

Using the Safe System Pillars

**Practical applications to
improve road safety**

The Safe System Pillars

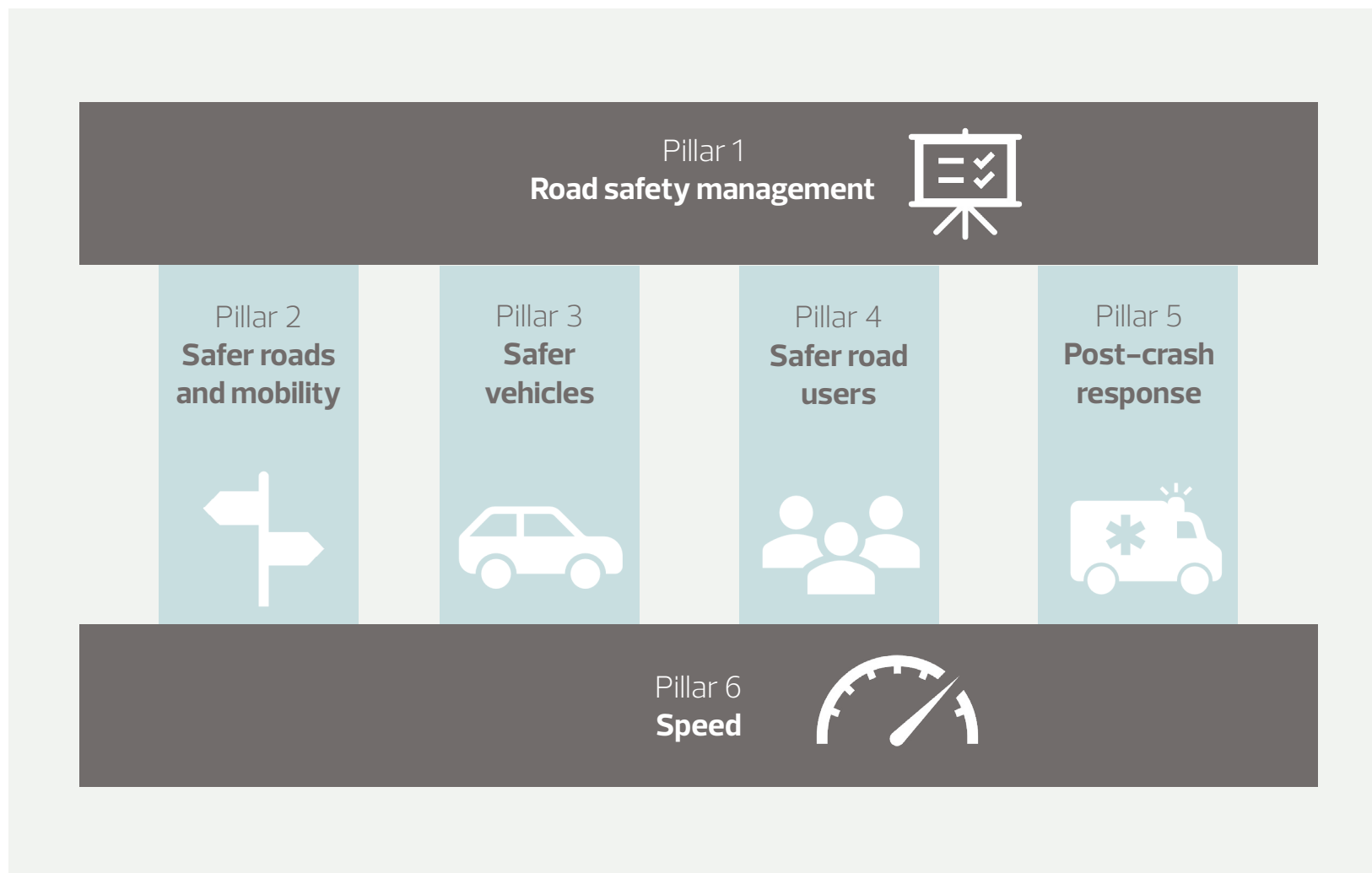


Figure 1: The Safe System Pillars

TRL and the Safe System Pillars

The Safe System pillars (Figure 1) were developed by working groups of the United Nations Road Safety Collaboration (UNRSC) to form a framework for the actions required for the first Decade of Action for Road Safety (2011-2020). As an active member of the UNRSC, TRL contributed to the pillar development.

Starting the second decade (2021-2030), these pillars are now even more important and speed has been added as a sixth item. These pillars form the focus for stakeholders to approach the development of Safe Systems strategies from different technical areas. However, all stakeholders must act together because it is a holistic approach; only collaborative working will achieve the major reductions in risks and casualties that are required globally. The focus is most often on Killed and Serious Injuries (KSIs) but may include slight injuries too.

TRL is in a unique situation of having expert teams that work in all the pillar areas.

These groups work very closely together, in mixed teams as appropriate and so are able to provide Safe System based solutions to clients.

How is this relevant to road authorities and other agencies?

Safe Systems is the basis recommended to achieve sustainable reductions in road deaths and serious injuries by all the leading international stakeholders. Following the six Safe System Pillars enables the road authority to construct a structured approach for delivering road safety against a defined set of objectives, targets and KPIs.

In many countries' organisations responsible for road action and enforcement have already achieved high impact. Applying the Safe Systems approach in countries can be challenging; however, there are good examples of successful projects. TRL delivered a Road Safety Programme which utilised elements of the pillars and created a strong eco-system for a crash data system deployment in Himachal Pradesh, India. Amongst many actions the project implemented the use of mobile devices for the police to collect the data improving reporting levels and data quality.

**iMAAP India
Case Study**

**iMAAP India
Video**



Pillar 1: Road safety management

Good data and data systems are fundamental to the Safe Systems approach. This includes use of collision incident reporting and a range of exposure data. This oversight and data management is essential for guiding strategy development, risk identification, and to evaluate the performance of interventions and strategy. This pillar over-arches the others; without good management and organisation of the responses the impacts of a safety strategy will be limited at best.

TRL works with countries, states and organisations:

- We have an established approach to assess existing capacity and to assist to develop costed, targeted strategies for reducing road deaths and serious injuries.
- Our approach has a focus on setting up strong institutions and oversight. Our researchers and practitioners are also experienced at assisting organisations to upskill their staff and to provide detailed advice.
- We have expertise at providing Crash Data Systems and supporting clients to improve the data collected. We can also provide, or train staff, on the analysis of the issues to provide the scientific evidence base for road safety strategy.

[Click here for iMAAP](#)

iMAAP Crash Data System Role in Safety Management



Pillar 2: Safer roads and mobility

The constructed road environment has a major impact on the safety of all road user groups. In some ways this is the easiest pillar in which to make significant improvements. However, the investments required for road upgrades are generally very substantial.

TRL provides research and training based on our wealth of roads and mobility expertise

Providing guidance to road designers in many countries throughout Africa, Asia and Europe through our widely used 'Towards Safer Roads' safety engineering guidance and more recently with three manuals produced for the African Development Bank (AfDB) on Road Safety Audit, Road Safety Inspection and Crash data use.

TRL developed a comprehensive series of Road Safety Engineering Manuals for the AfDB and can provide comprehensive training on their implementation.



TRL is the UK's Centre of Excellence for iRAP, an essential tool for assessing road safety

TRL was instrumental in developing the highly successful iRAP Star Rating model. This is a Safe System risk-based (proactive) approach to improve road design. We are an iRAP 'Centre of Excellence' which reflects our deep understanding of the algorithms and model, as well as our strong practical application experience. We can guide clients through the coding and localisation processes, interpretation of outputs and development of practical engineering schemes.





Pillar 3: Safer vehicles

Improvements in secondary safety features of vehicle design (reduction of the severity of injury outcomes during a collision) has been responsible for much of the reduction in KSIs seen globally over the last thirty years. Primary safety systems (e.g. crash avoidance) are now leading the next phase of vehicle safety improvements. TRL has experience in assessing the impact of current and future safety features through new and second-hand vehicles, control of which continues to be a major challenge. These features are increasingly relevant to protection of Vulnerable Road Users.

TRL has been at the forefront driving vehicle design improvements.

- TRL developed the crash protocols for the Euro NCAP crash testing, which led to Global NCAP. These programs provide consumers with star ratings to help them choose safer models, and to encourage vehicle design improvements from the manufacturers. Similarly, we have led the [Bus Safety Standard](#) research program.
- TRL has applied its knowledge to estimating how better standards in some basic vehicle safety properties would lead to significant reductions in KSIs and economic [benefits in Latin American countries](#).
- We have expertise in understanding the casualty reductions, societal and economic benefits that can be expected from the introduction of new 'ADAS' (Advanced Driver Assistance Systems) features in the vehicle fleet. Looking further to the future, we also have expertise in Connected and Autonomous Vehicles (CAVs), and their operation and risk management.
- We often provide clients with procurement strategy support, to develop ratings or prioritisation of vehicles, along with practical purchasing advice, research and tools.
- Our experience supporting the [development of the European 'General Safety Regulation'](#) is also something that can be applied in conjunction with better vehicle importation rules and enforcement.

Pillar 4: Safer road users

A central principle of Safe Systems is that although human actions contribute significantly to most serious and fatal road crashes that occur, these incidents are mainly due to errors. As such, this aspect of being imperfect humans cannot be eradicated through campaigns alone. However, good driver training, awareness raising and particularly enforcement of the road rules is effective. Road users do need to be informed how to use the road system correctly and they must be made aware of the road rules.

TRL's behavioural change experts support clients in all aspects of their interactions with road users:

- Skills include application of driving simulator to test scenarios, segmentation of target groups to tailor campaigns, and expertise in evaluating the impact of these approaches.
- In Africa, Central and South America and Asia we have developed guidance on school training curricula, and on how to create and run effective community-based road safety campaigns.
- We have also run technical assistance projects supporting enforcement targets in countries such as India, in addition to our work in the UK.



Pillar 5: Post-crash response

The time gap between injury in a crash and receiving competent roadside medical assistance and safe movement to a good emergency medical facility is vital to survival and also an improved chance of full recovery. This is a challenging area for countries where medical facilities tend to be overburdened and ambulance systems absent or often inefficient and underfunded. Other aspects of post-crash response include how the police and fire services manage the scene and report on the incident. It also includes in-depth crash investigation programmes that investigate a small number of collisions in detail leading to significant new knowledge on the factors leading to crashes and also the severity of injury outcomes.

For crash data systems to be effective, the use of data to enable insights driven from platforms such as iMAAP is very important. TRL believes the application of all or some of the six pillars is critical rather than deploying only a crash data system in isolation.

TRL supports clients developing Pillar 5 activities:

- TRL has led a range of projects that have assessed the capacity and funding of the emergency medical response ability in countries and states. We have developed plans with clients to improve emergency medical response.
- We also have a large team of in-depth investigation experts. Their work is used to increase the scientific understanding of what factors lead to crashes occurring and also the outcomes (for example RAIDS). The team takes a systems and temporal approach to analyse the very large volume of data that is available for each crash; the approach is holistic and is about understanding the reason why the event occurred, and not seeking to apportion blame. This approach promises to benefit countries where police crash data is poor or non-existent. The investigation skills can form training to enable police to collect far better incident report data.

Pillar 6: Speed

Speed has recently been added as an additional pillar for the Second Decade of Action. As with the 'Road safety management' pillar it also overarches the other pillars. This is because the reduction of energies in collisions below those that will cause KSIs is fundamental. There is a power relationship between the speed of vehicles and the energy released in a crash; this means increasing the speed by a small percentage results in a far higher relative increase in severity of the injuries that will result. Crashes are also more likely to occur at high speeds since human reaction times decrease, braking distances increase, and loss of control is more likely.

TRL has experience of assisting with speed reduction and speed management:

- We conducted some of the first research that investigated the relationships between vehicle speeds in crashes and the likelihood of occurrence and the severity of the injury outcomes.
- We have continued to refine the knowledge of the link between speed and the probability of collision fatalities based on our in-depth investigations (Pillar 5).
- We have several biomechanics experts who have been furthering our knowledge of the relationship between speed and injuries.
- In addition, we have been conducting work to develop practical Safe System speed-based Safety Performance Indicators for UK road authorities. We have also developed a sophisticated, but easy to use, Speed Limit Assessment tool which is based on iRAP coding data.



Contacts

TRL look forward to working with you to improve road safety. Should you wish to discuss anything within this document, details for our key contacts are listed below:

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