

2011

Annual Report

Centre for Automotive Safety Research



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Government of South Australia
Department of Planning,
Transport and Infrastructure



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Message from the Director

We will remember 2011 as the year we moved into our new Vehicle Testing Laboratory in Kent Town. For many years we had operated from a small laboratory located inside a bus depot. We are very grateful to Barry Nesbitt and his family from Explorer Coach Lines for allowing us to use that space and the extensive support and assistance they provided to us over the years. The new laboratory allows us to maintain the high technical standards we have always been known for and provides a space for us to demonstrate the importance of vehicle design in reducing pedestrian injury. The move to our new laboratory was a joint venture between CASR and the Australasian New Car Assessment Program (ANCAP) and we would like to thank the members of ANCAP for their continuing support.

2011 also saw CASR involved in an exciting research program. Highlights of this program are presented later in this annual report and include work in all pillars of the safe system.

Knowledge Transfer is an important part of CASR's role and this year we worked closely with the Department of Planning, Transport and Infrastructure (DPTI) to present a seminar program designed to introduce a range of road safety issues to a wide variety of stakeholders. We will be continuing this program in 2012.

In 2011 we undertook research and knowledge transfer that directly supported the development of the South Australian Road Safety Strategy. Former Minister for Road Safety, Honorable Tom Kenyon, launched the strategy at a function held at our Vehicle Testing Laboratory.

We are expecting to build on the successes of 2011 in 2012. We have developed a new three-year research program with DPTI and the Motor Accident Commission (MAC) and we are doing interesting work with Austroads, the Queensland Department of Transport and Main Roads and the Office of Road Safety in

Western Australia. We are also working with Safework South Australia to apply some of the lessons learnt in road safety to improving occupational health and safety.

The continued success of CASR is dependent on many people; in particular I would like to acknowledge the hard work and dedication of our staff and the encouragement and help provided by our Reference Board chaired by Tom Phillips.

In conclusion our thanks go to the management and staff of DPTI and MAC for their ongoing support of CASR. Our joint research program is critical to the achievement of road safety goals and the continuing development of CASR as a world-class road safety research unit.



Tom Phillips, Chair of the CASR Reference Board, welcoming guests to the official opening of the Vehicle Testing Laboratory in September



Left to right: Sir Eric Neal, former Chair of the Road Safety Advisory Council, Mary Lydon, Honorable Tom Kenyon, former Minister for Road Safety, Andrew van den Berg

CASR overview

Communication and Collaboration

Collaboration between road safety researchers in Australia and overseas is vital to improving knowledge about road safety and is a priority at CASR.

In 2011 the Centre was involved in collaboration with Professor Tetsuya Nishimoto from Nihon University and the Hanson Institute to better understand brain injury by assessing the response of the sheep brain to direct deformation. CASR has also entered into a Cotutelle PhD with IFFSTAR at the University of Marseille. IFFSTAR is the French government road and transport research organisation.

In May 2011 CASR encouraged national cooperation by hosting the first Directions in Road Safety Research Forum. The Forum included representatives from all the major Australian road safety research units and successfully encouraged sharing of research experience and new ideas. It is encouraging to note that The Centre for Accident Research & Road Safety - Queensland (CARRS-Q) offered to host a second forum in 2012.

Also in 2011 the Centre took the first steps to developing a memorandum of understanding with Monash University Accident Research Centre and this will be signed at a joint seminar in 2012.

In addition to these formal collaborations CASR continues to work closely with other organisations and individuals to move towards reducing the human and social costs of road trauma.

Knowledge Transfer

Directions in Road Safety Research - Road Safety Research Forum

The Centre was proud to be the first to host Australia's Directions in Road Safety Research Forum in May 2011.

Designed to complement the Road Safety Research, Policing and Education Conference, key road safety professionals were invited to attend a 2-day event for the purpose of disseminating and discussing current research initiatives. A total of eight sessions were conducted over the two days, providing delegates with the opportunity to explore common research issues, such as quality and data reliability, through peer discussion and in-depth review.

The keynote address was delivered by Mr. Lauchlan McIntosh, President of the Australasian College of Road Safety, Chairman of Australasian New Car Assessment Program (ANCAP) and Asia Pacific Ambassador for the International Road Assessment Program (iRAP).

The Forum's limited numbers and casual design provided delegates with the opportunity to network with leading road safety professionals, develop ideas for future studies and explore possibilities for collaboration on future research projects.

Knowledge Transfer Program

With the support of the Department of Planning, Transport and Infrastructure (DPTI) and the Motor Accident Commission (MAC), CASR developed a road safety Knowledge Transfer Program. The program is aimed at those who are directly or indirectly involved with the provision of a safe road transport system. This includes, amongst others, people working in the areas of local government, design, road and traffic management, maintenance, planning, regulation, enforcement, education and health.

The program will consist of 10 sessions over the 2011-2012 period, with five sessions being held in 2011. Two regional sessions are also being considered for 2012.

Topics that make up the program include:

- Road safety. Past, present and future
- Priority issues for safer urban roads
- Speed and speed management
- High risk road users
- Priority issues for safer rural roads
- Using road safety data and evaluating road safety programs
- Priority issues for benefitting from safer vehicles
- Road safety beyond traditional circles
- Pedestrians, cyclists and motorcyclists
- Road safety enforcement

Directions in Road Safety Research



Discussion / Inspiration / Dissemination

The program mainly consists of CASR researchers sharing their road safety knowledge, with external presenters taking part where appropriate. The sessions are designed to allow participants to gain an understanding of road safety principles and how their various roles can contribute to a long term vision of reducing deaths and serious injuries on the road system. The program facilitates the dissemination of information on best practices in key areas of road safety and identifies issues and challenges that South Australia faces over the next decade.

Postgraduate study

CASR supports six PhD students who are currently working on various engineering and psychology research projects.

- **Jeffrey Dutschke** – the effect of particular criteria for head injury on vehicle design
- **Jamie Mackenzie** – potential effects of electronic stability control (ESC) on crashes on Australian rural roads
- **Daniel Searson** – characteristics of pedestrian headform impacts (thesis submitted in 2011)
- **James Thompson** – ageing and mobility (supported by the Royal Automobile Association of South Australia)
- **Blair Turner** – reducing road casualties on rural roads through reduced speeds
- **Adrian Weissenfeld** – causes of motorcycle crashes in Australia (supported by Motorcycling Australia)

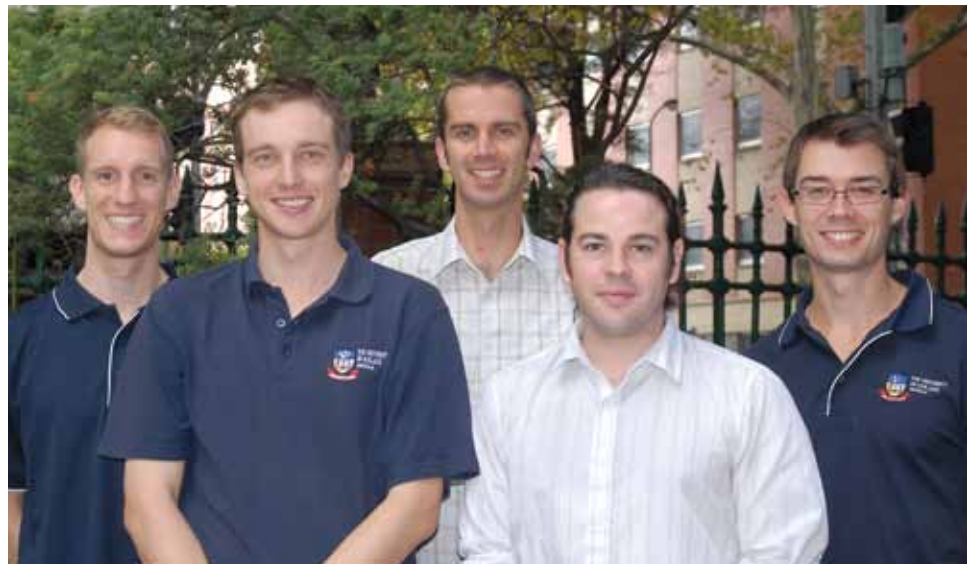
Postgraduate research recognised at conference

In 2011 Daniel Searson presented a paper at the Australasian Road Safety Research, Policing and Education Conference. He won the Peter Vulcan Award for Best Paper for his paper titled 'The Global Technical Regulation on pedestrian safety: likely effects on vehicle design'.

Undergraduate study

In 2011 CASR presented the Traffic Engineering and Design course for the Civil Engineering undergraduate degree. Mary Lydon, Jeremy Woolley and Paul Hutchinson all presented lectures in the areas of traffic management, modelling and impact assessment.

The Centre also delivered the Automotive Safety Engineering course for the Mechanical Engineering degree. The course taught students about the principles of active and passive safety in automobile design and the role of safe vehicles within a broader context of road safety.



Left to right: Jamie Mackenzie, Jeffrey Dutschke, Daniel Searson, Adrian Weissenfeld, James Thompson (Absent: Blair Turner)



Daniel Searson (right) receiving the Peter Vulcan Award from Peter Vulcan

Informing the community

Road safety discussions with Local Government Associations

Whilst in Perth, Jeremy Woolley visited the Western Australian Local Government Association (WALGA) to provide a question and answer session on road safety and safe systems research. The session was attended by 20 local government representatives from all parts of Western Australia as part of a planning week for the WALGA Infrastructure and RoadWise Unit. Discussions ranged from speed and traffic management to safe systems treatments that could be adopted in remote areas. There was a strong desire that research be published on how practitioners can retrofit safe systems treatments into the existing road network.

In June, Jeremy Woolley and Matthew Baldock ran a workshop in NSW on road safety considerations for local government. The workshop was hosted by Blacktown City Council and included attendees from neighbouring councils in Western Sydney, the Blue Mountains and rural NSW. The day long workshop covered many aspects of road safety including Safe Systems principles, crash investigation, road safety priority issues and discussions on solutions for local government in tackling common traffic problems. The 26 attendees included traffic engineers, road safety officers, consultants and academics.

Library

CASR holds the largest and most comprehensive collection of road accident material in Australia.

The highly specialised library provides support to staff at the Centre by way of literature reviews, current awareness services and inter-library loans. Library staff also provide regular support to road safety professionals and organisations, other libraries, university students and members of the public.

The library holds a comprehensive collection of primary and secondary materials including the latest research reports, conference proceedings, journals and books from both Australia and overseas.

In 2011 the library continued to develop the CASR authored publications collection, including improving public access to publications via the website.

**For more information go to
www.casr.adelaide.edu.au/library**



Matthew Baldock (back left) and Jeremy Woolley (centre right) with attendees from the NSW local government roads workshop held at Blacktown City Council.

Vehicle Testing Laboratory

The team

Associate Professor

Robert Anderson

PhD, BE(Hons), Deputy Director

Brett Linke

BE(Hons), Research Officer

Giulio Ponte

BE, Research Engineer

Daniel Searson

BE(Hons), Postgraduate student

Marleen Sommariva

BSc, Library Assistant

Andrew van den Berg

BE (Mech)(Hons)

Vehicle Testing Laboratory Manager



Left to right: Robert Anderson, Marleen Sommariva, Andrew van den Berg, Brett Linke, Daniel Searson, Giulio Ponte

The Vehicle testing laboratory is a purpose built facility designed to measure the extent to which the design of new cars protects a pedestrian in the event of a collision. The laboratory is a central component of the pedestrian safety research at CASR, which considers both accident prevention and injury mitigation through vehicle design.

Results from laboratory testing provide valuable contributions to CASR's research projects. In 2011 testing was conducted as part of an NRMA project analysing the

pedestrian safety performance of vehicles at different crash speeds. The Centre also conducted impact testing of a Sea Lion Exclusion Device for the New Zealand Ministry of Fisheries.

In 2011 Daniel Searson submitted his postgraduate thesis for examination. The research, examining the results of testing under Global Technical Regulations, uses a combination of theory and empirical data from testing conducted at the laboratory.



Left to right: Andrew van den Berg, Mary Lydon, Robert Anderson

In 2011, the laboratory relocated to a new facility in Kent Town. The new facility enables CASR to better promote the importance of pedestrian testing and expand the scope of work that can be offered to Australian and overseas testing programs and for industry. The larger facility also enables CASR to host functions for road safety and vehicle manufacturing groups as well as promote the Centre's work to the general community.

An official opening was held in March and was attended by the Honorable Tom Kenyon, former Minister for Road Safety, Sir Eric Neal, the Australasian New Car Assessment Program (ANCAP) Board and other guests.

In September the official launch of the South Australian Road Safety Strategy 'Towards Zero Together' was held at the laboratory. Several other events were also hosted, including a 'Stars On Cars' launch for vehicle manufacturers. CASR participated in the University of Adelaide Research

Week, running tours of the laboratory for the general public and also hosted a function for the University Alumni which included a demonstration impact test.

The laboratory is the official testing facility for the pedestrian component of the Australasian New Car Assessment Program (ANCAP), a consortium of Australian and New Zealand motoring clubs, State Government departments and motor injury insurance authorities. ANCAP provides vehicle buyers with information on the crash performance of vehicles, including side impact tests, offset-frontal tests and pedestrian tests. Since 2000 CASR has been contracted to perform the pedestrian tests and has tested about 168 vehicles for the program.

In 2011, CASR tested the Toyota Rukus, Mitsubishi Pajero, Chery J1, Ford Territory, Hyundai Accent, Chery J11, Hyundai Elantra, Holden Cruze, Subaru Impreza and the Subaru Impreza XV.

The Vehicle Testing Laboratory – a brief history

The laboratory was initially developed for a long-term study of brain injury mechanisms in fatal road crashes. An important part of that investigation was examining the force of the impact to the head of a pedestrian when it hit the bonnet of the striking car. Computer modelling is used to estimate the speed of that impact and impact force is measured by firing an instrumented headform at the same make and model of car.

Until the mid-1990s there was only one commercially available headform launcher and its maximum launch speed was just over 40 km/h. With the 60 km/h speed limit in Adelaide, researchers needed to be able to reconstruct head impacts at speeds of up to at least 70 km/h.

One of the CASR engineers, Luke Streeter, then set out to design a headform launcher and supervised its construction in Adelaide at only a small fraction of the cost of similar machines. In 2000, Autoliv Research Sweden, expressed interest in the design of the headform launcher. After an agreement was reached between the two organisations, Autoliv created a facsimile of the headform launcher for their own use.

With the development of internationally recognised test procedures to assess the risk of injury to the legs of a pedestrian, a second launcher was designed and built to conduct tests in which instrumented legforms are fired at the front of a stationary vehicle.



Left to right: Mike Stapleton (ANCAP Director), David Shelton (ANCAP Director), Mike Harris (ANCAP Director), Keith Simmons (ANCAP Director), Phil Allan (ANCAP Director), Lauchlan McIntosh (ANCAP Chairman), Nick Clarke (ANCAP Business Manager), Hon Tom Kenyon, former Minister for Road Safety, Mike Paine (ANCAP Technical Manager), Mary Lydon (CASR), Mark Terrill (ANCAP Director), Craig Newland (ANCAP Director), Ray Grigg (AAA President), Jack McLean (CASR)

A message from ANCAP

An important part of the road safety equation is the Australasian New Car Assessment Program (ANCAP) – Australia's leading independent vehicle safety advocate. ANCAP crash tests new vehicles and awards them a star rating for safety. This provides consumers with independent information on the level of occupant safety in serious front and side crashes.

In the almost 20 years since its inception, ANCAP has crash tested over 380 new cars and advised the motoring public of their safety levels. ANCAP's crash testing regime is in line with recognised international protocols, and information is shared with similar assessment programs around the world.

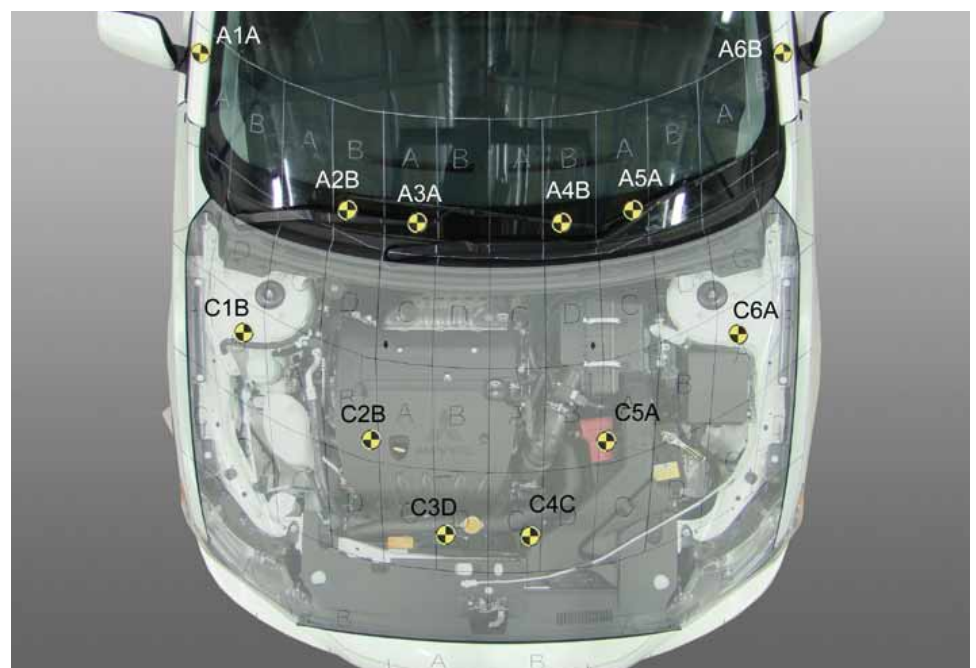
ANCAP has overseen the drive by Australian and overseas manufacturers to increasingly incorporate safety into automotive production processes and the motoring public continues to seek such safety information when making their important new car purchases. ANCAP is now learning from our testing that drivers and occupants have twice the chance of being killed or seriously injured in a 4-star ANCAP rated vehicle compared to a 5-star ANCAP rated vehicle.

ANCAP continues to raise the bar in vehicle safety, with the release of its Road Map identifying emerging safety technologies and their phased inclusion into the ANCAP testing programs for the forward-looking five-year period.

One major element of these new technologies and safety focus is the inclusion of pedestrian safety testing in the event of a collision involving an external road user. While modern safety technologies are designed to protect the driver and passengers, there is also an opportunity for vehicles to have "built-in" safety design for external road users such as pedestrians and bike riders.

ANCAP has worked with CASR for many years to test the pedestrian safety of vehicles. CASR currently conducts pedestrian testing on behalf of ANCAP, and these results are an increasingly important component of ANCAP crash testing. ANCAP is proud to be associated with CASR in the development of the new laboratory facilities.

ANCAP is supported by Australian and New Zealand motoring clubs, Australia's State and Federal governments, the New Zealand government, the Victorian Transport Accident Commission, NRMA Insurance and the FIA Foundation. **To view ANCAP's star ratings, please visit www.ancap.com.au**



In-depth crash investigation

The team

Dr Matthew Baldock

PhD, BA(Hons), Research Fellow

Sam Doecke

BE(Hons), Research Officer

Jeffrey Dutschke

BE(Hons), BSc, Postgraduate student

Jennifer Grigo

BBehSc(Hons), Research Officer

Tori Lindsay

RN RM, Dip App Sc, BN Ed,
Research Officer

Brett Linke

BE(Hons), Research Officer

Jamie Mackenzie

BE(Hons), Postgraduate student

Simon Raftery

B.Psych (Hons), Research Fellow

Dr Jeremy Woolley

PhD, B.E (Hons) Senior Research Fellow

Dr Lisa Wundersitz

PhD, BA (Hons), Research Fellow



Front row: Simon Raftery, Brett Linke, Matthew Baldock. Back row: Jeffrey Dutschke, Jennifer Grigo, Jeremy Woolley, Tori Lindsay, Lisa Wundersitz, Jamie Mackenzie, Sam Doecke

CASR was again active in its program of in-depth investigation of South Australian road crashes during 2011. The activity was focused on data collection for crashes in both urban and rural areas. Currently, 293 crashes that satisfy the criteria for inclusion in the final database have been investigated as part of the study. Of these 247 crashes, 202 occurred in rural areas and 91 in Metropolitan Adelaide.

Data from in-depth crash investigation continues to be used in other projects by CASR staff. In 2011, it was used in projects

concerned with the effectiveness of barriers and clear zones, modelling of barriers and wide medians, specific analysis of the crashes of young drivers and examination of the relative importance of aberrant and normal behaviour in road trauma. Jamie Mackenzie used in-depth crash data in his PhD project on Electronic Stability Control (soon to be completed), and Adrian Weissenfeld is using in-depth crash data in his PhD on motorcycle safety, sponsored by Motorcycling Australia.



In addition to these projects, Jeremy Woolley recently completed a project for Austroads looking at lessons learned from in-depth crash investigation and CASR provided in-depth crash investigation data and expert advice to ARRB for an Austroads project concerned with providing for road user error in the safe system.

CASR also began its Knowledge Transfer Program in 2011, in which we ran a series of seminars on road safety issues for practitioners. These sessions routinely used case studies and examples from in-depth crash investigation to illustrate the road safety principles being communicated.

Matthew Baldock and Jeremy Woolley also convened a day long workshop in Western Sydney for local government engineers wishing to apply safe system principles to road safety treatments. Again, this workshop featured case studies and examples from in-depth crash investigation.

In 2012, Matthew Baldock will be involved as a consultant on an Austroads motorcycle crash case control study being run by Neuroscience Research Australia.



Infrastructure and safe systems

The team

Stephen Crotty

BE, GDMathSc, Research Assistant

Sam Doecke

BE(Hons), Research Officer

Craig Kloeden

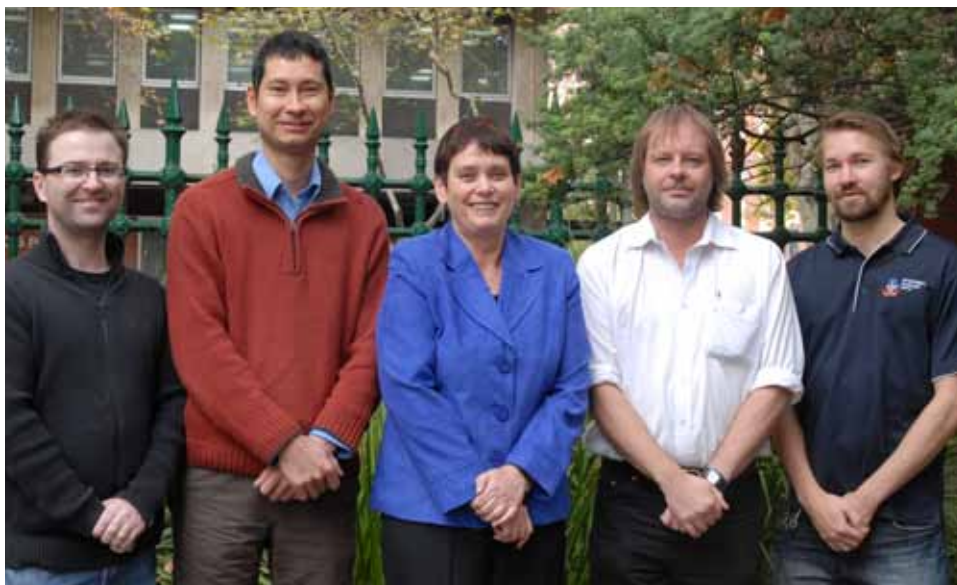
BA, Research Fellow

Professor Mary Lydon

PhD, MEngSci, BSc(Hons), Director

Dr Jeremy Woolley

PhD, B.E (Hons) Senior Research Fellow



Left to right: Stephen Crotty, Jeremy Woolley, Mary Lydon, Craig Kloeden, Sam Doecke

Research highlights

Calibration of microsimulation model

This research aims to develop techniques to successfully calibrate complex microsimulation models. The calibration method is based on a systematic optimisation of the model with respect to multiple parameters. Encouraging results have been obtained using a model of the City of Adelaide and surrounding ring route. Successful calibration of this model will make it an invaluable tool for further research into traffic behaviour and control measures in Adelaide.

Departures on curves

This study examined the nature of vehicle departures on rural curves. The outcomes of the study will provide guidance on the extent of clear zone necessary to achieve a safe system. It also examined if barriers on curves were a plausible alternative to the clearzones identified as being required.

Adequacy of barrier and median separation on rural roads

This study examined crashes in which a vehicle crossed the centerline or entered a median on rural roads. The study will provide guidance on the width of median necessary to prevent head on collisions and the value of adopting narrow medians with barriers on typical rural road cross sections.

Research scan of heavy vehicle literature

The Australian Trucking Association commissioned a research scan to develop a knowledge base that may be used to guide the strategic direction and development of effective outcomes in the area of heavy vehicle safety. The scan included a large focus on road and vehicle design, speed management and enforcement as well as human and social factors. This scan identified a number of gaps in knowledge and recommendations for future research were suggested in the areas of traffic management, technology, fatigue and seat belt use.

Speed surveys

The management and control of vehicle speeds is an important road safety measure. In order to evaluate the effects of the general speed reduction program, CASR has been monitoring the speeds of vehicles at approximately 130 sites around South Australia each year since 2007 and will continue to do so into the future. The consistency of the surveys allows changes in vehicle speeds on different road types to be tracked over time.





Publications

Doecke SD, Woolley JE, Mackenzie JRR (2011) **'Post impact trajectory of vehicles at rural intersections'**, A Safe System, making it happen. Australasian College of Road Safety national conference, Melbourne, Australia, 1-2 September 2011.

Doecke SD, Kloeden CN, McLean AJ (2011) **Casualty crash reductions from reducing various levels of speeding** (CASR076).

Doecke SD, Woolley JE (2011) **'Further investigation into the effective use of clear zones and barriers in a safe system's context on rural roads'**, 2011 Australasian Road Safety Research, Policing and Education Conference, Perth, 6-9 November 2011.

Hutchinson TP (2011) **'Tackling accident blackspots head on'**, Traffic Engineering & Control, 52(10), pp 387-392.

Rafferty SJ, Grigo JAL, Woolley JE (2011) **'Heavy vehicle road safety. A scan of recent literature'**, Journal of the Australasian College of Road Safety, 22(3), pp 18-24.

Rafferty SJ, Grigo JAL, Woolley JE (2011) **Heavy vehicle road safety: Research scan** (CASR100).

Wundersitz LN, Baldock MRJ (2011) **The relative contribution of system failures and extreme behaviour in South Australian crashes** (CASR092)

Human factors

The team

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James Thompson

BA, BHSc(Hons), Postgraduate Student

Adrian Weissenfeld

BA (Hons), Postgraduate student

Dr Lisa Wundersitz

PhD, BA (Hons), Research Fellow



Left to right: Simon Raftery, Jennifer Grigo, Matthew Baldock, Adrian Weissenfeld, Tori Lindsay, James Thompson (Inset: Lisa Wundersitz)

Research highlights

The role of medical conditions in crashes

This research sought to identify the extent to which pre-existing medical conditions contributed to crash causation. The study involved examining the data of 1490 drivers, riders, pedestrians and cyclists who were hospitalised as a result of a crash. Results indicated that a medical condition contributed to 11-12% of crash events, with more than 18% of drivers found to have a medical condition that directly contributed to the crash. The most common conditions identified were loss of consciousness (25%), functional impairment relating to mental illness, including suicide attempts (22%) and seizure (17%).



Contribution of system failures and extreme behaviours in South Australian crashes

This study examined the relative contribution of extreme behaviour (e.g. high level drink driving or speeding) and 'normal' road user errors in South Australian crashes, as identified from information in Coroner's investigation files and databases of in-depth crash investigations conducted by CASR. The analysis of 83 fatal crashes, 272 non-fatal metropolitan injury crashes and 181 non-fatal rural crashes indicated that very few non-fatal crashes (3% metropolitan, 9% rural) involved extreme behaviour by road users. Even in fatal crashes, the majority (57%) were the result of 'normal' road user errors. This means that there is considerable scope for a Safe System approach, which protects road users who make simple errors, to reduce serious road trauma in South Australia.

Prevalence of restraint usage in observational surveys and crash statistics

This project sought to understand why the prevalence of restraint use in fatal crashes is considerably different to restraint use rates identified in observational studies. A review of South Australian Coroner's data for fatal crashes in 2008 revealed that 37% of vehicle occupants killed in a crash were unrestrained. Compared to restrained occupants those unrestrained fatalities were younger, more likely to have tested positive to drugs, were more likely to have engaged in extreme behaviour and more likely to be ejected from a vehicle. Examination of the characteristics of fatal crashes suggest that observational survey methodologies have a limited effectiveness in detecting those least likely to wear seat belts.

Publications

Anderson RWG, Hutchinson TP (2011) **'Child Safety Restraints: Advice to Parents'**, The Irish Medical Journal, 104(10).

Austroroads, Lindsay VL, Ryan GA (2011) **Medical Conditions as a Contributing Factor in Crash Causation** (AP-R389-11), Austroroads, Sydney.

Baldock MRJ, Grigo JAL, Raftery SJ (2011) **Protective clothing and motorcyclists in South Australia** (CASR088).

Doecke SD, Grigo JAL (2011) **Annual performance indicators of enforced driver behaviours in South Australia, 2009** (CASR084).

Grigo JAL, Baldock MRJ (2011) **Sleepiness and road crashes: Challenges of definition and measurement** (CASR082).

Grigo JAL, Baldock MRJ, Raftery SJ (2011) **'The benefits and use of protective clothing for motorcyclists'**, 10th National Conference on Injury Prevention and Safety Promotion, Brisbane, 2-4 November 2011.

Hutchinson TP, Kloeden CN, Lindsay VL (2011) **'Intoxicated pedestrians: accident data from South Australia'**, Transport Engineering Australia, 13(1), pp 41-48.

Hutchinson TP, Kloeden CN, Wundersitz LN (2011) **'Studies on South Australia's Driver Intervention Program, and related research'**, Under The Radar Conference on Traffic Offender Programs, Sydney, 7 December 2011.

Hutchinson TP, Wundersitz LN (2011) **'Road safety mass media campaigns: Why are results inconclusive, and what can be done?'**, International Journal of Injury Control and Safety Promotion, 18(3), pp 235-241.

Lindsay VL, Ryan GA (2011) **'Medical conditions as a contributing factor in crash causation'**, 2011 Australasian Road Safety Research, Policing and Education Conference, Perth, 6-9 November 2011.

Raftery SJ, Wundersitz LN (2011) **The efficacy of road safety education in schools: A review of current approaches** (CASR077).

Raftery SJ, Wundersitz LN (2011) **No restraint? Understanding differences in seat belt use between fatal crashes and observational surveys** (CASR090).

Raftery SJ, Wundersitz LN (2011) **'Road Safety Education: Directions for the future'**, 2011 Australasian Road Safety Research, Policing and Education Conference, Perth, 6-9 November 2011.

Thompson JP, Baldock MRJ, Mathias JL, Wundersitz LN (2011) **'Conditions and characteristics of serious and fatal crashes involving older rural drivers'**, Emerging issues in safe and sustainable mobility for older people, Washington DC, USA, 30 August - 1 September 2011.

Weissenfeld AP, Baldock MRJ, Hutchinson TP (2011) **'Analysis of trends over time for motorcycle crashes in South Australia'**, 2011 Australasian Road Safety Research, Policing and Education Conference, Perth, 6-9 November 2011.

Wundersitz LN (2011) **Best practice in OHSW mass media campaigns** (CASR091).

Wundersitz LN, Baldock MRJ (2011) **The relative contribution of system failures and extreme behaviour in South Australian crashes** (CASR092).

Wundersitz LN, Hutchinson TP (2011) **'What can we learn from recent evaluations of road safety mass media campaigns?'**, Journal of the Australian College of Road Safety, 22(4), pp 40-50.

Effectiveness of road safety education in schools

This project reviewed current road safety education (RSE) programs for school students with the aim of evaluating the effectiveness of these approaches. Five primary approaches to RSE were identified: indirect or holistic approaches, one-time interventions, driver training, curriculum-based and multi-modal approaches. While driver training and programs resulting in early licensure have proved problematic, the majority of RSE programs are likely have some positive effect and at the very least do not produce harm. At present, programs that indirectly address road safety by targeting aspects of resilience and risk taking are showing some promise.

Evaluation of the effectiveness of the Community Policing and Education Project

The Community Policing and Education Project was launched by VicRoads and Victoria Police in 2009 to reduce the likelihood of motorcycle crashes through a combination of enforcement and education countermeasures. CASR evaluated the effectiveness of the Project using a range of methods. These methods included a process evaluation, analysis of crash data, on-road speed surveys, an online survey of motorcyclists and roadside traffic observation. Findings included improved wearing rates of protective clothing in metropolitan Melbourne and perceived increases in the likelihood of motorcyclists being detected for traffic offences.



Vehicle safety

The team

Associate Professor

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Sam Doecke

BE(Hons), Research Officer

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Professor Jack McLean

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Professorial Research Fellow

Giulio Ponte

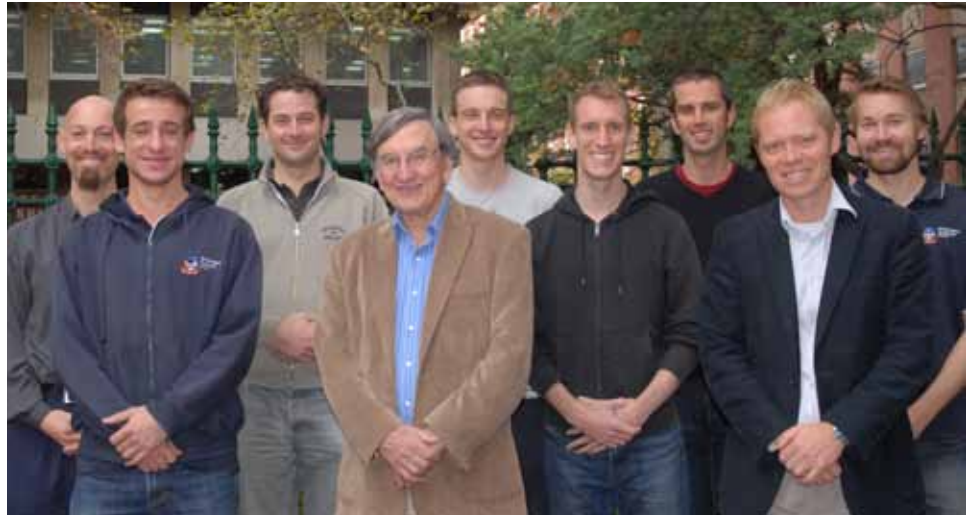
BE, Research Engineer

Daniel Searson

BE(Hons), Postgraduate student

Andrew van den Berg

BE(Mech)(Hons)
Vehicle Testing Laboratory Manager



Left to right: Giulio Ponte, Brett Linke, Andrew van den Berg, Jack McLean, Jeffrey Dutschke, Jamie Mackenzie, Daniel Searson, Robert Anderson, Sam Doecke

The results of the study highlighted the potential benefit of forward collision avoidance and mitigation technologies and also highlighted the advantages of developing such systems to be able to operate effectively over a wide range of driving conditions.

A Global Technical Regulation on pedestrian protection

Australia currently has no vehicle design regulations relating to pedestrian protection, however this may change if the Global Technical Regulation (GTR) on pedestrian safety is adopted. This research has sought to estimate whether current vehicles would comply with the GTR, based on their results in the Australasian New Car Assessment Program. The results indicate that many current vehicles would still fail to pass the requirements of the GTR, despite the requirements being less stringent than other international protocols.

Modelling the effects of advisory Intelligent Speed Adaptation (ISA) on the Australian driving population

This study sought to estimate the reductions in serious and fatal crashes due to advisory

Intelligent Speed Adaptation (ISA) in Australia and determine if the effect of advisory ISA is sensitive to the amount of time the driver is exposed to the advisory ISA device. The study used data from the trial of advisory ISA conducted by the NSW Centre for Road Safety as the basis for the effect of ISA. It was calculated that advisory ISA could reduce serious injury crashes by 19.3% and fatal crashes by 18.9%. No evidence of the effect of advisory ISA being sensitive to the exposure time was found.

Advisory Intelligent Speed Adaptation for government fleets

This project sought to determine the likely crash savings if state government fleets in Australia were fitted with advisory Intelligent Speed Adaptation (ISA). The cost effectiveness of such a fitment considered four different types of advisory ISA devices. ISA was found to have the potential to reduce casualty crashes in government fleets by 20%, avoiding 171 casualty crashes and saving \$31.6 million in crash costs per year. The type of device that was found to be most cost effective, having a payback period of around one year, was a navaid device that included ISA functionality.

Research highlights

Benefits of emerging vehicle technologies

The Queensland Department of Transport and Main Roads commissioned CASR to examine the likely benefits of emerging vehicle technologies. The project involved considering the relative occurrence of crashes that were likely to be reduced by several types of technologies under active development for passenger vehicles, heavy vehicles and motorcycles. The types of technology considered were primarily active safety systems designed to prevent crashes from occurring.

Publications

Anderson RWG (2011) **'Safety related attributes of registered vehicles and of vehicles that crash in South Australia'**, 2011 Australasian Road Safety Research, Policing and Education Conference, Perth, 6-9 November 2011.

Anderson RWG, Doecke SD (2011) **'An analysis of head impact severity in simulations of collisions between pedestrians and SUVs/work utility vehicles, and sedans'**, Traffic Injury Prevention, 12:388-397, 2011, 12, pp 38-397.

Anderson RWG, Hutchinson TP, Linke BJ, Ponte G (2011) **'Analysis of crash data to estimate the benefits of emerging vehicle technology'** (CASR094).

Creef K, Wall JP, Boland P, Vecovski V, Prendergast M, Stow J, Fernandes R, Beck J, Doecke SD, Woolley JE (2011) **'Road safety**

benefits of intelligent speed adaptation for Australia', 2011 Australasian Road Safety Research, Policing and Education Conference, Perth, 6 - 9 November 2011.

Doecke SD, Anderson RWG, Woolley JE (2011) **'Advisory Intelligent Speed Adaptation for government fleets'** (CASR099).

Doecke SD, Woolley JE (2011) **'Cost benefit analysis of Intelligent Speed Adaptation'** (CASR093).

Doecke SD, Anderson RWG, Woolley JE, Truong J (2011) **'Advisory intelligent speed adaptation in government fleet vehicles'**, 2011 Australasian Road Safety Research, Policing and Education Conference, Perth, 6-9 November 2011.

Hutchinson TP, Anderson RWG (2011) **'Newer cars: much safer'**, 34th Australasian Transport Research Forum, Adelaide, 28 - 30 September 2011.

Hutchinson TP, Anderson RWG (2011) **'Smaller cars: Not to be feared'**, 34th Australasian Transport Research Forum, Adelaide, 28 - 30 September 2011.

Hutchinson TP, Searson DJ, Anderson RWG, Dutschke JK, Ponte G, Van Den Berg AL (2011) **'Protection of the unhelmeted head against blunt impact: The pedestrian and the car bonnet'**, 2011 Australasian Road Safety Research, Policing and Education Conference, Perth, 6-9 November 2011.

Searson DJ (2011) **'The Global Technical Regulation on pedestrian safety: Likely effects on vehicle design'**, 2011 Australasian Road Safety Research, Policing and Education Conference, Perth, 6-9 November 2011.

Are newer cars safer than older cars?

The secondary safety of new cars has been improving substantially in recent years. Evidence comes from single-car crashes in South Australia and car-car collisions in SA and NSW. Comparison of the severities of injury to the two drivers in the one collision is useful because speed of the impact is the same for the two drivers. The basic question is, which driver is killed? It is shown that it is much more likely to be the driver of the older car.

Are smaller cars less safe for occupants?

Small cars are sometimes said to have a relatively high probability of serious injury to their occupants. In collisions with other vehicles, this is true, as there is a strong effect of mass ratio. Beyond that, results of this project argue that there is probably little or no further effect. Three lines of evidence are presented: theoretical analysis of the movement of occupants in collisions, review of claims made about data from the 1970's and 1980's and analysis of recent South Australian data on single-car crashes.



Biomechanics

The team

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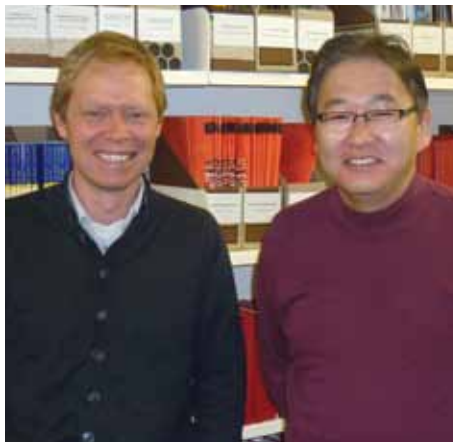


Left to right: Robert Anderson, Jeffrey Dutschke (Inset: Baptiste Sandoz)

Research highlights

Traumatic brain injury

CASR is maintaining its involvement in traumatic brain injury research through two projects examining brain injury mechanisms and thresholds. Robert Anderson is a co-chief investigator on an NHMRC project examining mechanisms of injury in non-accidental head injury in the infant (sometimes known as shaken baby syndrome) in collaboration with other brain injury researchers at the University of Adelaide and at the Hansen Institute. He is also collaborating with Associate Professor Tetsuya Nishimoto from Nihon University examining thresholds for the production of brain injury in response to mechanical strain. These are long-term projects but significant results are expected to appear in publications during 2012.



Left to right: Robert Anderson, Tetsuya Nishimoto



Publications

Anderson RWG, Doecke SD (2011) **'An analysis of head impact severity in simulations of collisions between pedestrians and SUVs/work utility vehicles, and sedans'**, Traffic Injury Prevention, 12:388–397, 2011, 12, pp 38-397.

Sandoz B, Anderson RWG, Finnie J, Wells A, Turner R, Vink R (2011) **'Reproducible brain injuries produced in a sheep model by direct impact'**, International Society of Biomechanics, Brussels, Belgium, 3-7 July 2011.

Sandoz B, Anderson RWG, Liu Q, Helps S, Finnie J, Blumbergs PC, Vink R (2011) **'Biomechanical responses in an ovine model of non-accidental head injury (shaken baby syndrome)'**, International Society of Biomechanics, Brussels, Belgium, 3-7 July 2011.

Data analysis

The team

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Left to right: Paul Hutchinson, Craig Kloeden, Robert Anderson

Research highlights

Data analysis is fundamental to research conducted at CASR. The majority of research projects require a level of data analysis and all staff are involved in this process. However, the Centre does have a specialist team of data professionals who support more complex analysis and develop new approaches to studying and applying data.

A recent example of complex data analysis is a project modelling the forecast changes in the road toll in the medium and longer term:

Utility of historic trends to project future number of crashes

With the release of the state and national road safety strategies, it became timely to examine the likely magnitude of the road toll over the strategy period. In this study some simple models were examined for their utility in projecting future fatality numbers. Functions that represent the crash rate and travel exposure were fitted to time series of South Australian crash data. The model is used to examine the utility of forecasting crash numbers based on medium to long-term trends. The work will be used for forecasting in future modelling of road crashes for the estimation of probable benefits of a range of road and vehicle safety changes.



Publications

Anderson RWG (2011) '**The utility of historical trends to project future numbers of crashes in South Australia**', A Safe System, making it happen. Australasian College of Road Safety national conference, Melbourne, Australia, 1-2 September 2011.



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