APPENDIX – Ⅷ

RESULTS OF SOIL TEST

CONTENTS

VIII-1 TABLE OF SOIL TEST

Name of test pit			BTP-101		BTP-102		BTP-103		BTP-104	
Depth of sampling (m)			3.0 - 5.0		0.0 - 5.0		0.0 - 5.0		0.0 - 2.0	
Colour			Yellow		Yellow		Yellow		Yellow	
Classification			MH		MH		MH		MH	
Gradation Analysis	4.76mm >	(%)			100		100		100	
	2.00mm >	(%)	100		99.8		97.3		99.8	
	0.42mm >	(%)	99.4		98.6		94.4		98.5	
	0.149mm >	(%)								
	0.074mm >	(%)	93.9		92.4		67.1		91.6	
	10 μ >	(%)	74.0		76.0		49.0		72.0	
	1 μ >	(%)	44.8		39.0		24.0		40.0	
ω	natural	(%)	56.9		56.6		145.0		51.4	
e	natural	(%)	1.744		1.977				1.989	
Sr	natural	(%)	90.7		79.0				71.8	
Atterberg's Limites	Method		D	U	D	U	D	U	D	U
	LL	(%)	79.8	85.0	79.8	84.0	220.3	166	72.8	72.0
	PL	(%)	52.8	61.0	52.6	58.0	146.7	121	44.8	52.0
	Ip	(%)	27.0	24.0	27.2	26.0	73.6	45	28.0	20.0
	G		2.78		2.76		2.63		2.78	
Compaction Test	Method		D	U	D	U	D	U	D	U
	ω	optimum(%)	53.3	55.0	51.1	56.4	126.0	126.5	46.2	50.0
	γd.	max (g/cm^3)	1.079	1.052	1.113	1.010	0.561	0.572	1.160	1.075
	e	optimum	1.576	1.643	1.480	1.733	3.688	3.598	1.397	1.586
	Sr.	optimum	94.0	93.1	95.3	89.8	89.9	92.5	91.9	87.6
Consolidation Test	Av	(cm^2/kg)			0.0055		0.0685		0.0110	
	Cv	(cm^2/sec)			0.0108		0.0104		0.0270	
	mv	(cm^2/kg)			0.0025		0.0174		0.0050	
	K	(cm/sec)			2.7×10^{-8}		1.81×10^{-7}		1.35×10^{-7}	
	Load	(kg/cm^2)			0 - 16		0 - 4		0 - 4	
Triaxial compression test	Method		U-CU	U-CD	U-CU	U-CD	U-CU		U-UU	
	C	(kg/cm^2)	0.3	0.59	0.2	0.7	0.2		0.8	
	ϕ	(°)	35.5	33.7	37	31.4	39		11	
	tan ϕ		0.624	0.585	0.657	0.538	0.703		0.175	
Direct shear test	Method				D		D		D	
	C	(kg/cm^2)			0.30		0.10		0.30	
	ϕ	(°)			32		41.6		30.9	
	tan ϕ				0.550		0.766		0.527	
CBR	Method		D		D		D			
	(%)		31		32		11.5			

Note: D: Dry method

U: Un-Dry method

VIII-2 GRADATION ANALYSIS

BTP - 101

Test \ Depth		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Classification U.S.C.E											
Atterberg's Limit's	LL (%)	120.7	72.0	81.1	81.2	77.2	87.0	78.6	90.1	73.2	87.2
	PL (%)	84.3	50.5	59.4	63.4	60.7	68.1	61.3	65.8	59.1	64.6
	Ip	36.4	21.5	21.7	17.8	16.5	18.9	17.3	24.3	14.1	22.6
	IL	0.06	-0.07	-5.54	-0.13	-0.32	-0.36	-0.32	-0.30	-0.11	-0.24
	Ic	0.94	1.07	6.54	1.13	1.32	1.36	1.32	1.30	1.11	1.24
	G		2.78		2.79		2.77		2.76		2.77
ω natural (%)		86.4	49.0	53.6	61.1	55.5	61.3	55.8	58.4	57.6	59.1
e natural		2.34	1.67		1.81		1.86		1.84		1.81
γt (g/cm³)			1.55		1.60		1.56		1.54		1.57
Sr natural (%)		100	81		94		91		88		91

BTP - 102

Test \ Depth		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Classification U.S.C.E											
Atterberg's Limits's	LL (%)	62.6		81.2		88.3		102.8		83.3	74.4
	PL (%)	44.4		60.4		66.7		72.6		62.4	57.2
	Ip	18.2		20.8		21.6		30.2		20.9	17.2
	IL	0.22		-0.35		-0.32		-0.16		-2.83	0.15
	Ic	0.78		1.35		1.32		1.16		3.83	0.85
	G		2.82		2.85		2.81		2.87		2.82
ω natural (%)		48.4	50.8	53.1	64.4	59.8	61.0	67.8	66.8	59.1	59.8
e natural			1.91		2.06	1.90	1.90		2.09		1.78
γt (g/cm³)			1.46		1.53		1.56		1.55		1.62
Sr natural (%)			75		89		90		92		95

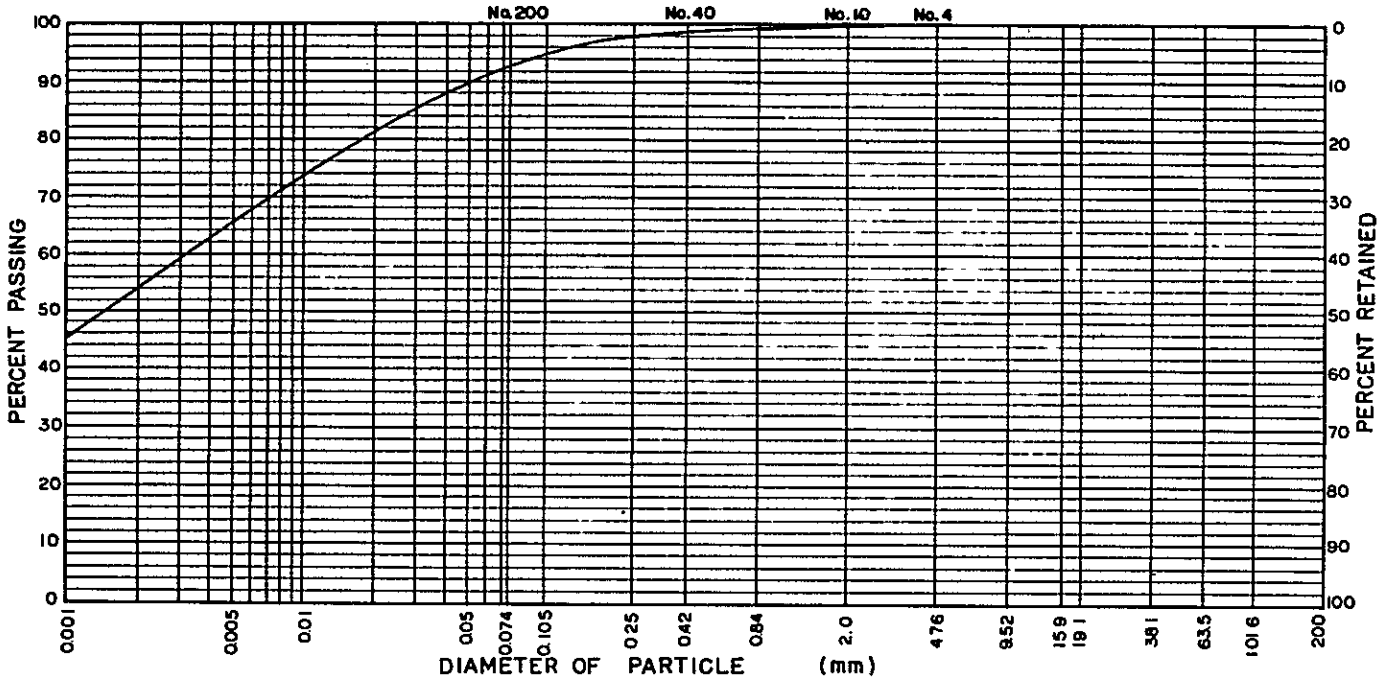
BTP - 103

Test \ Depth		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Classification U.S.C.E											
Atterberg's Limit's	LL (%)	179.7	150.4		346.4		248.7		201.8		93.2
	PL (%)	142.3	107.5		255.2		135.4		107.3		68.8
	Ip	37.4	42.9		91		113.3		94.5		24.4
	IL	-1.35	-0.27		-0.64		-0.04		0.37		1.19
	Ic	2.35	1.27		1.64		1.04		0.63		-0.19
	G		2.79		2.82		2.80		2.78		2.79
ω natural (%)		114.6	95.8		197.3		131.2		141.9		97.9
e natural			3.14		6.29		4.39		4.80		3.15
γt (g/cm³)			1.32		1.15		1.20		11.16		1.33
Sr natural (%)			85		88		84		82		87

BTP - 104

Test \ Depth		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Classification U.S.C.E.											
Attergerg's Limit's	LL (%)	81.7		108.6	77.4		53.7		52.7	51.2	
	PL (%)	68.8		69.3	58.9		43.4		38.0	36.0	
	Ip	12.9		39.3	18.5		10.3		14.7	15.2	
	IL	-0.31		-0.22	-0.04		0.99		0.95	1.15	
	Ic	1.31		1.22	1.04		0.01		0.05	-0.15	
	G		2.82		2.78		2.73		2.75		2.72
ω natural (%)		64.8	43.1	60.8	58.2	46.3	53.6	56.3	52.0	49.2	34.4
e natural			1.59		2.03		1.56		1.49		
γt (g/cm³)			1.56		1.45		1.64		1.68		
Sr natural (%)			77		80		94		96		

BTP-101 Gradation analysis curve



SAMPLE NO			
MAX GRAIN SIZE			
mm (%)			
mm (%)			
mm 4.8 (%)			
mm 0.074 (%)			
D60 (mm)			
D30 (mm)			
D10 (mm)			
Cu			
Cc			

$$Cu = \frac{D_{60}}{D_{10}}$$

COEFFICIENT OF UNIFORMITY

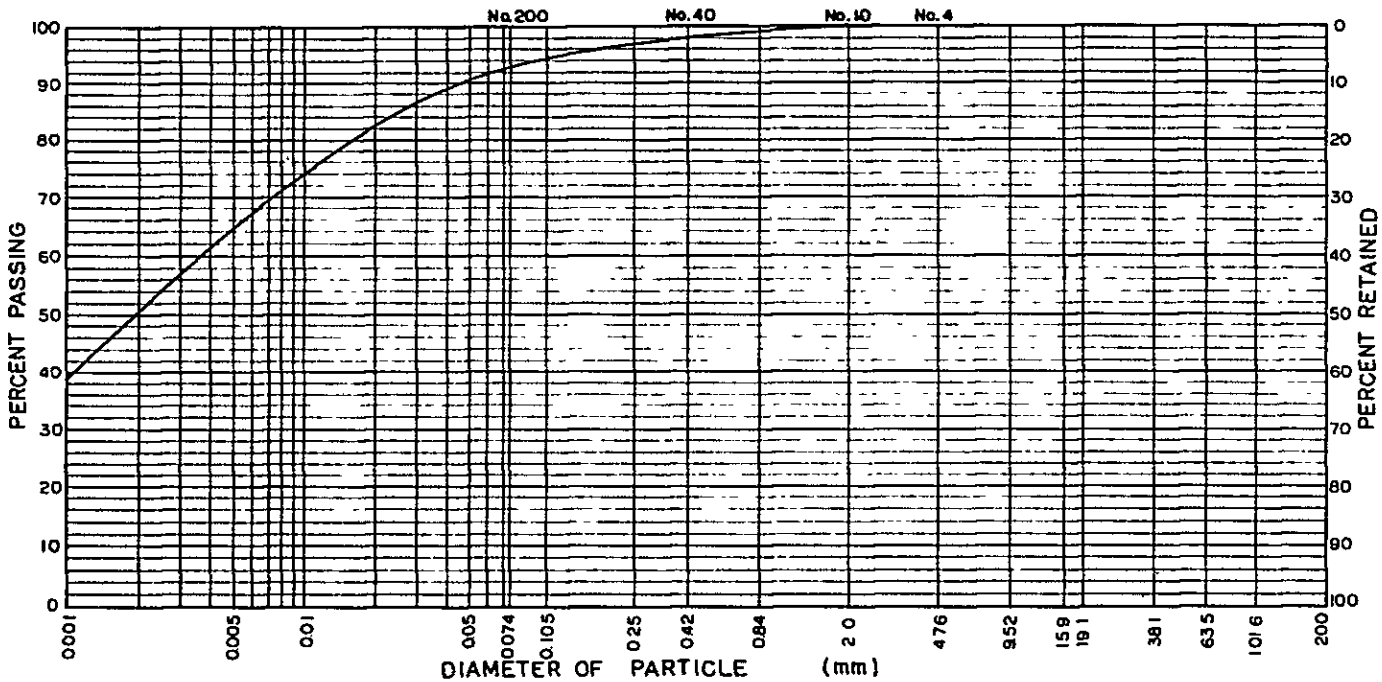
$$Cc = \frac{(D_{30})^2}{(D_{60}) \times (D_{10})}$$

COEFFICIENT OF CURVATURE

CLAY (PLASTIC) ~ SILT (NON-PLASTIC)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

SAMPLE		SOIL CLASSIFICATION		SPECIFIC GRAVITY		ATTERBERG LIMITS			
NUMBER	DEPTH (m)	UNIFIED SYSTEM	REVISED PR SYSTEM			LL	PL	PI	SL
BTP - 101	3.0~5.0	MH		2.78					

BTP-102 Gradation analysis curve



SAMPLE NO			
MAX GRAIN SIZE			
mm (%)			
mm (%)			
mm 4.8 (%)			
mm 0.074 (%)			
D60 (mm)			
D30 (mm)			
D10 (mm)			
Cu			
Cc			

$$Cu = \frac{D_{60}}{D_{10}}$$

COEFFICIENT OF UNIFORMITY

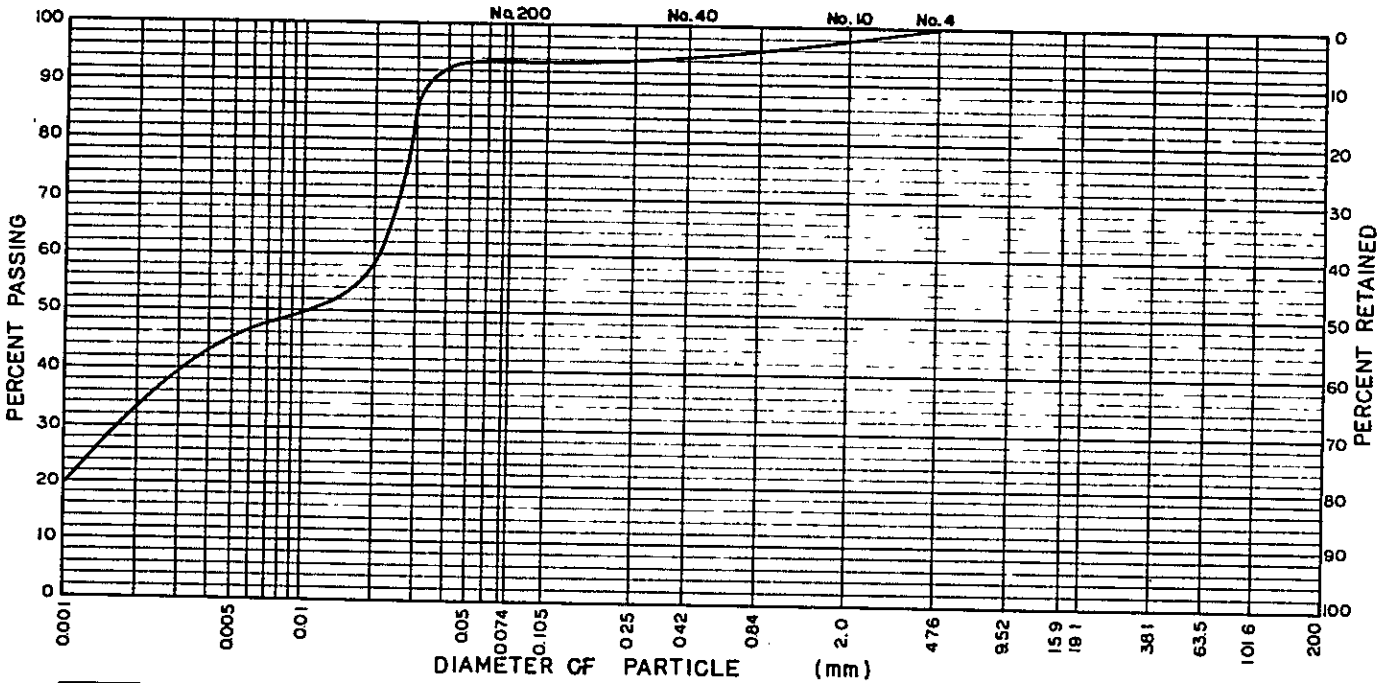
$$Cc = \frac{(D_{30})^2}{(D_{60}) \times (D_{10})}$$

COEFFICIENT OF CURVATURE

CLAY (PLASTIC) ~ SILT (NON-PLASTIC)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

SAMPLE		SOIL CLASSIFICATION		SPECIFIC GRAVITY		ATTERBERG LIMITS			
NUMBER	DEPTH (m)	UNIFIED SYSTEM	REVISED PR SYSTEM			LL	PL	PI	SL
BTP - 102	0.0~5.0	MH		2.76					

BTP-103 Gradation analysis curve



CLAY (PLASTIC) ~ SILT (NON-PLASTIC)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

SAMPLE NO			
MAX GRAIN SIZE			
mm (%)			
mm (%)			
mm 4.8 (%)			
mm 0.074 (%)			
D60 (mm)			
D30 (mm)			
D10 (mm)			
Cu			
Cc			

$$Cu = \frac{D_{60}}{D_{10}}$$

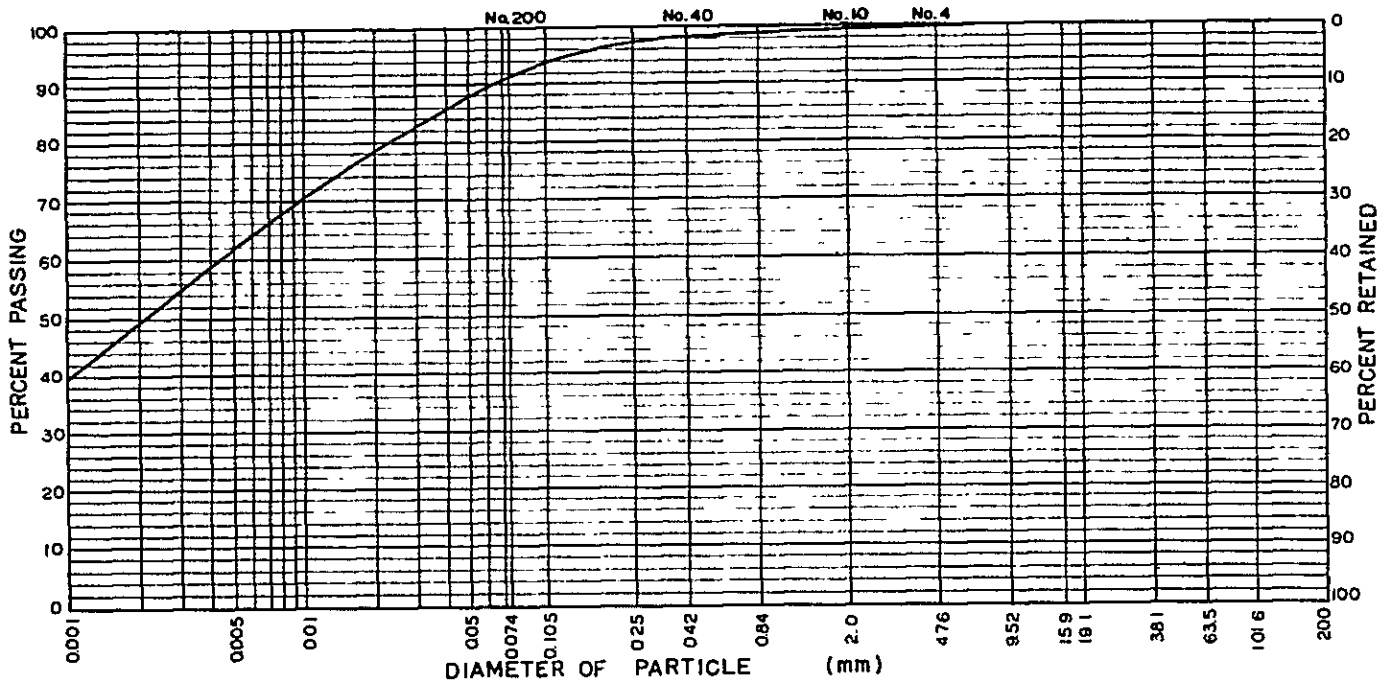
COEFFICIENT OF UNIFORMITY

$$Cc = \frac{(D_{30})^2}{(D_{60}) \times (D_{10})}$$

COEFFICIENT OF CURVATURE

SAMPLE		SOIL CLASSIFICATION		SPECIFIC GRAVITY		ATTERBERG LIMITS			
NUMBER	DEPTH (m)	UNIFIED SYSTEM	REVISED PR SYSTEM			LL	PL	PI	SL
BTP-103	00~50	MH		2.63					

BTP-104(1) Gradation analysis curve



CLAY (PLASTIC) ~ SILT (NON-PLASTIC)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

SAMPLE NO			
MAX GRAIN SIZE			
mm (%)			
mm (%)			
mm 4.8 (%)			
mm 0.074 (%)			
D60 (mm)			
D30 (mm)			
D10 (mm)			
Cu			
Cc			

$$Cu = \frac{D_{60}}{D_{10}}$$

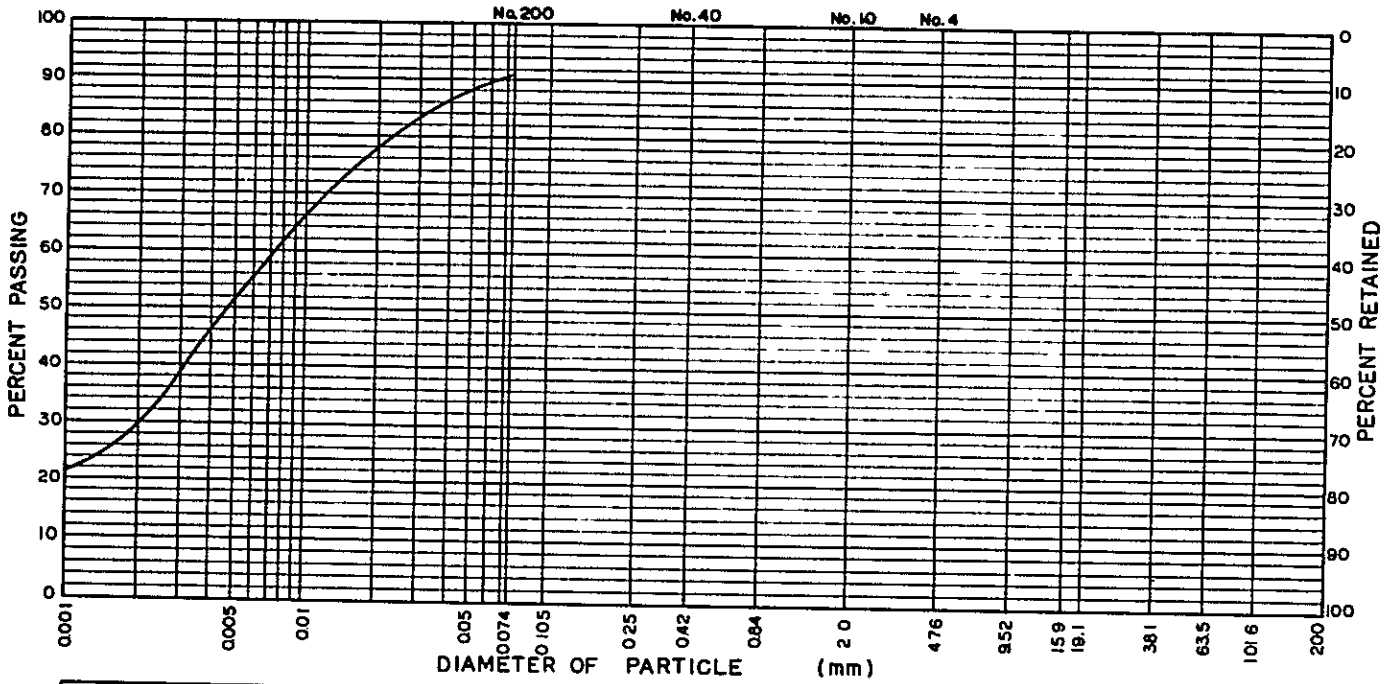
COEFFICIENT OF UNIFORMITY

$$Cc = \frac{(D_{30})^2}{(D_{60}) \times (D_{10})}$$

COEFFICIENT OF CURVATURE

SAMPLE		SOIL CLASSIFICATION		SPECIFIC GRAVITY		ATTERBERG LIMITS			
NUMBER	DEPTH (m)	UNIFIED SYSTEM	REVISED PR SYSTEM			LL	PL	PI	SL
BTP-104	0.0 ~ 2.0	MH		2.78					

BTP-104(2) Gradation analysis curve



CLAY (PLASTIC) ~ SILT (NON-PLASTIC)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

SAMPLE NO			
MAX GRAIN SIZE			
mm (%)			
mm (%)			
mm 4.8 (%)			
mm 0.074 (%)			
D60 (mm)			
D30 (mm)			
D10 (mm)			
Cu			
Cc			

$$Cu = \frac{D_{60}}{D_{10}}$$

COEFFICIENT OF UNIFORMITY

$$Cc = \frac{(D_{30})^2}{(D_{60}) \times (D_{10})}$$

COEFFICIENT OF CURVATURE

SAMPLE		SOIL CLASSIFICATION		SPECIFIC GRAVITY		ATTERBERG LIMITS			
NUMBER	DEPTH (m)	UNIFIED SYSTEM	REVISED PR SYSTEM			LL	PL	PI	SL
BTP-104	20~40			2.63					

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RESULTADOS DE ENSAYOS.

PROYECTO C.H JULUMITO HOJA 1 DE 2
LOCALIZACION ZONA DIQUE NO I y NO.2 VIII-27'79

PERFORACION	MUESTRA NO	PROFUNDIDAD	W NATURAL	ANALISIS GRANULOMETRICO % QUE PASA EN PESO														LIMITES DE ATTERBERG			CLASIFICACION		GRAVEDAD ESPECIFICA G	PESO UNITARIO (T/m3)	RELACION VACIOS e	S
				GRAVA							ARENA						LIMO Y ARCILLA										
				3"	2"	1½"	1"	¾"	½	⅜"	4	8	10	30	40	100	200	LL	LP	IP	AASHO	USC				
DDH		1.5 - 2	59.1															107	66	41				1.73		
101		3.5 - 4	73.5															105	77	28						
Dique1		7.5 - 8	63.8															80	55	25		MH				
		9.5-10	94.3															114	54	60		MH		1.37		
		13.5-14	68.4															83	33	50		CH		1.67		
		15.5-16	113.5												99	83	66							1.41		
		17.5-18	91.6													75	59	141	81	60		MH				
		19.5-20	79.2															102	68	34		MH	2.66			
		21.5-22	72.0															100	64	36		MH	2.67	1.49	2.08	0.92
		23.5-24	75.6													98	97	95	50	45		MH	2.66	1.53		
DDH		1-1.5	50.7												96	77	70	55	29	26		CL		1.73		
201		3-3.5													94	45	26					SM		2.00		
Dique2		5-5.5	69.5															80	①							
		9-9.5	36.4							96	90		73		39	31	30					SP				
		11-11.5	②																							
		13-13.5	②																							
		15-15.5	61.3															64	46	18		MH		1.68		
		17.5-16	57.2																							
		20-20.5											97		87	76	68							1.70		
		22-22.5	②																							
		24.5-25	25.4										93		9	4	3	③				SP				
DDH		1.5 - 2	56.4															107	72	35		MH	2.90			
102		3.5 - 4	65.4															85	64	21		CH	2.71			
Dique 2		8 - 8.5	88.9															88	56	32		MH				
		12-12.5	65.9															79	52	27		MH	2.80	1.57	1.96	0.94
		14-14.5	62.9													94	90	69	48	21		MH				

OBSERVACIONES

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RESULTADOS DE ENSAYOS.

PROYECTO C.H JULUMITO HOJA 2 DE 2
LOCALIZACION ZONA DIQUE No I y No.2 VIII-27 '79

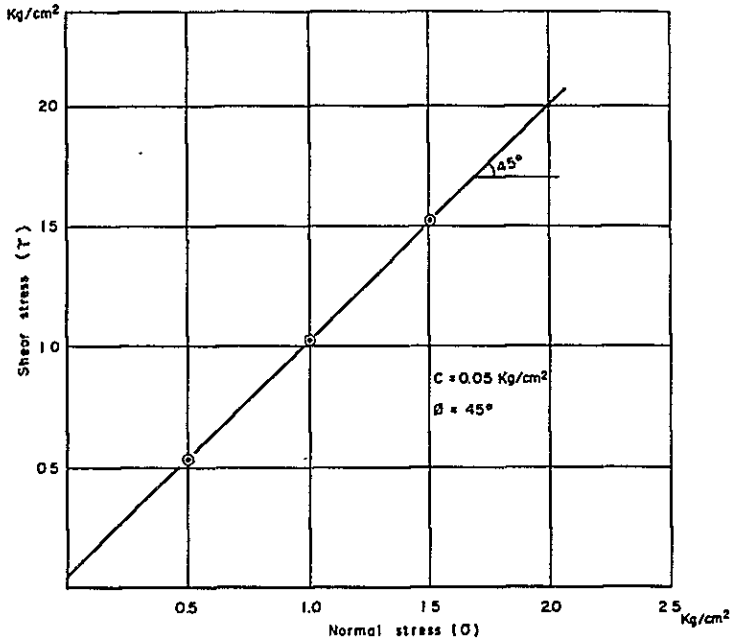
PERFORACION	MUESTRA No.	PROFUNDIDAD	W NATURAL	ANALISIS GRANULOMETRICO % QUE PASA EN PESO														LIMITES DE ATTERBERG			CLASIFICACION		GRAVEDAD ESPECIFICA G	PESO UNITARIO (T/m3)	RELACION VACIOS e	S
				GRAVA							ARENA						LIMO Y ARCILLA										
				3"	2"	1 1/2"	1"	3/4	1/2"	3/8"	4	8	10	30	40	100	200	LL	LP	IP	AASHO	USC				
DDH		15.5-16	②																							
		18-18.5	62.6																							
Dique 2		24-24.5	54.6															68	50	18		MH	2.82	1.66	1.76	1.00
																		65	37	28		MH		1.66		
BDH		9.5-10	59.0																							
I		16.5-17	52.2															84	59	25		MH	2.73	1.67		
		28.5-29	44.6															68	47	21		MH	2.71	1.72		
																		53	34	19		MH	2.69	1.71		

OBSERVACIONES

VIII-3 DIRECT SHEARING TEST

Direct Shearing Test

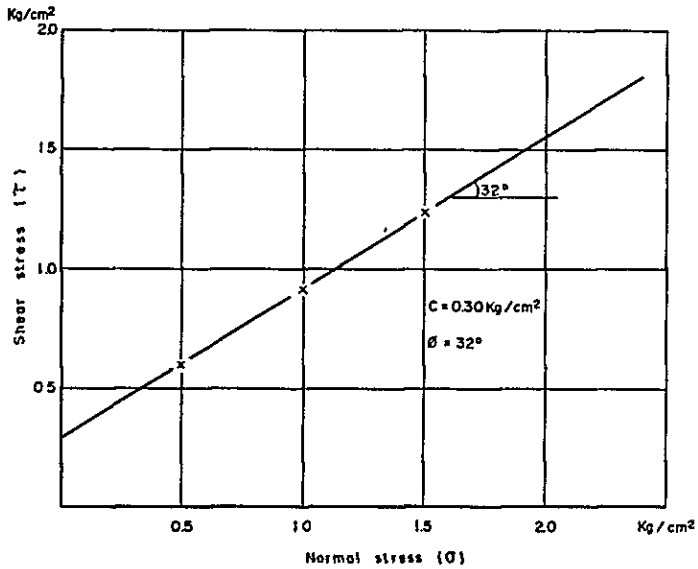
Locality of sample; BTP-101 Depth; 0.00 - 3.00 m



σ (Kg/cm²)	τ (Kg/cm²)
0.5	0.540
1.0	1.078
1.5	1.509

Direct Shearing Test

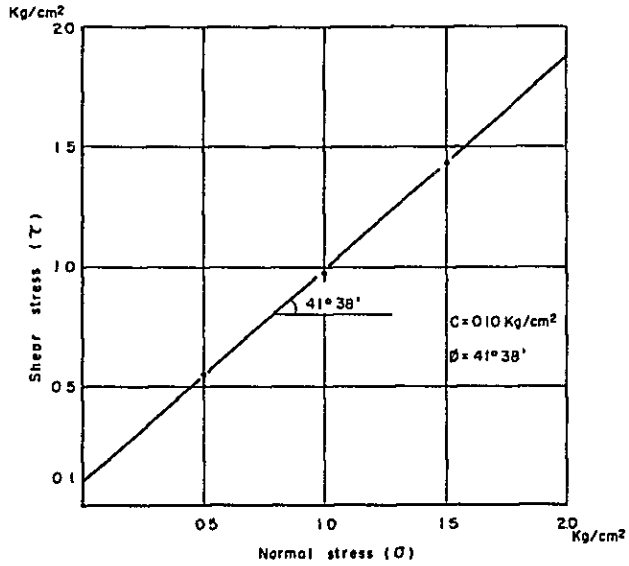
Locality of sample; BTP-102 Depth; 0.00 - 3.00 m



σ (Kg/cm²)	τ (Kg/cm²)
0.5	0.612
1.0	0.897
1.5	1.439

Direct Shearing Test

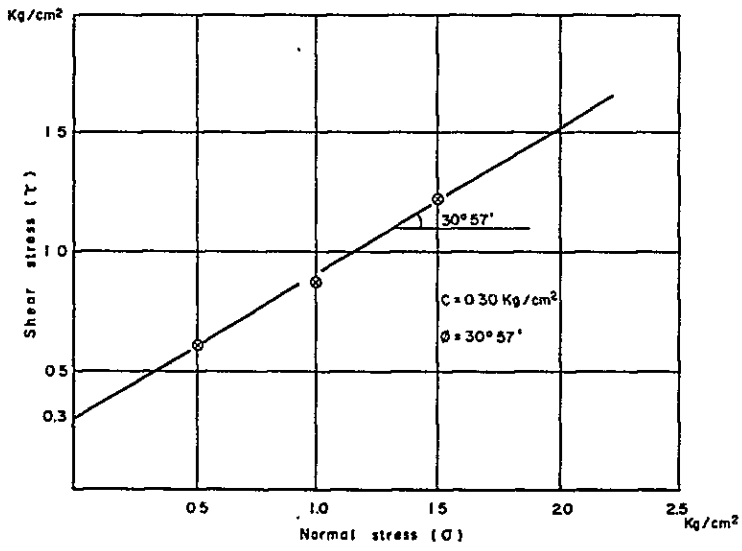
Locality of sample; BTP-103 Depth; 0.00 - 3.00 m



σ (kg/cm²)	τ (Kg/cm²)
05	0 551
10	0 994
1.5	1 425

Direct Shearing Test

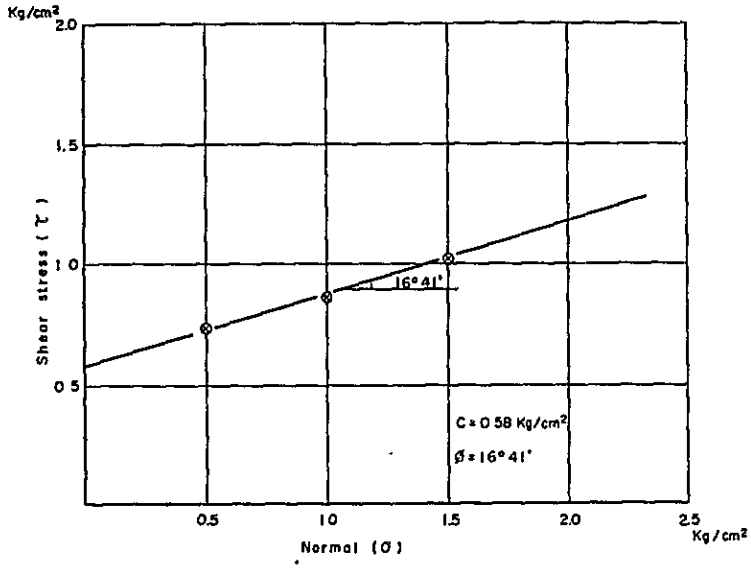
Locality of sample; BTP-104(1) Depth; 1.00 - 2.00 m



σ (Kg/cm²)	τ (Kg/cm²)
05	0609
10	0888
15	1 223

Direct Shearing Test

Locality of sample; BTP-104(2) Depth; 2.00 - 4.00 m

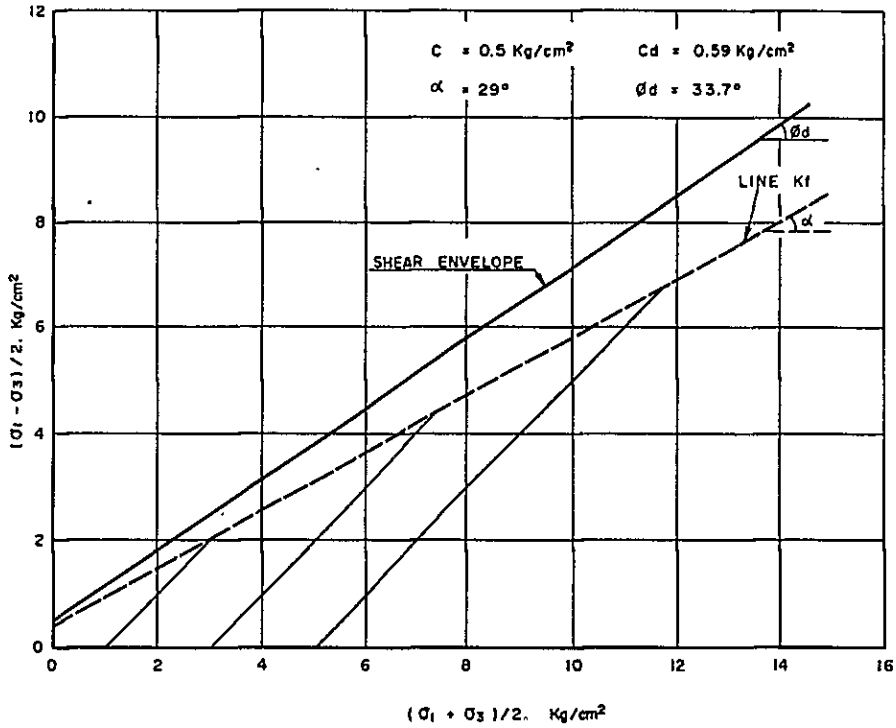


σ (Kg/cm²)	τ (Kg/cm²)
0.5	0.741
1.0	0.865
1.5	1.079

VIII-4 TRIAXIAL SHEARING TEST

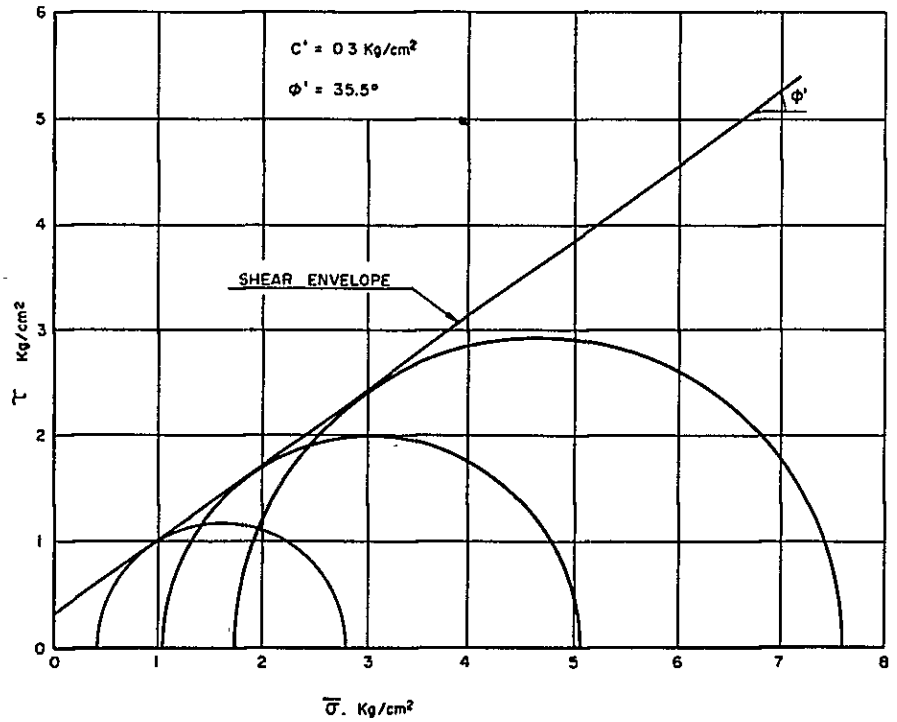
Triaxial Shearing Test

Locality of sample; BTP-101-A Type of test - CD Date-Aug. '79



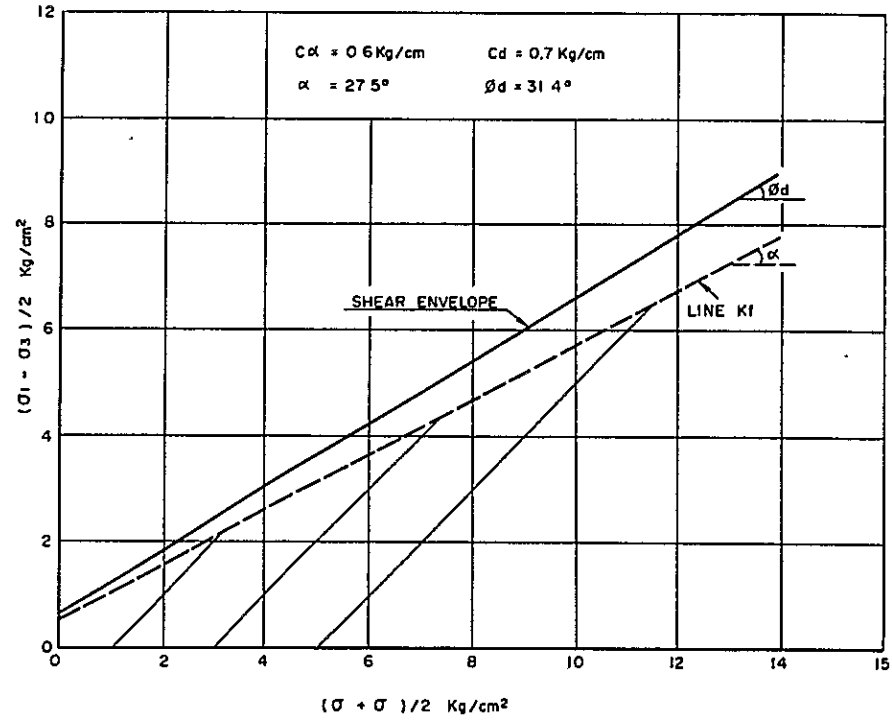
Triaxial Shearing Test

Locality of sample; BTP-101-B Type of test - CU Date-Aug. '79



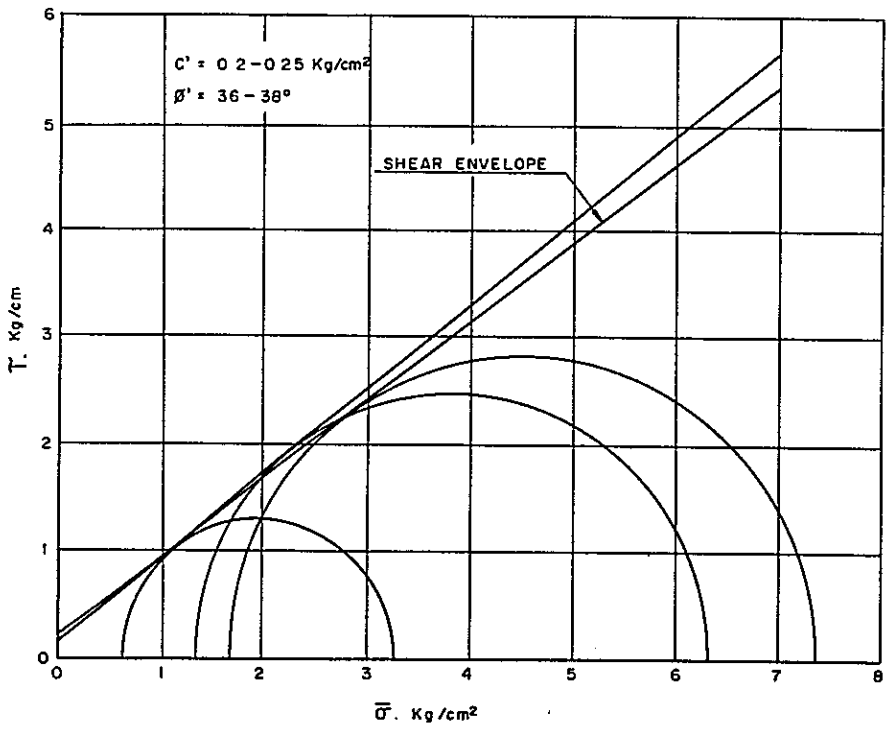
Triaxial Shearing Test

Locality of sample; BTP-102-A Type of test - CD Date-Aug. '79



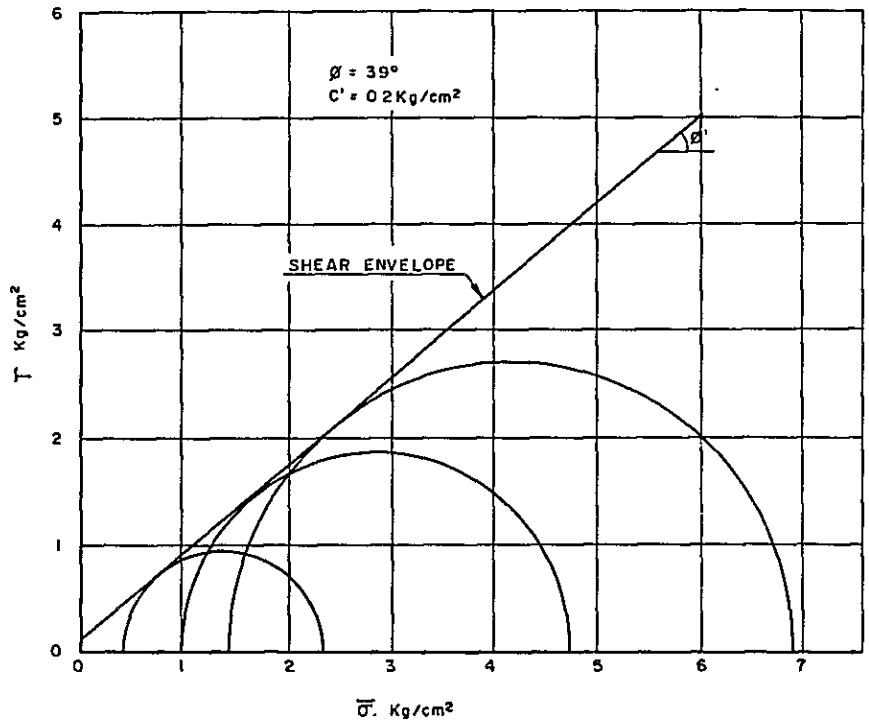
Triaxial Shearing Test

Locality of sample; BTP-102-B Type of test - CV Date-Aug. '79



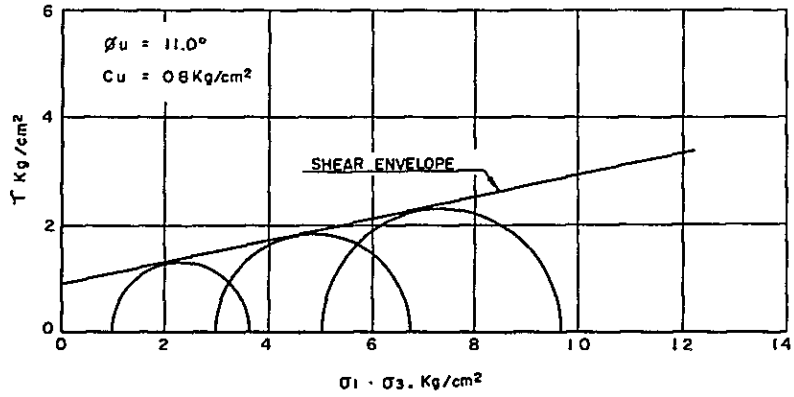
Triaxial Shearing Test

Locality of sample; BTP-103-B Type of test - CV Date-Aug. '79



Triaxial Shearing Test

Locality of sample; BTP-104-B Type of test - UU Date-Aug. '79

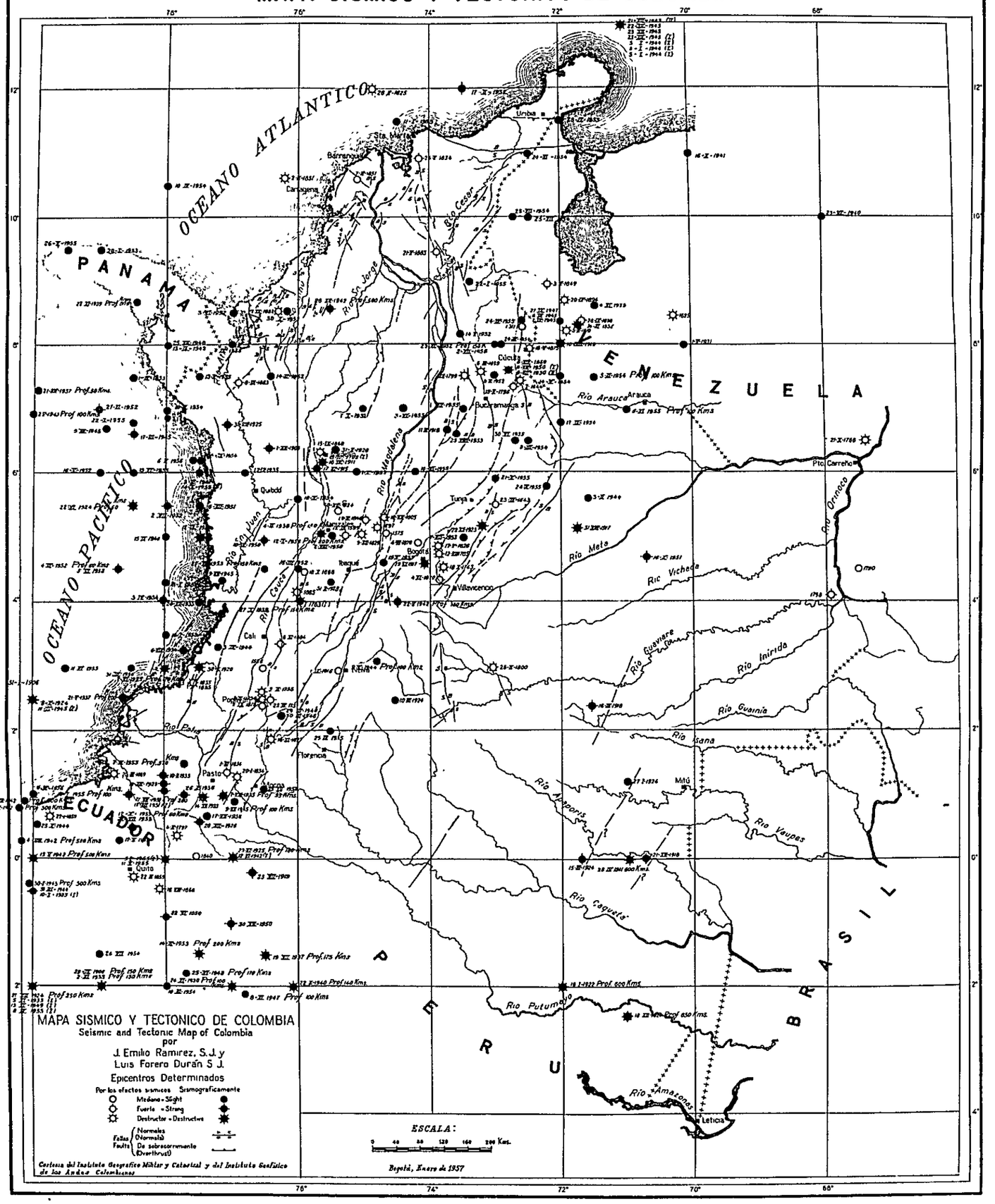


APPENDIX—IX

EARTHQUAKE OBSERVATION DATA

INSTITUTO GEOFISICO DE LOS ANDES COLOMBIANOS

MAPA SISMICO Y TECTONICO DE COLOMBIA



MAPA SISMICO Y TECTONICO DE COLOMBIA

Seismic and Tectonic Map of Colombia

por

J. Emilio Ramírez, S.J. y

Luis Forero Durán S.J.

Epicentros Determinados

Por los efectos sísmicos — Sismográficamente

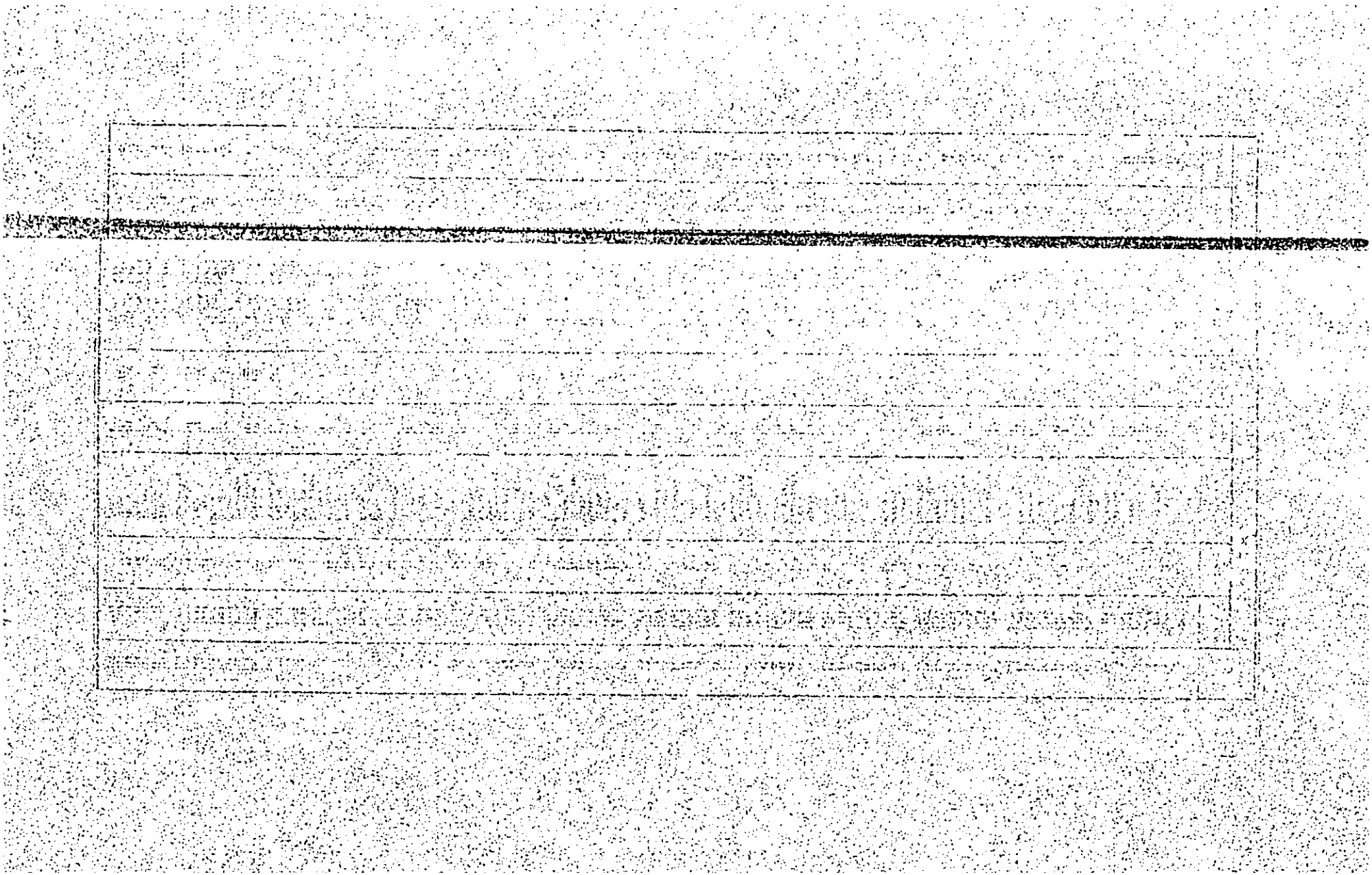
- Moderate = Slight
- Fuerte = Strong
- Destructor = Destructive

Fallas (Normales (Normals); De sobrecorrimiento (Overthrust))

Cartesia del Instituto Geográfico Militar y Catastral y del Instituto Geofísico de los Andes Colombianos

TEMBLORES SENTIDOS EN COLOMBIA

NUMERO DE ORDEN	FECHA: AÑO	FECHA: DIA	FECHA: MES	INTENSIDAD: TRIPLE ESCALA	PROFUNDIDAD: FOCAL EN KILOMETROS	EPICENTRO: COORDENADAS	EPICENTRO: MUNICIPIO	HORA DE ORIGEN (TIEMPO DE BOGOTA): HORAS	MINUTOS	SEGUNDOS
1	1566			I		76.5°O; 3.0°N	Santander, Cauca			
2	1575			II		74.6°O; 5.1°N	Guaduas, Cundinamarca			
3	1595	12	Marzo	II		75.4°O, 5.1°N	Manizales, Caldas	11		
4	1610	3	Febrero	III		71.9°O; 8.3°N	(Venezuela)			
5	1625			III		70.3°O; 8.5°N	(Venezuela)			
6	1643	23	Abril	II		73.0°O; 5.5°N	Pesca, Boyacá	20	30	
7	1644		Enero	III		72.5°O; 7.5°N	Herrán, Santander N.			
8	1697			III		74.8°O; 5.2°N	Honda, Tolima			
9	1735	2	Febrero	III		76.5°O, 2.6°N	Cajibío, Cauca	14	30	
10	1736	2	Febrero	III		76.5°O, 2.5°N	Popayán, Cauca	9		
11	1743	18	Octubre	III		73.8°O, 4.5°N	Fómeque, Cundinamarca			
12	1761	25	Abril	II		76.4°O; 2.5°N	Puracé, Cauca			
13	1763		Enero	I		76.0°O; 4.0°N	Tuluá, Valle			
14	1766	21	Octubre	III		67.4°O; 6.5°N	(Venezuela)			
15	1785	12	Julio	III		73.8°O, 4.7°N	La Calera, Cundinamarca	7	45	
16	1790			I		67.5°O, 4.5°N	(Venezuela)			
17	1792	13	Abril	I		75.6°O, 6.2°N	Medellín, Antioquia			
18	1796	15	Febrero	II		72.7°O, 7.4°N	Pamplona, Santander N.			
19	1797	4	Febrero	III		77.8°O, 0.4°N	(Ecuador)			
20	1798			II		68.0°O; 4.1°N	Comisaría del Vichada			
21	1798			II		78.7°O, 1.9°N	(Océano Pacífico)			
22	1799		Septiembre	II		73.5°O, 7.5°N	Puerto Wilches, Santander			
23	1800	26	Febrero	III		73.0°O, 3.5°N	Intendencia del Meta			
24	1805	16	Julio	III		74.6°O; 5.3°N	Honda, Tolima			
25	1816	1	Septiembre	I		75.4°O, 3.0°N	Neiva, Huila	00		
26	1824	30	Diciembre	I		75.4°O; 5.4°N	Salamina, Caldas			
27	1825	26	Febrero	III		75.0°O; 12.0°N	(Océano Atlántico)	00		
28	1826	17	Mayo	III		73.9°O, 4.8°N	La Calera, Cundinamarca			
29	1827	16	Noviembre	III		76.4°O, 1.8°N	San Agustín, Huila	22	45	
30	1829	9	Diciembre	III		75.1°O, 5.1°N	Casablanca, Tolima	17	55	
31	1834	20	Enero	III		76.9°O, 1.3°N	El Tablón, Nariño	4	30	
32	1834	1	Marzo	II		77.1°O, 1.4°N	El Tablón, Nariño	8		
33	1834	24	Mayo	II		74.2°O, 11.0°N	Ciénaga, Magdalena			
34	1835			III		77.5°O, 2.5°N	Timbiquí, Cauca	2		
35	1840			I		75.5°O; 0.1°N	(Ecuador)	2		
36	1846	19	Febrero	II		75.0°O; 5.3°N	Marquetalia, Caldas			
37	1849	3	Mayo	II		72.2°O, 8.9°N	(Venezuela)	7		
38	1851	2	Febrero	III		76.3°O, 10.7°N	(Océano Pacífico)			
39	1851	7	Febrero	I		75.1°O, 10.6°N	Repelón, Atlántico			
40	1859	22	Enero	III		79.9°O, 0.7°N	(Ecuador)			
41	1859	22	Marzo	III		78.5°O, 0.3°S	(Ecuador)			
42	1868	15	Agosto	III		78.1°O, 0.5°S	(Ecuador)			
43	1868	15	Septiembre	III		75.6°O, 6.3°N	Bello, Antioquia	1	40	
44	1868	18	Octubre	I		75.9°O; 4.5°N	La Victoria, Valle			
45	1869	6	Marzo	III		73.3°O, 7.7°N	Cáchira, Santander N.			
46	1870	4	Junio	II		73.8°O; 4.2°N	Quetame, Cundinamarca			
47	1875	18	Mayo	III		72.5°O; 8.0°N	Cúcuta, Santander N.	9	50	
48	1878	9	Septiembre	II		76.5°O, 2.4°N	Popayán, Cauca	11	15	
49	1882	7	Septiembre	III		76.2°O, 8.5°N	Turbo, Antioquia			
50	1883	8	Marzo	III		76.9°O, 7.4°N	Riosucio, Chocó	2	50	
51	1883	21	Mayo	II		73.8°O, 9.5°N	Chimichagua, Magdalena			
52	1884	6	Noviembre	II		76.3°O, 3.3°N	La Florida, Valle			
53	1885			III		77.5°O, 2.8°N	Timbiquí, Cauca			
54	1894	20	Abril	III		71.9°O, 8.7°N	(Venezuela)			
55	1898	28	Abril	II		71.6°O; 8.4°N	(Venezuela)			
56	1903	1	Diciembre	II		76.4°O, 6.4°N	Urrao, Antioquia			
57	1906	31	Enero	III		81.0°O; 1.0°N	(Océano Pacífico)	3		
58	1906	28	Septiembre	III	150	79.0°O; 2.0°S	(Ecuador)	10	36	
59	1911			I		72.5°O, 8.3°N	Puerto Villamizar, N. de S	10	24	54
60	1911	10	Abril	III		75.6°O, 6.2°N	Medellín, Antioquia			
61	1911	28	Abril	III	600	71.0°O, 0.0°	C. Amazonas	04	52	56
62	1915	17	Junio	II		75.7°O, 6.1°N	Angelópolis, Antioquia	11		
63	1917	29	Agosto	III		74.1°O 4.6°N	Bogotá, Cundinamarca	22	24	10
64	1917	31	Agosto	III		71.7°O, 5.2°N	Orocué, Boyacá	6	36	29
65	1918	11	Marzo	I		73.7°O; 6.7°N	Barrancabermeja, Santander	11	25	00
66	1918	16	Marzo	II		71.5°O; 2.4°N	C. Vaupés	8	37	52
67	1918	21	Diciembre	II		70.7°O; 0.0°	C. Amazonas	4	24	41
68	1919	10	Julio	III		72.0°O, 8.0°N	(Venezuela)	19	30	38
69	1919	23	Julio	II		76.7°O, 0.2°S	(Ecuador)	23	44	00
70	1920	30	Enero	III		77.5°O, 3.0°N	Micay, Cauca	13	26	45
71	1921	18	Diciembre	III	650	71.0°O, 2.5°S	C. Vaupés	10	29	24
72	1922	16	Enero	III	600	72.0°O, 2.0°S	C. Vaupés	22	50	24
73	1923	14	Diciembre	III		77.5°O, 1.0°N	Funes, Nariño	5	31	18
74	1923	16	Diciembre	II		78.0°O; 1.2°N	Ricaurte, Nariño	2	36	40
75	1923	22	Diciembre	III		73.2°O, 5.2°N	Miraflores, Boyacá	9	56	00
76	1924	27	Enero	I		71.0°O, 1.2°N	C. Vaupés	22	43	34
77	1924	10	Marzo	I		74.5°O, 2.5°N	I. Meta	18	00	29
78	1924	15	Marzo	II		71.7°O, 0.0°	C. Amazonas	20	22	56
79	1924	22	Junio	III	60	78.5°O, 5.6°N	(Océano Pacífico)	17	29	08
80	1924	21	Julio	III	250	80.0°O, 2.0°S	(Ecuador)	23	04	18
81	1924	18	Octubre	III		80.0°O, 2.5°N	(Océano Pacífico)	18	05	27
82	1925	7	Junio	III	170	78.0°O, 3.0°N	(Océano Pacífico)	18	41	42
83	1925	23	Junio	III	180	77.0°O, 0.0°	(Ecuador)	11	46	58
84	1925	31	Julio	II		77.1°O, 6.8°N	La Isla, Chocó	3	46	20
85	1926	20	Diciembre	II		77.5°O, 0.6°N	(Ecuador)			
86	1928	31	Octubre	I		75.5°O, 6.3°N	Medellín, Antioquia	23	12	35
87	1930	24	Noviembre	III	100	77.0°O; 2.0°S	(Ecuador)	01	06	48
88	1931	1	Mayo	I		70.1°O, 8.0°N	(Venezuela)	17	36	26
89	1931	12	Septiembre	III		77.5°O, 5.0°N	(Océano Pacífico)	10	41	32
90	1932	17	Febrero	II		73.5°O, 12.0°N	(Mar Caribe)	11	06	57
91	1932	14	Marzo	III		71.7°O, 8.3°N	(Venezuela)	17	42	48
92	1932	14	Mayo	I		73.5°O, 8.2°N	Río de Oro, Magdalena	17		48
93	1933	10	Febrero	II		78.0°O, 1.3°N	Ricaurte, Nariño			
94	1933	17	Mayo	II	60	78.5°O, 0.5°N	(Ecuador)	23	28	35
95	1933	4	Noviembre	I		71.5°O; 8.7°N	(Venezuela)	3	41	20
96	1933	5	Noviembre	I		80.0°O, 2.0°S	(Océano Pacífico)	7	11	56
97	1934	3	Abril	II		78.0°O, 4.0°N	(Océano Pacífico)	2	36	27
98	1934	6	Agosto	II		77.8°O, 3.4°N	(Océano Pacífico)	7	7	8
99	1935	7	Agosto	III	95	77.5°O; 1.0°N	Funes, Nariño	4	2	18
100	1935	17	Septiembre	I		76.8°O, 5.0°N	Beté, Chocó	23	58	00
101	1935	27	Octubre	III	150	76.0°O; 4.0°N	Pardo, Valle	17	5	6
102	1935	2	Noviembre	III	130	79.0°O, 2.0°S	(Ecuador)	16	5	40
103	1935	24	Diciembre	I		77.5°O, 4.0°N	(Océano Pacífico)	7	24	12
104	1936	17	Julio	I		77.4°O; 0.7°N	Potosí, Nariño	12	30	
105	1936	26	Octubre	II		77.8°O; 1.0°N	Guachucal, Nariño	20	45	
106	1937	21	Mayo	II	200	78.5°O, 2.5°N	(Océano Pacífico)	8	12	25
107	1937	21	Junio	I	50	80.0°O, 7.3°N	(Panamá)	10	13	2
108	1937	19	Julio	III	175	76.5°O, 1.5°S	(Ecuador)	14	35	14
109	1938	4	Febrero	III	130	76.7°O; 5.1°N	Manizales, Caldas	21	23	38
110	1939	27	Noviembre	I	80	78.5°O; 8.7°N	(Panamá)	21	9	56
111	1940	23	Junio	I		68.0°O; 10.0°N	(Venezuela)	13	59	33
112	1940	22	Octubre	III	140	76.0°O, 2.0°S	(Ecuador)	21	22	15
113	1941	2	Febrero	II		77.5°O; 6.0°N	(Océano Pacífico)	18	38	32
114	1941	16	Mayo	I		70.0°O, 11.0°N	(Venezuela)	8	7	21
115	1942	13	Mayo	III	600	80.0°O, 0.0°	(Ecuador)	21	13	22
116	1942	22	Mayo	II	130	74.5°O, 4.0°N	Cunday, Tolima	5	30	22
117	1942	12	Junio	I		77.0°O; 0.0°	(Ecuador)	5	21	44
118	1942	4	Julio	II	600	80.2°O, 0.3°N	(Ecuador)	20	53	6
119	1942	7	Julio	II	600	80.4°O; 0.9°N	(Ecuador)	7	32	42
120	1942	12	Julio	II	600	80.5°O, 0.8°N	(Ecuador)	0	5	17
121	1942	26	Diciembre	II	500?	75.5°O, 8.5°N	San Marcos, Bolívar	7	31	48
122	1943	30	Enero	I	500?	80.2°O; 0.3°S	(Ecuador)	0	33	54
123	1943	2	Mayo	I	100	80.1°O, 7.0°N	(Panamá)	12	18	12
124	1943	17	Mayo	I		78.7°O, 0.3°N	(Ecuador)	2	47	12
125	1943	21	Diciembre	II		71.0°O; 13.0°N	(Mar Caribe)	8	46	20
126	1943	22	Diciembre	III		71.0°O, 13.0°N	(Mar Caribe)	7	53	7
127	1943	23	Diciembre	III		71.0°O, 13.0°N	(Mar Caribe)	10	56	3
128	1943	23	Diciembre	I		71.0°O, 13.0°N	(Mar Caribe)	20	00	14
129	1944	3	Enero	I		71.0°O, 13.0°N	(Mar Caribe)	5	19	13
130	1944	4	Enero	I		71.0°O; 13.0°N	(Mar Caribe)	19	57	54
131	1944	5	Enero	I		71.0°O, 13.0°N	(Mar Caribe)	5	59	10
132	1944	3	Febrero	I		71.5°O; 5.6°N	Orocué, Boyacá	6	25	24
133	1944	31	Marzo	II		80.0°O; 0.5°S	(Ecuador)	15	35	4
134	1944	9	Mayo	I	100	74.8°O, 3.1°N	Baraya, Huila	9	29	49
135	1944	3	Septiembre	I		77.2°O, 3.8°N	San Antonio, Valle	16	29	36
136	1944	23	Octubre	III		80.0°O, 0.8°N	(Ecuador)	16	40	5
137	1944	23	Octubre	I		80.0°O, 0.5°N	(Ecuador)	19	27	42
138	1945	17	Marzo	II		78.5°O, 5.6°N	(Océano Pacífico)	18	57	54
139	1945	6	Abril	I		72.0°O, 8.4°N	(Venezuela)	13	30	50
140	1945	7	Abril	I		72.0°O, 8.4°N	(Venezuela)	5	25	23
141	1945	11	Abril	I		80.0°O, 2.5°N	(Océano Pacífico)	19	21	7
142	1945	9	Julio	I		78.9°O, 6.7°N	(Océano Pacífico)	6	56	44
143	1945	9	Julio	I	100	76.9°O, 1.0°N	C. Putumayo	11	42	8
144	1946	29	Marzo	I		76.3°O, 2.3°N	Volcán Puracé	2	17	23
145	1946	29	Marzo	I		76.3°O; 2.3°N	Volcán Puracé	15	7	1
146	1946	29	Marzo	I		76.3°O, 2.3°N	Volcán Puracé	19	2	18
147	1946	30	Marzo	I		76.3°O, 2.3°N	Volcán Puracé	12	22	31
148	1946	15	Septiembre	I		78.0°O, 5.0°N	(Océano Pacífico)	00	21	22
149	1947	27	Septiembre	I		72.0°O; 8.4°N	(Venezuela)	17	12	39
150	1947	8	Noviembre	I	100	76.8°O, 2.1°S	(Ecuador)	00	24	19
151	1948	25	Junio	I	170	77.7°O, 1.8°S	(Ecuador)	4	19	13
152	1948	25	Julio	I		78.0°O, 8.0°N	(Panamá)	22	37	42
153	1949	13	Septiembre	I		78.0°O; 8.0°N	(Panamá)	11	10	42
154	1949	13	Noviembre	I		80.0°O; 2.0°S	(Ecuador)	21	10	2
155	1950	10	Abril	II		76.5°O, 5.0°N	Condoto, Chocó	11	48	38
156	1950	22	Junio	II		78.0°O, 1.0°S	(Ecuador)	16	43	00
157	1950	8	Julio	III		72.8°O; 7.6°N	Arboledas, Santander N.	21	35	31
158	1950	8	Julio	I		72.8°O, 7.6°N	Arboledas, Santander N.	22	28	59
159	1950	9	Julio	II		72.8°O, 7.6°N	Arboledas, Santander N.	7	34	15
160	1950	30	Diciembre	II		77.0°O, 1.0°S	(Ecuador)	8	2	20
161	1951	17	Julio	II	200	78.0°O; 1.0°N	Cumbal, Nariño	2	34	17
162	1951	17	Julio	I		78.0°O; 1.0°N	Cumbal, Nariño	4	19	17
163	1951	7	Octubre	I		75.0°O, 7.0°N	Amalfi, Antioquia	1	00	30
164	1951	16	Octubre	II		70.7°O, 4.7°N	S. José de Ocune, Vichada	21	33	26
165	1951	6	Diciembre	I		77.5°O, 5.5°N	(Océano Pacífico)	9	29	18
166	1952	18	Enero	I		78.0°O; 3.5°N	(Océano Pacífico)	17	53	17
167	1952	14	Febrero	I		76.4°O, 7.5°N	Pavarandocito, Antioquia	16	2	26
168	1952	18	Marzo	I		76.0°O, 4.5°N	La Victoria, Valle	15	27	18
169	1952	8	Mayo	I		73.0°O; 7.5°N	Matanza, Santander	3	11	3
170	1952	16	Mayo	I		79.0°O; 6.0°N	(Océano Pacífico)	15	45	40
171	1952	3	Junio	I		77.0°O, 8.5°N	(Mar Caribe)	7	24	12
172	1952	4	Junio	II	60	78.7°O, 4.5°N	(Océano Pacífico)	16	30	58
173	1952	5	Junio	II		78.7°O, 4.5°N	(Océano Pacífico)	00	56	45
174	1952	29	Junio	I	150	73.0°O, 8.0°N	Bucarasica, Sant. N.	4	56	36
175	1952	2	Julio	II		78.0°O, 5.5°N	(Océano Pacífico)	19	52	27
176	1952	30	Octubre	I		76.3°O, 8.7°N	Montería, Córdoba	8	13	7
177	1952	27	Noviembre	II		79.0°O, 7.0°N	(Océano Pacífico)	20	12	56
178	1953	20	Enero	I		79.0°O, 9.5°N	(Panamá)	4	43	9
179	1953	14	Febrero	III	200	77.5°O; 1.5°S	(Ecuador)	17	10	20
180	1953	1	Abril	I		78.5°O, 7.5°N	(Océano Pacífico)	17	37	51
181	1953	7	Abril	I	570	77.7°O, 1.5°N	Los Andes, Nariño	5	23	13
182	1953	3	Junio	I		74.4°O, 7.0°N	Remedios, Antioquia	7	3	26
183	1953	11	Junio	I		79.5°O, 3.0°N	(Océano Pacífico)	9	36	00
184	1953	7	Julio	I		73.5°O, 5.0°N	Manta, Cundinamarca	22	26	50
185	1953	21	Agosto	I	150	76.5°O, 4.5°N	Versalles, Valle	11	45	57
186	1953	23	Agosto	I		73.6°O; 6.6°N	San Vicente, Santander	23	37	36
187	1953	28	Septiembre	I		72.0°O; 11.5°N	(Venezuela)	23	39	46
188	1953	7	Octubre	I		75.1°O; 6.0°N	Cocorná, Antioquia	2	26	45
189	1953	23	Diciembre	I		76.5°O, 1.0°N	Urcusique, Putumayo	4	45	23
190	1954	5	Febrero	I	100	71.5°O, 7.5°N	(Venezuela)	8	8	53
191	1954	9	Marzo	I		72.5°O; 6.5°N	El Espino, Boyacá	14	39	42
192	1954	10	Abril	I		78.0°O; 2.0°S	(Ecuador)	9	9	7
193	1954	10	Abril	I		78.0°O, 10.5°N	(Mar Caribe)	10	15	16
194	1954	24	Abril	I		72.9°O, 8.0°N	Villa Caro, Sant. N.	22	57	15
195	1954	14	Mayo	I		72.0°O, 7.5°N	(Venezuela)	13	34	37
196	1954	24	Junio	I		72.5°O, 11.0°N	Maicao, Guajira	10	37	3
197	1954	25	Julio	I		72.5°O, 10.0°N	(Venezuela)	5	40	46
198	1954	25	Julio	I		72.7°O, 10.0°N	(Venezuela)	6	00	15
199	1954	26	Julio	I		79.0°O, 1.5°S	(Ecuador)	14	9	00
200	1954	8	Septiembre	I		77.5°O; 6.2°N	Mutis, Chocó	23	50	14
201	1954	17	Septiembre	I		72.0°O; 6.8°N	Arauquita, Arauca	14	1	52
202	1954	10	Octubre	I		78.0°O; 7.0°N	(Océano Pacífico)	18	21	40
203	1954	16	Octubre	I		76.0°O; 5.6°N	Andes, Antioquia	14	49	29
204	1955	5	Enero	I		78.0°O; 0.0°	(Ecuador)	10	35	8
205	1955	10	Enero	I		80.0°O, 0.5°S	(Ecuador)	4	38	43
206	1955	11	Enero	I		74.5°O; 11.5°N	(Mar Caribe)	16	11	10
207	1955	19	Enero	II	100	78.5°O; 1.0°N	(Ecuador)	10	33	7
208	1955	22	Enero	I		78.5°O, 6.8°N	(Océano Pacífico)	11	18	53
209	1955	22	Enero	I		73.4°O; 9.0°N	Carmen, Santander N.	15	44	9
210	1955	8	Abril	I		80.0°O, 2.0°S	(Ecuador)	8	11	30
211	1955	24	Abril	I		72.5°O, 8.4°N	Puerto Villamizar, Sant. N	16	7	45
212	1955	25	Abril	I		75.5°O; 2.0°N	Andalucía, Huila	5	25	21
213	1955	11	Mayo	III		78.0°O; 0.0°	(Ecuador)	6	4	00
214	1955	13	Mayo	I		77.5°O, 7.5°N	Juradó, Chocó	16	55	47
215	1955	15	Mayo	I		74.7°O; 4.6°N	Jerusalén, Cundinamarca	20	2	12
216	1955	21	Mayo	I		72.9°O, 5.9°N	Sta. Rosa de Viterbo, Boy.	5	43	40
217	1955	26	Mayo	I		79.5°O, 9.5°N	(Panamá)	1	11	16
218	1955	10	Junio	I		74.2°O, 6.0°N	Puente Nacional, Boyacá	19	31	32
219	1955	13	Junio	I		78.5°O; 6.0°N	(Océano Pacífico)	22	42	50
220	1955	30	Junio	I		72.7°O, 6.5°N	Capitanejo, Santander	14	8	54
221	1955	20	Julio	II		78.5°O; 0.5°N	(Ecuador)	16	00	43
222	1955	1	Agosto	I		73.5°O, 7.0°N	San Vicente, Santander	23	00	30
223	1955	7	Septiembre	I		77.0°O, 8.0°N	Sautatá, Chocó	22	31	25
224	1955	14	Octubre	I		77.5°O, 6.0°N	(Océano Pacífico)	23	31	15
225	1955	24	Octubre	I		72.2°O, 5.8°N	Támara, Casanare	10	6	51
226	1955	6	Noviembre	I	100	71.0°O, 7.0°N	Arauca, Arauca	18	57	10
227	1956	12	Enero	I	200	75.5°O, 5.0°N	Villa María, Caldas	2	45	27
228	1956	18	Enero	I		78.0°O; 4.3°N	(Océano Pacífico)	22	52	3
229	1956	6	Febrero	I		77.5°O; 6.2°N	(Océano Pacífico)	21	3	25
230	1956	9	Marzo	I		80.0°O; 1.0°N	(Ecuador)	12	31	7
231	1956	31	Marzo	I		78.5°O; 3.0°N	(Océano Pacífico)	3	19	17
232	1956	2	Julio	I		73.0°O; 8.0°N	Villa Caro, Santander N.	5	31	30
233	1956	2	Agosto	I		75.5°O, 5.0°N	Villa María, Caldas	7	31	20



APPENDIX– X

LIST OF DATA COLLECTED

APPENDIX X LIST OF DATA COLLECTED

Name of Country	Name of Survey Team	Period of Field Investigations
Republic of Colombia	Republic of Colombia Julumito Hydro-electric Power Project Survey Team	From: February 13, 1979 To: March 14, 1979

No.	Name of Data	Form	Place Obtained or Name of Publishing Organ	Remarks
1	Geologia del cuarangulo. Main text N-6, Popayan, 1976	Text	Instituto Nacional de Investigaciones Geologico-Meneras	Purchased
2	Ditto Geological Map	Map	Ditto	Ditto
3	Hydrological Data (Daily) Rio Cauca, Julumito G.S., 1970 - 1976	Table	Instituto Colombiano de Hidrologia y Adecuacion de Tierras	Ditto
4	Hydrological Data (Daily) Rio Palace, Malvasa G.S., 1971 - 1976	"	Ditto	Ditto
5	Hydrological Data (Daily) Rio Sate, Pte. Carretera G.S., 1970 - 1976	"	Ditto	Ditto
6	Hydrological Data (Monthly) Rio Ovejas, Ovejas G.S., 1964 - 1974	"	Ditto	Ditto
7	Hydrological Data (Monthly) Rio Jamundi, Jamundi G.S., 1954 - 1976	"	Ditto	Ditto
8	Hydrological Data (Monthly) Rio Cauca, Salvajina G.S., 1946 - 1974 1975 - 1976 Daily	"	Ditto	Ditto
9	Meteorological Data (Precipitation) Popayan, 1970 - 1977	"	Ditto	Ditto
10	Meteorological Data (Precipitation) Popayan, Florida, 1970 - 1975	"	Ditto	Ditto
11	Meteorological Data (Precipitation) Coconuco, 1970 - 1978	"	Ditto	Ditto
12	Meteorological Data (Precipitation) Piendamo, 1970 - 1978	"	Ditto	Ditto
13	Meteorological Data (Precipitation) Silvia, 1970 - 1978	"	Ditto	Ditto
14	Meteorological Data (Precipitation) El Tambo, 1970 - 1978	"	Ditto	Ditto
15	Aerial Photograph WELO C-1288/157-165 C-1318/143-149 C-1470/051-056	Photo	Ditto	Ditto
16	Hydrological Data (Daily) Rio Cauca Julumito G.S., 1972 - 1975	Table	Instituto Colombiano de Hidrologia y Adecuacion de Tierras	Compliments of ICEL
17	Hydrological Data (Daily) Rio Palace Malvasa G.S., 1972 - 1975	"	Ditto	Ditto
18	Precipitation, Atmospheric Pressure, Humidity, Temperature Daily Data, Popayan Machangara Airport, 1972 - 1977	"	Ditto	Ditto
19	Popayan, Granja, Florida, 1969 - 1975	"	Ditto	Ditto

No.	Name of Data	Form	Place Obtained or Name of Publishing Organ	Remarks
20	Precipitation, Atmospheric Pressure, Humidity, Temperature Daily Data, Coconuco, 1971 - 1978	Table	Instituto Colombiano de Hidrología y Adecuación de Tierras	Compliments of ICEL
21	Ditto Purace, 1971 - 1978	"	Ditto	Ditto
22	Ditto Piendamo, 1971 - 1978	"	Ditto	Ditto
23	Ditto Silvia, 1968 - 1978	"	Ditto	Ditto
24	Ditto Tambo, 1968 - 1978	"	Ditto	Ditto
25	Personnel Costs, Materials Costs, Machinery Costs as of February 1979, Bogota	"	ICEL	Ditto
26	Labor Conditions Data (Days Off, Overtime, etc.)	"	Ditto	Ditto
27	Mesitas Project Construction Cost Breakdown	"	Ditto	Ditto
28	Mesitas Project Consumer Price Adjustment Formula	"	Ditto	Ditto
29	Inventario Nacional de Recursos Hidroelectricos, ISA Oct/78	Book	Ditto	Ditto
30	Expansión del Sistema Colombiano de Generación y Transmisión, ISA Oct/78	"	Ditto	Ditto
31	Construction Machinery Data (Machinery)	Table	Ditto	Ditto
32	Temperature and Humidity at Popayan, 1971 - 1977	"	Ditto	Ditto
33	Continental Drift at Southwest Colombia	Book	Instituto Geotisico de los Andes	Purchased
34	Earthquake History of Colombia	"	Ditto	Ditto
35	La Electrificación en Colombia (1977 - 1978)	"	ICEL	Compliments of ICEL
36	Revista del Banco de la República (Aug. 1978)	"	Banco de la República	Compliments of Banco de la Republic
37	Expansión del Sistema Colombiano de Generación y Transmisión	"	ISA	Purchased
38	Analisis Preliminar de Demandas Sistema CEDELCA, 1978 - 1995	"	CEDELCA	Compliments of CEDELCA
39	Inventario Nacional de Recursos Hidroeléctricos ISA	"	ICEL	Compliments of ICEL
40	Interconexión Eléctrica S.A., 1967 - 1977	Pamphlet	ISA	compliments of ISA
41	Pance Substation Equipment Layout (Plan)	Dwg.	CVC	Compliments of CVC
42	New 220-kV Popayan Substation Location Map	"	ICEL	Compliments of ICEL
43	Base para un plan energético nacional preparado por Ministerio de Minas y Energía		Instituto Geográfico "Agustín Codazzi"	Purchased
44	Anuario Estadística Departamento Nariño	Book	Planning Dept., Departamento Nariño	Compliments of Departamento Nariño

No.	Name of Data	Form	Place Obtained or Name of Publishing Organ	Remarks
45	Proyectos de Generación de Energía Eléctrica del ICEL Grupo		ICEL	Compliments of ICEL
46	CEDENAR 1978	Book	CEDENAR	Compliments of CEDENAR
47	CEDENAR 1977	"	Ditto	Ditto

APPENDIX—XI

SURVEY TEAM SCHEDULE

APPENDIX XI SURVEY TEAM SCHEDULE

Republic of Colombia Julumito Hydro-electric Power Project Survey Team

Day		Date	Itinerary	Overnight Quarters	Time	Survey Particulars and/or Remarks
1st	Tue	Feb./13	Tokyo (Narita) → Los Angeles	Los Angeles		JAL 062, Lv. Tokyo 1720, Arr. Los Angeles 0920
2nd	Wed	Feb./14	Los Angeles →	Inflight		AVIANCA 081, Lv. 2255
3rd	Thu	Feb./15	→ Bogota	Bogota		Arr. Bogota 0910, 1030 Courtesy call Japanese Embassy
						1400 Courtesy call Departamento Nacional de Planeacion
4th	Fri	Feb./16	Departamento Nacional de Planeacion, ICEL	Bogota	09:00	Discussions at Departamento Nacional de Planeacion including ICEL on procedure of field investigations.
					14:00	Yamamoto, Asai explain future schedule and procedure of field investigations to Japanese Embassy.
					14:00	Kagami, Abe, Ueno, Kato explain survey plan and questionnaire items at ICEL.
					16:00	Whole Team courtesy call on ICEL Vice President.
5th	Sat	Feb./17		Bogota	10:00	Study of detailed schedule to be followed at project site.
6th	Sun	Feb./18		Bogota		Rest
7th	Mon	Feb./19	Japanese Embassy, ICEL, EEEB,	Bogota	09:00	Yamamoto, Asai explain procedure of investigation works to Japanese Embassy.
			Instituto Geografíco "Agustín Cadazzi"		09:00	Others explain investigation schedule of Survey Team to ICEL.
			Andes Earthquake Institute		11:00	Yamamoto, Asai join others, listen to explanation by ICEL of present state of electric power development in Colombia.
					14:00	JETRO (Yamamoto, Asai)
						EEEB, Instituto Geografico "Agustin Cadazzi"
						Andes Earthquake Institute (Abe, Ueno, Kato)
					17:00	Departamento Nacional de Planeacion (Kagami).

Day		Date	Itinerary	Overnight Quarters	Time	Survey Particulars and/or Remarks	
8th	Tue	Feb./20	ICEL, EEEB, ACIC, Ministerio de Minas y Energia	Bogota	09:00 ~ 10:00 ~ 12:00	Study of reply from Tokyo regarding survey works contract (draft) (whole Team). Data collection at ACIC and Ministerio de Minas y Energia (Abe, Ueno, Kato).	
					14:30	Asai, Kagami visit EEEB for information on present state of electric power development.	
9th	Wed	Feb./21	Group A: ICEL, Japanese Embassy	Bogota	Group A (Yamamoto, Asai)		Group B (Kagami, Abe, Ueno, Kato)
			Group B: Bogota → Cali — Popayan	Popayan	Data collection		10:00 AVN 109 Lv. Bogota
					15:00	Courtesy call on ICEL President	10:45 " " Arr. Cali
			(Kawashima: Tokyo → Los Angeles)	Inflight	JAL 062 Lv. 1720 Arr. Los Angeles 0920		15:00 Arr. Popayan. Courtesy call on CEDELCA President.
					Lv. Los Angeles 2255 AVN 081		
10th	Thu	Feb./22	Group A: ICEL, JETRO, Toshiba	Bogota	09:00	Preliminary discussions with ICEL on survey works contract (draft)	09:00 Explanation of survey plan and 12:00 schedule at CEDELCA.
			Group B: CEDELCA, Highway Corporation Branch, Florida II P.S.	Popayan	14:30	Final touches on above contract (draft) with Departamento	14:30 Kagami: visit Popayan Substation Abe, Ueno, Kato: visit Florida II, Highway Corporation Popayan
					17:00	Nacional de Planeacion and ICEL	17:00 Branch.
			Kawashima	Bogota	Arr. Bogota, Courtesy call ICEL		
11th	Fri	Feb./23	Group A: Bogota — Cali — Popayan	Popayan	10:00	AVN 109 Lv. Bogota	18:00 Whole group: reconnaissances of powerhouse, dam, Rio Palace, Rio Blanco, Rio Cauca
			(Asai remains in Bogota)	Bogota	10:45	" Arr. Cali	
			Group B: Julumito Project Site reconnaissance	Popayan	15:00	Courtesy call on CEDELCA President.	17:00 Diversion dam sites.
12th	Sat	Feb./24	CEDELCA	Popayan	08:00	Yamamoto, Abe, Kawashima, Ueno, Kato: reconnaissances of Dike No. 1, No. 2 sites, powerhouse site.	
			(Asai: 1740 Lv. Bogota AVN 082, return Japan via Mexico)	(Mexico)	17:00	Kagami: sorting of data at CEDELCA office.	
13th	Sun	Feb./25	CEDELCA	Popayan	08:00 ~ 17:00	Yamamoto, Abe, Kawashima, Ueno, Kato: reconnaissances of dam site.	

Day		Date	Itinerary	Overnight Quarters	Time	Survey Particulars and/or Remarks
			CEDENAR (Popayan Pasto)	Pasto	13:00	Kagami: visit Rio Mayo Hydro P.S. for data collection.
				(Kagami)	16:30	Kagami: visit Pasto Substation, courtesy call CEDENAR
14th	Mon	Feb./26	CEDELCA	Popayan	08:00	Yamamoto, Abe, Kawashima, Ueno, Kato: survey of project site; stake
						driving at borrow area, quarry, surge tank geological survey sites.
					18:00	Request CEDELCA for various data.
			CEDENAR, Departamento de Nariño office	Pasto	09:00	Courtesy call on CEDENAR Vice President.
				(Kagami)		Receive information on present state of power system;
					12:00	Collect data for load forecasting.
					15:00	At Planning Dept., Departamento de Nariño: receive information of
						present state of economic development; obtain economic development data.
					17:00	Visit Pasto and Catambuco substations; data collection
15th	Tue	Feb./27	CEDELCA	Popayan	08:00	Yamamoto, Abe, Kawashima, Ueno, Kato: survey of project site;
						selection of dam site geological survey points and stake driving.
					17:00	Collection of data at CEDELCA
			CEDELCA (Kagami)	Popayan	13:30	Return to Popayan from Pasto
					15:00	At CEDELCA: sorting of data collected.
			Club Popayan		19:00	Survey Team welcoming party hosted by CEDELCA (Governor of Cauca,
					20:00	Mayor of Popayan, Universida del Cauca people, etc.)
16th	Wed	Feb./28	CEDELCA	Popayan	08:00	Yamamoto, Kagami: Field Investigation Report preparation work.
						Abe: intake geological survey.
						Kawashima, Ueno: project site investigation, dike sites surveying.
						Yamamoto, Abe, Kawashima, Ueno: Cauca Diversion Dam site
						investigation and geological survey.
					17:00	Selection of work sites and supervision of stake driving.
			(Kato: Cali → Bogota → Los Angeles → Japan)		09:00	Pasto → Cali → Bogota AVN 080 Lv. 1620, return Japan via Los
						Angeles.

Day		Date	Itinerary	Overnight Quarters	Time	Survey Particulars and/or Remarks
17th	Thu	Mar./1	CEDELCA	Popayan	08:00	Kawashima, Ueno: summarization of surveying data of dike sites; listen
						to explanations of construction cost estimation data by CEDELCA; recon-
					17:00	naissances of Rio Palace, Rio Blanco and Rio Cauca diversion dam sites.
					09:00	Yamamoto, Kagami, Abe: preparation of Field Investigation Report;
			(Kato: Lv. Los Angeles 1230 PA 003)			proofreading of report draft. Completion of typing, preparation of
					17:00	supplementary drawings.
18th	Fri	Mar./2	CEDELCA	Popayan	09:00	Arrangement of Field Investigation Report.
					12:00	Arrangements for payment for CEDELCA services.
					15:00	Report on results of field investigations to CEDELCA President and
						electrical and civil engineers. Explanation of further investigation
					17:00	works schedule.
			Club Popayan		19:00	Party hosted by Survey Team
						(CEDELCA persons concerned and Survey Team)
19th	Sat	Mar./3	Popayan —→ Salvajina site —→ Cali	Cali	08:00	Lv. Popayan (whole Team)
					12:00	Reconnaissance Salvajina Dam site.
			Pance Substation (CVC)		14:00	Visit Pance Substation, CVC, data collection.
					16:00	Arr. Hotel Pance
20th	Sun	Mar./4	Cali —→ Bogota	Bogota	14:00	Lv. Cali AVN 110, Arr. Bogota
					15:00	Arr. hotel
21st	Mon	Mar./5	ICEL, Japanese Embassy	Bogota	09:00	Explanation of outline of field investigation results to ICEL.
						Confirmation of status of ICEL procedures regarding survey works.
					11:00	Yamamoto, Kagami: explanation of outline of field investigation results
						to Japanese Embassy.
			HIMAT			Abe, Kawashima, Ueno: data collection at HIMAT, Geological Survey
					17:00	Institute and Geographical Survey Institute.
22nd	Tue	Mar./6	ICEL, DANE, Instituto Geográfico "Agustín Cadazzi"	Bogota	09:00	Abe, Kawashima, Ueno: receive data requested of DANE and Instituto
					12:00	Geografico "Agustin Cadazzi".

Day		Date	Itinerary	Overnight Quarters	Time	Survey Particulars and/or Remarks
					14:30	Yamamoto, Kagami: study of details of survey works contract (draft) prepared by ICEL.
					16:00	At ICEL conference room: explanation of results of investigations at Julumito project site to ICEL Vice President and persons concerned
					17:30	(whole Team).
23rd	Wed	Mar./7	Japanese Embassy, ICEL and Departamento Nacional de Planeacion	Bogota	09:00	Yamamoto, Kagami: explanations to Japanese Embassy of survey works
					12:00	contract (draft) and results of field investigations.
					14:30	At Departamento Nacional de Planeacion, with ICEL persons concerned attending, explanations of results of field investigations and discussions
					16:00	of problematic points in proceeding with Project.
24th	Thu	Mar./8	ICEL, Export-Import Bank of Japan, HIMAT, CAMACOL	Bogota	09:00	Kagami: obtain economic statistics data at Banco de la Republica.
						Yamamoto, Abe, Kawashima, Ueno: data collection at HIMAT and
					16:00	CAMACOL.
					17:00	Yamamoto, Kagami: discussion of method of proceeding with projects in Colombia and exchange of opinions at office of Export-Import Bank of Japan.
25th	Fri	Mar./9	ICEL	Bogota	08:00	Confirmation of typewritten text of survey works contract at Contract Section, ICEL.
					10:00	At ICEL President's conference room, with President and persons concerned attending, explanation of conclusions of results of field investigations, mutual confirmation of further investigation schedule.
					10:30	Signing by both parties of contract for survey works (witnessed by Japanese Embassy member).
					14:30	Collection of supplementary data (ICEL).
					17:00	Report to Japanese Embassy on signing of survey works contract.
					19:00	Party hosted by Survey Team.
						Attended by persons from Colombian Ministry of Foreign Affairs, De-
					22:00	partamento Nacional de Planeacion, ICEL, Japanese Embassy, etc.

Day		Date	Itinerary	Overnight Quarters	Survey Particulars and/or Remarks
26th	Sat	Mar./10		Bogota	09:00 Arrangement of data collected. 17:00 Arrangement of report to JICA.
27th	Sun	Mar./11	EEEB Mesitas Power Station Site	Bogota	10:00 Visit EEEB Mesitas Power Station site and preparations for return to Japan.
28th	Mon	Mar./12	Bogota — Los Angeles	Los Angeles	09:00 Farewell call at ICEL. 10:00 Farewell call at Japanese Embassy. 15:00 Lv. hotel 17:40 Lv. Bogota for Los Angeles by AVN 080.
29th	Tue	Mar./13	Los Angeles	Inflight	12:15 Lv. for Tokyo by JAL 061.
30th	Wed	Mar./14	Tokyo		16:30 Arr. Tokyo