



Journal of the Australasian College of Road Safety

Formerly RoadWise — Australia's First Road Safety Journal



In this edition

Contributed articles

- Milestones in Motorcycle Safety - Australia 1976 – 2009
- Motorcycle Safety in Australia – Consulting with Riders and Jurisdictions Working Together -
- A New Strategic Approach to Advance Motorcycle Safety and Mobility in Victoria
- Australian Road Safety Equipment Certification in Crisis?
- Roads and Motorcycling: Raising the Profile
- Effect of Past Black Spot Programs on Motorcycle Safety
- Community Policing and Education to Reduce Motorcycle Trauma
- Motorcycle Crash Casualties and their In-hospital Management
- The Motorcycle Safety Research Program at the George Institute
- A Survey of Motorcycle Safety Programs Across Australasia
- Daytime Running Lights for Motorcycles – an Idea and Research Proposal

Peer-reviewed papers

- Overview of Motorcycle Crash Fatalities Involving Road Safety Barriers
- Motorcycle Rider Protective Apparel Wearing: Observational Study Results from the Brisbane and Canberra Regions

A new approach to health

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The policy of the publisher is to provide a medium for expression of views and for debate, within the traffic safety community, on a wide range of issues. The journal provides authors of papers with the opportunity to have their work submitted to the Editorial Board for peer review.

Encouragement also is given to interested persons and organisations to submit articles, photographs or letters for publication. The publisher reserves the right to reject submissions or, with approval of the author, edit articles. No payment is offered for articles submitted.

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Cover photo: One of the key subjects discussed in this special motorcycling safety edition of the Journal is rider training. In this photo an Instructor is addressing a group of trainees, many of whom are older riders.

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Letters intended for publication should be sent to the Managing Editor (see address details inside front cover). Published letters would normally show the name of the writer and state/territory of residence, unless anonymity is requested.

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Guidelines for Authors

The ACRS Journal publishes articles in all facets of the study of traffic safety. Articles are accepted from a variety of disciplines, such as medicine, health studies, road and automotive engineering, education, law, behavioural sciences, history, urban and traffic planning, management, etc. Interdisciplinary approaches are particularly welcome.

Authors' guidelines may be downloaded from the College website at www.acrs.org.au/publications/journal.

Articles may be up to 5,000 words in length and should be submitted to the Managing Editor in Microsoft Word format as email attachments: email address: journaleditor@acrs.org.au. The email message should state whether or not peer review is requested. It is assumed that articles submitted have not previously been published and are not under consideration by other publishers.

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From the President

Dear ACRS Members,



Our excellent editor, Geoff Horne has indicated to the College that he will stand down later this year. Geoff has had a long and distinguished term with the College, first as Executive Officer and in recent years as Editor of the Journal. I know we will miss him and hope he will be able to continue as a member to advise and contribute. I know his

expertise will be difficult to replace and we have included an advertisement in the Journal for the position.

There is much happening this month. The College Conference in Perth, the Policing and Research Conference in Sydney and the First UN Ministerial Conference on Road Safety in Russia. Our Perth Conference will be well attended and will present good opportunities for delegates.

I had the opportunity to discuss road safety with the Hon Maxine McKew, the Parliamentary Secretary for Infrastructure, Transport, Regional Development and Local Government, as improving regional road safety is a key issue.

As ANCAP Chairman I will be attending the Moscow conference to encourage the introduction of safer cars and I am hopeful the Australian Government will support the UN proposal for a "Declaration for a Decade of Action on Road Safety" to focus international attention on the unnecessary burden of road trauma, particularly in the developing world.

It is disappointing to note that in the current calls for more infrastructure spending the benefits of safer road infrastructure have been ignored. Given that nationally we have failed to meet what were seen as reasonable road safety targets a decade ago, we will encourage this subject to be on the agenda of the new Australian National Road Safety Council. Over 14,000 people have died from road crashes in Australia since January 2001.

This is a special edition of the Journal focussing on motorcycle safety, with Liz de Rome as Guest Editor assisting Geoff Horne in the encouragement of writers and the collection of articles. We appreciate the substantial amount of voluntary time she has given to this edition of the Journal.

Motorcycling is increasing in popularity with many road users and so it is valuable for us to publish a range of relevant papers on the many facets of motorcycling safety. Reducing crash rates and crash trauma involving motorcycles is complex, but not unachievable. The articles in this Journal, like those in the August Journal on the National Road Safety Strategy for the next decade, are for your consideration and, if you wish, for your comment.

The College subscription notices will be sent out shortly; can I encourage you to continue your support for road safety by maintaining your membership in 2010 and by paying promptly. If you are close to retirement, I hope that you will continue as a member, taking advantage of the 50% discount for retirees or those working less than ten hours per week.

Lauchlan McIntosh AM, FACRS

President

Message from our Guest Editor, Liz de Rome*



Dear ACRS Members,

This special edition of the Journal marks a significant change in our approach to motorcycle safety that has evolved over the past ten years. The increased attention, worldwide, to motorcycle safety is largely due to an increasing presence of motorcycles and scooters on our roads and in our crash

statistics. It is also the result of more differentiated research in road safety. Early pioneers in road safety focused on broad brush strategies (helmets, seatbelts, RBT, GDL etc), but the low hanging fruit has been picked and we need to find more specific targeted approaches if we are to continue reducing the number of road crash casualties.

Perhaps the most important change to come, identified in national and international forums, will be for motorized two-wheelers to be recognized and accommodated as a separate class

of road user for road safety policy, traffic management and transport planning. The United Kingdom, and now Victoria, have taken a lead in this area. Motorcycles and scooters are an increasingly popular form of transport. They offer convenient and cheap solutions to traffic congestion, parking pressure and are an environmentally sustainable alternative to cars. The number registered in Australia increases by 7% each year, more than double the increase in the number of passenger vehicles (3%) [1]. The number of people who ride to work each day is equivalent to the number who cycle.

As the number of registered motorcycles increases, so does the number of casualties. Although they represent less than 4% of all registered vehicles, motorcycles now account for some 15% of road crash deaths and 20% of injuries. While at a national level the crash rate per registered motorcycle has decreased, there are substantial differences in crash rates between different Australian States and Territories. Such variations in crash rates can also be observed overseas, from which it would appear that motorcyclists are safer in some jurisdictions than in others. There is not a simple linear relationship between the number of motorcycles and the number of crashes.

While there are sometimes problems with the ways in which crash rates are calculated, we can learn much from studying the patterns in different jurisdictions.

Australia is well placed to advance the development and understanding of motorcycle safety best practice. We have a well established, if small, cohort of researchers working in the field. We have the legislative power to mandate change and in the past, have used it well (e.g. helmets. Learner Approved Motorcycles and compulsory training as a part of licensing).



The adoption of the 'safe systems' approach provides an opportunity to find a more balanced approach to road safety, by integrating education and enforcement with road systems that are designed to accommodate and reduce the risks and consequences of human error. Work done in Victoria on the motorcycle blackspots program is a prime example of what can be achieved, when all stakeholders work together.

Road safety may be described as the practice of creativity constrained by science. We need to apply rigorous science to

provide the evidence to ensure that what seems like a good idea, will work and will not have unintended bad consequences.

As road safety practitioners, we need to continue to work with the motorcycle community to ensure that our 'good ideas', are appropriate and will be effective. We also need to recognize that effective consultation is likely to be a partnership based on the mutual acceptance of different views.

This edition of the Journal provides an opportunity to consider how far we have come. Contributions, including the peer reviewed research papers and articles, were received from a wide range of researchers, government agencies and the rider community. This is more than just an encouraging beginning, but we need more quality research to answer the key questions about the role of motorcycles in our transport mix and how we accommodate the associated safety and traffic management requirements.

Liz de Rome

LdeR Consulting

** Liz is a psychologist with over 16 years experience as a road safety consultant specialising in local government road safety planning, novice driver education and motorcycle safety. She is currently based at The George Institute for International Health while undertaking a PhD in motorcycle safety at the University of Sydney. She is funded by a scholarship from the NRMA ACT Road Safety Trust. Liz is a member of the NSW (Sydney) Chapter and the Executive Committee of the Australasian College of Road Safety. She is internationally recognized for her work and has been invited to address a number of national and international motorcycle safety forums, including the US National Transportation Safety Board. She was recently invited to become a member of the US Transportation Research Board (TRB) Committee on Motorcycles and Mopeds (ANF30).*



RRSP Profile

Following the introduction of this feature in the May 2009 Journal, we are continuing to profile in each edition an ACRS member, who is on the ACRS Register of Road Safety Professionals. To be on the Register applicants must satisfy some stringent

qualification and experience criteria in road safety. (For details, visit www.acrs.org.au/professionalregister). To be an 'RRSP' is an indication that an ACRS member has worked for at least five years at a senior level in their particular field/s of road safety work, has relevant academic qualifications and is acknowledged as being an expert by his or her peers working in that field/s. This edition's focus is on Ms Maureen Kohlman, who lives and works in the Northern Territory. She has had extensive experience in training both indigenous and non-indigenous drivers and their driver trainers.

Maureen Kohlman RRSP (Driver Education)

Maureen is a qualified Adult Educator who, over the past 18 years, has established two national Registered Training Organisations, and developed and delivered client specific remote area training resources and continues to actively participate in community development.

All driver theory education delivered by Maureen involves driver attitudes, the development of defensive driving techniques as well as basic skills needed to operate a vehicle not only in remote areas but when travelling and driving in the cities. Maureen facilitates the Drink Driver Education Program, a unique set of competencies derived for offenders within the Northern Territory, in remote and urban areas.

In practical terms Maureen has been a qualified training facilitator working with both indigenous and non-indigenous clients in both urban and remote area situations since 1986 in the Northern Territory, and is currently working with a political party to develop sound driver safety and road safety strategies for future implementation.

RRSP Profile *continued*

Maureen is the current Treasurer of the Australian Driver Trainers Association National body and Northern Region President of the Australian Driver Trainers Association Northern Territory Incorporated.

We asked Maureen the following questions:

How long have you been a member of ACRS?

I have been a member of ACRS for 4 years and then in 2007 I became a RRSP.

What do you value most about your membership of ACRS?

The open communication among the professional group, the willingness to share knowledge and the common dedication towards saving lives.

Tell us about your particular expertise in Road Safety.

Particular expertise – very hands on practical training mixed with effective theory. I am good at delivering training in remote areas that brings about change in driver responsibility and attitudes. Communities on which I have taught have all developed the confidence to train their own people. I firmly believe in the old adage of watch, watch again and now try. I am delighted in the company of the Aboriginal people across the Northern Territory who taught me much and in return I trust I left behind sufficient skills within their own communities to continue their own dedication to saving lives. In urban areas I am constantly challenged by the youth of today with their different perceptions and the vastly different expectations of their age group. Sadly, many of the driving instructors currently in the industry are mature aged with very few of the younger generations scattered amongst them. I believe we have much to teach the youth of today just as they have much to teach us. I believe we need to be more open to the manner in which the youth of today live, play, work and learn. They are increasingly different, having to face much more than many of us have had to deal with in a life time.

What is a typical working day for you?

Living in a rural area, surrounded by virgin bush, I am delighted daily by the cacophony of birds that welcome each sunrise. The birds have four shifts, and by the time they reach the fourth shift it is time for me to stop work. That's very easy to do when I am at home, however when I am away I can work up to a 12 hour plus day. On a typical day I start by responding to all the emails I receive as a member of the Australian Driver Trainers Association (National) Inc group. I need to make a concentrated effort to stop handling these emails after two hours as there are many other things to do in a day. I then go onto the internet to see what the latest statistics are around Australia and to search for more innovative training around the world. When I find documents of interest I email links to like minded professionals as well as to those in politics. I find the ANCAP web site of great interest, especially with the new low cost vehicles currently being released onto the market which may adversely affect road safety, particularly within the NT. I am the Australian Driver Trainers Association Northern Territory branch representative on the DriveSafe Steering committee in the NT and am still involved in policy development with a political group. I usually spend around three hours a day involved with our own family businesses and I am also a member of the Family Planning & Welfare NT Board. Aside from the endless hours of work, my hobby is to follow up motocross and motorcycle road racing events worldwide. I am currently planning our next family adventure, during which I hope to include some practical exposure to road safety Montana USA style. At days end I have usually put in roughly 10 hours. When I go out to deliver practical training I find that an almost a relaxing day, except when the days stretch to 12 hours.

Letters to The Editor

Need for Coordination at a National Level

The Australasian College is to be congratulated for devoting an entire edition of their journal to motorcycles. I believe this to be a first amongst academic journals to focus solely on this mode of transport. There are many issues from both research and policy perspectives that are yet to be resolved, but it is heartening to know that motorcycles are at last receiving some of the attention required. A number of States now have motorcycle safety strategies, but we need coordination at a national level to achieve integration into transport and road safety planning and in order for best practice solutions to be developed and shared across Australia. An excellent model for

advancement is the Australian Bicycle Council (ABC), the national body that manages and coordinates implementation of the Australian National Cycling Strategy. The Council reports annually to the Australian Transport Council (ATC), through Austroads and the Standing Committee on Transport (SCOT). The Council's secretariat is provided by Austroads.

The Australian National Cycling Strategy 2005-2010 is a coordinating framework identifying responsibilities that lie with the various governments of all levels. The Strategy sets out actions, with targets, timeframes and resources that will ensure the continued growth of this important component of Australia's transport system.

By contrast, the Australian Motorcycle Council (AMC) is a volunteer run organization, funded solely by donations from the peak rider groups in each state. The Motorcycle Safety Consultative Committee (MSCC) is the only other national forum. It is convened by the Road Safety Branch of the Federal Department for Infrastructure (DITRDIG) but only meets once a year and has no direct input to policy or planning through Austroads, ATC or SCOT.

A properly constituted and funded Australian Motorcycle and Scooter Council could emulate our bicycling colleagues in coordinating a National Motorcycling Strategy. It could also act as a jurisdictional forum providing a motorcycling perspective to Austroads on technical matters, research and the development of publications.

Guy Stanford

Chairman

Motorcycle Council of NSW

Suggestions for the New Road Safety Strategy

In response to the request of our President for ideas in relation to the proposed revision of the National Road Safety Strategy, I write to make the following suggestions. In the hope that they are constructive they are couched in terms of being realisable in the short term and adding sustainability to the way we organise our transport system. It is interesting to note that the cost of road trauma to Australia remains enormous and is roughly equivalent to the economic losses calculated for each of the major climatic disasters in the United States over the past 20 years and yet we sustain them annually. My suggestions are as follows:

BIKE PLANS: This would be my number one priority for road safety in Australia. It is an excellent example of a 'systems approach' on the ground and encourages a more sustainable and healthy way of living. We have known about this methodology since it was introduced for the first time in the world in Geelong over 30 years ago and yet there are no functional Bike Plans operational in Australia. We face a problem nationally in the placing of responsibility for road safety initiatives at the

appropriate institutional door. I believe that the organisational mandate for Bicycle Plans should lie with Local Government and that all funding to that arm of government should be made contingent on the demonstration of having a functional Bike Plan in each locality.

THE THREE SECOND RULE: Australia does not have a sustainable freight system. The present system is not revenue neutral and our failure to appreciate the problems of peak oil will come to haunt us in the future. In the meantime we must learn to be more accommodating to the mix of light and very heavy vehicles on our roads. For those who want to drive more economically and safely at slower speeds it should be mandatory that following heavy vehicles maintain a three second distance and that 'tail gating' on country roads be banned.

TELECENTRES: We are in desperate need of a system of communication in Australia which does not require long distance travel. We need to minimize the social and financial costs of this behaviour. We now have the technology to do much of our business, professional supervision, Local Government, education and health through interactive telecommunications and every community should have a Telecentre where these services are available.

EVALUATION: This is a complicated and, in my experience, poorly understood field of road safety. It was a shame that some of the intellectual capital in this area was lost when the New South Wales Traffic Education Centre was closed down by the State Government. There is confusion over cost-effectiveness and cost-benefit ratios and, in the emphasis on outcomes, a failure to appreciate problems with implementation. Behavioural change strategies may be more effective in the longer term but, given the short-term funding cycles in Australia, tend to be aborted. We desperately need carefully constructed longer-term studies evaluating behavioural change strategies in Australia because, after all, most crashes occur because someone has made a mistake!

Brian Connor

Armidale NSW

[Ed: Dr Connor is an ACRS Fellow and one of the founding members of the College.]

Diary

Note to ACRS Chapter Committees: The ACRS Annual General Meeting by teleconference is tentatively planned for Thursday 20th May 2010. Please make sure that your Chapter AGM is held well in advance of that date so that all Chapter reports are ready for the ACRS AGM.

Correction

In the August Journal, page 46, the first paragraph of the article headed 'A Global View of Road Safety' should have been the final paragraph of the previous article on ANCAP. The Editor apologises for this mistake.

Quarterly News

Chapter News

Australian Capital Territory and Region

The Chapter held a very successful seminar on 'The Safe Systems Approach' on 14 October, attended by over 50 people. The seminar sought to explain and disseminate the 'Safe Systems Approach' and 'Vision Zero' concepts to both road safety practitioners and the ACT general public, and show how these ideas can be used in practice to improve road safety – especially in relation to speeding. The ACT Government is working towards a new ten-year Road Safety Strategy, to start in 2011, and like most other Australian jurisdictions, will use the 'safe systems approach' and the 'Vision Zero' philosophy, as a basis for the new strategy. The ACT Government is also determined to foster a new community culture for road safety, particularly in regard to speeding and drink driving. The seminar will thus be important in engaging interest and support from the ACT community on the development of the new ACT Road Safety Strategy. The seminar was kindly sponsored by the NRMA- ACT Road Safety Trust.

Presenters included Eric Howard, OECD 'Towards Zero' project, Chris Jurewicz, ARRB Group, David Quinlan, ACT Roads, and Rick Freeth, 'Road Ready' driver training. All presentations are on the 'ACT & Region Past Chapter Events' section of the College website. *(Robin Anderson, ACT and Region Chapter Representative on the ACRS Executive Committee)*

New South Wales (Sydney)

In September the Chapter held a seminar on Graduated Driver & Motorcycle Rider Licensing Systems: Current Australian Trends was presented by Dr Allan Williams, a world leading authority on graduated licensing from the United States, and Ms Liz de Rome and Dr Teresa Senserrick from The George Institute.

In October the Chapter were fortunate to host Dr David Sleet, Associate Director for Science in the Division of Unintentional Injury Prevention at the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia. The seminar, "Road Safety as a Public Health Issue: an Epidemic on Wheels", explored the integration of public health with road safety and the commonalities of approaching road safety as a public health problem. The seminar featured an introductory presentation by Ms Lori Mooren and the keynote presentation by Dr Sleet. A robust and informative discussion of issues with good audience participation followed. It is planned to provide a on line link to video recording of Dr Sleet's presentation.

The last Seminar topic for the year planned will be titled: "Crunch time - National Road Safety Strategy towards 2020" to be held in December.

Finally, as my last task for 2009 as Chapter Chairman, I would like to sincerely thank on behalf of the committee the Motor Accidents Authority for their most generous support and commitment to Road Safety in terms of sponsorship, venues for meetings. *(Professor Raphael Grzebieta, EACRS, Chapter Chairman)*

Queensland

The Queensland Chapter held its quarterly seminar and Chapter meeting on Tuesday, 1st September 2009. The seminar "*The other 2 wheels: Safety, mopeds and off-road motorcycles*" was presented by Ross Blackman, PhD Candidate and Dale Steinhardt, PhD Candidate, CARRS-Q. The next Queensland Chapter meeting and seminar is scheduled for Tuesday, 1st December 2009. *(Dr Kerry Armstrong, Queensland Chapter Rep)*

South Australia

The Chapter held a successful seminar on roadside hazards with over 40 attending and it was also used as a prelude to the Roadside Hazards Task Force inaugural meeting – another seminar planned for before the end of the year. *(Dr Jeremy Woolley, South Australia Chapter Representative on the ACRS Executive Committee)*

Victoria

The Victorian Chapter held a seminar on 27 October on the topic of "Child Road Safety: what's new in Legislation, Research and Information". The seminar was well attended with presenters from MUARC, VicRoads and the RACV. Issues covered including the new set of regulations being introduced targeting the safety of vehicle occupants under the age of 7 together with the range of educational resources now available to support children's safety on our roads.

With a view to building an active membership within the College and in accordance with business plan directions, the Victorian Chapter has sent letters of invitation to a number of relevant local government areas to become active members of the College.

Western Australia

The WA Chapter concentrated its efforts towards the end of this year on gearing up for the National Conference in Perth on 5-6 November 2009.. *(Paul Roberts, WA ACRS Chapter Chair)*.

The complete Austroads Guide to Road Safety is now available

This new nine part guide provides current information for road authorities about a wide range of road safety issues based on the *Safe System* philosophy. The *Safe System* emphasises how different elements of the road system interact with human behaviour to produce an overall effect on road trauma.

The Austroads Guide to Road Safety contains:

- Road safety overview
- Road safety strategy and evaluation
- Speed limits and speed management
- Local government and community road safety
- Road safety for rural and remote areas
- Road safety audit
- Road network crash risk assessment and management
- Treatment of crash locations
- Roadside hazard management



Austroads is the association of Australian and New Zealand road transport and traffic authorities. Its purpose is to contribute to improved Australian and New Zealand road transport outcomes. Austroads produces high quality publications which assist road agencies in the planning, design, construction, maintenance, operation and stewardship of roads.

For more information about Austroads, access to the Guide to Road Safety or any of our publications, or to register for RoadWatch, visit the website www.austroads.com.au, or call (02) 9264 7088.



Australian News

Safety Wear for Motorcyclists

On 9th September 2009 the Federal Minister for Transport, The Hon Anthony Albanese MP, released a new publication to encourage the wearing of effective safety clothing by motorcyclists. The book, an initiative of the Australian Motorcycle Council and written by ACRS member Liz de Rome, is called 'The Good Gear Guide for Motorcycle and Scooter Riders.'. The publication - an Australian first - provides riders with practical information about the safety gear they should be wearing every time they take to the road, setting out what to look for when shopping, the benefits of protective clothing and the injury risks posed to different parts of a rider's body. Every year more than 12,000 riders are hospitalised with serious injuries from both on- and off-road accidents. Many of these injuries could have been prevented or reduced in severity if riders had been wearing the appropriate gear. No matter what you ride - from scooter to superbike - good gear is an investment too important to ignore. It can make the difference between a nasty tumble and something far more serious. A copy of the 'Good Gear Guide for Motorcycle and Scooter Riders' can be downloaded from:

www.infrastructure.gov.au/roads/safety.

(Source: Dept of Infrastructure, Transport, Regional Development and Local Govt)



Photo taken at the launch of the book 'The Good Gear Guide for Motorcycle and Scooter Riders'. From left to right are Joe Motha, General Manager Road Safety Branch, Department of Infrastructure, Transport, Regional Development and Local Government, Guy Stanford, Chairman of the Motorcycle Council of NSW, Liz de Rome, The Hon Anthony Albanese MP, Minister of Transport, Shaun Lennard, Chairman of the Australian Motorcycle Council, Jen Wood, Ulysses and Robyn Major, former Chair of the Australian Motorcycle Council.

Extent of Motorcycle Use

More than 560,000 bikes are now registered for use on Australian roads and more than 134,000 were sold last year.

(Source:

www.mravic.org.au/forum/modules/news/article.php?storyid=1652)

Victorian Motorcycle Safety Program Progress

On 29th January this year the Victorian Police announced that they were launching a special road safety program for motorcyclists that would run for two years. The objectives of the project are to:

- reduce the incidence, severity and trauma of motorcycle crashes in the community;
- provide a safer environment for motorcyclists;
- align education and enforcement components for the purpose of motorcycle safety;
- enhance the active and visible police presence for the purpose of motorcycle safety in a positive way; and
- provide enforcement as a deterrent to those motorcyclists and drivers who exhibit high risk behaviours that jeopardise motorcycle safety.

The ACRS Journal inquired recently on progress so far. Superintendent Kevin Casey, Road Safety Strategic Services Division, who is coordinating the program, responded that the Centre for Automotive Safety Research at Adelaide University has been engaged to undertake an evaluation of the program. So far no firm figures are available. However, Supt. Casey said that “indications to date are that we are down on fatal and serious injuries for motorcyclists across the State. While I would not be so bold as to claim the results as a direct result of the program, we are looking forward to a more comprehensive evaluation to pick anything that the program can take credit for. In terms of time, the program is still in its infancy, as the competing priorities of the bushfires [last summer] delayed a number of regional operations commencing. During the autumn and winter months the program was relatively dormant although not completely, pending the riding season gearing up during October.”

Plan for Victorian motorcycle and scooter riders

On 31st August the Minister for Roads and Ports, Tim Pallas launched Victoria's Road Safety and Transport Strategic Action Plan for Powered Two Wheelers 2009-2013. The plan integrates road safety and transport needs of motorcycle and scooter riders and replaces the previous motorcycle road safety strategy for 2002-2007. The plan is aligned with the Victorian Government's road safety strategy Arrive Alive 2008-2017 and the Victorian Transport Plan. It has been developed in consultation with a number of stakeholders including significant input from Victorian Motorcycle Advisory Council (VMAC) members. A copy of the plan can be found at www.vicroads.vic.gov.au/ptwplan (Source: *Vicroads*)

Heavy Vehicle Accreditation Changes Approved

Australia's Transport Ministers have approved recommendations from a strategic review of the National Heavy Vehicle Accreditation System. The National Transport Commission (NTC) recommended that an improved National Heavy Vehicle Accreditation System (NHVAS) be administered by the COAG endorsed single national heavy vehicle regulator from 2011.

“Bringing together operational expertise in running NHVAS and sharing information across states and territories under a single national body will deliver better road safety outcomes,” said NTC Senior Manager, Safety and Environment, Dr Neil Wong.

NHVAS sets auditable national standards for maintaining trucks and buses, loading heavy vehicles to legal mass limits and preventing driver fatigue. Transport operators who comply with NHVAS standards benefit from increased business flexibility, reduced operating costs and fewer crashes.

Industry-developed accreditation schemes such as TruckSafe include additional safety management standards such as driver health, training, record keeping and speed management.

Research shows that transport operators who manage their safety risks through TruckSafe and NHVAS have 50 to 75 per cent less crashes and those crashes are less severe. Dr Wong said freight customers are increasingly contracting accredited transport operators to help demonstrate their compliance with chain of responsibility laws. Further recommended amendments to those laws would allow both industry and NHVAS standards to be recognised as prima facie evidence of taking ‘reasonable steps’. (*National Transport Commission Australia – October 2009*)

Wrong Walking Penalty - \$40 Fine

The Queensland Government has recently introduced a \$40 fine for pedestrians who walk on the wrong side of a road that has no footpaths. The correct walking side is the one facing the oncoming traffic. This rule applied from 12th October 2009.

(Source: *Queensland Government Dept of Transport and Main Roads*)

Road Safety Advertising in Video Games

Victoria's Transport Accident Commission (TAC) intends to increase its road safety advertising in computer games, since it is thought that this is the best way to target young males with road safety messages. The TAC has signed a new one-year contract with Microsoft's in-game advertising service Massive to put virtual billboards in games ranging from music hit Guitar Hero to the soon-to-be-released racing game Forza Motorsport 3. TAC Senior Marketing Manager, John Thompson, said the decision to increase the presence of messages in games was a reflection of the impact the medium had already had. Mr Thompson said the TAC was also about

to embark on a major survey of the impact of in-game branding and the effect of safety messages in a live online environment with Microsoft gaming rival Sony. (Source: *Simon Canning, The Australian* 7 September 09)

International Appointment for Former CARRS-Q Director

Dr Mary Sheehan has been chosen as "President-Elect of the International Council on Alcohol,

Drugs and Traffic Safety" at a meeting in the USA. For many years Dr Sheehan headed the Centre for Accident Research and Road Safety at the Queensland University of Technology (CARRS-Q), where she is now an Adjunct Professor. Dr Sheehan received acknowledgement of her contributions to the injury field when she was awarded the Australian Injury Prevention Network award for sustained achievement in injury prevention/safety promotion in July 2009.

New Studies on Driveway Run-Overs

Driveway run-overs are one of the leading causes of death and serious injury in young children. For this reason, CARRS-Q is embarking on two studies to address this problem. The first study will look at developing guidelines for interventions that result in parents making both behavioural and environmental changes to ensure increased supervision around moving vehicles and modifications to their home to separate driveways and play areas. Because commercial utility vehicles and 4WD vehicles are over-represented in driveway run-overs, the second study will develop an intervention specifically targeting work-related drivers. The problem here is that work-related vehicles appear to pose a substantial risk to children, due to the novelty of the visiting vehicle, the unfamiliarity of the environment for the driver, competing demands for the parents' attention and the type of vehicle involved. Funding for these studies is being provided by the Queensland Injury Prevention Council. (Source: *CARRS-Q 'Safety Visions' Winter 2009*)

Hidden Danger on NSW Roads

It is estimated that there are some 65,000 unregistered and, hence, uninsured vehicles being driven on NSW roads, according to NSW Transport Minister David Campbell. In order to combat this problem, the Roads and Traffic Authority is planning to use speed cameras to identify the rogue vehicles and their drivers. "People who drive unregistered and uninsured vehicles are not paying their way and motorists who do the right thing are the ones who pay the price," Mr Campbell said. "Not only are they cheating the system but they're also posing a major safety risk, with bald tyres, "The camera technology will be used to photograph number plates and anyone caught speeding or running a red light will have their number plate checked to make sure their vehicle is registered," he said. Dangerous drivers cheating the law, will now not only face

speeding fines, but also fines for unregistered and uninsured vehicles, when caught by a camera. (Source: *Ministerial media release* October 2009)

High Tech Signs Promote Road Safety

Motorists travelling on some of the major roads around Perth are now seeing road safety messages displayed regularly on Variable Message Signs (VMS's). In a new initiative developed by the Department of Main Roads, 23 fixed VMS's, across the metropolitan area are now used to display messages which are aimed at increasing driver awareness and promoting the principles of road safety. Main Roads together with the Office of Road Safety and The Western Australia Police have combined their efforts to identify over 30 different key messages that address some of the major road safety issues such as speed, fatigue and seat belts. Typical messages are: 'Seat Belts Save Lives', 'Maintain a safe distance between you and the car in front' and 'Drivers look twice for motorbikes'. (WA Office of Road Safety – August 2009)

New Zealand News

Extent of Motorcycle Ownership

In 2008 there were 55,180 motorcycles registered in New Zealand. Of these, 18,833 were registrations of new or ex-overseas machines. (Source: *LTSA Statistics*)

Public Input Wanted for 2020 Strategy

The New Zealand Government has announced that it is seeking submissions from the public regarding the development of a road safety strategy to take New Zealand through to 2020. In August 2009 the Safer Journeys discussion document was released by the Ministry of Transport. It outlines New Zealand's key road safety priorities, such as alcohol/drug-impaired driving, and over 60 proposed initiatives to address them.

The final 2020 Road Safety Strategy, to be released in December, will be the guiding document for transport decision makers and those with an interest in road safety. The discussion document is available at www.saferjourneys.govt.nz. (Source: *NZ Transport Agency 'Pathways' Sept 2009*)

Hand-held Mobile Phone Use to be Banned

From 1st November it will be illegal in New Zealand to use a hand-held mobile phone while driving. The new provision bans the use of hand-held mobile phones and other telecommunication devices, such as Blackberry and personal digital assistants, while driving (including using these devices to text or email); Exempts the use of hands-free mobile phones and two-way radios; Allows genuine emergency calls to be made where it is impractical to pull over to make a call.

However, while driving, a driver may use a mobile phone to make, receive or end a phone call only if they do not have to hold or manipulate the phone in doing so. Or – provided the mobile phone is securely mounted in the vehicle – if the driver manipulates the phone infrequently and briefly. Drivers must not create, send, or read a text message or use a mobile phone in any other way. (Source: NZ Transport Agency 'Pathways' Sept 2009)



Daylight Running Lights Compulsory on Motorbikes/Mopeds

From 1st November, riders of motorcycles and mopeds must switch on their headlamps during daylight hours, unless their vehicles were manufactured before 1 January 1980. (Source: NZ Transport Agency 'Pathways' Sept 2009)

European News

In 'PRAISE' of Road Safety

In May 2009 the European Transport Safety Council (ETSC) launched a new project: 'Preventing Road Accidents and Injuries for the Safety of Employees' (PRAISE) to increase road safety in the work context. The project is co-funded by the European Commission and the German Road Safety Council. It aims to praise best practices in order to help employers secure high road safety standards for their employees. In the framework of this campaign, ETSC is organising a series of country seminars in selected member states bringing together companies, fleet safety managers, government and road safety experts. (Source: ETSC)

Sweden Holds Alcolock Lead

The use of alcolocks, to prevent intoxicated drivers from starting their vehicles, is growing in Sweden, with further legislation expected this November. Sweden has been the main pioneer of the use of alcolocks, having run an alcolock pilot program for convicted drink drivers for the past decade. The current Swedish Government adopted a new Alcolock Strategy in 2007 and a recent public consultation has encouraged further development of this means of keeping drunk drivers off the roads and giving them motivation to reform. The Government took an important step in February by requiring that by 2012 75% of government authority vehicles shall be

fitted with alcolocks. The Government also plans to investigate broadening out the requirement of alcolocks for other user categories such as school buses and vehicles for urban transport. There are an estimated 30,000 alcolocks in use out of a total commercial fleet of approximately 200,000 vehicles in Sweden. (Source: ETSC Drink Driving Monitor 08/09)

European Commission Plans for 2011-2020

The consultation process has been started by the European Commission in preparation for the establishment of its 4th Road Safety Action Programme. The consultation aims to engage European citizens and stakeholders in governments at national, regional and local levels, as well as the business and professional sectors, in identifying the key road safety problems to be addressed and priority actions which could be taken. The aim of this consultation is to gather the views of stakeholders on how to best tackle the key road safety problems. A questionnaire has been launched that contains a listing of the main problem areas in road safety and possible ways of dealing with the problems concerned. (Source: ETSC Safety Monitor October 09)

Claims of 43/1 Return for Advertising

According to an Oxford study, "Economic Payback of Road Safety Advertising in Northern Ireland" the cost of an individual death in a road accident is estimated to be 1.43 million pounds sterling (in 2005 prices). With 16.4 million pounds of public funds spent on road safety advertising in Northern Ireland in 1995-2008, the research estimated total economic savings from these campaigns at 700 million pounds, providing a return of 43/1 for public money. (Source: ETSC Safety Monitor October 09)

Holland Concerned About Drug Driving

Experts estimate that about 10% of car collisions in Holland involve drugs, mainly cannabis.

The Dutch Transport Ministry plans to submit draft legislation on banning drug driving by the middle of 2010. Following a three-month trial last year, random drug tests for drivers will be introduced. The spot checks can be made using saliva, with follow-up blood and urine tests if necessary. The 'maximum level' of drug content has not yet been defined, and if it is not established, a zero tolerance policy will be adopted. (Source: ETSC Safety Monitor October 09)

North American News

Road Safety Dangers of Prescription Medicines

The AAA Foundation for Road Safety has recently published a report on the impact of prescription medicines on senior citizens' driving abilities. Entitled "2009 Older Adults' Knowledge

About Medications that can Impact Driving", the report states that among people aged 55 and over, 94.6% of respondents reported having one or more medical conditions. Of these, 68.7% currently used one or more prescription medications

that were potentially driver impairing (PDI). Among the users of PDI medicines, only 27.6% indicated that they were aware of the dangers associated with such medicines. It was also found that the older the driver, and the less educated, the less likely they were to be aware of the dangers of PDI medications. (Source: AAA Foundation for Road Safety August 2009)

Asia News

Road Safety for Children in China

General Motors recently launched a program to help educate children in road safety in China. The Child Family Road Safety Education Program is being hosted by the National Care for Children Committee and co-hosted by GM China. GM will be using its dealerships as 'Safety Education Centres' This year, the program aims to reach more than 300,000 families with children in five Chinese cities. It has already visited Beijing and Tianjin. Through the program GM hopes to touch 10 million families with children in 50 cities in China over the course of five years. (Source: GM China
<http://www.gmexpo2010.com/en/news/gm-launches-child-road-safety-education-program>)



Position Vacant

Journal Editor (Part-time)

The Australasian College of Road Safety Inc. (ACRS) needs an enthusiastic and experienced editor to be responsible for all tasks associated with the preparation and production of its quarterly journal. Provided deadlines are met, the editor has flexibility in completing tasks and may even be located away from the ACRS office in Canberra. Could suit recent retiree. Financial rewards and conditions for about one day per week subject to negotiation. For the job description and selection criteria, and to view electronic copies of the ACRS Journal visit www.acrs.org.au. Call 02 62902509 if you would like to discuss any aspect of the position.

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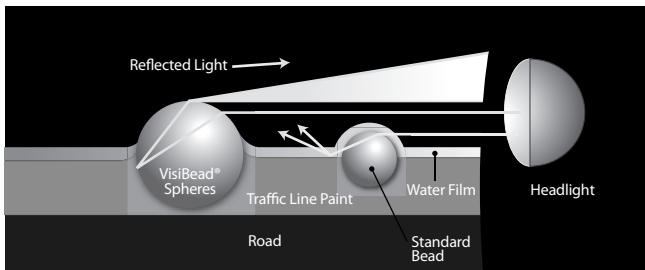


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Contributed Articles

Milestones in Motorcycle Safety - Australia 1976 - 2009

by Ray Newland - Australian Professional Driver Consultants

This article highlights the author's view of some of the major events that shaped motorcycle safety in Australia from the mid 1970's to the present. Prior to 1980 little had been done for motorcycle safety in Australia. Compulsory wearing of safety helmets was introduced in 1967 and 250-260cc engine restrictions in 1979. Motorcycle licence tests consisted of little more than 4 motorcycle questions added to the car knowledge test and perhaps a brief ride watched by the local police officer. In the late 1970s the concept of rider training was born and gradually introduced over the next decade. Rider training initiated government action on motorcycle safety and became a significant milestone for Australian motorcyclists.



Education campaigns, research, legislation, national conferences, government motorcycle committee's and Learner Approved Motorcycle Schemes were all largely connected to the establishment of rider training during this time.

Introduction of Training

Background

The first vision of government backed rider training originated in Victoria in 1976 when the President of the Motorcycle Safety Foundation USA (MSF) met with road safety experts and educators to promote the concept that training could translate to safer riders on the road. While there was no evidence of the effectiveness of rider training, the government convened a committee of riders, industry, Police and road safety officials in 1979 to consider how training could be implemented and this led to the development and trialling of:

- rider training at learner and licence stages
- riding skills tests for a learner permit and licence
- motorcycle knowledge test based on a riders handbook.

In addition the Motorcycle Operator Skills Test (MOST II) was evaluated as the possible skill test for a Victorian motorcycle licence.

Design of Training and Testing

In 1981 Victoria contracted Californian Jack Ford to develop Victoria's training and testing. Ford was project leader of the "Improved Motorcyclist Licensing and Testing Project". The 1980 report of this project showed an accident reduction of up to 21%.

Two levels of training and testing were developed for Victoria.

- Level I training - nine hours training, including the knowledge and learner skills test
- Level 2 training - six hours training, including the licence skill test MOST II.

Initial Introduction

Tasmania was interested in the training concept and Victoria shared the curriculum with its southern neighbour. The Government of Tasmania adopted this curriculum making the training mandatory for learner permit applicants in 1982 and thus became the first State to introduce government backed training in Australia. Victoria followed in 1983 when it introduced voluntary training with compulsory tests. For the next three years Tasmania and Victoria were the only States/Territories with government controlled training.

Introduction in Other States / Territories

The two levels of training in Victoria were voluntary and included the compulsory tests to make the training more attractive. Tasmania introduced the same levels of training but made these mandatory. Rider competence for a permit or licence was assessed during the training.

South Australia commenced its mandatory RiderSafe training in 1987. RiderSafe training also assessed rider competence for the issue of a learner's permit or licence. The Northern Territory's voluntary training Motorcyclist Education Training and Licensing (METAL) was also established around this time and assessed competence for a learner's permit and licence for riders choosing the training.

New South Wales began development of its mandatory training in the late 1980s at key Sydney locations and progressively introduced it across the State through the early 1990s. The training was "competency based training" designed to progressively assess rider competence throughout the course for issue of a learner's permit or licence.

The Australian Capital Territory followed the NSW model introducing mandatory rider training for learner permit applicants but voluntary training at the licence level in the late 1980s.

More than a decade later, in 2001, Queensland introduced its voluntary Q-RIDE training in major population areas. Q-RIDE is competency based, operating as one course of training taking riders from novice to licence level. Riders must obtain a learner's permit before attending the Q-RIDE training and successful riders receive a certificate of competency recognised by the licensing authority for issue of a licence.

Western Australia is currently the only State without official government training. However, this is expected to change soon following a series of key motorcycle safety forums in WA during 2009.

Interesting to note that Victoria, Northern Territory and Queensland implemented voluntary training while Tasmania, South Australia and New South Wales introduced mandatory training. The Australian Capital Territory decided on mandatory training for learners but voluntary training for licence level.

There is some debate on the merits of mandatory versus voluntary training. As noted by Haworth and Mulvihill in 2005 [1], in terms of best practice in training, compulsory training appears better than voluntary, possibly because of reductions in exposure rather than risk reduction.

Other differences exist between the various training approaches in relation to duration and content of courses and in particular whether or not the training includes an on-road ride. It would appear logical that if the training is to assess the rider's competence for licensed riding on the road, then an on-road ride should form part of the training.

New South Wales and Tasmania currently have on-road riding assessed by set criteria as part of the training. To ensure on-road competence and national consistency governments may wish to consider revising their curricula to include on-road riding in compulsory training.

Research

Undoubtedly the most significant research that influenced the development of the training was Hurt et al. (1981) commonly known as the Hurt Report [2]. The study by Anderson et al. (1980) was the major influence in the design of the licence tests [3]. Significant local studies, Haworth et al (1997) and Haworth and Mulvihill (2005) provide a valuable resource for refining the future direction of training and licensing in Australia [4, 1].

National Conferences

Four National Motorcycle Conferences were held between 1980 and 1992 mainly focusing on progress with rider training. In 1999, a Conference on Hazard Perception was held in Melbourne at which international and local experts in hazard perception successfully raised the importance of this skill for

motorcyclists. Attempts to develop methods for training and testing of hazard perception during the last decade have not met with great success. This remains an area of challenge.

Each year, particularly since 2003, an increasing number of papers dealing with motorcycle safety issues, has been presented at the Road Safety Research, Policing and Education Conference signifying a resurgence of research in this area.

In 2008 the very successful Motorcycle and Scooter Safety Summit was held in Canberra. Devised by members of the Motorcycle Safety Consultative Committee, the summit brought together international experts, road safety researchers, industry leaders and riders from all States and Territories belonging to the peak body, the Australian Motorcycle Council. Key issues from the agenda and recommendations from the workshop sessions align with current international issues and recommendations for improving motorcycle safety.

Key Committees

Motorcycle Safety Consultative Committee (MSCC)

Established in 1989 by the Federal government the MSCC currently consists of seven rider group representatives and one representative of the national industry. Key achievements of the MSCC include the Ride On safety video (1999), the staging of the 2008 Motorcycle and Scooter Safety Summit and overseeing the development of the recently launched Good Gear Guide [5].

Victorian Motorcycle Advisory Council (VMAC)

Arguably the premier motorcycle related committee in Australia, VMAC is an advisory council providing expert advice on motorcycle issues directly to the Minister through an independent Chair. Since 2002, when the Victorian Government imposed a \$50 levy on registered motorcycles to fund motorcycle safety initiatives, the role of the Council has become critical to determining the merits of levy project proposals.

South Australia's Motorcycle Task Force and the Motorcycle Safety Advisory Group (MSAG) in Queensland also play crucial roles in the development of key safety initiatives in these States. Motorcycle safety advisory committees in NSW and Tasmania are currently non-operational.

Legislation

Engine Capacity Restriction - 250/260cc

Introduced in 1979, this legislation for learner and first year riders continued in all States (except the ACT where it was never passed) for more than twenty years even though there was insufficient evidence to support engine capacity restrictions. This was an example of static legislation unsupported by evidence and unable to keep pace with dynamic engine development.

The legislation survived until 2002 when NSW lifted the capacity restriction to 660cc as part of its LAMS trial. As LAMS is introduced in other states the 250/260cc restriction is being replaced with 660cc. There is also no evidence to support the 660cc capacity restriction as a safety measure.

LAMS (Learner Approved Motorcycle Scheme)

The concept of a LAMS based on power to weight ratio of 150kW/tonne was proposed by the industry in 1992 at a licensing workshop in Victoria. The RTA introduced the P/W ratio in conjunction with its current 250cc restriction in 1993. Two years later the ACT introduced P/W ratio without a 250cc restriction but it was not introduced elsewhere until after the RTA raised its engine restriction to 660cc in 2002 for a two year trial period.

By the end of 2006, South Australia and Tasmania had introduced the NSW LAMS model of 150kW/tonne with 660cc engine restriction. Victoria and Northern Territory introduced the same LAMS in 2008 and Queensland followed in 2009.

Except for Western Australia the wide adoption of the 150kW/tonne with the 660cc engine restriction gives hope that we may soon see national uniformity achieved with the LAMS.

Australian Design Rule 19/01

In 1992 the Federal government introduced a "hardwiring" requirement (headlight on) to comply with ADR 19/01. While not opposed to the principle of 'lights on', rider groups strongly opposed the "hardwiring". Amongst their objections was the concern that if a motorcycle appeared as a silhouette against the setting sun, the glare of their headlight may render the motorcycle totally invisible to car drivers. The best safety measure here would be "headlight off" but with hardwiring this is impossible.

Riders continued lobbying the Federal Shadow Minister for transport and with the change of government in 1994 the new Minister found insufficient evidence to support hardwired headlights for motorcycles and repealed ADR 19/01 in November 1996. This was a positive outcome for Australian riders and a reminder for government of the need for legislation to be evidence based; however nearly all motorcycles and scooters imported today have hardwired headlights.

Victorian Safety Levy

This controversial issue was introduced without consultation in 2002 and has been the subject of rider outrage for the past seven years. It has raised around \$22m and funded a range of motorcycle safety projects including the Motorcycle Blackspot Program of road improvements to particular sites resulting in a 24% reduction in crashes at the sites.

Other governments showed interest in a safety levy, however when Tasmania attempted to introduce legislation it was defeated in the Upper House following persistent lobbying by riders from the Tasmania Motorcycle Council.

Strategic Plans

'Positioned for Safety' was developed in 2002 by the Motorcycle Council of NSW as a rider initiated strategic plan for motorcycle safety [6]. This was because at the time, governments were not recognising motorcyclists as a separate group of vulnerable road users within their overall road safety planning.

Following 'Positioned for Safety 2002' and the first Victorian strategy 2002-2007 [7], a number of States developed specific strategies for motorcycle safety. These included Tasmania's strategy 2005 [8], South Australia's strategy 2005-2007 [9] and Queensland's strategy 2009-2012 [10], all of which point to a renewed government concern for rider safety.

A second edition, 'Positioned for Safety 2010', was released in 2007 after workshops with key stakeholders to review and improve the strategic plan [11]. 'Positioned for Safety 2010' is an excellent example of the riding community working for the safety of its constituents.

In August 2009 Victoria released its 'Road Safety and Transport Strategic Plan 2009-2013' [12]. This plan, as a national first, recognises motorcycling as a legitimate form of transport. The Victorian Government is to be applauded for taking this step.

Education

In 1989 the Federal Government produced a series of "Look Bike" billboards showing a motorcyclist in the rear view mirror of a car to increase driver awareness of motorcyclists.

The 'Ride On' video produced by ATSB in 1999 is still widely accepted by riders as an informative training aid showing excellent riding tips needed for safe riding. Riders and the industry were instrumental in its production.

In 2008 the Roads and Traffic Authority of NSW produced a series of superb posters on how to ride curves; this appealed to riders in communicating the key message without alienating them.

The Good Gear Guide developed by Liz de Rome was recently launched by the Federal Minister for Transport [5]. This received much acclaim from Federal MPs and was recorded in Hansard following the launch. It provides excellent advice for riders on the identification and selection of good quality personal protective equipment (PPE).

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Motorcycle Safety in Australia – Consulting with Riders and Jurisdictions Working Together

By Shaun Lennard, Chairman, Australian Motorcycle Council

I congratulate the College for inviting contributions for this edition on the subject of motorcycle safety – I look forward to reading the thoughts of others on this topical issue.

When referring to “motorcycles” in Australia, we adopt the definition used by the International Transport Forum, that is, we’re talking about motorcycles, scooters, trikes, motorcycles with sidecars, and even quad bikes. For most common usage, “motorcycle” means “motorcycles and scooters”.

The College kindly published my article *Motorcycles and Road Safety in Australia for the Next Decade* in the August 2009 issue, so I won't repeat myself here, other than refocusing on a couple of points in particular.

In this article I'll cover two key themes – consulting with riders and jurisdictions working together.

Consulting with Riders

The international *Workshop on Motorcycling Safety*, hosted by the Organisation for Economic Cooperation and Development (OECD)'s International Transport Forum and held in Lillehammer, Norway, in June 2008 (“the Lillehammer workshop”), identified three general principles and 13 practical measures as priority measures for addressing motorcycle safety across the OECD. These were also ranked in order of importance amassing the individual views of each participant.

The first – that is, the highest of all priorities identified at the workshop – was listed with the heading “Cooperation between the various stakeholders” and stated:

“Improving safety for motorcyclists implies to set up a continuing dialogue and cooperation between the various stakeholders, including the motorcyclists themselves, policy makers, researchers and motorcycle manufacturers.”

It's important to note here that only around two thirds of the almost 90 participants were not motorcycle rider or industry representatives, that is, it was a group mostly made up of government representatives, policy makers, researchers, insurance

industry representatives and the like who agreed on this recommended way forward.

A common theme between virtually all participants at the Lillehammer workshop was that it was time to end the “blame-game and finger-pointing” and instead work cooperatively to improve motorcycle safety. Rather than a focus on motorcycle crash statistics, once the issues had been quantified, the focus of the workshop then turned to developing practical solutions. This needs to be the approach we take across Australia too, if we're to see any significant improvements to the current crash rates.

All reports from the Lillehammer workshop can be found at: <http://www.internationaltransportforum.org/jtrc/safety/Lillehammer2008/lillehammer08.html>

In Australia, fortunately we already have the right approach at the Federal level with the Motorcycle Safety Consultative Committee (MSCC). The largest rider groups in the country are represented on the MSCC, along with the Federal Chamber of Automotive Industries. The MSCC convened Australia's first Motorcycle and Scooter Safety Summit in Canberra in April 2008, attended by over 100 invited participants including many members of the College.

Members of the MSCC are currently working on progressing the seven key recommendations from the Canberra workshop. I recommend anyone with a serious interest in motorcycle safety in Australia to read this report at: http://www.infrastructure.gov.au/roads/safety/publications/2009/msss_report.aspx

The Australian Motorcycle Council (AMC) has amongst its members the peak rider group in each of the States and Territories. How each of these organisations interacts with government and other key stakeholders varies across the jurisdictions. There are a number of different consultative and advisory groups in place across the country.

Not to be confused with the Austroads-backed structure of the Australian Bicycle Council, the Motorcycle Council is a representative body made up of rider groups. Their details are all on the AMC's website, but for those unfamiliar with the organisations I'll mention them all by name here.

The members of the AMC are:

- Bikes Unlimited
- Motorcycle Council of New South Wales (MCC of NSW)
- Motorcycle Riders Association of Queensland (MRAQ)
- Motorcycle Riders Association of South Australia (MRA SA)
- Motorcycle Riders Association of the Australian Capital Territory (MRA ACT)
- Motorcycle Riders Association of Victoria (MRA Vic)
- Motorcycle Riders Association of Western Australia (MRA WA)
- Rider Awareness Northern Territory (RANT)
- Tasmanian Motorcycle Council (TMC)
- Ulysses Club
- Victorian Motorcycle Council (VMC)

For further information about how to contact any of these organisations, please contact the AMC by email committee@amc.asn.au.

Jurisdictions Working Together

We're all familiar with the public debate over hospitals, education and a number of other areas where Australia's federal system presents challenges for best-practice and efficient use of resources.

Although not as widely recognised or discussed, in my view road safety is clearly another area hampered by the State and Territory structures. How can eight different motorcycle rider training and licence regimes all be the "best"? Or how can there be eight different "best" ways of marking highway patrol cars in Australia?

I'm certain each of the jurisdictions shares the AMC's serious concerns – and the concerns of our member organisations – about motorcycle casualty numbers in Australia. Each of the jurisdictions was represented at the Canberra summit in 2008 and was therefore involved in developing the recommendations.

I mentioned the Australian Bicycle Council earlier intentionally. Austroads works collectively on issues concerning cycle safety and infrastructure planning. But each of the States largely works independently on motorcycle safety initiatives. A challenge in Australia is to work as collectively as we can; to break down the State borders and develop some nationally-consistent strategies.

Members of the Motorcycle Safety Consultative Committee will be working to progress outcomes from both the Canberra summit and the Lillehammer workshop as consistently as possible across Australia. We encourage cooperation between the jurisdictions, in consultation with rider groups as discussed above, to collectively bring about improvements in motorcycle safety in Australia.

A New Strategic Approach to Advance Motorcycle Safety and Mobility in Victoria

By Nicola Fotheringham, VicRoads

Abstract

Victoria recently released a new strategic action plan for Victoria's motorcycle and scooter riders. As part of its ongoing commitment to improving rider safety, Victoria already had a significant number and range of motorcycle safety projects currently being developed or delivered. The plan provides a new strategic focus as well as identifying a comprehensive set of actions aimed at improving both road safety and mobility for riders. Key focus areas within the plan include research and evaluation, the road network and environment, rider and pillion passenger safety, and vehicle safety and protective clothing. This paper provides an overview of the key safety actions identified in the plan and some of the projects in motion to address them.

Introduction

In August 2009, Minister for Roads and Ports Tim Pallas MP launched a new strategic action plan for Victorian motorcycle and scooter riders, *Victoria's Road Safety and Transport Strategic*

Action Plan for Powered Two Wheelers 2009-2013. The plan integrates both the road safety and mobility needs of riders and is the first of its kind for an Australian State Government. The plan recognises the role of motorcycles and scooters in Victoria's transport future. Its objectives are twofold: aiming to significantly reduce serious casualties to riders and pillion passengers and ensure that powered two wheelers (PTWs) are given appropriate recognition in transport and road use policy and planning.

Background

Since 2002, the Victorian Motorcycle Road Safety Strategy 2002 – 2007 guided the direction of motorcycle safety in Victoria. Over the life of the previous strategy, considerable gains in motorcycle safety were achieved. These contributed to a 20 per cent reduction in motorcyclist fatalities in Victoria at the same time as motorcycle registrations increased by 41 per cent.

Alongside targeted enforcement activities and the introduction of a Learner Approved Motorcycle Scheme, some of the recent achievements and completed projects in Victoria have included:

- *Motorcycle Blackspot Program.* Over 120 motorcycle blackspot sites and popular riding routes have now been treated under the Motorcycle Blackspot Program. Evaluation of the program showed a 24 per cent reduction in motorcycle casualty crashes at 85 sites treated since the program's inception. At a more detailed level of analysis, the evaluation showed a 40 per cent reduction in motorcycle casualty crashes at 54 treated blacklength sites.
- *Role of speed and speeding in motorcycle crashes.* This project improved our understanding of the role speed plays in motorcycle crashes. The project examined the separate role of inappropriate and excessive motorcycle speed on fatal motorcycle crashes, and identified rider, vehicle and environmental factors associated with fatal crashes involving excessive and inappropriate speeding.
- *Involvement of scooters in crashes.* This project improved our understanding of the involvement of the motor scooters in crashes and identified the types of crashes scooter are commonly involved in. The findings indicated that scooter crashes are increasing at a faster rate than that for motorcycles or cars, and that this increase is likely to be due to a proportionate increase in scooter use.
- *Motorcycle exposure study.* Measures of exposure to risk such as number of licences on issue or kilometres travelled do not necessarily represent the most accurate estimate of exposure for motorcyclists. The study collected and examined information on some of the more commonly travelled roads in Victoria, trip purpose and time of day, and key characteristics of different rider groups to provide enhanced information on the current exposure of motorcyclists in Victoria.
- *Motorcycle Enhanced Crash Investigation.* This project involved in-depth investigations of 25 serious motorcycle injury crashes and was aimed at increasing the understanding among road safety stakeholders, riders and emergency services professionals of the causes and outcomes of motorcycle crashes, as well as to identify issues requiring further action.
- *Look, look, look again campaign.* This campaign involved the adaptation of a UK commercial aimed at promoting the importance of drivers looking out for motorcyclists at intersections. The television commercial was supported by radio, billboards and online media.

Australian Road Safety Equipment Certification in Crisis?

By Tom Gibson CPEng

Introduction

Recent changes to the Australian standard setting and certification system threaten to undermine consumer confidence and certainty in safety products such as helmets and child

restraints. In the past, two separate systems have assured the quality of safety equipment used on the road. These two systems are detailed in the box.

Two Separate Systems to Assure Quality Control

1. For motor vehicles:

- The Motor Vehicle Standards Act 1989 requires new motor vehicles sold in Australia to comply with the Australian Design Rules (ADR).
- The ADRs are performance based vehicle standards which control vehicle safety, anti-theft and emissions.
- The Federal Road Vehicle Certification Scheme (RVCS) ensures that all new vehicles sold in Australia comply with the ADRs.
- The State Road Authorities ensure that the vehicles driven on the roads comply with the ADRs by means of the vehicle registration system.
- In both Europe and North America child restraint systems (CRS) and motorcycle helmets are part of the vehicle regulation.

2. For other road safety equipment not integrated with the vehicle (child restraints, bicycle helmets and motorcycle helmets), a separate certification system exists:

- Child restraints, bicycle helmets and motorcycle helmets are controlled at the Federal level by mandatory consumer safety standards through the Trade Practices Act of 1974.
- The import and sale of mandated equipment in Australia is enforced by the Australian Competition & Consumer Commission (ACCC) and the Australian Customs Service.
- The mandatory standards are AS/NZS 1754 for child restraints, AS/NZS 2063 or Snell 95C for bicycle helmets and AS/NZS 1698 for motorcycle helmets.
- Similar provisions are enforced at state level, for example, by the NSW Fair Trading Act 2007, which defines a product standard for protective helmets for motor cyclists complying with AS 1698.
- The individual State Road Authorities then ensure that only certified equipment gets used on the public roads by means of the Road Rules, which require approved equipment certified to a relevant Australian Standard.

Changes Since 2002

However since 2002 Standards Australia has been undergoing major change. The new Standards Australia is tasked with developing standards which are balanced, transparent and free of sectional interest, but must now operate as a not-for-profit commercial enterprise without government subsidy¹. The development of standards is expected to be funded by stakeholders driven by public benefit and national interest, not driven by sales. SAIGlobal was the certification arm of Standards Australia. It has lost its control of the certification of products to the Australian standards. This is of particular concern in relation to road safety equipment such as helmets and child restraints, because responsibility for these products falls between a number of State and Federal agencies.

In the past, consumers and police were able to rely on the SAIGlobal trademark of 5 ticks, see Figure 1, to easily identify certified helmets and child restraints. SAIGlobal required ongoing testing of a random sample of helmets from every manufactured batch to ensure the quality of the product through its production life. The strength of this system was demonstrated in a 2004 study funded by the Australian Transport Safety Bureau (ATSB)². The study tested 100 bicycle helmets randomly selected from the market. Half of the helmets had been certified under the AS batch testing system and half under the Snell certification system which does not require batch testing. All of the 50 AS certified helmets (purchased in Australia) passed all tests except one helmet which was discovered to have been fraudulently labelled. None of the 50 Snell helmets (purchased in the US) passed all of the tests specified for Snell certification.



Figure 1 The SAIGlobal, 5ticks' Standardsmark™, see www.saiglobal.com.

There are now appear to be at least 7 agencies, each with their own different certification mark, certifying bicycle and motorcycle helmets and at least 4 for CRSs. But confusion over different labels is the least of our concerns, the major issue is that there is no single agency nor mandated system for ensuring the quality of the certification by such agencies.

SAIGlobal is now an independent company in the business of supplying standards information, education and certification services in competition with other similar organisations worldwide. A Joint Accreditation Scheme of Australia and New Zealand (JAS-ANZ) has been set up to monitor these certifying organisations, but at present there is no controlling regulation for certification of any of the safety equipment discussed here. A further problem also exists because the product standards have continued to be developed for the previous system, where SAIGlobal had control. The three standards at this point do not contain specific certification requirements.

In order to address these issues, the NSW Road Safety Centre has been making representations to the Minister in two areas:

- To change the regulations at State level to include the product standard and also the requirement for the accreditation agency to belong to JAS-ANZ; and,
- To include explicitly in each of the individual product standards the requirements for the certifying agency to follow.

If we are to protect and maintain the current high standard of safety system certification in Australia, this action needs to be supported, and if they have not already done so, the other States need to be encouraged into taking similar action to NSW.

Two further the extra measures should also be adopted:

- A common certification label needs to be developed to ensure easy and efficient recognition by the Police and consumers of approved safety equipment. This could be defined within the product standard; and,
- A surveillance system needs to be implemented to ensure that approved CRS and helmets on the Australian market do meet the requirements of the product standard.

Roads and Motorcycling: Raising the Profile

By Chris Brennan, VicRoads

Abstract

Throughout the western world, motorcyclists, as a minority group on the roads, often don't receive the attention amongst road designers, maintenance workers and road engineers that their crash profile suggests is required. Since 2004, VicRoads has been raising the profile of the specific, and often unique, needs of riders to facilitate safer riding. Specific hazards for motorcyclists may not be as hazardous for other road users; e.g. potholes, loose gravel on a curve, slippery or sunken pit lids,

and impaired sightlines. This paper describes the approach taken by VicRoads in getting motorcycle safety "front of mind" for people involved in road design, building or maintenance, as well as the challenges faced in reaching external road managers.

Introduction

The number of motorcycles and scooters on Victoria's roads has experienced significant growth over the last decade (a 72% increase in motorcycle registrations in the ten years to 2008).

¹ www.standards.org.au/downloads/SA_Corporate_Brochure.pdf

² Gibson T and Cheung A (2004) "Assessing the Level of Safety Provided by the Snell B95 Standard for Bicycle Helmets." Road Safety Research Report CR202, ATSB, Canberra.

However, in conjunction with this growth, motorcyclists are over-represented in crash and injury statistics, accounting for 13% of fatal and serious injuries, yet making up only 3% of all registered vehicles and less than 1% of traffic volume.

A combination of factors is generally at play in any motorcycle crash. Such factors include driver and rider behaviour relating to speed, fatigue, and the presence of alcohol or other drugs. Other factors may be vehicle-related, such as the absence of vehicle safety technologies or the maintenance of a safe vehicle. However the profile of the road surface and environment can influence both the possibility of avoiding a crash and the severity of injury to a motorcyclist in the event of a crash.



As a two-wheeled vehicle, motorcycles have dynamic stability characteristics that are unique when compared to four-wheeled vehicles. Motorcycle stability is much more sensitive to changes in shape, texture or skid resistance of the road surface. Specific hazards for motorcyclists may not be as hazardous for other road users; e.g. potholes, loose gravel on a curve, slippery or sunken pit lids, and impaired sightlines. This provides increasing challenges for those involved in designing, constructing and maintaining Victoria's road network.

Road safety countermeasures and specifications tend to focus on the areas that will have the greatest impact in reducing road trauma. Motorcyclists are such a small proportion of all road users, and there has been a tendency to develop guidelines and specifications for the majority of motorists. The best example of a resource that specifically targets motorcycle safety is the Austroads *Guide to Traffic Engineering Practice Part 15: Motorcycle Safety*, first published in 1999. Whilst this guide provides good advice for road engineers, widespread knowledge of the best practice it demonstrated can still be improved.

'Making roads motorcycle friendly'

Following a review of engineering maintenance practices to identify potential improvements in motorcycle safety, VicRoads developed a resource titled 'Making Roads Motorcycle Friendly'. This resource was developed to raise the profile of motorcycle safety issues pertaining to the engineered road environment. Whilst small pockets of work had previously been done to raise the profile of motorcycle safety, the Making

Roads Motorcycle Friendly resource demonstrated a strategic, coordinated approach to bring motorcycle safety to 'front of mind' for all people involved in road design, construction, maintenance and roadworks.

The Making Roads Motorcycle Friendly communication tools include:

- a slideshow presentation and notes for use in a 2 hour seminar to be delivered regionally.
- *Making Roads Motorcycle Friendly* DVD that presents the riders perspective and seeks to raise awareness of key safety issues.
- Booklet: *Making Roads Motorcycle Friendly - A guide for road design, construction and maintenance*, for engineers and managers involved in road development, design, construction, maintenance or reinstatement.
- Brochure: *Making roads Motorcycle Friendly - A guide for working on roads* for field staff involved in road works.

These tools are designed to raise awareness of the vulnerability of motorcyclists in terms of the road environment and encourage consideration of how road design, construction, maintenance and roadworks can be carried out in a way that improves safety for motorcyclists, or as a minimum not be detrimental to their safety.

The communications strategy is designed to enable a flow of information throughout the targeted organisations. Delivery of the key information involves a two-hour seminar, a take away kit of materials, and workplace sessions for engineers and field staff. The key audiences for the communication strategy include those involved in road design, construction, maintenance and roadworks. This includes engineers, managers and field staff from VicRoads, local government, and contractors, as well as utility and public transport authorities.

Motorcycle safety levy

Perhaps the greatest tool that VicRoads has had to raise the profile of motorcycle safety issues has been the dedicated funding commitment made possible through the collection of the motorcycle safety levy. The motorcycle safety levy is added to the TAC premium on motorcycles with an engine capacity of 126cc and greater (with some exceptions), and is included with new registrations and registration renewals. Using motorcycle safety levy funding, the Victorian Government commenced a Motorcycle Blackspot Program in 2003 which enabled the development and implementation of motorcycle-specific road engineering treatments at high risk motorcycling locations. For the first time, VicRoads project development teams had access to a dedicated funding source for specific motorcycle on-road projects, and as a result, have developed a better understanding of the needs of motorcyclists and how this can best be reflected through remedial treatments and the use of motorcycle friendly products on road.

With the assistance of levy funding, VicRoads has been able to undertake trials of barrier protection devices consisting of

Rubrail, Stack Cushion and Polybuffer, flexible delineators and motorcycle-friendly furniture such as plastic signs and air-filled plastic posts. Through these trials, there has been an increased awareness of the range of products that are becoming available that are designed specifically for motorcyclist safety. Local manufacturers are beginning to design roadside furniture products specifically with motorcyclists in mind. Over time, it is expected that some of these engineering treatments will be incorporated into future guidelines or specifications, thus raising awareness even more.



Stack cushion



Air-filled plastic posts and sign

*Below:
Rub rail to prevent
motorcyclists crashing
under the barrier*



The challenges ahead

With Making Roads Motorcycle Friendly, despite the overall attendances being very good, one of the challenges has been achieving full attendance from contractors and utility providers. Given that contractors and utility providers attend the seminars in their own work time, it will always be difficult to get full attendance from these groups. Despite this, a number of contractors and utility providers have attended seminars. The challenge will be how to get more people from these groups to attend future seminars.

Perhaps the greatest challenge will be in encouraging the adoption of motorcycle safety practices that may have an increased cost associated with them. Certainly when it comes to VicRoads projects and contractors, requirements can be built

into the contracts specifying certain practices. However, this is not the case where it is not a VicRoads project. The approach probably needs to be a combination of guidelines, standards and legislative requirements.

One of the other challenges will be to maintain the motivation amongst seminar attendees to continue to deliver the motorcycle safety message and resources to their work colleagues. The involvement of motorcycle riders within the target organisations could be a very effective way to ensure awareness of motorcycle safety issues. Motorcycle riders could be encouraged to attend future seminars and return to their workplace as a 'champion' for the cause.

What evidence is there that this approach is working?

Ultimately, a safer road environment for motorcyclists will result in fewer deaths and serious injuries. Early indications are that the Making Roads Motorcycle Friendly seminars and distribution of materials is being well received by both internal and external recipients. There have been reports of staff external to VicRoads who have been encouraged to watch the Making Roads Motorcycle Friendly DVD by their managers who attended one of the seminars. These staff have then reported a raised awareness of motorcycle safety in their everyday thinking.

There is also evidence of a shift in thinking across VicRoads, in the consideration given to motorcycle safety in all road improvement project proposals, especially through the Safer Roads Infrastructure Program, which is a road improvement program for all road users. There is a process at the proposal review phase where the project development team are asked whether they have considered all potential motorcycle safety issues in the development of their proposal.

One of the biggest events on the motorcycling calendar is the Australian MotoGP event held at Phillip Island each October. Recognising that this event attracts a large volume of motorcycle traffic on the major roads leading to Phillip Island, for the last few years VicRoads has done a drive through inspection of the approach roads with a representative from the Motorcycle Riders' Association. This usually occurs in the month leading up to the event date. The aim of this inspection is to identify potential hazards, which can then be addressed prior to the race weekend. In addition, a motorcycle audit of duplication works on the Bass Hwy en route to Phillip Island was written into the contract to ensure any motorcycle hazards related to the duplication works were identified.

Thinking about motorcycle safety is not a difficult task – often the solutions are simple and the investment in thinking and planning can be life saving. However it is this prompting of all involved in road design, construction, maintenance and roadworks that is required to 'flip the switch' and get people thinking about motorcycle safety. This can then lead to establishing processes to ensure motorcyclists' needs are given consideration and are addressed as appropriate.

Effect of Past Black Spot Programs on Motorcycle Safety

By J.H. Scully, S.V. Newstead, B.F. Corben and N.L. Candappa.

Monash University Accident Research Centre

Background

The State Government of Victoria has implemented numerous accident black spot programs since the late 1970s. Commencing in the early 1990s, two substantial black spot programs, each funded by the Transport Accident Commission's (TAC), have been completed. The first of these programs was implemented from 1992/93 to 1995/96 and had a budget of \$85M. In total, there were 559 distinct sites treated under this program. A subsequent black spot program, with a budget of \$240M, was implemented from 2000/2001 to 2003/2004. This program is generally referred to as the \$240M Statewide Black Spot Program (SBP) and was made up of two distinct components; the Accident Black Spot component and the Potential Black Spot component. The 841 sites treated under the Accident Black Spot component were selected based on their poor history of casualty crashes over a number of preceding years. Similar methods of selecting sites for treatment were also used for earlier black spot programs. However the 285 sites treated under the Potential Black Spot component of the SBP were identified using an alternative method that did not rely on crash histories of sites. Of the \$240M allocated to the Statewide Black Spot Program, approximately \$20M was allocated to the Potential Black Spot component, with the remaining funds allocated to the Accident Black Spot component.

Over the years, numerous black spot programs have been evaluated. In each evaluation, it has been found that when sites were selected on the basis of their poor crash history the program reduced casualty crash frequencies at treated sites by a statistically significant amount. For example, when the \$85M program was evaluated in 2001 by Newstead and Corben [1], it was estimated that casualty crash frequencies at treated sites were reduced by 26%, while the Accident Black Spot component of the SBP resulted in a 31% reduction in casualty crashes at treated sites [2]. Until now, all the evaluations of black spot programs conducted in Victoria have focused on evaluating the extent to which treatments reduce the frequency of all types of casualty crashes at treated sites.

The purpose of the project reported in summary form in this paper was to evaluate the effect of black spot programs on the frequency of motorcycle crashes at treated sites. The evaluation focussed on the two most-recent programs only, that is, the \$85M black spot program and the Accident Black Spot component of the \$240M SBP (referred to as the \$240M program from this point forward).

Evaluation Method

Each program was evaluated separately using a quasi-experimental analysis design. The crash data used in the analysis were the same data used in the earlier evaluations of the respective programs. For each black spot program, the number of casualty crashes involving motorcycles that occurred at treated sites in before-treatment and after-treatment periods were calculated. These frequencies were compared with casualty motorcycle crash frequencies at suitably chosen control sites. For each program, estimates of reductions for casualty motorcycle crashes were derived for the entire program as well as for groups of treatments.

Main Findings

The evaluation indicated that for both programs, the estimated reductions in motorcycle crashes due to the treatments were comparable to the reductions when crashes involving all road users were considered. For the \$240M program, it was found that treatments resulted in an estimated reduction of 31% for casualty crashes involving all types of vehicles as well as for casualty crashes involving a motorcycle. Similarly, for the same program, a 36% reduction in serious casualty crashes involving a motorcycle was estimated compared with a 35% reduction for serious casualty crashes involving all road users. For the \$85M program, the estimated reduction in casualty crashes involving motorcycles was 24%, while the estimated reduction for casualty crashes involving all types of vehicles was 26%.

Of the three broad types of treatments implemented as part of the \$240M program, those targeting crashes at intersections resulted in the greatest reduction in casualty motorcycle crashes at treated sites (38% reduction), followed by off-path treatments (30%). However these estimated reductions were not significantly different from each other. These results were similar to Scully and colleagues' (2006) evaluation of the effect of different types of treatments on casualty crashes involving all types of vehicles. For the \$85M program, it was found that route-based treatments were more effective in reducing casualty motorcycle crashes (35%) than intersection treatments (27%); however as for the \$240M program, these estimated reductions were not significantly different from each other. The full evaluation contains more detailed analysis of the effectiveness of sites classified into more specific treatment type groups.

Tables 1 to 4 summarise other key findings for more specific forms of treatment or measures of effectiveness

Table 1 - Results of the effectiveness of treatments at black spot intersections for both motorcyclists and all road users (statistically reliable results except where noted).

Types of Intersection Treatment	All Road Users Estimated Casualty Crash Reduction (%)	Motorcyclists Estimated Casualty Crash Reduction (%)	Annual Casualty Crash Saving for Motorcyclists
Overall	43	38	19
Signal treatments	35	52	Not available
New roundabouts	73	77	Not available
Fully controlled right-turn phases	32	52	Not available

Table 2 - Main findings of evaluating route-based black spot treatments effectiveness, for both motorcyclists and all road users (statistically reliable results except where noted).

Types of Route or Off-path Treatment	All Road Users Estimated Casualty Crash Reduction (%)	Motorcyclists Estimated Casualty Crash Reduction (%)	Annual Casualty Crash Saving for Motorcyclists
Overall	21	30	28
Road Alignment and Delineation	30	59	Not available
Western Ring Road Treatments	Not significant	82	Not available
Shoulder Sealing	31	49	Not available

Table 3 - Main findings of evaluating the average cost to save a serious casualty for treatments undertaken within the \$240M SBP, for both motorcyclists and all road users.

Types of Treatment	All Road Users Estimated average cost to save one serious casualty (\$000s)	Motorcyclists Estimated average cost to save one serious casualty (\$000s)
Overall (\$240m)	62	546
Off-path	76	447
Intersections	40	492

Table 4 - Main findings of evaluating the average cost to save a serious casualty for treatments undertaken within the \$85M black spot program, for both motorcyclists and all road users.

Types of Treatment	All Road Users Estimated average cost to save one serious casualty (\$000s)	Motorcyclists Estimated average cost to save one serious casualty (\$000s)
Overall (\$85m)	26	304
Routes	30	231
Intersections	25	311

Even though this evaluation has shown that for both programs the estimated reduction of casualty motorcycle crashes at treated sites was similar to that for casualty crashes involving all types of vehicles, the estimates of the present value of savings due to the reduction in casualty crashes involving a

motorcycle were much less than the estimated savings due to reductions in all types of crashes. This is because only about 10% of casualty crashes involved a motorcycle, so that even if the estimated percent reductions are equal, far fewer motorcycle crashes will be prevented than other types of

crashes. For example, the present value of savings due to reductions in casualty motorcycle crashes for the \$240M program was estimated to be approximately \$56M over the life of the treatments (assuming a discount rate of 8% and using crash costs used by VicRoads in formulating the programs), which is only 13% of the estimated savings due to reductions in casualty crashes for all types of road users. Similarly, for the \$85M program, the present value of savings due to reductions in the frequency of casualty motorcycle crashes at treated sites was \$45M, which was only 11% of the savings due to reductions in all types of crashes. These results suggest that for both programs, the proportion of motorcycle crash cost savings at black spot sites is in line with that expected from the proportionate crash problem represented by motorcyclists. This supports the view that general black spot programs provide similar benefits in reducing motorcycle casualty crashes as in reducing casualty crashes overall.

Conclusion

It is more difficult to justify treatments based only on their effect on casualty motorcycle crashes using economic measures.

This has important implications when deciding how to best allocate funds to improve the safety of road infrastructure. Instead of using economic measures to justify treatments designed specifically to address motorcycle safety, it is recommended that road authorities consider what the likely effects of treatments on the safety of all road users, including motorcyclists, will be. Such an approach is compatible with the more general philosophy within which designers and operators of the road transport system are encouraged to ensure that all road users are fully considered in new designs and in the way the system operates.

References

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Community Policing and Education to Reduce Motorcycle Trauma

By Ray Shuey APM, RRSP, Road Safety Specialist, Former Assistant Commissioner

Kevin Casey, Superintendent, Road Safety Strategic Services Division, Victoria Police

Abstract

Last year 43 motorcyclists lost their lives (14% of the road toll) while another 1,044 were seriously injured on Victorian roads. 56% were single vehicle crashes with at least 50% of these crashes involving excessive speed. Motorcycles account for approximately 3% of the vehicle fleet in the state.

In January 2009, Victoria Police with the support of VicRoads and the Victorian Motor Cycle Advisory Council (VMAC), commenced an ambitious two year "Community Policing and Education" project with the objective to positively impact on motorcycle safety.



This new initiative provides a focus on communication and awareness for both motorcyclists and vehicle drivers while ensuring that a complementary enforcement strategy is maintained. In addition to normal policing activities, five major state-wide policing operations will be undertaken annually supported by 50 regional operations each year. The program is to be fully evaluated.

Introduction

Motorcyclists are among the most vulnerable road users in Victoria. Fatality and serious injury rates have been found to be in excess of 30 times higher than for car drivers. Though motorcycles account for approximately three percent of registered vehicles and less than one percent of traffic volume, they account for 14% of road fatalities and serious injuries in Victoria.

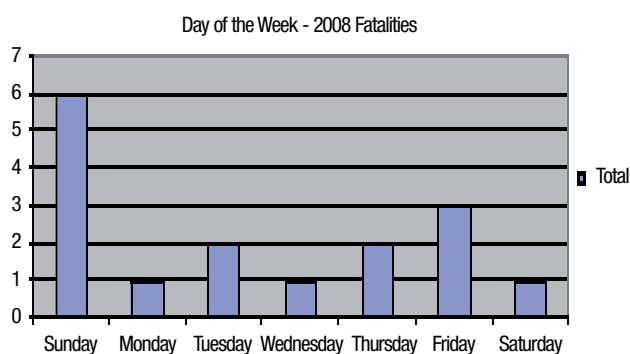
From 1 October 2002, to provide funding to improve motorcyclists' road safety outcomes, a levy was added to the Transport Accident Commission (TAC) premium on motorcycles with an engine capacity of 126 cc and over. The funds raised are fully dedicated to special projects that significantly improve rider safety. Direction for the allocation of these funds is provided by the *Strategic Guide for Expenditure of the Motorcycle Safety Levy Funding*.

The selection of projects to be funded from the levy is made with substantial input from the Victorian Motorcycle Advisory Council (VMAC). Approval for expenditure is given by the Minister for Roads and Ports. VMAC is supportive of enforcement measures that encourage a multi-action approach, i.e. one based on encouragement and enforcement.

Following the development of the program, the Minister for Roads and Ports has approved the implementation of a two year Community Policing and Education Project to reduce road trauma suffered by motorcyclists (Cost estimate - \$1.872m). In addition, Victoria Police has contributed substantial “in kind” support as well as the purchase of additional equipment. VicRoads was instrumental in assisting with getting the project underway and continues to monitor the development and progress.

Situational Analysis – key facts²

- Motorcycle riding is becoming increasingly popular as both a mode of transport and as a recreational activity
- Single vehicle motorcycle collisions, nationally have grown by around 4.9%
- Multiple motorcycle collisions, nationally have increased by 2.4%
- Nationally, registration growth is 6.8% and kilometres travelled have grown at 5.7% per year
- In Victoria, motorcycles comprise 3% of registrations but account for 14% of serious injuries and fatalities
- Per distance travelled motorcycle deaths are 30 times the rate of car occupants
- Per distance travelled serious injury of riders is 41 times higher than for car occupants
- It is estimated that motorcycle road trauma costs Victoria an average of \$372 million per year and is expected to increase
- 28% of motorcycle trauma occurred on Sundays



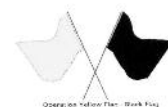
Program Objectives

The program was launched on 29 January 2009 with the following objectives to:

- Reduce the incidence, severity and trauma of motorcycle crashes in the community;
- Provide a safer environment for motorcyclists;
- Align education and enforcement components for the purpose of motorcycle safety;

- Enhance the active and visible police presence for the purpose of motorcycle safety in a positive way; and
- Provide enforcement as a deterrent to those motorcyclists and drivers who exhibit high risk behaviours that jeopardise motorcycle safety.

Program Activities



This two year motorcycle safety program, “**Operation Yellow Flag, Black Flag**”, adopts a multi-action approach to combine education and enforcement targeting both

riders and drivers who exhibit risk-taking behaviours that jeopardise motorcyclist safety. Operations focus on both general and specific deterrence, providing enforcement that is highly visible and active, repetitive, fair as well as credible, and well-publicised.

Research suggests that combining education and enforcement provides the best value in achieving road safety outcomes. The education component aims at improving motorcycle rider and vehicle driver awareness. It also aims at improving rider skills, knowledge, understanding and encouraging the use of better equipment and protective clothing.

“Operation Yellow Flag, Black Flag” provides for additional police involvement in motorcycle safety over and above existing enforcement levels. The operational focus is to:

- Help create a safer environment for motorcycle & scooter riders in Victoria and
- Broaden the Victoria Police role with increased emphasis on education of both riders and drivers, more so than general enforcement.

However, enforcement action will be taken where evident high risk behaviours occur. These include inappropriate speed, crossing double lines, excessive speed, failure to give way, changing lanes when unsafe, driver distractions (e.g. mobile phone use) and impaired drivers and riders (e.g. alcohol and drug impaired).

Victoria Police has increased its motorcycle fleet by 10 motorcycles and riders to complement the funding and program support provided through this initiative.

Key components of the initiative include:

- A state-wide traffic conference to identify and discuss critical issues on motorcycle safety
- Five major state-wide operations annually, each of three days duration using both regional and central police resources (10 operations)
- Ten two-day regional operations each year in each of the five Victoria Police regions (100 operations in total)
- An intelligence-led and outcome-focused program, with a dedicated analyst funded for the life of the program
- Design of a new educational brochure for drivers and motorcycle riders to be distributed at the time of interaction between police, motorcycle riders and drivers
- A motorcycle awareness program for 100 non-rider personnel in the Police Traffic Management Unit (TMU)

² Victoria Police 2008 Motorcycle Strategic Assessment

- An update of the Road Safety Information and Awareness Unit display
- Program coordination and marketing
- **A targeted communications strategy providing effective messages to motorcycle riders, vehicle drivers and the wider community.**

This program takes account of Victoria's Road Safety and Transport Strategic Action Plan for Powered Two Wheelers 2009-2013 as well as the overarching framework of Victoria's Road Safety Strategy: arrive alive 2008-2017 and the Victoria Police Road Policing Strategy 2009-2010 .

Enhanced information sources

The broader focus on education and awareness has provided a different structure in recording of police/road user interactions over and above the normal infringements. While these “non-offender” interactions have occurred in the past, they were not part of any official recorded process and therefore the value of such communication could not be legitimately assessed or evaluated. In addition, the results of data collected on “driver” distractions such as the use of mobile phones (while driving) as well as “impaired rider/driver” infringements could not be directly linked to motorcycle safety. The restructured data enables more valuable analysis.

During the state-wide operations from January to June 2009, the following “education and awareness” interactions have occurred:

- Riders 1,469
- Drivers 955

Preliminary Breath Tests conducted also provide an opportunity for an education/awareness interaction. The following tests were undertaken during the January to June operations:

- Riders 1,335
- Drivers 1,303

Regional operations were also subject to the same re-structured reporting framework and returned similar numbers to those above.

Each police motorcycle rider involved in the operations is required to submit a debriefing report at the completion of each operation. This provides a foundation for the data collection and subsequent analysis.

“Sharing the Road” Brochure

This newly designed brochure with input from key stakeholders is a major component of the education and communications initiative. The brochure is provided to motorcyclists and vehicle drivers during the course of any interaction with positive communication being encouraged at all times.

The brochure addresses some of the risk factors for motorcycle riders. It provides tips for drivers including:

- Take the time to look out for motorcyclists
- Give motorcyclists space
- Expect the unexpected



It provides tips for riders including:

- Expect the unexpected and drive defensively
- Positioning on the roadway
- Making sure you can be seen

Safe control of a motorcycle places great demands on the rider and requires different skills and tactics compared with driving a car. Most important are the anticipation and recognition of hazards along with the ability to brake and corner safely and effectively.

Use of the media as a communications medium

During the program to date, an emphasis has been placed on both state-wide and regional communications through the daily and local publications. Media releases have been provided through the office of the Minister for Police and Emergency Services as well as through Victoria Police Media office. The official launch was undertaken on 29 January 2009 with statements from the Police Minister Bob Cameron, the then Assistant Commissioner Ken Lay and Neil O'Keefe, Chairman of VMAC.

Periodic media releases have been provided for relevant events or operations.



Media Release

From the Minister for Police and Emergency Services

Thursday, 29 January, 2009

Police target motorcycle safety in state operation

Police Minister Bob Cameron and Assistant Commissioner Ken Lay today joined Victorian Motorcycle Advisory Committee (VMAC) Chairman Neil O'Keefe to launch a new motorcycle safety program.

The two-year motorcycle safety program will be the first of its kind in Victoria and involves a series of enforcement and education initiatives across Victoria.

Analytical Support

The dedicated analyst for this program has assisted with the following information base:

- The identification of “problem profiles” for state-wide operational tasking and coordination
- State-wide strategic assessment of motorcycle trauma over the past five years
- Monthly statistical updates for general policing, Traffic Management Units and the Special Solos
- Development of Geo-Spatial Analysis tools

This new information analysed from current data provides a solid foundation for the Communications Plan.

Governance

Within Victoria Police, the operational scheduling and progress results are tabled at the Road Policing Strategic Advisory Group chaired by Deputy Commissioner, Ken Lay. This “internal communication” forum informs Police Command and ensures that the project timelines, activities, and objectives are maintained on-time and on-budget. Project documentation and reporting is supported by functional analytical and graphical information to provide clear indicators on progress against targets. As an example the following colour coded table provides a readily identifiable tracking schedule (green, amber, red complemented by relevant data)

Region	Operation Tally	Scheduled Operation Dates	Area	Internet Data Entered	Overruns Paid	Administration Returned
1	1	25/02				
	2	20 & 21/02				
	3	24/03				
	4	28 & 29/04				
	5	1/2 - 15/05				
	6	15 - 18/07				
	7	1 & 4/10				
	8	16 - 19/11				
	9	Dec				
	10	Dec				
2	1	20 & 21/02	Macarthur	Red		
	2	12 - 14/03	Ballarat	Yellow		
	3	28 - 30/03	Corangamite	Yellow		
	4	21 - 22/04	Traralgon	Yellow		
	5	12 & 13/05	Heathcote	Yellow		
	6	23/05 - 28/07	Ballarat	Yellow		
	7	11 - 21/08	Merri-ymung/Murrumbidgee	Yellow		
	8	18 & 19/09	Geelong	Yellow		
	9	28 - 30/10	Ballarat	Yellow		
	10	18 & 20/12	Great Ocean Rd	Yellow		
3	1	17 & 18/02	Edwards	Yellow		
	2	14 & 20/03	Shepparton	Yellow		
	3	12 & 20/04	Geelong & Macedon Ranges	Yellow		
	4	17 & 18/05	Rockhampton	Yellow		
	5	1 & 2/06	Wimmerie/Kinglake West	Yellow		
	6	24 & 25/07	Wimmerie/Kinglake West	Yellow		
	7	1 & 15/11	Shepparton	Yellow		
	8	19 & 18/12	Wimmerie/Kinglake West	Yellow		
	9	18 & 17/12	Geelong & Macedon Ranges	Yellow		
	10	28 & 27/12	Corangamite	Yellow		
4	1	28 & 29/03				
	2	22 & 23/04				
	3	12 & 13/05				
	4	26 & 27/05				
	5	19 & 19/05				
	6	11/06 & 11/11				
	7	12 & 15/11				
	8	16 & 20/11				
	9	12 & 13/12				
	10	18 & 18/12				

Similarly, the specific tracking of motorcycle crashes provides incident identification at various levels and the foundation of enforcement and targeted education components of the program. As an example the fatal crashes are identified in the following map. All levels of information may be overlaid to highlight relevant activities at various times and locations.

Communications Focus

The communications objectives within the program include

- Increasing stakeholder awareness
- Improving team efficiency and productivity
- Gaining management sponsorship and buy-in



Communications Guidelines

The communications guidelines established include:

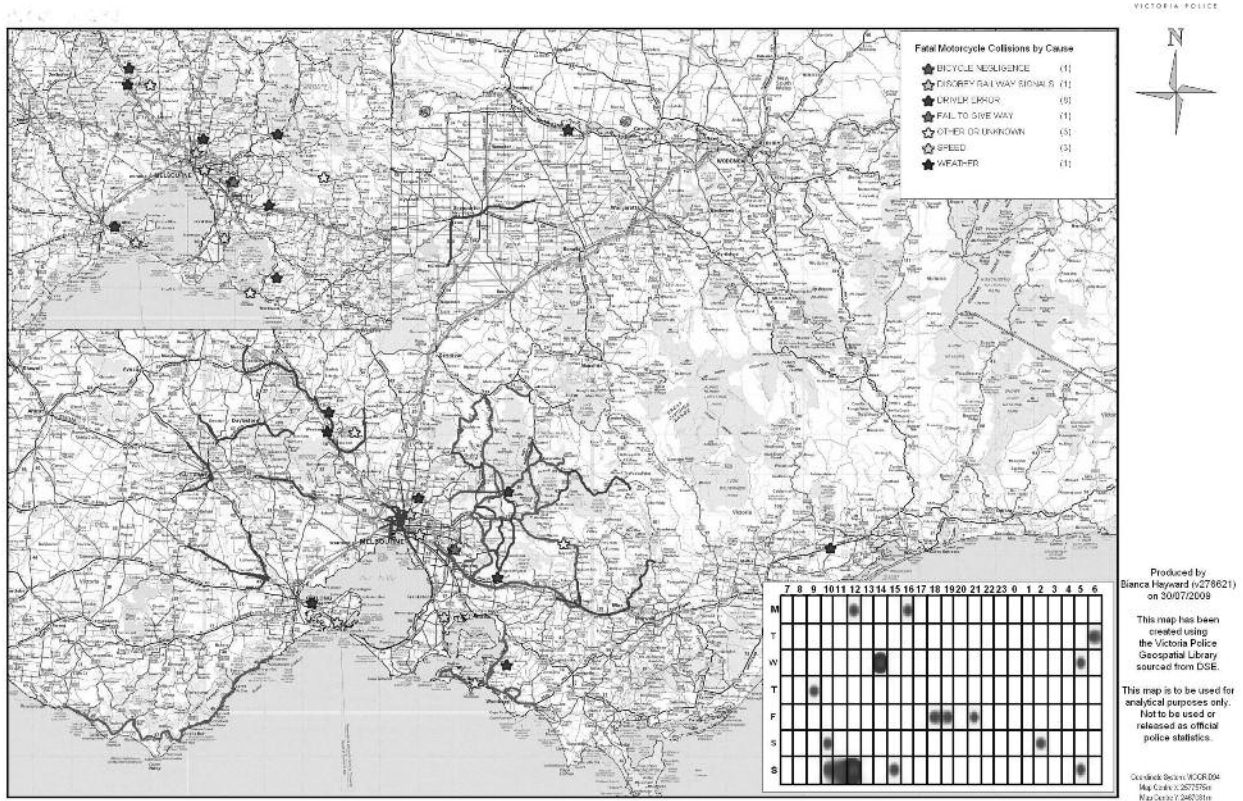
- All messages will be audience-specific
- Every key message will be communicated formally
- Messages will be distributed through an appropriate channel
- The team will communicate what people need to know before they need to know it
- Communication will be tailored, based on what people need to know
- All critical communications must be approved by management prior to distribution
- Only the media communications team will be able to distribute official press releases
- Project-wide meetings will be held at all important milestones
- Regular, unbiased reporting will be undertaken
- The project team will listen and act on feedback

Program Evaluation

Recently, the Centre for Automotive Safety Research (Adelaide University) has been engaged to undertake an evaluation of the program. Victoria Police is focussing on motorcycle rider safety, education and interaction with motorcycle riders and motorists as well as providing safety information through a focussed police effort targeting mass rider locations and known



Fatal Motorcycle Collisions 01 January - 26 July 2009



locations for trauma. With the increased fleet of police motorcycles and presence of the “Yellow flag Black flag” operations around the state, it would be expected that there will be an offset to the incidents of trauma. The program’s management and coordination is also evolving, using intelligence analysis to inform police and guide operational response. All these issues will be subject to scrutiny and continued improvement during the life of the project and subject to progress evaluation and final evaluation at the conclusion of the two years. It is also relevant to note that the Transport Accident Commission is providing complementary motorcycle safety awareness communications campaigns which are expected to impact positively on motorcycle safety

Conclusion

It is too early in the program lifecycle to determine the effectiveness of the educational awareness, communications strategy and operational activities undertaken by Victoria Police. The issues and counter-measures are very complex as a single facet (motorcycle safety) of a broad road safety program. However, early indications show a reduction in fatal and serious injuries for motorcyclists across the state. It is appreciated that in the dynamics of road safety, there are many components involved which affect both positive and negative attitudes in driver/rider behaviours. Victoria Police continues with the primary objectives to reduce the incidence, severity and trauma of motorcycle crashes in the community and provide a safer environment for all riders.

Motorcycle Crash Casualties and their In-hospital Management – observations from St Vincent's Hospital, Sydney.

By Faux, SG, FAFRM (RACP) FFPMANZCA Director of Rehabilitation and Pain Medicine, St Vincent's Hospital Sydney, Donaldson, L, University of New South Wales, and Brook, KJ, FAFRM (RACP) Staff Specialist in Rehabilitation Medicine St Vincent's Hospital Sydney.

Introduction

Recent studies conducted at St Vincent's Hospital, Sydney, have identified a number of short comings in the delivery of in hospital care and follow up, particularly for motorcyclists.

A retrospective study (Fig. 1) examined the pattern of fractures and hospital service utilization by 187 road crash casualties with fractures, over an 18 month period in 2005/06. This study found that motorcyclists, who represented 23% of the cohort, tended to leave hospital earlier, cost less and receive fewer services than other road users. Their pattern of fractures show frequent chest and upper limb fractures as well the expected high frequency of lower limb fractures.

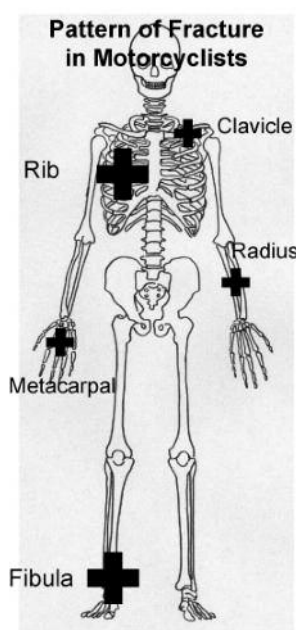


Fig. 1

For motorcyclists admitted with injuries the average length of stay was 5.7 days (SD=9.2 CI = 2.9 – 17.0), which was significantly shorter than car drivers (mean 15.7 days SD = 23.4 $p=0.006$). The mean cost of their admission was the lowest of all road users at \$6,914 (SD= \$6389) while the average cost of admission was \$13,336 (SD= \$27066)¹. Motorcyclists admission costs were significantly lower than those of drivers ($p = 0.01$ CI = \$5,556- \$40,112). In addition, there was a significant difference in the time before social workers had their first consultation with motorcyclists compared to drivers or pedestrians ($p = 0.043$ and $p = 0.025$).

A second study, the Motor Accident Acute Rehabilitation Response Study (MAARRS), was a two year, prospective cohort controlled trial of early rehabilitation interventions compared to usual care protocols for 80 road crash casualties who had sustained a fracture (2). The intervention group had a consultation with a rehabilitation physician, the control group were simply followed up and a variety of physical, psychological, vocational and quality of life outcomes were measured. This study found that motorcyclists, from both the intervention and control groups, had faster return to work rates than other road users despite having higher pain levels and an equal level of

injury. They were also less likely to accept offers of additional medical services.

As a result of these findings, and a philanthropic grant from George and Charis Schwartz in consultation with the Motorcycle Council of NSW, the Motorcycle Accident Rehabilitation Initiative (MARI) project was devised. The aim of this project was to offer social work follow-up to all motorcyclist presenting to the St Vincent's Hospital, following a road crash. Patients were identified from the Emergency Department database and contacted either on the ward (if admitted) or by phone by a rehabilitation social worker. The social worker would explain the intervention program and complete an assessment including a screening questionnaire made up of elements of psychological screens, functional screens and pain questionnaires. Further treatment or assistance services were offered on the basis of the assessment or if requested by the patient.

Patient who were not able to be contacted after 3 phone attempts were sent a letter. Over 16 months from April 2007 until August 2009, 141 motorcyclists presented to the Emergency Department following an accident and 21 (15%) were admitted to the hospital. The majority of those presenting were male (85.4%) with an average age of 32.16 years.

Only 56 motorcyclists (40%) were successfully contacted by phone and went through a screening process with the social worker. Almost a quarter (23%, $n= 13$) were offered treatment. Treatments offered included consultations with social workers ($n=7$, 54%) doctors ($n= 4$, 31%) and psychologists 9 $n=2$, 15%). Overall 60% of motorcyclists presenting to the Emergency Department did not respond to repeated phone calls or a letter. Patients who were admitted were seen by social workers and not followed up by phone or letter as their needs were attended to by ward social worker. Ward social workers were contacted by the MARI social worker and were encouraged to see their patients earlier than planned. (3)

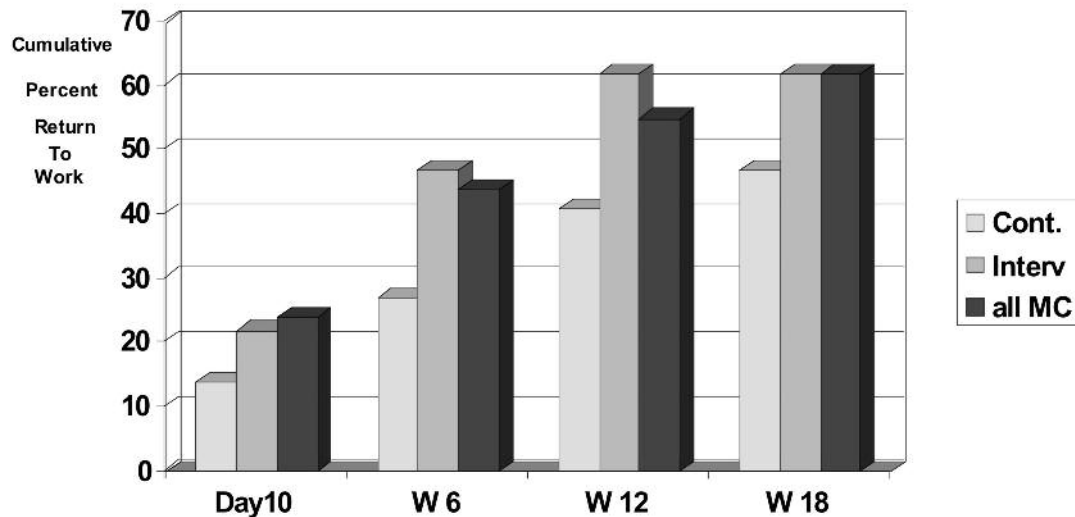
Discussion

The Haddon matrix conceptual approach (4) identifies Emergency Response and Rehabilitation as a "Post Crash/Physical Environmental" contribution to overall road safety. As such much of the work at St Vincent's has focused on the Emergency and Rehabilitation response to road crash injury in Sydney's CBD.

The orthopaedic injuries sustained by motorcyclists in Sydney's

¹. All calculations were based on the NSW Department of Health pre-calculated per day hospital bed costs and do not include medical consultations, surgical prostheses, allied health interventions etc.

Graph One – Return to work rates of intervention and controls compared to all motorcyclists



CBD according to the presented studies do not result in lengthy hospital stays. This may be explained on the basis of less severe injuries and the younger age of riders (30-40) compared to car occupants (average age above 50). Indeed according to the quality assurance data of the MARI project only 15% of motorcyclists are admitted, suggesting that most accidents in the CBD result in minor injury. Minor injuries can be managed in the community (without being admitted to hospital) and do not prevent the patients from attending to their own activities of daily living such as walking, eating, dressing and toileting/grooming. The Abbreviated Injury Scale is used in the Emergency Department to scale injuries from 1(minor)- 6 (maximum usually not compatible with life). (5) Simple fractures of the arm or leg can be managed with plaster and crutches and do not always need admission to hospital.

In quality assurance data from the phone follow-up of all motorcyclists injured and assessed at St Vincent's (MARI project (3)) fewer than 10% of those contacted by phone or letter requested or took up offers of assistance. A suggested reason for this phenomenon may be either that most motorcyclists had few medical or social needs following such minor accidents or that other reasons (such as convenience, high levels of self reliance, new transport difficulties etc) prevented them from taking up offers of assistance.

One might also speculate that motorcyclists may not be easily able to predict the impacts of health related problems until they arise at a later time, particularly the psychological and social sequelae of motor vehicle accidents as indicated by Amertunga

et al (6) and Read et al (7). One might speculate that motorcycle riders tend to be more stoic as a group and be more motivated to return to work. Finally, one might suggest that as the larger part of riders are male that existing barriers preventing or delaying men from accessing health services may also be operating in this group. (8)

It is also of interest that social workers took longer to see admitted motorcyclists following fractures. Donaldson et al (1) suggests that 47% of patients were discharged after 3 days and that social workers were not informed early enough that patients needed to be seen, as the average delay from admission to first consultation with a social worker was 2.7 days. One might also speculate that delays were contributed to by the peculiarities of the allied health referral process. In general, nurses identify patients who may need to see a social worker and it may be that nurses take longer to identify the social needs of motorcyclists. Social workers themselves may put greater priority on those patients with immediate emotional or psychological distress as opposed to administrative needs like insurance, repairs and work, although most acknowledge that assistance in both spheres are core social work roles. More disturbingly, there is no firm or consistent policy or protocol in any major teaching hospital in the South Eastern and Illawara Area Health Service as to which member of staff can assist a patient or their family with their insurance matters or indeed whether they should be helped at all. It is perplexing, that while health professionals have a moral obligation to protect patient's confidentiality, privacy issues are often cited by allied

health or nursing staff as a barrier to assistance in these matters (9). This may create an environment of avoidance with respect to medical professionals approaching motorcycle accident victims to assist them with their administrative needs.

It seems, that characteristics of the public hospital response to motorcycle accident victims, may leave many unassisted as they attempt to return to work, restore finances and their transportation. In the MAARRS study while motorcyclists with fractures did better than expected there were still 40% who had not returned to work by 5 months post accident. There is little evidence to identify who are likely to be successful and who may need further assistance. It may be beneficial to develop screening tools which may assist in the prediction of those likely to have difficulties returning to work as well as those likely to suffer persistent health related problems, so that more proactive programs like the MARI project can be offered to a targeted population of motor cycle accident victims..

Conclusion

Motorcycle accidents in the Central Business District present to St Vincent's Hospital, Sydney at a rate of 1-2 per week and result in mostly minor injuries with about 15% of cases serious enough to be admitted to hospital. There are significant shortcomings in the hospital and rehabilitation management of injured motorcyclists with less than half seeing social workers and an ambiguity about which health professionals should offer to assist patients with administrative issues to do with insurance. Improvements in the hospital and rehabilitation management of

injured motorcyclists in the CBD lie in the introduction of early proactive rehabilitation and the development of screening tools to predict late onset social and health related problems.

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The Motorcycle Safety Research Program at the George Institute

By A/Prof Rebecca Ivers and Liz de Rome

Research on the prevention of road traffic injuries is a primary focus of the Injury Division at the George Institute for International Health. In keeping with a public health approach to injury prevention, our work encompasses research on a range of topics from surveillance, observational and intervention studies through to program evaluation and policy. The Division has a special interest in motorcycle safety as an emerging cause of increased injury in high income countries and a major cause of injuries in low and middle-income countries.

Current work by researchers from the George Institute in motorcycle safety includes:

The Novice Rider Study was a cross sectional survey of over 1000 riders, recruited when they attended the compulsory NSW pre-provisional rider training course in 2008. The aim was to identify factors associated with the use and non-use of protective clothing by novice motorcycle riders and how and why motorcyclists make decisions about usage of protective clothing. The survey also asked about the actual riding exposure of learner

riders to validate their crash risk rate. The long-term objective was to develop an educational intervention program to increase the use of protective clothing. The analysis of results are currently under way. A paper on the extent and range of their riding practice while on the learner licence has recently been accepted for presentation at the TRB Annual Meeting in Washington, 2010. Funding: NRMA Motoring and Services, NSW.

The GEAR Study is a one year prospective cohort study of 212 motorcyclists who crashed on public roads in the ACT. The aim is to identify the associations between usage/ non-usage of motorcycle protective clothing and injury and subsequent disability. This will be the first study worldwide to distinguish between different qualities of protective clothing and to examine the role of impact protectors in preventing injury. In order to ensure a representative sample of all riders who crash, injured riders were recruited from hospitals and uninjured riders are sourced through motorcycle crash repair services. The riders were also followed-up at six weeks and six months to monitor their recovery progress and quality of life following the crash.

The study will be completed early in 2010. Funding: Swann Insurance (Australia).

Motorcycle Helmet Use and Risk Factors for Helmet Non-use Among Motorcyclists in China. A roadside observational study of 4,852 motorcyclists was conducted, 98% of whom agreed to be interviewed at 18 randomly selected sites in Guigang China, in 2002. The aim of the study was to determine the prevalence, quality and correct usage of motorcycle helmet, and secondly, to identify factors associated with these outcomes in China. Just over half (56%) of the motorcyclists wore helmets and two thirds of these helmets were substandard. The findings of the study will be used to develop intervention strategies to promote proper helmet use and reduce motorcycle injuries.

Motorcycle Helmet Use in Vietnam: Prevalence, Barriers to Use and Policy Implications. The aim of this study was to: estimate the prevalence of helmet use in motorcycle riders in the Hai Duong province of Vietnam; examine current policies aimed at reducing motorcycle injuries and promoting motorcycle helmet use in Vietnam; identify barriers to helmet use; and study the prevalence of risky behaviours among motorcycle drivers. A cross-sectional on-site observational survey design has been implemented in order to estimate the prevalence of helmet use based on a random sample of the road hierarchy. The estimates have been obtained adjusting for the time of day, day of week and the season (summer, winter).

Researchers from the George Institute have also conducted a number of Cochrane systematic reviews relating to motorcycle safety. The purpose is to review and synthesise evidence for interventions designed to reduce motorcycle injury and summarise the estimated reductions in risk of death and injury achieved by these interventions. Reviews conducted to date

include: **helmets for preventing injury in motorcycle riders (published)**, **motorcycle rider training for preventing road traffic crashes (under review)**, and **motorcycle helmet legislation for preventing injuries in motorcyclists (under revision)**.

The George Institute has also been recently contracted by VicRoads to undertake the evaluation of a large-scale trial of an on-road assisted ride program for newly licensed motorcycle riders.

Recent publications:

1. Hung DV, Stevenson M, Ivers R. Barriers to, and factors associated, with observed motorcycle helmet use in Vietnam. *Accident Analysis and Prevention* 2008;40(4):1627-1633.
2. Hung DV, Stevenson M, Ivers R. Motorcycle helmets in Vietnam: ownership, quality, purchase price and affordability. *Traffic Injury Prevention* 2008, 9:135-143.
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A Survey of Motorcycle Safety Programs Across Australasia

By N Haworth, K Greig and D Wishart

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Abstract

The continued growth in popularity of motorcycling has been accompanied by an increase in the number of motorcyclists killed and injured. While the effectiveness of motorcycle licensing and training has been examined, little is known about the many smaller motorcycle safety programs. This paper describes current motorcycle safety programs in Australia and New Zealand. Programs were defined by the six factors identified as major contributors to the over-representation of motorcycles in serious crashes (inexperience or lack of recent experience, driver failure to see motorcyclists, vulnerability to injury, road surface and environmental hazards, risk taking and instability and braking difficulties) and by their organisation, type of delivery and likely effectiveness. Very few small-scale

programs had been evaluated. Many statewide programs had only limited or no process evaluation and very few had an outcome evaluation. Recommendations are made for current and future programs for delivery by road safety stakeholders, clubs and other local organisations.

Introduction

Australia and New Zealand, in common with other developing countries, continue to experience a boom in the sales and use of motorcycles. In both countries there was about a 50% increase in the number of registered motorcycles between 2003 and 2008 [1, 2]. The growth in popularity of motorcycling has been accompanied by increases in the number of motorcycle riders and their passengers killed per year, from 188 in 2003 to

245 in 2008 in Australia [3] and from 28 in 2003 to 41 in 2007 in New Zealand [4]. Given the overall increase in motorcycling and associated road trauma, it is therefore of interest to examine what types of motorcycle safety programs have been implemented.

Motorcycle safety programs and systems in Australia and New Zealand range from statewide licensing and training systems administered by government licensing and transport agencies to smaller safety programs and interventions run by local communities and rider groups. Although there has been an increased focus on motorcycle safety by State and Local government agencies in some jurisdictions, with safety strategies and strategic plans being developed in several states [5, 6], overall there has been little formal research undertaken in Australia to assess the effectiveness of motorcycle programs, particularly smaller programs. As a result of this lack of research, safety initiatives directed toward improving motorcycle safety often rely on overseas data, anecdotal evidence or outdated information [7]. Training and testing requirements are set out by the state licensing authority, however, practitioners of motorcycle training often rely on their experience and anecdotal evidence to design and deliver training and safety programs. It is therefore unknown whether these safety activities are fully addressing the underlying issues inherent in improving the safety of motorcyclists.

This paper summarises material presented in a report to the NRMA – ACT Road Safety Trust [8]. The reader is encouraged to consult that document to obtain fuller details of the research.

Method

Motorcycle safety programs were identified through a number of processes. Electronic publications database searches were undertaken as well as Internet searches (including websites of organisations that may have sponsored recent research) and reviewing motorcycle interest magazines. Contact was made with a wide range of stakeholders including road safety agencies, Police, motorcycle rider trainers, and motorcycle rider groups to identify programs that have been implemented.

Motorcycle clubs were contacted via email. A flyer containing project information which asked clubs to “tell us about your motorcycle safety activities...” was sent to all clubs listed in the Australian ‘Motorcycle Trader’ magazine web version. Although this list did not cover every club in Australia and New Zealand, the email included information which encouraged clubs to pass the flyer onto other clubs, groups and individuals involved in motorcycle riding and motorcycle safety.

One hundred and twenty five local, statewide and national motorcycle programs were examined. This sample provided an opportunity to analyse the type of programs available. State licensing and training systems were excluded because they have been reviewed earlier [7], but individual innovative training programs, such as post licence training, are addressed.

Programs of this nature consisted of 6% of all programs examined. The examination involved categorising programs into topics defined by the six factors which have been identified as contributing to the over-representation of motorcycles in serious crashes: vulnerability to injury; inexperience or lack of recent experience; driver failure to see motorcycles; instability and braking difficulties; road surface and environmental hazards; and risk taking [9].



An examination of program mode was also undertaken. Programs were categorised by their organisation and type of delivery. Other supporting information about motorcycle programs was collected and included the following: time of implementation/duration of program; participating agencies; source/ contact; benefits and issues with the program; and program relevance to the road environment and motorcyclists who receive the message.

Results and Discussion

The research identified 125 motorcycle safety programs in Australia and New Zealand. There were similar proportions of local (48%) and statewide (44%) programs, however, only 8% were national. These categories were defined by the reach of the program (to the target audience), not by the status of the organisation that implemented or funded the program. Some state government funded agency programs may have been classified as local programs due to their scope, for example, being a small community intervention. It is acknowledged that the percentage of local programs may be underestimated in the survey because they are often run for shorter time periods and are not as well known as statewide programs. Only 4% of the programs examined had an outcome evaluation and 1.6% had a process evaluation. The programs that had been evaluated ranged from refresher training for returning riders to road improvements and most were developed or funded by road safety agencies.

Across the Australian states, the percentage of programs from each jurisdiction roughly mirrored the percentage of registered motorcycles in that jurisdiction (calculated from [1]), with the largest representations being from New South Wales, Victoria and Queensland (see Table 1). Compared to their contribution to the Australian fleet, there were relatively few programs from South Australia and Western Australia and relatively more from the Australian Capital Territory.

Table 1. Percentage of programs identified from each jurisdiction and percentage of Australia's registered motorcycles.

Jurisdiction	Percentage of programs identified registered motorcycles	Percentage of Australia's registered motorcycles
New South Wales	29.6	26.1
Victoria	20.8	24.0
Queensland	21.6	24.6
South Australia	0.8	7.0
Western Australia	0.8	13.6
Tasmania	0.0	2.2
Northern Territory	2.4	0.9
Australian Capital Territory	8.8	1.8
Australia-wide	6.4	
New Zealand	8.8	

Topics addressed

There were 72 programs that focused on a single topic, and 53 that addressed a range of topics. Table 2 presents the number of programs which target each of the six motorcycle crash contributors. The overall priority particular topics received changed somewhat in relation to whether the program was specific to one topic or addressed a mixture of topics. Inexperience or lack of recent experience was the topic most often addressed by single topic programs. Few programs solely addressed risk taking such as drink riding. Less than 1% of programs specifically targeted instability and braking difficulties. Information about vulnerability to injury is included more often in mixed programs than any other topic. Risk taking is addressed more often in mixed than single topic programs, and information about drivers' failure to see motorcyclists is less commonly addressed in mixed programs. State programs appeared to be more likely than national or local programs to focus on driver failure to see motorcyclists, whereas local programs were more likely to address road surface and environmental hazards.

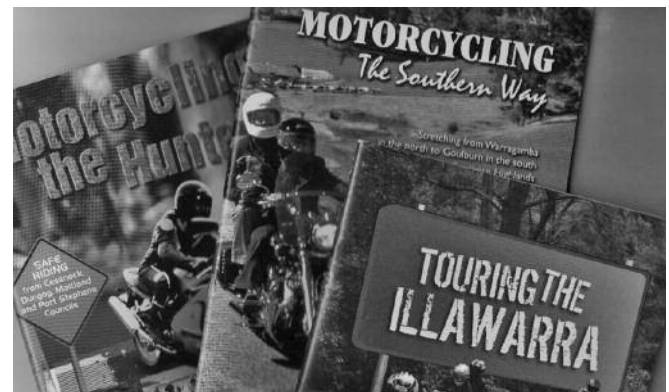
The delivery media were categorised into advertising or educational material (including brochures, websites and ride guides), training courses, events (including awareness days, rallies and workshops), road environment changes (including improvements to signage and auditing), mixed (where a range of delivery media were used) and other (which included enforcement, research and changes to licensing systems). Many programs aim to convey a single message but use a mixture of delivery modes to disseminate the message. Other programs find a means for delivering motorcycle safety messages and combine a number of topics into one form of delivery. Of the programs that addressed a mixture of topics, 35% used printed material (in one or two forms of delivery) for example, a ride guide brochure or internet education. The other 65% used a wider range of delivery methods and included an intervention method beyond written material, for example, hazard signs, awareness days, displays, local Police involvement and media advertising. Table 3 summarises delivery media for programs across the six topic areas and more detail is provided in the sections that follow.

Table 2: Number of single topic and mixed programs including each motorcycle safety topic

Topic	Number of single topic programs				Number of mixed programs	Total programs
	Overall	National	State	Local		
Inexperience or lack of recent experience	26	4	16	6	15	41
Driver failure to see motorcyclists	18	0	16	2	8	26
Vulnerability to injury	11	2	4	5	17	28
Road surface and environmental hazards	12	0	2	10	9	20
Risk taking	4	0	1	3	11	15
Instability and braking difficulties	1	0	1	0	8	9

Programs addressing inexperience or lack of recent experience

The most common approaches to address inexperience or lack of recent experience in riders are licensing and testing, training and enforcement. With regard to smaller, more innovative activities, often public education programs utilising advertising campaigns are run by state agencies in support of new licensing and enforcement initiatives. Training courses specific for novice riders as well as post licence training are another common activity to address this issue. Increasingly, training is being tailored to accommodate returning riders and mature age riders. This is particularly important given that older riders are the fastest growing rider group among serious crashes. However, only 11% of programs which address inexperience or lack of recent experience were courses specifically for returning riders. While information about such programs in the ACT and New Zealand was provided, it is acknowledged that similar programs are available in other jurisdictions..



and hazard perception, rather than advanced or racing skills. Given the increasing popularity of scooters, not only do education programs need to further incorporate safe scooter riding in their content, but the degree to which the current motorcycle training and licensing systems address scooter riding needs to be reconsidered.

Table 3. Number of programs delivered by particular media for each of the motorcycle safety topics

Topic	Advertising or educational material	Training course	Event	Strategic document	Road env change	Mixture	Other
Inexperience or lack of recent experience	8	13					5
Driver failure to see motorcyclists	17		1				
Vulnerability to injury	6		1		1	1	2
Road surface and environmental hazards	1		1		9		1
Risk taking	2						2
Instability and braking difficulties	1						

Ride Guides are one type of publication which provide motorcycle safety advice specific to particular routes. While these guides often cover a range of topics aimed at preventing crashes, reducing injury severity and improving treatment if a crash does occur, the advice is focused on the rider and the environment in which they are riding and so play a role in addressing the issue of inexperience with a particular route. Many ride guides are a form of tourist promotion, often providing maps and other information about the local area and take the form of brochures, booklets and articles in magazines. Ride guides therefore have the potential to reach many riders. More recently, some more sophisticated ride guides have become available on DVD or can be viewed on YouTube. Examples of ride guides include: 'The Great Ocean Road Ride'; 'Motorcycling the Hunter' and 'Motorcycling the Southern Way'.

Although this issue is well represented by programs in Australia and New Zealand (relative to other topics), a number of recommendations can be made to further address inexperience and lack of recent experience. These include promoting refresher courses for returning riders that address basic skills

Programs addressing driver failure to see motorcycles

Most of the programs that address the issue of drivers' failure to see motorcycles are run by state government road safety agencies and include television advertisements (e.g. in Victoria) or a mixture consists of printed slogans on buses, other outdoor advertising and radio (e.g. in NSW). General awareness campaigns also use a variety of delivery modes, with program types including day rides, awareness weeks, awareness sessions, messages on the back of registration labels and, again, television and radio.

Television advertisements are particularly suited to this area of motorcycle safety as they have a wide reach in the community. This medium has the ability to reach 'other road users' as well as motorcyclists themselves. Other advantages of television advertisements include the following:

- Children and teenagers who do not yet operate a vehicle on road, but who are pedestrians and may operate a road vehicle in the future, also receive the safety message. The message then has potential to become part of society's safety culture.
- Television advertisements also have the ability to portray

realistic situations with sound, vision and motion. This has potential to provide a higher impact message than other modes of delivery.

- Although this form of delivery is associated with high monetary costs, it reaches a large number of people.

Although this issue is also well represented by specific programs relative to other issues, this topic could be better addressed in mixed programs. A large emphasis should be placed on hazard perception skills and encouraging motorcycles to position themselves on the road where other users can see them rather than in a position where drivers do not expect motorcyclists to be. This information should be delivered in conjunction with programs targeting public awareness of motorcycles. Both conspicuity (e.g. wearing bright and reflective clothing in order to be seen) and motorcyclist perception of hazards (e.g. not riding in the line, or shadow of a sign) are important issues to be addressed.

Programs addressing vulnerability to injury

Vulnerability to injury is one motorcycle safety factor where programs can target all three areas, road user, vehicle and the environment, to improve this problem. The delivery of these types of programs is often in the form of internet information, brochures and magazine advertisements and there have been a small number of television advertisements. All programs addressing this issue examined in this research were government run programs.

Given the high rate of helmet use by on-road motorcyclists, there has been little emphasis on helmets in safety programs. The research, however, did identify an innovative helmet trade-in project. Wearing of protective clothing is promoted by road safety agencies. Examples of this include the Victorian TAC website which displays a photograph of a motorcycle rider with protective clothing only on one half of his body, and describes the injuries a person would receive without protective clothing. A joint RTA-MAA NSW public education campaign in 2002-03 showed pictures of a cow riding a motorcycle with the slogan 'Dress safely unless you have skin like leather'. This appeared in a range of venues, including the back of buses, however, little information is provided to Australian riders regarding the likely level of protection provided by different brands and types of protective clothing and Australian manufacturers and importers are not subject to any mandatory standards in relation to protective clothing except for helmets. For these reasons, a star rating scheme for motorcycle protective clothing has been proposed to provide consumers with access to information about some of the key safety characteristics of protective clothing, which they may then use in making purchasing decisions [10].

A number of recommendations are made for road safety stakeholders to address the issue of vulnerability to injury, these include:

- linking to, or adaptation of protective clothing promotional campaigns;

- the promotion of the need for development and provision of information on what constitutes effective protective clothing; and
- the promotion of the need for protective clothing to scooter riders.

More widespread uptake of the following programs by motorcycle clubs and other local organisations is recommended:

- 'what to do post crash' courses, including securing the scene and motorcycle specific first aid courses;
- encourage the appointment of a first aid officer (as well as ride leader and tail end person) on group rides; and
- the promotion of protective clothing or establishment of protective clothing requirements for club rides.

Programs addressing road surface and environmental hazards

As with instability and braking difficulties, road surface and environmental hazards are issues not generally tackled by small programs, rather they are primarily run by local and state government road engineering departments. These departments are responsible for design, and oversee the building and maintenance of most road systems. Private contractors also design, build and sometimes maintain roads in areas of residential or industrial developments, however, they must meet specifications set out by government regulation. The number of initiatives undertaken by government agencies is often limited by financial constraints. Re-engineering and re-building intersections is one way of addressing the safety issues for many situations, however, this can be very costly.

The initial design of roads and road systems can play a very important role in this safety area. Design regulations have the ability to affect all new roads, though maintenance programs generally target specific sites only. The re-engineering of problematic intersections sometimes occurs only when a problem has already arisen for motorcyclists. The VicRoads 'Motorcycle Blackspot Program' targeted loss-of-control crashes, intersection crashes and long routes with high numbers of motorcycle crashes and was successful in reducing motorcycle casualty crashes by 38% at the first 51 sites treated [11].

Local councils and state road agencies operate road hazard reporting programs for all road users and these are sometimes promoted to motorcyclists. Several motorcycle organisations operate motorcycle-specific hazard reporting systems and particular programs to identify high risk intersections and roundabouts have been developed by state and local government and local organisations in some rural areas.

Occasionally programs are implemented that do not require a large engineering or re-engineering effort, rather, they are small interventions that alter the road surface or surrounds in some way. There is potential for these types of programs to be effective particularly considering their relatively low costs.

However, some of these programs have not been tested before, and some can potentially have a negative effect on safety.

Given the issue of road surface and environmental hazards cannot be directly addressed by community programs, it is recommended that motorcycle clubs and other local organisations encourage reporting of hazardous locations and areas requiring treatments to the relevant authority. Recommended programs for road safety stakeholders to reduce road surface and environmental hazards include the following:

- educate road managers on motorcycle-friendly road design and maintenance practices
- identify and treat motorcycle blackspots
- establish and promote a road hazard reporting line
- undertake motorcycle-oriented road safety audits

Programs addressing risk taking

Of the programs that address risk taking, alcohol use along with excessive speed are areas addressed more often than issues such as drug use, un-helmeted riding or other risk taking behaviours such as deliberately not following the road rules.

Most initiatives addressing risk taking among motorcyclists are supported by State Government agencies and run in association with local groups. Although only a small number of programs specifically addressing risk taking were identified, almost half of these utilise local police enforcement measures combined with awareness information to tackle this issue. These were generally targeted at known, specific motorcycle routes. Given that almost half of risk taking programs utilise local resources, are undertaken in shorter time frames, are of smaller scope and less well known, a larger proportion may exist than what is reported in these results. However, the results show overall, even when taking mixed programs into consideration, the issue of risk taking is addressed less than any other topic, second only to instability and braking difficulties. Further, while local programs have many advantages, they do not have as wide a reach as larger initiatives.

Another form of innovative program was undertaken by the TAC and included the use of the free breathalysers located at many clubs and facilities at the Grand Prix venue in Victoria. The Queensland Police Service conduct a variety of enforcement initiatives aimed at improving the safety of motorcyclists. A number of specifically targeted enforcement operations have been undertaken in the South East Queensland region along designated popular motorcycle routes.

About half of the risk taking programs identified were advertising campaigns. The RTA and the Motor Accident Authority (MAA) and in consultation with the Motorcycle Council of NSW conducted an extensive motorcycle safety public education campaign targeting a number of topics which included marketing such as posters containing the message 'Drinking and riding don't mix'. A number of forms of delivery were used increasing the exposure of motorcyclist and other road users to the message.

Few programs target non-use of helmets. This may be due to the high compliance with helmet wearing in Australia. There is, however, information available which promotes the use of helmets. Most often this information is in the form of internet recourse through state government road safety agencies.

Since this issue requires more attention, the following programs are recommended for road safety stakeholders to reduce risk taking:

- linking to, or adaptation of drink riding campaigns undertaken by government agencies;
- enforcement activities to detect unlicensed and unregistered vehicles; and
- randomly scheduled, sustainable enforcement on popular motorcycle routes.

Recommended programs for motorcycle clubs and other local organisations include:

- setting alcohol guidelines for club rides;
- incorporating measures to minimise fatigue on club rides; and
- drink riding promotional material in hotels and other venues frequented by riders.

Programs addressing instability and braking difficulties

Some of the approaches to the issue of instability and braking difficulties, such as improving vehicle design, need to be addressed by manufacturers and are outside the scope of smaller programs. Nevertheless, pre-licence and some post-licence training attempt to cover some issues of instability and braking difficulties. Often, the skills required to address these issues are not covered in depth. Those courses that focus on hazard perception and those which bring attention to the limitations of motorcycles in terms of stability and braking, and provide practical countermeasures are useful programs. Those courses which provide advanced training without addressing these components are likely to advance overconfidence in their students without providing them a balance of skills and defensive riding/ hazard perception techniques. Most motorcycle education and training programs are designed for traditional motorcycles, rather than scooters and mopeds, and the specific instability and braking issues of these vehicles are generally not addressed. There are very few programs which actively provide accurate information and promote the purchase of safer designed motorcycles. Some rallies and rides also address braking issues.

Given there are currently few programs which target the issue of instability and braking, it is recommended that the following type of programs be developed:

- hazard perception and emergency braking programs (these should be included in motorcycle training)
- programs promoting purchase of motorcycles with better braking technology (such as ABS or linked braking systems) where it is available
- programs promoting better motorcycle maintenance.

Limitations of existing programs

In collecting and examining motorcycle safety programs from across Australia and New Zealand, a range of limitations of existing programs were identified. Many current initiatives lack collaboration between state road safety agencies, local community groups and rider groups. Collaboration increases the potential for success with greater sharing of information to ensure more accurate messages are disseminated. Collaboration also provides a greater opportunity to build rapport between motorcycle riders and those who design and implement motorcycle safety programs.

Programs run in local communities can be a very effective method to address local safety issues. Initiatives run by state and federal agencies generally do not adapt the message and delivery of a program to suit a local issue. This makes local programs very important to improving motorcycle safety. However, local community run programs do not have as many resources as state and federal programs and therefore, some of these local programs do not appear to be well coordinated. Although their safety message is often accurate and relevant to a local problem, the program may not be delivered in such a way that the safety message effectively reaches the target group. Sometimes, inaccurate information is produced, and when this does occur, there are fewer checks and balances made before the message is delivered.

Two limitations of statewide programs delivered by Government agencies were identified. Some programs have inadequate consultation with rider groups that can result in a lack of acceptance of materials and programs that are developed. Delivery of material, or the message, is sometimes undertaken by a method that appears to be cheapest but may not reach the target audience. For example, sending brochures to registered owners of motorcycles when it is new licence holders that are the target.

Conclusions and Recommendations

Most of the programs examined in this research had only limited (or no) process evaluation available and very few had an outcome evaluation, making it very difficult to identify which programs have been beneficial. This is an unfortunate characteristic shared by larger-scale motorcycle safety programs both in Australasia and internationally [7].

While unequivocal conclusions cannot be drawn regarding what programs are beneficial, it is recommended that structured guidance material or guidance packages be developed and made available for use by all groups or organisations developing future motorcycle safety initiatives. The key components of these packages should be as follows:

- The packages would provide accurate motorcycle safety facts.
- Road safety authorities in each jurisdiction should be the organisations that distribute the packages as official government guidance material.
- The packages should include information which would guide designers in their thinking about the possible wider effects of the program, the possible negative and positive implications of implementation at the design stage and the wider effects once the program is in operation.
- The packages should provide advice on the best ways to deliver the information and run the program.
- The packages should encourage collaboration and consultation with other groups and government organisations in order that
 - o organisations know what others are doing;
 - o programs do not compete with each other; and
 - o the overarching road safety government bodies can better identify areas in need, areas which already have programs in place and can allocate safety resources more efficiently and effectively.
- Packages should provide material in a way such that groups can choose what might best work for them in terms of the specific motorcycle issues to their area and the practicalities of implementing a successful program in that area.
- The guidance packages should address each of factors that have been identified as contributing to the over-representation of motorcycles in serious crashes [8].

To facilitate dissemination and acceptance of programs, there is a need to ensure that materials are developed in consultation with representatives of motorcycle organisations.

Acknowledgements

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Daytime Running Lights for Motorcycles – an Idea and Research Proposal

By Michael Paine

Vehicle Design and Research Pty Ltd

By now you have probably noticed that the headlight units of new Audi cars on Australian roads have two strips of bright white lights illuminated during the daytime. These are daytime running lights (DRLs). The European Commission has decided to require dedicated white DRLs on new cars in Europe from 2011 and Audi has introduced them well ahead of the deadline.

Since 1997 DRLs have been fitted to all General Motors cars in the USA and they have been mandatory on Canadian vehicles since 1989.



Holden Special Vehicles is now advertising the safety benefits of DRLs that are standard on the sporty E2 Commodore. These comply with Australian Design Rule 76 for optional DRLs.

In 2003 I conducted research on DRLs for the NRMA and was surprised to find how effective they would be in Australian conditions. This research included analysis of various types of vehicle lights for possible use as DRLs and referred to photometric theory, traffic signals research and road design practices. That same year Paul Thompson from General Motors published an SAE paper on the change in crash rates of General Motors models after they were fitted with DRLs. That study confirmed my own photometric analysis and showed that DRL effectiveness is correlated with lamp signal range (see chart below). Importantly it found a noticeable positive effect with bright yellow turn signal DRLs that are fitted to about half of the GM cars.

It can be seen that the GM research also supported my finding that low-beam headlights perform marginally as DRLs under most daylight conditions. To prevent glare at night the regulations set a maximum headlight intensity of 437 candela in the direction of oncoming motorists. On a bright day headlights at this maximum have a signal range of about 100m, which is less than the recommended minimum road design sight distance for an intersection on a 60km/h road. This helps to explain the so-called latitude effect, where early studies of the daytime use of low-beam headlights found stronger benefits in high-latitude countries like Norway.

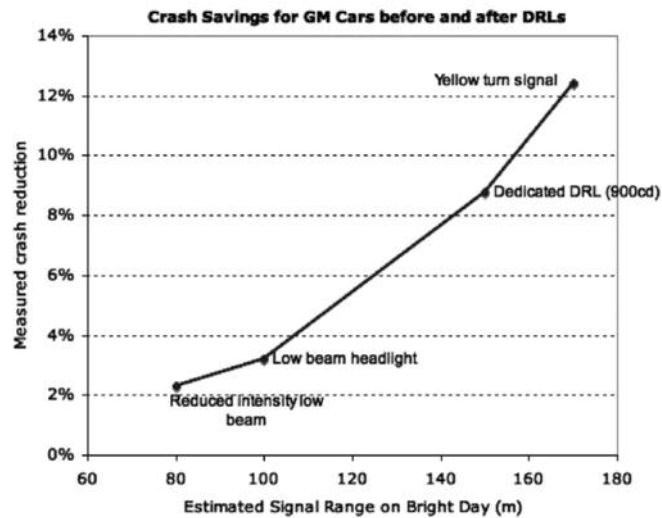


The same marginal performance can be expected from low beam headlights on motorcycles. Much brighter lights are needed to make motorcycles stand out under most daylight conditions.

Bright Yellow Turn-Signal DRLs

There has been relatively little work on motorcycle DRLs in recent years. Based on the GM research findings, in 2005 I co-wrote a paper recommending that bright yellow turn signals (luminous intensity about 1000cd) be considered for use as DRLs on motorcycles. This was published in the proceedings of the 20th International Conference on the Enhanced Safety of Vehicles (ESV). However at that time I was unsuccessful in obtaining research funding to develop this concept further and to conduct some closed-road trials.

Some motorcycle groups in Europe have complained that DRLs on cars will make motorcycles less conspicuous. It seems to me the obvious answer is to fit well-designed DRLs to motorcycles. This year the BAST road research organisation in Germany has been trialling some possible DRL systems for



motorcycles but, unfortunately, they did not include turn signal DRLs in their on-road trials.

It is acknowledged that bright yellow turn-signal DRLs on motorcycles would be novel in Europe (and Australia) and it would take a little time for motorists to understand their meaning. However, they would quickly come to understand that two yellow lights meant that a motorcycle was approaching and that speeds and distances needed to be judged differently to cars (because the motorcycle lights are closer together). I do not agree with the argument that car drivers would take greater risks if they know the approaching vehicle is a motorcycle - motorcyclists are much better off if the other motorist knows they are different.

Another major advantage of turn-signal DRLs is that the direction of turn is unambiguous at a much larger range. With a single turn signal that, on a motorcycle, is necessarily close to the centreline of the vehicle the direction of turn may not be evident until the motorcycle is quite close. With turn signal DRLs (as with GM cars) one light stays on and so the flashing

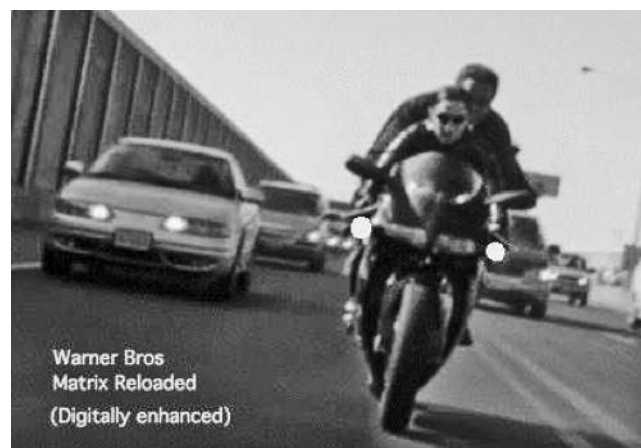
of the other light instantly indicates the direction of turn. Added to this is the fact that most current motorcycle turn signals are likely to be near the minimum regulated brightness and have poor signal range on bright days - replacing them with 900cd yellow lights would result in a vast improvement.

Finally, recognising that many motorcyclists and motorcycle manufacturers are loath to fit anything extra on the front of motorcycles, the concept of replacing current turn signals with brighter yellow DRLs would be easier to “sell” to these groups than fitting additional lights.

The latest designs of dedicated DRLs are very promising and, like the Audi cars, use energy-efficient light emitting diodes (LEDs).

Conclusion

There exists a unique opportunity to improve motorcycle conspicuity through well-designed DRLs. It is recommended that the potential for bright yellow turn-signal DRLs be examined for this purpose.



Peer Reviewed Papers

Overview of Motorcycle Crash Fatalities Involving Road Safety Barriers

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Abstract

There were 238 motorcycle-related fatalities in Australia during 2006, the highest number recorded in over 15 years. Similar increases are being noted in New Zealand where 38 motorcyclists were killed in 2006. Previous research indicates around 8% of NSW motorcycle fatalities involve a roadside barrier. No studies have been done for all of Australia.

Many myths still pervade concerning how injuries occur when a motorcycle strikes a roadside barrier. The main reason is that there have been relatively few recent real world studies of such crashes where "in depth" detailed analysis of the factors leading up to the crash and the injury mechanisms have been thoroughly investigated. Physics dictates that a rider/pillion passenger travelling at speeds at around 60 km/h or more impacting a crash barrier is at a very high risk of a fatal injury, regardless of whether the barrier is concrete, steel or wire rope. Obviously the human body is not designed for such high severity impacts, in the absence of any additional safe system components.

This paper presents some preliminary findings from a major research project currently underway at UNSW's Injury Risk Management Research Centre and funded by a consortium comprised of road authorities, insurers and a consumer group. Statistical characteristics from an investigation of motorcycle

fatal crashes for the years 2001 to 2006 extracted from the National Coroners Information System (NCIS), are presented. The issues of survivability and motorcycle rider injury reduction strategies are also discussed and observations concerning typical crash scenarios are provided.

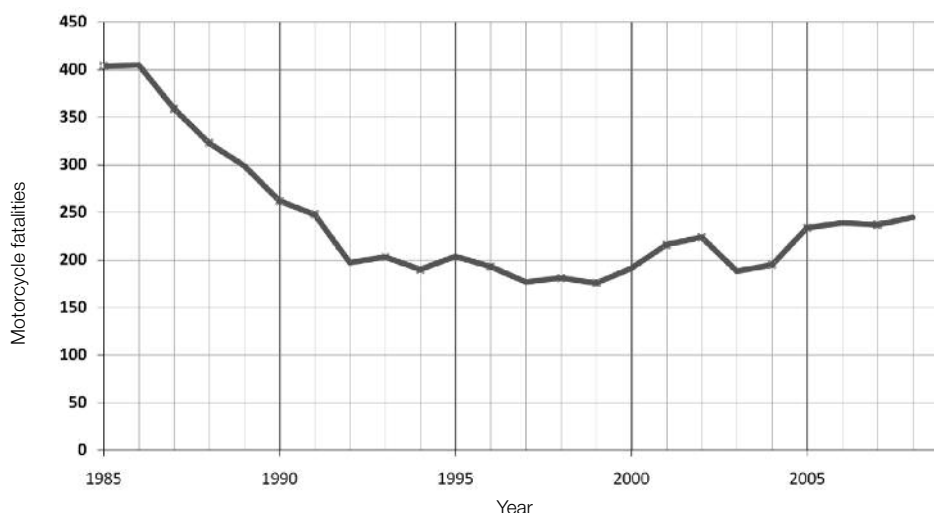
Keywords

Motorcycle Crashes, Roadside Barriers, Wire Rope, W-beam

Introduction

Motorcycle fatalities in Australia have been rising over the past decade as shown in Figure 1. They are increasing at an average of 5.7% per annum [1]. Of particular alarm is the rise of single vehicle motorcycle crashes. They have almost doubled between 2003 and 2008, rising from 61 to 110 deaths [2]. Single vehicle motorcycle crashes include impacts into roadside barriers.

The increased numbers of motorcycle crashes are likely in part to be the result of an increase in motorcycle registrations. Australian Bureau of Statistics (ABS) data of motorcycle registrations shown in Figure 2, indicate the number of motorcycle numbers over the past decade has almost doubled, a trend which can be expected to continue with increases in fuel costs, parking costs, and traffic density.



*Figure 1:
Motorcycle
fatalities [2]*

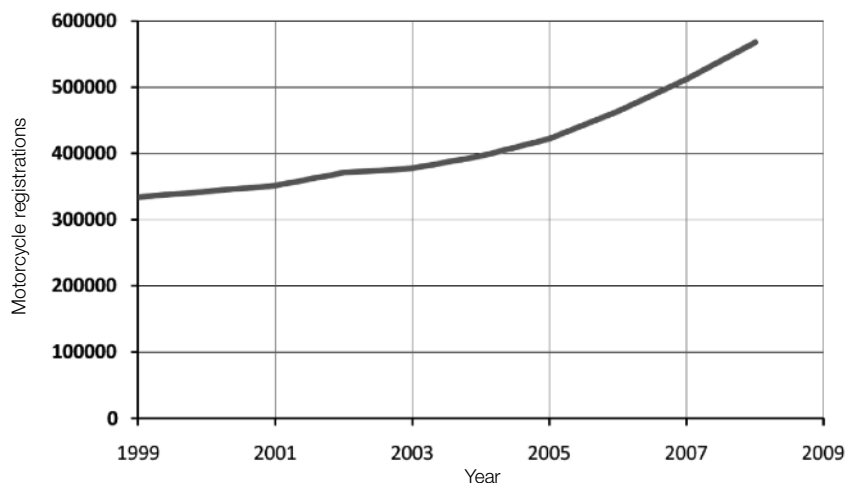


Figure 2:
Motorcycle
registrations
(ABS)

Motorcycles, and more recently scooters, are perceived as a viable alternate mode of transport to cars. Thus, motorcycle safety is likely to become an increasingly important focus for road safety researchers and practitioners, particularly because motorcycle crashes are typically severe. Hence, it is important to understand the factors leading to these crashes and how riders are being injured during the crash in order to mitigate the rise in deaths.

This paper presents preliminary results of a research project investigating motorcycle crashes into roadside safety barriers. The work is being carried out at the Injury Risk Management Research Centre at the University of New South Wales.

Roadside barriers are typically concrete, W-beam, Thrie beam, bridge railings and/or wire-rope. There has been significant concern raised by motorcycle organisations in Australia and overseas regarding the use of wire rope barriers. One of the main objectives of the research described here is to inform such public debate in regards to the safety or otherwise of motorcycle riders and pillioners impacting all forms of roadside barriers.

While there is currently a reasonable amount of knowledge in regards to what is a survivable crash for occupants in cars, trucks and buses that crash into different barrier systems for speeds up to 100 km/h and impact angles up to 25 degrees, there is little credible information concerning survivability of crashes involving motorcyclists. Similarly, statistical information concerning the incidence of rider impacts into roadside barriers may now be dated. Data compiled by Gibson & Benetatos of crashes in 1998-99 [3] showed that 8% of motorcycle fatalities in NSW involve a roadside barrier (excluding roadside hazards such as trees, poles, etc). This data is around ten years old now. No work has been done since then for Australian or New Zealand (NZ) crashes despite the nearly doubling of motorcycle registrations over the past decade.

There have been a number of studies carried out to date to determine factors associated with how Australian motorcyclists are being killed and injured [3, 4, 5, 6, 7, 8]. Two of these studies have focussed on roadside barrier impacts. However, over the past decade a large number of wire-rope barriers have been installed. Hence, further work needs to be carried out to

assess if there have been any changes to the type and nature of injuries occurring with the existing mix of roadside barriers. Moreover, little information concerning causal factors leading to the crash with the barrier has been provided by these previous researchers. While the nature of how the injuries are occurring to riders when impacting a roadside barrier are important, just as important are the casual factors leading up to the crash.

A research team was consequently formed to investigate the causal factors and the injury mechanisms that motorcycle riders and pillioners are subjected to when they impact a roadside barrier. The team is also determining the survivability envelope for motorcyclists crashing into each of the different barrier system types. This survivability envelope will be compared to the survivability envelope for occupants in other vehicles that impact the barriers in later phases of the project.

In summary, the different phases of the project are:

- to gather information and statistics (fatalities & serious injury) for all available motorcycle impacts into any roadside barrier;
- determine the causal factors the led to the crash such as other vehicle involvement, speed, alcohol, fatigue, bad cornering, inexperience, human error, etc;
- determine the biomechanical injury causal mechanism during impact;
- determine survivable and non-survivable impact envelopes for all barrier types;
- reconstruct crashes using currently accepted practices & computer simulation;
- develop and investigate injury mitigation strategies and assess their effectiveness. This may include proposed redesign of some barrier types;
- carry out crash tests demonstrating injury reducing design modifications that can be made to existing barriers

As presented above, the initial phase of this work has focused on accessing detailed information from the Australian National Coroners Information System (NCIS). Ethics approval for the research was obtained from the University of New South Wales

and from the Victorian Department of Justice, to access the National Coronial Information (NCIS) system. Physical case files held by the Coroner's courts were accessed and coded in terms of the details of the crashes that were available. It is also planned to access New Zealand serious injury and fatality data in later phases of the project.

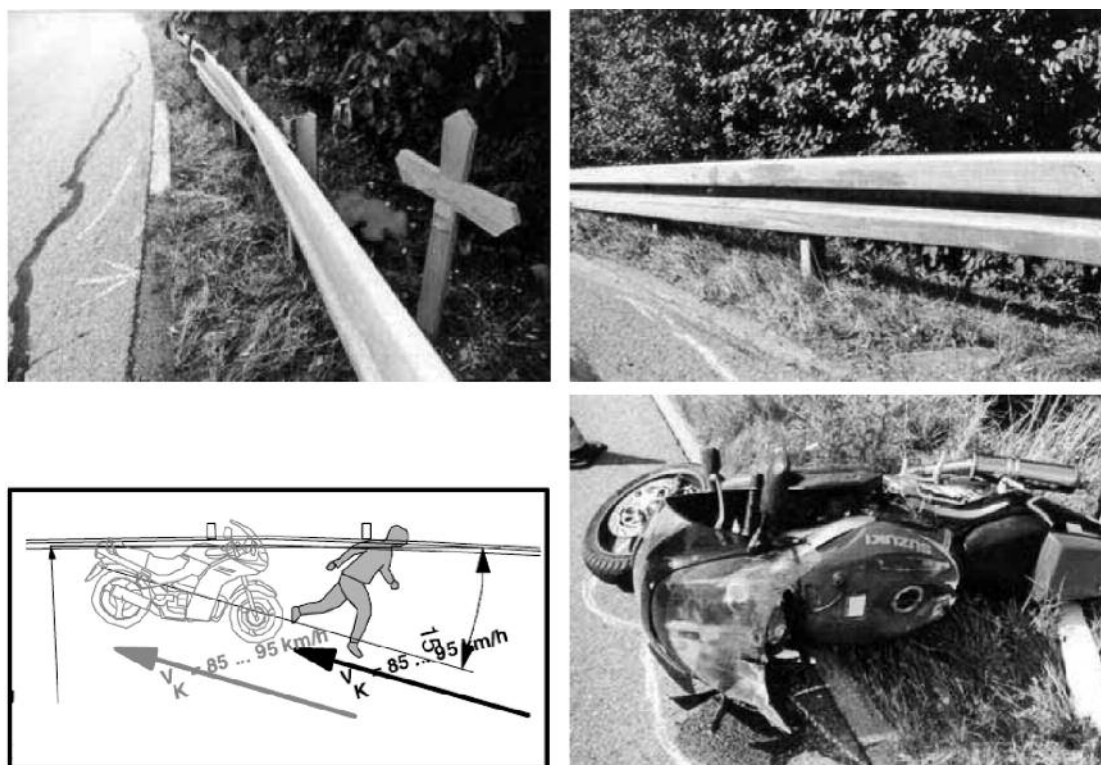
The results presented in this paper focus on this first phase of the project, i.e. background information and some preliminary statistical results.

Background information from other studies

A number of studies have been carried out around the world concerning motorcycle impacts into roadside barriers. Gibson and Benetatos [3] present a good précis of the earlier work by others. The reader is referred to their report for references and summary information concerning those studies. Gibson and Benetatos concluded from their study of 102 (out of 113) motorcycle fatalities in NSW that occurred in 1998 and 1999, that impacts with trees and telegraph poles were more likely to be identified as responsible for the fatal injuries incurred in motorcycle crashes than kerbs/culverts and roadside barriers. They mention little about the main factors that led to the loss of control in the first place, i.e. speeding, fatigue, alcohol, inexperience, other vehicles, etc. These circumstances must also be explored. While they point out a number of issues concerning motorcycle impacts with wire-rope barriers, they did not find any crashes (of the 8 barrier crashes they investigated) that occurred with any wire-rope barrier at that time.

Similarly, Gibson and Benetatos [3] did not provide information with respect to the hazards being protected by the barriers and whether they were equivalent or worse in terms of crash severity and potential injury outcomes than resulted from the barrier. Detailed investigations of the sites where motorcycle barrier crashes occur need to be included into any "in-depth" study. Also little was explored by them in terms of varying the different factors and degrees of these factors leading to the crash, e.g. speed, sobriety, etc, and how they may produce different injury outcomes. For example, García et al [9] indicated in their 'in-depth' crash reconstruction study of 16 run-off-road motorcycle crashes that included 19 injuries and 2 fatalities, that in 90% of the 16 crashes studied, high speed was clearly present. Data related to motorcycles, showed, for instance, that in a 50 km/h speed limit bend, 85% of the motorcycles were travelling at over 100 km/h.

Previous work by Berg et al [10], involving the lead author in collaboration with DEKRA Germany, investigated German fatalities. It was found that 82% of fatalities involved a steel barrier. In 51% of 57 cases analysed the motorcycle impacted the barrier while riding in an upright position. However, 45% occurred where the motorcycle slid on its side on the road surface and then struck the barrier as shown in Figure 3. Berg et al [10] carried out a number of upright impact tests and demonstrated that the rider is either ejected over the barrier or slides along it. Berg et al [10] also demonstrated how certain features of existing German steel barriers can snag a rider. The new system developed by them had a smooth surface along the top of the barrier causing the rider to be thrown over the barrier.



*Figure 3:
German study of
barrier impacts
after Berg et al
[10]*

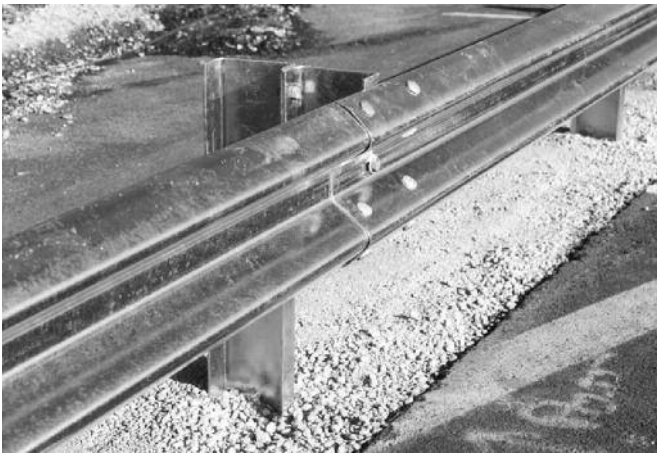


Figure 4: Strong post W-beam barriers with steel posts and blockouts.

The German barriers are different to Australian, New Zealand and US roadside W-beam type barriers. The longitudinal part of the most common steel barrier in Australia is made from a W-beam profile, similar to US guardrail barriers. In Australia, the traditional wooden posts and block outs commonly used in the US, have been replaced with steel C-section posts and block outs as shown in Figure 4. The flanges of the C-section post are turned away from the oncoming traffic. Nevertheless, if a rider were to fall onto or slide along the top of the barrier, the post and block out would likely cause serious injury.

Work on 2005 fatality data carried out in the United States (US) by Gabler [11] from Virginia Tech, indicated that for the first time, US motorcycle riders suffered more fatalities (224) than the passengers of cars (171) or any other single vehicle type involved in a guardrail collision. The total number of US motorcycle fatalities for 2005 is 4553 which means US motorcycle fatalities involving a guardrail barrier represents around 5% of all motorcycle fatalities. In terms of fatalities per registered vehicle, motorcycle riders are dramatically overrepresented in the number of fatalities resulting from guardrail impacts. US motorcycles comprise only 2% of the vehicle fleet impacting guardrail, but account for 42% of all fatalities resulting from guardrail collisions.

The German and US studies show that steel roadside barriers appear to be a concern both in the US and Europe.

The research question that has arisen as a result of recent motorcyclists' concerns regarding installation of wire-rope barriers is, what barrier type is particularly hazardous and associated with the majority of Australian and New Zealand fatalities. Gibson and Benetatos [3] only identified one concrete barrier impact resulting in a fatality from the 8 barrier impacts they analysed. They identified the W-beam barrier as hazardous and essentially speculated what may occur with wire-rope barriers. In summary, their study had too few barrier impacts to be able to reach any firm conclusions concerning other barrier types such as concrete and wire-rope barriers. Similarly, no Australian study has identified what proportion of barrier impacts are riders striking the barrier sliding or in an upright manner, nor identified at what speed and angle the impact occurs at with reasonable certainty. The issue of whether a motorcyclist strikes the barrier upright or slides into it is particularly relevant. If the motorcyclist is being thrown over the barrier protecting the hazard, then it possibly becomes irrelevant what barrier the motorcycle strikes depending on the nature of hazard being protected.

Some recent work concerning the effectiveness of wire-rope barriers has also been carried out in Sweden. Around 1,800 km of wire-rope safety barrier systems have been installed in Sweden. A study by the Swedish National Road and Transport Research Institute (VTI) to evaluate the in-service performance of this road safety barrier type was published in January 2009. It showed that this barrier system significantly reduces road trauma [12]. The evaluation covered 470 km of what the Swedish researchers called "collision-free" expressways of which 336 km have a speed limit of 110 km/h. These are also sometimes referred to as 2+1 roads.

Sweden's 2+1 roads are a category of three-lane road, consisting of two lanes in one direction and one lane in the other, alternating every few kilometres, and separated with a steel wire-rope barrier. Traditional roads of at least 13 metres width can be converted to 2+1 roads. Figure 5 shows a picture of a Swedish 2+1 road.

The evaluation also examined data from 1,275 km of 2+2 roads of which 400 km had a posted speed limit of 100 km/h. A 2+2 road is a specific type of dual-carriageway built in Sweden, consisting of two lanes in each direction separated by a steel wire-rope barrier. These roads do not have hard shoulders.



Figure 5:

*Swedish 2+1 road
[source: reproduced
with kind permission
from Torsten Bergh of
a VTI Powerpoint
presentation to US
AFB 20 Roadside
Safety Barrier
committee in San
Antonio, June 2009]*

The Swedish report [12] found that compared to normal 13 metre wide roads and expressways, 2+1 and 2+2 roads with a speed limit set at 110 km/h showed an overall reduction in fatalities and serious injuries of about 57% and 39% respectively. For the roads with a posted speed limit of 90 km/h, the fatalities and serious injuries were reduced by 62% and 63% on the 2+1 and 2+2 road types, respectively.

The Swedish study also looked into the road safety outcome of the 2+1 roads for motorcyclists. This was in response to complaints registered by motorcyclists concerning the safety of 2+1 roads. Fatal and seriously injured (FSI) motorcyclists were found to constitute 7.8% of the total FSI's for this road type being slightly lower than the Swedish nationwide proportion of 9.3%. However, 9 motorcycle fatalities were reported out of 56 (16.1%) which according to Carlson [12] is slightly higher than the national Swedish average of 11.5%. Nevertheless, when compared to standard 13 metre wide roads (without a wire-rope median barrier) and accounting for the mileage covered by motorcyclists, the 2+1 road type showed a reduced number of killed or seriously injured motorcyclists (65-70%). Carlson points out that even when the mileage travelled by motorcyclists was reduced significantly, the 2+1 road type showed a reduction of 32% to 35% in the number of killed or serious injured motorcyclists.

Similarly, several regions of the United States of America have more recently installed wire-rope safety barrier systems. A report published by the state of North Carolina by Lynch [13] shows that between 1994 and 1997, 97 people were killed on North Carolina freeways in cross median crashes. This study showed that cross median crashes constituted only 5% of all freeway crashes but they accounted for 20% of the fatalities and 13% of severe injuries on freeways. Further, this report showed that cross median crashes on North Carolina freeways were difficult to characterise as they did not occur on any particular day, season, or time of day. A case study was undertaken to gauge the effectiveness of median wire rope barriers on a section of freeway in North Carolina. After 30 months, it was reported that average daily traffic had increased from 90,000 vehicles per day to 120,000 vehicles per day. Prior to the installation of the wire-rope safety barrier, the section of highway being monitored was experiencing an average of one fatality and ten (10) cross median serious injuries per year. During the trial period, of the 118 crashes recorded by the police where vehicles hit the wire-rope safety barrier, only 2 involved serious injuries. It was also reported that one of the injured drivers was travelling at 85 miles per hour (approximately 136 km/h) while the posted speed limit was 65/70 miles per hour (approximately 104/113 km/h). Overall, the trial was deemed a success as no fatality was recorded and as a result median wire-rope safety barriers were progressively installed on more freeways.

Further data published recently by South Carolina Department of Transport (SCDOT) [14] has shown that road fatalities have

reduced on highways fitted with wire-rope median safety barrier when compared to the number of fatalities on the same road prior to barrier installation. Figure 6 shows that fatal crashes were rising before South Carolina Department of Transport (SCDOT) instituted the safety improvement program which encompassed installing wire-rope median barriers from October 2000. The data in Figure 6 only refers to fatalities occurring on South Carolina highways involving an errant vehicle crossing the median strip and colliding with another vehicle. It appears that following the installation of the wire rope barrier system, the number of fatal crashes dropped dramatically.

Other regions of the USA such as the Washington State, have reported favourable performance of wire-rope safety barrier systems. Data collected in Washington State between 1997 and 2003 (the installation dates varied between 1.75 years to 5 years) showed that the installation of wire-rope safety barrier systems was cost effective. A 2004 report by McClanahan [15] stated that *"While the accident data shows that the number of accidents increased noticeably, the number of severe accidents (fatal and disabling) decreased significantly"*. Furthermore, only one (1) fatality where the driver was ejected from the vehicle after it rolled was reported.

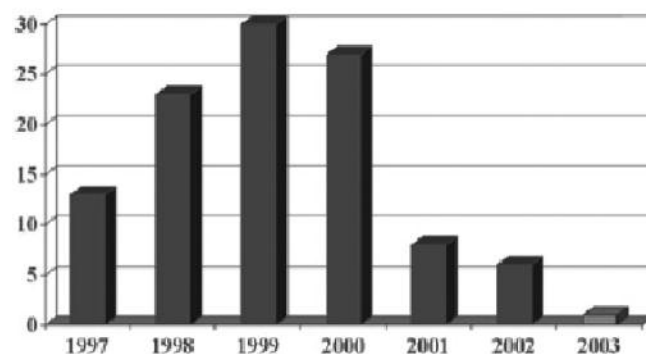


Figure 6: Fatalities on South Carolina Highways

Source: <http://www.tflrc.gov/pubrds/03nov/11.htm> [accessed March 3, 2009]

The Washington state report [15] concluded that the wire-rope safety barrier system has a net benefit to society of US\$420,000 per installed mile (equivalent to approximately US\$261,000 per km). This figure was arrived at after taking into consideration the installation and maintenance costs as well the damage to property as a result of impact with the barrier. These costs were then compared to the benefit accrued to the society based on the fatalities and injuries prevented.

Further information from Washington State indicates that wire-rope safety barrier systems continue to be effective in preventing fatalities and serious injuries wherever they are installed [16]. This report suggests that in 2000, there were eighteen fatal and disabling crashes involving unprotected medians and about 10 miles of cable median barrier installed. By 2006, 135 miles of cable median barrier had been installed

and the number of fatal and disabling collisions had been reduced to five. The report concludes that by installing cable median barriers, fatal and disabling crash rates had reduced by 75%. The barriers were also found to be effective in containing 95% of errant vehicles in the median.

The findings of a study conducted in 2001 on the efficacy of three strand median barriers by the Missouri Department of Transport (MsDOT) was also reported by Donnell and Hughes [17]. This study suggests that three strand wire rope median barriers are effective in preventing cross median fatalities and serious injuries. A 55 km section of Interstate 44 was used to gather data of which 21 km had a three strand wire rope barrier installed and 34 km had a concrete median barrier or no median barrier. Data was gathered over four years (1997 to 2000) with two years used as “before installation” and two years as “after installation”. At locations where the wire rope barrier system was installed, the following was recorded;

- Cross-median crashes were reduced by 33% (33 before, 12 after).
- Fatal cross-median crashes were reduced by 33% (3 before, 1 after).
- Injury cross-median crashes were reduced by 50% (13 before, 6 after).
- Property damage only crashes were reduced by 70% (17 before, 5 after).
- Enter median only crashes were reduced by 45%.
- Enter median and struck wire rope crashes increased by 300%.
- Enter median and struck wire rope injury crashes increased by 150% and
- Enter median and struck wire rope property damage only crashes increased by 400%.

For comparative purposes, sections where wire rope barrier was not installed were analysed. In the “after installation” period, cross-median crashes declined (33 before, 25 after), but the fatal crash frequency increased (2 before, 4 after). In combining injury and property damage only crashes, the frequency was reduced in the after period (21 before, 16 after). The Donnell and Hughes [17] report concluded that after installing a wire rope median barrier, cross median crash severity will decrease, however, the crash frequency will increase. This is similar to the previously reported findings.

A more recent 2007 report by Chandler [18] on the performance of wire rope barriers in the State of Missouri also suggests that wire rope barrier system is effective in preventing cross median crashes and fatalities. On a particular stretch of a highway (Interstate 70) 24 motorists were killed in 2002 as a result of a crash after crossing the median. After installation of a wire rope median barrier, 2 fatalities were registered on the same road. Figure 7 shows the effect of progressively installing more wire rope median barriers on a stretch of Interstate 70. It is clear from Figure 7 that as the length of the highway with wire rope barriers installed increased, there was a corresponding decrease in cross median fatalities.

A relatively old working party report was published by the Australian Transport Safety Bureau (ATSB) in 2000 [19]. The working party consisted of officials from the ATSB and motorcyclist representative groups and was formed after the then Australian federal minister of Transport and Regional Development had directed ATSB to examine motorcyclist concerns about wire rope safety barriers. This report [19] indicated no known report of a fatality as a result of motorcyclist impacting a wire rope barrier in Australia. Similarly, no fatality was reported on Australian roads involving a wire rope barrier system.

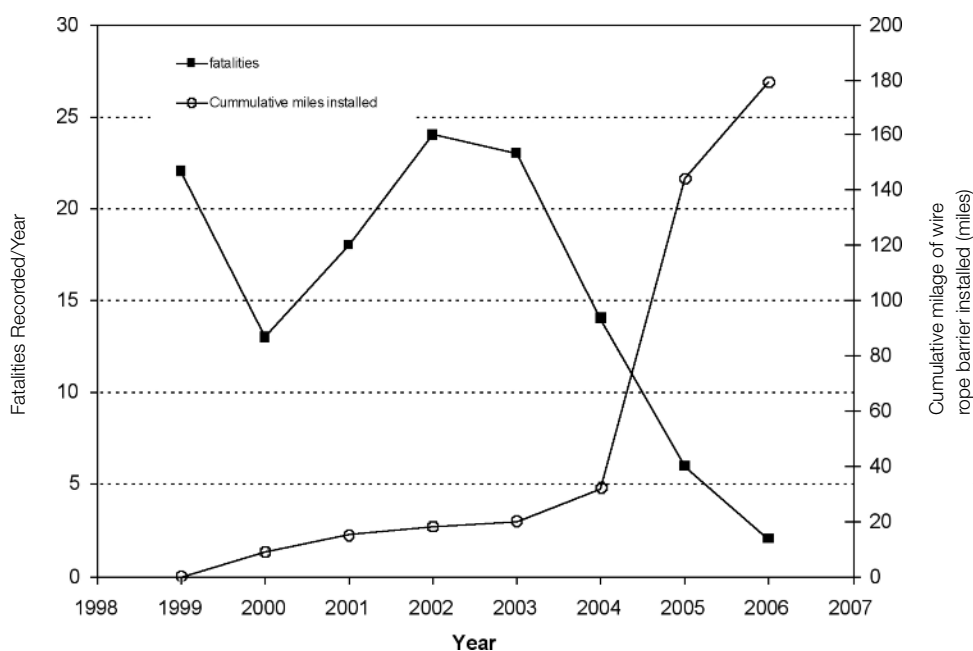


Figure 7:
Cross median fatalities on Interstate 70 in Missouri and the cumulative miles of wire rope median barrier installed (source: after Chandler, 2007 [18]).

The ATSB working party report [19] could not reach a consensus on the wire rope safety barriers. However the stated views of the ATSB were published which indicated that;

- *If wire rope barriers were banned, the substitution with more rigid barrier types could result in a net increase in casualties among car occupants.*
- *If wire rope barriers were banned, the cost of installing alternative treatments would be greater in many cases. This could require an increase in overall road funding levels or a reduction in the number of treated sites. The latter would result in a net increase in road user casualties.*

In regards to crash testing of roadside barriers, Peldschus et al [20] proposed in 2007 a new test for the European Community (ECE) simulating an upright and sliding rider. Considerable research work still needs to be carried out in regards to the viability of the test procedures. For example the sliding test requires a rider wearing a helmet to slide into a barrier head first at 30 degrees at 60 km/h. This is an equivalent “diving” speed of around 30 km/h, i.e. dropping a person upside down on their head into the ground. This may indeed be an overly ambitious requirement when one considers what is required to fracture the neck. The load at which injuries begin to occur is around 6000 N or an impact “equivalent diving speed” of around 2.2 m/s (8 km/h). Catastrophic loading to the neck is around 11 kN or 4.5 m/sec (16 km/h) [21]. This demanding “diving mode” procedure may be an unrealistic requirement that rarely occurs in “real world” motorcycle into roadside barrier crashes. This has yet to be established from “in-depth real world” crash data.

Another issue in regards to the ECE tests is that the procedure requires only upper neck loads be measured in the test dummy. It is well known that subluxation neck fractures may well occur as a result of a diving type of impact similar to what is being proposed in the new standard. Hence lower neck loads should also be measured.

A variety of products have been developed to protect motorcyclists who impact longitudinal barriers. Most of these products, many of which come from Europe, are designed to shield the posts of the steel barrier systems. Padding around posts, whilst useful at low speeds, become quickly ineffective at higher impact speeds (30 km/h or more), analogous to the ineffectiveness of motorcycle helmets to protect against brain trauma and neck fractures at higher impact speeds. Shield fascias, considered useful in terms of reducing the snagging characteristics of some barriers for riders, may result in changing the crash characteristics of the barrier for the other vehicle crashes for which they were certified. Hence, the overall road safety benefit could drop significantly with only a small gain in motorcycle safety. Similarly, proposals to increase the frangibility of posts by drilling holes at the base of the posts may not necessarily increase post frangibility because the inertial mass of the post has not been reduced. Thus, further work needs to be carried out in regards to suitable test procedures and protective systems to ensure that the safety of all road users is considered.

Another concern is the issue of human body vulnerability. Rumar [22] proposed an injury risk curve for pedestrians being struck by an automobile. One could theoretically draw the analogy that a motorcycle rider’s body is equivalent in terms of vulnerability to that of pedestrian’s body. Both road users are unprotected during a crash. Figure 8 shows the Rumar graph. At impact speeds in excess of around 60 km/h, the crash has a very low chance of survivability if the rider strikes an immovable object. Indeed the impact can be presented as being equivalent to jumping off a building hoping one will survive. For example, the well known equation from physics $v = \sqrt{2gh}$ where v is the velocity, g is the earth’s gravitational constant 9.81 m/sec^2 and h the height above the ground, it can be readily shown that: striking a solid object at 30 km/h is equivalent to jumping off the roof of a house, 40 km/h is equivalent to jumping off a 3 story building, 50 km/h is equivalent to jumping off a 5 storey building, and 60 km/h is equivalent to jumping off a 7 story building and hoping you will survive.

All of these issues demonstrate the need for further research in terms of understanding the underpinning physics of the human into structure interaction, basic energy management principles, and overall assessment of injury countermeasure strategies from a broader road safety perspective for all road users. It is evident from all of the above cited publications that a rigorous analysis of Australia motorcycle impacts into roadside safety barriers is still much needed.

Preliminary statistical results

The National Coroners Information System (NCIS) was interrogated for motorcycle crashes involving a roadside safety barrier. NCIS contains information about every reportable death in Australian states and territories. NCIS was created in 2000 by all state and territory governments except Queensland.

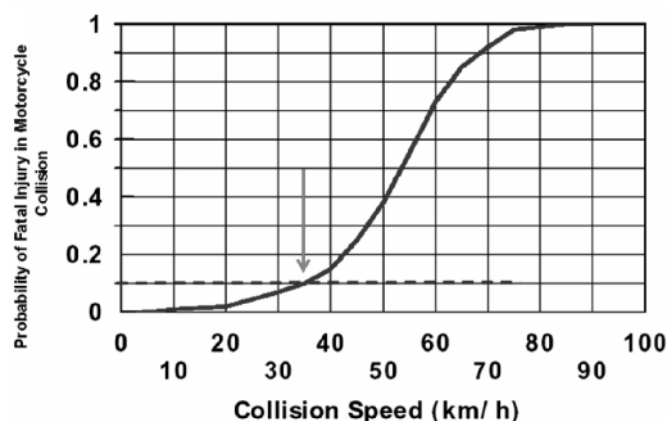
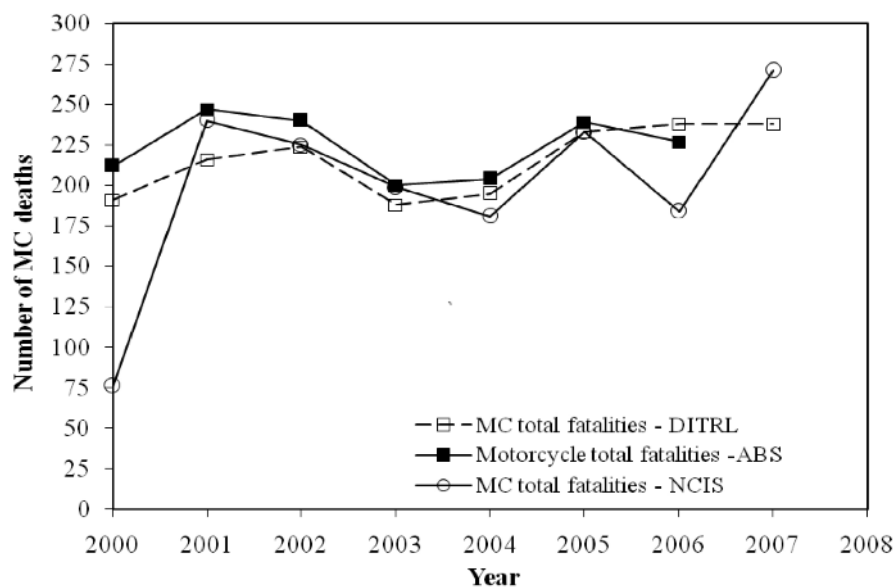


Figure 8:
Probability of a motorcycle fatal crash by collision speed (motorcyclist striking a hard object).



*Figure 9:
Fatalities involving
a motorcycle –
comparison of
different data
sources.*

The system became operational in July 2000. Queensland joined NCIS at the beginning of 2001. The NCIS database is hosted by the Victorian Institute of Forensic Medicine. NCIS is funded by state and territory governments as well as the federal government of Australia. Any results from searching NCIS data needs to bear this history in mind.

The NCIS database query for this study was designed as follows:

- 1) All jurisdictions were searched
- 2) Employment field was left blank
- 3) Time field was left blank
- 4) Query object was chosen as a mechanism
- 5) The mechanism that caused the death was defined as blunt force
- 6) Level 2 of the mechanism was defined as a transport injury event
- 7) Level 3 of the mechanism was defined as motorcyclist/motorcycle rider
- 8) The vehicle details were defined as two wheeled motor vehicle
- 9) The vehicle was further defined as a motorcycle

The database was searched for particulars of the deceased such as the sex, age, date of birth, date of death, location, the counterpart crash vehicle, and any associated police, toxicology and autopsy reports. The automated data search produced a total of 1532 identified fatalities involving a motorcyclist or a pillion passenger for the years 2000 to 2007. These results were transferred to a Microsoft excel spreadsheet and manually categorised. Each death record should have attached to it an initial police, autopsy and toxicology report. Each case also usually has the finding of the cause of death as recorded by the investigating coroner. Further detailed information is usually available where an inquest was held to establish the cause of death.

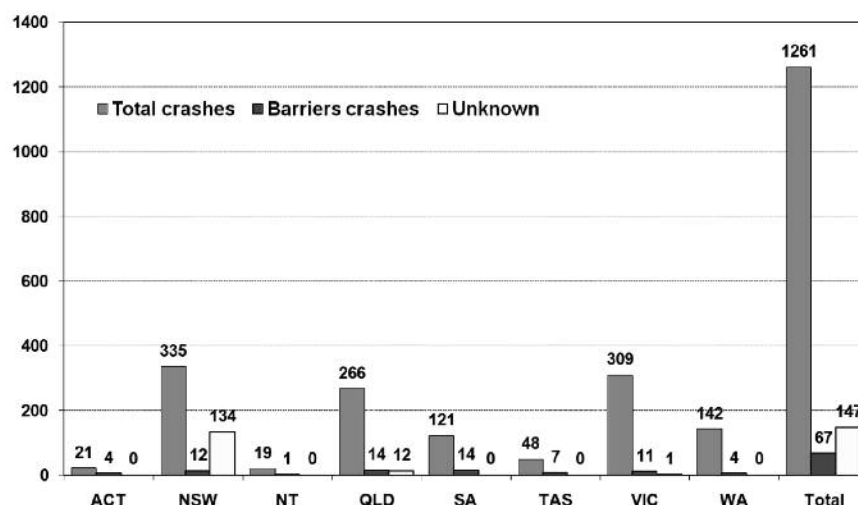
To gauge the reliability of the data obtained, the number of motorcycle deaths identified per annum from NCIS was compared in Figure 9, to the number of motorcycle deaths recorded by the Australian Department of Infrastructure, Transport, Regional development and Local government (DITRL)¹ and the Australian Bureau of Statistics (ABS). Data from the ABS was available only up to 2006. Figure 9 shows that the data extracted from NCIS, DITRL and ABS were generally in agreement. However, the data from the ABS consistently reports a slightly higher number of deaths than that from NCIS or DITRL.

There are a number of possible reasons why motorcycle fatality numbers differ between data sources. This includes issues such as coding errors, missing data and variations in the definition of a road fatality. For example, ABS data refers to underlying cause of death which may include a long period of complicating illnesses as a result of injury sustained in a motorcycle crash. The data from all sources is in reasonably close agreement for the years 2001 to 2006. Hence the statistical analyses were restricted to this period.

Once all motorcycle fatality cases from all jurisdictions in Australia were identified for 2001 to 2006, each case was screened manually using the coroner's findings, the initial police, autopsy and toxicology reports, in order to determine whether a roadside barrier was involved in the incident. All motorcycle fatality cases were then categorised into: (a) involving a barrier; (b) not involving a barrier; and (c) undefined cases with insufficient information. The results are shown in Figure 10.

In total 1261 cases of a roadside fatality involving a motorcycle were identified to have occurred in Australia for the period under review. A further 67 cases were positively identified as involving a roadside safety barrier. Unfortunately 147 cases could not be categorised, the majority of which (134 out of 147) occurred in NSW. The NSW NCIS data lacked sufficient

¹ These data were formerly collated by the Australian Transport Safety Bureau, ATSB



*Figure 10:
Motorcycle fatalities
in Australia (2001
to 2006) based on
NCIS data*

information to identify how the crash occurred. For example, thirty four cases or nearly 10% of the total motorcycle fatality cases in NSW (34 out of 335) did not provide any details other than the gender and age of the deceased. Queensland also had a number of cases which could not be categorised because of insufficient information in the database.

Figure 11 shows that around 5.3% of all motorcycle fatalities are known to involve a roadside barrier. This value is somewhat less than that found by Gibson and Benatatos for NSW data. The 67 motorcycle fatalities identified in Figure 10 involving roadside barriers identified occurred over a 5 year period, translates to an average of around 13 to 14 fatal crashes involving a roadside barrier nationally per year. For NSW, SA and Qld the average was around 3 per year, for Vic around 2 per year and around 1 per year for ACT, Tas and WA. The numbers are quite low in comparison to other modes of injury for motorcyclists such as fixed object impacts (trees, poles, etc) and collisions involving other motor vehicles.

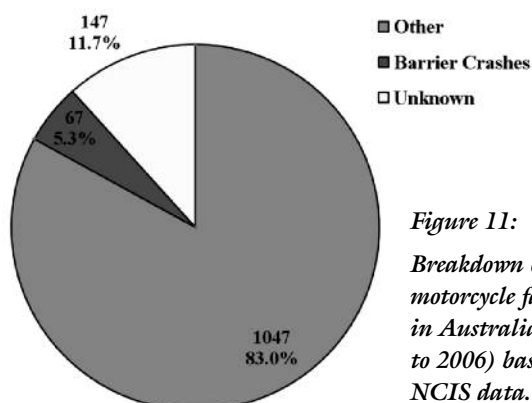
Figure 12 shows motorcyclist fatalities involving a roadside safety barrier segregated according to the type of barrier impacted. Fatalities involving a steel barrier (not wire-rope) appear to be the most dominant. W-beam steel barriers were involved in a large majority of the 54 out of the 67 (80.6%) cases. This was followed by 7 deaths involving a concrete

roadside safety barrier (10.4%). 5 out of the 7 deaths involving a concrete barrier occurred on a raceway. Therefore on public roads only 3.0% of motorcycle fatalities involved a concrete barrier. Wire rope safety barriers were involved in 3 cases (4.5%). Two of the wire-rope cases involved high speed whereas one of the cases could not be properly analysed based on the information so far available.

It should also be pointed out that attempts to identify the 147 unknown motorcycle crash modes are being made. Similarly, the steel barrier type cases will be assessed and further segregated into for example W-beam, Thrie-beam, or steel bridge rails, etc. Hence, the crash distributions shown in Figures 10 to 12 will change as more information is revealed. Suffice to say that W-beam barriers appear to be over represented in the injury data. This is consistent with overseas findings.

An important consideration concerning the information provided in Figure 12 is the exposure of motorcyclists to the different roadside safety barriers. Further information concerning the installed lengths (kms) of each safety barrier type in each state will be considered in order to try to establish fatality rates for each barrier type. However, it should be noted that W-beam roadside safety barriers are used predominantly on curved hilly road sections in areas regularly frequented by motorcycling enthusiasts. Hence, utilising actual installed lengths as a denominator for exposure rates may not reflect the problems concerning roadside barrier type involvement in motorcycle injuries and fatalities. In contrast wire rope barriers are often installed on straight roads and hence may be why they are not struck as often. These issues need to be further investigated.

Detailed data is still being collected and processed at this point in time. Similarly, little work has been completed concerning the impact mechanisms. The results from this work will be presented in future papers as more information and results become available.



*Figure 11:
Breakdown of
motorcycle fatalities
in Australia (2001
to 2006) based on
NCIS data.*

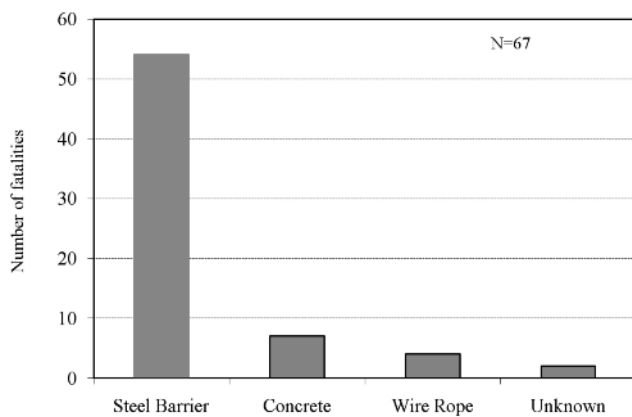


Figure 12: Australian motorcycle fatalities involving a roadside safety barrier segregated according to barrier type impacted (2001 to 2006) - NCIS data

Conclusions

A number of conclusions can be reached in regards to the information and results presented in this paper. They are:

1. Motorcycle fatality data from National Coroners Information System (NCIS) appears to be reliable for the years 2001 to 2006. However a substantial amount of information is missing from NSW and Queensland data making detailed analysis of crash circumstances difficult. Case file follow-up is being conducted.
2. The number of known motorcycle impacts into roadside barriers is low at around 5.3% of all motorcycle fatalities over the five year period 2001 to 2006 for the whole of Australia. This is notably less than the 8% value presented by Gibson and Benetatos for 1998-1999 for NSW data. More recent data obtained after this paper was written, indicates that motorcycle impacts into roadside barriers appears to be still at around 8% for NSW and that motorcycle into barrier crashes may be over represented for this state compared to other states.
3. W-beam steel barriers are over represented in fatal motorcycle crashes into roadside barriers. They appear to be particularly hazardous to motorcycle riders which is consistent with other international research findings.
4. Wire-rope barriers have to date provided a significant benefit to reducing vehicle related crash fatalities in Europe and the USA. It also appears that installation of wire-rope barriers in Sweden has reduced motorcycle fatalities. However it is still unclear what effect these barriers are having on motorcycle fatalities in Australia.
5. Assuming that when a motorcycle rider crashes and impacts an object that is solid relative to the human body, and that the risk of a fatal injury is similar to that for a struck pedestrian, it would appear that survivability of a rider would likely rapidly reduce above body impact speeds of around 40 km/h.

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Motorcycle Rider Protective Apparel Wearing: Observational Study Results from the Brisbane and Canberra Regions

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Abstract

The continued growth in popularity of motorcycling is an area of concern within the road safety domain due to the vulnerability of motorcyclists sustaining injury in the event of a crash. Currently in Australia only motorcycle helmets are mandatory for motorcyclists or pillion to wear and there is no legislative standard for other protective apparel. This paper reports the results obtained from a series of motorcyclists' apparel observational studies undertaken in the Brisbane and Canberra regions. The sites selected for the research were designed to enable the observation of both recreational and commuter riders. The results highlight both similarities and differences in the type of protective apparel worn by motorcyclists and pillion observed across the two regions. Encouragingly, across all the sites the majority of riders were wearing protective apparel on their upper body. However, a lower proportion of riders were observed wearing protective

apparel on their lower body, particularly at the commuter sites in Brisbane. Similarly, the wearing of full face helmets was very high, except at the commuter sites in Brisbane. The generally lower use of protective apparel among commuter riders in Brisbane would appear to reflect both situational factors, such as climate, and the higher proportion of scooters observed at the sites. The implications of these results are discussed and recommendations are made for future research to identify factors that influence the wearing of protective motorcycle apparel.

Introduction

Motorcycle sales and associated motorcycle use is rapidly increasing within Australia. The growing popularity and use of motorcycles is a concern for those in the road safety and injury domains due to the vulnerability of motorcyclists sustaining injury in the event of a crash. Motorcyclists are over-represented in the road injury and fatality statistics. Whilst motorcycles

represent only 3% of the vehicle registrations in Australia, motorcycle riders have five times the risk of being in a fatal crash per registered vehicle [1], and 29 times the risk per kilometre travelled [2].

Due to the exposed design of the motorcycle, in the event of a crash riders are much more likely to come into direct contact with the many hard and abrasive surfaces in the road environment than most other road users. The most effective protection for the rider in the event of a crash is through the use of protective riding apparel, including helmet, jacket, pants, boots and gloves. Previous research has demonstrated that motorcycle riders wearing protective apparel spend less time in hospital and on average return to work earlier than motorcycle riders who do not wear protective apparel [3]. The authors concluded that protective apparel was significantly effective in preventing or reducing approximately 43% of skin injuries and 63% of deep tissue injuries.

Given the safety benefits of protective apparel, it is important to both quantify the extent to which such apparel is worn and to identify the factors that influence its use. In this regard, a number of self-report studies have been undertaken in Australia examining the use of protective apparel [4, 5, 6]. These studies have tended to find that while most riders report wearing protective apparel on their upper body, they are less likely to wear protective pants or boots. In addition, the wearing of protective apparel appears to be less common among non-club riders, pillion riders, and scooter and moped riders [4, 5, 6, 7]. The reported lower wearing of protective apparel by scooter and moped riders is of particular concern, given the recent strong growth in the sales of these types of motorcycles in Australia [7, 8]. It has been suggested that the lower apparel wearing among scooter and moped riders is linked to the greater use of these vehicle types among commuter riders. In this regard, focus group research has suggested that the type of apparel worn by motorcycle riders is influenced by the nature of the ride they are intending to undertake [9, 10]. For example, riders reported a greater preparedness to wear protective apparel on longer rides, particularly those undertaken for recreational reasons. The results also suggested that climatic factors can have a strong influence on the wearing of protective apparel, with some riders reluctant to wear extensive apparel in hot weather.

While self-report studies provide valuable insights into the wearing of protective apparel, the representativeness of the samples and related results remain unclear. For example, the studies cited above included relatively large numbers of club-riders and recreational riders. Consequently, the authors of this paper have embarked on program of observational research to obtain more objective data on the extent of protective apparel wearing in Australia to inform relevant policy-making. A particular focus of this research has been to establish whether there are any systematic differences in the wearing of protective apparel across regions and times of the year, and between recreational and commuter motorcyclists. To date, the authors of have conducted observational studies in the Brisbane [11,12]

and Canberra regions [9]; two areas with differing climatic conditions and socio-demographic characteristics. Accordingly, the aim of this paper is to compare and contrast the findings of these studies, in order to obtain a better understanding of the extent of protective apparel wearing in general, and to identify potential differences in wearing across regions and between commuter and recreational riders and pillions. In addition, while the vast majority of motorcyclists wear helmets in Australia, this research specifically examined the extent to which riders and pillions wear full face helmets given the greater safety benefits of these compared to open-face helmets [13, 14].

Before proceeding, it is important to note that it was beyond the scope of this observational research to assess the quality of the protective apparel worn by riders. Using observational methods, it is only possible to identify whether riders are wearing motorcycle specific 'protective' apparel, leather clothing or some other type of clothing. Moreover, while motorcycle specific apparel may be marketed and sold as protective in nature, the actual level of protection provided in the event of a crash remains unclear. This is because there is currently no legislated standard or rating system in place in Australia to ensure that motorcycle apparel affords the rider the stated, or even appropriate, level of protection [15]. While there is a voluntary set of industry guidelines (developed by Standards Australia), these do not necessarily ensure the quality of motorcycle apparel. Therefore, while this paper uses the term 'protective' to describe motorcycle specific apparel that is worn for this or other purposes by riders, no assumptions should be made about the actual level of protection provided by such clothing.

Method

The methodology used for the observations involved researchers observing motorcyclists travelling or stopping along predetermined popular commuter and recreational routes in both the Canberra and Brisbane regions. Commuter and recreational observation sites were chosen after consultation with government agencies and with local motorcyclists recruited to assist in the research. This was undertaken to determine the routes commonly frequented by motorcyclists. In order for a location to be considered suitable the location was also required to meet the following criteria:

- be positioned along a route that was frequented by motorcyclists;
- be in a place where motorcyclists either slowed down sufficiently or stopped to enable observations to be undertaken; and
- be considered suitable in relation to the safety of the researchers/observers following a risk assessment

The observations were usually undertaken in teams comprising two or three researchers who were all active motorcyclists and therefore familiar with motorcycle apparel. The researchers were trained in observation methodology by one of the authors and each researcher was responsible for observing a particular aspect

of the apparel observations. For instance, one researcher from each team was responsible for observing either the upper body apparel, lower body apparel, or type of motorcycle being ridden. A standardised data recording template was utilised to both simplify and enhance the reliability of the observations.

Observations were recorded as motorcyclists slowed down or became stationary at predetermined observation points along the routes. For example, along recreational routes particularly slow corners or coffee stop locations were used, while the commuter observations were primarily undertaken at the entrance to parking facilities. Among the data that was collected for each motorcycle (and pillion if present) were:

- type of motorcycle - including brand, model and capacity;
- upper body apparel - including gloves, type of jacket or clothing worn on the upper trunk section of the body, and open or closed face helmet; and
- lower body apparel - including the type of clothing worn on the leg section of the body, and the type of footwear worn.

In terms of the apparel worn, the researchers specifically recorded whether the upper and lower body clothing observed was made of leather, was of a motorcycle-specific 'protective' nature, or was casual or work wear type clothing (and therefore not designed or marketed as motorcyclist protective apparel). Consistent with the aims of the study, wet weather clothing was not recorded as motorcycle specific 'protective' apparel but as 'other' clothing.

The times and locations of the observations were designed to facilitate the observation of both commuter and recreational riders and included both weekend and weekday times. Commuter site observations were undertaken between the hours of 7.00am to 9.30am and 3.00pm to 6.00pm. At recreational sites observations were undertaken between the hours of 8.30am to 2.00pm.

The Brisbane recreational site observations were conducted at two different times of the year: i) 29 - 30 October 2005 (which featured maximum daily temperatures of 28.2o and 28.6o C, respectively); and 26 February 2006 (which featured a maximum daily temperature of 29.1o). While there was little difference between the October and February observation days in terms of the maximum daily temperature, it was decided to keep these two sets of observations separate due to potential seasonal or other influences, including the possible effects of organised group rides.

In contrast, the Brisbane commuter observations and all of the Canberra observations were drawn from only one period of time. The Brisbane commuter site observations were conducted on 20 - 21 February 2008 (which featured maximum daily temperatures of 29.5o and 31.9o C, respectively). The Canberra recreational site observations were conducted on 28 - 29 April 2007 (which featured maximum daily temperatures of 17.8o and 18.3o C, respectively), while the commuter observations were conducted on 30 April and 1 May 2007 (and featured maximum daily temperatures of 18.3 o and 18.8o C, respectively).

Results

Table 1 reports the results of the observations for motorcycle riders at both the commuter and recreational sites in the Canberra and Brisbane regions. As noted above, the observations at the Brisbane recreational sites were not pooled, because they were conducted at two different times of the year. For all other sites, the observations are pooled across the relevant days.

At both the Canberra and Brisbane sites, the most frequent type of motorcycle observed was the sports type. However, a relatively high proportion of the motorcycles observed at the Brisbane commuter sites were scooters (44%), confirming the popularity of these vehicles in city precincts. Consistent with these findings, the majority of the motorcycles observed were larger in engine size (eg. 750 cc or above), except in Brisbane where 53% of those observed were 250 cc or less.

In regard to helmet use, the large majority of the riders were observed wearing full face helmets. Once again, the exception to this finding was at the Brisbane commuter sites where only 59% of the riders were observed wearing full face helmets. To examine this issue more closely, Table 2 provides a breakdown of the Brisbane commuter site results by type of motorcycle. As can be seen, the lower use of full face helmets was mainly due to the higher proportion of scooter riders at these sites. Indeed, over three-quarters (77%) of the scooter riders observed at the Brisbane commuter sites were wearing open face helmets.

As shown in Table 1, the vast majority of both the recreational (99%) and commuter riders (96%) in Canberra were observed wearing full gloves. In contrast, the proportion wearing full gloves in Brisbane was lower in general, and particularly so at the commuter sites where 50% of the riders were observed wearing no gloves at all. As shown in Table 2, this result again reflects the relatively large proportion (70%) of scooter riders at the Brisbane recreational sites who were not wearing gloves.

Overall, a relatively large proportion of riders were observed wearing protective apparel on their upper body. In Canberra, 92% of those observed at the recreational sites and 86% of those observed at commuter sites were wearing a leather jacket or a motorcycle specific protective jacket (see Table 1). Similarly, 83% and 89% of the riders observed at the Brisbane recreational sites were wearing a leather or motorcycle specific protective jacket. Once again, the poorest performing area was the Brisbane commuter sites where only 53% of the riders were observed wearing protective apparel on their upper body. As shown in Table 2, the wearing of upper body protective apparel was again lowest among the scooter riders at the Brisbane recreational sites, with only 24% wearing a leather or motorcycle specific jacket.

In addition, some interesting differences emerged between the Canberra and Brisbane sites in terms of the upper body apparel worn by riders. For example, the wearing of motorcycle specific protective jackets was much more common at the Canberra

Table 1: Results of motorcycle rider observations in Canberra and Brisbane

	Canberra		Brisbane		
	April/May 2007 Recreational N = 116	April /May 2007 Commuter N = 272	October 2005 Recreational N = 118	February 2006 Recreational N = 144	February 2008 Commuter N = 262
Motorcycle type					
Sports	52 (45%)	120 (44%)	63 (53%)	77 (54%)	118 (45%)
Sports tourers	36 (31%)	26 (10%)	6 (5%)	16 (11%)	5 (2%)
Cruisers	8 (7%)	35 (13%)	23 (20%)	10 (7%)	18 (7%)
Tourers	7 (6%)	36 (13%)	18 (15%)	27 (19%)	0 (0%)
Off road	5 (4%)	17 (6%)	7 (6%)	6 (4%)	6 (2%)
Scooters	8 (7%)	38 (14%)	1 (1%)	8 (5%)	115 (44%)
Motorcycle size					
1000 cc or more	50 (43%)	79 (29%)	56 (48%)	57 (40%)	29 (11%)
750 - 999 cc	29 (25%)	47 (17%)	38 (32%)	42 (29%)	37 (14%)
251 - 749 cc	29 (25%)	76 (28%)	17 (14%)	26 (18%)	57 (22%)
250 cc or less	8 (7%)	70 (26%)	7 (6%)	19 (13%)	139 (53%)
Helmet					
Full face	111 (96%)	247 (91%)	97 (82%)	134 (93%)	155 (59%)
Open face	5 (4%)	25 (9%)	21 (18%)	10 (7%)	107 (41%)
Gloves					
Full gloves	115 (99%)	261 (96%)	84 (71%)	121 (84%)	126 (48%)
Fingerless gloves	0	8 (3%)	8 (7%)	1 (1%)	5 (2%)
No glove	1 (1%)	3 (1%)	26 (22%)	22 (15%)	131 (50%)
Upper Body					
Leather	23 (20%)	42 (15%)	57 (48%)	69 (48%)	47 (18%)
M/cycle specific	84 (72%)	193 (71%)	41 (35%)	59 (41%)	92 (35%)
Other clothing	9 (8%)	37 (14%)	20 (17%)	16 (11%)	123 (47%)
Lower Body					
Leather	15 (13%)	6 (2%)	16 (14%)	23 (16%)	2 (1%)
M/cycle specific	50 (43%)	87 (32%)	18 (15%)	13 (9%)	6 (2%)
Jeans	45 (39%)	117 (43%)	78 (66%)	103 (71%)	75 (29%)
Other	6 (5%)	62 (23%)	6 (5%)	5 (4%)	179 (68%)
Footwear					
Boots	94 (81%)	136 (50%)	78 (66%)	85 (59%)	39 (15%)
Joggers	13 (11%)	35 (13%)	23 (20%)	22 (15%)	52 (20%)
Other	9 (8%)	101 (37%)	17 (14%)	37 (26%)	171 (65%)

sites than any of the Brisbane sites, while the wearing of leather jackets was more common among the riders observed at the Brisbane recreational sites (see Table 1).

In contrast, the wearing of protective apparel on the lower body was less widespread, particularly among those observed at commuter sites. As shown in Table 1, the highest proportion of riders wearing protective apparel on the lower body was at the Canberra recreational sites, where 56% were wearing either

leather or motorcycle specific pants. However, this proportion fell to 34% for those observed at commuter sites in Canberra and to 25 – 29% for those observed at recreational sites in Brisbane. The lowest wearing rates were at the Brisbane commuter sites where only 3% of riders were wearing lower body protective apparel. More particularly, 68% of the riders at the Brisbane commuter sites were wearing lower body apparel with effectively no protective quality such as trousers, skirts and

Table 2: Results of motorcycle rider observations at Brisbane commuter sites

	Brisbane Commuter Site February 2008				
	Sports N=118	Sports Tourer N= 5	Cruiser N=18	Off Road N=6	Scooter N= 115
Helmet					
Full Face	113 (96%)	4 (80%)	6 (33%)	6 (100%)	27 (23%)
Open face	5 (4%)	1 (20%)	12 (67%)	0	88 (77%)
Gloves					
Full gloves	78 (66%)	3 (60%)	8 (45%)	4 (67%)	34 (29%)
Fingerless gloves	3 (3%)	0	1 (5%)	0	1 (1%)
No glove	37 (32%)	2 (40%)	9 (50%)	2 (33%)	80 (70%)
Upper Body					
Leather	33 (28%)	1 (20%)	7 (39%)	0	5 (4%)
M/cycle specific	54 (46%)	2 (40%)	7 (39%)	5 (83%)	23 (20%)
Other clothing	31 (26%)	2 (40%)	4 (22%)	1 (17%)	87 (76%)
Lower Body					
Leather	2 (2%)	0	0	0	0
M/cycle specific	2 (2%)	2 (40%)	1 (6%)	0	1 (1%)
Jeans	42 (35%)	0	11 (61%)	1 (17%)	21 (18%)
Other	72 (61%)	3 (60%)	6 (33%)	5 (83%)	93 (81%)
Footwear					
Boots	28 (24%)	3 (60%)	5 (28%)	2 (33%)	1 (1%)
Joggers	14 (12%)	1 (20%)	3 (17%)	1 (17%)	33 (29%)
Other	76 (64%)	1 (20%)	10 (55%)	3 (50%)	81 (70%)

other office wear. As shown in Table 2, this finding was common across the majority of the motorcycle types observed at the Brisbane commuter sites, not just the scooter riders.

As shown in Table 1, the majority of riders across all recreational sites in Canberra and Brisbane were wearing boots. The highest proportion was found at the Canberra recreational sites, where 81% of the riders were observed to be wearing boots. Once again, the lowest proportion of motorcyclists wearing boots (15%) was at the Brisbane commuter sites. Notably, only one of the scooter riders observed at these sites was wearing boots (see Table 2).

Table 3 reports the results obtained from the observations of the motorcycle pillion passengers in the Canberra and Brisbane regions. As can be seen, the number of pillions observed was relatively small, so care needs to be taken when interpreting the results. Notwithstanding this, all the pillion passengers observed at the Canberra sites were wearing full face helmets, while the majority were also doing so at the Brisbane recreational sites. However, only around half of the pillions observed at the Brisbane commuter sites were wearing full face helmets.

In Canberra, the majority of pillions were observed wearing full gloves at both recreational and commuter sites. While the corresponding proportion was lower at the Brisbane sites, only a small proportion of pillions were not wearing any gloves at all.

At the Canberra sites, all the pillions were observed wearing either leather or motorcycle specific jackets. Similarly, the majority of the pillions at the Brisbane recreational sites were wearing leather or motorcycle specific jackets. However, over 80% of the pillions observed at the Brisbane commuter sites were not wearing a protective jacket.

The lower body apparel results demonstrate that many pillions wear jeans, both when riding recreationally and commuting. Only at the Canberra recreational sites was the majority of pillions (57%) observed to be wearing motorcycle specific lower body apparel. In contrast, at the Brisbane commuter sites, 91% of the pillions were observed wearing non-protective lower body clothing, such as office wear. Furthermore, very few Brisbane pillions were wearing boots, while some were observed wearing open footwear such as thongs or sandals.

Discussion

This paper has provided an opportunity to compare motorcycle protective apparel wearing across two regions with inherent climatic differences, as well as between recreational and commuter riders and pillion passengers. The findings are largely consistent with those of previous self-report surveys, which have indicated that many riders are prepared to wear protective apparel on their upper body, but less so on their lower body.

Table 3: Results of motorcycle pillion observations in Canberra and Brisbane

	Canberra		Brisbane		
	April/May 2007	April /May 2007	October 2005	February 2006	February 2008
	Recreational N = 7	Commuter N = 5	Recreational N = 14	Recreational N = 21	Commuter N = 11
Helmet					
Full Face	7 (100%)	5 (100%)	12 (86%)	17 (80%)	6 (55%)
Open face	0	0	2 (14%)	4 (20%)	5 (45%)
Gloves					
Full gloves	7 (100%)	4 (80%)	6 (43%)	10 (48%)	8 (73%)
Fingerless gloves	0	1 (20%)	7 (50%)	11 (52%)	2 (18%)
No glove	0	0	1 (7%)	0	1 (9%)
Upper Body					
Leather	1 (15%)	1 (20%)	4 (28%)	8 (38%)	0
M/cycle specific	6 (85%)	4 (80%)	5 (36%)	10 (48%)	2 (18%)
Other clothing			5 (36%)	3 (14%)	9 (82%)
Lower Body					
Leather	0	0	0	0	0
M/cycle specific	4 (57%)	1 (20%)	0	3 (14%)	0
Jeans	3 (43%)	2 (40%)	12 (86%)	14 (66%)	1 (9%)
Other	0	2 (40%)	2 (14%)	4 (20%)	10 (91%)
Footwear					
Boots	6 (85%)	3 (60%)	2 (14%)	7 (33%)	0
Joggers	0	1 (20%)	6 (43%)	8 (38%)	2 (18%)
Other	1 (15%)	1 (20%)	5 (36%)	6 (29%)	7 (64%)
Thongs/sandals	0	0	1 (7%)	0	2 (18%)

Similarly, the observational results confirm existing concerns about lower apparel wearing among commuter riders, particularly scooter riders, and pillion passengers [4, 5, 6, 7].

In terms of helmet wearing, it is encouraging that the large majority of the riders observed in this research were wearing full face helmets. The exception to this finding was at the Brisbane commuter sites, where only 59% of the riders were observed wearing full face helmets. This was mainly due to the relatively large proportion of scooters observed at these sites, 77% of whom were wearing open face helmets. Similarly, the proportion of riders wearing gloves was considerably lower at the Brisbane commuter sites. These results highlight that commuter riders, particularly those riding scooters, need to be encouraged to wear full face helmets and gloves.

Overall, the results relating to other upper body apparel wearing were very encouraging. The majority of riders observed at all sites were wearing either a leather or motorcycle specific protective jacket. Once again, however, the riders observed at the Brisbane commuter sites were the least likely to be wearing such apparel on their upper body. In contrast, the results relating to lower body apparel wearing are less encouraging. With the exception of the riders observed at the Canberra

recreational sites, the majority of riders were wearing either jeans or other clothes on the lower body. Moreover, among those observed at the Brisbane commuter sites a majority were wearing office wear such as skirts or trousers, which offer little or no protection in the event of a crash (even at low speeds).

It is interesting to note that the results obtained for the recreational riders in Brisbane were largely consistent across the two time periods in question (October 2005 and February 2006). It was purposefully decided to not pool the results from these two time periods due to the possible influence of seasonal or other factors on apparel wearing. However, the results suggest that the wearing of protective apparel among this group may be relatively stable across seasons, at least in the Brisbane region.

Some interesting differences were also apparent in the apparel wearing of the Canberra and Brisbane riders. Overall, both the Canberra recreational and commuter riders were more likely to be wearing protective apparel than their Brisbane counterparts. In addition, the wearing of motorcycle specific apparel on the upper and lower body was much more common at the Canberra sites than any of the Brisbane sites, while the wearing of leather jackets was more common among the riders observed at the Brisbane recreational sites. It is unclear whether these

differences between the Canberra and Brisbane observations are primarily due to climatic factors, social demographic factors, or other socio-cultural influences operating at a local level. For example, the Brisbane observations were conducted at warmer times of the year than those in Canberra, with the daily maximum temperatures in Brisbane approaching 30oC compared to around 18oC in Canberra. However, other factors are also likely to influence protective apparel wearing including purpose of journey, as reflected in the lower apparel wearing among commuters (particularly in Brisbane). In this regard, it is possible that commuting is perceived as safer by some riders due to the generally lower travel speeds encountered compared to recreational riding, while some commuters may not have access to facilities to change clothes at work. These are issues that require further research to identify potential factors that work to either encourage or discourage the wearing of protective apparel in different regions. Furthermore it is suggested that future research could investigate potential cultural factors of influence within various sectors of the motorcycle community which may impact on the wearing of appropriate apparel.

The findings highlight a number of important issues for future education and publicity campaigns addressing the safety benefits of protective apparel. In particular, the data confirm the need for further initiatives to encourage:

- greater levels of protective apparel wearing among commuter and, particularly, scooter riders, many of whom were observed wearing clothes more appropriate for the office;
- greater use of protective apparel on the lower body; and
- greater use of protective apparel by pillion, particularly among commuters.

As noted earlier, it was beyond the scope of this observational research to assess the quality of the apparel being worn by riders and pillion. Nonetheless, this is an important issue that requires ongoing attention. As explained earlier, in Australia there are currently no legislated minimal standards that motorcycle apparel must meet in order to be manufactured or sold as protective apparel [15]. Therefore, although motorcycle riders may purchase and wear motorcycle specific apparel believing that it will offer a certain degree of protection, the apparel being worn may not actually offer much protection at all in the event of a crash. Future research and improvement in motorcycle specific and other related apparel should strongly consider investigating and developing a system of classification to indicate to potential purchasers the level of protection such apparel offers [15]. Similarly, educational and publicity campaigns in this area should encourage riders to wear the apparel that offers a high level of protection in the event of a crash.

The research summarised in this paper features a number of limitations that should be borne in mind when interpreting the findings. Firstly, to the knowledge of the researchers these are among the first apparel observation studies to be undertaken in Australia. As such, it remains unclear whether the methodology

utilised in the study produces a representative sample of riders, both in general terms as well as across commuter and recreational sites. Secondly, the studies were undertaken at particular times of the year and, thus, subject to the influence of various seasonal factors, particularly climatic conditions. Accordingly, it remains unclear whether the results obtained are indicative of wearing rates at other times of the year. Thirdly, while the overall number of motorcycles observed in the studies was satisfactory, some of the subgroups of riders observed were relatively small, particularly the pillion. Finally, it was not possible to assess the quality of the protective apparel being worn by riders. Accordingly, the results should be treated as indicative of the apparel generally worn by motorcycle riders in the Canberra and Brisbane regions, rather than being representative.

Conclusion

The research reported in this paper has attempted to provide more objective data regarding the extent of motorcycle protective apparel wearing in Australia in general, as well as differences across regions and motorcycle rider types. Notwithstanding the limitations of the research, it has both confirmed and extended upon the results of previous self-report studies. While the wearing of protective apparel on the upper body of motorcycle riders appears relatively common, further efforts are required to encourage the wearing of appropriate apparel on the lower body. In addition, further efforts are required to encourage apparel wearing in general among commuter riders, particularly those riding scooters. Finally, the research has highlighted the need for further research into the factors that serve to either facilitate or inhibit the wearing of motorcycle rider protective apparel, in order to develop effective educational strategies.

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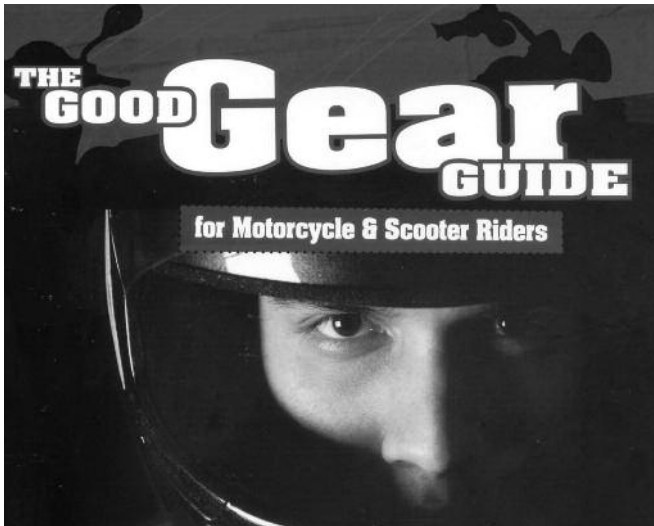
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Road Safety Literature

Book Review



The Good Gear Guide published by the Federal Department of Infrastructure, Transport, Regional Development and Local Government, October 2009.

This book resulted from an initiative by the Australian Motorcycle Council, which is the national peak body for riders. They approached the Federal Government for a grant to fund the book's development, a great example of motorcyclists working together with government to achieve safety improvements. Representatives of road authorities and rider groups from each State and Territory were consulted throughout the development of the book.

"A Review of the Good Gear Guide" by Jeremy Bowdler, Editor, Two Wheels

With the publication of the Good Gear Guide, at last Australian motorcyclists have no-nonsense, practical advice on how to select appropriate riding gear. For far too long, we, as riders, have been somewhat confused by choice in the market, with few guidelines other than recommendations from salespeople or other riders. Now we have some sensible advice.

One of the most appealing aspects of the Good Gear Guide is that it is written from the perspective of the rider's needs (and wants). It's not prescriptive, but it does explain the benefits of protective gear and why a rider should wear it. There is no point in having fantastic motorcycle clothing in the shops if it's not on riders' backs.

Another important point is the stress placed on the benefits of protective clothing away from a worst-case crash scenario. Riders are much more likely to wear proper clothing if it keeps them warm, or cool, or dry or free from insect stings, etc. They will see the value in that, rather than in paying a lot of money for crash protection they "know" they'll never use. And, once the riders have learned what proper gear can do, the Good Gear Guide helps them with the selection process, explaining how to judge quality and protection for themselves. All in all, it's a terrific new resource for riders, both experienced and new. I only wish it had been around 30 years ago, when I started riding.

New to the College Library

Journal of Highway and Transportation Research and Development

Volume 4 Number 1 June 2009, Research Institute of Highway, Ministry of Transport, Republic of China.

Recent Publications

Centre for Automotive Safety Research (CASR) University of Adelaide

The following reports have been published and are now available on the Internet:

CASR065 On-road observational survey of restraint and child restraint use in South Australia, 2009.

<http://casr.adelaide.edu.au/publications/list/?id=1091>

Australian Websites Concerning Motorcycle Safety

Motorcycle Council of NSW

<http://roadsafety.mccofnsw.org.au/>

The Motorcycle Council of NSW (MCC) road safety web site is for riders and others with an interest in improving motorcycling safety. The web site is part of the Motorcycle Council's strategic plan, Positioned for Safety, the result of consultation with riders, the motorcycle industry, road safety researchers, Local Government and State Government agencies. It provides a framework and direction for the Motorcycle Council and other stakeholders to improve road safety for motorcyclists from four perspectives, viz:

Safer Roads - WHO deals with poor road design or conditions

Safer People - WHAT we know about motorcycle road safety

Safer Equipment - WHICH clothing and equipment will help to keep you safe

Safety Co-ordination - WHEN we work with other road users and government agencies.

Queensland Motorcycle Safety Strategy 2009–2012

http://www.transport.qld.gov.au/Home/Safety/Road/Motorbike/Motorcycle_safety_strategy/

Three key initiatives were implemented on 1 July 2009, viz:

1. Learner Approved Motorcycle Scheme (relating to engine capacity).
2. Pillion passenger restrictions for learner riders.
3. Requirement to display a P plate.

It is anticipated that these changes will have a positive impact on the unacceptably high level of motorcycle-related crashes in Queensland. The initiatives also ensure greater consistency between Queensland and other States.



Motorcycle Safety in Victoria

<http://www.tacsafety.com.au/jsp/content/NavigationController.do?areaID=13&tierID=1&navID=B4347615&navLink=null&pageID=206>

Motorcycle Safety in South Australia

www.transport.sa.gov.au/pdfs/safety/mcsafety2.pdf

The South Australian Motorcycling Road Safety Strategy has been developed in conjunction with the Motorcycle Task Force to provide a coordinated approach to motorcycle safety in order to reduce the incidence and severity of motorcycle crashes on our roads. This strategy sets out the goals for improving motorcycle safety in South Australia for the period 2005-2010 and has assigned priorities to the various initiatives.

Motorcycle Safety in Western Australia

<http://www.roadwise.asn.au/resources/resources/motorcyclesafety>

To address the increasing trend in motorcycle and scooter involvement in serious crashes the RAC, on behalf of the Road Safety Council, hosted a series of Motorcycle & Scooter Safety Action Group forums. The agreed actions from the forums can be viewed at

<http://www.ors.wa.gov.au/documents/MotorcycleForumActionsListFinal.pdf>

An American Motorcycle Safety Website

Motorcycle Safety

<http://www.msgroup.org/>

This site is focused on Motorcycle Safety. The information includes any motorized two or three wheeled vehicle. The intention is to provide information that will significantly reduce the odds of having an accident while riding a motorcycle.



MOTORING + SERVICES
www.mynrma.com.au



www.howsafeisyourcar.com.au



NZ TRANSPORT AGENCY
WAKA KOTAHĪ
www.nzta.govt.nz



www.ntaa.com.au



www.nzaa.co.nz



www.raa.net



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www.racq.com.au



www.ract.com.au



www.racv.com.au



www.rta.nsw.gov.au



Government of South Australia
Department for Transport,
Energy and Infrastructure
www.transport.sa.gov.au



www.transport.tas.gov.au



www.transport.wa.gov.au



www.vicroads.vic.gov.au



www.fiafoundation.com



www.transport.qld.gov.au



www.nrma.com.au

Don't be a dummy

Do your research before buying a new car

The top selling models of vehicles sold in Australia and New Zealand have been crash tested by the Australasian New Car Assessment Program (ANCAP), a group comprising all Australian and New Zealand Motoring Clubs, Australian State governments, the FIA Foundation, NRMA Insurance and the New Zealand government.



→ **CHECK** if the vehicles you are interested in have been tested by logging on to <http://www.ancap.com.au> or your local motoring club or government transport department website.



ANCAP

Crash testing for safety

AUSTRALASIAN
NEW CAR ASSESSMENT
PROGRAM

For further information
please contact the motoring
club or government
transport department in
your location.



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