

diminished.

- Shortage of sight distance due to the steep gradient of the approach to the Kasatsuk Bridge.
- Some vehicles running on the opposing lane. At the intersection with Krung Kasem Road, traffic volume beyonds the capacity, especially during peak hours. This leads drivers for right turn at this intersection to stride over the center line and drive on the opposing lane, even from the approach section of the Kasatsuk Bridge, while vehicles from the opposite direction are stopped by the traffic signal. Actually, traffic policemen guide drivers to drive like this way during morning peak hours.
- Difficulty of left turn at the intersection with Krung Kasem Road due to the sharp corner and insufficient length of left turn lane.

d) Safety measures

Widening of carriageway is the desirable measures for above mentioned problems. However, widening of this section can be determined not only from traffic safety point of view but also from road network improvement point of view, since it will require large investment for construction as well as solution for land acquisition problem.

Therefore, in this study, the following safety measures are proposed as immediate actions.

- Installation of the median by pavement markings and chatter-bars, in order to restrict the invasion on the opposing lane and to secure the orderly traffic flows at least up to the top of the bridge.
- Provision of adequate pavement markings in order to secure the orderly traffic flow at the section where number of lane is diminished.
- Extension of left turn lane and provisions of the adequate corner cut at the intersection with Krung Kasem Road, in order to increase the capacity at the intersection.
- Channelization by chatter-bars at the marging section of Krung Kasem Road towards the Hualampong Station.

(7) Sukhumvit Road (S7)

a) General description

Figure 5.4.11 indicates the location of this segment.

Between Soi Nana Nua and Soi Asok, Sukhumvit Road is 6-lane undivided

road and one-way system is adopted for this section, together with the provision of a contra-flow bus lane. There are many sois joined Sukhumvit Road. In this section, 2 pedestrian overpasses were constructed by BMA after introduction of one-way system.

Between Soi Asok and Soi Thonglor, Sukhumvit Road is 6-lane dual carriageway and there is one signalized intersection with Soi 26 (Soi Aree). As same as the section between Soi Nana and Soi Asok, many sois join Sukhumvit Road and there are openings of the median at 12 locations in order to allow right turn and U-turn for vehicles from/to these sois. In this section, only one pedestrian overpass exists near Soi 18.

There are 3 large size intersections related to this road segment, i.e. Nana Intersection, Asok Intersection and Thonglor Intersection. All of these intersections were improved by BMA and overhang type traffic signals were installed, however more measures are required to reduce accidents at Thonglor Intersection. This Thonglor Intersection is a staggered type of intersection consists of 2 T-shape intersections with Soi Thonglor and Soi 38. At present, there is no facility to control traffic at the intersection with Soi 38.

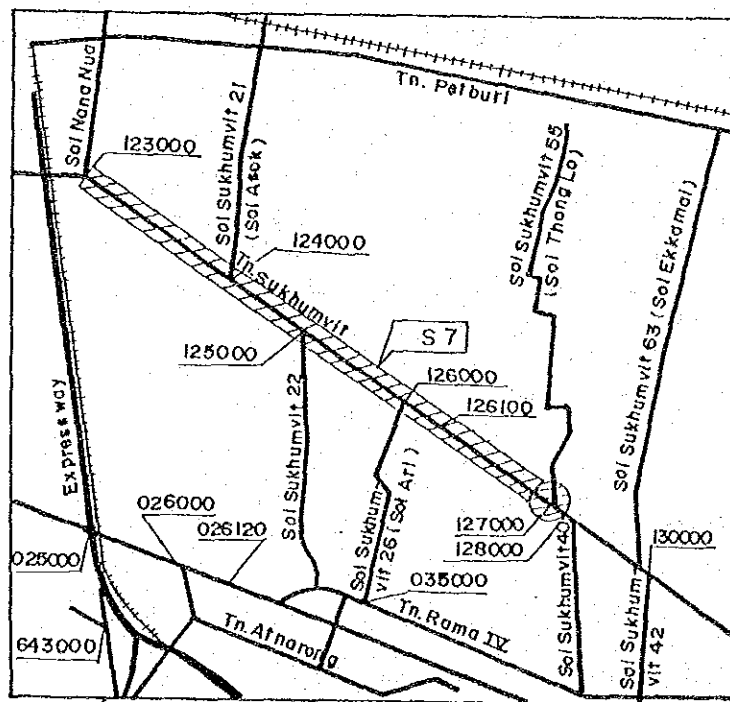


Figure 5.4.11 Road Segment for Safety Planning on Sukhumvit Road

b) Accident patterns

For the whole stretch of this segment, accidents involving pedestrians shows high percentage and behavior of pedestrians are suspected to be one of the cause of rear end collision and side contact by vehicles. Between Soi Asok and Soi Thonglor, many "vehicle vs. vehicle" accidents occur at the openings of the median and major accident patterns are rear end collision and right turn collision. At Thonglor Intersection, right turn collision is outstanding, followed by rear end collision and pedestrian accidents.

c) Major problems

Major problems are pointed out as follows;

* Whole Stretch of the segment

- Many pedestrians cross carriageway (Refer to Table 5.4.4)

Table 5.4.4 Number of Pedestrians Crossing Sukhumvit Road at Crosswalks

Location of Crosswalk	No. of Pedestrian Crossing on Crosswalks (Persons/hr)	Traffic Volume on Sukhumvit Road (Veh./hr)
Soi 8	332	
Soi 10	225	
Soi 22	434	
Soi 31	59	4,097
Soi 33/1	169	
Soi 39	790	3,902
Soi 30	141	
Soi 47	44	
Soi 49	76	
Soi 51	332	
Soi 53	217	3,666

- Difficulty of road crossing by pedestrians due to heavy traffic volume with high driving speed and wide carriageway even at crosswalks.
- At random crossings by pedestrians.
- Poor visibility in the night time due to the insufficient street lightings.

* Section between Soi Asok and Soi Thonglor

- Many turning vehicles including U-turn vehicles at openings of the median.

- Disorderly turning movements caused by inadequate pavement markings at openings of the median.
- Insufficient length for weaving at openings of the median due to short distances between openings.
- Difficulty of right turns and U-turns at openings of the median due to the continuous traffic flows from the opposite direction.

* Thonglor Intersection

- Disorderly traffic flows in right turning both from/to Soi Thonglor due to the acute intersecting angle and vast area for turning.
- Insufficient pavement markings.
- Poor visibility of traffic signals.

d) Safety measures

The following safety measures are proposed for this segment and Figure 5.4.12 illustrates locations where safety measures are proposed.

- Construction of pedestrian overpasses at 3 locations. A pedestrian overpass in front of the Ambassador Hotel will be constructed in 1987 by BMA.
- Installation of traffic signals and provision of crosswalks at 6 intersections where the median is opened related to important sois and many pedestrians crossing carriageway. Important sois are considered as connecting roads with Petburi Road or Rama IV Road, and roads with many branch roads. In addition, it is desirable to introduce a coordinated signal control system for these signals together with existing traffic signals at 4 intersections.
- Cancellation of existing crosswalks other than at intersections to be signalized.
- Restriction of turning movements by closing openings of the median at 5 locations. The estimated effects on turning movements by closing these openings are illustrated in Appendix 5.4.6, as the comparison with present turning movements.
- Provision of exclusive lanes for right turn (including U-turn) and adequate pavement markings to channelize traffic at 6 intersections to be signalized.
- Provision of sufficient street lightings.
- Rearrangement of the channelization by pavement markings and chacter-bars at Thonglor Intersection.
- Provision of an exclusive lane for right turn and U-turn traffic at the entrance of Soi 38.
- Installation of additional overhang type traffic signals at Thonglor

Intersection.

- Provision of exclusive signal phases for right turn and for pedestrians at Thonglor Intersection.

(8) Rama IV Road (S8)

a) General description

Location of this road segment between Mahaphruttharam Road and Silom Road is shown in Figure 5.4.13. At this segment, Rama IV Road is 10-lane dual carriageway and trees are planted on the median. There is only one opening of the median in front of the Red Cross office other than intersections.

There are 4 large size intersections (with Mahaphruttharam Road, Phaya Thai Road, Surawong Road and Silom Road) and 2 medium size intersections (with Charumuang Road and Charoenphol Road). At each intersection, new pedestal type traffic signals are installed. And also, many sois join to Rama IV Road.

Recently, BMA constructed one pedestrian overpass in front of the Mandarin Hotel.

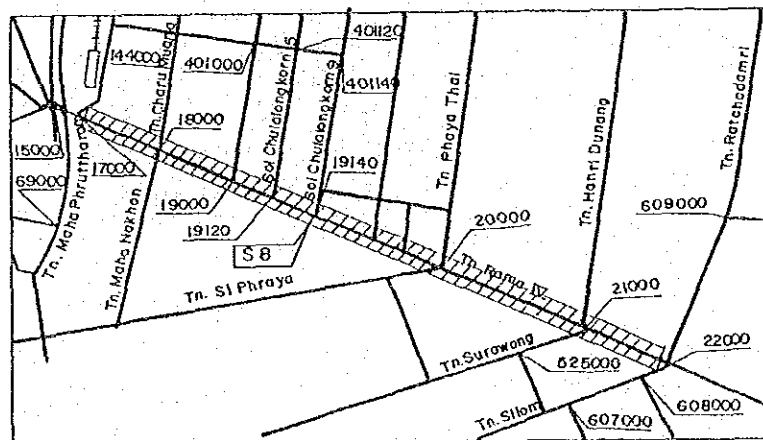


Figure 5.4.13 Location of Safety Planning Segment on Rama IV Road

b) Accident patterns

Typical accident patterns are pedestrian accidents, rear end collision, right turn collision and side contact. On mid-block sections, pedestrian accidents occupy more than a half of recorded accidents. On the other hand, rear end collision and right turn collision frequently occur at

intersections.

c) Major problems

Major problems in this segment are pointed out as follows;

- Insufficient number of crossing facilities for pedestrians on mid-block sections.
- Difficulties of crossing carriageway by pedestrians including school children due to the wide carriageway width (10-lane) and heavy traffic volume with high driving speed. Figure 5.4.14 indicates number of pedestrians crossing the carriageway on crosswalks and vehicular traffic volume.
- At random crossings by pedestrians. It is suspected that at random crossings by pedestrians may be one of the cause for rear end collisions and side contacts by vehicles.
- Poor visibility of traffic signals owing to the low height of traffic signal displays.

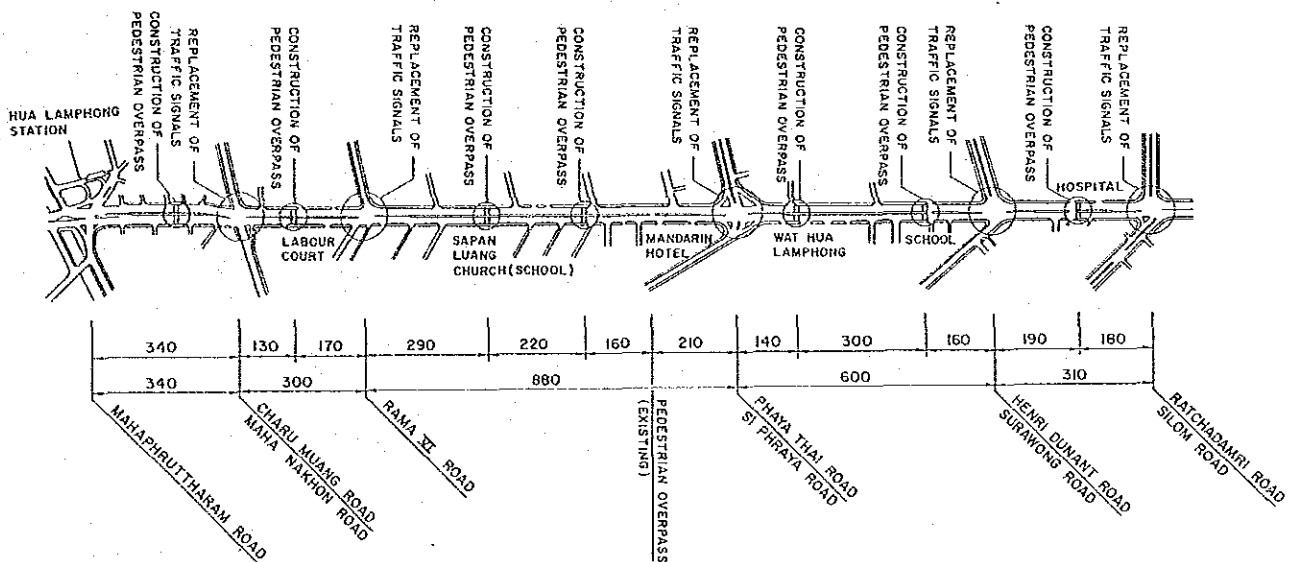


Figure 5.4.14 Number of Pedestrians Crossing Rama IV Road

d) Safety measures

In this segment, following safety measures are proposed as solutions for pedestrian accidents mid-block sections and vehicle vs. vehicle accidents on at intersections. The locations of proposed site for safety measures are indicated in Figure 5.4.15.

- Installation of pedestrian overpasses at 7 locations. Among them, two pedestrian overpasses in front of the Sapan Luang Church and the

- Chulalongkorn Hospital are planned to be constructed in 1987 by BMA.
- Installation of guardfences on the median to prevent at random crossings by pedestrians.
 - Replacement of pedestal type traffic signals by overhang type traffic signals at 5 intersections.

In the case that the continuous flyover crossing over Silom Road, Surawong Road and Si Phaya Road proposed by "Road Improvement" in this Study will be constructed, proposed 3 pedestrian overpasses between Silom Road and Si Phaya Road should be canceled. Instead of that, installation of pedestrian signals are proposed for these locations.

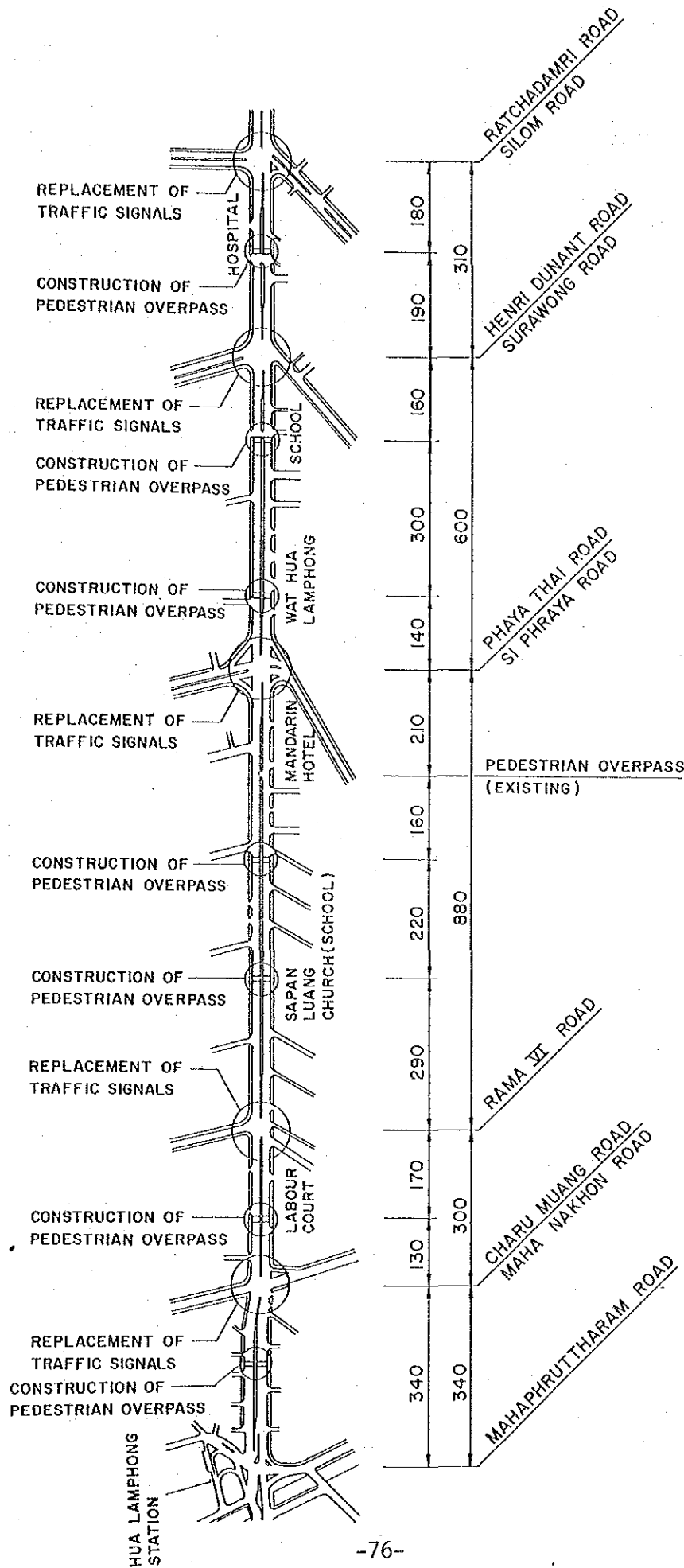


Figure 5.4.15 Proposed Safety Plan for Rama IV Road

(9) Itsaraphap Road (S9)

a) General description

Figure 5.4.16 indicates the location of this segment. This segment is a T-shape medium size signalized intersection on Itsaraphap Road (4-lane undivided road) with Wang Doem Road (4-lane undivided road), together with adjacent mid-block sections.

At this intersection, old pedestal type traffic signals are installed. In addition, composition rate of motorcycle is very high as approximately 40% at this segment.

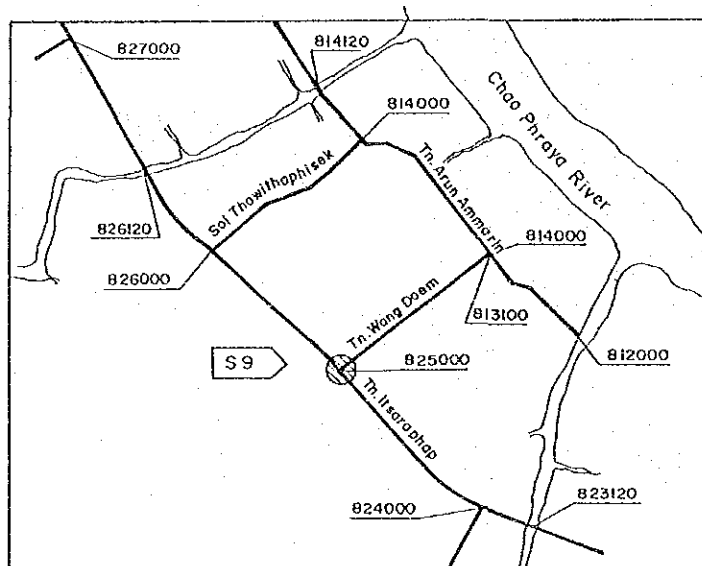


Figure 5.4.16 Road Segment for Safety Planning on Itsaraphap Road

b) Accident patterns

Major accident patterns are rear end collision and right and left turn collision, while pedestrian accidents also occur frequently. Many accidents occur at night time especially on mid-block sections. In addition, many motorcycles are involved in accidents.

c) Major problems

Major problems on this segment are as follows;

- Poor visibility of traffic signal due to old pedestal type signals as well as concealed signal displays by roadside trees

- At random crossings by pedestrians.
- Difficulties for crossing by pedestrians at signalized intersection due to the continuous turning vehicles.
- Confusion of traffic flows due to the mixture of through and right turn traffic in the same lane.
- Inadequate cross slope due to the overlay.
- Insufficient street lightings on the mid-block section towards north from the intersection with Wang Doem Road.

d) Safety measures

In order to reduce the accidents, following safety measures are proposed.

- Replacement of traffic signals by overhang type.
- Widening of carriageway in order to provide a right turn lane.
- Overlay to improve cross slope of surface.
- Installation of chatter-bars to prevent improper turning and striding over the centerline.

(10) Charoen Nakhon Road (S10)

(Mid-block section in front of Wat Sawettachat)

a) General description

Figure 5.4.17 indicates the location of this segment. Charoen Nakhon Road is 6-lane undivided road and there is a small bridge near to the Wat Sawettachat, where the vertical alignment level is different.

In front of the Wat Sawettachat, a crosswalk is installed and a traffic policeman controls traffic during peak hours. Two schools and a jetty are located near this place, and temporary market is opened in the premises of the Wat Sawettachat every morning.

b) Accident patterns

At this location, particularly many accidents involved pedestrians were recorded, followed by rear end collision, side contact and right turn collision.

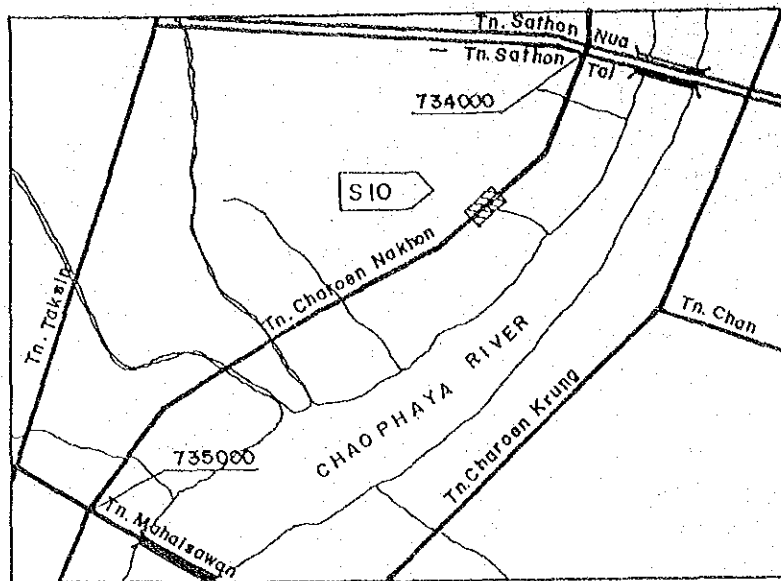


Figure 5.4.17 Road Segment for Safety Planning on Charoen Nakhon Road

c) Major problems

The following major problems are identified at this segment.

- Many pedestrians cross carriageway.
From the result of survey in the morning peak hour, number of pedestrians crossing the crosswalk is approximately 2,900 person/hr., while traffic volume of this mid-block section is 3,300 veh/hr..
- Difficulty for crossing by pedestrians due to wide carriageway and continuous vehicular traffic.
- Insufficient sight distance caused by a small bridge.
- Confusion of traffic flows caused by disorderly movements of buses including mini buses and parked vehicles.
- Uneasy turnings and insufficient sight distance at the entrance of sois due to the small radius at corner cut and parked vehicles.

d) Safety measures

The following safety measures are proposed for this segment.

- Construction of a pedestrian overpass.
A pedestrian overpass are constructed by BMA at this location.
- Installation of the median strip.
- Installation of guard fences on the median to prevent at random crossings by pedestrians.
- Installation of stop signs and stop lines at exits of sois.

- Prohibition of parkings at approaches to a small bridge, vicinity sections of bus stops and entrances of sois.
- Provision of bus stop markings.

5.5 Cost Estimation

(1) Procedure

After the calculation of quantity of safety devices applicable to each road segment for safety planning, cost estimation consisting of installation cost and operation/maintenance costs are carried out by the following procedure.

- Determination of unit costs of safety devices.
- Determination of service life of each safety device.
- Estimation of installation cost for each safety plan.
- Estimation of maintenance cost (including replacement cost) and operation cost for each safety plan during the plan period.

(2) Determination of unit cost

The cost estimation to install the safety devices are made with unit costs at the estimated 1986 year's price which were derived from prevailing unit costs in Thailand. The unit cost for each safety device is summarized in Appendix 5.5.1.

(3) Determination of service life of safety devices

In order to ensure the original functions of safety devices, they have to be maintained (including replacement) properly. Therefore, the durable year for each safety device in Thailand and maintenance expenditure for the safety devices are estimated in accordance with their expected durable years, as shown in Appendix 5.5.2.

(4) Estimation of installation cost for safety plans

Based on the calculated quantities of the safety devices within each safety plan, the installation cost for each safety plan is estimated multiplying the unit cost of each safety device by the required quantity. Estimated installation costs for safety plans are summarized in Table 5.5.1.

(5) Estimation of maintenance cost for safety plans

Every safety plan should include the expenditure for the maintenance (including replacement) and operation of the proposed safety devices. In the Study, safety plans are assumed to be implemented over the period of 10 years, and the maintenance and the operation expenditure of the safety

plans for 10 years are estimated in accordance with expected durable years of safety devices concerned. The annual investment schedule for the implementation of safety plans and their maintenance and operation costs are tabulated in Table 5.5.2.

Table 5.5.1 Summary of Installation Costs for Safety Plans

Unit ฿

Item	Location	Pracha Chuen		Techa Wanit		Rachadam-noen Nok	Si Ayut-thaya	Phaya Thai	Rama I	Sukhumvit	Rama IV	Itsara-phap	Charoen Nakhon
		S1	S2-1	S2-2	S3								
1. Pavement Marking		65,000	63,700	53,820	166,400	148,980	170,300	101,140	-	829,920	-	60,580	27,300
2. Traffic Sign		2,670	1,780	8,900	6,230	32,280	3,360	890	-	11,170	-	2,670	8,590
3. Raised Pavement Marker		-	45,000	-	-	-	54,000	247,500	-	12,000	-	43,500	-
4. Guard Fence		-	-	318,600	117,000	-	-	-	-	-	2,043,000	-	262,500
5. Traffic Signal		336,400	407,600	201,000	190,000	348,000	74,000	-	-	2,516,000	342,000	96,000	-
6. Pedestrian Overpass		-	-	-	-	-	-	-	-	3,690,000	11,970,000	-	1,230,000
7. Pavement		51,300	-	-	5,400	-	-	40,800	-	413,160	-	164,650	34,000
8. Small Size Structure		-	-	-	-	-	-	610,000	-	-	-	-	-
9. Lighting		150,000	-	-	-	-	-	-	-	3,437,500	-	50,000	-
10. Land Acquisition		138,750	-	-	-	-	-	-	-	-	-	-	-
11. Miscellaneous		9,000	-	-	6,400	-	-	30,900	-	189,700	-	157,000	206,000
Sub-Total		730,120	518,080	502,320	491,430	529,260	301,660	1,031,230	14,355,000	11,099,450	14,355,000	574,400	1,758,690
Add Opt (25%)		186,880	131,920	147,680	118,570	120,740	78,340	258,770	3,585,000	2,677,550	3,585,000	145,600	441,310
Grand Total		940,000	650,000	730,000	610,000	650,000	380,000	1,290,000	17,940,000	13,777,000	17,940,000	720,000	2,200,000

Source : JICA Team Estimation

Table 5.5.2 Annual Investment Schedule for Safety Plans

Unit : Baht in Thousand

Location Year	Pracha Chuen		Techa Wanit		Rachadam-noen Nok	Si Ayut-thaya	Phaya Thai	Rama I	Sukhumvit	Rama IV	Itsara-phap	Charoen Nakhon
	S1	S2-1	S2-2	S3	S4	S5	S6	S7	S8	S9	S10	
1	1,002	698	753	640	650	335	1,290	14,759	18,486	739	2,250	
2	61	51	33	26	43	9	0	883	543	19	51	
3	143	131	100	234	230	221	126	1,920	543	95	85	
4	61	51	33	26	43	9	0	883	543	19	51	
5	143	131	100	234	230	221	126	1,920	543	95	85	
6	61	51	33	26	43	9	0	883	543	19	51	
7	143	131	100	234	230	221	126	1,920	543	95	85	
8	65	54	44	34	78	13	1	896	543	23	63	
9	143	131	100	234	230	221	126	1,920	543	95	85	
10	61	51	33	26	43	9	0	883	543	19	51	
Total	1,883	1,480	1,329	1,714	1,820	1,318	1,795	26,867	23,373	1,218	2,857	

Source : JICA Team Estimation

6. ECONOMIC EVALUATION OF SAFETY PLANS

6.1 Evaluation Method

It is generally agreed that economic effectiveness of the traffic safety improvement is measured by analysis identifying annual benefits and costs, and subsequent total net benefit accumulated by the number of years within a suitable evaluation period and its benefit/cost ratio.

For this economic evaluation, the benefits are assumed as the monetary values of persons saved from fatality and prevented from injury and those of properties prevented from damage, attributable to reduction of traffic accidents after implementation of the safety plan. Actually, these benefits are a part of the social benefit. As for the costs, they comprised the installation and maintenance costs of the safety devices adopted in the safety plan.

Although there are many discussions on this type of evaluation method which is obliged to put a certain value to the life and injury of human being, this method is regarded as one of the practical ways of evaluation for traffic safety plan.

The evaluation components required for the analysis consist of the following;

- Number of fatality and injury and amount of property damage
- Reduction rate of traffic accident
- Installation and maintenance costs and their annual allocation
- Values assigned to fatality, injury and property damage

The evaluation is attempted based on the conditions and assumptions that the prices applied for benefits and costs are at 1986 market prices, evaluation period is set for 10 years with the rate of discount being 5% per annum, and the number of traffic accident is fixed at 1986 level for the practical convenience. It might be possible to adopt the number of accident based on the traffic volume projection with annual increase for the evaluation period in case of detailed study.

Evaluation Process

The process of evaluation is roughly described as follows;

- Identification and calculation of each annual benefit and cost for the applicable years of evaluation period.
- Accumulation of the gross benefit and gross cost of the evaluation

period, which are to be converted to the present values by application of discount rate.

- Calculation of net benefit (B - C) and benefit/cost ratio.

6.2 Accident Reduction Rate

In order to carry out the effective assessment for the safety plans, it is requisite to estimate accident reduction rates by various safety devices. Although there are a number of studies and researches on effectiveness of safety devices, the team refers the results of 3 studies (2 studies in Thailand and 1 study in Japan), which mainly compared number of accidents before and after the installation of safety devices, to determine accident reduction rates. The results of these 3 studies are summarized in Appendices 6.2.1 to 6.2.3.

Based on the comparison of results of these studies, accident reduction rates by various safety devices for mid-block section and intersection are estimated and shown in Table 6.2.1. At this time, it should be noted that accident reduction rates presented in this table are effectiveness of each individual safety device.

6.3 Effectiveness of Safety Plans

In order to evaluate each traffic safety plan prepared for 10 hazardous road locations, expected reduction number of accidents and casualties should be estimated.

Since every traffic safety plan is prepared as the combination of several safety measures, it is impossible to simply adopt accident reduction rates determined in the previous section. However, it is possible to assume that a safety measure with the highest accident reduction rate within each safety plan at least represents the effectiveness at each safety planning site. Under this concept, the expected reduction number of accidents are estimated and shown in Table 6.3.1. At the same time, it should be noted that reduction rates for Sukhumvit Road and Rama IV Road are estimated in the ratios of number of accidents to be reduced at each spot by safety measures against the total number of accidents occurred on the whole stretch of these road locations, since several different types of safety measures are proposed for these long road locations.

Table 6.2.1 Accident Reduction Rates by Safety Device
(Mid-block Section)

Safety Devices	Reduction Rate of Number of Accident	Remarks
Traffic Signal for Pedestrian	50	Study in Japan
Refuge Island	65	JICA DOH Study
Crosswalk	30	Study in Japan
Pedestrian Overpass	55	- do -
Sidewalk	45	- do -
Guardfence	40	- do -
Lighting	30	- do -
Visual Guidance	50	JICA DOH Study
Median Island	20	Study in Japan
Marking (Edge Line)	30	- do -
Traffic Sign	15	- do -
Chatter Bar	35	DOH Data

(Intersection)

Safety Devices	Reduction Rate of Number of Accident	Remarks
Traffic Signal	50	JICA DOH Study
Lighting	30	Study in Japan
Channalization	50	- do -

Table 6.3.1 Expected Reduction Number of Accidents

Location	Present Accident Condition per year			Accident Reduction Rate (%)	Accident No. to be reduced
	No. of Accident	No. of Fatality	No. of Injury		
Pracha Chuen Road (S1)	8	0	5	50	4
Techa Wanit Road (S2-1)	16	0	3	50	8
Techa Wanit Road (S2-2)	14	2	11	50	7
Rachadamoen Nok Road (S3)	32	0	10	50	16
Si Ayutthaya Road (S4)	13	0	3	46	6
Phaya Thai Road (S5)	10	1	3	50	5
Rama I Road (S6)	17	1	11	35	6
Sukhumvit Road (S7)	157	5	57	37	58
Rama IV Road (S8)	118	4	65	40	47
Itsaraphap Road (S9)	15	2	13	50	8
Charoen Nakhon Road (S10)	24	1	18	55	13

Source : JICA Team Estimation

6.4 Estimation of Benefits

The monetary values of the person who are saved from fatality and prevented from injury and of the property prevented from damage by implementation of the traffic safety plan are considered as the benefits.

As to estimation of the economic value in accident reduction, if applicable data are available, those values such as wage lost, medical expense, home and family care expenses, physical and mental pains can be estimated. Since there has not been reliable statistics and studies pertaining to above estimation in Bangkok, these values were not adopted in the study.

In this study, the unit values of above benefits were estimated as follows, based on the data by Auto Sub-Committee of the General Insurance Association of Thailand and by the Traffic Police.

(1) Unit value of benefit

1) Fatality : 0.9 million Baht

The unit value of fatality was estimated on the factors that in Bangkok an average amount insured per person for fatality caused by traffic accident in 1984 was 0.85 million Baht with the compound inflation rate from 1984 to 1986 was estimated to be 1.06%. Based on above factors, the unit value of fatality in 1986 was estimated to be 0.9 million Baht.

2) Injury : 0.09 million Baht

The unit value of injury was estimated on the factors that in Bangkok an average amount paid per person for injury by traffic accident in 1984 was 0.085 million Baht with the compound inflation rate of 1.06% from 1984 to 1986 being similarly applied as fatality estimation to arrive at the unit injury value in 1986 to be 0.09 million Baht.

3) Property Damage : 0.02 million Baht

This value was estimated by the factors that an average value of property damage per traffic accident in 1985 in Thailand was calculated to be 16,420 Baht with the regional difference of wholesale price in Bangkok to Thailand to be 1.18 : 1.00, and the compound inflation rate from 1985 to 1986 to be estimated as 1.03% and consequently, the unit value of property damage to be 0.02 million Baht.

(2) Benefit/cost computation

The computation of benefits and costs was attempted for 11 safety plans respectively with the evaluation components, conditions and assumptions and the process of calculation as described in the previous section. In addition to the benefit and cost computation for a period of 10 years, computation for 5 years was also made for comparison purpose. The calculation sheet for these 11 safety plans are shown in Appendix 6.4.1.

Table 6.5.1 Summary of Economic Evaluation for Traffic Safety Plans

(Unit : Cost & Benefit : Baht in million)

Road Segment No.	Evaluation Period : 5 Years				Evaluation Period : 10 Years			
	Cost	Benefit	Net Benefit (B-C)	B/C	Cost	Benefit	Net Benefit (B-C)	B/C
S1	1.357	1.380	0.023	1.02	1.687	2.448	0.761	1.45
S2-1	1.015	1.334	0.319	1.31	1.307	2.367	1.060	1.81
S2-1	0.983	6.944	5.961	7.06	1.201	12.312	11.111	10.25
S3	1.089	3.484	2.395	3.20	1.476	6.180	4.704	4.19
S4	1.123	1.113	△ 0.010	0.99	1.559	1.974	0.415	1.27
S5	0.781	3.099	2.318	3.97	1.112	5.497	4.385	4.94
S6	1.507	3.759	2.252	2.49	1.685	6.668	4.983	3.96
S7	19.652	21.586	1.934	1.10	24.202	38.289	14.087	1.58
S8	20.400	21.373	0.973	1.05	22.300	37.911	15.611	1.70
S9	0.936	7.398	6.462	7.90	1.112	13.125	12.013	11.80
S10	2.488	7.669	5.181	3.08	2.721	13.603	10.882	5.00

Source : JICA Team Estimate

Remarks 1. Nos. of accident and casualties are based on 1986 survey by JICA Team.

2. The costs and benefits are calculated at 1986 price.

3. Unit values of fatality, injury and property damage are;

1) fatality = ¥ 0.9 million

2) injury = ¥ 0.09 million

3) property damage = ¥ 0.02 million

4. Traffic volume is set at 1986 level.

5. Rate of Discount : 5% per annum

6.5 Evaluation of Safety Plans

The economic analysis to identify respective net benefit and benefit/cost ratio for 11 safety plans proves that every plan yields considerable net benefit or reasonable benefit/cost ratio. The summary of the analysis is shown in Table 6.5.1.

Regarding the net benefit with the evaluation period of 10 years, there are 5 safety plans which yield more than 10 million Baht of net benefit. They are safety plans for road segment No. S2-2 on Techa Wanit Road with 11.1, No. S7 on Sukhumvit Road with 14.1, No. S8 on Rama IV Road with 15.6, No. S9 on Itsaraphap Road with 12.0 and No. S10 on Charoen Nakhon Road with 10.9 million Baht respectively. The smallest net benefit is yielded by safety plan for road segment No. S1 on Pracha Chuen Road at 0.8 million Baht.

With regard to the benefit/cost ratio for 10 year evaluation period, safety plans for road segment No. S2-2 on Techa Wanit Road and No. S9 on Itsaraphap Road are showing very high B/C ratios of more than 10, and No. S3 on Rachadamnoen Nok Road, No. S5 on Phaya Thai Road, No. S6 on Rama I Road, and No. S10 on Charoen Nakhon Road are showing fairly high ratios of 4.2, 4.9, 4.0 and 5.0 respectively.

Judging from above two analyses, safety plans for road segment No. S2-2, No. S9 and No. S10 can be regarded as the plans with very high economic effectiveness marking high scores both in net benefits and benefit/cost ratios.

It is also calculated through this analysis that by implementation of all the eleven (11) safety plans, about 178 traffic accidents and 92 casualties will be reduced per year on the selected ten (10) hazardous road locations, and the number of persons saved from fatality and prevented from injury for 10 year evaluation period are about 70 and 850 persons respectively on the same locations.

With these results, eleven (11) safety plans worked out in this study can be clearly said that all the plans are very effective on reduction in number of accidents and casualties with an average reduction rate of about 42%, and are also economically justified yielding fairly high rate of return in monetary terms.

APPENDICES

Accident Record Format
(For Major Road)

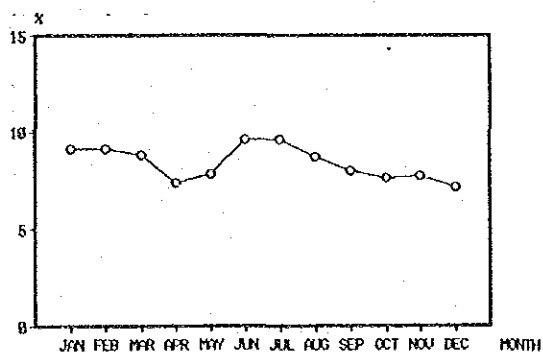
No.	Police Station	Date	Month	Year	Day	Time								
District		Location of Accident												
No. of Fatality		No. of Serious Injury			No. of Light Injury									
Type of Accident		Weather Condition		Type of Vehicle Involved										
1. <input type="checkbox"/> Motor Vehicle VS Motor Vehicle 2. <input type="checkbox"/> Motor Vehicle VS Bicycle 3. <input type="checkbox"/> Motor Vehicle VS Pedestrian 4. <input type="checkbox"/> Motor Vehicle VS Itself 5. <input type="checkbox"/> Others (Defined)		1. <input type="checkbox"/> Clear 2. <input type="checkbox"/> Dull 3. <input type="checkbox"/> Raining 4. <input type="checkbox"/> Foggy		1. <input type="checkbox"/> Passenger Car 2. <input type="checkbox"/> Motorcycle 3. <input type="checkbox"/> Taxi 4. <input type="checkbox"/> Light Bus 5. <input type="checkbox"/> Light Truck 6. <input type="checkbox"/> Heavy Bus 7. <input type="checkbox"/> Heavy Truck 8. <input type="checkbox"/> Others (Defined)										
Cause of Accident														
1. <input type="checkbox"/> Over Speed Limit 2. <input type="checkbox"/> Improper Overtaking at Restricted Section 3. <input type="checkbox"/> Improper Overtaking 4. <input type="checkbox"/> Improper Parking at Restricted Section 5. <input type="checkbox"/> Improper Parking 6. <input type="checkbox"/> Parking without light at night 7. <input type="checkbox"/> Inadequate Signalling 8. <input type="checkbox"/> Improper Turning 9. <input type="checkbox"/> Violate Traffic Sign or signal 10. <input type="checkbox"/> Driving Wrong Way 11. <input type="checkbox"/> Not Stop at Crosswalk 12. <input type="checkbox"/> Overloading of Passenger 13. <input type="checkbox"/> Overloading of Goods 14. <input type="checkbox"/> Wrong Use of High Beam 15. <input type="checkbox"/> Vehicle Defects 16. <input type="checkbox"/> Sleeping 17. <input type="checkbox"/> Drunkenness 18. <input type="checkbox"/> Inexperienced Driving 19. <input type="checkbox"/> Others (Defined)														
Location			Collision Pattern											
1. <input type="checkbox"/> Tangent Intersection 2. <input type="checkbox"/> Curve Section 3. <input type="checkbox"/> Intersection 4. <input type="checkbox"/> Crosswalk 5. <input type="checkbox"/> Slope Section 6. <input type="checkbox"/> Bridge 7. <input type="checkbox"/> Railway Crossing 8. <input type="checkbox"/> Others (Defined)			<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; text-align:center;">Direction</td> <td style="width:2%; border-left: 1px dashed black;"></td> <td style="width:2%; border-right: 1px dashed black;"></td> <td style="width:50%; text-align:center;">Direction</td> </tr> <tr> <td style="border-top: 1px dashed black; border-bottom: 1px dashed black;"></td> <td style="border-top: 1px dashed black; border-bottom: 1px dashed black;"></td> <td style="border-top: 1px dashed black; border-bottom: 1px dashed black;"></td> <td style="border-top: 1px dashed black; border-bottom: 1px dashed black;"></td> </tr> </table>				Direction			Direction				
Direction			Direction											

Characteristics of Traffic Accidents in Bangkok

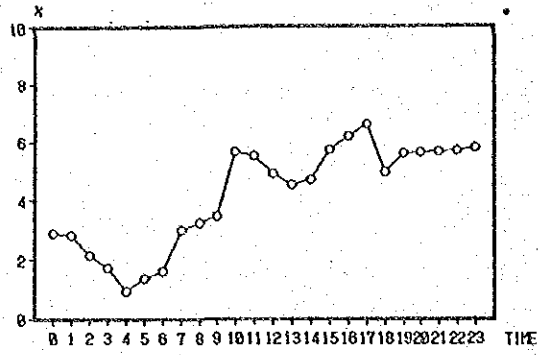
(Number of Accidents and Casualties)

District Name	No. of Accidents			No. of Casualties		
	1984	1985	Total	1984	1985	Total
1. Phra Nakhon	477	245	722(4%)	192	82	274(3%)
2. Pom Prap Sattru Phai	476	236	712(4%)	201	94	295(4%)
3. Pathumwan	1057	489	1546(8%)	406	230	636(8%)
4. Samphanthawong	87	42	129(1%)	30	12	42(1%)
5. Bang Rak	276	113	389(2%)	106	52	158(2%)
6. Yannawa	462	290	752(4%)	264	131	395(5%)
7. Dusit	1172	595	1767(9%)	504	235	739(9%)
8. Phaya Thai	1209	613	1822(9%)	458	152	610(7%)
9. Huai Khwang	597	344	941(5%)	104	80	184(2%)
10. Phra Kha Nong	1844	764	2608(13%)	798	303	1101(13%)
11. Bang Khen	2274	1252	3526(18%)	797	427	1224(15%)
12. Bang Kapi	905	508	1413(7%)	313	84	397(5%)
13. Nong Chok	30	10	40(0%)	33	31	64(1%)
14. Min Buri	93	41	134(1%)	35	7	42(1%)
15. Lat Krabang	48	19	67(0%)	30	22	52(1%)
16. Thonburi	638	301	939(5%)	421	173	594(7%)
17. Khlong San	300	128	428(2%)	147	74	221(3%)
18. Bangkok Noi	335	173	508(3%)	198	101	299(4%)
19. Bangkok Yai	163	58	221(1%)	126	53	179(2%)
20. Phasi Charoen	329	146	475(2%)	249	104	353(4%)
21. Bang Khun Thian	93	77	170(1%)	100	94	194(2%)
22. Taling Chan	26	27	53(0%)	34	37	71(1%)
23. Rat Burana	170	86	256(1%)	121	67	188(2%)
24. Nong Khaem	32	21	53(0%)	33	22	55(1%)
BMA Area Total	13093	6578	19671(100%)	5700	2667	8367(100%)
STUDY ROADS	4271	1948	6219(32%)	1985	861	2846(34%)

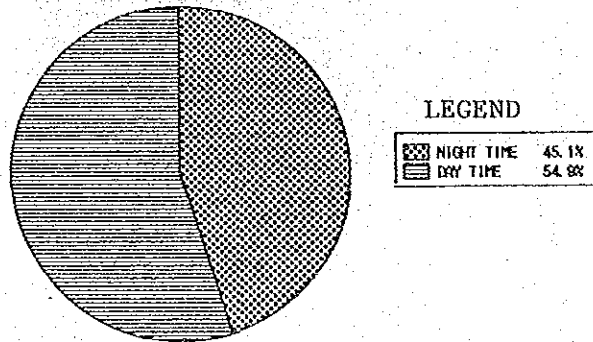
(Yearly Fluctuation of Accident)



(Hourly Fluctuation of Accident)

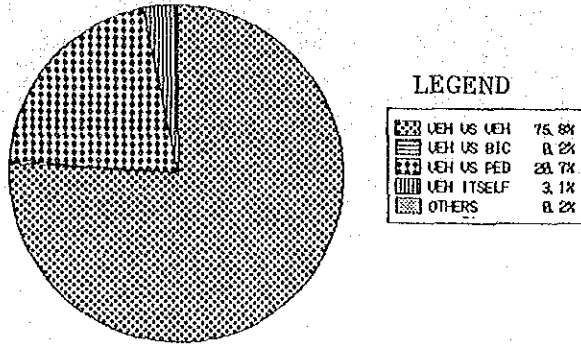


(Day and Night Composition)

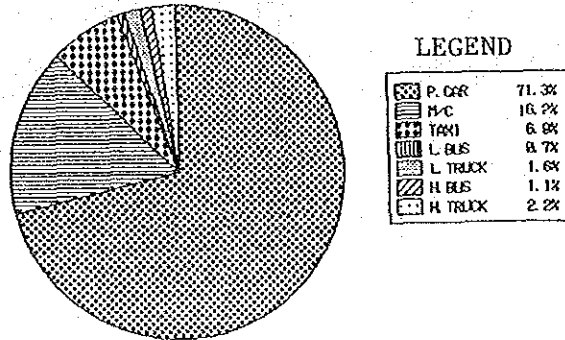


Situation of Traffic Accident Occurrence
on the Study Road

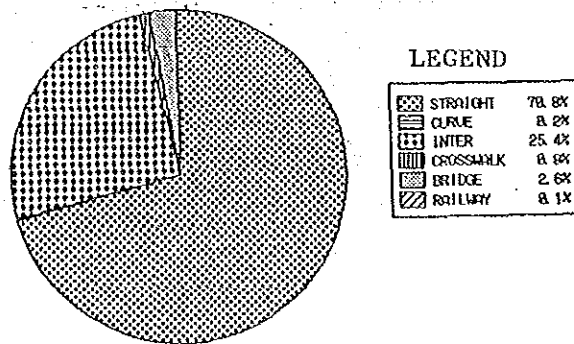
(Type of Accident)



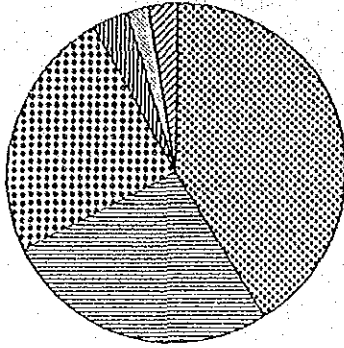
(Type of Vehicle Involved in Accident)



(Accident Location)

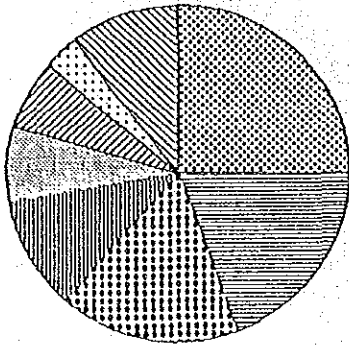


(Cause of Accidents)



Legend	
Improper Driving Speed	41.0%
Improper Overtaking	26.6%
Improper Turning	24.1%
Ignore Signal/Sign	3.5%
Not Stop at Crosswalk	2.0%
Others	2.8%
Total	100.0%

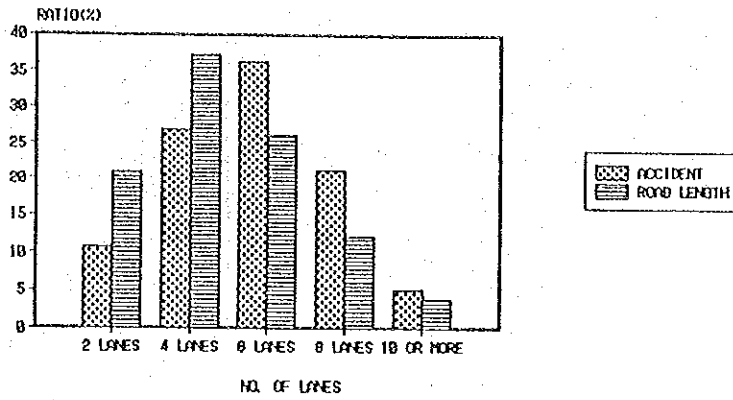
(Collision Pattern)



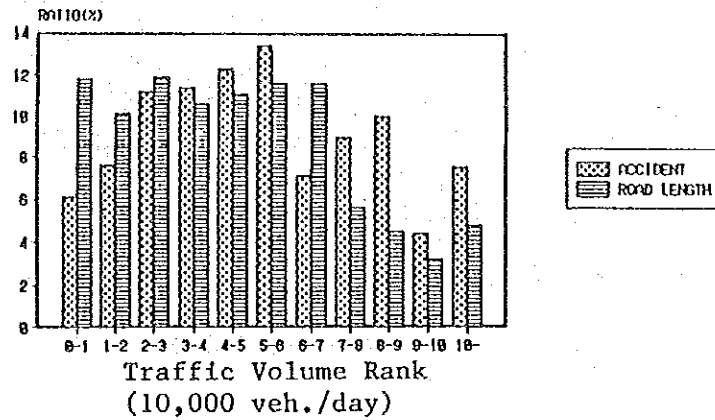
Legend	
Rear End Collision	25.1%
Right Turn Collision	19.5%
Side Contact	16.9%
Crossing Other Part	11.0%
Left Turn Collision	7.3%
Head-on Collision	6.7%
Crossing Intersection	3.3%
Others	10.2%
Total	100.0%

Comparison of Accident by Road Section

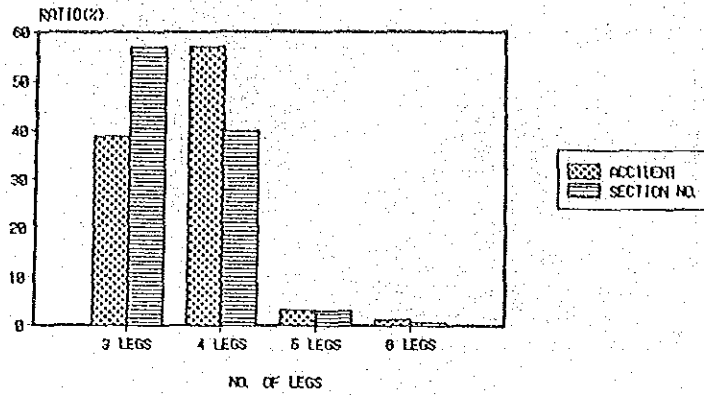
(Comparison of Accidents and Road Length)
by Number of Lanes



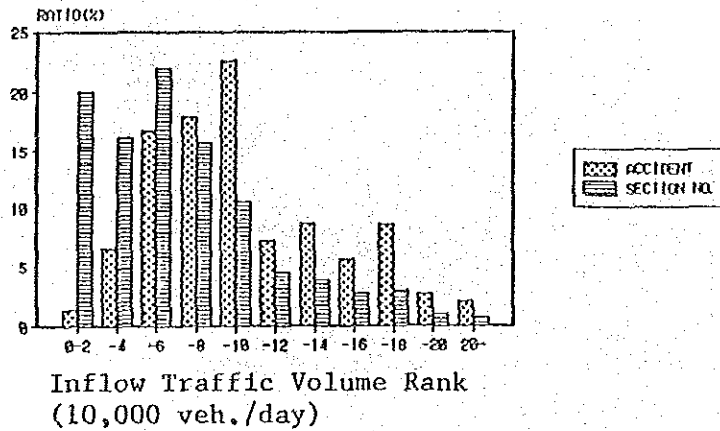
(Comparison of Accidents and Road Length)
by Traffic Volume Rank on Mid-block Section



(Comparison of Accidents and Number of Intersections by Intersection Legs)



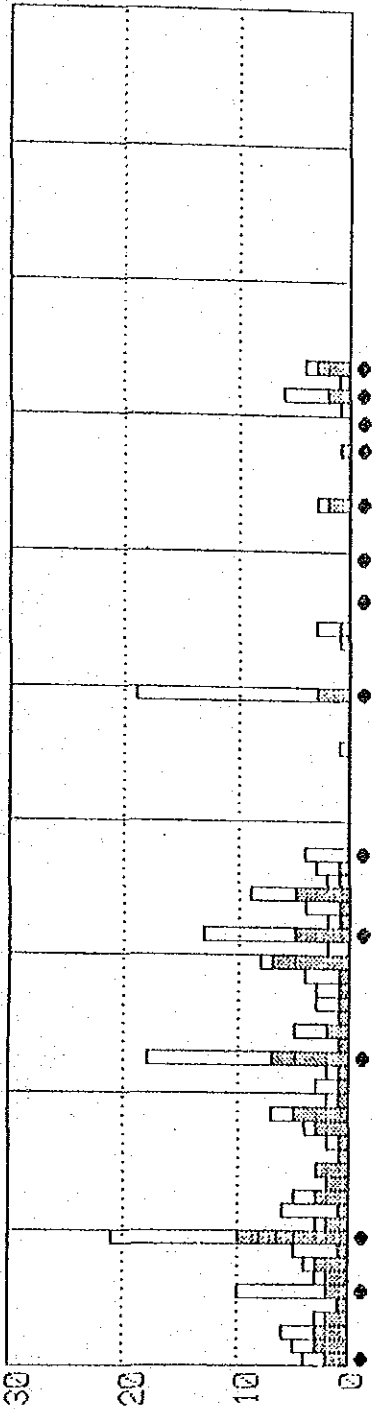
(Comparison of Accidents by Inflow Traffic Volume Rank at Intersections)



Accident Location Histogram

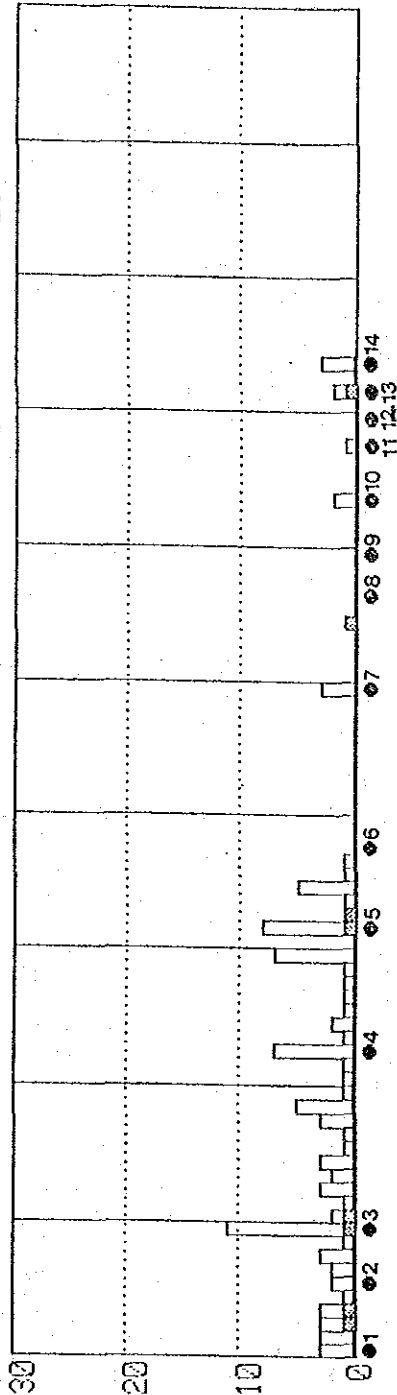
NO. OF ACCIDENTS (2527/2528 ROAD NAME : RAMA IV)

▨ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY



NO. OF CASUALTIES (2527/2528 ROAD NAME : RAMA IV)

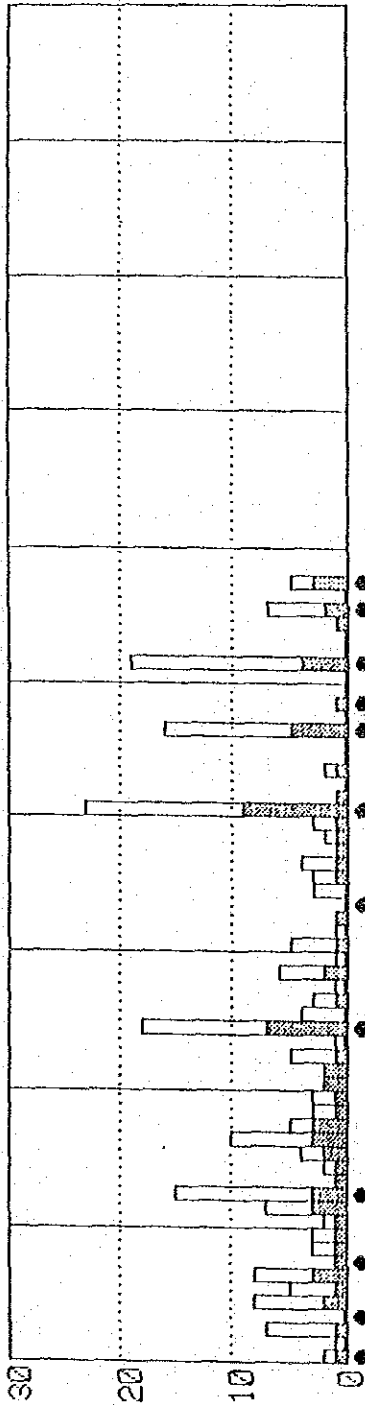
▨ NUMBER OF FATALITIES □ NUMBER OF INJURIES



Accident Location Histogram

NO. OF ACCIDENTS (2527/2528 ROAD NAME : RAMA I/PLOENCHIT)

■ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY

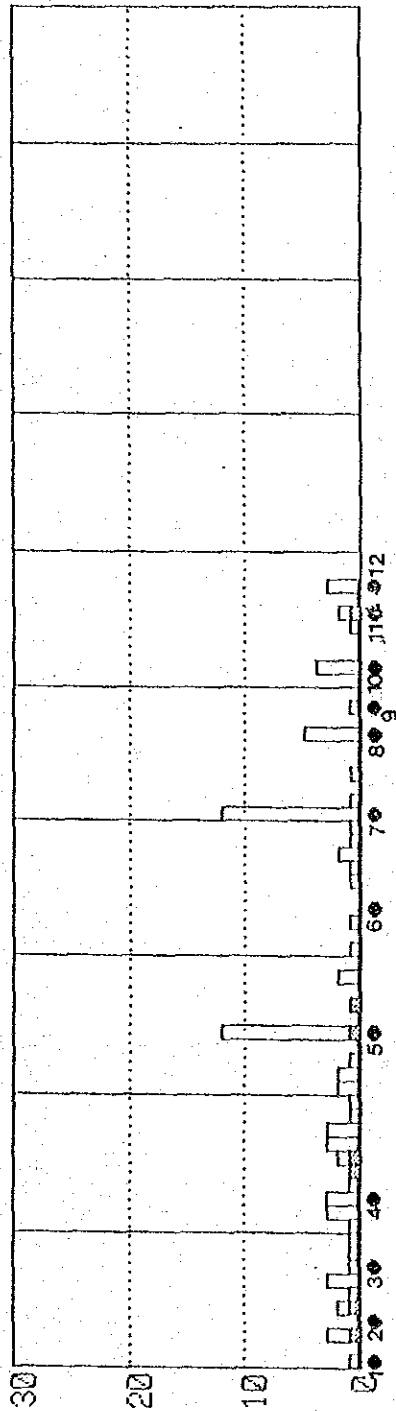


List of Intersection

1. Krung Kasame/Plabpla Chai
2. Rongmuang/Kasatserk
3. Rama I/Nua Tai
4. Charoenphon
5. Pathumwan
6. Rama I/Henry Dunant
7. Rachaprasong
8. Ploenchit/Langsuan
9. Ploenchit/Tonson
10. Ploenchit
11. Ploenchit/Ruamrudee
12. Ploenchit/Expressway

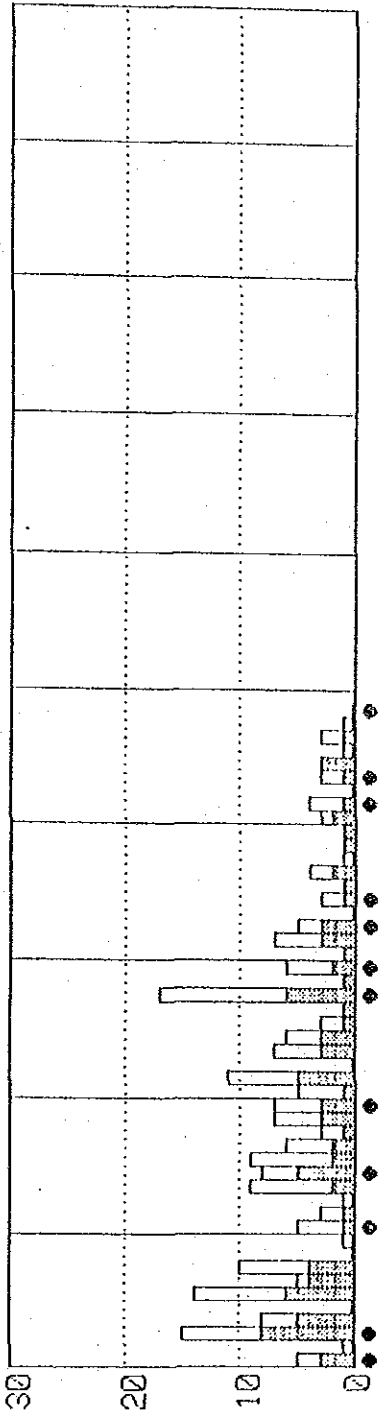
NO. OF CASUALTIES (2527/2528 ROAD NAME : RAMA I/PLOENCHIT)

■ NUMBER OF FATALITIES □ NUMBER OF INJURIES

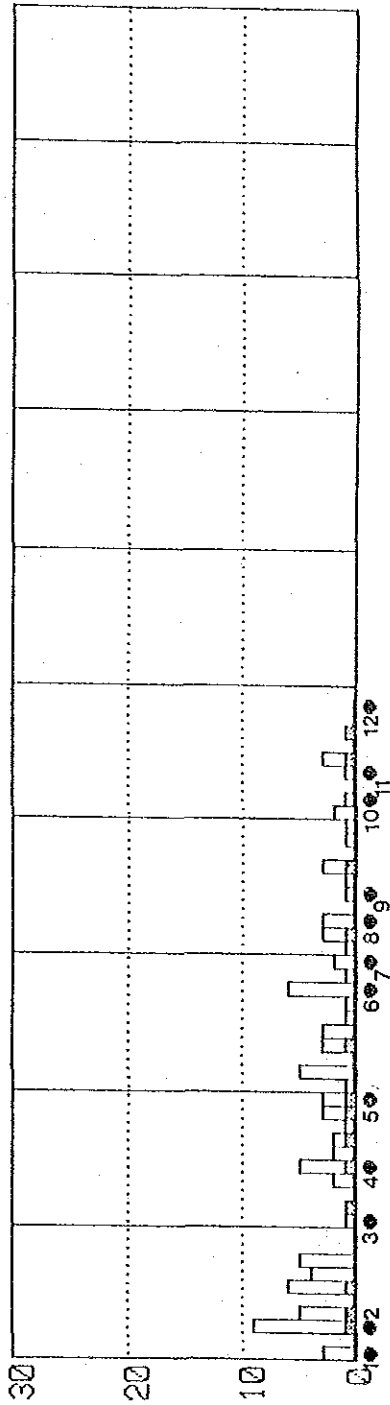


Accident Location Histogram

NO. OF ACCIDENTS (2527/2528 ROAD NAME : SUKUMVIT EXPRESSWAY-YEAK ON NUJ)
 ■ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY



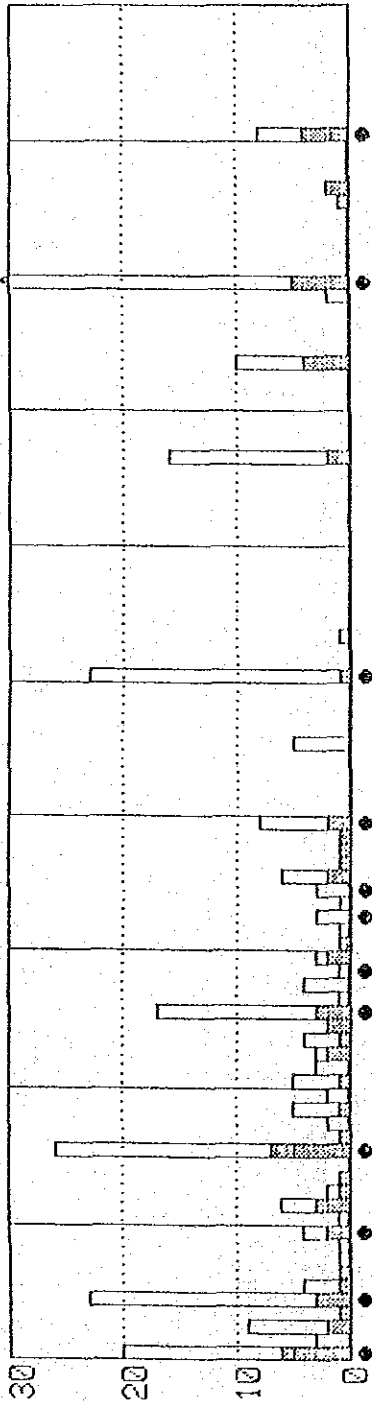
NO. OF CASUALTIES (2527/2528 ROAD NAME : SUKUMVIT EXPRESSWAY-YEAK ON NUJ)
 ■ NUMBER OF FATALITIES □ NUMBER OF INJURIES



Accident Location Histogram

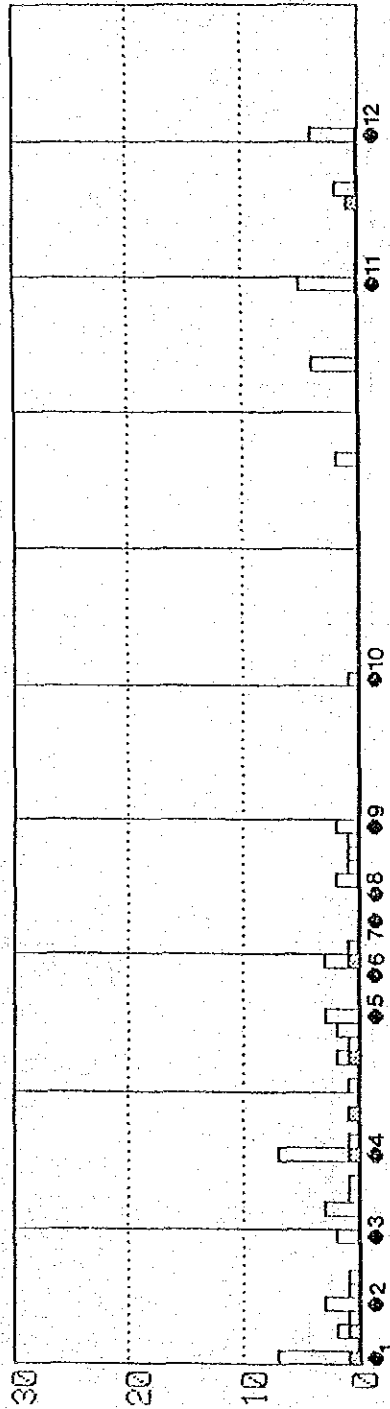
NO. OF ACCIDENTS (2527/2528 ROAD NAME : PETBURI)

■ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY



NO. OF CASUALTIES (2527/2528 ROAD NAME : PETBURI)

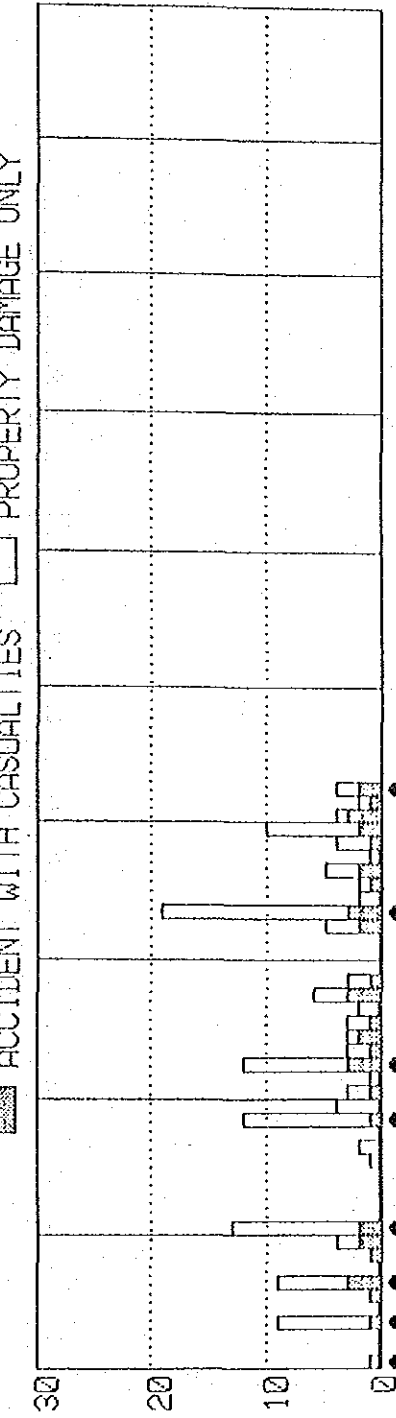
■ NUMBER OF FATALITIES □ NUMBER OF INJURIES



Accident Location Histogram

NO. OF ACCIDENTS (2527/2528 ROAD NAME : SI AYUTTHAYA)

▨ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY

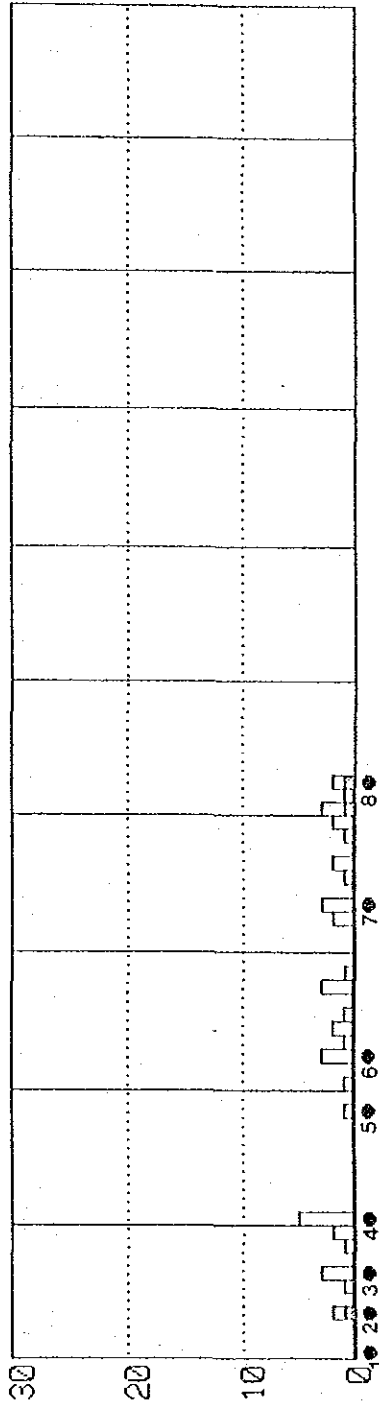


List of Intersection

1. Si Ayutthaya/Samsaen
2. Si Ayutthaya/Rachasrima
3. Yeak Phraboromrupe
4. Benjamabophit
5. Sao Wanee
6. Si Ayutthaya
7. Phayathai
8. Si Ayutthaya/Ratcheprarop

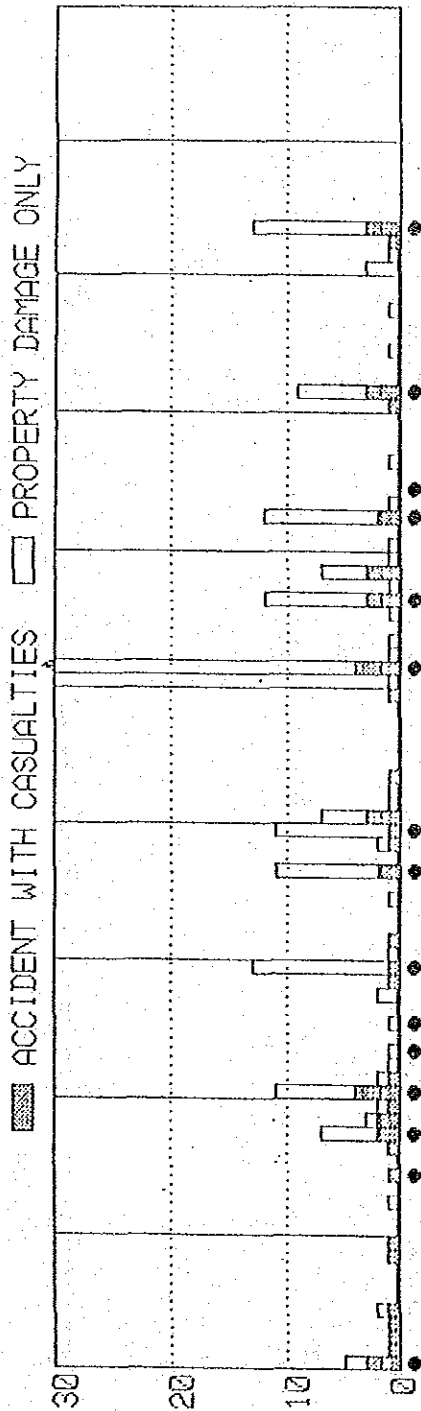
NO. OF CASUALTIES (2527/2528 ROAD NAME : SI AYUTTHAYA)

▨ NUMBER OF FATALITIES □ NUMBER OF INJURIES

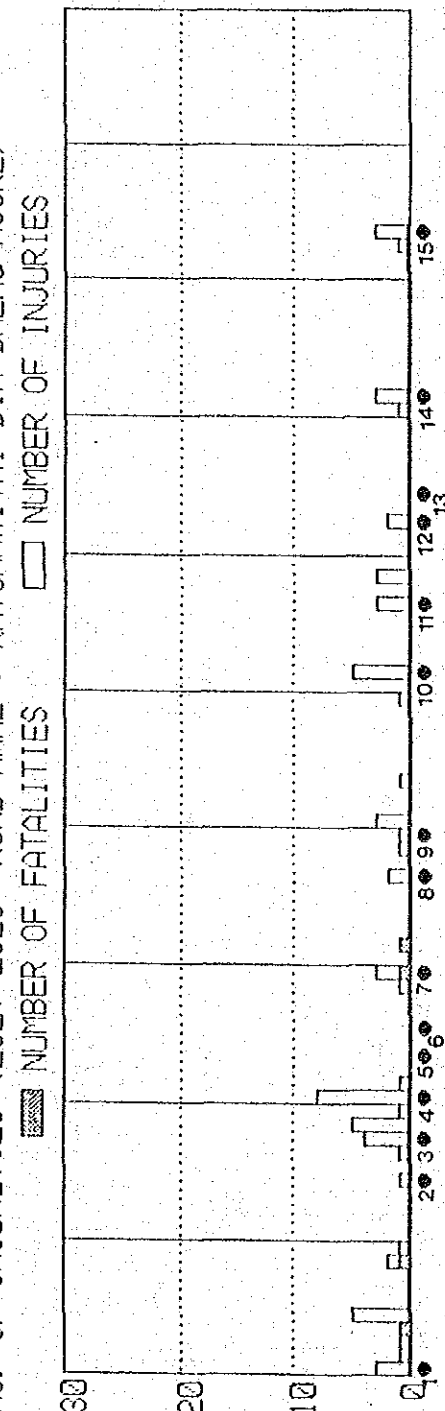


Accident Location Histogram

NO. OF ACCIDENTS (2527/2528 ROAD NAME : RATCHAWITHI/DIN DAENG-ASOKE)

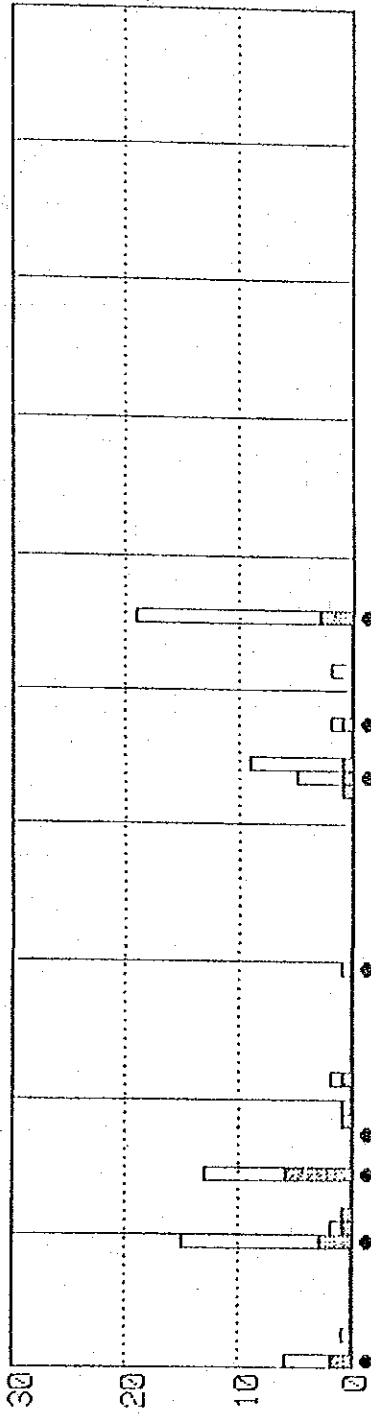


NO. OF CASUALTIES (2527/2528 ROAD NAME : RATCHAWITHI/DIN DAENG-ASOKE)

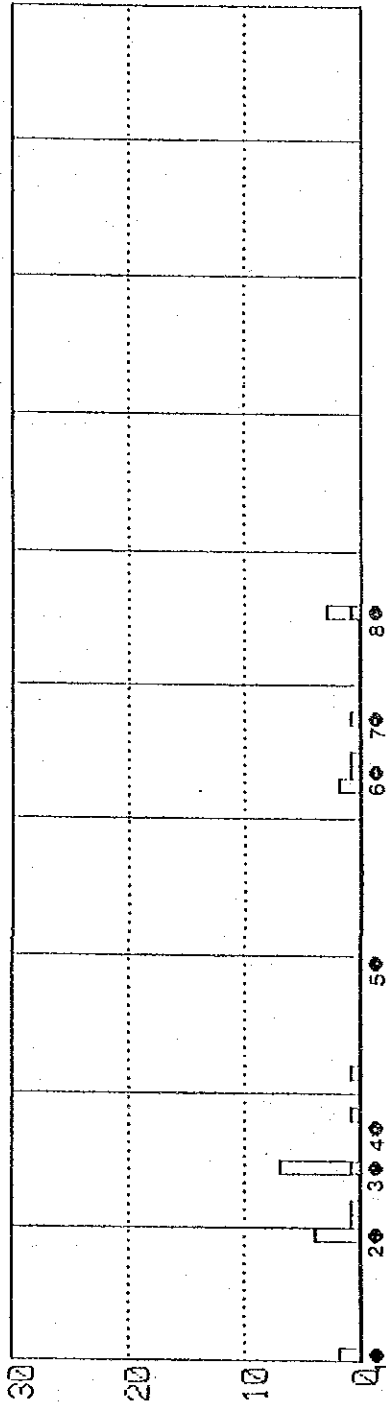


Accident Location Histogram

NO. OF ACCIDENTS (2527/2528 ROAD NAME : THAHAN/PRADIPHAT/INTHAMARA)
 ■ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY



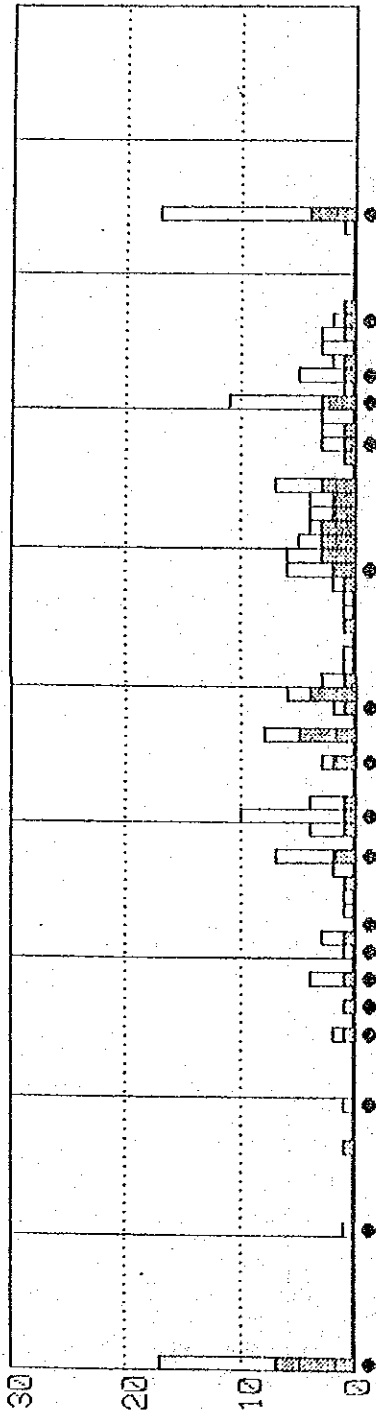
NO. OF CASUALTIES (2527/2528 ROAD NAME : THAHAN/PRADIPHAT/INTHAMARA)
 ■ NUMBER OF FATALITIES □ NUMBER OF INJURIES



Accident Location Histogram

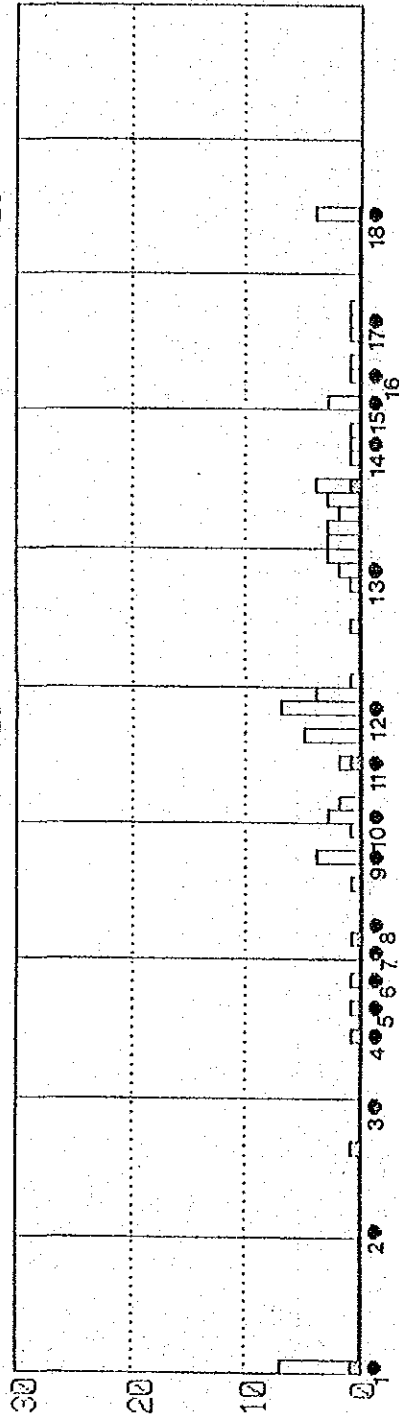
NO. OF ACCIDENTS (2527/2528 ROAD NAME : SAMSEN/PRACHA RAT II)

▨ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY



NO. OF CASUALTIES (2527/2528 ROAD NAME : SAMSEN/PRACHA RAT II)

▨ NUMBER OF FATALITIES □ NUMBER OF INJURIES



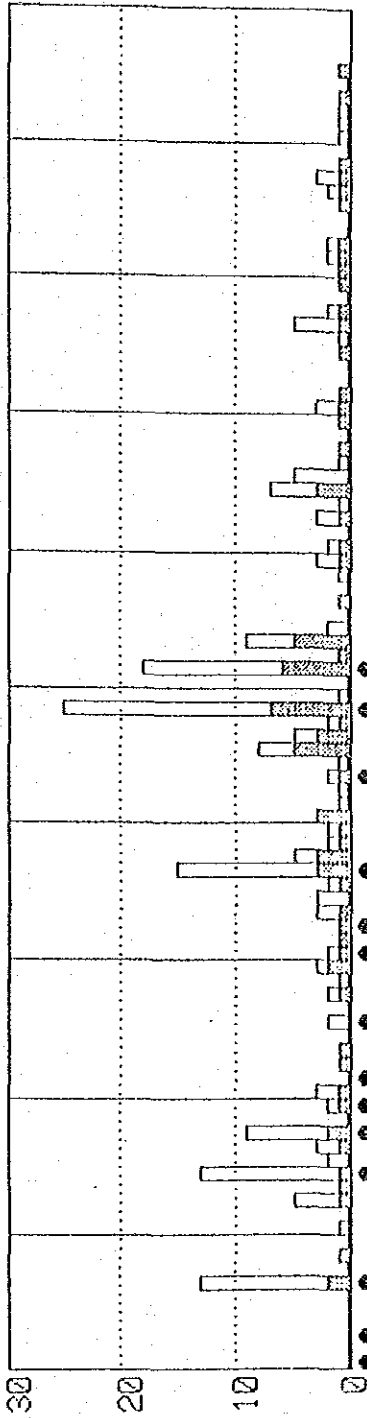
List of Intersection

1. Yeak Sapan Phanpipob
2. Bang Lamphu
3. Visuttikasat/Samsaen
4. Krung Kasame/Samsaen
5. Lookluang/Samsaen
6. Phitsanulok/Samsaen
7. Si Ayutthaya/Samsaen
8. Thaywate
9. Sang Hee
10. Samsaen/Sukhothai
11. Sriyarn
12. Bang Krabue
13. Thahan/Pracharat 1
14. Bang Pho
15. Pracharat 1/Prachanarumit
16. Pracharat 1/Swai Suwan
17. Pracharat 1/Kema Narumit
18. Wongsawang/Pibun Songkram

Accident Location Histogram

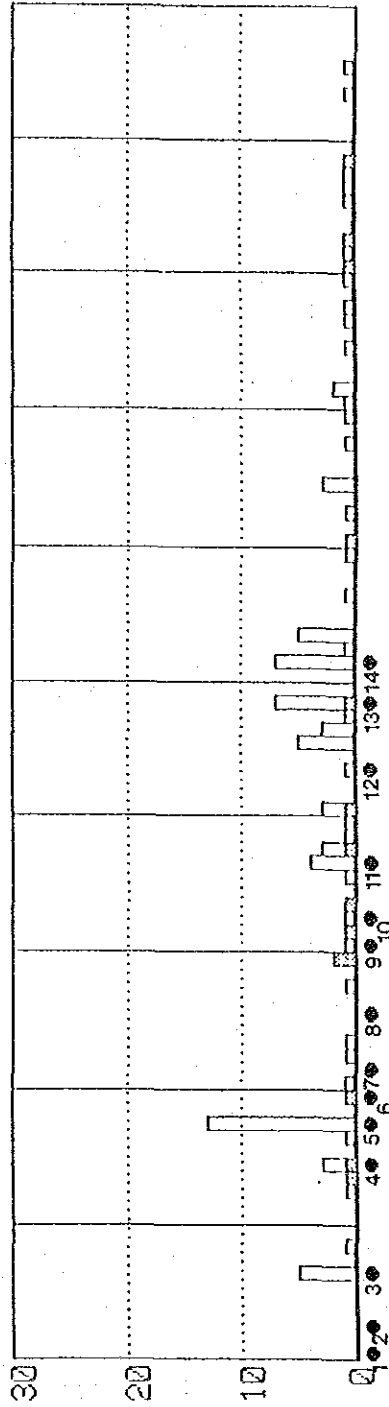
NO. OF ACCIDENTS (2527/2528 ROAD NAME : RAMA V/TECHAWANIT/PRACHACHUEN)

▨ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY



NO. OF CASUALTIES (2527/2528 ROAD NAME : RAMA V/TECHAWANIT/PRACHACHUEN)

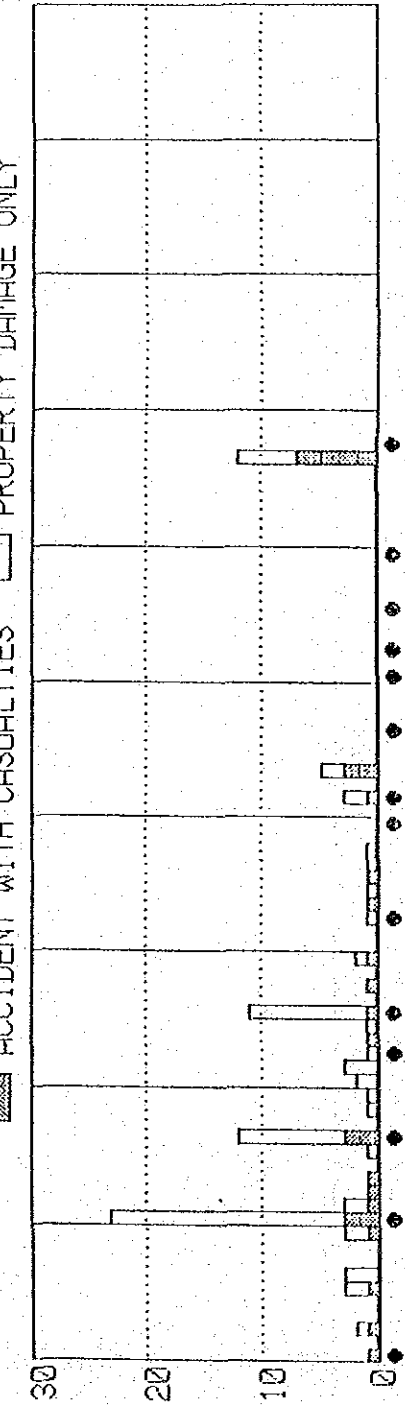
▨ NUMBER OF FATALITIES □ NUMBER OF INJURIES



Accident Location Histogram

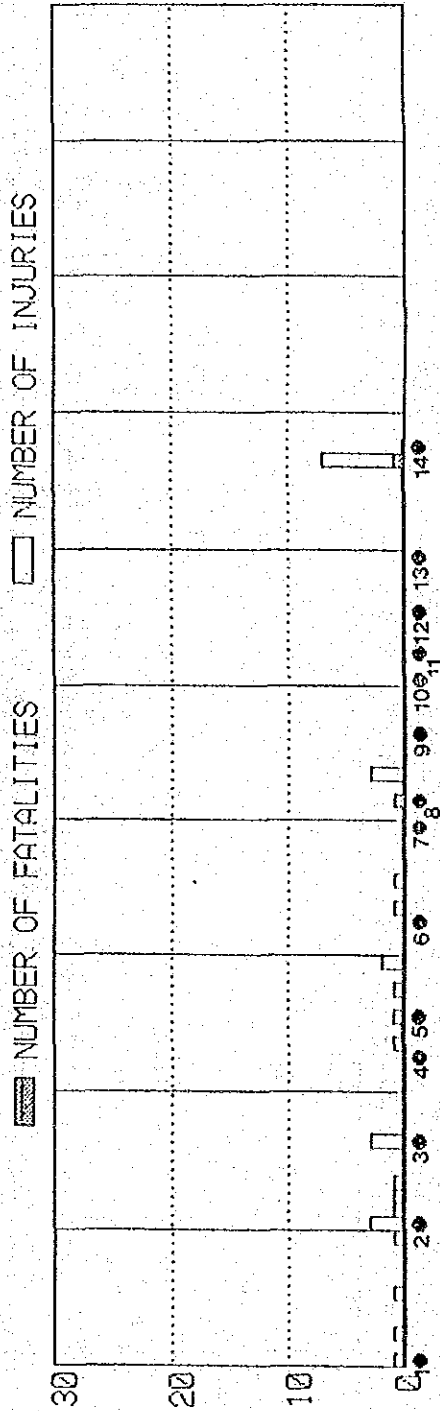
NO. OF ACCIDENTS (2527/2528 ROAD NAME : RAMA VI-2)

▨ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY



NO. OF CASUALTIES (2527/2528 ROAD NAME : RAMA VI-2)

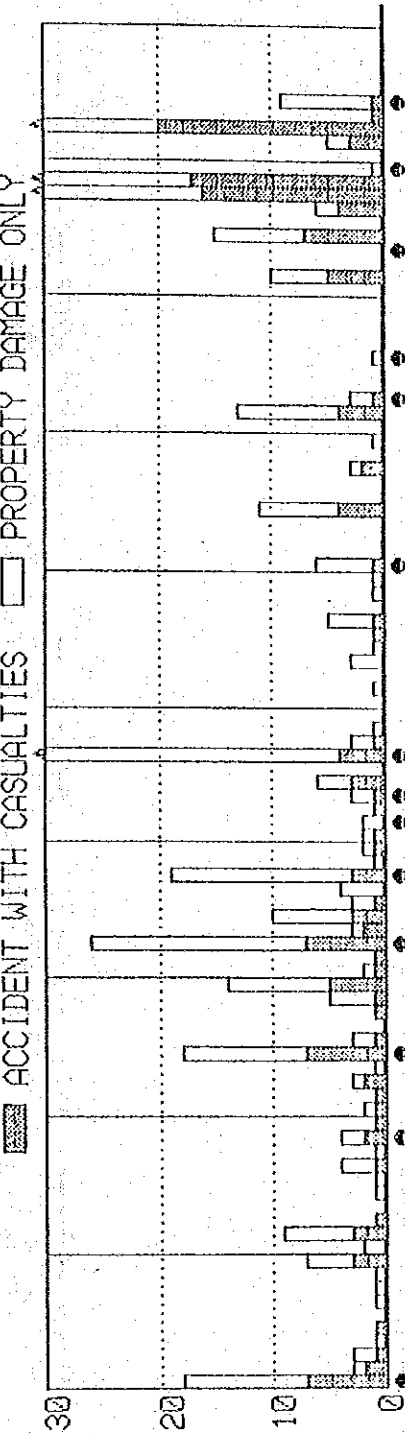
▨ NUMBER OF FATALITIES □ NUMBER OF INJURIES



Accident Location Histogram

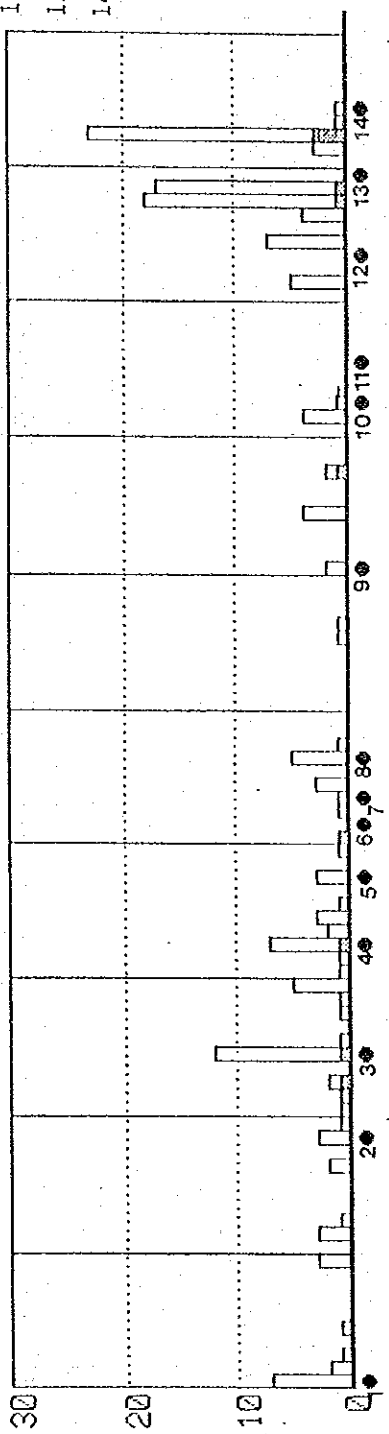
NO. OF ACCIDENTS (2527/2528 ROAD NAME : PHAYATHAI/PAHON YOTHIN)

▨ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY



NO. OF CASUALTIES (2527/2528 ROAD NAME : PHAYATHAI/PAHON YOTHIN)

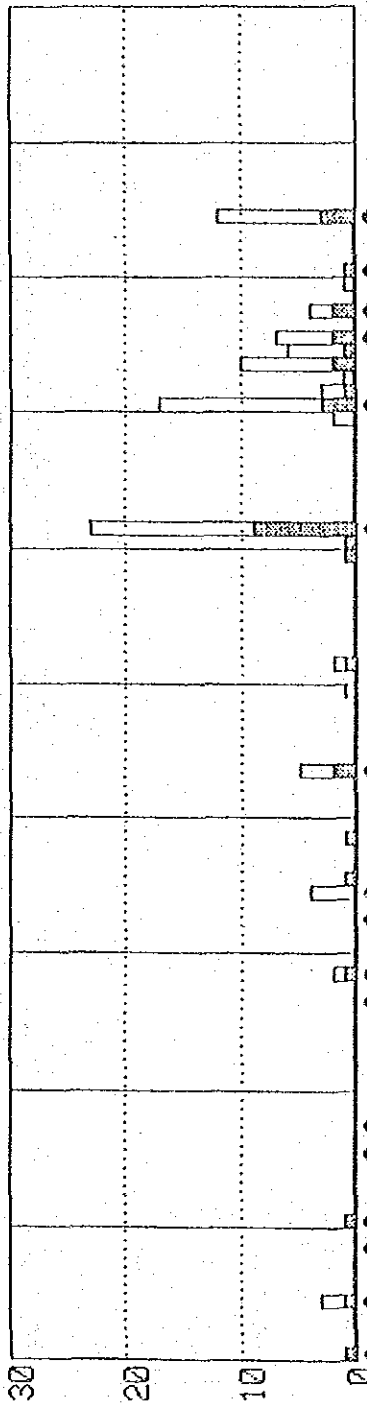
▨ NUMBER OF FATALITIES □ NUMBER OF INJURIES



Accident Location Histogram

NO. OF ACCIDENTS <2527/2528 ROAD NAME : SILOM/RATCHADAMRI/RATCHAPRAROP>

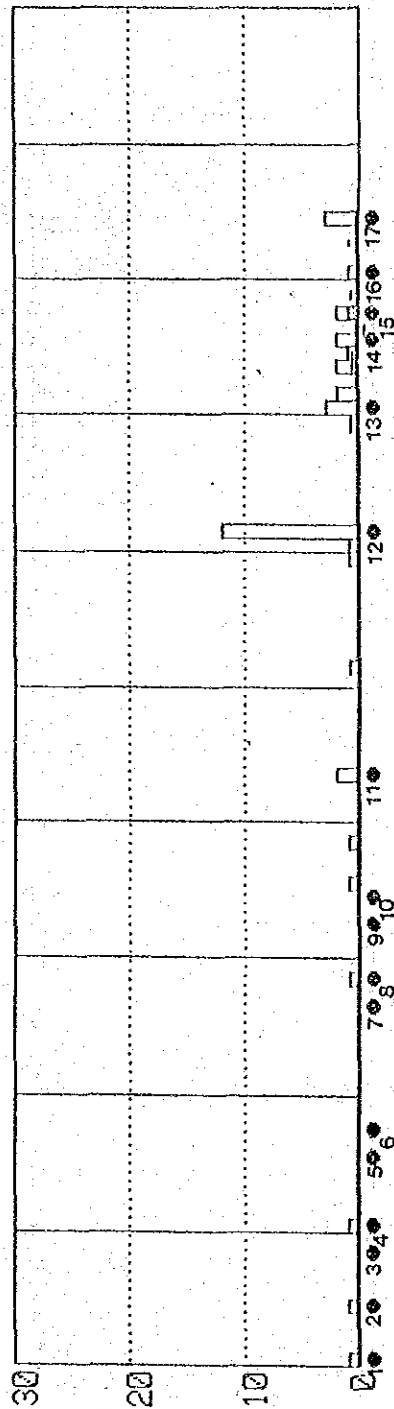
■ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY



A-20

NO. OF CASUALTIES <2527/2528 ROAD NAME : SILOM/RATCHADAMRI/RATCHAPRAROP>

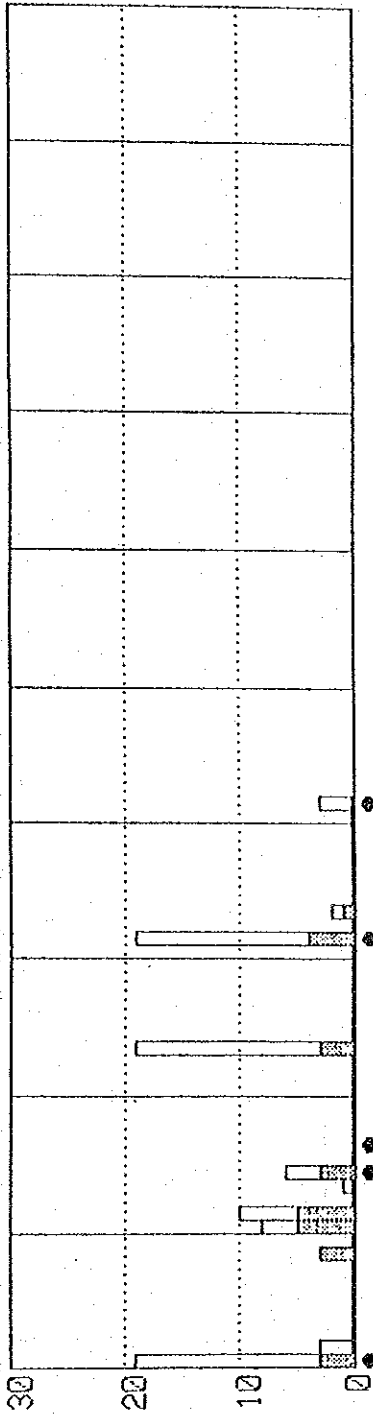
■ NUMBER OF FATALITIES □ NUMBER OF INJURIES



Accident Location Histogram

NO. OF ACCIDENTS (2527/2528 ROAD NAME : WITTHAYU)

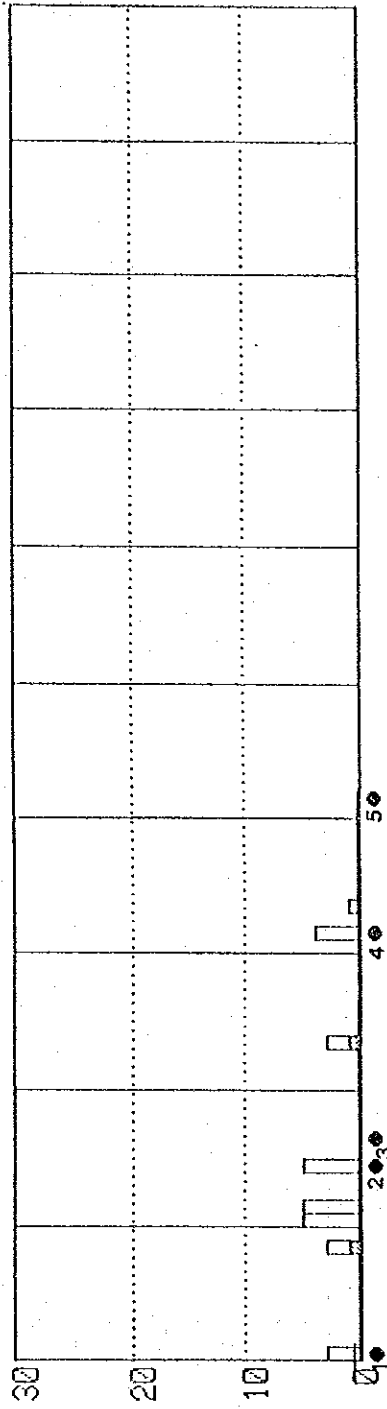
■ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY



- List of Intersection
1. Rama IV/Witthayu
 2. Witthayu/Sarasin
 3. Witthayu/Ruamrudee
 4. Ploenchit
 5. Petburi/Witthayu

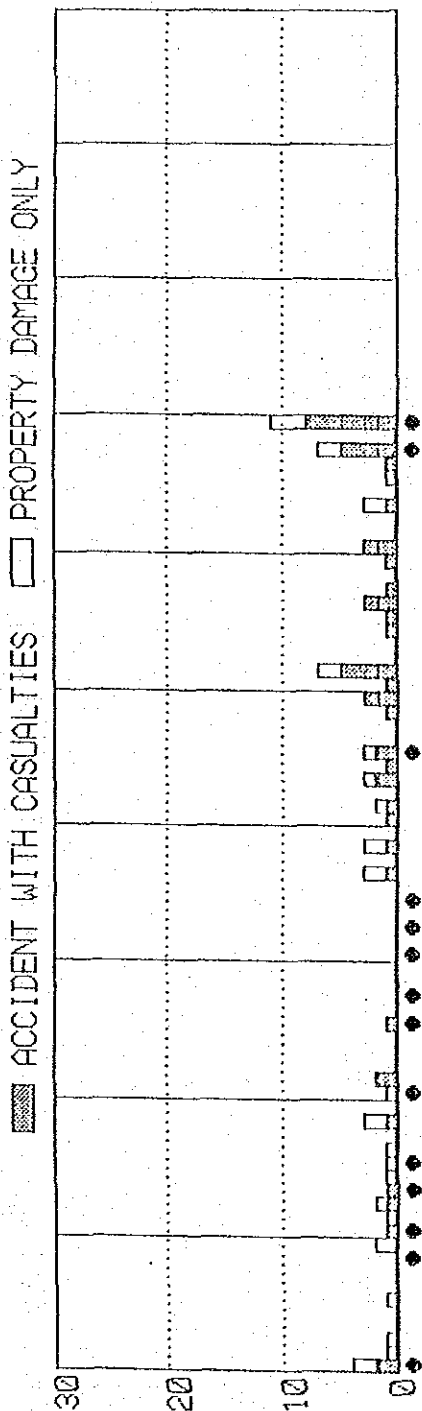
NO. OF CASUALTIES (2527/2528 ROAD NAME : WITTHAYU)

■ NUMBER OF FATALITIES □ NUMBER OF INJURIES

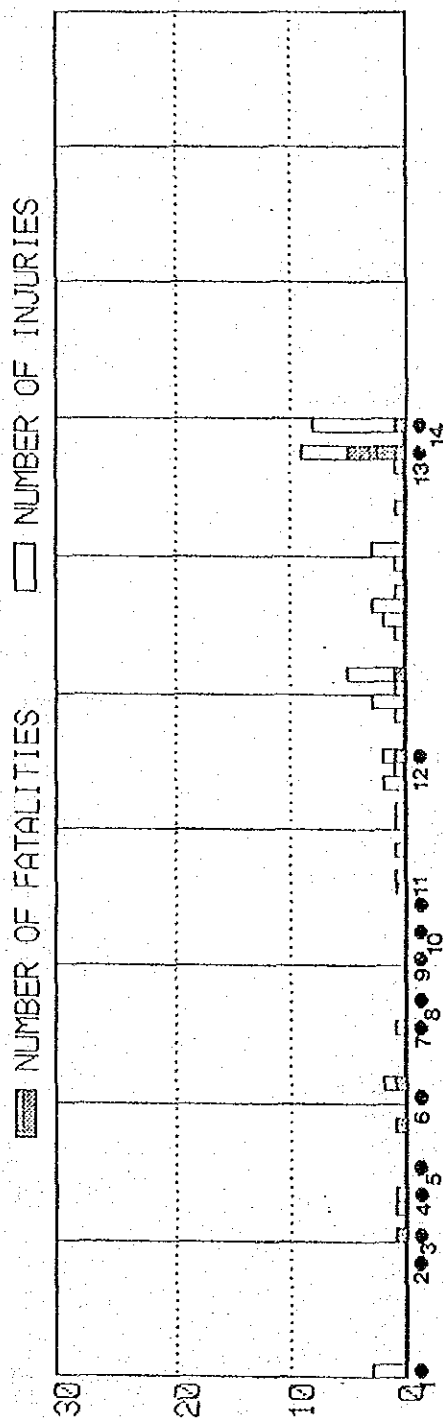


Accident Location Histogram

NO. OF ACCIDENTS (2527/2528 ROAD NAME : CHAROEN KRUNG)



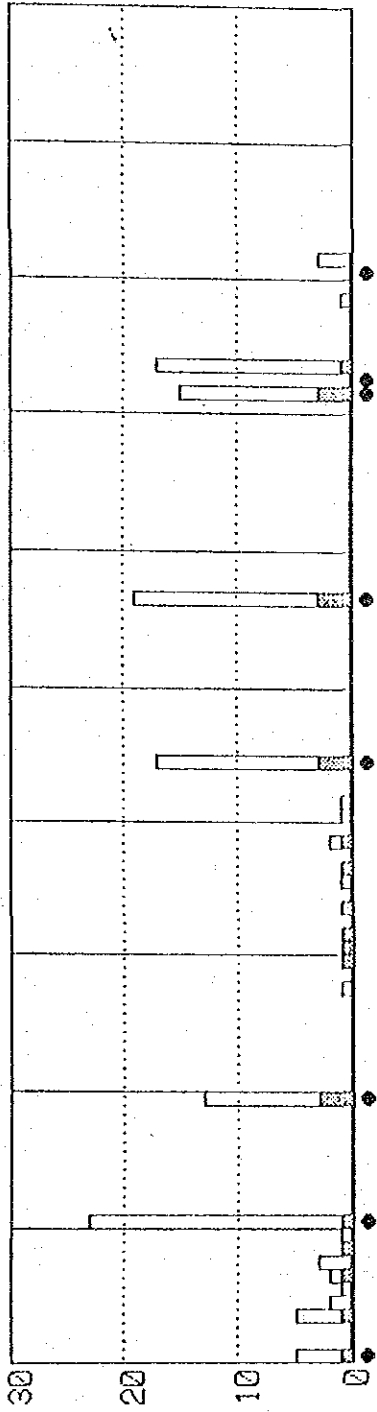
NO. OF CASUALTIES (2527/2528 ROAD NAME : CHAROEN KRUNG)



Accident Location Histogram

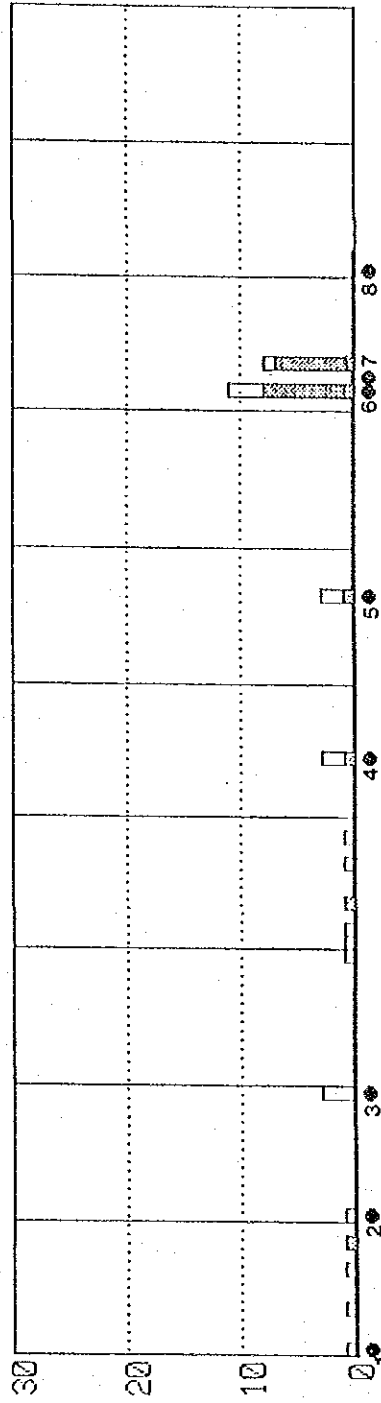
NO. OF ACCIDENTS (2527/2528 ROAD NAME : ASOKE/RACHADAPHISEK)

▨ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY



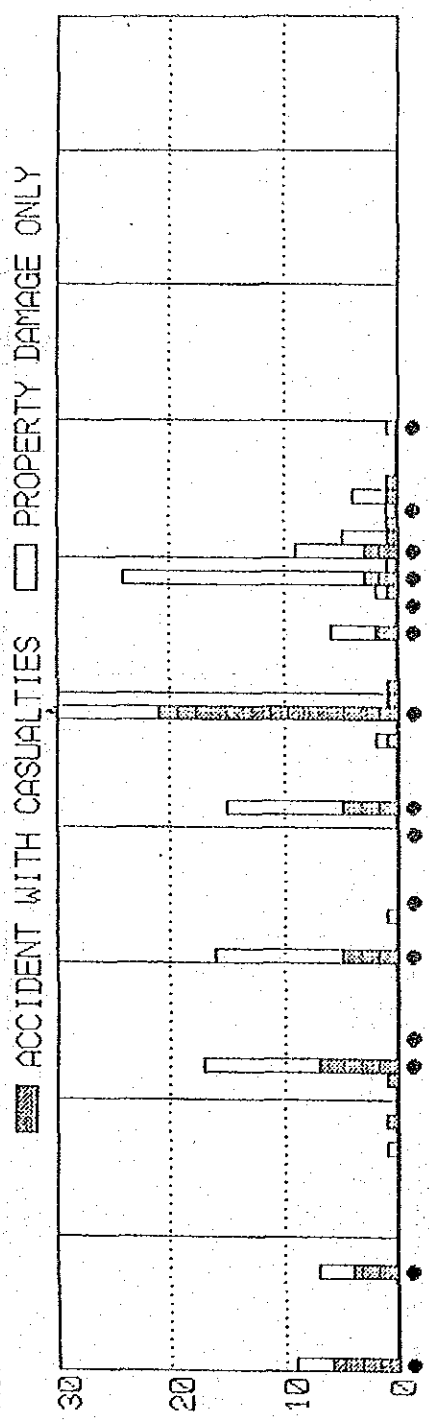
NO. OF CASUALTIES (2527/2528 ROAD NAME : ASOKE/RACHADAPHISEK)

▨ NUMBER OF FATALITIES □ NUMBER OF INJURIES

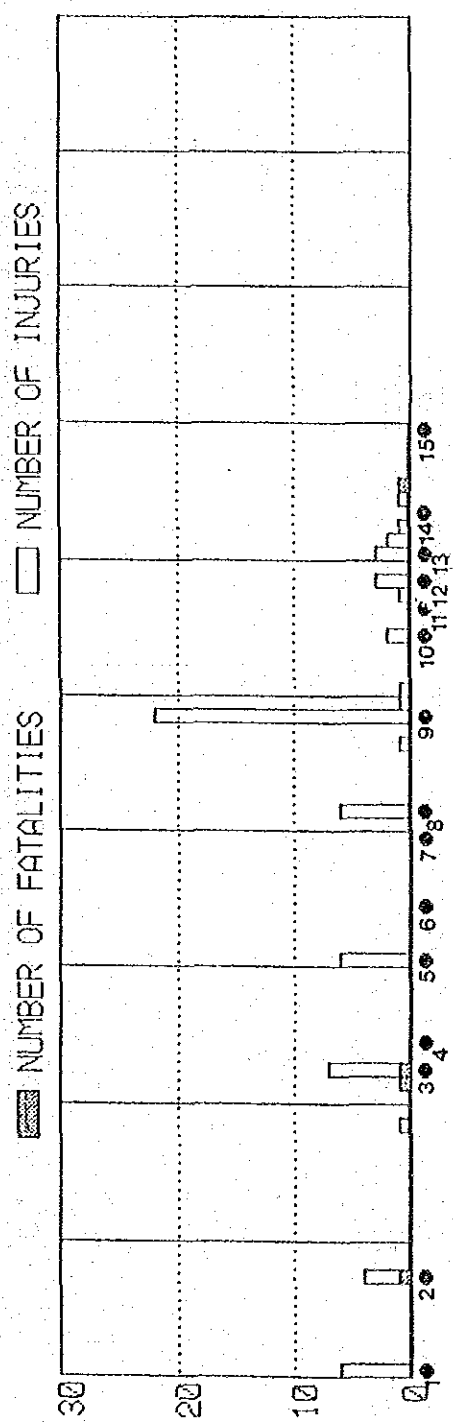


Accident Location Histogram

NO. OF ACCIDENTS (2527/2528 ROAD NAME : PHRAPINKLAO/RATCHADAMNOEN KLANG & NOK

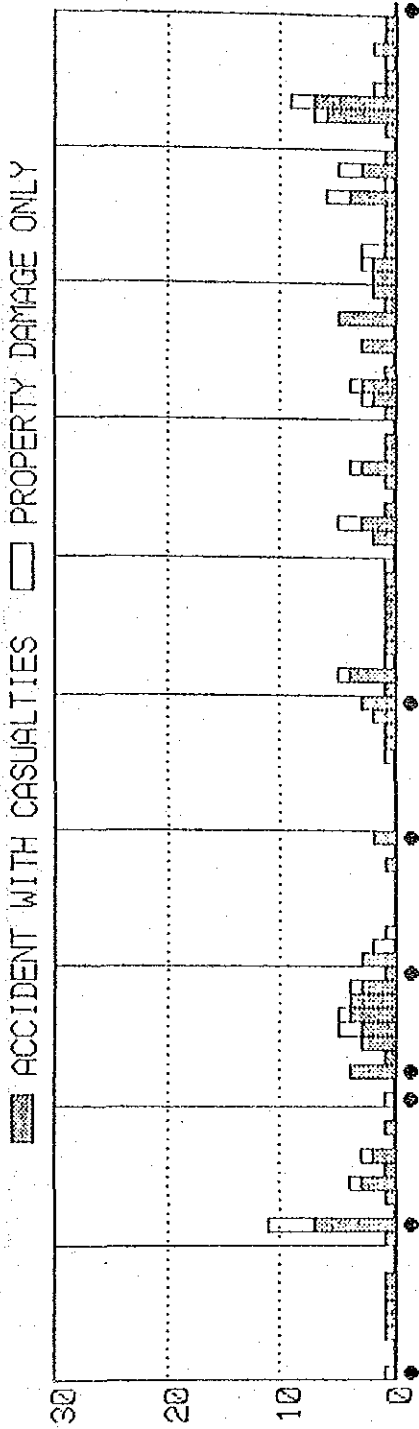


NO. OF CASUALTIES (2527/2528 ROAD NAME : PHRAPINKLAO/RATCHADAMNOEN KLANG & NOK



Accident Location Histogram

NO. OF ACCIDENTS (2527/2528 ROAD NAME : LATYA/PHETCHAKASEM)

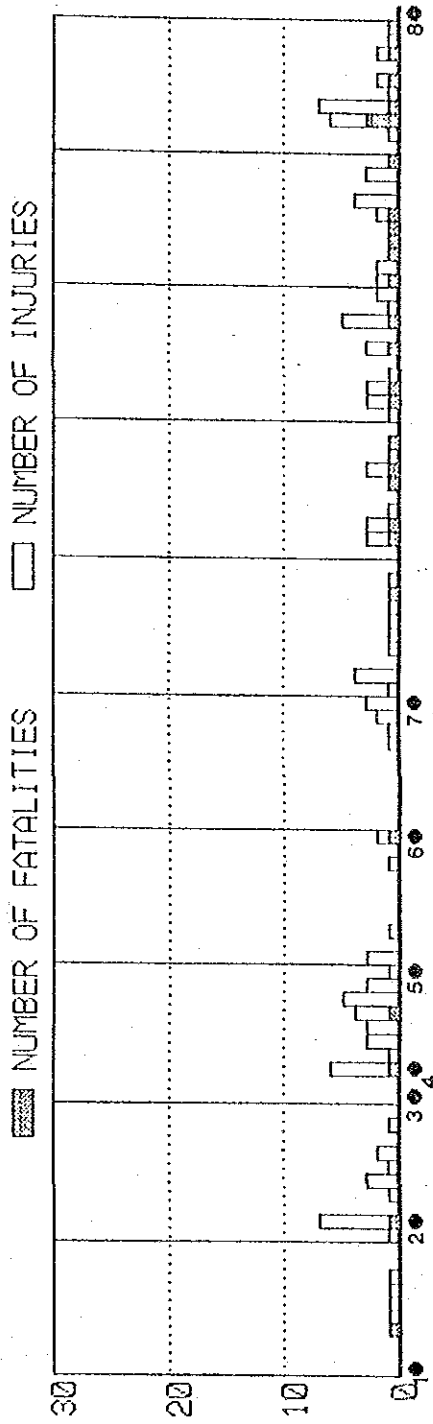


List of Intersection

1. Ladya/Somdej Chaophraya
2. Ladya/Tha Dindaeng
3. Saraphee 2/Ladya
4. Wongwien Yai
5. Intaraphitak/Terd Thai
6. Yeak Wat Sangkajai
7. Tha Phra
8. Bang Kare

A-25

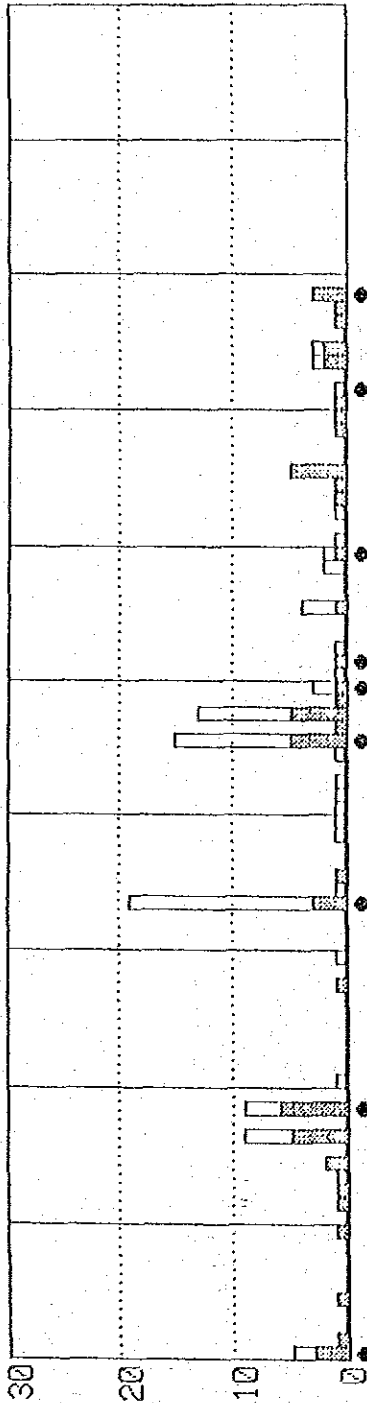
NO. OF CASUALTIES (2527/2528 ROAD NAME : LATYA/PHETCHAKASEM)



Accident Location Histogram

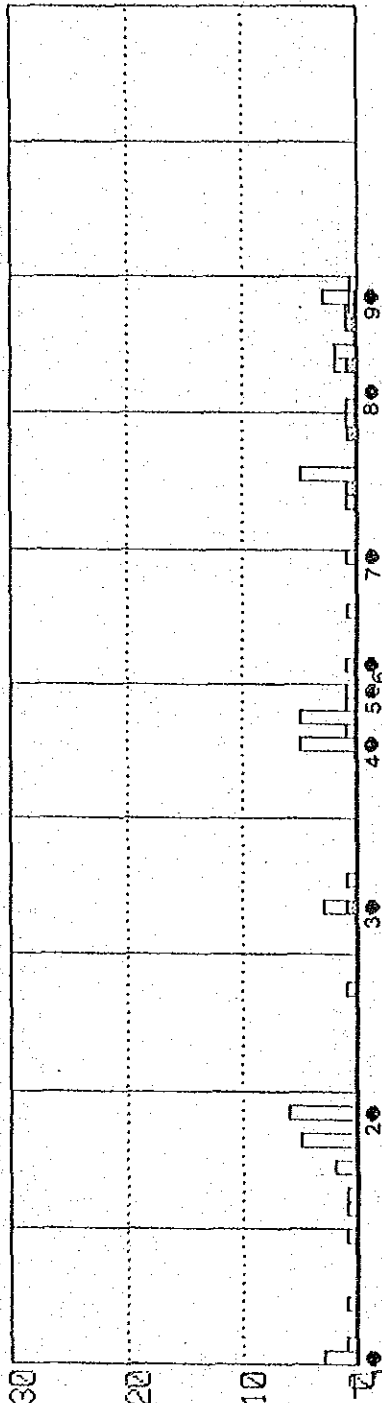
NO. OF ACCIDENTS (2527/2528 ROAD NAME : CHARAN SANITWONG 2)

 ACCIDENT WITH CASUALTIES
  PROPERTY DAMAGE ONLY



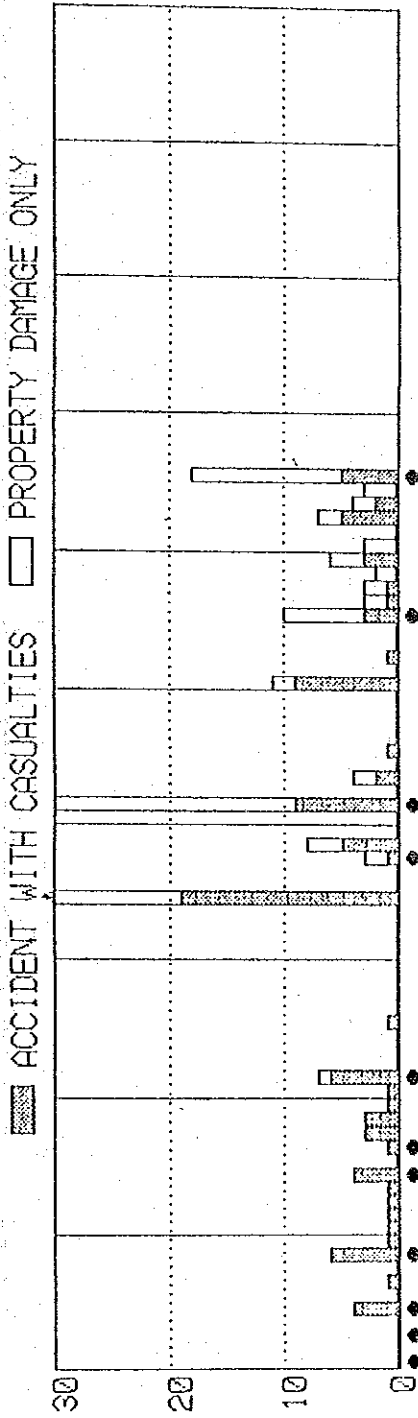
NO. OF CASUALTIES (2527/2528 ROAD NAME : CHARAN SANITWONG 2)

 NUMBER OF FATALITIES
  NUMBER OF INJURIES



Accident Location Histogram

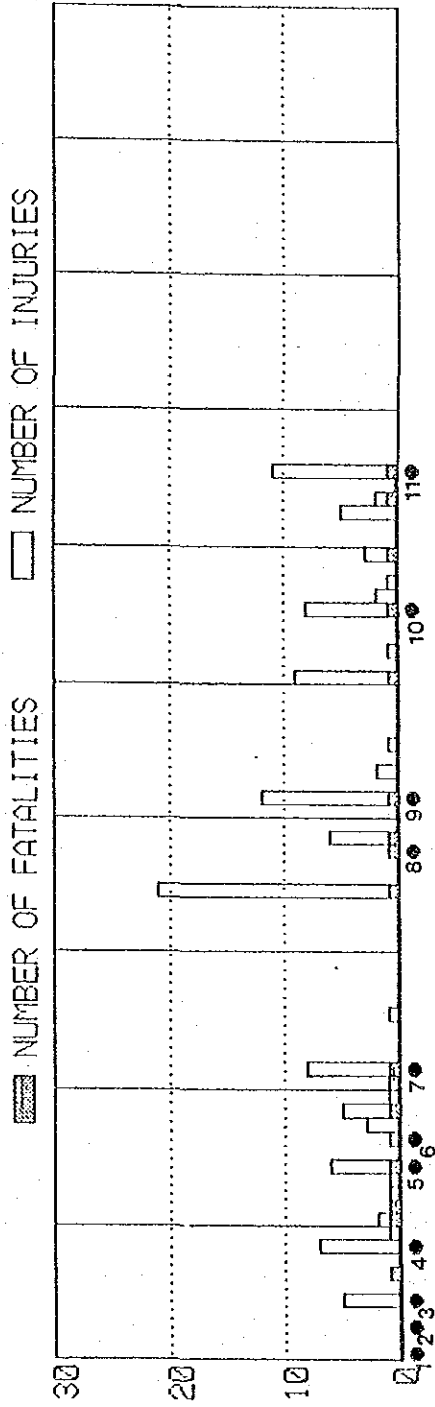
NO. OF ACCIDENTS (2527/2528 ROAD NAME : PRACHATIPOK/TAKSIN/SUKSAWAT)



List of Intersection

1. Prachatipok/Tetsaban 1
2. Prachatipok/Tetsaban 2
3. Prachatipok/Tetsaban 3
4. Ban. Khake
5. Wongwien Yai
6. Charoenrat/Prachatipok
7. Saraphee/Prachatipok
8. Somdej Chaophraya/Watsutti
9. Mahai Swan
10. Daokanong/Jomthong
11. Thonburi Pakthor

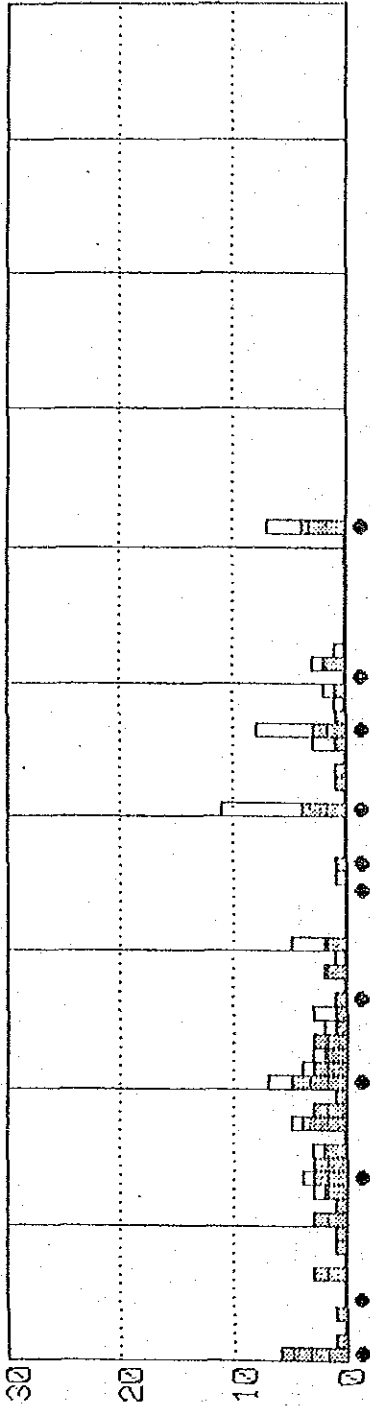
NO. OF CASUALTIES (2527/2528 ROAD NAME : PRACHATIPOK/TAKSIN/SUKSAWAT)



Accident Location Histogram

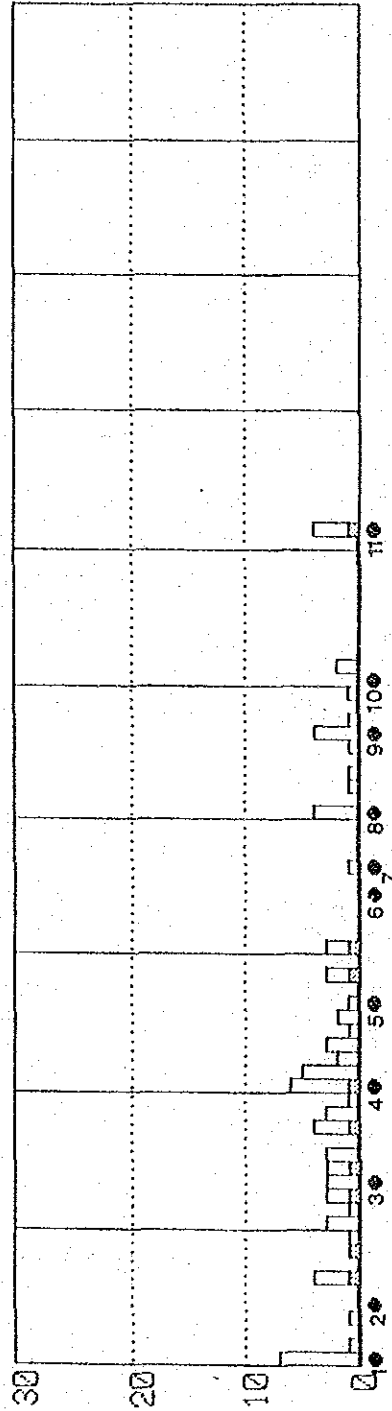
NO. OF ACCIDENTS (2527/2528 ROAD NAME : ITSARAPHAP)

▨ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY



NO. OF CASUALTIES (2527/2528 ROAD NAME : ITSARAPHAP)

▨ NUMBER OF FATALITIES □ NUMBER OF INJURIES



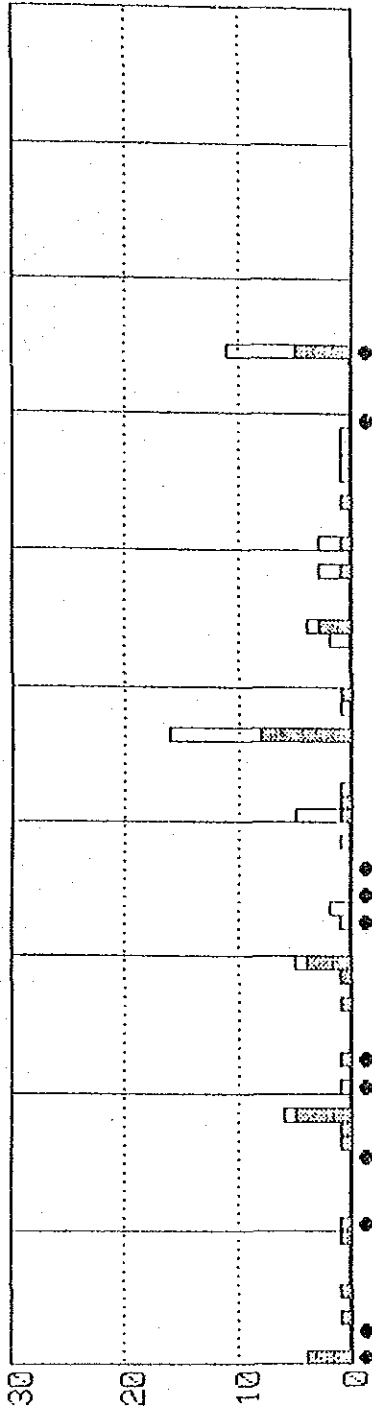
List of Intersection

1. Ban Khake
2. Itsaraphap
3. Itsaraphap/Phetchakasem
4. Itsaraphap/Wangderm
5. Itsaraphap/Thaveethapisake
6. Ratsathha/Wat Dongmoonlek
7. Itsaraphap/Wat Dongmoonlek
8. Prannok
9. Sirirat
10. Arun Amarin/Tang Rotfai
11. Arun Amarin

Accident Location Histogram

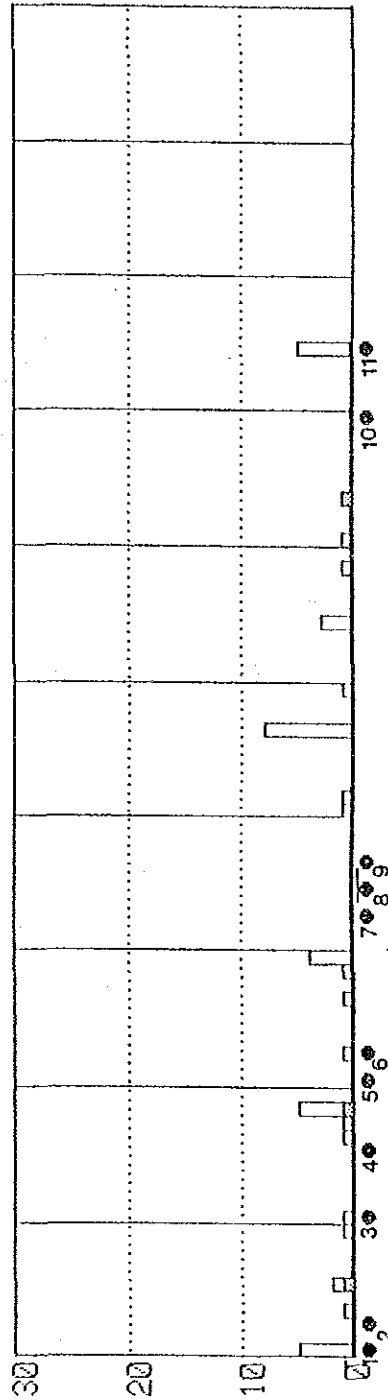
NO. OF ACCIDENTS (2527/2528 ROAD NAME : SOMDEJCHAOPHRAYA/CHAROEN NAKHON)

▨ ACCIDENT WITH CASUALTIES □ PROPERTY DAMAGE ONLY



NO. OF CASUALTIES (2527/2528 ROAD NAME : SOMDEJCHAOPHRAYA/CHAROEN NAKHON)

▨ NUMBER OF FATALITIES □ NUMBER OF INJURIES



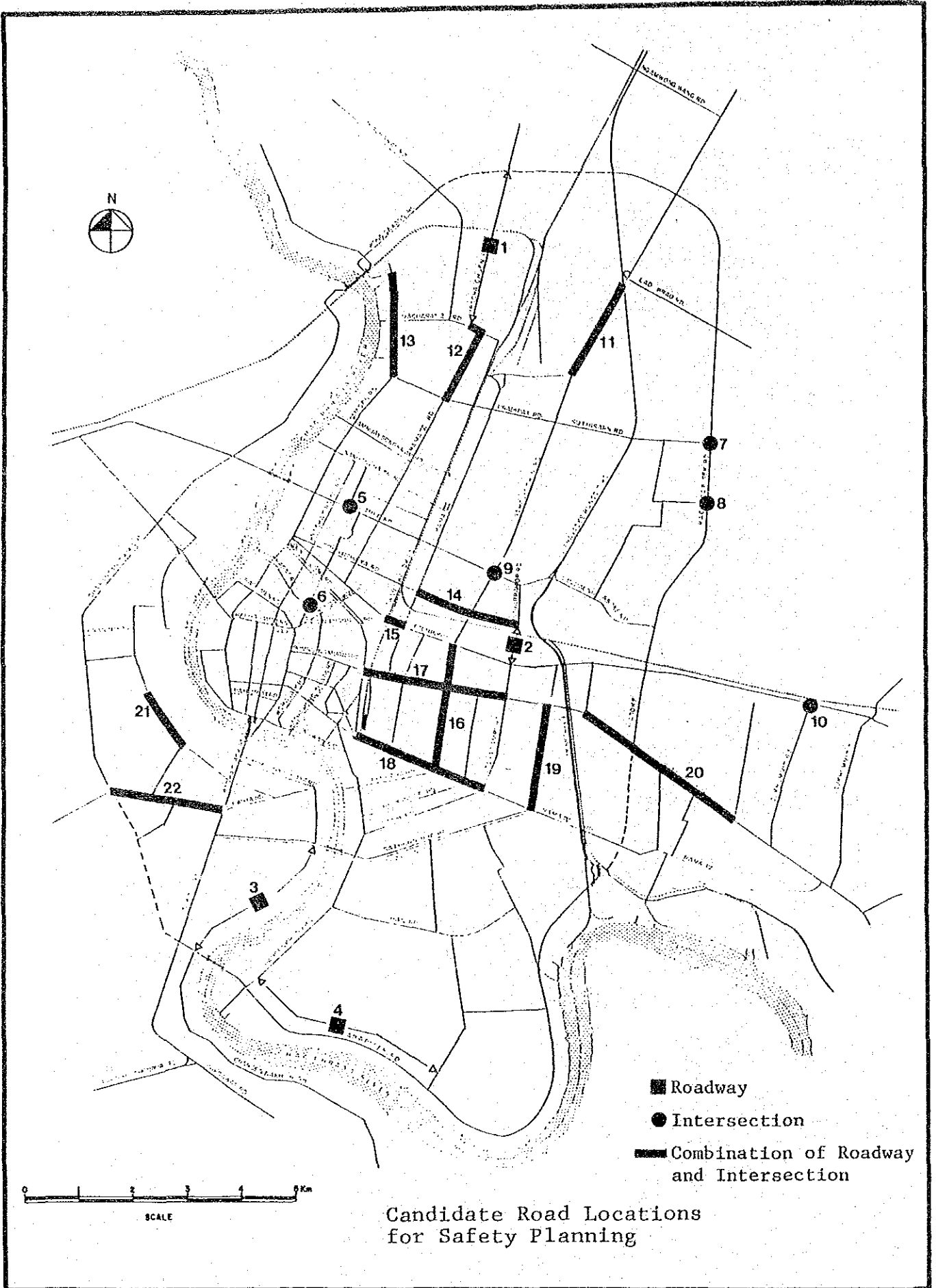
86/03/18

13:06:23

* LIST OF IDENTIFIED HAZARDOUS ROADWAY SECTIONS

RANKING	S.NODE	E.NODE	ROAD NAME	LENGTH	C.WIDTH	LANE	MEDIAN	ONEWAY	ADT	ACCIDENT	CASUALTIES	A/RATE	RATING	POLICE
1	81	936	SOI PRAOU 1	4200M	6.00M	2	NO	NO	2870	22	15	500.03	YES	YES
2	512	513	PHAHON YOTHIN	1068M	20.00M	8	YES	NO	96674	83	47	220.24	YES	YES
3	734	735	CHAROEN NAKHON	1165M	20.00M	6	NO	NO	56229	43	16	179.84	YES	YES
4	360	922	PRACHA CHUEN	2742M	6.00M	2	NO	NO	35679	63	29	176.43	YES	YES
5	17	18	RAMA IV	215M	25.00M	10	YES	NO	110589	14	10	161.32	YES	YES
6	18	19	RAMA IV	200M	25.00M	10	YES	NO	104773	12	6	156.89	YES	YES
7	824	825	ITSARAPHAP	500M	14.00M	4	NO	NO	53713	15	13	153.02	YES	YES
8	215	610	RATCHAPRAPHOP	560M	15.00M	5	NO	YES	61372	19	5	151.46	YES	YES
9	358	359	TECHA WANIT	650M	12.00M	4	NO	NO	40985	14	9	133.69	YES	YES
10	359	361	TECHA WANIT	750M	12.00M	4	NO	NO	40985	14	9	133.69	YES	YES
11	20	504	PHAYA THAI	1080M	23.00M	8	YES	NO	68344	35	13	129.91	YES	YES
12	116	117	RAMA I	480M	18.00M	7	YES	YES	66971	13	7	127.84	YES	YES
13	211	212	PETBURI	330M	21.00M	6	YES	NO	84848	13	3	127.20	YES	YES
14	505	611	SI AYUTTHAYA	900M	22.80M	8	YES	NO	79750	31	9	118.33	YES	YES
15	21	22	RAMA IV	380M	25.80M	10	YES	NO	129993	21	8	116.47	YES	YES
16	19	20	RAMA IV	965M	25.00M	10	YES	NO	107139	41	23	108.65	YES	YES
17	20	21	RAMA IV	596M	23.70M	10	YES	NO	114624	27	13	108.28	YES	YES
18	120	150	WITTHAYU	860M	13.00M	6	NO	NO	55998	19	3	108.09	YES	YES
19	338	339	RATCHADAMNOEN N	300M	7.00M	4	YES	NO	9762	6	3	561.30	YES	NO
20	317	346	PRACHA NARUMIT	1030M	7.00M	2	NO	NO	2870	6	3	556.08	YES	NO
21	112	113	RAMA I	140M	18.50M	5	NO	NO	39706	21	6	458.12	YES	NO
22	825	826	ITSARAPHAP	360M	14.00M	4	NO	NO	45020	15	13	253.57	YES	NO
23	17	163	RONG MUANG	379M	7.50M	2	NO	YES	20626	7	2	245.33	YES	NO
24	10	136	SUA PA	400M	12.00M	4	NO	NO	27760	9	3	222.06	YES	NO
25	209	230	KRUNG KASEM	246M	11.50M	4	NO	YES	45429	9	2	220.64	YES	NO
26	114	115	RAMA I	765M	18.50M	6	NO	YES	64487	38	16	211.04	YES	NO
27	352	417	SUKHOTHAI	750M	19.50M	6	NO	NO	33145	16	6	176.34	YES	NO
28	716	724	LAT YA	724M	21.00M	6	YES	NO	21731	10	7	174.14	YES	NO
29	315	316	PRACHA RAT 2	970M	17.00M	6	NO	NO	51440	31	19	170.21	YES	NO
30	727	728	SOMDET CHAOPRAYA	358M	15.00M	4	NO	NO	40604	9	8	169.63	YES	NO
31	111	112	RAMA I	163M	18.50M	4	NO	NO	89706	9	3	168.63	YES	NO
32	109	136	SUA PA	440M	12.00M	4	NO	NO	27760	7	2	157.01	YES	NO
33	114	403	RAMA VI	392M	18.50M	6	NO	NO	40334	9	3	155.95	YES	NO
34	115	116	RAMA I	563M	18.50M	7	NO	YES	60971	21	4	152.59	YES	NO
35	316	345	PRACHA RAT 2	1020M	16.00M	6	NO	NO	38443	21	8	146.73	YES	NO
36	411	510	SOI SENA RUAM	1180M	6.00M	2	NO	NO	14526	14	5	143.85	YES	NO
37	113	114	RAMA I	300M	18.50M	5	NO	YES	92567	14	6	138.12	YES	NO
38	318	319	PRACHA RAT 2	470M	17.00M	6	NO	NO	38696	9	3	135.58	YES	NO
39	316	317	PRACHA RAT 2	320M	17.00M	6	NO	NO	38696	6	1	132.75	YES	NO
40	648	936	SATHU PRADIT	1700M	13.00M	4	NO	NO	35445	29	17	131.86	YES	NO
41	114	80	RAMA VI	890M	12.00M	4	NO	NO	40316	17	7	129.80	YES	NO
42	80	81	CHAROEN KRUNG	2048M	11.50M	4	NO	NO	29106	28	24	128.69	YES	NO
43	513	514	PHAHON YOTHIN	857M	20.00M	8	YES	NO	96674	37	27	122.55	YES	NO
44	424	425	THOET DAMRI	625M	7.00M	2	NO	NO	25376	7	5	120.92	YES	NO
45	42	58	TRI PHET	435M	16.50M	5	NO	NO	56496	7	1	120.80	YES	NO
46	800	801	INTRAPHITHAK	190M	22.00M	6	YES	NO	96624	8	5	119.39	YES	NO
47	126	127	SUKHUMVIT	61M	22.00M	6	YES	NO	88364	33	14	118.83	YES	NO
48	115	214	PHAYA THAI	770M	26.40M	8	NO	YES	79463	26	9	116.42	YES	NO
49	347	904	KRUNGTHEP-NONBRI	1960M	7.00M	6	NO	NO	39801	31	21	108.87	YES	NO
50	123	124	SUKHUMVIT	1023M	21.00M	6	NO	YES	96729	38	21	105.21	YES	NO
51	801	824	WAT SANG KRACHAI	790M	5.50M	2	NO	NO	14349	6	4	102.15	YES	NO
52	125	126	SUKHUMVIT	628M	22.50M	6	YES	NO	88364	26	9	102.04	YES	NO
53	214	505	PHAYA THAI	530M	26.70M	8	NO	YES	102865	21	6	90.21	YES	NO
54	124	125	SUKHUMVIT	70M	22.50M	6	YES	NO	81.90	14	3	81.90	YES	NO
55	211	363	PHITSANULOK	1100M	22.00M	8	NO	NO	83904	18	7	79.43	YES	NO
56	509	510	PHAHON YOTHIN	1100M	24.00M	8	YES	NO	84962	27	10	79.15	YES	NO
57	636	638	CHONG NONSI	1650M	5.00M	2	NO	NO	20369	15	11	122.28	NO	YES
58	909	910	CHARAN SANITWONG	434M	5.00M	6	YES	NO	95413	14	6	92.65	NO	YES
59	704	800	INTRAPHITHAK	670M	22.00M	6	YES	NO	96624	21	18	88.87	NO	YES
60	149	23	WITTHAYU	930M	25.80M	8	YES	NO	88502	25	13	83.22	NO	YES
61	404	505	SI AYUTTHAYA	1070M	22.80M	8	YES	NO	79750	24	10	77.06	NO	YES

* LIST OF IDENTIFIED HAZARDOUS INTERSECTIONS											13:08:05	86/03/18
RANKING	NODE	INTERSECTION NAME	LANE	LEG	SHAPE	SIGNAL	ADT	ACCIDENT	CASUALTIES	RATING	POLICE	
1	221	PETBURI/EKKAMAI	16	3	AT-GRADE	YES	103570	46	5	YES	YES	
2	238	YEAK JOR POR ROR	32	4	AT-GRADE	YES	97889	42	22	YES	YES	
3	508	VICTORY MONUMENT	28	4	ROUNDABOUT	NO	190987	35	5	YES	YES	
4	361	SAPAN SUNG	12	3	FLY-OVER	NO	51344	23	7	YES	YES	
5	117	RATCHAPRASONG	27	4	AT-GRADE	YES	151296	23	12	YES	YES	
6	212	URUPONG	25	4	AT-GRADE	YES	139936	23	3	YES	YES	
7	211	YOMMARAT	24	4	FLY-OVER	YES	136268	20	7	YES	YES	
8	902	YEAK SUTTISAN	20	4	AT-GRADE	YES	81773	19	3	YES	YES	
9	901	RACHADAY/HUAYKWANG	22	4	AT-GRADE	YES	71883	17	3	YES	YES	
10	358	KROM TAHAN	18	4	AT-GRADE	YES	69423	15	4	YES	YES	
11	918	NEW RD/LIAB MAENAM	16	4	AT-GRADE	YES	82944	11	8	YES	YES	
12	332	KARNRUAN	16	4	AT-GRADE	YES	65688	11	8	YES	YES	
13	829	PRANNOKE	16	4	AT-GRADE	YES	74776	11	4	YES	YES	
14	420	TERD DR/SETSIRI	13	4	AT-GRADE	YES	37907	8	1	YES	YES	
15	825	ISARAPHAB/WANGDERM	10	3	AT-GRADE	YES	59279	7	6	YES	YES	
16	709	MAKAI SUAN	24	3	AT-GRADE	YES	142042	30	12	YES	NO	
17	214	RATCHATHEVI	29	4	FLY-OVER	YES	182217	26	7	YES	NO	
18	337	PHITSANULOK	34	4	AT-GRADE	YES	94587	24	3	YES	NO	
19	220	ASOKE	23	4	FLY-OVER	YES	189887	23	1	YES	NO	
20	19	RAMA IV/RAMA VI	24	3	AT-GRADE	YES	126123	21	11	YES	NO	
21	120	PLOENCHIT	20	4	AT-GRADE	YES	153173	19	4	YES	NO	
22	505	PHYATHAI	32	4	AT-GRADE	YES	182613	19	3	YES	NO	
23	908	BANGKHUNNON	16	3	AT-GRADE	YES	88828	19	3	YES	NO	
24	115	PATUMWAN	29	4	AT-GRADE	YES	139632	18	12	YES	NO	
25	711	THON BR/PAKTHOR	20	3	AT-GRADE	YES	88898	18	11	YES	NO	
26	20	SARYAN	30	4	AT-GRADE	YES	167960	18	7	YES	NO	
27	360	CHALERM PHAN	12	3	AT-GRADE	YES	55225	18	7	YES	NO	
28	517	RACHADA PS/PHAHOL YT	32	4	AT-GRADE	YES	97151	17	8	YES	NO	
29	127	THONGLOR	18	3	AT-GRADE	YES	103364	17	6	YES	NO	
30	905	WONGSAWANG/PIBUN SK	20	4	AT-GRADE	YES	59365	17	4	YES	NO	
31	215	PRATUNAM	26	4	FLY-OVER	YES	142698	17	3	YES	NO	
32	118	PLOENCHIT/LANGSUAN	24	4	AT-GRADE	YES	130670	16	5	YES	NO	
33	903	RACHADA PS/LADPHRAO	28	4	AT-GRADE	YES	95568	15	11	YES	NO	
34	518	SANA NK/PHAHOL YT	20	3	AT-GRADE	YES	73508	15	5	YES	NO	
35	904	WONGSAWANG	18	3	AT-GRADE	NO	42773	14	3	YES	NO	
36	423	TERD DR/PRADIPHAT	18	4	AT-GRADE	YES	70603	13	7	YES	NO	
37	350	BENJAMBOPHIT	18	4	AT-GRADE	YES	91965	13	5	YES	NO	
38	342	KHATTIYANEE	20	4	AT-GRADE	YES	60229	13	4	YES	NO	
39	351	RATWITHI-RAMA V	16	4	INTERCHANGE	NO	81022	13	3	YES	NO	
40	990	EXPRESSWAY DIN DAENG	12	2	INTERCHANGE	NO	74591	13	1	YES	NO	
41	333	SUAN REARN	20	4	AT-GRADE	YES	57861	11	8	YES	NO	
42	345	TAOPOON	18	3	AT-GRADE	YES	58343	11	7	YES	NO	
43	317	PRACHARATI/PRACHA NM	14	3	AT-GRADE	NO	42283	11	3	YES	NO	
44	416	RATCHAVITHI	20	4	AT-GRADE	YES	97009	11	2	YES	NO	
45	81	NEW RD/PRADU1	10	3	AT-GRADE	NO	36002	7	9	YES	NO	
46	630	SATHON N/SURASAK	12	3	AT-GRADE	YES	54269	7	3	YES	NO	
47	23	RAMA IV/WITTIAYU	36	5	AT-GRADE	YES	221165	19	3	NO	YES	
48	202	YEAK SAPAN PHAN PP	56	6	AT-GRADE	YES	178121	17	7	NO	YES	
49	204	KHOOK WUA	34	4	AT-GRADE	YES	189792	16	6	NO	YES	
50	208	LOOKLUANG	22	4	AT-GRADE	YES	84053	12	2	NO	YES	
51	724	LADYA/THA DD	22	4	AT-GRADE	YES	52898	11	7	NO	YES	



Candidate Road Locations
for Safety Planning

Characteristics of Accidents and Existing Improvement Plan
for Candidate Road Locations for Safety Planning

(1)

No.	Type of Location	Location	Average No. of Accident (1984/1985)	Average No. of Casualties (1984/1985)	Characteristics of Accidents	Improvement Plan
1	Mid-block Section	Pracha Chuen Road	63	27	<ul style="list-style-type: none"> Accidents in daytime are 62%. Improper driving speed (37%) and improper overtaking (33%) are major causes of accidents. 78% of accidents are Veh. vs. Veh. type (right turn collision : 21%, side contact : 20%), while 22% are Veh. vs. Ped. type. 	None
2	-do-	Ratchaprarop Road	19	5	<ul style="list-style-type: none"> Improper overtaking (41%) and improper driving speed (38%) are major causes of accidents. 93% of accidents are Veh. vs. Veh. type (side contact : 45%, rear end collision 35%). 	Rehabilitation of pavement (On-going)
3	-do-	Charoen Nakhon Road	43	16	<ul style="list-style-type: none"> Accidents in daytime are 68%. Improper driving speed (68%) is the main cause of accidents. 68% of accidents are Veh. vs. Veh. type (rear end collision: 37%), while 28% are Veh. vs. Ped. type. 	None
4	-do-	Soi Pradu 1	22	15	<ul style="list-style-type: none"> Accidents in nighttime are 61%. Improper overtaking (49%) and improper driving speed (42%) are major causes of accidents. 67% of accidents are Veh. vs. Veh. type (head-on collision: 27%), while 27% are Veh. vs. Ped. Type 	None
5	Intersection	Yeak Karnruan	11	8	<ul style="list-style-type: none"> Accidents in nighttime are 62%. Improper turning (50%) is the main cause of accidents. 94% of accidents are Veh. vs. Veh. type (right turn collision : 44%) 	None

Continue/

(2)

No.	Type of Location	Location	Average No. of Accident (1984/1985)	Average No. of Casualties (1984/1985)	Characteristics of Accidents	Improvement Plan
6	Intersection	Yeak Jor Por Ror	42	22	<ul style="list-style-type: none"> Improper driving speed (37%) and improper turning (32%) are major causes of accidents. 92% of accidents are Veh. vs. Veh. type (right turn collision : 33%, rear end collision : 32%). 	Improvement of intersection (proposed plan)
7	-do-	Yeak Suttisan	19	3	<ul style="list-style-type: none"> Accidents in nighttime are 75%. Improper driving speed (39%) is the main cause of accidents. 82% of accidents are Veh. vs. Veh. type (rear end collision : 29%, right turn collision : 29%). 	Improvement of intersection (to be implemented soon)
8	-do-	Ratchadaphisek/ Huaykwang	17	3	<ul style="list-style-type: none"> Accidents in nighttime are 72%. Improper driving speed (60%) is the main cause of accidents. 88% of accidents are Veh. vs. Veh. type (right turn collision : 60%). 	Improvement of intersection (to be implemented soon)
9	-do-	Victory Monument	33	5	<ul style="list-style-type: none"> Accident in daytime are 67%. Improper turning (33%) and improper overtaking (33%) are major causes of accidents. 94% of accidents are Veh. vs. Veh. type (left turn collision : 37%, side contact : 29%). 	Improvement of channelization and installation of traffic signal (under designing stage)
10	-do-	Petburi/Ekkamai	46	5	<ul style="list-style-type: none"> Improper turning (51%) and improper driving speed (32%) are major causes of accidents. 94% of accidents are Veh. vs. Veh. type (right turn collision : 33%, rear end collision : 29%). No signal phase for right turning vehicle is the main cause of accidents (opinion of traffic policemen) 	Extension of Soi Ekkamai to Lad Prao Road (Planning)

Continue/

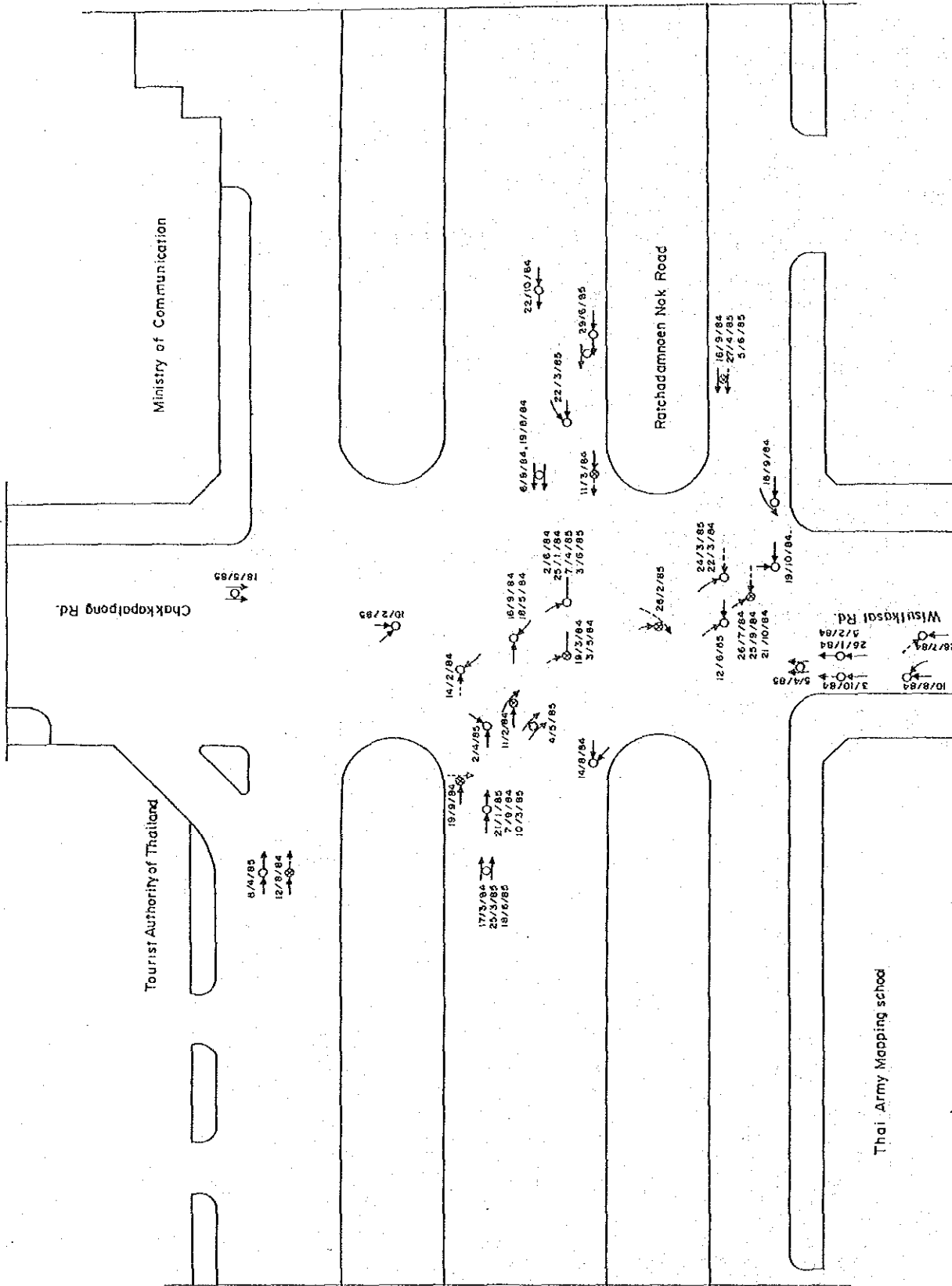
(3)

No.	Type of Location	Location	Average No. of Accident (1984/1985)	Average No. of Casualties (1984/1985)	Characteristics of Accidents	Improvement Plan
11	Combination of Mid-block Sections and Intersections	Pahon Yothin Road (North Bus Terminal)	121	74	<ul style="list-style-type: none"> Improper driving speed (50%) and improper overtaking (38%) are major causes of accidents. 75% of accidents are Veh. vs. Veh. type (rear end collision: 28%, head-on collision: 26%), while 21% are Veh. vs Ped. type. 	Modification of traffic system was completed in March, 1986
12	-do-	Techa Wanit Road	90	37	<ul style="list-style-type: none"> Improper turning (28%), improper overtaking (26%) and improper driving speed are major causes of accidents. 78% of accidents are Veh. vs Veh. type (right turn collision: 30%, side contact: 20%), while 22% are Veh. vs Ped. type. 	None
13	-do-	Pracha Rat I Road	74	31	<ul style="list-style-type: none"> Improper driving speed (32%) and improper overtaking (31%) are major causes of accidents. 85% of accidents are Veh. vs Veh. type (right turn collision: 28%, rear end collision: 22%). 	Construction of 4 pedestrian bridges (to be implemented soon)
14	-do-	Si Ayutthaya Road (Rama VI-Ratchaprarop)	90	27	<ul style="list-style-type: none"> Improper overtaking (40%), improper driving speed (27%) and improper turning are major causes of accidents. 83% of accidents are Veh. vs Veh. type (side contact: 28%). 	Construction of a pedestrian bridges
15	-do-	Petburi Road (Yommarat-Urupong)	56	13	<ul style="list-style-type: none"> Improper driving speed (48%) is the main cause of accidents. 89% of accidents are Veh. vs Veh. type (rear end collision: 43%, side contact: 25%). 	<ul style="list-style-type: none"> Construction of a pedestrian bridge (on-going) Extension of fly-over (planning)
16	-do-	Phaya Thai Road	135	56	<ul style="list-style-type: none"> Improper driving speed (52%) is the main cause of accidents. 78% of accidents are Veh. vs Veh. type (rear end collision: 39%, side contact: 22%). 	<ul style="list-style-type: none"> Widening of a bridge-Sapan Chalerm Maha (planning)

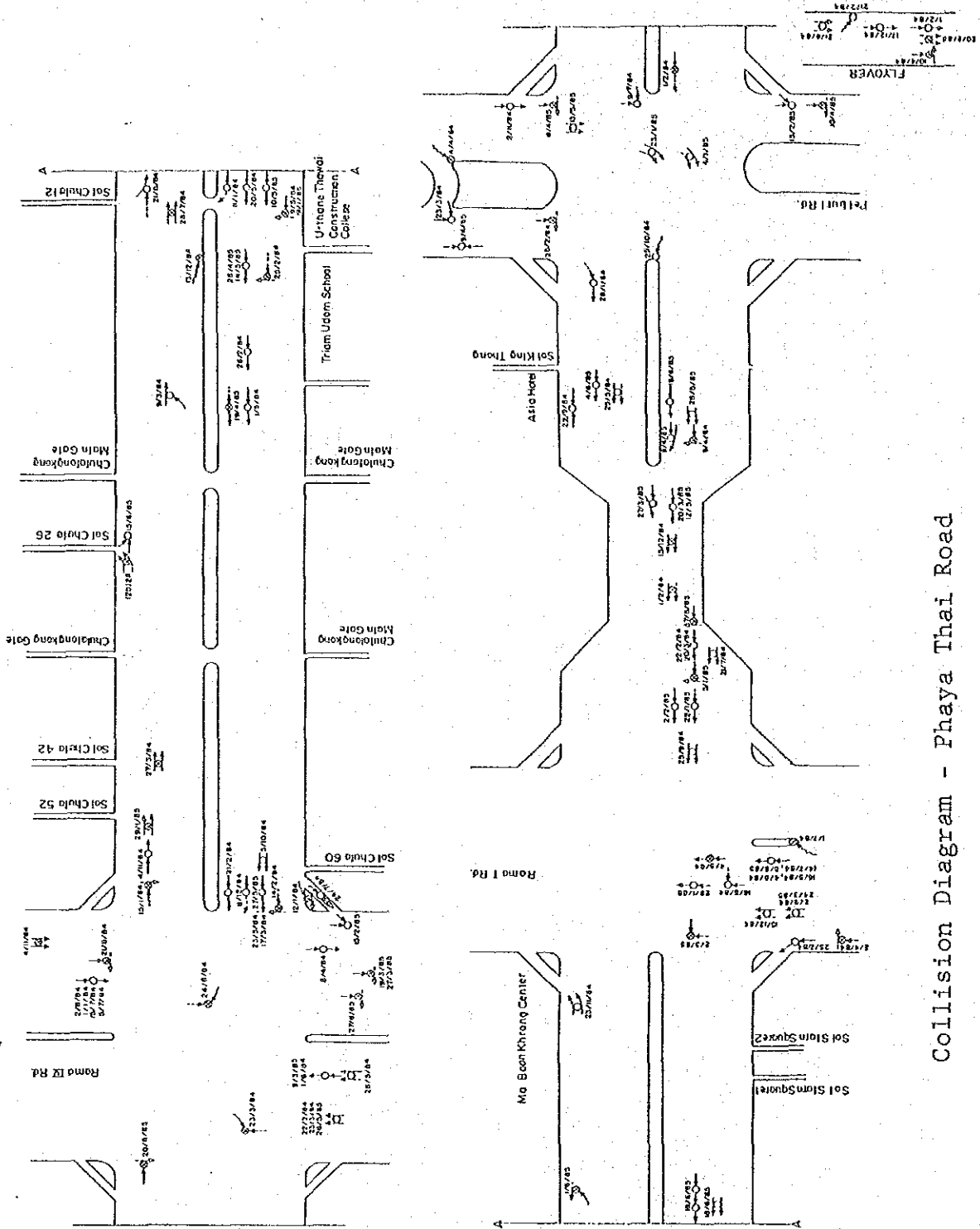
Continue/

(4)

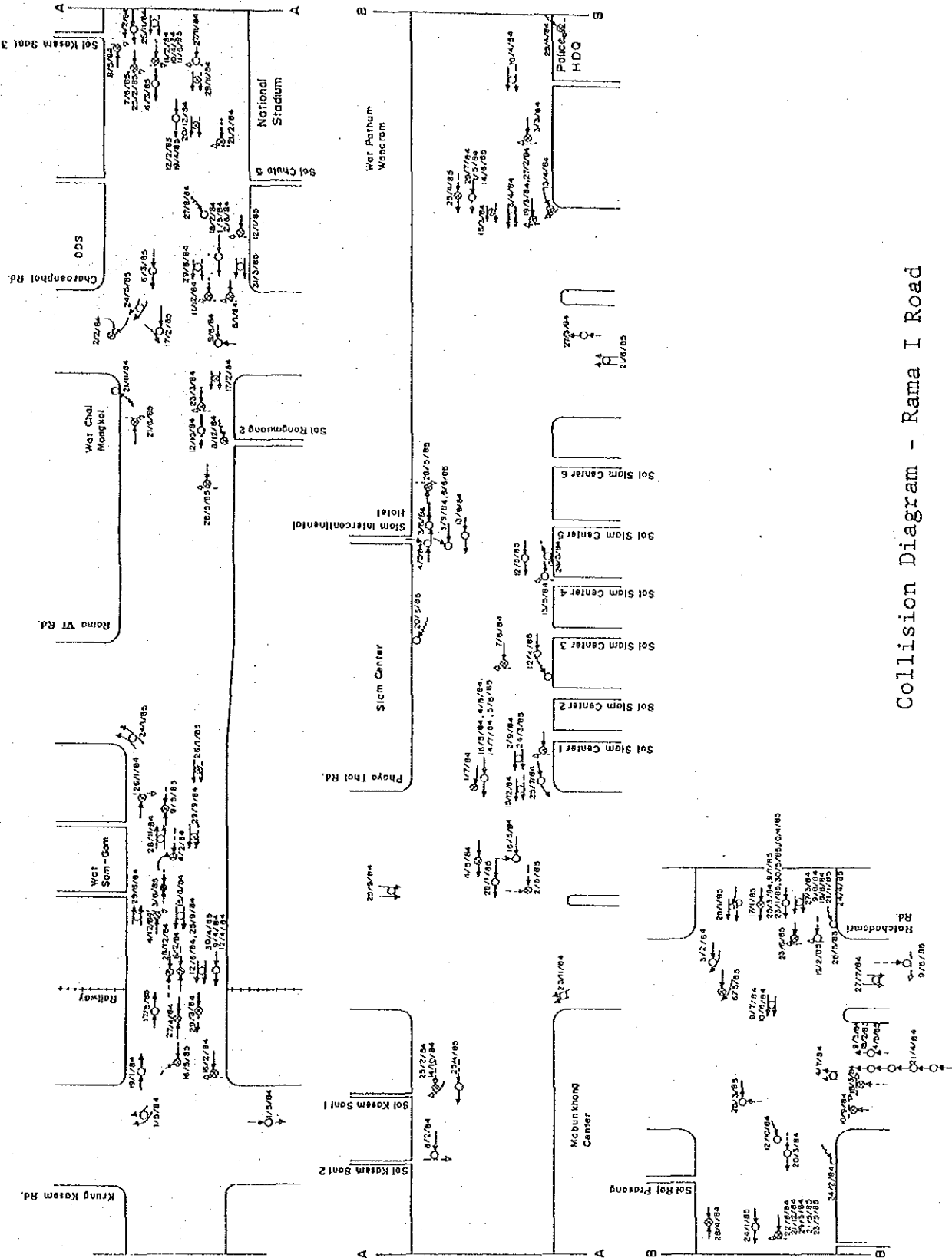
No.	Type of Location	Location	Average No. of Accident (1984/1985)	Average No. of Casualties (1984/1985)	Characteristics of Accidents	Improvement Plan
17	Combination of Mid-block Sections and Intersection	Rama I Road	177	70	<ul style="list-style-type: none"> Improper driving speed (58%) is the main cause of accidents, followed by improper overtaking (24%). 74% of accidents are Veh. vs Veh. type (rear end collision : 40%). 	None
18	-do-	Rama IV Road (Hua Lampong-Silom)	185	91	<ul style="list-style-type: none"> Improper driving speed (60%) is the main cause of accidents. 72% of accidents are Veh. vs. Veh. type (rear end collision 38%), while 24% are Veh. vs Ped. type. 	Construction of a pedestrian bridge
19	-do-	Witthayu Road (Rama IV-Ploenchit)	88	28	<ul style="list-style-type: none"> Improper driving speed (49%) is the main cause of accidents, followed by improper overtaking (24%) and improper turning (21%). 82% of accidents are Veh. vs Veh. type (rear end collision 34%). 	Modification of islands (to be implemented soon)
20	-do-	Sukhumvit Road (Nana-Thonglor)	163	71	<ul style="list-style-type: none"> Improper driving speed (52%) and improper overtaking (26%) are major causes of accidents. 78% of accidents are Veh. vs Veh. type (rear end collision : 39%, side contact 22%) 	Improvement of islands and marking
21	-do-	Itsaraphap Road	42	36	<ul style="list-style-type: none"> Improper overtaking (63%) is the main cause of accidents. 65% of accidents are Veh. vs Veh. type (side contact 21%), while 29% are Veh. vs Ped. type (along carriageway : 19%). 	None
22	-do-	Intarapitak Road	43	36	<ul style="list-style-type: none"> Improper driving speed (43%) is the main cause of accidents. 49% of accidents are Veh. vs Veh. type (left turn collision : 21%), while another 49% are Veh. vs Ped. Type (crossing other part : 34%). 	Widening of a bridge



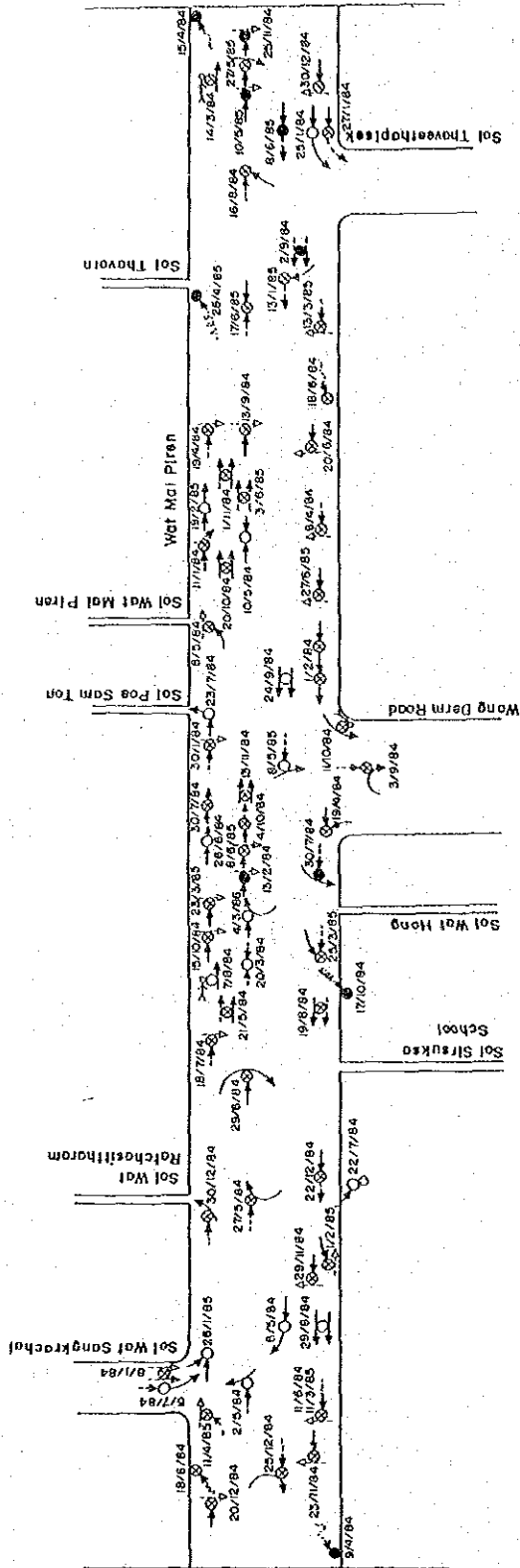
Collision Diagram - Ratchadamoen Nok Road
(Yeak Jor Por Ror Intersection)



Collision Diagram - Phaya Thai Road



Collision Diagram - Rama I Road



Collision Diagram - Itsaraphap Road

Characteristic of Accidents on Selected Road Locations (1)

Number of Accidents	S 1 Pracha chuen		S 2 Techa Wanit		S 3 Yaek Jor Por Por		S 4 Si. Ayutthaya		S 5 Phaya Thai		S 6 Rama I		S 7 Sukhumvit		S 8 Rama IV		S 9 Istaraphap		S 10 Charoen Nakhon		Average in Study Road %
	Length (km)	2.74	1.73	-	1.97	2.23	2.40	3.20	2.34	0.86	1.65										
1 With Casualties	41 (43.2)	51 (37.8)	31 (49.2)	40 (29.9)	54 (36.5)	89 (33.5)	102 (41.8)	126 (45.5)	46 (74.2)	23 (52.4)											40.2
2 Without Casualties	54 (56.8)	84 (62.2)	32 (50.8)	94 (70.1)	94 (63.5)	177 (66.5)	142 (58.2)	151 (54.5)	16 (25.8)	42 (64.6)											59.8
3 Total No.	95	135	63	134	148	266	244	277	62	65											
Number of Casualties	4 (9.3)	4 (7.3)	0	2 (4.9)	2 (3.6)	6 (5.7)	12 (11.2)	6 (4.4)	3 (5.6)	1 (4.2)											9.0
1 Fatality	5 (11.6)	5 (9.1)	2 (6.1)	2 (4.9)	6 (10.7)	10 (9.5)	17 (11.7)	16 (11.7)	17 (31.5)	1 (4.2)											15.7
2 Serious Injury	34 (79.1)	46 (83.6)	31 (93.9)	37 (90.2)	48 (85.7)	89 (84.8)	78 (72.9)	115 (83.9)	34 (63.0)	22 (91.7)											75.3
3 Light Injury	43	55	33	41	56	105	107	137	54	24											
4 Total Casualties																					
Time of Accidents																					
1 Day Time	59 (62.1)	78 (57.8)	31 (49.2)	59 (44.0)	68 (45.9)	130 (48.9)	110 (45.1)	128 (46.2)	33 (53.2)	44 (67.7)											54.9
2 Night Time	34 (35.8)	55 (40.7)	21 (33.3)	73 (54.5)	70 (47.3)	112 (42.1)	131 (53.7)	121 (43.7)	28 (45.2)	21 (32.3)											45.1
3 Unknown	2 (2.1)	2 (1.5)	11 (17.5)	2 (1.5)	10 (6.8)	24 (9.0)	3 (1.2)	28 (10.1)	1 (1.5)	0											
Cause of Accidents																					
1 Improper Speed	35 (36.8)	33 (24.4)	23 (36.5)	36 (26.9)	77 (52.0)	153 (57.5)	122 (50.9)	166 (59.9)	6 (9.7)	44 (67.7)											41.0
2 Overtaking (NO)	7 (7.4)	6 (4.4)	1 (1.6)	0	3 (2.0)	11 (4.1)	6 (2.5)	4 (1.4)	0	2 (3.1)											1.8
3 Over Taking	24 (25.3)	35 (25.9)	13 (20.6)	53 (39.6)	36 (24.3)	53 (19.9)	36 (14.8)	36 (13.0)	39 (62.9)	9 (13.8)											24.8
4-6 Parking	0 (0)	0	0	0	0	0	0	0	0	0											0.0
7 Bad Signalling	0	1 (0.7)	0	0	0	0	5 (2.0)	0	0	0											0.0
8 Improper Turning	20 (21.1)	38 (28.1)	20 (31.7)	29 (21.6)	18 (12.2)	26 (9.8)	43 (17.6)	51 (18.4)	8 (12.9)	1 (1.5)											0.5
9 Violate Sign/Signal	7 (7.4)	12 (8.9)	4 (6.3)	8 (6.0)	1 (0.7)	5 (1.9)	9 (3.7)	11 (4.0)	5 (8.1)	2 (3.1)											24.1
10 Driving Wrong Way	0	1 (0.7)	0	1 (0.7)	0	2 (0.8)	9 (3.7)	2 (0.7)	0	5 (7.7)											3.5
11 Not Stop Crosswalk	0	6 (4.4)	2 (3.2)	6 (4.5)	4 (2.7)	9 (3.4)	14 (5.7)	2 (0.7)	1 (1.5)	0											0.5
12-13 Over load	0	0	0	0	1 (0.7)	2 (0.8)	0	0	0	2 (3.1)											2.0
14 High Beam	0	0	0	0	0	0	0	0	0	0											0.0
15 Vehicle Defect	0	0	0	0	0	0	0	0	0	0											0.0
16 Sleeping	0	1 (0.7)	0	0	0	0	0	0	0	0											0.1
17 Drunkenness	0	2 (1.5)	0	0	3 (2.0)	5 (1.9)	0	0	0	0											0.6
18 Inexperienced	2 (2.1)	2 (1.5)	0	0	0	0	0	0	0	0											0.8
19 Others	0	0	0	0	0	0	0	0	0	0											0.0
Accident Location																					
1 Tangent Section	89 (93.7)	46 (34.1)	0	81 (60.4)	88 (29.5)	160 (60.2)	154 (67.2)	172 (62.1)	44 (71.0)	60 (92.3)											59.0
2 Curve Section	0	0	0	0	0	0	0	0	0	1 (1.5)											0.6
3 Intersection	0	89 (65.9)	63 (100)	52 (38.8)	39 (26.4)	89 (33.5)	77 (31.6)	104 (37.5)	18 (29.0)	0											36.7
4 Cross-walk	0	0	0	1 (0.7)	1 (0.7)	3 (1.1)	3 (1.2)	1 (0.4)	0	2 (3.1)											0.6
5 Slope Section	0	0	0	0	0	0	0	0	0	0											0.2
6 Bridge	6 (6.3)	0	0	0	20 (13.5)	14 (5.3)	0	0	0	2 (3.1)											2.0
7 Railway cross	0	0	0	0	0	0	0	0	0	0											0.1
8 Others	0	0	0	0	0	0	0	0	0	0											0.9
Number of Motorcycles Involved in the Accidents	21 (12.4)	30 (12.5)	15 (12.2)	37 (14.6)	46 (17.2)	87 (18.6)	66 (15.4)	45 (19.5)	23 (22.5)	24 (22.0)											14.1

() : Composition
- : Figure beyond the average

Characteristic of Accidents on Selected Road Locations (2)

Section No.	S 1 Pracha chuen	S 2 Techa Wanit	S 3 Yaek Jor Por Por	S 4 Si Ayuttha	S 5 Phaya Thai	S 6 Rama I	S 7 Sukhumvit	S 8 Rama IV	S 9 Itsearaphap	S 10 Charoen Nakhon	Average in Study Road %
10. Vehicle vs. Pedestrian	21 (22.1)	30 (22.2)	4 (6.3)	20 (14.9)	27 (18.2)	48 (18.0)	57 (22.4)	66 (23.8)	16 (29.0)	18 (27.7)	18
11. Hit pedestrian walking along carriageway	0	2 (1.5)	1 (1.6)	4 (3.0)	4 (2.7)	2 (0.8)	5 (3.0)	3 (1.1)	12 (19.4)	0	3.1
12. Hit pedestrian crossing carriageway at intersection	0	17 (12.6)	3 (4.8)	5 (3.4)	5 (3.7)	12 (4.5)	18 (7.4)	9 (3.2)	2 (3.2)	0	3.3
13. Hit pedestrian crossing carriageway at crosswalk	0	0	0	1 (0.7)	1 (0.7)	3 (1.1)	3 (1.2)	2 (0.7)	0	2 (3.1)	0.6
14. Hit pedestrian crossing carri- ageway other than crosswalk	21 (22.1)	11 (8.1)	0	17 (11.7)	10 (7.5)	31 (11.7)	31 (12.7)	52 (18.9)	4 (6.5)	16 (24.6)	11.0
15. Hit pedestrian emerging on Carriageway	0	0	0	0	0	0	0	0	0	0	0.0
16. Hit pedestrian playing on carriageway	0	0	0	0	0	0	0	0	0	0	0.0
17. Others	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0.0
20. Vehicle vs. Bicycle	0 (0.0)	0 (0.0)	1 (1.6)	3 (2.2)	5 (3.4)	20 (7.5)	8 (3.3)	11 (4.0)	4 (6.5)	3 (4.6)	3.5
30. Vehicle only	0 (0.0)	0 (0.0)	1 (1.6)	0	1 (0.7)	3 (1.1)	1 (0.4)	4 (1.4)	1 (1.6)	0	0.7
31. Car carriageway	0	0	1 (1.6)	0	0	0	0	0	0	0	0.0
32. Collision with parked vehicle	0	0	0	0	2 (1.4)	7 (2.6)	0	6 (2.2)	0	2 (3.2)	0.0
33. Collision with guard rail	0	0	0	3 (2.2)	1 (0.7)	5 (1.9)	5 (2.0)	1 (0.4)	0	1 (1.5)	0.8
34. Collision with electric pole	0	0	0	0	0	0	2 (0.8)	0	0	0	1.5
35. Collision with other objects	0	0	0	0	1 (0.7)	5 (1.9)	0	0	0	0	0.1
36. Others	0	0	0	0	1 (0.7)	5 (1.9)	0	0	3 (4.8)	0	0.3
40. Vehicle vs. Vehicle	74 (77.9)	105 (77.8)	58 (92.1)	111 (82.8)	116 (78.4)	198 (74.4)	179 (73.4)	200 (72.2)	40 (64.5)	44 (67.7)	78.4
41. Head on collision	10 (10.5)	9 (6.7)	1 (1.6)	12 (9.0)	3 (2.0)	22 (8.3)	6 (2.5)	3 (1.1)	14 (22.6)	2 (3.1)	6.7
42. Rear end collision	14 (14.7)	13 (9.6)	20 (31.7)	23 (17.2)	58 (39.2)	106 (39.8)	72 (29.5)	104 (37.5)	0	24 (36.9)	25.1
43. Side collision during crossing	7 (7.4)	11 (8.1)	4 (6.3)	6 (4.5)	0	1 (0.4)	12 (4.9)	2 (0.7)	5 (8.1)	6 (9.2)	2.9
44. Side collision during right turn	20 (21.1)	40 (29.6)	21 (33.3)	18 (13.4)	6 (4.1)	3 (1.1)	36 (14.8)	25 (9.0)	8 (12.9)	2 (3.1)	19.5
45. Side collision during left turn	4 (4.2)	5 (3.7)	2 (3.2)	15 (11.2)	17 (11.5)	26 (9.8)	26 (10.7)	33 (11.9)	0	3 (4.6)	7.3
46. Side contact	19 (20.0)	27 (20.0)	10 (15.9)	37 (27.6)	32 (21.6)	40 (15.0)	27 (11.1)	33 (11.9)	13 (21.0)	7 (10.8)	16.9
47. Others	0	0	0	0	0	0	0	0	0	0	0.1
50. Others	0	0	0	0	0	0	0	0	0	0	0.0
Total	95 (100)	135 (100)	63 (100)	134 (100)	148 (100)	266 (100)	244 (100)	277 (100)	62 (100)	65 (100)	100.0

() : Composition

- - - Figure beyond the average

Characteristics of Accidents on Selected Road Locations/Mid-block Section (1)

	S1 Pracha Chuen	S2 Techa Wanit	S4 Si Ayuttraya	S5 Phaya Thai	S6 Rama I	S7 Sukhumvit	S8 Rama IV	S9 Irsaraphap	S10 Charoen Nakhon	Average in Study Road %
Number of Accidents	41 (43) 54 (57) 95 (100)	25 (56) 20 (44) 45 (100)	28 (34) 54 (66) 82 (100)	40 (39) 63 (61) 103 (100)	56 (32) 121 (68) 177 (100)	67 (40) 99 (60) 166 (100)	88 (51) 84 (49) 172 (100)	34 (77) 10 (23) 44 (100)	23 (35) 42 (65) 65 (100)	(45.7) (54.3) (100.0)
Number of Casualties	4 (9) 5 (12) 34 (79) 43 (100)	3 (12) 1 (4) 22 (85) 26 (100)	1 (4) 1 (4) 26 (92) 28 (100)	1 (2) 6 (15) 34 (83) 41 (100)	5 (8) 7 (12) 49 (80) 61 (100)	7 (10) 13 (19) 50 (71) 70 (100)	4 (4) 12 (13) 75 (83) 91 (100)	2 (5) 13 (33) 24 (62) 39 (100)	1 (4) 1 (4) 22 (92) 24 (100)	(9.3) (17.6) (73.1) (100.0)
Time of Accidents	59 (62) 34 (36) 2 (2)	26 (58) 18 (40) 1 (2)	40 (49) 40 (49) 2 (2)	45 (44) 49 (47) 9 (9)	90 (51) 64 (36) 23 (13)	77 (46) 87 (52) 2 (2)	88 (51) 62 (36) 22 (13)	21 (48) 23 (52) 0 (0)	44 (68) 21 (32) 0 (0)	(50.0) (38.9) (11.1)
Cause of Accidents	35 (37) 7 (7) 24 (25) 0 (0) 0 (0) 0 (0) 20 (21) 7 (7) 0 (0) 0 (0) 0 (0) 2 (2)	14 (31) 5 (11) 11 (24) 0 (0) 0 (0) 7 (16) 7 (16) 0 (0) 0 (0) 1 (2)	21 (26) 0 (0) 40 (49) 0 (0) 0 (0) 16 (19) 3 (4) 1 (1) 1 (1) 0 (0)	66 (64) 2 (2) 20 (19) 0 (0) 0 (0) 8 (8) 1 (1) 0 (0) 0 (0) 6 (6)	106 (60) 10 (6) 38 (22) 0 (0) 0 (0) 11 (6) 4 (2) 2 (1) 3 (2) 3 (2)	87 (52) 3 (2) 29 (18) 0 (0) 4 (2) 29 (18) 5 (3) 6 (4) 3 (2) 0 (0)	107 (62) 3 (2) 21 (12) 0 (0) 0 (0) 28 (16) 8 (5) 1 (1) 1 (1) 3 (2)	5 (11) 0 (0) 31 (71) 0 (0) 0 (0) 2 (5) 4 (9) 0 (0) 0 (0) 2 (4)	44 (68) 2 (3) 9 (14) 0 (0) 1 (2) 2 (3) 5 (8) 0 (0) 2 (3) 0 (0)	(44.8) (2.3) (27.4) (0.1) (0.6) (18.5) (3.1) (0.5) (0.9) (1.8)
Accident Location	89 (94) 0 (0) 0 (0) 0 (0) 0 (0) 6 (6) 0 (0) 0 (0)	45 (100) 0 (0) 0 (0) 0 (0) 0 (0) 0 (0) 0 (0) 0 (0)	81 (99) 0 (0) 0 (0) 1 (1) 0 (0) 0 (0) 0 (0) 0 (0)	88 (85) 0 (0) 0 (0) 1 (1) 0 (0) 14 (14) 0 (0) 0 (0)	160 (90) 0 (0) 0 (0) 3 (2) 0 (0) 14 (8) 0 (0) 0 (0)	162 (78) 0 (0) 0 (0) 4 (2) 0 (0) 0 (0) 0 (0) 0 (0)	171 (99) 0 (0) 0 (0) 1 (1) 0 (0) 0 (0) 0 (0) 0 (0)	44 (100) 0 (0) 0 (0) 0 (0) 0 (0) 0 (0) 0 (0) 0 (0)	60 (92) 1 (2) 0 (0) 2 (3) 0 (0) 2 (3) 0 (0) 0 (0)	(94.8) (0.8) (0.0) (0.9) (0.2) (2.8) (0.1) (0.2)
Accidents Involved Motorcycles	21 (12)	12 (15.1)	17 (11)	34 (18)	63 (20)	43 (15)	65 (23)	16 (22)	24 (22)	(15.6)

(Accidents in Jan 1984 - Jun 1985)
() : Composition

Characteristic of Accidents on Selected Road Locations/Mid-block Section (2)

	S1 Pracha Chuen	S2 Techa Wanit Si Ayuttaya	S4 Si Ayuttaya	S5 Phaya Thai	S6 Rama I	S7 Sukhumvit	S8 Rama IV	S9 Itsaraphap	S10 Charoen Nakhor	Average in Study Road %
10. <u>Vehicle vs. Pedestrian</u>	21 (22)	11 (24)	15 (18)	20 (19)	34 (19)	38 (23)	55 (32)	12 (27)	18 (28)	(22.0)
11. Hit pedestrian walking along carriageway	0 (0)	0 (0)	4 (5)	2 (2)	0 (0)	4 (2)	2 (1)	8 (18)	0 (0)	(3.4)
12. Hit pedestrian crossing carriageway at intersection	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	(0.0)
13. Hit pedestrian crossing carriageway at crosswalk	0 (0)	0 (0)	1 (1)	1 (1)	3 (2)	3 (2)	1 (1)	0 (0)	2 (3)	(0.9)
14. Hit pedestrian crossing carri- ageway other than crosswalk	21 (22)	11 (24)	10 (12)	17 (16)	31 (17)	31 (19)	52 (30)	4 (9)	16 (25)	(17.6)
15. Hit pedestrian emerging on carriageway	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	(0.0)
16. Hit pedestrian playing on carriageway	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	(0.0)
17. Others	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	(0.0)
20. <u>Vehicle vs. Bicycle</u>	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (5)	(0.2)
30. <u>Vehicle only</u>	0 (0)	0 (0)	1 (1)	4 (4)	12 (7)	5 (3)	9 (5)	3 (7)	44 (68)	(3.4)
40. <u>Vehicle vs. Vehicle</u>	74 (78)	34 (76)	66 (81)	99 (77)	131 (74)	123 (74)	108 (63)	29 (66)	2 (3)	(74.4)
41. Head on collision	10 (11)	7 (16)	12 (15)	3 (3)	22 (12)	5 (3)	2 (1)	14 (32)	24 (37)	(10.1)
42. Rear end collision	14 (15)	4 (9)	10 (12)	47 (46)	70 (40)	48 (29)	51 (30)	0 (0)	6 (9)	(24.1)
43. Side collision during crossing	7 (7)	7 (16)	3 (4)	0 (0)	0 (0)	6 (4)	1 (1)	4 (9)	2 (3)	(2.9)
44. Side collision during right turn	20 (21)	7 (16)	16 (20)	6 (6)	1 (1)	25 (15)	17 (10)	2 (4)	3 (4)	(16.6)
45. Side collision during left turn	4 (4)	2 (4)	0 (0)	6 (6)	12 (7)	19 (11)	16 (9)	0 (0)	7 (11)	(4.1)
46. Side contact	19 (20)	7 (16)	25 (30)	17 (17)	26 (15)	20 (12)	21 (12)	9 (21)	0 (0)	(16.5)
47. Others	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	(0.1)
50. Others	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	(0.0)

Characteristic of Accidents on Selected Road Locations/Intersection (3)

	S2	S3	S4	S5	S6	S7	S8	S9	S10	Average in Study Road %
	Techa Wanit	Yeak Jor Por Ror	Si Ayuttaya Phaya Thai	Rama I	Sukkurvit	Rama IV	Itsaraphap	Charoen Nakhon		
Number of Accidents	26 (29) 64 (71) 90 (100)	31 (49) 32 (51) 63 (100)	12 (23) 40 (77) 52 (100)	25 (35) 47 (65) 72 (100)	22 (36) 40 (64) 62 (100)	35 (45) 43 (55) 78 (100)	38 (36) 67 (64) 105 (100)	12 (67) 6 (33) 18 (100)	7 (41) 10 (59) 17 (100)	(31.3) (68.7) (100.0)
Number of Casualties	1 (3) 4 (14) 24 (83) 29 (100)	0 (0) 2 (6) 31 (94) 33 (100)	1 (8) 1 (8) 11 (84) 13 (100)	2 (6) 1 (3) 30 (91) 33 (100)	0 (0) 2 (8) 24 (92) 26 (100)	5 (13) 4 (11) 28 (76) 37 (100)	2 (4) 4 (9) 40 (87) 46 (100)	1 (7) 1 (27) 10 (66) 15 (100)	0 (0) 1 (12) 7 (88) 8 (100)	(8.4) (11.9) (79.7) (100.0)
Time of Accidents	1 Day Time 2 Night Time 3 Unknown	31 (49) 21 (33) 11 (18)	19 (37) 33 (63) 0 (0)	38 (53) 33 (46) 1 (1)	25 (40) 36 (58) 1 (2)	33 (42) 44 (56) 1 (1)	40 (38) 59 (56) 6 (6)	12 (67) 5 (28) 1 (5)	11 (65) 6 (35) 0 (0)	(47.7) (46.8) (5.5)
Cause of Accidents	1 Improper Speed 2 Overtaking (NO) 3 Over Taking 4-6 Parking 7 Bad Signalling 8 Improper Turning 9 Violate Sign/Signal 10 Driving Wrong Way 11 Not Stop Crosswalk 12-19 Others	23 (37) 1 (2) 13 (21) 0 (0) 0 (0) 20 (32) 4 (6)	15 (29) 0 (0) 13 (25) 0 (0) 0 (0) 13 (25) 5 (10)	25 (35) 2 (3) 19 (26) 0 (0) 0 (0) 13 (18) 0 (0)	33 (53) 0 (0) 12 (19) 1 (2) 0 (0) 0 (0) 4 (7)	35 (45) 3 (4) 7 (9) 0 (0) 1 (1) 14 (18) 4 (5)	59 (56) 1 (1) 15 (14) 0 (0) 0 (0) 23 (22) 3 (3)	1 (6) 0 (0) 8 (44) 0 (0) 0 (0) 6 (33) 1 (6)	8 (47) 0 (0) 5 (29) 0 (0) 0 (0) 4 (24) 0 (0)	(34.9) (0.9) (20.9) (0.0) (0.3) (33.2) (4.0)
Accident Location	1 Tangent Section 2 Curve Section 3 Intersection 4 Cross walk 5 Slope Section 6 Bridge 7 Railway cross 8 Others	0 (0) 0 (0) 63 (100) 0 (0) 0 (0) 0 (0) 0 (0) 1 (1)	0 (0) 0 (0) 52 (100) 0 (0) 0 (0) 0 (0) 0 (0) 0 (0)	0 (0) 0 (0) 66 (92) 0 (0) 0 (0) 6 (8) 0 (0) 0 (0)	0 (0) 0 (0) 62 (100) 0 (0) 0 (0) 0 (0) 0 (0) 0 (0)	0 (0) 0 (0) 76 (97) 0 (0) 0 (0) 0 (0) 2 (3)	0 (0) 0 (0) 104 (99) 0 (0) 0 (0) 0 (0) 1 (1) 30 (15)	0 (0) 0 (0) 18 (100) 0 (0) 0 (0) 0 (0) 0 (0) 7 (24)	0 (0) 0 (0) 16 (94) 0 (0) 0 (0) 0 (0) 0 (0) 1 (6)	(0.0) (0.2) (95.8) (0.0) (0.1) (0.6) (0.0) (3.2)
Accidents Involved Motorcycles	18 (11)	15 (12)	20 (20)	17 (13)	19 (20)	23 (17)	30 (15)	7 (24)	4 (12)	(12.0)

(Accidents in Jan 1984 - Jun 1985)
() : Composition

Characteristics of Accidents on Selected Road Locations/Intersection (4)

	S2 Techa Wanit Jor Por Ror	S3 Yeak Jor Por Ror	S4 Si Ayuttaya	S5 Phaya Thai	S6 Rama I	S7 Sukhumvit	S8 Rama IV	S9 Itsaraphap	S10 Charoen Nakhon	Average in Study Road %
10. Vehicle vs. Pedestrian	19 (21)	4 (6)	5 (10)	10 (14)	11 (18)	19 (24)	11 (11)	6 (33)	3 (18)	(11.5)
11. Hit pedestrian walking along carriageway	2 (2)	1 (2)	0 (0)	2 (3)	2 (3)	1 (1)	1 (1)	4 (22)	1 (6)	(2.5)
12. Hit pedestrian crossing carriageway at intersection	17 (19)	3 (5)	5 (10)	8 (11)	9 (15)	18 (23)	9 (9)	2 (11)	2 (12)	(8.7)
13. Hit pedestrian crossing carriageway at crosswalk	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	(0.0)
14. Hit pedestrian crossing carri- ageway other than crosswalk	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	(0.2)
15. Hit pedestrian emerging on carriageway	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	(0.0)
16. Hit pedestrian playing on carriageway	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	(0.0)
17. Others	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	(0.0)
20. Vehicle vs. Bicycle	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	(0.0)
30. Vehicle only	0 (0)	1 (2)	2 (4)	4 (5)	5 (8)	3 (4)	2 (2)	1 (6)	0 (0)	(3.7)
40. Vehicle vs. Vehicle	71 (79)	58 (92)	45 (86)	58 (81)	46 (74)	56 (72)	92 (87)	11 (61)	14 (82)	(84.9)
41. Head on collision	2 (2)	1 (2)	0 (0)	0 (0)	0 (0)	1 (1)	1 (1)	0 (0)	0 (0)	(1.2)
42. Rear end collision	9 (10)	20 (32)	13 (25)	24 (33)	23 (37)	24 (31)	53 (51)	0 (0)	6 (35)	(26.6)
43. Side collision during crossing	4 (4)	4 (6)	3 (6)	0 (0)	1 (2)	6 (8)	1 (1)	1 (6)	0 (0)	(2.8)
44. Side collision during right turn	33 (37)	21 (33)	2 (4)	1 (1)	1 (2)	11 (14)	8 (8)	6 (33)	4 (24)	(24.1)
45. Side collision during left turn	3 (3)	2 (3)	15 (29)	14 (19)	11 (18)	7 (9)	17 (16)	0 (0)	0 (0)	(12.5)
46. Side contact	20 (22)	10 (16)	12 (23)	19 (26)	10 (16)	7 (9)	12 (11)	4 (22)	4 (24)	(17.6)
47. Others	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	(0.0)
50. Others	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)*	0 (0)	0 (0)	(0.0)

(Accidents in Jan 1984 - Jun 1985)
() : Composition

Result of Running Speed Survey

S 4. Si Ayutthaya Road

RUNNING SPEED						
RUNNING SPEED (KM/H)	ORDINARY VEHICLES		HEAVY VEHICLES		T O T A L	
	NUMBER	RATIO(X)	NUMBER	RATIO(X)	NUMBER	RATIO(X)
20 - 25	0	0.0	0	0.0	0	0.0
25 - 30	0	0.0	0	0.0	0	0.0
30 - 35	0	0.0	0	0.0	0	0.0
35 - 40	3	2.9	0	0.0	3	2.9
40 - 45	10	9.5	0	0.0	10	9.5
45 - 50	20	19.0	0	0.0	20	19.0
50 - 55	16	15.2	0	0.0	16	15.2
55 - 60	16	15.2	0	0.0	16	15.2
60 - 65	20	19.0	0	0.0	20	19.0
65 - 70	9	8.6	0	0.0	9	8.6
70 - 75	5	4.8	0	0.0	5	4.8
75 - 80	5	4.8	0	0.0	5	4.8
80 - 85	1	1.0	0	0.0	1	1.0
85 - 90	0	0.0	0	0.0	0	0.0
90 - 95	0	0.0	0	0.0	0	0.0
95 - 100	0	0.0	0	0.0	0	0.0
100 -	0	0.0	0	0.0	0	0.0
T O T A L	105	100.0	0	100.0	105	100.0
AVERAGE SPEED	56.5KM/H		0.0KM/H		56.5KM/H	
MAXIMUM SPEED	82.0KM/H		0.0KM/H		82.0KM/H	
STANDARD DEVIATION	10.2KM/H		0.0KM/H		10.2KM/H	
15 PERCENTILE	45.8KM/H		0.0KM/H		45.8KM/H	
75 PERCENTILE	62.0KM/H		0.0KM/H		62.0KM/H	
85 PERCENTILE	66.0KM/H		0.0KM/H		66.0KM/H	

S 5. Phaya Thai Road

RUNNING SPEED						
RUNNING SPEED (KM/H)	ORDINARY VEHICLES		HEAVY VEHICLES		T O T A L	
	NUMBER	RATIO(X)	NUMBER	RATIO(X)	NUMBER	RATIO(X)
20 - 25	0	0.0	0	0.0	0	0.0
25 - 30	0	0.0	0	0.0	0	0.0
30 - 35	0	0.0	0	0.0	0	0.0
35 - 40	5	5.2	2	20.0	7	6.5
40 - 45	9	9.3	1	10.0	10	9.3
45 - 50	18	18.6	4	40.0	22	20.6
50 - 55	27	27.8	1	10.0	28	26.2
55 - 60	14	14.4	2	20.0	16	15.0
60 - 65	15	15.5	0	0.0	15	14.0
65 - 70	6	6.2	0	0.0	6	5.6
70 - 75	1	1.0	0	0.0	1	0.9
75 - 80	2	2.1	0	0.0	2	1.9
80 - 85	0	0.0	0	0.0	0	0.0
85 - 90	0	0.0	0	0.0	0	0.0
90 - 95	0	0.0	0	0.0	0	0.0
95 - 100	0	0.0	0	0.0	0	0.0
100 -	0	0.0	0	0.0	0	0.0
T O T A L	97	100.0	10	100.0	107	100.0
AVERAGE SPEED	53.8KM/H		47.5KM/H		53.2KM/H	
MAXIMUM SPEED	77.0KM/H		59.0KM/H		77.0KM/H	
STANDARD DEVIATION	8.6KM/H		7.1KM/H		8.5KM/H	
15 PERCENTILE	44.1KM/H		38.5KM/H		42.1KM/H	
75 PERCENTILE	59.0KM/H		51.0KM/H		58.3KM/H	
85 PERCENTILE	63.0KM/H		55.0KM/H		62.0KM/H	

Result of Running Speed Survey

S 6. Rama I Road

RUNNING SPEED						
RUNNING SPEED (KM/H)	ORDINARY VEHICLES		HEAVY VEHICLES		T O T A L	
	NUMBER	RATIO(X)	NUMBER	RATIO(X)	NUMBER	RATIO(X)
20 - 25	0	0.0	0	0.0	0	0.0
25 - 30	0	0.0	0	0.0	0	0.0
30 - 35	2	2.0	2	25.0	4	3.7
35 - 40	8	8.1	2	25.0	10	9.3
40 - 45	20	20.2	2	25.0	22	20.6
45 - 50	30	30.3	1	12.5	31	29.0
50 - 55	17	17.2	1	12.5	18	16.8
55 - 60	12	12.1	0	0.0	12	11.2
60 - 65	5	5.1	0	0.0	5	4.7
65 - 70	2	2.0	0	0.0	2	1.9
70 - 75	0	0.0	0	0.0	0	0.0
75 - 80	3	3.0	0	0.0	3	2.8
80 - 85	0	0.0	0	0.0	0	0.0
85 - 90	0	0.0	0	0.0	0	0.0
90 - 95	0	0.0	0	0.0	0	0.0
95 - 100	0	0.0	0	0.0	0	0.0
100 -	0	0.0	0	0.0	0	0.0
T O T A L	99	100.0	8	100.0	107	100.0
AVERAGE SPEED	49.5KM/H		40.6KM/H		48.9KM/H	
MAXIMUM SPEED	77.0KM/H		53.0KM/H		77.0KM/H	
STANDARD DEVIATION	8.8KM/H		7.0KM/H		8.7KM/H	
15 PERCENTILE	41.0KM/H		32.4KM/H		40.0KM/H	
75 PERCENTILE	52.3KM/H		43.0KM/H		52.0KM/H	
85 PERCENTILE	57.0KM/H		47.8KM/H		57.0KM/H	

S 7. Sukhumvit Road

RUNNING SPEED						
RUNNING SPEED (KM/H)	ORDINARY VEHICLES		HEAVY VEHICLES		T O T A L	
	NUMBER	RATIO(X)	NUMBER	RATIO(X)	NUMBER	RATIO(X)
20 - 25	0	0.0	0	0.0	0	0.0
25 - 30	0	0.0	0	0.0	0	0.0
30 - 35	0	0.0	0	0.0	0	0.0
35 - 40	9	9.8	1	11.1	10	9.9
40 - 45	11	12.0	3	33.3	14	13.9
45 - 50	22	23.9	1	11.1	23	22.8
50 - 55	18	19.6	2	22.2	20	19.8
55 - 60	11	12.0	2	22.2	13	12.9
60 - 65	10	10.9	0	0.0	10	9.9
65 - 70	9	9.8	0	0.0	9	8.9
70 - 75	1	1.1	0	0.0	1	1.0
75 - 80	1	1.1	0	0.0	1	1.0
80 - 85	0	0.0	0	0.0	0	0.0
85 - 90	0	0.0	0	0.0	0	0.0
90 - 95	0	0.0	0	0.0	0	0.0
95 - 100	0	0.0	0	0.0	0	0.0
100 -	0	0.0	0	0.0	0	0.0
T O T A L	92	100.0	9	100.0	101	100.0
AVERAGE SPEED	52.3KM/H		48.1KM/H		51.9KM/H	
MAXIMUM SPEED	77.0KM/H		56.0KM/H		77.0KM/H	
STANDARD DEVIATION	9.4KM/H		7.3KM/H		9.2KM/H	
15 PERCENTILE	41.0KM/H		38.7KM/H		41.0KM/H	
75 PERCENTILE	58.0KM/H		50.0KM/H		56.8KM/H	
85 PERCENTILE	63.2KM/H		53.3KM/H		63.0KM/H	

Result of Running Speed Survey

S 8. Rama IV Road

RUNNING SPEED						
RUNNING SPEED (KM/H)	ORDINARY VEHICLES		HEAVY VEHICLES		T O T A L	
	NUMBER	RATIO(X)	NUMBER	RATIO(X)	NUMBER	RATIO(X)
20 - 25	0	0.0	0	0.0	0	0.0
25 - 30	0	0.0	0	0.0	0	0.0
30 - 35	1	1.0	0	0.0	1	1.0
35 - 40	4	4.1	2	28.6	6	5.7
40 - 45	9	9.2	3	42.9	12	11.4
45 - 50	19	19.4	1	14.3	20	19.0
50 - 55	17	17.3	1	14.3	18	17.1
55 - 60	19	19.4	0	0.0	19	18.1
60 - 65	11	11.2	0	0.0	11	10.5
65 - 70	8	8.2	0	0.0	8	7.6
70 - 75	6	6.1	0	0.0	6	5.7
75 - 80	2	2.0	0	0.0	2	1.9
80 - 85	1	1.0	0	0.0	1	1.0
85 - 90	1	1.0	0	0.0	1	1.0
90 - 95	0	0.0	0	0.0	0	0.0
95 - 100	0	0.0	0	0.0	0	0.0
100 -	0	0.0	0	0.0	0	0.0
T O T A L	98	100.0	7	100.0	105	100.0
AVERAGE SPEED	55.5KM/H		43.2KM/H		54.7KM/H	
MAXIMUM SPEED	89.0KM/H		50.0KM/H		89.0KM/H	
STANDARD DEVIATION	10.6KM/H		5.3KM/H		10.3KM/H	
15 PERCENTILE	44.7KM/H		35.2KM/H		43.0KM/H	
75 PERCENTILE	60.5KM/H		43.8KM/H		60.0KM/H	
85 PERCENTILE	65.3KM/H		45.9KM/H		65.0KM/H	

S 10 Charoen Nakhon Road

RUNNING SPEED						
RUNNING SPEED (KM/H)	ORDINARY VEHICLES		HEAVY VEHICLES		T O T A L	
	NUMBER	RATIO(X)	NUMBER	RATIO(X)	NUMBER	RATIO(X)
20 - 25	0	0.0	0	0.0	0	0.0
25 - 30	0	0.0	0	0.0	0	0.0
30 - 35	0	0.0	1	7.1	1	0.8
35 - 40	2	1.9	0	0.0	2	1.7
40 - 45	22	20.8	7	50.0	29	24.2
45 - 50	28	26.4	3	21.4	31	25.8
50 - 55	37	34.9	2	14.3	39	32.5
55 - 60	13	12.3	1	7.1	14	11.7
60 - 65	3	2.8	0	0.0	3	2.5
65 - 70	1	0.9	0	0.0	1	0.8
70 - 75	0	0.0	0	0.0	0	0.0
75 - 80	0	0.0	0	0.0	0	0.0
80 - 85	0	0.0	0	0.0	0	0.0
85 - 90	0	0.0	0	0.0	0	0.0
90 - 95	0	0.0	0	0.0	0	0.0
95 - 100	0	0.0	0	0.0	0	0.0
100 -	0	0.0	0	0.0	0	0.0
T O T A L	106	100.0	14	100.0	120	100.0
AVERAGE SPEED	49.9KM/H		45.6KM/H		49.3KM/H	
MAXIMUM SPEED	66.0KM/H		56.0KM/H		66.0KM/H	
STANDARD DEVIATION	5.7KM/H		6.1KM/H		5.8KM/H	
15 PERCENTILE	43.0KM/H		40.0KM/H		43.0KM/H	
75 PERCENTILE	52.0KM/H		48.0KM/H		52.0KM/H	
85 PERCENTILE	55.0KM/H		49.8KM/H		54.0KM/H	

Existing Road Condition of Safety Planning Segment (2)

Section No.	S 7	S 8	S 9	S 10
Location	Sukhumvit Nana Nua - Thonglor	Rama IV Rong Muang - Rachadamri	Itsaraphap Intersection with Wang Doem	Charoen Nakhon Infront of Wat Sawetthachai
Land Use	Commerical Area	Commerical Area	Commerical Area	Commerical Area
Kind of Road	Signalized Intersection and Mid-block Section	Signalized Intersection and Mid-block Section	Signalized Intersection and Mid-block Section	Mid-Block Section
Lane	6 - lane	10 - lane	4 - lane 3 - lane	6 - lane
Division	None: One Way Mounted up Median: Two Way	Mounted up Median	Undivided	Marking Median
Horizontal Alignment	Straight	Straight	Straight	Straight
Vertical Alignment	Level	Level	Level	Crown
Surface	Good (Concrete)	Good (Concrete)	Improper Cross Slope (Asphalt)	Good (Asphalt)
Shoulder	-	-	-	-
Others	Bus Lane, (One way)	-	-	Bridge
Marking	Insufficient	Good	Partially Erased	Insufficient
Lighting	Insufficient	Poor Luminance Uniformity	Partially Poor	Obstructed by Trees
Sign	Concealed by Trees	Insufficient	Concealed by Trees	Concealed by Trees
Guard Rail	-	Partially at Median	-	-
Side Walk	Both Side	Both Side	Both Side	Both Side
Pedestrian Crossing	Pedestrian Overpass, Cross Walk	Cross Walk with Flash Lamp, Pedestrian Cross Walk	Cross Walk	Cross Walk
Others	Road Stud	-	-	Road Stud
Vehicle	4,000 Veh/hr	5,000 Veh/hr	3,000 Veh/hr 650 Veh/hr	3,300 Veh/hr
Pedestrian	Many	Many	Many	Many
Others	One Way Two Way	-	-	-

Accident Pattern of Safety Planning Segment (1)

Segment No.	S 1	S 2-1	S 2-2	S 3	S 4	S 5	S 6
Location	Pracha Chuen Intersection With Poem Sap Damri	Techa Wanit Intersection With Inoet Damri	Techa Wanit Infront of Bang Sue Market	Rachadamaoen Nok Inter section With Wisut Kasat	Si Ayuthaya Phaya Thai - Rachaprarop	Phaya Thai Intersection With Petburi	Rama I Rama IV - Krung Kasen
Length (Km)	0.30	0.35 + 0.30	0.35	0.35 + 0.25	0.55	0.30 + 0.20	0.55
10. Vehicle vs. Pedestrian	1 (8)	0 (0)	7 (28)	1 (2)	5 (19)	3 (20)	2 (9)
11. Hit pedestrian walking along carriageway	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
12. Hit pedestrian crossing carriageway at intersection	0 (0)	0 (0)	0 (0)	1 (2)	0 (0)	3 (20)	0 (0)
13. Hit pedestrian crossing carriageway at crosswalk	0 (0)	0 (0)	3 (12)	0 (0)	3 (11)	0 (0)	0 (0)
14. Hit pedestrian crossing carriageway other than crosswalk	1 (8)	0 (0)	4 (16)	0 (0)	2 (8)	0 (0)	2 (9)
15. Hit pedestrian emerging on carriageway	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
16. Hit pedestrian playing on carriageway	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
17. Others	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
20. Vehicle vs. Bicycle	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
30. Vehicle Only	0 (0)	0 (0)	1 (4)	0 (0)	3 (11)	2 (13)	0 (0)
31. Off carriageway	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
32. Collision with parked vehicle	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
33. Collision with guard rail	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
34. Collision with electric pole	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
35. Collision with other objects	0 (0)	0 (0)	1 (4)	0 (0)	3 (0)	2 (13)	0 (0)
36. Others	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
40. Vehicle vs. Vehicle	11 (92)	24 (100)	17 (68)	48 (98)	19 (70)	10 (67)	19 (90)
41. Head on collision	0 (0)	1 (4)	0 (0)	0 (0)	1 (4)	1 (7)	5 (24)
42. Rear end collision	3 (25)	9 (38)	4 (16)	11 (22)	5 (19)	3 (20)	5 (24)
43. Side collision during crossing	0 (0)	0 (0)	0 (0)	1 (2)	0 (0)	1 (7)	0 (0)
44. Side collision during right turn	5 (42)	8 (33)	2 (8)	20 (41)	3 (11)	3 (20)	1 (5)
45. Side collision during left turn	1 (8)	0 (0)	1 (4)	4 (8)	3 (11)	1 (7)	1 (5)
46. Side contact	2 (17)	6 (25)	8 (32)	2 (4)	7 (26)	1 (7)	7 (33)
47. Others	0 (0)	0 (0)	2 (8)	0 (0)	0 (0)	0 (0)	0 (0)
50. Unknown	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
TOTAL	12 (100)	24 (100)	25 (100)	49 (100)	27 (100)	15 (100)	21 (100)

Accident Pattern of Safety Planning Segment (2)

Segment No.	S 6	S 7	S 8	S 9	S 10
Location	Rama I Road	Sukhumvit Road	Rama IV Road	Itsaraphap Road	Charoen Nakhon Road
Accident Pattern					
Length (Km)	0.55	3.50	2.50	0.3 + 0.25	0.25
10. Vehicle vs. Pedestrian	2 (9)	44 (19)	57 (32)	8 (35)	13 (48)
11. Hit pedestrian walking along carriageway	0 (0)	1 (1)	2 (1)	1 (4)	1 (7)
12. Hit pedestrian crossing carriageway at intersection	0 (0)	13 (6)	7 (4)	2 (8)	0 (0)
13. Hit pedestrian crossing carriageway at crosswalk	0 (0)	11 (5)	20 (11)	0 (0)	10 (37)
14. Hit pedestrian crossing carriageway other than crosswalk	2 (9)	19 (8)	28 (16)	5 (21)	2 (7)
15. Hit pedestrian emerging on carriageway	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
16. Hit pedestrian playing on carriageway	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
17. Others	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
20. Vehicle vs. Bicycle	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
30. Vehicle only	0 (0)	14 (6)	4 (2)	1 (4)	2 (7)
31. Off carriageway	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
22. Collision with parked vehicle	0 (0)	4 (2)	3 (2)	0 (0)	2 (7)
33. Collision with guard rail	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
34. Collision with electric pole	0 (0)	6 (3)	0 (0)	0 (0)	0 (0)
35. Collision with other objects	0 (0)	3 (1)	1 (1)	1 (4)	0 (0)
36. Others	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)
40. Vehicle vs. Vehicle	19 (90)	178 (75)	117 (56)	14 (61)	12 (44)
41. Head on collision	5 (24)	1 (1)	0 (0)	1 (4)	0 (0)
42. Rear end collision	5 (24)	64 (27)	57 (32)	4 (17)	5 (19)
43. Side collision during crossing	0 (0)	1 (1)	4 (2)	0 (0)	0 (0)
44. Side collision during right turn	1 (5)	61 (26)	25 (14)	3 (13)	3 (11)
45. Side collision during left turn	1 (5)	20 (8)	6 (3)	4 (17)	0 (0)
46. Side contact	7 (33)	31 (13)	25 (14)	2 (9)	4 (15)
47. Others	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
50. Unknown	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
TOTAL	21 (100)	236 (100)	178 (100)	23 (100)	27 (100)