WHAT IS A HIGH-RISK INTERSECTION?

A number of inter-related factors associated with road design, speed, vehicles and road use contribute to the likelihood and severity of intersection crashes (NZTA 2012). Traditionally, high-risk intersections are defined as those that have a high number of Death and Serious Injury (DSi) crashes. However very few intersections have multiple fatal or serious crashes in a five year period and it would be risky to form safety conclusions about these sites based on a small number of potentially random events.

The NZTA’s High-Risk Intersection Guide (2012) introduces a means of estimating the risk of DSi crashes occurring in the future by combining factors such as the speed environment, intersection type and control, and crash movement type. The relationships between these factors are presented in Severity Index tables.

The High-Risk Intersection Guide (NZTA 2012) identifies two types of risk metric:
- **Collective Risk** – the actual or estimated number of DSi crashes per intersection in the crash period
- **Personal Risk** – the actual or estimated number of DSi crashes per 100 million vehicles using an intersection.

The High-Risk Intersection Guide (NZTA 2012) also defines a technique for refining the order in which intersections that have the same risk ratings in terms of Collective Risk and Personal Risk are prioritised, which is known as the Level of Safety Service (LoSS) indicator.

**Outputs and Conclusions**

The results of the analysis were displayed in a series of map books showing intersections colour coded according to their Collective Risk, Personal Risk and LoSS indicator profile. The distribution of the DSi Crash Risk and LoSS was graphed, and a prioritised list of intersections for further investigation and intervention was developed from the risk profiles. Auckland Transport is using this information to prioritise safety improvement investment against the intersections that are likely to yield the greatest benefits.

**Geographic Information System (GIS) Analysis of High-Risk Intersections**

The calculation of risk metrics for intersections across the Auckland Region was undertaken as a GIS analysis. Traffic volumes, speed environment, number of approaches, intersection control and type and crash history factors were combined using GIS to generate Collective Risk, Personal Risk and Level of Safety Service profiles for each intersection.

As part of the analysis, a methodology was developed to assign crashes in close proximity to more than one intersection to the intersection they are most likely to be associated with. This methodology involved ranking intersections from highest to lowest traffic flows, and where a crash was located close to two (or more) intersections, this was then assigned to the intersection with the higher total traffic flow.

**Intersections**

Determining the Good, the Bad and the Ugly

Intersections account for approximately 30% of all injury crashes in New Zealand making them one of the key areas where road safety improvements can offer a high return for investment.

This study involved an evaluation of the safety performance of all the non-State Highway intersections across the Auckland Region within the period of 1 July 2006 and 30 June 2011. The purpose of this evaluation was to identify high-risk intersections to enable Auckland Transport to direct road safety efforts towards those intersections where improvements in road safety performance are most necessary.

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