

A Review Paper- II on “Analyzing and Implementing Traffic Safety Measures for Accident Reduction on the Samruddhi Expressway”.

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Abstract: Rapid growth of population coupled with economic activities has resulted in continuous growth of motor vehicles and due to increasing population and vehicles, traffic accidents are increasing day-by-day. Traffic accidents related to deaths and injuries result in not only substantial economic losses but also serious physical and mental suffering. The increasing road accident has also created social problems due to loss of lives and human miseries. The road accidents are very much on Nagpur-Mumbai Expressway & due to which it was very essential to evaluate “Accident analysis of Nagpur-Mumbai Expressway” so that the remedial measures should be suggested to the accidents on Nagpur-Mumbai Expressway, according the data related to traffic volume, type of vehicles, accident data, type of accident, causes of accident vehicles involved in the accident, were collected from the last five years and analysed.

Key Words: Samruddhi Expressway, traffic safety, accident reduction, infrastructure, intelligent traffic management, driver-assistance systems.

I. INTRODUCTION

The Samruddhi Expressway, a vital lifeline of transportation and commerce in the region, has witnessed a steady rise in traffic accidents in recent years. As a testament to the growing economic activity and urbanization in the surrounding areas, the expressway's importance cannot be understated. However, with increased vehicular traffic, the issue of traffic safety has become a pressing concern.

This paper represents a comprehensive review of the traffic safety challenges plaguing the Samruddhi Expressway, aiming to provide valuable insights into the root causes of accidents and the measures necessary to curb them. In this second review paper, we delve deeper into the subject, examining the effectiveness of previously implemented safety measures and proposing new strategies to further enhance road safety.

Drawing upon the latest available data and research findings, this study seeks to not only analyze the existing traffic safety measures but also to advocate for innovative solutions that will reduce accidents and make the Samruddhi Expressway a safer route for all commuters and cargo carriers. It is our hope that this review will serve as a valuable resource for policymakers, engineers, and stakeholders involved in the maintenance and enhancement of this critical transportation artery. By doing so, we can ensure that the Samruddhi Expressway remains a beacon of safety and efficiency for years to come.

II. LITERATURE REVIEW

1. Chattarjee (2020): This review conducted safety audit on 2 national highways NH 60 & NH 117 having length 307 kilometers & 130 kilometers respectively in India. Insufficient sight distance on curves and high speed of vehicles were major factors contributing to road accidents. Authors suggested remedial measures to improve the road safety.

2. Rao (2018): This review performed a road safety audit on an expressway in Uttar Pradesh, India, from ‘Noida’ to ‘Greater Noida,’ and suggested the remedial measures to reduce the number of accidents.

3.Mohan and Landage (2017):This review is aimed to identify the accident-prone locations (APL) along AmravatiNagpur road stretch from Asian Highway-46 in Maharashtra, India. The identification of top APL using the WSI method gave suggestions to improve the transportation system. According to the recent road accident data, the authors concluded that the highly populated Maharashtra state had reported the highest accident rate.

4.Bobade and Patil (2015):This review is aimed to identify the hotspots on the Pune-Solapur national highway in Maharashtra, India, for a stretch of 50-60 kilometers. Various methods like severity index benchmark, WSI, method of ranking, accident density method (ADM) were used.

5.Sorate (2015):This review have identified accident hotspots on NH4 (New Katraj Tunnel to Chandani Chowk, Pune, Maharashtra, India) for 14.6 kilometers length by using methods like the method of ranking & severity index, ADM, and WSI. The accident data used was collected from the National Highway Authority of India (NHAI) and police stations. Inspection of the 14.6-kilometer highway was done by the physical survey at every 100m chainage.

6. Ponnaluri (2012):This review carried out a case study on road traffic crashes in Andhra Pradesh (AP), India to discuss the trend of accidents and recommend remedial measures for reducing the road accidents. The author discussed about the fatality rates in AP from 2001 to 2009 and found that urban to rural share was 40%:60%. Also, recommendations, like developing an accident recording system, capacity-building efforts, and providing emergency response services, were made.

7.Rajaraman (2009):This review conducted a detailed investigation of accidents on NH 45 throughout the 60-kilometer length in Tamilnadu, India. The authors collected the live accident data for 45 days in cooperation with police stations and highway patrols of the study area. They have used standard accident reporting forms and categorized the accident data according to their requirements. The study showed that head-on and rear-end collisions involving trucks and buses account for 58% of accidents.

8. Chand and Alex (2007):computed accident risk index and accident severity index (ASI) for different states in India. These indices are based on a set of accident indicators, which are combined together to form an index. Values of these two indices have been computed and compared across the states of India.

9.Parida (2006):This review attempted to develop a correlation between highway geometric

parameters, traffic parameters, and crash rate for two-lane non-urban highways. Variables included in the model were access density per kilometer, curve density per kilometer, intersection density per kilometer, space mean speed, shoulder width, lane width, and volume of heavy vehicles. The authors observed a strong positive relationship between the volume of heavy vehicles and crashes, speed, and crash rates. Shoulder width and lane width have shown a negative relationship with the crash rate.

10.Chakraborty and Roy (2005): conducted a study to determine the road safety level in Kolkata city of India. They considered 4 parameters namely accident severity index, accident fatality rate, accident fatality risk and accident risk and created a model based on Smeed's approach to predict future accidents for Kolkata.

11. S K Singh and Ashish Misra (2004): This review conducted a case-study on 'Road Accident Analysis of Patna city' made a conclusion that congestion and encroachment are the main reasons behind road accidents performed a case study.

12.R K Singh, S K Suman (2001) :This review proposed a study on Accident Analysis and Prediction of Model on National Highway-77 aiming at finding the monthly and annual variation in accident rate, effect of traffic volume on accident rate and to develop model using AADT and road condition. Equation represented by them for road accident prediction is: $\text{Accidents/Km-Year} = C_0 + C_1 (\text{AADT}) + C_2 (\text{Road Condition Rank})$. Using the above equation conclusion was made that number of accident increases per km- year with AADT and decreases with improvement in road shoulder condition.

III. OBJECTIVE OF PAPER

- 1) Review existing literature and research on traffic safety measures, accident causes, and mitigation strategies on expressways.
- 2) To study the economic feasibility of the expressway To analysis benefits of construction of expressway project.(Mumbai-Nagpur).
- 3) Propose evidence-based recommendations for enhancing traffic safety on the Samruddhi expressway, which may include engineering solutions, enforcement strategies, public awareness campaigns, and policy changes.
- 4) Discuss potential challenges and barriers to implementing these recommendations.

IV. CONCLUSION

The overall conclusion includes a collection of data, identification, evaluation, and treatment of accident black spots. From the analysis, it can be concluded that accidents are occurring

almost uniformly during the day as well as at night hours, but the severity index is very high during night hours. The problem of death and injuries as a result of road accidents in Indian cities is serious enough to demand the attention of respective administrative authorities.

As far as vehicle-wise accident rates are concerned buses, trucks and three-wheelers are the first, second and third risky vehicles respectively. Furthermore, the city traffic police identified a few accident-prone locations on basis of the severity and frequency of accidents in allocations. After analysis of accident data, the age ranges from 18 to 30 were more involved in accidents than other age groups. While comparing gender-wise distribution, males' involvement is more than females in accidents and also the severity of accidents.

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