THE TIME IS HERE TO PUT ROAD SAFETY AUDIT TO WORK - WORLDWIDE

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1 INTRODUCTION

The imminent release of the new AUSTROADS Road Safety Audit guide is an opportunity to reflect on the progress of road safety audit, and to re-examine the usefulness of this relatively new road safety process. In so doing, one has to ask why road safety audit is not yet a fully integrated process within all road design departments all over the world.

As major new road infrastructure projects are planned, designed and built, there is usually a belief amongst all concerned that road safety will naturally benefit. This belief can lead to a situation where other issues to do with those projects (such as costs, timing, pavement quality, environmental issues, historical preservation and land acquisition to list but a few) receive **explicit** and detailed consideration, while road safety issues do not. Examples of this can be seen in developed and motorising nations all over the world. Good practice indicates that road safety is too important to leave as an **implicit** part of a new road project - it needs to be explicitly detailed throughout the planning, design and construction process.

The one sure way to make this happen is to introduce the road safety audit process into the road design process. This paper provides reasons why governments should introduce road safety audit into the design and construction of new road projects. It encourages governments worldwide to adopt this low cost/high benefit process and it offers some advice for those about to implement the safety audit process.

2. WHAT IS A ROAD SAFETY AUDIT?

A road safety audit is "a formal examination of an existing or future road or traffic project, in which an independent, qualified team reports on the project's accident potential and safety performance."(AUSTROADS 2001). Being a proactive process, the theme of road safety audit is prevention is better than cure. Road safety audit is an extremely valuable, low cost process in the field of road safety engineering. It is proving to be an impressive new road safety engineering process and has become an accepted practice in highway agencies around the world.

3 A SHORT HISTORY OF ROAD SAFETY AUDIT

Road safety audit is generally considered to have started in the County of Kent in Great Britain in the mid 1980s. At that time, the County Accident Investigation Team – responsible for investigating high accident frequency (blackspot) sites – questioned

the number of newly designed and built road projects which were appearing in the County's list of high accident frequency sites.

The Team believed that road safety would be improved if they were permitted to check the designs of all new road projects from a safety point of view before the project was built so that any safety concerns could be designed out of the project. With support from the Chief Engineer, the County developed a policy requiring all new road designs to be checked and approved for safety by the Team Leader of the Accident Investigation Team prior to construction. If approval was not granted, the project was not permitted to proceed.

In time this process became formalised as road safety auditing. The word audit was used – and continues to be used - to refer to a thorough and detailed safety assessment of a road design. A road safety audit is a systematic and detailed review rather than a design check.

Similar procedures and policies soon emerged elsewhere in Britain, and allied processes were beginning to emerge in road authorities elsewhere. In Australia, for instance, pre-opening audits of major road projects were carried out routinely to assess the safety of the new road prior to it opening to traffic. The engineers responsible for this task also recognised the benefits of carrying out these audits earlier – during the design of the road project – and were contemplating ways to achieve this at the time that the first detailed documentation about road safety audits was published.

The 1990s witnessed a global expansion of interest in and adoption of the road safety audit process. In 1992 AUSTROADS established a Project Team to review the benefits of road safety audit and to develop a set of guidelines (AUSTROADS 1994) for use within Australia and New Zealand.

All state road authorities in Australia and New Zealand have embraced these guidelines. They have since been adopted and used by a number of engineers, professional associations and road authorities in other parts of the world as a "quick start" for the implementation of road safety audit in their jurisdiction. The guidelines are currently widely used and recognised in Canada, the United States, South Africa, and Singapore. They were a model for the development of the Malaysian road safety audit guidelines, and they are referenced by individuals and researchers in many nations including Thailand, India and Bangladesh as well as in Scandinavia, Western Europe and parts of the Middle East.

4. STAGES OF AUDIT

The new edition of the AUSTROADS road safety audit guide (due for release mid 2001) adds an extra stage – the audit of roadworks – to the current five stages of audit.

4.1 Feasibility Stage Audits

By providing a specific safety input at the feasibility stage of a scheme, road safety audit can influence fundamental issues such as route choice, standards, impact on and continuity with the existing adjacent network, and intersection or interchange provision.

4.2 Preliminary (Draft) Design Stage Audits

This audit occurs on completion of the preliminary road design. Typical considerations will include horizontal and vertical alignments, and intersection layouts. Subsequent significant changes in road alignment become much harder to achieve after this stage as land acquisition and other associated legal matters become finalised.

4.3 Detailed Design Stage Audits

This audit occurs on completion of the detailed road design but before the preparation of contract documents. Typical considerations include geometric layout, linemarkings, signals, lighting, signing, intersection details, clearances to roadside objects (crash barriers/frangibility,) and provision for vulnerable road users. Attention to detail at this design stage can do much to reduce the costs and disturbances associated with last minute changes which may otherwise be brought about with a pre-opening audit. It is cheaper and easier to change some marks on a drawing than to later re-build or rectify a road project that proves to be hazardous.

4.4 Pre-Opening Stage Audits

This audit involves a detailed inspection of a new scheme prior to its opening. The new road is driven, ridden and walked (when appropriate) by the audit team to ensure that the safety needs of all road users are provided for. A nighttime inspection is particularly important to check signing, delineation and other darkness-related issues.

4.5 The Audit of Existing Roads

This audit aims to ensure that the safety features of a road are compatible with the functional classification of the road, and to identify any feature which may develop over time into a safety concern. Regular audits of existing roads allow road safety hazards to be identified before they result in accidents.

4.6 Roadworks Audits

This audit involves both an audit of the traffic management plans for a use during the construction of a road project, and inspections (day and night) of the safety issues such as signs, roadside protection and traffic management during each phase of the project.

5. BENEFITS AND COSTS OF ROAD SAFETY AUDIT

The question about whether or not the benefits of the road safety audit process outweigh the cost has been asked on a number of occasions and in many parts of the

world. AUSTROADS therefore recently commissioned a consultant to investigate, identify and measure the benefits achieved by road safety audit in Australia. The AUSTROADS study has already completed an international review of recent literature and has found four studies which demonstrate the benefits of road safety audit:

- A study in Great Britain that compared before and after crash statistics for a sample of audited schemes and non-audited schemes, found that audited schemes achieved an average casualty saving per year of 1.25, compared to a saving of 0.26 for non-audited schemes.
- Another study in Great Britain found that the average saving from implementing changes at the design stage rather than after the project was constructed was approximately AUD$23,000.
- An evaluation study, which involved a cost benefit analysis of 13 projects in Denmark that had been subject to road safety audit, gave a first year rate of return of 146%.
- A study in the Middle East, which considered a number of projects that were not subject to road safety audit but developed problems soon after construction, concluded that road safety audit would have provided a first year rate of return of 120%.

There are clearly positive benefits from the road safety audit process. The cost of an audit is low (something in the order of 0.2 – 0.5% of the total project cost. The higher the total project cost, the lower this percentage drops). With such low costs and high returns, one has to ask why all governments have not rapidly adopted this process.

6. STEPS IN IMPLEMENTING ROAD SAFETY AUDIT NATIONALLY

6.1 Ensure that there is a road safety audit policy in Council's road safety plan.

These policies are usually brief and cover issues such as:

- Who may be in the audit team
- The type of road projects which must/should be audited
- The cost of road projects above which a percentage must be audited
- The reporting system within the audit process
- The responding system within the audit process
- The stages of audit to be carried out
- The presentation style of the audit report

For example,

- In Victoria, VicRoads requires road safety audits to be carried out at all stages for projects exceeding $5 million, and at a minimum of one stage for 20% of all other projects. In addition, existing route audits were required to be undertaken on the worst 30% of the regional declared network in the mid 1990's, as part of VicRoads' road safety investigations program.

- In New South Wales, 20 road construction projects are audited each year within each Road and Traffic Authority region, and 20% of the existing road system is audited each year.
- Main Roads Western Australia generally requires that audits be conducted for all projects exceeding $100,000, all new roads, at fatal crash sites (where warranted), at hazardous locations (being the worst 10% by crash/injury type), and on 10% of the existing road network.

6.2 Adopt a set of road safety audit guidelines.

Such guidelines do not have to be prepared anew - the AUSTROADS road safety audit guidelines are in wide use throughout Australia and New Zealand. They will provide a focus for road safety audit, and thereby assist with the widespread awareness and understanding of the audit process within the municipality. These guidelines will also be an integral part of the program for road safety audit training workshops.

6.3 Develop an agreed road safety audit procedure.

By adopting a procedure similar to that contained in the AUSTROADS guidelines, and by applying it within the structure of the infrastructure or design department of the municipality, local government can readily commence road safety audit at minimum cost and generally with minimum disruption to existing programs.

6.4 Know where to obtain teams of auditors.

One of the issues facing the implementation of road safety audit in any new jurisdiction is that the Client may not know where to go to find suitable road safety audit team members. If road safety audit is to take hold smoothly, Project Managers and Client representatives will need a list of qualified auditors to call on. To assist in this regard, AUSTROADS has established an accreditation system, and most States have a database of individuals who have satisfied these requirements:

A. *Five years (minimum) relevant experience in road design, traffic engineering, road safety engineering or other closely related road safety discipline.*
B. *Successful completion of a road safety audit training course, approved and recognised by a State Road Authority.*
C. *Participation in at least five road safety audits under the guidance /leadership of a Senior Auditor, of which at least three must be design stage audits, and another must be a Stage 4 or 5 audit.*
D. *Certify maintenance of knowledge/experience by completing one audit per annum.*

To be listed as an accredited Road Safety Auditor within the AUSTROADS model, a person is required to satisfy points A and B above. To be listed as a Senior Road Safety Auditor, a person is required to satisfy points A, B, and C above. Both levels of auditor are required to satisfy point D in order to remain on the list.

6.5 Ensure that all officers within local government are aware of the road safety audit process.

While there are many well-qualified and technically competent officers in local government, relatively few have undertaken a formal training workshop in road safety audit. To ensure that the road safety audit process takes hold in a uniform manner, and to establish a process which is recognised as formal and worthwhile, it is usually necessary to hold a number of road safety audit training workshops. The initial workshop should be held in conjunction with the launch of the new policy on road safety audit, and it should be repeated as often as required.

There are three groups of professionals in need of specific information about the road safety audit process:

- those who need awareness of the process (typically road safety professionals and senior managers)
- those practitioners who are to do the audits, and
- those who are to use the audit reports and respond to the audit outcomes (typically project managers).

Each state road authority, following the AUSTROADS principles, undertakes training in road safety audit at present. More people are being trained at present in Australia than ever before – suggesting that there is a real need for an on-going program of awareness and technical training in road safety audit.

6.6 Develop a system for monitoring progress with road safety audit.

This should include activities such as recording the number of audits and the stage of audits, identifying common safety concerns arising from these audits, and establishing the level of compliance with the process. It should include recording the numbers of individuals undertaking training workshops and participating in audits, to assist with the accreditation system for auditors. The quality of responses from the designers and Project Managers, the overall outcomes of the process including its benefits and its costs, and the need for amendments to the procedures are other issues for this position to monitor.

7. CONCLUSION

Road safety audit is a low cost, high benefit process that can assist local government to design and build safer new roads. It is valuable insurance against building an accident blackspot. Its adoption by all Australian local government authorities is to be encouraged.

8. FURTHER READING

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