Fig.E.1-2 Drill Log (1/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.					
HOLE NO.	NO. 1	ELEVATION	809.01 m. A. S. L.	DEPTH	90 m	DATE: Feb. 17 — Feb. 22, 1990.
ANGLE		DIRECTION		SLOPE		

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	CORE RECOVERY % (m)	R. Q. D. % (m)	WATER PRESSURE TEST (N Value, Lugeon Value, Yielding Pressure: kg/cm², K Value: cm/sec.)
0			Wet Masonry			Fresh angular hard blocks of reddish brown welded tuff. Fine to coarse size mortar with irregular form of void and large thin void around the blocks. Some beige clay deposit in mortar from 2.70m. Void is ø 8mm in maximum.		NQ (76/47.6)			
5										59 (5.00)	Lower Depth : 5.00 K Value : 2.07 × 10^{-3}
10										76 (10.00)	Lower Depth : 10.00 K Value : 4.24 × 10^{-3}
15										81 (15.00)	Lower Depth : 15.00 K Value : 9.50 × 10^{-3}
16									100 (16.30)		
20						Joint along the contact between block and mortar with thin reddish oxide and/or beige clay.	17/2 (20.00)		100 (20.00)	78 (20.00)	Lower Depth : 20.00 K Value : 6.30 × 10^{-3}
24						Some inclusion of wooden pieces.					
25										76 (25.00)	Lower Depth : 25.00 K Value : 8.40 × 10^{-3}
28	27.90	781.11				Top of the Phase I construction.					
30										76 (30.00)	Lower Depth : 30.00 K Value : 8.60 × 10^{-3}

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is 1 l/min/m under injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (10.0) is Converted Lugeon Value.

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Fig.E.1-2 Drill Log (2/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.						
HOLE NO.	NO. 1	ELEVATION	809.01m. A. S. L.	DEPTH	90 m	DATE	Feb. 17 — Feb. 22, 1990.
ANGLE		DIRECTION		SLOPE			

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST
30							One meter of fine compacted mortar with subround agregates, avarege size ϕ 2mm.							
31														
32							Relatively good contact without major quantity of void.			32.35				
33														
34							Some angular blocks (26-35cm) are seen irregulary.							
35			Wet Masonry				Some layers of orange colour oxide.					84 (35.00)		Lower Depth : 35.00 K Value : 7.00 × 10 ⁻¹
36							Closed contact composed of fine layer of mortar & cement.							
37	37.62	771.39									100 (37.70)	78 (37.70)		Lower Depth : 37.70 K Value : 1.30 × 10⁻³
38						Moderately Alterated	Light pink to light red, fine grain with white spot of plagioclase and micro grained matrix.					32 (39.00)		
39														
40							Sub-vertical joints are seen in general with reddish brown clay and secondary silicate.							
41														
42						Slightly Alterated	Cracked section : 39.14 - 39.68m 43.45 - 44.60m 46.70 - 48.80m	16/2 (42.06)			100 (42.00)	41 (42.10)	CM	
43												70 (43.00)		
44							Irregular oxide along joints with deposit of white clay.							Upper Depth : 37.70 Lower Depth : 45.00 Lugeon Value : (13.1) B. Point :
45									NQ (76/ 47.6)			12 (45.00)		
46							Grout in construction period is seen, but not good penetrated.					90 (46.00)		
47							Light pink to light red, compact, fine rock.						CM	
48												27 (49.00)		
49			Welded Tuff		C, III, b		Sub-vertical open joints are predominant.				100 (50.00)	63 (50.00)		Upper Depth : 45.00 Lower Depth : 50.00 Lugeon Value : (15.5) B. Point :
50						No Alterated								
51														
52							Cracked section : 52.00 - 53.35m 54.00 - 54.45m					38 (52.50)	CM	
53												0 (53.60)		
54							Joints contain fine clay layer and/or oxide, sometimes secondary silicate veins.							Upper Depth : 50.00 Lower Depth : 55.00 Lugeon Value : (15.8) B. Point :
55								19/2 (55.00)			100 (55.00)			
56							Intensive reddish yellow oxidation section : 57.35 - 60.00m					30 (56.50)		
57													CM	
58							Cracked section : 57.50 - 57.83m 59.30 - 60.00m					35 (59.00)		
59														Upper Depth : 55.00 Lower Depth : 60.00 Lugeon Value : (14.6) B. Point :
60												0 (62.00)		

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is l / min. in water injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (10.0) is Corrected Lugeon Value.

Fig.E.1-2 Drill Log (3/20)

SHEET No. 3 OF 3

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.						
HOLE NO.	NO. 1	ELEVATION	809.01 m. A. S. L.	DEPTH	90 m	DATE	Feb. 17 — Feb. 22, 1990.
ANGLE		DIRECTION		SLOPE			

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION
60–72.70	72.70	736.31	Welded Tuff	~Δ~ / Δ~Δ	C, H, b	No Altered	Cracked section with clay layer or secondary silicate. 61.15 - 61.50m; 63.28 - 64.30m; 65.00 - 65.30m; 67.95 - 68.30m; 69.53 - 69.73m. Many voids are seen along stratified layers.
72.70–78.10	78.10	730.91	Welded Tuff	~Δ~ / Δ~Δ	C, H, b	No Altered	Hardly compact fine light pink rock. Little joint parallel to stratified layers.
78.10–90.00	90.00	719.01	Spotted Welded Tuff	~O~ / O~O	C, H, b	Slightly Altered	Reddish brown, fine compact with many light grey tuffaceous spots showing agromeradic aspect. Many voids are seen parallel to stratified layers. Sporadic open sub-vertucal joints with orange/black oxide and white clay layer.

DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)
20/2 (65.00)	NQ (76/47.6)		100 (65.00)	0 (62.00); 52 (63.50)
				0 (66.00); 40 (67.00); 0 (68.00); 80 (69.10); 60 (71.10); 94 (75.00); 48 (78.10)
21/2 (80.00)			100 (80.00)	44 (80.00)
22/2 (90.00)			100 (90.00)	60 (88.00); 85 (90.00)

CLASSIFICATION	WATER PRESSURE TEST (N Value, Lugeon Value, Yielding Pressure : kg/cm², K Value : cm/sec.)
CM	Upper Depth : 60.00, Lower Depth : 65.00, Lugeon Value : (15.5), B.Point : 7.2
CM	Upper Depth : 65.00, Lower Depth : 70.00, Lugeon Value : (17.2), B.Point :
	⊗
CH	Upper Depth : 70.00, Lower Depth : 75.00, Lugeon Value : 7.6, B.Point :
	Upper Depth : 75.00, Lower Depth : 80.00, Lugeon Value : (26.8), B.Point :
CM	Upper Depth : 80.00, Lower Depth : 85.00, Lugeon Value : (17.0), B.Point :
CM	⊗
	Upper Depth : 85.00, Lower Depth : 90.00, Lugeon Value : (17.9), B.Point :

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (18.0) is Converted Lugeon Value.

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Fig.E.1-2 Drill Log (4/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.					
HOLE NO.	NO. 2	ELEVATION	809.01 m. A. S. L.	DEPTH	120 m	DATE	Feb. 26 — Mar. 5, 1990.
ANGLE		DIRECTION		SLOPE		

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST (K Value, Lugeon Value, Yielding Pressure : kg/cm², K Value : cm/sec.)
0							Fresh hard angular block of light pink welded tuff of 10 - 70cm in large.							
1														
2							Fine grained porous mortar, sometimes alterated.							
3														
4							Detached contact between blocks and mortar.					77 (5.00)		Lower Depth : 5.00 K Value : 9.30 × 10⁻³
5							Voids with deposit of white clay and oxide.							
6														
7							Many voids(max. 10mm) are seen in the part of little cement portion and large size agregate.							
8														
9														
10							Sporadic joint with oxide and white clay.	26/2 (10.00)			100 (10.00)	57 (10.00)		Lower Depth : 10.00 K Value : 4.30 × 10⁻³
11										11.80				
12							Some inclusion of wooden pieces.							
13														
14							Agragate shows variable size and irregular distribution.					70 (15.00)		Lower Depth : 15.00 K Value : 7.00 × 10⁻³
15									NQ (76/47.6)					
16														
17														
18														
19												74 (20.00)		Lower Depth : 20.00 K Value : 1.00 × 10⁻³
20														
21														
22														
23														
24														
25												58 (25.00)		Lower Depth : 25.00 K Value : 9.90 × 10⁻³
26														
27	27.21	781.74	Wet Masonry				Top of the Phase I construction compact uniform mortar with round fine agregate. Little void.							
28														
29							Base layers composed of gradation in grain.	27/2 (30.00)			100 (29.63)	60 (29.63)		Lower Depth : 30.00 K Value : 1.70 × 10⁻³
30	29.62	779.39												

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) ÷ (Total drill length) × 100%
* LUGEON VALUE is l/min/m water injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is EASTERN LOUISIANA TEST performed point.
* (10.0) is Converted Lugeon Value.

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Fig.E.1-2 Drill Log (5/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.					
HOLE NO.	NO. 2	ELEVATION	809.01m. A. S. L.	DEPTH	120 m	DATE	Feb. 26 — Mar. 5, 1990.
ANGLE		DIRECTION		SLOPE		

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST
30				~Δ~			Open contact with beige clay.					0 (30.40)		
31				Δ~Δ										
				~Δ~			Light pink, fine grain with much quartz, white plagioclase in fine matrix.							
32				Δ~Δ									CM	
				~Δ~										
33				Δ~Δ										
				~Δ~			Sporadic sub-vertical joints with secondary silicate veins and beige clay.							Upper Depth : 30.00 Lower Depth : 35.00 Lugeon Value : (16.5) B. Point :
34				Δ~Δ										
				~Δ~								90 (35.10)		
35				Δ~Δ										
				~Δ~										
36				Δ~Δ										
				~Δ~									CM	
37				Δ~Δ										
				~Δ~										
38				Δ~Δ										
				~Δ~										
39				Δ~Δ										Upper Depth : 35.00 Lower Depth : 40.00 Lugeon Value : (13.8) B. Point :
				~Δ~										
40				Δ~Δ			Sub-vertical joints are predominant with little frecuency.							
				~Δ~										
41				Δ~Δ										
				~Δ~										
42				Δ~Δ										
				~Δ~									CM	
43				Δ~Δ			Voids are seen parallel to stratified layers, sometimes oxidated.							Upper Depth : 40.00 Lower Depth : 45.00 Lugeon Value : (14.2) B. Point :
				~Δ~										
44				Δ~Δ										
				~Δ~										
45				Δ~Δ					NQ (76/ 47.6)					
				~Δ~										
46				Δ~Δ										
				~Δ~										
47				Δ~Δ										
				~Δ~				28/2 (47.74)			100 (47.70)		CM	
48				Δ~Δ			Clare grey tuffaceous layers are seen.							
				~Δ~										
49				Δ~Δ										Upper Depth : 45.00 Lower Depth : 50.00 Lugeon Value : (11.8) B. Point :
				~Δ~										
50				Δ~Δ			Sub-vertical joints are predominant and contain orange colour oxide, secondary silicate, organic matarial and breccia.							
				~Δ~										
51				Δ~Δ										
				~Δ~										
52				Δ~Δ										
				~Δ~									CM	
53				Δ~Δ										
				~Δ~										
54				Δ~Δ										Upper Depth : 50.00 Lower Depth : 55.00 Lugeon Value : (10.1) B. Point :
				~Δ~										
55				Δ~Δ										
				~Δ~										
56				Δ~Δ										
				~Δ~										
57				Δ~Δ										
				~Δ~									CM	
58				Δ~Δ										
				~Δ~										
59				Δ~Δ			Stratified layers are seen horizontal.							Upper Depth : 55.00 Lower Depth : 60.00 Lugeon Value : (11.6) B. Point :
60				~Δ~								100 (79.30)		

Welded Tuff

C. II ~ III. b

No Alterated

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is l min. at water injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (10.0) is Corrected Lugeon Value.

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Fig.E.1-2 Drill Log (6/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.						
HOLE NO.	NO. 2	ELEVATION	809.01m. A. S. L.	DEPTH	120 m	DATE	Feb. 26 — Mar. 5, 1990.
ANGLE		DIRECTION		SLOPE			

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST N Value / Lugeon Value / Yielding Pressure : kg/cm² / N Value : cm/sec.
60–90	80.35	728.66	Welded Tuff / Spotted Welded Tuff		C. II～III. b / C. II. c / C. IV. c / C. II. b	No Alterated / Slightly Alterated / Moderately Alterated	Cracked section : 71.00 -71.70m Cracked section : 75.20 - 76.15m, 77.90 - 79.00m Light brown to reddish brown, fine compact with agromeradic aspect in fine compact matrix. Tuffaceous white spots are shown glassy fine grain which trend to make voids between 5 and 10mm in large. Cracked section is shown in the part of large presence of tuffaceous part : 88.25 - 88.73m, 89.10 - 89.75m	1/3 (65.00) 2/3 (78.00)	NO (76/47.6)		100 (65.00) 100 (70.30) 0 (72.00) 90 (75.00) 65 (78.00) 18 (77.00) 0 (80.25) 68 (82.00) 52 (87.25) 65 (88.20) 0 (90.20)	CM	Upper Depth : 60.00 Lower Depth : 65.00 Lugeon Value : (7.4) B. Point : Upper Depth : 65.00 Lower Depth : 70.00 Lugeon Value : (16.4) B. Point : Upper Depth : 70.00 Lower Depth : 75.00 Lugeon Value : (19.2) B. Point : Upper Depth : 75.00 Lower Depth : 80.00 Lugeon Value : (16.6) B. Point : Upper Depth : 80.00 Lower Depth : 85.00 Lugeon Value : (17.1) B. Point : Upper Depth : 85.00 Lower Depth : 90.00 Lugeon Value : (13.2) B. Point :

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (76.0) is Converted Lugeon Value.

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Fig.E.1-2 Drill Log (7/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.						
HOLE NO.	NO. 2	ELEVATION	809.01 m. A. S. L.	DEPTH	120 m	DATE	Feb.26 — Mar. 5, 1990.
ANGLE		DIRECTION		SLOPE			

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST (Lugeon Value)
90			Spotted Welded Tuff		B, III, c	Moderately Altered	Cracked section : 90.10 - 90.26m 91.10 - 91.30m 93.30 - 93.70m Horizontal joints are seen predominant. Many voids in grey spots. Dark beige clay layer : 95.85 - 96.00m	3/3 (91.00)	NQ (76/47.6)		100 (91.00)	10 (93.50) 0 (94.40) 19 (95.40)	CM	Upper Depth : 90.00 Lower Depth : 95.00 Lugeon Value : (13.4) B.Point :
95														
96					B, III, c								CM	Upper Depth : 95.00 Lower Depth : 100.00 Lugeon Value : (13.8) B.Point :
100						Slightly Altered	Cracked section : 99.00 - 99.45m 100.00 - 100.30m 100.85 - 101.00m 102.00 - 102.15m 102.90 - 103.00m	4/3 (101.74)				0 (102.00)	CM	Upper Depth : 100.00 Lower Depth : 105.00 Lugeon Value : (15.0) B.Point :
103					C, II, c							20 (104.00)		
106	106.20	702.81					Lithological gradation.							
107			Tuffaceous Welded Tuff		B, II, c	Moderately Altered	Light pink, compact fine grain. Sporadic joints (45 ° ~ Sub-vertical) with secondary silicate and/or orange colour oxide of clay.				100 (108.60)	92 (108.80)	CM	Upper Depth : 105.00 Lower Depth : 110.00 Lugeon Value : (11.8) B.Point :
110							Sub-horizontal joints with red clay layer or black organic material.							
112	112.00	697.01										35 (112.70)		
113			Tuff				White, reddish brown, red, fine or granular, compact.					45 (113.90)	CL	Upper Depth : 110.00 Lower Depth : 115.00 Lugeon Value : (10.4) B.Point :
114	114.48	694.63										0 (114.90)		
115			Sand Stone				Light gray, fine in upper and coarse in lower part. Spot of oxide.				100 (115.60)		CL	
116	116.65	692.36												
117	117.50	691.51	Tf				White, compact.	5/3 (117.50)				90 (117.60)	CL	
118			Welded Tuff		B, III, d	Slightly Altered	Sharp contact. Pinky grey, clare stratified layer. Open joint (45 ° ~ Sub-vertical).				100 (120.00)	100 (120.00)	CL	Upper Depth : 115.00 Lower Depth : 120.00 Lugeon Value : (20.5) B.Point :
120	120.00	689.01												

* R. Q. D is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (10.6) is Corrected Lugeon Value.

Fig.E.1-2 Drill Log (8/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.						
HOLE NO.	NO. 3	ELEVATION	805.49m. A. S. L.	DEPTH	90 m	DATE	Jan. 26 — Feb. 5, 1990.
ANGLE		DIRECTION		SLOPE			

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST
0	0.31	805.18					Gravestone (max. 5cm) with concrete.							
1			Tuff		C, <IV, d	Moderately Altered	Light pink, soft, moderately compact, sandy coarse matrix.							
2							Ryolitic rock.	26/1 (2.35)					CM	Upper Depth : 2.35 Lower Depth : 2.65 N Value : 104
3	3.30	802.19					Partially brown clay layer max. 30 -40 cm.				100 (3.30)	0 (3.40)		
4			Welded Tuff		C, II, b	No Altered	Light pink to light red, compact.					42 (6.00)		
5							Inclusion of 2 - 5 cm large andestic angular fragments.							
6												89 (7.00)		
7							Joints (sub-vertical, 45 -60°) with orange colour oxide are predominant.							
8					C, II & III, b		From 6.80m deposit of beige clay is seen along joints.							
9													CM	Upper Depth : 8.00 Lower Depth : 10.00 Lugeon Point : (9.9) B.Point :
10								27/1 (10.00)				40 (10.00)		
11												96 (11.00)		
12							Cracked sector :- 12.68 - 14.00m					15 (12.70)		
13					C, III, b			28/1 (13.36)						
14	14.20	791.29						29/1 (14.00)			100 (14.00)			Upper Depth : 14.00 Lower Depth : 15.00 Lugeon Value : 58.00 B.Point : 1.6
	14.90	790.58					Hollow (rubber piece is found).		NQ (76/ 47.6)		45 (15.00)			
15	15.40	790.09	WT				Same as upper stratum.						CM	
16					E, <IV, d	Moderately Altered	White to light beige, ryolitic sandy matrix, little compact, soft, friable.	30/1 (16.00)						
17														
18							Rim of core is covered by dark brown to reddish clay and/or silt.							Upper Depth : 18.49 Lower Depth : 18.79 N Value : 23
19														
20											100 (20.00)			
21			Sandy Tuff				Dark reddish clay layers are seen irregularly.				98 (21.00)			
22													CL ~ D	
23														
24						Very Altered	Clay alteration is predominant.							
25														
26														
27											100 (27.20)			Upper Depth : 27.60 Lower Depth : 27.90 N Value : 22
28	28.60	776.89												
29			Breccia			Hardly Alt.	Fault breccia zone.							
30	30.00	775.49										0 (42.10)		

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) ÷ (Total drill length) × 100%
* LUGEON VALUE is l/min·m under injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (10.0) is Converted Lugeon Value.

Fig.E.1-2 Drill Log (9/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.						
HOLE NO.	NO. 3	ELEVATION	805.49m. A. S. L.	DEPTH	90 m	DATE	Jan.26 — Feb. 5, 1990.
ANGLE		DIRECTION		SLOPE			

SCALE (m)	DEPTH (m)	ELEVATION (m. A. S. L.)	ROCK TYPE	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST (N Value, Lugeon Value, Yielding Pressure: kg/cm², K Value: cm/sec.)
30–40.45	40.45	765.04	Sandy Tuff	E, < IV, d	Hardly Altered	White, fragile, soft. Some reddish brown clay layers are seen. Alteration grade is disminished to the lower part.	31/1 (35.00) 1/2 (40.45)		36.65	100 (40.45)		CL ~ D	Upper Depth : 32.87 Lower Depth : 33.17 N Value : 24 Upper Depth : 38.60 Lower Depth : 38.90 N Value : 23
40.45–45.20	45.20	760.29	Clayey Tuff	D, < IV, d	Slightly Altered	Light pink, fine compact with many plagioclase and black mica. Irregular joints (60° ~ 70°). Broken section : 44.60 ~ 45.00m					0 (42.10) 44 (42.90)	CM	Upper Depth : 40.00 Lower Depth : 45.00 Lugeon Value : (13.7) B. Point :
45.20–57.20	57.20	748.29	Silty Tuff	D, II, c	Almost No Altered	White to light pink, compact, sometimes granular fragile with reddish brown spots. Stingy joints are seen.	2/2 (50.00)	NQ (76/47.6)			20 (45.50) 18 (48.30) 47 (49.70)	CL	Upper Depth : 45.00 Lower Depth : 50.00 Lugeon Value : (10.7) B. Point :
				C, II, c	Moderately Altered	Principal joints are inclined 70° with deposit of clay. Stingy joints are seen in general.				100 (57.20)	68 (52.00) 82 (57.20)	CL CM	Upper Depth : 50.00 Lower Depth : 55.00 Lugeon Value : (12.6) B. Point :
57.20–60			Porous Welded Tuff	B, II, c		Pink to reddish brown, compact, friable, sometimes with granular aspect in fine matrix.				100 (60.00)	85 (60.00)	CL	Upper Depth : 55.00 Lower Depth : 60.00 Lugeon Value : (9.8) B. Point :

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊕ is LATERAL LOADING TEST performed point.
* (10.0) is Corrected Lugeon Value.

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Fig.E.1-2 Drill Log (10/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.							
HOLE NO.	NO. 3	ELEVATION	805.49m. A. S. L.	DEPTH	90 m	DATE	Jan.26 -- Feb. 5, 1990.	
ANGLE	90°	DIRECTION	N 0° E	SLOPE	90°			

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST
60				~Δ~			Many voids are seen.							
61				Δ~Δ			Stingy joints are seen.							
				~Δ~										
62				Δ~Δ										
				~Δ~			Reddish brown, yellow, brown, orange, granular rough aspect with little voids.						CL	
63				Δ~Δ										
				~Δ~										
64				Δ~Δ										Upper Depth : 60.00 Lower Depth : 65.00 Lugeon Value : (12.2) B. Point :
				~Δ~			Many oxidated spots are seen.	3/2 (65.00)						
65				Δ Δ										
				~Δ~										
66				Δ~Δ			Almost horizontal stratified layers are seen in general.							
				~Δ~										
67				Δ~Δ										
				~Δ~										
68				Δ~Δ										
				~Δ~										
69				Δ~Δ									CL	Upper Depth : 65.00 Lower Depth : 70.00 Lugeon Value : (14.2) B. Point :
				~Δ~								100 (70.00)		
70				Δ~Δ			Thin reddish brown clay layer along the joint.							
				~Δ~										
71				Δ~Δ										
				~Δ~										
72				Δ~Δ										
				~Δ~			Alteration zone and it's grade are irrgular.							
73				Δ~Δ										
				~Δ~										
74				Δ~Δ								94 (74.00)		Upper Depth : 70.00 Lower Depth : 75.00 Lugeon Value : (17.2) B. Point :
				~Δ~	C. H. c									
75				Δ~Δ			Granular aspect with many voids.		NQ (76/ 47.6)					
				~Δ~										
76				Δ~Δ										
				~Δ~			Large thin voids are seen along stratified layers.							
77				Δ~Δ										
				~Δ~										
78				Δ~Δ										
				~Δ~										
79				Δ Δ										Upper Depth : 75.00 Lower Depth : 80.00 Lugeon Value : (2.6) B. Point : 5.3
				~Δ~										
80				Δ~Δ			Yellow grey with oxidation irregular bands.							
				~Δ~										
81				Δ~Δ									CM ≀ CL	
				~Δ~								100 (82.00)		
82				Δ~Δ										
				~Δ~										
83				Δ~Δ										
				~Δ~										
84				Δ~Δ			Stingy joints are seen.							Upper Depth : 80.00 Lower Depth : 85.00 Lugeon Value : (1.3) B. Point : 9.4
				~Δ~				4/2 (85.00)						
85				Δ Δ										
				~Δ~										
86				Δ~Δ										
				~Δ~										
87				Δ~Δ			Many little voids along stratified layers.							
				~Δ~										
88				Δ~Δ										
				~Δ~										
89				Δ~Δ										
				~Δ~										
90	90.00	715.49	Welded Tuff			Moderately Alterated		6/2 (90.00)			100 (90.00)	93 (90.00)		Upper Depth : 85.00 Lower Depth : 90.00 Lugeon Value : (13.0) B. Point :

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is l-min/m under injection water pressure of 10kg/cm².
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (10.0) is Corrected Lugeon Value.

Fig.E.1-2 Drill Log (11/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.					
HOLE NO.	NO. 4	ELEVATION	794.27m. A. S. L.	DEPTH	60 m	DATE	Jan. 27 — Feb. 5, 1990.
ANGLE		DIRECTION		SLOPE		

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST
0			Silty Tuff		D, V, c	Weathered	Completely wheathered White to light gray, scattered pieces, fine grain.				100 (2.85)	0 (2.85)	CM ≀ CL	
2.85	2.85	791.42	Tuff		C, III, c	Moderately Altered	White to light pink, with many voids. Scattered broken core. Ryolitic rock.	27/1 (5.00)				19 (6.00)	CM	
6.38	6.38	787.89	Welded Tuff		B, IV, b	No Altered	Light pink compact with sandy hard matrix. Sub-vertical and sub-horizontal joints are predominant, sometimes open joints. Orange colour clay layers and oxide are seen along the joints. Length of core is cut between 10.00 - 15.00cm. Reddish oxide and black organic material are seen along the joints.	28/1 (12.71) 29/1 (15.00)	NO (76/47.6)			0 (7.00) 58 (9.00) 20 (11.00) 0 (12.10) 20 (15.00)	CH ≀ CM	Upper Depth : 5.00 Lower Depth : 10.00 Lugeon Value : (13.4) B.Point : Upper Depth : 10.00 Lower Depth : 15.00 Lugeon Value : (14.4) B.Point :
19.44	19.44	774.83									100 (19.44)			Upper Depth : 15.00 Lower Depth : 20.00 Lugeon Value : (52.6) B.Point : 2.5
19.87	19.87	774.40					Hollow (open joint)					0 (19.87)		
20			Welded Tuff		C, III, b	No Altered	Light grey to light brown, compact, hard, with many crystal of quartz and plagioclase. Slightly stratified. Irregular sub-vertical and 60° joints are predominant. Some joints contain secondary silicate and orange colour oxide. Stingy joints are seen.	30/1 (24.21)				40 (25.00)	CH	Upper Depth : 20.00 Lower Depth : 25.00 Lugeon Value : (17.2) B.Point : Upper Depth : 25.00 Lower Depth : 30.00 Lugeon Value : (18.0) B.Point :
30												69 (31.00)		

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (18.0) is Corrected Lugeon Value.

Fig.E.1-2 Drill Log (12/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.					
HOLE NO.	NO. 4	ELEVATION	79427m. A. S. L.	DEPTH	60 m	DATE	Jan.27 — Feb. 5, 1990.
ANGLE		DIRECTION		SLOPE		

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST
30							Light brown, compact, hard with many crysteles of plagioclase.			▽ 30.25		69 (31.00)		
31								31/1 (31.41)						
32					B. III. b								CH	
33												42 (33.00)		
34							Sub-horizontal open joints are predominant, sometimes contain secondary silicate of 0.5cm in maximum.							Upper Depth : 30.00 Lower Depth : 35.00 Lugeon Value : (15.2) B.Point :
35														
36													CH	
37							Stingy joints.							
38								1/2 (38.28)				85 (39.00)		
39					B. II. b									Upper Depth : 35.00 Lower Depth : 40.00 Lugeon Value : (17.0) B.Point :
40							Voids along the contact between andestic inclusion and matrix.							
41													CH	
42							Many white plagioclases are seen							
43														Upper Depth : 40.00 Lower Depth : 45.00 Lugeon Value : (16.3) B.Point : ⊗
44														
45			Welded Tuff			No Alterated		2/2 (45.00)	NQ (76/47.6)					
46							Stratified layers are clare.					59 (47.00)		
47														
48							Large voids along stratified layers.							
49														Upper Depth : 45.00 Lower Depth : 50.00 Lugeon Value : 10.6 B.Point :
50												66 (50.00)		
51					B. III. b								CH	
52														
53								3/2 (53.00)						
54														Upper Depth : 50.00 Lower Depth : 55.00 Lugeon Value : (12.1) B.Point :
55							Welded micro breccia with secondary dark grey silicate.							
56								4/2 (56.61)				54 (57.00)		
57														⊗
58					B. II. b		Stingy joints are seen.						CH	
59														Upper Depth : 55.00 Lower Depth : 60.00 Lugeon Value : (11.1) B.Point :
60	60.00	734.27						5/2 (60.00)			100 (60.00)	86 (60.00)		

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is l/min. at meter injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOGGING TEST performed point.
* (10.0) is Corrected Lugeon Value.

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.				
HOLE NO.	NO. 5	ELEVATION	790.49m. A. S. L.	DEPTH 60 m	DATE Feb. 16 — Feb. 22, 1990.
ANGLE		DIRECTION		SLOPE	

SCALE (m)	DEPTH (m)	ELEVATION (m. A. S. L.)	ROCK TYPE	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST
0–1.10	1.10	789.39	WT	C, II, c	M. Alt.	Completely wheathered. Light grey, not much compact.					CM ~ CL	
1.10–7.8			Welded Tuff	C, II ~ III, b	Slightly Alterated	Light grey to light pink, compact, massive with many inclusion of sub-angular brown and grey andesite in fine matrix. Irregular sub-vertical open joints with secondary silicate veins and orange colour oxide.				65 (2.00); 82 (7.00)		
7.8–15.3					No Alterated	Sometimes deposits of beige clay are seen along the open joints. Partially tuff rich soft layers are found. Joints (70 ~ 75°) are predominant.	16/2 (8.60)	NO (76/47.6)	100 (8.60)	10 (8.00); 60 (10.00); 12 (11.90); 54 (15.30)		Upper Depth : 5.00 Lower Depth : 10.00 Lugeon Value : (11.4) B.Point : ; ⊗ ; Upper Depth : 10.00 Lower Depth : 15.00 Lugeon Value : (13.7) B.Point :
15.3–30						Some primary open fractures with oxide and breccia are seen between 15.30 & 16.30m. Stingly joint. Many voids along the contact between inclusion and matrix. Clare stratified layers are predominant. Little open joints with orange colour oxide and secondary silicate are seen.	17/2 (18.00); 18/2 (26.00); 19/2 (30.00)		100 (18.00); 100 (26.00); 100 (30.00)	100 (31.00)	CM	Upper Depth : 15.00 Lower Depth : 20.00 Lugeon Value : (14.0) B.Point : ; Upper Depth : 20.00 Lower Depth : 25.00 Lugeon Value : (7.6) B.Point : ; ⊗ ; Upper Depth : 25.00 Lower Depth : 30.00 Lugeon Value : (5.7) B.Point :

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) (Total drill length) × 100%
* LUGEON VALUE is 1 min m water injection water pressure of 10kg cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (10.0) is Corrected Lugeon Value.

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Fig.E.1-2 Drill Log (14/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.						
HOLE NO.	NO. 5	ELEVATION	790.49m. A. S. L.	DEPTH	60 m	DATE	Feb.16 — Feb. 22, 1990.
ANGLE		DIRECTION		SLOPE			

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST (K Value, Lugeon Value, Yielding Pressure : kg/cm², K Value : cm sec.)
30			Welded Tuff	~Δ~	C. II. III. b	No Alterated	White silty tuff of 20cm.					100 (31.00)		
31				Δ~Δ										
32				~Δ~										
33				Δ Δ						32.95		52 (33.00)		
34				~Δ~										Upper Depth : 30.00 Lower Depth : 35.00 Lugeon Value : (6.0) B. Point :
35				Δ~Δ			Contain aboundant quartz.						CM	
36				~Δ~										
37				Δ~Δ			Slightly stratified.							
38				~Δ~										
39				Δ~Δ							109 (39.20)	98 (39.00)		Upper Depth : 35.00 Lower Depth : 40.00 Lugeon Value : (7.2) B. Point :
40				~Δ~	C. II	Slightly Alterated	Pink, compact, hard.	20/2 (40.00)				46 (40.00)		
41				Δ~Δ			Almost horizontal joints containing secondary silicate veins.							
42				~Δ~										
43				Δ~Δ									CM ↓	
44				~Δ~										Upper Depth : 40.00 Lower Depth : 45.00 Lugeon Value : (9.4) B. Point :
45				Δ~Δ			Light pink, compact, hard with clare stratification.		NQ (76/ 47.6)					
46				~Δ~										
47				Δ~Δ			Open irregular joint with secondary silicate.							
48	48.65	741.83		~Δ~								95 (48.65)		
49			Clayey Tuff	/\/\	B. IV. b	Very Alt.	Pinky white, soft, friable with white clay layers.						D	Upper Depth : 45.00 Lower Depth : 50.00 Lugeon Value : (6.8) B. Point :
50	50.60	740.49										22 (50.00)		
51			Breccia & Clay		D. < IV. d	Hardley Alterated	Fault breccia zone with reddsh clay.	21/2 (51.49)			100 (51.48)			
52							Reddish brown, yellow orange colour, soft, friable, broken part.							
53													CL	
54							Hardly alterated matrix.							Upper Depth : 50.00 Lower Depth : 55.00 Lugeon Value : (13.7) B. Point :
55							Many irregular joints.							
56	56.20	734.29										0 (56.24)		
57			Sandy Tuff	/\/\	C. II. c	Slightly Alterated	Light pink, brown grey, compact with little joints.						CM	
58				/\/\										
59				/\/\										Upper Depth : 55.00 Lower Depth : 60.00 Lugeon Value : (10.4) B. Point :
60	60.00	730.49		/\/\				22/2 (60.00)			100 (60.00)	98 (60.00)		

* R. Q. D is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is 1 min. in water injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (10.0) is Corrected Lugeon Value.

Fig.E.1-2 Drill Log (15/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.						
HOLE NO.	NO. 6	ELEVATION	75828m. A. S. L.	DEPTH	60 m	DATE	Feb. 26 — Mar. 6, 1990.
ANGLE		DIRECTION		SLOPE			

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST (K Value: Lugeon Value; Yielding Pressure: kg/cm²; K Value: cm/sec.)
0–9	9.82	748.46	River Deposit				Angular to sub-angular blocks of welded tuff ranging from 1.5 to 22cm, beige to light grey sand and silt.			2.20				
								26/2 (3.00)						
							Fine sand and silt zone, with fine gravel of welded tuff.							
								21/2 (8.00)						
							Principally large gravels.				100 (9.70)	(9.70)		
10			Welded Tuff		C, IV, d	Moderately	Pinky grey, compact with inclusion of angular to sub-angular andsite.					0 (11.00)	CL	Upper Depth : 10.00 Lower Depth : 15.00 Lugeon Value : (11.4) B. Point :
11–12							Almost horizontal open joints parallel to stratified layers are predominant.					22 (12.00)		
13–14							Secondary silicate veins are seen along joints.	28/2 (14.25)			100 (14.60)	15 (14.60)		
15					C, III, b		Cracked section : 14.26 - 14.80m 15.65 - 15.75m 16.00 - 16.15m 16.25 - 16.56m 19.10 - 19.20m		NQ (76/ 47.6)			50 (15.90)		
16–17												10 (17.30)		
18–19					B, II ~ III, b	Slightly Alterated	Slightly stratified layer with 30°							Upper Depth : 15.00 Lower Depth : 20.00 Lugeon Value : (10.8) B. Point :
20								1/3 (20.00)				58 (20.00)		
21–23							Small voids and oxide layers are seen along stratified layers. Cracked section : 20.60 - 21.05m 22.00 - 22.40m 24.50 - 24.68m							
24							Reddish brown, compact, hard with clare stratified layers.							Upper Depth : 20.00 Lower Depth : 25.00 Lugeon Value : (9.3) B. Point :
25								2/3 (25.00)				54 (25.00)		
26					B, III, b		Cracked section : 26.21 - 26.35m 28.55 - 29.00m 30.45 - 30.80m 32.00 - 32.47m 32.67 - 33.70m					64 (26.00)		
27–30												0 (27.00) 12 (30.00)		Upper Depth : 25.00 Lower Depth : 30.00 Lugeon Value : (15.8) B. Point :

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is 1 min. on meter injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (10.8) is Converted Lugeon Value.

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Fig.E.1-2 Drill Log (16/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.					
HOLE NO.	NO. 6	ELEVATION	758.28m. A. S. L.	DEPTH	60 m	DATE	Feb.26 — Mar. 6, 1990.
ANGLE		DIRECTION		SLOPE		

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST
30			Welded Tuff	~Δ~	C, III~IV, b	Slightly Alterated	Very scattered.	3/3 (31.00)						
31				Δ~Δ										
32				~Δ~			Some white tuffaceous bands along primary joints.							
33				Δ~Δ								16 (33.00)	CM	
34				~Δ~								0 (34.00)		Upper Depth : 30.00 Lower Depth : 35.00 Lugeon Value : (11.2) B. Point :
35				Δ~Δ				4/3 (35.00)						⊗
36				~Δ~										
	36.75	721.53		Δ~Δ										
37			Spotted Welded Tuff.	~O~	C, IV, c	Moderately Alterated	Reddish brown, compact, hard rock with grey spots sometimes voids.							
38				O~O							100 (38.33)	15 (38.33)		
39				~O~			Scattered zone is seen in 38.34 - 41.50m.						CM	Upper Depth : 35.00 Lower Depth : 40.00 Lugeon Value : (6.7) B. Point :
40				O~O										
41				~O~										
	41.50	716.78	Br				Fault breccia.							
42	42.00	716.28	Sandy Tuff	⋱⋰⋱	C, II, c	Hardly Alterated	Light pink, brown, dark grey, white, compact, friable.							
43				⋰⋱⋰				5/3 (43.76)					CL	
44				⋱⋰⋱			Sometimes breccia aspect.							Upper Depth : 40.00 Lower Depth : 45.00 Lugeon Value : (8.5) B. Point :
	44.85	713.43		⋰⋱⋰					NQ (76/ 47.6)		190 (45.10)	0 (45.10)		
45			Welded Tuff	~Δ~	C, II~III, c	Moderately Alterated	Grey, pink, reddish brown, compact, fragile, sometimes with granular aspect.							
46				Δ~Δ										
47				~Δ~			Stingy joints are seen.							
48				Δ~Δ										
49				~Δ~										Upper Depth : 45.00 Lower Depth : 50.00 Lugeon Value : (8.5) B. Point :
50				Δ~Δ			Orange colour oxidation irregular zones.							
51				~Δ~									CM ~ CL	
52				Δ~Δ										
53				~Δ~										Upper Depth : 50.00 Lower Depth : 55.00 Lugeon Value : (8.6) B. Point :
54				Δ~Δ										
55				~Δ~										
56				Δ~Δ										
57				~Δ~			Slightly stratified layers.							
58				Δ~Δ										
59				~Δ~										Upper Depth : 55.00 Lower Depth : 60.00 Lugeon Value : (4.8) B. Point :
60	60.00	698.28		Δ~Δ				6/3 (60.00)			100 (60.00)	100 (60.00)		

WATER PRESSURE TEST: N Value / Lugeon Value / Yielding Pressure : kg/cm² / K Value : cm/sec.

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (10.0) is Corrected Lugeon Value.

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Fig.E.1-2 Drill Log (17/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.						
HOLE NO.	NO. 7	ELEVATION	806.95m. A. S. L.	DEPTH	60 m	DATE	Mar.8 — Mar. 15, 1990.
ANGLE	90°	DIRECTION		SLOPE			

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST (N Value / Lugeon Value / Testing Pressure : kg/cm² / N Value : cm/sec.)
0			Welded Tuff		C, III～IV, c	Moderatery Alterated	Pinky grey, compact, with angular to sub-angular reddish brown andestic inclusions.							
1														
2														
3							Sometimes granular aspect is seen in general.					30 (3.00)		
4												47 (4.00)		
5								8/3 (5.00)				12 (5.00)		
6							Almost horizontal joints are predominant.							
7							Cracked section : 0.65 - 1.00m, 1.30 - 1.42m, 4.30 - 4.37m, 4.43 - 4.50m, 4.76 - 4.87m, 6.13 - 6.25m, 7.15 - 7.61m, 8.25 - 8.33m, 8.44 - 8.53m, 9.15 - 9.22m						CM ≥ CL	
8												35 (8.00)		
9												20 (9.00)		Upper Depth : 5.00 Lower Depth : 10.00 Lugeon Value : (14.0) B. Point : ⊗
10														
11					D, III, c		Slightly stratified.					65 (11.00)		
12					C, III, c		Cracked section : 11.84 - 11.95m, 12.40 - 13.50m				100 (12.40)			
13					D, IV, d							25 (13.00)		
14					B, III, d		Core with clayey rim of soft, fractured section.							Upper Depth : 10.00 Lower Depth : 15.00 Lugeon Value : (13.8) B. Point :
15					B, III～IV, d				NO (76/47.6)			45 (15.50)		
16					B, IV, d		Light reddish brown with clare stratified white tuffaceous layers.					10 (16.00)		
17														
18					B, III, c		Joint dips 70 ° with secondary black oxide.	9/3 (18.41)				45 (18.80)		Upper Depth : 15.00 Lower Depth : 20.00 Lugeon Value : (13.1) B. Point : ⊗
19														
20							Rough surface of core due to high content of tuffaceous portion.			19.80 ▽		0 (20.80)		
21					B, III～IV, c	Slightly Alterated	Cracked sector : 20.25 - 20.34m, 20.42 - 20.72m, 21.20 - 21.44m, 21.92 - 22.00m, 22.18 - 22.31m, 22.82 - 22.97m					20 (22.00)	CM	
22														
23					B, III, a							0 (23.00)		
24														Upper Depth : 20.00 Lower Depth : 25.00 Lugeon Value : (13.4) B. Point :
25					C, III, c		Sub-vertical open joints are predominant with beige clay layers from 23.00m to 26.00m.					25 (25.00)		
26														
27							Irregular white tuffaceous bands are included.							
28														
29												83 (31.00)		Upper Depth : 25.00 Lower Depth : 30.00 Lugeon Value : (12.8) B. Point :
30														

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is 1 min. in water injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (18.0) is Converted Lugeon Value.

Fig.E.1-2 Drill Log (18/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.				
HOLE NO.	NO. 7	ELEVATION	806.95m. A. S. L.	DEPTH	60 m
ANGLE		DIRECTION		SLOPE	

DATE: Mar. 8 — Mar. 15, 1990.

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST
30			Welded Tuff		B, III~IV, c	Slightly Altered	Light reddish brown, compact with almost horizontal stratified layers.					83 (31.00)	CM	
31														
32							Predominant cracked sector : 31.56 - 31.72m, 31.83 - 32.00m, 32.16 - 32.25m, 32.36 - 32.63m, 32.74 - 33.25m, 33.40 - 33.60m, 33.70 - 33.86m	10/3 (33.00)				10 (33.90)		
33						Alt.								
34					B, II, c	M. Alt.		12/3 (35.00)				70 (35.60)		Upper Depth : 30.00 Lower Depth : 35.00 Lugeon Value : (14.3) B. Point :
35														
36					B, II, d	Alt.	All joints contain beige clay layer and orange colour oxide.					0 (37.20)	CM ≀ CL	
37														
38					C, III, d	Moderately Alterated						65 (38.20)		
39	39.12	767.83										80 (39.12)		Upper Depth : 35.00 Lower Depth : 40.00 Lugeon Value : (12.3) B. Point :
40			Sandy Tuff, Clay		E < IV, d	Hardly Alterated	Fault clay and breccia mixed zone. Dark reddish brown, soft, friable. Clay portion is predominant. Breccia portion is predominant. Light to dark grey.		NQ (76/47.6)				CL ≀ D	
41														
42														
43														
44														
45							Alternation of clayey and breccia irregular bands.	13/3 (48.00)						
46														
47														
48	48.53	758.42			C, V, d		White, pink, reddish brown, scattered, soft fragile with granular rough surface of core					0 (50.00)		
49			Welded Tuff		D, IV, d	Alterated						25 (50.90)		
50														
51														
52							White tuffaceous sector.					0 (53.00)		
53					C, III, c	Moderately Alterated								
54												70 (54.50)	CL	Upper Depth : 50.00 Lower Depth : 55.00 Lugeon Value : (16.8) B. Point :
55								14/3 (55.00)						
56							Stingy joints are seen in general.							
57														
58												65 (58.00)		
59														Upper Depth : 55.00 Lower Depth : 60.00 Lugeon Value : (0.6) B. Point : 5.0
60	60.00	746.95						15/3 (60.00)			100 (60.00)	84 (60.00)		

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is l-min. in water injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (10.0) is Converted Lugeon Value.

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Fig.E.1-2 Drill Log (19/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.						
HOLE NO.	NO. 8	ELEVATION	807.48m. A. S. L.	DEPTH	60 m	DATE	Mar.16 — Mar. 18, 1990.
ANGLE		DIRECTION		SLOPE			

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST (Lugeon Value)
0			Tuff		D, <IV, d	Very Alt.	Light grey, compact, soft, friable and broken.		NQ (76/47.6)				CL	
1							Hardly weathered.							
	1.90	805.58												
2			Tuffaceous Welded Tuff			Hardly Alterated	Fault zone. White grey, very soft, friable rock.							
3														
4														
5							Reddish brown clay rim of core.							
6							Many irregular clay layers.							
7														
8							Hardly alteration is seen in general.							
9														
10													D	
11							Breccia of fine grain white tuff from 12.48m to 12.76m.	16/3 (11.32)			100 (11.50)			
12														
13														
14														
15							Large proportion of reddish brown clay.							
16														
17	17.00	790.48										0 (17.30)	CM	
18			Welded Tuff		C, III~IV, c	Slightly Alterated	Reddish brown, granular rock with variable hardness. Broken section : 17.00 - 17.50m 17.90 - 18.25m Variable joint angle (60°, 45°, 10°, 30°).						CL	
19														
20	20.50	786.98										85 (20.60)	CH	
21			Tuff			Alterated	White, very fine micro granular friable rock.	17/3 (21.00)			100 (21.20)		CL	
	21.45	786.03												
22			S.S.				Dark grey volcanic sandstone, friable.						CM	
	22.66	784.82												
23			W.T.				Dark reddish grey rock with white reddish spots with green rim.							
24	24.00	783.48										20 (24.10)		Upper Depth : 20.00 Lower Depth : 25.00 Lugeon Value : (12.8) B. Point :
25			Tuff		B, III, b	Moderatery Alterated	Dark reddish brown, very fine, uniforme, compact, friable.					75 (25.00)	CL	
26														
27							Stingy joints are seen in general.							
28														
29														Upper Depth : 25.00 Lower Depth : 30.00 Lugeon Value : (16.8) B. Point :
30								17/3 (30.00)				70 (30.20)		

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is 1 min in water injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊕ is LATERAL LOADING TEST performed point.
* (18.0) is Corrected Lugeon Value.

Fig.E.1-2 Drill Log (20/20)

PROJECT	REHABILITATION OF COYOLAR DAM AND IRRIGATION IMPROVEMENT PROJECT, REPUBLIC OF HONDURAS.						
HOLE NO.	NO. 8	ELEVATION	807.48m. A. S. L.	DEPTH	60 m	DATE	Mar. 16 — Mar. 18, 1990.
ANGLE		DIRECTION		SLOPE			

SCALE(m)	DEPTH(m)	ELEVATION (m. A. S. L.)	ROCK TYPE	COLUMN SECTION	CORE CONDITION	ALTERATION	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R. Q. D. % (m)	CLASSIFICATION	WATER PRESSURE TEST
30–34	34.60	772.88	Tuff	\/\/	B, III, b	Moderately Alterated	Inclusion of white irregular layers. Intensity of oxidation change the colour. Major granulometry. May be lake deposit.					72 (34.60)	CL	Upper Depth : 30.00 Lower Depth : 35.00 Lugeon Value : (13.0) B. Point :
35–39			Welded Tuff	~Δ~ Δ~Δ	C, II ~ III, b	No Alterated	White grey, greenish white, very fine. White soap like tuffaceous inclusions. Sporadic sub-vertical joints with black oxide and/or clay layer.						CM	Upper Depth : 35.20 Lower Depth : 40.00 Lugeon Value : (17.0) B. Point :
40–41												96 (41.00)		
41–42					C, II, b							69 (42.00)		
42–43														
43–44					C,III~IV,b		Many inclusions of reddish brown angular to sub-angular andesite.					68 (43.80)		Upper Depth : 40.00 Lower Depth : 45.00 Lugeon Value : (12.4) B. Point :
44–45									NQ (76/ 47.6)			100 (45.10)		
45–46					C, III, b							75 (46.00)		
46–47										46.80				
47–48					C, II, b							85 (48.10)		
48–49						No Alterated	No clare stratified layers are seen.					68 (49.00)		Upper Depth : 45.00 Lower Depth : 50.00 Lugeon Value : (16.4) B. Point :
49–50								18/3 (50.00)				99 (50.00)	CM	
50–53					C, II ~ III, b							100 (53.00)		
53–54												68 (54.00)		Upper Depth : 50.00 Lower Depth : 55.00 Lugeon Value : (14.5) B. Point :
54–57														
57–58							Cracked sector : 58.17 - 58.28m 58.40 - 58.80m					100 (58.00)		
58–59					C, II, b	Slightly Alterated								Upper Depth : 55.00 Lower Depth : 60.00 Lugeon Value : (14.3) B. Point :
59–60	60.00	747.48			C, III, b			18/3 (60.00)			100 (60.00)	18 (60.00)		

* R. Q. D. is Rock Quality Designation. R. Q. D. = (Total length of cylindric cores longer than 10cm) / (Total drill length) × 100%
* LUGEON VALUE is l min. in water injection water pressure of 10kg/cm²
* DEPTH and ELEVATION are in meter.
* DIAMETER is in millimeter.
* ⊗ is LATERAL LOADING TEST performed point.
* (10.0) is Corrected Lugeon Value.

2) Rock Classification

In the drill log, classification of the rock condition is made based on the Japanese Electric Power Central Institute Method and Institute of Civil Engineering of Japan by the following criteria.

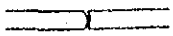
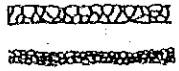
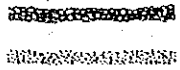
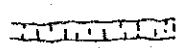
Class	Description
CH	Fresh rock, with no trace of weathering. Cracks are closed tightly in fresh condition.
CM	Moderately fresh rock, slightly weathered. Cracks are a little strained from weathering and are rather frequent.
CL	Weathered rock, Almost all cracks are strained from weathering. Frequently cracked.
D	Very soft, fragile, intensively weathered or fractured rock. Cracked very frequently. Often clay is observed in open cracks.

Moreover the core condition is made by the following criteria.

Hardness of Core

A	Very hard core. Difficult to broke.
B	Hard core. Metalic sound by hammer hit.
C	Moderately hard core. Easy to broke by hammer hit.
D	Soft core. Turn to fragments by hammer hit.
E	Highly soft core showing clayish or sandy aspects.

Form of core

I		More than 50 cm length
II		Between 50 and 15 cm length
III		Between 15 and 5 cm length
IV		Less than 5 cm
V		Brecha-like core
VI		Sandy-like core
VII		Clayish-like core
VIII		Impossible to obtain core

Condition of crack

a	Close joint or slightly open joint without weathered and alteration aspects.
b	Weathered and alteration aspects only along the joints.
c	Weathered and alteration aspects showing soft band.
d	Brecha, sandy and clayish core without showing joints.

3) Lugeon Test

The Lugeon test is performed generally to obtain the Lugeon values and coefficient of permeability of strata. The test shall be carried out for every section not exceeding 5 m on lenght of the hole and in the descending method as a principle. The injection water should be clean water, without any fine materials suspension.

- Apparatus

Usually, the apparatus to be used for the test are as follows:

a. Packer; mechanical expansion packer or air packer.
b. Water flow meter and pressure gauge.
c. Pump; pumping capacity of more than 100 lit/min at 10 kg/cm^2.

- Method

a. After drilling the test section, the hole should be washed out by low pressured clean water.

b. Packer shall be set at the top of the test section, and water flow meter and pressure gauge shall be set at the hole mouth.

c. After setting all apparatus, the supply of water is started for more than 10 minutes under the pressure of less than 1 kg/cm^2 as measured at the hole mouth.

d. Then, the measurement of water injection shall be started.

The test pressure shall be 1, 3, 6, 8, 10, 6, 3 and 1 kg/cm^2 in principle. The injection for the measurement for each pressure shall be done for more than 5 minutes.

e. The items to be measured and recorded are as follows:

① Depth of test section.
② Depth of water level in borehole.
③ Height of pressure gauge as against the hole mouth.
④ Bore hole diameter of test section.
⑤ Diameter of water injection pipe.
⑥ Reading records of pressure gauge and water flow meter.

The above items shall be recorded in an appropiate data sheet. The test results, Lugeon values and/or coefficients of permeability, shall be mentioned in the drilling log.

- Testing method

a. Effective Water Injection Pressure

Below figure shows how the Lugeon value has been determined.

$P = Po + \gamma w\ (h_1 - h_2 - h_3)$ (kgf/cm^2)

where,

P : Effective Water Injection Pressure (kgf/cm^2)
Po : Pressure at the hole mouth (kgf/cm^2)
h_1 : Distance between the pressure gauge and the middle point of the test section (m)
h_2 : Head from the subterranean water level to the middle of the test section (m)

This is the head appropiate for the confined water case.

h_3 : Head loss depending on the water pipe resistance (m)
γw : Specific gravity of water volumen (1 tf/m^3 = 0.1 kgf/cm^2/m)

The head loss has been calculated by the following formula:

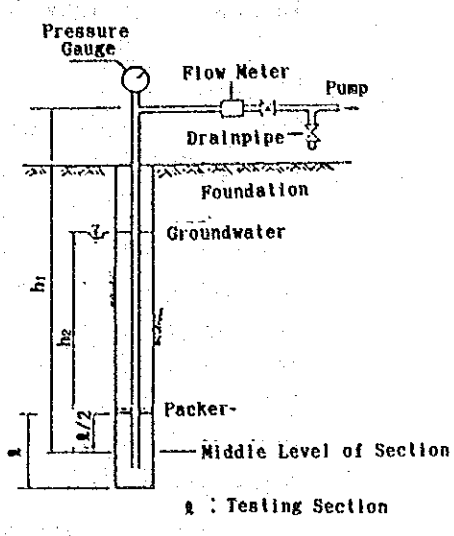
$h_3 = \gamma Q^2 L$

where,

Q : Volumen of water injected (ℓ/min)

L : Injection pipe lenght

γ : $7x10^{-5}$ ($min^2/liter^2$)



b. Lugeon Value, Yielding Pressure Determination

Above values have been determined by a graphic method (curve P - Q) as shown in the following figure.

The curve P - Q pattern (1), (4)b has confirmed that with an effective water injection pressure (P) of 10kgf/cm² there is no indication of existence of yielding pressure. The Lugeon value (Lu) has been taken when the injected water volume (Q, liter/min/m) reached a level of 10kgf/cm².

When P is less than 10kgf/cm², through the curve P-Q pattern (2), (3), (4)a, (5), and before the apperance of yielding pressure, a line has been extended from the curves in order for it to reach the level of 10kgf/cm² and the Q value reached through this procedure is considered as the Lugeon value.

Concerning the yielding pressure (P_1), as we can see from the following figure , the effective water injection pressure has been determined by a sudden increase of the volumen of injected water. However, for the curve P - Q pattern (3), it was very difficult to determine the yielding pressure.

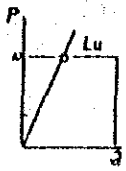
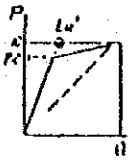
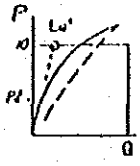
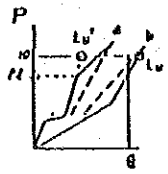
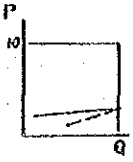
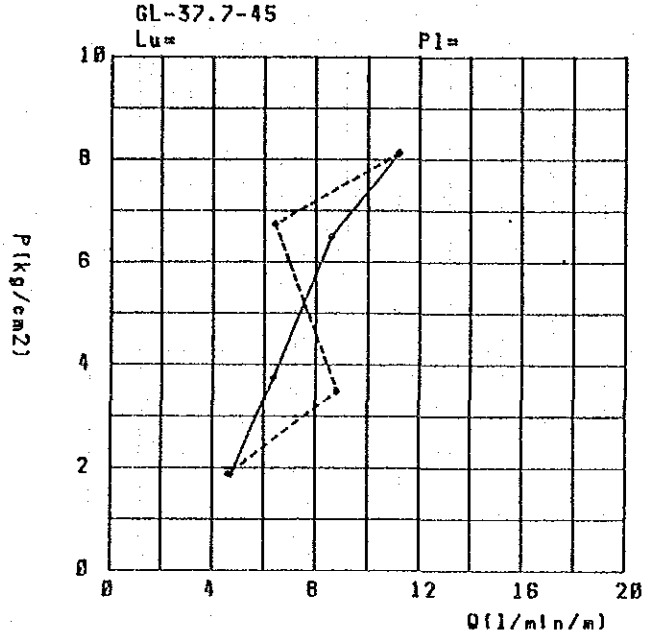
P - Q curve	Description
① 	- Elastic behaviour from the point of view of permeability - In case the Darcy formula is adopted
② 	- Elastic - Remarkable yielding force - Increment of the water outflow
③ 	- Plastic behaviour, due to creep deformation yielding pressure is not clearly noticed - Water leakage from packer
④ 	- Suspension of fine particles - Temporary increment of water outflow - Filling up by fine particles along the crack
⑤ 	- Leakage through the developed water outflowing cracks - Possible decrease due to low water pressure

Fig.E.1-3 show curve of Pressure vs. Inyected Water Volume for the performed Lugeon test in boreholes.

Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (1/46)

Hole No. 1 Test Section (m)= 37.7 - 45 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 9.75
Longitude of Inyection Tube L(m)= 41.35 Height h1(m)= 41.90
Height h2(m)= 31.60

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
23.70	1.00	1.63	1.87	4.74	0.0003285930
31.80	3.00	2.93	3.74	6.36	0.0002203040
43.00	6.00	5.35	6.49	8.60	0.0001714170
56.00	8.00	9.08	8.12	11.20	0.0001785100
32.00	6.00	2.96	6.73	6.40	0.0001230420
44.00	3.00	5.60	3.47	8.80	0.0003283390
23.00	1.00	1.53	1.88	4.60	0.0003172800



Hole No. 1 Test Section (m)= 45 - 50 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 9.60
Longitude of Inyection Tube L(m)= 62.50 Height h1(m)= 47.95
Height h2(m)= 37.90

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
26.00	1.00	2.96	1.71	5.20	0.0003938400
41.00	3.00	7.35	3.27	8.20	0.0003246730
51.20	6.00	11.47	5.86	10.24	0.0002262890
61.10	8.00	16.33	7.37	12.22	0.0002145970
47.00	6.00	9.66	6.04	9.40	0.0002015190
42.00	3.00	7.72	3.23	8.40	0.0003363270
30.00	1.00	3.94	1.61	6.00	0.0004820700

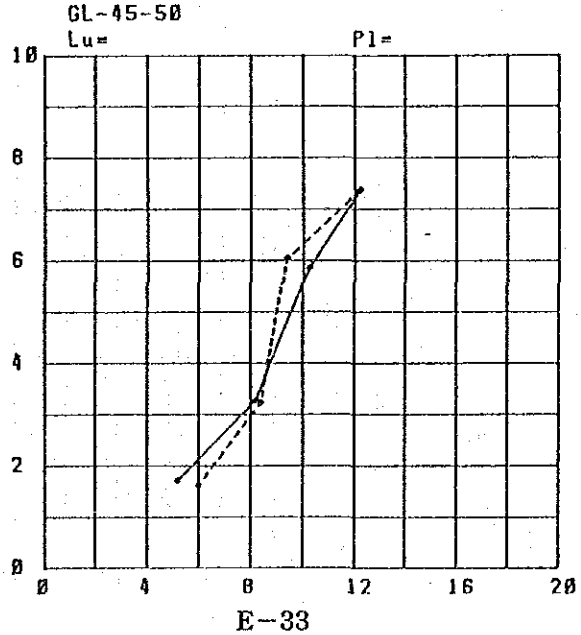
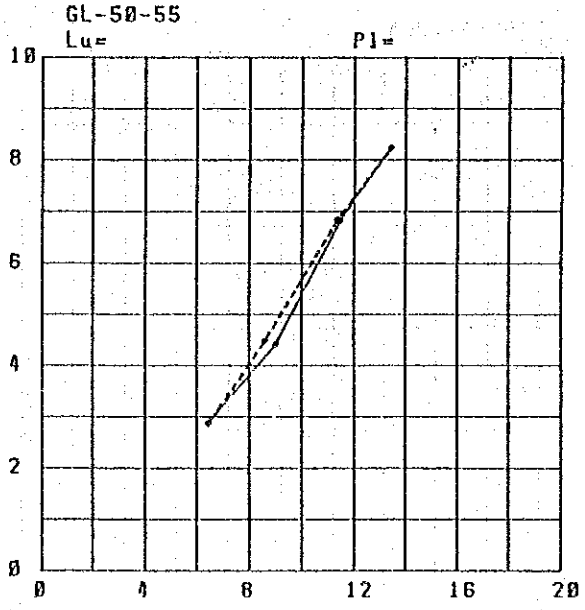


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (2/46)

Hole No. 1 Test Section (m)= 50 - 55
Radius of Borehole r(cm)= 3.8
Longitude of Inyection Tube L(m)= 67.50
Height h2(m)= 29.40

Longitude of Test l(m)= 5
Groundwater Level H(m)= 23.10
Height h1(m)= 53.00

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
32.20	1.00	4.90	2.87	6.44	0.0002904770
45.00	3.00	9.57	4.40	9.00	0.0002646050
57.20	6.00	15.46	6.81	11.44	0.0002173410
67.20	8.00	21.34	8.23	13.44	0.0002115040
56.80	6.00	15.24	6.84	11.36	0.0002151410
43.10	3.00	8.78	4.48	8.62	0.0002489610
32.40	1.00	4.96	2.86	6.48	0.0002929040



Hole No. 1 Test Section (m)= 55 - 60
Radius of Borehole r(cm)= 3.8
Longitude of Inyection Tube L(m)= 72.50
Height h2(m)= 25.00

Longitude of Test l(m)= 5
Groundwater Level H(m)= 32.50
Height h1(m)= 58.10

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
32.10	1.00	5.23	3.79	6.42	0.0002194590
48.30	3.00	11.84	5.13	9.66	0.0002439580
57.00	6.00	16.49	7.66	11.40	0.0001926340
43.90	8.00	9.78	10.33	8.78	0.0001100110
32.80	6.00	5.46	8.76	6.56	0.0000968998
26.20	3.00	3.48	5.96	5.24	0.0001137860
20.20	1.00	2.07	4.10	4.04	0.0001274710

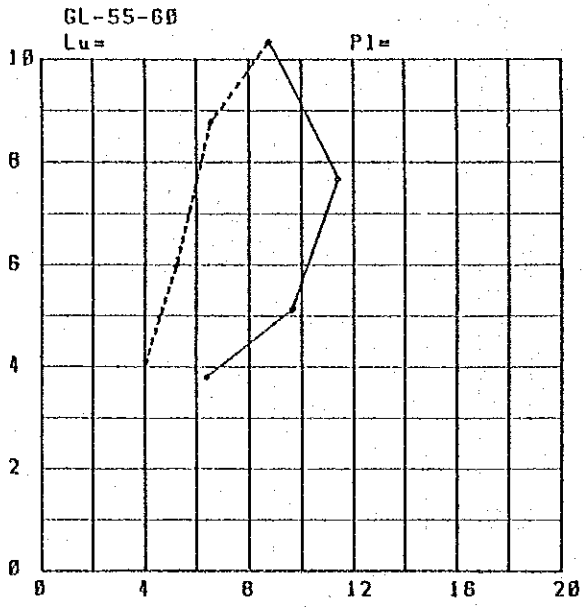
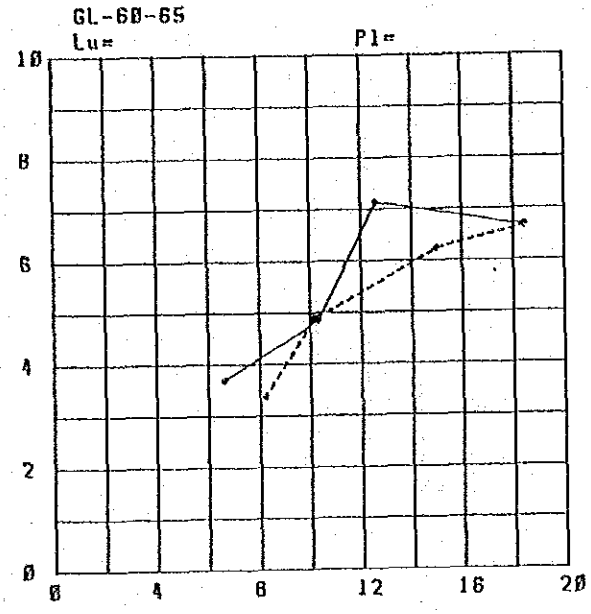


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (3/46)

Hole No. 1 Test Section (m)= 60 - 65 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 32.40
Longitude of Inyection Tube L(m)= 77.50 Height h1(m)= 62.50
Height h2(m)= 30.10

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
33.20	1.00	5.98	3.68	6.64	0.0002334550
51.70	3.00	14.50	4.83	10.34	0.0002771400
63.00	6.00	21.53	7.13	12.60	0.0002288740
92.20	8.00	46.12	6.67	18.44	0.0003579880
75.00	6.00	30.52	6.23	15.00	0.0003117700
50.80	3.00	14.00	4.88	10.16	0.0002695230
41.20	1.00	9.21	3.36	8.24	0.0003175570



Hole No. 1 Test Section (m)= 65 - 70 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 31.80
Longitude of Inyection Tube L(m)= 82.50 Height h1(m)= 68.10
Height h2(m)= 35.70

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
25.00	1.00	3.61	3.88	5.00	0.0001668650
45.20	3.00	11.80	5.06	9.04	0.0002312740
61.80	6.00	22.06	7.03	12.36	0.0002274650
70.00	8.00	28.30	8.41	14.00	0.0002154970
58.80	6.00	19.97	7.24	11.76	0.0002101800
50.20	3.00	14.55	4.78	10.04	0.0002716460
39.00	1.00	8.78	3.36	7.80	0.0003003780

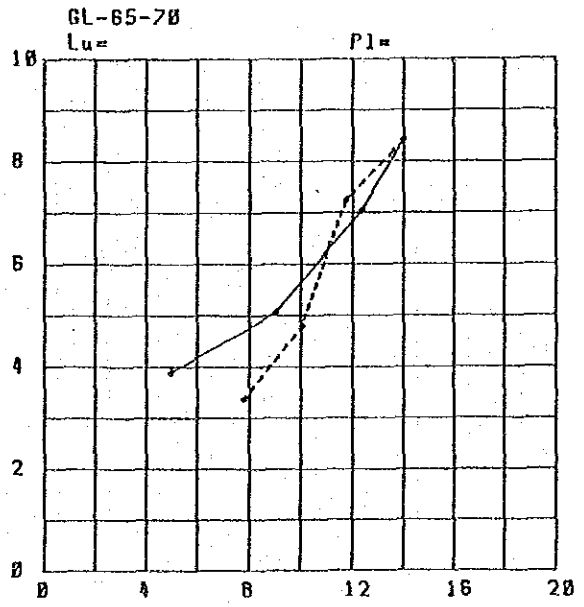
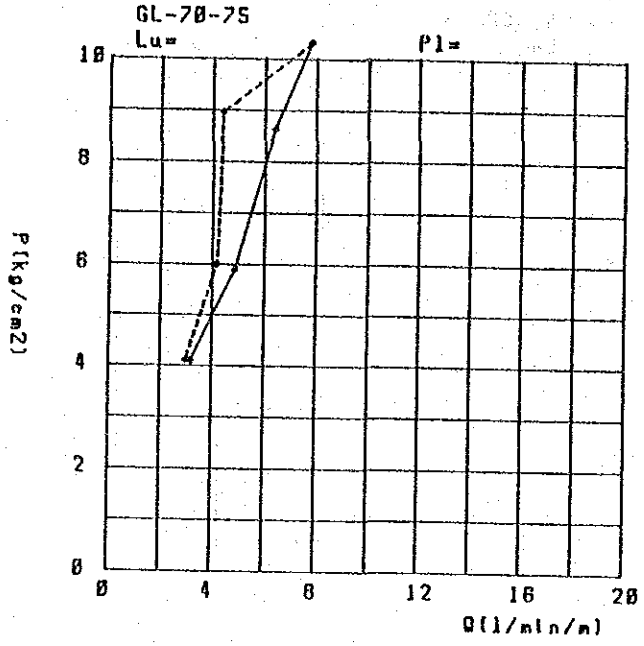


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (4/46)

Hole No. 1 Test Section (m)= 70 - 75
Radius of Borehole r(cm)= 3.8
Longitude of Inyection Tube L(m)= 87.50
Height h2(m)= 40.55
Longitude of Test l(m)= 5
Groundwater Level H(m)= 31.95
Height h1(m)= 73.10

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
16.00	1.00	1.57	4.10	3.20	0.0001010830
24.30	3.00	3.62	5.89	4.86	0.0001067570
32.00	6.00	6.27	8.63	6.40	0.0000960289
39.00	8.00	9.32	10.32	7.80	0.0000978125
22.00	6.00	2.96	8.96	4.40	0.0000636824
20.90	3.00	2.68	5.99	4.18	0.0000903766
15.00	1.00	1.38	4.12	3.00	0.0000943285



Hole No. 1 Test Section (m)= 75 - 80
Radius of Borehole r(cm)= 3.8
Longitude of Inyection Tube L(m)= 92.50
Height h2(m)= 45.60
Longitude of Test l(m)= 5
Groundwater Level H(m)= 31.90
Height h1(m)= 78.15

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
17.00	1.00	1.87	4.07	3.40	0.0001082020
46.00	3.00	13.70	4.88	9.20	0.0002438120
63.00	6.00	25.70	6.69	12.60	0.0002439980
79.00	8.00	40.41	7.21	15.80	0.0002835340
63.00	6.00	25.70	6.69	12.60	0.0002439980
44.00	3.00	12.54	5.00	8.80	0.0002277770
34.00	1.00	7.49	3.51	6.80	0.0002510490

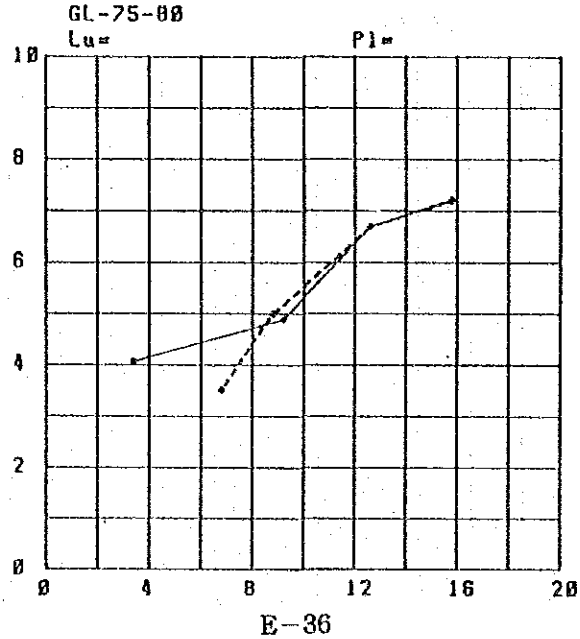
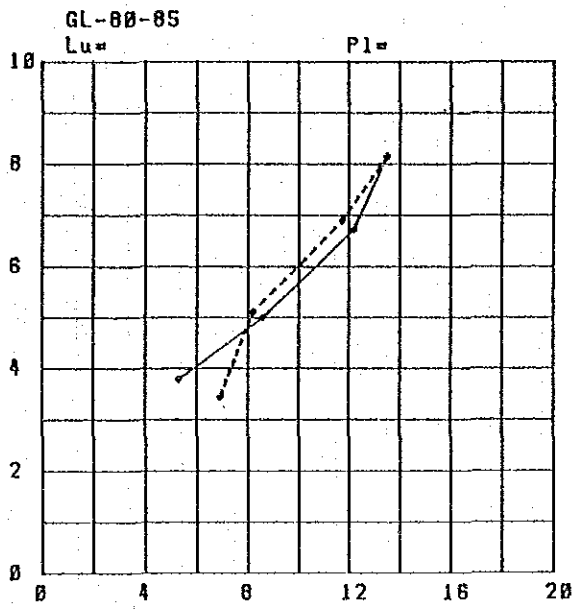


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (5/46)

Hole No. 1 Test Section (m)= 80 - 85 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 32.05
Longitude of Inyection Tube L(m)= 97.50 Height h1(m)= 83.05
Height h2(m)= 50.45

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
26.50	1.00	4.79	3.78	5.30	0.0001814780
42.90	3.00	12.56	5.00	8.58	0.0002219720
61.00	6.00	25.40	6.72	12.20	0.0002350100
67.50	8.00	31.10	8.15	13.50	0.0002144270
58.80	6.00	23.60	6.90	11.76	0.0002206280
41.00	3.00	11.47	5.11	8.20	0.0002076270
34.60	1.00	8.17	3.44	6.92	0.0002601950



Hole No. 1 Test Section (m)= 85 - 90 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 32.10
Longitude of Inyection Tube L(m)= 102.50 Height h1(m)= 88.15
Height h2(m)= 55.40

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
29.80	1.00	6.37	3.64	5.96	0.0002120930
48.00	3.00	16.53	4.62	9.60	0.0002688900
58.80	6.00	24.81	6.79	11.76	0.0002240710
78.10	8.00	43.76	6.90	15.62	0.0002931210
54.60	6.00	21.39	7.14	10.92	0.0001981020
46.00	3.00	15.18	4.76	9.20	0.0002503790
34.00	1.00	8.29	3.45	6.80	0.0002554880

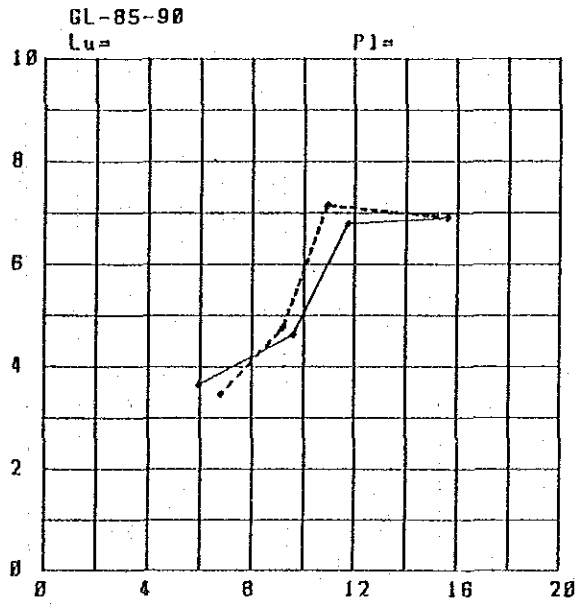
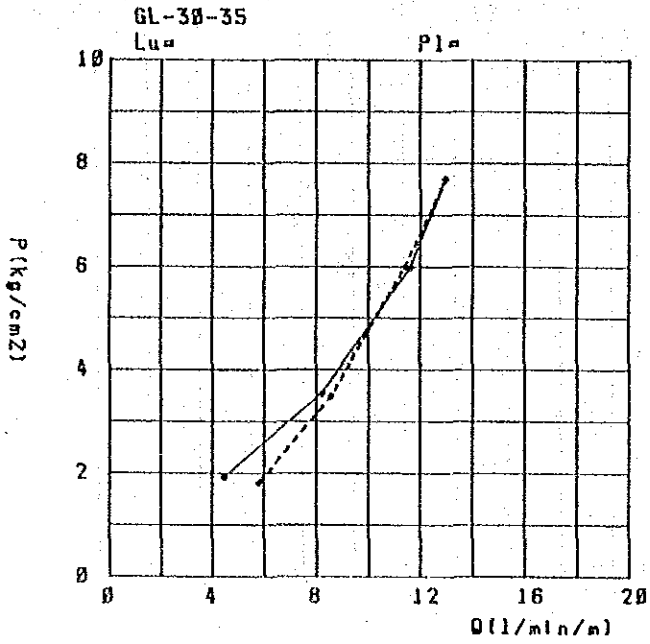


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (6/46)

Hole No. 2 Test Section (m)= 30 - 35 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 10.20
Longitude of Inyection Tube L(m)= 47.50 Height h1(m)= 33.15
Height h2(m)= 22.30

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
22.30	1.00	1.65	1.92	4.46	0.0003007700
41.00	3.00	5.59	3.53	8.20	0.0003010550
58.00	6.00	11.19	5.97	11.60	0.0002516880
64.80	8.00	13.96	7.69	12.96	0.0002182060
57.00	6.00	10.80	6.00	11.40	0.0002457740
42.80	3.00	6.09	3.48	8.56	0.0003188060
29.00	1.00	2.80	1.81	5.80	0.0004158960



Hole No. 2 Test Section (m)= 35 - 40 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 10.15
Longitude of Inyection Tube L(m)= 52.50 Height h1(m)= 38.10
Height h2(m)= 27.35

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
20.00	1.00	1.47	1.93	4.00	0.0002885810
38.00	3.00	5.31	3.54	7.60	0.0002775890
51.00	6.00	9.56	6.12	10.20	0.0002157910
56.00	8.00	11.52	7.92	11.20	0.0001830110
52.50	6.00	10.13	6.06	10.50	0.0002242280
39.00	3.00	5.59	3.52	7.80	0.0002871860
26.00	1.00	2.48	1.83	5.20	0.0003685440

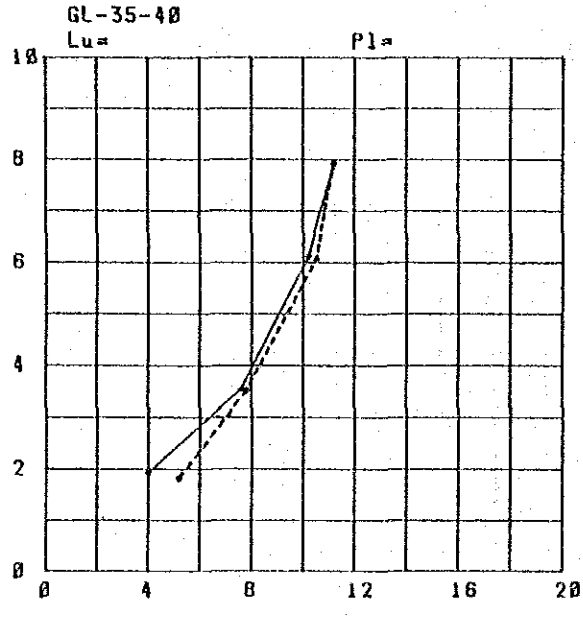
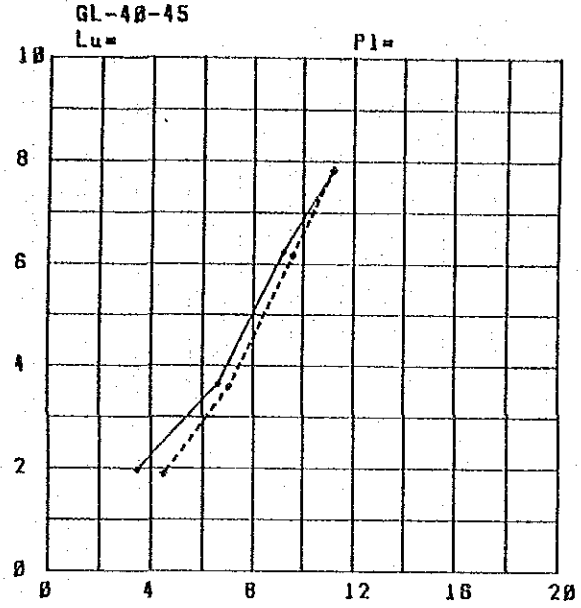


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (7/46)

Hole No. 2 Test Section (m)= 40 - 45 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 10.25
Longitude of Inyection Tube L(m)= 57.50 Height h1(m)= 43.15
Height h2(m)= 32.25

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
17.30	1.00	1.20	1.97	3.46	0.0002274230
33.00	3.00	4.38	3.65	6.60	0.0002339770
46.00	6.00	8.52	6.24	9.20	0.0001909160
56.00	8.00	12.62	7.83	11.20	0.0001852260
47.80	6.00	9.24	6.17	9.58	0.0002011170
35.20	3.00	4.99	3.59	7.04	0.0002537730
22.40	1.00	2.02	1.89	4.48	0.0003071770



Hole No. 2 Test Section (m)= 45 - 50 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 13.35
Longitude of Inyection Tube L(m)= 62.50 Height h1(m)= 48.15
Height h2(m)= 34.15

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
23.80	1.00	2.48	2.15	4.76	0.0002863190
35.70	3.00	5.58	3.84	7.14	0.0002405560
43.30	6.00	8.20	6.58	8.66	0.0001703850
51.00	8.00	11.38	8.26	10.20	0.0001598210
46.20	6.00	9.34	6.47	9.24	0.0001849890
36.00	3.00	5.67	3.83	7.20	0.0002431730
27.00	1.00	3.19	2.08	5.40	0.0003359160

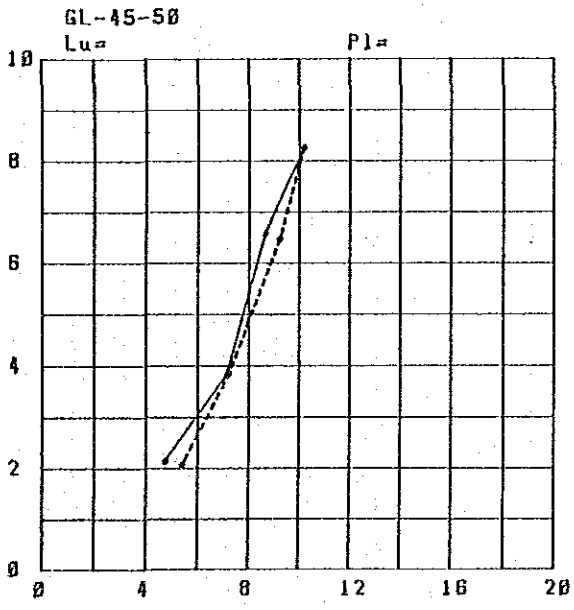
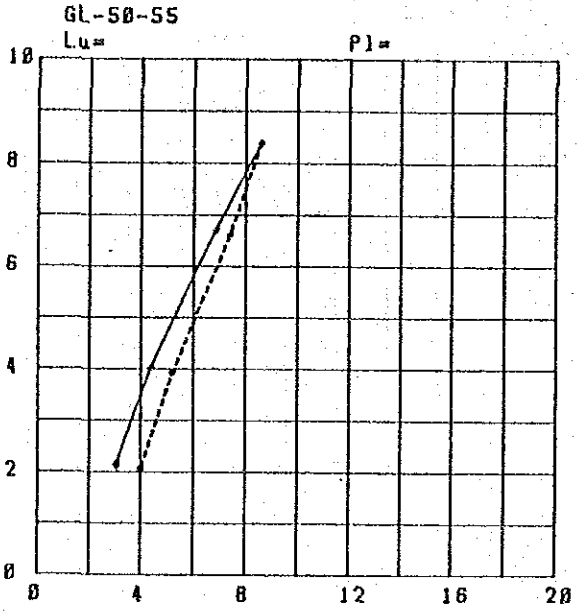


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (8/46)

Hole No. 2 Test Section (m)= 50 - 55 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 11.90
Longitude of Inyection Tube L(m)= 67.50 Height h1(m)= 53.20
Height h2(m)= 40.60

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
15.30	1.00	1.11	2.15	3.06	0.0001843010
22.00	3.00	2.29	4.03	4.40	0.0001412960
34.20	6.00	5.53	8.71	6.84	0.0001320160
43.00	8.00	8.74	8.39	8.60	0.0001327540
36.90	6.00	6.43	6.62	7.38	0.0001443910
26.00	3.00	3.19	3.94	5.20	0.0001708300
20.00	1.00	1.89	2.07	4.00	0.0002500360



Hole No. 2 Test Section (m)= 55 - 60 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 11.25
Longitude of Inyection Tube L(m)= 72.50 Height h1(m)= 58.20
Height h2(m)= 46.25

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
7.00	1.00	0.25	2.17	1.40	0.0000835149
8.00	3.00	0.32	4.16	1.60	0.0000497606
32.10	6.00	5.23	6.67	6.42	0.0001245650
42.50	8.00	9.17	8.28	8.50	0.0001329220
34.80	6.00	6.15	6.58	6.96	0.0001360240
23.20	3.00	2.73	3.92	4.64	0.0001531620
17.50	1.00	1.55	2.04	3.50	0.0002221520

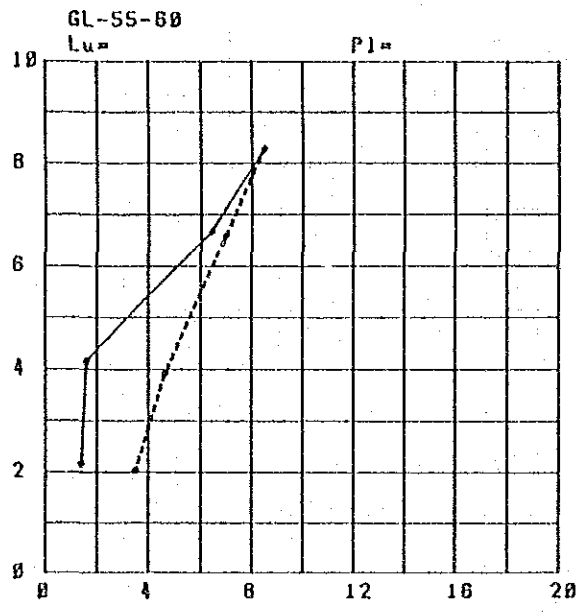
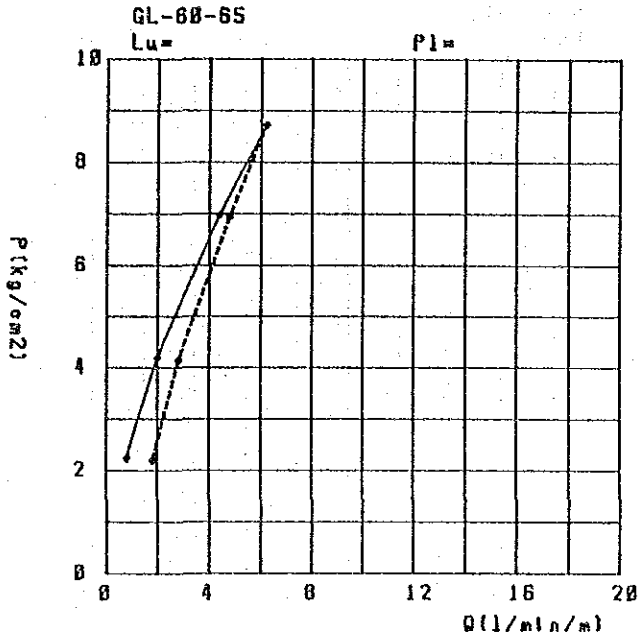


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (9/46)

Hole No. 2 Test Section (m)= 60 - 65 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 11.85
Longitude of Inyection Tube L(m)= 77.50 Height h1(m)= 63.10
Height h2(m)= 50.65

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
4.00	1.00	0.09	2.24	0.80	0.0000463104
9.90	3.00	0.53	4.19	1.98	0.0000611482
21.90	6.00	2.60	6.98	4.38	0.0000811786
31.00	8.00	5.21	8.72	6.20	0.0000920058
23.80	6.00	3.07	6.94	4.76	0.0000888205
14.00	3.00	1.06	4.14	2.80	0.0000875829
9.00	1.00	0.44	2.20	1.80	0.0001058680



Hole No. 2 Test Section (m)= 65 - 70 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 15.75
Longitude of Inyection Tube L(m)= 82.50 Height h1(m)= 68.15
Height h2(m)= 51.75

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
21.00	1.00	2.55	2.39	4.20	0.0002279420
38.00	3.00	8.34	3.81	7.60	0.0002584980
53.90	6.00	16.78	5.96	10.78	0.0002340620
61.50	8.00	21.84	7.46	12.30	0.0002135680
51.00	6.00	15.02	6.14	10.20	0.0002151300
42.00	3.00	10.19	3.62	8.40	0.0003002880
32.20	1.00	5.99	2.04	6.44	0.0004084300

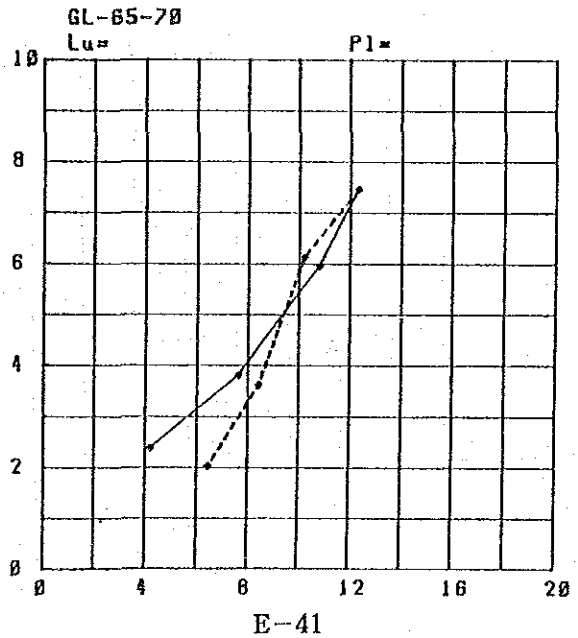
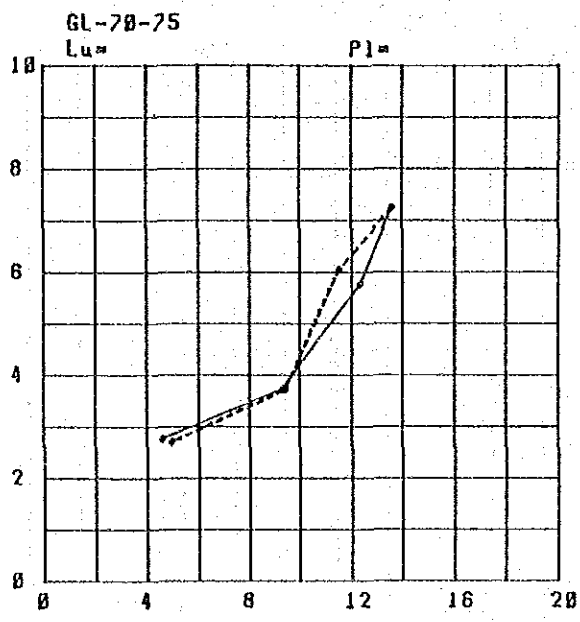


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (10/46)

Hole No. 2 Test Section (m)= 70 - 75 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 20.25
Longitude of Inyection Tube L(m)= 87.50 Height h1(m)= 73.15
Height h2(m)= 52.25

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
23.00	1.00	3.24	2.77	4.60	0.0002152930
46.70	3.00	13.36	3.75	9.34	0.0003220710
61.50	6.00	23.17	5.77	12.30	0.0002758020
68.00	8.00	28.32	7.26	13.60	0.0002425810
57.50	6.00	20.25	6.06	11.50	0.0002454680
47.20	3.00	13.65	3.73	9.44	0.0003280320
24.80	1.00	3.77	2.71	4.96	0.0002366510



Hole No. 2 Test Section (m)= 75 - 80 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 21.65
Longitude of Inyection Tube L(m)= 92.50 Height h1(m)= 78.10
Height h2(m)= 55.85

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
28.60	1.00	5.30	2.70	5.72	0.0002747260
40.50	3.00	10.62	4.16	8.10	0.0002518880
55.60	6.00	20.02	6.22	11.12	0.0002313150
64.60	8.00	27.02	7.52	12.92	0.0002223310
51.60	6.00	17.24	6.50	10.32	0.0002055050
40.40	3.00	10.57	4.17	8.08	0.0002509500
28.40	1.00	5.22	2.70	5.68	0.0002720600

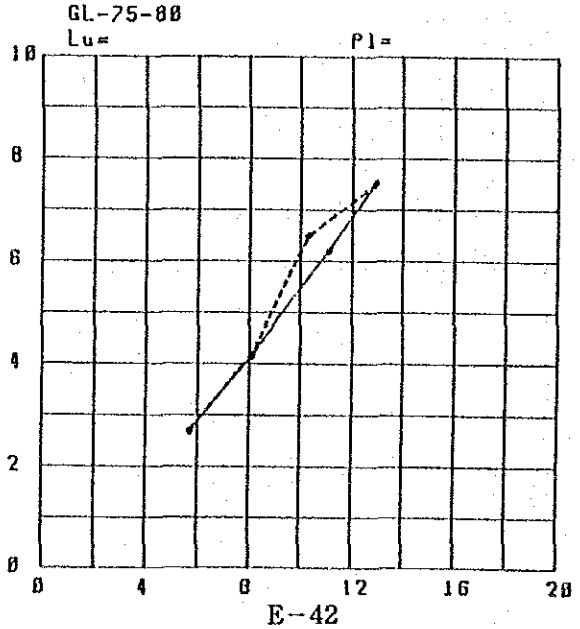
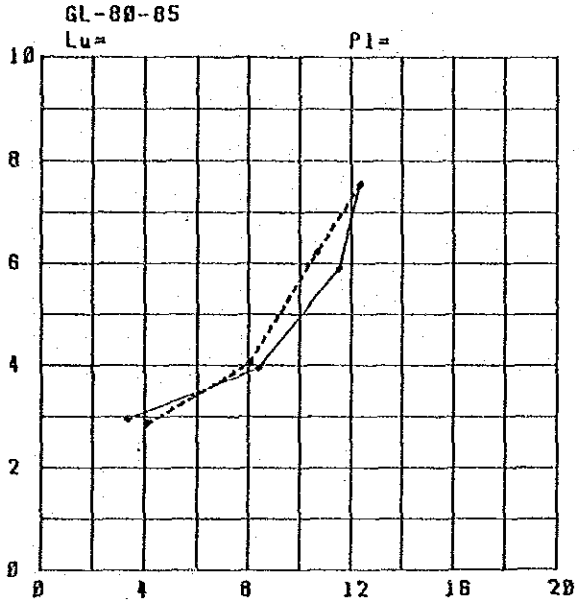


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (11/46)

Hole No. 2 Test Section (m)= 80 - 85 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 20.85
Longitude of Inyection Tube L(m)= 97.50 Height h1(m)= 83.20
Height h2(m)= 61.65

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
16.90	1.00	1.95	2.96	3.38	0.0001478210
42.20	3.00	12.15	3.94	8.44	0.0002773420
57.60	6.00	22.64	5.89	11.52	0.0002531700
61.80	8.00	26.07	7.55	12.36	0.0002119760
53.30	6.00	19.38	6.22	10.66	0.0002220050
40.30	3.00	11.08	4.05	8.06	0.0002578520
20.50	1.00	2.87	2.87	4.10	0.0001850550



Hole No. 2 Test Section (m)= 85 - 90 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 21.60
Longitude of Inyection Tube L(m)= 102.50 Height h1(m)= 88.20
Height h2(m)= 65.90

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
17.30	1.00	2.15	3.02	3.46	0.0001485500
34.40	3.00	8.49	4.38	6.88	0.0002033030
46.60	6.00	15.58	6.67	9.32	0.0001808370
53.40	8.00	20.46	8.18	10.68	0.0001688380
44.20	6.00	14.02	6.83	8.84	0.0001675960
31.90	3.00	7.30	4.50	6.38	0.0001835450
19.50	1.00	2.73	2.96	3.90	0.0001707300

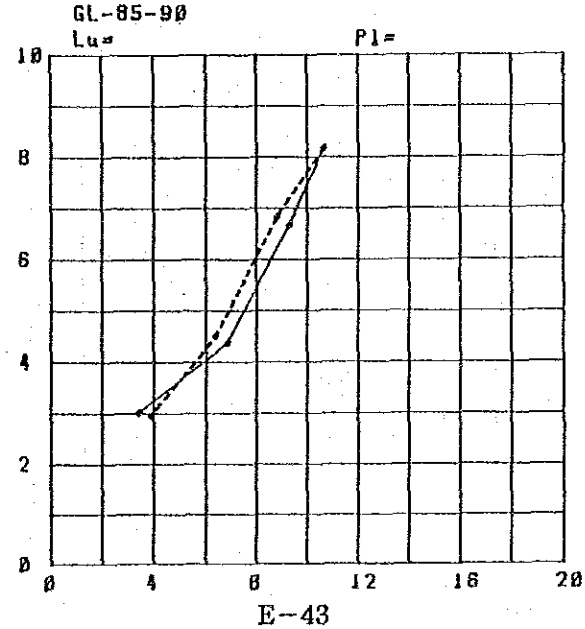
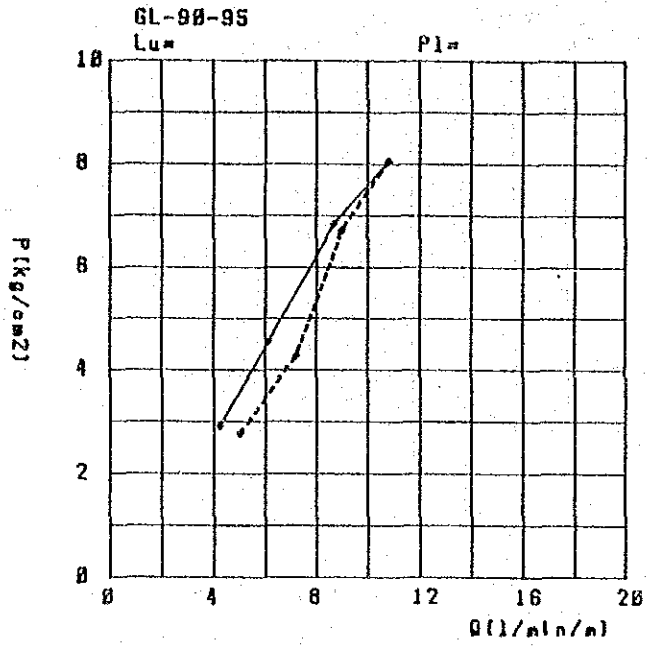


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (12/46)

Hole No. 2 Test Section (m)= 90 - 95 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 21.95
Longitude of Inyection Tube L(m)= 107.50 Height h1(m)= 93.00
Height h2(m)= 70.55

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
21.20	1.00	3.38	2.91	4.24	0.0001888310
30.60	3.00	7.05	4.64	6.12	0.0001744940
43.40	6.00	14.17	6.83	8.68	0.0001645780
54.00	8.00	21.94	8.05	10.80	0.0001736650
45.00	6.00	15.24	6.72	9.00	0.0001733480
36.00	3.00	9.75	4.27	7.20	0.0002182980
25.00	1.00	4.70	2.77	5.00	0.0002332800



Hole No. 2 Test Section (m)= 95 - 100 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 22.05
Longitude of Inyection Tube L(m)= 112.50 Height h1(m)= 98.15
Height h2(m)= 75.45

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
23.30	1.00	4.28	2.84	4.66	0.0002122320
31.90	3.00	8.01	4.47	6.38	0.0001848280
45.10	6.00	16.02	6.67	9.02	0.0001751130
55.20	8.00	24.00	7.87	11.04	0.0001815900
46.90	6.00	17.32	6.54	9.38	0.0001857350
37.90	3.00	11.31	4.14	7.58	0.0002370900
25.70	1.00	5.20	2.75	5.14	0.0002419770

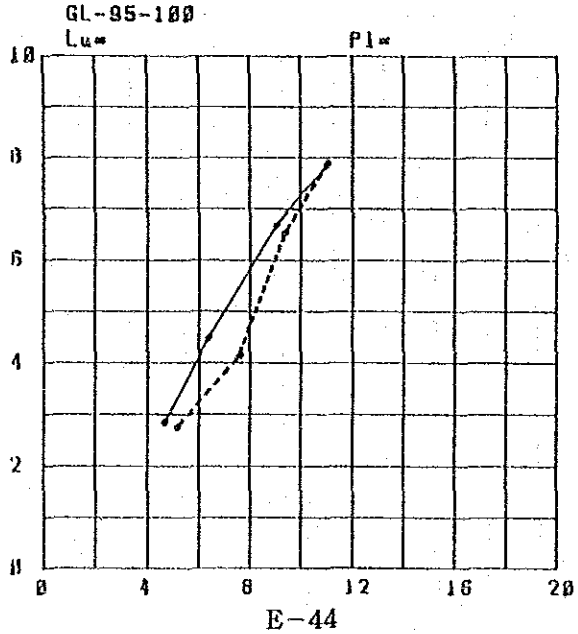
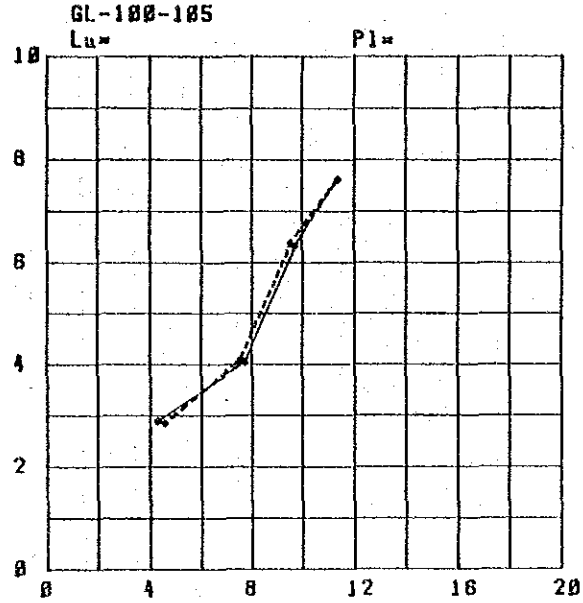


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (13/46)

Hole No. 2 Test Section (m)= 100 - 105 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 22.05
Longitude of Inyection Tube L(m)= 117.50 Height h1(m)= 103.15
Height h2(m)= 80.45

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
21.40	1.00	3.77	2.89	4.28	0.0001915000
38.60	3.00	12.25	4.04	7.72	0.0002471010
48.60	6.00	19.43	6.33	9.72	0.0001988710
56.80	8.00	26.64	7.62	11.36	0.0001930860
47.80	6.00	18.79	6.39	9.56	0.0001936560
37.70	3.00	11.69	4.10	7.54	0.0002380150
22.70	1.00	4.24	2.85	4.54	0.0002064980



Hole No. 2 Test Section (m)= 105 - 110 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 22.65
Longitude of Inyection Tube L(m)= 122.50 Height h1(m)= 108.10
Height h2(m)= 84.85

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
20.00	1.00	3.43	2.98	4.00	0.0001736500
29.70	3.00	7.56	4.57	5.94	0.0001683160
40.60	6.00	14.13	6.91	8.12	0.0001520910
48.70	8.00	20.34	8.29	9.74	0.0001520760
43.20	6.00	16.00	6.72	8.64	0.0001663270
31.00	3.00	8.24	4.50	6.20	0.0001783240
22.60	1.00	4.38	2.89	4.52	0.0002026800

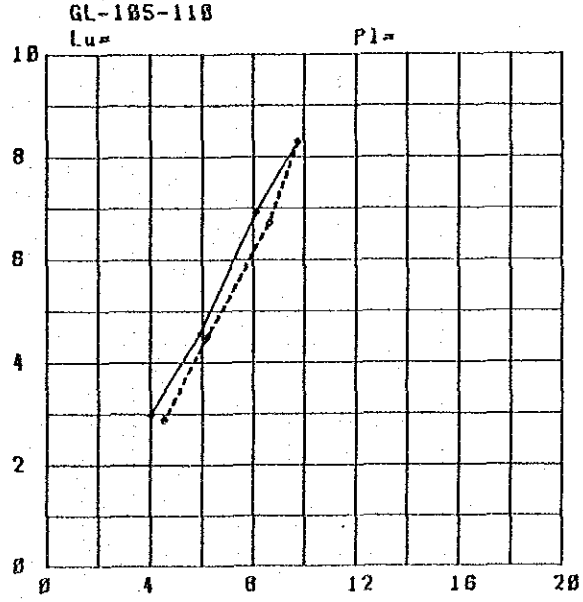
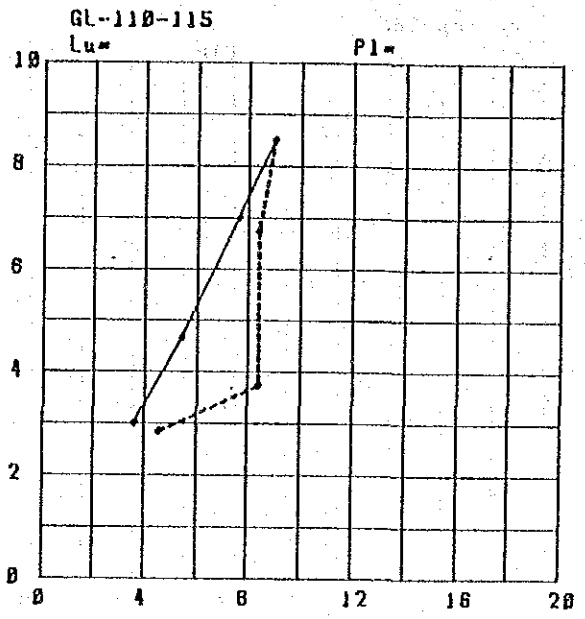


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (14/46)

Hole No. 2 Test Section (m)= 110 - 115 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 22.65
Longitude of Inyection Tube L(m)= 127.50 Height h1(m)= 113.00
Height h2(m)= 89.85

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
18.20	1.00	2.96	3.02	3.64	0.0001560660
27.00	3.00	6.51	4.66	5.40	0.0001498730
38.20	6.00	13.02	7.01	7.64	0.0001410380
45.00	8.00	18.07	8.51	9.00	0.0001368470
42.00	6.00	15.74	6.74	8.40	0.0001613250
42.00	3.00	15.74	3.74	8.40	0.0002907080
22.80	1.00	4.64	2.85	4.56	0.0002070540



Hole No. 2 Test Section (m)= 115 - 120 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 28.90
Longitude of Inyection Tube L(m)= 132.50 Height h1(m)= 118.20
Height h2(m)= 88.60

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
19.60	1.00	3.56	3.60	3.92	0.0001408190
39.30	3.00	14.33	4.53	7.86	0.0002247440
56.00	6.00	29.09	6.05	11.20	0.0002396000
64.50	8.00	38.59	7.10	12.90	0.0002351630
55.60	6.00	28.67	6.09	11.12	0.0002362720
43.00	3.00	17.15	4.25	8.60	0.0002622630
22.00	1.00	4.49	3.51	4.40	0.0001622310

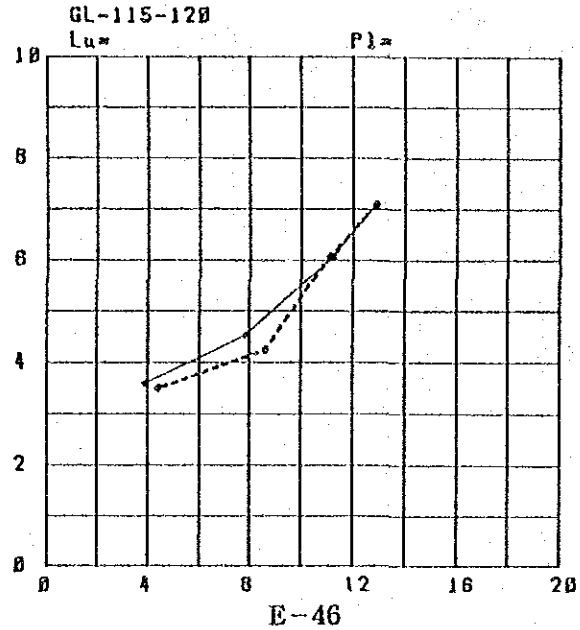
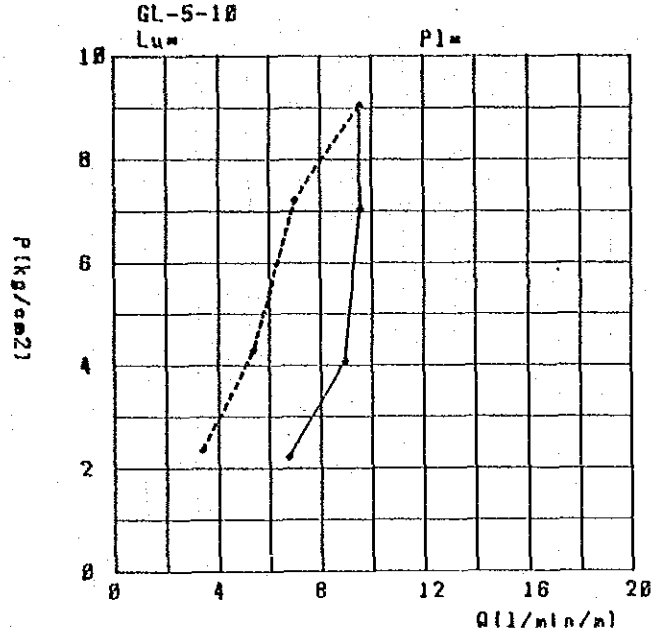


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (15/46)

Hole No. 3 Test Section (m)= 5 - 10 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 6.00
Longitude of Inyection Tube L(m)= 22.50 Height h1(m)= 15.60
Height h2(m)= 1.50

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
33.80	1.00	1.80	2.23	6.76	0.0003924200
44.80	3.00	3.16	4.09	8.96	0.0002833310
47.70	6.00	3.58	7.05	9.54	0.0001751380
47.60	8.00	3.57	9.05	9.52	0.0001361320
34.90	6.00	1.92	7.22	6.98	0.0001251850
26.90	3.00	1.14	4.30	5.38	0.0001621200
16.90	1.00	0.45	2.37	3.38	0.0001850140



Hole No. 3 Test Section (m)= 10 - 15 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 14.00
Longitude of Inyection Tube L(m)= 27.50 Height h1(m)= 13.30
Height h2(m)= 0.00

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
95.50	1.00	17.56	0.57	19.10	0.0043050400
117.60	3.00	26.62	1.67	23.52	0.0018256700
110.80	1.00	23.63	-0.03	22.16	-.0862691000

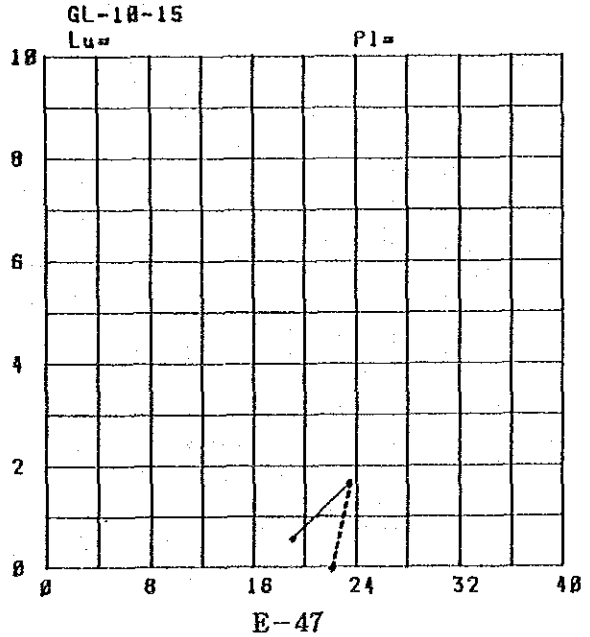
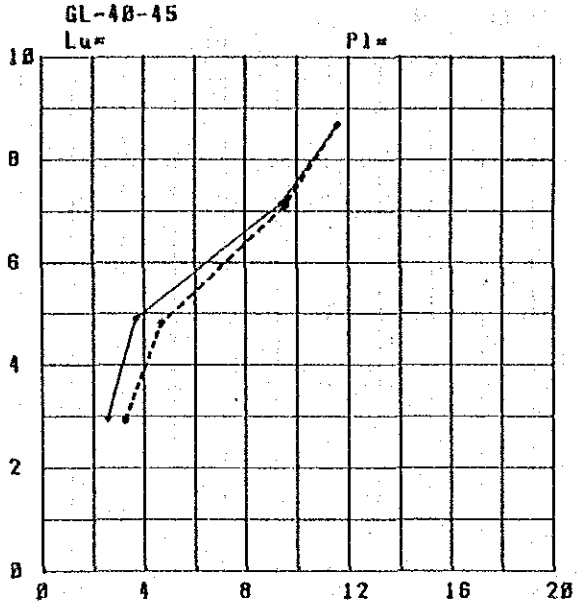


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (16/46)

Hole No. 3 Test Section (m)= 40 - 45 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.6 Groundwater Level H(m)= 19.60
Longitude of Inyection Tube L(m)= 57.60 Height h1(m)= 43.30
Height h2(m)= 22.90

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
12.90	1.00	0.67	2.97	2.58	0.0001123420
18.40	3.00	1.36	4.90	3.68	0.0000971501
47.00	6.00	8.89	7.15	9.40	0.0001701730
57.90	8.00	13.49	8.69	11.58	0.0001724960
47.80	6.00	9.20	7.12	9.56	0.0001738110
23.40	3.00	2.20	4.82	4.68	0.0001257060
16.30	1.00	1.07	2.93	3.26	0.0001438860



Hole No. 3 Test Section (m)= 45 - 50 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 42.45
Longitude of Inyection Tube L(m)= 62.50 Height h1(m)= 48.30
Height h2(m)= 5.05

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
12.60	1.00	0.69	5.26	2.52	0.0000620733
17.50	3.00	1.34	7.19	3.50	0.0000630086
48.60	6.00	10.33	9.29	9.72	0.0001354240
58.60	8.00	15.02	10.82	11.72	0.0001401900
47.50	6.00	9.87	9.34	9.50	0.0001317030
33.20	3.00	4.82	6.84	6.64	0.0001256200
22.90	1.00	2.29	5.10	4.58	0.0001163580

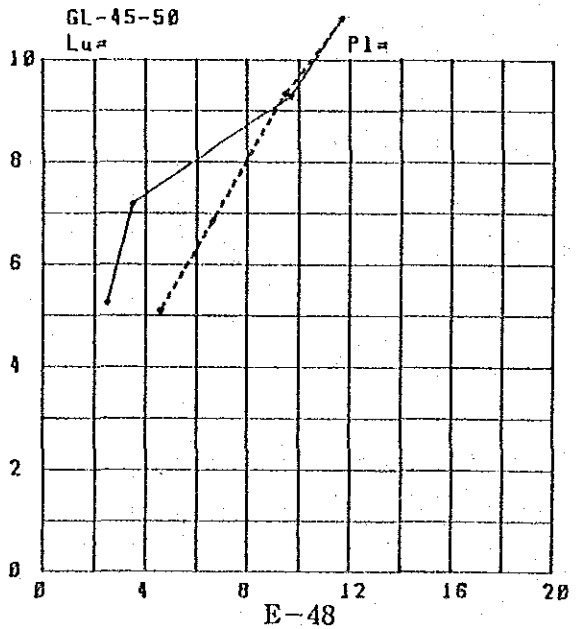
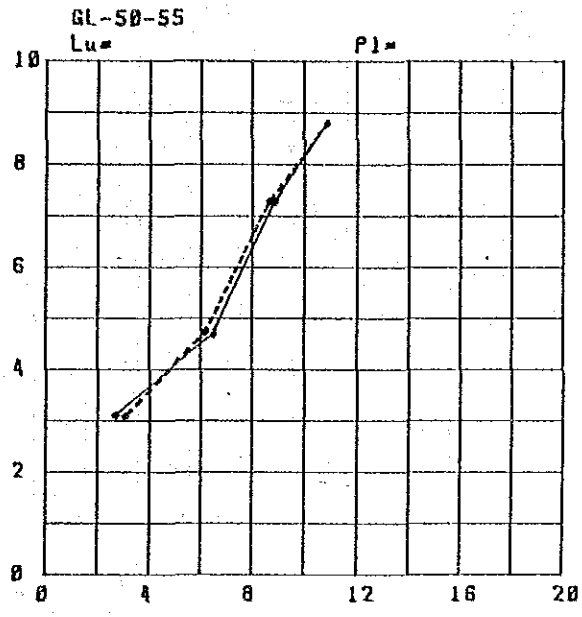


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (17/46)

Hole No. 3 Test Section (m)= 50 - 55 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 20.95
Longitude of Inyection Tube L(m)= 67.50 Height h1(m)= 53.45
Height h2(m)= 31.55

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
13.40	1.00	0.85	3.11	2.68	0.0001117310
32.40	3.00	4.96	4.69	6.48	0.0001787130
44.20	6.00	9.23	7.27	8.84	0.0001574800
54.30	8.00	13.93	8.80	10.86	0.0001598180
43.30	6.00	8.86	7.30	8.66	0.0001534870
31.00	3.00	4.54	4.74	6.20	0.0001694760
15.30	1.00	1.11	3.08	3.06	0.0001286410



Hole No. 3 Test Section (m)= 55 - 60 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 11.10
Longitude of Inyection Tube L(m)= 72.50 Height h1(m)= 58.20
Height h2(m)= 46.10

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
18.60	1.00	1.76	2.03	3.72	0.0002367140
25.30	3.00	3.25	3.89	5.06	0.0001686030
38.50	6.00	7.52	6.46	7.70	0.0001543590
42.40	8.00	9.12	8.30	8.48	0.0001323010
34.00	6.00	5.87	6.62	6.80	0.0001329090
23.00	3.00	2.68	3.94	4.60	0.0001510830
12.90	1.00	0.84	2.13	2.58	0.0001571340

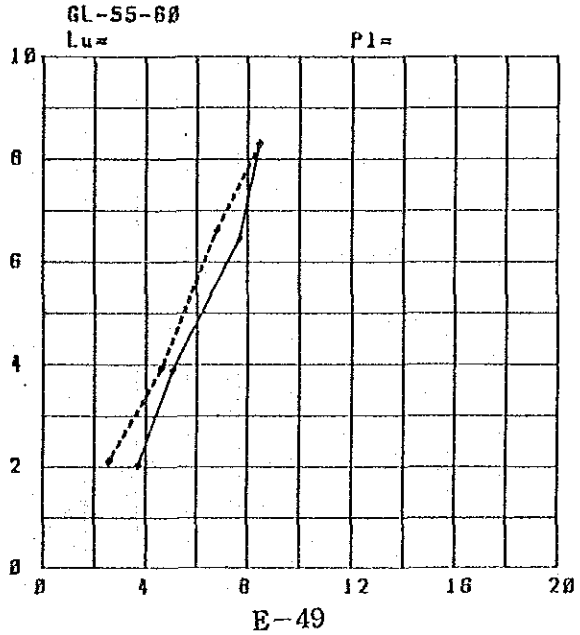
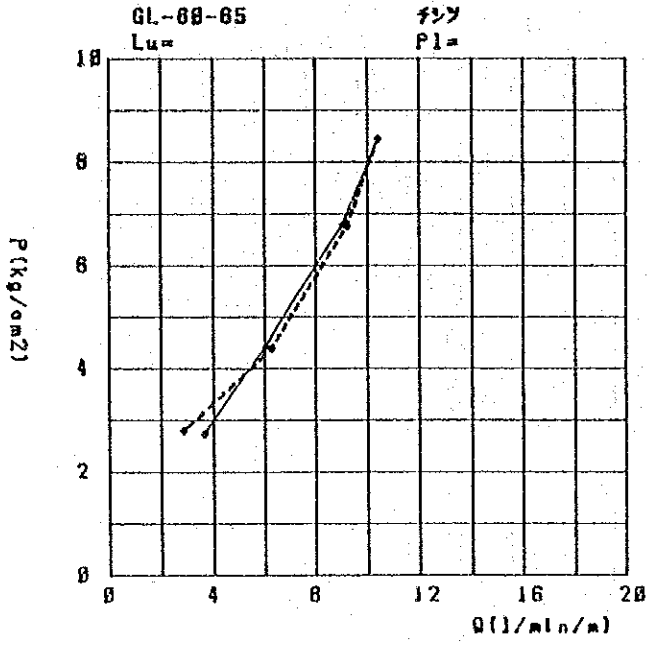


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (18/46)

Hole No. 3 Test Section (m)= 60 - 65 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 18.30
Longitude of Inyection Tube L(m)= 77.50 Height h1(m)= 63.25
Height h2(m)= 44.20

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
18.10	1.00	1.78	2.73	3.62	0.0001718310
30.00	3.00	4.88	4.42	6.00	0.0001758610
45.10	6.00	11.03	6.80	9.02	0.0001716800
51.90	8.00	14.61	8.44	10.38	0.0001591420
45.90	6.00	11.43	6.76	9.18	0.0001757460
31.20	3.00	5.28	4.38	6.24	0.0001845610
14.00	1.00	1.06	2.80	2.80	0.0001295170



Hole No. 3 Test Section (m)= 65 - 70 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 25.35
Longitude of Inyection Tube L(m)= 82.50 Height h1(m)= 68.35
Height h2(m)= 42.15

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
7.90	1.00	0.36	3.58	1.58	0.0000570711
32.00	3.00	5.91	5.03	6.40	0.0001647600
50.00	6.00	14.44	7.18	10.00	0.0001803950
58.00	8.00	19.43	8.68	11.60	0.0001730600
50.00	6.00	14.44	7.18	10.00	0.0001803950
31.00	3.00	5.55	5.07	6.20	0.0001584650
8.00	1.00	0.37	3.58	1.60	0.0000578083

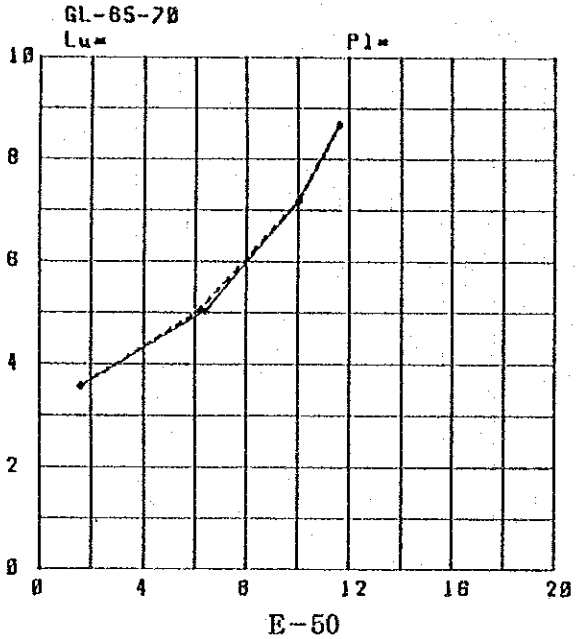
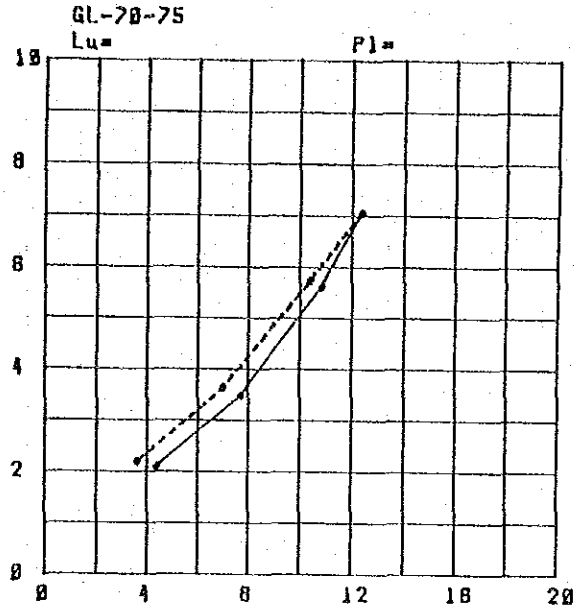


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (19/46)

Hole No. 3 Test Section (m)= 70 - 75 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 13.30
Longitude of Inyection Tube L(m)= 87.50 Height h1(m)= 73.25
Height h2(m)= 59.20

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
21.80	1.00	2.91	2.11	4.36	0.0002670060
38.50	3.00	9.08	3.50	7.70	0.0002850380
54.00	6.00	17.86	5.62	10.80	0.0002488230
61.80	8.00	23.39	7.07	12.36	0.0002264560
52.00	6.00	16.56	5.75	10.40	0.0002341950
35.00	3.00	7.50	3.65	7.00	0.0002479590
16.00	1.00	1.98	2.21	3.60	0.0002112080



Hole No. 3 Test Section (m)= 75 - 80 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 25.90
Longitude of Inyection Tube L(m)= 92.50 Height h1(m)= 78.40
Height h2(m)= 51.60

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
4.00	1.00	0.10	3.67	0.80	0.0000282221
7.00	3.00	0.32	5.65	1.40	0.0000320874
39.00	6.00	9.85	7.70	7.80	0.0001312200
65.10	8.00	27.44	7.94	13.02	0.0002123920
39.90	6.00	10.31	7.65	7.98	0.0001350550
15.10	3.00	1.48	5.53	3.02	0.0000706673
10.00	1.00	0.65	3.62	2.00	0.0000716166

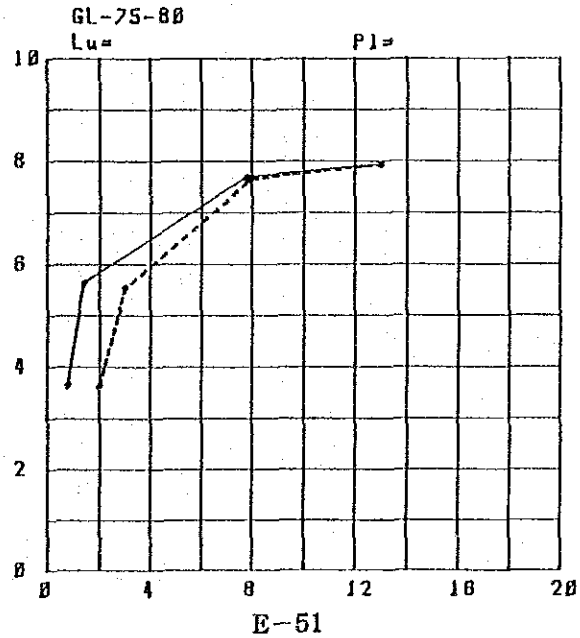
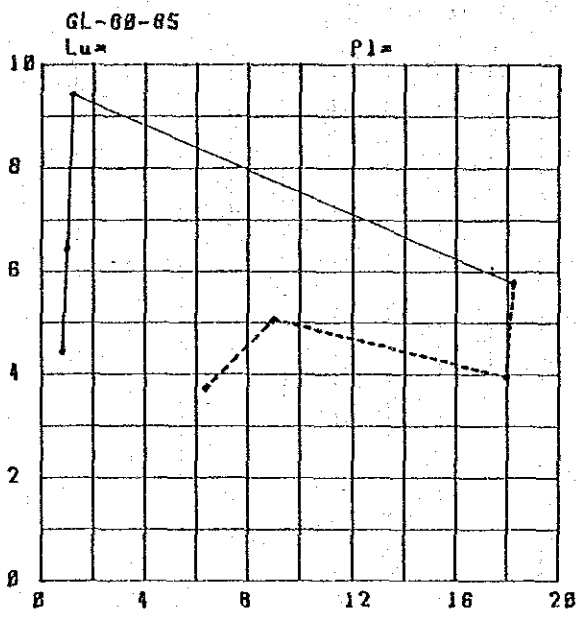


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (20/46)

Hole No. 3 Test Section (m)= 80 - 85 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 33.60
Longitude of Inyection Tube L(m)= 97.50 Height h1(m)= 83.35
Height h2(m)= 48.90

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
4.10	1.00	0.11	4.43	0.82	0.0000239434
5.00	3.00	0.17	6.43	1.00	0.0000201396
6.10	6.00	0.25	9.42	1.22	0.0000167668
81.20	8.00	50.77	5.77	18.24	0.0004093510
88.70	6.00	54.91	3.95	17.94	0.0005874330
45.00	3.00	13.82	5.06	9.00	0.0002301240
32.00	1.00	6.90	3.75	6.40	0.0002211670



Hole No. 3 Test Section (m)= 85 - 90 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 32.00
Longitude of Inyection Tube L(m)= 102.50 Height h1(m)= 88.30
Height h2(m)= 55.50

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
22.00	1.00	3.47	3.93	4.40	0.0001448370
40.00	3.00	11.48	5.13	8.00	0.0002018020
53.00	6.00	20.15	7.26	10.60	0.0001888950
57.00	8.00	23.31	8.95	11.40	0.0001649150
48.20	6.00	16.67	7.61	9.64	0.0001639230
35.00	3.00	8.79	5.40	7.00	0.0001677800
24.00	1.00	4.13	3.87	4.80	0.0001607020

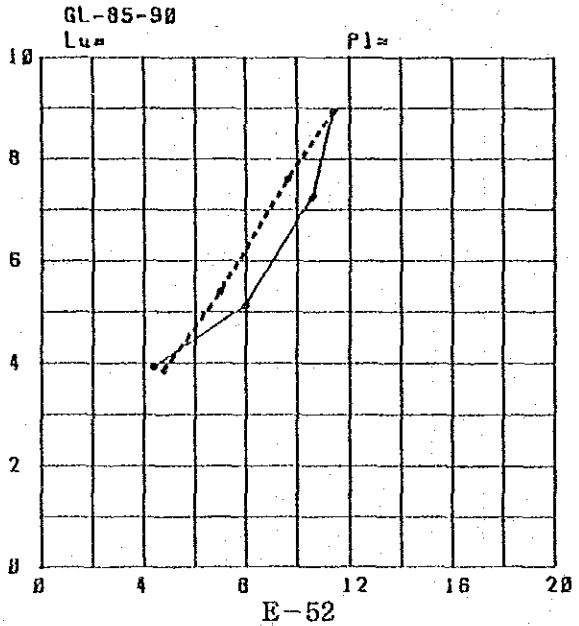
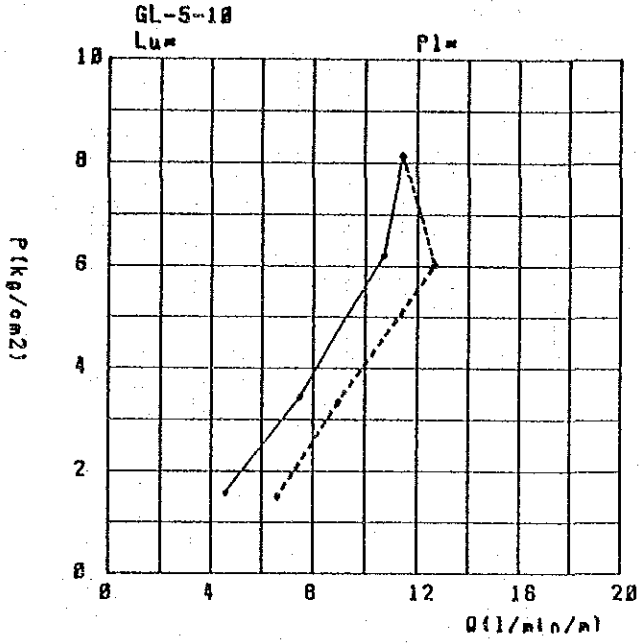


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (21/46)

Hole No. 4 Test Section (m)= 5 - 10 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 6.00
Longitude of Inyection Tube L(m)= 22.50 Height h1(m)= 8.10
Height h2(m)= 1.50

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
22.90	1.00	0.83	1.58	4.58	0.0003758760
37.40	3.00	2.20	3.44	7.48	0.0002815160
53.50	6.00	4.51	6.21	10.70	0.0002230850
57.20	8.00	5.15	8.14	11.44	0.0001818330
63.40	6.00	6.33	6.03	12.68	0.0002723620
45.00	3.00	3.19	3.34	9.00	0.0003487230
33.00	1.00	1.72	1.49	6.60	0.0005740140



Hole No. 4 Test Section (m)= 10 - 15 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 15.00
Longitude of Inyection Tube L(m)= 27.50 Height h1(m)= 13.10
Height h2(m)= 0.00

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
32.50	1.00	2.03	2.11	6.50	0.0003994280
42.20	3.00	3.43	3.97	8.44	0.0002754110
54.00	6.00	5.61	6.75	10.80	0.0002071700
64.40	8.00	7.98	8.51	12.88	0.0001958960
51.80	6.00	5.17	6.79	10.36	0.0001974190
41.50	3.00	3.32	3.98	8.30	0.0002700750
32.10	1.00	1.98	2.11	6.42	0.0003935830

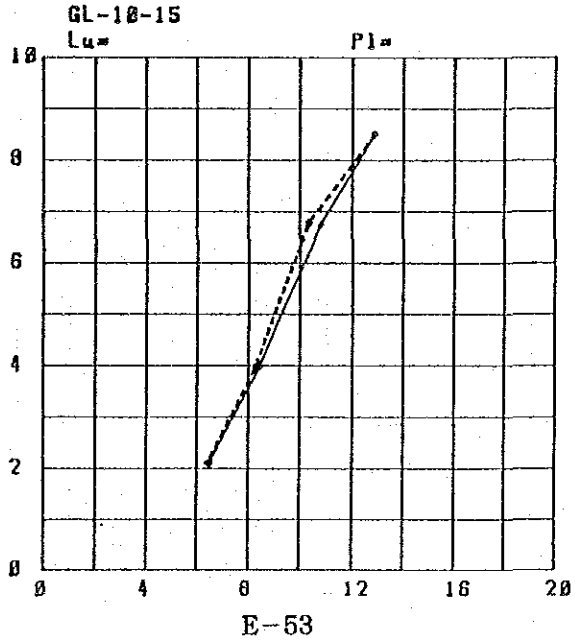
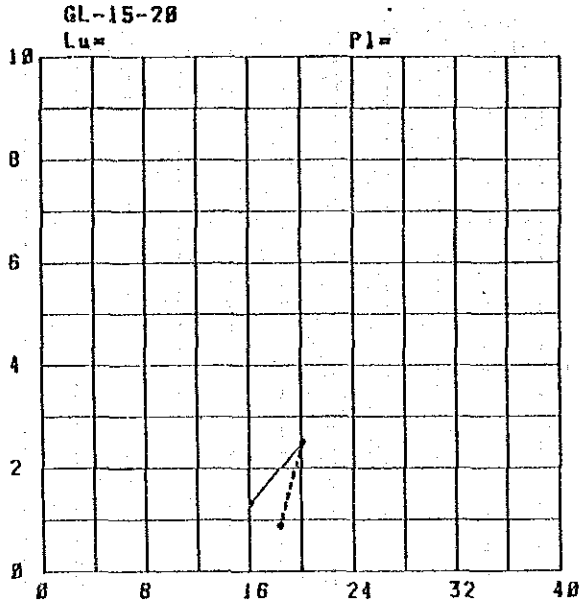


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (22/46)

Hole No. 4 Test Section (m)= 15 - 20 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 20.00
Longitude of Inyection Tube L(m)= 32.50 Height h1(m)= 18.10
Height h2(m)= 0.00

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
80.80	1.00	14.85	1.32	16.16	0.0015791900
100.70	3.00	23.07	2.50	20.14	0.0010416300
92.00	1.00	19.26	0.88	18.40	0.0026932200



Hole No. 4 Test Section (m)= 20 - 25 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 20.30
Longitude of Inyection Tube L(m)= 37.50 Height h1(m)= 24.00
Height h2(m)= 2.20

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
45.20	1.00	5.36	2.64	9.04	0.0004426680
57.00	3.00	8.53	4.33	11.40	0.0003410560
69.40	6.00	12.64	6.92	13.88	0.0002598220
77.60	8.00	15.81	8.60	15.52	0.0002336420
67.20	6.00	11.85	6.99	13.44	0.0002487480
55.30	3.00	8.03	4.38	11.06	0.0003270960
46.40	1.00	5.65	2.61	9.28	0.0004594350

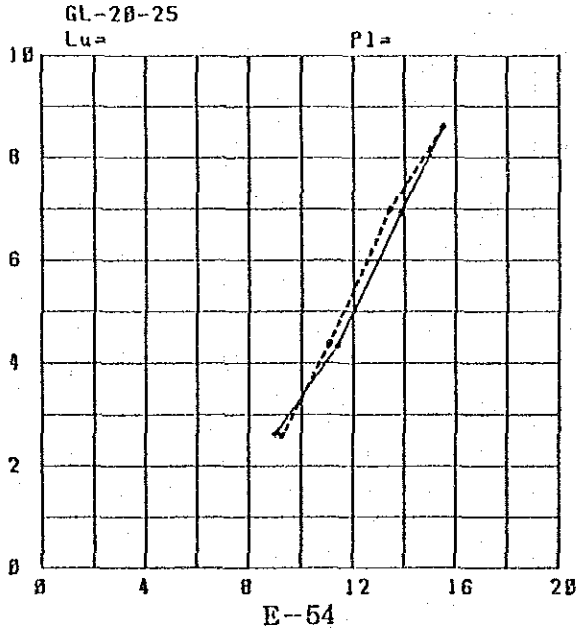
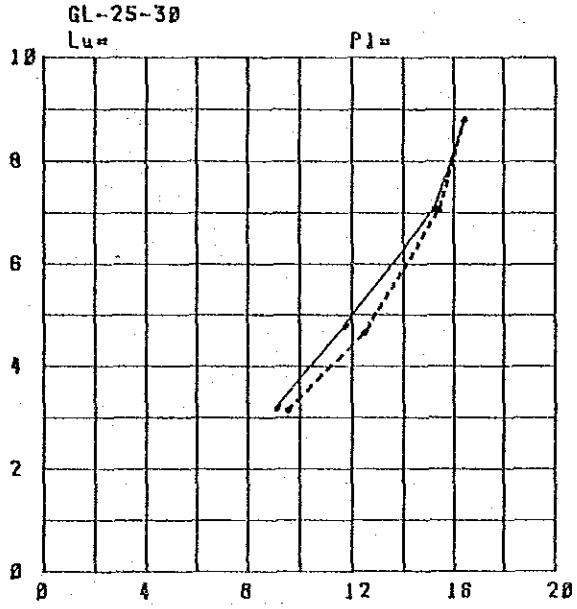


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (23/46)

Hole No. 4 Test Section (m)= 25 - 30 Longitude of Test l(m)= 6
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 29.00
Longitude of Inyection Tube L(m)= 42.50 Height h1(m)= 28.25
Height h2(m)= 0.00

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
45.70	1.00	6.21	3.20	9.14	0.0003693350
58.70	3.00	10.25	4.80	11.74	0.0003166340
76.20	6.00	17.27	7.10	15.24	0.0002779690
82.20	8.00	20.10	8.81	16.44	0.0002414400
77.10	6.00	17.68	7.06	15.42	0.0002828880
62.50	3.00	11.62	4.66	12.50	0.0003470380
47.80	1.00	6.80	3.15	9.56	0.0003934810



Hole No. 4 Test Section (m)= 30 - 35 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 31.80
Longitude of Inyection Tube L(m)= 47.50 Height h1(m)= 33.05
Height h2(m)= 0.70

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
50.80	1.00	8.58	3.38	10.16	0.0003894870
58.70	3.00	11.46	5.09	11.74	0.0002986290
68.90	6.00	15.78	7.66	13.78	0.0002329900
73.80	8.00	18.11	9.42	14.76	0.0002027550
64.30	6.00	13.75	7.86	12.86	0.0002118000
53.80	3.00	9.62	5.27	10.76	0.0002641860
48.10	1.00	7.69	3.47	9.62	0.0003593380

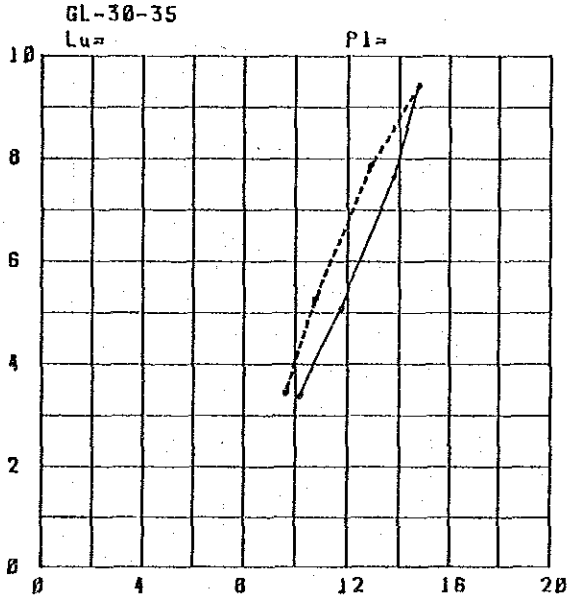
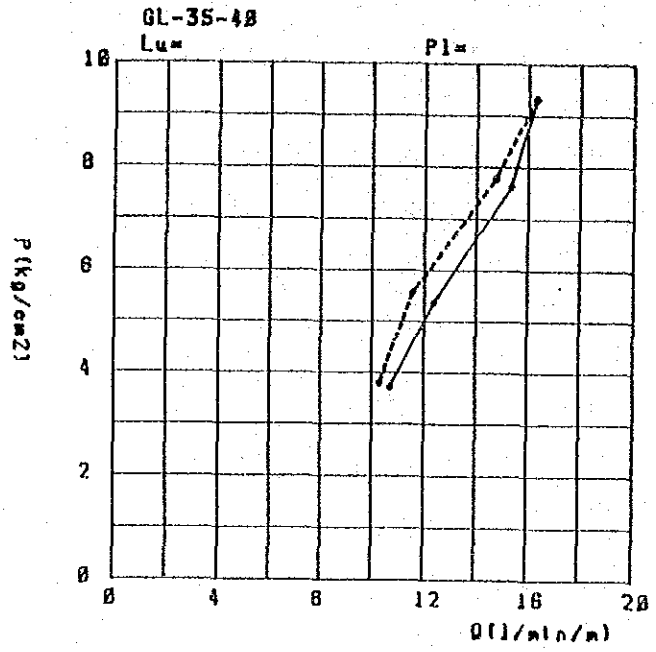


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (24/46)

Hole No. 4 Test Section (m)= 35 - 40 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 36.35
Longitude of Inyection Tube L(m)= 52.50 Height h1(m)= 38.90
Height h2(m)= 1.15

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
53.60	1.00	10.56	3.72	10.72	0.0003731370
61.80	3.00	14.04	5.37	12.36	0.0002978860
76.60	6.00	21.56	7.62	15.32	0.0002603160
81.60	8.00	24.47	9.33	16.32	0.0002264830
73.70	6.00	19.96	7.78	14.74	0.0002453040
57.70	3.00	12.24	5.65	11.54	0.0002691030
51.60	1.00	9.78	3.80	10.32	0.0003518980



Hole No. 4 Test Section (m)= 40 - 45 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 38.60
Longitude of Inyection Tube L(m)= 57.50 Height h1(m)= 43.25
Height h2(m)= 3.90

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
52.40	1.00	11.05	3.83	10.48	0.0003542450
58.30	3.00	13.68	5.57	11.66	0.0002711460
72.40	6.00	21.10	7.83	14.48	0.0002396500
78.70	8.00	24.93	9.44	15.74	0.0002158050
69.20	6.00	19.27	8.01	13.84	0.0002237470
55.40	3.00	12.35	5.70	11.08	0.0002516590
50.20	1.00	10.14	3.92	10.04	0.0003315080

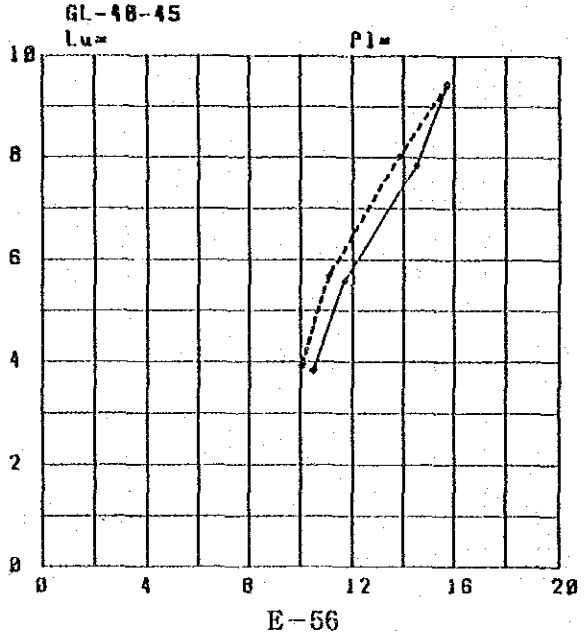
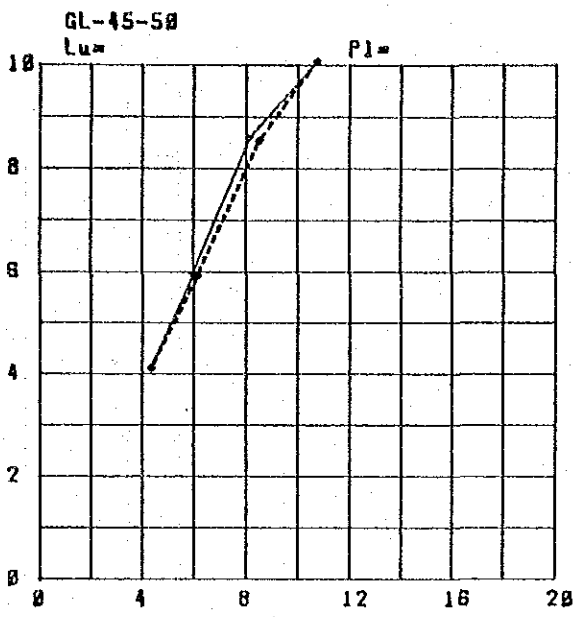


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (25/46)

Hole No. 4 Test Section (m)= 45 - 50 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 32.50
Longitude of Inyection Tube L(m)= 62.50 Height h1(m)= 48.30
Height h2(m)= 15.00

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
21.70	1.00	2.06	4.12	4.34	0.0001362370
29.80	3.00	3.80	5.94	5.96	0.0001298590
40.70	6.00	7.25	8.61	8.14	0.0001224660
53.60	8.00	12.57	10.07	10.72	0.0001377700
42.50	6.00	7.90	8.64	8.50	0.0001288530
30.70	3.00	4.12	5.92	6.14	0.0001343200
21.70	1.00	2.06	4.12	4.34	0.0001362370



Hole No. 4 Test Section (m)= 50 - 55 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 32.05
Longitude of Inyection Tube L(m)= 67.50 Height h1(m)= 53.05
Height h2(m)= 20.45

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
24.10	1.00	2.74	3.99	4.82	0.0001565590
40.60	3.00	7.79	5.48	8.12	0.0001917810
50.50	6.00	12.05	8.06	10.10	0.0001623220
58.50	8.00	16.17	9.64	11.70	0.0001570710
48.40	6.00	11.07	8.15	9.68	0.0001537000
38.20	3.00	6.89	5.57	7.64	0.0001775500
30.30	1.00	4.34	3.83	6.06	0.0002050340

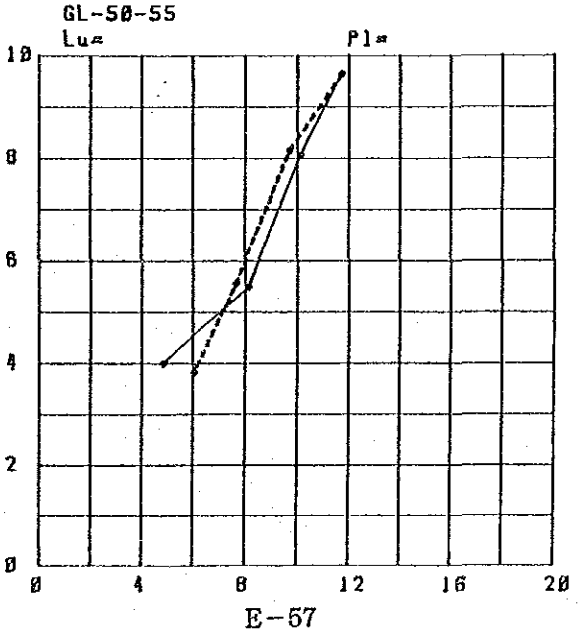


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (26/46)

Hole No. 4 Test Section (m)= 55 - 60 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 31.95
Longitude of Inyection Tube L(m)= 72.60 Height h1(m)= 58.20
Height h2(m)= 25.55

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
24.60	1.00	3.07	3.96	4.92	0.0001609250
34.90	3.00	6.18	5.65	6.98	0.0001600190
45.30	6.00	10.41	8.22	9.06	0.0001426230
54.30	8.00	14.96	9.77	10.86	0.0001439190
44.50	6.00	10.05	8.26	8.90	0.0001394860
35.10	3.00	6.25	5.64	7.02	0.0001611380
27.80	1.00	3.92	3.87	5.56	0.0001858550

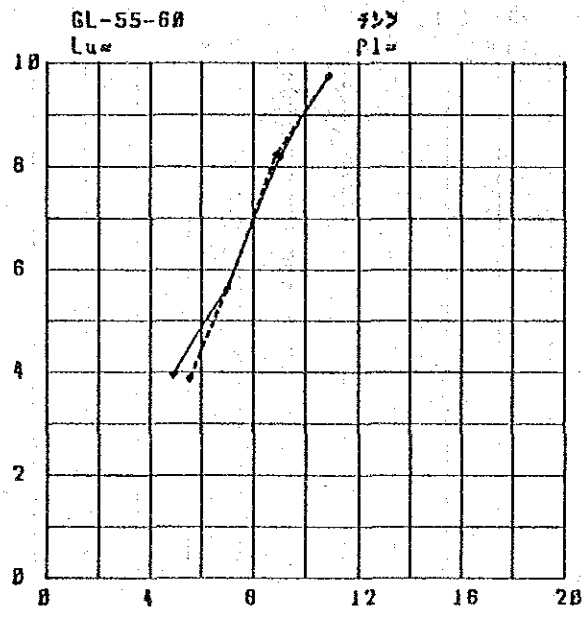
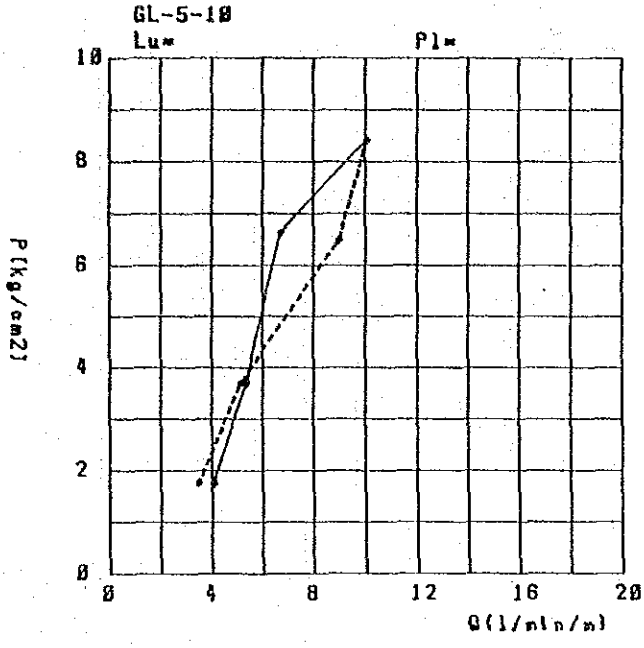


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (27/46)

Hole No. 5 Test Section (m)= 5 - 10 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 7.70
Longitude of Inyection Tube L(m)= 22.50 Height h1(m)= 8.15
Height h2(m)= 0.00

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
20.30	1.00	0.65	1.75	4.06	0.0003003210
26.70	3.00	1.12	3.70	5.34	0.0001866990
33.40	6.00	1.76	6.64	6.68	0.0001302500
50.20	8.00	3.97	8.42	10.04	0.0001543980
44.80	6.00	3.16	6.50	8.96	0.0001784810
25.60	3.00	1.03	3.71	5.12	0.0001785710
17.40	1.00	0.48	1.77	3.48	0.0002549100



Hole No. 5 Test Section (m)= 10 - 15 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 12.85
Longitude of Inyection Tube L(m)= 27.50 Height h1(m)= 13.10
Height h2(m)= 0.00

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
17.80	1.00	0.61	2.25	3.56	0.0002049180
22.80	3.00	1.00	4.21	4.56	0.0001402210
44.70	6.00	3.85	6.93	8.94	0.0001671160
59.80	8.00	6.88	8.62	11.96	0.0001795830
47.60	6.00	4.36	6.87	9.52	0.0001792910
32.30	3.00	2.01	4.11	6.46	0.0002035170
22.80	1.00	1.00	2.21	4.56	0.0002671210

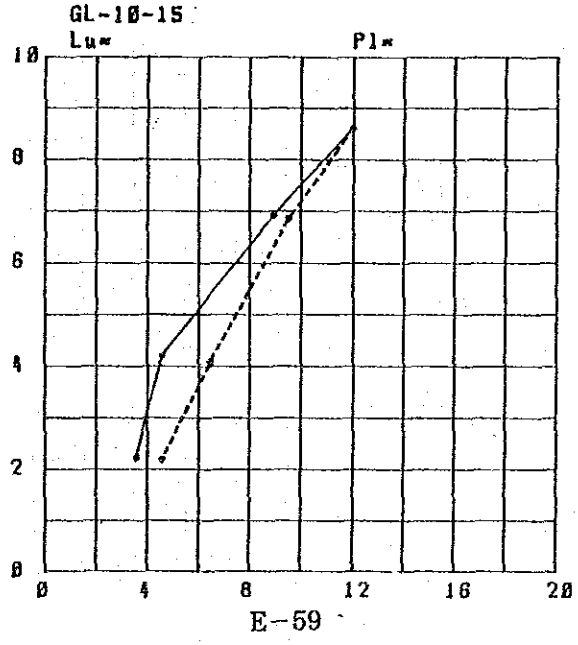
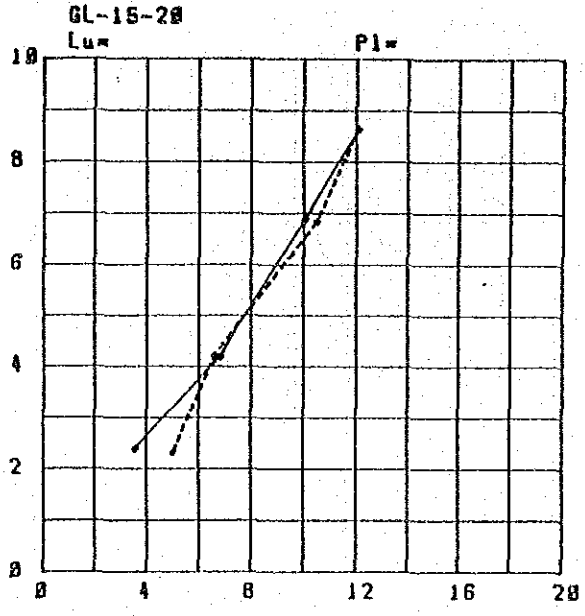


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (28/46)

Hole No. 6 Test Section (m)= 15 - 20 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 14.25
Longitude of Inyection Tube L(m)= 32.50 Height h1(m)= 18.00
Height h2(m)= 3.25

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
17.80	1.00	0.72	2.40	3.56	0.0001917930
34.10	3.00	2.65	4.21	6.82	0.0002096900
50.20	6.00	5.73	6.90	10.04	0.0001883220
60.40	8.00	8.30	8.65	12.08	0.0001808930
52.40	6.00	6.25	6.85	10.48	0.0001980480
33.00	3.00	2.48	4.23	6.60	0.0002021190
25.00	1.00	1.42	2.33	5.00	0.0002774680



Hole No. 5 Test Section (m)= 20 - 25 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 14.20
Longitude of Inyection Tube L(m)= 37.50 Height h1(m)= 23.10
Height h2(m)= 8.30

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
12.00	1.00	0.38	2.44	2.40	0.0001272190
13.80	3.00	0.50	4.43	2.76	0.0000806541
22.80	6.00	1.36	7.34	4.56	0.0000803862
35.50	8.00	3.31	9.15	7.10	0.0001004610
24.60	6.00	1.59	7.32	4.92	0.0000869978
15.80	3.00	0.66	4.41	3.16	0.0000926682
13.50	1.00	0.48	2.43	2.70	0.0001437120

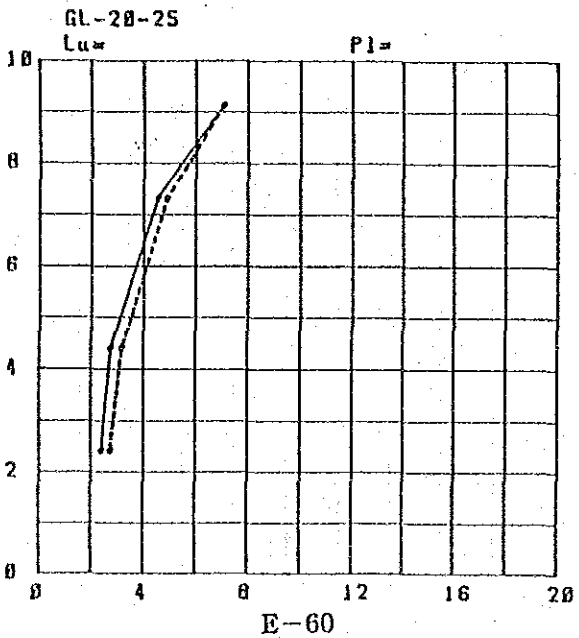
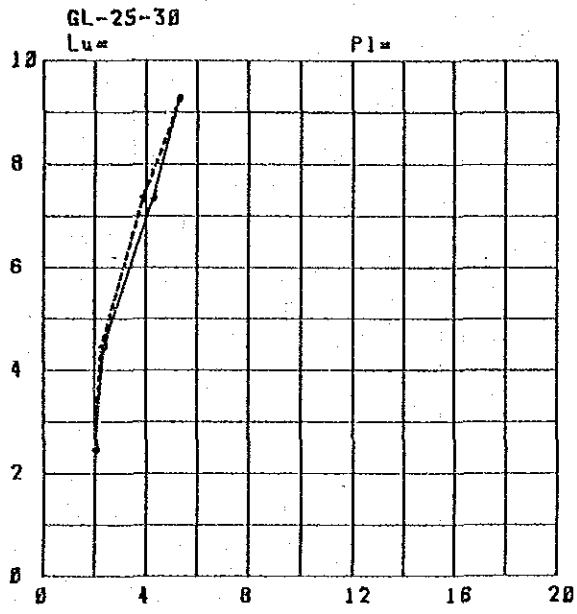


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (29/46)

Hole No. 5 Test Section (m)= 25 - 30 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 14.30
Longitude of Inyection Tube L(m)= 42.50 Height h1(m)= 28.10
Height h2(m)= 13.20

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
10.20	1.00	0.31	2.46	2.04	0.0001073950
11.80	3.00	0.41	4.45	2.36	0.0000686773
21.40	6.00	1.36	7.35	4.28	0.0000753454
26.60	8.00	2.10	9.28	5.32	0.0000742180
19.40	6.00	1.12	7.38	3.88	0.0000680790
11.30	3.00	0.38	4.45	2.26	0.0000657165
10.20	1.00	0.31	2.46	2.04	0.0001073950



Hole No. 5 Test Section (m)= 30 - 35 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 14.10
Longitude of Inyection Tube L(m)= 47.50 Height h1(m)= 33.10
Height h2(m)= 18.40

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
10.60	1.00	0.37	2.43	2.12	0.0001128180
12.90	3.00	0.55	4.41	2.58	0.0000756561
18.80	6.00	1.18	7.35	3.76	0.0000662028
27.80	8.00	2.57	9.21	5.56	0.0000781258
21.70	6.00	1.57	7.31	4.34	0.0000768229
13.10	3.00	0.57	4.41	2.62	0.0000768591
11.60	1.00	0.45	2.43	2.32	0.0001238370

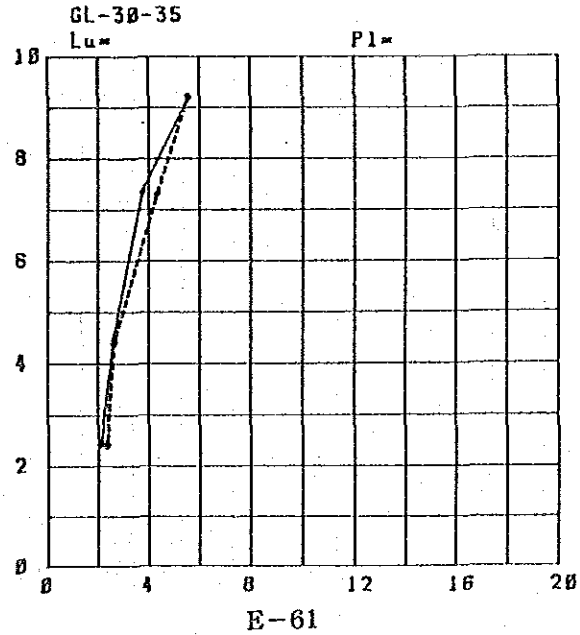
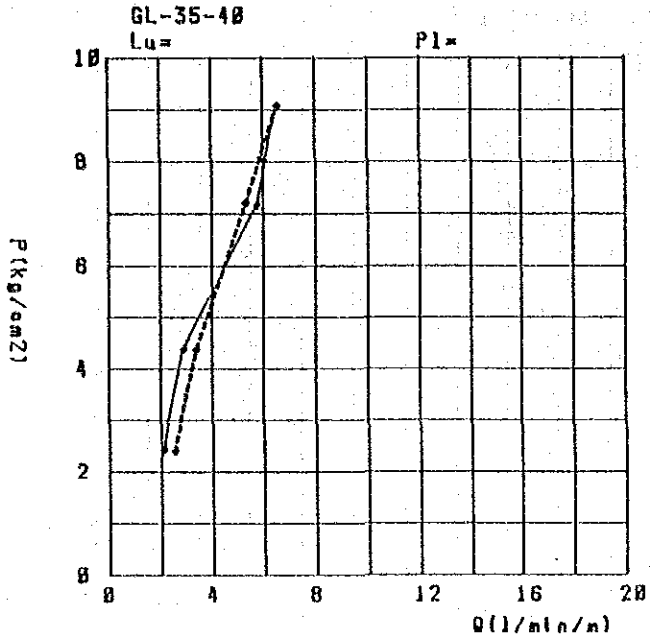


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (30/46)

Hole No. 5 Test Section (m)= 35 - 40 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 14.10
Longitude of Inyection Tube L(m)= 52.50 Height h1(m)= 38.10
Height h2(m)= 23.40

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
10.40	1.00	0.40	2.43	2.08	0.0001107090
14.30	3.00	0.75	4.39	2.86	0.0000842450
28.70	6.00	3.03	7.17	5.74	0.0001036760
32.70	8.00	3.93	9.08	6.54	0.0000932730
26.50	6.00	2.58	7.21	5.30	0.0000951364
16.80	3.00	1.04	4.37	3.36	0.0000996208
12.50	1.00	0.57	2.41	2.50	0.0001341470



Hole No. 5 Test Section (m)= 40 - 45 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 13.90
Longitude of Inyection Tube L(m)= 57.50 Height h1(m)= 43.10
Height h2(m)= 28.60

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
10.20	1.00	0.42	2.41	2.04	0.0001096660
15.20	3.00	0.93	4.36	3.04	0.0000903249
34.40	6.00	4.76	6.97	6.88	0.0001277170
40.60	8.00	6.63	8.79	8.12	0.0001196360
32.60	6.00	4.28	7.02	6.52	0.0001201970
21.70	3.00	1.90	4.26	4.34	0.0001318730
22.30	1.00	2.00	2.25	4.46	0.0002566290

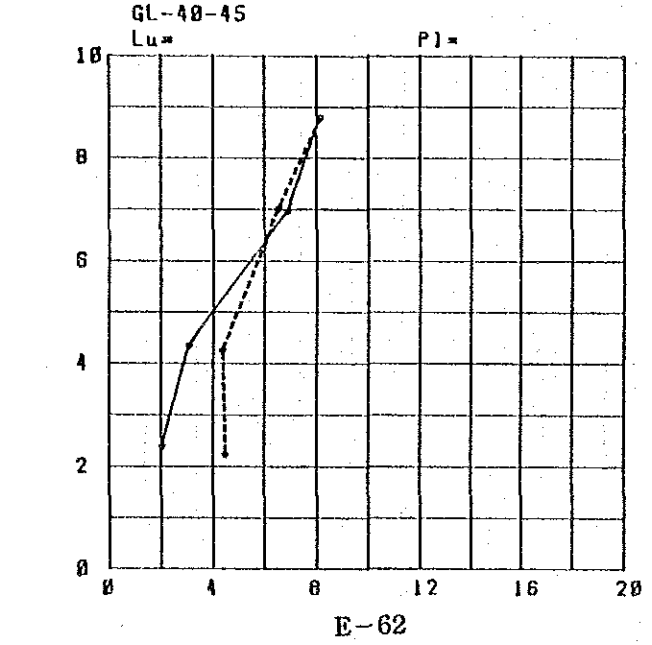
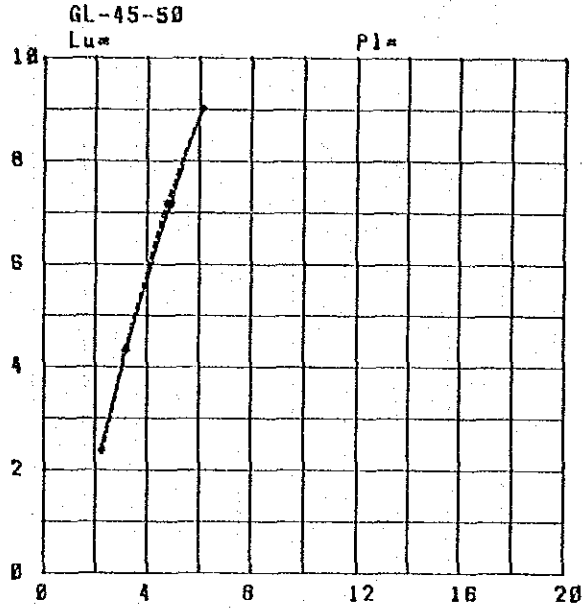


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (31/46)

Hole No. 5 Test Section (m)= 45 - 50 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 13.60
Longitude of Inyection Tube L(m)= 62.50 Height h1(m)= 48.10
Height h2(m)= 33.70

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
11.10	1.00	0.54	2.39	2.22	0.0001204450
16.00	3.00	1.12	4.33	3.20	0.0000957161
24.40	6.00	2.60	7.18	4.88	0.0000879926
30.50	8.00	4.07	9.03	6.10	0.0000874217
23.60	6.00	2.44	7.20	4.72	0.0000840089
15.70	3.00	1.08	4.33	3.14	0.0000938312
11.40	1.00	0.57	2.38	2.28	0.0001238530



Hole No. 5 Test Section (m)= 50 - 55 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 13.90
Longitude of Inyection Tube L(m)= 67.50 Height h1(m)= 53.10
Height h2(m)= 38.60

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
19.20	1.00	1.74	2.28	3.84	0.0002184320
27.30	3.00	3.52	4.10	5.46	0.0001724880
39.70	6.00	7.45	6.71	7.94	0.0001532940
55.40	8.00	14.50	8.00	11.08	0.0001793010
38.40	6.00	6.97	6.75	7.68	0.0001472210
30.50	3.00	4.40	4.01	6.10	0.0001969060
21.10	1.00	2.10	2.24	4.22	0.0002439250

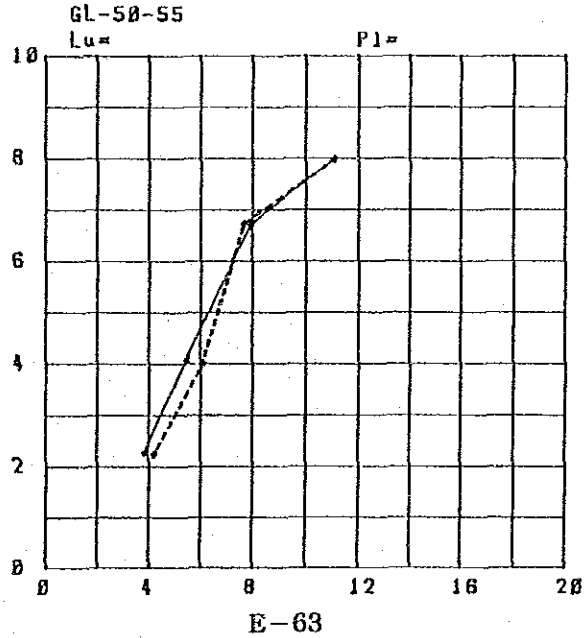


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (32/46)

Hole No. 6 Test Section (m)= 55 - 60 Longitude of Test l(m)= 6
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 13.90
Longitude of Inyection Tube L(m)= 72.50 Height h1(m)= 68.10
Height h2(m)= 43.60

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
12.40	1.00	0.78	2.37	2.48	0.0001353620
19.60	3.00	1.95	4.26	3.92	0.0001102630
36.20	6.00	6.65	6.78	7.24	0.0001381390
44.00	8.00	8.83	8.47	8.80	0.0001346400
33.80	6.00	5.80	6.87	6.76	0.0001273790
20.60	3.00	2.15	4.23	4.12	0.0001259510
18.10	1.00	1.66	2.28	3.62	0.0002052030

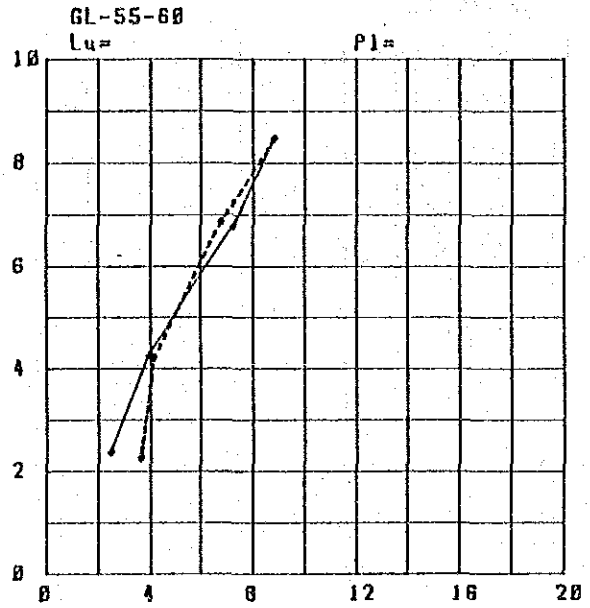
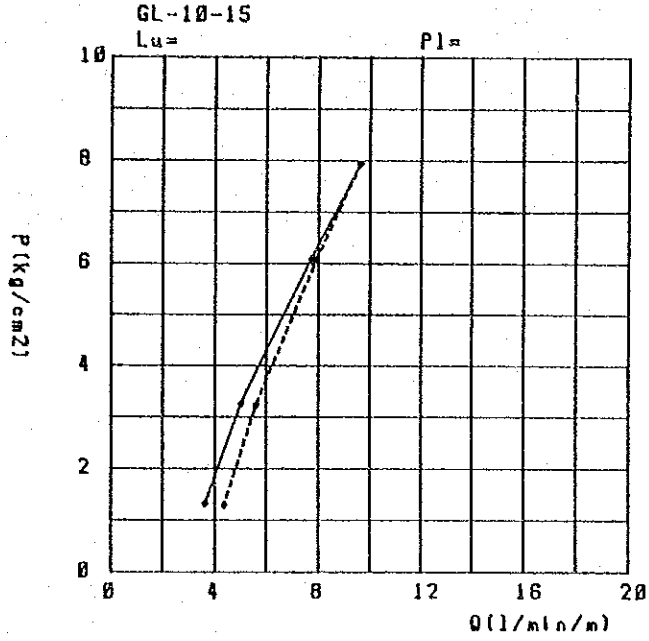


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (33/46)

Hole No. 6 Test Section (m)= 10 - 15 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 3.25
Longitude of Inyection Tube L(m)= 27.50 Height h1(m)= 13.10
Height h2(m)= 9.25

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
18.10	1.00	0.63	1.32	3.62	0.0003645040
25.10	3.00	1.21	3.26	5.02	0.0001991190
38.60	6.00	2.87	6.10	7.72	0.0001638850
48.20	8.00	4.47	7.94	9.64	0.0001572170
39.60	6.00	3.02	6.08	7.92	0.0001685470
28.00	3.00	1.51	3.23	5.60	0.0002241610
21.80	1.00	0.91	1.29	4.36	0.0004363520



Hole No. 6 Test Section (m)= 15 - 20 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 3.75
Longitude of Inyection Tube L(m)= 32.50 Height h1(m)= 18.10
Height h2(m)= 13.75

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
10.70	1.00	0.26	1.41	2.14	0.0001966250
20.00	3.00	0.91	3.34	4.00	0.0001548520
33.80	6.00	2.60	6.18	6.76	0.0001417180
44.10	8.00	4.42	7.99	8.82	0.0001428580
26.20	6.00	1.56	6.28	5.24	0.0001080370
18.90	3.00	0.81	3.35	3.78	0.0001459100
16.00	1.00	0.59	1.38	3.20	0.0003008940

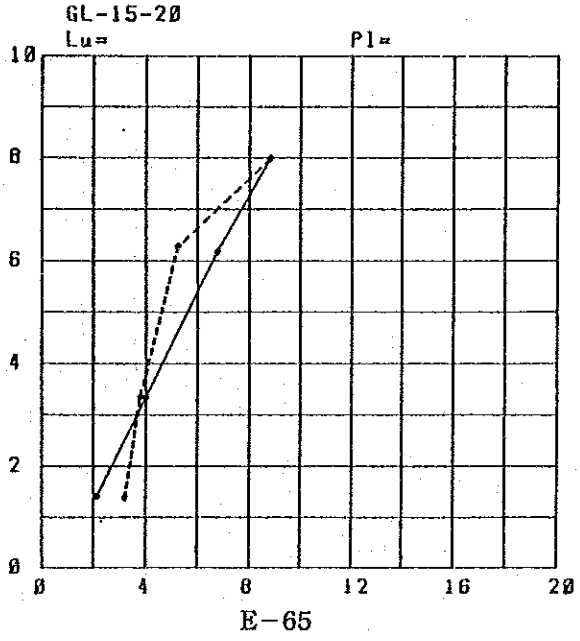
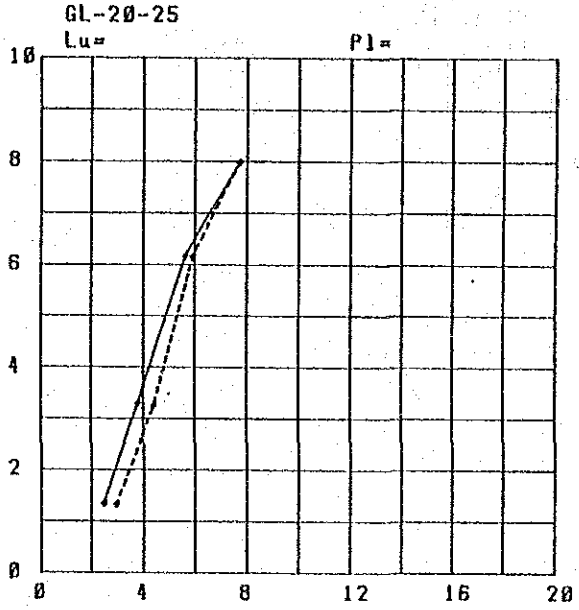


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (34/46)

Hole No. 6 Test Section (m)= 20 - 25 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 3.25
Longitude of Inyection Tube L(m)= 37.50 Height h1(m)= 23.10
Height h2(m)= 19.25

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
12.40	1.00	0.40	1.34	2.48	0.0002387640
18.90	3.00	0.94	3.29	3.78	0.0001486810
28.10	6.00	2.07	6.18	5.62	0.0001177690
38.60	8.00	3.91	7.99	7.72	0.0001250210
29.60	6.00	2.30	6.16	5.92	0.0001245130
22.00	3.00	1.27	3.26	4.40	0.0001748360
14.80	1.00	0.57	1.33	2.96	0.0002886550



Hole No. 6 Test Section (m)= 25 - 30 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 3.25
Longitude of Inyection Tube L(m)= 42.50 Height h1(m)= 28.10
Height h2(m)= 24.25

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
19.80	1.00	1.17	1.27	3.96	0.0004041770
28.30	3.00	2.38	3.15	5.66	0.0002328510
41.30	6.00	5.07	5.88	8.26	0.0001819300
60.20	8.00	10.78	7.31	12.04	0.0002133140
41.70	6.00	5.17	5.87	8.34	0.0001840020
30.60	3.00	2.79	3.11	6.12	0.0002550420
21.60	1.00	1.39	1.25	4.32	0.0004487650

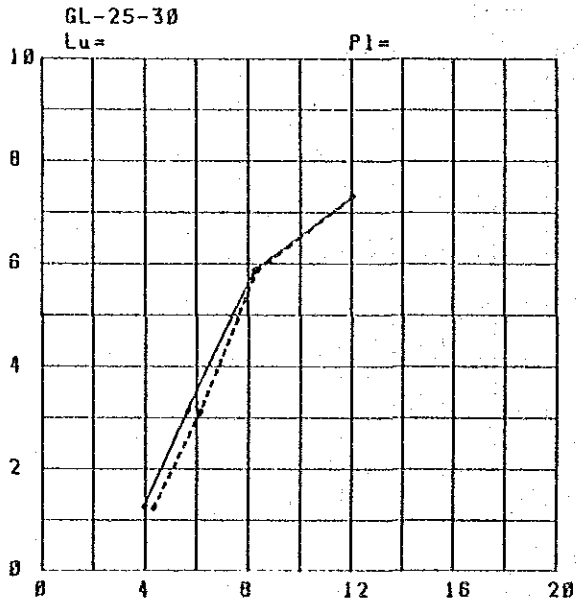
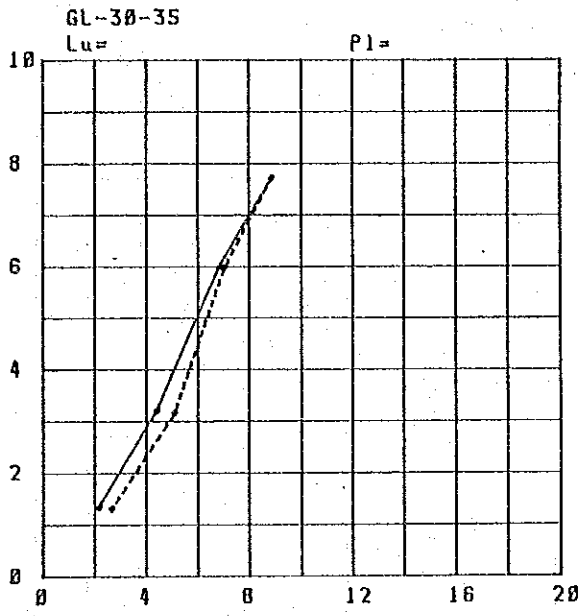


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (35/46)

Hole No. 6 Test Section (m)= 30 - 35 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 3.25
Longitude of Inyection Tube L(m)= 47.60 Height h1(m)= 33.10
Height h2(m)= 29.25

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
10.90	1.00	0.40	1.35	2.18	0.0002097470
22.10	3.00	1.62	3.22	4.42	0.0001775570
34.20	6.00	3.89	6.00	6.84	0.0001476760
44.40	8.00	6.55	7.73	8.88	0.0001487240
35.20	6.00	4.12	5.97	7.04	0.0001525810
25.40	3.00	2.15	3.17	5.08	0.0002074250
13.30	1.00	0.69	1.33	2.66	0.0002596570



Hole No. 6 Test Section (m)= 35 - 40 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 1.60
Longitude of Inyection Tube L(m)= 52.50 Height h1(m)= 38.10
Height h2(m)= 35.90

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
10.70	1.00	0.42	1.18	2.14	0.0002351900
16.40	3.00	0.99	3.12	3.28	0.0001360440
21.20	6.00	1.65	6.05	4.24	0.0000906538
28.20	8.00	2.92	7.93	5.64	0.0000920983
23.80	6.00	2.08	6.01	4.76	0.0001025000
13.70	3.00	0.69	3.15	2.74	0.0001125700
10.10	1.00	0.37	1.18	2.02	0.0002211410

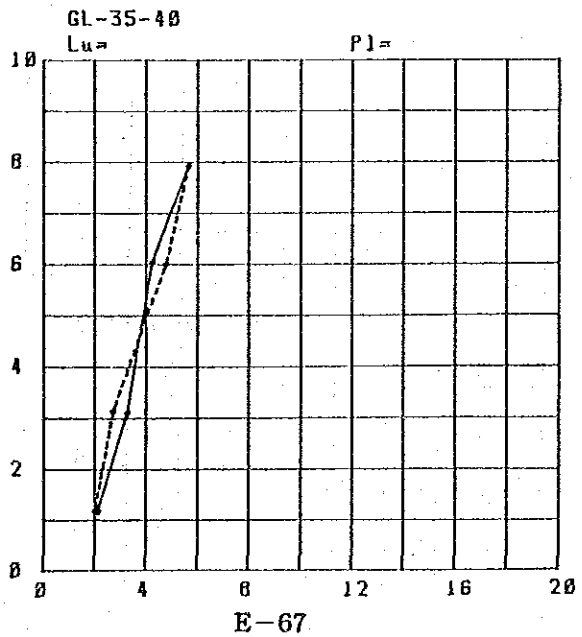
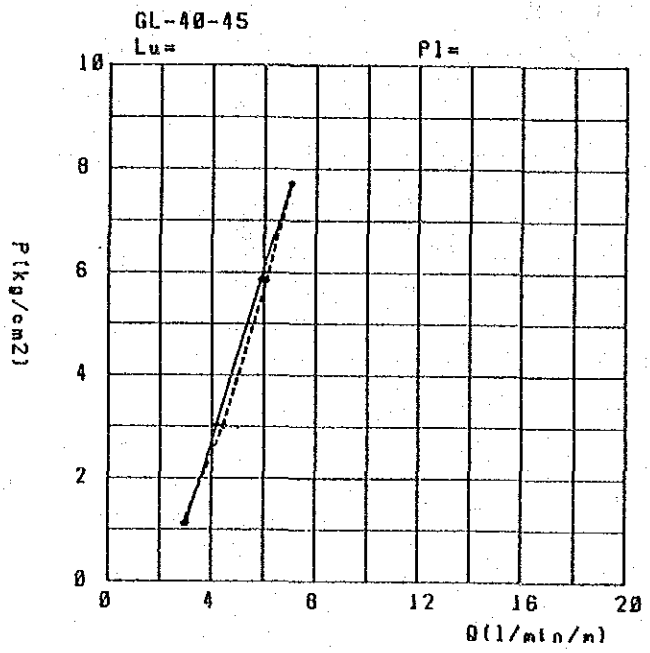


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (36/46)

Hole No. 6 Test Section (m)= 40 - 45 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 1.60
Longitudo of Inyection Tube L(m)= 57.50 Height h1(m)= 43.10
Height h2(m)= 40.90

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
15.20	1.00	0.93	1.13	3.04	0.0003491960
20.90	3.00	1.76	3.04	4.18	0.0001777570
29.40	6.00	3.48	5.87	5.88	0.0001296300
35.10	8.00	4.86	7.72	7.02	0.0001176550
30.50	6.00	3.74	5.85	6.10	0.0001350910
22.20	3.00	1.98	3.02	4.44	0.0001902230
14.60	1.00	0.86	1.13	2.92	0.0003332840



Hole No. 6 Test Section (m)= 45 - 50 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 1.60
Longitude of Inyection Tube L(m)= 62.50 Height h1(m)= 48.10
Height h2(m)= 45.90

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
13.90	1.00	0.85	1.14	2.78	0.0003169500
18.70	3.00	1.53	3.07	3.74	0.0001578620
20.60	6.00	1.86	6.03	4.12	0.0000883872
28.10	8.00	3.45	7.87	5.62	0.0000923917
19.70	6.00	1.70	6.05	3.94	0.0000843039
17.50	3.00	1.34	3.09	3.50	0.0001468220
11.60	1.00	0.59	1.16	2.32	0.0002586600

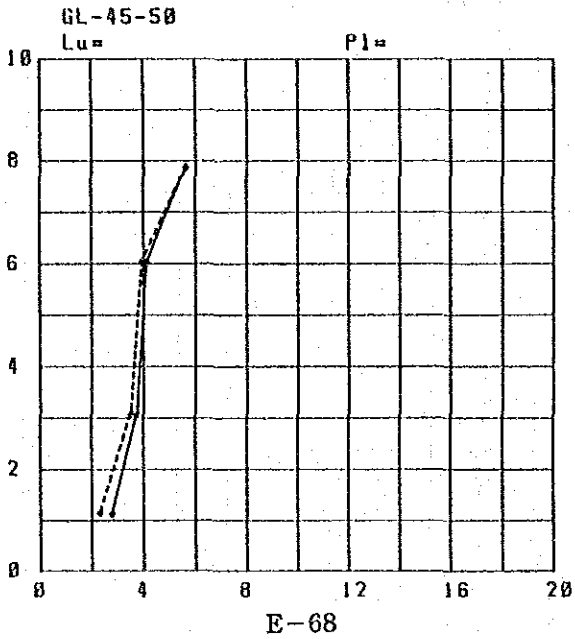
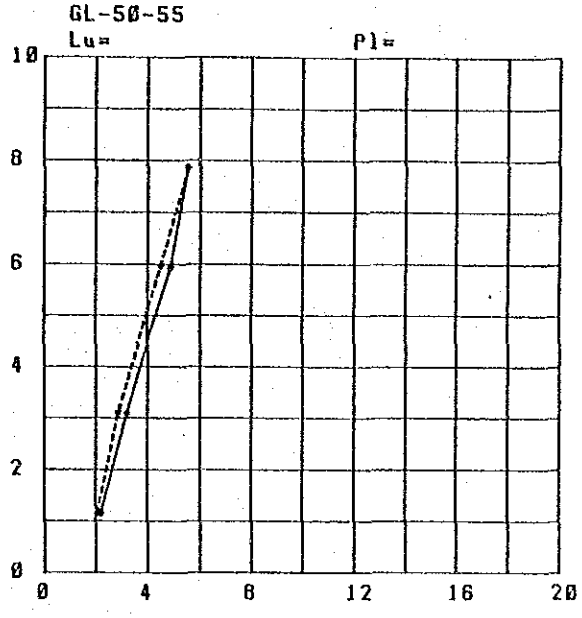


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (37/46)

Hole No. 6 Test Section (m)= 50 - 55 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 1.60
Longitude of Inyection Tube L(m)= 67.50 Height h1(m)= 53.10
Height h2(m)= 50.90

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
11.10	1.00	0.58	1.16	2.22	0.0002473720
16.00	3.00	1.21	3.10	3.20	0.0001336730
24.30	6.00	2.79	5.94	4.86	0.0001059010
27.60	8.00	3.60	7.86	5.52	0.0000909149
22.50	6.00	2.39	5.98	4.50	0.0000974037
14.40	3.00	0.98	3.12	2.88	0.0001194200
10.40	1.00	0.51	1.17	2.08	0.0002303620



Hole No. 6 Test Section (m)= 55 - 60 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 1.60
Longitude of Inyection Tube L(m)= 72.50 Height h1(m)= 58.10
Height h2(m)= 55.90

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
10.20	1.00	0.53	1.17	2.04	0.0002262600
12.20	3.00	0.76	3.14	2.44	0.0001004540
16.30	6.00	1.35	6.09	3.26	0.0000693534
21.30	8.00	2.30	7.99	4.26	0.0000690237
18.10	6.00	1.66	6.05	3.62	0.0000774118
14.40	3.00	1.05	3.11	2.88	0.0001196990
11.80	1.00	0.71	1.15	2.36	0.0002658200

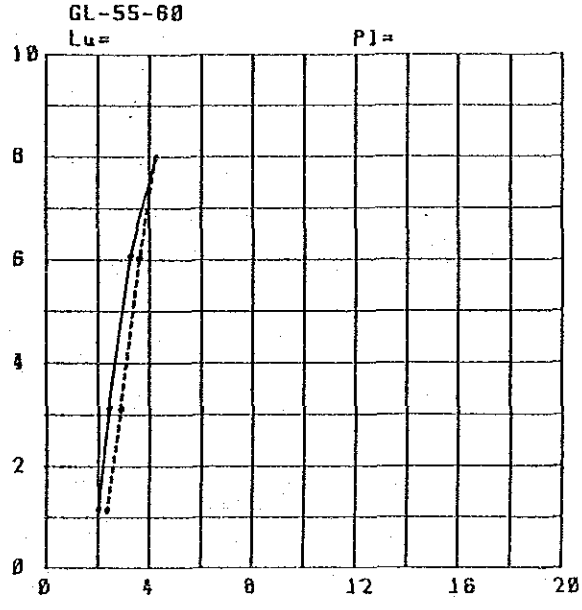
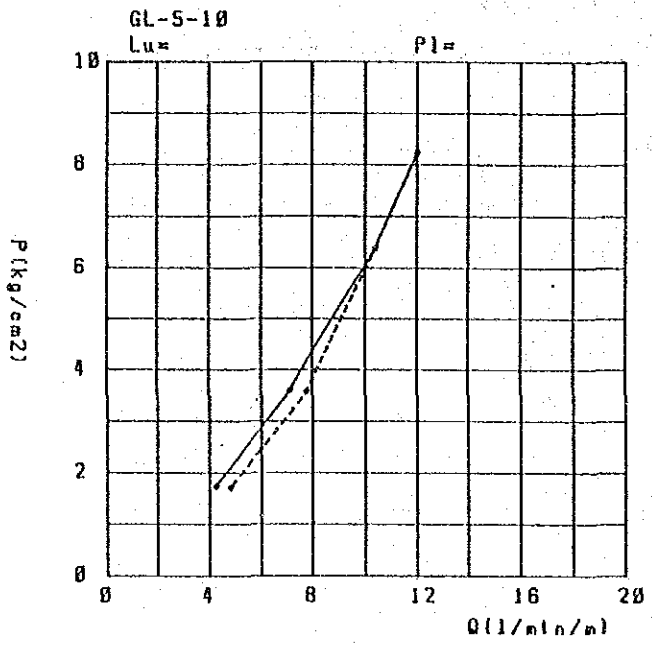


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (38/46)

Hole No. 7 Test Section (m)= 5 - 10 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 9.65
Longitude of Inyection Tube L(m)= 22.50 Height h1(m)= 8.10
Height h2(m)= 0.00

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
21.20	1.00	0.71	1.74	4.24	0.0003155990
35.70	3.00	2.01	3.61	7.14	0.0002560950
51.90	6.00	4.24	6.39	10.38	0.0002104300
60.00	8.00	5.67	8.24	12.00	0.0001884600
51.90	6.00	4.24	6.39	10.38	0.0002104300
38.90	3.00	2.38	3.57	7.78	0.0002819880
24.00	1.00	0.91	1.72	4.80	0.0003614240



Hole No. 7 Test Section (m)= 10 - 15 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 14.50
Longitude of Inyection Tube L(m)= 27.50 Height h1(m)= 13.10
Height h2(m)= 0.00

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
27.00	1.00	1.40	2.17	5.40	0.0003221980
38.20	3.00	2.81	4.03	7.64	0.0002454750
53.00	6.00	5.41	6.77	10.60	0.0002027150
61.30	8.00	7.23	8.59	12.26	0.0001848370
53.20	6.00	5.45	6.77	10.64	0.0002036030
43.20	3.00	3.59	3.95	8.64	0.0002831110
32.20	1.00	2.00	2.11	6.44	0.0003950400

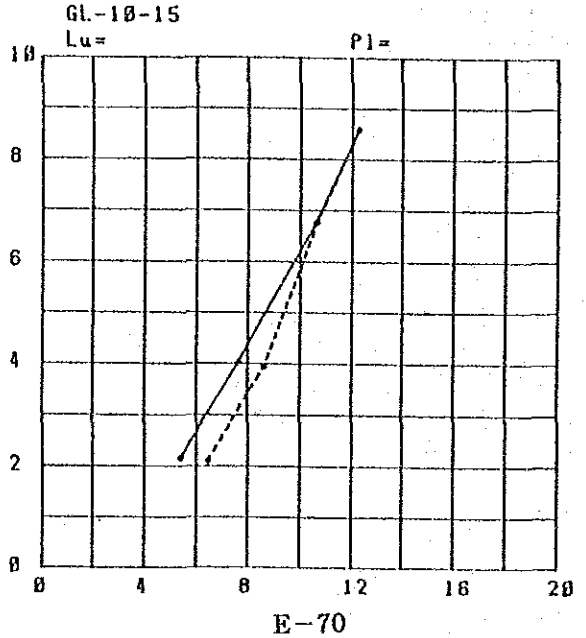
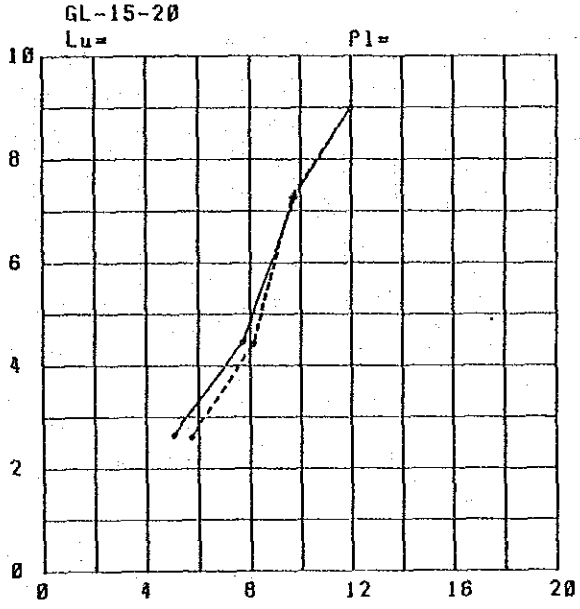


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (39/46)

Hole No. 7 Test Section (m)= 15 - 20 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 18.55
Longitude of Inyection Tube L(m)= 32.50 Height h1(m)= 18.10
Height h2(m)= 0.00

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
25.30	1.00	1.46	2.66	5.06	0.0002458540
38.60	3.00	3.38	4.47	7.72	0.0002235280
48.80	6.00	5.42	7.27	9.76	0.0001738380
59.90	8.00	8.16	8.99	11.98	0.0001724400
48.30	6.00	5.31	7.28	9.66	0.0001717950
40.60	3.00	3.75	4.44	8.12	0.0002370200
28.60	1.00	1.86	2.62	5.72	0.0002822070



Hole No. 7 Test Section (m)= 20 - 25 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 21.30
Longitude of Inyection Tube L(m)= 37.50 Height h1(m)= 23.10
Height h2(m)= 1.20

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
28.20	1.00	2.09	2.98	5.64	0.0002449080
43.00	3.00	4.85	4.70	8.60	0.0002366430
55.60	6.00	8.11	7.38	11.12	0.0001951000
62.40	8.00	10.22	9.17	12.48	0.0001762250
56.40	6.00	8.35	7.36	11.28	0.0001985400
44.30	3.00	5.15	4.67	8.86	0.0002453510
34.70	1.00	3.16	2.87	6.94	0.0003126120

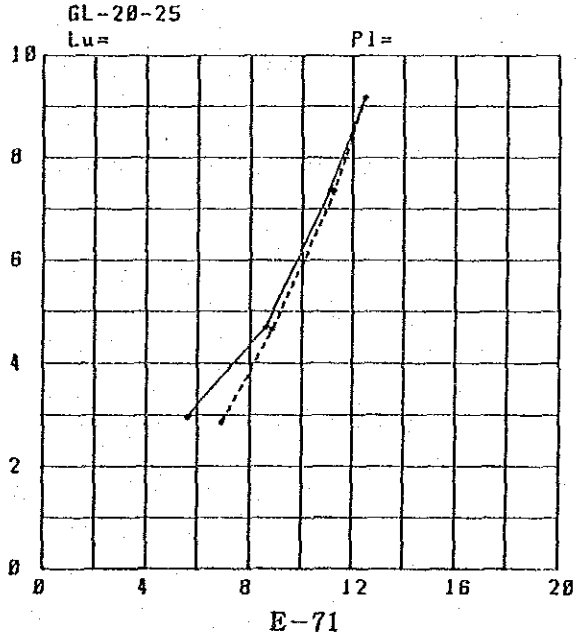
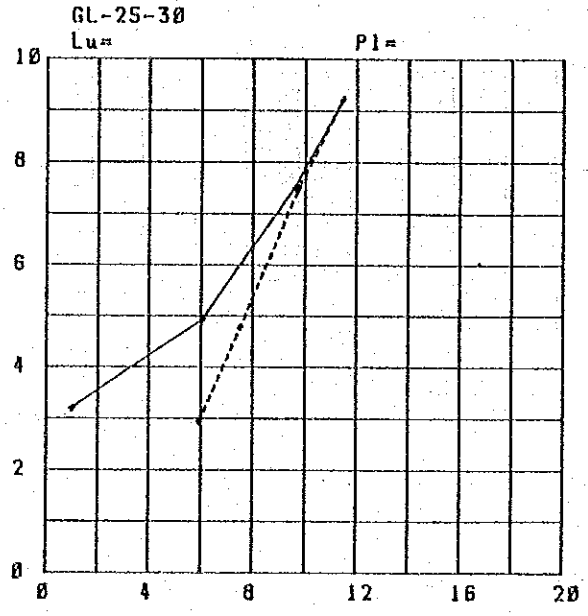


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (40/46)

Hole No. 7 Test Section (m)= 25 - 30 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 21.45
Longitude of Inyection Tube L(m)= 42.50 Height h1(m)= 28.10
Height h2(m)= 6.05

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
5.00	1.00	0.07	3.20	1.00	0.0000404858
30.30	3.00	2.73	4.93	6.06	0.0001590680
48.00	6.00	6.85	7.52	9.60	0.0001652730
57.30	8.00	9.77	9.23	11.46	0.0001607640
48.70	6.00	7.06	7.50	9.74	0.0001681330
37.60	3.00	4.21	4.78	7.52	0.0002034750
29.60	1.00	2.61	2.94	5.92	0.0002602890



Hole No. 7 Test Section (m)= 30 - 35 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 21.30
Longitude of Inyection Tube L(m)= 47.50 Height h1(m)= 33.10
Height h2(m)= 11.20

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
27.60	1.00	2.53	2.94	5.52	0.0002433320
46.20	3.00	7.10	4.48	9.24	0.0002669850
58.50	6.00	11.38	7.05	11.70	0.0002147780
64.40	8.00	13.79	8.81	12.88	0.0001892400
58.90	6.00	11.64	7.04	11.78	0.0002167260
47.50	3.00	7.50	4.44	9.50	0.0002770020
37.40	1.00	4.65	2.72	7.48	0.0003553620

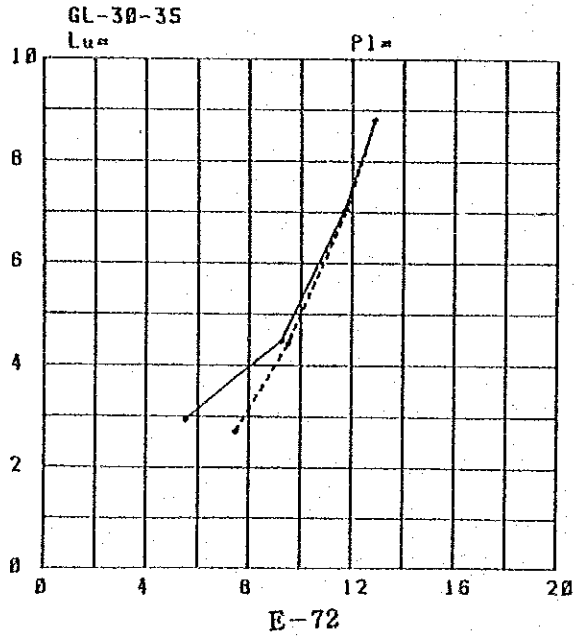
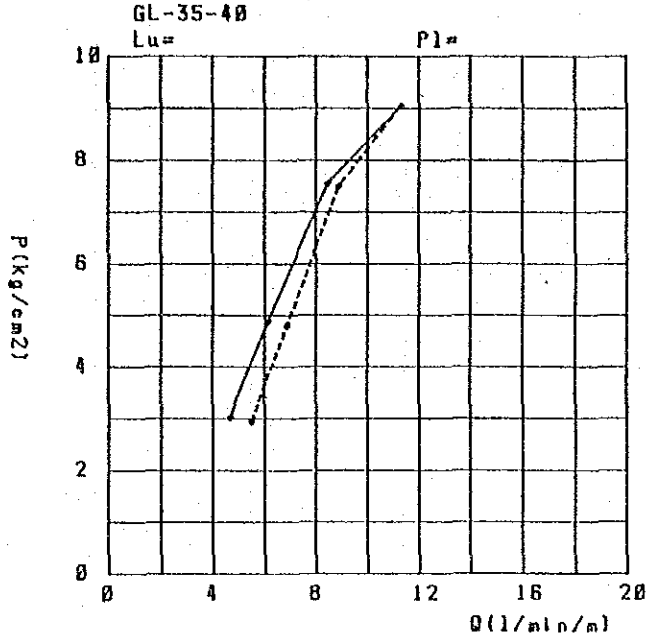


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (41/46)

Hole No. 7 Test Section (m)= 35 - 40 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 21.60
Longitude of Inyection Tube L(m)= 52.50 Height h1(m)= 38.10
Height h2(m)= 15.90

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
23.30	1.00	2.00	3.02	4.66	0.0001997240
30.60	3.00	3.44	4.88	6.12	0.0001624870
42.30	6.00	6.58	7.56	8.46	0.0001448210
56.40	8.00	11.69	9.05	11.28	0.0001613370
44.40	6.00	7.24	7.50	8.88	0.0001533670
34.30	3.00	4.32	4.79	6.86	0.0001854820
27.40	1.00	2.76	2.94	5.48	0.0002409630



Hole No. 7 Test Section (m)= 50 - 55 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 20.80
Longitude of Inyection Tube L(m)= 67.50 Height h1(m)= 53.10
Height h2(m)= 31.70

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
20.60	1.00	2.01	2.94	4.12	0.0001814460
45.60	3.00	9.82	4.16	9.12	0.0002839780
59.50	6.00	16.73	6.47	11.90	0.0002382050
66.30	8.00	20.77	8.06	13.26	0.0002128960
60.40	6.00	17.24	6.42	12.08	0.0002437300
46.20	3.00	10.09	4.13	9.24	0.0002895270
36.00	1.00	6.12	2.53	7.20	0.0003687560

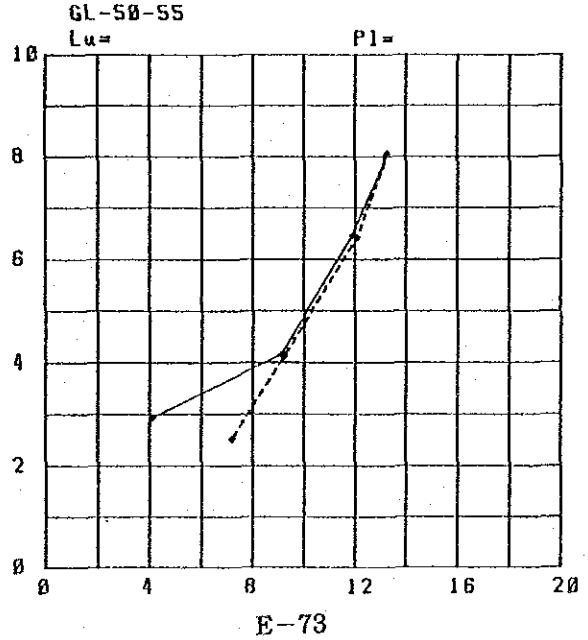


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (42/46)

Hole No. 7 Test Section (m)= 55 - 60 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 19.80
Longitude of Inyection Tubo L(m)= 72.50 Height h1(m)= 58.10
Height h2(m)= 37.70

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
0.00	1.00	0.00	3.04	0.00	0.0000000000
1.00	3.00	0.01	5.04	0.20	0.0000051377
35.00	6.00	6.22	7.42	7.00	0.0001221560
46.90	8.00	11.16	8.92	9.38	0.0001360760
40.30	6.00	8.24	7.22	8.06	0.0001446020
21.70	3.00	2.39	4.80	4.34	0.0001170250
5.25	1.00	0.14	3.03	1.05	0.0000449201

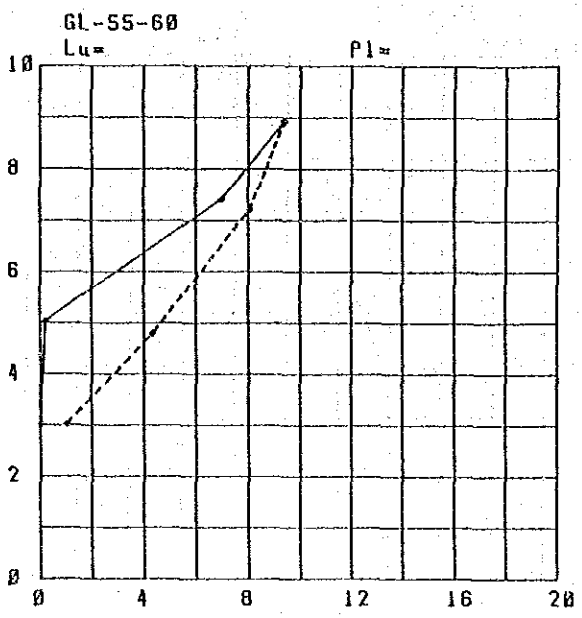
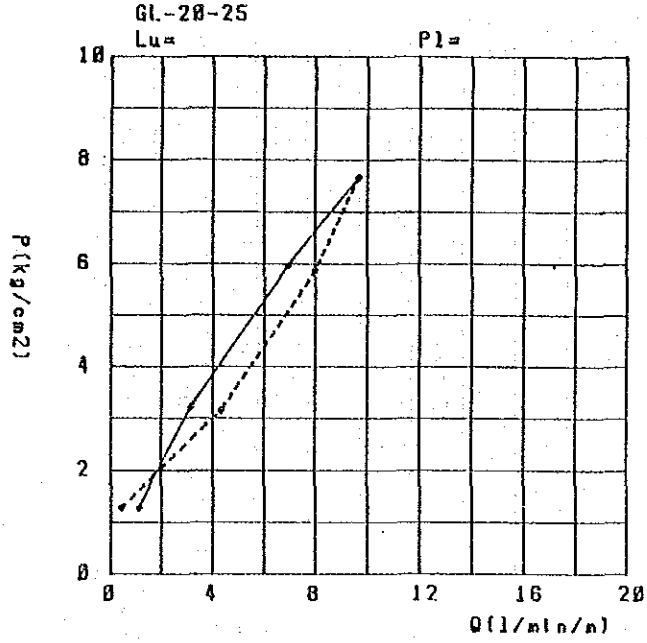


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (43/46)

Hole No. 8 Test Section (m)= 20 - 25 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 1.80
Longitude of Inyection Tube L(m)= 37.50 Height h1(m)= 17.50
Height h2(m)= 14.64

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
5.60	1.00	0.08	1.28	1.12	0.0001134380
15.70	3.00	0.65	3.22	3.14	0.0001261740
34.70	6.00	3.16	5.97	6.94	0.0001504820
48.30	8.00	6.12	7.67	9.66	0.0001629590
40.00	6.00	4.20	5.87	8.00	0.0001765400
21.60	3.00	1.22	3.16	4.32	0.0001767590
2.00	1.00	0.01	1.29	0.40	0.0000402873



Hole No. 8 Test Section (m)= 25 - 30 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 0.00
Longitude of Inyection Tube L(m)= 42.50 Height h1(m)= 20.68
Height h2(m)= 19.45

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
14.20	1.00	0.60	1.06	2.84	0.0003456200
34.10	3.00	3.46	2.78	6.82	0.0003178370
52.50	6.00	8.20	5.30	10.50	0.0002562880
59.20	8.00	10.43	7.08	11.84	0.0002164570
54.20	6.00	8.74	5.25	10.84	0.0002673060
38.30	3.00	4.36	2.69	7.66	0.0003690010
18.20	1.00	0.99	1.03	3.64	0.0004596370

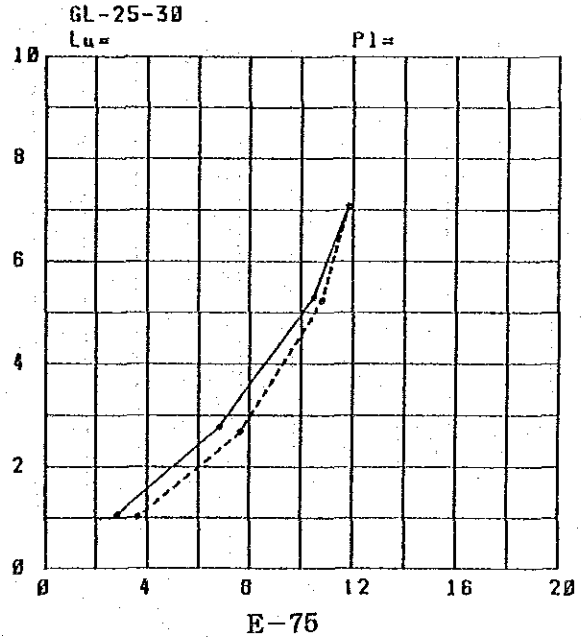
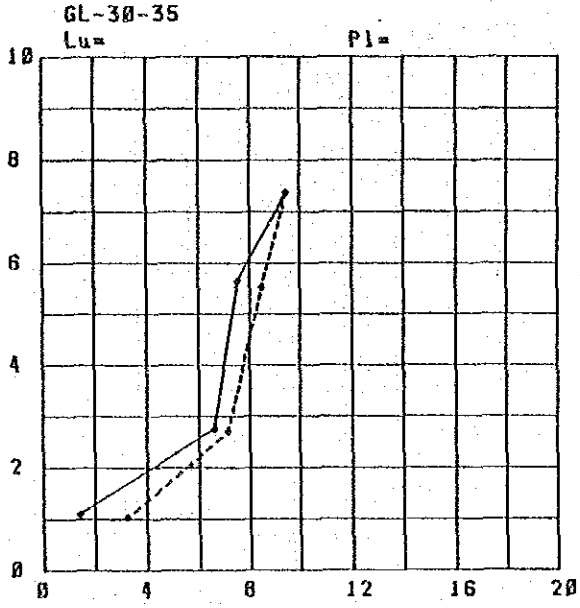


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (44/46)

Hole No. 8 Test Section (m)= 30 - 35 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 0.00
Longitude of Inyection Tube L(m)= 47.50 Height h1(m)= 24.22
Height h2(m)= 24.98

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
7.10	1.00	0.17	1.11	1.42	0.0001660620
33.00	3.00	3.62	3.76	6.60	0.0003093840
37.60	6.00	4.70	5.65	7.52	0.0001721910
47.30	8.00	7.44	7.38	9.46	0.0001659460
42.40	6.00	5.98	5.53	8.48	0.0001986590
35.60	3.00	4.21	2.70	7.12	0.0003410840
16.20	1.00	0.87	1.04	3.24	0.0004046740



Hole No. 8 Test Section (m)= 35 - 40 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 0.00
Longitude of Inyection Tube L(m)= 52.50 Height h1(m)= 27.75
Height h2(m)= 26.52

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
12.40	1.00	0.57	1.07	2.48	0.0003008240
31.60	3.00	3.67	2.76	6.32	0.0002967820
52.40	6.00	10.09	5.11	10.48	0.0002652560
59.30	8.00	12.92	6.83	11.86	0.0002247480
53.50	6.00	10.52	5.07	10.70	0.0002731100
34.40	3.00	4.35	2.69	6.88	0.0003312400
14.60	1.00	0.78	1.05	2.92	0.0003615930

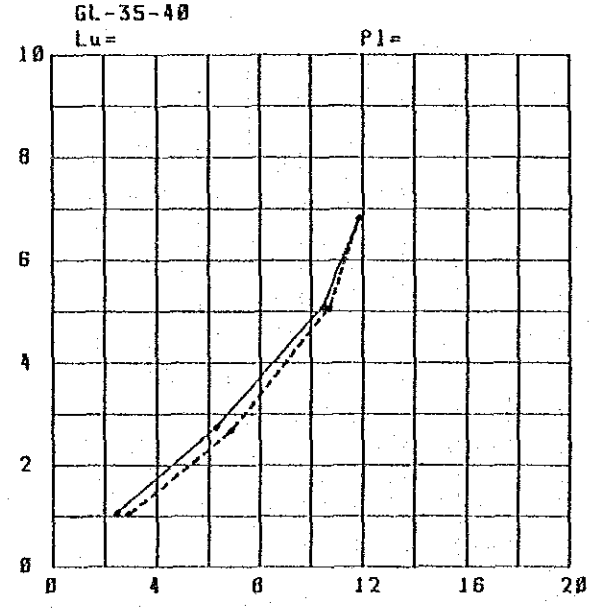
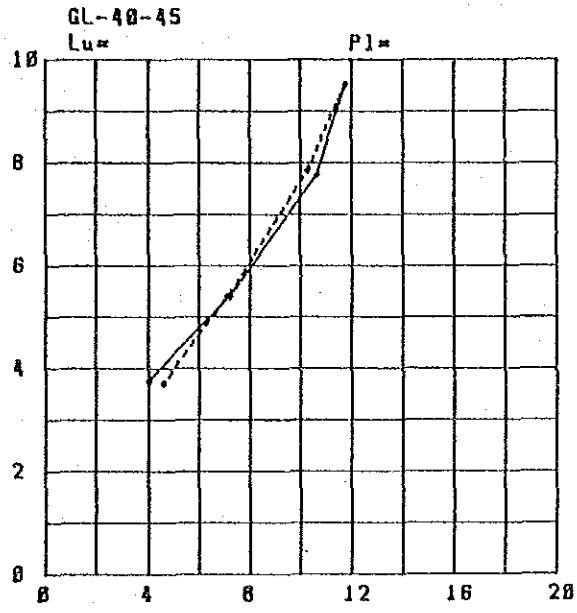


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (45/46)

Hole No. 8 Test Section (m)= 40 - 45 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 39.60
Longitude of Inyection Tube L(m)= 57.50 Height h1(m)= 31.29
Height h2(m)= 2.05

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
20.00	1.00	1.61	3.76	4.00	0.0001376140
36.10	3.00	5.25	5.40	7.22	0.0001731080
53.30	6.00	11.43	7.78	10.66	0.0001773680
58.80	8.00	13.93	9.53	11.76	0.0001597100
51.40	6.00	10.63	7.86	10.28	0.0001693030
35.70	3.00	5.13	5.41	7.14	0.0001708250
22.80	1.00	2.09	3.71	4.56	0.0001589170



Hole No. 8 Test Section (m)= 45 - 50 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 44.10
Longitude of Inyection Tube L(m)= 62.50 Height h1(m)= 35.14
Height h2(m)= 2.40

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
14.60	1.00	0.93	4.18	2.92	0.0000904194
45.80	3.00	9.18	5.36	9.16	0.0002213920
58.40	6.00	14.92	7.78	11.68	0.0001943060
70.30	8.00	21.62	9.11	14.06	0.0001997590
57.60	6.00	14.52	7.82	11.52	0.0001906490
47.40	3.00	9.83	5.29	9.48	0.0002319520
30.90	1.00	4.18	3.86	6.18	0.0002074690

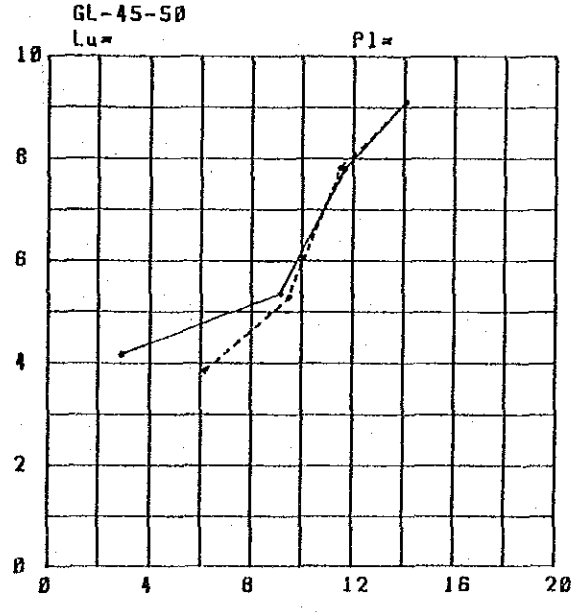
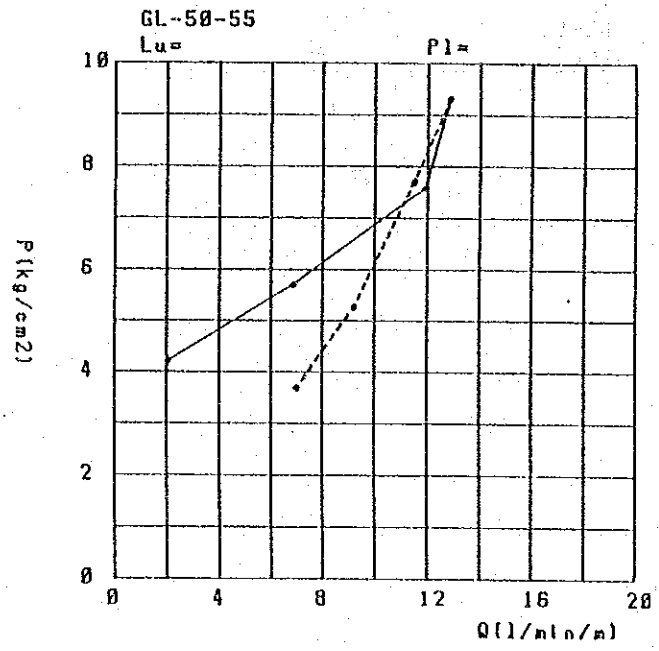


Fig.E.1-3 Curve of Pressure vs. Inyected Water Volume (46/46)

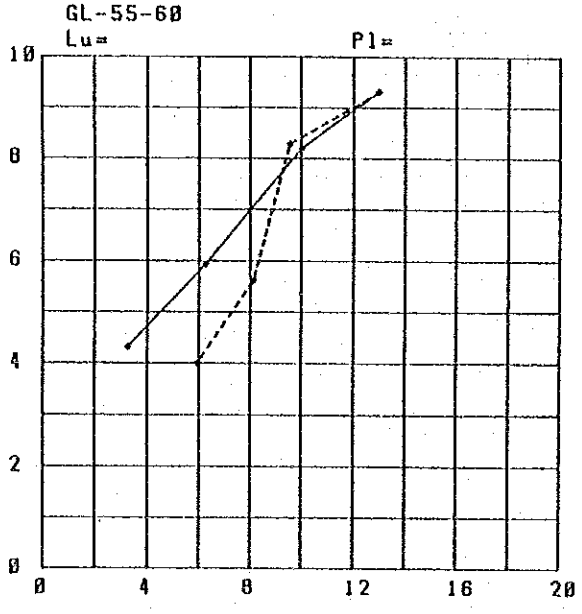
Hole No. 8 Test Section (m)= 50 - 55 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 44.20
Longitude of Inyection Tube L(m)= 67.50 Height h1(m)= 38.57
Height h2(m)= 5.87

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
10.30	1.00	0.50	4.22	2.06	0.0000631806
34.30	3.00	5.56	5.71	6.86	0.0001554070
59.60	6.00	16.78	7.59	11.92	0.0002032560
64.20	8.00	19.47	9.32	12.84	0.0001782940
57.50	8.00	15.62	7.71	11.50	0.0001931390
46.00	3.00	10.00	5.27	9.20	0.0002259710
35.00	1.00	5.78	3.69	7.00	0.0002454770



Hole No. 8 Test Section (m)= 55 - 60 Longitude of Test l(m)= 5
Radius of Borehole r(cm)= 3.8 Groundwater Level H(m)= 46.80
Longitude of Inyection Tube L(m)= 72.50 Height h1(m)= 42.11
Height h2(m)= 7.57

Q0(l/min)	P0(kg/cm2)	h3(m)	P(kg/cm2)	Q(l/min/m)	K(cm/sec)
16.30	1.00	1.35	4.32	3.26	0.0000977054
31.40	3.00	5.00	5.95	6.28	0.0001365480
50.00	6.00	12.69	8.19	10.00	0.0001581530
64.90	8.00	21.38	9.32	12.98	0.0001803590
47.80	6.00	11.60	8.29	9.56	0.0001492040
40.60	3.00	8.37	5.62	8.12	0.0001871210
29.70	1.00	4.48	4.01	5.94	0.0001919280



4) Lateral Loading Test

Lateral loading tests were conducted at twenty eight points in the drill holes Nos. 1, 2, 3, 4, 5, 6 and 7, by use of OYO Elatmeter 100. The stratas in dam foundation were tested in order to correlate the results with those of the in-situ tests.

The loading was made in two parts; (1) the step loading with 3 cycles of loading up to a peak load and unloading to 5 kg/cm^2, increasing the peak load in a general sequence of 10, 20 and 30 kg/cm^2, and (2) the maximum loading up to the maximum peak load. Rates of loading and unloading were 2.5 kg/cm^2/min. and 5 kg/cm^2/min., respectively. The minimum load of 5 kg/cm^2 during the step loading was at that level in order to keep the drill hole from collapsing.

5) Standard Penetration Test

Standard penetration tests were carried out in the drill hole No.3 for the purpose of examing compaction of unconsolidated alterated clay and rock zone. The test was made by counting the number of blows for each 10 cm of drop hammer with 63.5 kg of weight falling 75 cm of height that was necessary to make standard Raymond sampler penetrate 30 cm into the rock.

However, this test was performed in the strate with containing infiltrated water and fragments of rock, therefore the values have to been considered as reference.

The results are presented in Fig.E.1-2.

6) Laboratory Test

Laboratory tests were performed according to an approved and standardized testing method such as ASTM (American Society for Testing and Materials, referred by the designation number ASTM C-97, ASTM D-2938,D-3148,etc.).

The results are presented in the Table E.1-3.