

Road Safety Towards 2010

An evaluation and expert views on what
should be done in the next 7 years to achieve
the target of reducing the national road toll



Sponsored By:



The Australasian College of Road Safety Incorporated

The College was established in 1988 as an association for people and organisations working in road safety. The College values experience as much as academic qualifications in its members, who come from a wide range of disciplines. These include traffic engineers, epidemiologists, road trauma specialists, researchers, driver trainers, enforcement agencies, policy makers, transport manufacturing industries, motoring associations, insurance companies and many others who have a stake in road safety.

College Activities

- National conferences and seminars;
- Annual visiting lecturer program;
- State and regional chapter programs such as local seminars, forums and guest lecturers;
- Workshop series;
- Joint conferences with related organisations;
- Submissions to governments on road safety issues;
- Promotion of best practice in all facets of road safety.

College Objectives

- To foster communication, cooperation and support among workers in road safety;
- To disseminate information on road safety and traffic education;
- To encourage community groups to work for the reduction of the road toll;
- To encourage the professional assessment, evaluation and monitoring of road safety programs and to promote those most effective in reducing road trauma;
- To provide a forum for the promotion of workable road safety programs;
- To encourage the provision of care and support for victims of road trauma.

College Executive Committee

An Executive Committee elected by the members is responsible for the running of the College, supported by the staff at Head Office in Canberra.

President:

Assoc. Professor Raphael Grzebieta, Dept of Civil Engineering, Monash University, Victoria

Co-Vice President and ACT and Region Representative:

Ms Kerry Smith, Dept of Health and Ageing, Canberra, ACT

Co-Vice President and RoadWise Editor:

Mr Colin Grigg, EastAust Mgt. Unit, Armidale, NSW

Treasurer:

Mr Jeff McDougall, Managing Director, Trent Driving School, Sydney, NSW.

Secretary and SA Chapter Representative:

Mr Paul Simons, Tonkin Consulting, Adelaide SA

Queensland Chapter Representative:

Mr John Lee, Brisbane City Council, Brisbane QLD

WA Chapter Representative:

Mr Peter Waugh, ARUP, West Perth WA

NSW (New England) Chapter Representative:

Mr David Steller, Armidale Dumaresq Council

Victorian Chapter Representative:

Ms Anne Harris, RACV, Melbourne, VIC

New Zealand Chapter Representative:

Mr Craig Hill, LTSA.,
Wellington, New Zealand

General Members:

Ms Lori Mooren, Consultant, Birchgrove NSW; Dr Soames Job, Road Safety Strategy, RTA, Sydney NSW; Mr Barry Watson, CARRSQ, Queensland University of Technology, Brisbane, QLD.

Contents

Introduction

Message from the President of the ACRS - Raphael Grzebieta 3

Strategies

Road Safety - A Preventable Health Problem - Lauchlan McIntosh 4
 Plotting Progress For Road Safety Policy Development - Ann Williamson 6
 Ways Of Implementing Road Safety Measures - Ken Smith 11
 Why A National Safer Roads Project? - Lauchlan McIntosh 2
 'Magic Bullets' Lose Their Spell? - Colin Grigg 14

Driver Training and Education

Certificate IV, The Road Ahead For Driver Trainers And Licensing
 Authorities - Jeff McDougall 17
 Aboriginal Road Safety - A State Problem Or A National
 Concern? - Eve Somssich 20

Special Road User Categories

Young Drivers - Ken Smith 24
 Older Driver Safety - Anne Harris 26
 Employers' Contribution To Road Safety
 Targets - Lori Mooren and Phil Sochon 30
 Effects Of Alcohol And Other Drugs On Driver Performance - Edward Ogden 34

Enforcement

The Safety Camera Partnership In Victoria - Ray Shuey 37

Engineering Solutions

The Road Toll - To Get Rid Of It Permanently We Must
 Engineer It Down - Raphael Grzebieta 41
 Crocodile Tears For Heavy Vehicle Safety - George Rechnitzer 45
 Rollover: One Of The Road Safety Problems That Is Not
 Being Addressed - Shane Richardson 48

General

Safer Roads In A Changing Legal Environment - John Jamieson 52
 The Importance Of Rural Road Safety - Michael Henderson 54
 Roadside Memorials - Jennifer Clark 57

Message from the President

of the Australasian College of Road Safety



The bloodshed on our roads due to accidents is a terrible blight on our society. It destroys families, either kills or renders healthy people disabled for life, temporarily disables many others and lays a heavy financial burden on the Australian economy. No other human activity, be it either work, recreational or defence related, tolerates such carnage. To stop this carnage much more must be done. In response to this need to do much more, the Australian Transport Council (ATC), which comprises Federal, State and Territory Ministers responsible for transport, launched the National Road Safety Strategy in 2001. This Strategy is being implemented through a series of two-year Action Plans monitored and coordinated by the Australian Transport Safety Bureau. Two Action Plans have so far been developed.

A key objective of the National Strategy is to reduce the number of road fatalities per 100,000 population by 40% from 9.3 in 1999 to no more than 5.6 in 2010. With seven more years remaining to 2010, it is an appropriate time to assess progress to date and to consider how to achieve or even improve on the targeted reduction in road deaths. That is the theme of this Year Book. It draws together the views of some of Australia's leading road safety professionals, based on their own research programs and/or work related experience.

It is also fitting in the year that the World Health Organisation has chosen Road Safety as the theme for World Health Day on April 7th 2004 to be assessing what improvements in road safety have been achieved in Australia since the National Strategy was launched. That is also addressed in the following pages.

I strongly recommend this book to all who make decisions regarding road safety programs and expenditure. It contains a number of well-researched and achievable countermeasures, any one of which if implemented on a national scale, would definitely help to obtain what we would all like to see - a dramatic reduction in road trauma.

Proviso

The articles presented in this Year Book are the result of an invitation to members and friends of the Australasian College of Road Safety to submit papers on road safety issues that they personally considered important. The Year Book does not attempt to cover all aspects of road safety. While all the articles have undergone review by the Editorial Committee of the Executive Committee of the College, they essentially contain the views of the authors. The policies and programs presented in the articles have not been subject to the College's normal policy acceptance process. In that process policies only become official College policies after a majority vote of the members at a General Meeting.



Strategies

Road Safety - A Preventable Public Health Problem

by Lauchlan McIntosh, Executive Director, Australian Automobile Association

Poor road safety exacts a huge toll on Australian communities. Each year there are some 600,000 reported road crashes, taking 1,750 peoples' lives and injuring in excess of 200,000. Of the injuries sustained, 22,000 are serious, requiring long-term hospital and community care. According to the Bureau of Transport and Regional Economics, these often preventable road crashes waste more than \$15 billion every year in health, social welfare, lost productivity, insurance, legal, personal and other costs.

To put this into perspective, the economic cost of poor road safety is equal to Australia's annual defence budget, more than three times annual university funding, and, according to the OECD, is equivalent to over 3 per cent of GDP.

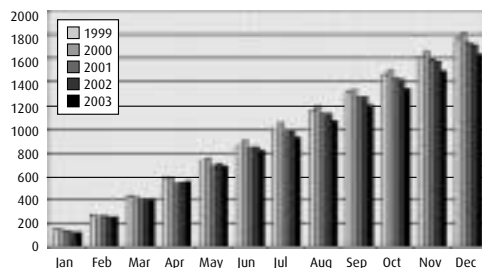
Traffic deaths and injuries are not only a national health issue, but also a growing global health issue. The World Health Organisation says traffic accidents will become the world's third-leading cause of death and disability by 2020, up from ninth today - a toll particularly costly because victims are so often young adults.

Recent Progress

Having witnessed the spectacular improvement in road safety statistics during the previous twenty years, the current plateau in the Australian road toll has been disheartening for those who have devoted themselves to saving lives. However, while making in-roads into what has proven to be an inflexible road toll is difficult, judging by this year's data it is not an insurmountable task.

Despite a poor Christmas holiday period (75 deaths in 2003/04 compared to 67 in 2002/03)¹, as Figure 1 shows, there were fewer people killed on our roads in 2003 than in recent years. By the end of the year, there had been 78 fewer deaths than by the same time in 2002. In pragmatic terms, that's an economic saving of over \$120 million for Australian society. More importantly though, that's countless family members and friends that have not had to suffer the loss of a loved one.

Figure 1 - Cumulative road fatalities in Australia by month

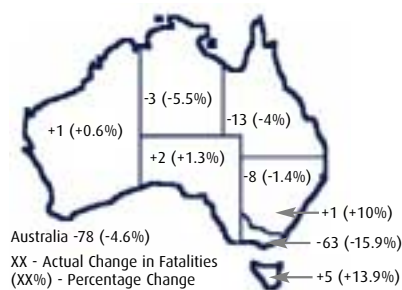


Source: ATSB Fatal Road Crash Database; State road authorities.

This improvement was led by Victoria, with a 16.0 per cent improvement on 2002 figures, equating to 63 lives saved. Although the exact reasons for this improvement are not yet clear, it seems that a tough stance on speed enforcement may have had something to do with it.

As shown in Figure 2, Queensland also made notable progress, with 4.0 per cent fewer fatalities than in 2002, equating to 13 lives saved. Unfortunately, South Australia, Western Australia, Tasmania and the ACT each suffered more road deaths in 2003 than in 2002.

Figure 2 - Change in fatalities between 2002 and 2003.

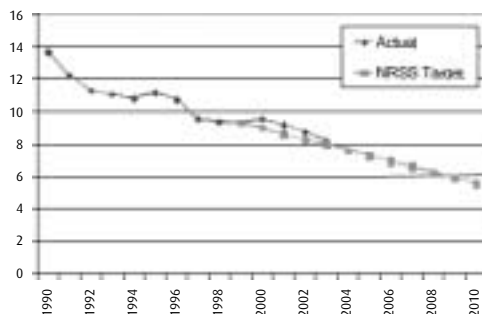


Source: ATSB Fatal Road Crash Database.

Greater efforts are needed

After languishing behind the National Road Safety Strategy target since its inception in 2001, it seems that Victoria has almost single handedly managed to put Australia's fatality rate back on track. As shown in Figure 3, the fatality rate in 2003 was around 8.20 deaths per 100,000 population - only slightly above the NRSS target for this year of 7.95.²

Figure 3 National Road Safety Strategy: Australian comparison of performance (1990-2003) against target (2000-2010).



1 ATSB Road Fatalities - Holiday Periods, as at 15/01/04.

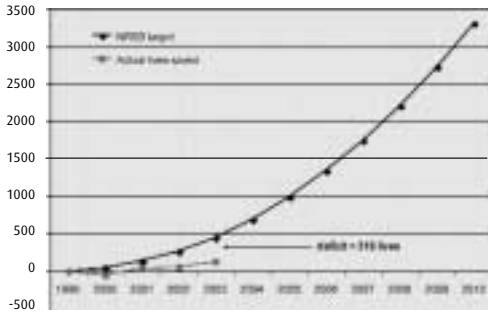
2 Assuming the NRSS target is to be met by a linear rate of improvement.

Despite the fact that we are technically back on target however, there is a long way to go. If we were to assume that the NRSS target of a 40 per cent reduction in fatalities per population was to be met by a simple linear rate of improvement over the eleven years to 2010, and projecting forward for population growth³, we would see a saving of around 3,298 lives. However, as is shown in Figure 4, when cumulative lives saved according to the target is plotted against actual lives saved since 1999 (the NRSS reference point), we see a deficit of 318 lives.

We need to ensure that we are on target every year, not just occasionally. To get back on track in terms of total lives saved, greater gains, and efforts, will have to be made in ensuing years.

What this demonstrates is that simply achieving the NRSS target by 2010 is not enough. To fully realise the potential of the Strategy, we must treat the journey towards the final target as at least as important as achieving the target itself. We need to ensure that we are on target every year, not just occasionally. To get back on track in terms of total lives saved, greater gains, and efforts, will have to be made in ensuing years.

Figure 4 - Cumulative projected lives saved using the NRSS target versus actual lives saved since 1999

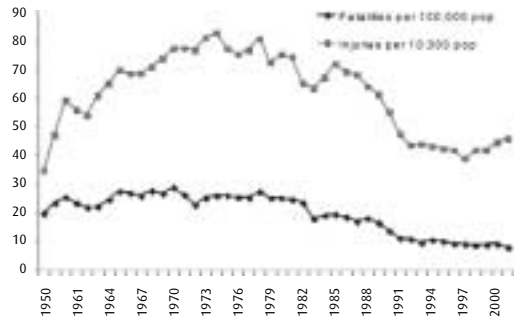


And while fatality statistics are important, unfortunately they tell only part of the road safety story.

For every person who loses their life in a crash, there are another 125 people who sustain injuries

Although the number of people killed each year on our roads has not risen during the past six years, there is evidence to suggest that the same cannot be said of injuries. For every person who loses their life in a crash, there are another 125 people who sustain injuries; some

minor, not requiring specific medical attention, some very serious, requiring long term care. For example, in NSW during each of the past six years there has been an increase in the number of people who have sustained injuries on the roads.



Source: NSW Roads and Traffic Authority (RTA), Statistical Statement - Year Ended 31 December 2001.

Conclusion

The improvement in last year's national road toll, compared with previous years, demonstrates that gains in road safety are possible. With a concerted effort, achieving the National Road Safety Strategy target should certainly be achievable, not just by 2010, but each and every year until then. It is important to remember however, that fatality rates tell only a part of the road safety story. Focussing solely on crashes that result in deaths might prove to be misleading, and ultimately detrimental for road safety planning.

3 Population projections based on "1% growth" projection as described by McDonald, P. and Kippen, R. (for the Business Council of Australia), "Population Projections for Australia", Australian Centre for Population Research, ANU.



Strategies

Plotting Progress for Road Safety Policy Development

By Ann Williamson, NSW Injury Risk Management Research Centre University of New South Wales

Acknowledgement: The impetus for this paper came from the recently formed Comprehensive Third Party (CTP) National Road Safety Group and a discussion paper prepared by Ross McColl and Geoff Vogt from the Motor Accident Commission in South Australia who identified the need for reliable casualty statistics to be produced as rapidly as are fatality statistics.

Nationally, and in most Australian states, the development of road safety strategy focuses on road fatality data. Media regularly report trends in fatalities across time and “league table”- type comparisons of fatalities for different types of road users and comparisons between states and even between countries are common. Information on road fatalities is used as an indicator to make decisions on where preventive action and resources are allocated. If there are problems with this indicator, we may be putting our efforts and finances into activities that are inappropriate and worse, unlikely to really lead to improvements in road safety outcomes.

The traditional use of fatality data is understandable as it has undoubted advantages. First, a data collection of fatalities can be defined readily as it is an unequivocal outcome, compared to other outcomes such as injury or crashes. This means that with fatalities we are always counting the same thing, whereas in data collections of injuries or crashes there may be problems in defining what to include. For example, do you include minor injury or non-casualty crashes? Second, fatality data is probably the most readily available data on road safety because there are (fortunately) manageable numbers, making it feasible to follow-up and validate the details on a case-by-case basis. In addition, the system is geared up to report fatalities through such organisations as the Australian Bureau of Statistics and reports from all road safety authorities, so reports can be timely. Third, it is easier to explain road safety information based on fatalities as they are readily understood by the general population and media.

Problems with road fatalities as indicators

There are some significant problems, however with only using fatality data to direct road safety strategy, the most important being that only focusing on patterns of fatalities may overlook the importance of other road safety problems. There are a number of examples that can illustrate this.

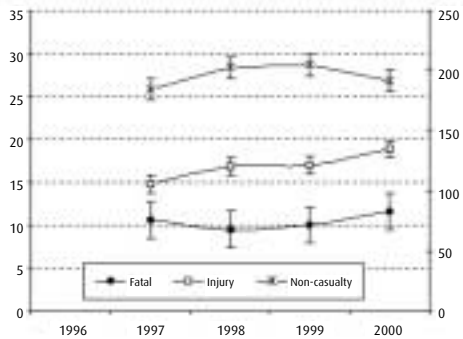
1. An analysis of the contribution of heavy vehicles to road safety in NSW (Williamson, Irvine and Friswell,

2003) showed that based on fatal crashes there has been no change in rates for heavy trucks. Based on injury-related crashes however, there has been a significant increase in crashes per registered heavy truck (see Figure 1). The

An analysis of the contribution of heavy vehicles to road safety in NSW showed that ... based on injury-related crashes, there has been a significant increase in crashes per registered heavy truck

analysis also showed increases in this period for injury-related crashes per kilometre travelled especially for crashes where the truck was the vehicle judged at fault. We could conclude, if only looking at fatality data, that crashes involving heavy trucks are not a major road safety problem and that these crashes are more to do with other vehicles than the trucks themselves, but analysis of non-fatal casualty crashes gives a different picture. There are a lot of them and they cost a lot.

Figure 1: Number of heavy truck-involved accidents per 10,000 registered heavy trucks



2. Analysis of pedestrian, bicycle and motorcycle crashes across Australia also showed different patterns between fatalities and injury crashes (see Table 1). Bicyclists accounted for only around two percent of road fatalities compared with pedestrians who accounted for around 15 percent of road fatalities. On the other hand, bicyclists and pedestrians accounted for similar proportions of road-related serious injuries, especially in 2001 (hospitalised for at least one night). Using only fatality information, therefore, we could conclude that pedestrian injury is considerably more important than motorcycle and bicycle injury, but the serious injury statistics would lead to a different conclusion, with motorcycle injury being placed first.

Table 1: Relative representation of bicyclists, motorcyclists and pedestrians among fatal and serious injury data in Australia.

	Fatalities ^a			'Serious' injuries ^b		
	2000	2001	2002	2000	2001	2002
Bicyclists	1.7%	2.6%	1.98%	5.3%	10.7%	n/a
Motorcyclists	10.5%	12.4%	13.1%	18.1%	19.4%	n/a
Pedestrians	15.8%	16.7%	14.5%	12.8%	11.9%	n/a

a = from ATSB (2003). Road crash data and rates Australian states and territories 1925 to 2000.

b = from ATSB (2003). Serious injury due to road crashes Australia, July 1999 to June 2002.

3. Reliance on fatalities data can also overlook the importance for road safety strategy development of less serious injury. A good example is the issue of whiplash injury, by far the most common injury involved in third party motor accident compensation schemes. For example, in NSW Motor Accidents Authority statistics whiplash accounts for almost 60 percent of claims, with the next highest group of claims, injury to upper or lower limbs, accounting for less than ten percent of claims in total. In South Australia, Motor Accident Commission figures also show a preponderance of claims due to neck injury, which accounted for 42.9% of total claims in 2002-2003; torso injuries were the next most common and accounting for 14.3% of claims. Furthermore, ATSB statistics suggest that neck injury increased significantly between 1999-2000 and 2001-2002. This type of injury clearly would not be considered in strategy development if only fatality data is used.

Injuries as indicators of road safety

These examples illustrate the point that analysis of injury and crashes in addition to fatalities can give us important insights into road safety and can provide other potential road safety targets. There are, however, a number of problems with using injury or crashes as outcomes that need to be taken into account to ensure that appropriate conclusions are being drawn.

Typically information on injuries is obtained through databases of hospitalisations, emergency department attendances or GP visits and most of the problems relate to the nature of injury data collections. One of the main problems is defining which types of injury will be included in a data collection. The representation of particular types of injuries and particular types of road user groups in hospitalisations, emergency department or GP visits databases may change from year to year for socio-economic and policy reasons. For example children are more likely to be admitted to hospital for injuries of lower severity than adults (Walsh and Jarvis, 1992), and the likelihood of hospital admission for even quite severe injury can vary across calendar years due to variations in hospital admission policies (Cryer, Langley, et al, 2002). Problems of defining severity and of different types of injury being included in a data collection mean that any injury counting may not be consistent or accurate.

In addition, sources of data on injury usually have relatively limited information on injury causes so they don't contribute a great deal to understanding how they occur. This also limits their usefulness for directing policy and strategy. Crash databases can provide good information on causes, but these databases also have problems of defining the types of crashes to be included. Again, changes in definitions, policies and procedures can mean that counting of crashes may not be comparable from year to year. Lastly, the large numbers of cases involved in injury or crash databases mean that information is usually not available very rapidly.

Where to from here?

As discussed in the previous sections, there is a good argument for broadening the information we use to evaluate and plan for road safety. In doing so, we don't want to ignore fatalities as indicators, but we need to be clear that they don't provide the full picture. Interventions aimed at preventing fatalities may have little effect or worse, negative or unanticipated effects on non-fatal cases. For example, reducing road deaths may increase more severe or moderate injury so increasing the burden of non-fatal cases. Injury data has the potential to provide greater insight into road safety problems and potential interventions, and if ignored may result in skewed priorities.

The concept of the fatality road toll can be misleading and may be one of the reasons why we will be having difficulties in achieving the targets set for the next few years

The road safety picture is therefore, much more complex than numbers and rates of fatalities. We need to ensure that we do not exchange simplicity of message on fatalities with the depth of analysis of road safety data that gives us better information on possible road safety interventions needed to make progress. The concept of the fatality road toll can be misleading and may be one of the reasons why we will be having difficulties in achieving the targets set for the next few years. As the situation is more complex, the targets should also reflect this. Better information and better road safety targets can be seen as part of the education of the public regarding road safety. This has always been an important component of road safety strategy.

There have been some recent promising approaches to developing better road safety indicators. These include the following:

1. Using existing specific-purpose databases like hospital admissions and CTP scheme claims. The ATSB has recently implemented a national serious road injury database that has been producing some useful information (ATSB, 2003b). In this database, serious injury is defined as road injuries requiring hospitalisations of one day or more so this database is likely to have problems of injury definition as discussed above. Nevertheless, this database is an important first step towards using non-fatality data at the national level.



2. Using systematic definitions to classify injury outcomes. The development of the Abbreviated Injury Scale (AIS) by the [American Association for Automotive Medicine (AAAM) (1985) is potentially an approach that will overcome many of the problems of using injury data to look at trends. The AIS is a coded scale for rating the severity of motor vehicle-related injury and has been used widely by accident investigation teams to standardise description of injuries. The scale describes an injury in terms of its anatomical location, type of injury and relative severity in terms of threat to life. Injuries are coded with increasing severity levels from 1-6. The scale can be used to define a specific severity level for reporting. For example, more serious injuries with AIS values above 3 are often associated with large amounts of blood loss from major artery rupture and serious head injury. Use of the AIS will require training of coders, which would add costs to data collection and reporting. However, there would clear benefits of taking this approach.



3. Linking of hospitalisation and crash databases. The Western Australian Road Injury Database is an on-going linkage of police crash reports and the details of casualties in these crashes that result in hospitalisation or death (Rosman, 2001). A similar linkage project is currently being undertaken by the NSW Injury Risk Management Research Centre. The benefits of linked databases are that information on both the types of injury and how it happened are available for each case. This helps to define better the injury outcomes from particular types of crashes and may help to develop better road safety indicators though clarifying the link between type of crash and injury severity. The linkage has some problems, particularly in missing cases and the time taken to get the data prior to linkage.

4. Public health approaches to injury indicators. There has been some significant discussion in the public health area on the development of systematic injury indicators that are also relevant to road safety. The general thrust of this work is to set out the criteria for a sound injury indicator (Cryer, Jarvis, Edwards and Langley, 2000) and to put forward indicators and test their validity (McClure, Peel, Kasulke and Neale, 2002; Cryer, Langley, et al, 2002). Some of the suggested approaches to public health indicators have included tracking injuries of sufficient severity such as road injuries that are admitted to a Trauma centre or tracking of specific injury types like spinal cord injury or long bone fracture. While this issue has not been resolved, a number of the suggestions show considerable promise as injury indicators.

Conclusion

What benchmarks does road safety need? It depends on the purpose. To track overall trends we need one or more road injury indicators that are consistent across time and unlikely to be influenced by extraneous factors. To evaluate the effects of specific changes in response to particular interventions, we need indicators that reflect those changes. For example, we shouldn't expect changes in fatality rates or even just crash rates when a considerable amount of road safety action is focused around education and information. Telling people about aspects of road safety is necessary, but may not result in the required behaviour change to affect fatality rates. Similarly, we shouldn't expect changes in national or even state fatality rates if road safety interventions are focused on specific parts of the road network as their effect may not be discernible in mass statistics. The indicators really need to be relevant to the specific road safety interventions undertaken. The apparent stalling of the current road safety fatalities indicator may be an instance of using an inadequate indicator for the sorts of changes that might be expected at this stage in road safety development.

Similarly, different indicators may be relevant for different purposes that the current fixation with road fatalities overlooks. While it is clearly essential to do all we can to avoid road fatalities, from the viewpoint of the agencies charged with picking up the pieces following a crash, we also need to avoid injuries that are costly in financial and personal terms. Unfortunately, strategies developed for reducing fatalities may not do anything for all types of crashes or injury. Clearly, we really need to look again at the best indicator or preferably the best set of indicators to be used to progress road safety in Australia. This means removing the blinkers that have focussed our attention unduly on fatalities and turning to development of new, more comprehensive data sources.

References

ATSB (2003a). Road crash data and rates Australian states and territories 1925 to 2000.

ATSB (2003b). Serious injury due to road crashes Australia, July 1999 to June 2002.

Cryer, PC, Jarvis, SN., Edwards, P. Langley, JD. (2002). Why the Government was right to change the 'Our Healthier Nation' accidental injury target, *Public Health*, 114, 232-237.

Cryer, C. Langley, HD, Stephenson, SCR. Jarvis, SN. (2002). Measure for measure: the quest for valid indicators of non-fatal injury incidence. *Public Health*, 116, 257-262.

McClure, RJ. Peel, N. Kassulke, D. and Neale, R. (2002). Appropriate indicators for injury control? *Public Health*, 116, 252-256.

Rosman, DL. (2001). The Western Australian Road Injury Database (1987-1996): ten years of linked police hospital and death records of road crashes and injuries. *Accident Analysis and Prevention*, 33, 81-88.

Walsh, SS. And Jarvis, SN. (1992). Measuring the frequency of 'severe' accidental injury in childhood. *Journal of Epidemiology and Community Health*, 46, 26-32.

Williamson, AM, Irvine, P and Friswell, R. (2003). What is the involvement of heavy trucks in crashes in NSW? Presented at the Road Safety Conference: Research, Education and Policing conference, Sydney, September, 2003.



**MOTOR ACCIDENTS
AUTHORITY**

**The Motor Accidents Authority of NSW
supports an evidence-based approach
to road safety and is a proud
sponsor of the ACRS Yearbook**

www.Arrivealive.com.au

www.maa.nsw.gov.au

Strategies

Ways of implementing road safety measures

by Ken Smith, road safety consultant and Fellow of the Australasian College of Road Safety

When implementing road safety measures the method of approach may be very important. When considering road safety measures one frequently first considers mass approaches like those aimed at drink driving, requiring legislation in several or all jurisdictions, the application of significant education, enforcement and other resources, or campaigns like those relating to fatigue with mass advertising and standard media presentations, but not requiring legislation. The National Road Safety Action Plan for 2003 and 2004 put greater emphasis on general measures (such as road system and black spot improvements, measures to combat drink driving). These are appropriate and necessary in many cases but can take up to years to put into effect, especially if they require prior research, legislation or significant budgets and the development of mass media campaigns and materials. Further, mass approaches may resonate with some parts of the community but not with others. They can appear remote from local concerns and lack flexibility.

For some road safety measures, other approaches may be effective. For example, the Proceedings of all recent annual road safety research, policing and education conferences carry a host of accounts of local projects undertaken with the guidance and involvement of local government road safety officers, community road safety groups and other community agencies, local police, and the like. Because these programs are locally focussed, involve personalities known to the town or community, and usually involve local media, they can be very effective in raising awareness and involvement and can have more impact than a campaign that originates from somewhere other than the local community, whatever its merits. Frequently the impact can be greater because of some local event of which the whole community is aware. Further, a small scale project in a community may also be able to function as a pilot for larger scale projects.

It is true that 'success' or effectiveness of local projects can vary widely. Problem areas include expertise of participants, measurement of effects, suitability of the methodology chosen, identification of confounding variables, evaluation. None of these is insurmountable, and the experience gained can be valuable for the conduct of future projects.

Several jurisdictions (two known examples are NSW and Victoria) already provide handbooks and other resources to help carry out local campaigns, including how to conduct research, approaches to marketing, obtaining sponsorship, obtaining community support, the kinds of activities that can be undertaken, and evaluating outcomes. State governments can further assist by providing local communities with reference to previous research on the

topic, and may be able to point to other community groups that have looked at it, and whose positive and negative experiences can be valuable. Where a topic is of wide interest and concern, a comprehensive handbook dealing with that subject area can be produced, together with guidance on methods of conducting and evaluating a local campaign.

This is not to say that legislation and mass approaches should be eschewed. I am of the view however that local campaigns and activities can have considerable merit, providing they are well founded, managed and evaluated, and the findings reported for the guidance of others. Local campaigns and activities can provide a useful supplement to mass approaches. Local activity can be more flexible and may be more effective for the reasons outlined above, especially on topics that may be controversial or on which the acceptability of the measure is uncertain.

Reference

National Road Safety Action Plan 2003 and 2004, Australian Transport Council, www.ATSB.gov.au



Strategies

Why a National Safer Roads Project?

by Lauchlan McIntosh, Executive Director, Australasian Automobile Association

A new paradigm

It was evident at the recent public hearing of the parliamentary inquiry into national road safety that there is a lack of new ideas among policy makers about how to significantly reduce the current road toll. The days of the 'silver bullet' – initiatives like random breath testing and compulsory seat belt laws – appear to be gone, and with them the impressive improvements of the final quarter of last century. For the past six years, Australia's road toll has remained stagnant at around 1,750 deaths each year.

More than ever, it seems there is a need to thrust the issue of road safety into the nation's social consciousness.

With this background it seemed timely to the Australian Automobile Association (AAA), the Australian Local Government Association (ALGA) and the Australian Trucking Association (ATA), who combined represent the majority of road users, for a new national approach that moves road safety from its current status as a narrow transport issue to the wider stage of being seen as a preventable public health issue.

More than ever, it seems there is a need to thrust the issue of road safety into the nation's social consciousness. The concept of a national Safer Roads Project grew from this belief.

As a way of giving this perspective, it is worth paraphrasing recent comments by the US Transportation Secretary, Norman Mineta - *"If we had 1,750 people dying in aviation accidents, we wouldn't have an airplane flying. People wouldn't put up with it. They ought not to put up with 1,750 uncles, aunts, mothers, dads, brothers and friends whose lives are cut short by traffic accidents."*

The national Safer Roads Project is about creating a paradigm shift in the way we, the Australian community, deal with the issue of poor road safety. For there to be substantial, sustained improvements in the road toll, we need to build a broad consensual agreement within the community that dying or being injured on the road is costly, tragic and preventable.

Improving roads

There are a number of ways to improve the death rate, many of which are behavioural. If everyone always wore their seatbelts for example, it is possible that up to 340 fewer people would die each year in crashes (around 20 per cent of

fatalities). The problem is that behaviour is notoriously difficult to influence. In the case of seat belts, it is only a determined few who continue to ignore warnings.

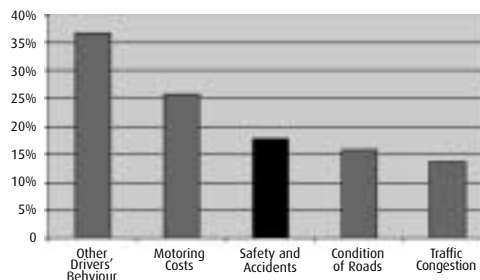
The fact is however, that the majority of crashes occur because of human error - but to err is human. The Safer Roads Project recognises this fact, and focuses not on behaviour itself, but instead on the one area over which we have the greatest control, roads. Our roads need to be designed to accommodate people's mistakes; they need to be more forgiving. Relatively simple upgrades can have a profound effect. By sealing road shoulders for example, crash reductions of 20-40 per cent can be achieved at a cost of as little as \$2 per sqm.¹

Shifting perceptions

The high cost of poor road safety should make it a major public policy issue. However, governments and politicians are highly reliant on community attitudes when setting the political and policy agenda, and at present, road safety does not rate as a major issue. As shown in Figure 1, motorists are less concerned with road safety (18 per cent) than they are with other motorists' driving behaviour (27 per cent) and the costs of motoring (26 per cent).

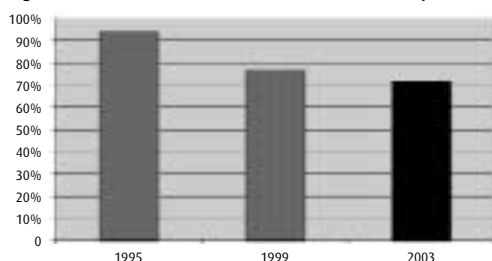
Figure 2 shows that during the past four years, the proportion of motorists concerned about road safety has declined from 94 per cent in 1995 to 72 per cent in 2003, partly reflecting efforts by governments to 'blame the driver' to avoid expensive infrastructure costs. This is despite the fact that the National Road Safety Strategy identifies improved roads as likely to contribute to almost half the targeted 40 per cent reduction in the fatality rate by 2010.

Figure 1 – Motorists' Main Issues in 2003.



Source: AAA National Survey of Motorists' Attitudes, 2003 (ANOP).

¹ McLean, J., presentation to the National Heavy vehicle Safety Seminar – A targeted contribution to the National Road Safety Strategy, October 2002.

Figure 2 – Total Concerned about Road and Car Safety.

Source: AAA National Survey of Motorists' Attitudes, 2003 (ANOP).

For there to be substantive improvements in our roads, there needs to be active community engagement in the process. The profile of road safety must be raised among policy makers.

The Safer Roads Project

The Safer Roads Project is designed to build this necessary community engagement. The project builds on a cooperative effort from all sections of the community – government, industry, community and business organisations, health professionals and road users.

The Safer Roads Project acknowledges that the National Road Safety Strategy (NRSS) provides a useful conceptual and practical framework for saving lives and avoiding injuries. However, Safer Roads sees that Strategy not as an end in itself, but as a stepping stone on the path to a long term goal of creating a broad consensual agreement within the community that dying or being injured on the road is preventable and therefore unacceptable.

The project will draw in community engagement largely through communication. Involvement in the Safer Roads project may be as simple as sharing information on the issues within organisations, linking websites to the Safer Roads website, using the Safer Roads logo on stationary and other public documents, branding any road safety related activities under the Safer Roads umbrella and publicly and privately supporting the project.

Safer Roads will complement the World Health Organisation's Year of Road Safety (2004) and World Health Day on 7 April 2004 which has a theme of road safety. The WHO makes the point that 125 people are killed in the world every hour – that is well over one million deaths per annum.

On a broader level, people from all walks of society can actively engage in making our roads safer:

Road users can contribute through safer road use, by recognising the importance of attention to the driving task and the road rules, and by eliminating the dangers – drink driving, speeding, failing to wear seatbelts and driving when fatigued;

Vehicle Manufacturers / Distributors can contribute by ensuring the rapid introduction of new technologies into their cars and trucks, by working with road authorities to ensure vehicle and road infrastructure compatibility, and by making safer vehicles their main priority - from design to manufacture and the marketing of their products;

Governments can contribute by building well designed new roads, by making existing roads more forgiving, by demanding safer vehicles through fleet purchases, by effectively regulating and enforcing vehicle and driver standards and by actively encouraging the adoption of Intelligent Transport Systems;

Business can help by actively promoting and rewarding safer road use by employees, suppliers and distributors, by demanding safer vehicles through fleet purchases and by using the Safer Roads brand to indicate their support.

Conclusion

The Safer Roads Project has grown from discussions with like-minded groups who believe it is time we fully recognised the unnecessary tragedy of road trauma and its impact on society, and give it the priority it deserves. Ultimately, the Safer Roads project is founded on a belief that it is not acceptable for policy to characterise poor road safety as an inevitable part of the transport system. We should place road safety in Australia into the context of the "vision zero" concept:

...any road related death or injury should be unacceptable...our eventual goal should be a zero road toll, and that is a possibility.

More information on the Safer Roads Project is available on the Safer Roads website www.aaa.asn.au/saferroads.



Strategies

'Magic Bullets' Lose Their Spell?

Colin Grigg, Management Consultant and Fellow of the Australasian College of Road Safety

The Road Toll Lingers

The problems arising from motorised human mobility are lingering. Reflection on the Christmas/New Year road toll alone is disturbing. Despite the gains made with various countermeasures, some of which may be still working, the overall effects are diminishing. The annual reduction in the road toll in recent years has stalled. At the present rate, the ten-year plan to 2010 will not be met.

Year	Deaths (Christmas/NY)	Annual Deaths
1995/96	71	2017
1996/97	86	1970
1997/98	82	1767
1998/99	73	1763
1999/00	75	1765
2000/01	75	1822
2001/02	58	1737
2002/03	67	1715
2003/04	75	(2003 figures not available)

What can be done to overcome various aspects of these problems and to find solutions between now and 2010? Reduction in death and injury and improvement in general health and wellbeing are the criteria.

Since 1970, the number of road fatalities has decreased in many OECD countries including Australia. While some of the countermeasures used in Australia were controversial at the time, in an international context, they can now be considered less controversial and more easily implementable in terms of the range of possibilities. During the late 1980s and early 1990s, however there has been a reduced rate of decrease in fatalities in some countries and even slight increases in other countries (OECD Scientific Experts Group 1994, pp 9 and 13). 'It is necessary to make the most efficient use of known countermeasures in order to reduce the number of accidents and, if necessary, to find, develop and implement new measures' (OECD Scientific Experts Group 1994, p 9).

Camkin (c1990) showed graphically how, in terms of fatalities per 100 million vehicle kilometres, there was an asymptotic regression, ie, a gradual reduction in effectiveness of countermeasures, resulting in fatalities gradually moving to a constant level or plateau. He predicted 'given that travel is still increasing, the prospect is

that fatal accidents will soon start to increase again, even if we keep the rate constant in per capita terms. In essence, we have either to breach the asymptote and /or reduce the rate of growth of travel'. This would require more effective application of countermeasures or reducing the use of private vehicles with car-pooling or public transport. Camkin referred to 'the dearth of "magic bullets", like compulsory seat belt wearing in Victoria in 1971, the 55 mph speed limit in USA in 1973 and random breath testing in New South Wales in 1982' as well as 'the prospect of "hitting the wall" of an asymptotic regression in fatality rates' (failure to make improvements in the road toll) as justification for a more coordinated and strategic approach.

There is recent evidence, including the graphical presentation of data (see Transport Safety Statistics Unit, 2000 and 2001), to show how a reduction in the number of casualties, indeed, has stalled over recent years.

Progress in Understanding the Problem

Although there was once an ad hoc approach to understanding the problem of traffic crashes, the gradual adoption of scientific method and technological application of research knowledge over four decades has facilitated the analysis of the fundamental causes and the proposal of solutions. Australia has the means to use scientific methods, technological applications and management techniques that, together, have gradually replaced the ad hoc approaches of the past.

Solving the Problem

One can justifiably ask the question - if an approach using scientific and managerial techniques has been adopted, why has the effect on road trauma stalled?

Partially, the answer is that the efficiency of adoption of science, technology and management has been retarded by parochial differences, vested interests and lack of collaboration and resources. In addition, the management of Traffic Safety has relied substantially on the 'process approach' that has used strategic planning, implementing countermeasures and evaluation of the effects. However, management also requires the 'systems approach' in which planned objectives (ends) are only one element in a complex set of criteria. The 'systems approach' focuses on the means to the ends or goals. One essential characteristic is the coordination of the means, which are comprised of a mixture of components, policies, countermeasures or interventions (Grigg, 1999).

Traffic Safety in Australia requires more attention to the resources and inputs (means). These include, adequate finance, political acceptance and support, cooperation and coordination between relevant organisations, standardised rules and regulations applicable to all Australian states and genuine community participation, including cultural change.

motor vehicles have caused more deaths on the roads than guns in war

Traffic management has to deal with a set of often-conflicting objectives. These include safety, efficiency, equity and environmental (ecological and social) impacts. There is a tendency for trade-offs to be made but a stronger commitment must be made to safety.

Since motor vehicles have caused more deaths on the roads than guns in war, yet the latter attract a national guns buy-back scheme (and rightly so), does not road trauma warrant a stronger commitment and more action and resources at a national level? Also, democracy does not necessarily require soft legislative options for serious problems.

Cultural Change

Although a strong lead must come from governments, it has been pointed out previously (Evans, 1991 and Brindle, 1991) that the largest potential gains in Traffic Safety depend on changes in social norms. In Australia, we have seen an example of this in community attitudinal change, over an extended period, to driving under the influence of alcohol.

Even when a government has taken the initiative, the community must still be involved (OECD Scientific Expert Group, 1994).

Brindle has explained the 'Darwin Matrix', used for classification of definitions and examples of "traffic calming". The matrix consists of six cells in two groups of three. Each group of three is subdivided into measures that are applicable spacially to (a) local/neighbourhood (b) intermediate/corridor/precinct (c) macro/city-wide.

The first group of three rely on physical control or engineering design treatments (technique). The second group of three involve social/cultural change (ethos).

The third cell of the second group (or sixth cell) represents attempts to bring about cultural change in attitudes to the motor vehicle and loss of choice in its use. Some examples of measures in this category include energy constraints, restrictions on travel choices, population control, telecommuting. Brindle describes this ultimate cell as representing examples that are 'harder and more long term'. The challenge is to move the community to this position, but 'the more drastic are the social changes that would be required'.

Evans concludes that the largest potential gains in Traffic Safety will be derived from 'encouraging and stimulating changes in social norms relating to driving in ways that are more conducive to safety and away from directions which

are inimical to safety'. This is a recommendation that implies that people should take steps to protect themselves. He points to the success in various health areas as an appropriate model for Traffic Safety which requires people to be convinced that they should not engage in high speed, high risk and drunk driving.



Brindle has pointed to cultural change as the ultimate scenario. Similarly, a call has been made for corporate culture to be developed in organisations operating vehicle fleets (MUARC). This has been promoted as a measure to counter the occurrence of 49% of all work-related deaths on the roads.

Questions Require Answers

As a result of the deficiencies in dealing with Traffic Safety, some of the 'magic bullets' are not being used to their inherent advantages and have lost some of their spell. Also, perhaps new 'magic bullets' (less palatable with existing social norms) could be introduced, e.g., transport pricing, driver selection, use of incentives and rewards, intelligent transport systems, programs for aged and young pedestrians and drivers, knowledge-based expert systems, social marketing, alternative travel modes.

Many questions can be posed. Are there new problems not engaged as yet? Will the positive effects of existing countermeasures continue to diminish incrementally? What current measures must be done better to improve the position? What new measures are likely to be tried? Will intelligent road and vehicle systems be an option that eliminates human error and driver discretion? Is the increase in traffic and its infrastructure economically sustainable? When will the employers of traffic safety professionals recognise the importance of career paths? Is 'community ownership' of the problem realistic or idealistic? Do we need a cultural shift to overcome the death and injury on our roads? Who will decide the agenda for future action?

We should all hope that these challenging questions are considered and new approaches adopted by 2010. These approaches should be managed by a 'systems approach' and may require social/cultural change represented in the sixth cell of the 'Darwin Matrix' - measures not tried before.



References

Brindle, R, 1991, 'What is Traffic Calming'? in Australian College of Road Safety, *Road Safety Position Papers*, pp. 9-13, University of New England, Armidale.

Camkin, H L, c1990, 'Strategic Planning for Road Safety in Australia', copy of unpublished paper in possession of the author, pp. 1-31, NSW Road Safety Bureau, Sydney.

Evans, Leonard, 1991, *Traffic Safety and the Driver*, Van Nostrand Reinhold, New York.

Grigg, C C, 1999, 'The Future: Whither Traffic Safety'? in Clark, J (Ed), *Safe and Mobile - Introductory Studies in Traffic Safety*, pp. 161-196, EMU Press, Armidale.

MUARC (Monash University Accident Research Centre), 'Review of Best Practice - Road Safety Initiatives in the Corporate and/or Business Environment.

OECD Scientific Experts Group, 1994, *Targeted Road Safety Programmes*, Organisation for Economic Cooperation and Development, Paris.

Transport Safety Statistics Unit, *Road Fatalities Australia: Monthly Bulletin*, December 2000 and January 2001, Australian Transport Safety Bureau, Canberra.

Driver Training & Education

Certificate IV: The Road Ahead for Driver Trainers and Licensing Authorities

By Jeff McDougall - President ADTA NSW

There has long been a need for driver trainers to take a much greater role in the education and development of competent and safe new drivers. The crash statistics are still showing alarmingly high figures for younger drivers, who are particularly vulnerable within the period immediately after licensing. While much has been done to make new drivers aware of the problem including restrictions on their driving, advertising campaigns, education programs and so on, the figures remain unacceptably high.

Some Researchers have stated that driver training has had little effect on the crash statistics in the past. There certainly has been much debate about the problem but perhaps it is the type and delivery of driver training that is the issue and that the time is right for driving instructors to take a much more comprehensive look at the way in which the job is done.

Safe driving practices are not inherent in many new drivers who are generally unaware of the dangers, and if safety is **not** to be learnt by scare experiences, or worse, by actual crashes after licensing, new drivers should be able to be taught by teachers who have the right qualifications to do the job properly. Safe and competent driving requires a systematic approach that enables learner drivers to acquire the skills in a logical and planned sequence over a period of time with each part or topic of the course covering the full range of introduction, explanation, demonstration, try it out, safety, practice and feedback questioning.

In Australia, prior to 1990 there was no specific course for trainee driving instructors other than training programs provided by individual driving schools in some States that literally did just enough to get the trainee through a fairly simple Driving Instructor's Test at the Licensing Authority.

There was no common theme to any of these training programs and as a result there was a huge variance in the standard of new driving instructors. There had to be a change in this system and in the late 1980's a full course for new driving instructors was developed by a group of driving school proprietors and TAFE in NSW, who had an interest in ensuring that instructors would be able to impart knowledge and training of a higher standard than otherwise would have been the case.

This course then became the recognized course for driving instructors in NSW and all existing Instructors were required to complete the course before December 1994 if they wished to continue as commercial driving instructors.

In 1995, the industry, through ADTA (The Australian Driver Trainers Association), in conjunction with licensing authorities, developed competency standards for driving

instructors, as this was the direction that training was taking at the time. From these competencies a Certificate III course was developed in Victoria that became the basis for training of driving instructors. This course had national approval for 5 years and was adopted across the country. At the same time ADTA developed a set of competencies for learner drivers, known as "The National Driver Competencies", which was the "what to teach" component of the course and these were available to any training organization that wanted to develop a Certificate III course for driving instructors.

Even though training was now becoming much more formalized, the age old problem of new drivers just doing enough training to pass the Driving Test was still there. This put pressure on the Driving Instructors generally (but with a few exceptions) who were gearing all of their training to just helping their students to pass the Test. This meant that the more difficult items to teach and test, such as the correct use of vision techniques, space, decision making and visibility, were neglected, along with the higher speed areas on the open road and freeways. It is these areas where many of our new drivers are being killed or seriously injured.

The development of a new Certificate IV course for driver trainers is a big step towards tackling these problems as it requires the Driving Instructor to plan well ahead in "what to teach, where to teach and how to teach" all the topics as laid out in the "National Driver Competencies". The new course also enables the driver trainer to thoroughly assess, as well as train, new drivers, a factor that was not evident in the previous Certificate III course.

For specific content on assessment and training, it was decided to align the course to Certificate IV in Assessment and Workplace Training. This is a generic course from the Business Services Training Package that is specifically designed to be adapted into any workplace environment. In this course it has been adapted to Driver Training.

A simple explanation of Certificate IV in Assessment and Workplace Training reveals two sections, assessment and training. These two sections are divided into: -

Prepare for assessment - assess - review assessment
Prepare for training - train - review training

The Course has been designed to educate and train driving instructors to teach driving or riding to new car drivers, motorbike riders and truck drivers covering the four areas of light, medium, heavy and combination. The core course was designed to train driving instructors to teach learner drivers to drive motorcars. The bike and truck

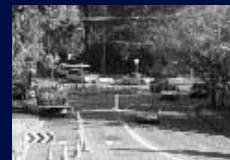


modules were designed by adding or reducing the modules of that course to meet specific needs of teaching in these vehicles. The course is made up of the following modules: -

1. IN-CAR SPECIFIC INSTRUCTION TECHNIQUES
Imparts the skills that enable the driving instructor to instruct learner drivers in all sections of driving. This module is conducted in-car.
2. UNIQUE INDUSTRY TOPICS
Covers such topics as safety, training routes and locations, dual controls, in-car instruction techniques.
3. VEHICLE DRIVING PROFICIENCY
This module ensures that the driving skills of the driving instructor are of the highest order.
4. THE DRIVING INSTRUCTION INDUSTRY
Covers such topics as industry structure, legal requirements, and accident and breakdown procedures.
5. ROAD LAW UNDERSTANDING
Ensures a complete knowledge of the road laws.
6. ASSESSING LEARNER DRIVERS
Covers the purposes and principles of assessment and the procedures to assess learner drivers.
7. DRIVER TRAINING STRATEGIES
Covers task analysis, competency establishment, learning outcomes, group-training strategies.
8. PLAN ASSESSMENT
Covers establishing evidence required, assessment methods, assessment tools.
9. REVIEW ASSESSMENT
Covers reviewing procedures and reporting of assessment.
10. PLAN AND PROMOTE A TRAINING PROGRAM
Covers identifying competency needs, development of a training program.
11. PLAN A SERIES OF TRAINING SESSIONS
Covers training requirements, development of training sessions, training materials, arranging resources.
12. DELIVER TRAINING SESSIONS
Covers prepare training participants, present training sessions.
13. REVIEW TRAINING
Covers record training data, evaluate training, report on training.

In order to understand how Certificate IV in Driving Instruction qualified Driver Trainers can use their training in the workplace, the following framework for topic delivery from no competence or understanding to full competence is presented.

- A lesson plan is developed.
- Research is conducted to find suitable locations for topic presentations.



These pictures show the progression of different locations for the topic called Roundabouts starting from the basic simple Roundabout through the practice area, then to multi-laned and complex.

- Training aids and support materials are gathered.
- The topic is sequenced within the driving framework to ensure logical and correct driver development.
- A dual controlled vehicle is provided.
- Student prior knowledge of the topic is ascertained.
- The topic is introduced to the student and outcomes explained.
- An explanation of what is required using the support materials and observations.
- A "try it out" phase for the student including feedback questions to ascertain comprehension.
- A practice regime to help gain knowledge and competence is commenced.
- The topic is applied in various situations and integrated into other topic practice.
- Continuous revision of the topic is commenced.
- The student's progress is recorded.
- The trainer's actions are recorded.
- Assessments are conducted to check levels of competence.
- The driving test will assess how well the training was conducted.

This process for the presentation, practice, skill development, and record keeping for all topics is fundamental to driving instructors if they are to be equipped to produce safer, more educated and competent new drivers. The record keeping process provides an audit trail for any external auditor such as the Licensing Authority, ADTA or Driving School Proprietor to monitor the driving instructor at anytime throughout the whole procedure.

The Driver Training Industry now has a course in place that can give driver trainers the ability to produce a safer, more educated and competent new driver.

The Driver Training Industry now has a course in place that can give driver trainers the ability to produce a safer, more educated and competent new driver.

The course places a great deal of emphasis on the safety aspects for all driving situations and the safety of the learner and trainer during the training process. For example, the RTA Statistics tell us that there are in excess of fifty thousand motor vehicle crashes reported to the police each year, of which about one third could be directly attributed to speed, alcohol and fatigue. There is plenty of publicity given to all three but there doesn't seem to be an explanation for what happened to the other two thirds where it would appear that the drivers involved just drove into a crash situation with no realization of what was to happen until it was too late to do anything about it.

The course provides driving instructors with a technique to help new drivers process the information, in a logical way that will recognize crash situations early and provide a course of action that, if followed, will help avoid the consequences. The Safety Factors of good vision and perception, the correct use of space, early decisions both voluntary and influenced, visibility and crash avoidance are well covered in the course, are simple to learn and can apply to all situations.

The "National Driver Competencies" devotes a complete module to these safety aspects along with another module that enables the driving instructor to develop attitudes and proficient driving techniques that meet community expectations with emphasis on such items as community problems that are caused by road crash trauma, the effects of risk taking behaviour on driver safety, the effects of peer pressure, opinions and beliefs on young driver behaviour, the reasons for road laws and regulations, the effect of drugs, alcohol and fatigue on drivers and the causal attribution theory. It should be said, however, that these items are difficult to cover in a comprehensive way, during a course of driving lessons where the main pressure on the learner driver is to pass a driving test as cheaply as possible.

The Driver Training Industry now has a course in place that can give driver trainers the ability to produce a safer, more educated and competent new driver. Course presenters must make sure that trainee driving instructors are fully competent in all aspects of the course before completion. The course is now being implemented in most States and Territories across the Country.

Testing Authorities must also realize that new learner drivers will only do enough preparation to pass the driving test, so if the new course is to have a longer term effect on the road toll, the driving test must reflect the ideals that are an integral part of Certificate IV. This will encourage, or indeed force, the driver trainers to keep up the high standards necessary to fully educate young drivers, rather than just train them to pass the test or to teach by just correcting mistakes, a common problem up until now.

There must also be a re-assessment of the speed limits for learner drivers. As most crashes occurring at high speed can result in death or serious injury it would be logical to be able to teach new drivers appropriate driving at high speed on the open road and freeways and also manoeuvres, such as lane changing and merging, which will better prepare them for solo driving. At some testing centers there are speed limits of 40 and 50KPH and the applicant is never able to prove that they can drive safely at even 60KPH. The restrictions for "P" drivers driving solo should remain in place except when they are accompanied by a fully licensed driver when the higher speed can assist in the supervised learning process.

There are good signs across the country that driving tests are being reviewed to provide improved testing and assessment procedures. This being the case it will provide a better alignment to the aims and objectives of these new training and assessing procedures that are contained in Certificate IV.

The Course is available on the National Register of Accredited Courses www.ntis.gov.au and can be purchased from the curriculum clearing house www.oten.edu.au/nswcccn at cost price.

The National Driver Competencies are available from the ADTA NSW, contact Allan Porter on (02) 9918 3590.

Further reading is available in the Learn to Drive Handbook by Kerry O'Sullivan, available at Angus and Robertson Book Stores.



Driver Training & Education

Aboriginal Road Safety - A State Problem or a National Concern?

By Eve Somssich, Manager, Driver Education & Training Unit Northern Territory University

In the Northern Territory Aboriginal people represent 28% of our population but account for over 50% of our annual road toll. This is an unacceptably high figure. The population demographics are as follows:

Northern Territory Population

- 190,000 Total residents
- 28% Aboriginal
- 70% Reside in remote communities
- Most speak English as a second language



The over representation of indigenous people in road trauma seems to be consistent in all states and Territories. Current Australian statistics record that Aboriginal people are three times more likely to be involved in serious road crashes than their non-indigenous counterparts. Some reasons behind this alarming trend are lack of seatbelt wearing, alcohol impairment by drivers and pedestrians, unroadworthy/unregistered vehicles, overcrowding in vehicles and lack of driver training and licensing just to name a few.

Only by placing Indigenous Road Safety on the National agenda will we get recognition and involvement from key stakeholders such as health, ATSI and education.

Aboriginal Road Safety is a completely unique and difficult area of study. It is not just a matter of educating people in best practice. It takes into account a whole host of issues experienced by a socially disadvantaged segment of our population, particularly in remote areas. Low levels of health, education, social justice and increasing levels of poverty, poor housing, sickness and alcohol abuse, all play a big role, a bad road toll being only one of many side effects. Only by placing Indigenous Road Safety on the National agenda will we get recognition and involvement from key stakeholders such as health, ATSI and education. This involvement is critical in making any substantial improvement in this area all over Australia.

I first became involved in Aboriginal Road Safety in 1998 when, as a driving instructor, I was involved in the development of the driver-training unit at Batchelor

Institute NT, a college specifically for indigenous students. The concept was to involve Aboriginal students in driver training whilst on campus attending other courses.

Many of the students attending Batchelor were enrolled in courses such as community and environmental health, teachers, short trades courses etc, for all of which a licence was imperative to deliver their services and do their job successfully. Unfortunately it was more common than not that these students had no licence and little opportunity of gaining one within their community, without assistance or relative training.

Due to time constraint and changes in Abstudy this didn't happen, so we made a decision to take driver training to the bush. It wasn't till I spent time in remote communities that I began to realise the enormity of the problems faced in these communities. It became apparent to me that much more needed to be done to address the problems and issues and that mainstream had completely ignored the indigenous predicament.

Major issues:

- Driver training in communities was virtually non-existent, extremely expensive and culturally inappropriate, so for most it just didn't happen causing many to drive without licences.
- Because most programs were developed for mainstream, communities had no ownership or relativeness to the programs.
- The extent of involvement of indigenous people in crashes is not understood by most community people with health issues, lack of housing etc taking precedent. The Northern Territory currently has the highest rate of murder and renal disease in Aust. Road safety was a sleeping issue and something that was accepted as a way of life if you travelled.



- Licensing was difficult as some remote communities have no police or licensing agencies and on paydays where police were present they were busy attending other police business such as fights and domestic violence, grog running and other issues related to influx of money.
- Most communities don't have garages or facilities where members can take their vehicle to be fixed for registration thus many drive unroadworthy, unregistered vehicles.
- Alcohol consumption and anti social behaviour contributes substantially to crashes and the list goes on.

I've seen many attempts to address the issues and have outlined a few major milestones.

April 1999

A major recommendation from the National Aboriginal Road Safety Conference, Darwin 1999 was to put indigenous road safety on to the national Road Safety Agenda rather than it just being a jurisdictional issue. At the conference workshop it became evident that many of the problems and issues highlighted were experienced by all states and not just a minority. It also identified that Aboriginal land borders were not the same as jurisdictional borders. As a consequence one community may have three different laws relating to one issue, as was the case with open load spaces in Central Australia. A working committee was formed to take outcomes of the conference to the then Federal Office of Road Safety, however two years later little progress had been achieved.

April 2002

It was with great excitement that I read an invitation to be involved in a National Indigenous Road Safety Working Group Forum. The forum was held in Adelaide, chaired by representatives from ATSB and hosted by Transport SA in June 2002. Finally it seemed that key stakeholders were listening to the many pleas made. For the first time a real opportunity to get a unified approach to Aboriginal Road Safety issues was platformed, to take the initiatives and put into practice nationally some of the great initiatives that have been developed to combat the high involvement of indigenous people in serious and fatal car crashes.

The document "Purpose and Terms of Reference of the Working Group" stated that as a means of providing an appropriate level of national coordination:

"The purpose of the Indigenous Road Safety Working Group is to provide expert strategic advice to the National Road Safety Strategy Panel about measures to reduce indigenous people's involvement in road trauma."

Participants from all state road safety councils, police and other interested Aboriginal Road Safety practitioners were invited to attend to form this "National Indigenous Road Safety Working Group". Many excellent initiatives were presented from all over NT, QLD, WA and SA. It was

clearly evident that much work has gone into developing strategies to deal with the issues. However, strategies and programs are of little use without the funding to put them into practice. Some of these programs have had great results but have up to now only been localised, spasmodic and ad hoc, aimed at crisis management and not to longer-term strategies and planning.



The forum achieved a number of actions to support and coordinate a National approach to Indigenous Road Safety. This included a welcome invitation to make an input to the development of the National Road Safety Action Plan 2003-2004.

December 2003

Where are we now? What improvements have been made and what has developed from the National Indigenous Road Safety meeting in Adelaide in June 2002?

To date there has been no other forum established or follow up workshop, which I feel, has led to a real stagnation in Indigenous road safety awareness.

To date there has been no other forum established or follow up workshop, which I feel, has led to a real stagnation in Indigenous road safety awareness. At the meeting, it was agreed that the Working Group would meet annually in conjunction with an annual Indigenous Road Safety Forum in order to develop and progress road safety programs. In fact, the National Road Safety Action Plan 2001-2002 contained the phrase "Conduct an annual Aboriginal and Torres Strait Islander Road Safety Forum". To my knowledge these requirements have not been met despite requests from a number of agencies.

The ATSB is very supportive of initiatives and recognises the huge need for indigenous based programs yet this commitment has very little financial backing with funding for programs still being at local levels. There have been a small number of programs that have been co funded by ATSB but unfortunately nothing that would constitute a "National" Aboriginal Road Safety initiative. The wheels of the funding process turn very slowly, which sometimes results and impacts on problems shifting and/or

accelerating before any real initiatives can be implemented to reduce road death rates.

However via a collaborative approach between a number of state agencies in Northern Territory, Western Australia, and South Australia one program has been developed as a result of recommendation from 1999 conference. This was the National Aboriginal Road Safety Video "*Corrugations to Highways*". The resultant video has turned out a huge success by commentators and audiences all over Australia. Funding and production of this video was achieved by each state combining resources and the initiative did eventually receive top up funding from ATSB to cover national distribution and a second reprint.

At the 2003 Road Safety Research, Policing and Education Conference, September 2003, it was with great consternation I listened to a recent research paper on "Behavioural patterns associated with fatal crashes involving intoxicated pedestrians" by Dr Peter Cairney (ARRB). Whilst the presentation was good and accurate, this research told us everything we already knew at the 1999 conference. Indeed we have even developed strategies to address the problem. To me this was just another example of money going to research without back up to put findings into action. There is much research funded in Australia but outcomes and strategies never seem to be considered in the funding equation. So we just have another research paper lying on someone's desk collecting dust while the problem continues.

Solutions:

Whilst I don't pretend to have answers to all the problems there are things I can see could improve the situation. There has been much effort by practitioners to develop some very effective strategies however these are still localised. I'm not suggesting that these strategies would work everywhere, they won't. Localised programs are needed to deal with local issues however there needs to be more national emphasis and attention to indigenous issues. Some states refuse to admit that they even have an indigenous road safety problem.

...there needs to be more national emphasis and attention to indigenous issues. Some states refuse to admit that they even have an indigenous road safety problem.

There are many meetings held to discuss issues but many times they are at the top level and very rarely do they involved the practitioners at the coal face. Thus the people implementing strategies are very rarely consulted and hear of outcomes second or third hand, by which time there is little they can do to provide relevant input. There needs to be more collaboration with practitioners and means by which practitioners can communicate results, successes and ideas such as the forums, rather than on the higher theoretical plane. Also people in the field often feel isolated and without support in what is sometimes a very frustrating and

unrewarding job. It is all too easy for other agencies to put it in the too hard basket because they do not fully understand the underpinning dynamics of the task.

The Northern Territory University's Driver Education Unit with funding from Territory Insurance Office has come up with some very successful programs to date.

1. Remote Area Community Driving Instructor program training people to be driving instructors within their own communities.
2. Remote Area driver training and licensing program. This course is designed for indigenous communities and takes in various levels of literacy using the University to undertake all assessments required by Motor Vehicle Registry for learners and C class licences.
3. Development of culturally appropriate resources for driver training and road safety such as assessments, videos and props. In the past all resources were focussed on mainstream having no relevance to indigenous community life or culture.



These are just a few with other states developing some very good programs of their own. Unfortunately whilst no one minds sharing knowledge and resources there is not a database that practitioners or even researchers can tap into to know what is available and how to access it. Thus we are not able to maximise the potential of some of these programs.

Many people claim to be specialists and experts in indigenous road safety, gaining their knowledge from books and statistics. But very few people have first hand experience or are aware of community and cultural dynamics that inhibit learning. When we look at the number of bureaucrats involved in indigenous road safety compared to the few technocrats in the field, the levels are extremely top heavy.

With diminishing budgets our task is becoming increasingly harder. Surely it would make more economic sense to utilise existing research and established proven programs. These could be promoted and sponsored in an Australia-wide campaign, rather than each state and region working independently at a greater cost, particularly when a program similar in nature could possibly be already working somewhere else in Australia (i.e., the old reinventing the wheel syndrome).



Priorities:

I have listed below a few priorities that I see from my view on the “coal face”

1. More state and practitioner collaboration and national focus on issues below.
2. More communication with people in the field
3. Pedestrian safety. With more indigenous people moving into urban centres the rate of indigenous pedestrians involved in fatal crashes is ever increasing.
4. Lack of seatbelt wearing by indigenous people
5. Licensing and registration issues in remote Australia.
6. Higher indigenous focus on road safety including all aspects such as alcohol, fatigue etc.
7. More qualified, experienced people at the coal face.

Whilst we continue to treat Indigenous Road Safety in a lacklustre fashion purely as a localised and state issue, little will be achieved other than ad hoc crisis management. To date much effort and funding has been placed into research and development of strategies to combat the unacceptably high involvement of Aboriginal people in serious road crashes throughout Australia. It is now simply time to put these actions into practice.

This is by no means a criticism of past practices but a platformed challenge to move ahead and be serious about addressing an area that for too long has been uncoordinated and spasmodic. What can we all do as stakeholders and road safety practitioners to make it happen? How can we better use our resources to bring about a national reduction in the indigenous road toll? It's up to the collective body of practitioners, policy makers and all representatives to find a solution. It should not just be left up to a few individuals or small organisations to put in place bandaid solutions to what is a real and alarming “National Problem.”

Special thanks to Snr Sergeant Hughie Tollan WA Police Road Safety and Inspector Jim Carter Aboriginal Road Safety Action Group SA for their input in this article.

Special Road User Categories

Young Drivers

By Ken Smith, Road Safety consultant and Fellow of the Australasian College of Road Safety

The National Road Safety Action Plan 2003-2004 (1) mentioned that measures specifically targeting particular road user groups were not always the most important means of achieving better safety outcomes for those groups (p.23). General measures such as road and road system improvements hold promise for specific vulnerable groups as well as the wider road user population.

Young and novice drivers are at greatest risk late at night and when carrying multiple passengers.

Nevertheless there are steps that can be taken for specific groups. Young novice drivers, for example, remain one of the most vulnerable road user groups and often have crashes that are emotionally charged and attract considerable media attention. Young and novice drivers are at greatest risk late at night and when carrying multiple passengers. Research undertaken by Monash University in the early 1990s on behalf of the Federal Office of Road Safety (The Young Driver Research Program) examined exposure reduction measures, including passenger restrictions. But when various young driver harm and exposure reduction measures were being considered following that research, passenger restrictions were rejected as a policy initiative, primarily on the grounds that they were unlikely to be effective. It was further concluded that night driving restrictions should be preferred on first principles (2, 3).

The analysis conducted at the time, from which that conclusion was drawn, showed that, for Victorian data for 1990 and 1991:⁽²⁾

- Drivers under 26 years had 13.2% of crash involvements while carrying two or more passengers (for drivers under 21 years, the equivalent figure was 16.2% of crash involvements)

- Young drivers had a higher proportion of their crashes while carrying passengers and, as crash severity increased, the probability that young drivers would be carrying multiple passengers increased
- Young drivers had more crashes between 10pm and 5am for all occupancy classifications
- Young people had more crashes between 10pm and 5am as vehicle occupancy increased
- For 18-20 year olds, there were two or more passengers in 28% of crashes in the period 10pm-5am (note that the absolute numbers in this case were small).

More recently Regan and Mitsopoulos ⁽⁴⁾ examined passenger influences on driver behaviour and found that different passengers had positive and negative influences on the behaviour of young drivers: for example the crash risk was elevated when peers were carried as passengers but reduced (compared to when carrying no passengers) when carrying an adult or a child as passenger.

Nevertheless Drummond ⁽²⁾ concluded that imposing passenger restrictions would not make young drivers barred from carrying passengers any safer. One possible effect of imposing passenger restrictions was exposure transfer: young people barred from travelling as passengers might instead drive their own cars and lead to an aggregate increase in crash risk. There might also be some exposure transfer to other groups, such as parents who would have to drive their children. Concerns were also expressed about equity and viability of imposing passenger restrictions.

There are a few points at which one might take issue with these findings, set out briefly below.

- Drummond found that if the aggregate crash risk resulting from exposure transfer was not increased, there were benefits of imposing passenger restrictions in the



late night period, estimated at 45% for novice drivers carrying two or more passengers, 37% for novice drivers carrying one passenger. This is a significant benefit

- It has been argued but not shown that exposure transfer would increase aggregate risk for young people. It is not necessarily so that all young persons who would be passengers would drive their own cars and that this would increase aggregate risk
- Where exposure transfer is to parents and other adults ferrying young persons, the risk is less than where the driver is young
- Some behaviours may not occur at all if passenger restrictions are imposed, especially at night (but some others involving young people in a number of cars might)
- Some journeys, especially at night when the risk is highest, might not be made if passenger restrictions are imposed.

There are also safety and equity concerns to be addressed. Imposing night curfews would affect the employment of some young people, but exemption permits could be obtained for those who have jobs affected by a curfew. It is not expected that passenger restrictions would have much impact here. Late at night public transport is less available and dangers increase, especially for young women.

There are two main reasons for imposing passenger restrictions. One is to reduce the road trauma impact should there be a crash – more likely in itself for inexperienced young drivers than for other road user groups. The second reason is that several passengers accompanying a driver, especially late at night, may of itself increase risk because of skylarking, peer behaviour or simple inattention.

...a case can probably be made for a late night ban (eg midnight-5am) on a P-plate driver carrying more than one passenger.

On the figures cited above and on the grounds of risk, a case can probably be made for a late night ban (eg midnight-5am) on a P-plate driver carrying more than one passenger.

The question of whether or not passenger restrictions (or for that matter night time driving restrictions) can be implemented with enough effect to make a difference has never been seriously examined. It appears to have been considered that resistance by young people (and possibly their parents and carers) and difficulties of enforcement mean that that these measures could not be implemented effectively, and they have not been further considered.

The first requirement is to establish whether passenger and night-time driving restrictions are or are not acceptable and enforceable. This can only be done by inquiry of those most directly concerned: young people themselves, their parents and carers, police, and so on. It may be that views have changed in the intervening years. It may also be that, on a matter that is controversial and probably difficult of



acceptance, the method of implementing and enforcing restrictions is highly important. This could be established through survey. It may be that on a measure like this where enforcement is difficult and compliance might be relatively low, the existence of the restrictions does at least two things: prevent some crashes from occurring and result in young people behaving so as not to draw attention to themselves, which may reduce risk. It is also possible that the mere existence of a ban, even if difficult to enforce, will provide moral suasion and backup to parents and carers who are concerned about the risks.

In an environment where the number of fatalities and serious injuries has plateaued and the 2010 national road trauma reduction target is in danger of not being met, potentially effective measures like this ought to be further considered. The Australasian College of Road Safety has advocated that this issue be re-examined, and that re-examination was the subject of a new policy statement, approved by members in 2003.

References

- National Road Safety Action Plan 2003 and 2004, Australian Transport Council, www.ATSB.gov.au
- Drummond AE (1994) Young Driver Research Program: A Technical and Strategic Overview of Exposure Reduction measures as a Means of Reducing Young Driver Crashes FORS, Canberra, CR 130
- Triggs TJ and Smith KB (1996), Young Driver Research Program: Digest of Reports and Principal Findings of the Research FORS, Canberra CR 164
- Regan MA and Mitsopoulos E (2001), Understanding Passenger Influences on Driver Behaviour: Implications for Road Safety and Recommendations for Countermeasure Development Monash University Report No 180 for NRMA-ACT Road Safety Trust

Special Road User Categories

Older Road User Safety

by Anne Harris, Chief Behavioural Scientist, RACV Public Policy Group

Today's road accident statistics show that older people are not particularly over-represented in driver and passenger deaths in absolute terms. However this is likely to change with the ageing of the population. By 2021, 18 per cent of the Australian population will be aged over 65 and this percentage will grow to 25 per cent by 2040. Not only will older people represent a large group of road users, they will also represent a large and influential voting and consumer group.

With the predicted changes in population demographics and mobility patterns, more older people will be involved in road crash casualties in the future (Charlton, Andrea, Fildes, Oxley, Morris, Langford and Johnson, 2002). In fact, predictions based on US data suggest that fatal crashes could be as much as *three* times greater than at present for the older age group over the next three decades, without active intervention. Similar increases in older driver fatalities are predicted for Australia due to the sheer increase in the population of older people (Fildes, Fitzharris, Charlton and Pronk, 2001).

...urgent work is needed to address the safety of older pedestrians, who last year, represented over 30% of all pedestrians killed in Australia.

Obviously, the "older driver safety problem" is one that will continue to grow in coming years, unless action is taken now. Even more urgent work is needed to address the safety of older pedestrians, who last year, represented over 30% of all pedestrians killed in Australia. With the population ageing, the number of older pedestrian deaths and injuries is likely to skyrocket.

So what are the factors affecting the safety of older road users and how do we ensure that this age group will not become a significant road safety problem in the future? It is important to firstly understand the factors that influence the safety of older people and then to develop sound solutions to improve the safety of older people both today and in the future.

Factors affecting the safety of older people

The key factors affecting the safety of older people are:

- Frailty - as we age, our bones become more brittle and we become more fragile. Frailty is a key contributing factor in all types of older road user crashes - of drivers passengers, pedestrians and motorcyclists. Older people are less able to withstand crash impacts and are also less able to recover from injuries caused in crashes.

- Health – as people age, the onset of health problems becomes more prevalent. Of course, health status varies enormously between individuals, regardless of age. However, some of the age-related health conditions that can impair driving are cognitive declines and visual impairments. Cognitive decline and diseases such as dementia and Alzheimers are considered to be the most serious conditions that impair driving. Second to cognitive decline are visual impairments. Many eye conditions are associated with ageing, and early detection and treatment is vital.
- Dependency on the car – as a society, Australia is very car dependant. The most common form of transport used on every trip is the private motor car. Future generations of older people will have driven for all of their adult lives and will want to keep driving for as long as possible. Creating viable and appealing alternatives will be important in the future if older people need to, want to, or should give up driving.

Some potential solutions

Addressing older road user safety in coming years needs to include initiatives to:

- ensure the health of older drivers via the education of health professionals and older people about fitness to drive;
- encouraging older people to purchase safer vehicles, given their increased level of frailty;
- create traffic environments that accommodate the needs of older drivers and pedestrians;
- assisting people who can no longer drive by providing feasible mobility alternatives.

Health

The role of health professionals in older road user safety is a vital one. Declining physical health is one of the key reasons many older people stop driving. Health professionals not only play a significant role in ensuring the medical well-being of their patients, but also in advising their patients about their fitness to drive safely and assisting with decisions about driving. Health professionals therefore need increasing information and assistance in identifying patients who may be at risk as drivers, and in communicating effectively with older people about their driving futures.

Encouraging older people to talk to their health professionals is also very important. Ensuring older people



have accurate information about their medical conditions and the effects of any medications they are taking will help older people stay safe on the roads for longer.

Vehicle design

Further research is needed to design vehicles that are safer for older people given that they are the age group of occupants that would benefit most from safer vehicles. Vehicle manufacturers should be encouraged to design vehicles that not only offer crash protection, but can also overcome some of the common difficulties older drivers experience. Improving the mirrors, seat belts and car seats to make getting in and out of cars easier, would benefit all drivers, particularly older drivers. In-car information technology, especially applications like collision warning systems, vision enhancement and navigation systems may also assist older drivers in the future.

Educating older drivers about vehicle safety features is also important. Research among older people has shown that vehicle safety is not a major consideration when selecting a vehicle. Older people, particularly older women do not access information about vehicle safety features, and many older people do not understand or believe that features like airbags and ABS brakes were effective safety devices (Seymour and Christie, 2003).

The purchasing power of older people will also increase in future years, when, due to their increased numbers, they will represent a larger and more lucrative segment of the car buying market (Transportation Research Board, 1988).

Only recently have the needs of older drivers been a priority area for traffic engineers and transport planners...

In the future, intelligent technology in vehicles may potentially be of great assistance to all drivers, including older drivers. Recent research in this area has concluded that older drivers would potentially benefit from using in-car information technology, especially applications like collision warning systems, vision enhancement and navigation systems. However, thorough evaluation of in-vehicle systems needs to include how older drivers interact and adapt to these systems. Measures need to be taken to ensure in-vehicle

systems do not add to the complexity of the driving task for older people, but make it easier and safer.

Traffic environment

Only recently have the needs of older drivers been a priority area for traffic engineers and transport planners, and to date only limited research has been conducted into how older driver safety can be assisted by engineering techniques. As older drivers will represent a large proportion of all drivers on the road in the future, such research and advancement is vital.

Engineering measures such as improving the placement, size and design of road signage, improving delineation, and reducing the amount of glare that the signs create, would assist older drivers whose visual acuity and glare recovery may have declined. Incremental improvements in the areas of highway signs, road markings, intersection design and street lighting can have a positive impact on the performance of older drivers.

Intersections are the most dangerous parts of the road network. Older drivers, more than other drivers, have difficulty negotiating intersections. Road crash statistics demonstrate this, as older drivers are far more likely to be involved in injury crashes while turning at intersections, especially unsignalised intersections (Fildes, Corben, Ken, Oxley, Le, Ryan, 1994). Subsequently, significant road safety benefits for all drivers, especially older drivers, could be achieved with the further installation of fully controlled traffic signals, that is, signals where there is an exclusive right turn phase.

Improving the traffic environment is also an important way of preventing older pedestrian crashes. Installing crossings in areas of high older pedestrian activity is one solution, as is addressing the road design in many built-up areas to ensure that safer traffic speeds can be achieved to help protect older pedestrians. Lowering speed limits in areas like strip shopping centres, for instance, may benefit older pedestrians, as these tend to be areas with a high incidence of older pedestrian crashes.

Other engineering countermeasures that would assist older pedestrians include the installation of intelligent pedestrian crossings, which vary the walk times on crossings, depending on the number of pedestrians using the crossing and the speed of the pedestrians.

Alternative Mobility

Ensuring that all older Australians have adequate mobility must also be a priority. The impact of inadequate mobility can be profound and can affect an individual's health and well-being and their family, as well as having significant social and economic consequences for their community.

If older people do not have access to alternative forms of transport, they are less likely to stop driving voluntarily, even if they need to. The cessation of driving is often

associated with decreased social participation and with an increased incidence of depression and ill-health (Maratolli, et al, 1997).

While the most common forms of alternative transport used by older people who do not drive are taxis and getting rides with family or friends, there are currently many older people in Australia who do not have access to good mobility. People living in rural areas and in outer metropolitan areas are often the most disadvantaged, as some areas have no forms of public transport and others do not have taxis (Harris, 2003).

If the planning and implementation of measures to improve mobility for people who are unable to drive themselves does not commence now, in future years, the numbers of older people who are isolated and more prone to illness will increase, subsequently placing an increased burden on community and health resources.

If the planning and implementation of measures to improve mobility for people who are unable to drive themselves does not commence now, in future years, the numbers of older people who are isolated and more prone to illness will increase, subsequently placing an increased burden on community and health resources. Initiatives that encourage older people to undertake mobility planning are also needed. While some older people consider what level of accessibility they have to health and social services if they need to stop driving, others do not, and make some poor decisions about where they choose to live in their later years.

Investing in efficient and effective transport programs that provide at least some level of mobility for those in need is likely to have numerous road safety, health and community benefits. To achieve this, significantly increased effort is needed to find community-specific, efficient and cost-

effective transport alternatives. Many overseas countries have recognized this significant and growing problem and are investing in potential solutions. Australia needs to do the same.

Conclusion

If Australia is going to continue to be a world-leader in road safety and if we are to achieve road toll reduction targets, then implementing and planning to ensure the safety of both today's and tomorrow's older road users is needed.

References

- Charlton, J., Andrea, D., Fildes, B., Oxley, J., Morris, A., Langford, J. and Johnson, L. (2002) *Safer Vehicle Choices for Older Adults*. RACV Report No. 02/01.
- Fildes, B., Fitzharris, M., Charlton, J. and Pronk, N. (2001). *Older Driver Safety – A Challenge for Sweden's 'Vision Zero'*. Proceedings of the Australian Transport Research Forum, Hobart, April, 2001.
- Fildes, B., Corben, B., Kent, S., Oxley, J., Le, T. and Ryan, P. (1994) *Older Road User Crashes*, Report No 61.
- Harris, A. 2003 *Transport research among non-driving older people*, ARRB/REAAA Conference Proceedings, Cairns, May 2003.
- Marottoli, R., Mendes de Leon, C., Glass, T., Williams, C., Cooney, L., Berkman, L. & Tinetti, M. (1997), *Driving Cessation and Increased Depressive Symptoms: Prospective Evidence from the New Haven EPESE*, Journal of the American Geriatric Society, Vol. 45, No. 2, 203-206.
- Seymour, R. and Christie, R. (2003) *Vehicle Safety Knowledge and Older Driver Decision Making*, 2003 Road Safety Research, Policing, and Education Conference, Conference Proceedings, Sydney, September 2003.
- Transportation Research Board (1988) *Transportation in an ageing society*, Special Report 218, 2 vols, TRB Washington DC.





DVExperts Pty Ltd

*From First Response
To Total Safety Solution*

Formed through the vision of its founding partners, DVExperts Pty Ltd (DVE) is a Forensic Engineering Solutions Company, established for the purpose of bringing together several of Australia's leading experts.

Launched in February 2002, DVE represents the formal affiliation and partnership of some of the country's most respected and well established private consultancies. Through this broad new industry network, DVE offers a wide range of specialist services to clients and institutions both locally and overseas.

Our services are presently utilised by groups as diverse as:

EXPERTS IN

- ▶ *Accident Investigation*
- ▶ *Scientific Reconstruction*
- ▶ *Failure Analysis*
- ▶ *Safety Solutions*
- ▶ *Forensic Mechanical Inspection*
- ▶ *Forensic Medicine*
- ▶ *Road Safety Auditing*

- **Legal Firms**
- **Insurance Companies**
- **Transportation Companies**
- **Fleet Owners & Operators**
- **Government Instrumentalities**
- **Product Manufacturers**
- **Research Institutes & Universities**
- **Road Safety Organisations**



DVEXPERTS PTY LTD

*229 Canterbury Road
Canterbury VIC 3126*

*P: (03) 9880 7399 F: (03) 9880 7725
www.dvexperts.net*

Special Road User Categories

Employers' Contribution to National Road Safety Targets

By Lori Mooren and Phil Sochon, Fleet Safety Solutions

Employers can make a significant contribution to meeting the National Road Safety targets. Company vehicles make up a large proportion of registered vehicles in Australia. Those who own and manage them are in a good position to influence the ways in which these vehicles are used in a way that is not afforded to road safety agencies. And, to a degree, those with large fleet buying power can also influence the safety levels of vehicles themselves.

A complicating factor in the distribution of company or work-related vehicles is that the majority of those vehicles are found in small to very small organisations. This means that any initiatives need to recognise the difference in motivational opportunities that apply to larger companies and organisations, and those that apply to owner-drivers and self-employed owners of both light and heavy vehicles used for work.

Increasingly employers are taking an active approach to promoting safe driving within their organisations. Many are pursuing good policies and practices. Some are still just ticking the boxes, or are unwittingly investing in ineffective programs. Some employers, particularly those whose operations carry risks of 'catastrophic' risk, for example those handling dangerous goods, have strong safety policies and ambitious targets. Both BHP Billiton and BP, as examples have targets of *Zero Harm* to people and environment. On the other hand some employers have corporate goals that tend to moderate their safety policies. Examples are car manufacturers who wish to reduce crash and injury risk to their employees, and at the same time promote driving as 'fun', and sometimes encourage participation in driving sports. These disparate corporate goals can send mixed messages about safety to employees.

Approximately 20-30% of corporate fleet vehicles crash each year in Australia. And the largest proportion of occupational fatalities is related to driving vehicles for work or commuting purposes.

There are apparent ambiguities in Government actions that sometimes make it difficult for employers to know what they should be doing. One example is the requirement for training. Many employers, while understanding that conventional driver training programs often fail to deliver safety benefits, believe that they must send their employee drivers to driver training courses in order to comply with OHS legislative requirements, or that this training will prevent them from being subjected to civil action in the event of a work-related crash.

This paper attempts to identify ways that employers and government can more effectively contribute to a reduction in road injury and fatalities in relation to both light and heavy vehicles managed by organisations in Australia.

Benchmarks and Targets for Crash Improvement

Approximately 20-30% of corporate fleet vehicles crash each year in Australia. And the largest proportion of occupational fatalities is related to driving vehicles for work or commuting purposes.

There has been a growing interest in making improvements to fleet and occupational driving safety and to reducing these incidents. Many employers would like to know how they are doing compared with other organisations.

Lumley General uses crash data from its client claims data to analyse comparative performance of different organisations within industry categories. This enables them to see whether they are performing well or otherwise against benchmark targets and against the performance of others with like occupational driving circumstances. An annual seminar of those participating in the Lumley "Benchmark Club" enables an exchange of ideas for good practice as well as monitoring how well or otherwise these organisations are performing.

This kind of process is useful in setting realistic goals and targets for improvements in corporate and occupational crash reductions.

A benchmarking study commissioned by the National Road Transport Commission in 2002 found that of OECD countries Australia's heavy vehicle fatality rate per kilometre travelled is 47% higher than the USA and 39% higher than the UK. It is comparable to Germany & Canada. And Australian heavy vehicle fatalities rates are 20% lower than Sweden, 45% lower than France, and 55% lower than New Zealand.

Moreover, compared with the other countries, Australia has the highest proportion of single vehicle fatal crashes and the highest proportion of truck occupant fatalities. The researchers concluded that there is potential to reduce truck occupant fatalities through less night-time driving, improved fatigue control, more protective cabin structures and increased use of seat belts by truck occupants.

The Australian transport industry, while not performing the worst in the world, can do more, together with government authorities to tackle these issues. Responsible operators are indeed taking an active role in advancing

safety. But some of these operators complain that there are other operators that are engaging in dangerous practices.

Indeed in a largely unregulated market, there is intense commercial pressure to keep freight rates to a level that often results in driving practices that carry higher than desirable risk.

Legislative Frameworks

Whilst there is not exact uniformity of legislation around Australia in relation to occupational driving safety, the broad thrust is essentially the same. Legislation primarily reflects the two key elements of the equation. In the first instance there is road safety or transport legislation that governs general road use including driving hours for heavy vehicles as well as vehicle safety and driver qualification and regulatory frameworks.

On the other hand, organisations that operate vehicles for work are also governed by the occupational health and safety legislation. Again, whilst not necessarily exactly uniform, states and territories recognise vehicles used for work as work premises in which the OHS legislation applies. In addition to this, in most states and territories, travel in vehicles for purposes of going to or returning from work is covered by workers compensation legislation which means that companies / organisations are liable for the relevant premiums to cover this activity.

It is true that whilst many OHS regulators are becoming much more aware of their opportunities to enhance the safety of driving for work, particularly as it is the biggest killer of workers of any kind of work, few are undertaking specific initiatives to target this area. Obvious standouts are Western Australia where WorkCover Auditors are used to monitor compliance of transport companies with fatigue management codes of practice and Qld where police have been given powers to investigate company records for work-related driving incidents. Other States are also beginning to investigate and enforce infringements by companies in logistics chains under the Chain of Responsibility principles applying to transport operations and regulations.

The cost of work-related crashes is estimated to cost over half a billion dollars per year in Australia.

This duality reflects a history of regulating road safety on the one hand and a history of regulating work on the other. What is becoming clear to many is the tremendous opportunity to marry these two things together so that work-driving safety belongs to both road safety and occupational health and safety organisations working synergistically to achieve mutual goals.

Strong legislative penalties of OHS authorities (large fines, imprisonment) can be effective deterrents. These deterrents combined with educational initiatives carry a potential to encourage vigilance by companies to commit to occupational driving safety policies and programs.

Clearly this will boost efforts toward achieving improved safety of work-driving.

Occupational Driving Safety Policy and Management Commitment

There are many good reasons for employers to take an active approach in minimising driving risks to their employees. Work related crashes are costly. The cost of work-related crashes is estimated to cost over half a billion dollars per year in Australia. It is also estimated that between 13-15% of fleet spending is on repairs to crashed vehicles. But in determining the real costs a multiplier of between 3 and 5 can be used to find the actual cost of crashes, taking into account production downtime, workers' compensation, administration, loss of assets, personal injury, retraining, insurance premiums and vehicle depreciation.

Moreover, there are also good legal and ethical reasons for employers to adopt an occupational driving, or fleet safety policy. Increasingly, we are seeing employers with a strong commitment to safe vehicle use by their employees. They are moving away from the stance that road safety is wholly a government responsibility and towards a shared role.

...governments could be taking a leading role in demonstrating and advancing active and effective occupational driving safety and fleet safety practices, much more so than currently evident

In the transport industry, however, there are questions of accountability and level playing fields. These questions don't have easy answers. It is still early days in implementing the 'Chain of Responsibility' principles to all involved in the logistics supply chain and carry significant enforcement challenges. Customers strive to negotiate lowest freight rates while at the same time are beginning to appreciate safe driving demands. Transport companies sometimes feel that they are between a rock and a hard place balancing safety goals against the need to remain competitive in the market. And generally, the consignors' view is that "it's their responsibility to deliver safely, efficiently and stay within the law."

Government authorities as employers have a uniquely strategic opportunity to set examples of good practice. While some Australian road and transport authorities are developing and adopting good road safety policies within their organisations, it seems that few other Australian Government agencies are taking an active role with regard to their employees and fleets. Apart from ethical and legislative responsibilities to protect their employees from injury in the course of work duties, with the large size of government vehicle fleets, agencies are in a good position to improve the safety of vehicles on the used car market by purchasing vehicles with the best safety features. So, rather than just having passive policies and advocating safe driving policies and practices for other employers to adopt, governments could be taking a leading role in

demonstrating and advancing active and effective occupational driving safety and fleet safety practices, much more so than currently evident.

Driver Assessment, Driver Training and Driver Education

Typically training is seen as an integral OHS requirement to ensure that employees are skilled to carry out work tasks safely. This equally applies to occupational driving tasks.

A study carried out by the authors in 2001 for the Australian Transport Safety Bureau, found that organisations that only recently began to address fleet safety tended to be the ones that focused on driver skills training, even including advanced driver training. Many are using defensive driving programs. Some of these have negotiated with the training companies to focus the training more strongly on safety aspects and defensive versus advanced training. It is important to note that most organisations utilizing these programs do not evaluate the effectiveness of the programs. This type of training appears to be widely used particularly in the corporate environment, and it therefore represents a significant component of spending by corporate organisations on driving safety.

Some organisations with considerable experience in fleet safety are moving away from traditional driver skills training and are concentrating their efforts more on improved safety education and behaviour.

However, while some driver assessment and training programs have made some improvements in safety, the safety benefits from some attempts at conventional driver training have been found to be negligible or even counterproductive. Driver training, while useful in some contexts, has been found to sometimes even increase the risk of crashing in other contexts. Driver training that encourages on-track/off-road advanced skills in non-emergency traffic situations increases road safety problems. The Australian Driver Trainers Association has been working towards training curricula and methods that more effectively advance safe driving practices and has made some good strides in this regard in recent times.

Some organisations with considerable experience in fleet safety are moving away from traditional driver skills training and are concentrating their efforts more on improved safety education and behaviour. These organisations have developed or adapted educational programs in accordance with their identified needs or specific driving risks. These programs are designed to meet their organisational cultures and policies, unique driving needs and conditions, and/or the safety issues defined through analysis of their internal crash data.

Employers need to be very careful of their objectives, expectations and choices of driver training programs. If they don't, they may find that they are making costly mistakes. And importantly, they may be missing opportunities to do things that would achieve better results. Moreover, the objectives need to be clearly communicated with those being sent for this training. Even then, there is no guarantee that the employees will go into the courses with same goals as their employers have.

It is sensible to assess the driving behaviour of employees at the recruitment phase and to emphasise the organisation's commitment to safe driving on employment of new employees. This can be as simple as checking the recruit's driver licence and infringement records. Or it can be a process of professional observation in an on-road examination of driver behaviour.

Educating employee drivers about risks associated with vehicle and road use is probably more helpful than sending employees on traditional types of driver training courses, if the main aim is to improve safety. However, there are still very few programs or resources available to employers for this type of activity.



Risk Identification and Resolution

As road safety professionals, we have long recognised the three "Es" as essential elements of good road safety strategies. Indeed, engineering, enforcement and education are fundamental road injury prevention activities. We have also applied the so-called "scientific method" or Haddon's matrix in identifying contributing factors to road injury. Our road safety strategies have been effective, we think, largely because we have taken an "evidence based" approach to designing and implementing countermeasures.

In an occupational setting the same principles can be effectively applied. But within an organisation there may be even greater opportunities to identify risk factors before the crashes even happen. In other words, there are some opportunities to identify risk behaviours, environments and injury mechanisms in the workplace and eliminate or reduce these, thus preventing the injurious events occurring or minimising the severity of these incidents.

Improving Occupational Driving Safety in Organisations

The Australasian College of Road Safety has seen an increase in members whose role it is to improve safety or reduce risks in their organisations. State Chapters of the College, particularly Victoria, NSW and Queensland, have held seminars on fleet safety and recruited more occupational safety practitioners into the organisation.

While the fields of occupational safety and road safety have traditionally been kept apart, there is now more impetus to work together...

While the fields of occupational safety and road safety have traditionally been kept apart, there is now more impetus to work together to improve practices and to offer support to each other. The National Road Transport Commission was set up to advance safety and other objectives within the heavy transport field. The Queensland Department of Transport has adapted an occupational safety audit process to design a fleet safety audit process. VicRoads and the TAC in Victoria have produced some resources to assist employers in advancing safe driving in corporate settings. And other State road and transport agencies have begun to look at ways to support employer efforts as well.

Insurance companies, industry associations and unions are also becoming increasingly involved in promoting safe driving. Moreover, there are some private agencies and consultants now specialising in occupational driving safety.

And the road safety and public health research communities are carrying out research that will inform employers on important vehicle and behavioural safety issues. Australian road safety authorities and researchers are becoming increasingly involved in this area. The challenge is for road

safety agencies to demonstrate good practice not only in policies but also in programs and systems.

It is this synergy that can foster improved practices and improved outcomes.

Conclusions

Employers can collectively make a measurable contribution to the National and State targets for road safety. Governments, as employers, can do more to demonstrate good practices within their agencies.

There is an opportunity to improve occupational driving safety, drawing from the lessons learnt in road safety.

References

- Haworth N, Sweatman P, and Vulcan P, *Truck Safety Benchmarking Study*, National Road Transport Commission, March, 2002
- Haworth, N, Tingvall, C, Kowadlo, N, Review of Best Practice Road Safety *Initiatives in the Corporate and/or Business Environment*, Monash University Accident Research Centre, Australia, March, 2000
- Murray W, Newnham S, Watson B, Davey J, Schonfeld C (CARRSQ) ATSB, *Evaluating and improving fleet safety in Australia*, 2002



Special Road User Categories

Effects of Alcohol & Other Drugs On Driver Performance

By Edward J D Ogden, Forensic Physician, Forensic Medical Consultants

Introduction

The knowledge that many transport mishaps are related to intoxication is not new: it was common knowledge in the pre-industrial age that drunkards risked life and limb when riding horses or driving horse-drawn vehicles. A good horse can partially compensate for human impairment but the advent of the horseless carriage brought the era of such forgiving transportation to an end.

Alcohol is associated with premature death and injury in all aspect of human behaviour. The effects on human skills and performance commence at the lowest measurable blood alcohol concentrations. There is no scientific basis for choosing a particular blood alcohol concentration as an acceptable limit.

When the layman thinks of impairment, he envisages the obvious signs of poor judgment, loss of self-control and gross incoordination. In Sweden, experienced doctors assessing drivers arrested on suspicion of being under the influence of alcohol were right only half the time when drivers were over 0.15%. Police officers don't fare much better. One US study examined drivers cleared by police as "not under the influence". The police had only correctly identified thirteen percent of drivers between 0.05% and 0.08 %, twenty eight percent of those between 0.08-0.10%, and less than forty percent of those over 0.10%. The gross intoxication that the layman associates with being "drunk" bears no relationship to the impairment that is significant for road safety.

So when it comes to the skill required for safe driving, we need to look for more scientific evidence. There have been thousands of studies that are relevant to driving. What follows is a quick overview of key findings. Several reviews of the evidence have been published (Borkenstein, 1964; Moskowitz & Austin, 1983; Moskowitz, Burns, Fiorentino, Smiley, & Zador, 2000; Zador, 1991).

The essence of what most people have in mind when they think of controlling a car is the ability to follow the roadway correctly. Impairment of road position and tracking occurs at as low as 0.02 %. Any task that requires people to do more than one thing at a time will be sensitive because the alcohol-affected brain processes information more slowly. It takes longer to understand what is happening and make appropriate adjustments. Low doses of alcohol interfere with learning and adaptation to an unfamiliar task.

Safe driving often requires a reaction to changes in traffic conditions.

Reaction time

Reaction time is prolonged by alcohol. Some studies have demonstrated deterioration at levels as low as 0.02%, but a level of 0.07% is needed to produce significant deficit with familiar tasks.

Visual functions

Vision is particularly sensitive to alcohol. There are abnormal eye movements, difficulty tracking moving objects, delayed recovery from glare, reduced visual acuity, impaired colour discrimination, tunnel vision, and even temporary blindness. What's more, alcohol changes the way that we use vision. Drivers with blood alcohol concentrations as low as 0.04 % have a form of tunnel vision and spend less time looking to the sides. It takes longer to work out what you are looking at, so each look takes longer. This means that less can be observed in a given time. One result is that alcohol affected drivers cannot work out the meaning of road signs until they are closer than normal.

Recovery from glare

Steering errors are noticed at an alcohol concentration of 0.03% and collision frequencies start to rise. In driving experiments it is reported that subjects start ignoring instructions before reaching 0.05%. They are sluggish to correct road position. Driving skill and experience makes some difference but increasing blood alcohol levels reduce the advantage that a skilled driver has, so that by 0.08% professional racing drivers and amateurs make similar errors.

Although the experience of "hangover" is common, few people realise the extent to which driving can be impaired even when the blood alcohol concentration has fallen to zero.

In a classic study, researchers compared breath alcohol levels in roughly 6,000 crash-involved drivers with 7,600 control drivers who had not crashed. The probability of involvement in a collision was determined to be a sharply rising exponential function of the driver's blood alcohol concentration. At 0.05% the risk of collision was roughly doubled, at 0.08% it was about 5 times, and at 0.15% about 32 times higher than a sober driver.

Examining the probability of fatal single-vehicle crashes involving alcohol, it has been determined that at 0.03% the risk increases about 40 percent; between 0.05 and 0.09

% it increases 1,100 per cent; between 0.10% and 0.14% it increases 4,800 percent; and at levels over 0.15 %, the fatal collision risk increases by 38,000 percent.

Although the experience of “hangover” is common, few people realise the extent to which driving can be impaired even when the blood alcohol concentration has fallen to zero. Measurable effects of hangover include hormonal changes, depression of brain activity, difficulty with judgment of space-time relationships, irritability, and poor concentration. Whilst the degree of “hangover” is not easily measured, impairment has been demonstrated in tasks as varied as driving, flying, skiing, and administrative tasks.

Alcohol not only reduces performance and affects behaviour, but the use of alcohol predisposes to more severe and extensive injury than might otherwise be expected.

One study examined over one million traffic crash reports in North Carolina. When they controlled for a wide variety of factors such as crash severity, type and weight of vehicle, speed, driver age and sex, and seatbelt use, they found that the presence of alcohol increased the probability of being killed in an accident 225 percent over that of a matched non-alcohol involved driver. Another study showed that at 0.10 % the risk of death from a given impact doubled and at 0.25 % the probability of death trebled.

Summary

In the past century we have learned that driving performance is impaired by alcohol even in low dosage. There is no evidence of a threshold concentration below which impairment does not occur, and there is no defined category of drivers who will not be impaired by alcohol. Alcohol increases not only the probability of collision, but also the probability of poor clinical outcome.

Drugs other than alcohol

Whilst alcohol remains the dominant drug causing impairment of driving performance, other drugs, especially in combination with alcohol increase collision risk. Impairment can be predicted from known or expected effects of medication on:

- Alertness (eg sedation, stimulation)
- Vision (eg visual blurring, delayed recovery from glare)
- Function (eg impaired coordination or movement)
- Performance (eg impaired performance on skills testing)
- Psycho-social (eg changes in behaviour, risk taking)

This information is available from the pharmacology of certain substances, reports of adverse drug reactions, epidemiological data and specific testing.

Major problems

There are four major problem areas that need to be considered when attempting to show the correlation between drug consumption and road trauma.

1. Proof that the drug has been consumed.

This requires analysis of a body fluid to identify the drug. There are a large number of potential drugs that could be screened, and many of the drugs of interest may only be present in minute quantities whilst having significant effects.

2. Quantitative estimation of the drug consumed.

Whilst it may be possible to detect a drug is present, it may not be possible to determine the quantity present, yet accurate quantification is necessary before any opinion regarding impairment of skills can be provided.

3. Could the amount of drug detected produce impairment?

Does this substance cause impairment of human skills? If so, is such impairment universal or idiosyncratic? Does the impairment occur in normal dosages or only when used in excess? The presence of a drug may not necessarily mean the driver is impaired. There is no critical level of most drugs above which impairment is present or below which no impairment can be demonstrated.

4. Could this amount of drug have contributed to the crash?

There are a number of individuals whose behaviour and functioning are considerably improved by prescription medications, and without which they would not be fit to hold a drivers licence, eg. drugs to control epilepsy. Withdrawal of such drugs may produce a considerable deterioration in driving performance.

There are literally thousands of medications, over-the-counter preparations and illicit substances that have the potential to impair driving. It is essential that the focus be on the drugs that are associated with the most harm. Concentrating on drugs causing road fatalities, the following risks emerge:

Table 1: Risk of causing a fatal collision (Drummer, 2002)

Drug(s)	% of cases	Culpability Odds Ratio
Alcohol alone	24%	9.1
Alcohol plus drugs	9%	11
Psychoactive drugs	2%	3.4
Drug combinations	3%	4.6
THC > 5 ng/ml	1%	3.0
Benzodiazapines	4%	2.4
All psychotropics	13%	1.5
Stimulants	3%	1.4



Marijuana

Marijuana is the common term given to the leaves of the plant *cannabis sativa*. Of the many chemical compounds in its leaves D9 tetrahydrocannabinol (D9 THC) has been identified as the major psychoactive component. D9 THC has significant effects on the human brain in tiny concentrations both at the time of consumption and long term.

There is no biological measurement of cannabinoid concentration that allows direct estimate of cannabis-induced impairment of driving skills as exists for alcohol.

There is no biological measurement of cannabinoid concentration that allows direct estimate of cannabis-induced impairment of driving skills as exists for alcohol. However, THC levels greater than 5 ng/ml are associated with a 3-fold increase in the risk of being responsible for a fatal collision. The combination of marijuana and alcohol severely impairs performance.

Marijuana use increases the variability of speed and road position, and affected subjects tend to hit obstacles, miss signs, display inappropriate braking and accelerating, and drive more slowly than when unaffected. On-road drivers exposed to high doses of marijuana are 5 times more likely to strike cones on a driving task than when not affected by the drug.

Anti-anxiety drugs

The benzodiazepines are minor tranquillisers, sedatives, anticonvulsants and hypnotics. Representative members of the group are diazepam, oxazepam, nitrazepam and flunitrazepam. The available data suggests that there is an increased risk of personal injury traffic accidents among drivers using anti-anxiety drugs compared with the rest of the population and this is exacerbated by alcohol. There is a hangover effect and a small dose of alcohol the following day can potentiate the effect.

The benzodiazepine group (such as Valium®, Serenax®, temazepam) has been shown to impair driving skills to a similar degree and in similar ways to alcohol. The risk of collision is roughly doubled for patients taking benzodiazepines and is greatest in the first 2 weeks of treatment.

There are laboratory studies showing that small doses of stimulants can improve cognitive performance and reaction time but at the expense of poor ability to perform divided attention tasks and the development of tunnel vision. Amphetamines have been implicated in traffic fatalities. They are reported to be used to reduce the sense of fatigue. The scary part of this is that as the levels of the drug decline, the person using them to stay awake can drop unexpectedly into a deep sleep even when driving!

The opiate drugs - heroin, methadone, codeine and related compounds - are used for pain relief and the suppression of cough. They are well known to have a high addiction potential. Acute sedation and impairment can interfere with driving, but long-term controlled therapy with methadone or pain killers is not associated with an increased collision risk after the initial stabilisation period.



Summary

Alcohol remains the most frequent cause of driver impairment but other drugs are important. Much more experimental and epidemiological investigation is required to appreciate the specific effects of individual compounds.

There is a need for a reliable battery of psychomotor tests that can predict driving impairment to allow further investigation of the risk.

Bibliography

Borkenstein, R., Crowther, R.F, Shumate, R.P., Zeil, W W and Zylman R. (1964). *The Role of the Drinking Driver in Traffic Accidents*. Bloomington IN: Department of Police Administration, Indiana University.

Drummer, O. (2002). *Involvement of Drugs in Accident Causation*. Paper presented at the 2nd Australasian Conference on Drug Strategy, Perth, WA.

Moskowitz, H., & Austin, G. (1983). *A Review of Selected Research Studies from the Last Decade on the Effects of Alcohol on Human Skills Performance*. Los Angeles: Southern California Research Institute.

Moskowitz, H., Burns, M., Fiorentino, D., Smiley, A., & Zador, P. (2000). *Driver Characteristics and Impairment at Various BACs* (No. HS 809- 075). Springfield, VA,: National Highway Traffic Safety Administration.

Zador, P. (1991). Alcohol-related relative risk of fatal driver injuries in relation to driver age and sex. *Journal of Studies on Alcohol*, 52(4), 302-310.

Enforcement

The Safety Camera Partnership in Victoria - Key Success Factors to Achieve Road Trauma Reduction for Speed Related Collisions

By Ray Shuey, Road Safety Adviser, TENIX Solutions, Former Assistant Commissioner, Victoria Police

Road Safety a Cooperative Effort

Road safety is a key socio-economic problem for most societies. While errant or careless individual human behaviour is the underlying factor in over 90% of collisions, injuries and fatalities, road safety improvements depend on intergovernmental, multi-agency cooperation coupled with powerful community partnerships, strategically focused, politically sponsored and endorsed at the highest level.

Enforcement of safe behaviour by road users involves strong leadership in the effective use of intelligence. The tactical use of scarce police resources, identification of strategic solutions and adopting a relentless proactive approach is required to develop sustainable change and conscious awareness in responsible driver behaviour.

Speed control is one example where a partnership between enforcement authorities and a private agency with specific expertise can have definite economic benefits while at the same time maintaining or even increasing the efforts to reduce road trauma.

Speed Control

Speed control is one example where a partnership between enforcement authorities and a private agency with specific expertise can have definite economic benefits while at the same time maintaining or even increasing the efforts to reduce road trauma. Universally, many drivers display an inherent compulsion to speed and operate with a self-legitimized rationale for their actions. Speeding, whether deliberate or careless, has the same potential road trauma risks - the faster you go the greater the stopping distance and the harder you hit.

Research shows that the relative risk involved in casualty crashes doubles for every 5kph over a 60kph speed limit (Figure 1). Inappropriate speed as a contributing factor in road collisions amounts to 30% - 40% of road trauma in most countries.

Positive, dynamic and sustainable results in speed reduction require political initiative and direction, a substantial investment in enforcement strategies and integrated inter-agency coordination.

It is generally recognized that strong enforcement campaigns will bring about positive short term impacts on road safety and long term gains rely on improvements in road design/black-spots and black-lengths, roadside safety, vehicle design, occupant protection and engineering. Enhanced medical response to cover that "golden hour" immediately after an accident also plays a critical role in saving lives and injury minimization. However, unless the enforcement pressure has integrity and is rigorously maintained, given all these cosmetic and structural improvements, drivers will continue to break laws, take unnecessary risks and behave in a careless or reckless manner.

Collisions are caused through human carelessness or error. Basically they are not accidents and mostly all avoidable. What do we do in the future? Develop a mobile machine which is collision proof with sensors all round, full of air bags so that we can still drive in an antisocial manner while intoxicated, drugged or selfishly speed to our destination? No! We need to attack the real problem - that is the **attitude** and **behaviour** of the driver and the **culture** of the communities that accept road deaths as accidents, rather than the culpability of individuals who choose their own course of action - to the detriment of themselves or others.

The Victorian Situation

The Victorian community's sensitivity to road deaths was heightened in the 1970's, projecting forward with strong campaigns to address seat belt wearing, random breath testing, speeding and fatigue. Car mounted speed cameras were first trialled and introduced in 1989/90, with mobile units providing state-wide coverage. While strategically placed, the perceived randomness from the public's perspective assisted in reducing errant speed behaviour initially from 23% to 14% of vehicles driving above the threshold (the trigger speed at which the camera is set).

In 1998, the Victorian Government, recognising that a further reduction in the road toll might be achieved by more effective speed control, adopted a public/private partnership approach to safety camera enforcement, infringement processing and debt collection. This partnership, with Tenix Solutions, has proved to be highly successful in achieving greater administrative efficiencies, processing integrity and directly assisting the enforcement process to pursue sustainable road safety benefits.



Tenix Solutions' end-to-end process (speed detection, infringement issue, fines collection and processing, demerit registration, court process, debt collection, etc) achieved the successes of integration and coordination of the legal systems in addition to achieving economies of scale with a single point of public contact and agency reference. Retaining authority and policy direction within the enforcement and other judicial bodies, ensures responsibility and control is always maintained by government agencies.

Economies in Policing

In the transition phase in 1998, the development of the Tenix Solutions model in a partnership approach enabled a substantial number of both sworn and unsworn police personnel to be redeployed to higher priority policing duties. Those staff previously involved in camera car duties, processing and administration were reallocated to targeting traffic hotspots or other community and police-identified priorities.

The partnership with Tenix Solutions maximised the benefits of technology as a complementary law enforcement tool in the strategic treatment of large sections of the road network, whilst maintaining total integrity of the enforcement infrastructure. The adoption of new technological solutions in the use of digital fixed site and red light/speed cameras are an integral component operating 24 hours a day, 7 days a week to bring about average and high level speed reduction rapidly for sustainable results. Reduced speed in many situations means reduced crash risk. (NB errant speed behaviour in Victoria is now only 1-2% above the threshold).

Traditional enforcement to cover the same infrastructure would be limited, costly and labour intensive. Point to point (time over extended distance) cameras currently being introduced in regional areas have the ability to substantially impact further on road safety outcomes. While Tenix Solutions, as the private provider, owns and operates approximately 50 "camera cars" in service, deployment of these units across 2,500 strategically identified speed enforcement sites throughout Victoria is maintained under a police controlled scheduling process. This maintains system integrity and automatically negates any aspersions of commercial interests or revenue gain by the company in the placement of cameras.

Coupled with the "Wipe Off 5" road safety marketing campaign, the whole strategic focus is directed at increasing the perception and the reality of certainty of

detection (if you speed, you *will* be caught). *Swiftness and certainty of penalty rapidly brings about behavioural and cultural change.*

Benefits of the Partnership

Importantly, several key factors have ensured the achievement of enhanced efficiency and processing integrity with the new partnership. These include **increasing the percentage of prosecutable images** from 65% to 85%+ (ie. enhanced images, reduced cull rate, etc); **reducing delays** to ticket infringement issue; **increasing processing capacity**, call centre capability and proactive revenue collection; and **maximizing the intelligence** available to law enforcement. Peaks and troughs in infringement issue have also been smoothed to enhance efficiency.

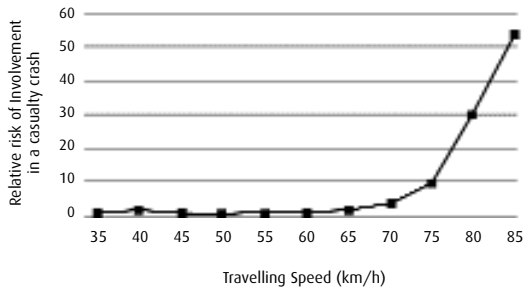
During the last twelve months Victoria's road toll fatality has fallen by approximately 16% (Figure 2), It is my considered view that this has been principally attributable to the enforcement effort, reducing the speed threshold, complemented by the strategic use of safety cameras (speed and red light), high profile advertising and the integrated partnership with Tenix Solutions. The model adopted of harnessing the resources of a private agency with technical and administrative expertise in specific aspects of road safety has worked well and is one that might assist many authorities to achieve their road safety objectives more economically and effectively.

Road safety and road trauma reduction requires an integrated effort, working together with strong quality partnerships addressing the social evils of alcohol and drugs together with the carelessness and negligence of speeding drivers. Prevention and detection enforcement strategies need to be coupled with integrated technological solutions with the integrity of back office processing, ticket issue, fines management and debt collection. The outcome sought is a change in driver behaviour that reduces collision risk, thereby minimising the level of harm caused by speed and alcohol impaired driving.

Road safety starts and finishes with every individual. Driving on our roads is a shared activity that has an element of risk. All drivers are personally responsible to minimize those risks for themselves and others by compliance with road Laws. One death is one too many. The ultimate result sought is SAFETY on our roads!

ABC = Attitude - Behaviour - Culture

Figure 1 - Crash Risk by Travel Speed



In a 60km/h speed zone, research shows that for every increase in travel speed of 5km/h above the 60km/h limit, the risk of casualty crash involvement doubles.¹

Figure 2 - Fatalities Victoria

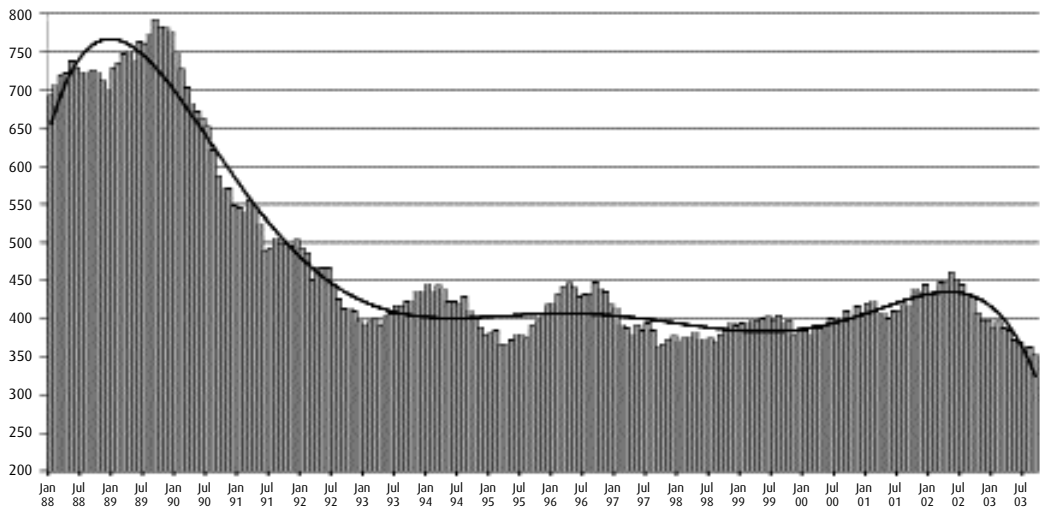


Figure 2 shows the dramatic decrease in road toll fatalities over the past twelve months in Victoria. The solid media campaign “Wipe off five”; lowering the enforcement threshold and an upgrade of Safety Camera enforcement may well prove to have had a significant impact on this improvement.

¹ Kloeden, C.N., McLean, A.J., Moore, V.M. & Ponte, G 1997. Travelling Speed and the Risk of Crash Involvement. Federal Office of Road Safety, Canberra, page 391.

Road safety relies on solutions...

Tenix Solutions

With a proven track record, Tenix Solutions sources the world for innovative technologies for its clients.

State of the art cameras, fully integrated back office processes and call centre management capabilities.

The result - a safer road system for all.

For innovative solutions.



www.tenix.com

Engineering Solutions

The Road Toll - to get rid of it permanently we must engineer it down

By Raphael Grzebieta, Associate Professor (Structures), Department of Civil Engineering, Monash University.

A serious question concerning road trauma that we keep asking is whether there is another "silver" or "magic" bullet? The current perception is that there are "no more silver bullets". This view is quite wrong. There are still significant opportunities as a number of "silver bullets" are yet to be loaded, let alone fired. These include setting of appropriate engineering design performance requirements for:

- Vehicle rollover
- Heavy vehicle safety
- Vehicle compatibility
- Roadside hazards and infrastructure design
- Vulnerable road users

...there are clear engineering countermeasures that work but have not been applied ... to reduce the number of fatalities and serious injuries in crashes

There are well-known and well-identified engineering design deficiencies in each of these areas that contribute to the road toll. Similarly, there are clear engineering countermeasures that work but have not been applied in each of these areas to reduce the number of fatalities and serious injuries in crashes. It is estimated that over 50% of fatalities and injuries have not been addressed by current measures. However, any realistic reduction in the road toll will require firm commitment and a political will to implement such countermeasures.

The principle advocated in this paper is that it is feasible in this day and age to design significant parts of the road system (consisting of vehicles, road infrastructure and vulnerable road users) on the basis that if a crash occurs, it will be within the human severe-injury tolerance levels consistent with Tingvall's Vision Zero philosophy.¹ It is not that we should be critical of the current methods but rather there are major opportunities that have yet to be exploited to make our transport system 'human error tolerant'. By recognising these opportunities and focussing effort on their implementation, additional and significant permanent reductions in the road toll will occur.

Take for example the seat belt. Camkin called this countermeasure a 'magic bullet' and Herbert attributed 25% reduction of fatalities to its introduction.² It is an engineering design developed with biomechanicists that must meet a minimum performance criterion developed in the form of an Australian Design Rule (ADR) and harmonised Australian Standard (AS). It is estimated that

some 10 to 20 percent more fatalities could be reduced if wearing rates were increased to 100% from the current levels of around 85 to 90 percent.

Vehicles can now be manufactured that can detect and will not start if a seat belt is not worn. The only impediment to requiring such devices in vehicles via an ADR or AS are international trade treaties, – nothing else. It is interesting to note however, that such treaties did not stop the introduction of unique ADR's and AS's for seat belt installation and laws for mandatory wearing.

Clark³ also attributes the second 'magic bullet' to Random Breath Testing (RBT) and the introduction of another device also developed by electronic engineers together with biotechnical professionals, i.e. the breathalyser. Consider how many lives would be saved if vehicles could detect a driver over 0.05 and immobilise the engine according to an ADR – a call made by a number of road safety experts for the past decade. Such an engineered design feature in cars would not only save many lives, it would release RBT police resources to other tasks. What is more baffling is why new vehicles aren't installed with breathalysers as an accessory next to the CD player. Many countries already require such devices to be fitted to the vehicles of drink driving offenders, including jurisdictions within USA, Canada, Australia and Sweden. Surely an ADR could be developed to cater for this. Again, harmonisation with international trade treaties (i.e. Treasury) is impeding such developments.

Simons alludes to yet another 'magic bullet' (or in his vocabulary 'silver bullet').³ He states: "Speed effects both the cause and outcome of most crashes ...speed has a demonstrated effect on both issues of primary and secondary safety."

Expert transport engineers usually set speed limits based on road geometry, traffic demand, crash statistics and cost benefit. The probability of a crash of an errant vehicle is estimated for a particular road environment and speed. A risk threshold is then estimated and subsequently the speed is adjusted until an "acceptable" risk threshold via a cost-benefit is reached (i.e. "acceptable" to engineers).

Granted that enforcement of speed limits to within 3 km/hr will result in less fatalities as reduction in speed means reduction in crash severity. However, such enforcement will not eliminate the road toll as the acceptable risk threshold design philosophy (in contrast to Vision Zero philosophy), still permits design faults, inherent within the road and vehicle system, to remain. Hence, if a vehicle impacts the design fault, occupants will still be killed and/or maimed even though the risk of the crash occurring was below the "acceptable" risk threshold.



So let's get down to it. If we could control the speed of vehicles to comply with speed limits, we would reduce both the incidence and severity of crashes and hence, we would have a dramatic reduction in the road toll and trauma. In fact, experts are implying that a major part of Victoria's record low road toll in 2003 is the result of tougher enforcement of speed limits, i.e. increased number of speed cameras set at a lower infringement tolerance. An impressive 64 fatalities less than in 2002 seems to confirm this. However, recent figures from 2004 are indicating a rise on the 2003 figures.

Once again engineering technology can assist us with reducing the road toll via speed limit compliance if we only want it to. Accurately measuring speeds and tuning the infringement notification process to be responsive is one way of achieving compliance. A more appropriate way is to begin to implement speed limiters that are triggered via a radio signal or a Global Satellite Positioning System (GPS). Again an engineered ADR could be introduced requiring such technology be implemented into cars. An ADR could also be introduced that requires speedometers to only measure speeds up to 120 km/hr. Why do we need to measure higher speeds that are illegal to travel at? Again, introducing such legislation would upset libertarians, possibly car enthusiasts and probably breach a number of international trade harmonisation treaties. It is a political problem - not a technological one.

Whilst it is acknowledged that significant reductions in the Road Toll have occurred due to speed enforcement, BAC, and publicity and education campaigns, these forms of managing the road toll through behavioural changes alone are short-lived by their nature unless continuously maintained. The evidence is overwhelming that permanent sustainable reductions start to occur the moment we introduce design rules or consumer tests that demand a minimum safety performance for our vehicles and roads.

...human behavioural initiatives are, on the whole, introduced to overcome the engineering design deficiencies in the system.

Arguably the successes to date in reducing road trauma have been achieved from the integrated use of engineering and education/enforcement measures. However, this author contends that the human behavioural initiatives are, on the whole, introduced to overcome the engineering design deficiencies in the system. The engineering deficiencies could be the result of a number of factors such as economic rationalism (cost benefit v Vision Zero),⁴⁵ socio-political factors, inadequate or no design rules or standards, poorly researched design parameters, insufficient technological advances, no consumer testing, to name a few reasons.

Tingvall¹ clearly acknowledges that road safety is a design issue: *'The designers of the system are ultimately responsible for the design, operation and use of the road transport system and thereby responsible for the level of safety within the entire system'*. Whilst at first glance Tingvall's statement may seem to be targeting an ethical issue, it also implies a

technical issue, i.e. that the designers of the system are ultimately responsible for any fatalities or injuries that occur on our roads and it is the designers who need to fix the problems. The issue rests with the definition of who are the designers?

This author contends that when Tingvall's statement is viewed in the whole context of Vision Zero, it is essentially referring to engineering design issues. Moreover, if we really get down to it, vehicles and road infrastructure constitute the road transport system designed by engineers for road users. However, one could also argue that the provision of a safe road system does not simply rest with engineers, but also with those authorities that are involved in the management of the road system and its users. One could also further argue that any engineering improvements require some degree of educational/enforcement support to create a socio-political environment that is supportive of introducing an engineering counter measure. However, again this author contends that it is the engineers, in consultation with other stake holders, who specify via Australian Design Rules and Engineering Standards how the system should perform and hence operate and be used. They are the designers who compromise on technical specifications resulting from financial and political constraints and ultimately control how 'human error tolerant' the system is designed to be. Certainly when Coronial inquests, civil compensation and criminal action is pursued in courts, it is the engineering technical specifications and designs that are closely scrutinised for deficiencies.

Some more silver bullets:

Returning to our original question of whether there are any more 'silver bullets', the following provide an overview of some of the key areas that would provide major opportunities for reducing the road toll. Some of these areas overlap. These include:

VEHICLE ROLLOVER (22% fatalities)

Rollover crashes (Figure 1) are one of the most harmful events that occur on our roads, producing 22% of the road fatalities in Australia and many injuries.

There are no design rules for rollover protection systems, nor any requirements or guides for a vehicle's rollover propensity in Australia.

There are no design rules for *rollover protection systems*, nor any requirements or guides for a vehicle's *rollover propensity* in Australia. Given the large number of deaths (1 in every 5 fatalities!) and serious injuries including spinal injuries that involve rollover, two performance requirements, one covering rollover propensity and the other rollover crashworthiness, would begin to reduce this large number of fatalities and injuries (see article by Richardson,⁶⁷ in this Yearbook).



Figure 1: 4WD rollover.

Similarly there are no rollover propensity standards for heavy trucks nor is there any legislated requirement (ADR) for the introduction of anti-rollover active safety braking systems that prevent a truck from rolling over.

There is at least one truck rollover per week somewhere in Australia. Moreover, there is at least one rollover of a petroleum tanker every month somewhere in Australia. If the fuel ignites (50 % of cases) the cost is of the order of \$1.5 million as well as involving either a fatality or injury.

HEAVY VEHICLE SAFETY (15% fatalities)



Figure 2: Heavy vehicle incompatibility. Note intrusion in bottom photo at driver head height.

15% of road fatalities were attributed to truck crashes in 2001. One of the areas where immediate gains can be obtained is in the crashworthiness design of front (see Figure 2), side and rear ends of trucks against under-run and over-ride. Again there are *no crashworthiness design standards* to date in Australia covering these aspects of commercial vehicles in Australia. International Standards already exist and yet not introduced into Australia despite repeated presentations.⁸ (see article by Rechnitzer⁹ in this yearbook).

VEHICLE COMPATIBILITY (15 - 20% fatalities)

This crash type mainly refers to 4WD vehicles crashing into smaller vehicles. Again there are no standards or performance requirements in Australia covering this aspects of vehicle design. An international consumer performance test already exists for a 4WD crashing into the side of a 4WD though much more needs to be implemented particularly for 4WD's, trucks, trams, buses and trains impacting a small vehicle.^{10,11}

ROADSIDE HAZARDS AND INFRASTRUCTURE DESIGN (25 % fatalities)

Approximately 40% of fatalities are caused by run-off the road crashes of which around 60% are impacts with roadside hazards.¹²

Roadside infrastructure can now be designed according to two Australian Standards,^{12,14} and guidelines are also available.^{15,16} However, every state in Australia has a different set of guidelines, specific to that state, creating a road safety problem in itself. There should only be one body that governs and sets standards for Australian roads similar to the USA's Federal Highway Administration (FHWA). This way the driving environment can be standardised so that there are no surprises when a vehicle travels interstate.

Most road safety barrier and signage systems adopted in Australia are based on US and European crashworthiness research. Installation of such systems into Australian roads is carried out without testing or analysis of conditions that are specific to Australia conditions, e.g. heavier trucks, unpaved surfaces and unsealed edges, old and dangerous road safety barrier systems have been deemed to comply with AS3845 (Figure 3) and hence not being replaced, to mention a few issues.

There are presently little funds made available to investigate what are safe and unsafe systems for Australian conditions. This is quite strange as the cost of research and testing to assess the safety of roadside barrier and signage systems would only be of the order of one to two million per year compared to the cost of fatalities and injuries being of the order of billions of dollars.

What is even stranger is that road authorities are continuing to install unsafe systems at a considerable commercial price to the detriment of the Australian tax payer. For example adoption of the Road Safety Barrier Manual¹⁶ would reduce such costs in many instances because expensive retrofits would be prevented once a hazard has been identified. In many instances, the need for barriers can be designed out; for example slight relocation of a bridge pier. The Manual also enables the real cost-generating aspects of roadside safety to be identified, thus

enabling a systems approach to reduce costs. At the present time, state road authorities do not have a good grasp of the principal cost-generators.



Figure 3: Dangerous roadside barriers.
Top: end terminal spearing.
Bottom: impacting concrete barrier at large angles is hazardous.

Of particular concern is the high occurrence of pole and tree crashes (Figure 4). Utility companies are presently not liable for the crashworthiness of their poles and hence there are no design standards for frangible pole systems. This issue needs urgent attention. Systems already exist that can provide passive protection against impact that include frangible poles and protected poles.

VULNERABLE ROAD USERS (10% fatalities)

The main issue is that trucks, trams, 4WD vehicles and cars be required to comply to a pedestrian impact performance criterion where the interface between the impacting vehicle and the vulnerable road user is designed to reduce impact



Figure 4: Flowers at scene of concrete pole related vehicle fatality (80 km/hr zone). Note proximity of pole to road.

severity. Mitigation of injuries can be done via barrier guards, padding, and airbags. While there is an international committee developing a pedestrian impact performance standard for cars, there is no requirement in Australian standards for cars, trucks, trams, trains or buses. All of these vehicles should be designed and tested such that an impact by any one of them up to 50 km/hr with a vulnerable road user is survivable.

...there is significant scope and opportunities to introduce immediately solutions to engineer the road toll down

In summary, the efforts to date to reduce the road toll are to be applauded and must be maintained. However there is significant scope and opportunities to introduce immediately solutions to engineer the road toll down which in turn would also help reduce the costs of enforcement and education. This fact cannot be over emphasised. In essence a paradigm shift in road safety thinking strategy is required.^{4,5} The potential to reduce fatalities and serious injuries is substantial. To state that there are no more "silver or magic bullets" is to concede defeat that there are no more dramatic engineering improvements to make.

It is, in effect, a blight on our society that we continue to accept what is equivalent to more than four 747 Jumbo aircraft full of people crashing each year and killing all on board. Certainly in the Occupational Health & Safety sector such carnage would never be tolerated. Why then in road safety?

1. Tingvall, C., The Swedish 'Vision Zero' and how Parliamentary approval was obtained, paper presented to Road Safety Research – Policing- Education Conference, Wellington, New Zealand, November, 1998.
2. Clark J., A short history of road safety, Australian College of Road Safety Yearbook 2000.
3. Simons P., The change is blowin' in the wind, Australian College of Road Safety Yearbook 2000.
4. Reznitz G. and Grzebieta R.H., Crashworthy Systems – a paradigm shift in road safety design, Transport Engineering in Australia, IEAust, Vol.5, No.2, Dec. 1999.
5. Grzebieta R.H. and Reznitz G. Crashworthy Systems – a paradigm shift in road safety design (part II), Transport Engineering in Australia, IEAust, Vol. 7, Nos. 1&2, Dec 2001.
6. Richardson S.A., Reznitz G., Grzebieta R.H. and Hoareau E., An Advanced Methodology for Estimating Vehicle Rollover Propensity, International Journal of Crashworthiness, Vol.8, No.1, 2003.
7. Richardson S.A., Grzebieta R.H. and Reznitz G., Proposal for a Dynamic Rollover Protective System Test, Proceedings ICRASH2002, 3rd International Crashworthiness Conference, Society of Automotive Engineers Australia, Melbourne, February 2002.
8. See page 118 Parliament of Victoria, Social Development Committee, Inquiry into Vehicle Occupant Protection, March, 1990.
9. Grzebieta R.H. and Reznitz G., Commercial Vehicles in Australia – Fleet,

- Accident Statistics, Crash Tests, Keynote Lecture, 3rd DEKRA Symposium, Passive Safety of Commercial Vehicles, Neumunster, Germany, October 2002.
10. Grzebieta R.H., Tingvall C. and Reznitz G., Geometric Compatibility in Near Side Impact Crashes, Proc. 17th International Technical Conference on the Enhanced Safety of Vehicles, Amsterdam, Netherlands, June 2001.
11. www.hwysafety.org/srpdfs/sr3804.pdf
12. Kloeden C.N., Mclean A.J., Baldock M.R.J. and Cockington A.J.T. (1999) Severe and fatal car crashes due to roadside hazards, Report to the Motor Accident Commission NHMRC Road Accident Research Unit, The University of Adelaide.
13. AS/NZS 3845:1999, Road Safety Barrier Systems, Standards Australia, Homebush, Australia.
14. AS/NZS 1742, Manual of Uniform Traffic Control Devices, Standards Australia, Homebush, Australia.
15. McInerney R., Dunjey M., and Grzebieta R.H., Frangible Sign Supports, Part 1: Recommended Procedures for Design, Testing, Installation and Maintenance, Part 2: State of the Art Review, Austroads, ISBN 0 85588 614 5, 2002.
16. Fardon D., Troutbeck R. and Grzebieta R.H., Road Safety Barrier Manual for Arterial Roads, HB 175-2004, Standards Australia.
17. Milner B., Grzebieta R.H., Zou R. Theoretical Study of a Vehicle-Pole Impact, Proceedings Road Safety Research, Policing and Education Conference, CMO Monash University, ISBN 0-7326-2190-9, Melbourne, 2001.

Engineering Solutions

Crocodile Tears for Heavy Vehicle Safety

Dr George Rechnitzer, DVExperts Pty Ltd., Canterbury, Victoria.

The Sunday Age dated the 4th January 2004, front page feature caught my attention regarding: “community outrage” following Australia’s well known crocodile man Steve Irwin holding his one-month old baby in one hand and feeding a large crocodile with the other. His response at such apparent community outrage and concern over the safety of his infant was that he was more worried about the safety of the baby travelling in a car on the roads than being eaten by a croc. I thought he had a point.

Thinking of crocodiles, it also reminded me, once again, in this new year, of “crocodile tears” being shed in some quarters over road safety, but little being done about conspicuous and well known causes of hundreds of fatalities and serious injuries on Australia’s roads every year – that is, crashes involving heavy vehicles and other road users. We know very well what can be done about reducing this toll – but every year those who have the authority and capability to act, both in Canberra and at a State Level, seem to have forgotten what their responsibilities and roles should be.

Before the relevant bureaucrats, the trucking industry, safety researchers and all other vested interests get into their defensive bunkers and knee-jerk reaction mode, may I quickly add two key points: what I have to say has nothing to do with who is at fault in terms of the crash (this is irrelevant) and that the mass of the heavy vehicle, contrary to popular opinion, is not the main obstacle to improved heavy vehicle safety! The biggest obstacle to improved heavy vehicle safety is a system that encourages and enables bureaucrats, regulators, and safety exponents, to hide behind mindless cost-benefit calculations to avoid requiring known and effective design improvements to heavy vehicles. Yes, cost-benefit analysis indeed is the main culprit.

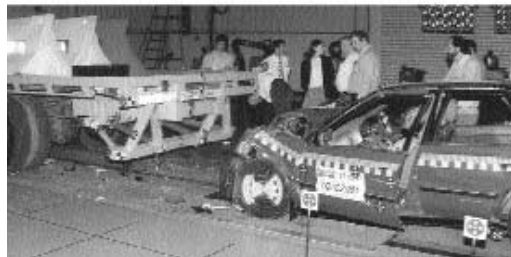
In this regard, it is my opinion that Sweden has got it right, with their Vision Zero philosophy [13], which states that “*Life and health can never be exchanged for other benefits within the society*”. You can think of it this way: if we require each new heavy vehicle to add a package of safety related design requirements, including, well designed front, side and rear underrun protection which, let’s say, adds an average \$2,000 per vehicle, what will this mean to transport economics? Simply not much except that perhaps, for example, a packet of breakfast cereal may go up by one or two cents due to slightly increased freight costs. And that’s our cost! And the benefits? Many members of our community and families saved from fatal and serious injuries. So what cost-benefit analyses really means, is that when no action is taken to improve the design of heavy vehicles, people’s lives are being traded for reduced transport costs. Will the trucking industry object to these requirements? No – provided it is a level playing field – that is, it is a regulatory requirement.



50km/h Offset crash, no rear underrun barrier, 10t rigid truck



50km/h centre crash, rigid rear underrun barrier, 10t rigid truck



75km/h centre crash, energy absorbing rear underrun barrier, 9.1t rigid truck

Figure 1. Examples of crash test development work on rear underrun barriers carried out by the author at Monash University for VicRoads and DOTARS (then FORS).[4]

What is required? Simply the addition of well-known design requirements [1-12] making the front, side and rear of heavy vehicles compatible (in crashworthy terms) with the rest of the road travelling public, be they vehicles, cyclists or pedestrians [see Figures 1, 2 & 3]. Europe has had regulations for many years requiring rear, side and front protection. The USA back in 1997 introduced rear underrun standards.

In any collision, particularly between objects of significantly different masses (such as a car and heavy vehicle; or pedestrian and car), the issue is not one of absorbing the kinetic energy of the heavy vehicle, but of

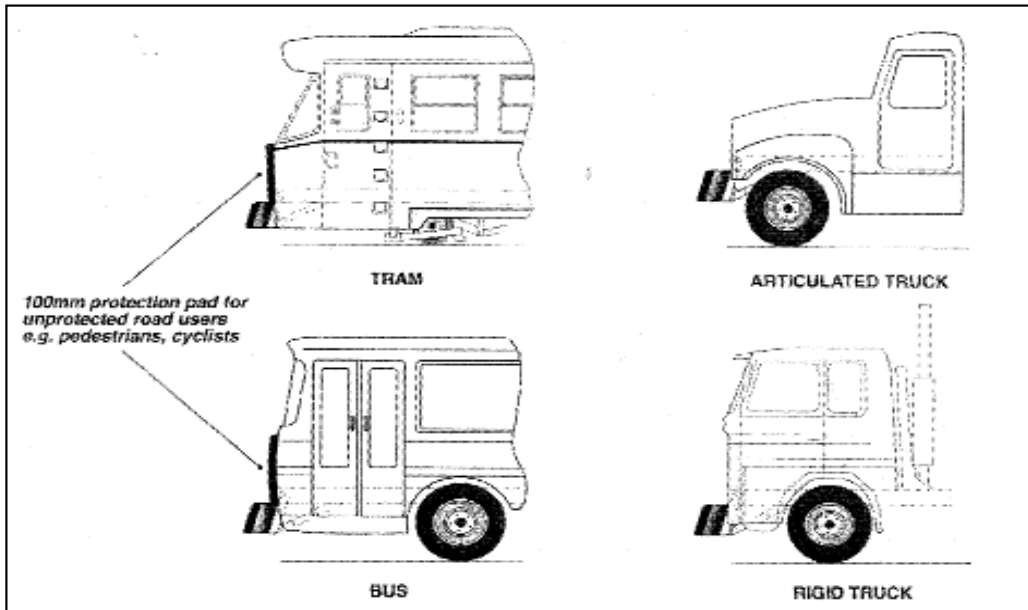


Figure 2. Diagram showing proposed modifications to the front of heavy vehicles, trams and buses incorporating an energy absorbing front underrun barrier (and pedestrian protection pad) (from Rechnitzer, 1993).[11]

control of the exchange of energy between the two objects [7]. This is clearly a simpler problem to deal with than that of absorbing the energy of a heavy vehicle. The latter “problem” is often considered, mistakenly, to be the issue, and has thus prevented the realistic consideration of countermeasures aimed at reducing heavy vehicle aggressiveness in crashes. The key issue in these cases is not the very high mass (momentum) and energy of the heavy vehicles but the *appropriate management of the interface* between the two impacting objects. This requires both geometric/stiffness compatibility as well as energy absorption.

Scania Trucks¹ have recently announced that the introduction of energy absorbing front underrun structures on trucks would have major safety benefits.

“The front underrun protection on modern trucks is estimated to save 900 lives every year in the European Union.

Scania believes redesigning the front of cabs can double the number of saved lives. Vehicle length is limited by law in most countries. Permitting an extra 600 mm for a crash-zone and some additional weight could thus save many lives.”

The inclusion of a 600mm crush zone is similar in concept to that suggested by this author in his 1993 report to VicRoads [11].

So in 2004, let’s hope that Australia finally catches up with the rest of the world and those responsible for road safety get bouquets of appreciation from the community by, at least, introducing the safer European requirements for the design of the front, side and rear of heavy vehicles.

I hope that 2004 will see the end of “crocodile tears” in relation to heavy vehicle safety.



Figure 3. Examples of different styles of side underrun protection on various heavy vehicles.[2,3]

1. http://www.scania.com/products/trucks/Safety/the_future/crash_zone.asp

References

1. Rechnitzer G. The Improvement Of Heavy Vehicle Design To Reduce Injury Risk In Crashes With Other Road Users, PhD Thesis, Monash University, June 2003.
2. Grzebieta R.H. and Rechnitzer G, Commercial Vehicles in Australia -Fleet, Accident Statistics, Crash Tests. 3rd DEKRA Symposium "Passive Safety of Commercial Vehicles", October 2002, Neumunster, Germany.
3. Lambert, J McK. & Rechnitzer, G., Review of Truck Safety: Stage 1: Frontal, Side and Rear Underrun Protection, Monash University Accident Research Centre. Report N0. 194, for VicRoads, 2002.
4. Rechnitzer G., Seyer K. & Powell G. (2001), Performance Criteria, Design And Crash Testing Of Effective Rear Underride Guards, Proceedings Of The 17th International Technical Conference On The Enhanced Safety Of Vehicles, Amsterdam 2001, June 4-7, 2001.
5. Grzebieta R.H. & Rechnitzer G., Crashworthy Systems – A Paradigm Shift In Road Design (Part II). Transport Engineering in Australia, V7, Nos 1&2, 2001, Institution of Engineers Australia.
6. Rechnitzer G. and Grzebieta R.H. (1999), Crashworthy Systems – A Paradigm Shift In Road Safety Design, Transport Engineering In Australia, IEAUST, Vol. 5, No. 2, Dec. 1999, pp74-82.
7. Rechnitzer G, Applying First Principles For The Design Of Crashworthy Systems For Road Safety, Proceedings Road Safety Research, Policing and Education 2000 Conference, Sheraton Brisbane, QLD, November 26th –28th 2000.
8. Rechnitzer G., Road crashes; Chapter for the "The Inquest Handbook"; Ed: Hugh Selby; The Federation Press, 1998, Australia.
9. Rechnitzer G., Powell C., Seyer K. (1996), Development And Testing Of Energy Absorbing Rear Underrun Barriers For Heavy Vehicles. 15th International Technical Conference On The Enhanced Safety Of Vehicles, May 13-16; Paper No. 96-S4-O-10, World Congress Centre, Melbourne.
10. Rechnitzer, G., Scott G. & Murray, N.W., (1993). The Reduction Of Injuries To Car Occupants In Rear End Impacts With Heavy Vehicles; 37th STAPP Car Crash Conference, 8-10 Nov. 1993, San Antonio, Texas. Paper 933123, SAE Inter.
11. Rechnitzer, G. (1993), 'Truck Involved Crash Study: Fatal And Injury Crashes Of Cars Into The Front And Sides Of Heavy Vehicles'. Monash University Accident Research Centre, Report 35.
12. Rechnitzer, G. And Foong Chee Wai. (1991) Truck Involved Crash Study - Fatal And Injury Crashes Of Cars Into The Rear Of Trucks. Monash University Accident Research Centre, Melbourne. Report No. 26.
13. Tingvall C., The Swedish 'Vision Zero' and how Parliamentary approval was obtained. Paper presented to Road Safety Research – Policing - Education Conference, 1-17 November 1998, Wellington, New Zealand.



Engineering Solutions

Rollover: One of the Road Safety Problems that is not being addressed

By Shane Richardson, DVExperts Pty Ltd., Canterbury, Victoria.

Rollover in Australia is the most injurious type of collision. Rollovers cause proportionally more injuries and fatalities than any other collision type, such as forward collisions, side impacts and rear impacts. The Australian Transport Safety Bureau (ATSB) Crash Database for the period 1996, 1997 and 1998 shows that although 12.2% of the Australian fatal crashes involved rollover, these crashes resulted in a disproportionately high (22.8%) contribution to the road fatalities, i.e. *more than one in every 5 fatalities in Australia is the result of a rollover crash.*

There are no government requirements ...compelling manufacturers to provide ...occupant protection against rollover for any passenger cars, passenger vans or Four Wheel Drive (4WD) vehicles.

All other collision types have some form of design regulation or consumer test that affects, impacts and/or compels the manufactures to account for the collision type. Currently in Australia there are regulated rollover protection structure requirements for buses, earthmoving equipment and tractors. There are no government regulated requirements or consumer tests compelling manufacturers to provide systematic occupant protection against rollover for any passenger cars, passenger vans or Four Wheel Drive (4WD) vehicles.

Further analysis shows that rollover is a rural rather than an urban problem:

	Vehicle did not rollover	Vehicle did rollover	Unknown or not applicable
Urban	2529 75.8%	152 4.6%	654 14.4%
Rural	2304 66.2%	676 19.4%	503 19.6%
Total	4870 70.8%	873 12.2%	1172 17.0%

Table 1: Australian fatal road crashes for 1996, 1997 and 1998

Rollover is more prevalent in four wheel drives¹ (4x4's) and Sports Utility Vehicles (SUV's) than in passenger cars, with some 4x4's having up to 5 times the rollover rate than typical passenger cars. This is of concern given the surge

in popularity and hence ever increasing numbers of 4x4 on our roads.

The phenomenon of rollover can be segregated into two issues. The first deals with rollover propensity whereas the second issue concerns rollover crashworthiness. What is needed is either government or consumer testing for:

1. Rollover propensity.
2. Rollover crashworthiness.

Rollover Propensity

The problem of rollover propensity has been characterised by Kahane², i.e. *“rollover risk has two components: directional stability (handling) and rollover stability. A vehicle is directionally unstable if it tends to skid, spin out of control or is hard to steer on course. A directionally unstable vehicle will have many more off-road excursions into loose dirt, ditches etc., where rollovers are more likely to occur. “Rollover Stability” is the tendency of a vehicle to remain upright given that it has come into contact with a tripping mechanism such as loose dirt, ditches etc.”*

The cause of a large proportion of rollover collisions is entrenched in the dynamic directional stability (handling) of the vehicle. Most rollover collisions start out as a minor directional error. However, the driver typically inputs one or a series of rapid and large steering corrections in an attempt to regain directional control of the vehicle. As a result of the steering correction(s) the vehicle yaws (rotates about its vertical axis) and slides sideways encountering some tripping mechanism.

Rollover stability factor is a measure of how well a vehicle can slide sideways before it rolls and is determined by the ratio of: half the track width divided by the vehicle's Centre of Gravity (CofG) height. Having encountered a sufficient tripping mechanism the vehicle's sideways slide speed is converted into a combination of rotation (about the roll axis) and speed i.e. a rollover. Figure 1 illustrates a typical rollover sequence.

As a result of several rollover collisions a testing handling methodology has been developed and is being used by the Victoria Police Force³ (and other institutions and companies) to evaluate and procure vehicles based on both dynamic directional stability (handling) and rollover stability (Richardson⁴ et. al.)



Figure 1. Typical Rollover

Rollover Crashworthiness

In a rollover, injuries and fatalities occur primarily as a result of partial or complete ejection. The vehicle's structure either collapses around the occupant(s) (i.e. roof crush) or the restraint system does not contain and control the flailing motion of the occupant(s).

Richardson⁵ and Richardson⁶ et al evolved and developed a Roll Over Protection Structure performance specification, which is currently being used by the Australian Department of Defence for Military General Service Vehicles. The performance specification is based on energy and force loading requirements and the occupant survival spaces located in seating positions. A Roll Over Protection Structure performance specification has been validated by a combination of; computer simulations, impact test, rollover simulations and analysis of real world crashes. Figure 3 illustrates a rollover simulation of one of the structures built to the specification. The vehicle is dropped from the rear of a truck.

The structural requirements demand some complex engineering skills but they are achievable and are well within the design and production capabilities of current vehicle manufacturers.

What is ultimately needed is a regulated government or consumer rollover test, that evaluates seat belts, seat belt pretensioners, side air curtains and roof structure in a full scale test with anthropomorphic crash test dummies

United States of America Experience

In the United States of America (USA) rollover presents a similar problem if not worse than in Australia and there has been extensive work on the issue of rollover, including the following:

1. Regulated quasi-static structural test requirement for the forward roof structure (FMVSS216).
2. Consumer information on static rollover propensity.
3. Consumer information on untripped rollover propensity.

The weaknesses with the work carried out in the USA are that:

1. The quasi-static structural test requirement is based on 1.5 times the mass of the vehicle whereas the tractor, earthmoving and Richardson⁶ et al requirements are for at least 2 times the mass of the vehicle. The USA quasi-static requirement involves applying a force to the roof structure commencing at the driver's side "A" pillar area. The manufacturers typically achieve the requirement by using the windscreen as a structural member. This would be acceptable if in a rollover the vehicle rolled only onto this one part of the roof. However, it is typical for the roof to sustain multiple impacts where the windscreen usually breaks during first contact. Hence, the test should be conducted without the windscreen and require multiple impacts to the roof structure. The occupant motion within the vehicle is not considered in the USA test.
2. The USA implemented⁷ a rollover rating system into the New Car Assessment Program (NCAP) based on the static rollover stability factor: half the track width divided by the vehicle Centre of Gravity (CofG) height. The rollover rating for NCAP is based on a four-year study of single vehicle crash data from six states. The analysis is based on 226,117 single vehicle crashes of which 45,574 involved rollovers and 100 vehicle types were identified.
3. Consumer information on untripped rollover propensity is not related to the four-year study of single vehicle crash data from the six USA states.



Figure 2. Evaluation of the Roll Over Protection Structure performance specification

Currently in Australia there is no regulatory or consumer information on rollover propensity

Proposed Regulations

Currently in Australia there is no regulatory or consumer information on rollover propensity. The Australian New Car Assessment Program has considered propensity protocols but has not announced a position or intention. Let us hope that information will soon be provided so that consumers at least can make an informed choice. Did you know that you could choose between vehicles that have either a 80% or 5% probability of being involved in a single vehicle crash that is a rollover? A methodology has been developed that is simple, effective and repeatable which can discriminate which is a better vehicle. Aren't consumers at least entitled to the information?

To effectively protect 4x4 and passenger vehicle occupants from the threat of injury, regulatory and consumer bodies have developed a range of crash tests to evaluate the vehicle system performance against occupant injury criteria for forward collisions, side impacts, rear impacts and pedestrian collisions. **No such regulatory or consumer requirement for rollover exists in Australia to-date or is currently being investigated or considered for implementation.** As a result of the high fatality rates, there is an urgent need for a repeatable dynamic vehicle rollover test to evaluate the vehicle rollover crashworthiness system performance for all passenger vehicles.

In collaboration with others offer you the following, which would provide safer vehicles and help reduce the road toll:

1. **Information about the propensity of vehicles to rollover so that consumers can make informed decisions.**
2. **A rollover structural protection requirement for 4x4, people moving utility vans and passenger vehicles.**

3. **Full scale dynamic rollover protection test using anthropomorphic crash test dummies to evaluate occupant injury.**

References

1. R.G. Snyder, T.L. McDole, W.N. Ladd and D.J. Minahan, On Road Crash Experience of Utility Vehicles, University of Michigan, UM-HSRI-80-14.
2. C. J. Kahane, An Evaluation of Door Locks and Roof Crush Resistance of Passenger Cars, DOT HS 807 489.
3. G. Rechnitzer, S. Richardson, E. Hoareau, N. Deveson, T. Triggs and E. Fitzgerald, Police Vehicles – Defining Safety and Performance Requirements, Monash University Accident Research Centre, 2002.
4. Richardson S.A., Rechnitzer G., Grzebieta R.H., Methodology for Estimating Vehicle Rollover Propensity That Combines Stability Factor and Handling Metrics, Proc. 18th International Technical Conference on the Enhanced Safety of Vehicles, Nagoya, Japan, May 2003.
5. S. Richardson, Society of Automotive Engineers – Australia, 1999 Young Engineers Conference. “Development of a 4x4 Rollover Protective Structure Performance Requirement”.
6. Richardson S.A., Grzebieta R.H. and Rechnitzer G., Proposal for a Dynamic Rollover Protective System Test, Proceedings ICRASH2002, 3rd International Crashworthiness Conference, SAE Australia, Melbourne, February 2002.
7. Department of Transport (USA), National Highway Traffic Safety Administration, Docket No. NHTSA-2000-6859.

we have gained respect through our
Reputation



JAMIESON FOLEY
CONSULTING FORENSIC ENGINEERS

Your experts in road safety



General

Safer Roads in a Changing Legal Environment: An Expert Witness Perspective

By John Jamieson, Jamieson Foley Forensic Consulting Engineers

Introduction

On 31 May 2001 the High Court judgements in the matters of *Brodie v Singleton Shire Council* and *Ghantous v Hawkesbury Shire Council* essentially abolished the non-feasance rule (otherwise known as Highway immunity).

A layperson's explanation for this rule could be summarised as follows. If a government road building authority just left a road or bridge to "naturally" deteriorate and someone was injured because of that deterioration, then the authority was not liable for that injury – "non-feasance". If however that authority had attempted to fix that road's deterioration, but made a mistake while doing it, then the authority becomes liable – "mis-feasance".

Lawyers working in the area had expected this decision for many years (Goudkamp et al, 2001).

In response to this High Court ruling, various state governments have passed legislation to partially and/or conditionally reintroduce aspects of the non-feasance rule.

Background

It has been recognised (Goudkamp) that since the rule's introduction in the United Kingdom in the 18th Century, serious inconsistencies have evolved. For example, the rule only applied to "highway" authorities but not to "traffic" authorities.

Despite this very narrow applicability, there has been significant concern about the rule's abolition, particularly within local and state governments. While it will be a matter for others to evaluate this new law's real effect, from a scientific viewpoint, it will be very difficult to isolate this one variable in the background of other insurance/litigation events currently in Australia. For example, the collapse of major insurers, the effect of the attack on the United States in 2001, changing social attitudes to litigation, changing legislation in relation to compensation and so on.

Legal Purity versus the 'Real World'

The High Court was not unanimous in its judgement. Their Honours, Kirby, Goudron, McHugh and Gummow, expressly overruled the non-feasance rule, while their Honours Gleeson and Callinan disagreed with the majority. His Honour, Justice Hayne suggested that it was an issue for the Legislature rather than the courts (Hunt, 2001).

The majority judgement noted that:

- The rule denied equal protection of the law by barring a remedy to victims of negligence of highway authorities, while victims of negligence of other public authorities retained a right of action.
- Where a highway authority was negligent in the conduct of its affairs in one of its other capacities, limitation of funds afforded no defence.
- It was incongruous that an authority could escape liability if it had never attempted to repair some danger on a road or a bridge, but thereafter may become liable if it attempted to repair it. As such there was a strong incentive not to address such dangers.

Hunt (2001) noted that

"Importantly, Gaudron, McHugh and Gummow JJ, in their joint judgment, specifically addressed the issue of competing responsibilities by stating, at p.67, that: 'The formulation of the duty of care includes consideration of competing or conflicting responsibilities of the authority. In the circumstances of a given case, it may be shown that it was responsible for an authority to deal in a particular priority with repairs in various locations.

The resources available to a road authority including the availability of material and skilled labour, may dictate the pace at which repairs may be made and the effect and order of priority in which they are to be made. It may be reasonable in the circumstances not to perform repairs at a certain site until a certain date, or to perform them after more pressing dangers are first addressed. Even so, it may well be reasonable for the authority to exercise other powers including, for example, by erecting warning signs, by restricting usage, or, in extreme cases, by closing the road in question."

On the other side of the High Court, His Honour, Justice Gleeson noted that if the non-feasance rule was to be changed, then it should be changed by an Act of Parliament. His Honour appeared particularly impressed by the fact that the non-feasance rule was a rule about the accountability of public authorities invested by Parliament with the responsibility of applying public funds to the construction, maintenance and improvement of public roads.

As such, His Honour was moved to suggest that reform in the area should be conducted by those *'in a position to investigate and fully understand the consequences of change and who are politically accountable for those consequences'* (page 13). As such, Justice Gleeson refused to overrule the non-feasance rule and dismissed each appeal. (ibid).

In terms of certainty, the argument put forward by Goudkamp suggests that the new law will have the potential to actually reduce litigation, as it was pointed out by the majority Justices that:

“The postulate that, without the ‘highway rule’,..... statutory authorities will be subjected to fresh, indeterminate financial hazards... should not be accepted[The] expenditure of public funds on litigation turning upon indeterminate and value-deficient criteria is encouraged, indeed mandated, by the present state of the law.”

Indeed, their honours went so far as to assert that the ‘highway rule’ itself might in fact be economically detrimental to councils:

‘At present day, the ‘immunity’ serves poorly the interests of public authorities. The distinctions found in the cases are apt to provoke rather than to settle litigation and to lead to expenditure of public moneys in defending struggles over elusive, abstract distinctions with no root in principle and which are foreign to the merits of the litigation.’

The authorities by successfully fulfilling their statutory duty to maintain the highway network, make a significant contribution to the safety of the travelling public...

Engineering Ramifications

The rule was abolished in the United Kingdom in 1961. Research done by Hillier (2001) noted that the message given to the UK authorities was a relatively simple one. The authorities by successfully fulfilling their statutory duty to maintain the highway network, make a significant contribution to the safety of the travelling public within their areas. As a by-product, this automatically reduces the need and opportunity for claim.

Hillier went on to note that the key element of successfully reducing the risk of claims and improving user safety, is setting relevant, unambiguous highway management and maintenance policies, which can be consistently and demonstrably achieved.

The UK experience also demonstrates that it is better for highway authorities to consistently meet policy and standards that are realistic (appropriate to the level of funding available) rather than to fail to meet over-ambitious policies and standards (albeit said with the best of intent).

The Engineer’s Perspective

Despite all the concern associated with the abolition of the non-feasance rule, specific claims under the non-feasance rule have occurred in only a handful of cases. Indeed, the reviewed literature noted that there were many “loopholes” identified by those who challenged the rule.

Therefore, from a purely statistical viewpoint, and from this author’s perspective, nothing significant has really changed following the rule’s abolition.

From some lawyers’ viewpoints (as discussed in Goudkamp) there is an argument that due to the increased

certainty of the new regime, many cases will now settle more economically compared with those few that might benefit from the new ruling.

There would however appear to be little doubt that following the non-feasance rule abolition, it would be more prudent for Local and State Government engineers to expand (or at least reinforce) present inventory and auditing processes on their public assets

If a Local or State Government Agency can satisfactorily show that they regularly and “reasonably” monitor and audit their facilities, and rationally distribute and prioritise their construction and maintenance budgets, then such information (if made available) would and could provide an excellent defence in many cases.

Prior to 2001, if a claim was litigated, it was all too common that much of the work undertaken by Local and State Governments in relation to inventory checks, auditing, prioritising and so on, was caught up in the adversarial legal process and did not see “light of day”. This new law might give everyone the opportunity to “clear the air” and to be open and frank about how assets are managed within the public works environment and the results of the limitations imposed by finite budgets.

A Final Word

In common with health care, defence and education, there can never be enough money to go around to satisfy the Australian community’s expectation of what they feel is needed in a “civilised” society. Given the engineering challenges associated with a continent the size of Australia, there will never be sufficient funds to go around either for maintenance or construction.

If a Local or State Government applies various “reasonable” tests (for example, those defined in the UK) in relation to maintenance and construction budgets, then theoretically there should be no real difference in the litigation experience following the abolition of the non-feasance rule.

(Author’s Note: This article is an edited version of a Presentation to the Public Infrastructure Forum Institute Of Public Works Engineering Australia Limited, May 2003. It was prepared from the author’s perspective as a traffic engineer working regularly in traffic safety litigation. Noting that his qualifications relate to traffic engineering and not to the law, there is no suggestion that any statement made in the article could represent a “legal opinion”).

References:

- Goudkamp et al, (Goudkamp T and Goudkamp J) – “Implications of the Abolition of the Immunity of Highway Authorities for Nonfeasance” Plaintiff Journal, Issue 46, August 2001).
- Jamieson, John, 1988 - *Future Aspects of Traffic Safety Litigation* - The Shire and Municipal Record, August 1988.
- Hunt, Peter, 2001 - *A Question of Priorities will Determine Highway Immunity* - Law Society Journal, July 2001.
- Hillier, Paul, 2001 *The Abolition of Non-Feasance* (AITPM Regional Seminar, August 2001).



General

Country Drivers on Country Roads: The importance of rural road safety

By Michael Henderson, Road Safety Consultant and Fellow of the Australasian College of Road Safety

Country people die on country roads. That is such a truism that it has been widely used in road safety advertising. Drivers resident in country NSW are, on average, 50% more likely than metropolitan resident drivers to be involved in a fatal crash.

But what is less widely known is that *most* people die on country roads. National statistics show that about six out of ten fatal crashes occur in “rural regions”. If only non-pedestrian crashes are taken into account, the “rural” percentages are even higher. If road safety resources were allocated according to priorities based on injury rates, about two-thirds of national expenditure should go to country roads and country towns.

Consider the kinds of crashes that are especially likely to result in death or injury:

- collisions with heavy vehicles;
- high-speed rollovers;
- drivers going to sleep;
- occupants not wearing seat belts;
- drivers affected by alcohol.

All these kinds of crashes are prevalent outside urban areas. Many have features that are typically associated with the rural way of life:

- the pub is an important social centre, and the only way to get there is to drive;
- long distances between destinations make for high exposure to risk;
- average travelling speeds are high;
- excessive speeds, alcohol use and belt wearing are hard to police;
- passenger vehicles are generally less crashworthy, older, and with a high proportion of four-wheel-drives;
- roads and roadsides, once off the main highways, are brutally intolerant of human error.

Young drivers in the country

The drivers who are most likely to have been behind the wheel in casualty crashes are typically young and predominantly male. The “problem” of the young driver, and specifically the young male driver, is of course not confined to country roads and country towns. Driver

licensing administrations throughout the developed world recognise that the transition between novice status and maturity carries with it several hazards associated with attitudes, behaviour, experience and skills.

In this regard, probably the most important single initiative of recent years is the introduction and implementation of a formal graduated licence scheme, the underlying aim of which is to ensure that young drivers gain their experience in a relatively safe environment and under continual monitoring. But the behavioural changes sought by such programs are arguably directed to driving in busy urban conditions rather than those common in the country.

... there are features of the graduated licence scheme that should be redirected to rural conditions.

While country drivers must learn to understand what it is like to drive in the city, there are features of the graduated licence scheme that should be redirected to rural conditions.

Inappropriate and excessive speed

Inappropriate and excessive speeds are important contributory factors in rural road crashes. Managing speeds and reducing the incidence of excessive speeding depends on a mix of countermeasure activities, including the following:

- technology (for example, speed cameras);
- a mixture of covert and overt enforcement;
- targeted intensity of enforcement;
- monitoring performance and outcomes for speeding countermeasures;
- adjustment of tolerance levels;
- a fine and demerit point system which reflects community expectations;
- public education based on good theoretical models.

The present official concentration is on speed limits and their enforcement. The difficulty in rural areas is in balancing enforcement, especially when based on technology, with public expectations. The public perception that this technology is primarily a revenue-raising measure – whether incorrect or not – results in a cynicism that is an unhelpful adjunct to efforts to persuade people to wear belts, not drive tired and not drive drunk.

When and where enforcement is clearly based on outcomes showing reductions in crashes and injuries, it is most likely to be embraced and complied with.

There is no doubt that fatigue is a major contributor to road trauma in rural areas.

Driver fatigue

There are estimates that driver fatigue is a factor in at least 20% of fatal crashes, although for obvious reasons its contribution will never be precisely established.

There is no doubt that fatigue – probably more correctly defined as sleepiness or drowsiness – is a major contributor to road trauma in rural areas. There are three priority areas for countermeasure activity in country regions:

- educate young males (ages 16 to 24) about drowsy driving and how to reduce lifestyle-related risks (driving all night after a party is not an option!);
- promote shoulder rumble strips (audible edge lines) as an effective countermeasure for drowsy driving;
- raise public and policymaker awareness about drowsy-driving risks and how to reduce them;
- educate shift workers about the risks of drowsy driving and how to reduce them.

Drink driving

Alcohol use remains a major problem for road safety, and is probably a worse problem in the country than the city. The bulk of alcohol-related fatal crashes (with and without speed as an associated contributing factor) occur on roads in rural locations, with the incidence of alcohol involvement at around 25% to 28%. In crashes on roads in remote locations, the incidence of alcohol use is even higher, in places exceeding pre-RBT levels.

The most cost-effective deployment of enforcement effort would appear to be on rural roads in the general vicinity of country towns.

The most cost-effective deployment of enforcement effort would appear to be on rural roads in the general vicinity of country towns.

The influence of passengers on driver behaviour

There may be scope for enhancing road safety through the direct influence of the behaviour of young passengers on young drivers. Many of the vehicles involved in crashes on country roads have been packed full of happy young

people. If passengers can play a positive role in influencing the behaviour of the driver to enhance both driver and passenger safety, then finding the ways in which this can be achieved, through an understanding of how they behave, would provide an additional strategy for road safety campaigns and programs.

Seat belts and child restraints

In the country, vehicle occupants – especially in rear seats – are less likely to wear seat belts than in urban areas of Australia. National crash statistics can be summarised by the following points:

- The proportion of unrestrained crash casualties is rather constant over time. In remote areas, the proportion is much higher than in metropolitan or rural areas.
- Male crash casualties are less likely to be wearing a seat belt than females.
- The lowest seat belt wearing rate amongst crash casualties is for the age groups 0-2 and 8-16 years. Casualties aged over 60 have the highest seat belt use rate.

A combination of education, enforcement and incentives can be effective in improving seat belt wearing rates. Enforcement may be effective in encouraging people to start wearing seat belts, and education on the safety benefits of seat belts may sustain their use. Educating people on the dangers that unrestrained passengers pose to other occupants of the vehicle can be an effective way of improving passenger restraint use rates.

The following countermeasures have the most promise:

- signage, particularly on remote area highways, reminding road users to “buckle up”;
- community based campaigns aimed at parents (who often do not correctly use child restraints);
- continuous reporting of road safety issues in the local media (including both local incidents and broader research findings);
- increased enforcement, coupled with publicity to increase the perceived risk of being caught without a seat belt;
- in the longer term, more aggressive in-car warnings that belts are not fastened.

Several of the very youngest vehicle passengers, aged under five years, have been killed in Australia while not using any kind of restraint at all. This should be inconceivable, these days. It is essential the principles suggested above for adult belt wearing are applied to the correct use of child restraints.

Roads and roadsides

In terms of the National Road Safety Strategy, there is no issue of greater importance than the necessity for safer roads and safer roadsides. This is a basically simple issue of



public policy and cost-effective resource allocation, and its importance should not be lost in the fog of well-intended but disparate efforts to improve driver behaviour, many of which are suggested in this article.

What needs to be done is well known. The provision of low-cost safety improvements could result in major benefits. The features regarded as most important by researchers and road engineers are signing, centre-lining and edge marking, shoulder sealing and maintenance, the provision of guide posts and reflectors, overtaking lanes and intersection improvements.

“Forgiving” roadside concepts and roadside improvements

There is very high potential for improving overall safety by treating or removing roadside obstacles.

in general are stressed because they can significantly reduce the severity of crashes. There is very high potential for improving overall safety by treating or removing roadside obstacles. Obstacle-free zones of between four and 10 metres are desirable if the road geometry and right-of-way will allow it.

The importance of local communities

The involvement of local communities can be sought along the following lines, all of which have clear implications for road safety in rural areas:

- promote greater involvement of rural shires and councils and their local communities in defining local road safety issues and developing partnerships to address them;
- assist local authorities in the detailed analysis of factors impacting on local road safety, and in the development of action plans to target problems;
- establish information programs to disseminate information to councils and local communities about successful local initiatives and local programs, as well as those found not to have been effective;
- provide training opportunities and guidance for local government on best practice in application of road safety countermeasures;
- formulate special arrangements for Aboriginal

communities, particularly in remote areas, ensuring representation in the planning, implementation and evaluation of programs to improve safety for them.

Trauma systems

Finally, while prevention will always be the ideal solution to the problem of road trauma, an effective trauma care system is essential to treat the injured. The physiological consequences of injuries sustained in road crashes need to be reduced through more rapid notification of crashes and provision of primary treatment, and through more effective medical and rehabilitation services. All health care providers should therefore be encouraged to further improve their casualty treatment operations and distribution of trauma treatment centres.

These measures will reduce the disabling consequences of trauma and help to conserve the life of country people in country crashes.

Footnote: The issues discussed in this article were highlighted in work performed by the author for the Motor Accidents Authority of New South Wales and published by the Authority. The Authority’s support is deeply appreciated. However, the responsibility for opinions expressed in this article is that of the author alone.

General

Roadside Memorials

Jennifer Clark, University of New England

In December 2002, 14 year-old Jennifer Bonds was hit by a car while jogging along Santa Rosa Road in California. Her family erected a roadside memorial with flowers, balloons and candles on the spot where she was killed. 'When you lose your daughter, your whole world changes', said Jennifer's father, 'Everything she was and everything she will be is gone'. The local authorities were not sure how to respond when motorists complained that people gathering at the memorial site were nearly hit by passing vehicles. The Deputy Director of Public Works wanted to remove the memorial and the danger to mourners. He told the *Los Angeles Times*: 'I am trying to make the right decision, but I'm not real clear on an answer, and it's not, frankly, something I am anxious to do. I would feel more confident if Mr Bonds would remove it on his own and put it on his property. [Memorials] are what cemeteries are for.'ⁱ Jennifer's father has since become a road safety advocate. He is a member of a residents' advisory panel to government making road safety recommendations. They successfully petitioned against a bypass lane to Santa Rosa Road arguing that it would encourage speeding.

There is no doubt that roadside memorials are now attracting attention as never before.

There is no doubt that roadside memorials are now attracting attention as never before. They are the subject of academic study, photographic work, newspaper reports, radio programs, council deliberations and personal examination. There is, however, no single response to them, rather they have generated discussion and controversy. Public authorities see them as disturbing, out of place by the roadside and creating new traffic hazards. Those who erect them do so with the self-given authority of personal grief.

Roadside memorials, erected by family and friends usually consist of a white wooden cross carrying the name of the deceased with the dates of their birth and death. Flowers often decorate the memorial and quite often, mementos are placed at its base, tacked onto the cross, or draped around it. These objects may be gifts from mourners or in some way represent the life of the deceased. It is not uncommon to find teddy-bears, cherubs, fairies, toys, pictures, pin wheels, clothing and sporting equipment set around the cross in a garden of memorabilia. Sometimes liquor bottles and beer cans, almost always empty with one left unopened, can be found on the ground surrounding the memorial. Friends have gathered to farewell a mate with one last drink. The

other frequently found object at a memorial site is a message to the deceased, handwritten on the cross, laminated and tied to the cross, or written on cards and wrapped in plastic as protection against the weather.

The memorials are readily found on major highways, back streets and in urban areas. They are set into the road reserve, tacked to power poles, intertwined through wire fences, set into the pavement and in one Brisbane example, memorial notes were written on the wall of a house that butted against the footpath. It can be said though, that memorials are found most frequently on rural highways.

Roadside memorials are now found all over Australia, New Zealand, North America and Europe. Although there are visual differences between them that suggest particular ethnic practices or sub-cultures such as the presence of alcohol bottles around the memorials of young men or the more highly decorated memorials in the American South West, fundamentally, roadside memorials around the world are very similar in form and purpose. The differences demonstrate the powerful expression of individualism and at the same time point to a common understanding of memorial forms.ⁱⁱ

Most obviously the memorial is erected to celebrate a life lost due to the tragedy of road trauma and to act as a grieving place for family and friends. Although some memorials eventually fall into disrepair others are tended and maintained. Flowers are renewed and surrounding grass is mowed. In some cases the memorial is especially decorated for birthdays, Christmas or anniversaries. This ongoing use of the memorial suggests that it holds continued significance for the mourners who connect with the deceased at that place in some way. That communication can take a wide variety of forms. There are accounts of mourners speaking to the deceased, lighting candles, saluting by horn blowing or driving by the memorial at great speed and undertaking cleansing ceremonies at the site.ⁱⁱⁱ

The memorials have obvious mourning and grieving purposes and can serve as significant places to focus personal grief. What is less clear is the relationship between roadside memorials and road safety. The case of Jennifer Bonds' father is clearer than most. He saw the memorial as a way to ease grief but at the same time identified the importance of making a personal commitment to road safety. 'I have nothing else to do with my life', he said.^{iv} Closer to home, the formation of Australian Parents against Road Trauma demonstrates the willingness of those touched by tragedy to turn their grief into a cause.

There is no evidence to show that the presence of roadside memorials has a direct relationship with positive road safety outcomes. Hartig and Dunn surveyed drivers and found that the memorials made 'half of all drivers temporarily more cautious in their driving, and one-third of male motorists reported slowing down after passing them'. This is self reported data from drivers at a Driver-Reviver station and so the sample may be skewed towards caution. Robert Smith, using anecdotal police evidence taken from a speed camera reading suggests that in fact drivers can speed past memorials demonstrating no cautionary effect. ^v Both of these studies relate to speed and perceived or reported cautious behaviour. Clearly not enough research has yet been undertaken to determine whether or not roadside memorials can be directly linked to safer behaviour.



In South Australia, official crash markers have been in use for some time. They are not connected to any individual but rather mark the location of a fatal crash or one that resulted in serious injury. In 1999 an evaluation of a collection of road safety initiatives in Millicent, South Australia, demonstrated that the markers were well recognised and favourably received. It was not possible to evaluate the impact of the markers separately from other initiatives run simultaneously.

A 1996 Federal Office of Road Safety (FORS) study, 'Understanding the Rural Motorist', reported that "in light of the many favourable comments the accident marker posts received and their apparent positive impact on driver attitudes and behaviours it would be beneficial for FORS to evaluate their impact not only in terms of reductions in serious crashes or driver behaviour but also as a means of increasing the salience of road safety in a local area."^{vi}

A similar crash marker system was also introduced into the ACT in June 2001. Black posts with a white cross mark fatalities and red posts with a white line mark the location of crashes that resulted in serious injury. Brendan Smyth, MLA, who announced the introduction of the system described the aim as 'a powerful reminder to motorists to take care when driving on our roads'. The markers are not intended as memorials.^{vii}

In the United Kingdom another scheme has been introduced by Roadpeace, a citizen action group, which marks a road fatality or serious injury by erecting a sign decorated with a red anemone for remembrance that says 'Remember Me'. This program began on 31 August 2003, six years after the death of Diana, Princess of Wales. The

'Remember Me' program is intended to memorialise road trauma victims and at the same time act as a warning to road users.^{viii}

Although there has been very little in the way of evaluation of roadside memorials as a road safety strategy it is undoubtedly true that popular perception supports a view that there is a connection. Hartig and Dunn's survey respondents commented on their understanding of that connection: 'Memorials are a very sad reminder of how dangerous the roads can be, and how we should actually pay more attention to what we're doing'. Another responded: 'It does make you realise, 'yeah, it does happen' and there's an instance of it.' Hartig and Dunn concluded that 'for most drivers these memorials were read as personal expressions of grief, with the message that road use can be dangerous, and that motorists should be vigilant.'^{ix} What these and other comments reveal is that motorists are aware of the memorials and have given some thought to them.

Awareness was effectively used in 1999 by the New South Wales Roads and Traffic Authority (RTA) in their 'memorials' advertising campaign. Country drivers were targeted in this campaign by filming the friends and families of those killed in road trauma standing alongside roadside memorials and pleading for the public to slow down, not to drink and drive, and not to drive when tired. The advertisement was poignant because the people speaking were clearly those most affected by road trauma.

These campaigns and the desire of grieving relatives to mark road death has meant that road victims are now more visible than ever before. In the 1960s the Australian Road Safety Council ran an advertising campaign with the slogan 'Don't be a road safety statistic'. Even then, the Road Safety Council recognised that road death was anonymous. The statistics mounted with a progressive tally given in the newspapers and on television. The individuality of the victim was always lost.

After a crash, the roadway is cleared, debris taken away, road furniture mended and, of course, the dead and injured taken to hospital. The façade of deathless road travel is restored. If roadside memorials have any impact at all, it is surely to raise the public profile of road trauma. It is now possible to see very clearly where crashes have occurred. They are marked. It is also clear that those crashes have resulted in actual deaths rather than anonymous accumulated statistics. The people who have died are young men and children, old people and families. The RTA advertisement brought this point home very clearly as each speaker talked about 'my son', 'my father' or 'my only daughter'.

The issue for road safety advocates that emerges from the roadside memorialisation phenomenon, is surely that this popular process may have wider implications for road safety.

The growth of roadside memorialisation is a movement that has come from the people, from those most affected

by trauma as an expression of grief but the consequence of this action is to reduce the anonymity of road death and to allow the grieving to speak about the devastation of road trauma. The desire to memorialise road victims is not a government program or a road safety initiative, rather it is the public expression of private grief, but it does demonstrate a new willingness to engage with road trauma in a different way. The issue for road safety advocates that emerges from the roadside memorialisation phenomenon, is surely that this popular process may have wider implications for road safety. At last the public is willing to acknowledge road trauma in ways never before imagined. This must be a good thing.

References

- i *Los Angeles Times*, 7 April, 2002.
- ii Jennifer Clark and Ashley Cheshire, 'RIP by the roadside: A comparative study of roadside memorials in New South Wales, Australia and Texas, USA' *Omega* (forthcoming); Kate V. Hartig and Kevin M. Dunn, 'Roadside Memorials: Interpreting new deathscapes in Newcastle, New South Wales', *Australian Geographical Studies*, 36(1998). Online source.
- iii *The Nelson Mail*, 8 May 2002; *Los Angeles Times*, 7 April, 2002; 'Roadside Memorials' 'Sunday Night Talk' Talkback 11 January 2004, ABC Local Radio; for a fuller discussion on the practice see Jennifer Clark and Majella Franzmann, ' "A father, a son, my only daughter": Memorialising road trauma', *RoadWise* 13.3(2002): 4-10.
- iv *Los Angeles Times*, 7 April 2003.
- v Hartig and Dunn, p. 12. Robert Smith, 'Roadside memorials – Some Australian Examples', *Folklore*, 110(1999), p. 105.
- vi Elliot and Shanahan Research, *Understanding the Rural Motorist* Federal Office of Road Safety Canberra April 1996 quoted in J. Moller, 'Millicent Myth or Miracle: Community Evaluation Report for the SE of SA Division of General Practice and the Wattle Range Road Safety Committee, June 1999.' p 7.
- vii *RoadWise*, 13.3(2002), p. 18.
- viii *RoadWise* 14.3(2003), p. 2.
- ix Hartig and Dunn, pp. 10-11.

Benefits of Membership of the Australasian College of Road Safety

- Links to a broad network of people and organisations concerned with road safety;
- Mailings of the College Quarterly Report and official journal 'RoadWise';
- Annual Members' Directory, with contact details of members and their expertise;
- Voting rights at all College meetings and opportunities to influence College policies;
- Special member discounts to attend College conferences and seminars;
- Access to the College's Canberra library of resource material;
- Opportunities to present academic papers for peer review and subsequent publication in the College journal;
- Opportunities to serve in the leadership and to represent the College;
- Recognition of a member's professional experience and service for road safety through election to Associate Fellow;
- Recognition of exceptional service to road safety through election to Fellow.

Membership Qualifications

Any person or organisation interested in advancing the objectives of the College is invited to apply for membership.

Membership Subscriptions

Annual subscription rates are shown on the College website at www.acrs.org.au.