

ACRS Policy Position Statement

A New Systems Thinking Approach to Road Safety

Summary

A systems thinking approach for road safety is required if we are to realise our ultimate safety goals. This approach recognises that:

- The road traffic system is a complex interaction of many interrelated components, involving many participants in different situations;
- Many road user errors and crashes are created by the interactions between road system components;
- The design and operation of a safe road traffic system must respond to the capacities as well as the limitations and vulnerabilities of the human user;
- Understanding the causes of road traffic crashes and injuries requires understanding interactions within the broader road traffic system and other aspects of society.

Different participants (organisations or individuals) in the road system have different levels of authority, responsibility and power to influence road safety. They should apply systems thinking in developing countermeasures which reflect their control and influence within the road traffic system.

Key policy positions

1. Road safety needs to focus on the interactions of the various components and participants in the road system to reduce serious crashes and prevent serious injury.
2. Road safety strategy, policy and planning, need to apply systems thinking especially by:
3. Ensuring the accountability of governments and government agencies in governing and managing road safety performance;
4. Developing standards and guidance for all sectors which facilitate systemic safety practices, scalable to organisational capacity and capability;
5. Undertaking, learning from, and implementing reforms as a result of systematic, multidisciplinary, and preferably statutory, no-blame crash investigations.

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Policy problem

Ambitious road safety targets for the next decade have been set globally, with an ultimate vision of eliminating fatal and serious injury on the road(1). However, current rates of safety improvement in many countries, including Australia and New Zealand(2, 3), indicate that business-as-usual will not realise our ultimate goal. The ‘Safe System’ approach has become a primary reference point for road safety decision-making by road authorities in many countries during this century(4-7), and has been important in recognising, for example, the need to protect those who use the road. It promotes the idea of a more forgiving road system where mistakes by road users do not have fatal consequences and the forces in crashes are controlled to levels preventing serious injury. However, as it has been often described and applied, this approach has limitations:

1. The Safe System approach treats error as inevitable, and reinforces road users as the source of the problem, but fails to recognise that some road safety practices create road-user error and impedes the development of strategies to reduce and potentially prevent human error(8). The approach should be expanded to include usability as a central design principle in road safety, so that interfaces between users and aspects of the road system are intuitive and errors are minimised(9).
2. A “shared responsibility” is a core principle of the Safe System approach, but this term lacks definition and guidance and has failed to remove the emphasis on road users as the major source of problems(10). The notion that responsibility is shared blurs our understanding of who is responsible for what and can allow very powerful participants to publicly deflect responsibility onto other participants. Much greater clarity is needed regarding the authority, responsibility and power of different participants.

The common focus on “pillars” and related interventions (e.g. roads and vehicles) is too narrow and encourages an isolated focus on one component at a time. Safe or unsafe outcomes result from interactions between different components and participants across the whole road system, which itself is part of a much broader societal context.

Principles underpinning ACRS position

- Prevent all fatal and serious injury crashes on our roads.
- The road traffic system must be made safe for all road users.
- System designers should aim to prevent human error and mitigate its consequences.

Evidence base

Much better safety investment and decision-making are required, and would make an enormous difference right now, but we need to strengthen our approach to road safety in three key areas to keep making a significant difference in the future.

Systems thinking

Systems thinking is based on exploring behaviour and developing effective action by looking at the relationships between the broader structures in a system rather than its separate parts and is therefore applicable in road safety (11-18). A central tenet of systems thinking is that safety arises from the interactions between multiple components of a system. In this frame, road crashes are caused by multiple and interacting components and participants, impacted by different levels and types of activity and societal systems(19). Focusing on the road system, rather than the features of a particular crash, makes it easier to

look beyond the road users and the road environment to identify organisational, social or political components that both contribute to causes of the safety problem and can provide solutions.

Public Safety Leadership

Different participants within the road system hold different levels of authority, responsibility and power in regard to the safety of the system (see Figure 1). Parliaments or government agencies, for example, are not solely responsible for road traffic safety, but hold the highest levels of authority and power over the safety of the system. They can set societal expectations, regulate the safety of roads and vehicles and users/operators, and oversee the delivery of system-wide safety activity and investment. Authority, responsibility and power flow through government agencies (including local or regional government), industry groups and delivery mechanisms, combining to influence and control the system that is actually used by individuals. This user experience can then feed back up the levels of authority, responsibility and power, to ensure unsafe outcomes are eliminated over time.

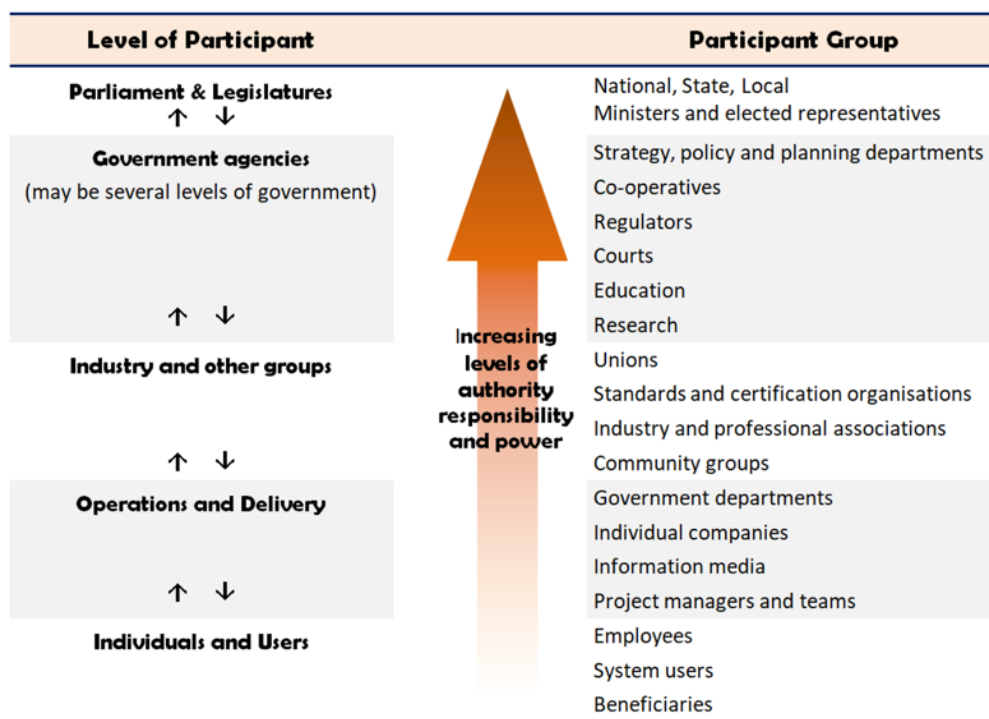


Figure 1: Authority, Responsibility and Power (P7Safety 2018 adapted from (20))

Safety Decision Making

A wide variety of safety controls can be applied to reduce and eventually eliminate fatal and serious injury on the road. A systems thinking-based approach should prioritise:

- Applying the hierarchy of control used in workplace safety to determine the most effective approach to managing road safety risk ranging from eliminating the hazard where possible to protecting the individual from the hazard (such as reducing motor vehicle traffic around areas where there are many pedestrians in contrast to administrative controls like reducing speed limits)
- Networks of interventions based on the acknowledgement that desired changes in safety results can only be achieved via associated interventions across the broader road traffic system (such as reducing alcohol consumption and misuse as well as enforcing drink driving laws)

- Sustainable responses which continue to be effective or can be further adapted long after they have been applied (such as installing pedestrian friendly infrastructure rather than simply relying on a speed limit reduction) and

Cost effective responses that represent a significant safety improvement for the investment required (such as automated speed enforcement).

Learning from other safety fields

Safety management in other fields which are much safer than road traffic illustrates alternative or complementary approaches which have improved safety in these settings and which are likely to prove very useful in road safety. For example, ten principles have been described for applying systems thinking to aviation safety including emergence, just culture, demand and pressure, resources and constraints and emergence(21). In practical terms, these approaches lead towards organisations demonstrating their safety credentials through safety management systems which reflect the safety impact of their business activity(22, 23). They also lead towards statutory no-blame incident investigations which extend “up and out” to examine the overall system, rather than “down and in” to focus on particular operators(24, 25). Systems-based guidance is increasingly available, but with limited promotion and uptake in road safety(26, 27). Most recently the FIA has launched a road safety index which “offers a systematic approach to identify organisations’ value chains, and assess how traffic safety is affected by their range of services or products” (28).

Recommended policy actions

1. Focus on the interactions of components and participants within the road traffic system (spanning all levels of the system up to and including government and international organisations) to reduce the circumstances which lead to serious crashes and increase the circumstances which prevent serious injury
2. Apply systems thinking to road safety strategy, policy and planning activity:
3. Specifying the accountability of governments and government agencies in governing and managing road safety performance
4. Establishing standards and guidance for all sectors which describe incremental and ultimate levels of system-aligned safety management systems and practices, scalable to organisational capacity and capability
5. Undertaking, learning from and implementing reforms as a result of, systematic multidisciplinary no-blame crash investigations which recommend improvements to the entire road traffic system.

ACRS actions

1. Advocate for using system-aligned thinking to broaden conceptual and practical approaches to road safety
2. Advocate for clear governance and management responsibility and accountability for road safety
3. Recognise and showcase examples of genuine systems-aligned practice to demonstrate and inspire effective implementation.

What does a more systems approach look like?

Responding to a common crash

A driver parks their vehicle in a parking spot next to a cycling lane and opens their car door into a cyclist, causing them to be injured. A systems-based approach involves considering the interactions between the driver, the cyclist, their vehicles, and other stakeholder decisions and actions that may have influenced their behaviour such as road designers, local councils, road safety authorities, cycling organisations, businesses, and vehicle manufacturers. Rather than blaming the incident on user error, attempts are made to understand why the driver and cyclist actions made sense to them at the time. Interventions focus on systemic change and include changes to road design guidelines and standards, improvements to road infrastructure and urban design, education for drivers and cyclists, improved signage, and vehicle design.

Addressing a significant issue

Current approaches to managing driver fatigue involve the traditional strategies of education, engineering and enforcement, with advertising, technology-based warnings of signs of drowsiness and a system of fatigue-related offences. A systems-based approach to fatigue management would take a different tack. It would address the reasons people drive when fatigued, the alternatives for making a trip when fatigued, and the options drivers have when they know they are too tired to drive. It would include solutions like increasing availability of public transport in rural and regional areas especially at times when fatigue is likely, as well as encouraging on-demand transport or ridesharing. It would also encourage employers to schedule work to avoid drivers commuting when fatigue is likely (such as midnight to dawn) or to provide access to alternative forms of transport. These approaches expand our solutions to prevent fatigued driving rather than only responding once drivers are too tired.

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