Road Safety Committee

Inquiry into Driver Distraction

August 2006

Inquiry into Driver Distraction

Report of the Road Safety Committee on the Inquiry into Driver Distraction

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Functions of Road Safety Committee

The Victorian Road Safety Committee is constituted under the *Parliamentary Committees Act* 2003, as amended.

The Committee comprises seven Members of Parliament drawn from both houses and all parties. The Chair is elected by Members of the Committee.

Section 15 of the *Parliamentary Committees Act* 2003, describes the functions of the Committee as:

> The functions of the Road Safety Committee are, if so required or permitted under this Act, to inquire into, consider and report to the Parliament on any proposal, matter or thing concerned with –
>
> (a) road trauma;
>
> (b) safety on roads and related matters.

Terms of Reference

The Governor in Council, under section 33 of the *Parliamentary Committees Act 2003,* referred an Inquiry into Driver Distraction to the Road Safety Committee.

The Committee is required to inquire, consider and make recommendations on the role of driver distraction in causing crashes and, in particular to report to Parliament on:

1. the prevalence of mobile telephone use by drivers and its impact on crash causes;

2. the prevalence of in-car video devices, their effect on drivers and impact on crash causes;

3. the types of other devices and activities, both inside and outside the vehicle, that may distract a driver's attention from the driving task and lead to unsafe driving;

4. the suitability and enforceability of existing laws concerning the use of mobile telephones and other electronic devices by drivers; and

5. the possible need for change to legislation or statutory requirements to implement any recommendations made as a result of the inquiry.

In conducting its inquiry, the Committee is requested to seek information from the manufacturers and distributors of mobile telephones and other electronic devices with in-car applications, research organisations, Government and non-government agencies, motoring organisations and the community.

In particular, the measures adopted to address the issue of driver distraction in other jurisdictions and countries should be examined.

The Committee is required to report to Parliament by 30 June 2006*.

Dated 9 August 2005

Responsible Minister

Steve Bracks, MP

Premier

* extended to 30 August 2006

Chair's Foreword

The Road Safety Committee is pleased to present this Report into driver distraction, an under-recognised road safety issue not only in Victoria, but throughout Australia.

One of the problems faced by the Committee during the Inquiry was the lack of a clear definition and information systems which measure distraction and its role in crashes. The Committee calls on Victorian road safety authorities to develop clear definitions, categories and suitable crash data reporting in order to understand the extent of the problem and to develop appropriate countermeasures.

While there has been much media focus on driving while using a mobile phone, and concern in the road safety community about new technology in vehicles, evidence illustrates the problems are much wider. A variety of everyday activities and events, both in-car and external, are likely to be the major contributors to distraction-related crashes. To this end, the Committee believes there is a need for greatly improving public awareness about the risks of these activities undertaken while driving.

Victoria, with its significant manufacturing industry and research capabilities, has the opportunity to take a leading role in government-industry discussions to ensure safe application of emerging technology in vehicles.

In investigating a subject as broad as driver distraction, the Committee has been mindful of its limitations with respect to its Terms of Reference and scope of evidence received. The Committee is of the belief that after many of the issues identified by the Report are addressed and recommendations implemented, the topic should be revisited. In particular, distractions specifically affecting truck, bus, taxi, courier and other special driver groups should be examined in depth, along with distractions affecting pedestrian and cyclist safety.

On behalf of the Committee, I would like to thank the many organisations and individuals who contributed to the Inquiry in the form of written submissions, evidence provided at public hearings and numerous briefings.

Thanks to my fellow Committee members for their active participation and their commitment to addressing road safety issues in a bipartisan manner. I also thank Committee staff for their hard work; namely Executive Officers Alexandra Douglas (to January 2006), Richard Willis (since February 2006), research staff, Graeme Both and Marilyn Johnson, and office managers, Heidi Millton-Young, followed by Vanessa Hamilton.

Ian Trezise, MP

Chair, Road Safety Committee

Executive Summary

Evidence highlights there are a wide variety of everyday activities that may contribute to driver distraction-related crashes. The continuing introduction of new electronic devices into vehicles provides additional sources of potential driver distraction.

Measuring Distraction and its Role in Crashes

There is a need for Victorian road safety authorities to develop and adopt a clear concise definition and categorisation of driver distraction. Recent overseas studies into driver distraction have developed various definitions and categories. The Committee notes the useful definition developed out of a 2005 Toronto conference on driver distraction.

In view of a lack of suitable definitions, categorisations and suitable data, Victoria and most other Australian jurisdictions are not well placed to accurately assess the role of driver distraction on crashes. Recent studies in the United States, together with an ongoing study by the New Zealand Ministry of Transport, provide some insights into driver distraction impacts. Development of comprehensive crash data is a vital first step in guiding future Victorian road safety initiatives relating to driver distraction.

Mobile Telephones

An increasingly large proportion of the Victorian population own mobile phones and carry them in their vehicles, but the extent to which they use them while driving is relatively unknown.

There is a need to determine the prevalence of both hand-held and hands-free mobile phone use by drivers in Victoria and to examine the effects of various aspects of mobile phone use on driving performance. Road safety authorities need to improve crash data systems on mobile phone use, including type of device and the context in which it was being used when the crash occurred.

Ways of improving mobile phone technology in vehicles should be explored before giving any consideration to banning all use of phones in vehicles. The State Government need to work with the vehicle industry to encourage development of safer in-car mobile phone technology including integrated speech-controlled phone communication systems.

The public needs to be more aware of the dangers of driving while using a mobile phone. Publicity campaigns should warn of the associated risks, with a particular emphasis on text messaging and the need to limit hands-free use.

Video, Audio and other Electronic Devices

Consumer demand and willingness to acquire the latest technology has seen a growth in video, audio and other electronic devices used in vehicles. Many of these devices present a potentially greater in-car distraction than the use of mobile phones, however the prevalence of their actual use in vehicles is unclear.

Route navigation systems can reduce a driver's mental workload, however they can be distracting if destination entry occurs while moving, there is no voice guidance and the screen display is complex.

As portable computing becomes more widespread the concept of an AutoPC has emerged. Use of speech-based email systems can affect performance in simulated driving tasks but to date there is no data that links email use with crashes or crash risk. Road safety authorities need to closely monitor their application and possible impact on driver performance.

Research in driving simulators illustrates how manipulating audio systems adversely affects driving performance, while there is some evidence to indicate such actions are associated with crashes to an equal or greater extent than mobile phones.

Other Distractions

Distractions such as interacting with passengers, dining, smoking, grooming or looking at objects or events outside the vehicle can affect driving performance and result in crashes.

Evidence reveals that passengers are the greatest source of potential driver distraction; greater than use of mobile phones or other electronic devices. The Committee is particularly concerned over the impact passenger distractions may have on novice drivers and believes the matter should come under consideration as part of the Government's Graduated Licensing Scheme.

There has been limited publicity in Australia on the dangers of non-electronic distractions and the Committee conclude that here is a need for a publicity campaign to increase awareness of everyday distraction while driving.

Road Signs and Advertising

Many poorly considered road signs can create visual clutter, resulting in one form of driver distraction. There is a need for the relevant authorities to develop appropriate guidelines to regulate the location, size and content of all road authority and other signs within road reserves to minimise potential driver distraction.

Driver distraction can also be caused by advertising signs. Advertising within or near road reserves can come in many forms. Various forms of advertising are also placed on vehicles, including public buses, trams and taxis. Video-type

signs, also referred to as electronic billboards, provide moving graphical material, sometimes combining news headlines and news/film clips with an accompanying advertisement.

A more consistent and stringent approach to the installation, use and content of scrolling, moving and video-style advertising within and adjacent to road reserves is required.

Laws and Enforcement

Laws on the use of hand-held mobile phones in vehicles are difficult to enforce and their effect in reducing crashes is unknown. Any consideration of the use of mobile phones while driving, in particular the argument over banning hand-free use, should take into account the potential safety and economic benefits of hands-free mobile phone use while driving.

The road rule relating to TV and video screens is also difficult to enforce, with the distraction of other drivers being particularly subjective. There is scope for separate penalties for installations which distract the driver from within the vehicle and those which distract other drivers.

The Committee considers that there would be value in investigating the introduction of a specific traffic infringement notice offence for driving while undertaking activities which could distract from safe driving.

In view of the large number of potential distractions facing drivers, including a significant source of distraction from passengers, the issue of novice driver passenger restrictions needs to be reviewed in the future.

Vehicles of the Future

The activities and information provided by some technological devices can potentially divert the driver's attention and vision away from the main driving task and therefore become a distraction. A Driver Workload Manager can monitor the amount and nature of information being sent to the driver and prevent or defer some messages if unnecessary for the driving conditions.

The increasing number and complexity of driver warning devices has the potential to distract drivers from more important driving tasks.

There is a need for Victoria to monitor research and development occurring on the interface or boundary between humans and vehicles, such as speech recognition. New technologies need to minimise potential driver distraction through good system integration, driver-machine interfaces and the positioning of vehicle displays and controls.

In recent years Europe, the United States and Japan have all issued guidelines for telematic and vehicle warning devices. Transport Canada is attempting to negotiate a Memorandum of Understanding with automobile manufacturers on the key issues, basic design principles and design processes in relation to

technology and driver distraction. At present there are no Australian guidelines, therefore the Committee recommend the Minister of Transport raise the issue at the Australian Transport Council.

The Way Forward

The Committee sees a need for the profile of driver distraction as a road safety issue to be increased in Victoria. This includes an increased profile in VicRoads strategies, driver training and school road safety programs, and publicity.

The Committee propose that VicRoads develop a comprehensive and prioritised approach to address the driver distraction issue, incorporating research and other policy initiatives

The Committee support an occupational health and safety approach to driver distraction for employees and employers who drive as part of their work. In addition, the State Government should encourage the voluntary minimisation of hand-free phone use while driving in government and private sector vehicle fleet policies. Advice on the safer use of route navigation systems and video, audio and electronic devices should be provided, as well as how to avoid or minimise other (non-electronic) distractions while driving.

In a number of recent inquiries the Committee has identified areas where existing Victorian crash information systems need to be improved and this was again the case (in this Inquiry). Victoria is well behind the USA in the use of Event Data Recorders (‘black-boxes’) to provide additional data on the circumstances of road crashes. The use of camera-based Video Incident Recording Devices should also be investigated to see how this new technology can provide fresh insights into driver behaviour, including driver distraction, and how crashes and near misses occur.

Recommendations

Chapter 2: Measuring Distraction and its Role in Crashes

1. That VicRoads adopt a clearer concise definition of driver distraction, consistent with the definition arising out of the 2005 Toronto conference on driver distraction, and establish a range of categories of distraction sources. Any definition and categorisation should distinguish distraction from other driver behaviours such as fatigue and inattention.

2. That VicRoads and Victoria Police develop methods to enable the future assessment of the role of distraction in crashes on Victorian roads including a review of existing traffic crash reporting systems. Consultation should take place with other Australasian jurisdictions and the Australian Transport Safety Bureau on appropriate methods and classification of distraction.

Chapter 3: Mobile Telephones

3. That VicRoads undertake a comprehensive roadside observational study to determine the prevalence of both hand-held and hands-free mobile phone use by drivers in Victoria that will provide a benchmark for future studies and a basis for measuring the effect of any countermeasures.

4. That VicRoads continue to monitor research on the effects of various aspects of mobile phone use on driving performance, with a particular emphasis on:

    - the context, duration and content of conversations;
    - experimental validity and repeatability;
    - age-related differences;
    - phone design and new technology; and
    - experience with using a mobile phone while driving.

5. That VicRoads and Victoria Police improve crash data systems on mobile phone use, including type of device and the context in which it was being used when the crash occurred.

6. That the State Government work with the vehicle industry to encourage development of safer in-car mobile phone technology including integrated speech-controlled phone communication systems.

7. That relevant State Government agencies implement targeted publicity campaigns warning drivers of the dangers of mobile phone distraction, including:

    - the use of hands-free phones in hazardous traffic conditions;
    - the dangers of text and video messaging; and
    - the greater risks associated with complex phone conversations.

In developing publicity campaigns, the Government should examine the recent '*Switch off before you drive off*' campaign undertaken in the United Kingdom.

Chapter 4: Video, Audio and other Electronic Devices

8. That VicRoads review the results of the NSW Roads and Traffic Authority study of the distraction from in-vehicle videos and possible subsequent Australian Transport Safety Bureau investigations for their implications in addressing driver distraction in Victoria.

9. That VicRoads undertake a survey on the current use of video, audio and other electronic devices by drivers in Victoria to establish a benchmark for future usage surveys and a basis for measuring the effect of any countermeasures.

10. That VicRoads and Victoria Police improve crash data systems on video, audio and other electronic device use, including the type of device and the context in which it was being used when the crash occurred.

Chapter 5: Other Distractions

11. That VicRoads and the Transport Accident Commission undertake a publicity campaign warning of the dangers of drivers being distracted by 'everyday' activities and the need to remain alert to the driving task.

Chapter 6: Road Signs and Advertising

12. That VicRoads, in consultation with local councils, develop a set of guidelines to regulate the location, size and content of all road authority and other signs within road reserves. Such guidelines will be designed to minimise potential driver distraction and will apply to individual signs as well as the total signscape along a road.

    That following the implementation of the above guidelines, VicRoads and local councils aim to remove superfluous and obsolete signs.

13. That VicRoads, the Department of Sustainability and Environment and municipalities develop a more consistent and stringent approach to the installation, use and content of scrolling, moving and video-style advertising within and adjacent to road reserves. Any installations should be monitored for their effect on road safety.

14. That VicRoads, the Department of Sustainability and Environment and municipalities develop more prescriptive regulations and guidelines controlling advertising in or near road reserves, including the need to control the content of advertisements.

Chapter 7: Laws and Enforcement

15. That any future consideration of the laws dealing with mobile phone use while driving, take into consideration the potential safety and economic benefits to be gained from using hands-free mobile phones.

16. That VicRoads monitor, evaluate and publish the results of the impact on road crashes and driver performance of a ban on all mobile phone use while driving by learner permit and first year probationary licence drivers under Victoria's revised Graduated Licensing System.

17. That in relation to the road rule on the use of television and video-screen devices in vehicles, Victoria Police and VicRoads implement separate penalties for installations which could distract the driver and those which may distract drivers of other vehicles.

18. That VicRoads develop, in conjunction with the automotive manufacturer and aftermarket motor accessory industry, a verification process for the installation of video and TV screens in motor vehicles so that vehicle owners and potential purchasers can be assured that the installation satisfies Australian Design Rules.

19. That VicRoads review the intent of Australian Road Rule 299 (television receivers/visual display units) and Australian Road Rule 300 (use of hand-held mobile phones) in view of emerging technologies and consider the appropriateness of having two separate rules.

20. That following the development of a clear definition and categorisations of driver distraction (see Recommendation 1), Victoria Police and VicRoads introduce an appropriate road rule to prohibit driving while undertaking activities which could distract from safe driving.

21. That following the implementation and evaluation of the recently announced changes to the Graduated Licensing Scheme, the Government reconsider the issue of restricting the carriage of multiple passengers by novice drivers.

Chapter 8: Vehicles of the Future

22. That VicRoads liaise with the Australian Transport Council with a view to further research and development into the potential benefits to be gained from various emerging driver assistance technologies including:

    - Electronic Stability Control
    - Driver Workload Managers
    - Speech recognition devices.

23. That VicRoads liaise with the Australian Transport Council with a view to further research and development to ensure that driver assistance technologies minimise potential driver distraction through appropriate system integration, driver-machine interfaces and the positioning of vehicle displays and controls.

24. That the Minister for Transport raise at the Australian Transport Council the need to undertake public and industry consultation leading to a Memorandum of Understanding between governments and industry to reduce driver distraction from in-vehicle electronic devices.

Chapter 9: The Way Forward

25. That the Government increase the profile of driver distraction as a road safety issue. This should include:

    - addressing the issue in the forthcoming Victorian road safety strategy;
    - school road safety programs; and
    - development of suitable publicity for use by the rental car industry.

26. That VicRoads develop a comprehensive and prioritised program of research and policy initiatives on driver distraction to improve road safety in Victoria.

27. That VicRoads and the driver training industry incorporate driver distraction material in driver training and licensing processes and publications.

28. That VicRoads and Worksafe encourage an occupational health and safety approach to driver distraction for people who drive as part of their work.

29. That the State Government implement vehicle safety policies to encourage government and vehicle fleet drivers, while driving, to:

    - minimise hands-free mobile phone use;
    - more safely use other electronic devices, such as navigation systems, and
    - avoid or minimise non-electronic distractions.

30. That VicRoads and Victoria Police investigate how information from Event Data Recorders in modern motor vehicles can be used to provide new insights into the role of driver distraction in crashes and other information to improve road safety in Victoria. This should include data access, privacy and resourcing issues.

31. That VicRoads investigate how video camera event recordings of driver behaviour and traffic conditions when collisions or near-misses occur can be used to provide new insights into driver distraction and other aspects of road safety.

List of Acronyms

AAA	American Automobile Association
AAAA	Australian Automobile Aftermarket Association
ADR	Australian Design Rule
AMTA	Australian Mobile Telecommunications Association
ARR	Australian Road Rule
ARRB	Australian Road Research Board
ATSB	Australian Transport Safety Bureau
CD	Compact Disc
CRC	Cooperative Research Centre
DAS	Driver Assistance Systems
DVD	Digital Video Disc
EDR	Event Data Recorder
ESC	Electronic Stability Control
GM	General Motors (United States)
GPS	Global Positioning System
HMI	Human Machine Interface
ITS	Intelligent Transport System
MRA	Motorcycle Riders' Association
MUARC	Accident Research Centre, Monash University
NHTSA	National Highway Traffic Safety Administration (United States)
PDA	Personal Digital Assistant
RACS	Royal Australasian College of Surgeons
RACV	Royal Automobile Club of Victoria Limited
RTA	Roads and Traffic Authority, New South Wales

SMS	Short Message Service
TAC	Transport Accident Commission
VDU	Video Display Unit
VMS	Variable Message Sign
VTTI	Virginia Tech Transportation Institute

Chapter

1

Introduction

This chapter provides an introduction to the Road Safety Committee's report, background to the Inquiry into Driver Distraction, and an overview on the conduct of the Inquiry.

Context

History of Distraction as a Road Safety Issue

Driver distraction has been a road safety issue since the early days of motor vehicles. Distractions resulting from drivers eating and drinking, smoking, grooming or interacting with passengers have always existed. Over the years, concerns have been raised about the effects on drivers of various vehicle features, including the introduction of windscreen wipers a century ago and radios in the 1930s.[1] In the 1970s and 1980s distraction associated with advertising billboards close to highways was considered an issue and a number of studies were undertaken.[2]

The recent rapid growth and ownership of mobile (cell) phones and their use within vehicles has lead to a growing body of research on related road safety issues. More recently, the introduction of many new electronic devices in vehicles, including televisions, DVD players and route navigation systems also have the potential to significantly distract drivers. Some of these devices are built into the original vehicle, however increasingly they are being fitted aftermarket.

Largely as a result of these technological interactions and their affect on driving capabilities, governments and research bodies are increasingly focussing on the issue of driver distraction.

In recent years, several major international conferences have been held on the emerging problem of driver distraction. In 2000, the United States National Highway Traffic Safety Administration (NHTSA) conducted a public meeting and innovative internet forum which assembled a wealth of information and viewpoints from a wide spectrum of contributors, both expert and the general public.[3]

In 2005, two international conferences specifically on the topic of distraction were held, one in Sydney in June and the other in Toronto, Canada in October.[4] More recently, the results of investigations by the New Zealand Ministry of Transport and by the Virginia Tech Transportation Institute in the United States have provided new information on driver distraction and its involvement in crashes.[5]

2005 Country Road Toll Inquiry

In May 2005, the Road Safety Committee tabled a report on its *Inquiry into the Country Road Toll*. The issue of driver distraction was considered on a number of levels including fatigue and inattention, the safety risks associated with mobile phones, enforcement of current laws relating to hand-held phones and the impact of new entertainment, information and control technologies being introduced into vehicles.[6]

The Committee's investigations into the unacceptably high road toll in country Victoria highlighted the growing problem of driver distraction. Several recommendations were made to the Victorian Parliament focussing on distraction including:

- the need for more research on the effects and extent of driver distraction;
- the development of countermeasures and safety strategies; and
- enforcement and education campaigns centred on use of hand-held mobile phones while driving.[7]

It was also recommended that the Government refer to the Road Safety Committee, an inquiry to:

- define distraction, both internal and external to the vehicle, and its effect on the driver; and
- explore, examine and identify possible strategies for road and vehicle design to minimise the potentially dangerous effects of driver distraction and to enhance road safety.[8]

The Government supported this recommendation and noted in its November 2005 response that it had issued the Committee with a Terms of Reference to examine driver distraction.[9]

2005/06 Driver Distraction Inquiry

Terms of Reference

On 9 August 2005, the Government issued the Road Safety Committee with a Terms of Reference to inquire, consider and make recommendations on the role of driver distraction in causing crashes and, in particular to report to Parliament on:

1. the prevalence of mobile telephone use by drivers and its impact on crash causes;

2. the prevalence of in-car video devices, their effect on drivers and impact on crash causes;

3. the types of other devices and activities, both inside and outside the vehicle, that may distract a driver's attention from the driving task and lead to unsafe driving;

4. the suitability and enforceability of existing laws concerning the use of mobile telephones and other electronic devices by drivers; and

5. the possible need for change to legislation or statutory requirements to implement any recommendations made as a result of the inquiry.

A copy of the complete Terms of Reference is provided on page vii of this Report.

Conduct of the Inquiry

Terms of Reference of the Inquiry were advertised in the major daily Melbourne metropolitan newspapers on 17 September 2005. The Committee also wrote to relevant Government departments, key stakeholders and community groups, inviting written submissions. In response to the Committee's advertisements and invitations, 44 written submissions were received (see Appendix A).

The Committee was particularly assisted by the comprehensive submission from the Monash University Accident Research Centre (MUARC), which contained an extensive review of the research literature, commissioned by VicRoads. Much of this material was reproduced by VicRoads in a separate submission containing separate recommendations.

In addition to the receipt of written submissions, the Committee held a series of public hearings and briefings. Hearings were held in Melbourne in December 2005 and January 2006 together with other briefings in 2006.

The Committee heard evidence from witnesses representing government agencies, motor vehicle and communication industries, other organisations and academia. Appendix B lists the witnesses who appeared before the Committee.

As the Terms of Reference required an examination of measures adopted to address the issue of driver distraction in other jurisdictions and countries, the Committee wrote to various organisations interstate and overseas. A number of valuable contributions were received from international government and research bodies. A list of these contributors is provided in Appendix C.

The Committee held a series of briefings in Canberra and Sydney in February 2006 to meet with relevant Commonwealth Government departments and agencies and key road safety organisations in New South Wales. Meetings were also held in Wellington, New Zealand on 15 and 16 May 2006 to discuss with New Zealand officials the content of a NZ Ministry of Transport study into driver distraction. A list of these interstate and New Zealand briefings are provided in Appendix D.

Much of the Committee's findings and recommendation are based on evidence received through written submissions and public hearings. The Committee's Report also draws heavily upon a volume of distraction related studies and research undertaken overseas.

Focus of Report

In investigating a subject as broad as driver distraction, the Committee has been mindful of its limitations with respect to its Terms of Reference and scope of evidence received. More significantly, the opportunity to thoroughly examine the role of driver distraction in causing crashes has been limited by a lack of comprehensive data and research. Furthermore, as is the case with many road safety issues, there are various motivational and behavioural issues that need examination, however such a broader behavioural study is beyond the Committee's role.

The scope of the Inquiry and structure of this Report is consistent with the Committee's Terms of Reference. Initial chapters attempt to define distraction and its involvement in crashes. The issue of a lack of suitable data is highlighted in Chapter 2.

Existing research and much of the public's attention has been on mobile telephones, however the Committee's investigations reveal the problem of distraction is far wider. Chapter 3 focuses on the use of mobile telephones while driving and subsequent chapters highlight the emerging problems associated with other in-car devices such as video, audio and other electronic systems (Chapter 4).

The Committee found that drivers are also faced with a large number of non-technology based everyday distractions such as conversing with passengers, smoking, grooming and eating (see Chapter 5). Another major form of distraction relates to the proliferation of road and advertising signs (Chapter 6).

In Chapter 7, the Committee examines the application of relevant laws and enforcement and the possible need to change legislation or statutory requirements to manage the problem of driver distraction. The final two chapters look to the future in terms of emerging vehicle technologies, the need for further research, education and awareness, and other countermeasures.

The Committee's investigations have focussed on drivers of motor vehicles, including motorcycles. Various submissions highlighted road safety issues associated with the use of mobile phones and portable audio devices by pedestrians and cyclists. The Committee did not examine these issues. Similarly, there are many more specific distractions faced by bus, truck, taxi and courier service drivers due to communication and other devices associated with these professions. Due to limitations in the evidence received and time restrictions, the Committee has not had the opportunity to thoroughly examine distractions in these broader contexts.

It would be beneficial for a more comprehensive study and follow-up review in the future once there has been an opportunity to collect sufficient data on a range of aspects of driver distraction, and to address any new emerging distraction issues.

Endnotes

[1] Australian Mobile Telecommunications Association, Submission to the Inquiry, 11 November 2005, p. 4.

[2] Wallace, B, *External-to-Vehicle Driver Distraction*, Scottish Executive Social Research, Edinburgh Scotland, 2003, pp. 41-57.

[33] Llaneras, R, *NHTSA Driver Distraction Internet Forum: Summary and Proceedings*, National Highway Traffic Safety Administration, Washington, DC, United States, November 2000.

[4] STAYSAFE Committee, Parliament of New South Wales, *Driver Distraction: Proceedings of an International Conference on Distracted Driving, Sydney, 2-3 June 2005*, Report 67, Sydney, 2006;

Canadian Automobile Association, International Conference on Distracted Driving, Toronto, Ontario, Canada, 3-5 October 2005. Program and links to papers, presentations and workshop summaries, www.distracteddriving.ca/English/index.cfm.

[5] Ministry of Transport, New Zealand, Correspondence, 21 October 2005.;

Dingus, T, Klauer, S, Neale, V, Petersen, A, Lee, S, Sudweeks, J, Perez, M, Hankey, J, Ramsey, D, Gupta, S, Bucher, C, Doerzaph, Z, Jermeland, J, and Knipling, R, *The 100-Car Naturalistic Driving Study, Phase II – Results of the 100-Car Field Experiment*, DOT HS 810

593, National Highway Traffic Safety Administration (NHTSA), Washington DC, United States, April 2006.;

Klauer, S, Dingus, T, Neale, V, Sudweeks, J, and Ramsey, D, *The Impact of Driver Inattention on Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data*, DOT HS 810 594, NHTSA, Washington, DC, United States, April 2006.

[6] Parliament of Victoria, Road Safety Committee, *Inquiry into the Country Road Toll*, May 2005, pp. 175-197, 260-267 and 289-314.

[7] ibid., Recommendations 59-60, 64, 66 and 68, pp. xxiii-xxiv.

[8] Ibid., Recommendation 67, p. 313.

[9] Government of Victoria, *Government Response to Inquiry into the Country Road Toll*, 17 November 2005, p. 22.

Chapter

2

Measuring Distraction and its Role in Crashes

This chapter examines various attempts to define, categorise and measure distraction and its role in crashes. Evidence is drawn from Australian road safety authorities and researchers, together with international research. A further more detailed discussion of distraction in later chapters addresses various distraction categories, including mobile phones; audio, video and other electronic devices; and various other internal and external distractions.

Defining, Categorising and Measuring Distraction

Definitions of Distraction

The cause of road accidents is varied and can often be attributed to a combination of factors. Excessive speed and intoxication are statistically the most common cause of road accidents. Driver fatigue is also acknowledged as a major factor, particularly on country roads. Increasingly, other factors such as inattention, distraction and general unawareness are seen as having a detrimental affect on driver performance.

Speeding and intoxication can be clearly identified and measured as causes of road accidents. The categories of distraction, inattention and unawareness are less obvious for road safety authorities to measure.

During the course of its investigations, the Committee noted a wide range of definitions of driver distraction and notes that there does not appear to be a single internationally accepted definition of distraction. This in turn, makes it difficult to assess the role of distraction in crashes.

In order to determine the role of driver distraction in causing accidents, the Committee believes it is important to clearly define distraction and to distinguish it from other related driver behaviours such as inattention.

In its 2005 *Inquiry into the Country Road Toll*, the Committee discussed the distinction between distraction and inattention and recommended that VicRoads establish the extent to which inattention contributed to injury crashes in Victoria.[1]

Until relatively recently distraction has tended to be considered as part of some wider form of driver behaviour, such as inattention, or coupled with other driving performance deteriorations such as fatigue.

In the USA, a major National Highway Traffic Safety Administration (NHTSA)-sponsored *100-Car Naturalistic Driving Study* of driver eye glances prior to crashes and near-crashes, by researchers from the Virginia Tech Transportation Institute (VTTI), stated that the definition of distraction needed to be expanded to a more encompassing 'driver inattention', incorporating secondary tasks, fatigue and two new categories – 'driving-related inattention to the forward roadway' (such as checking mirrors) and 'non-specific eye glance'.[2]

While the VTTI linked distraction with inattention, some other attempts have been made to separate the two behaviours. The Traffic Injury Research Foundation of Ontario, Canada stated in 2002 that:

> What distinguishes distracted driving from inattentive driving is the presence of a specific event or activity that triggers the distraction.[3]

Dr M. Regan, a senior research fellow at Monash University Accident Research Centre (MUARC) and a leading international researcher on human machine interfaces, considers driver distraction occurs when the driver 'engages, willingly, or unwillingly, in a secondary activity which interferes with performance of the primary driving task'.[4]

VicRoads also define distraction as encompassing a triggering event or secondary action:

> Driver distraction is a voluntary or involuntary diversion of attention from primary driving tasks not related to impairment (from alcohol/drugs, fatigue or a medical condition) where:
>
> a. The diversion occurs because the driver is:
>
> - performing an additional task (or tasks) and
> - temporarily focussing on an object, event or person not related to primary driving tasks.
>
> b. The diversion reduces a driver's situational; awareness, decision-making and /or performance resulting, in some instances, in any of the following outcomes:
>
> - collision or near-miss
> - corrective action by the driver and / or other road user.[5]

VicRoads noted that the above definition, which was based on a definition by Dr L. Tasca from Transport Canada, places distraction within driver attentional processes and allows for diversion of intention to be voluntary or involuntary.[6] In contrast to the broader definition by the Virginia Tech Transportation Institute '100 Car' study, the VicRoads/Tasca definition excludes attentional problems caused by other factors such as impairment due to drugs, alcohol, and fatigue.

The Committee believes the VicRoads definition of distraction could be clearer and more concise. To this end, the following definition developed by the delegates from the 2005 Toronto conference on driver distraction should form the basis of a definition for application in Victoria:

> Distraction involves a diversion of attention from driving, because the driver is temporarily focussing on an object, person, task, or event not related to driving, which reduces the driver's awareness, decision-making, and/or performance, leading to an increased risk of corrective actions, near-crashes, or crashes.[7]

For the purpose and scope of this Inquiry, the Committee does not adopt the wider VTTI definition of distraction/inattention and is of the opinion that driver distraction and inattention should be classified as two separate and distinct behaviours. Further, the Committee does not believe fatigue should be categorised as distraction.

The Committee acknowledges it is the 'triggering event' or 'secondary activity' that is the key distinction that separates distraction from general inattention, lack of concentration, or fatigue.

Categories of Distraction

Just as there is currently no generally accepted definition of driver distraction, the Committee found that neither was there a generally accepted method of categorising sources of distraction.

Several recent research projects undertaken internationally have aimed to create or improve current methods for recording or categorising distraction, especially those appearing in crash records or observations of drivers.

Various examinations of crash data and driver behaviour in the USA by the NHTSA; the University of North Carolina, and the VTTI have all involved an attempt to categorise driver distractions with similar conclusions and some minor variables.

The USA categorisations are consistent with the more comprehensive categories identified by the Ministry of Transport in New Zealand, who have recently completed a major study into the role of internal and external distractions in crashes. The findings of

this study are highlighted throughout this Report. At the time of completing this Inquiry, the New Zealand Government was seeking stakeholder feedback prior to finalising its policy position on the paper.

In undertaking a detailed analysis of police crash records for 2002 and 2003, the New Zealand Ministry chose to categorise distraction sources into:

- inside the vehicle distractions;
- outside the vehicle distractions; and
- other distraction sources.

Table 2.1 below categorises the various sources of internal and external distractions identified in the New Zealand study, in order of significance.

Table 2.1 Sources of Internal and External Distraction
New Zealand Ministry of Transport Study 2005

Internal Sources	External Sources
1. Passengers 2. Telecommunications 3. Entertainment systems 4. Emotionally upset-preoccupied 5. Personal effects 6. Vehicle controls/devices 7. Food-drink 8. Smoking 9. Animal or insect in vehicle 10. Sneezing/coughing/itching 11.General distraction – inside	1. Driver dazzled - sun strike 2. Checking for traffic 3. Other road users – vehicles 4. Trying to find destination/location/something 5. Scenery – persons 6. Police – emergency vehicles, crash scenes, etc 7. Scenery – Landscape/architecture 8. Other road users – pedestrian/cyclist 9. Driver dazzled – headlights 10. Animal outside vehicle 11. Other external event 12. Advertising – signage 13. General distraction – external

Source: New Zealand Ministry of Transport, Correspondence, 21 October 2005.

The vast majority of the above distractions are non-technology based, the main exceptions being telecommunications, entertainment systems and vehicle control/devices. Passengers are listed as the main internal source of distraction which also featured as key distracters in USA studies.

Telecommunications essentially encompasses mobile phones, and as discussed in Chapter 3, it has its own variables such as dialling numbers, conversing, sending and reading text/SMS messages. While not specifically listed in New Zealand study as a distraction, the Committee heard in other evidence that the acts of reaching for an object and reading/writing are also major distractions. Similarly, the New Zealand study does not specifically refer to a driver singing

or talking, or personal grooming, although the USA studies did mention these as potential distractions.

The New Zealand study identified 'driver dazzled by sun strike' as the major external source of distraction. However, as discussed later in Chapter 5, the Committee argues that sun strike is a weather condition or driving hazard outside the control of the driver and should not be classified as distraction.

Similarly, the New Zealand categorisation of 'emotionally upset/preoccupied' and the VTTI '100 Car' study classification of 'daydreaming' could both be classified as general inattention behaviours as opposed to distraction that may be caused by a triggering event.

Within Victoria, both MUARC and VicRoads examined categories of distraction in their submissions. MUARC divided sources of distraction into:

- technology based distracters (eg: mobile phones, route navigation and CD players); and
- non-technology based distracters (eg: talking to passengers; eating/drinking and smoking.[8]

VicRoads chose to consider distraction in terms of the role of the driver, and used the following categorisation:

- purposeful – involving a high level of conscious control to undertake, eg: watch a DVD or dial a phone number;
- incidental – an activity which adds to the workload, but is incidental to driving, eg: eating, drinking or answering a hands-free phone call; and
- uncontrolled – without conscious control, eg: distractions from children or the attention-grabbing effect of movement in the peripheral field of vision.[9]

The Committee notes that under the VicRoads categorisation, sending a text message would be considered as purposeful, while receiving it would be incidental.

As with the definitions of distraction, the Committee found there is no widely accepted method of categorising distractions in either crash reports or observations of real world, or 'naturalistic', driving.

As stated previously, the Committee believes any definition and categorisation of distraction should be limited to the 'triggering event or secondary activity' actions which would exclude behaviours

including fatigue and inattention. The Toronto Conference definition should be used as a reference.

The Committee also see a need for categories of source of distraction to be developed for use in crash studies and observations of driving.

Recommendation 1

That VicRoads adopt a clearer concise definition of driver distraction, consistent with the definition arising out of the 2005 Toronto conference on driver distraction, and establish a range of categories of distraction sources. Any definition and categorisation should distinguish distraction from other driver behaviours such as fatigue and inattention.

Observing and Measuring Distraction

There are a number of methods of observing and measuring the effects of driver distraction with each method potentially resulting in varying outcomes. Dr H. Simpson, President of the Traffic Injury Research Foundation in Canada, in a presentation at the Toronto Conference in October 2005, categorised the methods as:

- Surveys – have people tell you what they see and do;
- Observational studies – watch what they do;
- Crash-based studies – reconstruct what they did; and
- Laboratory/experimental studies – monitor what they do under controlled conditions and circumstances.[10]

Surveys are typically either questionnaire-based, usually by telephone by a public opinion polling organisation, or from focus group discussions with selected individuals. Australian examples include regular surveys by AAMI Limited and the Australian Transport Safety Bureau (ATSB).[11] Reference is made in later chapters to various driver distraction surveys, including those undertaken in Western Australia and New South Wales.

Observational studies include roadside observation of drivers using various devices, such as hand-held mobile phones, and video-recording devices observing driver behaviour. The most sophisticated of these methods involve a number of cameras in the vehicle recording what the driver is doing and a camera recording what is happening on the road ahead (and sometimes behind). These are combined with simultaneous recording of vehicle movements, such as steering wheel and brake pedal movements and travelling speed.

Crash-based studies are drawn from analysis of records of crashes reported to police, although in some cases researchers have

interviewed drivers attending hospitals or surveyed drivers who have made insurance claims.

Compared with other factors involved in crashes, such as driver demographic and vehicle characteristics, type of crash, involvement of speeding, alcohol use or seat belt usage; the identification and recording of data about distraction or inattention is limited. The most detailed work is the previously mentioned New Zealand Ministry of Transport study.[12]

A wide range of laboratory experiment studies have been undertaken in a variety of settings. Some are simple laboratory experiments such as reaction time; others are conducted in driving simulators ranging from a PC screen and a joystick to multi-million dollar moving-base simulators supporting real vehicle cabins and multiple projection screens. The driving scenarios, quality and realism of the simulations all vary greatly.

Experiments are often conducted on closed tracks or circuits while some have been conducted in open public roads, although usually in relatively safe and 'controlled' conditions. Recording mechanisms can range from an observer making notes to sophisticated vehicle instrumentation.

Two major American observational studies were particularly relevant to the Inquiry, one by the University of North Carolina and the other by VTTI. The first focuses on a sample recording of short periods of normal 'everyday' driving during a week long period. The second recorded data over a year and at present has mainly analysed behaviour immediately prior to various events - crashes, near-misses and incidents. The entire year-long video and vehicle records have been archived for possible future analysis.

University of North Carolina Study

In 2001, the Highways Safety Research Centre at the University of Carolina conducted a study for the AAA (American Automobile Association) Foundation for Traffic Research to determine the occurrence of various driver distractions and to examine the potential consequences of these distractions on driving performance. This study followed earlier work examining crash data to develop taxonomy for categorising distraction.[13]

The study involved 70 drivers who drove their own vehicles for a week during which time approximately 10 hours were video-recorded, and three hours viewed and coded every 1/10 seconds. The primary aim was to determine the occurrence of various driver distractions and to examine the potential consequences of these distractions on driving performance.

Table 2.2 provides the key findings for the proportion of subjects involved in various potentially distracting activities, and the total time spent while vehicles were moving. These, and other more detailed figures, will be referred to later chapters.

Table 2.2 Proportion of Subjects Involved in Potentially Distracting Activities and Total Driving Time, Everyday Driving Study

Potential Distraction	% of Subjects	% of Total Driving Time
Talking on cell phone Answering cell phone Dialling cell phone	30.0 15.7 27.1	1.30[1]
Eating, drinking, spilling Preparing to eat or drink	71.4 58.6	1.45 3.16
Manipulating music/audio controls	91.4	1.35
Smoking (includes lighting and extinguishing)	7.1	1.55
Reading or writing	40.0	0.67
Grooming	45.7	0.28
Baby distracting Child distracting Adult distracting	8.6 12.9 22.9	0.38 0.29 0.27
Conversing	77.1	15.32
Reaching, leaning, etc. Manipulating vehicle controls Other internal distractions	97.1 100.0 67.1	3.78[1]
External distractions	85.7	1.62

[1] combined categories

Source: Stutts, J, et al., Distractions in Everyday Driving, 2003, p. 8.

Virginia Tech Transportation Institute (VTTI) Study

The more recent VTTI study, now commonly referred to as the '100-Car Naturalistic Driving Study', is also a landmark investigation. It was undertaken for NHTSA and the first results were reported in a paper by Neale and colleagues at the 19th International Technical Conference on Enhanced Safety of Vehicles in Washington, DC in June 2005.[14] A more comprehensive final report, and an associated report on driver inattention on near-crash/crash risk, was published in late April 2006.[15]

Using hardware and software developed over a 15 year period, and used in at least two previous smaller scale truck driver fatigue studies, the dataset includes approximately 2 million vehicle miles (3.2 m km), almost 43,000 hours of data, 241 primary and secondary drivers, 12 to 13 months of data collection for each vehicle and data from five channels of video and vehicle kinematics. One hundred drivers who commuted into or around the North Virginia/Washington, DC metropolitan area were recruited, using either their own or leased vehicles. In order to fit the complex instrumentation into the vehicles, including special mounting brackets, only six common small to mid-size models were used. [16]

The driver sample was selected to include a higher number of younger (under 25 year old) drivers and those who drove more than average distances per annum, since:

> A goal of the study was to maximise the potential to record crash and near-crash events through the selection of subjects with higher than average crash-or-near-crash risk exposure.[17]

The data analysis focussed on eye glance analysis captured on video for three types of events:

- crashes – any contact between the subject vehicle and another vehicle, fixed object, pedestrian, cyclist or animal;
- near crashes – conflict situation requiring rapid, severe evasive manoeuvres to avoid a crash; and
- incidents – conflict requiring evasive action, but less severe than a near miss.[18]

The study assembled extensive information on 69 crashes, 761 near-crashes and 8,295 incidents. Some of the crashes were low level and would not be reported to police. While some drivers experienced no events, others were involved in 3 or 4 crashes and many incidents.[19]

Nearly 80 per cent of the crashes of any level of severity and 65 per cent of the 761 near-misses involved driver 'inattention' just prior to conflict (within 3 seconds). A VTTI Fact Sheet notes that prior estimates relating to driver 'inattention' as a contributing factor have been in the range of 25 per cent of all crashes.[20]

One of the findings from the eye glance analysis of crashes and near-crashes was that driver's glances away from the forward roadway potentially contribute a much higher proportion of events than has been previously thought.[21]

While the study does relate to only a relatively small number of drivers, primarily commuters in the vicinity of Virginia and Washington, DC, it nevertheless presents useful small scale findings. The VTTI authors comment that:

> Despite the massive scope of the current effort, it was designed to serve as an exploratory study to determine the feasibility, value, and methods for initiating a larger, more representative study.[22]

As noted earlier each of the four methods used to provide an insight into driver distraction has advantages and disadvantages. The Committee notes that close attention needs be made to the context and limitations of each reported study in order to determine its relevance to the Victorian situation. In particular, there is an absence of information on distractions outside built-up areas.

Role of Distraction in Crashes

Several recent crash-based studies have examined the role of distraction in crashes, most notably the previously mentioned New Zealand and United States work. However, no Statistics were available within Victoria on the extent to which distraction leads to crashes.

As stated in the MUARC submission:

> It is difficult to quantify the frequency of crashes in which driver distraction is a contributing factor. The main problem in doing so is that it is rarely recorded on accident reporting forms whether or not a driver was engaging in a distracting activity – and even where provision is made to do so, drivers may not admit that they were doing so for various reasons. It is likely, therefore, that the level of driver involvement in distraction-related crashes is underestimated in crash studies.[23]

In the *Inquiry into the Country Road Toll*, the Committee referred to a 2001 NHTSA report *The Relative Frequency of Unsafe Driving Acts in Serious Traffic Crashes* which stated that the largest driver behavioural problem was inattention.[24] Based on 1995 statistics from the Crashworthiness Data System (CDS), the first year in which distraction-related information was available, NHTSA estimated 25 per cent of police reported crashes in the USA involve some form of inattention. Distraction was considered a factor in over half of those crashes.

Victoria

Table 2.3 illustrates the main cause of road fatalities in Victoria during 2004-2005 and highlights driver error is the most significant factor by a significant margin. Victoria Police indicated that most crashes involving distraction would be included under the category 'driver error', and that distraction could also be a contributing factor in many of the other categories.[25]

ARRB Group advised of a report on crashes at urban arterial/local road intersections in Melbourne in 1981 which found 9 per cent of 783 drivers involved in casualty crashes were distracted (and a few more may have been distracted).[26]

Interestingly, ARRB Group commented that, while dated and before the advent of mobile phones and video devices, the findings of the report:

> ... remain of interest because of the richness of the information available about each accident from the files kept by police at that time. The study could not be repeated today, because police no longer keep such detailed files about the majority of traffic accidents.[27]

Table 2.3 Main Cause of Road Fatalities in Victoria 2004 to 31 October 2005

Cause of Deaths	2004	To 31 Oct 2005
Alcohol	17	22
Speed	67	60
Fail to give way	55	48
Fatigue	7	2
Driver Error	132	119
Rear End Collision	10	6
Pedestrian Negligence	39	30
Other	8	11
Bicycle at Fault	7	1
Medical Condition	1	1
No Seat Belt	N/A	51
TOTAL	342	351

Source: Victoria Police, Submission, p. 4.

ARRB also referred to a 1994 report *Why are young drivers over-represented in traffic accidents?* which looked at three types of crashes. From the two reports ARRB conclude that:

- before mobile phones, distraction contributed to a small but not negligible proportion of casualty crashes;
- distraction contributes to a higher proportion of single vehicles crashes those collisions with other road users; and
- there are a very wide range of objects and events that contribute to distraction-related casualty crashes.[28]

New Zealand Study

As mentioned earlier, the Ministry of Transport in New Zealand is currently conducting a study of driver distraction, a major aspect of which is a more detailed crash analysis of internal and external distractions involved in crashes in. Two approaches are being used:

- Summary of crash causes into internal and external distractions, based on the distraction contributory codes in the police-reported Crash Analysis System (CAS) for crashes in calendar years 2002 and 2003; and
- Detailed review and categorisation of individual crash reports in terms of type of behaviour, object or action involved.[29]

Approximately 10 per cent of all reported crashes involved distraction, with a relatively even distribution between inside distractions (44%) and outside distractions (46%). The remaining 10 per cent of crashes comprised multiple causes or lacked sufficient information to categorise further.

The first reported results focussed on internal distractions with some limited preliminary examination of external distractions. Results for some for the more significant major distractions are summarised in Table 2.4.

Table 2.4 Sources of Distraction in New Zealand Casualty Crashes, 2002 and 2003

	Number of crashes by worst injury sustained in the crash				
Vehicle Driver Distraction Sources	Fatal	Serious	Minor	Total	Proportion distraction involvement
Driver dazzled – sun strike	4	46	208	258	13%
Passenger/s	8	53	168	229	12%
Checking for traffic	0	27	193	220	11%
Other Roadusers – Vehicles	2	25	101	128	7%
Telecommunications	7	14	87	108	5%
Entertainment Systems	0	15	89	104	5%
Emotionally Upset or Preoccupied	6	19	78	103	5%
Personal Effects	0	14	77	91	5%
Vehicle Controls-Devices	2	19	70	91	5%
Trying to Find Destination/Location/Something	2	17	53	72	4%
Food-Drink	3	8	53	64	3%
Scenery – Persons	0	7	46	53	3%
Police/Emergency Vehicles/Crash Scenes etc	2	5	40	47	2%
Smoking	0	10	36	46	2%
Scenery – Landscape/Architecture	2	6	28	36	2%
Animal – Insect Inside Vehicle	0	3	33	36	2%
Other Roadusers – Pedestrians/Cyclists etc	1	2	30	33	2%
Driver Dazzled – Headlights	3	5	20	28	1%
Animal Outside Vehicle	0	1	20	21	1%
Sneezing/Coughing/Itching	0	1	11	12	1%
Other external event	0	1	10	11	1%
Advertising – Signage	0	1	7	8	0%
General Distraction – Inside	2	9	45	56	3%
General Distraction – External	0	4	33	37	2%
General Distraction – Source Not Defined	7	27	94	128	7%
Total Driver Distraction Related Crashes	49	332	1583	1964	

Source: Ministry of Transport, New Zealand, Correspondence, attachment titled Table 4.

As noted earlier, the Committee observed that the most frequently reported source of 'driver dazzled by sun strike', should not be classified as driver distraction, rather it is a driving hazard or condition outside of the driver's control. Similarly, it is debateable as to whether the third most frequent source, 'checking for traffic', is a driving task or a distraction.

Passengers in the vehicle are clearly the most frequent distraction source (12 per cent) and more that the combined total of telecommunications and entertainment systems (5 per cent each). The relative order of importance of the sources changes slightly if fatal or serious crash rankings are used, but the numbers are too small to produce any indication of significant differences from the pattern for all casualty crashes.

The New Zealand analysis was undertaken at a very detailed level including:

- separating data into the number of fatal, serious injury and minor injury crashes as well as the number of people involved at each of these levels of severity;
- grouping data into 15 types of crash movement, with either 50 to 80 km/hr or open (100 km/h) speed limits, for nine major groupings of internal distractions;
- additional categorisation of behaviour (eg: arguing, conversing, looking at/attending to) and types of passenger (eg: adult, young adult/teenage, child); and
- the crashes, especially fatal crashes, were also examined for the possible involvement of alcohol, fatigue and speeding.

A similar level of analysis is now being undertaken on external distractions.[30]

The Committee noted that one of the useful features of the New Zealand study was its consideration of the impact of other factors operating in conjunction with distraction. This illustrates that some crashes have a number of contributing factors. For example:

> It seems likely that the combination of alcohol and using a telecommunication device, smoking or dealing/conversing with passengers places additional strain on the drivers resources and/or the presence of alcohol may mean the driver is more likely to combine activities that they might not otherwise have. [31]

As part of the study, the Ministry of Transport conducted focus group discussions with 37 people and compared the risk ranking of the focus group with a subjective ranking made by Dr M. Regan of

MUARC in a 2005 publication.[32] This comparison is reproduced in Table 2.5 below.

Table 2.5 Risk Rankings from Regan (2005) and New Zealand Focus Group Research

Regan (2005)	NZ Focus Group
1. E-mail/internet (when available/used) 2. Mobile phone – text messaging 3. Mobile phone – conversation/talking (hands-free and hand-held) 4. DVD Player (if portable and poorly located) 5. Conversation with passengers (if driver is young or old) 6. Route navigation (if poorly designed) 7. Cassette player/CD player 8. Radio 9. Climate controls 10. Eating/drinking 11. Smoking-related	1. Disruptive passengers, sober driver with drunk teens, reading a map, pets unrestrained, changing clothes, reading and writing 2. Texting, cell phone – long call, answering hand-held, rolling cigarettes, selecting a CD, reaching for item under seat. 3. Answering hands-free, eating-drinking, cell phone – short call 4. Reaching for item next to driver, non-disruptive passengers. 5. Adjusting climate control, restrained pets, doing makeup or shaving.

Source: Gordon, C., Paper at IPENZ Conference, Auckland, September 2005, p. 9.

There are some notable variations in risk rankings between Regan's ranking and the New Zealand study. The vast majority of Regan's major risks are technology based, including email/internet use, mobile phones and in-car entertainment systems. While the New Zealand study found disruptive passengers to be the highest risk category, the study participants also considered that long mobile phone calls are likely to be a high risk.

The Committee observe that the New Zealand respondents placed disruptive passengers in the highest risk group, but non-disruptive passengers towards the bottom of their ranking of disruptive risks. In contrast Regan considered passengers only in terms of their conversation and are ranked as a middle level risk.

The Ministry of Transport concluded that 'while not directly comparable because of the difference in the behaviours considered and scales, the focus group ratings are not widely divergent from the research guided ranking'.[33]

The Committee consider that a similar comparison of the risk ratings of various distractions by experts and the general public would be useful in Victoria.

University of North Carolina and Pennsylvania Studies

In the report of the CDS analysis the authors, Stutts, et al (2001) reported that, of the crashes examined, 8.3 per cent were the result of driver distraction.

In the report of the second phase of the University of North Carolina study, the summary results of two data sources were tabled together as reproduced in Table 2.6.

Table 2.6 Comparison of United States Crashworthiness Data Systems and Pennsylvania Crash Data

Driver Distraction	United States CDS Data 1995-1999[1]	Pennsylvania Data 1999-2000[2]
Outside object, person or event	29.4%	21.9%
Adjusting radio/cassette/CD	11.4	10.2
Other occupant	10.9	10.2
Moving object in vehicle	4.3	8.2
Using other device/object brought into vehicle	2.9	5.7
Adjusting vehicle/climate controls	2.8	5.2
Eating and/or drinking	1.7	5.1
Using/dialling cell phone	1.5	5.2
Smoking related	0.9	4.7
Other distraction	25.6	21.6
Unknown distraction	8.6	2.0
Total	100.00	100.00

[1] Based on the 8.3% of *drivers* identified as distracted in crashes. [2] Based on the 3.5% of *crashes* involving a distracted driver.

Source: Stutts J, et al., Distractions in Everyday Driving, 2003, p.12

Approximately 70 percent of the distractions in the CDS data were inside the vehicle and 30 per cent outside. In the smaller scale Pennsylvania study, the proportions were close to 80 per cent inside and 20 per cent outside. Otherwise, the distraction rankings were fairly similar, with passengers and audio devices being the most frequent distraction sources in both studies. Moving objects in vehicles and other devices or objects brought into the vehicle were also prominent distractions.

Stutts, et al, in their 2001 report noted:

> … the importance of taking into account specific contextual factors in collecting and analysing driver distraction data. A few illustrative examples include the higher proportion of adjusting radio/cassette/CD events occurring in night time crashes, the higher proportion of moving object in vehicle events occurring in crashes on non-level grade roadways, and the higher proportion of other occupant distractions occurring at intersection crashes.[34]

Virginia Commonwealth University Study

The Virginia Commonwealth University study used data specifically collected by troopers (State police) in part of 2002.[35] The results are summarised in Table 2.7.

Table 2.7 Sources of Distraction from Virginia Police Data, 2002

Distraction Source	% of all reported distractions
Passenger/children distraction	8.7
Adjusting radio, cassette, CD	6.5
Eating or drinking	4.2
Using/dialling mobile telephone	3.9
Adjusting vehicle/climate controls	3.6
Other personal items	2.9
Smoking related	2.1
Document, book, map, directions, newspaper	1.8
Unrestrained pet	0.6
Grooming	0.4
Technology device	0.3
Pager	0.1
Other distraction inside vehicle	26.3
External distractions	35.2
Unknown distractions	3.1

Source: MUARC, Submission, p. 63.

Approximately 65 per cent of the distractions in the brief Virginia study were from inside the vehicle. Passengers were reportedly the most frequent distraction, again followed by adjusting audio devices. MUARC note the Virginia data differs in a number of ways from the University of North Carolina figures and suggest some reasons for the differences, including sample sizes, differences in methodology and time differences.[36]

Japanese Fatal Crash Study

A Japanese study, solely relating to fatal crashes, reported that 'distracted' driving was the leading overall cause of fatal crashes (23 per cent) in 1995. Further, distraction becomes the highest proportion of fatal crash causes for those over 30 years of age and continues to increase with age. Of these crashes, 22 per cent were due to a secondary task, 31 per cent to a specific task associated with driving and 47 per cent for no specific action, eg., day-dreaming.[37]

Other Jurisdictions

The Committee found no recent comprehensive statistics in Australia relating to the involvement of specific distraction sources as a crash contributor. However, some submissions provided information on undefined distraction or inattention causes.

The Queensland Minister for Transport and Main Roads stated that distraction accounts for 5.1 per cent of all fatalities and 3.5 per cent of all hospitalisations.[38] *Road Crash Facts 2004* in South Australia states that inattention was the reported cause in 28 per cent of fatal crashes and 50 per cent of serious injury crashes in 2004.[39] Inattention was a factor in 12 per cent of serious crashes in Tasmania over a five year period.[40] Finally, a study by Lam (2002) of New South Wales police records from 1996 to 2000 found 0.6 per cent out of 414,000 crashes were due to distraction. These were broadly categorised into inside, outside and hand-held phone categories and the relative risk of various driver age groups estimated.[41]

Recently, as part of '*An exploration of the role of driver distraction in serious road crashes'* study by The George Institute for International Health, University of Sydney for the Motor Accidents Authority of New South Wales, researchers interviewed drivers who attended a Perth hospital after a crash. One in seven (14 per cent) reported a distraction had contributed to their crash. By comparing them with a 'control' group of Perth drivers who were not in a crash, it was found that being distracted increased the odds of having a serious crash by more than 2.5 times.[42]

In the United Kingdom, five percent of heavy vehicle drivers and four per cent of car drivers were reportedly 'distracted' in crashes on motorways involving a heavy truck or bus, while research for urban crashes found one per cent mentioning in-vehicle distractions and nine per cent other unspecified distractions. A study in Cambridgeshire found 7.3 per cent of drivers involved in crashes on dual carriageway roads and 5.4 per cent on single carriageway roads reported being 'distracted'.[43] In contrast, a 2001 report by Stevens and Minton identified in-vehicle distractions in only 1.8 per cent of 5,740 fatal crashes examined in England and Wales occurring between 1985 and 1995.[44]

The Committee concluded that Victoria and most other Australian jurisdictions are not well placed to determine the extent of the various sources of driver distraction as causes of crashes. The various United States studies provide some insights and the New Zealand study is recent, comprehensive and detailed, but the extent to which these results of these studies might apply to Victoria is unknown.

The Committee concludes that the overseas studies have generally found that most prevalent internal distracters tend to be everyday activities such as passengers, eating and drinking and manipulating vehicle audio or climate controls. Mobile phones and other electronic devices were not significant factors.

Need for Improved Crash Data

There is currently a lack of data on the extent to which driver distraction is a contributing factor in crashes in Victoria, and which sources of distraction are the most significant in the Victorian crashes.

Existing Victoria Police crash reporting is not comprehensive to determine whether driver distraction was a potential contributing factor to road crashes. Further, unlike the recent New Zealand analysis of police crash reports, there has been no attempt in Victoria to examine crash data to enable investigations into the role of driver distraction in crashes.

Mr D. Healy, General Manager Road Safety, Transport Accident Commission (TAC), at a briefing on 6 December 2005, questioned the extent to which distraction is a major cause of crashes in Victoria:

> I think it is fair to say that we simply do not have definitive research at this stage to know the extent different issues impair our driving ability and how frequent they are. On that basis we would advocate that on that issue there is a need for research and development to begin to understand the types of distraction and to what degree they contribute to trauma as an outcome.[45]

Some submissions advocated the need for improved data in relation to the role of distraction in crashes in Victoria. MUARC recommended, as an interim step, a pilot study in which distraction data was recorded as supplementary information for a sample of crashes reported by police.[46] Such an approach was used by Virginia Commonwealth University in 2002.[47]

The Committee considers the development of comprehensive crash data is a vital first step in guiding future safety initiatives relating to driver distraction. Consultation with relevant road safety authorities and researchers in other Australasian jurisdictions should be undertaken to determine the best methods and classification systems. The suggestion by MUARC of an interim pilot study approach should also be considered.

Recommendation 2

That VicRoads and Victoria Police develop methods to enable the future assessment of the role of distraction in crashes on Victorian roads including a review of existing traffic crash reporting systems. Consultation should take place with other Australasian jurisdictions and the Australian Transport Safety Bureau on appropriate methods and classification of distraction.

Distraction and its Effect on Stopping Distances

One of the consequences of distraction is a delayed effect on stopping distances. If a potentially hazardous situation arises, the driver does not react in time to avoid a collision or the response is delayed so that there is insufficient time for the vehicle to stop or be steered clear of a collision. Further, if a collision does occur, it will be at a higher impact speed than if the driver had been fully alert to the road and traffic environment and reacted earlier.

In recent years in Victoria there has been considerable publicity, particularly through the Transport Accident Commission 'Wipe off 5' campaign, of the consequences on total stopping distances and impact speeds of small increases in vehicle speed above the legal speed limit.[48] To better understand the effect of distraction it is useful to divide stopping distance into its two major components – braking time and so-called 'reaction' time.

The definition of reaction time varies in the technical literature. An article by American crash litigation attorney Mr M. Green in the journal *Transportation Human Factors* divides 'reaction' time into:

- Mental Processing Time – the time to perceive something occurred and decide on a response. It can be further subdivided into sensation, perception/recognition, situation awareness and response selection stages. These are often called 'perception time', which is a misnomer since response selection is an important component; and

- Movement Time – the time for the responder to make the required muscle movements, e.g., lifting the foot off the accelerator, moving laterally to the brake and depressing the pedal.[49]

Mr Green states that reaction times are greatly affected by whether the driver is alert to the need to brake. Green divides alertness into three classes:

- Expected – the driver is alert and that there is a good possibility that braking may be necessary. The best estimate is 0.7 seconds, comprising 0.5 seconds for perception and 0.2 seconds for movement.

- Unexpected – the driver detects a common event such as a brake light or traffic light ahead. Time is about 1.25 seconds.

- Surprise – the driver encounters a very unusual circumstance, resulting in extra time to interpret the event and decide on a response. Time is about 1.5 seconds.[50]

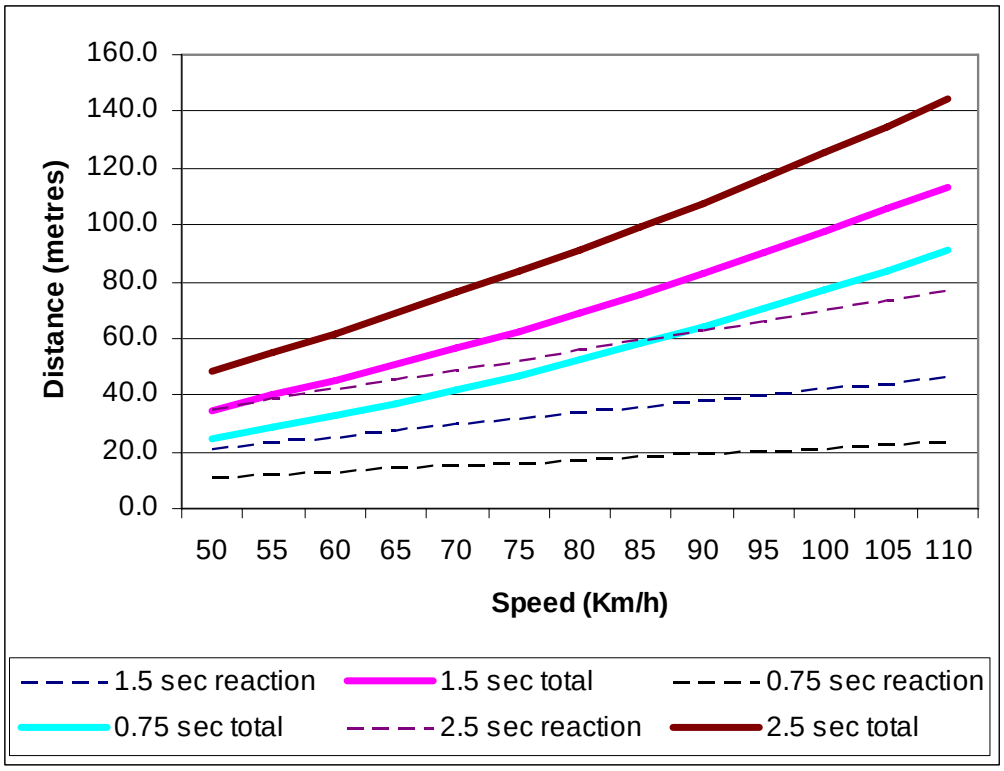
The values tend to increase to some extent with age of driver, darkness and weather conditions and the particular characteristics of the situation.[51]

Because braking distance is a function of the co-efficient of friction between the tyre and the roadway and the square of the velocity of travel, a doubling of speed results in a quadrupling of braking distance. It is unlikely many drivers appreciate the significance of a delay in reaction time and the resulting impacts.

To demonstrate the consequences of different reaction times, the Committee compared reaction distance and total stopping distance against speed for:

- 0.75 seconds - representing a driver expecting they may need to stop;
- 1.5 seconds - a typical value used in road safety publicity; and
- 2.5 seconds - representing a typical driver whose response is delayed by one second. This value also represents the typical value which has been used in Australian road design guidelines.[52]

Figure 2.1 Reaction and Braking Distances versus Speed



Source: Derived from TAC Safety website diagram

Figure 2.1 illustrates that with 1.5 second reaction time, the reaction distance is approximately equal to the braking distance at around 70 km/h. As speed increases the braking component grows as a proportion of the total stopping distance.

Travelling below the maximum speed limit but being distracted can result in a greater stopping distance than being alert but exceeding the speed limit by a considerable amount. For example, travelling at 60 km/h with a reaction time of 2.5 seconds results in a total stopping distance (on a dry road with average tyres) of around 62 metres. This is approximately the same total distance as for a vehicle travelling at 75 km/h with a driver reaction time of 1.5 seconds, or travelling at almost 90 km/h with a reaction time of 0.75 seconds.

These figures highlight that alertness is a significant factor in determining total stopping distances, especially in the lower speed situations. Even relatively short periods of driver distraction can be detrimental to safety if a critical driving situation arises. Safe driving should involve respecting speed limits combined with a high level of driver alertness.

Chapter 2 Recommendations

Recommendation 1

That VicRoads adopt a clearer concise definition of driver distraction, consistent with the definition arising out of the 2005 Toronto conference on driver distraction, and establish a range of categories of distraction sources. Any definition and categorisation should distinguish distraction from other driver behaviours such as fatigue and inattention.

Recommendation 2

That VicRoads and Victoria Police develop methods to enable the future assessment of the role of distraction in crashes on Victorian roads including a review of existing traffic crash reporting systems. Consultation should take place with other Australasian jurisdictions and the Australian Transport Safety Bureau on appropriate methods and classification of distraction.

Endnotes

[1] Parliament of Victoria, Road Safety Committee, *Inquiry into the Country Road Toll*, May 2005, Recommendation 43, p. 193.

[2] Neale, V, Dingus, T, Klauer, S, Sudweeks, J, and Goodman, M, 'An Overview of the 100-Car Naturalistic Study and Findings', Paper 05-0400, *19th International Technical Conference on Enhanced Safety of Vehicles*, Washington, DC, United States, June 2005, p. 6.

[3] Bierness, D, Simpson, H and Pak, A, *The Road Safety Monitor: Driver Distraction*, Traffic Injury Research Foundation, Ottawa, Canada, 2002, p. 5.

[4] Dr M. Regan, Monash University Accident Research Centre (MUARC), Notes of Discussion, 6 December 2005, p. 34; Presentation, 6 December 2006, p. 1.

[5] VicRoads, Submission to the Inquiry, November 2005, p. 5.

[6] ibid.; Taska, L, 'Driver Distraction: Towards a Working Definition', Presentation, *International Conference on Distracted Driving, Toronto, October 2005*, Canadian Automobile Association, www.distracteddriving.ca/english/presentations.cfm

[7] Canadian Automobile Association, 'Conference Summary and Recommendations', *International Conference on Distracted Driving, Toronto, October 2005*, Canadian Automobile Association, p. 2, www.distracteddriving.ca/english/conferenceSummary.cfm

[8] Young, K, Reagan, M, and Hammer, M, *Driver Distraction: A Review of the Literature*, Report No. 206, MUARC, Melbourne, p. 3.

[9] VicRoads, op. cit., p. 31.

[10] Simpson, H, 'Distracted Driving: How can we know that it's a problem?', Presentation, *International Conference on Distracted Driving, Toronto, Canada, October 2005*, Canadian Automobile Association, p. 4.

[11] AAMI Limited, *Road Crash Index and Young Driver Crash Index* series; Australian Transport Safety Bureau, *Community Survey* series, Canberra.

[12] Ministry of Transport, New Zealand, Correspondence, 21 October 2005.

[13] Stutts, J, Feaganes, J, Rodgman, E, Hamlett, C, Meadows, T, Reinfurt, D, Gish, K, Mercandante, M and Staplin, L, *Distractions in Everyday Driving*, AAA Foundation for Traffic Safety, Washington, DC, United States, 2003, pp. 7-8.

[14] Neale, V, et al., op. cit.

[15] Dingus, T, Klauer, S, Neale, V, Petersen, A, Lee, S, Sudweeks, J, Perez, M, Hankey, J, Ramsey, D, Gupta, S, Bucher, C, Doerzaph, Z, Jermeland, J, and Knipling, R, *The 100-Car Naturalistic Driving Study, Phase II – Results of the 100-Car Field Experiment*, DOT HS 810 593, National Highway Traffic Safety Administration (NHTSA), Washington DC, United States, April 2006;

Klauer, S, Dingus, T, Neale, V, Sudweeks, J, and Ramsey, D, *The Impact of Driver Inattention on Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data*, DOT HS 810 594, NHTSA, Washington, DC, United States, April 2006.

[16] Neale, V, et al., op. cit., pp. 1-5.

[17] ibid., p. 4.

[18] ibid., Table 3, p. 5.

[19] ibid., p. 5.

[20] Virginia Tech Transportation Institute*, 100 Car Naturalistic Driving Study Fact Sheet*, Blacksburg, Virginia, United States, 2005, p. 3, www.vtti.vt.edu/Documents/100-Car%20Fact%20Sheet.doc

[21] Neale, V, et al, op. cit., p. 7.

[22] ibid., p. 10.

[23] MUARC, Submission to the Inquiry, December 2005, p. 61.

[24] Parliament of Victoria, op. cit., p. 193, citing Hendricks, D, Fell, J, and Freedman, M, *The Relative Frequency of Unsafe Driving Acts in Serious Traffic Crashes: Summary Technical Report*, NHTSA, Washington, DC, United States, 2001, p. ii.

[25] Assistant Commissioner R. Hastings, Victoria Police, Notes of Discussion, 5 December 2005, pp. 2-3.

[26] ARRB Group, Submission to the Inquiry, 4 November 2005, p. 1 of Attachment citing Cairney, P, and Catchpole J, *Road user behaviours which contribute to accidents at urban arterial/local intersections*, ARR 197, Australian Road Research Board, Melbourne, 1991.

[27] ibid., p. 1 of Attachment.

[28] ibid., p. 4 of Attachment.

[29] Gordon, C, 'A Preliminary Examination of Driver Distraction Related Crashes in New Zealand', *Proceedings of an International Conference on Distracted Driving, Sydney, Australia, 2-3 June 2005,* Report 67, STAYSAFE Committee, 2006, p. 1 of paper.

[30] MUARC, op. cit., p. 65.

[31] Gordon, C, op. cit., p. 21.

[32] Gordon, C, 'Driver distraction: An initial investigation of the 'attention diverted by' contributing factor codes from crash reports and focus group research on perceived risks', *IPENZ Technical Conference*, Auckland, New Zealand, September 2005, p. 9. This was provided in Ministry of Transport, New Zealand, Correspondence, 21 October 2005.; Regan, M, 'Driver distraction: reflections on the past, present and future', *Proceedings of an International Conference on Distracted Driving, Sydney, Australia, 2-3 June 2005*, Report 67, STAYSAFE Committee, 2006.

[33] Gordon, C, IPENZ Technical Conference, op. cit., p. 9.

[34] Stutts, J, Reinfurt, D, Staplin, L and Rodgman, E, *The Role of Driver Distraction in Traffic Crashes*, AAA Foundation for Traffic Safety, Washington DC, United States, 2001, p. 4.

[35] MUARC, op. cit., p. 63.

[36] ibid.

[37] Makishita, M and Mutoh, M, 'Accidents Caused by Distracted Driving in Japan', *Safety Science Monitor*, Volume 3, 1999, p. 1-2.

[38] Queensland Minister for Transport and Main Roads, Submission to the Inquiry, 22 November 2005, p. 1.

[39] South Australia , Department of Transport, Resources and Infrastructure, *Road Crash Facts 2004 for South Australia*, 2005, p. 16.

www.transport.sa.gov.au/pdfs/safety/road_crash/2004_crash_facts.pdf

[40] Tasmania, Minister of Infrastructure, Energy and Resources, Correspondence, 28 October 2005, p. 1.

[41] Caird, J, Scialfa, C, Ho, G, and Smiley, A, *Effects of Cellular Telephones on Driving Behaviour and Crash Risk: Results of Meta-Analysis*, prepared for CAA Foundation for Traffic Safety, Canada, 2004, p. A-6, citing Lam, L, 'Distractions and the Risk of Car Crash Injury. The Effects of Drivers' Age', *Journal of Safety Research*, Volume 33, pp. 411-419.

[42] McEvoy, S, and Stevenson, M, *An Exploration of the Role of Driver Distraction in Serious Road Crashes*, Report for Motor Accidents Authority, The George Institute for International Health, University of Sydney, New South Wales, 2005, p. 1.

[43] Howard, A and Connell, D, *Attention and Driving,* AA Road Safety Unit, United Kingdom, undated, pp. 2-3 provided in AA Motoring Trust, Correspondence, 6 October 2005.

[44] Stutts, J, et al (2003), p. 13, citing Stevens, A and Milton, R, In-vehicle Distraction in Fatal Accidents in England and Wales, *Accident Analysis and Prevention*, Volume 33, pp. 539-545.

[45] Mr D. Healy, Transport Accident Commission, Notes of Discussion, 6 December 2005, p. 55.

[46] MUARC, op. cit., p. 88.; Victorian Automobile Chamber of Commerce, Submission to the Inquiry, October 2005, p. 3.; Motorcycle Riders' Association Australia, Submission to the Inquiry, October 2005, p. 2.

[47] Glaze, A, and Ellis, J, *2002 Pilot Study of Distracted Drivers*, Virginia Commonwealth University, Transportation and Safety Training Center, Virginia, United States, 2003, p. 2.

[48] TAC, *Wipe off 5* campaign,

www.tacsafety.com.au/jsp/content/NavigationController.do?areaID=13&tierID=2&navID=13347671&navLink=null&pageID=211

[49] Mr M. Green, 'Driver Reaction Time', Visual Expert Human Factors website, www.visualexpert.com/Resources/reactiontime.html.

[50] ibid.

[51] ibid.

[52] Parliament of Victoria, Road Safety Committee, *Inquiry into Road Safety for Older Road Users,* September 2003, p. 234.

Chapter

3

Mobile Telephones

As highlighted throughout this Report, the Committee found that driver distraction can result from a wide range of sources, both in-car and external, and technology and non-technology based. However, most of the road safety research and media focus to date has been on mobile phone use. This Chapter examines issues relating to the use of mobile phones while driving, while subsequent chapters deal with the wider sources of distraction.

Mobile (cell) phones, have been a rapidly embraced technology worldwide. Over 8 million mobile phone handsets were sold in Australia in 2005, more than double the figure from three years earlier.[1]

A road rule prohibiting use of hand-held communication equipment while driving was introduced in Victoria in 1988.[2] The current hand-held mobile phone rule dates from the adoption by Victoria of the harmonised' Australian Road Rules in late 1999.[3]

As part of the *Inquiry into the Country Road Toll* of May 2005, the Committee investigated enforcement of the hand-held mobile phone ban and made recommendations proposing increased penalties for offences, supported by a subsequent education and enforcement campaign and the need for education on the dangers of hands-free use of phones while driving.[4]

The Government Response of 17 November 2005 supported increased penalties in principle and the Government will review penalty levels generally by the end of 2006. Publicity of the dangers of hands-free use was supported and the Government advised that the Transport Accident Commission (TAC) would work with telecommunications providers to promote the safe use of hands-free mobile phones.[5]

The Mobile Phone – An Evolving Device

The first analogue network in Australia commenced in 1987, with the handsets being large and costing over $4000. In 1993 the second generation digital network was launched and subscriber numbers dramatically increased.[6] According to a September 2005 industry survey, 94 per cent (or 19 million) of Australians would have a

mobile phone at the end of 2005-06 (i.e. June 2006), an increase from an estimated 81 per cent the previous year.[7]

Mobile phone use is now widespread in all developed countries and their capabilities are rapidly evolving. Dr M. Regan from Monash University Accident Research Centre (MUARC), noted that:

> Five years ago it *(mobile phone)* used to be used for talking; now it is used for texting; to download video clips from the Internet; it can be used as a navigation system; to play games; and even in some countries to pay bills by beaming a signal from the phone to a machine that registers that you have paid for something.[8]

A camera and radio function on a mobile phone is now a standard feature. Customers will soon be able to download music and live TV to their handset, use it to recognise fingerprints rather than PIN numbers, and gain access to buildings by using it as an electronic pass.[9]

As mobile phone capabilities are enhanced, the opportunity for a driver to be distracted by the device is also increased.

Using a phone while driving has a range of different distractions depending on whether the user is reaching for the phone, answering and talking, dialling a number, sending or receiving text/SMS messages, taking a photo or using other capabilities. Hand-held and hands-free operations are different and there are a range of hands-free configurations, including headsets, earpieces, car sound-system speakers and voice activation. The level of distraction may depend on the particular device configuration, the length of time using the device and the phone user's ability to undertake multiple tasks.

Prevalence of Mobile Phone Use While Driving

A large proportion of the Victorian population own mobile phones and carry them in their vehicles but the extent to which they use the phones while driving is relatively unknown.

According to MUARC, establishing the prevalence of mobile phone use while driving requires answers to two questions:

- What proportion of all drivers at any one time are using phones?; and
- Of those driving at any time who own phones, what proportion use them while driving?[10]

The first question is usually answered by observation of drivers from the roadside, while the second is obtained by either phone or personal interview/questionnaire surveys.

Observational Surveys

The Committee examined evidence from local, interstate and overseas roadside surveys on the extent of mobile phone use by drivers in Victoria.

Melbourne Roadside Surveys

The VicRoads *Driving Around Melbourne* publication in 2003 is based on passenger cars and small vans observed stationary at two intersections on primary and secondary arterial roads in each of the 32 municipalities in the Melbourne Statistical Division in April/May of 2001.[11]

The observations revealed that 74 per cent of the total vehicle distance travelled was with a mobile phone in the vehicle. The publication contained the ratio and/or percentage of the estimated total travel distance, with and without phones, for a wide range of demographics and categories.[12]

The survey found that overall, if a driver had a mobile phone in the car it was turned on for 83 per cent of the total driving time. Males were more likely to have their mobile phone turned on, as were the younger drivers.[13]

In a separate study, Dr D. Taylor and colleagues from the Royal Melbourne Hospital reported the results of observations of 17,000 drivers at 12 metropolitan Melbourne highway sites during three hourly periods on each of three consecutive Fridays in October 2002. Overall 315, or 1.85 per cent, of drivers were observed using a hand-held phone. Older drivers (50 years or more) had a significantly lower observed usage rate (0.5 per cent) than younger or middle aged drivers. The rate in the early evening (5-6 pm) was significantly higher (2.35 per cent) than in the morning or mid-afternoon hours. No statistically significant differences were found between gender or in the three highway types – metropolitan, central business district and freeway exits.[14]

Perth Roadside Surveys

In Perth, Western Australia researchers observed drivers 40 times in summer daytime at 19 major road locations and compared results to a year earlier. The results reported in 2001 found that 1.5 per cent were using hand-held mobile phones, with 78 per cent being male and 64 per cent less than 40 years old. Usage remained constant over the one year period and, while varying between sites, did not differ significantly by time of day.[15]

In a later survey, researchers at The George Institute for International Health, University of Sydney, conducted a crash risk

study in Perth using data from April 2002 to July 2004, and found that:

> Although not based on rigorous sampling methods, periodic roadside observations conducted in Perth before, during and after our study indicated that about 2 per cent of drivers were illegally using hand held phones.[16]

The Committee observes that while the 'two per cent' figure seems to be widely quoted for Australia, it appears to be based on a small number of observations at Melbourne and Perth intersections. The situation for moving traffic in those cities, in other cities or towns or in country situations is unknown. Nevertheless, in the absence of more comprehensive data, the Committee accepts that the current best estimate of illegal hand-held use by drivers at any one point in time in Melbourne is of the order of 1 in 50 drivers.

Unlike in Australia, there have been national statistical surveys of hand-held phone use in the United States and the United Kingdom for a number of years. Both have developed out of pilot studies conducted in conjunction with longer running roadside observational surveys of occupant restraint use.

United States Roadside Surveys

In the United States, four daylight surveys have now been held by the National Highway Traffic Safety Administration (NHTSA) - in 2000, 2002, 2004 and 2005. The last two surveys covered 1200 sites and observed 38,000 and 43,000 cars, vans/sports utility vehicles and pick-up trucks respectively. Overall hand-held use in the USA, now described as 'holding a phone to their ears', has increased from 3 per cent in 2002, to 4 per cent in 2002, 5 per cent in 2004 and 6 per cent in 2005.[17]

A large number of motorist demographics and location characteristics are observed.[18] Some results of the 2005 survey are:

- wide variation by age group, with 10 per cent of 16-24 year olds holding a phone, compared to 1 per cent of ages 70 years and over;
- female use is now 8 per cent, compared to 5 per cent for males;
- higher use by those in suburban areas, up from 4 per cent in 2004 to 7 per cent; and
- an increase in the number of drivers speaking with headsets on.[19]

Using other sources of information on hand-held/hands-free usage, the 2005 NHTSA publication reports an estimated 10 per cent of

vehicles in the typical daylight moment whose driver is using some type of phone, whether hand-held or hands-free.[20]

In addition to this national United States study, there have been various state-based USA surveys. For example, observations of 14,000 vehicles at 85 sites throughout North Carolina reported in 2001 found an overall hand-held rate of 3.1 per cent, consistent with the national results of the time, but lower than the 5 per cent reported in Texas.[21]

Studies have also been held in Michigan and Minnesota, the latter showing 3.7 per cent hand-held use in daylight hours in 2005. This was slightly lower, 0.5 per cent, than in 2004, but the difference was not statistically significant.[22] Minnesota studies have also shown hand-held phone use is linked to lack of safety belt use, hence cell phone users involved in a crash are also more likely to sustain greater injury should a crash occur.[23]

Surveys in New York State and Connecticut, one month before, immediately after the 1 November 2001 New York hand-held cell phone ban and 16 months after, showed an initial reduction in hand-held use in New York to 1.1 per cent, which later reverted to the pre-ban levels of approximately two per cent. Overall rates in Connecticut did not change.[24]

In the University of North Carolina study reported by Stutts (2003), 34 per cent of the drivers of 70 vehicles whose driving was observed using hidden cameras used a phone at some stage during the three hours of 'coded' driving. In terms of the proportion of total time in which all vehicles were moving this amounted to 1.3 per cent.[25]

Of these observations a phone was in conversational use 1.1 per cent of total driving time, 0.2 per cent dialling and 0.02 per cent answering.[26] When only the 34 per cent of drivers were included this value was 3.8 per cent.[27] The study report did not specify whether use was hand-held or hands-free.[28]

United Kingdom Roadside Surveys

On behalf of the United Kingdom Department for Transport, TRL Limited has conducted regular six monthly Seat Belt Surveys at around 30 sites chosen to represent all types of roads.[29] In October 2000, the surveys were expanded to observe mobile phones. The results show the level of phone use declines with increasing age and are slightly higher for men than for women.[30]

Following preliminary trials, separate more technologically-advanced Mobile Phone Surveys were conducted by TRL at 39 sites in October 2002 and September 2003, the later involving nearly 110,000 cars and approximately 27,000 other vehicles.

The Mobile Phone Surveys gather hand-held and hands-free use, assisted by an electronic detector that alerts the observer that a phone is being used in the nearby vicinity (up to 40 metres). It thus enables free-flowing traffic to be observed, although no driver characteristics are obtained.[31]

Subsequent to the U.K. hand-held phone use ban introduced on 1 December 2003, further surveys have been held, covering 30 sites in south east England six-monthly.[32]

The latest results, for weekdays in April 2005 and weighted by the travel on the various road classes, show 1.5 per cent of car drivers using hand-held and 1.2 per cent hands-free, and a total of 2.7 per cent. For other vehicles the figures were higher at 2.4, 1.2 and 3.6 per cent respectively.[33]

Comparison of the results of the past four surveys shows that, after a slight decline after the ban on hand-held use, the overall hand-held rate was almost identical to 18 months earlier. Interestingly, hands-free use declined and is continuing to decline, though the law is only aimed at hand-held use.[34]

Though the Mobile Phone Surveys gather no data on driver characteristics a TRL leaflet mentions that, from the Seat Belt Surveys:

> … drivers aged under 30 years were almost twice as likely to be using a mobile phone as those aged 30 and over.[35]

TRL authors Broughton and Hill (2005) also report:

> Another result from the Seat Belt Survey is that car drivers who were using mobile phones were more than twice as likely as non-users to be driving while not wearing a seat belt, and a similar difference was found among van drivers. This may indicate that using a mobile phone whilst driving unbelted are manifestations of a person's general willingness to take risks while driving, or indifference to or ignorance of these risks.[36]

The authors also compared the phone usage results of the Seat Belt and Mobile Phone observations and found that hand-held use was similar but the Seat Belt Survey:

> … observed only about one third of the use of hands-free phones. This demonstrated the value of the electronic detector in assisting human observers.[37]

Monitoring Mobile Phone Use by Victorian Drivers

As noted above, in both the United States and the United Kingdom there are now well established regular programs monitoring the prevalence of mobile phone use while driving. In particular, TRL Limited in the UK had found a means of electronically detecting use of mobile phones in moving vehicles.[38]

There is now a need for similar monitoring programs to be developed in Victoria. Evidence put to the Committee supports the need for improved data on monitoring.

MUARC recommend that regular exposure surveys need to be developed, implemented and analysed to determine under what conditions, how often and for how long, drivers engage in distracting activities.[39] VicRoads also recommend improved data on the prevalence of mobile phone use and to allow on-going tracking of such use.[40] The Royal Australasia College of Surgeons submission also recommended establishing the current level of phone use to establish a baseline for measuring the effectiveness of future countermeasures.[41]

The Committee note that the UK and USA publications give considerable description of the technical details for the surveys, including how interpretive issues were addressed. Of particular interest is the use in the UK of phone usage detectors to estimate hands-free use.[42]

Victoria needs to build on the overseas data collection and interpretative experience. Desirably, similar definitions and procedures should be used to enable international comparisons. The Committee notes that the selection of the number and location of sites and the duration of observations are important in order to obtain representative data.

Recommendation 3

That VicRoads undertake a comprehensive roadside observational study to determine the prevalence of both hand-held and hands-free mobile phone use by drivers in Victoria that will provide a benchmark for future studies and a basis for measuring the effect of any countermeasures.

Questionnaire Surveys

In addition to the abovementioned observational surveys, the Committee also examined evidence on questionnaire surveys.

Transport Accident Commission

The Transport Accident Commission (TAC) provided a summary of a telephone interview survey of 550 Victorian motorists conducted by Sweeney Research in November 2004. The key findings were:

- 82 per cent owned a mobile phone;
- ownership was highest amongst those aged 16-29 years;

- 19 per cent of owners admitted having used the phone while driving in the previous month;
- 21-29 year old males were the most frequent users;
- mean use while driving was 7.5 times per month of those admitting usage; and
- the highest rates were amongst middle-aged and country drivers.[43]

Based on the above finding, it can be estimated that about 15 per cent of all Victorian drivers have used a phone while driving in the previous month.

Telstra Telephone Surveys

Telstra surveys conducted throughout Australia since 2001 provide the following insight into driver attitudes and opinions on mobile phone usage:

- one third of the 750 drivers in the 2004 Telstra survey reported making calls while driving in the previous week and more than half answer the phone when it rings;[44]
- one in six motorists in the April 2003 survey had sent text/SMS messages while driving, up from one in five in a smaller 400 person survey in late 2001;[45] and
- in 2004, 58 per cent of drivers aged 17 to 29 years regularly read text/SMS while driving and 37 per cent regularly sent SMS while driving.[46]

AAMI Telephone Surveys

Insurance company AAMI Limited, has conducted larger (2400 person) telephone opinion surveys in most Australian motor vehicle insurance markets for over ten years, including separate surveys of young drivers, 18 to 24 years, for the past five years.[47] Results in 2005 include:

- 53 per cent of all drivers confirm they have used a mobile phone without a hands-free kit when driving;
- one in five drivers use a hand-held mobile phone regularly;
- 21 per cent of metropolitan drivers often use a phone without a hands-free kit compared to 16 per cent in regional areas;[48]

- young drivers are one-and-a-half times more likely to use a hand-held phone than other drivers (77 per cent compared to 50 per cent); and

- young drivers are also two-and-a-half times more likely to have sent or read a text message while driving (68 per cent compared to 25 per cent).[49]

Sydney Municipal Survey

A study commissioned by the City of Sydney and Marrickville Council in New South Wales, collected data by telephone from 203 respondents and two focus groups. The aim was to determine the level of awareness of driver distraction, driver beliefs and attitudes on the issue of driver distraction and the extent drivers participate in distracting behaviour.[50]

The results indicated:

- 22 per cent of respondents said they had talked on a hand-held phone, and 29 per cent on a hands-free phone while driving during the survey week;

- only 14 per cent of drivers admitted to text-messaging (sending or receiving) while driving; and

- young drivers were more likely to have engaged in text messaging (20 per cent males and 26 per cent females compared).[51]

Perth Injured Drivers Survey

As part of the crash risk study in Perth, Dr S. McEvoy, of The George Institute for International Health, University of Sydney, et al (2005), interviewed 941 drivers who owned or used a mobile phone and attended an emergency department after a crash between April 2002 and July 2004. Nine per cent reported frequent use while driving and 45 per cent admitted to occasional use.[52]

Overseas Surveys

Dr M. Sullman of Massey University, Palmerston North (New Zealand) and Mr P. Baas of Transport Engineering Research New Zealand Limited, reported in 2004 that over 57 per cent of participants in a New Zealand survey used mobile phones when driving, with 83 per cent of these being hand-held. The users tended to be young males from urban areas, who have later model cars and high average mileages.[53] It should be noted that there are no restrictions on mobile phone use while driving in New Zealand.

In 2002, the Gallup Organisation, for NHTSA, conducted a nationally representative sample survey of the views of 4,000 drivers on driver distraction. In relation to cell phone use it found approximately 30 per cent of all drivers use a cell phone while driving to make outgoing or ingoing calls on at least some of their driving trips. American drivers estimated they spent an average of 4.5 minutes on a call. Approximately one-third of calls were with a hands-free model with speakerphone or head-phones. [54]

A Transport Canada survey in 1997 found 16 per cent of Canadian drivers use cell phones while driving. The Traffic Injury Research Foundation's *Road Safety Monitor* annual telephone surveys of 1200 Canada drivers on a range of safety issues shows the proportion of drivers who use cell phones increased from 20.5 per cent in 2001 to 31.7 per cent in 2004, and 30.7 per cent in 2005.[55]

Troglauer and colleagues of the Danish Transport Research Institute, in a 2005 paper *Extent and variations in mobile phone use among drivers of heavy vehicles in Denmark*, reported more than 99 per cent of 1044 truck drivers surveyed by questionnaire used a phone while driving. Despite a ban on hand-held phone use 31 per cent reported doing so.[56]

The Committee notes that different opinion survey methods and a lack of clarity about frequency of use make it difficult to draw firm conclusions on usage in Australasia. The Committee also notes a lack of information about use in rural cities, towns or country areas.

Effect of Mobile Phone Use on Driving Performance

There have been several studies on the effect of mobile phone use on driving performance, some in laboratories, others in vehicle simulators, on closed-circuit tracks and in a few cases in actual on-road conditions. As stated in the MUARC submission:

> There is a large body of knowledge regarding the impact of mobile phone use on driver performance and safety – more than any other distraction. This knowledge is limited, however, to that relating to the use of the device to converse and, to a far lesser extent, to send text messages. At present, the effect on driving performance of using mobile phones to access emails and the internet and to perform other functions has not been studied.
>
> Using a phone while driving can distract drivers visually, physically and/or attentionally.[57]

The MUARC submission provided a table summarising 29 publications into 9 categories of performance.[58] In short MUARC stated that collectively the literature showed using a mobile phone while driving can:

- impair correct lane position ability;

- impair appropriate and predictable speed ability;
- result in longer reaction times;
- result in drivers missing traffic signals;
- reduce functional field of view;
- result in shorter distances following a vehicle in front;
- result in driver's accepting gaps in traffic which are not large enough;
- increase mental workload;
- encourage eyes looking straight ahead rather than scanning road ahead; and
- reduce awareness of surrounding situation.[59]

In addition to experimental observations of driver behaviour, there have been some surveys of how drivers rate various distracting tasks.

Work by Westat consultant Mr N. Lerner for NHTSA reported in 2005 looked at the willingness to multi-task of 88 drivers in the Washington, DC area.[60] Unlike some other researchers, who have produced similar comparisons of driver willingness to engage in tasks and their perceived risks from focus group discussions, the participants responded following an 'on-road' procedure. Lerner ranked mobile phone risks as follows, from highest risk to lowest:

1. take notes during phone conversation;
2. key in call; open/listen to Voicemail; look up number;
3. extended conversation; and
4. answer a call; speed dial; short exchange of information.[61]

Hand-Held Phones

As indicated earlier it is an offence for Victorian motorists to use hand-held mobile phones while driving (see Chapter 7). It is also clear that different use of mobile phones can lead to different types and levels of distraction.

The MUARC submission reported that a number of studies have looked at the effect on driving performance of manually dialling numbers on hand-held phones, but fewer have examined the impact

of answering a phone and none directly.[62] Also, according to MUARC:

> Numerous studies have examined the effect of conversing on a hand-held phone on driving behaviour and safety.[63]

In summarising research publications both MUARC and VicRoads reached similar conclusions, with MUARC stating that:

> … holding a conversation on a hand-held phone can significantly impair drivers' ability to maintain their speed and position on the road, increase their reaction time to hazardous events by up to 50 per cent or result in drivers failing to detect traffic signals and hazards at all. Increases in subjective mental workload, frustration and perceived time pressure have all been reported.[64]

and:

> … it is not just the physical distraction of handing the phone that presents a significant safety hazard, but also the attentional distraction of being engaged in a conversation.[65]

Hands-Free Phones

MUARC advise there have been several studies on the effect of dialling a phone number on a hands-free phone, however, there have been no studies on the effect on driving of answering hands-free phones.[66]

Both the MUARC and VicRoads submissions summarise five dialling studies, particularly noting the effect of voice-activated dialling:

- Lamble, et al (1999) found, in an on-road study, that dialling had slightly less effect than conversing, but still resulted in slower brake reaction times;[67]
- Lesch and Hancock (2004), in a closed-road study, found increased braking times and reduced stop light compliance;[68]
- Schreiner and colleagues (2004), again in a closed-road study, found driver performance in detecting forward and peripheral events was less affected by voice-activated dialling;[69]
- Tornros and Bolling (2005), found reaction times in a simulator were similar, but mean speed decreased more when dialling hand-free;[70] and
- Mazzae et al 2004 (2004) reported that drivers in their simulator study found hands-free dialling less mentally demanding and it was easier to maintain speed and lane position.[71]

Both submissions conclude that dialling a number on a hands-free phone has less effect than hand-held phone dialling, and that voice activation can further reduce the effect.[72] VicRoads note that one reason for the development of hands-free phones was to eliminate or reduce the physical distraction of handing the phone. However, hands-free phones can still distract the attention of drivers.[73]

The MUARC and VicRoads submissions summarise a simulator study of 30 participants reported by Haigney and colleagues (2000), who found mean heart rate increased when conversing, regardless of type of phone, which the authors concluded were related to the cognitive demands of the conversation.[74] Evidence also highlights more recent research confirms that conversing affects hands-free phone driving performance in a similar manner to hand-held phones.[75]

MUARC note that the extent to which conversation effects performance is determined by the difficulty or emotion of the conversation.[76]

Text Messaging

The Committee's evidence highlights that text messaging while driving presented a far greater risk than dialling or conversing on the phone. This can be attributed to the extent of eye diversion from the road and the need to use at least one hand while texting.

In raising concern over text messaging, MUARC's Dr Regan stated that:

> We have a whole system that is really geared to use the phone to text messages more than to talk. It is cheaper to text and it is easier for them to get away with doing that. The sad thing is that the people doing that are the young people and, as we will see, they are much more vulnerable to the effect of distraction. [77]

The existing laws prohibiting the use of a hand-held mobile phone are covered in Chapter 7. The laws only prohibit text messaging in so far as that activity is performed using a hand-held phone. The Committee is concerned that current laws would appear to allow text messaging from hands-free phones (located in a phone cradle), despite the significant distraction caused by texting.

To date there has been limited research on the distracting effects of sending or receiving text messages while driving.

In the United Kingdom, the Direct Line insurance company engaged the public relations firm MORI to survey the opinions of 2,000 drivers. Texting was considered the most distracting activity, ahead of reading a map, using a phone, eating or changing a cassette tape.[78]

Both MUARC note stated that they knew of only two studies to investigate the impact of texting on driving, both in simulators. One was a small scale study in Sweden by Kircher and colleagues (2004) that found retrieving a message increased reaction times to a simulated motorcycle hazard.[79] The other was conducted with 20 young novice drivers at MUARC, sponsored by the NRMA Motoring and Services and NRMA Insurance organisations and reported in Hosking et al (2006).[80]

The MUARC study found that when sending or receiving text messages, the participant's ability to maintain lateral position on the road and respond to traffic signals was reduced. The study also found:

> Participants spent approximately 10 per cent of time with their eyes off the road when not text messaging, but this percentage increased to approximately 40 per cent when participants were both retrieving and sending text messages. This percentage equated to drivers spending about 12 seconds of each 30 second text messaging episode with their eyes off the road. The frequency and duration of glances away from the road was also substantially larger when text messaging.[81]

At a Committee briefing in Sydney in February 2006, Mr J. Brown, a road safety policy specialist with NRMA Motoring and Services, stated that one of the reasons for conducting the experiments was to create a compelling argument for young text-using drivers as to why they should stop their illegal and dangerous behaviour.[82]

The Committee is particularly concerned about the apparent hazards of texting, especially the evidence about the lengthy period looking away from the road. Given the popularity of texting by young people, who already have a much higher crash risk than older drivers, specific attention should be given to warning of the danger of text messaging while driving.

Factors That Impact on Driving Performance

According to MUARC there are a number of driver and task characteristics which reduce the impact of mobile phone use on driving performance. These include:

- the amount of time the driver spends engaging in the task;
- secondary task complexity;
- current driving demands;
- driver experience and skill; and
- the willingness of the driver to engage in the task.[83]

Time Spent Using Phone

The Committee heard anecdotal evidence that the length of time a driver uses a mobile phone can impact upon the level of distraction. Without any real scientific evidence to support this view, it would appear logical that a brief conversation of 15 seconds or less is unlikely to have the potential to distract to the same extent as a 10 minute conversation where the driver can be totally engaged in conversation. However, as is the case with all forms of driver distraction and inattention, it only takes a split second error for potential fatal consequences.

The University of North Carolina study, as reported by Stutts (2003), shows many distracting behaviours, such as mobile phone use, are predominantly undertaken when the vehicle is stationary. Of the three hours of coded driving activity during a week of driving for each of 70 drivers studied only 1.3 per cent of their total travel time was interacting with a mobile phone.[84] According to MUARC, drivers were more likely to do this while stationary, suggesting that drivers do this at 'safer' driving times.[85]

Type and Complexity of Phone Conversations

In addition to the length of a conversation, the Committee also found the nature and complexity of a phone conversation can impact on distraction levels.

There have been a growing number of overseas studies relating to the complexity or emotional level of conversations. One of the first was by McKnight and McKnight (2003).[86] More recently simulator studies by Al Tarawneh et al (2004) and Patten (2004) have found slower response times with more complex verbal tasks than simpler tasks.[87]

In terms of on-road experiments Harbluk, et al (2002) of Transport Canada investigated the impact of cognitive distraction on visual behaviour for 21 drivers who drove an instrumented vehicle along a city test route in Canada. The researchers found drivers spent more time with their eyes focussed centrally, less time looking for peripheral hazards, braked harder and perceived higher driver workload and distraction when performing complex tasks.[88]

As noted by MUARC:

> One concern that has been raised with previous research examining the use of mobile phones while driving has been the use of artificial mathematical or verbal tasks to simulate phone conversations. … While these tasks may be practical to implement, the extent to which they are representative of typical phone conversations and the demands associated with these is questionable.[89]

As a response, some studies are now using naturalistic phone conversation. MUARC describe one study by University of Michigan researchers Rakauskas et al (2004) which found that, although the use of the phone reduced driving performance, the level of conversational difficulty did not affect performance on mean speed, speed or steering variability or subjective mental effort.[90] One explanation, by Dr. D. Shinar of Ben-Gurion University of the Negev in Israel, may be that:

> …naturalistic conversations require less cognitive effort than the verbal reasoning and mathematical tasks used in previous studies.[91]

Shinar et al (2005) also found performing a mathematical task produced a worse driving performance in a simulator than an emotional conversation.[92] MUARC comment that studies that have used maths or verbal tasks might have over-estimated the adverse driving effects of mobile phone use.[93]

Some researchers, such as Manalavan et al (2002), have argued that there is a difference between conversations between passengers who are aware of the current driving situation and a conversation on a mobile phone with someone who cannot see the situation.[94] However, investigations by Swedish researchers Esbjornsson and Juhlin from The Mobility Studio, Interactive Institute (published in 2003) observed and recorded real life mobile phone conversations, found:

> … a number of examples in the conversations taking place in crowded and narrow streets where the remote conversationalist were provided with resources to understand the traffic situation. Thus, the conversationalists could collectively adapt to the road context.[95]

The Swedish authors were also critical of some simulator or 'on the road' studies, stating that the interest to control the experiment very much distorted the results of phone conversations studies. They believed a so-called 'phone conversation' was unrealistic.[96]

Another criticism is that many studies have examined only a limited number of trials or drivers. The recent study reported by Shinar et al (2005) of 30 participants found a learning effect, with MUARC concluding that:

> Clearly, further research is needed in this area before any firm conclusions can be drawn. However, the study does highlight the need for research to utilise more ecologically valid tasks to examine the effects of performing a secondary task on driving.[97]

Commenting on the same study, VicRoads stated that:

> It is possible that the effects of conversing on a mobile telephone are more subtle than the effects of complex cognitive tasks and less able to be detected using simulator studies and simple on-road measurement approaches. It is also possible that the relationship between mobile phone

> use and crash risk relates to dialling and having to answer the telephone more than it does to conversing on the telephone.[98]

The Committee conclude that many of the experiments of the effect of mobile phone conversations on driving appear to be more designed for experimental repeatability and validity rather than representing real life situations. The context and content of conversations is crucial and appears not to be adequately taken into consideration in many of the experiments conducted so far.

Phone Design

The physical design and type of the mobile phone is one factor which influences task demand characteristics.[99] MUARC stated that a number of simulator studies, such as that of Haigney, et al (2000) with thirty young participants and Strayer and colleagues (2001) found similarly poorer driving performance for both hand-held and hands-free phones.[100]

There have been attempts to determine if various types of hands-free phones have different effects on performance. MUARC reported a study by Matthew et al (2003) which found a personal hands-free ear-piece kit had a greater performance than an external speaker, while another by Mazzae et al (2004) found a cradle-mounted phone faster to answer as a headset.[101]

MUARC stated that the task of physically manipulating the phone adversely affects driving and that conversing has also been shown to be distracting. However, the Committee noted that differences between various types of hands-free phone have not yet been extensively studied.[102]

Driving Task Demands

Evidence suggests traffic density and the complexity of the traffic environment can influence the distraction resulting from mobile phone use. For instance, using a mobile phone on a quiet country road may be considerably different to that in a busy urban environment.[103]

Research by Strayer and Johnston (2001) of the University of Utah demonstrated poorer tracking performance, while Strayer et al (2003) demonstrated increased reaction times in a simulated driving task in more complex environments.[104] However, in a recent simulator experiment at MUARC, Horberry and colleagues (2006) reportedly failed to find any interaction between the complexity of the driving environment and conversing on a hands-free mobile phone.[105]

The MUARC submission commented that:

> It is possible that increasing the number of objects that are not central to the driving task has little effect on increasing the demands of the driving task because drivers simply ignore environmental features not essential to the driving task when under increased load (e.g. when performing a secondary task).[106]

The influence of adverse weather conditions has also been shown by Cooper and Zheng (2002) to adversely affect the ability of a driver using a phone to make safe cross-traffic turning decisions in a closed-track experiment.[107]

The Committee concluded that while scientific evidence is sparse and derived from a few simple experiments it would seem logical that the higher the traffic demand task the greater the potential for distraction to lead to deterioration in driving performance. Context is therefore important in interpreting the possible consequences of driving performance.

Driver Age and Driving Experience

Research shows older people and young novice drivers are less able to share their attention between two concurrent tasks.[108] Both MUARC and VicRoads quoted a number of generally simulator studies which compared small numbers of participants in a variety of young and old age groups and showed 'worse performance' for the novice and the oldest age groups.[109]

There is some evidence, such as that of Horberry et al (2006) that older drivers reduce speed or avoid using phones, in order to compensate for the effects of phone use.[110]

Phone Experience

Until recently the many experiments conducted by researchers have been brief one-off events, with no consideration of whether participants might improve their ability to perform the artificial experimental tasks if undertaken repeatedly. As mentioned earlier, a recent simulator study by Shinar et al (2005) with 30 participants in five 30-minute simulator sessions over a two week period found a learning effect such that;

> … over the course of the five sessions, the negative effects of the telephone tasks on driving performance diminished, such that, on several of the driving measures, there was no difference between performance in the distraction and no-distraction conditions. [111]

While the Shinar et al study may be small and the findings isolated, the Committee notes with interest the comment by VicRoads, in their submission, that:

> It also suggests that experience with mobile telephone use while driving may help reduce the distracting effects reported in most studies. [112]

While Shinar and colleagues found performance on the experiments plateaued by the fourth session for the younger drivers and the fifth for the older drivers, the effects of longer periods of experience in real driving situations have yet to be explored scientifically.

The Committee considers this may be the case with someone who is experienced in sending quick text messages with minimal eye glance from the road, however, the sending of text messages from hand-held phones while driving is currently illegal in Victoria and evidence throughout this report suggest the action is more dangerous than talking on a mobile phone.

The Committee believes drivers who are inexperienced in using a mobile phone while driving should be educated on the benefits of using hands-free devices and how to minimise distraction risks. Tips on how to use such a mobile phone while driving are provided later in this chapter.

Compensatory Behaviour

The Committee also received evidence on the question of whether drivers, consciously or unconsciously, adapt their behaviour in order to attempt to maintain safe driving while using a phone. MUARC considered that this can occur at a number of levels ranging from the strategic (e.g., choosing not to use a phone) to operational, for example:

- decreasing speed;
- increasing distance to the vehicle ahead;
- changing the balance between driving and phone tasks in response to changes in the road environment; and
- adopting a lower standard in certain driving tasks, such as checking mirrors and instruments less frequently/often.[113]

Both MUARC and VicRoads listed a number of studies, again mostly in simulators, which have demonstrated such compensatory behaviour.[114] These were:

- Brookhuis et al. (1991) – found drivers paid less attention to checking mirrors, etc, on a quite motorway but did not alter their attention to other traffic on a busy ring road;[115]
- Haigney et al. (2000) – mean speed and standard deviation of accelerator travel decreased;[116]

- Strayer et al. (2003) – increased following distance;[117]
- Rakauskas et al. (2004) – lower speed but increased variability;[118] and
- Strayer and Drews (2004) – again increased following distance, but in many cases insufficient to avoid collisions.[119]

In a presentation at the University of Sydney in March 2006, Dr D. Shinar (of Ben-Gurion University) stated that his recent simulator-based research, using more realistic verbal tasks:

> … portrays a more complex and possibly more optimistic view of cell phones and driving than previously suggested.
>
> Deleterious effects are clearly there initially, especially for older drivers, but they diminish with practice.[120]

Dr Shinar also described the results of the first study of 24 volunteer drivers, half aged 60 years and over, talking on a mobile phone while driving in their own cars in a 45 minute pre-determined urban journey.[121] Shinar concluded that phones do interfere with cognitive processing, including from visual inputs, and that the impact increases with age. The ability to use a phone while driving increases with practice. They are still dangerous, but we don't know by how much relative to other tasks.[122]

As the Committee found in the *Inquiry into the Safety of Older Road Users,* many drivers apparently compensate for decreases in their driving capabilities by travelling at different times, using different routes, reducing speeds and/or taking other precautions.[123] Compensatory behaviours also appear to occur with at least some drivers who use phones while driving.

The Committee concluded that the use of a mobile phone while driving can impair driving performance in a wide range of measures thought to be safety-related. However, in some instances, drivers consciously or subconsciously attempt to compensate for these deficits.

The Committee consider that VicRoads should continue to monitor research on the effects of various aspects of mobile phone use on driving performance. Particular emphasis should be given to aspects such as the context, duration and content of phone conversations; the validity and repeatability of experiments; effects which vary with the age of the driver; the design of the mobile phone; and the extent of experience drivers have had with using a mobile phone while driving.

Recommendation 4

That VicRoads continue to monitor research on the effects of various aspects of mobile phone use on driving performance, with a particular emphasis on:

- **the context, duration and content of conversations;**
- **experimental validity and repeatability;**
- **age-related differences;**
- **phone design and new technology; and**
- **experience with using a mobile phone while driving.**

Impact of Mobile Phone Use on Crashes and Crash Risk

A number of the major studies described earlier in the report provide information on the extent of involvement of mobile phones in crashes. Other research examines the relative crash risks of using a phone while driving.

Crash-based Studies

Major Studies

The major crash studies described earlier reveal the following extent of mobile phone-associated crashes as a percentage of all distraction-related crashes:

- 1.5 per cent - 1995-1999 US Crashworthiness Data System examined by the University of North Carolina;[124]
- 3.9 per cent – 2002 Virginia Commonwealth University study;[125] and
- 5 per cent - 2002 and 2003 New Zealand Ministry of Transport study.[126]

The Committee notes that based on the above studies, mobile phone impacts on distraction-related crashes are small but nonetheless worthy of examination in a Victorian context.

The Committee was advised by the New Zealand Ministry for Transport that almost one half (48 per cent) of mobile phone–related crashes involved drivers under 24 years of age.[127] However, this may just reflect the high phone usage of this age group rather than a higher relative risk of crashing.

Proportion of all Crashes

The Committee found it difficult to determine the proportion of total crashes in which a phone was involved. The New Zealand study estimated distraction-related crashes comprised 10 per cent of all casualty crashes reported to police. This implies crashes involving mobile phone crashes were about 0.5 per cent of all reported crashes.[128]

VicRoads stated that it was only aware of one study in Australia on the involvement of mobile phone use in crashes, that by a Sydney hospital researcher Mr. L. Lam (2002).[129] That study examined records of over 414,000 crashes reported in New South Wales from 1996 to 2000 and showed only 134 directly related to hand-held phone use.[130] According to MUARC the:

> … results revealed that, of all the age groups examined, drivers in the 25 to 29 age group had the highest risk of being involved in a fatal or injury crash while using a hand-held phone. [131]

VicRoads question the study results noting that:

> … it used an unreliable source of information about telephone usage and cannot be considered to be a valid study of the relationship between mobile telephone use and crashes.[132]

In a study of over 223,000 crashes from 1992 and 1995 in the United States, Violanti (1998) found a phone present in four per cent of fatal crashes. Almost eight per cent of drivers in these crashes were reported to be using them at the time of the crash.[133] Hence they represented about 0.3 per cent of fatal crashes.

In the United States the National Conference of State Legislatures *Cell Phones and Highway Safety 2005 State Legislature Update*, authored by Mr. M. Sundeen, provides a table of published state statistics of phone involvement in crashes. For the six largest states the proportions ranged from 0.09 per cent of 147,000 crashes in Pennsylvania to 0.31 per cent of 367,000 crashes in Texas.[134] It should be noted that the crashes involved both casualty and property-damage only severities.

A subjective estimate from a Swedish Road Administration official was that cell phones were associated with from 0.1 to 1.0 per cent of fatal crashes, but a higher proportion of non-injury crashes.[135]

The Australian Mobile Telephone Association (AMTA), pointed out that road fatalities had continued to decrease in Victoria over a period, from 1999 to 2004, in which the number of mobile phone customers had increased by about 2.5 to 3 times.[136]

Dr S. Job, General Manager Road Safety, Roads and Traffic Authority (RTA), New South Wales, made a similar observation:

> If this distraction factor from mobile phones were as large as it is meant to be we would have seen a huge increase in fatalities when mobile phones became more and more common. I do not believe we saw that. I think it is quite difficult to judge if because of the improvements in cars and roads and various other enforcement factors, but if they were adding 30 per cent or anywhere near what speed adds in, I think we would have seen much more of an increase than we have seen. However, it is a significant factor and one of which we do not have a very good understanding.[137]

Type of Phone Activity

As stated earlier in this Chapter, the various uses of a mobile phone will have different impacts on distraction and consequently may impact on crash causes and probabilities.

The New Zealand Ministry of Transport study categorised crashes involving telecommunications equipment as follows:

- 40 per cent were reacting to an incoming call or message;
- 21 per cent using the device to dial a number, sending a text message, etc;
- 15 per cent searching for or replacing the phone or pager;
- 14 per cent were conversing; and
- the remainder reacting to a falling/moving device or suspected of using a device.[138]

In the *Inquiry into the Country Road Toll* the Committee quoted the number of crashes in Japan from 1997 to 1999 by mobile phone task. Converting those 2418 crashes to percentages shows 45 per cent were receiving a call, 20 per cent dialling, 15 per cent talking and 20 per cent classified as 'other'.[139]

The Committee observes the Japanese proportions are similar to those in New Zealand and highlight the extent of crashes involving handling the mobile phone rather than just conversing. It should be mentioned that Japan only commenced a ban on hand-held mobile phones in November 1999 while no ban currently exists in New Zealand.

Crash Severity

There is some evidence that mobile phones are more likely to be involved in rear-end and other less severe crashes and incidents.[140] The submission from the Queensland Minister for Transport and Main Roads noted that analysis of enforcement and crash data over the past five years identified a strong increase in the use of hand-held mobile phones, resulting in a loss of control due to driver

distraction.[141] Between 2001 and 2004 there were 94 crashes where talking on a phone was a contributing factor. Of these 80 per cent were property damage or minor casualty crashes, 18 per cent resulted in a hospitalisation and 2 per cent a fatality.[142]

The Committee concluded that, in addition to improving Victorian crash data related to driver distraction, any information on mobile phone use in crashes should determine the type of device and how it was being used at the time of the crash.

Recommendation 5

That VicRoads and Victoria Police improve crash data systems on mobile phone use, including type of device and the context in which it was being used when the crash occurred.

Crash Risk Studies

Further to the actual crash studies based on police records there have also been a number of survey studies which have attempted to determine whether using a mobile phone increases the likelihood of being involved in a crash.

The most frequently mentioned study is that conducted by medical researchers Redelmeier and Tibshirani in Toronto, Canada and reported in *The New England Journal of Medicine* in 1997. They examined phone records of 699 drivers involved in property damage-only crashes in Toronto in a 14 month period commencing in July 1994 and found phones had been used in the 10 minutes before the reported time of the crash in 170 instances, whereas 37 had used the phone during the same period the day before and 13 had used the phone during both periods.[143] Their major finding was that:

> … using a cellular telephone was associated with a risk of having a motor vehicle collision that was about four times as high as that among the same drivers when they were not using their cellular telephones.[144]

According to MUARC, the authors observed no difference between hand-held and hands-free phones, thereby questioning the policy of some jurisdictions of banning only hand-held use while driving.[145]

MUARC elaborated on concerns of researchers over the validity of the results:

> … the data method used in the study does not allow for an accurate conclusion to be drawn regarding whether the drivers was on the phone at the time of the accident or immediately after the accident occurred.[146]

More recently, researchers from The George Institute for International Health, University of Sydney conducted a study of 456 mobile phone owners in Perth, Western Australia who had been involved in a crash resulting in hospital attendance between April

2002 and July 2004. The results published in McEvoy et al (2005) found that a hand-held phone was 4.9 times more likely to have been used within 10 minutes before the crash than in a similar period at the same time on the day a week earlier. With respect to hands-free phones it was 3.8 times more likely.[147]

There has been some criticism by researchers and others about the validity of some of the crash risk estimates. For example, Dr F. Bellavance, of the Transportation Safety Laboratory in Montreal, examined three problems with the cross-over study design used by Redelmeier and Tibshirani (1997) and McEvoy et al (2005).[148] They were:

- the exact time of collision is unknown – they are typically recorded to 5 or 15 minute values in police records and in one study 61 per cent of calls to emergency services were prior to the recorded time of crash;

- the choice of length of hazard interval (e.g., 10 minutes) for which the driver is at risk; and

- were people driving during the 'control' period?[149]

Dr Bellavance also re-examined phone records of 407 cases from data used by Laberge-Nadeau et al (2003) in Canada and found 81 drivers used the mobile phone within ten minutes prior to the reported crash, while 19 used the phone in the same interval 24 hours earlier, a ratio of 5.1.[150] He concluded that the three epidemiological studies showed a significantly increased risk, but it was difficult to determine the exact magnitude.[151]

There has also been criticism of the ability of such studies to prove a causal relationship. For example, in a 2003 literature review for the Scottish Executive, consultant Dr B. Wallace states that epidemiological studies cannot demonstrate that mobile phone use causes crashes. Wallace criticises the in-exactness of reported crash times, making comparison of crash times and mobile phone call records 'extremely problematic'.[152]

An April 2006 report of a driver inattention analysis based on the Virginia Tech '100-Car' study provides new insights on what drivers do in normal driving compared to prior to incidents. Dialling a hand-held phone increased individual risk by 2.8 times, and talking or listening by 1.3 times, but this latter result was not statistically different to normal driving.[153] Both dialling and conversing had the same proportion of the crashes/near-crashes – 3.6 per cent each.[154] Dialling was more dangerous but less frequent, while conversing was less dangerous but done for longer periods.[155]

VicRoads concluded that mobile phone use appears to increase the risk of crash involvement based on limited research, while the RACV considered it difficult to determine the crash risk of using a mobile phone while driving in Victoria.[156]

MUARC, in their submission, were more definite, concluding that mobile phone use whilst driving:

> … can increase the risk of being in a collision by up to four times. Importantly, these findings are true for both hand-held and hands-free mobile phones, although hands-free phones have been shown to be slightly less distracting than hand-held phones when performing phone tasks such as dialling.[157]

However, the Committee concluded that the evidence on the relationship between use of mobile phones while driving and crashes is complex and the results not definitive. A casual would appear to depend very much on the type of driver, the driving context, the length and content of the communication/conversation and particular phone 'configuration'.

Victoria lacks crash data demonstrating that mobile phone use is a major cause of casualty crashes. There is also a lack of exposure data that would assist in determining the relative crash risk of driving and various activities associated with hand-held and hands-free use.

Improving Mobile Phone Technology

The Committee received evidence which referred to technology aimed at preventing any mobile phone use in moving vehicles. Other evidence suggested there might be ways to improve phone technology to make it safer to use when driving.

The Hobsons Bay City Council submission, in effectively recommending banning all mobile phone use while the engine is running, stated that the advantage of such a blanket ban would be that consideration could be given to:

> … amending Australian Design Rules to require car manufactures to install devices that would not allow operation of a mobile phone whilst the engine is running or to require mobile phones to be so configured as not to operate within the metal confines of a passenger cabin.[158]

The Royal Automobile Club of Victoria (RACV) submission stated that Cell Block Technologies had developed a method to prevent mobile phones accessing the telecommunications network which could be used for phone-restricted areas such as hospitals. Further research would be needed to see if it was suitable for in-car use.

The Committee perceives a number of problems with such an approach; most notably that such technology would also prevent

passengers legitimately using mobile phones, and that calls to emergency services might be prevented.

According to AMTA, blocking mobile phone communications is currently illegal under the federal telecommunications legislation, except for national security purposes.[159]

The RACV described a 'polite phone' developed by Motorola, which detects driving conditions (eg. stopped, easy or complex conditions) and can automatically divert to a hands-free unit, let only certain phone numbers through, or divert all calls to voicemail. It will also automatically call a predetermined number if an airbag is activated.[160] Consequently, the RACV recommended that:

> Given the potential of the use of technology in managing the use of mobile phones in vehicles, technological development is a high priority. The motor (manufacturing) and telecommunications industries and road safety stakeholders should establish a dialogue to seek ways to address this.[161]

The federal Department of Transport and Regional Services is currently investigating a Queensland proposal of introducing an Australian Design Rule requiring Bluetooth mobile phone technology in all new cars.[162] Bluetooth enables electronic devices to communicate by wireless over short distances. ITS Australia have suggested 100 per cent fitment of Bluetooth to vehicles.[163]

The Committee considers ways of improving mobile phone technology in vehicles should be explored before giving any consideration to banning all use of mobile phone use in vehicles.

The Government should encourage development of safer mobile phone technology including integrated speech-controlled systems.

The topic of future vehicle technology is discussed further in Chapter 8.

Recommendation 6

That the State Government work with the vehicle industry to encourage development of safer in-car mobile phone technology including integrated speech-controlled phone communication systems.

Publicity on How to Safely Use Mobile Phones

In the *Inquiry into the Country Road Toll* the Committee considered that a broad educational strategy to mobile phone use was required and recommended:

> 59. ... That an education and enforcement campaign be conducted to reinforce the dangers of using a hand-held phone, in any manner, while driving.[164]

and:

> 60. That in conjunction with telecommunications providers, the Transport Accident Commission conduct an education and advertising campaign to inform the community of the dangers associated with using hands-free mobile phones while driving, and to provide advice on their appropriate use.[165]

The Government Response of November 2005 supported the recommendations, stated that TAC would work with telecommunication providers on a campaign to promote safe hands-free use of phone, and would directly support Victoria Police through public education in a coordinated campaign that targets the non-use of restraints and mobile phone use.[166]

While TAC have recently been supporting police in their local enforcement efforts, including trialling new in-vehicle video recording technology, the Committee received no evidence that the recommended publicity campaigns have commenced.[167]

Australian Mobile Telecommunications Association

The Australian Mobile Telecommunications Association (AMTA) believe the mobile phone industry and governments should educate customers about the appropriate use of mobile communications products in vehicles.[168]

AMTA advised it had developed 10 driver safety tips based on their research, a review of similar safety guidelines around the world and discussion with Australian road safety authorities.[169] The tips marketed under the slogan 'Safety is Your Most Important Call' are:

1. Always use hands free.
2. Plan your trip and make calls when stationary.
3. Don't call in heavy traffic or weather conditions.
4. Don't engage in complex or emotional conversations.
5. Use message services to answer calls.
6. Pull over safely if you stop to make a call.
7. Use your phone's features to reduce the effort to make a call.
8. Never take notes, look up phone numbers, read or send SMS.
9. Tell callers you're driving while on the phone.
10. In emergencies use your phone to call for help.[170]

AMTA have actively promoted the safety tips and sought the Committee's support in helping introduce materials into driver education programs in Victoria.[171]

Telstra

In December 2002 Telstra launched their '*Drive Safe. Phone Safe*' campaign, consisting of:

- community service announcements on radio and television (over the Christmas and New Year period);
- customer brochures available at Telstra shops;
- working with hand-set manufacturers to discount the price of personal hands-free devices in the Telstra shops; and
- ensuring the safety message was kept alive long term by sponsoring research by the University of Western Australia Injury Research Centre.[172]

The Telstra internet site contains information on *Drive Safe, Phone Safe*, which list four safe driving tips. Briefly these are:

- when behind the wheel, never use a handheld phone – it is illegal;
- it the phone rings allow it divert to Messagebank (i.e. voicemail);
- stop in a safe place if you need to call or retrieve a message; and
- never dial a number, take notes, write down or send an SMS while driving.[173]

Telstra has also made media announcements, typically reporting the results of their public opinion surveys.[174] Motorola also provide safe driving advice with their products and on their websites.[175]

United Kingdom

One innovative approach to promoting safe mobile phone use is the UK Department for Transport's *Switch off before you drive off* campaign. The Department's website states that:

> This year the mobile phone campaign will concentrate on cinema and radio advertising encouraging drivers to get into the habit of switching off their mobiles while driving.
>
> Apart from in a vehicle, one of the only places people normally switch off their mobile phone is in the cinema. It's already in the cinema audience's consciousness to switch off their mobiles before a film.
>
> The THINK! Campaign wants to encourage the audience to repeat this behaviour in their vehicles, and explaining that by leaving their phone on

> they could be tempted to answer it which could be dangerous or even fatal.[176]

The Committee recommends that, in addition to better publicity to seek driver compliance with the ban on hand-held phones, the use of hands-free phones in hazardous circumstances should be discouraged by publicity campaigns.

Victorian Government agencies should consider emulating the innovative UK publicity campaign.

Victorian Government Agencies

The Committee's evidence suggests that to date, there has been a significant lack of publicity campaigns by Victorian Government authorities on the dangers of driving while using a mobile phone.

The VicRoads and TAC websites briefly cover safe mobile phone use while a study of the Victorian Police and Department of Justice road safety websites reveals no mentions of safe mobile phone use.[177]

The VicRoads website tips on mobile phone use have a very low profile, being included as one of 13 topics in the employer-orientated 'Safe driving program for businesses'.[178] The three tips provided on a Smart Facts card for managing a phone when driving are:

- Organise for a message bank service to take your calls when driving;
- Pull off the road to take calls if it is safe to do so; and
- Arrange to ring the caller back at a time when you are not driving. [179]

Similarly worded messages are contained in the corresponding VicRoads Fact Sheet.[180]

The TAC website provides general information about the problem of using a mobile phone while driving.[181]

The Committee consider that internet-based safety advice on phone use while driving by Victorian government agencies should have a much higher profile.

The TAC conducted a television and outdoor advertising campaign in October 2004. The television advertisement, viewable on the TAC Safety Website, shows a young female driver glancing to read a text message and colliding with a young boy crossing the road.[182] The concluding message was:

> Even a moment's distraction can lead to a lifetime of consequences – if you're on the phone, get off the road.[183]

The Committee consider this is the type of publicity campaign which is needed on a continuing basis.

The RACV submission noted that, to their knowledge, there has been no evaluation of the effectiveness of the Victorian education campaigns.[184]

The TAC believe the 2004 campaign was successful, although a significant proportion of the population still continue to risk using a hand-held phone.[185] The TAC stress that public education has an important role to play in a broader approach to minimise mobile phone use while driving.

As indicated earlier, the Committee heard of particular concerns about the use of text messaging by young drivers, including proposals for a particular focus on this in publicity campaigns. Meanwhile another potential hazard is emerging – the Multimedia Messaging Service (MMS). These contain pictures, graphical and/or video-content, as well as text.

The Committee consider that publicity campaigns should warn of the dangers of drivers being distracted by both text and video messaging, with a special focus on young drivers. A more consistent set of safety messages and tips should also be adopted by the various message providers.

Recommendation 7

That relevant State Government agencies implement targeted publicity campaigns warning drivers of the dangers of mobile phone distraction, including:

- **the use of hands-free phones in hazardous traffic conditions;**
- **the dangers of text and video messaging; and**
- **the greater risks associated with complex phone conversations.**

In developing publicity campaigns, the Government should examine the recent '*Switch off before you drive off*' campaign undertaken in the United Kingdom.

Chapter 3 Recommendations

Recommendation 3

That VicRoads undertake a comprehensive roadside observational study to determine the prevalence of both hand-held and hands-free mobile phone use by drivers in Victoria and to provide a benchmark for future studies and a basis for measuring the effect of any countermeasures.

Recommendation 4

That VicRoads continue to monitor research on the effects of various aspects of mobile phone use on driving performance, with a particular emphasis on:

- **the context, duration and content of conversations;**
- **experimental validity and repeatability;**
- **age-related differences;**
- **phone design and new technology; and**
- **experience with using a mobile phone while driving.**

Recommendation 5

That VicRoads and Victoria Police improve crash data systems on mobile phone use, including type of device and the context in which it was being used when the crash occurred.

Recommendation 6

That the State Government work with the vehicle industry to encourage development of safer in-car mobile phone technology including integrated speech-controlled phone communication systems.

Recommendation 7

That relevant State Government agencies implement targeted publicity campaigns warning drivers of the dangers of mobile phone distraction, including:

- **the use of hands-free phones in hazardous traffic conditions;**
- **the dangers of text and video messaging; and**
- **the greater risks associated with complex phone conversations.**

In developing publicity campaigns, the Government should examine the recent '*Switch off before you drive off*' campaign undertaken in the United Kingdom.

Endnotes

[1] Australian Mobile Telecommunications Association (AMTA), *Industry Statistics*, www.amta.org.au/default.asp?Page=339

[2] Road Safety (Traffic) Regulations 1988, Regulation 1505, S.R. No. 30/1988 (Vic).

[3] Road Rules, Victoria, Gazetted 28 October 1999, Rule 300, p. 221.

[4] Parliament of Victoria, Road Safety Committee, *Inquiry into the Country Road Toll*, May 2005, pp. 260-267 and Recommendations 59 and 60, pp. 265, 267.

[5] Government of Victoria, *Government Response to Inquiry into the Country Road Toll*, 17 November 2005, pp. 20-21.

[6] Australian Mobile Telecommunications Association (AMTA), *A Snapshot of Australia's Mobile Telecommunications Industry* , www.amta.org.au/AMTA/default.asp?ID=365

[7] Allen Group, *Australian Mobile Telecommunications Industry – Economic Significance*, Report for AMTA, September 2005, www.amta.org.au/default.asp?Page=628

[8] Dr M. Regan, Monash University Accident Research Centre (MUARC), Notes of Discussion, 6 December 2005, p. 35.

[9] Smith, B, 'It's a mobile phone SIM, but not as you know it', *The Age*, 6 January 2006.

[10] MUARC, Submission to the Inquiry, December 2005, pp. 5-6.

[11] VicRoads, *Driving in Melbourne*, Melbourne, 2003. pp. 6, 37.

[12] ibid., pp. 37-43.

[13] ibid, pp. 42-43.

[14] Taylor, D, Bennet, D, Carter, M, and Garewal, D, 'Mobile Telephone Use among Melbourne Drivers: A Preventable Exposure to Injury Risk', *Medical Journal of Australia*, Volume 179, Number 3, August 2003, pp. 140-141.

[15] Horberry, T, Bubnich, C, Hartley, L, and Lamble, D, 'Drivers' Use of Hand-Held Mobile Phones in Western Australia', *Transportation Research Part F*, (p. 213-218,) 2001, abstract.;

Caird, J, Scialfe, C, Ho, G, and Smiley, A, *Effects of Cellular Telephones on Driving Behaviour and Crash Risk: Results of Meta Analysis*, University of Calgary and Human Factors North Inc., Canada, October 2004, p. A-4.

[16] McEvoy, S, Stevenson, M, McCartt, A, Woodward, M, Haworth, C, Palamara, P, and Cercarelli, R, 'Role of Mobile Phones in Motor Vehicle Crashes Resulting in Hospital Attendances: A Case-Crossover Study', *British Medical Journal*, London, UK, 12 July 2005, pp. 1, 5. (BMJ.Com)

[17] Utter, D, *Passenger Vehicle Driver Cell Phone Use - Results from the Fall 2000 National Occupant Protection Use Survey*, DOT HS 809 293, National Highway Traffic Safety Administration (NHTSA), Washington, DC, United States, 2001.;

Glassbrenner, D, Cell *Phone Use on the Roads in 2002*, DOT HS 809 580, NHTSA, Washington, DC, United States, November 2005.;

Glassbrenner, D, *Driver Cell Phone Use in 2004 – Overall Results*, DOT HS 809 847, NHTSA, Washington, DC, United States, February 2005.;

Glassbrenner, D, *Driver Cell Phone Use in 2005 – Overall Results*, DOT HS 809 967, NHTSA, Washington, DC, United States, December 2005.

[18] ibid., p. 2.

[19] ibid., pp. 1-2.

[20] ibid., p. 1.

[21] Reinfurt, D, Huang, H, Feaganes, J, and Hunter, W, *Cell Phone Use While Driving in North Carolina*, University of North Carolina Highway Safety Research Center, North Carolina, United States, 2001, page (i).

[22] Eby, D and Vivoda, J, *Driver Hand-Held Cellular Phone Use in Minnesota*, August 2005, Minnesota Office of Traffic Safety, St. Paul, Minnesota, United States, September 2005, p. 3. www.dps.state.mn.us/OTS/crashdata/default.asp

[23] ibid., p. 4.

[24] McCartt, A and Geary, L, 'Longer Term Effects of New York State's Law on Drivers' Handheld Cell Phone Use', *Injury Prevention*, Volume 10, 2004, pp. 11-15.

[25] Stutts, J, Feaganes, J, Rodgman, E, Hamlett, C, Meadows, T, Reinfurt, D, Gish K, Mercandante, M, and Staplin, L, *Distractions in Everyday Driving*, AAA Foundation for Traffic Safety, Washington, DC, United States, June 2003, Table 10, p. 42.

[26] MUARC, op. cit., pp. 7-8.

[27] Stutts, J, et al, 2003, Table 10, p. 42

[28] MUARC, op. cit., p. 8.

[29] TRL Limited, *Restraint Use by Car Occupants, 2003-2005*, LF2096, Wokingham, United Kingdom, p. 1.

[30] Broughton, J, and Hill, J, *Mobile Phone Use by Drivers, 2000-03*, Prepared for Road Safety Strategy Division, Department for Transport, Report TRL634, TRL Limited, Wokingham, United Kingdom, 2005, p. 1.

[31] ibid., pp. 1 and 7.

[32] TRL Limited, *Mobile Phone Use by Drivers, 2003-2005*, LF2097, Wokingham, United Kingdom, p. 2.

[33] ibid, Table 2, p. 2

[34] ibid., p. 2.

[35] ibid.

[36] Broughton, J, and Hill, J, op. cit., p. 1.

[37] ibid.

[38] ibid., p. 7.

[39] MUARC, op, cit., Recommendation 2, p. 88.

[40] VicRoads, Submission to the Inquiry, November 2005, p. 24.

[41] Royal Australasian College of Surgeons, Submission to the Inquiry, 19 October 2005, p. 1.

[42] Broughton, J, and Hill, J, op. cit., p. 7.

[43] Transport Accident Commission (TAC), Submission to the Inquiry , November 2005, p. 7.

[44] Telstra, Media Release, 22 December 2004.

[45] Telstra, Media Releases, 3 August 2003 and 7 June 2002.

[46] Telstra, Media Release, 22 December 2004.

[47] AAMI Limited, *Crash Index - Annual Road Safety Index, Australia*, September 2005; AAMI Limited, *Young Drivers Road Safety Index, Australia*, November 2005.

[48] AAMI Limited, *Crash Index - Annual Road Safety Index, Australia*, September 2005, p. 4.

[49] AAMI Limited, *Young Drivers Road Safety Index, Australia*, November 2005, p. 2.

[50] Baker, S, and Spina, K, 'Drivers' Attitudes, Awareness and Knowledge of Driver Distractions: Research from two Central Sydney Communities', *Proceedings, International Conference on Driver Distraction, Sydney, 2-3 June, 2005*, Report 67, STAYSAFE Committee, 2006, p. 4 of paper.

[51] ibid.

[52] McEvoy, S, et al, op. cit., p.3.

[53] Sullman, M, and Baas, P, 'Mobile Phone Use amongst New Zealand Drivers', *Transportation Research Part F*, Volume 7, 2004, abstract, p. 95.; MUARC, op. cit., p. 8.

[54] Royal, D, *National Survey of Distracted and Drowsy Driving Attitudes and Behaviours: 2002, Volume 1 – Findings Report*, Report Number 809 566, National Highway Traffic Safety Administration, Washington DC, USA, March 2003, Executive summary, pp. 1-2.

[55] Beirness, 'Distracted Driving: The Role of Survey Research', Presentation, *International Conference on Distracted Driving, Toronto, Canada, October 2005*, p. 13 citing a Transport Canada survey, www.distracteddrving.ca/english/program.cfm

[56] Troglauer, T, Hels, T, and Christens, P, 'Extent and variations in mobile phone use among drivers of heavy vehicles in Denmark', *Accident and Analysis Prevention*, Volume 38, 2006, pp. 105 and 107.

[57] MUARC, op. cit., p. 8.

[58] ibid., Table 2.1, p. 12.

[59] Ibid., p. 9.

[60] Learner, N, 'Deciding to be Distracted', *Proceedings of the Third International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design*, Paper 73, Maine, United States, June 2005, pp. 501.

[61] ibid., p. 504.

[62] MUARC, op. cit., pp. 10-11.

[63] ibid, p. 13.

[64] ibid.; VicRoads, op. cit., p. 13.

[65] MUARC, op. cit., p. 13.
[66] ibid.
[67] MUARC, op. cit., p. 13.; VicRoads, op. cit., p. 12, citing Lamble, D, Kauranen, T, Laakso, M, and Summala, H. (1999).
[68] MUARC, op. cit., p. 13.; VicRoads, op. cit., p. 12, citing Lesch, M. and Hancock, P. (2004).
[69] MUARC, op. cit., p. 14 and Table 2.1.; VicRoads, op. cit., p. 12, citing Schreiner, C, Blanco, M, and Hankey, J.(2004).
[70] MUARC, op. cit., p. 14 and Table 2.1.; VicRoads, op. cit., p. 12, citing Tornros, J, and Bolling, A. (2005).
[71] MUARC, op. cit., p. 14.; VicRoads, op. cit., p. 12, citing Mazzae, E, Ranney, T, Watson, G, and Wightman, J. (2004).
[72] MUARC, op. cit., p. 13.; VicRoads, op. cit., p. 12.
[73] VicRoads, op. cit., p. 12, citing Wheatley, D. (2000).
[74] MUARC, op. cit., p. 15.; VicRoads, op. cit., p. 13, citing Haigney, D, Taylor, R, and Westerman, S. (2000).
[75] MUARC, op. cit., p. 15.; VicRoads, op. cit., p. 13.
[76] MUARC, op. cit., p. 15.
[77] Dr M. Regan, MUARC, Notes of Discussion, 6 December 2005, p. 35.
[78] MUARC, op. cit., p.15, citing Direct Line (Motor Insurance) (2002).
[79] MUARC; op. cit., p. 16.;VicRoads, op. cit., p. 13, citing Kircher et al (2004).
[80] Hosking, S, Young, K., and Reagan, M, *The Effects of Text Messaging on Young Novice Driver Performance*, Report Number 246, MUARC, 2006. p. iii.
[81] ibid., p. 20.
[82] Mr J. Brown, road safety specialist, NRMA Motoring and Services, Notes of Discussion, Sydney, 23 February 2006, p. 52.
[83] MUARC, op. cit., p. 17.
[84] Stutts, J, et al (2003) , pp. 8-9 and 34-44.
[85] MUARC, op. cit., p. 18.
[86] ibid., p. 19, citing McKnight and McKnight ((1993).
[87] ibid., p. 20, citing Al-Tarawneh et al (2004) and Patten et al (2004).
[88] ibid., p. 20, citing Harbluk, Noy and Eizenman (2002).
[89] ibid., p. 20, citing Rakauskas et al (2004).
[90] ibid., pp. 20-21, citing Rakauskas, Gugerty and Ward (2004).
[91] ibid., citing Shinar, D, Tractinsky, N and Compton, R, 'Effects of Practice, Age and Task Demands on Interference from a Phone Task while Driving', *Accident Analysis and Prevention*, Volume 37, 2005, pp. 315-326.
[92] ibid.
[93] ibid.
[94] Esbjornsson, M and Juhlin, O, *Combining Mobile Phone Conversations and Driving – Studying a Mundane Activity in its Naturalistic Setting*, The Mobility Studio, Interactive Institute, Sweden, 2003. www.tii.se/mobility (publications, 2003), p. 10, citing Manalavan, P, et al (2002).
[95] ibid.
[96] ibid., p. 1.
[97] MUARC, op. cit., p. 21.
[98] VicRoads, op. cit., p. 17.
[99] MUARC, op. cit., p. 18.
[100] ibid., p. 19, citing Haigney et al (2000) and Strayer et al (2001).
[101] ibid., citing Matthews et al (2003) and Mazzae et al (2004).
[102] ibid., p. 19.
[103] MUARC, op. cit., p. 21.; VicRoads, op. cit., p. 17.
[104] MUARC, op. cit., p. 22, citing Strayer, D, and Johnson, W, (2001) and Strayer, D, et al (2001).
[105] ibid., citing Horberry, T, et al (2006).
[106] ibid., p. 23.

[107] VicRoads, op. cit., p. 17, citing Cooper and Zheng (2002).

[108] ibid. p. 18.

[109] MUARC, op. cit., pp. 23-25.; VicRoads, op. cit., p. 18.

[110] MUARC op. cit., p. 25, citing Horberry, T, et al (2006).

[111] VicRoads, op. cit., p. 19.; Shinar, D, Presentation, The George Institute for International Health, Sydney, 29 March 2006, slide p. 17.

[112] VicRoads, op. cit., p. 19.

[113] MUARC, op. cit., p. 25.

[114] ibid., pp. 25-26.; VicRoads, op. cit., p. 19-20.

[115] Brookhuis, K, De Vries, G, and De Waard, 'The Effects of Mobile Telephoning on Driving Performance', *Accident Analysis and Prevention*, Volume 23, pp. 309-316, 1991.

[116] Haigney, D, Taylor, R and Westerman, S, 'Concurrent Mobile (Cellular) Phone Use and Driving Performance: Task Demand Characteristics and Compensatory Processes', *Transportation Research Part F*, Volume 3, pp. 113-121, 2000.

[117] Strayer, D, Drews, F, and Johnston, W, 'Cell-phone Induced Failure of Visual Attention During Simulated Driving', *Journal of Experimental Psychology: Applied*, Volume 9, pp. 23-32, 2003.

[118] Rakauskas, M, Gugerty, l, and Ward, N, ' Effects of Naturalistic Cell Phone Conversation on Driving Performance', *Journal of Safety Research*, Volume 35, pp. 453-464, 2004.

[119] Strayer, D, and Drews, F, 'Profiles of Driver Distraction: Effects of Cell Phone Conversations on Younger and Older Drivers', *Human Factors*, Volume 46, pp. 640-649, 2004.

[120] Shinar, D, op. cit., 2006, slide 33.

[121] ibid., slide 36.

[122] ibid., slide 42.

[123] Parliament of Victoria, Road Safety Committee, *Inquiry into Road Safety for Older Road Users*, September 2003, pp. 119-121.

[124] Stutts, J, Reinfurt, D, Staplin, L and Rodgman, E, *The Role of Driver Distraction in Traffic Crashes*, AAA Foundation for Traffic Safety, Washington, DC, United States, 2001, p. 4.

[125] Glaze, A, and Ellis, J, *2002 Pilot Study of Distracted Drivers*, Virginia Commonwealth University, Transportation and Safety Training Center, Virginia, United States, 2003, p. 14.

[126] Internal distractions were 44 per cent of all distraction crashes, telecommunications devices comprised 12 per cent of internal distraction-related crashes and mobile phones were 93 per cent of these. MUARC, op. cit., p. 29.

[127] Ministry of Transport, New Zealand, Tape of Discussions, Wellington, 16 May 2006.

[128] Gordon, C, 'A Preliminary Examination of Driver Distraction Related Crashes in New Zealand', *Proceedings of an International Conference on Driver Distraction, Sydney, 2-3 June 2005*, Report 67, STAYSAFE Committee, 2006, p. 3 of paper.

[129] VicRoads, op. cit., p. 20.

[130] Caird, J, et al (2004), pp. 4 and A-6, citing Lam, L, 'Distractions and the Risk of Car Crash Injury. The Effects of Drivers' Age', *Journal of Safety Research*, Volume 33, pp. 411-419.

[131] MUARC, op. cit., p. 24.

[132] VicRoads, op. cit., p. 20.

[133] VicRoads, op. cit., p. 22 , citing Violanti (1998).

[134] Australian Mobile Telecommunications Association (AMTA), Presentation, 30 January 2006, slide 6, p. 3.

[135] Mr C. Patten, Swedish National Road Administration, Correspondence, 2 November 2005.

[136] AMTA, op. cit., slide 7, p. 4.

[137] Dr S. Job, General Manager Road Safety, Roads and Traffic Authority, New South Wales, Notes of Discussion, Sydney, 24 February 2006, p. 92.

[138] Gordon, C, op. cit., p. 10 of paper.

[139] Parliament of Victoria, Road Safety Committee, *Inquiry into the Country Road Toll*, Table 9.9, p. 262, citing Green, P, 2000, p. 4.

[140] AMTA Presentation, 30 January 2006, slide 8, p. 4 citing a 2001 study of 9000 Norwegian drivers.; Neale, V, et al (2005), p. 9.

[141] Queensland, Minister for Transport and Main Roads, Submission to the Inquiry, 22 November 2005, p. 2.
[142] ibid.
[143] Redelmeier, D, and Tabshirani, R, 'Association Between Cellular-Telephone Calls and Motor Vehicle Collisions', *The New England Journal of Medicine*, Volume 336, Number 7, 1997, p. 455.
[144] ibid., p. 456.
[145] MUARC. op. cit., p. 27.
[146] ibid.
[147] McEvoy, S, et al (2005), op. cit.
[148] Bellavance, F, 'Linking data from different sources to estimate the risk of a collision when using a cell phone while driving', Presentation and paper, *International Conference on Distracted Driving, Toronto, Canada, October 2005*.
[149] ibid. presentation, slide 19 and paper, p. 4.
[150] ibid., slide 14.
[151] Ibid., slide 22.
[152] Wallace, B, *External-to-Vehicle Driver Distraction*, Scottish Executive Social Research, Edinburgh, Scotland, 2003, p. 35-36.
[153] Virginia Tech Transportation Institute, *100-Car Naturalistic Driving Study Fact Sheet*: *Driver Inattention Analysis Fact Sheet*, April 2006, p. 1.
[154] Klauer, S, et al (2006), p. xi.
[155] ibid.
[156] VicRoads, op. cit., p. 24.; Royal Automobile Club of Victoria (RACV), Submission to the Inquiry, November 2005, p. 15.
[157] MUARC, op. cit., p. 30.
[158] Hobsons Bay City Council, Submission to the Inquiry, September 2005, p. 3.
[159] RACV, op. cit., p. 22.; Meeting with AMTA representatives, 11 May 2006.
[160] RACV, ibid.
[161] ibid., p. 23.
[162] Australian Transport Council, Communiqué, June 2005, www.atcouncil.gov.au/communiqué/atc21.aspx, p. 5.
[163] ITS Australia, Presentation, 30 January 2006, slide 54.
[164] Parliament of Victoria, op. cit., pp. 265, 267.
[165] ibid., p. 267.
[166] Government of Victoria, *Government Response to the Road Safety Committee Inquiry into the Country Road Toll*, November 2005, p. 21.
[167] TAC, op. cit., pp. 16-17.
[168] AMTA, Presentation, 30 January 2006, p. 12.
[169] AMTA, Submission, p. 15.
[170] ibid., Appendix B.
[171] ibid., p. 17.
[172] Telstra Corporate Communications Centre, 'Phone Safe Drive Safe launch' speech, 20 December 2001.
[173] Telstra, www.telstr.com.au/mobile/life/community/drivesafe.htm (accessed 15 May 2006)
[174] Telstra Corporate Communications Centre, Media Releases: 7 June 2002, 3 October 2002, 3 August 2003, 18 October 2004 and 22 December 2004.
[175] Motorola Australia Pty. Ltd., Submission to the Inquiry, 11 November 2005, p. 1.
[176] Department for Transport, United Kingdom., *Mobile Phones: Switch off before you drive off* , The Think! Road Safety Website, http://www.thinkroadsafety.gov.uk/campaigns/mobilephones/mobilephones.htm
[177] TAC, http://www.tacsafety.com.au/jsp/content/NavigationController.do?areaID=13&tierID=1&navID=AEB30EF97F00000100136DA6C7B5DDD4&navLink=null&pageID=421
VicRoads: http://www.vicroads.vic.gov.au/vrne/vrne5nav.nsf/LinkView/9303F11290C19619CA256FF10009BE47E04D47DE049DA6C0CA256FFE001A5D84

[178] VicRoads, Safer Driving Program for Business, http://www.vicroads.vic.gov.au/VRNE/vrne5nav.nsf/LinkView/F0959E471A60AFC4CA2570070015F0E73CD8E42D8EFAAC0CCA257007000C4CE0

[179] VicRoads, Driving and Mobile Phones Smartfacts card, http://www.vicroads.vic.gov.au/VRNE/vrne5nav.nsf/LinkView/8DC7CBA83E179D5FCA256FEF002757E93CD8E42D8EFAAC0CCA257007000C4CE0

[180] VicRoads, Driving and Mobile Phones Fact Sheet, http://www.vicroads.vic.gov.au/VRNE/vrne5nav.nsf/LinkView/1489A8D5CDC6CAC2CA256FEF001B5EB43CD8E42D8EFAAC0CCA257007000C4CE0

[181] TAC, op. cit.

[182] ibid.

[183] ibid.

[184] RACV, op. cit., p. 21.

[185] Mr D. Healy, General Manager Road Safety, TAC, Notes of Discussion, 6 December 2005, pp. 63-64.

Chapter

4

Video, Audio and other Electronic Devices

In the previous chapter, the Committee highlighted how the rapid growth of mobile phones, coupled with their technological advancement, had led to a potentially dangerous distraction for motorists. Consumer demand and willingness to acquire the latest technology has also seen a growth in video, audio and other electronic devices used in vehicles. The Committee found that many of these devices present a potentially greater in-car distraction than the use of mobile phones.

The Committee's 2005 *Inquiry into the Country Road Toll* examined various vehicle features, including information and entertainment systems, as a potential cause of crashes in country Victoria.[1] The Committee subsequently recommended that VicRoads undertake research to determine the effects and extent of driver distraction of in-car features.[2] The Government responded by referring the Inquiry into Driver Distraction to the Committee in August 2005.

The types of in-built and portable devices considered in this chapter include:

- television receivers;
- visual display screens using Compact Disc (CD), Digital Versatile Disc (DVD), MP4 digital video file and internet-based devices as the source mediums;
- car radios and audio sound systems using cassettes, CD, MP3 and the internet as the source mediums;
- navigation or route guidance systems based on Global Positioning System (GPS) technology; and
- email-related systems, unrelated to mobile phone text messaging systems.

TV and Video Systems

Prevalence of Systems

The inclusion of television, DVD and other video devices in the car is becoming increasingly prevalent. Monash University Accident Research Centre (MUARC) noted that in the United States rear seat TV/DVD systems are one of the best selling in-car devices on the market. In Australia, in-car television devices are less prevalent having only recently entered the market in the more expensive vehicles.[3]

According to both MUARC and VicRoads, rear-seat DVDs are standard in the upmarket Holden Caprice, sales of which are about 500 per year in Australia. Ford Falcon DVD sales since introduction of their roof-mounted DVD units in May 2003 total around 1800, while Ford Territory DVD sales are around 1600 units since March 2004.[4] The Committee is also aware that the sale of portable DVD players with car-kits is becoming increasingly popular.

The Australian Automotive Aftermarket Association (AAAA) noted that three years ago video display unit sales increased 51 per cent, two years ago by 80 per cent and last year over 100 per cent in the aftermarket. Putting this into context, the AAAA advised that total Australian sales of 'electronic devices' for use in cars would be unlikely to be less than 60,000 to 80,000 units nationwide in the last two years.[5]

There is an Australian Design Rule covering the installation and placement of television and Visual Display Unit (VDU) screens in new and imported vehicles so as not to distract the driver when a vehicle is in motion.[6]

There is a similar Victorian Road Rule that also refers to the screen not being placed so that it can be a possible distraction to another driver.[7] The Details of these rules, their enforcement and the situation in other jurisdictions are covered in Chapter 7 on laws and enforcement.

The Committee conclude that while the installation of TV and video systems in motor vehicles remains small relative to the total fleet in Victoria (4.4 million), it is growing rapidly. However, the prevalence of their actual use in Victorian vehicles is unclear.[8]

The Committee supports the recommendation by VicRoads that research into the prevalence of TV/DVD systems be a priority in order to develop effective programs to reduce any harm associated with this potential source of distraction.[9]

Distraction and Crash Risk

The Committee heard that VDUs, such as DVDs, are potentially of greater distraction to a driver than talking on a mobile phone.[10] They could also potentially be a distraction to drivers of other vehicles. However, evidence received by the Committee was inconclusive in terms of the extent of distraction.

Dr M. Regan, a senior research fellow at MUARC, advised the Committee that there is no data on whether VDUs distract other drivers however indications are that back-seat DVDs are a possible auditory distraction for drivers.[11]

According to AAAA, the major reason for fitting in-car video in the rear of a vehicle was to entertain passengers, typically children, and minimise the likelihood of them distracting the driver on long journeys.[12] VicRoads also supported the view that properly installed TV/DVDs had the potential to improve safety by placating children.[13]

In relation to safety, AAAA stated that they had found no research that in-car rear-seat and roof-installed entertainment systems had been a factor in causing crashes.[14] Further, the AAAA didn't believe in-car screens could realistically distract drivers of other vehicles due to the small size of the screens, the presence of internal obstructions and the motion of the vehicles.

Despite the lack of current research, the Committee believes that a mere flicker from in-car video screens might be distracting to other drivers, especially at night and may encourage a curious driver to look at the screen.

Existing Reviews of In-car TV/DVD Video Systems

At the time of completing this Report, the Committee was aware of two reviews being undertaken in Australia on the potential impact on driving of in-car television, DVD/Video systems.

A yet-to-be-published study for the Roads and Traffic Authority (RTA), New South Wales will soon provide results of Australian research on visual display units in a simulated driving environment. The aims of the University of New South Wales research are to evaluate the impact of the audio part of a video, relative to no-sound or a radio; and the visual material positioned as if on the back of the front seat of a vehicle in an adjacent traffic lane compared to no video.[15]

The Committee understands the draft findings from this study conclude that the video displays have the potential to distract drivers in neighbouring vehicles and impair their performance.[16]

In June 2005, the House of Representatives Standing Committee on Transport and Regional Services tabled the *Eyes on the Road Ahead* report into National Road Safety and recommended the Australian Transport Safety Bureau (ATSB) review the potential for video devices to cause driver distraction and propose measures to minimise their impact on driver concentration.[17]

The Australian Government Response supported the recommendation in principle, noted the planned RTA research and commented that the ATSB is awaiting the release of the report and will consider the need for further investigation.[18]

The Committee considers that VicRoads should review the results of the RTA study and possible ATSB investigations for their implications in addressing driver distraction from video display units in Victoria.

Recommendation 8

That VicRoads review the results of the NSW Roads and Traffic Authority study of the distraction from in-vehicle videos and possible subsequent Australian Transport Safety Bureau investigations for their implications in addressing driver distraction in Victoria.

Taxi Video Screens

A further potential distraction for drivers is the recent installation of video screens in the headrests of taxis.

Video screens incorporating advertising could potentially provide money for taxi owners as well as being a source of entertainment and information for passengers. However, consideration should also be given to the potential distraction of other drivers.

The Committee is aware of a trial installation of touch screen units in Melbourne taxis to provide entertainment and information for rear seat passengers. Screens were installed in 50 taxis in 2004 and showed news, sport, weather and advertisements.[19]

In 2006, a series of specifically produced local short films have been made for taxi passenger viewing.[20] While there is value for Victoria's growing film industry to promote its work to a wider audience, the Committee is concerned over the possible distracting effects for the taxi drivers as well as drivers of surrounding vehicles.

Route Navigation Systems

Many luxury cars in Australia already include route navigation systems either as standard or as an option and they are gradually being introduced into less expensive models. After users enter a

destination, usually by a keypad or touch screen, the system provides turn-by-turn instructions on how to reach a destination, either on-screen, by speech or both.[21]

The navigation systems are based on a GPS device which knows, from satellites, where the vehicle is located. This is combined with digital maps for the locality obtained either from CD/DVD devices located in the vehicle, or more recently using data downloaded from the internet. Screens may be built into the vehicle dashboard, often shared with an entertainment function, or be part of pocket-sized dashboard or windscreen-mounted portable devices.

According to ITS Australia, it is believed that Australia currently has the highest usage of hard copy street directories in the world. It is estimated that the total number of in-built and portable units in vehicles in Australia were 225,000 in 2005 and are expected to rise to some 575,000 by 2008.[22]

The Committee observes that the purchase of route navigation systems appears to be growing rapidly, but the prevalence of their actual use and their potential benefits or possible distraction impacts is unknown.

While in-built navigation devices have been fitted to luxury vehicles for more than a decade and they are the most researched of all driver assistance systems, the Committee was not made aware of any research concerning the distracting effects of portable navigation devices.

The Australian Automotive Aftermarket Association (AAAA) believes that in-car navigation systems should be seen as driver aids and that they contribute a net positive benefit to road safety. However, it opposes the use of hand held devices by the driver whilst the vehicle is moving.[23]

Evidence from MUARC and VicRoads highlighted the results of various studies investigating the potentially distracting effects of in-built navigation systems. With respect to destination entry studies, findings included:

- depending on the system and the way information is entered, inputting the destination details could take up to 9 minutes;
- the entry task took substantially longer than phone dialling or radio tuning tasks;
- speech recognition is a viable and quicker means for input and visual/manual methods are ill-advised while driving; and

- drivers using a dashboard-embedded touch-screen in an on-road experiment maintained an acceptable level of driving performance and eye glance behaviour.[24]

Studies of other aspects of route navigation show turn-by-turn guidance by screen and voice provided the best performance, with voice guidance/electronic map the best system and use of a paper map the worst.[25] Specific driver performance effects discovered include reduced mean speed when entering destination details, faster reaction times when using the system compared to a paper map, more time looking at the display and less at the roadway; and drivers saying the systems required less mental workload than a paper map.[26] Navigation information received by hearing is also remembered for slightly longer than by seeing.[27]

The Committee heard that the Netherlands Government provides a tax benefit to encourage the installation of navigation devices due to the safety benefits of a reduced driver workload. ITS Australia advocated similar treatment in Australia for all safety-related technology and that the government fleet take a lead role in car navigation.[28]

In conclusion, the evidence provided to the Committee indicates route navigation systems can reduce a driver's mental workload, however they can be distracting if destination entry occurs while moving, there is no voice guidance and the screen display is complex. Even the most poorly designed systems can be only marginally more complex or distracting than trying to navigate using a paper map.[29]

Email Systems and Portable Computing Devices

As portable computing becomes more widespread, the concept of an AutoPC has emerged. One feature would be access to emails, either viewed on a dashboard screen similar to or combined with that of a modern car radio, or by a speech-based system. The Committee is aware that such systems have recently become a feature in more expensive motor vehicles.[30]

Portable devices brought into vehicles include Personal Digital Assistants (PDAs), Blackberries, laptop/notebook computers and portable games consoles.

Two studies have examined the effect on driving of retrieving, reading and responding to email messages. Both focussed on speech-based systems.[31]

In 2002, University of Iowa researchers used a simulator to investigate the effect of an email system on reaction time to a periodically braking lead vehicle. A 30 per cent increase in reaction

times was measured, accompanied by an increase in simulated collisions and the velocities at which they occurred.[32] A later simulator study by the University of Leeds found drivers adopted longer headways, but again were slower to react and made less corrective steering movements.[33]

As far as the Committee is aware, only the Virginia Tech Transportation Institute '100 Car' study identified portable computing devices as a source of distraction. The authors found PDAs contributed rarely to recorded crashes and near-misses, but this may simply reflect the low ownership and minimal exposure to these devices by the 240 drivers in the study.[34]

The Committee found the use of speech-based email systems can affect performance in simulated driving tasks but there is so far no data that links email use with crashes or crash risk.[35] Given the potential market growth of email systems and portable devices in vehicles, road safety authorities need to closely monitor their application and possible impact on driver performance.

Audio Systems

Listening to and manipulating controls of radios, cassettes, CD players and other audio systems are very common driver activities. Research in driving simulators illustrates how manipulating audio systems adversely affects driving performance, while there is some evidence to indicate such actions are associated with crashes to an equal or greater extent than mobile phones. Even listening to a radio can affect driver performance to some degree. However, the impact of loud music and the effects of different audio content on driver performance is unknown.

The range and complexity of car audio systems has changed considerably in recent years. With such advancements drivers distraction levels are potentially increased. From single band AM radios with simple tuning and volume controls we have moved to multiple bands of AM and FM stations, with more complex push-button station-selection controls and a variety of multiple speaker balance, tone and volume adjustments. Many car radios incorporate steering-wheel volume and tuner controls.[36]

A further potential distraction may arise from the commencement of digital radio in Australia in January 2009. An article in the *Herald Sun* newspaper of 26 May 2006 noted:

> It will open up a new world of in-car entertainment, including more stations and an in-car display listing the artist and the title of the song as it plays. It will even show album covers or traffic information.[37]

Recorded music has also moved from a single cassette tape deck to CD players with multiple discs and more recently MP3 audio-file players containing thousands of music tracks. In addition to in-built sound equipment there are numerous portable audio devices, such as iPods, which can be heard through ear pieces or headphones, or connected by cable or Bluetooth wireless to vehicle-based speakers.

The Committee notes that many of these audio devices have very small screens to display station/track identification and other sound control settings. These small display screens and the actions of searching through the large number of music tracks available could lead to a significant distraction for drivers. In this context, the Committee is aware of one incident where a driver in France, looking at a portable audio player, crashed his car causing the death of a passenger.[38]

In addition, a number of new after-market audio systems feature pulsating graphics on the screens, introducing a new form of distraction.

The Transport Accident Commission (TAC) submission referred to a 2004 telephone survey by motor insurer AAMI which found half of respondents admitted losing concentration while changing a CD, tape or radio. TAC also noted that drivers can spend disturbing amounts of time glancing away from the road when engaged in the most common of activities, such as tuning a radio. Listening to radio and changing CDs can be taken for granted by motorists and unlikely to be consciously recognised.[39]

The Committee found overseas studies showed that crashes associated with radio and other audio or entertainment systems are as high, or substantially higher, than the number of those associated with mobile phone use. For example:

- Stutts (2001) reported 11.4 per cent of distraction-related Crashworthiness Data System crashes from 1995 to 1999 were associated with radio, etc, compared to 1.5 per cent for mobile phones;[40]

- Glaze and Ellis (2003) of Virginia Commonwealth University found 6.5 per cent of the Virginia distraction-related crashes from June to November 2002 involved radio, etc, compared to 3.9 per cent for mobile phones;[41]

- the New Zealand study reported by Gordon (2005) found entertainment systems were at a level comparable to mobile phones, each about 5 per cent of total distraction-related casualty crashes in 2002 and 2003,[42] and

- a postal survey of 9000 Norwegian drivers who had had a crash, reported by Sarberg (2001) of the Institute of Transport

> Economics in Oslo, noted both radios and CD players were involved in more crashes than mobile phones.[43]

MUARC reported several studies had found radio tuning more distracting than dialling or talking on a mobile phone or using a navigation system.[44]

An on-road study by Wikman and colleagues (1998) of the University of Helsinki compared the visual allocation of 23 experienced and 24 inexperienced drivers as they tuned a radio, changed a cassette and dialled a phone on city and rural roads. Drivers spent a greater time looking away from the road when radio tuning than using the phone. Cassette changing had the shortest glances away from the road. The effects were strongest for inexperienced drivers.[45]

Similar results were found in a recent MUARC simulator-based study of 30 drivers in three age groups (less than 25, 30-45 and 60-75 years) undertaking radio/cassette and phone tasks in both simple and complex environments.[46]

Dr. M Regan, MUARC, advised the Committee that:

> Even listening to a radio degrades lane-keeping performance. So this is a classic example of a system that has been around for 40 to 50 years and until recently we had no idea that it affected performance.[47]

The MUARC submission quotes a simulator study of 20 participants on simple and complex roads by Jancke et al (1994) of Heinrich-University, Düsseldorf, Germany which found:

> Listening to the radio program resulted in a strong deterioration in driving performance, as measured by deviations from the correct lane, particularly under the complex driving condition.[48]

In a report for the Swedish National Road Administration by Patten and colleagues (2003) they stated that objective assessments were that a difficult radio-setting manoeuvre was roughly the same as a demanding telephone call. Listening attentively to the radio impairs driving to approximately the same degree as a very simple phone conversation.[49]

The MUARC and VicRoads submissions both mention simulator research by United States consultants Jenness et al (2002) of 26 participants undertaking five distracting tasks. It suggests using a CD player while driving is more distracting than dialling a mobile phone.[50]

MUARC also mention that use of voice/speech recognition controls may minimise distraction when using CD players.[51] Bosch researchers Gartner, Konig and Wittig (2001) studied 16 participants in on-road conditions as part of the EU-project SENECA.[52]

MUARC commented that:

> ... use of a voice-actuated system reduces some of the distraction associated with operating a CD player.[53]

However, MUARC also note this does not affect operations such as getting CDs in and out of cases and inserting them in the player.[54] In this regard the Australian Driver Trainers Association NSW state that:

> CD players should be mounted out of reach of the driver such as in the boot or under the front seat and preferably contain a stacker that contains a number of CDs which can be loaded before the trip starts. These types of CD players already exist and it should not take too much trouble to entrench it in law.[55]

Some evidence suggests that loud music can be distracting to drivers, to drivers of other vehicles and to pedestrians and cyclists. The 2005 AAMI Crash Index publication reported 73 per cent of 2400 telephone survey respondents in most Australian metropolitan and regional centres believe very loud music is a serious distraction.[56] Roadsafe Inner South East also note that loudness of music can prevent drivers hearing emergency vehicle warnings and other audible warnings.[57]

There is also a possibility that the style and mood of music can affect driving. Further research needs to be carried out on this issue as well as the degree to which content of radio programs (eg. music, talk-back, sport) may impact upon driving performance.

As noted earlier, VicRoads recommended research into the prevalence of DVD and TV systems in the Victorian vehicle fleet. The Committee considered that this needs to be extended to include at least use of route navigation systems, portable devices, email and desirably also audio and other electronic devices. This would provide a comparative benchmark for the future prevalence surveys and assist in measuring the effects of any countermeasures.

The Committee consider that, given the widespread use of audio systems while driving, there is a need for the research community to give more consideration to the volume and content of audio material in driver distraction research and to clearly document the audio content used in experiments.

Recommendation 9

That VicRoads undertake a survey on the current use of video, audio and other electronic devices by drivers in Victoria to establish a benchmark for future usage surveys and a basis for measuring the effect of any countermeasures.

Crash Data

The Committee found little detailed information about the involvement of various types of in-vehicle video, audio and other electronic devices in overseas crash data. The analysis of driver distraction crashes in 2002 and 2003 related to 'entertainment systems' by the New Zealand Ministry of Transport appears to be the most detailed data available. However the Committee notes that this category did not include the more recent route navigation system devices.[58]

The Committee concluded that, in addition to improving Victorian crash data related to driver distraction, information gathered on the involvement of video, audio and other electronic devices in Victorian crash investigations should attempt to identify the specific type of device and how it was being used at the time of the crash. In particular there should be a distinction between devices that are part of the vehicle and portable devices brought into the vehicle by the occupants.

Recommendation 10

That VicRoads and Victoria Police improve crash data systems on video, audio and other electronic device use, including the type of device and the context in which it was being used when the crash occurred.

Chapter 4 Recommendations

Recommendation 8

That VicRoads review the results of the NSW Roads and Traffic Authority study of the distraction from in-vehicle videos and possible subsequent Australian Transport Safety Bureau investigations for their implications in addressing driver distraction in Victoria.

Recommendation 9

That VicRoads undertake a survey on the current use of video, audio and other electronic devices by drivers in Victoria to establish a benchmark for future usage surveys and a basis for measuring the effect of any countermeasures.

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That VicRoads and Victoria Police improve crash data systems on video, audio and other electronic device use, including the type of device and the context in which it was being used when the crash occurred.

Endnotes

[1] Parliament of Victoria, Road Safety Committee, *Inquiry into the Country Road Toll*, May 2005, pp. 289-320.

[2] ibid., Recommendation 66, p. 305.

[3] Monash University Accident Research Centre (MUARC), Submission to the Inquiry, December 2005, p. 31.

[4] ibid.; VicRoads, Submission to the Inquiry, November 2005, p. 27.

[5] Mr B. Barnett, Manager Member Services, Australian Automotive Aftermarket Association (AAAA), Minutes of Evidence, 6 February 2006, pp. 115-120.

[6] Department of Transport and Regional Services, Australian Design Rule 42/04 Part 18.

[7] Road Rules – Victoria, Road Rule 299, gazetted 28 October 1999, p. 220.

[8] VicRoads, website, Total motor vehicles registered in Victoria at 30 June 2005, www.vicroads.vic.gov.au/vrne/vrne5nav.nsf/FirstChild/-6FD017FBAD667F0DCA257164007E47F5

[9] VicRoads, op. cit., p. 29.

[10] Dr M. Regan, MUARC, Notes of Discussion, 6 December 2005, p. 44.

[11] ibid., p. 45.

[12] AAAA, Submission to the Inquiry, 26 October 2005, p. 3.

[13] VicRoads, op. cit., p. 28.

[14] AAAA, op. cit., p. 3.

[15] The University of New South Wales, Injury Risk Management Research Centre, *Research Summary 2004*, Sydney, 2005, p. 18.

[16] Dr S. Job, General Manager Road Safety, Roads and Traffic Authority, New South Wales, Notes of Discussion, Sydney, 24 February 2006, p. 96.; Hatfield, J, and Chamberlain, T, 'The Impact of In-Vehicle Displays on Drivers in Neighbouring Vehicles', poster display, *8th World Congress on Injury Prevention and Safety Promotion*, Durban, South Africa, April 2006, p. 4.

[17] Parliament of the Commonwealth of Australia, *National Road Safety – Eyes on the Road Ahead*, *Inquiry into National Road Safety*, House of Representatives Standing Committee on Transport and Regional Services, Canberra, 21 June 2004, Recommendation 15, p. 80.

[18] Australian Government, *Response to the National Road Safety – Eyes on the Road Ahead, An Inquiry into National Road Safety*, 7 December 2005, p. 30.

[19] Matheson, C, 'Drivers to provide soundtracks for films in taxis', *The Age*, 28 February 2006, p. 2. See also TouchTaxi website, www.touchtaxi.com

[20] ibid.

[21] VicRoads, op. cit., p. 33.

[22] Mr B. Stafford, Executive Director, ITS Australia, Minutes of Evidence, 30 January 2006, p. 80.; ITS Australia , Presentation, slide 23.

[23] AAAA, op. cit., pp. 3-4.

[24] MUARC, op. cit., pp. 43-49; VicRoads, op. cit., pp. 33-35.

[25] MUARC, op. cit., p. 47 citing Dingus, T, McGehee, D, Hulse, M, Jahns, S, and Manakkal, N, *Travtek evaluation task C3 – Camera Car Study*, FHWA-RD-94-076, Federal Highway Administration, McLean, Virginia, United States, 1995.;

MUARC, op. cit., p. 48 citing Srinivasan, R, and Jovanis, P, Effect of in-vehicle route guidance systems on driver workload and choice of vehicle speed: Findings from a driving simulator experiment', in Y.I. Noy (Ed.) *Ergonomics and safety in intelligent driver interfaces*, 1997.

[26] MUARC, op. cit., Table 4.1, p. 45.

[27] Patten, C, Ceci, R, Malmstrom, T, and Rehnberg, K, *The Use of Mobile Phones in Road Traffic*, Publication 2003:91, Swedish National Road Administration (SNRA), Borlänge, Sweden, 2003, p. 23.

[28] Mr B. Stafford, Executive Director, ITS Australia, Minutes of Evidence, 30 January 2006, p. 80.

[29] MUARC, Presentation, 6 December 2005, p. 9.

[30] Dr M. Regan, MUARC, Notes of Discussion, 6 December 2005, p. 40.

[31] MUARC, Submission, p. 49.; VicRoads, op. cit., pp. 35-36.

[32] MUARC, op. cit., p. 49.; VicRoads, op. cit., p. 36, citing Lee, J, Caven, B, Haake, S, and Brown, T, 'Speech-based interaction with in-vehicles computers: The effects of speech-based E-mail on drivers' attention to the roadway', *Human Factors*, Volume 45, pp. 631-629, 2002.

[33] MUARC, op. cit., p. 49.; VicRoads, op. cit., p. 36, citing Jamson, A, Westerman, S, Hockey, G, and Carsten, M, 'Speech-based email and driver behaviour: Effects of an in-vehicle message system interface, *Human Factors*, Volume 46, 2004, pp. 625-639.

[34] MUARC, op. cit., p. 53.; VicRoads, op. cit., p. 36, citing Neale, V, Dingus, T, Klauer, S, Sudweeks, J, and Goodman, M, 'An Overview of the 100-Car Naturalistic Study and Findings', Paper 05-0400, *19th International Technical Conference on Enhanced Safety of Vehicles*, Washington, DC, United States, June 2005.

[35] MUARC, op. cit., p. 49.; VicRoads, op. cit., p. 36.

[36] Ford Motor Company of Australia Limited, Submission to the Inquiry, 25 January 2006, p. 2.

[37] McGrath, G, 'Digital means you'll dig it all', *Herald Sun*, 26 May 2006, Car Guide p. 17.

[38] HSV7, *Today Tonight*, 21 March 2006.

[39] Transport Accident Commission (TAC), Submission to the Inquiry, November 2005, p. 4.

[40] Stutts, J, Reinfurt, D, Staplin, L, and Rodgman, E, *The Role of Driver Distraction in Traffic Crashes*, AAA Foundation for Traffic Safety, Washington, DC, United States, 2001, pp. 3-4.

[41] Glaze, A, and Ellis, J, *2002 Pilot Study of Distracted Drivers*, Virginia Commonwealth University, Transportation and Safety Training Center, Virginia, United States, 2003, pp. 2, 14.

[42] Gordon, C, 'What do police reported crashes tell us about driver distraction in New Zealand, 2005: *Road Safety Research, Policing and Education Conference Proceedings*, June 2005, Wellington, New Zealand, Table 4, p. 5 of paper.

[43] Australian Mobile Telecommunications Association, Submission to the Inquiry, 11 November 2005, p. 7, citing Sarberg, F, 'Accident risk of car drivers during mobile phone conversations', *International Journal of Vehicle Design*, Volume 26, Number1, pp. 57 (abstract), 2001.

[44] MUARC, op. cit., p. 50.

[45] ibid.; VicRoads, op. cit., p. 32, citing Wikman, A-S, et al (1998).

[46] MUARC, op. cit., p. 50, citing Horberry, T, Anderson, J, Regan, M, Triggs, T, and Brown, J, 'Driver Distraction: The Effects of Concurrent In-Vehicle Tasks, Road Environment Complexity and Age on Driving Performance', *Accident Analysis and Prevention*, January 2006, pp. 185-191.

[47] Dr M. Regan, MUARC, Notes of Discussion, 6 December 2005, p. 39.

[48] MUARC, Submission, pp. 50-51, citing Jancke, L, Musial, F, Vogt, J, and Kalveram, K, 'Monitoring radio programs and time of day affect simulated car driving performance', *Perceptual Motor Skills*, Volume 79, pp. 484-486.

[49] Correspondence from Mr C. Patten, Swedish Road Administration, 2 November 2005, citing draft English translation of Patten, C, Ceci, R, Malmstrom, T, and Rehnberg, K, *The Use of Mobile Phones in Road Traffic: SNRA Inquiry into the Use of Mobile Phones in Road Traffic*:, Publication 2003:91, SNRA, Borlänge, Sweden, August 2003, p. 12.

[50] MUARC, op. cit., p. 51.; VicRoads, op. cit., p. 33, citing Jenness, J, Lattanzio, R, O'Toole, M, and Taylor, N, 'Voice-activated dialling or eating a hamburger; Which is more distracting during simulated driving', *Proceedings of the Human Factors and Ergonomics Society 46th Annual Meeting*, Pittsburgh, Philadelphia, United States, 2002.

[51] MUARC, op. cit., p. 52.

[52] Gartner, U, Konig, W, and Wittig, T, 'Evaluation of manual vs. Speech input when using a driver information system in real traffic', *Proceedings International Driving Symposium on Human Factors in Driving Assessment , Training and Vehicle Design*, Aspen, Colorado, UnitedStates,2001,http://ppc.uiowa.edu/driving-assessment/2001/Summaries/Driving%20Assessment%20Papers/02_Gartner_Wittig.htm

[53] MUARC, op. cit., p. 52

[54] ibid.

[55] The Australian Driver Trainers Association New South Wales, Submission to the Inquiry, 28 October 2005, p. 6.

[56] Roadsafe Inner South East Inc., Submission to the Inquiry, 28 October 2005, p. 2.; Roadsafe Westgate Inc., Submission to the Inquiry, October 2005, p. 4.; Roadsafe

Metropolitan North Eastern Inc., Submission to the Inquiry, October 2005, p. 4.; AAMI, *Crash Index – Annual Road Safety Index*, September 2005, pp. 2 and 4.

[57] Roadsafe Inner South East, op. cit.

[58] Gordon, C, 'A Preliminary Examination of Driver Distraction Related Crashes in New Zealand', *Proceedings of an International Conference on Distracted Driving, Sydney, Australia, 2-3 June 2005,* Report 67, STAYSAFE Committee, 2006, pp. 13-14.

Chapter

5

Other Distractions

Previous chapters have examined driver distractions caused by mobile phones and in-car video, audio and electronic devices. Most of these potential distractions are relatively new to the driver as they relate to emerging technologies. However, the task of minimising driver distraction becomes more difficult considering the wide range of other in-car behavioural actions and external distractions that have been in existence since the invention of the motor vehicle.

This chapter examines the numerous non-technology distractions both internal (in-car) distractions and external (outside the vehicle). External distractions from road signs and advertising are dealt with separately in Chapter 6.

Sources of Other Distractions in Crashes

Only a few overseas studies have analysed non-technological sources of distraction in depth. Previously mentioned studies by the New Zealand Ministry of Transport and the University of North Carolina are considered by the Committee to be the most significant despite some major differences in the way distractions were categorised by both studies.

New Zealand

As mentioned earlier in the report, part of the study by the New Zealand Ministry of Transport involved a detailed analysis of 20,808 casualty crashes reported to police in 2002 and 2003. The study provided a very detailed subdivision of distraction sources.

In the case of in-vehicle non-technological activities, the most prominent were:

- passengers – 12 per cent of distraction crashes (and 1.1 per cent of all casualty crashes) ;
- emotionally upset-preoccupied – 5 per cent (0.5 per cent);
- personal effects – 5 per cent (0.5 per cent);
- vehicle controls and devices – 5 per cent (0.5 per cent);

- food and drink – 3 per cent (0.3 per cent);
- general in-vehicle distractions – 3 per cent (0.3 per cent);
- smoking – 2 per cent (0.2 per cent); and
- animal/insect inside vehicle – 2 per cent (0.2 per cent).[1]

In terms of crashes associated with external distractions, the most prominent sources were:

- driver dazzled: sun strike – 13 per cent of distraction crashes (and 1.2 per cent of all casualty crashes);
- checking for traffic –11 per cent (1.1 per cent);
- other road users: vehicles – 7 per cent (0.6 per cent);
- trying to find destination, location or something – 4 per cent (0.3 per cent);
- scenery: persons – 3 per cent (0.3 per cent);
- police and emergency vehicles and crash scenes – 2 per cent (0.2 per cent);
- general external distractions – 2 per cent (0.2 per cent);
- scenery: landscape and architecture – 2 per cent (0.2 per cent); and
- other road users: pedestrians/cyclists – 2 per cent. (0.2 per cent).[2]

The Committee examines many of these activities throughout this Chapter.

University of North Carolina

The crash-based study by the University of North Carolina determined the proportion of 2,380 distraction-related crashes occurring in the United States from 1995 to 1999 for various sources of distraction. For non-electronic sources inside the vehicle, the researchers found the proportion of drivers for these distractions were:

- passengers (other occupant in vehicle) – 10.9 per cent;
- moving object in vehicle – 4.3 per cent;
- using other object/device brought into vehicle – 2.9 per cent;

- adjusting vehicle/climate controls – 2.8 per cent;
- eating and/or drinking – 1.7 per cent; and
- smoking related – 0.9 per cent.[3]

By comparison, other distractions recorded in this study include external distractions 29.4 per cent, other distractions 25.6 per cent, unknown distractions 8.6 per cent, adjusting radio, cassette or CD 11.4 per cent and using cell phones 1.5 per cent.[4]

In addition to the five years of coded data, the researchers also looked in detail at two years of narrative data, 1997 and 1998, and for each compiled statistics for the 744 crashes at a more detailed level.[5] Again some of the more significant values are quoted in the relevant sections later in this chapter.

The Committee observed that the different definitions and classifications used in the New Zealand and University of North Carolina studies prevent more than a cursory comparison of the crash statistics. Factors which make the comparison more difficult include different vehicle occupancies and the extent of rural driving – both probably higher in New Zealand. The order of significance for some categories and some of the relativities are however similar. For example, distractions by passengers were the highest in both studies and the relativities the same for eating/drinking compared to smoking.

Some information from the Virginia Tech Transportation Institute (VTTI) '100 Car' study also provides relative crash risks for various activities.

Extent of Distracting Everyday Activities

The 2003 University of North Carolina report *Distractions in Everyday Driving* observed:

> … the majority of distractions are neither new nor technological. Rather they are aspects of everyday driving that people are likely to seldom think about – sipping a coffee, reaching into the glove compartment, changing a tape or CD, tending to a small child, or "rubbernecking" to get a better view of something outside the vehicle. [6]

The following section will examine more closely some of the leading potentially distracting 'everyday' activities and events in more detail, primarily drawing on the New Zealand crash analysis and University of North Carolina crash and activity-based studies described earlier, together with key evidence from leading Victorian bodies such as Monash University Accident Research Centre (MUARC), VicRoads and the Transport Accident Commission (TAC).

Passengers

Both the New Zealand and University of North Carolina studies found that passengers are the major source of driver distraction.

Dealing with children in the backseat is an obvious distraction for all parents who are a driver. The level of distraction may involve turning around to deal with a crying baby or fighting children. However, all drivers are susceptible to distraction from interaction with passengers, which may include conversing, arguing or physical interaction.

In terms of total time of distractions, conversations with passengers accounted for 15.5 per cent of total durations observed in the University of North Carolina study, while occupant distraction totalled a further 0.9 per cent. The latter were almost evenly split between babies, children and adults, though the mean duration of distractions by adults were almost double (46 seconds), those for children and babies.[7]

Passengers were the reported distraction source for 12 per cent of distraction crashes in New Zealand, the largest in-vehicle distraction category and more than twice the number for telecommunications device distractions. The study categorised the 223 crashes into six main types of behaviour and three type of passenger – adults, young adults/teenagers, and children. The two most common behaviours were 'looking-at/attending to' (35 per cent) and 'conversing' (33 per cent), while 'arguing' (11 per cent) and 'suspected passenger involvement' (10 per cent) were also notable.

Crashes predominantly involved interaction with children (i.e. less than 13 year old) or teenagers and young adults (i.e. 13 to 25 years old).[8] Regarding passenger type it was reported that:

> Where children were the passenger involved, in approximately 66% of crashes the behaviour involved the driver looking at or attending to the one or more children.[9]

The University of North Carolina study of the narratives of 744 crashes, where passengers comprised a much smaller proportion of distraction-related crashes, provided less detail, with most crashes being categorise as either 'talking, arguing or conversing with passenger' or 'other occupant – not otherwise stated'.

The first results of the '100-Car' study by VTTI found interaction with passengers accounted for 20 per cent of the observed crashes, near-crashes and hazardous incidents.[10] MUARC commented that:

> While data for crashes only were not reported, the findings from this study appear to implicate passenger-related distraction as a proportionately greater contributing factor to crashes than other crash studies.[11]

According to MUARC there is a large body of research investigating the effects of passengers on driving behaviour and crash risk, with the focus primarily on young novice drivers.[12] Much of this related to the age of drivers and the number of young passengers, with risk declining with driver age, but increasing with the number of passengers.[13]

MUARC state that very few studies have examined on-road the effects on driving performance. Their submission cites a 1998 study which found young drivers with young male passengers drove more dangerously than when driving alone.[14] They comment that:

> There is general agreement in the literature that observed increases in crash risk, where these are associated with the carriage of passengers, occur because of distraction deriving from passengers, because of social influences (e.g., peer pressure) that arise from interactions between drivers and passengers, or both. What is not understood, however, is the relative contributions that these two factors make to the observed increases in crash risk.[15]

The University of North Carolina coded observations of 207 hours of driver behaviour found nearly as many instances of drivers distracted by passengers as by phones.[16] They also commented on young passengers:

> Taking into account the shorter amount of time that children and especially babies were carried in vehicles, children were about four times and infants almost eight times more likely than adults to be a source of distraction, based on number of distracting events per hour of driving.[17]

The Committee notes that based on existing crash-data, there is a relatively high involvement of children in passenger-related distraction crashes, yet there appears to be no scientific examination of the impact of children on driver distraction. It may be that scientific attention has been focussed on aspects, such as mobile phones, on which it is relatively easy to conduct experiments, whereas potentially more important types of distractions are ignored.

The Committee also raises concern over the potential distraction passengers may have on learner and probationary drivers and this is discussed later in Chapter 7 dealing with laws and enforcement.

Eating and/or Drinking

With increasingly busy lifestyles, motorists are faced with a further potentially fatal distraction through the desire or need to drive while eating or drinking. Fast food outlets encourage the use of drive-thru takeaway meals. The concept of eating breakfast while driving to work is increasingly embraced by consumers. The Committee received evidence on this potential for eating and drinking to distract drivers, most notably from the New Zealand study. The Committee

also observes that this common, everyday activity has more than likely been performed by the vast majority of drivers.

It is now an offence in Victoria to drive while using a hand-held mobile phone. However the same restrictions are not placed on drivers who attempt to drive vehicles eating and drinking, yet it could be argued it is a similar if not greater risk.

Streets Ahead, a motor insurance and driver training company, commented on the emerging vehicle designs to accommodate eating and drinking:

> Besides evolving into mobile offices, twenty-first century cars are becoming equipped to perform the role of a modern day kitchen. The latest in-car appliances include mini-microwaves, refrigerated glove boxes, utility trays, warming cup holders and last, but by no means least, rubbish compactors.[18]
>
> Closer analysis of when people eat and drive identifies that it is often when they are running late.[19]

Eating or drinking accounted for 4.6 per cent of the total driver time observed in the University of North Carolina study. Preparing to eat/drink was 3.1 per cent, eating (bringing hand to mouth) 0.8 per cent and drinking 0.7 per cent.[20]

In the New Zealand study, food and drink accounted for three per cent of distraction-related crashes. The main categories of driver action were:

- reaching, searching for or moving food or drink items – 40 per cent;
- unwrapping or opening the item – 26 per cent;
- reacting to a falling or shifting item - 18 per cent; and
- reacting to a dropped or spilt item – 11 per cent.[21]

Approximately half occurred in 50-80 km/h speed limits, with most crashes involving loss of control on straights or curves. Very few crashes involved alcohol or travelling too fast.[22]

A study by Virginia Commonwealth University of 2,792 Virginia police reports of distraction-related crashes in 2002 found 4.2 per cent attributable to eating or drinking.[23]

Initial results from the '100-Car' study by VTTI indicate that approximately seven per cent of distraction-related crashes, near-crashes and incidents involved 'dining', with crash data not separately reported.[24] A later report of the study stated that eating had a Relative Individual Risk for a crash or near-crash of 1.57 and 'drinking from an open container' 1.03, although neither was

statistically significant at a 95 per cent confidence level. The Population Attributable Risk Percentage for eating was 2.2 per cent while that for drinking was negligible.[25]

A simulator study reported by Jenness et al (2002), compared eating a cheese burger with using a CD player, dialling a phone and reading directions. While CD and reading activities were found to be more distracting than eating and phone dialling, the act of eating, compared to not-eating, resulted in more traffic lane deviations and failures to observe a minimum speed of 10 km/h hour.[26]

The Committee received some anecdotal evidence and research on the extent to which various food and drink types and packaging can impact on variations in distraction levels. Some more fragile food has the potential to break open and fall on the drivers lap. Hot takeaway coffee cups present another problem, especially as drivers attempt to remove a lid with one hand while steering with the other hand.

Grooming

Grooming refers to activities such as attending to hair or face, shaving and applying cosmetics. The Committee noted that these activities can be observed everyday on our roads, especially in peak hour morning traffic.

Very little evidence was put to the Committee addressed grooming, although it was occasionally mentioned in lists of distractions published in technical literature.[27]

The University of North Carolina observational study found 0.4 per cent of total driver time was spent grooming, with a mean duration of almost 12 seconds.[28] The North Carolina crash study only mentions an instance of 'getting makeup' within the general category of 'Using Other Device Brought into Vehicle'.[29] Interestingly none of the published documentation of the normally more detailed New Zealand crash study made any reference to grooming.[30]

The '100 Car' study by VTTI reported a statistically significant Relative Individual Risk for a crash or near-crash of three for 'applying make-up', and a Population Attributable Risk of 1.4 per cent.[31]

The Committee found no evidence of experimental studies on the effect of grooming on driver performance, yet this everyday activity is dangerous and does result in crashes and near-misses. One could argue that self grooming while driving and looking in mirrors is potentially a far greater distraction risk than conversing on a mobile phone.

Smoking

Cars have long been fitted with ash-trays and cigarette lighters enabling people to smoke and drive at the same time, which can add to their distraction levels. The adverse health affects of smoking and successful anti-smoking campaigns have reduced the Victorian community's acceptance of smoking. However many people continue to smoke and drive at the same time and there has been no community discussion of the risks of smoking as a distraction to drivers.

Smoking can involve several forms of distraction - physical, visual and attentional - as the driver obtains a cigarette from a packet or 'rolls their own' from tobacco, lights and holds the cigarette, monitors the rate at which it burns and disposes of the ashes and butt.[32]

The University of North Carolina study observed that about 7 per cent of drivers smoked while driving, occupying 1.6 per cent of the total time of all drivers. Times spent lighting and extinguishing cigarettes, pipes, etc were brief, but the mean duration of actual smoking was quite long, some 4 minutes, 20 seconds.[33]

Studies which have reported an association between smoking and crashes include:

- New Zealand – 2.2 per cent of nearly 2000 distraction-related crashes in 2002 and 2003;[34]
- the University of North Carolina study – 0.9 per cent of distraction-related crashes from the Crashworthiness Data System (CDS) from 1995 to 1999;[35]
- the Virginia Commonwealth University study – 2.1 per cent of distracted-driving crashes;[36] and
- the '100-Car' study by VTTI – 2 per cent of distraction-related crashes, near misses and incidents.[37]

The New Zealand study revealed approximately half of the smoking-related crashes involved reaching for cigarettes, a quarter lighting them and the remaining quarter reacting to a dropped cigarette. Alcohol was also involved or suspected in 22 per cent of smoking-associated distracted driver crashes.[38]

MUARC stated that several studies have found that smoking while driving increased the risk of being involved in a crash.[39] Their submission described a somewhat dated questionnaire study reported by Brison (1990) which found smokers where 1.5 times more likely to be involved in crashes.[40] A VicRoads literature review by Christie (1990) found smokers over-involved in crashes even when age, gender, education, alcohol consumption and driving

experience were accounted for.[41] Reasons suggested by MUARC include distraction, possible effects of carbon-monoxide in the smoke and behavioural differences between smokers and non-smokers.[42]

The submission by Streets Ahead quoted a 1986 report in the New York Journal of Medicine which found smokers had 50 per cent more crashes and 46 per cent more violations than non-smokers.[43]

Mr. J. Bolitho, Manager Legal Policy, (TAC) stated that an issue they were surprised to find, but for which they had no quantitative evidence, was smoking:

> In our claims experience, smoking as a distraction has resulted in the TAC having to pay quite a lot of money, particularly when people have dropped lighted cigarettes into their laps causing them to take fright and then have an accident.[44]

Emotionally Upset/Preoccupied

The Committee also heard that an emotionally upset or preoccupied driver has a greater potential to be distracted. When examining the level of distraction caused by mobile phone use, it was considered that the nature of a conversation may have an adverse impact. For example, a driver may be engaged in a negative conversation about a relationship or work and that accompanying high stress levels may affect the driver's performance.

Five per cent of crashes in the New Zealand distracted driving study were for the category of 'emotionally upset or pre-occupied' drivers.[45] This category appeared to be unique to the New Zealand study.

The New Zealand Crash Analysis System (CAS) describes the code 357 for 'emotionally upset-preoccupied' drivers as being:

> Where the source of the distraction relates to the driver, where they are upset, angry, crying or similar behaviour, or cognitively preoccupied - thinking about something such as daydreaming, thinking about the day. The distraction is not related to the presence of passengers. If the emotional state is related to crash then this is not considered to be distraction.[46]

In the analysis conducted by the Ministry of Transport, these crashes were divided into those where there was possible driver distraction and those where distraction was not an issue. The former were further divided into driver 'stress-pressure-preoccupied', 'upset' and 'suspected upset or stressed' categories. Most crashes were assigned to the first group.[47]

In commenting on the findings for the 91 crashes in the 'distraction' group, Gordon (2005) states that a high proportion of these crashes also involved alcohol and speed as contributing factors.[48]

An illegal driver alcohol level was found or suspected in a third of crashes, while travelling too fast was a factor in three out of ten crashes. These were the highest proportions for any of the distraction categories.[49] The author noted that, given the context of the events that lead to typical crashes under this code, the finding is not surprising.[50]

While 'emotionally-upset' drivers are likely to exhibit some of the performance deficits of other drivers who are distracted the Committee is not aware of any scientific evidence to quantify the impact. The Committee is of the view that such drivers are not truly distracted but merely displaying some form of inattention. Hence the need for clear definitions to be established when reporting crash data or observing driving.

Reaching for an Object

Unfortunately, even simple everyday activities can have fatal consequences if performed in the wrong situation. Even the most experienced driver has at one stage in their lives been forced to correct their steering as a result of reaching for an object beside or behind them and diverting their gaze from the road. Examples include reaching for a street directory on the back seat, reaching across to the glove compartment, picking up an object from the floor, all of which have the potential to be fatal.

At the Intelligent Transportation Systems (ITS) Australia SmartDemo event in Adelaide on 29 September 2005, Professor J. McLean, Director, Centre for Automotive Safety Research, University of Adelaide, illustrated a video of a fatal distraction-related crash. The home video, filmed by a rear seat passenger, illustrated the female driver turning around to pass a box of paper tissues to a rear seat passenger. The car went off the bitumen road onto the left-hand gravel shoulder. The driver over-corrected and the car then veered across the road, hitting an on-coming vehicle and overturning. A passenger died as a result of this simple, yet ultimately tragic event.[51]

One of the most note-worthy results from a detailed April 2006 '100-Car' report by VTTI was:

> Reaching for a moving object increased the risk of a crash or non-crash by nine times.[52]

The corresponding figure for a non-moving object was 1.4 times, though this was not statistically significant at the 95 per cent confidence level.[53]

External Distractions

Chapter 6 examines the significant distractions caused by advertising and road signs. However, there are endless sources of other external objects or events that may distract a driver's attention. These can include scenery, persons or animals outside the vehicle, other traffic, road crashes, or drivers trying to find a location.

The University of North Carolina observational study of 70 drivers found 1.6 per cent of total driver time while moving was occupied with an external distraction. There was an average of 3.2 external distractions per hour per driver.[54]

The analysis of the CDS data for 1995 to 1999 by the same university attributed 29.4 per cent of distraction-related crashes to an external source. Their more detailed analysis of narrative data for 1997 and 1998 further divided those crashes into nine categories. The largest specific group, approximately one quarter, was 'outside traffic/vehicle'. This was described as:

> Vehicle swerved, turned in front of, changed lanes, slowed, or stopped, encroached on lane, emergency vehicles, bright vehicle lights, etc.[55]

The New Zealand study attributed 46 per cent of distraction related crashes to external factors, compared with 44 per cent for internal and the remaining 10 per cent to multiple factors or the source was unclear.[56] While the figures for external distractions have not yet been published, the Ministry of Transport, provide preliminary figures for 13 categories. The most significant categories are listed below, with the percentages representing the proportion of all distraction crashes - external, internal and other:

- driver dazzled - sun strike – 13 per cent;
- checking for traffic – 11 per cent;
- other road users – vehicles – 7 per cent;
- trying to find destination/location/something – 4 per cent; and
- scenery – persons – 3 per cent.[57]

The Committee met with New Zealand Ministry of Transport officials in May 2006 and some discussion centred around the particular findings relating to outside distractions. The Committee believes it is debatable whether the action of a driver being dazzled by the sun or checking for traffic conditions should be classified as distraction.

The Committee sees little difference between visual obstructions caused by sun-strike and other weather conditions such as heavy rain or hail. These conditions are beyond the control and behaviour

of the driver. Further, it would not be reasonable to classify checking for traffic as a distraction as it is essentially a primary driving task. One could argue checking for traffic is an essential element of safe driving, however this would depend on the nature of the traffic situations being viewed by the driver (eg, 'rubber necking' nearby traffic accidents). New Zealand author, Mr C. Gordon also observed that checking for traffic is not so much a distraction as a misallocation of attention to the wrong stream of vehicles.[58]

New Zealand Ministry officials indicated they were still fine tuning and developing the various distraction categories.

According to the MUARC submission, a report by Lam (2002), using data for 1996 to 2002 from the NSW Traffic Accident Database System, found outside distractions accounted for 2.5 per cent of all crashes. It might be noted that these included 'property damage only' crashes over $500 or when one vehicle was towed away.[59]

MUARC also quoted Glaze and Ellis (2003) of Virginia Commonwealth University who found that 35 per cent of distraction-related crashes in Virginia attended by police were from external sources.[60]

A further perspective is provided in the initial results of the Virginia Tech '100-Car' study. Though not quoting statistics, a graph of event numbers (i.e: crashes, near-crashes and incidents) suggests external distractions are about 5 per cent of all observed events - around the level of dining and grooming.[61]

The '100 Car' study also found a statistically significant Relative Individual Risk for a crash or near-crash of 3.7 for 'looking at external object', and a Population Attributable Risk of 0.9 per cent.[62]

The Committee notes that, like many other forms of distraction, it is difficult for road safety authorities and researchers to accurately measure the extent to which a driver is distracted by outside objects and events and whether such actions have been the main cause of a crash. As MUARC state:

> Many of these studies note that accident reports may underestimate distraction because drivers will be unwilling to admit to being distracted. This is particularly true for outside the vehicle distractions, as there is no evidence that the driver was not attending to the road.[63]

The Committee conclude that so-called 'everyday' distractions, such as interacting with passengers, dining, smoking, grooming or looking at objects or events outside the vehicle can affect driving performance and result in crashes. Relative to electronic devices, the extent to which they do so is poorly documented and researched, however anecdotal evidence suggest the potential risks could be even greater than those associated with mobile phones and electronic devices.

This is mainly due to a lack of research focus on what drivers are actually doing in vehicles. The use of hidden cameras is starting to reveal this information, but the analysis of such recordings is still in its infancy with only a few hundred drivers observed to date.

While some dated 1990 studies suggest a relative crash risk of 1.5 for smoking) the new VTTI '100 Car' findings are that Relative Individual Risks for 'everyday' driving, which were statistically significant at a 95 per cent confidence level, can be summarised as:

- reaching for a moving object – 8.8 times;
- looking at an external object – 3.7 times;
- reading – 3.4 times;
- applying makeup – 3.1 times; and
- passenger in an adjacent seat – 0.5 times.[64]

Although based on just one recent large-scale observational study, the figures do highlight to the Committee the under-recognised crash risks of everyday driving activities. Drivers need to be aware of the everyday dangers of distraction.

Publicity Campaign for Everyday Distractions

In addition to improving crash data collection and gathering information on the incidence, frequency and duration of everyday driver distractions, the two actions the Committee considers are necessary at this time relate to traffic laws and public education/publicity. The legal aspect is covered in Chapter *7*.

In their submission, MUARC conclude that community awareness on the impact on driving performance and safety of using mobile phones while driving is poor and that awareness and understanding of the relative impact of other sources of distraction is probably low.[65] Specifically MUARC recommended research:

> … to identify what factors motivate or encourage drivers to willingly engage in distracting activities, such as peer-pressure, pleasure, task urgency, personality, age and driving experience.[66]

MUARC also recommend that government, police, motoring clubs and other road safety stakeholders conduct education and publicity to raise awareness of the relative dangers of distracting activities, factors that increase vulnerability to distraction, ways to minimise the effects of distraction and, where relevant, penalties for undertaking distracting activities.[67]

VicRoads, in discussing incidental distractions in their submission, recommend that:

> Public education materials could be developed concerning the risks associated with distractions that result from apparently-innocuous activities, targeting drivers in general. These distractions result from behaviours that are generally considered safe as a result of the accumulated experience of drivers, so public education materials will need to focus on a harm-reduction approach rather than attempts to pursued drivers not to engage in these activities.[68]

The TAC recommended that suitable forms of education and information be developed focussing on radios and CD players.[69] The RACV submission only referred to an education campaign on mobile phones.[70] The Victoria Police submission also focussed on publicity dealing with technological devices in motor vehicles.[71]

As far as the Committee is aware, with the exception of mobile phones, little is happening interstate or in New Zealand in relation to publicity about everyday distractions although South Australia and Tasmania have commenced some publicity campaigns.[72]

Apart from those focussing primarily on mobile phones the Committee is aware of only two public attitudes surveys on general driver distraction in Australasia, one in inner Sydney and the other in New Zealand. In both cases developing a publicity campaign was one reason for the focus group research.[73]

Sydney Focus Groups

In 2005 the City of Sydney and Marrickville Council engaged Taverner Research to undertake a survey of driver attitudes, awareness and knowledge with the intention of developing a publicity campaign. The study of 203 telephone respondents and two focus group discussions was described in a presentation made at the Driver Distraction Conference in Sydney in June 2005. The objectives were to:

- Determine the level of awareness of driver distraction in the community.
- Determine driver beliefs and attitudes on the issue of driver distraction, the effects distraction has on driving behaviour and if drivers adjust their behaviour.
- Determine the extent drivers participate in distracting behaviour.
- Collect information to assist in the development of a road safety campaign.[74]

Most of the authors' conclusions related to mobile phones, but in relation to general distractions, it was noted that:

> Activities such as fiddling with the radio or CD player, talking with passengers and attending to children were more common behaviours and

> were not seen as dangerous. More than half did not change their behaviour to compensate.[75]

New Zealand Focus Groups

In September 2004, the Land Transport New Zealand (formerly the Land Transport Safety Authority) commissioned focus group research from Research International Limited, Auckland to find out the attitude and perceptions of different groups of drivers to 'inside-the-vehicle' distractions, their behaviours and suggest key safety messages to improve public awareness of distractions.[76] A total of 37 people participated in six focus groups.[77] The results were presented by Mr C. Barker, Senior Advisor, Ministry of Transport at the Sydney Conference and in the accompanying consultant's research report. They were also described to the Committee in Wellington on 15 May 2006.

The conclusions of the research were that awareness of distraction as a road safety problem was low and that a lot of effort will be required to affect the beliefs and attitudes of drivers before we can expect a behaviour change.[78]

Mr Barker summarised part of the recommendation of the report as being that:

> … any potential public awareness campaign should focus on the necessary attention required for driving, as this was more meaningful for drivers and helped stop them from classifying distractions into things they can and cannot control. [79]

The research report notes, as a first step, that drivers need a reason why full attention is important, such as statistics showing distraction is not just a safety issue with minor consequences, and the difference in stopping distances or reaction times if other tasks are being undertaken while driving:

> You need a comparison, that if you are doing something else it takes this much longer to switch your brain back and this is what could happen in that time. [80]

Overseas Publicity Campaigns

One significant overseas publicity campaign on general driver distractions that the Committee is aware of is by General Motors and the Governors Highway Safety Association (GHSA) in the United States. Their 'SenseAble Driving' campaign commenced with a pilot in Michigan in March 2001.[81] It now operates nationwide and includes educational materials including brochures, poster, a video and an interactive computer exercise 'D3' (Distracted Driving Demo) aimed at younger drivers.[82] The key safety tips are summarised under the headings:

- Keep both EYES on the road;
- Both HANDS on the wheel;
- And your MIND on the drive![83]

NHTSA also have a 'Smart Drivers Just Drive' campaign, including a website www.distracteddriving.org. In addition to reading news releases and technical material, viewers are encouraged to run local campaigns and are given suggestions on how to run a campaign, including resources such as templates for media advisory, press releases, news articles, letters to the editor and talking points for interviews. In addition there are on-line banners and e-cards for people who want to spread the message on-line.[84]

The Committee consider the community involvement techniques displayed at the 'Smart Drivers Just Drive' website are worthy of consideration by Victorian road safety practitioners and others wanting to increase community awareness of safety messages.

Following distracted driving research in 2001 the AAA Foundation for Traffic Safety produced a 10-point plan to address the issues.[85] This included distribution in 2003 of distracted driving public service announcements for radio and television for use throughout the United States in the 'Stay Focused: Keep your mind on the road' campaign.[86] The Foundation also prepared two pages of suggested text for state Driver's Licence Handbooks, using material from five of the six states who had such material – California, Delaware, Michigan, New Jersey and Wisconsin.[87] In the following year an eight page 'Pay Attention' brochure was published, describing common forms of driver distraction and giving safer driving tips.[88] The tips on an associated website are shown in Table 5.1.

American states have also undertaken campaigns. For example, in 2001 Minnesota used 43 highway billboards to encourage people to concentrate on driving. The three slogans were:

- Stop Fiddling with the Radio;
- Stop Checking Your Makeup; and
- Put down the Coffee.[89]

Table 5.1 AAA Tips for Managing Distractions

• Recognise driving requires your full attention. If you find your mind wandering, remind yourself to stay focussed on the road.
• Before you get behind the wheel, familiarise yourself with the features of your vehicle's equipment.
• Preset radio stations and climate control.
• Secure items that may move around when the car is in motion.
• Avoid smoking, eating drinking and reading while driving.
• Pull safely off the road and out of traffic to deal with children.
• Do your personal grooming at home – not in the car.
• Review maps before hitting the road.
• Monitor traffic conditions before engaging in activities that could divert attention away from driving.
• Ask a passenger to help you with activities that may be distracting.

Source: AAA, Distracted driving, cell phone tips, www.aaaexchange.com

The Committee is not aware of any campaigns in the United Kingdom on general driver distraction. However 'The THINK Road Safety' website does, under the mobile phone advice heading, suggests avoiding a few other distractions:

- loud music that may mask other sounds;
- trying to read a map;
- inserting cassette or CD or tuning the radio;
- arguing with your passengers or other road users; and
- eating and drinking.[90]

The Committee conclude that here is a need for a publicity campaign to increase awareness in Victoria.

Recommendation 11

That VicRoads and the Transport Accident Commission undertake a publicity campaign warning of the dangers of drivers being distracted by 'everyday' activities and the need to remain alert to the driving task.

Chapter 5 Recommendation

Recommendation 11

That VicRoads and the Transport Accident Commission undertake a publicity campaign warning of the dangers of drivers being distracted by 'everyday' activities and the need to remain alert to the driving task.

Endnotes

[1] Gordon, C, 'Driver Distraction Related Crashes in New Zealand', *International Conference on Driver Distraction, Sydney, 2-3 June 2005*, Report 67, STAYSAFE Committee, 2006.; Ministry of Transport, New Zealand, Correspondence, 25 October 2005, Attach., Table 1.

[2] Ministry of Transport, ibid.

[3] Stutts, J, Reinfurt, D, Staplin, L, and Rodgman, E, *The Role of Driver Distraction in Traffic Crashes*, AAA Foundation for Traffic Safety, Washington, DC, United States, 2001, pp. 4 and 8.

[4] ibid., p. 4.

[5] ibid., Table 15, pp. 26-27.

[6] Stutts, J, Feaganes, J, Rodgman, E, Hamlett, C, Meadows, T, Reinfurt, D, Gish, K, Mercandante, M and Staplin, L, *Distractions in Everyday Driving*, AAA Foundation for Traffic Safety, Washington, DC, United States, 2003, p. 65-66.

[7] ibid., Table 9, p. 38.

[8] Gordon, C, op. cit., pp. 8-10.

[9] ibid., pp. 7-8.

[10] Monash University Accident Research Centre (MUARC), Submission to the Inquiry, December 2005, p. 58, citing Neale, V, Dingus, T, Klauer, S, Sudweeks, J, and Goodman, M, 'An Overview of the 100-Car Naturalistic Study and Findings', Paper 05-0400, *19th International Technical Conference on Enhanced Safety of Vehicles*, Washington DC, United States, June 2005.

[11] MUARC, op. cit., p. 58.

[12] ibid., p. 56.

[13] ibid., p. 57.

[14] ibid.

[15] ibid.

[16] Stutts, J, et al (2003), op cit., p. 8.

[17] ibid.

[18] Streets Ahead, Submission to the Inquiry, 21 October 2005, p. 1.

[19] ibid., p. 2.

[20] Stutts, J, et al (2003), op cit., Table 9, p. 38.

[21] Gordon, C, op. cit., p. 18.

[22] ibid.

[23] MUARC, op. cit., p. 55.

[24] ibid.

[25] Klauer, S, Dingus, T, Neale, V, Sudweeks, J, and Ramsey, D, *The Impact of Driver Inattention on Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data*, DOT HS 810 594, National Highway Traffic Safety Administration (NHTSA), Washington, DC, United States, April 2006, pp. 121 and 125.

[26] MUARC, op. cit., pp. 54-55, citing Jenness et al (2002).

[27] Marrickville Council, Presentation, Sydney, 23 February 2006, p. 6.; MUARC, op. cit., p.63.

[28] Stutts, J, et al (2003), op. cit., Table 9, p. 38.

[29] Stutts, J, et al (2001), op. cit., Table 15, pp. 26-27.

[30] For example, Gordon, C, op. cit..

[31] Klauer, S, et al (2006), op. cit., pp. 121, 125.

[32] MUARC, op. cit., p. 55.; Barker, C, 'Key findings from focus group research on inside-the-vehicle distractions in New Zealand', *Proceedings International Conference on Driver Distraction, Sydney, 2-3 June 2005*, Report 67, STAYSAFE Committee, Sydney, 2006, p. 6 of paper.

[33] Stutts, J, et al (2003), Table 8, p. 37 and Table 9, p. 38.

[34] Gordon, C, 'Inattention diverted by' contributory factor involvement by source category for police reported crashes in 2002 and 2003, Table 1 provided by Ministry of Transport, Wellington, 15 May 2006.

[35] Stutts, J, et al (2001), p. 4.

[36] Glaze, A, and Ellis, J, *2002 Pilot Study of Distracted Drivers*, Virginia Commonwealth University, Transportation and Safety Training Center, Virginia, United States, 2003, Table 9, p. 14.

[37] Neale, V, Dingus, T, Klauer, S, Sudweeks, J, and Goodman, M, 'An Overview of the 100-Car Naturalistic Study and Findings', Paper 05-0400, *19th International Technical Conference on Enhanced Safety of Vehicles*, Washington, DC, United States, June 2005, Figure 6, p. 8.

[38] Gordon, C, 'Driver Distraction Related Crashes in New Zealand', *Proceedings International Conference on Driver Distraction, Sydney, 2-3 June 2005*, Report 67, STAYSAFE Committee, Sydney, 2006, p. 15.

[39] MUARC, op. cit., p. 56.

[40] ibid., citing Brison (1990).

[41] ibid., citing Christie (1990).

[42] ibid.

[43] Streets Ahead, op. cit., p. 1.

[44] Mr J. Bolitho, Transport Accident Commission (TAC), Notes of Discussion, 6 December 2005, p. 60.

[45] Gordon, C, 'Inattention diverted by' contributory factor involvement by source category for police reported crashes in 2002 and 2003, Table 1 provided by Ministry of Transport, Wellington, 15 May 2006.

[46] Gordon, C, 'Driver Distraction: An initial examination of the 'attention diverted by' contributory factor codes from crash reports and focus group research on perceived risks', *Institute of Professional Engineers Technical Conference,* Auckland, New Zealand, September 2005, p. 13.

[47] Gordon, C, 'Driver Distraction Related Crashes in New Zealand', *Proceedings International Conference on Driver Distraction, Sydney, 2-3 June 2005*, Report 67, STAYSAFE Committee, Sydney, 2006, p. 12 of paper.

[48] ibid.

[49] ibid., p. 21.

[50] ibid.

[51] Dr J. McLean, video presentation, SmartDemo 2005, ITS Australia, Adelaide, 29 September 2005.

[52] NHTSA, Media Release, 20 April 2006, http://nhtsa.gov/portal/site/

[53] Klauer, S, et al (2006), op. cit., p. 121.

[54] Stutts, J, et al (2003), op. cit., pp. 42-43.

[55] Stutts, J, et al (2001), op. cit., p. 4 and Table 15, p. 26.

[56] Gordon, C, op. cit., p. 4.

[57] Ministry of Transport, New Zealand, Correspondence, 25 October 2005, Attachment, Table 4.

[58] MUARC, op. cit., p. 37, citing personal communication from C. Gordon in Sept. 2005.

[59] ibid., p. 70.

[60] ibid.

[61] Neale, V, et al (2005), op. cit., Figure 6, p. 8.

[62] Klauer, S, et al (2006), op. cit., pp. 121, 125.

[63] MUARC, op. cit., p. 71.

[64] Klauer, S, et al (2006), op.cit., p. 30.

[65] MUARC, op. cit., p. 89.
[66] ibid., Recommendation 53, p. 97.
[67] ibid., p. 89.
[68] VicRoads, Submission to the Inquiry, November 2005, p. 46.
[69] TAC, Submission to the Inquiry, November 2005, p. 19.
[70] Royal Automobile Club of Victoria (RACV) Limited, Submission to the Inquiry, November 2005, pp. 20-21.
[71] Victoria Police, Submission to the Inquiry, 28 September, p. 12.
[72] Transport South Australia, Inattention Campaign, http://www.transport.sa.gov.au/rss/content/safer_people/issues/driver_distraction.htm ; Transport South Australia, Inattention Campaign radio and TV advertisements, http://www.transport.sa.gov.au/rss/content/safer_people/programs_resources/road_safety_campaigns.htm ; Road Safety Task Force, Tasmania. www.rstf.tas.gov.au/television.html www.rstf.tas.gov.au/othermedia.html
[73] Baker, S, and Spina, K, 'Drivers' Attitudes, Awareness and Knowledge of Driver Distractions: Research from two Central Sydney Communities', *Proceedings International Conference on Driver Distraction, Sydney, 2-3 June 2005*, Report 67, STAYSAFE Committee, Sydney, 2006, p. 2 of paper.; Barker, C, op. cit., p. 2 of paper.
[74] Baker, S, and Spina, K, op. cit., p. 2.
[75] Marrickville Council, Presentation, Sydney, 23 February 2006, p. 13.
[76] Ministry of Transport , New Zealand, Correspondence, 25 October 2005, attachment titled Research, p. 2.
[77] Barker, C, op. cit., p. 2.
[78] ibid., slide 20, p. 17.
[79] ibid., p. 7.
[80] Sutherland, R, Parkinson, T, and Gilmore, S, *Project Distraction* , Report by Research International for the Land Transport Safety Authority, New Zealand, October 2004, p. 26.
[81] General Motors, SenseAble Driving News, www.gm.com/company/gmability/safety/drivers_seat/senseable_driving/releases/index.html www.gm.com/company/gmability/safety/drivers_seat/senseable_driving/releases/videos.html
[82] General Motors, SenseAble Driving, www.gm.com/company/gmability/safety/drivers_seat/senseable_driving/index.html. www.gm.com/company/gmability/safety/drivers_seat/senseable_driving/releases/videos.html
[83] General Motors, SenseAble Driving, www.gm.com/company/gmability/safety/drivers_seat/senseable_driving/tips/driving_tips.html
[84] NHTSA, Smart Drivers Just Drive campaign, www.distracteddriving.org
[85] AAA Foundation for Traffic Safety, *AAA's 10-Point Plan*, Washington, DC, United States, p. 1. www.aaaexchange.com/Main/Default.asp?CategoryID=3&SubCategoryID=35&ContentID=40
[86] AAA Foundation for Traffic Safety, E-Newsletter, 15 August 2003, Washington, DC, United States, p. 1.
[87] AAA Foundation for Traffic Safety, *Driver's License Section Distracted Driving*, Washington, DC, United States, 6 August 2003, p. 3.; AAA Newsroom, 'Driver's Licence Manuals Lack Crucial Information on Distracted Driving', 8 June 2003, www.aaanewsroom.net/main/PrinterFriendly.asp?CategoryID=7&ArticleID=243
[88] AAA Foundation for Traffic Safety, *Pay Attention* brochure, Washington, DC, United States, www.aaafoundation.org/products/index.cfm?button=free
[89] Minnesota Department of Public Safety, Distracted Driver Campaign, www.dps.state.mn.us/comm/dd/distracteddriver.htm
[90] Department for Transport, United Kingdom, The THINK! Road Safety Website, Advice – mobile phones, www.thinkroadsafety.gov.uk/advice/mobilephones.htm

Chapter
6

Road Signs and Advertising

In addition to other general external distractions discussed in the previous chapter, the Committee received evidence to indicate that road traffic signs, billboards and advertising signs can present a major visual distraction for drivers.

This chapter focuses on:

- signs erected within road reserves by road authorities or other public sector organisations to regulate traffic, give road directions or provide other public information;
- advertising signs and devices erected within, over, on the boundary of, or close to road reserves; and
- billboards, video signs and electronic advertising signs located near road reserves, on buildings or from mobile vehicles.

VicRoads, other road authorities, local councils, and in some instances other state departments, such as the Department of Sustainability and Environment and its agencies, have responsibilities to install and remove signs within road reserves, and some powers to control outdoor advertising within or close to road reserves. These bodies also have responsibilities to create and maintain a safe road environment for motorists.

Road Signs – Placement and Readability

The *Road Safety (Road Rules) Regulations* 1999, Part 3, gives road authorities power to erect traffic signs.[1] Schedule 2 of the 1999 *Road Rules - Victoria* shows standard and commonly used traffic signs, while Schedule 3 shows other traffic signs permitted to be used in Victoria.[2]

Road authorities also have powers to erect road/street name and destination/direction signs and notices of impending road works or events.

Sign Proliferation and Visual Clutter

During the 2005 *Inquiry into the Country Road Toll*, the Committee expressed concern over the proliferation of roadside signage and considered this issue may require future investigation.[3] According to MUARC, visual clutter impacts driver safety in three ways;

- it distracts from driving task;
- impairs visual search; and
- increases workload.[4]

A motor insurance and driver training company, Streets Ahead, observed from their investigations that the clutter of road signs and advertising accounted for a number of crashes.[5]

The Transport Accident Commission (TAC) stated that the amount of external information presented to drivers is increasing and finding a sign in highly cluttered scenes is difficult, especially at intersections.[6] Because some street names and numbers were difficult to locate, drivers looking for a particular street or building had their attention diverted from the driving task, according to the Motorcycle Riders' Association (MRA).[7]

The Municipal Association of Victoria (MAV) commented on the importance of minimising visual clutter from advertising and signage, including roadside and overhead speed advisory signs.[8] The Committee agrees with this assessment; however it notes that local government itself is partly responsible for much of the visual clutter from roadside signage.

In particular, the Committee is concerned at the visual clutter from signs in regional Victoria, including tourist welcome signs on the outskirts of their municipal boundaries, together with numerous other tourist information signs. Similarly, in metropolitan Melbourne, particularly near major strip shopping centres, there is a proliferation of signs approved by local councils that welcome visitors and give general information about municipal attractions.

The Committee concluded that too many poorly considered road signs can create visual clutter, resulting in one form of driver distraction, while the absence or poor location of necessary signs and numbers can also distract drivers.

VicRoads Submission

The Australian Manual of Uniform Traffic Control Devices contains guidelines on the legibility of road signs to ensure they are easy to read and comprehend.[9] VicRoads also has a Traffic Engineering Manual which has a section on signs, pavement markings and associated devices for freeways and arterial roads. In general the contents are based on the Australian Manual. In the interests of uniformity VicRoads invites municipalities to apply the Victorian manual practices to their own roads.[10]

VicRoads also has Tourist Signing Guidelines for tourist and services signing on Victorian Roads.[11] These are currently being revised in conjunction with Tourism Victoria and expected to be published early in 2007.[12]

In its submission, VicRoads made the following observations and recommendation with respect to 'signs':

> Signage may contribute to driver distraction, but the extent to which this is so and the types of signs that are potential problems are uncertain. It is known that signs that include movement or flashing lights are likely to be more distracting, and there is some evidence that signage of this type near intersections or in similar locations where driver distraction would be more serious is a problem. It would be reasonable to suggest the following:
>
> - There is a need for further research to understand the role of signs in distracting drivers.
>
> - Current knowledge would suggest that signs that include changing visual content should not be laced in locations where they can be seen by drivers as they negotiate complex driving situations such as heavy traffic or intersections. Current guidelines could be modified to reduce the potential for distraction.[13]

The Committee notes that VicRoads made no distinction between road traffic signs erected by road authorities and advertising signs in the above recommendation. The Committee believes any research and possible guidelines should apply to both forms of signs.

Combinations of Signs – The 'Signscape'

The Committee is concerned about the safety implications of the clutter of traffic, road direction and other information signs and the potential for them to distract motorists from their main driving task. While individual signs may have been appropriately sited and designed, the Committee considers that there is a need for the relevant authorities to give more emphasis to the overall 'signscape' as a driver travels along a road.

At a hearing in July 2006, VicRoads advised it was developing proposals to review traffic signs along key road corridors. It was envisaged:

> … this would reduce visual clutter by removing redundant signs and simplifying and amalgamating the existing signs.[14]

Variable Message Signs

A type of traffic information sign becoming increasingly prevalent is the Variable Message Sign (VMS). It can be either permanently located or mounted on a trailer and moved to different locations. Sometimes the signs provide advance warning of road congestion, an incident or future road works or events, which may result in traffic delays and/or detours.

Few submissions mentioned such signs, however the Motorcycle Riders' Association noted that the displays usually use a series of message 'screens' which may change too slowly. The MRA recommended that VMS operators set messages so that the entire message can be read when travelling at normal speeds.[15]

Mr N. McDonald, an ARRB Group consultant, advised the Committee that signs with changing messages which take a long time to read, may need to be controlled:

> If it is a sign advising that something is happening at a later time – for example, a road closure or road works – would that be important enough to draw that much driver attention away from the road and the traffic environment around them at that time? There is really a need for caution. We may need to look at controlling the types and frequency of messages beyond what is already specified by various road authorities and standards.[16]

One practical concern the Committee has with VMS messages is when they are still being displayed some time after the road works, event are over. Whilst the same concern applies to static signs, the potentially more distracting effect of VMS messages requires extra diligence in immediately removing such messages when they are no longer relevant.

The Committee is not aware of any existing Australian guidelines with respect to variable message signs.

According to a multinational International Commission on Illumination (CIE) working group in 1994, VMS are increasingly being used to provide the public with up-to-date information. The group notes that:

> The use and siting of a variable message sign have requirements different to that of a conventional sign. Despite the increase in the use of variable message signs there are no clear guidelines for their design.[17]

The Committee is aware of a number of VMS guidelines prepared by various states in the USA.[18] The Committee is also aware of recent work in the United States to develop new guidelines on VMS for the U.S. Manual on Uniform Traffic Control Devices.[19]

The Committee consider VicRoads should investigate the need for more specific instructions about the use of Variable Message Signs.

Recommendation 12

That VicRoads, in consultation with local councils, develop a set of guidelines to regulate the location, size and content of all road authority and other signs within road reserves. Such guidelines will be designed to minimise potential driver distraction and will apply to individual signs as well as the total signscape along a road.

That following the implementation of the above guidelines, VicRoads and local councils aim to remove superfluous and obsolete signs.

Billboards and Advertising

Advertising within or near road reserves can come in many forms ranging from hand-made paper or cardboard signs advertising a weekend 'garage sale', medium sized real estate advertising signs and small local shop signs under verandas or on windows, to large illuminated or video-style signs erected by the roadside, over the road, or on or above buildings. They may also be accompanied by banners, balloons, beacons, lights and other devices, such as inflatable figures.[20]

Various forms of advertising are also placed on vehicles, including public buses, trams and taxis. In their submission MUARC note an increasing use of VMS for advertising.[21]

In addition, road reserves are also used for 'public interest' advertising, such as general tourist information, fire and water restriction warnings, environmental and health messages, local events and general road safety messages.

The Motorcycle Riders' Association went so far as to say roads have been transformed from places to travel, where the main distracters were street signs, to virtual sales catalogues.[22]

Mobile Advertising

The proliferation of advertising continues to increase as companies look for new ways to market their products and services to the public. Mobile outdoor advertising has many forms, from corporate

logos on cars and trucks, advertising on public transport to vehicles whose sole purpose is to carry a mobile sign or billboard.

Less than 20 years ago, public transport in Melbourne was free of advertising. Now trams and buses are covered in advertising and even the windows are now being utilised to sell a message.

For a long time some large trucks have displayed corporate logos and company advertising, as have smaller delivery and courier vehicles. However on-vehicle advertising is now extending to cars driven by private motorists. One new Australian marketing company leases young Melbournians a small car on condition that advertisers can use it as a moving billboard.[23]

ARRB Group consultant Mr N. McDonald mentioned that, in order to improve the ability of other road users to see their vehicles and avoid crashes, some large companies:

> Of their own initiative and also due to regulations in the United States and Europe, are taking measures such as removing advertising from their vehicles. This is a moving billboard, but they are choosing to go for safety and remove the advertising to make it less complex, to put simple boarders around the vehicles so they stand out for what they are . . .[24]

Billboards are no longer static displays. There are now mobile versions mounted on, or towed by, vehicles ranging in size from motor scooters and small cars to large trucks. Some signs are changeable, including so-called tri-panel signs, which rotate at short intervals. There are also vertically scrolling illuminated signs, typically located on footpaths in the city centres.

Evidence from Victoria Police referred to mobile advertising and a sign on the Monash Freeway which changes every 30 seconds to a new sign. They noted that authorities need to be cautious over the quantity and content of these signs.

Mr D. Anderson, Chief Executive, VicRoads, commented that:

> I guess that this is one area where we have jumped the research debate and said, 'We would prefer not to have them in areas that are distracting to drivers because we need signs to help drivers; not to distract them.' From the point of view of the advertisers, of course, that is not helpful because that is the very reason that they put the signs there – to distract drivers and passengers.[25]

Effect of Billboards on Driver Performance and Crashes

The Committee received a range of evidence and views on the extent to which billboards affect driver performance and are a factor in some crashes.

VicRoads advised that advertising on the roadside has been linked to higher crash risks, but there still remains a lack of data on the extent of this linkage.

Preliminary figures from the New Zealand Ministry of Transport study on the involvement of various types of external distraction found that in the casualty crashes reported to police for 2002 and 2003, only one per cent of the external-distraction related crashes related to advertising/signage'.[26]

MUARC stated that research has shown various external distractions such as billboards or signs can reduce the amount of time drivers spend looking at the roadway, particularly if the billboard is moving or is a video board.[27]

A 2004 Canadian study found that 90 per cent of 25 drivers videotaped glanced at one or more signs for at least 0.75 seconds, while 20 per cent glanced for a duration longer than 2 seconds.[28] While two seconds may not seem like high risk duration, it should be noted that even the briefest distractions are enough to cause a fatal crash.

The RACV, noting Cairney and Gunatillake (2000), commented that:

> ..... the relationship of roadside advertising to crashes suggests that regulation, but not prohibition, of roadside advertising is desirable if adverse road safety outcomes are to be avoided.[29]

The Committee received conflicting Australian viewpoints on the relationship of roadside advertising and crashes. A 2000 ARRB literature review for the RACV found advertising has the capacity to contribute to crashes whereas road safety consultant Mr D, Andreassen, in an independent 2001 review, found no direct connection.[30]

A recent Scottish Executive Social Research literature review on *External-to-Vehicle Driver Distraction* found there is evidence that billboards and signs can distract drivers and that external distractions maybe under-represented in crash database.[31]

In contrast, a 2003 driver behaviour study by the Virginia Tech Transportation Institute (VTTI) concluded the presence of billboards does not cause a change in driver behaviour, in terms of visual behaviour, speed maintenance, or lane keeping.[32]

The above evidence illustrates a lack of clear and consistent scientifically-based conclusions with respect to the effect of billboards on driver performance. This may be due to methodological deficiencies, lack of sufficiently large or adequately recorded crash circumstances, or unsuitable experimental environments.

Video Signs/Electronic Billboards

Video-type signs, also referred to as electronic billboards, provide moving graphical material, sometimes combining news headlines and video images with an accompanying advertisement.

The ITS Australia referred to a Tattersall video sign, circa 1996, located near Dandenong Roads in the Melbourne suburb of Caulfield and noted it would be at the high end of driver distraction and possibly one that is contrary to regulations. It:

> . . . really lights up the night sky. It is a video-style system that one must say would have to be at the high end of drive distraction.[33]

The Committee is aware of at least two other large video-style screens, one at the South Road/Nepean Highway intersection in Moorabbin and the other at St Kilda junction. These screens are approximately 18 square metres in size and display continual video images.[34] The Committee considers these screens to be at the high end of potential visual distraction and accordingly, present a risk to drivers.

Peripheral Flicker and Movement

It has been known for some time that human eyes automatically respond to flicker or movement in the periphery of vision and at a lower threshold than for looking straight ahead.[35]

At the 5 December 2005 hearing Ms A. Cavallo, Manager Road User Behaviour, VicRoads, stated that:

> What we do know is when there is movement involved, such as flicker or movement in the visual periphery, that this is more likely to capture a driver's attention. We actually are hard-wired as human beings to movement, so particularly moving screens and information that scrolls at intersections and in highly complex driving situations – these are risky, and in particular researchers have been most concerned about those sort of advertising materials.[36]

Toronto Video Advertising Studies

A 2004 University of Toronto paper by Beijer et al examined the extent to which roadside video advertisements are likely to distract drivers.

The research found that signs with video components receive significantly longer glances (greater than 0.75 seconds) per sign than static billboard signs. Accordingly, the researcher concluded that scrolling text or video signs should be regulated to minimise inappropriate glances.[37]

Separate research by Smiley, Smahel and Eizenman (2004), on behalf of the City of Toronto, examined driver eye fixation patterns. The primary conclusions were:

- the eye fixation study showed that, with a relatively safe group in daytime, advertising signs were similar on average with number and duration of glances to road signs, however, individual examples of unsafe behaviour was associated with glances at signs;

- the evidence is not clear, but it is intuitively obvious that distraction to the driving task in a busy environment increases the level of risk;

- based on one of the studies, it is apparent that video advertising can distract drivers inappropriately, leading to individual crashes;

- comparison between this study and an earlier study, suggests that there may be large differences in driver distraction dependent on the placement and environment in which the sign is seen; and

- further eye fixation studies are required to determine design and placement factors which keep driver distraction at a minimum.[38]

The authors recommended that the City of Toronto adopt a cautious approach to allowing additional video signs. Further eye fixation studies are required to determine design and placement factors which keep driver distraction to a minimum.[39]

In July 2003, Toronto City Council Works Committee introduced interim guidelines for commercial advertising next to expressways, which effectively place a moratorium on new video installations for at least two years, while the safety effects of existing video signs were monitored.[40]

The Committee observes that the use of eye-glance observation technology is enabling new research on the possible distracting effects of road signs, advertising devices and roadside distractions. Further conclusive studies should be carried out to develop definitive scientific conclusions. Nevertheless, some policy implications are already apparent, such as the need for separate assessment of sign installations depending on locations.

The Committee consider the various Victorian road organisations need to take a more consistent and stringent approach to scrolling, moving and video signs at this time. There is also a need to monitor the safety of such installations.

Recommendation 13

That VicRoads, the Department of Sustainability and Environment and municipalities develop a more consistent and stringent approach to the installation, use and content of scrolling, moving and video-style advertising within and adjacent to road reserves. Any installations should be monitored for their effect on road safety.

Guidelines and Practices on Advertising

While guidelines are currently in place for the placement of advertising signs near road reserves, the Committee found that a more prescriptive approach is required to control the location and content of advertising signs.

Existing guidelines and practices vary considerably and have yet to be developed in the case of the newer variable message signs, movable/tri-panel advertising and electronic billboards. Aesthetic appearance and scenic value is often a primary consideration ahead of road safety.

Victorian Guidelines

The *Road Management Act* 2004, Division 2 states that advertising signs are not permitted within the road reserve without the written permission from the relevant road authority.[41] VicRoads is the relevant authority that regulates signage within the road reserve of freeways and major arterial roads, while signage on local roads is controlled by local municipalities. VicRoads and local councils often consult each other in the development of local policies.

VicRoads

The VicRoads has raised concern over the potential for drivers to be distracted by billboards, and advised it has developed a set of guidelines to assess whether a proposed sign is likely to pose an unacceptable risk. However as these guidelines have no legal standing, the Victorian Civil and Administrative Tribunal may overrule VicRoads' decisions.[42]

VicRoads also states that the Act does not apply if the sign is permitted under another Act, such as the Planning and Environment Act 1987. This means that when an advertising sign appears without written authority from the relevant road authority, the road authority has to ascertain whether the sign is permitted under any legislation before asking for it to be removed.[43]

VicRoads notes that although the *Road Management Act* states that unauthorised signs must be removed no time limit is set.[44]

VicRoads provided the Committee with a ten point road safety checklist designed to assist in the location of new advertising signs. (See Table 6.1)

Table 6.1 VicRoads' Ten Point Road Safety Checklist

An advertisement, or any structure, device or hoarding for the exhibition of an advertisement, is considered to be a road safety hazard if it:
1. obstructs a driver's line of sight at an intersection, curve or point of egress from an adjacent property; or
2. obstructs a driver's view of a traffic control device, or is likely to create a confusing or dominating background which might reduce the clarity or effectiveness of a traffic control device; or
3. could dazzle or distract drivers due to its size, design or colouring, or it being illuminated, reflective, animated or flashing; or
4. is at a location where particular concentration is required (eg. high pedestrian volume intersection); or
5. is likely to be mistaken for a traffic control device, for example, because it contains red, green or yellow lighting, or has red circles, octagons, crosses or triangles, or arrows; or
6. requires close study from a moving or stationary vehicle in a location where the vehicle would be unprotected from passing traffic; or
7. invites drivers to turn where there is fast moving traffic or the sign is so close to the turning point that there is no time to signal and turn safely; or
8. is within 100 metres of a rural railway crossing; or
9. has insufficient clearance from vehicles on the carriageway; or
10. could mislead drivers or be mistaken as an instruction to drivers.

Source: VicRoads, Correspondence, 5 January 2005.

The Committee notes that the only numerical criteria is the distance from a level crossing, making the application of the other criteria wholly subjective.

The VicRoads operational requirements for the installation of Variable Advertising Message Signs are that the sign:

- not display animated or moving images, or flashing or intermittent lights;
- not be brighter than 0.25 candela per square metre;
- remain unchanged for a minimum of 30 seconds;
- not be visible from a freeway; and
- satisfy the ten point checklist.[45]

Planning Scheme Guidelines

The Victorian Planning Provisions 1999, Clause 52.05, lists nine aspects responsible authorities should consider in making planning approval decisions for the erection of advertising signs. They include seeking the views of VicRoads if the proposed sign is an animated, floodlit, internally illuminated panel, reflective or sky sign and is to be displayed within 60 metres of a freeway or arterial road.[46] However, in making decisions it is not a requirement for VicRoads to view a planning permit condition.

VicRoads advised in July 2006 that it had sought amendments to the Victorian Planning Provisions to ensure the VicRoads checklist applies to all advertising signs and to make VicRoads a referral authority for electronic billboard permit applications.[47] VicRoads expressed concern over the inconsistent weight given to use of the checklist in various Victorian Civil Administrative Tribunal (VCAT) permit appeal hearings. In the case of variable message advertising signs VCAT panels had, on one occasion approved 10 seconds animation with 5 seconds static display, while on another occasion allowed 30 seconds of static display.[48]

The RACV note the lack of quantitative criteria, leaving it open to interpretation and providing scope for disagreement between the road authority and the advertiser.[49] The RACV state that the checklist could be improved by specifying the limits of acceptable practice.[50]

TAC Billboards

One of the ironic consequences of prominent roadside road safety advertising is that such signage may create a potential safety problem by distracting drivers. Examples would include various TAC billboards that have been highly successful in sending road safety messages.

In acknowledging the potential for such signs to distract drivers, TAC argue that they have tried to minimise any distraction from their signs and that the benefits of the safety message outweigh any distractions of the billboard.[51]

TAC also referred to their own use of billboards to display road safety messages. TAC guidelines for the placement of their fixed and trailer-mounted mobile billboards require that:

- locations be approved by VicRoads and the relevant local Council;
- signs not obstruct the view of motorists or constitute a road safety hazard; and

- they be appropriately placed away from road edges or behind guardrails, securely anchored and positioned to eliminate sun-glare for drivers.[52]

In terms of their use and content the TAC stated that:

> Billboards are only used as a supporting medium to TV, radio and print advertising. . . . Getting the message across requires that billboards are clear and simple; use minimal words are easy to read at a glance as part of the driver's normal road and roadside scanning. Drivers are not required to view the billboard for more than a very brief period of time.[53]

Future Guidelines and Regulations

MUARC recommended both local councils and advertising companies be provided with guidance on the ergonomic design, location and content of proposed advertising signs so that they minimise driver distraction.[54]

The RACV recommended that roadside advertising should be subject to regulation to:

- ensure that signs do not compromise road user safety or amenity;
- control the size, placement and design of advertising signs; and
- strictly prohibit or severely restrict the use of advertising signs in areas of scenic, historic, architectural, scientific or cultural interest value.[55]

Hobson Bay City Council recommended the removal of any advertising from road reserves and rigorous controls on off-road advertising. The Council also recommended restrictions on rotating beacons, other than on motor vehicles.[56]

VicRoads advised that other Australian States have similar legislation to Victoria, with some States having detailed guidelines describing permitted colours, maximum size and minimum distances between advertising signs and road signs. No Commonwealth legislation regulates advertising near roads.[57]

ARRB authors, Cairney and Gunatillake (2000), also proposed specific parameter values, drawn from existing guidelines elsewhere, for:

- sign types and position;
- colours and size;
- legibility;

- illumination and luminance;
- movement and rotation;
- variable text message signs; and
- spacing, number and content.[58]

The Queensland Department of Main Roads have prepared a discussion paper which focused on the effect on driver distraction of the presence of roadside advertising.[59] The paper provides examples of diagrams from the Department's *Guide to the Management of Roadside Advertising*. With respect to billboards, the paper includes restrictions on their location, size, shape, clearance beneath, overall height and illumination. The Guide restricts billboards adjacent to other billboards, important traffic control devices, driver decision making points and areas with a significant crash history.[60]

The Committee notes the extensive detail of the Queensland guide, the wide range of circumstances considered and the public availability of the Guide through the Main Roads Department website.[61] The Committee notes that VicRoads is reviewing Queensland and New South Wales practices for controlling advertising signs and will also be developing a policy supplement to guide staff in assessing advertising signs.[62]

The Queensland Main Roads Department also explores future directions for driver distraction research and action. In the case of advertising devices it states that:

- unless restrictions and regulations are effective the proliferation of devices will rapidly become more of a problem;
- community concerns about disorder and clutter may lead to consideration of aesthetics, amenity and streetscape when considering approvals;
- advertising could be a source of revenue for funding road safety campaigns;
- control of advertising content be investigated; and
- ways for making the advertising industry more accountable be looked into.[63]

The Committee believes VicRoads and the Department of Sustainability and Environment should review traffic sign and advertising sign practices in Victoria in the light of issues discussed in the ARRB report of 2000, the Queensland Department of Main Roads discussion paper and interstate and overseas best practice.

Advertising Content Guidelines

Although not highlighted in evidence, the Committee questions the content of advertisements and its effect, if any, on crashes. Extensive visual content takes longer to read, while obscure messages are likely to take longer to understand, meanwhile reducing cognitive capacity for other tasks, such as safe driving.

The South African National Roads Agency Limited (SANRAL) regulations on outdoor advertising introduced in 2000 included controlling advertisement content.[64] The main content controlling factor in the regulations was the number of bits of information, with long words, logos, graphics, digits and symbols rated separately. There were more stringent restrictions on freeways than other roads. There were also a number of other regulations on colour and size as well as amenity and decency.[65]

Although not having investigated the topic in detail, the Committee consider that VicRoads should review its current guidelines with the view to introducing a more quantitative approach along the lines of the Queensland guidelines. The content of advertisements should also be considered.

Recommendation 14

That VicRoads, the Department of Sustainability and Environment and municipalities develop more prescriptive regulations and guidelines controlling advertising in or near road reserves, including the need to control the content of advertisements.

Chapter 6 Recommendations

Recommendation 12

That VicRoads, in consultation with local councils, develop a set of guidelines to regulate the location, size and content of all road authority and other signs within road reserves. Such guidelines will be designed to minimise potential driver distraction and will apply to individual signs as well as the total signscape along a road.

That following the implementation of the above guidelines, VicRoads and local councils aim to remove superfluous and obsolete signs.

Recommendation 13

That VicRoads, the Department of Sustainability and Environment and municipalities develop a more consistent and stringent approach to the installation, use and content of scrolling, moving and video-style advertising within and adjacent to road reserves. Any installations should be monitored for their effect on road safety

Recommendation 14

That VicRoads, the Department of Sustainability and Environment and municipalities develop more prescriptive regulations and guidelines controlling advertising in or near road reserves, including the need to control the content of advertisements.

Endnotes

[1] State of Victoria, Road Safety (Road Rules) Regulations, Part 3, S.R. No. 120/1999.

[2] State of Victoria, Road Rules – Victoria, 1999, pp. 251-272.

[3] Parliament of Victoria, Road Safety Committee, *Inquiry into the Country Road Toll*, May 2005, p. 194.

[4] Edquist, J, Horberry, T, Regan, M, and Johnston, I, 'Visual clutter and external-to-vehicle driver distraction', Presentation, *Proceedings International Conference on Driver Distraction, Sydney, 2-3 June 2005*, Report 67, STAYSAFE Committee, 2006, p. 3 of paper.

[5] Streets Ahead, Submission to the Inquiry, 21 October 2005, p. 2.

[6] Transport Accident Commission (TAC), Submission to the Inquiry, November 2005, p. 13.

[7] Motorcycle Riders' Association (MRA), Submission to the Inquiry, November 2005, p. 21.

[8] Municipal Association of Victoria, Submission to the Inquiry, 27 October 2005.

[9] VicRoads, Submission to the Inquiry, November 2005, p. 57.

[10] VicRoads, *Traffic Engineering Manual Volume 2, Signs and Marking*, November 2004, Foreword.

[11] VicRoads, *Tourist Signing Guidelines*, Second edition, 2001.

[12] Mr G. Mavroyeni, General Manager Road Safety, VicRoads, Minutes of Evidence, 27 March 2006, p. 134.

[13] VicRoads, Submission, op. cit., p. 47.

[14] Mr. G. Mavroyeni, op. cit., p. 134.

[15] MRA, op. cit., p. 7.

[16] Mr N. McDonald, ARRB Group, Notes of Discussion, Sydney, 23 February 2006, p. 78.

[17] International Commission on Illumination (CIE), CIE111-1, Variable Message Signs, Vienna, Austria, www.cie.co.at/publ/abst/111-94.html, 1994.

[18] For example, Colorado Department of Transportation, CDOT Guidelines on Variable Message Signs (VMS), February 2005, www.cotrip.org/its/whitepapers/VMSGUIDE-rev-2005.pdf;

Oregon Department of Transportation, Guidelines on the Operation of Variable Message Signs on State Highways, June 2004,

http://ntl.bts.gov/lib/6000/6900/6988/Guidelines_for_VMS_on_State_Highway.pdf

[19] Dudek, C, 'New Guidelines in the United States for Effective Variable Message Design and Display', Abstract, *13th International Road Safety on Four Continents Conference*, Warsaw, Poland, October 2005.

[20] Mr D. Anderson, Chief Executive, VicRoads, Notes of Discussion, 5 December 2005, p. 27.

[21] Monash University Accident Research Centre (MUARC), Submission to the inquiry, December 2005, p. 40.

[22] MRA, op. cit., p. 7.

[23] *City Weekly*, Melbourne, 2 May 2005, p. 3.

[24] Mr. N. McDonald, op. cit., p. 75.

[25] Mr D. Anderson, op. cit., p. 27.

[26] Ministry of Transport, New Zealand, Correspondence, 21 October 2005, attached 'Table 3: Crash Involvement Outside the Vehicle Distractions 2002-2003'.

[27] MUARC, op. cit., p. 73.

[28] ibid., p. 70, citing Beijer, D, Smiley, A, and Eizenman, M, 'Observed Driver Glance Behaviour at Roadside Advertising', *Transportation Research Record*, Number 1899, Transportation Research Board, Washington, DC, USA, pp. 93-103, 2004.

[29] Royal Automobile Club of Victoria (RACV), Submission to the Inquiry, November 2005, p. 26, citing Cairney, P, and Gunatillake, T, *Roadside Advertising Signs - A review of the literature and recommendations for policy*, Report for RACV, ARRB Transport Research, Melbourne, 2000, p. 35.

[30] Dr D. Andreassen, Submission, Attachment (Critique of ARRB Report), October 2005, p. 13.

[31] Wallace, B, *External-to-Vehicle Distraction*, Transport Research Series, Scottish Executive Social Research, Edinburgh, Scotland, pp. 56-57.

[32] Lee, S, Olsen, E, and DeHart, *Driving Performance in the Presence of Billboards*, Virginia Tech Transportation Institute, Virginia, United States, 2003, Executive Summary, p. 1.

[33] ITS Australia, Presentation, 30 January 2006, slide p. 59.; Mr B. Stafford, Minutes of Evidence, 30 January 2006, p. 83.

[34] Mr A. Collings, Senior Network Policy Officer, VicRoads, Minutes of Evidence, 3 July 2006, pp. 137.

[35] VicRoads, op. cit., pp. 43-44.

[36] Ms A. Cavello, VicRoads, Notes of Discussion, 5 December 2005, p. 25.

[37] Beijer, D, Smiley, A, and Eizenman, M, 'Observed Driver Glance Behaviour at Roadside Advertising', *Transportation Research Record*, Number 1899, Transportation Research Board, Washington DC, USA, pp. 93-103, 2004, p. 2 of paper supplied by Dr A. Smiley.

[38] Smiley, A, Persaud, B, Bahar, G, Mollett, C, Lyon, C, Smahel, T, and Kelman, W, 'Traffic Safety Evaluation of Video Advertising Signs', Paper 1802, Transportation Research Board Conference, Transportation Research Board, Washington, DC, USA, 2005, Paper 1802, 2005, p. 8 of paper supplied by Dr A. Smiley.

[39] ibid.

[40] Toronto City Council, Works Committee, Report No. 6, Clause 6, 22-24 July 2003, pp. 9 and 16-17.

[41] Government of Victoria, *Road Management Act* 2004 (No. 12), Division 2, pp. 79 -81.

[42] VicRoads, op. cit., p. 57.

[43] ibid.

[44] ibid.

[45] VicRoads, Correspondence, 5 January 2006, Attachment 2, pp. 2-3.

[46] State of Victoria, *Planning Provisions*, Clause 52.05, 2004.

[47] Mr G Mavroyeni, General Manager Road Safety, VicRoads, Minutes of Evidence, 3 July 2006, p. 135

[48] Mr. A. Collings, op. cit., p. 136.

[49] RACV, op. cit., p. 26.

[50] ibid.

[51] Mr D. Healy, General Manager Road Safety, TAC, Notes of Discussion, 6 December 1005, p. 59.

[52] TAC, op. cit., pp. 13-14.

[53] ibid., p. 13.
[54] MUARC, op. cit., p. 95.
[55] RACV, op. cit., p. 27.
[56] Hobsons Bay City Council, Submission to the Inquiry, September 2005, p. 6.
[57] VicRoads, op. cit., p. 57.
[58] Cairney, P and Gunatillake, T, *Roadside Advertising Signs - A review of the literature and recommendations for policy*, Report for RACV, ARRB Transport Research, Melbourne, 2000, pp. 36-38.
[59] Minister for Transport and Main Roads, Queensland, Submission to the Inquiry, 22 November 2005.
[60] ibid, Discussion Paper attached to Submission, p. 10.
[61] Queensland Government, Department of Main Roads, *Guide to Management of Roadside Advertising, Edition 1.0*, TERS Product Number 80.500, Brisbane, December 2002, www.mainroads.qld.gov.au/MRWEB/Prod/Content.nsf/b495dab138a6b17a4a256a42001c8f4f/d095db4b569721854a2570ba000aa301!OpenDocument
[62] Mr. A. Collings, op. cit., pp. 135-6.
[63] Minister for Transport and Main Roads, Queensland, op. cit., pp. 13-15.
[64] Coetzee, J, 'The Evaluation of Content on Outdoor Advertisements', www.itse.co.za. p. 1.
[65] ibid., pp. 2-3.

Chapter

7

Laws and Enforcement

This chapter examines laws and enforcement that may impact upon driver distraction. Particular attention is given to the suitability and enforceability of existing Victorian laws, the laws and enforcement in other jurisdictions and the possible need to amend legislation or statutory requirements.

Overview of Australian and International Driver Distraction Laws

Victoria was the first Australasian jurisdiction to address the issue of mobile phone use by introducing a regulation banning the use of hand-held telephones while driving in 1988.[1]

Other states and territories now have a similar rule (Rule 300), based on the harmonised Australian Road Rules (ARR) introduced nationwide in 1999. The ARR also regulate television receivers and visual display units in motor vehicles in a separate rule (Rule 299). A further rule that has relevance to the consequences of driver distraction is ARR Rule 297 which relates to a driver not having proper control of a vehicle. However 'proper control' has not been defined in the Rules, nor have the courts ruled on what constitutes proper control.

The Committee observed that some legislative efforts overseas to address driver distraction are frequently mislabelled as proposals to ban mobile phone use while driving. In fact, such legislation covers a range of issues including prohibition on specific wireless technologies, restrictions on the use of wireless technologies by specific types of drivers and requirements for police to undertaken data collection.[2]

Some European countries have chosen to allow other forms of legislation to restrict behaviour that may result in distracted driving. For example, their general regulations that deal with the careless or dangerous driving can be applied in the case of mobile phone use.[3]

In the United States, the emerging trend is to legislate against a multitude of behaviours (eg: reading, writing, personal grooming, interacting with pets or unsecured cargo, using personal

communications technologies or engage in other activities that cause distractions).[4]

In 2003, a Task Force on Driver Distraction and Highway Safety in Delaware USA made several recommendations which included expanding a current state-wide inattentive driving law to include, but not limit, examples of driver distractions such as hand-held mobile phone use, grooming and attending to children.[5]

In Washington, District of Columbia (DC) legislation specifically targets the offence of 'distracted driving', which means that the driver is inattentive while operating a motor vehicle, and that inattention results in the unsafe operation of the vehicle because of the behaviour listed above.[6]

The DC legislation also bans talking on a hand-held phone while the vehicle is in use, and all phone use by school bus and learner drivers. Other activities covered by the legislation include reading, writing, performing personal grooming, interacting with pets or unsecured cargo, or engaging in any other activity which causes distraction and results in inattentive driving.[7]

Mobile Telephone Use Laws

Existing Laws

Victorian Road Rule 300

The current rule, gazetted in October 1999 states:

> 300. Use of hand-held mobile phones
>
> (1) The driver of a vehicle (except an emergency vehicle or police vehicle) must not use a hand-held mobile phone while the vehicle is moving, or is stationary but not parked, unless the driver is exempt from this rule under subrule (3).
>
> Penalty: 2 penalty units.
>
> Note **Emergency vehicle**, **park** and **police vehicle** are defined in the dictionary.
>
> (2) In this rule—
>
> ***mobile phone*** does not include a CB radio or any other two-way radio.
>
> (3) This rule does not apply to a driver if the Corporation (i.e. VicRoads) has, by notice in writing, exempted the driver from subrule (1).[8]

That is, that hand-held mobile phones must not be used while a vehicle is moving or stationary but not parked. In Victoria, there are exemptions for emergency vehicles, police vehicles and those with an exemption in writing, however VicRoads has yet to make such an exemption.[9] This legislation specifically excludes CB radio or other two-way radios. As noted elsewhere in this Report, this road rule

does not specifically prohibit text messaging from hands-free devices.

Other Australian Jurisdictions

Similar road rules exist in other Australian jurisdictions, although some do not provide for a road authority to give a written exemption. The penalties, both monetary fines and demerit points, vary between the States and in some cases have recently been increased.[10]

Overseas Jurisdictions

Laws prohibiting or limiting the use of mobile phones while driving are increasingly prevalent in other countries. According to one overseas source, approximately forty countries have bans or restrictions on the use of hand-held mobile phones.[11]

Appendix E provides a list of mobile phone laws in selected countries. In some countries the ban only applies in a local jurisdiction or municipality.

In the United States:

- three states (New York, New Jersey and Connecticut) and the District of Columbia prohibit hand-held phones;
- ten states and DC prohibit all phone use by drivers with a learner's permit;
- eleven states and DC ban use by school bus drivers;
- 26 municipalities in nine states have hand-held restrictions, but nine state legislatures prohibit municipalities making local hand-held laws; and
- Florida and Illinois prohibit two-sided headphone sets.[12]

In some jurisdictions there are restrictions on the use of mobile telephones by learner, probationary or teenage drivers and by those driving a school bus.[13]

An interesting feature in the USA is that many legislatures are requiring government to collect data on the involvement of phones in crashes or conduct driver distraction studies or reviews.[14]

Only one Canadian province (Newfoundland and Labrador) bans hand-held mobile phones, though some are considering restricting novice driver use.[15]

The European Commission's *Comparative Study of Road Traffic Rules and Corresponding Enforcement Actions in Member States of the European Union* provides details as of July 2003 for the then 15

Member States. It found that the majority had recently introduced rules on mobile phones or were planning to do so, and that the use of hands-free sets is usually allowed under the condition that drivers do not endanger traffic.[16]

The hand-held phone ban in the United Kingdom commenced on 1 December 2003.[17]

In 2002, the French government considered a total ban on the use of mobile telephones, however the ban was never put in place because of enforcement issues.[18] Instead, a restriction on the use of hand-held mobile telephones was implemented, and together with the automobile industry, and the country's mobile phone operators, a driver education program was developed.[19]

Sweden, a country that leads the world in road safety, has no restriction on mobile phones. The Swedish Road Administration noted that:

1. A total ban was neither desirable nor cost effective (in terms of e.g. police activity being shifted from speed controls to 'phone controls).
2. The major problem involved with mobile phones and other devices is not the apparatus itself, but the activity of conversing – the distracter. In normal driving, having both hands on the steering wheel has no benefit if you are not focused on the driving task.
3. If a mandatory hands free requirement was legislated, we would be creating a false sense of security for the hands free users because research has shown that the level of distraction between hands free and handheld units are comparable.[20]

The situation in Australia is that use of a hand-held mobile phone in a vehicle is legal only if the car is correctly parked and the engine turned off. However there are instances in some European countries and states in the USA where hand-held use is legal as long as the vehicle is stationary.[21]

Proposed Changes to Australian Road Rule 300

Changes to the Australian Road Rules are currently under consideration by the ARR Maintenance Group, convened under the auspices of the National Transport Commission. The first proposal is to change the heading of the rule to 'Use of mobile phones'. The second relates to a change in wording that clarifies the meaning of 'hand-held' to be a 'mobile phone that the driver is holding in his or her hand'. The third is to define the term 'use' in relation to mobile phones.[22]

A new sub-rule 300(2) defining 'use' is proposed to be inserted after the definition of mobile phone as follows:

a) holding the phone to, or near, the ear (whether or not engaged in a phone call);

b) writing, sending or reading a text message on the phone;

c) turning the phone on or off; and

d) operating any other function of the phone.[23]

The intent would be to allow the enforcement agencies certain powers to adapt to the ever-evolving technology. The Committee support this intent, but observe that because of the rapid changes in technology it is difficult for national regulations to keep up with the use of new electronic devices within motor vehicles. For example, there will still be no specific laws relating to composing a text/SMS message using a hands-free mobile phone (mounted in a cradle).

Enforceability

Enforceability of the hand-held mobile phone bans in Victoria is a key area of concern for police.[24] It could be argued that offences relating to mobile phone use are merely one avenue for police to address 'distracted driver' issues. There are, in most jurisdictions, a variety of laws that have the potential to address these issues including laws covering negligent, careless, inattentive or improper driving or driving without reasonable control of a vehicle, to name a few.[25]

Detection Difficulties

Victoria Police advised the Committee of the difficulties of observing and intercepting drivers using hand-held phones, including in heavy traffic, at night or with tinted windows. Some drivers were so absorbed in their conversation they did not see police trying to attract their attention.[26]

The Transport Accident Commission (TAC) submission described a Localised Enhanced Enforcement Program to improve Police effectiveness. One example was where plain clothes foot police observed drivers at the corner of St Kilda Road and Flinders Street, Melbourne, while uniformed police subsequently intercepted offenders further down the road.[27]

Offences

Table 7.1 below illustrates the number of mobile phone offences for Rule 300 for the years 2001 to 2004 and the first ten months of 2005.[28]

Table 7.1 Mobile Telephone Offences, Victoria, 2001 to 31 October 2005

2001	2002	2003	2004	2005 (to 31 Oct)
17,944	30,154	23,326	22,572	25,075

Source: Victoria Police, Submission, p. 5.

New South Wales Police advised that in 2001 some 11,740 drivers were caught using hand-held phones whereas in 2005 this had increased to over 24,800.[29] It was considered that these numbers represented less 10 per cent of the problem.[30]

Penalty Levels

Hand-held mobile phone offences currently result in a fine of $141 and three demerit points in Victoria. By comparison, fines in New South Wales and Queensland are now $225 and in the Australian Capital Territory $220.[31]

Some submissions proposed an increase in penalties while the TAC recommended looking at the merits of higher penalties.[32] VicRoads recommended increasing penalties to be equivalent to those for moderate levels of speeding.[33]

The Committee previously made a recommendation to increase penalties for mobile telephones in its *Inquiry into the Country Road Toll*.[34] The Government Response stated:

> The Government supports the principles behind this but not an approach that simply increases penalties.
>
> While setting appropriate penalties for offences plays an important part in deterring and modifying unsafe driver behaviour, increasing penalties alone does not change the way drivers behave. There must be high levels of enforcement, which must be seen as applying anywhere and anytime so that drivers believe that if they commit an offence they will be detected. This will continue to be supported by high levels of publicity.
>
> The Transport Accident Commission will directly support Victoria Police through public education in a coordinated campaign that targets the non-use of restraints and mobile phone use. The Enhanced Enforcement Program that the TAC conducts in partnership with the Force enables police in local districts to bid for additional support for enforcement programs that target local safety issues in an effective way.[35]

The Government Response also stated that VicRoads would review penalty levels generally and provide advice to the Government by the end of 2006.[36]

The Committee concluded that hand-held phone use bans are hard to enforce, their effectiveness in reducing use is limited without ongoing publicity and enforcement, and their effect in reducing crashes is unknown.

Appropriateness of Existing Mobile Phone Bans

The Committee received a number of submissions questioning the appropriateness of the existing laws which ban driving with a hand-held phone but still permit the use of hands-free devices. Several organisations and individuals recommended to the Committee that the existing bans be extended to include hands-free mobile phones, however, little if any supporting data or evidence was provided to justify such action.

The Royal Australasian College of Surgeons, Road Trauma Committee recommended banning all phone calls while driving, as did the Motorcycle Riders' Association Australia.[37] Monash University Accident Research Centre (MUARC) recommends not only examining the costs and benefits of a complete ban, but in expectation that this would be favourable, propose that Rule 300 then be amended to also ban hand-use of a mobile phone by all drivers.[38]

The TAC recommended a publicity campaign on the risk of any phone use while driving to increase voluntary compliance, with a view to reviewing the merits of a hands-free ban in the future.[39] VicRoads also recommended such publicity as a precursor to any future ban.[40] Victoria Police did not present and official position on the issue of total bans, but stressed the need for improved behaviour by drivers in using mobile phones.[41]

The Royal Automobile Club of Victoria (RACV), the Australian Automotive Aftermarket Association (AAAA) and Australian Mobile Telecommunications Association (AMTA) all supported retaining the current laws, with AMTA stating that overseas experience was that a total ban would be difficult to enforce and that:

> Such restrictions would also not take into account advances in other car systems, such as adaptive cruise control and collision warning systems, which might compensate for the effect of driver distractions or systems already being used in Australia that manage potential sources of distraction.[42]

AMTA also stated that a complete ban might lead to drivers taking risks to use mobile phones surreptitiously to avoid detection.[43]

The Committee consider that currently, with the hand-held ban, some drivers are resorting to texting with the phone out of sight on their lap. This is arguable more dangerous than holding a phone to their ear. As noted earlier, the Committee consider the preferable approach at this stage is greater publicity on the risks of driving while using a mobile phone and for the Government to encourage the development of safer in-vehicle mobile phone technology.

Safety and Economic Benefits from Hands-free Mobile Phones

Any consideration into the use of mobile phones while driving, in particular the argument over banning hands-free use, should take into account both the potential safety and economic benefits of mobile phone use while driving.

A number of submissions referred to the safety benefits of mobile phones.[44] For example, according to the RACV:

> Having a mobile phone in the car to a call emergency services for help or to help others if there is a fire, crash or medical emergency will result in faster response rates and may help save lives.[45]

AMTA stated that almost one third of genuine calls to '000' are from mobile phones.[46]

In addition, the Association stated that those concerned with road safety risks such as speeding, drink driving and fatigue can use their phones to report reckless drivers. AMTA quoted 'The Age' newspaper as reporting that a Victoria Police Assistant Commissioner publicly asked drivers to use their mobile phones to report reckless drivers after release of the figures showing Victoria topped the national Easter 2002 road toll.[47]

The AMTA submission also quoted figures from a 1998 study by Professor S. Chapman of the University of Sydney that found:

- one in four mobile phone users had used it to report a dangerous situation; and
- two out of three users had called ahead to say they were running late and almost all had consequently slowed down or calmed down.[48]

The Motorola submission also mentioned the substantial public safety and personal security benefits provide by mobile phones.[49]

Mobile phones are also now an essential business tool, particularly for tradesmen and small businesses. The concept of the mobile office is becoming more prevalent as workplaces and technology evolves. Many of these businesses may be economically disadvantaged without the ability to be contactable while travelling.

The MUARC submission mentioned the economic benefits of phone use while driving, stating that:

> Mobile phones may increase productivity, particularly for drivers whose jobs require them to regularly travel and stay in contact with clients.[50]

Yet, as MUARC remark:

> Very few studies have attempted to explore the economic implications of banning the use of mobile phones when driving.[51]

MUARC summarised three studies by:

- Hahn and Tetlock (1999) of the AEI Brooking Joint Centre for Regulatory Studies in Washington DC in the United States;[52]
- Redelmeier and Weinstein (1999) of the University of Toronto;[53] and
- Cohen and Graham (2003) of the Harvard Center for Risk Analysis in Boston, USA.[54]

MUARC stated that the two 1999 studies tried to quantify the benefits of a ban of mobile phones and the loss of consumer convenience of using them when driving. Both concluded a ban would not be economically efficient, with Hahn and Tetlock estimating the benefits of a ban being $US1.2 billion, compared with costs of $US25 billion. However, Cohn and Graham (2003), using more recent estimates and assuming a ban on use of both hand-held and hands-free phones, concluded a net benefit of closer to zero.[55]

AMTA, citing an AEI Brookings working paper by Hahn and Dudley (2002), stated that:

> The three studies examining this issue have found that costs probably exceed the benefits and that a ban on the use of cellular phones would be a rather expensive way to improve safety in automobiles.[56]

Recommendation 15

That any future consideration of the laws dealing with mobile phone use while driving, take into consideration the potential safety and economic benefits to be gained from using hands-free mobile phones.

Learner and Probationary Drivers

Restrictions on hands-free phone use have being introduced recently in some parts of the United States for novice drivers and school bus drivers.[57]

In America the definition of novice drivers for cell phone bans varies - sometimes learner permit and/or probationary licence holders,

while in others it is drivers less than a certain age, for example 18 or 21 years.[58] The Committee observes that periods of learner permit and 'probationary' (or equivalent) licence holding are much shorter in the United States jurisdictions and American drivers can obtain a licence at a younger age than in Victoria.

In August 2005, the Victoria Government issued a *Young Driver Safety and Graduated Licensing Discussion Paper* which included a proposal that no mobile phone use of any kind be permitted for learner (L-plate) and first year probationary (P1) drivers.[59] Following public input, the Government announced in June 2006 that the proposal would be implemented for new learner permits in July 2007 and for new probationary licences in July 2008.[60]

The Committee supports the introduction of such a requirement and considers the effect of the hands-free phone ban should be monitored and evaluated by VicRoads and the results published.

Recommendation 16

That VicRoads monitor, evaluate and publish the results of the impact on road crashes and driver performance of a ban on all mobile phone use while driving by learner permit and first year probationary licence drivers under Victoria's revised Graduated Licensing System.

Laws for Other Electronic Devices

Existing Laws

Victorian Road Rule 299, gazetted in October 1999, states:

> 299. Television receivers and visual display units in motor vehicles
>
> (1) A driver must not drive a motor vehicle that has a television receiver or visual display unit in or on the vehicle operating while the vehicle is moving, or is stationary but not parked, if any part of the screen:
>
> (a) is visible to the driver from the normal driving position; or
>
> (b) is likely to distract another driver.
>
> Penalty: 2 penalty units.
>
> (2) This rule does not apply to the driver if:
>
> (a) the drivers is driving a bus and the visual display unit is, or displays, a destination sign or other bus sign; or
>
> (b) the visual display units is, or is apart of, a driver's aid; or
>
> (c) the Corporations (i.e. VicRoads) has, by notice in writing, exempted the driver from subrule (1)
>
> *Examples of driver aids*
>
> 1. Closed-circuit television security cameras.

2. Dispatch systems.

3. Navigational or intelligent highway and vehicle system equipment.

4. Rearview screens.

5. Ticket-issuing machines.

6. Vehicle monitoring devices.[61]

Laws in other states are identical or very similar, since all are based on the Australian Road Rules of 1999.

Enforceability

The Victoria Police provided figures on Rule 299 offences for 2002 to 2004 and the first nine months of 2005. These show the numbers increasing from 10 per annum to approximately 30 per annum. The offences currently result in an infringement notice fine of $79 and no demerit points.[62]

New South Wales Police provided numbers for 2001 to 2005, but divided into those where the screen was visible to the driver and those where the image was likely to distract other drivers. The annual numbers where the driver can see the screen from their normal driving position were 10 or below, while those where another driver could be distracted have grown from less than 10 to over 50 per annum.[63] While relatively low compared to mobile phone offences, the New South Wales Police stated their challenge is to develop new detection methods to deter screen use while driving.[64]

Both the VicRoads and MUARC submissions mentioned the need to review the exemptions in ARR 299.[65] VicRoads notes that:

> There is some potential uncertainty about exemptions applied to drivers aids given the development of units that serve more than one function. It may be useful to consider limiting the exemption such that it cannot be applied if the technology is seen being used for some other purpose. This would rely on rewriting Part 2(b) such that there is an exemption that applies only if the device is being used as a drivers aid.[66]

MUARC supports VicRoads' suggestion and believes penalties should be increased to a level comparable to Rule 300.[67]

Australian Design Rule 42/04

Australian Design Rule (ADR) 42/04, clause 18, sets out the requirements for television and visual display units and is part of the Australian motor vehicle standards system.[68] The two relevant clauses are:

> 18.1 General
>
> All television receivers or visual display units and their associated equipment must be securely mounted in a position which:
>
> 18.1.1 Does not obscure the driver's vision;

> 18.1.2 Does not impede driver or passenger movement in the vehicle, and Is unlikely to increase the risk of occupant injury.
>
> 18.2 Restriction on Visibility of Screen
>
> Unless a driver's aid, all television receivers or visual display units must be installed so that no part of the image on the screen is visible to the driver from the normal driving position.[69]

In commenting on the design rule, MUARC and VicRoads note that:

- drivers aids include satellite navigation, road/driving condition advisory systems and camera-based rear-vision systems;
- manufacturers appear to have a duty of care for ensuring information likely to greatly distract drivers not be viewable when the vehicle is moving or presented so the driver cannot see it directly;
- the States and Territories are responsible for vehicles after they first sold and require compliance with the ADRs which applied at the time of manufacturer. However they have no established approval process and compliance would most likely only be tested in the event of a roadworthiness inspection – which is not conducted annually in all jurisdictions.[70]

While ADR 42/04 applies to new vehicles manufactured in Australia, it does not apply to devices placed in vehicles after manufacture – i.e. after-market devices that are displayed on dashboards or mounted in instrument panel/dashboards.

A concern regarding the ADR is that it does not provide for the requirement in the Road Rules that the unit or screen must not distract viewers from outside the vehicle.[71]

In contrast to the limited mobile phone laws in the United States, over 49 USA jurisdictions have similar legislation to that in place in Australia for televisions and video monitors in cars.[72]

According to a presentation at the 2005 Toronto Conference, nine Canadian jurisdictions prohibit or restrict the use of television screen in vehicles, with eight restricting screen placement.[73]

Other countries, such as the United Kingdom, prohibit hand-held devices if they can 'send and receive data' – for example, PDAs or navigational systems that are able to be held in the hand.[74]

Japanese legislation was supported by statistics stating that injuries caused by car navigation systems were up in 1998 by 14 per cent on the previous year.[75]

Victoria Police advised the Committee that some industries want the Police to use the ADRs as having legal effect, when in fact they are just rules and not legislation.[76]

The AAAA sought exemption of in-car rear seat entertainment from the ADR, stating that they had found no research showing in-car entertainment systems increase crashes.[77] The AAAA also sought uniform national regulations in terms of in-car video systems, stating that:

> The present variety of regulations and enforcement, among the States is counterproductive to efficient product management and compliance with Vehicle Regulations.[78]

The Committee considers that enforceability of Road Rule 299 is difficult, with the distraction of other drivers being particularly subjective. Whilst viewing a screen within one's own vehicle while driving is clearly deliberate, distraction of other drivers is less clear. The Committee considers that there is scope for separate penalties for installations which distract the driver from within the vehicle and those that may distract other drivers.

Recommendation 17

That in relation to the road rule on the use of television and video-screen devices in vehicles, Victoria Police and VicRoads implement separate penalties for installations which could distract the driver and those which may distract drivers of other vehicles.

Verifying Aftermarket Installation Processes

As mentioned earlier, there is no established approval process to verify that an aftermarket installation of a visual display unit conforms to ADR requirements.

The VicRoads submission states that:

> In relation to Australian Design Rule 42/04 Part 18, vehicle owners are held responsible and are required to install equipment in accordance with the requirements of the ADR. The States and Territories do not, however, have an established approval process and compliance would most likely only be tested in the event of a roadworthy inspection by the relevant authority. Annual roadworthy inspections are not conducted by road authorities in all Australian States and Territories. It is possible, therefore, for drivers to install devices in locations where they can be seen while the vehicle is in motion and to circumvent devices that lock out the information displayed when the vehicle is in motion, without the knowledge of road authorities.[79]

and:

> There is currently no regime in place to ensure that all television receivers and visual display units installed in Australian vehicles as aftermarket products are fitted in accordance with the requirements of the ADR.[80]

The AAAA indicated that it would be willing to cooperate with vehicle authorities and the automotive manufacturing industry in developing a Code of Practice. If adopted the Association would communicate the requirements to members and recommend they abide by the code.[81]

The Committee considers that, in addition to the desirability of an installation code, there is a need for potential future vehicle owners and drivers to be aware of whether any installed video or TV screens satisfy the relevant Australian Design Rules. VicRoads should develop a quality assurance-based or auditable verification and documentation process. This might include a suitable sticker to be attached to the vehicle, or a certificate that could be placed in a vehicle handbook or service record book.

Recommendation 18

VicRoads develop, in conjunction with the automotive manufacturer and aftermarket motor accessory industry, a verification process for the installation of video and TV screens in motor vehicles so that vehicles owners and potential purchasers can be assured that the installation satisfies Australian Design Rules.

Mobile Phone and TV/VDU Distinction

Mobile phone users can presently access live television transmission, video clips, Multimedia Messaging Service (MMS) and video-phone conversations. In view of the emerging technologies, the Committee believes the distinction in law between mobile phones, television receivers and visual display units in motor vehicles is becoming less clear and should be reviewed.

The nationally-proposed changes to ARR 300 contain a clause (c) defining use of a phone as ‘operating any other function of a phone’. The Committee questions whether a driver watching TV on a hands-free phone would be in contravention of ARR 299. The existing rules do not make it clear as the terms ‘phone’, ‘television receiver’ and ‘visual display unit’ are not defined in the ARR.

Given the blurring of the distinction between mobile phones and TV/VDUs and the rapid pace of technological change, the Committee believes it is timely to review whether the concept of two separate road rules is still appropriate.

Recommendation 19

That VicRoads review the intent of Australian Road Rule 299 (television receivers/visual display units) and Australian Road Rule 300 (use of hand-held mobile phones) in view of emerging technologies and consider the appropriateness of having two separate rules.

Careless, Dangerous and Distracted Driving Laws

Existing Laws

Victoria Police can charge drivers with 'dangerous driving' or 'careless driving' as regulated by the *Road Safety Act* 1986 (Vic), and can charge a driver under the *Road Rules Victoria* for 'not having proper control of a vehicle' and for 'not keeping a safe distance behind vehicles'.[82]

Dangerous and Careless Driving

The Victoria Police submission provided figures for the annual number of Careless Driving offences in Victoria for 2000 to 2004 and the first half of 2005. The average annual number was 3560, with no clear trend. The maximum penalty for a first offence is 12 penalty units (approximately $1200).[83]

Victoria Police considered that a rear-end collision would be considered careless driving because the driver was travelling too close to the vehicles in front.[84]

The Committee notes that because there is no infringement notice and cases must go to court, the Police may be reluctant to prosecute in situations where there was no crash or it would be difficult to prove conscious carelessness.[85]

Other Road Rules

Victorian Road Rule 297 of 1999 states:

> 297. Driver to have proper control of a vehicle etc.
>
> (1) A driver must not drive a vehicle unless the driver has proper control of the vehicle.
>
> Penalty: 3 penalty units.
>
> (2) A driver must not drive a motor vehicle unless the driver has a clear view of the road, and traffic, ahead, behind and to each side of the driver.
>
> Penalty: 3 penalty units.[86]

Victorian Road Rule 126 states:

> 126. Keeping a safe distance behind vehicles

> A driver must drive a sufficient distance behind a vehicle travelling in front of the driver so the driver can, if necessary, stop safely to avoid a collision with the vehicle.
>
> Penalty: In the case of drivers of large vehicles, 10 penalty units;
>
> In the case of drivers of vehicles other than large vehicles, 5 penalty units.[87]

The Committee notes that greater publicity of the dangerous and careless driving rules and their penalties might encourage drivers to be more cautious in undertaking secondary tasks while driving.

Need for a Specific Distracted Driving Law

As noted earlier in this chapter, a number of United States jurisdictions have introduced or investigating specific distracted driving laws. New Hampshire passed the nation's first distracted driving law in 2001.[88] Other jurisdictions with similar laws include Washington DC (2004) and Connecticut (2005).

Legislation in Connecticut places a prohibition on drivers from 'engaging in any activity not related to the actual operation of a motor vehicle in a manner that interferes with the safe operation of such vehicle on any highway'.[89]

Victoria Police have advised MUARC that:

> … if there was a traffic infringement notice that they could issue for distracted driving, then they would probably be more likely to apprehend more people for that misdemeanour than having to take them to court.[90]

The Committee see that one advantage of such a rule is that it would give publicity on the dangers of distracted driving more relevance and credibility.

The Committee therefore consider that there would be value in investigating the introduction of an appropriate road rule and accompanying traffic infringement notice offence for driving while undertaking activities which could distract from safe driving. Victoria Police and VicRoads should undertake such an investigation following the development of a clear definition and categorisation of distraction.

Recommendation 20

That following the development of a clear definition and categorisation of driver distraction (see Recommendation 1), Victoria Police and VicRoads introducing an appropriate road rule to prohibit driving while undertaking activities which could distract from safe driving.

Novice Driver Passenger Restrictions

In the Government's *Young Driver Safety and Graduated Licensing Discussion Paper* of April 2005, consideration was given to the concept of limiting the number of passengers travelling with probationary drivers. The discussion paper stated that carrying multiple passengers significantly increased the risk of an inexperienced driver crashing, and that;

> The rate of fatal and serious injury crashes, is elevated when probationary drivers carry two or more passengers, either day or night. 26 per cent of first year probationary drivers involved in fatal crashes are carrying two or more passengers, yet only 9 per cent of their total driving is with multiple passengers.[91]

The paper commented that distractions increase mental workload and that multiple peer passengers can also encourage risk taking behaviour. It also reported that New Zealand and 25 USA states have passenger restrictions on newly licensed drivers. The overseas restrictions range from a total ban on passengers to a limit of only one passenger to accompany an unsupervised driver for the first 6 to 12 months of their probationary licence, unless they are a dependent, spouse or other family member. Exemptions may apply where transport options to get to work or study are limited.[92]

In terms of the impact on crashes, the discussion paper reported a nine per cent reduction in crashes involving teenage passengers of restricted drivers was observed in New Zealand and a 23 per cent reduction in passenger injuries was found in California. [93]

However, the paper noted that restrictions on passengers would mean that first year drivers would not be able to take on the role of designated driver.[94]

The new Graduated Licensing Scheme changes were announced in June 2006, however novice driver passenger restrictions are not included in the new Scheme. At the time of the announced changes, the RACV criticised the omission of the passenger restrictions.[95]

In view of the large number of potential distractions facing drivers, including a significant source of distraction from passengers (see Chapter 5), the Committee believes the issue of novice driver passenger restrictions must be reviewed. Following the implementation and evaluation of the revised Scheme, the Government should again consider the desirability of restrictions on the number of passengers that can accompany a novice driver in the early period of their probationary licence.

Any reconsideration of passenger restrictions under the Graduated Licensing Scheme should take into account the success or otherwise of the designated driver program, including consideration of any appropriate data.

Recommendation 21

That following the implementation and evaluation of the recently announced changes to the Graduated Licensing Scheme, the Government reconsider the issue of restricting the carriage of multiple passengers by novice drivers.

Chapter 7 Recommendations

Recommendation 15

That any future consideration of the laws dealing with mobile phone use while driving, take into consideration the potential safety and economic benefits to be gained from using hands-free mobile phones.

Recommendation 16

That VicRoads monitor, evaluate and publish the results of the impact on road crashes and driver performance of a ban on all mobile phone use while driving by learner permit and first year probationary licence drivers under Victoria's revised Graduated Licensing System.

Recommendation 17

That in relation to the road rule on the use of television and video-screen devices in vehicles, Victoria Police and VicRoads implement separate penalties for installations which could distract the driver and those which may distract drivers of other vehicles.

Recommendation 18

VicRoads develop, in conjunction with the automotive manufacturer and aftermarket motor accessory industry, a verification process for the installation of video and TV screens in motor vehicles so that vehicles owners and potential purchasers can be assured that the installation satisfies Australian Design Rules.

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Endnotes

[1] Road Safety (Traffic) Regulations, 1988, Reg. 1505 (1) (Vic.).

[2] Sundeen, M, *Cell Phones and Highway Safety 2005 State Legislative Update*, National Conference of State Legislatures, Denver, Colorado, United States, August 2005, p. 7. http://gulliver.trb.org/news/blurb_detail.asp?id=5277

[3] SWOV Institute for Road Safety Research, *Factsheet - Mobile Phones*, Leidschendam, The Netherlands, March 2005, www.swov.nl/rapport/factsheets/fs_mobile_phones.pdf

[4] Sundeen, M, op. cit., p. 9.

[5] Delaware, House of Representatives, Media Release, 1 April 2003, www.delhousegop.com/html/cellphone.html.

[6] District of Columbia, Distracted Driving Safety Act of 2004, Washington, DC, United States, 2004 http://mpdc.dc.gov/mpdc/cwp/view,a,1240,q,547851,mpdcNav_GID,1552,mpdcNav,%7C.asp

[7] ibid.

[8] State of Victoria, Road Rules – Victoria, Rule 300, Victorian Government Gazette, 28 October 1999, p. 221.

[9] Ms. A. Cavallo, Manager Road User Behaviour, VicRoads, Minutes of Evidence, 3 July 2006, p. 138.

[10] In Tasmania the penalty was increased to $110 and two points in October 2003 – Minister for Infrastructure, Energy and Resources, Submission to the Inquiry, 28 October 2005, p. 1; In Queensland the penalty was increased to $225 and three points on 1 January 2004 – Minister for Transport and Main Roads, Submission to the Inquiry, 22 November 2005, p. 3.

[11] Sundeen, M, op. cit., p. 11 citing Cellular News, www.cellular-news.com/car_bans/

[12] Sundeen, M, 'Distracted Driving Legislation', Presentation, *International Conference on Distracted Driving*, Ontario, Canada, October 2005, pp. 11 and 16. http://www.distracteddriving.ca/english/presentations.cfm

[13] Sundeen, M, *Cell Phones and Highway Safety 2005 State Legislative Update*, National Conference of State Legislatures, Denver, Colorado, United States, August 2005, p. 8.

[14] ibid.

[15] Wilson, J, 'Legislation and Regulation in Canada with respect to Driver Distraction', Paper, *International Conference on Distracted Driving*, Ontario, Canada, October 2005, p. 2.

[16] European Commission, Directorate-General for Energy and Transport, *Comparative Study of Road Traffic Rules and Corresponding Enforcement Actions in Member States of the European Union, Final Report*, Brussels, Belgium, (undated), p. 67.

http://europa.eu.int/comm/transport/road/publications/trafficrules/index_en.htm

[17] Department for Transport , United Kingdom, *Mobile Phones – Frequently Asked Questions*, www.dft.gov.uk/stellent/groups/dft_rdsafety/documents/page/dft_rdsafety_025216.hcsp

[18] Australian Mobile Telecommunications Association (AMTA), Submission to the Inquiry, 11 November 2005, p. 12.

[19] ibid. Appendix C contained a copy of the resulting brochure.

[20] Mr. C. Patten, Swedish Road Administration, Correspondence, 2 November 2005.

[21] SNRA, *The Use of Mobile Phones in Road Traffic*, unpublished English translation, pp. 35-36 provided in Correspondence, 2 November 2005 , Attachment 6;

New York State, *Vehicle and Traffic Law*, Section 1225c. 2001;

Washington, DC, *Distracted Driving Safety Act* 2004, Section 4 (a).

[22] National Transport Commission, *Australian Road Rules General Amendments and Regulatory Impact Statement,* 2005, pp. 30-31, http://www.ntc.gov.au/docview.aspx?page=a0231240340045002O&M=0&T=0

[23] National Transport Commission, Draft *Road Transport Legislation - Australian Road Rules, Amendment Regulations 2005*, pp. 55-56, www.ntc.gov.au/FileView.aspx?page=A02310406400080020/

[24] Assistant Commissioner R. Hastings, Victoria Police, Notes of Discussion, 5 December 2005, pp. 5-6.

[25] Olsen, R, IRMI.Com, May 2003, www.irmi.com/Expert/Articles/2003/Olson05.aspx.

[26] Superintendent P. Keogh, Victoria Police, Notes of Discussion, 5 December 2005, p. 5;

Assistant Commissioner R. Hastings, op. cit., p. 5.

[27] Transport Accident Commission (TAC), Submission to the Inquiry, November 2005, pp. 16-17.

[28] Victoria Police, Submission to the Inquiry, 28 September 2005, p. 5.

[29] Chief Superintendent J. Hartley, New South Wales Police, Paper presented at meeting, Sydney, 23 February 2006, p. 5. Also in Report 67, STAYSAFE Committee.

[30] Chief Superintendent J. Hartley, Notes of Discussion, Sydney, 23 February 2006, p. 37.

[31] Victoria Police, op. cit., p. 5.; Roads and Traffic Authority, New South Wales, website, Demerit Points Offence – Search.; Minister for Transport and Main Roads, Queensland, Submission to the Inquiry, 22 November 2005, p. 3.; Monash University Accident Research Centre (MUARC), Submission to the Inquiry, December 2005, p. 111.

[32] Roadsafe Inner Northern, Submission to the Inquiry, 21 October 2005, p. 2.;Victorian Automobile Chamber of Commerce, Submission to the Inquiry, October 2005, p. 4.; MUARC, op. cit., p. 91.; TAC, op. cit., p. 19.

[33] VicRoads, op. cit., p. 66.

[34] Parliament of Victoria, Road Safety Committee, *Inquiry into the Country Road Toll*, May 2005, Recommendation 59, p. 265.

[35] Government of Victoria, *Government Response to the Road Safety Committee Inquiry into the Country Road Toll*, November 2005, p. 20.

[36] ibid.

[37] Royal Australasian College of Surgeons (RACS), Submission to the Inquiry, 19 October 2005, p. 2.; Motorcycle Riders' Association (MRA) Australia, Submission to the Inquiry, November 2005, p. 6.

[38] MUARC, op. cit., Recommendations 10 and 11, p. 90.

[39] TAC, op. cit., p. 19.

[40] VicRoads, op. cit., p. 25.

[41] Assistant Commissioner R. Hastings, op. cit., p. 7.

[42] Royal Automobile Club of Victoria (RACV) Limited, Submission to the Inquiry, November 2005, p. 31.; Australian Automobile Aftermarket Association (AAAA), Submission to the Inquiry, 26 October 2005, p. 2.; AMTA, op. cit., p. 17.

[43] AMTA, op. cit., p. 12.

[44] RACV, op. cit., p. 21.; AMTA, op. cit., p.15.; MUARC, op. cit., p. 30.

[45] RACV, ibid., p. 21.

[46] AMTA, op. cit., p. 15.

[47] ibid.

[48] ibid.
[49] Motorola Australia Pty. Ltd., Submission to the Inquiry, 11 November 2005, p. 2.
[50] MUARC, op. cit., p. xiii.
[51] ibid., p. 29.
[52] Hahn, R, and Tetlock, P, *The Economics of Regulating Cellular Phones in Vehicles*, AEI Brookings Joint Center for Regulatory Studies, Working Paper 99-9, Washington, DC, United States, October 1999.
[53] Redelmeier, D and Weinstein, M, 'Cost-effectiveness of Regulations against using a Cellular Telephone While Driving', *Medical Decision Making*, Volume 19, pp. 1-18, 1999.
[54] Cohen, J and Graham, J, 'A Revised Economic Analysis of restrictions on the Use of Cell Phones Whilst Driving, *Risk Analysis*, Volume 23, pp. 5-17, 2003.
[55] MUARC, op. cit., p. 29.
[56] AMTA, op. cit., Appendix A, p. 3, citing Hahn, R, and Dudley, P, *The Disconnect Between Law and Policy Analysis: A Case Study of Drivers and Cell Phones*, Working Paper 02-7, AEI-Brookings Center for Regulatory Studies, Washington, DC, United States, May 2002.
[57] An American Automobile Association tabulation of 2 May 2006 lists 12 jurisdictions, www.aaaexchange.com/Main/Default.asp?CategoryID=3&SubCategoryID=35
[58] Sundeen, M, op. cit., p. 8.
[59] Government of Victoria, *Young Driver Safety and Graduated Licensing Discussion Paper*, August 2005, p. 19.
[60] Office of the Premier, *A Safer System for Younger Drivers in Victoria*, Media Release, 21 June 2006. For fact sheet and details see www.arrivealive.vic.gov.au/c_youngGLS_1.html
[61] Road Rules Victoria, Gazetted 28 October 1999, Rule 299, p. 220.
[62] Victoria Police, op. cit., p. 10.
[63] New South Wales Police, Presentation, Sydney, 23 February 2006, slide 18, p. 6.
[64] Hartley, J, 'Driver Distraction: A Law Enforcement Perspective', *International Conference on Driver Distraction, Sydney, 2-3 June 2005*, Report 67, STAYSAFE Committee, 2006, p. 5 of paper.
[65] VicRoads, op. cit., p. 58.; MUARC, op. cit., pp. 79-80 and 91-92.
[66] VicRoads, op. cit., p. 58.
[67] MUARC, op. cit., pp. 91-92.
[68] Department of Transport and Regional Services, Australian Design Rules, ADR 42/04 , http://www.dotars.gov.au/transreg/str_adrindx.aspx
[69] Department of Transport and Regional Services, Australian Design Rules, ADR 42/04.
[70] MUARC, op. cit., p. 82.; VicRoads, op. cit., 2005, pp. 54-55.
[71] AAAA, op. cit., p. 5.
[72] Sundeen, M, op. cit., pp. 21-23, http://gulliver.trb.org/news/blurb_detail.asp?id=5277
[73] Wilson, J, 'Legislation and Regulation in Canada with respect to Driver Distraction', Paper, *International Conference on Distracted Driving*, Toronto, Ontario, Canada, October 2005, p. 1.
[74] Department for Transport, United Kingdom, *Switch it off! Missing a call won't kill* you campaign, www.thinkroadsafety.gov.uk/campaigns/mobilephones/mobilephones.htm
[75] Drivers.com, *Japan's Cell Phone Legislation*,6 April 2000, www.drivers.com/article/273/
[76] Assistant Commissioner R. Hastings, op. cit., p. 6.
[77] AAAA, op. cit., p. 3.
[78] ibid., p. 2.
[79] VicRoads, op. cit., p. 55.
[80] ibid.
[81] Mr B. Bartlett, Manager Member Services and Mr S. Charity, Executive Director, AAAA, Minutes of Evidence, 6 February 2006, p. 119.
[82] *Road Safety Act* 1986, Sections 64 and 65 (Vic).; Road Rules Victoria, Gazetted 28 October 1999, Rule 297, pp. 219-220.; ibid., Rule 126, p. 100.
[83] Victoria Police, op. cit., Graph 3, p. 7.
[84] Assistant Commissioner R. Hastings, op. cit., p. 9.
[85] Superintendent P. Keogh, Victoria Police, Notes of Discussion, 5 December 2005, p. 9.
[86] Road Rules Victoria, op. cit., Rule p. 297, pp. 219-220.
[87] ibid., Rule 126, p. 100.

[88] Kelderman, E, *State Laws Vary on Driver Distraction*, Stateline.Org, 22 March 2005, www.stateline.org/live/ViewPage.action?siteNodeId=136&languageId=1&contentId=20069
[89] Sundeen, M, op. cit., p. 9.
[90] Dr M. Regan, MUARC, Notes of Discussion, 6 December 2005, p. 45.
[91] Government of Victoria, *Young Driver Safety and Graduated Licensing Discussion Paper*, August 2005, pp. 7 and 12.
[92] ibid., p. 27 and 29.
[93] ibid., p. 29, citing McKnight and Peck (2002) and (2003).
[94] ibid., p. 27.
[95] Office of the Premier, op. cit.; Murphy, M, 'New P-plate laws to 'save young lives', *The Age,* Melbourne, 23 June 2006, p. 4.

Chapter

8

Vehicles of the Future

In its 2005 *Inquiry into the Country Road Toll,* the Committee considered a range of emerging driver assistance technologies aimed at minimising the risk of a driver losing control of the vehicle. Some of these features included:

- Intelligent Transport Systems (ITS) – computer and communication technologies to improve transport efficiency, reduce environmental effects and increase safety;

- driver assistance technologies – warning systems, cruise control, adaptive cruise control and Electronic Stability Control (ESC), advanced braking systems and intelligent speed adaptation; and

- information and entertainment systems – Global Positioning Systems (GPS) and in-car navigation (or route guidance) systems, driver workload managers, personal computers and internet access, DVDs and audio systems.[1]

Key findings from the Country Road Toll Inquiry included:

- as new driver assistance technologies emerge, it is essential that they be subject to strict standards or codes of practice to ensure safety on our roads;

- driver assistance technology has a significant role to play in reducing road trauma, and the continued development of responsible road safety applications is to be encouraged;

- while much research has gone into evaluating the safety benefits of many in-vehicles safety features, the relatively recent deployment of the devices and the lack of statistical information makes it difficult to evaluate the safety risks; and

- behavioural adaptation to driver assistance systems may see increasing unsafe driving behaviours as drivers continue to grow more reliant on the systems.[2]

The Committee recommended that VicRoads undertake research to better understand the crash risks associated with driver assistance

systems and determine the effects of driver distraction of in-car features.[3]

This chapter examines control and assistance systems in future vehicles, human machine interface research and development of guidelines for driver aids and warning devices.

Given that driver distraction has a significant risk of the driver losing control of a vehicle, it is important that road safety authorities and vehicle manufacturers look at potential benefits and risks to be gained from the emerging driver assistance technologies.

New Driver Assistance Systems

In Chapter 3, the Committee recommended encouraging the development of safer in-car mobile phone technology including integrated speech-controlled phone communication systems. A similar approach is advocated for other telecommunication and driver information devices.

The environment in some modern vehicle cabins has been described as being a 'vehicle cockpit'.[4] Advanced Driver Assistance Systems (ADAS) have been described as representing a third class of telematics entering the vehicle cockpit, after entertainment systems and information and communications systems.[5]

Motor vehicle design and manufacture is one of Victoria's international strengths and the Committee believes the State is in a position to capitalise on the emerging driver assistance technologies to minimise the impact of driver distraction.

As mentioned earlier, driver assistance technologies include driver warning systems, vehicle cruise (speed) control and adaptive cruise control, advanced braking systems such as Electronic Stability Control (ESC), and intelligent speed adaptation. Systems range from simple warning lights or sounds to sophisticated computer and sensor systems, such as ESC, which momentarily automatically take control of the vehicle power and braking mechanisms when a hazardous situation is detected. Some systems, such as those for collision warning and avoidance, can take control of the vehicle if the driver fails to heed warnings.[6]

As reported in the *Inquiry into the Country Road Toll,* the systems include:

- Warning Systems – which assist the driver in keeping the vehicle on the roadway, stay in the same traffic lane or alert that the vehicle is travelling too close to the one ahead or that an object or person is on the roadway or crossing the

roadway. One simple device is a warning that a seat belt is not being used.

- Cruise Control – in which the driver sets a system to operate the acceleration and brake systems in order to maintain a constant speed. It is disengaged when the brakes are applied or the driver switches the system off.

- Adaptive Cruise Control – similar to cruise control, but via a forward-looking radar device it automatically maintains a safe distance between vehicles if it detects a slower-moving vehicle ahead.

- Advanced Braking Systems – measure wheel speeds and steering wheel angles to determine whether the vehicle is likely to spin in a sever braking situation. They range from the now common Anti-lock Brake Systems (ABS) to the more advanced ESC systems.

- Intelligent Speed Adaptation (ISA) – where GPS technology is used to determine where the vehicle is on the road system, the maximum speed limit found from an accompanying digital map and either a warning given if the vehicle's speed exceeds the limit or the device will intervene to prevent the limit being exceeded.

The Department of Information Engineering at the Australian National University informed the Committee of further recent technologies that might eventually be used to address driver distraction. These include automatic machine-interpretation of digital camera-based recorded information of a driver's face and eye movements combined with the machine-recognition of objects outside the vehicle. Such technology has the potential to greatly alter the way information to the driver is provided and how drivers and motor vehicles might interact. Examples of systems being developed included:

- one which determines the percentage of time the driver viewed the centre of the road, comprising upper and lower bounds and dashboard warning lights to draw the drivers attention back to the road;

- combinations of road-directed and face-directed cameras which could detect both the existence of a sign and whether the driver was looking in that direction and had seen it;

- monotony detectors, where the variability of the road scenery was 'measured', using the extent of MPEG compression of the video-recording, to provide a numeric indicator;

- lane tracking devices; and

- cameras which could detect objects such as pedestrians, vehicles and signs, and in the case of speed limit signs, read the value, display it in the vehicle and - if the vehicle was travelling faster than the limit - alert the driver.[7]

The Committee notes the recent establishment of an Australian Research Council-funded Cooperative Research Centre (CRC) for Advanced Automotive Technology. The Centre will bring together key players from the automotive industry, universities and equipment manufacturers to research issues critical to the success of the automotive industry. A significant component of the research program, led by Holden and MUARC, is likely to be design of the driver-vehicle interface to minimise distraction.[8]

The Committee believes that Victoria has an opportunity to influence future vehicle design in relation to driver distraction through its leading involvement in this research centre.

Electronic Stability Control

One of the outcomes of driver distraction can be a late recognition of a hazardous situation and an attempt by the driver to avoid a collision. This corrective action by the driver can often result in the vehicle swerving and skidding out of control.[9]

As the Committee noted in the *Inquiry into the Country Road Toll,* early results of the crash risk reduction effects of Electronic Stability Control (ESC) are substantial, but the Committee expressed concern about behavioural adaptation to the systems which could lead to drivers taking greater risks as they become more reliant on the systems. Drivers may also lose skills they previously possessed.[10]

Nevertheless the greater adoption of ESC in new vehicles could reduce the consequences of driver distraction in circumstances where otherwise the driver would lose control of the vehicle.

The Committee consider the installation of ESC in all new Victorian government vehicles should be investigated.

Driver Workload Managers

A Driver Workload Manager has been described as:

> … a device that attempts to determine if a driver is overloaded or distracted, and if they are, alters the availability of telematics and the operation of warning systems. [11]

The devices can monitor the amount and nature of information being sent to the driver and prevent or defer some messages if they were considered unnecessary for the driving conditions.[12]

For example, the Australian Mobile Telephone Association (AMTA) advised that Volvo have developed a driver information system that monitors throttle movement, braking, steering angle and the use of traffic indicators and windscreen wipers to determine whether to withhold non-safety related information, including phone calls, from the driver. The system is currently in a number of Volvo models in Australia.[13]

In the *Inquiry into the Country Road Toll* the Committee expressed the view that adoption of this technology should be considered with caution and that further research and development was needed in order to regulate the amount of information a driver can receive under certain conditions.[14]

In the current Inquiry, only the Victorian Automobile Chamber of Commerce (VACC) made any significant reference to workload managers and overseas research programs on new automobile technology.[15] The Committee's previous views are therefore still applicable and VicRoads should sponsor, or co-sponsor, research and development of driver workload managers to minimise driver distraction in future vehicles. This could possibly be undertaken through the new CRC for Advanced Automotive Technology.

Speech Recognition

In addition to Driver Workload Manager devices, there is a need for Victoria to monitoring research and development occurring on the interface or boundary between humans and machines. One major new method rapidly becoming technically and economically feasible is speech recognition in vehicles.

Speech recognition is already widely used in a number of ways, including telephone applications such as directory assistance, booking services and financial account information; along with dictating word processing documents on a personal computer. Recent innovations in information technology have seen speech recognition applications in vehicles.

In 2005, IBM and the Honda Motor Company introduced the world's first in-car navigational systems using advanced speech recognition.[16] Since then, speech recognition navigational devices are widely available and applications are rapidly being extended to control other in-car devices such as radio and telephones.

Holden Limited stated that speech recognition is likely to greatly reduce driver distraction as voice, unlike visual attention, does not have to be shared with the driving task and speech-based control greatly reduces secondary task completion times, the time that eyes are off-the-road and the number of glances. However, speech recognition is difficult in a car because of high background noise.[17]

According to a paper by Nissan Japan authors Miki et al (2003) both voice recognition and text-to-speech (TTS) systems, which convert text into synthesized speech, have made rapid progress in recent years.[18] The authors conducted experiments with a small number of subjects in both driving simulators and on a test track and found that:

> … the mental distraction level when listening to a TTS reading of information is comparable to that of listening to a car radio and the workload of the voice activation system is significantly lower than that of a traditional manual operation system.[19]

The Committee is aware of research in the European Community and the United States on the human/automobile interface to minimise driver distraction.[20] As a result of these international activities a number of guidelines for telematic and vehicle warning devices in motor vehicles have emerged.[21]

Travel Information Services

In many parts of the United States real-time Travel Information Services are accessible by a common nation-wide phone number 511, phone menus and speech recognition technology. In some instances it can also be accessed via the internet and emailed messages. Information on major highways and in metropolitan areas includes travel time, events and weather, while public transport information is also sometimes available. [22]

Because few studies have explored the usability of the 511 phone interface, and none using mobile phones while driving, researchers at the Western Transportation Institute, Montana State University recently undertook a brief simulator study with 35 participants and the Montana 511 system. There were no conversations, with the participants using voice commands to determine what the road and weather conditions were for a given highway. The researchers found poorer driving performance, comparable to that found in other mobile phone studies, with at most a marginal safety benefit for the hand-free interface.[23]

While the idea of providing real-time road and traffic information to motorists is attractive, the means by which this occurs needs careful consideration. The Committee consider that road authorities have a responsibility to ensure that any such system, using information gathered about the road system, does not simply add another distraction from the main task of driving.

Recommendation 22

That VicRoads liaise with the Australian Transport Council with a view to further research and development into the potential benefits to be gained from various emerging driver assistance technologies including:

- **Electronic Stability Control;**

- **Driver Workload Managers; and**
- **Speech recognition devices.**

Possible Distractions from Driver Assistance Technologies

Despite the apparent advantages of emerging driver assistance technology, the Committee is aware that the activities and information provided by some technological devices can potentially divert the driver's attention and vision away from the main driving task and therefore become a distraction.[24] MUARC and VicRoads noted this can occur if:

- the visual, auditory or tactile information presented is poorly designed requiring excessive vision and/or attention;
- visual displays and the associated controls are poorly located, away from the driver's line of sight; and
- controls are poorly designed, requiring excessive vision, attention and physically interfere with driving.[25]

System Integration and Driver Interfaces

A 2003 Transport Canada discussion paper *Strategies for Reducing Driver Distraction from In-vehicle Telematic Devices* states that there are several features of telematic devices that could be a distraction because they have the potential to hamper effective driver-system integration.[26] These features were:

- open architecture – which allows portable 'plug and play' products to interact with other devices installed in the vehicle. An example in wireless communications is Bluetooth. Because they are an 'add-on' they are a serious challenge to integrate with the driver-vehicle system;
- multifunction interfaces – a single display surrounded by multiple controls which can lead to drivers having difficulty navigating menus; and
- configurable interfaces – customisation of instrument panels to one's own preferences, as with a modern desktop computer, which may lead to visual and attentional overload.[27]

Transport Canada concludes that these features are only part of the problem and that steps need to be taken to ensure all features of in-vehicle telematics devices are safely integrated with the driver-vehicle system without becoming a dangerous distraction.[28]

Positioning of Vehicle Displays and Controls

An issue of concern to the Committee is the location of the various vehicle controls, as their placement can affect the ease with which instrument displays and controls can be viewed and control switches, knobs, dials and buttons adjusted. Desirably, they should be located high on the dashboard, rather than located in a central console, between the front seats, thereby minimising the time a driver glances away from the road ahead. An example is the location of some audio system controls on the steering wheel.[29] In addition to their positioning, vehicle buttons and controls should be able to be easily distinguished or read, especially at night.

The Committee observes that it is not only the original vehicle manufacturers that need to consider these aspects. The vehicle aftermarket industry needs to be involved, both for devices permanently installed in the vehicle and for cradles and other attachments for portable devices such as mobile phones, Personal Digital Assistants (PDA), MP3 and MP4 players and pocket-sized route navigational systems.

Driver Warning Systems

The increasing number and complexity of driver warning devices has the potential to distract drivers from more important driving tasks. Most vehicles have long had fuel and oil level and engine temperature gauges or warning lights, parking/hand brake and more recently ‘door not closed properly’ warning lights and seat belt reminders.

A more recent inclusion are speed monitoring systems where the driver sets an auditory device which sounds if the vehicle speed exceeds a certain driver-set number - of value if inadvertently exceeding maximum speed limits and incurring speed camera offences.

The range of warning methods used includes lights, buzzers and seat vibrators. A relatively new method, so far only in use in a few up-market vehicles, involves so-called Head Up Displays (HUDs). This technology enables an image (such as the speed) to be projected onto the windscreen, which gives the appearance of the image sitting near the front of the bonnet.

The Committee is not aware of any research on the extent to which these warnings might distract drivers from more important driving tasks. However, the Committee is concerned that it as further warning sources are integrated into vehicles, there may be a threshold value at which the combined negative effects of distraction might outweigh the safety benefits of particular warnings. Given the wide variability of human abilities, this might vary from person to person and from one driving context to another.

Recommendation 23

That VicRoads liaise with the Australian Transport Council with a view to further research and development to ensure that driver assistance technologies minimise potential driver distraction through appropriate system integration, driver-machine interfaces and the positioning of vehicle displays and controls.

Guidelines for In-Vehicle Electronic Devices

In recent years Europe, the United States and Japan have all issued guidelines for in-vehicle electronic devices.[30] They are:

- A Statement of Principles on Human Machine Interface, a European Community/Commission recommendation on safe and efficient in-vehicle information and communication systems issued in 1999.

- Statement of Principles, Criteria and Verification Procedures on Driver Interactions with Advanced In-vehicle Information and Communication Systems, developed by the Alliance of Automobile Manufacturers (AAM) in the United States and published by NHTSA in 2002; and

- Guidelines for In-vehicle Display Systems – Version 3.0 published by the Japan Automobile Manufacturers Association (JAMA) in 2004.[31]

Holden Limited advised that some of these guidelines differ significantly:

> The Japanese standards are very prescriptive, but the American and European Standards are more principle based – and they are also very similar. In fact the main difference is that the American standards have verification procedures and the European standards have just the principles. Australia has virtually no standards or guidelines in this area.[32]

Holden also advised that in the United Kingdom, TRL Limited (formerly the Transport Research Laboratory) have created a safety list designed to be an assessment tool.[33] The University of Michigan Transportation Research Institute (UMTRI) has also undertaken a detailed comparison of 11 approaches and 'guideline' documents, which range from broad statements of principle to voluminous documents of over a hundred pages.[34]

In October 2005, as a result of two years of extensive consultation between scientists and industrialists, a Revised European Statement of Principles was produced.[35] The Committee is not aware of whether this has yet to be formally adopted within the European Community, however the Revised Statement appears to be a major

step forward in providing technical guidance to the European industry.

At present, Transport Canada is attempting to negotiate a Memorandum of Understanding with automobile manufacturers on the key issues, basic design principles and design processes in relation to technology and driver distraction.[36] This followed several years of public consultation as to whether a Memorandum of Understanding or government regulation was preferable.

Holden Limited argues that Australia needs national guidelines rather than a unique, state-based policy, because:

> Uniformity is critical given our low production volumes compared to global competitors. We see consistent, broadly accepted guidelines as an essential mechanism to counteract the prevent use of inappropriate and mediocre "off the shelf" interfaces.[37]

Based on research by MUARC and industry knowledge, Holden is developing its own set of Human Machine Interface (HMI) guidelines, comprising;

- twelve simple rules of thumb for interface design;
- a style guide for those who create the HMI 'look and feel'; and
- a checklist for engineers and software designers to ensure adherence to core driver distraction minimisation principles.[38]

Holden stated it would work with industry and governments to develop appropriate national guidelines, while the VACC recommended development of a memorandum of understanding between government and car manufacturers for fitting in-vehicle devices.[39] The Federal Chamber of Automobile Industries (FCAI) recommended that any driver distraction requirements in Australia should be based on a nationally uniform approach and acknowledge the work worldwide to develop a globally harmonised approach.[40]

The Queensland Government Road Safety Strategy 2004-2011, *safe4life,* recognises the need to ensure vehicle innovations do not provide additional distractions or further complicate the driving task. The strategy proposes Queensland:

> … play a significant role in the development of national standards for in-vehicle technologies and the criteria for assessing these new technologies. We will also build an alliance between government and industry that delivers safe passage of these technologies into the vehicle fleet. [41]

The Committee sees a need for inter-government and industry discussions with both local automobile manufacturers and importers on this issue. Given the location of the design offices of three of the nation's car manufacturers are in this state Victoria should take a lead role in the process.

Recommendation 24

That the Minister for Transport raise at the Australian Transport Council the need to undertake public and industry consultation leading to a Memorandum of Understanding between governments and industry to reduce driver distraction from in-vehicle electronic devices.

Chapter 8 Recommendations

Recommendation 22

That VicRoads liaise with the Australian Transport Council with a view to further research and development into the potential benefits to be gained from various emerging driver assistance technologies including:

- **Electronic Stability Control;**
- **Driver Workload Managers; and**
- **Speech recognition devices.**

Recommendation 23

That VicRoads liaise with the Australian Transport Council with a view to further research and development to ensure that driver assistance technologies minimise potential driver distraction through appropriate system integration, driver-machine interfaces and the positioning of vehicle displays and controls.

Recommendation 24

That the Minister for Transport raise at the Australian Transport Council the need to undertake public and industry consultation leading to a Memorandum of Understanding between governments and industry to reduce driver distraction from in-vehicle electronic devices.

Endnotes

[1] Parliament of Victoria, Road Safety Committee, *Inquiry into the Country Road Toll*, May 2005, pp. 289-314.

[2] ibid., p. 319.

[3] ibid., Recommendation 64, p. 292 and Recommendation 66, p. 305.

[4] Regan, M, 'Driver Distraction: Reflections on the Past, Present and Future', *Journal of Australasian College of Road Safety*, November 2005, p. 22.

[5] Monash University Accident Research Centre (MUARC), Submission to the Inquiry, December 2005, p. 38, citing Regan, M, 'Driver Distraction: Reflections on the Past, Present and Future', *Journal of Australasian College of Road Safety*, November 2005, p. 23.

[6] ibid., p. 39.; VicRoads, Submission to the Inquiry, November 2005, p. 37.

[7] Mr L. Fletcher, Australian National University, Presentation, Canberra, 22 February 2006, slides 19, 23, 7-13 and 27.

[8] MUARC, op. cit., p. 42.; Co-operative Research Centre for Advanced Automotive Technology, www.autocrc.com

[9] Dr J. McLean, video presentation, SmartDemo 2005, ITS Australia, Adelaide, 29 September 2005.

[10] Parliament of Victoria, op. cit., pp. 299-300.

[11] Green, P, 'Driver Distraction, Telematics Design, and Workload Managers: Safety Issues and Solutions', *Convergence 2004 Conference Proceedings*, 2004-21-0022, Society of Automobile Engineers, Michigan, United States, October 2004, p. 1.

[12] Parliament of Victoria, op. cit., p. 305.

[13] Australian Mobile Telecommunications Association (AMTA), Submission to the Inquiry, 11 November 2005, p. 13, citing 'Volvo holds the phone', *The Sydney Morning Herald*, 19 March 2004, p. 3.

[14] Parliament of Victoria, op. cit., p. 307.

[15] Victorian Automobile Chamber of Commerce (VACC), Submission to the Inquiry, October 2005, pp. 10-12 and 22-24.

[16] IBM website, http://domino.watson.ibm.com/comm/pr.nsf/pages/news.20040901_speech.html

[17] Holden Limited, Presentation, 30 January 2006, p. 6.

[18] Miki, Y, Yoshitsugu, N and Ito, K, 'Driver's Load of Voice Interaction System in Vehicles', Paper Number 170, *Enhanced Safety of Vehicles Conference*, Nagoya, Japan, 2003, p. 1.

[19] ibid.

[20] Real Opportunities for Exploitation of Transport Telematics Applications (ROSETTA) project, University of Southampton, United Kingdom, www.trg.soton.ac.uk/rosetta/index.htm ; Department of Transportation, Volpe Centre, Safety Vehicle Using Adaptive Interface Technology (SAVE-IT) project, Cambridge, Massachusetts, United States, www.volpe.dot.gov/opsad/saveit/index.html

[21] For example the Second ROSETTA Report on Human Machine Interface, Work Area 2b, 2002, looks at EC Principles, the AAM Statement of Principles and Japanese Guidelines, www.trg.soton.ac.uk/rosetta/workareas/2b_hmi/hmi_gl_intro.htm

[22] For general 511 information see www.fhwa.dot.gov/trafficinfo/511what.htm and www.its.dot.gov/511/511.htm

[23] Stanley, L, Kelly, M, and Lassacher, S, 'Driver Performance While Interacting with the 511 Travel Information System in Urban and Rural Traffic', Paper 71, *Proceedings of the Third International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design*, Maine, United States, 2005, http://ppc.uiowa.edu/driving-assessment/2005/Final/index.htm#Session6

[24] MUARC, op. cit., p. 40.; VicRoads, op. cit., p. 38.

[25] MUARC, op. cit., p. 41.; VicRoads, op. cit., p. 38.

[26] Transport Canada, Standards Research and Development Branch, *Strategies for Reducing Driver Distraction from In-Vehicle Telematics Devices: A Discussion Document*, TP 14133E, Ottawa, Canada, April 2003, pp. 5-6.

[27] MUARC, op. cit., pp. 41-42.; VicRoads, op. cit., pp. 38-39.; Transport Canada, op. cit., pp. 5-6.

[28] ibid., pp. 6-7.

[29] Mr J. Brown, road safety policy specialist, NRMA Motoring and Services, Notes of discussion, Sydney, 23 February 2006, p. 55.

[30] Holden Limited, Presentation, 30 January 2006, p. 2.; Holden Limited, Submission to the Inquiry, January 2006, p. 15.

[31] ibid., pp. 15-16.

[32] Mr M. Hammer, Holden, Minutes of Evidence, 30 January 2006, p. 68.

[33] Holden Limited, Submission, p. 16, citing Stevens, A, Board, A, Allen, P, Quimby, A, *Safety List for the Assessment of In-Vehicle Information Systems: A Users Manual*, TRL Limited, United Kingdom.

[34] University of Michigan, Transportation Research Institute, Driver Interface Group, 'All the Telematics Guidelines We've Seen',
http://www.umich.edu/~driving/guidelines/guidelines.html

[35] eSafety Forum, *Recommendations from the eSafety–HMI Working Group*, Brussels, Belgium, 18 October 2005, p. 1; For eSafety–HMI Working Group information see also
http://europa.eu.int/information_society/activities/esafety/forum/hmi/index_en.htm

[36] Canadian Automobile Association, Summary of Proceedings and Recommendations, *International Conference on Distracted Driving,* Toronto, Ontario, Canada, April 2006, p. 7.

[37] Holden Limited, op. cit., p. 16.

[38] Holden Limited, Presentation, 30 January 2006, p. 7.

[39] Holden Limited, op. cit., p. 18.; VACC, Submission, October 2005, p. 20.

[40] Federal Chamber of Automobile Industries, Submission to the Inquiry, 28 October 2005, p. 3.

[41] Queensland Government, *Queensland Road Safety Strategy 2004-2011 safe4life*, 2004, p. 13.

Chapter

9

The Way Forward

This final chapter summarises the need to increase recognition of driver distraction as a road safety issue. Looking to the future, the Committee examines the development of a comprehensive program of research and countermeasures, driver training and licensing, vehicle fleet safety management and the use of new technology to provide new insights into how and why crashes occur.

Increasing the Profile of Driver Distraction as a Road Safety Issue

With the exception of some very recent references to distraction in low-level road safety documents in South Australia, Queensland and Tasmania, driver distraction currently has a negligible profile in most government policy and road safety publications in Australia.

Victoria

The Committee sees a need for the profile of driver distraction as a road safety issue to be increased in Victoria. This includes an increased profile in Government strategies, driver training and school road safety programs, and publicity.

The Victorian Road Safety Strategy a*rrive alive! 2002-2007* does not include distraction as one of its 17 key initiative topics.[1] There is only one use of the word 'distraction' in the 24 page document – as one of four effects of fatigue, along with inattention, drowsiness and falling asleep.[2] Mobile phones and other possible driver distracters are also not mentioned.

The Government's *Young Driver Safety and Graduated Licensing* Discussion Paper of August 2005, while mentioning mobile phone use and proposing restrictions, only mentions driver distraction in the context of the issues of peer passengers at night-time and multiple passengers – issues where the Government did not propose restrictions.[3]

However, in concluding their submission to this inquiry, VicRoads state that unless countermeasures are taken to limit the adverse effects of driver distraction it has the potential to escalate into a major road safety problem.[4]

Later in this Chapter the Committee examines driver training and licensing. The Committee also see a need for the topic of driver distraction to be integrated into primary and secondary school road safety programs and publications.

At present, VicRoads has a series of programs and resources aimed at road safety education for primary and secondary school students. For students in the final years of secondary school, programs such as *Keys Please* and *Motorvation 2* are focussed on pre-licence education. The RACV also conduct road safety education programs. These programs should be updated to incorporate suitable information on the risks associated with driver distraction.

The Committee also considers the rental car industry as another important means by which drivers should be educated on driver distraction. People who rent vehicles while on holidays or for other purposes not only need to be informed where vehicle controls are and how they operate, but should be made aware of distraction risks. The Committee notes that California requires that rental cars with embedded cell phone equipment contain written instructions on the safe use of the phone while driving.[5]

It is also noted that the Australian Driver Trainers Association NSW has recommended that, in order to minimise the distraction caused by lack of knowledge of the vehicle controls, publicity be given to the importance of a systematic cockpit drill for the major driving controls and electronic devices for any driver entering a vehicle which was new to them.[6]

Other States

In South Australia, the Department for Transport, Energy and Infrastructure road safety website now includes driver distraction as one of the 'fatal five behaviours', along with drink driving, speeding, driving while tired and not using seat belts or restraints.[7]

The recognition of 'inattention' as an important issue is also highlighted in *Road Crash Facts 2004 for South Australia,* where it is the reported cause of 28 per cent of fatal crashes and 50 per cent of serious injury crashes.[8] However the Committee notes the difference, if any, between distraction and inattention is unclear from the documents or the website. This provides further evidence of the need for a more clearly definition of the two terms in road safety publicity.

South Australia is also now undertaking a distracted driving/inattention publicity campaign, including radio, television and petrol bowser advertisements. The key slogan is:

> It only takes a split second to lose your concentration, good drivers just drive.[9]

The audio and video advertisements for the 2005/06 campaign can be accessed on the Transport SA website.[10]

The *Queensland Road Safety Strategy 2004-2011, safe4life*, identifies inattention as one of nine key issues. However the Committee observes that some of the accompanying text also uses the word distraction, without clarifying whether there is any difference in meaning in the two words.[11]

Queensland Transport is also considering an education and media campaign to inform young drivers of the dangers of driver distraction and inattention.[12]

Neither distraction nor inattention feature on the lengthy list of road safety issues on the Western Australian Office of Road Safety web site, however there is 2001 fact sheet on mobile phones.[13] There is also no mention of distraction in the *Arriving Safely* Road Safety Strategy for Western Australia 2003-2007.[14]

The *Tasmanian Road Safety Strategy 2002-2006* does not mention distraction but occasionally mentions inattention, usually in connection with fatigue or speed. The strategy also mentions research to improve understanding of inattention.[15] Specifically, the document states that from November 2001 all new vehicles purchased by Tasmania Police and the Departments of Health and Human Services, and Infrastructure, Energy and Resources will display a car sticker warning of the dangers of speed and inattention and other driving behaviours.

Examples of the sticker slogans are Inattention – Dead just like that' and 'Speed, inattention, alcohol: Wreck your life just like that'.[16] A television advertisement and some outdoor advertising signs have been produced focussing on inattention. The message conveyed in the television commercial is 'Concentrate. When you are driving, just drive.[17]

In the Australian Capital Territory (ACT) inattention is one of 12 contributing factors to crashes mentioned in *Safety on the road in the 21st century,* the Road Safety Strategy for 2001-2005. However the *ACT Road Safety Action Plan 2005-2006* gives driver inattention and distraction more coverage and includes a proposal to develop strategies targeted at inattention.[18]

Elsewhere in Australia the recognition of driver distraction, or even inattention, as a policy issue is negligible. The ten-year New South Wales *Road Safety 2010* strategy makes no mention of either while the *Road Users' Handbook* only mentions distraction in relation to its effect on driver reaction time.[19] The *Northern Territory Road Safety Strategy 2004-2010* makes no mention of distraction or inattention.[20]

Again, the Committee observes the failure to distinguish between distraction and inattention in policy documents, crash statistics and publicity materials.

Nationally

The *National Road Safety Strategy 2001-2010* omits mention of driver distraction and mobile phones, as did the associated early Action Plans.[21] However, the Action Plan for 2005 and 2006 recognises driver distraction and the need to identify and respond to in-vehicle issues.[22] The two items for action are to:

1) Investigate potential safety effects of in-vehicle entertainment systems and other devices with visual displays.[23]

2) Identify and respond to issues related to in-vehicle driver distraction:

   - monitoring emerging research, including the impacts on different risk groups
   - encourage voluntary fleet policies that prohibit the use of all mobile phones while driving.[24]

The federal Australian Transport Safety Bureau (ATSB) and Austroads, the association of Australasian road authorities, have also recently taken initial actions to address driver distraction. For example, ATSB included questions on mobile phone use in its 18th *Community Attitude to Road Safety* survey in 2005 and Austroads has recently included articles on the road safety implication of driver distraction and of using hand-free mobile phones when driving in a recent road safety handbook.[25]

The International Driver Distraction Conference held in Sydney in June 2005 brought together researchers and policy advisors and the forthcoming publication of the Conference Proceedings by the STAYSAFE Committee of the New South Wales Parliament will increase the amount of information on driver distraction available to Australian road safety professionals.[26]

On the basis of the evidence received in this Inquiry, the Committee consider that the Government should increase the profile of driver distraction as a road safety issue in Victoria and address the topic in the strategy to follow *arrive alive! 2002-2007*.

Recommendation 25

That the Government increase the profile of driver distraction as a road safety issue. This should include:

- **addressing the issue in the forthcoming Victorian road safety strategy;**
- **school road safety programs; and**

- **development of suitable publicity for use by the rental car industry.**

A Comprehensive and Prioritised Approach

As in recent Inquiries, the Committee advocates development of a comprehensive and strategic approach to addressing road safety issues.[27] The Committee therefore noted the comprehensive and integrated package of 72 recommendations provided in the Monash University Accident Research Centre (MUARC) submission.[28] At a briefing in December 2005, MUARC Director, Dr I. Johnston, stated that:

> There does not exist another document anywhere else in the world that we know of that has tried to package together distraction as an issue, so we have the potential to be the first jurisdiction.[29]

At the briefing MUARC presented a list of their eight highest priorities with respect to driver distraction.[30] These were:

- Collect data on the role of distraction in Victorian crashes for a sample of Police-reported crashes.
- Ban use of hands-free mobile phones for L and P Platers - for the whole period.
- Limit the carriage by P-platers of passengers – at least for part of the P-period.
- Ban use of hand-held phone devices by public transport drivers.
- Implement public education programs to state the facts and debunk the myths.
- Training for managing distraction needs to be formalised and implemented within the Graduated Licensing System.
- Develop a system whereby vehicle manufacturers, road authorities, suppliers and other stakeholders ensure that systems and products entering the market meet minimum ergonomic requirements for limiting distractions deriving from within or outside the vehicle.
- Encourage governments and the private sector to develop and implement vehicle fleet safety management policies for limiting driver distraction.[31]

Some other submissions also proposed some general directions on the way forward. For example, VicRoads, in the conclusion to their submission, state that:

> Reducing the potential harm caused by distraction will require the development and implementation of an effective public education campaign, and the extension of current road rules to deter drivers from engaging in distracting activities while driving.[32]

The conclusion of the Transport Accident Commission (TAC) submission focussed primarily on new vehicle technology, mobile

phones and the need for research into the prevalence of various driver distractions and the extent to which they contribute to crashes.[33]

As in the *Inquiry into Crashes involving Roadside Objects of March 2005* the Committee propose that VicRoads develop a comprehensive and prioritised approach to address the driver distraction issue, incorporating research and other policy initiatives.[34] The Committee consider the recommendations and priorities in the MUARC package to be a good starting point for the development of the program.

Recommendation 26

That VicRoads develop a comprehensive and prioritised program of research and policy initiatives on driver distraction to improve road safety in Victoria.

Driver Training and Licensing

Training

Driver instruction, together with extensive supervised driving experience in a wide range of conditions, is meant to produce safe drivers and there has been much past effort by government and the industry in Victoria to improve the driver training and safe driving skills.

The Committee received evidence that that the ability to cope or manage distraction is a skill that can be improved by training. However, MUARC state that there appears to be little focus in Victoria on distraction in driver training.[35] Their presentation to the Committee made the following points on training:

- decide when and how to expose drivers to distraction within GLS (Graduated Licensing Schemes);
- train drivers in how to limit and cope with distraction;
- optimal modes of programming/interacting with technologies;
- make drivers self-aware of effects of distraction;
- calibrate drivers skills in relation to distraction; and
- team training for passengers and drivers.[36]

The three recommendations on training made in the MUARC submission can be summarised as:

- training material to parents and supervisors of learner drivers facilitate development and practice of skills to limit the adverse effects of distraction;

- formal training delivered by professional instructors include development and practice of those skills; and

- the syllabuses for training professional driving instructors include how to train young drivers in those skills.[37]

Apart from the MUARC submission, and some comments by the Australian Driver Trainers Association on how drivers can be taught about minimising distraction, the Committee received little evidence on driver training or instruction.[38]

Licensing

Victorian governments have made numerous improvements to the driver licensing process over the years including recently announced changes to the Graduated License Scheme. The licensing process provides governments with an opportunity to inform and test learner and probationary drivers as they move through the system and also place various restrictions on them during that time. However, the Committee found only limited reference to driver distraction in the current driver licence handbook.[39]

The MUARC submission made four recommendations on licensing, which can be summarised as:

- novice driver handbooks be revised to include information on the relative risks of distractions, factors making young drivers more vulnerable and practical strategies to avoid and cope with distractions;

- the VicRoads Knowledge Test include testing driver knowledge of these issues;

- the On-Road practical tests cover driver awareness of distraction, willingness to engage in distracting activities and ability to compensate for the effects of distraction; and

- the Graduated Licensing System is redesigned to systematically and chronologically expose drivers to distracting activities.[40]

Again, the Committee notes that key road safety agencies and stakeholders have not adequately provided advice on driver distraction in driver licensing and associated handbooks. In this regard the Committee noted in Chapter 5 that in America the AAA Foundation for Traffic Safety had developed suggested text on driver distraction for state Driver Licence handbooks.[41]

Recommendation 27

That VicRoads and the driver training industry incorporate driver distraction material in driver training and licensing processes and publications.

Vehicle Fleet Safety Management

During the Inquiry, the Committee received evidence on an occupational health and safety approach in relation to minimising the distracting effects of hands-free mobile phone use in vehicles used for work purposes, and to a lesser extent, other in-vehicle devices and non-technology events and activities that can distract such drivers.

According to the Centre for Accident Research and Road Safety, Queensland University of Technology (CARRS-Q), regulation of the use of in-vehicle devices is difficult and health and safety regulations may be a useful way of having a positive impact for at least some of the population.[42]

The MUARC submission notes that:

- one quarter of all vehicles in crashes are business vehicles suggesting many distraction-related crashes occur when people are driving for work purposes;
- Australian companies purchase around 60 per cent of new vehicles for their fleets and, when sold, they rapidly go to the general driving community;
- employers are required to provide a duty of care for drivers and company polices, driver supervision and vehicle choice can minimise distraction; and
- government can play a leading role with their own fleet safety policies.[43]

A significant proportion of total road travel is undertaken as part of people's work, travelling to or from work, or travelling in a work-related vehicle for private purposes. Consequently, many crashes are associated with such travel. For example, research suggests that 49 per cent of all Australian workplace fatalities occur on the roads if travelling to and from work is included.[44]

The author of an RACV report on driver training programs, consultant psychologist, Dr R. Christie, advocates a broad approach to fleet safety:

> All workplaces should have a driver safety policy of some type and safety programs should be driven by this broader policy.[45]

The Committee was advised of a number of instances, both overseas and locally, where corporations or government agencies had implemented polices on mobile phone use by employees. A number of companies in Australia, such as Shell, BP, Mobil, BHP Billiton and BOC Gases, have banned all use of mobile telephones in company vehicles.[46] The Victoria Police submission states that this practice of corporate leadership displays a commonsense approach to the issue.[47]

It has been suggested that, regardless of the general duty of care obligation of an employer for an employee, new occupational healthy and safety laws in Australia require employers to warn employees about the hazards about distracted driving.

Legislation in the United Kingdom covers those who 'permit or cause' others to use a mobile phone. This provides an onus on employers to not force their employees to use their mobile telephones, and allows for responsibility to be carried over to the employer if the employee is in breach of the legislation.[48]

TAC, in their submission, state that:

> Following the recent reforms to the Occupational Health and Safety legislation after the Maxwell Report, it may well be that Occupational Health and Safety obligations imposed on employers may be valuable tools to promote a safer driving environment and assist with legal enforcement.[49]

Mr N. McDonald, a consultant with ARRB Group, advised the Committee that private fleets had introduced their own measures to improve their safety, going beyond legislation:

> Examples include BP globally, which has an engine-on, phone off policy. No matter who you are – it does not matter whether you are the manager of the company or a fleet driver.[50]

Mr McDonald added that some employers had extended this to walking around worksites – a recognition that walking and talking on the phone leads to worker distraction and that they might walk out in front of vehicles, or into a hazardous situation.[51]

The TAC submission also refers to corporate policies on phones. *The TAC Safe Driving Policy*, introduced in 2000 and reviewed annually, advises drivers that use of either a hand-held or hands-free increases the risk of being involved in a crash:

> It reinforces the legal prohibition on the use of hand-held phones while driving and recommends that the use of hands-free phones be kept to a minimum.[52]

The RACV provided a copy of its Safe Driving Policy which under 'In-car distractions' stated that:

> Staff should minimise distractions while driving and obey road laws related to mobile phones. Specifically staff should:
>
> - never use a hand held phone whilst driving
> - minimise the use of a hands free mobile phone whilst driving
> - pull over, if safe, to use a mobile phone
> - use message bank, if appropriate.[53]

The RACV also advocated a fleet management approach to addressing driver distraction and recommended a 'whole-of-government' safe driving policy on mobile phone use while driving.[54]

The MUARC submission did not specifically mention a fleet safety management approach for mobile phones, instead making three broader recommendations, which can be summarised as:

- the Government to amend all fleet management policies to include strategies to minimise distraction and manage distraction-related risks;
- provide guidance on how to do this to Government departments, including guidance on legal responsibilities and product information that stimulates purchase of vehicles and technologies that minimise distraction; and
- developing mechanisms to encourage private companies to adopt similar policies.[55]

More specifically, the Victorian Automobile Chamber of Commerce recommended that:

> Assessment of Workplace vehicle distraction issues should be subject to the jurisdiction of WorkSafe Victoria.[56]

The Committee wrote to WorkCover in June 2006 seeking information on driver distraction as an Occupational Health and Safety issue, however at the time of completing this Report, the information was not provided.

The Committee supports an occupational health and safety approach to driver distraction for employees and employers who drive as part of their work. In addition, the State Government should encourage implementation of vehicle use policies which incorporate the voluntary minimisation of hands-free phone use while driving in government and private sector vehicle fleet policies. Advice on the safer use of route navigation systems and video, audio and electronic devices should be provided, as well as advice on how to avoid or minimise non-electronic distractions while driving.

Recommendation 28

That VicRoads and Worksafe encourage an occupational health and safety approach to driver distraction for people who drive as part of their work.

Recommendation 29

That the State Government implement vehicle safety policies to encourage government and vehicle fleet drivers, while driving, to:

- **minimise hands-free mobile phone use;**
- **more safely use other electronic devices, such as navigation systems, and**
- **avoid or minimise non-electronic distractions.**

New Technology Providing Insights into Crash Causes

In a number of recent Inquiries, the Committee has identified areas where existing Victorian crash information systems need to be improved. This current report reiterates the need for improved systems.

Victoria Police demonstrated to the Committee how recent computer system improvements will make existing information more readily accessible to various users. Nevertheless, the Committee observes that the systems still use basic data sources not far removed from the police crash report cards and paper report forms of decades ago.[57]

The Committee consider that it is time for Victorian organisations involved in crash investigations and research to be considering the possibilities that digital technology provides to gain new insights into road crash and traffic incident causes, including those where driver distraction is involved. Such technology provides opportunities to gather evidence to supplement, or in some cases replace, existing sources of information about collisions. Possibilities range from elaborate, technologically-sophisticated multiple-channel video and electronic recording systems, such as those used by Virginia Tech Transportation Institute (VTTI) in the recent '100 Car' naturalistic driving study, through to digital photos taken by drivers, police, or crash witnesses on mobile phone cameras now so common in Victoria.

The Committee was informed that police in Victoria and New South Wales are installing video camera technology in some police vehicles to visually record traffic and other offences to assist in successful prosecutions.[58] However, there is also a need to look at other ways in which new technology can assist road safety

authorities and researchers. Two such examples are Event Data Recorders and video event recording cameras.

Event Data Recorders

Event Data Recorders (EDR), commonly called 'black boxes', capture vehicle and occupant restraint information in the event of a crash in which airbags may or may not deploy.[59] This typically comes from vehicle speed, engine power and brake sensors in the moments prior to a collision Noting that most new vehicles are equipped with event data recorders, MUARC recommends that:

> Local vehicle manufacturers should be required to design event data recorders to record information about the use and status of telematics systems at the time of a collision to clarify the contribution of these devices to collisions.[60]

Most discussions on this topic in this Inquiry have been on privacy - who 'owns' the data, and in the case of Victoria Police the resourcing issue of reading, processing and storing the information.[61] The Committee note that there appears to have been little use of such data by public authorities in Victoria.

The Committee notes that significant work has been done in the United States to legislate, regulate and standardise EDRs since 1997.[62]

The Committee considers that Victoria is well behind the USA in the use of EDRs to provide additional insights on the circumstances of road crashes, both in particular instances of crashes investigated by police and in the broader road safety context. VicRoads should investigate how this technology could assist Victoria in its efforts to better understand crashes and whether legislation and additional resources are necessary to enable public authorities to more easily access and use EDR data.

Recommendation 30

That VicRoads and Victoria Police investigate how information from Event Data Recorders in modern motor vehicles can be used to provide new insights into the role of driver distraction in crashes and other information to improve road safety in Victoria. This should include data access, privacy and resourcing issues.

Video Camera-based Incident Recording Devices

New digital camera recording technology can also play a role in improving understanding of the role of driver distraction and other driver behaviours in crashes and near-misses. MUARC propose that a naturalistic driving study be undertaken, similar to the '100-Car' Study by VTTI, but on a smaller scale.[63] The Committee considers

that such a study would be the most useful area for Victoria's limited research resources on driver distraction.

In addition, other simple video event recorder technologies are starting to provide evidence of the driver behaviour and/or traffic circumstances immediately prior to collisions or sharp braking, accelerating or cornering movements. Typically images and sounds 10 seconds before and 10 seconds after an event are digitally stored from a forward-facing camera and an optional additional camera proving a view of the vehicle cabin. This can be a means of discouraging distracting behaviour in the vehicle or provide useful feedback for driver training purposes. There is American evidence, gathered from experience in more than 40,000 vehicles, that the use of the video event recorders can reduce vehicle fleet collision costs and modify teenage driver behaviour.[64]

VicRoads should investigate how this new technology can provide fresh insights into driver behaviour, including driver distraction, and how crashes and near misses occur. This should include consideration of the technical issues relating to the systematic gathering, storing and analysis of the evidence from the numerous video images which could potentially become available to police, insurance companies, road authorities and researchers in future years.

Recommendation 31

That VicRoads investigate how video camera event recordings of driver behaviour and traffic conditions when collisions or near-misses occur can be used to provide new insights into driver distraction and other aspects of road safety.

Chapter 9 Recommendations

Recommendation 25

That the Government increase the profile of driver distraction as a road safety issue. This should include:

- **addressing the issue in the forthcoming Victorian road safety strategy;**
- **school road safety programs; and**
- **development of suitable publicity for use by the rental car industry.**

Recommendation 26

That VicRoads develop a comprehensive and prioritised program of research and policy initiatives on driver distraction to improve road safety in Victoria.

Recommendation 27

That VicRoads and the driver training industry incorporate driver distraction material in driver training and licensing processes and publications.

Recommendation 28

That VicRoads and Worksafe encourage an occupational health and safety approach to driver distraction for people who drive as part of their work.

Recommendation 29

That the State Government implement vehicle safety policies to encourage government and vehicle fleet drivers, while driving, to:

- **minimise hands-free mobile phone use;**
- **more safely use other electronic devices, such as navigation systems, and**
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Endnotes

[1] Government of Victoria, *Victoria's Road Safety Strategy, arrive alive! 2002-2007*, 2002.
[2] ibid., p. 10.
[3] Government of Victoria, *Young Driver Safety and Graduated Licensing Discussion Paper*, August 2005, pp. 7 and 10-12.
[4] VicRoads, Submission to the Inquiry, November 2005, p. 60.
[5] Sundeen, M, *Cell Phones and Highway Safety 2005 State Legislative Update*, National Conference of State Legislatures, Denver, Colorado, United States, August 2005, p. 17.
[6] Australian Driver Trainers Association NSW, Submission to the Inquiry, 28 October 2005, pp. 6-7.
[7] South Australia, Department for Transport, Energy and Infrastructure, road safety web site,
http://www.transport.sa.gov.au/rss/content/safer_people/issues/fatal_five_summary.htm.
http://www.transport.sa.gov.au/rss/content/safer_people/issues/driver_distraction.htm
[8] South Australia, Department of Transport, Energy and Infrastructure, Roa*d Crash Facts 2004 for South Australia*, Adelaide, 2005, p. 18.
http://www.transport.sa.gov.au/safety/road/road_use/roadcrash.asp
[9] Transport South Australia, Inattention Campaign,
http://www.transport.sa.gov.au/rss/content/safer_people/issues/driver_distraction.htm
[10] Transport South Australia, Inattention Campaign, radio and TV advertisements, http://www.transport.sa.gov.au/rss/content/safer_people/programs_resources/road_safety_campaigns.htm
[11] Queensland Government. *Queensland Road Safety Strategy 2004-2011, Safe4life*, Brisbane, 2004, pp. 5, 6, 13 and 14.
[12] Queensland Transport, *Queensland youth: on the road and in control*, Brisbane, October 2005, p. 16.
[13] Office of Road Safety, Western Australia, Road safety issues,
http://www.officeofroadsafety.wa.gov.au/FramesetGenerator.jsp?Section=publications;
Mobile Phones: The Facts fact sheet, 2001,
http://www.officeofroadsafety.wa.gov.au/FramesetGenerator.jsp?Section=Facts&Page=mobile_phones_facts.htm.
[14] Road Safety Council of Western Australia, *Arriving Safely Road Safety Strategy for Western Australia 2003-2007*, Perth, 2003.
[15] Department of Infrastructure, Energy and Resources, Tasmania, *Tasmanian Road Safety Strategy 2002-2006*, Hobart, undated, pp. 6 and 17.
[16] ibid.
[17] Road Safety Task Force, Tasmania, www.rstf.tas.gov.au/television.html www.rstf.tas.gov.au/othermedia.html
[18] Australian Capital Territory, Department of Urban Services, *Safety on the road in the 21st century: ACT Road Safety Strategy 2001-2005*, Canberra, 2005, p. 7.; *ACT Road Safety Action Plan 2005-2006*, Canberra, 2005, p. 17.
[19] Roads and Traffic Authority, New South Wales, *Road Safety 2010,* Sydney, undated; *Road Users' Handbook* (print friendly version), November 2005, p. 44.
[20] Department of Infrastructure, Planning and Environment, Northern Territory, *Northern Territory Road Safety Strategy 2004-2010*, Darwin, 2004.
[21] Australian Transport Council, *The National Road Safety Strategy, 2001-2010*, Canberra, ACT, 2001.
[22] Australian Transport Safety Bureau (ATSB), Submission to the Inquiry, 31 October 2005, p. 1.
[23] Australian Transport Council, *National Road Safety Action Plan, 2005 and 2006*, Canberra, 2005, p. 32.
[24] ibid., p. 39.
[25] ATSB, op. cit., p. 1 and attachment.; Austroads, *Australasian Road Safety Handbook: Volume 2*, Sydney, 2005, pp. 92-107.
[26] STAYSAFE Committee, Parliament of New South Wales, *Proceedings of an International Conference on Distracted Driving, Sydney, Australia, 2-3 June 2005*, Report 67, Sydney, 2006.

[27] Parliament of Victoria, Road Safety Committee, *Inquiry into Crashes Involving Roadside Objects*, March 2005, pp. 84-85.; Parliament of Victoria, Road Safety Committee, *Inquiry into the Country Road Toll*, May 2005, p. 71.

[28] Monash University Accident Research Centre (MUARC), Submission to the Inquiry, December 2005, pp. 88-99.

[29] Dr I. Johnston, MUARC, Notes of Discussion, 6 December 2005, p. 47.

[30] MUARC, Presentation, 6 December 2005, slide 50, p. 25.

[31] ibid.

[32] VicRoads, op. cit., p. 60.

[33] Transport Accident Commission (TAC), Submission to the Inquiry, November 2005, p. 18.

[34] Parliament of Victoria, Road Safety Committee, *Inquiry into Crashes Involving Roadside Objects*, March 2005, Recommendation 11, p. 85.

[35] MUARC, Submission, p. 89.

[36] MUARC, Presentation, 6 December 2005, slide 41, p. 21.

[37] MUARC, Submission, pp. 89-90.

[38] Australian Driver Trainers Association NSW, Submission to the Inquiry, 28 October 2005, pp. 1, 4, 6 and 7.

[39] MUARC, op. cit., p. 96.

[40] ibid., pp. 96-97.

[41] AAA Foundation for Traffic Safety, *Driver's License Section Distracted Driving*, Washington, DC, United States, 6 August 2003, p. 3; AAA Newsroom, 'Driver's Licence Manuals Lack Crucial Information on Distracted Driving', 8 June 2003, www.aaanewsroom.net/main/PrinterFriendly.asp?CategoryID=7&ArticleID=243

[42] Centre for Accident Research and Road Safety, Queensland University of Technology (CARRS-Q), Submission to the Inquiry, 28 October 2005, p. 6.

[43] MUARC, op. cit., pp. 95-96.

[44] Somerville, P, 'Roadkill', *National Safety*, Journal of the National Safety Council of Australia, March 2002, www.fleetsafetysolutions.com/roadkill.htm, p. 1.

[45] ibid., p. 4.

[46] Streets Ahead Pty Ltd, Submission to the Inquiry, 21 October 2005, p. 1.; RoadSafe – Inner South East; Submission to the Inquiry, 28 October 2005, p. 1.; RoadSafe – Inner Eastern, Submission to the Inquiry, 25 October 2005., p. 1.; Somerville, P, 'National Safety - Fleet Safety is Australia's most serious OHS issue, in terms of injuries and deaths', (undated), www.fleetsafetysolutions.com/roadkill.htm.; Mr N. McDonald, principal consultant, ARRB Group, Notes of Discussion, Sydney, 23 February 2006, p. 77.

[47] Victoria Police, Submission to the Inquiry, 28 September 2005, p. 6.

[48]Department for Transport, United Kingdom, The Think! Road Safety Website, Mobile Phones: Switch off before you drive off. http://www.thinkroadsafety.gov.uk/campaigns/mobilephones/mobilephones.htm

[49] TAC, op. cit., p. 8.

[50] Mr N. McDonald, op. cit., p. 76.

[51] ibid.

[52] TAC, op. cit., p. 7.

[53] RACV, Correspondence, 2 March 2006, Safe Driving Policy, p. 2.

[54] RACV, op. cit., pp. 30-31.

[55] MUARC, op. cit., p. 96.; Presentation, 6 December 2005, slide 46, p. 23.

[56] Victorian Automobile Chamber of Commerce, Submission to the Inquiry, October 2005, p. 3.

[57] Acting Inspector J. Cole, Victoria Police, Minutes of Evidence, 27 March 2006, p. 124.

[58] Mr D. Healy, General Manager Road Safety, TAC, Notes of Discussion, 6 December 2005, p. 62.; TAC, op. cit., p. 17.; Chief Superintendent J. Hartley, New South Wales Police, Notes of Discussion, 23 February 2006, pp. 40-41.

[59] Kowalick, T, 'Motor Vehicle Event Recorder (EDR) Standardisation, Regulation and Legislation Initiatives within the United States 1997-2005', *Road Safety on Four Continents Conference*, Warsaw, Poland, October 2005, Abstracts of Conference Papers, p. 40, www.vti.se/4880.epibrw

[60] MUARC, op. cit., Recommendation 3, p. 88.

[61] Acting Inspector J. Cole, op. cit., p. 132.

[62] Kowalick, T, op. cit.

[63] MUARC, op. cit., Recommendation 55, p. 97

[64] Drivecam, www.drivecam.com; ITS Australia, Presentation, 30 January 2006, slide 75.; Mr B. Stafford, Executive Director, ITS Australia. Minutes of Evidence, 30 January 2006, p. 84.

Bibliography

AAA Foundation for Traffic Safety, *Cell Phones and Driving*, (undated) presentation, Washington, DC, United States, www.aaafoundation.org/multimedia/index.cfm?button=presentations

AAA Foundation for Traffic Safety, *Managing Driver Distraction* presentation, 2003, Washington, DC, United States, www.aaafoundation.org/multimedia/index.cfm?button=presentations

AAA Foundation for Traffic Safety, *Drive Safer Talk Later: The AAA Guide to Cell Phones and Driving*, Heathrow, Florida, United States, 2003.

AAA Foundation for Traffic Safety, *Pay Attention*, Washington, DC, United States, 2004, http://www.aaafoundation.org/e-news/issue7/payattention.cfm

AAA Foundation for Traffic Safety, *Traffic Safety Issues of the Future: A Long Range Research Agenda*, Washington, DC, United States, January 2006.

AAMI, Crash Index, *Eleventh Annual Road Safety Report*, Australia, 2004.

AAMI, *Young Drivers Road Safety Index*, Australia, November 2005.

Allen Consulting Group, *Australian Mobile Telecommunications Industry – Economic Significance*, Report for Australian Mobile Telecommunications Association, Canberra, September 2005, www.amta.org.au/default.asp?Page=628

Alm, H and Nilsson, L, 'The Effects of a Mobile Telephone Task on Driver Behaviour in a Car Following Situation', *Accident Analysis and Prevention*, Volume 27, Number 5, pp. 707-715, United States, 1995.

Anderson, J, Horberry, T and Regan, M, 'Development of a Framework to Establish the Safety Benefits of Intelligent Transport Systems: The Use of Cognitive Work Analysis', Presentation, *Road Safety Research and Policing Education Conference*, Sydney, 2003.

Australian Government, *Response of the Australian Government to the Report of the House of Representatives Standing Committee on Transport and Regional Services, National Road Safety – Eyes on the Road Ahead, An Inquiry into National Road Safety*, Canberra, December 2005.

Australian Transport Council, *National Road Safety Action Plan, 2003-2004*, Australian Transport Safety Bureau, Canberra, 2003.

Australian Transport Council, *National Road Safety Action Plan, 2005-2006* Australian Transport Safety Bureau, Canberra, 2005.

Baker, S, and Spina, K, Driver Distraction in Sydney, *Journal of the Australasian College of Road Safety*, Sydney, pp. 26-31, February 2006.

Beijer, D, Smiley, A, and Eizenman, M, 'Observed Driver Glance Behaviour at Roadside Advertising Signs', *Transportation Research Record*, 1899, pp 96-103, 2004.

Beirness, D, Simpson H, and Pak, A, *The Road Safety Monitor: Driver Distraction*, Traffic Injury Research Foundation, Ottawa, Canada, 2002.

Brooks, C, Rakotonirainy, A, and Marie, F, 'Reducing Driver Distraction through Software', *2005 Australasian Road Safety Research Policing Education Conference*, Wellington, New Zealand, November 2005.

Brown, J, Horberry, T, Anderson J, Regan, M, and Triggs, T, 'Investigation of the Effects of Driver Distraction', *2003 Road Safety Research, Policing and Education Conference Proceedings, Volume 2*, Sydney, 2003.

Broughton, J, and Hill, J, *Mobile Phone Use by Drivers, 2000-03*, Prepared for Road Safety Strategy Division, Department for Transport, Report TRL634, Wokingham, United Kingdom, 2005. www.trl.co.uk

Burnett, G and Portner, J, 'Ubiquitous Computing Within Cars: Designing Controls for Non-visual Use', *International Journal Human-Computer Studies*, Volume 55, pp. 521-531, 2001.

Burns, P, and Lansdown, T, *E-Distraction: The Challenges for Safe and Usable Internet Services in Vehicles*, Internet Forum on the Safety Impact of Driver Distraction When Using In-vehicle Technologies, National Highway Traffic Safety Administration, Washington, DC, United States, 2000.

Burns, P, Parkes, A, Burton, S, Smith R, and Burch D, *How Dangerous is Driving with a Mobile Phone? Benchmarking the Impairment to Alcohol*, Report Number 547, Transport Research Laboratory, Surrey, United Kingdom, 2002.

Cain, A, and Burris, M, *Investigation of the Use of Mobile Phones While Driving*, Center for Urban Transportation Research, College of Engineering, University of South Florida, United States, 1999.

Caird, J, Scialfa, C, Ho, G, and Smiley, A, *Effects of Cellular Telephones on Driving Behaviour and Crash Risk: Results of Meta-Analysis*, prepared for CAA Foundation for Traffic Safety, Canada, 2004.

Caird, J, Scialfa, C, Ho, G, and Smiley, A, 'A Meta-Analysis of Driving Performance and Crash Risk Associated with the Use of Cellular Telephones While Driving', Paper 70. *Proceedings of the Third International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design*, Rockport, Maine, United States, 2005, http://ppc.uiowa.edu/drivingassessment/2005/Final/index.htm#Session6

Cairney, P, *Implications of Intelligent Transport Systems for High Risk Road Users and High Risk Situations*, Austroads, Sydney, 2003.

Cairney, P, and Gunatillake, T, *Contract Report: Roadside Advertising Signs – A Review of the Literature and Recommendations for Policy for RACV*, ARRB Transport Research, Australia, June 2000.

California Highway Patrol, *Driver Distractions and Inattention Data Summary*, Report to the Government and Legislature, 2002.

Canada Safety Council, *Eyes on the Road, Hands on the Wheel*, Ottawa, Canada, 2003.

Canadian Automobile Association, 'Summary of Proceedings and Recommendations' *International Conference on Distracted Driving, Toronto, Ontario, Canada, 3-5 October 2005*., April 2006, www.distracteddriving.ca/english/conferenceSummary.cfm

Carsten, O, 'Implications of the First Set of HASTE (Human Machine Interface and the Safety of Traffic in Europe) Results on Driver Distraction', *Proceedings from the Fourteenth Behavioural Research in Road Safety Seminar*, Department for Transport, United Kingdom, 2003.

Catchpole, J and Styles, T, *Who Takes Risks? Targeting Risky Young Drivers*, 2005 Australasian Road Safety Research Policing Education Conference, Wellington, New Zealand, November 2005.

Ceci, R, Hogman, L, and Patten, C, *Measures of Driver Behaviour and Cognitive Workload in a Driving Simulator an in Real Traffic Environment – Experiences from Two Experiments in Sweden*, Driving Assessment Conference, University of Iowa, Iowa, United States, 2001.

Cellular News, 'Countries that Ban Cell Phones While Driving", October 2005, www.cellular-news.com/car_bans/

Chaparro, A, Wood, J, and Carberry, T, 'Effects of Age and Auditory and Visual Dual Tasks on Closed Driving Performance', *Optometry and Vision Science*, Volume 82, Number 8, August 2005, pp. 747-754, Lippincott, Williams and Wilkins, Philadelphia, United States .

Chaparro, A, Wood, J, and Carberry, T, 'Effects of Age and Auditory and Visual Dual Tasks on Closed Driving Performance', *Proceedings of Human Factors and Ergonomics Society*, New Orleans, United States, 2004, pp. 2319-2324.

Christie, R, and Harrison, W, *Driver Training and Education Programs of the Future*, Royal Automobile Club of Victoria (RACV) Ltd, Report Number 03/03, Melbourne, October 2003.

Coetzee, J, *The Evaluation of Content on Outdoor Advertisements*, Innovative Transport Solutions, Pretoria, South Africa, www.itse.co.za (Publications webpage)

Cohen, J and Graham, J, A Revised Economic Analysis of Restrictions on the Use of Cell Phones While Driving, *Risk Analysis*, Volume 23, pp. 5-17, February 2003, (Blackwell Publishing).

Cooper, P, 'Driven to Distraction in the Corner(ing) Office', *Ontario Traffic Conference*, Ontario, Canada, 2001.

Cooper, P, 'Giving Cellular Telephones the Attention They Deserve: How Use of Communications Devices Can Affect Attention to Driving', *Injury Prevention Symposium*, Saskatchewan Safety Council, Saskatoon, Saskatchewan, Canada, 2003.

Curry, D, 'In-Vehicle Cell Phones: Fatal Distraction?', *Professional Safety*, March 2002, American Society of Safety Engineers, 2002.

Department of Infrastructure, Planning and Environment, Northern Territory, *Northern Territory Road Safety Strategy 2004-2010*, Darwin, 2004.

Department for Transport, *Mobile Phones and Driving: Decision Letter and Summary of Responses*, London, United Kingdom, 2003.

Department for Transport, Road Safety Division, *Proposal for An Offence of Using a Hand-held Mobile Phone While Driving*, London, United Kingdom, November 2002.

Department for Transport, *Switch It Off! Missing a Call Won't Kill You* Campaign, London, United Kingdom, 2002. http://www.thinkroadsafety.gov.uk

Department of Transportation, Wisconsin, *Electronic Billboards and Highway Safety*, Madison, Wisconsin, United States, 2003.
www.dot.wisconsin.gov/library/research/docs/tsrs/ tsrelectronicbillboards.pdf

Department of Urban Services, Australian Capital Territory, *ACT Road Safety Action Plan 2005-200*6, Canberra, 2005.

de Waard, D, *HMI and Safety-Related Driver Performance*, HASTE (Human Machine Interface and the Safety of Traffic in Europe) Report, Brussels Workshop, March 2005.

Dingus, T, *Driver Distraction: New Features, New Tasks, New Risks*, Presentation, Virginia Tech Transportation Institute, Virginia, United States, July 2000.

Dingus, T, Klauer, S, Neale, V, Petersen, A, Lee, S, Sudweeks, J, Perez, M, Hankey, J, Ramsey, D, Gupta, S, Bucher, C, Doerzaph, Z, Jermeland, J, and Knipling, R, *The 100-Car Naturalistic Driving Study, Phase II – Results of the 100-Car Field Experiment*, National Highway Traffic Safety Administration, DOT HS 810 593, Washington, DC, United States, April 2006.

Direct Line Motor Insurance, *The Mobile Phone Report: A report on the Effects of Using a 'Hand-held' and 'Hands-free' Mobile Phone on Road Safety*, Croydon, United Kingdom, March 2002.

District of Columbia, United States, *Distracted Drivers Safety Act* 2004.

Drivers.com, 'Japan's Cell Phone Legislation', April 2000.
www.drivers.com/article/273/.

Draft National Road Traffic Regulations 1999, South Africa.

du Toit, E and Coetzee, J, 'Advertising Boards On or Visible from National Road', *20th South African Transport Conference*, July 2001.

Eby, D, Kostyniuk, L and Vivoda, J, 'Risky Driving: The Relationship Between Cellular Phone Use and Safety Belt Use', *Transportation Research Record*, Number 1843, pp. 20-23.

Esbjornsoon, M, and Juhlin, O, *Combining Mobile Phone Conversations and Driving – Studying a Mundane Activity in its Naturalistic Setting*, The Mobility Studio, Stockholm, Sweden, 2003.

European Commission, 'Commission Recommendation of 21 December 1999 on Safe and Efficient In-Vehicle Information and Communication Systems: A European Statement of Principles on Human Machine Interface', *Official Journal of the European Communities*, Brussels, Belgium, 2000.

European Commission, *Comparative Study of Road Traffic Rules and Corresponding Enforcement Actions in the Member States of the European Union, Final Report*, Brussels, Belgium, undated. www.etsc.be

European Commission, *Recommendations from the eSafety-HMI Working Group, Meeting with Public Authorities, Paris, 28 February 2005*, Brussels, Belgium, February 2005.

European Commission, *Recommendations from the eSafety-HMI Working Group, Final Report*, Brussels, Belgium, 18 October 2005.

Eyre, D, *Motoring Issues Survey June 2002*, New Zealand Automobile Association Inc, Auckland, New Zealand, 2002.

Farbry, J, Wochinger, K, Shafer, T, Owens, N and Nedzesky, A, *Research Review of Potential Safety Effects of Electronic Billboards on Driver Attention and Distraction*, Department of Transportation, Federal Highway Administration, Washington, DC, United States, 2001.
www.fhwa.dot.gov/realestate/pseebdad.htm

Faulkner, S, *Mobile Phones and Driving: Decision Letter and Summary of Responses*, Department for Transport, London, United Kingdom, June 2003.

Fletcher, L, and Zelinksky, A, *Autonomous Technologies for Continuous Driver and Road Scene Monitoring*, Department of Information Engineering, Research School of Information Sciences and Engineering, Australian National University, Canberra.

Ford Motor Company, website, Driver Distraction,
www.ford.com/en/innovation/safety/accidedAvoidance/drvierdistractionlab.htm

Gartner, U, Konig, W, Wittig, T, ' Evaluation of Manual vs. Speech Input When Using a Driver Information System in Real Traffic', *International Driving Symposium on Human Factors in Driving Assessment , Training and Vehicle Design*, Aspen, Colorado, United States, 2001.

Glassbrenner, D, *Cell Phone Use on the Roads in 2002*, National Highway Traffic Safety Administration, National Centre for Statistics and Analysis, DOT HS 809 580, Washington, DC, United States, November 2005.

Glassbrenner, D, 'Driver Cell Phone Use in 2004 – Overall Results', National Highway Traffic Safety Administration, National Centre for Statistics and Analysis, DOT HS 809 847, Washington, DC, United States, 2004.

Glassbrenner, D, *Driver Cell Phone Use in 2005 – Overall Results*, National Highway Traffic Safety Administration, National Centre for Statistics and Analysis, DOT HS 809 967, Washington, DC, United States, 2005.

Glaze, A, and Ellis, J, *2002 Pilot Study of Distracted Drivers*, Virginia Commonwealth University, Transportation and Safety Training Center, Virginia, United States, 2003.

Goodman, M, Barker, J, and Monk, C, *A Bibliography of Research Related to the Use of Wireless Communications Devices from Vehicles*, National Highway Traffic Safety Administration, Washington DC, United States, February 2005.

Gordon, C, 'An Initial Examination of Driver Distraction Related Crashes', Presentation, *Institute of Professional Engineers New Zealand Technical Conference*, New Zealand, 2005.

Gordon, C, 'What Do Police Reported Crashes Tell Us About Driver Distraction in New Zealand', *2005 Australasian Road Safety Research Policing Education Conference*, Wellington, New Zealand, November 2005.

Government of South Australia, *The South Australian Road Safety Strategy 2003-2010*, Adelaide, September 2003.

Gras, M, Cunill, M, Sullman, M, Planes, M, and Aymerich, M, 'Cellular Phone Use by Spanish Drivers', *3rd International Conference on Traffic and Transport Psychology*, Nottingham, United Kingdom, September 2004.

Green, M, 'How Long Does it Take to Stop? Methodological Analysis of Driver Perception-Brake Times', *Transportation Human Factors*, Volume 2, Issue 3, Pages 195-216, Toronto, Canada, 2000.

Green, P, 'Crashes Induced by Driver Information Systems and What Can Be Done to Reduce Them', *Convergence 2000 Conference Proceedings*, Paper 2000-01C008, Detroit, Michigan, United States, 2000.

Green, P, 'Driver Distraction, Telematics Design, and Workload Managers: Safety Issues and Solutions', *Convergence 2004 Conference Proceedings*, Paper 2004-21-0022, Detroit, Michigan, United States, 2004.

Green, P, 'Estimating Compliance with the 15-Second Rule for Driver-Interface Usability and Safety', *Proceedings of the Human Factors and Ergonomics Society 43rd Annual Meeting*, United States, 1999.

Green, P, *Synopsis of Driver Interface Standards and Guidelines for Telematics as of Mid-2001*, Report Number UMTRI-2001-23, The University of Michigan, Transportation Research Institute, , Michigan, United States, 2001.

Government of Victoria, *Young Driver Safety and Graduated Licensing Discussion Paper*, August 2005.

Hahn, R, and Dudley, P, *The Disconnect Between Law and Policy Analysis: A Case Study of Drivers and Cell Phones*, Working Paper 02-7, AEI Brookings Joint Center for Regulatory Studies, , Washington, DC, United States, May 2002.

Hahn, R, and Prieger, J, *The Impact of Driver Cell Phone Use on Accidents*, Working Paper 04-14, AEI Brookings Joint Center for Regulatory Studies, Washington, DC, United States, July 2004.

Hahn, R, and Tetlock, P, *The Economics of Regulating Cellular Phones in Vehicles*, Working Paper 99-9, AEI Brookings Joint Center for Regulatory Studies, Washington, DC, United States,1999.

Haigney, D, and Taylor, R, *Mobile Phone Use whilst Driving: Phone Operation vs Vehicle Transmission*, Royal Society for the Prevention of Accidents, Birmingham, United Kingdom, 1998. http://www.rospa.co.uk

Hankey, J, Dingus, T, Hanowski, R, Wierwille, W, Monk, C, and Moyer, M, *The Development of a Design Evaluation Tool and Model of Attention Demand*, United States, National Highway Traffic Safety Administration, Washington, DC, United States, 2000.
http://www-nrd.nhtsa.dot.gov/departments/nrd-13/driver-distraction/Topics033080008.htm

Harbluk, J and Lalande, S, 'Performing E-mail Tasks While Driving: The Impact of Speech-based Tasks on Visual Detection', *Proceedings of the Third International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design*, Paper 46, Rockport, Maine, United States, 2005.
http://ppc.uiowa.edu/driving-assessment/2005/Final/index.htm#Session6

Harbluk, J, Noy, Y, and Eizenman, M, *The Impact of Cognitive Distraction on Driver Visual Behaviour and Vehicle Control*, Transport Canada, Report TP# 13889 E, Ottawa, Ontario, Canada, February 2002.

Harbluk, J, Noy, Y, and Eizenman, M, *The Impact of Internal Distraction on Driver Visual Behaviour*, Transport Canada, Ottawa, Ontario, Canada, 2002. http://www.tc.gc.ca/roadsafety/tp/tp13889/pdf/tp13889es.pdf

Hatfield, J, and Chamberlain, T, 'The Impact of In-Vehicles Displays on Drivers in Neighbouring Vehicles', Poster Display, *8th World Conference on Injury Prevention and Safety Promotion*, Durban, South Africa, April 2006.

Hatfield, J, and Chamberlain, T, 'The Impact of In-Car Displays on Drivers in Neighbouring Cars: Survey and Driving Simulator Experiment', *Accident Analysis and Prevention* (in press).

Hatfield, J, and Chamberlain, T, 'The Effect of Audio Materials from a Rear-seat Audiovisual Entertainment System or from Radio on Simulated Driving', *Accident Analysis and Prevention* (in press).

Hendricks, D, Fell, J, and Freedman, M, *The Relative Frequency of Unsafe Driving Acts in Serious Traffic Crashes: Summary Technical Report*, National Highway Traffic Safety Administration, Washington, DC, United States, 2001.

Herzog, L, 'Driver Distractions', *Canadian Driver*, Transport Canada, 22 November 2004.

Hill, J, *A Survey of Mobile Phone Use by Drivers, April 2004*, Prepared for Department for Transport, TRL Report TRL635, Wokingham, United Kingdom, 2005. http://www.trl.co.uk/store/report_detail.asp?srid=2768

Horberry, T, Anderson, J, Regan, M, Triggs, T and Brown, J, 'Driver Distraction: The Effects of Concurrent In-vehicle Tasks, Road Environment Complexity and Age on Driving Performance', *Accident Analysis and Prevention*, Volume 38, Issue 1, Pages 185-191, January 2006.

Horrey, W, and Wickens, C, *The Impact of Cell Phone Conversations on Driving: A Meta-Analytic Approach*, Technical Report AHFD-04-2/GM-04-1, Prepared for

General Motors Corporation, Institute of Aviation, University of Illinois, Michigan, United States, March 2004.

Hosking, S, Young, K, and Regan, M, *The Effects of Text Messaging on Young Novice Driver Performance*, Report for NRMA, Report Number 246, Monash University Accident Research Centre, Melbourne, 2006.

Howard, A and Connell, D, *Attention and Driving,* AA Road Safety Unit, United Kingdom, undated (1998).

Insurance Commission of British Columbia, 'Hands Free Cell Phone Study', *ICBC Driver Distractions Research,* 25 January 2001, Provincial News Releases, Vancouver, British Columbia, Canada, 2001.
www.icbc.com/inside_icbc/2001_archive.asp

Insurance Commission of British Columbia, 'The Impact of Auditory Tasks (as in hands-free cell phone use) on Driving Task Performance', *ICBC Transportation Research*, June 2001, Vancouver, British Columbia, Canada, 2001.

Insurance Information Institute, *Cell Phones and Driving*, New York, United States, May 2006, http://www.iii.org/media/hottopics/insurance/cellphones/

Insurance Institute for Highway Safety, *Status Report*, Volume 40, Number 5, Washington, DC, United States, July 2005.

Insurance Institute for Highway Safety, *Cell Phone Laws as of July 2006*, Washington, DC, United States, 2006.
www.iihs.org/laws/state_laws/cell_phones.html

Intelligent Transport Systems Japan, *Report of the ITS Strategy Committee*, *Summary Version*, Tokyo, Japan, July 2003.

Kanianthra, J, *Driver Distraction: Understanding the Problem, Identifying Solutions', National Highway Traffic Safety Administration*, Presentation International Consumer Electronics Show, United States, 7 January 2005.

King, P, *March 2006 Membership Opinion Survey – Initial Report*, New Zealand Automobile Association, Auckland, New Zealand, 2006.

Kircher, A, Vogel, K, Tornros, J, Bolling, A, Nilsson, L, Patten, C, Malmstrom, T, and Ceci, R, *Mobile Telephone – Simulator Study*, Report 969A, Swedish National Road and Transport Institute, Linkoping, Sweden, 2004.

Klauer, S, Dingus, T, Neale, V, Sudweeks, J, and Ramsey, D, *The Impact of Driver Inattention on Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data*, DOT HS 810 594, National Highway Traffic Safety Administration, Washington, DC, United States, April 2006.

Kramer, A, McCarley, J, and Geisler, S, 'An Examination of the Efficacy of a Brief Educational Program on Driver Distraction', *Proceedings of the Second International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design*, Park City, Utah, United States, July 2003.

Laberge-Nadeau, C, Maag, U, Bellavance, F, Lapierre, S, Desjardins, D, Messier, S, and Saidi, A, 'Wireless Telephones and the Risk of Road Crashes', *Accident Analysis and Prevention,* Volume 35, Issue 5, Elsevier Science Limited, September 2003.

Lam, L, 'Distractions and the Risk of Car Crash Injury. The Effects of Drivers' Age', *Journal of Safety Research*, Volume 33, pp. 411-419.

Lamble, D, Laakso, M, and Summala, H, 'Detection Thresholds in Car Following Situations and Peripheral Vision: Implications for Positioning of Visually Demanding In-car Displays', *Ergonomics*, Volume 42, Number 6, pp. 807-815, 1999.

Land Transport Safety Authority, New Zealand, *Advertising Signs and Road Safety: Design and Location Guidelines*, Road and Traffic Guideline RTS 7, Wellington, 1993.

Lee, J, 'Driver Distraction: Breakdowns of a Multi-level Control Process', *Journal of the Australasian College of Road Safety*, Sydney, pp. 33-38, November 2005.

Lee, J, Caven, B, Hakke, S, and Brown, T, 'Speech-Based Interaction with In-Vehicle Computers: The Effect of Speech-Based E-mail on Drivers' Attention to the Roadway', *Human Factors*, Volume 43, Number 4, pp. 631-640, 2001.

Lee, S, Olsen, E, DeHart, M, *Driving Performance in the Presence and Absence of Billboards*, Virginia Tech Transportation Institute, Virginia, United States, December 2003.

Lenne, M, Mulvihill, C, Regan, M, Triggs, T, Corben, B, Verdoorn, A, Hoareau, E, 'The Effects of an In-Vehicle Advanced Warning Device on the Safety of Driver Interactions with Emergency Vehicles', *Proceedings of 2004 Road Safety Research Policing and Education Conference*, Perth, 2004.

Lerner, N, 'Deciding to be Distracted', *Proceedings of the Third International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design*, Paper Number 73, Rockport, Maine, United States, June 2005.

Llaneras, R, *NHTSA Driver Distraction Internet Forum: Summary and Proceedings*, National Highway Traffic Safety Administration, Washington, DC, United States, 2000.

Llaneras, R, and Singer, J, 'In-Vehicle Navigation Systems: Interface Characteristics and Industry Trends', Driving Assessment 2003, *2nd International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design*, Park City, Utah, United States, 2002.

Makishita, H and Mutoh, M, 'Accidents Caused by Distracted Driving in Japan', *Safety Science Monitor*, Special Edition, Volume 3, Road Safety Article 3, 1999.

Mason-Dixon Polling & Research, *Drive for Life – Annual National Driver Survey*, Washington, DC, United States, June 2005.

Mazzae, E, Goodman, M, Garrott, W, and Ranney, T, 'NHTSA's Research Program on Wireless Phone Driver Interface Effects', *Proceedings of 19th International Technical Conference on the Enhanced Safety of Vehicles*, Washington, DC, United States, June 2005.

Mazzae, E, Ranney, T, Watson, G and Wightman, J, 'Hand-held or Hands-free? The Effects of Wireless Phone Interface Type on Phone Task Performance and Driver Preference', *Proceedings of the 48th Annual Meeting of the Human Factors and Ergonomics Society*, pp. 2218-2221, 2004.

McCartt, A, 'Cell Phones and Other Driver Distractions: Legislation, Regulation and Enforcement', Presentation from International Conference on Distracted Driving, 2-5 October 2005, Toronto, Ontario, Canada, 2005.

McCartt, A and Geary, L, 'Longer Term Effects of New York State's Law on Drivers' Handheld Cell Phone Use', *Injury Prevention*, Volume 10, pp. 11-15, 2004, www.injuryprevention.com

McEvoy, S, and Stevenson, M, *An Exploration of the Role of Driver Distraction in Serious Road Crashes*, Report for Motor Accidents Authority, The George Institute for International Health, University of Sydney, New South Wales, 2005.

McEvoy, S, Stevenson, M, McCartt, A, Woodward, M, Haworth, C, Palamara, P, and Cercarelli, R, 'Role of Mobile Phones in Motor Vehicle Crashes Resulting in Hospital Attendances: A Case-Crossover Study', *British Medical Journal*, London, United Kingdom, 12 July 2005.

McGarva, A, Ramsey, M, and Shear, S, 'The Effects of Driver Cell-Phone Use on Driver Aggression', *Journal of Social Psychology*, Volume 146, Part 2, pp, 133-146, April 2006.

McKnight, J and McKnight, A, *The Effect of Cellular Phone Use Upon Driver Attention*, Report for AAA Foundation for Traffic Safety, National Public Services Research Institute, Landover, Maryland, United States, 1991.

Merat, N and Jamson, H, 'Shut Up I'm Driving! Is Talking To An Inconsiderate Passenger The Same As Talking On A Mobile Telephone', Paper 63, *Proceedings of the Third International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design*, Rockport, Maine, United States, 2005. http://ppc.uiowa.edu/driving-assessment/2005/Final/index.htm#Session6

Miki, Y, Yoshitsugu, N and Ito, K, 'Driver's Load of Voice Interaction System in Vehicles', Paper Number 170, *Enhanced Safety of Vehicles Conference*, Nagoya, Japan, 2003.

Ministry of Transport, *Motor Vehicle Crashes in New Zealand 2004,* Wellington, New Zealand, September 2005.

National Highway Traffic Safety Administration, Department of Transportation, *An Investigation of the Safety Implications of Wireless Communications in Vehicles*, Washington, DC, United States, 1997.

National Highway Traffic Safety Administration, Department of Transportation, *Examination of the Distraction Effects of Wireless Phone Interfaces Using the National Advanced Driving Simulator – Preliminary Report on Freeway Pilot Study*, Report Number 809 737, Washington, DC, United States, 2004.

National Highway Traffic Safety Administration, Department of Transportation, *Proposed Driver Workload Metrics and Methods Project*, Washington, DC, United States, 2000.

National Highway Traffic Safety Administration, Department of Transportation, *Smart Drivers Just Drive* internet site, www.distracteddriving.org

National Transportation Safety Board, *Safety Recommendation, Reference H-03-11*, Washington, DC, United States, June 2003.

National Transportation Safety Board, *Most Wanted Transportation Safety Improvements State Issues. Promote Youth Highway Safety*, Washington, DC, United States, September 2005, www.ntsb.gov/recs/mostwanted/yout_safety.htm.

Neale, V, Dingus, T, Klauer, S, Sudweeks, J, and Goodman, M, 'An Overview of the 100-Car Naturalistic Study and Findings', Paper 05-0400, *19th International Technical Conference on Enhanced Safety of Vehicles*, Washington, DC, United States, June 2005.

Network of Employers for Traffic Safety, *Who's Driving: Distracted Driver Took Kit*, Vienna, Virginia, United States, http://www.trafficsafety.org/distracted.asp

Nowakowski, C, Friedman, D, and Paul, G, *Cell Phone Ring Suppression and HUD Caller ID: Effectiveness in Reducing Momentary Driver Distraction Under Varying Workload Levels*, Report Number 2001-29, University of Michigan Transportation Research Institute, Ann Arbor, Michigan, United States, 2001.

Noy, Y, *Harmonised Research on ITS*, UNECE ITC:ITS Roundtable, Geneva, Switzerland, 18 February 2005.

Noy, Y, *Human Factors Issues Related to Driver Distraction From In-Vehicle Systems*, Ergonomics Division, Road Safety and Motor Vehicle Regulation Directorate, Transport Canada, http://www-nrd.nhtsa.dot.gov/PDF/nrd-13/NoyI_ppt.pdf

NRMA Insurance, *Crashes: Costs and Causes in NSW and the ACT 2005*, Sydney, 2005.

Olson, R, *Cell Phone Bans for Drivers: Wise Legislation?*, International Risk Management Institute, Dallas, Texas, United States, 2003. http://www.irmi.com/Expert/Articles/2003/Olson05.aspx

Östlund, J, Nilsson, L, Carsten, O, Merat, N, Jamson, H, Jamson, S, Mouta, S, Carvalhais, J, Santos, J, Anttila, V, Sandberg, H, Luoma, J, de Waard, D, Brookhuis, K, Johansson, E, Engström, J, Victor, T, Barbluk, J, Janssen, W, and Brouwer, R, 'HMI and Safety Related Driver Performance, *HASTE (Human Machine Interface and the Safety of Traffic in Europe) Project Deliverable 2*, European Commission, 2004, www.its.leeds.ac.uk/projects/haste/deliverable.htm

Parliament of the Commonwealth of Australia, *National Road Safety – Eyes on the Road Ahead, Inquiry into National Road Safety*, House of Representatives, Standing Committee on Transport and Regional Services, Canberra, June 2004.

Parliamentary Advisory Council for Transport Safety, *Impairment Issues in the Road Safety Bill: Alcohol, Mobile Phones and Fatigue*, PACTS Parliamentary Briefing, London, United Kingdom, December 2004.

Parkes, A, 'Mobile Phones and Car Driving: Cause for Concern or Action?', Department for Transport, *14th Behavioural Research in Road Safety Seminar*, London, United Kingdom, 2003.

Patten, C, *Inquiry into the Use of Mobile Telephones and other IVIS in the Road Transport System*, Swedish National Road Administration, Borlänge, Sweden, undated.

Patten, C, Ceci, R, Malmstrom, T, and Rehnberg, K, *The Use of Mobile Phones in Road Traffic*, Publication 2003:91, Swedish National Road Administration, Borlänge, Sweden, August 2003.

Pauzié, A, 'In-vehicle Communication Systems: The Safety Aspect', *Injury Prevention*, Volume 8, pp. 26 – 29, 2002.

Pennsylvania State Senate, *Driver Distractions and Traffic Safety*, Staff Report Pursuant to 2000 Senate Resolution Number 127, Harrisburg, Pennsylvania, United States, December 2001.

Perel, M, *Minimizing the Distraction-Related Crash Risk from In-Vehicle Technologies*, National Highway Traffic Safety Administration, Presentation, 2004, http://www-nrd.nhtsa.dot.gov/pdf/nrd-01/SAE/SAE2004/IVT-related_risks_Perel.pdf

Peters, G and Peters, B, 'The Distracted Driver: How Dangerous is "Multitasking"?', *Professional Safety*, March 2002, http://www.asse.org/celldanger.htm

Pettitt, M, Burnett, G, and Stevens, A, 'Defining Driver Distraction', *World Congress on Intelligent Transport Systems*, San Francisco, November 2005.

Plungis, J, 'Distracted Driver Fixes Don't Work: Hands-Free Cellular Phones are Not Safer, New Studies Show', *The Detroit News, Autos Insider*, 18 October 2004, http://www.detnews.com/2004/autoinsider/0410/18/a01-307032.htm

Poysti, L, Rajalin, S, Summala, H, 'Factors Influencing the Use of Cellular (Mobile) Phone during Driving and Hazards While Using it', *Accident Analysis and Prevention*, Volume 37, Issue 1, Elsevier Science Ltd, January 2005.

Queensland Government, Department of Main Roads, *Guide to Management of Roadside Advertising, Edition 1.0*, TERS Product Number 80.500, Brisbane, December 2002.

Queensland Government, Department of Transport, *Queensland Road Safety Strategy 2004-2011. Safe4Life*, Brisbane, 2003.

Queensland Government, Department of Transport, *Queensland Youth: On the Road and in Control, Discussion Paper*, Brisbane, October 2005.

Rakauskas, M, Ward, Bernat, N, Cadwallader, M, and de Waard, D, *Driving Performance During Cell Phone Conversations and Common In-Vehicle Tasks While Sober and Drunk*, Report MN/RC – 2005-41, University of Michigan, Minneapolis, Minnesota, United States, October 2005.

Rakotonirainy, A, 'Human-Computer Interactions: Research Challenges for In-vehicle Technology', *Proceedings of Australasian Road Safety Research Policing and Education Conference*, Sydney, 2003.

Ranney, T, Mazzae, E, Garrott, R, and Goodman, M, *Driver Distraction Research: Past, Present and Future*, Internet Forum on Driver Distraction, National Highway Traffic Safety Administration, Washington, DC, United States, 2000, http://www.nrd.nhtsa.dot.gov/departments/nrd-13/driver-distraction/PDF/233.pdf

Ranney, T, Watson, G, Mazzae, E, Papelis, Y, Ahmad, O, and Wightman, J, *Examination of the Distraction Effects of Wireless Phone Interfaces Using the National Advanced Driving Simulator – Preliminary Report on Freeway Pilot Study*, Report Number DOT 809 737, National Highway Traffic Safety Administration, Washington, DC, United States, April 2004.

Recarte, M, 'Mental Workload While Driving: Effects on Visual Search, Discrimination, and Decision Making', *Journal of Experimental Psychology: Applied*, Volume 9, Number 2, pp.119-137, 2003.

Redelmeier, D, and Tabshirani, R, 'Association Between Cellular-Telephone Calls and Motor Vehicle Collisions', *The New England Journal of Medicine*, Volume 336, Number 7, 1997.

Redelmeier, D, and Tabshirani, R, 'Car phones and car crashes: some popular misconceptions', *Canadian Medical Association Journal*, Volume 164, Issue 11, pp.1581-1582, 2001.

Redelmeier, D, and Weinstein, M, 'Cost-effectiveness of Regulations against using a Cellular Telephones while Driving', *Medical Decision Making*, Volume 19, pp.101-102, January-March 1999.

Regan, M, 'Driver Distraction: Reflections on the Past, Present and Future', *Journal of the Australasian College of Road Safety*, Sydney, pp, 22-33, November 2005.

Regan, M, and Mitsopoulos, E, *Understanding Passenger Influences on Driver Behaviour: Implications for Road Safety and Recommendations for Countermeasure Development*, Report for NRMA-ACT Road Safety Trust, Report Number 180, Monash University Accident Research Centre, Melbourne, 2001.

Regan, M, and Young, K, 'Driver Distraction: A Review of the Literature and Recommendations for Countermeasure Development', *2003 Road Safety Research, Policing and Education Conference Proceedings*, *Volume 1*, Sydney, 2003.

Regan, M, Oxley, J, Godley, S, and Tingvall, C, *Intelligent Transport Systems: Safety and Human Factors Issues*, Report Number 01/01, Royal Automobile Club of Victoria Ltd, Melbourne, 2000.

Reinfurt, D, Huang, H, Feaganes, J, and Hunter, W, *Cell Phone Use While Driving in North Carolina*, University of North Carolina Highway Safety Research Center, Chapel Hill, North Carolina, United States, 2001.

Response Insurance, *Even When Not on a Phone, Cell Phone Users Are More Distracted When Driving. Is There a 'Distracted-Driver Personality Type?*, Meriden, Connecticut, United States, July 2003.

www.response.com/about_response/press_releases/distracted_driver_personality.asp

Road Rules – Victoria, Part 18, sections 297, 299 and 300, 1999.

Road Safety Act 1986 (Vic) sections 64 and 65.

Road Safety (Road Rules) Regulations 1999, section 602.

Road Safety Council of Western Australia, *Arriving Safely Road Safety Strategy for Western Australia 2003-2007*, Perth, 2003.

Roads and Traffic Authority, New South Wales, *Advertising on RTA Infrastructure*, Road Safety and Traffic Management Directorate Policy 99/2, Sydney, 1999.

Roskam, A, Brookhuis, K, de Waard, D, Carsten, O, Read, L, Jamson, S, Östlund, J, Nilsson, L, Bolling A, Antilla, V, Hoedemaeker, M, Janssen, W, Harbluk, J, Johansson, E, Tevell, M, Fowkes, M, Engstrom, J and Victor T, *Development of an experimental protocol (HASTE (Human Machine Interface and the Safety of Traffic in Europe) Deliverable 1,* European Commission, 2002, www.its.leeds.ac.uk/projects/haste/deliverable.htm

Royal, D, *National Survey of Distracted and Drowsy Driving Attitudes and Behaviours: 2002, Volume 1 – Findings Report*, DOT 809 566, National Highway Traffic Safety Administration, Washington, DC, United States, March 2003.

Royal Canadian Mounted Police, 'Legislation, Regulation and Enforcement for Dealing with Distracted Driving', Presentation by Inspector Rod Booth, *Proceedings of International Conference on Distracted Driving*, Toronto, Ontario, Canada, October 2005.

Rudin-Brown, C, 'Driver Distraction from In-vehicle Telematic Devices: The Public Opinion', Transport Canada, *Proceedings of International Conference on Distracted Driving*, Toronto, Ontario, Canada, October, 2005.

Sarberg, F, 'Accident Risk of Car Drivers During Mobile Phone Use', *International Journal of Vehicle Design*, Volume 26, Number 1, pp. 57-69, 2001.

Shinar, D, *Mobile Phone Use and Road Injury*, Presentation, The George Institute for International Health, University of Sydney, 29 March 2006.

Shinar, D, and Tractinsky, N, *Effects of Practice on Interference From an Auditory Task While Driving: A Simulation Study*, DOT-HS 809 826, National Highway Traffic Safety Administration, Washington, DC, United States, 2004.

Smiley, A, Persaud, B, Bahar, G, Mollett, C, Lyon, C, and Smahel, T, 'Traffic Safety Evaluation of Video Advertising Signs', *Transportation Research Record*, Number 1937, Washington, Dc, United States, 2005.

Smiley, A, Smahel, T, and Eizenman, M, 'Impact of Video Advertising on Driver Fixation Patterns', *Transportation Research Record*, Number 1890, pp 76-83, 2004.

Smith, E, *Study on Distracted Driving: Outline of Results, Methodology and Data Limitations*, University of North Carolina Highway Safety Research Centre, Chapel Hill, North Carolina, United States, 2001.

http://www.aaafoundation.org/projects/index.cfm?button=disdrvstudylim

Somerville, P, 'Roadkill', *National Safety*, National Road Safety Council of Australia, http://www.fleetsafetysolutions.com/roadkill.htm

Stanley, L, Kelly, M, and Lassacher, S, 'Driver Performance While Interacting with the 511 Travel Information System in Urban and Rural Traffic', Paper 71, *Proceedings of the Third International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design*, Rockport, Maine, United States, 2005. http://ppc.uiowa.edu/driving-assessment/2005/Final/index.htm#Session6

STAYSAFE Committee, Parliament of New South Wales*, Driver Distraction: Proceedings of an International Conference on Distracted Driving, Sydney, Australia, 2-3 June 2005*, Report 67, Sydney, 2006.

Stevens, A, *Human Machine Interface: Guidelines and Legislation*, ROSETTA Project, University of Southampton, Southampton, United Kingdom, October 2002. http://www.trg.soton.ac.uk/rosetta/workareas/2b_hmi/hmi_gl_intro.htm

Stevens, A, and Rai, G, *Development of Safety Principles for In-vehicle Information and Communication Systems*, Transport Research Laboratory, Wokingham, United Kingdom, 2000, www-nrd.nhtsa.dot.gov/departments/nrd-13/driver-distraction/papers.htm

Strayer, D, Drews, F, Albert, R, and Johnston, W, 'Cell Phone Induced Perceptual Impairments During Simulated Driving', *International Driving Symposium on Human Factors in Driving Assessment , Training and Vehicle Design*, Aspen, Colorado, United States, 2001, http://ppc.uiowa.edu/Driving-Assessment/2001/Summaries/Driving%20Assessment%20Papers/03_Strayer_David.htm

Strayer, D, Drews, F, and Johnston, W, 'Cell-phone Induced Failure of Visual Attention During Simulated Driving', *Journal of Experimental Psychology: Applied*, Volume 9, pp. 23-32, 2003.

Strayer, D, Drews, F, Crouch, D, and Johnston, W, 'Why Do Cell Phone Conversations Interfere with Driving?', *Proceedings of the 81st Annual Meeting of the Transportation Research Board*, Washington DC, United States, 2002.

Stutts, J, Feaganes, J, Rodgman, E, Hamlett, C, Meadows, T, Reinfurt, D, Gish K, Mercandante, M, and Staplin, L, *Distractions in Everyday Driving*, AAA Foundation for Traffic Safety, Washington, DC, United States, June 2003.

Stutts, J, Huang, H, and Hunter, W, *Cell Phone Use While Driving in North Carolina: 2002 Update Report,* University of North Carolina Highway Safety Research Centre, Chapel Hill, North Carolina, United States, December 2002.

Stutts, J, Knipling, R, Pfefer, R, Neuman, T, Slack, K, and Hardy, K, 'NCHRP Report 500. *Guidance for Implementation of the AASHTO Strategic Highway Safety Plan, Volume 14: A Guide for Reducing Crashes Involving Drowsy and Distracted Drivers*, National Cooperative Highway Research Program, Transportation Research Board, Washington, DC, United States, 2005.

Stutts, J, Reinfurt, D, Staplin, L, and Rodgman, E, *The Role of Driver Distraction in Traffic Crashes*, AAA Foundation for Traffic Safety, Washington DC, United States, 2001.

Sullman, M, and Baas, P, 'Mobile Phone Use amongst New Zealand Drivers', *Transportation Research Part F*, Volume 7, pp. 95-105, 2004.

Sundeen, M, *Cell Phones and Highway Safety: 2005 State Legislative Update*, National Conference of State Legislatures, Denver, Colorado, United States, August 2005.
http://gulliver.trb.org/news/blurb_detail.asp?id=5277

Sundeen, M, 'Distracted Driving Legislation', *Proceedings of International Conference on Distracted Driving,* Toronto, Ontario, Canada, October 2005.

SWOV Institute for Road Safety Research, *Use of Mobile Phones While Driving – Effects on Road Safety*, Report R-2005, Leidschendam, Netherlands, 2005.

SWOV Institute for Road Safety Research, 'Mobile Phones: Both Hand-held and Hands-free Bad for Road Safety', *Research Activities,* Number 31, pp. 3-4, Leidschendam, Netherlands, March 2006.

Taverner Research Company, *Driver Distraction, Research Report for City of Sydney and Marrickville Councils*, Sydney, April 2005.

Tay, R and Knowles, D 'Driver Inattention – Drivers' Perception of Risks and Compensating Behaviours', *IATSS Research*, Volume 28, Number 1, 2004.

Taylor, D, Bennet, D, Carter, M, and Garewal, D, 'Mobile Telephone Use among Melbourne Drivers: A Preventable Exposure to Injury Risk', *Medical Journal of Australia*, Volume 179, Number 3, August 2003.

Telstra, *Phone Safe Drive Safe Campaign*, Media Release, Sydney, 13 April 2003.

The Road Vehicles (Construction and Use) (Amendment) (No. 4) Regulations 2003 (United Kingdom)

Thulin, H, and Gustarfsson, S, *Mobile Phone Use While Driving. Conclusions from Four Investigations*, Report 490A, Swedish National Road and Transport Research Institute, Linkoping, Sweden, 2004.

Tijernia, L, Johnston, E, Parmer, E, Winterbottom, M, and Goodman, M, *Driver Distraction with Route Guidance Systems,* DOT HS 809-069, National Highway Traffic Safety Administration, Washington, DC, United States, 2000.

Tijerina, L, Parner, E, and Goodman, M, 'Driver Workload Assessment of Route Guidance Systems Destination Entry While Driving: A Test Track Study', *Proceedings of the 5th ITS World Congress*, Seoul, Korea, 1998.

Transport Canada, *Strategies for Reducing Driver Distraction from In-Vehicle Telematics Devices: A Discussion Document*, TP 14133E, Ottawa, Canada, April 2003.

Transport Canada, *Strategies for Reducing Driver Distraction from In-Vehicle Telematics Devices: Report on Industry and Public Consultations*, Report Number TP14409E, September 2005.
http://www.tc.gc.ca/roadsafety/tp/tp14409/menu.htm

TRL Limited, *Mobile Phone Use by Drivers, 2003-2005*, Reference LF2097, Wokingham, United Kingdom, 2005.

Triggs, T, and Harris, W, *Reaction Time of Drivers to Road Stimuli*, Report HFR-12, Department of Psychology, Monash University, Melbourne, 1982.

Troglauer, T, Hels, T, and Christens, P, 'Extent and Variations in pp. 3-Mobile Phone Use Among Drivers of Heavy Vehicles in Denmark', *Accident and Analysis Prevention*, Volume 38, pp.105-111, 2006.

University of Michigan, Transportation Research Institute, Driver Interface Group, *All the Telematics Guidelines We've Seen*,
www.umich.edu/~driving/guidelines/guidelines.html

Utter, D, *Passenger Vehicle Driver Cell Phone Use - Results from the Fall 2000 National Occupant Protection Use Survey*, DOT HS 809 293, National Highway Traffic Safety Administration, Washington, DC, United States, 2001.

Vanlaar, W, 'Legislation, Regulation and Enforcement for Dealing with Distracted Driving in Europe', *Proceedings of International Conference on Distracted Driving*, Toronto, Ontario, Canada, October 2005.

Vanlaar, W, and Yannis, G, 'Perception of Road Accident Causes', *Accident Analysis and Prevention*, Volume 38, pages 155-161, 2006.

VicRoads, *Driving Around Melbourne*, Melbourne, 2003.

VicRoads, *Traffic Engineering Manual, Volume 2*, Melbourne, 2004.

VicRoads, *Tourist Signing Guidelines, Second Edition*, Melbourne, 2001.

Victoria Legal Aid, *Road to Court – A Guide to Traffic Offences in the Magistrates' Court*, Melbourne, 2004.

Violanti, J, 'Cellular Phones and Fatal Traffic Collisions', *Accident Analysis and Prevention*, Volume 31, Number 5, pp. 519-524, September 1999.

Virginia Commonwealth University, Transportation Safety Training Centre, *Driver Inattention and Driver Distraction Study*, Special Report 15, Richmond, Virginia, United States, 2001.

Walker, J, 'Presentation to Distracted Driving Conference', by Senior Vice President of Decima Research, *Proceedings of International Conference on Distracted Driving*, Toronto, Ontario, Canada, October 2005.

Wallace, B, *External-to-Vehicle Driver Distraction*, Scottish Executive Social Research, Edinburgh, Scotland, 2003, http://72.14.203.104/search?q=cache:QHulGUhlsg0J:www.scotland.gov.uk/library5/finance/evdd-00.asp+Wallace+%22External+to+Vehicle+Driver+Distraction%22&hl=en&gl=au&ct=clnk&cd=2

Wang, J, Knipling, R, and Goodman, M, 'The Role of Driver Inattention in Crashes: New Statistics from the 1995 Crashworthiness Data System', *40th Annual Proceedings, Association for the Advancement of Automotive Medicine*, Vancouver, British Columbia, Canada, 1996.

Wilber, V, *Driver Focus: A North American Perspective*, Presentation to the Inland Transport Committee, United Nations Commission for Europe, Geneva, Switzerland, 18 February 2004, www.unece.org/trans/doc/2004/itc/itcrt/AAM%20Final%20Briefing%20for%20ITC.pdf

Wierwille, W, and Tijerina, L, 'An Analysis of Driving Narratives as a Means of Determining Problems Caused by In-vehicle Visual Allocation and Visual Workload', in Gale, A.G., et al (Editors), *Vision in Vehicles – V,* Elsevier Science, 1996.

Williams, A, 'Teenage Drivers: Patterns of Risk', *Journal of Safety Research*, Volume 34, pp. 5-15, 2003.

Williamson, A, 'Fatigue and Coping with Driver Distraction', *Journal of the Australasian College of Road Safety*, November 2005.

Young, K, and Regan, M, 'Road Safety Implications of Driver Distraction', *Australasian Road Safety Handbook, Volume 2*, Austroads, Sydney, 2005.

Young, K, Regan, M, and Hammer, M, *Driver Distraction: A Review of the Literature*, Report Number 206, Monash University Accident Research Centre, Melbourne, 2003.

Appendix A

List of Formal Written Submissions

Government

Australian Transport Safety Bureau
Department of Premier & Cabinet - Office of Road Safety, Western Australia
Minister for Transport & Mains Roads, Queensland
Ministry of Transport, New South Wales
Queensland Police Service
South Australia Police
Tasmania Police
Transport Accident Commission
VicRoads
Victoria Police

Local Government

Hobsons Bay City Council

Non-Government

Alpine Electronics of Australia Pty Limited
ARRB Group Limited
AusEdrive
Australian Automotive Aftermarket Association Limited
Australian Driver Trainers Association NSW
Australian Mobile Telecommunications Association
Centre for Accident Research & Road Safety - Queensland
Federal Chamber of Automotive Industries
Ford Motor Company of Australia Limited
GM Holden Limited
Insurance Australia Group
Monash University Accident Research Centre
Motorcycle Riders' Association
Motorola Australia Pty Limited

Municipal Association of Victoria
Pioneer Electronics Australia Pty Limited
Queensland University of Technology
RoadSafe - Inner Eastern
RoadSafe - Inner Melbourne
RoadSafe - Inner Northern
RoadSafe - Inner South East
RoadSafe - Metropolitan North Eastern
RoadSafe - Westgate
RoadSafe - Wimmera
Royal Australasian College of Surgeons
Royal Automobile Club of Victoria Ltd
Streets Ahead Pty Ltd
Victorian Automobile Chamber of Commerce
Victorian Motorcycle Advisory Council

Individuals

Name	Suburb
Mr E. Farrow	Shepparton
Dr D. Andreassen	Ringwood
Mr L. Stillman	Elwood

Appendix B

Public Hearings

Melbourne 5 December 2005

Assistant Commissioner Robert Hastings Superintendent Peter Keogh	Traffic and Transport Department Traffic and Operations Support **Victoria Police**
Mr David Anderson Mr Eric Howard Ms Antonietta Cavallo	Chief Executive General Manager, Road Safety Manager, Road User Behaviour **VicRoads**

Melbourne 6 December 2005

Professor Ian Johnston Dr Michael Regan Kristie Young	Director Senior Research Fellow Research Fellow **Accident Research Centre, Monash University**
Mr David Healy Mr John Bolitho	General Manager, Road Safety Manager, Resolution **Transport Accident Commission**

Melbourne 30 January 2006

Dr Laurie Sparke Mr Mike Hammer	Chief Engineer Information and Crash Avoidance Technologies **Holden Innovation**
Ms Catherine Sheehan	National Manager – Corporate Responsibility, Corporate Affairs **GM Holden Limited**
Mr Brent Stafford	Executive Director **ITS Australia**
Mr Russell Scoular Mr Bruce Priddle	Government Affairs Manager Manager, Vehicle Assurance & Homologation **Ford Motor Company Limited**
Dr Ken Ogden Ms Robyn Seymour	General Manager, Public Policy Road User Team Leader, Public Policy **Royal Automobile Club of Victoria**
Mr Kelly Parkinson	Member, AMTA Health and Safety Committee **Managing Director, KPPR**
Mr Randal Markey	Manager, Communications **Australian Mobile Telecommunications Association**

Dr Ken Joyner	Deputy Chair, Health and Safety Committee AMTA Director Global EME Strategy & Regulatory Affairs, **Motorola Pty Ltd**
Mr John Demezieres	Product Manager, Mobile Devices **Motorola Pty Ltd**

Melbourne 6 February 2006

Mr Stuart Charity	Executive Director
Mr Ben Bartlett	Manager, Member Services **Australian Automotive Aftermarket Association**
Mr Ron Beluszar	National Sales Manager **Pioneer Electronics Australia**

Melbourne 27 March 2006

Superintendent P. Keogh	Traffic Operations and Support Department
Acting Inspector J. Cole	Traffic Operations and Support Department **Victoria Police**

Melbourne 3 July 2006

Mr George Mavroyeni	General Manager, Road Safety
Ms Antonietta Cavallo	Manager, Road User Behaviour
Mr Andrew Collings	Senior Network Policy Officer **VicRoads**

Appendix C

International Contributions

AAA Foundation for Traffic Safety, USA

European Transport Safety Council, Belgium

Human Factors North Inc, Canada

Institute for Road Safety Research, Netherlands

Ministry of Transport, New Zealand

National Institute for Transport and Safety Research, France

Office of the Minster of Transport, Canada

Swedish Road Administration, Sweden

The AA Motoring Trust, United Kingdom

University of Calgary, Canada

Appendix D

Interstate and New Zealand Briefings

Canberra 22 February 2006

Mr John Goldsworthy	Team Leader, Road Safety Research and Statistics **Australian Transport Safety Bureau**
Mr Peter Robertson Mr Alan Jonas	Vehicle Safety Standards Principal Engineer, Legal Safety Standards **Department of Transport and Regional Services**
Mr John Metcalfe Mr James Hurnall	Director – Research and Policy Director – Technical Services **Australian Automobile Association**
Mr Keith Seyer	Director – Technical and Regulatory **Federal Chamber of Automotive Industries**
Mr Luke Fletcher	Research Engineer, Department of Information Engineering, Research School of Information Sciences and Engineering **Australian National University**
Dr Alex Zelinsky	Director, ICT Centre **CSIRO**

Sydney 23 February 2006

Chief Superintendent John Hartley	Commander, Traffic Services Branch **New South Wales Police**
Ms Pamela Leicester	Road Safety Manager, Policy, Research and Planning **Insurance Australia Group**
Mr John Brown	Road Safety Policy Specialist **NRMA Motoring & Services**
Ms Katherine Spina	Road Safety Officer **Marrickville Council**
Mr Harold Scruby	Chairman/CEO **Pedestrian Council of Australia**
Mr Nigel McDonald	Principal Consultant **ARRB Group**

Dr Suzanne McEvoy	Senior Research Fellow, Injury Prevention and Trauma Care Division **The George Institute for International Health, University of Sydney**

Sydney 24 February 2006

Dr Soames Job	General Manager, Road Safety Strategy **Roads and Traffic Authority**

Wellington, New Zealand 15 May 2006

Mr Craig Gordon Mr Chad Baker Mr Chris Roblett	Senior Scientist Senior Advisor, Safety and Security Solicitor, Legal Team **NZ Ministry of Transport**
Superintendent Dave Cliff Mr Glen Morrison	National Road Policing Manager National Co-ordinator Road Safety Education **New Zealand Police**
Ms Jayne Gale Mr Mike Noone	Motoring Policy Manager **New Zealand Automobile Association**

Appendix E

Selected Countries That Ban Use of Hand-Held Mobile Telephones While Driving

Country	Notes
Austria	
Belgium	Phones can be used without a hands-free unit when the car is stationary - but not while in traffic (such as at traffic lights)
Brazil	Ban imposed Jan. 2001
Canada	Banned only in Newfoundland and Labrador province
Chile	
Czech Republic	
Denmark	Ban imposed July 1998
Finland	Ban imposed January 2003
France	Banned 2003
Germany	Ban imposed Feb. 2001 - usage allowed without a hands-free unit only when the engine is switched off.
Greece	
Ireland	Hands-free kits allowed, although that is subject to review.
Italy	
Japan	Ban imposed Nov. 1999
Malaysia	
Netherlands	
Norway	
Poland	
Portugal	
Romania	
Russia	Ban imposed by Prime Minister - March 2001
Singapore	
Slovak Republic	
Slovenia	
South Africa	
South Korea	Ban imposed July 2001
Spain	
Switzerland	
Turkey	
United Kingdom	Banned from December 2003
United States	Only in States of New York, New Jersey, Connecticut and the District of Columbia plus some municipalities. Some states ban all use of phones by novice and school bus drivers.

Note: Current as at 1 January 2006. The list includes those countries that have banned the use of a mobile phone when driving unless used with some form of hands-free kit.

Source: http://www.cellular-news.com/car_bans/ (accessed on 7 August 2006)