

Use of the Safe System Assessment Framework as a Safety Key Performance Indicator

Brayden Capper^a, Ben Matters^b, Lisa Steinmetz^a, Blair Turner^a

^aAustralian Road Research Board, ^bMajor Road Projects Victoria

Abstract

As part of the Northern and South-Eastern Suburban Roads Upgrade packages Major Road Projects Victoria has sought to incorporate road safety metrics into the design review process. The Australian Road Research Board employed the Safe System Assessment Framework to meet this need. Thirteen road project reference designs were assessed to provide baseline scores. Once received, respondents' concept designs will be likewise assessed to provide a comparative metric of road safety performance. This work provided an extension in use of the Safe System Assessment Framework as well as insights into current gaps in road safety design practice.

Background

Major Road Projects Victoria (MRPV) engaged the Australian Road Research Board (ARRB) to undertake Safe System Assessments (SSA) of reference designs for 13 projects as part of the Northern and South-Eastern Suburban Roads Upgrade packages.

The Safe System Assessment Framework is a practitioner assessment tool to assist in the methodical consideration of Safe System objectives in road infrastructure projects. The tool was developed by ARRB for Austroads (2016).

For this package of projects, SSA were undertaken for each reference design to ascertain a baseline level of safety. This will enable a quantitative safety assessment to be undertaken of concept designs received by MRPV (for each of the 13 projects) against the reference designs.

Methodology

The assessments that were undertaken for this project were an extended rapid SSA that was conducted in accordance with the VicRoads Safe System Assessment template (VicRoads 2018) and Austroads Safe System Assessment Framework (Austroads 2016). The assessments focused on the reference designs in order to provide a baseline assessment for which submitted designs will be compared. These assessments did not reference existing conditions as the project intent was to provide insights into safety aspects of the baseline reference designs rather than the existing conditions. This approach of risk identification presents the opportunity to focus efforts on areas where the greatest safety improvements, for subsequent concept designs, are able to be gained.

In undertaking the SSA, various design elements within each project were grouped into midblock and intersection stereotypes. The SSA scores were aggregated to provide an overall baseline score for each project to allow direct comparison between respondents' concept designs and baseline reference designs.

Outcomes

Although the project's focus was to produce metrics to enable comparison of the road safety of concept designs to baseline reference designs, another useful outcome was the large amount of knowledge produced on the Safe System conformance of road design elements. This provides valuable insight into current road design standards conformance with Safe System principles and where – despite safety improvements overall – gaps still lie. In particular:

- Midblock design typically performed very well, particularly designs featuring elements such as high levels of access control, medians and flexible road safety barrier, which help manage vehicle conflicts and kinetic energy in the event of a crash.
- Intersection designs were typically assessed to be of higher-risk (which is common given the higher prevalence of crashes at conflict points), particularly high-speed, multi-lane cross- and T-intersections which expose road users to high-speed and right-angle type crashes.
- Vulnerable road users were often at higher risk, owing largely to their low biomechanical tolerance in the event of a crash.

Conclusions

The incorporation of SSA of designs into the tendering process brings consideration of road safety outcomes to the forefront of road infrastructure projects in a new and forward-thinking way that will ultimately result in improved visibility and consideration of the Safe System in future projects.

References

Austrroads 2016 Safe System Assessment framework, AP-R509-16, Austrroads, Sydney, NSW
VicRoads 2018, Full Safe System Assessment report template, VicRoads, Kew, VIC