

## ROAD SAFETY AND ROAD SAFETY AUDIT IN INDIA: A REVIEW

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**Abstract:** India is compounding and road traffic wounds (RTI) have been expanding in the course of recent years. A Road Safety Audit (RSA) is a formal technique for evaluating wellbeing execution examination of a current or future road or crossing point by an autonomous review group. Road wellbeing reviews can be utilized as a part of any period of venture advancement from arranging and preparatory building, configuration and development. RSAs can likewise be utilized on any estimated venture from minor rustic roads to between state National Highways. RSAs can be seen as a proactive minimal effort way to deal with enhance wellbeing. In this paper we review the concept of the road safety audit and its stages.

### I. INTRODUCTION

Road safety review is a formal methodology for autonomous appraisal of the accident potential and likely safety execution of a particular outline for a road or traffic plan - whether new development or a change to a current road. Road safety appraisal is a formal system for autonomous evaluation of the imaginable impacts of proposed road or traffic plans, or to be sure different plans that effect sly affect road traffic, upon accident event all through the road system whereupon traffic conditions might be influenced by the plans. These two methods empower the abilities of road safety building and accident examination to be utilized for the anticipation of accidents on new or adjusted roads. They hence supplement the utilization of these same aptitudes to lessen the event of accidents on existing roads by method for neighborhood safety plans, as a rule as minimal effort measures (ETSC, 1996). This survey expects to depict and show the utilization of safety reviews and safety appraisal in outlining and fabricate safe road and traffic plans, and at the arranging stage in picking which plans to advance from among a scope of potential outcomes. For the most part, roads are composed in light of an expansive number of criteria, for example, travel time, client solace and accommodation, fuel utilization, development costs, natural effect and objectives of urban or provincial arranging. Safety is one of the criteria, however is frequently verifiably thought to be accomplished by holding fast to endorsed principles of arrangement and format for every component of the outline. These principles are without a doubt set down in view of safety, and some of these incorporate unequivocal safety agendas (e.g. FGSV, 1988), however encounter demonstrates that adherence to them is not adequate to guarantee that a subsequent configuration is free from avoidable dangerous elements. Formal safety review and safety appraisal strategies guarantee that autonomous ability is utilized to make express the safety ramifications of a whole plan and, in doing as such, prompt more secure outlines of both new and changed roads. Both

strategies have solid commitments to settle on to discerning and compelling basic leadership while considering elective choices, and safety review is critical to the accomplishment of a protected outline for a picked elective. The two strategies are integral - the point is comparative and the distinction is in degree and timing. The extent of safety review is typically bound to an individual road plan, which might be another road or alteration to a current road. The premise for safety review is the utilization of safety standards to the configuration of another or an adjusted road area to forestall future accidents happening or to decrease their seriousness. The technique is normally done at one or all of five phases in doing a plan: attainability study, draft outline, itemized plan, pre-opening months in the wake of opening. A crucial component of the procedure is that it is completed autonomously of the configuration group. It ought to be embraced by a group of individuals who have encounter and up and coming ability in road safety building and accident examination. The extent of safety effect appraisal is subject to the size of the plans being considered. For little scale plots, the effect of progress can for the most part be required to be restricted to a sufficient extent to the plan itself. In this circumstance safety appraisal and safety review offer numerous procedural attributes. For bigger plans, the effect on accident event can be relied upon to be felt over a bigger part of the road system. All things considered, the effect might be assessed utilizing a situation strategy. By considering distinctive road sorts, the comparing estimations of significant safety pointers and the figure traffic volumes, the effect on accident event can be assessed for various options. Objective of the RSA is to evaluate ventures for potential mishaps end/lessening on the premise of road client learning, characteristics and aptitudes, day/night, wet/dry road conditions. Since our roads are planned and built by striking a financial harmony between wellbeing, openness, environment, economy and locally accessible material and expertise, RSA may decide the setback in security, however will most likely be unable to rectify the lacks in asphalt outline, waste, and proper space standard and so forth. RSA depends on the guideline of an autonomous audit. The procedure uncovers the inclusion of Client, Designer, Auditor and the Road User. The customer regularly designates the architect and the reviewer who are two separate experts. In India, where appropriate network in the provincial region has as of late been taken up, the road client additionally ought to be made a part of the group to make the review and counter measures viable. In the present setting, NRRDA names the PMC (to get ready rules, prepare the Sub Client and review). The SRRDA delegates the PIC and screens their work (to get ready subtle element plan, and manage the work of the temporary workers named by

SRRDA). At the end of the day NRRDA is helped by PMC and SRRDAs are helped by PIC.

II. METHODOLOGY

Security Audit can be connected to

- a) New Roads
- b) Existing/built Roads.

On new roads or roads to be enhanced or assembled, the review will prompt recognizable proof of clumsy circumstances and on existing or as of now built roads, the review will recommend fitting alleviation measures to lessen the likelihood of mishaps.

Road Safety Audit (RSU) essentially includes three (3) Stages:

- Stage 1 - Audit amid configuration and arranging
- Stage 2 - Audit amid Construction
- Stage 3 - Audit after the finishing of the venture

In the present connection, since Stage 1 (outline and arranging) has been finished in the greater part of the extends, a review in genuine terms is impractical. Nonetheless, the fashioners can best recognize the deficit in the outlines and the reasons thereof. Henceforth the prerequisite of 'Rebelliousness report for rustic roads configuration' ought to be finished by the PIUs/PICs.

Stage 2 is for the most part completed amid development as brief measure on high volume expressways/roads in urban range, and is not key for low volume ODR's. Be that as it may, the PIUs/PIC's (as it requires consistent observing, thought to be past the extent of PMC) may carryout such a review in view of IRC SP 55-2001.

Stage 3 is done in finished phase of the task and PIUs/PIC's who are at site, ought to doing the same for the whole finished road stretch according to the Format accommodated 'Rebelliousness Report For Rural Roads After Completion'.

The RSA would be founded on the above criticism from PICs, and Site Reconnaissance, wherever finished, and required relief measures might be executed.

| NEW CONSTRUCTION                         | STAGE         |
|--|---------------|
| During Feasibility Study                 | Stage 1 Audit |
| During Preliminary Design                | Stage 2 Audit |
| Completion of Detailed Design            | Stage 3 Audit |
| During Construction Stage                | Stage 4 Audit |
| Completion of Construction (Pre-opening) | Stage 5 Audit |
| EXISTING ROADS                           |               |
| On Existing Roads (Monitoring)           | Monitoring    |

Table 1. STAGE OF ROAD SAFETY AUDIT

RSA Stages

Stage 1 Audit (During Feasibility Study)

Stage 1 is suggested for significant plans, incorporating into urban regions, keeping in mind the end goal to impact course decision, arrangement determination, benchmarks, sway on

and congruity with the current system, intersection arrangement, conceivable risks from roadside development and so on. Audits of starting venture/arranging study. Essential subjects for appraisal at this stage will include:

- Effect on exiting network
- Number of junctions, their types, etc.
- Possible hazards from roadside development.

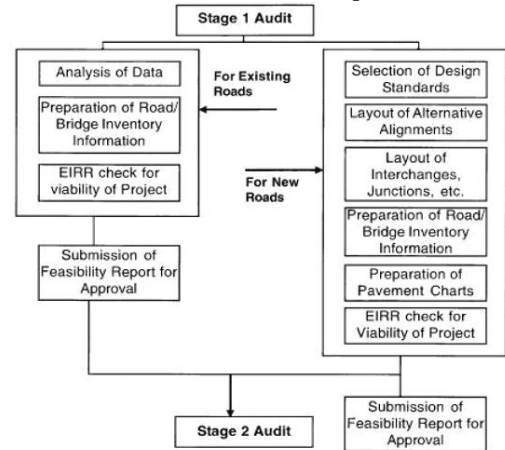


Fig 1. Stage 1 Audit

Stage 2 Audit (Completion of Preliminary Design)

Stage 2 is suggested on finishing of preparatory configuration, to survey even and vertical arrangements, sight lines and format of intersections including slip roads and lay-byes. After this stage, land obtaining might be taken up.

Steps involved in Stage 2 Audit are

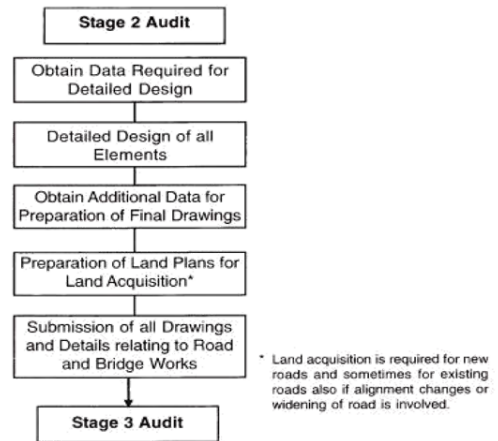


Fig 2. Stage 2 Audit

Stage 3 Audit (Completion of Detailed Design)

Stage 3 is suggested on fruition of nitty gritty outline and before planning of agreement archives, to evaluate itemized intersection design, markings, signs, signals, lighting points of interest, and so on subjects for appraisal at this stage are takes after Project changes since Stage 2 Audit Detail Design of junctions Design of geometrics Cross-fall Marking and Signs Side drains Embankment slopes Presence of clear zone Traffic Signals Lighting.

Stage 4 Audit (During Construction Stage)

Development zone is that region of the road which is influenced by the works and which influences traffic stream and safety of laborers and road clients. In this setting it can likewise be called 'Traffic Control Zone'. In provincial ranges, issue at these zones is emphasized by the diminished accessibility of carriageway, securing of area for redirections, and so forth. In urban territories, the issues are much more intense as redirections may must be over adjoining road of the road system and additionally the sharing of road space by various classes of road clients.

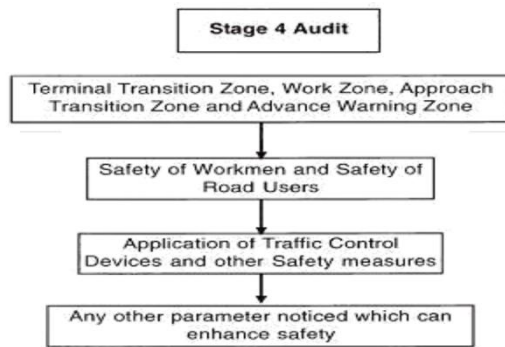


Fig3. Stage 4 Audit

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

Stage 5 is prescribed promptly before opening of plan, including the site staff and neighborhood traffic police in auto and truck. This ought to appear as driving and when proper, strolling and/or cycling the new course. This is checked amid evening time likewise to guarantee that required evening safety principles have been accomplished. Numerous plans are developed with the road open to traffic all through the whole development stage. At the point when there is no doubt of a real opening for traffic, a general examination is to be completed to review whether the markings and all traffic control gadgets are set up. This examination is to be done by the reviewer autonomously in the principal occasion and from there on alongside the Project Manager of the Contractor. Steps required in Stage 5 Audit are given

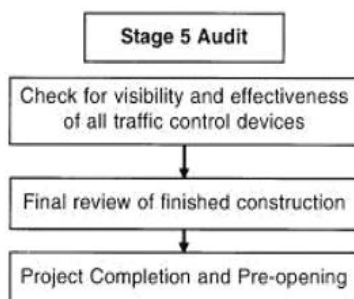


Fig 4. Stage 5 Audit

III. CONCLUSION

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.

REFERENCES

- [1] Gaurav Pandeya , Dinesh Mohanb, K. RamachandraRaoc, "Exposure measurement using traffic models",2013
- [2] KaviBhallaa, Dinesh Mohanb,"ROAD SAFETY IN INDIA STATUS REPORT",2015
- [3] Dinesh Mohan. 2004,"The Road Ahead: Traffic Injuries and Fatalities in India", World Health Day, 14th April 2004, New Delhi,
- [4] Mohan, D. 2008," Road traffic injuries: a stocktaking" Best Practice & Research Clinical Rheumatology, 22:4, 725-739.. Abstract
- [5] MANISH.D.KATIYARI," Road Safety Audit: A Case Study for Wardha Road in Nagpur City", Int. Journal of Engineering Research and Applications ,2014
- [6] Dr. S. S. Jain ,"ROAD SAFETY AUDIT FOR FOUR LANE NATIONAL HIGHWAYS ",International Conference on Road Safety and Simulation,2011 Transportation Research Board (TRB) (2012) "Human Factors Guidelines for Road Systems" NCHRP Report 600 (Second Edition). Washington D.C.
- [7] Transportation Research Board (TRB) 2010b. White Papers for the web Stakeholder Workshop for Toward Zero Deaths: A National Strategy on Highway Safety, August 25–26, Washington, D.C. [White paper on Safer Infrastructure (White paper No.6)]. Available from Internet: <http://safety.transportation.org/doc/web6SaferInfrastructureWhitePaper.pdf>
- [8] IRC: SP: 88-2010. "Manual on Road Safety Audit". Indian Road Congress, New Delhi, India.
- [9] National Co-operative Highway Research Program (2004), Road Safety Audit, NCHRP, Synthesis, 336.
- [10] Hauer, E., Harwood, D.W., Council, F.M. and Griffith, M.S. (2002), "Estimating Safety by the Empirical Bayes Method: a Tutorial", Transportation Research Record 1784, pp. 126–
- [11] [11] Hazardous Road Locations: Identification and Counter Measures: OECD, Paris, 1976. 13.Hiderbrand, E. And Wilson, F., "Road Safety Audit Guidelines",UNB Transportation Group,1999.
- [12] IRC: Road Development Plan "VISION: 2021", Ministry of Road Transpor and
- [13] Highways,Government of India, November 2001.
- [14] Jacobs, G. D. & Palmer, C. J. (1996), "Road Safety in the Emerging Nations," Intertraffic Middle East '96 Safety Symposium, Dubai, 24-25 November 1996.
- [15] Jacobs, G. D. & Baguley C. J. (1997), "Towards

- Strategy of Improving Road Safety in Developing Countries,” Annual Review 1996, Transport Research Laboratory, UK. Regional Health Forum – Volume 8, Number 1, 2004 51
- [16] Jacobs, G. D. & Thomas, A. A. (2000), “Road Safety as a Global Problem,” Sixty-fifth Road Safety Congress, 6-8th March 2000.
- [17] Jacob G.D., Baguley C.J. (1998), Towards Strategy for Improving Road Safety in Developing Countries, India Journal of Transport Management, Vol.22(3)
- [18] Kanellaiddis G (1999). “Aspects of Road Safety Audit”, Journal of Transportation Engineering, ASCE, Nov/Dec1999/481-485.
- [19] Langde V.S., Jain S.S., Parida M. ‘Development of A Rational Approach For Study of Road Accident’, Technical paper IRC and Permanent International Assosiation of Road Congress Vol.II,pp127-136, December 2003.