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Comprehensive Review on Road Safety Audit

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ABSTRACT: Road safety audit is formal procedure for assessing accident potential and safety performance in the provision of new road schemes, the improvement and rehabilitation of existing road & in maintenance of roads. The role of auditor is to provide independent advice in the form of written recommendations. The designer or client then considers the advice and formal decision is made by them on whether or not to adopt each of the recommended safety alterations. The primary role of audit team is to identify the potential problems of a highway project by conducting the site inspection & collecting data from various agencies. The objective of the study is the identification of accident prone areas on the road from FIR, to study the effect of roadway geometrics and traffic conditions on the road stretch and development of statistical relationship between accident rates and various factors causing accidents. The scope of the study is to reduce accidents on road network, reducing severity of accidents and the need for costly remedial work is reduced..

KEYWORDS: Accident, road safety

I. INTRODUCTION

Road Safety Audit (RSA) is defined as "the formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users. Road safety audits differ from conventional traffic safety studies in two key ways: road safety audits are often pro-active investigations, rather than reactive investigations of sites with histories of complaints or poor safety performance, and the investigation team is independent from the staff that is designing the project or maintains the road. Road Safety in India In India, at present there is no formal requirement for road safety audits to be undertaken. However, India has also started realizing the importance of road safety audits. It is because of Ministry of Road Transport and Highways sponsored the project on "Development of Safety Audit Methodology for Existing Roadway Sections" to Central Road Research Institute in April 2002 The National Highway Authority of India entrusted CRRI to carry out RSA of engineering design for construction packages under TNHP (8 packages) and GNTRIP (7 packages) on NH-2. The total length of these 15 packages was about 900 KM which was the longest road project for which RSA has been carried out in the world. Also, first RSA was carried out again by CRRI in 2000 on Indore Bypass. It is understood that the entire NHDP will be subjected to RSA as part of its implementation. However it is to be recognized that RSA are to be under taken all types of roads

There are five stages of a road project at which a road safety audit can be conducted.

Stage 1 Feasibility Stage/Preliminary Design Stage

An audit on completion of the planning or feasibility study stage will examine features such as design standards, route choice and continuity with the existing adjacent network, horizontal and vertical alignments, cross sections and interchange/intersection layouts. Careful auditing at this early feasibility study stage can help to reduce the costs and lost time associated with changes that may otherwise be brought about during later audits.

Stage 2 Detailed Design Stage

This audit stage occurs on completion of the detailed road design (the final DPR) but before the preparation of contract documents. Typical considerations include geometric layout, pavement markings, signals, lighting, road signs, intersection details, clearances to roadside objects (crash barriers/frangibility) and provision for vulnerable road users. Attention to detail at this design stage can do much to reduce the costs and disturbance associated with last minute changes that may otherwise be brought about with a pre-opening audit.

Stage 3 Construction Stage

This stage of audit takes place during construction of the road works. It examines the IRC:SP:88-2019 12 safety of the traffic management plans for each phase of construction for large road projects (i.e. before the works begin), and it also inspects the provisions for road safety at the road work site during the construction period. Typical issues examined include the provisions for pedestrian safety, advanced warning zones, adequate transition zone lengths, worker safety, effective numbers of reflective signs, safe delineation, credible speed limits, temporary crash barriers, lighting and diversions.

Stage 4 Pre-Opening Stage

This audit involves a detailed inspection of the new road project immediately prior to its opening. Although most road projects are constructed “under traffic” there is a time just before the Contractor hands over the project when the project is almost complete and when a pre-opening stage audit is undertaken. The new road should be driven, ridden and walked (as appropriate) by the audit team to ensure that the safety needs of all road users are provided for. A night-time inspection is particularly important at this stage to check installation and visibility of signs, markings, delineation, lighting and any other night time/low light related issues.

The number of project stages at which audits are conducted usually varies according to the classification of the road, and the size of the project. For example, a major road project on an expressway or multilane highway may be audited at each of the project stages. For efficient use of limited resources, smaller projects on roads carrying low volume of traffic may be audited at one or two stages.

Stage 5 Safety Audit of Existing Roads

The existing road may be a well-established road dating back decades or it may be a recently upgraded or rehabilitated road. The audit of existing road aims to ensure that the safety features of a road are compatible with the functional classification of the road. It also aims to identify any feature that may develop over time into a safety issue (such as a tree blocking sight lines at an intersection).

A number of the safety issues found in these audits should be readily addressed through simple and low cost maintenance practices (e.g. tree trimming, sign and line marking renewal, and roadside hazard issues). As such, there are benefits in having maintenance crews trained in road safety reviews so that they can apply their safety knowledge routinely during each shift.

These crews may not be independent of the existing road network, and they may not be able to look at the road through the eyes of a first time user, but they will be able to eliminate the more obvious safety concerns. Another issue with safety audits of existing roads revolves around the use of crash data. Some auditors like to have access to the Police crash data for the road they are auditing. They say it helps them to understand some of the proven safety issues along the road. Others argue that this can cause the audit team to focus too closely on the crash sites, possibly overlooking other high risk locations. Whichever option is adopted, the road authority should be very clear in its objectives. If it wants a crash investigation, use crash data together with the audit. IRC:SP:88-2019

The audit team should prioritize its findings according to those that can most readily and cost-effectively be treated. It makes easier for the road authority to undertake the recommended treatments as per available budget.

II. LITERATURE REVIEW

Abdul Rahoof, Bipin Kumar Singh [1] explained Road safety review is an essential means for giving careful consideration to road safety amid the configuration of road plans. This unequivocal consideration ought to help everybody required in settling on choices with respect to changes to road base to survey the safety ramifications of the numerous decisions that emerge amid the outline procedure, and accordingly build the road safety familiarity with base organizers, fashioners and powers.

Hitesh Kumar, Mrs. Monika [2] studied in the identification of accident prone areas on the road from FIR, to study the effect of roadway geometrics and traffic conditions on the road and development of statistical relationship between accident and various factors causing accidents. The road selected for the study is Kaithal-Kurukshetra, Haryana, India. Accident prone locations are identified by the all analysis.

Yuha Huvarinen , Elena Svatkova, Elena Oleshchenko , Svetlana Pushchina [3] shows that observance of automobile roads design and construction standards does not guarantee safety of traffic. The focus is put on the weakest component of the traffic system – “a person” in the context of growing motorization and psychological stresses and increase of accidents risks. Substantiation is provided for the conclusion about the necessity for using additional tools capable of minimizing accidents risks stipulated by the human factor. We have examined the world road industry experience 3 decades long and the results of its continuous methodical improvement. The main tool is the traffic safety audit

Athanasios Galanis, George Botzoris, Nikolaos Eliou, [4] presents an analysis of the relationship between pedestrian road safety, urban road type and motorists’ traffic flow. A suitable index for the evaluation of the walkability level of an urban street is the pedestrian traffic flow and the walking behavior. The researchers examined six urban streets of various 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

Sanjay Kumar Singh [5] analyzed the road accidents in India at national, state, and metropolitan city level. Analysis shows that the distribution of road accidental deaths and injuries in India varies according to age, gender, month and time. Age group 30-59 years is the most vulnerable population group, though males face higher level of fatalities and injuries than their female counterparts. Moreover, road accidents are relatively higher in extreme weather and during working hours. Analysis of road accident scenario at state and city level shows that there is a huge variation in fatality risk across states and cities

Rahul Patil , Kunal Pawar [6] studied the section of road from Four/Six Laning of Karodi (km 320.104) to Telwadi (km 375.000) road section of NH-211 (new NH No. 52) in the state of Maharashtra under NHDP Phase IV-B on EPC Mode” is undertaken. Road taken having considerable traffic during day and night time and some black spots on the road where accidents takes place continuously.

M D Katiyari, S.D.Ghodmare [7] identified deficiencies, developing mitigating strategies, improving public relations, enhancing credibility of the roads and calculating the crash rate of intersection or length of roads.

III. CONCLUSIONS

Road safety audits include; • Reduced “whole of life cycle costs” of a road project • Reduced risk of crashes and its severity while using the road network. • Enhanced attention to the safety needs of vulnerable road users • Lower costs for remedial work at black spots. • Reduced overall costs of road trauma to the community. In the process, the highway profession also benefits from: • Development of increased understanding and documentation of road safety engineering. • Enhanced level of importance for road safety engineering. • Serve to review and update safety standards and procedures

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