Lessons from in-depth –
Cutting edge software helps to visualise a crash

An important part of CASR's in-depth crash investigations is performing a reconstruction of the crash.

One of the main aims of such a reconstruction is to determine the speeds that the vehicles were travelling at prior to the crash and the speed at which the vehicles impacted. Another function of a reconstruction is to test the driver and witnesses' versions of events for their physical credibility. It is important that a reconstruction models the real life crash as closely as possible. At the beginning of 2009 CASR invested in state of the art software, known as HVE, to enhance this process. HVE is a complete 3D reconstruction environment that encompasses physics programs to simulate the movement of the vehicle and the collision forces. The 3D capacity of HVE means that the true 3D geometry of the road can be modelled and driven on including super elevation, slopes, crests and speed bumps. Roadside terrain such as embankments, batters and curbs can also be modelled and included in the reconstruction. The 3D environment also allows reconstruction of a crash where a vehicle becomes airborne or rolls over. In the event of a collision with another vehicle or the environment, the vehicle's mechanical properties are used to determine the extent of damage and the resultant forces the vehicle will experience. HVE also allows for many other factors to be taken into account including cross winds, hydroplaning, transmission type, drive type, suspension and tyre type, tyre deflation, wheel damage, ABS and 'hands off' vehicle steering. By matching the tyre marks, vehicle damage and final position of the vehicles the reconstruction can accurately reflect what happened in the real world crash. One of the outputs of the program is a 3D visualisation of the crash, which can be used to examine the crash from the driver's viewpoint. HVE can also be used to conduct simulation studies on crash phenomena or road-vehicle interactions and is currently being used to assist CASR determine the best approach to mitigate the consequences of a run off road crash.

New publications

Headform impact test performance of vehicles under the GTR on pedestrian safety (CASR072)

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Department for Transport, Energy and Infrastructure

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2010 CASR seminar series

The CASR seminar series will address major topics in the fight to reduce road trauma and highlight the latest research in the area.

31 March **Vehicle Regulations for Pedestrian Safety** Daniel Searson

28 April **Young drivers** Dr Lisa Wundersitz

For a full list of 2010 seminars please see our website.

The seminars are held in The Art Gallery Auditorium from 4.00 - 5.30pm.

To confirm your attendance please contact Leonie Witter on (08) 8303 4114 or email leonie@casr.adelaide.edu.au.

THE UNIVERSITY OF ADELAIDE AUSTRALIA

At the scene

Newsletter of the Centre for Automotive Safety Research Issue 5, March 2010

Lower rural speed limits – more good than bad

CASR researchers Jeff Dutschke and Jeremy Woolley have been studying the effect of lower speed limits on travel times on rural roads.

Reducing travelling speed is one of the most effective ways of reducing road trauma. This is especially true on rural roads. Lowering speed limits is a highly cost effective way to improve road safety, even when travel time is taken into account. There are also considerable benefits for the environment and vehicle running cost savings.

Many people perceive that a lowering of speed limits will impact greatly on their travel times. A common complaint is often heard during a telephone call to the local talk-back radio station: "I always travel at the speed limit and the time that it takes me to get somewhere is going to increase with this new speed limit." This study addressed these concerns directly. "There are other factors on the road that need to be considered beyond the speed limit," says principal researcher Jeffrey Dutschke. "Those factors include the other vehicles on the road and opportunities that exist for overtaking."

The study modelled a rural road that had its speed limit lowered from 110 kph to 100 kph. Various numbers of vehicles were modelled on the road and these vehicles obeyed a real distribution of traffic speed. The results show that travel time for the driver who drove at exactly the speed limit increased less than 10% when the speed limit reduction was applied. "The 10% increase in travel time only occurred for a small percentage of journeys when there were low numbers of vehicles on the road," comments Jeff. Generally, the increase in travel time was less than 10%. "Or the time it takes to make a cup of coffee after a 100km journey."

The study had other findings too. "Drivers who wish to travel at the speed limit spend less time behind slower vehicles when a lower speed limit is applied. And they have to overtake other vehicles less often," he said. "Both of those things may increase the road safety benefit of reduced speed limits," adds Jeremy.

This study was presented at the Road Safety Research Policing and Education Conference in Sydney in 2009 and was awarded the John Kirby Memorial Road Safety Award for the best paper by a new researcher.

For more information please contact Jeff Dutschke, jeff@casr.adelaide.edu.au

French researcher joins CASR

Baptiste Sandoz of INRETS in France has joined the CASR research team. He will be working on head injury and biomechanics projects including the NHMRC Grant project awarded to Dr Robert Anderson. Baptiste has recently completed a PhD in paediatric injury biomechanics and will be working at CASR for approximately 12 months.

Message from CASR

Welcome to our first newsletter for 2010. CASR is growing this year with three new researchers and a post-doctoral fellow having joined us in the first quarter. We think it is vital to keep bringing new people into the area and to give them a chance to develop into the next generation of road safety researchers. We hope you enjoy our first newsletter of the year and look forward to hearing your comments and suggestions.

Mary Lydon, Director, mary@casr.adelaide.edu.au

CASR researcher visits China

In December 2009 Jack McLean gave a presentation on the development and use of injury severity scales at a seminar on vehicle traffic safety at Hunan University in Changsha, China.

The seminar was part of a five year program to promote collaborative research activities in selected Chinese universities by inviting experts from other countries to present lectures in designated areas, in this case vehicle traffic safety. The Chinese Ministry of Education and Hunan University jointly fund the program. About a dozen experts have been involved in the program since its inception two years ago, mostly travelling from Europe, the United States and Japan, together with Robert Anderson and Jack McLean from Australia. The seminar coordinator is Professor Jikuang Yang of Hunan University, who also holds a professorial appointment at Chalmers University of Technology in Sweden.

Two or three seminars have been conducted each year. The topics covered by Robert and Jack have included:

- The methodology of accident investigation, including sampling criteria
- Database structures for in-depth injury studies
- Accident case studies: multifactorial crashes, vehicle, road and traffic factors
- Traffic injury epidemiology: descriptive and analytical studies
- Vehicle traffic accident prevention: with emphasis on the role of speed and alcohol
- The study of pedestrian injury to evaluate test procedures
- The effect of speed on pedestrian injury/fatality
- The study of injury biomechanics by using data from accident investigations with emphasis on brain injury mechanisms.

For more information please contact, Jack McLean, jack@casr.adelaide.edu.au

CASR welcomes new staff

Left to right: Simon Raftery, Brett Linke, Jennifer Grigo

This month we welcome 3 new staff to the CASR team.

Simon Raftery has a Bachelor of Psychology and is currently working on his PhD examining the relationship between substance use and offending behaviour. Jennifer Grigo holds a Bachelor of Behavioural Science (Psychology) and Brett Linke holds a Bachelor of Mechanical Engineering.

All 3 staff will initially be working as crash investigators.

CASR Researcher seconded to DTEI

CASR Senior Research Fellow, Jeremy Woolley, has commenced a six-month secondment to the Department of Transport, Energy and Infrastructure (DTEI).

Jeremy is currently acting as the Manager of the Safer People section (formerly Safety Policy) in the Safety and Regulation Division. The role will expose him to policy and legislative processes within the Department and will result in stronger ties between CASR and DTEI. Jeremy will play a key role in initiating the development of the next Road Safety Strategy for South Australia.

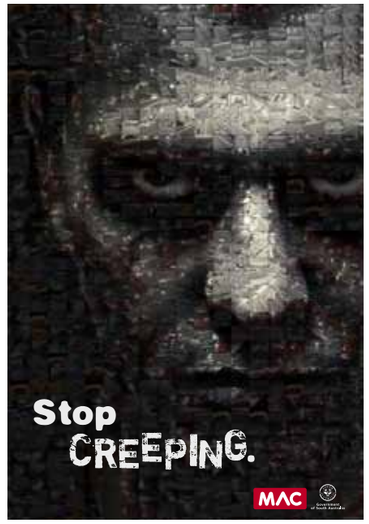

Image courtesy of Motor Accident Commission (MAC)

How can we make road safety advertising more effective?

Road safety advertising campaigns can play a valuable role in improving road safety though agenda setting and promoting safe behaviours.

It is important to understand what elements make a road safety advertising campaign effective and how we might enhance the ability of future campaigns to reduce the number of deaths and injuries on Australian roads. A current project worked on by Lisa Wundersitz was designed to provide a timely update of what is currently known about road safety advertising design and evaluation. Australian and international advertising literature was reviewed to determine best practice for road safety advertising campaigns. Instead of examining whether road safety advertising is effective or not, this review focused on what aspects of road safety advertising are more effective and for whom.

Design factors that can improve campaign effectiveness can include integrating advertising with other activities (e.g. enforcement), tailoring message content and means of communication to the characteristics of the target audience, using psychological theories of behaviour change, and using new technology and multiple forms of media to reach the target audience. The usefulness of different types of appeals (e.g. emotional, rational, threat) was also reviewed, with new evidence suggesting that gender may influence the effectiveness of different emotional appeals.

The review also highlighted the difficulties in establishing the effectiveness of an advertising campaign, considered different evaluation methods and discussed the value of different campaign evaluation measures. It is important to remember that the ideal evaluation methodology is not always feasible or practical. Where possible, campaign evaluations should be based on before and after comparisons of behaviours that can be objectively observed and are closely linked to safety such as on-road speed or seat belt surveys.

For more information please contact, Lisa Wundersitz, lisa@casr.adelaide.edu.au

In the spotlight – Lisa Wundersitz

Lisa began working as CASR in 1996 after completing a degree in Psychology.

Her research career began with an interesting project that involved observing and interviewing people using coin-operated breath testing machines at 25 licensed venues around South Australia.

In her time at CASR, Lisa has worked on a variety of projects associated with road user behaviour including: a review of best practice drink driving in South Australia, annual reports examining the operation and effectiveness of drink driving, drug driving speeding and restraint use enforcement, an on-road observational survey of seat belt use, and identifying and understanding exposure measures. She has also worked on numerous projects concerned with the evaluation of road safety programs such as roadside coffee stops, campaigns to increase restraint use in regional areas, road safety programs in schools and young driver interventions.

Lisa is also an integral member of the in-depth crash investigation team. Her involvement includes at-scene crash investigation and conducting follow-up interviews with crash participants. “Attending crash scenes really brings home the sad reality that road trauma not only affects the people directly involved in the crash but the whole community.”

Lisa has a special interest in the challenging area of young drivers. In 2007 she was awarded a PhD in Psychology, investigating individual characteristics that might identify young drivers at a higher risk of crashing. This work involved developing and administering questionnaires to young drivers and tracking their driving history. “Young drivers are consistently over-represented in crashes and this trend appears to be continuing. This year I will be working on a new project that will utilise the detailed information collected during our in-depth crash investigation program to explore causes and contributing factors leading to young driver crashes. The level of detail in our databases can’t be obtained from other aggregate data sources. Through the identification of specific young driver crash issues, better countermeasures might be developed to reduce young driver crashes.”

In her commitment to young driver issues, Lisa also works as a group facilitator for the South Australian Driver Intervention Program; a discussion group-based program designed for young traffic offenders.