



## รายการอ้างอิง

- International Civil Aviation Organization. 1983. Aerodrome design manual part 3 pavement. International Civil Aviation Organization.
- Amar, C., B., Cumberlandgo, G., and Hoffman, G. 1977. Flexible pavement evaluation and rehabilitation. Transportation Engineering journal, ASCE. vol 103 : 75-85.
- American Society for Testing and Materials. 1986. Soil and rock building stones (section 4). American Society for Testing and Materials.
- American Society of Civil Engineer. 1950. Development of CBR flexible pavement design method for airfields. A Symposium Transcation, ASCE. vol.115 : 453-589.
- Corps of Engineers. 1958. Engineering and design flexible airfield pavement. Corps of Engineers.
- Federal Aviation Administration. 1978. Airport pavement design. AC No.150/5320-6c. Federal Aviation Administration.
- Horonjeff, R. 1986. Planning and design of airport. 3 rd ed. New york : McGraw-Hill Book Co.
- Edwards, J., M., and Valkering, C., P. 1970. Structure design of asphalt pavement for heavy aircraft. London : Shell Co.
- Paul, G., V. 1953. Plate bearing used to evaluate Minnesota highways. Highway Research Bord. vol. 32 : 81-89.
- Teeracharti Ruenkrairevgsa, Saman N. Samarng. 1982. Investigation

of the bearing values of the existing concrete pavement of Bangkok International Airport. International Symposium on Bearing Capacity of Roads and Airfields. vol. 118 : 1070-1080.

The Asphalt Institute. 1973. Full-depth asphalt pavements for air carrier airports Manual series No. 11. The Asphalt Institute.

\_\_\_\_\_. 1969. Soil manual for design of pavement structure Manual series No.10. The Asphalt Institute.

University of Michigan. 1962. Pavement evaluation studies in Canada. International Conference on The Structural Design of Asphalt Pavements Proceeding. Part 3 : 137-218

Yoder, E., J., and Witczak, M.,W. 1975. Principle of pavement design. 2 nd ed. New York : John Willey and Sons Inc.

Yu T. Chou. 1982. Structural behavior of flexible airfield pavements. International Symposium on Bearing Capacity of Roads and Airfields. vol.105 : 192-201.

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

ภาคผนวก ก

ข้อมูลการทดสอบสนามกับ จ.แม่ฮ่องสอน



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

ตารางที่ ก-1

MH-1

PLATE LOAD TEST DATA SHEET

PROJECT : MAEHONGSON AIRPORT  
METHOD OF TEST : REPETITIVE STATIC PLATE LOAD TEST (ASTM D 1195)  
LOCATION : STA.0+968  
LOAD TEST ON : SUBGRADE TESTED BY :  
WEATHER : FINE DATE : JANUARY 28, 1989  
TIME : 19.00 - 21.30 JACK NO. : 31C-02SM  
TEST BEGUN : 19.30 hrs. GAUGE NO. : 12C-03C  
TEST FINISHED : 21.30 hrs. CYLINDER NO. : -  
SEATING LOAD : 2600 kg. SEATING DEFLECTION : 0.015 in.  
RESEATING LOAD : 1300 kg.  
CORRECTED RESEATING LOAD : 1300 kg.  
DEAD LOAD - PLATE, JACK, etc. 349 kg.

Time (hrs.)	19.00	20.00	21.00	22.00		
Temp (°C)	26	26	26	26		

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
1600	1st Appli.	19	28	0.0365	0.0245	0.0305	*
			29	0.0370	0.0245	0.0308	
			30	0.0370	0.0245	0.0308	
			31	0.0270	0.0245	0.0308	
	1st Release	19	32	0.0390	0.0220	0.0305	++
			33	0.0388	0.0210	0.0290	
			34	0.0388	0.0210	0.0290	
			35	0.0388	0.0210	0.0290	
	2nd Appli.	19	36	0.0398	0.0240	0.0319	*
			37	0.0398	0.0240	0.0319	
			38	0.0398	0.0240	0.0319	
	2nd Release	19	39	0.0390	0.0220	0.0305	++
40			0.0390	0.0220	0.0305		
41			0.0390	0.0220	0.0305		
3rd Appli.	19	42	0.0399	0.0250	0.0325	*	
		43	0.0399	0.0250	0.0325		
		44	0.0399	0.0250	0.0325		
3rd Release	19	45	0.0390	0.0220	0.0305	++	
		46	0.0390	0.0220	0.0305		
		47	0.0390	0.0220	0.0305		
4th Appli.	19	48	0.0401	0.0260	0.0331	*	
		49	0.0401	0.0260	0.0331		
		50	0.0401	0.0260	0.0331		
4th Release	19	51	0.0392	0.0220	0.0306		

\* End point deflection  
\*\* End point rebound deflection

ตารางที่ ก-1(ต่อ)

MH-2

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
1600	4th Release	19	52	0.0392	0.0220	0.0306	**
			53	0.0392	0.0220	0.0306	
	5th Appli.	19	54	0.0413	0.0280	0.0347	+
			55	0.0415	0.0280	0.0348	
			56	0.0415	0.0280	0.0348	
	5th Release	19	57	0.0397	0.0220	0.0309	**
			58	0.0397	0.0220	0.0309	
			59	0.0397	0.0220	0.0309	
	6th Appli.	20	00	0.0430	0.0300	0.0365	+
			01	0.0440	0.0320	0.0380	
			02	0.0440	0.0320	0.0380	
	6th Release	20	03	0.0440	0.0320	0.0380	**
			04	0.0400	0.0230	0.0315	
			05	0.0402	0.0220	0.0311	
06			0.0402	0.0220	0.0311		
5400	1st Appli.	20	13	0.1020	0.0950	0.0985	+
			14	0.1030	0.0950	0.0990	
			15	0.1040	0.0960	0.1000	
			16	0.1047	0.0960	0.1004	
1st Release	20	17	0.0642	0.0640	0.0641	**	
		18	0.0640	0.0640	0.0640		
		19	0.0640	0.0620	0.0630		
2nd Appli.	20	20	0.1070	0.0990	0.1030	+	
		21	0.1075	0.0990	0.1033		

+ End point deflection  
 \*\* End point rebound deflection

ตารางที่ ก-1(ต่อ)

MH-3

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
5400	2nd Appli.	20	22	0.1080	0.0990	0.1035	
			23	0.1080	0.1000	0.1040	
	2nd Release	20	24	0.0830	0.0750	0.0790	
			25	0.0820	0.0740	0.0780	
			26	0.0820	0.0740	0.0780	
			27	0.0725	0.0690	0.0708	
			28	0.0720	0.0680	0.0700	
			29	0.0720	0.0680	0.0700	
	3rd Appli.	20	30	0.0720	0.0680	0.0700	**
			33	0.1090	0.1000	0.1045	
			34	0.1095	0.1000	0.1048	
			35	0.1100	0.1010	0.1055	
36			0.1100	0.1010	0.1055		
37			0.1100	0.1010	0.1055		
3rd Release	20	38	0.0725	0.0720	0.0723	**	
		39	0.0720	0.0710	0.0715		
		40	0.0720	0.0710	0.0715		
		41	0.0710	0.0710	0.0710		
4th Appli.	20	45	0.1108	0.1020	0.1064	+	
		46	0.1110	0.1020	0.1065		
		47	0.1110	0.1020	0.1065		
		48	0.1110	0.1020	0.1065		
4th Release	20	49	0.0745	0.0745	0.0745	**	
		50	0.0740	0.0745	0.0743		
		51	0.0740	0.0740	0.0740		
		52	0.0740	0.0740	0.0740		

+ End point deflection  
 \*\* End point rebound deflection

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
5400	5th Appli.	20	58	0.1110	0.1025	0.1068	
			59	0.1112	0.1025	0.1069	+
		21	00	0.1112	0.1030	0.1071	
			01	0.1115	0.1030	0.1073	
	5th Release	21	02	0.0760	0.0760	0.0760	
			03	0.0755	0.0750	0.0753	++
			04	0.0755	0.0750	0.0753	
			05	0.0755	0.0750	0.0753	
	6th Appli.	21	10	0.1120	0.1045	0.1083	
			11	0.1120	0.1045	0.1083	+
			12	0.1120	0.1050	0.1085	
			13	0.1125	0.1050	0.1088	
6th Release	21	14	0.0770	0.0770	0.0770		
		15	0.0765	0.0760	0.0763	++	
		16	0.0765	0.0750	0.0758		
		17	0.0765	0.0750	0.0758		
8800	1st Appli.	21	27	0.1250	0.1200	0.1225	

Note : Counter weight failed

+ End point deflection

++ End point rebound deflection

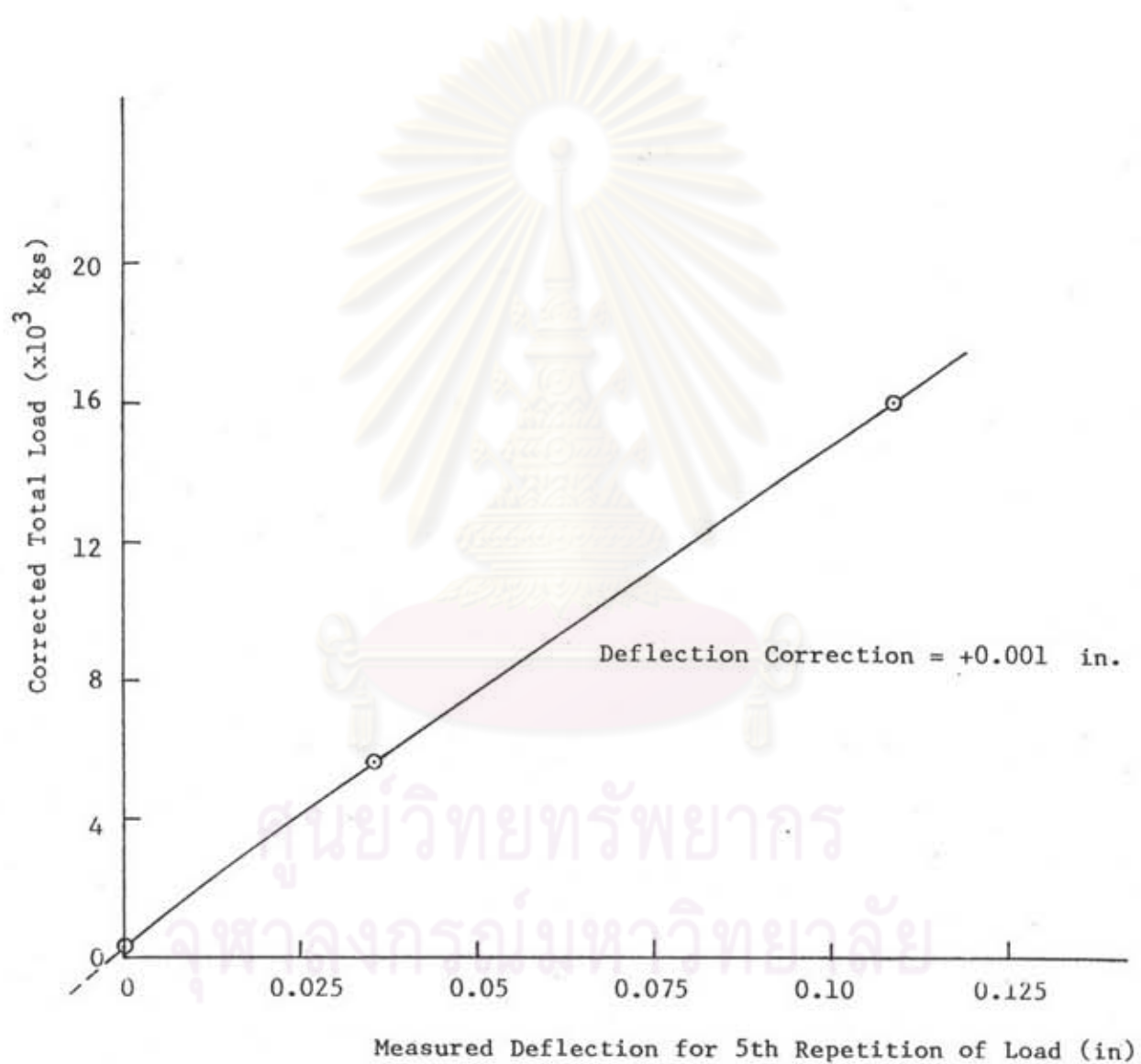
ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

ตารางที่ ก-2 สรุปผลการวัดค่าการทรุดตัวสนามบินจังหวัดแม่ฮ่องสอน

Applied Load				Measured Deflection Values in inches For Load Application No.					
Jack	Reading	Dead Load (kg)	Correct- ed. Total Load (kg.)	1	2	3	4	5	6
Gauge (lb)	Corrected (kg.)								
1600	5400	349	5749	0.0408	0.0319	0.0325	0.0331	0.0348	0.0380
5400	16000	349	16349	0.0990	0.1033	0.1055	0.1065	0.1069	0.1083
8800	25600	349	25949	0.1225	-	-	-	-	-

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

## MAEHONGSON AIRPORT



รูปที่ ก-1 การปรับแก้ค่าการทรุดตัวที่วัดได้จากการทดสอบ



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : MAEHONGSON AIRPORT Date : JANUARY 29, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : STA.#+25# Tested by :

WATER CONTENT DETERMINATION

Container No.	7
Wt. Container + Wet Soil (gm)	3487.6
Wt. Container + Dry Soil (gm)	3169.0
Wt. Water (gm)	328.5
Wt. Container (gm)	329.0
Wt. Dry Soil (gm)	2830.0
Water Content (%)	11.61

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	750	250.0	
0.050	1320	440.0	
0.075	1590	530.0	
0.100	1720	573.3	
0.150	1990	633.3	
0.200	2110	703.3	
0.250	2190	730.0	
0.300			
0.350			
0.400			
0.450			
0.500			

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : MAEHONGSON AIRPORT Date : JANUARY 28, 1989  
Description of sample : SUBGRADE Tested condition : SOAKED  
Location : STA.#+25# Tested by :

WATER CONTENT DETERMINATION

Container No.	X1
Wt. Container + Wet Soil (gm)	1840.6
Wt. Container + Dry Soil (gm)	1631.0
Wt. Water (gm)	209.5
Wt. Container (gm)	348.0
Wt. Dry Soil (gm)	1283.0
Water Content (%)	16.33

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	215	71.7	
0.050	370	123.3	
0.075	525	175.0	
0.100	625	208.3	
0.150	690	230.0	
0.200	690	230.0	
0.250	835	278.3	
0.300			
0.350			
0.400			
0.450			
0.500			

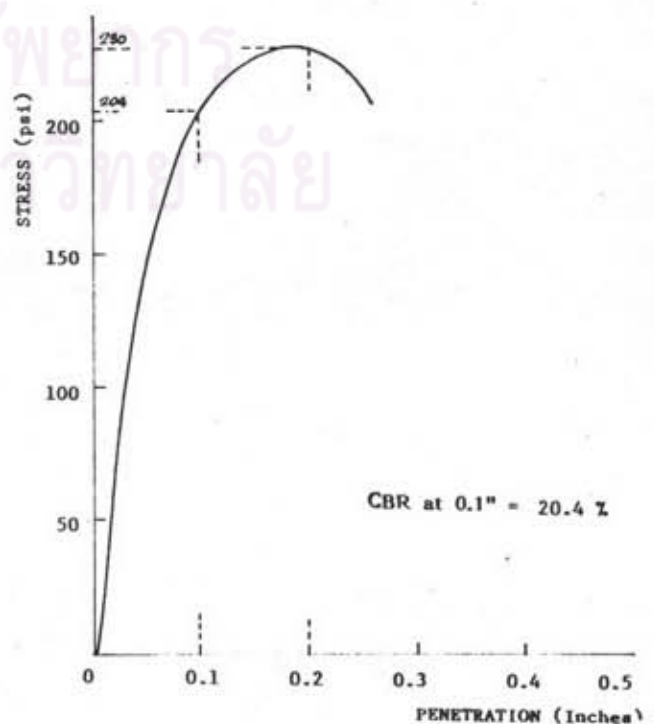
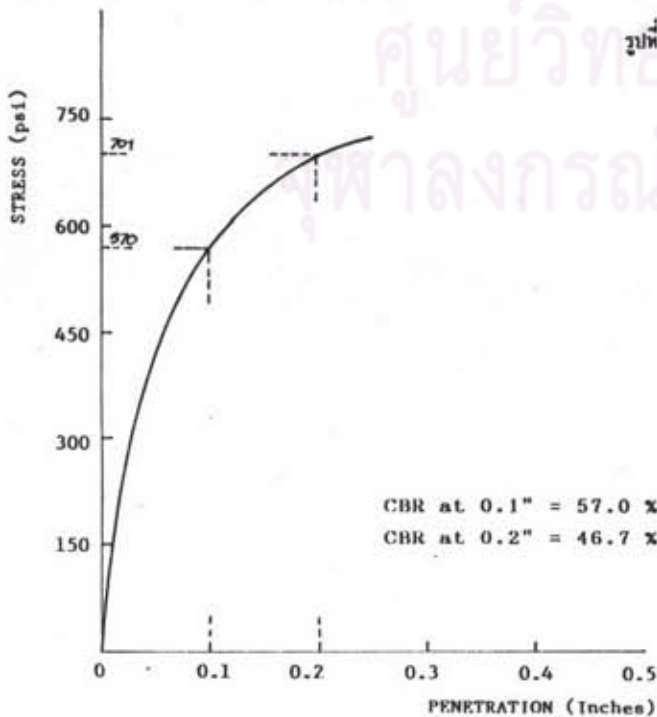
STRESS - PENETRATION CURVE

Description of sample : SUBGRADE  
Location : Sta. 0+250

Sample from : MAEHONGSON AIRPORT  
Date : January 1989

IN-SITU CONDITION

24 hrs SOAKED CONDITION



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : MAEHONGSON AIRPORT Date : JANUARY 28, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : STA.0+968 Tested by :

WATER CONTENT DETERMINATION

Container No.	X1
Wt. Container + Wet Soil (gm)	950.5
Wt. Container + Dry Soil (gm)	895.5
Wt. Water (gm)	55.0
Wt. Container (gm)	348.0
Wt. Dry Soil (gm)	547.5
Water Content (%)	10.04

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	600	230.0	
0.050	1175	391.7	
0.075	1540	513.3	
0.100	1820	606.7	
0.150	2210	736.7	
0.200	2490	830.0	
0.250	2650	883.3	
0.300	2780	926.7	
0.350	2855	951.7	
0.400	2925	975.0	
0.450			
0.500			

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : MAEHONGSON AIRPORT Date : JANUARY 29, 1989  
Description of sample : SUBGRADE Tested condition : SOAKED  
Location : STA.0+968 Tested by :

WATER CONTENT DETERMINATION

Container No.	X1
Wt. Container + Wet Soil (gm)	1332.5
Wt. Container + Dry Soil (gm)	1207.0
Wt. Water (gm)	125.5
Wt. Container (gm)	348.0
Wt. Dry Soil (gm)	859.0
Water Content (%)	11.61

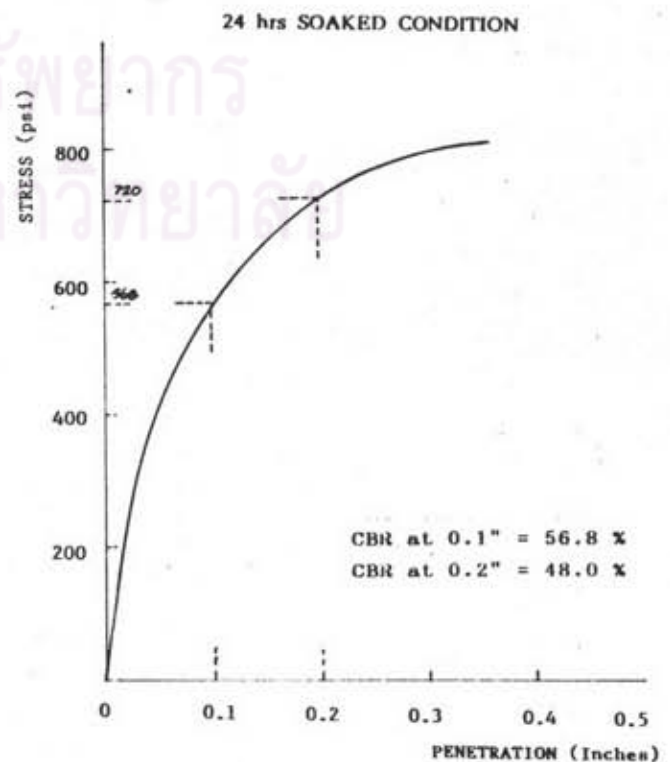
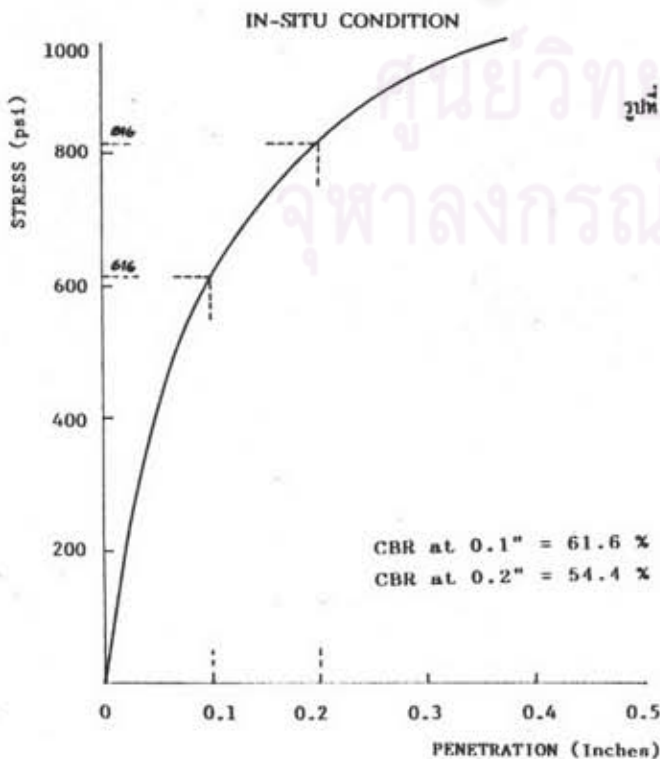
FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	580	193.3	*
0.050	1140	380.0	
0.075	1500	500.0	
0.100	1690	563.3	
0.150	1990	663.3	
0.200	2160	720.0	
0.250	2320	773.3	
0.300	2360	793.3	
0.350	2450	816.7	
0.400			
0.450			
0.500			

STRESS - PENETRATION CURVE

Description of sample : SUBGRADE  
Location : Sta. 0+968

Sample from : MAEHONGSON AIRPORT  
Date : January 1989



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : MAEHONGSON AIRPORT Date : JANUARY 30, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : STA. 1+300 Tested by :

WATER CONTENT DETERMINATION

Container No.	9
Wt. Container + Wet Soil (gm)	3637.0
Wt. Container + Dry Soil (gm)	3404.0
Wt. Water (gm)	233.0
Wt. Container (gm)	325.0
Wt. Dry Soil (gm)	3079.0
Water Content (%)	7.67

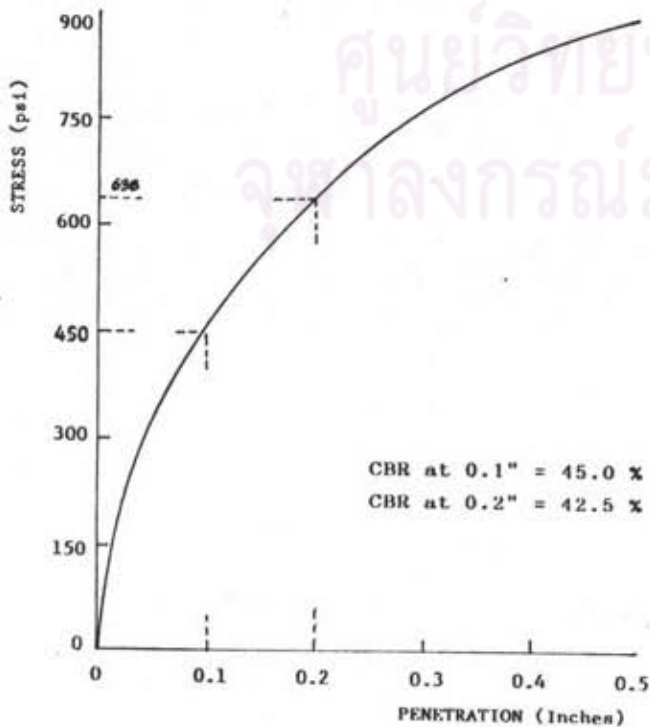
FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	545	181.7	
0.050	890	296.7	
0.075	1180	393.3	
0.100	1375	458.3	
0.150	1650	550.0	
0.200	1865	618.3	
0.250	2010	670.0	
0.300	2440	815.0	
0.350	2500	833.3	
0.400	2665	888.3	
0.450	2700	900.0	
0.500			

STRESS - PENETRATION CURVE

Description of sample : SUBGRADE Sample from : MAEHONGSON AIRPORT  
Location : Sta. 1+300 Date : January 1989

IN-SITU CONDITION



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : MAEIHONGSON AIRPORT Date : JANUARY 29, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : STA. 1+690 Tested by :

WATER CONTENT DETERMINATION

Container No.		7
Wt. Container + Wet Soil (gm)		3251.5
Wt. Container + Dry Soil (gm)		2802.0
Wt. Water (gm)		449.5
Wt. Container (gm)		259.0
Wt. Dry Soil (gm)		2543.0
Water Content (%)		17.68

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	75	25.0	
0.050	100	33.3	
0.075	120	40.0	
0.100	140	46.7	
0.150	170	56.7	
0.200	200	66.7	
0.250	220	73.3	
0.300	245	81.7	
0.350	260	86.7	
0.400	275	91.7	
0.450	320	106.7	
0.500	350	110.0	

FIELD CALIFORNIA BEARING RATIO TEST

145

Sample from : MAEIHONGSON AIRPORT Date : JANUARY 30, 1989  
Description of sample : SUBGRADE Tested condition : SOAKED  
Location : STA. 1+690 Tested by :

WATER CONTENT DETERMINATION

Container No.		X1
Wt. Container + Wet Soil (gm)		1284.0
Wt. Container + Dry Soil (gm)		1113.5
Wt. Water (gm)		170.5
Wt. Container (gm)		348.0
Wt. Dry Soil (gm)		765.5
Water Content (%)		22.27

FIELD CBR TEST LOAD DATA

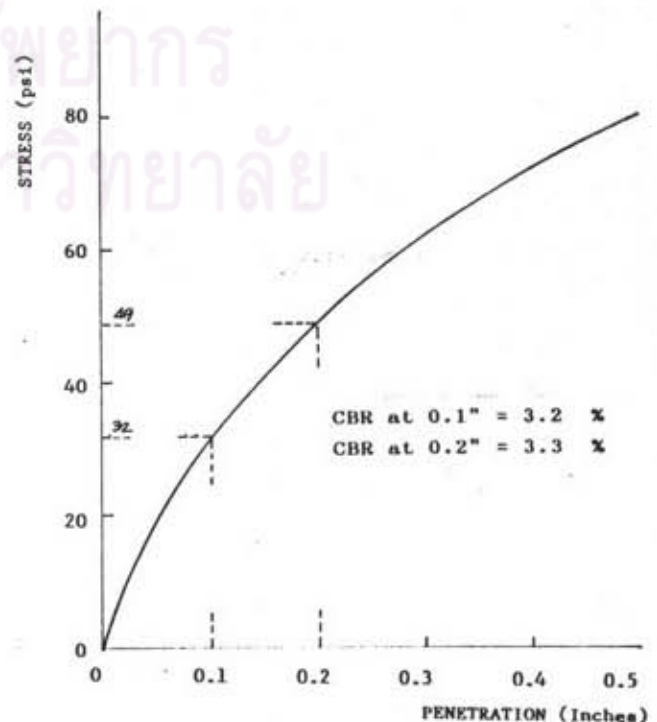
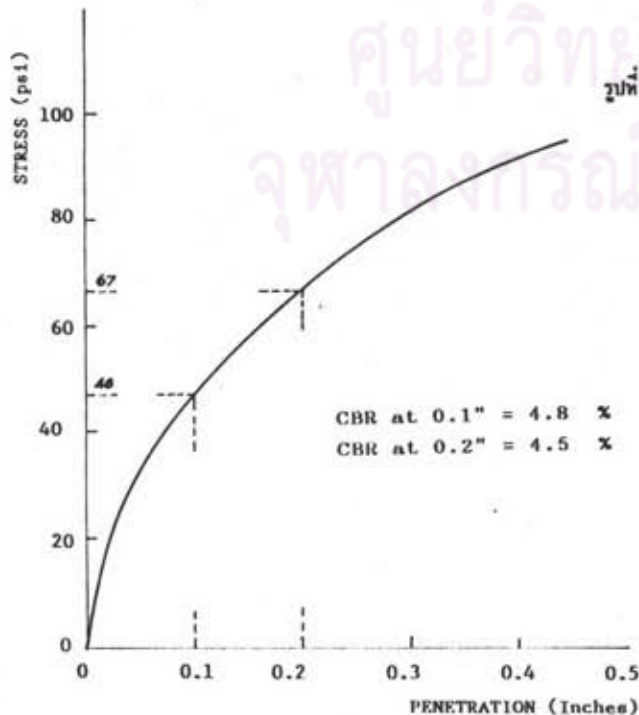
PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	45	15.0	
0.050	65	21.7	
0.075	85	28.3	
0.100	95	31.7	
0.150	120	40.0	
0.200	140	46.7	
0.250	165	55.0	
0.300	190	63.3	
0.350	200	66.7	
0.400	210	70.0	
0.450	220	73.3	
0.500	245	81.7	

STRESS - PENETRATION CURVE

Description of sample : SUBGRADE Sample from : MAEIHONGSON AIRPORT  
Location : Sta. 1+690 Date : January 1989

IN-SITU CONDITION

24 hrs SOAKED CONDITION



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : MAEHONGSON AIRPORT Date : JANUARY 29, 1989  
Description of sample : SUBBASE Tested condition : IN-SITU  
Location : STA. 1+690 Tested by :  
WATER CONTENT DETERMINATION

Container No.	5
Wt. Container + Wet Soil (gm)	2925.0
Wt. Container + Dry Soil (gm)	2680.0
Wt. Water (gm)	245.0
Wt. Container (gm)	285.0
Wt. Dry Soil (gm)	2395.0
Water Content (%)	10.23

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	235	78.3	
0.050	330	110.0	
0.075	390	130.0	
0.100	400	133.3	
0.150	475	158.3	
0.200	535	178.3	
0.250	585	195.0	
0.300	590	196.7	
0.350	595	198.3	
0.400	615	205.0	
0.450	600	200.0	
0.500	620	206.7	

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : MAEHONGSON AIRPORT Date : JANUARY 30, 1989  
Description of sample : SUBBASE Tested condition : SOAKED  
Location : STA. 1+690 Tested by :  
WATER CONTENT DETERMINATION

Container No.	X1
Wt. Container + Wet Soil (gm)	894.0
Wt. Container + Dry Soil (gm)	819.0
Wt. Water (gm)	75.0
Wt. Container (gm)	348.0
Wt. Dry Soil (gm)	471.0
Water Content (%)	15.92

FIELD CBR TEST LOAD DATA

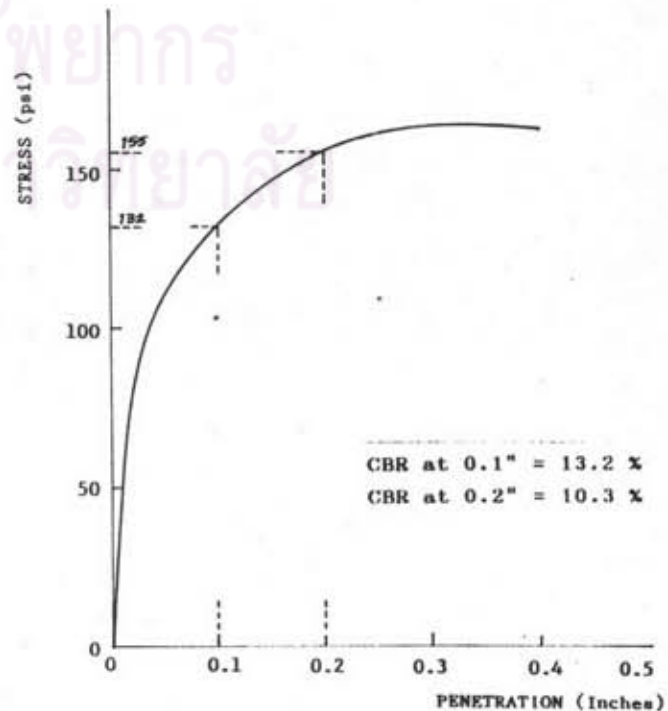
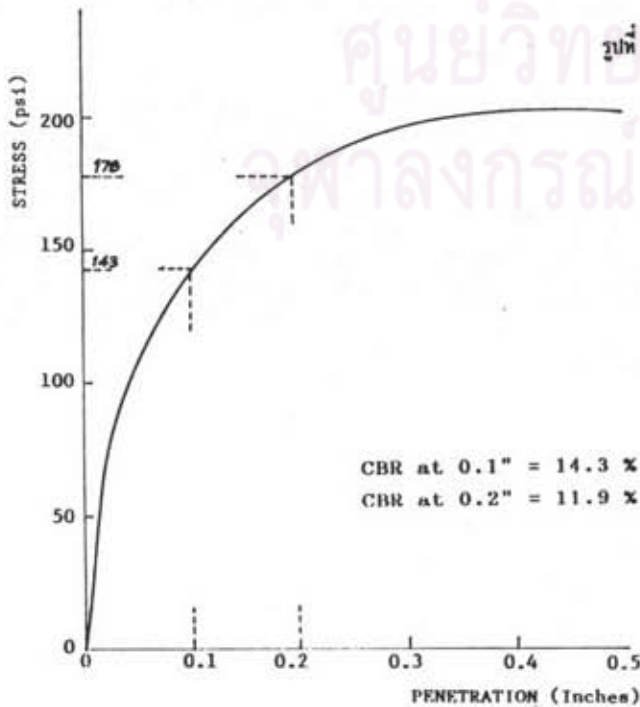
PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	255	85.0	
0.050	315	105.0	
0.075	400	133.3	
0.100	410	136.7	
0.150	435	145.0	
0.200	455	151.7	
0.250	480	160.0	
0.300	490	163.3	
0.350	485	161.7	
0.400			
0.450			
0.500			

STRESS - PENETRATION CURVE

Description of sample : SUBBASE Sample from : MAEHONGSON AIRPORT  
Location : Sta. 1+690 Date : January 1989

IN-SITU CONDITION

24 hrs SOAKED CONDITION



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : MAEHONGSON AIRPORT Date : JANUARY 29, 1989  
Description of sample : BASE Tested condition : IN-SITU  
Location : STA. 1+690 Tested by :

WATER CONTENT DETERMINATION

Container No.		4
Wt. Container + Wet Soil (gm)		3987.1
Wt. Container + Dry Soil (gm)		3796.8
Wt. Water (gm)		192.1
Wt. Container (gm)		318.0
Wt. Dry Soil (gm)		3485.8
Water Content (%)		5.51

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	198	63.3	
0.050	425	141.7	
0.075	615	205.0	
0.100	700	233.3	
0.150	1205	401.7	
0.200	1485	468.3	
0.250	1620	540.0	
0.300	1615	505.0	
0.350			
0.400			
0.450			
0.500			

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : MAEHONGSON AIRPORT Date : JANUARY 30, 1989  
Description of sample : BASE Tested condition : SOAKED  
Location : STA. 1+690 Tested by :

WATER CONTENT DETERMINATION

Container No.		X1
Wt. Container + Wet Soil (gm)		1632
Wt. Container + Dry Soil (gm)		1534
Wt. Water (gm)		98.0
Wt. Container (gm)		348.0
Wt. Dry Soil (gm)		1186.0
Water Content (%)		8.26

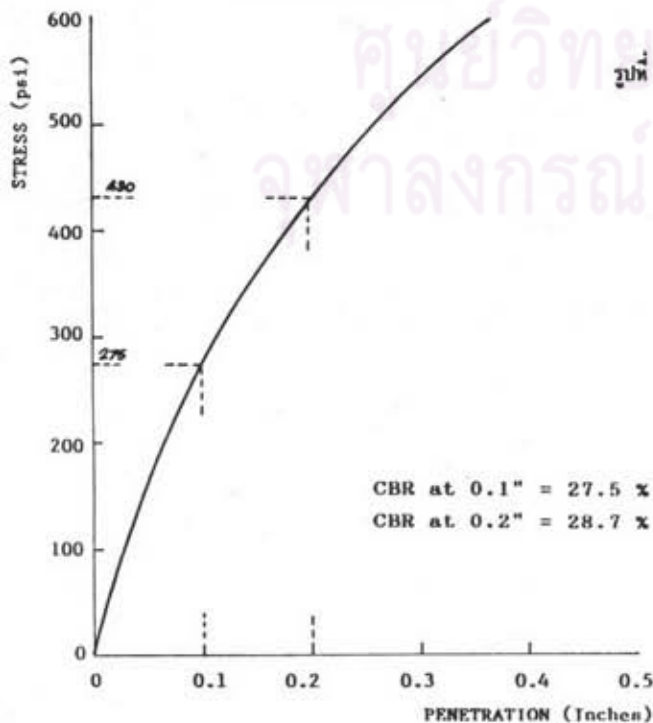
FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	175	58.3	
0.050	270	90.0	
0.075	305	131.0	
0.100	540	180.0	
0.150	620	273.3	
0.200	870	290.0	
0.250	1175	391.7	
0.300	1275	425.0	
0.350	1300	483.3	
0.400	1545	615.0	
0.450	1605	635.0	
0.500	1710	670.0	

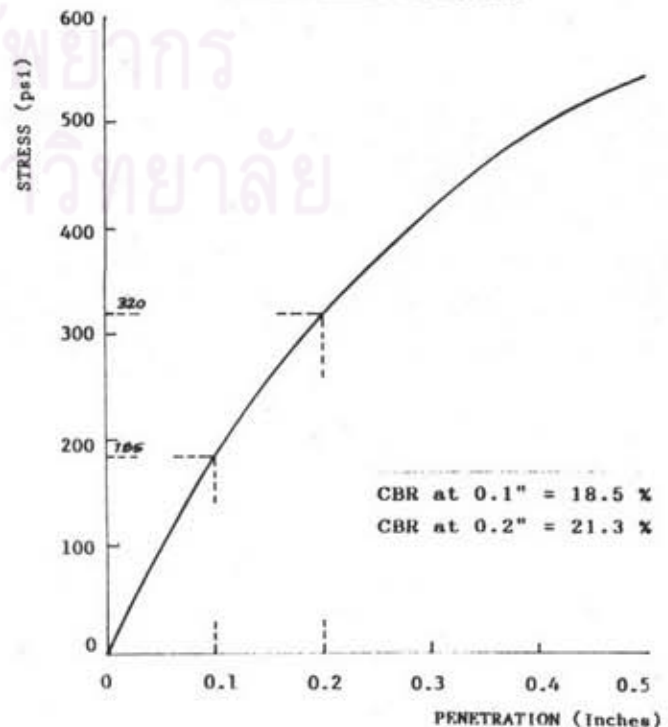
STRESS - PENETRATION CURVE

Description of sample : BASE Sample from : MAEHONGSON AIRPORT  
Location : Sta. 1+690 Date : January 1989

IN-SITU CONDITION



24 hrs SOAKED CONDITION



FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

COMPACTION CURVE

COMPACTION TEST

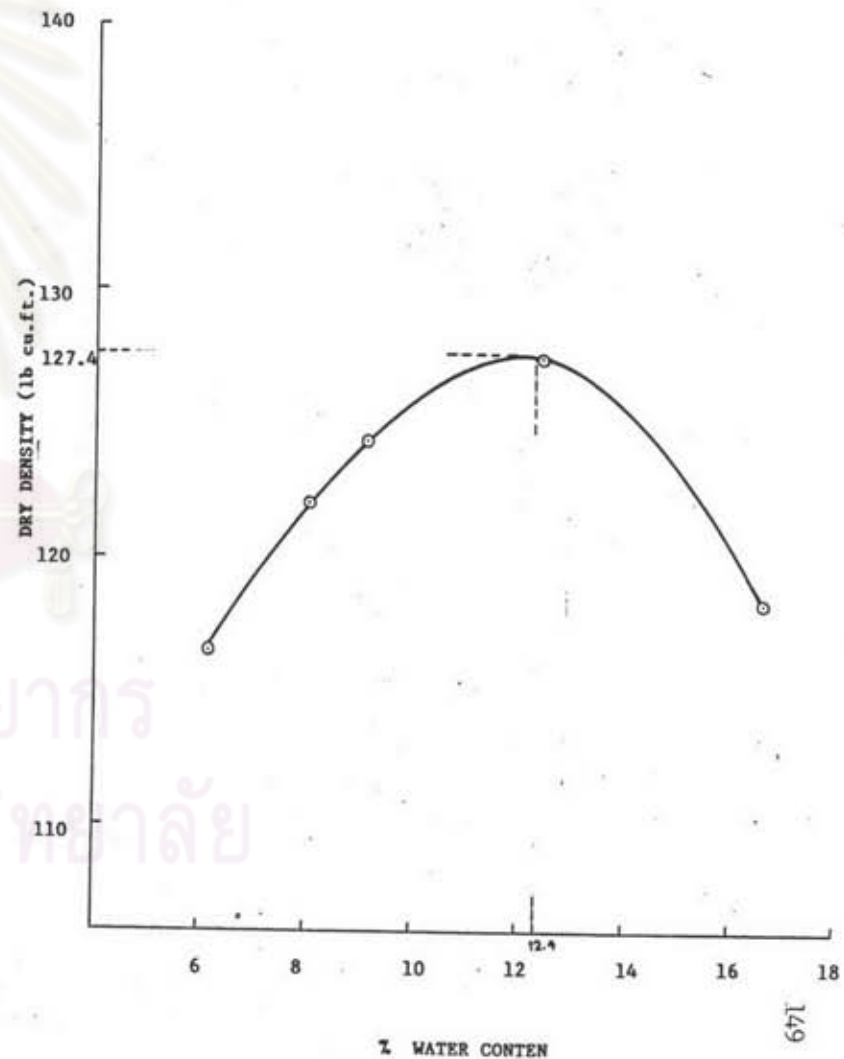
DESCRIPTION OF SAMPLE : SUBGRADE DATE : APRIL 21, 1989

SAMPLE FROM : MAEHONGSON AIRPORT LOCATION : STA. 1 + 690

SAMPLE FROM : MAEHONGSON AIRPORT  
 COURSE : SUBGRADE DATE : MARCH 27, 1989  
 LOCATION : STA. 1+690 TEST BY : PPP  
 TYPE OF TEST : MODIFIED PROCTOR 55 BLOWS ON EACH OF 5 LAYERS  
 10 lb. HAMMER 18 in. DROP MOLD NO. 3 VOLUME OF MOLD 0.0736 cu.ft.

Determination No.	1	2	3	4	5
Wt. mold+soil lb.	18.32	18.91	19.19	19.65	19.36
Wt. mold lb.	9.21	9.21	9.21	9.21	9.21
Wt. soil lb.	9.11	9.70	9.98	10.44	10.15
Av. water content, %	6.16	8.01	9.10	12.41	16.58
Moist density pcf.	123.80	131.79	135.60	143.21	137.91
Dry density pcf.	116.62	122.02	124.29	127.40	118.30

Water content from	T	B	T	B	T	B	T	B	T	B
Container No.	C36	B2	Z27	CX7	E10	L7	B3	H43	X5	E3
Wt. cont. + wet soil gm.	187.9	231.4	222.3	246.7	105.1	108.7	195.5	155.3	85.7	83.2
Wt. cont. + dry soil gm.	178.5	220.6	208.6	234.4	98.2	101.2	178.0	141.9	74.8	72.6
Wt. water gm.	9.4	10.8	13.7	12.3	6.9	7.5	17.5	13.4	10.9	10.6
Wt. container gm.	32.5	38.0	34.0	84.3	21.5	19.7	37.0	34.0	9.0	8.9
Wt. dry soil gm.	146.0	182.6	174.6	150.1	76.7	81.5	141.0	107.9	65.8	63.7
Water content %	6.40	5.91	7.83	8.19	9.00	9.20	12.41	12.42	16.52	16.84
Av. water content %	6.16		8.01		9.10		12.41		16.58	



รูปที่ ก-8

COMPACTION TEST

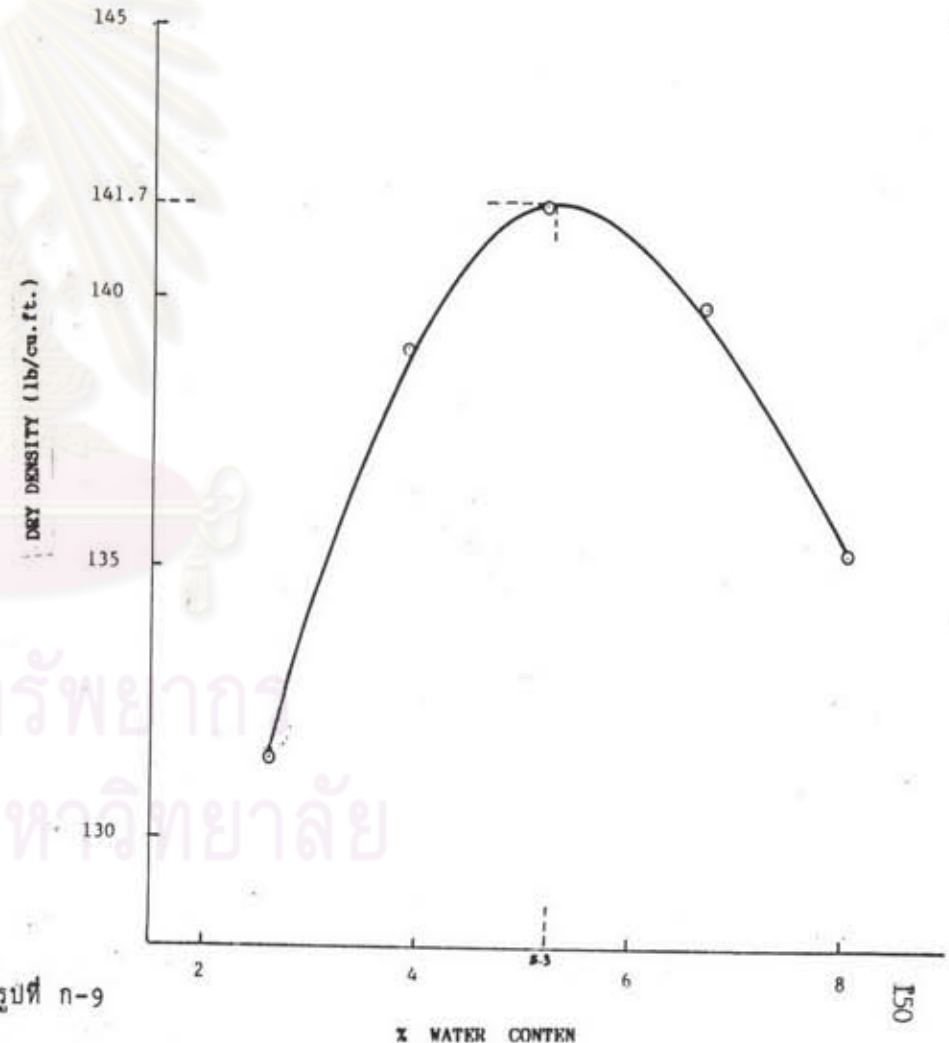
SAMPLE FROM : MAEHONGSON AIRPORT  
 COURSE : SUBBASE DATE : APRIL 20, 1989  
 LOCATION : STA. 1+690 TEST BY : PPP  
 TYPE OF TEST : MODIFIED PROCTOR 55 BLOWS ON EACH OF 5 LAYERS  
 10 lb. HAMMER 18 in. DROP MOLD NO. 1 VOLUME OF MOLD 0.0738 cu.ft.

COMPACTION CURVE

DESCRIPTION OF SAMPLE : SUBBASE DATE : APRIL 20, 1989  
 SAMPLE FROM : MAEHONGSON AIRPORT LOCATION : STA. 1 + 690

Determination No.	1	2	3	4	5
Wt. mold & soil lb.	19.06	19.84	20.10	20.10	19.87
Wt. mold lb.	9.12	9.12	9.12	9.12	9.12
Wt. soil lb.	9.94	10.72	10.98	10.98	10.75
Av. water content, %	2.59	3.91	5.21	6.70	8.02
Moist density pcf.	135.05	145.65	149.18	149.18	148.06
Dry density pcf.	131.64	140.17	141.80	139.81	135.22

Water content from	T		B		T		B		T		B	
Container No.	K10	L7	H43	B2	L12	Z29	C36	X9	C30	Z42		
Wt. cont. & wet soil gm.	145.2	137.6	153.4	188.4	153.4	147.1	148.0	111.2	160.1	169.3		
Wt. cont. & dry soil gm.	142.1	134.6	149.0	182.7	147.6	141.5	140.9	106.4	150.7	160.4		
Wt. water gm.	3.1	3.0	4.4	5.7	5.8	5.6	7.1	4.8	9.4	8.9		
Wt. container gm.	21.5	19.7	34.9	38.8	35.7	34.6	33.7	35.5	34.0	49.6		
Wt. dry soil gm.	120.6	114.9	114.1	143.9	111.9	106.9	107.2	70.9	116.7	111.4		
Water content %	2.57	2.61	3.86	3.96	5.18	5.24	6.62	6.77	8.05	7.99		
Av. water content %	2.59		3.91		5.21		6.70		8.02			





COMPACTION TEST

DESCRIPTION OF SAMPLE : BASE      DATE : APRIL 20, 1989

SAMPLE FROM : MAEHONGSON AIRPORT LOCATION : STA. 1 + 690

SAMPLE FROM : MAEHONGSON AIRPORT

COURSE : BASE

DATE : APRIL 20, 1989

LOCATION : 1+690

TEST BY : PPP

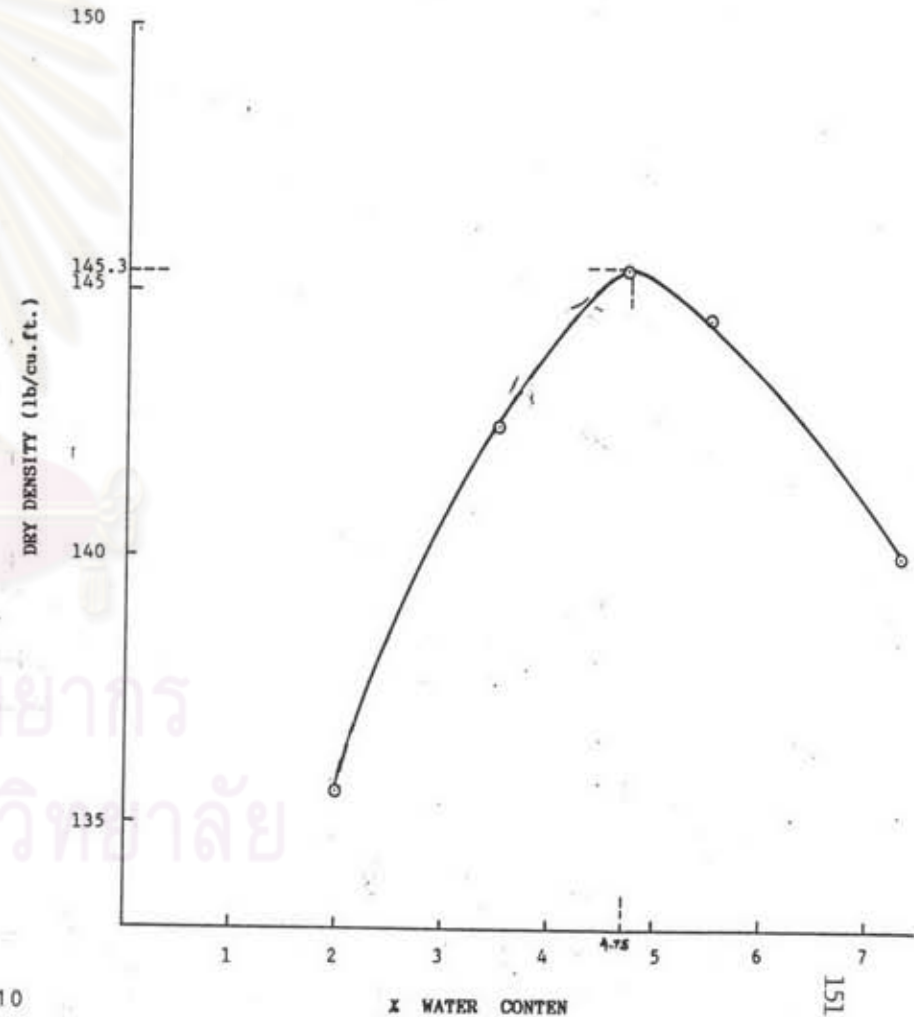
TYPE OF TEST : MODIFIED PROCTOR

55 BLOWS ON EACH OF 5 LAYERS

10 lb. HAMMER 18 in. DROP      MOLD NO. 1      VOLUME OF MOLD 0.0736 cu.ft.

Determination No.	1	2	3	4	5
Wt. mold soil lb.	19.30	19.97	20.32	20.34	20.18
Wt. mold lb.	9.12	9.12	9.12	9.12	9.12
Wt. soil lb.	10.18	10.85	11.20	11.22	11.06
Av. water content, %	2.02	3.49	4.67	5.52	7.34
Moist density pcf.	138.32	147.42	152.17	152.45	150.27
Dry density pcf.	135.58	142.45	145.38	144.47	140.00

Water content from	T		R		T		R		T		R	
Container No.	C46	CX7	TH12	Z11	K10	L7	36	21	C43	T2		
Wt. cont. + wet soil gm.	141.8	204.2	124.7	141.8	129.4	125.0	88.8	98.0	94.6	87.2		
Wt. cont. + dry soil gm.	139.8	201.7	121.5	138.4	124.7	120.2	85.1	93.5	88.8	81.8		
Wt. water gm.	2.0	2.5	3.2	3.4	4.7	4.8	3.7	4.5	5.8	5.4		
Wt. container gm.	35.0	84.3	34.2	35.5	21.5	19.7	20.5	8.8	8.9	8.9		
Wt. dry soil gm.	104.8	117.4	87.3	102.9	103.2	100.5	64.6	84.7	79.9	72.9		
Water content %	1.91	2.13	3.67	3.30	4.55	4.78	5.73	5.31	7.26	7.41		
Av. water content %	2.02		3.49		4.67		5.52		7.34			



### STRESS - PENETRATION CURVE

DESCRIPTION OF SAMPLE : SUBGRADE

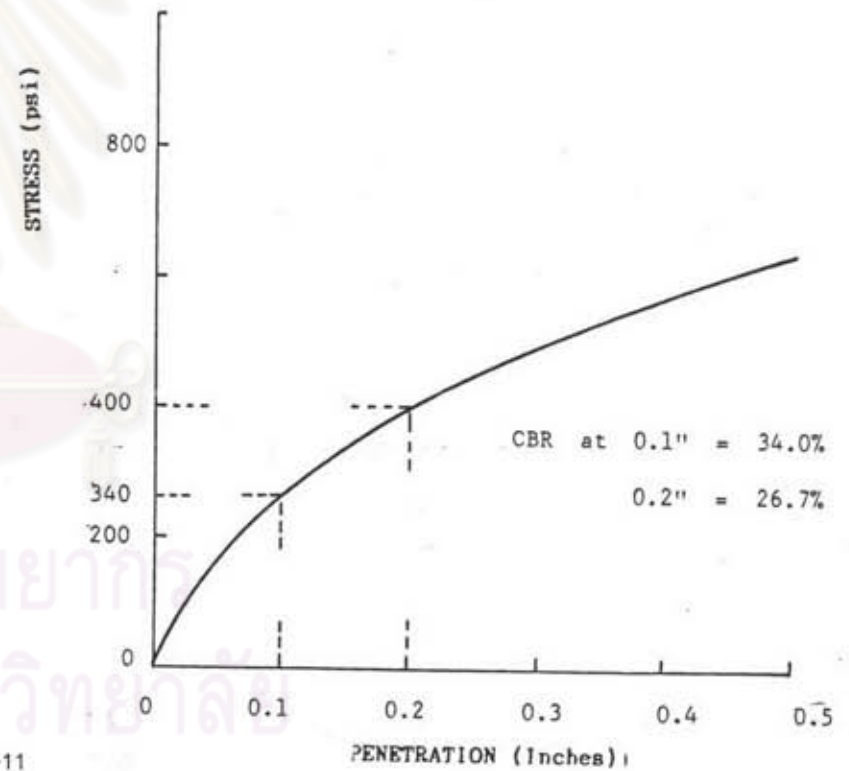
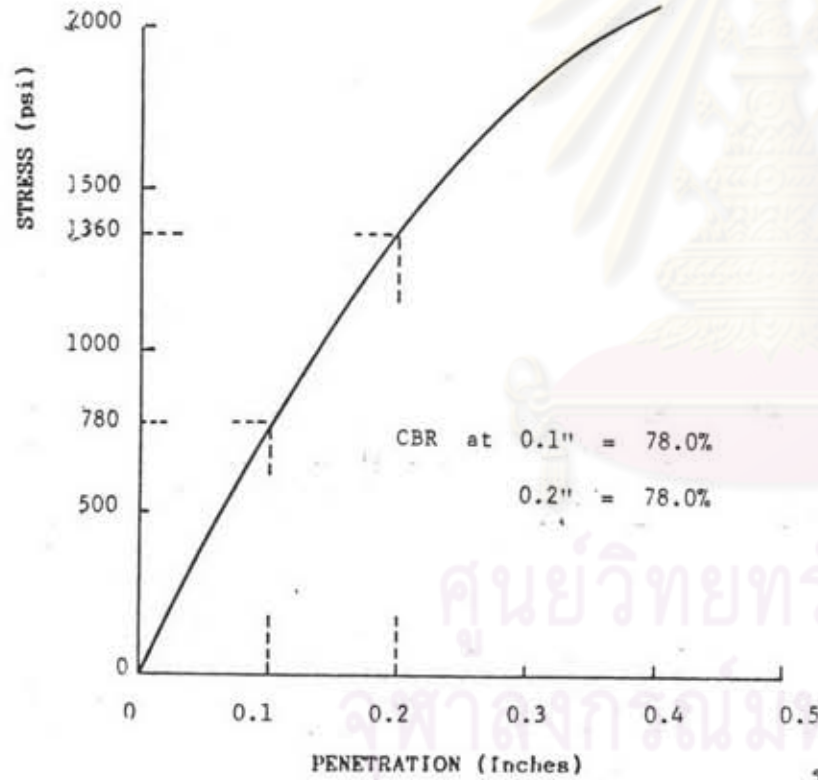
SAMPLE FROM : MAEHONGSON AIRPORT

LOCATION : STA. 0 + 96R

DATE : APRIL 24, 1989

UNSOAKED CONDITION

96 HRS. SOAKED CONDITION



รูปที่ ก-11

### STRESS - PENETRATION CURVE

DESCRIPTION OF SAMPLE : SUBBASE

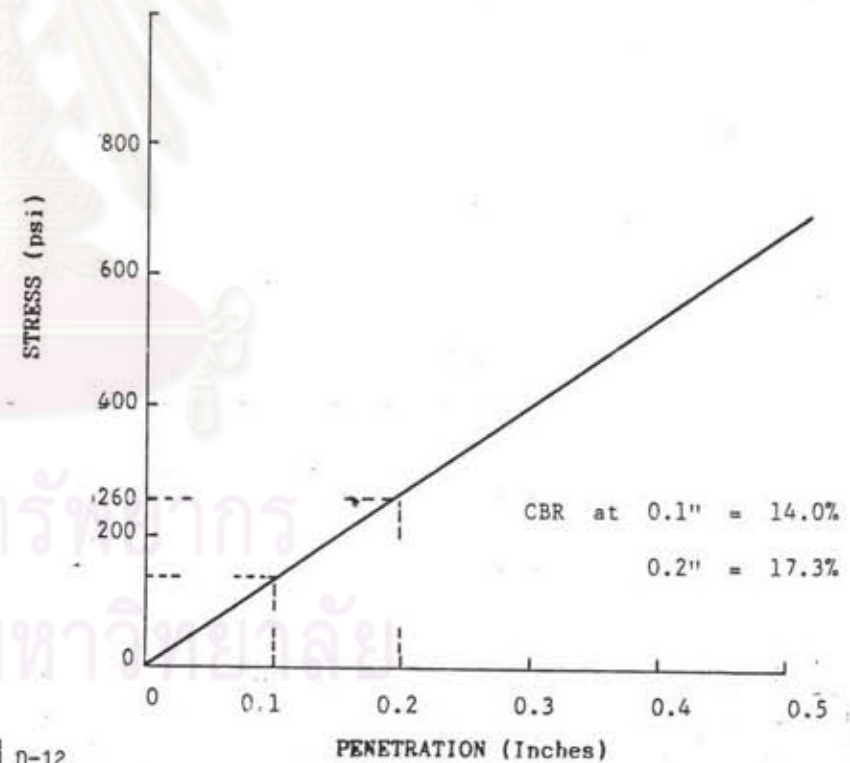
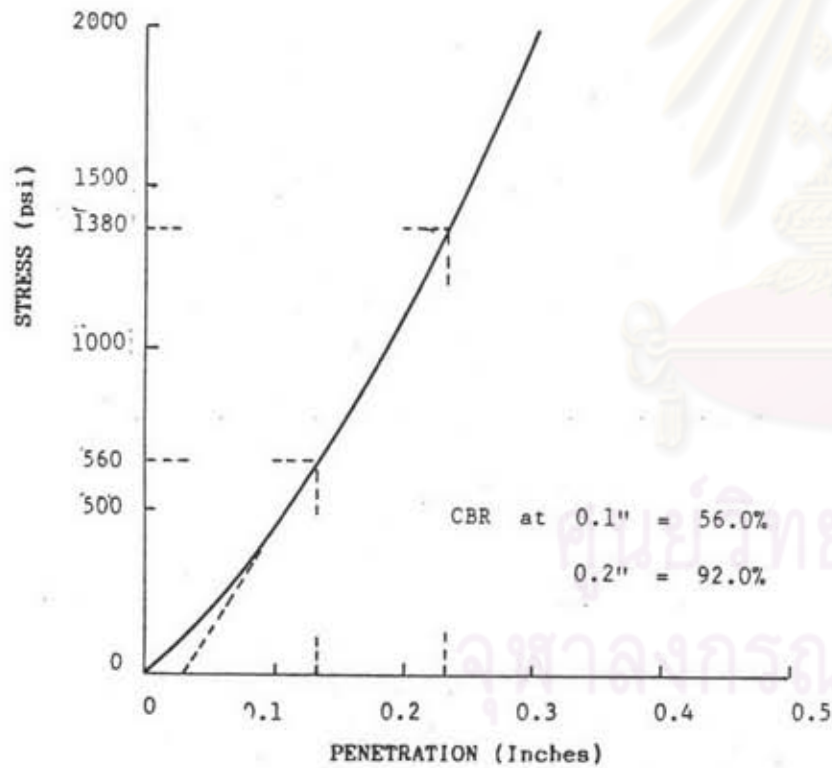
SAMPLE FROM : MAEHONGSON AIRPORT

LOCATION : STA. 1+690

DATE : APRIL 24, 1989

UNSOAKED CONDITION

96 HRS. SOAKED CONDITION



รูปที่ n-12

STRESS - PENETRATION CURVE

DESCRIPTION OF SAMPLE : BASE

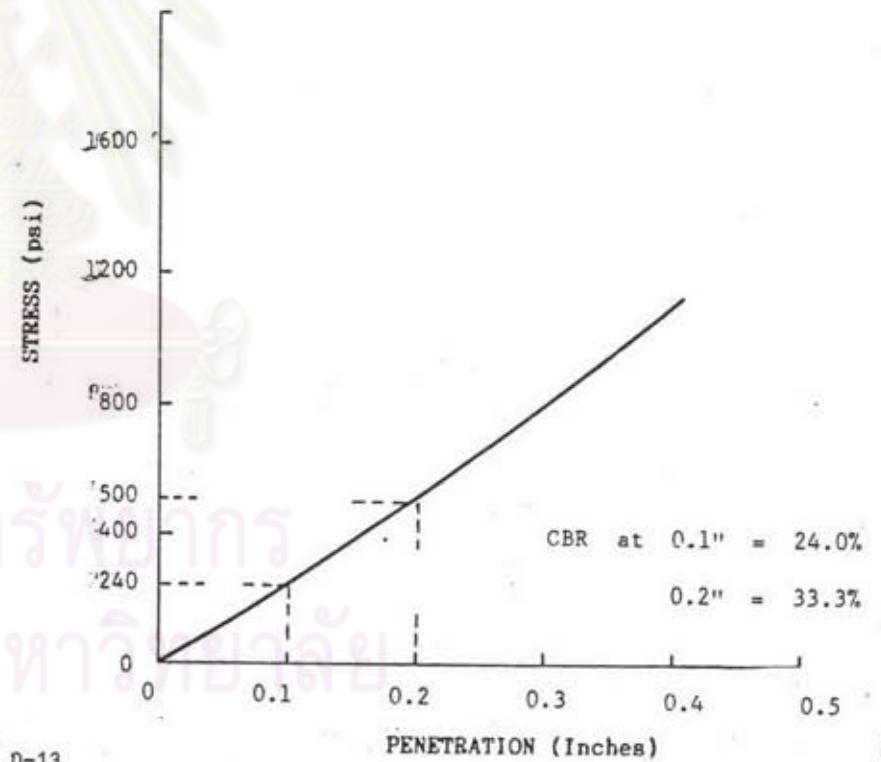
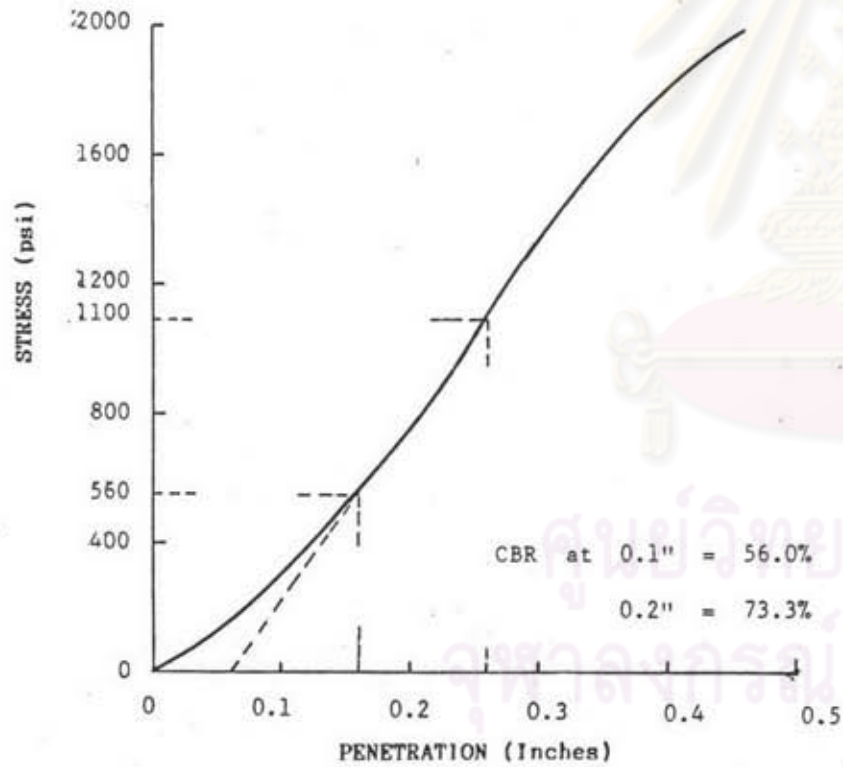
SAMPLE FROM : MAEHONGSON AIRPORT

LOCATION : STA. 1+690

DATE : APRIL 24, 1989

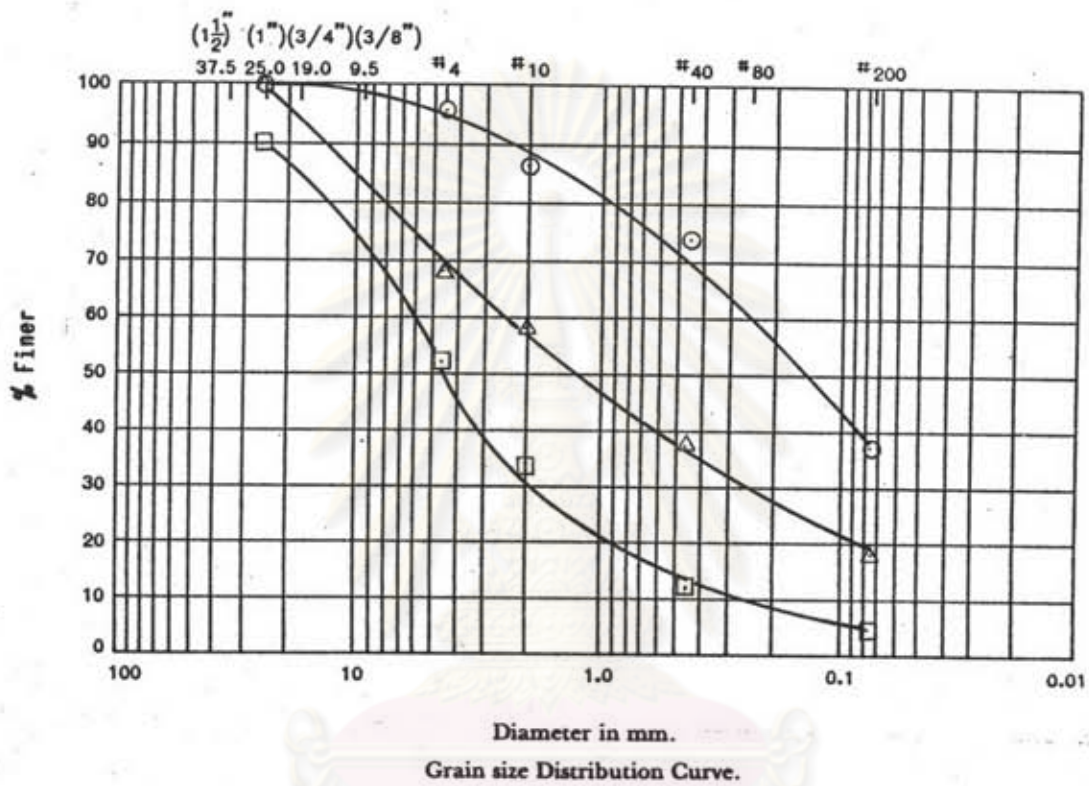
UNSOAKED CODITION

96 HRS. SOAKED CONDITION



รูปที่ ก-13

154



รูปที่ ก-14 กราฟแสดงการกระจายขนาดของเม็ดดิน

- ดินเค็ม
- △ รอนหินทาง
- หินทาง

มหาวิทยาลัยบูรพา  
จุฬาลงกรณ์มหาวิทยาลัย

ภาคผนวก ท

ข้อมูลการทดสอบสนามบิน จ. เชียงราย



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

PLATE LOAD TEST DATA SHEET

PROJECT : CHIANGRAI AIRPORT  
METHOD OF TEST : REPETTITIVE STATIC PLATE LOAD TEST (ASTM D 1195)  
LOCATION : STA. APRON  
LOAD TEST ON : SUBGRADE TESTED BY : BLW  
WEATHER : FINE DATE : FEBRUARY 2, 1989  
TIME : 17.00 - 22.30 JACK NO. : 31C-02SM  
TEST BEGUN : 17.50 hrs. GAUGE NO. : 12C-03C  
TEST FINISHED : 22.30 hrs. CYLINDER NO. : -  
SEATING LOAD : 3200 kg. SEATING DEFLECTION : 0.0165 in.  
RESEATING LOAD : 1600 kg.  
CORRECTED RESEATING LOAD : 1600 kg.  
DEAD LOAD - PLATE, JACK, etc. 440 kg.

Time (hrs.)	18.00	19.00	20.00	21.00	22.00	22.30
Temp (°C)	29	26	24	22	19	19

ตารางที่ ๕-1

CR-1

Gauge Reading (lb.)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No.1	No.2	Average	
1400	1st Appli.	17	57	0.0500	0.0330	0.0415	
			58	0.0510	0.0340	0.0425	*
			59	0.0510	0.0340	0.0425	
	1st Release	18	00	0.0520	0.0350	0.0435	
			01	0.0300	0.0180	0.0240	
			02	0.0290	0.0170	0.0230	++
			03	0.0288	0.0160	0.0224	
	2nd Appli.	18	04	0.0280	0.0160	0.0220	
			05	0.0540	0.0360	0.0450	
			06	0.0548	0.0360	0.0454	*
			07	0.0548	0.0360	0.0454	
			08	0.0548	0.0360	0.0454	
2nd Release	18	09	0.0320	0.0120	0.0220		
		10	0.0350	0.0020	0.0185		
		11	0.0350	0.0010	0.0180	++	
		12	0.0350	0.0000	0.0175		
		13	0.0350	0.0000	0.0175		
3rd Appli.	18	16	0.0510	0.0330	0.0423		
		17	0.0540	0.0350	0.0445		
		18	0.0550	0.0360	0.0455		
		19	0.0565	0.0370	0.0468		
		20	0.0570	0.0390	0.0480		
		21	0.0580	0.0390	0.0485	*	
		22	0.0580	0.0400	0.0490		
23	0.0580	0.0400	0.0490				
3rd Release	18	24	0.0260	0.0170	0.0265		

\* End Point deflection  
++ End Point rebound deflection

ตารางที่ ๒-1(ต่อ)

CR-2

Gauge Reading (lb.)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No.1	No.2	Average	
1400	3th Release	18	25	0.0340	0.0180	0.0250	**
			26	0.0320	0.0150	0.0240	
			27	0.0320	0.0150	0.0235	
			28	0.0320	0.0140	0.0230	
			29	0.0320	0.0140	0.0230	
	4th Appli.	18	29	0.0600	0.0410	0.0505	*
			30	0.0620	0.0430	0.0525	
			31	0.0630	0.0430	0.0530	
			32	0.0630	0.0425	0.0533	
			33	0.0630	0.0440	0.0535	
	4th Release	18	34	0.0400	0.0215	0.0308	**
			35	0.0320	0.0150	0.0270	
			36	0.0380	0.0150	0.0265	
			37	0.0380	0.0150	0.0265	
			38	0.0380	0.0150	0.0265	
	5th Appli.	18	39	0.0620	0.0430	0.0530	*
			40	0.0640	0.0430	0.0535	
			41	0.0640	0.0430	0.0535	
			42	0.0645	0.0430	0.0538	
	5th Release	18	43	0.0490	0.0060	0.0275	**
			44	0.0490	0.0050	0.0270	
			45	0.0490	0.0050	0.0270	
			46	0.0490	0.0050	0.0270	
	6th Appli.	18	47	0.0640	0.0430	0.0535	*
			48	0.0640	0.0450	0.0545	
			49	0.0660	0.0450	0.0553	
			50	0.0660	0.0450	0.0553	

\* End Point deflection  
\*\* End Point rebound deflection

ตารางที่ ๒-1(ต่อ)

Gauge Reading (lb.)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks	
		hr.	min.	No.1	No.2	Average		
1400	6th Release	18	53	0.0620	0.0100	0.0360	**	
			54	0.0590	0.0060	0.0325		
			55	0.0580	0.0050	0.0315		
			56	0.0570	0.0050	0.0315		
			57	0.0570	0.0050	0.0315		
5000	1st Appli.	18	58	0.2000	0.2100	0.2050	**	
			59	0.2110	0.2240	0.2175		
			19	00	0.2180	0.2290		0.2235
			01	0.2190	0.2340	0.2265		
			02	0.2230	0.2370	0.2300		
			03	0.2250	0.2430	0.2340		
			04	0.2270	0.2440	0.2355		
		05	0.2290	0.2465	0.2378			
		06	0.2300	0.2490	0.2395			
		07	0.2320	0.2515	0.2418			
		08	0.2340	0.2540	0.2440			
		09	0.2350	0.2550	0.2450			
		10	0.2360	0.2560	0.2460			
		11	0.2370	0.2590	0.2480			
12	0.2390	0.2620	0.2505					
19	1st Release	13	0.2400	0.2630	0.2515			
		14	0.2410	0.2640	0.2525			
		15	0.2420	0.2650	0.2535			
		16	0.1910	0.1840	0.1875			
		17	0.1880	0.1800	0.1840			
		18	0.1860	0.1770	0.1820			
		19	0.1850	0.1760	0.1805			
20	0.1850	0.1750	0.1800					

\* End Point deflection  
\*\* End Point rebound deflection



Gauge Reading (lb.)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No.1	No.2	Average	
5000	1st Release	19	21	0.1850	0.1750	0.1800	
	End Appli.	19	22	0.2550	0.2840	0.2695	
			23	0.2590	0.2880	0.2735	
			24	0.2610	0.2920	0.2765	
			25	0.2620	0.2930	0.2775	
			26	0.2640	0.2950	0.2795	
			27	0.2650	0.2960	0.2805	*
			28	0.2650	0.2970	0.2810	
			29	0.2650	0.2980	0.2815	
	End Release	19	30	0.2310	0.2150	0.2230	
			31	0.2280	0.2090	0.2185	
			32	0.2270	0.2080	0.2175	++
			33	0.2270	0.2070	0.2170	
			34	0.2265	0.2060	0.2163	
	3rd Appli.	19	35	0.2630	0.2950	0.2790	
			36	0.2740	0.3140	0.2940	
			37	0.2790	0.3180	0.2985	
			38	0.2800	0.3220	0.3010	
			39	0.2820	0.3260	0.3040	
			40	0.2840	0.3260	0.3050	*
			41	0.2850	0.3270	0.3060	
			42	0.2860	0.3280	0.3070	
	3rd Release	19	43	0.2450	0.2400	0.2425	
			44	0.2430	0.2350	0.2390	
			45	0.2420	0.2350	0.2385	
			46	0.2400	0.2330	0.2365	
			47	0.2400	0.2320	0.2360	++

\* End Point deflection  
 ++ End Point rebound deflection

Gauge Reading (lb.)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No.1	No.2	Average	
5000	3rd Release	19	48	0.2400	0.2320	0.2360	
	4th Appli.	19	49	0.2780	0.3100	0.2940	
			50	0.2890	0.3340	0.3115	
			51	0.2920	0.3360	0.3140	
			52	0.2940	0.3400	0.3170	
			53	0.2950	0.3410	0.3180	*
			54	0.2960	0.3410	0.3185	
	4th Release	19	55	0.2550	0.2520	0.2535	
			56	0.2520	0.2500	0.2510	
			57	0.2510	0.2470	0.2490	
			58	0.2515	0.2470	0.2493	++
			59	0.2500	0.2460	0.2480	
		20	00	0.2500	0.2460	0.2490	
	5th Appli.	20	01	0.2930	0.3490	0.3210	
			02	0.3010	0.3540	0.3275	
			03	0.3020	0.3570	0.3300	
			04	0.3040	0.3580	0.3310	
			05	0.3050	0.3590	0.3320	
			06	0.3070	0.3620	0.3345	
			07	0.3085	0.3635	0.3360	
			08	0.3100	0.3650	0.3375	
			09	0.3100	0.3650	0.3375	*
			10	0.3110	0.3660	0.3385	
	5th Release	20	11	0.2710	0.3000	0.2855	
			12	0.2640	0.2700	0.2670	
			13	0.2640	0.2660	0.2650	
			14	0.2630	0.2650	0.2640	++

\* End Point deflection  
 ++ End Point rebound deflection

ตารางที่ ๕-1(ต่อ)

CR-6

Gauge Reading (lb.)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
5000	5th Release	20	15	0.2625	0.2650	0.2638	
			16	0.2625	0.2650	0.2638	
	6th Appli.	20	17	0.3120	0.3700	0.3410	
			18	0.3210	0.3800	0.3505	
			19	0.3240	0.3840	0.3540	
			20	0.3250	0.3850	0.3550	
			21	0.3260	0.3880	0.3570	
			22	0.3280	0.3900	0.3590	
			23	0.3290	0.3900	0.3595	*
			24	0.3290	0.3910	0.3600	
	6th Release	20	25	0.2900	0.3200	0.3050	
			26	0.2750	0.2880	0.2815	
			27	0.2740	0.2850	0.2795	
			28	0.2740	0.2840	0.2790	++
29			0.2740	0.2830	0.2785		
6000	1st Appli.	20	30	0.3680	0.4270	0.3975	
			31	0.3770	0.4340	0.4055	
			32	0.3810	0.4370	0.4090	
			33	0.3840	0.4400	0.4120	
			34	0.3880	0.4430	0.4155	
			35	0.3900	0.4450	0.4175	
			36	0.3920	0.4470	0.4195	
			37	0.3950	0.4500	0.4225	
			38	0.3960	0.4510	0.4235	
			39	0.3980	0.4530	0.4255	
			40	0.4000	0.4550	0.4275	
			41	0.4010	0.4550	0.4280	*
			42	0.4020	0.4560	0.4290	
			43	0.4035	0.4570	0.4303	

\* End Point deflection  
 ++ End Point rebound deflection

ตารางที่ ๕-1(ต่อ)

CR-7

Gauge Reading (lb.)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
6000	1st Release	20	44	0.3590	0.3800	0.3695	
			45	0.3550	0.3700	0.3625	
			46	0.3550	0.3660	0.3605	
			47	0.3550	0.3660	0.3605	++
			48	0.3540	0.3660	0.3600	
	2nd Appli.	20	49	0.3550	0.3650	0.3590	
			50	0.4080	0.4680	0.4380	
			51	0.4200	0.4770	0.4485	
			52	0.4250	0.4800	0.4525	
			53	0.4290	0.4840	0.4565	
			54	0.4300	0.4850	0.4575	
			55	0.4300	0.4890	0.4596	
			56	0.4340	0.4900	0.4620	
			57	0.4360	0.4920	0.4640	
			58	0.4370	0.4930	0.4650	*
	2nd Release	21	00	0.4380	0.4940	0.4660	
			01	0.4390	0.4950	0.4670	
			02	0.3890	0.4120	0.4005	
			03	0.3850	0.4030	0.3940	
04			0.3830	0.3990	0.3910		
3rd Appli.	21	05	0.3820	0.3980	0.3900	++	
		06	0.3820	0.3970	0.3895		
		07	0.4430	0.5060	0.4745		
		08	0.4530	0.5130	0.4830		
		09	0.4550	0.5150	0.4850		
		10	0.4550	0.5150	0.4850		

\* End Point deflection  
 ++ End Point rebound deflection

Gauge Reading (lb.)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
6000	3rd Appli.	21	11	0.4580	0.5200	0.4890	
			12	0.4600	0.5210	0.4905	
			13	0.4610	0.5250	0.4930	
			14	0.4620	0.5250	0.4935	*
			15	0.4630	0.5250	0.4940	
			16	0.4640	0.5260	0.4950	
	3rd Release	21	17	0.4120	0.4500	0.4310	
			18	0.4080	0.4290	0.4185	
			19	0.4060	0.4250	0.4155	
			20	0.4050	0.4250	0.4150	++
			21	0.4050	0.4250	0.4150	
			22	0.4050	0.4250	0.4150	
4th Appli.	21	23	0.4690	0.5380	0.5035		
		24	0.4690	0.5380	0.5035		
		25	0.4740	0.5430	0.4085		
		26	0.4750	0.5440	0.4095		
		27	0.4780	0.5440	0.5110		
		28	0.4780	0.5450	0.5115	*	
		29	0.4790	0.5460	0.5125		
		30	0.4800	0.5470	0.5135		
4th Release	21	31	0.4220	0.4680	0.4450		
		32	0.4220	0.4660	0.4440		
		33	0.4200	0.4640	0.4420		
		34	0.4200	0.4630	0.4415	++	
		35	0.4200	0.4620	0.4410		
		36	0.4200	0.4610	0.4405		

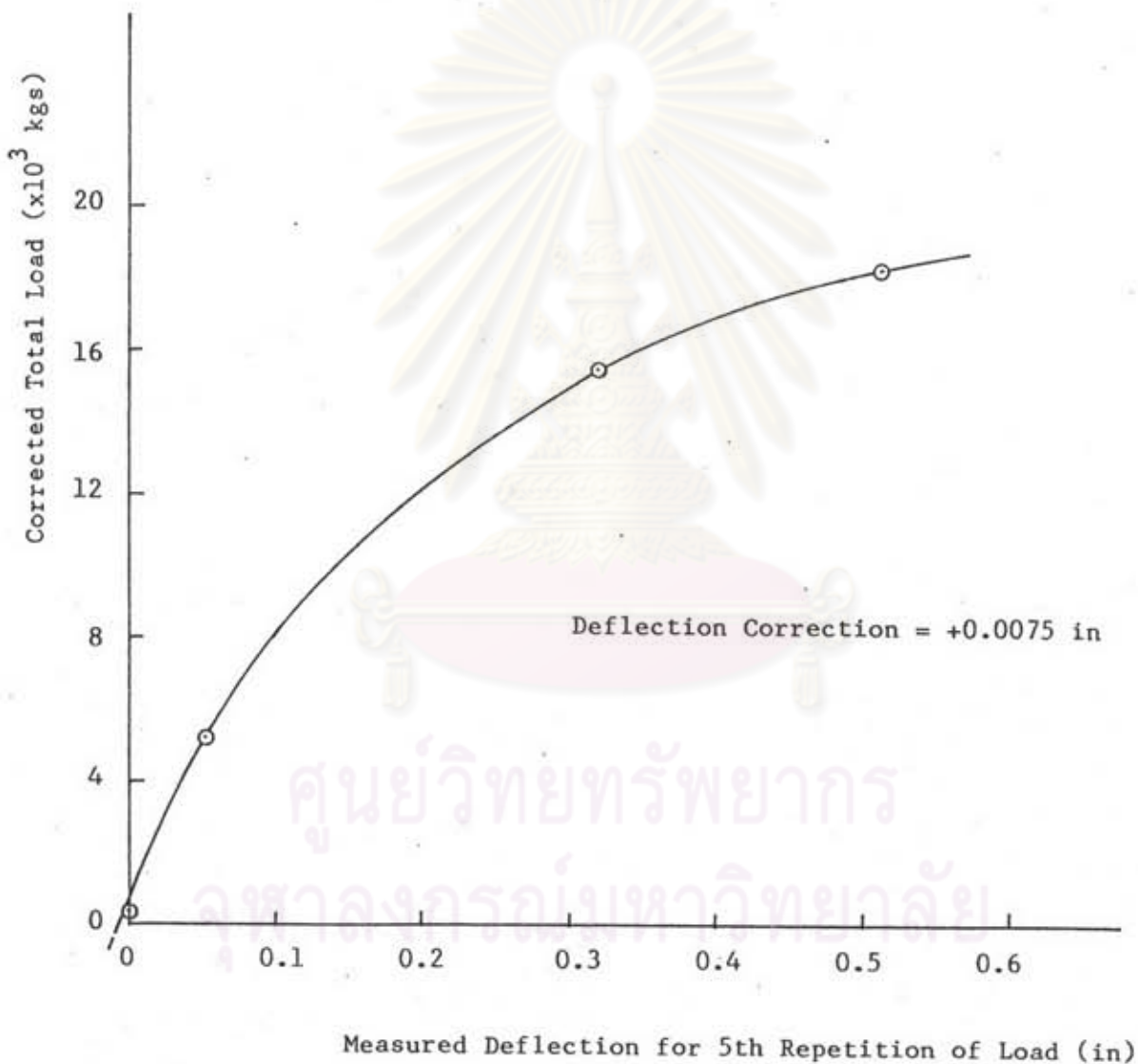
\* End Point deflection  
 \*\* End Point rebound deflection

ตารางที่ ข-2 สรุปผลการวัดค่าการทรุดตัวของสนามบิน จังหวัดเชียงราย.

Applied Load				Measured Deflection Values in inches For Load Application No.					
Jack	Reading	Dead Load (kg.)	Correct- ed.Total Load (kg.)	1	2	3	4	5	6
Gauge (lb)	Corrected (kg.)								
1400	4800	440	5240	0.0425	0.0454	0.0485	0.0525	0.0535	0.0545
5000	15000	440	15440	0.2515	0.2805	0.3050	0.3180	0.3375	0.3595
6000	17800	440	18240	0.4280	0.4650	0.4935	0.5115	-	-

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

### CHIANGRAI AIRPORT



รูปที่ ข-1 การปรับแก้ค่าการทรุดตัวที่วัดได้จากการทดสอบ

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : CHIANGRAI AIRPORT Date : FEBRUARY 1, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : STA. 1+240 Tested by :

WATER CONTENT DETERMINATION

Container No.	229
Wt. Container + Wet Soil (gm)	246.6
Wt. Container + Dry Soil (gm)	213.5
Wt. Water (gm)	33.1
Wt. Container (gm)	34.6
Wt. Dry Soil (gm)	178.9
Water Content (%)	18.5%

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	87	29.8	
0.050	117	39.8	
0.075	167	52.3	
0.100	167	52.3	
0.150	237	78.9	
0.200	267	95.6	
0.250	332	118.6	
0.300	337	122.3	
0.350	367	128.9	
0.400	417	138.9	
0.450	442	147.3	
0.500	462	153.9	

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : CHIANGRAI AIRPORT Date : FEBRUARY 2, 1989  
Description of sample : SUBGRADE Tested condition : SOAKED  
Location : STA. 1+240 Tested by :

WATER CONTENT DETERMINATION

Container No.	C29
Wt. Container + Wet Soil (gm)	427.2
Wt. Container + Dry Soil (gm)	348.6
Wt. Water (gm)	78.7
Wt. Container (gm)	35.2
Wt. Dry Soil (gm)	313.3
Water Content (%)	25.12

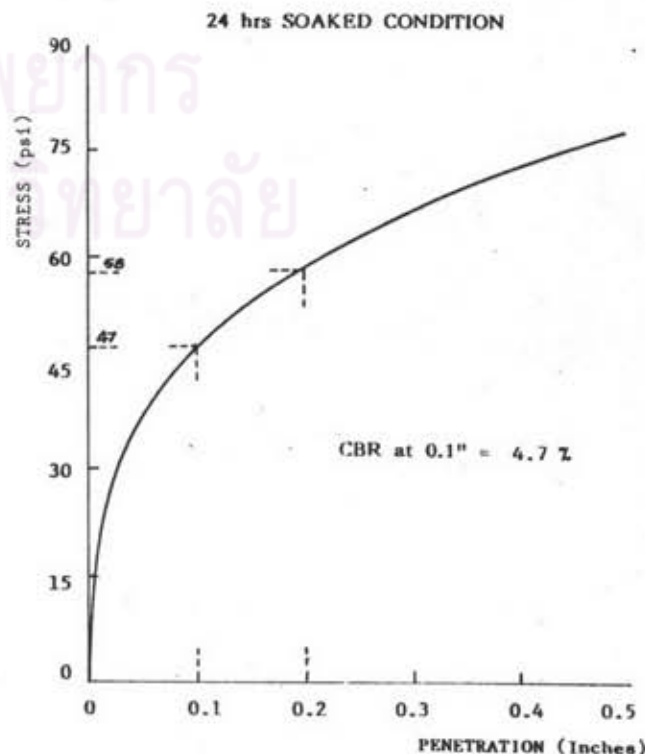
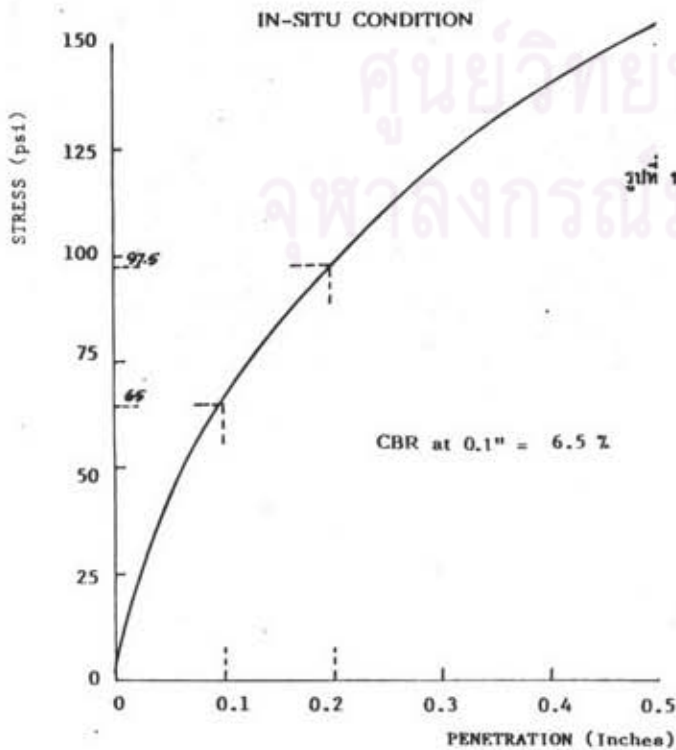
FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	109	36.2	
0.050	119	39.7	
0.075	132	44.0	
0.100	141	47.0	
0.150	159	53.0	
0.200	167	56.3	
0.250	184	61.3	
0.300	197	65.7	
0.350	209	69.7	
0.400	216	72.8	
0.450	229	76.3	
0.500	236	78.7	

STRESS - PENETRATION CURVE

Description of sample : SUBGRADE  
Location : Sta. 1+240

Sample from : CHIANGRAI AIRPORT  
Date : February 1989



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : CHIANGRAI AIRPORT Date : FEBRUARY 1, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : STA.2+000 Tested by :

WATER CONTENT DETERMINATION

Container No.	151C
Wt. Container + Wet Soil (gm)	307.9
Wt. Container + Dry Soil (gm)	270.7
Wt. Water (gm)	37.2
Wt. Container (gm)	82.9
Wt. Dry Soil (gm)	188.8
Water Content (%)	19.1

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	174	58.8	
0.050	231	77.0	
0.075	267	89.0	
0.100	314	104.7	
0.150	381	127.0	
0.200	431	142.7	
0.250	484	161.3	
0.300	521	173.7	
0.350	557	185.7	
0.400	601	200.3	
0.450	634	211.3	
0.500	667	222.3	

FIELD CALIFORNIA BEARING RATIO TEST

165

Sample from : CHIANGRAI AIRPORT Date : FEBRUARY 3, 1989  
Description of sample : SUBGRADE Tested condition : SOAKED  
Location : STA.2+000 Tested by :

WATER CONTENT DETERMINATION

Container No.	211
Wt. Container + Wet Soil (gm)	270.6
Wt. Container + Dry Soil (gm)	228.6
Wt. Water (gm)	50.1
Wt. Container (gm)	35.6
Wt. Dry Soil (gm)	184.9
Water Content (%)	27.10

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	71	23.7	
0.050	79	26.3	
0.075	81	27.0	
0.100	84	28.0	
0.150	88	28.7	
0.200	91	30.3	
0.250	96	32.0	
0.300	97	32.3	
0.350	102	34.0	
0.400	106	35.3	
0.450	107	35.7	
0.500	112	37.3	

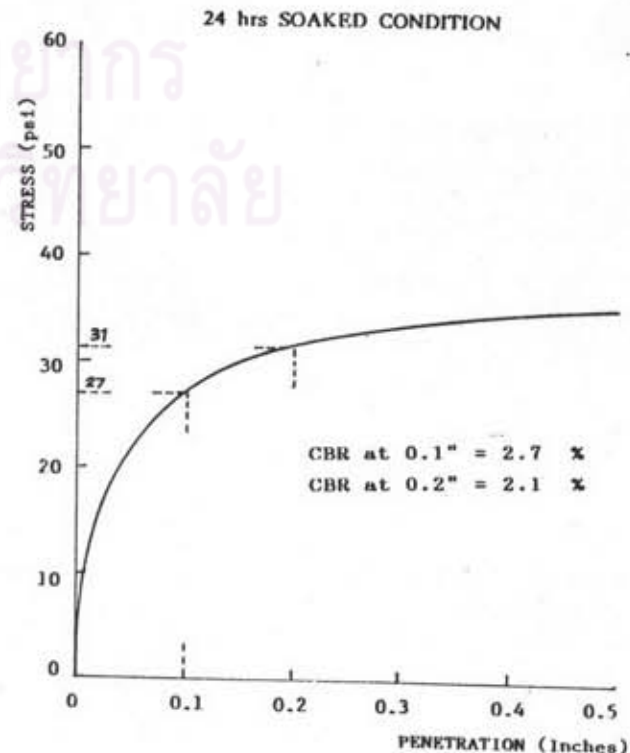
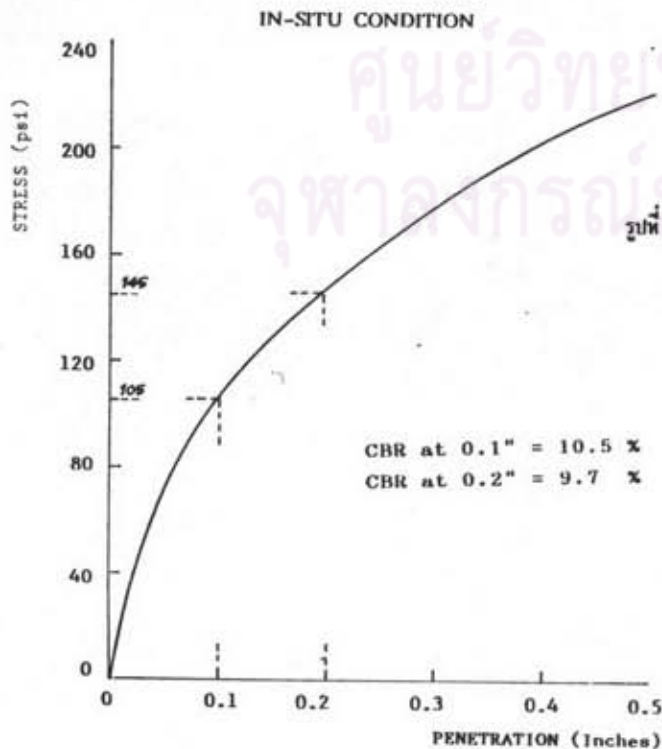
STRESS - PENETRATION CURVE

Description of sample : SUBGRADE

Sample from : CHIANGRAI AIRPORT

Location : Sta. 2+000

Date : February 1989



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : CHIANGRAI AIRPORT Date : FEBRUARY 2, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : APRON Tested by :

WATER CONTENT DETERMINATION

Container No.	TH12
Wt. Container + Wet Soil (gm)	365.7
Wt. Container + Dry Soil (gm)	326.7
Wt. Water (gm)	39.0
Wt. Container (gm)	34.28
Wt. Dry Soil (gm)	292.5
Water Content (%)	20.17

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	161	63.7	
0.050	181	68.3	
0.075	200	72.7	
0.100	218	79.3	
0.150	238	86.8	
0.200	258	93.7	
0.250	261	103.7	
0.300	311	112.8	
0.350	336	119.3	
0.400	358	126.8	
0.450	378		
0.500			

FIELD CALIFORNIA BEARING RATIO TEST

166

Sample from : CHIANGRAI AIRPORT Date : FEBRUARY 3, 1989  
Description of sample : SUBGRADE Tested condition : SOAKED  
Location : APRON Tested by :

WATER CONTENT DETERMINATION

Container No.	242
Wt. Container + Wet Soil (gm)	498.5
Wt. Container + Dry Soil (gm)	395.6
Wt. Water (gm)	94.9
Wt. Container (gm)	49.5
Wt. Dry Soil (gm)	346.1
Water Content (%)	27.42

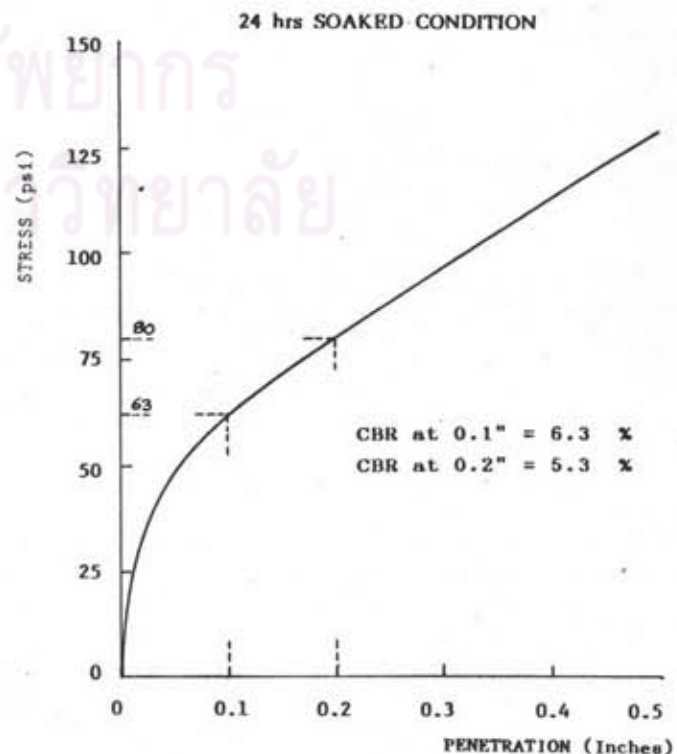
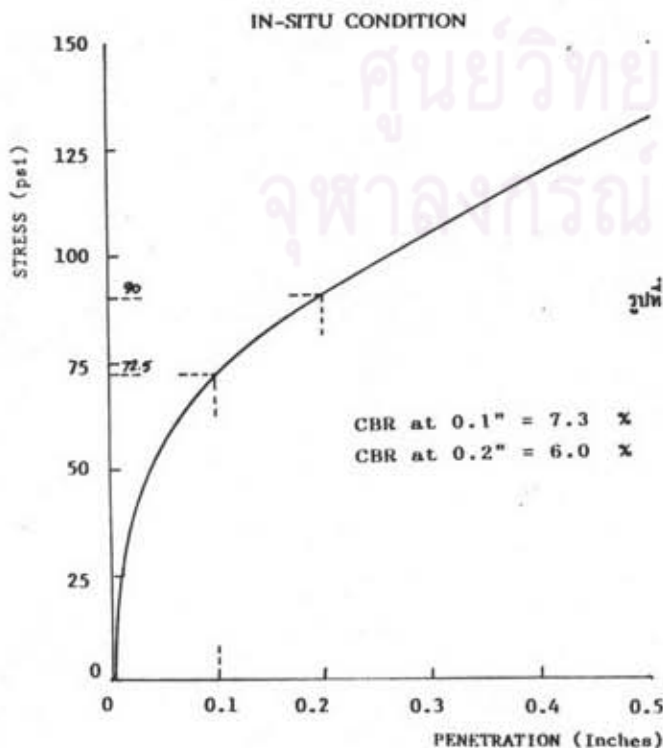
FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	193	46.3	
0.050	164	51.3	
0.075	171	57.8	
0.100	181	60.3	
0.150	208	69.3	
0.200	238	79.3	
0.250	278	92.7	
0.300	294	98.8	
0.350	316	105.3	
0.400	334	111.3	
0.450	361	120.3	
0.500	391	130.3	

STRESS - PENETRATION CURVE

Description of sample : SUBGRADE  
Location : Sta. APRON

Sample from : CHIANGRAI AIRPORT  
Date : February 1989





FIELD CALIFORNIA BEARING RATIO TEST

Sample from : CHIANGRAI AIRPORT Date : FEBRUARY 3, 1989  
Description of sample : SUBBASE Tested condition : IN-SITU  
Location : APRON Tested by :

WATER CONTENT DETERMINATION

Container No.		CX7
Wt. Container + Wet Soil (gm)		340.3
Wt. Container + Dry Soil (gm)		319.5
Wt. Water (gm)		20.8
Wt. Container (gm)		84.2
Wt. Dry Soil (gm)		256.0
Water Content (%)		8.13

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	250	83.3	
0.050	355	118.3	
0.075	435	145.0	
0.100	470	156.7	
0.150	550	183.3	
0.200	645	215.0	
0.250	710	236.7	
0.300	760	253.3	
0.350	792	264.3	
0.400	835	278.3	
0.450	865	288.3	
0.500	900	300.0	

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : CHIANGRAI AIRPORT Date : FEBRUARY 4, 1989  
Description of sample : SUBBASE Tested condition : SOAKED  
Location : APRON Tested by :

WATER CONTENT DETERMINATION

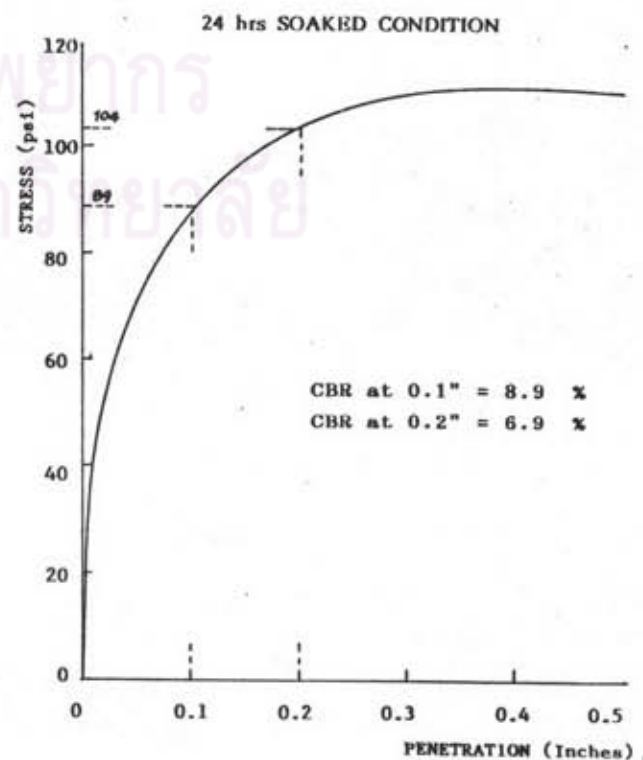
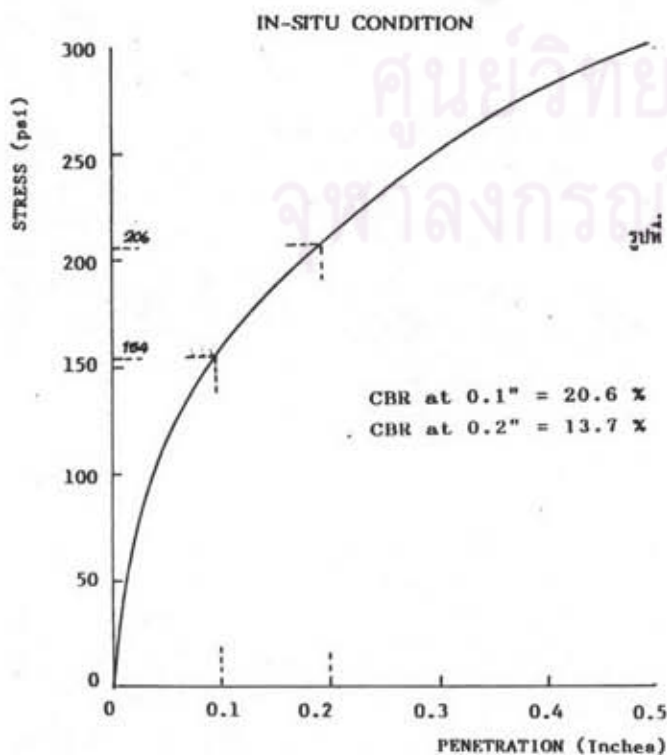
Container No.		L12
Wt. Container + Wet Soil (gm)		341.6
Wt. Container + Dry Soil (gm)		301.8
Wt. Water (gm)		39.8
Wt. Container (gm)		35.0
Wt. Dry Soil (gm)		266.2
Water Content (%)		14.95

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	166	55.3	
0.050	218	72.7	
0.075	261	87.7	
0.100	270	90.0	
0.150	296	98.7	
0.200	310	103.3	
0.250	320	106.7	
0.300	333	111.0	
0.350	335	111.7	
0.400	336	112.0	
0.450	338	112.7	
0.500	333	111.0	

STRESS - PENETRATION CURVE

Description of sample : Subbase Sample from : CHIANGRAI AIRPORT  
Location : Sta. APRON Sta. Date : February 1989



COMPACTION TEST

COMPACTION CURVE

DESCRIPTION OF SAMPLE : SUBGRADE DATE : MARCH 27, 1989

SAMPLE FROM : CHIANGRAI AIRPORT LOCATION : APRON

SAMPLE FROM : CHIANGRAI AIRPORT

COURSE : SUBGRADE

DATE : MARCH 27, 1989

LOCATION : APRON

TEST BY : PPP

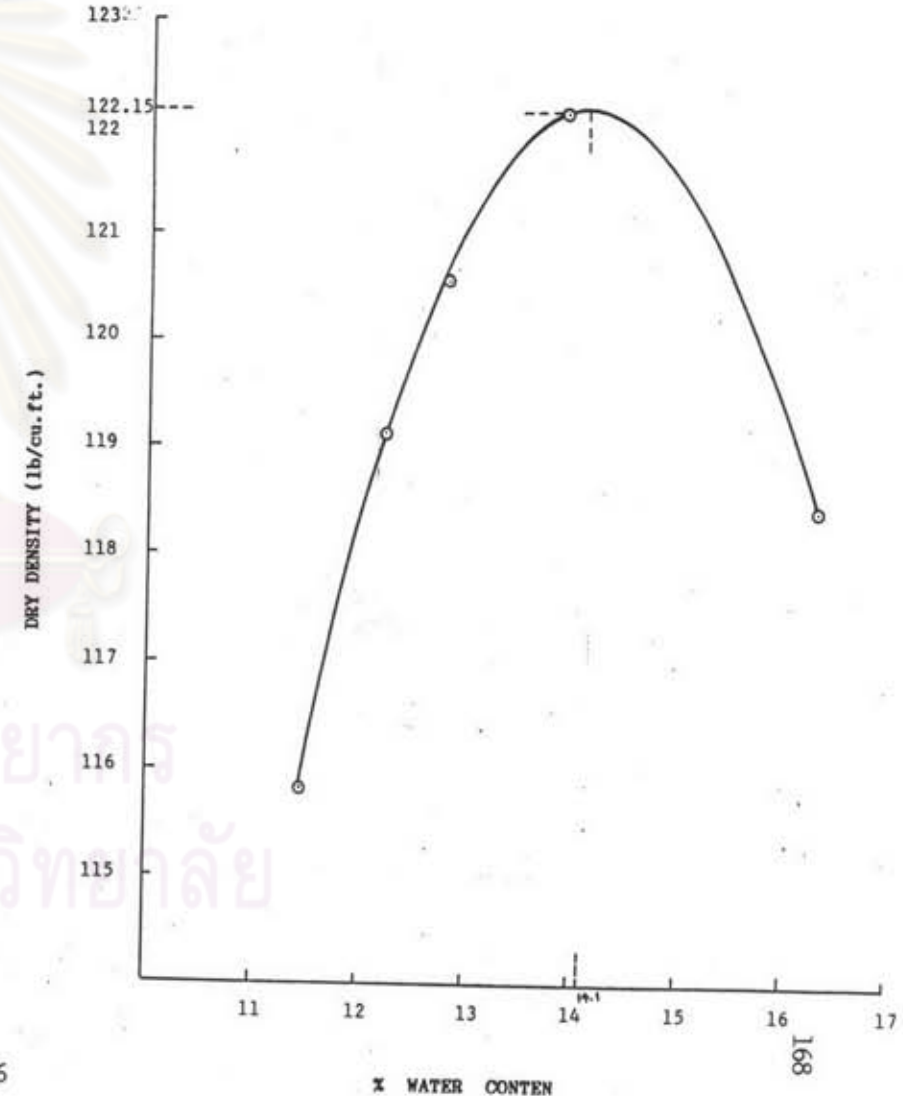
TYPE OF TEST : MODIFIED PROCTOR

55 BLOWS ON EACH OF 5 LAYERS

10 lb. HAMMER 18 in. DROP MOLD NO. 13 VOLUME OF MOLD 0.0736 cu.ft.

Determination No.	1	2	3	4	5
Wt. mold+soil lb.	18.71	19.05	19.22	19.45	19.35
Wt. mold lb.	9.21	9.21	9.21	9.21	9.21
Wt. soil lb.	9.50	9.84	10.01	10.24	10.14
Av. water content, %	11.46	12.23	12.82	13.90	16.34
Moist density def.	129.08	133.70	136.01	139.13	137.77
Dry density def.	115.81	119.13	120.55	122.15	118.42

Water content from	T	B	T	B	T	B	T	B	T	B
Container No.	C30	TH12	L12	Z11	Z29	C46	Z42	C29	B14	Z34
Wt. cont. + wet soil gm.	191.5	211.1	161.0	193.9	194.5	160.5	201.0	208.5	208.7	177.0
Wt. cont. + dry soil gm.	174.7	193.6	147.0	173.7	176.5	146.0	182.4	187.5	184.5	156.5
Wt. water gm.	16.8	17.5	14.0	16.4	18.0	14.5	18.6	21.0	24.2	20.5
Wt. container gm.	33.0	34.2	35.6	35.6	34.6	34.0	49.5	35.2	34.0	33.0
Wt. dry soil gm.	140.8	159.4	111.4	138.1	141.9	112.0	132.9	152.3	150.5	123.5
Water content %	11.93	10.99	12.57	11.88	12.68	12.95	14.00	13.79	16.08	16.60
Av. water content %	11.46		12.23		12.82		13.90		16.34	



FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

COMPACTION TEST

SAMPLE FROM : CHIANGRAI AIRPORT

COURSE : SUBBASE

LOCATION : APRON

TYPE OF TEST : MODIFIED PROCTOR

10 lb. HAMMER 18 in. DROP MOLD NO. 13 VOLUME OF MOLD 0.0736 cu.ft.

DATE : APRIL 21, 1989

TEST BY : PPP

55 BLOWS ON EACH OF 5 LAYERS

Determination No.	1	2	3	4	5
Wt. mold+soil lb.	18.51	19.93	19.79	19.97	19.616
Wt. mold lb.	9.12	9.12	9.12	9.12	9.12
Wt. soil lb.	9.39	10.20	10.67	10.85	10.49
Av. water content, %	2.77	4.48	5.77	6.80	9.20
Moist density pcf.	127.58	138.59	144.97	147.42	142.53
Dry density pcf.	124.14	132.64	137.08	138.03	130.52

Water content from	T	B	T	B	T	B	T	B	T	B
Container No.	Z29	L12	X9	C36	C30	Z42	Z11	CX7	C48	TH12
Wt. cont. + wet soil gm.	126.3	144.3	134.0	136.3	144.4	155.1	136.0	197.6	133.7	148.9
Wt. cont. + dry soil gm.	123.8	141.4	129.7	133.9	139.5	149.2	129.5	190.5	125.4	137.4
Wt. water gm.	2.5	2.9	4.3	4.4	5.9	5.9	6.5	7.1	8.3	9.5
Wt. container gm.	34.6	35.7	35.5	33.7	34.0	49.0	35.5	84.3	35.0	34.2
Wt. dry soil gm.	89.2	105.7	94.2	100.2	104.5	100.2	94.0	106.2	90.4	103.2
Water content %	2.80	2.74	4.56	4.39	5.65	5.89	6.91	6.69	9.18	9.21
Av. water content %	2.77		4.48		5.77		6.80		9.20	

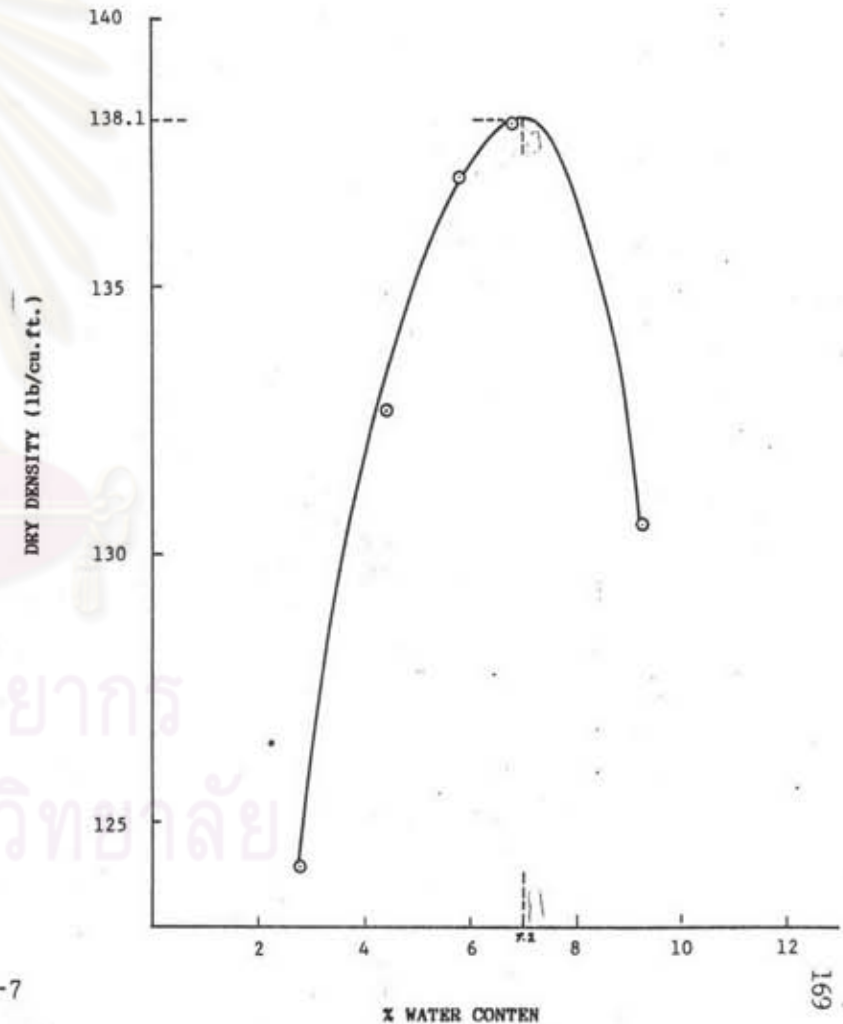
COMPACTION CURVE

DESCRIPTION OF SAMPLE : SUBBASE

DATE : APRIL 21, 1989

SAMPLE FROM : CHIANGRAI AIRPORT

LOCATION : APRON



FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

COMPACTION TEST

SAMPLE FROM : CHIANGRAI AIRPORT

COURSE : BASE

LOCATION : APRON

TYPE OF TEST : MODIFIED PROCTOR

10 lb. HAMMER 18 in. DROP

DATE : APRIL 21, 1989

TEST BY : PPP

55 BLOWS ON EACH OF 5 LAYERS

MOLD NO. 13 VOLUME OF MOLD 0.0736 cu.ft.

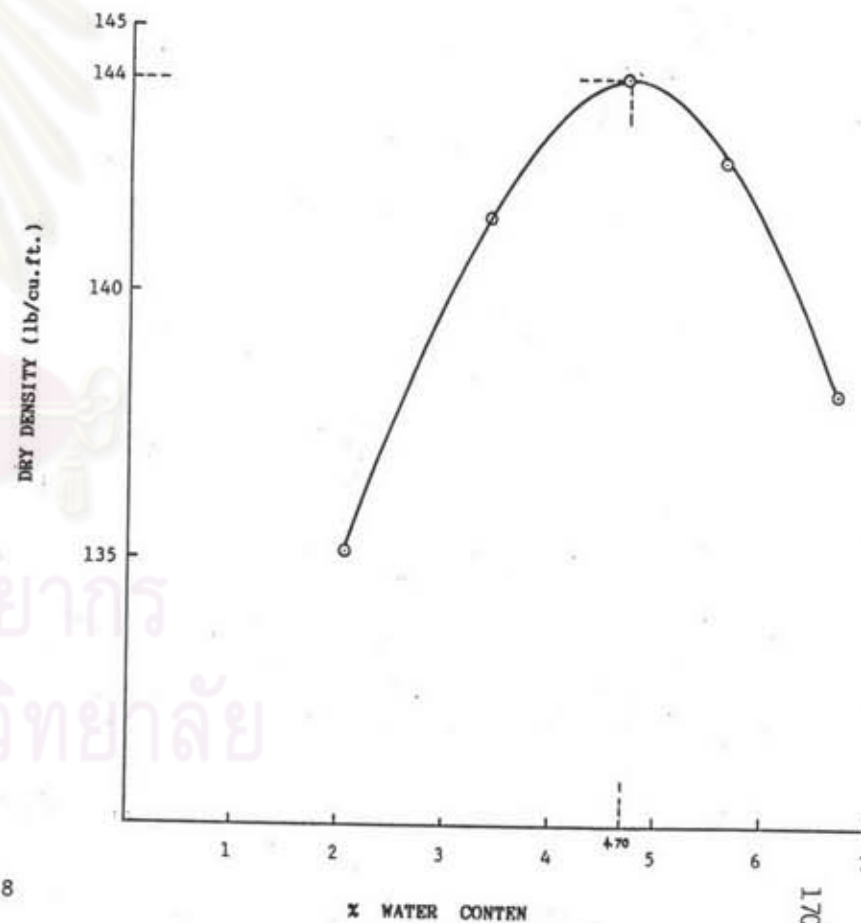
COMPACTION CURVE

DESCRIPTION OF SAMPLE : BASE DATE : APRIL 21, 1989

SAMPLE FROM : CHIANGRAI AIRPORT LOCATION : APRON

Determination No.	1	2	3	4	5
Wt. mold (soil) lb.	19.27	19.88	20.22	20.19	19.97
Wt. mold lb.	9.12	9.12	9.12	9.12	9.12
Wt. soil lb.	10.15	10.76	11.10	11.07	10.85
Av. water content, %	2.08	3.40	4.72	5.61	6.70
Moist density pcf.	137.91	146.19	150.81	150.42	147.36
Dry density pcf.	135.13	141.38	144.01	142.43	138.11

Water content from	T	B	T	B	T	B	T	B	T	B
Container No.	C43	T2	K1	E3	E10	L7	21	36	H2	H43
Wt. cont. + wet soil gm.	89.2	81.8	83.4	71.7	129.9	105.3	100.0	131.1	167.2	208.7
Wt. cont. + dry soil gm.	87.5	80.4	81.0	69.6	125.2	101.3	95.1	125.3	177.7	198.0
Wt. water gm.	1.7	1.4	2.4	2.1	4.7	4.0	4.9	5.8	9.5	10.7
Wt. container gm.	8.9	8.9	8.9	8.9	21.5	19.7	8.8	20.5	38.8	34.9
Wt. dry soil gm.	78.6	71.5	72.1	60.7	103.7	81.6	86.3	104.8	138.9	163.1
Water content %	2.16	1.96	3.33	3.46	4.53	4.90	5.68	5.53	6.83	6.56
Av. water content %	2.08		3.40		4.72		5.61		6.70	



รูปที่ ข-8

STRESS - PENETRATION CURVE

DESCRIPTION OF SAMPLE : SUBGRADE

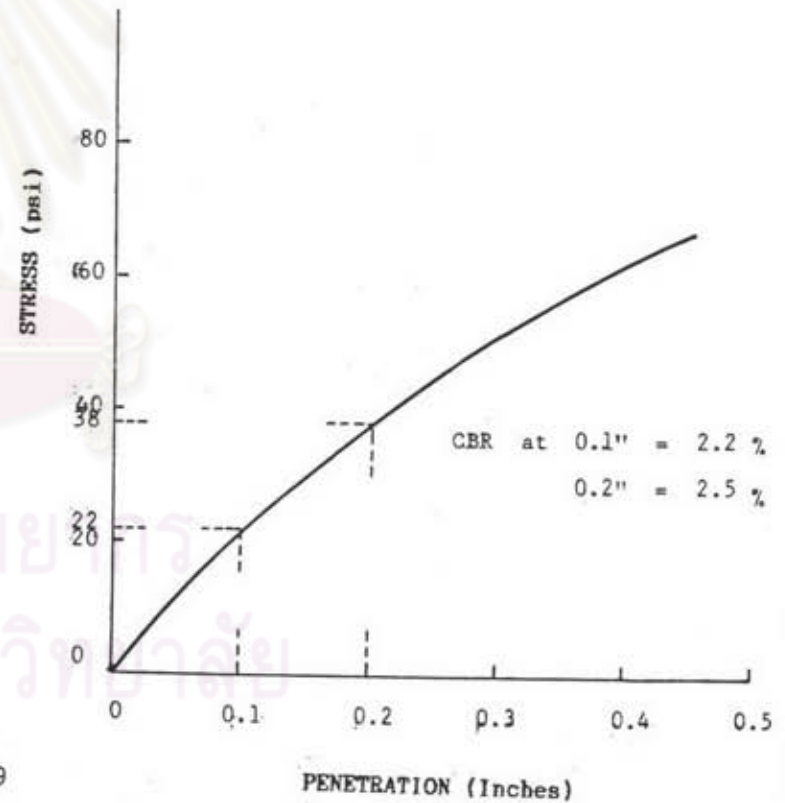
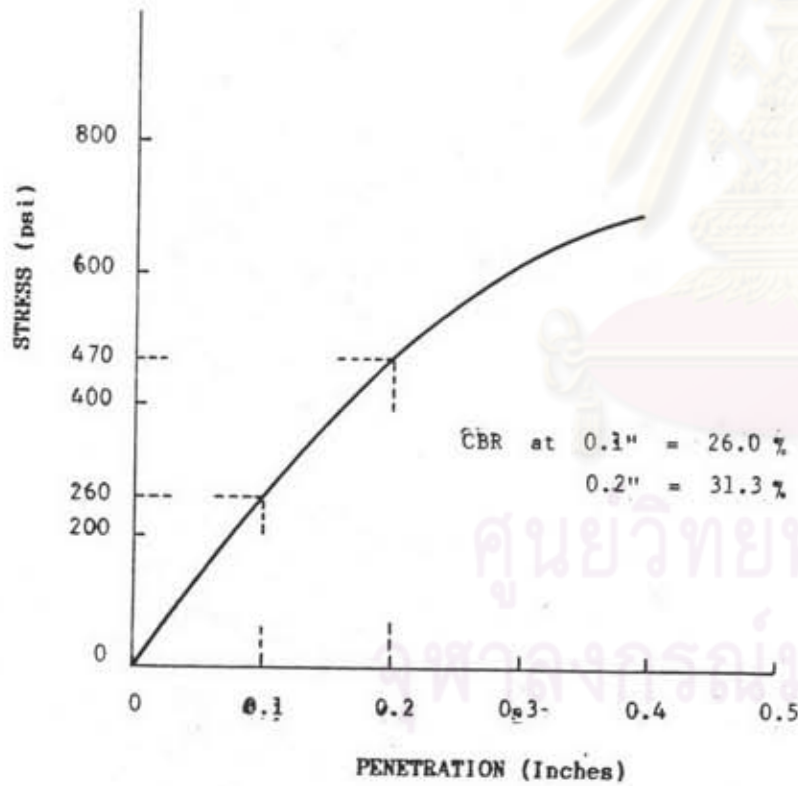
SAMPLE FROM : CHIANGRAI AIRPORT

LOCATION : APRON

DATE : MARCH 29, 1989

UNSOAKED CONDITION

96 HRS. SOAKED CONDITION



รูปที่ ๗-๑

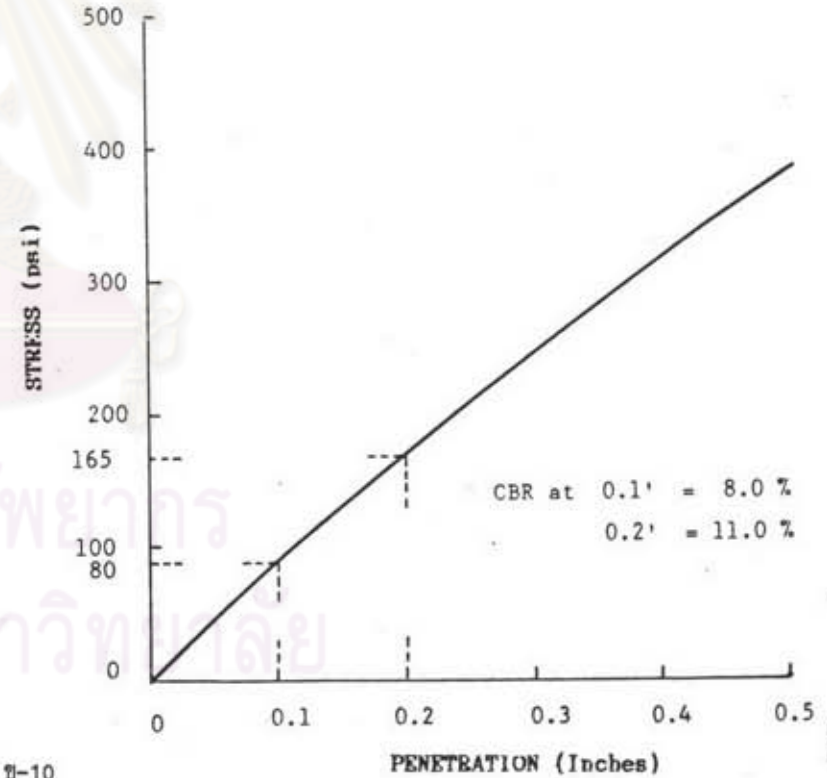
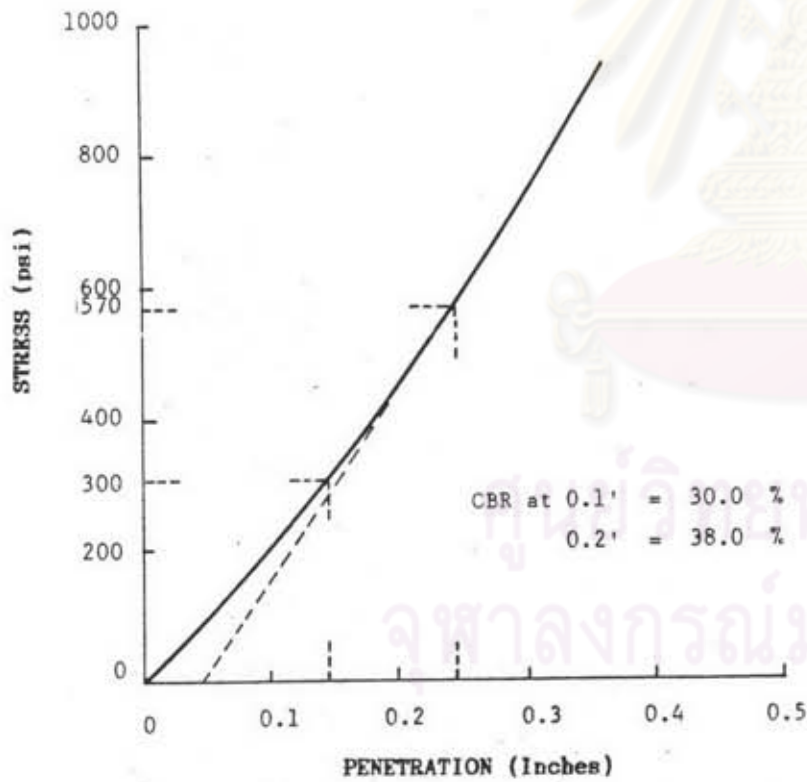
### STRESS - PENETRATION CURVE

DESCRIPTION OF SAMPLE : SUBBASE  
 LOCATION = APRON

SAMPLE FROM : CHIANGRAI  
 DATE : APRIL 28, 1989

UNSOAKED CONDITION

96 HRS. SOAKED CONDITION

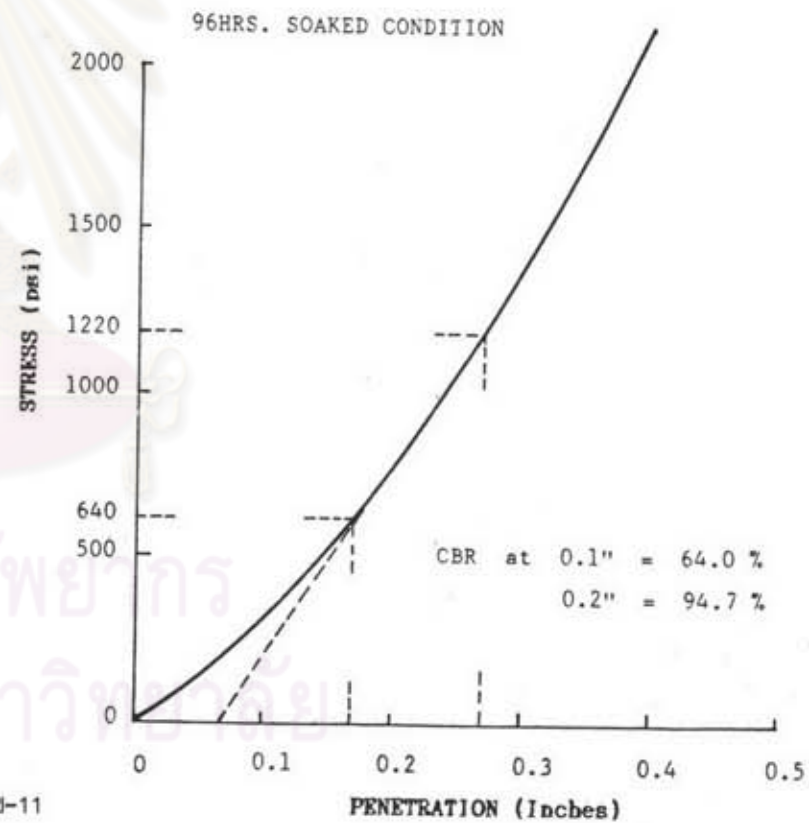
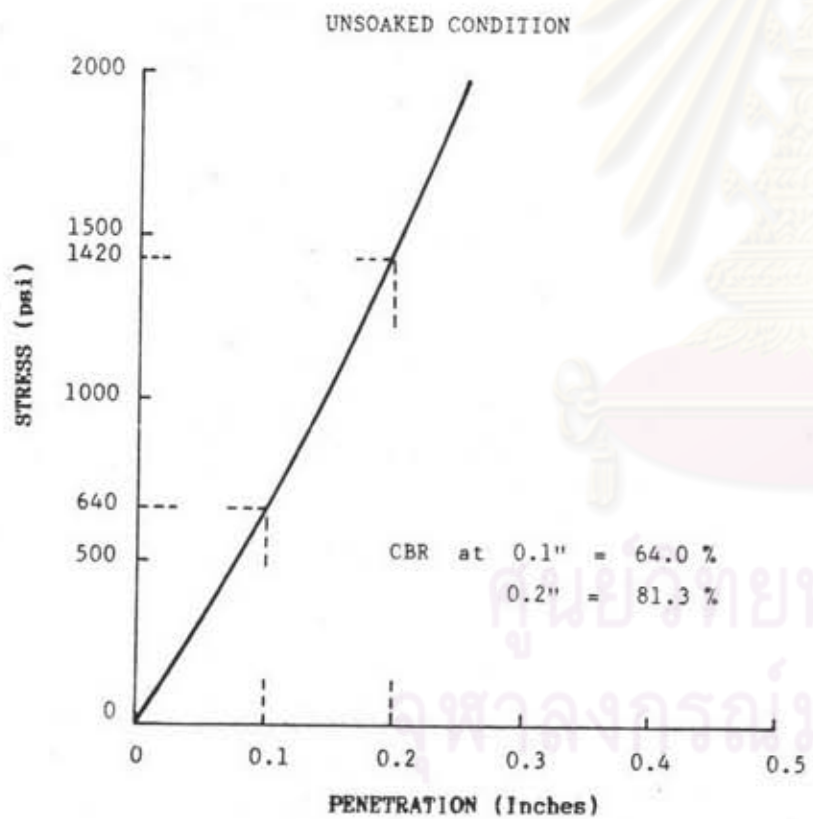


รูปที่ ข-10

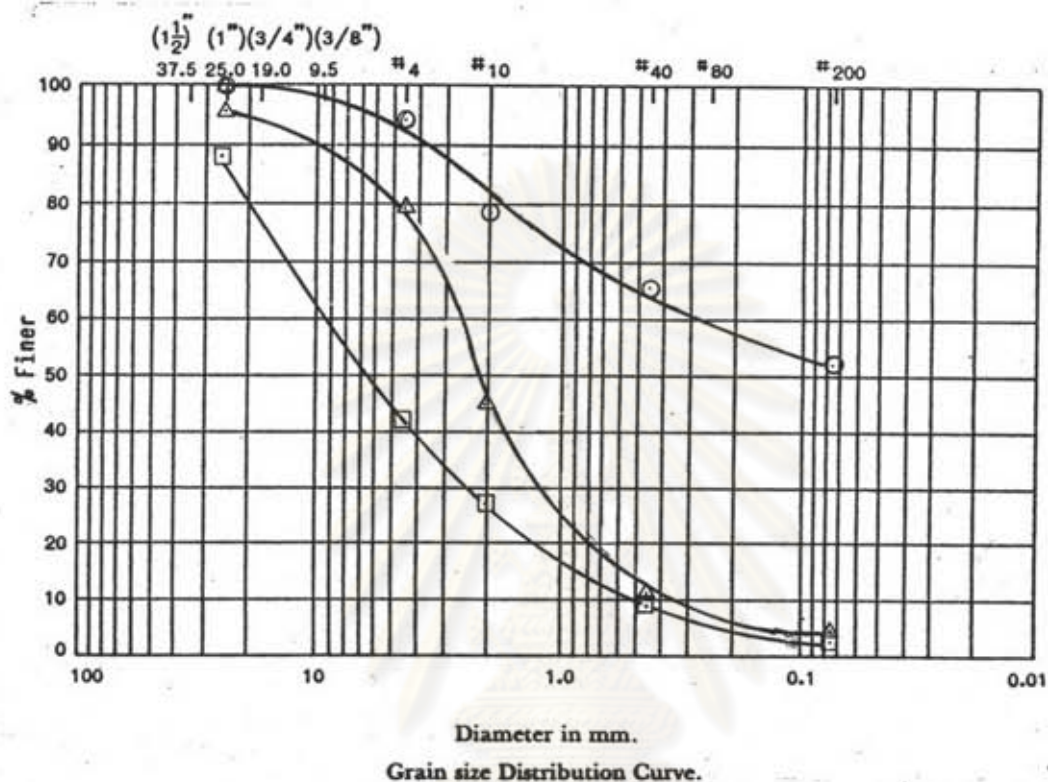
### STRESS - PENETRATION CURVE

DESCRIPTION OF SAMPLE : BASE  
 LOCATION : APRON

SAMPLE FROM : CHIANGRAI  
 DATE : APRIL 28, 1989



รูปที่ ๕-11



รูปที่ ข-12 กราฟแสดงการกระจายขนาดคละของเม็ดดิน

- ดินเหนียว
- △ ร่องพื้นทาง
- พื้นทาง

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย



ภาคผนวก ก

ข้อมูลการทดสอบสนามบิน จ.แพร่



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

PLATE LOAD TEST DATA SHEET

PROJECT : PHRAE AIRPORT  
 METHOD OF TEST : REPETITIVE STATIC PLATE LOAD TEST (ASTM D 1195)  
 LOCATION : STA.1+650  
 LOAD TEST ON : SUBGRADE TESTED BY : BLW  
 WEATHER : FINE DATE : FEBRUARY 7, 1989  
 TIME : 17.00 - 22.55 JACK NO. : 31C-02SM  
 TEST BEGUN : 18.00 hr. GAUGE NO. : 12C-03C  
 TEST FINISHED : 22.55 hr. CYLINDER NO. : -  
 SEATING LOAD : 2100 kg. SEATING DEFLECTION : 0.0165 in.  
 RESEATING LOAD : 1050 kg.  
 CORRECTED RESEATING LOAD : 1050 kg.  
 DEAD LOAD - PLATE, JACK, etc. 402 kg.

Time (hrs.)	18.00	19.00	20.00	21.00	22.00	23.00
Temp (°C)	29	28	27	27	26	26

ตารางที่ ก-1

PH-1

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks	
		hr.	min.	No. 1	No. 2	Average		
1500	1st Appli.	18	02	0.0050	0.0300	0.0400		
			03	0.0540	0.0340	0.0440		
			04	0.0560	0.0350	0.0455		
			05	0.0570	0.0350	0.0460	*	
			06	0.0580	0.0355	0.0468		
			07	0.0590	0.0360	0.0475		
			1st Release	18	08	0.0235	0.0140	0.0188
09	0.0215	0.0130			0.0173			
10	0.0205	0.0120			0.0163	**		
11	0.0200	0.0110			0.0155			
12	0.0200	0.0100			0.0150			
2nd Appli.	18	15	0.0650	0.0355	0.0525			
		16	0.0670	0.0360	0.0515			
		17	0.0680	0.0370	0.0525	*		
		18	0.0690	0.0370	0.0530			
		19	0.0700	0.0380	0.0540			
		2nd Release	18	20	0.0330	0.0180	0.0255	
				21	0.0300	0.0150	0.0225	
22	0.0290			0.0140	0.0215	**		
23	0.0285			0.0135	0.0210			
24	0.0280			0.0130	0.0205			
3rd Appli.	18	25	0.0680	0.0350	0.0515			
		26	0.0710	0.0370	0.0540			
		27	0.0715	0.0375	0.0545	*		
		28	0.0720	0.0380	0.0550			
		29	0.0725	0.0380	0.0553			
3rd Release	18	30	0.0370	0.0200	0.0290			

\* End Point deflection

\*\* End Point rebound deflection

ตารางที่ ส-1(คธ)

PH-2

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks	
		hr.	min.	No.1	No.2	Average		
1500	3rd Release			31	0.0335	0.0160	0.0248	
				32	0.0330	0.0150	0.0240	**
				33	0.0320	0.0150	0.0235	
				34	0.0320	0.0145	0.0233	
	4th Appli.	18		35	0.0720	0.0390	0.0555	
				36	0.0720	0.0390	0.0555	*
				37	0.0720	0.0390	0.0560	
				38	0.0720	0.0390	0.0560	
	4th Release	18		39	0.0390	0.0200	0.0295	
				40	0.0355	0.0160	0.0258	**
				41	0.0350	0.0150	0.0250	
				42	0.0350	0.0150	0.0250	
				43	0.0340	0.0150	0.0245	
	5th Appli.	18		44	0.0720	0.0440	0.0580	
				45	0.0720	0.0450	0.0590	*
				46	0.0740	0.0460	0.0600	
				47	0.0740	0.0460	0.0600	
	5th Release	18		48	0.0400	0.0240	0.0320	
				49	0.0385	0.0200	0.0293	
				50	0.0380	0.0190	0.0285	**
				51	0.0370	0.0180	0.0275	
				52	0.0370	0.0175	0.0273	
	6th Appli.	18		53	0.0740	0.0420	0.0580	
				54	0.0765	0.0435	0.0600	
				55	0.0770	0.0450	0.0610	*
				56	0.0780	0.0450	0.0615	
				57	0.0780	0.0450	0.0615	

\* End Point deflection  
\*\* End Point rebound deflection

ตารางที่ ส-1(คธ)

PH-3

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks				
		hr.	min.	No.1	No.2	Average					
1500	6th Appli.			19	58	0.0785	0.0450	0.0618			
				6th Release	19		00	0.0430	0.0240	0.0335	
							01	0.0405	0.0210	0.0375	
							02	0.0400	0.0200	0.0300	**
03	0.0390	0.0200	0.0295								
3400	1st Appli	19		04	0.0380	0.0190	0.0285				
				05	0.1250	0.0770	0.1010				
				06	0.1310	0.0830	0.1070				
				07	0.1330	0.0840	0.1085				
				08	0.1340	0.0850	0.1095	*			
				09	0.1350	0.0850	0.1100				
				10	0.1355	0.0860	0.1108				
				1st Release	19		11	0.0735	0.0330	0.0533	
							12	0.0690	0.0270	0.0480	
							13	0.0670	0.0250	0.0460	
14	0.0660	0.0250	0.0455				**				
2nd Appli.	19		15	0.0650	0.0250	0.0450					
			16	0.0645	0.0240	0.0443					
			19	0.1480	0.0950	0.1215					
			20	0.1500	0.0965	0.1233					
			21	0.1510	0.0970	0.1240	*				
			22	0.1510	0.0980	0.1245					
2nd Release	19		23	0.1520	0.0980	0.1250					
			24	0.0910	0.0365	0.0638					
			25	0.0875	0.0330	0.0603					
			26	0.0850	0.0310	0.0580					

\* End Point deflection  
\*\* End Point rebound deflection

Gauge Reading (lb.)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
3400	2nd Release	19	27	0.0840	0.0300	0.0570	++
			28	0.0830	0.0290	0.0560	
			29	0.0820	0.0280	0.0550	
	3rd Appli.	19	30	0.1520	0.0990	0.1255	*
			31	0.1520	0.0990	0.1255	
			32	0.1520	0.0990	0.1255	
			33	0.1520	0.0990	0.1255	
			34	0.1520	0.0990	0.1255	
	3rd Release	19	34	0.0940	0.0400	0.0670	++
			35	0.0900	0.0360	0.0630	
			36	0.0890	0.0350	0.0620	
			37	0.0880	0.0350	0.0615	
			38	0.0880	0.0350	0.0615	
	4th Appli.	19	43	0.1570	0.1015	0.1293	*
44			0.1590	0.1030	0.1310		
45			0.1600	0.1040	0.1320		
46			0.1610	0.1050	0.1330		
47			0.1620	0.1050	0.1335		
4th Release	19	48	0.1150	0.0550	0.0850	++	
		49	0.1110	0.0510	0.0810		
		50	0.1100	0.0510	0.0805		
		51	0.1090	0.0500	0.0795		
		52	0.1090	0.0500	0.0795		
5th Appli.	19	53	0.1590	0.1030	0.1310	*	
		54	0.1615	0.1050	0.1333		
		55	0.1620	0.1060	0.1340		
		56	0.1630	0.1070	0.1350		
		57	0.1640	0.1070	0.1355		

\* End Point deflection

++ End Point rebound deflection

Gauge Reading (lb.)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks			
		hr.	min.	No. 1	No. 2	Average				
3400	5th Release	19	58	0.1020	0.0460	0.0740	++			
			59	0.0980	0.0400	0.0690				
			00	0.0950	0.0380	0.0665				
			01	0.0930	0.0360	0.0645				
			02	0.0915	0.0350	0.0633				
		20	03	0.0910	0.0350	0.0630				
			04	0.0900	0.0340	0.0620				
			05	0.0900	0.0340	0.0620				
			6th Appli.	20	08	0.1620		0.1060	0.1340	*
					09	0.1645		0.1090	0.1368	
	10	0.1660			0.1100	0.1380				
	11	0.1670			0.1110	0.1390				
	12	0.1680			0.1120	0.1400				
	6th Release	20	13	0.1690	0.1130	0.1410	++			
14			0.1050	0.0470	0.0760					
15			0.1000	0.0425	0.0713					
16			0.0960	0.0400	0.0690					
17			0.0965	0.0390	0.0678					
18			0.0955	0.0380	0.0668					
19			0.0950	0.0370	0.0660					
5700	1st Appli.	20	21	0.2300	0.1755	0.2008				
			22	0.2330	0.1795	0.2063				
			23	0.2340	0.1815	0.2078				
			24	0.2360	0.1840	0.2100				
			25	0.2380	0.1850	0.2115				
			26	0.2390	0.1860	0.2125				
			27	0.2410	0.1880	0.2145				

\* End Point deflection

++ End Point rebound deflection

Gauge Reading (lb.)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
5700	1st Appli.	20	28	0.2420	0.1890	0.2155	*
			29	0.2430	0.1900	0.2165	
			30	0.2440	0.1910	0.2175	
	1st Release	20	31	0.1490	0.0990	0.1240	
			32	0.1410	0.0900	0.1155	
			33	0.1380	0.0860	0.1120	
			34	0.1240	0.0840	0.1090	
			35	0.1325	0.0820	0.1072	
			36	0.1310	0.0810	0.1060	
			37	0.1300	0.0800	0.1050	++
			38	0.1290	0.0790	0.1040	
			39	0.1285	0.0780	0.1033	
	2nd Appli.	20	40	0.2465	0.1970	0.2218	
			41	0.2490	0.1990	0.2240	
			42	0.2500	0.2000	0.2250	
			43	0.2510	0.2015	0.2263	
			44	0.2520	0.2025	0.2273	*
			45	0.2530	0.2035	0.2283	
			46	0.2535	0.2040	0.2288	
	2nd Release	20	47	0.1580	0.1090	0.1335	
			48	0.1505	0.1025	0.1265	
			49	0.1480	0.1000	0.1240	
			50	0.1460	0.0980	0.1220	
			51	0.1445	0.0965	0.1205	
52			0.1435	0.1460	0.1448		
53			0.1425	0.1450	0.1438	++	
54			0.1420	0.1450	0.1435		

\* End Point deflection  
 ++ End Point rebound deflection

Gauge Reading (lb.)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
5700	3rd Appli.	20	55	0.2600	0.2080	0.2340	
			56	0.2620	0.2095	0.2358	
			57	0.2640	0.2115	0.2378	
			58	0.2650	0.2125	0.2388	*
			59	0.2660	0.2135	0.2398	
	3rd Release	21	00	0.2670	0.2145	0.2408	
			01	0.2170	0.1650	0.1910	
			02	0.2145	0.1640	0.1893	
			03	0.2135	0.1630	0.1883	++
			04	0.2120	0.1620	0.1875	
	4th Appli.	21	05	0.2130	0.1610	0.1870	
			06	0.2690	0.2100	0.2425	
			07	0.2715	0.2180	0.2448	
			08	0.2730	0.2200	0.2465	
			09	0.2735	0.2200	0.2468	*
			10	0.2745	0.2210	0.2478	
	4th Release	21	11	0.2750	0.2220	0.2485	
			12	0.1780	0.1240	0.1510	
			13	0.1700	0.1210	0.1455	
			14	0.1670	0.1200	0.1435	
			15	0.1660	0.1190	0.1425	++
			16	0.1650	0.1180	0.1415	
			17	0.1640	0.1170	0.1405	
	5th Appli.	21	18	0.2790	0.2270	0.2530	
19			0.2805	0.2300	0.2553		
20			0.2815	0.2310	0.2563	*	
21			0.2820	0.2320	0.2570		

\* End Point deflection  
 ++ End Point rebound deflection

Gauge Reading (lb.)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
5700	5th Appli.	21	22	0.2830	0.2330	0.2580	
	5th Release	21	23	0.1840	0.1350	0.1595	
			24	0.1760	0.1280	0.1520	
			25	0.1730	0.1250	0.1490	
			26	0.1705	0.1240	0.1473	
			27	0.1690	0.1230	0.1460	
			28	0.1670	0.1220	0.1445	
			29	0.1665	0.1205	0.1435	
			30	0.1660	0.1200	0.1430	++
			31	0.1650	0.1190	0.1420	
			32	0.1640	0.1180	0.1410	
	6th Appli.	21	33	0.2860	0.2365	0.2613	
			34	0.2880	0.2390	0.2635	
			35	0.2890	0.2410	0.2650	
			36	0.2900	0.2430	0.2665	
			37	0.2910	0.2440	0.2675	*
			38	0.2915	0.2450	0.2683	
			39	0.2915	0.2450	0.2683	
	6th Release	21	40	0.1860	0.1400	0.1630	
			41	0.1820	0.1380	0.1600	
			42	0.1780	0.1345	0.1563	
43			0.1760	0.1320	0.1540		
44			0.1740	0.1310	0.1525		
45			0.1730	0.1300	0.1515	++	
46			0.1720	0.1290	0.1505		
47			0.1715	0.1280	0.1498		

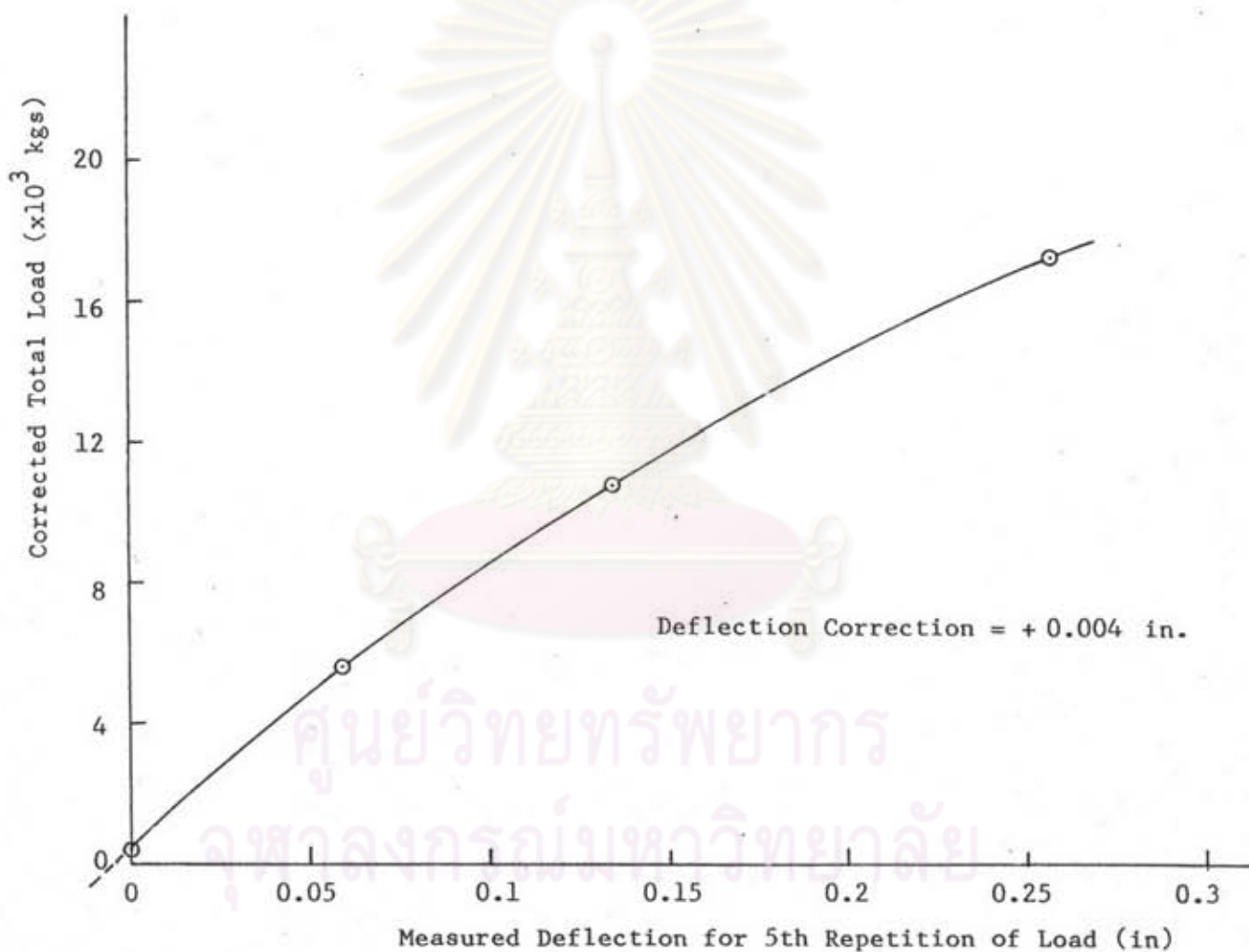
\* End Point deflection  
 ++ End Point rebound deflection

ตารางที่ ค-2 สรุปผลการวัดค่าการทรุดตัวของสนามบิน จังหวัดแพร่

Applied Load				Measured Deflection Values in inches For Load Application No.					
Jack	Reading	Dead Load (kg)	Correct- ed. Total Load (kg.)	1	2	3	4	5	6
Gauge (lb)	Corrected (kg.)								
1500	5200	402	5602	0.0460	0.0525	0.0545	0.0555	0.0590	0.0610
3400	10200	402	10602	0.1095	0.1240	0.1255	0.1320	0.1340	0.1390
5700	16800	402	17202	0.2155	0.2273	0.2388	0.2468	0.2563	0.2675

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

## PHRAE AIRPORT



รูปที่ ก-1 การปรับแก้ค่าการทรุดตัวที่วัดได้จากการทดสอบ



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : PHRAE AIRPORT Date : FEBRUARY 5, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : STA. 1+300 Tested by :

WATER CONTENT DETERMINATION

Container No.		CX7
Wt. Container + Wet Soil (gm)		299.3
Wt. Container + Dry Soil (gm)		270.3
Wt. Water (gm)		29.0
Wt. Container (gm)		84.3
Wt. Dry Soil (gm)		186.0
Water Content (%)		15.59

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	175	56.3	
0.050	280	93.3	
0.075	350	116.7	
0.100	390	130.0	
0.150	480	160.0	
0.200	580	190.0	
0.250	650	210.0	
0.300	700	225.0	
0.350	750	240.0	
0.400	800	255.0	
0.450	850	270.0	
0.500	900	285.0	

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : PHRAE AIRPORT Date : FEBRUARY 6, 1989  
Description of sample : SUBGRADE Tested condition : SOAKED  
Location : STA. 1+300 Tested by :

WATER CONTENT DETERMINATION

Container No.		TH12
Wt. Container + Wet Soil (gm)		292.2
Wt. Container + Dry Soil (gm)		263.4
Wt. Water (gm)		38.8
Wt. Container (gm)		34.2
Wt. Dry Soil (gm)		219.2
Water Content (%)		17.70

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	150	50.0	
0.050	217	72.3	
0.075	263	87.7	
0.100	287	95.7	
0.150	318	106.0	
0.200	343	114.4	
0.250	368	122.7	
0.300	392	130.7	
0.350	408	136.0	
0.400	427	142.3	
0.450	442	147.3	
0.500	458	150.0	

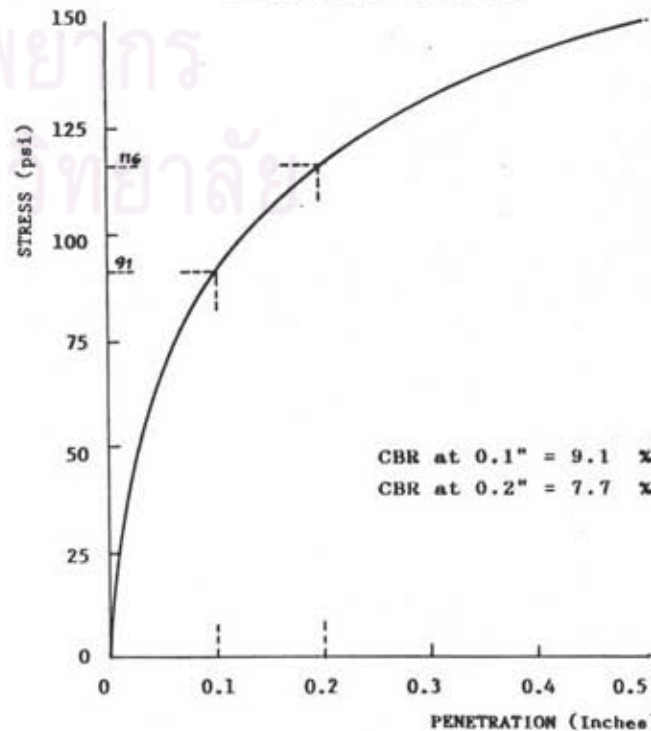
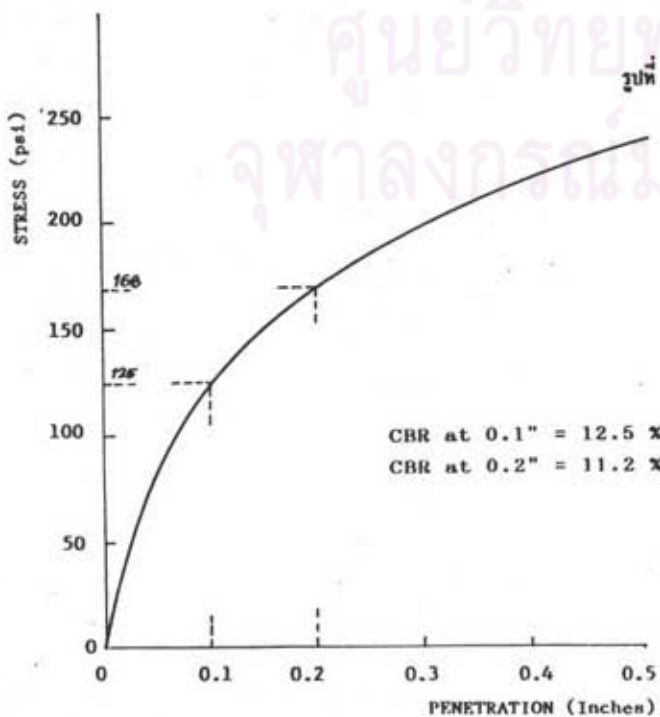
STRESS - PENETRATION CURVE

Description of sample : SUBGRADE  
Location : Sta. 1+300

Sample from : PHRAE AIRPORT  
Date : February 1989

IN-SITU CONDITION

24 hrs SOAKED CONDITION



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : PHRAE AIRPORT Date : FEBRUARY 5, 1989  
Description of sample : SUBBASE Tested condition : IN-SITU  
Location : STA. 1+300 Tested by :

WATER CONTENT DETERMINATION

Container No.	242
Wt. Container + Wet Soil (gm)	276.5
Wt. Container + Dry Soil (gm)	259.7
Wt. Water (gm)	16.8
Wt. Container (gm)	49.5
Wt. Dry Soil (gm)	210.2
Water Content (%)	7.99

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	79#	262.3	
0.050	122#	406.6	
0.075	179#	596.6	
0.100	213#	709.9	
0.150	278#	899.9	
0.200	281#	926.6	
0.250	298#	993.3	
0.300	309#	1029.9	
0.350	313#	1049.9	
0.400	315#	1043.3	
0.450	313#	1009.9	
0.500	303#		

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : PHRAE AIRPORT Date : FEBRUARY 7, 1989  
Description of sample : SUBBASE Tested condition : SOAKED  
Location : STA. 1+300 Tested by :

WATER CONTENT DETERMINATION

Container No.	812
Wt. Container + Wet Soil (gm)	481.8
Wt. Container + Dry Soil (gm)	362.5
Wt. Water (gm)	39.3
Wt. Container (gm)	38.8
Wt. Dry Soil (gm)	323.7
Water Content (%)	12.14

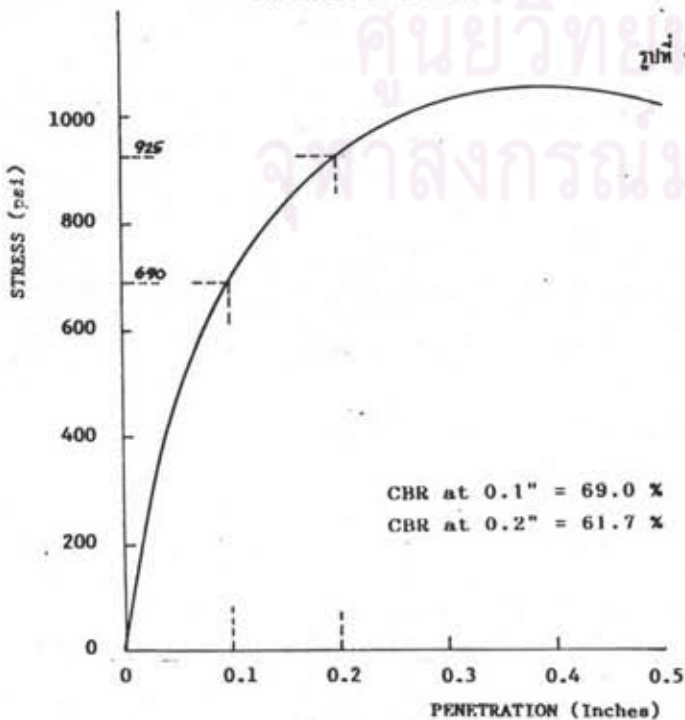
FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	29#	96.7	
0.050	44#	146.7	
0.075	56#	186.7	
0.100	67#	223.4	
0.150	81#	270.0	
0.200	91#	303.4	
0.250	98#	326.7	
0.300	103#	343.4	
0.350	96#	320.0	
0.400			
0.450			
0.500			

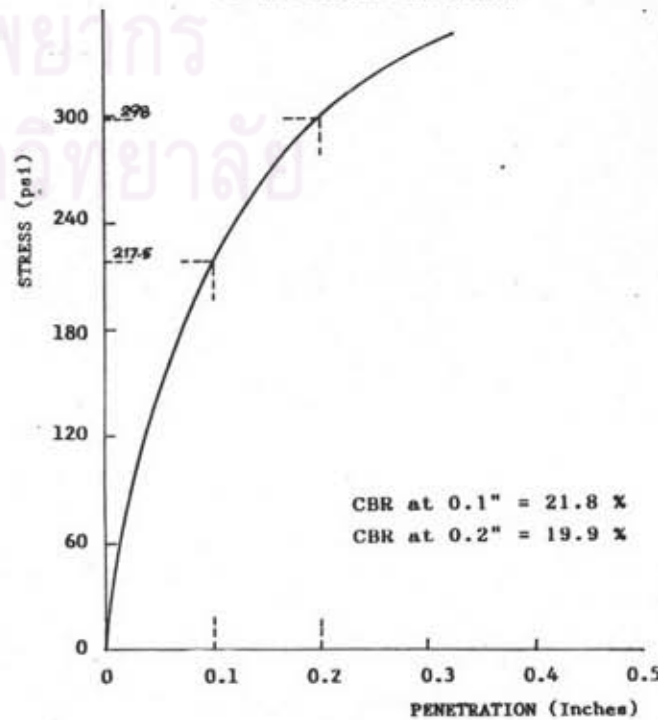
STRESS - PENETRATION CURVE

Description of sample : SUBBASE Sample from : PHRAE AIRPORT  
Location : Sta. 1+300 Date : February 1989

IN-SITU CONDITION



24 hrs SOAKED CONDITION



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : PHRAE AIRPORT Date : FEBRUARY 6, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : STA. 1+650 Tested by :  
WATER CONTENT DETERMINATION

Container No.	#
Wt. Container + Wet Soil (gm)	3399.0
Wt. Container + Dry Soil (gm)	2932.0
Wt. Water (gm)	467.0
Wt. Container (gm)	259.0
Wt. Dry Soil (gm)	2673.0
Water Content (%)	17.47

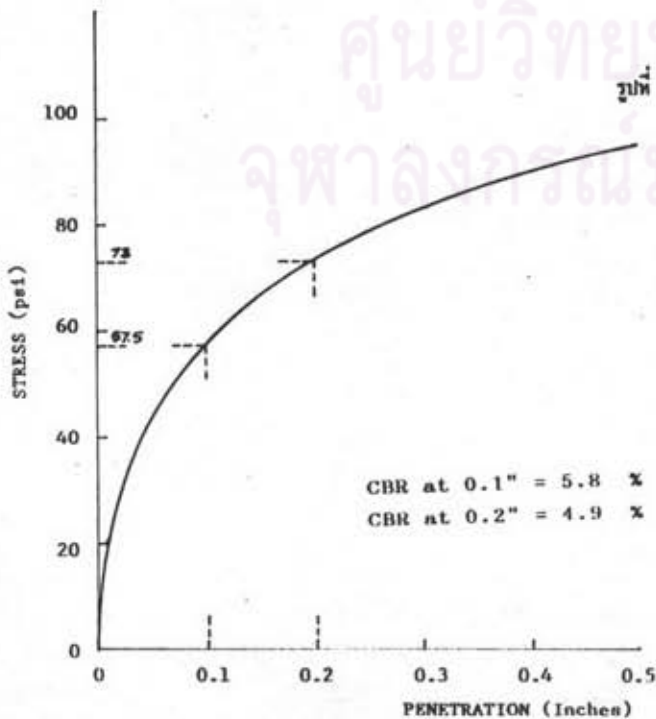
FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	114	38.0	
0.050	136	45.3	
0.075	156	52.0	
0.100	173	57.7	
0.150	196	65.3	
0.200	214	71.4	
0.250	233	77.7	
0.300	249	83.0	
0.350	256	85.3	
0.400	266	86.6	
0.450	276	92.7	
0.500	291	97.0	

STRESS - PENETRATION CURVE

Description of sample : SUBGRADE Sample from : PHRAE AIRPORT  
Location : Sta. 1+650 Date : February 1989

IN-SITU CONDITION



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : PHRAE AIRPORT                      Date : FEBRUAR 7, 1989  
Description of sample : SAND                      Tested condition : IN-SITU  
Location : STA.1+650                                  Tested by :

WATER CONTENT DETERMINATION

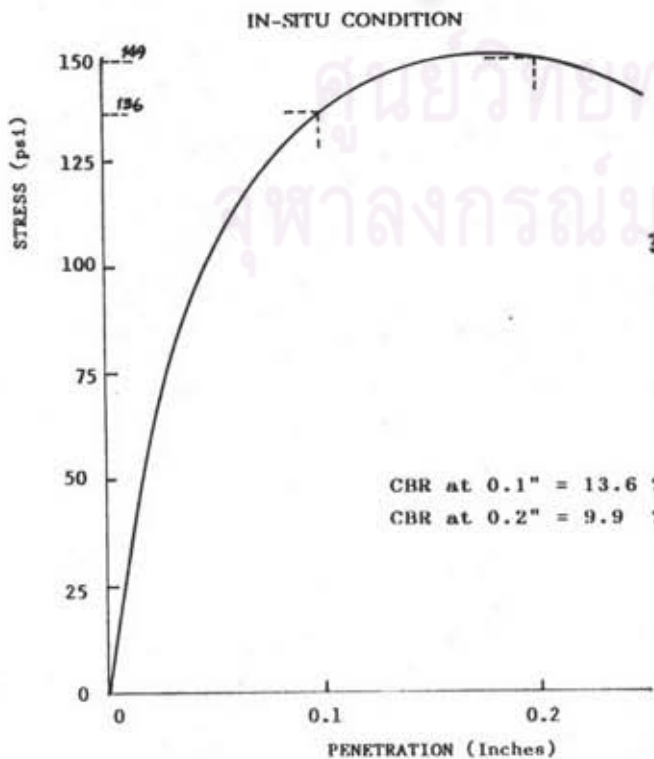
Container No.		5
Wt. Container + Wet Soil (gm)		2322.0
Wt. Container + Dry Soil (gm)		2162
Wt. Water (gm)		170.0
Wt. Container (gm)		285.0
Wt. Dry Soil (gm)		1867.0
Water Content (%)		9.11

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	190	63.3	
0.050	305	101.7	
0.075	380	126.7	
0.100	410	136.7	
0.150	450	150.0	
0.200	440	140.7	
0.250	410	139.3	
0.300			
0.350			
0.400			
0.450			
0.500			

STRESS - PENETRATION CURVE

Description of sample : SAND                      Sample from : PHRAE AIRPORT  
Location : Sta. 1+650                                  Date : February 1989



FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : PHRAE AIRPORT Date : FEBRUARY 7, 1989  
Description of sample : SUBBASE Tested condition : IN-SITU  
Location : STA. 1+650 Tested by :

WATER CONTENT DETERMINATION

Container No.	4
Wt. Container + Wet Soil (gm)	3127.0
Wt. Container + Dry Soil (gm)	2922.0
Wt. Water (gm)	205.0
Wt. Container (gm)	310.0
Wt. Dry Soil (gm)	2612.0
Water Content (%)	7.85

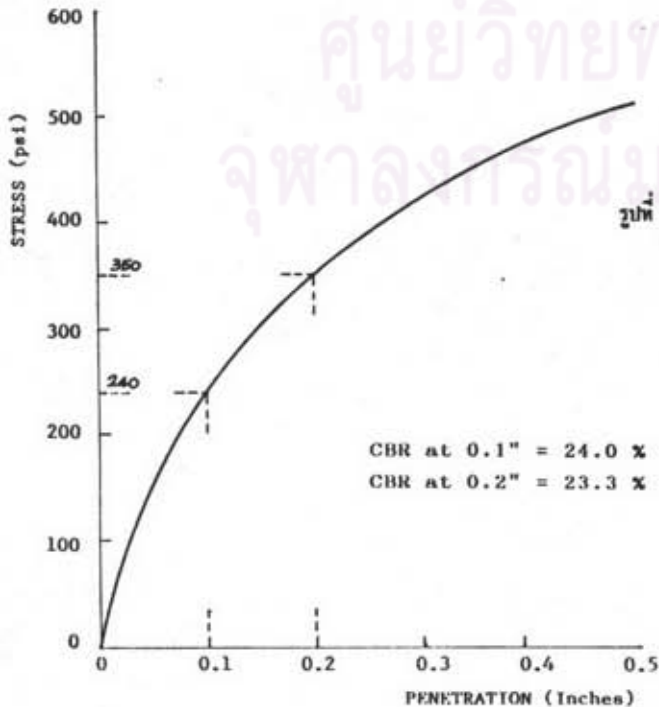
FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	265	95.0	
0.050	445	148.4	
0.075	575	191.7	
0.100	685	228.4	
0.150	855	285.0	
0.200	1005	335.0	
0.250	1145	381.7	
0.300	1245	415.0	
0.350	1345	448.4	
0.400	1435	478.4	
0.450	1545	515.0	
0.500	1565	521.7	

STRESS - PENETRATION CURVE

Description of sample : SUBBASE Sample from : PHRAE AIRPORT  
Location : Sta. 1+650 Date : February 1989

IN-SITU CONDITION



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : PHRAE AIRPORT Date : FEBRUARY 5, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : STA. 2+200 Tested by :

WATER CONTENT DETERMINATION

Container No.	1
Wt. Container + Wet Soil (gm)	2661.0
Wt. Container + Dry Soil (gm)	2347.0
Wt. Water (gm)	314.0
Wt. Container (gm)	300.0
Wt. Dry Soil (gm)	2047.0
Water Content (%)	15.34

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	107	35.6	
0.050	140	46.7	
0.075	165	54.5	
0.100	185	61.7	
0.150	225	74.5	
0.200	245	82.2	
0.250	265	88.3	
0.300	285	95.0	
0.350	305	101.7	
0.400	320	106.7	
0.450	335	111.7	
0.500	350	116.7	

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : PHRAE AIRPORT Date : FEBRUARY 6, 1989  
Description of sample : SUBGRADE Tested condition : SOAKED  
Location : STA. 2+200 Tested by :

WATER CONTENT DETERMINATION

Container No.	L12
Wt. Container + Wet Soil (gm)	300.6
Wt. Container + Dry Soil (gm)	254.5
Wt. Water (gm)	46.1
Wt. Container (gm)	35.6
Wt. Dry Soil (gm)	218.9
Water Content (%)	21.06

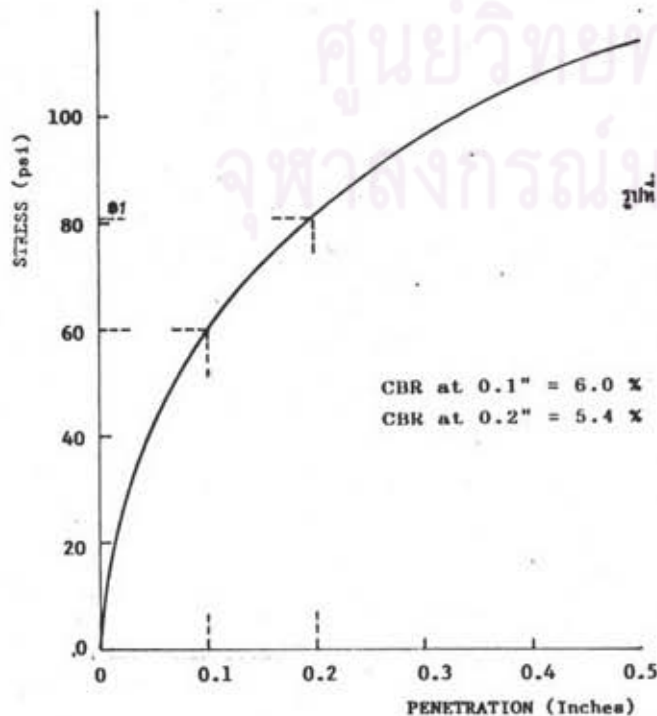
FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	92	30.7	
0.050	109	36.3	
0.075	114	38.0	
0.100	119	39.6	
0.150	134	44.6	
0.200	144	48.0	
0.250	159	53.0	
0.300	169	56.3	
0.350	174	58.0	
0.400	179	59.6	
0.450	184	61.3	
0.500	192	64.0	

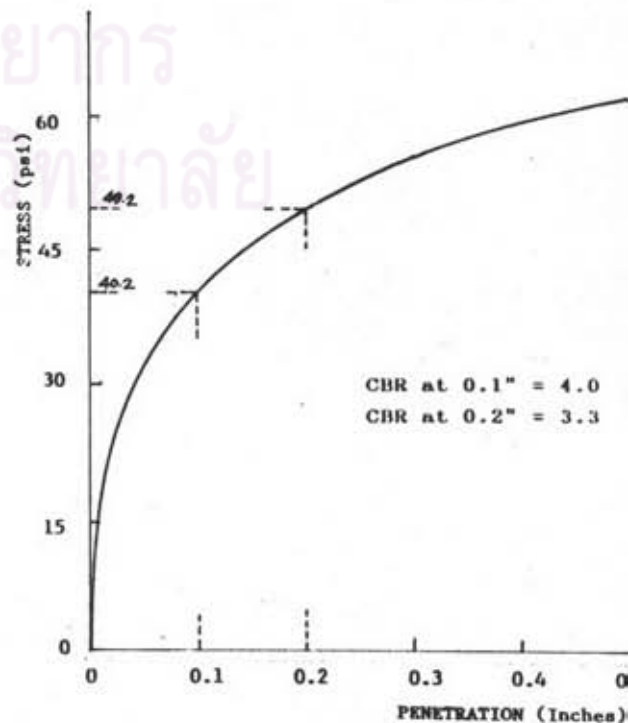
STRESS - PENETRATION CURVE

Description of sample : SUBGRADE Sample from : PHRAE AIRPORT  
Location : Sta. 2+200 Date : February 1989

IN-SITU CONDITION



24 hrs SOAKED CONDITION



FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

COMPACTION TEST

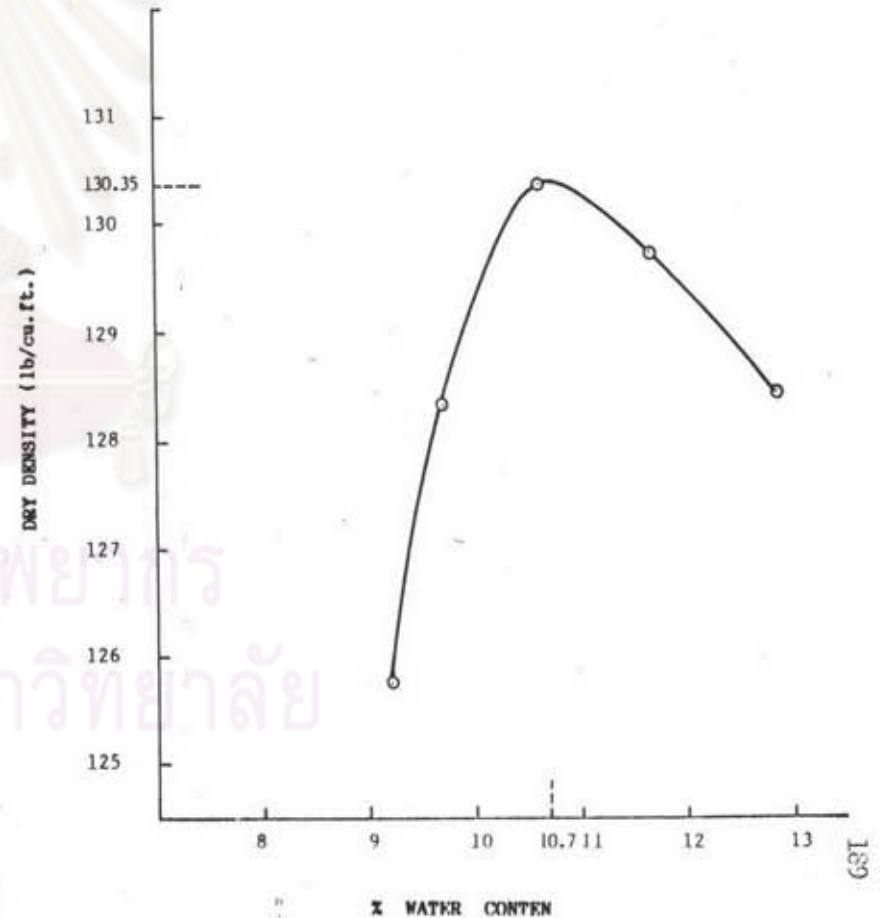
SAMPLE FROM : PHRAE AIRPORT  
 COURSE : SUBGRADE  
 LOCATION : STA. 0+650  
 TYPE OF TEST : MODIFIED PROCTOR  
 10 lb. HAMMER 18 in. DROP  
 DATE : MARCH 28, 1989  
 TEST BY : PPP  
 55 BLOWS ON EACH OF 5 LAYERS  
 MOLD NO. 3 VOLUME OF MOLD 0.0736 cu.ft.

COMPACTION CURVE

DESCRIPTION OF SAMPLE : SUBGRADE DATE : MARCH 28, 1989  
 SAMPLE FROM : PHRAE AIRPORT LOCATION : STA. 0 + 650

Determination No.	1	2	3	4	5
Wt. mold (soil) lb.	19.23	19.48	19.74	19.78	19.79
Wt. mold lb.	9.12	9.12	9.12	9.12	9.12
Wt. soil lb.	10.11	10.36	10.62	10.66	10.67
Av. water content, %	9.19	9.69	10.59	11.67	12.90
Moist density pcf.	137.36	140.76	144.29	144.84	144.98
Dry density pcf.	125.80	128.33	130.47	129.70	128.41

Water content from	T	B	T	B	T	B	T	B	T	B
Container No.	7H12	L12	Z34	C36	Z27	Z16	R2	B14	E4	21
Wt. cont. + wet soil gm.	217.3	205.1	124.4	130.4	118.1	125.3	135.8	149.9	103.4	117.6
Wt. cont. + dry soil gm.	201.7	191.0	118.3	121.9	110.1	116.6	125.4	138.0	92.5	105.3
Wt. water gm.	15.6	14.1	8.1	8.5	8.0	8.7	10.4	11.9	10.9	12.3
Wt. container gm.	34.2	35.6	34.2	32.5	34.0	35.0	38.0	34.0	8.9	8.9
Wt. dry soil gm.	167.5	155.4	82.1	89.4	76.1	81.6	87.4	104.0	83.6	96.5
Water content, %	9.31	9.07	9.87	9.51	10.51	10.66	11.90	11.44	13.04	12.75
Av. water content, %	9.19		9.69		10.59		11.67		12.90	



FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

COMPACTION TEST

SAMPLE FROM : PHRAE AIRPORT  
 COURSE : SUBBASE DATE : APRIL 26, 1989  
 LOCATION : STA. 0+650 TEST BY : PPP  
 TYPE OF TEST : MODIFIED PROCTOR 55 BLOWS ON EACH OF 5 LAYERS  
 10 lb. HAMMER 18 in. DROP MOLD NO. 3 VOLUME OF MOLD 0.0738 cu.ft.

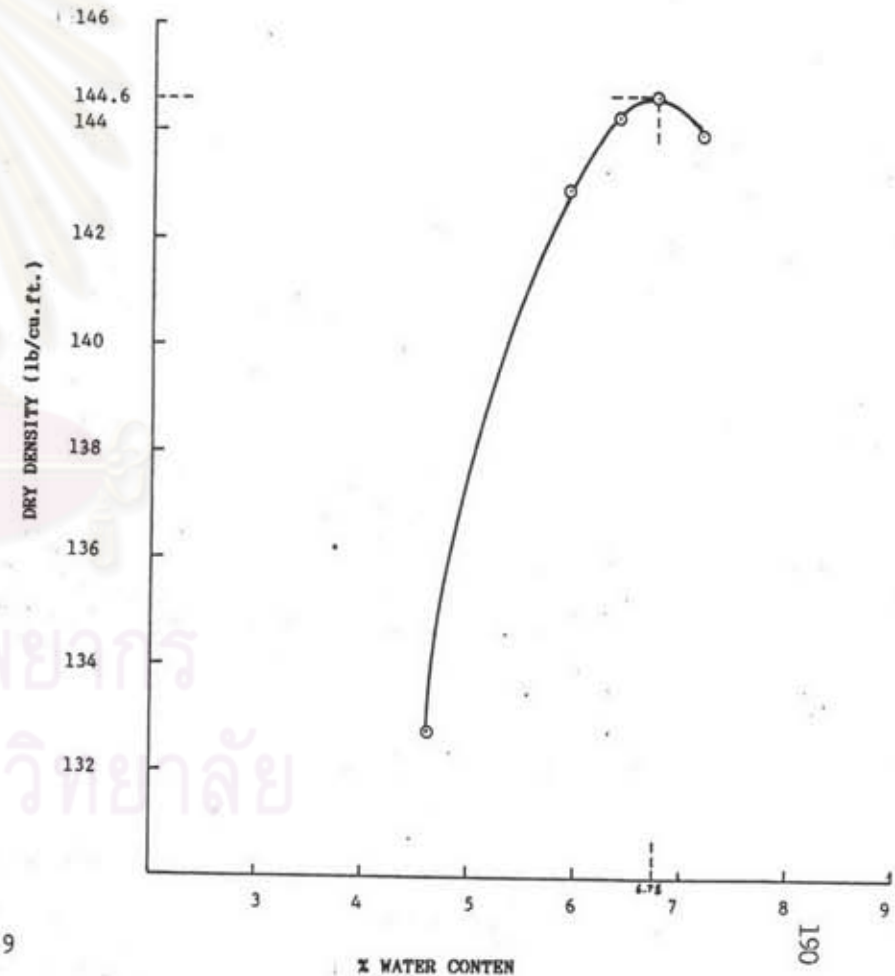
COMPACTION CURVE

DESCRIPTION OF SAMPLE : SUBBASE DATE : APRIL 26, 1989

SAMPLE FROM : PHRAE AIRPORT LOCATION : STA. 0 + 650

Determination No.	1	2	3	4	5
Wt. mold+soil lb.	19.42	20.30	20.49	20.56	20.55
Wt. mold lb.	9.20	9.20	9.20	9.20	9.20
Wt. soil lb.	10.22	11.10	11.29	11.36	11.35
Av. water content, %	4.60	5.86	6.38	6.75	7.18
Moist density pcf.	138.88	150.82	153.40	154.35	154.21
Dry density pcf.	132.75	142.47	144.20	144.59	143.88

Water content from	T	B	T	B	T	B	T	B	T	B
Container No.	C43	E3	T2	E1	E10	36	17	21	Z11	742
Wt. cont. + wet soil gm.	79.8	90.3	71.0	89.6	114.0	127.9	130.2	97.8	191.8	209.5
Wt. cont. + dry soil gm.	76.7	86.7	67.6	86.2	108.6	121.3	123.3	92.1	181.1	199.0
Wt. water gm.	3.1	3.6	3.4	3.4	5.4	6.6	6.9	5.7	10.7	10.5
Wt. container gm.	8.9	8.9	8.9	8.9	21.5	20.5	19.7	8.8	35.5	49.0
Wt. dry soil gm.	67.8	77.8	58.7	57.3	87.1	100.8	103.6	83.3	145.6	150.0
Water content %	4.57	4.63	5.79	5.93	6.20	6.55	6.66	6.84	7.35	7.00
Av. water content %	4.60		5.86		6.38		6.75		7.18	



รูปที่ ก-9

190



COMPACTION TEST

SAMPLE FROM : PHRAE AIRPORT

COURSE : BASE

LOCATION : 0+650

TYPE OF TEST : MODIFIED PROCTOR

10 lb. HAMMER 18 in. DROP

DATE : APRIL 26, 1989

TEST BY : PPP

55 BLOWS ON EACH OF 5 LAYERS

MOLD NO. 3 VOLUME OF MOLD 0.0736 cu.ft.

DESCRIPTION OF SAMPLE : BASE

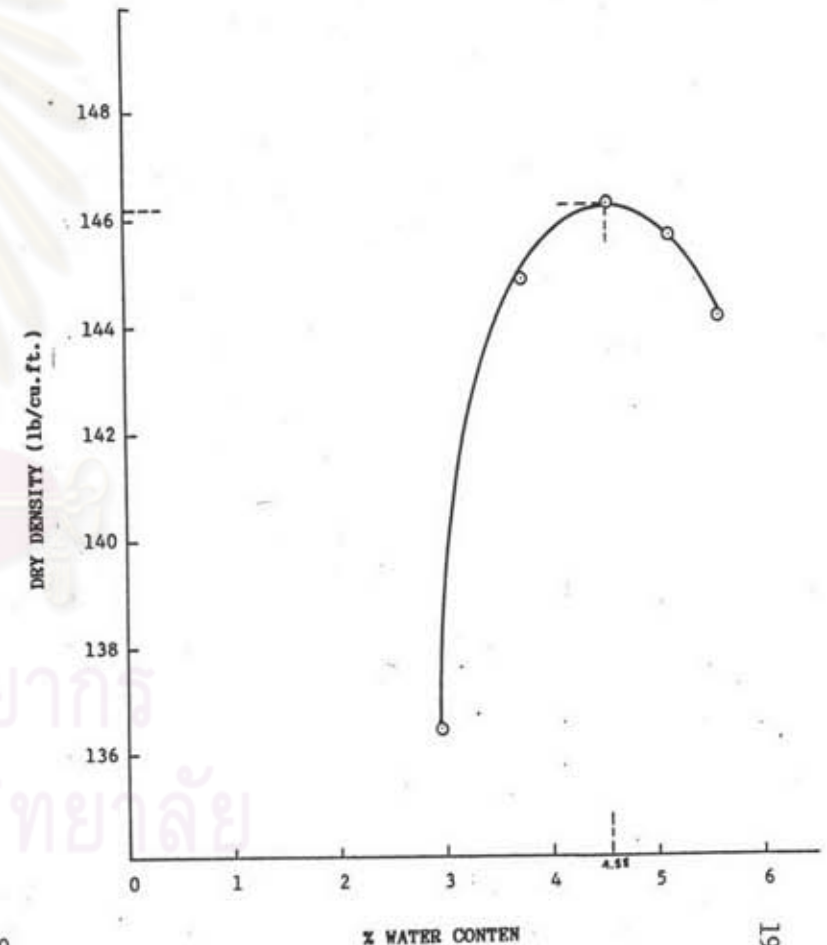
DATE : APRIL 26, 1989

SAMPLE FROM : PHRAE AIRPORT

LOCATION : STA. 0 + 650

Determination No.	1	2	3	4	5
Wt. mold+soil lb.	19.52	20.25	20.45	20.46	20.40
Wt. mold lb.	9.20	9.20	9.20	9.20	9.20
Wt. soil lb.	10.32	11.05	11.25	11.26	11.20
Av. water content, %	2.87	3.68	4.55	5.14	5.62
Moist density pcf.	140.22	150.14	152.85	152.99	152.17
Dry density pcf.	136.31	144.81	146.20	145.51	144.07

Water content from	T	B	T	B	T	B	T	B	T	B
Container No.	L12	Z29	C30	C46	CX7	H43	TH12	B2	X9	C36
Wt. cont. + wet soil gm.	157.7	163.8	152.7	136.2	199.2	176.7	143.1	151.0	169.6	140.7
Wt. cont. + dry soil gm.	154.1	160.4	148.5	132.6	193.9	170.9	137.8	145.5	162.6	134.9
Wt. water gm.	3.6	3.4	4.2	3.6	5.3	5.8	5.3	5.5	7.0	5.8
Wt. container gm.	35.7	34.6	34.0	35.0	84.3	34.9	34.2	38.8	35.5	33.7
Wt. dry soil gm.	118.4	125.8	114.5	97.6	109.6	136.0	103.6	106.7	127.1	101.2
Water content %	3.04	2.70	3.67	3.69	4.84	4.28	5.12	5.15	5.51	5.73
Av. water content %	2.87		3.68		4.55		5.14		5.62	



### STRESS - PENETRATION CURVE

DESCRIPTION OF SAMPLE : SUBGRADE

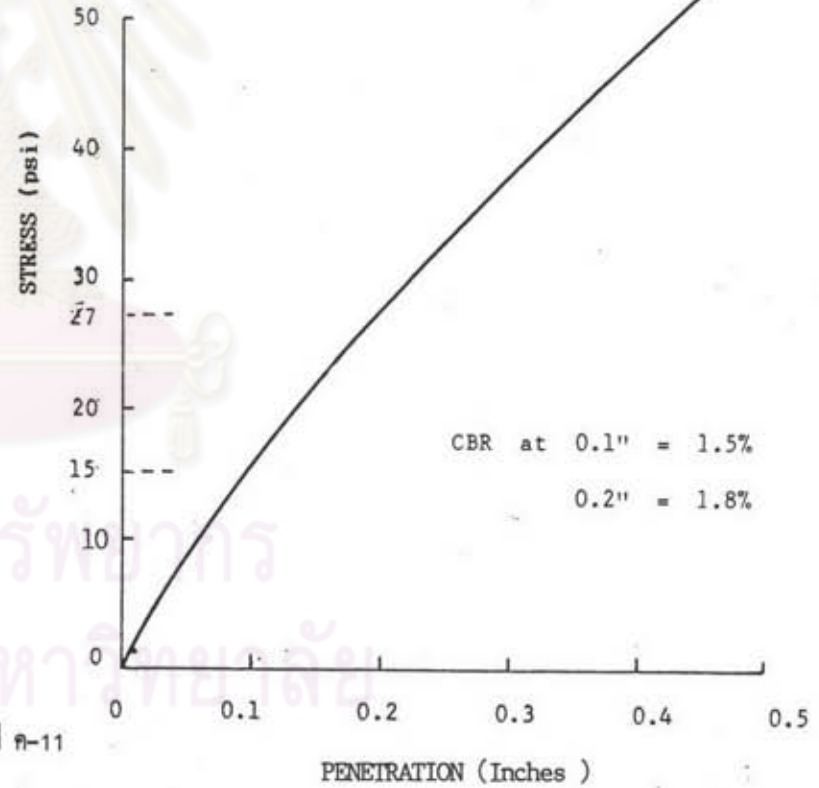
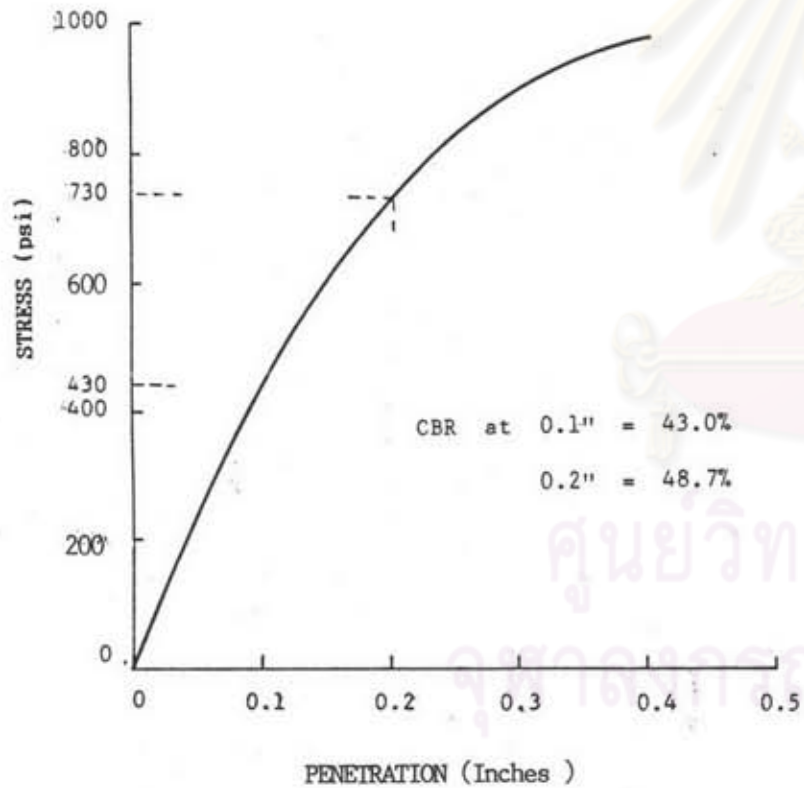
SAMPLE FROM : PHRAE AIRPORT

LOCATION : STA. 0+650

DATE : MAY 5, 1989

UNSOAKED CONDITION

96 HRS. SOAKED COND.



รูปที่ ค-11

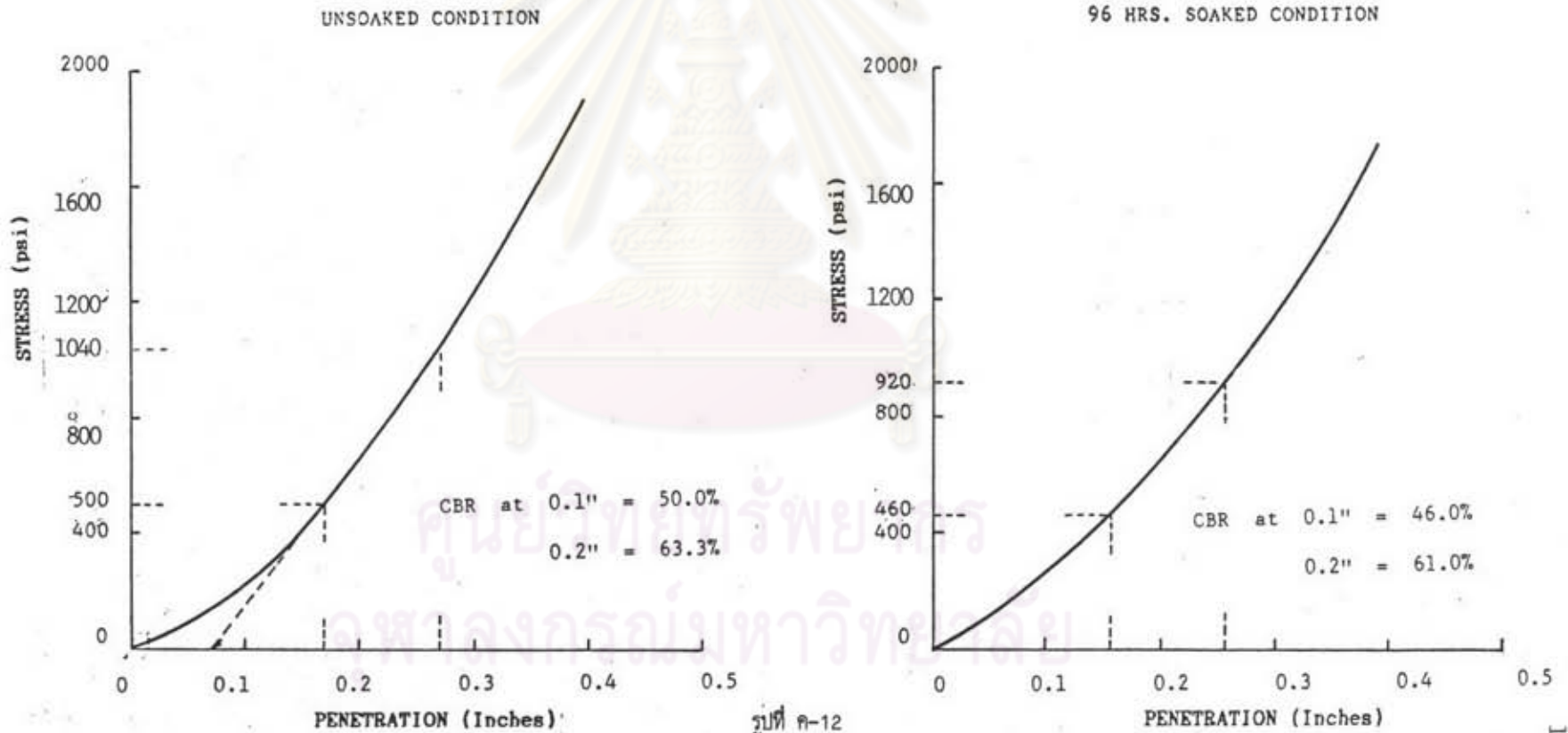
### STRESS - PENETRATION CURVE

DESCRIPTION OF SAMPLE : SUBBASE

SAMPLE FROM : PHRAE AIRPORT

LOCATION : STA. 0 + 650

DATE : MAY 1, 1989



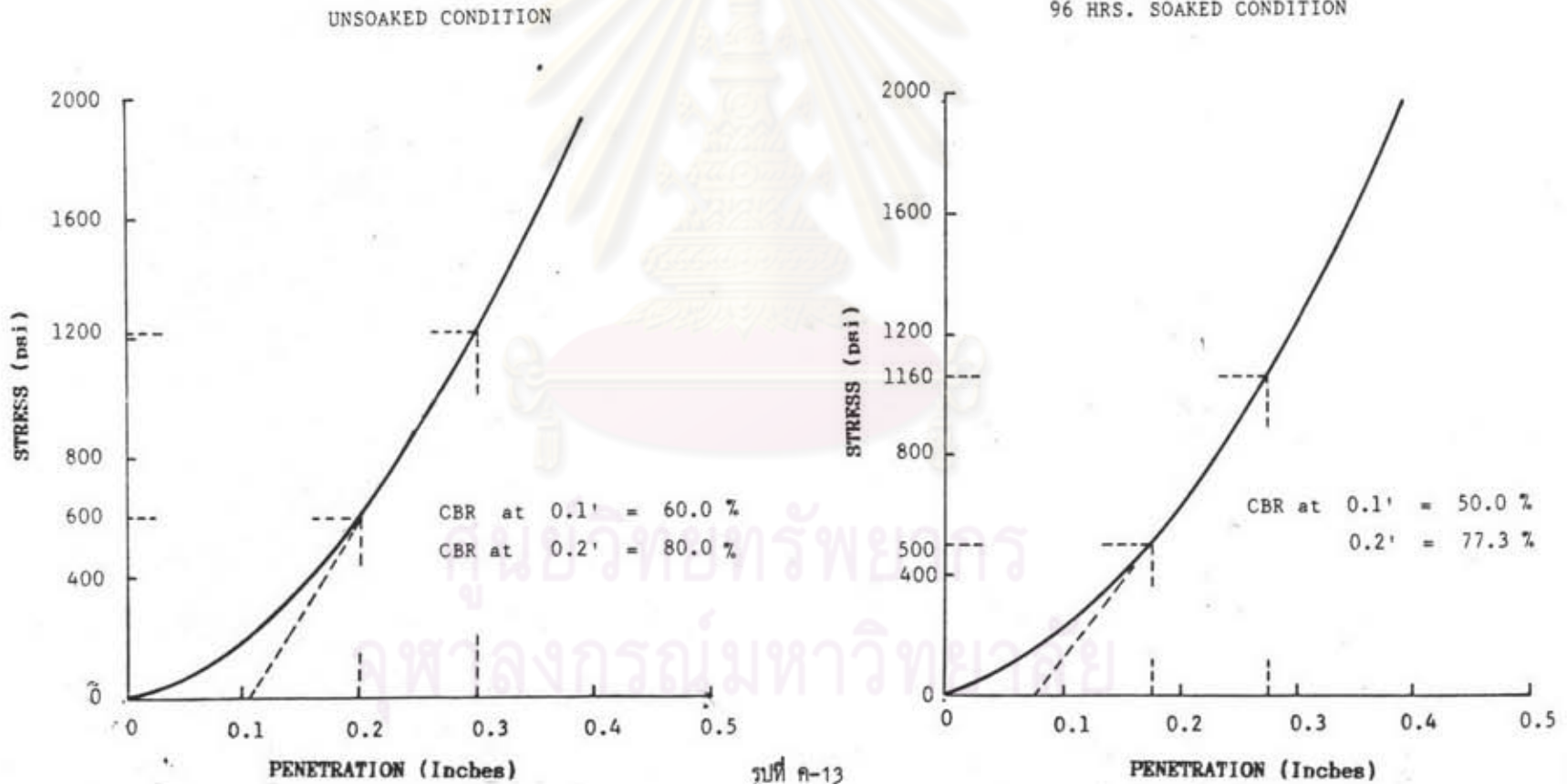
### STRESS - PENETRATION CURVE

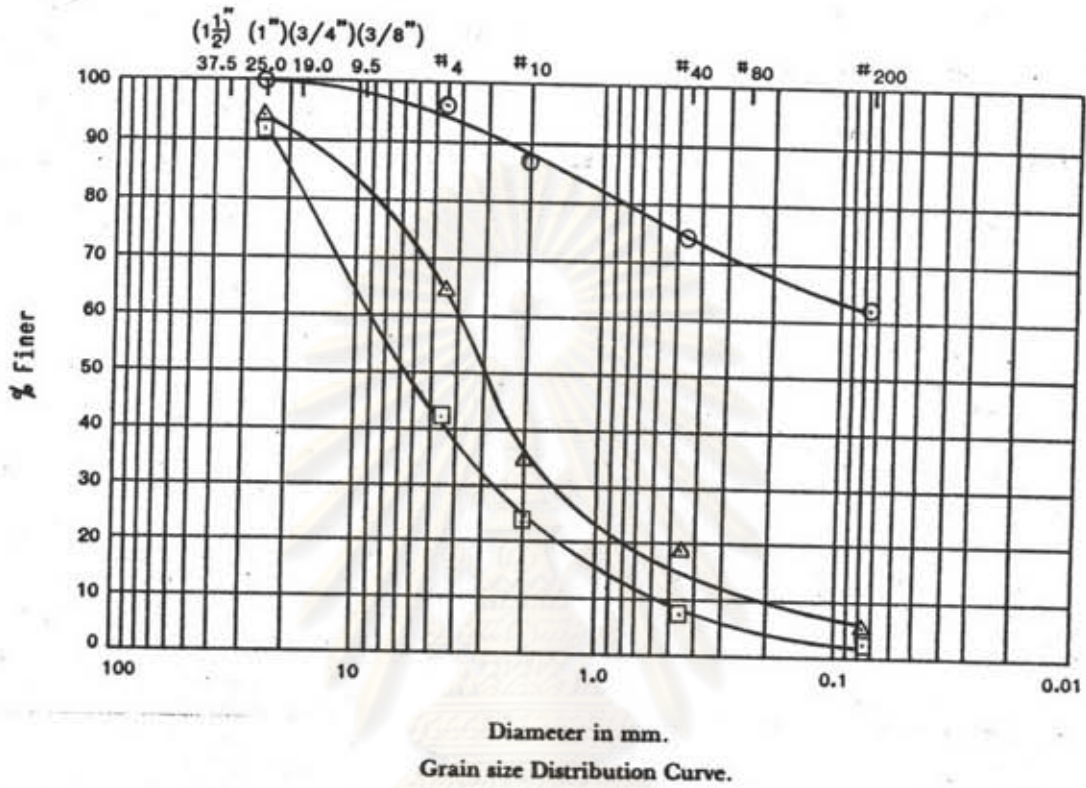
DESCRIPTION OF SAMPLE : BASE

SAMPLE FROM : PHRAE AIRPORT

LOCATION : STA. 0 + 650

DATE : MAY 1, 1989





รูปที่ ค-14 กราฟแสดงการกระจายขนาดผลของเม็ดดิน

- ดินเค็ม
- △ รองพื้นทาง
- พื้นทาง

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

ภาคผนวก ง

ข้อมูลการทดสอบสนามบิน จ.ลำปาง



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

PLATE LOAD TEST DATA SHEET

PROJECT : LAMPANG AIRPORT  
 METHOD OF TEST : REPETTITIVE STATIC PLATE LOAD TEST (ASTM D 1195)  
 LOCATION : APRON  
 LOAD TEST ON : SUBGRADE TESTED BY : BLW  
 WEATHER : FINE DATE : FEBRUARY 10, 1989  
 TIME : 12.00 - 17.00 JACK NO. : 31C-02SM  
 TEST BEGUN : 13.00 hrs. GAUGE NO. : 12C-03C  
 TEST FINISHED : 17.00 hrs. CYLINDER NO. : -  
 SEATING LOAD : 3800 kg. SEATING DEFLECTION : 0.0150 in.  
 RESEATING LOAD : 1900 kg.  
 CORRECTED RESEATING LOAD : 1900 kg.  
 DEAD LOAD - PLATE, JACK, etc. 356 kg.

Time (hrs.)	13.00	14.00	15.00	16.00	17.00	
Temp (°C)	35	35	35	36	36	

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
2400	1st Appli.	13	05	0.0300	0.0500	0.0400	
			06	0.0330	0.0530	0.0430	
			07	0.0340	0.0540	0.0440	*
			08	0.0345	0.0550	0.0448	
			09	0.0350	0.0550	0.0450	
	1st Release	13	10	0.0190	0.0140	0.0165	
			11	0.0180	0.0130	0.0155	**
			12	0.0180	0.0120	0.0150	
			13	0.0180	0.0120	0.0150	
2nd Appli.	13	14	0.0390	0.0560	0.0475		
		15	0.0405	0.0590	0.0498		
		16	0.0410	0.0600	0.0505		
		17	0.0430	0.0610	0.0520		
		18	0.0430	0.0610	0.0520	*	
		19	0.0430	0.0610	0.0520		
		20	0.0430	0.0610	0.0520		
		2nd Release	13	21	0.0240	0.0200	0.0220
22	0.0235			0.0190	0.0213	**	
23	0.0230			0.0180	0.0205		
24	0.0230			0.0170	0.0200		
2400	3rd Appli.	13	25	0.0435	0.0580	0.0508	
			26	0.0445	0.0590	0.0518	*
			27	0.0445	0.0600	0.0523	
			28	0.0445	0.0600	0.0523	
3rd Release	13	29	0.0265	0.0220	0.0243		
		30	0.0260	0.0200	0.0230		

\* End point deflection  
 \*\* End point rebound deflection

ตารางที่ 4-1(๑๑)

LP-2

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
2400	3rd Release	13	31	0.0255	0.0200	0.0228	++
			32	0.0255	0.0200	0.0228	
			33	0.0255	0.0200	0.0228	
	4th Appli.	13	34	0.0455	0.0620	0.0538	+
			35	0.0460	0.0630	0.0545	
			36	0.0460	0.0630	0.0545	
			37	0.0460	0.0630	0.0545	
	4th Release	13	38	0.0280	0.0230	0.0255	++
			39	0.0280	0.0220	0.0250	
			40	0.0280	0.0220	0.0250	
			41	0.0275	0.0220	0.0248	
	5th Appli.	13	50	0.0470	0.0640	0.0555	+
			51	0.0485	0.0650	0.0568	
			52	0.0485	0.0650	0.0568	
			53	0.0485	0.0650	0.0568	
			54	0.0485	0.0650	0.0568	
	5th Release	13	55	0.0300	0.0250	0.0275	++
			56	0.0290	0.0240	0.0270	
			57	0.0290	0.0240	0.0270	
			58	0.0290	0.0240	0.0270	
	6th Appli.	13	59	0.0490	0.0655	0.0573	+
			14	00	0.0500	0.0660	
		01	0.0500	0.0670	0.0585		
	6th Release	14	02	0.0500	0.0670	0.0585	+
			03	0.0310	0.0270	0.0290	

+ End point deflection  
 ++ End point rebound deflection

ตารางที่ 4-1(๑๒)

LP-3

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks			
		hr.	min.	No. 1	No. 2	Average				
2400	6th Release	14	04	0.0300	0.0280	0.0280	++			
			05	0.0300	0.0250	0.0275				
			06	0.0300	0.0250	0.0275				
4500	1st Appli.	14	07	0.0900	0.1190	0.1045	+			
			08	0.9350	0.1230	0.1083				
			09	0.0950	0.1240	0.1095				
			10	0.0960	0.1255	0.1108				
			11	0.0970	0.1265	0.1117				
			12	0.0975	0.1270	0.1123				
			13	0.0980	0.1280	0.1130				
			1st Release	14	14	0.0550		0.0600	0.0575	++
					15	0.0530		0.0560	0.0545	
					16	0.0530		0.0560	0.0545	
			2nd Appli.	14	17	0.0530		0.0560	0.0545	+
19	0.1010	0.1340			0.1175					
20	0.1030	0.1370			0.1200					
21	0.1040	0.1380			0.1210					
22	0.1050	0.1390			0.1220					
23	0.1050	0.1400			0.1225					
2nd Release	14	24	0.0620	0.0690	0.0655	++				
		25	0.0600	0.0670	0.0635					
		26	0.0590	0.0670	0.0630					
		27	0.0590	0.0660	0.0625					
		28	0.0590	0.0660	0.0625					
		3rd Appli.	14	29	0.1060		0.1420	0.1245	+	
30	0.1085			0.1445	0.1265					
31	0.1090			0.1455	0.1275					

+ End point deflection  
 ++ End point rebound deflection



Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No.1	No.2	Average	
4500	3rd Appli.	14	32	0.1095	0.1460	0.1278	
			33	0.1100	0.1470	0.1285	
	3rd Release	14	34	0.0660	0.0740	0.0700	
			35	0.0650	0.0730	0.0690	++
			36	0.0645	0.0720	0.0683	
			37	0.0640	0.0720	0.0680	
	4th Appli.	14	38	0.1100	0.1470	0.1285	
			39	0.1120	0.1490	0.1305	
			40	0.1120	0.1500	0.1310	*
			41	0.1130	0.1510	0.1320	
			42	0.1130	0.1510	0.1320	
	4th Release	14	43	0.0700	0.0800	0.0750	
			44	0.0680	0.0770	0.0725	
			45	0.0680	0.0770	0.0725	++
			46	0.0670	0.0760	0.0715	
			47	0.0670	0.0760	0.0715	
	5th Appli.	14	48	0.1150	0.1525	0.1338	
			49	0.1160	0.1535	0.1348	*
			50	0.116	0.1540	0.1350	
			51	0.1165	0.1550	0.1358	
	5th Release	14	52	0.0730	0.0825	0.0778	
			53	0.0700	0.0800	0.0750	
			54	0.0700	0.0800	0.0750	++
			55	0.0700	0.0800	0.0750	
	6th Appli.	14	56	0.1170	0.1520	0.1345	

\* End point deflection  
 ++ End point rebound deflection

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No.1	No.2	Average	
4500	6th Appli.	14	57	0.1180	0.1525	0.1353	*
			58	0.1185	0.1530	0.1358	
			59	0.1185	0.1530	0.1358	
	6th Release	15	00	0.0750	0.0850	0.0800	
			01	0.0735	0.0830	0.0783	
			02	0.0730	0.0820	0.0775	++
			03	0.0725	0.0820	0.0773	
6300	1st Appli.	15	14	0.1615	0.2050	0.1833	
			15	0.1630	0.2085	0.1858	
			16	0.1640	0.2090	0.1865	*
			17	0.1645	0.2090	0.1868	
			18	0.1650	0.2090	0.1870	
			1st Release	15	19	0.0980	0.1150
	1st Release	15	20	0.0950	0.1120	0.1035	
			21	0.0945	0.1110	0.1028	++
			22	0.0940	0.1100	0.1020	
			23	0.0940	0.1100	0.1020	
			2nd Appli.	15	27	0.1685	0.2150
	2nd Appli.	15	28	0.1700	0.2160	0.1930	
			29	0.1705	0.2165	0.1935	*
			30	0.1710	0.2170	0.1940	
			31	0.1720	0.2180	0.1950	
	2nd Release	15	32	0.1050	0.1230	0.1140	
			33	0.1020	0.1210	0.1115	
			34	0.1010	0.1200	0.1105	++
			35	0.1005	0.1200	0.1103	

\* End point deflection  
 ++ End point rebound deflection

ตารางที่ ง-1(ตบ)

LP-6

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
6300	3rd Appli.	15	41	0.1750	0.2210	0.1980	
			42	0.1770	0.2230	0.2000	
			43	0.1780	0.2235	0.2008	*
			44	0.1780	0.2240	0.2010	
			45	0.1785	0.2240	0.2013	
	3rd Release	15	46	0.1110	0.1330	0.1220	
			47	0.1080	0.1280	0.1180	
			48	0.1070	0.1280	0.1175	++
			49	0.1070	0.1280	0.1175	
			50	0.1065	0.1280	0.1173	
	4th Appli.	15	56	0.1820	0.2310	0.2065	
			57	0.1835	0.2320	0.2078	
			58	0.1840	0.2325	0.2083	*
			59	0.1850	0.2330	0.2090	
			16 00	0.1850	0.2335	0.2093	
4th Release	16	01	0.1135	0.1335	0.1233		
		02	0.1110	0.1300	0.1205		
		03	0.1105	0.1300	0.1203	++	
		04	0.1100	0.1290	0.1195		
		05	0.1100	0.1290	0.1195		
5th Appli.	16	10	0.1890	0.2400	0.2145		
		11	0.1910	0.2420	0.2165		
		12	0.1915	0.2420	0.2168	*	
		13	0.1915	0.2430	0.2173		
14	0.1920	0.2430	0.2175				
5th Release	16	15	0.1240	0.1450	0.1345		

\* End point deflection  
 ++ End point rebound deflection

ตารางที่ ง-1(ตบ)

LP-7

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
6300	5th Release	16	16	0.1190	0.1410	0.1300	
			17	0.1180	0.1410	0.1295	++
			18	0.1180	0.1410	0.1295	
			19	0.1175	0.1410	0.1293	
	6th Appli.	16	24	0.1950	0.2450	0.2200	
			25	0.1965	0.2460	0.2213	
			26	0.1970	0.2465	0.2218	*
			27	0.1980	0.2465	0.2223	
	28	0.1980	0.2470	0.2225			
	6th Release	16	29	0.1245	0.1480	0.1363	
			30	0.1210	0.1420	0.1315	
			31	0.1200	0.1415	0.1308	++
			32	0.1195	0.1410	0.1303	
			33	0.1190	0.1405	0.1298	

\* End point deflection  
 ++ End point rebound deflection

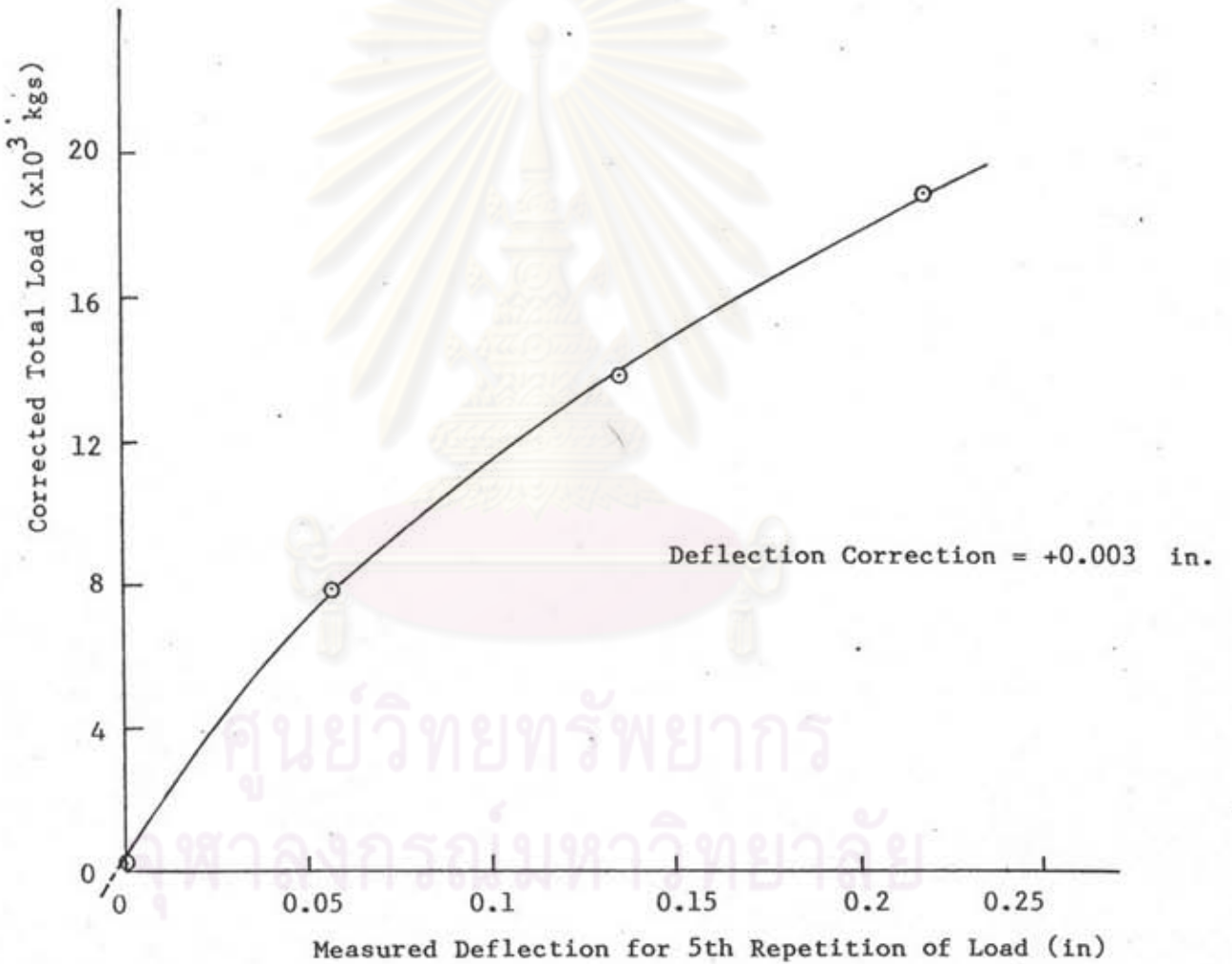
ตารางที่ ง-2 สรุปผลการวัดค่าการทรุดตัวของสนามบิน จังหวัดลำปาง

Applied Load				Measured Deflection Values in inches For Load Application No.					
Jack	Reading	Dead Load (kg)	Correct- ed. Total Load (kg.)	1	2	3	4	5	6
Gauge (lb)	Corrected (kg.)								
2400	7600	356	7956	0.0440	0.0520	0.0518	0.0545	0.0568	0.0580
4500	13500	356	13856	0.1118	0.1210	0.1273	0.1310	0.1348	0.1353
6300	18500	356	18856	0.1865	0.1935	0.2008	0.2083	0.2168	0.2218



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

### LAMPANG AIRPORT



รูปที่ ง-1 การปรับแก้ค่าการทรุดตัวที่วัดได้จากการทดสอบ

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : LAMPANG AIRPORT Date : FEBRUARY 9, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : STA.#+258 Tested by :

WATER CONTENT DETERMINATION

Container No.	TH12
Wt. Container + Wet Soil (gm)	382.8
Wt. Container + Dry Soil (gm)	361.6
Wt. Water (gm)	31.3
Wt. Container (gm)	34.2
Wt. Dry Soil (gm)	317.3
Water Content (%)	9.86

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	242	68.7	
0.050	427	142.3	
0.075	612	204.8	
0.100	842	280.7	
0.150	1367	456.7	
0.200	1897	632.3	
0.250	2297	765.7	
0.300	2527	842.3	
0.350	2807	936.7	
0.400	2857	945.7	
0.450			
0.500			

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : LAMPANG AIRPORT Date : FEBRUARY 14, 1989  
Description of sample : SUBGRADE Tested condition : SOAKED  
Location : STA.#+258 Tested by :

WATER CONTENT DETERMINATION

Container No.	229
Wt. Container + Wet Soil (gm)	486.6
Wt. Container + Dry Soil (gm)	315.4
Wt. Water (gm)	91.2
Wt. Container (gm)	34.8
Wt. Dry Soil (gm)	280.8
Water Content (%)	32.48

FIELD CBR TEST LOAD DATA

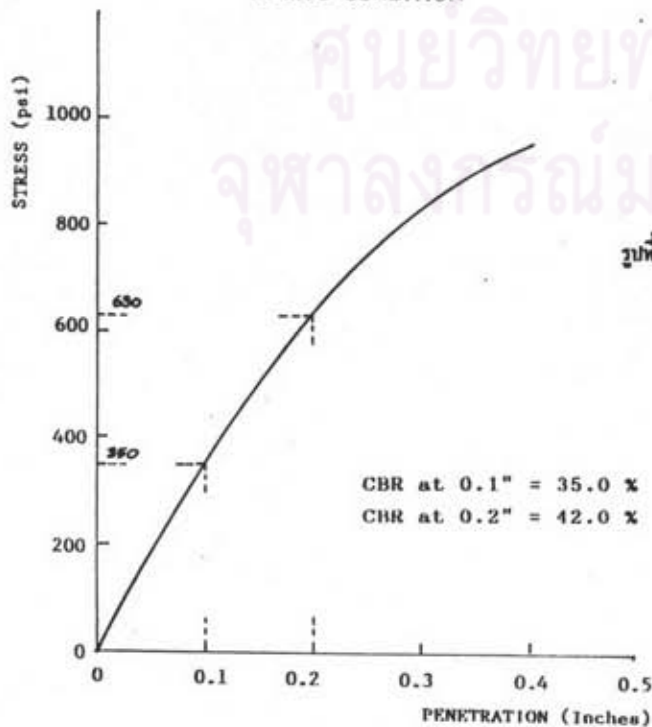
PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	76	25.1	
0.050	77	25.9	
0.075	77	26.9	
0.100	88	26.7	
0.150	98	30.8	
0.200	102	34.2	
0.250	112	37.6	
0.300	128	40.1	
0.350	126	41.7	
0.400	147	49.2	
0.450	162	54.2	
0.500	185	61.7	

STRESS - PENETRATION CURVE

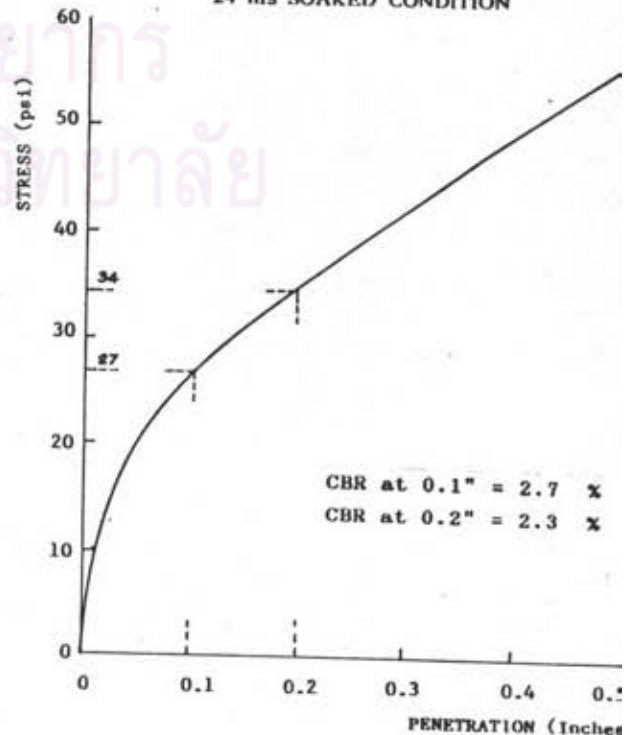
Description of sample : SUBGRADE  
Location : Sta.#+250

Sample from : LAMPANG AIRPORT  
Date : February 1989

IN-SITU CONDITION



24 hrs SOAKED CONDITION



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : LAMPANG AIRPORT Date : FEBRUARY 9, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : STA. 1+100 Tested by :

WATER CONTENT DETERMINATION

Container No.		CX7
Wt. Container + Wet Soil (gm)		356.3
Wt. Container + Dry Soil (gm)		317.9
Wt. Water (gm)		38.4
Wt. Container (gm)		84.3
Wt. Dry Soil (gm)		233.6
Water Content (%)		16.43

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	427	142.3	
0.050	512	170.7	
0.075	587	195.7	
0.100	692	230.7	
0.150	777	259.0	
0.200	872	290.7	
0.250	952	317.3	
0.300	1032	344.0	
0.350	1127	375.7	
0.400	1197	399.0	
0.450	1262	433.3	
0.500	1307	435.7	

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : LAMPANG AIRPORT Date : FEBRUARY 18, 1989  
Description of sample : SUBGRADE Tested condition : SOAKED  
Location : STA. 1+100 Tested by :

WATER CONTENT DETERMINATION

Container No.		C29
Wt. Container + Wet Soil (gm)		386.2
Wt. Container + Dry Soil (gm)		380.0
Wt. Water (gm)		85.2
Wt. Container (gm)		35.2
Wt. Dry Soil (gm)		204.8
Water Content (%)		32.22

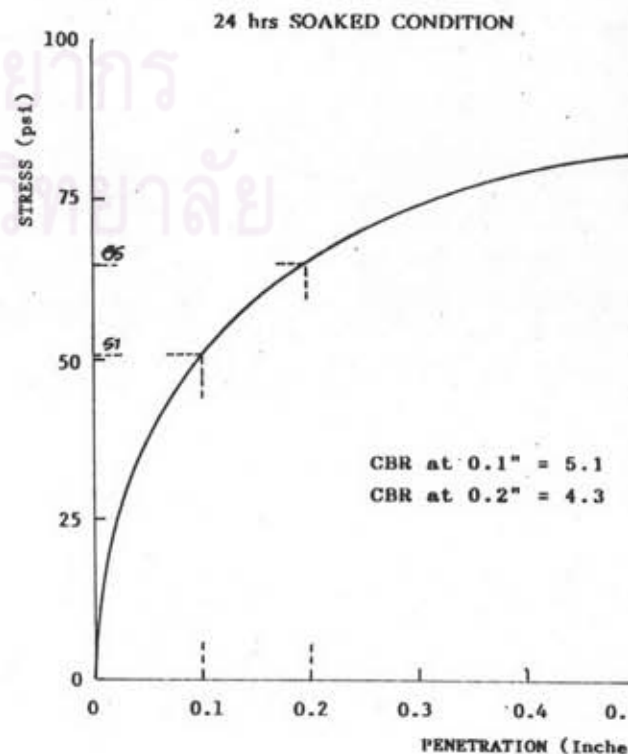
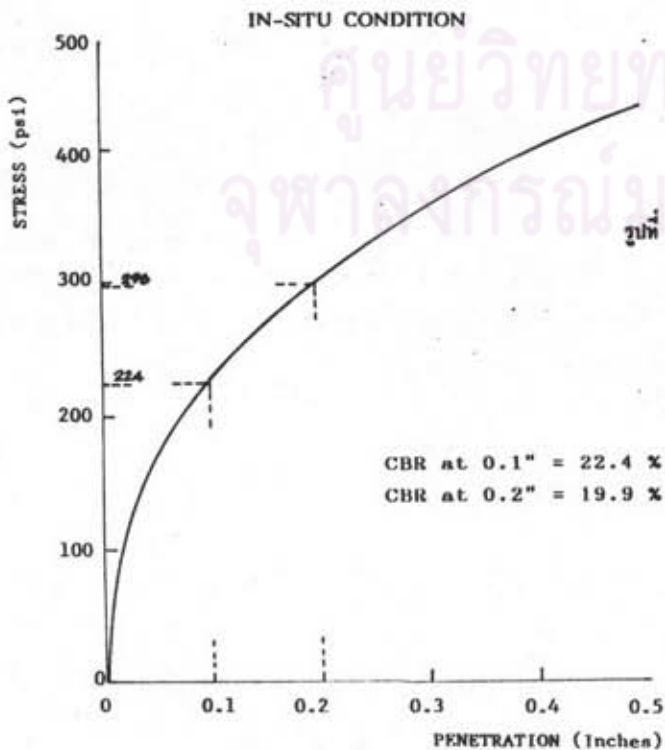
FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	102	34.2	
0.050	117	39.2	
0.075	137	45.9	
0.100	162	54.0	
0.150	178	59.3	
0.200	198	66.0	
0.250	207	69.0	
0.300	217	72.3	
0.350	232	77.3	
0.400	240	80.0	
0.450	245	81.7	
0.500	252	84.0	

STRESS - PENETRATION CURVE

Description of sample : SUBGRADE  
Location : Sta. 1+100

Sample from : LAMPANG AIRPORT  
Date : February 1989



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : LAMPANG AIRPORT Date : FEBRUARY 9, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : APRON Tested by :

WATER CONTENT DETERMINATION

Container No.	B12
Wt. Container + Wet Soil (gm)	453.6
Wt. Container + Dry Soil (gm)	415.2
Wt. Water (gm)	38.4
Wt. Container (gm)	38.8
Wt. Dry Soil (gm)	376.4
Water Content (%)	10.20

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	471	167.0	
0.050	711	237.0	
0.075	911	303.7	
0.100	1111	370.3	
0.150	1301	460.3	
0.200	1601	533.7	
0.250	1841	613.7	
0.300	2021	677.0	
0.350	2121	707.0	
0.400	2190	732.0	
0.450			
0.500			

FIELD CALIFORNIA BEARING RATIO TEST 205

Sample from : LAMPANG AIRPORT Date : FEBRUARY 11, 1989  
Description of sample : SUBGRADE Tested condition : SOAKED  
Location : APRON Tested by :

WATER CONTENT DETERMINATION

Container No.	L12
Wt. Container + Wet Soil (gm)	316.6
Wt. Container + Dry Soil (gm)	264.4
Wt. Water (gm)	52.2
Wt. Container (gm)	35.6
Wt. Dry Soil (gm)	228.8
Water Content (%)	22.8

FIELD CBR TEST LOAD DATA

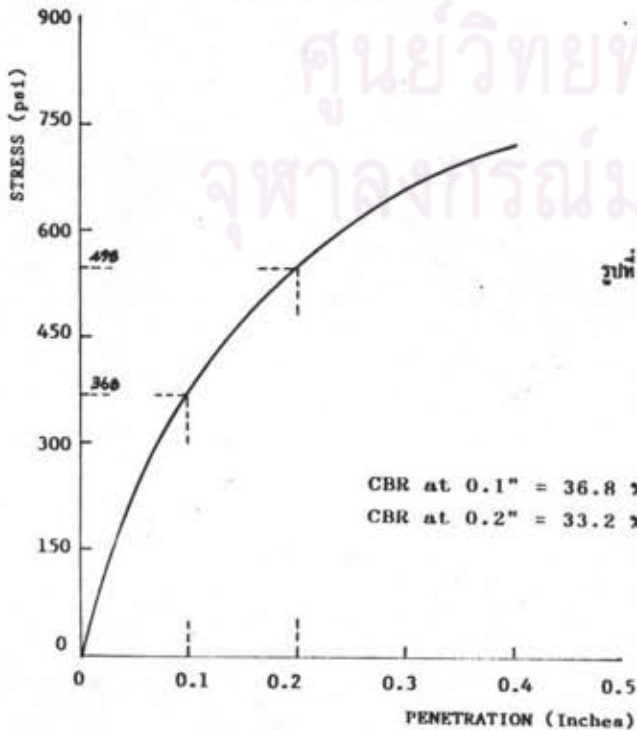
PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	389	129.7	
0.050	609	203.0	
0.075	804	268.0	
0.100	949	316.3	
0.150	1184	394.7	
0.200	1384	461.3	
0.250	1460	489.7	
0.300	1500	500.0	
0.350	1526	508.3	
0.400			
0.450			
0.500			

STRESS - PENETRATION CURVE

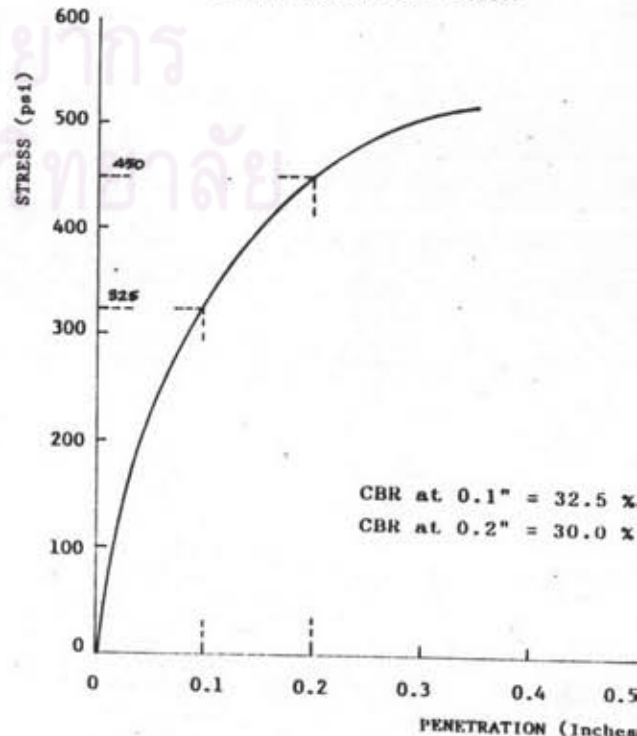
Description of sample : SUBGRADE  
Location : Sta. APRON

Sample from : LAMPANG AIRPORT  
Date : February 1989

IN-SITU CONDITION



24 hrs SOAKED CONDITION



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : LAMPANG AIRPORT Date : FEBRUARY 10, 1989  
Description of sample : SUBBASE Tested condition : IN-SITU  
Location : APRON Tested by :

WATER CONTENT DETERMINATION

Container No.	242
Wt. Container + Wet Soil (gm)	412.6
Wt. Container + Dry Soil (gm)	382.8
Wt. Water (gm)	29.7
Wt. Container (gm)	49.5
Wt. Dry Soil (gm)	333.3
Water Content (%)	8.91

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	261	87.8	
0.050	326	108.7	
0.075	371	123.7	
0.100	416	138.7	
0.150	466	162.8	
0.200	521	173.7	
0.250	546	182.8	
0.300	561	187.8	
0.350	596	198.7	
0.400	601	208.3	
0.450	611	203.7	
0.500	646	215.3	

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : LAMPANG AIRPORT Date : FEBRUARY 11, 1989  
Description of sample : SUBBASE Tested condition : SOAKED  
Location : APRON Tested by :

WATER CONTENT DETERMINATION

Container No.	211
Wt. Container + Wet Soil (gm)	483.6
Wt. Container + Dry Soil (gm)	393.8
Wt. Water (gm)	89.8
Wt. Container (gm)	35.6
Wt. Dry Soil (gm)	358.2
Water Content (%)	30.51

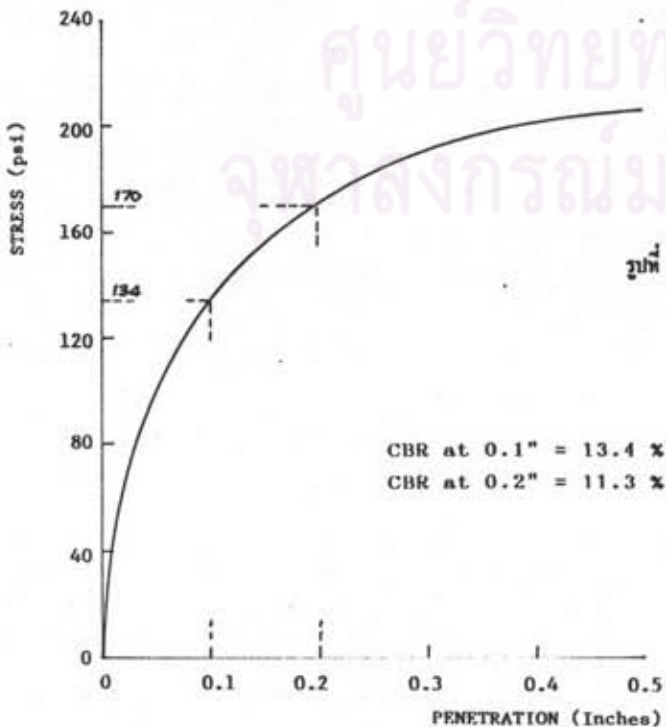
FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	109	36.2	
0.050	124	41.2	
0.075	144	47.9	
0.100	159	52.9	
0.150	179	59.5	
0.200	196	65.4	
0.250	216	72.8	
0.300	239	79.5	
0.350	261	87.8	
0.400	284	94.5	
0.450	296	96.7	
0.500	311	103.7	

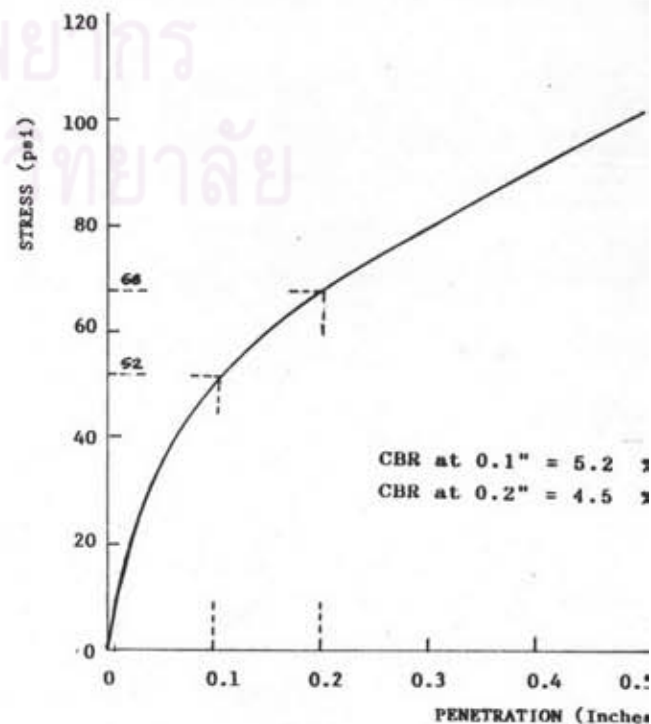
STRESS - PENETRATION CURVE

Description of sample : SUBBASE Sample from : LAMPANG AIRPORT  
Location : Sta. APRON Date : February 1989

IN-SITU CONDITION



24 hrs SOAKED CONDITION





FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

COMPACTION CURVE

COMPACTION TEST

DESCRIPTION OF SAMPLE : SUBGRADE | DATE : APRIL 24, 1989

SAMPLE FROM : LAMPANG AIRPORT

COURSE : SUBGRADE

DATE : MARCH 24, 1989

LOCATION : APRON

TEST BY : PPP

TYPE OF TEST : MODIFIED PROCTOR

55 BLOWS ON EACH OF 5 LAYERS

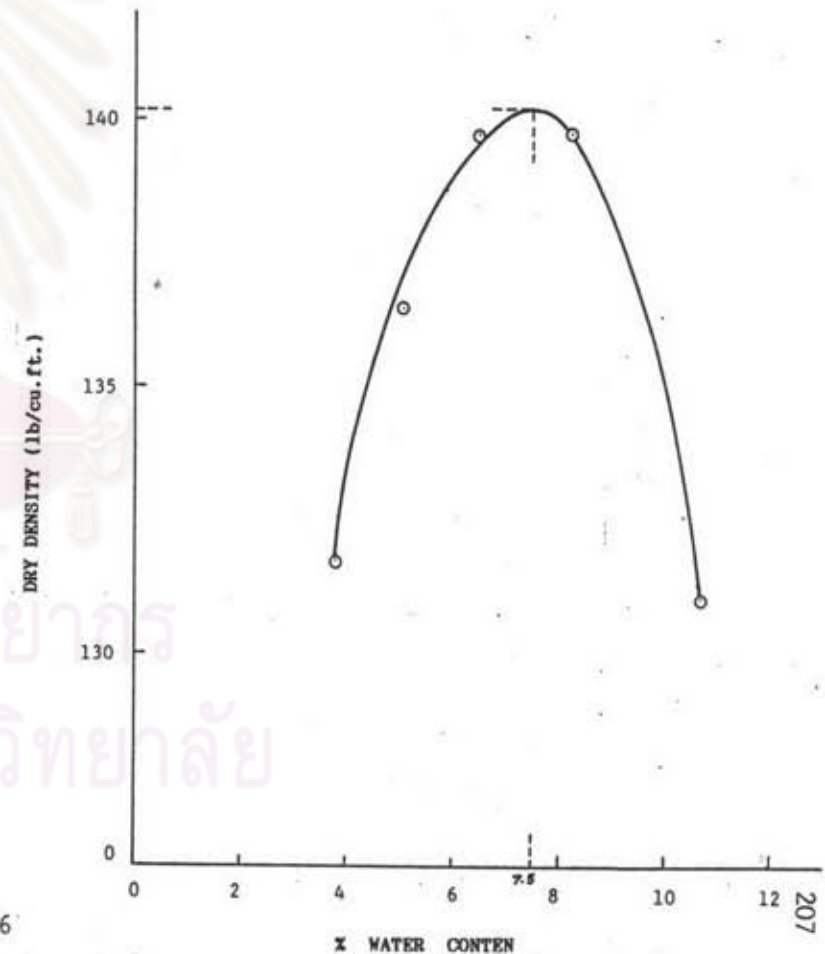
10 lb. HAMMER 18 in. DROP | MOLD NO. 3 | VOLUME OF MOLD 0.0738 cu.ft.

SAMPLE FROM : LAMPANG

LOCATION : APRON

Determination No.	1	2	3	4	5
Wt. mold+soil lb.	19.27	19.76	20.16	20.33	19.88
Wt. mold lb.	9.21	9.21	9.21	9.21	9.21
Wt. soil lb.	10.06	10.55	10.95	11.12	10.67
Av. water content, %	3.77	5.17	6.52	8.16	10.70
Moist density pcf.	136.68	143.34	148.78	151.09	144.97
Dry density pcf.	131.71	136.29	139.67	139.69	130.96

Water content from	T		B		T		B		T		B	
Container No.	X9	H14	B2	Z27	C46	B3	H43	C36	Z16	Z34		
Wt. cont. + wet soil gm.	215.5	206.5	230.2	200.0	209.0	191.4	188.0	201.5	186.5	216.5		
Wt. cont. + dry soil gm.	209.2	200.0	220.8	191.8	198.7	181.6	175.8	189.4	171.5	199.2		
Wt. water gm.	6.3	6.5	9.4	8.2	10.3	9.8	12.2	12.1	15.0	17.3		
Wt. container gm.	34.5	34.0	38.0	34.0	34.0	37.0	34.0	32.5	35.0	33.0		
Wt. dry soil gm.	174.7	166.0	182.8	157.8	164.7	144.6	141.8	156.9	136.5	166.2		
Water content %	3.61	3.92	5.14	5.20	6.25	6.78	8.60	7.71	10.99	10.41		
Av. water content %	3.77		5.17		6.52		8.16		10.70			



รูปที่ 4-6

COMPACTION TEST

SAMPLE FROM : LAMPANG AIRPORT

COURSE : SUBBASE

LOCATION : APRON

TYPE OF TEST : MODIFIED PROCTOR

10 lb. HAMMER 18 in. DROP

DATE : APRIL 27, 1989

TEST BY : PIP

55 BLOWS ON EACH OF 5 LAYERS

MOLD NO. 13 VOLUME OF MOLD 0.0736 cu.ft.

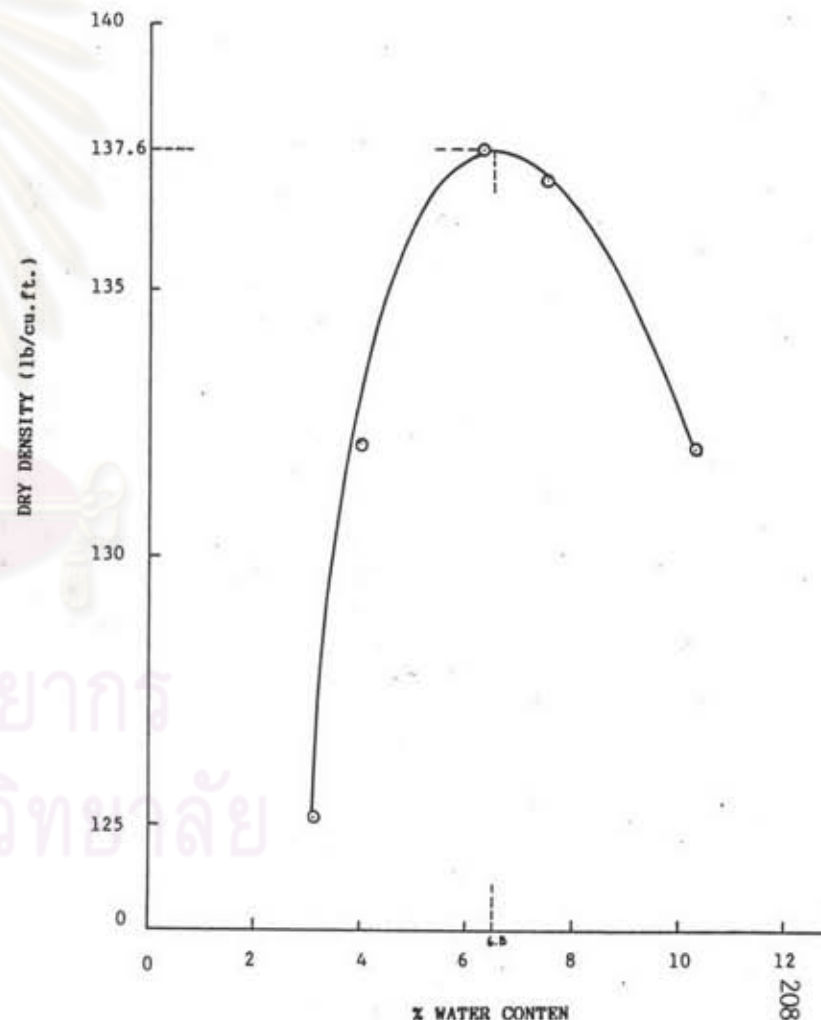
Determination No.	1	2	3	4	5
Wt. mold/soil lb.	18.80	19.49	20.07	20.15	19.846
Wt. mold lb.	9.31	9.31	9.31	9.31	9.31
Wt. soil lb.	9.49	10.18	10.76	10.84	10.53
Av. water content, %	3.09	4.75	6.24	7.50	10.37
Moist density pcf.	128.94	138.32	146.20	147.28	143.07
Dry density pcf.	125.08	132.04	137.61	137.00	132.02

Water content from	T	B	T	B	T	B	T	B	T	B
Container No.	C36	H43	C46	Z29	B2	L12	CX7	TH12	X9	C50
Wt. cont. + wet soil gm.	136.0	129.8	141.9	147.8	179.8	145.3	221.1	187.9	199.8	182.4
Wt. cont. + dry soil gm.	133.1	126.8	137.3	142.4	171.6	138.8	211.0	177.8	186.7	171.3
Wt. water gm.	2.9	3.0	4.6	5.4	8.2	6.5	10.1	10.1	13.1	11.1
Wt. container gm.	33.7	34.9	35.0	34.6	38.8	35.7	84.3	34.2	35.5	34.0
Wt. dry soil gm.	99.4	91.9	102.3	107.8	132.8	103.1	126.7	143.6	151.2	137.3
Water content %	2.92	3.26	4.50	5.00	6.17	6.30	7.97	7.03	10.66	10.08
Av. water content %	3.09		4.75		6.24		7.50		10.37	

COMPACTION CURVE

DESCRIPTION OF SAMPLE : SUBBASE DATE : APRIL 27, 1989

SAMPLE FROM : LAMPANG AIRPORT LOCATION : APRON



FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

COMPACTION TEST

SAMPLE FROME : LAMPANG AIRPORT  
COURSE : BASE  
LOCATION : APRON  
TYPE OF TEST : MODIFIED PROCTOR  
10 lb. HAMMER 18 in. DROP

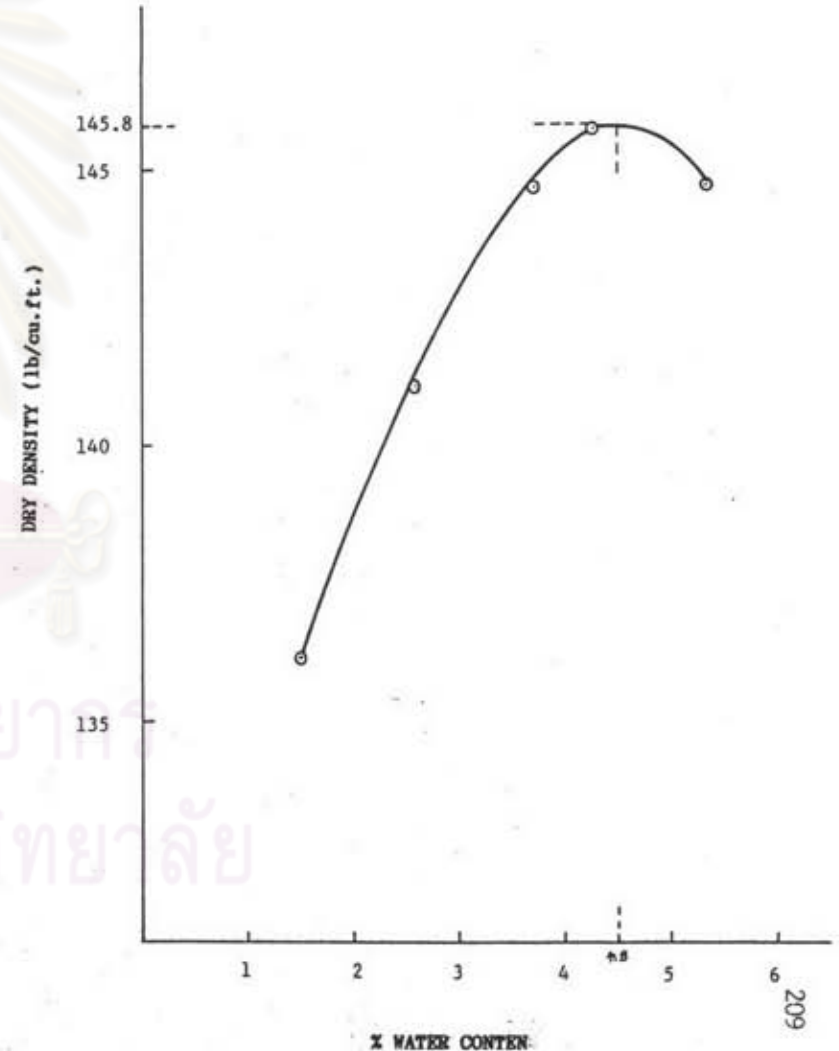
DATE : APRIL 27, 1989  
TEST BY : PPP  
55 BLOWS ON EACH OF 5 LAYERS  
MOLD NO. 13 VOLUME OF MOLD 0.0736 cu.ft.

Determination No.	1	2	3	4	5
Wt.mold+soil lb.	19.27	19.88	20.22	20.19	19.97
Wt.mold lb.	9.31	9.31	9.31	9.31	9.31
Wt.soil lb.	10.18	10.64	11.04	11.19	11.22
Av.water content, %	1.53	2.76	3.82	4.27	5.37
Moist density pcf.	138.32	144.58	149.97	152.04	152.45
Dry density pcf.	136.24	140.70	144.45	145.81	144.68

Water content from	T	B	T	B	T	B	T	B	T	B
Container No.	C43	E1	E3	T2	21	36	E10	L7	Z11	Z42
Wt.cont.+ wet soil gm.	97.5	93.3	78.9	84.8	194.2	122.4	109.9	135.2	171.7	203.5
Wt.cont.+ dry soil gm.	96.2	92.0	76.9	82.9	91.1	118.6	106.1	130.7	164.8	195.6
Wt.water gm.	1.3	1.3	2.0	1.9	3.1	3.8	3.8	4.5	6.9	7.9
Wt.container gm.	8.9	8.9	8.9	8.9	8.8	20.5	21.5	19.7	35.5	49.0
Wt.dry soil gm.	87.3	83.1	68.0	74.0	82.3	98.1	84.6	111.0	129.3	146.6
Water content %	1.49	1.56	2.94	2.57	3.77	3.87	4.49	4.05	5.34	5.39
Av. water content %	1.53		2.760		3.82		4.27		5.37	

COMPACTION CURVE

DESCRIPTION OF SAMPLE : BASE DATE : APRIL 27, 1989  
SAMPLE FROM : LAMPANG AIRPORT LOCATION : APRON



รูปที่ ง-8

### STRESS - PENETRATION CURVE

DESCRIPTION OF SAMPLE : SUBGRADE

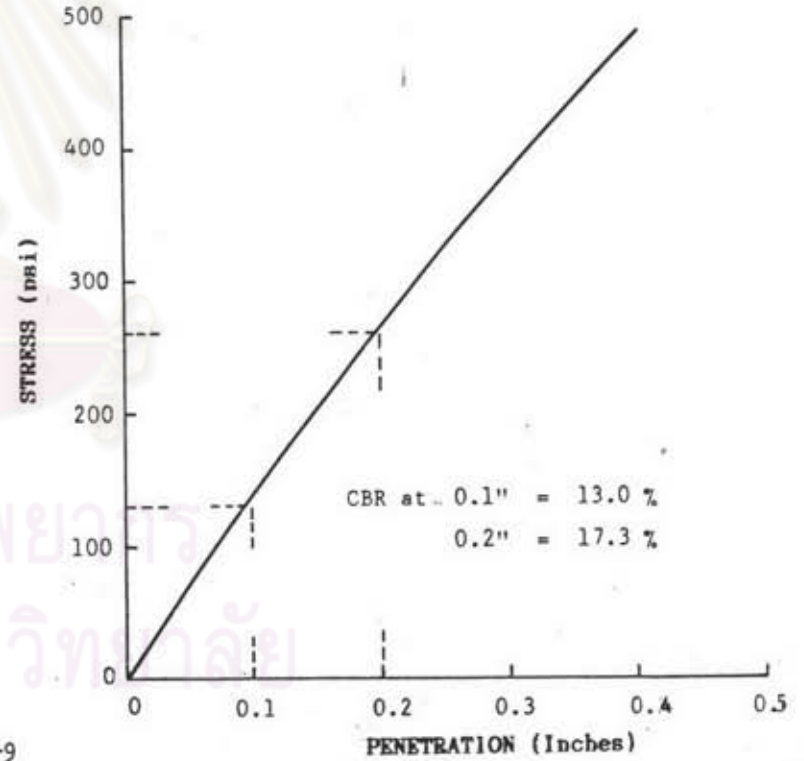
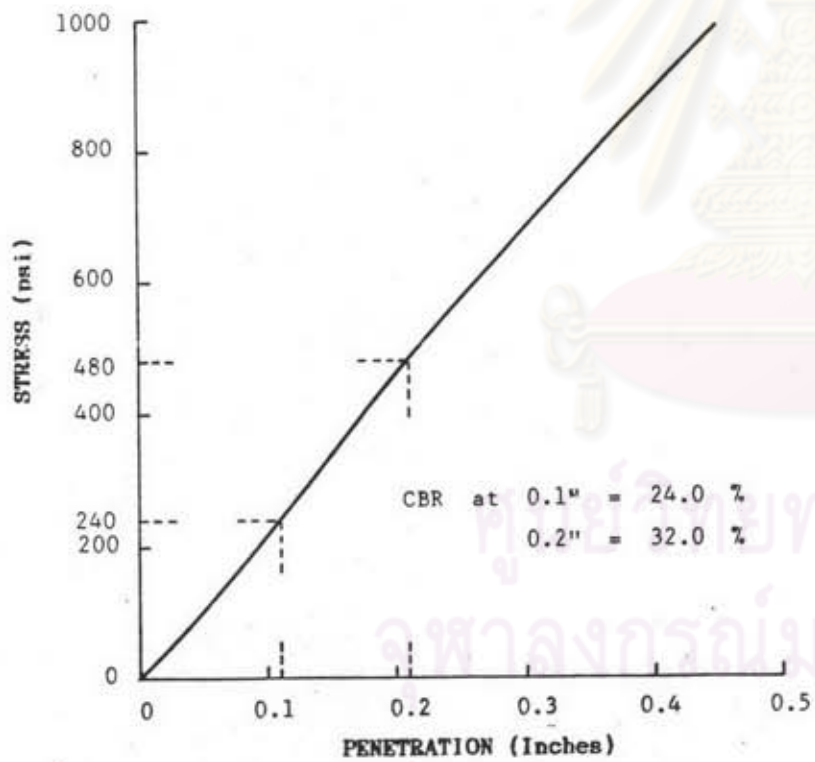
SAMPLE FROM : LAMPANG AIRPORT

LOCATION : APRON

DATE : APRIL 29, 1989

UNSOAKED CONDITION

96 HRS. SOAKED CONDITION



รูปที่ ๔-๑

STRESS - PENETRATION CURVE

DESCRIPTION OF SAMPLE : SUBBASE

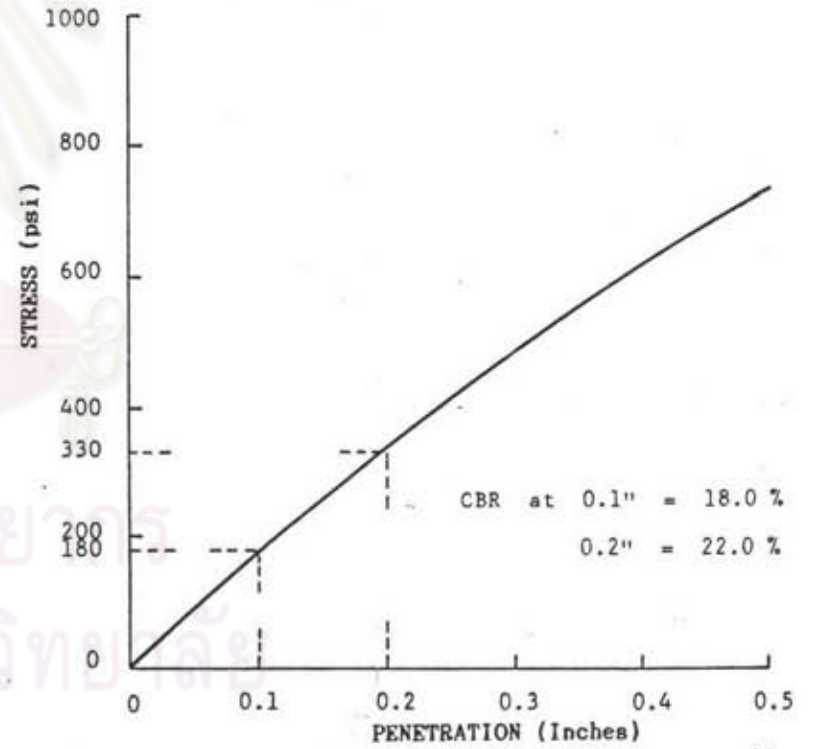
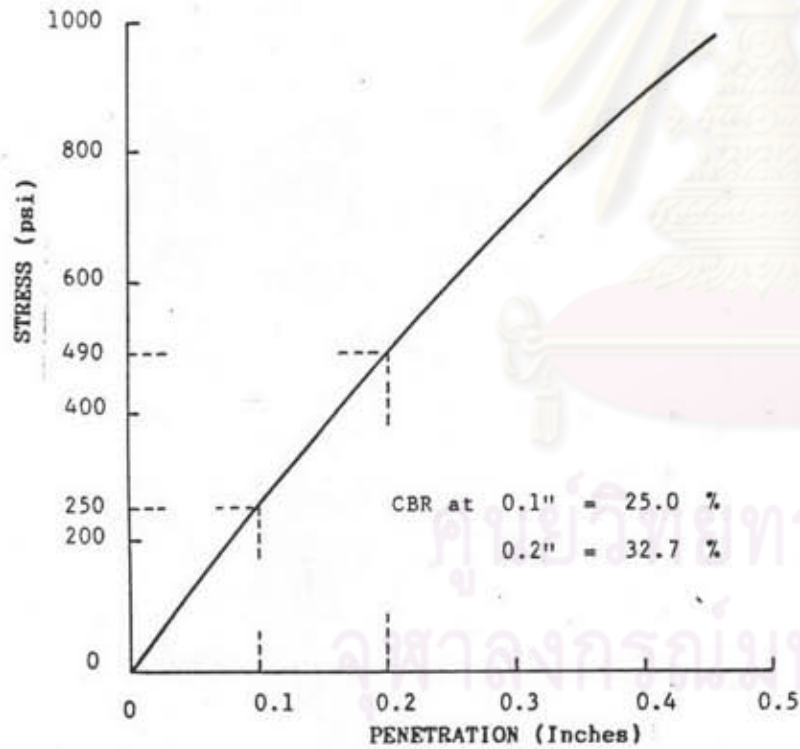
SAMPLE FROM : LAMPANG AIRPORT

LOCATION : APRON

DATE : MAY 4, 1989

UNSOAKED CONDITION

96 HRS. SOAKED CONDITION



STRESS - PENETRATION CURVE

DESCRIPTION OF SAMPLE : BASE

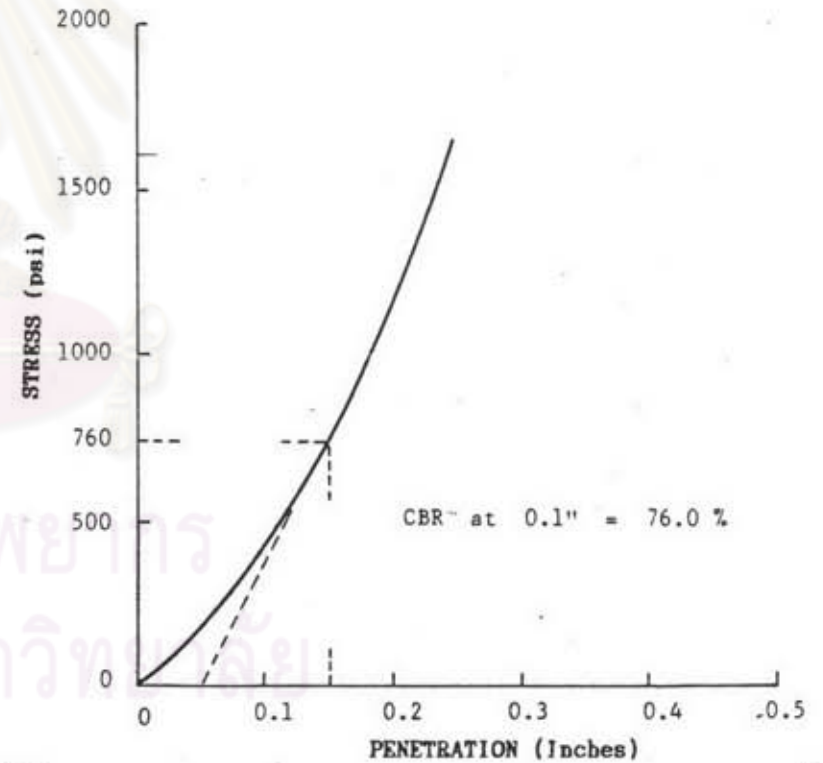
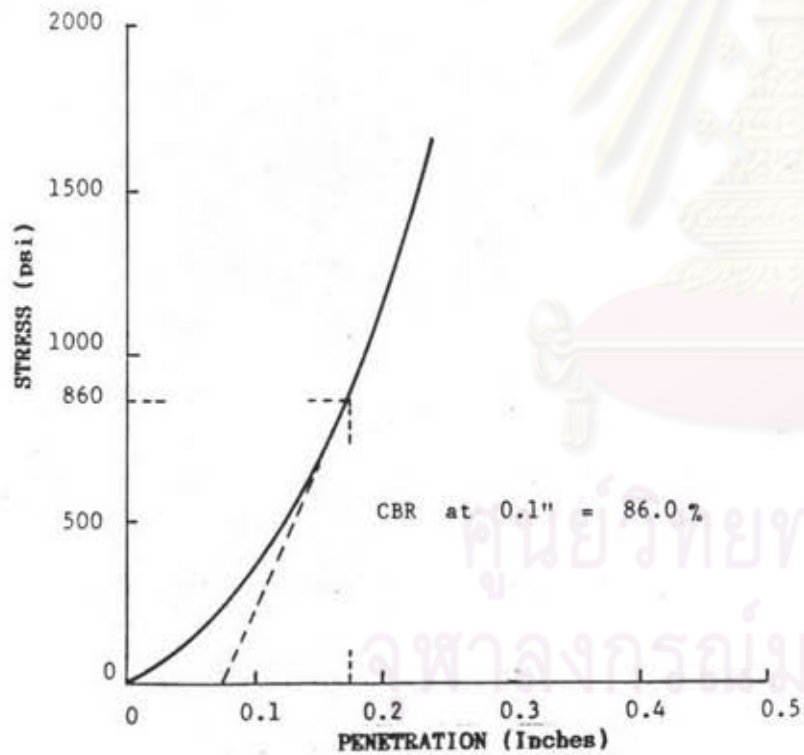
SAMPLE FROM : LAMPANG AIRPORT

LOCATION : APRON

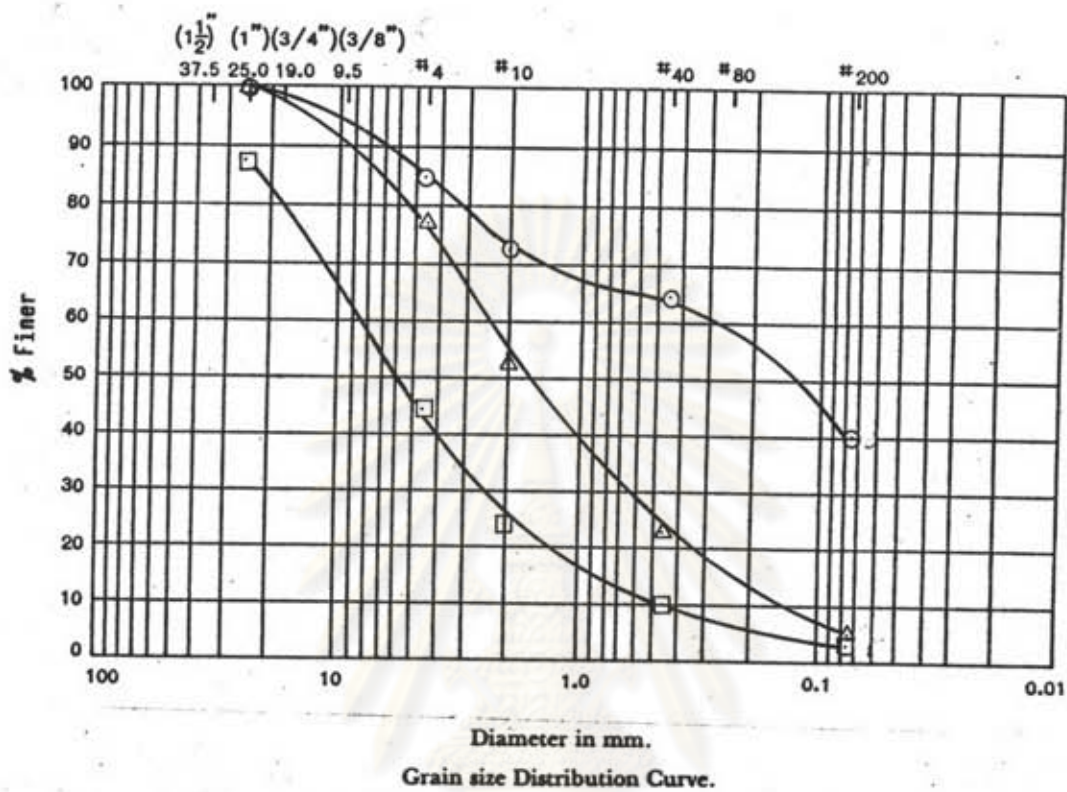
DATE : MAY 4, 1989

UNSOAKED CONDITION

96 HRS. SOAKED CONDITION



รูปที่ 4-11



รูปที่ ง-12 กราฟแสดงการกระจายขนาดผลของเม็ดดิน

- ดินเหนียว
- △ ร่องหินทาง
- หินทาง

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

ภาคผนวก จ

ข้อมูลการทดสอบสนามบิน จ.ศรีสะเกษ



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย



FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

PLATE LOAD TEST DATA SHEET

PROJECT : TRANG AIRPORT  
METHOD OF TEST : REPETITIVE STATIC PLATE LOAD TESTS (ASTM D 1195)  
LOCATION : STA.0+600  
LOAD TEST ON : SUBGRADE TESTED BY : BLW  
WEATHER : FINE DATE : FEBRUARY 14, 1989  
TIME : 21.00 - 03.30 JACK NO. : 31C-02SM  
TEST BEGUN : 22.00 hrs. GAUGE NO. : 12C-03C  
TEST FINISHED : 03.30 hrs. CYLINDER NO. : -  
SEATING LOAD : 2100 kg. SEATING DEFLECTION : 0.0150 in.  
RESEATING LOAD : 1050 kg.  
CORRECTED RESEATING LOAD : 1050 kg.  
DEAD LOAD - PLATE, JACK, etc : 277 kg.

Time (hrs.)	22.00	23.00	24.00	01.00	02.00	03.00
Temp (°C)	26	24	22	20	20	20

ตารางที่ ๓-1

TR-1

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
1600	1st Appli.	22	02	0.0420	0.0380	0.0400	*
			03	0.0430	0.0400	0.0415	
			04	0.0440	0.0400	0.0420	
			05	0.0445	0.0400	0.0423	
			06	0.0450	0.0400	0.0425	
			06	0.0450	0.0400	0.0425	
	1st Release	22	07	0.0130	0.0140	0.0135	++
			08	0.0120	0.0130	0.0125	
			09	0.0120	0.0120	0.0120	
			10	0.0110	0.0120	0.0115	
	2nd Appli.	22	11	0.0420	0.0380	0.0410	*
			12	0.0450	0.0410	0.0430	
			13	0.0470	0.0420	0.0445	
			14	0.0480	0.0420	0.0450	
			15	0.0480	0.0420	0.0450	
			16	0.0480	0.0420	0.0450	
16			0.0480	0.0420	0.0450		
16			0.0480	0.0420	0.0450		
2nd Release	22	17	0.0170	0.0170	0.0170	++	
		18	0.0160	0.0150	0.0155		
		19	0.0150	0.0150	0.0150		
		20	0.0150	0.0150	0.0150		
		21	0.0150	0.0140	0.0145		
3rd Appli.	22	22	0.0470	0.0420	0.0445	*	
		23	0.0490	0.0420	0.0455		
		24	0.0490	0.0430	0.0460		
		25	0.0495	0.0430	0.0463		
		26	0.0500	0.0430	0.0465		
3rd Release	22	27	0.0190	0.0190	0.0190		

\* End point deflection  
++ End point rebound deflection

ตารางที่ ๑-1(ค)

TR-2

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
1600	3rd Release	22	28	0.0180	0.0180	0.0180	++
			29	0.0170	0.0170	0.0170	
			30	0.0170	0.0170	0.0170	
4th Appli.	22	22	31	0.0480	0.0430	0.0455	+
			32	0.0500	0.0430	0.0465	
			33	0.0500	0.0430	0.0465	
			34	0.0500	0.0430	0.0465	
			35	0.0500	0.0430	0.0465	
4th Release	22	22	36	0.0200	0.0200	0.0200	++
			37	0.0190	0.0190	0.0190	
			38	0.0180	0.0180	0.0180	
			39	0.0180	0.0180	0.0180	
5th Appli.	22	22	40	0.0460	0.0400	0.0430	+
			41	0.0500	0.0430	0.0468	
			42	0.0510	0.0435	0.0473	
			43	0.0510	0.0430	0.0470	
			44	0.0520	0.0440	0.0480	
5th Release	22	22	45	0.0220	0.0220	0.0220	++
			46	0.0210	0.0200	0.0205	
			47	0.0200	0.0190	0.0195	
			48	0.0200	0.0190	0.0195	
			49	0.0195	0.0190	0.0193	
6th Appli.	22	22	50	0.0515	0.0445	0.0480	+
			51	0.0525	0.0450	0.0488	
			52	0.0530	0.0455	0.0493	
			53	0.0525	0.0455	0.0495	

+ End point deflection  
 ++ End point rebound deflection

ตารางที่ ๑-1(ค)

TR-3

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks	
		hr.	min.	No. 1	No. 2	Average		
1600	6th Release	22	54	0.0240	0.0230	0.0235	++	
			55	0.0220	0.0210	0.0215		
			56	0.0215	0.0200	0.0208		
			57	0.0210	0.0200	0.0205		
			58	0.0210	0.0200	0.0205		
5400	1st Appli.	23	04	0.1580	0.1420	0.1500	+	
			05	0.1660	0.1480	0.1570		
			06	0.1690	0.1500	0.1595		
			07	0.1720	0.1510	0.1615		
			08	0.1740	0.1525	0.1633		
			09	0.1750	0.1535	0.1643		
			10	0.1760	0.1540	0.1650		
			11	0.1760	0.1540	0.1650		
	1st Release	23	23	11	0.0960	0.0710	0.0835	+
				12	0.0950	0.0690	0.0820	
				13	0.0880	0.0660	0.0770	
				14	0.0870	0.0660	0.0765	
				15	0.0860	0.0650	0.0757	
				16	0.0850	0.0640	0.0745	
				17	0.0850	0.0640	0.0745	
				18	0.0850	0.0640	0.0745	
2nd Appli.	23	23	20	0.1890	0.1630	0.1760	++	
			21	0.1940	0.1670	0.1805		
			22	0.1960	0.1690	0.1825		
			23	0.1985	0.1705	0.1845		
			24	0.1955	0.1715	0.1855		
			25	0.2010	0.1720	0.1865		
			26	0.2010	0.1720	0.1865		
			27	0.2010	0.1720	0.1865		
			28	0.2010	0.1720	0.1865		
2nd Release	23	23	27	0.1250	0.0960	0.1105	++	
			28	0.1150	0.0860	0.1005		
			29	0.1150	0.0850	0.1000		

+ End point deflection  
 ++ End point rebound deflection

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
5400	2nd Release	23	30	0.1150	0.0840	0.0995	
			31	0.1150	0.0830	0.0980	
	3rd Appli.	23	35	0.2125	0.1790	0.1958	
			36	0.2145	0.1800	0.1973	*
			37	0.2155	0.1810	0.1983	*
			38	0.2165	0.1820	0.1993	
			39	0.2170	0.1830	0.2000	
			40	0.1470	0.1130	0.1300	
	3rd Release	23	41	0.1340	0.0990	0.1165	
			42	0.1280	0.0950	0.1115	
			43	0.1270	0.0940	0.1105	++
			44	0.1260	0.0930	0.1095	
			45	0.1255	0.0930	0.1093	
			46	0.1250	0.0930	0.1090	
	4th Appli.	23	49	0.2240	0.1860	0.2050	
			50	0.2270	0.1900	0.2085	
			51	0.2285	0.1900	0.2093	
			52	0.2300	0.1910	0.2105	
			53	0.2310	0.1920	0.2115	*
			54	0.2315	0.1920	0.2118	
			55	0.2320	0.1920	0.2120	
			56	0.2120	0.1480	0.1800	
	4th Release	23	57	0.1450	0.1050	0.1250	
			58	0.1400	0.1030	0.1215	
			59	0.1395	0.1020	0.1208	
			00	0.1370	0.1000	0.1185	
			01	0.1365	0.1000	0.1183	++
			02	0.1360	0.0990	0.1175	

\* End point deflection  
 \*\* End point rebound deflection

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
5400	4th Release	24	03	0.1355	0.0990	0.1173	
			04	0.1355	0.0990	0.1173	
	5th Appli.	24	08	0.2330	0.1920	0.2125	
			09	0.2355	0.1940	0.2148	
			10	0.2365	0.1950	0.2158	*
			11	0.2380	0.1955	0.2168	
			12	0.2385	0.1960	0.2173	
			13	0.1570	0.1180	0.1375	
	5th Release	24	14	0.1515	0.1110	0.1313	
			15	0.1500	0.1100	0.1300	
			16	0.1490	0.1090	0.1290	++
			17	0.1480	0.1080	0.1280	
			18	0.1480	0.1070	0.1275	
			19	0.1480	0.1070	0.1275	
	6th Appli.	24	21	0.2400	0.1970	0.2185	
			22	0.2440	0.2000	0.2220	
			23	0.2450	0.2020	0.2235	
			24	0.2460	0.2030	0.2245	*
			25	0.2465	0.2030	0.2248	
			26	0.2480	0.2030	0.2255	
			27	0.1620	0.1270	0.1445	
			28	0.1590	0.1150	0.1370	
	6th Release	24	29	0.1560	0.1130	0.1345	
			30	0.1555	0.1130	0.1343	++
			31	0.1550	0.1120	0.1335	
			32	0.1540	0.1110	0.1330	
8000	1st Appli.	24	43	0.3450	0.2600	0.3025	
			44	0.3480	0.2630	0.3055	

\* End point deflection  
 \*\* End point rebound deflection

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks	
		hr.	min.	No. 1	No. 2	Average		
8000	1st Appli.	24	45	0.3510	0.2640	0.3075		
			46	0.3540	0.2655	0.3098		
			47	0.3580	0.2670	0.3115		
			48	0.3585	0.2680	0.3133		
			49	0.3590	0.2690	0.3140		
			50	0.3610	0.2700	0.3155		
			51	0.3620	0.2720	0.3175		
			52	0.3640	0.2720	0.3180		
			53	0.3655	0.2730	0.3193		
			54	0.3665	0.2740	0.3203		
			55	0.3680	0.2750	0.3215		
			56	0.3690	0.2755	0.3223	*	
			57	0.3705	0.2760	0.3233		
			58	0.3715	0.2770	0.3243		
		1st Release	24 01	59	0.2800	0.2600	0.2600	
	00			0.2700	0.1740	0.2220		
	01			0.2530	0.1610	0.2070		
02	0.2450			0.1570	0.2010			
03	0.2450			0.1560	0.2005			
04	0.2420			0.1550	0.1985			
05	0.2410			0.1540	0.1975	**		
	2nd Appli.	01	12	0.3910	0.2890	0.3400		
13			0.3960	0.2920	0.3440			
14			0.3990	0.2930	0.3460			
15			0.4010	0.2950	0.3480			
16			0.4030	0.2960	0.3495			
17	0.4040	0.2970	0.3505					

\* End point deflection  
\*\* End point rebound deflection

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks	
		hr.	min.	No. 1	No. 2	Average		
8000	2nd Appli.	01	18	0.4050	0.2980	0.3515		
			19	0.4070	0.2990	0.3530		
			20	0.4080	0.3000	0.3540	*	
			21	0.4090	0.3000	0.3545		
			22	0.4100	0.3000	0.3550		
		2nd Release	01	23	0.3200	0.2050	0.2625	
	24			0.2860	0.1820	0.2340		
	25			0.2830	0.1780	0.2305		
	26			0.2810	0.1770	0.2290		
	27			0.2800	0.1760	0.2280	**	
		3rd Appli.	01	34	0.4220	0.3060	0.3640	
	35			0.4260	0.3090	0.3675		
	36			0.4280	0.3100	0.3690		
	37			0.4300	0.3120	0.3710		
	38			0.4315	0.3125	0.3720		
	39			0.4330	0.3140	0.3735		
	40			0.4340	0.3150	0.3745	*	
	3rd Release	01	42	0.4360	0.3160	0.3760		
43			0.3660	0.2400	0.3030			
44			0.3120	0.2000	0.2560			
45			0.3020	0.1910	0.2465			
46			0.2990	0.1900	0.2445			
			47	0.2960	0.1870	0.2415		
			48	0.2950	0.1860	0.2405	**	
			49	0.2950	0.1860	0.2405		

\* End point deflection  
\*\* End point rebound deflection

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
8000	3rd Release	01	50	0.2940	0.1850	0.2395	
	4th Appli.	01	51	0.3430	0.2300	0.2865	
			52	0.3890	0.2750	0.3320	
			53	0.4150	0.3000	0.3575	
			54	0.4340	0.3140	0.3740	
			55	0.4435	0.3210	0.3823	
			56	0.4460	0.3230	0.3845	
			57	0.4480	0.3245	0.3863	
			58	0.4500	0.3260	0.3880	
	01	59	0.4510	0.3270	0.3890	*	
		02	00	0.4520	0.3280	0.3900	
	4th Release	02	01	0.4530	0.3290	0.3910	
			02	0.3470	0.2200	0.2835	
			03	0.3290	0.2070	0.2680	
			04	0.3260	0.2040	0.2650	
			05	0.3250	0.2040	0.2645	**
			06	0.3240	0.2030	0.2635	
			07	0.3230	0.2020	0.2625	
	5th Appli.	02	11	0.4550	0.3190	0.3870	
12			0.4610	0.3330	0.3970		
13			0.4635	0.3350	0.3993		
14			0.4650	0.3360	0.4005		
15			0.4650	0.3370	0.4010	*	
16			0.4660	0.3380	0.4020		
5th Release	18	18	0.3800	0.2500	0.3150		
		19	0.3420	0.2160	0.2790		

\* End point deflection  
 \*\* End point rebound deflection

Gauge Reading (lb)	No. of Load Application or Release	Time		Deflection Gauge Rdg. (in)			Remarks
		hr.	min.	No. 1	No. 2	Average	
8000	5th Release	02	20	0.3360	0.2120	0.2740	
			21	0.3350	0.2100	0.2725	
			22	0.3340	0.2100	0.2720	**
			23	0.3330	0.2090	0.2710	
	6th Appli.	02	28	0.4740	0.3430	0.4085	
			29	0.4760	0.3450	0.4105	
			30	0.4790	0.3450	0.4120	
			31	0.4800	0.3460	0.4130	*
			32	0.4810	0.3470	0.4140	
			33	0.4815	0.3480	0.4148	
			6th Release	02	34	0.3620	0.2300
	35	0.3510			0.2220	0.2865	
	36	0.3460			0.2180	0.2820	
	37	0.3445			0.2170	0.2808	
	38	0.3425			0.2150	0.2788	
	39	0.3410			0.2140	0.2775	
	40	0.3400			0.2130	0.2765	**
	41	0.3390			0.2120	0.2755	
	42	0.3385			0.2120	0.2753	

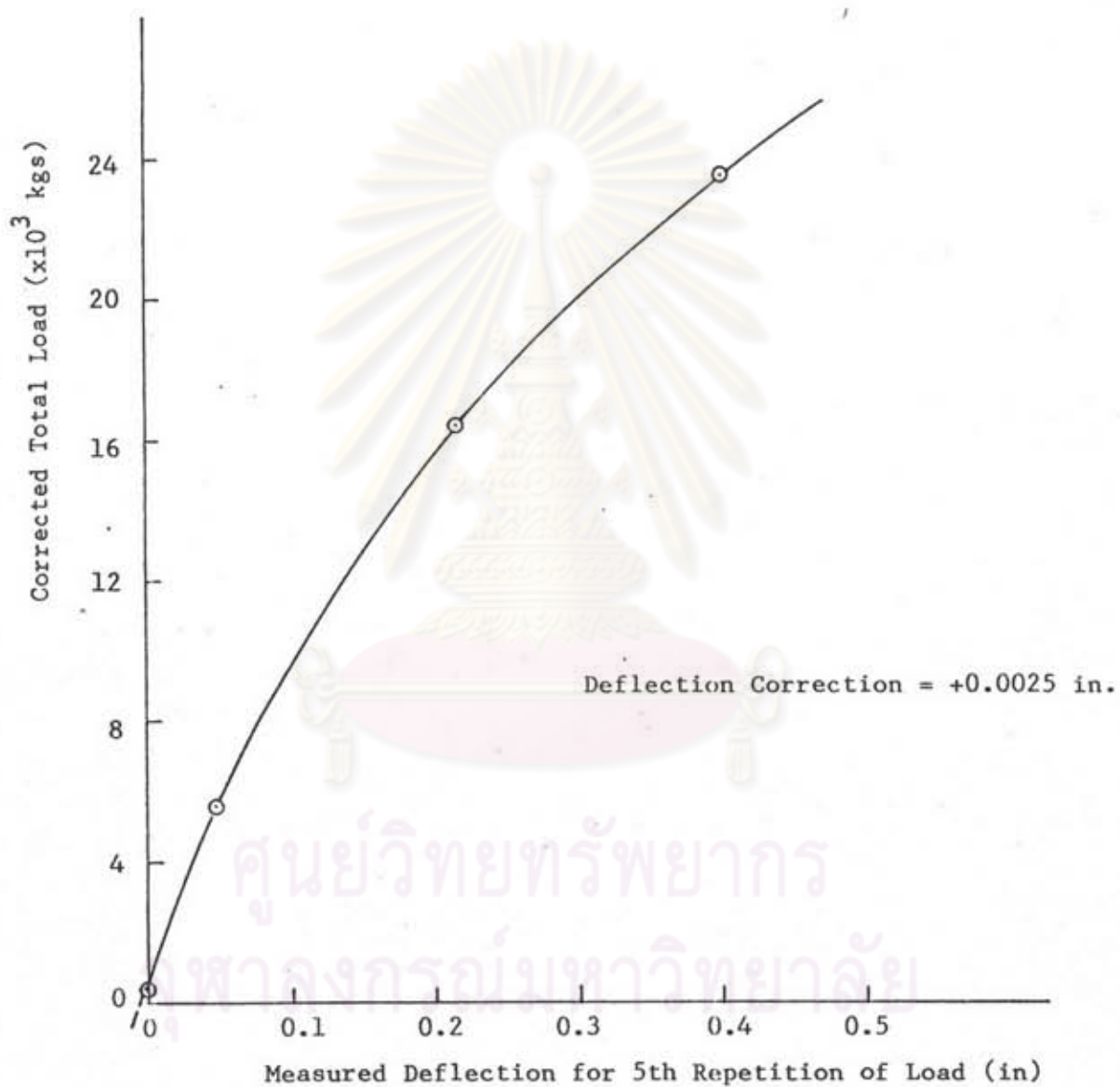
\* End point deflection  
 \*\* End point rebound deflection

ตารางที่ จ-2 สรุปผลการวัดค่าการทรุดตัวสนามบิน จังหวัดศรีสะเกษ

Applied Load				Measured Deflection Values in inches For Load Application No.					
Jack Reading		Dead Load (kg)	Corrected Total Load (kg.)	1	2	3	4	5	6
Gauge (lb)	Corrected (kg.)								
1600	5400	277	5677	0.0420	0.0450	0.0460	0.0465	0.0473	0.0488
5400	16000	277	16277	0.1643	0.1855	0.1983	0.2115	0.2158	0.2245
8000	23300	277	23577	0.3223	0.3540	0.3745	0.3890	0.4010	0.4130

ศูนย์วิทยพัชการ  
จุฬาลงกรณ์มหาวิทยาลัย

## TRANG AIRPORT



รูปที่ จ-1 การปรับแก้ค่าการทรุดค้ำที่วัดได้จากการทดสอบ

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : TRANG AIRPORT Date : FEBRUARY 14, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : STA. 0+600 Tested by :

WATER CONTENT DETERMINATION

Container No.		1
Wt. Container + Wet Soil (gm)		3143.0
Wt. Container + Dry Soil (gm)		2872.0
Wt. Water (gm)		271.0
Wt. Container (gm)		300.0
Wt. Dry Soil (gm)		2572.0
Water Content (%)		10.50

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	155	57.0	
0.050	250	88.6	
0.075	355	123.6	
0.100	450	155.3	
0.150	700	238.6	
0.200	875	297.0	
0.250	1005	340.3	
0.300	1065	360.3	
0.350	1110	375.3	
0.400	1170	395.3	
0.450	1205	407.0	
0.500	1270	428.6	

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : TRANG AIRPORT Date : FEBRUARY 15, 1989  
Description of sample : SUBGRADE Tested condition : SOAKED  
Location : STA. 0+600 Tested by :

WATER CONTENT DETERMINATION

Container No.		CX7
Wt. Container + Wet Soil (gm)		392.3
Wt. Container + Dry Soil (gm)		349.0
Wt. Water (gm)		43.3
Wt. Container (gm)		84.3
Wt. Dry Soil (gm)		264.7
Water Content (%)		16.40

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	175	58.3	
0.050	255	85.0	
0.075	325	108.3	
0.100	385	128.3	
0.150	490	163.3	
0.200	610	203.3	
0.250	680	226.7	
0.300	740	246.7	
0.350	765	255.0	
0.400	800	266.7	
0.450	820	273.3	
0.500	845	281.7	

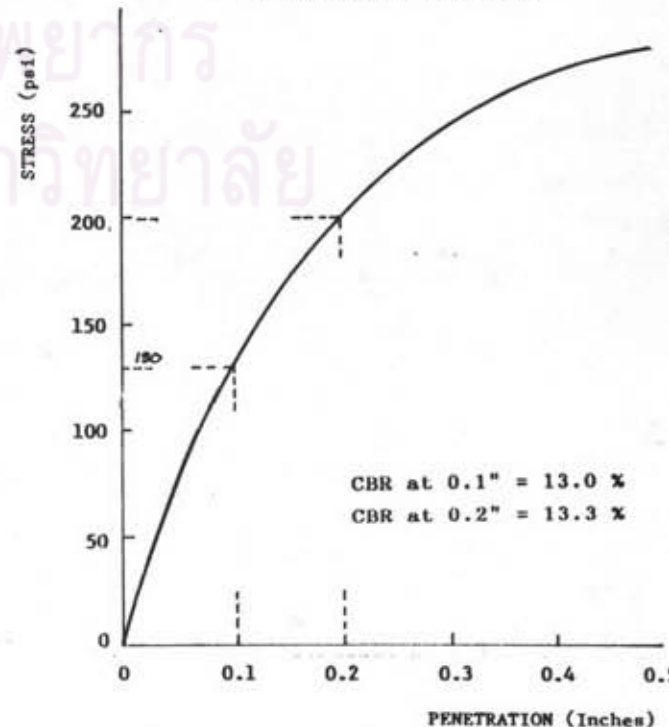
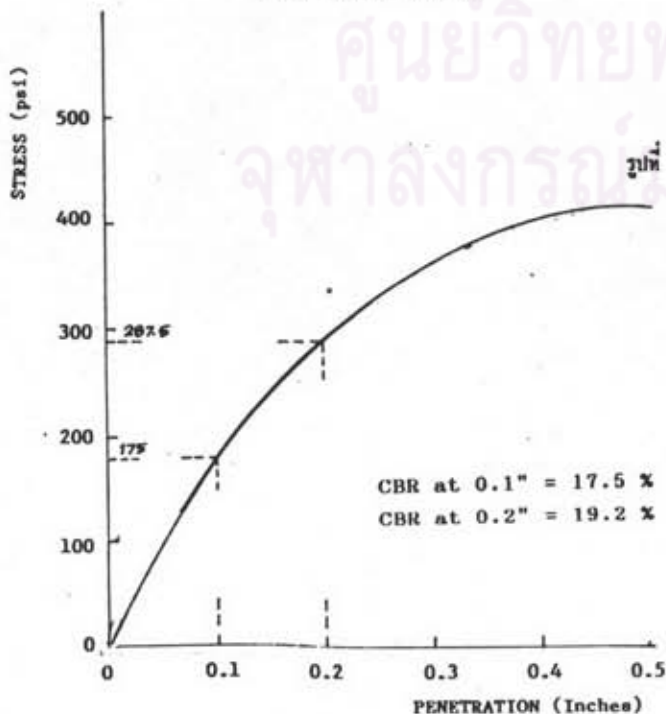
STRESS - PENETRATION CURVE

Description of sample : SUBGRADE  
Location : Sta. 0+600

Sample from : TRANG AIRPORT  
Date : February 1989

IN-SITU CONDITION

24 hrs SOAKED CONDITION





FIELD CALIFORNIA BEARING RATIO TEST

Sample from : TRANG AIRPORT Date : FEBRUARY 14, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : STA. 1+100 Tested by :  
WATER CONTENT DETERMINATION

Container No.		2
Vt. Container + Wet Soil (gm)		3629.5
Vt. Container + Dry Soil (gm)		3400.0
Vt. Water (gm)		221.5
Vt. Container (gm)		355.0
Vt. Dry Soil (gm)		3050
Water Content (%)		7.26

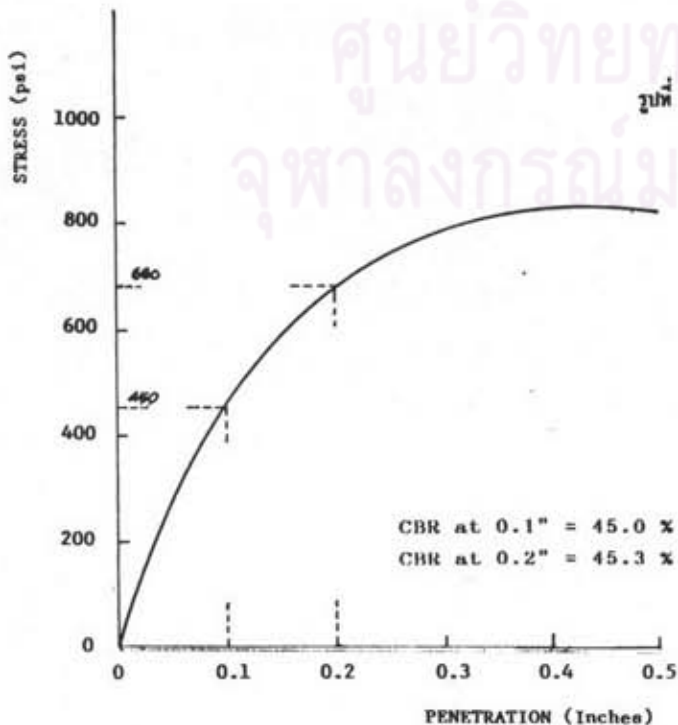
FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	410	136.7	
0.050	790	263.3	
0.075	1065	355.0	
0.100	1350	450.0	
0.150	1620	540.0	
0.200	2115	705.0	
0.250	2270	756.7	
0.300	2300	766.7	
0.350	2405	801.7	
0.400	2470	823.3	
0.450	2460	820.0	
0.500	2470	823.3	

STRESS - PENETRATION CURVE

Description of sample : SUBGRADE Sample from : TRANG AIRPORT  
Location : Sta. 1+100 Date : February 1989

IN-SITU CONDITION



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : TRANG AIRPORT Date : FEBRUARY 14, 1989  
Description of sample : SUBGRADE Tested condition : IN-SITU  
Location : APRON Tested by :

WATER CONTENT DETERMINATION

Container No.		812
Wt. Container + Wet Soil (gm)		321.5
Wt. Container + Dry Soil (gm)		279.8
Wt. Water (gm)		42.5
Wt. Container (gm)		38.8
Wt. Dry Soil (gm)		248.2
Water Content (%)		17.69

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	105	35.8	
0.050	135	45.8	
0.075	145	48.3	
0.100	160	53.3	
0.150	175	58.3	
0.200	190	63.3	
0.250	205	68.3	
0.300	215	71.7	
0.350	220	73.3	
0.400	225	75.8	
0.450	235	78.3	
0.500	240	80.8	

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : TRANG AIRPORT Date : FEBRUARY 16, 1989  
Description of sample : SUBGRADE Tested condition : SOAKED  
Location : APRON Tested by :

WATER CONTENT DETERMINATION

Container No.		229
Wt. Container + Wet Soil (gm)		348.6
Wt. Container + Dry Soil (gm)		271.8
Wt. Water (gm)		69.6
Wt. Container (gm)		34.6
Wt. Dry Soil (gm)		236.4
Water Content (%)		29.4

FIELD CBR TEST LOAD DATA

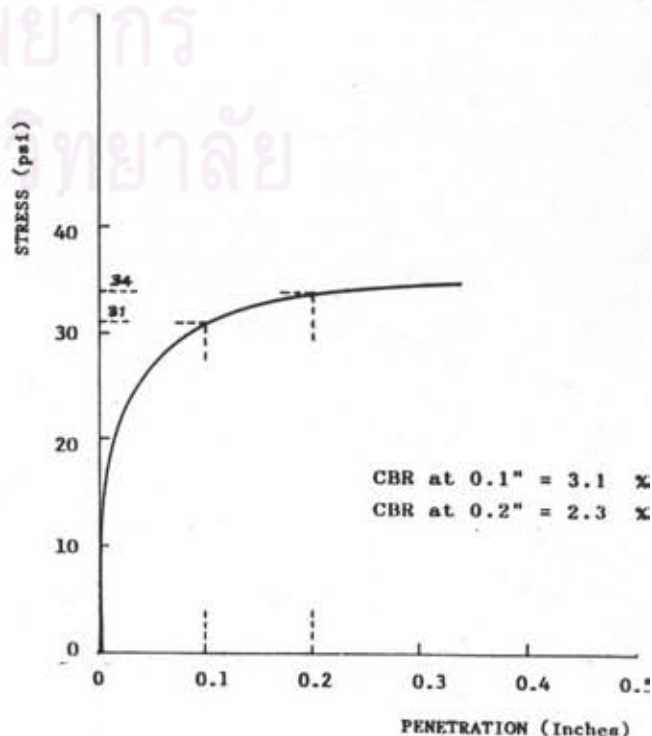
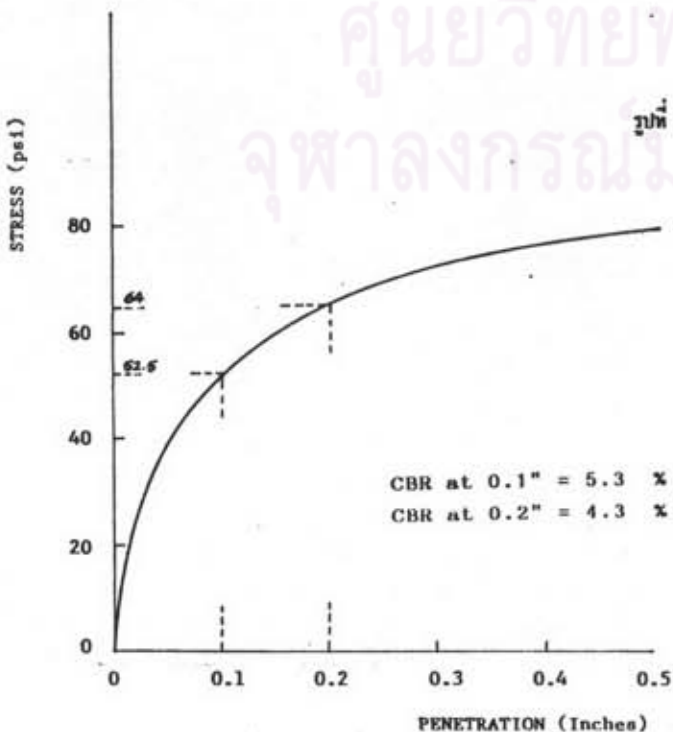
PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	88	28.7	
0.050	85	28.3	
0.075	90	30.0	
0.100	95	31.7	
0.150	100	33.3	
0.200	103	34.3	
0.250	105	35.0	
0.300	107	35.7	
0.350	110	36.7	
0.400	115	38.3	
0.450	110	36.7	
0.500	110	36.7	

STRESS - PENETRATION CURVE

Description of sample : SUBGRADE Sample from : TRANG AIRPORT  
Location : Sta. APRON Date : February 1989

IN-SITU CONDITION

24 hrs SOAKED CONDITION



FIELD CALIFORNIA BEARING RATIO TEST

Sample from : TRANG AIRPORT Date : FEBRUARY 14, 1989  
Description of sample : SUBBASE Tested condition : IN-SITU  
Location : APRON Tested by :

WATER CONTENT DETERMINATION

Container No.		4
Wt. Container + Wet Soil (gm)		3155.5
Wt. Container + Dry Soil (gm)		2771.8
Wt. Water (gm)		384.8
Wt. Container (gm)		318.8
Wt. Dry Soil (gm)		2461.8
Water Content (%)		15.68

FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	235	76.3	
0.050	495	165.8	
0.075	745	248.3	
0.100	995	331.7	
0.150	1445	481.7	
0.200	1885	601.7	
0.250	2065	666.3	
0.300	2295	745.8	
0.350	2435	811.7	
0.400	2465	821.7	
0.450	2695	865.8	
0.500	2555	851.7	

FIELD CALIFORNIA BEARING RATIO TEST

Sample from : TRANG AIRPORT Date : FEBRUARY 15, 1989  
Description of sample : SUBBASE Tested condition : SOAKED  
Location : APRON Tested by :

WATER CONTENT DETERMINATION

Container No.		242
Wt. Container + Wet Soil (gm)		448.8
Wt. Container + Dry Soil (gm)		376.8
Wt. Water (gm)		72.4
Wt. Container (gm)		49.5
Wt. Dry Soil (gm)		326.1
Water Content (%)		22.28

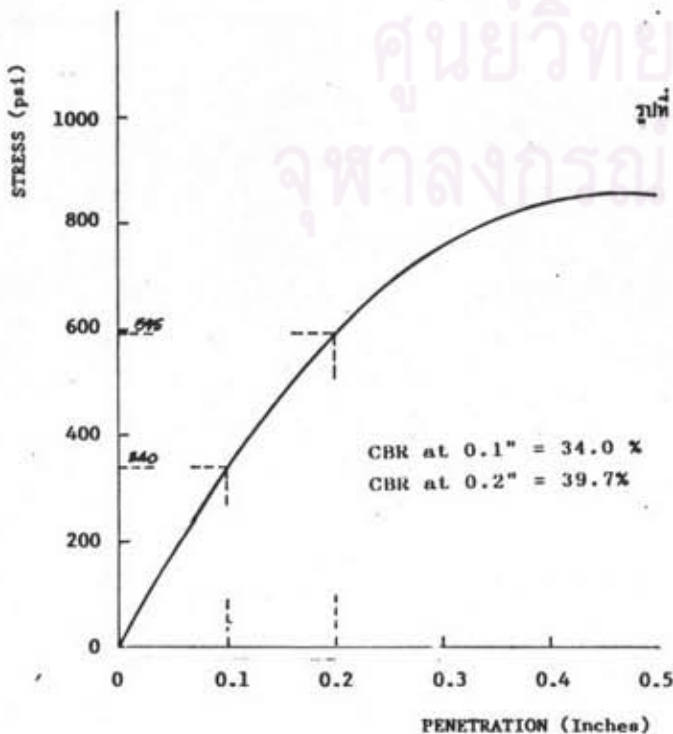
FIELD CBR TEST LOAD DATA

PENETRATION (in)	LOAD (lb)	STRESS (psi)	REMARKS
0.025	218	70.8	
0.050	285	95.8	
0.075	348	113.3	
0.100	385	126.3	
0.150	585	188.3	
0.200	615	205.8	
0.250	715	236.3	
0.300	778	256.7	
0.350	835	276.3	
0.400	868	286.7	
0.450	895	298.3	
0.500	925	308.3	

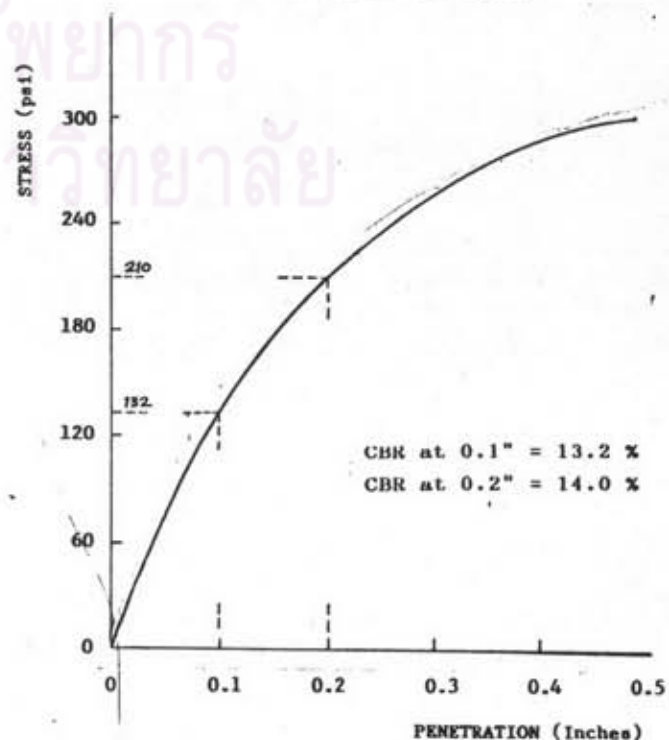
STRESS - PENETRATION CURVE

Description of sample : SUBBASE Sample from : TRANG AIRPORT  
Location : Sta. APRON Date : February 1989

IN-SITU CONDITION



24 hrs SOAKED CONDITION



FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

COMPACTION TEST

SAMPLE FROME : TRANG AIRPORT  
COURSE : SUBGRADE  
LOCATION : Sta.0+600  
TYPE OF TEST : MODIFIED PROCTOR  
10 lb. HAMMER 18 in. DROP

DATE : MARCH 24, 1989  
TEST BY : PPP  
55 BLOWS ON EACH OF 5 LAYERS  
MOLD NO. 3 VOLUME OF MOLD 0.0736 cu.ft.

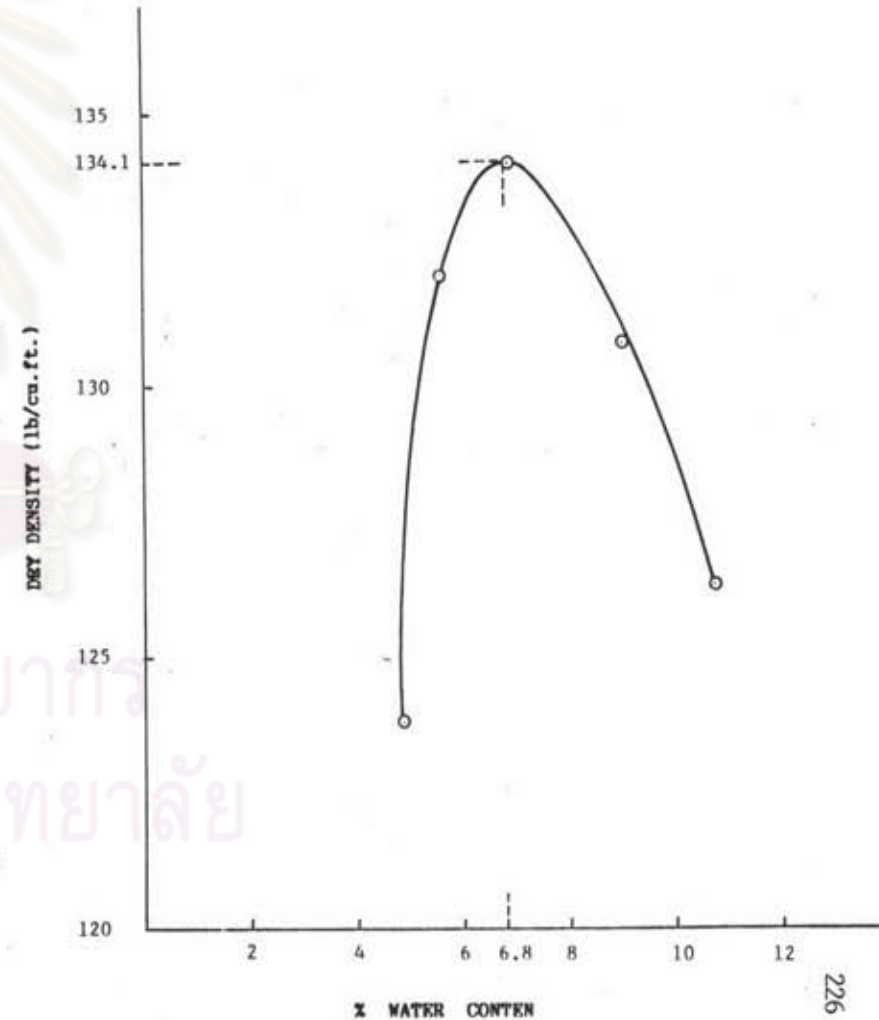
Determination No.	1	2	3	4	5
Wt.mold+soil lb.	18.76	19.47	19.76	19.69	19.50
Wt.mold lb.	9.21	9.21	9.21	9.21	9.21
Wt.soil lb.	9.55	10.26	10.55	10.48	10.29
Av.water content, %	4.84	5.59	6.93	8.97	10.68
Moist density pcf.	129.76	139.40	143.34	142.39	139.81
Dry density pcf.	123.77	132.02	134.05	130.67	126.32

Water content from	T	B	T	B	T	B	T	B	T	B
Container No.	E10	L7	Z11	Z29	TH12	C29	CX7	Z42	L12	C30
Wt.cont.+ wet soil gm.	170.7	171.6	247.4	218.2	177.0	214.5	193.5	202.0	241.5	239.5
Wt.cont.+ dry soil gm.	164.0	164.4	235.6	209.0	167.5	203.2	184.4	189.6	222.2	219.0
Wt.water gm.	6.7	7.2	11.8	9.2	9.5	11.3	9.1	12.4	19.3	20.5
Wt.container gm.	21.5	19.7	35.6	34.6	34.2	35.2	84.3	49.5	35.6	33.0
Wt.dry soil gm.	142.5	144.7	200.0	174.4	133.3	168.0	100.1	140.1	186.6	186.0
Water content %	4.70	4.98	5.90	5.28	7.13	6.73	9.09	8.85	10.34	11.02
Av. water content %	4.84		5.59		6.93		8.97		10.68	

รูปที่ ๑-6

COMPACTION CURVE

DESCRIPTION OF SAMPLE : SUBGRADE DATE : APRIL 24, 1989  
SAMPLE FROM : TRANG AIRPORT LOCATION : STA. 0 + 600



FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

COMPACTION TEST

SAMPLE FROME : TRANG AIRPORT

COURSE : SUBBASE

LOCATION : Sta.0+600

TYPE OF TEST : MODIFIED PROCTOR

10 lb. HAMMER 18 in. DROP

DATE : MAY 2, 1989

TEST BY : PPP

55 BLOWS ON EACH OF 5 LAYERS

MOLD NO. 13 VOLUME OF MOLD 0.0736 cu.ft.

Determination No.	1	2	3	4	5
Wt.mold+soil lb.	18.19	18.55	19.14	19.53	19.346
Wt.mold lb.	9.12	9.12	9.12	9.12	9.12
Wt.soil lb.	9.07	9.43	10.02	10.41	10.22
Av.water content, %	4.16	6.49	8.32	9.96	13.12
Moist density pcf.	123.10	128.13	136.14	141.44	138.86
Dry density pcf.	118.18	120.32	125.68	128.63	125.98

Water content from	T	B	T	B	T	B	T	B	T	B
Container No.	C36	H43	L7	21	E3	C43	E10	36	Z42	Z11
Wt.cont.+ wet soil gm.	119.3	124.8	85.7	63.0	70.0	75.7	92.5	96.4	152.4	141.8
Wt.cont.+ dry soil gm.	115.8	121.3	81.8	59.6	66.3	70.5	86.0	89.6	140.2	129.7
Wt.water gm.	3.5	3.5	3.9	3.4	4.7	5.2	6.5	6.8	12.2	12.1
Wt.container gm.	33.7	34.9	19.7	8.8	8.9	8.9	21.5	20.5	49.0	35.5
Wt.dry soil gm.	82.1	86.4	62.1	50.8	57.4	61.6	64.5	69.1	91.2	94.2
Water content %	4.26	4.05	6.28	6.69	8.19	8.44	10.08	9.84	13.38	12.85
Av. water content %	4.16		6.49		8.32		9.96		13.12	

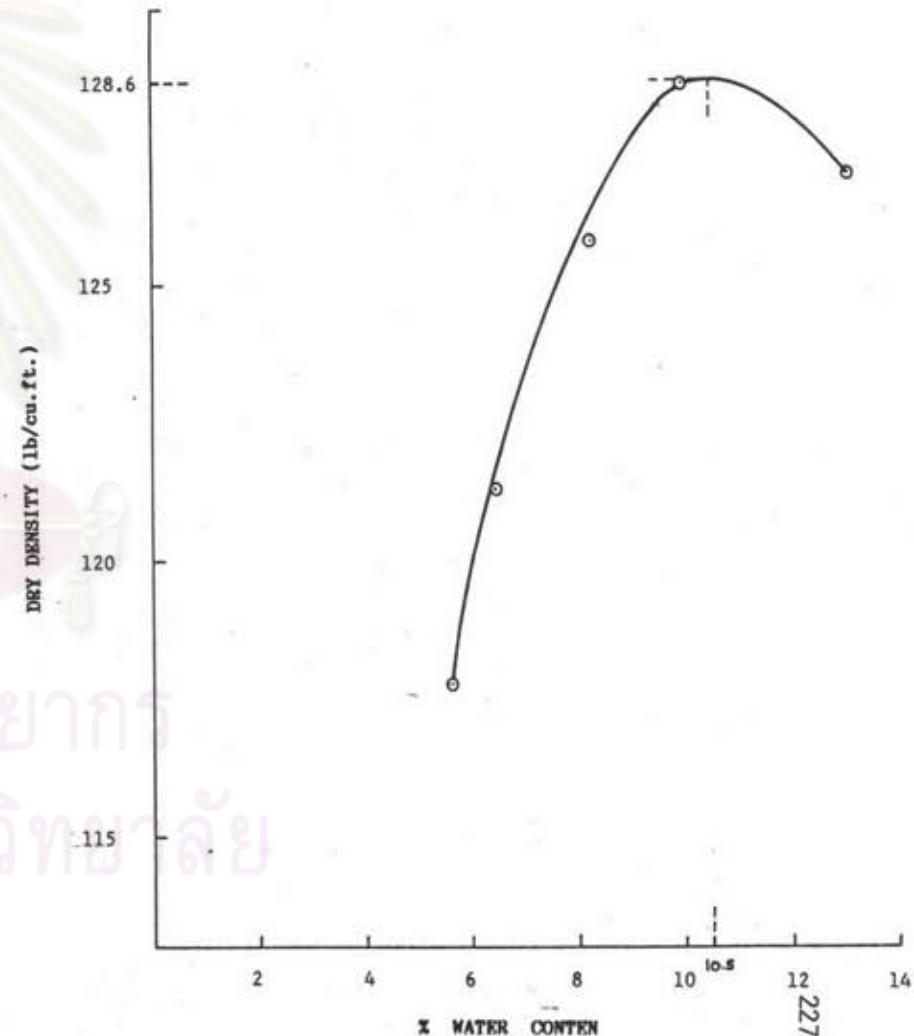
COMPACTION CURVE

DESCRIPTION OF SAMPLE : SUBBASE

DATE : MAY 2, 1989

SAMPLE FROM : TRANG AIRPORT

LOCATION : STA. 0 + 600



FACULTY OF ENGINEERING  
CHULALONGKORN UNIVERSITY

COMPACTION TEST

SAMPLE FROM : TRANG AIRPORT

COURSE : BASE

LOCATION : Sta.0+600

TYPE OF TEST : MODIFIED PROCTOR

10 lb. HAMMER 18 in. DROP MOLD NO. 10 VOLUME OF MOLD 0.0736 cu.ft.

DATE : MAY 3, 1989

TEST BY : PPP

55 BLOWS ON EACH OF 5 LAYERS

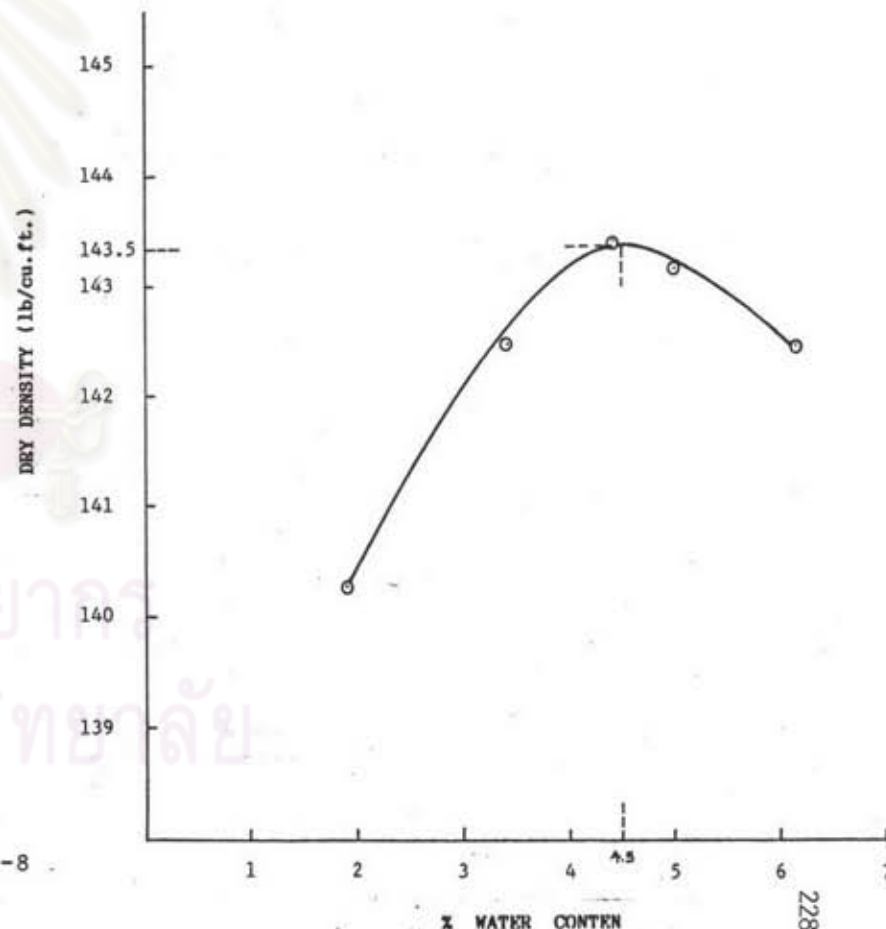
COMPACTION CURVE

DESCRIPTION OF SAMPLE : BASE DATE : MAY 3, 1989

SAMPLE FROM : TRANG AIRPORT LOCATION : STA. 0 + 600

Determination No.	1	2	3	4	5
Wt.mold+soil lb.	19.63	19.94	20.12	20.16	20.23
Wt.mold lb.	9.10	9.10	9.10	9.10	9.10
Wt.soil lb.	10.53	10.84	11.02	11.06	11.13
Av.water content, %	1.91	3.42	4.42	4.98	6.18
Moist density pcf.	143.07	147.32	149.73	150.27	151.22
Dry density pcf.	140.39	142.45	143.39	143.14	142.42

Water content from	T	B	T	B	T	B	T	B	T	B
Container No.	Z29	TH12	L12	C30	C46	CX7	E6	A7	X9	B2
Wt.cont.+ wet soil gm.	147.8	150.6	158.4	146.3	165.6	252.2	85.6	81.9	164.1	176.4
Wt.cont.+ dry soil gm.	145.8	148.3	154.0	142.9	160.0	245.2	82.0	78.4	156.7	168.3
Wt.water gm.	2.0	2.3	4.4	3.4	5.6	7.0	3.6	3.5	7.4	8.1
Wt.container gm.	34.6	34.2	35.7	34.0	35.0	84.3	8.9	8.9	35.5	38.8
Wt.dry soil gm.	111.2	114.1	118.3	108.9	125.0	160.9	73.1	69.5	121.2	129.5
Water content %	1.80	2.02	3.72	3.12	4.48	4.35	4.92	5.04	6.11	6.25
Av. water content %	1.91	3.420	4.42	4.98	6.18					



รูปที่ จ-8

STRESS - PENETRATION CURVE

DESCRIPTION OF SAMPLE : SUBGRADE

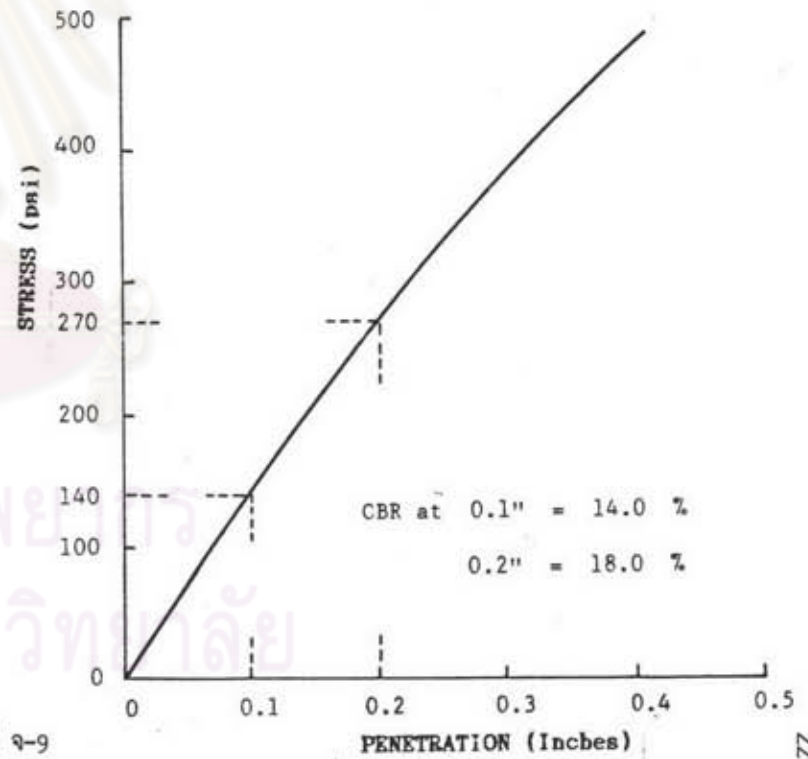
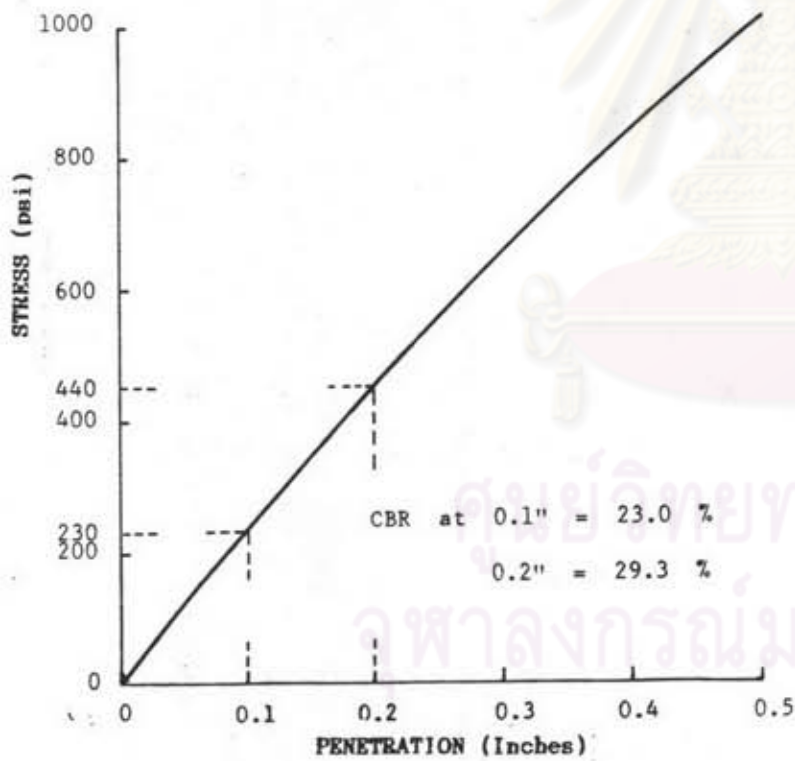
SAMPLE FROM : TRANG AIRPORT

LOCATION : STA. 0 + 600

DATE : APRIL 29, 1989

UNSOAKED CONDITION

96 HRS. SOAKED CONDITION



รูปที่ ๑-๑

STRESS - PENETRATION CURVE

DESCRIPTION OF SAMPLE : SUBBASE

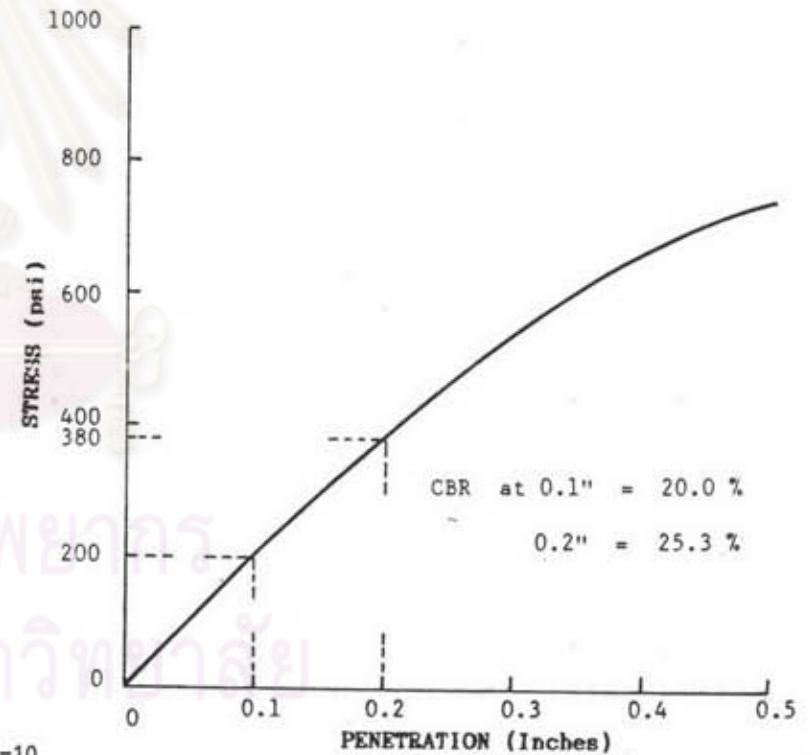
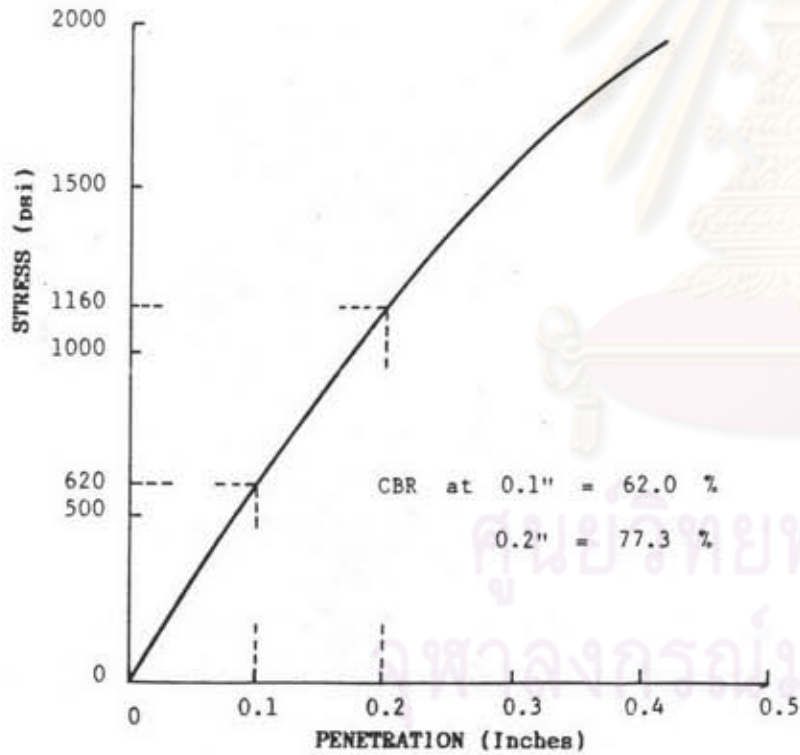
SAMPLE FORM : TRANG AIRPORT

LOCATION : STA. 0 + 600

DATE : MAY 8, 1989

UNSOAKED CONDITION

96 HRS. SOAKED CONDITION



รูปที่ ๑-10



### STRESS - PENETRATION CURVE

DESCRIPTION OF SAMPLE : BASE

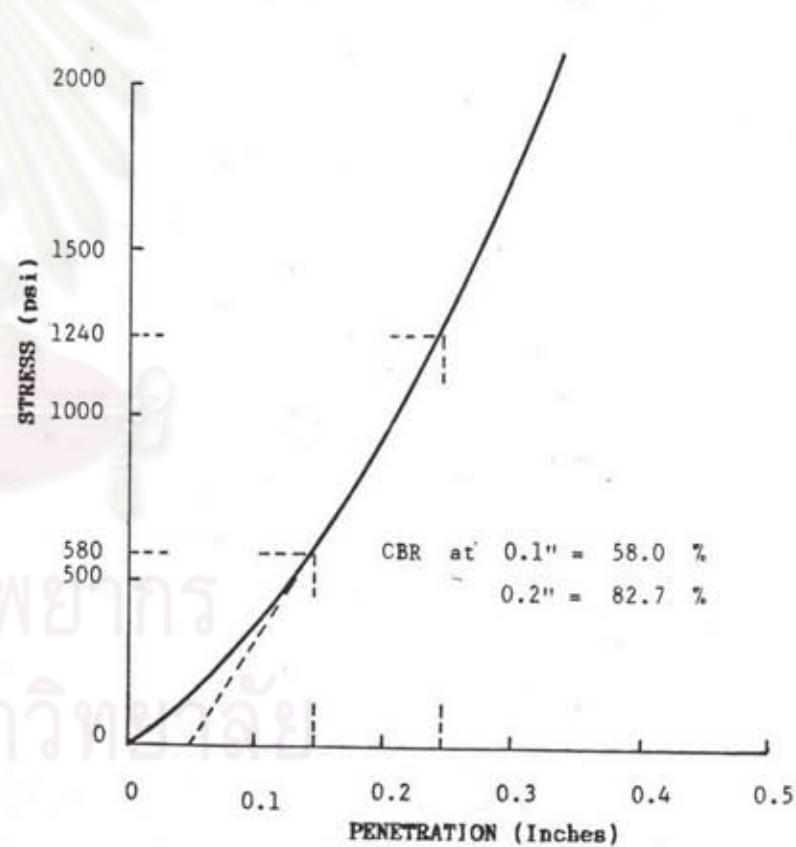
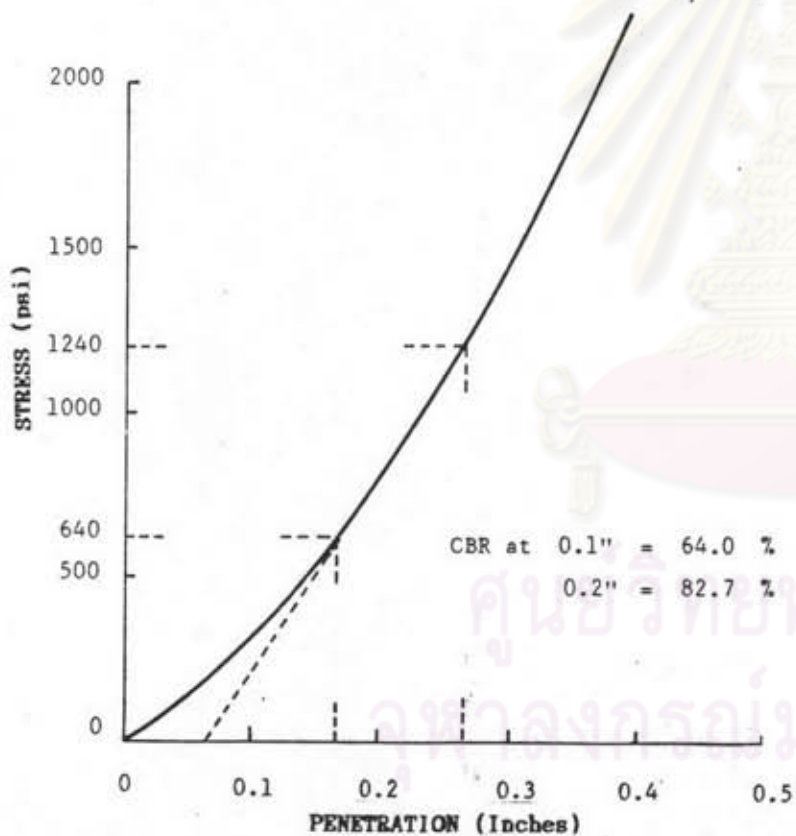
SAMPLE FROM : TRANG AIRPORT

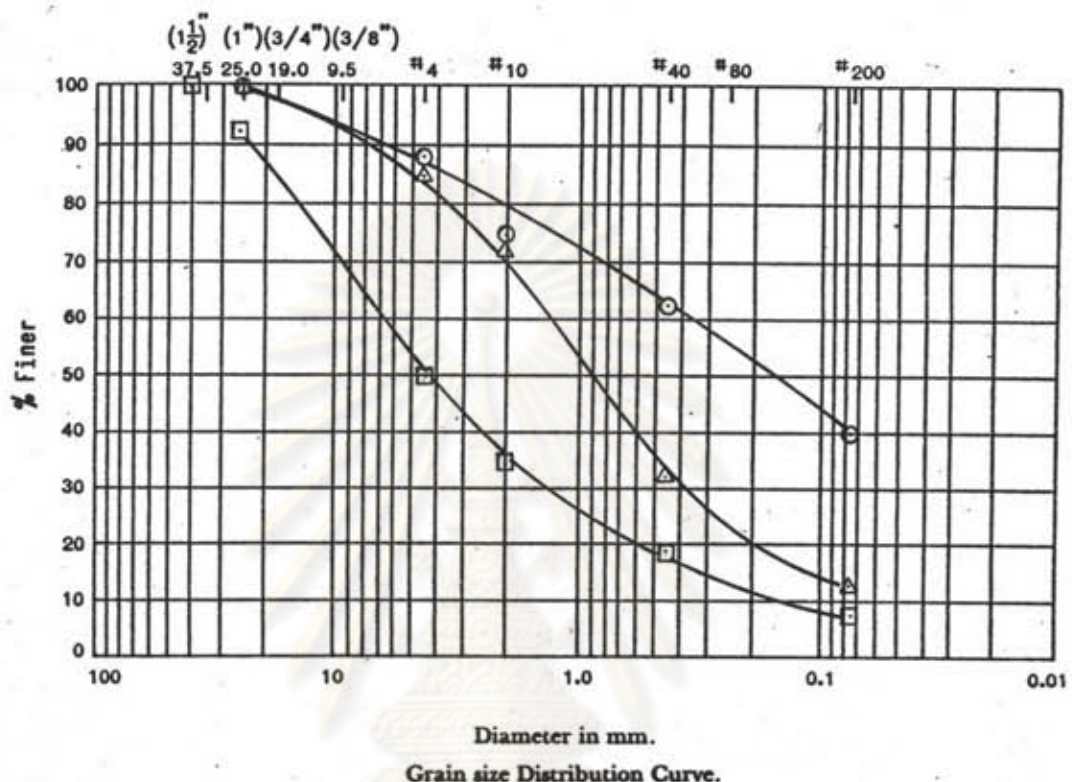
LOCATION : STA. 0 + 600

DATE : MAY 8, 1989

UNSOAKED CONDITION

96 HRS. SOAKED CONDITION





รูปที่ ๑-12 กราฟแสดงการกระจายขนาดตะกอนของเม็ดดิน

- หินเต็ม
- △ ร่องพื้นทาง
- พื้นทาง

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย



### ประวัติผู้เขียน

นายประเทศ บิดิธรรมกรณ์ เกิดเมื่อวันที่ 17 เมษายน 2505 ที่จังหวัด กรุงเทพมหานคร สำเร็จการศึกษาวิศวกรรมศาสตร์ สาขาวิศวกรรมโยธา จากจุฬาลงกรณ์มหาวิทยาลัย- เมื่อปีการศึกษา 2527 ต่อมาเข้าทำงาน บริษัทวิศวกรที่ปรึกษา อาร์ เค วี ระหว่างปี พ.ศ. 2528 - 2530 หลังจากนั้นเข้าศึกษาต่อ คณะวิศวกรรมศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย สาขาบทพิภลศาสตร์ ในปีการศึกษา 2530



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย