ROAD SAFETY AUDIT PROCEDURES REVITALISATION

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Benefits

- Contribute to the objectives of a safe system by providing a safer road network
- Produce designs that reduce the number and severity of crashes
- Reduce costs by identifying safety issues and correcting them before projects are built
- Reduce the whole-of-life costs of the project

Saves Lives / Saves Costs
Why?

Prevention is better than cure
Associated Benefits

- Process helps improve the awareness of safe design practices.
- Provides fresh set(s) of skilled eyes – integrated assessment from the perspective of all road users
- Focus on human factors in all facets of design
Benefits

Austroads report on benefits of design stage audits:
Benefits

- Benefit cost ratio of implementing specific recommendations ranged from <1 to 2600.
- Over 90% of all recommendations had BCR > 1.0.
- Approx. 75% of all recommendations had BCR > 10.
- 65% of recommendations had a cost < $1,000.

RSA pay for themselves many times over
Issues Identified

- Designers and clients not always giving due consideration to safe system outcomes
- Inconsistent interpretation of safety concerns and rankings
- Recommendations not followed through or completed
- RSA used to check acceptability of design
Changes Overview

- Focus on Safe System approach
- Clarification of skills and responsibilities
- Suggested ranking matrix
- Focus on tracking of decisions – example template
- Either RSA or exemption form required
What is a Road Safety Audit?

Definition

- A road safety audit is a term used internationally to describe an independent review of a future road project to identify anything that may affect the road’s safety.

Objective

- To deliver completed projects that contribute towards a safe road system that is increasingly free of death and serious injury.
Auditors must understand the four safe system principles and:

- Understand all road users perception of roads and roadsides
- Limit crash forces to prevent fatal and serious injuries
- All parties to the audit need to work together to produce a safe outcome

Feedback loop

Keep abreast of technical developments
Examples

Prevention is better than cure

<table>
<thead>
<tr>
<th>Hazard type</th>
<th>Fatal/serious injuries per run-off road injury crash (100km/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poles</td>
<td>0.81</td>
</tr>
<tr>
<td>Tree (shrub/scrub)</td>
<td>0.75</td>
</tr>
<tr>
<td>Fence/Wall</td>
<td>0.55</td>
</tr>
<tr>
<td>Embankment</td>
<td>0.53</td>
</tr>
<tr>
<td>Rigid barrier</td>
<td>0.50</td>
</tr>
<tr>
<td>Semi-rigid barrier</td>
<td>0.60</td>
</tr>
<tr>
<td>Flexible barrier</td>
<td>0.33</td>
</tr>
<tr>
<td>No hazard hit</td>
<td>0.43</td>
</tr>
</tbody>
</table>
Road safety audits are applicable to all types of road projects, on all types of roads.

- eg: major deviations, reconstruction, intersections, pedestrian or cycle facilities, PT, local area improvements, private developments, or temporary management works.

- It is not the scale of the project that is important.

- Method of procurement is no obstacle.
Audit Stages

- Audits early in the development cycle recommended
- All stages of project cycle can be audited
Project Exemption

- Record any decision to exempt an audit stage
- All development stages of a project with NLTP funding must be audited
- Completed audit reports attached to funding requests
- Project Manager may elect to omit project to stage audit providing decision is documented in an exemption declaration
# Process Steps

<table>
<thead>
<tr>
<th>Road safety audit process STEPS</th>
<th>Party responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify project audit stages required or complete exemption declaration</td>
<td>Client</td>
</tr>
<tr>
<td>Select the road safety audit team</td>
<td>Client / road safety audit team leader</td>
</tr>
<tr>
<td>Provide the project information</td>
<td>Client / designer</td>
</tr>
<tr>
<td>Hold a briefing meeting</td>
<td>Client / designer / road safety audit team</td>
</tr>
<tr>
<td>Assess documents and inspect site</td>
<td>Road safety audit team</td>
</tr>
<tr>
<td>Hold an exit meeting</td>
<td>Client / designer / road safety audit team</td>
</tr>
<tr>
<td>Complete audit report and forward to client</td>
<td>Road safety audit team</td>
</tr>
<tr>
<td>Designer responds to client</td>
<td>Designer</td>
</tr>
<tr>
<td>Client completes decisions</td>
<td>Client</td>
</tr>
<tr>
<td>Complete audit tracking report and feedback response to designer and road safety audit team</td>
<td>Client</td>
</tr>
<tr>
<td>Implement client decisions Document final actions and finalise audit tracking report</td>
<td>Designer / client</td>
</tr>
</tbody>
</table>
Safety Audit Team

- The audit team is to be appointed by the client.
- The client should consult with the team leader to agree on other team members with appropriate skills.
- Must be independent from the designer, contractor and the client.
- Preferably two or more.
SAT Experience

- Range of experience appropriate to the stage and type of project
- A good understanding of the Safe System approach – attended training course
- Team Leaders to have 5 years experience in a relevant field audit experience with a minimum of five relevant safety audits of same stage
- Team Members should have at least three years experience in a relevant field
The amount of information will vary dependent on size and stage of audit

- Drawings
- Scheme Reports
- Traffic data / Crash data
- Design report or statement including standards adopted
- Project staging or temporary traffic management
- Previous audits and responses
Key Steps

- Briefing meeting can be desirable
- Team assessment
- Site visit – consider viewpoint of all road users, day/night, busy traffic periods
- Exit Meeting - often desirable – provides preliminary feedback and helps to clarify design intention
- Checklists
Checklists
Description

Succinctly report on road safety concerns

Make recommendations about corrective actions

(Recommendations may indicate the nature or direction of a solution but they do not specify the details of how to solve the concern. Responsibility for the solution rests with the designer)

Ranking of concerns to assist decision making
Focus on reducing death and serious injury crashes

Improve consistency of ranking

Clarify the rationale for ranking to improve guidance to project managers
### Report – Ranking Matrix

<table>
<thead>
<tr>
<th>Severity (likelihood of death or serious injury)</th>
<th>Frequency (probability of a crash)</th>
<th>Frequent</th>
<th>Common</th>
<th>Occasional</th>
<th>Infrequent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very likely</td>
<td>Serious</td>
<td>Serious</td>
<td></td>
<td><strong>Significant</strong></td>
<td>Moderate</td>
</tr>
<tr>
<td>Likely</td>
<td>Serious</td>
<td>Significant</td>
<td>Moderate</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Unlikely</td>
<td>Significant</td>
<td>Moderate</td>
<td>Minor</td>
<td>Minor</td>
<td>Minor</td>
</tr>
<tr>
<td>Very unlikely</td>
<td>Moderate</td>
<td>Minor</td>
<td>Minor</td>
<td>Minor</td>
<td>Minor</td>
</tr>
</tbody>
</table>

- **Professional judgement required**
Rating Crashes

High-risk rural roads guide

High-risk intersections guide
DRAFT FOR CONSULTATION

Economic evaluation manual
Volume 1

Safer Journeys
New Zealand Gover

New Zealand Transport Agency

Land Transport NZ

TDG
To assist decision makers for each concern report on:

- frequency rating (probability of a crash)
- severity rating (likelihood of crash resulting in serious injury), and
- overall ranking to be reported

Comments are useful

All concerns should be considered by the client
Audit Responses

- Designers response (with recommendation and reasons to accept or reject audit recommendation)
- Safety engineer’s comments
- Clients decision
- Action taken
- Decision tracking embedded in report with each item
- Feedback to safety audit team

- The feedback loop is an essential part of the process
1.1 Long "Steep" Grades

A long grade of 5.2% over a length of 1500m is proposed. This long grade will slow heavy vehicles and result in a speed differential between the slowest heavy vehicles and a faster car. It is recognised that newer heavy vehicles and unladen heavy vehicles are capable of maintaining higher speeds which means that frequently the heavy vehicles will themselves be overtaking the slower vehicles. These slower vehicles will reduce the level of service on the uphill road section with a corresponding increase in frustration of following drivers and potentially leading to erratic driver behaviour i.e. potential for fast lane changing due to high speed differential.

Recommendation:

Assess the effect the long grade on the level of service and associated safety ramifications based on the expected volume of heavy vehicles and consider the need for a crawler lane.

<table>
<thead>
<tr>
<th>Frequency Rating</th>
<th>Occasional</th>
<th>Severity Rating</th>
<th>Unlikely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designer Response</td>
<td>Proposed uphill gradients and lengths are longer than desirable and will affect truck speeds. However, due to traffic volumes being relatively modest, there are no capacity issues. No crawler lanes are proposed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Engineer</td>
<td>Agree with designer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Client Decision</td>
<td>Agree with designer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action Taken</td>
<td>No changes to design required.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Focus on achieving a Safe System – not ticking the box
Prevention is better than cure
Consider the safety risk not just the scale of project
Document any decision not to audit a particular stage
Agree an appropriately experienced team
Professional judgement is required
ALL concerns should be considered
Decisions and actions recorded
Feedback loop important
Feedback

- Please send feedback / comments to:
  - RSAuditTrial@nzta.govt.nz
Thank you

- Questions?
- Ranking Exercise