

4 Identifying crash locations

4.1 Crash period

The most recent five full calendar years of crash data is recommended, although this may be increased to 10 years in areas with low traffic volumes and/or crash numbers or when studying longer trends. Shorter periods could be used in heavily trafficked networks or areas where road changes are recent or ongoing.

A five-year period is preferred because:

- it is long enough to provide a sufficient number of crashes for meaningful results
- it is short enough to limit the number of traffic and environmental changes that may bias results
- it helps remove statistical fluctuation and reduces the impact of the regression-to-the-mean effect
- it provides a consistent base for before and after comparisons.

Although full calendar years are normal and desired for some of the reasons outlined above, in some instances it may be appropriate to use part years and/or the most up to date data available. This includes when works have been implemented during the usual crash period of the study that would affect the crash pattern or, for reactive studies at developing crash locations where due to urgency, a part-year period may be used.

4.2 Sources of crash data

The primary source of crash data in New Zealand is the crash analysis system (CAS) database, which contains and summarises Police reported crashes {Traffic crash reports (TCRs)}, including fatal, injury and non-injury crash types.

Road safety reports and road safety issues reports are produced annually by Land Transport NZ. These summarise the crash data for RCAs giving indications of trends and key safety issues. Road safety issues reports are available on the Land Transport NZ website www.landtransport.govt.nz/regions/index.html. Road safety reports can be provided by Land Transport NZ on request.

It should be recognised that reported crashes are often only the tip of the iceberg and account for approximately one-fifth of all crashes. Locally reported crashes from the public, contractors, ambulance, tow truck agencies, etc can be added to the CAS database by the RCA. Many organisations also have their own database of locally reported crashes. These locally reported crash databases and local knowledge can add to the identification of safety issues and crash locations. However, the potentially incomplete nature and/or inaccuracy of the data can make detailed analysis and sound decision-making difficult. Furthermore, care must be taken to avoid duplication of locally reported and Police reported crashes.

Refer to Austroads Pt 4, section 5.

4.3 Defining crash locations

4.3.1 Background

Determining what should be investigated is the most important and often most difficult aspect of a CRS. It sets the scene for the remainder of the study.

Historically, emphasis has been given to investigating crash black spot sites (crash locations) as it is a relatively simple process to 'cluster' crashes. However, in many areas, particularly in RCAs with lower traffic densities, most crash locations have now been investigated and there are a limited number of new crash locations developing. Crash problems can also result from route or area deficiencies and hence treating an individual crash site alone may not necessarily solve the problem and could simply move it from one location to another (crash migration).

While there will still be many situations or instances where investigating specific crash clusters is still appropriate, greater emphasis should now be given to investigating routes, areas of road networks or common crash movement types and/or factors (themes).

Austroads Pt 4, section 7 gives guidance on the identification and selection of locations worthy of study. In New Zealand, the road safety reports and road safety issues reports give good guidance as to crash types, factors and locations worthy of evaluation. The Road Safety to 2010 strategy also places emphasis on high severity crash types and locations in an effort to reduce the social cost and impact of crashes (road trauma).

The advent of CAS with its mapping capability has made the identification of crash locations much simpler. It is now possible to identify and plot clusters, routes and areas based upon crash numbers, social cost, crash severity, movement type, factors and location during the selection stage.

The following gives some guidance as to the various crash location types.

4.3.2 Crash sites

These are small areas or short lengths of road that have one or more of the following:

- crash numbers above a pre-determined threshold. It is up to the RCA to determine what may constitute an appropriate threshold level for the study. Historically five (sometimes three) injury crashes have been adopted as a trigger level for clusters worthy of consideration and this is still appropriate for rural clusters or small urban centres. Where injury crash data is sparse, reported non-injury crashes can be used if the RCA considers this to be appropriate. However, on a busy urban network 10–15 crashes may be an appropriate trigger level
- over-representation in crash numbers compared with the expected number of crashes. Various documents, including the PEM, can be used to determine the expected number of crashes based on crash rates or crash models
- commonality of treatable crash types, ie three loss of control on wet road and/or at night
- a high social cost of crashes (ie high crash severity).

Traditionally 30 m and 250 m radii have been adopted for urban and rural sites respectively; this may still be an appropriate default for initial clustering of crashes. However, experience has shown that it is necessary to check crashes near the fringes of these sites and either extend or reduce the boundaries to capture the crashes that relate to the features of the site.

4.3.3 Routes

Routes are lengths of road where the road character is reasonably homogeneous. They could be selected on the basis of the number of crashes, high crash rate (per 10^8 veh-km), crash cost density (social cost/km/year), high social cost rate (per 10^8 veh km), and commonality of crash type or factors, eg cyclist crashes.

4.3.4 Network areas

It may be appropriate to study an area of a road network that has a high number of crashes and/or multiple crash clusters.

This type of study is particularly appropriate to urban networks including CBDs where there may be intersection conflicts across the network area or commonality of crash types, eg pedestrians, along various roads.

In studying these areas, it is important to understand the road network and hierarchy and ensure that any counter-measures such as changing intersection priorities do not inappropriately redistribute the traffic flows and/or crashes to different sites within the network.

4.3.5 Theme studies (movement type or factor)

Land Transport NZ's road safety reports and road safety issues reports highlight over-representation or high frequency of various crash movement types and common factors across a network. It may be appropriate to investigate these crashes and apply either site specific mitigation measures or mass action treatments across the network where similar features exist. Examples could be:

- loss of control crashes in a rural environment where widespread upgrading of the delineation or improving of skid resistance could be appropriate, or
- the installation of edge lines in urban areas to address a collision with parked cars problem.

These studies in particular, lend themselves to collaboration with agencies involved in enforcement and education where a multi-discipline approach to solutions may be appropriate.

4.3.6 Locations of safety concern

Locations of safety concern are where a problem has been identified by the RCA from local residents' or transport operators' reports but where there may presently be a lack of Police reported crashes or where a crash trend is developing.

4.4 Previous CRSs and crash locations

When initiating a new CRS, previous CRSs and the crash locations (sites, routes or areas) in those studies should be reviewed to:

- identify locations that have previously been studied to avoid duplication of effort or disturbing countermeasures being monitored
- determine if previous recommendations have been implemented
- determine if the location is worthy of further investigation.

The relevant Land Transport NZ monitoring results are required for this (refer to section 9).