Safety Effectiveness of Speed Reductions: A Queensland Experience

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Abstract

Previous Queensland Department of Transport and Main Roads (TMR) studies on the effect of speed reductions on crashes have demonstrated promising results for both high and low speed road environments. Recent analysis in Queensland by TMR has shown that a 10km/h reduction in posted speed limit can reduce casualty crashes by up to 39% in high speed environments and 26% in lower speed environments. Road authorities should use these findings to improve stakeholder communications on the safety benefits of speed reduction strategies. This paper shares the learning of Queensland speed reduction initiatives, provides a brief review of the available guide for speed reductions, and suggestions to improve the existing guidelines.

Background

Considering the importance of speed management on roads that have a history of high crash rates. TMR implemented speed reductions on selected high-risk road sections from 100km/h to 90km/h in 2008-09. In April 2009, Brisbane City Council (BCC) also reduced speed limits from 50km/h to 40km/h on the road network in Brisbane CBD to improve safety for vulnerable road users. There was a drop of 26% in casualty crashes if speed limit is reduced in lower speed environments, from 50km/h to 40km/h. This paper aims to share key learnings from TMR speed reduction intervention and suggests further works that could be undertaken to provide a robust framework for developing similar interventions in the future.

Method

A three-step process was implemented in selecting black links (defined as roads having high crash rates) for speed reductions in high speed environment. The following criteria were applied to identify these links in the first step (Edgar and Tripathi, 2011):

- At least two casualty crashes (over a 10 km section) within five years (this was considered because of the definition applied in federal black spot funding program);
- A daily traffic volume of more than 2,000 vehicles; and
- An existing speed limit of 80km/h or greater.

In the second step, the following four performance measures were used to rank the road links in order to identify black links.

- Equivalent Property Damage Only (EPDO) per 100 million Vehicle Kilometres Travelled (VKT);
- DCA (Definition of Coding Accidents) social cost;
- Casualties per kilometre; and
- Casualty per crash ratio.

The third step in the selection of black links for speed reductions involved consultation with stakeholders. The consultation provided opportunities for considering site specific issues in the implementation.

Evaluation of the safety effectiveness of speed reductions is undertaken using a simple comparison of pre- and post-implementation crash data. It is acknowledged that the method

has limitations and the results may have been affected by other factors which have not been taken into account by the evaluation, including regression to mean issue.

Speed surveys were also carried out before and after the implementation of speed reductions.

Results

Evaluation of the effectiveness of speed reductions on roads with high speed environments were undertaken in the past and results reported in a number of studies (Edgar and Tripathi, 2011; Stapleton, 2013; Whittaker and Somasundaraswaram, 2013). There were also a number of evaluation studies undertaken in relation to implementing default 50 km/h which demonstrated promising results on crash reductions (Long, Kloeden & Hutchinson, 2006; Hoareau & Newstead, 2004; Hoareau, Newstead, Oxley & Cameron, 2002).

The evaluation of the effectiveness of speed reductions in high speed environments found that:

- Average reduction for fatal/serious injury crashes per year was 26%;
- Average total crash reductions was 39%;
- There was a significant increase in crashes on one road where the speed limit was subsequently increased back to 100km/hr;

Edgar and Tripathi (2011) previously reported that the 85th percentile speeds along all road sections reduced up to 12km/hr except on one road where speed remained almost the same.

Conclusions

There are significant opportunities for improving road safety outcomes in Queensland by implementing speed reduction strategies on roads which have records of high crash rates. Future works should be undertaken to investigate the value of incorporating infrastructure risks in identifying sections of roads with high crash rates for speed reductions. Provided future research works show the benefits of including infrastructure risks, the methodology to implement speed reduction strategies could be based on a combination of collective risks, individual risks and infrastructure risks.

References

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