

Problems in the collection and dissemination of accident information – A case study

Les problèmes posés par la collecte et la diffusion des informations sur les accidents – Une étude de cas

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ABSTRACT: The increase in population and sprawling of cities has resulted in an increase in vehicle ownership. This has caused higher rates of road accidents in developing countries as compared to developed countries. This paper presents the problems faced during the collection and dissemination of accident information through a case study conducted in Kota city, India. The basic problems discussed are the availability of total accident information at different sources (police records, insurance companies or individuals), the reporting of information in non-standardized accident formats and the absence of trained traffic police staff. Extra efforts were made for the collection of information and for extracting useful information from the unstandardised formats filled by untrained persons. The information was disseminated according to time phases, maneuvers, socioeconomic characteristics of persons involved, road condition or geometric and modes involved in accident on urban or rural roads.

RESUME : l'accroissement de la population et l'extension tentaculaire des villes a provoqué une augmentation du nombre des propriétaires de véhicules. Dans les pays en voie de développement, cela a engendré des taux d'accidents élevés en comparaison de ce qui se passe dans les pays développés. A partir d'une étude de cas menée à Kota city, en Inde, cet exposé présente les problèmes qui se posent à l'occasion de la collecte et de la diffusion des informations sur les accidents. Les problèmes de base qui sont discutés sont : la disponibilité de l'ensemble des informations sur les accidents à partir de différentes sources (relevés de police, compagnies d'assurance ou les individus eux-mêmes), la communication de l'information sur des documents non-standardisés, et l'absence de personnel de police bien formé. Des efforts supplémentaires ont été faits pour la collecte de l'information et pour l'extraction de données utiles à partir de documents non standardisés remplis par des personnes non formées. Les données étaient diffusées de façon différente selon les périodes, les tactiques, les caractéristiques socio-économiques des personnes concernées, l'état des routes ou leur géométrie, et les modes de transport impliqués dans des accidents sur des routes en zones urbaine ou rurale.

1.0 INTRODUCTION

The vehicular growth in India has increased in the recent years. But it is more in the area of private mobility. The main contributors to this increase are the availability of finance at zero interest rates for the purchase of vehicles, its use as a symbol of status or for short distances in small and medium sized cities or as substitute to degrading mass transport services in big cities / metropolitan areas. The choice of mode for personal mobility, may be private or public, is generally based on

convenience and comfort and the availability of modes in the neighbourhood or at residence. But the use of any mode becomes hazardous if the relating rules and laws are not enforced effectively. This causes accident on roads may be fatal or major or minor, with or without loss of property. The data of 1989 indicates that India experienced higher value of the accident index (fatalities per motor vehicle per population) as compared to the developed countries. This is presented in Table 1. High value of index reflects the traffic problems leading to road accidents in India and the need to

initiate the safety measures to minimize the road accidents.

With this perspective, an accident study was taken up in Kota, a medium sized city, as a part of academic work. The main objective of this paper is to identify the problem areas in the collection of accident information and to study the accident patterns in the city. In this regard, first the study area is introduced, then the accident pattern in the study area is presented and finally the problems faced in the collection of accident data are outlined.

Table 1: Comparison of Road Accident Index for Different Countries (1989)

Country	Total accidents / number of motor vehicles	Fatalities / number of motor vehicles / population
India	0.01596	0.00299
UK	0.01078	0.00022
USA	0.01177	0.00022
Japan	0.00901	0.00015
Germany	0.00921	0.00024
Spain	0.00667	0.00044

Source: Motor Transport Statistics of India, 1988-89.

2.0 STUDY AREA AND DATA COLLECTION

The district and city of Kota is situated in Rajasthan State of India. Their location is shown in Fig.1 along with road networks. The population of district is 1568580 and that of city is 695899 (District statistical Book-2000). As per the growth rate per decade, the rate is decreasing from 1961 onwards for city. It is not possible to compute it for district as it is divided in two in 1991. In last decade the rate has decreased by around 4 percent in district and by around 20 percent in city. This is shown in Table 2. The vehicle ownership is constantly increasing from year to year. It has increased by 115 percent in the last decade. This is presented in Table 3. Therefore, the two trends are opposite in nature. This is resulting in increase in vehicle ownership per person. This was 0.0839 in 1991 and is 0.1403 in 2001. The increase in vehicle ownership per person is 67 percent.

Table 2: Population Increase in Kota District and City

Year	Population increase in			
	Kota District		Kota City	
	Nos.	Percent	Nos.	Percent
1931	551385	---	37876	---
1941	624006	+ 13.17	47339	+ 24.98
1951	657509	+ 05.37	65107	+ 37.53
1961	831869	+ 26.52	120345	+ 84.84
1971	1123336	+ 35.04	212991	+ 76.98
1981	1534749	+ 36.62	358241	+ 68.20
1991*	1220505	+ 32.32	537371	+ 50.00

2001	1568580	+ 28.52	695899	+ 29.50
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* The district was divided in to two parts and a new district (Baran) was formed.

Source: District Statistical Book-2000

The data was collected in three phases. The accident information was collected from First information Report (FIR) of police stations in and around the city, from the district statistical book and the insurance companies and from the individuals through a accident survey questionnaire. This way it was tried to collect the information of accidents reported or unreported to the police. Around 800 individuals were contacted and information was collected from them about the accident held at some point of time. The information so collected was analysed to study the accidents occurring in the city or the district. This is presented in the next section.

3.0 ACCIDENT STUDY

The district statistical book simply presents the total number of accidents in the district along with fatalities and persons injured and vehicles damaged. This is presented in Table 4. It is important to note that in last ten years the increase in fatalities is 329 percent as compared to 157 percent increase in total number of accidents. This requires immediate consideration and the implementation of safety measures based on reason of accident and other technical considerations. But this record does not provide the location of accident and the reasons of its occurrence. So as to overcome this problem the FIRs available with police stations in different areas were studied.

The information was requested from the Superintendent of Police (City/Rural). On their instructions the copy of FIRs was provided by the police stations. But not all police stations provided the same. From the records the following information could be extracted.

1. The total accidents, fatalities, major or minor accidents on rural highways with type of vehicles involved, reason of accident, month of accident and vehicles or persons involved in accident.
2. The fatal, major or minor accidents by type of vehicle for city.
3. The location of accident in the city with accident classification.

Some extracts from the police records are presented in Table 5 and Table 6. It was noted that 2-wheelers were involved in maximum number of accidents in the city. The car/jeep, minibus/tempo,

trucks, 3-wheelers and bus followed it. There were more fatalities due to trucks and in case of 2-wheeler drivers. Therefore, the need is to control the movement of such vehicles, which are involved more in accidents and at the same time causes more loss to life and property. In case of rural highways 3-wheelers were involved in maximum number of accidents. Trucks, car/jeeps, buses and 2-wheelers followed it. On rural highways more fatalities were due to trucks and 3-wheelers. The reason of accident was attributed 100 percent to the fault of the driver in the police records. The numbers of accidents were found increasing during the months of March, October and November. But no reason was noted for this phenomenon and relatively less number of accidents during monsoon.

It was observed that the police records were also lacking some important information, viz. the

reason of accident (other than fault of driver), the type of maneuver, the socioeconomic characteristic of the person involved, the geometric of the road, the phase of the day and so on. These are important factors and become part of comprehensive accident study or modelling of accidents. So as to collect above information a survey was carried out in certain parts of the city. A questionnaire was finalised to collect information from persons involved in accident at some point of time. The BTech students with complete knowledge of the subject were employed for this purpose. Finally a sample set of 224 persons who had been involved in accident some time back was collected. Some of the results from this data are presented in Table 7, 8 and 9.

Table 3: Vehicle Ownership increase in Kota District

Year	Vehicle category								Total
	Car / Jeep	Bus	2 or 3-wheeler	Taxi / Thela	Tempo	Truck	Tractor	Others	
1990-91	6016	902	74190	496	682	7261	12946	---	102493
1991-92	6516	932	81170	547	758	7488	13920	---	111331
1992-93	6798	957	94293	712	848	7556	15238	---	126402
1993-94	7311	978	102224	766	913	7876	15827	153	136048
1994-95	7894	1065	104361	1093	1059	8024	16797	---	140293
1995-96	9038	1122	113163	1149	1081	8436	17572	---	151561
1996-97	10714	1343	131497	1193	1166	9554	18919	702	175088
1997-98	10901	1254	135644	989	2666	9791	19556	---	180801
1998-99	11994	1531	145663	1045	2666	10103	19866	783	193651
1999-00	13732	1735	156776	1072	2828	10479	20596	180	207398
2000-01	15659	1802	166214	1182	2840	10719	21420	313	220149

Source: District Statistical Book-1994, 2000

Table 4: Accidents in Kota District

Accidents	Year									
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
a) Total	442	562	608	682	NA	904	994	1144	1164	1137
b) Fatalities	48	74	78	75	NA	161	177	171	195	206
c) Injuries	482	547	597	745	NA	1041	1320	1294	1371	1349
d) Vehicles damaged	52	58	56	63	NA	126	68	58	39	266

Source: District Statistical Book-1994, 2000

Table 5: Accidents in Kota City by Vehicle Type (for sample year, 1994)

Type of vehicle	Fatal	Major	Minor	Total
Bus	11	17	18	46
Truck	40	68	72	180
Minibus / tempo	25	68	93	186
Car / jeep	26	85	115	226
2-wheeler	30	169	249	448
Heavy vehicle	11	35	22	68
3-wheeler	5	28	43	75
Unknown vehicle	12	3	8	23

Note: Based on data received from ten police stations of city (B. Tech Project Thesis, 1996).

Table 6: Accidents on Rural Highways (for sample year 1994)

Highway / reason / vehicle involved	Fatal		Major		Minor		Non-injury	Total
	Accident	fatality	accident	Injury	accident	Injury		

National highway	13	16	2	2	14	23	3	32
State highway	19	21	3	4	26	70	8	56
Other road	21	22	1	1	68	173	14	104
Fault of driver	---	---	---	---	---	---	---	192
Fault of passenger	---	---	---	---	---	---	---	---
Fault of weather	---	---	---	---	---	---	---	---
Vehicle involved:								
Truck	22	25	2	3	18	48	4	46
Bus	2	2	0	0	18	22	1	21
Minibus	0	0	1	1	1	1	1	3
Car/jeep/taxis	5	5	1	1	26	70	11	43
2-wheelers	2	2	0	0	17	22	0	19
Heavy vehicle	0	0	0	0	0	0	0	0
3-wheelers	18	20	2	2	27	102	8	55
Not known/other	4	5	0	0	1	1	0	5

Note: Based on records of police stations (B. Tech Project Thesis, 1996).

It can be noted that other than straight reaches the merging or turning operations were the other maneuvers, which need safety provisions. The median was observed to be reducing accidents by around 13 percent on double lane roads. In case of single lane bad road surface was more accident-prone. The need is also to increase the literacy level as this reduces probability of occurrence of an accident. Interestingly the persons in middle age group were involved more in accidents as compared to youngsters or aged persons. The study of accident rate based on weather condition on the day of accident indicated that it was more on rainy days as compared to normal day.

Table 7: Accidents based on Type of Maneuver

Type of Maneuver	Type of accident				Total
	Fatal	Major	Minor	Non-injury	
Straight	1	23	80	27	131
Crossing	---	4	11	---	15
Stationary	---	2	9	1	12
Parked	---	---	4	---	4
Turning Right	---	---	18	---	18
Turning Left	---	---	11	---	11
U – turn	---	2	5	---	7
Side – brushing	---	---	5	---	5
Reversing	---	1	5	---	6
Merging	---	4	11	---	15
Diverging	---	---	---	---	---
Total	1	36	159	28	224

Source: sample collected from persons involved in accident (B. Tech Project Thesis, 1996).

Table 8: Accidents based on Road Geometric and Surface Condition

Road geometric and surface condition	Total accidents	Percent	Percent by road condition
1. Single Lane Road	28	11.86	
a. Wet surface	1		3.57
b. Bad	15		53.57
c. Normal	12		42.85
2. Double lane with divider	88	37.29	
a. Wet surface	4		4.54
b. Bad	9		10.23
c. Normal	75		85.22
3. Double lane	120	50.85	

without divider			
a. Wet surface	4		3.33
b. Bad	23		19.17
c. Normal	93		77.50

Source: sample collected from persons involved in accident (B. Tech Project Thesis, 1996).

Table 9: Accidents by Characteristics of Person Involved

Characteristics	Total accident	Male	Percent	Female	Percent
a) Age (years)	223	198	88.79	25	11.21
< 18	7	5	2.5	2	8.0
18-20	43	40	20.25	3	12.0
21-30	65	56	28.3	9	36.0
31-50	86	76	38.4	10	40.0
51-60	16	15	7.5	1	4
> 60	6	6	3.1	---	---
b) Literacy					
Level	223	198	88.79	25	11.21
Graduate or less	181	163	82.32	18	72.00
Post graduate	42	35	17.68	7	28.00

Source: sample collected from persons involved in accident (B. Tech Project Thesis, 1996).

Also this rate was comparatively low on a very hot or a very cold day. The police records indicated that the fatal accidents were more during afternoon period (may be because of relatively less volume and higher speeds), whereas, survey indicated that major accidents were more during evening period and minor accidents were relatively more during morning period. The identification of most applicable reasons to above situations needs more detailed study of accidents.

It can be noted from the above discussion that not one source of accident information is complete and therefore, there is a need to interact with different agencies for the collection of data and its study. This unnecessarily wastes the time and resources. The next section now takes up the problems faced during the collection of information and its dissemination and discusses it along with experiences of other researchers in this area.

4.0 PROBLEMS FACED

Those problems, which have been observed during the collection and dissemination of accident information, are discussed here. The problem areas identified in the implementation of safety measures are not discussed as they are out of scope of this paper.

4.1 Traffic Education and Training

No organised training facilities are available and there is hardly any exposure of police personnel to traffic safety science. Sarin (1998) also expresses the same. The traffic police control the traffic but when any accident takes place it is recorded and investigated by the general police, which has no idea of traffic maneuvers and operations at all. In fact they treat it as one of many other tasks assigned to them. The better way would be the recording and investigation of an accident by traffic police personnel who gains some knowledge in this area by default as a part of the duty.

4.2 Recording of Accidents

Indian Roads Congress (IRC) has published standard accident reporting forms the use of which can help in detailed study of accidents. But most of the police stations record the information without consulting them. In most of the government agencies the utility of accident data is not realized and is considered to be a low priority area (Sarin 1998). It was observed that the FIRs prepared by police personnel were deficient in case of many important parameters, which are very important for proper planning and for formulating cost-effective traffic safety measures. Mittal and Sarin (2001) reported that the socioeconomic characteristics of road accident victims, like, age, education, occupation, etc. were missing between 85 to 99 percent cases, property damage was not reported in 70 percent cases, the age of primary driver was not available in 90 percent cases and moreover the location of accident was not reported between 18 to 30 percent of cases. The effect of use of proper accident reporting forms can be visualised from the analysis done by Saija et al (2000). They could analyse the spectrum of driver's mistake, the road characteristics viz. road surface condition, carriageway width, type of crossing, type of control, locational pattern, type of accident and so on.

4.3 Cooperation and Co-ordination between agencies

A lack of cooperation and coordination between different agencies involved with accident data collection and publication was observed. There was no single agency, which was responsible for

the reporting of accident data in an organised manner. The statistical department publishes highly macro data for the district (and not for city), police records (i.e FIRs) are deficient in terms of some important parameters and insurance companies are reluctant in parting with their information on accident claims. There is no involvement of educational institutes and use of their expertise in analysing accidents and identification and implementation of safety measures. In such condition most of the energy gets wasted in the collection of data from different sources and the analysis done and corrective measures suggested remains the work of academic nature.

5.0 CONCLUSION

The above discussion has highlighted the problem of collecting the traffic-related information in developing countries. Such information is not available at one agency and at the same time is not complete as is not recorded on standard formats. In the absence of such useful information no planing relating to safety measures can be successful. Even if the information is disseminated and analysed and some suggestions are recommended they remain a part of academic interest as traffic police department do not feel any requirement of such interactions. The need of today is to set single agency, which should be responsible for keeping the record of traffic-related information, for its analysis and for the implementation of the outcomes.

References

- B. Tech Project Thesis, (1996) An Analysis of Road Accidents on major Transportation Corridors in and Around Kota City. Submitted to Civil Engineering Department, Engineering College Kota, Rajasthan, India.
- District Statistical Book-1994* (1995) District-Kota, Economic and Statistics Directorate, Rajasthan, Jaipur, India, 17-19, 169, 171.
- District Statistical Book-2000* (2001) District-Kota, Economic and Statistics Directorate, Rajasthan, Jaipur, India, 7-9, 71-72.
- Mittal, N. and Sarin, S. M. (2001) Characteristics of Road Accidents on Lower Category of Roads in India. *Indian Highways*, Vol. 29 (10), 15-23.
- Motor Transport Statistics of India* (1988-89), Ministry of Surface Transport, New Delhi, India.
- Sarin, S. M. (1998) Road Traffic safety in India – Issues and Challenges Ahead. *Indian Highways*, Vol. 26 (6), 19-29.
- Saija, K. K., Patel, C. D. and Sureja, G. K. (2000) Spectrum Analysis of Road Accidents – A Case Study. *Indian Highways* Vol. 28 (9), 29-41.

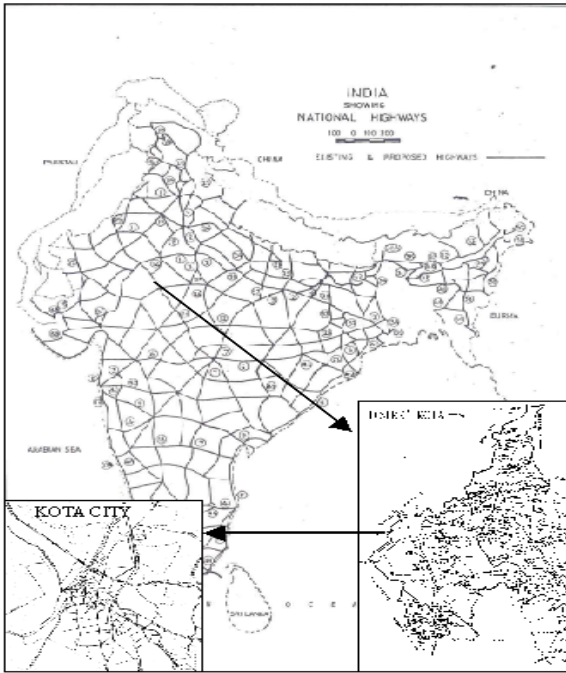


Figure 1: Study Area – Kota District and Kota City