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ANALYSIS OF ACCIDENTS TREND DUE TO DRIVING PROBLEMS IN BANGLADESH

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ABSTRACT

In world nearly 1.3 million people die in road accident each year, on average 3,287 deaths a day. Bangladesh has one of the highest fatality rate in road accidents in the world which causes untold suffering and misery to the members of the victim's family. Many studies have shown that drivers are responsible for most of the accidents. The aim of this paper is to identify the causes of road accidents and accidents trend due to driving related problems in Bangladesh. For this study 15 years (1998-2013) accident data have been collected from Accident Research Center(ARC), BUET and detail diagnosis have been done on these available data. In this analysis driver's characteristics and some factors that affect safe driving & causes accidents were identified so that adequate procedures can be taken to reduce such as fatal accidents. The current condition of existing facilities of safe driving and some suggestion to reduce accidents rate is also discussed in this research. From this paper it is found that by proper licensing & training of drivers, improving existing road facilities, regularly checking fitness of the vehicles, introducing traffic islands at intersections, introducing enforcement to control traffic and preventing alcohol use of driver's will reduce accidents rate.

Keywords: *Road accident, driver behaviour, traffic, alcohol, licence*

1. INTRODUCTION

In Bangladesh, road accidents and injuries are now a growing and serious problem. It has about 1.6 million motorized and could be over 3 million non-motorized vehicles(Hoque,2004) This situation is very severe by international standard. Each year, half million people die and 10-15 million people are injured in road accidents worldwide (Odgen,1996) Yet among all transportation accidents road accidents are paid less attention than air plane crush to the policy makers and general people, as a result more road accidents occurs (Odgen,1996). Even lesser attention is given to the accident caused by driving problems. Although driving problem is one of the major problem that causes road accidents, particularly in developing countries like Bangladesh.

According to a study conducted by the Accident Research Centre(ARC) of BUET, road accidents claim on average 12,000 lives annually and lead to about 35,000 injuries in Bangladesh . According to World Bank statistics, annual fatality rates from road accidents is found to be 85.6 fatalities per 10,000 vehicles (World Bank Report, 2009). Also, 77% of traffic accident fatalities are pedestrians and 50% of these fatalities involve buses (Hoque, M. M., 2004) The majority of the people including media pundits tend to hold the drivers responsible for all sorts of traffic accidents. There is no doubt that the greater number of road accidents and resultant fatalities are caused by irresponsible and inexperienced drivers. Drivers are hampering road safety agenda.

The objectives of this paper is to provide a broad overview of characteristics features of drivers and factors that causes road accidents and which are related to safety problems in Bangladesh.

2. METHODOLOGY

In Bangladesh, police is the core organization for road accident data collection and storage. For each accident the Accident Research Center(ARC) is completed by a sub inspector of police after visiting the accident spot. The ARF is then dispatched to the respective Accident Data Units(ADU) where the information from ARF and location of the accident is incorporated into Microcomputer Accident Analysis Package (MAAP). Ten regional ADUs were established during early 1998. These units are responsible for processing and analysis of accident data of their jurisdiction. Additionally, an ADU was established at police Headquarters' (HQ) to assemble the national accident database and to analyze accident data at national level. Data is sent from the regional ADUs to the police HQ in soft form. The MAAP system is used to analyzed accident data and it provides the pattern of accidents in the country.

The Accident Research Center (ARC) at BUET essentially uses the MAAP database. This database was transferred to the center to the institutional collaboration of the Road Safety Cell (RSC) of the BRTA and the police department. The current road safety research and investigation works have been based on this database. The MAAP data has now been included as part of the official First Information Report (FIR) form, so it is expected that the system will improve more in the future years.

Data in this research were collected from accident records database maintained at the Accident Research Center (ARC) of BUET for the 15 years (1998-2013) and PPRC report-2012. The data included accident date, time location and other relevant information. For convenient, the whole study was divided into two categories. After that the collected data was analyzed and related graph was prepared using the Polygon Analysis Procedure of Micro Computer Accident Analysis Package(MAAP).

2.1 Background of the problems

Bangladesh is one of the densely populated country. It having an area of 1,47,570 sq.km and a population of 160 million. The number of population is increasing day by day. A rapid urbanization has been taken place around the country in the last few decades. So people needs vehicles to travel from one place to another. For travelling purpose the number of vehicles is increasing day by day. Due to rapid increasing of vehicles the number of drivers are increasing as well as accident rates. As a results the number of casualty rate is increasing which is very alarming.

Mainly accidents are occured due to bad driving or driving related problems. Now a days drivers are given license without appropriate training by authoraty and some drivers drive their vehicles even without having any license. For this reason, road accidents are becoming common senerio in Bangladesh. From literature review, it has been found that causal factors fall within four major clusters: i) driving habits ii) road-related factors iii) vehicle-related factors iv) socio-economic environmental factors. Beside these, drivers are not tring to maintain traffic rules and regulation. Adverse roadway, roadside environment, poor detailed design of junctions and road sections, overloading, dangerous overtaking, reckless driving, carelessness of road users, failure to obey mandatory traffic regulations, variety of vehicle characteristics and defect of vehicles etc are common reason for accident. factors affect safe driving which causes fatality accidents. The 2013 WHO global report on road safety highlights five causal factors of drivers that causes road accidents are- i) excessive speed ii) drunk driving iii) non-use of motorcycle helmets iv)non-use of seat belts v)non-use of child constrains.

Bangladesh has one of the highest fatality rate in road accidents. Whereas many other developed countries the accident rate is relatively low. From figure-1 it is seen that number of casualty is decreased from the year 2011 to 2013. In the year 2003 it is maximum.

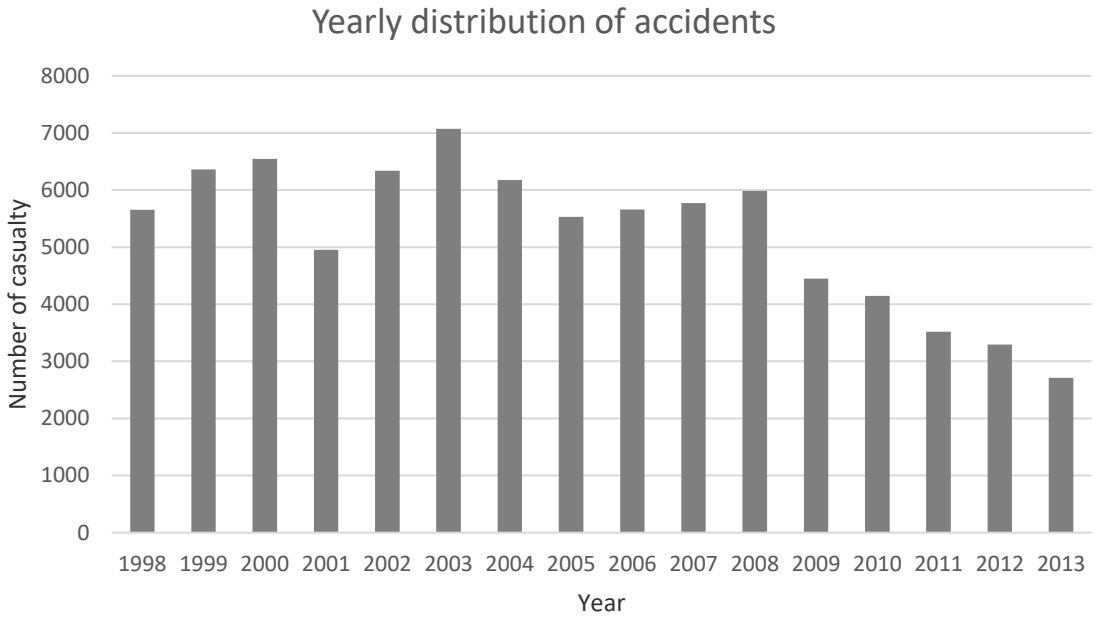

Figure-1: yearly trend of accidents; Source: Accident Research Center(ARC), BUET

3.CHARACTERISTICS OF ACCIDENT DATA

The analysis of accident data involved the determination of accidents severities rate due to bad driving on the basis of

i) Driver's characteristics.
ii)The different factors that affect drivers.

3.1 Driver's characteristics

3.1.1 According to driver's age

Figure-2 shows the age distribution of drivers according to their casualty rates. Variation of ages are presented as abscissa with respect to the percentage of casualties involved in accident which is presented as ordinate. According to figure-2 the age of driver below 10 years and above 60 years are less vulnerable to road accidents. The age of drivers between 21-40 years are more involved in road accidents and causes more casualty. The accident rates are decreasing above the age of 40. So young people are more involving accidents due to inadequate educational background. Though below 18 age is not accepted for driving license but from analysis it is seen that below 18 age peoples are also driving vehicles.

Figure 2: Casualty rates of driver on the basis of age (1998-2013)

3.1.2 According to alcohol use of driver

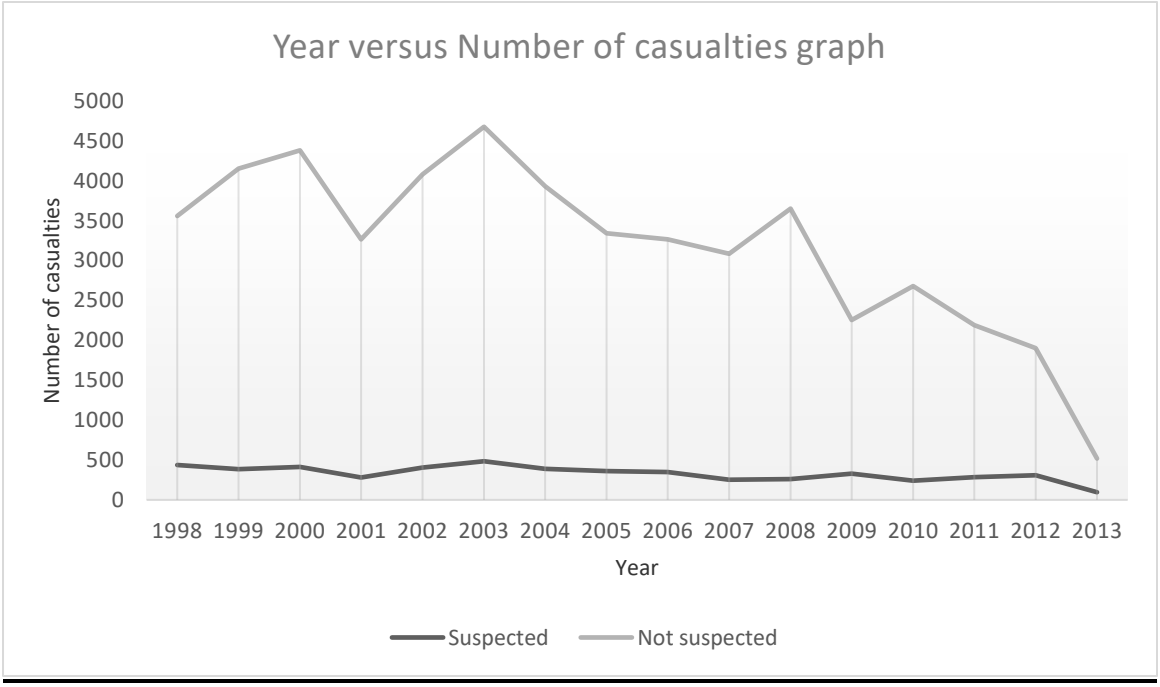

Figure 3: Yearly trend of number of casualties according to driver alcohol use (1998-2013)

Figure 3 shows the graphical representation of yearly distribution of casualty rates of drivers which depends on driver's alcohol use.(ARC, BUET)) From figure-3 it is seen that number of casualties due to suspected alcohol use of drivers are more from the year 2002 to 2004. In year 2003 it is maximum. From the year 2005 suspected casualty rates due to driver alcohol use are started to decrease and in the year 2013 it is minimum. So number of casualty rates are decreased due to alcohol use in recent decades. In the case of non-suspected alcohol use of drivers the same results are found. It is maximum in the year 2003

and started to decrease from the year 2005 and it is minimum in 2013.So proper checking of driver's medical condition is required.

3.2 Different factors that affect drivers

3.2.1 According to time periods

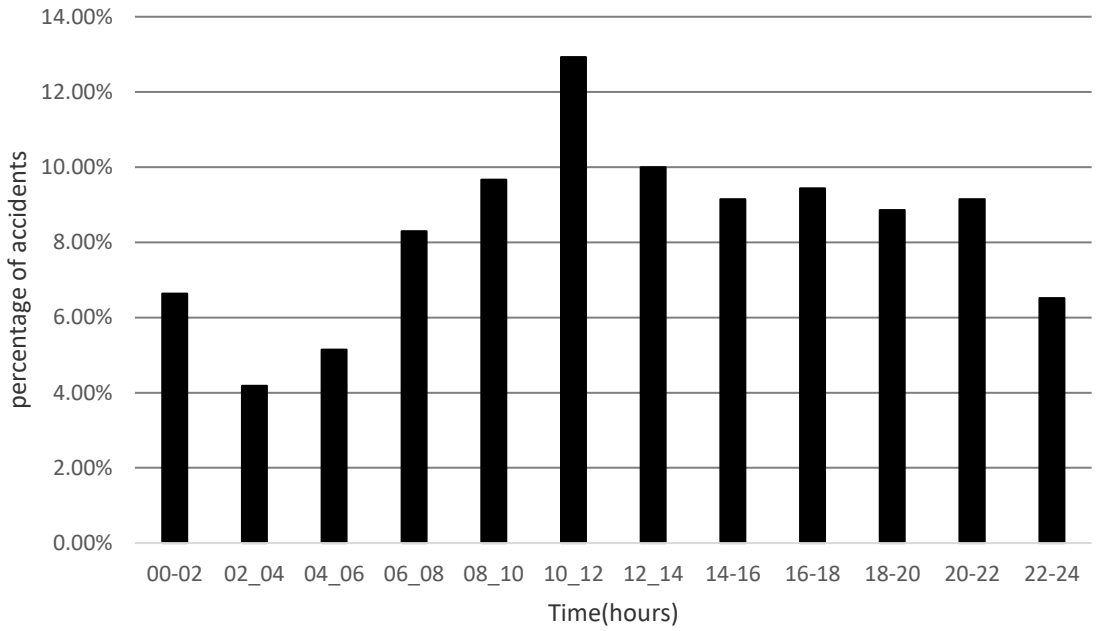

Figure 4: Percentage of accidents by time of day. (2013)

Figure-4 shows, hourly distribution of accidents which represents hour of accidents as abscissa and percentage of accidents as ordinate. From figure-4 it is seen that, from 10a.m. to 12p.m. the percentage of accidents is 13% which is maximum and it is the peak value of accidents. It also observed that, from 12a.m. to 6a.m. the accident rate is minimum. In day time from 6a.m. to 6p.m. the percentage of accidents is more than night time. So day time is peak time for accidents. Time was represented as local time. Mainly people leaves their home during day time to fulfill their needs that's why accidents rate is more in day time.

3.2.2 According to road surface type

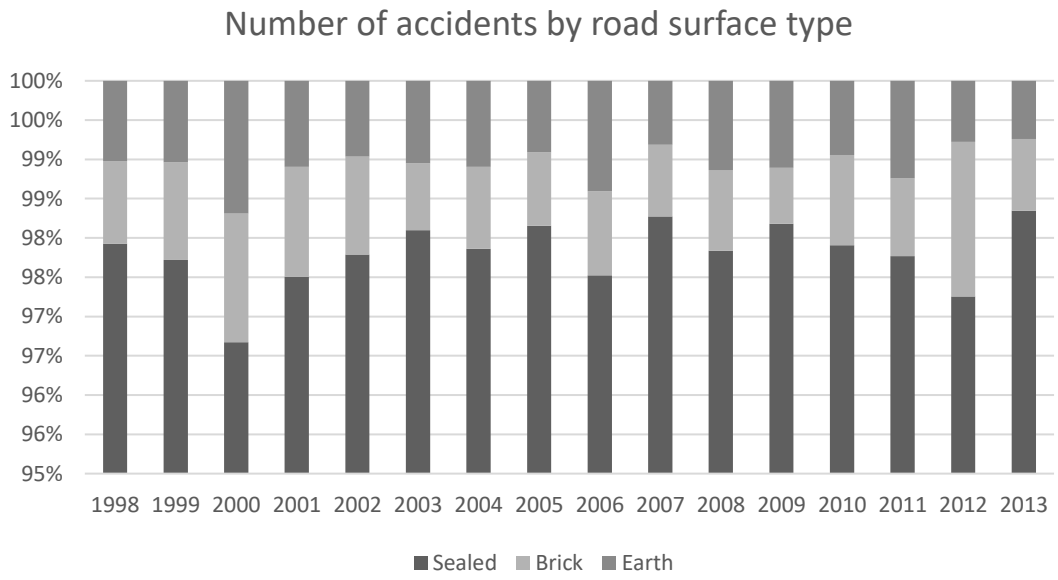

Figure 5: Accidents trend analysis according to road surface type.

Figure 5 shows, yearly distribution of accidents according to road surface type, year of accidents as abscissa and percentage of accident as ordinate. From figure-5 it is observed that, from the year 1998-2013 the accidents rates is more in bituminus road than brick road and earth type road surface. So drivers are involved in more road accidents in sealed roads. In year 2013, the percentage of accidents is maximum in sealed roads and minimum in year 2000. From figure-5 it also seen that, the accidents rates in earth surface roads are decreased in last few decades and increased in brick surface roads. From “Roads and Highway Department of Bangladesh” it is found that total length of the paved road in Bangladesh is 17353.69km whereas total length of earth road is only 684.51km and unpaved road is 636.06km. The vehicle operation is easy in bituminus road than brick and earth road. So vehicle speed is found more in sealed road than brick road & earth road. So it is seen that because of more length & ease of vehicle operation the accident rate is more in sealed road than brick & earth road.

3.2.3. According to Traffic control system

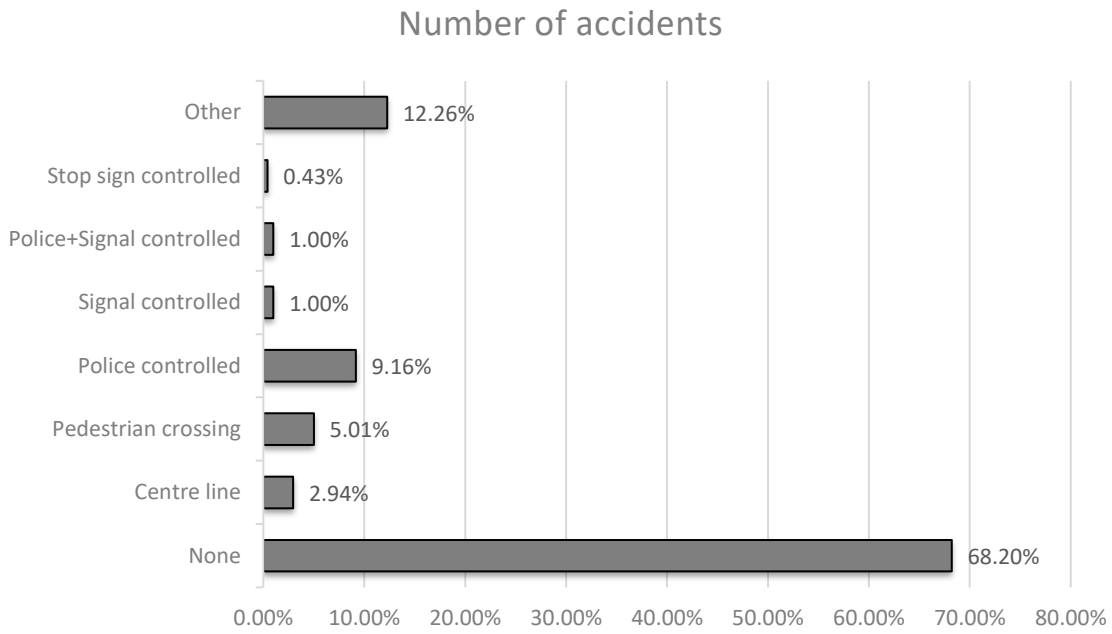

Figure 6: Accidents rate according to traffic control system (2013)

From figure-6, the bar diagram of accidents rate in year 2013 according to traffic control system, it is observed that, 68.20% accidents were occurred due to the absence of traffic control system. Rest of 31.80% accidents were occurred at the present of traffic control systems. According to modal analysis, 5.10% accidents were occurred at pedestrian crossing and 9.16% accidents were occurred in spite of presence of police control system. 2.94% accidents occurred at center line, 1% at signal controlled, 1% at police and signal controlled, 0.43% at stop sign controlled and 12.26% accidents occurred at other control systems.

3.2.4. According to Junction type

Figure-7 shows a bar diagram of number of accidents by junction type. From the analysis from collected data it is seen that 73% accidents were taken place in the absence of junctions. Rest of 27% accidents were taken place in the presence of junctions. 5.28% accidents were taken place at cross junction, 8.18% accidents were taken place at T-junction, 1.15% at staggered, 1.23% at roundabout, 0.27% at rail crossing and 11.33% accidents were taken place at other junction types. So minimum accidents rate is at rail crossing.

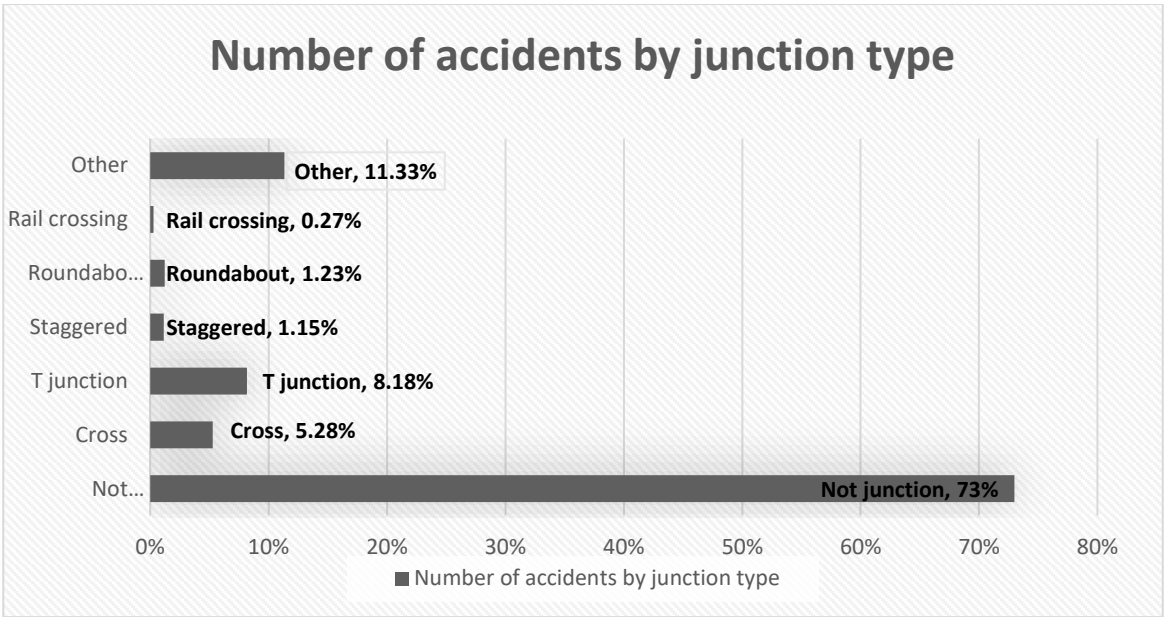

Figure 7: Accidents analysis according to junction type (1998-2013); Source: ARC(BUET)

3.2.5. According to contributory factor

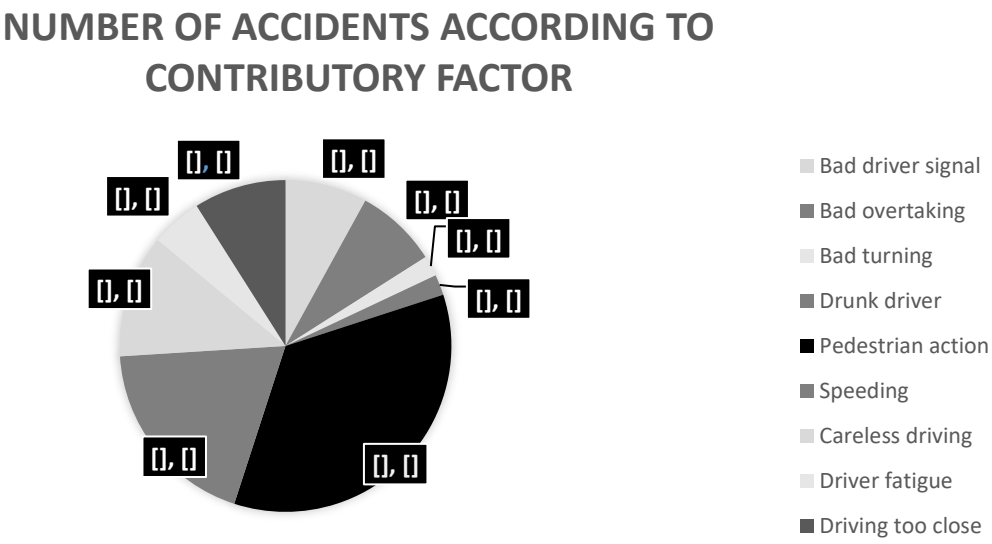

Figure 8:Rate of accidents according to contributory factor (1998-2013)

Figure 8 shows modal distribution of number of accidents according to contributory factors. From the analysis it is seen that, 35% accidents were taken place because of pedestrian action which is huge number. 19% accidents were occurred due to over speeding of drivers. Beside these 12% accidents were occurred due to careless driving, 5% due to driver fatigue, 9% due to driving too close, 8% due to bad driver signal, 8% due to bad overtaking, 2% due to bad turning and 2% due to drunk driver. So accidents mainly occurs due to careless movement of pedestrians. The analysis was done from collected accidents data from 1998 to 2013.

3.2.6. According to vehicle type

Figure-9 shows a graph of casualty class as abscissa and number of casualties as ordinate. From Figure-9 it is observed that pedestrians are involved in maximum number of accidents. Among motorized vehicles mainly motorcycles and buses are involved in maximum number of accidents. Cars, jeeps, micro buses and cycles are less responsible for accidents. From the figure-9 it also seen that, fatality rate is more than grievous rate in accidents occurred by all type of casualty class.

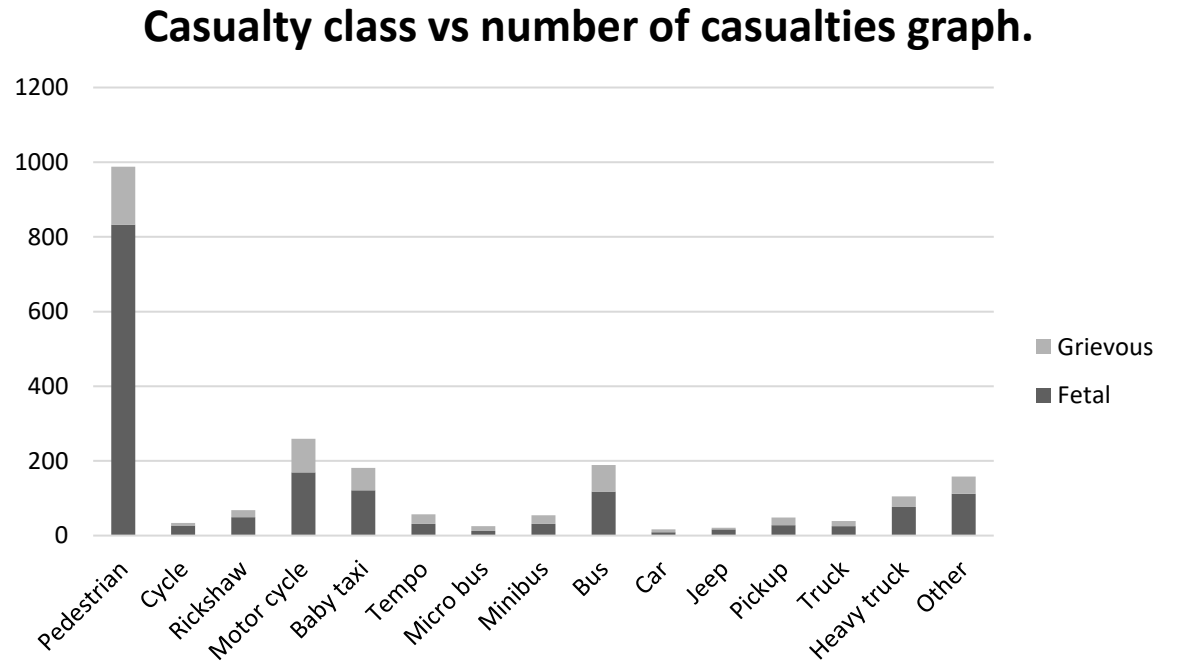

Figure 9: Number of casualties according to casualty class (2013)

3.2.7. According to training of driver

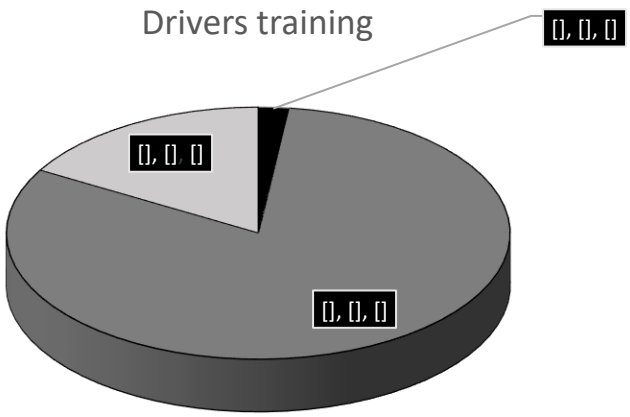

Figure 10: percentage of driving training of drivers

Figure-10 shows a modal analysis of present situation of driver's driving knowledge. It is seen that 81.40% drivers in Bangladesh does not have any formal learning about driving.

Only 2% has formal training of driving and proper knowledge about driving. Rest of 16.70% drivers have both formal training and informal learning. So this 16.70% does not complete their proper training. So the numbers of non-trained drivers are more.

4. RESULTS & DISCUSSION

Results obtained from the study can be summarized as follows:

- From the available data it has been observed that the ages of drivers' ranges between 21 to 40 are mainly involved in accidents.
- The number of accidents due to alcohol use of driver's both suspected and not suspected is maximum in year 2003 and it is decreased in last few years.
- Accidents mainly take place in sealed surface roads because its length is more than other types of road & high speed of vehicles.
- It is observed from the study that 68.20% accidents take place in the absence of control systems.
- From the analysis it is observed that 73% accidents occurred due to absence of junctions.
- Pedestrian action (35%) is the main contributory factor which causes maximum number of accidents.
- It is also observed from the study that motor cycles and buses are involved more accidents than other type of casualty classes.
- From the available data it is observed that 81.40% drivers in Bangladesh does not have any formal learning of driving. These drivers are mainly responsible for accidents.

CONCLUSIONS

From the above analysis it is observed that accident is mainly occurs due to age of drivers, alcohol use of drivers, not wearing helmet & seatbelt, high speed in sealed surface road, absence of vehicle control system, absence of junctions, lack of driver's proper licensing & formal training. It is also observed that motor cycles & buses are the main culprit for accidents. The accidents rate can be decreased by proper licensing & training of driver, adequate control system & presence of junction, strict law to regulate traffic rules, controlling pedestrian movements.

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