

Streamlining road safety risk mapping and intervention programming on local networks: The Northland Transportation Alliance Risk Mapping Application

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Abstract

Crash risk is only one of the necessary metrics that local authorities require to analyze road safety risk and to plan and prioritize intervention programmes on their networks. Outputs of such analysis is often aggregated and not stored alongside the outputs of other important metrics and frameworks.

Abley Transportation Consultants have developed an interactive application for the Northland Transportation Alliance that combines various risk analyses and metrics. Interactive analysis tools and the ability to overlay different metrics allows for an increased understanding of crash risk and aid efficient and robust planning for intervention programmes.

Introduction

Since 2014 the Northland Transportation Alliance (NTA) has analysed the risk on its network using the urban KiwiRAP risk mapping protocols (Brodie et al, 2013). The outputs have been visualized through an online map viewer. The NTA has previously used this, along with the NZ Transport Agency Safer Journeys Risk Assessment Tool website (Mega Maps) to inform their understanding of risk across the network and the interventions they are planning to deliver.

The websites provide a myriad of risk metrics to direct NTA staff to parts of the network where road safety efforts should be directed. Whilst this information is highly valuable, the NTA sought a consolidated hub of risk metric information with an interactive interface for the tracking of both high-risk locations and interventions. The outcome of the enhanced application and its interactive tools is expected to be improved road safety programming that will ultimately lead to fewer deaths and serious injuries on the Northland road network.



Figure 1. Northland region locality map

Components

Collective and personal risk urban KiwiRAP outputs, injury crashes and performance tracking layers between updates are provided as the base data in the application.

Speed Management Framework

The speed management framework is a single assessment method for determining safe and appropriate travel speeds on road sections within a network and prioritising speed management interventions (Durdin et al, 2016). The metric is calculated using ONRC, urban KiwiRAP personal risk and Infrastructure Risk Rating (Zia et al, 2016). High benefit opportunities based on the difference between posted and safe and appropriate speeds are visualized based on the potential for reducing fatal and serious crashes.

Crash Commonalities

Crash commonalities are calculated for high risk intersections where there is a common cause or movement (Southey-Jensen, 2017). This allows the NTA to quickly assess intersections where there are specific trends in driver behavior or road conditions that contribute to increased crash risk.

Out of Context Curves

Horizontal curves on rural roads where the approach operating speed is out-of-context with the safe negotiation speed of the curve are highlighted along all rural roads.

Interactive tools

An interactive crash filter tool allows the NTA to explore crashes based on codes pulled from the national crash analysis system (CAS). This allows for efficient cross checking between risk metrics, suggested interventions and the characteristics of crashes on specific segments of the network.

Crash statistics are displayed in infographics for urban KiwiRAP intersection and corridor segments. These detail generic crash movements and track crashes per year (indicating trends and the effects of changes in the network). Figure 2 shows crash statistics for a selected corridor detailing the number of crashes for each generic crash movement type and injury crashes per year. This is overlaid with injury crashes used in the analysis.

Figure 2. Northland Transportation Alliance Risk Mapping Application with the crash statistics tool displayed for a selected corridor.

The collated metrics and interactive tools allow efficient and holistic assessment of risk and intervention possibilities at the network level. They aid community engagement, enabling the efficient communication of raw crash statistics and risk, road infrastructure conditions and existing safety modelling all in one.

References

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