Survey Sheet for Traffic Volume Counting Survey

การนับปริมาณการจราจรแยกประเภท
CLASSIFIED TRAFFIC COUNT SUMMARY SHEET

TOPR STUDY
JICA / DOH

SURVEY STATION	DIRECTION OF TRAVEL	DAY	MONTH	YEAR
	NO.			

Hours	1			2	3		4		Remarks
	 Passenger Car	 Taxi and Sedan	 Pick-up Station Wagon, Van Light Van and Micro Bus	 Motorcycle and Motor Scooter	 10 Wheel Truck and Trailers	 Heavy Bus (BMTA) School Bus, Sightseeing Bus and Factory Bus	 4 Wheel Truck and 6 Wheel Truck	 Minibus (BMTA) Factory Bus	
06.00 - 06.15									
06.15 - 06.30									
06.30 - 06.45									
06.45 - 07.00									
07.00 - 07.15									
07.15 - 07.30									
07.30 - 07.45									
07.45 - 08.00									
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18.30 - 18.45									
18.45 - 19.00									
19.00 - 19.15									
19.15 - 19.30									
19.30 - 19.45									
19.45 - 20.00									

Traffic Data on Case Study Road Sections

Location No.	Area Class	Route No.	No. Of Lanes at Midblock	Traffic Volume 1/			Peak Hour 2/					Remarks
				24 Hr(A)	12 Hr(B)	(A)/(B)	Ratio (%)	Volume (veh/hr)	Heavier Dir. Traff. Ratio (%)	Heavy Veh. Ratio (%)	Motorcycle Ratio (%)	
C1 (Bang Na)	A (Inter-section)	3(NB)	2	-	10,100	-	9.1 *	1,481	57.0	20.7	37.9	24 hours traffic vol. were not counted.
		3(SB)	3	-	16,916	-	10.0 *	2,324	53.5	14.8	27.2	
		3102(EB)	3 (2+1)	-	12,229	-	10.6 *	1,975	52.7	15.3	34.3	
		34(WB)	2	-	5,973	-	8.3 *	972	34.4	8.6	49.0	
C2 (Chonburi)	B (Inter-section)	3(NB)	3	18,913	12,490	1.51	8.5	2,687	64.6	4.1	40.0	
		3(SB)	3	20,770	14,361	1.45	5.4	1,996	55.7	7.3	44.3	
		315(WB)	2	5,797	4,073	1.42	7.7	1,077	45.3	2.8	58.8	
		344(WB)	2	9,250	6,433	1.44	5.7	856	43.8	4.3	38.7	
C3 (Siracha)	B (Inter-section)	3(NB)	2	13,998	10,188	1.37	9.5	1,910	56.9	8.0	30.2	
		3(SB)	2	15,934	11,784	1.35	7.5	1,849	45.1	5.7	35.3	
C4 (Wang Noi)	C (Inter-section)	1(NB)	2	13,496	8,170	1.65	6.7	965	59.6	62.7	5.6	
		1(SB)	2	12,317	6,697	1.84	5.1	694	42.2	42.2	9.2	
		309(EB)	1	1,431	1,043	1.37	3.9	115	38.9	17.4	51.3	
		3189(WB)	1	486	335	1.45	10.9	186	62.4	5.9	71.5	
C5 (Ban Bung)	C (Inter-section)	344(NB)	1	-	1,975	-	10.5 *	228	45.1	27.2	9.2	24 hours traffic vol. were not counted.
		344(SB)	1	-	2,104	-	11.2 *	267	57.1	27.0	12.0	
		331(EB)	1	-	923	-	8.2 *	101	45.3	25.7	24.8	
		331(WB)	1	-	980	-	6.7 *	109	50.9	33.0	22.0	

Note: 1/ Entering traffic volume excluding motorcycle.
2/ Entering traffic volume including motorcycle.
* Ratio = $\frac{\text{(Peak Hour Volume - Motorcycle) x 100}}{\text{12 Hour Volume}}$

Area Class; A : Bangkok Suburban Area
B : Local City Area
C : Intercity Roadway

Traffic Data on Experimental Work Road Sections

Location No.	Area Class	Route No.	No. Of Lanes at Midblock	Traffic Volume 1/			Peak Hour 2/					Remarks
				24 Hr(A)	12 Hr(B)	(A)/(B)	Ratio (%)	Volume (veh/hr)	Heavier Dir. Traff. Ratio (%)	Heavy Veh Ratio (%)	Motorcycle Ratio (%)	
E1 (Laksi)	A (Inter-section)	1(NB)	3	26,048	17,511	1.49	3.7	1,336	38.6	13.8	26.9	
		1(SB)	3	25,573	16,888	1.51	5.3	2,369	53.3	6.7	43.2	
		304(EB)	2	31,148	21,623	1.44	3.9	1,656	50.4	8.8	26.8	
		304(WB)	3	31,779	20,919	1.52	5.6	2,410	55.3	7.2	26.7	
E2 (Pathum-thani)	A (Inter-section)	3111(NB)	1	4,870	3,567	1.37	6.0	331	47.6	31.4	12.1	
		3111(SB)	1	4,203	3,085	1.36	6.7	305	48.4	41.6	7.2	
		346(EB)	1	1,895	1,379	1.37	5.3	117	52.2	35.9	13.7	
		346(WB)	1	4,731	3,664	1.29	6.8	367	53.1	29.4	12.3	
E3 (Khon Kaen)	B (Roadway)	2	2	-	6,573	-	9.7 *	1,168	53.7	10.1	45.3	24 hr was not counted.
E4 (Khon Kaen)	C (Roadway)	2	1	3,362	2,086	1.61	6.6	269	57.6	33.5	17.8	

Note: 1/ Entering traffic volume excluding motorcycle.
2/ Entering traffic volume including motorcycle.
* Ratio = $\frac{\text{(Peak Hour Volume - Motorcycle) x 100}}{\text{12 Hour Volume}}$

Area Class; A : Bangkok Suburban Area
B : Local City Area
C : Intercity Roadway

Quantity of Experimental Improvement Works
for Laksi Roundabout and Pathumthani Intersection

Item	Unit	Quantity	
		Laksi	Pathumthani
Master Controller	SET	1	1
Local Controller	SET	4	-
Signal Pole	EA	9	4
Signal Mast-Arm	EA	8	8
3-Aspect Signal Head	SET	17	8
1-Aspect Signal Head	EA	8	4
Warning Sign	SET	4	-
Pavement Marking	SQM	300	-
Others			

Traffic Accident Survey Form

TOPR

JICA STUDY FOR TRAFFIC OPERATION PLAN FOR RECORDS

WEATHER
[1] Fine
[2] Cloudy
[3] Rainy
[4] Foggy

SURVEY LOCATION	SURVEY NAME	DAY	DATE	MONTH	YEAR

TRAFFIC ACCIDENT RECORD SHEET_____

(1) Time of Accident: _____ ☐☐ ☐☐

(2) Time to Clear Vehicle: ____ ☐☐ ☐☐

(3) Traffic Jam Caused by Accident: [1] Yes [2] No ☐

4 Type of Accident:
[1] Vehicle Vs Vehicle
[2] Vehicle Vs Pedestrain
[3] Vehicle Vs Bicycle
[4] Vehicle Itself
[5] Others _____ ☐

(5) Type of Vehicle Involved:
[1] Bicycle
[2] Motorcycle
[3] Somlor
[4] Passenger Car
[5] Pick-up
[6] Van and Wagon
[7] Taxi
[8] Mini-Bus
[9] Bus
[10] Light Truck
[11] Heavy Truck (More than 6 Wheel)
[12] Others
☐☐☐☐☐☐☐☐☐☐☐☐

(6) Number of Pedestrain Involved in Accident: _____ ☐

(7) Number of Casualties
[1] Killed _____ Person ☐☐
[2] Injured _____ Person ☐☐

(8) Property Damaged:
[1] Vehicle
[2] Public Utility _____ (Electric pole, traffic sign, etc.)
[3] Others _____ ☐

(9) Police Investigation:
[1] Investigation and Record
[2] No investigation
[3] Investigation But No Official Record ☐

(10) Cause of Accident:
[1] Over Speed Limit
[2] Improper Overtaking
[3] Immediate Crossing
[4] Failure to Yield Signal
[5] High Beam
[6] Illegal Parking
[7] Vehicle Defects
[8] Sleepy Driving
[9] Drunkon Driving
[10] Others _____ ☐☐ ☐☐

LOCATION AND SITUATION OF ACCIDENT

EFFECTIVENESS EVALUATION OF MOTORCYCLE LANE

1 Traffic Condition Survey

(1) Method

A traffic condition survey with the use of a video camera was conducted before and after the installation of the motorcycle lane, and its benefits were analyzed primarily on;
- Usage of motorcycle
- Smoothness
- Safety
- Motorcycle lane width

As shown in Figure 1, the traffic condition survey utilized a video camera placed on the roadside near the middle point of the motorcycle lane to record traffic streams during a period from 8.00 to 10.00 am including peak and off-peak hours.

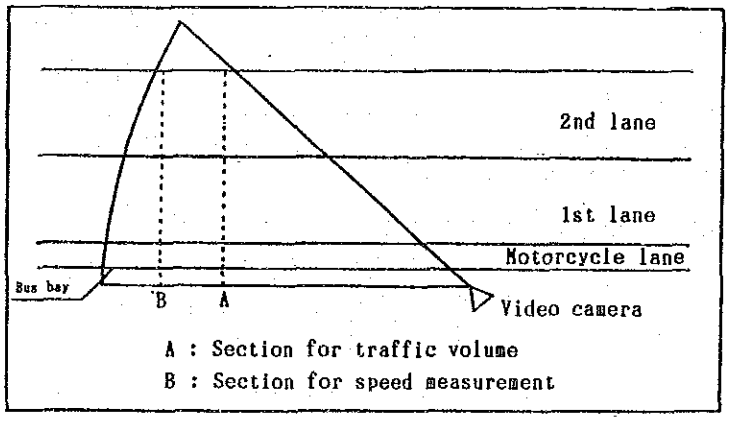


Figure 1 Method of Traffic Condition Survey

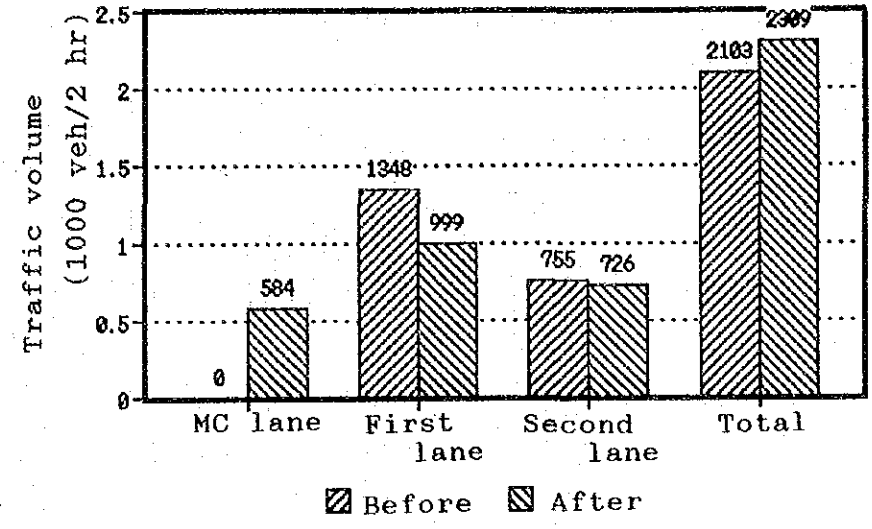
(2) Usage of Lanes

a) Traffic Volume

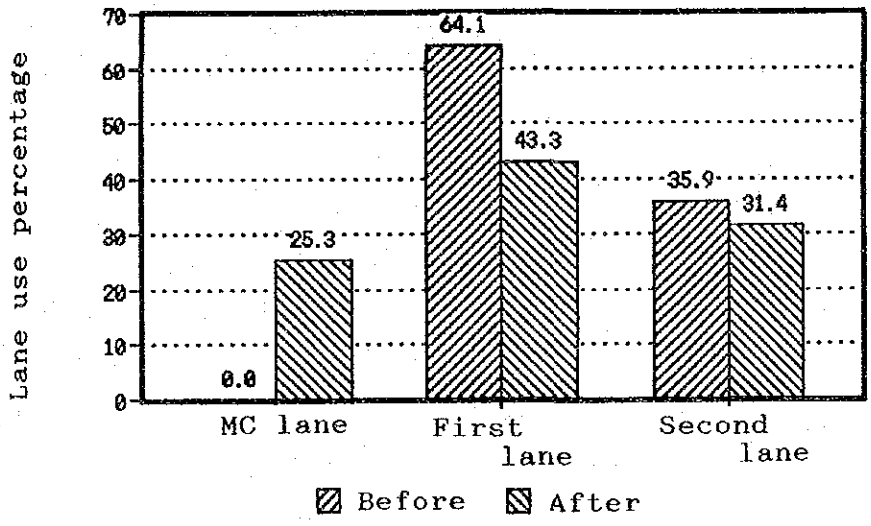
Figure 2 shows the traffic volume and lane use percentage by lane during the survey period, together with the lane use percentages on the first and second lanes. In addition, Table 1 summarizes 5-minute period traffic volume by vehicle type as references.

A. The traffic volume over the entire section was about 2,100 vehicles per two hours during the before-survey and about 2,300 vehicles per 2 hours during the after-survey.

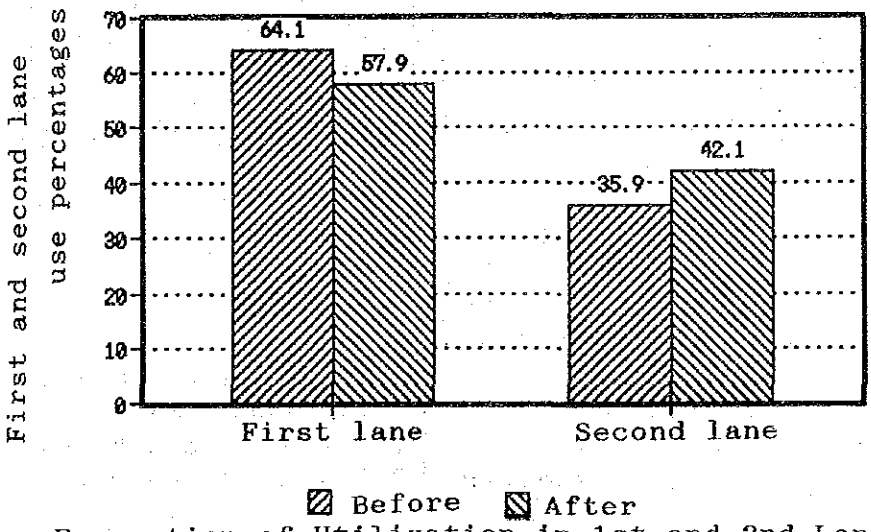
B. The after-survey result shows that the 2 hours traffic volume on the motorcycle lane was about 550



Traffic Volume by Lane



Proportion of Utilization by Lane



Proportion of Utilization in 1st and 2nd Lanes

Figure 2 Traffic Volume and Proportion of Utilization by Lane

Table 1 Five Minutes Period Traffic Volume (1)
(After Implementation)

MC lane

Time-period \ Vehicle Type	1	2	3	4	5	6	7	8	#1	#2	Total
8:00~ 8:05	0	1	0	44	0	0	0	0	1	0	45
8:05~ 8:10	0	1	0	43	0	0	0	0	1	0	44
8:10~ 8:15	0	1	0	29	0	0	0	0	1	0	30
8:15~ 8:20	0	2	0	38	0	1	0	0	2	1	41
8:20~ 8:25	2	2	0	20	0	0	0	0	4	0	24
8:25~ 8:30	0	3	1	33	0	0	0	0	4	0	37
8:30~ 8:35	0	2	0	23	0	0	0	0	2	0	25
8:35~ 8:40	0	1	0	17	0	1	0	0	1	1	19
8:40~ 8:45	0	1	0	19	0	0	0	0	1	0	20
8:45~ 8:50	0	0	0	12	0	0	0	0	0	0	12
8:50~ 8:55	0	1	0	23	0	0	0	0	1	0	24
8:55~ 9:00	1	2	0	24	0	0	0	0	3	0	27
Total	3	17	1	325	0	2	0	0	21	2	348
9:00~ 9:05	0	0	0	28	0	0	0	0	0	0	28
9:05~ 9:10	0	1	0	17	0	0	0	0	1	0	18
9:10~ 9:15	0	1	0	18	0	0	0	0	1	0	19
9:15~ 9:20	0	0	1	18	0	0	0	1	2	0	20
9:20~ 9:25	1	1	0	15	0	0	0	0	2	0	17
9:25~ 9:30	1	0	0	15	0	0	0	0	1	0	16
9:30~ 9:35	1	0	0	18	0	0	0	0	1	0	19
9:35~ 9:40	0	0	1	18	0	0	0	0	1	0	18
9:40~ 9:45	0	1	0	14	0	0	0	0	1	0	15
9:45~ 9:50	0	2	1	25	0	0	0	0	3	0	28
9:50~ 9:55	0	1	1	23	1	0	0	0	2	1	26
9:55~ 10:00	0	0	0	10	1	0	0	0	0	1	11
計	3	7	4	219	2	0	0	1	15	2	236

First lane

Time-period \ Vehicle Type	1	2	3	4	5	6	7	8	#1	#2	Total
8:00~ 8:05	2	3	8	28	3	0	1	0	14	3	45
8:05~ 8:10	6	7	8	30	0	3	3	0	24	3	57
8:10~ 8:15	5	9	12	31	1	1	3	0	29	2	62
8:15~ 8:20	5	10	10	18	2	2	2	0	27	4	49
8:20~ 8:25	2	4	9	23	3	1	2	0	17	4	44
8:25~ 8:30	7	4	10	30	3	1	1	0	22	4	56
8:30~ 8:35	2	4	11	24	2	0	1	0	18	2	44
8:35~ 8:40	5	8	17	12	6	1	1	0	31	7	50
8:40~ 8:45	5	2	13	9	3	0	3	0	23	3	35
8:45~ 8:50	3	8	8	11	1	0	1	0	20	1	32
8:50~ 8:55	5	3	11	14	2	0	7	0	26	2	42
8:55~ 9:00	4	8	12	9	5	1	0	0	24	6	39
Total	51	70	129	239	31	10	25	0	275	41	555
9:00~ 9:05	8	4	17	10	8	0	5	0	34	8	52
9:05~ 9:10	4	6	8	5	3	2	7	0	25	5	35
9:10~ 9:15	5	1	9	5	7	0	4	0	19	7	31
9:15~ 9:20	4	5	11	7	3	1	1	0	21	4	32
9:20~ 9:25	9	4	8	10	3	0	1	0	22	3	35
9:25~ 9:30	5	6	19	6	4	0	1	0	31	4	41
9:30~ 9:35	1	9	8	6	3	0	3	1	22	3	31
9:35~ 9:40	5	2	16	8	10	1	1	0	24	11	43
9:40~ 9:45	6	5	17	8	7	1	1	0	29	8	45
9:45~ 9:50	3	7	9	2	7	1	3	0	22	8	32
9:50~ 9:55	2	5	10	2	6	0	4	0	21	6	29
9:55~ 10:00	5	6	10	7	7	2	1	0	22	9	38
Total	57	69	142	76	68	8	32	1	292	76	444

※ #1 gives a total for vehicle types 1, 2, 3, 7 and 8.
#2 gives a total for vehicle types 5 and 6.

< Vehicle classification >

1. Passenger car
2. Taxi, Samulo
3. Pickup van, van
4. Motorcycle, scooter
5. Large-sized truck
6. Large-sized bus
7. Small-sized truck
8. Small-sized bus

Table 1 Five Minutes Period Traffic Volume (2) (After Implementation)

Second lane

Time-period \ Vehicle Type	1	2	3	4	5	6	7	8	#1	#2	Total
8:00~ 8:05	6	6	18	1	2	2	1	1	32	4	37
8:05~ 8:10	16	1	11	0	1	1	6	1	35	2	37
8:10~ 8:15	14	0	22	1	3	3	3	1	40	6	47
8:15~ 8:20	16	3	13	4	6	6	3	0	36	12	51
8:20~ 8:25	16	1	15	0	2	2	1	0	33	4	37
8:25~ 8:30	15	0	31	0	3	3	6	0	52	6	58
8:30~ 8:35	9	1	14	1	2	2	5	0	29	4	34
8:35~ 8:40	11	0	24	1	3	3	0	0	35	6	42
8:40~ 8:45	8	0	17	1	3	3	1	0	26	6	33
8:45~ 8:50	2	1	8	1	1	1	0	0	12	2	15
8:50~ 8:55	6	1	11	1	3	3	9	0	27	6	34
8:55~ 9:00	5	1	17	1	5	5	0	0	23	10	34
Total	124	15	202	12	34	34	35	3	379	68	459
9:00~ 9:05	13	0	17	0	2	2	3	0	33	4	37
9:05~ 9:10	5	0	13	3	3	3	7	0	26	6	34
9:10~ 9:15	6	0	15	1	0	0	2	0	23	0	24
9:15~ 9:20	2	2	13	0	1	1	3	0	20	2	22
9:20~ 9:25	4	2	15	0	2	2	2	0	23	4	27
9:25~ 9:30	8	0	10	0	2	2	0	0	18	4	22
9:30~ 9:35	3	1	11	4	3	3	2	0	17	6	27
9:35~ 9:40	7	0	6	1	2	2	3	0	16	4	21
9:40~ 9:45	7	0	11	0	0	0	1	0	19	0	19
9:45~ 9:50	5	0	6	2	2	2	0	0	11	4	17
9:50~ 9:55	6	0	11	0	0	0	0	0	17	0	17
9:55~ 10:00	0	0	0	0	0	0	0	0	0	0	0
Total	66	5	128	11	17	17	23	0	222	34	267

※ #1 gives a total for vehicle types 1, 2, 3, 7 and 8.
#2 gives a total for vehicle types 5 and 6.

< Vehicle classification >

1. Passenger car
2. Taxi, Samulo
3. Pickup van, van
4. Motorcycle, scooter
5. Large-sized truck
6. Large-sized bus
7. Small-sized truck
8. Small-sized bus

Table 1 Five Minutes Period Traffic Volume (3)
(Before Implementation)

First lane

Time-period \ Vehicle Type	1	2	3	4	5	6	7	8	#1	#2	Total
8:00~ 8:05	3	2	21	59	3	1	1	1	28	4	91
8:05~ 8:10	4	3	20	54	4	2	0	0	27	6	87
8:10~ 8:15	5	3	21	54	0	1	2	0	31	1	86
8:15~ 8:20	2	2	10	51	3	3	1	0	15	6	72
8:20~ 8:25	3	4	8	53	3	0	2	0	17	3	73
8:25~ 8:30	1	1	13	50	1	0	3	0	18	1	69
8:30~ 8:35	2	1	19	41	1	1	1	0	23	2	66
8:35~ 8:40	4	0	14	38	4	0	1	0	19	4	61
8:40~ 8:45	4	0	12	22	6	1	2	2	20	7	49
8:45~ 8:50	2	0	10	35	3	1	3	0	15	4	54
8:50~ 8:55	6	2	12	30	2	1	3	0	23	3	56
8:55~ 9:00	5	1	17	17	2	0	4	0	27	2	46
Total	41	19	177	504	32	11	23	3	263	43	810
9:00~ 9:05	2	1	17	22	4	1	2	0	22	5	49
9:05~ 9:10	1	0	14	30	4	2	2	0	17	6	53
9:10~ 9:15	7	0	13	23	1	0	0	0	20	1	44
9:15~ 9:20	2	0	13	21	3	0	1	0	16	3	40
9:20~ 9:25	0	1	14	17	4	2	4	0	19	6	42
9:25~ 9:30	1	1	14	30	6	0	2	0	18	6	54
9:30~ 9:35	2	1	11	21	5	1	2	0	16	6	43
9:35~ 9:40	1	4	15	20	4	1	1	0	21	5	46
9:40~ 9:45	2	3	18	15	2	1	1	0	24	3	42
9:45~ 9:50	1	0	8	21	2	0	4	0	13	2	36
9:50~ 9:55	3	1	15	17	2	0	3	0	22	2	41
9:55~ 10:00	3	2	12	21	9	0	1	0	18	9	48
Total	25	14	164	258	46	8	23	0	226	54	538

Second lane

Time-period \ Vehicle Type	1	2	3	4	5	6	7	8	#1	#2	Total
8:00~ 8:05	14	0	28	5	4	0	1	0	43	4	52
8:05~ 8:10	11	0	26	4	1	1	4	1	42	2	48
8:10~ 8:15	12	0	37	6	0	0	0	0	49	0	55
8:15~ 8:20	6	1	25	2	4	1	0	0	32	5	39
8:20~ 8:25	16	0	27	2	3	2	2	0	45	5	52
8:25~ 8:30	12	0	25	3	0	0	0	0	37	0	40
8:30~ 8:35	9	0	21	3	2	1	0	0	30	3	36
8:35~ 8:40	10	0	21	0	1	0	2	0	33	1	34
8:40~ 8:45	7	0	17	0	2	0	1	0	25	2	27
8:45~ 8:50	4	0	13	1	2	0	1	0	18	2	21
8:50~ 8:55	7	1	19	3	1	0	1	0	28	1	32
8:55~ 9:00	5	0	15	0	3	0	2	0	22	3	25
Total	113	2	274	29	23	5	14	1	404	28	461
9:00~ 9:05	6	0	20	3	1	0	1	0	27	1	31
9:05~ 9:10	8	0	12	1	1	1	2	0	22	2	25
9:10~ 9:15	4	0	14	1	1	0	2	0	20	1	22
9:15~ 9:20	3	0	16	2	5	0	0	0	19	5	26
9:20~ 9:25	5	0	12	0	3	0	0	0	17	3	20
9:25~ 9:30	5	0	14	1	2	1	2	0	21	3	25
9:30~ 9:35	3	0	14	2	2	1	0	0	17	3	22
9:35~ 9:40	4	0	16	0	1	0	0	0	20	1	21
9:40~ 9:45	4	0	18	1	1	0	0	0	22	1	24
9:45~ 9:50	3	0	17	1	2	0	0	0	20	2	23
9:50~ 9:55	6	0	20	1	4	0	0	0	26	4	31
9:55~ 10:00	1	0	19	2	1	1	0	0	20	2	24
Total	52	0	192	15	24	4	7	0	251	28	294

※ #1 gives a total for vehicle types 1, 2, 3, 7 and 8.
#2 gives a total for vehicle types 5 and 6.

< Vehicle classification >

1. Passenger car
2. Taxi, Samulo
3. Pickup van, van
4. Motorcycle, scooter
5. Large-sized truck
6. Large-sized bus
7. Small-sized truck
8. Small-sized bus

Table 2 Utilization of Motorcycle Lane

	Traffic Volume on North Bound (Veh)					
	Motorcycle				All Vehicles (4)	Proportion of Motorcycle (%) (3)/(4)
	MC Lane (1)	Outside of MC Lane (2)	Total (1+2)=(3)	Proportion (%) (1) / (3)		
6 : 00～ 7 : 00	103	43	146	71	420	35
7 : 00～ 8 : 00	337	215	552	61	1150	48
8 : 00～ 9 : 00	434	202	636	68	1416	45
9 : 00～10 : 00	260	72	332	78	968	34
10 : 00～11 : 00	219	63	282	78	864	33
11 : 00～12 : 00	248	68	316	78	831	38
12 : 00～13 : 00	276	72	348	79	848	41
13 : 00～14 : 00	257	81	338	76	944	36
14 : 00～15 : 00	228	63	291	78	842	35
15 : 00～16 : 00	290	83	373	78	974	38
16 : 00～17 : 00	395	158	553	71	1226	45
17 : 00～18 : 00	345	200	545	63	1056	52
6 : 00～18 : 00	3392	1320	4712	72	11539	41

vehicles. On the other hand, the traffic volume on the first lane was decreased about 20% compared with the result of the before-survey. In addition, utilization of motorcycle lane for 12 hours is summarized in Table 2.

b) Usage of Lanes by Vehicle Type

Figure 3 shows the vehicle composition ratio by lane, while Figure 4 illustrates the usage of lanes by vehicle type.

A. 93% of vehicles utilizing the motorcycle lane were motorcycles, which seems to indicate that the motorcycle lane is being used for the purpose for which it is intended. Nearly two-thirds of the remaining vehicles were Samlor.

B. Before the installation of the motorcycle lane, nearly 60% of vehicles utilizing the first lane were motorcycles. But, after the installation, the percentages accounted for by motorcycles was reduced to about 30%.

C. Most of vehicles utilizing the second lane were pick-ups both before and after the installation of the motorcycle lane.

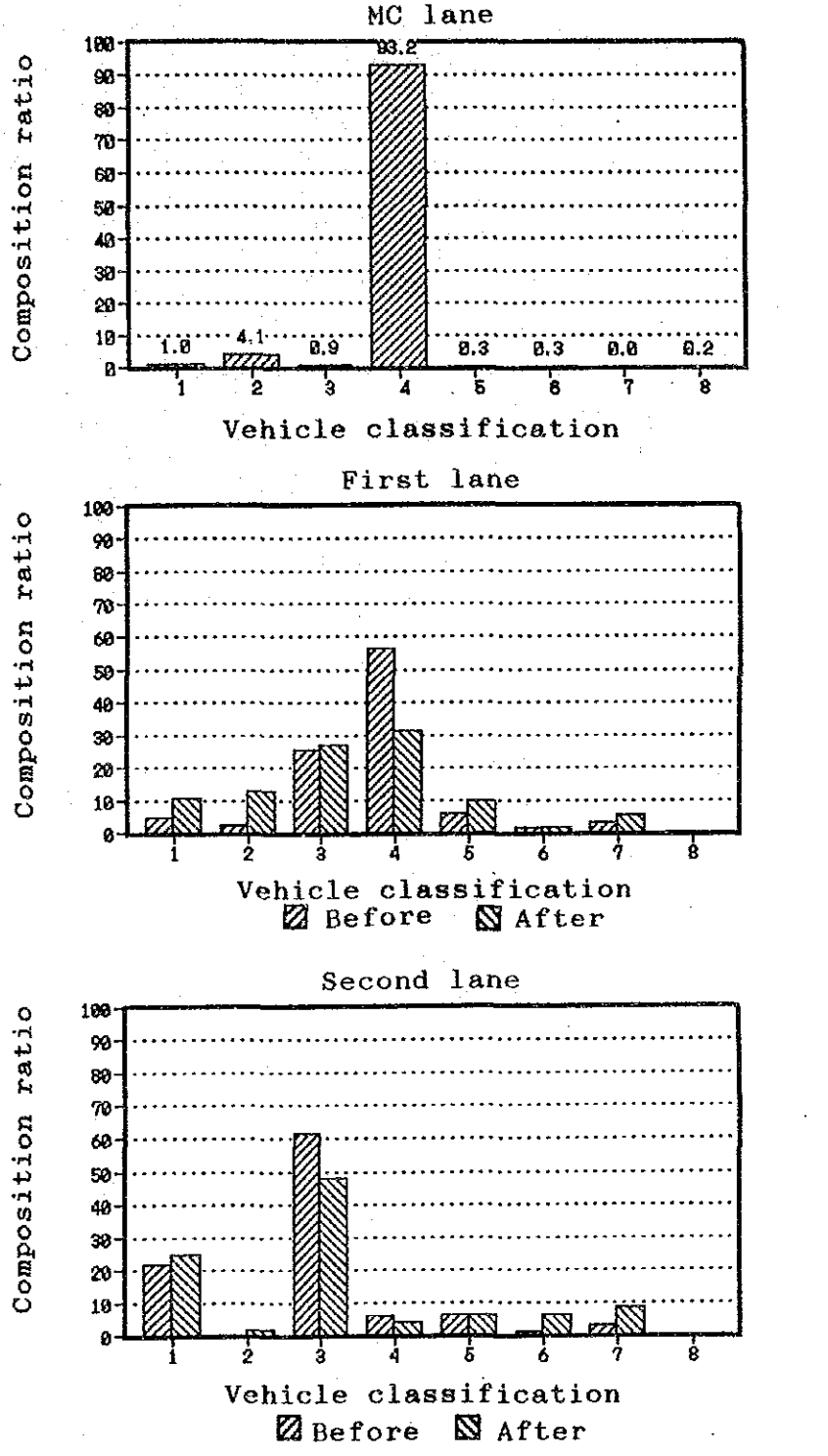
D. The video observation after the installation of the motorcycle lane has found that 63% of motorcycle used the motorcycle lane, 36% the first lane, and 1 percent the second lane. The motorcycle lane is also used by 15% of "Samlor" and 5% of heavy buses, because passengers' getting on and off at bus stops.

E. Based on the result of traffic volume counting for 12 hours, about 70% of motorcycles used the motorcycle lane.

(2) Evaluation of Smoothness

The running speeds before the installation of the motorcycle lane were compared with those after the installation to determine whether the smoothness of traffic had improved over the section where the motorcycle lane was installed.

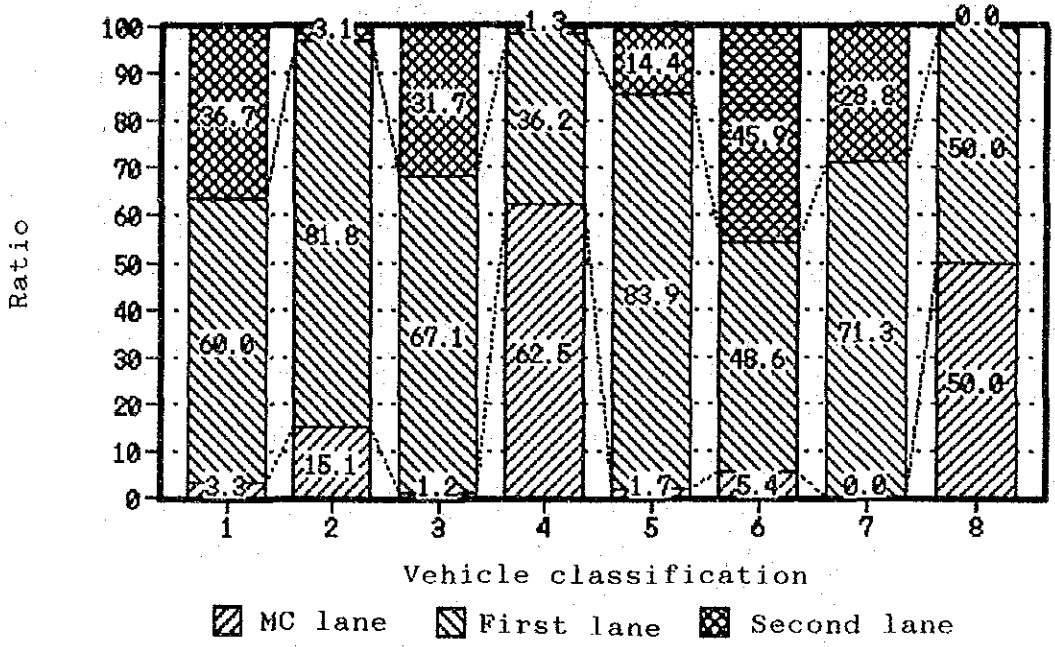
Table 3 gives the average speed obtained for each vehicle type and lane, while Figure 5 shows the speed distribution on each lane both for a vehicle running alone and for the leading vehicle in a platoon. It should be noted that a group of vehicles with a headway of 5 seconds or less is regarded as a platoon.



< Vehicle classification >

1. Passenger car
2. Taxi, Samulo
3. Pickup van, van
4. Motorcycle, scooter
5. Large-sized truck
6. Large-sized bus
7. Small-sized truck
8. Small-sized bus

Figure 3 Vehicle Composition Ratio by Lane



< Vehicle classification >

1. Passenger car	5. Large-sized truck
2. Taxi, Samulo	6. Large-sized bus
3. Pickup van, van	7. Small-sized truck
4. Motorcycle, scooter	8. Small-sized bus

Figure 4 Lane Use Percentage by Vehicle Type After Implementation

Table 3 Average Vehicle Speed by Lane

	Before installation of motorcycle lane		After installation of motorcycle lane		
Vehicle Type	First lane	Second lane	Motorcycle Lane	First lane	Second lane
1	52.9	60	28.9	55.7	56.6
2	32.3	47.4	28.5	45.3	53.8
3	50.9	58.6	26.5	51.9	58
4	43.8	59.6	44.6	53.8	52.4
5	48.8	52.3	25.5	48.1	54.5
6	44.8	56.8	18.2	44.5	62.4
7	48.4	55.6	–	49.5	53.7
8	–	–	–	49.7	61.8

A. On the first lane, the average speed of all vehicle types increased from 45 km/hr to 50 km/hr after installation of the motorcycle lane. At the same time, the speed of passenger cars also increased from 53 km/hr to 56 km/hr.

B. On the second lane, the average running speed of vehicles was 56 km/hr for both those running alone and those leading a platoon before the installation of the motorcycle lane, but it increased to 60 km/hr after the installation.

C. The average running speed on the motorcycle lane was about 43 km/hr.

The facts listed above clearly indicate that the installation of the motorcycle lane has led to an increased running speed, hence improved smoothness. This tendency is evident particularly on the first lane where the motorcycle mixing percentage was as high as 60% before the installation of the motorcycle lane.

The fact that there is not much difference in speed between those running alone and those leading a platoon should be understood to indicate that the mixing of motorcycles whose running speed is relatively low can lower the average running speed but does not necessarily lead to the formation of a platoon.

(3) Evaluation of Safety

The composition of motorcycles in a platoon on the first lane before the installation of the motorcycle was compared with that after the installation to determine whether traffic safety has improved over the section where the motorcycle lane was installed.

Figure 6 shows the number of vehicles in a platoon by vehicle type before and after the installation of the motorcycle lane.

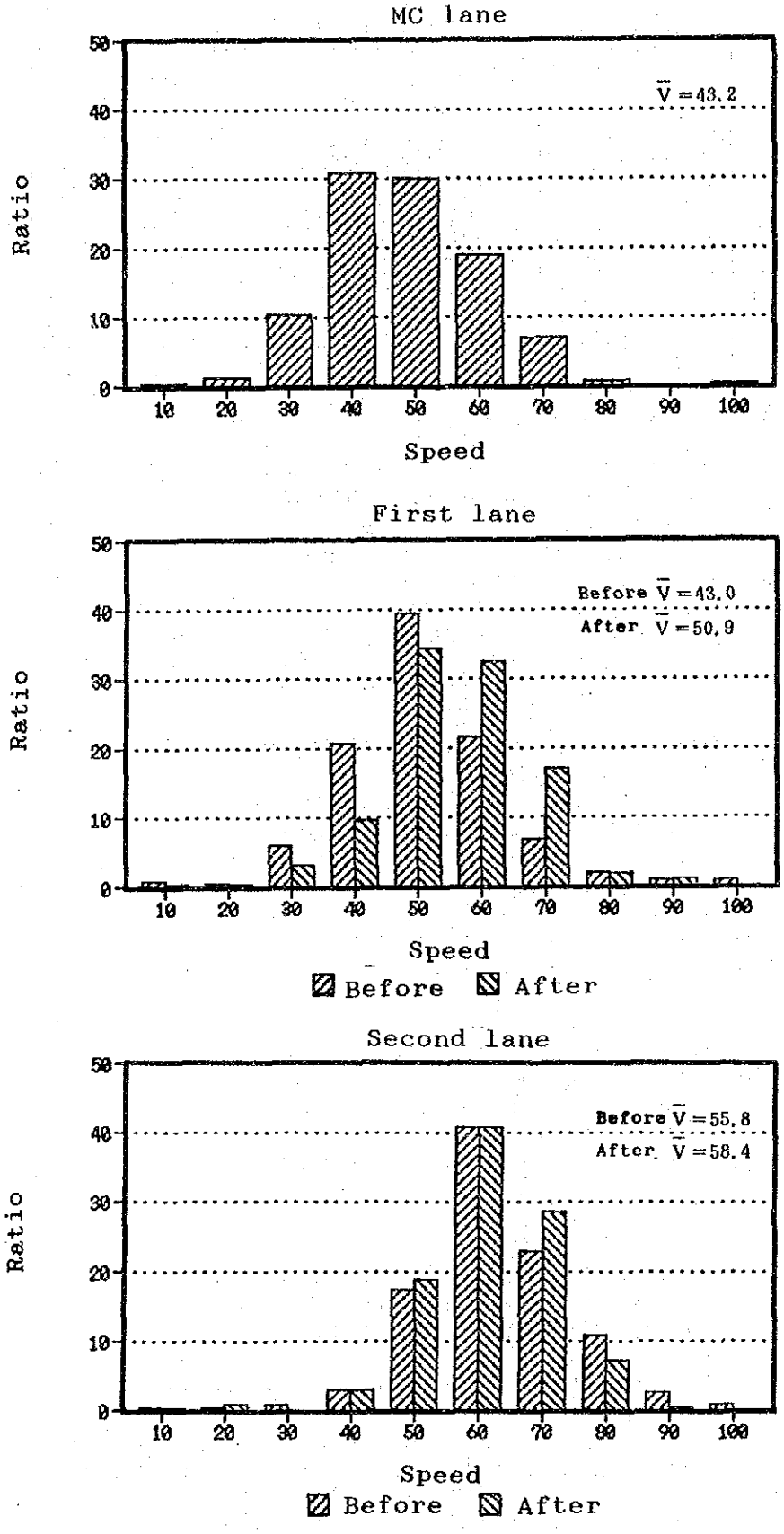


Figure 5 Distribution of Vehicle Speed by Lane (1)
(Vehicle Running Alone)

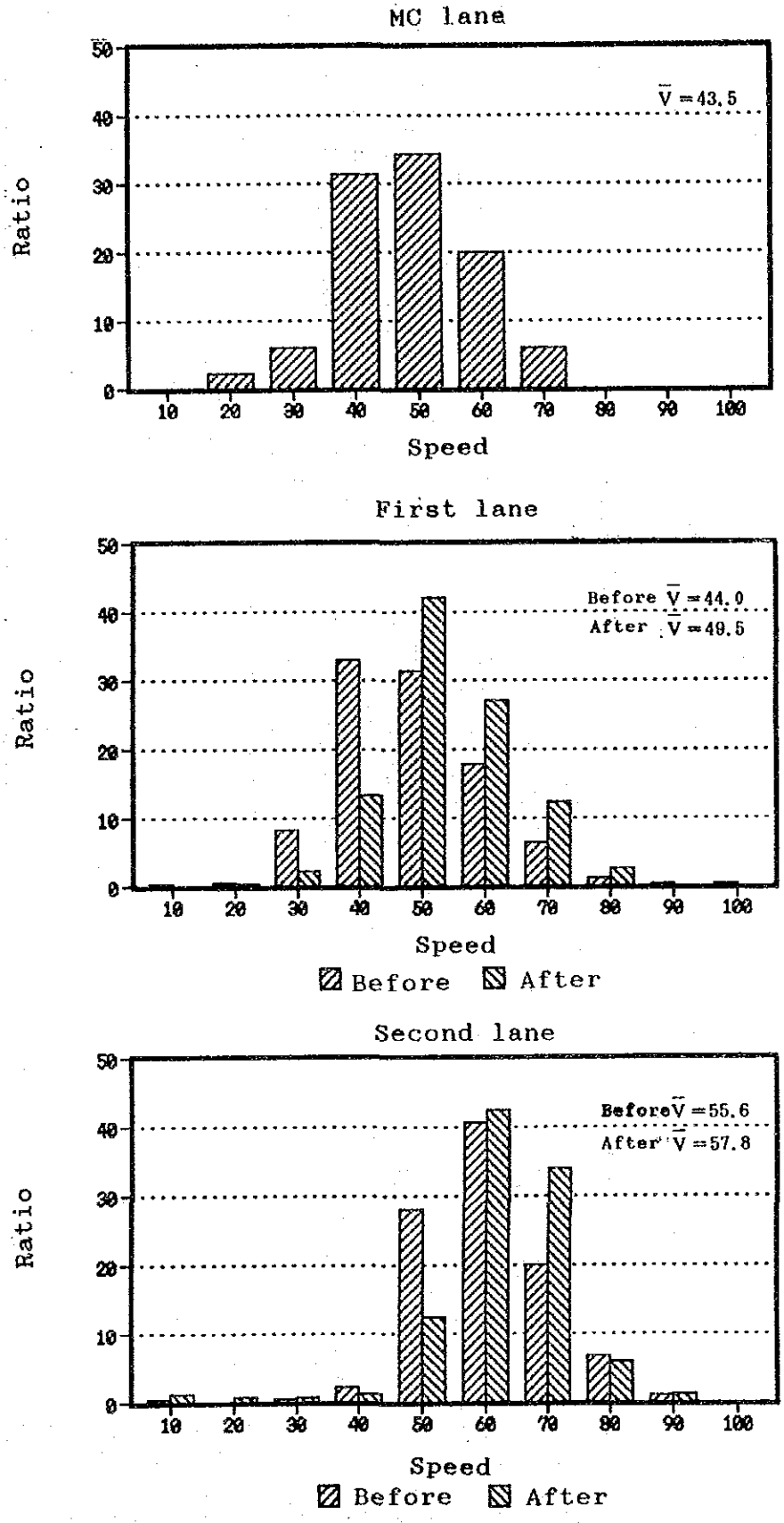
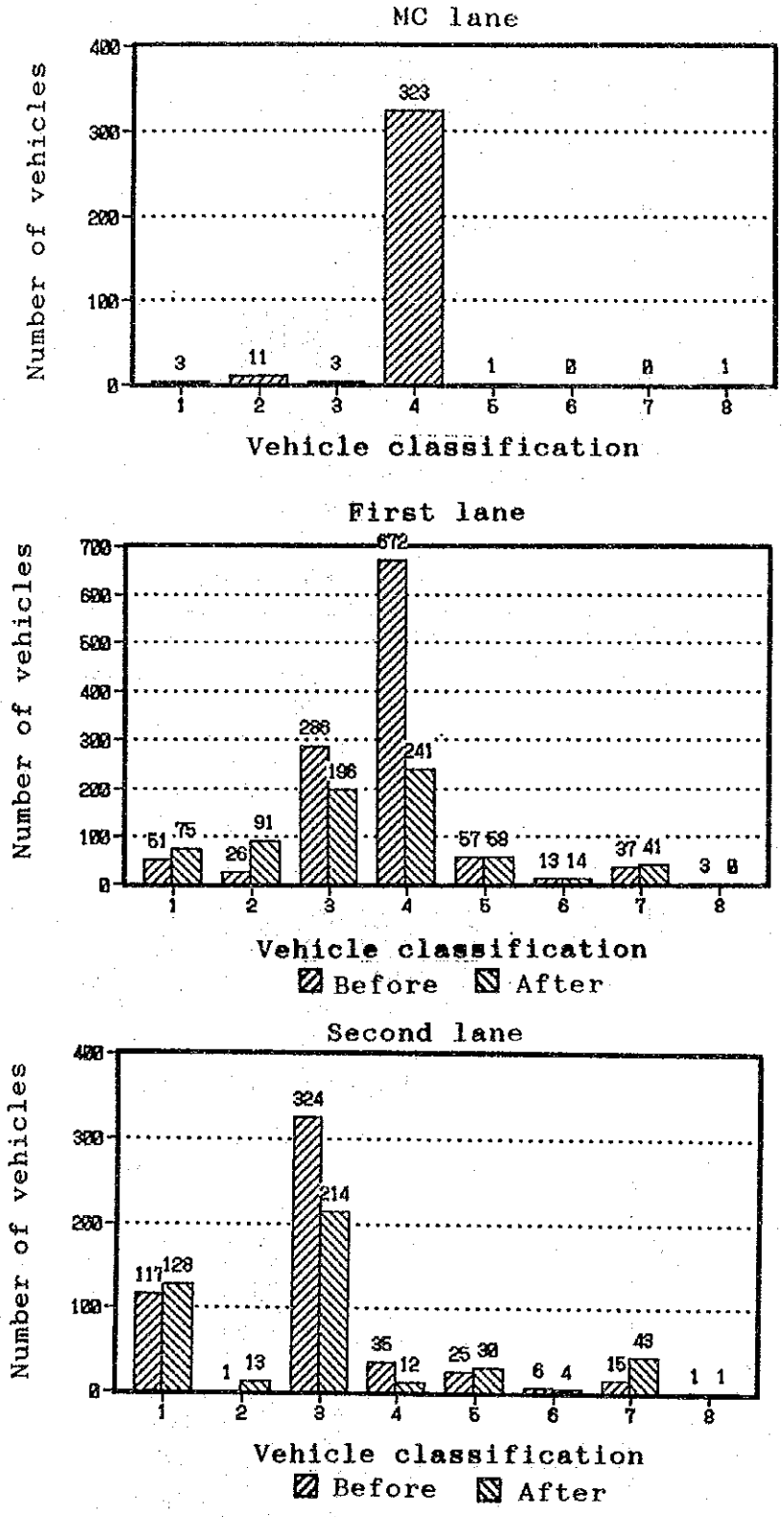


Figure 5 Distribution of Vehicle Speed by Lane (2)
(Leading Vehicle in a Platoon)



< Vehicle classification >

1. Passenger car
2. Taxi, Samulo
3. Pickup van, van
4. Motorcycle, scooter
5. Large-sized truck
6. Large-sized bus
7. Small-sized truck
8. Small-sized bus

Figure 6 Number of Vehicles in a Platoon by Vehicle Type

A. The number of motorcycles in a platoon on the first lane decreased as much as 65% from about 700 vehicles/2 hours to about 250 vehicles/2 hours.

B. On the second lane, there was no significant change in the number of vehicles in a platoon except pick-ups.

C. On the motorcycle lane, the number of vehicles in a platoon was about 300 vehicles/2 hours, which is approximately 55% of an encountered motorcycle traffic volume of about 550 vehicles per 2 hours.

The facts listed above clearly indicate that the installation of the motorcycle lane helps to substantially reduce a potential danger involved with motorcycles running between cars on the first lane. It can therefore be concluded that the installation of the motorcycle lane has contributed significantly to improve the safety.

(4) Evaluation of Lane Width

The specific paths taken by motorcycles when utilizing the motorcycle lane were investigated to determine whether the lane width is appropriate.

Figure 7 shows the frequency of use of each possible running path into which the 1.5m wide motorcycle lane is divided equally.

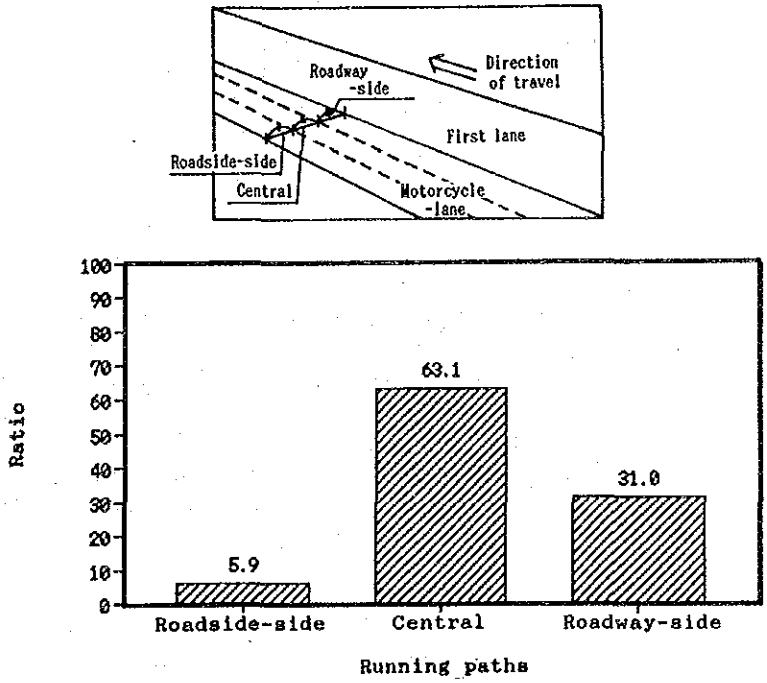


Figure 7 Running Paths within the Motorcycle Lane

The result of the analysis indicates that the central path is most often taken (63% of motorcycles), which is followed by the first lane side path (30%). These paths, when combined together, account for 94% of use, clearly showing that only a few motorcycles run on the shoulder side. The video observation also confirmed that motorcycles were running steadily.

These findings indicate that the lane width needed for running would be 1.0m. Thus, in the absence of factors (e.g., a wall along the roadside) which hinder smooth running, it might be possible to reduce the current lane width of 1.5m.

2 Traffic Accident Survey

A traffic accident survey was conducted to evaluate the effectiveness of experimental work in terms of traffic safety.

Traffic accident data that recorded during two month period before and after the implementation of the motorcycle was collected from relevant local police stations.

Before-survey : from Aug. 1, 1989 to Sept. 30, 1989.
After-survey : from Nov. 15, 1989 to Jan. 14, 1990.

Table 4 gives the results of analysis on the data from the local police stations.

The result of accident analysis shows that there was a significant reduction in the number of accidents and casualties, and it has been concluded that the motorcycle lane is serving its purpose well. The results of analysis may be summarized as follows.

A. The number of accidents decreased more than 50% from 16 to 7.

B. In terms of type of accident, the number of vehicle-versus-vehicle accidents was 14, which accounted for 90% of accidents reported, before the installation. The number, however, decreased as significantly to 4 after the installation of the motorcycle lane.

C. Casualties also decreased from 8 to 5. Motorcycle riders account for 75% of the casualties both before and after the installation of the motorcycle lane.

Table 4 Results of Accident Survey

		Before	After
No. of Accidents		16 (7)	7 (4)
Fatality		0 (0)	1 (1)*
Injury		8 (6)	4 (3)
Property Damage Only		8 (1)	2 (0)
Type of Accident	Vehicle vs Pedestrian	1 (0)	2 (1)
	Vehicle Itself	1 (0)	1 (0)
	Vehicle vs Vehicle	14 (7)	4 (3)
Vehicle Type	Bicycle	0	0
	Motorcycle	4	4
	Passenger Car	8	1
	Light Bus	0	0
	Light Truck	11	5
	Heavy Bus	0	0
	Heavy Truck	2	4
	Others	0	1
Property Damage	Vehicle	15	5
	Public Utility	1	1
	Others	0	0

Appendix 4.15

1. The number in parentheses represents one associated with motorcycles.

2. * : The accident was caused by a motorcycle which suddenly rushed out of a narrow crossroad.

3 Interview Survey

An interview survey was conducted at the end of November 1989 to collect supplementary data for the evaluation of effectiveness, such as the characteristics of road users and users' opinions. Table 5 shows the results of interview survey.

A. 95% of road users with all vehicle types involved considered that the installation of a motorcycle lane helps to improve traffic conditions.

B. Most of users think that the installation of a motorcycle lane contributes significantly to reduced travel time, improved mobility and reduced accidents. 88% of users pointed out the improved mobility.

C. 74% of motorcycle riders think the width of the motorcycle lane is adequate.

D. 95% of users think that motorcycle-related traffic problems can occur in other areas; hence installation of more motorcycle lanes is desirable.

Table 5 Results of Interview Survey

Samples	Total Number	287			
	Vehicle Type	M C 202 (70%)	P C 29 (10%)	L B, L T 40 (14%)	H B, H T 16 (6%)
	Sex	Male 228 (80%)		Female 56 (20%)	
	Age	<= 20 41 (14%)	20 <- 30 114 (40%)	30 - 40 75 (27%)	40 <= 55 (19%)
	Purpose of Trip	Business 149 (52%)	Private 97 (34%)	others 41 (14%)	
User Opinion	General	Better 271 (95%)	No Change 9 (3%)	Worse 6 (2%)	
	Width of MC Lane	Too Wide 15 (6%)	Adequate 204 (74%)	Too narrow 56 (20%)	
	Travel Time	Increased 24 (9%)	No Change 78 (28%)	Decreased 175 (63%)	
	Travel Comfort	Increased 246 (88%)	No Change 19 (7%)	Decreased 15 (5%)	
	Accidents	Increased 10 (4%)	No Change 47 (17%)	Decreased 219 (79%)	
	More MC Lanes needed	Yes 271 (95%)		No 14 (5%)	

EFFECTIVENESS EVALUATION OF EXPERIMENTAL WORKS AT PATHUMTHANI INTERSECTION

1 Traffic Condition Survey

(1) Method

A traffic condition survey with the use of a video camera was conducted before and after the installation of traffic signals, and its benefits were analyzed primarily on;

- Traffic volume
- Vehicle speed
- Conflicts

As shown in Figure 1, the traffic condition survey was carried out by utilizing a video camera placed on the roadside near the intersection to record traffic flows during a period from 8.00 a.m. to 9 a.m. (peal hour) and 10.00 a.m. to 11 a.m. (off-peak hour).

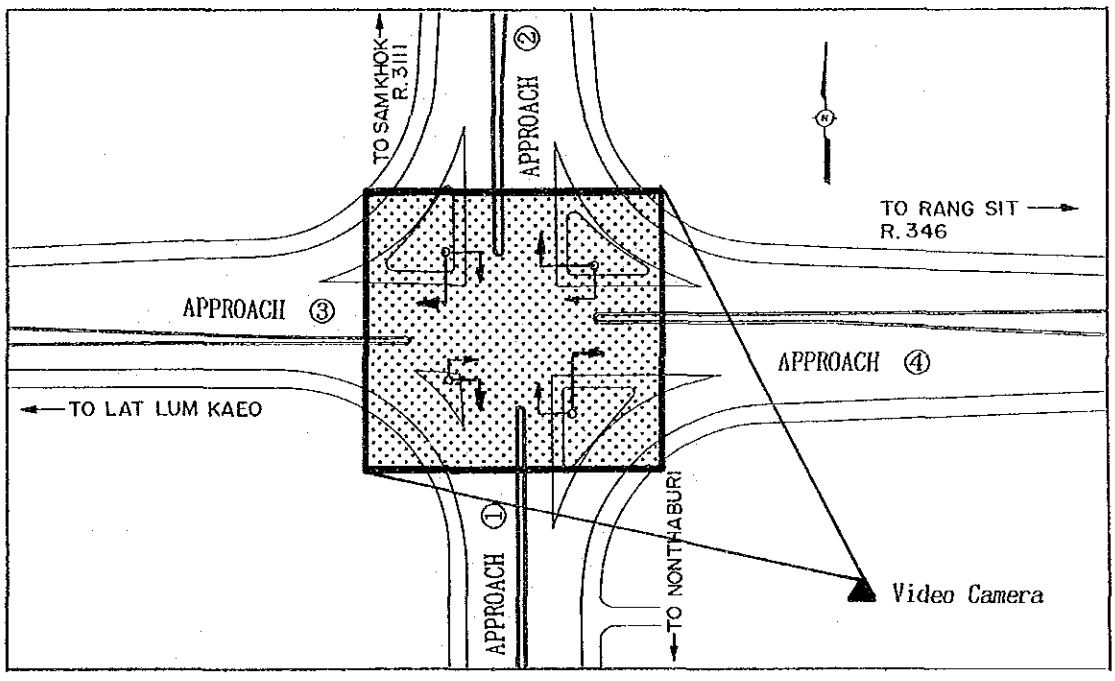


Figure 1 Traffic Condition Survey Coverage Area

(2) Traffic Volume

Figures 2 and 3 illustrate turning movements from each approach (vehicles/2 hours) for both before- and after-

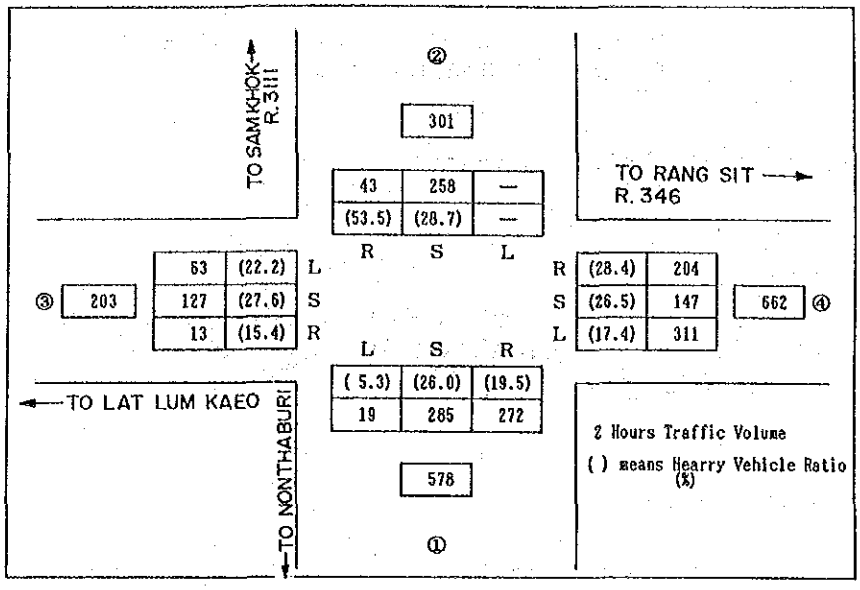


Figure 2 Turning Movement Traffic Volume before Implementation

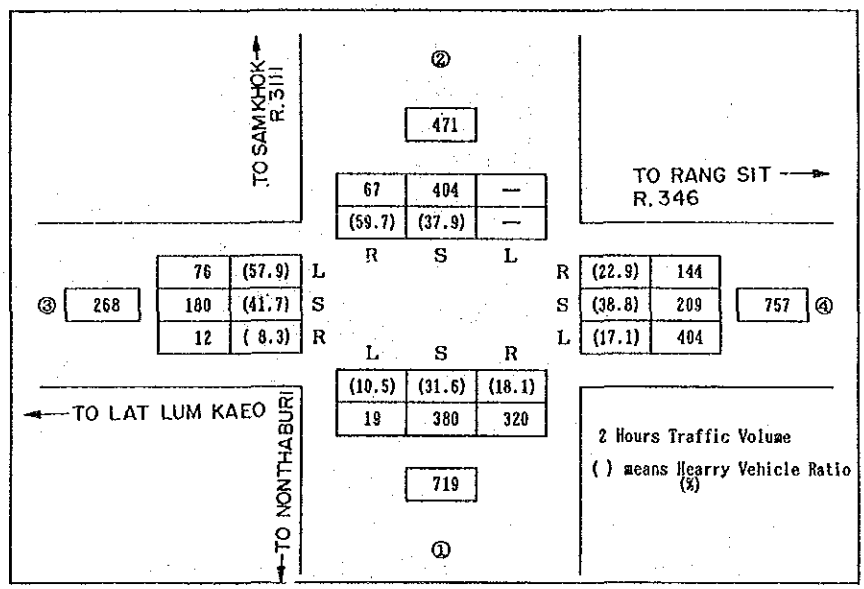


Figure 3 Turning Movement Traffic Volume after Implementation

survey periods at this intersection. In addition, Tables 1 and 2 show the 15 minutes traffic volume by vehicle type (heavy vehicle and ordinary vehicle) and direction. According to these figures and tables, traffic conditions at this intersection are analyzed and results are shown described below.

A. The inflow traffic volume at the intersection was about 1,700 veh/2 hrs before the implementation. Traffic volume during the after-survey period for 2 hours increased by 500 vehicles to 2,200 veh/2 hrs.

B. The main traffic flows at this intersection both before and after implementation were as follows.

- Through traffic between Pathumthani and Sam Khok.

- Left and right turn traffic from Rangsit.

- Right turn traffic from Pathumthani.

C. Ratio of heavy vehicles increased from 24.5% before implementation to 30% after implementation. Particularly, considerably high ratio of heavy vehicles at about 60% was observed for the left turn traffic from Lat Lum Kaeo and right turn traffic from Sam Khok after implementation.

(3) Running Speed

In order to identify the improvement in traffic smoothness at the intersection after installation of traffic signals, running speeds at the intersection were compared.

Table 3 summarizes the average running speed and the standard deviation of running speed in each approach for both before- and after-survey period, and their reduction rate. In addition, Figure 4 indicates the running speed distribution at each approach. From these figure and table, the following facts are identified.

Table 3 Running Speed at Pathumthani Intersection

Approach	Average Speed (km/hr)		Standard Deviation		Reduction Rate (%)	
	Before	After	Before	After	Average Speed	Standard Deviation
1	27.5	34.9	7.7	10.5	-26.9	-36.4
2	29.6	34.6	8.3	12.5	-16.9	-50.6
3	33.5	39.2	12.8	11.3	-17.0	11.7
4	35.2	39.7	11.3	14.4	-12.8	-27.4

Table 1 Turning Movement Traffic Volume before Implementation

	Time period	Left turn				Straight				Right turn				Total			
		Heavy	Light	Total	Heavy Ratio	Heavy	Light	Total	Heavy Ratio	Heavy	Light	Total	Heavy Ratio	Heavy	Light	Total	Heavy Ratio
APPROACH ①	8:00~8:15	0	3	3	0.0	6	18	24	25.0	12	29	41	29.3	18	50	68	26.5
	8:15~8:30	0	2	2	0.0	11	25	36	30.6	5	20	25	20.0	16	47	63	25.4
	8:30~8:45	1	2	3	33.3	0	26	26	0.0	7	16	23	30.4	8	44	52	15.4
	8:45~9:00	0	1	1	0.0	14	21	35	40.0	7	18	25	28.0	21	40	61	34.4
	Subtotal	1	8	9	11.1	31	90	121	25.6	31	83	114	27.2	63	181	244	25.8
	10:00~10:15	0	2	2	0.0	6	25	31	19.4	4	45	49	8.2	10	72	82	12.2
	10:15~10:30	0	5	5	0.0	7	30	37	18.9	6	27	33	18.2	13	62	75	17.3
	10:30~10:45	0	3	3	0.0	12	41	53	22.6	5	26	31	16.1	17	70	87	19.5
	10:45~11:00	0	0	0	—	18	25	43	41.9	7	38	45	15.6	25	63	88	28.4
	Subtotal	0	10	10	0.0	43	121	164	26.2	22	136	158	13.9	65	267	332	19.6
	Total	1	18	19	5.3	74	211	285	26.0	53	219	272	19.5	128	448	576	22.2
APPROACH ②	8:00~8:15	—	—	—	—	11	23	34	32.4	2	2	4	50.0	13	25	38	34.2
	8:15~8:30	—	—	—	—	8	32	40	20.0	4	2	6	66.7	12	34	46	26.1
	8:30~8:45	—	—	—	—	8	14	22	36.4	2	0	2	100.0	10	14	24	41.7
	8:45~9:00	—	—	—	—	10	17	27	37.0	1	1	2	50.0	11	18	29	37.9
	Subtotal	—	—	—	—	37	86	123	30.1	9	5	14	64.3	46	91	137	33.6
	10:00~10:15	—	—	—	—	5	27	32	15.6	4	4	8	50.0	9	31	40	22.5
	10:15~10:30	—	—	—	—	11	22	33	33.3	3	2	5	60.0	14	24	38	36.8
	10:30~10:45	—	—	—	—	13	29	42	31.0	3	7	10	30.0	16	36	52	30.8
	10:45~11:00	—	—	—	—	8	20	28	28.6	4	2	6	66.7	12	22	34	35.3
	Subtotal	—	—	—	—	37	98	135	27.4	14	15	29	48.3	51	113	164	31.1
	Total	—	—	—	—	74	184	258	28.7	23	20	43	53.5	97	204	301	32.2
APPROACH ③	8:00~8:15	1	2	3	33.3	3	8	11	27.3	0	2	2	0.0	4	12	16	25.0
	8:15~8:30	0	3	3	0.0	2	11	13	15.4	1	3	4	25.0	3	17	20	15.0
	8:30~8:45	2	9	11	18.2	1	10	11	9.1	0	1	1	0.0	3	20	23	13.0
	8:45~9:00	2	5	7	28.6	6	9	15	40.0	1	0	1	100.0	9	14	23	39.1
	Subtotal	5	19	24	20.8	12	38	50	24.0	2	6	8	25.0	19	63	82	23.2
	10:00~10:15	3	6	9	33.3	4	13	17	23.5	0	0	0	—	7	19	26	26.9
	10:15~10:30	2	9	11	18.2	6	15	21	28.6	0	1	1	0.0	8	25	33	24.2
	10:30~10:45	2	12	14	14.3	9	8	17	52.9	0	2	2	0.0	11	22	33	33.3
	10:45~11:00	2	3	5	40.0	4	18	22	18.2	0	2	2	0.0	6	23	29	20.7
	Subtotal	9	30	39	23.1	23	54	77	29.9	0	5	5	0.0	32	89	121	26.4
	Total	14	49	63	22.2	35	92	127	27.6	2	11	13	15.4	51	152	203	25.1
APPROACH ④	8:00~8:15	6	36	42	14.3	3	15	18	16.7	8	13	21	38.1	17	64	81	21.0
	8:15~8:30	9	40	49	18.4	7	9	16	43.8	7	12	19	36.8	23	61	84	27.4
	8:30~8:45	8	30	38	21.1	8	14	22	36.4	7	18	25	28.0	23	62	85	27.1
	8:45~9:00	8	29	37	21.6	2	10	12	16.7	3	9	12	25.0	13	48	61	21.3
	Subtotal	31	135	166	18.7	20	48	68	29.4	25	52	77	32.5	76	235	311	24.4
	10:00~10:15	3	25	28	10.7	5	14	19	26.3	11	23	34	32.4	19	62	81	23.5
	10:15~10:30	9	32	41	22.0	3	13	16	18.8	5	19	24	20.8	17	64	81	21.0
	10:30~10:45	4	37	41	9.8	10	18	28	35.7	7	26	33	21.2	21	81	102	20.6
	10:45~11:00	7	28	35	20.0	1	15	16	6.3	10	26	36	27.8	18	69	87	20.7
	Subtotal	23	122	145	15.9	19	60	79	24.1	33	94	127	26.0	75	276	351	21.4
	Total	54	257	311	17.4	39	108	147	26.5	58	146	204	28.4	151	511	662	22.8

Table 2 Turning Movement Traffic Volume after Implementation

	Time period	Left turn				Straight				Right turn				Total			
		Heavy	Light	Total	Heavy Ratio	Heavy	Light	Total	Heavy Ratio	Heavy	Light	Total	Heavy Ratio	Heavy	Light	Total	Heavy Ratio
APPROACH ①	10:30~10:45	0	0	0	-	17	26	43	39.5	10	33	43	23.3	27	59	86	31.4
	10:45~11:00	1	0	1	100.0	15	24	39	38.5	7	32	39	17.9	23	56	79	29.1
	11:00~11:15	0	1	1	0.0	22	27	49	44.9	7	42	49	14.3	29	70	99	29.3
	11:15~11:30	0	3	3	0.0	12	34	46	26.1	4	38	42	9.5	16	75	91	17.6
	Subtotal	1	4	5	20.0	66	111	177	37.3	28	145	173	16.2	95	260	355	26.8
	13:00~13:15	0	4	4	0.0	9	40	49	18.4	7	22	29	24.1	16	66	82	19.5
	13:15~13:30	1	4	5	20.0	17	36	53	32.1	5	29	34	14.7	23	69	92	25.0
	13:30~13:45	0	3	3	0.0	12	33	45	26.7	10	32	42	23.8	22	68	90	24.4
	13:45~14:00	0	2	2	0.0	16	40	56	28.6	8	34	42	19.0	24	76	100	24.0
	Subtotal	1	13	14	7.1	54	149	203	26.6	30	117	147	20.4	85	279	364	23.4
	Total	2	17	19	10.5	120	260	380	31.6	58	262	320	18.1	180	539	719	25.0
APPROACH ②	10:30~10:45	16	31	47	34.0	16	27	43	37.2	5	6	11	45.5	37	64	101	36.6
	10:45~11:00	9	21	30	30.0	23	52	75	30.7	5	0	5	100.0	37	73	110	33.6
	11:00~11:15	9	19	28	32.1	26	36	62	41.9	3	4	7	42.9	38	59	97	39.2
	11:15~11:30	-	-	-	-	11	26	37	29.7	4	4	8	50.0	15	30	45	33.3
	Subtotal	-	-	-	-	76	141	217	35.0	17	14	31	54.8	93	155	248	37.5
	13:00~13:15	-	-	-	-	20	34	54	37.0	6	4	10	60.0	26	38	64	40.6
	13:15~13:30	-	-	-	-	16	19	35	45.7	4	3	7	57.1	20	22	42	47.6
	13:30~13:45	-	-	-	-	22	28	50	44.0	8	5	13	61.5	30	33	63	47.6
	13:45~14:00	-	-	-	-	19	29	48	39.6	5	1	6	83.3	24	30	54	44.4
	Subtotal	-	-	-	-	77	110	187	41.2	23	13	36	63.9	100	123	223	44.8
	Total	-	-	-	-	153	251	404	37.9	40	27	67	59.7	193	278	471	41.0
APPROACH ③	10:30~10:45	8	5	13	61.5	12	10	22	54.5	0	2	2	0.0	20	17	37	54.1
	10:45~11:00	5	2	7	71.4	11	14	25	44.0	0	3	3	0.0	16	19	35	45.7
	11:00~11:15	7	3	10	70.0	7	11	18	38.9	0	0	0	-	14	14	28	50.0
	11:15~11:30	5	3	8	62.5	6	21	27	22.2	0	1	1	0.0	11	25	36	30.6
	Subtotal	25	13	38	65.8	36	56	92	39.1	0	6	6	0.0	61	75	136	44.9
	13:00~13:15	3	4	7	42.9	10	12	22	45.5	0	0	0	-	13	16	29	44.8
	13:15~13:30	3	7	10	30.0	10	12	22	45.5	0	2	2	0.0	13	21	34	38.2
	13:30~13:45	6	4	10	60.0	4	8	12	33.3	0	2	2	0.0	10	14	24	41.7
	13:45~14:00	7	4	11	63.6	15	17	32	46.9	1	1	2	50.0	23	22	45	51.1
	Subtotal	19	19	38	50.0	39	49	88	44.3	1	5	6	16.7	59	73	132	44.7
	Total	44	32	76	57.9	75	105	180	41.7	1	11	12	8.3	120	148	268	44.8
APPROACH ④	10:30~10:45	11	37	48	22.9	10	17	27	37.0	0	2	2	0.0	21	56	77	27.3
	10:45~11:00	12	52	64	18.8	5	15	20	25.0	0	0	0	-	17	67	84	20.2
	11:00~11:15	9	34	43	20.9	7	15	22	31.8	0	0	0	-	16	49	65	24.6
	11:15~11:30	8	31	39	20.5	6	18	24	25.0	8	21	29	27.6	22	70	92	23.9
	Subtotal	40	154	194	20.6	28	65	93	30.1	8	23	31	25.8	76	242	318	23.9
	13:00~13:15	6	52	58	10.3	17	17	34	50.0	6	20	26	23.1	29	89	118	24.6
	13:15~13:30	7	43	50	14.0	15	15	30	50.0	6	26	32	18.8	28	84	112	25.0
	13:30~13:45	9	44	53	17.0	10	11	21	47.6	5	21	26	19.2	24	76	100	24.0
	13:45~14:00	7	42	49	14.3	11	20	31	35.5	8	21	29	27.6	26	83	109	23.9
	Subtotal	29	181	210	13.8	53	63	116	45.7	25	88	113	22.1	107	332	439	24.4
	Total	69	335	404	17.1	81	128	209	38.8	33	111	144	22.9	183	574	757	24.2

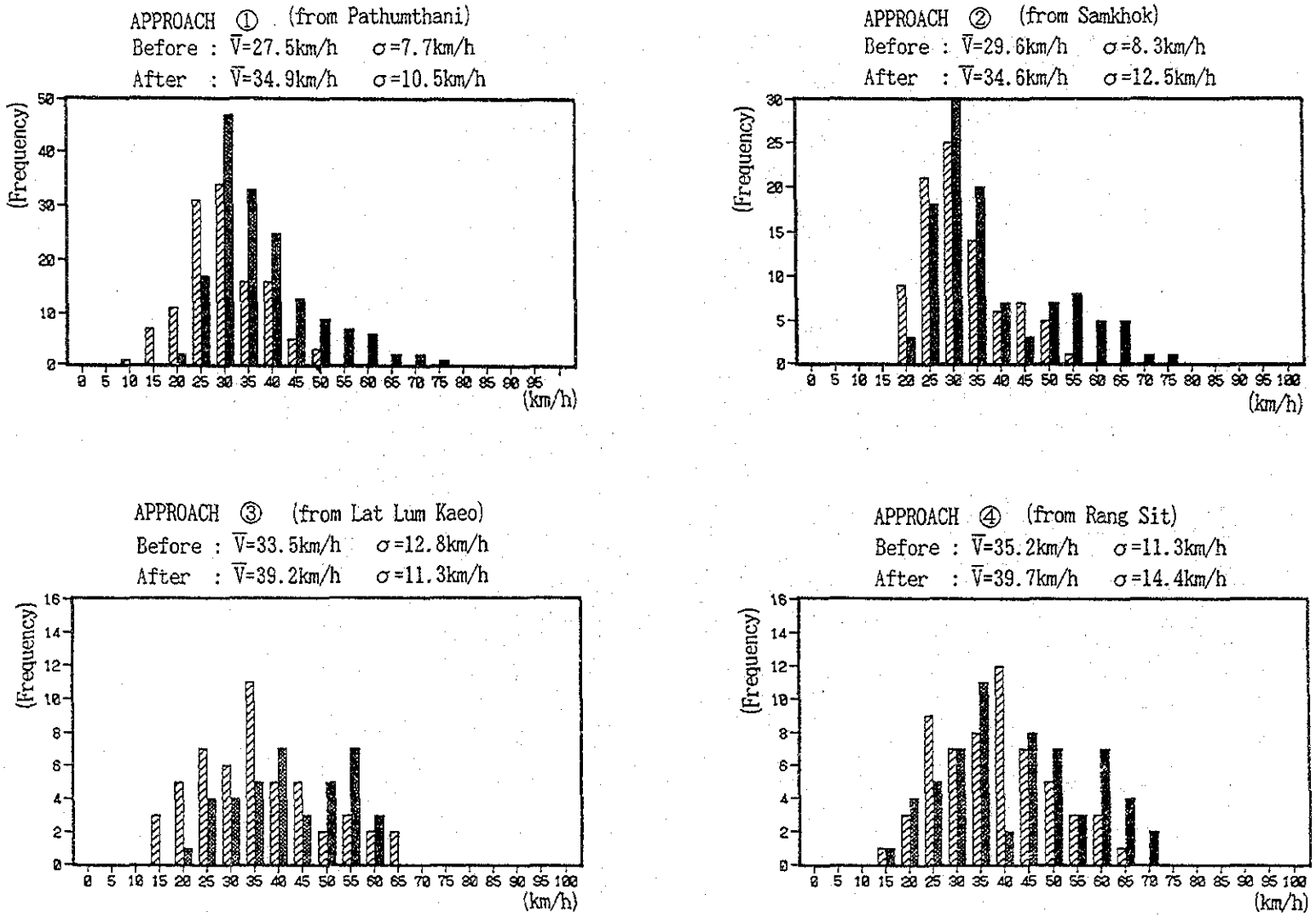


Figure 4 Distribution of Running Speed at Each Approach

A. The average passing speed at the intersection increased from 25-35 km/hr before implementation to 35-40 km/hr after implementation. The results indicate the increase of running speed by 10-25% at each approach.

B. The standard deviation of passing speed at the intersection, except vehicles from minor approaches, increased from 8-13 km/hr before implementation to 10-14 km/hr after implementation. This means that more vehicles passed the intersection at higher speed after implementation, as shown in Figure 4. However, the standard deviation of running speed on the approach from Lat Lum Kaeo was only reduced. Since traffic volume of this approach for both before- and after-survey period were not heavy compared with other approaches, it is considered that uncertain traffic right was improved by installation of traffic signals.

From the above facts, it is concluded that traffic capacity at the intersection increased with faster running speed, greater traffic smoothness and reduced passing time at the intersection.

(4) Traffic Conflict

In order to measure the improvement of safety level at the intersection after installation of traffic signals, traffic conflicts between vehicles at the intersection were analyzed.

Figure 5 illustrates typical patterns of conflicts at this intersection. Also, Table 4 summarizes the number of conflicts by pattern before and after the implementation, its reduction rate and rate of conflict per vehicle calculated from number of conflicts divided by the traffic volume.

Table 4 Number of Conflicts

	No. of Conflicts (A)		Traffic Volume (B)		(A)/(B)		Reduction Rate (%)	
	Before	After	Before	After	Before	After	(A)	(A)/(B)
Pattern (1)	35	3			0.0201	0.0013	91.4	93.5
Pattern (2)	12	2			0.0069	0.0009	83.3	87.5
Pattern (3)	7	0	1,742	2,320	0.0040	0	100.0	100.0
Pattern (4)	1	0			0.0006	0	100.0	100.0
Pattern (5)	10	0			0.0057	0	-	-
Pattern (6)	0	6			0	0.0026	-	-
Total	65	11	1,742	2,320	0.0373	0.0047	83.1	87.3

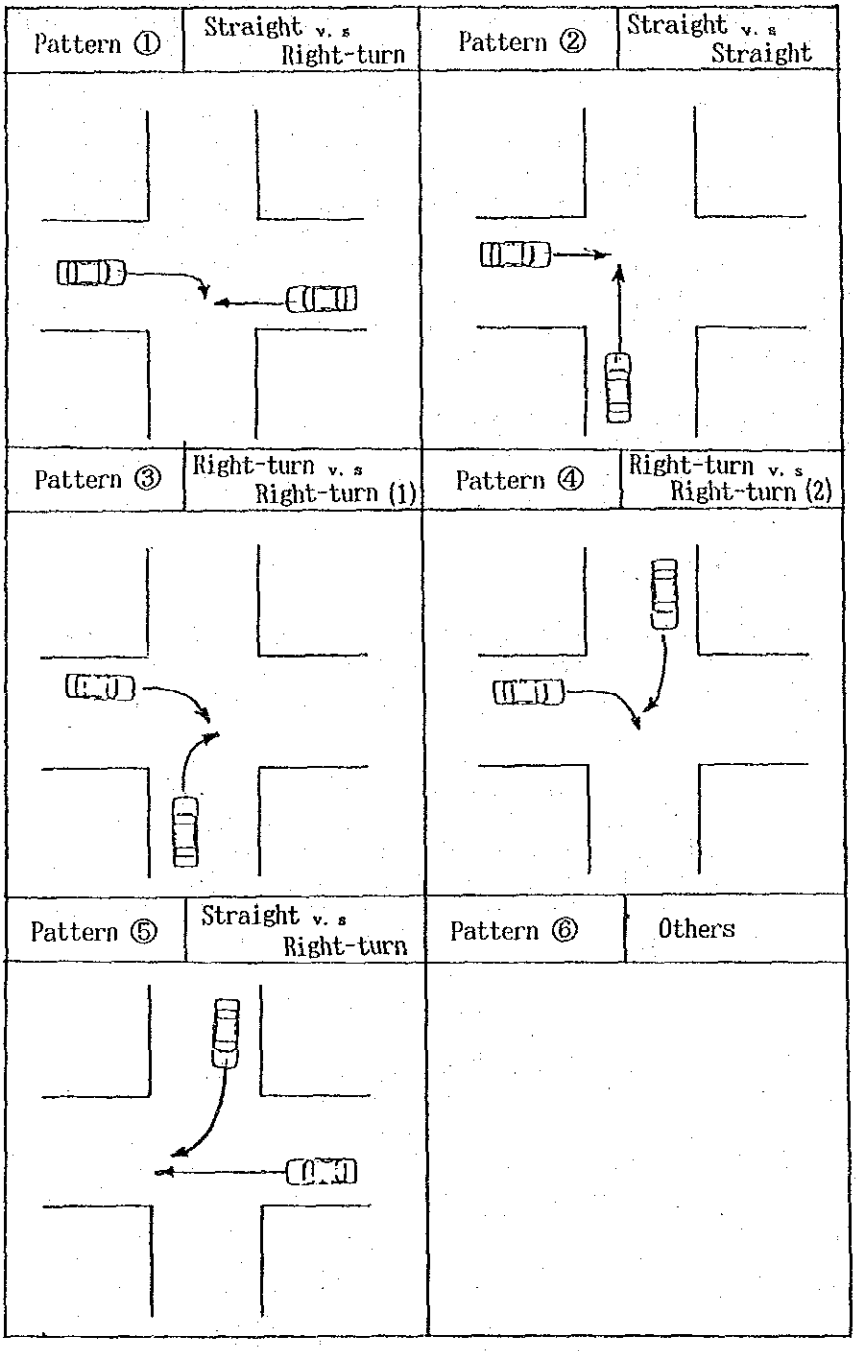


Figure 5 Traffic Conflict Pattern

From this table, the following facts are identified.

A. Total number of traffic conflicts were reduced from 65 to 11 as a result of signal installation. The reduction rate was 83% in number and 87% per vehicle.

B. Because traffic flows are segregated by installation of traffic signals, traffic conflicts, which may directly lead to traffic accidents, caused by vehicles simultaneously entering the intersection, were almost prevented.

C. Before implementation, the most typical case of conflicts were between through vehicles and right turn vehicles from opposite direction (54%), followed by through vehicles each other, through vehicles vs. right turn vehicles and right turn vehicles each other. By provision of the exclusive right turn phase, this type of conflicts were drastically reduced.

D. Most of conflicts after implementation are caused by irregular driving behaviors, such as U-turn, ignorance of traffic signals, overtaking at the intersection, etc.

The above results indicate that traffic conflicts were drastically reduced by installation of traffic signals, which consequently means the reduction of the potential danger of traffic accidents. Hence, it is considered that installation of traffic signals contributed to increase the safety level of the intersection.

2 Traffic Accident

Traffic accident analyses at the intersection were carried out only based on the results of one-month traffic accident survey at the site before and after implementation. Due to the delay of implementation of improvement works, it was impossible to collect traffic accident data from a local police station for the after survey period.

Table 5 shows the result of traffic accident survey. According to the analyses, number of accidents, especially accidents with casualties, were reduced. Therefore, it can be said that installation of traffic signals and improvement of channelization were effective for the prevention of traffic accident and improvement of safety at the intersection. The results of traffic accident analyses are summarized below.

A. Number of accidents were reduced from 5 cases to 4 cases.

B. Number of casualties were drastically reduced from 4 persons to 1 person.

C. Damages to road facilities were also reduced.

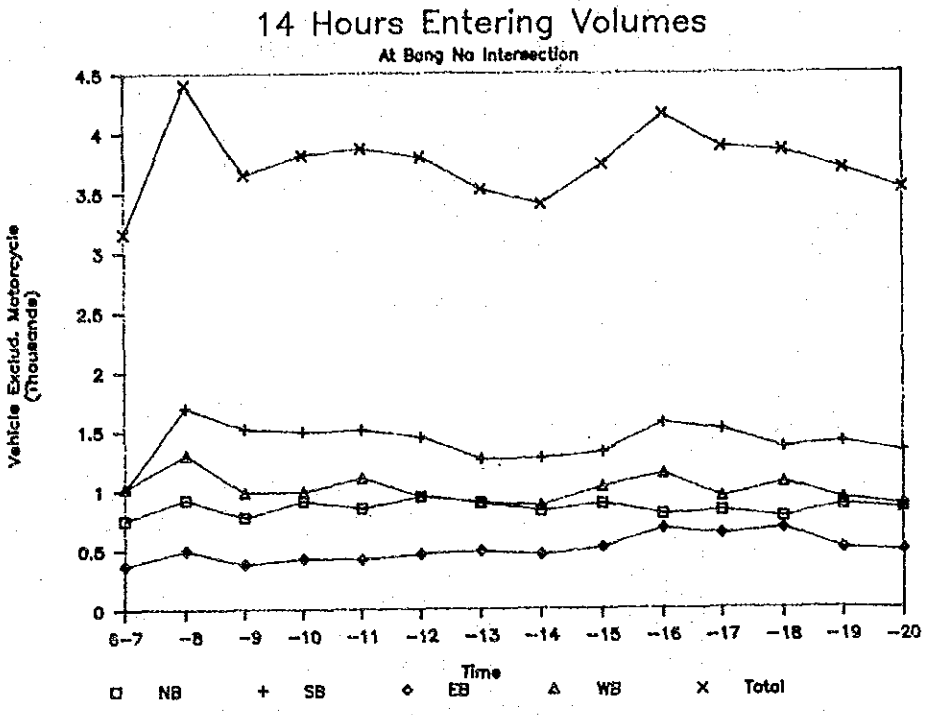
D. Every accident was vehicle vs. vehicle type.

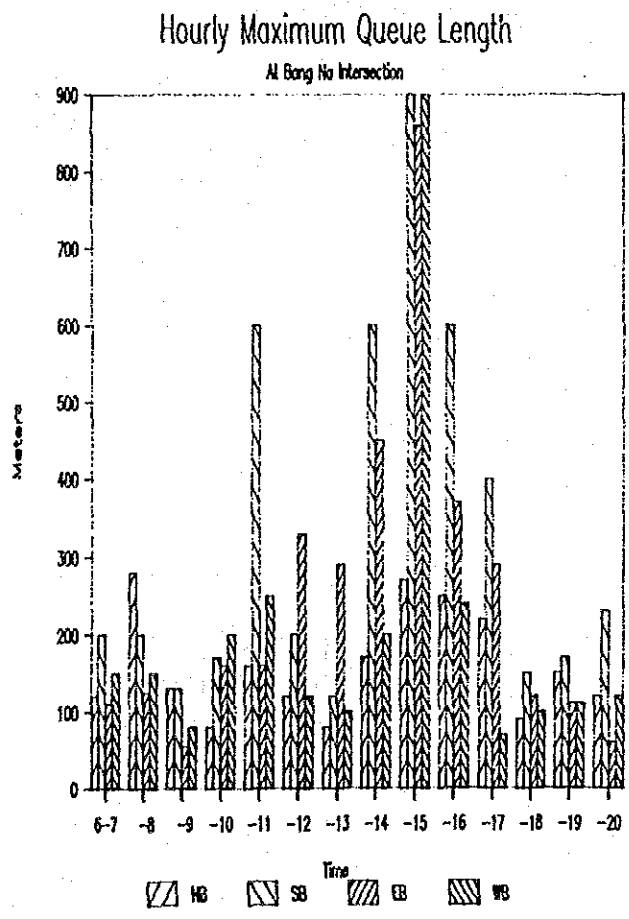
E. Side collision during turning was reduced from 4 cases to 1 case. On the contrary, rear-end collision increased from 1 case to 4 cases, but those collisions were not severe. It is understood that increase of rear-end collisions are general tendency after installation of a traffic signal.

F. Regarding the types of vehicles involved in accidents, ratio of heavy vehicles was reduced from 50% to 22%.

Table 5 Results of Traffic Accident Survey at Pathumthani Intersection

			Before	After
No.of Accidents			5	4
Fatality			4	0
Injury			0	1
Property Damage Only			4	3
Type of Accident	Vehicle vs Pedestrian		0	0
	Vehicle Itself		0	0
	Vehicle vs Vehicle	Head-on Collision	0	0
		Rear-end Collision	1	4
		Side Collision during Crossing	2	0
		Side Collision during Right-turn	1	0
		Side Collision during Left-turn	1	0
		Side Contact	0	0
		Others	0	0
		Total	5	4
Vehicle Type	Bicycle		0	0
	Motorctcle		0	1
	Passenger Car		2	1
	Light Bus		1	0
	Light Truck		2	5
	Heavy Bus		0	0
	Heavy Truck		5	2
	Others		0	0
Property Damage	Vehicle		5	4
	Public Utility		2	0
	Others		0	0


14 Hours Entering Volumes
At Bang Na Intersection
Vehicle Exclud. Motorcycle (Thousands)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
6-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18
-19
-20
Time
NB
SB
EB
WB
Total


Hourly Maximum Queue Length
At Bang Na Intersection
Meters
900
800
700
600
500
400
300
200
100
0
6-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18
-19
-20
Time
NB
SB
EB
WB

SATURATION FLOW RATE AT BANG NA INTERSECTION
- Summary of Survey Results -

1. Survey Method

The survey was conducted by using two video cameras to observe delay time and signal phasing on each approach to the Bang Na Intersection, on 7th August, 1989 (Monday) between 9 a.m. and 2.30 p.m. Figure 1 shows the layout of the Bang Na Intersection. The recorded results were then subsequently analyzed in Japan.

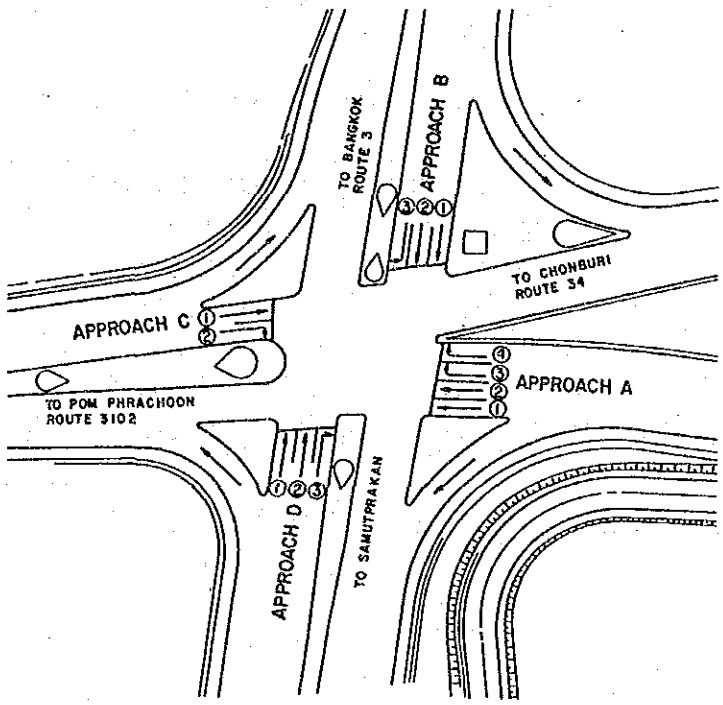


Figure 1 Layout of Bang Na Intersection

2. Survey Results

(1) Traffic Condition During Survey

The condition of traffic flows during the survey were as follows.

A. There were many right turning vehicles on Approach A, while through traffic was limited.

B. When the survey was commenced at 9 a.m., traffic on Approach B was stacked due to congestion of Exit D and the traffic police closed the through lane of this approach. The congestion of Exit D was eased at about 10.30 a.m. After that, traffic volume on both through lane and right turn lane were heavy.

C. Traffic volume on Approaches C and D were less compared with Approaches A and B.

(2) Results of Analysis

The analysis was conducted by randomly selecting saturated cycles and reading the time when vehicles crossed the intersection stop line. The results were compiled into a time-cumulative volume curve. This process was repeated on each approach except Approach D, which was excluded from the analysis due to low traffic volume.

The compiled time-cumulative volume curves are shown in Figures 2 to 10. Table 1 summarizes the saturation flow rate and delay time by approach.

Table 1 Saturation Flow Rate by Approach

Approach Lane	A-1	A-2	A-3	A-4	B-1	B-2	B-3	C-1	C-2
Cycle Length (Sec.)	132	132	132	132	132	132	132	132	132
Green Time (Sec.)	20	20	20	20	40	40	32	20	20
Average Headway (Sec.)	3.53	2.61	3.12	2.21	2.48	2.80	1.97	1.80	3.39
Throughout per Green Time (Veh.)	1,020	1,379	1,154	1,629	1,451	1,286	1,827	2,000	1,062
Saturation Flow Rate	0.368	0.377	0.442	0.380	0.419	0.292	0.498	0.319	0.315
Vehicle per Hour (veh.)	1,325	1,357	1,591	1,368	1,508	1,051	1,774	1,148	1,134
Delay Time (Sec.)	3.44	3.43	4.74	5.77	3.20	2.26	4.45	3.77	-

3. Conclusion

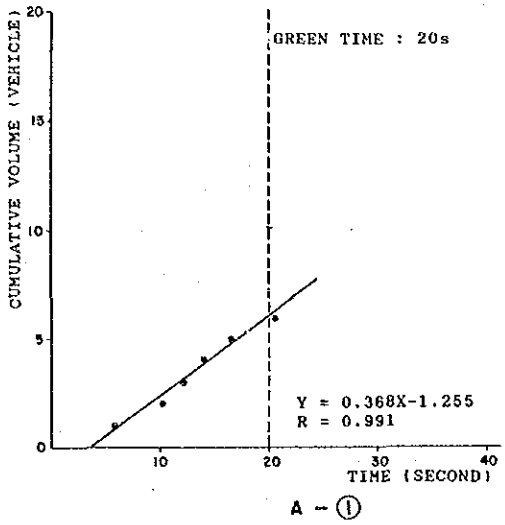
The saturation flow rates obtained from the above survey are lower than the average rate utilized in Bangkok (2,200 PCU/hr. for straight-through traffic). This is considered to be attributed to the following factors.

A. The ETA expressway, runs over this intersection, causes shadow over Approach B and reduces the visibility of traffic signals at the approach.

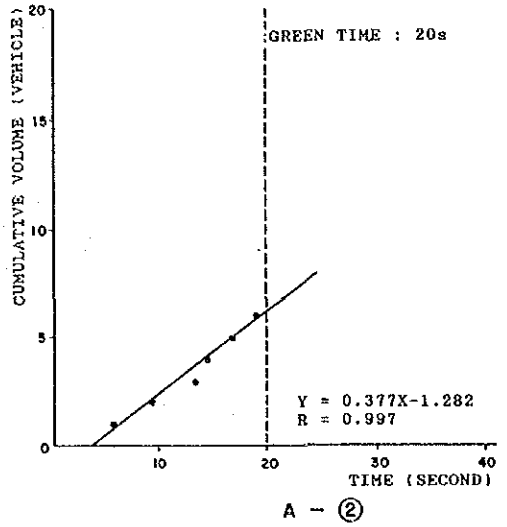
B. The pavement conditions near the stop line of all approaches are very bad, particularly Approaches C and D.

C. Left turning vehicles on Approach B tend to form a queue on the through lane. This is considered to be one of factors to decrease the saturation flow rate of the through lane.

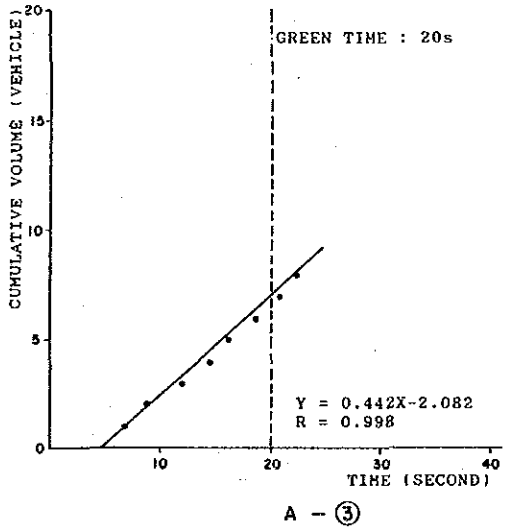
D. Width of pavement markings (stop line, crosswalk, lane line) at all approaches are almost disappeared.



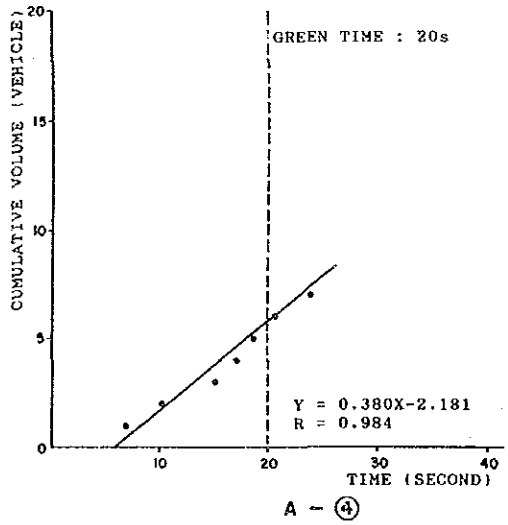
A - ①



A - ②

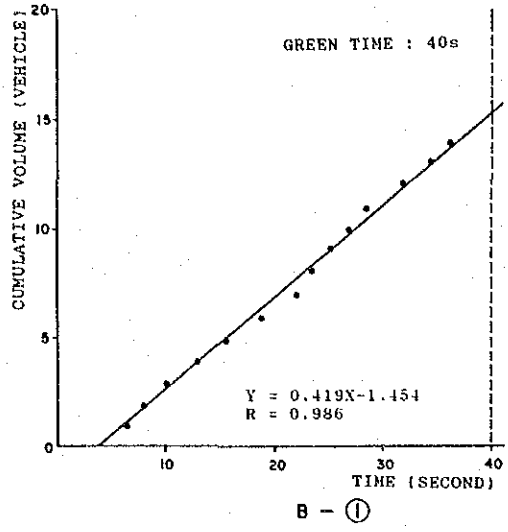


A - ③

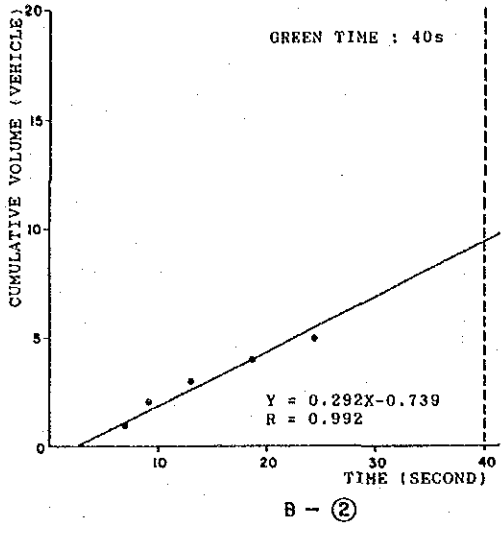


A - ④

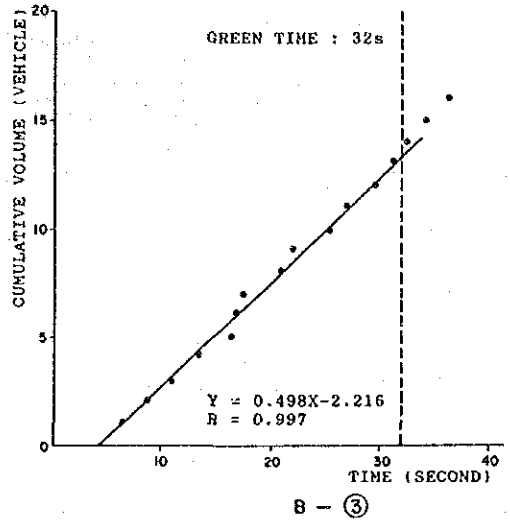
TIME-CUMULATIVE TRAFFIC CURVE



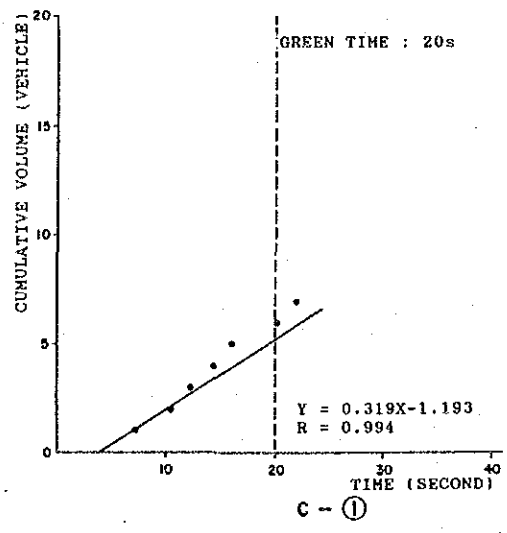
B – ①



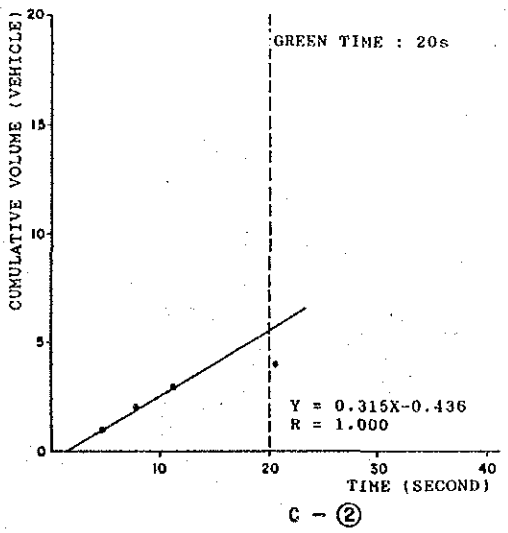
B – ②



B – ③

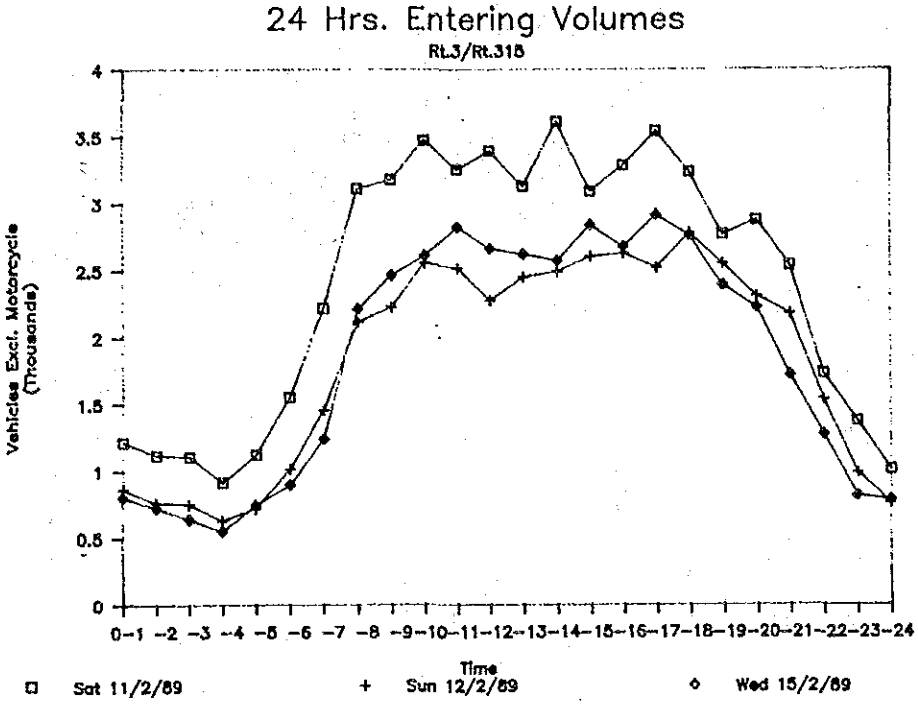


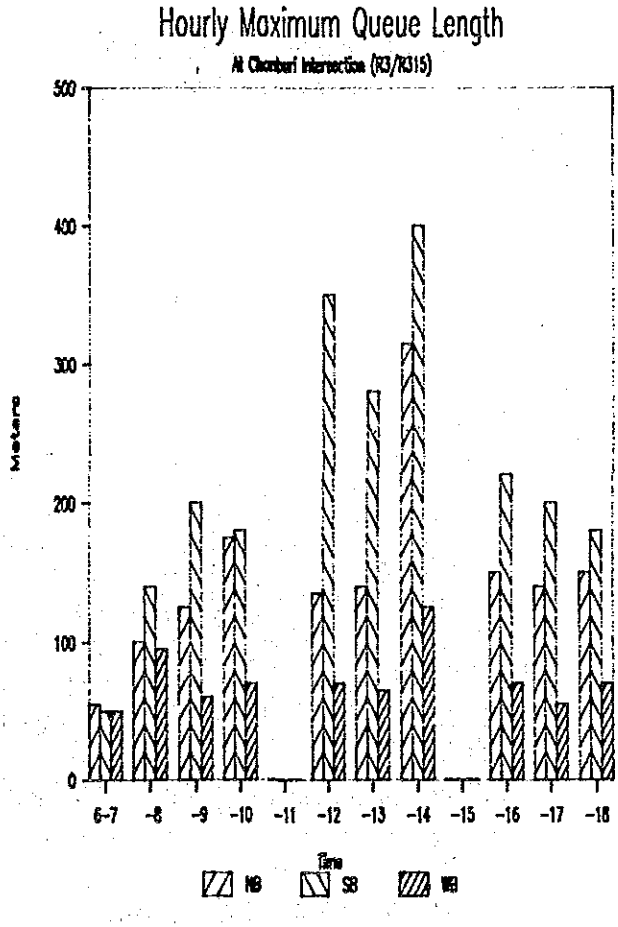
C – ①

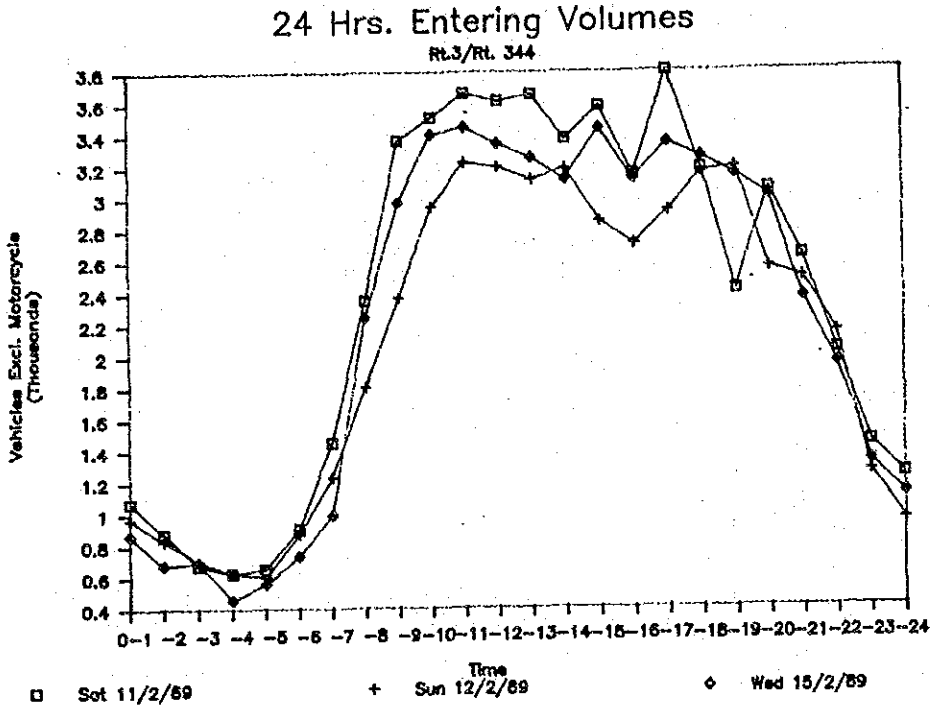


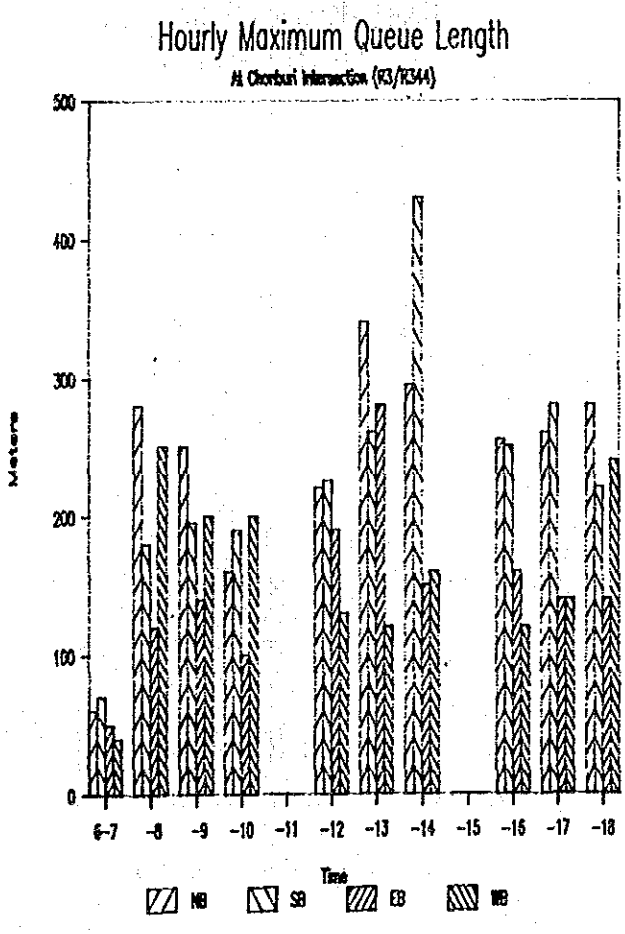
C – ②

TIME-CUMULATIVE TRAFFIC CURVE


24 Hrs. Entering Volumes
Rt.3/Rt.315
Vehicles Excl. Motorcycle (Thousands)
4
3.5
3
2.5
2
1.5
1
0.5
0
0-1 -2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19 -20 -21 -22 -23 -24
Time
Sat 11/2/89
Sun 12/2/89
Wed 15/2/89

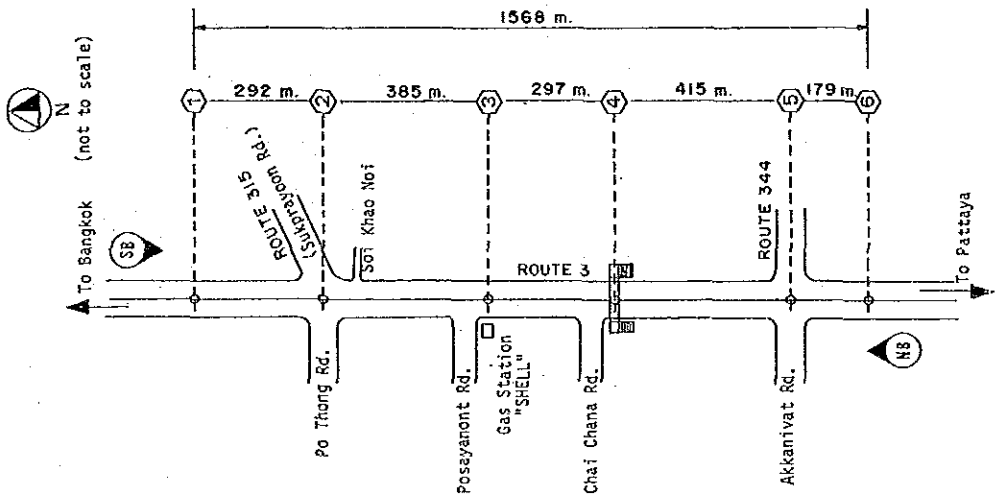

Hourly Maximum Queue Length
At Chonburi Intersection (R3/R315)
Meters
500
400
300
200
100
0
6-7 -8 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18
Time
NB
SB
WB


24 Hrs. Entering Volumes
Rt.3/Rt. 344
Vehicles Excl. Motorcycle (Thousands)
Time
Sat 11/2/89
Sun 12/2/89
Wed 15/2/89


Hourly Maximum Queue Length
Meters
Time
NB
SB
EB
WB

Date : Wed.12th July 1989

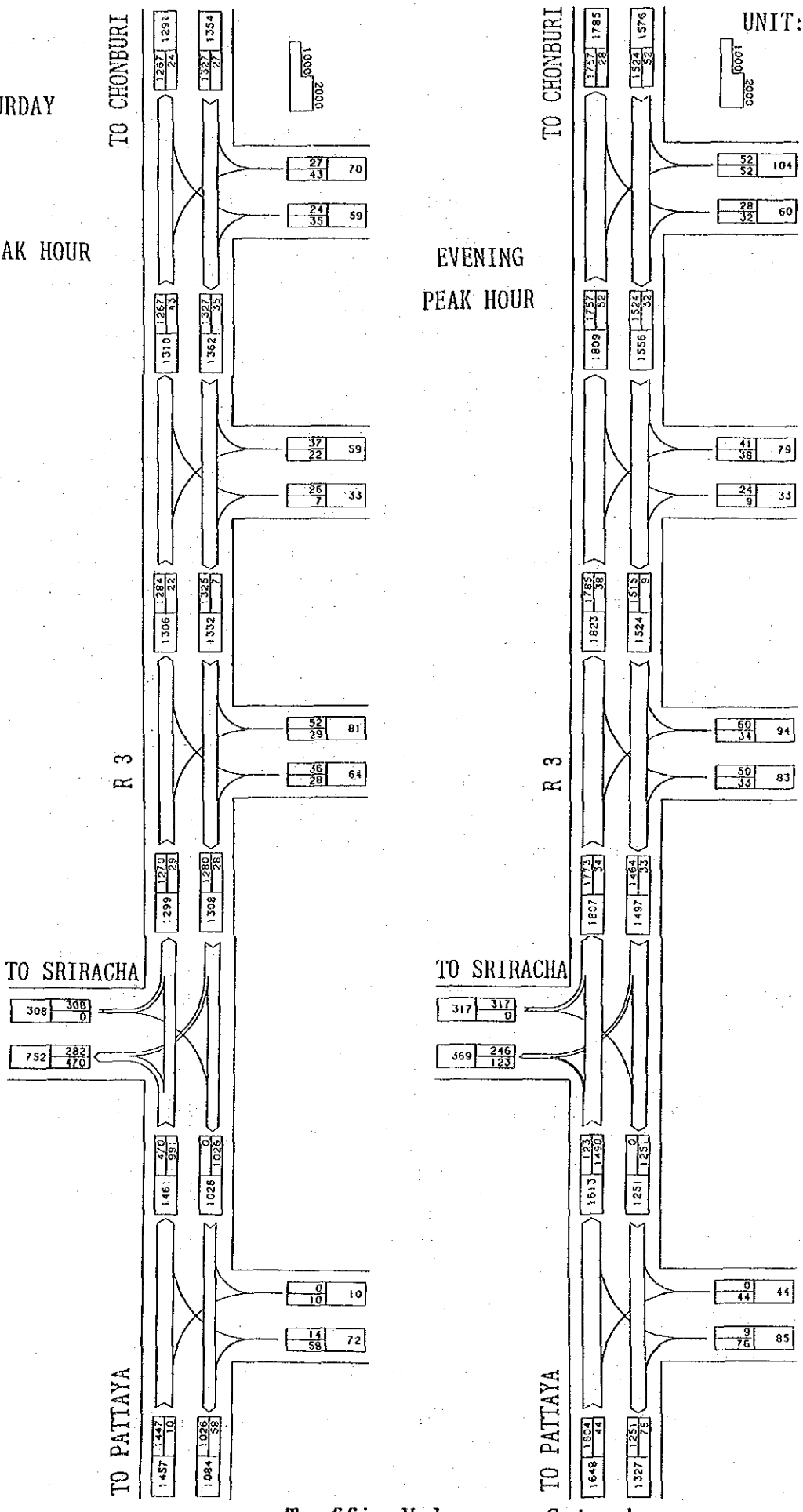
Time	Run No.	Travel time (sec)	Running time (sec)	Travel speed (kph)	Running speed (kph)
08:00-09:00	2 -NB	307.36	204.84	18.4	27.6
	4 -NB	225.20	208.43	25.1	27.1
	6 -NB	205.17	186.67	27.5	30.2
	Av. -NB			23.7	28.3
	1 -SB	260.24	189.10	21.7	29.9
	3 -SB	262.96	199.56	21.5	28.3
	5 -SB	256.95	190.44	22.0	29.6
	Av. -SB			21.7	29.3
11:00-12:00	7 -NB	327.99	252.94	17.2	22.3
	9 -NB	328.52	227.22	17.2	24.8
	11 -NB	396.83	253.87	14.2	22.2
	Av. -NB			16.2	23.1
	8 -SB	338.83	233.28	16.6	24.2
	10 -SB	479.74	247.21	11.8	22.8
	12 -SB	413.96	279.76	13.6	20.2
	Av. -SB			14.0	22.4
16:00-17:00	14 -NB	349.67	233.92	16.1	24.1
	16 -NB	340.58	242.80	16.6	23.2
	17 -NB	371.08	245.36	15.2	23.0
	Av. -NB			16.0	23.4
	13 -SB	265.02	197.64	21.3	28.6
	15 -SB	375.61	208.14	15.0	27.1
	18 -SB	373.45	212.14	15.1	26.6
	Av. -SB			17.1	27.4



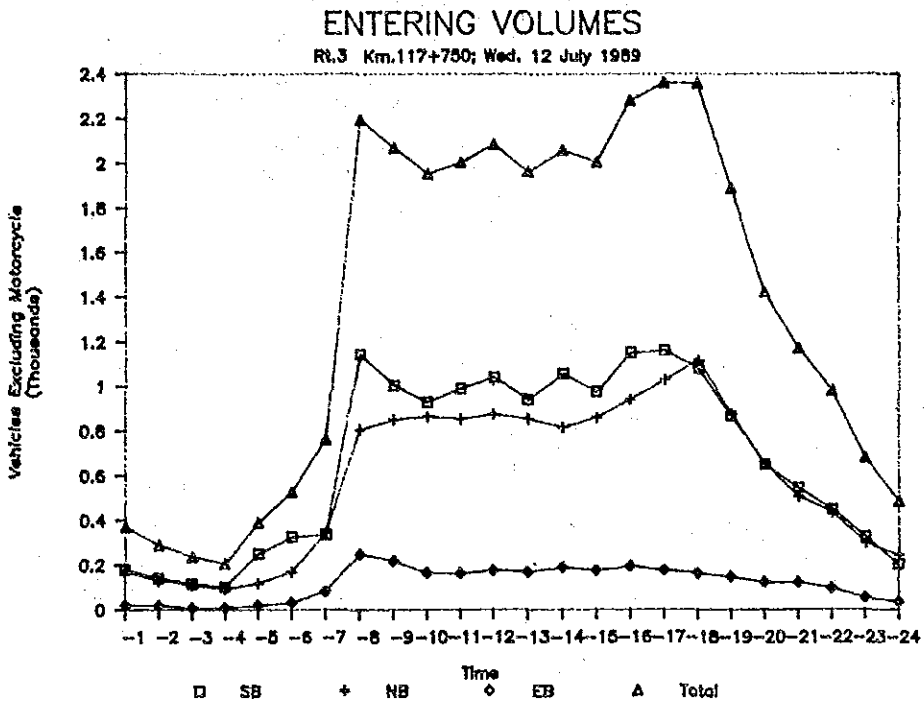
ROUTE OF TRAVEL TIME SURVEY

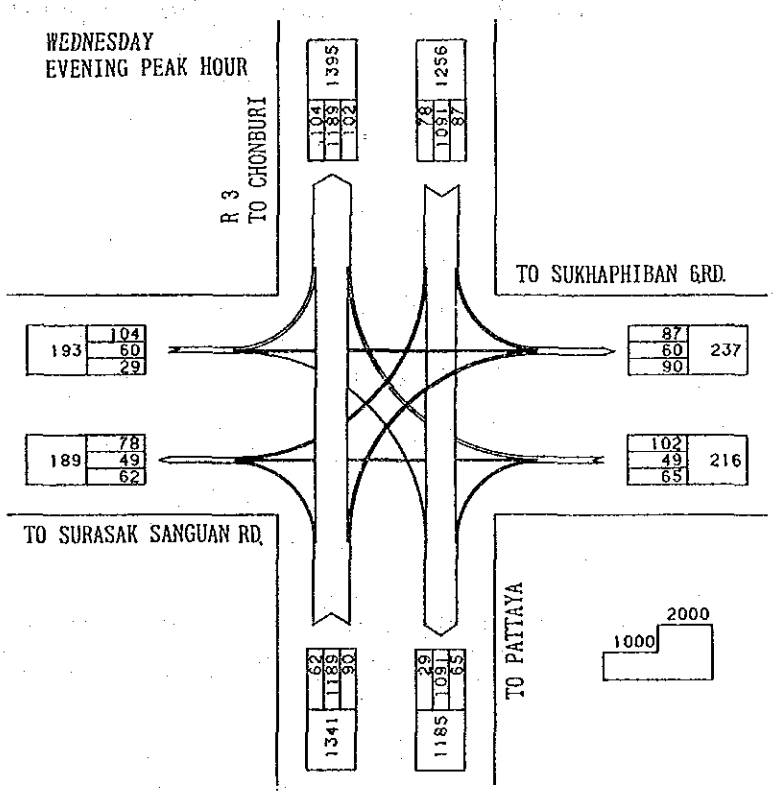
Results of Travel Time Survey at Chonburi

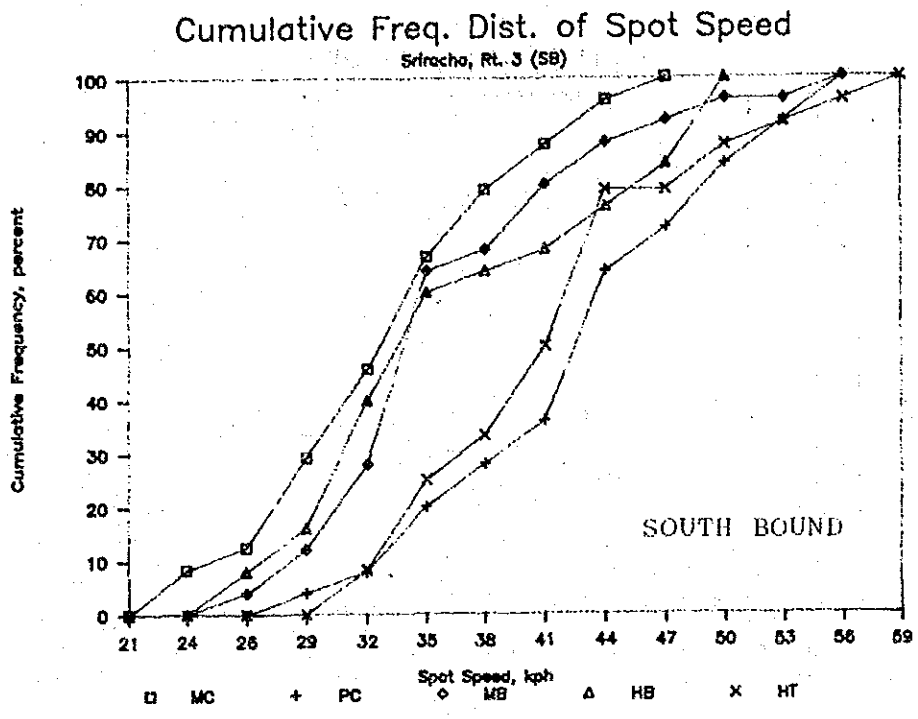
UNIT: PCU/hr

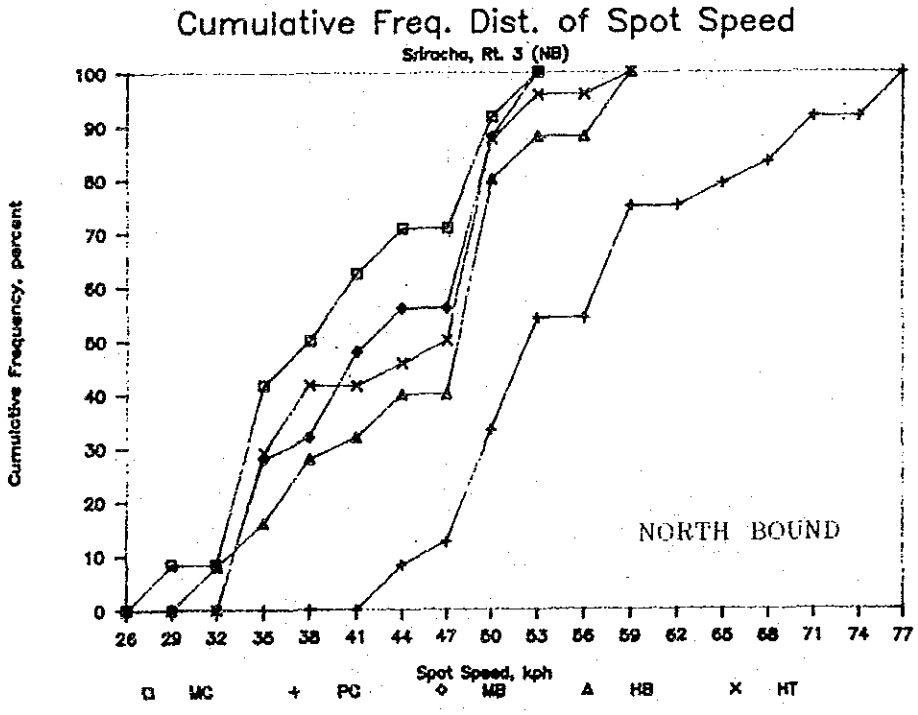


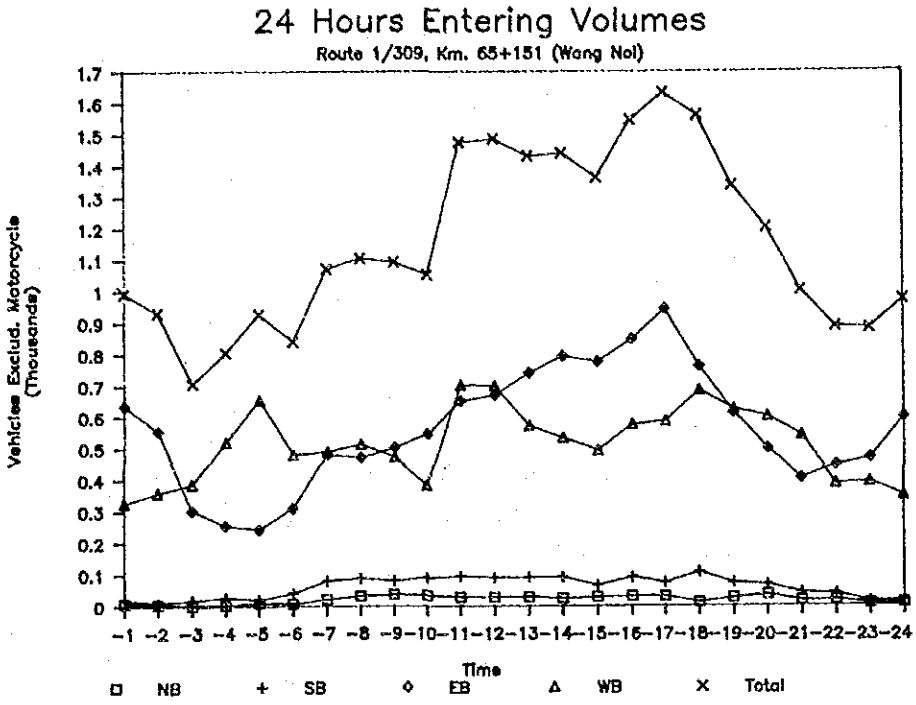
Traffic Volume on Saturday
at Sriracha Intersection

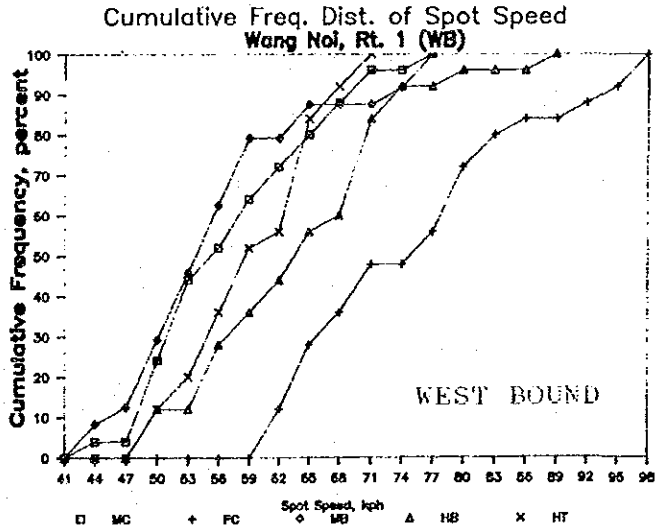

ENTERING VOLUMES
Rt.3 Km.117+750; Wed. 12 July 1989
Vehicles Excluding Motorcycle (Thousands)
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-1 -2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19 -20 -21 -22 -23 -24
Time
SB
NB
EB
Total

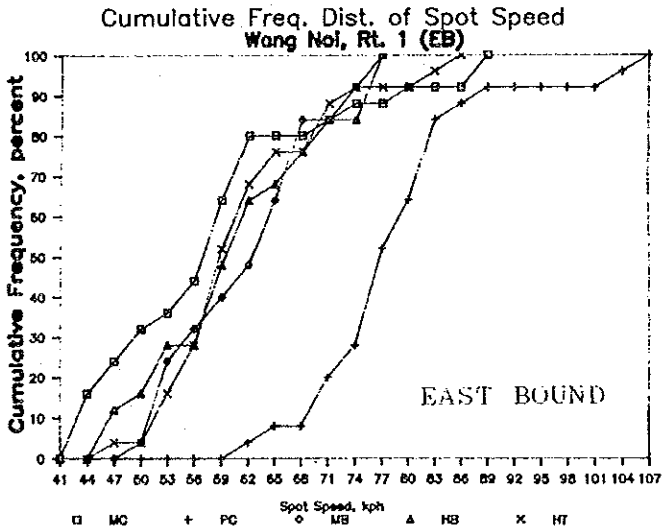

WEDNESDAY
EVENING PEAK HOUR
R 3
TO CHONBURI
1395
104
1189
102
1256
78
1091
87
TO SUKHAPHIBAN 6RD.
193
104
60
29
87
60
90
237
189
78
49
62
102
49
65
216
TO SURASAK SANGUAN RD.
TO PATTAYA
2000
1000
62
1189
90
1341
29
1091
65
1185

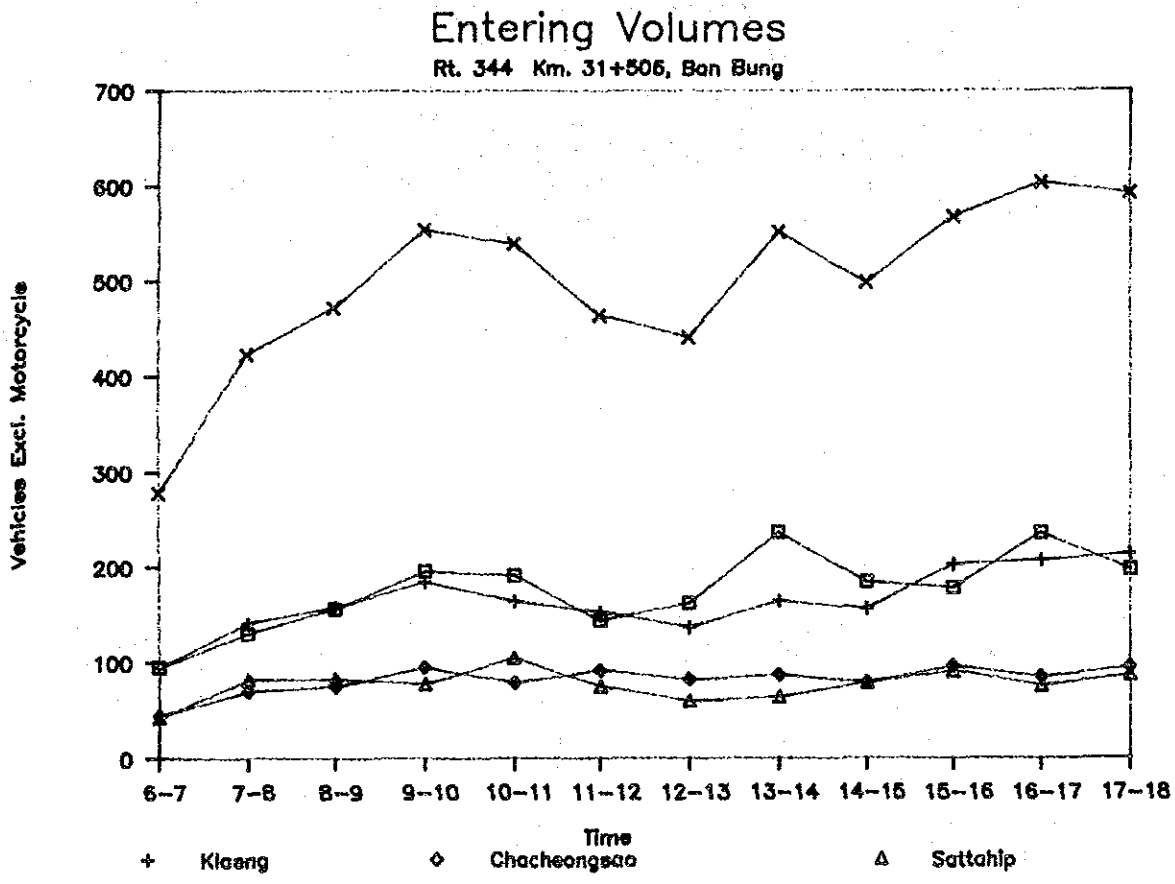

Cumulative Freq. Dist. of Spot Speed
Sriracha, Rt. 3 (SB)
Cumulative Frequency, percent
100
90
80
70
60
50
40
30
20
10
0
21 24 26 29 32 35 38 41 44 47 50 53 56 59
Spot Speed, kph
SOUTH BOUND
MC
PC
MB
HB
HT

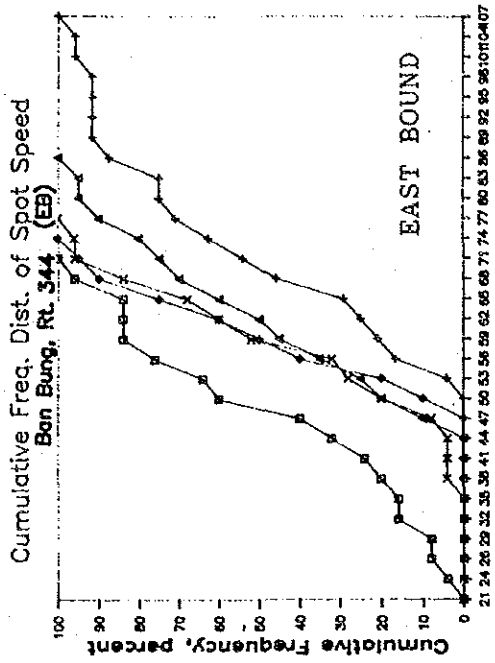

Cumulative Freq. Dist. of Spot Speed
Sriracha, Rt. 3 (NB)
Cumulative Frequency, percent
100
90
80
70
60
50
40
30
20
10
0
26 29 32 35 38 41 44 47 50 53 56 59 62 65 68 71 74 77
Spot Speed, kph
NORTH BOUND
MC
PC
MB
HB
HT

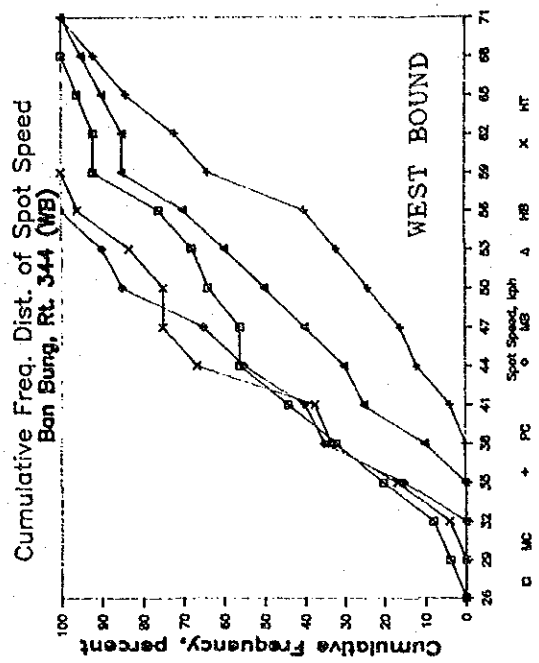

24 Hours Entering Volumes
Route 1/309, Km. 65+151 (Wang Noi)
Vehicles Exclud. Motorcycle (Thousands)
Time
NB
SB
EB
WB
Total

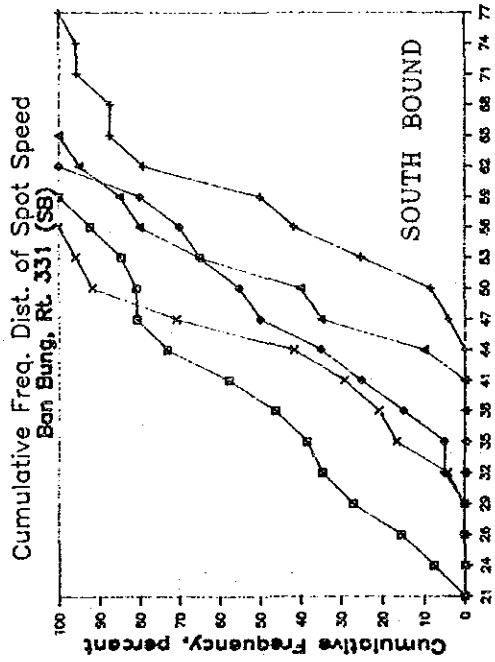

Cumulative Freq. Dist. of Spot Speed
Wang Noi, Rt. 1 (WB)
Cumulative Frequency, percent
WEST BOUND
Spot Speed, kph
MC
PC
MB
HB
HT

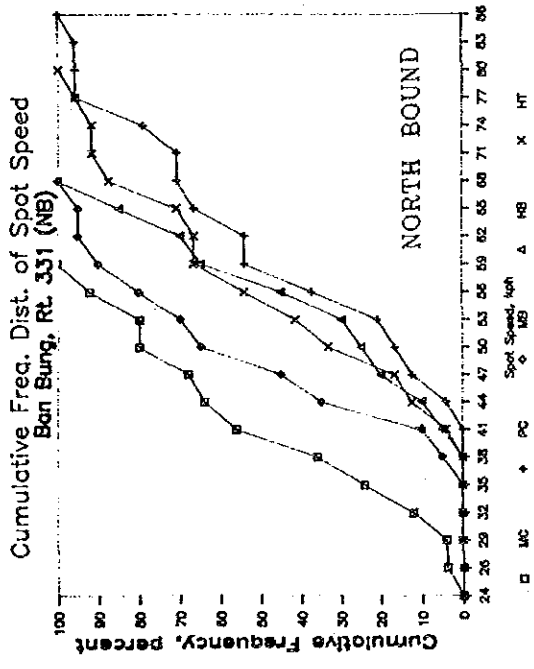

Cumulative Freq. Dist. of Spot Speed
Wang Noi, Rt. 1 (EB)
Cumulative Frequency, percent
EAST BOUND
Spot Speed, kph
MC
PC
MB
HB
HT

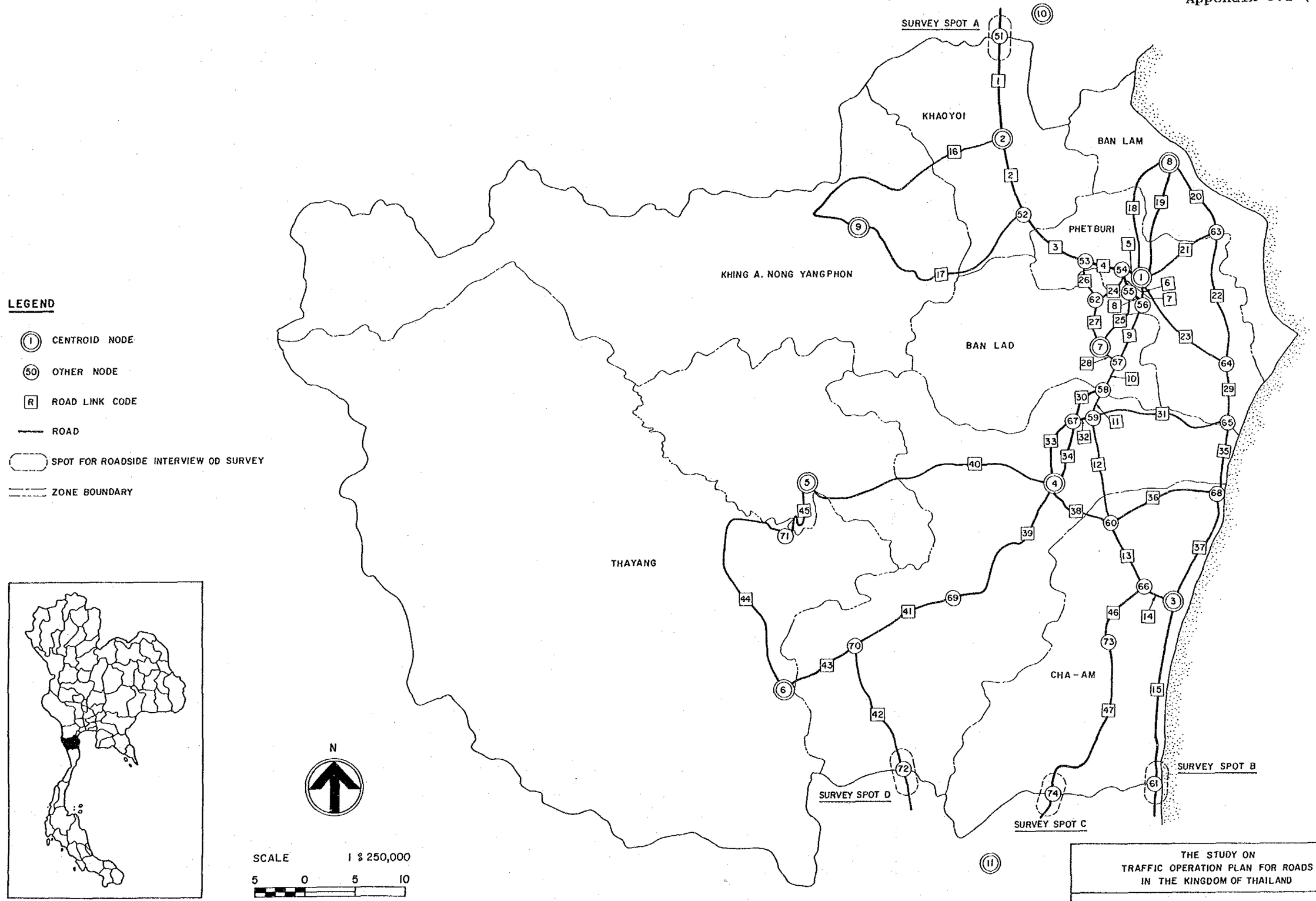

Entering Volumes
Rt. 344 Km. 31+506, Ban Bung
Vehicles Excl. Motorcycle
700
600
500
400
300
200
100
0
6-7
7-8
8-9
9-10
10-11
11-12
12-13
13-14
14-15
15-16
16-17
17-18
Time
Klaeng
Chacheongsao
Sattahip


Cumulative Freq. Dist. of Spot Speed
Ban Bung, Rt. 344 (EB)
EAST BOUND
Cumulative Frequency, percent
Spot Speed, kph
MC
PC
MB
HB
HT


Cumulative Freq. Dist. of Spot Speed
Ban Bung, Rt. 344 (WB)
WEST BOUND
Cumulative Frequency, percent
Spot Speed, kph
MC
PC
MB
HB
HT


Cumulative Freq. Dist. of Spot Speed
Ban Bung, Rt. 331 (SB)
SOUTH BOUND
Cumulative Frequency, percent
Spot Speed, kph
MC
PC
MB
HB
HT


Cumulative Freq. Dist. of Spot Speed
Ban Bung, Rt. 331 (NB)
NORTH BOUND
Cumulative Frequency, percent
Spot Speed, kph
MC
PC
MB
HB
HT



THE STUDY ON TRAFFIC OPERATION PLAN FOR ROADS IN THE KINGDOM OF THAILAND
SAMPLE OD SURVEY
ZONES AND NETWORK (C. PHETBURI)

Zone for Sample OD Survey (C.Phetburi)

Zone Code	Amphoe Name	Tambon Name
(1)	Phetburi	All
(2)	Khaoyoi	All
(3)	Cha-am	All
(4)	Thayang	All except (5)&(6)
(5)	- do -	Kaeng Krajarn
(6)	- do -	Song Phi Nong
(7)	Ban-lad	All
(8)	Ban-lam	All
(9)	Khing Amphoe Nong Yangphon	All
(10)	North Gateway	-
(11)	South Gateway	-

Network for sample OD Survey (C.Phetburi)

Link code	Node Pair		Distance	Speed	Remarks
	Origin	Distination	(Km)	(Km/h)	
1	51	2	10.5	80	Route 4
2	2	52	8.0	80	- do -
3	52	53	8.5	80	- do -
4	53	54	4.5	80	- do -
5	54	1	2.0	40	- do -
6	1	56	2.5	40	- do -
7	54	55	2.5	80	- do -
8	55	56	2.0	80	- do -
9	56	57	6.5	80	- do -
10	57	58	3.0	80	- do -
11	58	59	3.0	80	- do -
12	59	60	10.5	80	- do -
13	60	66	7.5	80	- do -
14	66	3	4.0	80	- do -
15	3	61	19.0	80	- do -
16	2	9	26.5	30	
17	9	52	21.5	30	
18	1	8	13.0	40	Route 3176
19	1	8	12.5	40	Route 3178
20	8	63	9.5	30	
21	1	63	9.0	30	
22	63	64	13.0	30	
23	1	64	12.5	40	Route 3177
24	54	62	4.0	40	Route 3171
25	55	7	6.5	40	Route 3179
26	53	62	4.5	30	
27	62	7	5.0	30	
28	7	57	2.5	40	Route 3179
29	64	65	5.5	30	
30	58	67	5.0	30	Route 3187
31	59	65	14.5	40	Route 3187
32	59	67	2.0	40	
33	67	4	7.0	40	Route 3187
34	67	4	6.5	30	Route 3175
35	65	68	7.5	30	
36	68	60	12.0	30	Route 3174
37	68	3	11.5	30	
38	60	4	8.0	30	
39	4	69	16.0	30	
40	4	5	26.5	30	
41	69	70	11.0	30	Route 3410
42	70	72	14.0	30	Route 3301
43	70	6	8.5	30	Route 3410
44	6	71	26.0	30	Route 3432
45	5	71	7.5	30	
46	66	73	7.5	40	
47	73	74	18.0	30	Route 3203

THE STUDY ON
TRAFFIC OPERATION PLAN FOR ROADS
IN THE KINGDOM OF THAILAND

SAMPLE OD SURVEY

ZONES AND NETWORK
(C. PHETBURI)

Number of Personnel Necessary for OD Survey

TABLE - 1 PLANNING PREPARATION

	Chief Engineer	Engineer A	Engineer B	Engineer C	Part-timer	TOTAL
Implementation of survey plan	5	15	15			35
Implementation of random sampling		1	5	10	150	166
Verification of number of vehicles studied		1	5	5	10	21
Establishment of survey zones		1	5	5		11
Establishment of number of surveyors			1	5		6
Recruitment of surveyors			5	20		25
Design of survey questionnaire	1	5	5			11
Preparation of entry example	1	1	5			7
Preparation of survey manual	1	5	10			16
Dispatchment to survey zones			5	5	20	30
Surveyor's briefing meeting			10	10	10	30
TOTAL	8	29	71	60	190	358

TABLE - 2 (1) IMPLEMENTATION OF SURVEY (North Region)

	Chief Engineer	Engineer A	Engineer B	Engineer C	Part-timer	TOTAL
Distribution of survey questionnaire				25	1600	1625
Progress check (I)		5	5	10	10	30
Collection of survey questionnaire				25	1600	1625
Progress check (II)		5	5	10	10	30
Mid-term check			5	15	15	35
Final collection		5	5	20	20	50
Coding			5	10	120	135
Check				10	10	20
MT preparation				5	10	15
Development of check program		1	5			6
Correction				5	5	10
TOTAL		16	30	135	3400	3581

TABLE - 2 (2) IMPLEMENTATION OF SURVEY (Northeast Region)

	Chief Engineer	Engineer A	Engineer B	Engineer C	Part-timer	TOTAL
Distribution of survey questionnaire				40	2500	2540
Progress check (I)		5	5	10	10	30
Collection of survey questionnaire				40	2500	2540
Progress check (II)		5	5	10	10	30
Mid-term check			5	25	25	55
Final collection		5	5	30	30	70
Coding			5	10	185	200
Check				10	10	20
MT preparation				5	10	15
Development of check program		1	5			6
Correction				5	5	10
TOTAL		16	30	185	5285	5516

TABLE - 2 (3) IMPLEMENTATION OF SURVEY (Central Region)

	Chief Engineer	Engineer A	Engineer B	Engineer C	Part-timer	TOTAL
Distribution of survey questionnaire				30	2000	2030
Progress check (I)		5	5	10	10	30
Collection of survey questionnaire				30	2000	2030
Progress check (II)		5	5	10	10	30
Mid-term check			5	20	20	45
Final collection		5	5	25	25	60
Coding			5	10	150	165
Check				10	10	20
MT preparation				5	10	15
Development of check program		1	5			6
Correction				5	5	10
TOTAL		16	30	155	4240	4441

TABLE - 2 (4) IMPLEMENTATION OF SURVEY (South Region)

	Chief Engineer	Engineer A	Engineer B	Engineer C	Part-timer	TOTAL
Distribution of survey questionnaire				10	700	710
Progress check (I)		5	5	5	5	20
Collection of survey questionnaire				10	700	710
Progress check (II)		5	5	5	5	20
Mid-term check			5	10	10	25
Final collection		5	5	10	10	30
Coding			5	5	50	60
Check				5	5	10
MT preparation				5	5	10
Development of check program		1	5			6
Correction				5	5	10
TOTAL		16	30	70	1495	1611

Appendix 6.1 Official Radio Broadcasting Program for Traffic Report in Bangkok

Agency	Channel	Program	Time	Remarks
1. Radio Thailand	FM 93.5	All working days	6:30 - 6:55 7:30 - 8:00 8:30 - 8:45 9:05 - 9:10 10:05 - 10:10 11:05 - 11:10 14:05 - 14:10 15:05 - 15:10 16:05 - 16:10 17:05 - 17:10 18:15 - 18:20	
2. Bangkok Metropolitan Administration Broadcast Station	AM 864	All working days	6:30 - 6:40 17:50 - 18:00	
3. National Security Command Headquarters Broadcast Station	AM 1521 FM 99.5	All working days	8:05 - 8:15	
4. Military Transportation Department Broadcast Station	AM 1278 FM 102	Everyday	8:00 - 8:05 17:00 - 17:05	
5. Voice of Samyord	FM 91	All working days	6:55 - 7:00 12:00 - 12:05 16:30 - 16:35	
6. Border Patrol Police Broadcast Station	AM 576	All working days	6:55 - 7:00 12:00 - 12:05 16:30 - 16:35	
7. Pitak Santi-Rad Bangkok Broadcast Station	AM 1170	All working days	6:55 - 7:00 12:00 - 12:05 16:30 - 16:35	

Appendix 6.2 Variable Message Sign in ETA

Code No.	Indication Content
1.	Stop
2.	Stop Ahead
3.	Reduced Speed
4.	Pass with Care
5.	Accident Ahead
6.	Road Machinery
7.	Road Work
8.	Slippery when Rain
9.	Left Lane Closed
10.	Right Lane Closed
11.	Center Lane Closed
12.	2 Left Lanes Closed
13.	2 Right Lanes Closed
14.	Speed Limit 15 K.P.H
15.	Slippery
16.	Royal March Ahead

Questionnaire on Driver's Needs for Traffic Information

Q.1 Where did you come from?

Q.2 Where are you going to now?

Q.3 How long do you think it will take to get to your final destination?

Q.4 How did you estimate your travel time on Q.3 above?
1. From traffic information
2. From experience
3. Just intuition
4. Others ( )

Q.5 What kind of traffic related information do you wish to obtain? (multiple answer accepted)
1. Road guide
2. Congestion
3. Traffic restriction
4. Accident & road works
5. Weather
6. Shortest route to the destination
7. Estimated travel time to the destination
8. Others ( )

Q.6 When do you wish to obtain such information?
1. Before starting the trip (Home, Office)
2. During the trip
   If you have selected 2, please specify the place you wish to get these information.
   ( )

Q.7 What do you want to know when you are in traffic congestion?
1. Cause of the congestion
2. Detour to get out of congestion
3. Estimated time till the congestion is over
4. Length of road section in congestion
5. Others ( )

Profile of data provider
1. Age ( ) Male/female
2. Occupation
3. Type of car
4. Purpose of travel

Summary of Questionnaire Survey Results

		No. of Samples	Percentage
Sex	Male	277	86.6
	Female	43	13.4
	Total	320	100.0
Age	< 31	101	31.6
	31 - 40	134	41.9
	41 - 50	61	19.1
	51 - 60	19	5.9
	> 60	6	1.6
	Total	320	100.0
Occupation	Business	77	24.2
	Employee	105	33.0
	Officer	37	11.6
	Driver	79	24.8
	Others	20	6.3
	Total	318	100.0
Vehicle Type	Motorcycle	2	0.6
	Passenger Car	257	80.8
	Pick-up & Wagon	32	10.1
	Taxi	4	1.3
	Micro Bus	23	7.2
	Total	318	100.0
Trip Purpose	Work or Business	62	19.9
	Private	11	3.5
	Send or Receive	223	71.7
	Travel by Air	11	3.5
	Others	4	1.3
	Total	311	100.0
Travel Time Estimation	Traffic Information	32	10.0
	Experience	217	66.0
	Intuition	57	17.9
	Others	13	4.1
	Total	319	100.0
Desired Traffic Information	Road Guide	43	5.8
	Congestion/Travel Time	261	34.9
	Traffic Restriction	133	17.8
	Accident & Road Works	157	21.0
	Weather at Destination	30	4.0
	Shortest Route	116	15.5
	Others	7	0.9
	Total	747	100.0
Obtaining Traffic Information	Before Trip	233	75.2
	During Trip	77	24.8
	Total	310	100.0
Traffic Congest. Information	Cause	69	22.3
	Detour	192	61.9
	Time to Finish	23	7.4
	Length	21	6.8
	Others	5	1.6
	Total	310	100.0

CONTROL SECTION

Route Number ;
Control Section-Subsection ;
Subdivision ;
Chainage of Start (m) ;
End (m) ;
Route Name ;
Section Length (m) ;

Region-Division-District ;
Administrative Region ;
Changwat ;

Road Functional Class ;
Type of Road Cross Section ;
Length of Flat Terrain (m) ;
Rolling Terrain (m) ;
Mountainous Terrain (m) ;
Length of Urbanized Area (m) ;
Urbanizing Area (m) ;
Agricultural Area (m) ;
Mountainous Area (m) ;

Connecting Link from ;
to ;

Coodinate of Start-X (m) ;
-Y (m) ;
End -X (m) ;
-Y (m) ;

Horizontal Alignment
Minimum Curvature (m) ;
Total Length of R<100m (m) ;
Vertical Alignment
Maximum Gradient (%) ;
Total Length of G>3% (m) ;

No. of Bridges in Link ;
Pedestrian Bridges ;
At Grade Railway Crossing ;
Graded Railway Crossing ;

CROSS SECTION

	LEFT		RIGHT		TOTAL
	Type/No.	Width(m)	Type/No.	Width(m)	Width(m)/No.
No. of Lanes					
Carriage Way					
Passing Lane					
Motercycle Lane					
Shoulder					
Side Walk					
Right of Way					

Median Type ;
Width (m) ;

Coded by ;
Date ; _____/___/_____

INTERSECTION

Route Number ;
Control Section-Subsection ;
Subdivision ;
Chainage (m) ;
Region-Division-District ;
Name of Intersection ;

Type of Intersection (I) ;
(II) ;
No. of Intersection Legs ;
Type of Traffic Control ;

No. of Guide Signs ;
Warning Signs ;
Regulatory Signs ;
Other Signs ;

Intersecting Road
Name ;
Chinage (m) ;
Road Class ;
Administrator ;

Existence of
Island ;
Pedestrian Crossing ;
Lighting ;

Coded by ;
Date ; ____/____/____

No. of Lanes - Inflow(S) - Straight/Left Turn
- Right Turn
- Outflow(S)
- Outflow(E)

	DOH Road	Intersecting Road

PLAN (Scale = 1/500)

Intersection Type Code(I)
1 ; At Grated
2 ; Grade Separated

Intersection Type Code (II)
1 ; Crossing with DOH Road
2 ; Crossing with Other Road

Traffic Control Type Code
1 ; Signal Controlled
2 ; Signed Priority
3 ; Uncontrolled

TRAFFIC VOLUME

Route Number ;
Control Section-Subsection ;
Subdivision ;
Chainage (m) ;
Region-Division-District ;
Survey Spot Number ;
Survey Hours (12 or 24) ;
Surveyed Date (yymmdd) ;

No. of Pedestrian ;

Peak Hour Factor ;
Ratio of Direction ;
Daytime Travel Hours during Control Section ;
Ratio of Daytime Traffic to Daily Traffic ;

	No. of Vehicles	Peak Hour Traffic
Bi/Tri Cycle		
Motercycle		
Passenger Car		
Light Bus		
Light Truck		
Heavy Bus		
Medium Truck		
Heavy Truck		
Total		

PLAN (Scale = 1/1000) Coded by Date / /

TRAFFIC ACCIDENT

Route Number ;
Control Section-Subsection ;
Subdivision ;
Chainage (m) ;
Region-Division-District ;

Date of Accident (yymmdd) ;
Day of Week ;
Time in 24 Hour ;
Accident Type ;
Collision Diagram ;
Vehicle Type ;
Cause ;
Damage-DOH Property Type ;
in Baht ;
-Private in Baht ;

Location ;
Type of Highway ;
Alignment-Horizontal ;
-Vertical ;
Surface Type ;
Width-Pavement (m) ;
-Surface (m) ;
Visibility ;

No. of Vehicles Involved ;
No. of Injulies ;
No. of Fatalities ;

Data Source ;
Coded by ;
Date ; _____/___/____

Day of Week Code
1 ; Sunday
2 ; Monday
3 ; Tuesday
4 ; Wednesday
5 ; Thersday
6 ; Friday
7 ; Saturday

Accident Type Code
0 ; Pedestrian
1 ; Vehicle vs Vehicle
2 ; Vehicle vs Train
3 ; Animal Drawn
4 ; Bicycle
5 ; Animal
6 ; Fixed Object
7 ; Over taking
8 ; Off Path
9 ; Others

Vehicle Type Code
1 ; Bicycle
2 ; Motercycle
3 ; Passenger Car
4 ; Light Bus
5 ; Light Truck
6 ; Heavy Bus
7 ; Median Truck
8 ; Heavy Truck
9 ; Others

Accident Cause Code
1 ; Over Speed
2 ; Improper Passing
3 ; Side Collision
4 ; Missing of Signal
5 ; High Beam
6 ; No Light Parking
7 ; Defective Vehicle
8 ; Impaired Driver
9 ; Drunken Driver
0 ; Other

DOH Property Type Code
1 ; Roadway
2 ; Bridge
3 ; Street Lighting
4 ; Traffic Signal
5 ; Traffic Sign
6 ; Guardrail,Guide Post
7 ; Km/Right of Way Post
8 ; Others

Location Code
1 ; Roadway
2 ; Bridge
3 ; Intersection
4 ; Railway Crossing
5 ; Other

Highway Type Code
1 ; Undivided 2 Lanes
2 ; Undivided 4 Lanes
3 ; Divided 2 Lanes
4 ; Divided 4 Lanes
5 ; Other

Horizontal Alignment
1 ; Straight
2 ; Curve
3 ; Diverted

Vertical Alignment
1 ; Tangent
2 ; Slope
3 ; Mountanious

Surface Type Code
1 ; Concrete
2 ; Asphalt Concrete
3 ; Asphalt
4 ; Soil Aggregate
5 ; Other

Visivility Code
1 ; Fine
2 ; Foggy
3 ; Smoky
4 ; Rainning
5 ; Dark Street Lighting
6 ; Dark without Lighting
7 ; Other

Data Source Code
1 ; Highway Police
2 ; Local Police

TRAFFIC SIGN

Route Number ;
Control Section-Subsection ;
Subdivision ;
Chainage (m) from ;
to ;
Length of Section (m) ;
Region-Division-District ;
Location (1;Roadway 2;Intsct) ;

No. of Guide Signs ;
Warning Signs ;
Regulatory Signs ;
Other Signs ;
Signs in Total ;

Coded by ; _____
Date ; ____/____/____

INSPECTION RECORDS (No. of Signs)

Date	to be Repaired				to be Improved				to be Renewed				to be Installd				Remarks
	G	W	R	O	G	W	R	O	G	W	R	O	G	W	R	O	
/																	
/																	
/																	
/																	
/																	
/																	

REPAIR RECORDS

Date	Repaired				Improved				Renewed				Installed				Cost
	G	W	R	O	G	W	R	O	G	W	R	O	G	W	R	O	
/																	
/																	
/																	
/																	
/																	
/																	

NOTE
G ; Guide Sign R ; Regulatory Sign
W ; Warning Sign O ; Other Sign

TRAFFIC SIGNAL

Route Number ;
Control Section-Subsection ;
Subdivision ;
Chainage (m) ;
Region-Division-District ;
Location Name ;
Type(1;Instst,2;Pdstrn) ;

Signal Control type ;
Cycle Time ;
No. of Phases ;
Installed Date ;

Coded by ;
Date ; /__/__

No. of Signal Faces ;
Poles ;
Flashing Lights ;
Regulatory Signs ;

REPAIR RECORDS

Date	Type of Works	Cost	Remarks
/			
/			
/			
/			
/			
/			

PLAN (Scale = 1/1000)

Signal Type Code(I)
1 ; Fixed Pattern
2 ; Vehicle Actuated
3 ; Multi-Pattern Coordinated
4 ; Vehicle acutuated Coordinated

Repair Work Type Code
1 ; Improvement
2 ; Reinforcing
3 ; Repairing/Rehabilitation
4 ; Adjustment
5 ; Other Works

ROAD LIGHTING

Route Number ;
Control Section-Subsection ;
Subdivision ;
Chainage (m) from ;
to ;
Region-Division-District ;
Length of Section (m) ;
Location (1;Roadway 2;Intsct) ;

Type of Lamp ;
Pole ;
No. of Lamps ;
No. of Poles ;
Height of Pole (m) ;

Electricity Consumption
Lamp (W) ;
Total (KW) ;
Rates per Month (KWH) ;
Average Luminous
Intensity (Lux) ;
Installed Date ;

Coded by ; _____
Date ; ____/____/____

REPAIR RECORDS

Date	Type of Works	Cost	Remarks
/			
/			
/			
/			
/			
/			

Lamp Type Code
1 ; Low-Pressure Sodium (Yellow)
2 ; High-Pressure Sodium (Orenge)
3 ; Mercury Vapor (White)
4 ; Flourescent (White)

Pole Type Code
1 ; Y-Shape Pole
2 ; T-Shape Pole
3 ; Overhanged Pole
4 ; Straight Pole
5 ; Others

Repair Work Code
1 ; Improvement
2 ; Reinforcing
3 ; Circuit Repair
4 ; Circuit Parts Renewal
5 ; Bulb Renewal
6 ; Adjustment
7 ; Other Works

GUARDRAIL/FENCE

Route Number ;
Control Section-Subsection ;
Subdivision ;
Chainage (m) from ;
to ;
Length of Section (m) ;
Region-Division-District ;

Left Center Right
Type of GR / F ;
Length(m) ;
Installed date ;

Coded by ; _____
Date ; ____/____/____

INSPECTION RECORDS

Date	Condition			Repair Work Needed		Remarks
	Left	Center	Right	Type of Works	Estimated Cost	
/						
/						
/						
/						
/						
/						

REPAIR RECORDS

Date	Type of Works	Cost	Remarks
/			
/			
/			
/			
/			
/			

Guardrail / Fence Type Code	Condition Code	Repair Work Type Code
1 ; Guardrail	1 ; Good	1 ; Improvement
2 ; Guard-Pipe	2 ; Good / Fair	2 ; Reinforcing
3 ; Box-Beam Guard Fence	3 ; Fair	3 ; Repairing/Rehabilitation
4 ; Guard-Cable	4 ; Fair / Poor	4 ; Adjustment
5 ; Rigid Guard Fence	5 ; Poor	5 ; Other Works

PEDESTRIAN BRIDGE

Route Number ;
Control Section-Subsection ;
Subdivision ;
Chainage (m) ;
Region-Division-District ;
Bridge Name/Location ;
Type of Bridge ;
Length (m) ;
No. of Spans ;

Effective Width (m) ;
Clearance to Roadway (m)
Vertical ;
Horizontal ;

Completion Date ;
Construction Cost ;
Constructor Name ;
Drawing Number ;

Coded by ;
Date ; ___/___/___

INSPECTION RECORDS

Date	Condition	Repair Work Needed		Remarks
		Type of Works	Estimated Cost	
/				
/				
/				
/				

REPAIR RECORDS

Date	Type of Works	Cost	Remarks
/			
/			
/			
/			

Bridge Type Code	Condition Code	Repair Work Type Code
1 ; Steel	1 ; Good	1 ; Improvement
2 ; Reinforced Concrete	2 ; Good / Fair	2 ; Reinforcing
3 ; Prestressed Concrete	3 ; Fair	3 ; Repairing/Rehabilitation
4 ; Timber	4 ; Fair / Poor	4 ; Painting
5 ; Others	5 ; Poor	5 ; Other Works

ACCESS ROAD

Route Number ;
Control Section-Subsection ;
Subdivision ;
Chainage (m) ;
Left/Right (1;L,2;R) ;
Region-Division-District ;

Permission Number ;
Date ;
Aaplicant Type ;
Name ;

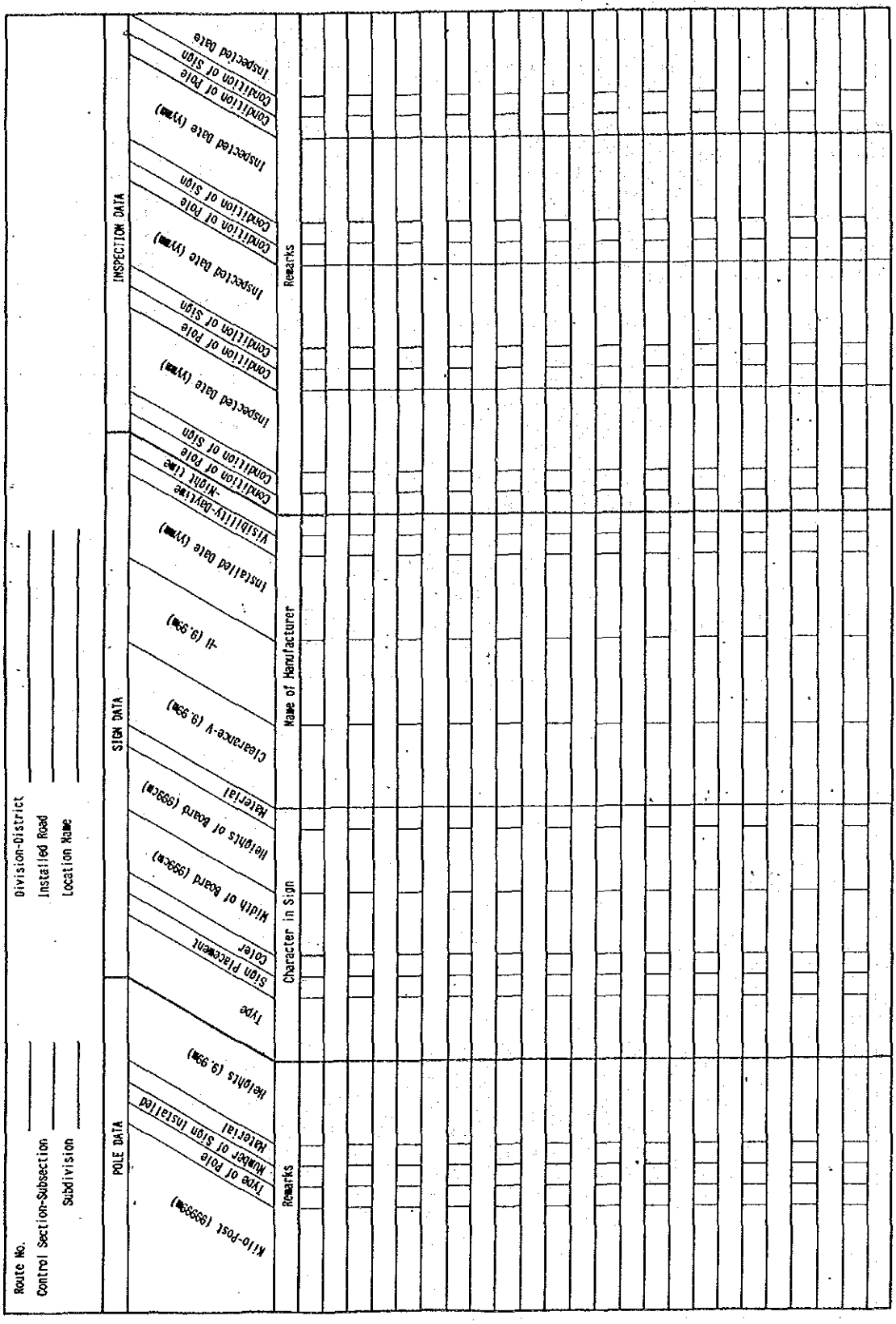
Access Road
Width (m) ;
Length (m) ;
Occupied Area ( ) ;
No. of Lanes ;
Surface Type ;
No.of Vehicles(/Day) ;

Coded by ; _____
Date ; ____/____/____

Applicant Type Code	Condition Code	
1 ; Official Use	1 ; Earth	7 ; Asrhaltic Concrete
2 ; School	2 ; Soil Aggregate	8 ; Concrete
3 ; Hospital	3 ; Single S.T.	
4 ; Private Company	4 ; Double S.T.	
5 ; Shop	5 ; Under STD Penetration Macadam	
6 ; Others	6 ; Penetration Macadam	

PLAN (Scale = 1/1000)

Traffic Sign Inventory Form



Road Lighting Inventory Form

Route No. _____ Division-District _____

Control Section-Subsection _____

Subdivision _____ Chainage from (m) _____

to (m) _____ Location Name _____

Type of Location _____

POLE DATA		LAMP DATA		ELECTRICITY	
Type of Pole		Type Lamp		Type of Switch Board	
Heights (9.99m)		No. of Lamp		Type of Branching	
No. of Pole		Type of Regulator		Type of Main Switch	
Installed Location		Type of Switch		Type of Sub-Switch	
Type of Paint		Luminous Intensity	(lux)	Rates per Month	(kwh)
Paint Area (m²)		Consumption per Lamp	(w)	Type of Contract	
Maker Name		Maker Name		Contract Number	
Installed Date	(yymm)	Remarks		Remarks	
Remarks					

SIDE ELEVATION

PLAN

REPAIR DATA

Repair Date	Type of Works	Repair Costs	Cause of Repair

Appendix 7.13 Database File for Control Section (1/2)

	Field	Type	Digits	Remarks
	(Key Identifiers)			
1	Route Number	N	4	*
2	Control Section-Subsection	N	4	*
3	Subdivision	N	3	New item to subdivide CSS
	(Attributive Data)			
4	Chainage-Start	N	5	* (m)
5	End	N	5	* (m)
6	Route Name	X	15	*
7	Section Length	N	5	* Length for subdivided section
8	Resion-Division-District	C	3	* Same code as existing RDB
9	Administrative Region	C	1	* do.
10	Changwat	C	2	* do.
11	Connecting Link from	N	7	CSS+Subdivision toward start
12	to	N	7	CSS+Subdivision toward end
13	Coodinate of Start-X	N	7	* (m)
14	-Y	N	7	* (m)
15	End -X	N	7	* (m)
16	-Y	N	7	* (m)
17	Road Functional Class	C	2	* Same code as existing RDB
18	Type of Road Cross Section	C	1	
19	Length of Flat Terrain	N	5	* (m)
20	Rolling Terrain	N	5	* (m)
21	Mountainous Terrain	N	5	* (m)
22	Length of Urbanized Area	N	5	** (m)
23	Urbanizing Area	N	5	** (m)
24	Agricultural Area	N	5	** (m)
25	Mountainous Area	N	5	** (m)
26	Minimum Horizontal Curvature	N	5	** (m)
27	Total Horizontal Curve Length	N	5	** (m) Total length of R<100m
28	Maximum Vertical Gradient	N	3	** max. 9.9%
29	Total Vertical Gradient Length	N	5	** (m) Total length of G>3%
30	No. of Bridges in Link	N	3	
31	Pedestrian Bridge	N	3	
32	At-grade Railway Crossing	N	3	
33	Graded Railway Crossing	N	3	
34	No. of Lanes -Left	N	2	**
35	-Right	N	2	**
36	-Total	N	2	**

(Continued)

Appendix 7.13 Otabase File for Control Section (2/2)

	Field	Type	Digits	Remarks
37	Type of Carriage Way -L	C	1	**
38	-R	C	1	**
39	Width of Carriage Way -L	N	4	** max. 99.9m
40	-R	N	4	** max. 99.9m
41	-T	N	5	** max. 999.9m
42	Type of Passing Lane -L	C	1	
43	-R	C	1	
44	Width of Passing Lane -L	N	4	max. 99.9m
45	-R	N	4	max. 99.9m
46	Type of Motercycle Lane -L	N	1	
47	-R	N	1	
48	Width of Motercycle Lane -L	N	4	max. 99.9m
49	-R	N	4	max. 99.9m
50	Type of Shoulder -L	N	1	**
51	-R	N	1	**
52	Width of Shoulder -L	N	4	** max. 99.9m
53	-R	N	4	** max. 99.9m
54	Type of Side Walk -L	N	1	
55	-R	N	1	
56	Width of Side Walk -L	N	4	max. 99.9m
57	-R	N	4	max. 99.9m
58	Right of Way -L	N	4	* max. 99.9m
59	-R	N	4	* max. 99.9m
60	-T	N	5	* max. 999.9m
61	Type of Median	N	1	**
62	Width of Median	N	4	** max. 99.9m

(Total 236 Bytes)

Note N ; Numerical Value
X ; Character
C ; Code
* ; Same item as that of RDB
** ; Same but improved item of RDB
RDB; Road Database existed.

Appendix 7.14 Database File for Intersection

	Field	Type	Digits	Remarks
	(Key Identifiers)			
1	Route Number	N	4	*
2	Control Section-Subsection	N	4	*
3	Subdivision	N	3	New item to subdivide CSS
4	Chainage	N	5	* (m)
	(Attributive Data)			
5	Region-Division-District	C	3	* Same code as existing RDB
6	Name of Intersection	X	20	
7	Type of Intersection (I)	C	1	
8	(II)	C	1	
9	No. of Intersection Legs	N	1	
10	Type of Traffic Control	C	1	**
11	Intersecting Road -Name	X	20	
12	-Chainage	N	5	*
13	-Road Class	C	1	*
14	-Administrator	X	10	
15	Existence of Island	C	1	
16	Pedestrian Crossing	C	1	
17	Lighting	C	1	
18	No. of Guide Signs	N	3	
19	Warning Signs	N	3	
20	Regulatory Signs	N	3	
21	Other Signs	N	3	
	No. of Lanes of DOH Road			
22	Inflow(S) -Straight/Left Turn	N	2	
23	-Right Turn	N	2	
24	Outflow(S)	N	2	
25	Outflow(E)	N	2	
	No. of Lanes of Intersectng Road			
26	Inflow(S) -Straight/Left Turn	N	2	
27	-Right Turn	N	2	
28	Outflow(S)	N	2	
39	Outflow(E)	N	2	

(Total 110 Bytes)

Note N ; Numerical Value
X ; Character
C ; Code
* ; Same item as that of RDB
** ; Same but improved item of RDB
RDB; Road Database existed.

Appendix 7.15 Database File for Traffic Volume

	Field	Type	Digits	Remarks
	(Key Identifiers)			
1	Route Number	N	4	*
2	COntrol Section-Subsection	N	4	*
3	Subdivision	N	3	New item to subdivide CSS
4	Chainage	N	5	*
5	Surveyed Date	N	6	** yymmdd
	(Attributive Data)			
6	Region-Division-District	C	3	* Same code as existing RDB
7	Survey Spot Number	X	6	
8	Survey Hours	N	2	12 or 24 hours
9	No. of Pedestrian	N	5	
10	Peak Hour Factor	N	2	
11	Ratio of Direction	N	2	
12	Day Time Travel Hours	N	3	During control section
13	Ratio of Daytime/Daily Traffic	N	3	
	No. of Vehicles			
14	Bi/Tri Cycle	N	5	
15	Motercycle	N	5	
16	Passenger Car	N	5	
17	Light Bus	N	5	
18	Light Truck	N	5	
19	Heavy Bus	N	5	
20	Medium Truck	N	5	
21	Heavy Truck	N	5	
22	Total	N	5	
	Peak Hour Traffic			
23	Bi/Tri Cycle	N	5	
24	Motercycle	N	5	
25	Passenger Car	N	5	
26	Light Bus	N	5	
27	Light Truck	N	5	
28	Heavy Bus	N	5	
29	Medium Truck	N	5	
30	Heavy Truck	N	5	
31	Total	N	5	

(Total 138 Bytes)

Note N ; Numerical Value
X ; Character
C ; Code
* ; Same item as that of RDB
RDB; Road Database existed.

Appendix 7.16 Database File for Traffic Accident

	Field	Type	Digits	Remarks
	(Key Identifiers)			
1	Route Number	N	4	*
2	Control Section-Subsection	N	4	*
3	Subidvision	N	3	New item to subdivide CSS
4	Chainage	N	5	* (m)
5	Date of Accident	N	6	** yymmdd
	(Attributive Data)			
6	Region-Division-District	C	3	* Same code as existing RDB
7	Day of Week	C	1	
8	Time in 24 Hour	N	2	
9	Location	C	1	
10	Type of Highway	C	1	
11	Alignment-Horizontal	C	1	
12	-Vertical	C	1	
13	Surface Type	C	1	
14	Width-Pavement	N	5	
15	Surface	N	5	
16	Visibility	C	1	
17	Accident Type Code	C	1	
18	Collision Diagram	C	2	
19	Vehicle Type (1)	C	1	
20	(2)	C	1	
21	(3)	C	1	
22	Cause	C	1	
23	Damage-DOH Property Type	C	1	
24	in Baht	N	5	Thousand baht
25	-Private in Baht	N	5	do.
26	No. of Vehicles Involved	N	3	
27	No. of Injulies	N	3	
28	No. of Fatalities	N	3	
29	Data Source Code	C	1	

(Total 72 Bytes)

Note N ; Numerical Value
X ; Character
C ; Code
* ; Same item as that of RDB
** ; Same but improved item of RDB
RDB; Road Database existed.

Appendix 7.17 Database File for Traffic Sign (1/2)

	Field	Type	Digits	Remarks
	(Key Identifiers)			
1	Route Number	N	4	*
2	Control Section-Subsection	N	4	*
3	Subdivision	N	3	New item to subdivide CSS
4	Chainage from	N	5	* (m)
5	to		5	* (m)
	(Attributive Data)			
6	Length of Section	N	5	(m)
7	Region -Division-District	C	3	* Same code as existing RDB
8	Location	C	1	
9	No. of Guide Signs	N	4	
10	Warning Signs	N	4	
11	Regulatory Signs	N	4	
12	Other Signs	N	4	
13	Signs in Total	N	4	
	Latest Inspection Records			
14	Inspected Date	N	4	yymm
	<No. of Signs to be Repaired>			
15	Guide Signs	N	3	
16	Warning Signs	N	3	
17	Regulatory Signs	N	3	
18	Other Signs	N	3	
	<No. of Signs to be Improved>			
19	Guide Signs	N	3	
20	Warning Signs	N	3	
21	Regulatory Signs	N	3	
22	Other Signs	N	3	
	<No. of Signs to be Renewed>			
23	Guide Signs	N	3	
24	Warning Signs	N	3	
25	Regulatory Signs	N	3	
26	Other Signs	N	3	
	<No. of Signs to be Installed>			
27	Guide Signs	N	3	
28	Warning Signs	N	3	
29	Regulatory Signs	N	3	
30	Other Signs	N	3	

(Continued)

Appendix 7.17 Database File for Traffic Sign (2/2)

	Field	Type	Digits	Remarks
	Latest Repair Records			
31	Repaired Date	N	4	yymm
	<No. of Repaired Signs>			
32	Guide Signs	N	3	
33	Warning Signs	N	3	
34	Regulatory Signs	N	3	
35	Other Signs	N	3	
	<No. of Improved Signs >			
36	Guide Signs	N	3	
37	Warning Signs	N	3	
38	Regulatory Signs	N	3	
39	Other Signs	N	3	
	<No. of Renewed Signs>			
40	Guide Signs	N	3	
41	Warning Signs	N	3	
42	Regulatory Signs	N	3	
43	Other Signs	N	3	
	<No. of Installed Signs>			
44	Guide Signs	N	3	
45	Warning Signs	N	3	
46	Regulatory Signs	N	3	
47	Other Signs	N	3	

(Total 150 Bytes)

Note N ; Numerical Value
X ; Character
C ; Code
* ; Same item as that of RDB
** ; Same but improved item of RDB
RDB; Road Database existed.

Appendix 7.18 Database File for Traffic Signal

	Field	Type	Digits	Remarks
	(Key Identifiers)			
1	Route Number	N	4	*
2	Control Section-Subsection	N	4	*
3	Subdivision	N	3	New item to subdivide CSS
4	Chainage	N	5	*
	(Attributive Data)			
5	Region-Division-District	C	3	* Same code as existing RDB
6	Location Name	X	12	
7	Type	C	1	
8	Signal Control Type	C	1	
9	Cycle Time	N	3	
10	No. of Phases	N	2	
11	Installed Date	N	4	yymm
12	No. of Signal Faces	N	2	
13	Poles	N	2	
14	Flashing Lights	N	2	
15	Regulatory Signs	N	2	
	<Latest Repair Record>			
16	Repaired Date	N	4	yymm
17	Type of Works	C	1	
18	Costs in Baht	N	5	Thousand baht

(Total 60 Bytes)

Note N ; Numerical Value
X ; Character
C ; Code
* ; Same item as that of RDB
** ; Same but improved item of RDB
RDB; Road Database existed.

Appendix 7.19 Database File for Road Lighting

	Field	Type	Digits	Remarks
	(Key Identifiers)			
1	Route Number	N	4	*
2	Control Section-Subsection	N	4	*
3	Subdivision	N	3	New item to subdivide CSS
4	Chainage from	N	5	
5	to	N	5	
	(Attributive Data)			
6	Region-Division-District	N	3	* Same code as existing RDB
7	Length of Section	N	5	Installed length (m)
8	Location	C	1	
9	Type of Lamp	C	1	
10	Pole	C	1	
11	No. of Lamps	N	4	
12	Poles	N	4	
13	Height of Pole	N	5	99.99 (m)
	<Electricity Consumption>			
14	Per One Lamp	N	4	(w)
15	Total	N	4	(kw)
16	Rates per Month	N	4	(kwh)
17	Average Luminous Intensity	N	3	(lux)
18	Installed Date	N	4	yymm
	<Latest Repair Record>			
19	Repaired Date	N	4	yymm
20	Type of Repair Works	C	1	
21	Costs	N	5	Thousand baht

(Total 74 Bytes)

Note N ; Numerical Value
X ; Character
C ; Code
* ; Same item as that of RDB
** ; Same but improved item of RDB
RDB; Road Database existed.

Appendix 7.20 Database File for Guardrail/Fence

	Field	Type	Digits	Remarks
	(Key Identifiers)			
1	Route Number	N	4	*
2	Control Section-Subsection	N	4	*
3	Subdivision	N	3	New item to subdivideCSS
4	Chainage from	N	5	(m)
5	to	N	5	(m)
	(Attributive Data)			
6	Length of Section	N	5	(m)
7	Region-Division-District	C	3	* Same code as existing RDB
8	Type of GR/F - Left	C	1	
9	- Center	C	1	
10	- Right	C	1	
11	Length of GR/F - Left	N	4	(m)
12	- Center	N	4	(m)
13	- Right	N	4	(m)
14	Installed Date	N	4	yymm
	<Latest Inspection Record>			
15	Inspected Date	N	4	yymm
16	Condition of GR/F - Left	C	1	
17	- Center	C	1	
18	- Right	C	1	
19	Type of Repair Works Needed	C	1	
20	Estimated Costs	N	5	Thousand baht
	<Latest Repair Record>			
21	Repaired Date	N	4	yymm
22	Type of Repair Works	C	1	
23	Costs	N	5	Thousand baht

(Total 71 Bytes)

Note N ; Numerical Value
X ; Character
C ; Code
* ; Same item as that of RDB
** ; Same but improved item of RDB
RDB; Road Database existed.

Appendix 7.21 Database File for Pedestrian Bridge

	Field	Type	Digits	Remarks
	(Key Identifiers)			
1	Route Number	N	4	*
2	Control Section-Subsection	N	4	*
3	Subdivision	N	3	New item to subdivideCSS
4	Chainage	N	5	(m)
	(Attributive Data)			
5	Region-Divigion-District	C	3	* Same code as existing RDB
6	Bridge Name/Location	X	20	
7	Type of Bridge	C	1	
8	Length	N	6	999.99(m)
9	No. of Spans	N	2	
10	Effective Width	N	5	99.99(m)
11	Vertical Clearance to Roadway	N	5	99.99(m)
12	Horizontal Clearance to Roadway	N	5	99.99(m)
13	Completion Date	N	4	yymm
14	Construction Costs	N	5	Thousand baht
15	Constructer Name	X	12	
16	Drawing Number	X	12	
	<Latest Inspection Record>			
17	Inspected Date	N	4	yymm
18	Type of Repair Works Needed	C	1	
19	Estimated Repair Costs	N	5	Thousand baht
	<Latest Repair Record>			
20	Repaired Date	N	4	yymm
21	Type of Repair Works	C	1	
22	Repair Costs	N	5	Thousand baht

(Total 116 Bytes)

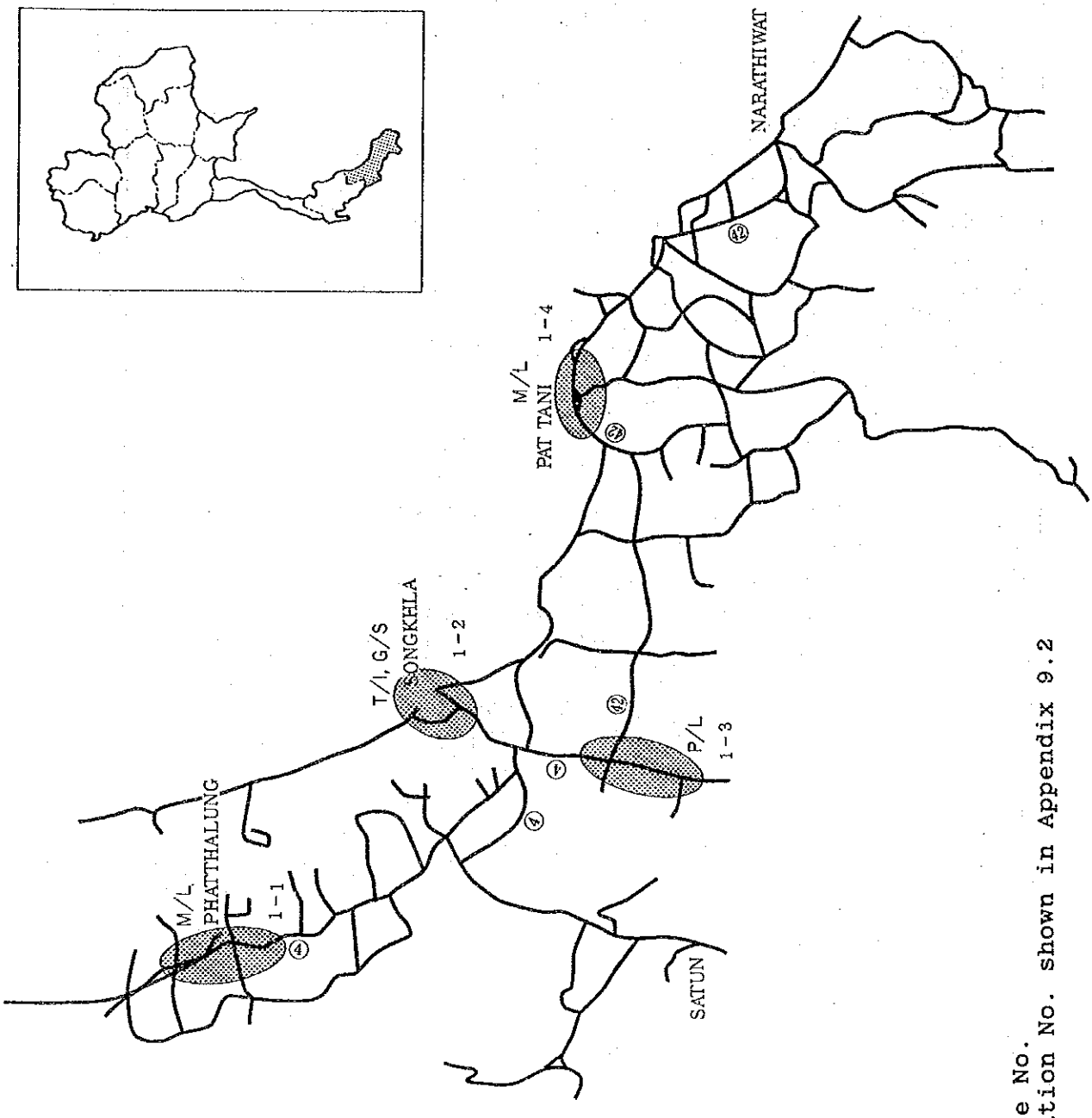
Note N ; Numerical Value
X ; Character
C ; Code
* ; Same item as that of RDB
** ; Same but improved item of RDB
RDB; Road Database existed.

Appendix 7.22 Database File for Access Road

	Field	Type	Digits	Remarks
	(Key Identifiers)			
1	Route Number	N	4	*
2	Control Section-Subsection	N	4	*
3	Subdivision	N	3	New item to subdivide CSS
4	Chainage	N	5	(m)
5	Left/Right	C	1	1;Left, 2;Right
	(Attributive Data)			
6	Region-Division-District	C	3	* Same code asexisting RDB
7	Permission Number	X	10	
8	Permitted Date	N	6	yymmdd
9	Applicant Type	C	1	
10	Name	X	12	
11	Access Road - Width	N	5	999.9(m)
12	- Length	N	5	999.9(m)
13	- Occupied Area	N	5	99999(m^2)
14	- No. of Lanes	N	2	
15	- Surface Type	C	1	
16	- No. of Vehicles	N	4	per Day

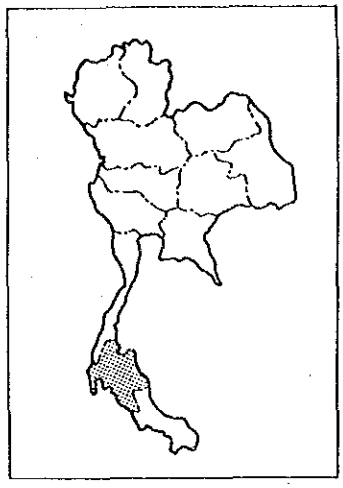
(Total 71 Bytes)

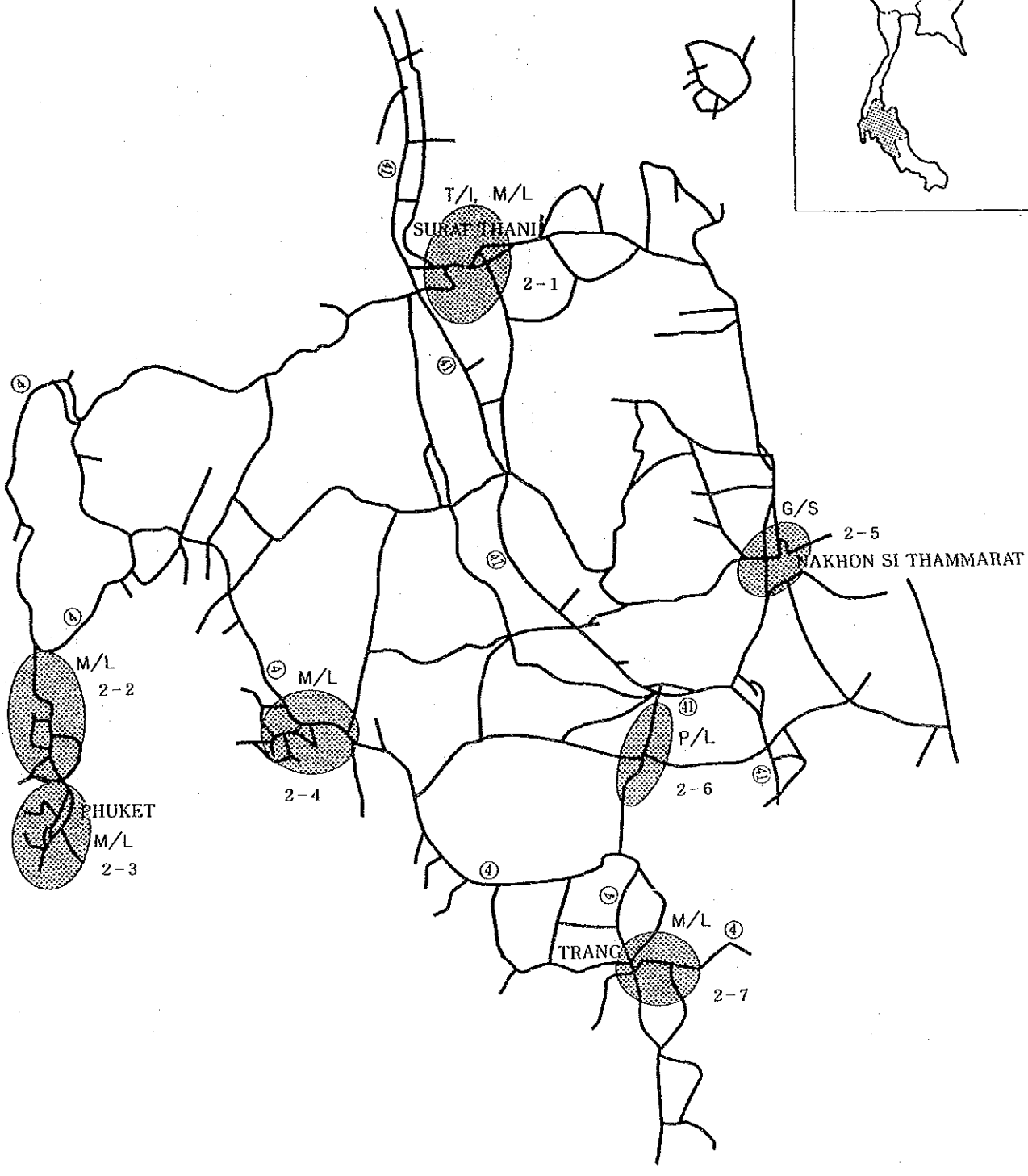
Note N ; Numerical Value
X ; Character
C ; Code
* ; Same item as that of RDB
** ; Same but improved item of RDB
RDB; Road Database existed.



Legend
④ : Route No.
1-1 : Location No. shown in Appendix 9.2

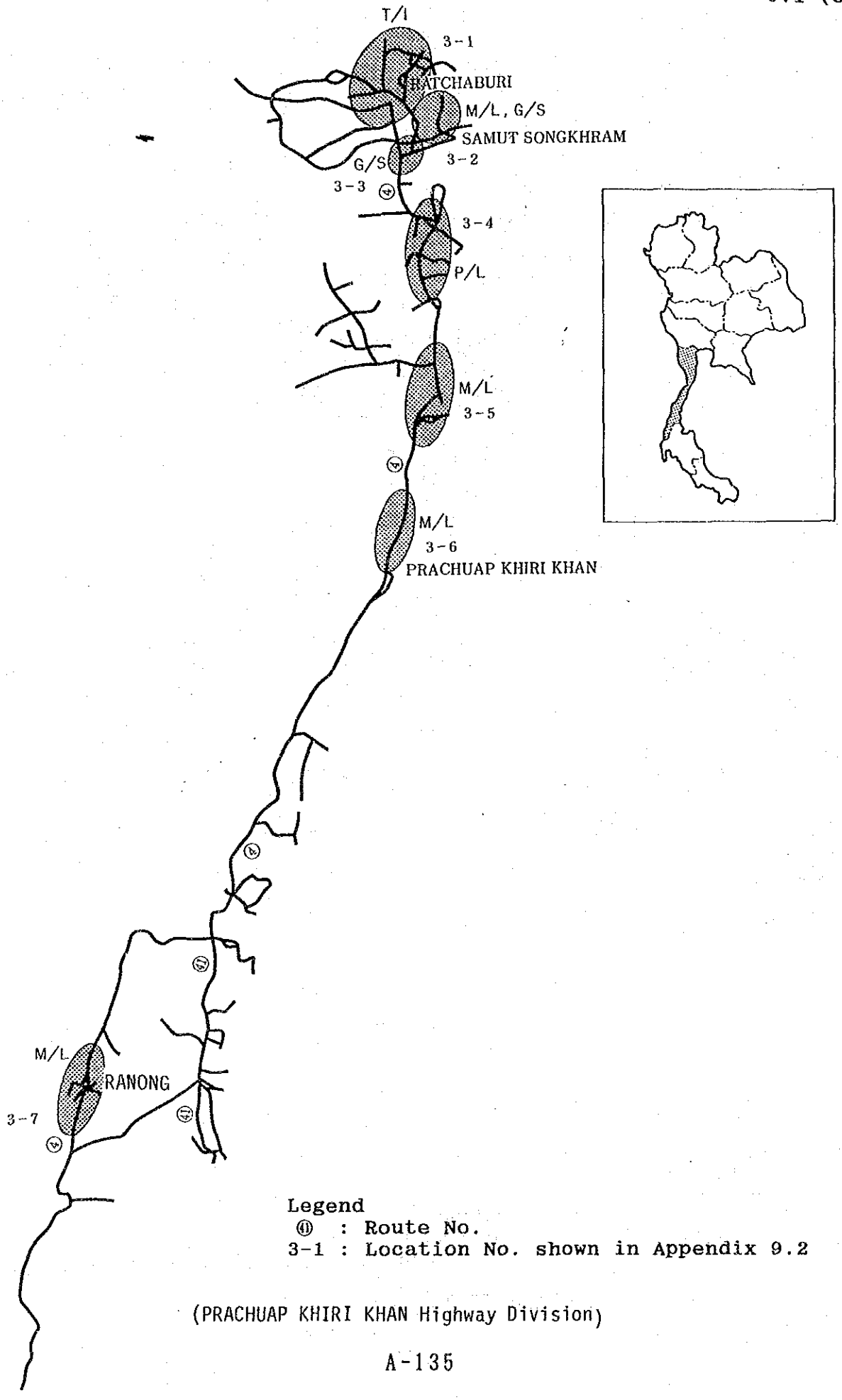
(SONGKHLA Highway Division)





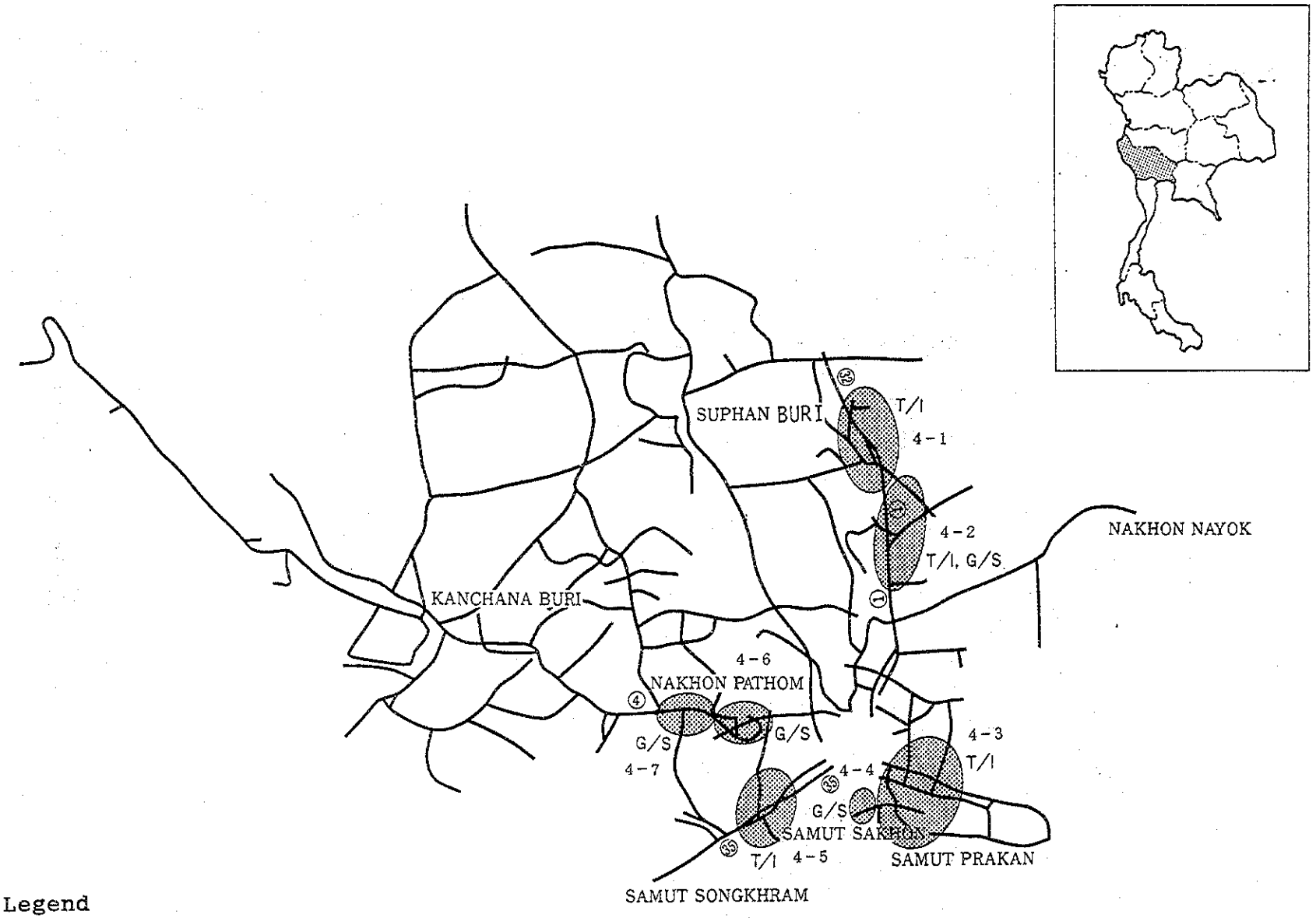
Legend
④ : Route No.
2-1 : Location No. shown in Appendix 9.2

(NAKHON SI THAMMARAT Highway Division)



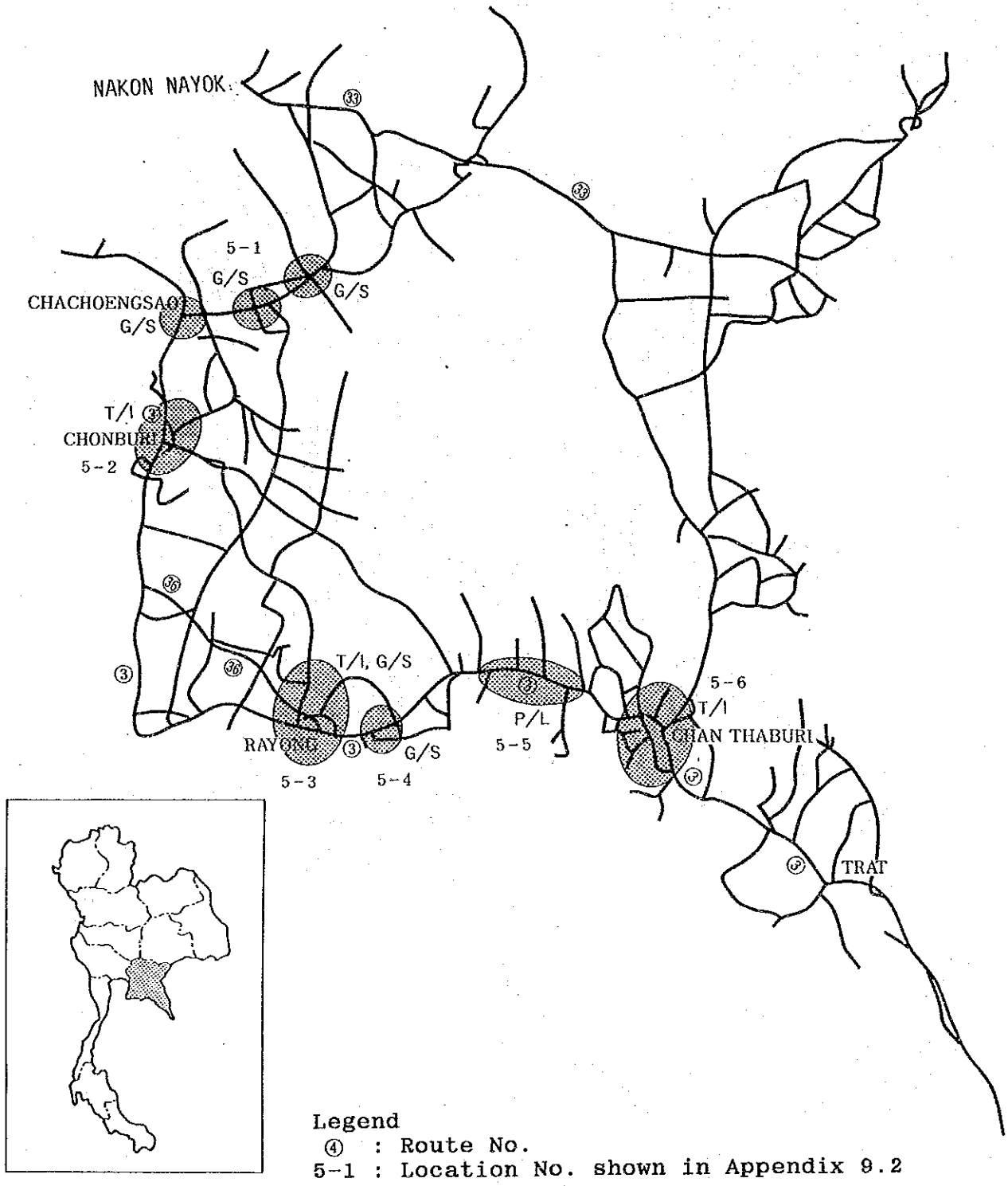
Legend
④ : Route No.
3-1 : Location No. shown in Appendix 9.2

(PRACHUAP KHIRI KHAN Highway Division)



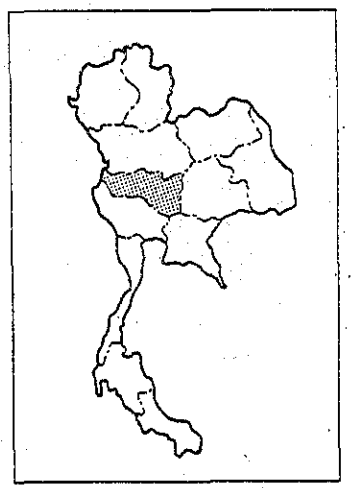
Legend
④ : Route No.
4-1 : Location No. shown in Appendix 9.2

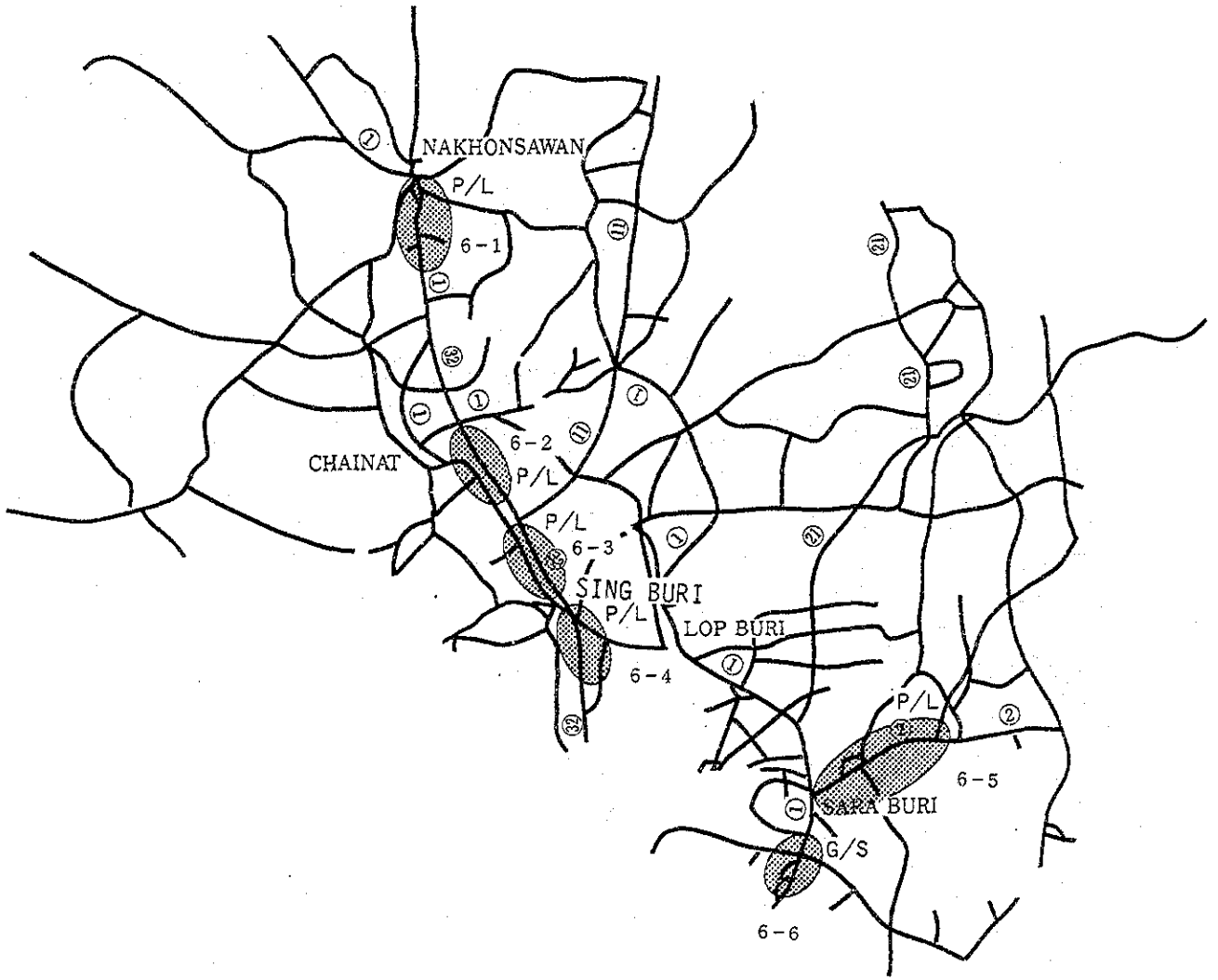
(BANGKOK Highway Division)



Legend
④ : Route No.
5-1 : Location No. shown in Appendix 9.2

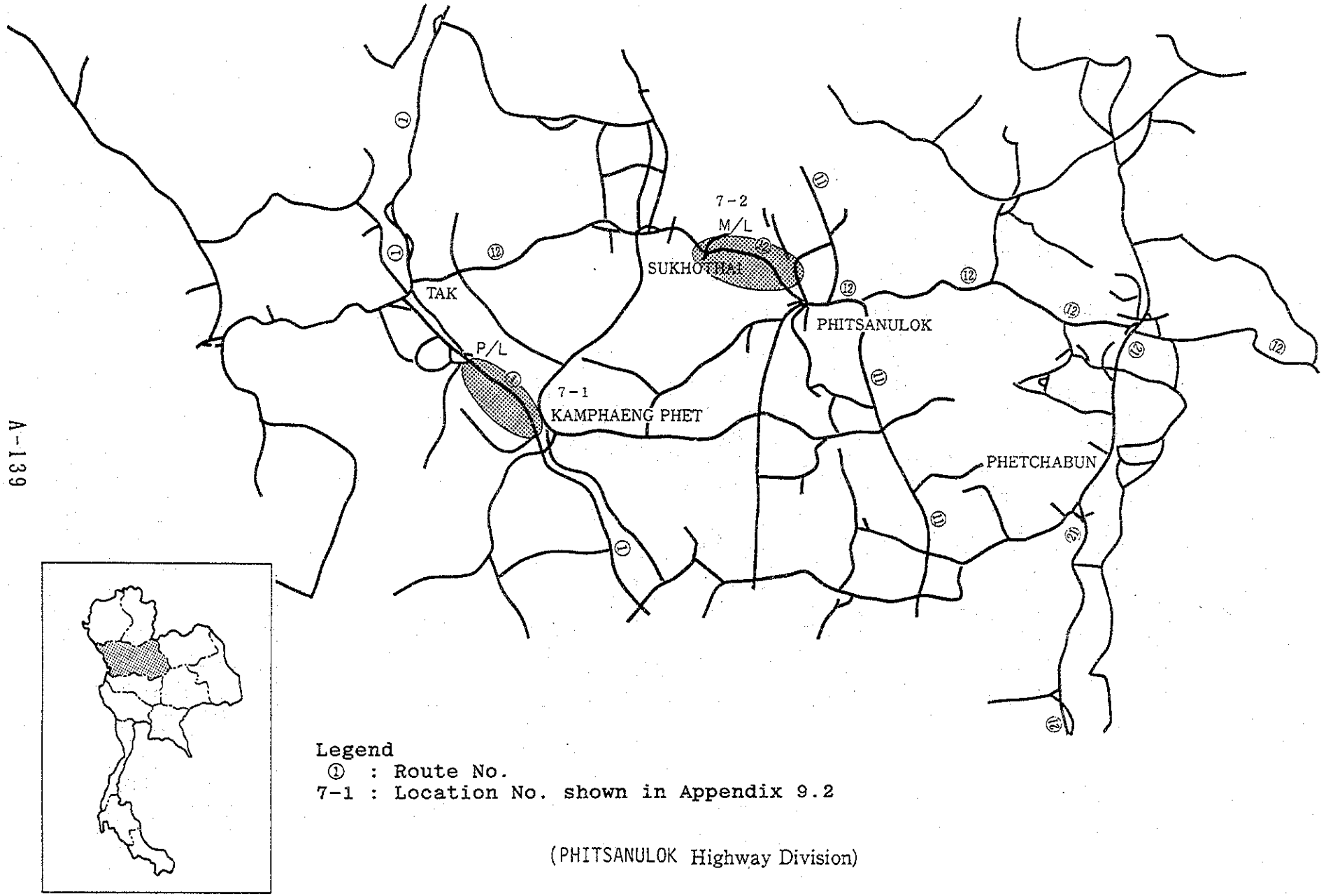
(CHACHOENGSAO Highway Division)





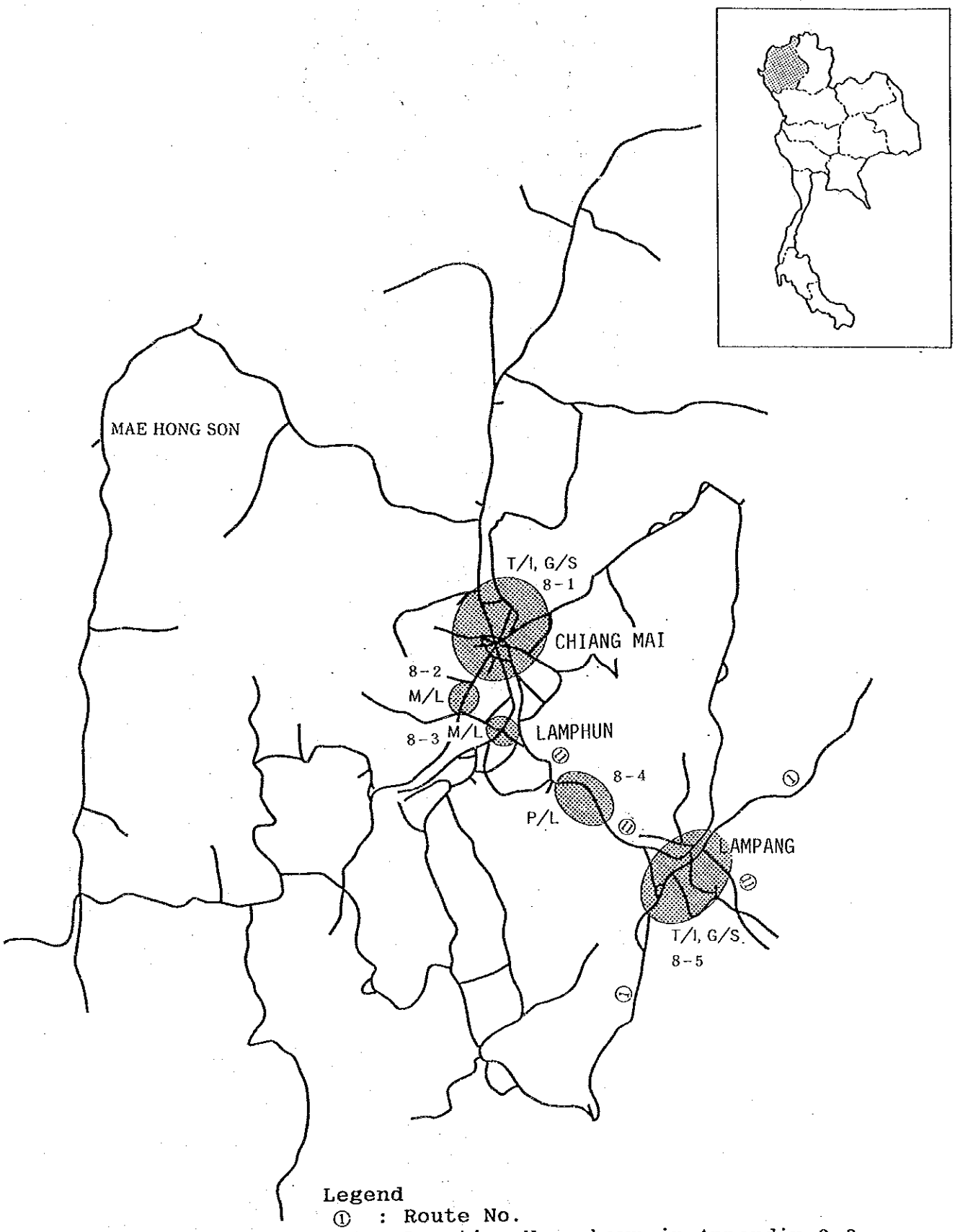
Legend
① : Route No.
6-1 : Location No. shown in Appendix 9.2

(LOP BURI Highway Division)



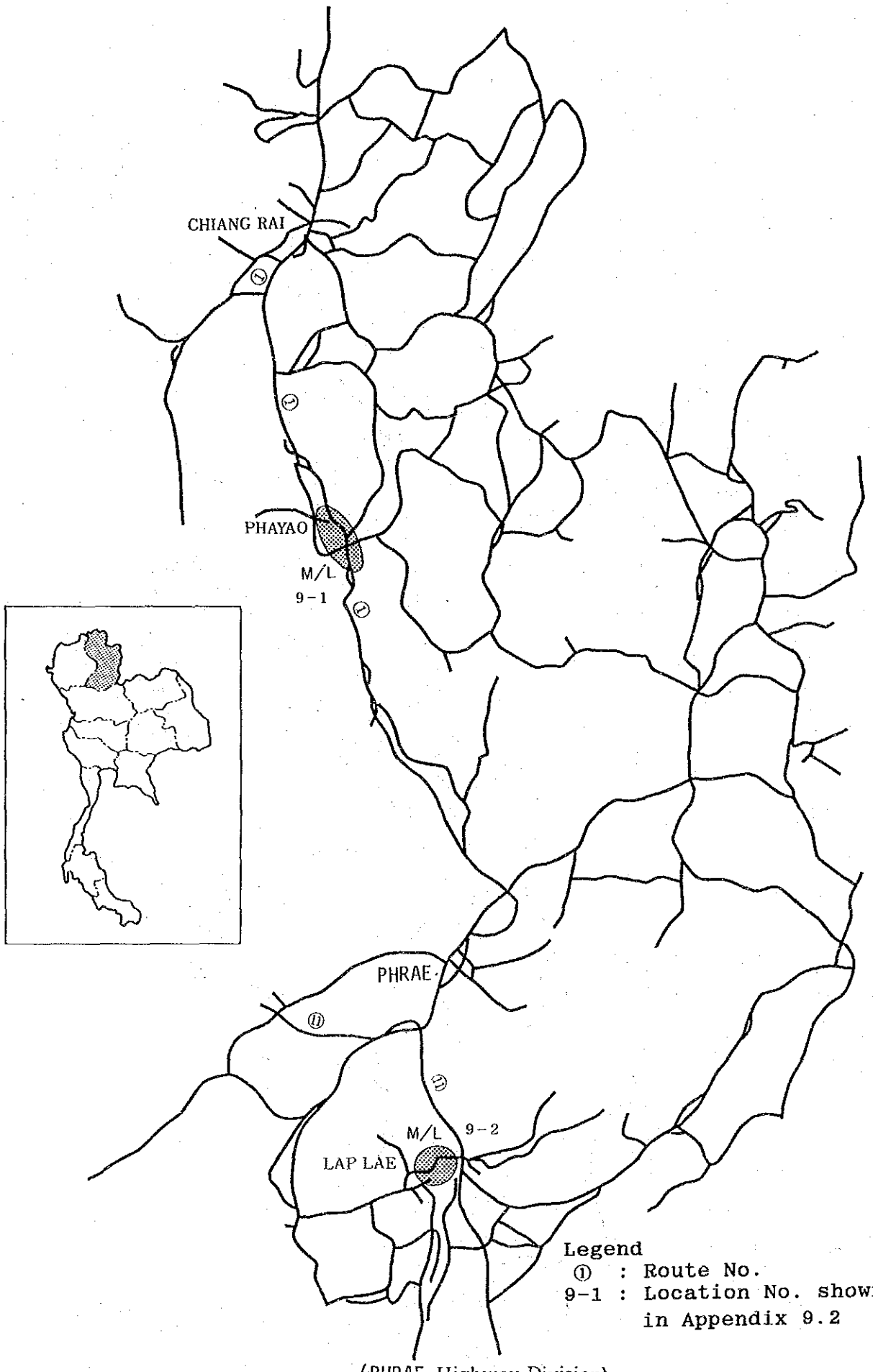
Legend
① : Route No.
7-1 : Location No. shown in Appendix 9.2

(PHITSANULOK Highway Division)

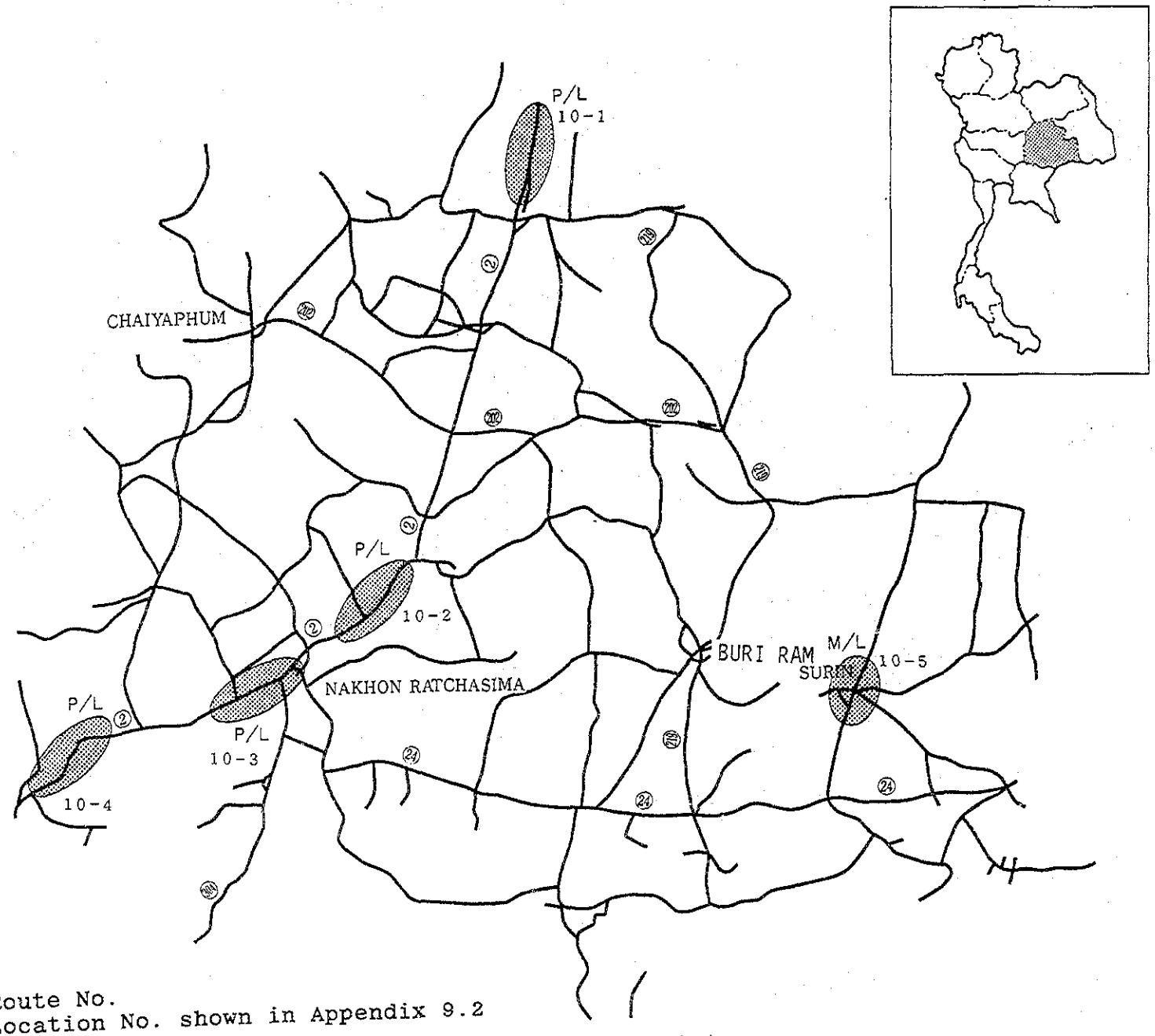


Legend
① : Route No.
8-1 : Location No. shown in Appendix 9.2

(CHIANG MAI Highway Division)

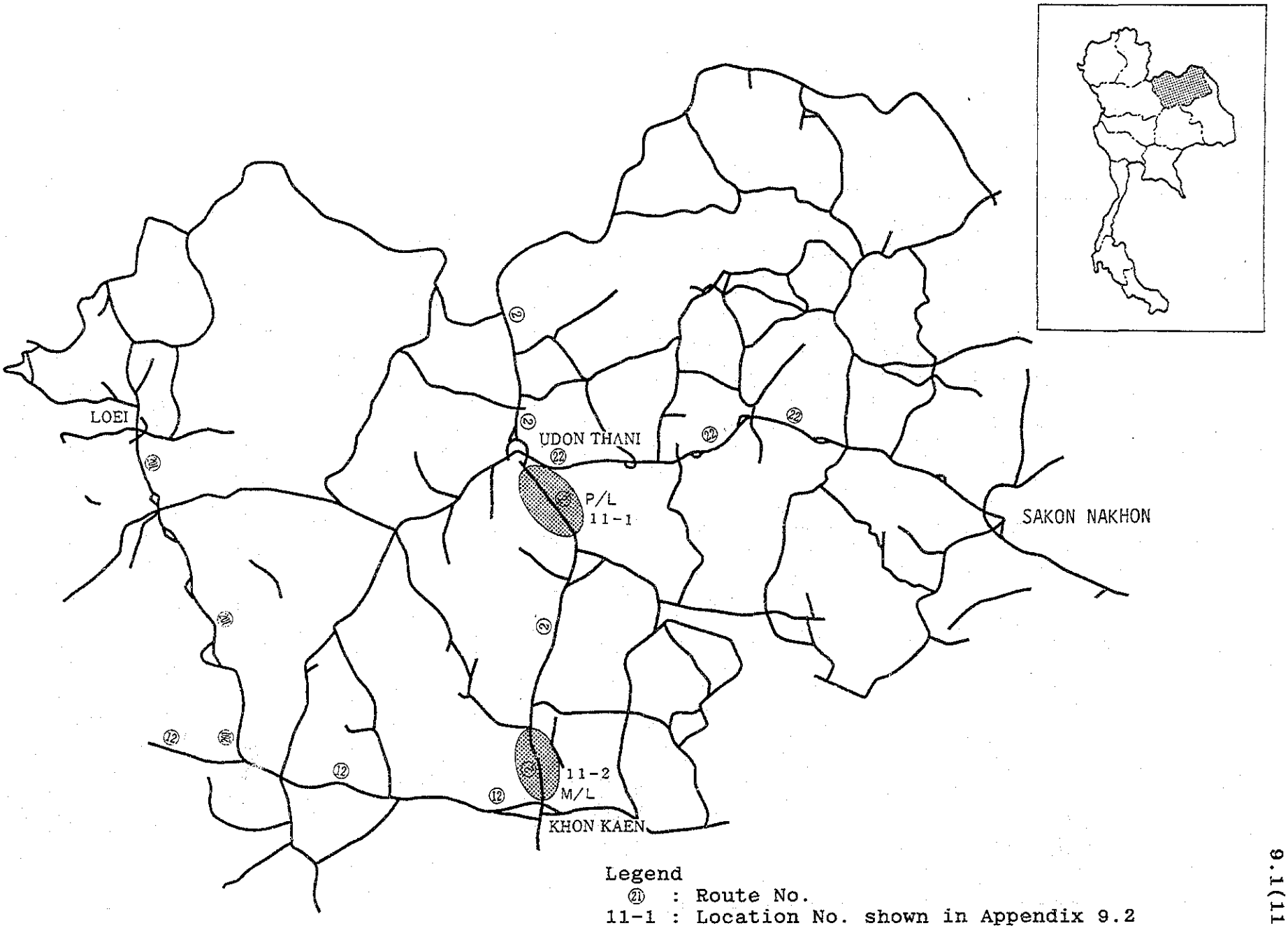


(PHRAE Highway Division)

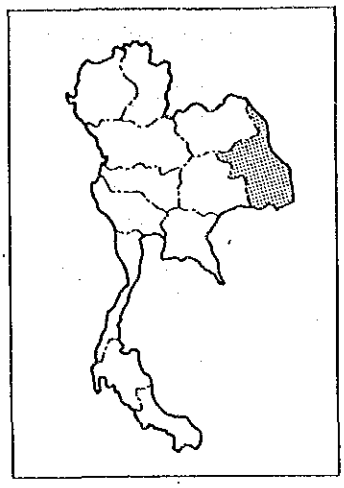


Legend
② : Route No.
10-1 : Location No. shown in Appendix 9.2

(NAKHON RATCHASIMA Highway Division)



(KHON KAEN Highway Division)



Legend
㉑ : Route No.
12-1 : Location No. shown in Appendix 9.2

(UBON RATCHATHANI Highway Division)

Type of Media Motorcycle Lane								
No.	Location No.	Route No.	Control Section No.	No. of Lane	Traffic Volume (PCU)	Motor-cycle Ratio		Remarks
1	1－1	41	1,100	2	2,384	0.224		
2	1－4	42	400	2	3,365	0.395		
3	2－1	401	601	2	13,100	0.228		
4	2－2	402	201	2	7,603	0.475		
5	2－3	4,021	100	2	4,914	0.601		
6	2－4	4	3,400	2	3,172	0.481		
7	2－7	4	3,800	2	2,365	0.471		
8	3－2	335	100	2	4,943	0.373		
9	3－5	4	900	2	8,914	0.198		
10	3－6	4	1,100	2	11,603	0.295		
11	3－7	4,080	1,003	2	7,748	0.500		
12	7－2	12	400	2	2,169	0.210		
13	8－3	108	100	2	10,783	0.462		
14	8－4	114	100	2	4,730	0.469		
15	9－2	1	2,801	2	14,710	0.367		
16	9－3	1,045	101	2	1,606	0.481		
17	10－5	214	801	2	2,635	0.256		
18	11－2	2	1,000	2	19,050	0.377		
19	12－1	208	200	2	2,369	0.374		
20	12－2	212	1700	2	21,697	0.308		
Total					149,860			

Type of Media	Passing Lane							
No.	Location No.	Route No.	Control Section No.	No. of Lane	Traffic Volume (PCU)	Heavy Vehicle Ratio		Remarks
1	1－3	4	4,400	2	6,584	0.090		
2	3－4	4	700	2	12,468	0.157		
3	5－5	3	1,000	2	7,310	0.145		
4	6－1	1	1,101	2	11,691	0.178		
5	6－2	32	700	2	8,902	0.259		
6	6－3	32	700	2	8,902	0.259		
7	6－4	32	602	2	14,404	0.129		
8	6－5	2	101	2	13,811	0.302		
9	7－1	1	1,600	2	4,077	0.139		
10	8－5	11	1,400	2	6,278	0.113		
11	10－1	2	902	2	10,152	0.191		
13	10－2	2	502	2	6,906	0.159		
13	10－3	2	402	2	14,101	0.455		
14	10－4	2	302	2	15,088	0.498		
15	11－1	2	1,201	2	6,028	0.223		
Total					146,702			

Type of Media	Traffic Information System							
No.	Location No.	Route No.	Control Section No.	No. of Lane	Traffic Volume (PCU)	Motor-cycle Ratio	Heavy Vehicle Ratio	Remarks
1	1－2	407	100	2	10,419	0.169	0.066	SONGKHLA
2	2－1	401	601	2	13,100	0.228	0.112	SURATTHAAI
3	3－1	3,291	100	2	8,099	0.244	0.256	KATLHABURI
4	4－1	32	500	2	12,626	0.059	0.275	BANGKOK
5	4－2	1	301	4	35,421	0.060	0.422	BANGKOK
6	4－3	34	100	4	39,883	0.000	0.235	BANGKOK
7	4－5	35	100	4	17,673	0.099	0.095	BANGKOK
8	5－2	3	403	2	10,865	0.069	0.495	CHONBURI
9	5－3	3	800	2	10,755	0.332	0.052	RAYONG
10	5－6	3	1,200	2	7,708	0.180	0.060	CHANTHABURI
11	8－2	11	1,600	2	8,568	0.304	0.094	CHIANGMAI
12	8－6	1	2,203	2	7,884	0.290	0.066	LAMPANG
Total					183,001			

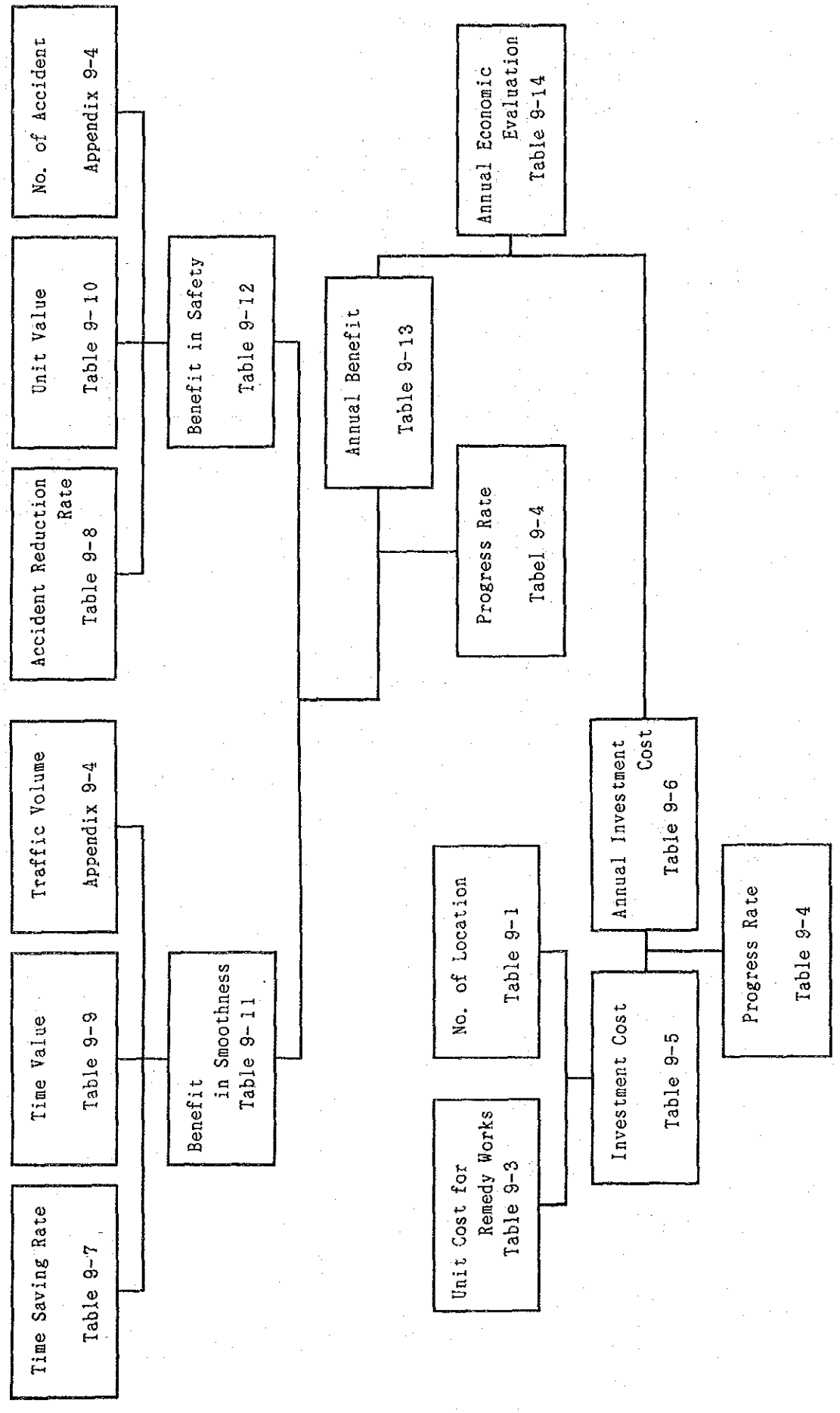
Type of Media	Grades Separation of Intersection							
No.	Location No.	Route No.	Control Section No.	No. of Lane	Traffic Volume (PCU)	Motor-cycle Ratio	Heavy Vehicle Ratio	Remarks
1	1－2	407	100	2	10,419	0.169	0.066	
2	2－5	4,011	1,003	2	8,142	0.425	0.052	
3	3－2	335	100	2	4,943	0.373	0.071	
4	3－3	4	601	2	12,969	0.100	0.227	
5	4－2	1	301	4	35,421	0.060	0.227	①
6	4－2	1	301	4	35,421	0.060	0.422	②
7	4－4	303	100	4	19,510	0.172	0.134	
8	4－6	4	3,000	2	2,808	0.361	0.145	
9	4－7	4	3,101	2	3,065	0.334	0.160	
10	5－1	304	300	2	9,196	0.129	0.187	①
11	5－1	304	300	2	9,196	0.129	0.187	②
12	5－1	304	300	2	9,196	0.129	0.187	③
13	5－3	3	800	2	10,755	0.332	0.052	①
14	5－3	3	800	2	10,755	0.332	0.052	②
15	5－4	3	900	2	4,678	0.241	0.084	
16	6－6	1	302	4	27,069	0.108	0.368	
17	8－1	1,001	101	2	7,512	0.402	0.062	
Total					221,055			

Type of Media	Motrecycle Lane							
No.	Location No.	Route No.	Control Section No.	No. of Fatality	No. of Injury			Remarks
1	1－1	41	1,100	—	—			
2	1－4	42	400	—	—			
3	2－1	401	601	—	—			
4	2－2	402	201	2	13			
5	2－3	4,021	100	—	—			
6	2－4	4	3,400	1	5			
7	2－7	4	3,800	1	5			
8	3－2	335	100	—	—			
9	3－5	4	900	1	6			
10	3－6	4	1,100	2	7			
11	3－7	4,080	1,003	—	—			
12	7－2	12	400	1	6			
13	8－3	108	100	3	19			
14	8－4	114	100	—	—			
15	9－2	1	2,801	—	—			
16	9－3	1,045	101	—	—			
17	10－5	214	801	—	—			
18	11－2	2	1,000	8	26			
19	12－1	208	200	1	7			
20	12－2	212	1700	2	12			
Total				22	106			

Type of Media	Passing Lane							
No.	Location No.	Route No.	Control Section No.	No. of Fatality	No. of Injury			Remarks
1	1－3	4	4,400	1	5			
2	3－4	4	700	51	182			
3	5－5	3	1,000	5	13			
4	6－1	1	1,101	1	5			
5	6－2	32	700	15	145			
6	6－3	32	700	15	145			
7	6－4	32	602	9	57			
8	6－5	2	101	29	152			
9	7－1	1	1,600	5	11			
10	8－5	11	1,400	2	23			
11	10－1	2	902	—	—			
12	10－2	2	502	17	78			
13	10－3	2	402	10	52			
14	10－4	2	302	16	51			
15	11－1	2	1,201	—	—			
Total				176	919			

Type of Media	Traffic Information System							
No.	Location No.	Route No.	Control Section No.	No. of Fatality	No. of Injury			Remarks
1	1－2	407	100	23	74			
2	2－1	401	601	—	—			
3	3－1	3,291	100	—	—			
4	4－1	32	500	22	92			
5	4－2	1	301	4	38			
6	4－3	34	100	3	19			
7	4－5	35	100	15	30			
8	5－2	3	403	—	—			
9	5－3	3	800	1	1			
10	5－6	3	1,200	17	36			
11	8－2	11	1,600	4	6			
12	8－6	1	2,203	0	7			
Total				89	303			

Type of Media	Grades Separation of Intersection							
No.	Location No.	Route No.	Control Section No.	No. of Fatality	No. of Injury			Remarks
1	1－2	407	100	17	34			
2	2－5	4,011	1,003	—	—			
3	3－2	335	100	—	—			
4	3－3	4	601	8	13			
5	4－2	1	301	2	20			①
6	4－2	1	301	2	20			②
7	4－4	303	100	—	—			
8	4－6	4	3,000	—	—			
9	4－7	4	3,101	—	—			
10	5－1	304	300	5	5			①
11	5－1	304	300	5	5			②
12	5－1	304	300	5	5			③
13	5－3	3	800	1	1			①
14	5－3	3	800	1	1			②
15	5－4	3	900	0	7			
16	6－6	1	302	16	40			
17	8－1	1,001	101	—	—			
Total				62	151			



Estimation Flow for B/C

Research Institutes Related to Traffic

In Japan

1. Ministry of Construction

   Public Works Research Institute - Road Department
   - Traffic Engineering Division
   - New Transportation System Division
   - Traffic Safety Division
   - Traffic Environment Division
   - Greenery Division
   - Pavement Division
   - Tunnel Division

2. Ministry of Transport

   Research Institute for Traffic Safety and Environment
   - Traffic Safety Division
   - Traffic Nuisance Division
   - Vehicle Inspection Division

3. National Police Agency

   Traffic Bureau
   - Traffic Guidance Section
   - Traffic Regulation Section
   - Traffic Control Section

   Scientific Police Research Institute (Traffic Division)
   - Traffic Regulation Section
   - Traffic Safety Section
   - Vehicle Operation Section

In France

1. National Research Institute for the Transportation and the Security

   1) Arcueil Office
      - Dept. of Analysis and Regulation of Traffic
      - Dept. of Evaluation and Research in Accident
      - Dept. of Economy and Sociology of Transport

   2) Lyon-Bron Office
      - Laboratory of Collision and Biomechanics
      - Laboratory of Health and Comfort
      - Laboratory of Energy and Nuisance
      - Dept. of Modernization Mechanic and Acoustic

   3) Salon de Province
      - Dept. of Mechanics of Accidents

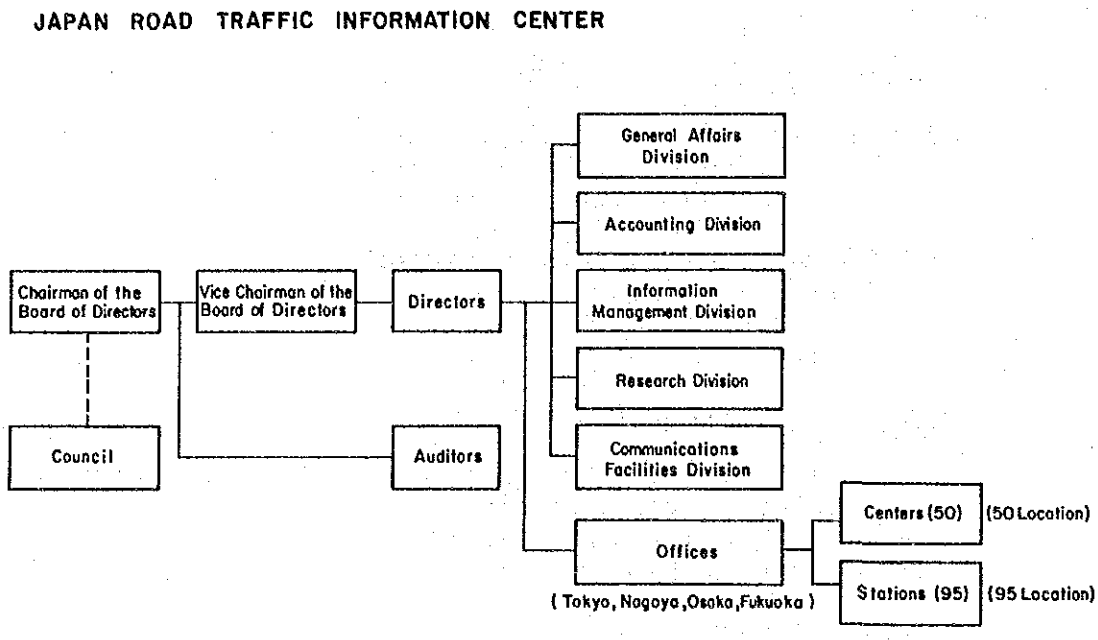


Figure 1 Organization Chart of Japan Road Traffic Information Center

Table 1 Number of Weekly Broadcasting of Traffic Information for Whole Japan (1989)

(Unit : times/week)

Type of Broadcast	Sub-Total	Total
Regular Radio Broadcasting from Information Center	4,928	5,435
Regular TV Broadcasting from Information Center	148	
Regular Radio Broadcasting by Radio Company	321	
Regular TV Broadcasting by TV Company	38	

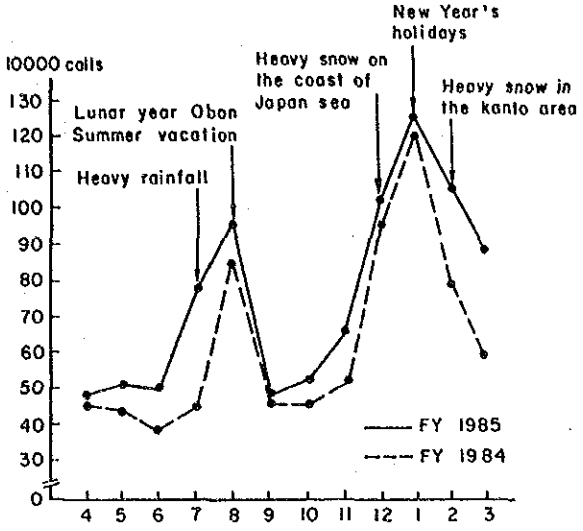


Figure 2 Conditions of Monthly Information Supply by Telephone

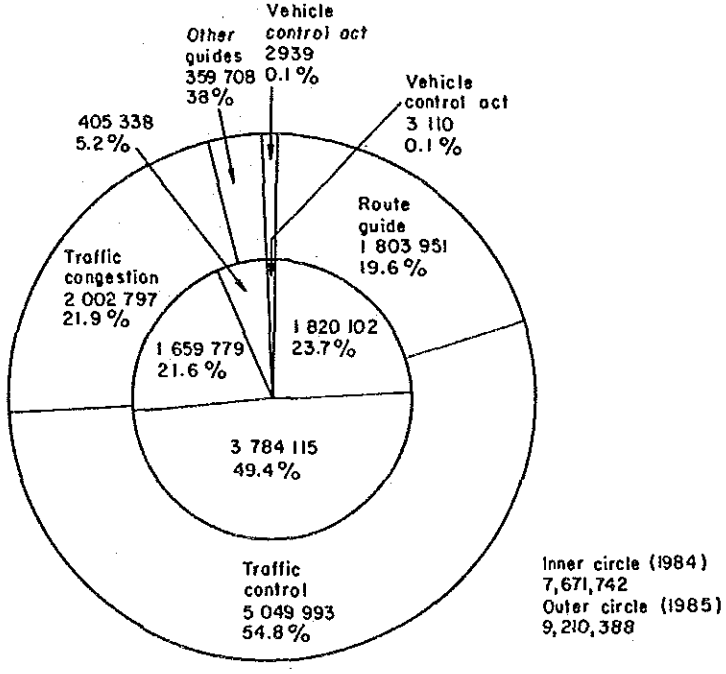


Figure 3 Details of Information Supply by Telephone