

THE STATUS QUO OF ROAD SAFETY AUDIT AND ASSESSMENT IN SOUTH AFRICA

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1. INTRODUCTION

This paper aims to stimulate debate regarding the status of Road Safety Audits in South Africa. The intention is not to blame any particular person or road authority for the poor level of implementation of road safety audits in the country, but rather to highlight some of the dilemmas and concerns regarding the perceived appropriateness of the Road Safety Audit process in a developing country such as South Africa.

In recent years road authorities all over the world have shifted the emphasis from road accident *reduction* to road accident *prevention*. Road accident reduction implies the development of accident remedial measures for high accident frequency sites whilst road accident prevention aims at ensuring that the design of new road and traffic schemes will provide a high level of safety. Accident *prevention* through *Road Safety Audit (RSAUDIT)* has been *lauded* throughout Australia, New Zealand, Great Britain, Canada, Malaysia, the United States and several other countries, as an important tool to reduce the accident potential of existing and new traffic schemes. In South Africa, Transportek investigated the concept of RSAUDITs in 1996/97. The investigation resulted in a guideline document for the Department of Transport. The South African Road Safety Manual, probably one of the more comprehensive road safety engineering procedures, was developed and published under the COLTO banner in 1999.

2. BACKGROUND

The idea of having a road design or project scrutinised by an outside party is credited to "British traffic engineers who developed the idea of a Road Safety Audit as a safety check for new and improved road schemes in the early 1980s." (Proctor, S. et al., 2001, p1).

The South Africa Road Safety Manual (SARSM) was compiled in 1999 as a best practice guideline to Road Safety Assessments and design. Road Safety Audits were introduced as Volume 4 of this manual, with the aim of reducing accident risk and improving road safety performance. The manual defines a Road Safety Audit as "a formal examination of a future or existing road/traffic project/any project where interaction with road users takes place, in which an independent, qualified examination team reports on the accident potential and safety performance of the project" (COLTO, 1999).

The South African efforts in developing the SARSM did not attract much international attention, as the following quote from a recent publication on Practical Road Safety Auditing illustrates: "Formal Safety Audit procedures have been developed in a number of countries, following the initiatives taken in the UK. During the early 1990's, work was

carried out in Australia, Denmark and New Zealand. Since then, national and local governments in Canada, France, Greece, Hong Kong, Iceland, Ireland, Italy, Malaysia, the Netherlands, Peru, Singapore, and the United States have been investigating the development of Road Safety Audit" (Proctor, S. et al., 2001, p4). The omission of South Africa's name from the list may be contributed to the lack of implementation that followed the development of the guidelines.

According to the South African Road Safety Manual, the benefits of Road Safety Audit (RSAUDIT) include the following:

- A reduction in the likelihood of accidents on the road network;
- A reduction in the severity of accidents on the road network;
- An increased awareness of safe design practices among traffic engineers and road designers;
- A reduction in expenditure on remedial measures, and
- A reduction in the life-cycle cost of a road.

If Road Safety Audits have all these benefits, the question can be asked why audits are not regularly undertaken in South Africa and why is there such a low interest in the auditing process. Furthermore, with specific reference to the third bullet above, if the 'increased awareness of safe design practises' is one of the benefits of RSAUDIT, are there supporting mechanisms to ensure that in the application of RSAUDIT, knowledge and experience in "safe design practices" are monitored, evaluated and recorded to inform a process of improvement of current design standards?

3. PURPOSE OF THE PAPER

The purpose of the paper is to determine underlying causes to the low interest displayed by road authorities to utilise RSAUDIT as a tool. It discusses the nature of and requirements for RSAUDIT and then, through a survey of road authorities, tried to determine the following:

- Who is responsible for RSAUDIT in road authorities?
- Awareness regarding RSAUDIT as a technique to improve safety.
- Knowledge or availability of training and extent to which training took place.
- The scope and extent of implementation of RSAUDIT.
- Scope and extent of institutional support, including budget allocation.
- Perceptions of the usefulness and cost efficiency of RSAUDIT.

In addition to the above, various concerns are expressed in the paper regarding the technical soundness of the RSAUDIT process as applied in South Africa.

A secondary purpose of the paper is to also provide an indication of the status quo with regard to Road Safety Assessment. Only precursory comment is offered on some of the perceptions around the application of Road Safety Assessment. Most of the respondents in the research expressed views which were similar to what they had on RSAUDIT.

4. METHODOLOGY

The first part of the paper discusses the nature of and requirements for RSAUDITs. These were compiled from literature. The second part discusses some aspects of the status of implementation at a selection of road authorities.

The most prominent road authorities were selected for the survey. It is unlikely that small local authorities would be heavily involved in Road Safety Audits, while the larger road authorities would be in control of the more important routes on which the highest vehicle kilometres are travelled and the highest number of accidents are likely to occur. Such roads are mostly under the control of the national, provincial and metropolitan road authorities, through their respective departments or agencies. The road authorities surveyed are listed in Table 1 below.

Table 1: List of road authorities contacted

Level	Authority
National	Department of Transport South African National Roads Agency
Provincial	Gauteng KwaZulu-Natal North West Limpopo Mpumalanga Free State Eastern Cape Western Cape Northern Cape
Metropolitan (Category A)	Johannesburg eThekweni Cape Town Tshwane Ekurhuleni Nelson Mandela (Port Elizabeth)

An initial attempt was made to collect information by means of a questionnaire that was sent via e-mail. This proved unsuccessful with only six completed questionnaires returned. Telephonic interviews were then conducted with the various authorities listed in the table.

5. THE SOUTH AFRICAN ROAD SAFETY MANUAL

The South African Road Safety Manual (SARSM) was published in 1999 under the banner of the Committee of Land Transport Officials. Apart from the “COLTO” emblem, the SARSM document bears no other mark that indicates any relationship with a specific Government department. There is also no indication of how or by whom the document is supported. In the documentation, orders for the SARSM are directed to a person of whom the contact details are no longer valid.

The direct responsibility for the SARSM at the NDOT could not be determined with certainty. However, as an existing guideline or standards type document, SARSM is incorporated into the Road to Safety Strategy 2001 to 2005 as one of the guidelines/standards documents of which the use must be promoted. To this end, NDOT recently released a tender for “Improving awareness and knowledge of the SARSM and the implementation thereof”. The tender was not awarded at the time of the writing of this paper. NDOT, thus assumed some responsibility with regard to the documentation but with regard to the institutionalisation of the SARSM there appears not to be formal procedures to maintain the relevancy of this manual as would generally be required of guidelines or standards publications.

6. THE MOTIVATION FOR UNDERTAKING ROAD SAFETY AUDITS

The purpose and objectives of road safety audits, according to Austroads (1994), is to establish a road project's accident potential and safety performance and to identify potential safety problems. However, it is NOT the objective of a road safety audit to check a project against compliance to standards (although the completion of checklists is seen as a key component of the road safety audit).

The fact that the road has a high accident potential implies one of only two things:

- Insufficient attention was given to traffic safety during the design process.
- Current design standards are inadequate and unsafe.

If it is not the objective of a road safety audit to check a project against compliance to standards, it means that it is accepted that the road has been designed according to standards. The only conclusion that can then be made is that current design standards and processes must be inadequate and lead to unsafe roads.

This conclusion is in fact confirmed by Robert Morgan, the principal author of AustRoads' Road Safety Audit Guidelines (1994 and the current revision). According to Morgan (1999), one of the cornerstones of road safety audits is that "standards do not necessarily equal safety". In contrast to the commonly held view amongst engineers that complying with standards results in safe road design, such standards cannot be relied upon to provide road safety. According to Morgan (1999), there are specific reasons for this:

- *Standards often reflect what is considered economically justifiable at the time they were established. They reflect value judgements that can change over time.*
- *Standards reflect what we know so far. As we learn and understand more, standards can lag behind.*
- *Standards are developed for a range of reasons which may have little to do with safety, e.g. cost or traffic capacity.*
- *Standards usually cover simple or common situations, not all situations.*
- *A designer may be mistaken and use an inappropriate standard or an outdated standard.*
- *Individual road elements, designed to standard, may be quite safe in isolation but may, when combined with other standard elements, be unsafe (i.e. lead a significant number of users to make errors).*
- *Standards are often a minimum requirement. Combining a series of minimums can leave no room for error, either on the part of the designer, the builder or the final users. This can particularly be the case where the standard was developed by a large committee and agreement was difficult to achieve.*

According to Morgan, a road safety audit can not be a check against standards. This means that professional judgement is required by persons or people with road safety engineering skills and experience. A road safety audit is therefore ***the means by which road safety engineering skills and experience can be applied to a road design.***

The conclusions that can be drawn from the above are that road safety audits are required because:

- Road design engineers are not capable of designing safe roads unless they are also road safety experts.
- The simple compliance to road design standards does not guarantee safe roads.

The question is then whether road design engineers cannot be trained to become road safety experts and whether road design standards cannot be improved to ensure safer road design.

7. THE MOTIVATION FOR UNDERTAKING ROAD SAFETY ASSESSMENTS

The SARSM defines Road Safety Assessment as follows:

‘An examination of the quality of traffic flow, accident potential and safety performance of a road based on a set number of key indicators to identify hazardous locations and safety deficiencies.’

The objectives of a road safety engineering assessment according to SARSM is:

- To **evaluate** the **total road network** in order to determine which road segments and intersections take the highest priority for the implementation of road safety audits and remedial measures.
- To assist the road authority in **identifying any existing safety deficiencies** of design, layout and road furniture, which are not consistent with the road’s function and use.

Road Safety Assessment is aimed at highlighting problems that are considered so urgent that they require immediate attention but many items identified will be in fact items of routine maintenance. The benefit of the process is thus to ensure that optimum road safety is pursued through a programme of maintenance, rehabilitation and upgrading.

It appears that none of the authorities have done road safety assessments to the full letter of the word in the SARSM. Many authorities were of the opinion that the Road Safety Assessment procedures, aimed at the evaluation of the road network under the road authorities jurisdiction, were possibly too comprehensive and difficult to accommodate under increasingly curtailed road maintenance budgets. There are also sentiments that Road Safety Assessments will only serve to highlight the many problems of the road network and will leave authorities despondent with insufficient resources to be able to ever address them.

8. QUALIFICATIONS OF ROAD SAFETY EXPERTS

Morgan (1999) has expressed the opinion that ***safety engineering has to be learnt – it cannot be taught***. A person can therefore not be trained to become a safety expert. Experience, thus, is an essential component of achieving competency in safe road design.

This requirement is indirectly confirmed by the South African Road Traffic Signs Manual who states that the senior road safety auditor of the audit team must have:

- Expert knowledge in road safety engineering with at least three years of experience.
- At least conducted five road safety audits as a Road Safety Auditor under a Senior Road Safety Auditor.
- Should conduct at least one road safety audit annually.

According to ITE Technical Committee on Road Safety Audit (1995), a person with “expert knowledge” in road safety engineering is one with experience in accident investigations and who has experience in safety engineering principles and practice.

A problem in South Africa is that accident investigation and road safety audit are not often undertaken. Proper before- and after-studies of road improvement projects are not often undertaken either and are often not possible due to the lack of reliable accident data.

Since it is not possible to train a person to become an expert, and because of the lack of opportunity to gain experience in accident investigations and road safety audits, it appears unlikely that many engineers in South Africa would have the opportunity to become experienced road safety experts or senior road safety auditors. South Africa then faces the dilemma that it does not have the expertise to design safe roads, nor does it have the expertise to undertake road safety audits.

One possibility of addressing the above dilemma would be to import the required expertise from countries who regularly undertake road safety studies and audits. The problem with this, however, is that conditions in South Africa are very different from those in other countries. Expertise in road safety studies and audits based on work in such other countries would also not necessarily be appropriate for the conditions in South Africa.

The above indicates that greater opportunity should be created in South Africa for professionals to become road safety experts. It also indicates a need for the development of road design standards that would ensure a greater level of safety on our roads.

9. RESULTS OF THE SURVEY

- **Who is responsible for road safety audits in road authorities?**

The first step was to find the person in a particular road authority that is responsible for Road Safety. Specific questions regarding the application of, and concerns about Road Safety Audit were then posed. The results of the survey are discussed below. Using the telephone switchboard as access point to the road authority, the responses varied from a *total blank* to a *direct connection to the appropriate official*. The results of the access evaluation are shown in Table 2.

Table 2: Accessibility of road authorities contacted

Authority	Status of accessibility per authority (anonymous)
National bodies	1. Not accessible in 4 calls 2. Accessible in 3 calls
Provincial Road Authorities	1. Accessible in 3 calls 2. Not accessible in 6 calls 3. Accessible in 2 calls 4. Accessible in 7 calls 5. Not accessible in 12 calls 6. Accessible in 2 calls 7. Accessible in 3 calls 8. Accessible in 6 calls 9. Accessible in 4 calls
Metropolitan Road Authorities	1. Accessible in 3 calls 2. Accessible in 3 calls 3. Accessible in 3 calls 4. Accessible in 3 calls 5. Not accessible in 6 calls 6. Not accessible in 6 calls

- **Awareness regarding Road Safety Audits as a technique to improve safety**

Having located the responsible official, the response to how aware they are of RSAUDIT as a technique to improve safety varied from *no awareness* to *having been on the steering committee that compiled the South African Road Safety Manual*. The responses were particularly poor among the smaller provinces' road officials, who are often a manager and not an engineer or law enforcer. The metropolitan officials, also managers, acknowledged being responsible for road safety audit, but the specific technical implementation was left to a junior official with technical background. Table 3 shows the results of this survey.

Table 3: Awareness regarding Road Safety Audit

Authority	Status of accessibility per authority (anonymous)
National bodies	<ol style="list-style-type: none"> 1. Some formal responsibility and aware 2. Some formal responsibility and aware
Provincial Road Authorities	<ol style="list-style-type: none"> 1. Formal responsibility and aware 2. Individual interest (senior engineer level)- no formal responsibility 3. Formal responsibility and aware 4. No awareness 5. Limited awareness 6. No formal responsibility but aware 7. Formal responsibility and aware 8. No awareness 9. No awareness
Metropolitan Road Authorities	<ol style="list-style-type: none"> 1. No formal responsibility low awareness 2. Formal responsibility and active awareness 3. Formal responsibility plus policy and awareness 4. No formal responsibility but individual awareness 5. No formal responsibility, some awareness 6. No formal responsibility, some awareness

- **Knowledge of availability of training and extent to which training took place**

The knowledge of availability of training and extent to which training took place, correlates with the awareness of Road Safety Audits on the broad level, but the responses of those aware of the technique was analysed further. In more than 30 per cent of the cases, where officials were aware of Road Safety Audits, they did not know how to access training and were not trained themselves. Table 4 shows the extent of this problem.

Table 4: Access to training regarding Road Safety Audit

Authority	Knowledge of accessing training	Number of trained persons
National bodies	1. Offer awareness training 2. Yes	1 3
Provincial Road Authorities	1. Yes 2. Yes 3. Yes 4. No 5. No 6. Yes 7. Yes 8. No 9. No	1+ 1 5 ? 0 8 2+ Uncertain Uncertain
Metropolitan Road Authorities	1. Yes 2. Yes, has identified own training needs 3. Yes 4. Yes 5. No 6. Yes	Uncertain 1+ 1+ 1+ Uncertain Uncertain

- **The scope and extent of implementation of Road Safety Audits**

The scope and extent of implementation of Road Safety Audits appears to be very limited in South Africa. The National Road Agency's biggest project, the Platinum Toll road to the value of R3 billion was not subjected to an independent Road Safety Audit and the road construction currently in progress has not, and is not, envisaged to be audited. A RSAUDIT was done on the N4 section near Swartuggens as part of the redesign and upgrading of this section.

KwaZulu-Natal has had RSAUDIT executed at all stages and on all road types. Gauteng is gearing up to do RSAUDIT on mostly existing work, as new work has all but stopped. At metropolitan level, Cape Town and Tshwane have had RSAUDIT done. In most cases, consultants undertake road design work and road authorities themselves undertake road safety checks.

The range of stages on which Road Safety Audits are undertaken by road authorities are shown in Table 5, while the number of Road Safety Audit projects undertaken are shown in Table 6.

Table 5: Stages of Road Safety Audit

Authority	Stages of Road Safety Audit undertaken
National bodies	<ol style="list-style-type: none"> 1. Uncertain 2. Detail design stage selectively
Provincial Road Authorities	<ol style="list-style-type: none"> 1. Detail design stage and existing road stage selectively (and infrequently) 2. None 3. Detail design stage selectively 4. None 5. None 6. Existing road stage selectively 7. Detail design stage and existing road stage selectively 8. None 9. None
Metropolitan Road Authorities	<ol style="list-style-type: none"> 1. None 2. All stages selectively and want to undertake detail design and existing road stage frequently 3. None 4. None 5. None 6. Yes

Table 6: Number of Road Safety Audit undertaken

Authority	Number of Road Safety Audits undertaken
National bodies	<ol style="list-style-type: none"> 1. Uncertain 2. 5
Provincial Road Authorities	<ol style="list-style-type: none"> 1. 10 2. None 3. 5 4. None 5. None 6. 12 7. 10 8. None 9. None
Metropolitan Road Authorities	<ol style="list-style-type: none"> 1. None 2. 10 3. 5 4. None 5. None 6. None

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- **Scope and extent of institutional support, including budget allocation**

None of the respondents, except KwaZulu-Natal, Eastern Cape, eThekweni and Cape Town, could indicate any institutional support for Road Safety Audits, including budget allocation specifically for such audits. Eastern Cape, eThekweni and Cape Town have sections dedicated to initialising and co-ordinating Road Safety Audits, representing an institutional structure and is awarded a dedicated budget.

Metropolitan road authorities feel that the national or provincial government must provide enabling legislation and regulations, similar to the urban transport process. They would find it difficult to motivate funding and resource allocation to a supporting function, given the lack of capacity and more pressing needs of other functions already their responsibility.

The opinions expressed about institutional support and budget allocation are shown in Table 7.

Table 7: Institutional support and budget allocation for Road Safety Audit

Authority	Institutional support for RSAUDIT	Budget allocation for RSAUDIT
National bodies	1. Uncertain 2. None	1. Uncertain 2. None
Provincial Road Authorities	1. Yes 2. None 3. Yes 4. None 5. None 6. None 7. Yes 8. None 9. None	1. Yes 2. None 3. Yes 4. None 5. None 6. None 7. Yes 8. None 9. None
Metropolitan Road Authorities	1. None 2. Yes 3. Yes 4. None 5. None 6. None	1. None 2. Yes 3. Yes 4. None 5. None 6. None

- **Perceptions of the usefulness and cost efficiency of Road Safety Audits**

When questioned on their perceptions of the usefulness and cost efficiency of RSAUDIT, the officials that were not aware of the method, were informed of the definition of RSAUDIT and the question restated. The responses were mostly positive, but cannot be regarded as an indication of commitment to implementation. The officials who knew about RSAUDIT all agreed that it was a good thing, but most have reservations on the issue of cost efficiency as they considered the RSAUDIT a duplication of the designers' work or part of the design process. The results of the survey are shown in Table 8.

Table 8: The usefulness and cost-efficiency of Road Safety Audit

Authority	Usefulness of RSAUDIT	Cost-efficiency of RSAUDIT
National bodies	1. Uncertain 2. Questionable	1. Uncertain 2. Questionable
Provincial Road Authorities	1. Yes 2. Yes 3. Yes 4. Uncertain 5. Yes 6. Yes 7. Yes 8. Uncertain 9. Uncertain	1. Yes 2. Uncertain 3. Yes 4. Uncertain 5. Uncertain 6. Not evaluated yet 7. Yes 8. Uncertain 9. Uncertain
Metropolitan Road Authorities	1. Uncertain 2. Yes 3. Yes 4. Uncertain 5. Uncertain 6. Uncertain	1. Uncertain 2. Yes 3. Yes 4. Uncertain 5. Uncertain 6. Uncertain

10. CONCLUSIONS

The survey conducted among 17 primary road authorities indicates that responsible road safety officials cannot be found (5 authorities) or are difficult to contact. At the remaining 12 authorities, it takes at least 3 calls to make contact. Among these officials, the extent of formal responsibility varies from none (5) and no or low awareness (5) to formal responsibility (4) and active awareness (8). Although 70% of the respondents are aware of training, only 58% of the authorities indicated that someone has had training, resulting in about 24 trained officials. Audits are done at only 7 road authorities and approximately 60 audits of all stages were done to date. Institution support and dedicated budget allocation occurs in only 5 of the 17 biggest road authorities in South Africa. It comes as little surprise that while 47% of the respondents perceive RSAUDIT as useful, but 60% are uncertain of the cost efficiency of undertaking them.

A further conclusion is that South Africa does not have professionals with the expertise that meets the requirements of the SARSM or of specifically RSAUDIT. Few persons in South Africa regularly undertake quality road safety studies, and few persons would gain experience in Road Safety Audit if such audits are not undertaken regularly in the country.

11. DISCUSSION

South Africa is known to talk the talk, not to walk the walk. Road Safety Audit is another field in which we have formulated the policies, drafted the guidelines at huge costs, spread the word but not the funds, therefore nothing recognisable to the outside world has occurred.

The above is also true of many other standards in South Africa. The one good example is in the provision of road signs and traffic signals. We have laws and regulations that regulate the provision of such road signs and traffic signals. Manuals have been developed that explain the installation of road signs and traffic signals in great detail. In spite of all this, we still continue to erect road signs and traffic signals that not only do not comply with the manuals, but that are in total defiance of the laws of the country. If we can not even achieve compliance to the laws of the country, how can we expect more from Road Safety Audits.

It is therefore also unlikely that this paper will make one iota difference to the situation in South Africa. It would also become part of talking the talk and the huge amount of paper generated about the subject. It appears likely that we would still continue to talk about Road Safety Audit for years to come, but that few such audits will be undertaken.

12. RECOMMENDATIONS

The situation regarding safety on our roads can only be improved if all three E's of the road safety equation can be addressed, namely education, enforcement and engineering. Road safety will not improve if we continue to design and build unsafe roads. This should be a matter of national concern, and National Government should take an active lead in addressing the problems in the country.

The results of the paper indicate that the current requirements regarding Road Safety Audit as prescribed in the Road Safety Manual cannot be met in South Africa. We do not have the expertise available, are unlikely to develop the required expertise, and cannot import expertise that is appropriate to local conditions. This means that an urgent review is required of the Road Safety Audit process in South Africa. Intervention is either required to improve the level of expertise, or other methods have to be implemented to improve road safety.

The need for Road Safety Audit can be reduced if design standards can be developed that would ensure safer roads. Serious consideration should be given to continually upgrading our design standards to reflect the newest developments in the field of road safety engineering. This should again be an action of National Government. If National Government is not prepared to accept this responsibility, provincial and local authorities should consider combining their resources to undertake the required work.

13. REFERENCES

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