NSW Centre for Road Safety

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Oral History Program

Towards a safer system

Innovations in Australian road safety

Summary Report

Towards a safer system – Innovations in Australian road safety

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About this oral history…

Oral history has been described as 'a picture of the past in people's own words'. It is based on stories by people who were involved in life's events, told in their own warm and passionate words. It complements the official written history and gives us a more intimate and personal perspective on how, when and why things happened. Oral history is a means of communicating how individuals perceived and dealt with challenge, achievement and failure. It often reveals the unsung heroes, those actually responsible for innovations and important changes, and provides them with an opportunity to evaluate their actions in a wider occupational, social and political context.

The Roads and Traffic Authority of New South Wales established its Oral History Program in 1997 to investigate various topics of historical interest. 'Towards a safer system – Innovations in Australian road safety' is the latest thematic oral history in the series and constitutes a significant milestone. It was based on 40 hours of digitally recorded interviews with 29 persons who have made significant contributions to road safety. The project was nine months in the making.

This report is a summary of the key themes revealed in the course of research, investigation and interviewing, and explores the three basic strands of road safety: the vehicle, the road environment and the driver. It discusses the many significant developments within each area, including seat belts, development of vehicle standards, crash testing, child restraints, helmets, speed zoning, breath and drug testing, road engineering improvements, driver and rider licensing changes, public awareness campaigning and enforcement. Although the project covers road safety on a national level and interviews were carried out in three states and the ACT, its main focus is the New South Wales experience.

Outputs from this project include the original interview recordings in CD format, transcripts, photographs, research materials, this Summary Report and an edited three-CD compilation which tells the story thematically. Compiled excerpts from the original interviews may be accessed on the RTA website at www.rta.nsw.gov.au/oralhistory. Researchers and historians wishing to access the source interviews and associated transcripts should contact the RTA Library by phone on 61 2 8849 2913.

Excerpts of interviews in this document have been edited for easier comprehension. The author would like to acknowledge all those who generously contributed to this oral history - the interviewees whose biographies are at the end of this document and the staff of the RTA and NSW Centre for Road Safety who assisted with the project.

It should be emphasised that the comments made by interviewees in this project were made by the participants themselves and do not necessarily reflect in whole or in part the position of the Roads and Traffic Authority of New South Wales.

Contents

'The British Royal Commission on the Motor Car of 1908 saw the most serious problem of this infant technology to be dust thrown up from untarred roads.'

- DAVID COLLINGRIDGE, 1980

The Highway Code

Traffic has always been there. Even stone-age man and woman had to contend with hordes of deer, bison and other animals on their annual migrations. To survive the stampede one observed the first traffic rule: keep to one side. Later, in Roman times there were one-way streets, parking laws, stepping stones as crossing places and even roundabouts to regulate traffic.

Traffic also became an issue for London in the early nineteenth century. As the number of horse-drawn carriages increased, a certain George Borrow, referring to the traffic of the 1820s penned this gem:

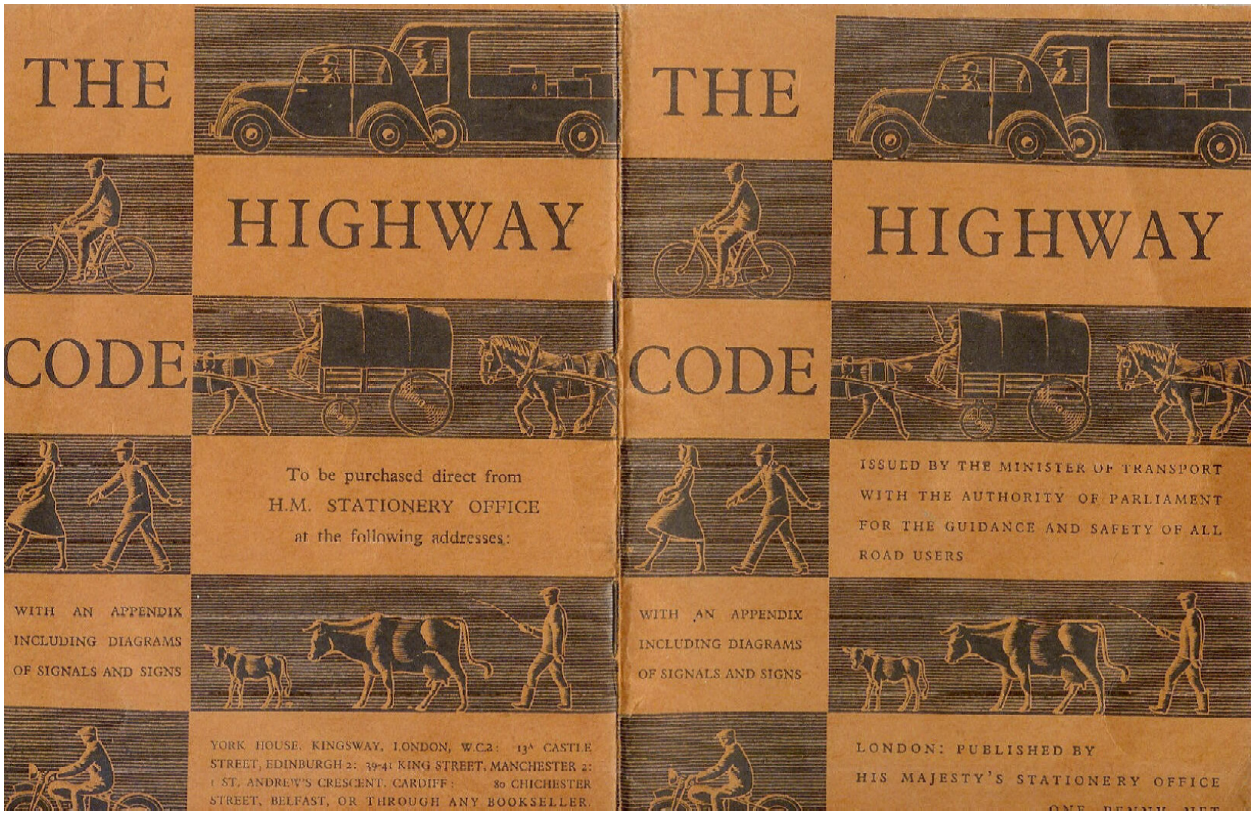
> *'Thousands of human beings were pouring over [London] bridge. But what chiefly struck my attention was a double row of carts and wagons, the generality drawn by horses as large as elephants, each row striving in a different direction, and not infrequently brought to a standstill. Oh, the cracking of whips, the shouts and oaths of the carters, and the greating of wheels upon the enormous stones that formed the pavement!'* (Source: 'Lavengro', autobiography by George Borrow, published in London, 1851).

Road crashes had long been a problem in nineteenth century Britain, especially in the fast growing urban areas. Thus in 1875 there were 1,589 fatalities, mostly involving horse conveyance of some kind. In time, mankind began to devise some basic rules of the road. Dr John Knott is a Senior Lecturer in History at the Australian National University. He has made a study of the history of motoring in Australia:

> 'The Highway Code was introduced in the English-speaking world in the early nineteenth century, so the idea of keeping to the left, certain basic rules of the road, many of which are still around today existed in Australia at the time, they have since the nineteenth century, but there was no specific legislation for motor vehicles. There was some traffic legislation, both in Melbourne and in Sydney, there was legislation involving how vehicles should behave on the city streets, who should give way to whom at intersections, what sort of speed, what sort of devices should be on the vehicles. The first state in Australia to introduce specific legislation for motor cars is South Australia in 1907; in New South Wales the first legislation is 1909, Victoria it is 1910 and the other states were all around that period.' (John Knott, Disc RTA-RS38, CD Track 3.)

It was not long before the first speed restrictions came into force:

> 'Where there would be motorists travelling through the local government area and it was seen by the ratepayers as being a problem, there the local councils would start to introduce by-laws, such as restricting the speed to low levels - in the case of Parramatta it is about five miles an hour. There were rules where motorists had to come to a full stop at an intersection and give way to any other vehicle. What they particularly had in mind is horses, who were allegedly frightened by these new fangled motor cars, so some councils had quite strict rules. The motorists started to form the first motoring organisations to counter this pressure. In most cases the state governments quickly asserted their authority, their jurisdiction, and they are trying to protect motorists because the motor car is seen as the vehicle of the future and you don't want to impede the future, you don't want to stop progress in that way.' (John Knott, Disc RTA-RS38, CD Track 3).



The Highway Code of 1934, London (front cover)

However, progress could not prevent the first Australian recorded motor car crash fatality:

> 'It occurs in 1905. It involves a young man by the name of Samuel Payne. He is a draper and he is pedalling his bike, which is described as a racing bike, into Melbourne, where he works in a drapery store. On 5th of January 1905 he is crossing an intersection where a motor car appears on his right hand side, he attempts to get across the intersection before the motor car and doesn't make it. He runs into the side of the car, in fact, and is thrown off his bicycle and lands on his head. He is put into the back of the car by the driver and the passenger and they whisk him off to Melbourne Hospital but unfortunately he died that afternoon. He is the first official fatality on the roads involving a motor car. There was great public interest as you can imagine, in this incident - this was the first death. Public concern about motor cars had been growing for some time, although there weren't many around they were noted to be faster than other road vehicles. There was an inquest and quite an extensive examination of the whole incident. A draughtsman from the Melbourne Metropolitan Board of Works was asked by the coroner to interview people, the police interviewed people to draw up a diagram of the intersection and work out what had actually happened. Of course, what they are trying to determine is if the motorist was to blame but the inquest eventually determined that in fact it was poor Samuel Payne who was at fault and was the cause of his own death.' (John Knott, Disc RTA-RS38, CD Track 2).

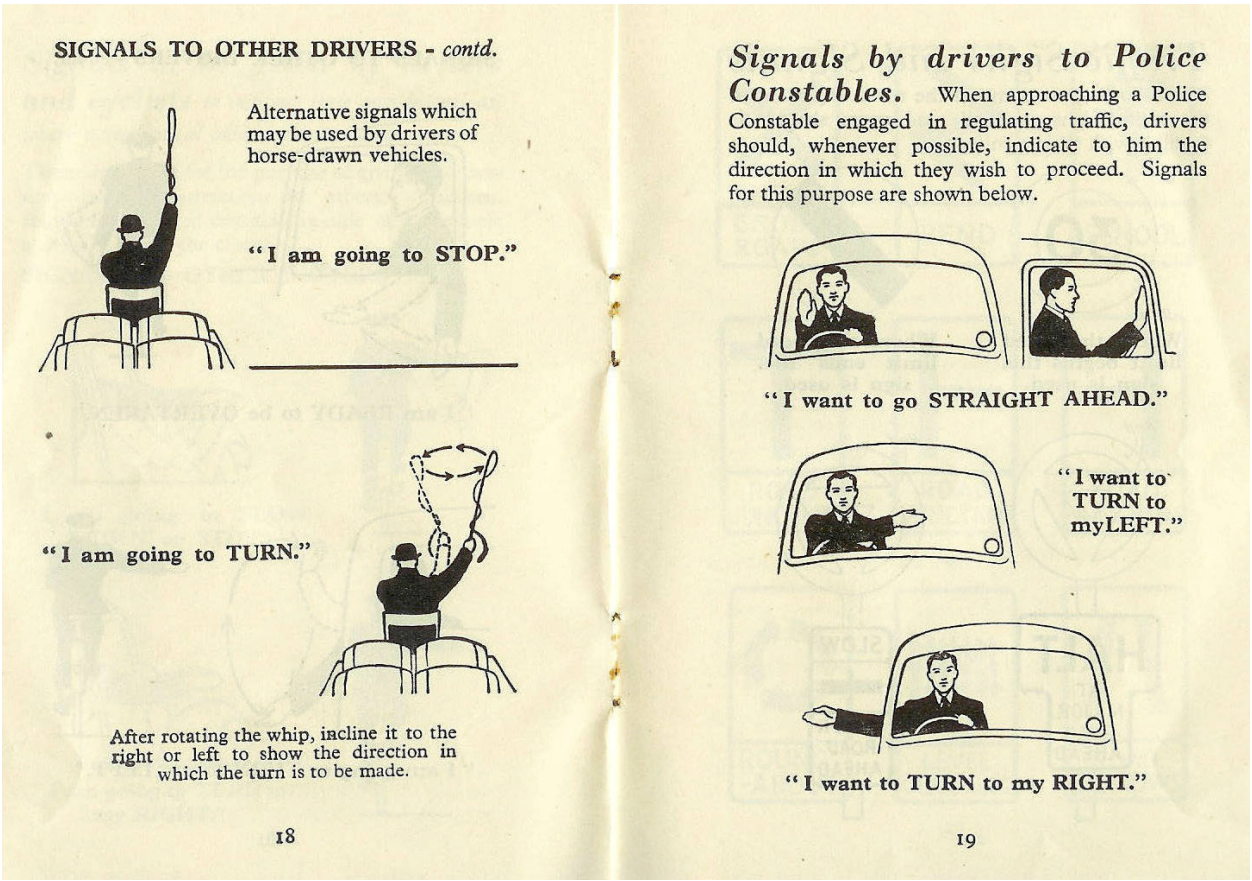
The victims of the early motor car fatalities were not drivers but pedestrians, particularly children:

> 'For children, one of the reasons they were being killed on the roads was because they play on the roads. Old games that used to be played were in the street,

> hopscotch and so on. The street was not just for vehicles, it was for pedestrians and children played out there. They were fascinated by the first motor cars, so they also developed their own games for motor cars, taking their hats off and throwing it across, playing last across the street with their friends, running across the street in front of motorists to see what would happen. This is dangerous behaviour to say the least, and probably that is why it accounts for so many children dying proportionately in the early decades. But with more vehicles on the road children are sort of pushed off the road by the motor car. The big surge in motor car ownership before World War II is in the 1920s, from 1927 right up until the Depression there is a huge surge in the sales of motor vehicles - nowhere near like the proportion we find today, where there is almost one car for every adult in Australia, but certainly in world terms quite significant.' (John Knott, Disc RTA-RS38, CD Track 5).

In the mid-1920s a kind of moral panic gripped the nation about the increasing number of fatalities caused by the motor car. Various road safety education programs were introduced for school children:

> 'In South Australia in 1918, in fact, they introduced the first safety curriculum, I suppose, we would call it. By the 1920s all primary school children across all the states, all the jurisdictions in Australia are having lessons, are being warned about the dangers of the road and the campaign, as it was targeting school children was called Safety First. That program was taught to children in Australian primary schools during the 1920s.' (John Knott, Disc RTA-RS38, CD Track 5).



SIGNALS TO OTHER DRIVERS - *contd.*

Alternative signals which may be used by drivers of horse-drawn vehicles.

"I am going to STOP."

"I am going to TURN."

After rotating the whip, incline it to the right or left to show the direction in which the turn is to be made.

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Signals by drivers to Police Constables. When approaching a Police Constable engaged in regulating traffic, drivers should, whenever possible, indicate to him the direction in which they wish to proceed. Signals for this purpose are shown below.

"I want to go STRAIGHT AHEAD."

"I want to TURN to my LEFT."

"I want to TURN to my RIGHT."

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Photo supplied courtesy of Hughes Walker Solicitors, London

In 1925 Safety First was extended from school children to cover other segments of the community and wider jurisdictions.

> 'In 1925 in Victoria the RACV established the first Road Safety Week; they devote the whole of the first week of March 1925 to an emphasis on road safety. That same year Safety First Association is formed in Australia and they would promote road safety campaigns right around Australia. The police would become involved in New South Wales, the Public Safety Bureau of the Police Department would be formed, they would have designated vehicles, the 'Blue Car' it was called, that would travel on the roads to book offending motorists.' (John Knott, Disc RTA-RS38, CD Track 8).

Photo supplied by Graham Brisbane

The way John Knott sees it, the way we conceptualise road safety has changed considerably over time:

> 'The oldest conceptualisation, and still one that is very prominent, is what I think of as the 'Accident Paradigm' - that is that somehow road traffic accidents are part of life, it is a matter of luck, or ill-luck, whether you have an accident or not and in a sense nothing can be done about it, so you don't do much about it, other than perhaps have faith in superstition, carry a lucky charm with you, or perhaps say prayers. There was a strong movement in the 1950s in churches in Australia to have prayers, to pray for better behaviour and safety on the road. The Catholic Church had young people take a pledge that they would behave safely on the road and they were still doing that in the 1960s.
>
> The other big paradigm is the 'Legislative Paradigm', that somehow road traffic accidents are the result of inadequate codes, or laws, or regulations, and that what you have to do is get better regulations, better laws, and of course, associated with it enforce those better regulations and laws and you'll improve safety on the roads, get

> the codes right and you will reduce road traffic accidents. The very old Highway Code is part of that view of safety on the roads.
>
> The third very strong paradigm in Australia is the 'Enforcement Paradigm', that you have the right laws but now you have to enforce them. Essentially what is implied by this is that it is a rule-breaker, an offender, who is the cause of a crash. This has dominated police thinking in Australia in regard to road safety for a century or more; the police have wanted to find those who had caused road traffic accidents, find out where the blame is associated. At different times it has identified particular groups as being the cause of road traffic accidents, so if you can get the group that is causing the road traffic accidents and somehow penalise them, get them off the roads, crush their cars, or whatever, that you'll solve the problem.' (John Knott, Disc RTA-RS38, CD Track 9).

Harry Camkin is a former Director of the Traffic Authority:

> 'The philosophies of the early days of road safety were largely focused on the concept that it was the driver's fault if there was an accident. There was no understanding of the contribution that environmental factors took into account, like the vehicle, or the road, or the weather, or anything like that, the concept being that they're simply matters that the driver should take into account. There's some logic to that and that from a cause point of view it makes a bit of sense, but not from a prevention point of view. Preventative action was largely ad-hoc. Agencies looked at solving a particular problem, often with no real consideration being given to the possibilities of transferring the problem to another location. If you put a stop sign at intersection 'A' traffic might go a different way and raise the accident level at intersection 'B', for example. Independence: the Police Department often working independently of the Department of Motor Transport, for example; so-called publicity campaigns not having any real relationship to any evidence about the relationships of the issues it's addressing to road safety at all and unscientific: in a similar vein the solutions being proposed not having been seen as being directly related to the causes of the issues they're purporting to relate to.' (Harry Camkin, Disc RTA-RS5, CD Track 6).

But this situation was about to change, even as the road toll was rising. In the 1950s, William Haddon, an American medical doctor had begun to focus his interest on road safety.

Prof. Ian Johnston is a former Director of Road Safety at VicRoads:

> 'Haddon's work was pivotal to my thinking. He was a public health physician and he brought the concept of epidemiology and the public health approach to problems to the road safety field and said, 'Here's a way,' - and people call it the Haddon Matrix - of thinking. He had a simple matrix that said 'There are events that precede the crash that you can influence, there are events that occur within the crash', so seat belt wearing is something within the crash because you can protect people. Then there were things that happen after the crash: for example, the eruption of a fuel tank into a fire. So he had pre, during and post. Then on the other axis there were people, vehicles and the road system. So you could kind of park stuff in boxes and have a look at the interactions between them. So the Haddon Matrix was really the first systematic scientific way of not just thinking about crashes, but thinking about how to prevent them and how to prevent serious injury. From it you could list all the potential things you could do, and you knew that some of them would work in one box but not in another, so you could try and make informed guesses about what might be the most effective thing to do.' (Ian Johnston, Disc RTA-RS44, CD Track 6)

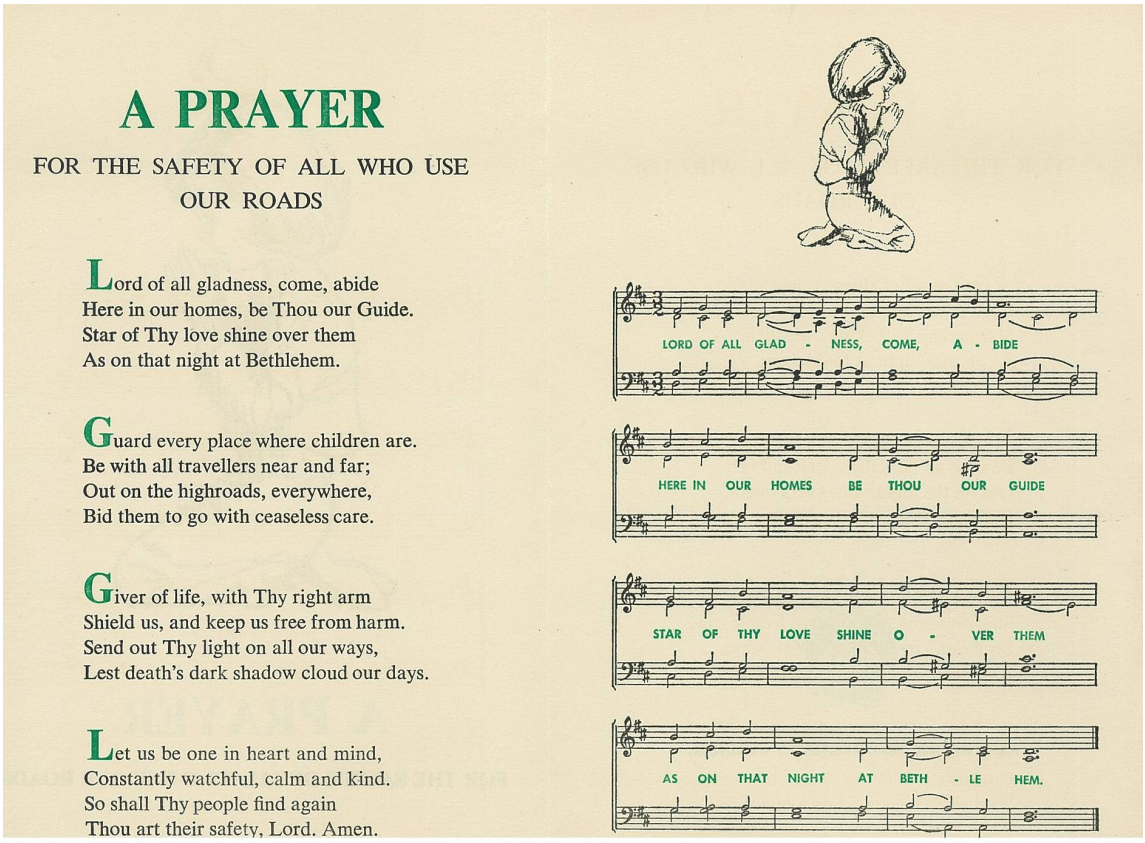
Bill Haddon Jnr and the Haddon Matrix (below)

Phases	Factors			
	Host	**Agent/ Vehicle**	**Physical Environment**	**Social Environment**
Pre-event (*Before the crash occurs)*	• Driver vision • Alcohol impairment • Driver experience/ability	• Maintenance of brakes, tires • Speed of travel • Load characteristics	• Adequate roadway markings • Divided highways • Roadway lighting • Hazardous intersections • Road curvature • Adequate roadway shoulders	• Public attitudes on drinking and driving • Impaired driving laws • Graduated licensing laws • Speed limits • Support for injury prevention efforts
Event (*During the crash)*	• Spread out energy in time and space with seat belt and/or airbag use • Child restraint use	• Vehicle size • Crashworthiness of vehicle—"crush space", integrity of passenger compartment, overall safety rating • Padded dashboards, steering wheels, etc.	• Guard rails, median barriers • Presence of fixed objects near roadway • Roadside embankments	• Adequate seat belt and child restraint laws • Enforcement of occupant restraint laws • Motorcycle helmet laws
Post-event *(After the crash)*	• Crash victim's general health status • Age of victims	• Gas tanks designed to maintain integrity during a crash to minimize fires	• Availability of effective EMS systems • Distance to quality trauma care • Rehabilitation programs in place	• Public support for trauma care and rehabilitation • EMS training

Source: Injury Prevention: Meeting the Challenge, AJPM, 1989; Christoffel T, Gallagher S. Injury Prevention and Public Health, Gaithersburg, MD, 1999.

A pivotal figure in road safety to emerge in the 1950s in Australia was Dr John Lane from the Federal Department of Transport. John Knott provides this background:

> 'He was an aviation medical doctor. Safety in aviation is paramount - road safety, which his department also had some responsibility for, was a very big issue in the late 1950s, so much so that in 1959 the Senate had a Select Committee Inquiry Into Road Safety in Australia and heard from a lot of experts. John Lane appeared at that Senate inquiry and he brought with him William Haddon's matrix, where he was using boxes on a chart to show how public health can be separated out into different factors. At that Senate inquiry he absolutely astonished the senators because they were still thinking in terms of enforcement, they were still thinking about regulations and rules and here was a man who was saying, 'No, this is a public health problem and it has to be approached in the same way as any major public health issue - that is that there is an epidemic going on here and that we have to look at the various causes, the various factors. We have to look at the survivability rates, the conditions on the road, we have to look at the driver, car design, road design, the availability of ambulance services and health to improve survivability of those who are injured. We have to look at so many other factors here, but it is doable, it is doable scientifically' and that is an approach that started to come in in the 1960s in Australia in thinking amongst the road safety experts and public policy makers about road safety.' (John Knott, Disc RTA-RS38, CD Tracks 11 & 12)



A PRAYER

FOR THE SAFETY OF ALL WHO USE OUR ROADS

Lord of all gladness, come, abide
Here in our homes, be Thou our Guide.
Star of Thy love shine over them
As on that night at Bethlehem.

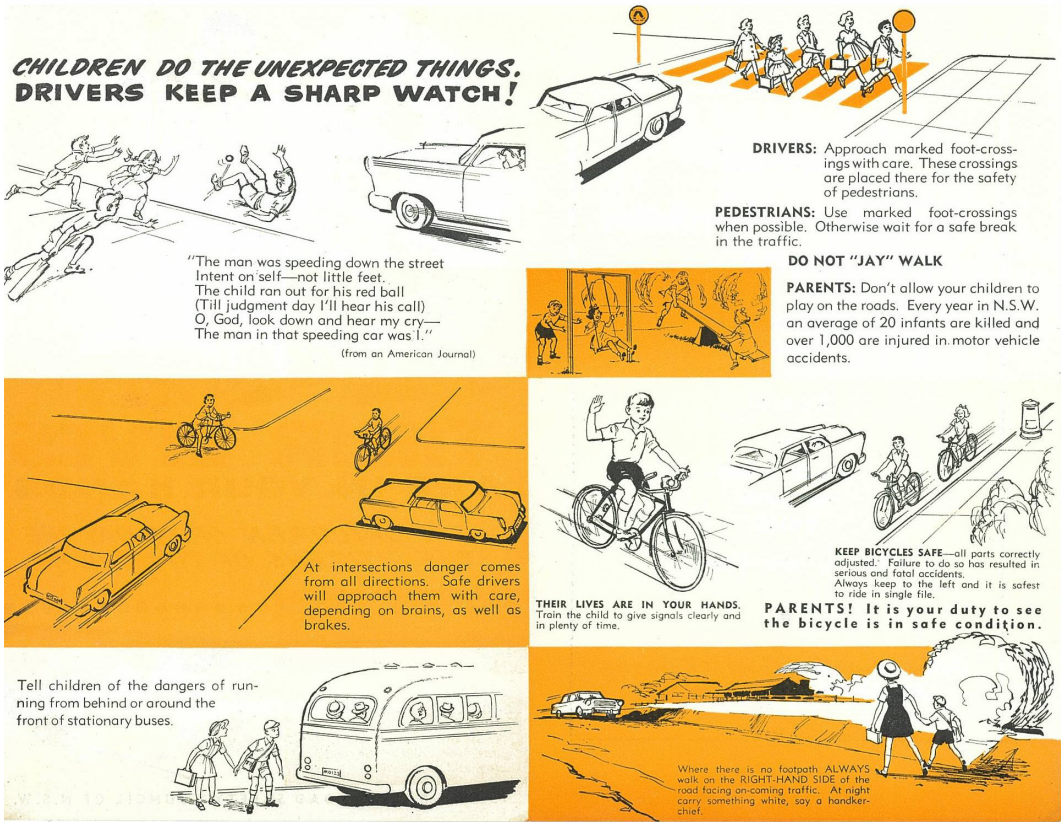
Guard every place where children are.
Be with all travellers near and far;
Out on the highroads, everywhere,
Bid them to go with ceaseless care.

Giver of life, with Thy right arm
Shield us, and keep us free from harm.
Send out Thy light on all our ways,
Lest death's dark shadow cloud our days.

Let us be one in heart and mind,
Constantly watchful, calm and kind.
So shall Thy people find again
Thou art their safety, Lord. Amen.

Extract from 1960s Australian Road Safety Council brochure

1960s child safety brochure from the Road Safety Council of NSW



'[There are] only two classes
of pedestrians in these days
of reckless motor traffic –
the quick, and the dead.'

- LORD THOMAS DEWAR, BRITISH INDUSTRIALIST, 1864-1930

'His fuel was rich
His speed was high
He parked in a ditch
To let the curve go by.'

- ANONYMOUS

Cars for the people

Australians have always had a love affair with the motor car, from the time in 1897 that Colonel Harry A. Tarrant produced his first car in his workshop in Melbourne. It was probably the first petrol-driven car manufactured in Australia. He was a remarkable entrepreneur whose inventive ability places him among the pioneers in international automobile history. Tarrant's car is now long forgotten and was quickly replaced by mass-produced vehicles from America, notably the Model T Ford, which, as a mass-produced item was priced to sell to wider markets. In the 1920s, as the motor car became the symbol of financial success and social status its rapidly-growing use increased fatality rates to levels not seen before. Then, as Australia went to war in 1939 the civilian road fatality rate dropped markedly as the nation's resources began to concentrate on winning the conflict at home and abroad.

Andy Graham is the RTA's Principal Road Safety Statistician:

> 'There were no new vehicles manufactured for the public in the Second World War, petrol rationing existed up until about 1945, or post-1945. Then in 1948 Holden came out with a car for the people and then it just caught on, and so it became much more accessible to the normal household to be able to purchase a vehicle and drive it on the roads. So we got this tremendous increase in the number of vehicles, tremendous increase in the number of drivers and obviously a tremendous increase in the amount of travel that was done. Most of that travel was within Sydney, but people started taking holidays as well on country roads and it took a while for the road network to sort of catch up with this sort of increase in travel. Yes, the 1950s, 1960s and through to the 1970s - tremendous growth in vehicle use and travel and we see in the road fatality statistics and also the injury statistics a big increase in road trauma through those decades so that people were demanding, politicians were starting to step in and say, "We've got to do something about this." People were starting to call the politicians to account.' (Andy Graham, Disc RTA-RS42 CD Track 8).

Dr Graham Brisbane is an expert in vehicle technologies, practices and research. He worked as a Civil and Structural Engineer for the NSW Department of Main Roads, the DMR, in the 1970s, building roads around Glen Innes, Ballina and Walgett. He reflects on the level of consciousness that then existed among engineers about road safety:

> 'The only real level was that there was a set of standards to build a road to and that is how you should conform and as long as we built a road to the Austroads standards or the DMR standards we'd honoured our commitment to road safety. We weren't interested in police enforcement campaigns, we weren't interested in behavioural campaigns, we weren't really interested in new design features. We took on board proprietary products, we built guardrails with the old fishtail end terminals that later on research said was very bad, but the standard was a fishtail, so we adopted it and off we went with our guardrail with those things on. I don't think there was an awful lot of thinking about what might be wrong with what we were doing. As long as we followed our guidelines and our standards how could we be wrong? That is what we did, we were engineers - move dirt, pour concrete, let's get it out there, and we did it well, but it wasn't about road safety in those days. It certainly wasn't a priority. Let alone the DMR, it wasn't a priority for government, the road toll kept going up and the Road Safety Bureau kept the statistics but there was very little done about how we get it down, apart from possibly we should have more policemen on the road and

> that was really the only answer to road safety.' (Graham Brisbane, Disc RTA-RS6 CD Track 2).

Chris Ford is a former Director of Road Safety and Traffic Management at the RTA. After graduating from the University of Sydney he enrolled in 1970 at the University of New South Wales to complete a course at the School of Highway & Traffic Engineering to enlarge his knowledge of those disciplines. We asked him whether road safety was also taught as part of that course:

> 'No, as it turned out there wasn't. There was a significant amount of what later became known as road environment safety countermeasures, but that was purely from an engineering perspective and involved intersection treatments and road improvements generally. There was not much of the course at all devoted specifically to other road safety countermeasures, in fact I can't think of any.' (Chris Ford, Disc RTA-RS49, CD Track 1).

The New South Wales fatality rate reached 27 per 100,000 population in 1966 and 1143 persons were killed on the roads. That same year Dr Michael Henderson, a medical doctor working in Aviation Medicine in England and a committed racing car enthusiast began some groundbreaking research that would have an effect around the world among racing car drivers and the motoring world in general. His research was based on the experiences of Hugh de Haven, a Canadian pilot who had taken part in aerial combat during the First World War:

> 'Hugh de Haven was absolutely fundamental in starting a way of thinking that says that it is not just human behaviour that causes injury and death, it is other things that combine with human behaviour. When flying he came into collision with another aircraft and they both crashed, he survived and the pilot of the other aircraft did not survive and instead of saying, Act of God, just luck, whatever, he started by thinking, well why is this so? Why did I survive and he didn't, we both crashed our aircraft under very similar circumstances? His way of thinking developed into a concept which is completely accepted now, which was really groundbreaking at that time, which was the concept that if you package a person in the way that you package a vase, if you send it in the mail then that person may not be injured in incidents or accidents, as they used to be called, that were potentially injurious, didn't have to be, they didn't have to kill people. Even quite violent crashes in aircraft, trains, cars, racing cars, they didn't have to result in death and injury, and it wasn't just a matter of luck, it wasn't just an Act of God, it was a matter possibly in the future of applying science to this kind of thought which would make life safer, even for risk-takers or people in dangerous occupations.' (Michael Henderson, Disc RTA-RS2, CD Track 5).

But why did de Haven survive the crash and the other pilot did not?

> 'Well it was a combination of things. It was a combination of: he did have a lap belt on, the instruments that he came into contact with were not as injurious as the instruments in the cockpit that the other pilot came into contact with. He compared the cockpits with the injuries and so forth and he realised that if the cockpits had been made safer and the pilots in the future were all properly restrained, including the use of shoulder belts, which hadn't been used at all at that time, then people could survive quite severe accidents. In that case it was just a fundamental comparing of two outcomes from a similar crash, which of course is a concept that applies all the time now in crash investigation.' (Michael Henderson, Disc RTA-RS2, CD Track 5).

In 1966 and 1967 Henderson researched every incident in motor racing in Britain:

> 'Obviously I missed a few that might not have been reported but I followed up all the circuits, all the races, and made sure that I got pretty much all of them. I worked out later - I think I got eighty per cent of the incidents that had occurred, defined as enough damage to the car to prevent further competition that day, all the way up to devastating crashes that caused a fatal injury. So, I just manually - long before computers or even decent calculators - built up this big spreadsheet of what had happened. Because things were emerging from that I started writing articles about it, flowing from really the first research of its kind that had ever been done anywhere in the world. It came out originally in a series of magazine articles in 1967. I thought towards the end of that year that maybe there's a book in this and I approached a publisher who specialised in motoring books. He was very enthusiastic and so I pulled together everything that I'd done, everything that had been written by other people and the book was published in early 1968 as *Motor Racing in Safety: the Human Factors* and that was the first book of its kind in the world that touched on anything like that. I mean safety in motor sport - the whole idea was to most people just inconsistent. Motor sport was a sport in which you were likely to be killed - I mean the death rate in Formula One drivers at the time was something like the death rate in Battle of Britain fighter pilots. In five years of Formula One racing the chances are you are going to end up dead or permanently injured, but everybody accepted that. Everybody from Formula One down to the kind of club and national and occasional international racing that I was doing just accepted that, it was it a fatalistic approach, I guess. The sport was so exciting, so challenging, people did it despite all that.' (Michael Henderson, Disc RTA-RS2, CD Track 6).

As a result of the publication of his book Henderson accepted a tantalising offer:

> 'I was invited to join a team in Italy working at the Ferrari factory and with support from Pininfarina, who was one of Ferrari's major stylists and body builders I was asked to develop a concept car, a concept Formula One racing car, which would demonstrate that everything that might be done, or foreseeably could be done for safety to provide protection for the driver. I was asked to join the team and there were other engineers, particularly Professor Fiala, who at the time was a Professor of Engineering in Germany, who understood these concepts, and who found it exciting that the concepts of packaging could be applied to racing cars. So with money supplied by Pininfarina and Ferrari we designed a built a car from concept up in the space of about a year and that was first shown at the Geneva Motor Show at the beginning of 1969 and it had a huge influence.
>
> Using the technology of the time we were still able to demonstrate concepts such as a very strong inner capsule in which the driver would be restrained by a multi-point racing harness. At that time no racing car drivers in Europe in open cars were wearing any kind of seat belt, it was regarded as safer to be thrown out – well, I proved that was wrong from the research I did in 1967 but I was the first one to show that. So we've now got the driver strapped into the centre capsule and then we built outside that crushable structures to ease the shock loadings in a crash. We added fire protection because fire was the terrible thing then, many drivers died in fires, so we built in a fire-extinguishing system. We put aircraft-style tanks in, which by that time were already resistant to being damaged with a great outflow of fuel. We introduced a concept which didn't come into widespread use for decades afterwards and that was to restrain the head and neck of the driver so that having restrained the body the head wasn't going to flick forward and break the neck. We demonstrated that in 1969 and that was a revolutionary concept, there is no question of that, there was nothing like it that had been done before and since. My

concept was to combine the four-point strap harness with two straps that went between the legs and under the hips and that would prevent the driver sliding underneath and it also stabilised the whole system so that it became a much more stable system in a complicated crash. It just stayed in position, didn't allow the lap belt to rise up and there were all kinds of advantages. The car is still being shown around the world, it is considered by Pininfarina as one of the most significant concept cars that he has ever made. The concepts there are exactly the same now as they are in modern Formula One racing cars and the concepts are exactly the same as they are in modern road cars as well: that of central strong structure, crushable outer structures, full restraint, roll-over protection and so on, they are all just exactly the same concepts. Every one of those concepts since then has been built into the rules for international motor racing.' (Michael Henderson, Disc RTA-RS2, CD Tracks 7 & 8).

Michael Henderson in his multi-point racing car driver harness (Photo supplied by Michael Henderson)

It took only a year for Henderson's invention to become commonplace among racing car drivers:

'It was one of the most astonishing turnarounds in safety in any kind of human activity, particularly an activity which fundamentally is very high risk - one year it took. By the end of 1968 every Formula One car had a harness and pretty much every other open racing car in the world had fitted harnesses by that time. Same thing happened here. People realised that friends of theirs were surviving, or they were surviving crashes in which the harness had made the fundamental difference, so of course it was a very fast snowball effect.' (Michael Henderson, Disc RTA-RS2, CD Track 9).

Henderson's discovery was to provide great impetus for the wider introduction of seat belts into all vehicles, particularly in Australia during the 1970s.

Michael Henderson in his Sigma Grand Prix safety concept F1 car, 1970 (Photo supplied by Michael Henderson)

'Safety doesn't happen by accident.'

- AUTHOR UNKNOWN

Crash investigation and analysis

Being involved in a crash or witnessing its effects can be a harrowing experience. Maureen Elliott is the RTA's Manager, Safer People. She spent the first 18 years of her career as a nurse in the emergency departments of hospitals:

> 'It is a very distinctive memory that I have of motor vehicle crashes and probably two extremes: one where a person comes in and they are very, very badly damaged, lacerated, bleeding, glass, shredded clothing and skin – and the other extreme I remember a young woman that we nursed in the intensive care unit who had not one mark on her but had been travelling in the back of a panel van at that time, which crashed, and she sustained a catastrophic head injury, although externally it looked like there was nothing the matter with her at all. So yes, you see awful things, quite horrific things, and long-lasting sort of effects on those that survive and the families that are affected as well.' (Maureen Elliott, Disc RTA-RS40, CD Track 1).

One of the pioneers of crash investigation is Professor Jack McLean of the University of Adelaide's Centre for Automotive Safety Research. He began to analyse car crashes in 1962 in what became known as the First Adelaide Study:

> 'Well, they were very much team studies. We were able to hire two teams of researchers, each with a medical doctor, an engineer and a psychologist. We set out to record a sample of crashes to which an ambulance was called, where the sample had the same distribution by time of day and day of week as all accidents, in other words, representative by time of day and day of week. That meant we relied on ambulance records for the previous twelve months and would allocate, assign our working periods accordingly, such that on a late Friday afternoon, early evening, one

team would be on call for perhaps four hours with, on average, an assurance that there would be at least one accident occurring during that time, whereas on a Tuesday morning they might go on call at eleven o'clock at night until eight o'clock in the morning and chances are there might be one accident in that time. I am still surprised to the point of astonishment and very grateful for the six people doing that work that they lasted the twelve months. It was irregular and very difficult work, but done very well. Cars were much less safe than they are today and I can think of just one head-on collision in the Adelaide parklands at night between a large Ford utility and I still have the colour slide showing teeth marks in a metal dashboard, a young lady whose face hit the dashboard. The other car was a Volkswagen Beetle and the steering wheel and steering column were pushed up about thirty centimetres, about a foot, and the driver was a quadriplegic. Neither of those things happen any more, steering columns don't come back and hit the driver under the chin and dashboards are padded.' (Jack McLean, Disc RTA-RS47, CD Track 10).

Photograph supplied by Jack McLean

McLean confirms how many items of information were collected for the study:

'I once made an estimate for a two-car crash with two people in each car - there were about three thousand items of information, but by items of information that would include information on specific injuries, and one occupant might have a dozen injuries, and an estimate of the objects, or object causing those injuries. It was very, very detailed. In fact, it is still the most detailed representative study of crashes conducted at the scene of the crash that has ever taken place anywhere in the world.' (Jack McLean, Disc RTA-RS47, CD Tracks 10 & 11)

McLean's crash investigation study provided new information on the mechanics of a crash:

'We were looking for information on anything that we thought might be relevant to why the crash had happened, or why the injuries occurred in the crash. At that time we occasionally would go back to the scene of the crash, sometimes we would go and have a look at the car in the crash repair yards. In a subsequent study we went

> into even more detail in that way. New information that we provided was particularly to do with pedestrian accidents where we had some cases, or one case in particular where the pedestrian was thrown up onto the roof of the car, pivoting about head and shoulders into the windscreen and denting the roof in front of the rear window, by which time the driver had applied the brakes and the pedestrian then slid forwards across the front of the car and ended up on the road in front. That was typical of most of the pedestrian accidents with an adult pedestrian; pedestrians, we discovered were run under, not run over. Dr Tony Ryan and I published a paper at the Stapp Car Crash Conference in 1965, which was the first one to show that pedestrians got run under by the striking car, that was a study based on actual accidents. We also postulated that the overall shape and impact properties of the front of the car were the major determinant of pedestrian injury. It is interesting to think that that was forty-four years ago and today our Impact Laboratory at the Centre for Automotive Safety Research does the testing of new cars to determine how well they protect a pedestrian in the event of an impact, so we've come a long way.' (Jack McLean, Disc RTA-RS48, CD Track 4)

Seven years after McLean had begun his crash investigation study in Adelaide Dr Michael Henderson was appointed as the founding Director of TARU, the Traffic Accident Research Unit set up in 1969 by the NSW Department of Motor Transport. Henderson and his team began to mount their own crash investigation studies:

> 'Well, the first thing to do was to bring together the people in the department and from outside who had an interest in road safety and the scientific approaches to reducing road accidents and death and bring them into one group that was working together as a team, so that was why we were getting people in from outside. The idea was to become serious about a systems approach, that is, integrating traffic engineering with mechanical engineering and with human factors approaches, so we were all working under the same roof with the same aim. The aim obviously was to reduce the rate of accidents and death and hopefully to actually start bringing the actual numbers down. I have to say in the early days that looked a pretty optimistic aim because it did look as if the trends were essentially inexorable and the best we could hope for was to stop deaths going on up.' (Henderson, Disc RTA-RS2, CD Track 12)

Behavioural Psychologist Dr David Saffron joined TARU in 1979:

> 'I suppose the person who really got TARU going and made a big name for it was Michael Henderson. He had written extensively on road safety based on the sort of work that Haddon was doing in the USA. When we came into TARU each morning we'd see a picture of the Haddon Matrix - that would remind us that was what it was about. When you started there you were encouraged to read a book about road safety, which was a book edited by Haddon, Suchman and Klein and it included articles by Haddon and other researchers, which really related to taking a research-based analytical approach to road safety, rather than these general views such as "It's the nut behind the wheel" or "We just need to educate them and it will be right." Yes, taking a more scientific, more professional approach was what was encouraged in TARU.' (David Saffron, Disc RTA-RS37, CD Track 3)

Michael Henderson and team member at crash scene, 1970s (Photo supplied by Michael Henderson)

Michael Griffiths, then a young engineer with degrees in Mechanical Engineering, Environmental Acoustics and Biomedical Engineering joined TARU in 1976:

> 'It was learn on the job. There was no one in the teams who had done it before, so a lot of the early months were just really learning how to go about it. The one thing that was planned was that there would be someone looking at the vehicle contribution, someone looking at the road and the environment contribution and someone looking at the behavioural contribution, so that is why you had a psychologist and a traffic engineer and a mechanical engineer. My job was in the area of the vehicles, looking at what the vehicle's role was in terms of its condition that might lead up to the crash, but really subsequently, more importantly, how people got injured inside the vehicles. It turned out really that vehicle defects are a very minor contribution towards crashes and basically we found what most people have subsequently found elsewhere in the rest of the world that for cars it is round about one per cent, so it is a very minor factor. Crashes are caused overwhelmingly through human behaviour failure, not negligence, not wilful behaviour, just the fact that people are limited in their abilities and their attention to the task and they make mistakes. Obviously there are some people who drive really badly deliberately but mostly people just make errors of judgement that leads to a crash. That tends to make people think "Oh well, stopping crashes is all about changing behaviour" but it is very difficult to change behaviour, so in fact the most effective ways of reducing injuries in crashes have been through engineering out the likelihood of getting an injury, or even engineering out the likelihood of having a crash.' (Michael Griffiths, Disc RTA-RS14 CD Track 3)

Peter Croft, a Melbourne-based Human Factors Engineer had also joined the TARU team:

> 'It was exciting. I was twenty-seven or something at the time and I threw all my worldly belongings into my old Wolseley and drove north to Sydney, so that was an easy move. But it was exciting because TARU of the day was at the forefront of research into lots of different aspects of road safety, the medical, the psychological,

the vehicular and so on. I was working in a group headed by Gordon Messiter, Michael Henderson was the director, they were both relatively young people to be directing a high profile organisation like that, they were in their thirties at the time and it was all happening. We were discovering new ideas, new aspects of vehicular and psychological aspects on road safety and I was working with Gordon on some of the other areas like the traffic engineering side of things. We had some policemen seconded to TARU in those early days who were there to help us with recording and analysis and access to information coming from crash investigations. We would typically travel to these sites with the police, who would be able to help us gain access to records of vehicles, of people, of hospital admissions, and so on, and that was I think very instructive. We learnt a lot about the investigative approach, learning to be critical and questioning, which was part of our scientific approach anyway, but in a setting where the police were able to help. I think they learnt a little bit more about the scientific approach, about the approach to identifying facts, not necessarily worrying about culpability and the legal pursuit of participants in the crash.' (Peter Croft, Disc RTA-RS10, CD Tracks 2 & 6)

Attending so many crash investigations had an effect on members of the team:

'It did have a big toll on some people, some people just couldn't cope. Some people ostensibly go out to do the job and kind of disappear for the day and then turn up later. But we were very lucky that one of the behavioural scientists we had recognised that there were some bereavement issues that we needed to deal with and he organised some really good training for us and so we ended up getting bereavement counselling training. I had never seen a dead person until I went into that area and I thought hopefully, things will build up slowly but within the first week I went to the first fatality, which was where a large truck had a head-on with a Holden ute and went right over the top of it and that was quite a mess. I thought at the time it hasn't affected me much but I remember driving home from work that night on a road with an eighty kilometre per hour speed limit and I looked down I was doing about twenty, so it obviously had had some effect.' (Michael Griffiths, Disc RTA-RS14 CD Track 2)

Crash investigation by TARU team, 1970s. (Photograph supplied by Michael Griffiths)

Did any of the revelations about vehicle design from crash investigation make their way down to the car manufacturers?

> 'It was kind of a circuitous route. The management we had at the time was sort of interested in research but not so much in the turn it around and change things bit. But those of us who stayed became pretty motivated and so then we'd get on something like the National Vehicle Safety Advisory Committee and that is where you could feed back that kind of information and say "Here's an area where you need to improve vehicle design." That is why it was really important to be investigating crashes because if you went to one of those meetings the car manufacturers were represented there and their perception was: they knew more than you did, but if you'd been to real crashes and could point out real mechanisms of injury that were happening in the real world then you first of all were motivated to tell your story with some enthusiasm and you could present a more compelling picture to bring about change. It wasn't an easy process, it was a battle, it wasn't like you had the vehicle manufacturers in the room and you're in the room and you are all trying to work towards making the vehicle safer; it was like you are in the room trying to make vehicles safer and as a general rule, there were exceptions, the vehicle manufacturers really were saying we didn't know what we were talking about and other people weren't interested and they just wanted to sell vehicles.' (Michael Griffiths, Disc RTA-RS14, CD Track 4)

> 'In terms of in-depth investigation of crashes a relatively small proportion of crashes involve some sort of vehicle factor, be it the sort of tyre wear or shonky alignment of the steering, and things like that. I think about three to maybe five per cent of crashes have a vehicle factor involved. The vehicle factors, the environment factors, the road factors and the human factors are about ninety, ninety-five per cent of crashes - the environment factors are about twenty per cent and vehicle factors may be three to five per cent per se, so obviously that is much more than a hundred per cent, there is obviously a couple of the factors working together in most crashes. They tend to determine whether a crash will occur and they will also determine the severity of the crash, so the fact that a car has bald tyres and it is wet road, it is late a night, means that the car will lose control on a curve and go off the road. The road environment will come into play if there is a large tree and things like that there, that is not going to be a good sort of outcome, but it might also be the human factor, in that the speed approach for that curve was inappropriate, or the person chose not to wear the seat belt. That will eventually determine the outcome of the crash.' (Andy Graham, Disc RTA-RS43, Track 12)

What do crash databases reveal about the nature of the crash? Rosemary Rouse, a former Manager, Road User Safety at the RTA points out:

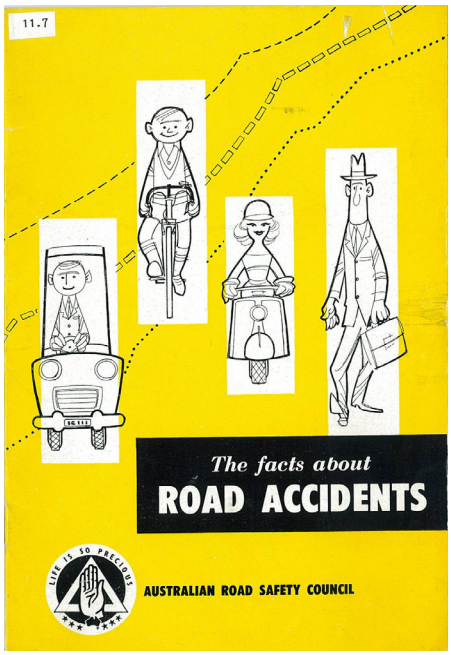
> 'We look at what the crashes tell us. What are the vehicles involved, what are the ages of the people, what local government area do they live in, where were they travelling, what vehicle were they driving? There is a wealth of information in the crash database and we use that to develop understanding of who was involved, the who, what, where and when as I used to call it, of traffic crashes. Then we go to the who and we do a lot of behavioural research with them. We talk to them about what their knowledge is, what their perceptions are, what their attitudes are, what their beliefs are, what motivates them to act in certain ways and what it would take to change their behaviours. Who are their champions? What is the role of peer influence and parental influence on them? So we build a whole profile of a target group.' (Rosemary Rouse, Disc RTA-RS1, Track15)

Andy Graham provides another account of modern crash investigation methods:

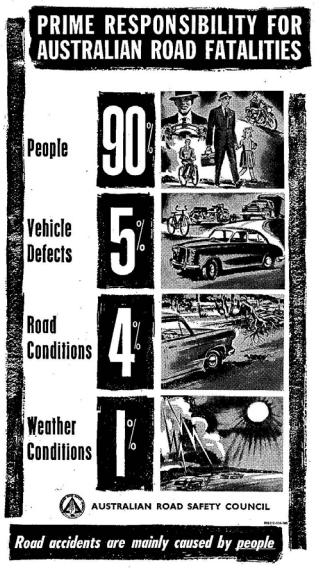
> 'Most of the crash data comes from the police system, from our police reporting. In New South Wales, currently, and it has been for a number of years. When a crash of a certain degree of severity occurs they are required to be reported to the police. The police will take information, they may not attend the crash but they do so in most serious crashes, so it is really the police who are the initial collators of the information. These days it is entered through a computerised system so they will have information from their notes and they'll enter it on the data system, the COPS system, which is the police data entry system. That information is sent to us electronically. We add some information from the Health Department, Division of Analytical Laboratories, which has alcohol information for controllers and other people killed or seriously injured. Some geographic information is coded, we code the Australian map grid reference data, locations, longitude and latitude co-ordinates for the crash data so we can plot it on electronic maps and things like that and at the end of it we've got a record of something like a hundred and fifty variables with crash information: location and stuff; time, date; type of location; road surface conditions; weather; vehicle information or traffic unit information; what sort of traffic unit; what was the age of the driver; what were they doing; what manoeuvres; what errors did they make and casualties from the crash, if there are casualties from the crash, and that will have information: age, gender, et cetera, as well as class or road user, and so on. So it is quite a comprehensive data record and there is a lot of work that goes into each of them. Approximately half of our fatalities are aged over forty years and obviously the other half are under forty years, so it is clearly a trauma problem across all the years. As far as rates per population are concerned, yes, young people are over-represented, and young males in particular are over-represented. In the seventeen to twenty-five year age group they are over-represented by a factor of about two to one against the general population. Amongst male drivers, in that age group, they are over-represented by about three to one. So they still represent a significant issue and a significant problem relative to the road toll in their involvement rates. I think that is one of the challenges, to start not only reducing the risk taking amongst that group and reducing their over-representation but spreading the measures across the whole of the community.' (Andy Graham, RTA-RS42 CD Tracks 5 &11).

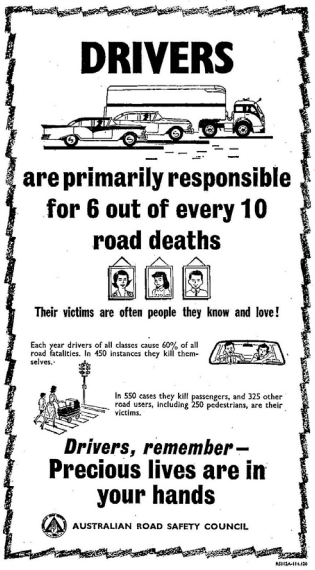
Older drivers also present issues of concern to road safety practitioners:

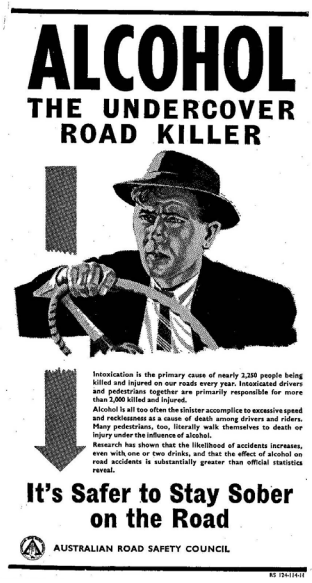
> 'On the surface they look as if they are as dangerous as the young worst group, young males seventeen to twenty years. There are different reasons for it. When you look at the fatality rates per licence held the very elderly, eighty-five years plus, have a crash involvement rate in fatal crashes roughly the same as a seventeen to twenty year olds and so they are a bit of a concern. Bear in mind that the elderly age group represents only a small proportion of the population, certainly much smaller than the seventeen to twenty-five year olds, and also remember that the elderly have different factors contributing to their over-involvement. It is not quite like the young drivers, the very elderly have issues to do with frailty and how much their bodies can withstand in a crash, which normally, to a young person would be very minor but to an elderly person could end up with injuries that would be too severe for them. Also the types of crashes they have would also generate more severe outcomes, they tend to have cross-intersection-type crashes, or visual impairment-type of crashes where they just don't see vehicles and they come out in front of a big truck, they tend to have those sort of crashes. Obviously, with the ageing of the population we are going to see a lot more people moving into those older age groups and for that reason it represents a challenge to road safety practitioners in this state, and indeed the rest of the world' (Andy Graham, Disc RTA-RS42 CD Track 12).



Extract from early 1960s road safety awareness brochure from the Australian Road Safety Council







ROAD CASUALTY STATISTICS AND VEHICLE POPULATION AUSTRALIA, 1937-61 †

Year ending June 30	Vehicle Population* at June 30	Casualties		Ratio per 10,000 Vehicles	
		Killed	Injured	Killed	Injured
1937	791,497	1,387	22,940	17.5	289.8
1938	856,828	1,483	25,097	17.3	292.9
1939	899,533	1,433	25,653	15.9	285.2
1940	895,023	1,558	26,142	17.4	292.1
1941	871,542	1,298	23,340	14.9	267.8
1942	750,833	1,297	17,529	17.3	233.5
1943	755,996	1,340	16,236	17.3	209.2
1944	820,220	1,089	14,785	13.3	180.3
1945	853,982	1,011	15,643	11.8	183.2
1946	928,445	1,270	21,114	13.7	227.4
1947	1,012,758	1,346	24,759	13.3	244.5
1948	1,107,345	1,347	24,062	12.2	217.3
1949	1,224,777	1,424	25,310	11.6	206.6
1950	1,397,106	1,643	31,447	11.8	225.1
1951	1,580,351	1,926	35,095	12.2	222.1
1952	1,770,184	2,054	38,376	11.6	216.8
1953	1,839,894	1,856	39,405	10.1	214.2
1954	1,947,346	1,976	44,629	10.1	229.1
1955	2,129,720	2,042	46,465	9.6	218.2
1956	2,276,691	2,119	48,773	9.3	214.2
1957	2,391,425	2,113	50,450	8.8	211.0
1958	2,536,439	2,146	52,213	8.5	205.9
1959	2,664,702	2,264	53,975	8.5	202.6
1960	2,833,728	2,468	60,104	8.7	212.1
1961	3,001,663	2,542	60,749	8.5	202.7

* Includes Motor Cycles and Motor Scooters.

†SOURCE: Commonwealth Bureau of Census and Statistics, "Road Traffic Accident Statistics."

'The demand for seat belts is too low to justify seat belts being introduced as standard equipment and what demand there is could be satisfied by after-market fitment.'

- AUSTRALIAN VEHICLE MANUFACTURER, 1967

Road safety in the 1970s

Apart from accident investigation, the TARU team notched up a myriad of other achievements. They stand as shining beacons to road safety in New South Wales and soon made their way to the other states, and even beyond. Bruce Dowdell joined the TARU team as an engineer in 1974:

> 'Much of the work we did was made use of overseas - after I'd been on a couple of overseas study tours there was a lot of interest in what was happening in Australia and people were coming to Australia to see what we were doing. We really were leading what was happening in the world in road safety.' (Bruce Dowdell, Disc RTA-RS25, CD Track 6)

Among the most important of TARU's projects in the 1970s was their research into seat belts and child restraints which were then not compulsory to wear.

> 'We were already realising, all of us knew, really, that to get people wearing seat belts…. Really, if we couldn't do that then vehicle occupancy safety could never really be improved much. So that was a fundamental thing we had to do by persuasion or legislation, or whatever, but however that was done people had to wear seat belts. David Herbert had published a paper in the *Medical Journal of Australia* a year or two before, I think about 1967 on the effects of an experiment, essentially, that had been conducted at the Snowy Mountains Authority. The then head of the Authority, Sir William Hudson had been influenced by David Herbert to mandate the fitting and use of seat belts in all the equipment and all cars used in the Snowy Authority, which is a huge enterprise of course, so you are looking at hundreds and hundreds of vehicles of all kinds, from passenger cars up to trucks. One of David's jobs was to monitor and eventually research that project and again, it was an extraordinary turnaround. After the mandate was introduced, if you like, what would now be known as an industrial health and safety measure, where they had been losing several vehicle drivers they lost none after that was introduced, it was astonishing. So I was very keen to get David's expertise on board.' (Michael Henderson, RTA-RS2, CD Track 13)

David Herbert became an important figure in the TARU team. He and Michael Henderson were already members of the Australian Standards Committee that was writing the standards on seat belts and they started agitating to have seat belt wearing made compulsory:

> 'This was not that controversial because to most people it just made commonsense. Again, we researched everything when the New South Wales government was thinking about introducing it, as all the states were, particularly Victoria. We wanted to know what kind of backlash might there be if we did introduce it and what we found was that even among people who never wore a seat belt there was no strong opposition to making it compulsory. In fact there was a feeling that for people who never wore seat belts because of whatever reason, laziness or peer pressure, the regulation would make them wear a seat belt and they realised that was a good thing to do and so they were happy to accept that regulation and it eased the pressures on them and a lot of people did feel pressures not to wear a seat belt. If a passenger put a seat belt on it was a message to the driver "I don't trust you" and that was something that was quite strong at the time - make it mandatory and the pressure is off. It was a mandated change of behaviour and to that extent was a very important one. We were the first country, by the end of 1972, to introduce it as a nation - no

one else had done, closely followed by New Zealand. We became the focus of world interest in whether or not it was possible and how you go about it.' (Michael Henderson, Disc RTA-RS3, CD Track 2)

15.11

IT'S SAFER INSIDE

THE LIFE OFFICES' ASSOCIATION FOR AUSTRALASIA

AUSTRALIAN ROAD SAFETY COUNCIL

LIFE IS SO PRECIOUS

THE TRUTH ABOUT SAFETY BELTS

Every nine minutes, every day of the week, someone is killed or injured on Australia's roads. If this continues, one in every 20 of us will become a road casualty in the next 10 years.
This is a constant challenge — and a threat — to every one of us.
If we could eliminate the one major factor in the road toll — human error — something like 90 per cent of all fatalities would never occur.
But until road safety education takes full effect, we must take steps to defend ourselves and our families from the dangers of the road.
There is a simple, quick, and inexpensive way in which *you* can do this right now — by fitting safety belts in your car and by using them every time you drive. Intensive research in Britain and America has shown that, if you become involved in a road accident, you and your passengers face *five times the risk* of death or injury if thrown out of the car.
After a crash, drivers and passengers without safety belts keep going at the speed at which the car was travelling until they hit something solid. This is the impact that kills and maims. It is the sudden, violent reduction in speed — the deceleration — of the victims which does the damage. Even low-speed collisions can produce high deceleration rates . . . and serious injuries.
Safety belts make drivers and passengers five times as safe because they are designed to hold them in their seats and so prevent them:

- *From being thrown through the windscreen;*
- *From being thrown out of the car on to the road, perhaps into the path of another vehicle.*
- *Being thrown against control knobs and other projections inside the car.*

YOU'RE SAFER BY FAR WHEN YOU STAY IN THE CAR!

IT'S NOT ALWAYS THE OTHER FELLOW!

The results of five years' investigation, both in Australia and overseas, suggest that when approved safety belts with proper fittings come into general use:

1. The road death toll could be cut by at least **25%**
2. The serious injury rate could be cut by at least **60%**

You may be a good driver, and it may not be your fault, but latest statistics from the Australian Road Safety Council show that in a typical young family of four, one will probably become the victim of a road accident . . . with the odds against the male members. You owe it to yourself and your family to reduce the risk as far as possible . . . with safe driving habits, a safe car, and safety belts.

YOU CAN'T MEASURE A LIFE OR LIMB IN MONEY, BUT JUST CONSIDER THIS!

You can buy an approved-make safety belt for as little as £3.10.0. What a wonderful investment in peace of mind.
Personal preference will decide the type and make of belt that suits you. But whether it be a lap belt or a diagonal sash, a "three-point" combination of the two, or a full shoulder harness, there's a simple way of knowing whether it's a recommended make.
Just look for "E35" stamped on the buckle. That means the belt is approved by the Standards Association of Australia.

E35

SO WEAR A SAFETY BELT . . . AND STOP WITH THE CAR!

These facts about safety belts are brought to you by The Life Offices' Association for Australasia, comprising the major life assurance societies operating in Australia and New Zealand. It is a contribution to the ceaseless fight of the official national road safety body — The Australian Road Safety Council — to stop drivers and passengers killing and maiming themselves on our roads.

The L.O.A. urges you to:

- Drive safely. *The only final protection against death and injury on the road is to avoid accidents altogether.*
- Fit safety belts to your car *and use them every time you drive;* and
- Be sure the belts you fit are *makes approved by the Standards Association of Australia,* and that they are properly attached to the vehicle.

REMEMBER, TOO, that every member office of The Life Offices' Association is ready to protect you and your family financially as well.

PLAY SAFE – IT'S A GOOD POLICY

FOOTNOTE: Every car owned by member offices of The Life Offices' Association is now fitted with safety belts.

OBJECTIONS TO BELTS EXPLODED

Personal objections to safety belts are not borne out by facts.

1. *You're not a fast driver, so you don't think you need a belt?*
   Research at Cornell University in New York has shown that a person can be thrown out of a car and seriously injured while travelling at no more than 11 m.p.h.
2. *Aren't the chances of being thrown out exaggerated?*
   A U.S. study of car accidents showed that in more than half of them the car's doors opened, and that nearly half of those killed were thrown out of the car.
3. *What if the car catches fire or plunges into water?*
   This happens in only one out of every 200 accidents, but if it does, the buckle of an approved make of belt clips open easily.
4. *You're afraid of being hurt by the belt itself?*
   A safety belt goes around the heaviest and strongest part of the body. Any bruise from a belt will be far less than the serious injury to the head or chest caused from being without one.
5. *You think you might tend to drive faster?*
   The fact is that a safety belt serves as a constant reminder that car driving is one of the most hazardous of all modern occupations.

Early 1960s brochure from the Australian Road Safety Council promoting seat belt use

Peter Vulcan is a former Director of Road Safety Research for the Commonwealth Department of Transport:

'The Standards Committee at the stage of comment on the standard had quite an altercation with the Ford Motor Company because the 1965 standard specified that you had to have upper torso restraint, usually provided by a diagonal, and that that diagonal should not be capable of being disconnected from the lap belt. In America it was allowed to disconnect the diagonal and if you stepped into most American cars they were using the lap belt and the diagonal portion of the belt was still in its original wrapping along the roof rail. Ford said, "You don't need them". We stuck to our guns, based on research that showed that you did need upper torso restraint, otherwise your head went crashing into the dashboard, or the steering wheel, and we won that battle and Australia has always had upper torso restraint, usually with a sash, right since the word go.' (Peter Vulcan, Disc RTA-RS27, CD Track 6)

The TARU team took their cue in seat belt wearing from the experience of European nations:

> 'The Scandinavian nations, I think, for a number of reasons were always concerned about road safety, it was a major government issue long before it was in many other parts of the world and they were prepared to put more resources into it. I remember reading a figure from 1960 when few cars in Australia had seat belts, never mind people wearing them - in 1960 in Sweden sixty per cent of drivers were wearing seat belts.' (John Knott, Disc RTA-RS15, CD Track 14)

15.19

HARNESS YOURSELF FOR SAFETY

THE ROAD SAFETY COUNCIL OF N.S.W. CONFIDENTLY RECOMMENDS SAFETY BELTS

Every week 260 people in N.S.W. are needlessly and seriously injured in motor accidents.

And at least one person is needlessly killed **every day.**

These are the 8 out of 10 casualties which safety belts can prevent.

It is well established that properly designed and fitted safety belts of the types which restrain the upper parts of the body will reduce serious injuries and fatalities to motor vehicle occupants by 80% **under Australian conditions.**

No matter what vehicle you own, whether it be private car, commercial unit, truck or industrial wheeled vehicle, there are belts available now to provide its driver and his passengers with the protection which **only** belts can give.

REMEMBER, SAFETY BELTS SAVE LIVES!

Brochure from the Road Safety Council of NSW promoting seat belt use, prior to compulsory fitment and wearing laws

SOME POINTERS TO HELP YOU CHOOSE A BELT

Unless you have a "problem" vehicle, installing belts is simplicity itself. First choose the right style. Second, have them fitted securely by a competent mechanic. Thirdly, make sure that every passenger has a belt.
One of the three types of belt below will meet most needs. Each has been found to be safe, practical and effective.

THE SASH OR DIAGONAL:

A simple, inexpensive harness which has been found to give protection of the order of 80% under Australian conditions. Restrains the head and shoulders effectively. Very easy to use.

THE THREE-POINTER OR COMBINATION:

This harness is becoming very popular with Australian drivers. It restrains the upper half of the body and gives protection in the 80% range. Has the added restraint of the strap across the thighs.

THE LAP STRAP:

This simple type gives adequate protection for rear seat use, but, as it does not restrain the head and shoulders, should not be used in front seat applications where one of the types above can be used. It is recommended for use in situations where shoulder harness cannot be fitted, such as in the middle of the front seats, in some convertibles, in buses, or in industrial equipment.

OTHER TYPES OF HARNESS:

Full shoulder harness, similar to that worn by aircraft pilots, can also be fitted, but unless the seat frame is very strong or specially reinforced, this harness is difficult to fit safely in the front seats of family cars.
Special harnesses for small children are also available now. They are put on the child before he or she is put in the car, and can also be used as a walking harness.

SAFETY BELTS ARE SAFE IN THEMSELVES

Safety belts of the approved types described on the opposite page are absolutely safe to wear. There has never been any evidence uncovered by any survey anywhere in the world to show that an approved type of safety belt has ever added to anyone's injuries.

Forget the Old Wives' Tales !

Women especially should forget the old wives' tales about safety belts causing breast injury or cancer. There is not the slightest shred of evidence to suggest this.

Fallacies versus Facts

It is a FALLACY that a belt is dangerous in case the wearer is trapped in a burning or sinking vehicle. In FACT, all the accidents involving fire or immersion **together** total less than one accident in every hundred; and the belt, by often preventing the driver being knocked unconscious, gives him a better chance to get out in these rare circumstances. The buckle of every approved belt will always open easily after an accident.

It is a FALLACY that the best way to escape injury is to be thrown out of the vehicle. In FACT, and by the proof of statistics, it is the **surest** way of being killed or seriously injured. A safety belt eliminates this danger from the outset.

It is a FALLACY that only country drivers need belts, because the FACTS show that most accidents and injuries occur in the suburbs and city.

And, finally, for those who "wouldn't be seen dead" in a belt — do they realise that they have a five times better chance of being seen dead **without** one?

Watch for the Standard

Standards for the design, construction and performance of adult safety belts, calculated to give adequate protection to the wearer, have been laid down by the Australian Standards Association in Standard E.35. The Road Safety Council of N.S.W. recommends the purchase of only those belts which meet the standard. Every belt meeting the requirements of the standard has E.35, the month and year of manufacture and the Manufacturer's name stamped on it.

ROAD SAFETY COUNCIL N.S.W.

ISSUED BY
THE ROAD SAFETY COUNCIL OF N.S.W.

In Victoria the AMA had been advocating seat belt use from as early as 1958. The Victorian Government had bravely installed them in police cars:

> 'What happens is the police don't wear them. The detectives force did not want to crush their suits by wearing seat belts in a vehicle - it has to be made compulsory, but compelling someone for their own health to do something is not something that is easy to do in a democratic liberal society.' (John Knott, Disc RTA-RS38, CD Tracks 10 & 15)

On the 22nd December 1970 Victoria became the first state to mandate the compulsory wearing of seat belts. It had an immediate effect:

> 'There was a huge reduction in vehicle occupant injuries and deaths in the twelve months after the introduction of the law. It was very interesting: there was a wearing rate of about twenty per cent before the law was introduced; some people had been persuaded to fit belts and people understood that belts were life-saving devices and about twenty per cent of drivers were wearing them. The day after the law was passed in Victoria, without any enforcement that wearing rate went up to about fifty per cent. A lot of people were waiting for an excuse to be forced to wear the belt and we did some early observations immediately after the law was passed and others did much more extensive observations and there was this jump to fifty per cent; getting up to ninety, ninety five per cent took quite a few years of publicity and rigorous enforcement.' (Peter Vulcan, Disc RTA-RS27, CD Track 10)

Dr Soames Job is the Director of the Centre for Road Safety within the RTA:

> 'Seatbelts are a really good example of the success of enforcement. So, prior to introducing compulsory seatbelt wearing in New South Wales we had many advertising campaigns telling people seatbelts would improve their safety, save them in a crash, et cetera, but the seatbelt wearing rate remained very low. We introduced compulsory seatbelt wearing, which essentially was an enforcement threat and it was at the time a threat that said, "If you don't wear your seatbelt we'll fine you fifty dollars." Suddenly, the seatbelt wearing rate went to way over ninety per cent and so because of the enforcement we went from a small number of people wearing their seatbelts to over ninety per cent. The effect of enforcement on behaviour is very powerful.' (Soames Job, Disc RTA-RS23, CD Track 11)

By the end of 1971 all other Australian states had followed Victoria's lead and had made seatbelt wearing mandatory. But problems remained with the design of the seat belts themselves:

> 'In the early days of TARU - the early to mid-1970s - there were a number of programs which we devised, a couple of which I was involved in. One, for example, was: what was the limit of protection that seat belts could offer? So we investigated crashes where people wearing seat belts were nevertheless killed. These days it is easy to understand that what we were looking at were high speed crashes where the limits of seat belt protection were exceeded.' (Peter Croft, Disc RTA-RS10, CD Track 5)

> 'In those early days some of the seat belt hardware was fine when you did a strength test on it but when it was in the field..... there were wire stalks commonly used in those days to hold the seat belt buckle up and it turned out that the wire was very prone to fatigue, so after a while of flipping left and right, or backward and forward they could just break quite easily with no big load. Some of the very early seat belt latches had release buttons that were prominent, so they could be knocked and

> released. These days if you look at a seat belt you will see that the release surfaces are all recessed and it is a small defined area to get rid of that idea of inadvertent release. Some of the seat belts had mechanisms which could actually release themselves through inertia. So those sorts of things were all fed back.' (Michael Griffiths, Disc RTA-RS14, CD Track 7)

There were also some issues with seat belts in heavy vehicles. Michael Griffiths confirms:

> 'Drivers wouldn't wear them because in heavy vehicles they have a suspension seat and as the suspension seat would go up and down the retractor would tighten progressively on the driver and it would become uncomfortable. So we said this is pretty straightforward, all we've got to do is make the seat belts less sensitive in their locking, they don't need to be that sensitive. We just did some work and that became part of a total national review process and eventually resulted in a revised Australian Design Rule for seat belts in trucks. (Michael Griffiths, Disc RTA-RS15, CD Track 1)

Michael Paine is a Chartered Professional Engineer who became involved in implementing new Australian Design Rules for vehicles:

> 'I sit in an aeroplane these days and think how primitive the technology is. You've got to buckle up and pull it tight, a very clumsy buckle, so that basically aeroplane seats are probably twenty or thirty years out of date compared with cars. We've got retractor seat belts, so they swing out of the way when you are getting out of the car, they automatically adjust to the tension that is needed to keep you in place, the buckles are better designed. Probably the biggest innovations have been load limiters and pre-tensioners. Load limiters are either components in the seat belt, or the webbing that allow a bit of give, so when at the very peak of the crash if the loads on the chest of the occupant are getting a bit high then the system will give a bit to reduce those loads, they've probably been there since the early 1990s in many seat belt systems. Later in the 1990s pre-tensioners were introduced; now these are smart devices that use a similar detection system to airbags to detect a serious crash and they actually reel the seat belt in a bit to take any slack out and that means the occupant is more firmly tied to the vehicle in the crash.' (Michael Paine, Disc RTA-RS16, CD Track 6)

How much have seat belts actually contributed to reducing the road fatality rate?

> 'The estimates I hear are about a third, so a third of all fatalities have been prevented by seat belts. In fact it shows up in our current crash statistics where the risk of dying in a crash is about four or five times higher for a person who is not wearing a seat belt.' (Michael Paine, Disc RTA-RS16, CD Track 6)

Ian Johnston adds:

> 'We've now got ninety-seven per cent of drivers wear their seat belts all the time, twenty-five per cent of drivers who die don't have their seat belts on, so the last three per cent. The physics is inescapable, but the kind of people who won't wear their belts take more risks than the kind of people who do, so they are more likely to have a crash, and of course, in a crash they are more likely to die. We aren't going to get from ninety-seven per cent to a hundred per cent with more education or more enforcement or convincing people to be nice, the only way we are going to get to a hundred per cent is through vehicle design - let's have a car that won't start unless all the belts are on, that kind of thing. We've agitated for years to get a decent seat belt warning system in place so that if you forget to put your belt on the car will tell you, and the manufacturers said, "Oh, we did that," but when you look at it all it did was light up a tiny little red stick figure and go "beep, beep, beep" for three seconds and if you didn't put it on it didn't care, it stopped. Now we are finally getting systems that will emit very high frequency noises continuously until you put your belt on. The point I'm making, I think, is that with a lot of the behavioural stuff we've gone almost as far as we can and we've got to take technology to use the last little bit.' (Ian Johnston, Disc RTA-RS44, CD Track 13)

Another area of concern to TARU was child restraints. Michael Henderson recalls:

> 'A particular interest of mine personally, and I guess I probably had some influence in that, was the protection of children in crashes. They are truly the innocent victims when a car crashes and whoever's fault it is, it is never the child's. I understood some of the concepts, in fact the concepts of restraining children are exactly the same as restraining racing drivers, and that is a properly fitting seat, and the seat is securely mounted in the car. I had been using almost a prototype being produced by a British company in my own car and one I brought out to Australia when our daughter was six or seven. In the early days, in fact before we came out she'd been using this little bucket seat, which I'd had to drill holes in the car to fit. The concept seemed to me a very sound one and it had crutch restraint as well as the lap belt and shoulder belt. I came out here and in Australia, as pretty much everywhere else in the western world the concept of restraining children was not really understood. Many of us knew how to make a better child seat, a safety seat, the question was now to get the system running again so that would happen.' (Michael Henderson, Disc RTA-RS2, CD Track 16)
>
> 'There was a child restraint that was put into the market which had a four-point harness and we collected information that showed that children were dying in it, not even in crashes, because they could just slide down and when you look back at some of the child restraints in those days they were really almost ejector seats. They raised the child up a little bit, they didn't really restrain it much and many of them actually assisted the child's ejection from the car in a crash.' (Michael Griffiths, Disc RTA-RS14, CD Tracks 3 & 7)
>
> 'There were several things we had to do. We had to develop an Australian standard, which represented proper safety for children. We had to get manufacturers interested so they'd make them, government wasn't going to make them, and we had to do the testing to help manufacturers who had no idea how to do this kind of thing to develop seats that would meet with the standard that we were developing at the same time. So this was a wheel that was rolling, taking everything in. One way of

> starting this off was a program I did with *Four Corners,* which some people I have spoken to still remember, because they remember the drama. There were no child dummies like there are now, you can buy a child dummy for several hundreds of thousands of dollars but in those days we had to make our own, so we did. What we did was do two sled runs - one with the child dummy in this basic hook-over seat and we had the basic shell of a car, which the seat was mounted in and we put the dummy in this basically hook-on child seat and we ran the sled in a crash representing about forty or fifty kilometres an hour and what happened was that the seat came off, the dummy came out of the seat and it slammed into the concrete block. This was filmed by *Four Corners*, I got them in, and it was all set up. It was really a very dramatic demonstration of what would happen to a child who was either unrestrained or using one of this so-called child seats. In fact it made them more likely to be ejected because it raised them up and they'd go straight through the windscreen, everybody could see that. Then we ran a test with an early prototype seat that was properly bolted into the sled and would be bolted into a car, the child was properly restrained, with five different straps all over. Again, the dummy flops forward and sits back in the seat - obviously any injury would be absolutely minimal. That had a shattering affect and that is the kind of public education I like, it did have an enormous effect. I mean the nursery equipment manufacturers then came and said, 'Okay, tell us how to do this.' (Michael Henderson, Disc RTA-RS2, CD Track 16)

By the late 1970s a relatively safe child restraint had been developed by the child seat manufacturers but research showed that further advances were still needed:

> 'We started to require top-tether anchorages on vehicles for child restraints - that was a world first. It is only in the last couple of years, for example, that the USA has required these top-tether anchorages on vehicles and recognised the advantages for child safety.' (Michael Paine, Disc RTA-RS16, CD Track 2)

But even the new child seats had their limitations:

> 'We realised that the child safety seats were for the protection of children up to around four years of age, still the case. But after that there was a gap between children of, say, five and children of ten, eleven years old, because they had to move into the use of the adult seat belt. The main problem that we saw originally was that if you put an adult seat belt on a five or six-year old sitting in a car seat the belt is in the wrong place, the lap belt comes up into the stomach and the shoulder belt, the sash belt, tends to cut across the neck, also the child can't see out, so what you have got is an unhappy child with an unsafe seat belt. So we thought let's raise the child up, that's the first thing, and seat them on a cushion, so we built cushions and did the sled tests. The child, having been raised up immediately made the seat belt orientation better, the lap belt went back down to the hips and the sash belt tended to go over the chest and shoulder, not the neck. So just by raising the child up we solved quite a lot of things all at once. However, on the sled test what we found was that the cushions just slipped out from underneath the child and shot off and then the child was effectively, or would have been, in a loose seat belt, so that didn't work. So then we went two ways: we developed a booster seat that hooked into the lap belt so that it couldn't slip out from under the child and we started moving into booster seats with a back, so that was held in position by the child. The original kind of booster seat that was simply a cushion; that doesn't exist any more but the booster seat with a back is basically still what children use and they can sit in that and use the adult seat belt and now there are several that you can convert from one stage to another.' (Michael Henderson, Disc RTA-RS3, CD Track 4)

The next area of investigation by TARU were baby capsules:

> 'We went out with the police, studying accidents where children had been involved and it was clear that the early child restraints had some issues, or just weren't available. There was no proper restraint for babies, for example and it was quite a long process working with manufacturers to improve child restraints and Paul Kelly, who worked in the laboratory really took a close interest in that issue and worked with a number of manufacturers. He would test their devices, he would offer suggestions as to how they could be improved. There were issues with the design and the materials. We had some of the early plastics that just couldn't withstand the impact of the crash, so they would almost explode on impact.' (Bruce Dowdell, Disc RTA-RS25 CD Track 5)

Michael Griffths recalls:

> 'With infant restraints - we wrote a standard for infant restraints in Australia that was so tough that none of the current product could pass it, now that is pretty unusual, so I think for more than a year after the new standard came out and was mandatory there was no product that could pass the standard and I remember that Safe 'n' Sound came to us with a product they were developing. It was a guy called Bob Heath and I looked at it and I thought it had potential, but it still had a lot of things to be worked out. We decided that we were going to evaluate this product through the full range of tests and then provide feedback to the manufacturer on where it needed to be improved, but we also said to the manufacturer, "We've got a very comprehensive workshop here and if you want to send up your development staff then they can have free access and use of that workshop to do on ongoing modifications to your prototypes until we can get it through this standard." That was Safe 'n' Sound and that's what they did, they sent up their development staff and they lived in Sydney, I think on and off, it was for a few months. We worked with them to modify the first infant capsule until it could pass the Australian standard and it went on to win the Australian Design Award and the Prince Philip Award. I took that device to an international task force meeting in France some years later and they just said that from their point of view they had never seen any product as comprehensively safe for infants.' (Michael Griffiths, Disc RTA-RS15, CD Track 4)

In Victoria the road authorities took baby bassinets a step further. Ray Taylor is a road safety practitioner who has played a leading role in road safety initiatives:

> 'One of the examples that became important for both baby bassinets and child car seats was that they be correctly fitted and it was clear that a number of people were putting their children at risk - they put the seat in but they wouldn't fit it properly and therefore the seat could move around, or they didn't have a top tether strap, or they didn't work the seatbelt into it in the appropriate fashion. So there was a series of fitting stations that were registered, if you like, or regulated to provide fitting advice. Those stations all received professional training from VicRoads before they were able to undertake their task, so it was really a professional development type process. Many of the fitting stations were associated with garages that ran roadworthy certificates as well, so that it's sort of like a one-stop shop, and the reason for that was because in many cases earlier cars had to have some anchorage points put into the vehicle and they had to be done properly, otherwise they wouldn't work, so, it was a combination of those things.' (Ray Taylor, Disc RTA-RS29, CD Track 10)

For those parents who did not want to purchase baby bassinets there was an alternative:

> 'We bought a whole heap of the new restraints; they were the 'Safe and Sound' capsules and made them available to the community through a loan scheme that was run at a local level by Community Health and Welfare Services and they were loaned to parents, I think, for about ten or twenty dollars for the six-month period where your child needed it because after that period they were old enough to sit up. And that was an interesting program, it went across the state. Issues like when did the capsule stand up, or when does it break down, and how do you make sure they're clean so that the next baby's going into a clean bassinet, all of those sorts of things had to be dealt with in the program.' (Ray Taylor, Disc RTA-RS29, CD Track 5)

Maureen Elliott adds:

> 'The infant restraint, which is what we put the newborns into actually provided children with the safest seat in the car. We had very, very few fatalities, even when the rest of the family had been killed the safety afforded by that restraint, when correctly used gave us exceptional protection for that child.' (Maureen Elliott, Disc RTA-RS40, CD Track 11)

More recently some issues in respect of child restraints have come to light, as Maureen Elliott points out:

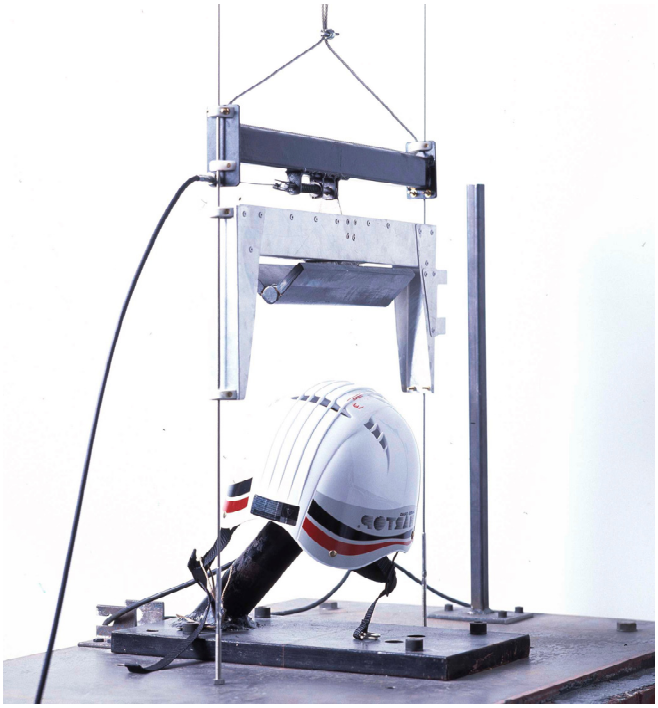
> 'Child restraints have been compulsory, but only for children up to one year of age, so what that means in real terms is if your child is one year and one day old they can sit in an adult seat belt. Now that is very clearly not safe and we've got lots of evidence that tells us that a child is not physically able to occupy an adult seat belt until they are at least seven, or a hundred and forty-five centimetres high, so we've looked at a number of things with regard to child restraints. We've looked at the level of protection that they afford. We've looked at the ease of use for parents to use them, we've looked at where they should be positioned and then we've looked at the type of injuries that are occurring if they are not correctly used. All those things have led us to a couple of key areas. One is that clearly we must increase the age that children are restrained in an approved child restraint and we are moving through some processes to correct that now. Secondly, placing a child in an adult seat belt before they are physically big enough can result in catastrophic abdominal injuries causing death. So the conclusions that we have come to, and they are very scientifically-based, is that we must keep children in a restraint that is appropriate for their size, weight and height, until at least seven years of age, children up to the age of four years must not travel in the front seat of a vehicle, must be in the back, and over four years of age can only travel in the front seat if every rear seat is occupied by a child of an equal or lesser age in a child restraint. So this will create, understandably, some difficulties for families, particularly if they've got more than three children. We will stage the implementation of new legislation so that it is more workable and feasible, but what is most important, apart from the legislation is about us communicating to parents what best practice is. I don't think parents ever deliberately place their children at risk but we need to tell them what we've learnt, what we know, so that is where we will be going with the child restraint as a result of the research that has been done.' (Maureen Elliott, Disc RTA-RS40, CD Track 11)

In November 2009 the compulsory use of child restraints for children up to seven years of age was mandated to begin on 1st March 2010.

In the 1970s TARU took up helmet testing:

'There had been for some years Australian standards for crash helmets but they needed upgrading and we did all the developmental work in crash helmets. We worked very closely with what is now known as Standards Australia. They had no facilities to do that and so we did it at public expense, and we did the development in better standards for crash helmets. Then I was asked to chair a committee for bicycle safety helmets and at that time there was only one bicycle safety helmet available anywhere in the world, made by the Bell Helmet Company in America. Once again, rightly or wrongly, we thought we could build a better mouse trap, so again the TARU team developed a standard for bicycle safety helmets, which again transformed the use of bicycle safety helmets - they weren't used at all originally and then over the various periods they were introduced for adults and then for everybody, and it became enforced.' (Michael Henderson, Disc RTA-RS3, CD Track 3)

'A lot of that work came directed towards getting a change to the Australian standard. The old standard led to a helmet that was like a mini-motorcycle helmet, so it was heavy, uncomfortable and expensive. We were able to demonstrate through our testing and crash studies that a helmet could be much lighter weight, could be ventilated and still provide effective protection and we actually developed some testing methods to help confirm that that was the case.' (Bruce Dowdell, Disc RTA-RS25, CD Track 6)



Bicycle helmet testing

At the same time Victoria was conducting its own research on helmets:

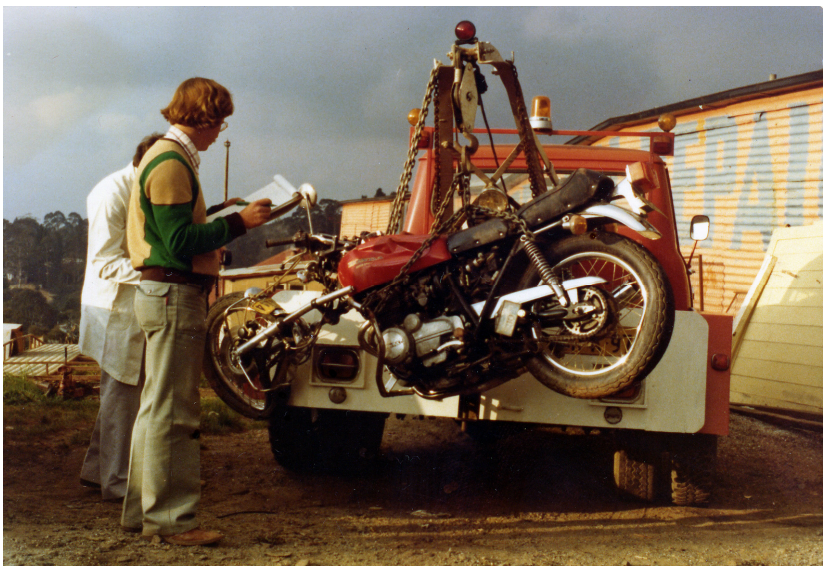
'When I was at VicRoads we knew that the majority of deaths and serious injuries to bicyclists were head injuries and they were caused by what we call the second collision. The first collision is between the car and the bicycle, the second collision is between the bicyclist's head and the pavement - that was the one that was killing people and creating the disabling injuries. Helmets were available but they were hot and heavy and horrible, so we started two things. We started a campaign to encourage helmet wearing and the government issued helmet rebates, parents could get ten dollars back off the price of a helmet. So we tried to encourage the purchasing and the wearing of helmets. We got schools to provide special lockers for

helmets because you'd get the kids to wear them to school and they wouldn't know where to put them all day and somebody was going to pinch it. So you just thought your way logically through all of the barriers to getting helmets on heads and we got the voluntary level up to just under half.' (Ian Johnston, Disc RTA-RS44, CD Track 11)

Motorcycle helmets also came under scrutiny:

'Actually in those days you could get an exemption from wearing a motorcycle helmet, you could just go down to your local doctor and say "I'm claustrophobic or get headaches" or whatever and they would write you out a letter, it just had to be on a doctor's letterhead. Of course motorcyclists who didn't want to wear helmets quickly spread the word about where the doctors were who would write these things out for you, and there were so many helmet wearing exemptions that the police wouldn't enforce helmet wearing. You had people who actually had an exemption, but then because it wasn't enforced you had all these other people who just didn't wear helmets anyway, so your helmet wearing rates were not great. I mean they were better than fifty per cent but the problem is that risk-takers are risk-takers, so the same kind of people who would think it was okay to ride without a helmet would be the same kind of person who would take another risk, which is more likely to get him into a crash.

That is where our research helped because we then did a study of motorcyclists who had received serious head injury, or fatal head injury over a period, think it was five years retrospective, and we calculated that the appropriate third party insurance premium for motorcyclists who had a helmet wearing exemption should have been two thousand dollars per annum, which back then would have been ten or twenty times what the actual premium was. It was actually when we put those dollar figures on it and got that up to our Minister for Transport that he finally took action because politicians are actually pretty scared of the bikie groups. He didn't abolish the exemptions scheme because that would have meant war, what they did was just refined it and the refinement which we recommended was that any exemption should be referred to an expert medical panel, which consisted of people nominated by the doctors who work in the area of spinal and brain injury and there weren't too many exemptions approved after that.' (Michael Griffiths, Disc RTA-RS14, CD Track 7)



Michael Griffiths checking damage after motorcycle crash, TARU, 1970s

'The safest risk is the one you didn't take.'

- AUTHOR UNKNOWN

The Halcyon Days

As the 1970s morphed into the 1980s, TARU began to diversify its research into new areas:

> 'I remember one of the engineers pulled together a report, which sort of showed in some instances one could suspect that the street lighting and the adjacent traffic signals might have been interplaying to an extent. What I mean is the amber, as a lot of people call it in the traffic signals was very much the same photometric colour as the sodium street lighting available at the time and in some instances you could look down a street and see the yellow, or the orange, lights of the street lighting and you could actually line up the yellow lights of the traffic signals at the same time, in which case visually the traffic signals disappeared for the short time that the yellow was on, a short time, three or four seconds, but you can travel a lot of distance in three or four seconds. We pointed to that as a possible factor. These days the colour of sodium street lighting has changed, it is the high-pressure sodium type and the colour is a bit whiter than it was in those days. It is a warning signal, I suppose, no pun intended, just to be careful what is out there in the visual environment.' (Peter Croft, Disc RTA-RS10, CD Track 8)

> 'There was also quite a bit of work done on the things that you run into because in the crash studies we had done we had gone out to accident sites, and it really highlighted the fact that some of the heavy street lighting poles that were around were quite lethal in relatively low speed accidents and we did quite a bit of work with the manufacturers of poles to look at break-away bases on poles and collapsible poles so that in a crash the pole wouldn't cut through the car, but also helped to contain the car, to catch it, so it didn't bounce off and create other problems. We also did work on the median barriers that you could put between traffic lanes because again, those head-on accidents have just so much energy involved, so that whatever you can do to divert two cars so they don't come to a head-on collision is going to provide a big benefit.' (Bruce Dowdell, Disc RTA-RS25, CD Track 4)

The TARU team continued to grow into the 1980s:

> 'We grew to a pretty substantial number eventually. Of professional university-educated people there would have been twenty-five at our peak. Then when you include the others, the semi-professional aides, non-professional statistical processing people I should think at our peak we would have been between eighty and ninety people. So it was certainly the biggest full-time road safety research group in Australia and one of the biggest in the world.' (Michael Henderson, Disc RTA-RS3, CD Track 6)

The demise of TARU began slowly. In 1976, when the Traffic Authority was created it appointed Harry Camkin as its Director. In 1982 Harry, as the head of TARU made an executive decision:

> 'I could see that TARU had been doing a lot of good work in the preceding five to six years so I was happy to let that run for the time being until we got a handle on why New South Wales was doing relatively poorly compared with Victoria. Victoria was rapidly establishing a reputation as one of the most up and coming road safety states in the world and we were going backwards. Their accident rate had improved since the early 1970s and ours was just continuing to rise. After a while, when I felt I had some good support from other advisors I felt they had passed their heyday in terms of bringing a scientific approach to road safety and they were becoming a little too

academic for what we needed in the Traffic Authority, given that we were responsible. A lot of their activities were more appropriately delved in some of the more academic institutions, universities, that sort of thing, and so I wanted them to become more results-oriented and move their research away from the basic or pure research end of the spectrum to the applied end of the spectrum. In the early 1980s I got the Commissioner of the day to agree to move the Traffic Accident Research Unit holus-bolus over to the Traffic Authority and effectively abolished it. I was very disappointed in some very comprehensive research they'd done but very poorly analysed, about why Victoria was doing so much better than New South Wales in road safety. So I thought the time has come to break them up as a research unit but move their very highly competent individuals into the Traffic Authority area and work more directly with people looking for results. There was a staff rebellion that took me to the Minister's office and the Minister berated me for doing it without telling him and then said "Go ahead and get the job done." (Harry Camkin, Disc RTAS-RS4, CD Track 6)

TARU team members and families: Michael Griffiths (right), Soames Job (middle) and others, 1970s (Photograph supplied by Michael Griffiths)

Michael Griffiths remembers:

'The guy in charge of the Traffic Authority basically sent around a Minute, which is very well remembered by everyone who worked there, called "The Halcyon Days Minute" and it basically said, "The halcyon days are over." It didn't like the camaraderie and I think the enthusiasm, or a word like that, that existed and that was going to go. That is my recollection, that is people's main recollection of it.' (Michael Griffiths, Disc RTA-RS14, CD Track 9)

'From my own perspective I think that was a very good move because it placed the very good research and development work that TARU had been doing in a broader context, the context of managing the road and traffic system for efficiency and safety, it gave it a framework within which to work. We could get on with the job and answer through the Traffic Authority for the development work we did, all very ably led by Harry Camkin, I think.' (Peter Croft, Disc RTA-RS10, CD Track 10)

'I enjoyed the TARU days very much. I was working with very good people across a whole range of disciplines and I learned a lot about marketing, about psychology, about the engineering, about the medical issues because I worked with doctors. Again, I learned a lot about people because one of the difficult parts of that job is you quite often had to deal with the family of people who had been killed despite helmets, or because of flaws in the design of vehicles and it just developed in me an enormous regard for the strength of people, that they have a great desire to end some of those circumstances, when something terrible has happened to them they will work with you very hard to attempt to stop that same thing happening to somebody else and it's just very impressive.' (Dowdell, Disc RTA-RS25 CD Track 8)

Michael Griffiths with crash test dummy, Rosebery Crashlab, 1988

'By all means, let's breath test pedestrians involved in road accidents – if they're still breathing.'

- THE BISHOP OF ELY, REPORTED IN THE BRITISH NEWSPAPER *THE OBSERVER,* 1967

Countermeasures

In 1978 the road toll in NSW reached a staggering 1384 deaths and alarm bells were ringing in road safety organisations, the media and within the Staysafe Parliamentary Committee. The public were demanding answers to the carnage on the roads. But the solution to the answer had already been found, as Harry Camkin confirms:

> 'For a long time no-one had thought alcohol was a major problem for road safety because drunken people wound up in hospital, or in the morgue quite often but there was no way of measuring the actual effect of relative amounts of inebriation amongst drivers or pedestrians, so police didn't write drunkenness down as a cause of accident unless it was incredibly obvious. Police wouldn't ascribe accidents to alcohol, as it was terribly hard to prove. So for a long while there was no screening of alcoholic content until the mid-1960s, when the health authorities agreed to, and it was made compulsory for accident victims in hospital to have their blood tested for alcohol.' (Harry Camkin, Disc RTA-RS4, CD Track 2)

Michael Henderson adds:

> 'While I think everybody realised that driving when drunk was a bad idea, and there was a law against it going back to the Middle Ages it was extremely difficult to enforce. So we did a fair bit of work on what kinds of blood alcohol level were involved here and what we found was that the levels were extremely high among people who were involved in serious and fatal accidents and that was a very strong lever for introducing a raft of measures over the next several years, cracking down on drinking drivers.' (Michael Henderson, Disc RTA-RS3, CD Track 3)

The breathalyser had been invented by an American doctor, Robert Borkenstein, in 1954 although another American, Professor Harger had developed his 'Drunkometer' as early as 1938. It collected a motorist's breath sample directly into a balloon inside a machine but it was too cumbersome for general use.

An early pioneer of road safety in recognising that drink driving was a problem was Dr John Birrell, the Victorian Police Surgeon. As a result of his findings the Victorian government established a Royal Commission out of which came important recommendations. It resulted in Victoria introducing a law limiting alcohol content in blood samples to .05 per 100 millilitres as early as 1966, but police could only pull over a motorist if they had reasonable grounds to suspect drink driving. That situation ruled in all states. When Victoria introduced the controversial concept of Random Breath Testing as a trial in 1976, and made it permanent in 1978, the other states were bound to follow, but there was some debate about what the permissible level, then set at 0.08, should be:

> 'We wanted to bring it down in NSW to .05 initially because we knew that a risk of doing something wrong increased rapidly after .05 so we wanted to bring that in straight away but the government was very reluctant to move. They felt that would not be respected by a community that didn't yet realise that such a low level of alcohol can affect your ability to drive safely. And they were also concerned that a lot of people and Ministers of Parliament at the time were partial to a drink. I don't know how true it is but I had heard it said, "It will never get through this caucus, too many of us like a drink after the house adjourns." (Harry Camkin, Disc RTA-RS4, CD Track 11)

The debate about blood alcohol levels for the introduction of Random Breath Testing in New South Wales continued. But where did these blood alcohol levels actually originate?

> 'As I understand it the .08 came originally from Scandinavian countries. The .05, .08, 0.1, they are grams per hundred millilitres, they are like a percentage, since a millilitre weighs about a gram. There were arguments in the Scandinavian countries in the 1930s when they first introduced their blood alcohol concentrations as to whether it should be .1 or .05 and halfway between that was .075, so they came up with .08 and that was the level they originally set. In the development of drink driving we eventually introduced .08. It made people take an interest in drink driving for a while but it faded away. Then about Christmas 1980, the blood alcohol concentration in New South Wales was reduced from .08 to .05. There was a lot of talk about the introduction of random breath testing and we had the impression that Cabinet had met and argued about it and come up with this reduction to .05 as a compromise. There were a lot of people wary about it of course, it was a major change. This idea that you could just be pulled up for nothing and asked to blow into a tube was quite a change, wasn't it, in civil liberties.' (David Saffron, Disc RTA-RS37 CD Tracks 1 & 6)

"This historic photo was taken in 1968 at Dr Bill Haddon's home in Bethesda Maryland. From the left is: Rune Andreasson, Editor of the International Journal on Accident and Traffic Medicine; Dr Bill Haddon Jr, my hero, who virtually initiated the scientific approach to traffic crashes; the author [Dr John Birrell] holding the can (as usual); Professor Leonard Goldberg from Sweden; Professor Milan Vamosi, German Democratic Republic, an authority on alcohol tests; Professor Bob Borkenstein, a wonderful man and the inventor of the breathalyser; Dr Kjell Bjerver, a Swedish psychiatrist who with Leonard Goldberg in 1950 produced a definitive paper on alcohol and driving."

Photo and caption from "Twenty Years as a Police Surgeon"
by Dr J.H.W. Birrell OAM, ISO, MB, BS, FAMA, LLD,
reproduced with the kind permission of Mrs J Birrell.

But would RBT live up to its expectations? The Victorian experience had not been very encouraging. Ian Johnston reflects:

> 'The random breath testing legislation had come into law in Victoria in 1976 and we'd done some evaluations which really showed it had no effect at all and the government was bitterly disappointed. We were sitting down thinking about why it didn't work and those of us who were psychologists started to think about general deterrence. If you want to deter someone from a behaviour that is very important to them, as drinking is important to most Australians, you've got to convince them that there is a high chance of being caught, and there just wasn't. The police were only doing a couple of hundred thousand tests a year, so the chances of you being pulled up at random for an alcohol test were small. So people would say, "As long as I don't have a crash, as long as I'm not weaving all over the road, I'm not going to get caught," and they were pretty right.' (Ian Johnston, Disc RTA-RS44, CD Track 10)

> 'I had a view and a number of other people around me had a view that in fact the evidence suggested it would work if it was introduced effectively and carefully and we believed that the real deterrence effect of enforcement came down to convincing people that they will be caught without actually having to catch them, and that's the general deterrence effect. In road safety the general deterrence effect is much more important than the specific deterrence effect. The specific one is where you actually catch an individual and they cop penalties for that behaviour, but the people you don't catch and don't do it because they're frightened that they will be caught actually give you more road safety gain. And our research suggested that many people believed that even though they'd been drinking their driving was extremely good, their skill level was still extremely good and so they believed they would never be caught by police, they would never come to attention because they were driving well anyway and that overconfidence was part of the problem. When we came to asking people about random breath testing we actually got two very interesting results. One was: people were very concerned by the possibility because they believed suddenly they would be caught drink driving, where otherwise they would not be, and that really gave us the general deterrence hint. Other people had quite a different interpretation and wanted it brought in and they said things to us like, "Well, you're not really regarded as a man unless you can drink-drive in this society, but actually I don't want to. If you bring random breath testing in that will give me an excuse to tell my mates why I'm not going to do it because despite the fact that I'm incredibly good at it I would get caught". So we gave advice to the StaySafe committee, who eventually made that decision for government that this was the right way to do it and it was introduced late in 1982 and it was a fantastic success. Drink-driving fatalities went from forty to fifty per cent of our road toll down to the low twenties; it essentially halved the drink-driving percentage of our road toll, which was a huge result.' (Soames Job, Disc RTA-RS23, CD Tracks 3 & 4)

RBT was finally introduced into New South Wales on the 17th December 1982. The public reaction was immediate. Soames Job joined TARU in 1980 and was head of the alcohol and driving area in 1982:

> 'The Staysafe Committee [which made the final decision to introduce RBT] visited TARU for our advice. There were mixed views within TARU. It seems very clear now with hindsight, but it was controversial in 1982. Some of us – Gary Hanson, Dave Saffron and I – believed that while the small trials did not produce big gains, they did show a deterrent effect could be created. On this basis, NSW was the first state to introduce a massive RBT program, with very prominent "booze buses" and a huge advertising campaign with the theme 'Be under 05 or under arrest'. I always

> thought we could get a long-term effect if we did it right from the start and kept up the pressure.
>
> I went out and about, looking at what was going on in the community the first Saturday night it came in and what was really striking around Sydney was queues of over an hour to get a taxi. So people went out and they went drinking but they organised [not to drive], and in fact at that point public transport hadn't caught up with the demand and it took a while for public transport to actually catch up with that demand.' (Soames Job, Disc RTA-RS23, CD Track 6)
>
> 'In the first year of operation of RBT we saw a drop in the road toll of around about three hundred fatalities - from twelve hundred and fifty odd in 1982 down to nine hundred and sixty-seven. The evaluation of RBT, which I was a little bit involved in, was conducted in the years prior to RBT and the three years after RBT and it found that there was a twenty-seven per cent reduction in fatalities associated with RBT. Of that twenty-seven per cent around three quarters of the reduction was directly attributed to the consequence of RBT, the remainder of the effect was a confusion of other things, as well as a downturn in the economy and the drought that we had in the 1980s, but a good deal of those lives saved, around about three hundred, or probably around about two hundred lives per year in the three years after, were saved directly because of the result of RBT introduction.' (Andy Graham, Disc RTA-RS42, CD Track 9)

Merv Lane is a retired Commander, Traffic Services Branch in the NSW Police. He reveals the initial police attitude towards RBT:

> 'They were reluctant to become involved in it, that's the impression that I get, mainly because it was boring and the fact that the arrest rate was very low, it was less than half a percent of the total number of people that were breath tested. The equipment that they had in those days was fairly crude. We had old ex-government buses, they had large generators that they had to manhandle on and off the bus to provide them with some light, and they had to assemble at the Police Station, in other words come back off the road in their vehicles and then go back out with the bus and work it that way. So to them it was time-consuming and to them they didn't see the results, and by that I mean the results in the number of people arrested.
>
> In those days with the Alcotest, it was a mouthpiece with a bag and it had crystals in it, and they had to blow into it, and if the crystals changed colour that determined whether or not they were affected by alcohol. What you had to do then was close down your operation on the side of the road and go back to the police station where they could be put on the breath analysis instrument to determine the legal reading for court purposes. With random breath testing now all police do it, it has extended to general duty police as well and that is why they were able to get in excess of one million breath tests a year.' (Merv Lane, Disc RTA-RS8, Tracks 6 & 8)

Random breath testing, NSW, late 1990s

In Victoria, the authorities were impressed by the success that NSW was experiencing with RBT, as Ian Johnston points out:

> 'Victoria had done the legislation first and it hadn't worked, we'd done the diagnostic research that explained why it hadn't worked, and then New South Wales implemented those results. Victoria wasn't politically game to do that. Then Victoria looked at what New South Wales had achieved and went 'Wow' and then cranked it up and within three years of really high levels of random breath testing the number of dead drivers over the legal limit fell from one in two to one in five, it was just a massive effect.' (Ian Johnston, Disc RTA-RS44, CD track 10)

As always, some members of the public tried to push RBT to the limit:

> 'In the survey after random breath testing was introduced we found a lot of drivers had come to the view that they could avoid random breath testing by taking side streets because the booze buses, as they were called, were only on the main streets. So, we introduced a policy where random breath testing could be done from highway patrol vehicles, not just buses, and that they would use side streets, and indeed they did use side streets. And we introduced an advertising campaign on TV and again in print media and radio saying that's what we were doing and so I think we very early on managed to correct some of the other behaviours that were beginning to come out in the surveys which would have damaged the impact of random breath testing. What surprised me most about the results of the survey was how candid some people would be. I remember interviewing one guy and knocked on his door and he turned up one minute after I did to his home at about eleven in the morning with twenty four cans of beer under his arm and proceeded to tell me that he really had

> to get home by that time because otherwise, you know, he might get caught, whereas he'd found pretty reliably if he went down to the club and he drank quite a few beers before eleven and then brought the rest home with him and drank for the rest of the day at home he was pretty safe drink-driving. He was extraordinary. He said he'd been driving as a professional driver all his life, often having drunk, and he regarded it as safe behaviour but he was concerned about the possibility he'd be caught with random breath testing; that really changed his view of it. And people were surprisingly candid about it, really surprisingly open about how much drink-driving they did.' (Soames Job, Disc RTA-RS23, CD Tracks 4 & 5)

RBT changed the public perception of drink driving irrevocably:

> 'Prior to RBT most people, if they got done for drink driving were considered unlucky, it wasn't your fault, it was just being unlucky. Post-RBT people's attitudes changed so that people who were done for drink driving were not considered lucky anymore, they were considered criminals.' (Andy Graham, Disc RTA-RS42, CD Track 10)

For road safety practitioners the effect that RBT had on the road toll exceeded their expectations:

> 'I think with random breath testing, when it was going to be introduced I expected that it would save hundreds of lives and thousands of injuries, would have a really strong effect for a while, maybe six months, or something, and then start to wear off. The fact that it kept having a massive effect on and on and on, the developments that came out of it was very surprising.' (David Saffron, Disc RTA-RS37, CD Track 14)

However effective the RBT initiate has been, it did not deter all drivers from separating their drinking from their driving and several more programs needed to be developed. One of these is the Sober Driver Program. Dr Patricia Bryant, the RTA's Principal Behavioural Scientist explains:

> 'It is an education and rehabilitation program for drink drivers that have committed two drink driving offences in a five year period, so it is a program that is designed for recidivists. It is not for first time drink drivers because most first time drink drivers are deterred by having to go to court, losing their licence, paying a fine and we never see them in front of a court again, so that tells us our penalties work quite well for the vast majority of drink drivers. But for drivers that have committed two offences usually there is something else going on. Usually it is alcohol-related issues, some substance abuse issues, so Rosemary Rouse developed a program along with a range of other agencies at the time to address that harder core group of drink drivers.
>
> The program was developed by the RTA, the Department of Corrective Services, the Attorney-General's Department, the Motor Accidents Authority and it basically aimed to develop a program that could be run by Probation and Parole through the Department of Corrective Services because we knew that the Department of Corrective Services would have access to these hard core offenders. The scheme works in the way that drink drivers that are given a good behaviour bond by a court with supervision by a Probation and Parole Officer can go on this program, provided they meet the drink driving criteria, that is two drink driving offences in a five year period. The program is a nine week education program, two hours a week for nine weeks, and it basically aims to explain to them some of the consequences of their drink driving and help them develop strategies to avoid relapse, and by relapse I don't mean drinking relapse, I mean drink driving relapse. The mantra of the program is 'If you are going to drink don't drive, if you are going to drive don't drink', so it doesn't

preach about alcohol being bad, it preaches about drinking followed by driving is not good, so its core aim is to get the offenders to separate those two behaviours.

It was piloted in 2002 in three locations and it was rolled out state-wide in 2003 and to this day it's delivered in about sixty-one district offices around New South Wales by the Department of Corrective Services. The RTA funds it, so we pay the Department of Corrective Services to deliver the program for us. I think there have been about six thousand drink driver offenders go through that program since it commenced and in 2006 we evaluated the program to see if it was having an effect on recidivism. We wanted to see people who have gone through this program: are they less likely to reoffend than people with the same offence history that didn't go through the program, and interestingly, we found that those that completed Sober Driver Program, the risk of them reoffending was almost half that of other similar drink drivers that didn't go through the program, so an enormously successful program. And when we compared it to other similar programs around the world we found that it was about six or seven times more effective than they were. So this effect of reducing reoffending by nearly half was just astronomical at the time.' (Patricia Bryant, Disc RTA-RS33, CD Track 1)

In addition to the Sober Driver Program the RTA developed the Alcohol Interlock Program:

'The Interlock Program basically puts certain drink drive offenders in a program - that means they have to have an interlock device fitted to their car for a certain period of time. For example, if you committed a high range drink driving offence, you went to court, you'd normally get a disqualification period of, I think it would be two or three years, but what the Interlock Program does, it says "I will replace that disqualification period with a shorter disqualification period, provided you agree to go on an Interlock Program for, say, two years." So what the participant does is - they go to court, they get this Interlock Order from a magistrate, they serve out their shorter disqualification period, which might be three months, or six months, or whatever the court has given them, and then they have to get a interlock fitted to their vehicle by an approved RTA interlock installer. And they have to go and do a brief medical intervention, which is just a very simple alcohol intervention that they do with their local GP that is listed to be trained to deliver this particular program and that gives them an opportunity to think about their alcohol use. They present a certificate from the doctor to the motor registry when they go to get their interlock licence and then they are issued with this interlock licence, which is a very specific and conditional licence - they have to drive the interlock-fitted car, and only an interlock-fitted car for the period of time, and that may be two years. Every month they have to take that interlock fitted car to an approved interlock maintenance auto electrician to have the interlock calibrated and the data from the interlock device is downloaded and sent to the RTA so that we can ensure that the device is doing what it is meant to do, which is to lock them out of driving when they're drunk, or over .02.

So the device works by preventing any starting of the vehicle if a breath sample provided by the driver is over .02. They have to blow and hum into this quite complicated device and if they are below .02 the car will start, and then five, ten minutes into the journey the device will ask them to provide another sample - it is what is called a rolling re-test. This is to prevent Interlock participants getting their best friend at the pub, who is sober, to start the car for them so they can drive home. If they try to start the car when they are over the limit it simply won't start.' (Patricia Bryant, Disc RTA-RS33, CD Track 2)

Alcohol Interlock device being tested

'The driver is safer when the roads are dry; the roads are safer when the driver is dry.'

- ANONYMOUS

New substances, new challenges

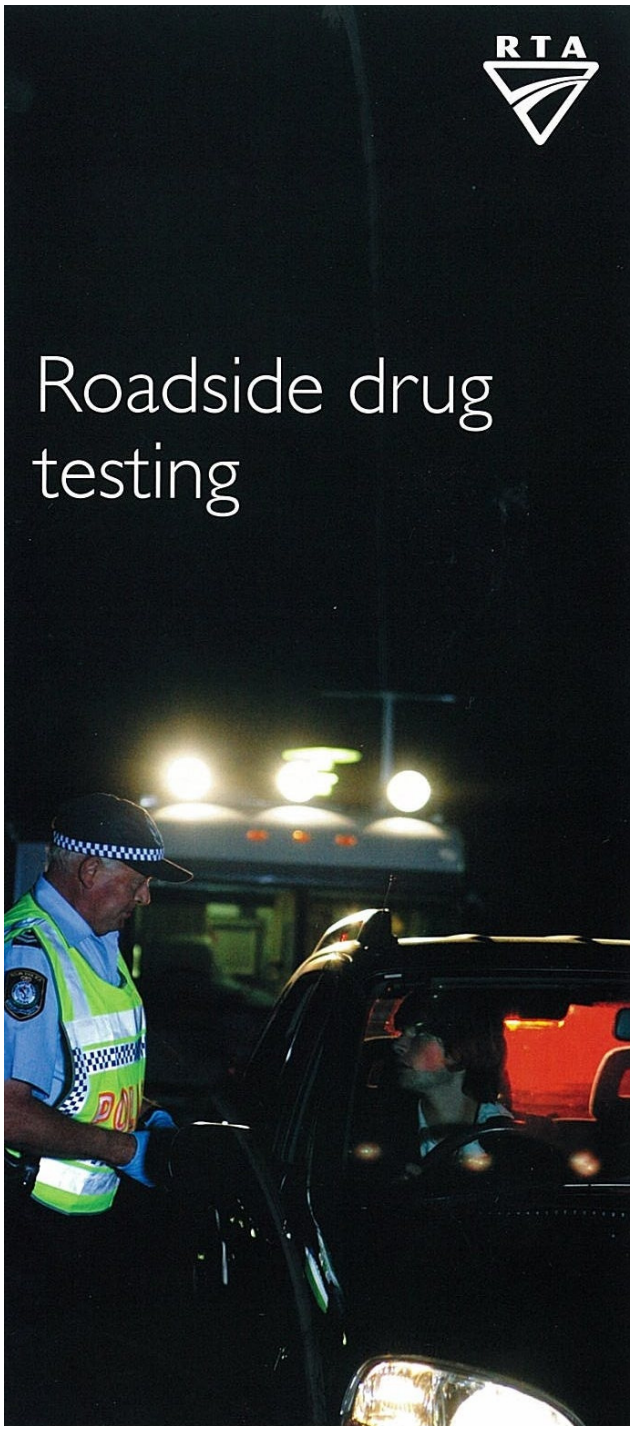
In the 1990s an emerging issue in road safety began to manifest itself. Patricia Bryant recalls:

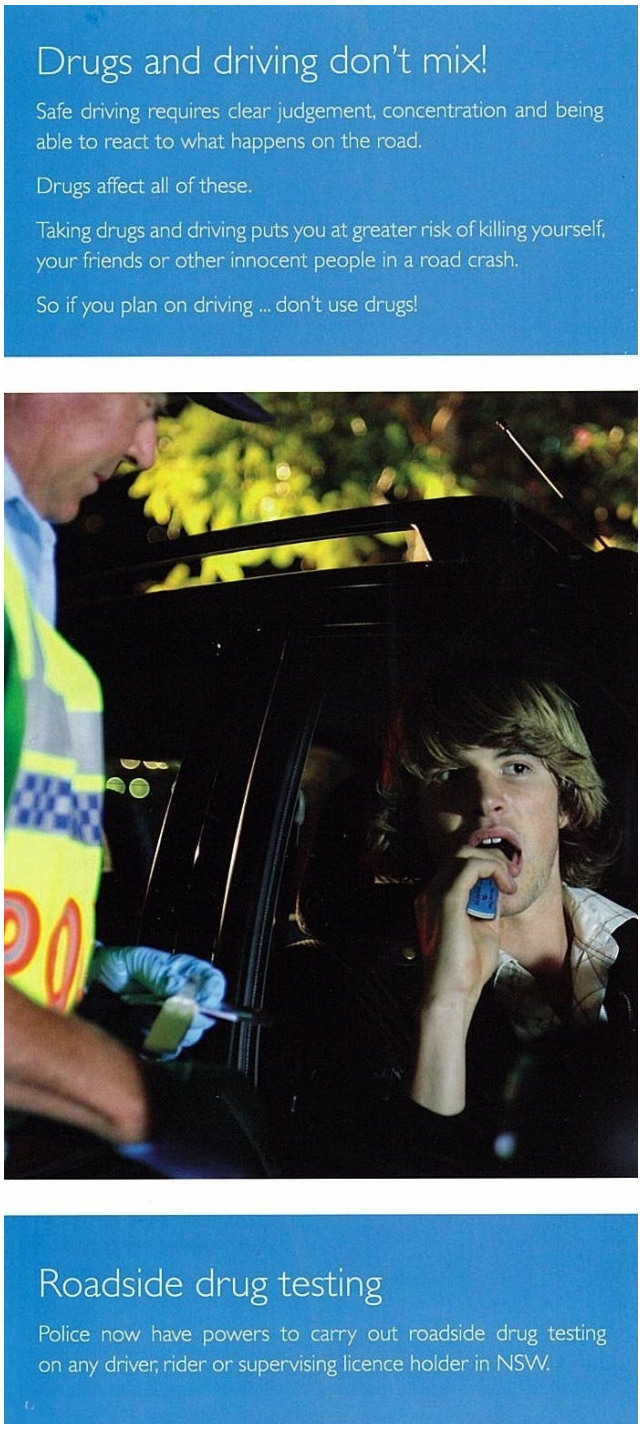
> 'There were a couple of reports that came out showing that in coronial studies of drivers killed twenty-four per cent of drivers were found to have drugs of some description in their system. Of course many of these were in fact perfectly legal prescription drugs that are known to impair driving. But it created a bit of a snowball effect, where government started to get quite interested about "Well, why aren't we doing something about drug driving? We've got these drink driving laws, which we've had since 1982, we should be addressing this." There was legislation in place at the time but it was quite weak in the sense that police could only detect drivers if they were driving in such a manner that would bring them to the attention of the police. So if the driver was slurring their words, or if they were falling out of their car, or if they were seeing imaginary butterflies, indicating some level of impairment the police would take them to hospital to have a blood and urine sample taken, but there were no random powers to pull drivers over and just test them for drugs. So there was a lot of debate about how the New South Wales Police would actually implement such a scheme and lots of concern, particularly from the Attorney-General's Department at the time that this was road safety authorities trying to bring in kind of de facto drug using laws to ban drug use.
>
> We had a lot of trouble trying to convince them that it was in fact a road safety measure to bring in new laws to address this because if you are using drugs and sitting on your couch at home that's fine from the RTA's point of view, but when you get in a car and drive you are putting both yourself and other road users at risk. So most of our arguments and most of the rhetoric around drug driving was concerning the risk they were to the community when they got in a car.
>
> We had to do a discrete study, which was done in 1997 and 1998 and the report was published in 1999, looking at a sample of about three hundred or so drivers that were killed and it basically looked at the drugs in their system and determined their culpability for the crash, based on a range of factors. It was quite concerning because some of the big drugs of interest were Cannabis, Amphetamines, Ecstasy, Ice, Speed and then some of the prescription drugs, things like Benzodiazepines, which use the chemical that is in drugs like Valium and Mogodon, fairly commonly used anti-anxiety drugs that are available widely. What the study showed was that drivers who had certain levels of things like Benzodiazepines, plus a little bit of alcohol were quite impaired in the driving skills to the point where they'd have a crash. Amphetamines was showing up, particularly in the heavy vehicle drivers that were killed. So there was a range of data that was indicating some top drugs here which we should be thinking about targeting, so some patterns started to emerge about how we'd develop policy around drug driving.' (Patricia Bryant, Disc RTA-RS32, CD Track 2)

Patricia Bryant was tasked with leading the project:

> 'We knew we wanted a random scheme; we knew we wanted new drug driving offences that were about presence, not about impairment, and this was because the police wanted a system that would make it easier for them to prove that drugs were an issue, rather than having to prove impairment. We said "We don't have to prove that you are impaired by drugs, we just have to prove that you've taken them" and so if the drug is present at any level we can prosecute.

Once we'd worked out roughly what we wanted the powers, the offences and penalties to be, we started to look at the existing legislation for drink driving and we thought, "Well, why don't we mirror them on what is there for random breath testing for alcohol because that is a very good foundation?" So a decision was made to do that as much as possible and there were a number of similarities that you could draw as well. (Patricia Bryant, Disc RTA-RS32, CD Track 6)





On 15 December 2006 roadside Random Drug Testing became law in NSW.

> 'Since the new laws commenced we've got about a one in forty-six hit rate, so that is one in forty-six drivers that are tested for drugs are positive to either cannabis, methyl amphetamine or ecstasy, or more than one of those. Some people test positive to two of those drugs, or all three of them. So that is a pretty impressive hit rate, that is a higher hit rate than we'd see with drink driving. On your average drink driving operation it would be about one in fifty, or one in one hundred, depending on if it was a state-wide operation. What it demonstrates is that the police are targeting drug drivers appropriately, they are not just sort of picking off grandma in a BMW and saying, 'You're going to be a pot smoker,' they are targeting the right kinds of age groups and population. Now of course, two and a bit years down the track we are doing twenty-five thousand tests a year.' (Patricia Bryant, Disc RTA-RS32, CD Tracks 8 & 10)

How effective are the new random drug testing laws proving to be?

> 'In 2003 four per cent of the New South Wales population admitted to drug driving, now three point six per cent, so it is a small drop, but it is a ten per cent drop. We did some further research in 2008, which was after the roadside drug testing laws came in on drug drivers and asked them a series of questions about: "Has the introduction of roadside drug testing changed your behaviour? Has it made you think about other ways of getting home? Has it made you more aware of cops being out there?" Even though the results are very early we are starting to see signs of behavioural change, so people are more worried in 2008 than they were in 2003 about being detected drug driving. Some groups of drug drivers that we tested basically said they would start thinking about new ways of getting home now, whether that would be getting a cab or whether walking, as a response to the new laws.' (Patricia Bryant, Disc RTA-RS32, CD Track 10)

'What is dangerous driving?

I have a tendency to believe that everyone's driving is dangerous, except my own.'

- GEORGE BERNARD SHAW

Speed

Photo supplied by Graham Brisbane

The history of speed limits is full of changes, though historically speed limits have mainly increased. In the beginning of the twentieth century local municipalities each set their own limits. In October 1904 Parramatta set the speed limit at six miles per hour and they were trendsetters, as some other Sydney municipalities set their limit at only four miles per hour. This caused endless confusion and saw the speed limit raised to 30 mph before the First World War. In 1925 fixed speed limits were abolished altogether and the following year saw a 47 per cent jump in the State-wide fatality rate per vehicle. In 1937 fixed speed limits were reintroduced: 30 mph in built-up areas and a prima facie limit of 50 mph in rural parts of the State.

John Bevins is a Creative Director who has been much involved in producing road safety advertising campaigns:

> 'One of the big problems that we face with road safety, particularly with speeding - beyond the fact that we all like to speed, less so as we get older - is that I remember as a young bloke that it's a thrilling thing to drive a car fast and there are many reasons why you do it. But beyond that, on the one hand society appears to say "No, you shouldn't do it" but in reality condones it. Cars have the ability to go far in excess of the speed limit, way above the speed limit. Car speedometers make a mockery of the speed limit and that would be bad enough in itself, but on top of that car makers glorify speed. They spend a lot of money on it, advertising, selling the fantasy of getting in a car and driving it at speed. And they find very clever ways of breaking their own rules, I suppose, but without being seen to break their own rules, so there's a self-regulatory system that says they shouldn't do a whole lot of things. They shouldn't glorify speed and yet they manage to do it.' (John Bevins, Disc RTA-RS31, CD Track 12)

What is it that makes drivers speed? Is gender a factor? Ray Taylor observes:

> 'There used to be a position, or a view that it was all male-oriented, it was to do with testosterone, plus age, you know, immaturity, and we know that young males at a certain age are more immature than young females at that same age and if you have licensing age that's the same for both the chances are there's more mature females at nineteen than there are young males. There was also a view that because seventy per cent of the young driver crashes were all males that it was all a male problem. Now, after a while some exposure-based research was undertaken which identified that young males actually travelled two thirds of the distances and females only travelled a third, so in fact the actual crash rates on an exposure basis wasn't a great deal different between young males and young females. And in more recent times there's been some research that's been identifying that explosive type of behaviour associated with your typical young male driver is also being seen amongst some young female drivers. So I guess what I'm saying is the picture's been confounded between males and females on that basis. The lines are blurring a bit and I think part of the reason is because we're actually now identifying what are the real keys for why they've got an elevated crash risk, whether they're male or female, and we know that one bag of issues are all to do with the fact that they're young and immature and all the rest of it. You can't change that, neither should you; people should allowed to be young. But we know that the very fact of inexperience in the process of driving is a bag of issues that leads to an elevated crash risk and that inexperience cuts right across the gender balance. If you're an inexperienced male or an inexperienced female you're inexperienced - you don't know about driving, you're trying to learn it, you haven't done it before, you make a few mistakes. Well, you know, if you make a few mistakes flying a kite, well you have to get a new kite, don't you? But if you make a few mistakes driving a car you might create a major problem and that's in essence what's happening. So it takes four or five years – up to about twenty five, actually, for the crash rates to come down substantially, although they do come down quite a lot in the first year.' (Ray Taylor, Disc RTA-RS30, CD Track 7)

> 'Generally speaking speed related crashes have been our major concern in terms of the road toll, it accounts for the largest risk-taking behaviour in road fatalities. It has been as high as forty, forty-four per cent of fatalities in some years over the past decade. There has been a general decrease in speed-related fatalities over the long term, but it has been round about the same levels as the general reduction in the road toll, so it is staying at around about the same levels.' (Andy Graham, Disc RTA-RS43,CD Track 5)

Michael de Roos is the RTA's General Manager, Safer Roads and an expert on speed management:

> 'Approximately two hundred people a year die in speed-related crashes each year, is that a big number or a small number? See, it depends how people put things into context. I actually think it is a very large number and we have to think in terms of how that aggregates, so over ten years it is a thousand people. The cost to the economy is estimated to be eight hundred million dollars, in all accounts that is probably an underestimate. We also know that speed is a factor in potentially any crash. We know that if we reduce the travelling speeds on a length of road the benefit is usually even greater. There is a misconception that speed management is engineering, so we get the speed environment right on the roads and we have the signs right, or there is a misconception that speed management is all about behavioural measures, or there is a misconception, particularly if you speak to the police, that it is all about enforcement. In fact it is all those put together, they have to work together.' (Michael de Roos, Disc RTA-RS36, CD Track 1)

In the 1990s Jack McLean and his colleagues in Adelaide embarked on yet another study and came up with some groundbreaking findings on speed:

> 'We were able to calculate how the risk of being involved in a crash was related to speed and we concluded that travelling at sixty-five kilometres per hour in a sixty zone doubled your risk of crash involvement, and every five kilometres per hour doubled it again. We were able to compare this study with the alcohol study we'd conducted previously and it is fairly well established for the average driver that driving with a 0.05 blood alcohol level doubles your risk, and so driving at sixty-five in a sixty zone is like driving at sixty with a 0.05 blood alcohol level. Now, most people would not drive if they thought they had 0.05 blood alcohol level but I would be astonished if more than one in a thousand drivers thought that driving at sixty-five was doubling their risk. The effect of speed is, if anything even more significant than we estimated.' (Jack McLean, Disc RTA-RS47, CD Track 15)

One of the 'silver bullets' believed to make reductions in speed possible was the use of monitoring devices such as radar. Chris Ford recalls an experiment conducted in Sydney in the early 1970s:

> 'It was an AWA device, it was not a camera it was just a radar device, it was called an Electromatic. The police asked the Traffic Engineering Branch to make an assessment of it and do a take-over test and I was asked to do that. That was my first exposure to radar and as a young engineer I had a lot of fun. We were actually measuring speeds of traffic coming off the Harbour Bridge and I was absolutely staggered at the accuracy of the device, it was very, very sharp.' (Chris Ford, Disc RTA-RS49, CD Track 2)

However the device suffered from what was known as the 'Doppler Effect' where the measurement could actually be distorted by the presence of another vehicle. It was shelved and took another five years of development before coming into widespread use. The next step was speed cameras and Victoria was the first state in 1990 to introduce them. Dr Bruce Corben, a Senior Research Fellow at MUARC, reflects:

> 'When we looked back to about 1980 at pedestrian deaths in Victoria, we found that there was something like one hundred and forty-five to one hundred and fifty pedestrians killed in Victoria each year on average during the 1980s. Then all of a sudden in 1990 that level dropped to about seventy or eighty per year. It was a distinct drop and the only plausible explanation was that in 1990 we introduced into Victoria speed cameras, so we saw this dramatic drop for pedestrian trauma. I think that has been one of the most powerful examples of getting the speed management right that I've seen in road safety.' (Bruce Corben, Disc RTA-RS46, CD Track 9)

Ray Taylor adds:

> 'The reduction in speeding was quite substantial. I can remember that prior to the installation of the large-scale speed checks we had something in the region of around eight per cent of drivers exceeding the speed limit by twenty kilometres or more and after a year or so of the operation of the speed cameras and the speed camera campaign that was down to about 2.1 and there were concomitant effects on the actual road injury as well.' (Ray Taylor, Disc RTA-RS29, CD Track 15

In New South Wales the first speed camera was installed in the Sydney Harbour Tunnel in 1997 as Michael de Roos recalls:

> 'It was in fact a modified red light camera and it was called the Traffic Phot SR, from memory, and it was installed in the Sydney Harbour Tunnel and we needed a curtain of light, so everyone going through the tunnel at the time would know exactly where the camera was because there was this really bright area. At the time there was a thing called the 3T Club, which was called "Ton Through the Tunnel", and people were posting on the Internet pictures of themselves doing two hundred kilometres through the tunnel, and that was the club. We had speed surveys to see whether this was true and the fact is our speed surveys can only measure up to two hundred and they were off the scale, so we put cameras down there and it stopped them. By all accounts that was successful, it was widely accepted, there was quite a bit of media coverage of this 3T Club and people thought that was stupidity, so it worked. That was like that for a couple of years and then, late in 1999 there was a real spike in bad crashes on the Pacific Highway through the Burringbar Range. It was a fairly poor length of road for a national highway and it was time to be bypassed, it had served its life as a highway and it was time to be upgraded, frankly, but we couldn't do it straightaway. We thought okay, we'll reduce the speed limit - that worked to a degree but there was still a lot of speeding.' (Michael de Roos, Disc RTA-RS35, CD Track 12)

An order was directed to de Roos by Rosemary Rouse, his manager to install two speed cameras on the Burringbar Ranges by Christmas 1999, an almost impossible task, given the time constraints:

> 'On Christmas Eve that year I climbed up the last ladder, I cut down the bagging on the signs, phoned in, 'Uncovered, cameras operating'…That was a massive project, massive.' (Michael de Roos, Disc RTA-RS35, CD Track 14)

The effect on the road toll through the Burringbar Range was startling:

> 'It dropped markedly. We put out an evaluation report, presented it at some conferences, I believe. It was a marked reduction in the road toll, in fact it stayed down until they duplicated that length of road, so that was actually very effective. The success of that meant that we could now operate speed cameras but it was at a time when wet film was really yesterday's technology. Digital cameras were becoming much cheaper, everyone was running around buying digital cameras for themselves, getting rid of their wet film cameras, it was shifting, so it was decided that we would now run into fixed digital speed cameras.' (Michael de Roos, Disc RTA-RS35, CD Track 14)

Chris Ford confirms:

> 'The images were downloaded from the cameras at pre-determined intervals. That technology has proven to be very, very robust, and to ensure the evidentiary provisions were met the images are encrypted with an algorithm, which effectively demonstrates to the courts that they haven't been tampered with. So a lot of work went into ensuring that the technology was (a) robust; and (b) satisfied all the requirements and concerns that the police and the courts would have in relation to evidentiary provision. That has worked extremely well.' (Chris Ford, Disc RTA-RS49, CD Track 6)

As Director of Road Safety and Traffic Management Ford began a wider speed camera placement program:

> 'We had a really substantial roll-out of speed cameras right across the state. Now I can't recall the numbers but we had a program that at that stage had more than a

hundred cameras in it. There were speed cameras right across New South Wales, mainly in Sydney, and sections of the road major rural network, where the crash rates were very high. The sites were identified in concert with the police, the NRMA and others, for that matter, and the cameras proved to be extremely effective in reducing the crash rates on those sections.' (Chris Ford, Disc RTA-RS49, CD Track 6)

Dr Don Carseldine is a former manager of Speed Management at the RTA:

'There was a very strict and comprehensive set of rules that we applied to the installation of the cameras and to put it in a nutshell, they needed to be in a Black Spot location, that is an area of road where there had been quite a number of injury crashes. Allied to that there are a number of specific measures that we needed to satisfy before the camera would be located there. For example, the existing speed limit on the length of road, the measured speed of the vehicles travelling that length of road, that is the extent to which vehicles were exceeding the speed limit there, the slope of the road; we tried to make sure that the road didn't have a steep gradient on it that might affect vehicle speeds. The location of the section of the road in relation to intersections and the nearest change in speed limit and so forth, so there were a whole range of different criteria that needed to be satisfied before we would put a camera at a given location.

The policy on speed cameras was designed by a team of people. Road engineers and the people in the Speed Management Section, of course, played a role in it. It was a consultation process amongst a variety of people and of course we needed to satisfy the Minister that the criteria that we were applying were appropriate and that there would be public acceptance of the criteria that we were applying. We wanted to make sure that the public would embrace, to the greatest extent possible speed cameras, realising that they were being used in a fair way to counter people behaving in an irresponsible manner, with the ultimate goal of reducing the number of injury-related crashes.' (Don Carseldine, Disc RTA-RS34, CD Track 12)

The New South Wales and Victorian experience with speed camera operation is quite different:

'New South Wales has had a system of fixed digital speed cameras, they've been placed at Black Spot locations and they've been phenomenally successful in reducing road trauma at those Black Spot locations. They are very widely signposted, you'd have to be completely distracted not to know that you were going through a fixed digital speed camera area, and not know what the speed limit was at the time. The evaluation of the fixed digital speed camera, I think, derived something like a ninety per cent reduction in fatalities, or fatal crashes, and a thirty something per cent reduction in injury crashes, so at Black Spots it is a very effective measure.

The Victorian experience is somewhat different to ours. Victoria incorporated a covert widespread location operation, as well as a reduced tolerance level, they started enforcing at speeds very much closer to the speed limits. You could be done for travelling at sixty-two or sixty-three kilometres per hour in a sixty kilometre zone in Victoria, whereas in New South Wales there is some level of tolerance which is probably higher than that, I don't know what it is specifically but we do know the Victorians are much tougher. Now Victoria was covert, so there was no sort of signage, you'd just get the letter in the mailbox three weeks later saying you'd done that, and what they found was there was, from my figures, my calculation of their figures, around about one-sixth reduction in road fatalities associated with the measure, which came in at the turn of the century, or just after 2001-2002. It is a

different sort of approach, it is not something that has been implemented in New South Wales, maybe it will be in time, who knows, that could be a great silver bullet too.' (Andy Graham, Disc RTA-RS43, CD Track 6)

Ray Taylor adds:

'The Victorian approach was: they're a little more covert to try and achieve a broadly-based reduction in speed. The deterrence impact on the driver is that the driver is in doubt as to whether there's a speed camera anywhere around; they don't know because they could be anywhere; they change locations, they're not identified necessarily. Therefore they will have a general reduction in their behaviour, so it's a different philosophy.' (Ray Taylor, Disc RTA-RS29, CD Track 16)

Typical NSW speed camera awareness sign

How effective has the introduction of speed cameras been in changing driver behaviour? Soames Job confirms:

'People do respond effectively to enforcement; they change their behaviour and so we know that. For example, our speed cameras reduce the number of people speeding around those locations hugely. An independent analysis of our first twenty eight cameras shows a ninety per cent reduction in fatalities in the areas treated by the cameras and over twenty per cent reduction in injuries in the areas treated by the cameras. So, they clearly work and they give us a road safety benefit. Having said that, I think that police presence is also a major deterrent. People do slow down when they see police, but I do have a caveat to that. I think that argument is often used to say, "Well, we shouldn't do anything but put more police out there" and I don't think that logically follows. I think that you have to judge, "Well, how much does it cost to put a police officer out there?" If you're going to run one car twenty four hours a day, that's two or three shifts of police officers and the cost of the vehicle three hundred and sixty five days a year. For way, way less cost than that you can put a camera in that will operate 24/7, so I don't think we should dismiss automated enforcement on the basis that police are very effective. Yes, police are effective; automated enforcement is also effective and really, you know, there's

always a limited resource available to do road safety. So for that limited resource I think the mix of police and automated enforcement is a good mix.' (Soames Job, Disc RTA-RS23, CD Track 11)

Police using roadside speed camera

For heavy vehicle speed management a system has been in place since the early 1990s, as Don Carseldine affirms:

'Over the years the RTA has been developing its Safe-T-Cam system and I must admit I haven't had a great involvement with the Safe-T-Cam system, but just to complete the picture that's a network of cameras across the state on the major highways that read the number plate on the trucks and keep a record of where that truck is at certain times and calculates whether that truck is getting from place to place quicker than it should. In that way it is possible to monitor whether the truck is speeding and whether the driver is taking the required rest breaks. Information is collected through that Safe-T-Cam system and then the operators responsible for those trucks are approached to explain why the trucks are behaving in a way that is illegal and dangerous.

Safe-T-Cam was developed here in New South Wales. There are other systems that are being developed in other countries that have broad similarity in as much as there are cameras located at different points along the way and calculating vehicle speeds between two different points, but not specifically designed for heavy vehicles, and not specifically designed to calculate whether drivers are taking their correct rest breaks.

> So the Safe-T-Cam system is unique – it's had a long period of development and I understand that other states are beginning to introduce it now here in Australia.' (Don Carseldine, Disc RTA-RS34, CD Track 10)

The latest technology in speed cameras is Point-to-Point cameras. Michael de Roos reports:

> 'The Netherlands developed a system we call Point-to-Point and they call Section Control. It is essentially two cameras some distance apart which measures the average speed travelled from one point to the second point. Now they've had this for some years and they have got a couple of internal evaluations. They were very useful in that they found that they had massive safety benefits by just calming the traffic down and they initially installed these devices. So there's just two speed cameras that had the capacity to measure the average speed, rather than the speed that you are doing at that point - it recognises one car at one point and time stamps it, recognises the same car at the second point and time stamps it. It knows how much time you have travelled to get from point A to point B, and because it knows how far that distance is it knows what your average speed has been over that distance.
>
> Now they found that noise was reduced, which was really what they were looking for, pollution, carbon emissions were reduced, but what they found was that capacity increased, so throughput increased and secondly, safety improved markedly. Now they didn't expect those two last ones, so that was a real turning point for them. Now the Dutch have rolled these out, these things are now being rolled out in England, they're in Italy, they're in Austria, they are in the Czech Republic, it is really being rolled out extensively across Europe. They have also done some community surveys and it has found that the community actually accept this more than the instantaneous point and infringement because it seems fairer.
>
> We've had trial Point-to-Points operating in New South Wales for some years now, in Parramatta, and two on the Pacific Highway. We know what we are measuring so we are actually monitoring the results. Victoria has installed six lengths, I believe, and they are monitoring the results of that, so it is coming. The Dutch have another variation to this in that they have mobile Point-to-Point, so instead of installing it on a post, such what we have, they actually have the capacity to put this in a car at one point and drive another car to another point and then link the two with satellite technology. That is quite interesting. Point-to-Point is coming to New South Wales. We've got approval to implement this for heavy vehicles, it is going through the legislation process at the moment.' (Michael de Roos, Disc RTA-RS35, CD Track 15)

In 1997 the realisation began to form in the minds of road practitioners and in segments of the public that despite the effectiveness of speed cameras the general urban speed limit at 60 km/h throughout Australia was still too high. Michael de Roos recollects:

> 'About that time the debate came about, 'Well, why do we have an urban default speed limit of sixty kilometres per hour?' We all grew up with sixty, no one else seemed to have sixty, except Australia. In fact, when you looked at the history before 1964 the default urban speed limit in New South Wales was thirty miles per hour, or forty-eight kilometres per hour. In 1964 it was increased to thirty-five miles per hour, which was fifty-six kilometres per hour. In 1977 when we adopted the metric system, we increased it from fifty-six to sixty, so from 1964 to 1977 we increased the speed limit on urban roads from forty-eight to sixty kilometres per hour, largely because it was convenient to do so. But what that meant was that we were travelling quite fast and at speeds which we knew, if they hit somebody, a cyclist or a pedestrian in particular, the chance of survival was very low.

So we questioned that and this was largely the work of Rosemary Rouse and she was managed by Chris Ford at the time, she said, "Right, what can we do?" Now Rosemary pretty much managed the trial period where something like fourteen councils had fifty kilometre speed limits as a trial. There was a major evaluation of it and it was seen to be successful, then they moved to the next phase, which was to do it by invitation. This is when I joined the corporate office from the region and the focus then was on rolling out this fifty kilometre, now this was something quite different.

There was a lot of criticism, admittedly a lot of it was from within the RTA, saying that this simply wasn't possible but they were reflecting a community view, I would suggest a fairly narrow community view, and the arguments were things like, "My car cannot travel at fifty kilometres an hour, there is going to be gridlock in the network, no one is going to get to work on time, we are going to bankrupt the state." I remember a headline in a Bathurst newspaper that said, "You will now need a cut lunch to go to work because it is going to take you that long." (Michael de Roos, Disc RTA-RS35, CD Track 7)

The Minister of the time, Carl Scully, agreed to a trial, a three-month trial, of 50km. It was a political risk because 50km was very unpopular amongst the community generally; drivers in particular, and of course the media. So it was a brave step forward and Carl Scully announced it, gave us the support for a three-month trial with twenty-six local government areas and in October 1997 boots and all we went into 50km.' (Rosemary Rouse, Disc RTA-RS1, CD Track 8)

Michael de Roos continues:

'We did it all by invitation, so we would invite the councils, we would go to councils, I did quite a few of these sessions myself, we'd give a presentation. We'd say "This is what fifty kilometres is, this is how it works, this is what you can expect if you do it and if you decide that you want it you make a submission to the RTA and we will manage that through". So we did that and that took some years. Rosemary was making reports weekly to the Minister, there were so many reports. There was this map that she used to produce which we lived and died by. Green meant that the council had adopted fifty. I think there was a green with dashes on it which meant they were considering it. Red was they hadn't considered it yet. Over those years that map turned from almost all red to half the state green. So the eastern half took up the fifty k and in the end we were able to say that ninety per cent of New South Wales were living in streets that were already fifty kilometres an hour.' (Michael de Roos, Disc RTA-RS35, CD Tracks 6 & 7)

'We had some councils who were adamant they were never going to introduce it. The most vocal at the time was Broken Hill, their claim to fame was they were going to be the last council area in the state with a sixty kilometre speed limit, they were not going to change to fifty, but I believe they have since.' (Chris Ford, Disc RTA-RS49, CD Track 9)

How did the public take to the new 50 km/h general urban speed limit?

We had to promote it so we had to use all the skills of speed management. Now one of the things about speed management is that it can be an engineering discipline, or an art, but there is the element of education, which is really important and there is the enforcement level. Now a lot of people don't like to talk about enforcement so much but I think of it as voluntary taxation. We have the rules, it is fairly clear, let's just drive to those rules. Now with the education: there are really two important

elements to the education. You are actually trying to promote to the public the benefits of this, but you are also trying to influence the decision-makers. So you are actually at the same time trying to get the political masters to think in terms of what the public education is saying. So it actually has two foci in order to get these things through and it was very successful.

We had a television commercial called *Bouncing Ball*, basically it was a car driving along a suburban street and a ball comes bouncing out, and a little girl comes chasing it and you think, "Oh yes, I can see what is going to happen here." The car brakes, so there is a big screech, a bit of rubber, and a thud, and you think, "Oh, the girl has been hit." But no, from another shot the girl stands up, picks up her ball, looks around and walks off. The message is: this car was doing fifty, he was able to stop in time, if he was doing sixty he would have killed the little girl. So it is actually a positive message.' (Michael de Roos, Disc RTA-RS35, CD Track 7)

What has been the effect of the reduction in general urban speed limits to 50 km/h?

'The 50 km/h limit has, I think, been one of the key drivers for the lowered road toll that we have achieved over the last few years in New South Wales, particularly in terms of pedestrian fatalities. Prior to 1997 it was somewhere in the range of a hundred, a hundred and twenty pedestrian fatalities a year in New South Wales. In the last few years, I understand, the annual pedestrian road toll has been somewhere in the range of fifty fatalities a year, so that is a major breakthrough in terms of pedestrian fatalities.' (Rosemary Rouse, Disc RTA-RS1, CD Track 10)

Having achieved and implemented a 50 km/h general urban speed limit there was a move to set speed limits even lower:

'That move commenced when I was manager of Road User Safety. We then started on 40km speed zones for places of high pedestrian activity, for example strip shopping centres, around schools, around hospitals. It is all really about stopping distances: if you are driving at 40km the impact on pedestrians is such that they will live rather than die. Anything much over 50km impact and the person has no hope, or very little hope of living. So it is really about drivers and travelling speeds, drivers recognising the need to drive more slowly so they can stop, and pretty much stop on a postage stamp if a child runs out.' (Rosemary Rouse, Disc RTA-RS1, CD Track 11)

NSW has now taken these successes in speed management further. We have new speed zoning guidelines which make speed limits more sensitive to risk and actual crash history [2009]. We are also substantially building on our successes with automated enforcement. In 2010 our first point-to-point speed cameras have begun operation; the first of 200 combined red light – speed cameras are already operating; and we will begin an extensive mobile speed camera program of 12,200 hours of operation per month. After six consecutive years of road toll reductions, a record in NSW, the toll increased in 2009. It is hoped that this package of measures will help to bring the road toll down again.' (Soames Job, 2010 update)

'Beneath this slab
John Brown is stowed
He watched the ads
And not the road.'

- OGDEN NASH, AMERICAN HUMOURIST, 1942

'Last year in America 40,000 people
died of gas. A few of them inhaled it,
some put a match to it and all the
rest stepped on it.'

- EXTRACT FROM 1952 ROAD SAFETY BOOK
"NOW THERE'S NO EXCUSE" (AUTHOR PRISCILLA HUGHES)

'Safety is a continuing journey,
not a final destination.'

- ORIGIN UNKNOWN

Road design and the road environment

How large a factor is road design and environment in contributing to increases or reductions in road fatalities statistics? Andy Graham points out:

> 'The road environment as a factor in crashes represents about twenty per cent of crashes, so they relate to the intersection design, the alignment of the road, the nature of the surface of the road, but probably more importantly the protective measures on the road and the run-off areas, so that obviously a better road in terms of road environment will have a median if there is a risk of a sort of head-on crash, as being a common crash on that piece of road. A particular road might have a poorly aligned curve or something like that and obviously that can be improved as well. The removal of hazardous objects, road side street furniture, telegraph poles, et cetera, they are all key critical factors in terms of the safety of a road. Now key measures in terms of those sort of things is to either remove them, protect them with barriers or reduce the speed, so that if they come into play they become less of a factor in causing a severe outcome for a crash. Yes, road environment is one of the key things that is important in terms of reducing road trauma. When you consider that human error is going to happen you've got to improve the situation in terms of the outcome, so you look at the road environment and those measures in terms of reducing trauma.' (Andy Graham, Disc RTA-RS43, CD Track 3)

Ray Taylor elaborates:

> 'We know from Black Spot analysis and we know from Road Safety Audit analysis that if you make an improvement at a particular site and you then monitor crashes and injury rates you can get substantial reductions: fifteen, twenty, twenty five, thirty, forty, seventy per cent on some sites, depending upon the treatment. So good road engineering is very effective on a site-by-site basis. The problem is that you need to treat a lot of sites to have an impact on the whole and when you start to treat a lot of sites you start to spend a lot of money, and so road engineering is very effective but the scale that you need to have an effect on the whole of the road toll is large enough to make governments gulp.' (Ray Taylor, Disc RTA-RS30, CD Track 8)

The road surface itself has an influence on the crash rate. Steve Levett verifies:

> 'We have concrete surfaces, we have what we call asphalt surfaces, we have sealed surfaces, chip seals, different type of aggregates in different types of seals, different ways of doing different types of roads, actually. Naturally your concretes have got long life, your asphalts have got longer than a seal, but they are put on certain types of roads, depending on the volumes of traffic on them. They perform quite differently and we do have situations where we have roads where we need to put in what we call non-skid pavements because of wet weather type crashes. We have ice problems up on the mountains, where we have put in detectors in the pavement and they will detect moisture levels and temperature levels. Once they reach a certain point it will start flashing signs saying, 'Ice Ahead' because it knows at that temperature the moisture will have turned to ice on the road. That is an interactive sign, actually working on the pavement as well and it is set into the pavement, it measures the moisture on the pavement. We used to get we called it 'bleeding' on sealed pavements, where all the aggregate disappears in hot weather and just becomes a smooth surface of basically tar. They became very slippery and rutted and if they got a bit of a dip in them they'd fill up with water where the wheels were just going through all the time and they became very dangerous in wet weather. We still put

chip seals in, we just try to do them a bit better than we used to.' (Steve Levett, Disc RTA-RS18, CD Track 1)

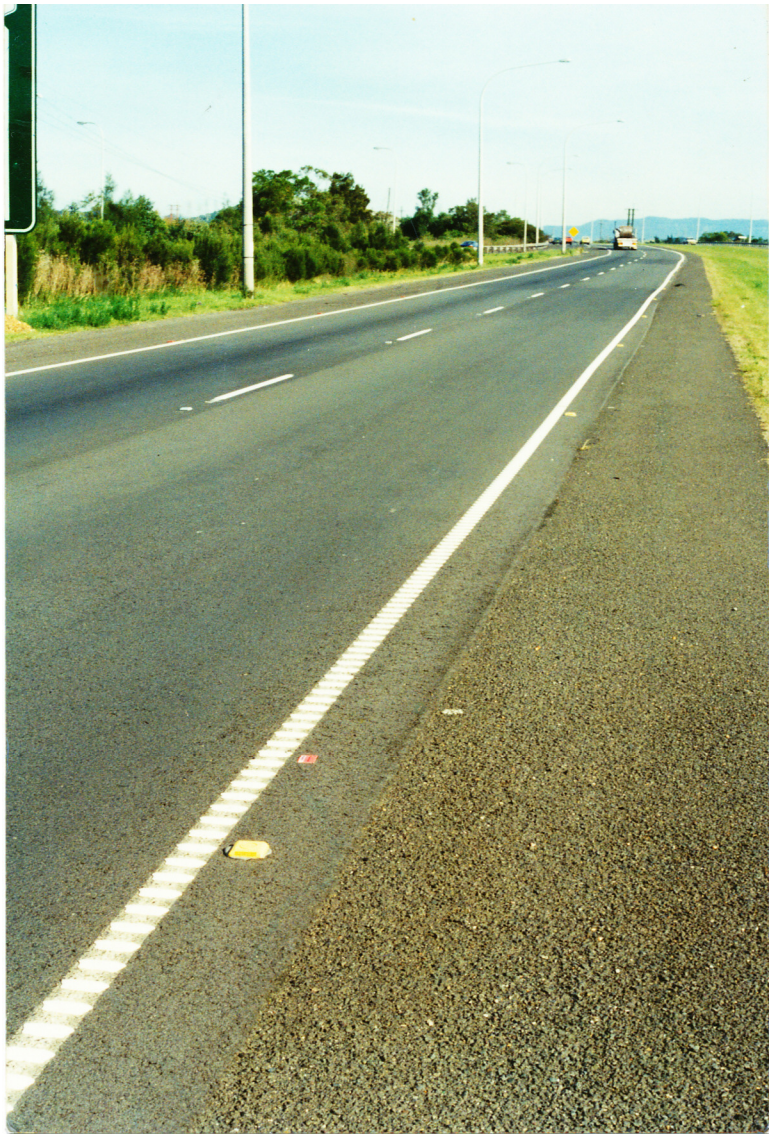
Steve Levett came up with some suggestions for improvements in road design to try and reduce crash fatalities:

'I got involved in crash analysis, looking at crashes occurring on rural roads, trying to work out what was the best way of doing it. Crash numbers were going up on rural roads. Why were they occurring? What we could do to fix them? Basically sixty per cent of the crashes of all the roads that we looked at were occurring on curves that probably made up only twenty per cent of the whole road network. That was a big problem. And fifty per cent of head-on crashes, not overtaking, were occurring on straights, so we are talking about loss of control here.

When we looked at curves we had about twenty-seven per cent of the vehicles that were leaving the road go off to the left, and that is because they are driving on the left-hand side of the road. But only eleven per cent were going off to the right. Why was there such a big difference in those numbers? Sixteen per cent difference is quite a large number out of the total number of crashes that occur - because there was another lane there. The other lane, you could drift into there, if you lost control you had all that pavement to recover. Once we worked out what was going on we said, "There is an eleven per cent difference, if we widen the outside of the curves on the left-hand side only we may get a benefit." It makes sense because it actually is a logical outcome. What it does, it actually affects almost fifty per cent of all curve crashes: one way or another there is an effect on those crashes. There could be a reduction of at least fifty per cent of all the loss of control crashes that are occurring on the road network just by widening the outside of the curve and the shoulders, so we've started implementing it. We call it Pavement Asymmetrical Design: on the curve you bulge out so that the whole road looks a bit funny when it goes around a curve and that is why it is asymmetrical. I came up with the name because that is what it looked like, and it works.

Now the types of crashes that are happening on straights are different. They tend to be more distraction, fatigue - speed doesn't really play a part in it. As soon as you hit a curve speed becomes the optimum problem but people get bored driving long straights and they tend to think about doing something else and they become distracted. They may want to play round with the CD player, get on the phone, or whatever and once they move their mind from watching the road and actually controlling the vehicle to doing something else they will wander all over the road, and they do. What we found was that on straights the size of the shoulders didn't need to be as wide because of the type of crash that was occurring. Once a vehicle starts leaving the road on a straight for whatever reason, because he is distracted, fatigued, or whatever, he keeps going unless something happens to wake him up or bring him back on track he will keep going off that line. So we use audio tactile strips where we can because of the big effect they do have in reducing these distraction, fatigue-type crashes on long distance roads, especially out west where you are travelling long distances. We have in some cases put them in the middle of roads and we've been getting very good results on that as well. What we are trying to do is pull the centre lines apart. The current centre line is two lines close together and there is no room for error on that. If you are distracted, you are in the opposing flow before you know about it and that is why we have such a high number of head-on crashes that aren't involving overtaking. So if you can wake those people up before they get there it gives them a little bit of room to manoeuvre. We think that we can change that and we are trialling a new centre line configuration at the moment which will be

audio tactile and will give them a chance to recover before they actually intrude into the opposing flow.' (Steve Levett, Disc RTA-RS17, CD Tracks 6 & 7)



Raised edge lines to alert drivers. (Photo supplied by Graham Brisbane)

Guard rails and barriers are another aspect of road design where improvement was imperative:

'Well the guard rails - we used to have what we call mesh wire fencing between the big wooden posts, so if you hit the wooden post it wasn't much of a guardrail and the mesh fencing didn't hold anything. They were there purely to tell people that there was a curve there because we painted them white, that was about all. As a safety device they were next to useless. They used to try some wire rope, slack wire rope fencing, it didn't work much either - they weren't scientifically tested, they were just stuck up.

The first real type of guard fence that came out was probably Armco when they brought out their W-Beam - it is steel. Armco was a good thing, it stopped a lot of

people from being killed but it kills a lot of people too, it causes a lot of problems in itself. Concrete was another one that they decided to go to, we have used a lot of concrete-type barriers, New Jersey barriers, things like that. Concrete doesn't give much, I mean you hit a concrete barrier and it stays where it is and all the energy of the vehicle goes through you. Brifen were the first ones to bring out wire rope in Australia and they had a weave pattern-type wire rope. We looked at it and we didn't know much about it and we thought we'd like to see some of the crash testing results. We started actually putting in some trial sections, we crashed a few vehicles into it and we found that it worked. We were a bit worried about it on tight curves because once you get down to about a two hundred metre radius Brifen said, 'We can't use it on anything smaller than that.' We decided to actually put a section up on a two hundred metre radius curve and started crashing vehicles into it. We were worried about a vehicle hitting it from the convex side and the whole thing de-tensioning. It didn't do what we thought it would do, it actually worked perfectly well and we were surprised at that.' (Steve Levett, Disc RTA-RS17, CD Track 11)

Wire rope median safety barrier on Pacific Highway

New Jersey barrier

Crash involving steel guard fence (former design)

Testing of improved steel barrier terminal

Road delineation is currently one of the road designer's areas of interest.

> 'Line marking is probably one of the cheapest ways that we can make a road safer. All types of delineation, whether it is a sign, or a series of what we call curve alignment markers, CAMS, paint on the pavement, reflectors on the pavement, they work exceedingly well to delineate the direction of a road, especially going into curves. You need to try and define the tightness of a curve to a driver so he can see that he needs to slow down. So paint on the road actually is the cheapest way to do it, but some of the ways that we have been doing it haven't always been the best and for many years we've had centre lines that were only separated by probably four or five hundred millimetres between opposing flows. Even double barrier lines, which used to be yellow, now are white, they are probably the cause of a lot of crashes, as soon as you become distracted you have no room for error to drift into the opposing flow, we would like to separate them. On whole sections of the Pacific Highway we have put down normal paint, separated the centre lines and reduced the shoulder widths - it was better value to reduce the shoulder width and get more width in the centre than to worry about whether the shoulder width had to stay wide or not. So we have actually moved the lines on the road to make the centre lines much wider and basically whatever we could get there we did. That was good - we were getting up to a metre, metre and a half width, massive reduction in crashes and if you made them audio tactile it was even better, we got better results.' (Steve Levett, Disc RTA-RS17, CD Track 12)

Wider centreline to improve safety margin.

The latest advancement in road markers are the Raised Retro-Reflective Pavement Markers, or RRPMs as they are known.

> 'They are a night time treatment. We get cases where we've had people put these things in and never had a night time crash. These are very good, we use them out

west and they work exceedingly well. We have them in different colours, on the left-hand side they are red, on the other side they are white, that is an old thing of red tail lights and white headlights. If you are on a freeway they are yellow because that always used to be the yellow centre line. You see different coloured ones just coming into an interchange, sometimes they are green or blue…They're good in wet weather because they stand proud of the pavement and if you get a film of water over the pavement they will sit above it. Now they are developing a new type that is actually a thermo-plastic blob which seems to work quite well. They have these different elements built into them, ceramic elements and reflective beads. What we have seen of those so far, and they are still being trialled, you can cover them with water and they light up at night with headlights and they just shine. So having water on the road and losing sight of all your pavement and line marking, that is not going to happen with this, it actually gets brighter and it is brighter when it is wet, when the water is over it, than when it is not.' (Steve Levett, Disc RTA-RS17, CD Track 13)

Typical intersection and curve advisory signs

Signage has also improved considerably since early experiments by Steve Levett in Wollongong in the 1980s:

> 'Signs have changed. We always had signs up there to tell people the size of curves. Very useful device for telling people that this curve is a thirty-five kilometre an hour curve, or a sixty-five kilometre an hour curve, and if you are travelling at a hundred you could run into trouble. Those sort of signs have changed over time, the type of the material has changed. We always used to use a sort of yellowy coloured sign with black writing, we have what we call Curve Alignment Markers which are CAMS, they are a large yellow sign with a chevron on it, we have those spaced around a curve to try and give the driver an idea of the sharpness of the curve. Recently we are changing the colours of those and moving more to a fluoro yellow-green. It wasn't to help with night time but daytime delineation. The problem was in certain high shadow areas, where you've got a lot of trees and a lot of shadow and sunlight the yellow and black basically was camouflaged like a tiger's stripes, they disappeared. We knew they were there but you couldn't see them in daytime and we were getting daytime crashes on them. The fluoro don't do that, they stand out. We actually got letters from the truck drivers saying, 'Thank heavens you put those round there, it has changed the whole way we can see the curve now.' (Steve Levett, Disc RTA-RS17, CD Track 6)

With computer technology signs have become interactive:

> 'Variable Message Signs are quite useful. You have static and you have mobile Variable Message Signs, things like "The road is wet, slow down", that's a good one. We've got a lot of systems that we have put up, like on the Pacific Highway, we have these large permanent Variable Message Signs and they are there for incident management as much as anything. If there is a major crash up a highway we will put up signs saying, "You must use this route, go another way." So we use it for incident management as much as anything. When we are not using it for that we will stick road safety signs on, just generic type signs.
>
> In urban areas we've been using variable speed-zoning signs for ages. A lot of it is a bit tricky. I don't know how the algorithms are still working but we tried to set one up in Newcastle where it was so interactive that when the vehicle flow got to a certain level these speeds would actually reduce from eighty to sixty, that was one that we were looking at. That would be fully interactive, so in other words when the number of vehicles crossing over a certain point got high enough the speed would actually slow the vehicles down. We were getting really high numbers of crashes, mainly rear-enders which aren't that bad, but at eighty kilometres are still fairly nasty. We slow them down, they go away.' (Steve Levett, Disc RTA-RS17, CD Track 15)

The technology even lends itself to detecting the length of queues at traffic lights. Graham Brisbane affirms:

> 'In Wollongong there are at least four locations where if the queue gets too long you haven't got a proper sight distance to see the end of the queue. So with detectors in the road when the queue has gone back a hundred metres, the sign will change and say "Queue ahead", lights start flashing and there is a change in the phasing of the traffic signal to get rid of the queue.

Figtree, NSW (Photo supplied by Graham Brisbane)

> Down in Kiama, on the Kiama Bends we have a system that checks whether the road surface is wet, and if the road surface is wet then the advisory curve sign changes from 65 km/h to 55 km/h and lights start flashing. When the road dries out the advisory curve warning drops back to 65 km/h. So you get a dynamic system of doing that. There is a lot of scope to do that with modern technologies.' (Graham Brisbane Disc RTA-RS6, CD Track 12)

Graham Brisbane was involved in the redesign of the existing fog warning variable message signs on the F4 Freeway:

> 'We ended up replacing the whole system down the freeway. We put in twenty-four signs and they all measured the speed of the car in the approach to the sign, they measured the visibility and if the two things were incongruous then the message would come up on the signs. What was clever about the new system was that we then tracked that if a vehicle carried on at that speed it would be in a certain position before it hit the next sign, so if you got a truck doing 40 km/h it would work out how long it would be until it got to the next sign. Then if another car came through at 110 km/h well then hang on, if you come across this truck with a seventy kilometre an hour speed differential you won't be able to stop in time in this visibility, but if you were to travel at 80 km/h instead of 110 km/h then when you come across the 40 km/h truck you will be able to slow down. So we had a system that said your speed was a hundred and five and safer speed would be seventy-five. So it tracked what was going through the system and the network and that was what was clever about it.' (Graham Brisbane Disc RTA-RS6, CD Tracks 10 & 11)

Fog Sign Development Central Workshop (c 1992)

Dynamic Wet Road Warning Sign

Photos supplied by Graham Brisbane

In urban areas the history of traffic control devices is a long and varied one. John Knott observes:

> 'By the 1920s they'd established a system of beacons, safety first beacons, sometimes with sponsorship on them, just a flashing light. If there was no electricity around it would be gas-powered, or an acetylene-powered flashing light to warn motorists or others that this was a place of danger. Street signs, 'Stop', 'Give Way' and so on and the first traffic lights date from the 1930s. There were some experiments with traffic lights earlier on but the real surge in bringing traffic lights to major intersections is in the 1930s.' (John Knott, Disc RTA-RS38, CD Track 6)

The first traffic light in Sydney was installed on the corner of Kent and Market streets in 1933 but in the suburbs there were still very few controlled intersections at the beginning of the 1970s, as Jack McLean recalls:

> 'At that time there were very few traffic signal controlled intersections, traffic lights, major intersections of arterial roads were generally controlled with stop signs. But in residential areas there was no traffic control at all, there were no stop signs, Give Way signs hadn't been thought of and drivers were expected to give way to the right. The situation existed where, if there was a side street intersecting with a major arterial road, legally a driver could come out of the side street without stopping, cross the traffic on the arterial road and if that car that had come out of the side street was on your right you were required to give way to it. Now most people weren't so stupid as to drive straight across an arterial road but some did, occasionally. A greater concern was in residential areas - at four-way intersections we found that many of the crashes we went to were collisions between cars at these intersections and in talking to the drivers we learnt that the drivers familiar with the area would say, 'I was on the main road,' and there was no designation whatsoever which road was main road, but it was on their way home, therefore it was the main road and they couldn't understand why the other driver had driven out in front of them.
>
> We measured the sight distance at these intersections and then measured travelling speeds of cars approaching the intersection, using what seemed as though it was the world's first radar meter, it looked like a very large headlight, and we found that we were able to calculate what we called a safe approach speed. We found that at most of these intersections one had to slow from a speed limit of sixty down to about twenty to thirty kilometres an hour - it was miles per hour in those days, but the equivalent - to be sure that if somebody entered the intersection on your right, travelling at the speed limit, not even speeding, you would be able to avoid a collision. In practice most drivers didn't slow down at all, a safe driver would blow the horn and a really safe driver would blow the horn and slow down to forty-five kilometres per hour, which simply meant that the collision wouldn't be as severe.
>
> We recommended that urban intersections should never be uncontrolled, that is to say never have to rely on the "Give way to the right" rule, and that caused a great deal of angst for some of the very senior traffic engineers in Australia who simply said we were wrong. In a subsequent study of ours we found the same thing again in the mid-1970s and by that time in the state of Victoria the major-minor road system came in, with controls at intersections, and by the late-1970s, even South Australia, where the research had been done moved away from the "Give way to the right" rule. Today it is very exceptional to find an intersection that does not have a stop or give way sign and that has made our roads very much safer.' (Jack McLean, Disc RTA-RS47, CD Track 5)

Roundabouts have also become an important feature in the road environment. Bruce Corben remarks:

> 'Roundabouts were being extensively used in the UK during the 1970s and earlier, and in fact one of the recommendations was greater use of roundabouts where we could. A lot of our evaluations of Black Spot programs that we have undertaken, and there are probably six to eight major studies that we have done over the years, really showed time and time again that roundabouts are the star performers of Black Spot treatments at intersections. Even as recently as last year, travelling to Europe again and visiting a lot of the same countries and organisations, still they remain one of the best ways forward in terms of solving our urban and our rural former problems.' (Bruce Corben, Disc RTA-RS46, CD Track 5)

In urban environments the importance of street lighting can't be underestimated:

> 'Certainly at junctions it is most important. David Andreassen did a study a number of years ago on this. He couldn't find a lot of correlation between just general street lighting and crash reduction but did find so at lighting of intersections, and at any conflict points. Wherever there is a point where vehicles are likely to conflict the lighting was paramount, it really was very, very useful. We don't have it on rural roads, it is of no use to anything, but as soon as you get to an intersection, or somewhere where someone has to make a decision on something the lighting was fantastic and it actually had a big effect on crash reduction, especially where you are more likely to get pedestrians trying to cross the road, that is really important.' (Steve Levett, Disc RTA-RS18, CD Track 4)

The placement of roadside utilities in both urban and rural environments is yet another issue in road safety:

> 'There had been some quite important work that was published in 1979 about the placement of power poles, and it made available some very good scientific methods for predicting the risks of those sorts of structures being hit in traffic. At the time we weren't extensively using barriers in that kind of setting, or in roadside safety in any extensive way. I think we are now seeing, during the 2000s a quite marked shift there and some very encouraging signs. Some of those poles are now being moved - there are examples of that happening and there is more insightful planning, design and placement, but the big picture view is that that still remains one of our single biggest problems, primarily in urban areas, but again, even on rural roads the vast majority of poles are placed in very sort of potentially hazardous locations, so that is one of our big challenges for the future. At the moment the consequences are not particularly felt by the utility companies when something severe happens in terms of collisions with poles and the practice has often been that the poles go back in the same location again. Whilst there have been some improvements, one of the things that is lacking are natural incentives for organisations to behave in a different way.' (Bruce Corben, Disc RTA-RS46, CD Track 6)

Steve Levett emphasizes the importance of Clear Zones:

> 'We have clear zones to try and give a run-off area for a vehicle that leaves the road so that he doesn't hit an object that is going to cause him a lot of grief, usually trees in rural areas. If you leave a road, you are more likely to be killed hitting a tree. If you can come up with a clear zone of, say, five, six metres, it would be great, that's the incremental number. With Incremental Safety it is about five or six metres, really for a hundred kilometre road, or a hundred and ten kilometre road, you need ten, eleven, twelve metres of Clear Zone before you start saying that you are going to get

> a good safety benefit out of it. That's on a freeway and all new Greenfield-type jobs should have that sort of Clear Zone. Trying to retrofit Clear Zones to the existing road network as it sits out there now, the rural road network, is almost impossible. Environmental legislation just doesn't let you go round chopping trees down everywhere so we have to go through a whole lot of hoops to try to get trees removed that are considered to be dangerous. It is difficult in that we have legislation to save trees from people but we haven't got any legislation to save people from trees. Victoria doesn't have that problem, their legislation is much, much more in favour of road safety and saving the person rather than saving the tree - New South Wales doesn't have that.' (Steve Levett, Disc RTA-RS18, CD Track 2)

Perhaps the most effective way of improving a rural road or highway is to turn it into a freeway-standard dual carriageway. Steve Levett explains:

> 'Dual carriageways are designed to a very high design standard. They have had a massive effect in actually reducing crashes. Any crashes that still occurs on it are high speed, it is the nature of the road, but if you give wide enough Clear Zones, if you get good enough barriers, like wire rope and things like that, if people do make mistakes, go off, drift off to sleep, they hit something that isn't going to kill them. When they do have a crash the idea is that the crash is of a less severe outcome.' (Steve Levett, Disc RTA-RS18, CD Track 2)

David Saffron adds his final comments on road design:

> 'There are a lot of ways you can improve the roads and it does seem to have a big effect. The improvements on the Pacific Highway have had a really strong effect on improving safety and they probably had a stronger effect than I would have expected, I would suggest that it would compete with a lot of the behavioural programs. Road improvements cost a lot, whereas an education campaign, or whatever, can cost relatively little compared with those sorts of things but the improvements on the road will last for a long time, so you need to do the benefit-cost analysis on those things over the life of the effect.' (David Saffron, Disc RTA-RS37, CD Track 14)

'Safety is a mission,
not an intermission.'

- ORIGIN UNKNOWN

Road Safety Audits

A European practice introduced in Australia in 1990, road safety audits have helped to identify and rectify issues of concern and have since become one of the major tools in the safety management of the road environment. Peter Croft organised what turned out to be a seminal conference in Wollongong in 1990:

> 'The motivation for it in the first place was to pull together people in various Australian jurisdictions and in New Zealand who had been working away in this area with a view to providing some sort of, almost training. In terms of how to go about looking at crash investigations, what the approaches should be, the sort of statistical tools we might use to try and evaluate some of this material, in other words managing safety in the road environment was the theme, I suppose. We sought some support from quite a number of quarters, I remember the Volvo company was involved at the time, not that there was a strong vehicle focus in that particular conference but certainly I think the Swedes were moving ahead in terms of their whole approach to road safety. For whatever reason Volvo became involved, which was good because they provided a keynote speaker to the conference and he was held in pretty high regard.
>
> We also sought input from colleagues in the UK, Barbara Sabey was one, and still is, the doyennes of road safety in the UK, she managed the Transport Research Laboratories Road Safety Area for many years and is highly regarded worldwide. She had visited New Zealand and Australia on many occasions and through her we sought some input from practitioners in the UK. As it turned out she came out and two engineers from counties, I think Essex and Cambridge were the ones involved, they came out and they gave us a run-down on the approach they were taking in the UK on managing safety in the road environment. One of the features they were talking about was the development of this process called Road Safety Audit, it was something we'd heard a bit about it, we knew the Brits were doing something about it, so we were able to sort of hear first hand the issues that they dealt with in developing this and we decided eventually to pursue that ourselves. So one of the outcomes of that conference was the establishment of an approach to Road Safety Audit for New South Wales. I think the other outcome was in terms of connection between the various people and the various jurisdictions who are working in this area, just the networking. It was the first time for many, many years that people in this area had got together and I think the relationships forged in those few days in Wollongong exist today.
>
> It has become one of the major tools in management of safety in the road environment. I remember my Director at the time, Harry Camkin, said, 'What do you know about this Road Safety Audit approach?' and I told him what I knew, which didn't take long, and he said, 'I think we should have that approach in New South Wales, what do you think?' and I said, 'I think it would be a good idea.' He said, 'I will give you a year to get something worked up so that we can do something here.' Thirteen months later, I must admit, we had an approach sketched out. We had a Guideline Manual, the initial one, to give some guidance to people who wanted to approach this, but in the interim we had gone through a lot of discussion and pain and argument and development about the process.
>
> It was seen by some people as a bit of a threat to their professionalism in that it is a checking procedure and we managed through dint of demonstration programs and

> picking up on what the Brits and the New Zealanders were doing, also the Victorians, who were active in that at the same time, we were able to demonstrate some worthwhile potential outcomes. There were no data at this stage, just a lot of faith involved but we were able to win the day, I think, turn some of the sceptics into advocates, and it went on from there. That was in 1991, when we produced the first approach to that and it has developed significantly since then. There was a major review in 1995 and another one, I think, about five years after that. It is one of the major tools, along with crash investigation and the production of good technical guidelines, those three pillars really underpin the approach to the management of safety in the road environment.' (Peter Croft, Disc RTA-RS11, Tracks 1 & 2)

Graham Brisbane championed their way into practice:

> 'It is an audit of a piece road to be built, being built, being designed, against an implied safety condition. I won't say standard, because there are situations where a safety audit will identify issues that are not necessarily outside the standard but still could be improved upon for safety reasons. You have a checklist of things: is the guardrail in the right place, are the curves not in certain radii, have we got a good friction resistance on the road, is the vegetation going to block sight distance over time, things like that. That is a typical example, you plant a tree and there are no guidelines to say you can't plant a certain tree, but if you look at the road and, say, you've got an important sign here that says there are traffic lights over the crest and then you put a tree next to it where the vegetation is going to hide it - why not plant the tree somewhere else? A Road Safety Audit can pick things like that up as they happen over time. So there is a checklist of things and it happens at different stages of the job. It happens when it is just an idea, when the design is being done, when the design is finished, when the road is about to be opened. You have a fifth stage of an existing road. We also introduced what we called Thematic Audits on a certain theme. You might go and look at ten sets of traffic signals, a guardrail along the road, or the signage along a road, so you might pick a theme to go out and look at. You could do a thematic audit on pedestrian crossings in Wollongong and you would go along and you would make sure that the parking is set back far enough and the appropriate signage is installed and there are zigzags if it is over a crest, and issues like that.' (Graham Brisbane, Disc RTA-RS7, Tracks 6 & 7)

Chris Ford stipulates:

> 'The audits themselves have now gone to a far more sophisticated level whereby auditors are in fact rated, there is an accreditation, a pre-qualification for road safety audits. The initial audits, by comparison, were undertaken by people who were not as well-trained, or as well-versed in the effectiveness of different road environment safety countermeasures, so I am pleased to see that the level of professionalism in the audits has increased significantly. My involvement in road safety audits initially was the introduction of Brifen wire fencing and later we extended the Brifen wire on the motorways. There are a whole series of countermeasures that came up as a result of the road safety audit process, so as a methodology it actually was instrumental in making a significant number of changes along sections of roads which had a poor crash history. Barriers, median traffic engineering improvements, speed limits, delineation, lighting, a variety of things, so as a road safety countermeasure device they are invaluable.' (Chris Ford, Disc RTA-RS49, CD Track 11)

'Too often, road safety is treated as a transportation issue… too many countries put far less effort into understanding and preventing road traffic injuries than they do into understanding and preventing diseases that do less harm.'

- DR JONG-WOOK LEE, DIRECTOR-GENERAL, WHO, 2004

The vehicle

How safe is a vehicle? The answer to that question has long intrigued the public, car dealers, advertisers and road safety practitioners. Some of the early findings on vehicle safety date back to Hugh de Haven in the 1950s who established the Automotive Crash Injury Research Center as part of Cornell University Medical College in New York. Jack McLean takes up the story:

> 'One of the first things, and in many ways the most important thing they discovered was that if you got ejected from the car, the risk of serious or fatal injury was increased greatly. They were able to show that most people were ejected because the doors came open. At that time in the early to mid-1950s the door latch on a car door was just like the latch on a house door and if the body structure of the car was distorted or deformed in the crash the doors just popped open. So quite a minor change was made to car door latches by including - the term is *longitudinal restraint* - but it meant that if the body of the car did distort and try to pull away from the door itself the door latch was designed to resist this. In the 1956 model year all of the major car manufacturers in the United States changed their door latches and this has proved to be probably one of the major public health reforms of all time. It was hugely important, but an almost trivial change in car design.' (Jack McLean, Disc RTA-RS47 CD Track 6)

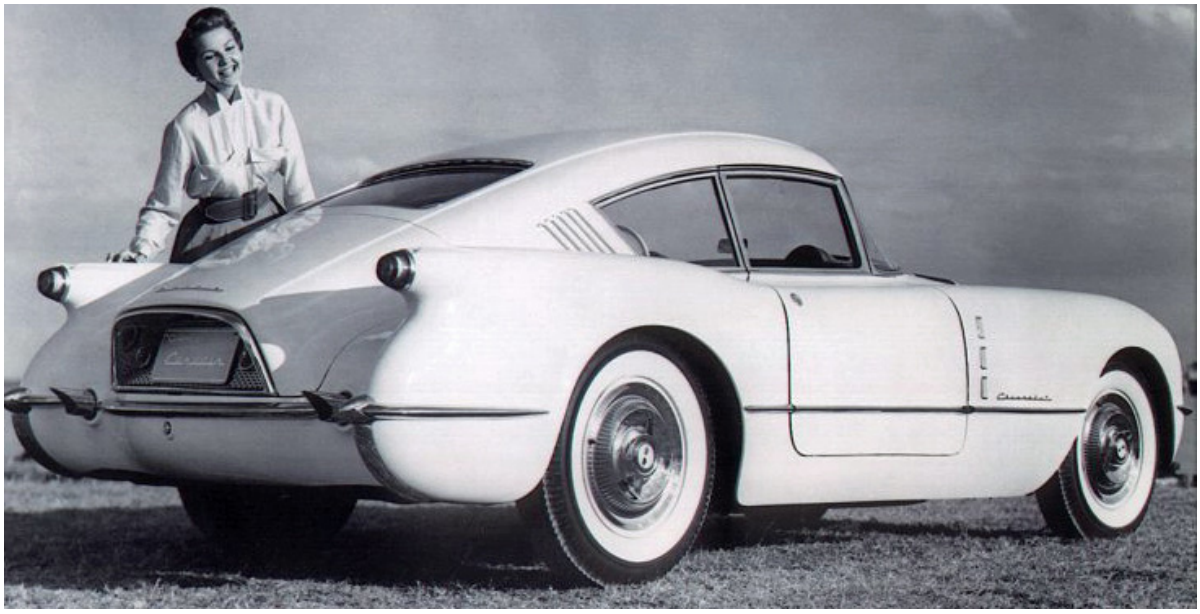
Bruce Dowdell thinks back to the cars of the 1960s:

> 'They had very few, if any, safety features. You could be in a situation where you could run into a curb in a reasonably low speed accident and die because the steering column was a solid column that would be forced backwards into the driver. The knobs on the dashboard might be made of hard material, so that if you hit your head on the knob you could die in a relatively insignificant accident. The capsule that contained the occupants wasn't as strong as it is in current vehicles. That capsule could quite easily be broken and the bonnet could come open and be driven back through the windscreen into the front seat passengers. The whole structure the occupants were in crumpled ahead of other parts of the car, so there was just no consideration at all of the car as a system to protect its occupants.' (Bruce Dowdell, Disc RTA-RS25, CD Track 2)

One of the seminal events in road safety occurred in the US in 1964 with the publication of *Unsafe at Any Speed,* a book by the consumer activist, Ralph Nader. Jack McLean recalls:

> 'Well, from my point of view I would never have ended up in the United States if he hadn't written that book. What happened was: he criticised a particular car made by General Motors, the Corvair, and by coincidence at about that time the US Congress had appointed a committee to consider whether the then United States government should get into the road safety area, which they did eventually, not long after, with the National Highway Traffic Safety Administration. The Congressional committee, which was chaired by Abraham Ribicoff from Connecticut and had Bobby Kennedy as a member called witnesses and Nader was a witness.
>
> It had become obvious that somebody was trying to collect information that could have been used to blackmail Nader: glamorous blondes were coming up to him in the drug store, saying they had just moved into the area and could he help move their furniture, and James Roach, the President of General Motors appeared before the committee and was asked did he know anything about putting a tail, as they say, on Nader and he indignantly denied it. The next day he asked for permission to appear

> again before the committee and said to his dismay he found that General Motors had hired a detective agency. Now this resulted in Congress voting to establish what became the National Highway Traffic Safety Administration, with fewer dissenting votes than any bill put before Congress, other than the decision to declare war on Japan after Pearl Harbour, so if the car industry, or General Motors hadn't misbehaved life could have been quite different.' (Jack McLean, Disc RTA-RS47 CD Track 7)



Corvair 1954 model

As a result of the book and a subsequent visit by Ralph Nader to Australia in the mid-1960s the Commonwealth Department of Transport established a committee to formulate safety standards for new cars. Michael Paine remembers:

> 'At that time the Australian Design Rules started to be developed, they were innovative, they were world first requirements for safety features on vehicles in some cases. I was very privileged to work with some of the people who were implementing those new design rules at the time.' (Michael Paine, Disc RTA-RS16, CD Track 2)

In an interesting quirk of history Don Wait, an Australian Automotive Engineer and Head of the School of Vehicle Trades at Sydney Technical College in 1966 built a car with many of the safety features presently offered in modern cars. He converted a 1965 XP Ford Fairmont and with his students in 1967 rolled out a car fitted with retractable three-point seatbelts, anti-whiplash head supports, a laminated foam dash, a roll bar, secondary door locks, four way flashers, reflective number plates and a deflector to slide the engine under the firewall in a head-on crash, rather than back in the cabin. He called it the "Australian Survival Car". He and a co-driver managed to drive the car from Pakistan to England in a rally. Then on an 15,000 kilometre return journey they crossed the channel by ferry to Calais and from there back to Sydney. In all, the 'Survival Car' managed to clock up 27,400 kilometres. The car did not survive the years but Don Wait is now 90. Sadly, when he returned to Australia there was no interest in the car as road safety had not yet caught the public imagination. (From *Too far ahead of its time,* article by Terry Smyth in Sydney Morning Herald 'Drive Life' section, 23 October 2009.)

In the TARU days of the 1970s Michael Henderson and his team had set up a crash sled at Rosebery to test vehicle components under crash conditions. The sled could only test part of a car, but not a full car running on its wheels, so it had its limitations. By the 1990s a proper crash barrier was needed . Michael Griffiths was at the heart of trying to obtain this vital piece of test equipment:

> 'A crash barrier is where a full car comes in on its own wheels and can go through all sorts of different crash configurations, it might be into a concrete barrier, or a pole, or whatever. With the research we'd done we'd identified areas where we wanted to make mandatory improvements in vehicle safety equipment in Australia but the states which used to have the power to rule make individually had all ceded their powers to the federal government and so we couldn't do it through unique rule making any more. Once upon a time a state could do something on its own and then the other states would have to make their own mind up whether they followed. Like with unleaded petrol, New South Wales just got sick and tired of waiting for federal action so it just said, 'Any new vehicle sold in New South Wales from this date onwards is going to have to have unleaded petrol,' so that just forced the issue.
>
> Now some time later the states ceded their powers to the Commonwealth to make rules uniquely and what we found is that we really it didn't matter how hard we knocked on the door, we just couldn't get much done in terms of changing the Australian Design Rules. At the same time we knew that vehicles were being sold in Europe and US with airbags and additional safety features that we weren't seeing on cars which came to Australia. The feedback I got from the then Federal Officer, Road Safety was that they weren't going to rule-make. So I went to a conference in Washington, the US Department of Transportation, where the US Department of Transportation is located, and I went and spoke to their Deputy Director who was in charge of their research and development area, a guy called Michael Finkelstein, and discussed this with him. He said that they would work with us and we set up a deal where some of the senior people from his organisation would come over and spend time with us.
>
> The arrangement was that NHTSA, US Department of Transportation paid their salaries and we paid for them to come out here. After a short time what they said was that they thought we needed the same program they had. They'd had a problem with rule-making too so they introduced a consumer crash test program which was called NCAP, New Car Assessment Program. They figured that the only way we were going to get airbags and all sorts of safety enhancements in Australia was if we had a similar program. They were motivated to assist us to get our own NCAP program because at the time they had the only consumer crash test program in the world that was government funded and organised and they were always under threat from Congress to have their funding taken away. They'd get a strong car manufacturer lobbying and they'd lobby their senators in Congress and the program was always under threat - if they could get an NCAP running in another country like Australia, then their program was going to be much more secure.
>
> So they then gave us further assistance by way of loaning us crash test dummies and various bits of equipment and from that we learnt enough to know that we really did need an NCAP program. But to do an NCAP program we needed a crash barrier. It was going to cost quite a few million dollars to build a crash barrier and to run an NCAP program means you've got to buy brand new cars and prepare them and put crash dummies in them, and that is quite a few million dollars each year as well. So I waited until my boss went on leave and went and saw Bernard Fisk, who was the Chief Executive Officer of the RTA at the time, and he really strongly believed in

delegated authority. I put my proposal to him and at the end of my discussion with him he said, "Okay, that's approved," and I suppose I had been in his office for twenty or thirty minutes. I walked out and I said to his secretary, "He has just said it is approved, what does that mean?" She said, "You put it in your budget and you do it." That was amazing.' (Michael Griffiths, Disc RTA-RS14, CD Tracks 10 & 11)

'It's better to be a minute late than 'the late'.

- SOURCE UNKNOWN

Crashlab and the birth of ANCAP

The reaction by the car manufacturers to the announcement of the establishment of a test facility to test their products and the news of a New Car Assessment Program was mixed:

> 'The car manufacturers had continually told us they would love to improve the safety of cars but safety doesn't sell, so what could they do? We thought we would test that idea and see if safety did sell. So we developed the New Car Assessment Program where the concept is that you crash test a car, you publish the results; if safety doesn't sell nobody ever reads the results of the test. If safety does sell the manufacturers change their cars so they get better test results and it was interesting, we discovered that safety does sell.' (Bruce Dowdell, Disc RTA-RS25, CD Track 8)

> 'Some car manufacturers just did denial, they didn't really believe it was happening. Others said we didn't know what we were doing and they were, I think, pretty confident that we would fail technically in our ability to set up a workable crash test facility. I think we had a meeting in Canberra, or somewhere or other, and they were carrying on as though they didn't believe it was all happening. We scheduled the next meeting in Sydney and I remember we walked over with these guys, and they just looked around this building and they saw the track, they saw the barrier, they saw the lights, they saw the cameras and I could see some of their faces just dropping because they really didn't think we'd get there. Even when we had it operational General Motors Holden decided to test us and got us to do some calibrations on test dummies ourselves, I think, with their aim being to show that we didn't know how to calibrate dummies. Anyway, we couldn't calibrate their dummies so they flew in two of their top dummy guys from the US and their mission, as we understood it, was to document how little we knew. They spent a few days with us and at the end of the time they turned to the local GM guys and said, "Where did you get these dummies from, they are made out of left over bits and pieces, no wonder they won't calibrate" and they gave us full marks, so that was good.' (Michael Griffiths, Disc RTA-RS14, CD Track 11)

The testing facility soon got its name: Crashlab, and using Australian ingenuity a few advances were made in the design of monitoring equipment as Bruce Dowdell recalls:

> 'We developed a system based on PCs that could give you the results of the test straight away, compared to in the States – if you did a test you would have to wait a day for the results to come back. So if you missed something that's a day lost. We had a very elegant low-cost solution to that problem and much of the work on that was developed by a company in Kensington who did no work in the automotive industry but had some very clever people who were able to take proprietary hardware for PCs and add some little twists to the software so it could record about 1,000 samples per second over 16 or 32 data channels and store all that information for later, capture it. That was a world first at that time.' (Bruce Dowdell, Disc RTA-RS25, CD Track 10)

Bruce Dowdell gives an account of the vision for Crashlab:

> 'The whole vision was to make it a centre of excellence in biomedical research to link the crash impact work with an understanding of how the human body reacts to those impacts. That was why the crash barrier was such an important component of that vision because that would allow us to test the vehicle as a complete system instead of testing a seat belt, and a collapsing steering column and all those separate

> bits, we could test the whole thing and have in a vehicle a dummy that was representative of a human being. We could measure what happened to that dummy and we could say whether the dummy lived or died, or was injured, depending on the readings we got off the instruments. So on the dummies we would measure the accelerations in the head because that's what determines how your brain reacts and how it can be injured. We measure the accelerations in the chest, but more particularly the compression of the chest and we could measure the forces in the thighs because if you slide forward and your knees hit the dash, that measures the forces there.' (Bruce Dowdell, Disc RTA-RS25, CD Track 11)

Bruce Dowdell was tasked with the construction of the new test facility:

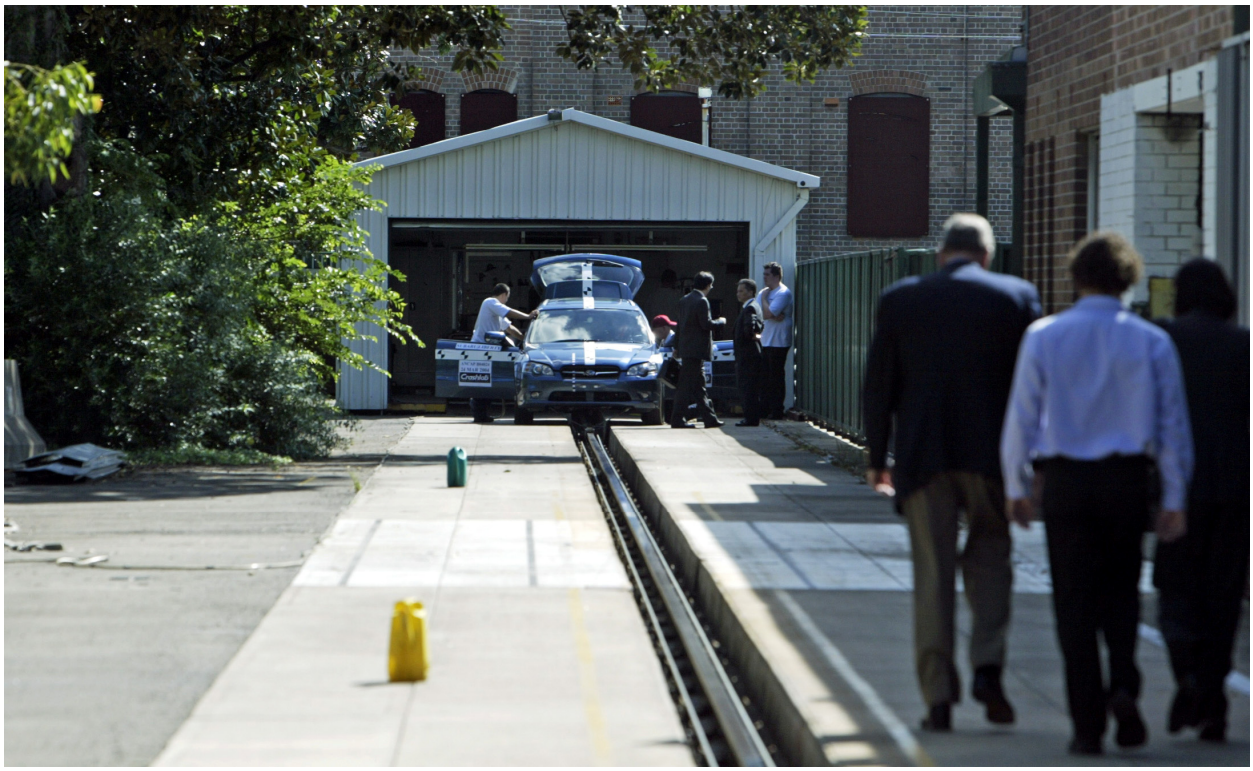
> 'I was the Project Manager for the construction of our first crash test facility. That facility grew out of a recognition by us that the way that vehicle manufacturers design cars was to publish the crash test results, so it had a strong strategic foundation. I also travelled overseas to see how people ran their laboratories overseas and to get ideas for the design of that facility, as well as a range of other things and it was an extremely interesting trip because I went, among other places to General Motors in Detroit. I saw their research and testing facility, where they tested the production cars and as I was driving around I was thinking "Why are we wasting our time when there is this enormous organisation with these huge facilities, why are we looking at doing something extra?" But as I looked and thought about it more, their facilities really typified their approach. It was very much a case of throw a lot of people, throw a lot of money, a lot of resources but maybe not get to the real nub of the problem. You know, I was driving around in a General Motors car with a seat I couldn't sit comfortably in and I thought that we at least had that focus, we know what we want to achieve and we can focus our much more limited resources to get quite good outcomes. And that view was reinforced when I went to Sweden as part of that same trip. I talked to the people in Sweden and looked at their crash test facilities and they were just beautifully elegant engineering designs, minimal material, maximum effect and I tried to incorporate a lot of that into the design of Crashlab. It's very much closer to that minimal Swedish approach than the American approach.' (Bruce Dowdell, Disc RTA-R25, CD Track 10)

Before building the new facility it was decided that some crash test experience was needed. Ross Dal Nevo has been associated with Crashlab since 1993 and is now Crashlab's Manager:

> 'Our first-ever crash test with dummies, data acquisition and high-speed cameras was conducted effectively in a paddock out at Homebush and we improvised a crash barrier by stacking together quite a few concrete Jersey barriers and we ran our first crash test. The result of that test was: whilst we were very successful in getting the vehicle to crash into the barrier at the correct speed we did have some teething problems with the data acquisition system. It was a very successful result in that we achieved the crashing of the car and managed to gather most of the electronic data and high-speed film but it really highlighted to us the complexity of trying to co-ordinate so many processes - the acquisition of data, the running of the vehicle, the running of the high-speed cameras, the co-ordination between all the staff, the safety issues obviously were of paramount importance. So we went from no experience at all to an incredible amount of experience in a very short time.' (Ross Dal Nevo, Disc RTA-RS20, CD Track 15)

The first official series of ANCAP tests were held in 1992 and the response by the vehicle manufacturers was loud and clear:

'We had to withstand the barrage of outrage from the manufacturers when the first test results were published and they said, "This cannot be true, these are one-off tests, this whole program is pointless." (Bruce Dowdell, Disc RTA-RS25, CD Track 8)



Crash test being prepared, Crashlab, Rosebery, early 2000s

'The manufacturers refused to accept that Crashlab was an adequate scientific test because it was a single sample and to some extent they had a reasonable case. You crash a car but if the car has only got one person in it that person wouldn't have died because of where they were sitting, and things like that, and a lot of it is an aggregation of circumstances, so they refused to use Crashlab ratings in their advertising. As soon as one of the cars got a five-star rating that disappeared and it started becoming an advertisement, "This is a five star car!" (Graham Brisbane, Disc RTA-RS6, CD Track 13)

'Car manufacturers perceived that a time would come when the buying public would really make safety a priority in their purchase and they figured it was a potential marketing tool, so they then committed to developing vehicles that would do well in the test. So what they would do before their vehicle was even released to the market, they would do the equivalent of our tests on their vehicle and develop them until they did well.' (Michael Griffiths, Disc RTA-RS14, CD Track 13)

'One of the outcomes of the first series of ANCAP tests done in 1992, and these were the full frontal crash tests - at the time we did this in conjunction with US NCAP where they provided some technical support and advice. Their conclusion was that the performance level that we were seeing in 1992 was similar to what they were seeing in 1978 when they did their first crash test program, so basically it appeared that the Australian vehicle fleet back in 1992 was somewhere around fifteen years behind the current US fleet. In terms of safety the results indicated that you were at least two to three times more likely to have been killed in an Australian

vehicle than you would have in an equal, or current model US vehicle. That first program certainly established the base line of where the Australian fleet was and the fact that it really needed to catch up, and catch up quickly to the level of vehicle safety performance that was available in the US and Europe at the time.' (Ross Dal Nevo, Disc RTA-RS20, CD Track 1)

And catch up they did. Michael Paine confirms:

'We have seen Australian-made cars go from three stars in 1999 to four stars in about 2003 and last year, 2008, we had our first two cars to five stars, very satisfying for us and very satisfying for the safety engineers, who had been working that way for probably ten years to get to that point.' (Michael Paine, Disc RTA-RS16, CD Track 10)

'Until 2004 the manufacturers had largely and actively resisted using ANCAP safety ratings to promote their cars. This all changed when Subaru offered a vehicle to Ross Dal Nevo and Crashlab. We got all the key media to Crashlab for a demonstration test. The Subaru achieved 5 stars, the media coverage was huge, and Subaru started using their great ANCAP rating in their ads. The 'no ANCAP in ads' deal was broken forever, and since then many car makers have used ANCAP ratings as the key feature in their ads.' (Soames Job, 2010 update)

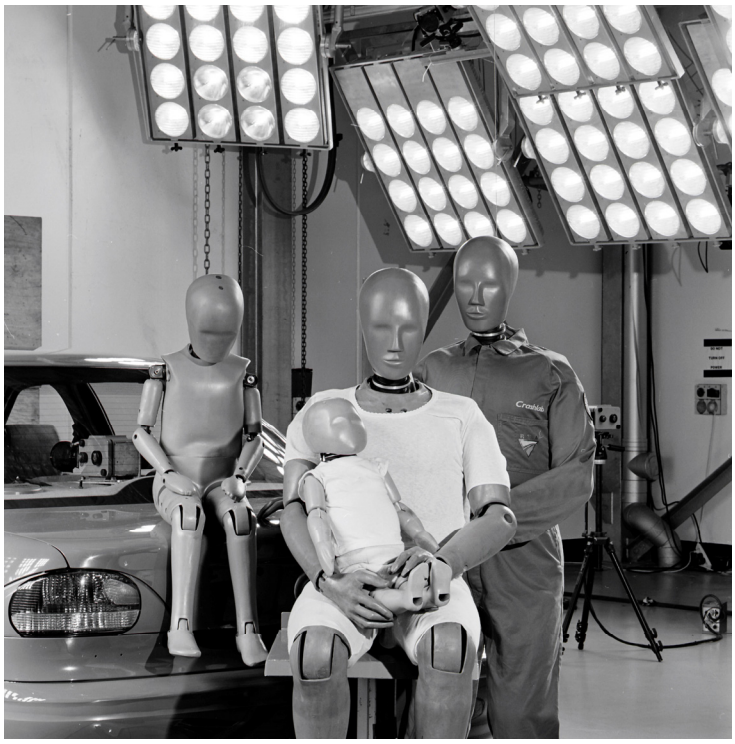
Ross Dal Nevo with crash test outcomes at 100 km/h and 60 km/h

Ross Dal Nevo gives an account of the kind of test dummies that are required to carry out the Crashlab tests:

'What we needed were dummies that could tell us what the restraint system, the seat belt, the steering wheel, the steering column, was doing to the occupant, so you actually need an anthropomorphic dummy which has the physical characteristics of a person but can also translate forces and accelerations into what will be an injury. The joints of the dummies share, or mimic the same articulation as a human being so joints will only bend as far as they will on a human. All the limbs have the correct

weight distribution and centre of gravity. The dummy, for all intents and purposes is mimicking a person in terms of how a relaxed person would interact with the interior of the vehicle. The big difference is that the dummies have steel bones and metal chassis so you certainly won't break a bone the way it might break in a human. We have what we call transducers, or instruments that measure the forces and accelerations. Whilst we don't actually have the dummy breaking its leg in a crash test it will record the forces that the leg was subjected to and then from other laboratory experimental data that has been established over the years you can determine the likelihood as to what injury that magnitude of force would create.

Predominantly there are two styles of crash test dummy. There is a full frontal dummy, which we usually refer to as the Hybrid Series, or the Hybrid III family, and there is a specialised version of that dummy which is a side impact dummy, referred to as a SID. They are designed to be human-like in their response to either forward or side impacts. Obviously it is very desirable to have a dummy that could do both, but the practicality is that there tend to be two families. Now these dummies range from small females, which we refer to as a fifth percentile female, someone whom only five per cent of the female population would be smaller than, all the way up to a ninety-fifth percentile male, who basically represents the size of person where only five per cent of the male population is larger. The fifth percentile female weighs approximately fifty kilos, the ninety-fifth percentile male weights approximately a hundred and one kilos. Now the common dummy though is the fiftieth percentile, or 'Mr Average' and the weight varies around seventy-eight kilograms. The cost of a basic crash test dummy without all the instruments installed, just the physical dummy itself: you are looking at around fifty to sixty thousand dollars US, so given the exchange rate you are looking at least a hundred thousand dollars by the time it is delivered in Australia. Then once we start introducing the load cells and sensors to measure acceleration and forces typically a crash test dummy would start around a hundred and fifty thousand dollars. Our more sophisticated side impact dummies would be getting closer to a couple of hundred thousand dollars per dummy.' (Ross Dal Nevo, Disc RTA-RS20, CD Tracks 6, 7 & 8)



Crash barrier test at Crashlab's Huntingwood facility

Safety harness test

Preparing a crash test dummy

Child dummy testing, Crashlab

Since Crashlab began testing in 1992 it has tested trucks, buses and other heavy vehicles, car seats, helmets, seatbelts, airbags, child restraints, barriers, wire rope, guard rails, light poles and cars in full frontal, side impact and offset configurations. In so doing they have set some new benchmarks:

> 'To give Michael Griffiths credit he introduced the first frontal offset crash test of any NCAP program around the world. He saw that a European committee was developing this offset crash test and were finding significant problems with the structure of vehicles and they way they coped with this type of test and so he convinced the Australian ANCAP to introduce this test in 1994. It was another two or three years before other NCAPs introduced it. That has probably been ANCAP's most influence on vehicle design because it meant the passenger compartment had to be built stronger, the foot well and pedals had to be designed so they didn't intrude, the same with the steering wheel - it had to be designed so that it intruded less. It is very demanding on the driver's side of the vehicle.' (Michael Paine, Disc RTA-RS16, CD Track 12)

Bus and truck test crash at Crashlab facility

Important work was also done on side impact testing as Graham Brisbane indicates:

> 'The side impact test was a standard vehicle that hit the side of another vehicle. There was a machine that pulled it in at a certain speed so it hit this vehicle and the idea was to see what effect it had on the driver and the driver's seat, which is a pretty standard test. It certainly measured the effect at an intersection where someone just ran the intersection and hit your side. The problem was in the late 1990s, early 2000s, four-wheel drives became more the norm, particularly in cities, for some strange reason, and soon everyone needed a four-wheel drive, which to my social conscience becomes a bit of the rich buying safety at the expense of the poor. They are safe if they are hit, but they do a lot more damage if they hit other people. The point about the Crashlab was that the test of this other car coming into its side - there was no damage to the driver because the vehicle hit below the driver's feet in the bottom area. So we had to come up with something that reflected what happened to these four-wheel drive vehicles in a more real world sense because the majority of side impact accidents is where a vehicle loses control and rolls over, or hits the side of a pole, or a tree, or something like that. So we developed a test that had the vehicle moving into the object, instead of the object moving into the vehicle and that produced quite different results and I'm sure hastened the introduction of, first of all side airbags down at the body level, and then later on curtain airbags up at the head level. I am sure that test has had a dramatic effect because if these vehicles are meeting five stars now they must be having adequate side protection, which they didn't have back in the early 2000s.
>
> We homogenised the tests so that we have some standard basis to do things on back in the 2000s, particularly with Euro NCAP, to a lesser extent with Japan NCAP and not at all with American NCAP. If the model was the same model we could do the

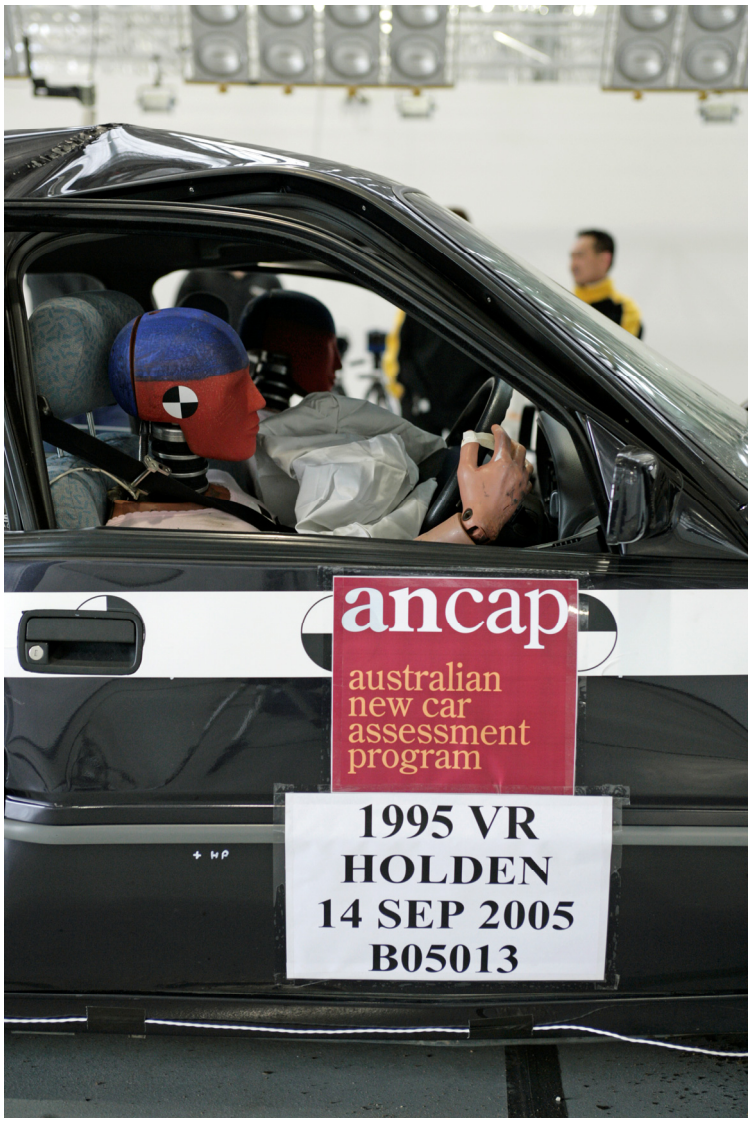
test. The Honda Civic - airbags were built into their cars in Europe, they were an option in New Zealand and they were taken out in Australia. They actually physically removed them from Australian cars because they said, "There is no market for them yet and we respond to the market," so the results were not reproducible, had they had airbags in the Australian cars the results would have been. A lot of the Swedish and German cars have safety features that are now available in the Australian cars, like the Mercedes. Like you'd expect it is the high end cars that get the safety features first, it takes a long time before they get down to the bottom level, but I'm pretty sure in Australia now every car has at least a driver's airbag and I'm pretty sure two airbags. (Graham Brisbane, Disc RTA-RS7, CD Track 4)

Side impact tests

ANCAP testing at different impact speeds, 2005

Are Australian testing standards higher than the European standard?

> 'No, the test standard is the same. The design standard has changed slightly, Australian design laws aren't necessarily the same as European design laws. I read a story, I believe it to be correct, where China developed a car and marketed it in Europe and it went to Euro NCAP for testing and it was the first car ever to get a nought star rating. Met all the European design standards for building vehicles and went to the crash testing and it got a nought star rating. They had never had a vehicle before that had that. I believe the new three thousand dollar car in India would go nowhere near meeting our design standards but they are introducing it in India. When you look at the safety of this car, that is little more than a shoebox with an engine, compared with the safety of four people sitting on a scooter the question is open as to which is safest. I'm sure they will get safer but one has to look at the societal impacts as well. It is very nice to say everything should be five star, but again, if you do that then that makes the cars dearer, then the poor people won't buy new cars and will drive older cars and they will be driving less safe cars for longer. So there is a fine balance between what you can force into a car and the economics of the society that gets those cars into the real world.' (Graham Brisbane, Disc RTA-RS7, CD Track 4)



The knowledge gained from conducting tests at Crashlab was shared with others around the world:

> 'When it was part of a cooperative program it was all leading edge work and that approach actually continued in some of the side impact work where we were working with the Europeans and the Americans in cooperative programs that led towards the development of the European standards for side crash tests and that then meant that when we in Australia adopted that standard it had some of our input. That was our preferred approach, to try and engage with the people who developed the overseas standards because we're a standard taker, we're not in position with the size of our car industry to drive big changes to standards.' (Bruce Dowdell, Disc RTA-RS25, CD Track 14)

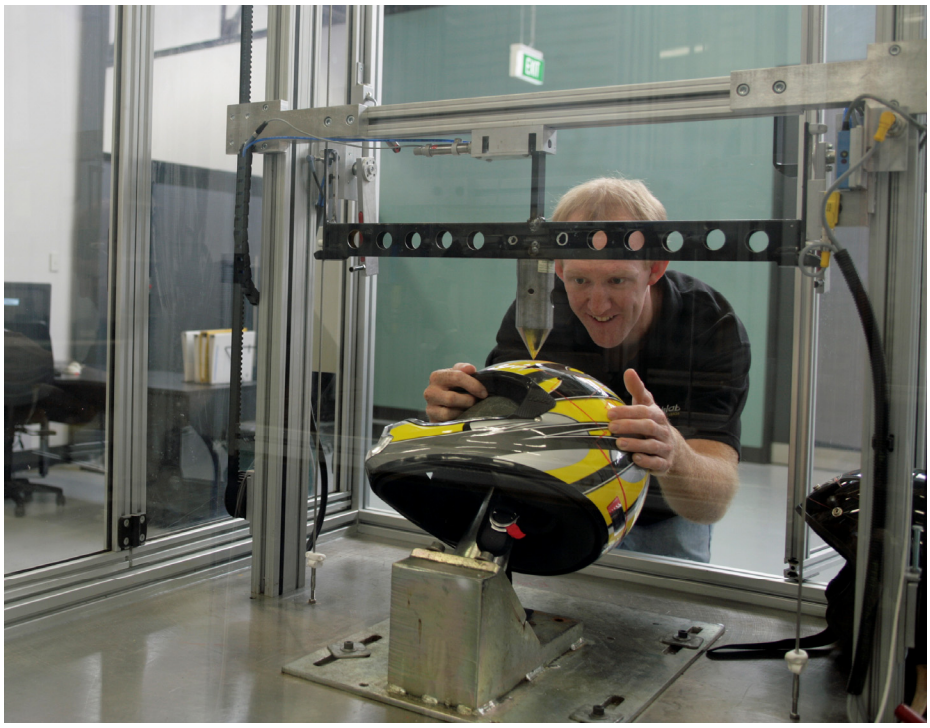
In 2005 Crashlab moved from Rosebery to a brand new world-class facility at Huntingwood, west of Sydney. Ross Dal Nevo elaborates:

> 'The new facility at Huntingwood was completed in mid-2005 and basically it consolidates all of the activities that Crashlab had undertaken up until that time and brought them all on to the one site. We've got a fully enclosed new crash barrier and runway, we've got two hundred metres of runway, we've got a movable crash barrier, 110 tonnes of steel and concrete which locks down to the building

foundations, that is what we would normally be crashing cars into, in a fully enclosed weatherproof environment, but if we need to crash two cars head-on we can move the crash barrier out of the way. It automatically detaches itself from the floor, picks itself up and walks across the room. It opens the facility up, allows us to test vehicles in head-on configuration.

We can run vehicles the full length of the runway out onto a big open area at the back, which is approximately a hectare of paved surface, so we can crash cars all the way up to eight tonne trucks into guardrail, wire rope, sign structures. The facility is very versatile in that we can do, I guess, the more traditional vehicle crash testing for ANCAP evaluation, for certification purposes, or we can run vehicles together, two four-wheel drives, we can smash them head-on for research purposes or we can run anything up to an eight-tonne truck at eighty kilometres an hour into roadside furniture. We also have the laboratory, which still incorporates our sled from Rosebery, which has conducted many thousands, probably tens of thousands of tests on child restraints, seat belts, bus seats, wheelchair occupant restraint systems. When you use taxis the system that locks the wheelchairs down, we test those, ferry seats, aircraft seats, motorcycle helmets, a whole array of safety equipment is tested in the laboratory area of the new facility.

We are currently running a series of tests to evaluate how different size vehicles interact with the various roadside barriers. This is the first time that they have been tested in Australia. The most recent one of those was an eight-tonne truck into a steel, or metal guardrail configuration and the truck proved too much of a challenge for the guardrail. It is an important test in establishing limits and once the RTA has a clear understanding of the limits we can then ensure that all guidelines are reviewed along that basis, so what we can see, or what we do in the laboratory can be translated into a safer system on the road. We deliberately push the limits, sometimes you can learn a lot more from a spectacular failure than you do from a successful test.' (Ross Dal Nevo, Disc RTA-RS20, CD Tracks 4-6)



Helmet testing at Crashlab

Crashlab's new facility at Huntingwood, opened in 2005

Crashlab pole crash test, Schofields, June 2000

Ross Dal Nevo sums up Crashlab's achievements:

> 'The achievements are numerous but the importance of the Crashlab is basically that it is there for road safety. It is there to support road safety from the technical sense, but also, what it does, it is there to assist industry as well. One of the arguments that we encountered early on in the piece, when we were looking at building a crash barrier, the local industry took the approach that, "Look, the Australian market is a fairly small and unique market place, if we impose all these crash test requirements and things on cars in Australia that apply to much larger markets, such as the US and Europe, you'll quite simply send us all broke." It is probably a very valid argument so the approach wasn't to impose requirements on the local industry, that would just make them uncompetitive, but by building a crash barrier, by enhancing the Crashlab capability it took away the argument that Australia is too small, the market place is too small, it is not feasible for us to do this testing, because the RTA made it

> perfectly clear that the facility would be available for all manufacturers, so there is no need for a car manufacturer in Australia to replicate the Crashlab because the government makes the Crashlab available to industry - admittedly on a commercial basis because of the sizeable investment.
>
> I think the important achievement of Crashlab really has been a change in attitude and the fact that it has allowed the policy makers to keep pushing forward, because whilst it is pushing forward in terms of policy and safety it is saying, "We are also here to assist, we are not trying to push anyone over the edge but we are all trying to move forward together." I think that the Crashlab has been very successful in doing that, we've worked very closely with several of the local car manufacturers. In the laboratory we're typically dealing with sixty to seventy clients, crossing the range of child restraints, helmets, seat belts, who would be in the same position. It wouldn't be feasible for them to have the sort of facility we have and duplicate it, so basically the RTA and the Crashlab provide an important service to ensure that there is good safety product on the market.' (Ross Dal Nevo, Disc RTA-RS20, CD Track 9)

Bruce Dowdell adds:

> 'I think the most significant thing was that whole concept of getting away from bureaucrat debating with industry to a concept where you set up what is effectively a direct relationship between consumer and the manufacturer. That if you get information about safety or environment out into the community, the community can then make the choice about the products they want to buy and invariably they go for the product that meets the higher standard.' (Bruce Dowdell, Disc RTA-RS26, CD Track 4)

Crashlab tests are now prominent events. The test shown below was conducted in January 2010, and was attended by (from left) the Hon. Kristina Keneally MP, NSW Premier and Minister for Redfern Waterloo; the Hon. David Campbell MP, Minister for Transport and Roads; Dr Soames Job, Director of the NSW Centre for Road Safety; and the Hon. Michael Daley MP, Minister for Police and Minister for Finance.

'Safety isn't expensive, it's priceless.'

- AUTHOR UNKNOWN

Safer cars, new technologies

Some of the early advances in safety features made in car design since the 1950s were more secure door locks, safety glass in windscreens and windows, collapsible steering columns, better tyres and dual brake systems. Then in the late 1980s the crumple zone arrived on the scene:

> 'The crumple zone became an Australian Design Standard in 1989, and it is just a weakened part of metal in the chassis of a car that allows for the transfer of energy on impact. A crumple zone will reduce some of the momentum of the car going into the passenger, and some passengers will live because it is not as hard as it was but a lot of passengers still die in impacts, so you can't say it is an instantaneous reduction but there is a reduction and there is an effect. We now have, unless it is a vintage car, no cars on the road that don't have crumple zones. My personal belief is that is an example of something that has gone through and has made a huge difference to road safety.' (Graham Brisbane, Disc RTA-RS7, CD Track 1)

There have been a number of driveway tragedies involving reversing vehicles and young children. Michael Paine elaborates on the work he has done on vehicle sensors and reversing cameras:

> 'Around 1999 I think, Michael Henderson was asked to look at this issue and he asked me to help on the technical side, so I looked at what devices were around. A common suggestion was a sensor at the back that would beep if a vehicle approached an object. I realised pretty quickly there was a big problem with false alarms, they would beep at shopping trolleys and other objects which was useful but they wouldn't tell the driver that a child or an adult was in the driveway in the path of the vehicle. The other big problem with them was their detection distance was simply too short to have an effect, the driver basically got a beep warning too late before they managed to stop in a typical driveway situation.
>
> So I dismissed that as a safety device, they are really only a parking aid, and started to look at visual aids and checked blister-type devices that you can stick on the back of windows to supposedly improve the view, a few other types of mechanical devices, but I actually imported a couple of cameras from America where the camera is on the rear of the vehicle and the driver has a monitor to view what is going on, I think they were developed for trucks. I realised that this was one countermeasure that had a lot of promise so I did some research on them, tested them out and wrote a report that found that yes, cameras, maybe in combination with parking sensors were a good countermeasure but it was clear that this would by no means prevent all of these driveway fatalities. The most important thing out of this was adult supervision of children whenever they are near a vehicle.
>
> These cameras are becoming quite common now on four-wheel drive vehicles and are there as an option on some other types of vehicles. I am quite pleased to see some of that early research is actually being used in America, they are about to bring in a regulation for these types of devices and they do refer to the research that Michael Henderson and I did, so that is very pleasing. I guess the disappointing thing there is still no sign of regulation in Australia to require them.' (Michael Paine, Disc RTA-RS16, CD track 14)

In recent years, as vehicle technology has started to accelerate at a phenomenal pace many advanced safety systems have been introduced. Michael Paine confirms:

> 'ABS anti-locking braking systems are crash avoidance features that NCAPs haven't traditionally encouraged, in fact manufacturers brought ABS brakes in and strongly promoted them with marketing through the 1990s and by the early 2000s just about every vehicle you could buy had ABS brakes. Crash-wise they turned out to be rather disappointing - the crash investigations essentially showing no net benefit from ABS brakes by themselves. ABS brakes are designed to stop the wheels locking up if the driver presses the brake pedal too hard, so that avoids a sideways skid, but they basically need the driver to know that. If you are in an ABS car and you are in an emergency situation you need to press the brake pedal as hard as you can and you need to know that you can actually steer moderately around obstacles, so there is a bit of driver training and advanced driver knowledge in using ABS brakes effectively and in my opinion that is probably why they are not showing up as a benefit in accident statistics. What has happened since is that manufacturers have added to the ABS brakes - they've introduced Electronic Brake Distribution, in which the computer decides which wheels are the best to apply the brake force, Emergency Brake Assist, which actually anticipates you want to stop quickly and provides extra braking force.' (Michael Paine, Disc RTA-RS16, CD Track 13)

Another feature introduced in cars is Electronic Stability Control:

> 'Luxury cars began getting ESC in the late 1990s and researchers started to look at them in the early 2000s and realised there were potentially great benefits there. The big difference between ESC and ABS brakes is that ESC does all the work for you, it actually detects that the vehicle is starting to go out of control and lightly applies brakes to wheels to try and restore control of the vehicle. So the big difference is that the driver doesn't need to have any knowledge of it, doesn't need to intervene at all. What that is doing is maybe halving the risk of a single vehicle loss-of-control crash, so potentially that has a big effect on some types of crashes.' (Michael Paine, Disc RTA-RS16, CD Track 13)

Soames Job emphasizes:

> 'I think that the safer vehicles will have an impact on reducing the road toll but it's not nearly as large as was anticipated. When the road safety plan called *Road Safety 2010* came out, that was a bit more than a ten-year plan of how the road toll could be reduced. It was expected then that the biggest single gains would come from vehicles and they definitely haven't come from vehicles, and I think there are a few reasons for that. First of all, it takes time to get the vehicle industry to improve, it takes a lot of time to get Australian design rules to ramp up into the kinds of features we want to see on vehicles and probably more importantly, you don't get a good match between who buys the safest vehicles and who has the greatest risk. The people who tend to buy the safest vehicles tend to see safety as a factor and they tend to be more cautious drivers; so middle-aged people and family people are more likely to buy a very safe vehicle and buy it for its safety features, whereas your average young male, who's really your highest risk driver, or your more elderly drivers don't tend to have the safest vehicles. And I think back to when I was seventeen or eighteen and then I would choose a car on the basis that I could afford it, and I think that's what's happening, and so really you're often buying a third-hand vehicle at that stage of your life, and people who still drive in their seventies and eighties don't do a lot of kilometres, so they tend to keep a vehicle for a very long time, so they're not accessing the most recent, safest vehicles.

So, I think one of the reasons we're not seeing as quick a benefit as we might have expected is because the safest vehicles take a long time to filter down to the people who will gain the most from their safety features. The really safe vehicles we're seeing built now will probably show us most road safety benefit in about a decade, when they're third-hand vehicles being driven by the people with the highest risk.' (Soames Job, Disc RTA-RS23, CD Track 8)

'If you think safety is expensive,
try ignorance.'

- US NAVAL CENTRE TRAINING COURSE QUOTE

Bus safety

In the late 1980s bus safety issues came to the fore. Several cases involved the entrapment of children in bus doors. Michael Henderson recollects:

> 'I did a whole series of studies on school buses and buses, that is at the time when Bruce Baird was Minister for Transport. What happened was, the trigger to a whole succession of studies that Michael Paine and I got into, a child getting out of a bus: the automatically closing doors had got her foot trapped in the door, she fell with her foot trapped and she died of fatal injuries, this was a huge story in the newspapers. Then it happened again, with the same outcome, and again you could imagine the size of the story, it was just a horrendous story, and there were screams for the government to do something about it. So I was asked by Bruce Baird personally to look into what was going on here and recommend anything that would stop it happening ever again. I remember being in his office, saying to me, "Look Michael, if it happens again the government could fall" it was such a big issue. That was the start of it all. I studied the issues, I got expert advice, talked to all the bus people and recommended changes in the mechanism that closed the bus doors so that it couldn't happen again, and since then it has never happened again.' (Michael Henderson, Disc RTA-RS3, CD Track 10)

On the morning of 20th October 1989 Australia woke up to the news of an horrific bus and semi-trailer crash at Cowper in Northern New South Wales that had killed 21 people and injured 22 and became, at that time the worst crash in Australian motor car history. Michael Paine remembers:

> 'I heard about it on the radio driving into work and when I got in I was told I was flying up to Grafton with the Transport Minister and the Police Minister and a couple of other people from the RTA. The dreadful mess had been cleared up by then but the vehicles were there to inspect and we could try and ascertain the contribution of each of the vehicles to the horrible loss there. A clear thing coming out of that crash was the inadequacy of the bus seats that basically shattered and were like a row of knives going down the bus to cut people up, really in hindsight a poor design. Things were rolling and then a couple of months later there was a double bus crash at Kempsey, where 35 people were killed and 41 were injured and that was the last straw.' (Michael Paine, Disc RTA-RS16, CD Track 5)

Michael Griffiths continues:

> 'We went up and looked at the buses and we said "We need a seat belt system that can withstand one hundred kilometre per hour velocity changes" because of those crashes the second big one was two buses and a tachometer in one of the buses said it was doing a hundred and two kilometres per hour at impact, so if you were going to do anything about reducing injury it had to be some sort of system that operated in that speed range. We started looking around to see if anyone had developed anything overseas and a couple of companies claimed to, and so we bought their products and tested them on our sled and they didn't do what they said they'd do. So then we started doing work ourselves to see if we could develop a system. An important principle we embraced pretty early on was that on an inter-city coach it might be hard to achieve a mix where everybody is wearing a seat belt, so therefore it would be a very unfair penalty if you are sitting there, conscientiously wearing your seat belt and the person behind you is not. In a crash you are going to wear their loads through the back of your seat. The only way you can get around that is to

> actually have your seat belt mounted on the seat, rather than on the structure of the bus and so we thought that is the principle we have to embrace. That meant the seat had to be much stronger, so the actual restraint system was really going to comprise the seat and an integrated seat belt.' (Michael Griffiths, Disc RTA-RS15, CD Tracks 1

Within twelve months Michael Griffiths and his team had developed a safety system for coaches that was a world first. Ross Dal Nevo adds:

> 'The safety of Australian buses isn't just the seat belts in buses. Following on from the fatal crashes a lot of other things were addressed as well: the roll-over strength of buses, access to emergency exits, fuel cut-off systems, obviously the three-point seat belts in buses. So Australia implemented a total bus safety package and other countries are still looking at what we've done here and slowly but surely adopting the practices that have now become standard-place in Australia.' (Ross Dal Nevo, Disc RTA-RS 20, CD Track 9)

In addition to these measures, and as a result of the inquest into the causes of the crashes speed limiters were made compulsory on coaches and heavy vehicles and further regulation of driving hours for bus and truck drivers were implemented. Because the driver of the truck in the Cowper accident, who was among the dead was found to have taken ephedrine to stay awake that substance and other stimulants were also banned.

There is an interesting footnote to this chapter:

> 'It was funny at the time because Bruce Baird, who was the State Minister for Transport did a world study tour, as ministers do, and he told us later that he was somewhere in France in one of the test facilities and they said to him, "The people who know the most about seat belts in high-speed coach crashes are in some place called Rosebery, in Australia," and Bruce Baird had to laugh because that was his own department.' (Michael Griffiths, Disc RTA-RS15, CD Track 2)

Some people have learnt to drive by accident.

- ANONYMOUS BUMPER STICKER

Licensing

Licensing and driver training is an integral part of road safety. But it wasn't always so, as John Knott reports:

> 'Going for a licence, as we would see it today, is not introduced really until the 1920s and in some states, South Australia, I think, it is the 1960s before you actually went for a licensed test as we would see it today. Motorists paid a fee for their licence but the test that is associated with it comes a few years later and some of the tests are quite rudimentary. It was really up to the local police sergeant to decide what sort of test and some of the anecdotal evidence is of him standing on a street corner saying to the motorist, "Well, drive around that roundabout there and come back to me" and when he successfully does that, then he can go inside and pay his fee for his licence. It becomes tougher. Mostly, what they first of all want to know is, "Do you know the Highway Code, the road rules?" and then, "Can you control a vehicle?" Most cars didn't have standardised controls as we have today, they had very, very different control systems; some were throttles, sometimes the accelerator was in the middle of the pedals, and so on - you needed to know how to drive a particular make of car and all you had to do for the police, as far as they were concerned is to prove you could drive that vehicle.' (John Knott, Disc RTA-RS38, CD Track 4)

Obtaining a motorcycle rider's licence was even easier. Paul Rees is Manager, Customer Education in the RTA's Licensing, Registration & Freight Directorate:

> 'The process for getting a rider's licence was simply to walk into a motor registry, pass a motorcycle knowledge test and you would walk out with a learner licence that allowed you to hop on your motorcycle and ride away. Unfortunately some people didn't get too far.' (Paul Rees, Disc RTA-RS39, CD Track 2)

As time went by more stringent conditions to obtain a licence were put in place and the most significant of these was the Provisional License Scheme, first introduced into NSW in 1966 for a one-year novice driver licence. That was extended in 2000 during Don Carseldine's tenure as Manager, Licensing Policy at the RTA:

> 'The licensing system hadn't undergone any major revision for a long time and there was mounting pressure to improve the system so that young drivers would be safer, but to do so in a way that was evidence-based. The changes most related to road safety were changes to the Novice Driver Licensing Scheme. We called it the New Graduated Licensing Scheme to indicate that we were extending something that was already there. It is not appreciated by a lot of people that in a lot of jurisdictions elsewhere in the world people don't even have a learner's licence before they go onto a full licence, they just go and do a test, and if they pass the test then they have a licence; that is a type of graduation. We moved on to an additional stage so that we had a P1 and a P2, or some people call it the 'Red P' and the 'Green P' stage. They were set up in a way that a driver would stay on a Red P, or a Green P until they had passed the required tests to move onto the next stage, there was no automatic progression under the new scheme that we introduced. It was a very, very big project, it was a very important one in terms of attempting to deal with a very serious problem that affected young drivers, who in many ways are the most valuable people on the road. We've already invested a lot of public monies in educating them, and they've got the longest productive life in front of them of all road users, and yet we were losing them at a rate much faster than other age groups in the driving population. So it was a very important area to try and address and I feel that what we

did was absolutely world class. There wouldn't be a better system for licensing young drivers anywhere in the world.' (Don Carseldine, Disc RTA-RS34, CD Tracks 7 & 8)

Maureen Elliott comments:

'Young males are, I think more influenced by peer pressure. There's a lot of risk-taking or sensation-seeking, which it is often referred to in the literature: it makes them feel that they are ten foot tall or bullet-proof. They have not the same sense of their own mortality that older, wiser people develop with time, so there is a sense that nothing can touch them, that they can take silly risks and still live. These things mean that young people are much more vulnerable as drivers because they are in a vehicle that allows them to take risks that put both themselves and other people at risk. And so the Graduated Licensing System is all about having a tiered approach to let them come into the licensing system. They have speed limits, they have alcohol limits that are lower than other older drivers for a certain period of time and they have to jump through certain hoops and prove their level of maturity in the licensing system before we say, "You know what, you've made it through these hoops, we are going to give you a full licence now." So graduated licensing systems, and most jurisdictions have them now, are all about cocooning these more vulnerable drivers in a little bit of cottonwool, as it were, until they are old enough and mature enough and less likely to risk-take, so they'll live past their twenty-fifth birthday and be able to drive on the network like the rest of us do, without doing things that are going to get them killed, basically.' (Maureen Elliott, Disc RTA-RS33, CD Track 3)

In the early 1990s licence conditions were somewhat tightened when applicants were required to pass a new computer-based Driver Knowledge Test:

'That allowed us to have a much more comprehensive test. There are well over four hundred questions in the question bank and questions are drawn at random from the test bank and we use a lot of moving graphics, so we are really able to test people's knowledge of the road rules, whereas prior to that it had been a very simple paper-based system. The test works by picking forty-five questions from a large question bank at random and it picks a number of road safety and general questions, and a certain number of road sign questions. In the road safety section people are only allowed to get one question wrong or they fail the test. (Paul Rees, Disc RTA-RS39, CD Track 4)

'We look at the Graduated Licensing Scheme as really having started in 2000 when we introduced the Learner Log Book and three year provisional licences and other restrictions. Then, of course, further major changes were made in 2007. First of all the fifty hours Learner Log Book was increased to a hundred and twenty hours. We introduced a zero tolerance on speeding, any speeding offence by a red 'P' driver results in licence suspension, we introduced a total ban on the use of mobile phones and we also introduced a passenger restriction. Any provisional driver under the age of twenty-five can only carry one passenger under the age of twenty-one between the hours of eleven p.m. and five a.m. Those restrictions are gradually eased as they build up experience. The sort of restrictions we are talking about are alcohol, speed and demerit points, and the vehicles they can drive, towing trailers, and a whole range of other things. As the driver progresses through the licensing system from red 'P's' to green 'P's' we slowly ease those restrictions. An example is the special speed limits that apply to novice riders. Learner drivers are restricted to eighty kilometres an hour, red 'P' drivers are restricted to ninety kilometres an hour and green 'P' drivers are restricted to a hundred kilometres an hour, so that is just an example of the gradual easing of restrictions as they acquire experience. And of course they are also restricted by the governing applicable speed limit, so obviously, if they are in a

> sixty kilometre an hour zone then that is the maximum speed they can travel.' (Paul Rees, Disc RTA-RS39, CD Tracks 5 & 6)

When is the safest time for a driver? Barry Elliott reveals:

> 'The safest time for a driver is when they're learning to drive. Now that might sound hilarious but it's true. I think there'd be in any one year throughout the whole of Australia one learner driver killed, and in some years it'd be none, and that is because these learner drivers are being supervised, so it's the safest time, which is really interesting because parents don't believe it to be true. They think they're at risk and I think they think their vehicle's very much at risk, but invariably if a learner driver has any sort of prang or dingle it's knocking the fence out, driving down the driveway or hitting a parked car at slow speed, but it is by far the safest time in any person's driving lifetime. The most unsafe time is immediately they get their licence: their crash rate skyrockets, and in the first three months they're especially vulnerable, right up to the first two years.
>
> So the most important thing we've done now is to try and make learner drivers infinitely more experienced than we used to do. When I got my licence I might have had three lessons and three hours' playing around, or something. These days you've now got to have a hundred and twenty hours of supervised practice across a whole range of situations, so at night-time, in the rain - and parents hate doing that. We've now sort of formalised all that to try and help parents and other supervisors, such that by the time the young person's had a hundred and twenty hours they've got a fair amount of driving experience because we know the biggest simple problem with novice drivers is that they make decisions differently than an experienced driver would make. How do you get an old, experienced head on a novice driver? Well, we're trying to do that via this supervised practice.' (Barry Elliott, DiscRTA-RS21, CD Track 15)

What conclusions can be drawn in respect of road safety from the Graduated Licensing Scheme?

> 'We're conducting an ongoing evaluation, but the initial figures that we have, have shown a thirty-five per cent reduction in provisional P1 crashes, as compared to figures prior to 2007.' (Paul Rees, Disc RTA-RS39, CD Track 6)

In motorcycle licensing the big change has been the introduction of the Compulsory Novice Motorcycle Rider Training Scheme, introduced into NSW in 1990. Paul Rees remarks on the milestones in motorcycle rider road safety:

> 'The Compulsory Novice Motorcycle Rider Training Scheme was progressively rolled out across the state to the point of where now ninety per cent of rider licence applicants undergo compulsory rider training before getting their licence. I think also the Learner-Approved Motorcycle Scheme, which was introduced in 2002 was a major milestone, it really saw a move away from what had become an unsuitable 250cc basis for restricting novice riders to a 660 power-to-weight ratio based restriction, which was much more suitable. I also think a major milestone was reached on 1st June 2009 when we introduced the Graduated Licensing System for motorcycle riders. In addition to that I think the ongoing education materials and education programs we've produced in itself could be regarded as a milestone, not only in the continual upgrading of the Motorcycle Rider Training course but also our Motorcycle Riders Handbook and the public education programs that have been directed at motorcycle riders.' (Paul Rees, Disc RTA-RS39, CD Track 3)

In 2008 major changes were also introduced for older drivers:

> 'Older driver licensing is a very controversial issue and a very difficult issue to deal with, but the changes we made have been very well accepted. The changes were that we reduced the age for the medical from eighty down to seventy-five; that was designed to be able to pick up eye diseases and things like that earlier and allow people to continue driving longer. We developed a new driving test, which is conducted every two years, in place of the previous test, which was conducted annually. The test is much more relevant and focuses on issues particular to older drivers. We also brought in the option of being able to do an assessment with an accredited driving instructor in lieu of a test with the RTA. Under the assessment a driving instructor can go to their home and they can do an assessment around their local area. We also brought in the option of a modified licence that allows older drivers to access local services without the need for a driving test or an assessment. These changes have been very, very well received by older drivers and we think they will also have a road safety benefit.' (Paul Rees, Disc RTA-RS39, CD Track 7)

The driver training industry itself has also undergone further reform:

> 'We've made extensive reforms, particularly in the last few years. For example, the course that driving instructors have to do is now a national course set at Certificate Four level. In addition to that we've required them to demonstrate high levels of competence, they are tested on renewal of their instructor's licence every five years for their knowledge of the road rules, they have a special ninety-question test. We take any complaints about them very seriously. One of the things that we have done recently is introduced a program called 'Beyond Test Routes' and the idea of that was to get driving instructors to teach hazard perception. We've had a major difficulty with the driving instruction industry in that we didn't think they were quite contributing to road safety as much as they could, and this was because traditionally driving instruction focused on just getting people to be able to scrape through the driving test. So the 'Beyond Test' program was designed to get them thinking outside that square and to think about how to give people safe driving strategies that they could use on an ongoing basis. We think, since that time the driving instruction industry has taken on a new focus and is probably now making a much greater contribution to road safety than they did before, when they were just focusing on getting people through the test.' (Paul Rees, Disc RTA-RS39, CD Track 9)

There are also new penalties for hoon drivers:

> The penalties for hoons is very severe. Fines, for example, will range up to three thousand three hundred dollars; immediate roadside suspension of licence for street racing and aggravated burn-out and automatic twelve month loss of licence. In addition to that drivers can be subject to vehicle confiscation, police may impound a vehicle at any time for hoon offences, but last year we made some substantial changes to that. For example, for a second offence a car can be impounded by police and for a third offence the vehicle can actually even be crashed in Crashlab. Where the driver in fact is not the owner severe penalties can apply as well. The registration can be suspended for a street racing offence on a second occasion, and for a third occasion the vehicle can be forfeited to the Crown.' (Paul Rees, Disc RTA-RS39, CD Track 9)

One of the most effective ways to deter errant driving behaviour is through the demerit points system. Paul Rees asserts:

> 'We think the demerit point system is a major component of our system that deters people from poor driving. We think it is a very, very effective tool. In fact, most drivers, more than seventy per cent, have not incurred any demerit points in the last three years but for those that have the demerit point system works as a very strong deterrent to further offending in conjunction with other strategies that we have, such as automatic licence suspension for high range speeding and automatic driver disqualification for blood alcohol content offences. Also, remember that the demerit points system is directly connected to a licence and if they get twelve or more demerit points their licence is suspended, so it is a central plank in our deterrence policy. We know, for example, with double demerit points operating at long weekends that there is a much reduced road toll, compared to other times, so we know as a package it does work. (Paul Rees, Disc RTA-RS39, CD Track 10)

It is possible to lose a licence for life if the offences are serious enough.

> 'We have a program called the Habitual Offenders Program, it essentially means that anyone who is caught for three serious offences in five years has their licence suspended, or disqualified for five years. If they breach again they will be suspended, disqualified, for another five years. We have people who have lost their licence for twenty or thirty years through that program, but for more serious offences such as grievous bodily harm and things like that there is no upper limit on the disqualification that courts can impose and there are people out there who have had their licence disqualified for life. (Paul Rees, Disc RTA-RS39, CD Track 11)

Soames Job had this to say:

> 'I think demerit points are a very important factor in road safety. There's no use catching people doing things and having no real penalty or no real impact on them. If the enforcement's going to have an impact it's got to be a penalty, it's got to be something that people don't want to happen to them. And one of the advantages of the demerit points is that it creates a level playing field, whereas a fine doesn't. So a fine has a very different impact on someone who has large resources and is earning a very large salary, compared with someone who's earning minimal income. The demerit points don't have that same kind of differential. So the threat of losing your licence has an impact on everyone who wants to drive, and so they have a value in really levelling out the playing field and creating a significant and lasting disincentive.' (Soames Job, Disc RTA-RS23, CD Track 12)

So who are the safest drivers? Andy Graham postulates:

> 'Obviously the crash stats would tell me that it would be a female driver in middle age. I mean, it is a generalisation with driver crash rates; any one particular driver could be better than another. Generally speaking your middle aged forty through to sixty year old driver, preferably female, would be a better driver, even though they are probably the group that thinks they are the least best at driving. When you look at the survey results they are probably the least confident and they have the lowest perception of their abilities, contrasted with the young males of seventeen to nineteen - they are the best drivers in the world.' (Andy Graham, Disc RTA-RS42, CD Track 12)

'It's best for one who hits the bottle
To let another use the throttle.'

'The minutes some folks save through speed
They never even live to need.'

'Sleep in a chair
Nothing to lose
But a nap at the wheel
Is a permanent snooze.'

- 1940S BURMA SHAVE JINGLES ON US ROADSIDE SIGNS

Behavioural campaigns and programs

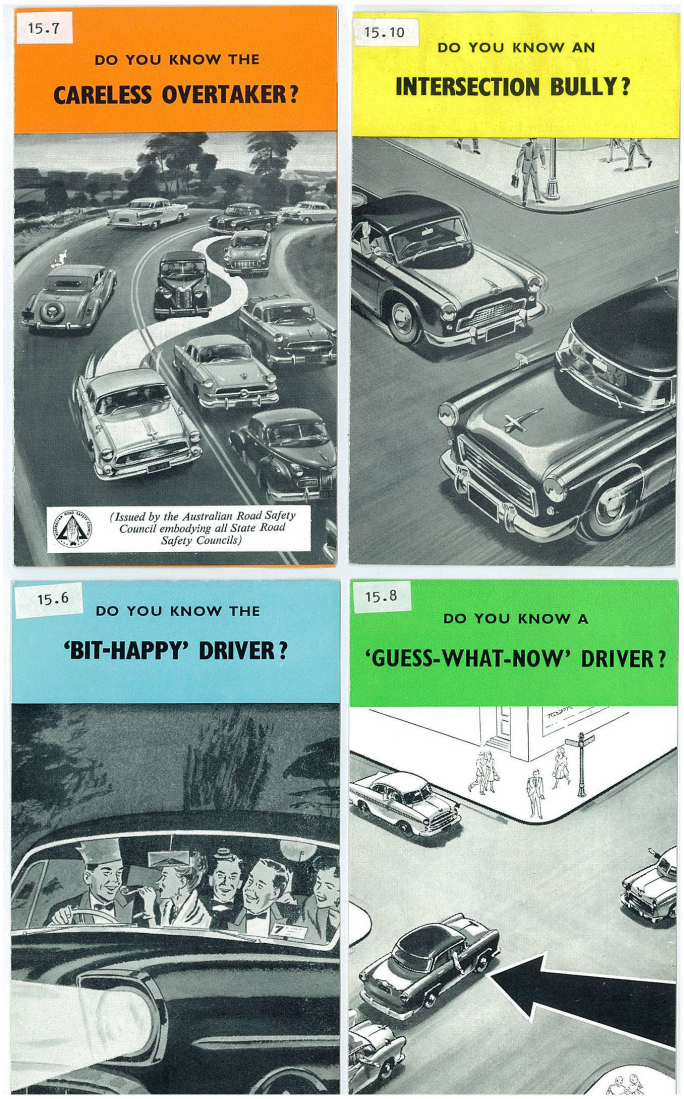
Publicity campaigns have been a necessary part of informing the public about road safety issues from the early days of motoring. John Knott's research brought this example to light:

> 'From the 1920s onwards we start to see a real growing concern in the community by public leaders about road safety and in the 1930s graphic publicity campaigns are introduced. One at the time notorious poster was of a motorist holding the limp body of a young girl and saying, "What have I done?" I should say that the NRMA in New South Wales objected to the use of this poster, saying that it would make drivers nervous and therefore worse drivers on the roads. There would be a long debate about how graphic you should be in advertising if you were going to promote road safety, and it is a debate that fluctuates in different periods in Victoria with the Transport Accident Commission adverts.' (John Knott, Disc RTA-RS38, CD Track 8)

In New South Wales the Department of Motor Transport decided in 1961 to embark on a series of television advertisements to promote road safety awareness under the title 'The Wise Old Owl'. The Owl was an animated character, a Professor who tapped road safety messages on a blackboard. Harry Camkin was involved in their production:

> 'I was the Technical Advisor, which largely meant that I had to see that all the stop signs were sitting up straight and the road markings were freshly painted for the locations where the shoot was. I and my baby son actually starred in one. We were the tortoise that followed the hare in a day trip up to the Blue Mountains. We had some scary driving scenes on that trip up there too because it had to portray the difficulties the hare got into and the nice serene calm trip that the tortoise had. The tortoise won the race, of course; the hare didn't quite make it - he had to stop in the pub to refresh himself on the way. That was applauded. I think there were about four or five in the series. There were some to do with changes in the road rules, changes in the way you made right hand turns at intersections when they came in, they'd use some of this publicity. That was much more valuable because it actually told people what to do. It won some sort of prize in the advertising industry, that series, but the advertising industry itself was pretty primitive in those days too.' (Harry Camkin, Disc RTA-RS4, CD Track 3)

The 'Wise Old Owl'



1960s Australian Road Safety Council brochures

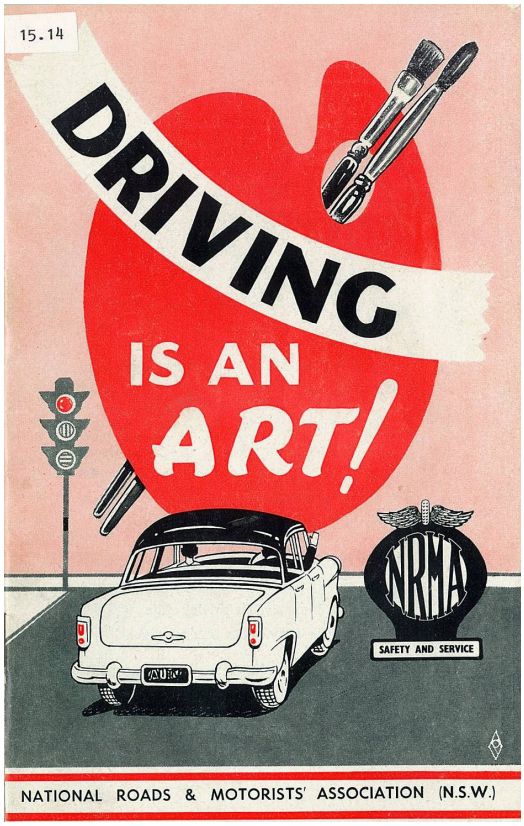
Soames Job provides this overview:

> 'Road safety advertisements are a very important part of what we do, and they do give us benefits, and we know that from the research we do, which tracks people's awareness of the message they take out from it and the changes we see. However, I would state a particular caveat to that: the most effective advertising campaigns will be the ones that talk about and are based on forms of enforcement or social disapproval, and we know that because the enforcement aspect is very important to road safety, it is because the general deterrence effect is so large. It's the people that you want to stop doing the behaviour in the first place that you therefore never catch; they're the ones that give you the biggest road safety gain. Now people aren't going to change their behaviour in response to the risk of enforcement unless they know about it, so ads that tell them about the risk of enforcement are the ones which are most likely to generate more of that general deterrence effect. Those kinds of ads give us value.' (Soames Job, Disc RTA-RS24, CD Track 2)

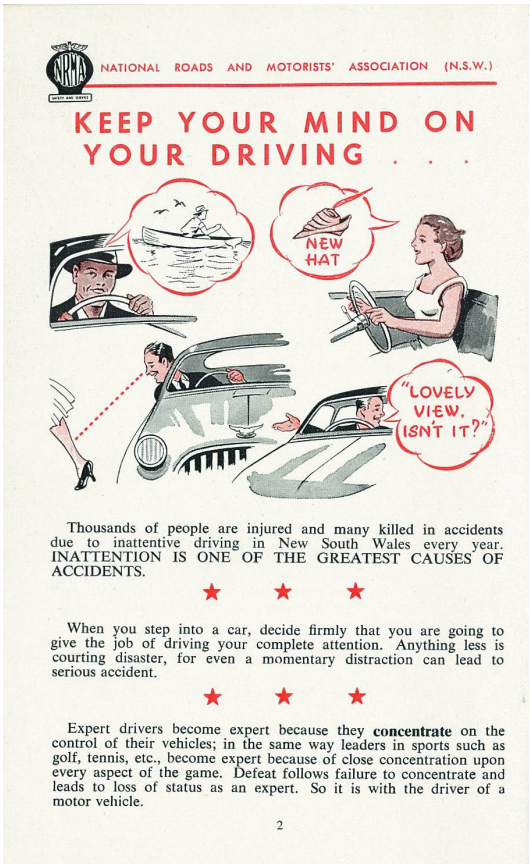
John Bevins adds:

> 'Over the years I've learnt - Hugh Mackay was the first one to draw my attention to it - that advertising's pretty ineffective at changing attitudes but it's a fantastic way of

working with existing attitudes and using those existing attitudes to modify the behaviour that you're seeking to modify.' (John Bevins, Disc RTA-RS31, CD Track 3)



Extract from early 1960s NRMA safe driving brochure



Russell Watsford is the RTA's Project Manager for Road Safety Marketing. He has been actively engaged in recent years in most of the RTA's major advertising campaigns. He explains how the research for a campaign feeds into the message:

> 'Marketing is all about research, and particularly in road safety marketing we are not just trying to deliver policy messages, sometimes that is the case, but where we are trying to alter behaviour it's that we need to know firstly who the target audience is. A part of that formative research is identifying and analysing crash data so that we can identify who, and where the target audience reside, so that we are able to reach them in our media. Depending on if it is a young audience they tend to have slightly different media components, where they watch a lot, rather than an older audience, but also too, there are psychological differences because younger audiences have less experience in driving, older audiences - they have been driving for a long time and their self-experience is often what dictates what is right and wrong for them. Then we need to look at if there is a segmentation within that audience of why they drive in a certain way, we need to then find out what motivates them. So just putting it in broad terms the formative research is one, to identify who, and then secondary is to identify the barriers and the opportunities to deliver a message to them. Once we have that we are able then to pull together a strategic idea of what the campaign needs to incorporate to deliver a message which will be meaningful and will be validated by them.' (Russell Watsford, Disc RTA-RS12, CD Track 6)

Some of the early advertising campaigns started in Victoria in the 1970s and were directed at drink drivers, as Barry Elliott describes:

> 'ROSTA, the Victorian Road Safety and Traffic Authority were looking to develop a new approach to road safety instead of all the blood and guts. Back in those days we had dreadful sort of road safety advertising and my first experience was to develop a drink-driving campaign aimed at young guys. So instead of telling them that they'd get caught and they'd lose their licence and so on we thought we'd try a different technique whereby we suggested that those who don't drink and drive are more likely to win the girls.' (Barry Elliott, Disc RTA-RS21, CD Track 3)

The next series of ads that Barry Elliott was involved in, sponsored by the Federal Office of Road Safety focused on the enforcement of drink driving legislation,

> 'They were the Cronin drink-driving commercials that won all sorts of awards, they featured Dave Cronin from *The Sullivans* and part of the reason they were liked a lot was that they used the freeze-frame technique, which is a very powerful communication tool, because if you freeze the visual people listen to the message. It was about friends intervening in other friends' drinking, or not letting them drive. So, we had a whole range of scenarios about what you and I could do if we had a mate who was going to drink too much and that had never been done before. They ran for a long time and there were four of them and they ran nationally.' (Barry Elliott, Disc RTA-RS21, CD Track 4)

John Bevins started his own advertising agency in 1982 and soon landed his first road safety advertising campaign:

> 'We were approached by the New South Wales branch of the Australian Medical Association. They were interested in doing an experimental road safety campaign in Wollongong to see if advertising could affect the behaviour of young males and that was back in the days when jingles were very popular, "I Feel Like A Tooheys" was the classic and we did a campaign of the same genre featuring Wollongong males to the tune of, I won't try to sing it but the theme of it was "Here's to the iron willed

> Wollongong drinkers, sure they know how to put it away" so it was really an ode to the hard drinking males of Wollongong but with a twist in terms of encouraging them to drive responsibly. Dr Gary Egger had done the research and I'd worked with Gary over the years on anti-smoking advertising and he had discovered that young working-class males in Wollongong had eroded self esteem and there was a lot of unemployment, so there was an opportunity for an advertising campaign that didn't attack them, didn't finger wag at them, but rather set out to empathise with them and to celebrate who they were. The campaign only ran for one month. It had a modest budget but it achieved an 87% awareness among its target audience, young males under 26.' (John Bevins, Disc RTA-RS31, CD Track 3)

Two months later John Bevins was commissioned to produce another campaign that was to secure his place in Australian advertising history:

> 'The StaySafe Committee recommended the introduction of Random Breath Testing into New South Wales. We got a very thorough brief and I don't think there was any research at the time. It was all happening so quickly - it was planned to be introduced on December 17, 1982 and discussions began in October, so there was very little time to prepare and write an advertising campaign and get it produced, get the television commercial made and then get it to air. So it was very much, "Here's the Brief", and I remember the brief clearly, and I remember that the objective of the advertising was to communicate the introduction of Random Breath Testing and explain the penalties and the procedures of RBT, and I asked if I could perhaps spend some time with some Highway Patrol Officers to get an understanding of what happened. And I was lucky enough to be sent out with two young Highway Patrol Officers and at this stage Random Breath Testing hadn't been introduced but the law at that stage allowed the police to pull over a driver if they were speeding, say, or changing lanes without indicating, and if they suspected the driver may have been drinking they could then require the driver to take a breath test.
>
> So these two young officers said "We'll set up a speed trap on Flat Rock Drive and when we catch people, if we've got good reason to believe that they may have been drinking we'll put the bag on them," because it was a bag in those days. And sure enough, the first person they caught was a young man in an Alfa Romeo, a nice fellow, a typographer who had worked with my advertising agency on the Wollongong Drink Drivers Campaign and the police pulled him over and he looked as white as a sheet. And I stood back behind a tree and the young officer waved me over and said "Come and see," because he wanted me to understand that it was quite a big deal when somebody was pulled over and asked to blow in the bag and I waved back and said "No, I can't go". He said "Why not?" and I said "Well, I know that fellow," and told him the story. As it turned out he asked me a bit about him and I said "Look, he's a good person, he's worked on this campaign," and he got off with a caution. I don't know whether it was because of that or not but it made me realise there was something in the notion of being pulled over by a police officer and when I spoke to the police officers I found that they had not only the power to arrest people but if they'd got them to blow into the bag and that indicated they were over the limit then they had to place them under arrest so they could get them back to the police station to put them on the breathalyser.
>
> And we went out that night and we caught quite a few people, and drunken drivers, because they were the days when people drove really drunk and I was able to see as they would get somebody, arrest the person, put him in the back of the car, all males, and take him to the police station. I was able to witness first hand how people tried to talk their way out of it. One fellow claimed to be friends with Ronald Reagan, the

> President of the United States and said "You can't arrest me". So I saw all of this, I saw normally upright businessmen, you know, crumbling, figuratively speaking in a heap because they had been arrested. So I was able to go back when we made our presentation and say "Look, I don't think this advertising campaign should be about the penalties and the procedure of Random Breath Testing, or the process of Random Breath Testing, it should be much more emotively potent than that". And I went back with the line "How will you go when you sit for the test: will you be under .05 or under arrest?" And it's quite fascinating because the advisor to the Minister for Police, or the press secretary, some fairly outspoken bloke, sort of said "Well you can't say that because we don't arrest people," and I was able to say to him "Well, in fact you do arrest people, I've been out with police, I know how it works," and as a result the campaign went ahead. That campaign - what gave me the conviction to really understand how to get it out there and do the copywriter's research, the best research you can do, and to get out there with the police was the brief I got from the Minister, the late Peter Cox, the Honourable Peter Cox because he was a very honourable man from my experience, and that was the real brief because he said to me, he was a man of few words, "I want to get the blood off the roads", and the way he said it, it was quite clear that he did want to do that, he wanted an end to the carnage on the roads. In 1981 there had been 39,000 injuries over around about 1200 deaths on the roads. It was an extraordinary thing that was happening and there was a Minister of vision who said "I want to get the blood off the roads." (John Bevins, Disc RTA-RS31, CD Tracks 4 & 5)

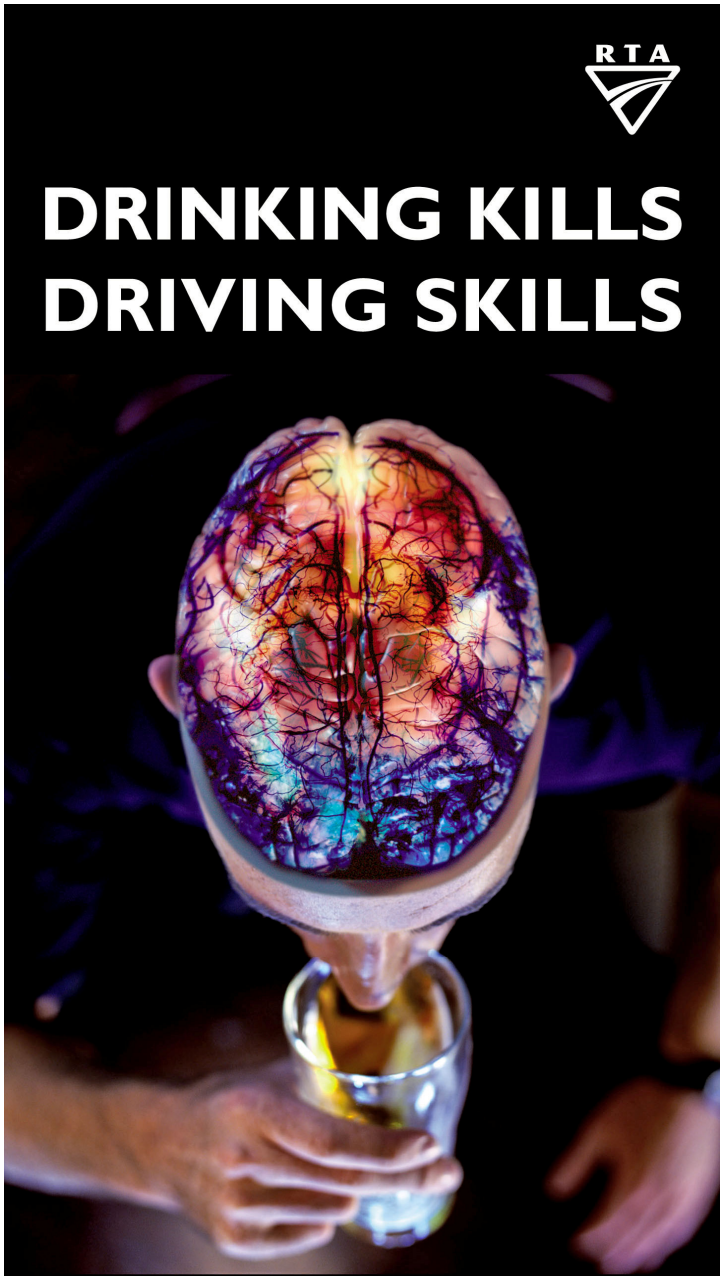
Harry Camkin adds:

> 'It was television and mass media advertising, really highly concentrated, very well-constructed advertisements. Our follow up surveys of public reaction to those demonstrated that it was very effective. We increased the perception well beyond the reality, but that's what we set out to do.' (Harry Camkin, Disc RTA-RS4, CD Track 10)

'Paranoia' campaign advertisement

Other behavioural campaigns that focused on drink driving were the 'Brain' and 'Paranoia' campaigns, launched in 2004 and 2006 respectively. Rosemary Rouse recalls:

'We knew that people were switching off in terms of public education campaigns, like being caught by policemen and we wanted to try a more rational approach, rather than a fear-based approach. We knew, because of our research, that young men pride themselves on their driving skills and that we could approach an anti-drinking message through presenting in a physiological way the impact of alcohol on the brain. It wasn't about whether you are a good driver or not, you're unlucky or not unlucky, alcohol has this physiological affect on your brain.' (Rosemary Rouse, Disc RTA-RS1, CD Track 16)



'Brain' campaign advertisement

The 'Paranoia' campaign built on the success of the earlier 'Brain' campaign:

> The main message behind the advertisement is that mobile RBTs could pop up anywhere, it is a police car, every police car is a mobile RBT. We factored in

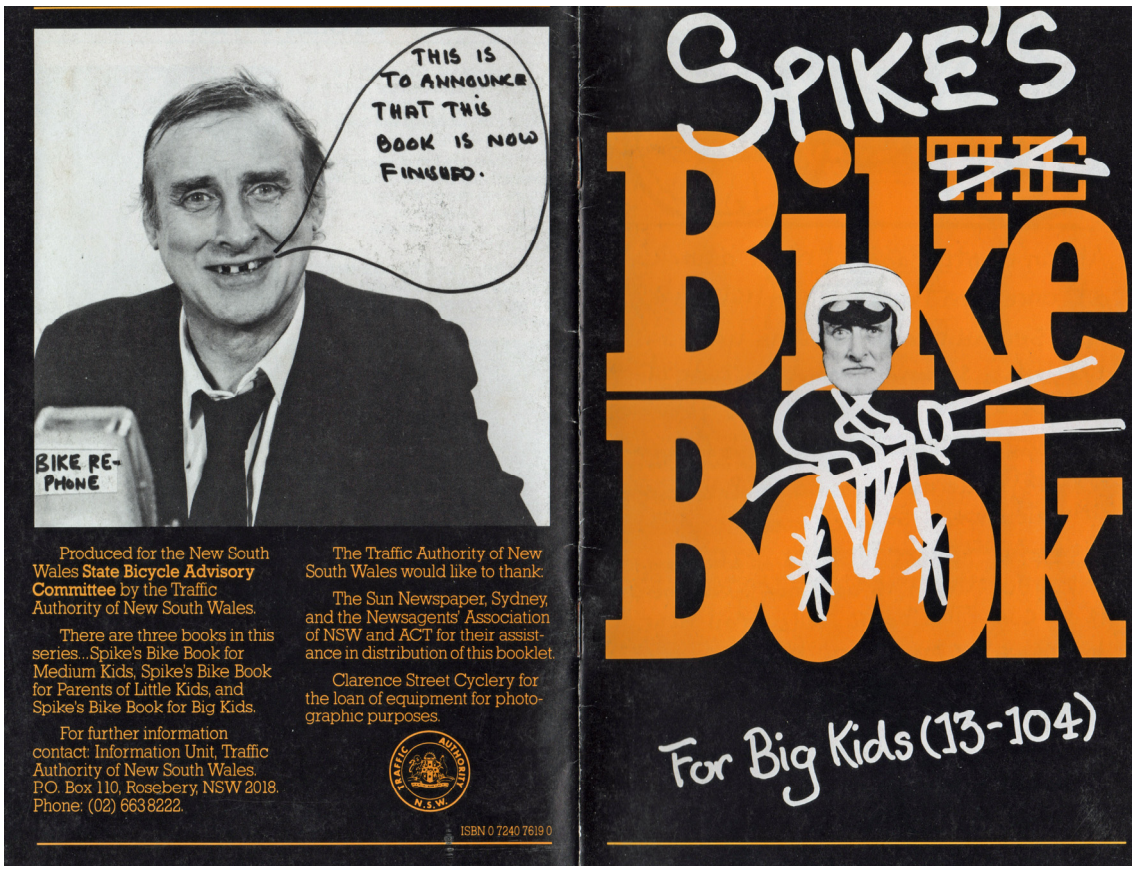
> psychological components to tap into the fear and guilt of what people go through when they know they are deliberately breaking the law and with this particular campaign a guy walks out of the hotel, he is not staggering but he has had a few drinks and how do we know that? Because he sees the security guard and he thinks it is a policeman. It is a paranoia component coming out. When he gets in his car someone taps on his window and he thinks that it is a policeman breathalysing, but it is a mate of his saying, "I'll see you later." Then as he is driving, everywhere he goes he believes that he is going to see a policeman, a taxi's behind him, he thinks it is a police car but no, it's not, and then in the last breath he does get pulled over by a police car. So the components that are embedded into that story is that he knew he was doing something wrong - that is why he is paranoid. He does get caught and that is because every police car is a mobile RBT. No one should feel sorry for him because what he was doing was deliberate and illegal.' (Russell Watsford, Disc RTA-RS12, CD Tracks 12 & 13)

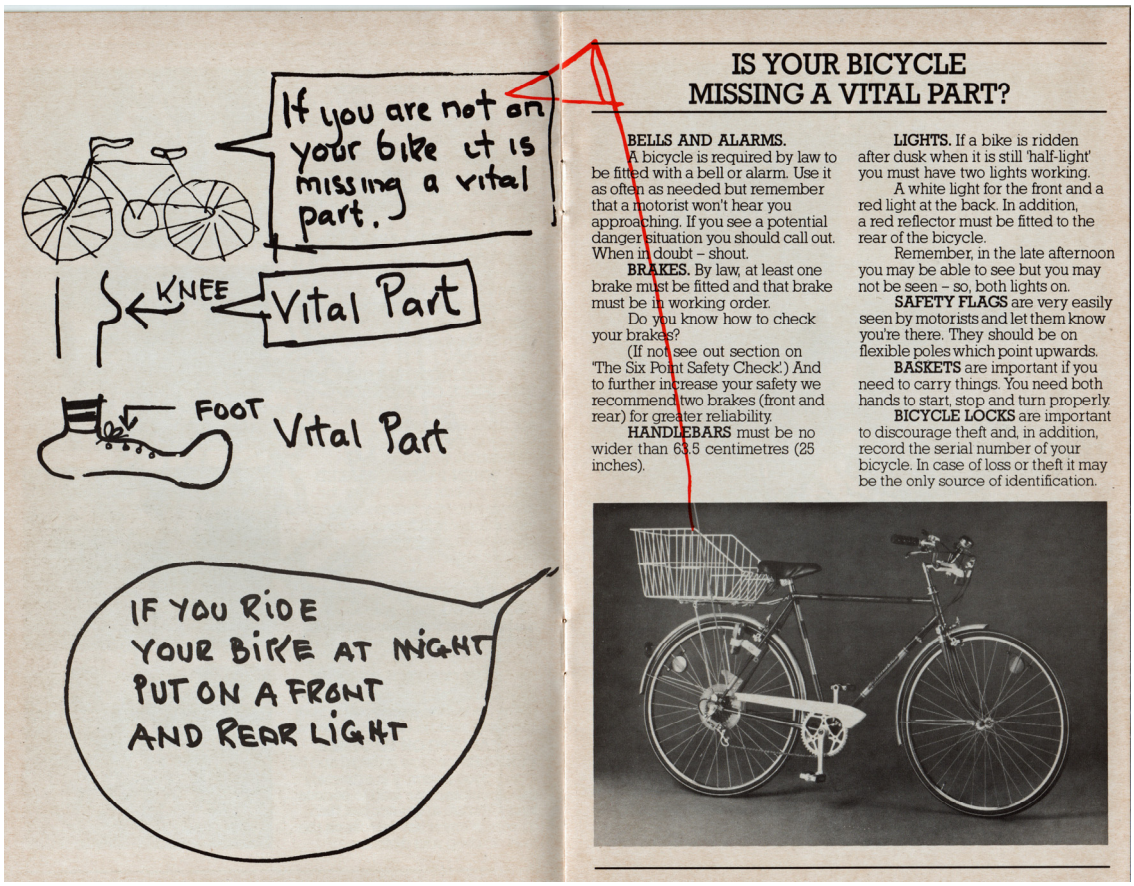
In New South Wales a seat belt campaign dubbed 'Click-Clack' was launched in the early 1980s. David Saffron recalls:

> 'The Victorians had done some research that had shown that if you combine police enforcement with publicity about that enforcement you can achieve behaviour changes to improve safety. They'd done a little bit with seat belts and a little bit with drink driving. That was what the 'Click-Clack' campaign was about, it involved a lot of police. We had a staff member going around talking to the police and getting them to understand what was going on about seat belt wearing. We had publicity campaigns, *Click-clack, Front and Back*, and they also reminded people that it was against the law and there were fines involved for not wearing seat belts. That became a banner headline which involved all the other sort of groups who get involved in road safety. There were television, radio and press advertisements, that is what it was about. It had a main theme of people understanding that if they wore a seat belt they would be safer and that if they didn't wear a seat belt they would be booked by the police and fined, so that was the main theme of the publicity. But it did have this essential element of trying to get the police involved.' (David Saffron, Disc RTA-RS37, CD Track 4)

John Bevins was also asked to prepare some material to promote safe bicycle use:

> 'The idea was that we would produce some bicycle safety books, the objective being to get young cyclists, children and their parents to look at the serious side of riding bikes because there are a lot of serious injuries, but riding bikes is fun and is hard to get people to address the serious side of it. So we thought what if we were to produce the books but leave some pages blank, and give the artwork to Spike Milligan and let him do whatever he wanted to do with the books, deface them as he saw fit, and then we'd call them *Spike's Bike Books*. So we did just that. We worked with the late Spike Milligan, who was the most wonderful of men, a lovely man, but unfortunately he was bi-polar and suffered bouts of depression, as we all know, but he came through and did a wonderful job. They're very funny books.' (John Bevins, Disc RTA-RS31, CD Track 9)

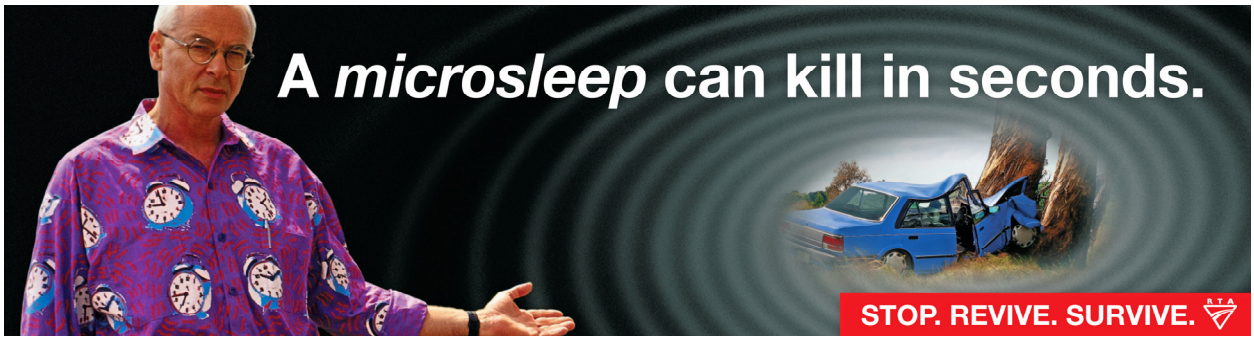




Extracts from 'Spike's Bike Book' (Photo courtesy of John Bevins)

The 2001 'Microsleep' campaign was Russell Watsford's first as Project Manager:

> 'The Microsleep Campaign was unique in a number of different ways and it was targeting driver fatigue. If you have had half-a-dozen beers, well you'd know that you are over the limit, but if you've had four hours sleep the night before and you are driving you are not a hundred per cent sure because there is no defining factor there to say that you are definitely doing the wrong thing. It had been a very difficult issue to educate the public on. There was a lot of scientific background on what triggered the brain to shut off at certain times to send you to sleep and we recruited a very high profile scientist, Dr Karl Kruszelnicki, who was profoundly acknowledged as a very smart person and who spoke to people in layman's language, which they could understand and that proved a very positive outcome for us. He was able to introduce a new piece of information that people had never heard of before, it had been in research but it hadn't been publicised at all, the term 'Microsleep', where you actually shut your eyes for a few seconds and your brain switches off. He also presented to the public that it doesn't just happen out of the blue, there are early warning signs, so as you experience these early warning signs you should be aware that you are entering into a Microsleep zone.
>
> One of the main objects of the campaign was also to get people to understand that it's not an accident, it is irresponsible driving, the same as drink driving or speeding. It was a multi-media campaign, one that incorporated a proper marketing strategy, not just advertising. There was cinema and radio, there was press and outdoor advertising to remind people of the fact that a Microsleep can kill in seconds. We said "If you shut your eyes for four seconds and you are travelling at a hundred kilometres an hour, in that four seconds you'll travel a hundred metres with your eyes shut." That message was the real trigger for people to go, "Oh, a hundred metres out of control!" That was a part of the scientific rationale that people just couldn't refute.' (Russell Watsford, Disc RTA-RS12, CD Track 9)



Dr Karl Kruszelnicki, featured in 'Microsleep' campaign

There have been many advertising campaigns on speed management. Don Carseldine was involved with an early effort to counter the car manufacturers' messages about the speed capabilities of their latest models:

> 'We went to the extent of producing our own road safety ad that more or less spoofed the automobile industry's ads by showing the types of imagery that they were showing with a young driver driving his car too fast on a country road, but our ending was different. Instead of showing the driver happily driving off into the distance at excessive speed our ad showed the car crashing. The automobile industry was very unhappy about that but I think they got the message that they needed to clean up their act and it was around about that time that they agreed to introduce an improved code of practice. We had to spend a lot of money on that, we had to do

up two utes that looked like neither a Ford nor a Holden, it looked like a Folden or a Hord, because we didn't want to target one company in particular, and of course we had to crash them. We were subversive in that case and I think it worked. We got some quite angry remarks. They actually went so far as to say that they thought our ad violated the code of practice that they had to comply with, which of course it didn't because it was a road safety ad and showed precisely what happens when young people try to drive at excessive speeds on the open road in their sleek powerful new cars.' (Don Carseldine, Disc RTA-RS34, CD Track 16)

One of the most effective road safety advertising campaigns of all time is the notable 'Pinkie' campaign. Russell Watsford recalls that the media response to the campaign was immediate:

'It was unbelievably positive and so widespread, it's amazing. At the launch of the campaign there was media exposure, not only in New South Wales but on the Sunday night news across Australia about the campaign. Then two days after the launch of the campaign a story appeared on the BBC web page and they sourced that themselves. Their tracking, which they do all the time, indicated that this story was the tenth most read story around the world and it was the third most emailed story globally, and that was just self-generating. It was just unbelievable, it has never ever happened before - there was a story written about this campaign in just about every country of the world. We even had a reporter come out from the *Chicago Tribune* for an interview on the campaign. This campaign not only broke the youth barrier, it actually has been embraced by popular youth culture.

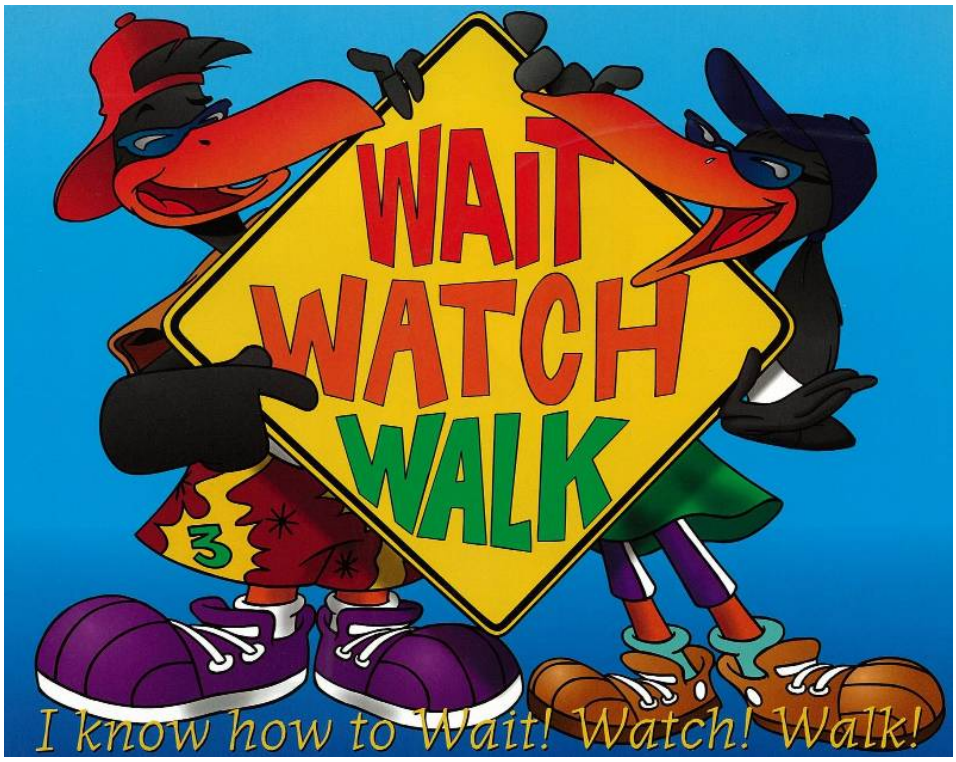
The 'Pinkie' campaign went on to win the AdNews Campaign of the Year Award and the State and National Australian Marketing Institute's Social Marketing Campaign Award of the year. It was also a finalist in the Cannes Advertising Titanium Award.

'Pinkie' campaign advertisement

Speed Blitz Blues campaign

In addition to the advertising campaigns the RTA also embarked on a school education program, at first managed by Rosemary Rouse. A new development was the 'Spiky and Sparky' campaign:

> 'Spiky and Sparky were two anthropomorphic birds and they were part of the first campaign for bus safety. We, the RTA, worked with the Department of Transport in school bus safety and this was at the time of the trial of flashing lights on buses. At the time, yet another child had been killed whilst crossing the road exiting a bus so it was a very strong political and community push for improved bus safety for children, particularly the pedestrian part of leaving a bus. Spiky and Sparky were invented and a television advertising campaign and a print media advertising campaign were created and pamphlets were created and distributed to all parents of children in primary school. Really, this was the first time that a school education program had been involved in a public education campaign so it really broke new ground and set the scene for the school bus safety ads and the pedestrian safety ads that you see today.' (Rosemary Rouse, Disc RTA-RS1, CD Track 5)

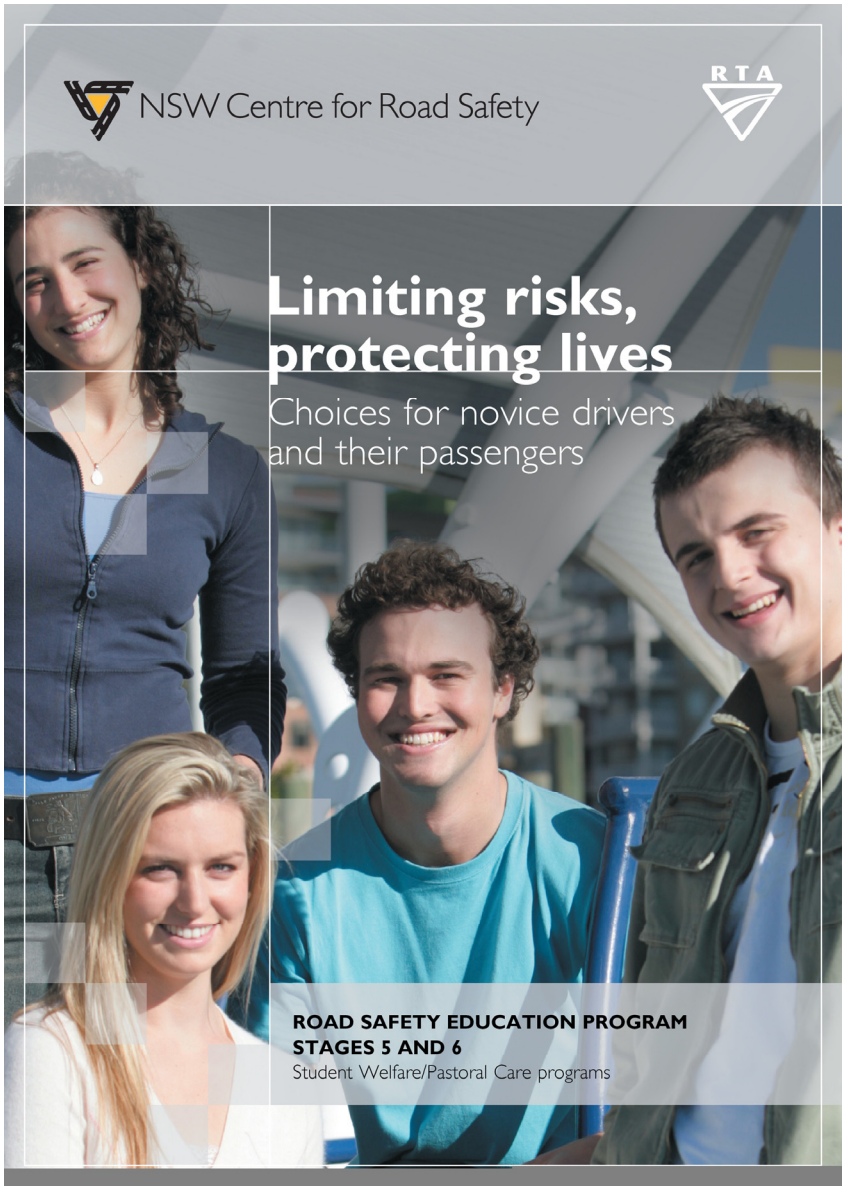


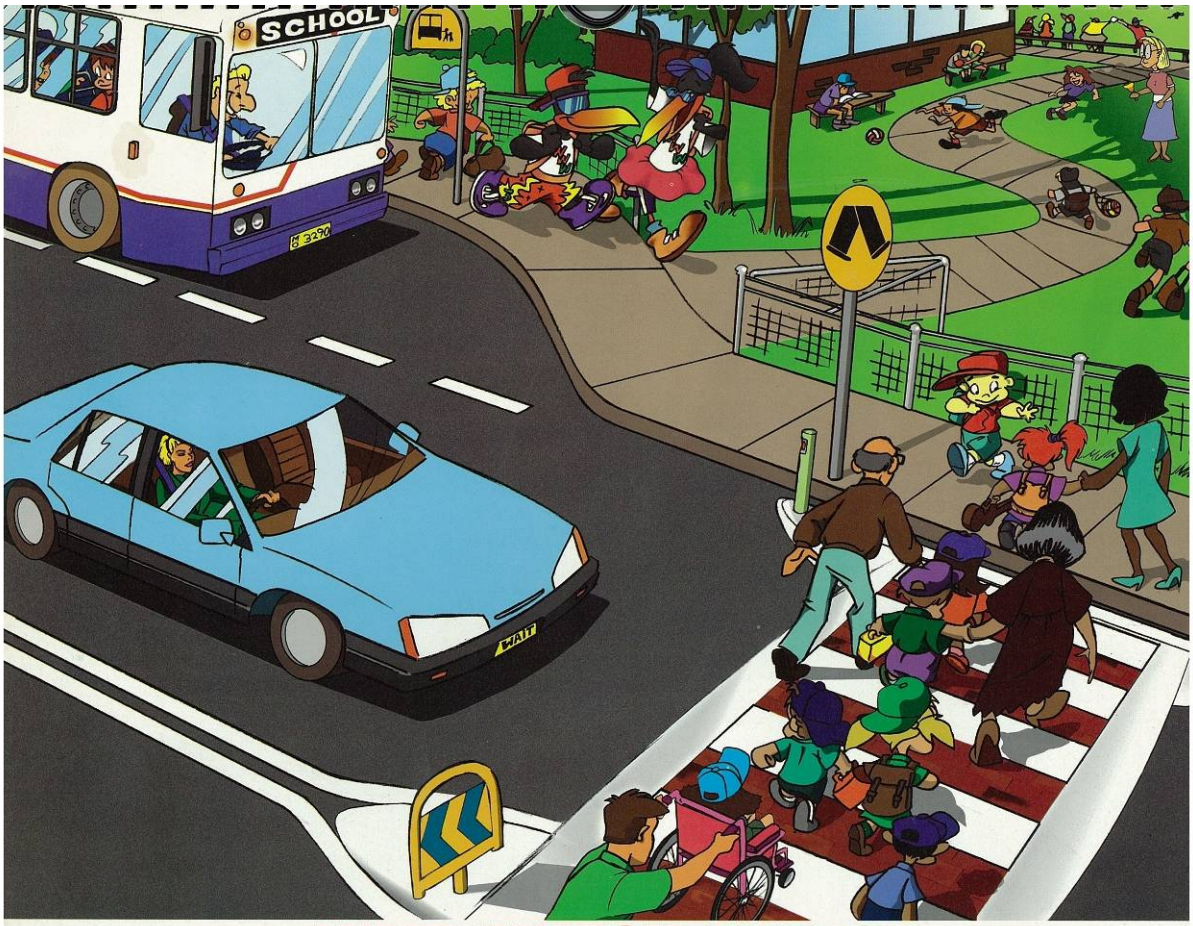
Maureen Elliott manages the school education program today:

> 'In New South Wales there are three main education agencies that help to deliver education curriculum to students from Kindergarten to Year Twelve. We've been very fortunate that road safety has been integrated into our mandatory curriculum, so every child attending school from Kindergarten to Year Ten will have road safety as part of their normal learning program. That's been a huge win for us, other states don't necessarily use those models, but we use that capacity that we have to develop resources for teachers and students along all road safety issues and they are provided free to schools, with training to teachers, and that partnership ensures that road safety is kept high on the agenda of schools, that students are given appropriate road safety at the right time in a sequential and an ongoing way, in an interactive and nurturing environment. And we've had some wonderful outcomes with our road safety education program which has won a number of international education awards and other states will frequently use our resources in developing their own road safety products for schools, so we are very proud of that program. I suppose when we started off, probably about eighteen years ago we didn't have road safety in-built into the curriculum, it was an add-on, a little bit like perhaps when you and I were at school and the policeman came to visit, gave us a talk about crossing the road safely and that sort of thing. It is much more refined now and so much more integrated, so that at any time a student may not even hear the word road safety but can be receiving road safety in a multitude of curriculum areas.
>
> We may start to talk about statistics and in the Maths lesson we will start to draw graphs and get the students to have a look at what the trends in the road toll has been, how many people have been booked, how many people have been hit as pedestrians. In English we most recently have developed a fabulous resource for Years Eleven and Twelve, which are the last two years of schooling, where that correlates with our young drivers and what we have done is used the English curriculum there and built a whole teaching resource around it, so that we've used

road safety ads, newspaper articles, and the students actually look at those, and dissect and critique, and review in terms of literacy, style and learnings and take-out messages, but it is all about road safety. In our Legal Studies we actually put examples of crash cases and simulate the legal outcomes from somebody who may have been speeding, or drinking, or driving unlicensed and going through the legal process, and looking at fault and that type of thing.

Many of our resources are interactive, so the student actually takes on the role of maybe the police officer investigating a crash, the newspaper reporter who is there trying to pull together a story of what happened. There's the coroner who might have to draw conclusions from all the facts that were drawn from the crash site. So we actually get the students actively thinking. One thing about road safety: it's not the RTA in isolation, it actually requires so many stakeholders and participants moving together in the same way, so the child, the parent, the adult, the siblings, the teacher, the community, the RTA, the police, the council, so many partners play a role. If everybody knows and anticipates the potential things that could happen and takes steps to minimise them then we get a better outcome.' (Maureen Elliott, Disc RTA-RS 40, CD Tracks 4 & 5)





WAIT WATCH WALK

Summer **February** 1996

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Parents/Carers, help your child: • locate and apply the 'February' sticker from the sticker sheet (inside the back cover) • dress the push out 'Safe Bear' (from the previous page) with his safety gear • discuss and practise the road safety message • copy this month's slogan in large letters for your child to trace with a crayon.				1 **Term 1** Week 1	2	3
4 Week 2	5 **Teachers Resume** Western Region	6 **Students Resume** Western Region	7	8	9	10
11 Week 3	12	13	14	15	16	17
18 Week 4	19	20	21	22	23	24
25 Week 5	26	27	28	29 This is our LEAP year day		

MOTOR ACCIDENTS AUTHORITY

Wait! Watch! Walk !

RTA

Extract from 1996 'Street Safe' Road Safety Education Calendar

Sign at cemetery along a busy road:
'Drive carefully – we can wait.'

- ORIGIN UNKNOWN

Vulnerable road users

The Vulnerable Road Users program at the RTA is now well established. Maureen Elliott explains the concept of vulnerability on the roads:

> 'I guess everyone of us, at one stage or another, will probably be a vulnerable road user, but traditionally we classify those as the very old, or the older road user, the very young, cyclists, because they quite exposed, motorcyclists, because there's not much between them and the ground, and disadvantaged groups would be another. So vulnerable, I suppose, I would describe as those groups who by virtue of their age, their mobility, their socio-economic status, or the device on which they are accessing the road places them at greater risk and not generally through their own fault, so the programs that we look at seek to try and do two things. One is to work with those vulnerable groups to get them thinking about ways to maximise their safety, but we also then go to the other side and we say, "Well, those of you who are motorists, you need to be aware that a bicycle, for example, there is a person there with a helmet on with not much more protection, they can't move, they don't have the power that you have." Frail people need longer to get across the road in some instances, the very young, being impulsive can dash out. So we work at two levels for our vulnerable groups. We look at strategies to improve those groups, but we also look at strategies to make the more powerful road user, which is generally the vehicle owner, to be more alert and aware and we put in a number of programs for that.' (Maureen Elliott, Disc RTA-RS40, CD Track 8)

School Zone signs

Children are a particularly vulnerable class of road user:

> 'The thing about children, I think, is that they aren't little adults. They may be able to talk and walk the walk, but really, their response times, they are easily distracted. They are not as visible to motorists on the road, they may dart out because they just don't think, they can't judge distance, so all those things that we as adults use in our skills to decide, "Can I get across this road safely, is that car far enough way for me to cross?" - a child doesn't have those skills. So in the absence of those things we try and make other concessions, I guess, to make them safer whilst they transition through.' (Maureen Elliott, Disc RTA-RS40, CD Track 2)

Research showed a huge gap in attitudes of pedestrians and motorists towards each other. Rosemary Rouse points out:

> 'There was a very strong 'us and them' mentality amongst both drivers and pedestrians and the more that you tended to be only a driver, or only a pedestrian, the more entrenched that 'us and them' mentality was. In fact, I know that there is a lot of research around that says everybody is a pedestrian, but the fact is in New South Wales everyone isn't a pedestrian, people park as close as possible to the shop, run into the shop, come out, jump into their cars and move on. Some people, particularly men don't have very many trips as a pedestrian at all and have very little regard and time for them. For example, young pedestrians would say something like, 'Well, I give drivers a death stare and keep on walking,' some older pedestrians said, 'Just quicken your pace, ignore them coming and hold out your hand.' There were pretty dangerous attitudes and behaviours on both sides.' (Rosemary Rouse, Disc RTA-RS1, CD Track 13)

Pedestrian / bullbar impact test, 1996

Alcohol has also become a factor in pedestrian fatalities. Rosemary Rouse identified some important issues in research undertaken in 1997:

> 'It was quite an important factor in what we called the drunk-walker phenomenon. In New South Wales twenty-eight per cent of pedestrians had a BAC of 0.05, so alcohol at the time was a factor in a quarter of all pedestrian fatalities. That was another big push for 40km around pubs, around strips, for example like Oxford Street, Paddington, where there is a very heavy concentration of hotels and nightclubs. The only thing you can really do with alcohol-affected pedestrians is to keep the travel speeds down, and so we had a campaign, a public education campaign late at night. It would start about six o'clock at night and go through to the early hours of the morning for drivers, saying, "If you are in this area or that area there are likely to be alcohol-affected pedestrians, so watch out and slow down." (Rosemary Rouse, Disc RTA-RS1, CD Track 13)

Motorcycle riders are among the vulnerable user groups.

> 'It is probably one of our most challenging areas because of the very high vulnerability of motorcyclists in traffic. We know from other studies that they are something like thirty times more likely to be killed than are vehicle occupants, so their risk is extraordinarily high. They, like pedestrians, would benefit enormously from lower speeds, not only their own speeds but also the speeds of vehicles around them because they are only slightly better protected than are pedestrians. (Bruce Corben, Disc RTA-RS46m CD Track 11)

Motorcycle rider training centre, Clyde

Paul Rees looks back to the 1980s:

> 'The motorcycle road toll was horrendous. In 1982 alone, 203 motorcycles and/or their passengers were killed, that was just terrible and it was something that couldn't continue. But since then we've had a major increase in the number of motorcycles on the road, we now have more than 130,000 registered motorcycles, we are back to about the same number of motorcycles that were registered in the 1980s but our road toll now is a third of what it was at the same time, with the same number of registered motorcycles. (Paul Rees, Disc RTA-RS39, CD Track 3)

The RTA's motorcycle cornering education campaign was a great success. It has been wonderfully well accepted by motorcyclists, and addresses a key factor in serious motorcycle crashes.

Motorcycle cornering and braking campaign

Pedal cyclists are also represented in fatality statistics, as Andy Graham outlines:

> 'The number of fatalities each year is roughly between six and maybe fourteen fatalities per year. A good many more are injured, although we do have issues about not capturing all the pedal cycle injuries because of the nature of the crash, the involvement of children more likely, and perhaps the reticence of police to get involved in accepting pedal cycle reports. We do know from hospital data that there are more people injured as pedal cyclists than we actually end up with in our crash data, so it is a group which is potentially much larger than we think it is and we accept that. It is also a group that is likely to increase with a move towards healthier living, alternative transport and the economic pressures of transport being more

expensive for vehicle use, so it is an interesting challenge.' (Andy Graham, Disc RTA-RS42, CD Track 15)

The RTA is also addressing the issue of vulnerable road users in disadvantaged communities, as Maureen Elliott clarifies:

'One of the interesting programs that is happening at the moment is that we are doing an assessment of sixty-three Aboriginal communities in New South Wales of their road environment and the behaviours of the road users on that land. It is not a blame game, it is looking at it and saying, "Well, some of these private lands have fallen off the map, there is not guttering, there's no tarring, there's no safe surface, there's no speed limit, there's no crossing facility. They've got a school on this mission - where is our school zone, or our processes to try and get those people in and out of those different places on that land?" So it has been a wonderful exercise and it is halfway through now with the final report due in December 2009, but it has been a partnership between the RTA, Aboriginal Land Council, the Department of Aboriginal Affairs, the Department of Local Government plus the community that we are visiting each time we go.

It is a very respectful process, we get invited onto the land, we listen, we observe, we record and then we make our reports, and those reports will be very useful in getting a better understanding as to what can we learn from these environments that might be contributing to road injury for these people. Not necessarily even on their land, but as they move from their land onto a local road to go into town, that route, for example. Many Aboriginal people don't drive and many that do drive don't have a licence and they pile into cars. Now we can say that's against the law – that's fine to say that, but that doesn't help those people. So what we do we try to identify what the issues are for those people to help them to live in comfort and safety and what we can do to assist. So the exercise has been very good in building bridges, I think would be a great way to describe it. There has been little, if any, resistance from any of the communities we've gone into; they are intrigued. Of course, they want outcomes, but they've been very helpful and the partnering and the building of the bridges has been a great catalyst for us to think: where should we go next? So the Aboriginal Land Assessment Program is a wonderful experience that we're moving through at the moment.' (Maureen Elliott, Disc RTA-RS40, CD Track 6)

'The best car safety device is a rear-view window with a cop in it.'

- DUDLEY MOORE

Agency cooperation and the Enhanced Enforcement Program

The introduction of RBT in 1982 ushered in an era of cooperation between all agencies involved in road safety. As part of the ongoing partnership between the RTA and the NSW Police, a Joint Road Safety Action Plan was developed. Part of that Action Plan was a Memorandum of Understanding which clearly outlined the roles and responsibilities of the RTA and Police, as Merv Lane comments:

> 'What RBT did was to bring all of those organisations much closer together and got us talking a lot better. In my day we had a very good, or an excellent, working relationship with all of those organisations to the extent that we introduced a Memorandum of Understanding with a number of them, with the RTA initially so that we could identify what each other's roles were, so that it didn't create any problems. It got better co-ordination - for example, in early days, pre-RBT days and everything, the police would go and do their enforcement on drink driving and the RTA might be advertising or doing publicity on speeding, so there was no co-ordination in the publicity and the enforcement. What we were able to do was to achieve that, not only at a state level but we also achieved it at a regional and a local level and coupled in the councils, as well as the NRMA, MAA and the RTA.' (Merv Lane, Disc RTA-RS9, CD Track 1)

Chris Ford comments on the key priorities in 1995:

> 'The immediate priority was to reduce the road toll and the biggest single issue was speeding and speeding-related crashes, but without a doubt the most pressing issue at that time was the development of the Road Safety 2000 strategy and to get public acceptance and political acceptance of the countermeasures identified in the strategy. Probably the hardest and most pressing task was the strategy document, its public and political acceptability, and in fact, getting the support of Staysafe and other jurisdictions, other government departments involved in safety like Health, Police, Education, et cetera to the strategy, and to submit their involvement. The most pressing task at that time was to get ownership of the document, ownership of the strategy and to get political support for the strategy across different jurisdictions and to lock in the involvement of the other organisations to deliver their parts of the program. The Police became very strongly part of the program, as indeed Education, after a lot of hard work came in as well. The Motor Accident Authority were always very supportive of what we were about. Other agencies, like Health were by comparison lukewarm. Local government was a mixed bag. We had road safety officers in a number of councils throughout the state, but nowhere near the number that were really required to generate local road safety programs at local government level. So the support from local government was pretty mixed, from Health was fairly mixed, Education was good, Police was excellent, NRMA and others was again, very strong.' (Chris Ford, Disc RTA-RS49, CD Track 8)

ROAD SAFETY 2000
MEMORANDUM OF UNDERSTANDING

THE ROLE OF THE ROADS AND TRAFFIC AUTHORITY

The RTA is responsible for developing, implementing and monitoring road safety strategies and policies, undertaking research and co-ordinating road safety programs by other key stakeholders. The RTA promotes safety in the use of the NSW road system, through initiatives and programs relating to:

- human factors (drivers and other road users);
- road, road environment and traffic systems; and
- vehicle and personal safety equipment.

At a **State** (or corporate) level, the Road Safety Bureau of the RTA initiates and co-ordinates strategic programs in consultation with other Branches and Regions of the RTA as well as with other key stakeholders. For major programs the Bureau convenes intersectoral task forces to ensure best co-ordination of these programs and optimal consultation concerning policy and strategic developments.

At a **Regional** level, the RTA initiates and co-ordinates regional and local programs in consultation with the Police and other key stakeholders as well as participating in Statewide programs. RTA Regions also provide strategic guidance on road safety initiatives developed by the Police and other stakeholders.

AGREED JOINT RESPONSIBILITIES

The RTA and Police Service agree that both organisations are bound in common purpose to advance implementation of the ***Road Safety 2000 Strategic Plan***. The RTA and Police at State and Region level are obliged to: share information about current project activities; float new ideas for consideration; develop joint activities for implementation; arrange organisational commitment to action on agreed projects; and monitor performance results and provide feedback to assist future directions.

Police and RTA at State, Region and local level undertake process and outcome evaluation of new and existing activities to identify *best practices* in operations, publicity and education. With regard to policy development, both organisations agree to report to (State) policy groups the results of implementing policy and procedures and generally contribute to strategic policy development.

At State, Region, District and Patrol levels, the RTA and the Police co-ordinate joint road safety initiatives having regard to all principles and objectives outlined in this document.

Bernard Fisk

BERNARD FISK
Chief Executive
Roads and Traffic Authority, NSW

N. O. TAYLOR
Deputy Commissioner
NSW Police Service

THE ROLE OF THE POLICE SERVICE

The Police Service is committed to improving road safety. As a key result area for the organisation, the overall objective is to reduce the number and severity of road crashes in NSW by concentrating Police activities on identified crash locations with emphasis on alcohol and speed related crashes. The key strategies for achieving this objective include:

- *Breath Testing Program* - reduce incidence of drink driving;
- *Speed Management Program* - reduce illegal and dangerous speeding;
- *Heavy Vehicle Program* - reduce speeding, fatigue, drug and alcohol abuse, defective vehicles, and promote owner responsibility;
- *Seat Belts/Helmets* - increase correct use of protective devices
- *Expansion of Technical Support* - develop intelligence and enforcement technology;
- *Road Safety Education* - school and community education and role modelling road safety behaviours;
- *Blackspot Locations* - concentrate enforcement at dangerous locations, advise authorities of needed road improvements where hazards are detected; and
- *Working with Others* - work with other agencies to achieve voluntary compliance by the public to road rules.

At **State** level Police co-ordinate with State and National agencies, especially the RTA, to optimise impact of road safety initiatives. The Police are responsible for advising the RTA on policy, legislative and strategic matters, particularly concerning enforcement implications.

At **Regional** level the Police have a strategic planning role in tandem with RTA Regions, ensuring optimal co-ordination of planned operations.

At **District and Patrol** level Police have responsibility for planning and managing traffic management and road safety operations making best use of all available resources. Police consult the RTA as appropriate on planned road safety operations.

Memorandum of Understanding between RTA and NSW Police Service, 1993

Road Safety Towards 2010

Local Government Road Safety Program

Memorandum of Understanding

The New South Wales Government's strategic plan *Road Safety 2000* provides an integrated framework within which the Local Government Road Safety Program is delivered.

Local Government is represented by the Local Government and Shires Associations and the Institute of Municipal Engineering Australia (NSW Division) for the purposes of this Agreement.

A key component of the Local Government Road Safety Program is the Local Council Road Safety Officer Program which the NSW State Government is committed to funding until 2010.

Through the Local Council Road Safety Officer Program the Roads and Traffic Authority (RTA) and Local Government work together to develop and implement local road safety projects throughout communities in NSW.

The role of the Roads and Traffic Authority

The Roads and Traffic Authority (RTA) is responsible for developing, implementing and monitoring road safety strategies and policies as well as undertaking research.

The RTA promotes safety in the use of the NSW road system, through initiatives and programs relating to:

- human factors (drivers and other road users)
- road, road environment and traffic systems
- vehicle and personal safety equipment.

At the State level, the Road Safety and Traffic Management Directorate of the RTA initiates and coordinates road safety programs in consultation with Directorates and Regions of the RTA, as well as with other key stakeholders.

The Road Safety and Traffic Management Directorate is responsible for the development, production and distribution of road safety education materials, road safety training, the provision of policy advice, guidelines and information, the conduct of research and the evaluation of road safety programs.

The Directorate liaises with Local Government to facilitate the exchange of information to support the delivery of the NSW Local Government Road Safety Program.

The Directorate provides funding to the NSW Local Government Road Safety Program, and is committed to 50/50 funding for the Local Council Road Safety Officer Program, until the year 2010.

The Directorate together with Local Government will identify road safety priorities for the years leading to 2010.

At the Regional level, the RTA will:

- provide assistance and guidance to Council Road Safety Officers
- provide road safety advice and support to local councils
- initiate and coordinate Regional and local community-based programs
- participate in statewide public education campaigns.

RTA

Roads and Traffic Authority NSW

Agreed joint responsibilities

Local Government and the RTA agree to advance the implementation of road safety towards 2010. We will continue to work together through the Local Government Road Safety Program to achieve improved road safety in NSW.

Local Government and the RTA are committed to:

- increasing the priority of road safety within Local Government and Local Government representative organisations
- increasing the road safety expertise and practice (knowledge, understanding and skills) of Council Road Safety Officers and other Local Government personnel
- improving the coordination of Local Government road safety with State and National activities
- facilitating the involvement of road safety networks and partnerships
- demonstrating the impact and effectiveness of the Local Government Road Safety Program.

We agree to consult and work collaboratively towards new 2010 road safety targets. We will continue to develop and implement strategies aimed at further reducing road trauma.

Hon. Carl Scully MP
Minister for Roads

Councillor Peter Woods OAM
President NSW Local Government Association

Councillor William Bott
President NSW Shires Association

Mr Steve Carmichael
President Institute of Municipal Engineering Australia (NSW Division)

Local Government and Shires Associations of NSW

INSTITUTE OF MUNICIPAL ENGINEERING AUSTRALIA

The role of Local Government

Local communities in New South Wales are represented by 177 local councils.

Local councils are responsible for the planning, management and maintenance of approximately 80% of the NSW road network. They are also responsible for:

- bridges, parks and gardens
- planning and building control
- infrastructure services such as waste disposal and flood mitigation, and
- the provision of community services.

Local councils work closely with their community. They are in a prime position to influence and educate a wide range of people and to coordinate activities.

Local councils make the roads safer for their community through engineering, behavioural and other community-based programs.

These include:

- building and maintaining safer roads and bridges
- developing and implementing road safety audits of existing roads and of all new planning and development initiatives
- working in coordination with the community and other agencies to address local road safety concerns
- controlling traffic flow
- promoting awareness and commitment to safe road use through community education programs
- providing pedestrian, cyclist and car parking facilities.

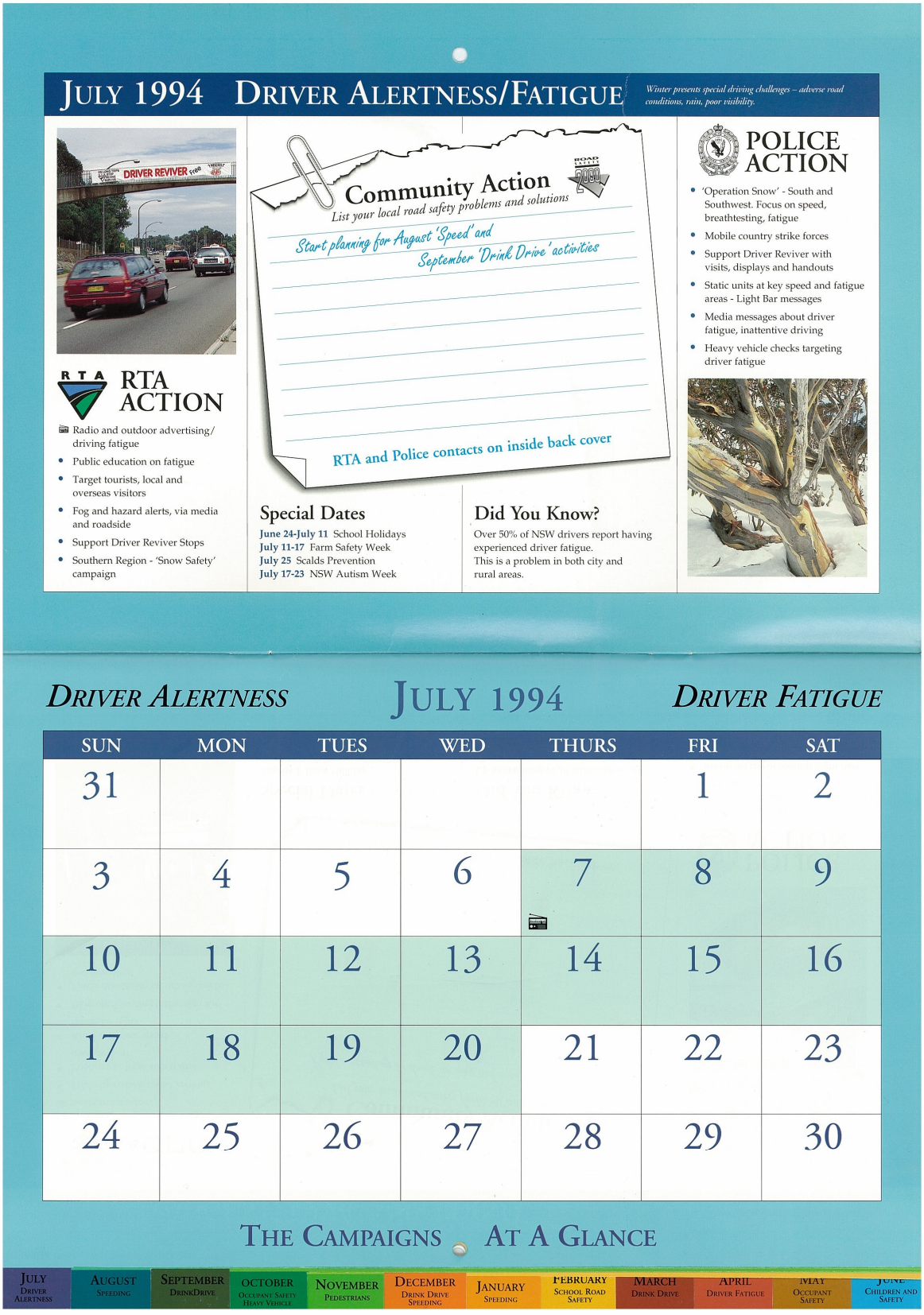
The delivery of these programs and services is supported and facilitated by the Local Government and Shires Associations of NSW and the Institute of Municipal Engineering Australia (NSW Division).

These organisations also offer assistance, information and guidance to Council Road Safety Officers throughout councils in NSW.

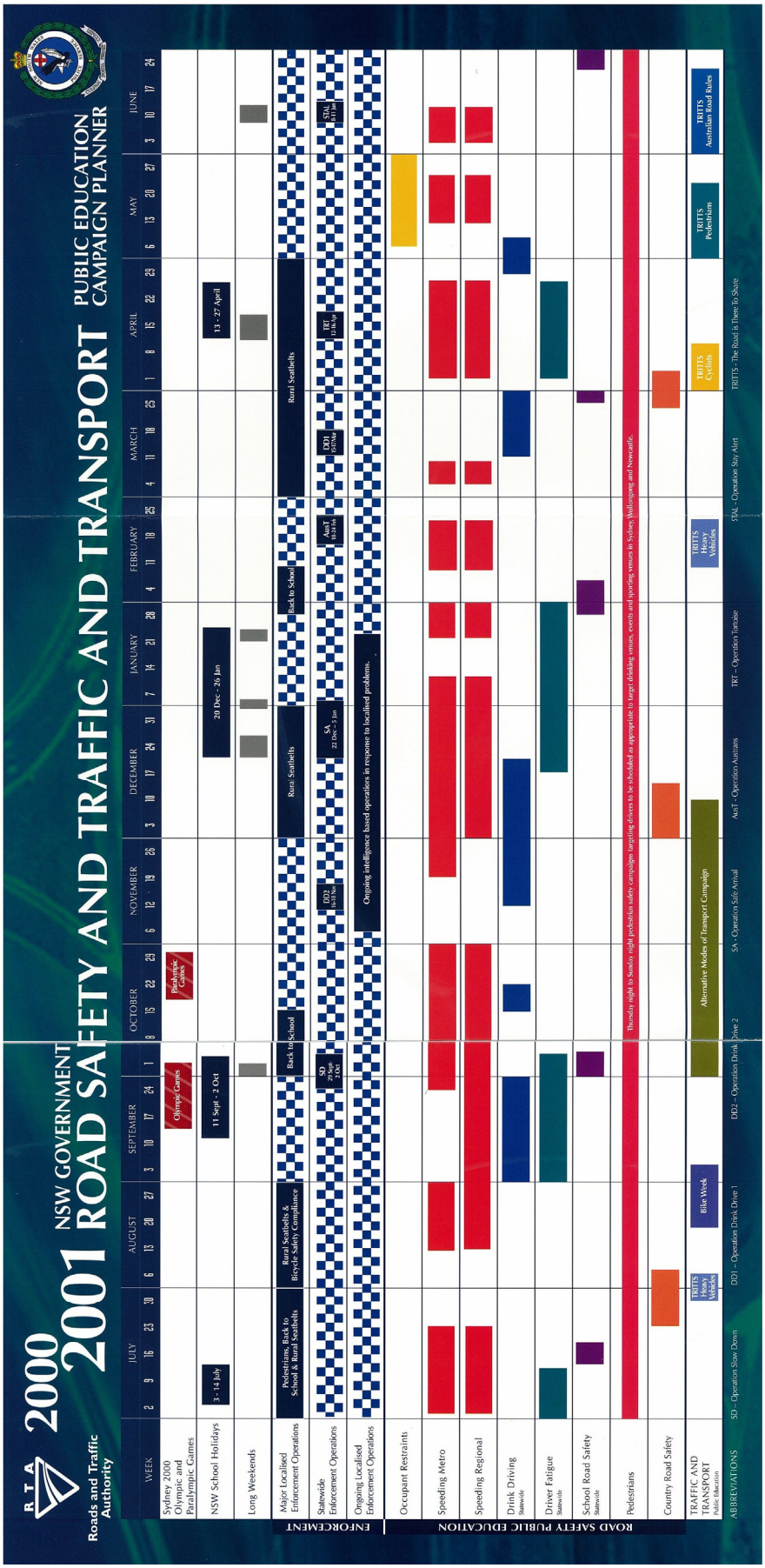
Memorandum of Understanding between RTA and NSW Local Government and Shires Association

In order to accelerate the reduction in road fatalities the RTA embarked on number of new programs with other agencies. Soames Job affirms:

> 'We have a program called the 'Enhanced Enforcement Program' which is, I think, a very innovative and clever way for us, the RTA, to work with police. What we do is we pay police for overtime to add hours of road safety to their normal shift. We pay the overtime on condition that they work the whole shift on road safety as well as the overtime. So we know when we're adding, say, two hours to a ten hour shift by police that we're getting twelve hours of road safety enforcement from that shift. I think that's a very effective programme and I think if we look at the data we'll see that police are doing a large amount of enforcement. I think it's one of the things where personal experience doesn't tell you what's really going on. So, for example, last year police handed out, I think, around forty thousand infringements for people using their mobile phone, yet I still hear lots of people saying, "Oh, no one ever gets caught using a mobile phone" – it's just not true - police are doing a lot of that kind of enforcement, it's just that as an individual we don't necessarily see a lot of it. It's not legal to use a hand-held phone, it's not legal to text and not legal to read a text. Our problem really goes beyond the regulation. It is that people perceive that they are doing it safely and so it comes down to really a better method of enforcement. Now, the police can't be everywhere all the time but I think if people were more aware of how many people actually get caught using a mobile phone they'd see that as more of a risk and we'd see less mobile phone use in cars. But I think ultimately a lot of the time the solution to these problems is actually a technological solution. It would be nice to make it so that mobile phones don't work in cars unless you have a hands-free kit. If you have a hands-free kit then some kind of barrier to its use in the car is overturned. So I think often there are inventive ways to do it.' (Soames Job, Disc RTA-RS23, CD Track 12 & 13)



Extract from the first RTA / Police Service Road Safety Campaign calendar, 1994-95



2000/01 RTA / Police Road Safety and Traffic and Transport Action Planner

'Drive carefully – 90 per cent
of people are caused by accident.'

- ANONYMOUS BUMPER STICKER

Vision Zero and the Safe System

In an ideal world there would be a road transport system where death, serious injuries and trauma would no longer occur. Is this ever achievable? John Knott speculates:

> 'We have always seemed to have accepted right through this long history that there is a cost to using the motor car, the cost to a total systems approach would be the complete separation of pedestrians from motor vehicles, the complete separation of cars travelling in one direction to cars travelling in another direction, it would be the complete separation of low speed vehicles from high speed vehicles and so on and so on. Now that is a massive infrastructure project, it is like something out of a science fiction film that I am imagining, or describing here, and I don't know whether society, whether society, governments are prepared to pay that.' (John Knott, Disc RTA-RS38, CD Track 13)

How does Australia rate in road safety against the world? John Knott remarks:

> 'Up until the 1970s Australia's reputation overseas in terms of road safety was appalling, we were used as an example of one of the worst developed countries for road safety, if you wanted an example of how to do things wrong then you could look to Australia. Since the 1970s, since Victoria introduced the compulsory wearing of seat belts, since we introduced random breath tests, helmet wearing, since speed cameras, since car and road design has improved dramatically, since all of those things, small in themselves but all incrementally have produced a dramatic fall in road fatalities.' (John Knott, Disc RTA-RS38, CD Track 13)

Michael de Roos points out:

> 'Sweden is the world's leader in road safety and it uses the international measure for performance that is benchmarked across the world, fatalities per one hundred thousand people. Sweden is less than five; from memory they are four point nine, four point eight. New South Wales in 2008 got under six for the first time but when I started it was about eight or nine. What is really challenging about Sweden is that travel is not that dissimilar to what we see in New South Wales. Sweden might be a little colder than New South Wales but that actually makes it worse when you think about it - they have to contend with ice, they have to contend with large animals on the road, bigger than kangaroos, the Swedes will drink alcohol as much as the Australians will, so they have to contend with all of that and they still do very well, so that is very commendable.' (Michael de Roos, Disc RTA-RS35, CD Track 4)

Road safety in Australia got a shot in the arm when Claes Tingvall, a Swedish road safety expert with his concept of *Vision Zero*, the notion of zero road fatalities, was appointed to head MUARC, the Monash University Accident Research Centre in 1998. Ian Johnston elaborates:

> 'Claes Tingvall from Sweden came here and he was immensely valuable for this place, just a brilliant forward-thinking Swede who changed the latest placed thought about safety, an absolute visionary. Claes' vision was that no one should be killed or seriously injured while using the public road system and behaving reasonably. What he is trying to do is, historically we always blamed the victim: if someone had a serious crash we would go, "It was because they were speeding, it is because they were drinking, it is because they were on drugs, it is because they had a microsleep" so we'd always look for a behavioural cause for the crash. We were encouraged to

> do that because insurance companies always wanted to apportion negligence, police always wanted to prosecute someone and the vehicle industry promoted this because it meant they didn't have to put as much effort into vehicle design, because it was only the idiots behind the wheel, and the road authorities didn't have to invest in safe road systems, because no matter what they did it was the idiots behind the wheel that caused all the problems. So we had an entire culture that was designed around blaming the individual, blaming the victim.
>
> Now there is lots of bad behaviour out there but there is also an entire population that uses the road system. We don't all behave like hoons, or go out there drunk but we all do make mistakes every day. So what Claes' view was is: you don't have to design a system for people to do two hundred kilometres an hour, or for people who are drunk, but you do have to design a system so that if you are playing by the rules, that is, you are sober and you are alert, and you are well trained, and all of that, a simple mistake will not cost you your life. That is what *Vision Zero* actually means and it switches the emphasis on safe systems to the road engineers and the traffic engineers and says, "Listen guys, we'll worry about legislation and we'll worry about controlling behaviour but you guys have got to worry about developing a really truly safe system," and they never have before. Safety simply was not a primary consideration in design. That's the biggest contribution Claes made, turning that thinking on its ear.' (Ian Johnston, Disc RTA-RS44, CD Track 14)

Australia incorporated Claes Tingvall's ideas into road safety thinking and adopted the 'Safe Systems' approach at the national level. Soames Job expands:

> 'The 'Safe Systems' approach really says you have to operate a safe system because people will make mistakes. Indeed, it would take brain surgery to stop humans from making mistakes but our road environment and our travel system shouldn't hand out the death penalty or permanently debilitating injuries for those mistakes. We live in a world where we don't give the death penalty for mass murder, yet we have a system which actually by default results in death for what are actually momentary errors.' (Soames Job, Disc RTA-RS23, CD Track 3)

Michael de Roos adds:

> 'A Safe System is not a strategy, it is a method of engaging and implementing the strategy, so it is a method of actually doing your work. The Safe System is not always that well understood but we are communicating it and teaching people about it. The Safe System says that the entire transport system needs to be managed in such a way that we build a system that is accommodating or forgiving, so you will see more wire rope barrier installed on the side of the road because we know that if cars lose control it will just capture them, slow them down and pull them in. We will build roads where conflicts will not be possible in an ideal world.
>
> Now in fact that is not possible in the real world so we have to manage the conflict points that exist in the network. We have to manage the speed so that they are in fact commensurate with what is the bio-mechanical tolerance of a human being in the event of a crash. Now the research is really well-known. For example, it is actually ridiculous to think that you can drive along at a hundred, or a hundred and ten kilometres an hour on some roads in your two tonne piece of metal, hurtling along, and someone else is doing exactly the same in the other direction and you are going to pass each other separated by a line that is about four inches wide - the physics of that are just horrible if you think about what might happen if something goes wrong, so we need to think this through. It is the combination of speed, physics, it is the

road environment and there is also an element of people being aware of those risks. So that is the Safe System.' (Michael de Roos, Disc RTA-RS35, CD Track 3)

Opinions on Claes Tingvall's concept of *Vision Zero* were bound to be controversial and varied. Barry Elliott's is an example:

'I happen to believe that is not a realistic way of looking at things. I believe that crashes will occur, I believe risk taking will occur. What we've got to do is make the environment as protective as possible so that the least harm occurs but this idea of zero - I think we could spend billions and billions and billions and we'd still have some road crashes.' (Barry Elliott, Disc RTA-RS22, CD Track 6)

Patricia Bryant offers:

'I think Vision Zero is a brilliant model for achieving road safety outcomes. A lot of people would argue that the claims of Vision Zero are very lofty and to have a target of a zero road toll is completely unachievable - maybe it is, but I don't think that makes that model any less appropriate because I think it sets the stage for the aim that we shouldn't be having any deaths on our roads. To have this idea, "Oh, we've only killed five hundred people this year, our road toll is actually okay" is the wrong way to think about it. If we are really serious about road safety we should be trying to avoid any deaths on the New South Wales roads and while I don't think we are necessarily going to achieve a zero road toll any time soon I think with that model in mind it allows road safety practitioners to look at the whole road safety system: safer roads, safer vehicles, safer behaviours, safer speeds, and it basically says "If all those things are working well then death should be minimised", so I think it is a great model.' (Patricia Bryant, Disc RTA-RS33, CD Track 6)

Chris Ford is of the opinion:

'It was always viewed politically as being difficult to sustain from a political point of view. Within that context a Vision Zero - the amount of pressure that the road safety practitioners would be under to achieve the Vision Zero would be absolutely staggering and would be totally inappropriate and unachievable. As a direction for change, however, it is quite different and I think that is what the Swedish model is about. They are simply saying that any death on the road is unacceptable, and that is a totally appropriate position for a politician or a government to take." (Chris Ford, Disc RTA-RS49, CD Track 15)

Andy Graham has this to say:

'It's a philosophy. It is not really designed to be an achievable. It is really desirable, something to strive for. Yes, it would be fabulous if we do get to zero fatalities and I think if we throw enough money at it over time we will eventually get there. But there will always be circumstances of crashes where we'll have to look into it and say "We haven't covered this particular type of situation." I've looked at fatal reports for twenty-five years now and some of the fatal crashes are just so ridiculous you wouldn't think about how on earth you'd come up with measures to intervene in those sort of circumstances. So Vision Zero is not impossible, it is highly desirable, but not really impossible.' (Andy Graham, Disc RTA-RS43, CD Track 11)

Michael Griffiths adds this analogy:

'There's a Zero Goal form of transport already – you know, elevators, lifts, you can't go in a lift and say, "Gee, I'd like to go faster up to the top floor, where's the speed control?" In vertical transport people accept nothing less than zero fatalities. You

> don't go off into a building in the city and say, "Gee, I wonder what the chances of a crash in the lift are today, I think I'll look around for the four-star rated one", so why don't we apply the same principles?' (Michael Griffiths, Disc RTA-RS15, CD Track 12)

Ian Johnston concludes:

> 'Do I think we will ever get zero? No, but neither does Claes, but you've got to put a light on the hill to push people in the right direction. We can at least halve what we've got now, and if you think of that in rate terms that would put us way ahead of anywhere else.' (Ian Johnston, Disc RTA-RS45, CD Track 5)

Mainstreaming road safety

Since January 2007 the RTA has allocated greater emphasis and resources on mainstreaming road safety within the organisation so that it permeates down to every manager. This meant that the Centre for Road Safety, the core responsibility area for road safety in the RTA, works with the rest of the RTA and other agencies across government and the community to implement evidence-based strategies to improve road safety. It also directed the RTA to refresh its approach and increase its commitment to managing road safety initiatives to give it greater priority. Soames Job explains:

> 'The mainstreaming of road safety, I think, is one of the important things that's helping with the road toll and helping the RTA to see that there are road safety gains to be made across the breadth of our work and it's a directive which was actually put out by the Chief Executive, identifying to everyone that road safety is part of their core business, not just the Centre of Road Safety's core business. There certainly are gains to be made there and it is a recognition of the Safe Systems approach directed to the people designing and building roads, and it says to our road maintenance that when we maintain roads it's not just about maintaining the asset but it's about improving the safety of the asset by targeting those works to where we know the safety problems are occurring. I think that this will in the future show us more and more gains. It takes time to make such significant organisational change in a large organisation but it is happening and I think we will see gains for years to come from that.' (Soames Job, Disc RTA-RS24, CD Track 4)

David Saffron adds:

> 'The managers are actually going to be tested on their results, or at least some assessment of what their results could be. As a result they will actually want to learn the right thing to do, so people become more interested. I think that is a big change that I have seen in Road Safety, that there is a much broader interest within the groups of people who can actually do something about it by the strategic approach, and now by this mainstreaming of road safety, two really big changes.' (David Saffron, Disc RTA-RS37, CD Track 9)

We asked Andy Graham what the best thing was for him, working in road safety:

> 'I think the team work, the shared expertise, the knowledge and experience of people that I work with. I think they are such a wonderful body of people and such a dedicated group of people. That has been the most enjoyable thing about Road Safety. You learn so much from teachers and from marketing people, from engineers, from other statisticians, from psychologists, the whole gambit of people that work at the Centre for Road Safety, as well as other people in the stakeholder groups, as well as other RTA people. It just gives you a better understanding of lots of issues, and lots of interesting machinations in terms of issues and directions.' (Andy Graham, Disc RTA-RS43, CD Track 11)

'A car is not the only thing
that can be recalled by its maker.'

- ANONYMOUS

Future directions in road safety

What is the future of road safety likely to be? The latest development in speed management technology has already arrived. Bruce Corben illustrates:

> 'In vehicle technologies it can help to control the speed choice that drivers make. There are things that are happening right now in Australia. You may have heard people talking about Intelligent Speed Assist in vehicle technology that detects what the speed limit is, the location where the vehicle is travelling and that can then introduce different sorts of interventions such as gentle warning systems, audible and visual warnings, through to systems than can actually intervene and make it very difficult to actually drive for any length of time above the speed limit. I think those sorts of technologies are available now and I think it will be only a matter of time before they appear in much higher levels in vehicles. I think there are lots of opportunities now to try and manage people's speeds through variable speed limit setting. We see them outside schools, see them increasingly on motorways and freeways to try and get people to travel at the speed that suits the conditions, so I think there will be more and more of that kind of initiative in the future.' (Bruce Corben, Disc RTA-RS46, CD Track 18)

Intelligent Speed Adaptation unit

Graham Brisbane adds:

> 'What's even more encouraging about vehicles is that the future is brighter than ever. The smarts we can build into cars could make such huge differences. We are very close to having cars that can put out a signal saying, "I'm here in this space," and another car saying, "Oh, you are there, are you? Well, I'd better watch it because unless I change my behaviour I will hit you." Hence the second car will then adjust its behaviour or tell the first car to get out of the way because it can't stop in time, to having cars talk to each other to let them know where they are. Cars can now, for instance, correct when you run over an edge line, they can detect the edge line and if you run over it they can correct you and bring you back, so drowsiness-type situations can be picked up. If an indicator is on it will let you cross, if there is no indicator it says you have wandered and it will either put out a noise or do something. We are not quite sure what the 'do something' is yet but we do know how to detect when things are wrong. It is inevitable over time that we will be able to say where there is a guardrail here, a post here, we'll put a little transponder on a post and the post will say, "Hey, I'm over here, don't hit me" and the car will be able to take evasive action. That sort of thing – in ten to twenty years it will be with us and cars will do that. It will wake you up when you are asleep, it will turn its ignition off or pull you over to the edge of the road safely. There are devices now that can detect if you are drinking, we don't want them introduced into our cars but they are there.' (Graham Brisbane, Disc RTA-RS7, CD Track 2)

Radar technology is also helping to make driving safer:

> 'We've seen some luxury cars, like Mercedes Benz and even the lower priced Volvo come out with radar detection so they can sense if there is an object up ahead and the vehicle is approaching too fast, they alert the driver and in the worst case situation if the driver doesn't do anything these devices can actually apply the brakes, so that is a promising breakthrough. The same with lane changing: if the driver tries to change lanes and the computer detects that there is an object in the way then it can warn the driver and even prevent further steering wheel movement' (Michael Paine, Disc RTA-RS16, CD Track 17)

Chris Ford forecasts:

> 'I think road safety will continue to be a very high profile area, it will still continue to have the level of community and political support that it currently has. If anything, in some areas it will become more a political issue than it is now. I'm thinking about the technology available for enforcement. You've got a whole variety of new technologies becoming available for pursuit cars, for example, for police cars, the highway patrol, the ambulance services, which is enhancing the survival rates of people injured in crashes, so there are a variety of areas there.' (Chris Ford, Disc RTA-RS49, CD Track 15)

Rosemary Rouse predicts:

> 'I think that one of the big challenges for future road safety, and this was a challenge that I was interested in when I was the Manager of Road User Safety was the ageing population. And I remember that we had an expert out from Western Europe and she gave a talk on older road safety and one of the people in the RTA, a senior manager said, 'Yes, we will have to think about that in the next decade,' and she fixed a steely gaze on him and said, 'Well, don't wait for then because it will be you, you'd better start doing something now.' I think that we will see with people who now are sixty and want to drive until they are ninety, and the baby boomers will want to drive, they will want to be active, I mean sixty is the new forty and eighty is the new

> sixty and these people are going to exercise their political power. And so the network is going to have to be reconfigured in some way to keep these people safer for longer and I think that will be a real challenge for the road safety people in the future.' (Rosemary Rouse, Disc RTA-RS1, CD Track 19)

Andy Graham adds:

> 'I think there is tremendous potential to transfer a lot of knowledge that we have developed in New South Wales, as well as some countries like Sweden, UK and the others to developing countries. When you think about the rising road toll - the road toll now is heading towards a figure of close to a million a year and that's largely being driven by developing countries like China and India, as well as the rest of Asia. Their road safety circumstances are very different to ours, they are going through that motorisation period that we experienced in the 1950s, 1960s and 1970s. They are going through all those sort of increases in road trauma, plus they also have huge populations, so it is going to be multiplied even more. That represents a tremendous challenge for the world's road safety community because, as we know, we do a good job of road safety in developed countries like Australia and Western Europe, but the challenge is going to be the trauma amongst the rest of the world. I think the International Road Federation quoted road trauma will become the largest cause of accidental death in the world by 2030. Forget about wars, civil wars, murders and that sort of thing, it is going to be a huge number by 2030 and it is being driven by developing countries like India and China.' (Andy Graham, Disc RTA-RS43, CD Track 12)

Rosemary Rouse has recently been working in Pakistan as a road consultant. She reports on the road safety aspects in that part of the world:

> 'The road safety situation in Pakistan is dire. Invariably when people say to me, "Well, what are you doing here in Pakistan?" and I say "road safety" they all laugh and say, "Well you'll be here forever." It's Rafferty's Rules on the road, anything goes. There is everything on the road, everyone lives next to the road, and so in a sense you really do take your life into your hands when you go on the road. The first project I worked on over there was a road safety campaign that was linked to construction projects on the National Highway 5, the main north-south road. We drove right down into the interior and had a big workshop and then we got into our cars and headed north, and the highway engineers got into their cars and headed south for about five kilometres and the vehicle overturned and they were all injured and had to stay there for a while. I say that to illustrate just how many road crashes, on every trip you took, no matter how short it was, you would see at least one crashed vehicle. Just even driving around Islamabad you see cars into poles, cars into creek beds, cars falling into excavation works in the middle of the city because there was no guardrail put up around the hole. You know it really is a 'driver beware' situation. Nobody really has to go for a licence test and nobody has a copy of any road rules. The only road rule that everyone follows in Pakistan is that smaller vehicles give way to the bigger ones.'

On the other side of the equation there are some positive aspects of road behaviour in Pakistan:

> 'I think that one positive thing over there is that the road is there to share and so drivers realise that everybody, even the man pushing the handcart across the road, has a right to use the road, has an economic necessity to use the road. I think there's more understanding and more willingness to share the road - the feeling over there is very much that these people need to live. I think there is probably something that

> Australia can take from that, something very important, allowing people to earn a livelihood, giving way to people, realising that everybody has a right to use the road.' (Rosemary Rouse, Disc RTA-RS1, CD Track 17)

Rosemary Rouse continues:

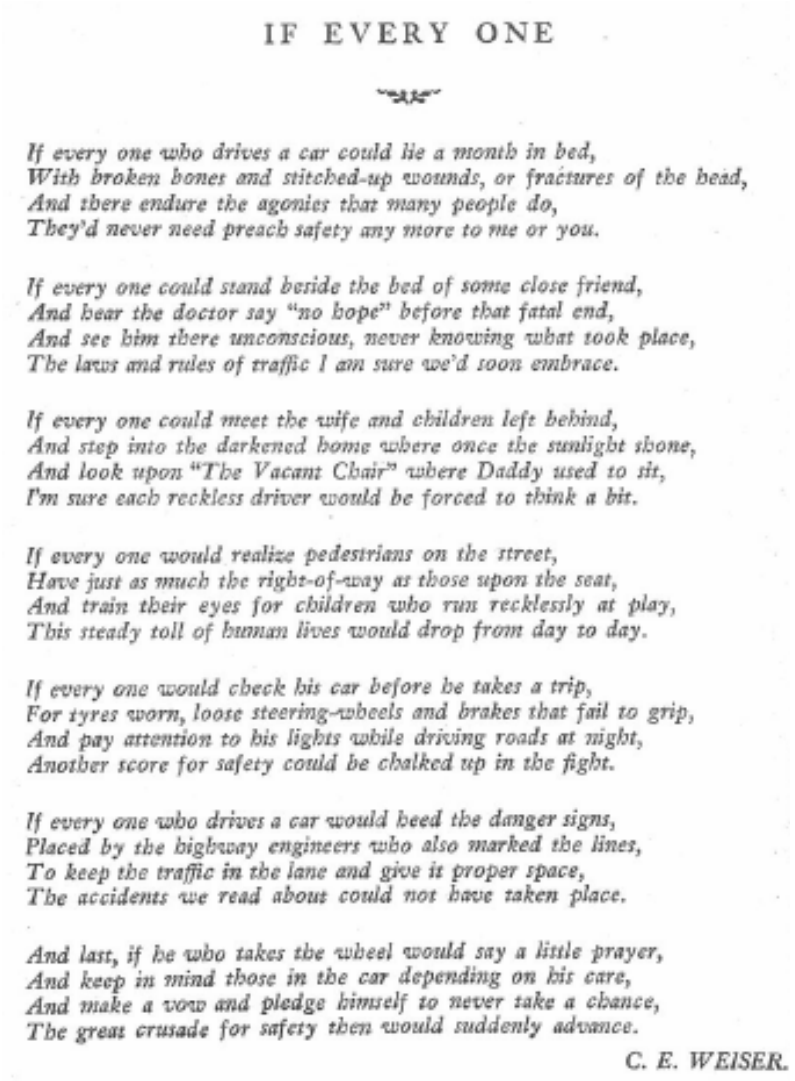
> 'I think road safety is not just a personal issue for individuals, it's very much a political issue. A government has to value road safety, they have to be willing to trial new measures to increase road safety, they have to be willing to support the jurisdiction, to take risks and to go where no one has gone before and place constraints on people's behaviour. When I think about road safety it's been one of the great public health wins, where you do take a public health issue and you can demonstrate that over time you drive down the deaths from this public health issue. You change fundamentally the way people think about wearing a seat belt, using a helmet, driving at the speed limit - these are fundamental shifts in the way people think and they are permanent changes in behaviour.' (Rosemary Rouse, Disc RTA-RS1, CD Track 19)

Michael Henderson adds this final comment:

> 'If you are going to continue improving the situation then you have to put the resources into the road, you have to put resources into the motor vehicle, you have to pay attention to human behaviour and how to modify it where possible, or adapt to it where it is not possible, and there I think alcohol is the major thing. But you are not seeing the kind of rate of change now that you saw ten years ago. At best it has been plateauing in terms of rates and numbers, which in itself is a credit, it is not rising, but we have to be terribly careful of that because it may happen again. I think the lack of commitment to improving the worst of the roads, for example, is an example of complacency. People have thought "Well, we have done pretty well, road safety is not the problem that it was thirty years ago, therefore we can go and spend money on something else." No, I think you need that commitment, you need the continued commitment, and the more improvements you make because of diminishing returns the harder it is to improve the system even further.' (Michael Henderson, Disc RTA-RS3, CD Track 13)

'The road toll should not be accepted as inevitable.'

- THE NATIONAL ROAD SAFETY STRATEGY 2001-2010



IF EVERY ONE

If every one who drives a car could lie a month in bed,
With broken bones and stitched-up wounds, or fractures of the head,
And there endure the agonies that many people do,
They'd never need preach safety any more to me or you.

If every one could stand beside the bed of some close friend,
And hear the doctor say "no hope" before that fatal end,
And see him there unconscious, never knowing what took place,
The laws and rules of traffic I am sure we'd soon embrace.

If every one could meet the wife and children left behind,
And step into the darkened home where once the sunlight shone,
And look upon "The Vacant Chair" where Daddy used to sit,
I'm sure each reckless driver would be forced to think a bit.

If every one would realize pedestrians on the street,
Have just as much the right-of-way as those upon the seat,
And train their eyes for children who run recklessly at play,
This steady toll of human lives would drop from day to day.

If every one would check his car before he takes a trip,
For tyres worn, loose steering-wheels and brakes that fail to grip,
And pay attention to his lights while driving roads at night,
Another score for safety could be chalked up in the fight.

If every one who drives a car would heed the danger signs,
Placed by the highway engineers who also marked the lines,
To keep the traffic in the lane and give it proper space,
The accidents we read about could not have taken place.

And last, if he who takes the wheel would say a little prayer,
And keep in mind those in the car depending on his care,
And make a vow and pledge himself to never take a chance,
The great crusade for safety then would suddenly advance.

C. E. WEISER.

From *"Now There's No Excuse – A Guide to Safe Driving"* by Priscilla Hughes (Angus and Roberston, 1952)

List of interviewees

Name	***Disc No.***	***Date***	***Place***	***Duration***
Rosemary Rouse	RTA-RS1	30/04/2009	Cremorne NSW	73 mins
Dr Michael Henderson	RTA-RS2-3	14/05/2009	Pittwater NSW	124 mins
Harry Camkin	RTA-RS4-5	14/05/2009	Cremorne NSW	85 mins
Dr Graham Brisbane	RTA-RS6-7	18/05/2009	Cremorne NSW	93 mins
Merv Lane APM	RTA-RS8-9	19/05/2009	Blacktown NSW	120 mins
Peter Croft	RTA-RS10-11	20/05/2009	Cremorne NSW	84 mins
Russell Watsford	RTA-RS12-13	21/05/2009	Cremorne NSW	90 mins
Michael Griffiths	RTA-RS14-15	22/05/2009	Caringbah NSW	110 mins
Michael Paine	RTA-RS16	25/05/2009	Cremorne NSW	62 mins
Steve Levett	RTA-RS17-18	26/05/2009	Cremorne NSW	95 mins
Ross Dal Nevo	RTA-RS19-20	01/06/2009	Cremorne NSW	101 mins
Barry Elliott	RTA-RS21-22	01/06/2009	Cremorne NSW	86 mins
Dr Soames Job	RTA-RS23-24	03/06/2009	Cremorne NSW	70 mins
Bruce Dowdell	RTA-RS25-26	04/06/2009	Cremorne NSW	55 mins
Dr Peter Vulcan AM	RTA-RS27-28	11/06/2009	Beaumaris Vic	71 mins
Ray Taylor	RTA-RS29-30	11/06/2009	Canterbury Vic	95 mins
John Bevins	RTA-RS 31	21/06/2009	Cremorne NSW	61 mins
Dr Patricia Bryant	RTA-RS32-33	23/06/2009	Cremorne NSW	80 mins
Dr Don Carseldine	RTA-RS34	25/06/2009	Cremorne NSW	67 mins
Michael de Roos	RTA-RS35-36	30/06/2009	Cremorne NSW	77 mins
Dr David Saffron	RTA-RS37	01/07/2009	Cremorne NSW	65 mins
Dr John Knott	RTA-RS38	06/07/2009	Canberra ACT	69 mins
Paul Rees	RTA-RS39	08/07/2009	Cremorne NSW	45 mins
Maureen Elliott	RTA-RS40-41	10/07/2009	Cremorne NSW	68 mins
Andy Graham	RTA-RS42-43	15/07/2009	Cremorne NSW	129 mins
Prof. Ian Johnston AM	RTA-RS44-45	20/07/2009	Clayton Vic	74 mins
Dr Bruce Corben	RTA-RS46	20/07/2009	Clayton Vic	68 mins
Prof. Jack McLean	RTA-RS47-48	21/07/2009	Norwood SA	83 mins
Chris Ford	RTA-RS49	29/07/2009	Cremorne NSW	62 mins

Interviewees' biographies

John Bevins

One of Australia's advertising bright sparks, John Bevins is a Creative Director with a social conscience. After leaving school he started as an 18-year old despatch boy at a leading Sydney advertising agency where Bryce Courtenay was Creative Director at the time. He was able to break into copywriting and started his own agency in 1982. The NSW Minister for Transport was among his early clients and his first road safety campaign was for the Australian Medical Association. Directed at young hard-drinking working-class males in Wollongong, it achieved an 87% awareness in its target audience.

John went on to produce many campaigns for the RTA - among them the RBT television commercials which included the memorable line: 'How will you go when you sit for the test? Will you be under .05 or under arrest?' His advertising agency, John Bevins, also produced bicycle safety booklets featuring cartoons drawn by Spike Milligan and the 'Microsleep', 'Heaven and Hell', 'Brain', 'Circadian Rhythms', 'Street Wise–You Legend' and 'Drinking Kills Driving Skills' campaigns. His agency has a long record of producing effective social marketing campaigns.

Dr Graham Brisbane

Armed with a degree in Civil and Structural Engineering from the University of Sheffield Graham Brisbane arrived in Australia in 1970 to start work with the Department of Main Roads, building roads all over New South Wales. He enthusiastically embraced the first Blackspot program (known as the Casualty Accident Reduction Program) in 1988 which was the first program to specifically look at roadworks designed to address road safety. He pioneered changes in the appearance of signs, introduced the computer program TRACKS into the Illawarra region which modelled and analysed traffic data and future projections based on proposed land development.

He became involved in developing Intelligent Transport Systems, such as using variable speed message signs to provide real time information on hazards based on queue and rain detectors in the road surface. In 1987 he obtained a PhD from Wollongong University for his work to improve the fog detection warning system on the F6 Freeway, making it more responsive to changing weather conditions and the speed of vehicles. As manager of Road Environment and Light Vehicle Standards from 2001 to 2004 he was involved with developing testing methods for cars, roadside furniture and wire rope barriers. He introduced the mandatory use of Road Safety Audits in specific works and is regarded by his peers as a guru in vehicle and road engineering technology.

Dr Patricia Bryant

The RTA's Principal Behavioural Scientist, Dr Patricia Bryant started in the RTA as a Program Officer in 1998 and found that working in road safety policy was both challenging and interesting. Her portfolio includes the issue of drug driving. An emerging trend of drugs in drivers killed from coronial data led to the need for new policy in the drug driving area. Patricia worked on the development of new drug driving policy and along with NSW Police and NSW Health and the Attorney General's Department developed the legislation to introduce roadside drug testing in NSW. Currently around twenty-five thousand drug tests are carried out each year by Police.

Patricia also worked in the policy area on mobile phone use while driving and managed research and developed strategies used to inform public education campaigns addressing Driver Fatigue and Drink Driving. With the Department of Corrective Services and the Motor Accidents Authority, Patricia was also involved in the implementation and evaluation of the NSW Sober Driver Program. This program, which is aimed at drink driving recidivists, is a nine week education and rehabilitation program delivered by Probation and Parole. Patricia was also involved in the ongoing implementation of another drink-drive initiative, the Alcohol Interlock Program.

Patricia was the 2007 recipient of the Road Safety Practitioners Award at the Australasian Road Safety Research, Policing and Education Conference in Melbourne.

Harry Camkin

Harry Camkin's career has been varied and successful, spanning many periods and organisations which have included the Department of Public Works, Department of Motor Transport, Traffic Authority and the RTA. As Director of the Traffic Authority from 1976 to 1988 his major contribution was to bring many separate entities and administrations concerned with road safety together under a single banner until it reached a stage where it could be considered as a road safety profession.

He was also important in pushing for the establishment of Staysafe, the NSW Parliamentary Committee on Road Safety, commissioned the research on the introduction of Random Breath Testing in NSW and brought out the report 'Towards Road Safety 2000'. He considers his major legacy to be the reduction in the road toll from 25 to 10 fatalities per 100,000 population during his time in public office.

Dr Don Carseldine

Don Carseldine's work toward his Honours degree and Doctorate in Psychology during the 1970's and early '80s was in the area of driving skills other than vision that drivers use in controlling a vehicle. He first joined the Traffic Authority and then subsequently the Road Safety Branch of the RTA as a Behavioural Scientist, working mainly on countermeasures to driving under the influence of alcohol and other drugs and driver fatigue. Between 1991 and 2001 he was Manager of Licensing Policy in the RTA. In this role, he led the RTA's work on diverse projects, including its Graduated Licensing Scheme and on prevention measures for unlicensed drivers.

He then worked in the Road Safety Strategy Branch of the RTA in the role of Manager, Speed Management. His responsibilities included leadership of policy development for fixed speed cameras, red-light cameras and the promotion of the use of occupant restraints and rider helmets.

Dr Bruce Corben

Bruce Corben joined Monash University Accident Research Centre (MUARC) as a Senior Research Fellow in 1993 following a twenty-year career in the fields of traffic management and road and traffic engineering safety. The principal focus of his research activities lies in developing approaches to road infrastructure design and system operation that meet the aspirations of Australasia's Safe System. His main areas of expertise are in the safety of pedestrians, roadsides, intersections and motorcyclists, as well as matching travel speeds to the inherent quality of roads and roadsides. These areas of expertise have been integrated to develop evidence-based road safety strategies for Australian jurisdictions. A strong theme of his research involves innovation generated from the principles underpinning best practice approaches of the leading road safety countries of the world.

He has on many occasions been requested to provide specialist advice on a wide range of road safety topics to State Government Ministers, parliamentary road safety committees, senior government executives, professional groups and community interest groups.

Peter Croft

As Dr John Lane's Human Factors Engineer, Peter Croft researched speed control in the early 1970s before joining TARU to provide solutions to pedestrian traffic facilities and crossings, seat belt mechanisms, child restraints, street lighting and conducting crash investigation. In addition he contributed to changing the prima facie speed limit to an absolute limit and helped to introduce the priority roads system. Peter also presided over trials with B-Doubles and was instrumental in bringing Road Safety Audits into existence.

He has extensive experience in traffic engineering and road safety in the public sector, becoming Manager of Road Environment Safety at the RTA. His responsibilities have included developing road environment safety policy and guidelines, overseeing speed management programs and developing safety management systems.

Peter joined ARRB Group's Sydney office in June 2006 to take up a role involving a mix of research and consulting activities.

Ross Dal Nevo

Ross Dal Nevo is a Mechanical Engineer and manager of the Centre for Road Safety's new Crashlab facility at Huntingwood, in western Sydney.

Ross started with the Traffic Accident Research Unit (TARU) at Rosebery in 1984 as a Research Engineer. His early work included input into several Australian Standards and major involvement in obtaining Crashlab's NATA accreditation for helmet testing in 1988. In the late 1980's he conducted a comprehensive evaluation of vehicle occupant restraint technologies in a joint project with the US Department of Transportation using Australia's first Hybrid III crash test dummy. In the early 1990s he was heavily involved in the research and development work that supported changes to the Australian Design Rules for compulsory three point seat belts in inter-city coaches. In 1992 he commissioned the original RTA crash barrier at Rosebery and managed the inaugural test program for the Australian New Car Assessment Program (NCAP). In the late 1990's he initiated Crashlab's development of a roadside furniture test capability that has now being incorporated into the new test facility at Huntingwood.

Crashlab, with its fully-equipped laboratory and highly skilled and experienced staff is recognised as a world-class testing facility and is a major contributor to the Australasian New Car Assessment Program (ANCAP) and Australia's body of knowledge in vehicle occupant and road user protection technology.

Ross' experience from research engineer to Manager Crashlab has included more than 900 vehicle crash tests to date conducted for various industry, government and road safety bodies.

Michael de Roos

Michael de Roos applied for a job with the DMR but actually started work in the RTA in the months that the RTA was created late in 1988. Starting as a road designer, he is now General Manager, Safer Roads within the RTA. He has worked and travelled extensively in Europe and brings an international perspective to road and traffic facilities design. He is an advocate of the *Safe System*, the philosophy of which is that the entire transport system needs to be managed in a way to accommodate human error and be forgiving.

Michael has had wide experience in speed management and was part of the team that introduced the 50 km/h general urban speed limit. He has been involved with red light and speed cameras from the beginning and managed the installation of the first of the modern generation of fixed digital speed cameras on the Burringbar Range, the forerunner of subsequent fixed speed camera installations. He has extensive experience developing and managing speed management programs.

He is currently General Manager of the Safer Roads Branch in the NSW Centre for Road Safety and has recently completed a ten-year project to produce Speed Zoning Guidelines. Michael is a passionate believer in a scientific evidence-based approach to road safety.

Bruce Dowdell

Currently the Senior Environmental Specialist (Air & Greenhouse) in the Environment Branch at the RTA, Bruce Dowdell worked in Road Safety for 25 years, starting in TARU in the 1970s. He was involved in accident investigations and the impact testing of seat belts, car and coach seats, child restraints, helmets, airbags, roadside barriers and frangible light poles and sat on a number of associated Standards Australia committees. He presented papers on the use of market forces to drive improvements in vehicle safety. As Manager, Crashlab he was project manager for the construction of the crash barrier facility at Rosebery that made it possible to publish the results of crash testing of cars.

Subsequently as the RTA's Manager Vehicle Standards, during the period when the responsibility for setting vehicle standards was transferred from the States to the Commonwealth, he successfully advocated for occupant protection in buses. He also led a review of the safety of loads on vehicles, initiated safety recalls for heavy vehicles and conducted research on heavy vehicle braking.

Barry Elliott

Barry Elliott, with a double Honours degree in Commerce and Economics, as well as a Diploma of Education under his arm became Manager of Consensus Research in his early twenties and then shot up to become Research Director of John Clemenger Advertising. Later he set up his own research consultancy, Elliott & Shanahan Research. For its first road safety campaign the firm was awarded a national drink-driving campaign using Dave Cronin from 'The Sullivans' television series as its presenter.

Barry conducted the initial surveys and provided the research for the introduction of Random Breath Testing in New South Wales to the Staysafe Committee, which then passed through the NSW Parliament. Barry has researched every area of road safety, including speed, fatigue, restraints, helmets, mobile phone use, bicycle and motorcycle safety in Victoria and New South Wales. He is an expert in campaign evaluation and in the psychology of humans in order to effect behavioural change.

Maureen Elliott

Maureen Elliott started her career in nursing and over the next eighteen years saw many victims of motor car collisions admitted to the emergency departments of hospitals. She joined the RTA in 1998 as Manager of School and Youth Programs where she began to regard crashes not as accidents but as preventable incidents.

Now General Manager of the Safer People Branch in the Centre for Road Safety, Maureen stresses the importance of research to underpin the programs and policies developed at the RTA. Her main areas of interest are Enforcement and Education. That includes partnerships with the Police under the Enhanced Enforcement Program and with education agencies where road safety continues to be integrated into the school curriculum from preschool to Year 12.

Another area of concern under her banner are Vulnerable Road Users, which include pedestrians, children, cyclists, motorcyclists, the aged and Indigenous communities. Her latest initiatives are concerned with restraints for children between the age of one and seven, who are presently not compelled to use an approved device.

Chris Ford

Chris Ford has had a distinguished career in road safety and traffic management spanning more than 39 years, rising to become Director of Road Safety and Traffic Management at the RTA. During that time he trialled radar speed devices, improved accident rates at uncontrolled intersections by installing traffic signals and found solutions for Black Spot locations. He presided over the introduction of speed and red light cameras and their associated legalities and rolled out an extensive installation program of fixed speed cameras in NSW.

Under his directorship he reduced the general urban speed limit throughout the state from 60 km/h to 50 km/h against wide opposition from some councils. He followed that up by introducing a 40 km/h speed zone around schools, hospitals and areas of high pedestrian activity. He also developed and expanded the 'Road Safety 2000' strategy, gaining political support for it from Staysafe, other jurisdictions and government agencies.

He believes that the biggest gains in road safety can be made by improving the road environment, particularly in urban areas and sees road safety as primarily a health issue.

Andy Graham

The RTA's Principal Statistical & Trend Analyst, Andy Graham started with TARU in 1983, initially assisting the senior researchers evaluating the effectiveness of RBT, which had been introduced some months earlier - the first big evaluation of a road measure within NSW. His job as statistician is to sift through the crash data to analyse patterns and discover variances and deviations from the patterns, looking for over-representation of particular groups and what it is that makes them different. Once that is known he can start identifying, creating and implementing countermeasures to address those characteristics. The last stage in the process is to evaluate how effective those countermeasures have been.

He considers the main reduction in fatality rates since the peak of 1970 to be due to compulsory seat belt wearing, drink-drive enforcement, general reduction in speed limits, measures such as the Graduated Licensing Scheme, speed and red light cameras, better vehicle and road environment design, Safe-T-Cam and highly-effective advertising campaigns, such as the 'Pinkie' campaign to bring the road safety message home to the public. To demonstrate the effectiveness of these measures he quotes the reduction in fatality rates from 28.9 per 100,000 of population in 1970 to 5.4 in 2008.

He points out that the best thing about working in road safety is the dedication and expertise of the teams in the Centre for Road Safety.

Michael Griffiths

An undisputed road safety guru to his peers, Michael Griffiths began his career in road safety by joining TARU in 1976 in on scene crash and injury cause investigation. He has qualifications of Bachelor of Mechanical Engineering and a Master's degree in Biomedical Engineering. Michael has visited the scenes of hundreds of crashes, many with vehicles and injured people still on scene. He continues to attend Sydney's Glebe Forensic Pathology unit to review fatal injury mechanisms first hand. His commitment to applied research and innovative implementation strategies to improve road safety stands out.

When appointed to head the TARU test laboratory in 1983, one of his first priorities was to find out where the rest of the world was up to in vehicle safety, for example why weren't airbags coming to Australia? In 1985 he commenced the first of over 30 visits (mostly self funded) to overseas research conferences and test facilities.

He is proudest of the achievements of the successful team he built, and the innovative implementation strategies they used to get vehicle safety improvements in place. Their work included research into adult restraint systems, child restraint systems, helmets, and vehicle crashworthiness including cars, motorcycles, buses and coaches. In 1985/87 he initiated a collaborative research arrangement with the US Dept. of Transport, and then secured the funding to set up a crash barrier at Crashlab. Programs he initiated include ANCAP and CREP. He and his colleagues believe that you can conduct all the research in the world about a problem and its possible solutions, but it is what gets implemented that saves lives. Michael is now an independent road safety consultant.

Dr Michael Henderson

Born from an Australian father and Scottish mother, Michael Henderson grew up in England where he became a medical doctor. He joined the RAF, where he specialised in aviation medicine and became a parachute rescue medical officer. He also happened to be a motor racing enthusiast and built his own Lotus racing car. In the mid-1960s he became concerned by the number of race car driver fatalities in Formula One and all other categories and, following a year's research, wrote a seminal book: *Motor Racing in Safety: the Human Factors.* He invented a multi-point harness for race car drivers at a time when no seat belts were being worn in open competition cars.

After moving to Australia in 1968, he soon afterwards became Director of the newly-established Traffic Accident Research Unit (TARU) of the (then) Department of Motor Transport. At TARU he led research and development in the design of seat belts, child restraints and booster seats, infant capsules and bassinets, safety helmets and car seats. He also introduced a dynamic crash sled, drafted the regulations for seat-belt wearing and the use of the breathalyser in New South Wales, and established several teams of in-depth crash investigators. These activities and many others turned TARU into the largest multi-disciplinary road safety research organisation in Australia at the time. The test laboratory in TARU evolved into today's Crashlab. Later in life he wrote *Living with Risk,* which won the Science Book of the Year award in the UK. He has been the Chairman of the Federal Government's Advisory Committee on Road Trauma and of many other government committees. He is credited with bringing a scientific approach to the road safety field during a period which saw the start of a steady downturn in annual road deaths. Until his recent retirement he was an independent road safety researcher and consultant. He remains a major figure in road and motor sport safety worldwide.

Dr Soames Job

As Director of the NSW Centre for Road Safety, Soames Job takes ultimate accountability for road safety within the RTA. He started as a senior behavioural scientist in the Traffic Accident Research Unit (TARU) in 1980. In 1982 he was a key player in the introduction and refinement of Random Breath Testing in NSW. He continued to conduct research and provide policy advice in road safety while Director of the Health and Safety Psychology Research Unit at the University of Sydney.

Soames' expertise in road safety is recognised internationally. His advice is sought by various countries and states, as well as acting as a road safety trainer for various country road safety leaders on behalf of the World Bank Global Road Safety Facility. He is also a member of the United Nations Road Safety Collaboration.

He is a believer in the use of psychological principles of behaviour change, and Cognitive Dissonance, where, when people's attitudes and behaviour don't match, and behaviour can't be changed, attitudes tend to change to match behaviour. He has published two books, over 260 research papers and delivered over 300 conference addresses. He is listed in *Who's Who in the World* for his contribution to research.

Prof. Ian Johnston AM

A former Director of the Monash University Accident Research Centre and now an adjunct professor, Ian Johnston runs his own consultancy in transport safety services. He also serves on the National Road Safety Council, the Core Advisory Group of the World Bank's Global Road Safety Facility and the board of the Driver Education Centre of Australia and is Deputy Chair of the National Transport Commission. He has almost 180 publications and major presentations to his credit and has received several national and international awards for his work in road safety, including an Order of Australia. Throughout the 1990s Ian was Managing Director of ARRB Transport Research. Before that he was a researcher and program administrator in road safety with the Australian federal government, Chief Scientist (Human Factors) at ARRB and Director of Road Safety at VicRoads.

Ian completed his PhD studies working with Dr John Lane and Professor Ron Cumming in the Human Factors Group at Melbourne University. He then joined the newly-set up (federal) Road Safety Research Group as a psychologist, delving into the behavioural causes of road crashes and trying to achieve an error-tolerant road system by making various recommendations, such as installing chevron markers and wider edge lines. As Director of Road Safety at VicRoads he oversaw the implementation of many road safety measures, which included working with the Victorian Police to evaluate and enforce random breath testing and setting up the Bicycle Helmet Rebate Scheme.

In later years his interest in road safety has been to improve the interface between researchers, policy makers and decision makers and address the cultural issues which make it difficult to achieve change. He is also focusing on the issue of how innovation and injury prevention does or does not find its way into public policy and practice.

Dr John Knott

John Knott is an historian at the Australian National University who has made a thorough study of the history of motoring in Australia and has published many papers on the subject. In his interview for this oral history project he provides valuable statistical information dating back to 1896 and colourful accounts of life with the motor car from the early years of the 20th century to his thoughts on the future.

His area of research covers licensing, speed limits, vehicle technology, the victims of motor car fatalities, pedestrian safety, road technology, publicity campaigns, drink driving, seat belts and the role of the motoring organisations. He also provides insights into how thinking about road safety has changed in what he terms the five paradigms: the 'Accident' Paradigm, the 'Legislative' Paradigm, the 'Enforcement' Paradigm, the 'Scientific' Paradigm and the 'Engineering' Paradigm. Finally, he compares Australia's road safety record with that of Western and developing nations.

Mervyn Lane APM

At the age of fifteen Merv Lane joined the police force as a Cadet in 1956 where he learned to be adept at shorthand and typing. After serving stints in various Police Stations, Police Headquarter, C.I.B and Traffic Branch he performed school crossing duties at various schools in Cadet uniform. On completing his initial Police training at Bourke Street, Redfern in 1959 he performed General and Traffic Duties at Regent Street Police Station before being transferred to the Traffic Branch. He remained in the traffic management, enforcement and education areas for the remainder of his service, progressing from Constable to Superintendent until he retired as Commander, Traffic Services Branch in 1996. During that period he successfully completed the Traffic Planning and Control course at the University of NSW and served on secondment on General Duties at Blacktown (two occasions), the Police Minister's Office and as Traffic Supervisor in the Eastern Suburbs. Merv lived through the trials, introduction and operations of stationary and mobile RBT. He was the only Police Officer to accompany the Staysafe Committee on an overseas study tour involving issues such as School Bus Safety and Police pursuits, culminating in the eventual introduction of in-car videos and computers in Police vehicles and the use of road spikes. He was instrumental in the introduction of Police speed cameras, integrated message and light systems on Police vehicles, the Graduated Licensing Scheme for Police drivers and improved operational guidelines for Police pursuits. He established a close working relationship with the RTA and Interstate Police forces, which led to coordinated enforcement and road safety programs at Interstate, State, Regional and Local levels. He was heavily involved in the introduction of the Joint Road Safety Action Plan and Memorandum of understanding between the Police and the RTA, as well as the introduction of the Road Safety Calendar and the Enhanced Funding Program. Merv was awarded the Australian Police Medal in 1991 for his service and contribution to road safety, the National Medal with two bars and the NSW Police Medal for Ethical and Diligent Service. Merv believes that there should be an increase in high-profile Police practices with enhanced face-to-face interaction with motorists to further reduce the road toll.

Steve Levett

Starting in 1973 with the DMR, Steve Levett became Manager, Safer Roads Policy, Standards & Research at the RTA. He had 36 years of experience working for the DMR/RTA in the areas of traffic analysis and geometric road design; concept, preliminary and final road design; project development & analysis and road environment safety.

Since 1994, he has worked in the area of road environment safety, lecturing in road safety auditing, crash investigation and analysis, economic evaluation of road safety projects and developing road safety programs, strategies and policies. At the time of his retirement in early 2010 he was involved in developing the principles of Incremental Road Safety for existing rural roads through the use of incremental clear zone widths, asymmetrical road design, wider centrelines and more visible road delineation.

Prof. Jack McLean

A true pioneer of road safety in Australia, Jack McLean started on a comprehensive at-scene crash investigation study in Adelaide funded by the Australian Road Research Board in 1962. That study questioned the "Give Way to the Right" rule and was the first to show that pedestrians struck by cars were 'run under' and not 'run over'.

In 1966 McLean was invited to work on a field study of crashes in Buffalo, New York. This was followed by five years at the Harvard School of Public Health and a PhD in Epidemiology and Biostatistics. In 1972 he took up a position to research vehicle safety systems for the University of North Carolina Highway Safety Research Centre. A year later, he returned to the University of Adelaide to set up the Road Accident Research Unit (now the Centre for Automotive Safety Research, CASR) and commenced planning a second field study with two teams of researchers, each with a medical doctor, an engineer and a psychologist. The reports on that study comprise the most detailed description of a representative sample of crashes ever obtained in any country. From 1981 to 1998 he used Research Unit grants from the National Health and Medical Research Council to investigate brain injury mechanisms in road crashes.

Jack McLean has been recognised for his great contributions to road safety with a Centenary Medal from the Commonwealth of Australia and several overseas awards from bodies such as the International Council on Alcohol, Drugs and Traffic Safety, the United States National Highway Traffic Safety Administration and the American Public Health Association He is presently a Professorial Research Fellow at the Centre he established and where he was Director for 34 years.

Michael Paine

Michael Paine is a high-profile Chartered Professional Engineer with over 25 years of post-graduate experience in the automotive field and in computer systems and programming. His first project while at the Department of Motor Transport was a survey of sixty-thousand trucks throughout NSW in the 1970s in which he pioneered the use of early computers and programs. He became involved in implementing new Australian Design Rules for vehicles and set up a new inspection scheme for heavy vehicles.

He is currently espousing the introduction of daytime running lights and has researched the use of reversing cameras and speed control devices for passenger vehicles. As Senior Engineering Manager at the RTA he was responsible for the development of automotive engineering policies.

Michael is currently ANCAP Technical Manager and is engaged in rating vehicles for the ANCAP Program.

Paul Rees

As Manager, Customer Education in the RTA's Licensing, Registration & Freight Directorate Paul Rees is in the vanguard of the development of improved licensing procedures and better car, truck and motorcycle rider training and testing. In the early 1990s as Manager, Rider Training he established the Compulsory Motorcycle Rider Training and Testing Scheme across NSW, a move considered a milestone in NSW motorcycle history and which helped to reduce the fatality rate among motorcycle riders and their passengers from a high of 203 to about a third of that figure today.

He also introduced many of the changes in licensing for motor car drivers, including the computer-based Driver Knowledge, Hazard Perception and Driver Qualification Tests and the changes to the Graduated Licensing Scheme in 2007, which have shown a 35% reduction in the crash rate of Provisional P1 drivers compared to prior to that date. He introduced changes in obtaining a Heavy Vehicle Driver's Licence, made major changes to older driver licensing, oversaw major penalties for street racing and hoons and initiated a graduated licensing scheme for motorcycle riders.

Rosemary Rouse

A former Manager, Road User Safety at the RTA, Rosemary was handed the responsibility for introducing the 50 km/h general urban speed limit throughout New South Wales. She also oversaw the formulation of policy and introduction of the Alcohol Interlock Program and the Sober Driver Program for repeat drink-drive offenders.

As Manager of the School Road Safety Education Program she introduced many innovative road safety ideas to the school curriculum and the program became a model copied and implemented by many overseas countries.

Rosemary is currently a road safety consultant, working in Pakistan.

Dr David Saffron

David Saffron started in road safety when the road toll was at its peak and research into road safety was still a relatively undeveloped science. Trained as a Behavioural Psychologist with a PhD, he joined TARU in 1979 and began to accumulate statistical data through the use of surveys. In the early 1980s he wrote and prepared a literature review of Driver Licensing Education and Training and as Head of the Behaviour Section he also helped to manage the introduction of Random Breath Testing.

He was involved in the 'Click-Clack' publicity and enforcement campaigns that increased the wearing of seat belts and child restraints. He wrote the first Heavy Vehicle Driving Manual. In the RTA he spent some years in the Legislation and Policy area at a time when the RTA began to put more resources and priority into road safety.

His work with the RTA in the 1990s as Manager, Road User Safety involved publicity campaigns to introduce compulsory bicycle helmet wearing, and setting up rider training centres for motorcycle riders. He is currently working on projects in the Safer Roads Branch of the RTA.

Ray Taylor

Ray Taylor is one of Australia's leading practitioners and authorities in the field of Road Safety. He has tertiary qualifications in Economics and Education and prior to his retirement was General Manager, Business & Marketing at ARRB Group. Prior to that appointment Ray was General Manager of Road Safety in the NSW RTA. During this period, new strategies and initiatives included the Local Government Road Safety Program and the Enhanced Enforcement program with the NSW Police Service.

Ray has also played a leading role in Road Safety initiatives in Victoria, including establishing the activities of the Transport Accident Commission (TAC) as its inaugural Director, Accident Prevention, resulting in the large-scale Random Breath Testing program, and the first speed camera program initiated in Victoria.

His prior road safety roles at VicRoads include publicity campaigns targeting drink-driving and other unsafe behaviour, the bicycle helmet wearing scheme, seat belt use, the baby bassinet loan scheme, heavy vehicle speed control mechanisms and pedestrian safety.

Dr Peter Vulcan AM

Professor Peter Vulcan started his research on aircraft crash safety in 1962, at Aeronautical Research Laboratories working on a project funded by Dr John Lane, Director of Aviation Medicine of the Department of Civil Aviation, a seminal figure in aviation and road safety. In 1971 he was appointed as the Director of Road Safety Research for the Commonwealth Department of Transport to provide research and support for the Expert Group on Road Safety. He was also Chairman of the committee which formulated the Australia design Rules for Motor Vehicle Safety. His team did some groundbreaking research on the effectiveness of various road safety initiatives including accident blackspot programs, improved seat belt use and various road user, road system and car safety standards.

He was Chairman of the Victorian Road Safety and Traffic Authority for seven years and later became the Foundation Director of the Monash University Accident Research Centre from 1987 until 1998. His responsibilities in these positions included road safety strategy, research and development. publicity and education. His career in road safety spans over 45 years. Peter has been involved in a wide range of road safety projects, including advice to the Federal Office of Road Safety, several Australian States, New Zealand, China and Cyprus.

Peter is a Mechanical Engineering graduate from Melbourne University, with a Ph.D. in Biomechanics from Wayne State University, Michigan. In 1996 he was presented with a Special Award of Appreciation for outstanding leadership in motor vehicle safety by the U.S. National Highway Traffic Safety Administration and he was awarded the International Distinguished Career Award by the American Public Health Association (Injury Control Section). He has also received five Australian awards for his contribution to road safety, including Member, Order of Australia.

Russell Watsford

Russell Watsford started as a clerk at the Department of Main Roads in 1969. After completing a degree in Social Science, majoring in Psychology and Marketing he became a Road Safety Analyst before securing a position as Project Manager for Road Safety Marketing. Russell has introduced the Scientific Rational Approach and Social Marketing Strategy into road safety campaigns as the 'middleman' between the road safety practitioners and the advertising agency team that create the final product.

He has managed the development of many campaigns, including the 'Microsleep', 'Brain', 'Paranoia' and the very successful 'Pinkie' campaign, for which the RTA has won major advertising awards.

Last year he was acknowledged by Adnews (a marketing publication) as one of Australia's top marketers. In 2008 he was also invited to the USA to present information on social marketing at a road safety conference in Washington State.

Road safety terminology, acronyms & organisations

AAA - Australian Automobile Association.

AAAM, Association for the Advancement of Automotive Medicine, an international organization for bringing together the medical, engineering and legal professions.

AACRT - Australian Advisory Committee on Road Trauma.

ABS - Antilock Braking System.

ADR - Australian Design Rules (for new vehicles).

ADVISORY CURVE SPEED SIGN

AIHW - Australian Institute of Health and Welfare. Australia's national agency for health and welfare statistics and information. It has compiled mortality data on selected causes of death by age and sex for each year from the beginning of the 20th Century called GRIM (General Record of Incidence of Mortality).

ALCOHOL INTERLOCK PROGRAM - a court-based penalty for drink drivers that commenced in 2003 and which allows drivers convicted of major alcohol-related offences to continue driving after a reduced disqualification period if they obtain an interlock driver licence and have an approved alcohol interlock device fitted to their vehicle.

ALCOHOL INTERLOCK DEVICE - an electronic breath-testing device connected to the ignition of a vehicle which will not allow a driver to proceed if he/she does not pass a breath test.

AMA - Australian Medical Association.

AMCVB - Australian Manufacturers Certification Vehicle Board.

ANCAP - Australasian New Car Assessment Program. An independent program supported by motoring clubs and governments in Australia and New Zealand. ANCAP results show the crash protection provided by vehicles in severe crashes.

ANTHROPOMORPHIC TEST FACILITY supplies a range of crash test dummies for Crashlab use.

ARRB - Australian Road Research Board.

ATA - Australian Trucking Association.

ATD - Anthropomorphic Test Dummy.

ATLM - Audio-tactile lane marking.

AUDIO TACTILE DELINEATION - thermoplastic strips that are often applied to the pavement to delineate the edge of the carriageway. If the vehicle crosses this line (possibly as a result of the driver falling asleep, or being distracted) the driver becomes aware of a rumbling sensation through the steering wheel, and a vibrating sound of the tyres hitting the bumps. The tyre noise issue generally makes this an undesirable safety feature in urban areas.

ACRS - Australasian College of Road Safety.

AIMSS - Australian Institute tor Motor Sport Safety.

AUSTRALIAN RURAL ROAD SAFETY ACTION PLAN, implemented in 1996.

ATSB - Australian Transport Safety Bureau.

AUSTROADS - the national body of Australian Roads and Traffic Authorities.

BAC - Blood Alcohol Concentration. 0.05 is legal limit for most drivers, zero limit for Provisional drivers.

BICYCLE SAFETY ADVISORY COUNCIL.

BLACK SPOT CRASHES - areas of highway or roads with a high crash rate singled out for special investigation.

BLACK SPOT PROGRAM - an initiative to investigate and treat locations with a high frequency of serious injury crashes.

CAM - curve alignment marker.

CAMS - Confederation of Australian Motor Sport. The governing body for motor sport in Australia. The CAMS Historic Commission is appointed by the CAMS board to administer historic motor racing in Australia.

CARES - Community and Road Education Scheme. A program to develop children's road sense at an early age through bicycle safety operated by NSW Police with support by RTA and MAA.

CARP - Casualty Accident Reduction Program, set up by DMR 1988.

CARRS-Q - Centre for Accident Research and Road Safety, Queensland University of Technology.

CASR - Centre for Automotive Safety Research, University of Adelaide.

CHEVRON HAZARD MARKERS - signs that indicate an oncoming curve.

CIRCADIAN RHYTHM CAMPAIGN - an advertising campaign that highlighted the danger of driving at night when the body is programmed to sleep and where the risk of an accident is increased four-fold.

CPR - Cardio Pulmonary Resuscitation.

CRASHCAM, also called AIRS (Automatic Incident Recording System) - a camera mounted above a black spot (usually an intersection) that records continuously, and saves to disk any footage preceding and following any traffic accident.

CRASHLAB - Australia's premier NATA-accredited independent vehicle crash-testing facility at Huntingwood in Sydney's west.

CRASHLINK - the RTA's Crash Database.

CRASH RATE - rate of crashes. Often expressed as per million vehicle kilometres travelled (MVT), or as a rate per 100,000 population, or a rate per 10,000 licence holders.

CRUMPLE ZONE - a weak point built into the chassis to make the front of cars crumple on impact thus absorbing the crash energy.

CURTAIN AIRBAGS - protect the head for front and in some cases back seat occupants during a side impact crash.

DIAdem - the industry standard package for data analysis and a tool for presentation of shock testing, impact testing and explosive testing results used by Crashlab.

DMR - former Department of Main Roads (NSW).

DMT - former Department of Motor Transport (NSW).

DNEPM - Diesel National Environment Protection Measure.

DoTaRS - Department of Transport and Regional Services.

DRAGON'S TEETH - triangular white markings on roads near school zones.

DRINK-LESS PROGRAM - a survey about alcohol use and consultation with a doctor that forms part of the process to obtain an Interlock Driver Licence.

DRIVER REVIVER SITES - where drivers can during peak holiday periods pull over to have a cup of tea or coffee - sponsored by the RTA and Bushells.

EAR - Expired-Air Resuscitation.

ESC - Electronic Stability Control, also known as Electronic Stability Program, Dynamic Stability Control, Vehicle Stability Control or Vehicle Stability Assist, a computer-assisted safety technology that helps drivers stay in control and avoid crashes during emergency manoeuvres.

ESV - Enhanced Safety Vehicles.

FIXED DIGITAL SPEED CAMERA - first introduced in NSW in 1997 in the Sydney Harbour Tunnel.

FORS - Federal Office of Road Safety, renamed Transport Safety Bureau.

GIPSICAM - Global/Inertial Positioning Systems Image Capture for Asset Mapping, a special-purpose vehicle-mounted image capture survey system devised, owned and operated by RTA.

GLS - Graduated Licensing Scheme. Introduced July 2000 to improve training and licensing arrangements for new drivers with the introduction of P1 and P2 class provisional drivers.

GRIM - General Record of Incidence of Mortality. Mortality data on selected causes of death by age and sex collected for each year from the beginning of the 20th Century.

HIC - Head Injury Criteria.

HSRCA - Historic Sports and Racing Car Association.

HV - a common acronym for heavy vehicle.

ICD-10 - 10th Revision of the International Statistical Classification of Diseases and Related Health Problems. ICD-10 codes show cause of death in various medical categories, e.g. Death from Land Transport Accidents' code is ICD-10 V01-V89.

IEA - Institute of Engineers Australia (since renamed Engineers Australia).

IIHS - Insurance Institute for Highway Safety (US).

IMD - Index of Multiple Deprivation, a score used by UK road safety researchers in analysing fatal crash data based on socio-economic status in UK postcodes.

INATTENTIONAL BLINDNESS or PERCEPTUAL BLINDNESS – failing to notice an unexpected stimulus (a common occurrence for persons using a mobile phone while driving).

INERTIA REEL SEATBELTS – an early seatbelt design which allowed the belt to move under normal driving conditions but lock in the event of a crash.

INTEGRATED LIGHT BARS - a flashing light bar placed on the roof of police vehicles with a variable message capability.

IPWEA – Institute of Public Works Engineering Australia.

IRCOBI - International Research Committee for the Biomechanics of Injury.

ISA - Intelligent Speed Adaptation. Uses satellites and in-car technology to help motorists stay within the speed limit. ISA is the generic name for systems where the vehicle 'knows' the speed limit and is capable of using that information to give feedback to the driver (advisory systems)

or limit the vehicle's speed (supportive systems). A trial of the technology began in July 2008 and will run for 18 months.

ISO - International Organisation for Standardization.

ISOFIX - the performance of child restraints in side impacts.

ITFCRS - International Taskforce on Child Restraint Systems.

LAC – Local Area Command (police term).

ITS - Intelligent Transport Systems.

LAP-SASH SEAT BELTS - a seat belt with three mounting points.

LATM - Local Area Traffic Management.

LED - Light-Emitting Diode. A technology now used for variable speed signs and traffic signals.

LGA - Local Government Area.

LTEC - Land Transport Environment Committee.

MAA - Motor Accidents Authority. A statutory corporation that regulates the NSW Motor Accidents Scheme. It was established by the Motor Accidents Act 1988 on 10 March 1989 and continues to be constituted under the Motor Accidents Compensation Act 1999.

MICROSLEEP - A short period, perhaps only seconds that a driver can fall asleep at the wheel.

MIRA - Motor Industry Research Association, Britain.

MITERS - Minor Improvement Traffic Engineering & Road Safety Program.

MUARC - Monash University Accident Research Centre.

MVKT - million vehicle kilometres travelled.

NATA - National Association of Testing Authorities. An accreditation body for compliance and testing of safety products to Australian Standards and Australian Design Rules.

NATIONAL BLACK SPOT PROGRAM - launched in 1991.

NCAP - New Car Assessment Program. Used by European, US and Japanese car makers

NEW JERSEY KERB - a solid divider commonly used to separate traffic lanes.

NHTSA - National Highway and Traffic Safety Administration, US Department of Transportation.

NOTES YOUTH ROAD SAFETY CAMPAIGN - an advertising campaign for cinema and magazines specifically targeting drivers aged 17-25 years.

NRMA - National Roads and Motorists' Association.

NRTAC - National Road Trauma Advisory Council.

NRTC - National Road Transport Commission.

NSW CENTRE FOR ROAD SAFETY a Directorate within the NSW Roads and Traffic Authority that implements the NSW Government's State Plan priorities of safer roads and improved driver behaviour.

OPERATION ROADSAFE - a road safety initiative of the RTA and NSW Police with involvement of local councils through their Road Safety Officers. Targets the Sydney Metropolitan Area for drink-driving, speeding and non-use of seatbelts.

OTSI – Office of Traffic Safety Investigation.

PACTS - British Parliamentary Advisory Committee on Transport Safety

'PINKIE' CAMPAIGN - The 'Speeding, no one thinks big of you' advertising campaign launched in June 2007.

PLM - Profile Lane Marking.

POLICE PUBLIC SAFETY BUREAU - First set up to detect speeding vehicles in the Sydney Metropolitan area, set up in 1926. Renamed SPECIAL TRAFFIC PATROL POLICE in 1962, HIGHWAY PATROL in 1975 and HIGHWAY PATROL RESPONSE GROUP in 1985.

PRETENSIONERS - A technology used in modern seat belt design to tighten the belt in the event of a crash.

QUEUE DETECTORS - Sensors in the road usually installed at traffic lights to measure the queue of cars, connected to a sign warning motorists of delays.

RACV - Royal Automobile Club of Victoria.

RARU - Road Accident Research Unit, University of Adelaide SA.

RBT - Random Breath Testing.

RDT - Roadside Drug Test.

RED LIGHT CAMERA - A camera to detect drivers running red lights at signalised intersections.

ROAD ACCIDENT PREVENTION AND RESEARCH UNIT - Set up in 1968. Renamed TARU six months later.

ROAD ATTRIBUTES - Design elements of the roadway such as median width, shoulder width, number of lanes, speed limits, curvature, clear zone, etc.

ROAD ENVIRONMENT SAFETY - A term used to describe safety that relates specifically to road design, traffic management, the roadway and its adjoining surroundings and environmental conditions.

ROAD SAFETY AND STANDARDS AUTHORITY - Set up in 1975 but which had only a brief existence.

ROAD SAFETY ADVISORY COUNCIL OF NSW.

ROAD SAFETY AUDITS - used by road authorities to identify potential crash problems on planned and existing roads.

ROAD SAFETY BUREAU.

ROAD FREIGHT ADVISORY COUNCIL.

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ROAD TRANSPORT (Safety and Traffic Management) ACT 1999 - Legislation introduced into the NSW Parliament in December 1999.

ROAD WHYS - A safety education program for Year 10-12 High School students in NSW, developed by NSW Police and RTA in 1992, delivered by Police in schools. It was updated in 1995.

ROSTA – former Road Safety and Traffic Authority, Victoria

RRPM - Raised Retro-reflective Pavement Markers.

RSIS - Road Safety Impact Statements (terminology used within RTA).

SAE - (International) Society of Automotive Engineers.

SAFE DRIVING POLICY - an RTA initiative developed as a policy for its employees who need to drive as part of their work.

SAFETY AROUND SCHOOLS PROGRAM

SAFE-T-CAM - introduced in 1995 to encourage behavioural change for the road transport industry by building profiles of heavy vehicle operators and drivers. It observes and identifies

heavy vehicles as they pass selected points on the NSW highway network and establishes the travel time between each pair of sites.

SCATS - Sydney Coordinated Adaptive Traffic System. A computerised system to control traffic signals and respond to changes in traffic levels.

SCHOOL OF SAFETY SCIENCE, UNIVERSITY OF NSW.

SHARING THE MAIN STREET refers to adapting the main street – or centre along a sub-arterial road – to improve the safety and quality of the road environment to all its users.

SIDE AIRBAGS - Used to protect occupants in side impact crashes.

SLEEP DEBT - the difference between the hours of sleep a person needs and gets. The larger the debt the stronger the tendency to fall asleep.

SLEEP INERTIA - A feeling of grogginess after waking that can last up to four hours.

SOCIETY OF AUTOMOTIVE ENGINEERS.

SPEEDBLITZ BLUES - A NSW Government sponsorship deal with the New South Wales Sheffield Shield Cricket Team that allows the RTA to use players in anti-speeding advertisements and to display messages at venues.

SLOWDOWN ROADSHOW - A program to educate the community about the consequences of speeding.

SNOWSAFE - A joint RTA, NSW Police, Australian Federal Police and NSW National Parks & Wildlife Service road safety campaign set up in 1994 focusing on key roads and highways leading to the NSW snowfields.

SOCIETY OF AUTOMOTIVE ENGINEERS, AUSTRALASIA.

STANDARDS AUSTRALIA - The body that determines and accredits a wide range of standards in Australia.

STAYSAFE COMMITTEE - Standing Parliamentary Committee on Road Safety (NSW).

STOP, REVIVE, SURVIVE - An RTA–sponsored advertising campaign to educate drivers about the dangers of driver fatigue and falling asleep at the wheel.

SUV - Sports Utility Vehicle.

TAC - Transport Accident Commission (VIC).

TARU - Traffic Accident Research Unit, part of the former NSW Department of Motor Transport and later, Traffic Authority.

TECHNICAL DIRECTIONS - RTA policy documents covering a wide range of technical areas, including road environment safety.

TERSIP - Traffic Engineering and Road Safety Improvement Program set up by the NSW Department of Motor Transport in the early 1970s.

TORSO AIRBAGS - Protect the body from the shoulders to the hip for front seat and in some cases rear seat occupants. There are also combined Head and Torso Airbags, which offer more protection.

TRANSMISSOMETERS, aka TRANSMITOMETERS - A device used at airports for measuring fog and cloud density.

VIBRALINE - A raised profile audio-tactile edge line for roads.

VKT - Vehicle Kilometres Travelled. A measure of the exposure to a crash event. One VKT is equivalent to one vehicle travelling a distance of 1km or alternatively two vehicles travelling for a distance of half a kilometre.

VMS - Variable Message Sign.

VRU - Vulnerable Road User.

VSL - Variable Speed Limit signs.

'WILLINGNESS TO PAY' METHOD - a method of calculating a dollar value of road trauma.

YOUTHSAFE - An independent not for profit organization and peak body in NSW for youth injury prevention. Maintains strong links with community based groups, professionals working with young people, research bodies, industry and government decision makers. Youthsafe's presenters visit schools and community groups.

Chronology of events in road safety

This table provides an overview of some of the more significant road safety milestones, both within Australia and internationally. It is by no means a comprehensive list, as this would be beyond the scope of this project. The material has been derived mainly from the interviews conducted for this oral history plus a limited number of other documentary sources:

1. The NSW road toll information is published daily on the RTA website
2. The Australian road toll data has been supplied by the Australian Transport Safety Bureau, Canberra
3. *Road Safety Milestones*, NRMA January 1988
4. *Vehicle Occupant Protection in Australia*, Federal Office of Road Safety, March 1988
5. *Road Safety in Australia – A Publication Commemorating World Health Day 2004*, Australian Transport Safety Bureau, 2004
6. Graeme Davison '*Car Wars – How the car won our hearts and conquered our cities'*, Allen & Unwin 2004
7. ANU historian Dr John Knott
8. Dr J. H. W. Birrell *'Twenty Years as a Police Surgeon'*, Brolga Publishing 2004
9. Wikipedia
10. Various organisations' websites.

Year	Event	Road Toll[1]	
		NSW	*Australia*
1901	NSW Metropolitan Traffic Act 1900, which had been aimed at protecting pedestrians from 'dangerous' cyclists, limited the speed of 'any vehicle' to 8 mph when crossing any intersection within a 4-mile radius of the Sydney GPO. The Act was repealed in 1916. Although there were 130 deaths recorded on NSW roads, none were associated with the motor car - 44% were buggy, cart and wagon accidents; 36% were people who were run down, thrown, kicked, or fell off their horse while drunk; 2% were bicycle deaths; 18% were killed by trams.		
1902			
1903			
1904	6 February - Louis Reichard becomes the first recorded victim of a motor car accident in NSW when he is hit by a car while crossing Elizabeth St, Sydney. He suffers a broken leg. By-law passed in Britain setting the maximum speed limit for motorists at 20 mph. October - Parramatta Council pass a by-law limiting 'automobiles' to 6 mph inside the town's boundaries. A number of other NSW Local Councils follow with speed limits as low as 4 mph.		

Year	Event	Road Toll[1]	
		NSW	*Australia*
1905	5 January - Australia's first official fatality involving a motor car. Samuel Payne was pedalling his bike into Melbourne where he worked in a drapery store. He crossed an intersection where a motor car appeared on his right hand side. He attempted to get across the intersection before the motor car but hit the side of the car, was thrown off his bike and landed on his head. He was put into the back of the car by the driver and passenger and taken to Melbourne Hospital but died that afternoon. Amidst great public interest, there was an inquest and an extensive examination of the incident. A draughtsman from the Melbourne Metropolitan Board of Works was asked by the coroner to draw a diagram of the intersection and work out what had actually happened, and the police interviewed people. The inquest determined that it was the bicyclist who was at fault and was the cause of his own death. 8 July - NSW records its first motor vehicle road death when a pedestrian, Ernest Goodwin, is killed by a hit-and-run driver while crossing Railway Terrace in Petersham. Adelaide City Council introduced some by-laws to govern the operation of motor vehicles in Adelaide. This was the first legislation of this type in Australia.		
1906	Seventeen motorists in NSW prosecuted for 'furious driving'.		
1907	South Australia became the first state in Australia to introduce specific state-wide legislation to control motor vehicle use.		
1908	Beginning of a consistent system of recording road deaths (NSW). First Melbourne-Sydney intercapital record attempt by motor car. Harry James and Charles Kellow take 25 hrs and 40 mins to drive the 572 miles of bush track. Record attempts on Australia's public roads would be outlawed in 1930.	120	
1909	12 October – NSW Motor Traffic Act passed the NSW Parliament. As of 1 Jan 1910 all motor vehicles had to be equipped with lights (front and rear), a bell or horn, display a licence plate at the rear, and have effective brakes. Annual registration was initially set at £1 for cars, 5 shillings for motor cycles. A driver's licence (there was no testing by the police until 1916) cost 5 shillings. First regulation under the NSW Motor Traffic Act stipulated a speed limit of 15 mph within 4 miles of the Sydney GPO. Local Councils retain the right to set their own speed limits.	146	
1910	1st January – NSW Motor Traffic Act commenced. The Police Traffic Office comprised 12 Police Officers and a clerical staff of six, engaged in the registration of motor vehicles and revenue collection. Revenue	167	

Year	Event	Road Toll[1]	
		NSW	*Australia*
	collected in 1911 was £3,500, mainly derived from registration of 2,350 motor cars and 2,203 motor cycles. Registration fees were £1 2s. 6d. and a license fee, five shillings. Motor cycle riders were issued with a license free of charge. The Act placed full responsibility on the Police to carry out all functions associated with control of motor vehicles, including registration, licensing & driver testing. Before 1910, persons wishing to become competent in the handling of a motor vehicle were tested by a representative of the Automobile Club of Australia, who would issue a Certificate of competency to drive. Victoria introduces legislation to control motor vehicle use.		
1911	Motor vehicle registrations (taxis, vans, omnibuses, cars, lorries and motor cycles) in NSW total 6,945. Melbourne motorists' indignation with 'speed traps' along Toorak Rd reach fever pitch after the State Governor's chauffeur is booked and found guilty of speeding while the Governor and Lady Fuller are in the car. Speedometers in cars are not commonplace until the 1920s and the only way for the police to measure a vehicle's speed is to time a car with a stopwatch over a measured section of road.	186	
1912	NSW Police begin using a motor car to catch traffic offenders.	186	
1913		207	
1914	Victorian Police adopt more stringent methods in regard to issuing driving licences. However, the emphasis is still on being able to operate the controls of a particular car. The operation of a car's gears and brakes, and even the position of the steering on the right, was not standardized until 1920s.	239	
1915		201	
1916	NSW Police motor cycle squad formed.	218	
1917		223	
1918	South Australia introduced the nation's first safety curriculum into schools. By the 1920s all States had similar programs in place, but in general they consisted of little more than "look left, look right, and look left again" drills.	192	
1919		210	
1920	Rule introduced to require that a driver entering a roundabout give way to those vehicles on his right which are already on the roundabout carriageway (SA). World's first 'green, amber, red' traffic lights begin operation in	211	

Year	Event	Road Toll[1]	
		NSW	*Australia*
	Detroit, USA.		
1921	Motor vehicle registrations (taxis, vans, omnibuses, cars, lorries and motor cycles) in NSW total 44,443.	225	
1922		216	
1923	Only 71 of the 231 road deaths in this year involved a motor vehicle.	231	
1924	The United States commenced its first road traffic safety campaign with the slogan *Enforcement, Education and Engineering*. This slogan was also used in Australia in the 1950s. NSW road toll (from all crashes, both motorised and non-motorised) jumped 34% in one year, the highest percentage increase ever recorded. Only 102 of the 309 road deaths in this year involved a motor vehicle.	309	
1925	The RACV established the first Road Safety Week, with the first week of March devoted to road safety (VIC). Safety First Association formed in Australia. It would promote road safety campaigns right around the nation. May – Meeting of heads of Australian State Police Traffic Branch recommend abolition of fixed speed limits in an effort to reduce traffic congestion. They also call the present fixed speed limits 'chaotic, unpopular and unenforceable'. July - Fixed speed limits (mostly the product of local by-laws and ranging from 8 to 20 mph) abolished in NSW. Provisions against 'negligent', 'furious', and 'reckless driving', 'at a speed, or in a manner, dangerous to the public' remain in force however. Fixed speed limits would be reintroduced in 1937. Only 139 of the 342 road deaths in this year involved a motor vehicle.	342	700
1926	In the first full year following the abolition of fixed speed limits in NSW, road traffic deaths involving motor vehicles (trams, motor cycles, motor cars) jumped from 139 in 1925 to 258 in 1926, an 86% increase. For the first time in NSW, the number of road traffic deaths involving motor vehicles exceeded the number of deaths involving non-motorized road traffic (bullocks, horses, bicycles). Motor vehicle registrations (taxis, vans, omnibuses, cars, lorries and motor cycles) in NSW total 150,073. NSW Police establish a 'Public Safety Bureau' to target 'excessive speeding'. All States have now enacted legislation to create a central agency	362	901

Year	Event	Road Toll[1]	
		NSW	*Australia*
	with major road responsibilities. The Commonwealth Government passed the Federal Aid Road Act 1926, to promote a national approach to road design & construction and establish a basis for development of the nation's first national roads program.		
1927	First use of 'traffic lights', acetylene lights turned by a police constable, in Australia at the intersection of Rundle and King William streets, Adelaide (SA). National Safety Council formed.	430	943
1928	16 November - Australia first 'green, amber, red' electric traffic lights installed at intersection of Collins and Swanston Streets, Melbourne.	463	1003
1929		553	1145
1930	Don Robertson lowers the Melbourne-Sydney intercapital record to 10 hours and 5 minutes. Two motorists are killed in a later record attempt. NSW Police issue regulations outlawing record attempts on public roads. 20 mph fixed speed limit abolished in Britain. A surge in casualties sees the introduction of a 30 mph fixed speed limit in built up areas in 1935. Motor vehicle registrations (taxis, vans, omnibuses, cars, lorries and motor cycles) in NSW number 249,316. This represents a greater than 5-fold increase over the preceding decade. There is now 1 motor vehicle for every 10 people in NSW.	466	1054
1931	Professor of biochemistry and toxicology Dr Rolla N. Harger invented the *Drunkometer*, a balloon-based device and the first practical breath test to measure whether people were drunk. It was patented in 1936 (USA).	372	916
1932	Motor Act 1932 required all vehicles to adhere to safety standards for maintenance of tyres, rear-view mirrors, windscreen wipers and vehicle horns (VIC).	366	818
1933	14 October - First set of traffic lights installed in Sydney, on the corner of Kent and Market Streets.	393	914
1934	Road executives from all states met for the first time, to exchange views on road administration and engineering. These meetings were known as the Conference of State Road Authorities until 1959, when the title changed to National Association of Australian State Road Authorities (NAASRA), the forerunner to Austroads.	405	952
1935		456	1100

Year	Event	Road Toll[1]	
		NSW	*Australia*
1936	Tasmania the first state to make safety glass windscreens compulsory in new motor vehicles.	550	1350
1937	The Motor Traffic (Amendment) Act set speed limits of 30 miles per hour in built-up areas and 50 miles per hour (prima facie) on the open road. This Act also increased penalties for serious traffic breaches, eg drunk driving or failing to stop after an accident resulting in death or injury attracted a £100 fine or 12 months imprisonment. Any repeat of these offences within 5 years brought a disqualification from driving for 2-3 years. The 30 mph speed limit was raised to 35 mph on 1 May 1964 (NSW). First dual carriageway road constructed in NSW - General Holmes Drive.	571	1387
1938	Centre line added to all main roads (NSW). Evanston, Illinois, study compared blood alcohol levels of drivers involved in accidents with random sample of non-accident drivers. Found that the higher the blood alcohol level the higher the risk of accident; 47% of those involved in an accident had been drinking; a driver with a blood alcohol level of 0.11 is 17 times more likely to have an accident (USA).	572	1483
1939	27 April – New regulations introduced making it compulsory to make right-hand turn from centre of intersection (NSW). 1 October - annual inspection of cars for roadworthiness commenced (NSW).	545	1426
1940		522	1558
1941		443	1298
1942	Australia-wide 30 mph maximum speed limit introduced as a temporary wartime measure to save fuel. The restriction was lifted in 1946.	493	1297
1943		392	1340
1944		371	1089
1945		411	1011
1946	Wartime 30 mph maximum speed limit lifted. NSW road toll (from all crashes, both motorised and non-motorised) jumps by 24% (the second-highest percentage increase ever recorded, after the 34% rise between 1923 and 1924).	508	1270

Year	Event	Road Toll[1]	
		NSW	*Australia*
1947	Australian Transport Advisory Council (the body responsible for coordinating transport issues for the relevant Commonwealth, State and Territory Ministers) established two new agencies – the Australian Motor Vehicle Standards Committee and the Australian Road Safety Council.	509	1346
1948	Motor vehicle registrations in Australia (private and commercial) total over 1 million for the first time.	539	1348
1949	Under the Queensland Traffic Act, it became an offence to drive under the influence of drugs, either an illegal drug or a prescribed drug if it affected driving performance.	535	1424
1950		634	1643
1951		728	1926
1952		700	2054
1953	9 September – A person was henceforth prohibited from driving a motor under the influence of intoxication liquor or a drug, if the person was incapable of exercising effective control of the vehicle (NT). December – first set of traffic signals in Perth.	704	1856
1954	Dr Robert Borkenstein, a captain with the Indiana State Police and later a professor at Indiana University at Bloomington, invented the breathalyser. It used chemical oxidation and photometry to determine alcohol concentration in a subject's blood based on a breath sample. Maximum metropolitan speed limit of 30 mph (48.3 km/h) introduced. Raised to 35 mph (56.3 km/h) in December 1965 (WA).	754	1976
1955	May – US Air Force Colonel John Paul Stapp, who had pioneered rocket sled research from the 1940s into the survivability of very high deceleration forces, invited representatives of the Armed Services, universities, automobile manufacturers, research laboratories, traffic and safety councils, and medicine to Holloman Air Force Base to witness a sled demonstration and auto crash tests and discuss automotive design and safety features. Recommendations included moving dashboards forward, with energy absorbing padding; fitting doors with safety locks so they would not fly open in a crash; removing rear window shelves; fastening seats more securely to car body; improving bumper design; and proving the effectiveness of seat belts. These gatherings became an annual event, the *Stapp Car Crash Conference*.	820	2042

Year	Event	Road Toll[1]	
		NSW	*Australia*
	First official reference to seat belts in Australia, when the Australian Motor Vehicle Standards Committee agreed on the need for an Australian specification for automobile seta belts. This followed a request from the Australian Road Safety Council for a report on the possibilities for in-built safety features in cars. The issue was then referred to the Standards Association of Australia. September - All US car manufacturers introduced longitudinal restraint into car door latches, to reduce the chance of doors bursting open in a crash. This was an important and inexpensive innovation in an era without seat belts. Motor vehicle registrations in Australia (private and commercial) total over 2 million (1 motor vehicle for every 5 people).		
1956	Traffic Commission of Victoria established, with responsibility for road safety.	801	2119
1957	Radar first used to detect speeding motorists. However, its use was discontinued after unsuccessful prosecutions (NSW). August – Dr John Birrell appointed as the first Victorian Police Surgeon. He would go on to demonstrate the significant role of alcohol in road crashes. Victorian Police 'Accident Appreciation Squad' created to provide onsite evaluation of all major road traffic accidents in the state.	765	2113
1958	Victorian doctors call for mandatory seat belt use in vehicles.	824	2146
1959	19, 20 , 21 June – Graham Perkins' '*Blood on the Bitumen*' articles in *The Age* expose the role of alcohol in traffic crashes (VIC). 13 August – Volvo released the PV544, the world's first production car to feature a 3-point seat belt. Volvo engineer Nils Bohlin is credited with the invention of this improved restraint system - one belt across the pelvis to restrain the hips and another one running from the outside shoulder to the inner hip to restrain the chest. The Australian Senate held a Select Committee Inquiry Into Road Safety. Dr John Lane, Director of Aviation Medicine in the Department of Civil Aviation, appeared at the inquiry and was able to change the perception of crashes away from enforcement, regulations and rules to an issue of public health, to be addressed in the same way as other health issues. NSW Dept of Motor Transport (DMT) commences the "Respect the Road Rules" campaign. Each year every licence holder received a letter seeking their help in reducing the road toll, and outlining some particular feature of the road rules, eg diamond turns, stopping distances, vehicle mechanical fitness. Road safety is also a consistent theme on the DMT's annual Waratah Day float.	859	2264

Year	Event	Road Toll[1]	
		NSW	*Australia*
1960	A survey showed that 60% of Swedish drivers were wearing seat belts. Police empowered to forbid persons who are incapable, by reason of physical or mental condition, from driving while in that condition. Such persons can be required to surrender the vehicle's ignition keys (VIC).	978	2468
1961	1 January - Helmet wearing made compulsory for motorcycle riders and pillion passengers (VIC). April - NSW DMT launches the "Driver Improvement" campaign. It invited every licensee to critically examine their own driving techniques, and encourage others to examine theirs. Drivers are referred to the *Motor Traffic Handbook* and the NRMA publication *Driving is an Art*. 28 April – Standards Association of Australia releases Australian Standard E35 for "safety belts and harness assemblies for motor vehicles". "Wise Old Owl" – the first comprehensive road safety television campaign in NSW introduced by Dept of Motor Transport. South Australia is the last State to introduce a compulsory driving test for anyone seeking to obtain a driving licence. 20 December – commencement of law requiring compulsory BAC tests for drivers suspected of drink-driving (VIC).	918	2542
1962	Commencement of the first Adelaide In-Depth Accident Study (400 crashes), funded by ARRB. Report published in 1966 questions the safety of the "Give Way to the Right" rule. Dr John Lane recognised at a conference in New York City as the person who introduced the term "crashworthiness". Radar introduced to used to detect speeding motorists (QLD).	876	2535
1963	1 January – default urban 30 mph (48.3 km/h) speed limit raised to 35 mph (56.3 km/h) (VIC). Robert Borkenstein's classic *Grand Rapids Study* in Michigan, the first case control study to establish a quantitative relationship between blood alcohol level and crash risk (USA).	900	2598
1964	1 March - Probationary licences (1 year) introduced (WA). 1 May – default urban 30 mph (48.3 km/h) speed limit raised to 35 mph (56.3 km/h) (NSW). Probationary licences (3 years) introduced (VIC). Commonwealth Bureau of Roads formed, operating until 1975. Its task is to investigate and report on all aspect of road transport, to	1010	2966

Year	Event	Road Toll[1]	
		NSW	*Australia*
	guide Federal road grants to the states. 5 November - Radar introduced to detect speeding motorists (SA).		
1965	16 January - Probationary licences introduced (TAS). Tony Ryan and Jack McLean published a paper in the Stapp Car Crash Conference, the first research to show that pedestrian injuries result from the impact with the vehicle, rather than from being actually run over. This finding eventually led to cars being tested for how well they protect pedestrians. Ralph Nader's book *Unsafe At Any Speed* published, highlighting vehicle safety issues. 8 October – Red and amber arrows introduced in traffic signals (NSW). 14 December – Portable speed measuring devices introduced (VIC).	1151	3164
1966	4 January - Provisional licence system introduced for all new drivers to hold for a one-year duration (NSW). 1 February - Maximum legal prescribed content of alcohol (PCA) of 0.05 grams of alcohol per 100 millilitres of blood introduced (VIC). 1 February – Hotel closing time extended from 6pm to 10pm, ending the 'six o'clock swill' that contributed to a large number of alcohol-related crashes between 6pm and 8pm (VIC). 20 July - Maximum legal PCA of 0.08 grams of alcohol per 100 millilitres of blood introduced (TAS). Lowered to 0.05 in 1983. 1 October – Roadside breath testing introduced (WA). Formulation of Australian Design Rules (ADRs) for new vehicles commenced.	1143	3242
1967	15 January - Helmet wearing made compulsory for motorcycle riders and pillion passengers. Certain exemptions apply (TAS). Publication of a paper by David Herbert in the *Medical Journal of Australia* on the positive effects of a directive by Sir William Hudson (head of the Snowy Mountains Authority) mandating the fitting and use of seat belts in all the equipment and all cars used in the Authority. The first Australian Design Rules approved, including those for seat belts and anchorages. October - Volvo engineer Nils Bohlin presented a paper at the 11th Stapp Car Crash Conference based on his study of 28,000 crashes which demonstrated the effectiveness of lap-sash seat belts. US Congress passed the Highway Safety Act, creating the National Highway Safety Bureau (later to become the National Highway Traffic Safety Administration, NHTSA). Dr William Haddon was appointed as	1117	3166

Year	Event	Road Toll[1]	
		NSW	*Australia*
	the first Director of NHTSA. He was responsible for the development of the Haddon matrix, which when applied in the road safety context separates crashes into three phases (before, during and after the crash) and for each phase looks at people, vehicles and the road environment. 23 November - Maximum legal PCA of 0.08 grams of alcohol per 100 millilitres of blood introduced. Roadside breath testing introduced (SA). December - Commencement of the Joint Select Committee on Road Safety, an all-party committee of both houses of Parliament (VIC). 31 December - Helmet wearing made compulsory for motorcycle riders and pillion passengers (SA).		
1968	22 April – Roadside breath testing introduced (QLD). 6 July - Maximum legal prescribed content of alcohol (PCA) of 0.10 grams of alcohol per 100 millilitres of blood introduced (QLD). Lowered to 0.08 in 1974 and 0.05 in 1982. Technology changes permit the introduction of improved radar devices for traffic law enforcement (NSW). Publication of Michael Henderson's influential book *Motor Racing in Safety: the Human Factors.* Criminologist Duncan Chappell urged adoption of *random* breath testing and more severe penalties (VIC). 13 November - Maximum legal PCA of 0.08 grams of alcohol per 100 millilitres of blood introduced (WA). 16 December - Maximum legal prescribed content of alcohol (PCA) of 0.08 grams of alcohol per 100 millilitres of blood introduced (NSW). Police became empowered to require a driver to submit to a preliminary breath test under specified circumstances if there are reasonable grounds to believe: (a) that the driver has contravened or failed to comply with any provision of the Motor Traffic Act and Regulations, (b) that from the manner in which the driver drives a motor vehicle or occupies the driving seat and attempts to put the vehicle in motion the driver has alcohol in his body; or (c) that the driver has been involved in an accident.	1211	3382
1969	1 January – All vehicles first registered in Australia after this date required to have front seat belts fitted. The first edition of the Australian Design Rules for Motor Vehicle Safety (ADRs) was published. There were three notable differences in the ADRs from the United States Federal Motor Vehicle Safety	1188	3502

Year	Event	Road Toll[1]	
		NSW	*Australia*
	Standards: Three point seat belts in the back seat, amber turn signal lights, and no tinting of the windscreen in the driver's field of view (the last one was revoked in 1991). 1 March – demerit points system introduced (NSW). Demerit points system introduced (VIC). Ferrari/Pininfarina motor racing concept car (featuring a strong inner capsule and crushable external structures; multi-point harness; head & neck restraints; fire extinguishing system; damage-resistant fuel tanks) shown at the Geneva Motor Show. At that time no racing car drivers in Europe in open cars were wearing any kind of seat belt, as it was regarded as being safer to be thrown out of the car in a crash. Traffic Accident Research Unit (TARU) established by the Dept of Motor Transport (NSW). Film '*Danger Level*' released, showing a series of alcohol impairment tests involving racing drivers and ordinary drivers at Sydney's Warwick Farm Race Course. The tests were conducted by Prof. Syd Lovibond from UNSW. Probationary licences (1 year) introduced (QLD). First NSW Crashlab established in Dept of Motor Transport basement in Rosebery.		
1970	Road Safety and Traffic Authority established by Act of Victorian Parliament January - demerit points system introduced (QLD). NSW Road Safety Council abolished by Traffic Safety Act. Traffic Accident Research Unit (TARU) established in Dept of Motor Transport. First Director of Road Safety (Michael Henderson) appointed. First Australian Standard for child restraints (AS E46). 24 October - Helmet wearing made compulsory for motorcycle riders and pillion passengers (QLD). 22 December – Victoria becomes the first jurisdiction in the world to make seat belt wearing compulsory.	1309	**3798[2]**
1971	1 January – Vehicles first registered after this date required to have rear seat belts fitted. Standards also set for seat anchorages, door latches and hinges (NSW). 1 February – Roadside breath testing introduced (TAS). 29 April – demerit points system introduced (SA). July – Spot checks of BAC, linked to mandatory periods of licence disqualification (VIC).	1249	3590

Year	Event	Road Toll[1]	
		NSW	*Australia*
	1 August - Helmet wearing (Australian Standard AS 1698-1980 refers) made compulsory for motorcyclists and pillion passengers. Certain exemptions apply (NSW). Commonwealth Government establishes a Road Safety Research unit within the Department of Shipping and Transport, with Peter Vulcan as Director. 15 September - Seat belt wearing made compulsory (TAS). 1 October – Seat belt wearing made compulsory (NSW). Various exemptions apply. 29 November - Seat belt wearing made compulsory (SA).		
1972	1 January - Seat belt wearing now compulsory throughout Australia. 1 January – All cars manufactured after this date must have suitable head restraints to the front outer seats (VIC) (ADRs 22, 22A). 1 January - demerit points system introduced (TAS). January – Prima facie speed limits removed and replaced with 70 mph (112.6 km/h) absolute limit. Reduced to 60 mph (96.5 km/h) in January 1974 (VIC). 1 August – All cars manufactured after this date must have suitable head restraints to the front outer seats (NSW) (ADRs 22, 22A). 8 November - Helmet wearing made compulsory for motorcycle riders and pillion passengers (NT). Commonwealth Dept of Transport published the book *The Road Accident Situation in Australia*, which had a profound effect on the Commonwealth's role in road safety. Recommendation for a national Road Safety and Standards Authority progressed to an establishment Act in 1975, but was not progressed with change of Government.	1092	3422
1973	1 April - Vehicles first registered between 1 January 1965 and 1 January 1969 must be equipped with front lap-sash seat belts if not already fitted (NSW). 1 July - Compulsory blood testing of all persons treated at hospital as a result of a motor accident (SA). Federal Office of Road Safety conducted a TV campaign aimed at informing adults how to correctly adjust and wear seat belts. This brought about a significant behavioural change in correct seat belt wearing, an important consideration prior to the arrival of inertia reel seat belts.	1230	3679
1974	8 April - Compulsory blood testing of all persons admitted to hospital as a result of a motor accident (VIC). 1 July - As part of Australia's program of conversion to metric system,	1275	3572

Year	Event	Road Toll[1]	
		NSW	*Australia*
	urban speed limit raised from 35 mph (56.3 km/h) to 60 km/h. Using crash simulations, David Herbert and his team from TARU showed the effectiveness of correctly installed child restraints (NSW). 3 October - Helmet wearing made compulsory for motorcycle riders and pillion passengers (WA). 2 December - Maximum legal PCA of 0.08 grams of alcohol per 100 millilitres of blood introduced. Probationary licences (1 year) introduced. (NT). First fog warning system installed on F6 Freeway, south of Sydney. With the passing of the National Roads Act 1974, the Federal Government assumes full responsibility for construction and maintenance of 16,000 km of national roads, the principal routes between the state & territory capitals. A massive program of duplication works on the Hume Highway commences.		
1975	National Road Safety and Standards Authority established by Act of Federal Parliament, with $10 million approved by Parliamentary Public Works Committee for research and testing facilities proposed to be built at Albury-Wodonga. Compulsory blood testing of all persons admitted to hospital as a result of a motor accident (QLD). 1 June – Demerit points system introduced (WA). Original child restraint standard (AS E46) updated to include a range of dynamic tests and requirement for easier adjustment of all straps. Resulting standard is AS 1754. Commencement of large-scale at-scene study of a representative sample of accidents by the University of Adelaide's Road Accident Research Unit; completed in 1981. The unit will eventually become the Centre for Automotive Safety Research (CASR) in the University of Adelaide (in 2003), focused on: • Conducting multidisciplinary research to understand how road crashes and the resulting injuries are caused • Proposing and evaluating ways to prevent crashes and injuries • Providing independent professional advice on road safety matters to government and non-government organisations in Australia and overseas. TARU also undertook a range of in-depth crash studies throughout the 1970s (NSW).	1288	3694
1976	January - Compulsory restraint of children in front seats of vehicles (VIC). National Road Safety and Standards Authority Act repealed and $10	1264	3583

Year	Event	Road Toll[1]	
		NSW	*Australia*
	million allocation returned to federal budget as "savings". Traffic Authority established to coordinate the road safety activities of the Dept of Main Roads and Dept of Motor Transport, and later takes over TARU (NSW). Top-tether anchorages for fitting of infant restraints made mandatory in Australian new vehicles. 1 July - Random breath testing introduced on a limited trial basis. Made permanent in July 1978 (VIC). The most comprehensive on-scene in-depth study of automobile crashes ever conducted in Australia commenced in mid-1976 with funding from the new Whitlam Government and conducted by the Traffic Accident Research Unit (NSW).		
1977	1 March - Drivers of cars (other than taxis), station wagons, utilities or panel vans must not permit a child under the age of eight to travel unrestrained if a suitable restraint is available in the vehicle (NSW). 11 March - Radar introduced to detect speeding motorists (WA). Radar introduced to detect speeding motorists (TAS).	1268	3578
1978	1 January – Motor vehicles manufactured after this date to have locking retractor seat belts fitted to outer seating positions. Taxi passengers must wear the belt if fitted (NSW). Commencement of the world's first New Car Assessment Program in the USA. This involved crash testing vehicles at 35 mph into a concrete barrier. November – A Consumer Product Safety Standard prohibited the sale of child seats and child harnesses not approved by the Standards Association of Australia. The Road Accident Research Unit (RARU) developed a method of breath testing drivers without involving the police. This led to a series of surveys over 20 years in which 80,000 drivers were breath tested in Adelaide, mostly between 10 pm and 3 am.	**1384**[2]	3705
1979	21 December - It became compulsory to wear seat belts in small trucks with an unladen weight of not more than two tonnes (NSW). A case-control study of the relationship between drivers' blood alcohol levels and the risk of crash involvement conducted in Adelaide by RARU. Introduction of Black Spot program (VIC). 1 July - Replacement of prima facie rural speed limit with 100 km/h limit (NSW). Trial designation of major and minor roads in some parts of Adelaide	1290	3508

Year	Event	Road Toll[1]	
		NSW	*Australia*
	as a replacement of the give way to the right rule.		
1980	1 February – Roadside breath testing introduced for a limited 2-year period (made permanent in December 1981). Also compulsory blood testing of all persons admitted to hospital as a result of a motor accident (NT). 1 June - Probationary licences (1 year) introduced (SA). Motorcycle helmets sold in Australia must comply with ADR 1698-1980. A report on the second Adelaide In-Depth Accident study recommends that: "In a metropolitan area, intersections should never be uncontrolled". 15 December - PCA limit lowered to 0.05 (NSW).	1303	3272
1981	Following a review of Victoria's success in reducing its road toll in the 1970s, Traffic Authority and Police recommend a joint parliamentary party on road safety and experiments with random breath testing (NSW). 5 June – Widespread introduction of roundabouts in NSW. Trial of red light camera system commenced (VIC). 14 October – Random breath testing introduced (SA).	1291	3321
1982	8 January - Motor Traffic Regulations amended to strengthen the law concerning the safety of children in motor vehicles. If the vehicle has front and rear seats, the driver shall not permit a child under the age of 8 to travel unrestrained in the front compartment if a rear seat is available (NSW). March - The Staysafe Committee (Joint Standing Committee on Road Safety) was established to investigate and report on road safety matters. Its early emphasis was on addressing the problem of drink-driving. Traffic Authority and Police combine to develop and fund an intensive education and enforcement campaign *(How will you go when you sit for the test? Will you be under 05 or under arrest?).* Campaign received international acclaim and effected a dramatic change in social attitudes to drinking and driving and a substantial reduction in road fatalities in the years ahead (NSW). 2 July - Regulations concerning the safety of children in motor vehicles further strengthened, to ensure that any child under the age of 14 wears an available restraint (NSW). Pilot loan scheme for bassinet restraints launched in outer Melbourne suburb. It became state-wide in January 1985 (VIC). 17 December – Random breath testing introduced, initially on a trial basis for 3 years. The introduction was accompanied by a high-profile	1253	3252

Year	Event	Road Toll[1]	
		NSW	*Australia*
	media campaign. 3,164,100 tests would eventually be carried out during the trial, equating to about 1 in 3 drivers being tested per year. It also involved the compulsory blood testing of all persons admitted to hospital as a result of a motor accident (NSW).		
1983	1 January – New motorcycles registered after this date to have two rear view mirrors (NSW). 6 January – Random breath testing introduced (TAS). 11 February – An amber flashing warning lamp must be installed on the roof of any vehicle serving customers on a public street (NSW). The Victorian Road Safety and Traffic Authority (ROSTA) was combined with the Transport Regulation Board and Motor Registration Branch to become the Road Traffic Authority. Country Roads Board renamed as Road Construction Authority (VIC). NSW annual road toll below 1000 fatalities for first time since 1963.	966	2755
1984	Radar introduced to detect speeding motorists (NT). A series of bicycle helmet rebate schemes are run throughout 1984 and 1985 to make bicycle helmets more affordable (VIC).	1037	2822
1985	2 April - it became an offence for the holder of a learner's permit or a first year provisional licence holder to drive with a PCA of 0.02 or more. It also became an offence for any supervisory licensed driver seated alongside a learner to be under the influence of alcohol or drugs or have a PCA limit of 0.05 or more (NSW). Traffic Authority's Road Safety Bureau established a number of *mobile* child restraint fitting stations (NSW). May - first year provisional licence holders permitted to accumulate 4 demerit points without having their licences cancelled (NSW). 10 December - RBT became a permanent feature of NSW Traffic Regulations. *Stop Revive Survive* fatigue campaign with Driver Reviver stops initiated (NSW).	1067	2941
1986	1 March - a driver can lose two demerit points and a fine for each child permitted to travel unrestrained (NSW). 2 May - Aircraft equipped used to check vehicle speeds on rural highways (NSW). Good effect on speeds, but deemed too expensive and "un-Australian". State-wide child safety restraint fitting network established by Traffic Authority with the assistance of the NRMA (NSW). NSW Government responds to Traffic Authority report on potential cost-effectiveness of accident prevention measures in containing	1029	2888

Year	Event	Road Toll[1]	
		NSW	*Australia*
	growth in Third Party insurance costs by promising $50 million grant for new activities. (Scheme ended after one year when Injury Insurance privatised to CTP scheme). Collaboration was established with the US Department of Transportation's National Highway and Traffic Safety Administration (NHTSA) to assist staff development and lay the foundations for expansion of the Crashlab facilities, ultimately leading towards an Australian New Car Assessment Program.		
1987	August - Mobile Random Breath Testing introduced. By the end of 1987 there had been a large increase in volume of police enforcement (number of tests conducted). The number of random breath tests conducted in NSW (both mobile and stationary RBT) peaked in 1996 when 2,380,149 tests were conducted (NSW). June - Monash University Accident Research Centre (MUARC) established (VIC).	959	2772
1988	The NSW Traffic Authority initiated the Red Light Camera Program in the Sydney metropolitan area. Camera housings and signs were installed at 20 selected intersections from January 1988 to June 1989. Six cameras were circulated among the various prepared sites. The scheme eventually covered 183 sites. First NSW road safety strategy adopted by Traffic Authority. 18 February - Child restraint regulations strengthened. The change made it compulsory for any child under the age of 12 months in private passenger vehicles to be restrained by approved restraint (NSW). 1 July - the speed limit for heavy trucks was increased from 90 to 100 km/h. A joint Police / Traffic inquiry subsequently found Trucking industry to be "out of control" so far as safety is concerned (NSW). 29 July - It became compulsory for passengers in motor lorries of more than two tonnes to use available seat belts (NSW). Original RTA Crashlab (Rosebery) received NATA accreditation. Casualty Accident Reduction Program (CARP) commenced (NSW). Publication of *Reducing Traffic Injury - A Global Challenge* (authors: Gordon Trinca, Jack McLean, Ian Johnston, Bob Campbell, Frank Haight, Peter Knight, Murray Mackay and Elaine Petrucelli). It is the first book of its kind to set down the principles on which safety works in a way that can be understood by policy makers as well as practitioners. Establishment of a joint initiative with the NSW Department of Education to develop and deliver integrated road safety education as part of the existing school curriculum. The initial focus (Street Sense)	1037	2887

Year	Event	Road Toll[1]	
		NSW	*Australia*
	was on the primary school curriculum.		
1989	16 January - Roads and Traffic Authority formed under the Transport Administration Act 1988 from the merger of the Dept of Main Roads, Dept of Motor Transport and Traffic Authority (NSW). VicRoads formed from the amalgamation of the Road Construction Authority and the Road Traffic Authority (VIC). 1 July – Child restraint rule extended to taxis (NSW). 20 October and 22 December – Major bus accidents near Grafton and Kempsey respectively on the Pacific Highway (NSW). These two tragic events led to a NSW-led major revision of standards for bus seats (ADR 68), stipulating a 20G occupant protection crash requirement. All development work for this standard was conducted by the RTA Crashlab. It was very significant and is still a world leading regulation. 15 December - Penalty for a seat belt offence was increased from 2 to 3 demerit points (NSW). December - Speed limit for trucks reduced to 90 km/h (NSW). December - TAC, Victoria Police and VicRoads adopt an integrated approach to accident prevention in response to community concern about the growing road toll. It involves a significant boost to enforcement resources, supported by high profile media campaigns, and a sustained focus on drink-driving. Road Safety Bureau commenced negotiations with Motor Accidents Authority to pursue similar approach in NSW. December – The Prime Minister released the Federal Government's 10-point Road Safety Initiative: 1. National 0.05 BAC limit 2. National licensing of heavy truck and bus drivers 3. National uniform speed limits 4. Speed limiters for heavy vehicles 5. Zero BAC limit for young drivers 6. Sufficient enforcement to ensure that one in four drivers is random breath tested annually 7. Graduated Licensing System for young drivers 8. Compulsory bicycle helmet wearing for all cyclists 9. Daytime running lights for motorcycles 10. Enforcement of seat belt and child restraint wearing	960	2801
1990	RTA CEO Bernard Fisk approved funding to establish an Australian New Car Assessment Program. To ensure a fast program commencement, initial funding was sufficient for NSW to run the program alone if necessary. Funding was also approved for a major	797	2331

Year	Event	Road Toll[1]	
		NSW	*Australia*
	expansion of the old Traffic Accident Research Unit test laboratory to include a full scale crash barrier (NSW). April – Launch of speed camera program (VIC). Public consultation phase of Road Safety 2000 strategy commenced and international peer-review of the process initiated (NSW). Road Safety 2000 strategy released (NSW). 1 July - Compulsory helmets for all bicycle riders (VIC). Radar detectors outlawed following the recommendations of the Coroner on the Grafton coach/semi-trailer crash of 1989 (NSW). Road Environment Safety conference held in Wollongong, leading to the adoption of road safety audits (NSW). Launch of the Australian Government's Black Spot Programme. Compulsory novice motorcycle rider training introduced in NSW. It involves two levels of training - pre-learner and pre-provisional. Pre-learner riders undertake a seven-hour off-road training program before obtaining a learner's licence (with a maximum speed of 80 km/h and a pillion passenger prohibition). After a minimum of three months, learners undertake a six-hour training course and test to obtain a provisional licence (with a speed restriction of 90 km/h and a pillion passenger prohibition). Safe-T-Cam initiated with a view to controlling heavy vehicle point-to-point speeds (NSW). RTA works with IPWEA and Local Government to establish Council Road Safety Officers and promote more activity at Council level (NSW).		
1991	1 January - Compulsory bicycle helmets for all riders *over 16 years old* (NSW). 1 January - new heavy vehicles were required to have speed limiters restricting them to 100 km/h. It is only on specially marked roads that speed limited vehicles may travel at 100 km/h. Tachographs made compulsory on all heavy vehicles (NSW). 1 January - PCA limit for professional drivers changed to 0.02 (NSW). March - 21 static slant radar speed cameras (14 urban and 7 rural) introduced in NSW. The initiative yielded a 32% reduction in fatalities and 22% reduction in serious injury crashes at the initial speed camera locations. Offences where drivers exceeded the speed limit by more than 20 km/h were reduced by almost half. Road Safety 2000 finalised and launched (NSW). April - First National Road Safety Strategy initiated.	663	2113

Year	Event	Road Toll[1]	
		NSW	*Australia*
	1 July - Compulsory bicycle helmets for *all* riders (NSW).		
1992	1 January – Previous exemptions to bicycle helmet wearing granted on medical and religious grounds, and for overseas bicyclists attending races, were removed (NSW). First ANCAP tests undertaken at Rosebery. Compulsory helmets for all bicycle riders (WA). 40 km/h school zone speed limits introduced (NSW).	649	1974
1993	NSW Local Government Road Safety program initiated following successful trials of the concept by the Sydney Region of NSW RTA. 8 December - Australian ANCAP commences frontal off-set program (at 60 km/h) in addition to full frontal crashes. First vehicle tested is a Holden Barina.	581	1953
1994	RTA and Police Service release the first Road Safety Campaigns calendar, to better coordinate information campaigns and on-road enforcement activities (NSW). RTA Crashlab initiates a consumer program for child restraints which becomes known as Child Restraint Evaluation Program (CREP). Initial co-partners were NRMA and ACA (Australian Consumers Association) (NSW). First tertiary-level Education Program for Road Safety practitioners initiated at University of New England (NSW). First National Road Safety Action Plan. Christmas – First trial of enhanced Police enforcement program, to support extended police enforcement at key periods of the year with structured and agreed publicity. The trial continued during Easter and the June holiday weekend in 1995. The concept was a success and an expanded program involving 7,500 extra police shifts was developed for the following year (NSW).	647	1928
1995	Europe and the Insurance Institute for Highway Safety in the US follow ANCAP with a frontal off-set crash test program (at 64 km/h, which is subsequently adopted by ANCAP). Updated fog warning system, incorporating speed detection, installed on F6 Freeway south of Sydney. Provision for local authorities to set lower speed limits on local roads (VIC). Zero BAC for taxi drivers (VIC).	620	2017
1996	Stop Revive Survive campaign including Driver Reviver stops on major highways commenced (NSW).	581	1970

Year	Event	Road Toll[1]	
		NSW	*Australia*
	Centre for Accident Research and Road Safety – Queensland (CARRS-Q) established as a joint venture initiative of the Motor Accident Insurance Commission and Queensland University of Technology, to address the human, economic and social costs resulting from road crashes. National Rural Road Safety Action Plan launched. The International Harmonised Research Activities (IHRA) was formed at the Enhanced Safety of Vehicles conference in Melbourne. IHRA seeks to share international vehicle-related safety research results, to minimise duplication and promote harmonisation of global standards.		
1997	The Sydney Harbour Tunnel becomes the first site in NSW to have a fixed speed camera installed. It was initiated due to community concern over drivers who deliberately travelled at high speeds through the tunnel. Speeding in the tunnel is difficult to enforce through conventional means. October – commencement of 3-month trial of 50 km/h urban speed limit in 26 Council areas in NSW. Report on a case-control study of travelling speed and the risk of involvement in a casualty crash in Adelaide published by RARU. This is the first, and only (as of 2009) study conducted in a metropolitan area in any country. The results influence the adoption of a default 50 km/h speed limit in urban areas. October - The Swedish parliament passed the Road Traffic Safety Bill, founded on the Vision Zero concept which states that eventually no one will be killed or seriously injured within the road transport system. It is an expression of the ethical imperative that *it can never be ethically acceptable that people are killed or seriously injured when moving within the road transport system.*	576	1767
1998	June – following the success of a trial, all NSW Councils invited to adopt 50 km/h urban speed limit. Swedish road safety expert Claes Tingvall appointed to head up the Monash University Accident Research Centre (MUARC). He had been responsible for the development of the Swedish *Vision Zero* concept.	556	1755
1999	1 April - Two fixed film-based speed cameras commenced operation on a section of the Pacific Highway in the Burringbar Range. In the previous 5 years there had been 176 crashes on this section, resulting in 6 fatalities and 72 injuries. 81% of all crashes were speed-related, and speed was a factor in all of the fatal crashes. Adoption of the 5-star rating system for ANCAP vehicle crash testing in Australia. Uniform demerit points system adopted across Australia.	577	1764

Year	Event	Road Toll[1]	
		NSW	*Australia*
	24 December - The Road Transport (Safety and Traffic Management) Act 1999 legislation commenced operation, permitting fixed digital speed cameras to operate in NSW. On that day the first cameras were installed at Kariong (Woy Woy Rd), Herons Creek (Pacific Hwy) and Tilbuster (New England Hwy).		
2000	July - Graduated Licensing System introduced for new learner drivers, requiring them to complete a logbook showing they had driven for at least 50 hours before progression to provisional driver stage. The 12-month P-plate stage was expanded. Drivers must now drive for at least three years at restricted speeds, and extra tests were introduced prior to obtaining full licences (NSW).	603	1817
2001	Report on a case-control study of travelling speed and the risk of involvement in a casualty crash in rural areas published by RARU. Alcohol interlock devices introduced (SA). December - Commencement of the *Microsleep* driver fatigue campaigns featuring well-known scientist Dr Karl Kruszelnicki (NSW).	524	1737
2002	RTA commences sponsorship of the NSW Speedblitz Blues cricket team. Significant reduction in the speed limit enforcement tolerance (VIC). July – Victorian Transport Accident Commission (TAC) produces advertisement featuring MUARC's Prof Ian Johnston, showing the effect of a small change in speed on crash severity. It was subsequently screened in all states, the ACT and New Zealand and is regularly used in driver training and school road safety programs. Commencement of pilot of the *Sober Driver Program*, an education and rehabilitation program for drink drivers that have committed two drink driving offences in a five year period. It is a joint initiative of the RTA, the Dept of Corrective Services, the Attorney-General's Dept and the Motor Accidents Authority (NSW). Introduction of the Learner Approved Motorcycle Scheme, a scheme based on power-to-weight ratio of 150 kilowatts per tonne (NSW). November – Installation of first speed cameras in 40 km/h school zones (NSW). Development of Crashcam to record actual crashes (NSW).	561	1715
2003	April - Commencement of the *Circadian Rhythms* fatigue campaign featuring Dr Karl Kruszselnicki (NSW). First major survey of drug driving (NSW). 8 September – Alcohol Interlock Program commenced (NSW). Pilot of NSW Sober Driver Program.	539	1621

Year	Event	Road Toll[1]	
		NSW	*Australia*
	Legislation for roadside drug testing passed. Came into effect in July 2004 (VIC).		
2004	3 May - Legal alcohol limit in NSW for all learner and provisional (P1 and P2) licence holders became zero. May – Launch of *The Brain* road safety campaign. Targeted mainly at young males, it used special effects to highlight the effects of even modest amounts of alcohol on driving (NSW). July - State-wide roll out of NSW Sober Driver Program. Introduction of combined speed and red light cameras (VIC).	510	1583
2005	21 December – Official opening of Crashlab facility at Huntingwood in western Sydney.	508	1627
2006	February – Launch of the *Paranoia* road safety campaign, which focused on the fear of getting caught by unpredictable mobile RBT (NSW). 15 December – Introduction of Roadside Drug Testing in NSW using oral fluid screening devices. Also the introduction of drug testing of any driver, rider or supervising licence holder involved in a fatal crash.	496	1602
2007	1 January – Northern Territory introduces 130 km/h speed limit on major highways. In the following two years, there was 25% less fatal accidents, 42% less 'hospitalised' accidents, 77% less 'minor injury' accidents and 38% less 'no injury' accidents on the Stuart, Barkly, Victoria and Arnhem Highways. 22 January - First Roadside drug testing operation by Police at Mt White Heavy Vehicle Checking Station (NSW). June - Launch of the so-called Pinkie campaign: *"Speeding. No one thinks big of you"* in NSW. The campaign won numerous awards and achieved worldwide recognition. 1 July - Learner licences now valid for five years. Learners required to fill out a Learner Driver Log Book and have to log at least 120 hours of supervised driving, which includes 20 hours of night driving (NSW). Use of mobile phones by learner drivers is banned.	435	1603
2008	1 January - NSW Centre for Road Safety became operational. It is charged with developing: • Advertising campaigns designed to make speeding become socially unacceptable. • Tests of new safety technology for both vehicles and the road environment. • Industry awards for innovation in safety technology. • Safety classifications for vehicles.	395[3]	1462[3]

Year	Event	Road Toll[1]	
		NSW	*Australia*
	• Best practice design models for road building and maintenance. 6 June – Commencement of the progressive introduction of new penalties relating to hoon driving (NSW). Features include increased fines; licence suspensions; imprisonment; and vehicle sanctions including wheel clamping, impoundment and crash testing. Australian-made cars achieve 5-star ANCAP rating for the first time. 1 December – Introduction of new licensing arrangements for older drivers (NSW). Features are: • Annual medical check-ups now start from the age of 75, instead of 80. • Practical driving assessments for drivers from the age of 85 will now be every two years instead of every year. • Drivers now have the option of taking a driving assessment from home with a driving instructor accredited by the RTA, on a 'fee for service' basis. • Drivers have the option of a modified licence and will not be required to take an assessment.		
2009	1 June - Graduated Licensing Scheme introduced for motorcycle riders. Riders issued with a provisional rider licence required to hold a provisional P1 licence for a minimum of 12 months and a provisional P2 licence for a minimum of 24 months before graduating to an unrestricted rider licence. Restrictions on speed, zero BAC and engine capacity/power to weight apply to both P1 and P2 levels, and a pillion restriction applies to P1 riders. An exemption from P2 is available to riders over 25 with an unrestricted driver licence. 19 December – One hour of professional driving instruction will now count as three hours in the Learner Driver Log Book. Learners aged 25 or over no longer required to complete a log book (NSW). December – Commencement of installation of combined speed and red light cameras at 200 sites, to replace the existing 183 wet-film based red light cameras installed from 1988 (NSW).	461[3]	1509[3]
2010	1 March – Children up to the age of seven years required to travel in approved seats (NSW).		

Notes:

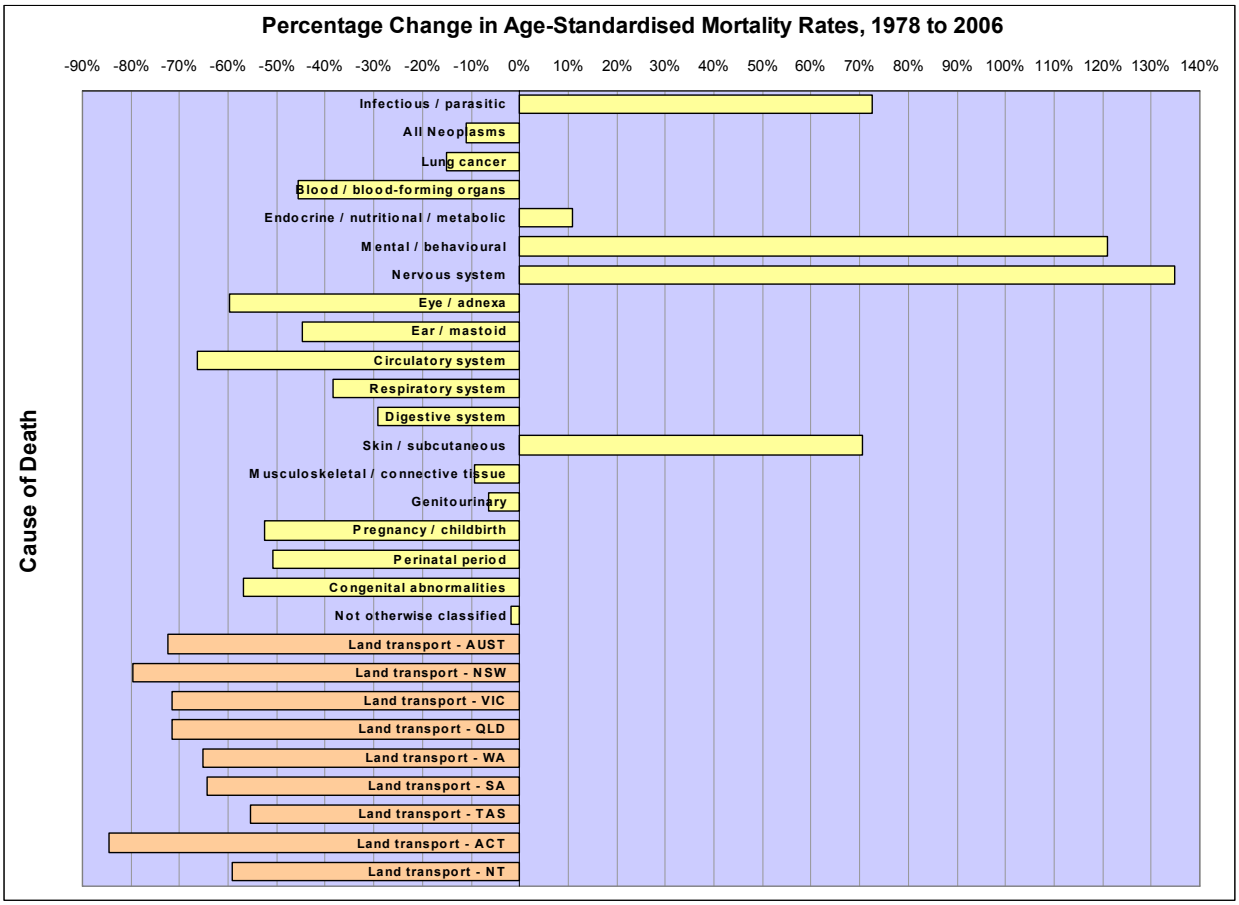
1. The Road Toll figures include deaths in crashes which did not involve a motor vehicle. In the early years of motorisation, fatal crashes involving a motor vehicle were the minority. For example, only 71 of the 231 road deaths in 1923, and 102 of the 309 deaths in 1924, involved a motor vehicle.
2. Peak figures for NSW and Australia
3. Provisional totals.

Mortality trends

This oral history has addressed many of the varied initiatives that have been employed over the years to reduce road toll. But how has the road toll changed in comparison to death rates from other causes?

A useful source of information about fatality rates from all causes is the GRIM (General Record of Incidence of Mortality) books compiled by the Australian Institute of Health and Welfare. These workbooks contain comprehensive long-term mortality data on selected causes of death by age and sex for each year, and enable mortality data to be analysed over specific time periods. Each workbook contains mortality data, population data, derived data items (eg age-specific and age-standardised rates), summary measures (eg mean age at death, potential years of life lost, lifetime risk of dying) and birth cohort information.

The following graph has been produced from the GRIM books, and shows the trends in mortality (adjusted for differences in age distribution) for the major medical causes plus Land Transport Accidents from 1978 to 2006. It shows conclusively that deaths from Land Transport Accidents fell by a greater percentage than any other cause of death in that period.



'We may have reached our limits in road safety pay-offs: seatbelts, vehicle design, random breath tests, and better and less intrusive roadside furniture such as poles set back from the roadside, energy absorbing poles and removal of some trees. Almost certainly future gains will come from both speed reduction from speed limits and from vehicles being built with less horsepower. We do not need, as one car company executive said years ago, the power to do 150 mph 'in case we need to pass'. He didn't say water or wind but he should have!

- DR JOHN BIRRELL, IN "TWENTY YEARS AS A POLICE SURGEON"
(BROLGA PUBLISHING, 2004)