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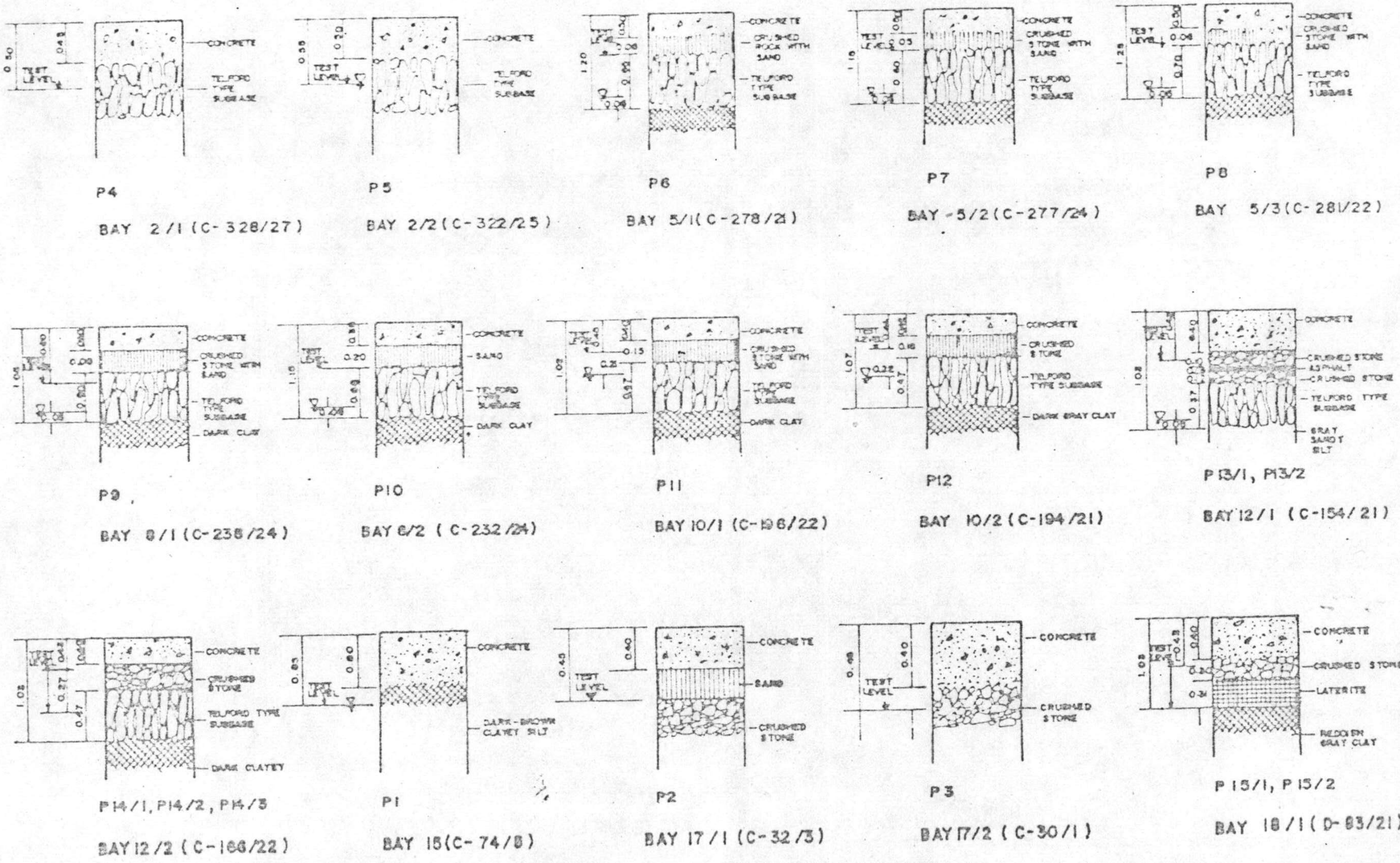
ภาคผนวก – ก

สรุปผลการทดสอบดินและรูปตัดหลุมขุดสำรวจ

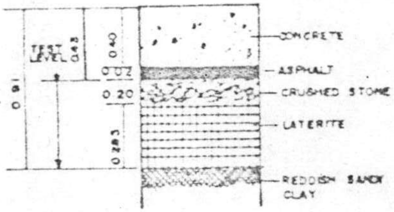
ท่าอากาศยานสากลกรุงเทพ ฯ

รูป ก-1 สรุปผลรูปตัดดินหลุมขุดสำรวจในบริเวณท่าอากาศยานสากลกรุงเทพฯ

Under Original Pavement, Airside

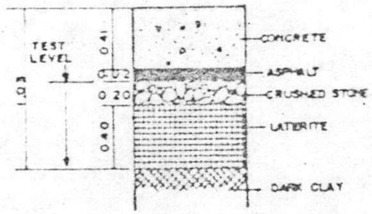


รูป ก-1 ต่อ



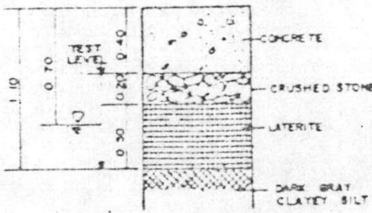
P16/1, P16/2

BAY 19/2 (D-61/19)



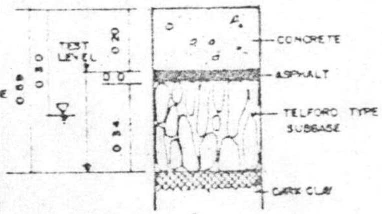
P17/1, P17/2

BAY 22/2 (D-21/20)



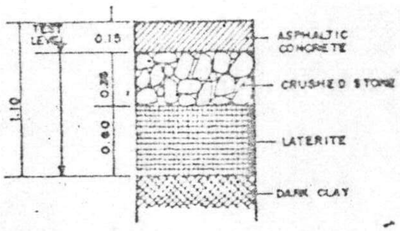
P18/1, P18/2

BAY 22/1 (D-18/21)



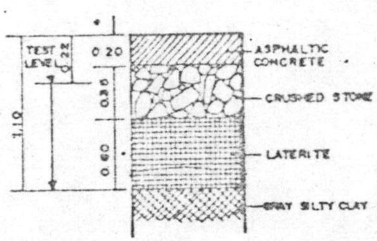
P19/1, P19/2

E-135/18



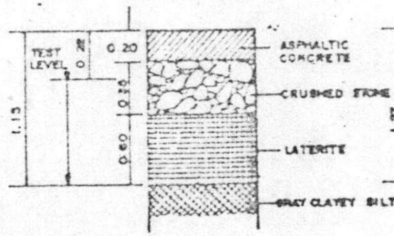
P20/1, P20/2

384 M. OFF SET FROM SOUTH TAXI-WAY CORNER CLOSED TO WEST BROKEN WHITE LINE MARKINGS



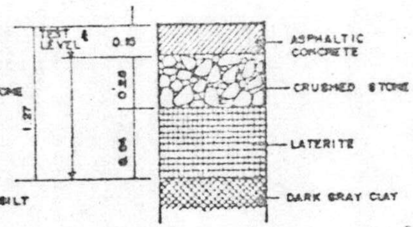
P21

330 M. OFF SET FROM SOUTH TAXI-WAY CORNER CLOSED TO WEST BROKEN WHITE LINE MARKINGS



P22/1, P22/2

194 M. OFF SET FROM SOUTH TAXI-WAY CORNER WITHIN YELLOW LINE MARKINGS

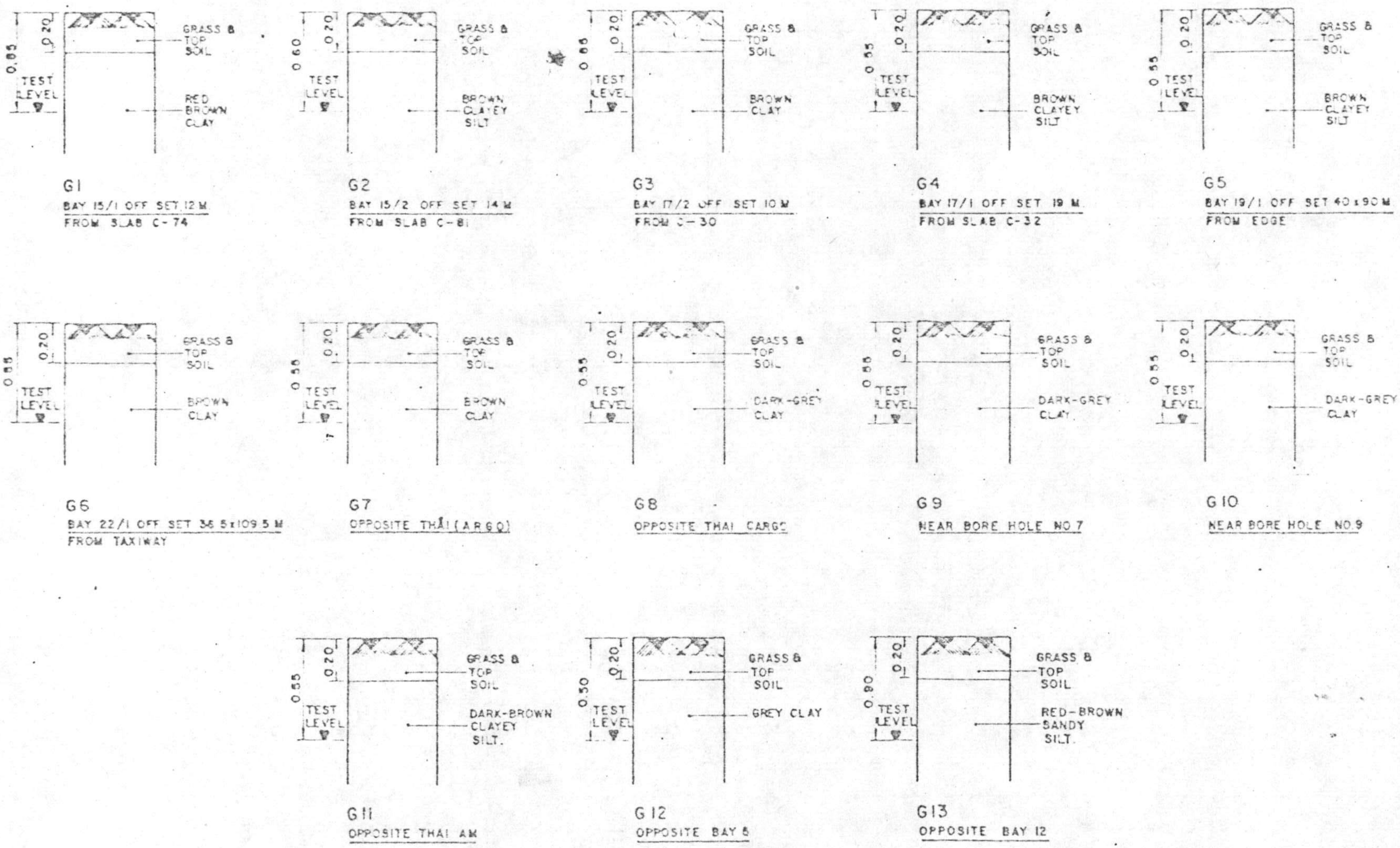


P23/1, P23/2

73 M. OFF SET FROM SOUTH TAXI-WAY CORNER WITHIN YELLOW LINE MARKINGS

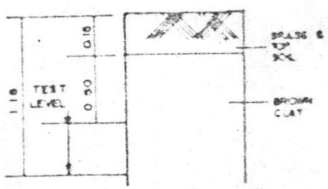
รูป ก-2 สรุปผลรูปตัดดินหลุมขุดสำรวจในบริเวณท่าอากาศยานสากลกรุงเทพฯ

Under Original Ground, Airside



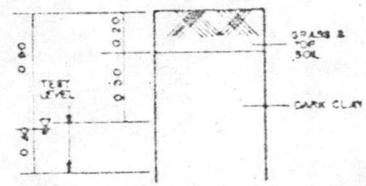
รูป ก-3 สรุปผลรูปตัดดินหลุมขุดสำรวจในบริเวณท่าอากาศยานสากลกรุงเทพฯ

Under Original Ground, Landside



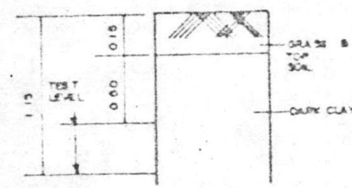
L1/1, L1/2

OPPOSITE REFUGEE CAMP



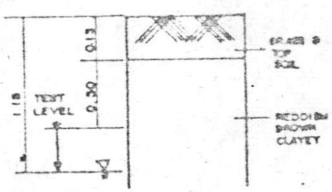
L2/1, L2/2

BEHIND SECURITY DIVISION



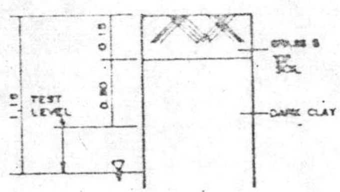
L3/1, L3/2

BEHIND THAI CARGO BUILDING



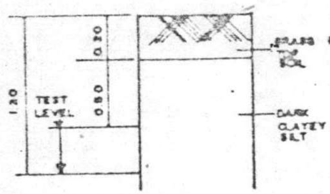
L4/1, L4/2

BEHIND BAY 23



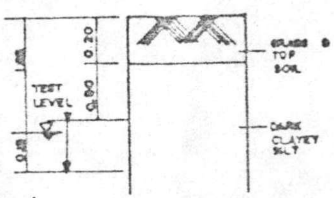
L5/1, L5/2

BEHIND BAY 19



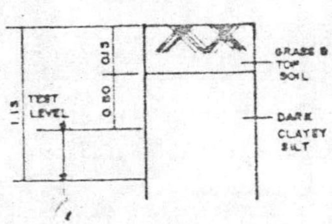
L6/1, L6/2

BEHIND RAMP SERVICE
EQUIPMENT PARKING AREA



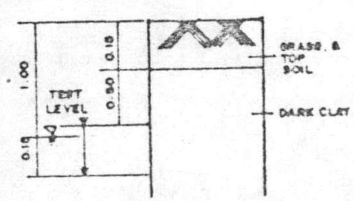
L7/1, L7/2

OPPOSITE OLD HANGER



L8/1, L8/2

NEAR OVERPASS BRIDGE



L9/1, L9/2

BESIDE TECHNICAL DEPARTMENT

ตาราง ก-1 สรุปผลการทดสอบดินในบริเวณลานจอดท่าอากาศยานสากลกรุงเทพฯ

Under Original Pavement, Airside

TEST NO.	LOCATION (BAY)	DEPTH (m)	MATERIALS DESCRIPTION	ATTERBERG LIMITS		SEVE ANALYSIS, % PASSING BY WT.									FAA CLASSIFICATION	K (30") pci	CBR %	γd gm/cc	NATURAL W/C %	REMARKS
				Wl	Ip	3"	2"	1"	3/4"	3/8"	4	10	40	200						
P1	BAY15	0.85	Dark-brown clayey silt	NP	-					100	99	96	93	86	E-6	57	2.7	1.298	22.3	
P2	BAY17/1	0.45	Crushed stone base	NP	-			100	91	79	62	42	18	11	E-2	339	42.8	2.105	2.5	
P3	BAY17/2	0.45	Crushed stone base	NP	-			100	96	78	61	46	28	19	E-2	353	42.2	2.076	9.9	
P4	BAY2/1	0.50	Crushed stone base	21.1	4.4			100	98	77	59	49	34	19	E-2	619	68.4	-	-	Submerged
P5	BAY2/2	0.55	Crushed stone base	NP	-		100	85	72	57	36	20	15	5	E-3	310	40.2	-	-	Submerged
P6	BAY5/1	0.55	Crushed stone base	NP	-	64	33	8	5	2	2	-	-	-	E-1	516	58.1	2.343	4.1	
P7	BAY5/2	0.55	Crushed stone base	NP	-	68	36	7	2	2	1	-	-	-	E-1	1121	147.8	2.337	3.0	
P8	BAY5/3	0.55	Crushed stone base	NP	-	66	32	5	4	2	1	-	-	-	E-1	442	52.3	2.126	6.6	
P9	BAY6/1	0.60	Crushed stone base	NP	-	100	81	69	53	36	27	16	11	4	E-3	913	88.0	2.299	4.5	
P10	BAY6/2	0.55	Crushed stone base	NP	-	100	79	72	49	38	25	17	13	4	E-3	301	36.6	2.121	4.2	
P11	BAY10/1	0.45	Crushed stone base	NP	-	100	76	71	54	34	24	18	10	4	E-3	531	61.6	2.122	8.6	
P12	BAY10/2	0.44	Crushed stone base	NP	-	100	78	71	52	41	26	17	9	4	E-3	737	68.4	2.011	11.9	

ตาราง ก-1 ต่อ

TEST NO.	LOCATION (BAY)	DEPTH (m)	MATERIALS DESCRIPTION	ATTERBERG LIMITS		SIEVE ANALYSIS, % PASSING BY WT.									FAA CLASSIFICATION	K (30") pci	CBR %	γd gm/cc	NATURAL W/C %	REMARKS
				WL	Ip	3"	2"	1"	3/4"	3/8"	4	10	40	200						
P13/1	BAY12/1	0.42	Crushed stone base	NP	-	100	80	61	55	41	27	17	7	3	E-3	425	54.3	2.237	8.4	
P13/2	BAY12/1	1.03	Grey sandy silt	NP	-					100	99	97	79	74	E-6	184	10.5	-	22.9	Submerged
P14/1	BAY12/2	0.41	Crushed stone base	NP	-		100	92	81	62	45	30	15	9	E-2	590	64.3	2.201	7.3	
P14/2	BAY12/2	0.43	Crushed stone base	NP	-	100	95	52	47	34	21	14	7	3	E-3	413	60.3	-	-	Submerged
P14/3	BAY12/2	1.03	Dark clayey silt	26.6	6.1						100	99	96	91	E-6	220	5.2	-	22.9	Submerged
P15/1	BAY19/1	0.43	Crushed stone base	NP	-		100	94	85	64	46	31	16	10	E-2	324	41.5	-	-	Submerged
P15/2	BAY19/1	1.01	Reddish grey clay	37.0	9.8							100	99	98	E-7	269	34.4	-	15.7	Submerged
P16/1	BAY19/2	0.40	Crushed stone base	NP	-		100	93	86	73	57	39	20	13	E-2	324	43.5	-	-	Submerged
P16/2	BAY19/2	0.91	Red sandy clay	32.0	12.4								100	99	E-7	254	31.8	-	12.9	Submerged
P17/1	BAY22/2	0.43	Crushed stone base	23.0	13.9			100	98	83	66	44	20	11	E-2	295	34.2	2.007	5.0	
P17/2	BAY22/2	1.13	Dark clay	32.7	10.8		-			100	99	97	92	78	E-7	82	2.5	-	26.8	Submerged
P18/1	BAY22/1	0.40	Crushed stone base	NP	-		100	98	97	91	79	68	52	24	E-2	442	60.3	1.900	5.0	

ตาราง ก-1 ต่อ

EST NO.	LOCATION (BAY)	DEPTH (m)	MATERIALS DESCRIPTION	ATTERBERG LIMITS		SIEVE ANALYSIS, % PASSING BY WT.									FAA CLASSIFICATION	K (30") pci	CBR %	γd gm/cc	NATURAL W/C %	REMARKS
				WL	Ip	3"	2"	1"	3/4"	3/8"	4	10	40	200						
P18/2	BAY22/1	1.10	Dark grey clayey silt	25.4	6.2					100	99	97	94	87	E-6	163	9.8	-	26.4	Submerged
P19/1	E-135/18	0.26	Crushed stone base	NP	-	100	78	45	40	31	23	27	7	3	E-3	313	43.2	2.165	4.8	
P19/2	E-135/18	0.59	Dark clay	46.0	18.0							100	99	97	E-7	85	2.5	-	18.3	
P20/1		0.15	Crushed stone base	NP					100	90	82	74	60	21	E-2	366	43.5	1.974	2.3	
P20/2		1.01	Dark clay	40.4	15.8							100	99	97	E-7	138	5.2	-	22.9	
P21		0.22	Crushed stone base.	NP	-			100	96	85	61	38	17	11	E-2	418	47.6	1.960	1.8	
P22/1	SEE LOCATION MAP	0.22	Crushed stone base	NP	-				100	91	64	43	19	12	E-2	501	55.6	2.002	2.20	
P22/2		1.15	Grey clayey silt	NP	-							100	98	96	E-6	99	3.2	1.145	29.0	
P23/1		0.15	Crushed stone base	26.5	5.9		100	98	94	81	64	48	32	26	E-4	442	53.6	2.087	1.8	
P23/2		1.27	Dark grey clay	45.8	19.8							100	99	97	E-7	96	3.4	1.313	26.2	
P24		0.30	Dark grey clay												-	51	2.0, 4.1 2.5, 2.8 2.0,	-	-	
P25/1		0.60	Dark grey clay												-	31	0.9, 2.7 2.4, 1.4	-	-	

ตาราง ก-1 ต่อ

ST O.	LOCATION (BAY)	DEPTH (m)	MATERIALS DESCRIPTION	ATTERBERG LIMITS WL	Ip	SIEVE ANALYSIS, % PASSING BY WT. 3"	2"	1"	3/4"	3/8"	4	10	40	200	FAA CLASSIFICATION	K (30") pci	CBR %	γd gm/cc	NATURAL W/C %	REMARKS
25/2		0.30	Dark grey clay												-	48	2.4,3.5 5.6,2.8	-	-	
26/1	SEE LOCATION MAP	0.60	Dark grey clay												-	36.8	2.8,3.6 2.6,3.4 5.0	-	-	
26/2		0.30	Brown clay												-	16.2	2.4,3.5 3.3,	-	-	
26/3		0.30	Brown clay												-	32.9	4.0,4.8 6.9,3.5 3.6	-	-	

Source: *Report on Airside Pavement Breaking-up and Pavement Investigation for Aircraft Parking Apron Design, Thailand Airport Consultants Joint Venture, 1980.*

ตาราง ก- 2 สรุปผลการทดสอบดินในบริเวณลานจอดท่าอากาศยานสากลกรุงเทพฯ

Under Original Ground, Airside

T	LOCATION (BAY)	DEPTH (m.)	MATERIALS DESCRIPTION	ATTERBERG LIMITS		SIEVE ANALYSIS, % PASSING BY WT.									FAA CLASSIFICATION	K (30") pci	CBR %	γd gm/cc	NATURAL W/C %	REMARKS
				WL	Ip	3"	2"	1"	3/4"	3/8"	4	10	40	200						
[illegible]	BAY 15	0.85	Red brown clay	38.2	12.4							100	[illegible]	96	E-7	116	5.1	1.167	23.7	
2	BAY 15	[illegible]	Brown clayey silt	NP	-							100	[illegible]	93	E-6	184	10.2	1.415	15.9	
3	BAY 17	0.35	Brown clay	40.1	13.8						100	99	98	95	E-7	50	3.6	1.330	26.2	
4	BAY 17	0.55	Brown clayey silt	20.3	5.4							100	98	96	E-6	156	10.0	1.504	16.5	
5	BAY 19	0.55	Brown clayey silt	NP	-						100	99	98	97	E-6	152	10.3	1.570	15.2	
[illegible]	BAY 22	0.55	Brown clay	42.6	26.9						100	99	98	97	E-7	103	5.0	1.314	27.4	
7	Opposite Thai Cargo	0.55	Brown clay	35.9	24.8						100	99	99	98	E-7	149	8.8	1.315	22.6	
8	Opposite Thai Cargo Godown	0.55	Dark grey clay	32.8	10.9						100	99	98	97	E-7	106	5.6	1.216	24.3	
9	Near bore hole#7	0.55	Dark grey clay	33.5	22.6						100	98	98	96	E-7	67	2.8	1.323	23.6	
1C	Near bore hole#9	0.55	Dark grey clay	42.0	16.9							100	99	97	E-7	134	7.2	1.254	19.9	
G11	Opposite Thai Am	0.55	Dark brown clayey silt	NP	-						100	99	97	92	E-6	120	60.0	1.235	29.0	
C12	Opposite Bay 5	0.70	Grey clay	53.0	24.6								100	99	E-8	92	2.8	1.171	19.4	

ตาราง ก-2 ต่อ

T ...	LOCATION (BAY)	DEPTH (m)	MATERIALS DESCRIPTION	ATTERBERG LIMITS		SIEVE ANALYSIS, % PASSING BY WT.									FAA CLASSIFICATION	K (30") pci	CBR %	γ d gm/cc	NATURAL W/C %	REMARKS
				wL	Ip	3"	2"	1"	3/4"	3/8"	4	10	40	200						
3	Opposite Bay 1[illegible]	0.90	Red brown sandy silt	NP	-							100	[illegible]	[illegible]	E-[illegible]	134	[illegible]	1.2[illegible]7	15.4	

Source: *Report on Airside Pavement Breaking-up and Pavement Investigation for Aircraft Parking Apron Design, Thailand Airport Consultants Joint Venture, 1980.*

ตาราง ก-3 สรุปผลการทดสอบดินในบริเวณลานจอดท่าอากาศยานสากลกรุงเทพฯ

Under Original Ground, Landside

TEST NO.	LOCATION (BAY)	DEPTH (m.)	MATERIALS DESCRIPTION	ATTERBERG LIMITS		SIEVE ANALYSIS, % PASSING BY WT.									FAA CLASSIFICATION	K (30") pci	CBR %	γd gm/cc	NATURAL W/C %	REMARKS
				WL	Ip.	3"	2"	1"	3/4"	3/8"	4	10	40	200						
L 1/1	SEE LOCATION MAP	0.65	Brown clay	46.8	17.7							100	99	98	E-7	135	6.7	1.268	24.3	
L 1/2		1.15	Brown clay	45.9	17.4							100	98	93	E-7	-	5.8	1.115	33.4	
L 2/1		0.70	Dark clay	35.2	14.0					100	99	98	96	91	E-7	67	2.4	1.203	30.7	
L 2/2		1.20	Dark clay	49.3	25.2							100	99	94	E-8	-	1.3	-	46.1	Submerged
L 3/1		0.65	Dark clay	29.9	10.7				100	99	98	95	91	85	E-7	99	5.6	1.200	26.0	
L 3/2		1.15	Dark clay	29.3	10.5				100	99	98	95	90	85	E-7	-	5.4	1.119	26.0	
L 4/1		0.65	Reddish brown clayey silt	28.6	8.2				100	86	61	45	35	23	E-6	42	3.4	1.389	20.4	
L 4/2		1.15	Reddish brown clayey silt	NP	-						100	99	97	80	E-6	-	2.2	-	27.9	Submerged
L 5/1		0.65	Dark clay	11.3	14.3							100	98	92	E-7	41	2.7	1.200	30.1	
L 5/2		1.15	Dark clay	45.4	19.4							100	99	98	E-7	-	1.4	-	-	
L 6/1		0.70	Dark clayey silt with fragment	NP	-				100	96	94	91	88	84	E-6	78	3.6	1.[illegible]35	27.[illegible]	Submerged
L 6/2		1.2	Dark clayey silt	NP	-						100	99	98	94	E-6	-	2.5	1.242	26.1	

ตาราง ก-3 ต่อ

TEST NO.	LOCATION (BAY)	DEPTH (m.)	MATERIALS DESCRIPTION	ATTERBERG LIMITS		SIEVE ANALYSIS, % PASSING BY WT.									FAA CLASSIFICATION	K (30") pci	CBR %	γd gm/cc	NATURAL W/C %	REMARKS
				Wl	Ip	3"	2"	1"	3/4"	3/8"	4	10	40	200						
L 7/1		0.70	Dark clayey silt.	NP	-					100	99	98	96	91	E-6	27	2.6	1.225	30.3	
L 7/2		1.20	Dark clayey silt	22.6	4.3						100	99	99	97	E-6	-	0.87	-	30.8	
L 8/1	SEE LOCATION MAP	0.65	Dark clayey silt	33.3	8.2								100	99	E-6	106	5.4	1.232	26.2	
L 8/2		1.15	Dark clayey silt	27.6	4.5								100	99	E-6	-	0.8	1.268	27.3	
L 9/1		0.65	Dark clay	34.8	13.7						100	98	95	91	E-7	64	3.3	1.224	27.5	
L 9/2		1.15	Dark clay	49.[illegible]	19.[illegible]							100	99	96	E-7	-	2.1	-	44.6	

Source: Report on Airside Pavement Breaking-up and Pavement Investigation for Aircraft Parking Apron Desig

ตาราง ข-2 สรุปผลการทดสอบ *FLEXURAL STRENGTH* ของแท่งคอนกรีตตัวอย่างในบริเวณลานจอดท่าอากาศยานสากลกรุงเทพฯ

SPECIMEN NO.	DIMENSION				DENSITY	MAXIMUM LOAD	TESTED FLEXURAL STRANGTH	STANDARD FLEXURAL STRANGTH
	WIDTH B, Cm.	DEPTH D, Cm.	LENGTH L, Cm.	WEIGHT W, Kg.	γ, Kg/Cm^2	P_{max}, Kg.	Fr, Kg/Cm^2	Fr', Kg/Cm^2 (Fr' = Fr X 0.90)*
P1,BAY15	10.3	10.1	30.2	7.402	2.356	1,615	41.5	37.4
P2,BAY17/1	10.2	10.0	25.6	6.500	2.489	1,625	38.2	34.4
P3,BAY17/2	9.9	9.9	25.2	6.010	2.433	2,145	46.4	41.8
P4,BAY2/1	10.0	9.8	28.1	6.626	2.406	1,440	36.0	32.4
P5,BAY2/2	10.1	10.1	27.0	6.506	2.362	1,620	37.8	34.0
P6,BAY5/1	10.1	10.0	23.4	5.515	2.333	1,720	35.7	32.1
P7,BAY5/2	9.8	10.1	26.7	6.226	2.355	1,225	29.4	26.5
P8,BAY5/3	9.9	10.0	28.8	6.723	2.358	1,165	31.8	28.6
P9,BAY8/1	10.1	9.7	28.6	6.549	2.337	1,285	31.8	28.6
P10,BAY8/2	9.6	9.8	25.5	5.443	2.269	1,045	27.2	24.5
P11,BAY10/1	10.1	10.1	24.4	5.759	2.314	960	19.1	17.6
P12,BAY10/2	9.9	10.2	29.3	6.967	2.355	705	18.5	14.8

* Correction factor is adopted from Japan Concrete Research Institute.

ภาคผนวก — ช

สรุปผลการทดสอบกำลังของแท่งคอนกรีตตัวอย่าง
บริเวณลานจอดท่าอากาศยานสากลกรุงเทพฯ

ตาราง ข-2 ต่อ

SPECIMEN NO.	DIMENSION				DENSITY	MAXIMUM LOAD	TESTED FLEXURAL STRANGTH	STANDARD FLEXURAL STRANGTH
	WIDTH B, Cm.	DEPTH D, Cm.	LENGTH L, Cm.	WEIGHT W, Kg.	γ, Kg/Cm^2	P_{max}, Kg.	Fr, Kg/Cm^2	(Fr′, Kg/Cm^2 Fr′ = Fr X 0.90)*
P13,BAY12/1	10.0	9.8	26.5	5.952	2.292	915	22.9	20.6
P14,BAY12/2	10.0	10.2	26.5	6.237	2.307	1,065	24.6	22.1
P15,BAY19/1	10.0	9.8	24.5	5.886	2.452	1,950	42.6	38.3
P16,BAY19/2	10.0	10.0	29.0	7.070	2.438	2,130	57.5	51.7
P17,BAY22/2	10.0	10.1	23.9	5.752	2.383	1,930	39.7	35.7
P19,E-135/18	15.0	15.5	52.5	29.405	2.409	3,430	42.8	42.8

Source: *Report on Airside Pavement Breaking-up and Pavement Investigation for Aircraft Parking Apron Design, Thailand Airport Consultants Joint Venture, 1980.*

ตาราง ข-2 สรุปผลการทดสอบ *FLEXURAL STRENGTH* ของแท่งคอนกรีตตัวอย่างในบริเวณลานจอดท่าอากาศยานสากลกรุงเทพฯ

SPECIMEN NO.	DIMENSION				DENSITY	MAXIMUM LOAD	TESTED FLEXURAL STRANGTH	STANDARD FLEXURAL STRANGTH
	WIDTH B, Cm.	DEPTH D, Cm.	LENGTH L, Cm.	WEIGHT W, Kg	γ, Kg/Cm^2	Pmax, Kg	Fr, Kg/Cm^2	Fr', Kg/Cm^2 (Fr' = Fr X 0.90)*
P1,BAY15	10.3	10.1	30.2	7.402	2.356	1,615	41.5	37.4
P2,BAY17/1	10.2	10.0	25.6	6.500	2.489	1,625	38.2	34.4
P3,BAY17/2	9.9	9.9	25.2	6.010	2.433	2,145	46.4	41.8
P4,BAY2/1	10.0	9.8	28.1	6.626	2.406	1,440	36.0	32.4
P5,BAY2/2	10.1	10.1	27.0	6.506	2.362	1,620	37.8	34.0
P6,BAY5/1	10.1	10.0	23.4	5.515	2.333	1,720	35.7	32.1
P7,BAY5/2	9.8	10.1	26.7	6.226	2.355	1,225	29.4	26.5
P8,BAY5/3	9.9	10.0	28.8	6.723	2.358	1,165	31.8	28.6
P9,BAY8/1	10.1	9.7	28.6	6.549	2.337	1,285	31.8	28.6
P10,BAY8/2	9.6	9.8	25.5	5.443	2.269	1,045	27.2	24.5
P11,BAY10/1	10.1	10.1	24.4	5.759	2.314	960	19.1	17.6
P12,BAY10/2	9.9	10.2	29.3	6.967	2.355	705	18.5	14.8

* Correction factor is adopted from Japan Concrete Research Institute.

ตาราง ข-2 ต่อ

SPECIMEN NO.	DIMENSION				DENSITY	MAXIMUM LOAD	TESTED FLEXURAL STRENGTH	STANDARD FLEXURAL STRENGTH
	WIDTH B, Cm.	DEPTH D, Cm.	LENGTH L, Cm	WEIGHT W, Kg	γ, Kg/Cm^2	Pmax, Kg.	Fr, Kg/Cm^2	(Fr', Kg/Cm^2; Fr' = Fr X 0.90)*
P13,BAY12/1	10.0	9.8	26.5	5.952	2.292	915	22.9	20.6
P14,BAY12/2	10.0	10.2	26.5	6.237	2.307	1,065	24.6	22.1
P15,BAY19/1	10.0	9.8	24.5	5.886	2.452	1,950	42.6	38.3
P16,BAY19/2	10.0	10.0	29.0	7.070	2.438	2,130	57.5	51.7
P17,BAY22/2	10.0	10.1	23.9	5.752	2.383	1,930	39.7	35.7
P19,E-135/18	15.0	15.5	52.5	29.405	2.409	3,430	42.8	42.8

Source: *Report on Airside Pavement Breaking-up and Pavement Investigation for Aircraft Parking Apron Design, Thailand Airport Consultants Joint Venture, 1980.*

ตาราง ข-3 สรุปผลการทดสอบ *TENSILE STRENGTH* ของแท่งคอนกรีตตัวอย่างในบริเวณลานจอดท่าอากาศยานสากลกรุงเทพฯ

SPECIMEN NO.	DIMENSION			DENSITY	MAXIMUM LOAD	TENSILE STRENGTH	REMARKS
	HEIGHT H, Cm.	DIAMETOR D, Cm.	WEIGHT W, Kg.	γ, Gm/Cm^2	Pmax, Kg.	Ft′, Kg/Cm^2	
P1,BAY15	28.4	15.0	11.728	2.348	25.9	38.7	
P2,BAY17/1	19.5	15.0	8.500	2.467	17.2	37.4	
P3,BAY17/2	24.8	15.0	10.502	2.396	16.0	27.4	
P4BAY2/1	19.9	15.0	8.395	2.387	10.2	21.8	
P5,BAY2/2	26.1	15.0	10.424	2.251	13.6	22.0	
P6,BAY5/1	19.5	15.0	8.063	2.340	13.8	30.6	
P7,BAY5/2	23.3	15.0	9.702	2.356	15.9	29.0	
P8,BAY5/3	24.3	15.0	10.151	2.364	15.7	27.4	
P9,BAY8/1	20.3	15.0	8.222	2.292	12.2	25.5	
P10,BAY8/2	20.7	15.0	8.278	2.263	10.9	22.4	
P11,BAY10/1	20.7	15.0	8.483	2.316	11.2	23.0	
P12,BAY10/2	17.1	15.0	7.360	2.436	12.9	32.0	

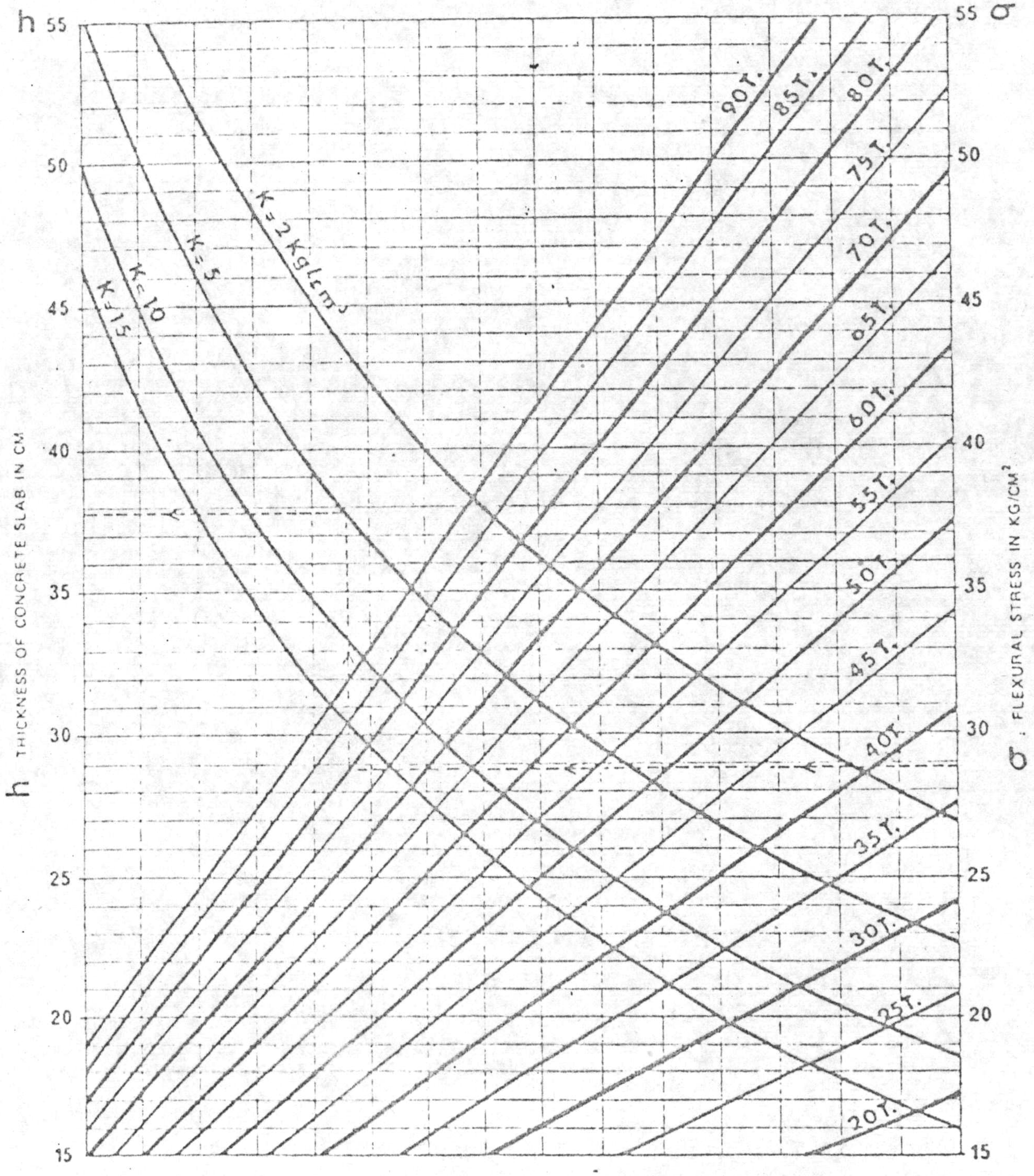
ตาราง ข-3 ต่อ

SPECIMEN NO.	DIMENSION			DENSITY	MAXIMUM LOAD	TENSILE STRENGTH	REMARKS
	HEIGHT H , Cm.	DIAMETOR D , Cm.	WEIGHT W, Kg.	γ , gm/Cm^2	Pmax , Kg	Ft', Kg/Cm^2	
P13,BAY12/1	29.2	15.0	11.736	2.274	16.0	23.3	
P14,BAY12/2	22.5	15.0	9.166	2.305	16.8	23.6	
P15,BAY19/1	10.6	15.0	4.620	8.466	10.5	42.0	
P16,BAY19/2	24.9	15.9	10.658	2.422	19.2	32.7	
P17,BAY22/2	24.6	15.6	10.600	2.438	19.7	34.0	
P18,BAY22/1	21.5	15.0	9.000	2.368	17.0	33.6	
P19,E-I35/18	15.5	15.0	6.603	2.411	14.8	40.5	

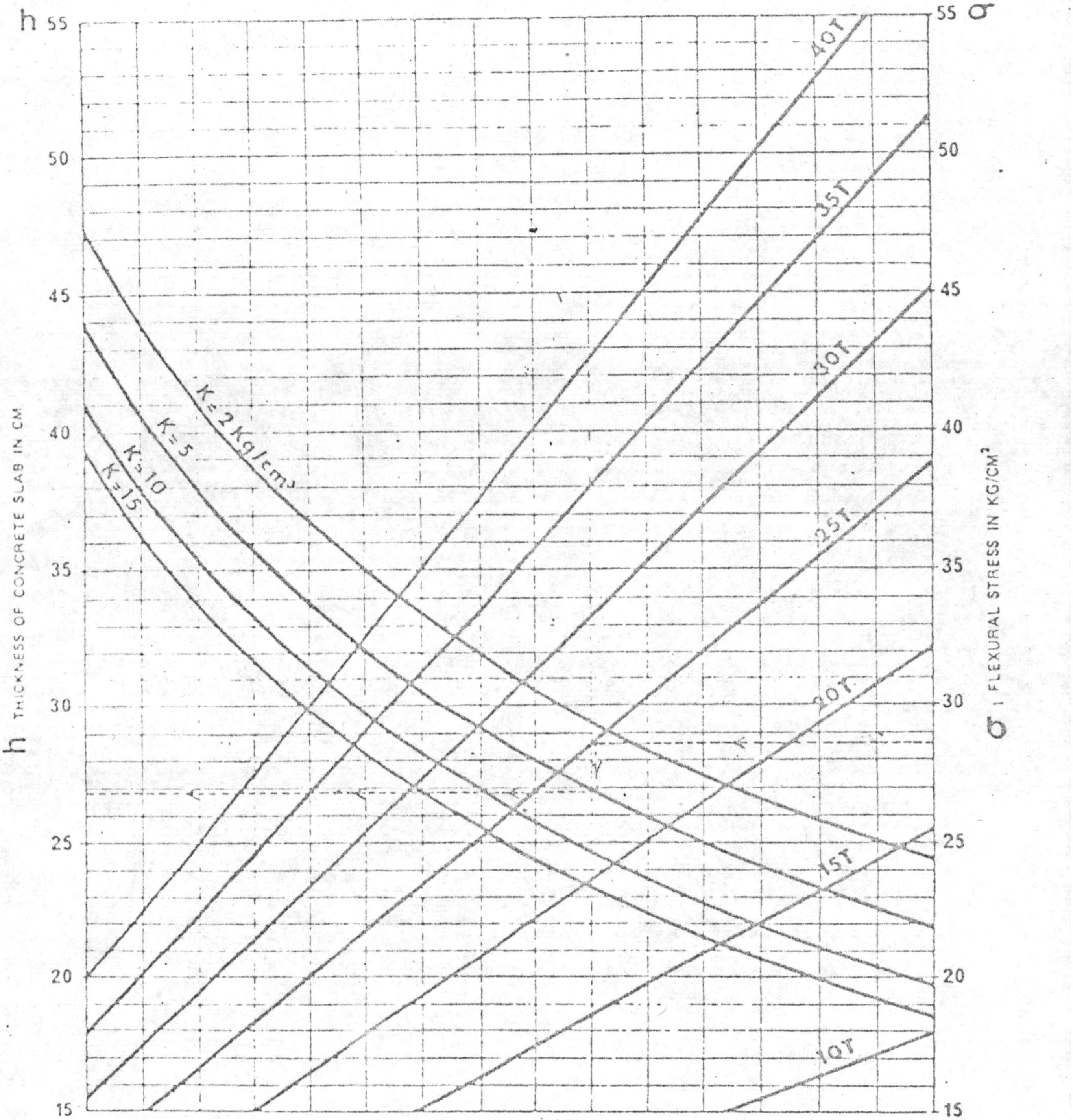
Source: Report on Airside Pavement Breaking-up and Pavement Investigation for Aircraft Parking Apron Design, Thailand Airport Consultants Joint Venture, 1980.

ภาคผนวก – ค

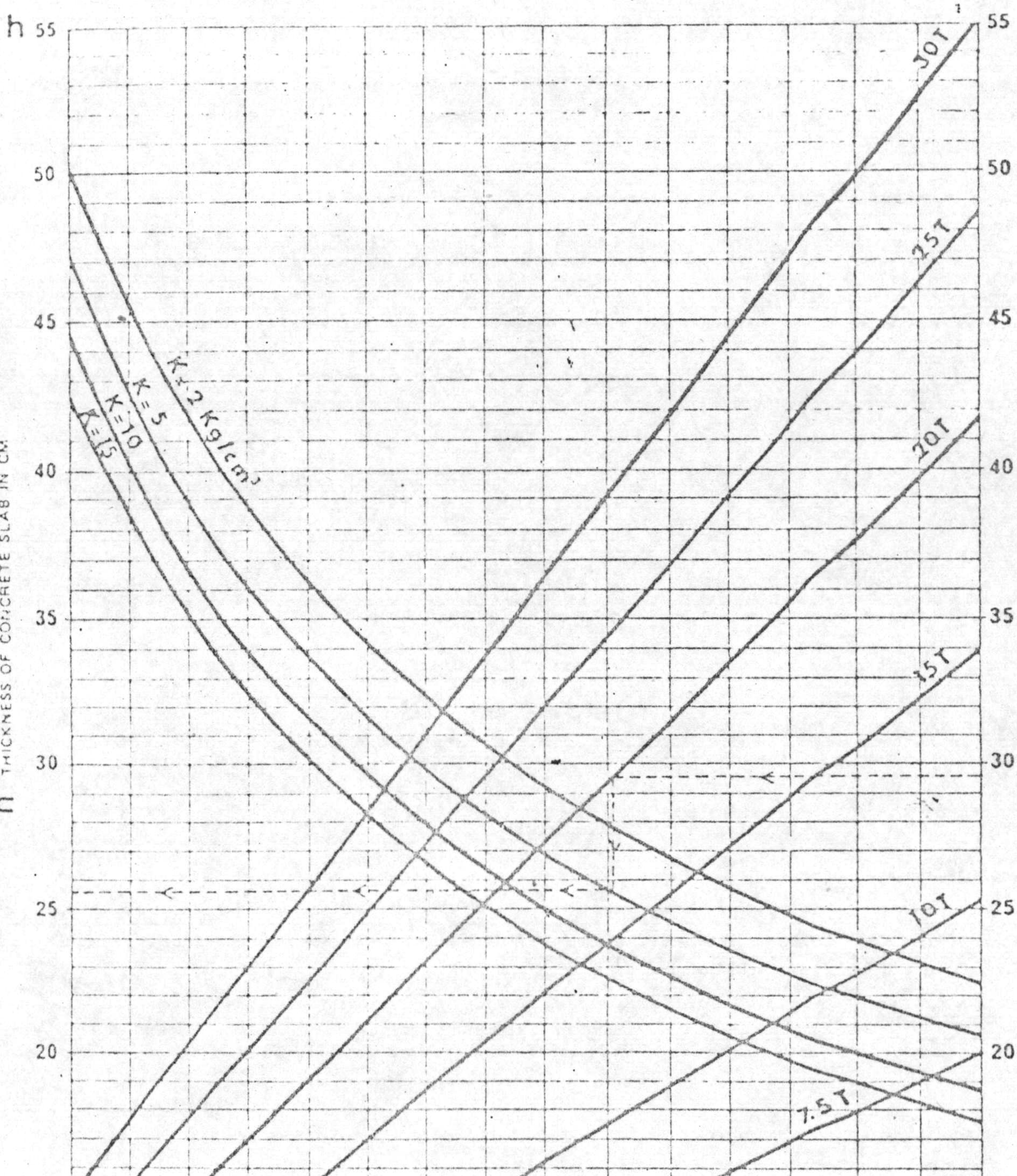
แผนภูมิของการออกแบบความหนา



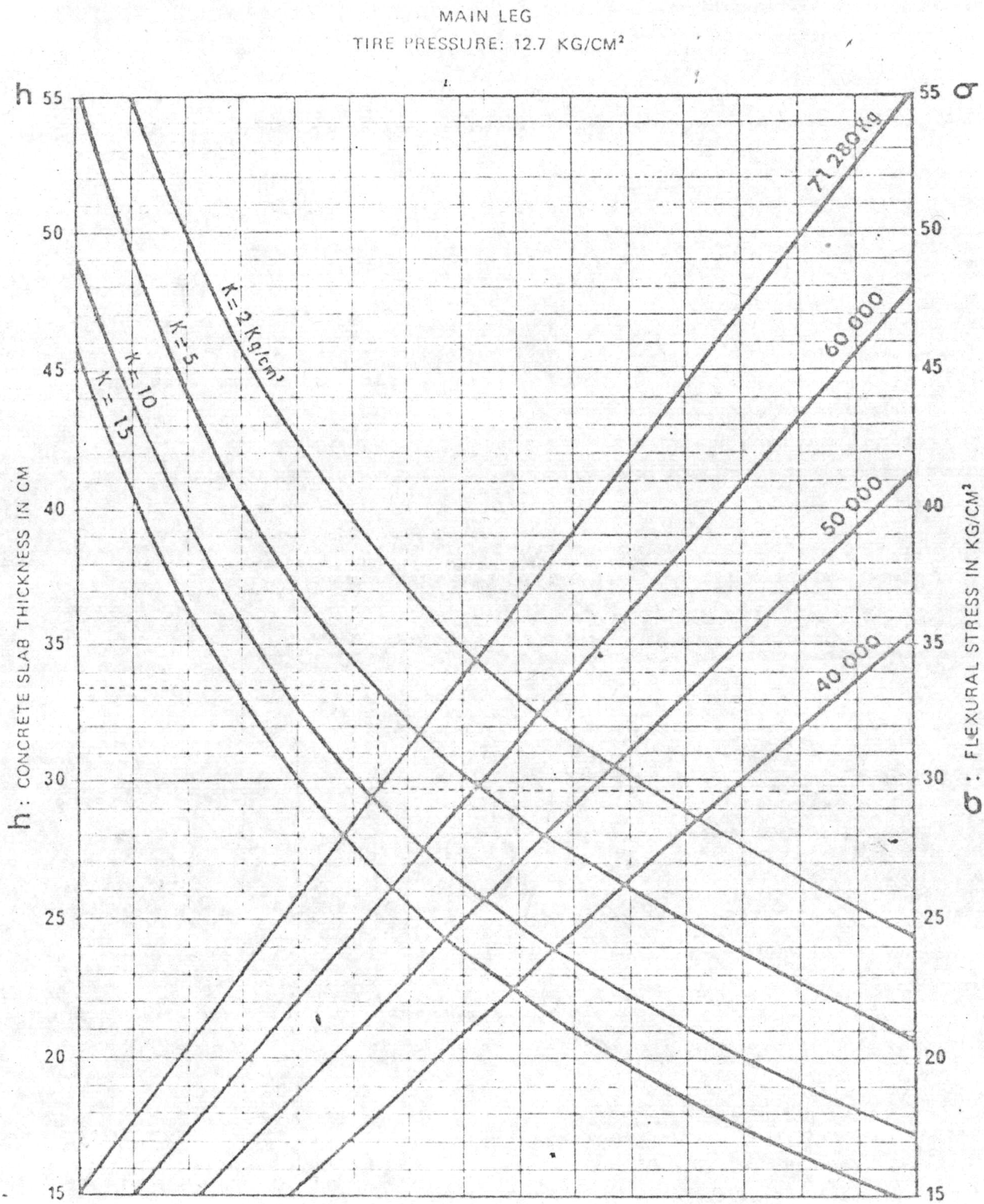
รูป ค-1 Design chart for rigid pavements
Typical dual tandem wheel leg , by. French Method



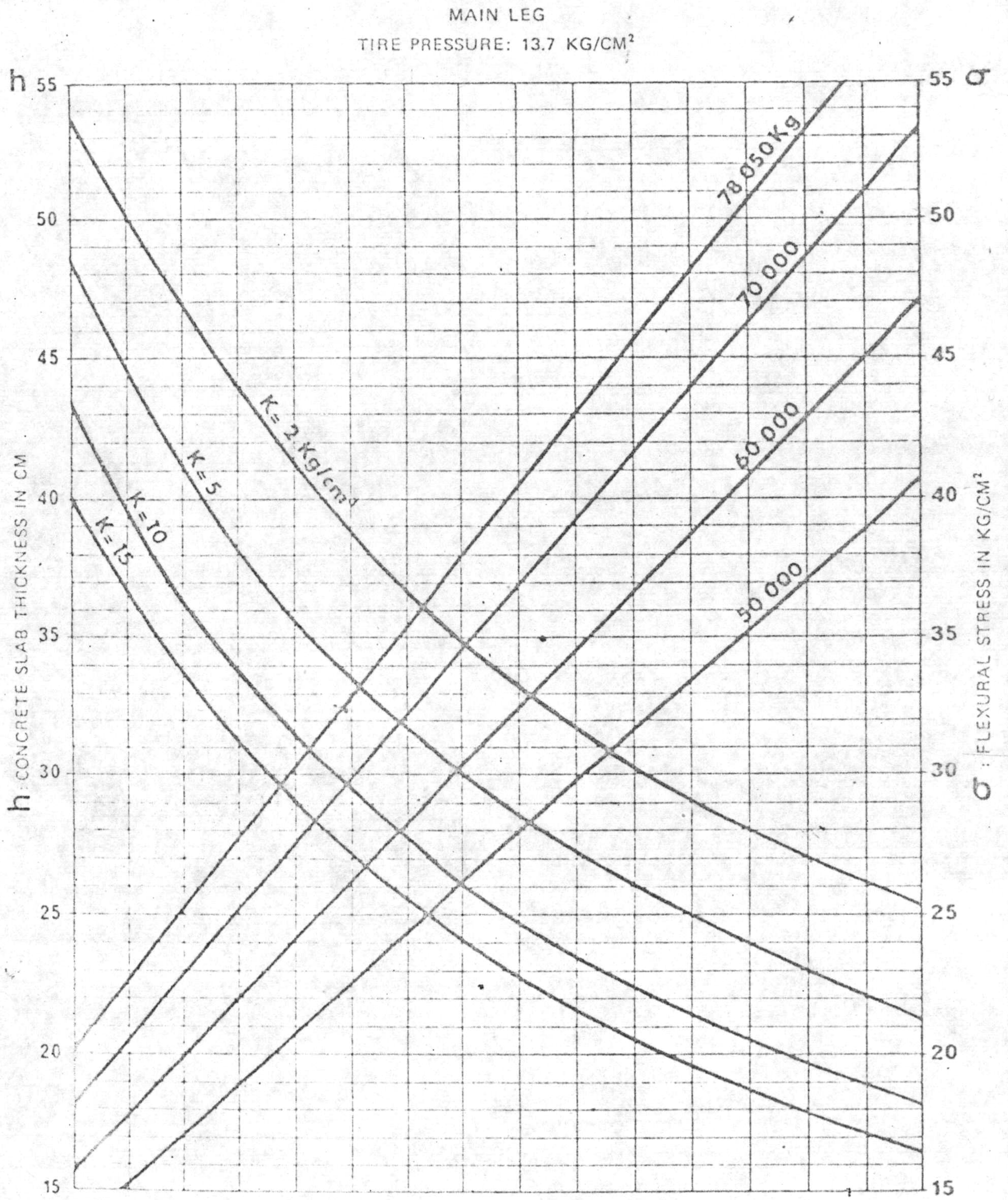
รูป ก-2 Design chart for rigid pavements
Typical dual wheel leg , by French Method



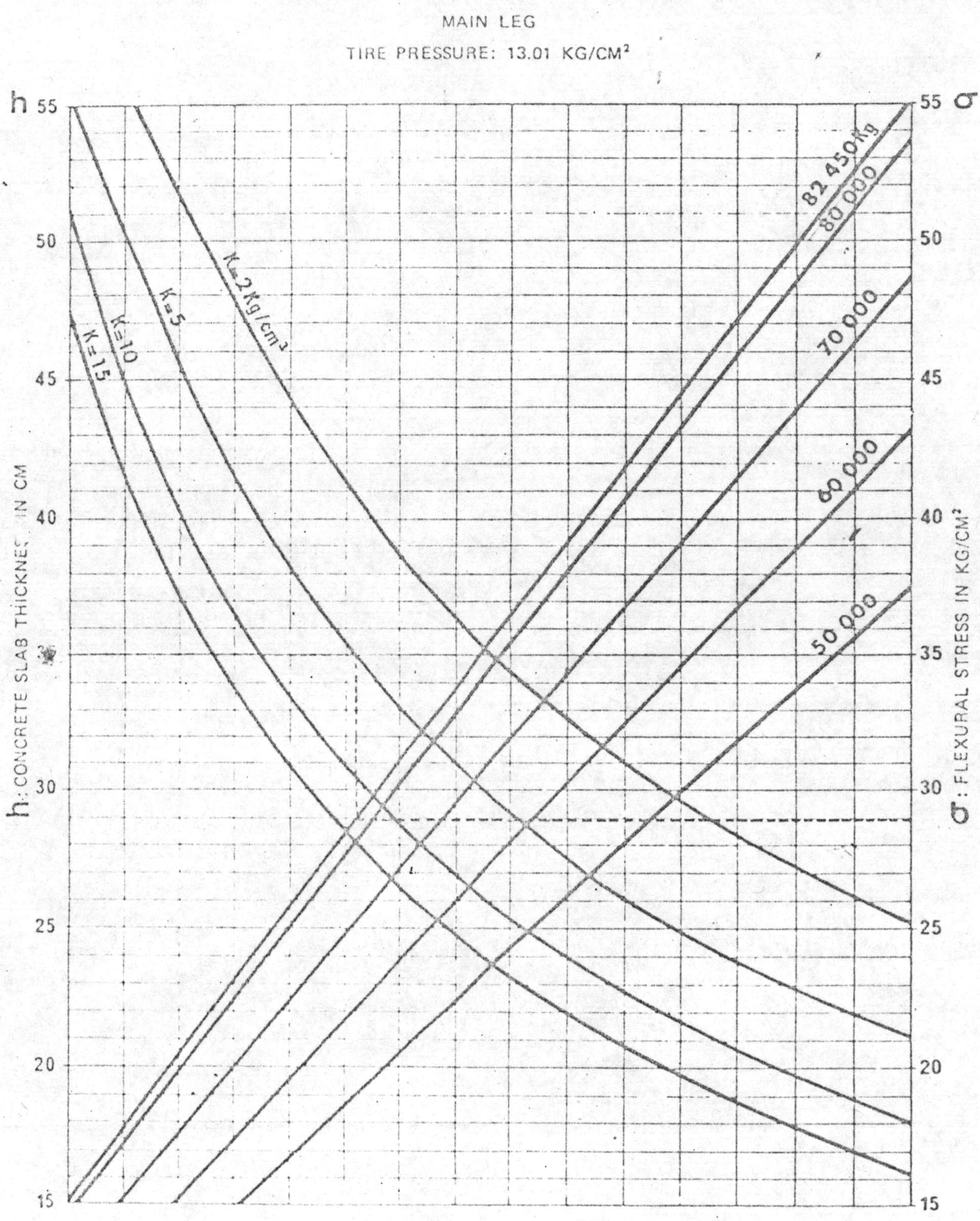
รูป ค-3 Design chart for rigid pavements
Typical single wheel leg, by French Method



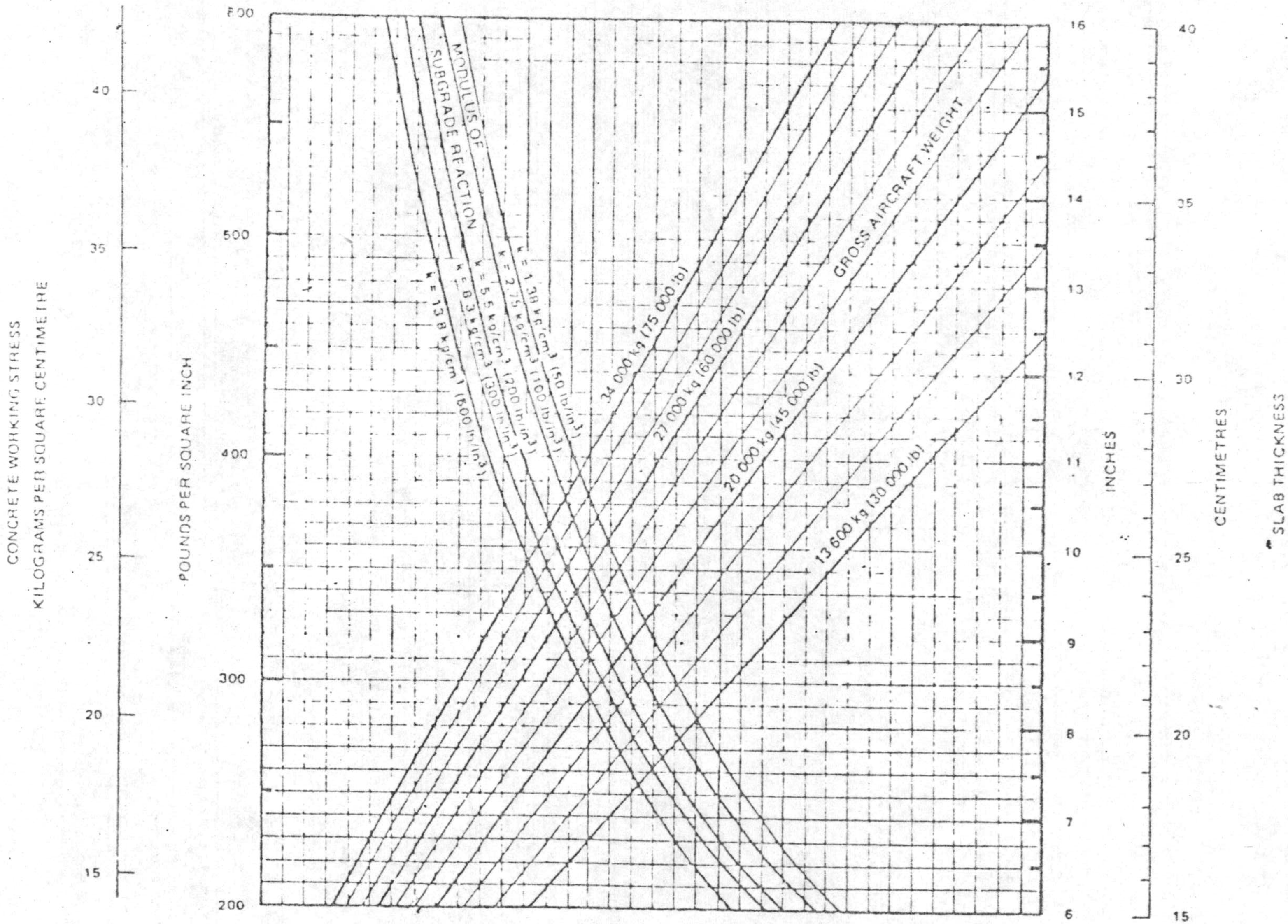
รูป ค-4 Rigid pavement - Boeing 707-320C



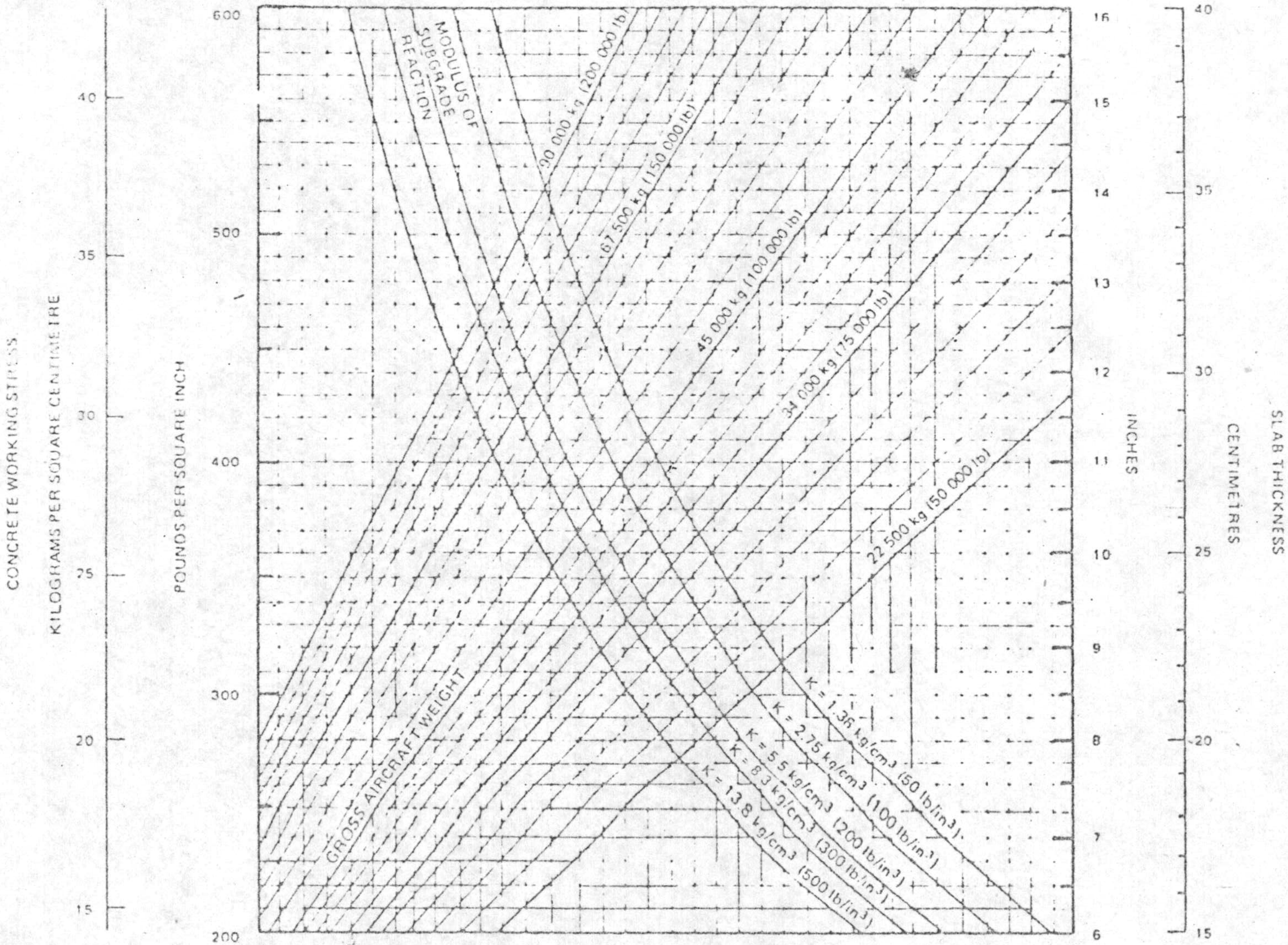
รูป ค-5 Rigid pavement - DC-8-63



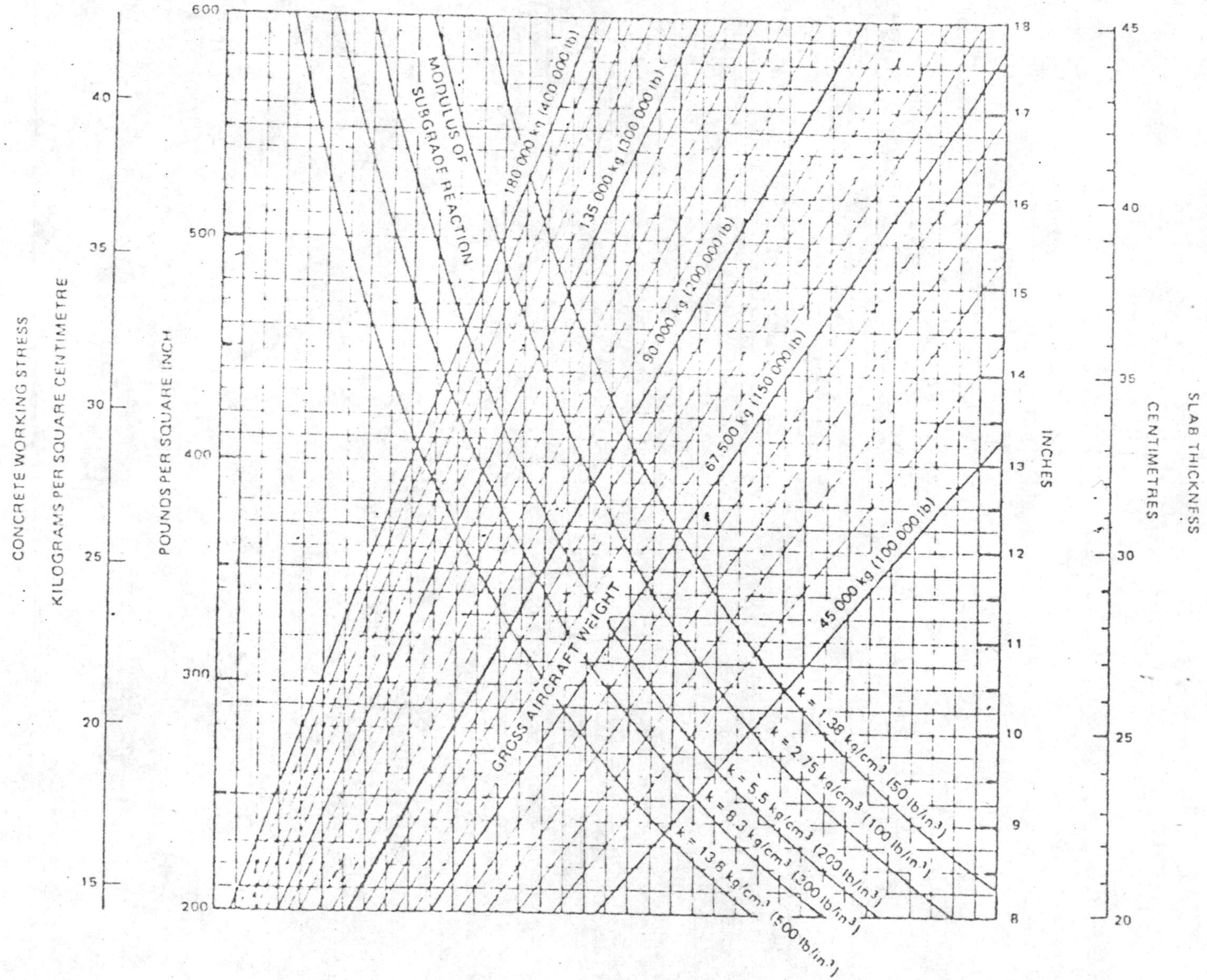
รูป ค-6 Rigid pavement - Boeing 747 B, C



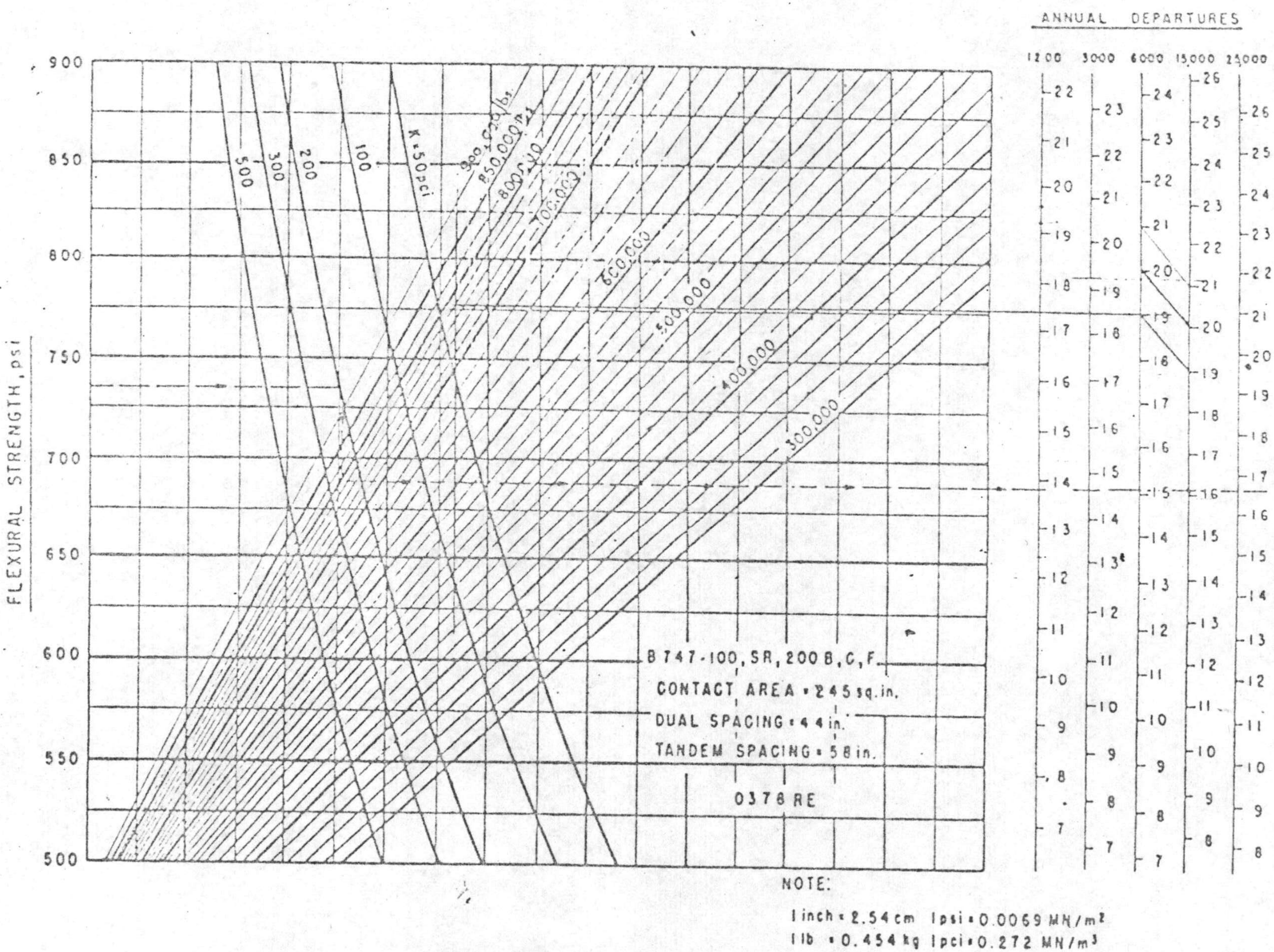
รูป ค- 7 Concrete working stress and slab thickness v. gross aircraft weight for single wheel gear, by FAA



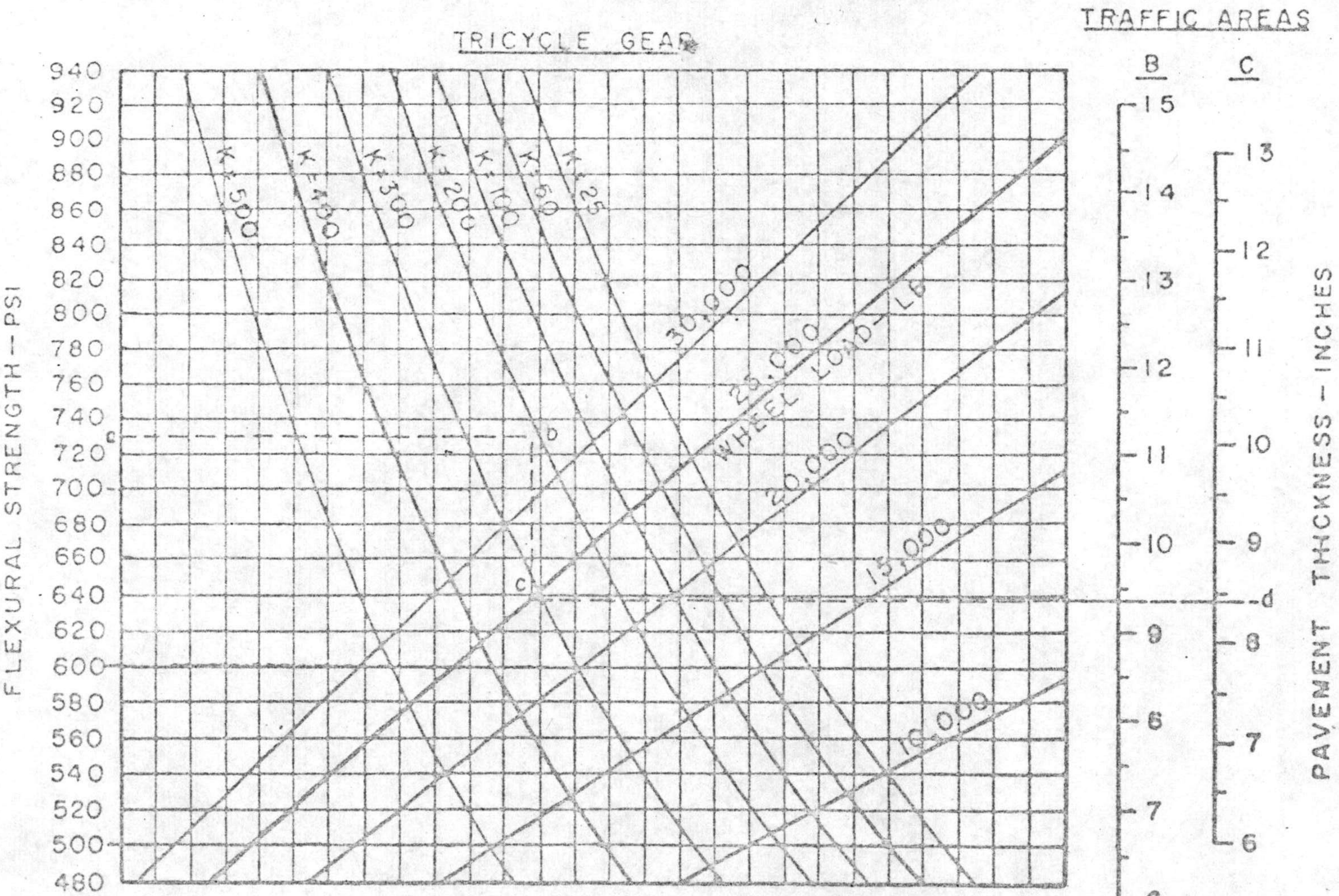
ƷU A-8 Concrete working stress and slab thickness v. gross aircraft weight for dual gear, by FAA



รูป ก – 9 Concrete working stress and slab thickness v. gross aircraft weight for dual tandem gear, by FAA

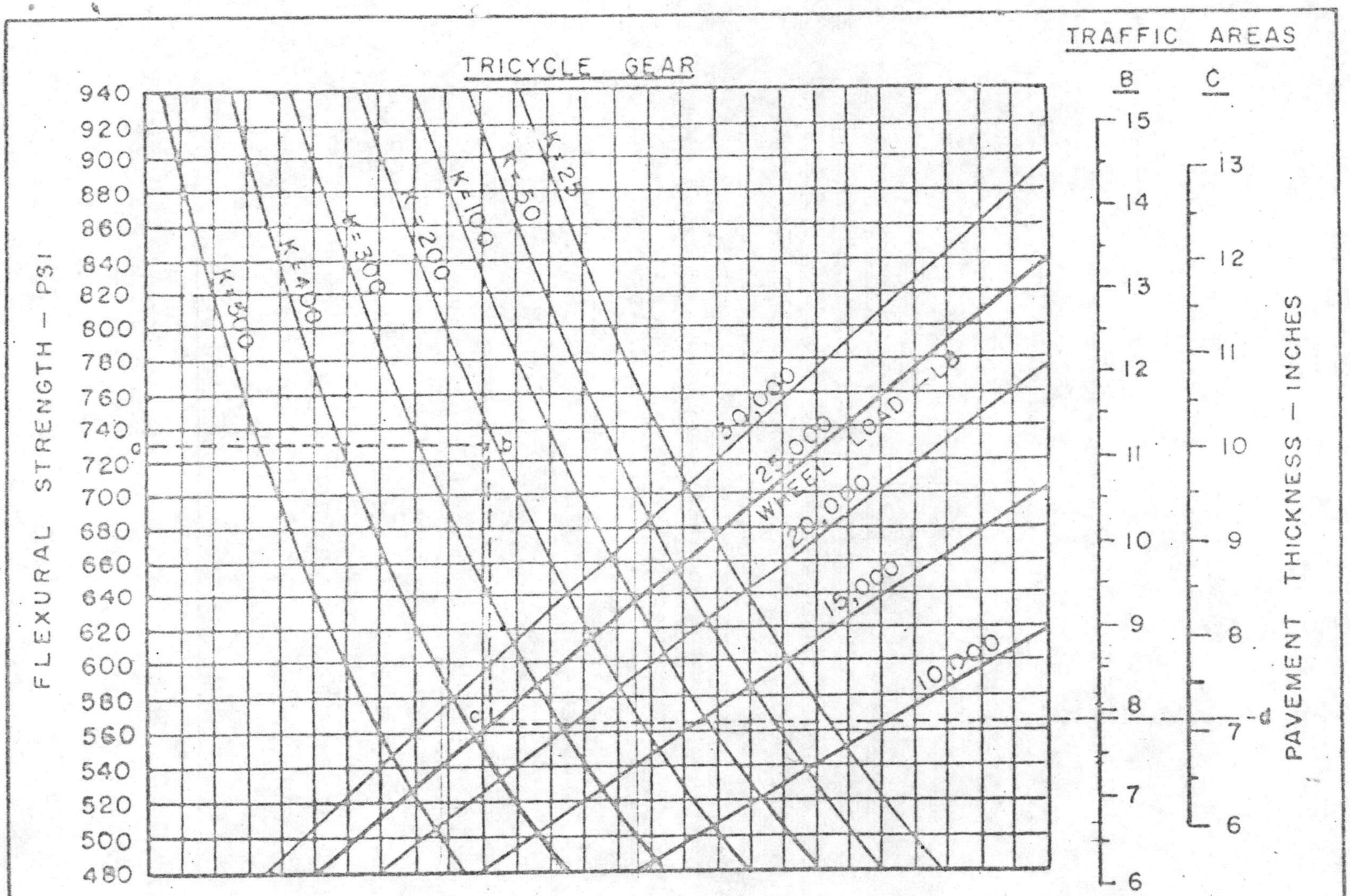


รูป ก-10 OPTIONAL RIGID PAVEMENT DESIGN CURVES - B-747-100, SR, 200 B, C, F, L-500
B747 STRETCH



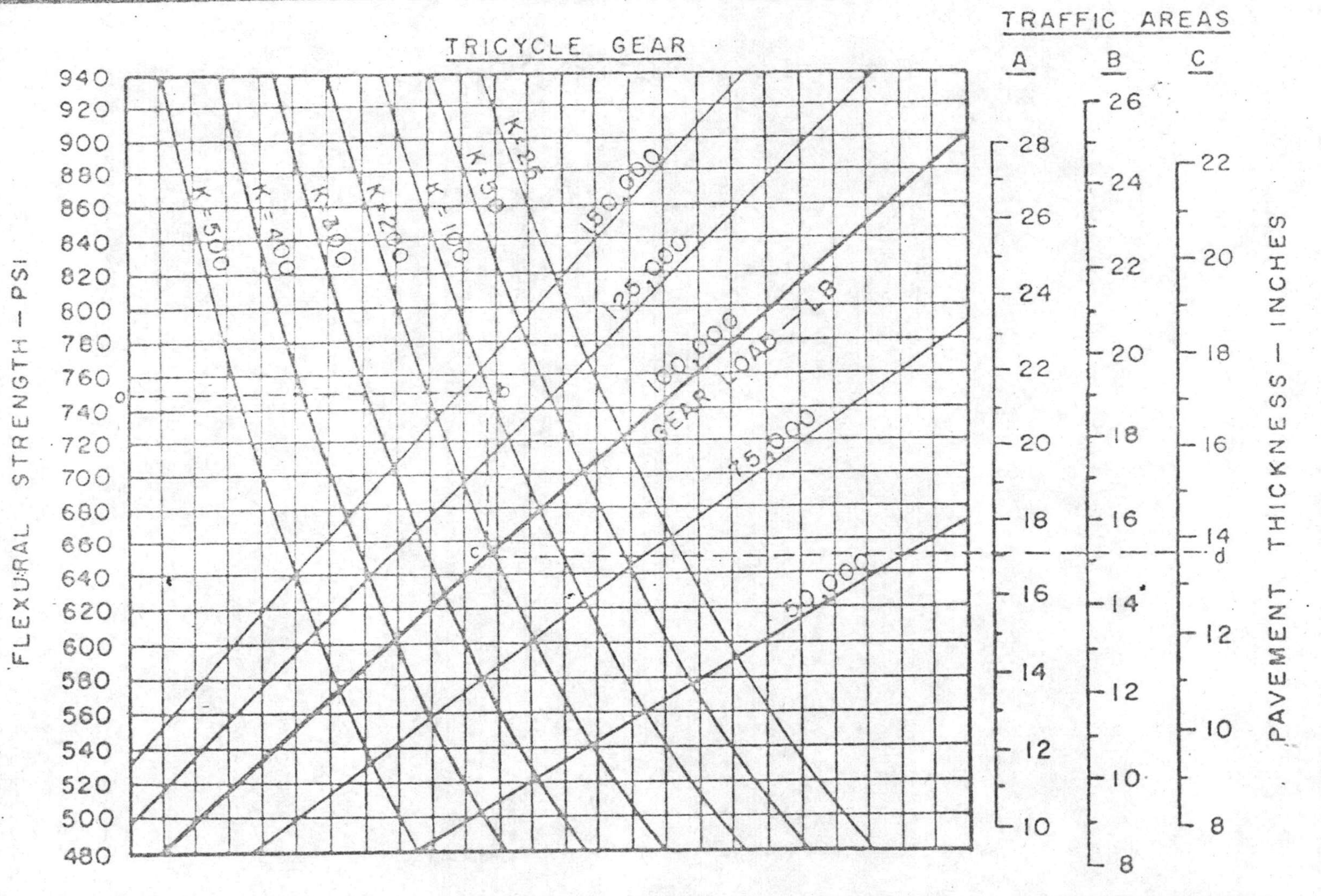
DESIGN CURVES FOR CONCRETE AIRFIELD PAVEMENTS
SINGLE WHEEL 100 SQ IN. CONTACT AREA

Fig. III-11 Regid pavement design curve for single wheel 100 in.^{2} contact area.



DESIGN CURVES FOR CONCRETE AIRFIELD PAVEMENTS
SINGLE WHEEL – 100 PSI INFLATION PRESSURE

Figure A-12 Regid pavement design curve for single wheel 100 psi inflation pressure.



DESIGN CURVES FOR CONCRETE AIRFIELD PAVEMENTS
TWIN WHEELS SPACED 37½" C. TO C.
(267 SQ IN. CONTACT AREA EACH WHEEL)

Fig.-13 Regid pavement design curve for twin wheels, tricycle gear.

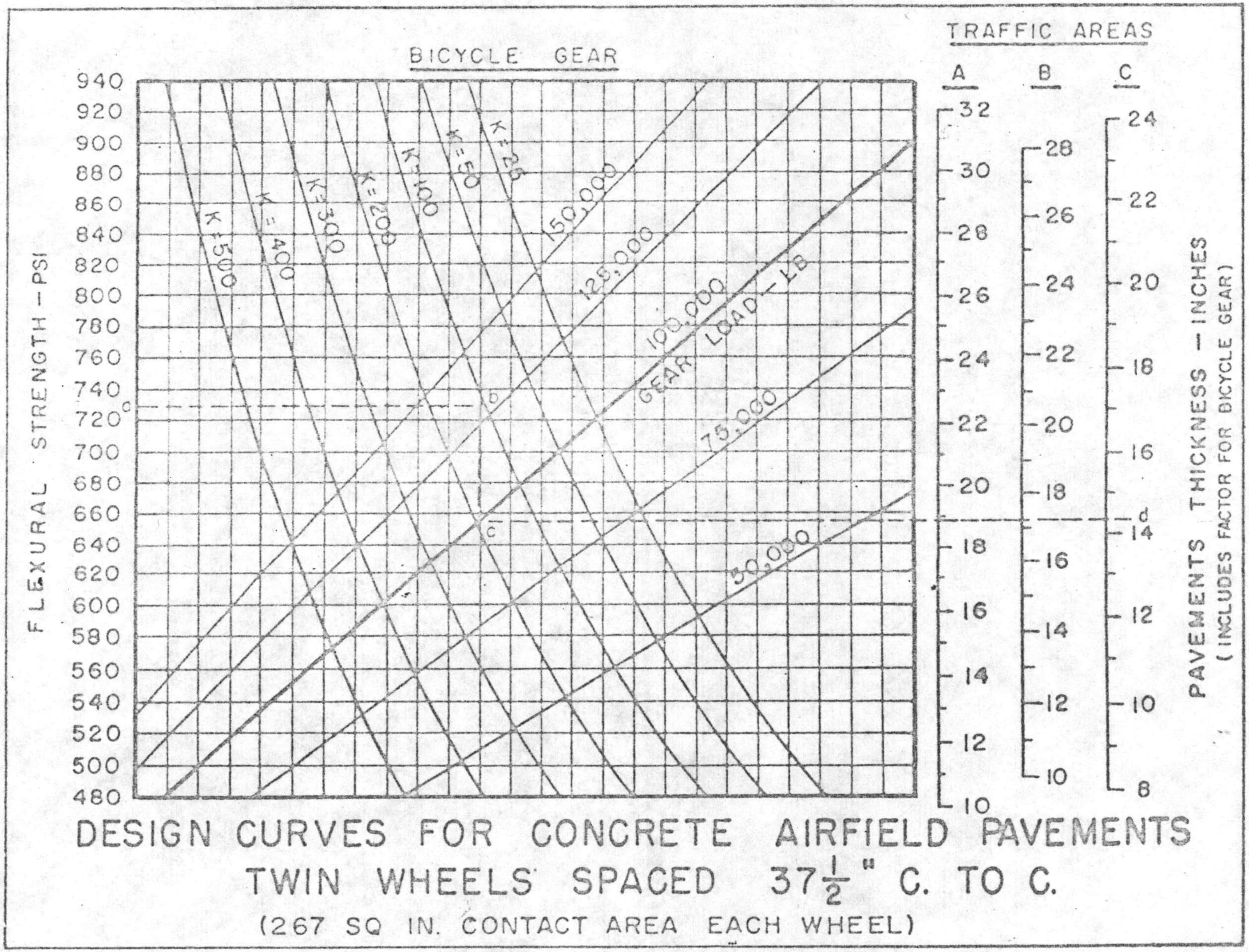
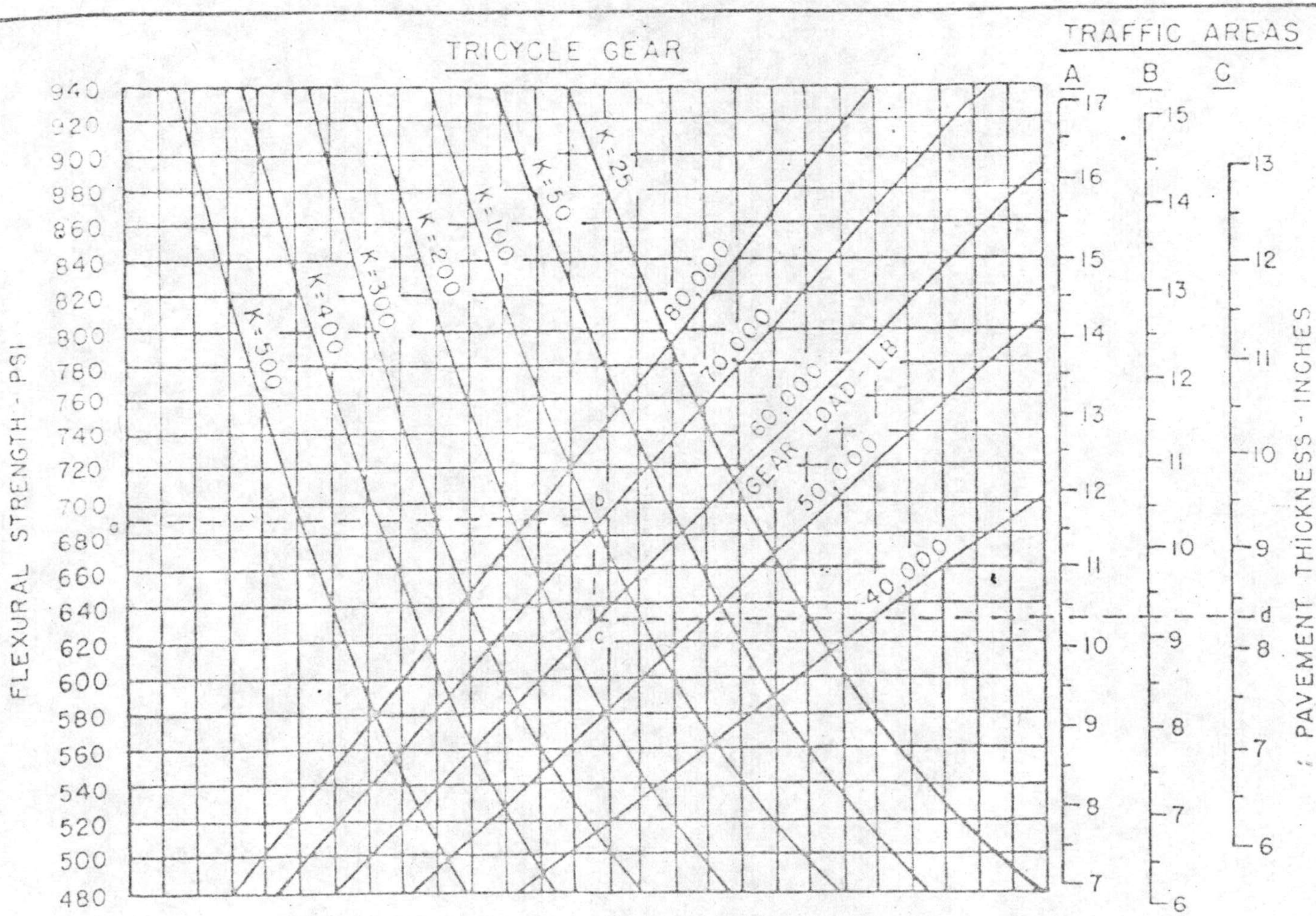
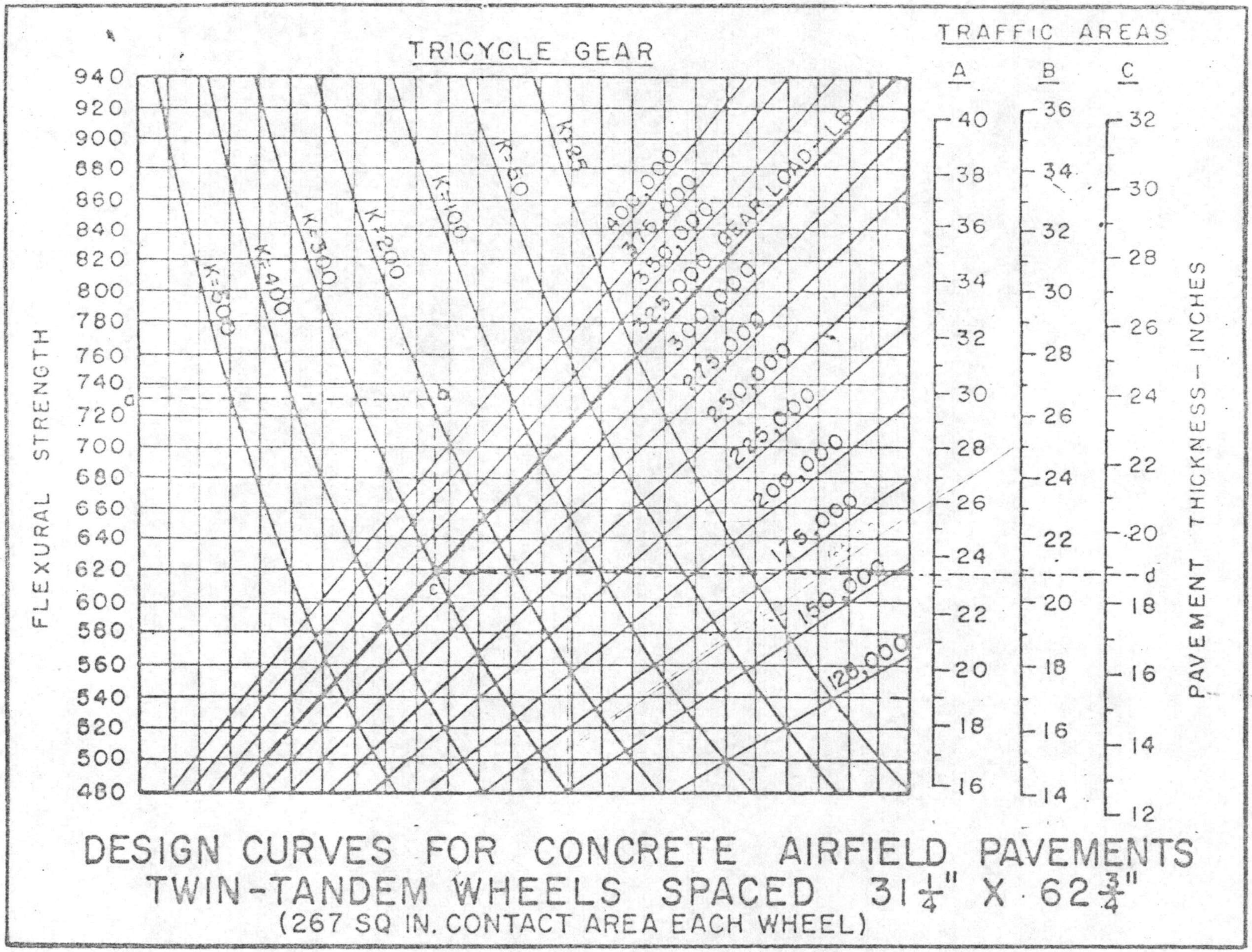


Fig H-14 Regid pavement design curve for twin wheels, bicycle gear.

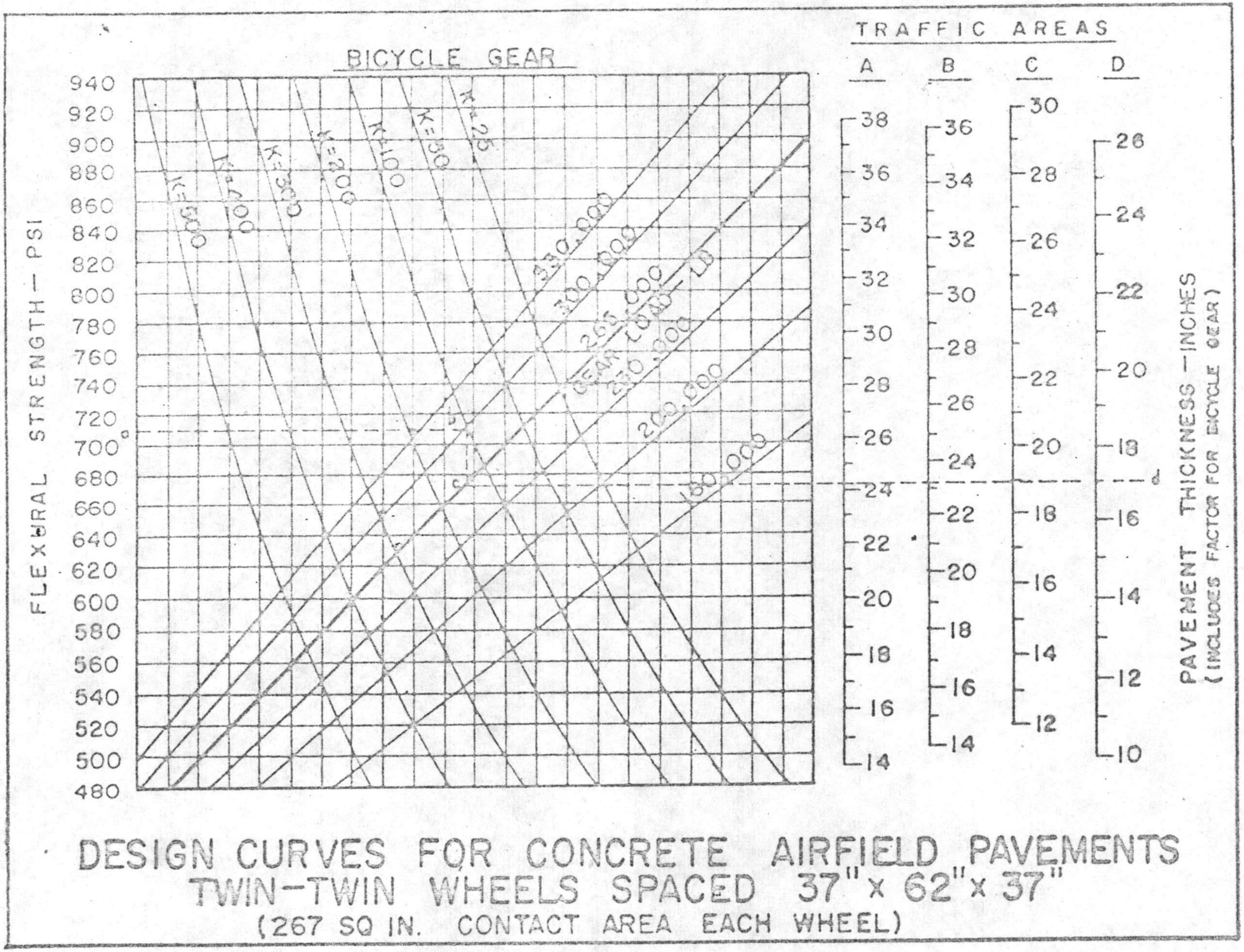


DESIGN CURVES FOR CONCRETE AIRFIELD PAVEMENTS
SINGLE-TANDEM WHEELS SPACED 60" C.C.
(400 SQ IN CONTACT AREA EACH WHEEL)

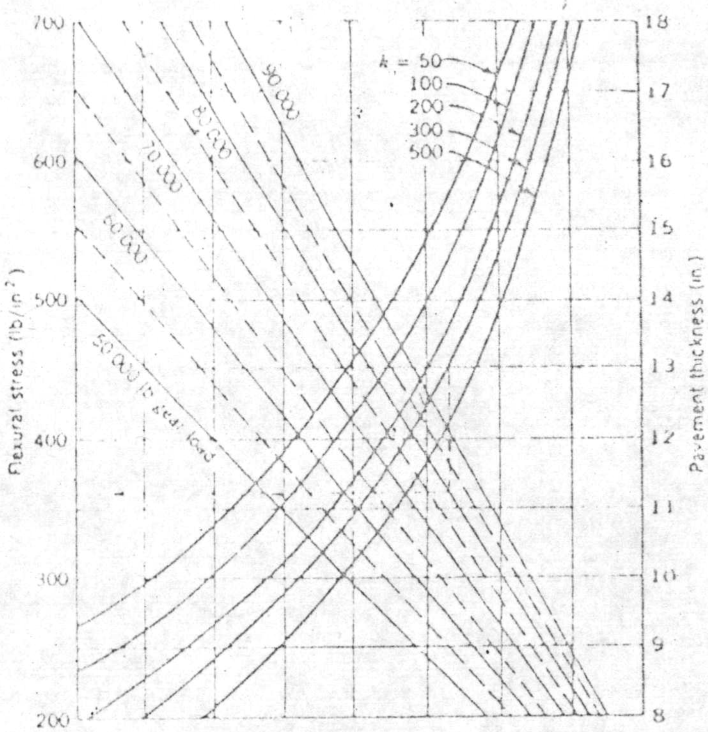
IVA-15 Regid pavement design curve for single tandam wheels,tricycle gear.



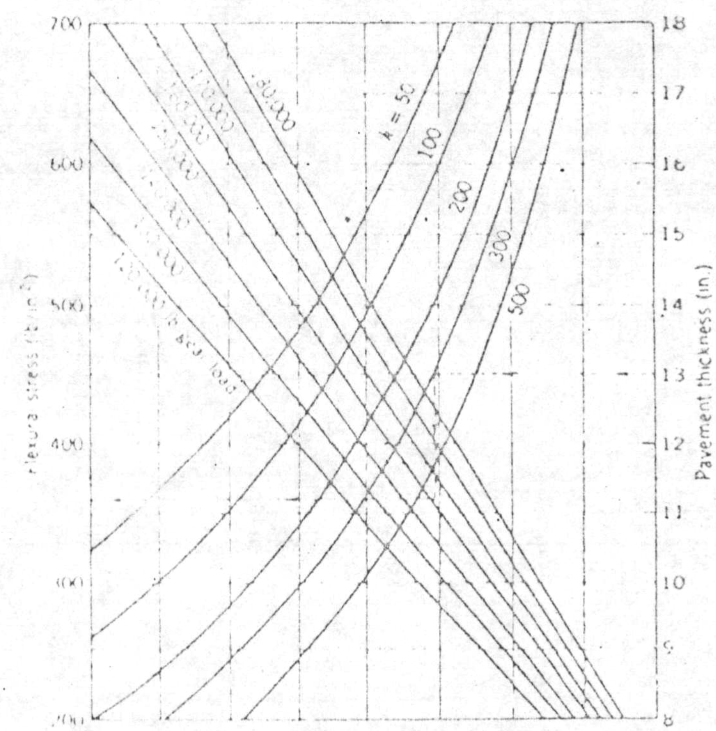
URE-16 Regid pavement design for twin tandam wheels, tricycle gear.



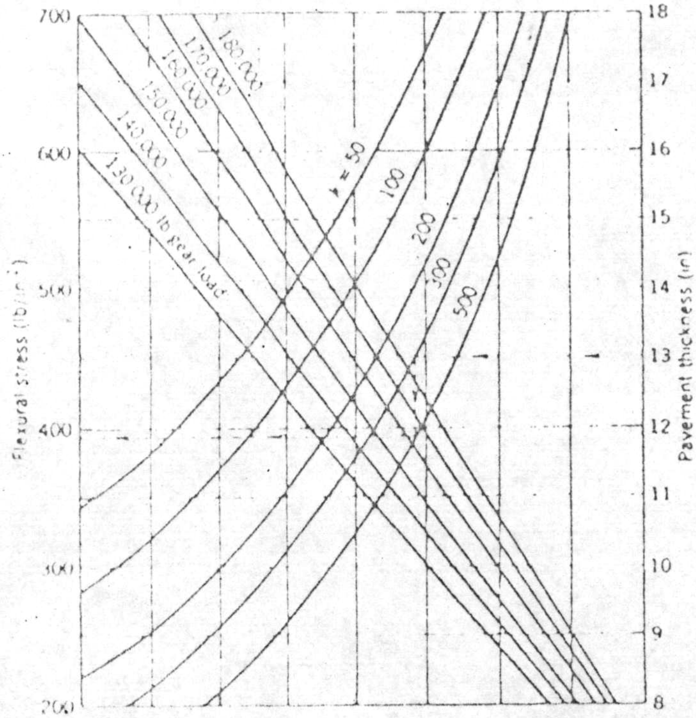
ure-17 Rigid pavement design for twin tandem wheels, bicycle gear.



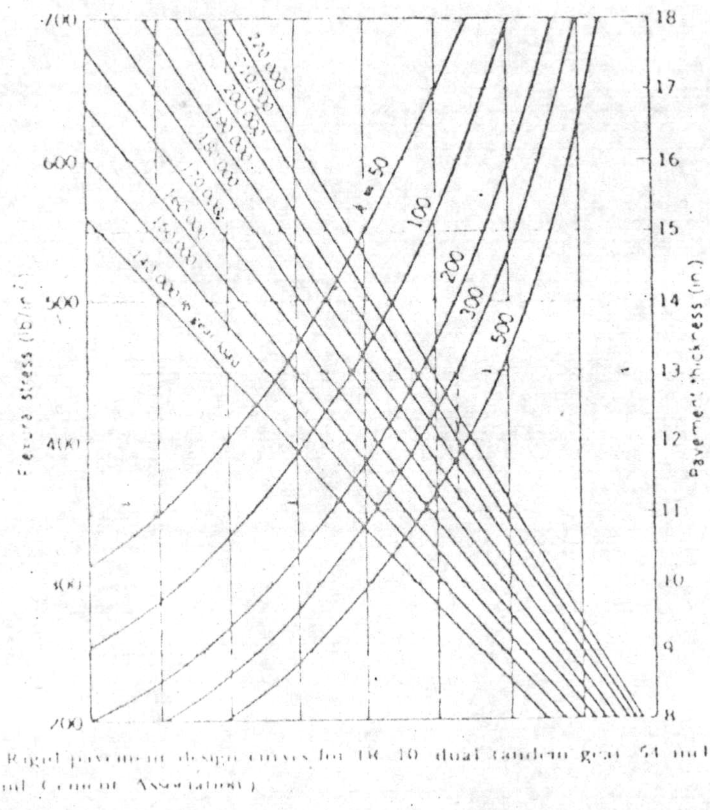
รูป ค – 18 Rigid-pavement design curves for Boeing 727, dual wheels, 34 inches c. c. (From Portland Cement Association).



รูป ค – 19 Rigid pavement design curves for Boeing 707, dual tandem gear, 34.6 inches x 56 inches. (From Portland Cement Association.)



รูป ก-20 Rigid pavement design curves for DC 8, twin tandem gear, 32 inches × 55 inches (From Portland Cement Association)



รูป ก-21 Rigid pavement design curves for DC 10 dual tandem gear 54 inches × [illegible] inches (From Portland Cement Association)

ภาคผนวก ง

รูปแบบของการสำรวจรอยแตกผิวหน้าการจราจร

B. Pavement Investigation

(1) Pavement Condition Survey

The condition survey for the existing parking apron would serve two purposes: (1) to establish the existing condition of the pavement and (2) to provide an aid to the evaluating engineer in arriving at representative physical property values and in determining requirement for overlay:

The procedure and method in making the visual pavement surface inspection and recording pavement defects are outlined as follows:

(a) Definitions

(1) Slab. A slab may be defined as a unit of the original pavement containing no joints or the final divisions made by dummy joints.

(2) Major or Structural Defects. A major or structural defect is defined as a crack or break in the concrete slab that will impair the load-carrying capacity of the pavement. The major defect or crack usually extends throughout the depth of the slab, thus, the original concrete slab is subdivided by the crack into two or more parts. The principal major defects are as follows:

(i) Longitudinal, Transverse, and Diagonal Cracks. These cracks are defined with reference to their orientation in the slab. Examples of such cracks are shown in Figure 1A, 1B and 1C.

(ii) Corner Breaks. Corner breaks occur across the corner formed by joints or joints and free edges (see Figure 1D).

(iii) Shattered Slabs. Shattered slabs are those in which all or a portion of the slab will have to be replaced to accomplish repair. A slab is normally considered to be shattered when it has broken into six or more pieces (see Figure 2A).

(3) Minor Defects. A minor defect is defined as a crack or break that is generally confined to the surface of the concrete and does not extend throughout the depth of the slab. These defects often cause undesirable surface conditions but do not impair the structural capacity of the concrete to carry load. Minor defects may or may not develop into major defects through continued use of the pavement but can generally be repaired by normal maintenance operations. Minor defects are as follows:

(i) Shrinkage Cracks. Shrinkage cracks range from several inches to 2 or 3 ft. in length and occur in irregular patterns. They are formed initially during the setting and curing of the concrete. See Figure 2B.

(ii) Map Cracking. Map cracking or surface crazing (Figure 2C) is a pattern of surface cracking that forms in parallelograms, with specings of approximately 2 to 6 in.

(iii) Joint Spalling Joint spalling is the occurrence of raveling or cracking along the joints, generally ranging from 2 to 6 in. in width. Typical spalling along the longitudinal joint, transverse joint, and at the corner of a slab is shown in Figures 2D, 3A and 3B, respectively.

(iv) Scaling Scaling is a condition in which the surface concrete has disintegrated, thereby exposing the coarse aggregate (see Figure 3C).

(v) Pumping Joints Pumping joints are caused by traffic on pavements having a poor subgrade condition and unsealed joints, which permit the infiltration of water into the foundation. Consequently, the subgrade or base course material becomes extremely wet and, when free water is present, mud and water will be pumped up through the joints under aircraft loadings. This type defect normally occurs in overloaded pavements; however, under certain foundation and moisture conditions, pumping can occur even on adequate pavements. Although generally classed as a minor defect, pumping can become a major defect if the slab becomes tilted sufficiently to produce a rough and irregular operating surface for aircraft. Pumping, if not corrected, will usually result in corner breaks in the slabs.

(vi) Settlement Settlement is the lowering of a slab or portion of slab from the as-constructed alignment. Settled slabs are usually caused by settlement of the foundation material and do not necessarily mean that the load-carrying capacity of the slab itself is impaired. However, if these slabs have settled to such an extent as to cause a hazardous or undersirable operating surface for the aircraft, they should be considered to be major defects. See Figure 3D.

(vii) Pop-outs Pop-outs (Figure 4A) are small spalls occurring in the interior portion of the slab and are usually caused by defective coarse aggregates.

(viii) Uncontrolled Contraction Crack In many instances an uncontrolled contraction crack (Figure 4B) will form during construction prior to the sawing of the transverse of longitudinal dummy joint. These contraction cracks usually form very close (within 1 or 2 ft.) to the proposed joint and will often be found meandering back and forth across the sawed joint. They are believed to form, or start to form, before the joint is sawed and although they may not be visible at the time of sawing, they will become visible as the slabs continue to contract or after a few cycles of expansion and contraction. Although this type of cracking extends throughout the depth of the slab, it is not considered a major defect since in essence the contraction crack serves the function of the scheduled joint.

Any one or a number of defects may be recorded for any one slab. When there are more than one of the same type defects in any one slab, it is desirable to indicate the number of such defects, especially if they are structural defects. This can be accomplished rather easily if the observer calls the number of each defect when there are more than one, and the recorder simply records a sign or symbol for each one. For example, if there were two transverse cracks in a slab, the recorder would record two transverse crack symbols in the slab. If a slab is so badly damaged with structural defects that it is classified as shattered, then only the symbol for a shattered slab need be recorded. If one type of defect occurs in several consecutive slabs in the same lane, the defects may be carried on the survey forms as indicated by "note A" in Figure 6, which will reduce the work of the recorder. When the end of each paving lane is reached, the number of the last slab should be recorded and the work "END" written in the block designating the last slab (note B, Figure 5). When the survey of the feature is completed, the end of the feature should be plainly designated (note C, Figure 5).

(c) Pavement Investigation Report:

Basedon the surface inspection and test results of pavement exploration (as specified in Section II), a report shall be prepared and submitted to the Engineers in the due time. It shall encompass summary of prevailing surface and structural pavement conditions, conclusions and recommendations for corrective measures. Conclusions shall be arrived on causes of failures such as major defects due to traffic load, climate, drainage, and/or poor material, and workmanship. Photographs are required to exhibit representative pavement defects or distress. Along with this report, maps showing noted defects shall also be prepared.

(b) Procedure and Method:

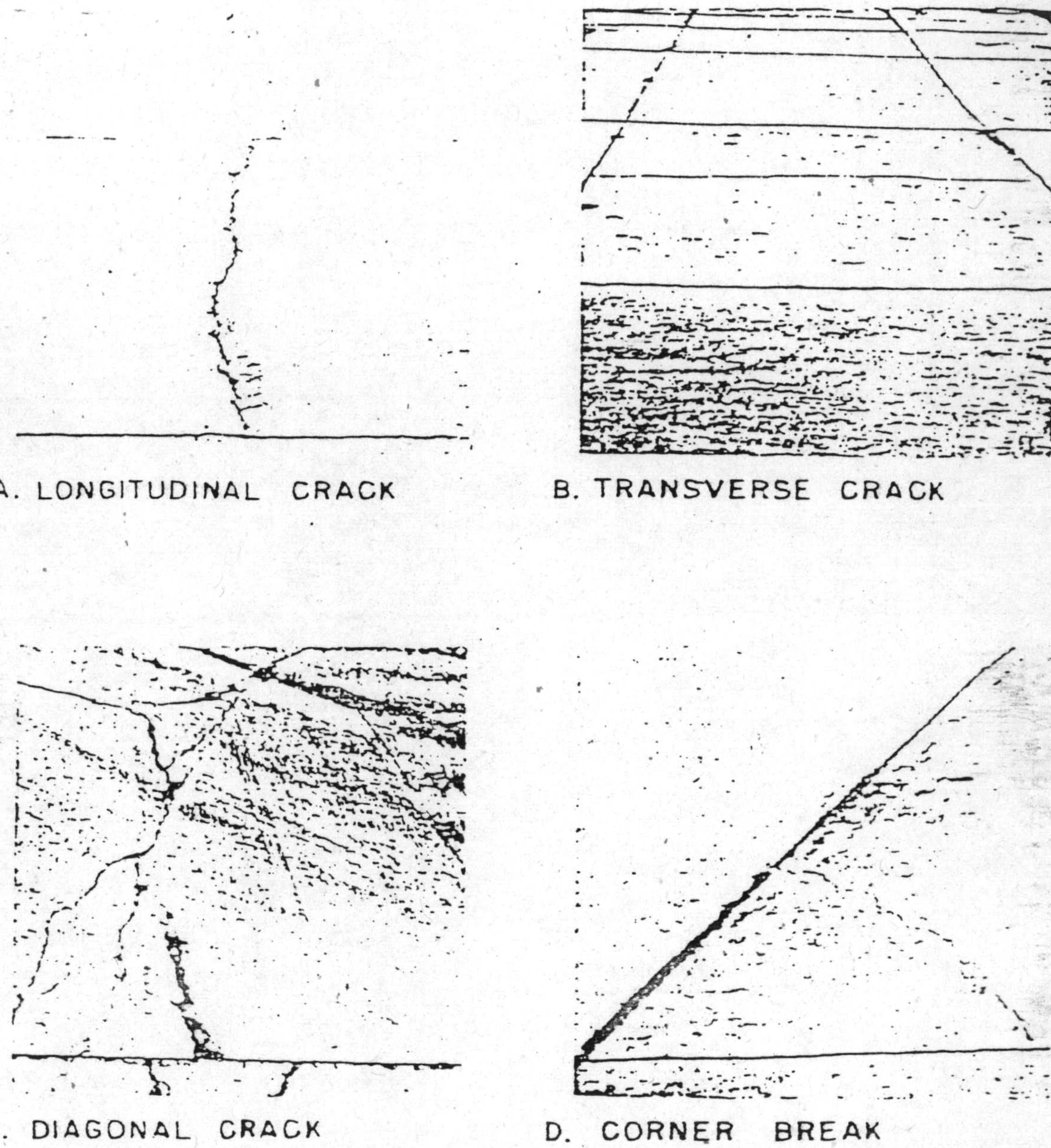
The existing parking apron should first be devided into features in accordance with their design and construction history; i.e., if the parking apron with two different thicknesses of pavements, it should be divided into two features and each should be surveyed separately. After selecting a feature for study, the point at which the pavement survey is to begin and the direction in which it will be made should be marked on the layout plan by arrows. The pavement lanes should be numbered consecutively from left to right, and the slabs from the starting point to the end. The survey crew can then proceed over the pavement features and record the pavement defects by lane and slab numbers. A suggested method for accomplishing the actual recording of defects is as follows:

(1) The survey crew consisting of at least three surveyors should be equipped with a vehicle (sedan or station wagon), survey forms (see example, Figure 5), and a pace tally.

(2) Once the feature to be studied is definitely located and marked on the layout plan, the survey crew will place the vehicle so that it straddles the longitudinal joint between paving lanes 1 and 2. The vehicle is then driven forward very slowly straddling the longitudinal joint. The surveyor will observe and call the defects in lane 1. The second surveyor will observe and call the defects in lane 2 and will count the slabs from the beginning of the feature with the pace tally. Both surveyors should also observe the longitudinal joint ahead of the vehicle to call the defects along the joint in either lane 1 or 2. When calling defects, the type of defect and the lane number in which the defect occurs should be called. The third surveyor will record the called defects by lane and slab number on the survey forms (see example, Figure 5). Only the slabs having defects need be recorded. When a defect is called by either of the observers, the man with the pace tally must immediately call the number of the slab in which the defect occurs. After completion of the survey for the first two lanes of the feature, the vehicle is taken back to the starting point and placed so as to straddle the longitudinal joint between paving lanes 3 and 4, which are surveyed in the same manner as were lanes 1 and 2. This procedure is followed, taking two lanes at a time, until the entire feature has been surveyed.

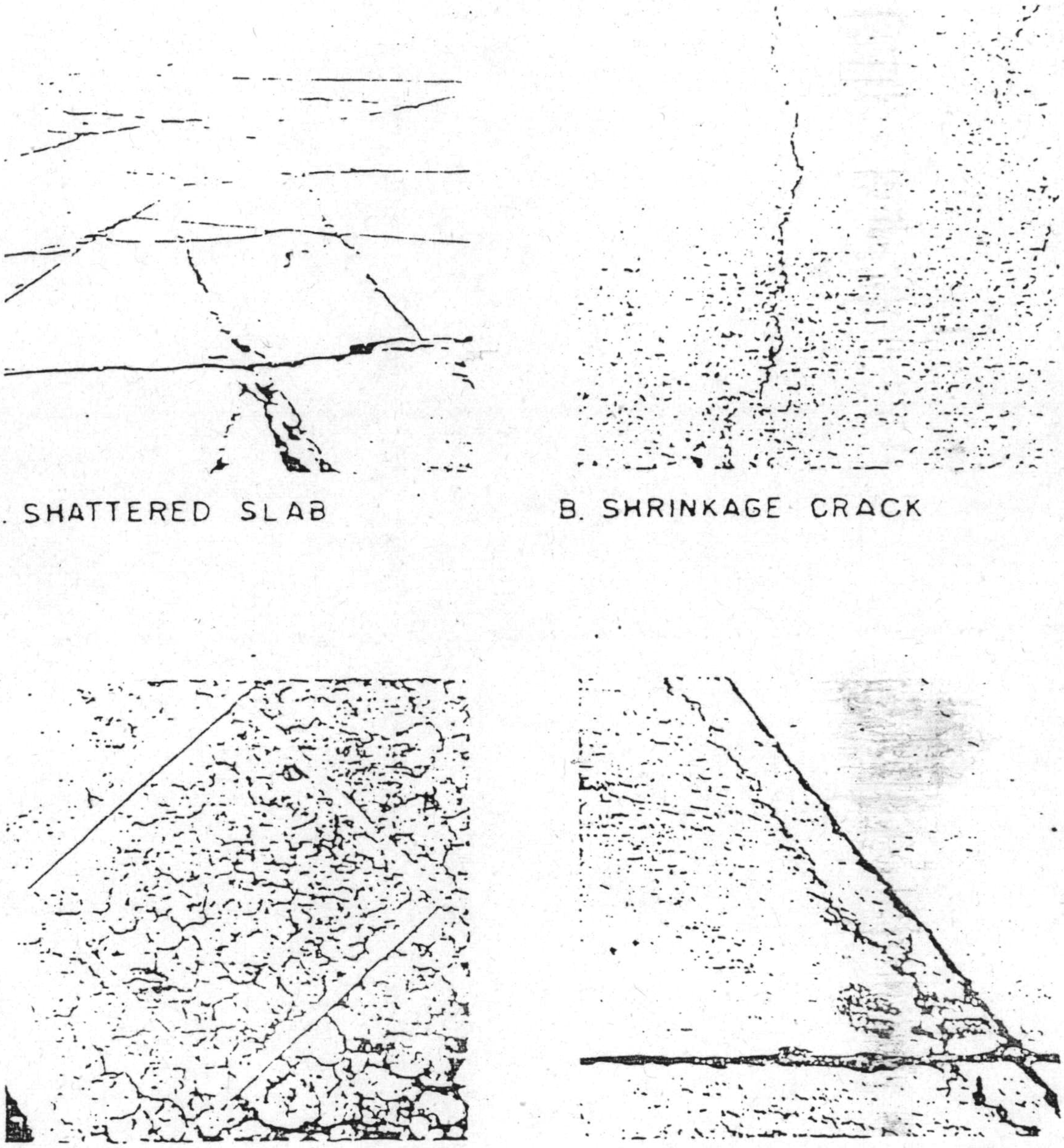
(3) To simplify the recording of defects, the recorder should become familiar with the following signs and symbols:

|	Longitudinal crack	⅃	Spalling along transverse joint
—	Transverse crack	⅃	Spalling along longitudinal joint
/	Diagonal crack	J	Corner spall
Δ	Corner break	S	Scaling
*	Shattered slab	P	Pumping joint
~~	Shrinkage crack	O	Pop-out
M	Map cracking	≑	Settlement



TYPICAL DEFECTS — RIGID PAVEMENTS

FIGURE 1



A. SHATTERED SLAB

B. SHRINKAGE CRACK

C MAP CRACKING

D. LONGITUDINAL JOINT SPALL

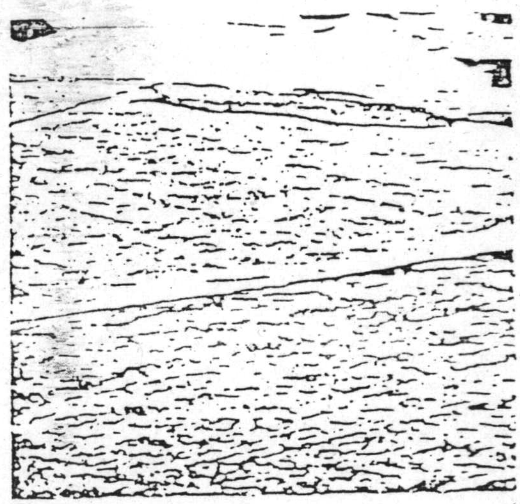
TYPICAL DEFECTS — RIGID PAVEMENTS

FIGURE 2

A. TRANSVERSE JOINT SPALL

B. CORNER SPALL

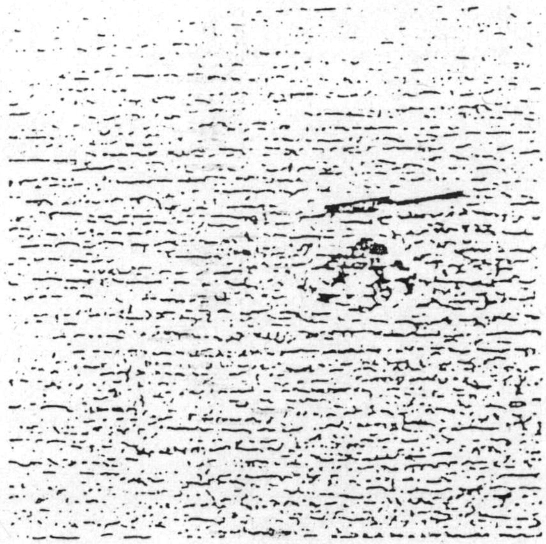
C. SCALING



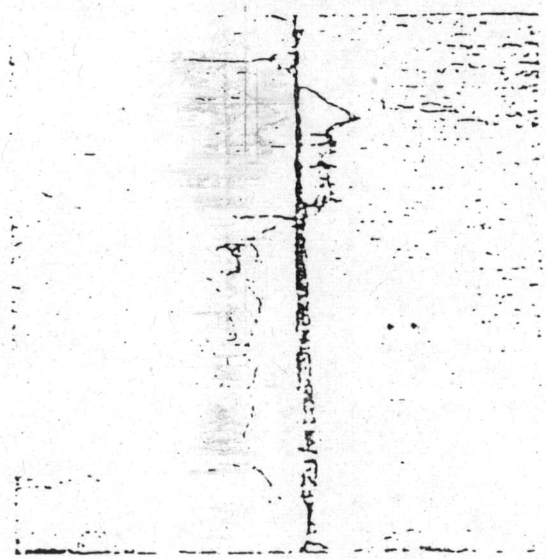
D. SETTLEMENT
(NOTE STANDING WATER)

TYPICAL DEFECTS — RIGID PAVEMENTS

FIGURE 3



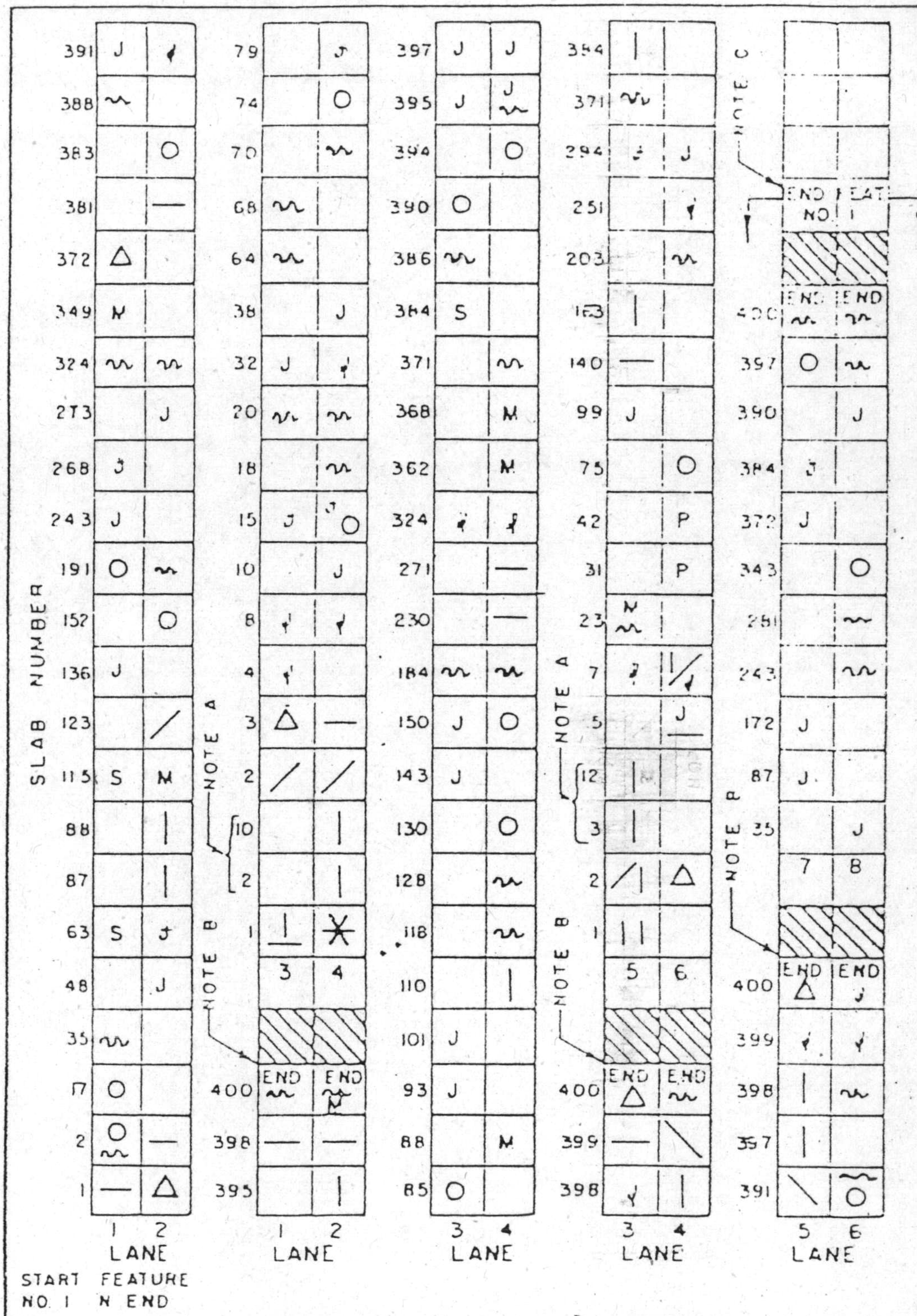
A. POP OUT



B. UNCONTROLLED CONTRACTION CRACK

TYPICAL DEFECTS – RIGID PAVEMENTS

FIGURE 4



EXAMPLE SURVEY FORM

FIGURE 5

ประวัติผู้เขียน

นายอภิวัฒน์ กฤษณะพันธ์ เกิดเมื่อวันที่ 25 ธันวาคม พ.ศ. 2498 ที่จังหวัดลพบุรี จบการศึกษาชั้นมัธยมศึกษาตอนปลายจากโรงเรียนกาฬสินธุ์พิทยาสรรพ์ จังหวัดกาฬสินธุ์ เมื่อปี พ.ศ. 2517 และสำเร็จการศึกษาขั้นปริญญาตรี สาขาวิศวกรรมโยธา จากมหาวิทยาลัยขอนแก่น เมื่อปี พ.ศ. 2520 จากนั้นได้เข้ารับราชการที่กรมชลประทานในตำแหน่งวิศวกรโยธา 3 ประจำกองก่อสร้างย่อย เป็นเวลา 1 ปี