TRAFFIC ACCIDENTS INFORMATION EXPLORATION TO IDENTIFY THE CAUSES OF TRAFFIC ACCIDENT: A STUDY ON JOYDEBPUR-JAMUNA BRIDGE CORRIDOR

Dilip Goswami*[1], Md. Manjur Morshed[2]

[1] *Graduate Student, Khulna University of Engineering & Technology (KUET), Bangladesh, e-mail: gshubro@yahoo.com*
[2] *Assistant Professor, Khulna University of Engineering & Technology (KUET), Bangladesh, e-mail: manjurmorshedkhan.gmail.com*

ABSTRACT

Traffic accident is a manmade disaster for Bangladesh. Dhaka-Joydebpur highway corridor, about 84 km in length, is one of most disaster prone areas in Bangladesh. The objective of this study is to find out the root causes of traffic accident, thus the environmental, behavioral and operational deficiencies of the highway. The highway corridor passes through Gazipur and Tangail district. To collect information on road accidents, 313 Accident Report Forms (ARF) from July 2009 to June 2014 were collected form Gazipur and Tangail Superintendent of Police (SP) office. The ARFs contain accident information about month, year, accident type, weather, vehicle classification, casualties, fatalities, geometric location of the accident and so on. The result of the research shows that 31.62% of accidents involved pedestrians with a fatality rate of 92.08%. The lack of pedestrian facilities is the prime cause of such fatalities. Most of the accidents(about 72%), took place on the rural part of the highway corridor. At the same time, rough driving constituted 62% accidents. The conclusion of this study is that traffic accident could be significantly downsized by improving a few geometric section of the highway and by applying strict regulations on driving.

Keywords: *Accident Report Form (ARF), Highway, Traffic, Accidents, Bangladesh*

1. INTRODUCTION

Road accident is one of the major socio-economic problems of Bangladesh, about 1.24 million people die because of road crashes all over the world. About 1064 fatalities are occurred per 100,000 motor vehicles in Bangladesh (WHO, 2013). Traffic accident takes a serious problem, approximately 4500 road accidents occurs in Bangladesh as reported by the police in each year . Most of the highway accidents are concentrated at a very few locations (Hoque, 2011). According to World Bank (WB), 12000 peoples die by road accident every year, which means, roads in Bangladesh are virtual death traps (ProthomAlo, 2014). Annual cost of road accidents and injuries varies between 1.8 to 2.8 % of national GDP in Bangladesh (Mazharul, 2008). About 42% of fatal road accidents are occurred on national highways (Rahman, 2006).

Joydebpur-Jamuna Bridge approach highway play an important role in road transportation of Bangladesh. Dhaka the capital of Bangladesh is connected with northwest and southwest parts of Bangladesh through this highway. Daily traffic volume of the highway corridor varies from 10000 to 12000, but more than 24000 vehicles moves through the corridor during Eid time. Although this highway corridor plays a vital role in socio-economic development; at the same time abnormal accidents occurs on the highway corridor. About 1127 casualties occurred due to road crashes on this highway corridor that are concentrated in some specific sections in last 5 years. So it very important to find out the root causes of traffic accident with its environmental, behavioral and operational deficiencies to take proper counterstrike against the abnormal nature of accidents for the improvement of road safety program. The objective of this study is to find out the root causes of traffic accident, thus the environmental, behavioral and operational deficiencies of the highway.

2. METHODOLOGY

The study location is starting from Joydebpur Jagroto Chowrasta to Jamuna Bridge weight station, about 84 km. along Dhaka-Tangail highway corridor. Accident Report Forms (ARF) for the period of July 2009 to June 2014 were collected from the Superintendent of Police (SP) office of Gazipur and Tangail district. This study primarily concerned with analysis of accident data in the view of road environment, road users and vehicles frontiers towards road crashes characteristics prevailing at the corridor for selected analysis period. Field survey

and focus group discussion were carried out to find out the particular road's environmental, operational and behavioural deficiencies of the study area.

3. ANALYSIS AND FINDINGS

Road and Vehicle Perspective Analysis part deals with the patterns and characteristics of road accident of Joydebpur to Jamuna Bridge approach highway throughout the study period from July 2009 to June 2014.

3.1 Road Environment and Vehicle Perspective

3.1.1 Accident by Road Features and Times

Most of the accident occurred in general section of highway which constitutes 82.10% of total accident. Bridge section of highway constitute 8.31% road crashes. Build up area along side of highway interfere in normal vehicle flowing, in which constitute 6.07% traffic accidents. 1.92% accident are occurred in culvert side of highway and 1.6% accident occurred in speed breakers.

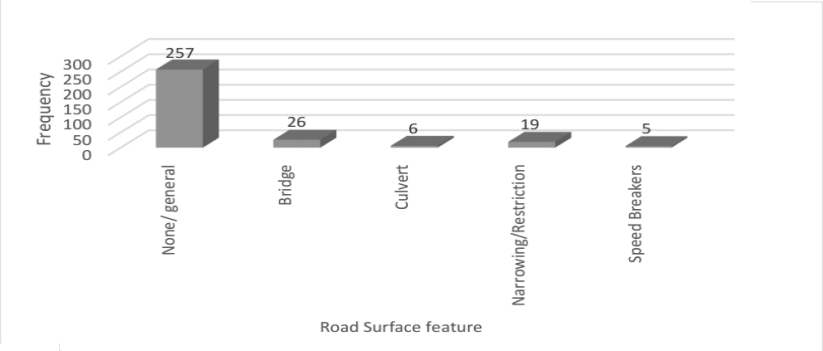

Figure 1: Accident by Road Features

About 11.50% accidents are occurred at 0 to 4 am and 24.61% accidents occurred at 4 to 8 am, at midnight and early in the morning. At mid night traffic control system is not so active to control traffic and early in the morning most of the garments, bazars and build up areas are started their activity.

3.1.2 Accident by Various Junction and Collision Type

Majority of the road crashes occurred in non-junction segments of highway, about 53.63% of total crashes. 27.8% accident concentrated on other type of junction which is not pointed out in the ARF. 7.98% crashes concentrated in T-junction type segment of the highway. Crashes are comparatively less in cross, rail crossing, roundabout, staggered section of the highway. The primary reason for high accidents in no junction road section is mostly due to the high speed of the vehicle – mostly, inter-regional buses – which cannot stop immediately.

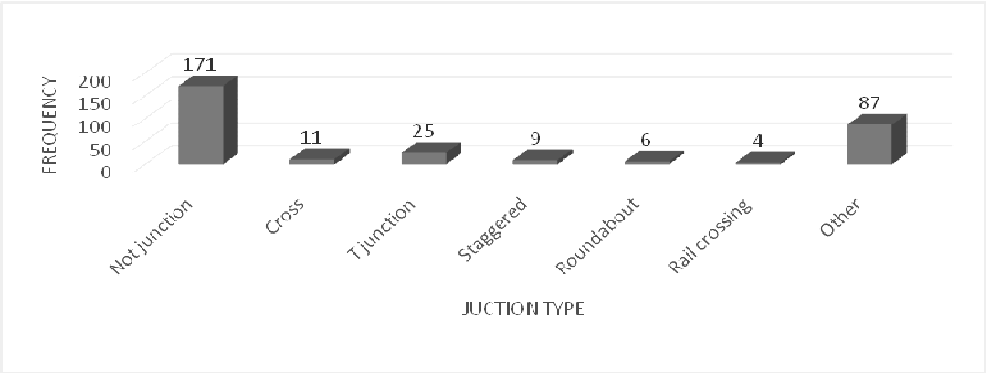

Figure 2: Accident by Various Junction Type

Rail crossings over the highway are mainly protected by safety features. Traffic system on major crossing of the highway are controlled by traffic police which play a big role to reduce accidents. Pedestrians are most vulnerable road user of the study area, which constitutes 31.62%. Head on type collision constitute 27.47% and side swipe type collision occurred 9.58%.

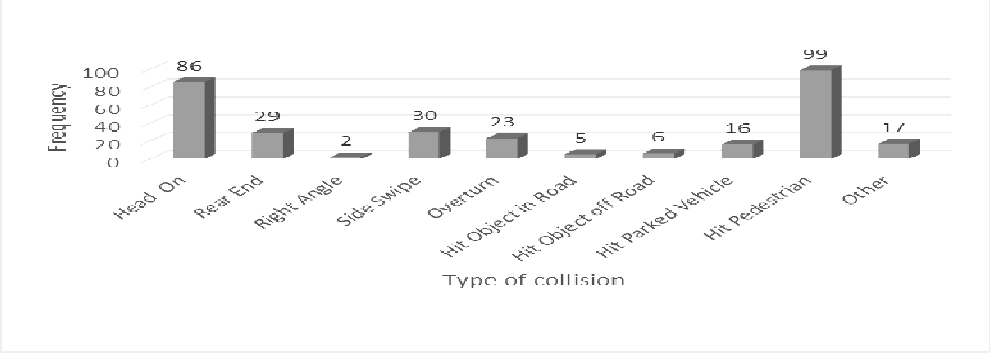

Figure 3: Accident by Various Collision Type

3.1.3 Type of Location and Lighting Condition

Traffic control system is not available in rural part of highway, which is responsible for road crashes are highly concentrated in there. Unwanted slow moving vehicles like three wheelers, tempu, auto rickshaw, CNG etc. are used in rural section of highway and high speed vehicle need to overtake them, so there is highly possibility to occurred road accident. Result shows that 72% accident occurred in rural part of highway. 28% accident occurred in town segment of highway. Duringt majority of the road crashes are occurred in this time about 55.27% of the total. 19.49% accident occurred in dawn and dusk. Dark road section of highway constitute 17.25% accident. Lighting section of highway covered 7.99% accident.

3.1.4 Accident by Road Surface Quality and Road Surface Condition

Good road surface constitute the most number of accident about 90.73%, where driver would like to drive in high speed. Where surface quality is bad driver need to drive slowly and carefully resulting in low accident rate is reduced there. About 7.67% accident occurred in rough surface of highway and 1.6% accident occurred during repairing situation.Careless driving ad high speeding are main cause of accident. When road surface condition are dried there is a tendency to increase the acceleration rate of vehicle. Dry surface condition constitute 87.22% accident, wet condition constitute 11.50% accident.

3.1.5 Accident by Vehicle Type

Total 492 vehicles involved in crashes last five year in Joydevpur to Jamuna Bridge approach highway. Most of the crashes occurred by the inter-regional buses, more frequent than any other mode of transports,which covered 27.23% of total vehicle involvement in crashes. Overtaking tendency among local buses is the major cause of those accidents.

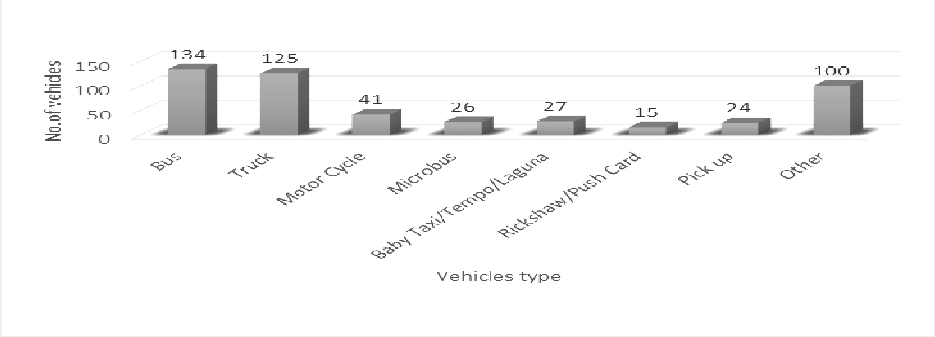

Figure 4: Accident by Vehicle Type

Sometimes local buses are not willing to provide enough side for high-speed vehicles when they come to nearer place of any bus stop. About 25.41% vehicle involvement in crashes covered by truck. About 51.44% crashes are occurred between two vehicles, single vehicle involved in 46% crashes.

3.2 Road User's and Operational Perspective

The road user can be considered as pedestrian, passenger and driver. Viewing road crashes through user perspective to identify operational and behavioral deficiencies on the highway corridor.

3.2.1 Casualty Breakup

Last 5 years, 1127 casualties are occurred by traffic accidents on Joydebpur-Jamuna Bridge approach highway corridor in which 75.33% passengers, 12.34% pedestrians and 12.33% driver casualties take place there. Passenger fatality rate is 23.33% of the total casualties, passenger grievous injury more than other casualties about 38.39% and simple injury is 36.98%. Normal collision injury is reported by Police very rarely and it about 1.30%. Pedestrians are the most vulnerable highway user. Pedestrian fatality rate far more than other severity level and it is about 92.08%.

3.2.2 Contributory Factor of Accident

Possible causes of accident and operational deficiencies are find out through this analysis. Road crash is mainly occurred due to rough and tough driving. Careless driving constitute 62% accidents. Speeding is also high contributory factor to occurred accident about 19.8% and 9.6% road crashes occurred due to bad overtaking tendency. Bad driver signal contribute in 1.9% accidents.

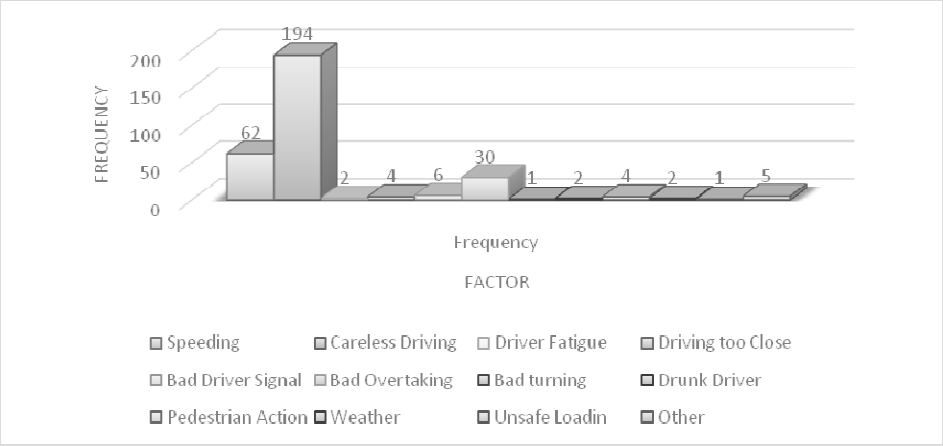

Figure 5: Contributory Factor of Accident

3.3 Road and Roadside Environmental Deficiencies

Deficient road geometry, defected shoulders or lack of proper shoulders, narrow and constricted lanes, bridge and culvert approaches, uncontrolled access of slow moving and non-motorized vehicles were the major contributing factors of highway accidents. Police reported accidentsdata shows, majority road crashes are occurred on good road surface but local people says that maximum times of the year the road surface remain rough. Traffic control and regulatory device, signs,markings were insufficient than necessary. Majority road sings and markings were removed from the road due to proper maintenance. Long ribbon development are built along with the highway which reduce the normal visibility and accessibilityinto the highway from access roads in Konabari, Mouchak, Safipur, Kaliakoir, Gorai, Mirzapur. Illegal use of roads and roadsides for shopping, trading, marketing, pilling, loading/unloading, parking activities make the highway accident prone. At bazar day, those places become more vulnerable for travelling when shoulders are covered for different illegal activitiesby local people which force road user's like pedestrians, vehicles for loading or unloading, parking activities to use the high speed carriage ways. Major roadside bazars alongside of the highways are placed at Konabari, Mouchak, PalliBidyut, Chandra, Saheb Bazar, Sutrapur and Board Ghar in Gazipur District and Gorai, Sohagpur, Mirzapur bypass, dholla, Pakulla, Natiapara, Elenga in Tangail District where at least two accidents are occurred during the study period.

3.4 Operational and Behavioral Deficiencies:

Careless driving, high speeding and bad overtaking are the root causes of traffic accidents. Long distance commercial vehicles are often conflicted with local low speed vehicles which come from access roads. Overtaking competition is increased among local and inter district like Dhaka- Tangail, Tangail- Gazipur etc. vehicles when they come onto nearer place of any bus stop or built up area for collecting new passengers from there which lead a great safety as well as operational hazard. Sometimes local buses would not like to give enough side to high commercial vehicles for passing them. Huge numbers of low speedy three wheelers, Laguna, microbus and non-motorized vehicles are present on highway which lead serious accidents because high speedy vehicles need to overtake them in regular basis to reach the destination in time. Most of the motor bikers would not like to keep helmet and other safety elements during riding which makes them one of the vulnerable road user. Local leaders are used the highway sections in their own way without following traffic rules and regulations for their car parking, loading or unloading which interfered in visibility and reduced road capacity. Unmarked signs, markings and lacking of other devices interfere drivers correct route selection and force for unsafe operation. Lack of proper traffic police forces is one of the major cause of traffic accidents because police on site force drivers and another road users to follow the traffic rules and regulations.

4. CONCLUSION

This study has made an attempt to find out the major causes of road accidents with its environmental, operational and behavioral deficiencies of Joydebpur to Jamuna Bridge approach highway in Bangladesh. According to the objective of the study, careless driving and high speeding are played big role in traffic accidents as well as operational deficiencies. About 7.67% accidents occurred due to the bad road geometry, defected or lack of shoulders, and lack of road markings, signs and pedestrian facilities (Field Survey, 2015; Goswami and Hasan, 2015). Uncontrolled access of slow moving and non-motorized vehicles makes the highway vulnerable. So proper installment and maintenance of highway infrastructures and strict traffic rules and regulations can improve road safety.

REFERENCES

Goswami, D and Hasan, M.S. (2015). Application of GIS Techniques to Analayze Highway Accident in Bangladesh. Undergraduate Thesis (unpublished), Department of Urban and Regional Planning, Khulna University of Engineering & Technology (KUET), Bangladesh.

Hoque M.M., Mahmud S.M.S**,** Sarker A. (2011). Identifications and investigations of hazardous road locations on Dhaka Aricha Highway. Accessed http://iebconferences.info/341.pdf

ProthomAlo. (2014) Govt. is responsible for road accident not only driver' publish on October 26, 2014. Accessed http:www.prothom-alo.com/opinion/article/353842

Rahman, M. F., Hoque, M.M., Ashrafuzzaman, M. and Sarkar, S. (2006). Observational Studies of Hazardous Road Locations on National Highways in Bangladesh. Published on: 22nd ARRB Conference, Australia, 2 November 2006**.** Accessed http://trid.trb.org/view.aspx?id=805897

WHO, ed. (2013). Global Status Report on Road Safety 2013: supporting a decade of action, Accessed http://www.who.int/iris/bitstream/10665/78256/1/9789241564564_eng.pdf