

ROAD SAFETY PROBLEMS IN BANGLADESH: SOME MAJOR INITIATIVES, CONSTRAINTS AND REQUIREMENTS

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ABSTRACT

In this paper, an attempt has been made to present the magnitude and trends of the road safety problem and the prevailing accident characteristics in Bangladesh. This paper also reviews some major road safety initiatives undertaken by different governmental and non-governmental actors in recent years to control and reduce road traffic accidents and injuries and their effectiveness. Finally, the paper identifies the road safety improvement constraints in Bangladesh and future requirements for developing research-based scientific, pragmatic and cost-effective countermeasures to improve the situation.

Keywords: road accidents in Bangladesh, road safety action

INTRODUCTION

Of all the systems with which people have to deal every day, road traffic systems are among the most complex and the most dangerous. Despite great progress in international traffic safety work, traffic accidents still cause a large and increasing number of fatalities and severe injuries in developing countries. Worldwide, the number of people killed in road traffic crashes is estimated at 1.3 million, with another 50 million injured each year. More than 85 per cent of the casualties, including 96 per cent of child deaths, occur in low- and middle-income countries (iRAP, 2008a). It is predicted that the number of people killed on roads will rise by at least 80 per cent over the next 20 years in developing countries such as Bangladesh, whereas it is expected to decrease by 30 per cent in high-income countries (iRAP, 2008b). Sustained declining trends in road fatalities in developed countries have been attributed to concerted efforts in many areas, including effective coordination, community involvement, research on road safety initiatives, the promotion of good road safety practices and improved targeting of resources.

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Bangladesh has one of the highest fatality rates for road accidents, with over 50 fatalities per 10,000 on-road motor vehicles. Vulnerable road users (VRUs)—for example, pedestrians, children, bicyclists, and cycle rickshaw occupants and pullers—are the worst-affected victims and they account for nearly 80 per cent of road traffic accident fatalities. The Government is concerned about the growing problem and has considered various measures in the past. As part of government and private initiatives, some programmes have been undertaken to ensure safer transport. Efforts are underway to identify the specific roles and responsibilities of different governmental and non-governmental organizations in order to develop effective measures to tackle the road safety problem in the country.

I. MAGNITUDE OF THE ROAD SAFETY PROBLEM IN BANGLADESH

Accident statistics

The police are officially responsible for the reporting and recording of road accidents and casualties in Bangladesh. According to the official police data, there were 3,764 fatalities and 3,284 injuries in 4,426 accidents in 2008 (PFIR, 2008). Reported road traffic accident data for the last decade are provided in table 1. A study on Bangladesh road crash costing conducted by the Transport Research Laboratory (TRL) in 2003 showed that there were 885,056 accidents, of which 10,692 were fatal, 106,062 grievous, 147,660 minor and 442,981 resulting in only property damage (TRL, 2003). This study also estimated that the total number of casualties resulting from road traffic accidents was 529,880, of which 12,792 were fatalities and 165,464 were serious injuries. Significant differences in the numbers of fatalities and injuries, as reported by police, are clearly due in part to reporting problems and recording inconsistencies. Methodological issues involved in data collection and definition may also have contributed to these differences.

Table 1. Number of road accidents, fatalities and injuries in Bangladesh

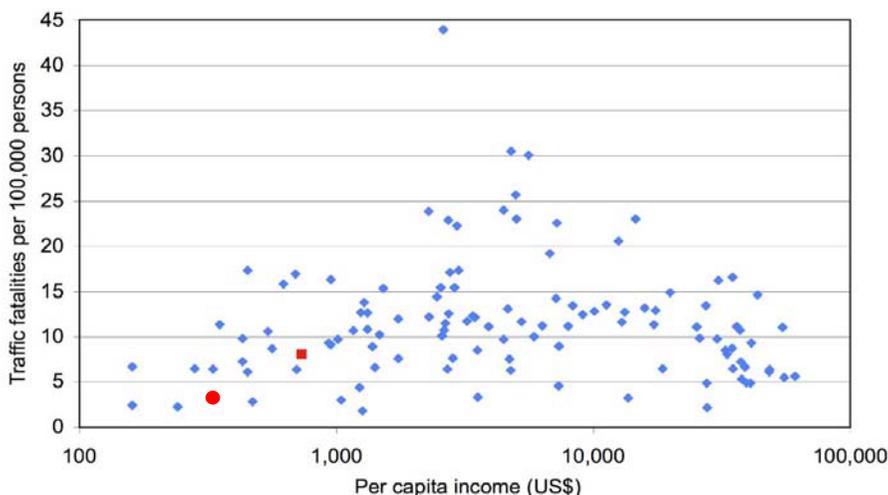
Year	No. of accidents		No. of fatalities		No. of injuries		Total casualties		Traffic fatalities per 10 000 on-road vehicles**
	FIR*	MAAP	FIR	MAAP	FIR	MAAP	FIR	MAAP	
1998	4 769	3 533	3 085	2 358	3 997	3 297	7 082	5 655	78.24
1999	4 916	3 948	3 314	2 893	3 453	3 469	6 767	6 362	79.60
2000	4 357	3 970	3 430	3 058	1 911	3 485	5 341	6 543	78.09
2001	4 091	2 925	3 109	2 388	3 127	2 565	6 236	4 953	66.39
2002	4 918	3 941	3 398	3 053	3 772	3 285	7 170	6 338	67.18
2003	4 749	4 114	3 289	3 334	3 818	3 740	7 107	7 074	61.03
2004	3 917	3 566	2 968	3 150	2 752	3 026	5 720	6 176	53.71
2005	4 949	3 322	3 187	2 960	2 754	2 570	5 941	5 530	52.86
2006	3 794	3 549	3 193	3 160	2 409	2 123	5 602	5 283	50.44
2007	4 869	3 910	3 749	3 250	3 273	2 102	7 022	5 352	56.41
2008	4 426	-	3 764	-	3 284	-	7 048	-	53.93

Source: Police-reported Micro Computer Accident Analysis Package (MAAP) database.

Notes: * FIR: First Information Record, the case entry record in the police log-book.
** Traffic fatalities per 10,000 vehicles were calculated considering the FIR data.

B. Fatality rate

Figure 1 shows fatality rates in various countries as a function of per capita income. The fatality rate in India (represented by the red square) is in the middle of the range for low-income countries (Mohan, 2004) and the fatality rate in Bangladesh (represented by the red circle) is in the bottom of the range for low-income countries. The much lower rate in Bangladesh could be attributed to a significant level of underreporting and to high population density coupled with a low motorization level. As incomes in Bangladesh increase along with its motor vehicle population, the experience of middle-income countries suggests that fatalities could see a dramatic rise before they start to drop, consistent with the so-called Kuznets curve.

Figure 1. Traffic fatality rates per 100,000 persons in 116 countries

Source: Mohan, 2004.

The fatality rates in Bangladesh in terms of the number of fatalities per 10,000 on-road motor vehicles (over 50) is very high compared with developed countries. The corresponding fatality rates in developed countries are only about 2 per 10,000 on-road motor vehicles (for example, 2 in the United States of America and 1.4 in the United Kingdom of Great Britain and Northern Ireland). A study conducted by Jacobs and Thomas showed that Bangladesh had one of the highest fatality rates, with over 40 deaths per 10,000 registered motor vehicles (Jacobs et al., 2000).

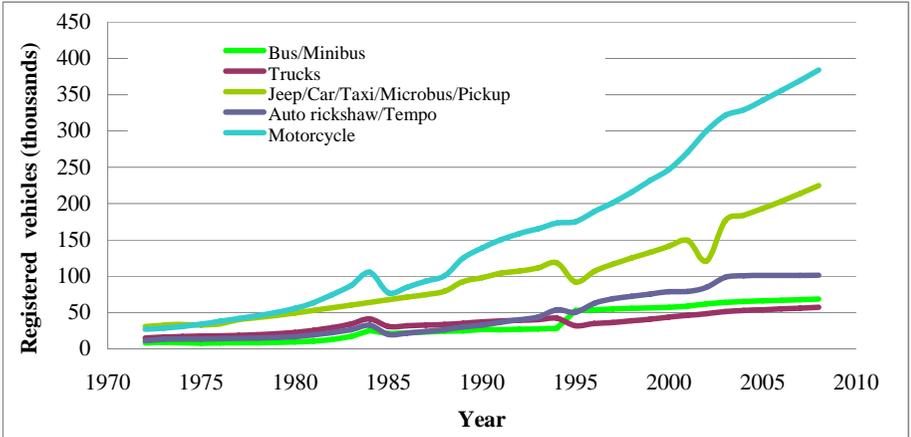
C. Statistics on vehicles and their involvement in road fatalities

The motor vehicle population increased from 94,960 in 1972 to 871,853 in 2008. The number of motor vehicles on the road is about 30 per cent lower than the number of registered vehicles, as many of the vehicles are out of service or under maintenance (BBS, BRTA, 2008).

The growth of different types of registered vehicles between 1972 and 2008 is shown in figure 2. Motorcycles comprise more than 1 1/2 times the combined population of other vehicle types and their rate of growth is also much higher than other vehicles. This pattern is very similar to the pattern of neighbouring countries. For example, in India, the number of registered motorcycles is five times higher than that of cars (Mohan et al., 2009). The composition of vehicle fleets in developed countries is quite

different from that in high-income countries, which has also affected their fatality rate patterns. In the United States of America in 2005, for example, passenger cars constituted 66 per cent of vehicles; trucks and vans, 30 per cent; motorcycles, 3 per cent; and buses, 1 per cent (Mohan et al., 2009).

Figure 2. Registered vehicles, 1972 through 2008



Source: Bangladesh Bureau of Statistics (BBS) and Bangladesh Road Transport Authority (BRTA).

Table 2 shows data on registered and on-road vehicles by type and by fatality rates per 10,000 vehicles for each type.

Table 2. Number of vehicles, fatalities and fatality rates

Vehicle types	Number of vehicles (registered) ¹	Number of vehicles (on-road) ²	Average fatalities per year	Average pedestrian fatalities per year	Fatalities per 10 000 vehicles (on-road)	Pedestrian fatalities per 10 000 vehicles (on-road)
Bus/minibus	40 469	29 717	1 005	545	338	183
Trucks	65 239	48 753	673	426	138	88
Jeep/car/taxi	189 287	78 236	133	63	17	8
Microbus/pickup	18 492	14 743	193	112	132	76
Auto rickshaw/tempo	116 242	77 700	246	58	31	8
Motorcycle	328 294	220 225	147	45	7	2
Rickshaw/rickshaw van	N/A	N/A	129	3	N/A	N/A
Bicycle	N/A	N/A	105	4	N/A	N/A
Others	26 324	15 854	172	89	108	56
Total	784 347	485 228	2 805	1 346	57	28

Source: Bangladesh Country paper, 2007.

Note: The total number of vehicles registered includes data up to 2003 and the number of vehicles on the road was 485,228 in 2001-2002.

D. Trends in road traffic accidents and fatalities

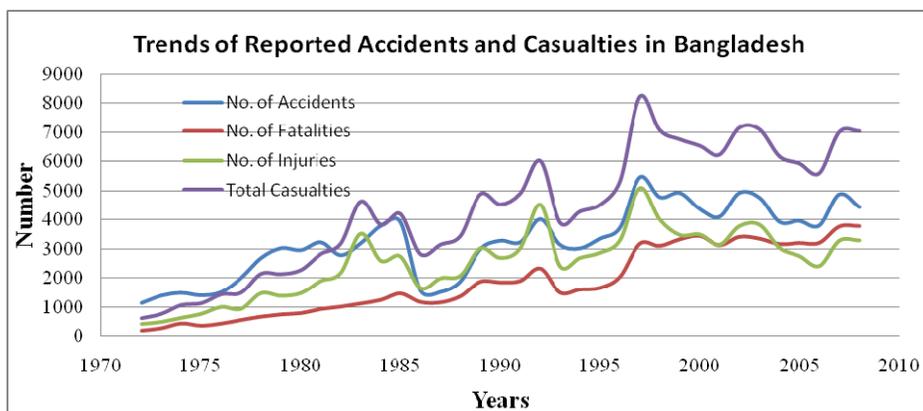
Total number of accidents and fatalities

According to the police-reported accident records, the number of fatalities increased from 187 in 1972 to 3,764 in 2008, which represented nearly a 10 per cent increase per year over a period of 37 years. In the last decade, however, the rate of increase has decreased significantly. The actual numbers increased from 3,314 in 1999 to 3,764 in 2008, representing about 2 per cent per year, although there was significant growth in the population and the number of personal trips and vehicles, as well as expansion of the road network. This positive trend is attributable to the improvement of road

conditions, the construction of national and regional highways incorporating a road safety auditing approach, an increase in the number of higher standard vehicles on the road, improved road user education and awareness levels, the enhancement of a coordinated official policy to control the problem and police enforcement.

Figure 3 shows traffic accidents and fatalities during the period 1972-2008. As can be seen, there were sudden increases in numbers between 1997 and 1999, which were perhaps due to changes in accident reporting and data collection methods. A newly developed accident reporting form was introduced and a series of training programmes for police personnel was organized to enhance their capacity in accident recording and reporting.

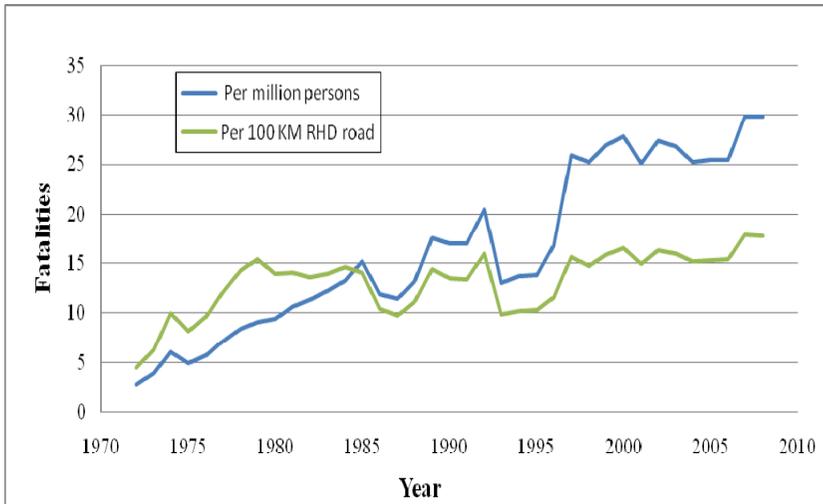
Figure 3. Traffic accidents, fatalities, 1972-2008



Fatalities per million persons and per 100 km roads

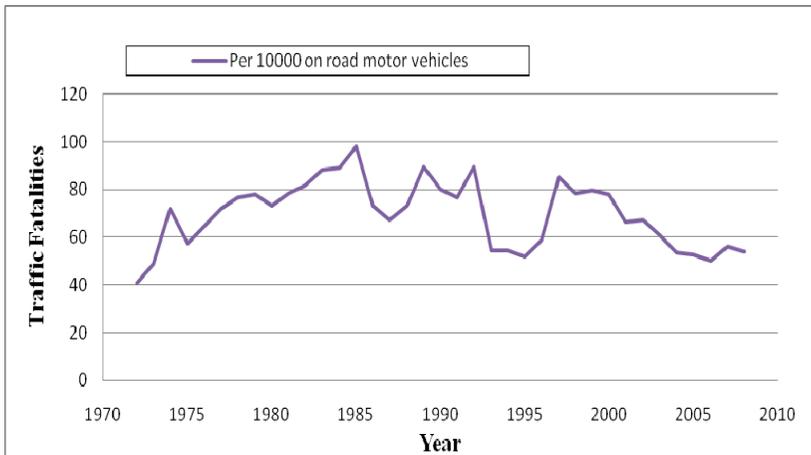
Figures 4 and 5 show the trends in fatalities per million persons and per 100 km Road and Highways Department (RHD) roads. Fatalities increased from 2.74 (per million persons) and 4.48 (per km of 100 RHD roads) in 1972 to 29.8 and 17.83, respectively, in 2008. In the last decade, however, their increases were much less pronounced (15.81 to 17.83 and 26.91 to 29.81, respectively). Overall fatalities per 10,000 on-road motor vehicles increased from 40 in 1972 to 53 in 2008. However, the rate has decreased in the last decade by about 31 per cent (from 78 to 53 fatalities per 10,000 on-road motor vehicles). Sudden upsurges in particular years reflect the methodological and reporting issues discussed earlier.

Figure 4. Traffic fatality per million persons and per 100 km RHD roads, 1972-2008



Source: Data from Police, RHD and BBS

Figure 5. Traffic fatality per 10,000 on-road motor vehicles, 1972-2008



Source: Data from Police and BRTA

The declining trend in fatality rates suggests that, although the degree of accident exposure in terms of the number of trips, vehicles and road users, as well as the length of the road network, have increased, there has not been a corresponding increase in fatalities.

Fatalities per 100 million vehicle kilometres

Accident and fatality rates with respect to vehicle-kilometres (veh-km) are calculated based on vehicle operation survey data conducted by RHD in different years. Table 3 depicts the total veh-km travel by motorized vehicles and the corresponding accidents and fatalities per 100 million veh-km in recent years.

Table 3. Accidents and fatalities per 100 million vehicle kilometres

Year	Total veh-km	No. of accidents	No. of accidents per 100 million veh-km	No. of fatalities	No. of fatalities per 100 million veh-km
1999	13 419 385 000	4 916	37	3 314	25
2000	12 719 533 000	4 357	34	3 430	27
2002	14 125 435 000	4 918	35	3 398	24
2004	21 042 770 900	3 917	19	2 968	14

Source: RHD (1999, 2001, 2003, 2005a).

Between 1999 and 2009, while the total annual veh-km increased by 57 per cent, the corresponding accident and fatality rates decreased by as much as 49 per cent and 43 per cent, respectively. Significant reductions in these rates also indicate a positive trend in traffic safety improvements in the country.

II. ROAD TRAFFIC ACCIDENT CHARACTERISTICS IN BANGLADESH

A. Accidents statistics: urban vs. rural areas

The distribution of reported road traffic accidents and fatalities in urban and rural areas for the period 1998-2007 is shown in table 4. In this period, at least 12,960 accidents occurred in urban areas, accounting for 35 per cent of total accidents in the country. These accidents resulted in 7,635 fatalities and 9,243 injuries. About 26 per cent of the total fatalities occurred in urban areas. The data presented in the table show some possible reporting inconsistencies in the distribution of urban-rural accidents, which require further investigation.

Table 4. Trends of accidents and fatalities in urban and rural areas

YEA R	Reported accidents				Reported fatalities			
	Urban		Rural		Urban		Rural	
	No.	Percent- age of cor- responding total	No.	Percent- age of cor- responding total	No.	Percent- age of cor- responding total	No.	Percent- age of cor- responding total
1998	1 754	50.2	1 743	49.8	795	34.1	1 534	65.9
1999	1 499	38.1	2 439	61.9	733	25.4	2 152	74.6
2000	1 504	38.0	2 451	62.0	775	25.4	2 276	74.6
2001	960	33.0	1 948	67.0	593	24.9	1 785	75.1
2002	1 366	34.8	2 557	65.2	752	24.8	2 283	75.2
2003	1 413	34.7	2 662	65.3	826	25.0	2 476	75.0
2004	1 079	30.7	2 435	69.3	697	22.4	2 416	77.6
2005	854	26.3	2 394	73.7	580	20.0	2 321	80.0
2006	1 043	30.1	2 418	69.9	768	24.9	2 313	75.1
2007	1 488	39.0	2 323	61.0	1 116	35.3	2 045	64.6
TOTAL	12 960	35.7	23 370	64.3	7 635	26.1	21 601	73.9

Source: Police reported MAAP Database.

B. Fatalities by road users

The distribution of road fatalities across road user groups for urban and rural areas is shown in table 5. Nearly 80 per cent of road fatalities in urban areas involved VRUs (pedestrians, bicycles, cycle rickshaws and motorcycles), with pedestrians being the largest group. They were also the largest group in rural fatalities, accounting for about 65 per cent.

Table 5. Fatalities by user groups in urban and rural areas (1998-2006)

User Groups	Urban	Percentage	Rural	Percentage
Pedestrians	4 083	63	8 878	46
Bicycles and rickshaws	782	12	1 226	6
Motorcycles	207	3	740	4
Baby taxi/ tempo/microbus	394	6	1 686	9
Car/jeep/pickup	136	2	738	4
Buses	436	7	3 669	19
Trucks	298	5	1 922	10
Others	166	3	594	3
Total	6 502	100	19 453	100

Source: Hoque et al. (2008a).

C. Temporal distribution

Analysis of the police-reported accident data revealed that 64 per cent of accidents occurred during the day (6 a.m. to 6 p.m.), while 36 per cent occurred at night (6 p.m. to 6 a.m.) in urban areas, whereas in rural areas the day-time share was 75 per cent. It was found that accidents and fatalities remained fairly evenly distributed in day-time, with the peak occurrence between 10 a.m. and 12 noon.

More accidents tended to occur on Thursdays, with fairly equal distribution among the other weekday and weekend days. Relatively speaking, more accidents occurred in the months of January, February and March, probably because of foggy weather conditions on many days in those months.

D. Vulnerable road user group: pedestrians

Pedestrians were by far the largest group involved in road traffic fatalities. Their share varied between 37 and 73 per cent, with an average of 65 per cent in metropolitan areas. Pedestrians also accounted for nearly 56 per cent of road traffic fatalities in non-metropolitan urban areas. Further analysis revealed that most of the pedestrian fatalities occurred while the pedestrians were crossing the road (41 per cent), closely followed by those walking on the road (39 per cent). The very high involvement of pedestrians in road fatalities indicates the need for special attention to be paid to this group.

E. Involvement of children in road accidents

The involvement of children in road accident fatalities was found to be very high, accounting for about 21 per cent. A recent study revealed that road traffic injuries were the leading cause of fatalities in children 10-14 years of age (Hoque et al., 2007). Of the total number of child road fatalities, nearly 80 per cent were pedestrians. About one half of the child pedestrian fatalities occurred on roadsides while the children were walking along the road, and nearly one third occurred while they were crossing the road. Heavy vehicles such as buses and trucks were the main contributors to child road traffic fatalities. Children were also vulnerable as bicyclists, accounting for nearly 16 per cent of the total cyclist fatalities.

F. Involvement of trucks and buses

Heavy vehicles such as trucks and buses, including minibuses, were major contributors to road accidents (bus/minibus—33 per cent, trucks 27—per cent), while their shares in fatal accidents were 35 per cent and 29 per cent, respectively. This group of vehicles was also responsible for most pedestrian accidents, accounting for about 68 per cent (bus/minibus—38 per cent, trucks—30per cent). The combined share of buses and trucks for road fatalities was 68 per cent, while their share for pedestrian fatalities was 72 per cent (Bangladesh Country paper, 2007).

G. Accidents on national highways

Of the total reported accidents, nearly 37 per cent occurred on national highways. A study on the identification of hazardous road locations on national highways revealed that accidents and fatalities on national highways were clustered on selected sections, identified as hazardous road locations (HRLs). Nearly 40 per cent of accidents were concentrated on about 2 per cent of the highway network (Hoque et al., 2006).

H. Predominant accident types

An accident type analysis showed that the “hit pedestrian” scenario was the dominant accident type, both in urban and rural areas; 45 per cent of accidents of this type were fatal. Other common accident types were: rear end collision (16.5 per cent), head-on collision (13.2 per cent) and overturning (9.3 per cent). These four accident types accounted for nearly 85 per cent of the fatal accidents. In rural areas, the types of accidents which

resulted in fatalities and injuries were categorized as follows: hit pedestrian, head-on collision, running-off-the-road and out-of-control vehicles.

I. Contributing factors in road accidents

Various studies comprising on-site field investigations, systematic safety checks and audits, comprehensive analyses of accident reports, eyewitness and victim interviews, drivers' observations and opinion surveys, and expert opinion surveys, have been conducted by different organizations to identify the causative factors of road accidents. Those studies revealed that the principal contributing factors to accidents were deficiencies in land-use and road network planning, adverse roadway and roadside environments, the absence of or inappropriate pedestrian facilities, defective bridges and bridge approaches, inappropriate intersection designs, reckless driving, vehicle defects, the presence of non-standard informal vehicles on main roads and unauthorized vehicle modifications. In addition, driver incompetency, road users' low level of awareness of the safety problem, and inadequate traffic law enforcement and sanctions were also among the major causes of accidents. However, it is difficult to quantify which factors were responsible for how many accidents due to the fact that a large number of contributory factors are not covered by the current accident reporting system.

III. MAJOR ROAD SAFETY INITIATIVES IN BANGLADESH

In order to improve the road safety situation, several initiatives have been taken by various government, non-governmental and donor agencies in the form of policy formulation and implementation, institutional development, geometric improvement of roads, legal sanctions and enforcement, capacity-building for professionals and academics, and awareness creation among the general public. Some of the major initiatives are summarized below:

Adoption of the National Land Transport Policy (NLTP)

The National Land Transport Policy (NLTP) was adopted in 2004 by the Planning Commission, which sets a vision for "providing safer roads". The NLTP has also set policies on various matters, including: (i) road safety auditing at all phases of road projects, road construction and road maintenance; (ii) speed restrictions on roads; and (iii) safety improvements on existing roads, which were considered vital in achieving the vision (RHD, 2005b).

Preparation of a safety manual, handbook and guidelines

RHD has prepared a set of manuals, handbooks and guidelines on road safety, which include the Guidelines for Road Safety Audit, Road Safety Improvement Works Manual, Road Safety Users Guide, Road Geometric Design Manual, Police Training Handbook, Road Safety Engineering Toolkit, Pavement Design Guide, Guidelines for Identification of Sites for Road Safety Improvement Works, and A Guide to Safer Road Design. In addition, a Traffic Sign Manual was developed by the Bangladesh Road Transport Authority (BRTA) in 2000. The police department has approved and adopted a revised traffic training syllabus and curriculum and, since 2004, all traffic training courses have been conducted as per the revised curriculum.

Establishment of the National Road Safety Council (NRSC)

The National Road Safety Council (NRSC) was established in 1995 under the auspices of the Ministry of Communications, with the support of a World Bank-funded road improvement project; it is now a unit of BRTA. The secretariat of NRSC sorely lacks manpower, logistics and facilities and has yet to become fully functional. NRSC comprises representatives of all key stakeholders, including transport owners, workers associations, professionals in the field, transport regulators, law enforcers and road authorities (Hossain, 2002). It acts as the apex body for approving and driving forward the national policy and plans and has formulated the National Road Safety Action Plan. In addition, NRSC is responsible for holding periodic meetings to provide policy-level decisions and directives to road safety-related organizations, such as RHD, BRTA, the police, Dhaka Transport Co-ordination Board (DTCB), city corporations and local governments., For various reasons, however, NRSC was not able to undertake any major activities in the last two years.

Preparation of national road safety strategic action plans

NRSC drew up the first National Road Safety Strategic Action Plan, covering the period from July 1997 to June 1999. Subsequently, plans for the periods 2000-2002, 2002-2004 and 2005-2007 were developed. NRSC also formulated an updated National Road Safety Strategic Action Plan 2008-2010, with the hope that it would provide an important framework for improving safety in a comprehensive way and address the issue holistically. A vision of a 50 per cent reduction in fatal road accidents within the next 15 years and the goal of a 10 per cent reduction in road accident fatalities by the end of the year 2007 were stated in the plan.

The Road Safety Action Plan identified nine priority areas for improvement. The nine areas are further subdivided and actions are

proposed under each sub-area. The activities of the strategic action plan follow the ADB/ESCAP road safety guidelines (ADB, 1997). Non-governmental groups have a key role to play in implementing the Action Plan.

Establishment of the Road Safety Cell and the District Road Safety Committee

An independent organization called Road Safety Cell (RSC) was set up to act as the secretariat to NRSC at the Bangladesh Road Transport Authority (BRTA). RSC is responsible for the preparation of plans, the coordination, and the monitoring and evaluation of the activities assigned to different agencies and for the implementation of programme activities assigned to it. It also disseminates information on road safety to all relevant organizations and to members of the public. Besides NRSC, district road safety committees at the district and metropolitan levels have been formed with the involvement of the local administration, BRTA and road authority and other transport/road user agencies; they implement the programmes and policies of NRSC. The committees are required to undertake road safety programmes according to local needs.

Establishment of the Accident Research Institute at the Bangladesh University of Engineering and Technology

The government realized that there was a need for scientific study and research on accidents and for remedial measures to address them. The commitment in this regard came from the highest level of government to establish an independent accident research centre as one of the top priority programmes. Accordingly, the Accident Research Centre (ARC) was established at Bangladesh University of Engineering and Technology (BUET) in 2002 to carry out scientific research with a view to understanding the safety problems and ascertaining the underlying causative factors that contribute to accidents on roads, railways and waterways. After successful completion of the project period, ARC became an institute under the Education Ministry at BUET in 2007.

Development of the Road Safety Unit at RHD and LGED

With the technical assistance of the Department for International Development (DFID) of the United Kingdom, RHD established a road safety division in January 1999 with a view to dealing with the safety aspects of national, regional and feeder roads. The Ministry recently approved the upgrading of the Unit and its roles and functions. The Local Government

Engineering Department (LGED) has also planned to create a similar road safety unit within the Department.

Establishment of the highway police

With the aim of improving safety and traffic management on highways, the Government created the highway police in 2005. The highway police are responsible for maintaining and ensuring discipline, enforcing traffic rules and regulations, managing traffic, preventing highway crime, collecting and sharing intelligence, undertaking police patrolling and ensuring road safety. The highway police are working under two units, namely the Traffic Unit and the Investigation Unit. Currently, the highway police have a workforce of 2,042 personnel.

Formation of road safety voluntary and advisory groups

Many non-governmental voluntary or advisory road safety groups have been formed at the national and local levels. *Nirapad Sarak Chai*, Work for Better Bangladesh (WBB), Safe Community Foundation and *Poribesh Bachao Andolon* are some of the major groups at the national level.

Approval of speed limit zoning and speed restriction rules

Excessive and inappropriate speed is one of the most important factors contributing to road accidents. A number of studies have clearly identified speeding as being a particular problem (GRSP, 2007). In cognizance of this fact, speed limit zoning and speed restriction rules have been developed for different highways in Bangladesh. They were approved and published in a gazette by BRTA in 2005 for the major highways in the country.

Development of an accident database

A standard format for accident information recording was designed in 1995 as an initiative under the Institutional Development Component (IDC) programme and was adopted by the police department. The department promulgated appropriate rules for its mandatory use as part of the first investigation report of accidents by the police. An accident database system based on MAPP5 software was developed and the database has been in use since 1998. In addition, RHD conducted a road inventory survey and prepared an inventory book to identify accident locations and black spots, and to treat those locations through different site-specific interventions. A

computerized database for recording registered motor vehicles and licensed drivers' data has also been established at BRTA.

Preparation of the road traffic accident annual report

BRTA has been preparing accident reports based on the National Road Traffic Accident (RTA) database. The system of accident data collection and analysis was set up with assistance under the Institutional Development Component (IDC) programme funded by DFID. Since 2005, BRTA has been undertaking data collection and analysis by itself without external assistance.

Training of road safety professionals

Efforts are underway to strengthen the capacities of the key agencies by organizing long- and short-term training programmes at home and abroad.

Safety awareness and training

Safety awareness campaigns and training programmes have been undertaken at different levels for professionals, transport owners and workers, students and the general public by different governmental and non-governmental organizations.

Implementation of road safety audits

Road safety audits as an accident prevention tool are a relatively new and highly cost-effective approach to improving road safety. Road safety audits are of particular importance as national road networks are still being developed, and unless safety checks are undertaken, the result will be unsafe networks in the future. In recognition of its importance, the RHD road safety unit has introduced formal road safety audits at different locations or spots on national highways.

Road safety initiatives of non-governmental organizations

Non-governmental organizations (NGOs) are becoming active in the area of road safety. The activities of two leading NGOs—Bangladesh Rural Advancement Committee (BRAC) and the Center for Rehabilitation of the Paralyzed (CRP)—are quite noticeable (Quazi, 2003). The major programmes being undertaken include the following: community road safety, training of students, road safety training for office staff, a community road

safety NGO network, publicity and awareness, research, driver training, and the treatment and rehabilitation of paralysed people.

Geometric improvement of roads

Significant improvement works have been undertaken on the national highways and regional and feeder roads all over the country. They include the construction of new and strategic roads, the realignment of existing roads, the widening of roads, surface treatment, road and roadside improvements such as shoulder improvements, the removal of vision obstructions, and the provision of loading and unloading facilities. In addition, some hazardous road locations have been improved on national highways.

International and regional cooperation

Concerned organizations have developed linkages with different institutions and organizations at the local, international and regional levels—including Asian Development Bank (ADB), the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), The Global Road Safety Partnership (GRSP), the Road Engineering Association of Asia and Australasia (REAAA), The Transportation Research and Injury Prevention Programme (TRIPP), Transport Research Laboratory (TRL), Swedish National Road and Transport Research Institute (VTI), World Bank (WB) and other donor agencies and specialized institutes—to facilitate the exchange of knowledge and technologies. They have also initiated exchange programmes with overseas counterparts to share knowledge and information. Efforts are underway to establish a network of road safety researchers, professionals, academics and practitioners.

Progress in road safety research

Long-term research work has started in recent years. Financing of traffic safety research is at present the responsibility of the government. Research institutes and universities can apply for funds for research projects. No industry or private organization has shown interest in safety research issues and funding support yet. Work on a joint traffic safety research programme is progressing in collaboration with donor agencies.

IV. MONITORING AND EVALUATION OF ROAD SAFETY MEASURES

Since 1995, a significant number of road safety measures have been implemented. Unfortunately, no major or comprehensive evaluation study

has been conducted to assess the effectiveness of the implemented measures. A few studies have been conducted by students as part of their research work. More detailed evaluation is necessary to determine the effectiveness and applicability of the measures to local traffic, land-use, social and behavioural characteristics.

A. Impact of implemented and ongoing initiatives

Development of awareness and understanding

RHD prepared a report entitled “Road Safety Initiatives in Bangladesh—A Brief Report” in collaboration with Finnroad in 2005. Some of the main findings of the report are the following:

- At the government policy level, a significant level of awareness and recognition of road safety as a national problem was observed.
- At the planning and policy level of stakeholder agencies (RHD, police, BRTA etc.), a significant level of awareness and recognition of road safety was observed. However, there was a need for a clearer understanding of what had to be done in future.
- Among the road engineering community, some awareness and understanding was observed. Road safety improvement was often confused and mixed with capacity improvement of road infrastructure, due mainly to the lack of traffic engineering practices.
- Among the field level of staff of other stakeholder agencies and road users, no awareness and recognition of road safety as a national problem was observed.
- The impact of general public awareness creation activities by BRAC and other NGOs was not conclusive for the lack of monitoring and post-impact assessment study.

Concerning capacity-building in related government agencies, the report observed:

- Activities for capacity-building in and the strengthening of the NRSC secretariat and the Road Safety Unit of RHD were not significant. Greater efforts are needed to make these institutions functional.

- Trainings for local engineers were minimal and engineers were not trained on the use and application of standards, manuals and guidelines.
- Training of police has been negligible and no initiative has been undertaken to strengthen the Traffic Training School of the police.

Safety manual, handbook and guidelines

Almost all of the manuals and guidelines were prepared by foreign consultants funded by government and donor agencies. Local engineers and professionals were not involved in their preparation and no training workshops were organized. Local professionals had little or no understanding of these manuals and, as a result, they failed to appreciate the utility of these documents in their work.

Evaluation of geometric improvement

The implementing agencies have not undertaken studies to evaluate the performance of the geometric improvement measures on different roads. A study was conducted to evaluate the effectiveness of black spot improvement measures on Dhaka-Aricha Highway. The major improvement measures included widening of the carriageway, along with alignment correction, the construction of bus bays, the installation of concrete guard posts and warning gates with speed limit signs at both entry and exit points.

The study revealed that the limited site-specific safety improvement measures were very effective in reducing the frequency and severity of accidents. However, in a few places the implemented accident countermeasures did not produce the desired level of positive effects for reasons such as the presence of intense roadside hawking and non-motorized activities, the conflicting use of road space and the absence of enforcement measures. Further details can be seen in Muniruzzaman (2004).

NRSC has been preparing national road safety strategic action plans for three-year periods and has prepared a fifth plan. The implementation of the plans, however, is very insignificant for the following reasons:

- The action plans are merely the compilation of some activities of different organizations on road safety or related issues. They are not prepared on the basis of priority needs, goals to achieve or a strategic vision and established targets.

- There has been no mechanism in place to oversee plan implementation.
- There has been no indication of budgetary requirements or how funding requirements would be met.
- No time frame for implementing the activities has been provided.

Accident Research Institute (ARI)

ARI is carrying out its activities in two broad areas, namely road safety research and training:

- *Road safety research and investigations.* ARI has conducted road safety research and investigations to better understand accident characteristics.
- *Road safety training and awareness programmes.* ARI has organized a series of capacity-building activities for professionals, practitioners and other interested parties at the national and local levels. It has also established a network with various departments, institutions and organizations to promote road safety. These initiatives have contributed to raising the level of awareness and capacity of policymakers, professionals and other stakeholders.

Road Safety Cell and district road safety committees

The Road Safety Cell and the district-level safety committees made important contributions in creating awareness at local levels. However, these institutions are currently not very functional.

Highway police

A separate highway police act has yet to be enacted. The police lack manpower and the necessary logistics support, including vehicles. Most of the staff work on deputation from the regular police force. They do not have any power to prosecute the traffic law violators and depend on the support of the national police.

Speed limit zoning and speed restriction rules

Speed limit zoning was promulgated through a Gazette notification in 2006. Subsequently, speed limit signs and markings were posted along the roads. Ex-post evaluations conducted by ARI and other organizations have

shown that most of the drivers did not have a sufficient understanding of these traffic signs and markings. It was also revealed that even those who understood did not comply. In addition, due to the high resale value of steel posts and plates, the theft problem was acute and it was difficult to maintain the traffic signs.

Traffic accident database

It is widely recognized that the road traffic accident database is not complete and does not contain adequate information on road accidents. Since DFID technical support ended in 2005, BRTA has not had the resources to continue training police on the collection and entry of road traffic accident data. Due to the lack of continued training and monitoring, the level of underreporting has increased, particularly on injury and property damage only (PDO) accidents. ARI is making efforts to reduce this problem by training the police personnel who are responsible for data recording and storing, and also by providing technical support.

V. RELATED ISSUES, CONSTRAINTS AND REQUIREMENTS

Increasing road network, motorization and urbanization

The government is making substantial investments in building the country's road network. With the expansion of the road network and the increase in vehicular traffic, road transport has become the dominant mode for the carriage of freight and passengers in the country. Further, with rapid urbanization, the urban transport issues of mobility, congestion, safety and environmental aspects are becoming increasingly important. The rapid increase in the level of motorization and urbanization could critically worsen the safety situation and become unmanageable unless well-coordinated and systematic approaches are considered at this time.

Underreporting of accidents

Widespread underreporting and incomplete collection of specific details on accidents are a major problem. Most of the injury and property damage accidents are not reported at all. Many fatal accidents in remote areas are also not reported. A case study on selected police stations adjacent to highways has shown that there is a significant difference in the number of accidents between the MAPP5 accident database and the First Information Report (FIR).

Institutional weaknesses

Road safety improvement efforts and initiatives have been seriously affected by institutional weaknesses. Lack of support, coordination and collaboration among safety stakeholders are among the leading barriers to institutional capacity-building. Fragmentation of responsibilities between agencies with insufficient inter-agency coordination, low levels of staffing and lack of professional capacity, lack of trained traffic police for effective enforcement and traffic regulations, inadequate dissemination of road safety research-based knowledge, and too few resources directed towards tackling the safety problem are some of the major reasons for agencies not being able to discharge their responsibilities. Activities implemented so far have generally not been coordinated or integrated, resulting in isolated efforts providing unsustainable benefits.

Lack of national commitment and targets

Many countries, including some developing countries, have formulated national road safety targets for reducing road accidents and fatalities. Unfortunately, no such commitments or targets have been set by the highest-level authorities.

Resource constraints

Road safety projects in Bangladesh are dependent on insignificant levels of local financing. Without a stable and sufficient flow of funds for road safety, attempts to address road safety problems would not meet with much success. It is necessary to establish a national road safety fund which could be financed through road user charges and levies on insurance company revenues and automobile company revenues.

Wrong policy

Until now, more focus has been given to increasing road length and the construction of bridges without much consideration for road maintenance and road safety. Road construction has followed standard geometrics with little concern for road safety. Undertaking/implementing road safety programmes/initiatives as a component or a sub-component of other large road improvement projects has resulted in lower attention by the concerned road-building agencies.

Lack of government and private partnership

Without the full participation of all concerned actors in the public and private sectors, it is difficult to make any significant progress in improving the road safety situation in the country. In this respect, partnership of the government agencies with non-governmental actors in planning, project implementation, funding support, capacity-building and public awareness campaigns is vital. Unfortunately, such initiatives are extremely rare in Bangladesh. There is a strong need to develop a global partnership with international aid, funding and social welfare organizations, and academic and research institutions.

Non-standard, informal, defective and road unworthy motor vehicles

A large number of non-standard and illegal informal vehicles are operating all over the country, particularly in rural areas. These vehicles pose a serious threat to safety on roads. The most common defects that these vehicles appear to have are faulty brake and indicator lighting systems, worn-out tyres, loose wheels, and overloaded axles. There are no data on these vehicles and there has been no assessment of their performance and ability to operate and manoeuvre in the road traffic flow. There is an urgent need to consider this issue. Further, a significant number of formal vehicles are also thought to be defective and road unworthy. They are also a threat to road traffic safety. The current vehicle inspection regime of BRTA has failed to tackle these issues.

Incompetent drivers

A study was carried out by Hoque et al. (2007) to assess drivers' practical driving experience and skill. It was found that 92 per cent of drivers did not have any formal training. The study also revealed that a considerable number of drivers (about 53 per cent) had obtained their licences by illegal means. Incompetent drivers driving with fake licences appear to be a major concern to safety. Strict licensing requirements are critically important. Effective driver testing, good control and registration of driver training schools and driving instructions are priority requirements.

Road engineering and environmental deficiencies

Improper planning, design and implementation are prevalent in the country. The unplanned development of road networks, uncontrolled roadside development, poor layout design and inappropriate roadway

interfaces pose significant and serious road safety hazards. There is a specific need and much scope for road environment improvements aimed at correcting the most common deficiencies through wider application of road safety audits and risk assessments. Safety should be incorporated and integrated into planning, design, construction, operation and maintenance phases rather than being applied as a retrofit.

Inadequacy of police inspection and legislation

It is important to intensify enforcement and educational programmes to alleviate the problems of road accidents. Current levels of traffic law enforcement, vehicular regulations and road users' education are exceedingly low. The problem of law enforcement needs to be urgently tackled.

Lack of safety education and awareness

Lack of safety education and awareness among all road users, including children, women, pedestrians, passengers, drivers and vehicle owners, is one of the major safety issues in Bangladesh. However, road safety education and awareness, especially for children and rural people, is an effective tool for improving the behaviour of road users. Public education should be carried out on a continuing basis by community leaders and local officials. Voluntary organizations and governmental and non-governmental organizations can be encouraged to prepare educational films on safe walking, crossing, alighting and boarding, and safe driving practices.

Poor accident data recording system

Currently, the only accident database in Bangladesh is based on police reports. No hospital or insurance-based accident database has yet been developed. ARI is continuing its efforts to develop a newspaper-based accident database but newspapers have large reporting inconsistencies and generally highlight major fatal accidents. Accidents resulting only in injuries or those occurring in remote areas are almost unseen in newspaper reports. Multiple independent databases are needed to reduce underreporting and to maintain and improve the quality of information as well as to meet various requirements.

CONCLUSION

Road traffic crashes are predictable and therefore preventable. In order to combat the problem, there is a need for close coordination between

all concerned public and private agencies. Appropriate resources need to be allocated to improve safety, which is currently far below what is required. Addressing the road safety problem is a considerable challenge for transport and road safety professionals in Bangladesh. There remains much scope for improving road safety and, for that, known and proven interventions need to be implemented with due urgency, ranging from education, engineering and enforcement. Initiatives to improve the conditions would require renewed government commitment and resources, trained personnel, safety specialists and researchers to build up local capacity. One fundamental aspect that may be considered by the government would be to create an organization dedicated to initiating and coordinating road safety activities. Realistic fatality and casualty reduction targets need to be established and adequate technical and financial resources to bring about the required improvements need to be made available. It is believed that regular and sustained monitoring and evaluation of safety initiatives will help in determining appropriate and proven measures which can be incorporated into the design and planning of transport infrastructure.

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