

A C C I D E N T I N F O R M A T I O N S Y S T E M I N
A N I N D I A N C I T Y :
C A S E S T U D Y D E L H I

SYNOPSIS

Rising accident trends have been engaging the attention of all concerned agencies. Though the occurrence of the accidents is attributed to manifold reasons, the quality of information prohibits in-depth analysis for drawing up meaningful programmes for accident prevention. It is observed that, irrespective of the high vehicle ownership, the developed nations have been able to approach the problem of accidents in a systematic manner by developing a variety of information systems with the use of the information technology, and has shown considerable efficiency in prevention and elimination of certain types of accidents. However, in India no serious efforts have been made until now to understand the problem of accidents and injuries. The anxiety for improving road safety has not brought down the rising trends and thus left the problem unabated. While there is less or literally no impact of the recent information technologies in this potential area of information management, this Paper critically analyses the prevailing manual systems with the hope that in future, with able political leadership, the country will see an entire transition process towards "New Information Order".

1. INTRODUCTION

Though technological innovation has added enjoyment to the life of man, it also has exposed the humanity to adverse effects. All countries are suffering from the by-products of high motorisation in the form of road accident toll which is killing and maiming, that has reached a proportion unequalled by war and other man made calamities. Reports of world health situation have regularly stressed the scale of road traffic accidents with about 10 million persons injured and 250 000 persons killed every year throughout the world (WHO 1979). The innovations to make driving a safer activity have not eliminated traffic fatalities and driving is not as safe as it should be. Trying to scare drivers into safer actions by comparing statistics on war and road death rates has not worked either (Bauman 1975).

In India, the road traffic accidents pose a great challenge to all those who are concerned with their reduction since comparative figures with many countries do not present a complimentary situation to them. Irrespective of the high vehicle ownership of 1 motor vehicle for 2 persons in United States of America (USA) and for 3 persons in Japan against 1 motor vehicle for 268 persons in India, the fatality rate was observed to be 64.9 per 10 000 motor vehicles, whereas it was 4.7 in U.S.A., 2.9 in Japan and varied between 5 and 15 in most of the European countries. The accident risk to which we are exposed on roads is increasing. In the year 1981, about 150 000 accidents were reported on the 1.5 million km of road network of India. About 10 per cent of the vehicles are involved in road accidents, killing 25 000 persons and injuring more than 100 000 persons. It means that every four minutes, one accident occurs killing or injuring one person in average on Indian roads (IRF 1971, SRINIVASAN 1985).

These accident risks are extremely high on urban roads. On these roads, that represent only six per cent of the total road network of the country, about 75 per cent of the accidents occur of which 40 per cent are reported from four big cities namely Bombay, Calcutta, Delhi and Madras alone.

2. ACCIDENTS AND THEIR PREVENTION

During recent years, scientists have turned the word "crash" to the term accident in reference to traffic collisions. Their belief is that traffic collisions are caused occurrences rather than incidents involving chance alone. The occurrence of the accident is attributed to manifold reasons. The problem of accident is a multidimensional one, involving a system that comprises man, machine and environment and all the complex relationships that are possible between these variables. There are always a number of causes which fit together like the links of a chain to create the final situation. Most of the circumstances of accidents can be discovered and, once discovered, can be controlled. The important circumstances can be isolated through analysis which makes the accident prevention possible. Whole series of accidents have common circumstances and by concentrating on the elimination of these circumstances, it is possible to reduce, or in some cases even eliminate completely a particular type of accident.

Today, from the experiences of the developed world, we know much about traffic and accidents and some people think that accidents have been prevented and are being prevented up to appreciable levels. In India, however, no serious effort has been made until now to understand the problem of accidents and injuries. The reliable information concerning injuries and accidents is difficult to obtain. Although in recent years, the ever increasing accidents on roads have been drawing attention of all concerned agencies, the accident problem is unabated. This may be attributed to the quality of information available which prohibits in-depth analysis for drawing up meaningful programmes, to take the problem of accidents. This needs urgent attention and perhaps the first useful step in this direction would be to strengthen accident collection and recording and to develop an efficient "Road Accident Information System".

3. ACCIDENT INFORMATION HANDLING AND INFORMATION TECHNOLOGIES

3.1 Experiences Abroad

With the emergence of fast computers and supportive technologies, both the scale of information systems and their efficiency changed in the developed world. As a result, it is possible to have varied and detailed policy options. This is a good precondition to bring government's full intelligence to bear on resolving the central problems of society.

The review of literature on accident information handling in the developed world suggests that concerted efforts were made with emphasis on improving traffic accident recording systems and

dissemination of information according to user needs. For example, the Presidential Committee of USA for traffic safety (1961) laid emphasis on establishing or improving the existing system, and have suggested that the system must incorporate a service agency, covering the areas of collection of basic records, data, extraction, compilation and supply the needed information to all users and not only to one favoured department. In order to assist in forwarding dissemination and exchange of knowledge relating to the cause and prevention of accidents, a "National Accident Prevention Centre" was founded in the House of Representatives of the USA (1963). As a result, there were several automated information systems designed at Federal and at State Levels. Various reports suggest that this had considerable impact on reduction of accidents, fatalities and severity of accidents (HRB 1979).

3.2 Indian Experiences

In India, the anxiety for improving road safety has been reflected by proposals for establishment of a "National Road Safety Council" at the Centre and State level. District and City level Councils are to act as arms to coordinate working of various departments involved in road safety. This has been under consideration of the Union Ministry of Transport for a considerable time. In the absence of a central agency for information handling, the scattered numerous sources are encouraged to give out incomplete information and inadequate results. The collection by parallel agencies have also resulted in misreporting. A comparative analysis (Table 1) of the statistics by two Union Ministries namely the Ministry of Home Affairs and the Ministry of Transport in 1977 brings out that the difference between two sets of figures was large (25 per cent in total). The situation is particularly serious in the context of metropolitan cities like Bombay, Kanpur, Ahmedabad and Hyderabad, where the reporting differed by 35 to 99 per cent. When we are at a point where the accident problem has to be tackled systematically, as there is no simple answer to the problem, the figures confirm the fact that the existing system in the country for recording such data are inherently defective.

Table 1 Comparison of accident statistics disseminated by two government agencies in India 1977

<u>Number of persons killed in accidents</u>			
Name of State/City	Ministry of Transport*	Ministry of Home Affairs	Comparison with Ministry of Transport figures =100
Calcutta	358	358	100.00
Bombay	660	822	124.50
Delhi	694	571	82.20
Madras	199	210	105.50
Bangalore	247	257	104.00
Ahmedabad	149	51	34.20
Hyderabad	210	4	1.90
Kanpur	73	96	131.50
Total 22 States	18247	14242	74.00
Total 9 Union Territories	891	848	95.20
Total	20138	15090	74.90

* Ministry of Transport (1982)

+ Ministry of Home Affairs (1979)

Today, accident records and data are scarce and difficult to obtain even by agencies involved in research, planning and management. Researchers find that whatever the quality of data availability may be, the time spent on compilation and gathering of basic information is eating up a large part of the time for research efforts. Thus in accident research in the country, there is too much duplication of effort, and one is often unaware of information available elsewhere. Though various institutions are collecting accident data, the information derived is often not made available to others. These valuable data are recorded, but are scattered, fragmented and neither adequately indexed nor properly identified with respect to where they can be found. The present manual system is unable to provide the needed efficiency in information storage, retrieval and dissemination.

4. METROPOLITAN EXPERIENCE

In metropolitan cities, the facilities and the environment for systematic approach are available and because of localised nature of administration, better systems of reporting should prevail. The present paper reviews the existing systems for accident information by a case study, to underline the strengths and weaknesses, the impact of information technologies and to suggest suitable measures for strengthening the system.

Case study selection

Amongst four big cities in India, i.e. Bombay, Calcutta, Delhi and Madras, traffic volume has been increasing at an alarming rate since the last two decades (Table 2). In Delhi, between 1961 and 1981, the number of vehicles has increased from 51 000 to 499 000 vehicles, an increase of 800 per cent against 18 per cent increase of population. In addition, there were about 700 000 cycles, about 16 000 slow moving vehicles (RAJESH 1982) and a few thousand motor vehicles from other states which come to Delhi every day. This results in heavy volumes of traffic of heterogeneous composition on the road network in Delhi.

Table 2 Distribution of population and vehicles in four metropolitan cities of India

City	Population (million)			Vehicles (million)		
	1961	1971	1981	1961	1971	1981
Calcutta	5.74	7.03	9.16	0.038	0.104	0.152
Bombay	4.15	5.97	8.20	0.067	0.177	0.265
Dehli	4.77	4.30	5.62	0.051	0.217	0.499
Madras	1.73	2.47	4.27	0.021	0.048	0.079
Total	14.39	19.77	27.26	0.177	0.546	0.945

This increased number of vehicles on the roads has also resulted in an increase in the number of road accidents, Table 3 shows that the fatalities went on increasing steeply from 98 persons killed in 1956 to 694 in 1980. The severity of accidents is also observed to be very high in Delhi compared to other cities which has been revealed in 172 deaths per 1 000 accidents whereas this figure stood at 60 in Madras, 40 in Calcutta and 30 in Bombay. On the above grounds of increase in vehicles and high severity of accidents, Delhi has been selected for discussion.

Table 3 Accident situation in Delhi

Year	Population (million)	Vehicles (million)	Total Accidents	Casualties		Victims
				Killed	Injured	per 1000 Accidents
1956	2.12	0.02	1127	98	731	730
1960	2.64	0.05	4814	163	1760	390
1964	3.16	0.08	8006	283	3193	430
1968	3.75	0.14	7893	400	3316	470
1972	4.50	0.25	5143	503	3301	730
1976	5.00	0.10	3840	587	3730	1120
1980	5.70	0.50	4032	694	3974	1130

5. EXISTING INFORMATION SYSTEM IN DELHI

5.1. Institutions involved

In Delhi, the following agencies are interested in accident data

- (a) The prime responsibility for collection rests with Delhi Police. They collect information on day-to-day occurrence through on-the spot surveys.
- (b) Delhi Transport Corporation (D.T.C.) being the single agency for providing public transport facilities with their objectives of providing a safer traffic, collect the information on accidents, as and when their buses are involved, by on the spot surveys, for their internal purposes.
- (c) When the victim is brought to the emergency hospital, the medico-legal case forms are filled with the coding of severity when the person arrived. Besides, medical history and progress reports are maintained for monitoring and for planning purposes.
- (d) As and when an insured vehicle is involved in an accident, the accident damages are claimed and the surveyors of insurance companies assess the actual damage. These data are maintained by the Tariff Advisory Committee for revising the premium on policies.
- (e) As a communication media the Newspaper agency collects the daily number of accident photographs and information regarding typical accidents. The number of fatal accidents and a short history on cause are disseminated daily.

Though many institutions hold records, most of them are not very accurate and largely dependent upon the primary information provided by the police, the victim or the local evidence. This review of sources of information suggests that as at present, Delhi Police is the major agency for a comprehensive collection

of data and should, therefore, be the nodal agency for collection of accident information.

5.2. Data Collection Methods

From the time of accident to the final compensation level, the necessary data are collected, according to the responsibilities and requirements, in predesigned proformas. The following types of information are collected.

- (a) First Information Report (FIR) and Research Forms of Indian Roads Congress (IRC) are filled by Delhi Police. FIR format contains Date, Hour of Occurance, Witness, Address, Steps taken, delay in recording, time and date of dispatch from police station. This format is intended to note all law violations and to record immediately addresses of offenders and witnesses. There are no special formats suggested for accidents. This FIR is to be supported by a charge-sheet which covers the accident spot and situation report by the investigation officer who has seen the accident site. The photographs of very serious accidents are also included. But the measurements of skid marks etc. are often found missing in the reports.
- (b) The IRC research forms collected by the Delhi Traffic Police contain location, record link, classification of accidents, roadway characteristics, details of the driver and the victims involved. These records are filled only for fatal accidents. This record will be helpful in identifying the areas and road sections having frequent severe accident occurrences.
- (c) The medico-legal forms filled in the Emergency Hospitals contain the name, place, date, police station, age, sex, address, nature of injury and the state in which the victim has been brought to the hospital. It is observed that these lengthy forms discourage the doctor to fill them in, most often in the case of slight injury accident. These records are not monitored but can be used for provision of suitable health facilities to the accident victims.

5.3. Manpower Capacities

While collecting the information, we need to consider capacities of the manpower involved in collection. The general outlook of the personnel involved is found to be different in many cases as would be revealed below.

- (a) The FIR form is filled by a sub-inspector of police. The minimum education level is intermediate school and he has other responsibilities like attending to criminal law cases.
- (b) The investigation reports completed by the investigation officer are concluded without any scientific arguments in identification of the cause of the accident.

- (c) Research forms are filled by the Traffic Inspector who is responsible for speed checks, licence checks, patrolling and VIP security. As there is no special training given for investigation of road accidents, the forms are not understood well and are hardly ever filled in completely, thus it is also observed that Research forms are filled by intuition without an in-depth investigation effort.
- (d) It is observed that the Investigation Officer is not provided with transportation facilities for the follow up action, which inhibits collection of useful information for identification of actual causes of accidents. The outlook of police in filling FIR forms is to prosecute a person involved in an accident which results in a biased report. In the present system of overloaded responsibilities, low qualification levels, and mechanical nature of work, it is impossible to expect reliable information without any special training or senior officers supervision, and without proper incentives (Bawa 1979).
- (e) Medico legal case reports are filled by a casualty medical officer with the qualification of medicine and surgery. We can expect reliable and efficient information collection, if forms are redesigned to suit the requirements.

5.4. Quality and Quantity

With the existing system of manpower capacities and the facilities available, it is found that the quality of information which is required for understanding of causes and effects of accidents is poor. It is seen that:

- (a) The road accident casualties reported in hospitals and police records show a considerable under reporting and misreporting by the police. In Delhi, there are 95 per cent discrepancies found between police and hospital records (Rajesh 1982). Amongst which 40 per cent of fatal accidents, 86 per cent of seriously injured and 100 per cent slightly injured are under-reported. The accidents occurring in the sample week are estimated to be 2 600 whereas 1 100 accidents are reported in hospitals and 66 accidents in police records. These discrepancies are shown in Table 4.

Table 4 Accidents in hospital and police records (sample week)

Report	Accidents	Persons			
		Fatal	Seriously Injured	Slightly Injured	Non-injury
Hospital	1100	20	426	883	-
Police	67	12	61	-	1
Under reporting (%)	45	40	86	100	-

- (b) The evaluation of the quality of information reviewed on the basis of completeness and accuracy of filled forms, reveals that only 29 per cent of the information is made available in the present collection (Rajesh 1982).

6. CRITICAL ANALYSIS OF THE EXISTING ACCIDENT INFORMATION SYSTEM

6.1. Input

The prevailing accident information system in Delhi is coordinated by the accident research cell of Delhi Police which receives the number of accidents, injuries and fatalities and the roadway and traffic characteristics data collected in the Research Proformas. Often these Research Proformas are filled by traffic inspectors after 2 days and the resulting information gaps are filled by intuition. The evaluation of the filled forms shows that the present proforma is lengthy and the technical terminologies are not completely understood by the traffic police. In addition to the collection of day-to-day accident data, welfare organisations and public also provide information to traffic police regarding potentially accident prone spots near their areas of residence. In the present system, accident information can reach the headquarters earliest after one day. Daily/Weekly/Fortnightly diaries, Research proforma for fatal accidents and the traffic violation reports are the only records as INPUT in the present system.

6.2. Recording and Storage

The data collected by traffic inspectors and the information reaching Delhi Police through daily/weekly/fortnightly diaries are recorded and stored in the Accident Research Cell (ARC). The daily and weekly diaries are coded in a temporary file and are updated through the fortnightly diaries. It is observed that some accidents which have been reported in daily diaries are not reflected in fortnightly diaries. In the number of casualties, there is a certain amount of discrepancies. The fortnightly diaries are recorded in the accident index register with a master index according to the date of occurrence. There is no register maintained for all victims reported. The fatal accidents and their brief history are recorded in the brief history register. Information regarding roads is recorded in a predesigned proforma "Roadwise Data Form".

The forms that have been filled by Traffic Inspectors for all fatal accidents are kept in files and coded in the index register. The accused drivers' particulars are maintained in a manual register for further action.

Existing recording of locations is found incomplete. While recording the accident, the investigator fixes the spot by landmarks, intersection code, lamp post number and major structures. The locations are based on street maps. Locations that are at long distances from landmarks and on open roads are however difficult to identify. It is also observed that there is no direction of traffic movement at the accident site. As no

measurements or estimated distances are given from the landmark, this results in vague and incomplete data.

The present storage of collected information is done manually. the brief history of fatal accidents, the data on the drivers accused for fatal accidents, the accident index and roadwise data forms are at present stored in registers. As there is no recording of victims, the information linkage is not possible. Though, useful data are collected, not all are stored because of the limitations on manual systems. As there is no exactly known location for storage, there is no inquiry from local agencies to identify the accident prone location for safety improvements programmes.

6.3. Dissemination Practices

Monthly review-of-crime reports (including traffic accident data) and yearly reports on road accidents and enforcement are the two publications disseminated by Delhi Police. Monthly reviews include total prosecutions, cash realised and activities of road safety cells by Police stations and traffic Police management activities.

This monthly review will be published in the following month whereas the yearly report on road accidents will be published by the sixth month of the following year. The yearly report includes past trends of accidents by time and day of accident, road-wise accidents and comparative figures of three-year accidents.

In each monthly and yearly summary, there is often a sub-classification of motor vehicle accidents by Police, which is essentially meaningless for users. Both in monthly and yearly disseminations, the location, place and road factor tabulation are not present. In case of motorcycle fatalities, there is no indicator whether the victim wore any helmet at the time of the accident. Type and speed of the vehicles involved in accident are not mentioned either. Information about defective brakes, light and other machanical failures is completely missing. Timewise classification of accidents is not useful, as this is not cross-classified with the regulatory measures initiated by police. Percentage comparison is missing.

The portion of childred killed and injured is not thoroughly sub-classified. The time tabulation is of little value when published. Distribution of accidents by day of week and time of day is well known and varies but slightly from month to month and from year to year. There is little value in repeating it every month. The terminology used to classify day and night accidents is not accurate. All the tabulations evaluated and summarised in yearly reports leave the reader with the task of interpretation of the data. The tables found in monthly/yearly accident summaries consist entirely of observed frequencies of accidents. The percentages are more informative for the readers than the observed frequencies. A comparative table affords an opportunity to test the changes from year to year. Mileage rates are useful rather than numbers of vehicles as they only present the total exposure. It is therefore concluded that the present

dissemination which provides repetitive summaries months after months is not meeting the user requirements.

6.4. Objective Evaluation

The evaluation of the present dissemination in the light of needed information (Table 5) reveals that except for the law enforcement agency, the information is inadequate for all other user groups. The present system is not useful for further action on road maintenance as the exact locations of accidents are not identified.

Table 5
EVALUATION OF PRESENT DISSEMINATION IN VIEW OF
USER NEEDS

Accident Prevention	Cause of Accident Deaths & Severity Injury		When, Where Critical (Immediate measures)		Suggest Preventive Actions		Measure effect or effort		Determine negligence or fault		Evaluation
	Needed	Present	Needed	Present	Needed	Present	Needed	Present	Needed	Present	
1	2	3	4	5	6	7	8	9	10	11	12
LAW ENFORCEMENT											
Police			x	O	x	N	x	N	x	I	N
Courts									x	N	N
SAFETY EDUCATION											
Road Users	x	I	x	I	x	I					I
Non-road Users	x	I	x	N	x	N					N
School Education System	x	N			x	N					N
PUBLIC INFORMATION											
Parliament					x	N	x	N	x	N	N
Public-TV etc.	x	I	x	N	x	I					I
DRIVER LICENCING											
Examination					x	N	x	N	x	N	N
Education	x	N	x	N	x	N	x	N			N
Improvement							x	N			N
Cancellation									x	N	N
ENGINEERING											
Traffic Engg.			x	I	x	N	x	N	x	N	N
Street Lighting			x	N	x	N	x	N	x	N	N
Geometric Design			x	N	x	N	x	N	x	N	N
Control Devices			x	N	x	N	x	N	x	N	N
Signs			x	N	x	N	x	N	x	N	N
EMERGENCY SERVICES											
Ambulance	x	N			x	N	x	N			N
Police	x	N	x	N			x	N			N
Hospitals	x	N			x	N	x	N			N
COMMUNICATION											
Telephone			x	N			x	N			N
Wireless			x	N							N
VEHICLE											
Design					x	N	x	N			N
Inspection	x						x	N	x	N	N
Cancel Permit					x	N	x	N	x	N	N
FINANCIAL RESPONSIBILITY											
Short Term	x	N	x	N	x	N					N
Long Term	x	N			x	N	x	N			N

x = User Needs O = Satisfactory I = Inadequate N = Not Satisfactory

The summaries and tabulations are informative in nature, but do not add any knowledge to causes and effects of accidents for drawing up any meaningful action programme. A critical analysis of the existing information system is shown in table 6.

Table 6 **CRITICAL ANALYSIS OF EXISTING ACCIDENT INFORMATION SYSTEM**

Components	Particulars	Content	Method	Merits	Demerits
1	2	3	4	5	6
Input	- Daily/Weekly/Fortnightly diaries - Research proforma for fatal accidents - Traffic violation reports	- No. of accidents persons injured filled - Roadways traffic characteristics - Vehicles, persons involved	- Predesigned proforma for diaries - A-I form by IRC - Reports on prosecutions	- Accident information can reach the Admn. earliest by one day - Updation of accident by fortnight	- Collecting acc. information for research purposes are by intuition - The proforma is lengthy, technical terminologies are not completely understood
Recording	- Temp. files for diaries - Index register for reported accidents	- FIR No./Police Station classification - Brief history for fatal accidents	- Manual register - Predesigned register	- Manual operation reduces cost - Redundant data can be avoided	- Not all particulars can be recorded - Incomplete and inaccurate records
Storage	- File for research proforma - Acc. index register - Roadwise data forms - History register for fatal accidents - Accused drivers' involved in fatal accidents-records further actions	- Index No., location persons killed/injured - Roadwise accidents - Accused drivers' particulars	- Manual storage - Predesigned forms for roadwise data - No format for brief history and drivers' records	- Master indexing of all accidents reported will be useful for retrieval purposes	- Unnecessary piling of data will occupy space - Efficiency in preserving records cannot be assured - No system for exact road location makes the record meaningless
Analysis	- Summarisation - Categorisation	- Day, time, P.S., veh. involved, roadwise accident summary	- Manual analysis	- Summaries and categories can be useful for comparisons	- Manual processing avoids usage of statistical techniques for cross-tabulation
Retrieval	- For review of accident situation by DCP (T)/Lt. Governor. - Inquiry from Parliament	- Police District-wise accidents - Accidents by certain Vehicles	- Manual retrieval - Statement of accidents by month - Identification of Index No.	- Will summarise specific accidents for better interpretations	- Manual retrieval limits accuracy, speed and completeness of needed information
Dissemination	- Crime report monthly review by traffic police - Yearly report on road accidents and enforcement	- Total prosecutions-cash realized-activities of road safety cell-acc. by P.S. Circles-Traffic Police management activities - Past trends/time, day of accident - Comparative figures of three year accidents - Roadwise accidents	- Monthly review is published by the next month - Yearly report is published by six months	- The summaries can be helpful for comparing trends - Informative	- Tabulation of repetitive data do not provide any increased knowledge on cause and effects - The disseminations are not presented in view of user needs

7. SUMMARY AND CONCLUSIONS

Rising accident trends in India have been engaging the attention of all concerned agencies. Though the occurrence of the accidents is attributed to manifold reasons, the quality of information prohibits indepth analysis for drawing up meaningful programmes for accident prevention. This problem needs urgent attention and perhaps, the first useful step in this direction would be to evolve an Accident Information System.

The review suggests that a wide variety of Information Systems have been developed in developed countries. In india control, management and regulation of traffic and in particular the maintenance of law and order rests solely upon the police. It is desirable that the accident information system be organised to serve all the agencies having accident prevention responsibilities, and that it is centralised under a single responsible institution.

Delhi, the third largest city in India which is growing at a faster rate than any other large metropolis in the country has been selected for assessing the weakness of the prevailing accident information system in metropolitan areas. For the control of crime and law and order situation, Delhi suburban area is subdivided into six Police districts; sixty four police stations are located widely over Delhi for these purposes. For traffic management and regulatory purposes, the city is subdivided into sixteen circles manned by traffic inspectors and supported by base support staff comprising zonal officers/traffic constables at the lower levels. In the event of accident occurrence, the accident information is transmitted to either the police control room/Station House Officer/ traffic control room/Traffic Inspectors/constable at the lowest level.

The First Information Report (FIR) is the major accident record which includes broad information pertaining to an accident. Follow up action brings out its severity supported by witness report. This is transmitted daily to the Accident Research Cell (ARC) which at present coordinates the information system. The ARC is collecting factual information in the prescribed proforma for Research purposes on the request of Indian Roads Congress. The Accident Research Cell documents this information in predesigned formats and stores it in manual registers for dissemination. Detailed investigation of accidents is taken on the strength of research forms filled by traffic inspectors for an indepth study of fatal accidents. In the First Information Reports collection of technical information of first hand is lacking. The Research proformas are filled by Traffic Inspectors normally after two days, and information gaps are filled up by intuition.

Numerous agencies such as transport corporations, insurance agencies, ambulance services and the emergency hospitals also collect information and maintain records of accidents. However, most of these accident records are not very accurate and largely depend upon the primary information provided by the police, the victim, or the local evidence. The review of source of

information suggests that at present Delhi Police is the major agency for a comprehensive collection of data on accidents and should, therefore, be the nodal agency for collection of information.

The review of completeness and accuracy of the accident forms filled by Police revealed that most of the columns remain unfilled and some columns are misunderstood. The collision diagramme which provides the environment data on accident occurrence is missing completely. However the evaluation of usefulness of collected information of 25 samples of filled forms by scalogram technique revealed that only 29 per cent of the reliable information has been obtained by the present system of collection.

The extent to which the reportable accidents either in hospitals or in police records are estimated to be one-third of the total accidents. About 94 per cent of the victims are underreported in police records than at hospital records.

Collection of accident information and the location procedures adopted to locate the accident spot are based on road names, without any actually estimated distances from the landmark, which results in vague and incomplete data. Traffic engineers have great problems in traffic safety work as they are far removed from the data collection phase.

In the present information system, as accident records involve the analysis of large volumes of data, lack of special training and skilled manpower forbids the use of statistical techniques for analysis of the record. The storage of information by manual methods is found to be inefficient and it reduces the capacity of storing of more needed information. This manual storage limits the retrieval of needed information from local agencies. The retrieval of the information regarding vehicles involved or accused drivers or dangerous locations is difficult with the existing manual storage.

The interpretations of categorised summary statistics are found missing completely. The location tabulation has no research utility in the present system. The sub-classification of accidents by police districts and stations is essentially meaningless for the users. The evaluation of the present dissemination in the light of user needs reveals that it is inadequate for operational and regulatory purposes. The periodicity of publication on monthly and yearly basis is found to be inadequate to cope with the urgency of information needs.

It is concluded that the present information dissemination is not adding knowledge to the causes and effects of accidents in India. The prevailing accident information system does not meet the requirements of providing needed information to the users in understanding the magnitude of the problem, the effectiveness of attempted counter measures, and for the developing of useful accident prevention programmes.

REFERENCES

- BAUMAN R. 1975, The absurd statistic, in: The California Highway, Patrolman 39, No. 4 : p 27
- HRB 1979, Development of Improvement Methods for Reduction of Traffic Accidents, Highway Research Board, U.S.A.
- IRF 1971, World Road Statistics 1966-70, International Road Federation, Washington D.C., U.S.A.
- MINISTRY OF HOME AFFAIRS 1979, Accidental Deaths and Suicides in India, 1977, Bureau of Police Research and Development, Government of India
- MINISTRY OF TRANSPORT 1981, Motor Vehicle Accident Statistics in India 1970-1980, Transport Research Division, Government of India
- RAJESH T. 1982, Accident Information System in Metropolitan Cities of India, unpublished Thesis Dissertation, School of Planning and Architecture, New Delhi
- SRINIVASAN N.S. 1985, Road Safety in Urban Areas, Proceedings of Metropolitan Transport in India Seminar, The Times Research Foundation, New Delhi
- THE HOUSE OF REPRESENTATIVES 1963, National Accident Prevention Centre, Washington D.C., U.S.A.
- THE PRESIDENT COMMITTEE 1961, Highway Safety Action Programme, Committee on Road Safety Washington D.C., U.S.A.
- WESTIN A.F. 1971, Information Technology in a Democracy, Harvard University Press
- WHO 1979, Road Traffic Accident Statistics, EURO Report and Studies 19, World Health Organisation, Copenhagen