

e-ISSN:2582-7219



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 5, Issue 5, May 2022



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.54



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Review on Highway Safety and Road Safety

⁽¹⁾Prof. Natish Sayyed, ⁽²⁾Vartika Meshram, ⁽³⁾Akash kumar, ⁽⁴⁾Kashik Lonare, ⁽⁵⁾Vaibhav Ukey,
⁽⁶⁾Lakhan Paswan, ⁽⁷⁾Ritik Thakre, ⁽⁸⁾Kaish Ansari

- ⁽¹⁾ Guide & Head of Department, Department of Civil Engineering, NIT Polytechnic College, Nagpur, India
- ^{(2), (3), (4), (5), (6), (7), (8)} Diploma Students, Department of Civil Engineering, NIT Polytechnic College, Nagpur, India

ABSTRACT: Transportation plays a key role in the development of an area, but it happens only when the transportation is safe, rapid, comfortable and economy. A road is considered safe when only a few, or no accidents occur. Road and its surroundings, road users and vehicles are the elements contributing to road accidents. Pedestrians, bicyclists and two-wheeler motorized riders are the vulnerable road users. The loss of human life due to accident is to be avoided. Road safety audit (RSA) is a formal procedure for assessing accident potential and safety performance in the provision of new road schemes and schemes for the improvement and maintenance of existing roads. These Audit studies or analysis give scope for the reduction of accidents and helps us to provide safe, self-explaining and forgiving roads. By this we can save the precious human life as well as the nation's economy. The selected for this study is part of Hyderabad Outer and Inner Ring Roads, HMDA Roads. Knowledge of accidents that have occurred on roads helps us to improve the design of the roads or to influence the behavior of road users, so that similar accidents do not occur again. Literature review will be done for the safe movement of the Road safety audit and will check the merits and demerits of the techniques used previously.

KEYWORDS: Accidents, HMDA Roads, Road Safety Audit, Outer ring road, Urban Road.

I. INTRODUCTION

Highways are designed with safety in mind there are signs which indicates safe speed for turning, entering, or exiting freeways signs which indicate ending and merging lanes etc. Road markings keep the traffic regulated and guide on safe passing. Lane separators and shoulders on the side of the fire ways are all safety features. Road traffic safety refers to the methods and measures used to the prevent road users to prevent road users from being killed or seriously injured In urban areas, road development has been helped by a national urban renewal mission program, through which the central government assists city governments with federal funds. With a combination of higher investments in urban and rural road infrastructure, increasing sales of motor vehicles, and 7-10% growth rates in the economy, the trend of increasing road traffic fatalities may be exacerbated if corrective policies are not put in place on an urgent basis. The government of India has indicated its concern by accepting the Report of the Committee on Road Safety and Traffic Management, which has recommended that a National Road Safety Agency be established in India through specific enabling legislation on road safety. This proposal is under consideration by the national government. The goal of the present report is to identify major road safety problems in India and to discuss countermeasures that have promise to address these specific road safety problems. A similar report for the situation in China was recently completed. The first part of the present report examines the available crash data and identifies a limited number of important areas that are especially characteristic of the current road safety situation in India, and for which relatively specific countermeasures are available. The second part discusses several promising countermeasures. In this discussion, we have organized the treatment of countermeasures in terms of an analysis that describes the total harm from road crashes as the product of three components: exposure, risk, and consequences.

Improvements in behavioral safety and vehicle safety are strategic long-term tasks. The progressive development of society, science, and technology indicates that traffic safety must undergo a long-term improvement process. In addition, traffic accidents are inevitable and occur in different degrees; thus, the threat of traffic accidents to human life cannot be completely eradicated. According to the "Global Status Report on Road Safety" published by the World Health Organization, despite improvements in road safety, approximately 1.25 million people still die from traffic injuries each year. In the 20th century, 25.85 million people died in traffic accidents worldwide, which exceeds the number of deaths in World War I. According to the statistics of the Roadside Safety Research Program of the Federal Highway Administration (FHWA) (2018), roadside accidents accounted for more than 50% of all traffic fatalities. According to China's Road Traffic Accident Statistical Annual Report (2018), roadside accidents account for approximately 8% of the annual total number of crashes but cause 13% of the death rate. Compared with other crash



types, based on the high fatality rate of roadside accidents and the significant difference in the risk factors that affect roadside accidents and multivehicle accidents, relevant research must be carried out on roadside safety.

Some developed countries (such as the United States and Australia) have realized that improving behavioral safety and vehicle safety is a long-term arduous task. By analyzing the causative mechanism of roadside accidents, some scholars have explored the risk factors that affect the frequency and severity of roadside accidents and then implemented corresponding measures to improve roadside safety and reduce roadside accident losses, such as driver management, vehicle review, and road optimization design. From the perspective of driver management and vehicle detection, poor driving behavior and poor vehicle performance are often significant factors that lead to roadside accidents. From the perspective of road design, numerous design elements have an impact on traffic safety, and they can be generally categorized into alignment design, including horizontal, vertical, and cross section alignments, and roadside design, including the roadside clear zone (RCZ), roadside guardrail, and roadside obstacles. It is generally believed that different road alignment designs and roadside designs have different effects on the improvement of traffic safety. Strict driver management, regular vehicle maintenance, and humanized alignment design based on drivers, vehicles, and roads can eliminate certain inevitable traffic accidents. "Forgiving roadside design" can reduce the probability of casual traffic accidents and the crash loss after the vehicle enters the roadside.

Since the 1960s, the number of traffic deaths in the United States has fluctuated at approximately 40000. Considering that the numbers of vehicles and vehicle miles of travel in the United States have increased 7.5 times over the previous period, the death rate per 100 million vehicle miles has actually fallen by more than half. In most countries and regions, especially in developing countries of Asia and Pacific, the death rate from traffic accidents has been on the rise, while in the United States, the death rate has been on the decline. These trends mainly profit from the concept of "forgiving roadside design"; corresponding planning and design methods which began in the 1960s were improved and promoted for approximately 40 years and became widely accepted by society and industries. The concept of forgiving roadside design considers that the driver's fault should not be compensated at the cost of life; that is, an RCZ should be provided for the driver who has to run off the road to regain control of their vehicle and return to the road surface. Even if the driver cannot return to the road surface, some degree of fault will be eliminated in the area to minimize the severity of traffic accidents. Therefore, the RCZ should be relatively flat and free of obstacles and offer an area where the out-of-control vehicle can return to its normal route. In highly motorized countries, this concept is extensively incorporated in most highway construction, which reflects the importance of roadside design for traffic safety.

II. LITERATURE REVIEW

CM Richard, K Magee, P Bacon Touching mobile devices, during driving, is prohibited by many law enforcement agencies. There are situations, especially in developing countries, where people get stuck on roads with a low battery, low device-memory, and no mobile network. This paper proposes the framework of the "citizen reporting program" (CRP) aided with mobile apps to reduce reckless driving in such resource-constrained situations (RCS). A mobile app was designed, developed, and tested as a tool for this purpose. It could convert speech to text without a cellular network, capture the nearest geolocation, and send data to a server on the network or internet availability.

ED SUSSMAN, H BISHOP B MADNICK R WALTER The Transportation Systems Center, in support of research carried out by the National Highway Traffic Safety Administration's Crash Avoidance Division, has reviewed research into driver attentional processes to assess the potential for the development of methods and techniques for reducing the number of accidents related to attentional lapses. Contained in this paper is a summary of the results of the review with regard to the (a) safety implications of inattention, (b) psychological and physiological indices of inattention, and (c) in-vehicle instrumentation for detecting inattention. Areas of research are suggested that could be valuable in the development of practical attention monitors for invehicle use.

Francis John Gichaga, The Impact of Road Improvements on Road Safety and Related Characteristics. IATSS Research (2016), University of Nairobi, Kenya In this paper presented the historical and cultural background relating to road improvement and road safety characteristics in Kenya. It discussed two case studies: one on the socio-economic impact following improvements to a 50-km, high-class, high-traffic-volume road and the other on the monitoring and evaluation of road safety aspects along the Northern Corridor in Kenya also following major road improvements. The results of monitoring and evaluation exercises on the Northern Corridor have shown that drivers are the major contributors in causing accidents, with a component ratio of 49.4%; pedestrians are next at 21.7%. Data also showed that 24% of the accidents along the Northern Corridor are fatal, which is of major concern. The study additionally indicated that most road users have not been exposed to education or training on road safety. This study presented many recommendations arising from the road safety study regarding possible improvements in aspects of road safety along the corridor and potential applications of those changes to other roads in general. The study also showed that high



truck composition levels contributed to a high rate of accidents and that accident black spots were influenced by factors such as the geometric characteristics of the highway, annual average daily traffic, truck composition, and other random factors. Observations also indicated that most road users did not have basic education or training on road safety.

Shalini Kanuganti et al. Road Safety Analysis Using Multi Criteria Approach: A Case Study in India. World Conference on Transport Research - WCTR 2016 Shanghai. 10-15 July 2016 In this paper a study was carried out to determine the priority of safety requirements of a certain category of rural roads, viz., Pradhan Mantri Gram Sadak Yojana (PMGSY) roads in the Jhunjhunu district of Rajasthan, India. Multi-criteria techniques were used to quantify the safety levels. Further analysis was done on the road having the worst safety features to rank various stretches. The parameters vital for safety have been selected and quantified using three multi-criteria decision-making analysis tools: Simple Additive Weightage (SAW), Analytical Hierarchy Process (AHP) and Fuzzy AHP methods and results are compared. Analysis has been done in two phases. In the first phase the prioritization of roads for safety provision was carried out considering the total length of each road as an alternative and the most critical road was identified. The parameters in the road were measured and rated (on a scale of 1-5). In the second phase, the road found critical from the first phase was considered for detail analysis. The entire stretch of the road was divided into stretches of 1 km and the stretch-wise prioritization of roads for safety provision was determined. The average values per km for the severity score of the parameters were obtained like the first phase. The methodology suggested can be used to determine the level of contribution of parameters towards safety hazard.

Athanasios Galanis et al. Pedestrian Road Safety in Relation to Urban Road Type and Traffic Flow. 3rd Conference on Sustainable Urban Mobility, 3rd CSUM 2016, May 2016, Volos, Greece In this paper presented an analysis of the relationship between pedestrian road safety, urban road type and motorists' traffic flow. The researchers examined six urban streets of several types in the city of Volos (a medium-sized Greek city, 130,000 inhabitants). They collected data of the pedestrian traffic flow and their legal or illegal walking behavior for each road segment of the examined streets. Furthermore, they collected data of motorists' traffic flow in the same road segments of the streets in the study area. The combination of those data with the administrative ranking of each road can indicate a walkability level of an examined street or a specific route and reveal pedestrians' mobility and safety issues.

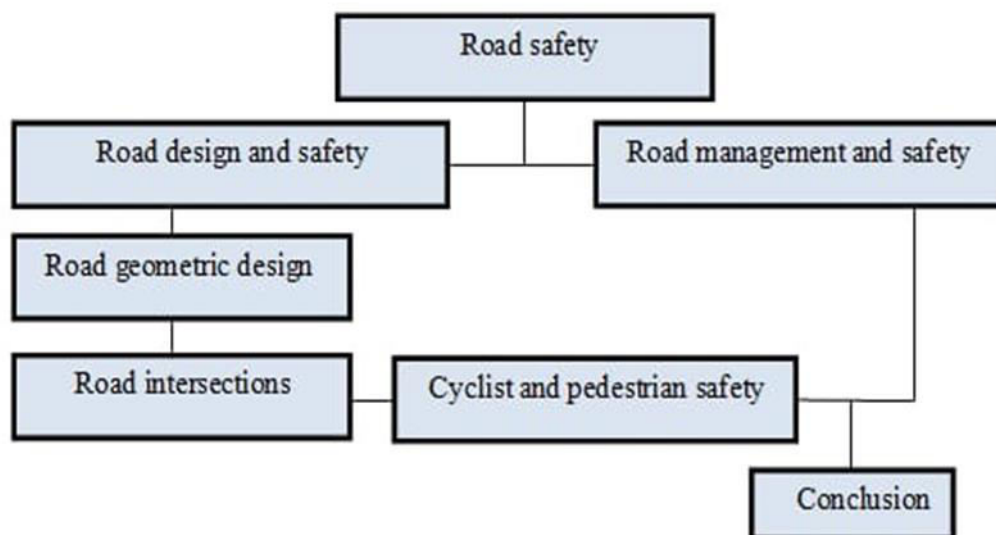
Xuchun S. Tu, Application of RiscFor Road Safety Program Development. World Conference on Transport Research - WCTR 2016 Shanghai. 2016 A review of the crash history has identified that the run-off-road crash is one of key crash types in Queensland, Australia. Hazards on both sides of a carriageway are identified a potential risk exposed to road users. This study says that, a proper roadside design plays an indispensable role to ensure a more forgiving road environment to reduce the likelihood and severity of run-off-road crashes. To assist road engineering practitioners in roadside design, the Queensland Department of Transport and Main Roads (TMR) developed a software application - the Roadside Impact Severity Calculator (RISC), however the applicability of RISC for developing the road safety improvement program needs to be evaluated through gaining a greater understanding of the correlation between the severity index and the crash reduction factor. The existing historical crash data indicates that run-off-road and head-on type crashes account for most of the serious crashes occurring on the roads in Queensland. Hazards on both shoulder and median sides are identified as a major risk to motorists involving run-off-road crashes. Managing road side hazards in a proper manner is key to reduce the likelihood and/or severity of run-off-road crashes. The effectiveness of a road safety treatment can be expressed as either a crash reduction factor (CRF) or a crash modification factor (CMF).

III. OBJECTIVES

- To study the various forces acting on septic tank. Understanding the most important factor's role in designing of a water tank.
- To study the guideline of design of septic tank according to IS Codes and checking the design.
- To know the design philosophies of water tank design.
- Preparing a septic tank design which is economical and safe, providing proper concrete and studying its safety according to various codes



IV. PROPOSED METHODOLOGY



V. CONCLUSION

The improvement of road safety is the major part for the development of road infrastructure safety management. The road framework safety management furnish the good sample on how to minimise the corresponding problems in the investigation methods such as: data, legal framework, funding, knowledge and tools. For the proper enhancement of the road infrastructure safety procedure, the availability and reliability of data is of high quality, the high quality of data is most important. Therefore, in order to promote the road infrastructure safety management procedures, a choice of various forms of road safety facts and information should be collected tabulation, calculation and analysis to allow application of each of the road infrastructure safety management procedure. For the permanent establishment procedures for the road infrastructure safety management procedures, the legal frame work is most important. Good examples for the improvement of the road infrastructure are toestablished and implementing the road safety audits, road safety impact assessments, road network safety and the safety inspections. Improvement in the road safety by investment on the road infrastructure safety management is an important investment. For the better highest benefits of the society the investment permits the chance of funnelling the available resources on the road network. Improvements in the infrastructure can provide the economic developments benefits for the both large and small scale. Lower down cost of production and improve market access, is due to the improvement in the transportation infrastructure. And also, for reduced down the crash frequency and severity the concept of “forgiving roadside design” must be applied and the “positive guidance” must be adopted. This examination analysed the impact of street enhancement for protection. This examination thought about the pattern of streets mishaps, qualities of mishaps and streets that influence safety by, during and after development.

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