Top 10 Road Designs at Odds with Safe System Principles in Australia

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Presentation of Abstract:

This presentation will involve presenting the background of the study and then revealing the Top 10 issues with examples - photos, design snips and alternative solutions that would provide better alignment with Safe System principles.

Abstract

This paper presents findings from an analysis of 500 Road Safety Audits and Safe System Assessments conducted across Australia in the past 5 years. The study categorised issues based on their departure from Safe System principles, frequency of occurrence in reviewed road designs, and the potential severity of trauma for specific crash types and road user groups.

The result is a concise ‘Top 10’ list of common design issues that have poor alignment with Safe System principles, along with alternative treatments and design solutions that could improve Safe System alignment and reduce future road trauma.

This work also highlights the importance of undertaking Safe System Assessments and Road Safety Audits in road and street designs, demonstrating their role in helping road authorises and road/street designers to understand safety implications and align projects with Safe System principles.

This technical presentation will showcase the ‘Top 10’ road design issues, supported by real-world examples and case studies. It aims to raise awareness of recurring design challenges, encourage industry professionals to adopt Safe System thinking, and drive improvements in road safety practices across Australia.

Introduction

All Australian states and territories, along with the federal government, have formally committed to the Safe System approach to road safety. This commitment aligns with national and international best practices aimed at eliminating fatal and serious injury crashes by designing roads and transport systems that accommodate human error. However, while the Safe System approach is widely endorsed, its practical application in road and street design remains poorly understood across the industry.

One of the key mechanisms for evaluating road designs and existing road networks against Safe System principles is the use of Road Safety Audits and Safe System Assessments. These assessments are conducted by independent road safety experts who critically review designs, construction projects, and existing roads to identify risks and areas for improvement. Beyond simply assessing compliance with standards, these processes aim to proactively mitigate crash risk and improve alignment with Safe System principles.

The Austroads Guide to Road Design Part 6: Road Safety Audit provides industry guidance on conducting Road Safety Audits, outlining their methodology and role in risk assessment. Additionally, the Safe System Assessment Framework (Austroads report AP-R509-16) offers a structured approach to evaluating road designs against Safe System objectives. Together, these tools play an important role in ensuring that road infrastructure projects across Australia contribute to a safe transport network.

Method

Safe System Solutions conducted a review of Road Safety Audits and Safe System Assessments to identify trends in road design issues and their alignment with Safe System principles. The dataset included 390 Road Safety Audits and 110 Safe System Assessments, encompassing a diverse range of projects with Total Estimated Costs (TEC) from $55,000 to $11.1 billion, including major infrastructure projects such as North East Link.

The collected audits and assessments were drawn from projects undertaken by Safe System Solutions as well as external audits and assessments conducted by independent practitioners. A subset of these assessments was sourced from a previous project for the Victorian Department of Transport and Planning, where Safe System Solutions reviewed independent investigations to identify recurring themes in audit findings and recommendations.

The analysis focused on identifying common themes in road design issues across the dataset. It also examined frequently proposed recommendations to determine how practitioners typically respond to identified risks. A further layer of analysis assessed the alignment of these recommendations with Safe System principles, evaluating whether they effectively mitigated risk and contributed to reducing fatal and serious injury crashes.

The review did not consider the economic differences between design approaches or the rate of implementation of recommendations following audits or assessments. Instead, the findings were collated, synthesised, and refined into a final 'Top 10' list, highlighting the most prevalent road design issues that depart from Safe System principles and the corresponding improvements that could enhance road safety outcomes.

Results

The Top 10 road design issues identified in this study will be revealed in detail during the conference presentation, providing insight into common misalignments with Safe System principles.

One of the most prevalent issues is the lack of appropriate facilities for vulnerable road users, including pedestrians and cyclists, particularly in areas with high foot traffic or multimodal interactions. Additionally, many road designs fail to adequately protect against high-risk crash types, such as high-speed right angle crashes involving passenger vehicles, which remain a leading cause of fatal and serious injury crashes.

Beyond physical road design, the findings also point to broader planning decisions that impact road safety. Land use planning, speed management, and pedestrian activity areas often do not fully consider Safe System principles, leading to environments where conflicts between different road users are more likely.

By identifying these recurring challenges, this research highlights the importance of embedding Safe System thinking at all stages of road and street design. The findings reinforce the value of Road Safety Audits and Safe System Assessments as critical tools in improving safety outcomes and ensuring that road infrastructure projects align with national and international best practices.

References

Austroads (2021). *Guide to Road Safety Part 6: Road Safety Audit*. Austroads, Sydney.
Austroads (2016). *Safe System Assessment Framework (AP-R509-16)*. Austroads, Sydney.