# Response to Inquiry into the National Road Safety Strategy 2011–2020

The Australian Road Research Board is the national research organisation for road transport and has been involved in road safety research for over 50 years. We are the lead Australian researchers in the development of Safe System infrastructure and have recently undertaken a project for Austroads to identify key initiatives required to assist in closing the gap to the 2020 targets.

We are pleased to provide this input to this critical inquiry and look forward to being part of a collaborative research effort to support the development of the next national road safety strategy. The main submission (provided below) addresses each of the four issues outlined in the inquiry terms of reference. Appendix A details more specifically with the issue of driver distraction.

## 1. Identify the key factors involved in the road crash death and serious injury trends including recent increases in 2015 and 2016.

- The annual number of road related deaths has been on a downward trend since 1970. In any such series random fluctuations occur and it is not possible at this point to determine whether the increases in 2015 and 2016 are just normal variations or the start of a different trend.

- The number of deaths involving motorcyclists have increased following the trend of increased total motorcycle vehicle kilometres.

- Research in 2013 showed that nearly 50% of fatal crashes and less than 10% of other crashes involved some type of extreme behaviour. Drivers exhibiting extreme behaviour are the most difficult to reach as they are not responsive to the normal suite of safety countermeasures. As the risk for the majority of drivers reduces then the contribution of the minority of high risk drivers becomes relatively greater.

- The limited availability and reliability of serious injury data makes it impossible to assess the success or otherwise of the NRSS in reducing serious injuries. It cannot be assumed that they will necessarily follow the same pattern as fatalities, particularly for vulnerable road users and the group of high-risk drivers discussed in the previous point. More accurate and more consistent treatment of data on injuries should be a priority for future strategies.

- It is also difficult to determine the cause of changes to both fatal and serious crash outcomes due to a lack of appropriate performance indicators, including 'intermediate' measures (such as average vehicle speeds, mobile phone use etc.) as well as implementation indicators (such as additional hours of enforcement, extent of infrastructure improvement etc.). As an example, the extent to which increased mobile phone use might have contributed to increases in distraction-related fatalities and serious injuries is unclear, due to lack of data about whether a phone was being used at the time of a crash.

2.  **Review the effectiveness of the National Road Safety Strategy (NRSS) 2011-2020 and supporting 2015-17 Action Plan, with particular reference to the increase in deaths and serious injuries from road crashes over the last two years.**

    - The NRSS provides a focus for road safety and a vision for future reduction in road related deaths and serious injuries.
    - The targets were not considered to be ambitious when the strategy was released but have proved difficult to achieve. The aim of jurisdictions to reach the targets has been one impetus for increased road safety activity as reported in the Implementation Status reports.
    - A number of the key recommendations in the strategy refer to changes in vehicle regulations which is known to be a lengthy process. Some of these changes are still in progress and the impacts of those that have been completed will not be seen until the change has penetrated a reasonable proportion of the fleet.
    - The NRSS recognised sources of distraction from within the vehicle as "a major and potentially growing problem area" and advocated a harm minimisation approach in managing the problem. The 2015-17 Action Plan contained no actions related to driver distraction. Given the converging evidence of the role of distraction in crashes, relatively little has been done to manage distraction as a road safety issue in Australia compared to other risk factors. Further details on the issue of distraction are provided in Appendix A.

3.  **Identify issues and priorities for consideration in development of a post-2020 national road safety strategy and 2018-2020 action plan, focusing on how Australia can recognise and move towards a safe road transport system which minimises harm to all users.**

Action Plan 2018-20:

    - A recent project led by ARRB and funded by Austroads listed key initiatives to be considered for the final action plan of the current NRSS. The findings were that the only initiatives that could provide meaningful reductions in the short duration before 2020 were increased enforcement, reductions in speed limits and, for some states, rapid roll out of sealed shoulders and safety barriers in rural areas.
    - The action plan should also be used to start the development of countermeasures which will have an impact after 2020. These included changes to the licensing age, introducing a graduated licencing scheme for motorcyclists, developing new enforcement methods and new technology to increase seat belt use and prevent the inappropriate use of mobile phones, changes to the design standards process to allow rapid roll out of safety improvements, and the development of low cost infrastructure improvements for low volume roads.

Post 2020 Strategy:

    - The decade starting 2020 will be a time of major changes in technology. Some of these changes can be predicted but others will be unexpected. The strategy will need to establish an environment where new technology can be embraced and used to reduce the risk to all road users. In particular emphasis should be given to ensuring accelerated, safe adoption of

autonomous vehicles. Coordination of efforts is required to ensure emerging evidence and good practice is shared between road agencies, industry and other key stakeholders. ARRB is working with other Australia and New Zealand Driverless Vehicle Initiative (ADVI) partners to provide solutions to the most pressing of these issues.

- This decade is also likely to see dramatic changes in settlement and movement patterns as Australian cities accommodate much larger numbers within their existing boundaries, and there comes to be greater reliance on public transport and active travel modes. Road safety must become more intimately engaged with all levels of the planning process if a safe travel network that meets the community's travel needs is to be created.

- Driving of heavy and light fleet vehicles as well as personal vehicles (termed the 'grey fleet') is a major part of the work day for many people, even those for whom driving is not their primary task. A large proportion of road deaths and serious injuries occur while driving for work purposes, estimated as approximately 15% in the current NRSS. For workers the vehicle represents the greatest risk with two-thirds of workplace fatalities involving a vehicle. The National Road Safety Partnership Program (NRSPP.org.au) continues to provide clear guidance on how risk can be reduced when driving for work. These opportunities represent a significant potential gain in road safety outcomes and need to be integrated into the post 2020 strategy. An organisation's influence can also be far reaching beyond its direct workers but also can influence safety through contractual requirements and community engagement.

- Government agencies need to lead the path and illustrate how workplace road safety is an investment and how the Safe Systems can be applied within an organization. There is a need for ensuring coordination of activities between agencies. In particular, Safe Work Australia and state-based counterparts need to engage in activities to ensure trauma that results from driving for work is minimized and when it occurs, that it is treated as any workplace injury.

- Crashes involving heavy vehicles involve a high risk of death or serious injury. The energy exchange involved in these crashes mean that the advanced occupancy protection built into modern vehicles is largely ineffective. Interactions with vulnerable road users carry even higher risks. Improving the safety for road users of all types when interacting with heavy vehicles should be a priority of the next strategy.

- Motorcyclists are especially at risk on the road and this is reflected in the growing numbers of fatally injured motorcyclists. Possible countermeasures are:
  o Require L and P plate riders to only ride motorcycles fitted with ABS. This would ensure that inexperienced riders received the protection provided by this technology and also accelerate the uptake of the technology into the fleet.
  o Develop a full graduated licensing scheme for motorcyclist concentrating on where, when and what they are allowed to ride
  o Considering mandatory retesting for riders above an agreed age. The additional skill and physical ability required for riding a motorcycle makes retesting of control skills much more relevant to motorcycle riders than car drivers.

- Road safety risk exists within a wider context and has been shown to be related to a range of social factors such as economic or geographic disadvantage. The new strategy should be flexible enough to allow some of these to be explored in cooperation with other agencies

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such as health and education. To meet this objective there is a need for a 'sociotechnical' analysis and evaluation of the Safe System approach to road safety management to understand how all the elements and partners in the system interact to enhance or diminish safety. Methods exists for doing so (e.g. STAMP), and have been used successfully to analyse the effectiveness of safety management systems in other domains.

- There is considerable scope to improve target setting, performance tracking and data collection in line with world's best practice (e.g. World Bank guidelines, including development of intermediate measures and implementation indicators). There is currently a lack of comprehensive performance indicators that are required to effectively manage road safety, meaning it is difficult to determine which interventions are most effective, and what causes fluctuations in fatal and serious injury outcomes. Related to this, there is a need to gain a fuller understanding of serious injuries.

- Best practice approaches to address distraction should be introduced, including a standard definition of distraction, a standard approach to coding of distraction in collisions and in crash databases, improved efforts during licensing, greater use of promising technologies (e.g. driver assistance and collision avoidance), standardised HMI design for technologies, and support for further research into various aspects of road user distraction. Further details on this issue of distraction are provided in Appendix A to this submission.

- Improved systems and clarity of thought are required to encourage and facilitate innovation, particularly in provision of safe road infrastructure. Currently there is a strong sense of risk-aversion amongst road agencies at all levels, which leads to a reliance on applying technical standards (some of which are now dated and related outcomes can be questionable) and a reluctance to try new initiatives to address existing and emerging needs. This position is unfortunate, and it is often due to an unfounded fear of litigation. Innovation, backed by a sound rationale, appropriate due diligence and disciplined record keeping, is vital in saving lives. Leadership is required in the new strategy to encourage innovation and share best practice. This should include funded demonstration projects, and mechanisms for the rapid dissemination of new guidance (including design notes), taking advantage of most modern methods of communication and data access.

- In many areas, particularly infrastructure, the 2011-2020 strategy and related action plans concentrated on providing the tools for jurisdictions to assess where infrastructure is needed rather than setting a target for expenditure of percentage of the network treated. While such targets would be extremely difficult to develop they would provide impetus for state and federal road programs to invest in road safety.

- New mechanisms are required to simplify and improve the allocation of existing funding for safe road infrastructure. Although highly cost beneficial, current processes could be improved to reflect global best practice which are proactive in identifying risk locations and solutions. The current system does not cater well for local government investment, where almost half of all fatal crashes currently occur.

- Besides improved funding mechanisms, other specific actions are required to support local governments in addressing road safety. This includes greater provision of support to help identify risk factors and locations, and the provision of direct guidance for local government on how to address these risks.

4. **Advise on arrangements for the management of road safety and the NRSS, looking at best coordination and use of the capacity and contributions of all partners.**

- While allowing for differences between states the new strategy needs to be a focus for national collaboration and consistency. Any management or governance model should make this a priority.
- The 2013 review of the current strategy identified lack of national leadership as a major failing of the strategy. For the post 2020 strategy an adequately resourced national leadership response is required. This national leadership is needed in two major areas:
  - The introduction of new technology including autonomous vehicles, national collaboration and consistency will be vital to the successful translation to autonomous and connected vehicles and networks
  - Countermeasures where implementation is difficult or unpopular – these include reduced speed limits, tougher licensing restrictions, increased enforcement and dedicating road space to cyclists and pedestrians
- A management group for the strategy needs to include all jurisdictions but be led and supported at the national level.
- Ideally the management group needs to be accessible providing opportunities for comments, ideas and regular reviews.
- There are major gaps in knowledge relating to effective safety strategies and solutions, and this lack of knowledge is costing Australian society dearly. Given the scale of the safety problem (estimates indicate that this is approaching $30bn per year) there is currently a minimal investment in finding solutions to this problem. The strategy management group should be supported by a well-funded research collaboration incorporating all the major Australian road safety research organisations.
- Effective management of road safety relies in part on development and application of tools to help identify risk, find appropriate solutions, and prioritise road safety activity. A number of tools have been developed and are proving to be effective in managing effective road safety outcomes. These tools include the Australian National Risk Assessment Model (ANRAM), AusRAP and the Safe System Assessment Framework. Such tools require ongoing support and development, as well as appropriate dissemination and training. Further support is required to maximise the benefit of these tools.
- As indicated in the sections above, there is a need to set appropriate performance indicators and targets for effective management of road safety, and track performance towards these, in line with world's best practice. As well as the traditional outcome measures, these should include implementation measures (e.g. hours of enforcement; percentage of the network with median separation) and intermediate measures (e.g. percent of roads with 3 star + AusRAP rating; mean speeds; percentage wearing helmets etc.).

# APPENDIX A: SUBMISSION ON THE ISSUE OF DISTRACTION

This portion of our submission has been prepared by Dr Mike Regan, Chief Scientist with the Safe Systems and Human Factors team at the Australian Road Research Board.

## 1. Identify the key factors involved in the road crash death and serious injury trends including recent increases in 2015 and 2016.

ARRB was involved in a recent scoping study of mobile phone use while driving, led by CARRS-Q in Qld (King et al, 2017), and undertaken for the Federal Department of Infrastructure and Regional Development (DIRD). Police impressions from the jurisdictions are that mobile phone use is rising and becoming harder to detect, which is consistent with information from the literature.

The extent to which increased mobile phone use might have contributed to increases in distraction-related fatalities and serious injuries during this period, however, is unclear, due to difficulties in determining whether a phone was being used at the time of a crash.

## 2. Review the effectiveness of the National Road Safety Strategy (NRSS) 2011-2020 and supporting 2015-17 Action Plan, with particular reference to the increase in deaths and serious injuries from road crashes over the last two years.

The National Road Safety Strategy recognised sources of distraction from within the vehicle as "a major and potentially growing problem area" and advocated a harm minimisation approach in managing the problem. The only concrete action for the first year of the strategy was to "Investigate technology-based options to minimise driver distraction from in-vehicle devices."

The 2015-17 Action Plan contained no actions related to driver distraction.

In Australia, in-depth analysis of crash data revealed that driver distraction was a contributing factor in around 16% of fatal and injury crashes for the data set investigated (Beanland et al. 2013). Data from the recent large-scale naturalistic driving study in the United States (involving more than 3,000 drivers) demonstrated that 68% of the 905 injury and property damage crashes recorded during the study involved some type of observable distraction (Dingus et al, 2016). Overall, drivers in that study were engaged in some type of observable distracting activity for more than 50% of their time and, overall, observable distraction was found to double crash risk.

Given the converging evidence of the role of distraction in crashes, relatively little has been done to manage distraction as a road safety issue in Australia compared to other risk factors such as speeding and drink driving.

## 3. Identify issues and priorities for consideration in development of a post-2020 national road safety strategy and 2018-2020 action plan, focusing on how Australia can recognise and move towards a safe road transport system which minimises harm to all users.

The European Commission funded recently what is arguably the most comprehensive, evidence-based, review of driver distraction ever undertaken (European Commission, 2015). It concluded that driver distraction is a contributing factor to between 10 and 30 percent of all crashes across Europe, and recommended that a number of "best practice' approaches be used by EU states in their efforts to reduce the road injury burden of distraction.

The following are recommended for consideration in development of a post-2020 national road safety strategy and 2018-2020 action plan:

1. Adopt a standard definition of distraction, and approach to coding distraction in collisions, for use across jurisdictions, to make it possible to quantify the extent of the problem.

2. Standardise data to be collected on distraction in crash databases across jurisdictions (utilising the definition above as their basis) so that comparisons across State and Territories can be made on the basis of the same underlying factors.

3. Legislation, certification, public awareness campaigns and education during the licensing acquisition process (as well as for professional drivers) were seen as the most effective non-technology-based approaches.

4. The most promising technologies recommended to prevent or minimise distraction were voice recognition, biometry, head-up displays, artificial intelligence, and vehicle automation.

5. Standardised HMI design (for technologies) to minimise distraction should be incentivised, and test protocols developed to assess the distractibility of systems and devices in new vehicles as part of new vehicle testing programs.

6. Stimulate the uptake of technologies that operate far in advance of collisions (distraction prevention measures such as phone blocking systems and distraction mitigation measures such as distraction warning systems)

7. Stimulate the uptake of Collision warning systems (forward collision warning and lane departure warning), as these would prevent or mitigate distraction-related collisions, score highly on safety impact and user acceptance, and are relatively mature technologies.

8. Encourage development of a standard interface for secure mounting and powering of mobile phones and other nomadic devices on a central position of vehicle dashboards to limit distractions caused by sliding and dropping devices and entanglement of power cords.

9. Provide incentives for local developers of automotive apps to develop safer, less distracting apps.

10. Support further research into various aspects of road user distraction, to broaden the scientific evidence base for policies to combat distraction. The following were identified as the top ten research priorities:

- Voice recognition: How should such systems be designed?

- Night vision: Can such systems present extra information to drivers in such a way as to alert the driver to potential risks, but without being too distracting?

- Biometry: Can systems spot inattention quickly enough to permit useful intervention or alerts? Can they be reliably enough to avoid drivers wanting to turn the systems off (e.g. false alarms)?

- Legislation of usage conditions: How should legislation be designed and worded with the pace of technology development (e.g. new input and output modes) being so quick?

- Public information campaigns: What is needed in such campaigns beyond the provision of information? How can behavioural change techniques help?

- Auditory/vocal (cognitive) distraction and how it relates to driver performance and crash risk.

- Sociological aspects of distraction: What makes drivers willing to take part in distraction activities? How do social norms play a role? Does the need for 'connectedness outweigh risks in the perception of drivers?

- Views of young drivers on driving and distraction: What makes young drivers particularly susceptible to distraction by devices? Which sub-groups of young drivers are particularly at risk?

- Effects of countermeasures: Which countermeasures can be shown to really work? What are the relative benefits of enforcement approaches? Can behaviour change approaches work to reduce exposure to distraction?

- Pedestrian distraction studies: What is the exposure of pedestrians to distraction? What behaviours other than crossing the road are affected? How does the increased risk for pedestrians (per unit of travel) compare with that of other road users?

- Distraction/alertness in the transition to automated driving: How long do people need to move from a distracting task to taking over control of an automated vehicle? What are the best ways of alerting drivers in this situation?

- Self-regulation of road users and good driving behaviour: Does behavioural adaptation (e.g. reduced speed) actually reduce risk for some distracting tasks? What are the distraction tasks that cannot benefit from behavioural adaptation?

- Future trends and challenges in distraction: Does the ageing population represent an increased distraction risk? Will 'wearable technology' improve the situation or make things worse?

- New vehicles and distraction: Will new vehicles with different behavioural profiles (e.g. electric bicycles with higher speeds) reduce distraction-related safety margins?

- Business models and eco systems of new distraction-preventing technologies: How can countermeasures be built into the business case? Who will pay for distraction-reducing technologies?

## 4. Advise on arrangements for the management of road safety and the NRSS, looking at best coordination and use of the capacity and contributions of all partners.

There is a need for a sociotechnical analysis and evaluation of the "Safe System" approach to road safety management to understand how all the elements and partners in the system interact to enhance or diminish safety. Methods exists for doing so (e.g. STAMP), and have been used successfully to analyse the effectiveness of safety management systems in other domains.

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