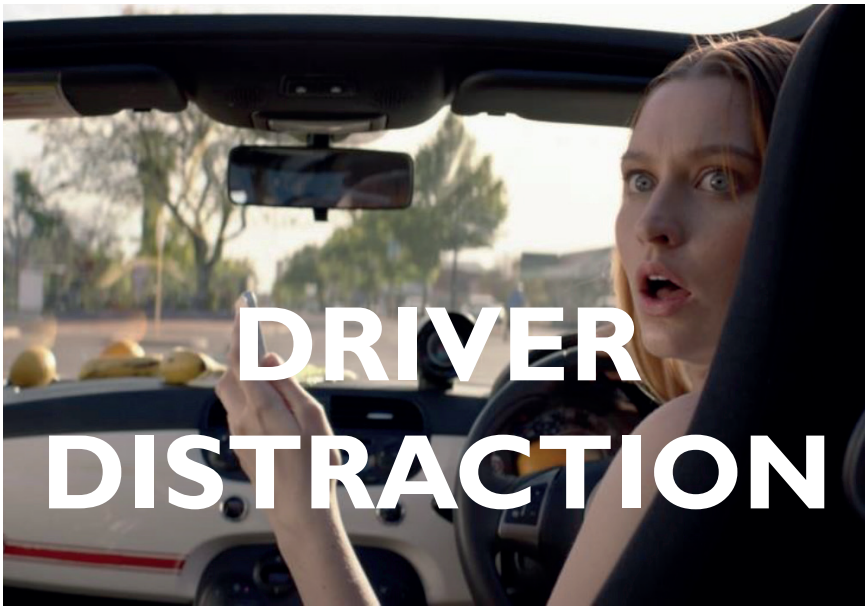
GOVERNMENT OF WESTERN AUSTRALIA

INFORMATION



DRIVER DISTRACTION

CONTENTS

In 2008, the State Government released its 12-year road safety strategy, Towards Zero, in which ambitious targets for reductions in people killed and seriously injured (KSI) on our roads, 40% or 11,000 people, were outlined. Targets for a 40% reduction were calculated on a baseline figure, using crash data across the years 2005-2007.

It is difficult to measure distraction-related crashes, but it was estimated in Towards Zero as affecting 32% of all crashes. It is believed that the risks associated with distraction are high.

Distraction-related crashes remain a major concern for the Government and other road safety authorities across Australia.

ROAD SAFETY COMMISSION

DEFINITION

There are four broad categories of distraction from the driving task:

- visual distraction: tasks that require the driver to look away from the roadway to visually obtain information;
- manual distraction: tasks that require the driver to take a hand (or both hands) off the steering wheel and manipulate a device;
- auditory distraction: occurs when the driver focuses their attention on auditory signals rather than on the road environment;
- cognitive distraction: tasks that are defined as the mental workload associated with a task that involves thinking about something other than the driving task (National Highway Traffic Safety Administration, 2010).

There is also evidence that mixed distraction affects pedestrians and other vulnerable road users crossing roads (Hobday, 2017; Mwakalonge, 2015).

WHAT IS THE PROBLEM?

The National Transport Commission provides the following definition for distracted driving: '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.' (National Transport Commission, 2018).

Viewed holistically, distracted driving is any activity that diverts attention from driving, including talking or texting on the phone, eating and drinking, talking to people in the vehicle, fiddling with the stereo, entertainment or navigation system, looking at something on the side of the road—anything that takes the driver's attention away from the task of safe driving.

However, it is important to note that distraction affects all road users in a broader sense. Road users other than drivers may be distracted. There is some evidence that distracted pedestrians are at risk when crossing roads (Hobday, 2017). Cyclists and motorcycle riders are also vulnerable.

In 2017, it's estimated that 77% of people killed or seriously injured were in crashes which involved a person making an error, a lapse in concentration, distraction, fatigue, judgement error or inattention. Only about 23% of people were killed or seriously injured in crashes that involved the primary risk taking behaviours of speeding, drink driving or not wearing a helmet or restraint.

Since 2005-2007, the number of people killed or seriously injured in crashes that involve primary risk taking have reduced by 48%, but only by 23% in crashes that involved mistakes, errors, distraction or poor judgement etc.

This reflects a tremendous improvement in community attitudes and behaviour to taking known risks. However, inadvertent errors, including distraction, are more difficult behaviours to change as they are often unintentional, and continue to be a significant issue in road trauma.

In 2017, 28 people lost their lives in crashes where the WA Police Force believed inattention was a factor. This was a 112% increase compared to the preceding five-year average, driven largely by inattention-related fatalities in the metropolitan area, which more than doubled in 2017 compared to the preceding five-year average.

WHAT IS THE SUPPORTING RESEARCH AND EVIDENCE?

Monash University Accident Research Centre and the Traffic and Road Safety Research Group at University of New South Wales are currently working on a long-running Australian Naturalistic Driver Study (ANDS) using data collected from vehicles in New South Wales and Victoria.

ANDS data revealed that driver engagement in secondary tasks is frequent. On average, drivers engage in a secondary task every 1.6 minutes. Almost one quarter (23.9%) of the secondary task events involved the driver engaging in multiple tasks at once. When multiple tasks were undertaken, this typically included drivers interacting with passengers while also performing other tasks.

Only 5% of the secondary tasks' events were associated with a driving incident. Many of these incidents involved a delay in drivers detecting that the traffic lights had turned green or that vehicles in front had moved away. However, several incidents were more serious, with drivers veering out of their lane or failing to detect the vehicle ahead braking suddenly.

Only 4.2% of driving time was used to hold, manipulate or talk on a mobile phone while holding the phone. The ANDS study highlights the extent to which distracted driving is a quotidien part of everyday life in Australia.

Non-Technological Distractions

Drivers often engage in a number of activities that, while legal, can potentially distract them from the driving task and therefore limit their ability to maintain proper control of the vehicle. These activities include eating, drinking, smoking and interacting with passengers.

For example, studies have revealed that a proportion of drivers involved in traffic accidents are distracted by eating or drinking and have found that an activity such as eating a cheeseburger while smoking and driving can increase the risk of being involved in a crash (Regan, 2003). Several studies have revealed that the presence of passengers can increase crash risk for young drivers due to distraction, to the point where they were less likely to detect traffic light changes or road signs (Regan, 2003). A recent meta-analysis found that talking to passengers had a similar effect to talking on a mobile phone (Caird, 2018).

A 2006 National Highway Traffic Safety Authority report on distraction found risk of collision increased by 9 times when reaching for a moving object inside the vehicle and around 4 times when looking at an external object (Research and Education Program of Kingston FaLAPH, 2007).

Advertising is an external factor that can distract drivers from the driving task. Evidence suggests that roadside advertising can adversely influence driver attention, with some evidence that electronic billboards attracted longer glances from drivers than regular traffic signs (Dukic, 2013). Western Australian research in 2018 found that digital billboards significantly adversely affected driving performance in the areas of mean speed, speed variability, high risk headway, variability in lane positioning and visual fixations (Meueleners, 2018).

Although studies have not conclusively determined whether electronic billboards constitute a traffic safety hazard, several Australian jurisdictions have developed guidelines and manuals to determine the advertising device types that may be permitted on roads based on technical criteria (Mainroads, 2018).

Technology-Based Distractions

New forms of mobile and in-vehicle technology are constantly developing, and the laws and guidelines addressing these potential distractions lag behind. The National Transport Commission is currently undertaking a major review of all mobile and in-vehicle technologies that may distract drivers (NTC, 2018).

Global Positioning Devices

There are no reliable sources of statistics for crashes caused by GPS-related distracted driving, but some experimental studies have found that GPS-assisted driving degrades driving performance, particularly with the use of visual navigation aids. These studies found this situation comparable to driver distraction while driving with a mobile phone (Brown and Laurier, 2012).

Wearable Technology

Studies on the impacts of wearable technology are still limited. However, a study on the safety of wearing a smartwatch while driving found that drivers glanced more frequently towards their smartwatch compared with their smartphone (Giang et al., 2015). The same study also found that drivers' brake response times were longer when receiving a notification prior to a lead vehicle braking event on the smartwatch compared with the smartphone.

Heavy Vehicle In-Vehicle Systems

The technology heavy vehicle drivers interact with on a regular basis includes navigation devices, fuel-economy coaching appliances, fleet management and workflow devices, in-cab fleet tracking and communication systems and, more recently, electronic logging devices.

The National Heavy Vehicle Regulator issued a call for improved road safety following an increase in the number of fatalities and incidents involving trucks. The National Heavy Vehicle Regulator urged the heavy vehicle industry to develop strategies that emphasise reducing distractions on the road (Safety Institute of Australia, 2018). The presence of emerging mobile technology in heavy vehicles has become more prevalent in recent years.

Automated and Autonomous Vehicles

Automated systems can compensate for some forms of driver distraction, such as lane departure warnings. On the other hand, some in-vehicle technology may in itself lead to distraction. For example, a survey of 57,000 drivers of vehicles fitted with blind spot monitoring found that the majority of drivers were satisfied with the technology, but a minority complained that the system was distracting and annoying (Palamara, 2018).

Currently no fully autonomous vehicles, classified as level 5 on the scale of autonomous vehicles, exist. Vehicles that include partial automation but which assume the driver remains alert may increase distractions as the driver is less involved in the driving process and has more opportunity to instead undertake other distracting activities.

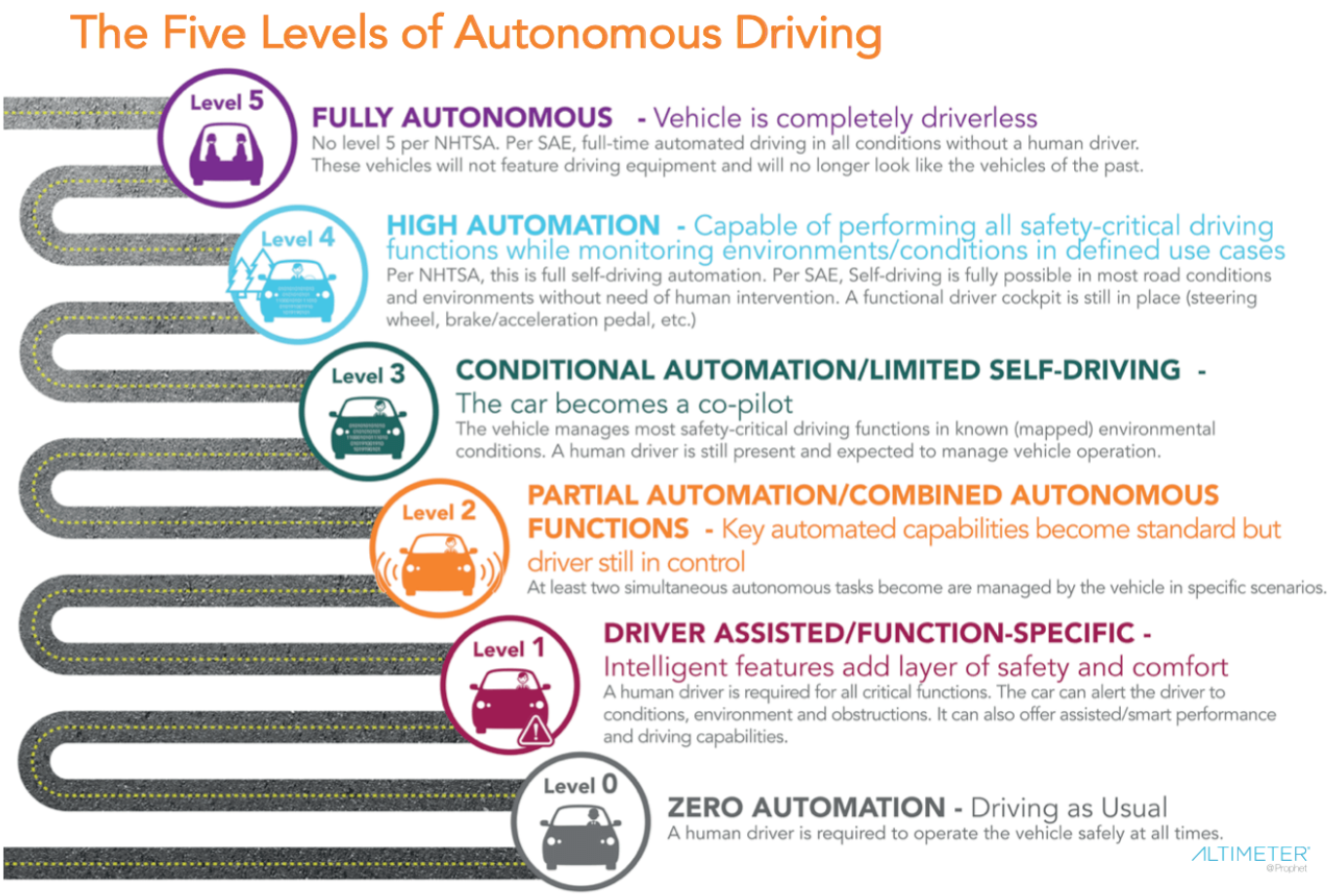


Image One: Levels of Autonomous Driving

Partially automated vehicles – those at Level 2 of automation – are designed to optimise driver comfort and safety, but require a human driver to remain on standby when the vehicle is in autonomous mode. That means paying close attention to the driving environment, and taking back control of the vehicle if required.

Bored drivers tend to engage spontaneously in distracting activities that stimulate them, such as using a phone, reading a magazine or watching a movie. This may be especially true if the driver feels a high level of trust in the automation (Cunningham, 2015).

Simulator tests of partially automated driving where the driver's only task is to monitor the system show significant effects on eye tracking parameters (blink frequency, blink duration, pupil diameter) and increased mind wandering (Korber, 2015). Real world studies which monitored partially automated vehicles showed that drivers were likely to divert attention to particularly risky activities, such as reading or using mobile phones (Cunningham, 2015).

There may be a need for partially automated systems to be fully described to drivers, so that they are educated on their limitations. Some providers are also experimenting with requiring drivers to demonstrate their engagement intermittently, by, for instance, touching the steering wheel.

Mobile Phones

The growth in level of ownership and use of mobile phones has created a pervasive cause of driver distraction. A 2018 meta-analysis found that the effects of using a mobile phone are comparable effect to talking to passengers (Caird, 2018).

Drivers who look at their mobile phones while driving are three times more likely to be involved in a crash than non-users (Dingus et al., 2016). Dialling, or even locating and answering a hand-held phone, increases the chances of having a crash by four times (Simmons, Hicks and Caird, 2016). Texting, browsing and emailing on a mobile phone while driving increases crash risk significantly (Caird, 2014).

Mobile phone behaviour and attitudes were surveyed by the Road Safety Commission in 2018 and it was found that:

- 48% never use a mobile phone handset while driving.
- 22% had typed a text while driving in the past year.
- 20% had made a call holding a handset while driving in the past year.
- 25% had taken a call on handset while driving in past year.
- 49% believe there's a high chance of getting caught using a mobile phone while driving.

A recent survey by the Australian Government found that 64% of respondents report using their mobile phone while driving, including 40% who make calls while driving and 21% who use their mobile phone for other activities such as browsing the internet and taking photos (Department of Infrastructure, Regional Development and Cities, 2018). The same survey also shows a significant increase in the proportion of participants considering 'driving distraction/driving while on a mobile' as the main factor leading to road crashes, growing from 8% in 2013 to 18% in 2017.

Mobile phones are also a distraction for pedestrians and are associated with increased risk of pedestrian injury (Hobday, 2017). A Brisbane survey of pedestrians found that smart phone use while walking and crossing the road was high, especially among 18-30 year olds (Williamson, 2015).

WHAT ARE THE COUNTERMEASURES?

Given the complexity of distraction as a road safety issue, counter-measures to address distraction must work within all the cornerstones of the Safe System.

Safe Road Use

Australian legislation relating to distracted driving dates back to 1999, but has not kept pace with the evolution of smartphones and modern in-vehicle technologies. The National Transport Commission is currently undertaking a review of the Australian Road Rules relating to road user distraction to clarify the law.

Currently there are Western Australian road rules specifically about the use of mobile phones and more generally prohibiting driving without proper control of the vehicle or careless driving.

Enforcing the road rules for driver distraction can be difficult in situations in which there is limited visibility of what is occurring inside vehicles. In addition, there is no feasible way to ensure that a driver's attention remains sufficiently focused on the driving task. Police often use strategies such as motorcycle units and cameras to detect the use of handheld phones by drivers.

The Road Safety Commission runs regular mass education campaigns about the dangers of distracted driving, with the most recent being Priorities – Distractions which ran from November 2016 to July 2017.

Image Two, Road Safety Commission, Distractions, 2016

There are steps that individual drivers can take to minimise distraction, such as using apps that block mobile phone use while driving.

Safe Vehicles

This is a complicated area, with some forms of technology reducing driver distraction and other forms potentially increasing it.

On one hand, some new in-vehicle technologies can compensate for distracted driving. For instance, features such as lane departure warning can counter-act a tendency to drift out of the lane while distracted (Palamara, 2016).

There are also specialised systems, currently mostly used in the transport industry, which monitor the driver's gaze. Distracted drivers, who are not looking ahead, are warned by the systems. This technology is being introduced into the wider passenger vehicle market.

Research is currently being undertaken into devices to warn drivers of crossing pedestrians and vice versa. This research shows some preliminary positive results, but is based on vehicles and pedestrians consistently using linked warning devices (Coegugnet, 2017).

Safe Speeds

The most straightforward way to reduce deaths and injuries associated with distracted driving is to ensure impact speeds are within the limits of human tolerance. Survivable speeds crashes involving unprotected road users such as cyclists and pedestrians are particularly important – the survivable speed for these crashes is 30km/h. The National Road Safety Action Plan for 2018-2020 highlights the need to reduce speed limits in areas with high pedestrian and cyclist traffic, an undertaking which would improve distraction-related crashes involving vulnerable road users (Australian Transport Council, 2018).

Appropriate speeds can be encouraged through vehicle features such as Intelligent Speed Adaptation (ISA) that assists drivers to abide by the speed limit. GPS technology linked to a speed zone database allows the vehicle to "know" its location and the speed limit on that road. The ISA system provides visual and auditory feedback to the driver if the vehicle exceeds the speed limit.

Improvements to roads can also make a significant difference. Main Roads Western Australia is currently beginning a program of variable speed limits at the approach to selected intersections.

Safe Roads and Roadsides

It is difficult to build roads to specifically address distracted-driving. Nonetheless, measures can be taken to provide some protection or early warning for drivers drifting off the road (Candappa, 2013). The Regional Run-off Road Program has attempted to improve roads in order to add protection to drivers. Improvements include:

- Installation of audible edge lines (that produce a bumping sensation and noise if the car drifts to the edge of the road)
- Widening of road shoulders on the regional network
- Flexible wire rope safety barriers.

Flexible Wire Barrier

Road Shoulder Widening

Tactile Audible Road Markings

There are also measures that may assist distracted pedestrians while crossing the road. New South Wales and Victoria are currently conducting trials of in-ground traffic lights so that pedestrians looking downwards (at mobile phones) still see the lights.

Image Four, Melbourne In-Ground Traffic Light

The Commission is maintaining a watching brief on the interstate pedestrian trials.

Additionally, there are efforts to regulate roadside distractions. To this end, Main Roads has guidelines intended to manage and control roadside advertising 'so as to ensure that such advertising does not pose a safety hazard to road users' (Main Roads, 2018).

Summary

Effective counter-measures can be undertaken in the following areas:

- Safe Speed – Reductions in speed improve road safety outcomes in all areas, including crashes related to distracted driving.
- Safe Vehicles – In-vehicle technology has the capacity to compensate for driver distraction. However, some technologies may be a distraction in themselves and partial automation can lead to drivers losing focus on driving. These issues require careful management.
- Safe Roads and Roadsides – Some improvements to road crossings and roadside distractions can be made. Additionally, improvements to roads and roadsides can partially ameliorate the results of distraction-related crashes.
- Safe Road User Behaviour – Education efforts are ongoing and legislation addressing distracted driving is currently being reviewed at a national level.

FUTURE FOCUS

Distraction is a difficult area to address, as it is often an involuntary behaviour and can be triggered by a wide range of behavioural and environmental factors. It is tempting to take a simple approach, by focusing on a single behaviour such as prohibiting mobile phone use. However, any effective approach needs to be more comprehensive (Young, 2013).

National research is being led by the Department of Transport and Main Roads (Queensland). This focuses on the driving ecosystem and the layers of responses by stakeholders. National law reform relating to the Australian Road Rules and distraction is being ed by the National Transport Commission. And, finally, the Commission continues to engage research into driver distraction through the ongoing research program.

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