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Investigating Patterns of Traffic Collisions and Identifying the Root Causes of Injuries: A Review

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ABSTRACT: Highways have an essential role in all aspects of a nation's life, including its culture, commerce, and transportation systems. The development of the world's population is often accompanied by an increase in both the volume of traffic and the number of fatalities and injuries that occur on the world's roadways. Expansion of the nation will be difficult to accomplish if there are not enough roadways. It is disturbing that so many individuals in India lose their lives as a result of traffic accidents. The inquiry that is described in detail in the dissertation will, throughout the course of its completion, result in the strengthening and establishment of incident-prone zones that are situated within the territory of NH-1 that was chosen. The National Highway Accident Investigation Board (NHAI) and Soma Isolux, an organization that is involved in the construction of the NH-1 network, received the road incident data for the 66-112 km long range for the years 2012-2018. The information that was obtained was not capable of differentiating clearly between the several elements that may lead to a collision, in particular the fault, the speed, or the drunken driver of the automobile. 4. The information that was collected was not capable of distinguishing explicitly between the numerous factors that could lead to a collision. The head-on and rear-end collision is responsible for 46% of all crashes. The head-on and rear-end collision is responsible for 19% of all collisions and about 14% of all rollovers. The incidence rate during the day is not noticeably different from that during the night. This difference is not statistically significant. The form that does not include a wound accounts for 49% of the total injuries, which is followed by the kind that involves a severe injury (29%), the kind that involves a moderate injury (17%), and the one that involves a catastrophic incident (5%). The reports contain not just injuries of a less severe kind but also those of a more serious one. There is not a substantial difference between the kinds of injuries that may occur during the daytime and the kinds of injuries that can occur during the overnight. When the number of injuries that were caused by each kind of vehicle that was involved in the incidents was tallied, it was determined that trucks, automobiles, and buses were responsible for the greatest number of injuries (42%). This was followed by cars and jeeps (35%), two-wheelers (13%), and other vehicles (10%). Automobiles are responsible for 6% of all accidental injuries. It seems that there is a bigger number of trucks, canters, and buses later on in the night. These vehicles are often seen traveling in groups. Injuries that occur during the day account for 61% of the total, whereas injuries that occur during the night account for just 39% of the total. There may be fewer cars and motorcycles on the road in the latter hours of the night. This is especially true with two-wheeled vehicles. An in-depth investigation of the events that took place indicates that the aspects of what occurred are, for the most part, the same as those that were mentioned before. Since the beginning of the NH-1 extension construction project in May of 2012, there has been a considerable rise in the number of persons who have sustained injuries while working on the project.

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

I. INTRODUCTION

The vast manufacturing of motor vehicles may be traced back to the rapid increase in economic activities as well as the population. On Indian National Roads, it is one of the primary factors that leads to automobile accidents. The ever-increasing frequency of traffic collisions subjects' victims to significant financial and social strains, in addition to countless direct and indirect financial expenditures. Unsafe encounters between drivers, drivers and other road users are the primary contributors to the occurrence of traffic accidents. Unsatisfactory interactions may be the result of a number of reasons, including the qualities of the pavement, the geometrical characteristics, the traffic characteristics, the conduct of road users, the design of the vehicle, the features of the driver, and the components of the surroundings. The whole process behind the accident is a dynamic phenomenon as well. A number of authorities have issued reports on the dangers of traffic accidents and the effects of driving on one's health. study has been conducted on the accident characteristics, accident predictions, and better construction on roads and bridges in order to make roads safer for

various types of traffic and road conditions. This study has been done in order to enhance road safety. The results of this investigation suggest that the Prone Accident occurred in a specific region of NH-1 and provide more evidence to support this conclusion.

Coverage of Road in India

With a total of 468.984 million km of paved roads, it is the second biggest road network in the world. The total length of roads in India is 92,851.05 km, with the National Highway accounting for 2,000 of those kilometres. After leaving the expressways, there is a total of 154,522 miles (2577,396 km) of state highways and 2650.577 kilometres of village and other highways. Despite the fact that the NHs only account for about 2% of the total travel time, they cover 40% of the overall traffic. Roughly one quarter of all NHs have only a single or an intermediate lane.



Fig 1:Map of NHs

Table 1 shows how the road length of NH has grown since India independence. Fig. 1 shows the Indian NH diagram.

Table 1: Expansion of NHs after the Independence of India

Time of Estimation	Total Length- National Highways (km)
1947-69	24,000
1969-90	33,612
1990-97	34,298
1997-03	58,112
2003-05	65,569
2005-13	79,116
At Present	92851.05

Types of Roads

The authorities in charge of different forms of roads in India are shown in table 2.

Table: 2 Authorities responsible for different categories of roads in India

Category of Roads	Authorities responsible
National Highways	Central Government (Through Ministry of Road Transport and Highways)
State Highways and Major Highways	State Governments(PWDs)
Rural Roads and Urban Roads	Rural Engineering Organizations, Local Authorities like Panchayats and Municipalities

II. LITERATURE REVIEW

Road Accidents In India

Although developed nations have been able to reduce their death rates, those in developing nations have been slowly on the rise. The study estimated that traffic accidents would have become a "epidemic" that will become the fifth-largest murderer in the world by the year 2030. This is despite the fact that developed nations have been able to decrease their death rates. It was said that low- and middle-income nations, which account for only 48 percent of all registered automobiles, are responsible for 90 percent of the deaths that occur on the world's roadways (21.5 and 19.5 per lakh of population).

The numbers for India are rather encouraging. At least 14 persons every hour are killed as a result of road accidents all around the globe. In 2013, 1,13 lakh people lost their lives as a result of road accidents in India. This number is much larger than the 81,649 (Morth) who perished in road accidents in China in 2013.

Because many of the incident events do not appear to be really recorded by road safety experts, the actual figures could be higher than what is reported here.

"We don't have modern traffic engineering, which has shaped the foundation or procedures of enhancing road health in the United States and Great Britain since the 1930s," said Baluja, both national and outdated governments though pressing to construct further bridges. The study reports that more than 1.2 million people die each year on the lane "and 20-25 million suffer from non-fatal accidents, worldwide." The figures for the study were based on data from 178 participating nations in 2013 and 2014. It is still handled by consulting firms in India, since we do not yet have our own in-house capabilities in the field of traffic engineering.

In point of fact, the figure was somewhat higher in the United States, coming in at 42 642, whereas in Britain just 3,298 persons lost their lives in road accidents in 2012.

According to the findings of the research, the most significant contributors were the size of the helmets, the use of seat belts and vehicle baby restraints, as well as improper use of these safety devices.

The most important component in crashes is speed, and even a little shift in the typical speed of moving vehicles may have a major influence not only on the likelihood of a collision but also on the severity of its aftereffects. According to the findings of the research, just 29 percent of nations have been successful in lowering the average speed of traffic in urban regions, and only 10 percent of those countries have successfully managed these situations.

After the state of Maharashtra (9875) and the state of Uttar Pradesh (9946), the state of Andhra Pradesh (11045) has the highest death toll, according to a brief statistical evaluation of the Baluja Rohit study.

According to the findings of the research, trucks are one of the leading causes of fatalities on the nation's roadways and are the most common contributors to vehicle breakdowns, despite the fact that in 2012, 23,991 people were killed while riding in trucks.

The number of people who lost their lives on Indian roads hit a new high in 2011, with an average of at least 14 fatalities occurring per hour, up from 13 in the previous year.

The traffic experts are worried about the upward trend of fatal roads from 2008 to 2015 as well as the developing nations that accounted for a big share of the deaths that occurred on the roads. In spite of the fact that the number was only 844,430 in 2009, it reached 1.18 lakhs in 2012, and the increase in road fatalities was seen in just 90 nations. The increase in tariffs is due to the fact that nobody can agree on who is to blame. In total, 4.69 lakh people were injured due to road accidents. According to the annual report of the NCRB, the period of time between three and sixteen o'clock in the afternoon is the most accident-prone period of the day. This time period accounts for the biggest percentage (37.1%) of the involuntary causes of unintentional fatalities across the globe. Analysts of traffic conditions said that during this time period, the number of accidents was high, and drivers were feeling stressed and sometimes falling asleep while driving. "Similarly important are the early morning hours," they stated.

According to the findings of the research, it was difficult to determine the number of fatalities that resulted from automotive accidents in states with a small population. It was most pronounced in the state of Arunachal Pradesh.

When it came to Sikkim, the number 5.7 came before the number 3.6. When compared to the national average of 28.4, the death rate per 100 road accidents was significantly higher in Nagaland (92.1) and Mizoram (89.7) than it was in the rest of the country.

Injuries sustained on India's roads have a significant negative impact on the country's GDP. According to Rohit Baluja, the societal cost of fatalities that occur on India's roadways runs at an average rate of 55,000 rupees each case. This accounts for three percent of the total GDP of the globe. In 2011, 1,05 lakh people lost their lives on Indian roadways, which averages out to 290 deaths every day. Despite this, there were 8,313 provisional citizens killed as a result of drunk driving, while the total number of provisional citizens killed as a result of road deaths was approximately 2,024.

According to the findings of a recent WHO research titled "Youth and Public Health," vehicular accidents cause more injuries to adolescents between the ages of 15 and 19 than anything else, including HIV and cancer. Accidents involving bicycles claim the lives of more than one thousand young people every single day, the majority of them are between the ages of 10 and 24.

In the last year, there were 1.2 million deaths caused by traffic accidents, of whom 40 percent were persons under the age of 25. Additionally, millions more people were injured severely or had injuries that would last a lifetime.

According to the planning that was done jointly by the Ministry of Health and the Ministry of Bridge, Highway, and Surface Transport, there were around 1.6 lakh people who were died in road accidents in the previous year. 1.25 lakh people were murdered in the year 2015.

According to some reports, fatalities that occur as a result of traffic accidents are one of the top three causes of mortality among those aged 5 to 44. According to the findings of the survey, it is also one of the top 10 causes of mortality for infants aged 0 to 4 years old.

One of the most significant causes for worry is the expanding use of two-wheeled transportation such as bicycles and scooters. Seventy one percent of the total number of autos that were registered in 2011 (72 million) were vehicles with just two wheels.

The Department of Surface Transport's most recent figures, released in 2015, put the percentage at 22.4%.

Accidents and approximately 20.2% of injuries caused by road accidents were caused by two-wheeled vehicles. The collision on the bridge was responsible for 15.7% of the damage to both wheels. According to sources inside the ministry, the action plan would be implemented quickly in order to cut losses by half by the year 2020.

"To avoid traffic accidents, technical experience and the government would appear to be weak," he argues. "[T]hese are all things that would appear weak."

As a part of this programme, hundreds of policymakers from across the world proclaimed their intentions to cut down on the number of people who died in traffic accidents as a part of the worldwide first "decade of action for road protection 2011-2020."

In spite of the fact that India has the unenviable distinction of having the largest number of fatalities, the programme has not yet been implemented in the country.

According to the World Health Organisation, traffic accidents are the main cause of mortality globally among young

people in the age range of 15 to 29. Additionally, these incidents are responsible for the deaths of about 1.3 million people each year on the global route, making them the ninth biggest cause of death worldwide. Nearly half of the people who are murdered around the world are pedestrians, bicyclists, and motorcyclists.

The social and economic repercussions that result from traffic accidents are experienced by industrialised countries as well as the families of those who were killed or injured. The consequences include the loss of lives, the permanent disability of individuals, the damage of collateral property, as well as the waste of energy and money. According to the World Bank, the amount of money lost due to fatalities caused by traffic accounts for 1% to 1% of gross domestic product (GDP) and 2% of gross domestic product (GDP). The World Bank estimates that the entire cost of development assistance will be 518 billion US dollars per year, although the budget for low-income countries is just 65 billion US dollars. The situation is becoming worse since resources should be employed to fight against other societal calamities such as starvation, HIV/AIDS, and a lack of development. This is making the scenario worse. It is estimated that inhabitants of numerous low-income and middle-income nations would get over half of the medical treatment they need as a result of traffic accidents from high-income countries.

According to Vasconcellos, the extent and possibility of traffic crashes are directly impacted by the method in which the region is built as well as the manner in which the road structure is constructed. He notices bicycles, and riders of bicycles are the most likely to suffer significant injuries in the event that they are involved in an accident. According to Vasconcellos, high-traffic pedestrian corridors usually have a steady flow of foot traffic. areas in which it is conceivable for a collision to occur as a result of the presence of both high-speed vehicle traffic and low-speed football traffic. According to Vasconcellos, the decision-making process for road development policies is often centred on economic reasoning and geared towards the highway. When discussing issues involving traffic and related policies, Vasconcellos brings this up. Roads in developed regions are three times higher than roads in other parts of the region, which contributes to the number of traffic casualties. Game based on both age and race.

Important functions and their connection to injuries caused by driving. Accidents involving vehicles on the road are considered to be fluid occurrences since, in the majority of instances, the investigation into the incidents is not carried out correctly due to poor data gathering, management, and assessment procedures. When an event takes place, it is normally the responsibility of the police officers on the scene to gather evidence. The law enforcement community is not properly schooled in the correct flow of data, and many officers have trouble understanding the significance of accurate and trustworthy records. The fact that road events aren't recorded adds another layer of complexity to the problem of studying traffic accidents (AI-Ghamdi).

III. 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. The method that was used to this study may be seen in the figure diagram. 3.1. 3.1.

IV. CONCLUSIONS AND SCOPE FOR FURTHER RESEARCH

Highways are vital in every aspect of a nation's existence, including its culture, transportation, and economy. Traffic and the number of people killed or injured on the world's roads both tend to increase in tandem with global population growth. If there are not enough highways, expanding the country will be tough. The number of people killed in road accidents in India is cause for concern. During the course of the investigation that is detailed in the dissertation, the incident-prone areas that are located within the region of NH-1 that was selected are strengthened and established. The following is a list of the most important takeaways from the report:

1. The National Highway Accident Investigation Board (NHAI) and Soma Isolux, an organisation that is engaged in the development of the NH-1 network, received the road incident data for the 66-112 km long range for the years 2012-2018. The information is examined in order to assess the many different aspects of the occurrence.
2. Excessive speeding and negligent driving have been recognised as the leading causes of injuries that occur on the roads. Approximately 2% of fatalities are the result of mechanical problems with vehicles or poor road conditions; approximately 6% of fatalities are caused by vehicles that are driven out of control; and approximately 3% of fatalities are the result of collisions caused by certain factors, which may include inclement weather, among other things. There is not a significant difference between the causes of injuries that occur during the day and those that occur at night.



REFERENCES

1. AI-GHAMDI A, Analysis of traffic accidents at urban intersections in Riyadh” Accident analysis and prevention,35:717-724.
2. Aworemi, Joshua Resmi , Abdul-Azeez, ibraheem adegoke , Olabode, Segun Oluwaseun,” Anlaytical study of the casual factors of road traffic crashes in southwestern Nigeria” educational Research volume14)pp.118-124.
3. Dowling ,AJ, CJ Baguley and BL hills, “Road safety in developing countries: an overview “,Transport and road Rsearch Laboratory. Crowthorne,Berkshire.
4. http://articles.timesofindia.indiatimes.com/2009-08-17/india/28181973_1_road-accidents-road-fatalities-global-road-safety.
5. IRC-53-1982”Road Accident Forms A-1 and4”.
6. IRC-SP-55-2001”Guidelines on safety in road constructionZones”.
7. Peden Margie, Scurfield Richard,sleet David ,Mohan Dinesh ,Hyper A Adnan, Jarawan Eva and mathers Colin,”World Report on Traffic injury Prevention,Geneva”,World Health Organization,Geneva.
8. Pucher ,John , Korattyswaropam , Nisha , Neha , Ittyerah, Neenu.Urban Transport Crisis in India . Transport Policy, volume 12,Issue 3, pp185-198.
9. Ravishankar Rajaraman ,”Analysis of Road traffic Accidents on NH-45, Kanchipuram District(Tamil Nadu)”,IRTAD conference ,16,17 september,SeoulKoera.
10. “Road User Behaviour: A Chennai traffioc study”, JP Research India Private limited , volume 3, no.2, April.



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