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Assessing the Impact of Road Safety Measures in Odisha's Accident Prevention

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ABSTRACT

India, with a population of 1.35 billion, is rapidly heading towards the direction of a developed nation. As part of this journey, there has been a significant push to expand and improve road infrastructure. But this expansion has not been matched by the increasing number of vehicles, and therefore there has been increased road safety concerns. According to the Ministry of Road Transport and Highways' 2018 report, 1,51,417 individuals were killed in road accidents within a year, and 85% of the fatalities belonged to the productive age group of 18 to 60 years. Not only are these fatalities a family loss but also an economic and social loss for the country.India accounts for 11% of global road accident deaths, which says a lot about the seriousness of the issue. The main causes are overloading of traffic, negligence of traffic rules, poorly planned roads, and safety non-compliance. In most instances, ignorance and negligence of the driver also play a helping hand in causing accidents. With the growth of transport networks, the likelihood of accidents continues to rise. Therefore, road safety must be addressed as a critical public health issue. Road safety education must be promoted, tougher laws must be enforced, and infrastructure needs to be enhanced to reduce the incidence and severity of accidents.

Key Words:- Road safety, Traffic accidents, Road safety awareness, Traffic violations

1. INTRODUCTION

Road safety is still an issue of public health and infrastructural concern for the state of Odisha with a varied landscape and a mix of urban and rural environments. Despite the frequent attempts by the government to streamline road safety regulations, accidents and fatalities continue to progress at an appalling rate. Since the number of vehicles on the roads is increasing, coupled with infrastructural deficiency and dangerous driving habits, the state is in dire need of a strong road safety plan During 2023 alone, Odisha reported 11,428 road accidents that took the lives of 5,315 people and injured more than 10,700. National highways alone reported 45% of the accidents, followed by 30% by state highways and 25% by rural roads. Interestingly enough, two-wheelers were the cause of 45% of the total accidents, and pedestrian deaths accounted for 12% of the death toll, which necessitates the immediate implementation of safer pedestrian infrastructure and road-sharing policy for vulnerable road users.

Time and space also play their part in accident frequencies. Most accidents occur between 5 PM and 10 PM. Coastal regions such as Khordha, Cuttack, and Balasore witness most accidents due to high urban traffic and highway road crossings. Western regions such as Sambalpur and Rourkela witness fewer accidents but greater fatality due to poor road conditions and absence of trauma care. Hilly areas like Koraput and Rayagada are likely to face danger during monsoons due to landslips and poor visibility.

Several recent incidents illustrate the cause factors—overspeeding, careless driving, bad road sight distance, and lack of pedestrian facilities. Bearing this in view, the current study aims at conducting a deep analysis of Odisha road accident trends, identify high-risk zones, evaluate ongoing safety measures, and provide tangible recommendations. Engineering interventions, observance of traffic rules, and behavioral interventions would be the focal points to enhance road safety within the state.

2. OBJECTIVE

The main objective of the project is to carry out an integrated study of security measures and accidents occurring in Odisha State with a view to mapping the current landscape of road safety and workplace security, identifying factors behind

accident occurrences, and providing recommendations that can alter safety procedures with a view to improving safety standards and thereby reducing accident rates. Detailed Breakdown of the Objective:-

1. Comprehensive Data Collection and Analysis
2. Identifying Contributing Factors
3. Assessment of Existing Safety Measures
4. Engagement with Stakeholders
5. Development of Actionable Recommendations
6. Long-Term Safety Strategy

3. LITERATURE REVIEW

Literature searched presents a complete image of road safety concerns and emerging technology solutions. Road Safety Audit (RSA) research in Kalahandi, Odisha, identifies most important safety shortfalls such as poor lighting, lack of markings, and lacking signage. It recommends design enhancement and more regulation to minimize accidents. Similarly, GIS-based studies identify accident zones and present fact-based solutions for zone-specific intervention in traffic flow and urban planning. Another study highlights frequent causes of accidents like careless driving, bad weather, and poor road infrastructure. The solutions range from improved engineering standards—such as expanding roads, installing pedestrian crossings, and more stringent speed controls—to public awareness and education for drivers. Urban research in Bhubaneswar indicates that highways and young drivers have strong correlation with accident risks due to high traffic concentration and risky behaviors. Sharma (2023) introduces smart traffic systems and green infrastructure, proposing the use of AI-based crash prediction models and intelligent traffic control systems. A number of RSA case studies, including those involving Bannerghatta Road, promote systematic risk site identification, better signage, increased lighting, and reduced speed limits. These audits use formal protocols with skilled engineers and robust data sets, which propose pilot measures and regulatory comment. Current advancements in autonomous vehicle technology are explored with a focus on integration of AI and ML for control, perception, and decision-making. Sensor fusion—combining LiDAR, radar, and camera feeds—is seen as key to improving situational awareness. V2V (vehicle-to-vehicle) and V2I (vehicle-to-infrastructure) communication enables enhanced coordination, reducing collisions. Ethical, environmental, and policy concerns are also addressed. Even though automation may reduce emissions and congestion, it poses problems such as job loss. The conclusion of the study is that even though technological fixes hold much promise, continued research, stronger policies, and sustainable design strategies need to be established to bring long-term improvements to road safety.

4. SAFETY OBSERVATION AND RECOMMENDATION

Fig – I represent the absence signboard of OHM

Observation:- Lacking of object hazard markers at bridge/CD/trees are potential safety hazard not only during night hours but also in day time which is shown in Fig - I

Recommendation;- Object hazard markers shall be installed at every parapet of CD/bridge on faces of both traffic direction with conforming IRC-67:2012-15.64.

Fig -II shows the absence of curve signboard.

Observation:- Lack of informatory sign (speed limit, Left/Right turn), Chevron sign board & solid center line are required (Fig – II)

Recommendation;- All curve shall have warning and informatory sign board with conforming IRC: 67-2022 and Curve having less than 450m radii are no overtaking zone shall be marked solid line at center as per IRC: 35:2015.

Fig – III Absence of safety measures in construction zone.

Observation:- Major/Minor bridge work is continued without proper construction safety measures.(Fig – III)

Recommendation;- Diversion sign. Safety ribbons, advance cautionary sign and maintenance of the diversion road has to provide till end of the construction.

Fig-IV Lack of signboards and marking in approach of Toll Gate

Observation:- Impact Attenuators, Exterior lighting and Interior lighting and road marking is not provided.(Fig-IV)

Recommendation;- Interior and Exterior lighting at Toll Plaza area has to installed as per Clause No. 10.11 of the IRC SP 73-2007 Road sign and Road marking shall be given as per IRC 67-2012 and IRC: SP:73-2007.

Fig – V represent the junction.

Observation:- At junction transverse bar marking, Pedestrian marking rumble sign, speed limit sign, intersection sign boards on project road and major road ahead sign, stop sign and rumble sign boards are not provided leads to confusion in the mind of user and potential for head on collision.(Fig-V)

Recommendation;- All junction shall have transverse bar marking, rumble sign, speed limit sign, intersection sign on project road and major road ahead sign, stop sign and rumble sigh at approach road for providing utmost safety to the users.Existing pole shall be protected by providing Concrete pedestal and impact attenuators sign.

5. CONCLUSION

This research was primarily focused on conducting a Road Safety Audit (RSA) to identify safety deficiencies on vulnerable sections of two-lane roads and recommend the appropriate remedial measure. The audit indicated several risk factors, with the observation that the two-lane highways' safety dynamics are quite different from four-lane highways. The most critical issue was a shortage of necessary road signs and markings. Even if they appear less important in a vacuum, in the absence of them, above all in conjunction with bad road planning, there are dangerous areas or accident hotspots so-called "black spots."One of the major area of concern that was said to be lacking was poor sight distance, particularly on horizontal curves and intersections. For roads such as national highways, adequate sight distance should be provided so as to facilitate safe and free traffic flow. Another area of concern that needed attention was a shortage of safety features around sensitive areas such as schools and hospitals. These areas need speed reduction, special notice signs, pedestrian crossing locations, and appropriate traffic regulation to secure safety.

Speed management is the most important aspect of highway safety. Speed limit signs, however, were seldom installed along the audited routes. Since highway features vary with ambient surroundings particularly in urban or populated surroundings, the installation of suitable speed zones is required, especially around schools, hospitals, markets, and low visibility curves.

The audit revealed a huge awareness gap among road users. Far too many drivers lack basic knowledge of road safety because they have minimal exposure to high-speed road conditions. Public education—especially in school-based settings—can create safe behavior from an early point.

Lastly, inadequate signage and dense vegetation were also reported to be significant contributing causes of accidents. Removing sight obstructions, erecting new signs on vacant or destroyed ones, and regular maintenance of roads are suggested to increase overall road efficiency and safety.

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