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Safe System Infrastructure Innovation in Victoria's Safer Roads Program

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Abstract

Safe System infrastructure development progressed significantly during the past five years. Most of this development has been delivered through practitioner-led innovation.

This abstract describes progress on several Safe System infrastructure innovations undertaken by Safer Roads program funded by Transport Accident Commission (TAC). These innovations include trials of signalised intersection platforms, rural side road activated intersection speed limits, compact roundabouts, and cushioned pedestrian crossings. Future innovation potential of additional designs is also discussed.

The presentation will showcase how TAC-funded infrastructure innovation is expanding Safe System implementation and practitioner design choices.

Background

Genuinely Safe System infrastructure has been limited to several design solutions, e.g. roundabouts, raised pedestrian crossings, and flexible safety barriers. These are proven to minimise impact forces so that death and serious injury are unlikely for targeted road users. Agencies funding and implementing Safe System infrastructure created strong demand for new knowledge and solutions in recent years.

TAC funds Safer Roads program delivered by Department of Transport (DoT). The program's objectives seek to maximise Safe System implementation and practice in a cost-effective manner. Thus, program funding and direction enabled DoT practitioners to develop innovative road infrastructure solutions more closely aligned with Safe System outcomes than conventional options.

This abstract describes progress on several Safe System infrastructure innovations funded by TAC, e.g. signalised intersection platforms, compact roundabouts, cushioned pedestrian crossings and rural side road activated intersection speed limits. Future innovation potential of new designs is also discussed. TAC-funded infrastructure innovation is expanding the range of Safe System investment opportunities and solutions available to practitioners.

Safe System Infrastructure Innovations

TAC and DoT staff work together to plan, develop and implement road improvement projects targeting key Towards Zero road safety strategy areas (VicRoads 2013). At times, existing design solutions are not adequately aligned with the Safe System objectives of the program. With TAC funding and encouragement, DOT staff have progressed innovation in several key areas of practice.

Initially, innovation was carried out ad-hoc based on initiative and skills of individual staff. Over time, clearer innovation management focussed on immediate and strategic Safe System infrastructure needs. In parallel, technology trials were carried out to create new data sources, strengthen evaluation and improve business intelligence (not covered here in detail).

Table 1 presents five targeted Safe System infrastructure solutions being progressed in Safer Roads program.

Table 1. Innovations in Safe System infrastructure

Solutions	Example	Application	Safe System alignment
Signalised intersection platforms	 Source: Department of Transport (2019a)	≤60 km/h urban roads	High for vehicle occupants – impact speeds 30-40 km/h *
Compact roundabouts (rural)	 Source: VicRoads, unpublished	High speed rural roads, any mobility function	High for vehicle occupants – impact speeds 30-40 km/h
Compact roundabouts (urban)	 Source: Davis (2017)	Low speed urban roads (≤ 60 km/h), low-medium mobility function	High for all road users – impact speeds 20-30 km/h
Cushioned pedestrian crossings	 Source: Nearmap (2020)	Low speed urban roads (≤ 60 km/h), low-medium mobility function	Moderate for pedestrians and cyclists – impact speeds 30-40 km/h
Rural side road activated speed limits	 Source: VicRoads unpublished	High-speed rural roads, medium-high mobility function	Supporting Safe Speeds pillar

* Severe injury (MAIS3+) impact speed thresholds based on Woolley et al. (2018).

Development of each of these solutions requires several innovation stages:

- Problem definition and prioritisation,
- Ideation and concept development,
- Funding and resourcing
- Pilot / trial execution
- Evaluation
- Development of DoT engineering guidance and its dissemination.

Table 2 shows the progress of the above System infrastructure innovations undertaken by Safer Roads.

Table 2. Progress towards Safe System practice

Solutions	Pilots and trial evaluations	Safe System guidance development
Signalised intersection platforms	First and second trials evaluated for speed changes under several design variants on 60-70 km/h roads.	Initial guidance published (Department of Transport 2019a). Lessons from the second trial evaluation yet to be incorporated.
Compact roundabouts (rural)	Pilot at one site in 2017, follow-up monitoring completed. A follow up trial is in planning.	Initial guidance development in progress.
Compact roundabouts (urban)	Trialled at several sites in Mildura completed in 2017. Evaluation completed.	Yet to occur.
Cushioned pedestrian crossings	Effects of speed cushions known from published literature. Several sites delivered since 2017, no evaluation planned.	Yet to occur.
Rural side road activated speed limits	Initial trials completed and the follow-up trial is under evaluation.	Technical specification has been published (Department of Transport 2019b).

Some solutions require a two stage approach: first a pilot or a small trial evaluation is funded to test fundamental Safe System benefits and any risks. If proven successful, a second larger trial and evaluation can be delivered via a funded treatment program on the basis of estimated severe injury savings. Typically, the second trial has an objective of testing broader application scenarios, refining guidance and/or refining Safe System benefit estimates (often based on Safe System proxies such as speed, conflict analysis). Long-term evaluations of actual severe injury prevention effectiveness are planned using crash data some years after treatment.

Safer Roads is considering additional Safe System infrastructure innovations to tackle difficult stratgic safety problem areas. These include development of additional / alternative Safe System design solutions for:

- Vehicle occupants at at-grade intersections on >= 70 km/h urban arterials
- High-speed intersections on rural motorways to replace the conventional sulution
- Highly-effective flexible barrier applications in urban conditions.

Conclusions

TAC funding of Safer Roads program enabled DoT staff to undertake a program of Safe System infrastructure innovation. As shown by the selected examples, this is leading to increased number of

Safe System design solutions which can be funded to minimise severe injury on Victorian roads. New guidance provides improved Safe System design choices for practitioners.

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