

Reporting and recording of road traffic accidents in Bangladesh

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ABSTRACT: Major issues regarding accident data include reliable data source, variables involved, methods of collection, provisions for storage and retrieval etc. The current road accident report form of Bangladesh is not comprehensive enough to conduct an in depth investigation. The form contains 69 fields of information from which only the general characteristics analysis of accidents can be carried out. This paper reviews the process of accident reporting and recording system, present status of accident database. It also includes identification and assessment of variables involved in accident and reviews the potential sources of errors in accident data collection. Accident statistics depend critically on the accuracy of data itself as well as on the reliability of the sequence of information links. It is observed that the sources of accident data are biased due to under-reporting, particularly in the case of non fatal accidents.

1 INTRODUCTION

Traffic accidents have been increasing rapidly in Bangladesh during last two decades causing a vast amount of social & economic loss in terms of fatalities & property damages. Significant progress in crash reduction can be achieved through a comprehensive information system about crashes. A common factor of central importance in road safety management is the collection and use of accurate and comprehensive data related to road accidents. The interpretation of those data can lead to a better understanding of operational problems, is a pre-requisite for an accurate diagnosis of accident problems, assists in the development of remedial measures and allows us to evaluate the effectiveness of road safety programs. A comprehensive database is a basic pre-requisite for any effective road safety initiative to be undertaken. Each agency, whether it is government or non-government, involved in road safety activity, should have a clear understanding of the nature, scale and distribution pattern of the road accident problem they want to address.

The study reveals that the current Accident Report Form (ARF) is not comprehensive enough to conduct an in-depth investigation. The form contains 69 fields of information from which only the characteristics analysis of accidents can be carried out. Moreover, the form is quite hard for the police officers to understand and they are unable to fill it properly. Still pictures are very important for post accident investigation but in the form there is no field to include such type of information. Even police officers do not have the option to take photographs of the accident scenario because the police stations do not have any camera to capture the moment. In order to identify the accident spots police is using an old chainage inventory prepared in 1996 which is incapable of identifying the actual locations at present perspective. Furthermore, police stations record those accidents only in which cases are filed but in most cases, the accidents that occur in our country ever day, no cases are filed at police stations and subsequently no records are documented there.

In any case of accident First Information Report (FIR) is conducted in our country. Then in case of road accidents, ARF is being filled. Discrepancies are found by comparing these two information, which is an indication that at the first stage of recording we are missing some valuable accident data. Accident statistics depend critically on the accuracy of data itself and on the reliability of the sequence of information links. The sources of accident data in our country are biased due to under-reporting, particularly in the case of lower severity. The paper deals with the reporting and recording system in Bangladesh, identification of the organization and their functions responsible for maintaining the relevant accident database, identification and assessment of variables involved in accident and reviews the potential sources of errors in accident data collection as well as identify the shortcomings of the present system and suggest some improvement options.

2 NECESSITY OF ACCIDENT DATABASE

A common factor of central importance in road safety management is the collection and use of accurate and comprehensive data related to road accidents. The interpretation of those data can lead to a better understanding of operational problems, is a pre-requisite for accurate diagnosis of accident problems, assists in the development of remedial measure and allow us to evaluate the effectiveness of road safety programs. Various groups and organizations use accident data for a number of purposes and it is important that data collection is carried out in a systematic and uniform manner using standardized form. There are numerous parties with interest in the use of road accidents data:

- Road Safety Engineers
- Police
- Lawyers
- Insurers
- Those with responsibility for road safety education or publicity
- Safety administrators
- Researchers
- Vehicle or component manufacturers and suppliers of highway materials.

It is important to record accident database as accurately as possible otherwise lack of reliable data would make it ineffective and thereby seriously affecting the overall accident scenario, estimates of accident costs, design of remedial measures and ranking of investment programs. Different organization and groups need traffic accident data for different kinds of purposes that are described below (Ogden 1996):

- Road Safety Engineers require accident information for the analysis and development of remedial measures.
- Police and lawyers may require the information for legal purposes.
- Insurance agencies require the information to take care of insurance claims.
- Educationalists require the information for designing and promoting safety education.
- Safety administrators need the information for administrative and statistical reporting purpose.
- Researchers and academicians require the information for analytical and research purpose.
- Manufacturer and suppliers of relevant components require the information for improved design purpose.

3 ACCIDENT REPORTING AND RECORDING SYSTEM

3.1 *History and background of accident report form (ARF)*

The idea of having an Accident Report Form (ARF) was first introduced in around 1995 in Bangladesh. In that year World Bank held a meeting with Bangladesh Government. They had a query about accident statistics in Bangladesh. Before 1995, there was no such statistics in Bangladesh. There were population censuses, agricultural census etc. but no definite data about accidents in Bangladesh. World Bank then decided to introduce an accident database here in Bangladesh.

World Bank then thought about a Data Form where number of accidents, types, descriptions etc. would be recorded. Some English consultants from World Bank then helped to prepare an accident data form. They showed a form by Transport Research Lab (TRL), UK. It was an international form as TRL introduced it in about 32 countries. Accident data document was produced for Dhaka Metropolitan Police (DMP) by Graham Elliott (a TRL consultant) from Institutional Development Component (IDC) of the Second Road Rehabilitation and Maintenance Project (RRMP-2) and Quazi Zakaria Islam. IDC is funded by the British Government Department for International Development (DFID).

IDC of the Second Road Rehabilitation and Maintenance Project (RRMP-2) was funded by the British Government Department For International Development (DFID) which is working on traffic accident analysis in Bangladesh. IDC in collaboration with Bangladesh Police introduced a new traffic accident report form which was experimentally introduced in DMP in 1995. By the end of 1996, all police stations of DMP were brought under network and thus they could start using the data and analysis the traffic accidents in the metropolitan area. The new approach to accident analysis has then shown some good result in changing fatal accidents.

The question is then “Who will collect accident data?” Usually, departments who are at the root of the system of a country do these kinds of entries. In Bangladesh, Union Parishad is that kind of department/organization. But people from union parishad are kind of busy in various works. So it was decided to

give this responsibility to the Police department as they made the FIR (First Information Report) and had to go to the accident places if anyone would injure there. Then the traffic Accident Report Form (ARF), designed jointly by the police and IDC was introduced into the northern division of DMP in June 1995. By January 1996, the Accident Report Form (ARF) had been introduced by all thanas of DMP. By the beginning of 1998, it had been introduced nationwide. The ARF, in both English and Bangla was introduced nationwide. Steps had been taken to adopt this form as a part of the FIR of accident cases.

Though Police works through a regulation, it was decided to make a regulation for Bangladesh Police by the Ministry of Law of Bangladesh Government. It took around one year for the Ministry of law to pass the regulation. So from then police have to fill up the ARF under Regulation 254 (B). Regulation 254 (A) is about accident litigates. ARF was first introduced at Gulshan, Uttara and Cantonment thana as a pilot project. Police officers were trained first on “How to fill up ARF” by Quazi Zakaria Islam (Consultant of IDC). After the pilot project and the training program, ARF was given to Dhaka Metropolitan Police (DMP) to circulate in Dhaka City. Finally ARF was circulated in 1998 from Police Headquarter in whole Bangladesh. The MAAP5 computer software package was developed by the Transport Research Laboratory of the U.K (TRL) specifically for the storage and analysis of road accident data. It is in use in many countries of the world including a large number in Asia and has recently been adopted by a number of UK police forces. The MAAP5 system has been installed at DMP HQ and much of this document consists of output from the MAAP5 system that has been enhanced using Microsoft office.

3.2 Preparation of the MAAP5 database by police

The circumstances, casualty and vehicles data associated with each personal injury accidents are recorded by police officers as First Information Report (FIR). In case of road traffic accidents, after recording, Investigating Officer (IO) after enquiring into the matter fills up the Accident Reporting Form (ARF). Each Police Station has to maintain a separate register on road accidents. Each accident is to be entered into that register with separate serial number by the officers. Example of such accident register is shown below:-

Table 1. Format of accident register to be maintained in all police stations.

Serial No. of the Accident	FIR No.	Date of Accident	Investigation Officer	Submitting Date to the HQ
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***

Then Investigating Officer submits the Accident Report Form (ARF) to the Superintendent of Police (SP) office. The Superintendent of Police collects Accident Reporting Form (ARF)'s from all Police Stations under his control, and sends those to Deputy Inspector General of Police (DIG) of concerned Range. All of the accident data collected is entered into computer in the Accident Data Units (ADU) established in DIG offices. All data entered and processed by using the MAAP5 (Microcomputer Accident Analysis Package) software (Fig.1). This work is forwarded to police headquarters through Floppy Disk on a monthly basis.

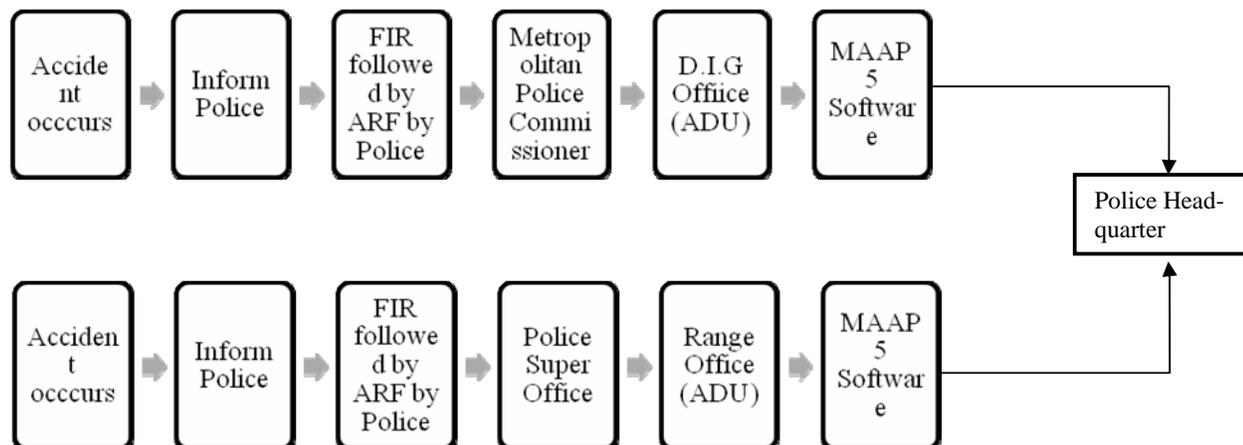


Figure 1. Accident Data Collection System

3.3 Other relevant agencies

After reporting an accident, they are recorded by the police as First Information Report (FIR) or entered into General Diary (GD). After FIR, police took data at ARF. These reports are recorded serially in separate serial numbers. These reports are then sent to the office of Superintendent of Police and then to the concerned Deputy General Police's office. All these data are entered into computer and analyzed with MAAP software. Essentially the MAAP software is used by the Accident Research Institute (ARI) of BUET. The collected data are sent to ARI with collaboration of Road Safety Cell (RSC) of the BRTA and Police Department. The current road safety measures and analysis works are done based on this database.

To strengthen the database information, some new variables should be added and validate other variables as extracted from ARF. Accident Research Institute collects all ARF from Accident Data Units (ADU) to develop a rich Accident Database system by checking ARF and fill up them with Road User Movement (RUM) code with additional data. At ARI, at first accident report forms are collected, checked and necessary corrections are made. Then RUM code is assigned for each type of accidents and finally input is given in MAAP5 database.

As stated above, in Bangladesh police officers are responsible for accident reporting. Most of the forms are not correctly filled up as they are not completely trained. On the other hand, in Bangladesh ARF is not comprehensive enough. Most of the accidents of lower severity are not recorded in this country. In most cases general people are not interested in FIR as there are probabilities of some harassment. So, most of the accidents are out of the record. Accidents those are reported also are not reported in a proper method. Duty officers are not trained properly that may reflect in reporting.

4 ERRORS DURING DATA ENTRY

To understand the present scenario of accident database in Bangladesh, randomly 275 ARF were chosen for analysis. ARF contains 69 different fields. Almost all fields were observed carefully and some fields (i.e. no. of vehicles involved, no. driver casualties, time of accident, road class etc.) were found which are frequently mistaken by the Investigation Officers. There are some remaining fields which should also be analyzed but due to lack of time that was not possible. As officers are not trained properly they commit those mistakes again and again. This analysis was done in Accident Research Institute (ARI), BUET. In Bangladesh, accident data could not get accurate due to under-recording and under-reporting. There are also errors due to wrong filling up of ARF by the Investigating Officer (IO). There are some probable reason for under-reporting and under-recording. Reasons of not submitting Accident Report Form (ARF)s or missing data are stated below:

- Lack of training for filling up of Accident report Form (ARF).
- Transfer of trained or skilled officers.
- Extra load of another works of the officers.

The level of missing data and error done by the Police officers can be understood by the following table. This table indicates some fields those are done wrong frequently by the officers themselves.

Table 2. Accident Data reporting Situation by analyzing 275 forms of Dhaka Range (2009)

Item name	Police Data	ARF Edited Data	% Reporting	% Missing Data
No. of vehicles involved	376	390	96%	4%
No. of driver casualties	90	100	90%	10%
No. of passenger Casualties	152	222	68%	32%
No. of pedestrian casualties	87	73	84%	16%

This table indicates data by analyzing 275 Accident Report Forms (ARF) due to lack of time. It can be noted that not only these items but also there are more items which are frequently mistaken by the officers. By analyzing the forms, 52 forms (around 19%) are found with wrong filling up with time, 68 forms (around 25%) are found with wrong filling up with junction type, 57 forms (around 21%) are found wrong with traffic control, 66 forms (24%) are found with wrong filling up with collision type, 40 forms (around 15%) are found with wrong filling up with traffic movement, 35 forms (around 13%) are found with wrong filling up with di-

vider, 34 forms (around 12%) are found with wrong filling up with road class. These fields are always filled up by the Investigation Officer in wrong way. This causes under-reporting of data to MAAP software. This leads to wrong analysis of accidents.

5 SHORTCOMINGS OF THE ACCIDENT DATABASE

In Bangladesh, MAAP5 and ARF based Accident Database constitute the one and only repository for road traffic accident information. Accident report form is helpful for recording accidents of some consequent years or so. But there are some problems related to this form. Those are summarized below.

- There is no field about the vehicle's making and model in Bangladesh ARF. It would be more convenient for the Investigating Officers if these fields were included as vehicle owner's identity can be found more easily.
- ARF and MAAP5 software provide us a general characteristics analysis of accident. These only provide us information those are easily understandable and visible. They cannot provide an in depth analysis that can provide some deep analysis. For example, considering item number 44 (Vehicle defects) of ARF, if the defect is due to tire then a question may arise which tire has the defect or if that defected tire's wheel has standard number of plies. Normally standard number of plies is 14-15 whereas in Bangladesh it is 4-5 for most of the vehicles.
- In the ARF, there should be a field for vehicle type. But indication of body style of a vehicle is an important parameter as a passenger car may be 2-door or 4-door and a truck may be a fire truck.
- Only the alcohol specimen type test is included in the ARF of Bangladesh. But most of the time, this shows negative as people of Bangladesh are mostly non-alcoholic. Drug test result should be included as teenagers may take drugs as a fashion trend and cause accidents.
- There is no field in ARF for roadway access. If it is known to the editor of ARF that whether the road is full or partial or no access controlled, it would be easier for him to edit the form.
- Every time it is not the driver who is completely responsible for an accident. It could be a defect of the vehicle or there could be pedestrian's fault or environmental vicinity could be the main reason for an accident. So this should be clearly indicated.
- Most of the traffic accidents are under reported. Extent and spatial distortion of underreporting might cause inappropriate design of counter-measures and misappropriation of resources. Accident Research Institute (ARI) of BUET conducted a survey data on Dhaka-Aricha road to investigate the extent of underreporting. Table shows that the extent of underreporting is as high as 60 percent in Dhamrai Police Station. Moreover a thorough review of newspaper revealed that underreporting of fatality information is also highly prevalent.

Table 3. Extent of Underreporting of Road Traffic Accident (2003-2004)

Thana	Accident case filed in Thana	Accident in MAAP Database	% of Under-Recording
Savar	159	107	33
Dhamrai	58	23	60
Saturia	20	9	55
Manikgonj	47	25	47
Ghior	28	25	11
Shibalay	66	59	11

- Improper transcription of Accident Report Form may evolve erroneous information even in the case of recorded accidents. A comparison between controlled transcription of ARF at Accident Research Institute and MAAP data reveals that there exists significant differences between the two. To overcome this problem, standard practice of accurate data transcription should be practiced.
- In the ARF, only driver's belt is a provision which is not appropriate. There should be provisions for more restraint like shoulder & lap belt, child seat belt etc.
- Sometimes drivers are not driving a vehicle. In many cases owner of the vehicle drives it. Again, the driver could be from another occupation. So this is an important field to include.
- Sometimes officers can not indicate the vehicle's proper damage location. A diagram of vehicle in ARF will help the officer to indicate type and location of the collision properly.

- It is important to investigate the vehicle's condition after accident. Wherever the vehicle is taken after accident, whether at depot or garage or to the owner, address should be written in ARF for further investigation.
- Road class is included in the ARF but there is no option for roadway part. Whether the accident has been occurred at main lane or ramp or on flyover, is not possible to know.
- Improper recording of ARF is one of the major problems that is caused by lack of time and resources. This error is caused several times thereby causes erroneous data. Usually it is observed that many items are not filled at all. Fields like location, mileages of the roadway are not filled accurately and create confusion with other data.
- Discontinuity is a major problem of the database. Interpretations of field data may be changed over time by those responsible for coding and recording, meaning that data from one time period can not be compared with that for another time period, or worse, the user may be unaware of the presence of a discontinuity and as a result the analysis becomes incorrect. In fact, the road safety analyst should take care to inquire about any such discontinuities. An abrupt change in accident experience at a site should also lead the analyst to inquire about any discontinuities or other inaccuracies in the data.
- Another problem is description of Kilometer post inventory. Most of the time the duty officer who is responsible for reporting an accident is unable to fill up the items 32 to 37 (Route, KM, 100 m, NODE MAP, NODE 1, and NODE 2). There are some other problems associated with this kilometer post inventory. Actually kilometer values described in the inventory were written at 1998. After that in these years it is still like that same. No data is changed there. This may create some frequent problems. Like if there is a new road now a day is described by the reporting officer, there is a possibility of not having the distance of that road in the inventory. Again, if the officer is writing about any popular location near the accident spot, there is a possibility of not having that place in the inventory. Black spot identify have become a great problem now a day.
- Still pictures are very important for post accident investigation but in the form there is no such field to include such type of information. Police officers do not have the option to take photograph of the accident scenario as they do not have any camera in police station to capture the moment and affected place of accidents.

6 IMPROVEMENT OPTIONS

To improve the present situation of the database, some steps should be taken immediately.

- Accident location coding system should be developed.
- Provision for taking photographs should be included in the Accident report Form (ARF).
- Public campaign should be held for informing the importance of database system.
- MAAP5 software should be upgraded from DOS to WINDOWS version.
- Investigating officers should be trained properly who are in charge of filling the ARF.
- Sub-Inspectors should be trained properly about ARF.
- There should be appropriate texts into course curriculum of the training.
- A better communication system should be developed among ADUs, Police Headquarters and Road Safety Cell of BRTA.

7 CONCLUSIONS

This paper has highlighted the general procedure of accident reporting and recording as well as the mistakes and limitations of responsible group for reporting and recording. It also highlights the necessity of database development in Bangladesh. It is very important to preserve all accident data in a proper way as it can lead us to further steps of accident countermeasure. In Bangladesh, accident database is fully dependent on police accident report, training of the officers in a proper way and mass awareness is urgent to improve the present situation. Accident database should be made comprehensive and accurate enough by overcoming the problems of under-reporting and under-recording.

REFERENCES

- Alam, M. J. B. & Karim, D. M. Initiatives Regarding Road Accident Database In Bangladesh.
- Hoque, M.M. 2010. Improving highway safety in Bangladesh: Road improvement and the potential application of iRAP.
- Kadiyali, L.R. Seventh edition, 2007. Traffic Engineering and Transport Planning.
- Ogden, K.W. 1996. Safer Roads: A Guide to Road Safety Engineering.
- Raufuzzaman, M. 2003. Characteristics of Accidents on Selected Arterials of Metropolitan Dhaka.
- Rahaman, M.M. 2010. Road safety becoming a vanishing desire.
- Siddique, A.B.M.A. & Ali, A. Status of Accident Database Management In Bangladesh.