VISION ZERO

Systems, Approaches and Implementation

Road fatalities have been a leading cause of deaths worldwide and it is a matter of grave concern for India, being the country with highest number of road fatalities. India has lost more than one hundred fifty thousand people annually in road accidents since the past few years. The aspects for improving road safety with an objective of Vision Zero Accidents, are manyfold including Engineering, Planning, Education, Management, Healthcare etc. "Vision Zero: Systems, Approaches and Implementation" is a book which is a compendium of chapters related to the identified themes towards Road Safety and Vision Zero. The book covers a wide variety of subjects like Road Engineering, Remote Enforcement, Stakeholder Agency Coordination, Land use and Urban Planning, Health and Trauma care etc. We are sure this book will be of great value to those interested in Road Safety and envisioning a Vision Zero for Indian Roads.

Dr. Alka Bharat has expertise in architecture, planning, economics, environment, natural resources, and human rights, with more than 35 years of experience in academics, research, administration, publications, and outreach. She has authored over 150 publications and presentations at national and international conferences, contributed to book chapters, and supervised more than 150 UG, PG & Ph.D. students. She has also served as an external reviewer for various IPCC and IPBES reports, is an Associate Editor and Reviewer for several international journals, and has received many reputed national and international citations. She is fluent in Hindi, English, and has basic knowledge of Sanskrit, Punjabi, and German languages. She is also the co-chairperson for the women's wing of the Institute of Town Planners, India (ITPI), and the India representative to the Commonwealth Association of Planners (women's wing). Additionally, she is a member of the IUCN Commission on Ecosystem Management (2022-25).

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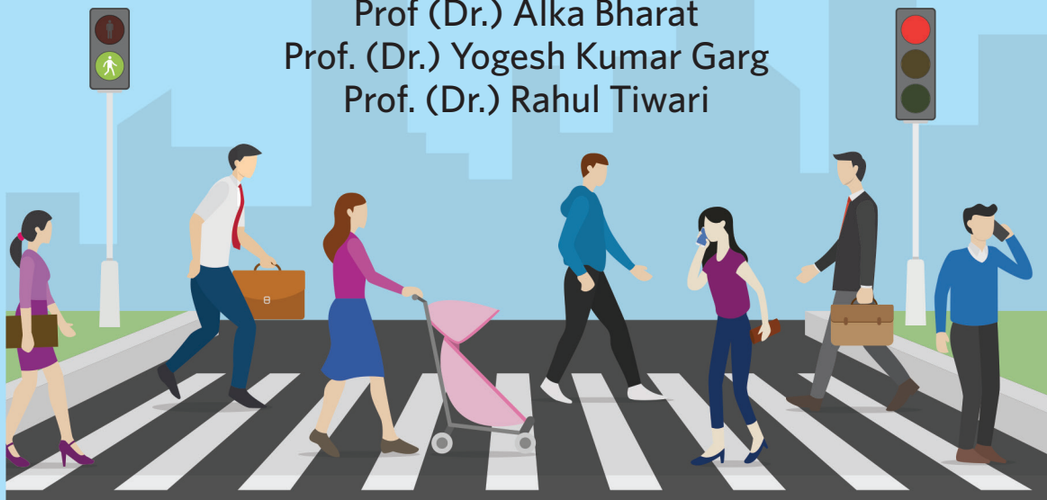

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Framework for Road Safety Improvement Measures for Madhya Pradesh

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Abstract

The "Framework for Road Safety Improvement Measures for Madhya Pradesh" is a review paper aimed at suggesting measures for improving road safety in the state of Madhya Pradesh, India. The review paper provides an overview of the current state of road safety in the state and identifies key challenges that need to be addressed. It proposes a structured approach to road safety management, consisting of four main components: road safety policy and strategy, institutional arrangements, road safety management, and performance monitoring and evaluation. The report also outlines a range of evidence-based interventions that can be implemented to improve road safety, such as infrastructure improvements, public awareness campaigns, and traffic law enforcement. The framework serves as a roadmap for the state government to enhance road safety and reduce fatalities and injuries on the roads.

Keywords: Road Safety, Traffic Management, Safety Guidelines, Framework for Road Safety, Tracking Vehicles.

INTRODUCTION

Road safety is a critical issue in India, where a large number of people lose their lives or suffer serious injuries in road accidents each year. Madhya Pradesh, is no exception (Kini, 2009). Despite several measures taken by the government to improve road safety, the state continues to experience a high number of accidents and fatalities. Therefore, there is a pressing need for a comprehensive framework that can help reduce the number of road accidents and improve road safety in the state.

In this paper, we will provide an overview of the current state of road safety in Madhya Pradesh and identify the key challenges that need to be addressed. We will then discuss the four main components of the proposed framework, namely road safety policy and strategy, institutional arrangements, road safety management, and performance monitoring and evaluation. Finally, we will outline a range of evidence-based interventions that can be implemented to improve road safety in the state. Overall, this report serves as a roadmap for the state government to enhance road safety and reduce fatalities and injuries on the roads (Regmi, 2021).

Road accidents continue to be a major cause of concern in Madhya Pradesh, with thousands of people losing their lives or suffering serious injuries each year. According to the Ministry of Road Transport and Highways, Madhya Pradesh accounted for 5.7% of the total road accidents in India in 2019, with 7,045 fatalities and 17,152 injuries reported in the state (Thakare et al., 2021).

The major causes of road accidents in Madhya Pradesh include overspeeding, drunk driving, reckless driving, and poor road infrastructure. Many of the roads in the state are in a poor condition, with inadequate signage and lighting, and the lack of proper traffic management systems exacerbates the problem. Additionally, the low awareness of road safety rules and regulations among the general public also contributes to the high number of accidents in the state.

To address this issue, the state government has taken several measures to improve road safety, such as the installation of speed cameras, the establishment of road safety committees, and the introduction of stricter penalties for traffic violations. However, these measures have not been able to reduce the number of accidents significantly. Therefore, there is a need for a more comprehensive and structured approach to road safety management in the state.

FINDINgS AND DISCUSSION

Road Safety Policy and Strategy

Driving with a considerate attitude is crucial for promoting road safety and reducing the number of accidents on the roads. A considerate driver is someone who is mindful of other road users, obeys traffic rules and regulations, and takes necessary precautions to avoid accidents. One of the key aspects of driving with a considerate attitude is being aware of one's surroundings and paying attention to other vehicles, pedestrians, and cyclists. This means avoiding distractions such as mobile phones or eating while driving, which can cause a loss of focus and increase the risk of accidents (Luke & Heyns, 2014).

Buckling up is a simple yet highly effective way to promote road safety and reduce the risk of serious injury or death in the event of an accident. Wearing a seatbelt can significantly reduce the impact of a collision, prevent ejection from the vehicle, and keep the driver and passengers in place during a crash. In fact, studies have shown that seatbelts can reduce the risk of fatalities in car accidents by up to 50% for front-seat passengers and up to 75% for rear-seat passengers. Despite this, many drivers and passengers still neglect to wear their seatbelts, often due to a false sense of security or discomfort.

Using a proper helmet is a vital way to promote road safety and reduce the risk of head injuries in the event of an accident. Helmets are designed to absorb the impact of a collision and protect the head and brain from injury, making them a critical piece of safety equipment for motorcyclists and bicyclists. Wearing a proper helmet can significantly reduce the risk of serious head injuries and fatalities in the event of a crash. In fact, studies have shown that wearing a

helmet can reduce the risk of head injury by up to 70% and the risk of death by up to 40% (Robinson, 1996).

Using child seats is an important way to promote road safety and reduce the risk of injury to children in the event of a crash. Child seats are specifically designed to provide protection for young children and infants, who are at greater risk of injury due to their smaller size and weaker neck muscles. Proper use of child seats can significantly reduce the risk of injury and death in the event of a crash. Studies have shown that using a child seat can reduce the risk of fatal injuries in infants by up to 71% and in toddlers by up to 54%. It is also important to ensure that the child seat is properly installed and secured in the vehicle. This may involve using seat belts or the LATCH system (Lower Anchors and Tethers for Children), which are designed to make it easier to properly secure child seats in the vehicle (Dacina & Lococo, 2007).

Controlling phone usage while driving is an important way to promote road safety and reduce the risk of distracted driving, which is a leading cause of accidents on the roads. Using a phone while driving can distract the driver's attention from the road, making it more difficult to react to changes in traffic or road conditions.

In many countries, including India, driving under the influence of alcohol is a criminal offense that can result in fines, imprisonment, or suspension of the driver's license. In addition, those convicted of drunk driving may also face increased insurance premiums, loss of employment opportunities, and social stigma (Ross & Gonzales, 1988).

Enforcement of drink and drive laws can be carried out through various means, including roadside checkpoints, breathalyzer tests, and penalties for refusing to take a sobriety test. Law enforcement agencies may also use public education campaigns to raise awareness about the dangers of drunk driving and promote responsible drinking habits.

Institutional Arrangements

Improving roads is a critical aspect of promoting road safety and reducing the number of accidents on the roads. Well-designed and well-maintained roads can provide a safer and smoother driving experience, reducing the risk of accidents caused by potholes, uneven surfaces, or inadequate signage (Cann et al., 2004). One of the key aspects of improving roads is ensuring that they are designed with safety in mind. This means ensuring that road widths, curves, and gradients are appropriate for the speed limits and traffic volumes, providing adequate sightlines, and including features such as barriers and guardrails where necessary.

Another important aspect of improving roads is maintaining them to a high standard. This involves regular inspection and maintenance of road surfaces, drainage systems, and signage to ensure that they are in good condition and clearly visible to drivers. In addition to these measures, improving roads can also

involve the introduction of new technologies and strategies, such as intelligent transportation systems (ITS) and traffic management systems, to help reduce congestion and improve the flow of traffic (Liu & Ke, 2022).

However, improving roads can be a costly and time-consuming process, requiring significant investment and planning. Therefore, it is important to prioritize and target the areas where improvements will have the greatest impact on road safety and ensure that resources are allocated effectively. Overall, improving roads is a crucial aspect of promoting road safety and reducing the number of accidents on the roads. By designing and maintaining roads with safety in mind and introducing new technologies and strategies where appropriate, we can create a safer and more efficient driving environment for everyone.

Road Safety Management

GIS mapping of roads is an important tool for improving road safety and transportation planning. GIS, or Geographic Information System, is a digital mapping technology that allows for the collection, analysis, and presentation of geospatial data. By using GIS mapping, road authorities and transportation planners can gain a better understanding of the road network and its features, such as road type, traffic volume, speed limits, and accident history. This information can be used to identify areas where road safety improvements are needed, such as high-risk intersections or stretches of road with a high incidence of accidents (Gupta et al., 2003).

GIS mapping can also help identify patterns and trends in accident data, allowing for the development of targeted interventions to reduce accidents and improve road safety. For example, if accidents tend to occur at certain times of day or during certain weather conditions, transportation planners can use this information to implement measures to improve road safety during these periods. In addition to improving road safety, GIS mapping can also be used to support transportation planning and decision-making (Giuffrida et al., 2019). By providing a detailed picture of the road network and its features, transportation planners can use GIS mapping to identify areas where new infrastructure is needed or where existing infrastructure needs to be upgraded or expanded.

GIS mapping of roads is an important tool for improving road safety and transportation planning. By providing detailed information about the road network and its features, transportation planners can develop targeted interventions to reduce accidents and improve road safety, ultimately creating a safer and more efficient transportation system. The use of GPS (Global Positioning System) in vehicles can provide a range of benefits, including improved navigation, more efficient routing, and better management of vehicle fleets (Ochieng et al., 2002). In some countries, the use of GPS in vehicles is mandatory, either for safety reasons or to comply with regulatory requirements. Mandatory GPS can help improve road safety by allowing authorities to track the movements of vehicles and respond quickly to emergencies or accidents. In addition, GPS can also

help reduce congestion on the roads by providing drivers with real-time traffic information and suggesting alternative routes (Pattanaik et al., 2016).

For fleet management purposes, mandatory GPS can help companies optimize their operations by tracking the location and movements of their vehicles, monitoring fuel consumption and vehicle performance, and ensuring compliance with safety and environmental regulations (Fontarus, 2017). While mandatory GPS can provide many benefits, it is important to consider the privacy implications of such technology. Drivers and vehicle owners should be informed about the collection and use of their location data, and appropriate safeguards should be put in place to protect personal privacy and prevent misuse of the data.

Performance Monitoring and Evaluation

Regular checkups of vehicles are an essential aspect of promoting road safety and preventing accidents on the roads. By ensuring that vehicles are well-maintained and in good working order, drivers can significantly reduce the risk of breakdowns and malfunctions, which can lead to accidents. Regular checkups involve inspecting various components of the vehicle, such as brakes, tires, lights, and steering, to ensure that they are functioning properly. This can be done by a professional mechanic or by the driver themselves, using a checklist provided by the manufacturer or a trusted source. In addition to preventing accidents, regular checkups can also help save money by identifying potential problems early and avoiding costly repairs down the line. They can also help improve fuel efficiency, reduce emissions, and extend the lifespan of the vehicle (Nakamoto et al., 2019).

Overall, regular checkups of vehicles are a crucial aspect of promoting road safety and preventing accidents on the roads. By taking the time to ensure that their vehicles are well-maintained and in good working order, drivers can help create a safer and more responsible driving environment for themselves and others.

Modern vehicles are equipped with a range of safety electronics, including anti-lock braking systems (ABS), electronic stability control (ESC), and traction control systems (TCS) (Chen & Kuo, 2014). These safety features are designed to help prevent accidents and keep drivers and passengers safe in the event of a collision.

It is important to never switch off safety electronics in a vehicle. While some drivers may be tempted to do so in order to improve performance or save fuel, disabling safety electronics can greatly increase the risk of accidents and reduce the effectiveness of safety features in the event of a collision. For example, switching off ABS can make it more difficult to maintain control of the vehicle during emergency braking or in slippery conditions, while disabling ESC can increase the risk of skidding or loss of control during cornering (Jitesh, 2014).

In addition, disabling safety electronics can also have legal and insurance implications. In many countries, it is illegal to modify or tamper with safety features in a vehicle, and doing so can result in fines or other penalties. In addition, insurance policies may be voided if safety electronics have been intentionally disabled (Yadav & Chaturvedi, 2022).

Vehicle tracking systems can be a valuable tool for law enforcement agencies in their efforts to combat crime and improve public safety (Morgan, 2002). By using GPS technology, vehicle tracking systems allow police to monitor the movements of vehicles in real-time, track the location of stolen vehicles, and quickly respond to emergencies or crimes in progress. In the case of stolen vehicles, vehicle tracking systems can help police quickly locate and recover the stolen vehicle, potentially leading to the arrest of the perpetrators and the recovery of stolen property. In addition, vehicle tracking systems can be used to monitor the movements of suspects in criminal investigations, providing valuable evidence that can be used in court.

Vehicle tracking systems can also be used to improve the safety of police officers in the field (Skilling, 2016). By monitoring the location and movements of police vehicles, command centers can quickly respond to emergencies or incidents, providing backup and support as needed. However, the use of vehicle tracking systems by police also raises important privacy concerns. It is important to ensure that appropriate safeguards are in place to protect the privacy of individuals and to prevent the misuse of tracking data. This may include policies and procedures for the collection, use, and retention of tracking data, as well as mechanisms for individuals to request access to or deletion of their data.

CONCLUSIONS

In conclusion, the Framework for Road Safety Improvement Measures for Madhya Pradesh provides a comprehensive set of strategies and recommendations aimed at improving road safety in the state. These measures range from promoting safe driving practices to improving the condition of roads; enhancing emergency response systems; and using technology such as GIS mapping and GPS tracking to better manage road safety.

The implementation of these measures will require the cooperation and collaboration of various stakeholders, including government agencies, law enforcement, transportation departments, and the general public. It is essential that all stakeholders work together to raise awareness about road safety, promote safe driving practices, and ensure that roads are well-maintained and designed with safety in mind.

The adoption of the Framework for Road Safety Improvement Measures has the potential to significantly reduce the number of accidents, injuries, and fatalities on Madhya Pradesh roads, improving the quality of life for all residents and visitors to the state. It is hoped that the implementation of these measures

will serve as a model for other states in India and around the world, promoting road safety and saving lives.

RECOMMENDATIONS

Here are 10 recommendations for improving road safety in Madhya Pradesh:

1. Increase public awareness of road safety through educational campaigns, social media, and public service announcements.
2. Improve road infrastructure, including road design, maintenance, and construction, to reduce accidents and improve traffic flow.
3. Implement strict laws and regulations for drunk driving, speeding, and other reckless driving behaviors, with strict penalties for offenders.
4. Mandate the use of seat belts, child car seats, and helmets for all passengers and drivers.
5. Improve emergency response systems, including ambulance services, medical facilities, and traffic control, to ensure prompt response to accidents and emergencies.
6. Use GIS mapping to identify high-risk areas and develop targeted interventions to reduce accidents and improve safety.
7. Encourage the adoption of safe driving practices through training programs for drivers, including defensive driving techniques and awareness of road safety laws and regulations.
8. Improve public transportation systems, including buses and taxis, to reduce the number of private vehicles on the road and encourage safe and sustainable transportation options.
9. Implement mandatory GPS tracking for all commercial vehicles, including trucks and buses, to improve fleet management and monitor compliance with safety regulations.
10. Increase law enforcement presence on the roads, including traffic police patrols and speed cameras, to deter reckless driving and enforce traffic laws.

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