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ROAD ACCIDENT INVESTIGATION

NTRC-179

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## S U M M A R Y

The primary objective of the Study was to investigate the conditions under which most of the accidents occurred in Pakistan during the period of September, 1987 to December, 1993 and identify the black-spots using a micro computer. The accident reports were received only from 3 Provinces viz. Punjab, Sind and Baluchistan and Federal Capital Islamabad. A total of 1585 accidents were reported by the Police during the period of which 2385 vehicles were involved in the 1585 accidents i.e. 1.5 per accident. Out of these 306 (13%) were cars, 930 (39%) Buses/Mini Buses, 223 (9%) Pick-ups, 198 (8%) Motorcycles, 430 (8%) Trucks, and rest of the other vehicles i.e. Tractors, Rickshaws, Trailers, Tractor Trolleys and Animal Drawn. The maximum of vehicles involved in one single accident were 3. Out of the total 1221 accidents i.e. 77% were fatal. A total of 1214 accidents i.e. 77% were occurred in the day light. The peak month of the accidents was February in which 189 accidents i.e. 12% of the total occurred. As regards the day of week, Sunday turned out to be the most hazardous in which 249 accidents i.e. 16% of the total occurred. The peak hour of the day was 08-09 AM in which 233 accident i.e. 15% of the total occurred.

In the collision type analysis, 34% of the accidents were of the pedestrians. Most of the accidents i.e. 1048 (66%) occurred away from the junction. The analysis of the speed of the vehicle at the time of accident shows that out of total 1585 accidents, 552 (35%) were due to exceeding the speed limit.

It has been discovered from the detailed analysis that out of total 1585 accidents 1498 (95%) occurred due to the negligence of the road users. Out of 1498 accidents 1418 (89%) were due to negligence of the drivers, 65 (4%) negligence of the pedestrians and only 15 accidents were due to the negligence of passengers. Only 49 accidents resulted due to mechanical fault. Where 38 accident happened due to the bad road surface condition i.e. slippery.

Out of 1418 accidents which occurred due to negligence of the drivers, wrong turning, over speeding, Rackless driving were the primary causes i.e. 22%, 35%, and 22% respectively. Other reasons include over taking 147 (9%), failing to stop at stop sign/signal 23. Of the 622 pedestrian's accidents, 522 (84%) were fatal.

The black-spots could not be identified due to incomplete information regarding the exact location of the accidents. This objective can only be achieved if the Reporting Officers clearly sketch the location map as per instructions issued with the accidents reporting booklet. Statements/reports of the drivers reporting officer etc. also need clearly written so that these could be read by the office staff.

The results of the analysis are consistent with previous studies as regards role of road, vehicle and road user; light condition and day of the week. There were however minor variations in other factors within the normal range.

The results of the analysis would be most valuable for Traffic Police to concentrate on those few aspects which are responsible for majority of the accidents and have the potential to yield greatest dividends.

Arrangements have been made for carrying out such analysis on regular basis in future to monitor the trends and suggest remedial measures.

## 2. Introduction

Traffic-accident investigation - or for that matter, any kind of investigation - is mainly a matter of obtaining, recording, refining, and interpreting information. However, a police investigator also may be required to discharge other responsibilities in connection with the accident. For example, at the scene of an accident, a police traffic-accident investigator may also protect life and property. This is not, strictly speaking, investigation. A person may subsequently become involved in law-suits, which are also not part of investigation. Hence, the end product of an investigation is a package of information. This information may be only a jumble of disconnected bits and pieces wholly in the mind of the investigator or it may be a carefully sorted bundle of forms, statements, drawings, photographs, and even pieces of vehicles transmitted to someone who has to do something with the data they contain.

The information may have been gathered by one person or many. It may relate to an intricate series of events and circumstances that constitute an accident or only to a minute aspect, such as a tiny lamp filament. The information may be confined to a few bare facts; or it may consist largely of fanciful speculations, unfounded assumptions, or simple guesses. Usually, however, the collected information consists of a mixture of fact and opinion.

Whatever its quantity or quality, the end product of investigation is still collection of information about the accident.

Mainly, information about traffic accidents is collected with specific uses in mind. Such purposes determine - or should determine - the amount and character of information collected.

At the scene of the accident, the investigator usually does not know exactly what data will eventually be needed. As a result, in gathering information, the investigator must be guided by instructions of some kind or by his own judgement, which may or may not be based realistically on experience. If he obtains too much information, some of it will be wasted; if too little, it may turn out to be inadequate for the purposes. Thus, at the scene of a serious accident, a certain amount of information is collected for possible future use. This is especially important with respect to information which can only be obtained at the time of the accident; or which may be much more difficult to get later. Some data collection, on the other hand, can be deferred until it is clear that it is actually wanted.

Users of traffic - accident information can be divided into two major categories: 1) those who want minimum basic information about all or most accidents; and 2) those who want a lot of information about a single accident.

3. Back Ground:

Over the past twenty years, the techniques of accidents investigation have proved to be highly successful in countries such as the U.K., U.S. and Australia. As an example of how economically rewarding this approach can be, the "London Council Accident Black-spot Team, after well over 1000 schemes, has received an average first year rate of return 35%. Because of these highly cost effective results, the Overseas Unit of the Transport and Road Research Laboratory (TRL), U.K. has put a high priority on testing the technique in developing countries. However, the technique depends upon a good standard of accident reporting and analysis and the Overseas Unit of TRL over the past eight years has therefore put considerable effort into developing (a) an easy-to-use Police accident report booklet and (b) an easy-to-use micro computer accident analysis package specifically designed for accident on black-spot work. As a part of this programme and to collect the data of Road accidents the Overseas Unit of TRL has developed a guideline of Road Accident report booklet intended for use in developing countries.

With a view to determine the viability of introducing the system in Pakistan the road accident report booklet was modified and translated in "Urdu" with the aim of reconciling two conflicting needs (i) to minimise the time and effort required by the reporting policeman to complete the booklet, and (ii) the need to maximise the recorded details of the accident for subsequent investigation and analysis. In particular, the booklet is designed so that the key details of the accident can be directly stored on Computer.

In order to demonstrate and to test the booklet a workshop was held in the National Transport Research Centre from 8th December to 14th December, 1985. 17 Police Officers of the rank of D.S.P. to Sub-Inspector Traffic Police participated in the workshop. During the seminar the lectures were delivered by Mr. M. Sadiq Swati, Senior Chief, National Transport Research Centre and Dr. Brian Hills, U.K. Expert. The procedure for completion of booklet with the help of lectures and films were explained, in addition to practical demonstration of stage accidents.

After the successful desired results of the workshop the sufficient number of copies of the booklet were supplied to all inspector General of Police with the request to report the all road accidents in the booklet in future and return to the NTRC for necessary analysis through Computer.

4. Objective

The principal aim of this study is to obtain four kinds of factual information - road user, roads vehicle, and to investigate the conditions under which most of the accidents occurred in Pakistan.

5. Analysis

An 'accident' is defined as an error in driver-vehicle-roadway system and it must be recognized that different types of accidents are caused due to different factors. It is usually possible to identify the cause of accidents at any given location by the predominant type of accidents occurring at that location, namely; rear-end, side-swipes, head-on, night-time, bad-weather, etc. For instance, predominance of rear-end accidents will indicate slippery pavement whereby the drivers have difficulty in stopping in time. Side-swipe accidents will indicate ambiguous traffic control devices, causing confusion among the drivers regarding right-of-way. Head-on collisions signify lack of adequate sight distances at the location. Predominance of night-time accidents at the location will indicate serious problems with night time visibility. Bad-weather accidents can result due to a road pavement which becomes dangerously slippery when wet or it may be due to inadequate signs for inclement weather. Similarly, there are numerous other types of accidents which occur due to a variety of reasons. The job of the accident analyst is, therefore, to relate the accidents experience at any location to one or more causes. The state of the art permit such treatments.

A total of 1585 booklets were received for the period of September, 1987 to December, 1993 from the provinces of Punjab, Sind, Islamabad and Baluchistan through the respective Police districts. These booklets have been entered in the Computer as well as examined through the Accident Analysis package specially designed for the purpose by the Overseas Unit of Transport & Research Laboratory (TRL), U.K.

The emphasis have been given in the analysis on four main items viz. (1) General Condition (2) Mechanical Fault (3) Negligence and (4) Road Condition. Each analysis have been done in 3 parts viz. national, provincial and at the district level. Therefore, the results of the analysis are reported on the same lines. The salient features of the analysis are reported in the following sections.



Part A - National Level

5.1

Type of Vehicle

In all of 1585 accidents a total of 2385 vehicles were involved which means that 1.5 vehicles per accidents. The type of vehicles involved are as under:-

*7 + 1.5 = 8.5  
vehicles per type*

522408

57021

	Nos.
Cars	306 ✓
M. Bus	423 ✓
Buses	507 ✓
Pick-up	223 ✓
Rickshaws	20 ✓
Motor Cycles	198 ✓
Cycles	61 ✓
Trucks	430 ✓
Trailer	47 ✓
Tractor	25 ✓
Tractor Trolley	58 ✓
Animal drawn	27 ✓
Others	60 ✓
TOTAL:-	2385

It seems from the above that buses/mini buses are to common vehicles which involved in total 2385 vehicles i.e. 930 (39%) of the total.

5.2 General Conditions

The purpose of this analysis is to out-line the conditions under which most of the accidents occurred. This analysis will help to identify the impact of environmental conditions on road accidents.

5.2.1 Months-wise Observation

The total road accidents were for the period of 76 months viz. from September 1987 to December 1993, it may worth to mention that major portion of the data is for 1992-93. The months-wise accidents details of total 1585 accidents are as under:-

January	187
February	189
March	177
April	132
May	108
June	116
July	101
August	149
September	109
October	107
November	112
December	98
TOTAL:-	1585

It can be seen from the above that most of the accidents i.e. 11 - 12% of the total were occurred during the month of January - March. It is pointed out that total 1585 accidents were recorded during the September, 1987 to December, 1993. Therefore, it may be assumed that the reporting officer of the traffic police were active only during the initial period as the accidents recording booklets were distributed in February 1986 and reminders were issued in September - October 1987.

5.2.2 Day of Week

The accidents have been examined according to the days of week and the results found as under:-

Saturday	228
Sunday	249
Monday	232
Tuesday	207
Wednesday	224
Thursday	234
Friday	211
TOTAL:-	1585

It seems from the above that the Sunday turned out to be the most hazardous in which 249 accidents i.e. 16% of the total occurred.

5.2.3 Hour of the Day

Similar by the analysis of hour of the day have been examined as per details below:-

<u>Hour</u>	<u>No. of Accidents</u>
00-01	16
02-03	33
04-05	44
06-07	139
08-09	233
10-11	216
12-13	176
14-15	197
16-17	197
18-19	172
20-21	117
22-23	45
TOTAL:-	1585

As reported above, it seems that most of the accidents i.e. 233 (15%) out of total 1585 occurred during morning peak time i.e. 08:00-09:00 hours and 12% in the 2nd peak time i.e. 14:00 - 17:00.

5.2.4 Light Conditions

This analysis has been done to check the rate of accidents in different light conditions. The results derived from this analysis are reported below:-

Day Light	1214
Night Street Light	129
Night Street Unlight	242
TOTAL:-	1585

The general view is that most of the accident occurs during the night time due to tiredness of drivers, vision problem etc.

But the results of the above analysis are shown that out of total 1585 accidents 1214 (77%) were occurred in the day light. Assuming that the accidents have not been recorded properly and the concentration have been given only on the day time's accidents, or may be this is due to un-reported accidents.

5.2.5 Collision Type

This factor has also been examined and the results derived as reported below:-

Side Swipe	230
Nose-to-tail	184
Head on	328

Pedestrian	545
Others	98
Animal	8
Obstl.	20
Rolls	172
TOTAL:-	1585

As shown above, most of the accidents are of Pedestrian i.e. 545 (34%) of the total.

#### 5.2.6 Junction Control

This analysis is related with the type of control, whether it was controlling by police, signals, stop signs etc. the results of this analysis are reported below:-

Not junction	1048
Police	117
Signals	67
Stop sign	16
Give way sign	23
Uncontrolled junction	314
TOTAL:-	1585

#### 5.2.7 Accident Severity

The severity of 1585 accidents have been examined and found that out of total 1585 accidents, 1221 (77%) are fatal, 222 (14%) hospitalized, 97 (6%) minors injuries and 45 (3%) are only damage of the vehicle.

5.3 Mechanical Fault

This analysis has been proved the contribution of un-fit vehicles in the road accidents. Subsequently it will also help to prevent the defective vehicles on road. This analysis shows the contribution in the accidents of different type of defective vehicles.

5.3.1 Vehicle Lights

This analysis comes under the mechanical condition of the vehicle.

A total of 2385 vehicles were involved in the 1585 accidents. Out of 2385 vehicles, the lights of the vehicles and the time of the accidents have been examined as per details below:-

Time	Vehicle Lights		Total
	Lts OK	Bad Lt	
00-01	25	1	26
02-03	55	5	60
04-05	67	6	73
06-07	208	6	214
08-09	321	5	326
10-11	308	6	314
12-13	256	8	264
14-15	289	3	292
16-17	280	10	290
18-19	260	5	265
20-21	160	26	186
22-23	68	7	75
TOTAL:-	2297	88	2385

5.3.2 Break Failure

Out of 1585 accidents 29 (2%) were occurred due to break failure.

5.3.3. Tyre Burst

Next most important analysis is the tyre conditions of the vehicles, in this analysis an attempt has been made to check whether the accidents occurred due to tyre burst or not. The load condition of the vehicles at the time of accidents have also been examined. The results derived from the data available are as under:-

VEHICLE LOAD	TYRE BURST						Total
	No. Bst	Frnt-R	Frnt-L	Rear R	Rear L	Other	
Legal	2081	8	5	5	5	38	2142
Front	14	-	-	-	-	1	15
Rear	39	2	1	1	-	2	45
Side	23	-	-	-	-	-	23
Top	34	-	-	2	1	5	42
Inside	109	2	-	2	-	5	118
TOTAL:-	2300	12	6	10	6	51	2385

It seems from the above that the load condition of 2142 vehicles i.e. 90% of total 2385 was within the legal limit whereas 243 vehicles (10%) were over loaded as per details above.

As regard the tyre condition, at the time of accidents the tyre of 2300 (96%) vehicles were O.K.

#### 5.3.4 Tie Rod

Out of total 1585 accidents 20 (1%) were occurred due to this reason.

5.4 Roads

This is one of the main reasons which influence the road accidents in different ways. The detail analysis are as under.

5.4.1 Road Geometry

The road characteristics also influence the road accidents. The analysis for road geometry as well as road separation have been included. The results derived from the analysis are reported below.

Road Geometry

<u>Median</u>	<u>Straight Flat</u>	<u>Curvature</u>	<u>Gradient</u>	<u>Both</u>	<u>Total</u>
Yes	426	29	4	30	489
No	918	90	37	51	1096
<b>TOTAL:-</b>	<b>1344</b>	<b>119</b>	<b>41</b>	<b>81</b>	<b>1585</b>

It may be seen from the above that out of 1585, 1344 (85%) vehicles were on straight, flat and median road. Whereas only 119 (8%) vehicles were on curved roads at the time of accidents. But that was not the Primary Cause of a accident.

5.4.2 Surface Condition

Road surface type and surface condition have also been examined. The results are as follows:-

<u>Surface Condition</u>	<u>Road Surface Type</u>			<u>Total</u>
	<u>Paved</u>	<u>Gravel</u>	<u>Kucha</u>	
Dry	1385	19	36	1440
Wet	118	4	4	126
Other	13	1	5	19
<b>TOTAL:-</b>	<b>1516</b>	<b>24</b>	<b>45</b>	<b>1585</b>

5.4.3 Shoulder Characteristics

The shoulder width and shoulder type of the roads where a total of 1585 accidents have been occurred were as under:-

<u>Type Shoulder</u>	<u>Shoulder Width (m)</u>				<u>Total</u>
	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	
Paved	-	214	164	65	443
Un-paved	-	306	342	217	865
No Shoulder	277	-	-	-	277
<b>TOTAL:-</b>	<b>277</b>	<b>520</b>	<b>506</b>	<b>282</b>	<b>1585</b>



5.4.4 Junction Type

The results of junction type analysis are as under:-

Non-Junction	1048
Cross	130
T-Junction	154
Stag-X	24
Y-Junction	7
Round	52
Other	170
TOTAL:-	1585

It may be seen from the above results that out of total 1585 accidents 1048 occurred on Non-Junction i.e. 66% of the total.

5.4.5 Road Under-construction

Out of total 1585 accidents 38 i.e. 2% occurred due to Road Under-construction.

## 5.5 Negligence

Under this analysis the results have been derived to determine the proportion of main type of negligence viz. wrong turning, stop sign/signal breaking, over speeding, over taking, pedestrian's wrong road crossing, Rackless driving and passenger negligence. The details of the analysis are reported.

### 5.5.1 Wrong Turning

Out of total 1585, 346 accidents occurred due to the wrong turning which mean that only 22% accidents occurred due to this reason.

### 5.5.2 Signal/Stop Sign Break

It is found from the reported data that only 23 accidents i.e. 1% were occurred due to failing to stop at stop sign/signal.

### 5.5.3 Over Speeding

As most of the data is related to the rural areas where the violation of speed limit is quite obvious on the other hand in an urban area, the violation of speed limit is not easy due to the curvatures, junctions, pedestrian crossings, speed breakers etc. It is found from the analysis that out of total 1585 accidents 552 i.e. 35% occurred due to speed violation.

### 5.5.4 Over Taking

Under the negligence of drivers the over taking is quite common and the analysis shows that the percentage of accidents due to over taking is 9% of the total accidents. A total of 147 accidents were recorded due to over taking.

### 5.5.5 Rackless driving.

This reason is also count in the analysis, the analysis shows that 350 (22%) out of total 1585 accidents were occurred due to this reason.

### 5.5.6 Passenger's Negligence

Passenger's negligence is one of the reasons of accident. The analysis shows that 15 out of total 1585 accidents occurred due to this reason.

### 5.5.7 Pedestrian's wrong road crossing

It is found from the reported data that 65 accidents i.e 4% out of total 1585 accidents were occurred due to pedestrian's wrong road crossing.

5.6 Pedestrian

This analysis is related with the pedestrian's accident severity. The results have been derived through the Computerized package and found that out of 1585 accidents 622 (39%) pedestrians were effected, of which 522 (84%) were fatal, 70 (11%) hospitalized and 30 (5%) were minor injured.

Percentage of Vehicle Involved

Cars	13%
M. Bus	18%
Buses	21%
Pick-Up	9%
Rickshaws	1%
Motor Cycles	8%
Cycles	3%
Trucks	18%
Trailer	2%
Tractor	1%
Tractor Trolley	3%
Animal Drawn	1%
Other	2%
Total	100%

SUMMARY

A. General Condition:

<u>Description</u>	<u>Condition</u>	<u>No. of Accidents</u>	<u>% of Total</u>
Month of the year	February	189	12
Day of the week	Sunday	249	16
Hour of the day	08-09	233	15
Severity	Fatal	1221	77
Collision type	Pedestrian	545	34
Junction type	Not-Junction	1048	66
Light condition	Day Light	1214	77

B. Mechanical Fault:

-	Break fail	29
-	Tie-rod	20
-	Tyre Burst	0
-	Vehicle Lights	0

Total B: 49

C. Roads:

-	Bad Road Condition	38
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Total C: 38

D. Negligence

i) Drivers:

-	Wrong turning	346
-	Over taking	147
-	Over speeding	552
-	Stop sign/signal breaking	23
-	Rackless driving.	350

Total D (i) 1418

ii) Users:

-	Passengers Negligence	15
-	Pedestrian's wrong road crossing	65

Total D (ii) 80

Grand Total (B-D): 1585

Part B - Provincial Level

PROVINCE WISE ACCIDENTS

5.7 Type of Vehicles

In all of 1585 accidents a total of 2385 vehicles were involved. 908 accidents were recorded in Punjab in which 1434 vehicles were involved which means that 1.7 vehicles per accident. Out of 1585 total accidents 515 were in Sind, 82 in Islamabad and 80 in Baluchistan. Where 707, 135 and 109 vehicles were involved in the accidents respectively.

	<u>Punjab</u>	<u>Sind</u>	<u>Islamabad</u>	<u>Baluchistan</u>	<u>Total</u>
Cars	172	74	47	13	306
Mini Bus	287	113	22	1	423
Buses	359	109	25	14	507
Pickups	117	68	12	26	223
Rickshaws	1	18	-	1	20
M. Cycles	81	95	7	15	198
Cycles	21	33	2	5	61
Trucks	246	139	19	26	430
Trailers	32	15	-	-	47
Tractor	17	6	-	2	25
Tractor Trolley	49	7	1	2	59
Animal Drawn	19	8	-	-	27
Others	33	22	-	4	59
Total :	1434	707	135	109	2385

It seems from the above that Buses are to common vehicle which involved in 2385 vehicles i.e. 646 (27%).

5.8 General Conditions

The purpose of this analysis is to out-line the conditions under which most of the accidents occurred. This analysis will help to identify the impact of environmental conditions on road accidents.

5.8.1 Months-wise Observation

The total road accidents were for the period of 76 months viz. from September, 1987 to April, 1993. However, the major portion of the data is for 1992-93. The months-wise accidents details of each province as under :

	<u>Punjab</u>	<u>Sind</u>	<u>Islamabad</u>	<u>Baluchistan</u>	<u>Total</u>
January	96	74	8	9	187
February	110	57	9	13	189
March	110	50	8	9	177
April	60	53	11	8	132
May	96	10	-	2	108
June	85	26	-	5	116
July	49	45	-	7	101
August	76	54	8	11	149
September	45	45	13	6	109
October	55	46	4	2	107
November	65	36	8	3	112
December	61	19	13	5	98
Total :	908	515	82	80	1585

It can be seen from the above that out of total 1585 accidents 908 occurred in Punjab, 515 in Sind and 82 in Islamabad and 80 in Baluchistan. It is found from the analysis that the common peak months in Punjab were February and March, the month of January in Sind, where as in Islamabad September and December are the common months, in Baluchistan February was observed as peak month.

5.8.2 Day of Week

The accidents have been examined according to the days of week of each province and the results found reported as under:

	<u>Punjab</u>	<u>Sind</u>	<u>Islamabad</u>	<u>Baluchistan</u>	<u>Total</u>
Saturday	133	70	13	12	228
Sunday	144	85	10	10	249
Monday	128	77	13	14	232
Tuesday	108	72	13	14	207
Wednesday	130	71	13	10	224
Thursday	142	77	8	7	234
Friday	123	63	12	13	211
Total :	908	515	82	80	1585

It is found from the analysis that in Punjab Sunday turned out to be the most hazardous in which 144 accidents i.e. 16% of the total occurred. Similarly in Sind Sunday was the hazardous day in which 85 accidents i.e. 17% of the total occurred. Whereas in Islamabad the hazardous day could not be found out as the No. of accidents on Saturday, Monday, Tuesday and Wednesday are same as 13. This might be due to small sample size. On the other hand in Baluchistan Monday and Tuesday are seems hazardous days where 14 accidents occurred.

5.8.3 Hour of the Day :

Similar to the analysis of day of week the accident records were examined according to the hour of the day of each province as per details belows:-

Hours	No. of Accidents :				Total
	Punjab	Sind	Islamabad	Baluchistan	
00-01	7	9	-	-	16
02-03	27	6	-	-	33
04-05	34	8	-	2	44
06-07	91	35	10	3	139
08-09	123	79	14	17	233
10-11	120	63	15	18	216
12-13	117	43	4	12	176
14-15	127	51	7	12	197
16-17	102	74	14	7	197
18-19	83	78	7	4	172
20-21	57	46	9	5	117
22-23	20	23	2	-	45
Total :	908	515	82	80	1585

As reported above, it seems that in Punjab most of the accidents i.e. 127 (14%) of the total occurred during peak time i.e. 14-15 hours. Similarly in Sind 79 accidents (15%) of the total recorded at 08-09 hours, where as in Islamabad 15 accidents (18% ) occurred during 10-11 hours. In Baluchistan 18 accidents (23%) occurred during 10-11 hours.

5.8.4 Light Conditions

This analysis has been done to check the rate of accidents in different light conditions. The results derived from this analysis are reported below :

	Punjab	Sind	Islamabad	Baluch.	Total
Day light	699	380	66	69	1214
Night street Light	29	83	13	4	129
Night street unlight	180	52	3	7	242
Total :	908	515	82	80	1585



The general view is that most of the accident occurs during the night time due to tiredness of drivers, vision problem etc. But result shows that in Punjab province 699 accidents (77%), 380 (74%) in Sind, 66 (80%) in Islamabad and in Baluchistan 69 (86%) accidents occurred in the day light.

#### 5.8.5 Collision Type

This factor has also been examined and the results derived as reported below :

	<u>Punjab</u>	<u>Sind</u>	<u>Islamabad</u>	<u>Baluch.</u>	<u>Total</u>
Side swipe	140	54	22	14	230
Nose-to-tail	96	64	19	5	184
Head on	242	62	17	7	328
Pedestrian	235	256	11	43	545
Animal	2	1	4	1	8
Obstl	13	5	-	2	20
Rollr	131	30	7	4	172
Others	49	43	2	4	98
<b>Total :</b>	<b>908</b>	<b>515</b>	<b>82</b>	<b>80</b>	<b>1585</b>

It seems from the above that most of the accidents are Head-on viz 242 (27%) in Punjab, Ped's 256 (50%) in Sind, Sideswipe 22 (27%) in Islamabad and Baluchistan Ped's 43 (54%).

#### 5.8.6 Junction Control

This analysis is related with the type of control of traffic. Whether it was controlling by police, signals, stop signs etc. The results of this analysis are reported below :

	<u>Punjab</u>	<u>Sind</u>	<u>Islamabad</u>	<u>Baluch.</u>	<u>Total</u>
Non Junction	710	269	47	33	1059
Police	39	52	11	15	117
Signal	28	27	9	3	67
Stop sign	4	8	3	1	16
Give way Sign	7	12	3	1	23
Uncontrolled Junction	120	147	9	27	303
<b>Total :</b>	<b>908</b>	<b>515</b>	<b>82</b>	<b>80</b>	<b>1585</b>

5.8.7 Accident Severity

The severity of accidents have been examined and results are reported below:-

	<u>Punjab (%)</u>	<u>Sind (%)</u>	<u>Islamabad (%)</u>	<u>Baluch. (%)</u>	<u>Total (%)</u>
Fatal	731 (8)	411 (80)	47 (57)	32 (40)	1221 (77)
Hospitalized	125 (14)	27 (14)	6 (7)	19 (29)	222 (14)
Minor Injuries	31 (3)	26 (5)	18 (22)	22 (20)	97 (6)
Only Damages of Vehicle	21 (2)	6 (1)	11 (14)	7 (8)	45 (3)
Total :	<u>908 (100)</u>	<u>515 (100)</u>	<u>82 (100)</u>	<u>80 (100)</u>	<u>1585 (100)</u>

### 5.9 Mechanical Fault

This analysis has been proved the contribution of un-fit vehicles in the road accidents. Subsequently it will also help to prevent the defective vehicles. Subsequently it will also help to prevent the defective vehicles on road. This analysis shows the contribution in the accidents of different type of defective vehicles.

#### 5.9.1 Vehicle Lights

This analysis comes under the mechanical condition of the vehicle.

A total 2385 vehicles were involved in the 1585 reported accidents out of 2385 vehicles, 88 were with defective lights. The lights of the vehicles at the time of the accidents have been examined as per details below :

Hour	Punjab			Sind			Islamabad			Baluchistan		
	Vehicle Lights			Vehicle Lights			Vehicle Lights			Vehicle Lights		
	!OK	!BAD	!TOTAL	!OK	!BAD	!TOTAL	!OK	!BAD	!TOTAL	!OK	!BAD	!TOTAL
00-01	13	-	13	10	1	11	-	-	-	-	-	-
02-03	48	2	50	7	3	10	-	-	-	-	-	-
04-05	53	3	56	10	3	13	-	-	-	4	-	4
06-07	140	2	142	47	2	49	18	-	18	3	2	5
08-09	179	2	181	101	1	102	22	-	22	19	2	21
10-11	172	2	174	82	4	86	28	-	28	26	-	26
12-13	179	4	183	59	2	61	5	-	5	13	2	15
14-15	194	2	196	71	-	71	9	-	9	15	1	16
16-17	157	5	162	94	5	99	22	-	22	9	-	9
18-19	136	4	140	107	1	108	11	-	11	6	-	6
20-21	88	12	100	54	8	62	15	2	17	3	4	7
22-23	34	3	37	31	4	35	3	-	3	-	-	-
<b>Total</b>	<b>1393</b>	<b>41</b>	<b>1434</b>	<b>673</b>	<b>34</b>	<b>707</b>	<b>133</b>	<b>2</b>	<b>135</b>	<b>98</b>	<b>11</b>	<b>109</b>

However, results derived for the analysis shows that not a single accident occurred due to this reason.

#### 5.9.2 Break Failure

This analysis is based on the police report, has carefully been examined and found that in Punjab 24 accidents i.e (3%) occurred due to this reason, in Sind 5 accidents i.e. (1%) occurred due to this reason and in Islamabad and Baluchistan not a single accident occurred due to this reason.

#### 5.9.3 Tyre Burst

Next most important analysis is the tyre conditions of the vehicles, in this analysis an attempt has been made to check whether the accidents occurred due to tyre burst or not. The load condition of the vehicles at the time of accidents have also been examined. The results derived from the data available

of each province are as under :

Punjab

Vehicle Load	No-Bst	Frt-R	Frt-L	Rear-R	Rear-L	Other	Total
Legal	1265	7	5	4	2	24	1307
Front	5	-	-	-	-	-	5
Rear	18	-	-	-	-	1	19
Side	15	-	-	-	-	-	15
Top	16	-	-	-	1	2	19
In Side	66	1	-	1	-	1	69
<b>Total :</b>	<b>1385</b>	<b>8</b>	<b>5</b>	<b>5</b>	<b>3</b>	<b>28</b>	<b>1434</b>

It seems from the above that the load condition of 1307 (91%) vehicles out of total 1434 was within the legal limit, whereas 127 (9%) vehicles were over loaded as per details above. As regard the tyre condition, at the time of accidents 1385 (96%) tyre of vehicles were O.K.

Sind

Vehicle Load	No-Bst	Frt-R	Frt-L	Rear-R	Rear-L	Other	Total
Legal	589	-	-	1	3	12	605
Front	9	-	-	-	-	1	10
Rear	20	1	-	-	-	1	22
Side	8	-	-	-	-	-	8
Top	15	-	-	2	-	3	20
In Side	36	1	-	1	-	4	42
<b>Total :</b>	<b>677</b>	<b>2</b>	<b>-</b>	<b>4</b>	<b>3</b>	<b>21</b>	<b>707</b>

It may be seen from the above that the load condition of 605 (86%) out of total 707 vehicles were within the legal limit, whereas 102 i.e. (14%) vehicles were over loaded. As regard the tyre condition at the time of accident 677 (96%) tyre of vehicles were O.K. No accident was occurred due to tyre burst.

Islamabad

Vehicle Load	No-Bst	Frt-R	Frt-L	Rear-R	Rear-L	Other	Total
Legal	126	-	-	-	-	1	127
Front	-	-	-	-	-	-	-
Rear	-	1	1	-	-	-	2
Side	-	-	-	-	-	-	-
Top	2	-	-	-	-	-	2
In Side	4	-	-	-	-	-	4
<b>Total :</b>	<b>132</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>135</b>

As shown above, the load condition of 127 (94%) vehicles out of total 135 was within the legal limit and only 8 (6%) vehicles were over loaded. Whereas the tyres of 132 (98%) vehicles were found O.K at the time of accident.

Baluchistan

Vehicle Load	No-Bst	Frt-R	Frt-L	Rear-R	Rear-L	Other	Total
Legal	101	1	-	-	-	1	103
Front	-	-	-	-	-	-	-
Rear	1	-	-	1	-	-	2
Side	-	-	-	-	-	-	-
Top	1	-	-	-	-	-	1
In Side	3	-	-	-	-	-	3
Total :	106	1	-	1	-	1	109

Its shown above, the load condition of 103 (94%) vehicles out of total 109 were within the legal limit and only 6 (6%) vehicles were over loaded. Whereas the tyres of 106 (97%) vehicles were found O.K and not a single accident occurred due to this reason.

5.9.4 Tie-rod

Due to this reason in Punjab 19 (2%) out of total 908 accidents, in Sind only 1 out of total 515 accidents, whereas in Islamabad and Baluchistan not a single accident occurred due to this reason.

5.10 Roads

The one of the main reasons which influence the road accidents is the road surface condition and its geometry. The details analysis are as under:

5.10.1 Road Geometry

The road characteristics also influence the road accidents. In this analysis the road geometry and road separation have been included. the results derived from the analysis are reported below :

Punjab

Road Geometry

<u>Median</u>	<u>Straight flat</u>	<u>Curvature</u>	<u>Gradient</u>	<u>Both</u>	<u>Total</u>
Yes	105	10	-	5	120
No	652	72	22	42	788
<u>Total</u>	<u>757</u>	<u>82</u>	<u>22</u>	<u>47</u>	<u>908</u>

It may be seen from the above that 757 (83%) of the total 908 accidents occurred on Straight flat roads. Whereas 151 (17%) accidents occurred on the curvature, gradient and both type of roads. From the analysis it may be concluded that most of the accidents occurred on straight, flat and without median roads.

Sind

Road Geometry

<u>Median</u>	<u>Straight flat</u>	<u>Curvature</u>	<u>Gradient</u>	<u>Both</u>	<u>Total</u>
Yes	259	18	4	6	287
No	196	13	13	6	228
<u>Total</u>	<u>455</u>	<u>31</u>	<u>17</u>	<u>12</u>	<u>515</u>

It may be seen from the above that 455 (88%) of the total 515 accidents occurred on straight and flat roads. Whereas 60 (12%) accidents occurred on the curvature, gradient and both type of roads respectively. From the analysis it may be concluded that most of the accidents occurred on straight and flat roads. However, as compare to Punjab the proposition of accidents in Sind is higher on median roads i.e. 57% of the total number of accidents occurred on straight and flat roads.

Islamabad

Road Geometry

<u>Median</u>	<u>Straight flat</u>	<u>Curvature</u>	<u>Gradient</u>	<u>Both</u>	<u>Total</u>
Yes	48	1	0	0	49
No	29	2	1	1	33
<u>Total</u>	<u>77</u>	<u>3</u>	<u>1</u>	<u>1</u>	<u>82</u>

It may be seen from the above that in Islamabad 77 (94%) of the total 82 accidents occurred on straight, flat and median roads. Whereas in Islamabad 5 (6%) of the total 82 accidents occurred on the curvature, gradient and both type of roads respectively. From the analysis it may be concluded that most of the accidents occurred on straight, flat and median roads.

Baluchistan

Road Geometry

<u>Median</u>	<u>Straight flat</u>	<u>Curvature</u>	<u>Gradient</u>	<u>Both</u>	<u>Total</u>
Yes	14	-	-	-	14
No	60	3	1	2	60
<b>Total:</b>	<b>74</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>80</b>

It may be seen from the above that in Baluchistan 74 (93%) of the total 80 accidents occurred on straight, flat and median roads. Whereas in Baluchistan 6 (7%) of the total 80 accidents occurred on the curvature, gradient and both type of roads respectively. From the analysis it may be concluded that most of the accidents occurred on straight, flat and median roads.

5.10.2 Surface Condition

Road surface type and surface condition have also been examined. The results are as follows :

ROAD SURFACE TYPE

	<u>Paved</u>	<u>Dry</u>	<u>Wet</u>	<u>Other</u>	<u>Total</u>
Punjab	786	89	6	881	
Sind	445	24	7	476	
Islamabad	79	2	-	81	
Baluchistan	75	3	-	78	
<b>Total</b>	<b>1385</b>	<b>118</b>	<b>13</b>	<b>1516</b>	

	<u>Gravel</u>	<u>Dry</u>	<u>Wet</u>	<u>Other</u>	<u>Total</u>
Punjab	10	1	-	11	
Sind	8	3	1	12	
Islamabad	1	-	-	1	
Baluchistan	-	-	-	-	
<b>Total</b>	<b>19</b>	<b>4</b>	<b>1</b>	<b>24</b>	

	<u>Kucha</u>	<u>Dry</u>	<u>Wet</u>	<u>Other</u>	<u>Total</u>
Punjab		12	2	2	16
Sind		22	2	3	27
Islamabad		-	-	-	-
Baluchistan		2	-	-	2
Total		36	4	5	45

5.10.3 Shoulder Characteristics

The shoulder width and shoulder type of the roads where a total of 344 accidents have been occurred were as under :

SHOULDER WIDTH

Shoulder Type

Province	Paved	Unpaved	No Shoulder	Total
<u>Punjab</u>				
0	-	-	135	135
1	99	238	-	337
2	48	207	-	255
3	23	158	-	181
<u>Sind</u>				
0	-	-	136	136
1	102	43	-	145
2	100	68	-	168
3	34	32	-	66
<u>Islamabad</u>				
0	-	-	2	2
1	9	7	-	16
2	12	25	-	37
3	8	19	-	27
<u>Baluchistan</u>				
0	-	-	4	4
1	4	18	-	22
2	4	42	-	46
3	-	8	-	8



5.10.4 Junction Type

The results of junction type analysis are as under :

<u>Junction Type</u>	<u>Punjab</u>	<u>Sind</u>	<u>Islamabad</u>	<u>Baluchistan</u>	<u>Total</u>
Not Junction	699	269	47	33	1048
Cross Junction	55	53	19	3	130
T Junction	46	65	8	35	154
Stag X	8	12	1	3	24
Y Junction	4	3	0	0	7
Round about	12	37	0	3	52
Other	84	76	7	3	170
<b>Total:-</b>	<b>908</b>	<b>515</b>	<b>82</b>	<b>80</b>	<b>1585</b>

5.10.5 Bad Road Condition

In Punjab 31(3%) of the total 908 accident, in Sind 6 of the total 515 accidents, whereas in Islamabad only 1 accident occurred due to this reason, in Baluchistan not a single accident occurred due to this reason.

## 5.11 Negligence

Under this analysis the results have been derived to determine the proportion of the following main type of negligence. The details of the analysis are reported below.

### 5.11.1 Wrong Turning

It is found from the analysis that in Punjab province out of total 908 accidents 299 (33%) occurred due to wrong turning, whereas in Sind only 21 (4%) out of total 515 accidents, in Islamabad 13 (16%) accidents occurred out of total 82 due to this reason and in Baluchistan 13 (6%) out of total 80 accident occurred due to this reason.

### 5.11.2 Over Taking

Under the negligence of the drivers the over taking is quite common and the analysis shows that in Punjab 111 (12%) of the total 908 accidents occurred due to over taking. Similarly in Sind 15 (3%) of the total 515, in Islamabad 11 (13%) of the total 82 whereas in Baluchistan 10 (13%) of the total 80 accidents occurred due to this reason.

### 5.11.3 Over Speeding

As most of accidents recorded in the rural areas (main highways) where the violation of speed limit is quite common, on the other hand in an urban area the violation of speed limit is not easy due to the Curvatures, Junctions, Pedestrian Crossings, Speed Breakers etc. It is found from the analysis that in Punjab 298 (33%) out of total 908 accidents, in Sind 187 (36%) out of total 515, in Islamabad 21 (26%) out of total 82 whereas in Baluchistan 46 (58%) out of total 80 accidents occurred due to the violation of speed limit.

### 5.11.4 Stop/Signal Sign Breaking

It is discovered from the analysis of the reported accidents that in Punjab only 4 out of total 908 accidents occurred due to this reason, in Sind 1 out of 515, in Islamabad 10 out of 82 and in Baluchistan 8 accidents occurred due to failing to stop at Stop Signs/Signals.

### 5.11.5 Rackless driving.

Due to this reason in Punjab 81 (9%) out of total 908 accidents, in Sind 243 (47%) out of 515 accidents, in Islamabad 26 (32%) out of 82 accidents, but in Baluchistan not a single accident occurred due to this reason.

### 5.11.6 Passenger's Negligence

Due to the negligence of passenger's the analysis shows that in Punjab 7 accidents, in Sind 8. Whereas in Islamabad and Baluchistan not a single accident reported due to this reason.

### 5.11.7 Pedestrian's Wrong Road Crossing

Under the negligence of Pedestrians the results are, in Punjab 34 (4%) of the total 908 accidents, in Sind 28 (5%) out of total 515, in Baluchistan only 3 accidents occurred, whereas in Islamabad not a single accident occurred due to this reason.

5.12 Pedestrian

This analysis is related with the pedestrian's accidents severity. The accidents data has been analysed and found that in Punjab 273 pedestrians were effected out of these 241 (88%) were fatal 26 (10%) were hospitalized and 6 (2%) were minor injured.

In Sind 237 pedestrians were effected out of these 237 (84%) were fatal 34 (12%) hospitalized and 11 (4%) were minor injured.

In Islamabad 24 pedestrians were effected of which 18 (75%) were fatal 1 (4%) hospitalized and 5 (21%) were minor injured.

In Baluchistan 43 pedestrians were effected of which 26 (60%) were fatal 9 (21%), hospitalized and 8 (19%) were minor injured.

SUMMARY

PROVINCE WISE ACCIDENTS

S.No.	Description	Punjab	Sind	Islamabad	Baluchistan
1	2	3	4	5	6

A. General Conditions:

1. Month of the Year

- Observation	Feb	Jan	Sep	Feb
- No. of Accidents	110	74	13	13

2. Day of the Week

- Observation	Sun	Sun	Sat	Mon
- No. of Accidents	144	85	13	14

3. Hours of the day

- Observation	14-15	08-09	10-11	08-09
- No. of Accidents	127	79	15	18

4. Severity

- Observation	Fatal	Fatal	Fatal	Fatal
- No. of Accidents	731	411	47	32

5. Collision Type

- Observation	HeadOn	Ped's	S.Swipe	Ped's
- No. of Accidents	242	256	22	43

6. Junction Type

- Observation	Not J.	Not J.	Not J.	Not J.
- No. of Accidents	710	269	47	33

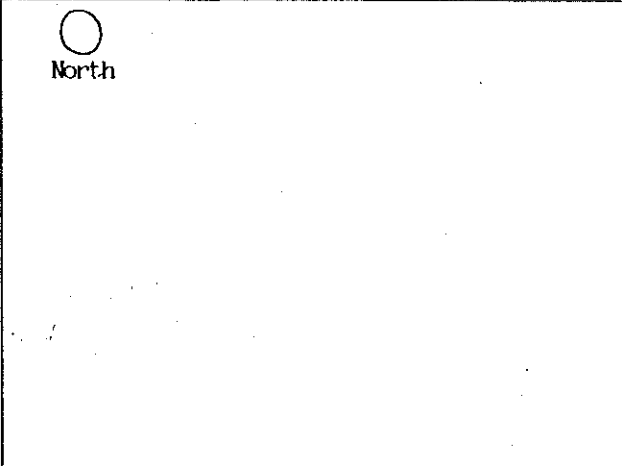
7. Light Condition

- Observation	Day	Day	Day	Day
- No. of Accidents	699	380	66	69

S.No.	Description	Punjab	Sind	Islamabad	Baluchistan	Total
1	2	3	4	5	6	7
<b>B. <u>Mechanical Fault:</u></b>						
	Break fail	24	5	-	-	29
	Tie-rod	19	1	-	-	20
	Tyre Burst	-	-	-	-	-
	Vehicle Lights	-	-	-	-	-
						<u>49</u>
<b>C: <u>Roads:</u></b>						
	- Bad Road Condition	31	6	1	-	38
						<u>38</u>
<b>D. <u>Negligence</u></b>						
<b>i) <u>Drivers:</u></b>						
	- Wrong turning	299	21	13	13	346
	- Over taking	111	15	11	10	147
	- Over speeding	298	187	21	46	552
	- Stop sign/ signal breaking	4	1	10	8	23
	- Rackless driving	81	243	26	-	350
						<u>1418</u>
<b>ii) <u>Users:</u></b>						
	- Passengers Negligence	7	8	-	-	15
	- Pedestrian's wrong road crossing	34	28	-	3	65
						<u>80</u>
	<b>Total:</b>	<u>908</u>	<u>515</u>	<u>82</u>	<u>80</u>	
	<b>Grand Total (B-D):</b>					<u>1585</u>

6. Identification of Block Spots.

As mentioned earlier in the introduction chapter that the main idea behind this examination through Computerized package is to identify the black-spots and their causes. In order to sketch the accident location and accident map, the page number 12 and 13 of the booklet have been provided for this purpose. The specimen of pages are reproduced below.

<b>ACCIDENT LOCATION</b>			
<b>61</b>	<b>LOCATION TYPE</b>	<b>CITY/TOWN</b> 1	<b>VILLAGE/SETTLEMENT</b> 2 <b>RURAL AREA</b>
<b>62</b> CITY/TOWN/VILLAGE NAME			
<b>63</b>	<b>WHERE KM POSTS EXISTS</b>	Nearest KM Post	<b>64</b> Accident location towards post <input type="text"/> m from km
<b>WHERE KM POSTS DO NOT EXISTS</b>		Distance to nearest feature such as police post, town etc <input type="text"/> kms <span style="float: right;">Direction towards <input type="text"/></span>	
<b>GENERAL LOCATION SKETCH - ALL ACCIDENTS</b>			
SHOW WHERE POSSIBLE Names of roads Location of accident Location of nearest on minor road Relation of accident site to significant buildings landmark etc North direction	<div style="text-align: center; margin-bottom: 10px;">○ North</div> 		



7. Conclusion:

It may be concluded from the analysis that out of total 1585 accidents 1221 (77%) are fatal. To outline the main causes of the accidents, four main reasons viz. general condition, mechanical fault, negligence and road conditions have been examined particularly. It is appeared from these analysis that most of the accidents occurred due to negligence of the drivers. Out of 1585 accidents 1418 accidents i.e. 89% have been found due to the negligence of the drivers. The rest of i.e. 167 (11%) due to the wrong road crossing by the pedestrian and some other reasons. Assuming that this is due to lack of education.

It is observed during the examination of the accidents records that the Reporting Offices have not recorded the details of accidents properly. They have also not sketched the location maps which is an important element to examine the accident record. Therefore, the accident locations as well as black-spots could not be identified which was one of the main objective of this whole analysis. Difficulties have also been faced to read the statements/reports recorded by the Reporting Officers. The best results can only be drawn if the Reporting Officers may records the accidents according to instructions issued to them with the accident recording booklets.



8. Recommendations:

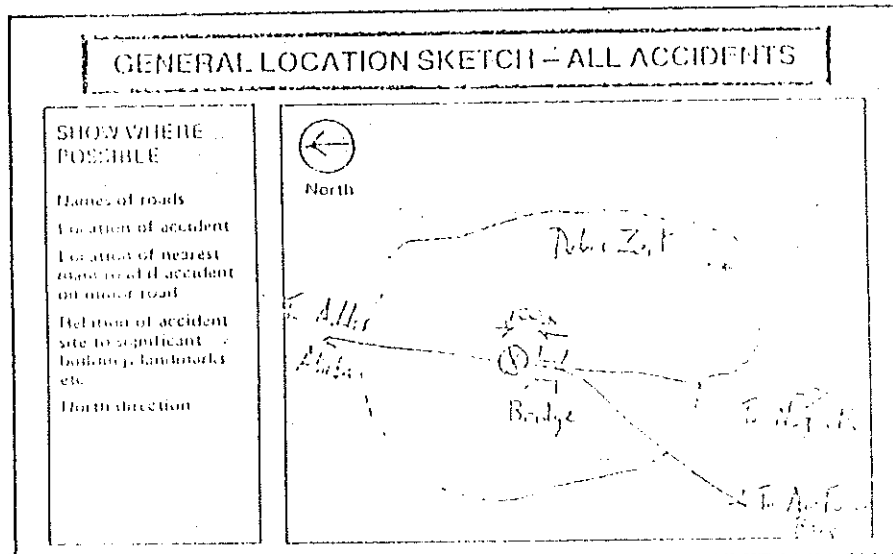
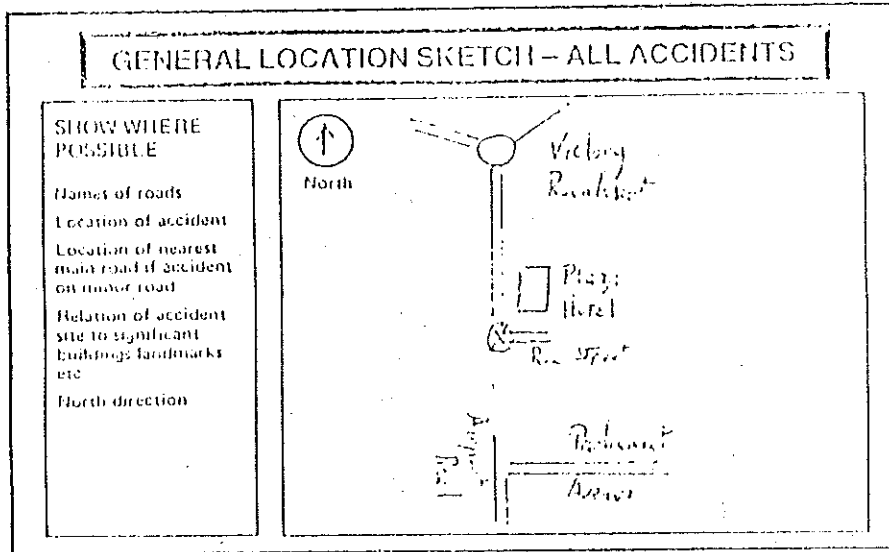
In order to achieve the principle aims of this study it is suggested that during recording the road accidents the following guidelines may be followed.

i) Accident Location:

This is one of the most important sections of the booklet, since the identification of accident black-spots is dependent upon this information and its accuracy.

ii) General Location Sketch:

This should be filled in for ALL ACCIDENTS. This is NOT intended to be used for showing details of the collision; rather, it is intended to be an aid to the office staff in identifying on a map exactly where the accident occurred. Roads can be represented by a single or narrow double lines. Landmarks or prominent buildings should also be marked, with approximate distances if possible, as these can greatly help pinpointing the accident location. The names of key streets should be marked. Examples are illustrated below.



iii) Non-junction Accidents:

An accident is considered to be a Non-junction Accident when it is further than 20 meters from the boundary lines of a junction. It will be noted that three road names are required to be given whenever this is possible, as in a town or city: the name of the road on which the accident actually occurred and the name of the roads at the junctions on either side of the accident locations. This is required to make sure the correct section of the 'accident road' is pinpointed.

In sketching the collision, REMEMBER TO MARK THE CODE NUMBERS YOU HAVE ALLOCATED TO EACH VEHICLE (1, 2 etc.). Also give approximate distances, normally in meters, to the junctions on either side of the accident locations.

An example is shown below:-

NON-JUNCTION ACCIDENTS

Road A

Road B

① ② ③

Road C

Show direction, position and code letter of vehicles involved

ACCIDENT ROAD NAME A Independence Avenue

Name of road B Main Street

Name of road C Main Street

Distance of accident from road B 100 km(m)\*

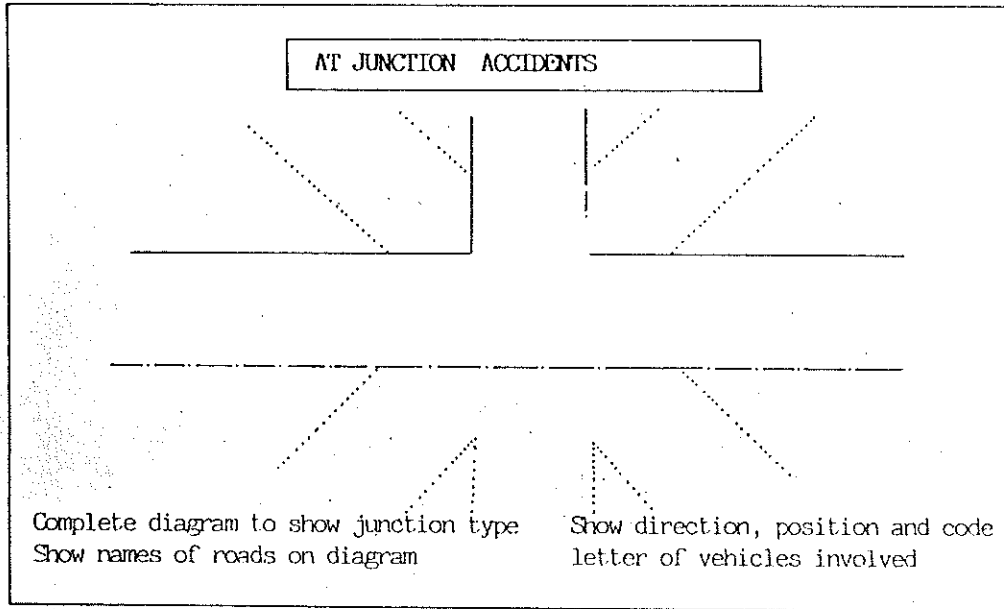
Distance of accident from road C 150 km(m)\*

\*CIRCLE INFORMATION TO BE RECORDED

iv) At junction Accidents:

An accident is considered to be At Junction if it is within the boundary lines of the junction or within 20 meters of the boundary lines. The dotted lines are intended to be an aid for drawing the junction - draw solid lines over those guidelines that are appropriate for the junction concerned. Remember to name all the roads at the junction and to mark the vehicles with the code numbers you have allocated to them.

An example is shown below:



v) Drivers Statements, Witnesses Statements and Reporting Officers, Account of Accident.

The reporting officers should be careful when they write the reports and the statements should at least be readable for examiners/analyst. If insufficient space, clip additional sheets to the booklet.

References:

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