



Journal of the Australasian College of Road Safety

Formerly RoadWise — Australia's First Road Safety Journal



In this edition —

Contributed articles:

- Creating a "Third Tier" for Road Safety
- Evaluating the impact of 'Speed Kills Kids' campaign in New Zealand schools
- 2008 Australian Road Patrol Skills Showcase - Event Summary and Review

Peer-reviewed papers

- Development of a Proactive Brief Road Safety Intervention for Industry
- The Structure of the Learner Licence Affects the Type of Experiences Novices Gain During this Phase
- Speed Enforcement – Effects, mechanisms, intensity and economic benefits of each mode of operation



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Cover photo: In this edition Peter Mackenzie discusses the need to get freight off the roads and back onto the railways and to design our national infrastructure to reduce the need for car travel and an ever-burgeoning road system.

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From the President



Dear ACRS Members,

The College has been honoured by Her Excellency Ms Quentin Bryce AC, the Governor-General of the Commonwealth of Australia, who has agreed to be our Patron.

Her decision will, I know, encourage College members, adding an

important leadership dimension to assist us in our primary aim to improve road safety in Australia. On behalf of the College, Robin Anderson and I participated in a small farewell function for our previous patron, the outgoing Governor-General, Major General Michael Jeffery, AC, CVO, MC. We are very grateful to him for being our Patron during his term of office.

The recent College Conference “High Risk Road Users” held in conjunction with the Queensland Travel Safe Committee was well attended and a credit to the Conference Chair, Associate Professor Barry Watson and all the team at Carrs-Q, the Travel Safe Secretariat and the ACRS Office staff.

The Federal Minister for Infrastructure, Transport, Regional Development and Local Government, the Hon Anthony Albanese recently replied on behalf of the Prime Minister to the College’s request for support to improve road safety outcomes in Australia and to demonstrate leadership on road safety practices to the world.

Minister Albanese said the Government “is committed to improving road safety outcomes through a national collaborative approach”.

He said that while he was unable to make any funding commitment to assist the College in a partnership we had suggested, he invited us to talk to the Department of Infrastructure, Transport, Regional Development and Local Government about any specific opportunities for future collaboration. We will follow up that opportunity.

More recently Bob McMullan, MP, the Parliamentary Secretary for International Development Assistance speaking at the launch of draft strategy on Disability, Disadvantage and Development in Asia and the Pacific said; “Another area of preventable impairment we are concerned about is road and workplace safety.

Approximately 1.2 million people globally are killed on roads each year and 50 million are injured or disabled. 90% of these deaths and injuries occur in poorer countries. These figures are expected to increase as increased traffic on poorly built roads leads to higher levels of impairment in many emerging countries.”

It is clear that the Government is keen to consider increasing road safety assistance in the aid programs. I know that College members will be available to assist.

The Joint Transport Research Centre of the OECD and the ITE, with support from the FIA Foundation, recently launched a new publication “Towards zero: ambitious road safety targets and the safe system approach”

According to Eric Howard, formerly General Manager of Road Safety for the State of Victoria and Chairman of the group of government experts that prepared the new report, “all countries should aspire to the long term elimination of death and serious injuries on their roads and adopt a safe system approach – many of the means of achievement are available and finding the balance will be energised by adopting that ambition.”

I know from the discussions I have had with members, that there are many ideas and many opportunities for the College to follow up to help develop and achieve ambitious targets here in Australasia. As I wrote in the August journal, I am keen to hear from members and would like to take this opportunity to report on some of the findings of our survey of members which was conducted mid year. Approximately 1 in 6 members replied to the survey and ACRS thanks all those who participated.

As expected our multidisciplinary membership was confirmed with many respondents being members of more than one other body, with other professional affiliations including engineering, driver training, medical, teaching and public service. The most important services provided by ACRS to members were the journal, the annual conference, local chapter meetings and seminars, lobbying, networking and the web site with a lesser level of importance for the register of road safety professionals and the library service.

The comments section of the survey elicited comments on the difficulties for rural members in participating in metropolitan chapter activities, especially in Queensland and NSW, the need for a balance within the College between researchers and practitioners, the perceived lack of media comments from ACRS and the need to build better links with Councils. In addition there were some very positive comments about ACRS. I have recently started a dialogue with the Australian Local Government Association (ALGA) in relation to the latter comment and would welcome from members any suggestions about how ACRS can improve in relation to any other matter (whether raised in the survey or not).

“I am saddened to report that Peter Waugh, a former WA Chapter Chairman and President of the College has died following a serious illness. I am sure all College members join me in offering our condolences to Peter’s wife Lyn and family. [Ed: See Obituary on page 3]”

Lauchlan McIntosh AM

President

Obituary

Peter Waugh: 3rd March 1950 - 1st November 2008

Peter had a very successful career as a road and traffic engineer with Main Roads WA from 1972 to 1998, BSD Consultants from 1998 to 2003 and finally ARUP from 2003. While with ARUP Peter served first in the Perth Office, then later in the Singapore Office, and for the last three years in the Sydney office. In his most recent role he was the leader of the Highway Team in the Infrastructure Group. Peter will be remembered as a quiet achiever who was always willing to help anyone and generated great respect from everyone who worked with him. He made a very valuable contribution to road safety in WA in his work as an engineer, from 1994 till 2005 as Chairman of the Executive Committee of the WA Chapter of the Australian College of Road Safety and from 1999-2001 as National President of the College. He will be sadly missed.

Diary

5-7 August 2009 AITPM Conference 'Traffic Beyond Tomorrow', Adelaide Convention Centre. For further information: www.aitpm.com

8-9 October 2009 Victorian Biennial RoadSafe Conference, Rydges Bell City Event Centre, Preston, Victoria. The Conference will feature keynote speakers, presentations from local specialists, a conference dinner and associated expo. Be informed and inspired by a number of high profile local speakers from the road safety industry. For more information visit: www.iceaustralia.com/roadsafe09

5-6 November 2009 ACRS Conference 'Road Safety 2020: smart solutions, sustainability, vision' Technology Park, Bentley, WA. Sub themes: advances in technology; research advances and solutions (smart systems); high risk road users; current issues. For further information contact: eo@acrs.org.au.

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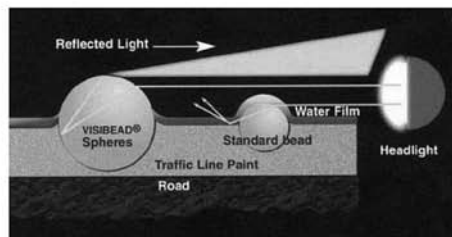
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Quarterly News

High Risk Road Users Conference - Report

By Linda Cooke, ACRS Executive Officer

ACRS Sets a Record



A record number of delegates attended the highly successful international conference on 18-19 September 2008 at Parliament House, Brisbane. Held jointly by the ACRS and the Travelsafe Committee of the Queensland Parliament, the conference theme was 'High risk road users: motivating behaviour change- what works and what doesn't work'. The conference was launched by the Queensland Minister for Transport, the Hon John Mickel. Former CARRS-Q Director and ACRS Fellow, Professor Mary Sheehan, Associate Professor Rebecca Ivers and two international visitors to CARRS-Q - Associate Professor Ray Bingham (University of Michigan Transportation Research Institute) and Professor Simon Washington (Arizona State University) - provided keynote presentations.

The conference comprised 4 plenary sessions and 40 presentation sessions. Included was the launch of Sarah Redshaw's book "In the Company of Cars" and a presentation by Sandra Cook and Kerry Sunderland about their project in progress, which was founded in Sandra's family experience of road trauma.

There was active participation and attendance by members of parliament from both Queensland and Victoria. The conference created Australasian-wide interest. Registrations were received from every state and territory and as well as the two American key note speakers we had registrations from Lao Peoples Democratic Republic, France, Pakistan, Fiji and New Zealand. Not surprisingly Queensland representation was high with Queensland Police and Queensland Transport supporting

us with substantial registrations. Over 210 delegate registrations were received, which is a record number for an ACRS annual conference.

There was significant media coverage of the conference with radio and television and print media interviews of presenters and the ACRS executive taking place.

Conference proceedings

A CD-ROM of the conference proceedings is available for purchase at minimal cost (contact ACRS office). Also, a Hansard transcript of the keynote presentations and final session panel discussion will be available in due course.

Partners and sponsors

ACRS is extremely grateful for the partnership of the Travelsafe Committee of the Queensland Parliament. Our sponsors were CARRSQ, Cozart, MAIC, NRMA-ACT Road Safety Trust, Queensland Transport and the Marque Hotel.

Social

The conference reception at QUT Gardens Point was assessed by those attending as overwhelmingly "very good" or "good". It provided a good opportunity for networking and numbers slow to attend the Friday morning session were not noticeably reduced by the previous night's socialising.

Prize winners

The following awards were made at the conference and copies of the papers are included in this edition of the Journal, the first being a non peer reviewed paper:

Practitioner's prize: 'Evaluating the impact of 'Speed Kills Kids' campaign in New Zealand schools' by Antoun, F. J., Road Policing Support, New Zealand Police

Student prize (joint): 'Development of a proactive brief road safety intervention for industry: Identifying issues associated with implementation' by Rowland, B., Davey, J., Freeman, J. & Wishart, D., Centre for Accident Research and Road Safety – Queensland, Queensland University of Technology

Student prize (joint): 'The structure of the learner licence affects the type of experiences novices gain during this phase: Examples from Queensland and New South Wales' by Bates, L., Watson, B. & King, M., Centre for Accident Research and Road Safety – Queensland, Queensland University of Technology

Researcher's prize: 'Speed enforcement – Effects, mechanisms, intensity and economic benefits of each mode of operation' by Cameron, M.H. & Delaney, A.K. Accident Research Centre, Monash University and latter formerly with Accident Research Centre, Monash University

Membership of ACRS

A reminder: previous non-members who registered for the Conference receive complimentary membership of the Australasian College of Road Safety up to 31 December 2008. As the Brisbane conference was held towards the end of the calendar year we will be contacting all members shortly to invite them to renew their memberships. The College hopes that membership of the College will be long and beneficial and that new and continuing members will be able to contribute to the interests of other members of the College, either at local chapter or national events and activities.

2009 ACRS Annual Conference

Please put this in your diaries for next year and make an early start to your travel plans!

ACRS Annual Conference 5-6 November 2009, Technology Park, Bentley, WA, "Road Safety 2020: smart solutions, sustainability, vision". Sub themes: advances in technology; research advances and solutions (smart systems); high risk road users; current issues. Abstracts open 9/2/09 and close 29/5/09.

Chapter News

Notice to all Chapter Executive Committees

At a recent ACRS executive meeting it was agreed that a call for topics for the 2009 ACRS Seminar Series should be made. It is suggested that you consult with your members and let our Executive Officer, Linda Cooke, have any suggestions by the end of the current year, including the names of possible keynote speakers.

Australian Capital Territory and Region

An Awareness Week for Canberra's Motorcyclists was held over the period, 11th to 17th of October 2008. Initially launched by a number of the ACT's motorcycling politicians, the events included a week long awareness program, an evening of information and strategy and a Riders Breakfast.

The information evening was sponsored by the ACT and Region Chapter of the College with support from the NRMA-ACT Road Safety Trust. Dr Stephen Jiggins, Chapter Secretary opened the evening with a short address which noted the crash performance and risk for motorcyclists. Ms Liz deRome from the George Institute of Health followed with a very informative presentation on protective clothing and equipment, standards and performance and Mr Dave Gibson of Stay Upright Motorcycle Techniques, then gave an interesting lecture on low

risk riding strategies. Some 120 riders attended with Peter Major from the ACT Motorcycle Riders Association thanking the presenters and sponsoring bodies for an informative evening.

The awareness week was finalised on the Friday at a Riders Breakfast for some 100 riders where the prize draw for the "Where's JOE Rider?" competition, was made. Some fifty "Joe's" wearing fluorescent vests, rode as "Joe Rider" throughout the week, resulting in reports of Joe being "spotted" over much of the ACT. This competition appeared to have been as much fun for the riders as the "spotters", and offered an interesting method of highlighting rider presence on the roads.

The awareness week coincided with the Pink Ribbon Ride to support Breast Cancer. Held on Sunday 19th October, the related ride involved a procession of highly visible pink decorated bikes and riders offering a further opportunity to highlight the presence of motorcycles on the roads. The organising committee plans to build on the success of this inaugural Motorcycle Awareness Week in the ACT, and has begun planning for 2009.

The organisers have been particularly grateful for the financial and sponsorship support from the ACT and Region Chapter of the Australasian College of Road Safety, the NRMA - ACT Road Safety Trust and SEEARS work wear. (Report provided by Gary McDonald, Road Safety Officer, Roads ACT)



Eddie Wheeler (NRMA_ACT Road safety Trust), David Gibson (Stay Upright Motorcycle Techniques), Liz deRome (George Institute of International Health) and Steven Jiggins (Canberra Chapter of the Australasian College of Road Safety) presenters at the ACT Motorcycle Awareness Week information evening,

New South Wales (Sydney)

For those who missed out on the ACRS High Risk Road Users Conference, The George Institute held a further seminar on novice drivers on Friday 10th October. Speakers included Raymond Bingham, University of Michigan Transportation Research Institute; Teresa Senserrick, The George Institute and Alex Jerrim, Driver Safety Services: Development.

Activities planned for the remainder of the year include:

November:

- 'Drivers attitudes to speed', to be held at Macquarie University. Speakers: Sarah Redshaw and Julie Hatfield.
- 'A high level review of road safety activities in Sweden', to be held at the George Institute. Speakers to include Jeanne Breen.

December:

- 'What road safety workers need to know about trauma and trauma systems', to be held at the George Institute.
- NSW Chapter AGM and election of Executive and Office Bearers. Check the website for further details and dates.

Queensland

The quarterly Chapter meeting scheduled for September varied from the usual format due to the imminent ACRS National Conference being held later that month in Brisbane. Instead of

the usual meeting on the first Tuesday of the month there was a seminar presentation on Tuesday 16 September by one of the conference international keynote speakers – Professor Simon Washington, from the Department of Civil and Environmental Engineering, Fulton School of Engineering at Arizona State University, whose presentation was entitled "Promising Future Directions in the Analysis of Road Safety".

The other major activity of note was the very successful ACRS National Conference held on 18-19 September 2008 at Parliament House, Brisbane, as reported above. The Queensland Chapter of the ACRS played a major role in the organisation of the conference with Associate Professor Barry Watson chairing the Organising Committee and Scientific Committee, in his capacity as the current Chair of the Queensland Chapter of the College.

The final quarterly meeting of the Qld Chapter is scheduled for Tuesday 2 December and will address the issue of road safety from the local government perspective.

South Australia

The Chapter continues to hold bi-monthly lunchtime with the RAA. Chapter members are involved in the organisation of the Australasian Road Safety Research, Policing and Education Conference in Adelaide, 10 – 12 November 2008.

Victoria

The next Chapter seminar is planned for 25th November on the subject of 'Vehicle Technologies'. Three seminars are currently in the pipeline for 2009 on Child Safety, the Safe System Approach and Road Safety and the Environment.

Western Australia

The WA Chapter have been very busy preparing for the Road Safety Forum on 6 November 2008. It is quite a big event this year and we are particularly pleased that the President of ACRS, Lauchlan McIntosh, will be a keynote speaker at the forum.

The remainder of our time has been devoted to the initial planning phase of the next National ACRS Conference to be held in Perth 5-6 November 2009. We expect to be rather busy in the next few months securing sponsorship and confirming keynote speakers. I am sure those who attended the Brisbane conference this year will agree it was a fantastic event. We are treating this as our benchmark and appreciate the support that the Brisbane organising committee have already provided.

The National ACRS 2009 Conference is entitled 'Road Safety 2020: Smart solutions, sustainability, vision' and has four sub-themes:

- advances in technology;
- research advances & solutions (smart systems);
- high risk road users (e.g. motorcycles, heavy vehicles, youth); and current issues.

Abstracts open on 9th February 2009. Information relating to the conference will appear early in the New Year on the National ACRS website with regular updates planned throughout the year. Make a diary note now!! (A/Prof Alexandra McManus, Chair WA Chapter ACRS)

Australian News

Researchers Consider Whiplash Problems

Thousands of drivers and passengers are involved in crashes causing whiplash injuries, but most recover within a few weeks. Nevertheless, about one third continue to have severe and debilitating symptoms for months and even years afterwards, according to the George Institute. For this reason, the Institute, in collaboration with the University of Queensland, is undertaking a study aiming to identify those patients who are more likely to develop long term symptoms. Patients will be assessed shortly after their injury and their recovery will be charted over a one year period. This information will help health professionals to identify those people who are at risk of a poor outcome and target them for specific interventions. In addition, the data collected will provide insight into the mechanisms underlying the pain and disability experienced. (Source: George Institute Newsletter September 08)

New Motorcycle Training Centre Opened in Brisbane

The training of motorcycle riders in Queensland has taken a useful step forward with the opening of the new Honda Australia Rider Training facility at Brisbane Airport on 4th September. Similar centres already exist in New South Wales and Victoria. The opening was welcomed by Transport Minister John Mickel who said, "I would like to congratulate Honda Australia in opening the program in Queensland. Facilities like this work well in partnership with the programs put in place by the Queensland Government and play an important role in providing quality training and important road-craft skills to riders in a secure learning environment." The Minister said it was alarming that 52 motorcyclists and pillion passengers had lost their lives on Queensland roads this year [as at 1 September 2008] representing nearly one quarter of the Queensland road toll, while only four percent of the vehicles on the road are motorcycles.

Honda Australia Rider Training (HART) is a non-profit division of Honda MPE who, apart from being the world's largest motorcycle manufacturer, is also one of the world's largest trainers of motorcyclists. HART is a Quality Endorsed Company and a Registered Training Organisation.

HART's training covers all levels of motorcyclists from beginner through to advanced.

HART opened in 1989 with a 15,000 square meter training range at the Tullamarine site in Melbourne's north. This facility is based on Honda's Suzuka Traffic Education Centre in Japan, which has been operating for over 30 years. In 1994 HART opened a second training centre at Kilsyth, in eastern Melbourne and in 1999 a third centre was established at St Ives, New South Wales.

As part of its training program, HART uses riding simulators. The simulators offer riders the opportunity to develop and improve their Hazard Perception skills, via real time simulation with the ability to replay and review the riders' response to various hazards. HART reports that, overall, it currently conducts training for 18,000 motorcyclists a year in Australia. (Sources: Sponsorship News and HART websites)

New Motorcycle Riders' Training Site in SA

The South Australian Government has improved its motorcycle riders' training program with the opening of a new Rider Safe facility opened last Sunday, 21 September at Jubilee Park Showgrounds, Whyalla. The facility is part of the \$635 000 Rider Safe upgrade, funded by the State Government.

Rider Safe, the compulsory pre-licence motorcycle training course, teaches basic and advanced motorcycle skills, and offers refresher training for experienced motor cyclists. The new facility features a larger training range with a smoother surface

and larger run off areas, making for safer, more efficient riding. Rider Safe courses are conducted on weekends and bookings can be made by contacting telephone 1800 018 300. (Source: SA Department for Transport, Energy and Infrastructure Media release, 23 Sept 08)

Victoria Introduces P1 and P2 Probation Levels

The State Government introduced a new two stage probationary licence system for new drivers on 1st July 2008 to replace the previous one stage, three year probationary licence. The first stage is a one year, P1 probationary licence (red plates), which is followed by the second stage, a three year, P2 probationary licence (green plates). A driver with a probationary licence issued before 1 July 2008, will continue to be covered by the previous system. A probationary driver who is aged 21 or older, when first licensed, will move directly to a P2 licence. P1 drivers are not allowed to use any kind of mobile phone while driving, can only carry one passenger aged between 16 and 21 and cannot tow (unless for work or if under instruction). There are also restrictions on driving high powered vehicles and drink driving offenders may have an alcohol interlock fitted to their vehicle. Any licence suspension, drink driving offence with a blood alcohol concentration (BAC) up to 0.05, or drug driving offence will result in an extension of the P1 licence period for six months, plus the period of suspension. If the P1 licence is suspended, a passenger limit of one will apply for the remainder of the P1 period.

P2 drivers remain on P2 restrictions for a three year minimum. There are restrictions on driving high powered vehicles and drink driving offenders may have an alcohol interlock fitted to their vehicle. Any licence suspension will result in an extension of the P2 period by six months, plus the period of suspension. (Source: VicRoads/home/roadsafety)

New South Wales Launches 'Slow Down Roadshow'

The NSW Centre for Road Safety launched in September 2008 the Slow Down Roadshow to target speeding and to help reduce the loss of life on NSW roads. Speeding is the biggest killer on NSW roads. The roadshow will travel around the State educating the community about the consequences of speeding. It features a graphic display of two identical cars crashed at different speeds – one at 60kmh and one at 100kmh – to visually highlight the impact of speeding. The message is very clear: "If you crash a car at 100kmh you will not survive". The need for education on the effects of speeding was reinforced by recent statistics: an average of almost 200 people die and 4000 people are injured on NSW roads every year as the result of a

speeding related crash. The NSW Centre for Road Safety has partnered with Lend Lease, Westfield and Centro shopping centres as settings for the display in local communities. For more information call 13 22 13.

The NSW Centre for Road Safety also drove home the anti-speeding message at the 2008 Australian International Motor Show at Darling Harbour from 9-19 October. The Centre, in its first appearance at the annual Motor Show, designed an innovative display to educate drivers about the consequences of speeding. Visitors were able to see exactly what happens during a high speed crash and how easy it is to lose control of a vehicle when speeding. There was also a road safety video featuring RTA Road Safety ambassador Michelle Amess, who lost her two teenage sons in a high speed crash in Morpeth in 2005. (Source: RTA Centre for Road Safety)

Tasmania Trials Alcohol Interlocks

In mid August 2008, the State Government commenced a six-to-nine-month trial of alcohol interlocks, based in the greater Hobart and Launceston areas. The trial of alcohol interlocks is one of the new actions undertaken as a result of the Tasmanian Road Safety Strategy 2007-2016, funded by the Road Safety Levy. An alcohol interlock is a device that is fitted to a vehicle's ignition that measures the driver's breath for alcohol.

The interlock requires the driver to provide a breath sample every time an attempt is made to start the vehicle. If alcohol is detected and the driver has a Blood Alcohol Content (BAC) over the permitted level, the vehicle's ignition locks and the vehicle is immobilised. The trial has been organised because drink driving is a major cause of a large number of fatalities and serious injuries on Tasmanian roads. Between 2000 and 2006, 15.6% of drivers involved in fatal crashes and 10.8% of those involved in serious injury crashes in Tasmania, were alcohol affected.

Current strategies have been successful in reducing the number of crashes involving drink-drivers, and have acted as a general deterrent and increased community awareness. However, research suggests that there are groups within the community that continue to be over-represented in drink-driving offences and alcohol-related crashes, and this remains a significant road safety issue. Alcohol interlocks may be a means of addressing this overrepresented group.

The trial has three objectives: to prevent trial participants from driving with an over-the-limit BAC; to identify how an alcohol interlock program might operate in Tasmania; and to examine the psychological, sociological, behavioural, practical and administrative impacts of alcohol interlocks in Tasmania. (Source: Tasmanian Department of Infrastructure, Energy and Resources)

Additions to the ACRS Professional Register

Congratulations to Mr Neil Guest and Mr Cameron Mercer, who have been approved for listing on the ACRS Register of Road Safety Professionals in the discipline of 'Road Safety Audit'.

New Zealand News

Amendments to the Road User Rule

Amendments to the Road User Rule could result in the banning of hand-held mobile phones while driving. Under the proposed changes, drivers would still be able to use hands-free mobiles and two-way radios. The need for this change has been highlighted by the doubling of reported crashes involving the use of mobile phones during the last six years. Between 2002 and 2007 there were 411 injury crashes and 26 fatal crashes in which the use of mobile phones or other telecommunication devices was identified as a contributory factor. Other proposals in the Road User Amendment Rule include changes to signalling requirements for cyclists at roundabouts, new maximum speed limits for mopeds and a requirement for mopeds and motorbikes to have their lights on during the day. The rule also proposes to put in place nationally-defined uniform regulations in relation to vehicles being parked on grassed or cultivated areas that are part of a road. Yet another issue for consideration is whether vehicles should be required to give way to buses leaving bus stops. (Source: NZ Transport Agency 'Pathways' Issue 01)

European News

ETSC's Blueprint for 2010-2020

The European Transport Safety Council (ETSC) has recently published a 51 page Policy Paper: "Road Safety as a right and responsibility for all: A Blueprint for the EU's 4th Road Safety Action Programme 2010-2020." The Policy Paper presents new ideas for European action to save lives on Europe's roads for the decade ahead. To download the Policy Paper visit: www.etsc.be/documents/Blueprint_for_a_4th%20Road_Safety_Action_Programme_ETSC_Sept%2008.pdf

The year 2010 is a deadline for both reaching the EU's target of halving road deaths and the end of the 3rd Road Safety Action Programme. New targets must be set for 2020 which will mobilise action at a joint European level to work further towards reducing the unacceptably high level of deaths and disabling injuries on Europe's roads. ETSC is urging the European Commission to develop a 4th Road Safety Action Programme that focuses its top activities upon the main behavioural causes of death and injuries with lasting effect (speeding, drink driving and lack of seat belt and child safety restraint use) as well as badly designed infrastructure and vehicles.

The ETSC is also recommending that the Programme should tackle new emerging trends such as the increasing numbers of motorcyclists among those killed or injured on the roads. It should work to reap the rewards of reducing speeds and to present policy solutions for the problems of an ageing society.

The ETSC hopes that this paper will contribute to discussions needed now amongst all relevant EU institutions and stakeholders, so that by 2010 new targets and a Programme with a clear road map will be set up and ready to go. (Source: ETSC Media release Sept 08)

Forum Concludes Speeding is Main Killer

"It is deplorable that we are a very long way from rendering speeding as socially unacceptable as drink driving," said Steve Stradling from the UK's Transport Research Institute at a September road safety Forum co-organised by the European Transport Safety Council (ETSC) and the Swiss Council for Accident Prevention (bfu). Experts looked at why drivers risk speeding against all odds and how to prevent this.

Speeding remains the single biggest contributory factor of traffic death and injury across Europe. The higher the speed limit, the more frequently speed is cited as the cause of the accident: from 5.9% at a 30 km/h, through 20% at 60 km/h and up to 37% at 120 km/h. Scientific data show that a 5% increase in speed leads to approximately 10% more injuries, 16% more severe injuries and 25% more deaths. The picture is even starker for pedestrians: if struck by a car at 30 km/h they have a 95% chance of survival, while at 65 km/h they survive in only 15% of cases.

However, despite this overwhelming evidence, exceeding the speed limit remains a mass offence, bfu's Raphael Denis Huguenin said at the Forum. "Although people realise that high speed is dangerous, their behaviour does not match up to this understanding. In particular, speeding among young drivers and motorcyclists is a particular problem in most European countries. Excessive speed accounts for 26% of road collisions among 18-20 year-olds, and for under 10% among drivers aged 35 years and older. Speed is also responsible for 14% of collisions involving male drivers compared to 9% for female drivers."

"There are three main kinds of reasons why drivers speed," said Steve Stradling from the UK's Transport Research Institute. "First, excessive technical capability of modern cars coupled with good road infrastructure and insufficient traffic law enforcement allow drivers to speed. Second, time or peer psychological pressure – overtaking, running late, anger or reacting to other drivers' behaviour – urges many drivers to exceed the speed limit occasionally. Third, some drivers, perhaps 1 in 5, like driving fast. These people need help!" "Unfortunately, exceeding speed limits remains socially acceptable", said Raphael Denis Huguenin. This needs to be changed both through stricter police enforcement and more effective education. Licence suspension and vehicle confiscation should be considered for repeat offenders in all EU countries. (Source; bfu-ETSC media release)

Asian News

Global Companies Support Road Safety in SE Asia

The BP Shell Company initiated an educational road safety program for Djakarta school children in May this year. This involved some 1,000 children from 13 elementary schools. In September the program concentrated on encouraging road safety during the Eid celebrations. The program includes motorcycle rider training.

Ford Motor Indonesia (FMI) launched the Ford Motor Company's Driving Skills for Life (DSFL) campaign in August 2008, with the support of the Ministry of Transportation and in cooperation with the Asia Injury Prevention (AIP) Foundation and the Indonesia Defensive Driving Centre (IDDC). The DSFL campaign offers free driver's education and training to the public, teaching practical skills and techniques to master both safe and fuel-efficient driving. The training has been customised for Indonesia to reflect the local driving environment and road conditions. Ford are running similar programs in Thailand, the Philippines and Vietnam.

North American News

Safer School Buses Planned for USA

New federal rules will make the nation's 474,000 school buses safer by requiring higher seat backs, mandating lap and shoulder belts on small school buses and setting safety standards for seat belts on large school buses. The new rules require all new school buses in America to be equipped with 24-inch-high seat backs, instead of the current 20-inch-high seat backs. Higher seat backs will help prevent taller and heavier children from being thrown over the seat in a crash, decreasing the chance of injury to them and the children in front of them. All new school buses weighing less than five tons will be required to have three-point seat belts. (Source: National Highway Traffic Safety Administration 15.10.08)

International News

George Institute Signs MOU with Emirates

Ties between Australia and the United Arab Emirates (UAE) have been strengthened by a Memorandum of Understanding (MOU) signed between the George Institute and the Emirates Institute for Health and Safety. Under the MOU the two organisations will cooperate in the UAE in a number of health and safety areas, including Road Safety and Trauma Care. (Source: George Institute Newsletter September 08)

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Contributed Articles

Creating a “Third Tier” for Road Safety

By Peter Mackenzie

Peter works in youth development with local government in Tasmania and has previously done project work concerning older people, people with disabilities and carers, all of which involved transport issues.

The Dead-End Transport Route

Australia has been heading down a dead-end land transport route for more than half a century. We seem to be almost obsessed with an over-reliance on road-use for both passenger and freight transport. Yet, this direction we keep travelling has always been unsustainable, unaffordable and, most relevant to our efforts for road safety, very unsafe.

Our road-use is carried out in an unsafe-incident-rich, hazard-filled environment on a road system so under-funded and inadequate to the task that it contributes to up to 30% of crashes occurring (1) and to the severity of a massive number of crash outcomes.

The risk levels on our roads are too often significantly downplayed by assessment limited to crash, death and injury statistics, and/or traffic violations. In the actual everyday situation on our roads, thousands of risks are taken by road users, too often putting other road users and even road-side users at risk. It is very often like a strange and dangerous game of ‘dodgems’ where dangerous high risk evasion and ‘chance’ plays far too much of a role.

And while Australia has often been applauded for its work with road safety audits, somewhere between the theory of the benefits of auditing and actual road upgrades, something seems to go awry.

“...recent upgrades of numerous locations have waited up to and more than a decade for safety treatment....”

There are current or recent upgrades of numerous locations that have waited up to and more than a decade for safety treatment, while thousands of others wait beyond the decade for funding. At the same time too many unsafe other locations are not listed for treatment, despite being hazardous for road users for up to a decade and more. Perhaps more vexing is that some locations have been recently upgraded, but with inadequate and outdated treatment – perhaps to outdated standards.

In addition, many other locations and sectors would never be ‘viable’ to upgrade. That situation often arises from that great difficulty authorities and their engineers have in trying to cope with traffic volumes and speed balanced against safety needs and the constraints imposed by the existing built environment.

A Failing System and Funding Crisis

Overall, this is a system that is failing, and in a funding crisis. That is concern enough, but what worries me more is that there is an apparent reluctance or inability on the part of government and their authorities to acknowledge this and take the necessary action.

“...we face what could easily be described as a land transport meltdown by 2020 or not far beyond....”

To exacerbate this already extremely problematic situation, as a nation, and community, we face what could easily be described as a land transport meltdown by 2020 or not far beyond.

Key predictions by the year 2020 include:

- Double the road freight task (2)
- Burgeoning numbers of older unsafe drivers, with many being de-licensed, creating along with others, a huge transport disadvantaged and socially excluded underclass.



- 78% increased transport emissions from 1990 levels (3)
- Urban traffic congestion costing \$20 billion per year (4)
- Road crash costs of near \$30 billion per year. (5)
- Crash costs involving heavy vehicles of more than billion per year (6)
- Significant growth in other health issues related to transport emissions.
- Shortage of suitable experienced traffic engineers and heavy vehicle drivers, with serious safety implications in both cases.
- Results of continued growth in traffic associated with employment – already 30% of crash totals - still without a dedicated comprehensive safety system.
- Unmanageable growth in currently emerging /growing risks with already high-risk younger drivers/riders.
- Estimated roads upgrade funding shortfall of up to or more than \$50 billion nationally to meet targets developed from the Swedish “Vision Zero” worlds best practice example. (7)

Separately these issues present huge challenges. When merged they may overwhelm us with a crisis involving public health, occupational health and safety, accident and injury prevention, risk management issues, greenhouse gas emissions, imported fuel usage and traffic congestion.

If we are going to steer our way out of this cul-de-sac, we need very clear collective vision as a nation, and strong political will as a driving force for the fundamental and rather monumental changes needed.

The Need for a ‘Third Tier’ of Road Safety

From this, my recommendation and plea to the Federal and State governments is that in parallel to the current development of a National Transport Policy and the related National Infrastructure Plan, a “Third Tier” of road safety be developed.

Currently “Tier One” of road safety involves creating safer roads, safer drivers and safer vehicles, while “Tier Two” involves encouraging more utilization of public transport (and to a lesser degree, alternative transport such as cycling).

The “Third Tier” of road safety would include a National Strategic Plan being developed to contain and minimize the overall growth in road freight transport and private motor vehicle use over future decades, and to actually reduce usage where possible. This plan also needs be linked to the National Road Safety Strategy, and associated action plans.

Given the implications for the future of road safety included in this article, we urgently need to develop this “Third Tier” of Road Safety. This is inextricably linked to greenhouse gas, fuel usage and public health considerations.

In road crash terms, if we keep moving in the current direction without any other fundamental and far-reaching

“...we will pay near to \$30 billion per year in road crash costs by 2020.”

change, we will pay near to \$30 billion per year in road crash costs by 2020. Overall numbers of deaths and injuries may not rise, but the 2020 figures will still involve otherwise avoidable death and serious injury to many thousands of Australians of all ages, as does today’s situation.

We might be able to build our way substantially to safer roads and lesser trauma numbers and costs, but there is a huge and costly catch. To do that we would need to equal or exceed world’s best practice in safety along the lines of the Swedish “Vision Zero” concepts and practices, as recommended by the National Transport Commission (NTC) in their recent advice to Federal Government.

However to do that would entail spending of an estimated minimum an additional \$50 billion before 2020. This is my own ‘quick and dirty’ estimate, but I doubt the figure would be less than that. If I had access to the estimations of upgrading costs from the AUSRAP assessment of road infrastructure, and could use that as a starting point, I suggest the total estimates for all needed road and highway upgrades might be considerably higher than the vast amount of money I have estimated.

That amount is twice the \$20 billion the Rudd Labor Government proposes to allocate to the Building Australia Fund for all infrastructure needs. The reasonable deduction is that nothing near \$50 billion of new money will be allocated for road and highway upgrades by 2020 or even beyond.

Added to that, the Australian public would need to pay an additional amount of possibly \$20 billion to have the ageing vehicle fleet upgraded to meet needed safety standards. This would include a mix of upgrading and replacement of vehicles. Again, this is my own very rough estimate and the accurate figure could range between \$15 and \$30 billion. I doubt it would be less.



Getting the Right Funding Priorities

While it might seem at first sight that the problems are centred on lack of funding from limited budgets, the actual situation is more complex than that. If we examine our land transport infrastructure, what we have is costly and often unnecessary duplication of rail and road infrastructure on some routes, while other routes and locations on both modes wait decades for upgrading. In fact we have almost unrestricted volumes of trucks, cars, vans, motorcycles, bicycles and pedestrians struggling to stay safe on a hazard filled, unforgiving road system, with an inadequate, incomplete and flawed road safety system.

“...too many stakeholders still want more and bigger roads, and unlimited use of cars and (bigger, heavier) trucks...”

Yet one of the monumental barriers to effecting the changes already needed is that despite the raft of massive disadvantages this presents to the health and safety of the community, too many stakeholders still want more and bigger roads, and unlimited use of cars and (bigger, heavier) trucks – to meet their own various needs and demands.

As mentioned above, this current direction locks Australia into trying to build and upgrade road infrastructure to satisfy the needs and demands of private cars and road freight vehicle users, while under-funding vital rail, public transport and community transport needs. (community transport includes mini-bus, community car etc for aged, disabled and other special transport needs). Maintaining the status quo would include continuing with ambitions to develop four-lane freeways around the eastern and southern seaboard between capital cities and other centres, with similar highway links to inland centres. It's part of an Australian dream along the lines of outdated, impossibly costly and unworkable schemes for greening and populating the deserts and about as rational.

Today we are still paying for the high financial and social costs of trying to turn this impossible 'highway dreaming' into a bitumen and concrete reality. One major component is trying to maintain the supposed benefits of competition between road and rail modes for freight haulage. I think the overall situation is well encapsulated in the comparison between the Tokyo-Osaka Shinkansen trains which have carried more than 3.5 billion passengers since 1964 without one death, and the Pacific Highway, which had more than 500 deaths from 10,000 crashes in the decade up to 2003.(8)

Despite the continuing excess of deaths and serious injury while the Pacific Highway upgrades take place, there has been no effort to use the availability of rail and intermodalism to reduce road traffic and consequent crash numbers. On the contrary, once a partial upgrade was complete, the highway was opened to longer and heavier B-Double trucks.

“...there is still an overwhelming acceptance that so-called 'competition' policy between road and rail is still acceptable...”

A Queensland Rail spokesman stated that without the rail track upgrades over recent decades, their Brisbane-Cairns mainline could not have competed with road transport. In NSW the slow and operationally difficult railway from Sydney to Brisbane will lose traffic to an upgraded Pacific Highway. Rail lobbyists argue that the upgrades are more about supporting road freight than car users and road safety. But in either case, if rail is the safer mode, why do we see competition as a good thing?

Yet there is still an overwhelming acceptance that so-called 'competition' policy between road and rail is still acceptable, even if begrudgingly by the 'rail lobby' and its peak bodies. Competition is still perceived or at least promoted as efficient and effective. Road freight is claimed to contribute \$30 billion per year to the economy annually (9). How this can be seen as beneficial defies understanding - except perhaps to some business interests - when it costs a death or maiming for every \$15 million per year contributed to the economy by road freight transport, and more than \$2 billion per year in road crash costs involving heavy vehicles (10).

It is worth noting that trucking peak bodies such as the Australian Trucking Association (ATA) actually argue for fewer trucks on our roads for safety reasons. The fundamental flaw is that they see this happening via longer and heavier B-Doubles and B-triples, which experience shows has simply resulted in more trucks on an overloaded system, from freight growth and from undercutting rail.

The modal freight split we have inherited is an anachronism that followed from the 1954 Hughes and Vale case to the Privy Council in England. The council decided that under the Australian constitution there had to be free interstate freight competition between road and rail. This situation has been continued through ideologically underpinned "Competition Policy", claiming that it has economic and other benefits for Australia.





At least the members of the Privy Council had the foresight to forecast the dangerous future with the massive growth in trucking on unsafe, inadequate roads. Others didn't, and it is telling to note that people in authority in Tasmania were prepared to see the rail system shut and all freight transferred to road as far back as the early 1950s. This situation has been repeated until really quite recently, making it obvious that too many people with influence on transport and road safety issues seemed oblivious to the dangers of putting more trucks onto unsafe roads with the inadequately controlled risk-taking activities of Tasmanian road users.

At the moment, apart from the restrictions on heavy vehicle use from certain urban roads, the main deciding factor on whether rail or road is used is a commercial decision, mainly based on which mode will provide the lowest price to the freight consignor, not on how that decision will impact on road safety issues. The fact that it is based on commercial decisions was recently re-confirmed as correct by the Transport Minister for my state of Tasmania.

Putting Profit Ahead of Safety

This so-called competition between rail and road (which I named "freight wars" back in 1996) means money spent on parallel road and rail links in some cases, while dragging vitally needed money away from other important needs. Yet if we can't afford to upgrade our roads to the safest standards possible, and rail is safer (and cleaner) then by deduction we are putting competition policy and commercial choice before road safety.

This has had a profound effect on the safety and health of our travelling workers, commuters, holidaymakers, and indeed all of our citizens. In allowing road to dominate for freight use over rail, we

"...whether rail or road is used is a commercial decision, mainly based on ... the lowest price to the freight consignor, not on ... road safety issues"

have chosen the least safe, more polluting mode, and as a consequence, in effect have put profit ahead of safety in our priorities. Similarly, with private car use dominating over road and rail based public transport, we have allowed domination of a greatly less safe form of road travel, in the least safe transport mode.

There are many changes to our work, social and other activities that have developed and changed pivotally around private car domination. To a great extent we have corralled ourselves into a cycle of development, not just of road-building, but also of mega-shopping centres, industrial developments, hospitals, public housing and much more, all linked to road access and often reliant on car use, so generating even more dependence on roads, cars and trucks.

This is a very complex situation and the nexuses between various aspects are even more complicated than they first appear to be. I think it is fairly straightforward, that if we have greater use of the less safe mode and in turn less safe vehicles on that mode, this creates greater exposure to risk, and consequently more crashes and resultant deaths and injuries.

What is not so straightforward is the evidence indicating that what we as a nation, think, understand and believe about road safety, coupled to what we don't do or at least don't do enough of, or well enough in our road safety approaches, actually facilitates or contributes to the imbalanced and unsafe use of road freight transport and private car usage.

Lack of a National Transport Plan

A significant component of the creation of this situation is that too many changes have just happened, in an ad hoc manner, and isolated from any 'big picture', rather than having been developed in any strategic fashion, as today we still move forward, rather erratically, without a national transport plan to guide us.

Despite the many statements over the years that have included strong rhetoric about 'integrated approaches' and 'intermodalism', new approaches in recent years, such as 'Auslink', have maintained the status quo with little fundamental change, and the indications are that this will continue without a major shift in thinking for the future.

This situation has not assisted with road safety efforts, and has actually worked counter to many of the positive developments.

Similarly there have been in past decades, and continue to be industrial developments that are sited away from rail access, while others have 'devolved' to road when rail links have been closed. Too many rail links have been closed as rationalisation measures by rail authorities, when it can be argued that they were not in fact losing money if safety costs of alternative road haulage, crashes and trauma (externalities) were factored in (as they traditionally weren't).

So Australia continues to career down this unsustainable, unaffordable and unsafe road, private car and road freight dominated land transport route. We are still too much of a car

“...Australia continues to career down this unsustainable, unaffordable and unsafe road, private car and road freight dominated land transport route...”

obsessed nation, and we ‘Baby Boomers’ are clinging to a dream I call ‘driving-on dreaming’. Sadly, the great majority of my ‘Baby Boomer’ peers for example, falsely believe they will be driving their cars for as long as they choose. Couched in terms of maintaining independence, it is at best an illusion. Even now, many older drivers are struggling to drive safely, with gradually increasing numbers being compulsorily delicensed or reluctantly so after crashes or high risk ‘scares’.

Ironically, many of the community members who support the current approaches, will find themselves part of the transport disadvantaged and socially excluded underclass by 2020, or not far beyond that date. Yet no government expecting to be re-elected is going to try and just force people out of their cars, or trucks off all of our roads. And just ‘putting it on rail’ as many rail lobbyists argue, is a very simplistic and unrealistic approach to our freight transport needs. But it is vital that we make big changes and urgently.

A Paradigm Shift Essential

We need to use the more creative, flexible and better resourced integrated intermodal options that are available. And we need to build or upgrade the infrastructure that best facilitates this shift. We may need to implement a ‘safety equalisation scheme’ for getting more freight on rail where most needed. This would be along the lines of the ‘Freight Equalisation’ scheme for the searoad to Tasmania. We may also need to put in place a ‘Buy-back’ scheme for a number of trucks.

At the same time, we urgently need to seriously reconsider the massive inadequacies in public transport and vastly poorly funded community transport, especially as much of the future increases in road freight will occur on urban roads.

But in all honesty I don’t see where that change is going to come from, without a paradigm shift developing from a major change in understanding of what is happening with our transport situation. To achieve this we would need to see the putting aside of self-interests, narrower focuses, and short-term thinking, and find solutions to the problem of competing and conflicting demands.

The pessimistic part of me takes great note of the National Transport Commission in its recent advice to COAG, warning about the existing problems of people/organisations “working in silos” and “patch protection”, rather than the national interest, so hindering vital changes. Can we really change this long entrenched behaviour?

Yet despite these impediments, and the current diversion of so much focus onto the current confusion and consternation with the global financial crisis, now is the time to act, and with just 11.5 years to 2020, we don’t have time to idle towards that

probable crisis situation. Nick Dimopoulos, Chief Executive from The National Transport Commission said in Feb 2008 “If we are to overcome the tyranny of distance, and support the sustainable growth of our cities, Australia’s road, rail, air and sea transport system –for passenger and freight – must be – planned and operated as integrated networks... a lot has already been achieved in transport reform without a national policy and plan. Just imagine what we could achieve if we had one”. This was in reply to a request for urgent advice on a national transport policy framework from Federal Minister for Transport, Anthony Albanese.

With respect, I believe even the NTC with its not unreasonably harsh criticisms of the current situation, is inadvertently understating the serious problems we have and the extremely difficult and challenging future. Getting people out of their silos and away from their patches is going to be about as easy as asking car enthusiasts to give up their cars – about as easy as talking down a charging, wounded rhino with calming words!

Fundamentals Needing Change

If we are going to have a chance to succeed, we need governments to begin by acknowledging some fundamentals that need changing:

- That the road transport mix of vehicles, drivers/riders and pedestrians, using a hazard filled, unforgiving road environment is fundamentally unsafe.
- That we have nothing like a comprehensive road safety system, despite all the dedicated work of so many people, and the system remains incomplete, inadequate and flawed.
- That there is compelling evidence that we cannot ever create such a system using what we can call ‘conventional road use’ as it exists today – as outlined in this article.
- That land transport policy and practice, particularly competition policy, often works counter to road safety efforts.
- That even if we could build and buy our way to bigger safer roads, this would still be against the national interests and not clean, green or safe enough.

Again, no less than The World Health Organisation argues for reduced motor vehicle use to reduce exposure to risk, which will in turn reduce crashes and the costly scourge of road trauma that kills and maims our citizens, and drains so many resources from our police, emergency services, hospitals and health system.

My ongoing wish is to be able to bring together a forum of people with passion for change, vision and expert knowledge on one or more of: road safety; rail/road competition issues; ageing issues; public transport; occupational health and safety in road use; transport disadvantage; environment. My vision is that we would draw up both a ‘Blueprint’ and ‘Greenprint’ for change that could be taken to a wider audience and to governments. I know it would only be a start. The main barrier to doing this at the moment is simply those three dreaded words – ‘lack of funds’.

And can we really steer around these barriers and head in a safer, less polluting, fuel guzzling future? I think we are in for a rough ride to 2020 and beyond, whatever we do!

I would welcome any constructive criticism on any aspect of this article. It is a complex topic and I realise I have probably glossed over certain aspects. My mailing and email addresses are below if anyone wishes to contact me directly*.

* [Editor: Readers are also invited to send their comments for publication in our 'Letters' section.]

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References

- 1) Main Roads WA Research cited on Fix Australia, Fix the Roads Website www.fix-the-roads.net.au
- 2) National Transport Commission: Rail Productivity Review Issues Paper Aug 2008; p2 (*Note the prediction is for a doubling of Australia's freight task 2000-2020 – noting that rail's share has been falling – so the 2020 road freight task may be more than double).
- 3) Henry, D (Australian Conservation Foundation), "Trains, planes and (mostly) automobiles" from ABC online 19th November 2007
- 4) Dimpoloulos, N. (National Transport Commission) "New Thinking for Transport"; speech to Roads Summit, March 4th 2008, Sydney, p2.
- 5) Mackenzie, P. 2008 *Note: Calculated using National Transport Commission (NTC) figure of road crash costs of \$17 billion per annum 2008 from "National Transport Policy Framework – A New Beginning" Feb 2008. Using a multiplier of 1.7 x \$17b (assuming 3% inflation) = \$28.9 billion. (*Note: the 'near \$30 bpa estimate assumes a 3.3% increase in death and injuries allowing for a decrease in crash rates from improved road safety as a balance against increased task and exposure).
- 6) Mackenzie, P. * Note: Calculated using figures for deaths then assuming ratio of deaths to injuries is similar to other vehicles as injury data not found.
- 7) Mackenzie, P. * Note estimated using data from AUSRAP, NRMA, Tasmanian Government, and estimates from various consulting engineers. (*Note: NRMA estimates for upgrading of Princes Highway are \$800 million alone).
- 8) NRMA Road Toll Crisis, p5 www.openroad.com.au/safety_roadtoll.asp
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Evaluating the Impact of 'Speed Kills Kids' Campaign in New Zealand Schools

By Antoun, F. J., Road Policing Support,
New Zealand Police

This article was originally presented as a paper at the September 2008 Brisbane Conference on 'High Risk Drivers, organised jointly by the ACRS and the Travelsafe Committee of the Queensland Parliament. It won the prize for the 'Best Practitioner's paper'.

Abstract

Speed is a major contributor to the incidence and severity of road crashes. While this is a generic problem across the road system, speeding in and around school zones is of concern owing to the large volumes of vehicle and pedestrian traffic at certain times of the day, and the presence of significant numbers of children and young people; for example, between 2004-06, and between the hours of 7:30-9:00am and 3:00-4:30pm, almost 1500 injury crashes were recorded within 250m of New Zealand schools (Ministry of Transport, 2008).

In attempts to counter this problem, in February 2006, New Zealand Police introduced its innovative 'Speed Kills Kids' campaign. The aim of this initiative was to reduce the incidence of speeding in school zones, through enforcing at lower speed tolerance levels, and to reduce the number of resulting injuries and fatalities associated with this problem.

Introduction

In New Zealand a school zone is defined as the area within 250m of a school's perimeter and schools can be in all speed limit areas i.e. 50, 60, 80 and 100 km/h zones.

The 'Speed Kills Kids' campaign was launched in February 2006; two years on from the launch of this initiative, this presentation tries to evaluate its results by providing a detailed quantitative and qualitative analysis of high-level indicators, such as speed-related crash, injury and fatality data, prior to and following its introduction. It also tries to identify opportunities for Road Policing to influence road user behaviours in school zones around the country. The work concludes by highlighting the limitations and successes of this initiative and ways forward.

To this end, this presentation will look at three main issues. These are:

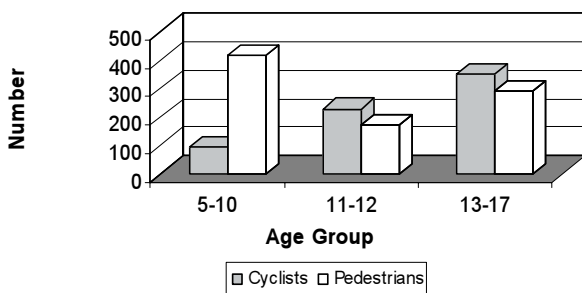
1. Assessing the risks of speeding in school zones on road users.
2. Travel patterns to and from schools by the students
3. 'Speed Kills Kids' campaign

Injuries among school students-cyclists and pedestrians

Students in the country between the ages of 5 and 17 year old represent 18% of the total population. The following figure shows the level of injuries sustained by this population in the three different age groups- 5-10, 11-12, and 13-17 year old groups between 2000 and 2005.

The risk of crash and injury in and around schools is quite real; for example, between 2004-06, and between the hours of 7:30-9:00am and 3:00-4:30pm, almost 1500 injury crashes alone were recorded among students within 250m of New Zealand schools (Ministry of Transport, 2008).

Injuries among school students- Cyclists & Pedestrians, 2000-2005



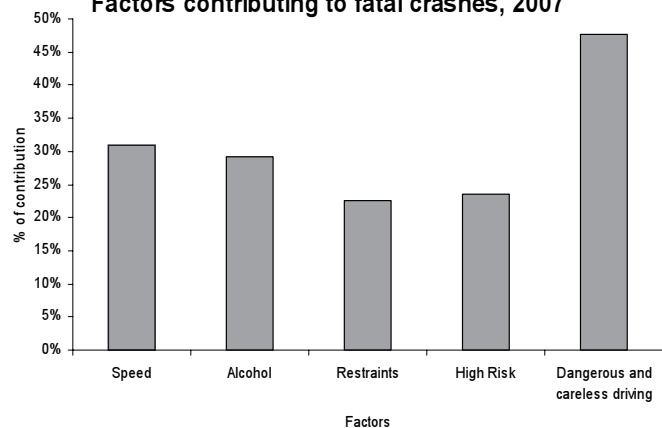
The figure above shows students in the 5-10 age group had more injuries among pedestrians than cyclists. This could be explained by the fact that students in this age group are more likely to walk to school rather than cycle.

Why is speeding a problem?

Speed, along with Alcohol, Restraints, Dangerous and Careless driving, and High Risk driving, have been recognised as the 'Fatal Five' risks to road users in New Zealand.

While all five factors are important, this work will only look at speed as the factor that poses the highest risk to road users in school zones.

Factors contributing to fatal crashes, 2007



Initial speed of a vehicle and the probability of pedestrian death (%)

Initial speed of vehicle (km/h)	0	20	30	40	60	70	100
Probability of pedestrian death if hit at initial speed (%)	0	5	8	27	90	99	100

The figure above the table shows the role speed plays as a contributing factor to fatal crashes¹. After Dangerous and careless driving, speed has been recognised as a major contributor to fatal crashes. In fact, 31% of all fatal crashes in 2007 alone had speed as a contributing factor.

The table below the figure shows the relationship between the initial speed of a vehicle and the probability of pedestrian deaths. As data in the table shows, the higher the initial speed of the vehicle is, the higher the probability of a pedestrian death. For example, at 40km/h there is a 27% chance of a pedestrian being killed by a car. At 60 km/h the probability increases to 90%. So, with the speed increasing by 50% only, the probability of death of a pedestrian increases by 233%.

Why are schools a problem site?

Over 760,000 students between the age of 5 and 17 years old (18% of the total New Zealand population) attend school every day. The high concentration of young road users in a fairly congested environment, due to the high number of cars, makes them more vulnerable to road crashes.

Child and Parent Travel to School Comparison

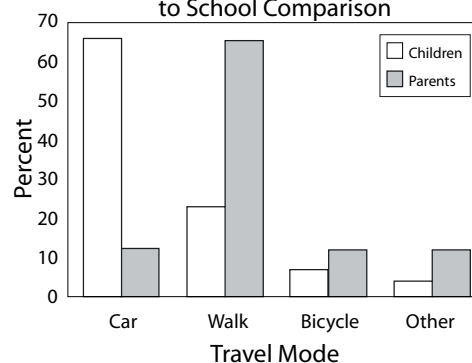
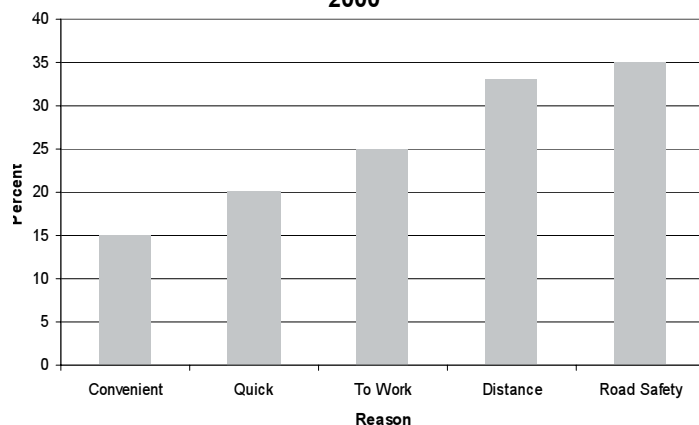


Figure two: Key Reasons for Car Travel to School, 2000

Early surveys done by Christchurch City Council, New Zealand in 2000 point to a dramatic shift in the means of transportation used by current students compared to their parents. The surveys also show the real factors behind this shift.

In the figure to the left, we see almost 65% of today's students use the car as a transportation means to get to and from school compared to only 10% by their parents.

The same figure also shows, only 21% of the current students walk to school compared to almost 65% by their parents. Without doubt, the car has replaced walking as the most common means of transportation by current students. The percentage of students cycling to school now is also smaller than that of the parents.

Clearly, the dramatic shift in the use of cars as the most preferred transportation means by students to get to and from school is undoubtedly responsible for the increase in traffic and congestion around schools, which could lead to an increase in the risk of road crashes and injuries among road users in general and students in particular.

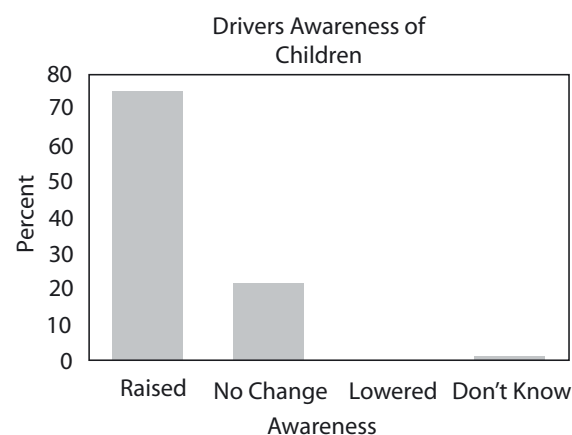
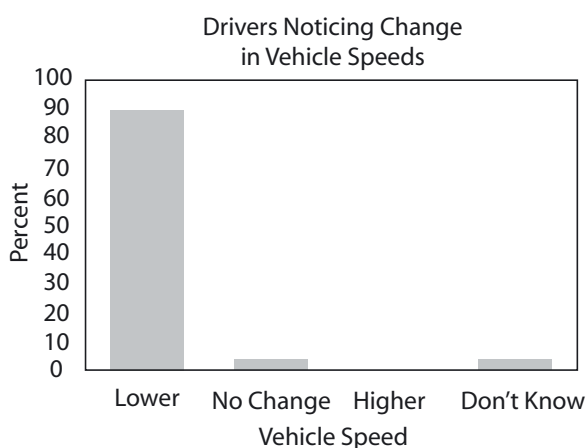
The figure to the right points to the key reasons for using the car to travel to school.

Five reasons are reported in the chart. Beside distance, convenience and other reasons, Road safety was seen by 35% of those surveyed to be the key reason for choosing the car as the preferred means to go to school. With this in mind, a road strategy taking into account the changing trend in travelling to and from school, while reducing the number of road crashes and the resulting injuries had to be developed.

Effects of the early trial on road users' behaviours

A two-year trial setting a maximum speed limit of 40 km/h near five schools first started in Christchurch, New Zealand in 2000.

A survey conducted after the trial period showed a strong support for Christchurch's school speed zone. School communities in the five trial sites, along with a section of the general motoring public, took part in the evaluation. They were asked questions on their attitudes towards, and perceptions of, the trial.



Results analysed from the survey showed:

- 90% saying that they have noticed lower vehicle speeds when the speed zone is active
- 81% saying that they drive below 40km/h when the speed zone is active
- 79% saying the school speed zones have raised child road safety
- 76% saying that their awareness of children has been raised by the presence of the school speed zone
- 93% saying that they would like to see more school speed zones in Christchurch

Some crashes have more than one contributing factor, hence percentages add to more than hundred percent.

'Speed Kills Kids' Campaign - the three-fold strategy

In attempts to counter the problem of speed in school zones and the associated risks, New Zealand Police introduced its 'Speed Kills Kids' campaign in February 2006 with the aim of reducing the incidence of speeding, through increase levels of speed enforcement at lower speed tolerance levels, and to reduce the number of resulting injuries and fatalities associated with this problem.

The following is a description of the campaign's aim and the way to achieve it.

Aim:

"Reduce the incidence of speeding in and around schools, and the resulting injuries and fatalities associated with this problem."

How?

- Release of a media campaign warning drivers about the dangers of speeding in and around schools.
- A reduction in the existing speed tolerance (specifically within school zones from 9 to 4 Km/Hr above the set speed limit.
- Increased enforcement effort in school zones to target speeders and to promote a wider specific and general deterrent effect.



The campaign started off with a media blitz highlighting the dangers of speed in school zones and the effects it has on students. The picture to the left represents the main poster used in the publicity for the campaign in 2006.

In addition to posters, brochures and televised advertisements were also used to inform and alert the public about the new campaign as well the dangers of speed on road users in school zones. In 2007, the focus of the advertisement campaign shifted more toward the lowering of tolerance to speeding by enforcement agencies, i.e. Police.

Reducing Speed Tolerance

Speed tolerance is the 'gap' between the legal speed limit and the point at which a notice is issued to a speeding driver. For example, in a situation where the legal speed limit is 50 km/h, a notice will not be issued till the speed of the car reaches a certain point above the legal speed limit, for instance 60 km/h. In this case the speed tolerance is 10km/h. This tolerance is the current norm in New Zealand.

A reduction in the existing speed tolerance, specifically within school zones, from 9 to 4 km/h above the set speed limit is one of the main objectives of the campaign.

The 'Speed Kills Kids' campaign considers a lower tolerance to offending by employing both speed cameras and staff as critical to reducing child pedestrian casualties. The following table shows the progress towards a lower tolerance to speeding by constables between 2005 and 2007.

Since 2007, ticketing starts at 55Km/h at anytime of the day school children are present. Previously, this was at 56 km/h and confined to 7.30-9 and 3.00-4.30. Prior to that it was 61 km/h at anytime.

In a 50 Km/h Zone

Year	Ticketing point	Tolerance
2005	61km/h (60)	10 Km
2006	56 km/h (55)	5 Km
2007	55 km/h (54)	4 Km

Since the role of speed has been recognised in aggravating the severity of collisions, a significant danger is, therefore, posed to school children by speeding drivers. As a result, a lower speed tolerance becomes critical to reducing child pedestrian casualties as a first step in ensuring safer roads around schools, thus reducing injuries and fatalities among students.

Currently, Police are enforcing a 4 Km/h tolerance within 250 m on each side of school boundaries to counter a quantifiable and publicly obvious road safety risk.

Increasing Enforcement of Legal Speed Limits

Increased enforcement effort to target speeders and to promote a wider specific and general deterrent effect is another way to ensure road users' safety in school zones.

Enforcement of speed around schools in New Zealand is achieved through the use of speed cameras and constables. The following table shows the changes in the levels of enforcement of legal speed limits in school zones between 2006, the year the campaign started, and 2007. No data is available before 2006 as school zones were not established prior to this.

Enforcement and Speed Detection

Year	Speed Camera Hours	Speed Camera Notices Issued	Constable-issued speed notices
Feb-Dec 06	3,561	75,696	4,025
Feb-Dec 07	5,678	105,692	7,969
% Variance	+ 59%	+ 40%	+ 98%

The table above shows the changes in the level of speed offences detected in the school zones.

Between 2006 and 2007, there was an increase of 59% in the number of speed camera hours deployed. This increase in the number of hours generated an increase of 40% in speed camera-issued notices.

Speed enforcement using speed cameras was also accompanied by an increase in the more visible form of enforcement, constable-issued notices. Between 2006 and 2007, the number of constable-issued notices increased by 98%, indicating a desire for the more visible form of enforcement in the school zone. The significance of distinguishing between these two types of enforcement will be highlighted.

Enforcement of Speed Limit in School Zone

The following section compares the use of speed cameras and constables as a means to enforce legal speed limits in school zones since 2006, the year the 'Speed Kills Kids' started.

Since 2006, the year 'Speed Kills Kids' campaign started, there was a sustained increase in the number of speed camera and constable-issued notices in school zones, reflecting a more

serious approach and greater effort in the way districts are enforcing legal speed limits.

While the trends in the figure above show a steady increase in the number of speed camera-issued notices, the number of constable-issued notices fluctuates between the various terms of the school years, being especially high at the start of the year, reflecting a higher deployment of constables in the first term and a much lower deployment throughout the remainder of the school year.

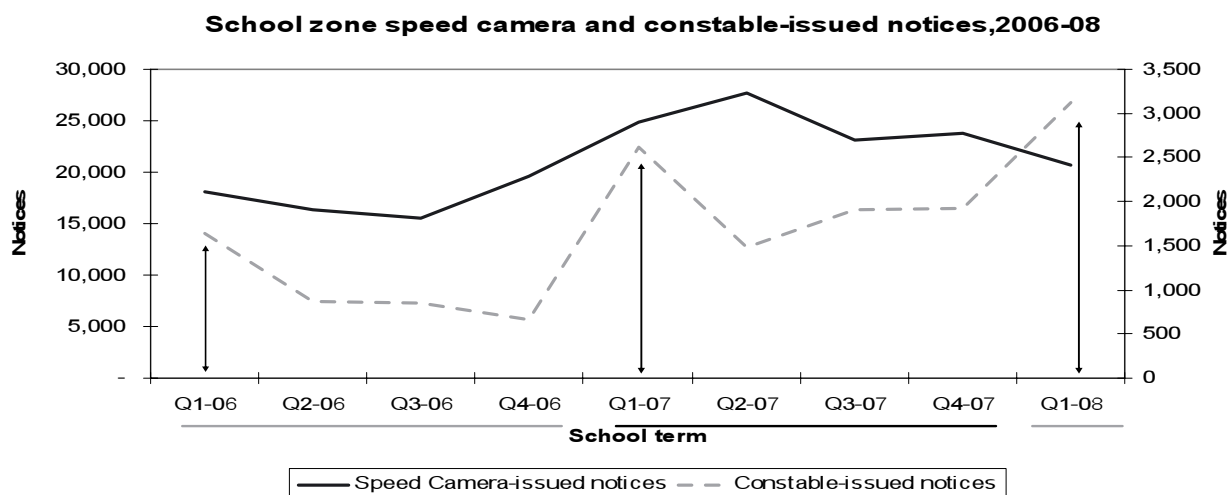
Campaign's Outcomes So Far – Speed camera-issued notices per hour in school zones

The use of speed camera-issued notices, as an indicator of the intermediate outcomes achieved so far, is a simple method to illustrate the success of the 'Speed Kills Kids' campaign.

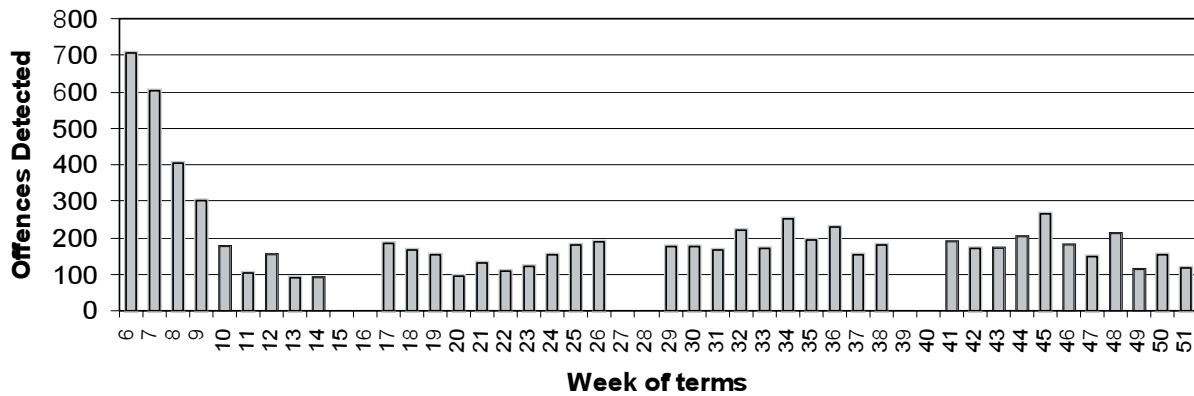
As has been discussed so far, speed is considered as one of the highest contributing factors to road crashes and injuries. By showing the numbers of speed notices issued by speed cameras since the campaign started will help us evaluate its effectiveness, as a tool, towards achieving the final outcomes- reducing the number of injury crashes in school zones.

The figure and table bottom right show the following:

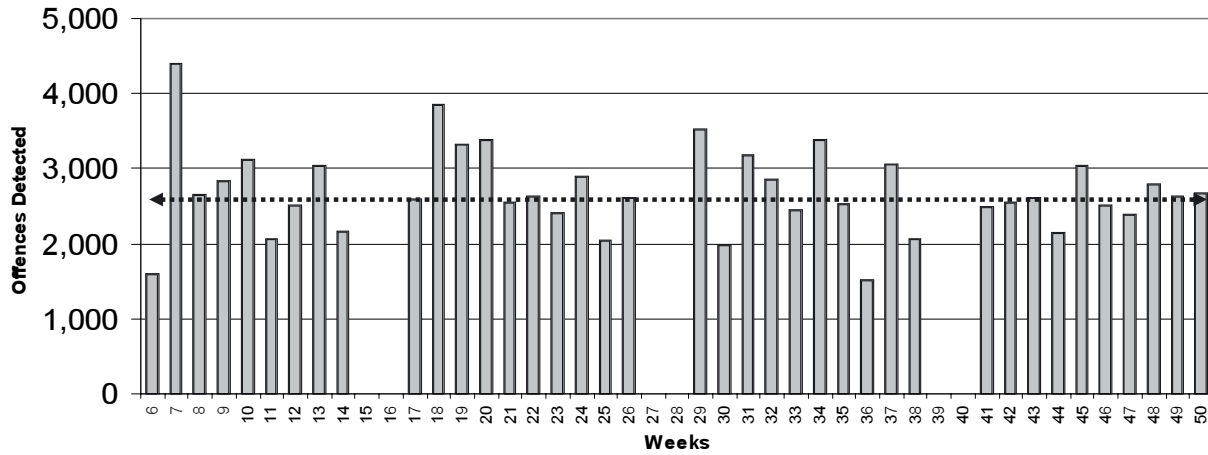
- In 2006, the number of speed camera-issued notices per hour was tracking high, while the number of notices per hour was tracking down throughout 2007 and part of 2008.
- In 2006, the year the campaign was launched, the median notices issued per hour was 32.
- In 2007, this median went down to 27 notices issued per hour; and
- In 2008, for the first 4 months only, the median went down to 24 notices issued per hour.
- Between the 2006 and 2008, the % change in the median number of notices issued was 25% decrease.



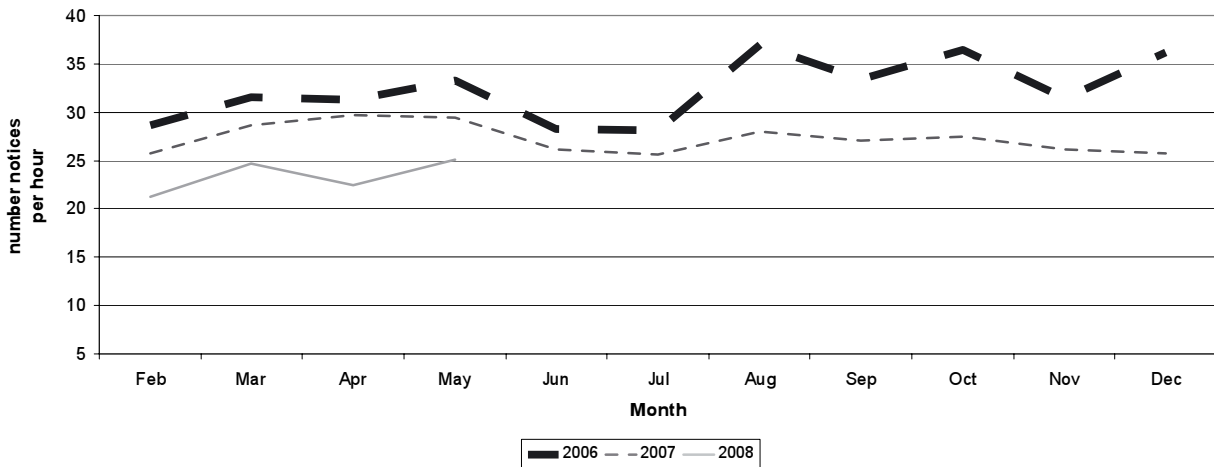
School-zone constable-issued speed notices, 2007



School zone speed camera-issued notices by week , 2007



Speed Camera-issued notices per hour in school zone, 2006-08



Year	2006	2007	2008
Median notices per hour.	32	27	24

The speed camera-issued notices ongoing decline since 2006, with the median notices per hour decreasing from 32 notices per hour in 2006 to 24 notices per hour in 2008, suggest a change in the drivers behaviour. This is seen as a positive development in the campaign aiming at reducing speed and increasing safety for all road users in school zones.

Relationship between Enforcement (speed cameras and constables) and Fatal and Injury Crashes

In New Zealand, both speed cameras and constables are used to enforce the legal speed limits in the country. The following section describes the relationship between enforcement, through the use of speed cameras and constables, and fatal and injury crashes in school zones.

The red line in the figure below illustrates the level of fatal and injury crashes in school zones in 2006, 2007 and part of 2008, while the blue and dotted grey lines illustrates the changes in constable and speed camera-issued notices.

It is interesting to note from the figure that in each of the 3 years, injury levels start lower at the beginning of the school year when enforcement levels by constables are highest. Conversely, the injury levels increase, almost suddenly, in the remaining quarters of the school year when enforcement levels by constables are decreasing. During this time, the changes in the speed camera-issued notices seem to have no significant effect on the level of fatal and injury crashes. On the other hand, the relationship between the injury levels and the more visible form of speed enforcement, i.e. constable-issued notices, is a lot stronger than with the speed camera enforcement.

- While the impact of speed cameras, as a tool to enforce speed, has already been proven, the figure above shows that the number of fatal and injury crashes is most affected by the number of constable-issued notices (blue line) rather by

the speed camera notices issued (dotted grey line). This might suggest that fatal and injury crashes in school zones are positively influenced by the level of constable-issued notices rather than speed camera-issued notices.

- In the second term of 2006, the number of fatal and injury crashes peaked at 172. This number has decreased to 150 in the corresponding term of 2007.
- Overall, fatal and injury crashes decreased by 4% between 2006 and 2007.
- In 2007, the ratio of speed camera to constable-issued notices was 13:1, down from 18:1 in 2006.

Fatalities and Injuries in School Zones, 2001- 08

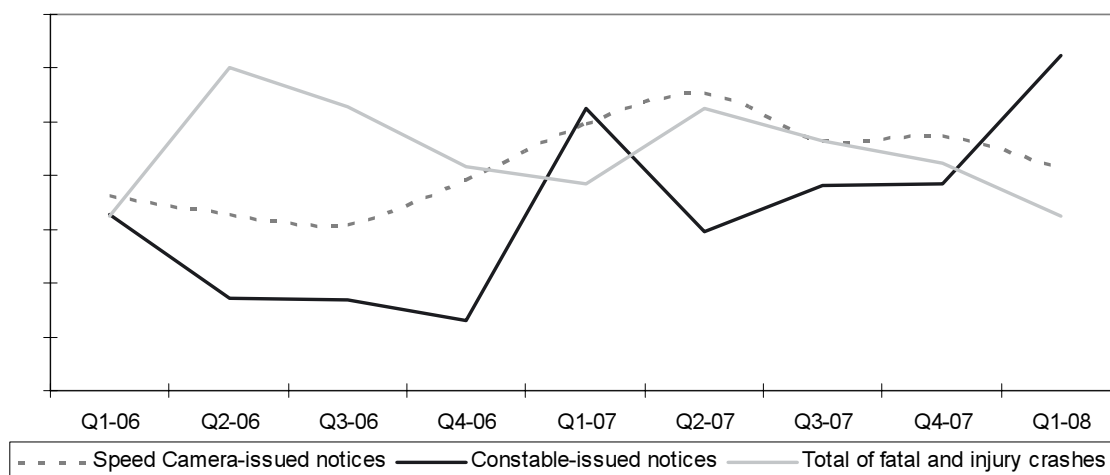
The main aim of the 'Speed Kills Kids' campaign is to reduce the resulting injuries and fatalities associated with speed among road users in school zones.

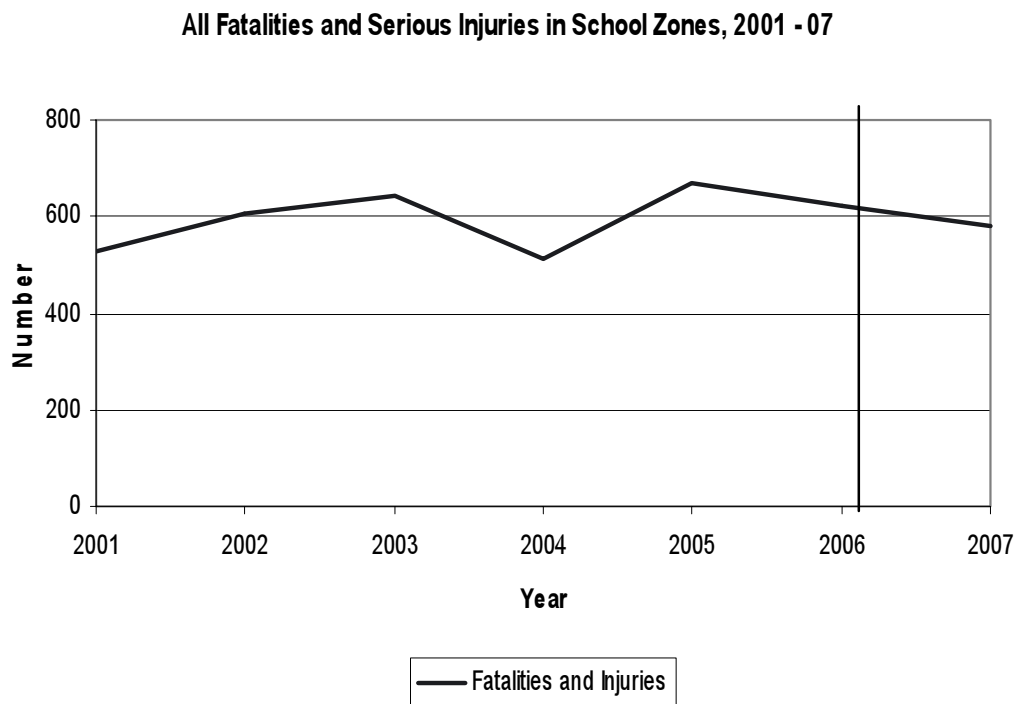
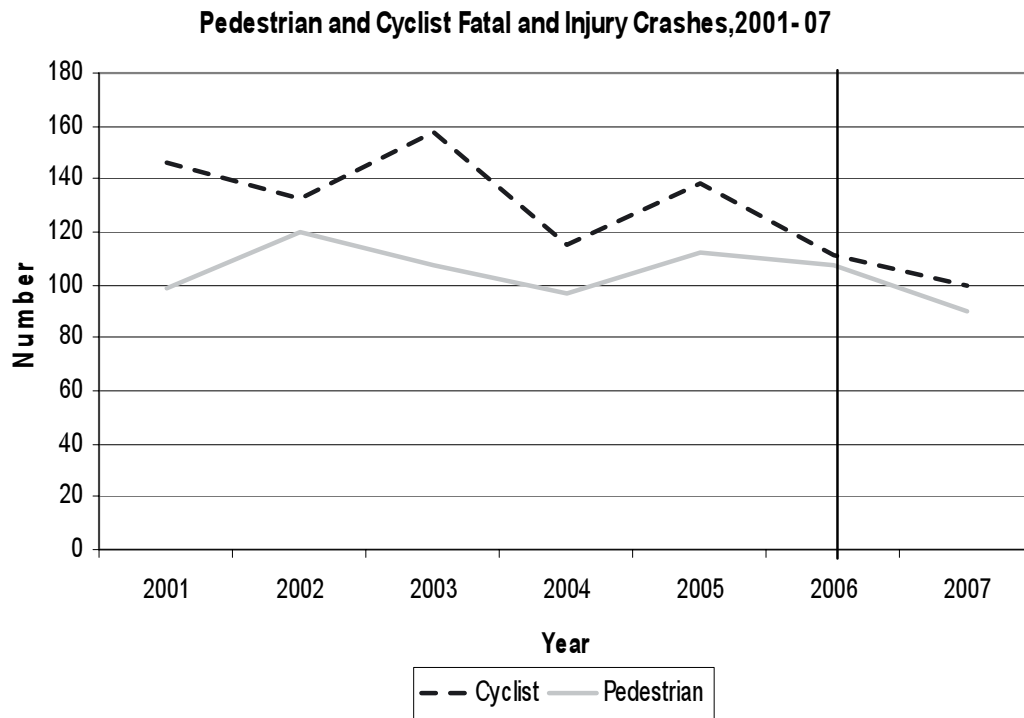
This section looks at the level of all fatalities and injuries, and the number of pedestrians and cyclists killed or injured in school zones between 2001 and 2007, prior and subsequent to the campaign being launched. A decline in the number of injuries and fatalities would point towards a favourable outcome of the campaign in its effort to reduce the number of road users affected by speed.

The figure to the right points to a decreasing trend in the level of fatal and serious injuries among road users in school zones since 2006, after a period of increase between 2004 and 2006.

The figure to the right shows the levels of fatalities and serious injuries among pedestrians and cyclists. It is interesting to note that the patterns in this figure are also similar to that of overall fatalities and serious injuries- a constant decline in numbers since 2005. This decline has continued since.

Speed camera and constable-issued notices cf. Fatal and Injury Crashes in school zones, 2006-08





The decrease in the numbers of fatalities and injuries in general and the decrease in the number of cyclists and pedestrians in particular point to a positive development in the campaign aimed at reducing the effects of speeding on road users in school zones in the country.

Limitations

This section looks into some of the problems facing a full implementation of the 'Speed Kills Kids' campaign in a way to maximise its benefits. It is natural that some of the issues discussed here below might apply to some districts and not others, while some of the issues might be common to all of them.

Key issues

- Inconsistency in the deployment of enforcement by constables compared to fixed speed cameras throughout the school year. Higher deployment in first term of the school year and much lower levels in the rest.
- Over reliance on speed cameras instead of the use of a more effective form of deterrent, i.e. Constables.
- Inability to enforce speed simultaneously around schools where there is more than one entrance.
- Delays in Traffic Crash Report (TCR) submissions by constables, thus delaying timely assessment of campaign's results.
- Inability to evaluate the impacts of speed enforcement alone on improvements to fatalities and injuries. i.e. other factors may also be contributing at the same time, e.g. better road safety engineering and education at schools.
- Absence of pre and post-campaign surveys measuring the changes in the perception of safety and change in behaviour by road users.

Summary

Statistics available so far suggest that the number of fatal and injury crashes in school zones is positively influenced by the more visible form of speed enforcement delivered by constables. While speed cameras have their important role to play in reducing speed around schools, constable -issued notices have the highest effect in altering drivers' behaviour, thus reducing the possibility for crashes and injuries.

In order to maximise the effects of this campaign on road users, an optimum deployment blueprint needs to be created whereby, constables must adhere to the strict rule of issuing notices at the new tolerance levels prescribed, and speed cameras, constables, media and education play a more balanced role in positively influencing the change in road users behaviours and towards increasing the perception of road safety by users.

With over than 18% of the New Zealand population currently attending schools and considering the increasing number of them taking cars, cycling or simply walking, creating a more secure environment for vulnerable road users in school zones becomes a pressing issue that cannot be overlooked nor completely sidestepped.

The 'Speed Kills Kids' campaign was created with the main aim of lowering speed in school zones while at the same time reducing the resulting injuries and fatalities among road users, namely students has achieved some promising results so far.

The indications of a decrease in the number of speed camera-issued notices, a decrease in the median number of notices issued, and a decrease in the number injuries and fatalities point to a positive development in the way school zones are currently policed.

As surveys show that the main concern for parents, when sending their kids to school, is road safety, this should be the guiding light to all enforcement, where police, schools and community work together to improve students and parent's perception of safety in school zones.

While the decrease in numbers of both fatalities and serious injuries among road users is evidence of the positive effect the 'Speed Kills Kids' campaign has created so far, there remain many questions to answer as to the best combination of enforcement to be used in school zones.

In the absence of data spanning over many years, it would be quite difficult to gauge the true effectiveness of the campaign or what type of enforcement combination would work best.

With evidence so far pointing to a change in driver behaviours through a decrease in speed and the reduction in the resulting injuries and fatalities, the overall impression is that the campaign has yielded some positive results. At the same time, this work has highlighted a need for more research in the area of police enforcement and the way it alters driver behaviours.

The interactions between enforcement and changing driver behaviours are complex issues that require further observations and study. With more data collected, it would become easier to understand how best to influence driving habits with the best combination of enforcement and education in order to maximise road users safety in school zones.

2008 Australian Road Patrol Skills Showcase

Event Summary and Review

This article was contributed by



By Mark Williams,
Manager National Technical Support

They are a combination of road safety warriors and motoring nurse maids – they are the public face of Australia’s motoring clubs, they are the clubs’ Road Patrols.

If ever you have broken down the road patrols are available 24 hours a day, seven days a week to help. They are there for you.

To recognise these road patrols and the service they provide for road users, the Australian Automobile Association and constituent motoring clubs this year conducted the first Road Patrol Skills Showcase to highlight their expertise and the service-delivery.

The purpose of the event was “to showcase and assess best practice Road Service Patrol operating procedures, Customer service techniques, OH&S standards, diagnostic techniques and equipment from the Australian Motoring Clubs”.

Five (5) AAA Affiliated Motoring Clubs participated in the event including NRMA Motoring + Services, RACV, RACQ, RACWA and RACT, each providing representative Road Service Patrols (one participant and one support Patrol).



During this event, participating Patrols were assessed in Technical Theory and Practical Tasks incorporating Customer Service role plays and Occupational Health and Safety aspects. A Research Task was also incorporated to assess their ability to quickly locate specific support information.

The Event

Day 1 commenced with the Theory Assessment and Research Task. This paper-based assessment commenced inside NRMA’s Mobile Member Centre where Patrols were able to utilise workstations and were provided with access to Technical support information and the Technical Knowledge Database to assist in the completion of the Research task.



Day 2 commenced with a briefing to the Patrol participants regarding the Practical Assessment and Research Task, where patrols were required to complete six practical tasks, each within a 20 minute time frame. The Practical tasks included Battery Diagnosis, two different Lockout Procedures, a Tyre change and two Engine Management Diagnostic tasks.

After each segment, the assessment team debriefed participants to gain feedback on the process and various aspects of the assessment. This information was recorded and will be used to “fine tune” future events.

The Results

All patrols performed extremely well and certainly ‘stood out’ as an asset to their organisation. Those patrols identified as “Best Practice” were:

Best Practice in Battery Diagnosis -
Ron Hoogkamer - RACV

Best Practice in Occupational Health & Safety -
Gerald Munchow – RACQ

Best Practice in Lockout Procedures -
Gerald Munchow – RACQ

Best Practice in Diagnosis -
Frank Carabetta - RACWA

Best Practice in Customer Service -
Josh Dobie - RACT

Best Practice in Technical Theory & Research -
Jace Wild - NRMA

Additionally, congratulations go to the Support Patrols for their assistance and participation in the event.

Patrol Vehicle & Equipment Displays

A display of the Road Service vehicles from each Club and associated equipment was set up on Day 2 of the event. This provided a fantastic opportunity to showcase individual designs, layout, parts, equipment and special tools.

The Patrols and other key club personnel utilised this segment as an opportunity to compare and discuss individual techniques and associated specialised equipment.

Overall, the event was well received by all those in attendance and strong support to continue with this event each year. The interaction opportunities that occurred for club staff in attendance was invaluable and definitely encourages and nurtures strong national clubs relationships.

The 2009 Road Patrol Skills Showcase will be held in Canberra in March.



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Peer Reviewed Papers

Development of a Proactive Brief Road Safety Intervention for Industry – Identifying issues associated with implementation

By Rowland, B., Davey, J., Freeman, J. & Wishart, D.,
Centre for Accident Research and Road Safety – Queensland, Queensland University of Technology

This paper was originally presented at the September 2008 Brisbane Conference on 'High Risk Drivers, organised jointly by the ACRS and the Travelsafe Committee of the Queensland Parliament. It shared the prize for the 'Best Student paper'

Abstract

In Australia, road crashes are the most common cause of work-related fatalities, injuries and absence from work (Haworth et al., 2000), with the average time lost being greater than any other workplace claim (Stewart-Bogle, 1999; WA, 2003). Furthermore, work-related crashes account for up to 49% of work-related fatalities in Australia (NOHSC, 1998), and 13% of the national road toll (Murray, Newnam, Watson, Davey & Schonfeld, 2003). Consequently, there is a growing necessity to implement proactive interventions aimed at reducing crash occurrence and improving driver behaviour whilst maintaining time, cost and resource effectiveness. Based on previous brief intervention techniques used successfully in the health care field, a driving diary concept was developed with aims to reduce engagement in unsafe driving practices. This paper draws together findings from focus group research of government work-related drivers ($n = 217$) across Queensland metropolitan and regional areas. Results of the study will outline intervention objectives and conceptual characteristics, as well as, investigate issues and difficulties associated with the driving diary program implementation. This paper will further report on the major advantages and barriers associated with fleet safety interventions and propose recommendations directed at improving the implementation of fleet safety interventions, especially, the driving diary program.

Keywords

Work-related drivers, fleet drivers, driver behaviour, driving diary

Introduction

In Australia, it is estimated that approximately a third of all travel is work-related and if work-related commuting is included in calculations, this estimation increases to over a half (Wheatley, 1997). Not surprisingly, evaluations conducted reveal that vehicle crashes comprise a substantial proportion of

all work-related fatality figures. For example, data from the Australian National Occupational Health and Safety Commission (NOHSC) showed that approximately 23% of all work-related fatalities between 1989-1992 were the result of road crashes at work and a further 26% of fatalities were whilst commuting to and from work (NOHSC, 1998). It was, however, suggested that this figure was underestimated because the coronial data that was utilised in the examination was incomplete. In the state of Queensland, recent research has reported that around 37% of all fatal vehicle crashes between the years 1997-2000 involved a commercial vehicle (Meers, 2002). The number of workers compensation claims between the years 1996-2001, also showed that 203 claims were made for fatal work-related crashes which represents 47% of all workplace fatal incidents for that period (Travelsafe, 2002). In addition, research indicates that work-related drivers have an increased road/travel exposure. For example, Lynn and Lockwood (1998) conducted a survey in work-related driving and found that company drivers travelled more than twice the annual distance than private car drivers travelled. Furthermore, from reported incident statistics revealed in the survey, Lynn and Lockwood (1998) suggested that after differences in demographic and exposure variables had been considered, company car drivers had about 50% more incidents than private drivers.

In regards to the economic cost, previous estimations have indicated that the total cost of work-related road incidents in Australia was in the vicinity of \$1.5 billion (Wheatley, 1997). More recent evidence has suggested that the average total insurance cost of a fleet incident to organisations and society is approximately \$28,000 (Davey & Banks, 2005), while the average cost of a fatal crash in the general Australian motoring community is estimated to be \$2 million (Austroads, 2006).

While there are obvious costs related to work crashes such as vehicle and property repairs, there are also many hidden expenses including third party costs, workers compensation, medical costs, rehabilitation, customer related costs, increased

insurance premiums, administrative costs, legal fees and loss of productivity (Haworth, Tingvall, & Kowadlo, 2000). Taken together, it is acknowledged the true figures are currently unclear, and available evidence appears to suggest that the direct cost of work-related crashes is only the 'tip of the iceberg' (Murray et al., 2003). As a result of fatality/injury statistics, the cost of work-related crashes, offences and increased road exposure, it could be argued that work-related drivers are a high risk road user. In addition, research highlights work-related road safety as an area that requires further attention with a focus on developing research informed interventions aimed at improving road safety outcomes, and in turn, offering huge financial savings to industry and the community (Haworth et al., 2000; Murray et al., 2003; Staysafe 36, 1997).

Occupational Health and Safety legislation

Arguably the most significant effect upon work-related driving has been the increasing focus on the issue from a legal perspective within Australia. Under all Occupational Health and Safety (OHS) acts, employers have a duty of care to ensure safe and healthy workplaces (which include vehicles) and conditions of work. In addition, it is the responsibility of the employing organisation to ensure their driving activities do not present a hazard to the community.

Recent changes to the road transportation industry laws including the introduction of Chain of Responsibility (COR) laws may also have a significant impact upon future work-related driving (Murray et al., 2003). COR laws regard all parties involved in the supply chain equally responsible for the safety of each other and the overall event. In other words, responsibility is shared by all parties including consignors, packers, loaders, receivers and not just drivers and operators of vehicles.

While there is a trend toward national standards regarding OHS processes, particularly crash investigation, responsibility for developing and implementing risk management policies and procedures related to work-related road safety currently rests with individual employers. As a result, the quality and extent of policy and procedure and countermeasure implementation related to work-related road safety across organisations is variable.

Need for brief interventions

A variety of work-related road safety initiatives have been implemented in recent years to reduce the highlighted costs of work-related driving incidents. For example, existing initiatives employed by organisations to reduce crashes typically focus on fleet safety policies and procedures, driver training, driver education and incentives (Haworth et al., 2000; Lancaster & Ward, 2000; Murray et al., 2003).

However, an overarching influence on any intervention implemented within work-related driving settings is the need for such countermeasures to be brief, as historically, managers as well as company drivers have little time to devote to safety

initiatives. Given the importance of time management within fleet environments, the current research team recognise there is a clear need for brief interventions that demand little resources and can be completed without intense management supervision.

The term, 'brief intervention' is an umbrella term that originated from a family of therapeutic techniques such as Milton Erickson's seminal works on brief therapy. When brief therapy originated, it represented a departure from the traditional worldview of the nature and treatment of psychological problems as it was not aimed at finding a cure for problems but rather trying to identify and mobilise client resources, energy and skills aimed at doing something to change the current status quo (Cade & O'Hanlon, 1993).

Barriers to implementing safety countermeasures

Historically in terms of exploring and implementing fleet safety interventions, industry has often taken a "silver bullet" approach aimed at developing and implementing a single countermeasure or intervention strategy to encompass and address all work-related road safety issues (Wishart & Davey, 2004).

This approach is often reactive rather than proactive which aims to only reduce similar incidents but also is aimed at improving behaviour. Davey, Freeman, Wishart and Rowland (2008) state that one shortcoming with a reactive approach is that often times the single implemented countermeasure results in only a short term fix and does not address the underlying contributing behavioural factors relating to the crash.

Thus the organisation embarks on a circular process similar to a "dog chasing its tail" and may not demonstrate significant improvement in their work-related road safety records over time. Furthermore, the silver bullet approach is no longer used in other areas of road safety, as research would suggest that intervention approaches need to be proactive and multi-dimensional (Davey et al., 2008).

In addition, Davey et al. (2008) suggest that the current state of work-related road safety has many organisations not addressing the work-related road safety issue as comprehensively as other work-related safety risk issues within their workplace. For example, organisations often allocate more safety related resources to lower exposure and lower workplace risk processes in contrast to the high exposure and high risk of work-related driving.

In attempting to satisfy legislated OHS requirements, organisations will plan the development of work-related road safety intervention strategies. However, the reality within the majority of organisations is that they often struggle to implement such interventions. The failure to effectively implement fleet safety interventions often stems from a lack of management commitment and support, and general under-resourcing (Davey et al., 2008; Davey & Wishart, 2004). Thus there is an immense discrepancy between what organisations

plan to do and what is actually undertaken in addressing work-related road safety risks and initiatives. Furthermore, Davey et al. (2008) suggest that there are a number of additional organisational difficulties that impact upon the successful implementation of fleet-based interventions. For example, these include:

- A tendency to focus on asset management rather than on employee safety;
- Fleet safety is rarely considered to be a core business issue;
- There is often a lack of resources allocated to work-related road safety;
- OHS and fleet safety are historically viewed as separate and often competing issues;
- Organisations do not always see an instant monetary return;
- Fleet safety is often overlooked until a crash happens; and
- Organisations rely heavily on inconclusive and insufficient crash data.

Research aims

As an initial component of a PhD study, this preliminary research aimed to explore the characteristics behind the development of the driving diary brief intervention and associated difficulties with implementation. More specifically, the study aimed to:

- a) outline the intervention objectives and conceptual characteristics of the driving diary brief intervention program; and
- b) explore qualitative data (i.e., focus groups) to identify barriers to the implementation of the driving diary within industry.

Method

The method utilised within this conceptual paper is divided into two phases. Phase 1 outlines the initial development of the Driving Diary. Due to the originality of the Driving Diary in the road safety arena, the authors believe that a detailed outline of the intervention and its development was warranted. Phase 2 identifies preliminary information on the potential barriers to intervention implementation within an industry organisation. Barriers can hinder or prevent an intervention's successful implementation and completion. Therefore, identification of the major barriers to intervention implementation was conducted to inform potential changes to content of the current version of the Driving Diary and also identification of potential methods for initial intervention implementation and continual facilitation.

Phase 1 – The driving diary concept

Phase 1 of the paper provides an overview of the driving diary concept, theoretical perspectives and the design process. Data collected for this phase of the project was summarised from an extensive literature review of road safety research and relevant research conducted in other areas in relation to intervention design and implementation. Basically, the driving diary is a brief intervention designed primarily to target high risk drivers that have been identified through traffic infringements, especially speeding, and work-related crashes. The intervention aims to reduce the incidence of dangerous driving practices committed by the employee through the use of a diary. The employee records in the diary the type and frequency of traffic violations they commit, and is then required to reflect and comment on their behaviour. Based on the Transtheoretical Model (DiClemente & Prochaska, 1998) of behaviour change, it is through this increased awareness that employees perceive themselves at increased risk, thereby facilitating their progress towards behaviour change.

Phase 2 – Focus group interviews

Focus groups were conducted as a component of a series of workshops undertaken with organisational staff from metropolitan and regional areas across the state of Queensland. A predefined set of semi-structured and open-ended questions aimed to explore participants' perceptions and experiences in relation to work-related road safety and barriers to the completion of the driving diary. The structured open-ended questions were employed as the researcher had a limited period of time with participants. An informal conversational approach was utilised with additional probing questions employed to clarify and/or expand on important experiences highlighted by participants during the interviews. A review of the open-ended questions was undertaken after each data collection phase, although ongoing data analysis revealed no necessary amendments.

A constraint of the data collection approach was that time restrictions with participants and the amount and quality of responses would limit the facilitation of conversational or content analysis, which rely on frequency counts (Patton, 1987). Instead, an inductive "open" coding technique developed by Strauss (1987) was implemented that entails re-reading transcripts, focusing on and coding the "conditions" and "consequences" that emerge from the text (e.g., themes), and developing and revising such codes. The technique is drawn from grounded theory which does not rely on frequency counts of specific words or pre-defined words, but rather facilitates the examination of major themes arising from the experiential data such as participants' responses (Corbin & Strauss, 1990; Yin, 1993). In essence, the study incorporates an open-ended inquiry method to generate linkages and identify patterns among key variables and outcomes such as the identification of barriers that are associated with work-related driving intervention implementation.

Notes were taken on verbatim statements, as participants' responses to open-ended questions were jotted down by the researcher during the interview, read back to participants, and then re-written with participants' necessary amendments included after the completion of the interview. The "open" coding technique (Strauss, 1987) entailed repeatedly reading and categorising participants' responses, focusing on similar experiences and events, which facilitated the development of themes and a coding manual that was employed to analyse the text.

The reliability of the coded schemes was addressed by having a second researcher independently identify themes and then code responses according to themes obtained from participant responses. The researchers collaborated on each of their results and subsequently developed themes from the sample. Reliability of coding between researchers on the sample indicated a 91% level of accuracy between coding responses according to the themes identified. This level of accuracy was achieved by computing the total number of agreements of coded responses between the two researchers divided by the total number of agreements plus disagreements of both researchers. Minor corrections were then made to the coding scheme and/or the coding of participants. The researcher subsequently re-read and re-coded the transcripts in order to make the necessary changes that resulted from the coding exercise with the second researcher.

Focus group participants

In total, 217 work-related drivers provided data through semi-structured, qualitative interviews for this research. Focus group interviews were undertaken with employees, ranging from field staff to management, in both major urban metro areas and provincial and regional centres across Queensland. Participants all volunteered to partake in the focus group sessions and stated that they drive a vehicle as a component of their work. The participants were not specifically targeted as high risk drivers from within their organisation. Rather, a random sample of work-related drivers was engaged representing drivers from across an organisation that drive in city, urban, rural and off road situations. As stated previously, work-related drivers could be considered as high risk road users due to the identified fatality and injury statistics, the costs associated with crashes and offences and increased exposure to the road. Focus group participant's comments are identified in the text through the use of quotation marks and italics. The names of the focus group participants were not recorded, and the various organisational departments and regions where the interviews took place and the name of the organisation remain confidential.

Results

Phase 1

The driving diary

The driving diary is based upon brief intervention techniques used successfully in the health care arena over the last twenty years, and thus the tool aims to reduce engagement in unsafe driving practices. A common example is a drinking diary which requires respondents to keep a record of how many standard drinks they consume in a week (Ryder et al., 1995). Diaries have been found to assist people tackle a wide range of health problems including reducing harmful levels of drinking (Ryder et al., 1995), smoking cessation (Jasjit et al., 1998) and have also been found to be beneficial in weight loss programs (Schmitz & Wiese, 2006). Generally, the research evidence on the effectiveness of brief interventions that has been systematically reviewed has been favourable (Heather, 2002). While it is acknowledged that the diary concept is not new, the use of a diary as a behaviour change strategy in a work-related road safety setting is novel.

Theoretical perspectives

Recipients of brief interventions are often at various stages of readiness to change. One theoretical approach that details these stages of change is known as the Transtheoretical Model of Behaviour Change (DiClemente & Prochaska, 1998). The model proposes that individuals move through five behavioural change stages before successfully ceasing a problem behaviour. These stages are:

- Precontemplation – No acknowledgment that there is a problem
- Contemplation - Acknowledgement that there is a problem but not ready to change
- Preparation - preparing to change
- Action – making changes
- Maintenance – maintaining changes

The model underpins a number of prominent public brief intervention health initiatives (diabetes, weight control, cancer prevention) as brief interventions have been demonstrated to instigate a natural change process from pre-contemplation to contemplation to action. Given the utility and predictive efficacy of the Transtheoretical Model, this theoretical underpinning was also utilised in the driving diary.

Another major component of many brief interventions such as drinking diaries, is a self-assessment of the nature and extent of current risky behaviour. The most common assessment tool is the AUDIT (Alcohol Use Disorders Identification Test AUDIT) (Who, 1996). The AUDIT assists in identification of excessive drinking behaviour and consists of ten questions designed to interpret the risk level of alcohol (Babor & Higgins-Biddle,

2001). The score levels are indicative of relative risk levels which have different implications for the type of intervention suggested. For example, no or low risk scoring individuals may only require some form of alcohol education whereas those who scored slightly higher and were of greater risk would require more specific alcohol advice. Those at higher risk levels would require more involved interventions ranging from intense advice to specialist referral (Babor & Higgins-Biddle, 2001).

Examination of the AUDIT effectiveness literature reveals that it has been rigorously validated (Maisto et al., 2000). From a practical perspective, it also appeared to be relatively short, easy to understand and administer. Consequently, the research team decided to incorporate an AUDIT-style approach within the driving diary to assess driving risk.

Consequently, after reviewing the general brief intervention and health promotion literature, the research team decided to develop an intervention tool that incorporates common key aspects from various successful initiatives within the health field such as an assessment of risk procedure (e.g., AUDIT) and use of a diary, with the overall intervention being guided by the Transtheoretical Model.

Diary content and design

The concept of the driving diary evolved from a larger body of research aimed at work-related road safety and the associated issues experienced by work-related drivers. From this research, it became evident that a number of additional more contemporary issues such as work pressures and multi-tasking (e.g., mobile phone use) were directly impacting upon the safety of drivers (Freeman et al., 2007, Rowland et al., 2008). In contrast, the research projects also revealed that traditional factors do not accurately account for a high proportion of the predictability of crashes (Freeman et al., 2007) or offences incurring demerit point loss (Freeman et al., 2007, Rowland et al., 2008) in the Australian fleet setting.

The current version of the driving diary consists of approximately 20 pages of information regarding (a) the importance of improving road safety and (b) material highlighting the procedures for completing the corresponding driving diary. The first section (e.g., 4 pages) outlines the importance of road safety, the responsibility of every road user, and why it should be the concern for employers and employees e.g., obligation and duty of care. The next section in the driving diary (2 pages) focuses on the “Challenge to Change” and provides some reasons for why someone would benefit from taking the time to examine how they perceive their driving behaviour. As highlighted in Table 1, the section also begins incorporating the concept of “risky driving behaviours” by highlighting a range of such behaviours (e.g., speeding, not wearing a seat belt, drink driving, etc) and asks respondents to start thinking about and identifying their own risky behaviours.

Table 1. The Challenge to Change (Wishart, Davey, Freeman & Rowland, 2007)

You may believe that due to your training and experience you are a good driver and possess better driving skills than the ‘average’ driver. You may never have been involved in a crash while driving for work. However, there may have been times, where you have found yourself:

- exceeding the speed limit without realising
- driving without wearing your seat belt
- driving while under time pressure
- driving while using a hand-held mobile phone

We will refer to these driving behaviours as “risky behaviours”. You may think of others which you can write below in the space provided.

Driver self assessment and motivation to change

Modelled on the AUDIT tool, the third section focuses on “Assessing Your Risky Driving Behaviours” and requires respondents to answer 10 questions that focus on the frequency and severity of the behaviour. Respondents are then required to total their responses to the items which provide an overall score highlighting their category of risk: (a) low-moderate, (b) high and (c) serious. The section also explains the possible risks associated with each category, discusses the benefits of change and requires participants to provide their own perceived possible benefits to commencing the change process e.g., reduce demerit point loss or reduce risk of harm.

This section also includes three questions related to readiness or motivation to change, confidence about making change and level of importance assigned to the behaviour change process. It is expected that the driving diary will assist drivers move through the various stages of change suggested by the stages of change model in relation to changing unsafe driving behaviours. Therefore, for both practical and research purposes, an initial assessment of motivation to change is undertaken.

Introducing the driving diary

The final section introduces the concept of the driving diary, outlines the process and highlights the importance of motivation and confidence both in regards to remaining on task and creating behavioural change. Filling out the diary requires respondents to make notes on how often they carry out unsafe and risky driving behaviours and take note of situations in which they have a tendency to engage in these behaviours more often than others. The section also reinforces that users need to fill in their diary on a daily basis, either during the day while on breaks, just before they are about to get out of the car, or at the end of the day. Taken together, there is no special induction in relation to the implementation of the driving diary program. However, research

suggests that it would be beneficial if a brief workshop or induction program (e.g., explanation) is provided to participants at the commencement of the intervention to remind drivers of how the driving diary is congruent with the company's policies and strategies to encourage safe driving (Davey, Rowland, Wishart, & Freeman 2008a; Wishart et al., 2007).

The instruction material also highlights that respondents will need to review what they have written on a daily basis. It is anticipated that daily completion of the driving diary would take participants approximately 10 minutes each day, usually at the end of the work day. Importantly, one of the primary aims is to identify when and where high risk driving behaviours occur and what feelings and emotions are associated with the event. By engaging in this process it is anticipated that participants will gain a greater level of understanding regarding their driving habits and high risk times, which will ultimately help them improve their own driving behaviour. Table 2 highlights an example of the driving diary and typical responses to the task.

Phase 2 – Focus group responses

Responses to questions relating to the barriers to the driving diary completion were comprehensive, with some common recurring issues emerging. In addition, interviews with participants revealed two primary themes relating to the barriers to the driving diary completion. For example, the two themes represent organisational and individual barriers to the completion of the driving diary.

Organisational theme

The organisational theme represents responses regarding the barriers to intervention implementation in relation to organisational structure and processes, and managerial processes and perceptions. General consensus from operational field type staff was that any countermeasures or interventions (relating to the driving diary) would need to be both time and cost effective or they would not be implemented by management. For example, "if it takes too long to do or it costs too much, management won't run with it" (male driver) and "the (organisation) put in place things to improve road safety in the past, for example, driver training, but have not followed through with it ...I wasn't asked to take part" (female driver). Encouragingly, in relation to intervention implementation, most

managerial staff believed some form of countermeasure or intervention was urgently required for work-related driving safety. However, management also had initial concerns regarding the cost and time needed to develop and implement specific road/driver safety interventions within their organisation. For example, a male manager stated that "we have a specified budget and timeframe for completion of work tasks...we cannot afford staff to be away from the workplace for any period of time or spend excessive time on intervention processes which takes valuable time from their usual work activities".

Interestingly, interviews with some management and/or supervisors, particularly executive management, revealed a reluctance to consider work-related driving as an organisational issue ($n = 3$). For example, one participant stated "it's the drivers who are not doing the right thing, it's not an organisational problem" (male manager). In addition, managers generally had reservations regarding whether all staff would attempt or subsequently complete the driving diary program. For example, "I know the staff ... if you don't make them do it they won't bother" (male supervisor). In contrast, some managerial staff ($n = 6$) believed that they are not required to participate within the driving diary program (or any other intervention) because they believed that they were safe drivers and that the intervention should be directed toward staff. For example, "I have an impeccable driving history ...I don't need to undertake the program" (male manager) and "I have been known to speed a little but I do it when it is safe to do so... I know when it is risky ...the intervention should be targeted to the field staff" (male supervisor) and "I don't have time each day to partake in the program" (male manager).

Individual theme

The individual theme identified responses by individual drivers in relation to barriers/issues that hindered the implementation of road safety interventions, particularly the driving diary. Generally, operational drivers viewed work-related driving as a Workplace Health and Safety issue and welcomed any countermeasure to improve safety. However, a number of participants also stated they would attempt any intervention as long as it did not mean extra work for them. For example, one participant's response suggested "I am willing to try any safety measure as long as it doesn't mean more paperwork for me" (male driver). Likewise, drivers stated that there was not enough time in the day to complete their work tasks as well as

Table 2: Driving Diary Example (Wishart et al., 2007)

	Behaviour	Where	When	What happened	How do you feel	What could I have done differently
DAY 1	Speeding	On Highway	6.00pm	I was speeding on the way home	Annoyed, frustrated and tired	Slowed down and thought of arriving safely
DAY 1	Cut drivers off	City	2.00pm	Rushing to next client and was late	Stressed	Phoned ahead and advised of new arrival time/ review schedule

the required daily paperwork. For example, “we have too much paperwork already ... no time to do work” (male driver) and “I’m sick and tired of doing more paperwork ... we never used to have to do as much as we are doing these days” (male driver). Due to revised systems within the organisation, the amount of paperwork has increased compared to previous years. Additional, paperwork (e.g. job completion worksheet, incident reports, etc) were introduced throughout the organisation as a requirement of Quality Assurance, Workplace Health and Safety legislation and Environmental legislation, etc.

A small number of drivers ($n = 11$) indicated that they did not believe they are required to complete the driving diary program. This was primarily due to their perception of past safe driving history. However, three drivers suggested that they could not be bothered to attempt the driving diary program because they did not have a problem (in relation to work-related driving). For example, “couldn’t be bothered ... I don’t have a driving problem, I’ve never had an accident” (male driver). In addition, a number of drivers stated that they would attempt the driving diary program but may not complete it for the specified ten days. Furthermore, within the organisation there are issues in relation to poor literacy of some drivers, especially from rural and/or remote areas. Most of these drivers, although not admitting their literacy issues, did state that they would complete the program by mentally reviewing their driving day. For example, “I may not complete the driving diary in written form but will go over my driving performance at the end of the day each day” (male driver – rural area).

Discussion

A primary aim of brief interventions is to convince recipients of the potential harmful aspects of their behaviour and encourage them to change (Heather, 2002). Furthermore, one of the best arguments for the implementation of brief interventions, especially evident within the health care sector, is that such interventions can be time and cost effective methods for behaviour change. Therefore, the aim of Phase 1 of the current paper was to highlight the initial development and characteristics of a driving diary brief intervention tool designed for work-related road safety settings. It is anticipated that the tool will provide drivers with information about safe driving behaviours and strategies to overcome bad habits, which will ultimately encourage behavioural change. Generally, the driving diary aims to not only improve driver safety but also to empower and motivate drivers to maintain changes so that they are less likely to fall back into inappropriate driving habits and behaviours.

The driving diary is based on the brief intervention concept, and draws on well-validated and effective assessment and intervention concepts such as the AUDIT and Transtheoretical Model of Change. As a result, it is anticipated that creating change within work-related driving environments will not necessarily be a linear process, but may involve relapse and recycling before termination of unwanted behaviours is achieved.

Taken together, it is anticipated that the driving diary will provide information that helps individuals think about their driving and give them a rationale for changing unsafe behaviour and implementing safe driving behaviour. The driving diary is not designed to be a “silver bullet” but rather utilised as part of a multi-dimensional and proactive course of interventions/countermeasures designed to specifically target work-related road safety within the organisation. In addition, a benefit of the driving diary is that drivers can complete the intervention autonomously and at their own pace. Therefore, the demographic location of staff (e.g., city, urban or rural) does not pose a barrier to the intervention implementation or completion. Contact details are included within the driving diary booklet if a driver requires any assistance in regards to the completion of the driving diary.

Phase 2 aimed to explore the barriers to the implementation of the driving diary by work-related drivers. This was undertaken by analysis of qualitative data, specifically focus groups, within an organisation with a large vehicle fleet. The response by focus group participants was generally positive in regards to completion of the driving diary program. However, there were a number of identified barriers to the completion of the driving diary program. For example, a number of participants identified work/time pressures as well as a substantial amount of current work-related paperwork to be completed as the primary barrier for completing the driving diary program. In addition, some drivers stated their good driving history as a reason for potentially not completing the driving diary program. Furthermore, it was also noted that the literacy of some participants would also hinder completion of the driving diary. Consequently, a workshop designed to convey work-related road safety information, the importance of road safety and the benefits of the driving diary is recommended to be facilitated before implementation of the driving diary. Potential strategies can be devised at the workshop to address barriers to the driving diary completion.

Management generally stated that they believed some form of countermeasure or intervention was urgently required for work-related driving safety. However, some management stipulated publicly that they were not going to participate within the driving diary program. Potentially this does not convey a sense of teamwork within the organisation or in the least promote a good impression to staff. Management have previously stated that some form of road safety countermeasure or intervention was urgently required. However, if managers do not provide commitment and support (e.g., “walk the talk”) it demonstrates to staff that perhaps management do not recognise work-related road safety as a high risk. This may hinder completion of the driving diary by the organisation’s drivers. Therefore, ensuring management commitment and support is an integral process in the successful completion of all interventions (Davey & Wishart, 2004), including the driving diary.

The anticipated limitations of the tool are that individuals may not devote the necessary time to sufficiently complete the allocated tasks and that an adequate workshop or brief induction program will not be permitted to be implemented. Nevertheless, this work-related road safety countermeasure may prove to make a practical contribution to road safety in the work-related arena and thus assist in reducing the tremendous burden of road crashes on the Australian community.

Conclusion

In summary, this paper has highlighted some of the major design concepts and characteristics of the driving diary. The driving diary is a cost, time and resource effective intervention designed to assist behaviour change in work-related drivers. Additionally, the paper has identified some of the major barriers to the effective implementation of the driving diary initiative (as well as other interventions) and discussed the value of a proactive multi-modal approach to improving safety within organisations. Furthermore, the effectiveness of work-related road safety programs are likely to improve through organisations and researchers working collaboratively to encourage both management and staff commitment and ensure work-related road safety intervention strategies are specifically targeted to meet the needs of organisations. The paper suggests that the driving diary intervention's successful implementation can only be achieved with management commitment and support. Many of the barriers to implementation, such as, time, support for drivers to complete the daily task, and realisation that work-related road safety is an important issue could be alleviated with full management commitment and support. Observations and research conducted with organisations that have successful safety programs also have full management commitment. In addition, to overcome additional barriers due to driver inadequacies or attitudes towards their own driving safety and organisational issues could be alleviated with the introduction of a short workshop. The workshop could be utilised as an additional intervention informing drivers and management of the importance of road safety, the risks, the reasoning behind the intervention, details regarding implementation and further discuss strategies to alleviate the effect of barriers to intervention implementation.

However, it remains of concern that organisations are reluctant to adequately resource and implement work-related road safety interventions that have been tailored to reduce their specific work-related road safety risks. Despite such difficulties, continued efforts to develop, implement and evaluate effective work-related road safety interventions and consequently communicate and consult with all staff during the implementation process can ultimately contribute to the reduction in the burden of work-related road trauma.

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The Structure of the Learner Licence Affects the Type of Experiences Novices Gain During this Phase – Examples from Queensland and New South Wales

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This paper was originally presented at the September 2008 Brisbane Conference on 'High Risk Drivers', organised jointly by the ACRS and the Travelsafe Committee of the Queensland Parliament. It shared the prize for the 'Best Student paper'.

Newly licensed drivers have a higher crash risk when compared with any other group of drivers. Graduated driver licensing, with learner, provisional and open licence stages, is one countermeasure demonstrated to reduce this crash risk. The objective of this study was to examine the self-reported behaviours and experiences of learner drivers in two Australian states with different learner licensing requirements: Queensland and New South Wales. Telephone interviews were conducted with 392 participants who were recruited from driver licensing centres immediately after they passed their practical driving test and obtained their driver's licence under the former driver licensing systems in Queensland and New South Wales. This research identified that the behaviour of learner drivers in both states was very similar, although it did differ on measures that the driver licensing system was likely to influence including the frequency with which L plates were displayed and completion of a log book. The paper also provides information on how learners organised their practice with learners in Queensland appearing less likely to deliberately structure their practice when compared with learners in New South Wales. This research suggests that much of the driving of learners in Queensland occurs on an ad-hoc, unplanned basis. As a result, licensing authorities need to carefully consider how they structure their licensing system in order to positively influence learners' driving experiences.

Keywords

Young drivers, graduated driver licensing, learner licence, learner drivers, driver licensing system

Introduction and literature review

Young drivers have a higher crash risk than drivers in any other age category. This risk is at its peak immediately after they obtain a provisional licence, which allows them to drive without supervision (Williams, 2003). This risk falls rapidly during the new few months and then falls more slowly for the next 18 months (Williams, 2003). In contrast, the learner driver period prior to licensing is relatively safe. Research that examined the fatal crashes of 15 year olds in North America, found that those learners who drove under supervision and in accordance with the conditions of their licence had comparatively few crashes (Jonah, 1986; Williams, Preusser, Ferguson, & Ulmer, 1997). Crash data from Queensland and Victoria confirms that the

learner licence stage is the safest for new drivers (Cavallo, 2006; Queensland Transport, 2005).

The learner phase, within a graduated driver licensing system, allows new drivers to develop their skills while under the supervision of a more experienced driver (Mayhew, 2003). This phase is designed to allow new drivers the opportunity to gain practical driving experience with vehicle handling, the road environment and with the behaviour of other drivers (Foss, 2007).

Supervised learning is an integral part of the learner's licence. Basic vehicle control skills can be taught to new drivers within a few hours (Lund, Williams, & Zador, 1986) but the higher order skills such as perception, attention and judgement develop over several years. The amount of practice required for driving to become a more automated task is not known (Simons-Morton, 2007). Although new drivers' ability improves over time, it does not equate to that of more experienced drivers in more complex driving situations.

A number of factors may affect the amount of practice undertaken by learner drivers. These factors include increasing self-confidence as vehicle control skills improve, time issues as participation in competing activities such as part-time work and social events increases and pressures resulting from completing secondary school at the same time as holding a learner's licence (Harrison, 2004). The level of supervised driving in Australia appears very low with a sample of Victorian learners accruing an average of 20.8 hours over 24 months (Harrison, 2004).

Some jurisdictions mandate the number of hours that learners are required to complete and require recording of driving practice in a logbook. In the United States these requirements vary from 20 to 50 hours in different States, and there appears to be limited evidence for the selection of these time limits (Foss, 2007). There is some research support for learners obtaining close to 120 hours of practice. Evidence from Swedish research suggests that supervised learning reduced post-licence crash rates for learners who had 118 hours practice. There was a benefit for the group that obtained greater levels of practice compared with a second group that had the same length of learner period but did not use this time to engage in more practice and a third group consisting of learners prior to the introduction of a longer learner period (Gregersen et al., 2000). Unfortunately, the study was not designed to test for the

benefits of a range of hours of supervised learning, so it is not known whether there is a certain number of hours of practice that is optimum.

Every state and territory within Australia has a learner phase, although differences exist in how it is applied (Senserrick, 2007). This study examines the learner phase in two of the six states, Queensland and New South Wales. These states were chosen as they represented, at the time, a more traditional learner phase (Queensland) and a more progressive learner phase (New South Wales). In Queensland, at the time this study was conducted, individuals were able to obtain their learner licence once they turned 16 ½ years of age by passing a theoretical road law knowledge test.¹ Individuals held their learner licence for a minimum of six months, displayed L-plates and drove under supervision. If the learner was under the age of 25 years they had to have a zero blood alcohol limit. If they obtained four demerit points in twelve months for offences, their learner licence was suspended or cancelled. Drivers were eligible to obtain their provisional licence once they reached their 17th birthday (Senserrick, 2007).

The New South Wales system had several elements that were not present in the Queensland system at the time of the data collection. At the time the research was conducted, individuals in New South Wales were able to obtain their learner licence from 16 years.² Similar to the Queensland system, the learner licence was obtained by passing a road law knowledge test and held for a minimum of six months. Learner drivers in New South Wales had to display L-plates and drive under supervision with a zero blood alcohol limit. They were restricted to a maximum speed of 80 kilometres per hour and also had a towing restriction. Drivers were eligible to progress to the next stage in the graduated licensing system once they turned 17 years of age (Senserrick, 2007). The major difference between the Queensland and the New South Wales licensing systems at the time this study was conducted was the requirement for learner drivers in New South Wales to record a minimum 50 hours of driving experience in a logbook.

The objective of this study was to examine the self-reported behaviours and experiences of learner drivers in two Australian states with different learner licensing requirements, that is Queensland and New South Wales, and provide information on how learners structured their practice in these states. It is expected that learner driver behaviour will differ based on the differing components of the learner licensing system.

Method

Participants in this study comprised 392 learner drivers who had recently passed their practical driving test in selected licensing centres in Queensland and New South Wales. In order to gain a representative sample, participants were recruited from both metropolitan and regional driver licensing centres, although only large licensing centres were used to ensure that there were sufficient individuals attempting their practical driving test. The actual driver licensing centres were selected after consulting with Queensland Transport and the New South Wales Roads and Traffic Authority. The Queensland data was collected in Brisbane and Townsville, while the New South Wales data was collected in Sydney, Newcastle, Ballina and Lismore during 2006 and 2007.

Learner drivers were approached outside the centre buildings and asked to participate in the research. The recruiter outlined the study, its purpose and provided information regarding the voluntary nature of the study. Each person was offered a movie ticket as an incentive. After agreeing to participate in the study, the recruiter recorded their name, phone number and a list of times that they were unable to be contacted by telephone. By recording unavailability rather than availability, there was a greater width of time that the interviewers were able to contact the participants.

Within a few weeks of the initial contact, the participants were contacted by telephone and the survey was administered via interview. The interview was designed to collect information on the personal, social, environmental and socio-demographic factors that affect learner drivers. If the interviewers were unable to contact the learner driver initially, they continued to call up to three times. If the learner driver was unable to complete the interview at that time, they made an alternative time. The interview took approximately 35 minutes to administer. At the conclusion of the interview, the researcher collected a postal address which was kept separate from the questionnaire. The movie ticket incentive was then posted to participants.

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1. It should be noted that a number of changes were made to the Queensland Graduated Driver Licensing system in July 2007 including lowering the minimum learner age from 16 ½ years to 16 years, introducing two provisional licence phases (P1 and P2), introduction of a hazard perception test, restricting P1 drivers to one passenger aged under 21 years from 11.00pm to 5.00am and restricting provisional drivers from driving high powered vehicles (Senserrick, 2007).

2. The Graduated Driver Licensing system was amended from 1 July 2007 in New South Wales with changes including the learner period being extended to 12 months and requiring 120 hours of practice. Drivers on a P1 licence are now limited to one passenger aged less than 21 years from 11.00pm to 5.00am and there is a zero tolerance on speeding. Any provisional driver caught speeding will have their licence suspended for three months (Senserrick, 2007).

interview at that time, they made an alternative time. The interview took approximately 35 minutes to administer. At the conclusion of the interview, the researcher collected a postal address which was kept separate from the questionnaire. The movie ticket incentive was then posted to participants.

Results

Sample characteristics

Of the 687 individuals approached at driver licensing centres that were eligible to participate, 392 completed the interview leading to an overall response rate of 57.1%. Of the 392 participants in the sample, 176 (44.9%) were male and 207 (52.8%) were female. The age of participants ranged from 17 years to 44 years with a mean of 19.8 years ($sd = 4.7$ years). The most frequent age was 17 years. Most of the sample was single ($N = 333$, 84.9%), although some were married ($N = 24$, 6.1%) or had a partner ($N = 33$, 8.4%) while a small percentage had been married previously ($N = 2$, 0.5%).

Most of the sample had completed at least some form of secondary schooling with 41.9% ($N = 164$) having completed their junior certificate (grade 10) and 37.3% ($N = 146$) having completed their senior certificate (grade 12). A small number ($N = 4$, 1%) had completed primary schooling only. Several participants had completed more advanced study with 7.7% ($N = 30$) finishing a TAFE or apprenticeship qualification and 12% ($N = 47$) holding a university qualification. Most participants were still studying ($N = 261$, 67.4%).

Most of the sample ($N = 323$, 82.4%) worked in paid employment with 122 participants (38.1%) indicating that they worked full time. The remaining 198 participants (61.9%) worked part time. It is therefore not surprising that the income level of most participants was low. Over half of the sample earned less than \$10,000 per annum before tax ($N = 177$, 52.4%). A further 20.7% ($N = 70$) earned between \$11,000 and \$20,000 with the other income categories remaining small. Most participants were not aware of the income level of their parents ($N = 205$, 54.4%).

Table 1: Self-reported behaviours of drivers on a learner licence

Behaviour	Number	Significance
<i>Displayed L plates</i>	$M = 6.42$ ($sd = 1.37$, $N = 392$)	$t(390) = -5.44$, $p = <.001$
QLD	$M = 6.10$ ($sd = 1.71$, $n = 219$)	
NSW	$M = 6.83$ ($sd = 0.49$, $n = 173$)	
<i>Did not drive over speed limit in 60km/hr zones</i>	$M = 6.24$ ($sd = 1.14$, $N = 392$)	$t(390) = -1.46$, $p = .15$
QLD	$M = 6.32$ ($sd = 1.11$, $n = 219$)	
NSW	$M = 6.15$ ($sd = 1.18$, $n = 173$)	
<i>Did not drive over speed limit in 100km/hr zones</i>	$M = 6.53$ ($sd = 1.10$, $N = 389$)	$t(387) = 0.89$, $p = .38$
QLD	$M = 6.58$ ($sd = 1.07$, $n = 217$)	
NSW	$M = 6.48$ ($sd = 1.13$, $n = 172$)	
<i>Wore seat belt</i>	$M = 6.99$ ($sd = 0.16$, $N = 389$)	$t(387) = -.48$, $p = .63$
QLD	$M = 6.99$ ($sd = 0.20$, $n = 218$)	
NSW	$M = 6.99$ ($sd = 0.08$, $n = 171$)	
<i>Did not drive under the influence of illegal drugs</i>	$M = 6.84$ ($sd = 0.90$, $N = 389$)	$t(387) = -.08$, $p = .94$
QLD	$M = 6.83$ ($sd = 0.89$, $n = 218$)	
NSW	$M = 6.84$ ($sd = 0.92$, $n = 171$)	
<i>Did not drive under the influence of legal drugs</i>	$M = 6.83$ ($sd = 0.89$, $N = 389$)	$t(387) = .92$, $p = .36$
QLD	$M = 6.87$ ($sd = 0.83$, $n = 218$)	
NSW	$M = 6.78$ ($sd = 0.96$, $n = 171$)	
<i>Allowed two seconds between my car and car in front on highways</i>	$M = 6.29$ ($sd = 1.12$, $N = 384$)	$t(382) = .96$, $p = .34$
QLD	$M = 6.34$ ($sd = 1.18$, $n = 213$)	
NSW	$M = 6.23$ ($sd = 1.03$, $n = 171$)	
<i>Did not drink alcohol before driving</i>	$M = 6.83$ ($sd = 0.88$, $N = 389$)	$t(387) = -.63$, $p = .53$
QLD	$M = 6.86$ ($sd = 0.83$, $n = 218$)	
NSW	$M = 6.80$ ($sd = 0.95$, $n = 171$)	
<i>Completed a log book each time I drove</i>	$M = 3.21$ ($sd = 2.49$, $N = 390$)	$t(388) = -21.71$, $p = <.001$
QLD	$M = 1.57$ ($sd = 1.63$, $n = 218$)	
NSW	$M = 5.28$ ($sd = 1.74$, $n = 172$)	

Amount of supervised practice

There was a significant difference in the amount of practice, in both planned and unplanned driving situations, undertaken by learners ($t(389) = -2.14, p = .04$). Learners in Queensland reported completing an average of 64.1 hours ($sd = 51.1$) while on their learners licence, as compared to those learners in New South Wales who reported completing an average of 73.3 hours ($sd = 24.1$).

Behaviour while on a learner licence

Independent group t-tests were conducted to compare the frequency with which learner drivers reported engaging in particular behaviours while on their learner licence and if there was any difference in these behaviours based on state of residence (see Table 1). Learners were asked to rate whether or not they engaged in these behaviours on a scale from 1 to 5. Several of the results in Table 1 appear to demonstrate a ceiling effect (Mitchell & Jolley, 1996), in particular for the questions relating to speeding, wearing a seat belt, driving under the

influence of both illegal and legal drugs and drinking alcohol before driving. In these cases, the mean response was particularly high. As shown, statistically significant differences were found between learners in Queensland and those in New South Wales on the frequency with which L plates were displayed ($t(390) = -5.44, p = <.001$) and the frequency with which learners completed a log book ($t(388) = -21.71, p = <.001$). Learners in New South Wales ($M = 6.8, sd = 0.49$) displayed their L plates more frequently than those in Queensland ($M = 6.1, sd = 1.71$).

Similarly, learner drivers in New South Wales ($M = 5.28, sd = 1.74$) completed their logbook with far greater frequency than those in Queensland ($M = 1.57, sd = 1.63$). The lack of completion of the logbooks by learner drivers in Queensland may probably be explained by its voluntary nature. Over two-thirds of the Queensland drivers ($n = 147, 67.7\%$) stated that they were unaware that Queensland Transport provided a logbook for use, on a voluntary basis, by learner drivers and their supervisors.

Table 2: Self-reported behaviours of drivers on a learner licence

Experience	QLD	NSW	Total	Significance
<i>Deliberately practised driving in suburban areas</i>	$n = 219$	$n = 171$	$N = 390 (100\%)$	$\chi^2(2) = 1.11, p = .575$
2 or fewer times per month	$n = 13 (5.9\%)$	$n = 11 (6.4\%)$	$n = 24 (6.2\%)$	$\phi = .53$
3-8 times per month	$n = 75 (34.3\%)$	$n = 50 (29.2\%)$	$n = 125 (32.1\%)$	
9 or more times per month	$n = 131 (59.8\%)$	$n = 110 (64.3\%)$	$n = 241 (61.8\%)$	
<i>Deliberately practised driving in the central business district of a major town or city</i>	$n = 219$	$n = 173$	$N = 392 (100\%)$	$\chi^2(2) = 13.05, p = .001$
2 or fewer times per month	$n = 84 (38.4\%)$	$n = 37 (21.4\%)$	$n = 121 (30.9\%)$	$\phi = .182$
3-8 times per month	$n = 74 (33.8\%)$	$n = 74 (42.8\%)$	$n = 148 (37.8\%)$	
9 or more times per month	$n = 61 (27.9\%)$	$n = 62 (35.8\%)$	$n = 123 (31.4\%)$	
<i>Deliberately practised driving in rural areas</i>	$n = 219$	$n = 171$	$N = 390 (100\%)$	$\chi^2(2) = 8.18, p = .017$
2 or fewer times per month	$n = 144 (65.8\%)$	$n = 88 (51.5\%)$	$n = 232 (59.5\%)$	$\phi = .145$
3-8 times per month	$n = 41 (18.7\%)$	$n = 44 (25.7\%)$	$n = 85 (21.8\%)$	
9 or more times per month	$n = 34 (15.5\%)$	$n = 39 (22.8\%)$	$n = 73 (18.7\%)$	
<i>Deliberately practised driving with passengers other than my supervisor in the car</i>	$n = 219$	$n = 172$	$N = 391 (100\%)$	$\chi^2(2) = 9.11, p = .011$
2 or fewer times per month	$n = 112 (51.1\%)$	$n = 63 (36.6\%)$	$n = 175 (44.8\%)$	$\phi = .153$
3-8 times per month	$n = 60 (27.4\%)$	$n = 68 (39.5\%)$	$n = 128 (32.7\%)$	
9 or more times per month	$n = 47 (21.5\%)$	$n = 41 (23.8\%)$	$n = 88 (22.5\%)$	
<i>Deliberately practised driving at night</i>	$n = 219$	$n = 172$	$N = 391 (100\%)$	$\chi^2(2) = 19.96, p = <.001$
2 or fewer times per month	$n = 75 (34.2\%)$	$n = 25 (14.5\%)$	$n = 100 (25.6\%)$	$\phi = .226$
3-8 times per month	$n = 79 (36.1\%)$	$n = 76 (44.2\%)$	$n = 155 (39.6\%)$	
9 or more times per month	$n = 65 (29.7\%)$	$n = 71 (41.3\%)$	$n = 136 (34.8\%)$	
<i>Deliberately practised driving on the weekends</i>	$n = 219$	$n = 172$	$N = 391 (100\%)$	$\chi^2(2) = 16.34, p = <.001$
2 or fewer times per month	$n = 49 (22.4\%)$	$n = 13 (7.6\%)$	$n = 62 (15.9\%)$	$\phi = .204$
3-8 times per month	$n = 91 (41.6\%)$	$n = 79 (45.9\%)$	$n = 170 (43.5\%)$	
9 or more times per month	$n = 79 (36.1\%)$	$n = 80 (46.5\%)$	$n = 159 (40.7\%)$	
<i>Deliberately practised driving on weekdays</i>	$n = 219$	$n = 172$	$N = 391 (100\%)$	$\chi^2(2) = 1.60, p = .448$
2 or fewer times per month	$n = 24 (11.0\%)$	$n = 26 (15.1\%)$	$n = 50 (12.8\%)$	$\phi = .064$
3-8 times per month	$n = 85 (38.8\%)$	$n = 61 (35.5\%)$	$n = 146 (37.3\%)$	
9 or more times per month	$n = 110 (50.2\%)$	$n = 85 (48.3\%)$	$n = 195 (49.9\%)$	

Experiences while on a learner licence

A series of chi-square tests were conducted to compare how often learner drivers in each state reported experiencing various situations while learning to drive. Participants were able to respond by answering in the following categories: 'not at all', '1-2 times a month', '3-4 times a month', '5-6 times a month', '7-8 times a month', '9-10 times a month' or 'over 10 times a month'. In order to ensure the chi-square analysis assumptions were met, these categories were collapsed to '2 or fewer times a month', 'between 3 and 8 times a month' and 'more than 9 times a month'.

The results provide a limited picture of the types of practice that learners reported undertaking while driving with a learner licence. Across the sample, 61.8% of learners reported that they deliberately practised driving in suburban areas nine or more times per month. In contrast, 59.5% of the sample reported that they deliberately practised driving in rural areas two or fewer times per month. The sample was comparatively evenly split between those who deliberately practised driving in the central business district of a major town or city two or fewer times per month (30.9%), three to eight times per month (37.8%) and nine or more times per month (31.4%).

The participants reported deliberately practising their driving with passengers other than their supervisor in the car two or fewer times per month (44.8%). They also reported deliberately practising their driving at night three to eight times per month (39.6%), and on weekdays more frequently than on weekends. Of the sample, 43.5% of the participants reported deliberately practising their driving on the weekend three to eight times per month, compared with 49.9% who deliberately practised driving on weekdays nine or more times per month.

All of the chi-squares tests, with the exception of two, were significant indicating that the experiences of learner drivers differed by state. Learners in New South Wales were more likely to practise deliberately driving in the central business district of a major town or city compared with those in Queensland as the results show that 35.8% of participants from New South Wales deliberately practised driving in this situation nine or more times per month. In contrast, only 27.9% of participants from Queensland deliberately practised their driving in a central business district with this frequency. Participants from New South Wales were also more likely to practise deliberately their driving in rural areas (22.8% did this nine or more times per month) than those living in Queensland (15.5% did this type of practice nine or more times per month).

Learners from New South Wales reported deliberately practising with passengers other than their supervisor in the vehicle with greater frequency than learners from Queensland. In New South Wales learners reported that this occurred nine or more times per month (23.8%) or three to eight times per month (39.5%) compared with 21.5% of participants from Queensland reporting that this behaviour occurred nine or more times per month and 18.7% of learners from Queensland reporting that this occurred three to eight times per month.

Participants from New South Wales reported that the deliberately practised driving at night while on a learner licence with greater frequency than participants from Queensland. Of the learners from New South Wales, 41.3% stated that they deliberately engaged in this type of practice nine or more times per month compared with 29.7% of the learners from Queensland.

This also occurred for the experience of deliberately practising their driving on weekends. More participants from New South Wales reported deliberately practising their driving on weekends nine or more times per month (46.5%) than participants from Queensland (36.1%). There was no difference between the two states in the frequency with which learners deliberately practised driving in suburban areas or the frequency with which they deliberately practised driving on weekdays.

Discussion

Participants from New South Wales reported completing more hours of practice, both planned and unplanned, on average whilst driving in the learner licence phase than those in Queensland. However, the average amount of practice completed is above 50 hours (the minimum mandated amount of practice for learner drivers in New South Wales at the time of the study) for both states. These results contrast with the findings of Harrison's (2004) research which found that a sample of learner drivers in Victoria completed an average of 20.8 hours over 24 months. This may reflect a number of factors. Harrison's research featured a different design involving learner drivers completing a log book of their practice as they proceeded, while this study involved learner drivers recalling the total amount of practice they obtained. This may result in inaccurate reporting by some learners. It may also reflect the fact that there were no mandated hours of practice required by the Victorian authorities at the time of Harrison's study.

A log book is used in New South Wales to record the number of hours that learners complete. It is a compulsory part of the licensing system and used to ensure that drivers meet the required 50 hours of supervised practice. As expected, drivers in New South Wales completed their logbook on a more regular basis than those in Queensland. This can be explained by the compulsory nature of the log book in New South Wales and its voluntary nature in Queensland. The voluntary nature also means that many learners (67.7%) in Queensland appear unaware that there is a logbook available. Therefore, a log book is likely to reach its maximum potential as a tool to manage a learner's practice when it is a required part of the driver licensing system. If it is offered as a voluntary tool, it needs to be supported with a program that encourages learners and their parents to use the log book.

The experiences of learner drivers differed across the states in a number of respects. The results suggest that learners in Queensland are less likely to deliberately structure their learning experiences with many respondents stating that they deliberately gained practice in various scenarios such as night,

with passengers or in rural areas two or fewer times per month. This suggests that much of their driving occurs on an ad-hoc, unplanned basis. This may be the result of not using a log book. A log book may encourage learner drivers and their instructors to better structure their learning experiences. It may also facilitate communication between professional and private instructors. The differences between the learner drivers in the different states may also reflect other social, economic or geographic factors that prevent Queensland learner drivers from being able to deliberately practise their learning. Alternatively, the differences may be a reflection of any differences between the Queensland and New South Wales log books.

Licensing authorities could consider introducing compulsory logbooks to help learners and their supervisors' structure their supervised practice. This may be a useful tool even without a set number of hours of practice being mandated. It would appear that completion of the log book would need to be compulsory as this research has shown that many learners are unaware of the log book with voluntary completion.

Although this study has provided good descriptive data regarding learner driver behaviours and experiences while on a learner licence, there is a need for further research in this area. Some graduated driver licensing systems explicitly encourage the involvement of parents during the learner phase (Simons-Morton & Ouimet, 2006) through the use of requirements such as mandating a set number of hours of supervised practice. Therefore, further research is needed to identify what facilitates and inhibits parental involvement in this licensing phase.

Additionally, graduated driver licensing systems are constantly evolving and developing. It is important to evaluate the changes that are occurring within the licensing system in order to assess whether these changes are enhancing the existing system. As mentioned earlier, both states within this study have made changes to their learner phase. Further research that examines the impact of these changes will help to identify if these countermeasures are effective in helping to reduce the crash risk of novice drivers.

One of the major strengths of this study was the participation rate with 57.1% of individuals approached agreeing to participate. However, there are several limitations in regard to this study. Participants were only recruited from larger driver licensing centres in both Queensland and New South Wales. The use of these larger centres may have biased the results. As such, caution should be exercised when generalising the results to the broader community. There may be inherent differences in learners who obtain their licences in locations with smaller licensing centres.

The self-report nature of the interview is another limitation. Participants may have difficulty remembering the details of their learner driver experiences such as the amount of driving that they undertook at night. However, self-report data on a number of behaviours, including drink driving and collisions, is considered to have an acceptable level of validity when it is

collected anonymously and there are no consequences associated with providing their responses (Zhao et al., 2006). This was the case with these interviews.

While the self-report data was useful in gaining an understanding of the factors that influence learner driver behaviour, additional research is needed to compare the self-report nature of the data collected in this study with data collected using alternative techniques. As an example, a study that uses crash data from the relevant road authorities will provide further information regarding the types of crashes that learners' experience. Alternatively, focus group research will enable the exploration of the factors that impact on their experiences such as accumulation of supervised experience or participation in formal driver education and training more thoroughly. A third option is to use technology to accurately augment self-report data regarding learner drivers. This technology includes tracking large numbers of individual drivers with GPS and mobile phones or using video data associated with traffic incidents.

Conclusion

This research has shown that the behaviour of learner drivers varies across two licensing systems based on the way the licensing system is structured. As a result, licensing authorities need to carefully consider how they structure their licensing system in order to positively influence learner drivers. For example, the Queensland participants in the study completed a log book less frequently than those in New South Wales. This appears to be the case because, at the time the data was collected, it was not compulsory to complete a log book in Queensland. This research has shown that the experiences of learner drivers differs between the states with drivers in Queensland less likely to engage in deliberate practice of a number of types including with passengers and at night (Foss, 2007).

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Speed Enforcement – Effects, mechanisms, intensity and economic benefits of each mode of operation

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This paper was originally presented at the September 2008 Brisbane Conference on 'High Risk Drivers, organised jointly by the ACRS and the Travelsafe Committee of the Queensland Parliament. It won the prize for the best Researchers' paper.

Abstract

Significant programs of speed enforcement have been in operation in a number of State and international jurisdictions for some time and many have been the subject of rigorous evaluation. Such programs aim to reduce crash frequency and/or injury severity through reductions in mean speed and/or changes to the speed distribution. In broad terms, the speed enforcement programs evaluated have been demonstrated to be beneficial in reducing road trauma. However, it is only in examining the individual characteristics of such programs that the mechanisms of effect become evident and information useful for the development of new speed enforcement programs can be obtained. This paper describes the speed enforcement program evaluations and the information concerning the relationship between enforcement intensity and program outcomes that they contain. Such analysis was conducted for all major speed enforcement modes, including mobile and fixed speed cameras operated overtly or covertly (including point-to-point average speed cameras), moving mode radar and hand-

held laser speed detectors. An economic analysis of program outcomes was also conducted for each of these modes. This analysis was used to inform the development of a new speed enforcement strategy for Western Australia (WA) that can be expected to reduce road fatalities by 25 percent in a cost efficient way.

Keywords

Traffic enforcement, speeding, effectiveness, economic analysis

Introduction

The research described in this paper was carried out to develop a speed enforcement strategy for WA reflecting best practice nationally and internationally, with the mix of enforcement options, number and intensity tailored to the WA road environment and their strategic targets. However the range of options considered and the analysis methods have universal applicability and can be used to define speed enforcement

strategies in other jurisdictions. The paper is structured as follows. First, an explanation of characteristics likely to influence the outcome of an enforcement program is provided. A description of the WA road environment and the speed enforcement options available for use in that State follows. The relationships between enforcement intensity and expected program outcome for each of these enforcement options are then derived from existing evaluations and an economic assessment of these options conducted. Finally, a package of speed enforcement options is recommended for use in WA on the basis of the economic analysis.

Program characteristics

There are a number of variables that likely influence the outcome of speed enforcement operations. In particular, an enforcement program may operate overtly or covertly, use fixed or mobile technology and may be directed at treating black-spot locations or addressing problem behaviour across the entire road network. A brief explanation of the principles surrounding these modes of operations follows. In addition, the key mechanisms through which enforcement operations are thought to operate are identified.

- Enforcement programs are generally classified as either overt or covert in nature. It is the intention of overt operations to be highly visible to road users and in doing so increase the perceived risk of detection, thus altering the behaviour of road users immediately in time and space. Conversely, covert operations are not intended to be seen by road users and road users should be unaware of the location and timing of such enforcement operations. Effective covert operations will create a perception that detection may occur at any location and at any time.
- In general, speed enforcement technology can be either fixed or mobile. Fixed devices are located permanently at one site. In contrast mobile technologies are portable and tend to operate at one site for only a short period of time.
- In some circumstances, the location of safety cameras, whether fixed or mobile, may be chosen to affect a known problem of high crash risk or the risk of particularly severe crashes in a defined area. Such treatments are referred to as black spot treatments. Where the increased risk relates to a particular route or area, the treatment can be spread across this black route or area. In general, black spot or black route programs are intended to have the greatest effect at the black spot site or along the black route and are rarely aimed at treating speed across the road network.

The choice between overt or covert, mobile or fixed, and black spot or network wide operations may be dependent on a number of factors and this is reflected in the variety of enforcement programs operating in different jurisdictions. Some common factors that likely influence the nature and extent of speed enforcement operations are the level of resources available (e.g. equipment, staff, back office processing facilities), the road type to be enforced, the prevalence of speeding behaviour prior to enforcement and public attitudes

towards the use of automated or semi-automated enforcement technologies. These factors, insofar as they impact upon the mode of enforcement, will also determine the mechanisms through which the enforcement achieves its effect.

The two primary mechanisms through which speed enforcement may effect positive behaviour change are general deterrence and specific deterrence. The key reasoning behind these processes relies on utility theory as described by Ross (1981). In general, this assumes that road users will decide whether or not to commit a traffic offence based on a rational analysis of the benefits and risks associated with committing the offence. It is noted, that it is the perceived risks and benefits of committing the offence that determines the utility of the action.

General deterrence is a process of influencing a potential traffic law offender, through his fear of detection and the consequences, to avoid offending (Cameron & Sanderson, 1982). Therefore, operations employing general deterrence mechanisms necessarily target all road users irrespective of whether they have previously offended. It follows that general deterrence programs have the potential to influence the behaviour of all road users. In contrast, specific deterrence is a process of encouraging an apprehended offender, through his actual experience of detection and the consequences, to avoid re-offending (Cameron & Sanderson, 1982). Therefore, the potential impact of a specific deterrence program is more limited than that of a program relying on the general deterrence mechanism. Enforcement programs relying solely on the mechanism of specific deterrence have the potential to influence only those offenders who have previously been detected and punished for committing offences. It follows that the magnitude of the penalty, especially that applying if subsequent offences are committed, is of particular importance.

Speed enforcement options for Western Australia

The State of WA has a population of approximately two million people with around 1.45 million concentrated in the Perth area. The State measures approximately 2.5 million square kilometers constituting around one third of the area of Australia. Table 1 below details the nature and extent of the road environments that are likely targets for speed enforcement in WA. It is noted that despite the extensive rural road network around 63 percent of all travel in WA is undertaken on urban roads.

Currently, the principal method for the detection of speed offender in WA is the Multanova 6f speed camera system. This mode of enforcement detected over 616,000 offenders in 2004 compared with about 303,000 offenders detected by non-photographic methods (mobile radar units, which can also be operated in stationary mode, and hand-held laser speed detectors). The Multanova cameras are operated using a tripod-mounted system at the roadside with no attempt to hide the system. Further, signage advising drivers that they have

Table 1: Road environments targeted for speed enforcement in Western Australia

Urban road type	Road length (km)	Estimated traffic (million vehicle km) 1991	Rural road type	Road length (km)	Estimated traffic (million vehicle km) 1991
<i>Arterial roads</i>	1,815	7,910	<i>Highways</i>	20,194	4,170
<i>Local roads</i>	8,200	8,200	<i>Undivided highways and local roads</i>	123,800 (estimate)	5,200
<i>Freeways</i>	62	230			

passed a camera in operation is used. Public announcement of the date and route of camera operations is made through television and press news segments. Sites are selected on the basis of criteria relating primarily to the existence of a speed related problem. However, given the diversity of the road environment in WA there is the potential for, and perhaps the requirement that, a range of enforcement modes be used to maximize the road safety benefits achieved. Following is a description of the enforcement modes identified as having potential for use in WA.

Considering arterial roads, there are two potential enforcement modes each of which might be expected to generate network wide crash reductions when optimally implemented. First, as in Victoria, mobile speed cameras could operate covertly using a car-mounted system in unmarked cars using a variety of popular vehicle makes/models. These operations should be 'flashless' when ambient light or digital technology permits. No advance warning or departure signs should be used and public announcements of camera locations or presence should not be made. Second, as in Queensland, mobile speed cameras could operate overtly with signs advising of camera presence but with operations scheduled randomly in time and space to raise drivers' perceived risk of detection. That is, camera shifts would be randomly allocated to sites and time blocks (four hours each, excluding late night/early morning) with very limited opportunities for actual operations to depart from the random assignments. Public announcements of camera locations or camera presence would not be made. Further, operational sites should be selected so as to cover a high proportion (at least 80%) of crash locations with 2 km of camera sites. Each of the enforcement modes described has the potential to reduce casualty crashes, however, the magnitude of effect is likely to vary by crash severity and across the enforcement modes. This will be the focus of later discussion.

Considering local streets in the urban environment, hand-held laser speed detectors provide another speed enforcement option. The two enforcement modes discussed above are unlikely to be suitable for use in lightly trafficked urban streets and are not considered further for this environment. The proportion of traffic exceeding the speed limit by at least 10 km/h on Perth's local access roads during 2005 was 18.3% on 50 km/h speed

limit roads and 8.6% on the 60 km/h limit roads (Radalj, 2006). The relatively high extent of excessive speeding in this road environment compared with other urban areas provides support for a method of speed enforcement focused on these roads.

Speed enforcement options for rural highways and rural local roads include the use of moving mode (mobile) radar units. The use of this technology is generally constrained to lightly trafficked undivided roads because of the need to intercept an offending driver, commonly involving a U-turn by the patrol car. Given the evidence concerning the effectiveness of this technology, operations should be conducted using vehicles operating covertly (unmarked car) or from a mixture of marked and unmarked cars on highways in the same region. During 2005 on local rural roads, the proportion of traffic exceeding speed limits by at least 10 km/h was 8.2%. This was substantially higher than the proportion on rural roads generally (6.7%). This supports the need for a method of speed enforcement in rural WA which is most suitable for the vast extent of the lightly trafficked local road system on which speed cameras may not be able to operate cost-effectively.

Finally, considering urban freeways and highly trafficked rural highways, there is the potential for use of individual fixed speed cameras or point-to-point speed camera systems. Fixed speed cameras have not been shown clearly to have anything other than a local effect on crashes, nevertheless the measured effects are very substantial, especially the effects on fatal and serious injury crashes. For this reason they are most suitable for use on highly-trafficked high-speed roads such as urban freeways, where other forms of speed enforcement such as mobile camera units at the roadside present a danger to the operators and the traffic itself. However, if the intention is to reduce speeds along a substantial "black" route using overt fixed cameras, there may be a case for installing point-to-point camera systems to enforce speeds along the whole route. This technology uses a number of fixed cameras mounted at staged intervals along a particular route. The cameras are able to measure the average speed between two points or the spot speed at individual camera sites. The distance between two camera sites may vary from as low as 300 meters to up to tens of kilometres.

Relationships between enforcement intensity and crash outcome

On the basis of a review of a large number of studies Elvik (2001) derived a general relationship between enforcement intensity and casualty crash reductions (Figure 1). It was concluded that, even for the most effective forms of enforcement, the relationship with crash reductions is not linear. Rather, diminishing returns apply as the level of enforcement increases. However, within the range of increases observed in the studies (up to 10-12 fold), it appears that at least some crash reductions occur for each increase in enforcement effort. Effects beyond that level are uncertain. While most of the studies from which this relationship was derived relate to stationary (intercept) speed enforcement, Elvik quotes evidence supporting its applicability to speed cameras as well.

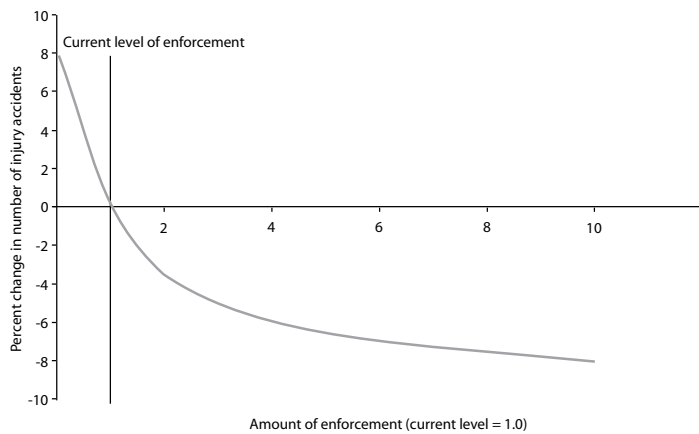


Figure 1: General relationship between traffic enforcement and crashes identified by Elvik (2001)

For the purposes of this study similar relationships have been derived for each of the key enforcement modes considered. This enables the additional benefits associated with each increase in speed enforcement intensity to be estimated and used as inputs into an economic analysis. Following is a description of the relationships derived.

Covert mobile speed cameras

Evaluations of the covert mobile speed camera program operating in Victoria provide the data from which the relationship between enforcement levels using this technology and crash outcomes is derived. During 1999, Victoria Police varied the levels of speed camera activity substantially in four Melbourne Police districts according to a systematic plan. Analysis of the associated changes in casualty crash frequency revealed that crash frequency was inversely associated with changes in the levels of speeding TINs (Traffic Infringement Notices) issued following detection in the same district during the previous month. A similar relationship was found for the risk of fatal outcome in a casualty crash. The relationships are displayed in the following two figures together with 95% confidence limits on the estimates.

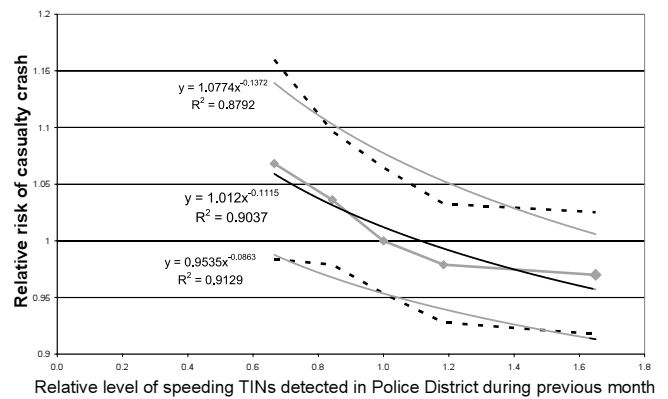


Figure 3: Relative relationship between casualty crash risk and level of speeding TINs detected by covert mobile speed cameras

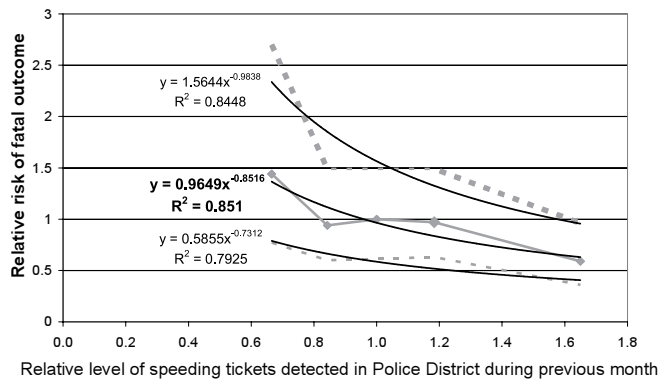


Figure 4: Relative relationship between the risk of fatal outcome in casualty crashes and the level of speeding TINs

Figure 3 shows the relative relationship between casualty crash risk and the level of speeding TINs issued in the prior month. It was found that the power function was the best of Elvik's proposed functional forms to represent this relationship. When this functional form was fitted to the relationship, the key parameter B ("elasticity") was estimated to be -0.1115. Figure 4 shows the relationship between the risk of fatal outcome of a casualty crashes and the level of speeding TINs issued, again expressed in relative terms. The power function also best represented this relationship, resulting in an estimate of B of -0.8516 in this case.

Overt mobile speed cameras with randomised scheduling

Studies have been conducted on the crash reduction effects of the Queensland program as it has grown from 852 hours per month in 1997 to about 6,000 hours per month during 2003-2006 (Newstead and Cameron, 2002; Newstead, 2004, 2005, 2006). The crash reductions have generally been limited to an area within two kilometres of the camera sites. The strongest effects have been on casualty crashes, with no differential effect on crashes of different severity (fatal, hospital admission, or medical treatment crashes). As the program grew, the two

kilometre areas around camera sites covered a greater proportion of the total casualty crashes in Queensland, rising from about 50% to 83% over the evaluation period. Thus the localised crash reductions around camera sites can be interpreted as a general effect on crashes, assuming that the program had no effect beyond the two kilometre areas (a conservative assumption). The relationship between the increased monthly hours and the general casualty crash reductions can be seen in Figure 5.

It could be expected that an effective anti-speeding countermeasures such as this would have greater effect on fatal

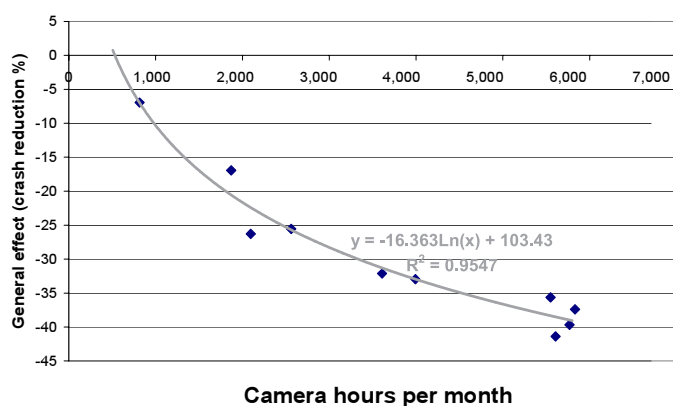


Figure 5: Relative between casualty crash reductions and monthly hours of overt mobile speed cameras with randomised scheduling

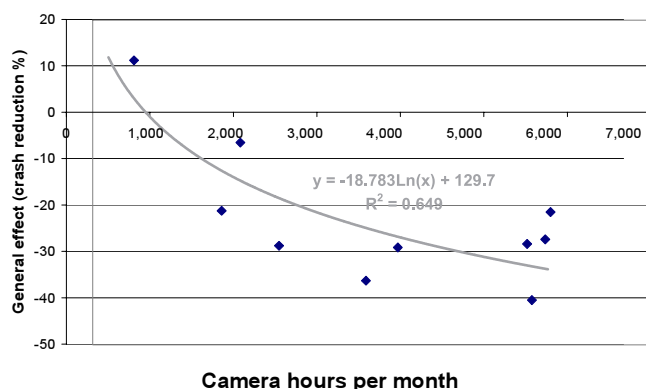


Figure 6: Relationship between fatal crash reductions and monthly hours of overt mobile speed cameras with randomised scheduling

crashes than non-fatal crashes. Figure 6 shows the estimated reductions in fatal crashes associated with the level of monthly hours operated each year. It should be noted that the individual annual estimated reductions are not as reliable as the reductions in all casualty crashes shown in Figure 5 and that no individual reduction is statistically significant. Nevertheless, the estimates do suggest a relationship between fatal crash reductions and camera hours of the same type as that in Figure 5. However, there is no evidence that the magnitude of the reduction achieved by the Queensland program on fatal crashes is any greater than that achieved on casualty crashes in general (of which fatal crashes are a part).

Economic analysis of key enforcement options

Economic analysis was conducted of the benefits (savings in social costs of crashes) and costs (equipment, operating, and detected offence processing costs) of each of the speed enforcement options outlined above, if applied to the appropriate road environment in WA (Cameron and Delaney, 2006; Cameron, 2008). The options analysed were:

- Covert mobile speed cameras on urban highways (arterial roads)
- Randomly-scheduled overt mobile speed cameras on urban and rural highways
- Covert mobile speed cameras on publicly announced routes
- Moving mode (mobile) radar units on rural highways (undivided) and rural local roads
- Hand-held laser speed detectors operated overtly on urban local roads
- Fixed speed cameras on Perth freeways
- Point-to-point speed camera systems on Perth freeways and urban and rural highways with limited opportunities or incentives to leave or enter the enforced sections

The economic analysis of different levels of operation of covert mobile speed cameras is shown in Table 2. The base level of 3000 hours per month reflects that achieved by the existing Multanova speed cameras during 2004. The crash reduction effects of increased hours, using covert mobile cameras, are relative to the unknown effects of the Multanova camera program. Reductions in casualty crashes were estimated from the fitted relationship in Figure 3. Reductions in fatal crashes were estimated by applying the reduction in risk of fatal outcome, estimated from the fitted relationship in Figure 4, to the estimated casualty crashes. The economic analysis of different levels of operating hours of randomly-scheduled overt mobile speed cameras on Perth arterial roads is shown in Table 3. Reductions in casualty crashes were estimated from the fitted relationship in Figure 5 after recalibration of the hours needed to achieve the same crash reductions in WA compared with more heavily-trafficked Queensland. The detection rate of speeding offences per camera hour has fallen logarithmically as camera hours increased in Queensland, resulting in the estimated speeding tickets issued from overt mobile cameras growing substantially less than those from covert cameras. In both cases, the estimated number of tickets is short term until speeding transgression rates reduce in response to the more threatening speed enforcement.

Recommended speed enforcement package

Following analysis of the type illustrated in Table 2 and 3 for each of the enforcement options at various levels of operation (number of devices and/or hours operated), a package was

Table 2: Economic analysis of increase in covert mobile speed camera operations on Perth's arterial roads

Speed camera hours per month	Speeding tickets issued per month (short-term)	Marginal BCR for next increase in hours	Program BCR (above base level)	Casualty crash reduction	Fatal crash reduction	Fine revenue per month (\$'000)	Program cost per month (\$'000)
3000	30,000	22.7	0.0	0.0%	0.0%	3000	221.1
4000	40,000	14.3	4.4	3.2%	24.2%	4000	289.9
5000	50,000	10.0	5.9	5.5%	38.9%	5000	358.8
6000	60,000	7.6	6.3	7.4%	48.7%	6000	427.6
7000	70,000	6.0	6.4	9.0%	55.8%	7000	496.4
8000	80,000	4.9	6.3	10.4%	61.1%	8000	565.2
9000	90,000	4.1	6.1	11.5%	65.3%	9000	634.1
10000	100,000	3.5	5.9	12.6%	68.6%	10000	702.9

Table 3: Economic analysis of increase in overt mobile speed camera with randomised scheduling on Perth's arterial roads

Speed camera hours per month	Speeding tickets issued per month (short-term)	Marginal BCR for next increase in hours	Program BCR (above base level)	Casualty crash reduction	Fine revenue per month (\$'000)	Program cost per month (\$'000)
3000	30,000	21.9	0.0	0.0%	3000	221.1
4000	33,020	16.6	4.5	7.1%	3302	289.0
5000	34,500	13.3	6.5	12.7%	3450	356.7
6000	34,760	11.1	7.4	17.2%	3476	424.2
7000	34,010	9.6	7.8	21.0%	3401	491.5
8000	32,390	8.4	8.0	24.3%	3238	558.8
9000	30,000	7.5	8.0	27.3%	3000	625.9
10000	26,940	6.8	7.9	29.9%	2694	693.0

developed based on the economic value of each enforcement program and the overall contribution to reducing road trauma in WA while avoiding overlap of enforcement operations on each part of the road system (Cameron and Delaney, 2006). The aim was to identify a package which, when fully implemented, would produce at least 25% reduction in fatal crashes, somewhat smaller reductions in less-serious casualty crashes, and have maximum cost-benefits in terms of the return on social cost savings for the investment.

The recommended enforcement programs, together with the level of input and the expected speeding ticket processing requirements (at least short-term), are shown in Table 4. Table 5 shows the estimated crash savings per month, valued in terms of social costs (in 2005 prices), and then aggregated across the package components to provide the overall impacts for the full WA road system. The aggregated benefit-cost ratio for the total social cost savings from the package, relative to the total package cost per month, is also calculated in this way.

The level of input recommended for each of the programs with variable intensity (mobile cameras and moving-mode radar units) was generally chosen on the basis of maximum program BCR and the potential contribution to achieving the targeted reductions in road trauma. The other enforcement options were generally constrained by the size of the road environment and/or the locational density of the crashes the enforcement was aimed at. The recommendation to operate the 24 fixed speed cameras on Perth freeways overtly, and intermittently aiming to detect about 10,000 speeding tickets per month (short-term), was based on experience from Sweden. The Swedish fixed camera program covers 120 highway routes totalling 2,500 kilometres with spacing of about 2.9 kilometres between cameras. Any one camera may be operational only 3-4% of the time, but because there may be 7-15 cameras in a row, drivers are deterred from speeding along the full route (Cameron 2008). If operated continuously, the 24 fixed cameras on Perth freeways were estimated to detect about 35,600 speeding tickets per month based on the traffic flows past them (Cameron and Delaney 2006).

The Swedish experience suggested that this level of ticketing could be unnecessary. The economic analysis of point-to-point speed cameras indicated that they would be cost-beneficial on Perth freeways and on parts of the urban and rural highway system where they would be suitable (Table 6). Specific recommendations to replace the recommended enforcement

programs (Tables 4 and 5) in whole or in part with point-to-point speed cameras, while economically warranted, were not made because of the need for further investigation of the nominated links, for example, examining the speed profile along the link (Cameron 2008).

Table 4: Recommended speed enforcement programs

Speed Enforcement Program	Speed Enforcement Hours per month	Speeding Tickets Issued per month (short-term)	Program BCR	Program Crash Reduction		
				Medical treatment crashes	Hospital admission crashes	Fatal crashes
URBAN ROADS (Perth)						
Covert mobile speed cameras on urban highways	9,000	90,000	6.1	11.5%	11.5%	65.3%
Laser speed detectors at black spot sites on urban local roads	1,025	3,413	29.78	3.76%	4.46%	4.46%
Overt fixed speed cameras on Perth freeways	Intermittent at 24 sites	10,000	9.33	7.76%	15.52%	15.52%
Total for urban roads		103,413	8.14	6.0%	6.2%	24.9%
RURAL ROADS (Rest of WA)						
Overt mobile speed cameras randomly scheduled on rural highways	3,000	10,000	37.4	28.5%	28.5%	28.5%
Mobile radar units on rural local roads	15,000	11,250	6.3	24.1%	24.1%	24.1%
Total for rural roads		21,250	11.84	26.2%	26.4%	26.8%
Total package for WA roads		124,663	10.08	9.0%	12.3%	26.0%

Table 5: Economic benefits and costs of the recommended speed enforcement programs

Speed Enforcement Program	Crash savings per month			Social Cost Saving per month (\$'000)	Program Cost per month (\$'000)	Fine Revenue per month (\$'000)
	Medical treatment crashes	Hospital admission crashes	Fatal crashes			
URBAN ROADS (Perth)						
Covert mobile speed cameras on urban highways	10.7	3.0	1.11	3,974.6	634.1	9,000
Laser speed detectors at black spot sites on urban local roads	5.2	2.4	0.11	1,551.5	51.9	341
Overt fixed speed cameras on Perth freeways	1.2	0.7	0.04	441.3	47.3	1,000
Total for urban roads	17.0	6.1	1.3	5,967.4	733.3	10,341
RURAL ROADS (Rest of WA)						
Overt mobile speed cameras randomly scheduled on rural highways	6.5	6.4	1.13	5,673.9	151.8	1,000
Mobile radar units on rural local roads	6.2	4.9	0.62	3,864.0	653.5	1,125
Total for rural roads	12.7	11.4	1.7	9,537.9	805.3	2,125
Total package for WA roads	29.8	17.5	3.0	15,505.3	1,538.5	12,466

Table 6: Freeways and highway links economically warranted for Point-toPoint speed cameras

Region	Roads warranted for Point-to-Point camera systems	Total Length of Links (km)	Reduction in fatal and hospital admission crashes	Reduction in medical treatment crashes	Point-to-Point system capital cost (\$)	Speeding Tickets issued per year (short term)	BCR
Perth metropolitan	Freeways	74	33.3%	12.6%	4,900,000	496,758	10.35
	Other links in top 40	248	33.3%	12.6%	4,450,000	218,210	16.54
Non-metro-politan	Links in top 40 ranked by BCR	2,990	33.3%	12.6%	11,800,000	133,591	15.76

Conclusions

A package of speed enforcement programs was defined for the WA road environment which recognised its relatively unique characteristics of vast size and light traffic density, except in Perth. The evidence of the effects on speeds and road trauma in other jurisdictions due to speed camera systems and manual speed enforcement methods was reviewed and synthesised to provide strategic understanding of their mechanisms. For some speed enforcement options, it was possible to calibrate the road trauma reductions against the operational levels.

From this research base, it was possible to define a suitable speed enforcement method for each part of the WA road system and calculate the road trauma reductions and economic benefits if operated at each level. The recommended speed enforcement package, when fully implemented, is estimated to produce 26% reduction in fatal crashes, 12% reduction crashes resulting in hospital admission, and 9% reduction in medically-treated injury crashes. These effects correspond to a reduction of 36 fatal, 210 hospital admission and 357 medically-treated injury crashes per annum.

The package is estimated to provide a saving of at least \$186 million in social costs per annum. The total cost to produce these savings is estimated to be \$18.5 million per annum. Thus the benefit-cost ratio of the package is estimated to be at least 10 to 1. The inclusion of point-to-point speed cameras in the package, replacing the fixed cameras on Perth freeways and other recommended enforcement options on parts of urban and rural highways, where economically warranted, could make the package more cost-beneficial and effective.

Notwithstanding WA's uniqueness, the methods developed in this research have universal applicability and can be used to define speed enforcement strategies in other jurisdictions.

Acknowledgements

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Road Safety Literature

Book Review



By Dr Stephen Jiggins,
Associate Fellow, ACT and
Region Chapter.

Sarah Redshaw, *In the Company of Cars*, Ashgate Publishing, 187 pp., Hard Cover.

In the October 13 (2008) edition of the Melbourne Herald Sun, Australia's largest selling newspaper, there was substantial coverage given to the results of the Bathurst 1000 car race. The same edition also contained a major story about the deaths of a learner-driver and his passenger: both had allegedly been drinking before going on a high-speed joy ride which resulted in their deaths. The learner-driver tragedy was accompanied by a Reader Poll on the question "Are L plate drivers a menace?"

The paper's cartoonist, Mark Knight, linked the two stories in his daily cartoon. The cartoon showed an ordinary sedan with the number-plate "Hoon", enveloped by a phantom vehicle representing the winning car at Bathurst. The caption for the cartoon read "Not Craig Lowndes" – Craig Lowndes is a professional driver and the winner of this year's Bathurst race. The clear inference from the cartoon is that young male drivers, fixated by speed and power, are likely to be influenced by broader social activities like motor racing.

Sarah Redshaw's book is likely to lead the reader to a similar conclusion. Redshaw notes that speeding appears to be implicitly condoned in the broader social and cultural context through such forms as motor vehicle advertising and the media. Indeed while the Herald Sun has a long history of supporting road safety initiatives, and voicing concern over crash rates and trends, the paper's coverage of the Bathurst race highlighted the thrill and excitement of high speed driving: "Roarest pleasure at the Great Race" read one headline. The dichotomy embodied within the motor vehicle, between a form of transport and the embodiment of cultural identity, is well recognised by road safety authorities and is evident in the design and marketing of new motor vehicles.

Redshaw observes that cars are not simply neutral transport technology: consumers are very attached to their vehicles and

particular cars are seen as saying something about the individual who owns them. While drivers have traditionally been blamed for mishaps and disasters, the book raises the importance of considering the interaction between car and driver. In this context cars are seen as dangerous machines that are articulated in particular ways related to the type of car as well as the characteristics of the driver. High performance vehicles and inexperienced male drivers are an obvious example of the increased risk associated with some of these articulations.

These characteristics are explored through data from a range of Focus Group studies and related areas of research about the cultural meanings of the motor vehicle and how these exceed the practical need for mobility. The Focus Group research with young people showed distinct differences between young men and women and the impact of cars in terms of shaping their evolving identities. A range of studies have demonstrated that young men tend to engage in behaviours that are more dangerous and risk related. Redshaw examines the social norms impacting on these behaviours, noting that it is evidently an important part of the social performance of young men to demonstrate a willingness to take risks in cars. The implications of this observation for road safety authorities are significant.

One of the major themes in the book is the social and cultural nature of driving and the institutional support given to the car as the dominant mode of personal transport – one needs only to consider the enormous need for parking areas and the negative impact on streets and other public places. Redshaw notes that the sheer weight and 'bullying' power of a motor vehicle compared to a pedestrian or cyclist evokes a power that it is not available to those that are not motorized, suggesting that with the growth of car use, pedestrians and others are simply bullied out of the way.

The book argues that there is a need to review current transport policies, with their emphasis on driver centered values, to a greater recognition and focus on the community aspects of mobility, so that places are primarily designed for people and not for motor vehicles.

There are parallels between Redshaw's observations and other areas of social policy. For example, during the the Royal Commission into Aboriginal Deaths in Custody. Commissioner Dodson commented on the existence of institutional racism in relation to the dealings between institutions and Aboriginal people. Institutional racism (or structural racism or systemic racism) refers to a form of racism which occurs specifically in institutions such as public bodies, corporations, and universities. The term has been defined as the collective failure of an organisation to provide an appropriate and professional service to people due to a particular attribute. In relation to

racism, the attribute is colour, culture or ethnic origin". In terms of mobility, the attribute is motor vehicle travel.

The motor vehicle dominates our social environment and apart from the significant social costs associated with deaths and injury, society is now facing impacts associated with the continued use of fossil fuels: both economic and environmental. While the move towards alternative fuels and less powerful engines makes perfect sense from an environmental perspective, the implications are that society will need to move away from high levels of privately owned motor vehicles and its attachment to the internal combustion engine and its 'fire power'.

What one appreciates from reading this book is the difficulties faced by policy makers, themselves embedded within existing social and institutional frameworks, towards addressing future mobility needs in a more ethical and sustainable way.

Road safety authorities face more immediate challenges in combating the contradictions of the car: the fantasy of increased power and speed and the reality of increased crash risk. As noted in the final chapter "The vision of mobility engineered by consumer culture is not appropriate for safer, more economical, environmentally and socially friendly mobility".

I think we can all agree with that.

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Australian Transport Safety Bureau (ATSB)

Train and Truck Crash in South Australia

http://www.atsb.gov.au/publications/investigation_reports/2007/RAIR/rair2007008.aspx

An investigation report was released on June 27, 2008, concerning a crash at a railway level crossing with Moloney Road, at Virginia, South Australia on 13 December 2007. A tandem tip truck loaded with a 'bobcat' excavator drove into the side of the Sydney to Adelaide, Indian-Pacific passenger train at the passively controlled level crossing. As a result of the collision, the truck driver was seriously injured. The locomotive drivers were shaken but not hurt. There were no injuries to passengers or hospitality staff.

The investigation concluded that the crash occurred because the driver of the truck entered the level crossing while a train was on the crossing and that he did not come to a halt at the level crossing 'Stop' sign. It is likely that the truck driver was not expecting a train at the level crossing and accordingly did not stop. The post-investigation recommendations include a review of the Australian Level Crossing Assessment Model (ALCAM) with respect to (a) assessing the risks associated with level crossings having a history of incidents/accidents (b) specific measures to reduce the road/rail interface risk at the Moloney Road level crossing.

Railway Level Crossing Safety Bulletin

http://www.atsb.gov.au/publications/2008/rail_bulletin.aspx

Crashes at level crossings

Although fatalities resulting from crashes between road vehicles and trains at level crossings have reduced by about 70 per cent since 1970, there have been an increasing number of crashes involving heavy road vehicles in the recent period.

In the period April 2006 to December 2007 the ATSB investigated 12 level crossing accidents. Of these, nine involved heavy road vehicles and four were collisions with long distance passenger trains. In addition, during the same period State authorities have investigated a further three significant crashes between heavy vehicles and passenger trains.

The loss in these crashes has been 19 deaths (13 on board the trains and 6 occupants of the road vehicles) and over 60 people have been injured. The damage bill is estimated at well over \$100 million.

International

Helena Stigson, Maria Krafft, and Claes Tingvall – "Use of Fatal Real-Life Crashes to Analyze a Safe Road Transport System Model, Including the Road User, the Vehicle, and the Road" *Traffic Injury Prevention*, 9:5, 463 — 471, URL:<http://dx.doi.org/10.1080/15389580802335240>

Objective. To evaluate if the Swedish Road Administration (SRA) model for a safe road transport system, which includes the interaction between the road user, the vehicle, and the road, could be used to classify fatal car crashes according to some safety indicators. Also, to present a development of the model to better identify system weakness. Methods. Real-life crashes with a fatal outcome were classified according to the vehicle's safety rating by Euro NCAP (European Road Assessment Programme) and fitment of ESC (Electronic Stability Control). For each crash, the road was also classified according to EuroRAP (European Road Assessment Programme) criteria, and human behavior in terms of speeding, seat belt use, and driving under the influence of alcohol. Each crash was compared with the model criteria, to identify components that might have contributed to fatal outcome. All fatal crashes where

a car occupant was killed that occurred in Sweden during 2004 were included: in all, 215 crashes with 248 fatalities. The data were collected from the in-depth fatal crash data of the Swedish Road Administration (SRA).

Results. It was possible to classify 93% of the fatal car crashes according to the SRA model. A number of shortcomings in the criteria were identified since the model did not address rear-end or animal collisions or collisions with stationary/parked vehicles or trailers (18 out of 248 cases). Using the further developed model, it was possible to identify that most of the crashes occurred when two or all three components interacted (in 85 of the total 230 cases). Noncompliance with safety criteria for the road user, the vehicle, and the road led to fatal outcome in 43, 27, and 75 cases, respectively.

Conclusions. The SRA model was found to be useful for classifying fatal crashes but needs to be further developed to identify how the components interact and thereby identify weaknesses in the road traffic system. This developed model might be a tool to systematically identify which of the components are linked to fatal outcome. In the presented study, fatal outcomes were mostly related to an interaction between the three components: the road, the vehicle, and the road user. Of the three components, the road was the one that was most often linked to a fatal outcome.

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