

Rehabilitation and up-gradation of Ahmednagar- Baramati-Phaltan NH-160 by Using Road Safety Audit

Pranali Bodhare¹, Dr.P.L.Naktode²Dr. R. M.Damgir³,
Sandeep L. Hake⁴

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ABSTRACT

Road safety is a huge problem in develop and developing countries, road safety measures are not implemented seriously yet, especially in developing countries. Road safety measures are important to be defined and implement before, during, and after road accident occur. Furthermore, evaluation is needed after implementation of road safety measures, in order to find out whether safer road is better or not. The aim of this study is to develop road safety measurement based on existing road condition, traffic condition, accident happened, before and after implementation of road safety measures. Road safety value by indicators as the results should be implemented consistently and hard effort of all stakeholders should be done to provide sear road. Results of this study are important to reduce number and severity of casualties and moreover lead to safer road. Post-construction. The purpose of the audit is to identify road safety problems and to suggest measures to eliminate or mitigate any concerns. Road Safety Audits are undertaken by self or road safety engineering. The purpose of the evaluation will be to determine whether the objectives of the process have been achieved and to make an assessment of the quantifiable benefits which flow from the audit process. This report on the findings of the Ahmednagar - baramati-phaltan NH-160. The research showcases the problems arising on NH-160 and Public is facing lives Risk by travelling through it.

I. INTRODUCTION

Road safety audit is a systematic and formal process of checking the safety aspects of road schemes before they are built. The objective is to identify potential safety problems, so that, where possible, the design can be changed to eliminate or reduce them. The audit is carried out by trained and experienced auditors who are independent of the scheme designers. Road safety auditing follows the principle of "prevention is better than cure". An audit conducted at the planning or design stage

allows a line on a plan to be changed, which is much cheaper than having to alter asphalt or concrete once the scheme has been built. Most countries have experience of having to make major alterations to a newly-built road because a significant safety problem was designed into the road. This can be avoided if all schemes are audited before construction. Experience from other countries suggests that at least a third of crashes can be prevented or their severity reduced by conducting road safety audits and acting on the findings. In today's world road and transport has become an integral part of every human being. Everybody is a road user in one shape or the other. The present transport system has minimized the distances but it has on the other hand increased the life risk. Every year road crashes result in loss of lakhs of lives and serious injuries to crores of people. In India itself about eighty thousand people are killed in road crashes every year which is thirteen percent of the total fatality all over the world. Man behind the wheel plays an important role in most of the crashes. In most of the cases crashes occurs either due to carelessness or due to lack of road safety awareness of the road user. Hence, road safety education is as essential as any other basic skills of survival.

II. RESEARCH BACKGROUND

In the last decade, some countries have introduced the practice of auditing new or existing roadways to assist in building safety into the road network. This practice is known as the road safety audit. A road safety audit is a formal and proactive process to complete a comprehensive traffic safety study. The Austroads guidelines define a road safety audit as a "formal examination of a future road or traffic project, an existing road, or any project which interacts with road users, in which an independent, qualified team assesses the crash potential and safety performance" (Austroads, 2002).

These formal safety-focused analyses started during the early 1980's in the United

Kingdom, moved to Australia and New Zealand in the early 1990's, and gradually have spread to many other countries (Navin et al., 1999). Road safety audits were introduced to the United States in the mid 1990's and various reasons justify the need for implementing them. The first and most powerful reason is the social and economic need to improve safety. In the United States, each year more than 40,000 people are killed and more than three million are injured on traffic.

At the national level, Austroads (the national association of road and traffic agencies) set up a working party to develop road safety audit guidelines to provide a national focus for this work. In 1994, they published the first guidelines that become an international guiding principle in the road safety audit process. These guidelines were revised in the Austroads International Road Safety Forum held in Melbourne in May 1998 and a second edition of the Austroads guidelines was published in 2002. This improved edition reflects the knowledge and experience gained around the world in these last years and it is an essential tool in the road safety audit practice (Austroads, 2002).

This paper had examined the current institutional arrangements for the management of road safety in Malaysia in a systematic manner. It focused on road safety funding and seemed to provide an insight into how funding factors may affect both the effectiveness and the efficiency of road safety management. The study followed an exploratory approach based on semi-structured interviews targeting key stakeholders in road safety management such as policy makers from various government agencies, private sector representatives and academia. The analysis revealed that the efficiency and effectiveness of the road safety management system in Malaysia may be sustainably improved by addressing the current dependence of funding solely on government sources, the fragmentation of the decision-making process of this de facto multi-disciplinary area, the road safety legislative framework, public awareness, local needs and institutional capacity. An institutional model based on 2nd generation road funds is tentatively suggested to this effect. The paper presented a systematic analysis for the assessment of road safety management applicable in countries where financial resources are limited or reduced.

III. STAGES OF ROAD SAFETY AUDIT

3.1 Stage 1 Audit (During Feasibility Study)

Stage 1 is recommended for major schemes, including in urban areas, in order to influence route choice, alignment selection, standards, impact on and continuity with the existing network, junction provision, possible hazards from roadside development etc.

- Choice of route options.
- Alignment and ease of achieving design standards.
- Standards and cross-section
- Effects on existing network.
- Number of junctions, their types, etc.
- Possible hazards from roadside development.

3.2 Stage 2 Audit (Completion of Preliminary Design)

Stage 2 is recommended on completion of preliminary design, to assess horizontal and vertical alignments, sight lines and layout of junctions including slip roads and lay-byes. After this stage, land acquisition may be taken up.

Examination when preliminary design is completed i.e., where the alignment has largely been Decided, but can still be modified before approval. Important subjects for assessment at this Stage are:

- Project changes since Stage 1 Audit
- Alignment
- Cross-section
- Arrangement of Junctions
- Any Interim Measures

3.3 Stage 3 Audit (Completion of Detailed Design)

Stage 3 is recommended on completion of detailed design and before preparation of contract Documents, to assess detailed junction layout, markings, signs, signals, lighting details, etc.

Examination when detailed design is completed and the limits of expropriation have been set, But before the tender documents are prepared and tenders are invited. Vital subjects for Assessment at this stage are:

- Project changes since Stage 2 Audit
- Detail Design of junctions
- Design of geometries
- Cross-fall
- Markings and Signs
- Side drains
- Embankment slopes
- Presence of clear zone
- Traffic Signals
- Lighting
- Interim Measures

3.4 Stage 4 Audit (During Construction Stage)

Construction zone is that area of the road which is affected by the works and which affects traffic flow and safety of workers and road users. In this context it can also be called 'Traffic Control Zone'. In rural areas, problem at these zones is accentuated by the reduced availability of carriageway, acquisition of land for diversions, etc. In urban areas, the problems are even more acute as diversions may have to be over adjacent road street of the road network as well as the sharing of road space by different categories of road users. Traffic control zone can be divided into three major components i.e..Advance Warning Zone, Transition Zone and Work Zone. Manual on Traffic Management at Construction Zones is published by the Indian Roads Congress as IRC: SP3: 55 should be referred to. Steps involved in Stage 4 Audit are given in Fig. 3.4.

- Examination of Terminal Transition Zone, Work Zone, Approach Transition Zone And Advance Warning Zone with respect to safety point of view.
- Examination of safety measures adopted for workmen and road users.
- Examination of traffic control devices adopted at construction zone.

3.5 Stage 5 Audit (Completion of Construction) (Pre-opening)

Stage 5 is recommended immediately prior to opening of scheme, involving the site staff and local traffic police in car and truck. This should take the form of driving and when appropriate, Walking and/or cycling the new route. This is checked during night time also to ensure that required night time safety standards have been achieved.

- A final review of the finished construction, to check from the standpoint of road safety that it is ready to be opened for traffic. It is particularly important to check the location and visibility of markings and other traffic control devices especially where changes were made during the construction period. The finished scheme should be assessed from the road users' point of view in daylight and in darkness.

- After opening for one or two months, the auditor should examine whether or not road users are using the project facility in an appropriate manner. Many schemes are constructed with the road open to traffic throughout the entire construction Phase When there is no question of an actual opening for traffic, an overall examination is to be carried out

to audit whether the markings and all traffic control devices are in place. This examination is to be carried out by the auditor independently in the first instance and thereafter along with the Project Manager of the Contractor.

IV. ROAD SAFETY AUDIT CONSTRUCTION STAGE

As mentioned above, RSA is a formal procedure for assessing accident potential and safety performance in the provision of new road schemes, the improvement and rehabilitation of existing roads and in the maintenance of roads.

Road Safety Audit is specifically intended for Construction Stage of the project stretch along with construction Work Zones of the project corridor as observed in 2020-2021. This RSA is primarily based upon guidelines presented in "IRC SP:88-2019 - Manual on Road Safety Audit" and "IRC:SP:55-2014, Guidelines for Traffic Management in Work Zones" and related international practices for work zone setups.

This report reviews the safety measures adopted by the Contractor in the on-going construction activities and it reports potential hazards due to the noncompliance of safety norms (if any), provisions for pedestrian safety, advanced warning zones, adequate transition zone lengths, workers safety, effective numbers of reflective signs, safe delineation, credible speed limits, temporary crash barriers, lighting & diversion setc. Note that the report's primary intent is to advise Concessionaire about measures to be undertaken to improve Work Zone Safety for all road users.

The recommendations/improvements suggested here in are based on the philosophy of averting road accidents due to erroneous judgment of the drivers and to protect the vulnerable road users and workers in the work zone from getting involved in collisions. The implementation of these recommendations entirely remains in the contractor's scope of work.

V. CONSTRUCTION STAGE AUDIT

The TOR stipulates conduct of Safety Audit after the construction activity begins. Towards assessing the safety related issues in an objective manner, we had visited the project road and carried out construction stage audit with the help of an objectively drafted check list. The Road Safety Manual is a good guide towards ensuring safety in construction zones. But application of the measures sometimes lack clarity on ground. These were the areas of pointed attention during this stage. That is also where

additional safety measures are often called for. These apply equally to roads and road structures.

5.1 Project specific approach of audit

The Audit carried out a comprehensive construction stage safety audit, during 29th June to 30th June 2019 (IInd Quarter) and the findings from the same have been documented in this report. While all the IRC guidelines and the various Circulars from the MORT&H have in built safety considerations, the following guidelines/codes of practices were considered by the Consultants for more in depth review (latest editions).

5.2 Route Safety Audits and Findings

- The safety consultant team carried out the day and night time audit of the project road. The construction work on the project road is under progress at few locations only.
- Major observations and findings of the audit are as follows;
- Temporary Diversions.
- Traffic Safety Measures adopted at site.
- (a) Absence of Information about Commencement or End of Work Zone
- (b) Barricading of work area.
- Absence of center and edge line markings on existing road.
- Construction material dumped along project high way.
- PPE for Workers
- Dust Control and Suppression Arrangements.
- First Aid Box.
- Emergency Response Mechanism.
- Housekeeping

VI. SUGGESTIONS FOR IMPROVING ROAD SAFETY

6.1 Measures to improve safety

The road construction activities are being carried out at various locations on the project road sections. The work zones are lacking the safety measures required to address the safety concerns of all road users.

- All the diversion signs installed and the traffic management scheme should be as per IRC SP: 55:2014. Wherever diversions are provided the widths of those should be equal to that of the previously existing road and also the diversions should not lead to bottlenecks and traffic congestion, especially on chainages Km 15+600, 38+300 etc.
- Vehicular traffic must be warned that a work zone is ahead, not only to alert the drivers

to be aware of hazards, but to also warn them that lane changes, detours, or temporarily blocked streets may appear. Warning signs must be placed in advance of the work zone, as detailed in chapter 5.

- Barricading Type of road work zone traffic equipment serves to establish transverse and longitudinal closures, to guide and funnel/channelize the traffic, and to create a visual and physical separation of opposite-way lanes. This must be done properly as per IRC standards.
- Steps to be taken to provide proper road markings and maintain those well always. Provide markings on each category of roads whether it is existing road waiting to be upgraded, an upgraded road section being used as a diversion or a temporary diversion as a part of the traffic management for the work zone.
- It is necessary to provide adequate visual information to the driver to control and navigate the vehicle, and also to enable the pedestrian to safely walk to the intended destination. All the median kerbs should, therefore, be properly painted as per IRC guidelines and should always be maintained well.
- The damaged road section needs to be repaired at regular interval

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