21 February 2019

National Transport Committee (NTC) Driver Distraction team

Submitted via email to Mandi Mees (mmees@ntc.gov.au) and Luis Gutierrez (lgutierrez@ntc.gov.au)

Dear Mandi and Luis

**Subject: ARRB response to the NTC's Driver Distraction Issues Paper**

Thank you for inviting the Australian Road Research Board (ARRB) to submit comments on the NTC's Driver Distraction Issues Paper. We offer the following broad comments for your consideration in further developing this Issues Paper and addressing the aims of the NTC's Driver Distraction project.

*In response to the NTC's questions posed in the Issues Paper*

1. Question 1: *Does the proposed definition include all the key functions required to safely perform the driving task?* On page 12, in the list of activities involved in the driving task, the activity 'responding to objects or events' could be expanded to 'appropriately responding to objects or events within the driving environment'.

2. Question 2: *Does the proposed definition capture all the behaviours that lead to driver distraction and a reduction in driving performance?*

   We believe there may be some issues with the definition of driver distraction, proposed for use for this project by the NTC, which reads:

   > *Driver distraction is the voluntary or involuntary diverting of attention, in a visual, manual, auditory or cognitive sense, away from the driving task to focus on a competing secondary activity.*

   It is unclear what "manual" attention means. Manual interference occurs when a hand(s) are off the wheel, but is not necessarily related to the diversion of visual or cognitive attention from tasks critical to safe driving (i.e., hands might be off the wheel but attention still directed towards the forward roadway and vice versa).

   The distinction between "auditory" and "cognitive" attention is unclear. Cognitive attention most likely subsumes auditory attention (e.g., it would be difficult to argue attention could be diverted towards a sound without thinking of it concurrently).

   The word "focus" may imply a voluntary action. We suggest revising "…away from the driving task to focus on a competing secondary activity" to "…away from the driving task towards a competing secondary activity".

   This definition does not address the effect of driver distraction on driving performance nor the type of driving tasks (i.e., tasks critical to safe driving).

   A diversion of attention away from the driving task does not always lead to impaired driving performance, and hence shouldn't be defined as such. For example, some secondary driver engagements (such as a task that increases cognitive load) may improve driving performance through certain mechanisms under some circumstances (e.g., counteracting fatigue on long drives).

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An alternative and widely used definition from the literature which could be considered is: '...the diversion of attention away from activities critical for safe driving toward a competing activity, which may result in insufficient or no attention to activities critical for safe driving.' (Regan, Hallett, & Gordon, 2011, p. 1776).

3. Question 3: *How could a distinction between manageable and unmanageable levels of driver distraction be used to inform the way distraction is regulated?* What evidence-based distinctions could be considered? While it would be pleasing for the NTC to have clear direction on this topic, given the complexity of findings from evidence-based research, this is not an easy question to address. Research findings providing evidence of crash risk associated with engaging in specific secondary tasks could be used to identify unacceptable levels of driver distraction. However, some research also indicates talking with passengers may increase crash risk compared with not engaging in a secondary task, which may not be as acceptable to the community to regulate compared to other forms of secondary task engagement (e.g., mobile phone use). Some research also identifies driver characteristics and other moderating factors which may impact the potential for a particular driver interaction to impair driving behaviour. These moderating factors include driver characteristics, the demand of the secondary task, the demand of the driving enviornment and the ability of the driver to self-regulate their secondary task engagement. This means certain driver interactions may pose an increased safety risk under certain conditions and not others, and so it is difficult to acertain what driver interactions may be 'safe' or 'acceptable' compared to others for individual drivers under different conditions.

4. Question 4: *Should conventional and technology-based causes of distraction be treated equally in the Australian Road Rules? Why?* This is a complex issue that may be difficult to address. Despite findings from some naturalistic driving studies about the crash risk associated with engaging in conversations with passengers, this behaviour is more difficult to control for drivers and trying to curb this behaviour for experienced drivers is likely to be less well accepted than not engaging with technologies while driving. Furthermore, for example, interacting with a passenger may not pose a significant safety risk to more experienced drivers compared to novice drivers who may be less likely to safely timeshare driving activities and certain secondary task engagements, such as passenger interactions. This issue is made more complex given in certain situations the presence of passengers may also improve driving safety, such as for Learner drivers, where there is an experienced driver also assessing the driving environment and driver behaviour, or drivers who self-report driving more safety in the presence of other passengers. Moreover, further limiting the number and ages of passengers for experienced drivers may cause other transport issues. However, consistent restrictions on the number of passengers (possibly by driver age, passenger age and time of day) provisional drivers may drive may be worth considering.

However, perhaps consideration could be given to conventional and technology-based causes of distraction being treated equally in the Australian Road Rules (ARRs), as it is not the source of distraction that produces distraction, but the triggered behavioural responses to engage with the source (i.e., eyes off road, mind off road, hand(s) off wheel).

5. Qustion 5: *Can you provide examples of effective non-regulatory approaches to driver distraction that assist drivers to self-regulate their behaviour in a dynamic driving environment?* There are many self-directed monitoring behaviours that may reduce the likelihood of engaging in secondary tasks while driving, such as (but not limited to):
    a. Not engaging with certain types of technology or other secondary tasks while driving
    b. Putting the mobile phone in the boot or another inaccessible place in the vehicle prior to driving
    c. Turning the mobile phone on silent prior to driving

     d.   Setting smartwatches to not receive alerts that may divert attention away from the driving task

     e.   Adjusting any in-vehicle controls (e.g., air conditioning, radio, etc.) and settings (e.g.,seat and mirror positions, etc.) prior to driving

     f.   Asking passengers to adjust air conditioning, select and adjust audio/radio/music controls, navigate, etc.

     g.   Using mobile phone apps to exclude or limit the type of notifications a driver receives while the mobile phone is moving at a certain minimum speed

Some reserachers involved in studies of Intelligent Speed Adaption (ISA) technologies (which provide real-time feedback to drivers about speeding behaviour) suggest systems that require a driver to turn on the system prior to driving, and/or allow a driver to disable the system, may be less effective than systems that do not require driver initiation or allow driver intervention. It seems possible similar issues may apply to technologies aimed at reducing driver distraction.

6.   Question 9: *Can you provide examples of strategies to ensure that users of partially automated vehicles are fully informed about their responsibilities, and the limitations of their vehicle's technology?* Is the NTC's Safety Assurance System for Automated Driving Systems project addressing this issue? Requirements could be implemented for purchasers and drivers/riders of new or used vehicles with automated functions to engage with a range of brief, easy-to-understand educational materials about these functions, and answer questions to confirm their understanding of the working capabilities and limitations of the technologies, as well as their responsibilities when driving/riding the vehicle, prior to being considered licensed to drive/ride these vehicles. Copies of the educational materials could be provided to the driver/rider in printed and/or electronic formats and made available free of charge online. The licence database could be accessible by enforcers from the roadside.

Recent preliminary research suggests such driver training protocols using Level 2 and Level 3 automated vehicle systems may be associated with safer driving behaviours, more sustained visual attention toward the forward roadway and better calibrated levels of trust in the automated vehicle systems.

### *General comments*

1.   There appears to be a disconnect between the driving population's acceptance of the safety risks of engaging in secondary tasks and real-world engagement of these tasks while driving or riding. Statistics from the 2017 Australian Community Attitudes to Road Safety survey (with over 1700 respondents) indicate 79% of respondents believe talking on a mobile phone increases crash risk. However, 64% admitted to using a mobile phone while driving or riding. This disconnect may point to a lack of understanding of, and belief in, the safety risks associated with such behaviours. Therefore, it appears specific risky behaviour(s) have not yet become socially unacceptable. This was once the case for driving under the influence of alcohol, prior to random breath testing (RBT) being introduced, which increased enforcement of the legal BAC limits and led to a substantial change in social norms and acceptability.

2.   Given the research surrounding the potential for driver distraction related to objects and events external to the vehicle, such as billboards and the built environment, it may also be worthwhile considering strengthening countermeasures to address these issues. The NTC's Driver Distraction Issues Paper notes many jurisdictions now have guidelines relating to the safety issues associated with the distraction from roadside advertising. In addition it states the "NTC is not aware of research into assessing the effectiveness of these guidelines in minimising driver distraction from advertising". Perhaps the most accessible document that should be considered in this context is the Austroads report No. AP-R420-13, Impact of Roadside Advertising

on Road Safety. This report reviewed the state of knowledge up until 2013 and suggested evidence-based guidance for the safe installation of roadside advertising. A number of (currently unpublished) Australian research projects have been conducted since the publication of that report that bear directly on the issue of the validity of some of the principles espoused by various SRA roadside advertising guidance documents. The NTC may be interested to note ARRB will soon be hosting a national roundtable on digital billboards to update stakeholders on this recent research and discuss the potential for evidence-based and harmonised guidance on roadside advertising.

*Comments related to relevant road safety legislation*

1. With respect to revising the existing and/or developing new national legislation aimed at ameliorating road trauma related to driver distration:
    a. We recognise the complexity involved in defining components of the driving task, driver distraction, what constitutes a driver's aid, and driver compliance with having 'proper control of the vehicle' (as specified in ARR 297(1): A driver must not drive a vehicle unless the driver has proper control of the vehicle). Of particular concern for the overriding aims of the NTC's Driver Distraction team is the impact such definitions may have on magistrates' abilities to uphold the law and determine whether a driver has displayed a reasonable level of control over the vehicle in a given circumstance.This is also made more complex by some of the circumstances affecting a driver's ability to maintain control of the vehicle that may be outside the immediate control of the driver (e.g., a sudden, unexpected medical condition).
    b. With regard to ARR 300(1) about drivers' use of mobile phones, while it seems worthwhile given the high ownership and frequent use of mobile phones to have a specific rule addressing these, it also seems sensible to base the rule/s around evidence-based research findings and standardise the legislation across the nation. Built-in human-machine interface (HMI) systems (requiring any type of driver interaction) may also have the potential to produce driver distraction. We suggest there be a system developed to evaluate/test the design of HMI systems to ensure their potential to produce driver distraction is as minimal as possible. Such tests/evaluations may be endorsed by certain bodies (e.g., ANCAP) which could encourage vehicle manufacturers, original equipment manufacturers (OEMs) and app developers to design these systems in a manner which reduces their potential to produce driver distraction.
    c. Our understanding is the ARRs do not explicity ban the reading of a text message, email or notification develiverd via any device (built-in, portable or wearable) while driving, and do not directly mention wearable technology (i.e., wrist, ear and eye wear). However, ARR 297(1) (mentioned above) could be interpreted as covering all types of potential distractors or secondary tasks.
    d. We suggest proposals for new legislation should be thoroughly tested (e.g., using methods such as mock trials) for how they would stand up in court and to allow issues that may arise to be addressed before the legislation is passed/enacted/gazetted.

*Comments related to relevant road safety technologies*

1. As well as automated vehicles, it is suggested this project consider addressng the introduction of connected vehicle and combined connected and automated vehicle (CAV) technology.


2. Given the complexity and limitations:
    i. Of accurately measuring visual and cognitive load/distraction in real-time (i.e., tracking eye gaze, eye-lid and head movements), and
    ii. With technology being able to block or limit messages sent to devices or limit the ability to engage with particular aspects of devices while driving,

we suggest more research is required into the road safety benefits of innovative technology systems (including investigating the accuracy, and user trust and acceptance of these systems) designed to:

   a. Provide advanced assistance to drivers, such as drawing driver's attention to potentially dangerous behaviour or situations, or taking control of driving functions on behalf of the driver (e.g., automated emergency braking, lane keeping assist, adaptive cruise control, headway alerts, connected vehicle technology, etc.).
   b. Provide feedback to drivers of behaviour related to visual and/or cognitive distraction (such as when a drivers eyes are detected as being off the forward roadway for an extended period of time). Given the difficultites with accurately measuring these states and behaviours, it is possible the research may suggest any driver feedback technology would need to be considered as providing driver warnings, rather than being enforceable.
   c. Block or limit messages (including notificaitons and phone calls) sent to mobile phones or in-vehicle technology from an external source (taking a safe system approach rather than relying on the individual to activate a self-regulatory system (either immediately or on an ongoing basis)).
   d. Limit a driver's ability to utilise certain functions of a device, while allowing the device to be used to make calls to emergency services, used by a passeger, or used as a driver's aid.
   e. Provide evidence (such as via roadside camera detection) of whether a driver is handling and using a mobile phone for purposes currently deemed illegal.

It is suggested this research commence with a literature review of existing evidence addressing these issues, and perhaps interviews with stakeholders currently trialing these technologies.


3. With respect to the use of technology by some commercial drivers, as discussed in section 2.1.4.2 of the NTC Issues Paper, we suggest any decisions regarding this are based on rigorous human factors studies investigating the entire driving environment (including all HMIs in the vehicle cabin) for each of these classes of driver.


4. With respect to the NTC considering extending bans on mobile phones to include hands-free kits (as mentioned in Section 2.2.3.2 Technology-specific appraoches in the NTC Issues Paper), we recommend a literature review be undertaken into the effect of additional technology (i.e., ear pieces, ear phones and headphones) on crash risk and driving performance, and consideration be given to whether more reseach in this area is warrented to allow informed consideration to be given to this issue as part of the NTC's legislative review.


5. Question 8: *Can you provide examples of effective strategies for ensuring that new in-vehicle technology and mobile apps minimise driver distraction?* Further to the information and suggestions presented above, drawing upon existing HMI guidelines and further research in this area may assist with this. It is recommended a set of HMI guidelines be developed and/or released for use in the Australian context, based on a combination of evidence-based research and the existing guidelines. As mentioned above, it is suggested an evidence-based rating system be developed to inform the design of in-vehicle technologies in a manner which reduces their potential to produce driver distraction while also providing advice to legislating bodies and consumers about the safety of these existing and emerging technologies. It is also suggested either strong incentives or regulatory measures be put in place for vehicle manufacturers, OEMs and app developers to comply with these guidelines (e.g., incorporating meeting such HMI design recommendations into ANCAP safety rating systems).

Yours sincerely

*[Submitted via email]*

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