

Incorporating Road Trauma Reduction into the Planning of Rural Single Carriageway Cross Sections

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Abstract

Main Roads Western Australia's traditional approach for developing the rural state road network is to plan road cross sections based on existing standards for the anticipated level of traffic flow. However, this approach may not necessarily deliver the reduction in killed and serious injury (KSI) crashes required by the State Government's Road Safety Strategy Towards Zero (ORS, 2009). Through development of a cross section tool incorporating KSI crash reduction factors for various countermeasures, it has been possible to first evaluate and then improve the proposed rural single carriageway cross sections, thus delivering greatly improved safety, maintenance and cost outcomes.

Background

Main Roads is responsible for the planning, development, and maintenance of the state road network in Western Australia (~18000 km). As part of this work, it is required to plan the development of the rural single carriageway network. The traditional approach is to forecast the traffic flow on each road and then develop future cross section based on standards (Austroads, 2016).

Through its commitment to the Safe System as set out in the State Government's Road Safety Strategy *Towards Zero 2008-2020* (ORS, 2009), Main Roads has set targets for reducing killed and serious injury crashes. It was therefore necessary to evaluate the future cross sections to establish if the target would be met given the forecast volumes.

Method

To carry out the evaluation, Main Roads pulled together two elements of its recently implemented Road Safety Management System (ROSMA). The first of these is a tool which uses the killed and serious (KSI) crash history associated with each road to generate the percentage reduction in KSI crash risk required for it to perform in line with the target. The second is a treatment resource which incorporates KSI crash reduction factors for treatments that could be applied to reduce the risk of crashes associated with the cross section. These include shoulder sealing, audible edge and centre lines and wide painted medians. These crash reduction factors take into account the existing configuration for each road.

The two elements were combined into a single tool which could evaluate the impact of treatments or combinations of treatments on lane departure KSI crashes. Thus it could determine whether or not as a whole the rural single carriageway state road network could deliver on the required target.

Result

The evaluation indicated that while there would be a reduction in killed and serious injury crashes as a result of implementing the cross sections based on standards, this reduction was not enough to achieve the target.

However, by either maximising seal widths on the existing carriageways (an interim solution) or maximising seal widths on the proposed Austroads configurations (the ultimate solution) the target would be exceeded. Furthermore, by sealing the full carriageway width, ongoing maintenance costs would be reduced as well as the need to identify further sources of gravel for unsealed shoulder rehabilitation.

The results of the evaluation have been shared with regional asset managers who have applied their knowledge to refine the cross sections to suit local circumstances and regional procedures without compromising on safety performance. These agreed cross sections now provide the basis of planning the rural single carriageway network for 2031 that greatly reduces the risk of KSI crashes.



Figure 1. Example of Cross Section map

Conclusions

The application of this evaluation process has resulted in planned rural single carriageway road cross sections that address both traffic and safety needs. The evaluation has resulted in cross sections that are less costly, more sustainable and easier to maintain.

References

Office of Road Safety (2009). Towards Zero. Retrieved from Perth, Australia: <http://www.ors.wa.gov.au/Documents/Strategies/ors-towards-zero-strategy.aspx>

Austroads (2016). Guide to Road Design Part 3: Geometric Design. Retrieved from Perth, Australia: <https://www.onlinepublications.austroads.com.au/items/AGRD03-16>