Identification and Improvement of Highway Accident Causes and Safety Management Strategies

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Abstract
The rapid population growth and increasing economic activities have resulted in the tremendous growth of motor vehicle. This is one of the primary factors responsible for road accident on National Highways in India. The increasing number of road accidents is imposing considerable social and economic burdens on the victims and various direct and indirect costs. Road accidents are essentially caused by improper interactions between vehicles, other road user and or roadway features. In this study, a survey was carried for the accidents due to drunken, over speeding, vehicle out of control, fault of driver of motor vehicle/driver of other vehicle/cyclist/passenger, defect in condition of motor vehicle/road condition, other from the highway Allahabad to Handia from the year 2009-2013. In this study, an attempt has been made to identify and minimise the accident causes and their safety management strategies is provided.

Keywords: Road accidents, national highways, over speeding, safety management strategies.

Introduction
India’s road network consist of 70,550 km National Highways (NHs) including 200 km of expressway, 1,28,000 km of State Highways, 4,70,000 km of Major District Road and 2,650,000 km of Village and other Roads. Though the length of NHs is about 2% of the total road length, they carry as high as 40% of the total traffic. About 32% of NHs have single/intermediate lane, 56% of the NHs have double lane and only 12% have four or more lanes. The NHs is thus, the most important carrier of passenger and freight traffic in the country. India has a road network of over 3.4 million km of roadway, making it the 2nd largest road network in the world. At 0.66 km of highway per square km of land, the density of India’s highway network than that of the united states (0.65) and far higher than that of china’s (0.16) or Brazil’s (0.20) (Ghamdi, 2003).

The problem of death and injuries as a result of road accident is now acknowledged to be a global phenomenon. The authorities in all countries of the world feel concerned about the growth in the name of people killed and seriously injured on their roads. Each year 1.2 million men, women and children around the world lose their lives as a result of road traffic collisions (Downing et al., 1991). Safety scenario on Indian Roads is very poor. Between 1970 and 2009, the number of the accidents increased by 4.3 times with more than 7 fold increase in injuries about 8.7 times increase in fatalities in the backdrop of about 64 fold increase in the number registered motor vehicles and threefold increase in road network.

The magnitude of road accident and fatalities in India is alarming. This is evident from the fact that every hour there are about 56 accidents (about one accident every min). Similarly, every hour, more than 14 deaths occur due to road accidents. In 2009, 1,25,660 fatalities take place making it to 345 fatalities daily and around 1 every 4.2 min (Rajaraman, 2009). Keeping this in mind, this study has been carried out so as to suggest some safety management strategies to minimise these accidents to some extent.

Materials and methods
Collection of data: Collection of data is based on the survey of the accident occurs due to drunken, over speeding, vehicle out of control, fault of driver of motor vehicle/driver of other vehicle/cyclist/passenger, defect in condition of motor vehicle/road condition, other from the highway Allahabad to Handia from the year 2009-2013.

Results and discussion
The aim of this study is to create high level safety and awareness program so as to minimise the accident rate as far as possible (Chakraborty and Roy, 2005). Table 1 show the mean value of the accident occurs on highway projects. The values clearly indicate that the accidents occurs due to the over speeding and vehicle out of control. Therefore, there is an urgent need to look after the factors which causes more accidents on the highway construction projects. The factor which have low accident rate should not be taken lightly but it should also treat as same as the factors having high accident rate.
The main reason behind the high rate of accident for the above factors is obvious and low level of awareness and education.

**Conclusion**

From the above study, it is found that if proper attention and safety management strategies are not applied there will be higher accident rate and loss of life, property etc. As over speeding/driver’s fault is found to be the main reason for most of accidents (87-88%) taking place on the road, effective speed regulation measures need to be taken on the road. The present speed limit of 90 kmph for cars and 65 kmph for heavy vehicles has not been revised since the time it was imposed about 10 year ago. It is seen that this speed limit is hardly being observed by vehicle for the stretches of the road passing through built up areas has been clearly and adequately indicated on the road (Margi et al., 2004). This results in high speed driving even through these stretches leading to more accident in these areas. It is suggested that:

1. Rational safe speed limits should be determined based upon 85th percentile sped of vehicles on the road.
2. These speed limits should be clearly and adequately indicated on the road.
3. Strict enforcement should be put in place and violators of speed limits should be punished by the enforcement agencies.
4. Drunken driving is one of the main reasons for rash and over speed driving. Steps like frequent breath analyzer test should be conducted to punish the drunken drivers.
5. It is seen that truck/canter/buses are found involved in maximum number of accidents (42%). Enforcement measures should especially focus on this group of vehicles to bring down their involvement in accident.
6. It is also observed from the study that in 35% of the fatal accidents, vulnerable roads users (2-wheelers driver, pedestrian and a cyclist) are killed. It is shown that there is an urgent need for segregation of valuable road users forms the other fast moving traffic on the road. For this purpose, it is suggested that the footpaths and separate cyclone lanes can be provided at least in such areas.
7. It is observed that accident increased tremendously after construction work for widening of 6-laning started in May, 2009. Field study of various sites of studied stretch indicated that proper safety measures have not been taken in the construction zones.

The safety measures include installing proper signs, markings, signals and other traffic control devices in the construction zone. A layout plan of signs and control devices for a typical road with a diversion as recommended by IRC-SP-55 have been followed which is one of the main reasons for increase in number of accidents after start of construction of widening project (Wootton and Jacobs, 1996). It is suggested that these safety measures in the construction zones can be immediately put in phase.

**References**