Best practice for Road Safety Auditors

IPENZ TRANSPORTATION GROUP CONFERENCE 2013

ABSTRACT

Road Safety Audits have been part of the process of building safety into infrastructure projects for about twenty years here in New Zealand, with a Guide for practitioners based on best overseas practices. However, the reliability and effectiveness of the process is dependent on several elements, not least of which is the ability of the audit team. While the New Zealand Guide gives some assistance, there are pitfalls that can catch out even experienced auditors.

Audits are often undertaken by Professional Engineers, who are bound by the IPENZ Code of Ethics, which imposes obligations on ethical behaviour. Key obligations in the Code focus on safeguarding the health and safety of people, having regard for the environment, and acting with honesty, objectivity and integrity. Usually Road Safety Engineers that undertake audits are mindful of this and keen to be regarded as helpful, and readily offer advice, with a strong safety motivation. In doing so, though, auditors need to be aware of their own limitations, the dangers of exceeding their ability or experience, and how best to deal with these issues to meet the needs of projects and clients.

Road Safety Auditing is a collaborative process. This presentation uses the experiences of the NZTA Auckland Motorways Alliance (AMA) safety engineers to investigate areas where the process can be improved, and considers what measures the Engineering Profession could promote to achieve improvement. Measures promoted for discussion include what elements to build into a report, assessing risk, making reports concise and effective, when and how to bring specialists in the audit team, maintaining the capacity of the audit team, scope of investigations, use of checklists, and the practicalities of maintaining a register of Road Safety Auditors such as the IPWEA do in Australia.

INTRODUCTION

The Road Safety Audit (RSA) process is a risk management exercise, designed to improve the safety of road projects. Experience with the process has indicated that the process has some vulnerability.

NZ started carrying out RSA's in earnest in the early 1990's, and was a subsidised project criteria by 2004. The process has thus become ingrained into project development. Even so, clients (RCA's) are finding problems with the application of RSA, and its effectiveness.

This discussion paper considers what best practices auditors might employ to maximise audit effectiveness as it is important for all players in the RSA process to recognise the importance of their role in achieving a safe system. This is a target outcome that all should strive for and aim to be proud of. Car manufacturers have risen to the challenge of a safe system by improving the quality of their products. Driver behaviours and the attitudes that give rise to them are similarly improving over time. The civil engineering profession needs to step up to the plate now and play its part in achieving a safer system, thereby saving some of the 5 million lives aimed to be saved in the Decade of Action for Road Safety.

ELEMENTS TO BUILD INTO THE ROAD SAFETY AUDIT REPORT

New Zealand RSA reports often identify a concern, and recommend ways to address this concern. This approach has often lead to designers taking umbrage at the Safety Audit Team (SAT) taking over their role. In New South Wales the RSA report must focus on identifying risks, and should not propose solutions to the identified risk. This maintains demarcation of design and audit roles. It also ensures that auditors are focussed on identification and assessment of risk, reducing the tendency for the SAT to add their own design flavour to the project.

Discussion Topic – Should NZ adopt the NSW model of Road Safety Audit reports only identifying risks?

The Safety Audit Team (SAT) need to maintain objectivity, which can be compromised when they start taking on a design role. Wouldn't it be better if the RSA report had no recommendations, or the recommendations be limited to identifying what risks should be addressed (the outcome), rather than how they should be addressed (the methodology)?

What does this workshop recommend?

The RSA report is an important record of the audit. While it is normal practice to include the participants to the audit (SAT members, client project manager) and the inspection dates and times, there are other matters that sometimes get overlooked. These include, but are not limited to:

- The findings of previous audits. If the previous audit recommendation appears to have been overlooked or the decision not implemented, then the SAT should identify the issue. A check should be made on any previous audit findings and decisions.
- Where the previous audit findings have not been upheld in the client decisions, the SAT needs to carefully consider whether it is appropriate to raise the matter again
- The content of the plans being audited, or at least a comprehensive description of the plans and documents that were presented to the SAT for consideration

Modern photocopying and document production methods afford opportunity to include photo-reduced copies of the inspected drawings and documents provided these are not too numerous. However, the issue of previous audit findings can be more contentious.

Discussion Topic – Is it appropriate to raise previous RSA findings when they were not upheld?

Under what circumstances should auditors revisit previously identified risks?

Should there be changes to the guidance on this in Road Safety Audit Procedures for Projects?

What does this workshop recommend?

ASSESSING RISK

Traditionally, risk in relation to RSA has been evaluated by considering either a worst case scenario, or a most likely consequence. The assessment uses a simple product of the consequence and associated likelihood to determine the severity of the risk.

Risks can take many forms, and there may be several possible outcomes, each with its own range of likely severities, and associated probabilities. A simplistic risk model might perform adequately with assessing a simple risk such as loss of control on an outlying rural curve. However, where there are complexities of traffic operation, then there may be many possible crash risks. By way of example, PIARC (2011) claim that in a motorway environment about half of crashes can be caused by lane changing and rear ending. With these crashes there may be several contributory factors affecting both severity and likelihood. In such a case a more detailed investigation or consideration needs to be made. This may need to consider local traffic and crash patterns for example. Audit teams may need to spend time viewing traffic performance at several critical time periods. This also extends to considering all light and weather conditions, and all user perspectives.

Discussion Topic – What model is appropriate to determine the level of risk?

What guidance should auditors have to assess risks?

What models are appropriate, and what are their limitations on application?

Should there be better guidance on risk assessment, particularly for complex situations, in the guide Road Safety Audit Procedures for Projects? For example should the Manual give guidance on where specialist audit team members are required, and what experience is appropriate?

What does this workshop recommend?

MAKING REPORTS CONCISE AND EFFECTIVE,

Audits can vary in size from small intersection changes or short reconstructions, through to urban arterial route upgrades that can be long with many and complex issues. The larger and more complex projects can result in very large reports. The danger is that the importance of the findings can be lost in a sea of words and concerns. For this reason it is important not to exaggerate lesser concerns, and a controlled and nationally consistent method of evaluating and prioritising risk is

needed.

The Transfund (2004) review of the RSA guide included decision tracking sheets. These are intended to ensure all RSA participants complete their respective roles, and projects are given clear and timely directions on how the RSA findings are to be addressed. However, it can be difficult and time consuming to replicate audit findings adequately in the decision tracking forms. More importantly, the detailed consideration of the audit report can be missed as participants at resolution meetings work through the decision tracking form rather than the full explanation in the main text of the report.

Discussion Topic – How can reports be kept concise?

Under what circumstances should auditors revisit previously identified risks?

Should there be changes to the guidance on reporting requirements in the Road Safety Audit Procedures for Projects?

Should a more concise form of report be promoted, such as the one page document that the NSW RTA use?

What does this workshop recommend?

WHEN AND HOW TO BRING SPECIALISTS IN THE AUDIT TEAM,

As auditors we take pride in our status and the honour afforded by being engaged to provide expert review of safety in a project. Being the helpful sorts we are, we attempt to give good guidance on safety issues. However, there is a risk that we either inadvertently or deliberately attempt to give advice beyond the limits of our expertise. Some key areas to be wary of include:

- Traffic signal design and phasing
- Lighting design
- Complex geometric design elements such as motorways, ramps, diagonal crowns
- Facilities for vulnerable users, particularly mobility or sight impaired
- Assembly and installation of barrier systems, terminals, crash cushions and transitions
- The design criteria, working width, length of need, and containment limitations of barrier systems
- ITS elements of designs

If for some reason expertise is not available, then any potential risk arising from the lack of expertise should be identified in the RSA report. For example, if the SAT lack the knowledge to check the assembly of specialist features such as lighting and barrier terminals used on a project and suspect a problem, they could recommend that the installations be independently verified.

The design of safety features such as lighting and barrier systems is much more complex and rigorous than many engineers and auditors recognise. NZTA have recognised this problem and are

attempting to raise the standard of training for designers and inspectors of barrier systems. Given the widespread use of barriers and the number of faults with their installation, should SAT's have expertise to review them?

Discussion Topic – Should the SAT have adequate training and expertise to review more complex yet common safety features such as lighting and barrier systems?

If not, why not? Further, if not then should there be an independent certifier??

What does this workshop recommend?

MAINTAINING THE CAPACITY OF THE AUDIT TEAM,

Complacency contributes to accidents in the workplace, and auditors are not immune to it, though it is something no-one likes to admit to. Similarly engineers and auditors can be vulnerable to fatigue, dehydration, heat or weather, alcohol and medication/drugs. With auditors being society's safety backstop, it is important that they take the job seriously, and present themselves in a fit condition to undertake the RSA.

The IPENZ Code of Ethics (IPENZ, 2005) sets out clear expectations on the behaviour of professional engineers, particularly with respect to the obligations to society to maintain the health and safety of people, to act with integrity, and not to misrepresent competence. IPENZ is about to review this Code. While not all auditors are Professional Engineers, all Road Safety Auditors would benefit from reading it. All Professional Engineers undertaking audits should have read and be familiar with the contents of the Code, act in an appropriate manner as set down in the Code, and take an active interest in its review.

SCOPE OF INVESTIGATIONS

As a matter of course the SAT should enquire of the Client Project Manager (CPM) and designers/contractor what changes have arisen to the project since the last audit. This is an important check to identify what changes may have slipped through the cracks, such as design or implementation changes as a result of discovered constraints. Often the CPM and designer may not be aware of changes if they seemed minor, and all project personnel (CPM, designer and contractor) may not have appreciated the safety risks.

The audit must also consider the wider influences of the surrounding environment on the project, and the project effect on traffic beyond the limitation of the project boundary. For example, will straightening a road make a downstream curve significantly out of context, or create issues for accesses with limited sight distance downstream of the project?

The transition or tie-in of a project to the surrounding network is often an area of contention with project teams, yet can be a key area for consideration by the audit. This is particularly the case where road marking changes extend beyond the "limit of physical works". Technically the extent of changes to road markings defines the limit of physical work, not the extent of resurfacing or pavement construction. Therefore where issues are identified at tie-ins, the SAT should point out that either the project needs to be reconfigured to tie in earlier (if this is appropriate), or the limit of works needs to be changed.

USE OF CHECKLISTS, AND RESEARCH

Senior auditors often turn their noses up at the mention of checklists. However, these provide a valuable opportunity to ensure that the audit considerations are comprehensive. In the heat of an audit inspection, it is easy to be distracted and omit a key consideration. Checklists can help overcome this risk. No matter what their level of experience, auditors should never be afraid to consult checklists.

In the same vein auditors should not be afraid to request additional research on identified concerns, seek advice on areas beyond their level of expertise, and/or challenge time frames if this is needed to ensure any concerns are adequately evaluated.

PRACTICALITIES OF MAINTAINING A REGISTER OF AUDITORS

One question often asked is how do we assess the capability of auditors? In New South Wales, Australia the IPWEA has set up a register for auditors that provides details on the capability of individual auditors. The process for getting onto the register is done in a reasonably open way, and requires that auditors undertake approved initial training and periodic updates, and have a recent work experience. This is demonstrated by auditors submitting record of their work. Auditors' areas of specialisation are also recorded.

This level of training, assessment, and record keeping needs commitment from a suitable organisation, which has proved to be a stumbling block in New Zealand. Previous suggestions for this role include NZTA, IPENZ, and Traffinz. However, none of these organisations has formally risen to the challenge. Some of these organisations arrange training courses on various engineering subjects. Some members of these organisations keep records of RSA's and SAT's in order to choose suitable engineers for project audits.

Discussion Topic – How can we maintain and improve the ability of auditors?

Is it time New Zealand adopted a more formal approach to RSA, like in NSW, Australia? Should there be a register of auditors to assist Road Controlling Authorities and Project Managers with choosing SAT members? Should there be formal assessment and on-going training/updating for auditors? This would help auditors keep abreast of new products and techniques, policy changes, research and crash trends, and reinforce knowledge and expected behaviours.

Should auditors be removed from the register if they fail to act correctly? Should they sign up to the IPENZ Code of Ethics, or an equivalent code?

What does this workshop recommend?

COMING UPDATE OF RSA PROCEDURES FOR PROJECTS

Road Safety Audit Procedures for Projects (Transfund NZ, 2004) is now being reviewed by an industry reference group to both update it generally and in particular to ensure a Safe System approach to road safety audits. The reference group has prepared a draft version of the revised guidelines which has been circulated throughout the industry for comments. Once any major issues have been resolved this document will become the active version for road safety audit procedures on a trial basis. Following this trial period any necessary revisions will be made and a final version agreed.

The major changes are the addition of an explanation of the Safe System approach, changes to the reporting process and a new ranking system as below.

Table 1: Risk Assessment Matrix

Severity (Likelihood of Death or Serious Injury Consequence)	**Frequency (Probability of a Crash)**			
	Frequent	**Common**	**Occasional**	**Infrequent**
Very Likely	Serious	Serious	Significant	Moderate
Likely	Serious	Significant	Moderate	Moderate
Unlikely	Significant	Moderate	Minor	Minor
Very Unlikely	Moderate	Minor	Minor	Minor

It is recommended that in addition to the overall assessment (Serious/Significant/Moderate/Minor) the severity and frequency ratings be individually noted for each issue in the RSA report to assist the project manager with his decision.

For NLTP projects the completed audits or exemption forms will be required to be added to the project documentation on TIO (Transport Investment Online).

Further details have also been added, without significant change on when audits should be undertaken, roles and responsibilities, and exemptions.

To obtain the latest version of this document or for any further information contact Steven Coulter at NZTA: steven.coulter@nzta.govt.nz

CONCLUSION

There are some key areas where improvements can be made to best practice for the RSA process, to make the outcomes more reliable. These improvements centre on focussing all those involved in and affecting the RSA process. Road safety auditors as the industry experts need to take the lead in this.

This paper has discussed how for auditting to be effective, and for auditors to provide the quality of advice required, the audit community needs to ensure that:

- Members' expertise is both comprehensive and current.
- Members recognise the limitations on their practice areas, and arrange for specialist advice where appropriate
- Members conduct themselves with integrity, review their own performance, and consider all aspects and affected parties, use checklists, research issues, and extend inspections as required
- Reports are comprehensive in terms of their scope, but concise to ensure that risk is

appropriately communicated and managed

This paper also challenges the road safety audit community to lift the standard as we seek to play our part in meeting the improving expectations on providing safe travel in New Zealand. Maintaining the currency of our expertise requires that we keep abreast of developments in all the aspects of transportation that we practice in. How can we hope to achieve this reliably, and monitor our performance, if we do not have a systematic process to detect and evaluate problems, disseminate information, and monitor results?

As transportation engineering becomes increasingly complex, and safety expectations grow, demand for a quality safety audit product also increases. Let's rise to meet that challenge!

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ACKNOWLEDGMENTS

Steve Coulter Principal Advisor - Road Safety, Strategy & Performance, NZ Transport Agency, for advice on the review of the RSA procedures guideline

Andrew Stevens, Road Safety Manager Auckland Motorways, and Associate – Transportation Beca for review comments