Getting the most out of the Road Safety Audit process

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ABSTRACT

Road Safety Audits are an important tool for ensuring that road design and improvement successfully achieves the aim of providing safer roads in New Zealand. Safer roads is one of the elements of the safe systems approach the government is promoting to meet its targets for reducing death and serious injuries on our roads. This is needed for New Zealand to contribute to the Decade of Action for Road Safety initiative launched by the UN, to prevent five million road traffic deaths globally by 2020.

Road Safety Audits depend on all parties understanding the importance of the process and fully playing their part.

This presentation considers where the Auckland Motorways Alliance (AMA) have found the safety audit process fails, and promotes discussion on what improvements need to be made to ensure that audits are effective. Issues for discussion include how do we recognise and deal with specialist areas, what should the process include to ensure that project changes are adequately considered from a safety perspective, and how do we deal with the findings of road safety audits, to ensure successful outcomes.
INTRODUCTION

The Road Safety Audit (RSA) process is a risk management exercise, which is vulnerable if it is not diligently completed. This discussion paper looks for the key areas where the process is failing to deliver to its potential, and what improvements might be made to deal with it.

DEFINING THE PROBLEM

Road Safety Auditing is a risk management process that relies on all project participants fulfilling their respective roles. Looking at each contributor in turn:

Auditors need to ensure that:
- The SAT has the appropriate expertise to carry out the audit, or should procure such expertise. They are in a suitable condition to undertake the audit.
- That they consider all perspectives; all road users (not just car drivers), and all conditions that the facility can be expected to work under.
- All aspects of the project have been identified, or any aspects that are missing are reported to the Client Project Manager (CPM) to arrange a follow up audit.
- Risks are adequately identified and correctly evaluated, and the report is clear and concise.

Client Project Managers need to ensure that:
- The SAT is adequately briefed and has sufficient information to understand the proposal, identify and evaluate risks.
- The full extent of the project is portrayed in the information given to the auditors.
- The audit is adequately resourced.
- Allowance is made for dealing with the findings, including redesign.
- All changes to the design are forwarded to the auditors.
- All findings are correctly evaluated and decisions are consistent with providing a safe system. Where the CPM does not have sufficient expertise to assess the risks and relative merits of opposing arguments, they should arrange to procure suitable expert advice.
- All decisions are recorded along with justifications.

Designers and Contractors need to ensure that:
- the SAT are furnished with full details to identify the nature and scope of the project
- the response to RSA findings are given a fair appraisal
- the decisions are implemented
- changes to the work are put to the CPM, with a recommendation as to whether they should be subject to a fresh audit.

EXPLORING CONTRIBUTING FACTORS AND SOLUTIONS

Roles and Responsibilities – The SAT

The SAT is often considered to be the safety experts relevant to the scale and technical aspects of the project, at least by the CPM. Some common areas where audits fail involve inadequate identification or evaluation of risk. For example:

- RSA of a motorway extension project fails to consider the need to accommodate cyclists approaching from the rural highway. Subsequent remedial work was required to correct the discrepancy and make the facility safe for all road users.
- RSA of a major motorway realignment identifies but incorrectly assesses the risk posed by an on ramp metering signal display that is visible to and in close proximity to traffic on the
motorway, and in a situation where the signals might confuse drivers travelling on the motorway. Urgent corrective work was required following a serious injury crash not long after opening.

In both situations the RSA was conducted by senior engineers, each with significant experience. These examples illustrate that auditors need to be very thorough in the risk identification process, and in the subsequent evaluation and reporting. So what can go wrong? There are several traps that SAT’s need to be aware of:

1. Fear of exaggerating risks

   Auditors may become desensitised to risk, or cautious about being accused of exaggerating risk. The better road safety auditors will have experience in crash analysis and injury causation, as well as in geometric design.

2. Overly simplistic risk assessment

   Risks take many forms, can have several possible outcomes, each with its own range of likely severities, and associated probabilities. In assessing risk, the guidelines use a simple product of consequence severity and probability. This might work with assessing a simple risk such as loss of control crash on an isolated rural curve. However, where there are complexities of traffic operation, then there may be many possible crash risks. In a motorway environment, PIARC (2011) claim about half of crashes can be caused by lane changing and rear end movements. 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.

3. Identifying all risks

   Identifying and assessing risk in more complex situations takes time and concentration, as well as experience. Quite often the more obvious or complex aspects of a project can distract the SAT from the needs for evaluation effort in more subtle areas of the improvements, e.g. interfaces with the existing road network. The devil lies in the detail it is often said.

4. Meeting budgetary and time constraints

   The SAT is often under pressure to perform to a budget or to time constraints. This is a well-recognised contributory factor to accidents in the industry. RSA is also vulnerable to this issue. That is why the SAT need to manage their workload to afford opportunity to make full assessments, and research where necessary.

5. Complacency and the condition of auditors

   Complacency can result in a RSA failing to recognise risks. Similarly engineers and auditors can be vulnerable to fatigue, dehydration, alcohol, and even substance abuse. With auditors being society’s safety backstop, it is important that they take the job seriously, and are in a fit condition to undertake the RSA.

6. Auditors' level of expertise

   No matter what their level of experience, auditors should consult checklists, carry out or ask for additional research on identified concerns, seek advice on areas beyond their level of expertise, or challenge time frames. Auditors with a background in highway geometric design might not have sufficient expertise to review lighting design, the intricacies of barrier systems and crash cushions, and traffic signals.
If for some reason expertise is not available, then any potential risk should be identified in the RSA report. For example, if the SAT lack the knowledge to check the assembly of barrier terminals used on a project and suspect a problem, they could recommend that the installations be independently verified.

One question often asked is how do we assess the capability of auditors? In NSW, Australia the IPWEA has taken this up by managing who can undertake audits, and assessing the capability of individual auditors. This requires that auditors undertake approved initial training and periodic updates, and have a recent work experience, demonstrated by auditors submitting record of their work. Then the auditor’s areas of specialisation can be 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 have formally risen to the challenge. Some of these organisations arrange training courses on various engineering subjects. Some members of these organisations keep records of RSAs and SATs in order to choose suitable engineers for project audits.

Should New Zealand adopted a more formal approach to RSA, like in Australia? Should there be a register of auditors to assist Road Controlling Authorities and Project Managers to choose 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. The process could also monitor the provision of auditors, thereby identifying shortages in experience or the number of auditors, and encouraging the uptake of new auditors and further training of existing auditors.

Roles and Responsibilities – The Client Project Manager

Decisions and documentation

Transfund’s General Circular 04/05 (Transfund 2004) describes the need to document decisions on the safety audit process, including where the CPM decides that an audit is not required. Similarly the NZTA Project Management Manual (NZTA 2010) sets out criteria for audits and the documentation that needs to be completed to record decisions in respect of audits. However, the NZTA (2010) checklist only requires the CPM to identify that an audit has been done, and decisions disseminated. Is this enough? Should the project phase be held in an incomplete status until it is demonstrated that the RSA of the full project at each phase has been undertaken, and issues resolved?

PIARC (2011) notes that documentation of the decisions in the project file is essential for future investigations of the road controlling authority’s decisions. The client’s response to an audit report must provide reasons for not accepting any auditor’s recommendation, which should be detailed and defendable.

It may be timely to review the provisions of NZTA (2010) to ensure the quality of documentation is adequately maintained. Consideration could be given to establishing “hold points” to ensure full compliance before the project can proceed. Potentially, the funding agency could also consider carrying out quality audits, to ensure that the project processes and documentation are kept up to required standards.

Keeping to programme

Time pressures and budgetary constraints can affect audit effectiveness or reliability. The CPM needs to ensure that the SAT is not under too much pressure to deliver by a certain date, or within an overly restricted budget, and has inputs available for consideration before the audit date.
Options to deal with this include delaying the audit until the design is complete, or arranging subsequent audit(s) to consider the ramifications of the changes or later design elements.

The problem often arises in the dismissal of the issue, as project teams consider that solutions for the final parts of the design will be just added on to meet standards at the end of the process. There is a risk, however, that incompatibilities will be created preventing the correct functioning of some elements. For example, the positioning of signs or design of landscaping can affect sight distances. Where issues are not picked up early enough and the project gains too much momentum, then it becomes too costly or difficult to arrange a satisfactory solution.

Thus the Client Project Manager (CPM) should ensure that the inputs and timeframes for the RSA are adequately provided, and that the composition of the SAT includes the expertise necessary to assess the project. While some tension on SAT timeframes and budget is appropriate, this has to be balanced against the need for auditors to have the opportunity for sufficient reflection on what they are reviewing.

The Project Manager must also ensure that all elements of the project have been subject to an audit. By specifying the RSA report delivery from the date of delivery of all inputs to the audit team, the CPM can maintain tension on both the design team and on the SAT.

**Getting the right mixture of expertise**

The role of the CPM requires management of many disciplines, and often decision making on conflicting interests. This extends to the management of the RSA process. The CPM needs to ensure that they have the best available expertise for the job. However, there is little guidance for CPMs on choosing the SAT, and dealing with the decision making process. Some functions can be delegated, others cannot. The CPM needs to be wary of what level of competence they have to make decisions, and know who to turn for help. In this regard the NSW IPWEA system gives better support to the industry, both for auditors and for Client Project Managers.

There appears to be a need for training and guidance for the CPM's role with respect to managing the RSA process. This could arguably extend to designers and contractors, and would likely increase their sense of ownership of the RSA process.

**Roles and Responsibilities – Designers and Contractors**

**Pressures of time and cost/budget**

Under Alliance or Design and Build procurement, all parties are positively focussed on achieving procurement within criteria of value and time. However, the safety process may not sit well in these models, to the point where it may be regarded as an obstruction or irritation. Under a traditional procurement model the timeframes and budgets are often under less stress, allowing Project Managers more opportunity to deal with the audit process.

The pressures on procurement need to be managed by the designer and contractor as well as by the CPM to maintain the function of the RSA process. Again, training may assist all stakeholders to appreciate and have a sense of ownership of the RSA process.

**Design changes during construction**

There are often situations during construction where the original design intention is not suitable or realistic, such as when previously unrecognised constraints are discovered. This often can be at a point in the project where completion dates are set, or there are time and budgetary constraints. Understandably there can be reticence to put changes forward for RSA. designers, contractors and
the CPM need to be alert to the ethical responsibility of their role. If there are any concerns that the designer or contractor is worried about being audited, then there is clearly a need for it to be audited!

CONCLUSION

Stakeholders correctly discharging their roles are key to the effectiveness of RSAs:

- the CPM that organises the audit and adjudicates on the audit findings,
- the SAT that carry out the RSA,
- the Designer/Contractor (depending on contract procurement type) that recommends appropriate action to address the RSA findings,
- sometimes an independent safety advisor to the CPM that assists with deliberation and decisions on RSA findings.

This paper has considered the benefits of training for all participants in the RSA process, and of maintaining an open register of auditor qualifications and experience. This could be based on the IPWEA NSW register and criteria for auditors, and be extended to train client project managers, designers and contractors. The key to implementation is finding a champion such as the IPWEA in Australia. Suitable NZ counterparts include Traffinz, NZTA and IPENZ.

It is important for all stakeholders to recognise the importance of their role in achieving a safe system, 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 are similarly improving over time. Therefore 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.

REFERENCES


Transfund NZ (2004), General Circular No. 04/05 (May 2004). Road safety audit policy and procedures.

World Road Association (PIARC) (2011). Road safety audit guideline for safety checks of new road projects. ISBN 2-84060-199-0
http://www.piarc.org

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