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Investigating Patterns of Traffic Collisions and Identifying the Root Causes of Injuries: A Research Analysis for Section of NH-I

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ABSTRACT: Interstates play crucial roles in the economic, cultural, and societal life of each given country. As the global population grows, so does the number of people using the world's roads, as well as the number of people killed or injured in traffic accidents. If there aren't enough roads, growing the country will be tough. It's tragic that so many lives are lost in road accidents every year in India. The investigation detailed in the dissertation will, throughout the course of its completion, lead to the reinforcement and development of incident-prone zones within the selected region of NH-1. The road event data for the 66-112 km long range between 2012 and 2018 was sent to the National Highway Accident Investigation Board (NHAI) and Soma Isolux, a company participating in the development of the NH-1 network. The information here is the result of a five-year data collection effort. The event is examined and evaluated to determine the many factors involved. It has been shown that speeding and other forms of irresponsible driving are a major factor in road deaths and injuries. Approximately 2% of fatalities are attributed to vehicle malfunctions or poor road conditions; 6% of fatalities are attributed to drivers who lose control of their vehicles; and 3% of fatalities are attributed to accidents brought on by external factors like bad weather. As far as we can tell, there is no difference between daytime and overnight injuries in terms of what causes them. There was insufficient evidence to determine which party was at blame in the accident, how fast the car was going, or if the driver had been drinking. The gathered data could not make an unequivocal distinction between the many potential causes of an accident. Nearly half of all accidents involve a frontal or rear-end collision. Nineteen percent of accidents and roughly fourteen percent of rollovers are caused by head-on and rear-end collisions. There is little difference between the daytime and nighttime occurrence rates. There is no statistically significant difference here. Nearly half (49%) of all injuries are of the "no wound" kind, while another 29% are of the "severe injury" variety, 17% are of the "moderate injury" variety, and 5% are the "catastrophic incident" variety. The incidents documented in the reports include both minor and major injuries. When comparing the potential for injury during the day and the nighttime, there is nothing to differentiate between the two. After tallying up the amount of injuries caused by each kind of vehicle involved in the accidents, researchers found that trucks, autos, and buses were to blame for the most (42%). After that came automobiles and jeeps (35 percent), then motorcycles (13%), and finally other vehicles (10 percent). Six percent of all unintentional injuries are caused by automobiles. The number of trucks, canters, and buses seems to increase as the night progresses. Groups of these automobiles are often seen on the road. Sixty-one percent of all injuries happen during the day, whereas just 39 percent of all injuries happen at night. In the latter hours of the night, there may be fewer vehicles on the road.

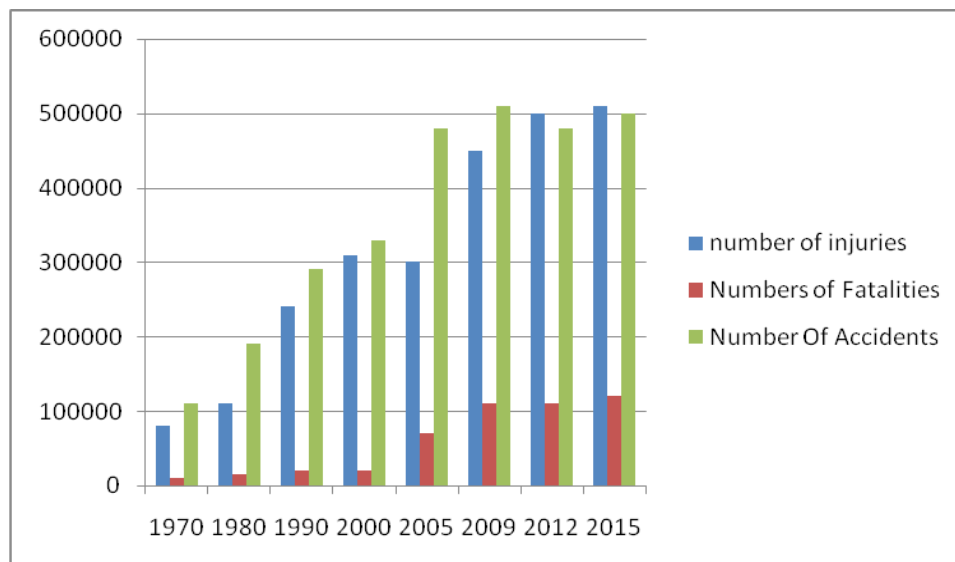
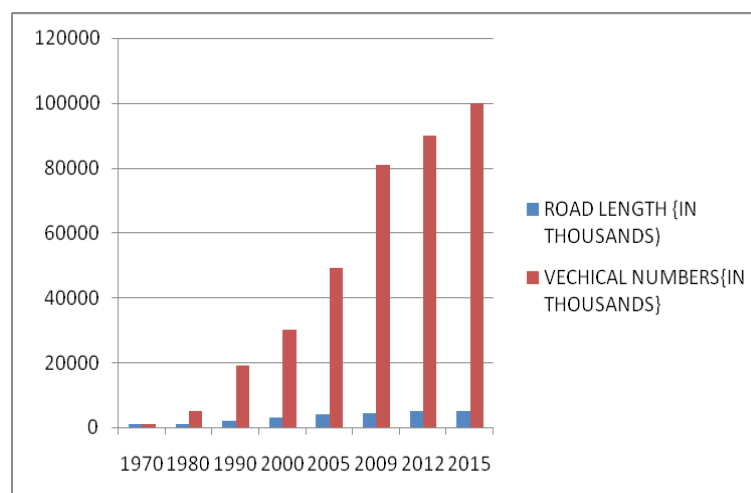
KEYWORDS: NH-1 Network, NHAI, Traffic Collisions, Transportation Systems

I. INTRODUCTION

The regulatory and security landscape in India is in a very poor state. Between 1970 and 2012, the number of fatalities climbed by 4.3 times, while the number of events increased by 7 times and by nearly the same amount. The number of registered motor vehicles has increased by 8.7 times, leading to an increase of almost 64 times in the number of accidents that have occurred, while the road network has tripled in size. The number of fatalities and injuries caused by automobile accidents in India is worrying. This is without a doubt the case given that each hour there are roughly 56 accidents, which equates to approximately one accident per minute. More than 14 people are killed on the world's roads every hour as a direct consequence of collisions. In 2009, there was one fatality every 4.2 minutes, totalling 1,25660, which resulted in 345 fatalities each and every day. Table 1.1 is a listing of the number of events that occurred across all routes during 1970-2017 (MORTH) per 1000 cars.

Table 1: Numbers of Accidents per 1000 Vehicles during 1970-2018

Year	On All Roads
1970	81.44
1980	33.88
1990	14.76
1995	11.62
1999	8.61
2000	8.01
2002	6.92
2005	5.39
2010	4.96
2015	4.60
2018	4.23

**Fig.1:** Road related Accidents in India**Fig. 2** Road Length and Vehicle Population

II. METHODOLOGY OF STUDY

The purpose of the study is to locate and investigate potentially hazardous regions within a specific NH-1 zone so that improvements may be made. In light of this objective, incident data drawn from a variety of sources are collected along the section of NH-1 spanning 66 to 116 km that has been selected for the investigation. After the details have been evaluated, the findings are analysed, and the areas that are susceptible to injuries are determined with the assistance of the ASV.

Data collection

The NHAI and SOMA Isolux National Authority of India were the sources for the accident data that was collected. The continuation and growth of the nation's natural habitats are inextricably related to NHAI. The SOMA Isolux Building Group is now working on a project to expand the National Highway 1 (NH-1) from Panipat to Jalandhar. The figures cover a broad range due to the fact that they were collected over a period of four years. There are a few summary tables of the findings included in Tables 3.1-3.4. When it is necessary, data on the site's physical attributes is gathered via an incident site field examination. This happens anytime it is necessary to get the data.

III. RESULT

PERVARIOUS CHARACTERISTICS

The information that was gathered is then analysed in terms of the several aspects of an accident, including the reason for it, the kind of harm that was sustained, the cars that were involved, and the area where it took place.

This link clearly illustrates that there is a significant number of injuries that can be attributed to both places of distance, extending 66-72 kilometres, and regions that are more prone to accidents at 108-112 km. The presence of some kind of incident collaboration. which displays data from numerous road locations. The link makes it abundantly clear that a multitude of accidents take place at both locations; specifically, the 66-72 kilometre range of the line is more inadvertently prone to accidents, and it is joined by the 103-107 kilometre range of the range.. According to these numbers, there are between 103 and 107 km that are responsible for the majority of fatal injuries. The last 112-116 km are when the biggest number of serious accidents occur. The total number of occurrences that cause non-serious or moderate injuries is between 66 and 72 kilometres high. The chart and figure 5.7 both show the types of vehicles that were engaged in traffic accidents in their respective regions. It has been noticed that the biggest number of trucks, canners, and buses are influenced by accidents with vehicles in practically every position, with the exception of 78-82 km and 108-112 km, where the number of cars outweighs the number of autos. The number of automobiles and jeeps involved in collisions is highest between km 112-116. In the range of 66 to 72 km, there are more cars, which increases the risk of an accident. Crash two-wheelers may be located on the portion of track that spans 112-116 and 66-72 km.

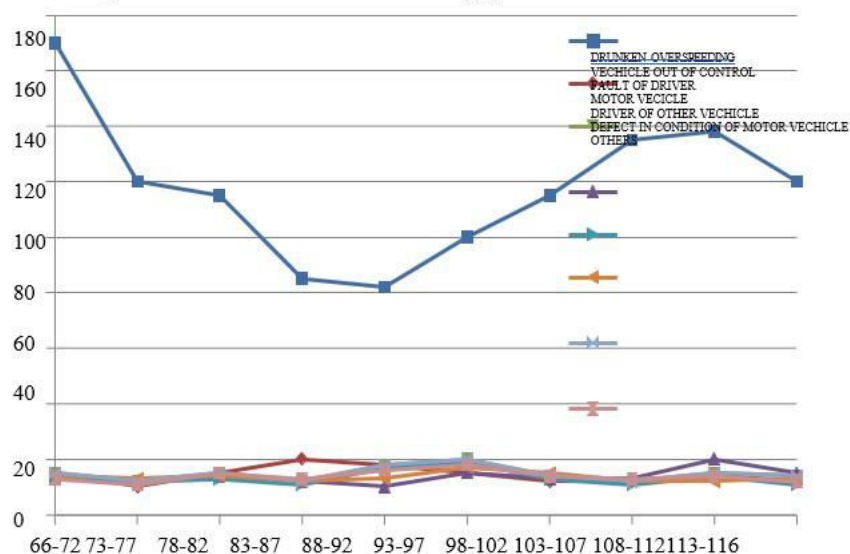
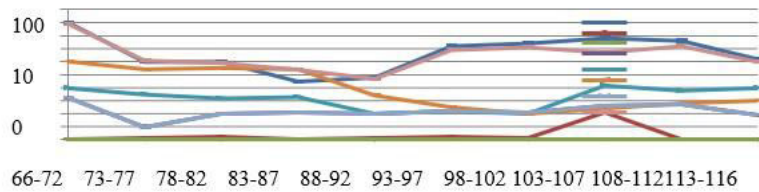
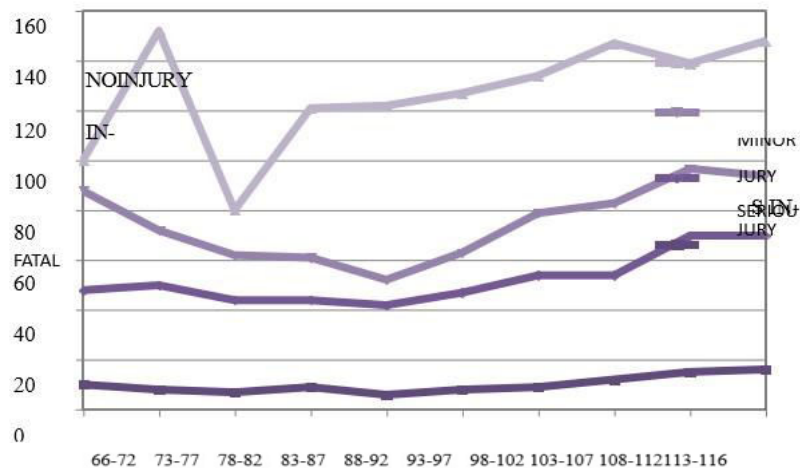


Fig. 3. Road Accidents due to their Cause

**Fig. 4:** Road Accidents due to their Nature**Fig:** Analysis of Road accidents -Injury

IV. CONCLUSIONS

The cultural, transportation, and economic lives of a country all depend on its highway system. As the world's population rises, so does the amount of traffic on its roadways and the number of individuals killed or wounded in such traffic. Lack of roadways makes national growth difficult. It's troubling that so many people in India lose their lives in traffic accidents each year. In the course of the research described in the dissertation, the area of NH-1 chosen for study is fortified and established in its most incident-prone locations. What follows is a summary of the report's key findings:

1. The road incident data for the 66-112 km long range from 2012-2018 was sent to the National Highway Accident Investigation Board (NHAI) and Soma Isolux, an organization involved in the building of the NH-1 network. The data is analyzed so that we can weigh the numerous facets of the event.

2.

The majority of traffic-related injuries are the result of reckless or careless driving, which includes traveling at high speeds. Roughly 2% of fatalities are attributable to vehicle malfunctions or poor road conditions; 6% of fatalities are the result of drivers who lose control of their vehicles; and 3% of fatalities are the result of accidents brought on by external factors like bad weather. The factors that lead to injuries at night are not drastically different from those that occur during the day.

Third, the collected data couldn't separate out the many causes of an accident, such as who was at blame, how fast the automobile was going, or whether the driver had been drinking.

Four, the head-on and rear-end collision accounts for 46% of all collisions, the head-on and rear-end collision accounts for 19% of all collisions, and the head-on and rear-end collision accounts for around 14% of all rollovers. The frequency does not significantly change between the day and night.

5. Forty-nine percent of all injuries are of the non-wound kind, followed by those of the severe injury (29%), moderate injury (17%), and catastrophic event (5%) varieties.

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