

CHAPTER III

TRAFFIC STUDIES IN THE STUDY AREAS

This chapter deals with the present road usage. Traffic volumes and vehicle classification were studied. An origin-destination survey was made from the 18th through the 21st of April 1975 on the Nong Plub road in order to understand the present patterns of the movement of persons and goods. These movements are an important characteristic of the level of development of the area served by the feeder road.

Transport Facilities

The Huptapong Feeder Road

This road, designated as route No. 3203, was upgraded in 1969 to provide access to the Huptapong project area. Since then the road has been extended to serve some other villages which are remote from the main Southern highway. This feeder road intersects two other feeder roads at KM 12 and KM 16. Therefore, most of the farm production is transported to market along the other two feeder roads in the dry season. These farm products are carried in small quantities by the farmers themselves. Whenever they have gathered enough to sell in the markets, mostly situated along the main Southern highway, the farmers load their produce onto

mini-buses. Those farmers who produce large quantities of produce transport them along the Huptapong road as the surface condition of route No. 3203 is better than that of the intersecting feeder roads. There are very few mini-buses travelling along the Huptapong road. Some of these enter the inner part of the study area by using other feeder roads which are shorter in distance to the Southern highway and Cha Am town. There are some motorcycles carrying passengers along the first few kilometers to the Huptapong Project area, or even further.

The Hua Hin-Nong Plub Road

Before 1963 the settlers in the remote area now served by Route Nos. 3218 and 3219 had to carry charcoal on their backs or on bicycles to the market at Hua Hin town, which is quite far from their homes. The land is somewhat hilly. Later on, jeeps began moving people and goods on the earth track. After the road had been improved in 1969, mini-buses began to play a more important role. Charcoal and some upland crops were transported to Hua Hin to be sold at the market. The farmers returned home with rice and other necessary domestic goods. Now, the inner part of the study area can also be reached by ARD roads, but most of the traffic uses the Hua Hin-Nong Plub road. This is because it is the shortest way to reach the coastal destinations, and the condition of the road is better than that of the others. There are now some 50 mini-buses running up and down this road; service is available at

about 20-minute intervals. The first eastbound mini-bus departs from the Hua Hin bus station at 07.30 hrs, and the last one at 17.00 hrs. Most make the full journey from Hua Hin to Walai. Other journies, such as from Hua Hin to Huei Mongkhon, are operated whenever there are enough passengers to make the trip worthwhile for the mini-bus operator. Currently the same level of daily service is carried on all through the year, even though there is a decrease of about 30 percent in the number of passengers carried during the rainy season.

Traffic Volumes

Traffic volume counts on feeder roads in Thailand have generally been made by the Department of Highways since 1972. Some counts were performed a few year before that. The Department's schedule requires that two sets of 8-hour counts be taken each year to estimate the average daily traffic volume (ADT). The first set is obtained in January and the second in July. Each set is obtained by 8-hour counts made on Monday and Thursday of the first week, on Wednesday and Friday of the second week, and on Tuesday of the third week. These counts are made from 08.00 to 16.00 hrs by manual observation. They are classified into: cars and taxis; light buses; light trucks; heavy buses; heavy trucks; and trucks with more than two axles. In addition, but not included in the ADT calculations, are counts of bicycles, motorcycles, and miscellaneous vehicles (tractors, ox-carts, etc.). The determination

of the ADT from two sets of 5-day counts is based on the assumption that there is only a slight monthly or seasonal variation in traffic flow. Thus, the results are less valid for roads which have large seasonal differences in traffic flow. Automatic traffic counters are used for 24-hour counts at these stations only once--in the first year of counting--to produce the necessary expansion factors for subsequent years. Therefore, the results cannot be considered to be representative of the annual average daily traffic volume (ADT). However, the values obtained in the counting program are generally of sufficient precision to indicate traffic patterns and trends.

One counting station on the Huptapong road, and two counting stations on the Hua Hin-Nong Plub road, have been conducted by the Department of highways recent years. The details of counting stations and the route termini are shown in Table 2 and Fig. 4. Values of ADT and the percentages of trucks and buses in the traffic stream at each counting station are listed in Table 3; a graph of the traffic volumes is shown in Fig. 5.

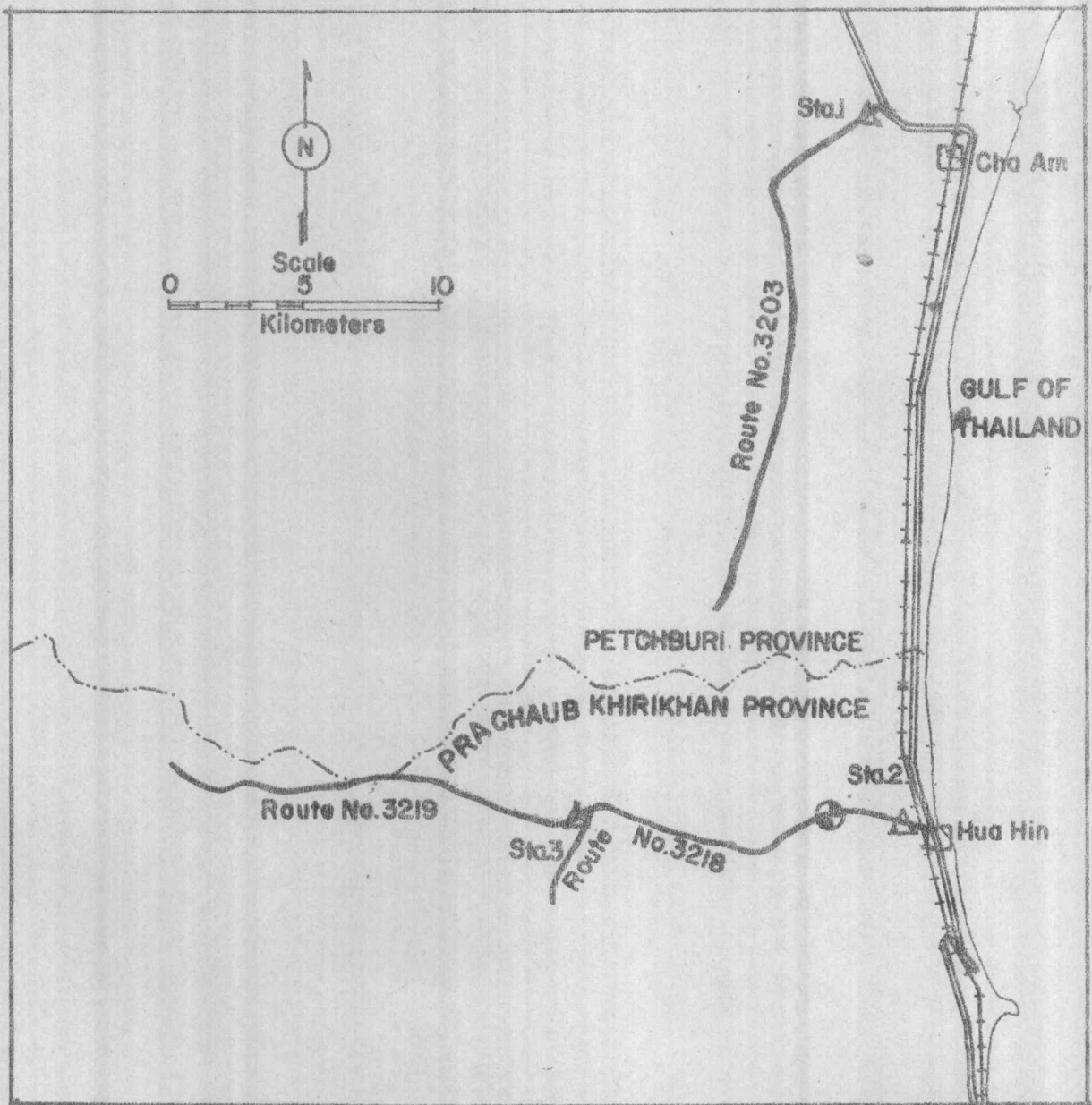
Traffic on these two roads is dominated by trucks and buses, averaging 80 percent of the total traffic on the Huptapong road and 77 percent on the Hua Hin-Nong Plub road. The remainder of the classified vehicles are passenger cars and taxis. The traffic volume along Hua Hin-Nong Plub road in 1975 varied from 788 vehicles per day (vpd) at the station near Hua Hin, to 595 vpd at the station west of Nong Tapow and near Nong Plub. The large

increase in 1975 of the traffic volumes on the study roads is thought to be caused by the large amount of sugarcane being transported from the study areas to factories in Prachaub Kririkhan, Petchaburi, and Ratchaburi Provinces. In the past the farmers grew maize as a major crop. The transportation requirements of maize are much less than those of sugarcane.

Table 2 - Location of the Traffic Counting Stations on the Study Roads

Station No.	Route No.	Counting station (kilometrage)	Section termini
1	3203	0 + 050 (from Petchakasem highway)	Petchakasem-Huptapong
2	3218	2 + 800 (from Hua Hin)	Hua Hin - Huei Mongkhon
3	3219	1 + 300 (from Nong Tapow)	Nong Tapow-Nong Plub

Fig.4— Locations of the Traffic Counting Stations and the Census Station



- ==== Highway
- Study Feeder Road
- + -+ -+ Railway
- Provincial Boundary
- District Town
- △ Traffic Counting Station
- ⊕ The Census Station

Table 3 - ADT and Percentage of Buses and Trucks on the Petchakasem-Huptapong (Route 3203), Hua Hin-Huei Mongkhon (Route 3218), and Nong Tapow-Nong Plub (Route 3219) Roads

Year	Route No. 3203		Route No. 3218		Route No. 3219	
	ADT ¹	%B&T ²	ADT ¹	%B&T	ADT ¹	%B&T
1969	220	76	-	-	-	-
1970	247	83	-	-	-	-
1971	386	79	-	-	-	-
1972	409	90	491	84	165	75
1973	362 ³	77	508	69	213	75
1974	410	79	530	78	1132 ⁴	79
1975	704	76	788	81	595	78

1
Adjusted from 8-hour counts by Highway Department.

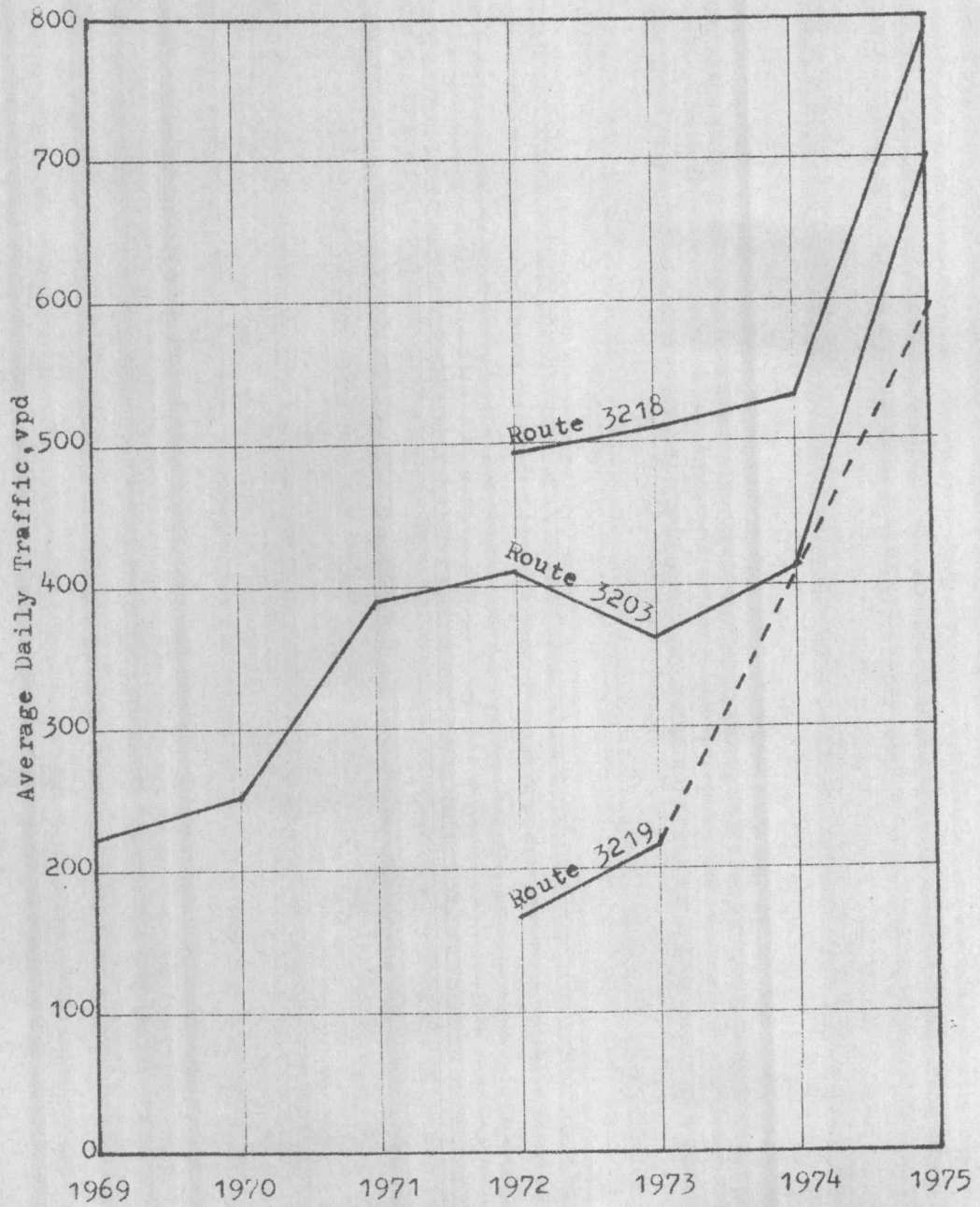
2
B & T = buses and trucks.

3
24-hr expansion factor probably too low.

4
Apparent mistake in traffic count.

Source: Department of Highways, Bangkok.

Fig. 5 - Average Daily Traffic on the Study Roads



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Traffic Studies in the Hua Hin-Nong Plub Feeder Road

An automatic traffic recorder was installed about 0.5 kilometer west of the census point before the interviews began. The recorder continuously recorded the total two-direction traffic volume during the entire survey period. The results were used to expand the manual traffic counts to provide a value of 24-hr traffic. A manual traffic volume count was made by a man sitting at the census point for classification of the traffic into nine types of vehicles: bicycles; motorcycles; passenger cars; light buses (less than 20 seats); heavy buses; light trucks (4-wheel trucks); heavy trucks (6-wheel truck); 3-axle heavy trucks; and farm tractors. The resulting values of daily traffic volume were adjusted to exclude bicycles. There were no animal-drawn vehicles passing the census point. Land Rovers were classified as passenger cars in this survey. The manual traffic volume count was performed each day from 05.30 to 22.00 hrs.

The traffic volume records at the census station from 18th April 1975 to 21st April 1975 are shown in Tables 4, 5, 6 and 7, respectively. From these data, it may be seen that the hourly volumes obtained from the manual counts are generally less than those obtained from the automatic traffic recorder. The reason is that automatic traffic recorder counts every two axles as one vehicle. The 16 $\frac{1}{2}$ -hour volumes from the manual counts at the census point are 94, 94, and 92 percent, of those

Table 4 - Traffic Volume Record by Automatic Recorder and Manual

Count: 18th April 1975

Time	Automatic recorder	Manual count									
		Total ¹	Modal split								
			Bicycles	Motorcycles	Passenger cars	Light buses	Heavy buses	Light trucks	Heavy trucks	3-axle trucks	Farm tractors
0 - 1	2										
1 - 2	2										
2 - 3	4										
3 - 4	4										
4 - 5	1										
5 - 5.30	14										
5.30 - 6											
6 - 7	33										
7 - 8	30	54	-	9	8	16	1	15	3	2	-
8 - 9	33	46	-	11	5	11	-	14	2	3	-
9 - 10	19	50	-	15	6	15	-	10	2	2	-
10 - 11	31	64	1	14	12	12	-	11	7	8	-
11 - 12	34	53	1	10	7	11	-	20	3	2	-
12 - 13	39	43	1	13	9	7	-	10	1	3	-
13 - 14	25 ²	47	-	12	8	13	-	10	2	1	1
14 - 15	37 ²	47	-	12	9	5	-	11	1	7	2
15 - 16	47	44	-	10	6	10	1	9	2	5	1
16 - 17	72	67	2	16	22	9	1	7	9	3	-
17 - 18	78	76	2	17	15	8	5	14	9	8	-
18 - 19	35	36	-	9	9	5	1	5	6	1	-
19 - 20	37	30	-	7	3	4	-	6	1	8	1
20 - 21	25	19	-	4	4	2	-	2	2	5	-
21 - 22	19	13	-	1	4	1	-	2	1	4	-
22 - 23	12		7	160	127	129	9	146	51	62	5
23 - 24	5		% ¹	23	19	19	1	21	7	9	1
Total	Inaccurate	689									

¹
Excluding bicycles

²
Reliability of automatic recorder improved after 14.00 hrs.

Source = Field survey.

Table 5 - Traffic Volume Record by Automatic Recorder and Manual

Count: 19th April 1975

Time	Automatic ² recorder	Total ¹	Manual count									
			Modal split									
			Bicycles	Motorcycles	Passenger cars	Light buses	Heavy buses	Light trucks	Heavy trucks	3-axle trucks	Farm tractors	
0 - 1	8											
1 - 2	2											
2 - 3	2											
3 - 4	8											
4 - 5	4											
5 - 5.30	26	23										
5.30 - 6			1	2	3	2	4	1	3	2	-	
6 - 7	48	47	1	9	13	10	3	9	3	-	-	-
7 - 8	57	52	1	18	6	13	1	7	5	2	-	-
8 - 9	59	53	3	13	9	15	-	9	5	1	1	-
9 - 10	48	47	1	10	10	11	-	12	1	3	-	-
10 - 11	53	50	-	11	9	9	2	15	2	2	-	-
11 - 12	54	54	4	17	4	16	1	8	3	4	1	-
12 - 13	58	55	-	17	11	10	-	12	2	3	-	-
13 - 14	50	47	2	11	5	8	-	16	2	4	1	-
14 - 15	56	49	1	9	8	8	3	14	5	2	-	-
15 - 16	58	46	2	8	12	11	1	10	3	1	-	-
16 - 17	88	67	1	16	18	7	4	12	7	3	-	-
17 - 18	79	60	1	10	16	8	2	11	9	3	1	-
18 - 19	45	34	2	7	9	-	1	8	5	4	-	-
19 - 20	37	24	3	5	5	1	-	7	1	5	-	-
20 - 21	18	17	-	1	1	2	-	5	3	4	1	-
21 - 22	19	13	-	-	-	2	-	4	3	2	-	-
22 - 23	12		23	164	141	133	22	160	67	45	5	
23 - 24	9		% ¹	22	19	18	3	22	9	6	1	
Total	898	737										

¹
Excluding bicycles.

²
Time errors: At various times, the manual counters' watches differed up to 6 minutes behind standard time. Also, there was a time lag arising from the distance between the census point and the automatic recorder.

Source: Field survey.

Table 6 - Traffic Volume Record by Automatic Recorder and Manual

Count: 20th April 1975

Time	Automatic recorder	Manual count									
		Total ¹	Modal split								
			Bicycles	Motorcycles	Passenger cars	Light buses	Heavy buses	Light trucks	Heavy trucks	3-axle trucks	Farm tractors
0 - 1	1										
1 - 2	7										
2 - 3	-										
3 - 4	9										
4 - 5	16										
5 - 5.30	7	57	1	14	14	14	6	2	5	2	-
5.30 - 6											
6 - 7	55										
7 - 8	49	53	8	12	16	20	-	2	2	1	-
8 - 9	64	61	4	18	16	12	1	9	3	1	1
9 - 10	69	59	4	15	21	14	-	4	2	2	1
10 - 11	58	47	5	7	16	16	-	4	1	1	2
11 - 12	62	60	1	15	9	17	1	11	2	3	-
12 - 13	51	48	3	13	3	15	1	14	1	1	-
13 - 14	61	93	-	21	17	21	-	25	5	4	-
14 - 15	51										
15 - 16	52	51	-	7	8	11	-	17	7	1	-
16 - 17	82	64	1	16	14	9	4	17	2	2	-
17 - 18	73	61	-	10	12	11	1	16	5	5	1
18 - 19	45	38	1	9	4	2	2	11	4	4	2
19 - 20	30	35	-	7	2	6	-	17	3	-	-
20 - 21	20	17	-	2	7	2	-	2	4	-	-
21 - 22	11	11	-	2	4	1	-	4	-	-	-
22 - 23	17		28	168	163	171	16	155	46	27	9
23 - 24	3		% ¹	22	22	23	2	20	6	4	1
Total	893	753									

¹
Excluding bicycles.

Source: Field survey.

Table 7 - Traffic Volume Record by Automatic Recorder and Manual

Count: 21st April 1975

Time	Automatic recorder	Manual count									
		Total	Modal split								
			Bicycles	Motorcycles	Passenger cars	Light buses	Heavy trucks	Light trucks	Heavy trucks	3-axle trucks	Farm tractors
0 - 1	7										
1 - 2	2										
2 - 3	1										
3 - 4	8										
4 - 5	6										
5 - 5.30	26										
5.30 - 6		28	-	3	3	1	4	5	10	2	-
6 - 7	50	42	2	12	9	7	2	10	1	-	1
7 - 8	57	61	3	15	8	17	1	12	5	3	-
8 - 9	67	69	5	14	15	12	-	13	11	3	1
9 - 10	58	44	2	9	5	10	-	15	4	1	-
10 - 11	53	46	-	13	4	6	-	21	-	1	1
11 - 12	47	49	1	18	5	10	-	12	4	-	-
12 - 13	39	40	-	9	9	10	1	7	1	1	2
13 - 14	42	38	-	5	6	7	-	13	5	2	-
14 - 15	57	52	-	8	10	12	1	11	9	1	-
15 - 16	55	55	2	10	10	11	-	16	8	-	-
16 - 17	70	61	-	12	11	7	6	12	10	2	1
17 - 18	70	66	3	14	8	14	2	16	8	3	1
18 - 19	50	49	3	12	13	7	1	10	5	-	1
19 - 20	26	29	0	8	3	1	-	14	3	-	-
20 - 21	17	14	2	4	4	-	-	5	-	-	1
21 - 22	13	8	3	1	2	2	-	3	-	-	-
22 - 23	30		26	167	125	134	18	195	84	19	9
23 - 24	10		% ¹	22	17	18	2	26	11	3	1
Total	861	751									

¹
Excluding bicycles

Source: Field survey

from the automatic traffic records for the 19th to the 21st April 1975, respectively. This shows that most of the vehicles passing the census station in both directions of traffic were interviewed during the survey period. From the hourly traffic volumes in the tables, it may be seen that there were two peaks of traffic flow: one in the morning between 07.00 and 09.00 hrs, the other in the afternoon between 16.00 and 18.00 hrs. One contributory reason is that there are two private pineapple canneries in the study area; these hire many workers from other towns, such as Hua Hin and Cha Am, who are transported to and from the plantations and canneries to work every morning and home in the evening. Another reason is Hua Hin Land Development project which employs many civil servants who travel each day to the project from their residences in Hua Hin town.

The modal split of the traffic along the study road displayed a constant pattern from day to day during the study period. Motorcycles occurred as a major mode of transportation. As the census station was only a few kilometers from Hua Hin, the people who lived in the villages near the station frequently drove their motorcycles to town for personal and business trips. Passenger cars, mini-buses or light buses, and light trucks appeared in nearly equal percentages, each about 20 percent. Most goods were delivered by light trucks. Ten-wheel (3-axle) trucks were the smallest portion of all trucks. Most of the heavy buses carried cannery workers to the Dole factory at KM 25; some were tour buses visiting the caves near Nong Plub Village.

The daily traffic volumes of Hua Hin-Nong Plub road at the census station during the study period are summarised in Table 8. They were computed by expansion of the $16\frac{1}{2}$ -hour manual count using that proportion of the automatic recorder volume for each day. The daily traffic volumes during the study period did not vary appreciably from day to day. The traffic volume on Monday, 21st April 1975, which was a working day, was slightly higher than that on Sunday, 20th April 1975, and Saturday, 19th April 1975, which were weekend days.

Table 8 - Summary of Daily Total Traffic Volumes

Date	Time	Manual counter	Automatic recorder
18 April 1975 (Friday)	00.00-24.00	-	Inaccurate
	07.00-22.00	689	Inaccurate
19 April 1975 (Saturday)	00.00-24.00	780 ¹	898
	05.30-22.00	737	849
20 April 1975 (Sunday)	00.00-24.00	797 ¹	893
	05.30-22.00	753	844
21 April 1975 (Monday)	00.00-24.00	815 ¹	861
	05.30-22.00	751	793

1

Computed by expansion of the 16 $\frac{1}{2}$ -hour manual count using the proportion from the automatic recorder volume for each day.

Source: Field survey.