

**Traffic standards and guidelines  
2004/2005 survey**

**RSS 23**

**Crash reduction  
studies and monitoring**

January 2006



# Survey of traffic standards and guidelines

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Land Transport New Zealand is a Crown entity with the objective of allocating resources and undertaking its functions in a way that contributes to an integrated, safe, responsive and sustainable land transport system. Part of its function is to promote safe transport on land in New Zealand and to audit the performance of approved organisations.

To support this objective, the regional engineering sections of Land Transport New Zealand undertake a survey programme that assesses the effectiveness of the implementation of various safety standards by road controlling authorities.

The purpose of these surveys is to:

- assist and advise road controlling authorities on the implementation of selected traffic standards and guidelines that affect road safety
- provide a national summary of the level of adoption and compliance with standards and guidelines, and report findings to road controlling authorities and other interested parties
- identify changes that are required to improve standards, guidelines or traffic rules.

The surveys are usually carried out in two parts:

- Part 1 - road controlling authorities are asked to complete a questionnaire and interview, which look at the systems and procedures the road controlling authority has in place to deliver on a standard.
- Part 2 - a field survey is used to measure, where possible, the actual delivery from the user's viewpoint. In essence, this provides a snapshot of road safety delivery at the date of the survey.

This report presents the results of the latest of these surveys.

I believe the findings are valuable and can be used to improve road safety in New Zealand.

Please contact the nearest office of Land Transport New Zealand if you would like further information or assistance with implementing traffic standards or guidelines.



Richard Braae

General Manager, Partnerships and Programmes

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# Summary

## Introduction

Surveys of 31 road controlling authorities (RCAs) were undertaken between March and May 2005 to investigate their policies and practices for crash reduction studies (CRS), and Stop and Give Way controls at intersections.

This report describes the procedures and presents the results of the CRS survey. A companion report, *RSS 24 Stop and Give Way controls at intersections (2005)* details the results of the survey on intersection controls.

In the CRS survey, interviews and field surveys were carried out to:

- determine the procedures and programmes used by the RCAs to undertake CRS and implement recommended treatments
- identify what data the RCAs provide to Land Transport New Zealand (Land Transport NZ) for entry into the Crash Analysis System (CAS) monitoring database and what use they make of the reports available from the monitoring system
- obtain a 'snapshot' of the accuracy of the implementation data recorded in the CAS for implementation of recommendations from CRS.

## Results of interview surveys

CRS were undertaken by all RCAs surveyed, as part of the Land Transport NZ joint crash investigation programme. Most carried these out at least once every five years.

- More than half of the RCAs (61 percent) stated they had not undertaken other CRS on their own initiative.
- 26 percent had undertaken CRS annually or more often.
- 32 percent had undertaken them about every three years, or as required.
- More than half of the RCAs said they investigated individual crash sites annually, or more often.

All of the RCAs said they implement the recommendations from the CRS as maintenance, minor safety or major works projects. 65 percent said they identify works that are a result of CRS, RCAs improve fewer sites per year as a result of CRS than as a result of other safety investigations.

None of the RCAs had a formal programme to provide new or updated CRS monitoring data to Land Transport NZ. Only 48 percent of the RCAs provided implementation data for CRS sites. None of the RCAs used the CAS monitoring system to monitor crash locations treated from other investigations and none had formal systems for monitoring crashes at treated sites.

Only four of the RCAs (13 percent) found the Land Transport NZ national evaluation or local site information reports very useful. About a third of the RCAs said they were of some use. Half did not use the reports at all.

## Results of field surveys

The field surveys showed that the data in the Land Transport NZ monitoring system is not very accurate or up to date.

- All the implementation data was correct for only 45 percent of the sites surveyed.
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## Summary, continued

### Results of field surveys, continued

- There were errors for a quarter of the sites recorded as 'implemented' that could result in incorrect analysis of the effectiveness of treatments.
- Forty two percent of the sites recorded as 'not implemented' had, in fact, been implemented.

### Recommendations for crash reduction studies

To improve the effectiveness of CRS, it is recommended that:

- RCAs have a safety management system (SMS) that states how often CRS will be undertaken
- RCAs adopt *A New Zealand guide to the treatment of crash locations* (December 2004, Land Transport NZ), the national guideline for undertaking CRS
- CRS be undertaken by a team with the appropriate expertise (see section 5.1 of the national guideline)
- Land Transport NZ continues its role of encouraging RCAs to undertake CRS and offering to assist and be involved in teams, where appropriate
- a CRS team leader be appointed for each study
- RCAs adopt and document procedures and responsibilities for programming and checking the implementation of CRS recommendations.

### Recommendations for monitoring

Monitoring is one of the key principles of CRS listed in *A New Zealand guide to the treatment of crash locations*. The Land Transport NZ CAS monitoring system has been set up to assist with this, but – as mentioned above – the field surveys showed the data in it is not very accurate or up to date.

It is recommended that:

- as a matter of priority, Land Transport NZ and the RCAs work together to improve the accuracy of the monitoring system data
- RCAs document and implement procedures and responsibilities for checking the accuracy of implementation data in the system
- Land Transport NZ investigates ways of obtaining monitoring data from RCAs for all treatments of crash locations – not just from joint CRS. (Site location details and problem and recommendation monitoring forms should be completed for each site, and the details entered into the monitoring system)
- Land Transport NZ and the Ministry of Transport improve the distribution and awareness of the national evaluation monitoring reports and focus the reports on the needs of the RCAs. The reports should include analysis of more types of treatment
- Land Transport NZ, the Ministry of Transport and the RCAs review ways to improve the CAS, to encourage its use for monitoring treated crash location sites.

If the above recommendations cannot be implemented, Land Transport NZ and the industry need to review whether the monitoring system should be replaced with better ways of assessing the effectiveness of treatments.



# Introduction

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Between March and May 2005, the regional offices of Land Transport NZ conducted surveys of two roading and road safety issues in a sample of RCAs. The two issues surveyed were:

- CRS and monitoring
- Stop and Give Way controls at intersections.

This report describes the procedures and presents the results of the survey of CRS and monitoring.

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## Purpose of the survey

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The purpose of the survey was to:

- determine the procedures and programmes used by RCAs to undertake CRS
  - determine what programmes are used to implement recommendations made as a result of a CRS
  - identify what data the RCAs provide to Land Transport NZ for entry into the CAS monitoring database
  - identify what use the RCAs make of the site monitoring data available from CAS
  - identify how useful the Land Transport NZ monitoring analysis reports are to the RCAs and what improvements or additional reports might be useful
  - obtain a 'snapshot' of the accuracy of the implementation data recorded in the CAS monitoring system for the implementation of recommendations from CRS.
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## Methodology

### **Sample selection**

A sample of 31 RCAs was chosen for the surveys. This included 28 territorial local authorities and three regional offices of Transit New Zealand. The sample was weighted towards authorities not included in the previous 2003/2004 Land Transport Safety Authority (LTSA) surveys.

The table in appendix 1 lists the 31 RCAs surveyed.

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### **Interview surveys**

Interview surveys were conducted with representatives of each of the 31 RCAs. The questionnaires were sent in advance, to give the representatives time to research answers, where necessary. Questions were centred on the programmes and procedures used for CRS and the implementation and monitoring of recommendations from CRS.

The questionnaire used for the interview surveys is shown in appendix 2.

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## Methodology, continued

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### Field surveys

The field surveys aimed to obtain a 'snapshot' of the accuracy with which the implementation of countermeasures from CRS is recorded in the CAS monitoring system.

The CAS monitoring system is used to analyse the effectiveness of remedial works at CRS sites. The analysis uses sites where all recommended works have been completed and implementation dates for the works are known. These sites are considered to be 'implemented' sites.

Up to 15 sites in each RCA were selected from the CAS monitoring system for the surveys. Generally the sites were selected from studies old enough that the recommendations should have been implemented, but not so old that there were likely to have been subsequent works or changes at the site. Implementation report forms for the selected sites were produced from CAS and used as the field survey forms. (Implementation report forms record the implementation status for each recommended action at the site, and any other works known to have been undertaken.)

The surveyors then:

- checked whether the implementation status for each recommendation was correct
- corrected the status, if it was not correct on the report
- recorded any other measures that had been implemented at the site but were not shown on the report
- assessed whether the implementation status of the site was correct.

An implemented site may also have a 'stop monitoring' date. These dates define the end of the period for monitoring crashes at the site. A stop monitoring date may be fixed at five or six years after the works have been implemented, or at the date on which significant alterations were made to the site after the works being monitored were implemented.

A site with one or more recommendations recorded with status 2 'works not yet done' is considered 'not implemented'.

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## Results of the interview surveys

There was a range of responses to the interview questionnaire and these have been grouped to show general patterns. Because of this, individual RCAs may not identify their exact response in the analysis that follows.

### Programmes for CRS

The RCAs were asked how often they investigated and recommended safety improvement works for various types of CRS. Their responses are summarised in the table below.

Frequency of undertaking CRS						
	Annually or more often	3-yearly or more often	5-yearly or more often	Every 6 to 10 years	As required	Never or n/a
As part of Land Transport NZ CRS programme	4 RCAs (13%)	9 RCAs (29%)	12 RCAs (39%)	3 RCAs (10%)	1 RCA (3%)	2 RCAs (6%)*
On RCA initiative	8 RCAs (26%)	1 RCA (3%)	-	-	3 RCAs (10%)	19 RCAs (61%)
At only one site at a time	17 RCAs (55%)	1 RCA (3%)	-	-	10 RCAs (32%)	3 RCAs (10%)
Other methods	-	-	-	-	10 RCAs (32%)	21 RCAs (68%)

\*Both of these RCAs had undertaken studies as part of the Land Transport programme, although one did not state how often and the other stated they undertook them in association with territorial local authority studies.

The other methods reported by the RCAs include:

- strategic studies to prioritise safety improvement works
- grey spot analysis and hazard register
- minor safety works to treat hazard sites
- traffic calming by area, including specific treatment of crash problem locations
- investigation of public reports of crashes and near misses
- political requests
- forward works programmes and minor safety works.

Four RCAs (13 percent) said they had the Road Safety Risk Manager software but had not yet used it.

## Results of the interview surveys, continued

### RCA staff responsibilities for CRS

The position titles of the RCA staff responsible for various aspects of CRS varied considerably. Some subjective assessments of the RCAs' responses were needed to group the positions under the general titles used below.

Where the RCA listed both a staff position and a consultant, the staff position was used in the grouping. The numbers for the consultant column may, therefore, be lower than the actual use of consultants for these aspects of CRS.

	Engineering/ operations services manager	Asset/ roading manager or engineer	Safety/ traffic/ transportation engineer	Consultant	Other
Manages a CRS programme	3 RCAs (10%)	12 RCAs (39%)	12 RCAs (39%)	3 RCAs (10%)	1 RCA (3%)
Decides when CRS will be undertaken	5 RCAs (16%)	12 RCAs (39%)	11 RCAs (35%)	-	3 RCAs (10%)
Decides crash locations to be included in a CRS	5 RCAs (16%)	11 RCAs (35%)	11 RCAs (35%)	2 RCAs (6%)	2 RCAs (6%)
Participates in CRS	3 RCAs (10%)	15 RCAs (48%)	7 RCAs (23%)	3 RCAs (10%)	3 RCAs (10%)

### Documentation for programming and undertaking CRS

Documentation used for programming CRS:

- Eight RCAs (26 percent) said their safety management system (SMS) specified when a CRS should be undertaken and a further 9 RCAs (29 percent) said their SMS would, when completed, specify a programme for CRS.
- 12 RCAs (39 percent) had no specific documentation or relied on the Land Transport NZ programme.
- The other two RCAs (six percent) used special reports to council or a public complaints tracking system to document when studies were undertaken.

Documentation used for undertaking CRS:

- 16 RCAs (52 percent) used CRS procedures or best practice guidelines. These RCAs made reference to best practice guidelines, the current national guideline (*A New Zealand guide to the treatment of crash locations*, Land Transport NZ, December 2004) and the 1991 *Accident investigation procedures*.
- Nine RCAs (29 percent) said they used no documentation. All of these undertook CRS under the Land Transport NZ programme, so presumably would have used the national guideline.

## Results of the interview surveys, continued

### Documentation for programming and undertaking CRS, continued

- The other six RCAs (19 percent) said they used:
  - professional services contracts (three RCAs)
  - Transit NZ initiatives (one RCA)
  - ISO documentation (one RCA)
  - briefs from previous studies (one RCA).

### Selection of crash locations for CRS

RCAs were asked how they decided which crash locations to include in a CRS.

- 16 RCAs (52 percent) selected crash locations from a review or analysis of their crash data. Three of these RCAs said they reviewed all their crash sites.
- Four RCAs (13 percent) selected sites from their annual road safety data or issues reports.
- Four RCAs (13 percent) included sites on the basis of Land Transport NZ recommendations.
- Four RCAs (13 percent) selected sites on the basis of community concerns, public complaints or undocumented knowledge of problem sites.
- The other three RCAs used multiple methods (2 RCAs) or their own method (one RCA).

### CRS team composition

RCAs reported using a variety of combinations of RCA staff, Land Transport NZ staff, consultants, Police and others to make up a CRS team. One RCA said this question was not applicable as they only participated in Transit NZ studies and there had not been any local road studies in their district. The question did not specifically refer to joint CRS studies under the Land Transport NZ programme, but the responses appear to be related to these studies rather than CRS undertaken on the initiative of RCAs.

Nearly all the RCAs (30, or 97 percent) typically included council and Land Transport NZ staff in their teams. All except one of these also included staff from one or more other organisations:

- 18 RCAs (58 percent) also included consultants
- 15 RCAs (48 percent) also included the police
- eight RCAs (26 percent) also included road safety coordinators
- six RCAs (19 percent) also included Transit NZ staff.

In response to the question on who was typically the team leader for a CRS team:

- 14 RCAs (45 percent) said they used a consultant as the team leader.

## Results of the interview surveys, continued

### CRS team composition, continued

- Seven RCAs (23 percent) said they used the Land Transport NZ engineer.
- Six RCAs (19 percent) said they used council staff (including one RCA that responded 'council staff or consultant').
- Two RCAs (six percent) said the team leader varied.
- One RCA (three percent) said there was no team leader as such, but Land Transport NZ staff coordinated the CRS and the council's consultant compiled the reports.

One RCA (three percent) said the question was not applicable as they only participated in Transit NZ studies.

### Implementation of safety improvement works

RCAs were asked how they would typically implement recommendations made as a result of a CRS and whether they specifically identified the works as being the outcomes of a CRS.

- 20 RCAs (65 percent) implemented recommendations as maintenance or minor safety works.
- 10 RCAs (32 percent) implemented recommendations as maintenance or minor safety works or major works.
- One RCA (three percent) implemented recommendations as minor safety works and sometimes as major works.
- 20 RCAs (65 percent) specifically identified the works, or most of them, as outcomes from a CRS.
- Eight RCAs (26 percent) did not specifically identify the works as outcomes from a CRS.
- One RCA (three percent) sometimes identified the works as outcomes from a CRS, one (three percent) usually did not and one (three percent) did for major works but not for minor works.

The RCAs were also asked what the typical number of locations treated per year was, and what the typical annual cost was for treatments from CRS recommendations and for treatments from other safety investigations. The tables below summarise the responses.

Number of crash locations treated in a year						
	<b>0</b>	<b>1 to 4</b>	<b>5 to 10</b>	<b>11 to 20</b>	<b>More than 20</b>	<b>Varies greatly</b>
As a result of a CRS	8 RCAs (26%)	16 RCAs (52%)	5 RCAs (16%)	1 RCA (3%)	1 RCA (3%)	-
As a result of other safety investigations	1 RCA (3%)	9 RCAs (29%)	11 RCAs (35%)	5 RCAs (16%)	3 RCAs (10%)	1 RCA (3%)

\*One RCA did not state how many treatments resulted from other safety investigations.

## Results of the interview surveys, continued

### Implementation of safety improvement works, continued

	Yearly cost of crash location treatments					
	\$0	Up to \$20,000	\$21,000 to \$50,000	\$51,000 to \$100,000	More than \$100,000	Varies greatly
As a result of a CRS**	8 RCAs (26%)	8 RCAs (26%)	1 RCA (3%)	2 RCAs (6%)	8 RCAs (26%)	1 RCA (3%)
As a result of other safety investigations**	1 RCA (3%)	6 RCAs (19%)	2 RCAs (6%)	3 RCAs (10%)	18 RCAs (58%)	-

\*\*Three RCAs did not give an answer for treatments resulting from CRS and one did not give an answer for treatments from other studies.

The RCAs were asked how the treatments for projects not done as a part of a CRS were chosen.

- 19 RCAs (61 percent) used engineering judgement or the experience of council staff. Four of these also noted that there was some input from consultants.
- Five RCAs (16 percent) said they used benefit-cost analysis or risk analysis.
- Four RCAs (13 percent) said consultants' recommendations were used.
- The other three RCAs (10 percent) identified:
  - national standards or best practice (one RCA)
  - traffic furniture moved, seal extension, urban roads upgraded (one RCA)
  - not applicable (one RCA).

### Programmes for the implementation of safety improvement works

- Five RCAs (16 percent) said they had no programme for implementing safety works as a result of CRS.
- One RCA said a programme was included as part of a CRS report.
- The remaining 25 RCAs (81 percent) said they used the normal maintenance, minor safety works and capital works programmes, as appropriate.

The RCAs were asked what proportion of CRS recommendations they would typically implement.

- 12 RCAs (39 percent) typically implemented all CRS recommendations.
- 12 RCAs (39 percent) typically implemented between 75 percent and 100 percent.
- Four RCAs (13 percent) implemented between 50 percent and 75 percent.
- One RCA (three percent) implemented between 40 percent and 50 percent.
- Two RCAs (six percent) said this was unknown or not applicable.

## Results of the interview surveys, continued

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### **Programmes for the implementation of safety improvement works, continued**

The RCAs were asked which projects in their current year's programme were specific safety improvement works. 30 RCAs (97 percent) listed projects, or identified programmes with safety improvement works. RCAs' responses varied from listing a few projects to stating 'all minor safety works plus some others'. The RCA that did not identify any projects said they would need to check the year's financial data to identify the projects.

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### **Data provided by RCAs for the Land Transport NZ monitoring system**

Questions 8 to 11 of the questionnaire related to the provision of data and use of the Land Transport NZ CAS monitoring system.

For CRS sites:

- 20 RCAs (65 percent) provided site data and 11 RCAs (35 percent) did not
- 20 RCAs (65 percent) provided problem definition and recommendation (PDR) data and 11 RCAs (35 percent) did not
- 15 RCAs (48 percent) provided implementation data and 16 RCAs (52 percent) did not.

Of the 15 RCAs that stated they provided implementation data on CRS sites:

- six RCAs (40 percent) later responded they did not undertake any checks to ensure the data was correct and up to date
- four RCAs (27 percent) undertook on-site inspections, except for maintenance works. One of these first undertook a desktop review of the data
- three RCAs (20 percent) responded to Land Transport NZ requests on the implementation report forms
- two RCAs (13 percent) checked their contract files or invoices.

No RCAs provided site, PDR or implementation data for major or minor safety works that were non-CRS sites. Two RCAs (six percent) had, after discussions with Land Transport NZ, provided some project implementation details to Land Transport NZ for monitoring of particular projects in their areas. One RCA (three percent) had provided some feedback to Land Transport NZ on the accuracy of CAS data.

The people in the RCAs responsible for providing data to Land Transport NZ were:

- safety/traffic/transportation engineer – 14 RCAs (45 percent)
- consultant – seven RCAs (23 percent)
- asset/roading engineer – five RCAs (16 percent)
- engineering/operations service manger – three RCAs (10 percent).
- Two RCAs (six percent) said the question was not applicable.

The RCAs were asked what programme they had for providing new or updated implementation data to Land Transport NZ.

For CRS sites:

- 17 RCAs (55 percent) had no programme or the question was not applicable. One of these RCAs said a programme was to be established and one said they did 'occasional chase ups'.



## Results of the interview surveys, continued

### Data provided by RCAs for the Land Transport NZ monitoring system, continued

- 10 RCAs (32 percent) provided data when asked to by Land Transport NZ.
- Two RCAs (six percent) noted their CRS contract required the consultant to provide the data for each study.
- Two RCAs (six percent) said they had spreadsheets. One commented that theirs was a one-off spreadsheet and the other said their spreadsheet needed updating.

For major works and minor safety works, only two RCAs indicated that they had a programme for providing new or updated monitoring data to Land Transport NZ. These were the two RCAs that stated they used spreadsheets for providing data on CRS sites. Their response was the same for all three site types (CRS, major works, minor safety works). The other 29 RCAs (94 percent) had no programme for providing implementation data on major works or minor safety works.

### RCA use of the CAS monitoring system

None of the 31 RCAs surveyed had ever used CAS to enter data on treated crash locations into the Land Transport NZ monitoring system.

### Role of safety management systems in CRS and monitoring

RCAs were asked what role, if any, their safety management system had in determining various aspects of CRS and monitoring. Their responses are summarised in the following table.

	N/a*	None*	Specifies timing or requirements	Gives some guidance
CRS programme	22 RCAs (71%)	1 RCA (3%)	8 RCAs (26%)	–
Number and choice of sites	22 RCAs (71%)	4 RCAs (13%)	3 RCAs (10%)	2 RCAs (6%)
Providing data to Land Transport NZ	22 RCAs (71%)	4 RCAs (13%)	4 RCAs (13%)	1 RCA (3%)
The frequency of updating implementation data	22 RCAs (71%)	6 RCAs (19%)	2 RCAs (6%)	1 RCA (3%)
The type of checks done on implementation data	22 RCAs (71%)	6 RCAs (19%)	2 RCAs (6%)	1 RCA (3%)
Any monitoring of the effectiveness of treatments	22 RCAs (71%)	6 RCAs (19%)	2 RCAs (6%)	1 RCA (3%)

\* 'N/a' has been used for RCAs that did not have an operative SMS. 'None' has been used for RCAs with an operative SMS that did not contain any guidance on the issues listed.

## Results of the interview surveys, continued

### RCA monitoring of crashes at treated sites

The RCAs were asked what monitoring of crashes they undertook for CRS sites, major works sites and minor works sites.

The responses showed none of the RCAs had formal systems for monitoring crashes at any of these site types. Informal systems mentioned in the responses were:

- public feedback or local knowledge – 11 RCAs (35 percent) for CRS sites, nine RCAs (29 percent) for major works sites and 13 RCAs (42 percent) for minor works sites
- annual review of road safety report and/or CAS data – five RCAs (16 percent) for CRS and major works sites and six RCAs (19 percent) for minor works sites.

### RCA use of monitoring system reports

Questions 14 and 16 asked the RCAs about the usefulness of Land Transport NZ reports from the monitoring system. These questions related to both local site reports and to national evaluation reports. The responses were as follows:

	Very useful	Some use	Not used
National evaluation reports	4 RCAs (13%)	11 RCAs (35%)	16 RCAs (52%)
Local site information	4 RCAs (13%)	9 RCAs (29%)	18 RCAs* (58%)

\*Nine of these RCAs either had no local sites or were not aware of these reports.

When asked about how they used the national evaluation reports, RCAs said the reports were:

- filed as reference for future project assessments
- read and filed, but little use made of them.

The local site information (implementation and/or RCA CRS monitoring) reports were:

- used for programming future safety improvement works
- used for getting consultants to update the implementation reports
- read and used as appropriate.

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## Results of the interview surveys, continued

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### **Comments on Land Transport NZ monitoring system information**

Eight RCAs (26 percent) made suggestions for additional information that could be provided from the monitoring system. Four RCAs (13 percent) said that no additional information was needed and the remaining 19 RCAs (61 percent) did not know or did not answer.

The suggestions for additional information were:

- annual site monitoring updates
- analysis of more treatments, such as comparing the effectiveness of wire rope barriers with W-section guardrail
- adding extra local sites for monitoring
- providing processes and instructions on how to prepare the reports locally.

Eleven RCAs (35 percent) made suggestions on how the information from the monitoring system could be improved and 20 RCAs (65 percent) did not know or did not answer.

The suggestions for improvements were:

- wider dissemination of reports, reports being more up to date, access to them being easier
- national reports being available on the effectiveness of basic treatments on local rural roads (eg, the installation of edge marker posts on curves, site benching, isolated edge line treatments)
- easier access to CAS and simple online reports.

Three RCAs (10 percent) also advised that they would like better reporting rates for crashes.

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## Results of the field surveys

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### Results of the field surveys

A site in the monitoring system is considered to be implemented if all recommendations at the site have been recorded as 'implemented' and the appropriate implementation dates are recorded. An implemented site may also have a 'stop monitoring' date, to define the end of the period for monitoring crashes at the site. A stop monitoring date may be fixed at five or six years after the works have been implemented, or at the date on which significant alterations were made to the site after the works being monitored were implemented.

A site is considered to be 'not implemented' if one or more of the recommendations is recorded with status 2 'works not yet done'. These sites are not used in the national analysis of the effectiveness of remedial works.

### Survey sample

Field surveys were undertaken for all except seven of the 31 RCAs. These seven RCAs either had no sites in the monitoring system or their sites all had 'stop monitoring' dates that were a year or more old.

In total, 193 sites were surveyed. The CRS report dates for the selected sites ranged from May 1989 to August 2004.

- 132 sites (68 percent) surveyed were sites recorded in the system as 'not implemented'. The CRS report dates for these sites ranged from February 1993 to August 2004.
- 61 sites (32 percent) were implemented sites. The report dates for these sites ranged from May 1989 to August 2004. Nine of these had 'stop monitoring' dates, ranging from September 1996 to May 2003.

The 193 sites had a total of 755 recommendations listed on the implementation reports produced from the CAS monitoring system.

- 421 recommendations (56 percent) were recorded as 'works not yet done' or had unknown dates
- 334 recommendations (44 percent) were recorded as 'works complete' and had all dates known.

Overall results, by RCA, are shown in appendix 1.

### Sites (193 sites)

- 87 sites (45 percent) were found to have all the implementation data correct.
    - 46 of these were implemented sites (24 percent of all sites, or 75 percent of the implemented sites)
    - 41 were not implemented sites (21 percent of all sites, or 31 percent of the not implemented sites).
  - 110 sites (57 percent) were found to be implemented and 83 sites (43 percent) not fully implemented. The monitoring system showed 61 sites (32 percent) as implemented and 132 sites (68 percent) as not implemented.
  - 56 sites recorded as 'not implemented' in the monitoring system (29 percent of all sites or 42 percent of the not implemented sites) had, in fact, been implemented and could be used for monitoring the effectiveness of the treatments.
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## Results of the field surveys, continued

### Sites (193 sites), continued

- 35 sites recorded as 'not implemented' in the monitoring system (18 percent of all sites or 27 percent of the not implemented sites) had errors on some of the recommendations but the overall status of the site was correct.
- 15 sites recorded as 'implemented' (eight percent of all sites or 25 percent of the implemented sites) had errors that could result in incorrect analysis of the effectiveness of the treatments.
  - Eight sites (four percent of all sites or 13 percent of the implemented sites) were implemented but had also had additional works implemented that were not recorded in the monitoring system.
  - Six sites (three percent of all sites or 10 percent of the implemented sites) had recorded works as 'implemented' that did not appear to be so at the time of the survey. Two of these had stop monitoring dates (April 2000 and May 2003). Either all the recommendations at these sites had not been done or they had changed since the stop monitoring dates.
  - The other site had listed recommendations that had been implemented at a nearby similar site but did not appear to have been implemented at the site being monitored.
- Reports for 16 sites recorded as 'not implemented' (eight percent of all sites or 12 percent of the not implemented sites) indicated that none of the recommendations would be implemented (implementation status 4).
  - 12 of these had, in fact, had some of the recommendations implemented.
  - Two had had other works implemented that were not recorded in the monitoring system.
  - Two were probably correct, although at one it was noted that other works were planned but not yet implemented, and not recorded in the monitoring system.
- 24 sites (12 percent) had had works implemented that were not recorded in the monitoring system. 18 of these were not implemented sites and six were implemented sites.
- 10 sites (five percent) had recommendations poorly or incorrectly coded. Eight of these were not implemented sites and two were implemented.
- Four sites (two percent) had significant changes that superseded the recommendations listed. Three were not implemented sites and one was implemented.

### Recommendations (755 recommendations)

- 516 recommendations (68 percent) were correctly recorded.
  - 234 of these were at implemented sites.
  - 282 were at not implemented sites.
- 239 recommendations (32 percent) had the wrong implementation status recorded.
  - Eight of these were at implemented sites.
  - 231 were at not implemented sites.

## Discussion

### **Procedures and programmes for CRS**

All RCAs said they undertake CRS as part of the Land Transport NZ joint crash investigation programme. Most do this at least once every five years. Three RCAs did not advise how regularly they undertook CRS as part of the programme – these RCAs indicated they undertook them as requested or as part of local authority studies in the programme.

More than half of the RCAs (61 percent) said they had not undertaken other CRS on their own initiative. 26 percent had undertaken CRS annually or more often and 32 percent had undertaken them about three yearly, or as required. More than half the RCAs said they investigated individual crash sites annually or more often.

Nearly half of the RCAs said they did not have documentation on when or how CRS were undertaken. They relied on Land Transport NZ for both the programme and the procedures. Those that did have documentation for these aspects used their SMS to determine when to do CRS, and the national guideline for guidance on how to do them. Those that did not document how to do CRS undertook the studies with Land Transport NZ, so presumably would have used the current national guideline.

Sites to be investigated in CRS were generally selected on the basis of some form of crash data analysis. Only four RCAs said sites were selected because of community concerns or undocumented knowledge of problem sites.

Nearly all RCAs (97 percent) included council and Land Transport NZ staff on CRS teams and most (94 percent) also included staff from one or more other organisations, such as the Police, consultants, road safety coordinators and Transit NZ. The team leader for CRS was most often the consultant (45 percent of RCAs) or the Land Transport NZ representative (23 percent of RCAs).

### **Implementation of CRS recommendations**

All RCAs implemented recommendations from CRS as maintenance, minor safety or major works projects and 65 percent of the RCAs identified that the works were a result of CRS. RCAs treated fewer sites per year from CRS than from other safety investigations. Recommendations from CRS were implemented at five or more sites per year by 22 percent of the RCAs and at one to four sites by 52 percent of the RCAs. From other safety investigations, 61 percent treated five or more and 29 percent one to four sites per year. Over \$20,000 per year was spent by 35 percent of RCAs on the treatment of sites from CRS recommendations, but by 74 percent of the RCAs for treatments resulting from other safety investigations.

39 percent of the RCAs implemented all the recommendations from a CRS and a further 39 percent implemented more than 75 percent of the recommendations. None of the RCAs had specific programmes for implementing treatments resulting from CRS – the works were scheduled through the normal programmes for the appropriate work categories.

## Discussion, continued

### Monitoring data and usefulness of Land Transport NZ monitoring reports

None of the RCAs had a formal programme to provide new or updated monitoring data to Land Transport NZ. About two thirds of the RCAs (65 percent) provided site and problem definition/recommendation data for CRS but only 48 percent provided implementation data for these sites.

None of the RCAs provided site, problem and recommendation monitoring forms or implementation data for non-CRS sites. Two RCAs had provided some project data, to work with Land Transport NZ on monitoring particular projects in their areas.

None of the RCAs had entered data on treated crash locations into the CAS monitoring system and none had formal systems for monitoring crashes at treated sites.

Only four of the RCAs (13 percent) found the Land Transport NZ national evaluation or local site information reports very useful. More than half did not use these reports. About a quarter of the RCAs (26 percent) suggested additional information that could be provided and a third (35 percent) made suggestions on how the information could be improved. The suggestions were:

- annual site monitoring updates
- analysis of more treatments, such as comparing the effectiveness of wire rope barriers with W-section guardrail
- adding extra local sites for monitoring
- providing processes and instructions on how to prepare the reports locally
- wider dissemination of reports, with more up-to-date reports and easier access to them
- national reports on the effectiveness of basic treatments on rural local roads (eg, installation of edge marker posts on curves, site benching, isolated edge line treatments)
- easier access to CAS and simple online reports.

### Accuracy of monitoring system implementation data

The field surveys showed the data in the Land Transport NZ monitoring system was not very accurate or up to date.

Of the 193 sites surveyed (132 not implemented and 61 implemented sites), only 45 percent were found to have all the implementation data correct.

- 56 sites recorded as 'not implemented' in the monitoring system (29 percent of all sites or 42 percent of the not implemented sites) had, in fact, been implemented and could be used for monitoring the effectiveness of the treatments.
- 15 sites recorded as 'implemented' (eight percent of all sites or 25 percent of the implemented sites) had errors that could result in incorrect analysis of the effectiveness of the treatments.
  - Eight sites (four percent of all sites or 13 percent of the implemented sites) were implemented but had also had additional works implemented that were not recorded in the monitoring system.

## Discussion, continued

### Accuracy of monitoring system implementation data, continued

- 
- Six sites (three percent of all sites or 10 percent of the implemented sites) had recorded works as 'implemented', but they did not appear to be so at the time of the survey. Two of these had 'stop monitoring' dates (April 2000 and May 2003). Either all the recommendations at these sites had not been done or they had changed since the stop monitoring dates.
  - The other site had listed recommendations that had been implemented at a nearby similar site but did not appear to have been implemented at the site being monitored.
  - 24 sites (12 percent) had had works implemented that were not recorded in the monitoring system. 18 of these were not implemented sites and six were implemented sites.
  - 10 sites (five percent) had recommendations poorly or incorrectly coded. Eight of these were not implemented sites and two were implemented.
  - Four sites (two percent) had significant changes that superseded the recommendations listed: three were not implemented sites and one was implemented.

Of the 756 recommendations recorded for the sites surveyed:

- 239 recommendations (32 percent) had the wrong implementation status recorded. Eight of these were at implemented sites and 231 at not implemented sites.

### Best practice

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No attempt was made to cross-reference the accuracy of the implementation data with individual RCAs' policies and procedures. The following recommendations are, therefore, the surveyors' opinions on what are the elements of best practice for CRS and monitoring. (They are not formed from analysis of improved accuracy of implementation data as a result of RCAs following certain practices).

- RCAs should have an SMS that states how often CRS will be undertaken.
  - RCAs should adopt the Land Transport NZ document *A New Zealand guide to the treatment of crash locations* (December 2004), the national guideline for undertaking CRS.
  - CRS should be undertaken by a team with the appropriate expertise (see section 5.1 of the national guideline).
  - Land Transport NZ should continue its role of encouraging RCAs to undertake CRS and offering to assist and be involved in teams, where appropriate.
  - A CRS team leader should be appointed for each study. The team leader should ensure site location details and problem and recommendation monitoring forms are completed for each site to be treated, and the forms sent to Land Transport NZ for entry into the monitoring system.
  - RCAs should document procedures and responsibilities for programming the implementation of CRS recommendations.
  - RCAs should document procedures and responsibilities for checking the accuracy of implementation data and providing updated data to Land Transport NZ.
  - Land Transport NZ should be proactive in providing RCAs with monitoring reports and obtaining implementation data from the RCAs.
-



# Recommendations

## Recommendations for crash reduction studies

The following best practices are recommended for undertaking CRS:

- RCAs should have a safety management system that states how often CRS will be undertaken.
- RCAs should adopt *A New Zealand guide to the treatment of crash locations* (December 2004, Land Transport NZ), the national guideline for undertaking CRS.
- CRS should be undertaken by a team with the appropriate expertise (see section 5.1 of the guideline).
- Land Transport NZ should continue its role of encouraging RCAs to undertake CRS and offering to assist and be involved in teams, where appropriate.
- A CRS team leader should be appointed for each study.
- RCAs should adopt and document procedures and responsibilities for programming and checking the implementation of CRS recommendations.

## Recommendations for monitoring

Monitoring is one of the key principles of CRS listed in the national guideline for the treatment of crash locations. The Land Transport NZ CAS monitoring system has been set up to facilitate this, but the field surveys showed it is not very accurate or up to date.

It is recommended that:

- as a matter of priority, Land Transport NZ and the RCAs work together to improve the accuracy of the monitoring system data
- RCAs document procedures and responsibilities for checking the accuracy of implementation data in the system
- Land Transport NZ investigates ways of obtaining monitoring data from the RCAs for all treatments of crash locations – not just from joint CRS. (Site location details and problem and recommendation monitoring forms should be completed for each site to be treated, and the details entered into the monitoring system)
- Land Transport NZ and the Ministry of Transport improve the distribution and awareness of the national evaluation monitoring reports. The reports should be focused on the needs of the RCAs, and include analysis of more types of treatment
- Land Transport NZ, the Ministry of Transport and the RCAs find ways to improve the CAS monitoring system, to encourage its use for monitoring treated crash location sites.

If the above recommendations cannot be implemented, Land Transport NZ and the industry need to decide whether the monitoring system should be replaced with better ways of assessing the effectiveness of treatments.

# Appendix 1

## Summary of field surveys, by road controlling authority

RCA	Number of sites						Number of recommendations				
	Total sites	Implemented with dates known or not needed	Not yet implemented or dates unknown	With all correct data	With some errors but site status OK	With incorrect site status	Total recommendations	Implemented with dates known	Not implemented or dates unknown	With correct data	With wrong status
Buller	0										
Central Otago	1	0	1	0	1	0	4	1	3	3	1
Dunedin	14	0	14	1	6	7	66	3	63	25	41
Franklin	9	7	2	8	0	1	30	28	2	29	1
Gore	4	0	4	0	1	3	5	0	5	1	4
Grey	0				0						
Hastings	11	0	11	6	2	3	46	0	46	34	12
Invercargill	13	3	10	3	0	10	30	10	20	19	11
Kaipara	0										
Kapiti Coast	8	1	7	1	2	5	38	10	28	12	26
Kawerau	4	4	0	3	0	1	15	15	0	15	0
Lower Hutt	0										
Mackenzie	0										
Napier	15	0	15	6	4	5	31	7	24	16	15
Nelson	7	2	5	3	0	4	17	17	0	11	6
New Plymouth	0										
Opotiki	2	0	2	0	1	1	12	0	12	7	5
Palmerston North	14	0	14	2	4	8	64	4	60	18	46
Porirua	6	1	5	2	1	3	17	12	5	11	6
Queenstown-Lakes	4	1	3	0	1	3	19	9	10	13	6
Rodney	10	7	3	7	1	2	62	55	7	59	3
Taupo	11	11	0	11	0	0	38	38	0	38	0
Tauranga	3	3	0	3	0	0	15	15	0	15	0
Thames-Coromandel	5	0	5	2	3	0	28	0	28	25	3
TNZ Auckland	10	10	0	5	0	5	41	41	0	39	2
TNZ Christchurch	15	11	4	12	0	3	59	48	11	54	5
TNZ Napier	10	0	10	3	2	5	36	21	15	16	20
Waimate	0										
Waipa	9	0	9	8	0	1	40	0	40	37	3
Waitakere	8	0	8	1	6	1	42	0	42	19	23
Westland	0										
<b>TOTAL</b>	<b>193</b>	<b>61</b>	<b>132</b>	<b>87</b>	<b>35</b>	<b>71</b>	<b>755</b>	<b>334</b>	<b>421</b>	<b>516</b>	<b>239</b>

## Appendix 2

### Crash Reduction Study and Monitoring Questionnaire, 2005

Road Controlling Authority: \_\_\_\_\_

Person(s) Replying to Questionnaire \_\_\_\_\_

Position in Organisation: \_\_\_\_\_

Contact Phone No.: \_\_\_\_\_

Date: \_\_\_\_\_

Interviewer: \_\_\_\_\_

For this questionnaire, crash reduction studies (CRS) are defined as studies that follow the format in the Transit NZ/MOT document 'Accident Investigation Procedures, January 1991' (either loosely or closely.) They may also be called 'Black spot Studies' or Accident Investigation Studies. More recent studies may follow the document 'A New Zealand Guide to the Treatment of Crash Locations.' (2004)

#### Questions

1 How often does your authority investigate and recommend safety improvement works:

as part of an LTSA (LTNZ) CRS programme? \_\_\_\_\_

in a CRS on its own initiative? \_\_\_\_\_

at only one site at a time? \_\_\_\_\_

by other methods eg Risk Manager  
(please specify) \_\_\_\_\_

2 Who, for your authority (individual, consultant, committee, or other):

a) manages a programme of crash reduction studies?

(Person/Position) \_\_\_\_\_

b) usually decides when a CRS will be conducted?

(Person/Position) \_\_\_\_\_

c) usually decides on the crash locations to be included in a CRS?

(Person/Position) \_\_\_\_\_

d) usually participates in CRSs when they are done?

(Person/Position) \_\_\_\_\_

3 What documentation (which may be specific to your authority) does your authority use to state when CRSs will be conducted?

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and how they will be conducted?

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4 How is it decided which crash locations to include in a CRS ? (blackspots, routes, high crash rates, severity threshold?)

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5 (a) What is the typical composition of a CRS team in your authority ?  
(Staff/consultants/Land Transport NZ/Police.)

---

(b) Who is typically the Team Leader for these studies?

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6 (a) How would your authority typically implement recommendations made as a result of a CRS? (eg, maintenance, minor safety works, major projects)

---

(b) Are they specifically identified as being the outcomes of a CRS?

---

(c) Typically, how many crash locations would your authority treat in a year as a result of conducting a CRS ?

Number \_\_\_\_\_ Total Cost \_\_\_\_\_

(d) Typically, how many crash locations would your authority treat in a year as a result of other safety investigations?

Number \_\_\_\_\_ Total Cost \_\_\_\_\_

(e) How are the most appropriate treatments chosen for the projects not done as part of a CRS?

7 (a) What sort of programme do you have to implement safety works as a result of CRS?

(b) What proportion of the measures recommended in CRS would you typically implement?

(c) Which projects in your current year's programme are specifically safety improvement works?

8 What data does your authority regularly provide to Land Transport NZ for entry into the Monitoring System database? (Please insert an X in the appropriate box.)

Yes No

CRS Sites

Site data for CRS sites

Problem Defn/Recommendation data for CRS sites

Implementation data for CRS sites

Non-CRS Sites

Site data for major safety works

PDR data for major safety works

Implementation data for major safety works

Site data for minor safety works

PDR data for minor safety works

Implementation data for minor safety works

Other data (specify)

9 (a) Who in your authority is responsible for providing the data to Land Transport NZ?

(b) What sort of programme do you have for providing new or updated implementation data to Land Transport NZ for each type of site?

CRS sites

Major Works

Minor Safety Works

10 What sort of checks do you carry out (eg, checking documentation, on-site checks) to ensure implementation data is correct and up to date?

CRS sites

Major Works

Minor Safety Works

11 Have you ever used CAS Monitoring to enter data on treated crash locations into the Land Transport NZ monitoring system?

12 What role, if any, does a Safety Management System have in determining:

(a) Your CRS Programme

(b) Number and choice of sites for CRS?

(c) Providing data to Land Transport NZ?

(d) The frequency of updating implementation data?

(e) The type of checks done on implementation data?

(f) Any monitoring of the effectiveness of treatments?

13 What type of monitoring of crashes at the following types of sites does your authority carry out on its own initiative?

CRS sites

Major Works

Minor Safety Works

14 What use does your authority make of the data available to you from the Land Transport NZ Monitoring System?

(a) Monitoring Analysis Reports on specific treatments

(b) Implementation Report forms and/or CRS Monitoring Reports on sites within your authority

15 Have you ever produced CAS Monitoring Site Reduction or Monitoring Site Summary Reports for sites in your authority? (please circle)

No

Yes

16 (a) How useful do you find the information from the CAS Monitoring System provided by Land Transport NZ? (please circle)

National Evaluation	Very Useful	Some Use	Not Used
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Local Site Information	Very Useful	Some Use	Not Used
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(b) What additional information could be provided from the Land Transport NZ Monitoring System?

(c) How could the information provided be improved?

Thank you very much for taking the time to complete this questionnaire.

## The road safety survey series

RSS 1	<i>Traffic signal light output</i>	1995/96
RSS 2	<i>Street lighting</i>	1995/96
RSS 3	<i>Treatment of slip lanes at traffic signals</i>	1995/96
RSS 4	<i>Stop and Give Way controls at intersections</i>	1996/97
RSS 5	<i>Advisory speed signs</i>	1996/97
RSS 6	<i>Pedestrian crossings</i>	1996/97
RSS 7	<i>Temporary speed limits</i>	1998
RSS 8	<i>Traffic control at road works</i>	1998
RSS 9	<i>Safety management systems</i>	1998
RSS 10	<i>Skid resistance</i>	1999
RSS 11	<i>Pedestrian platforms</i>	1999
RSS 12	<i>Floodlighting pedestrian crossings</i>	1999
RSS 13	<i>No passing lines</i>	2000
RSS 14	<i>Roundabouts</i>	2000
RSS 15	<i>Roadside hazard management</i>	2001
RSS 16	<i>Road hierarchies</i>	2001
RSS 17	<i>School crossing facilities</i>	2002
RSS 18	<i>Data collection</i>	2002
RSS 19	<i>Traffic signs</i>	2003
RSS 20	<i>Vehicle entrances, stock crossing facilities and amenity carriageway surfacings</i>	2003
RSS 21	<i>Traffic calming</i>	2004
RSS 22	<i>Road markings</i>	2004
RSS 23	<i>Crash reduction studies and monitoring</i>	2005
RSS 24	<i>Stop and Give Way controls at intersections</i>	2005

These reports are available on the Land Transport NZ website at [www.landtransport.govt.nz](http://www.landtransport.govt.nz) or may be purchased from the Land Transport NZ regional offices in Auckland (Private Bag 92-515), Hamilton (Private Bag 3081), Napier (PO Box 972), Palmerston North (PO Box 1947), Wellington (PO Box 27-249), Christchurch (PO Box 13-364) or Dunedin (PO Box 5245) at a cost of \$10 each including GST.