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Causes of accident on Samruddhi Expressway (Mahamarg)

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Abstract - *Road safety is still an important issue with road accidents among the leading causes of death accounting for more than 1.2 million fatalities and 20 to 50 million injuries globally per year. The paper begins by defining road accidents and highlighting their prevalence across different regions It delves into the various factors contributing to road accidents, including human factors such as driver behavior, vehicle-related factors such as mechanical failure, and environmental factors such as adverse weather conditions.*

Furthermore, the paper examines the wide-ranging consequences of road accidents, encompassing loss of life, injuries, economic costs, and psychological trauma. It underscores the profound societal impact of road accidents, underscoring the strain they place on healthcare systems, transportation infrastructure, and the economy. In addressing the challenge of road accidents, the paper identifies key preventive measures and interventions aimed at mitigating their occurrence and reducing their harm.

***Key Words*: Accidents, Highway hypnosis, Over speeding, Tyre burst, white line fever, monotonous etc.**

1.INTRODUCTION

1.1 General

Road accidents, also known as traffic accidents or car crashes, refer to incidents involving vehicles such as cars, motorcycles, bicycles, or pedestrians colliding with each other or with other objects on roads or highways. These accidents can result in property damage, injuries, or fatalities.

Road accidents are a significant public health and safety concern worldwide. They occur with alarming frequency and vary in severity depending on factors such as location, traffic volume, road conditions, and driving behavior.

1.2 Historical background

Maharashtra samruddhi highway was constructed between two major cities of Maharashtra, those cities are Mumbai and Nagpur main aim of this project to reduce time of traveling between Mumbai and Nagpur and also development of Maharashtra. The project is undertaken by Maharashtra state road development corporation (MSRDC). The expressway spans approximately 701 kilometers and is designed to reduce travel time between Mumbai and Nagpur significantly. It is planned as a 8-lane (expandable to 12 lanes), greenfield expressway with a design speed of 150-160 kilometers per hour.

A total of 1,282 accidents have taken place on the expressway since December 2022, of which 2 accidents involving 67 vehicles during this period have resulted in 135 deaths. In the nine months since Samruddhi Mahamarg opened to traffic, nearly 48 lakh vehicles have plied on a 600-km stretch from Nagpur to Bharvir in Igatpuri.

Two major accidents caused 37 of these deaths. In one accident, a private AC sleeper bus caught fire after the drunk driver lost control in July in that 25 people died, while on October 15, 12 people died and 23 others were injured. Expressed way witnesses three accidents in every day.

1.3 Aim

Our project aims to understand the causes of accidents that occur on the Samruddhi Mahamarg and take steps to solve these issues, thereby preventing future accidents. Through this initiative, we strive to enhance human safety by reducing accidents and promoting safe driving practices.

1.4 Objective of work

1. To study the different types of accidents on Samruddhi Expressway.
2. To study the causes of accidents on samruddhi Expressway.
3. To find solution to reduce the accidents on samruddhi expressway
4. To study the deficiencies in road infrastructure which causes accidents on Expressway.
5. To study the causes of accidents and suggest corrective measures at potential location

1.5 Scope of work

This measure reduces the percentage of accidents on the highway, helps maintain traffic volume, ensures consistency in speed limits, and reduces injuries. Additionally, it enables safe travel in any season.

2. LITERATURE REVIEW

2.1 General

This literature review is the methodological investigation of all published sources for information about the causes and types of accidents. It is a series of searches conducted across all possible resources of causes accidents and a list of resources that have been identified as relevant to the topic which is arranged alphabetically and details mentioned in topic 2.2. The result of the literature search is compiled and structured to understand the scope and breadth of the literature on the view of such causes of accidents on the highway.

2.2 literature review

Muthusamy A P (2015), In this research paper authors worked on road traffic accident and related factors of accident. Road traffic accidents are considered the most important general health concern, as it results in numerous injuries and deaths worldwide. India is one among the developing nation which experiences the highest rate of such accidents. Thus the traffic agencies and public concentrates at the measures to reduce such accident severity in order to reduce the fatality rate. This paper reviews various factors and statistics related to road accidents occurred in various countries and also studies different safety measures suggested by researchers.

Geetabai et al (2016), This paper analyses traffic safety situation in India and identifies the areas in which the total harm caused by crashes can be substantially and readily reduced. This focuses on two aspects road accident statistics and reasons for road accidents. The first part of the report provides a comprehensive analysis of the current statistics of road accidents happening in India. It is pointed out in analysis that fatality rate has increased during the past few years. These statistics indicate that number of fatalities in India is not likely to start to decline for many years to come unless new policies are implemented. Second part of the paper gives a brief insight on the various reasons for road accidents in India. From the reasons, we can make out, both the Govt. and motorist are equal shareholders

Yasashwini rajendra bhat (2016), In this paper student of biotechnology researched on causes of road accidents and their solutions. More than 140,000 people were killed on India's roads in 2015. According to figures released by the government, the total number of fatalities represents an increase of 4.6% on the previous year. More than half of the people killed in more than 500,000 road accidents in 2015 were aged 15-34. Road accidents cause death or severe injury. This paper deals with reasons and solutions for the road traffic accidents in India in the form of a review article using the available statistics in the literature.

Arkesh Prabhalkar khetade (2023), In this research paper students of MGM's Collage of Engineering and Technology, worked on causes of accident on mumbai-pune Expressway, Transportation on road is more year by year, but the rate of accident also increases with it. India is well developing countries and here rate of road accidents is high and also recording the accident specifically as per month, time, age and gender and also the types in that road traffic accident is on the top and here also thing to mention is day time accidents are more than the night time accidents road traffic accidents claim over a million lives every year in the world. As per World Health Organization (WHO), it is one of the leading causes of death. India, a rapidly developing country with an expanding economy, has its issues regarding road traffic accidents. Records from 2018 show that there is one death every 3.05 minutes because of road accidents. In 2020, there were around 138 thousand deaths due to road accidents in India. Planning, working upon it, various ideas road infrastructure should give priority to the safety and comfort of road users. Thus, this paper aims to tackle this issue and to explore the main factors contributing to the increase in car accidents rate.

3. METHODOLOGY

3.1 General

The information is related to the survey conduction in the initial stage as mentioned in 3.2 which is based on the public response and point of view of drivers of the vehicle. The basic questions involve normal speed, traffic rules, and regulations for driving.

There are many factors contributing to road accidents and to be able to pinpoint the main reason causing those accidents, a thorough survey is to be conducted to understand how each factor affects the rate at which road accidents happened

3.2 Methodology

In our methodology, we aim to comprehend the issues plaguing the Samruddhi Highway by first investigating the causes of accidents reported on various online platforms and gathering insights from vehicle drivers. Additionally, we are conducting a thorough review of past researches pertaining to accidents on this highway. The primary objective of this methodology is to identify the root causes of accidents on the Samruddhi Highway, enabling us to pinpoint the actual reasons behind these incidents. Given the multitude of factors contributing to road accidents, it is crucial to meticulously analyze each factor's impact on the frequency of accidents. By studying different accidents that have occurred on the Samruddhi Highway, we endeavor to unveil the underlying causes responsible for these incidents.

3.2.1 Location

In light of previous accident data on the Samruddhi Expressway, we have undertaken a survey of the area. The Samruddhi Expressway is planned as an 8-lane (expandable to 12 lanes) greenfield expressway, designed to accommodate speeds of 150-160 kilometers per hour. Stretching approximately 701 kilometers, this expressway aims to significantly reduce travel time between Mumbai and Nagpur. Currently, construction has been completed on the 600-kilometer stretch from Nagpur to Bharvir Khurd Igatpuri, with the remaining 101 kilometers from Igatpuri to Mumbai still under construction.

3.2.1 Road survey

To enhance our understanding of accidents on the Samruddhi Highway, we conducted a field visit or survey on the highway. Our first visit took place at the Samruddhi Mahamarg Bharvir Khurd entry point on January 25, 2024. At this location, 600 kilometers of the Mahamarg have been completed from Nagpur, with the remaining 100 kilometers still under progress. During our visit, we aimed to gather information from drivers regarding accidents that have occurred on the Samruddhi Mahamarg to understand the reasons behind them. We formulated a set of questions to ask the experience of drivers and to enlist and determine main causes of accidents:

1. Do you take any precautions for safe driving?
2. What is your experience while driving on such monotonous road?
3. Have you ever driven faster than 120 kmph?
4. Did you follow traffic regulations while driving on expressway?
5. Do you think the road is safe from a safety criteria?
6. Did you overtake while driving?
7. Did you encounter any obstacles while driving on this expressway?

In account for additional information, we met with an engineer to inquire about technical aspects related to the construction and design of the highway. Furthermore, we visited the emergency office at that location and interviewed some officers to gain deeper insights into the reasons behind accidents.

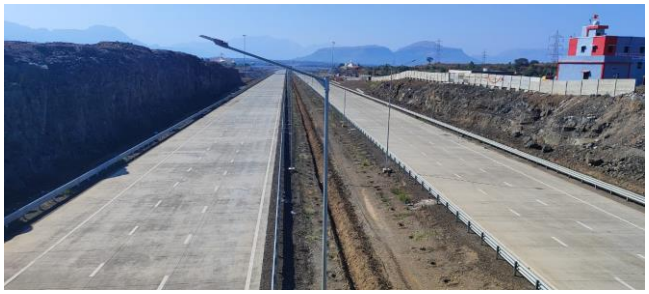

Fig no- 1: Samruddhi Expressway

4.CAUSES OF ACCIDENTS

From road survey we understand the main causes that majorly contribute to the accidents which occurred on Samruddhi Mahamarg since its construction, following are the main causes which are responsible for accidents as per study.

4.1 Highway hypnosis:

It's one of leading cause behind those accident as per our research and study, Highway hypnosis is a trance-like state that drivers can experience during long, monotonous journeys on highways or other uninterrupted roads, it is also called as white line fever. In this state, drivers may become unaware of their surroundings, lose track of time, and even forget that they are driving. It's like being in a daze, where the repetitive scenery and lack of stimulation can lead to decreased attention and alertness, increasing the risk of accidents.

4.2 Tyre burst

Tyre burst is a dangerous safety hazard that can lead to some of the worst accidents and injuries on the road. In simple terms, a tire burst, also known as a blowout, occurs when a tire suddenly loses air pressure, leading to a rapid deflation of the tire. This can happen due to various reasons such as overloading, under inflation, excessive wear and tear, or hitting an object on the road. When a tire bursts, it can cause the vehicle to lose control, potentially resulting in a dangerous situation or even an accident.

4.3 Over speeding

Speeding stands out as the primary cause of accidents on the Samruddhi highway, according to research findings. Despite the designated speed limit being set at 120 kmph, vehicles frequently surpass this threshold, hurtling along at speeds exceeding 120 kmph. The highway's design speed, a staggering 150 kmph, might inadvertently encourage drivers to push the boundaries further. Compounding the issue, the absence of speed breakers removes any deterrent for drivers predisposed to exceeding speed limits.

However, it's crucial to note that other factors also contribute to accidents on this highway, including animal crossings, vehicle overloading, and the quality of vehicles themselves. These combined factors create a hazardous environment for drivers, underscoring the need for comprehensive measures to enhance safety on the Samruddhi highway.

5.CASE STUDY

5.1 Introduction

The Hinduhridaysamrat Balasaheb Thackeray Maharashtra Samruddhi Mahamarg is a 701 km expressway connecting Nagpur to Mumbai, passing through 10 districts and linking 26 talukas. It boasts extensive infrastructure, including 25 interchanges, 18 proposed townships, numerous bridges, tunnels, viaducts, and culverts. The designed speed limit is 150 kmph, with reduced limits in mountainous areas. The project requires 24,255 acres of land and is estimated to cost Rs. 55,000 crores, with a planned completion date in 2022. Additionally, the expressway aims to connect 392 villages and establish 19 Krushi Samruddhi Nagar, potentially fostering regional development and connectivity.

Since the opening of the Samruddhi Mahamarg to traffic in December 2022, there have been a total of 1,282 accidents reported on the expressway. These accidents involved 67 vehicles and resulted in 135 fatalities. Over the course of nine months, approximately 48 lakh vehicles have traveled along a 600-km stretch from Nagpur to Bharvir in Igatpuri, part of the 701-km highway. Notably, two major accidents accounted for 37 of these deaths. In one instance, a private AC sleeper bus caught fire due to the driver losing control while intoxicated in July. Another tragic incident occurred on October 15, resulting in 12 fatalities and 23 injuries. On average, the expressway witnesses three accidents daily.

5.2 Accidents happened on Samruddhi highway

On July 1, between 12:30 am to 1 pm, 26 people died when a private sleeper bus traveling from Nagpur to Pune caught fire after colliding with a steel pole and road divider, damaging its diesel tank.

On June 10, three members of a family, including two women, died and one person was injured at Chandajhira near Jalna on the expressway. Their car was hit by a container truck as they were returning to Nagpur from Ahmedabad.

On June 3, three people, including a child, were killed and another person injured after their car overturned on the Dushinapur Shivar stretch on the Samruddhi Highway.

On May 29, three people were killed after a car collided with a road divider and caught fire in Bhuldana. One person was ejected from the vehicle and died from serious injuries, while two others were trapped in the car and died from burns.

6. SOLUTION FOR EXPRESSWAY SAFETY

6.1 Implementation of Cameras:

Installing cameras along highways can enhance surveillance and monitor traffic conditions in real-time. This allows authorities to detect and respond to accidents promptly, identify reckless driving behavior, and enforce traffic regulations effectively.

6.2 Checking Tires

Conducting regular tire inspections helps ensure that vehicles on the highway have properly inflated tires with sufficient tread depth. Proper tire maintenance reduces the risk of blowouts and loss of control, which are common causes of accidents.

6.3 Control Overload Vehicles

Enforcing restrictions on overloaded vehicles prevents excessive strain on tires and other components, which can lead to mechanical failures, loss of control, and accidents. Implementing weight limits and conducting inspections at checkpoints can help regulate vehicle loads effectively.

6.4 Toll Naka Movable Cameras:

Mobile cameras at toll nakas provide flexibility in monitoring traffic flow and detecting violations such as speeding, reckless driving, and overloading. This enforcement measure discourages risky behavior and promotes compliance with traffic laws.

6.5 Speed Detecting Sensors:

Installing speed detecting sensors along highways enables automated detection of speeding vehicles. This technology allows for real-time monitoring of vehicle speeds, enforcement of speed limits, and timely intervention to prevent accidents caused by excessive speed.

6.6 Wall Painting or Design

Implementing visually engaging wall paintings or designs along monotonous stretches of highway can help prevent driver fatigue and monotony. Vibrant and attention-grabbing artwork can provide visual stimulation, improving driver alertness and reducing the risk of accidents due to drowsiness or distraction.

6.7 Nitrogen Tire Inflation

Nitrogen inflation of tires can offer benefits such as improved tire pressure retention, better fuel efficiency, and reduced risk of tire blowouts. Maintaining optimal tire pressure enhances vehicle stability and handling, thus lowering the likelihood of accidents.

6.8 Precautionary Maintenance

Encouraging regular vehicle maintenance, including inspections of brakes, lights, steering, and other critical components, promotes vehicle reliability and reduces the probability of mechanical failures that could lead to accidents.

6.9 Speed Breakers for Every 50 km

Implementing speed breakers at regular intervals, such as every 50 kilometers, helps regulate vehicle speed and reduce the risk of accidents, especially in areas with high traffic volume or where speed limits may be frequently exceeded.

By implementing these measures comprehensively, highway authorities can mitigate the risk of accidents, improve road safety, and enhance the overall efficiency and reliability of highway transportation systems.

3. CONCLUSIONS

The conclusion is that a comprehensive approach involving surveillance, tire checks, vehicle control, camera monitoring, speed detection, wall designs, tire maintenance, and speed breaker placement is crucial for enhancing highway safety and reducing accidents.

REFERENCES

[1] Gemma Pastor Cerezuela 1 , Pilar Tejero, Mariano Chóliz, Mauricio Chisvert, M José Monteagudo Wertheim's hypothesis on 'highway hypnosis': empirical evidence from a study on motorway and conventional road driving, 2004 Nov;36(6):1045-54. doi: 10.1016/j.aap.2004.02.002.

[2] Muthusamy A, Rajendran M Ramesh K, Sivaprakash P, A Review on Road Traffic Accident and Related Factors International Journal of Applied Engineering Research ISSN 0973-4562 Volume 10, Number 11 (2015) pp. 28177-2818

[3] Geetabai, Sandya Pal (2016) A literature study on road accidents statistics and reasoning (ijitr) international journal of innovative technology and research Volume No.4, Issue No.6, October –November 2016, 4979-4984

[4] SJenkinsGodfrayandS.SenthilMurugan(2018),https://www.researchgate.net/publication/325790377_Stability_Control_of_Vehicles_during_Tyre_Burst_with_Auto_Expanding_Ri m

[5] Gaurav R. Bankar, Prof. P. P pale (2022) A Review onStudyofMumbai.NagpurExpressway.https://ijaem.net/issue_dcp

[6] Azeh Gerald, Innocent Ndoh (2022), A Systematic Review of Excessive Speed Monitoring and Control System for Accident Prevention on Cameroon Highways https://www.scirp.org/journal/paperinformation.aspx?paperid=115180

[7] Arkesh Prabhalkar khetade, Tanish Ramesh Naik, Prof. Khultej Gurav (2023), Causes of accident on Mumbai-PuneExpressway,https://www.irjet.net/archives/V10/i4/IRJET-V10I487.pdf