

# Analysis of Road Accidents on a Selected Stretch of NH-1

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**Abstract :** The paper brings forth the results of an accident study conducted on a selected stretch of NH-1 (Delhi-Ambala-Amritsar Road). The road accident data of four years of about 50 km long stretch of the road between RD 98 km to 148 km were analyzed to determine various characteristics of road accidents taking place on the road. The period of accident data from 2007 to 2010 includes the period when widening of the road from 4-lane to 6-lane had started. The study, therefore, also evaluates the impact of widening project on road accidents. To study the accident characteristics, the selected stretch was divided into smaller segments of approximately 5 km each. The characteristics of road accidents presented in the paper include their total number, cause of accidents, nature of accidents and type of injury, type of vehicles involved and time of accidents. The study shows that accidents increased tremendously on the road after the start of the widening project. The day time accidents are found to be more than night time accidents on all segments of the selected road.

**Keywords:** Road Accidents; National Highway; Black spots, Accident Prone Location.

## 1. INTRODUCTION

The rapid population growth and increasing economic activities have resulted in tremendous growth of motor vehicles. This is one of the primary factors responsible for road accidents on National Highways in India. Road accidents are essentially caused by improper interaction between vehicles and other road users and/or roadway features. Road traffic injuries account for 2.1% of global mortality. The developing countries bear a large share of burden and account for about 85% of the deaths as a result of road traffic crashes [1]. The problem of deaths and injuries as a result of road accidents is now acknowledged to be a global phenomenon. The authorities in all countries of the world feel concerned about the growth in the number 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. In India the magnitude of road accidents and fatalities is alarming. This is evident from the fact that every hour there are about 56 accidents (about one accident every minute). Similarly, every hour more than 14 deaths occur due to road accidents. In 2009, 1, 25,660 fatalities take place making it 345 fatalities daily and around 1 every 4.2 minute [2]. There is a great need to take up measures that can help improve road safety in the country. As NHs are responsible for causing about 40% of fatalities on Indian roads, the present study has been undertaken to analyze the road accident Stretch wise on RD-98-148km of NH-1.

## 2. METHODOLOGY OF STUDY

The present study is conducted on a selected stretch of NH-1 between RD-98 to RD-148 to analyze the various characteristics of road accidents taking place on the road. The accident data is collected for four years from 2007 to 2010 from National Highway Authority of India (NHAI) and SOMA Isolux. NHAI is associated with maintenance and construction of NHs in the country. The SOMA Isolux construction company is presently engaged in widening project of NH-1 from Panipat to Jalandhar. The study also evaluates the impact of 6-laning widening project on road accidents which started in May, 2009. The accident data includes that data also. The accident data contain the information like date, time and location of accidents. The data also include type of accident (fatal / minor or serious injury), number of persons dead / injured, vehicles involved in accident, probable cause of accident and the jurisdiction of the police station. The characteristics of road accidents are analyzed by dividing the selected stretch into smaller segments of approximately 5 km each which helps in identifying the accident prone locations. Suitable measures have been suggested in the end for improving the accident prone locations.

## 3. ANALYSIS OF ROAD ACCIDENTS

The road accident characteristics studied in this study include their total number, cause of accidents, nature of

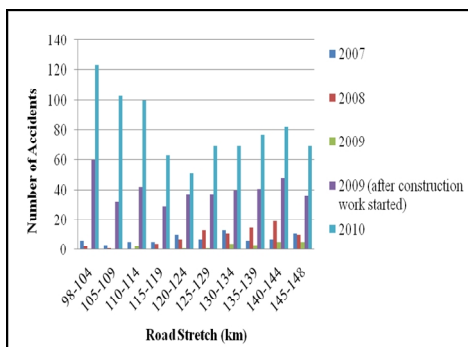
accidents and type of injury, type of vehicles involved and time of accidents. Accident tends to occur more frequently on some locations which are known as accident prone locations. To find the accident prone locations the data of the year 2007 to 2010 has been analyzed by dividing the selected stretch of NH-1 from 98 km to 148 km into smaller stretches of approximately 5 km each.

**3.1 Total Accidents**

The data of accidents is analyzed with reference to location of occurrence of accidents. Table 1 shows the total number of accidents per year that occurred during 2007-10. From table 1 it is clear that the number of accidents per year increased from 82 in 2008 before construction to 402 in 2009 and 806 in 2010. It is worth noticing that in 2009 construction work started in May only. From fig. 1 it is observed that maximum number of accidents take place between 98-104 km followed by 140-144 km and 109-114 km. It shows that construction activity has led to significant increase in accidents on the road which is clear in fig. 1. The increase in accidents can very well be attributed to non-compliance of safety measures in the construction zones and increased congestion on the road due to lesser carriageway available for the movement of traffic.

**Table 1 Total number of accidents during 2007-2010**

Year	Before Construction			After construction work started	
	2007	2008	2009	2009	2010
Total Number of Accidents	73	82	21	402	806

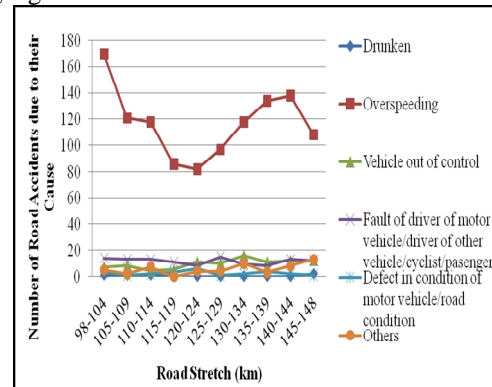


**Figure 1 Year wise total no. of accidents during 2007-10**

**3.2 According to cause of accident**

A road accident can occur due to many reasons, it can be due to over speeding, drunken driving, vehicle out of control, fault of driver of motor vehicle/ driver of other vehicle or the accident can take place due to defect in condition of motor vehicle/ road condition. It is clear from the fig. 2 that maximum accidents occur are due to over speeding on all locations and stretches 98-104 km and 140-144 km are more

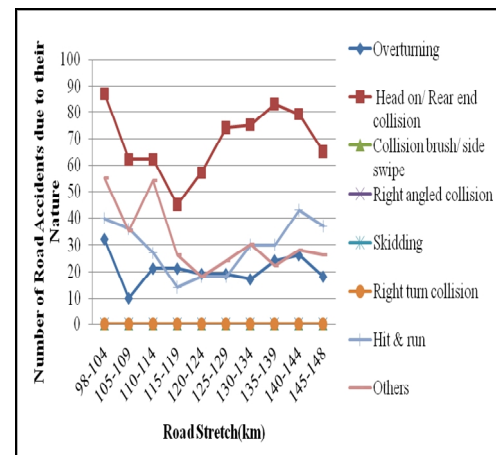
accident prone locations. The cause of accidents occurring on these locations frequently may be due to lack of markings and signage's on the road side.



**Figure 2 Road accidents due to their cause on road stretch (98-148km)**

**3.3 According to the nature of accident**

The nature of road accidents that occur on the road can be due to vehicle overturning, head on/ rear end collision, hit and run, right turn collision, right angled collision, brush/side swipe and skidding of vehicle etc. Fig. 3 depicts the nature or type of accident on different locations of the road. The figure clearly shows the above trend stretch wise also. Majority of accidents are head on/ rear end collision on all locations followed by others and then hit & run type. Stretches 98-104 km is again more accident prone location followed by stretch 135-139 km. It indicates human negligence and overspeeding as the main reason for the accidents.



**Figure 3 Road accidents due to their nature on road stretch (98-148km)**

**3.4 According to the type of injury**

Whenever a road accident occurs on the road, mainly four types of accidents are said to happen depending upon their severity of injury. Fig. 4 clearly shows that maximum numbers of fatal accidents occur on 135-139 km stretch making it more accident prone location. Maximum serious

injuries occur on last stretch of 145-148 km. Maximum numbers of minor and non serious injury accidents are on 98-104 km stretch. Fatal or serious injury type of accident occurs when a heavy vehicle collides with light vehicle or two vehicles have head on/ rear end collision at high speed.

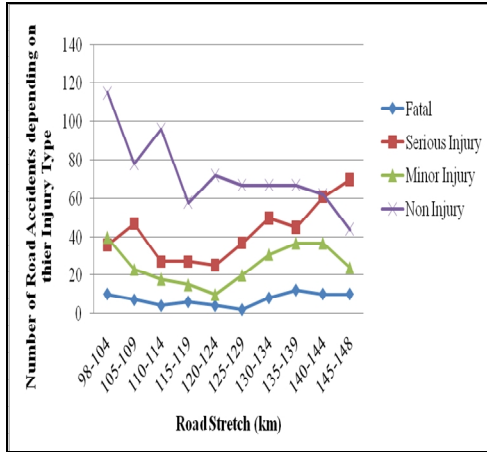


Figure 4 Road accidents according to injury type on road stretch (98-148km)

3.5 According to the type of vehicles involved in accident

The severity of accident depends upon the type of vehicle involved in the accident. It is observed from the fig. 5 that maximum numbers of trucks/canter/buses are involved in accidents followed by cars on almost all the locations except 110-114 km and 140-144 km where trucks exceed the cars. The number of car/jeep involved in accidents is more on the stretch 145-148 km.

The number of trucks involved in accidents is higher on stretch 98-104 km. 2-wheelers involved in accidents are more on stretch 145-148 km and 98-104 km. The reason of occurrence of these kinds of accidents is drivers tend to overtake slow vehicles on curves and diversions.

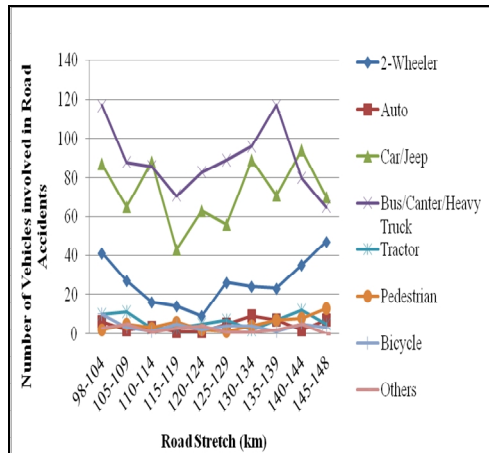


Figure 5 Vehicles involved in road accidents on road stretch (98-148km)

3.6 According to time of accident

The time period is divided into two categories; first one is from 6.00 a.m. to 6.00 p.m. as day time and second is from 6.00 p.m. to 6.00 a.m. as night time. It is clear from the fig. 6 that in day time accidents occur more on stretches 98-104 km and 140-144 km stretch and during night time more accident occurs on 98-104 km and 105-109 km stretch. It is observed that more accidents take place during day time than night time on all locations of the roads. This may be attributed to less number of cars and 2-wheelers during night. Though total number of PCU's remains almost the same during day and night, but total number of vehicles is less during night time.

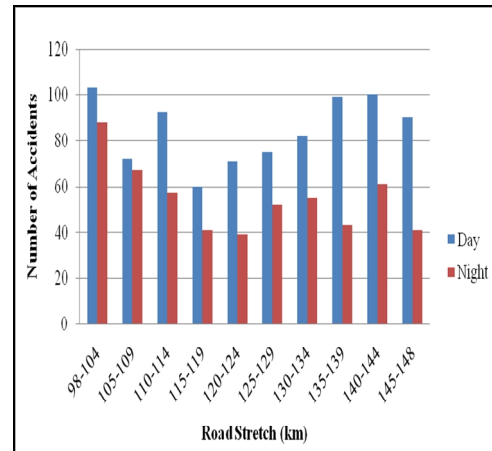


Figure 6 Stretchwise variation of road accidents during day and night

4. ACCIDENT PRONE LOCATION AND REMEDIAL MEASURES

Accident prone locations are identified by using the analysis done in previous section. It is observed from the above analysis that 98-104 km stretch is more accident prone location in almost all characteristic analysis followed by 140-144km and 110-114km.

Remedial Measures

In the light of above mentioned noticeable characteristics/causes of accidents and accident prone locations on studied stretch of the road the improvement measures have been suggested as under:

1. It is observed through analysis of collected road accident data that accident increased tremendously after construction work for widening of 6-laning started in May, 2009. The analysis of the studied stretch indicates 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. It is suggested that these safety measures in the construction zone is immediately followed.

2. Similar carriageway width should be adopted throughout the road section.
  3. Proper markings should be placed on both sides of the road.
  4. Strict enforcement should be put in place and violators of speed limits be punished by the enforcement agencies.
  5. Drunken driving is of the main reasons for rash and over speed driving. Steps like frequent breath analyzer test should be conducted to punish the drunken drivers.
2. There is a tremendous increase in road accidents due to widening project, so proper safety measures in the construction zone should be followed.
  3. The increase in accident can be due to increase in congestion on the road which reduces the carriageway available for the movement of traffic. So proper carriageway should be provided.
  4. More accident takes place during day time than in night time because of lesser number of 2-wheelers and cars.

## 5. ACKNOWLEDGEMENT

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## 6. CONCLUSIONS

The following conclusions drawn from the above analysis done in this study are:-

1. The road stretch 98-104km is more accident prone location in almost all characteristic analysis followed by 140-144km and 110-114 km.

## 7. REFERENCES

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- [2]. Sensarma Kuntal, Balani Nimmi, Rawat S S (2011), "Road Accidents in India, 2009", Government of India, Ministry of Road Transport and Highways Transport, New Delhi.