

# IMPACT OF ROADWAY CONDITION, TRAFFIC AND MANMADE FEATURES ON ROAD SAFETY

Hemant Gulati<sup>1</sup>, Er. Neeraj Kumar<sup>2</sup>

<sup>1</sup>M-Tech Scholar, Civil Engineering Deptt; SRMIET, Bhurewala, Ambala, Haryana, India.

<sup>2</sup>Assistant Professor, Civil Engineering Deptt; SRMIET, Bhurewala, Ambala, Haryana, India.

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**Abstract** – Road safety is a multi-sectorial and multi-dimensional subject. It includes orderly development and management of roads, provision of safer vehicles, and a comprehensive response to accidents. It relies on modern traffic management systems and practices, improved safety standards in design, construction, operation and maintenance of roads, and production and maintenance of safer vehicles. Owing to unsafe conditions on roads, the rate of accidents in India has been high. According to WHO statistics for 2002, out of about 11.8 lakh road accident deaths across the world, 84,674 deaths were reported from India alone. This paper summarizes the various studies which have been carried out to fulfill the requirement i.e. to make the road more safe and smooth for road user.

**Key Words:** Roadway condition, Traffic, Manmade features, Road safety.

## 1. INTRODUCTION

India is a developing country and safety of roads is still in a premature stage. Accident severity is increasing due to increasing in vehicle population. Accident leads to disablement, death, damage to health and property, social suffering etc. The road accident situation in India is alarming. Records show that there is one death at every 4 minutes because of road accidents. The high accident rate is largely attributed to the inadequacy of the highways to meet the traffic demands, road user behavior, vehicle defects, poor road geometrics and weathering conditions. Road accidents inflict heavy economic loss to the country. Road Safety is necessary to reduce accident involving both human and vehicles there by making the road more safe and user friendly to traffic.

Area selected for the proposed study will be “Ambala Chandigarh Expressway”. This express way is a four-lane highway having the length of 35 km and high traffic density passage of Ambala-Chandigarh section (km 5.735 to km 39.960 on NH-22 and 0 km to 871 km on NH 21) on BOT basis. This expressway was constructed by the GMR Group at a cost of ₹2.98billion. The expressway has been operational since December 2009. The map of Ambala-Chandigarh Expressway is shown below.

Road safety is one of the most important problems in our society. Every year 1.24 million of people are killed and

between 20 to 50 million people are injured in road accidents. If the current trends of road accidents continue then it will be predicting to be third leading contributor to the global burden of diseases and injury by 2020.



To minimize the number of crashes by any kind and severity expected to occur on the entity during a specific period is known as road safety. Accidents and the fatalities on road are the result of inter-play of a number of factors. Road users in India are various in nature, ranging from pedestrians, animal-driven carts, bi-cycles, rickshaws, hand carts and tractor trolleys, to various categories of two/three wheelers, motor cars, buses, trucks, and multi-axle commercial vehicles etc. The vehicle population has been gradually increasing because of change in the style of living of people. Increase in vehicle population with limited road space used by a large variety of vehicles has heightened the need and urgency for a well thought-out policy on the issue of road safety. In India the rate of accident is directly proportional to growth of vehicle population.

Road accidents are a human tragedy, which involve high human suffering. They impose a huge socio-economic cost in terms of untimely deaths, injuries and loss of potential income. The ramifications of road accidents can be colossal and its negative impact is felt not only on individuals, their health and welfare, but also on the economy. Consequently, road safety has become an issue of national concern. Road Safety is a multi-sectorial and multi-dimensional issue. It

incorporates the development and management of road infrastructure, provision of safer vehicles, legislation and law enforcement, mobility planning, provision of health and hospital services, child safety, urban land use planning etc.

## LITERATURE REVIEW

Many factors may exhibit a measurable influence on driving behavior and traffic safety on highways. These include:-

- 1) Human factors such as improper judgment of road ahead, driving under the influence of alcohol or drugs, driving education and experience & age.
- 2) Traffic factors like speed, volume, density, capacity, traffic mix and variation.
- 3) Vehicle deficiencies such as defective brake, headlight, tyres, steering and vehicle condition
- 4) Road condition like slippery or skidding road surface, ravel, pot hole, ruts etc.
- 5) Road design such as inadequate sight distances, shoulder width, number of lanes, improper curve design, improper lighting and traffic control devices.
- 6) Weather condition like fog, heavy rainfall, dust, snow etc.
- 7) Other causes such as enforcement, incorrect sign and signals, service stations, badly located advertisements, stray animals etc.

Hiselius (2004) studied the accident frequency and homogeneous flow of vehicle. It was found that the accident rate decreases when the traffic flow is homogenous in nature. For Lorries there was an decrease in no of accident and for car the accident rate was constant.

Tornros and Boiling (2005) conducted an experiment with 48 drivers by covering a distance of 15 Km on a two-lane road. They concluded that driving performance reduced by dialing hand held phone and speed decreased with hands free phone. Reaction time to warning sign at road side decreased for hand held phone user.

Aarts and Schagen (2006) studied relationship between speed and risk of a crash. The conclusion was when speed increases crash increases.

Hassan and Aty (2012) studied about 680 young driver behavior involvement in traffic crash in Florida. The result revealed that aggressive violation, in-vehicle distraction and demographic characteristics were the significant

factors affecting young drivers involvement in crashes at the age of 16-17. In-vehicle distraction, attitude towards speeding and demographic characteristics were the significant factors effect young drivers crash risk at the age of 18-24.

Bamzai et al., (2012) investigated into safety impacts of highway shoulder attributes in Illinois. Data were analyzed to establish correlation between shoulder related crashes by type and severity category.

Somchainuek et al., (2013) investigated road side safety on Thai NH. The result showed that speeding vehicles were involved in roadside crashes accounted for about 70% of the total crashes and 30% of road side crashes were due to road side trees.

## Objectives of the Proposed work

The objectives of the work would be:

- To study the annual, monthly, daily and hourly variation in accident rate on selected road Ambala-Chandigarh section- (km 5.735 to km 39.960 on NH-22 and 0 km to .871 km on NH 21).
- To study the effect of traffic volume, and road capacity on accident rate.
- To study the maintenance of road surface and shoulder w.r.t. road accidents.
- To develop an accident prediction model based on annual average daily traffic, road condition, road side features.

## CONCLUSION

The available literatures on accident analysis indicate that 75 percent of road accidents in India are caused due to driver's error.

Heavy vehicles like truck are involved in maximum no of accident on two-lane roads. It is estimated that fatalities caused by truck is 60 % followed by other (25%) and bike (8%) and jeep (4%) and bus (3%). Road safety awareness should be raised among road user.

## FUTURE SCOPE

Road safety can be improved by developing accident prediction model based on annual average daily traffic, roadway

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