:										
Elev.:		+248.69		Elev. of underwater level:		+0.00		Drilling date:										
Corrector:				Checker:				Sheet No.: 02										
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		N	0		10	20	30	40	50
4	226.39	22.3	4.6		Weathered granite broken in block, yellow, greenish grey, blackish grey.													D5 21.8-22.0
5	223.19	25.50	3.20		Granite is yellowish grey, blackish grey, cracked little. Hardness is level 8-9.													D6 25.3-25.50

No: 100706.02.2/CLD

SUMMARY OF TEST RESULTS

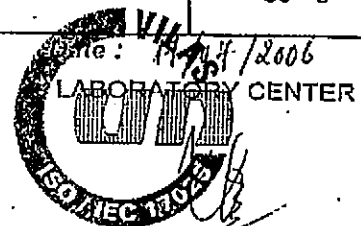
THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
PU TRANG BRIDGE

Borehole :		LK → T1		
Sample No :		Đ1	Đ2	Đ3
Depth (m): m		4.2 + 4.4	7.3 7.5	10.8 + 11.0
Test No.		698	699	700
Grain size analysis P %				
Percent finer (%)	50.8 (mm)	78.8	100.0	53.6
	25.4 (mm)	11.0	39.4	22.8
	10 (mm)	2.5	30.7	13.1
	9.5 (mm)	1.0	19.2	3.8
	4.75 (mm)	0.0	13.5	1.9
	2.00 (mm)		8.2	1.0
	0.425 (mm)		3.0	0.7
	0.075 (mm)		0.8	0.4
	0.050 (mm)			
	0.005 (mm)			
0.002 (mm)				
Natural water content	W %			
Natural unit weight	$\gamma_w$ g/cm <sup>3</sup>			
Dry unit weight	$\gamma_d$ g/cm <sup>3</sup>			
Specific gravity	$\rho$ g/cm <sup>3</sup>	2.680	2.680	2.680
Coefficient of uniformity	$C_u$	1.7	11.9	3.5
Coefficient of gradation	$C_c$	0.9	4.0	1.1
In Dry condision	$\alpha_k$			
In Saturation condision	$\alpha_w$			
Void Ratio	$e_0$			
Porosity	n %			
Degree of Saturation	S %			
Liquid Limits	Wl %			
Plastic Limits	Wp %			
Plasticity Index	Ip %			
Internal friction angle	$\varphi^0$			
Cohesion	C KG/cm <sup>2</sup>			
Compressibility Index	$a_{1-2}$ cm <sup>2</sup> /KG			
Soil classification ASTM - D 2487		Bad aggregate grit - GP	Bad aggregate grit - GP	Bad aggregate grit - GP

COLLECTED BY

*NCHP*

Eng. Nguyen Thi Khanh Ha



VILAS 129  
Eng. Tran Van Toan

No: 100706.02.3/CLD

SUMMARY OF TEST RESULTS

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

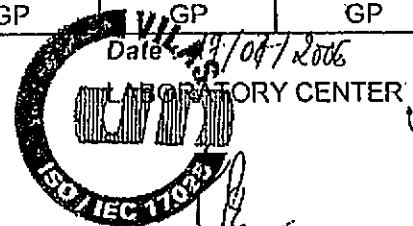
PU TRANG BRIDGE

Borehole :		LK - T2				
Sample No :		Ø1	Ø2	Ø3	Ø4	Ø5
Depth (m):	m	4.2 : 4.4	8.8 : 9.0	13.8 : 14.0	17.2 : 17.4	21.8 : 22.0
Test No.		705	706	707	708	709
Grain size analysis %						
Percent finer (%)	50.8 (mm)	73.9	100.0	100.0	100.0	23.50
	25.4 (mm)	13.60	29.4	16.7	19.9	3.60
	10.0 (mm)	5.0	24.2	1.0	2.3	
	9.5 (mm)	1.2	19.4	0.7	1.0	
	4.75 (mm)	0.4	9.4			
	2.00 (mm)		5.4			
	0.425 (mm)		2.3			
	0.075 (mm)		0.4			
	0.050 (mm)					
0.005 (mm)						
0.002 (mm)						
Natural water content	W %					
Natural unit weight	$\gamma_w$ g/cm <sup>3</sup>					
Dry unit weight	$\gamma_k$ g/cm <sup>3</sup>					
Specific gravity	$\rho$ g/cm <sup>3</sup>	2.680	2.680	2.690	2.690	2.690
Coefficient of uniformity	$C_u$	2.0	6.8	1.700	1.8	2.0
Coefficient of gradation	$C_c$	1.0	4.0	1.000	1.0	1.4
In Dry condition	$\alpha_k$					
In Saturation condition	$\alpha_w$					
Void Ratio	$e_0$					
Porosity	n %					
Degree of Saturation	S %					
Liquid Limits	W <sub>l</sub> %					
Plastic Limits	W <sub>p</sub> %					
Plasticity Index	I <sub>p</sub> %					
Internal friction angle	$\phi^\circ$					
Cohesion	C KG/cm <sup>2</sup>					
Compressibility Index	$a_{1-2}$ cm <sup>2</sup> /KG					
Soil classification ASTM - D 2487		Bad aggregate grit GP	Bad aggregate grit GP	Bad aggregate grit GP	Bad aggregate grit GP	Bad aggregate grit GP

COLECTED BY

*TKHP*

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  
PU TRANG BRIDGE

Borehole : T1  
Sample No : D1  
Depth (m) : 4.2 + 4.4

Test No : 698  
Date : 12/7/2006

**SIZE ANALYSIS**

Weight of dry soil (g): 1062.9

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	225.70	720.70	90.30	15.80	10.40	0.00			
Percent retained (%)	21.2	67.8	8.5	1.5	1.0	0.0			
Percent finer (%)	78.8	11.0	2.5	1.0	0.0				

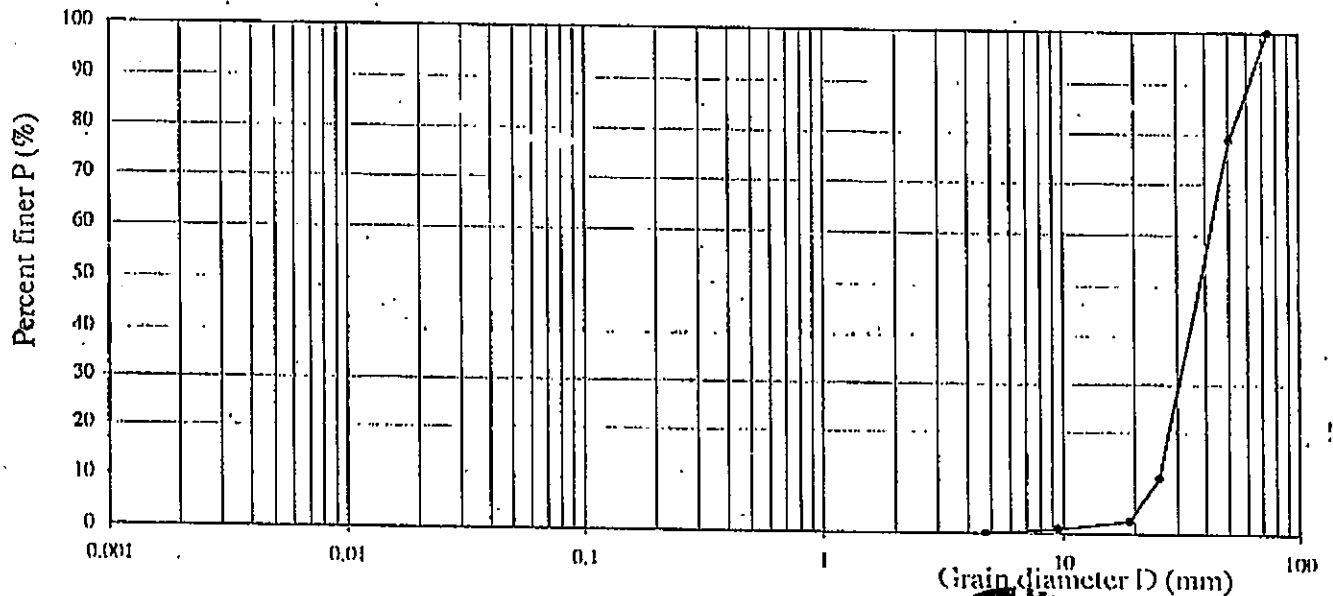
**RESULT**

$D_{60} = 42.0$                        $C_{u1} = 1.7$   
 $D_{30} = 31.0$                        $C_c = 0.9$   
 $D_{10} = 25.0$

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 (%)	21.2	67.8	8.5	1.5	1.0	0.0	0.0	0.0	0.0



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  
PU TRANG BRIDGE

Borehole : T1  
Sample No : D2  
Depth (m) : 7.3 + 7.5

Tota No : 699  
Date : 12/7/2006

## SIZE ANALYSIS

Weight of dry soil (g): 1320.7

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	800.80	115.10	150.80	75.40	70.30	68.30	29.80	10.20
Percent retained (%)	0.0	60.6	8.7	11.4	5.7	5.3	5.2	2.3	0.8
Percent finer (%)	100.0	39.4	30.7	19.2	13.5	8.2	3.0	0.8	

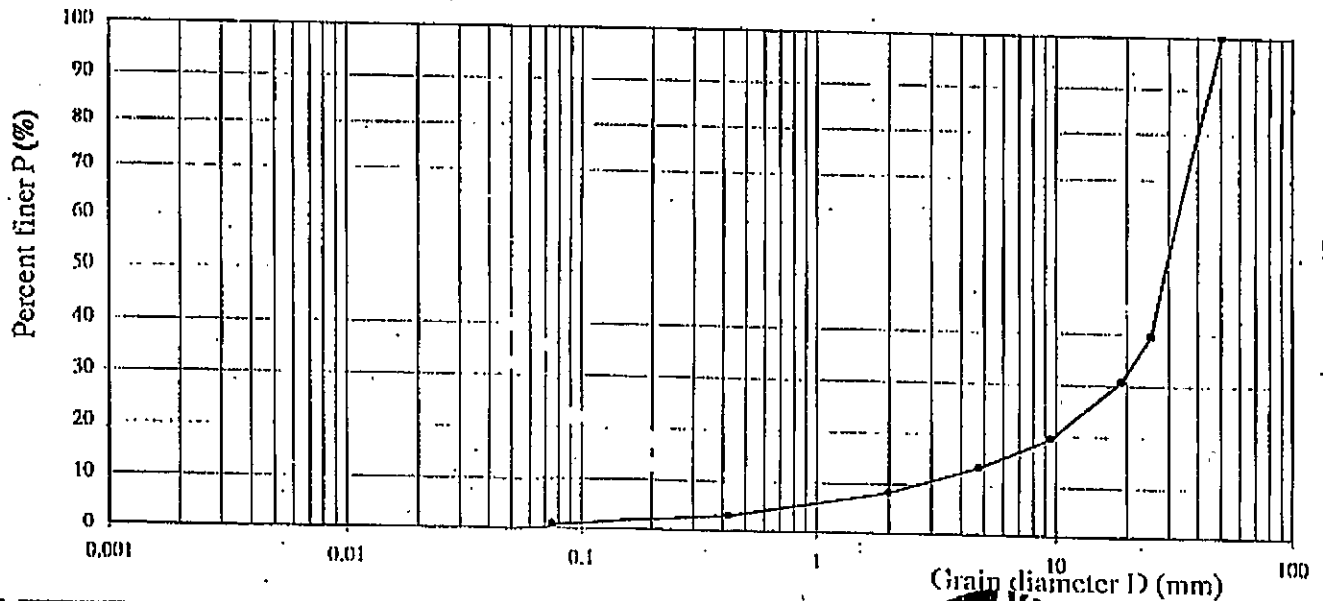
## RESULT

$D_{60} = 32.0$        $C_u = 11.9$   
 $D_{30} = 18.5$        $C_c = 4.0$   
 $D_{10} = 2.7$

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	60.6	8.7	11.4	5.7	5.3	5.2	2.3	0.8



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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  
PU TRANG BRIDGE

Borehole : T1  
Sample No : D3  
Depth (m) : 10.8 : 11.0

Tets No : 700  
Date : 12/7/2006

**SIZE ANALYSIS**

Weight of dry soil (g): 1088.6

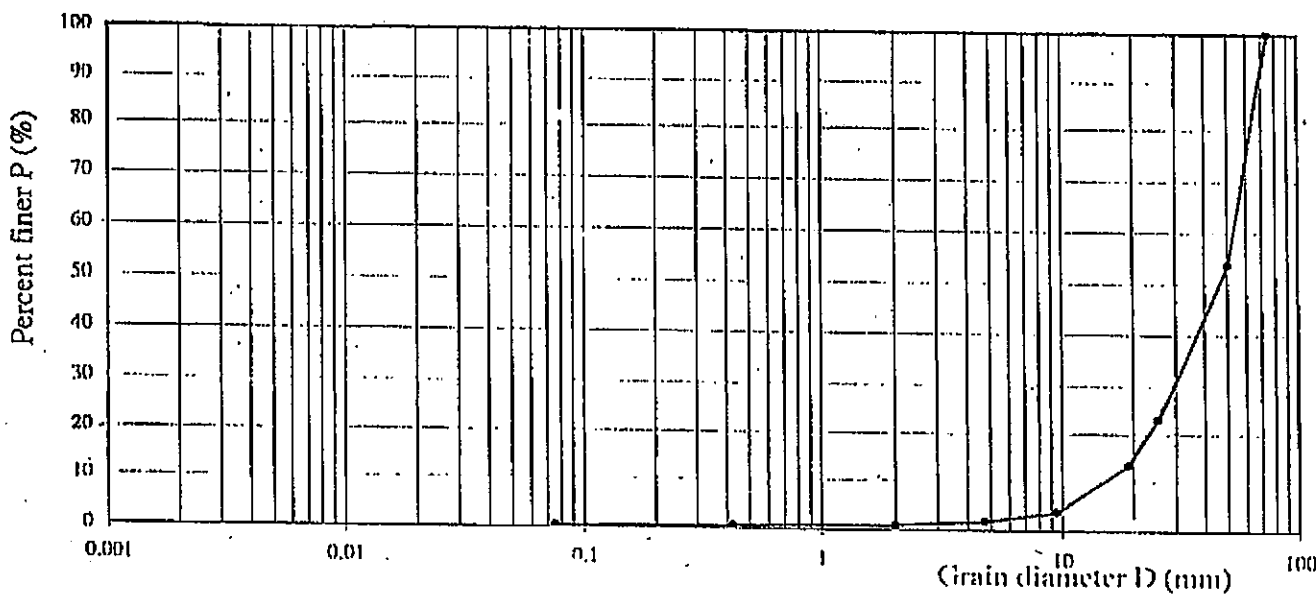
Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	505.30	335.10	105.60	100.80	21.20	9.60	2.90	3.30	4.80
Percent retained (%)	46.4	30.8	9.7	9.3	1.9	0.9	0.3	0.3	0.4
Percent finer (%)	53.6	22.8	13.1	3.8	1.9	1.0	0.7	0.4	

**RESULT**

$D_{60} = 53.0$        $C_u = 3.5$   
 $D_{30} = 30.0$        $C_c = 1.1$   
 $D_{10} = 15.0$

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 (%)	46.4	30.8	9.7	9.3	1.9	0.9	0.3	0.3	0.4



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*Handwritten signature*

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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  
PU TRANG BRIDGE

Borehole : T2  
Sample No : D1  
Depth (m): 4.2 - 4.4

Tests No : 705  
Date : 12/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 1227.0

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	320.20	740.40	95.80	55.30	10.50	4.80			
Percent retained (%)	26.1	60.3	7.8	4.5	0.9	0.4			
Percent finer (%)	73.9	13.6	5.8	1.2	0.4				

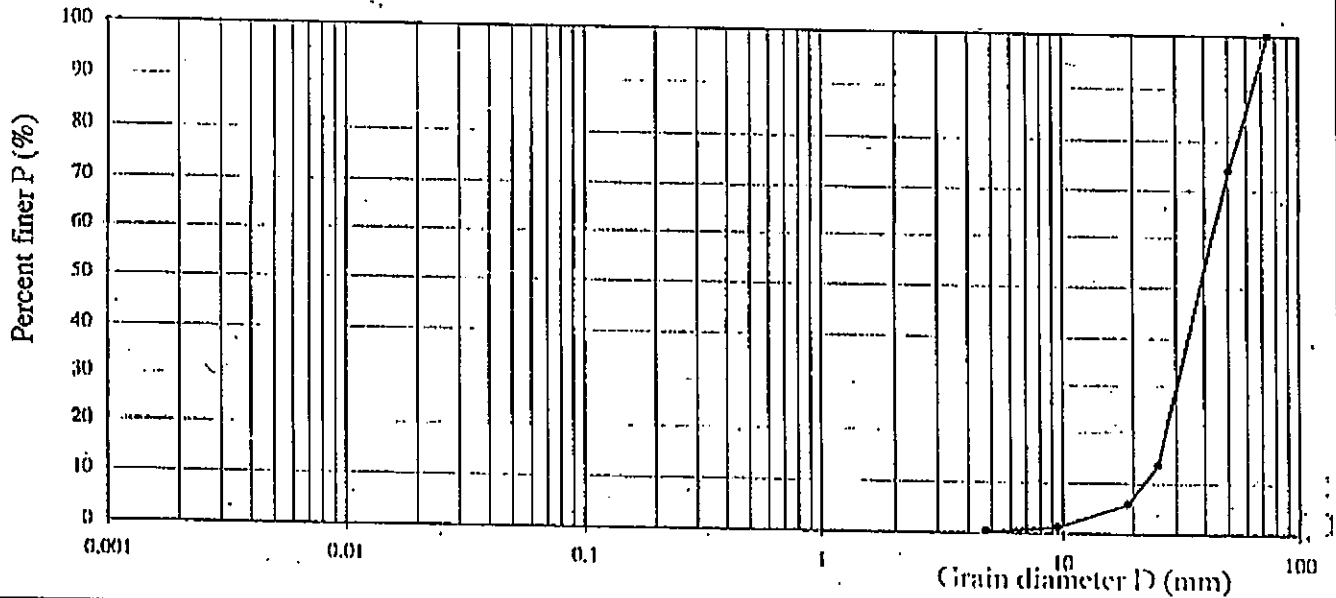
RESULT

$D_{60} = 43.0$        $C_u = 2.0$   
 $D_{30} = 31.0$        $C_c = 1.0$   
 $D_{10} = 22.0$

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 (%)	26.1	60.3	7.8	4.5	0.9	0.4	0.0	0.0	0.0



Tested by

*Nguyen Thi Hong*

Nguyen Thi Hong

Checked by

*Tran Van Toan*

Tran Van Toan

# GRAIN SIZE ANALYSIS

ASTM - D 422 - 63

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES  
PU TRANG BRIDGE

Borehole : T2  
 Sample No : D2  
 Depth (m) : 8.8 : 9.0

Tests No : 706  
 Date : 12/7/2006

**SIZE ANALYSIS**

Weight of dry soil (g) : - 957.9

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	0.00	675.80	50.40	15.40	96.00	38.80	29.10	18.60	3.80
Percent retained (%)	0.0	70.6	5.3	4.7	10.0	4.1	3.0	1.9	0.4
Percent finer (%)	100.0	29.4	24.2	19.4	9.4	5.4	2.3	0.4	

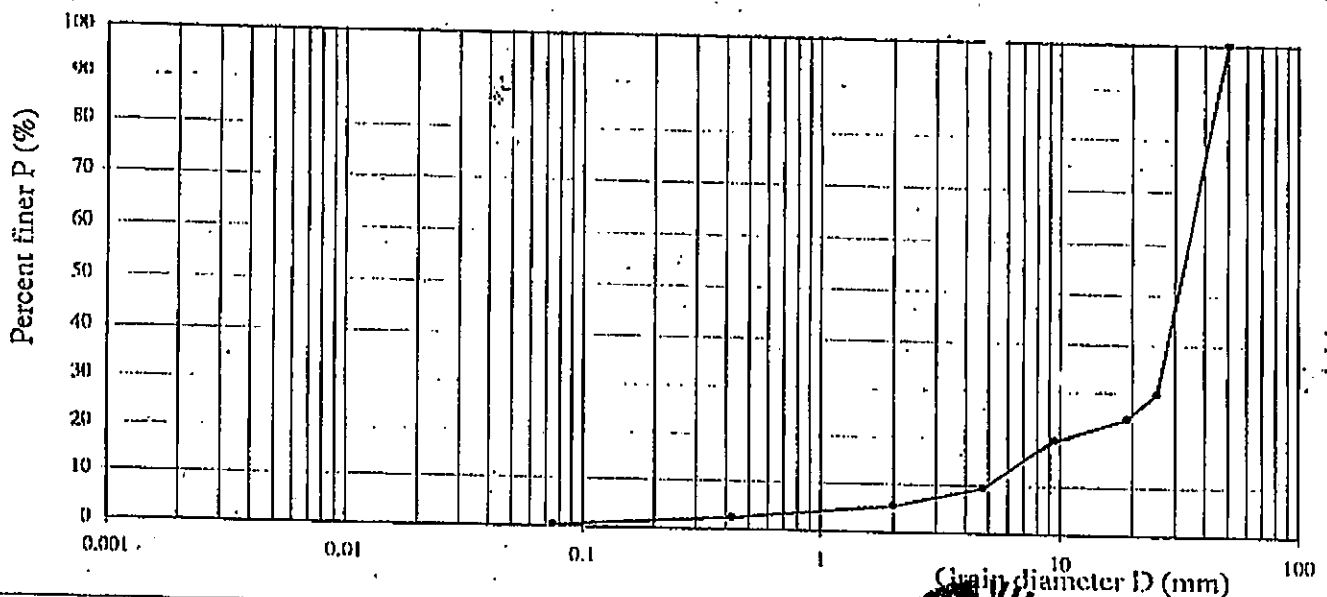
**RESULT**

$D_{60} = 34.0$        $C_u = 6.8$   
 $D_{30} = 20.0$        $C_c = 4.0$   
 $D_{10} = 5.0$

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	70.6	5.3	4.7	10.0	4.1	3.0	1.9	0.4



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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  
PU TRANG BRIDGE

Borehole : T2  
Sample No : D3  
Depth (m): 13.8 + 14.0

Tets No : 707  
Date : 12/7/2006

**SIZE ANALYSIS**

Weight of dry soil (g): 475.6

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	396.10	70.30	5.80	3.40				
Percent retained (%)	0.0	83.3	14.8	1.2	0.7				
Percent finer (%)	100.0	16.7	1.9	0.7	0.0				

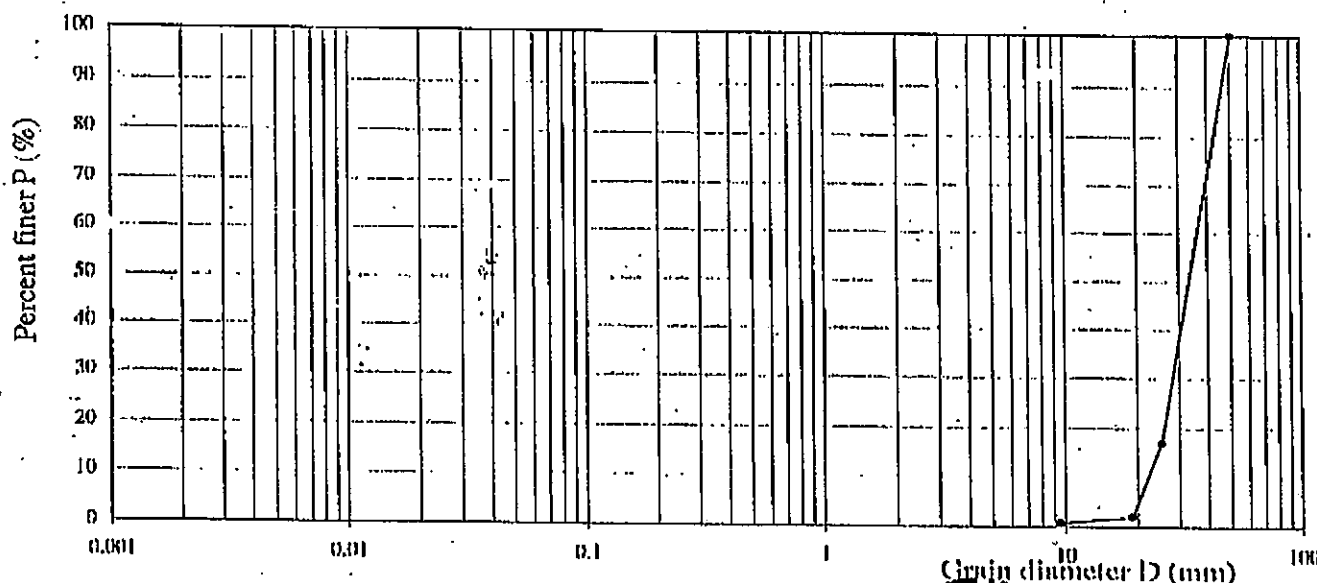
**RESULT**

$D_{60} = 37.0$        $C_u = 1.7$   
 $D_{30} = 29.0$        $C_c = 1.0$   
 $D_{10} = 22.0$

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	83.3	14.8	1.2	0.7	0.0	0.0	0.0	0.0



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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  
PU TRANG BRIDGE

Borehole : T2  
Sample No : D4  
Depth (m): 17.2 ; 17.4

Tets No : 708  
Date : 12/7/2006

SIZE ANALYSIS

Weight of dry soil (g): 982.0

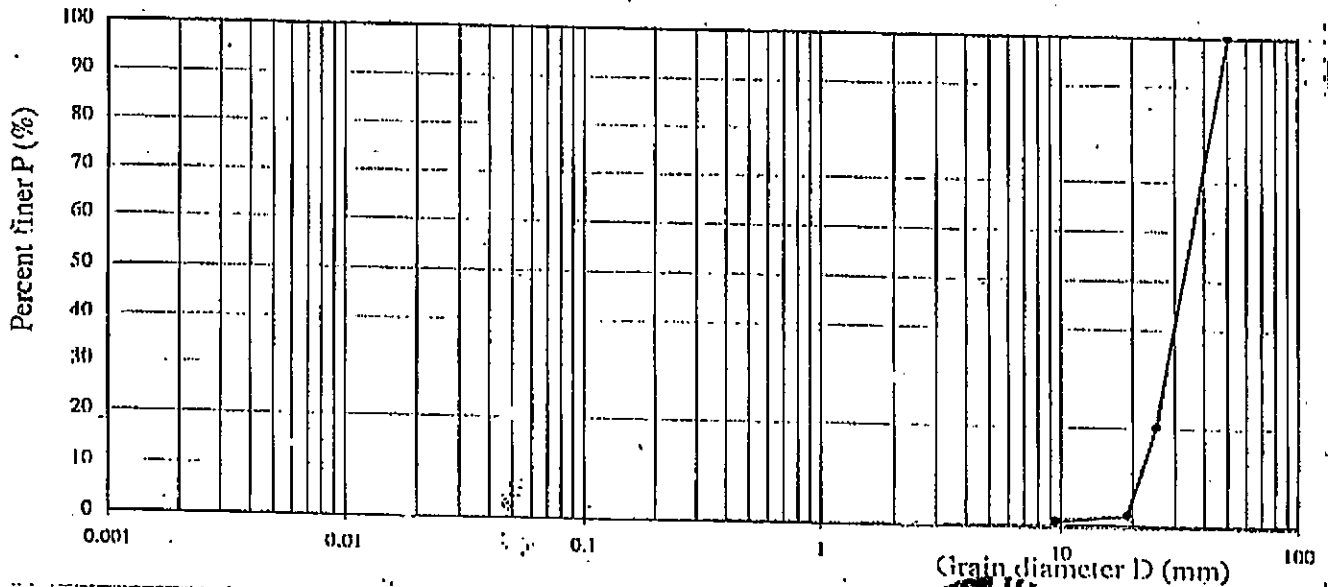
Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	0.00	786.40	172.60	12.70	10.30				
Percent retained (%)	0.0	80.1	17.6	1.3	1.0				
Percent finer (%)	100.0	19.9	2.3	1.0	0.0				

RESULT

$D_{60} = 37.7$        $C_u = 1.8$   
 $D_{30} = 28.0$        $C_c = 1.0$   
 $D_{10} = 21.0$

Soil classification (ASTM - D.2187)  
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	80.1	17.6	1.3	1.0	0.0	0.0	0.0	0.0



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*Signature*

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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  
PU TRANG BRIDGE**

Borehole : T2  
 Sample No : D5  
 Depth (m): 21.8 + 22.0

Tets No : 709  
 Date : 12/7/2006

**SIZE ANALYSIS**

Weight of dry soil (g): 706.3

Size (mm)	50.8	25.4	19.0	9.5	4.75	2.00	0.425	0.075	< 0.075
Weight soil (g)	540.10	140.90	25.30	0.00					
Percent retained (%)	76.5	19.9	3.6						
Percent finer (%)	23.5	3.6	0.0						

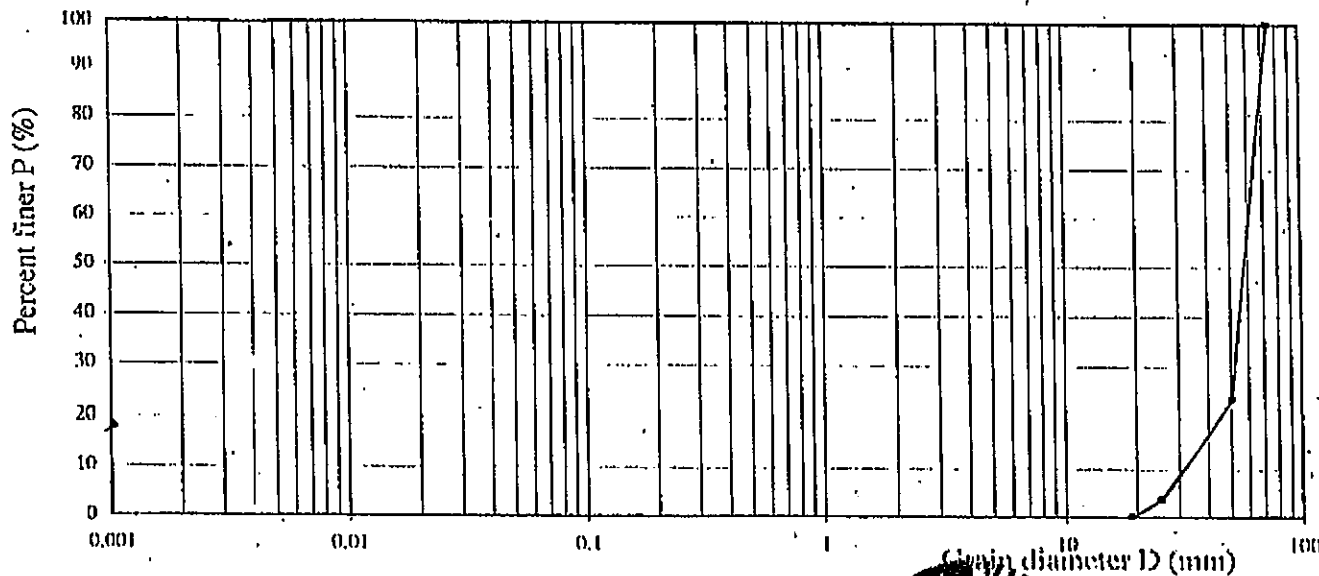
**RESULT**

$D_{60} = 61.0$        $C_u = 2.0$   
 $D_{30} = 52.0$        $C_c = 1.4$   
 $D_{10} = 31.0$

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 (%)	76.5	19.9	3.6	0.0	0.0	0.0	0.0	0.0	0.0



Tested by

*Signature of Nguyen Thi Hong*

Nguyen Thi Hong



VILAS 129

Tran Van Toan

**TEST FOR UNCONFINED COMPRESSIVE STRENGTH OF ROCK**

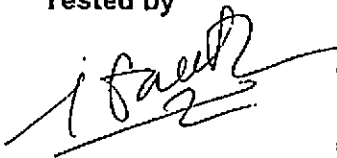
(22 TCN 57 - 84)

THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES

**PU TRANG BRIDGE**

Bore hole	M1	M2	LK - T2
Sample No	D7	D7	D6
Depth (m)	26,4-26,6	29,0-29,2	25,3-25,5
<b>Test items</b>			
Dry unconfined compressive strength $\sigma_{ti}$ (kG/cm <sup>2</sup> )	450,0	505,0	525,0
Saturated unconfined compressive strength $\sigma_{bh}$ (kG/cm <sup>2</sup> )	320,0	355,0	366,0
Index of softening k	0,71	0,70	0,70
Natural unit weight $\gamma_w$ (g/cm <sup>3</sup> )	2,385	2,390	2,390
Specific gravity $\Delta$ (g/cm <sup>3</sup> )	2,693	2,695	2,698

Tested by



Nguyễn Văn Hạnh


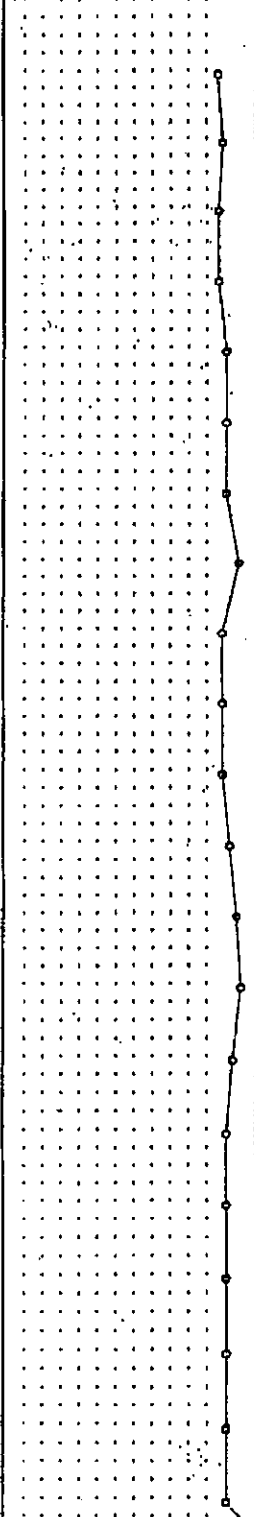
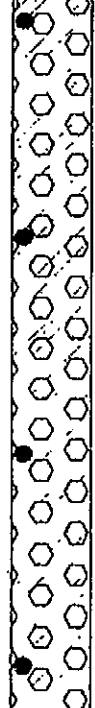
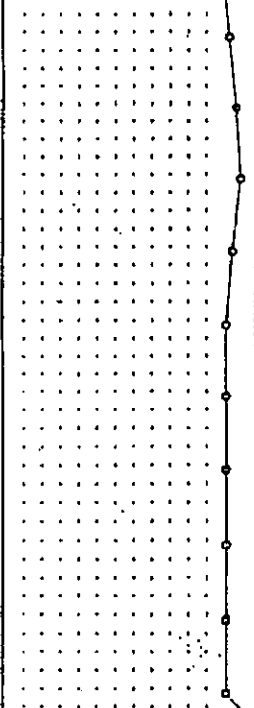


VII Trá Sv 9 Toản

BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF YEN BAI PROVINCE TA TIU BRIDGE (SHEET2/2)											
Bore hole		LKP02		Co-ord. X= Y=		Station: Km2+017m											
Elev.: +96.10		Elev. of underwater level: +0.00		Drilling date:		22/06/2006 - 27/06/2006											
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 <sub>60cm</sub>	Chart							
						N1	N2	N3			0	10	20	30	40	50	N
3	73.30	22.00		Granite is greenish grey and weathered to become grill-chip. Structure is very closed. While SPT to be refused.	SPT22 22.00-22.45	17	22	34	50							D8 24.80-24.80	
					SPT23 23.00-23.45	30	>50										
					SPT24 24.00-24.45	32	>50										
					SPT25 25.00-25.45	35	>50										
					SPT26 26.00-26.45	34	>50										
4	69.60	26.50		Granite is in greenish grey, weathered, cracked, some where broken to be block. Sample is not intact lump.											D9 28.00-28.20		
5	64.70	31.40		Granite is in greenish grey, little weathered. Hardness is level 7-8.											U10 33.80-34.00		
	62.00	34.10															

BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES TECHNICAL DESIGN PHASE				BRIDGES OF YEN BAI PROVINCE									
Bore hole		LKP02	Co-ord. X <sup>m</sup>	Y <sup>m</sup>	Station: Km2+017m										
Elev.: +96.10		Elev. of underwater level: +0.00		Drilling date:		22/06/2008 - 27/06/2008									
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 <sub>60</sub> cm	Chart					
N1	N2	N3	N <sub>60</sub> cm	0		10	20	30		40	50	N			
1	84.60	11.50		It is mixture of cobble, gravel, grit with blockstone, rolling boulder in blackish grey, whitish grey. Structure is loose (Value of SPT is N>50 due to during SPT to blow into cobble or blockstone).	SPT1 1.00-1.45	8	28	28	64						S1 2.00-3.00
					SPT2 2.00-2.45	8	31	38	67						
					SPT3 3.00-3.45	9	28	33	61						
					SPT4 4.00-4.45	10	22	31	53						
					SPT5 5.00-5.45	16	28	32	60						
					SPT6 6.00-6.45	11	32	34	68						
					SPT7 7.00-7.45	4	35	32	67						
					SPT8 8.00-8.45	5	33	42	75						
					SPT9 9.00-9.45	8	28	41	69						
					SPT10 10.00-10.45	7	31	39	70						
					SPT11 11.0-11.45	8	29	38	67						
2	84.60	11.50		It is mixture of cobble, gravel, grit in whitish grey, greenish grey mixed with rolling boulder and reddish brown clay. Structure is closed. (Value of SPT is N>50 due to during SPT to blow into cobble).	SPT12 12.00-12.45	11	38	43	71						S2 11.00-12.00
					SPT13 13.00-13.45	7	31	42	73						
					SPT14 14.00-14.45	6	38	43	81						
					SPT15 15.00-15.45	10	31	39	70						
					SPT16 16.00-16.45	13	29	37	65						
					SPT17 17.00-17.45	15	34	38	72						
					SPT18 18.00-18.45	12	36	35	71						
					SPT19 19.00-19.45	14	32	31	63						
					SPT20 20.00-20.45	15	29	36	65						
					SPT21 21.00-21.45	16	25	38	63						

BORING LOG

ENGINEERING		THE PROJECT FOR IMPROVEMENT OF RURAL BRIDGES IN NORTHERN MOUNTAINOUS PROVINCES				BRIDGES OF YEN BAI PROVINCE													
Bore hole		LKP01		Co-ord. X= Y=		Station: Km1+984m													
Elev.: +95.30		Elev. of underwater level: +0.00		Drilling date:		17/06/2006 - 21/05/2006													
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 <sub>60cm</sub>	Chart								
							N1	N2	N3			0	10	20	30	40	50	N	
1	85.50	9.80	9.80		It is mixture of cobble, gravel, grit with blockstone, rolling boulder in blackish grey, whitish grey. Structure is loose (Value of SPT is N>50 due to during SPT to blow into cobble or blockstone).	SPT1	1.40-1.85	25	32	40	72							D1 2.40-2.60	
						SPT2	2.60-3.05	26	35	41	78								
						SPT3	4.00-4.45	20	28	32	60								
						SPT4	5.00-5.45	22	31	38	69								
						SPT5	6.00-6.45	26	34	39	73								
						SPT6	7.00-7.45	21	29	39	68								
						SPT7	8.00-8.45	26	33	38	71								
						SPT8	9.00-9.45	23	29	42	71								
2	75.70	19.60	9.80		It is mixture of cobble, gravel, grit in whitish grey, greenish grey mixed with redish brown clay. Structure is closed. (Value of SPT is N>50 due to during SPT to blow into cobble).	SPT9	10.00-10.45	25	32	38	69							D2 6.60-6.70	
						SPT10	11.00-11.45	24	31	35	68								D3 7.60-8.00
						SPT11	12.00-12.45	27	34	39	73								
						SPT12	13.00-13.45	22	36	38	74								D4 10.80-11.00
						SPT13	14.00-14.45	20	32	40	72								
						SPT14	15.00-15.45	23	31	35	69								D5 12.60-13.00
						SPT15	16.00-16.45	20	28	39	67								
						SPT16	17.00-17.45	22	35	40	76								D6 15.60-16.00
						SPT17	18.00-18.45	27	28	36	64								
						SPT18	19.00-19.45	18	27	38	65	D7 18.80-19.00							