

**THE LEGISLATIVE COUNCIL SELECT COMMITTEE ON ROAD SAFETY MET
AT CASR, FROME STREET, UNIVERSITY OF ADELAIDE, ADELAIDE ON
FRIDAY 30 JANUARY 2009**

THE COMMITTEE MET WITH **Dr ROBERT ANDERSON**, DEPUTY DIRECTOR, **DR JEREMY WOOLLEY**, SENIOR RESEARCH FELLOW, **Professor JACK McLEAN**, FORMER DIRECTOR AND **Mr CRAIG KLOEDEN**, RESEARCH FELLOW, CASR, UNIVERSITY OF ADELAIDE.

Dr ANDERSON - I would like today to welcome you to CASR - the Centre for Automotive Safety Research. We will give a short overview of who we are with some background. Jeremy Woolley will give a presentation on some of the specific projects that we have been working on and other areas of interest. At any stage if there is something in particular you want to talk about or if you want to change direction that is fine; we will talk about whatever is most suitable for your inquiry.

The centre has been around for about 30 years in one form or another. It previously was known as the Road Accident Research Unit under the direction of Jack McLean for more than 30 years. We now have a new director, Professor Mary Lydon. We have around 18 people at any one time working for us, a combination of administrative staff, senior researchers, research assistants and PhD students.

I think we would happily claim that we have had a reasonable influence on State and national policy when it comes to road safety, maybe most famously or infamously to do with the study of risks associated with vehicle travelling speeds. That research was really what allowed people to make a decision to move to lower urban speed limits. We quantified the likely benefit from that reduction and since we have also done some evaluations of actual reductions. Originally it was theoretical exercise based on crash investigation and since then we have had a chance to evaluate that effect.

Similarly, for many years one of Jack's interests was the risk factors associated with drink-driving and looking at how the risk increased with increasing levels of alcohol. We are interested not only in road safety measures but also in vehicle safety measures and probably our major activity in that area has been looking at vehicle design and personal protection. I will talk about that area shortly.

One of the things that we have an emphasis on is having a good relationship with policy makers and practitioners. Our core funding at the moment really comes from the State Government, through a deed that was struck between the university and the State Government. The money flows from the Department of Transport, Energy and Infrastructure and also the Motor Accident Commission, the compulsory third party insurance body. We have a long history of collaboration internationally and locally, giving the context for backing up the research we do in the international sphere and this keeps the research relevant not only for here but internationally as well.

We have always been a part of the University of Adelaide. We are an academic department of the University but different from most other teaching departments we do very little teaching. We survive only on the money that we can bring in under contract

and through the State Government. There is no real money from the university; we are within the university but somewhat independent from the usual machinations of higher education. That means that we have access to a range of experts and we have done collaborations drawing on especially psychology experts and sometimes with engineering.

The team itself comes from quite a few different disciplines. Jack was originally an engineer and became a biostatistician. We have a lot of people from the behavioural sciences, such as psychology. We have some engineers, some behavioural psychologists, some medical staff. At the moment we have one research nurse and she is doing a lot of work with the hospital but we have had trained doctors working for us as well at various points in time, people with expertise in statistics and also an economist.

Ms FORREST - What is the nurse's role in the hospital; is she looking at data collection at all?

Dr ANDERSON - At the moment she is. The emphasis for that data collection is looking at medical factors in crashes. It is to do with fitness to drive. We had noticed in the indepth work that one of the causal factors in a reasonable proportion of crashes could be tied directly to a pre-existing medical condition, but because of the way we collected data we did not know whether we were getting a really good picture of that. It could have been biased to older people with medical conditions so we have recently looked at every admission coming through the hospital from a road crash to investigate their medical history. That dataset will pass through many other different things as well in looking at how good the police records are compared to actual injuries and a few other things like that.

Ms FORREST - Are you looking at quantifying the extent of the injury? You seem to have fatalities and serious injuries but the serious injuries are perhaps a bit loose in how they are defined, including just being transported to hospital. Some of those people would actually not be admitted and then you could have ones admitted overnight for observation or whatever not requiring serious treatment and then you have the ones who are in ICU for weeks.

Dr ANDERSON - Exactly. The definition is almost correct. If you are transported to hospital it is called a hospital treatment in the police system. If you stay overnight or longer it is an admission and that is a category we call 'serious'.

Ms FORREST - You just take admission not transport?

Dr ANDERSON - Yes, but that is a police code, it is not a hospital code. The reporting officer has to get that right so they have to follow up a case. We are not sure about the accuracy. We have done some work on the accuracy of that variable and it is a particular problem. Also that range of overnight observation through to catastrophic injuries is probably too broad. The data that she is collecting could answer some of those questions but we also have - and I will talk about data sources shortly - the hospital separations data which gives a bit more of a clue.

Ms FORREST - Not everyone from a car crash goes to hospital in an ambulance.

Dr ANDERSON - The category is not ambulance transport, it is either you are treated at the hospital as an outpatient or you are admitted. How you got there is not formally part of the coding. The police officer might ask an ambulance officer for an opinion about what is going to happen and write that down. We do not really know how that variable gets coded. On average you have it from year to year.

The centre has collaborated with different organisations over the years. For example, last year we did quite a large project with INRETS, the road research group in France and they do a lot of safety research. We did some biomechanical injury work on pedestrians with them. Currently we are proposing to do some work with Newark on indepth crash investigation and we are doing work for people like our Austroads, the Federal Government, the Department of Infrastructure and we have done work for the State road authorities as well.

In terms of international collaboration, it either takes the form of research projects where we might have visiting researchers or we have done training programs and indepth crash investigations. We have had engineers from Malaysia and from Thailand here for specific training on indepth crash investigations so that they can go back and create programs in their own countries.

CHAIR - They would have a lot of work in Thailand.

Dr ANDERSON - Yes.

Mr DEAN - And a lot of work Malaysia, too.

Dr ANDERSON - That is right. Australia does not really have a road safety problem when you compare it in context.

Ms FORREST - But they accept that there are different standards. For example, they accept deaths in childbirth.

Dr ANDERSON - I think they are becoming less accepting.

At the core of the general objectives of the research that we do is understanding why crashes occur and obviously trying to prevent crashes, and then if they are in a crash, why people are injured in one crash and not another. In terms of developing countermeasures, that means evaluation by and large. We might develop it through, for example, studies on speed or alcohol, but then there will probably be even more work if the countermeasures introduced evaluating different sentiments like rural speeds, determined speeds and so on. As to public response, we have done a few focus groups but we probably do a lot more in understanding the cost implications, whether that is the cost implications of road regulation changes or, for example, changes in vehicle design. We have done a little bit on that.

CHAIR - I suppose understanding the public response would be related to the goodwill of the public and whether they are prepared to accept certain measures?

Dr ANDERSON - I am sure that is what it is. I would not want to over emphasise that that is something that CASR is a specialist in, particularly as this is being put into *Hansard*.

Laughter.

Dr ANDERSON - As to the main sort tools that we have, number one on the list is our indepth crash investigation; everything starts with that. We need to understand what is happening in real crashes and that understanding helps to guide where we might focus our efforts later on. Even some of the more detailed biomechanical and laboratory work we do starts with that crash investigation and observations about pedestrian injuries, as I will explain in a minute.

Beyond that we have data collection analysis, which includes the regular police-reported traffic accident data. That is called the Traffic Accident Reporting System in South Australia, or TARS. You may not have heard of it but basically all the police-reported crashes are processed centrally by DTEI and they clean up the records and we have a copy of that database and are able to do quite a few different bits of analysis on that data, like looking at trends and ascertaining patterns of crashes amongst different aged drivers and so on.

Dr WOOLLEY - The main difference with what happens in Tasmania is that there the police records, or even the manually-written accident records get sent to DIER directly and then DIER do the data entry and quality control of that there and then. It is quite a tight operation and they manage to keep a good eye on quality control. What happens in many of the other States is that the police conduct the data entry and their own quality control and then release a version of that database to the road authorities who then value-add to it with their own variables, be they engineering things or things they need to maintain their own road networks.

So in Tasmania it is probably more integrated than most other jurisdictions in the sense that the police records go directly to DIER for processing and entering into the database. The other thing which is quite effective in Tasmania is that you have a spatial database which has been set up which means that you can produce maps of where the crashes are occurring and obtain your intelligence that way.

CHAIR - What do you consider to be the standard of the data provided by the police, the amount of detail et cetera?

Dr WOOLLEY - I think that what works well in Tasmania is just the sheer scale of things. Because you do not have as many crashes as other jurisdictions in terms of total numbers, DIER is able to keep a pretty close eye on what is happening and whenever there is variation in the quality of data coming in or clarification needed on things, I do know for a fact that the people in DIER actually ring up the officer who submitted the form and chase it up and clarify it. I think in that sense it works very well for the database you have.

Dr ANDERSON - We also operate an impact laboratory. That is all to do with safety of vehicles. We use that for racing vehicles for the new car assessment program in Australia. So we do the pedestrian test and components of that. We also do some crash reconstruction work; with crashes we have investigated we try to reconstruct the impact to understand why someone was injured or the severity of the impact they were subjected to.

We also do a lot of literature review-type work, so often some of the questions that the State Government road authority here might have can be answered just by a review of the literature, so being on top of that and understanding what is happening elsewhere is a service that we provide. As I mentioned before, we do some education, a lot of work through the library disseminating data, especially our own work, to as wide an audience as possible.

I was going to talk about the indepth work but Jeremy is going to present that in a bit more detail. I will just mention that probably what sets this activity apart from, for example, what is happening at MUARC, is that we do it at the scene, at the time of the crash. For the area we cover it is feasible to get to the scene within a reasonable time so that the cars are still in position. I think in Melbourne that is probably a little more difficult, but that means we are able to collect a lot more data from the scene, as it generally tends to erode quite quickly.

Mr DEAN - Do police have a requirement to notify you of reported serious crash scenes?

Dr ANDERSON - What happens is that we plug into the State's digital emergency services radio network and we also get paged. It is an automatic paging system and for certain codes we get a notification. We have a screen that we can look at and see what is happening and as soon as the ambulance is called we try to head out there.

Ms FORREST - Roughly how long does it take you to undertake that? I imagine that in many places you would have to close the road. In Tasmania you certainly would.

Dr ANDERSON - It depends. I think if you are at the scene and it is serious enough the police will have closed it off anyway. You try to do as much of that kind of work - correct me if I am wrong, Jeremy -

Dr WOOLLEY - I will talk directly to this topic, so we might wait until then.

Dr ANDERSON - In terms of the mass data analysis, I talked about the traffic accident reporting system and the database of police-reported crashes but more recently we have been trying to make use of that in conjunction with other data sources, so that includes the driver licensing and driver offence data. For example, Craig recently did a report for Austroads where he linked driver licensing and offence data to crashes to look at the linkage between how long they were on their Ls and a whole lot of other factors you could tell from the licensing records and their risk of crashing in the first 12 months after getting their licence. So by linking data we can do a lot more. If you just look up the crash data and you have a young driver crash, we don't know how long they had their Ls for; we don't know anything about that licensing period where they were learning to drive, but by matching the driver records we can do a little bit more.

It is the same with vehicle registration data. We can link that into the crash data to get more information about vehicle attributes, like the age of the vehicle. There is something we are working on now with the mass of vehicles and risk of injuries and those sorts of things. We can look at some of the risk factors for serious injuries. We also process a lot of data from on-road speed surveys, usually collected by a third party but sometimes at our design, where we instruct what parts of the road network we want

surveyed, and Jeremy has been involved with that. That data collection is analysed looking at the changes in speeds year on year, whether people are slowing down on average or what is happening to the speed distribution. On the basis that we know the speed, those sorts of speed changes will be reflected in crash numbers.

We also make use of other detailed data on crashes, including getting access to coronial files from fatal road crashes. They are not usually inquests, more just coroner's reports but that includes pathology reports with all the injuries for major crash interpretation of what happened and also things such as alcohol and drug consumption from blood tests and so on. All that data can be used again to look at risk factors for being involved in fatal crashes. Similarly, with hospital and medical data we are collecting information from hospital admissions at the moment. That will produce a fountain of data to try to relate the circumstances of the person, their condition and things to do with pre-existing medical conditions and their involvement in crashes. So a lot of it is trying to find and identify the best data sources to understand the whole problem from as many different angles as possible. Obviously there is other normal statistical data as well - ABS surveys and focus groups and so on.

The impact laboratory studies pedestrian impacts with vehicles and looks at the link between vehicle design and the potential for pedestrian injury. You might have seen crash test laboratories in the past or photos or films. In that case the car is usually driven into a large concrete block. The difference here is that the car is stationary and we fire things at it. We do not use a pedestrian dummy in the way that we have a crash test dummy because a crash test dummy in a car typically has to move about that far. They are sitting there and it goes like this. A pedestrian has to do a quite a large movement and to make a dummy that works was too much of a challenge. So we tend to just use these subsystems, like something representing the head. Up here you can see a dark black mass at the end of that yellow impact; that is representing the upper leg. We fire these things at the cars or in some cases we have been studying the effect of bull bars on pedestrian safety using this laboratory as well. As part of the work that we do for the new car assessment program we basically survey the fronts of vehicles for their potential to cause injury and that is reported to consumers if they are so inclined to take any notice of that information.

As I mentioned, these are the impactors we use. We are looking at injury here to the knee or to the tibia, then the upper leg and pelvis and then the head of a child and the head of an adult. These are statistically the most common body regions to be injured in pedestrian crashes.

We do all the testing for the Australian New Car Assessment Program according to the European New Car Assessment protocols. We have tested about 80 vehicles since about 2000. That is an average of about 10 a year through the laboratory. In the near future, and already in Europe, the pedestrian rating is now being integrated into the total star rating of the vehicle. So to produce a five-star car you have to make it pedestrian safe and we expect Australian cars to follow soon.

We also use computer simulation techniques to understand the motion of a pedestrian crash, to study the link between how people are injured and at what speed they tend to hit the bonnet or the windscreen so that we are making sure that we are testing under the

right conditions. This usually involves the reconstruction of real crashes that we have investigated in our indepth work.

We have probably Australia's most extensive library of road safety-related material and that is searchable on the library's web page. So if you are ever looking for particular publications or particular themes this is a valuable resource and we are part of interlibrary schemes to allow access to that material. We do all the normal things - write reports, present at conferences and so on.

Current projects we are looking at include ones surrounding road infrastructure and particularly issues around clear zones and barriers. That is a theme for the coming year. We are continuing to look at the effectiveness of speed countermeasures and understanding the role of speed in crashes and how speeds in general respond to speed limit changes, and continuing our work on projecting pedestrians and other vulnerable road users.

As a State government you really cannot do much about influence in vehicle design. That is a federal matter and is largely up to the vehicle manufacturers anyway. So what is of interest to the South Australian Government at the moment is that technology is making its way into the fleet. It is all very well for a high-level Citroen C6 or whatever to have top marks for pedestrian safety, but they only sold 80 in Australia last year so it is almost irrelevant.

So what is the performance of the fleet rather than the individual models? How is that technology making its way into the fleet? Related to that is work on evaluating electronic stability control in South Australian lost-control crashes, fitness-to-drive issues, young drivers, and the continuing of our training. So there is quite a large spread.

Ms FORREST - So you are looking at the psychological side of it at the moment, attitude and driver behaviour sort of stuff?

Dr ANDERSON - Most of the work in the human factors area is either in fitness to drive, young drivers or older drivers. Matthew Baldock, one of our psychologists, is looking at self-regulation by older drivers. When people get older they might be more careful or avoid certain routes, so what extent are they self-regulating and compensating for their declining skills. So that is an area of study for them.

Surveys of attitudes tend to be conducted because the Motor Accident Commission are interested in those but their marketing people do a lot of that work.

Dr WOOLLEY - We do have extensive experience of research in the road safety area and Professor McLean will attest to the contents of this study. It is special report number 1 for the Australian Road Research Board. One of the major findings from that, for example, was that pedestrians are actually run under rather than run over. The shape of the front of the vehicle was very much a determinant in the injuries that the pedestrian suffered. It highlights the fact there are a lot of myths and old wives tales in road safety and it often takes a lot of scientific studies like this to debunk those myths. From 1966 we have come a long way but it certainly has not been an easy route and we are still by no means there yet. There is still a lot of work to be done.

One of our key and core activities is indepth crash investigation. We tend to conduct those in both rural and metropolitan areas. What we have done in the past is formulate projects which were approximately three years in length. We would spend three years focusing on metropolitan crashes and then another three years focusing on rural crashes. As it turns out from this point onwards we are probably going to mix that up a little bit just to even it out and also attend crashes which may be of particular interest in both areas.

We have a core team of investigators who basically are notified by the ambulance service whenever an ambulance is despatched to a crash and they jump in the vehicle with all their relevant equipment and drive to the crash scene. Obviously, in the metropolitan area we can get to the crashes fairly quickly, whereas in rural areas it is more of a challenge. We normally have a 100 kilometre radius from Adelaide where we attend crashes and that means we can often get to crashes within about an hour and by that time there is still much of the evidence intact.

As highlighted, the main difference between this activity and that conducted by others is that we attend the crash scene. That means a lot of the evidence is still preserved and in place. We can see the final positions of involved vehicles and a lot of the physical evidence is still there, such as skid marks as so on. What tends to happen is that the police will block off the road or secure the site and once they have cleared the vehicles the firemen will sweep the debris away. If the crash happens in rain or other weather conditions the skid marks and other scratch marks may fade with time and a lot of that crucial evidence may be lost. We see it as very important that we try to attend the crash as soon as possible after it has occurred.

Ms FORREST - It would be much more difficult at night, obviously, to get the photos of skid marks.

Dr WOOLLEY - Yes, night is another issue, but at present our criteria for attending crashes are basically working hours during the working week for reasons of resourcing, if we were to go for other types of studies. We have in the past done around-the-clock representative samples but that is quite resource-intensive and at the end of the day it boils down to what specific things you are researching and looking for. At present, we find that weekday 9 to 5 crashes are adequate for our needs.

In terms of the notification, as Robert mentioned, we are on the digital dispatch system and we get an automatic page from the ambulance service every time a despatching scrambles an ambulance. We have found this to be a very good system; whereas in the past we had to rely on the generosity of the ambulance service to let us know that something had happened but in the pecking order we were right down the list of things to do when naturally they had other things to worry about. This system is quite foolproof and we have a pretty good idea of when most crashes are occurring.

We attend the crash at scene and we photograph and map the scene. We make an engineering drawing of the scene using a theodolite.

Mr DEAN - Why do you need to do that, because with all serious accidents and fatalities police do all these things using a theodolite, so you just repeat all of those?

Dr WOOLLEY - Yes, but the police only do that for a small number of cases.

Mr DEAN - They do it for all fatalities I think, don't they?

Dr WOOLLEY - They do it for all fatalities, generally.

Mr DEAN - And in Tasmania, I think, for serious injury.

Dr WOOLLEY - Okay. Well certainly here they don't do so for that many cases and generally if there is no surviving driver who is probably at fault or the culpable driver, in other words, they are unlikely to continue with investigation. That is where we are subtly different from the police in our investigations. The police are investigating if there is a case for prosecution and we are finding out all we can so we can better understand the crash to prevent it happening in the future.

Mr DEAN - Obviously, it is slightly different, because in Tasmania not only are they looking for evidence in relation to an offence but they are also looking at evidence of what caused the accident that is what you are looking at obviously.

Dr WOOLLEY - Yes. Just a slightly different emphasis in terms of where you might put your energies to investigate various avenues.

The other thing we do is, if there are victims or witnesses, we make initial contact which we pursue later through indepth interviews with them. As part of this we have a multi-disciplinary review. We will review the crash histories of the drivers and the crash location and in some cases we remodel the crashes using computer software so we can get a better understanding of the vehicle dynamics.

Here is an example of a crash diagram that may be created. You can see the lead-up to the crash and the vehicles in their final resting position but also indicated are the skid marks left by the vehicles and so on. We generally have a crash diagram for each crash we investigate. We have our own database of variables which we fill in and all these can be queried later for our own research needs.

We contact the people involved and on a voluntary basis conduct in-depth interviews with them. This is where we value-add on a lot of other research activities in the same area. We get all the standard information about their personal details, circumstances, demographics, and the circumstances of the crash. How did they perceive the crash? How did they interpret the road network? What was their state of mind or stress level at the time? Were any distractions occurring? We try to get their perspective on everything and what the contributing factors may have been to that crash. Obviously, we gain some very valuable insights through this activity.

Ms FORREST - How soon after the crash do you try to do that?

Dr WOOLLEY - That varies. Often we follow up within the next week trying to contact them, but there are various circumstances where obviously some people are very traumatised by the crashes and it may take a while before they are willing to talk. A lot of people refuse to talk or be involved any further because they just want to have nothing more to do with it. It varies, but we try to pursue them as soon as we can.

Ms FORREST - Is the general public aware? I am just thinking about compliance and I know people can be stressed and upset but if they can see there is potentially a public benefit I think most people are more likely to participate in research.

Dr WOOLLEY - I suspect that is what happens. There are two aspects here. First, we have freedom from subpoena under our health act under section 64D, and that gives a lot of peace of mind to the people who therefore talk to us. We are very careful about our image and how we cooperate with the police. We are careful not to give evidence in court and things like that in cases where we might get a situation where we are seen as being part of the police or working with the police. Our independence is a big consideration in our activities.

Ms FORREST - Is it well-known by the people of South Australia that that is how you operate?

Dr WOOLLEY - I do not know the extent to which it is well-known, but when we contact the participants this is explained to them and we must get proper ethics approval and consent to conduct these interviews. That is certainly outlined to them when we approach them.

Mr DEAN - My question might be jumping ahead, if it is please tell me. In getting all of this together, if you were to determine that for instance a certain class of vehicle, make, year et cetera is more subject to braking or whatever, what would happen as a result of that?

Dr WOOLLEY - I will get on to this later. Once we find things, we look to disseminate it and discuss it with the appropriate people.

From the indepth interviews, for example one thing we found - and Robert has alluded to - is pre-existing medical conditions. This is quite a conservative estimate and a study by our research nurse into hospital records and our own crashes reveals that approximately 13 per cent of drivers involved in these crashes had pre-existing medical conditions which it is thought contributed to the crash.

Ms FORREST - Does that include prescribed medications?

Dr WOOLLEY - I think so, yes - any medical condition that may have contributed by either impairing driving or they had a medical event whilst they were driving. All these are included. That is something that is emerging and is a landmark finding on our part, which we are starting to explore further. It may open up a Pandora's box in relation to that area.

Ms FORREST - A lot of people can take antihistamines, you can buy them over the counter at the pharmacy, particularly at certain times of the year, but they may not have been to a doctor about it so there is no actual record anywhere in their medical history of their having allergies and taking antihistamines, which have been known to make a driver drowsy.

Dr WOOLLEY - As I understand from the definition we used in this study, it was the hospital records. It was recorded in there that the pre-existing medical condition had

contributed to the crash, so that was the criterion for inclusion. No doubt that is conservative and there is obviously a large grey area of people who are on medication, prescribed or otherwise, and those with medical conditions. It just wasn't stated officially in the records that that was the case. So that's an area ripe for research. We find with this indepth crash investigation activity that it can be the seed for many of these research ideas where we go down that path and explore new areas. I see indepth crash investigation as a very good way of getting lateral ideas and pursuing other avenues of research.

Other areas that are mainly my forte are in infrastructure. Again, we have examples of where vehicles have come off the roadway and collided with crash barriers. In theory these crash barriers are put there to prevent serious injury and harm, but we have had a few cases where the vehicles have actually struck the end of these barriers and the barrier has speared in through the vehicle, trapping the occupant. There was an unfortunate case where the occupant was trapped in the vehicle and the vehicle subsequently caught fire and the occupant was killed. Just a week later we had another incident where the end of the barrier speared through the vehicle. They shouldn't really do this sort of thing. They are designed to bend away and collapse if a vehicle should strike them on the end. Again, this is something that we brought to the attention of our road authority. We hold regular seminars with our road authority to disseminate findings from our indepth crash investigations. Then we work with them to find possible solutions or ways of managing that infrastructure into the future. As a result of this, our Department of Transport, for example, is adopting the newer terminal-end treatments that are available, and trying to shy away from these now. Again, this study identified a lack of feedback loop in the process. A lot of these road agencies would buy off-the-shelf products, implement them with the best of intentions, but then no-one would ever monitor how they are working and just take the manufacturer's word for it that they work properly. We are working with the department to address that. The best opportunity for getting that feedback loop is through regular maintenance activities or maintenance crews, so that is something we are working on with them. That is an example of how we disseminate our findings.

Ms FORREST - Did the person survive or not?

Dr WOOLLEY - In this case, yes they did. Fortunately the injuries were not too severe. I think the injuries were mainly to the upper legs, but I think in this case they did survive.

Of course every State has a legacy of treatments from the past. Again, these old crash barriers were put in with the best of intentions but we have moved on from that. We know this old technology does not perform as well as newer barriers, yet there is still a lot of it out there. So we have to work with the transport departments to phase these out. What annoys me is when you go out on the road and you see these old treatments repaired in the same fashion, not actually upgraded or made better. They are merely repaired to present the same hazard as existed before.

Ms FORREST - Are you talking about the end bit to try to prevent the thing spearing through a car. I can't think what it's called.

Dr WOOLLEY - It is called a terminal end.

Ms FORREST - Motorcyclists say they are not in their best interests.

Dr WOOLLEY - Yes. The motorcycle debate is a whole other area, and motorcyclists aren't too happy about the new wire rope barriers which are being put in everywhere. The reality of most motorcycle crashes is if they didn't hit the barrier they'd end up hitting something else where they would probably receive fatal injuries anyway. There are actually circumstances where the barriers can assist motorcyclists because they prevent other vehicles crossing over into their path, so it's not totally about disbenefits to motorcyclists.

Mr DEAN - What is the position here with your traffic division responsible for all road safety and so on putting in safety equipment without consultation with you? Would they do that without consulting you?

Dr WOOLLEY - In the past I think they were responsible for their roads, and they pretty much did what they saw was appropriate. They are consulting us more and more and there have been several recent initiatives where we have been thoroughly involved from the conceptual stage onwards. So I think that has been very encouraging and demonstrates how seriously they are taking it now.

Mr DEAN - It seems to me as a layman that they should consult a division like this before they implement any road safety strategy.

Dr WOOLLEY - There are of course engineering standards and guidelines which every jurisdiction will stick to. I think what we are in now is a bit of a transition period where we have engineering standards from an older mindset and we are transitioning to a new mindset with what is called the safe systems approach. Under this we have to think a little bit differently about how we provide infrastructure and safety infrastructure. The standards and guidelines need to catch up to that but we are certainly starting to ask the serious questions now.

Here is an example where the indepth crash investigation has really paid dividends. We have a T-junction here on a main road in Adelaide. It is a bit of an unusual configuration because on the left we have an angled walkway for pedestrians and on the right we have a regular right-angle walkway for the pedestrians. Cars were turning right out of here and colliding with pedestrians on the walkway on the right-hand side, despite the fact that there is a red arrow there and so on. The department obviously knew about this because they tried what I call 'mini bandaid' measures. So they have erected a sign saying 'Right turn give way to pedestrians'. They actually had below the green light a white flashing pedestrian light, which is most unusual. Of course they had the red arrow signal control. The green light would be showing to motorists. That would essentially permit motorists to turn left. The red arrow, in theory, prevented motorists from turning right, but these accidents were still occurring despite all these efforts. Talking to shop owners along there and observing the site during the times of the day when the crashes were occurring, and we also looked at the crash history for the site, we slowly deduced that the main problem was sun glare at various times of the year. The sun was coming low over the horizon, just above the shops there, and there was sun glare and drivers were clearly having trouble seeing. Because it is an irregular configuration, once they see the green light they just assume it is a green light for everybody to go. That was the main issue there so that conflict, arguably, is not really resolved if the driver still receives sun glare and does not necessarily see all the information they need.

I see two solutions there: either to have an all pedestrian phase where you eliminate the vehicular conflict or you eliminate that pedestrian crossing on that side altogether. Either way I think that they are only two satisfactory solutions at this point in time. Again, it is through getting more intimate knowledge of the crash. If you were to delve through police records it is possible you would pick up this pattern, but not likely. You gain so much more information through the sort of indepth crash investigations that we conduct,

Getting onto the more philosophical points of all this, in the past we treated road safety on a site-by-site basis. We have had various initiatives but they might be isolated to one region or just one small government department. As we get more sophisticated and government departments are talking to each other, we are coordinating more of the initiatives. We might have road safety advertising on a statewide level and so on. But it is still falling short and there are still a lot of holes and opportunities we are missing to improve the road trauma situation.

Basically what we want to work towards is a road system where people can behave normally and not be injured for their mistakes. We have this philosophy in many other parallel systems. If we consider the whole issue of workplace safety, we allocate a lot of responsibility to the employer to be responsible for the safety of his employees. We put screens there that physically stop them putting their hand in the machine. So if they turn up to work drunk or on drugs or what have you there is still a level of safety there to protect them. We do not just train them not to turn up to work and not put your hand in there; we actually physically stop them doing that.

With road safety this sort of approach has not been fully encapsulated. I have no doubt you are fully aware of Vision Zero and the whole philosophy behind that, so I will not go over that again but no doubt you have seen these sorts of pictures.

Ms FORREST - No.

Dr WOOLLEY - Okay, then I will explain them. But in effect, what our road network represents to people - and this is in terms of energy transfer - are these dangerous scenarios. If we have pedestrians on the side of a footpath crossing the road and weaving in and out of vehicles, in terms of energy transfer that is the equivalent to a drop down a ravine. When they fall down a ravine and stop at the end of it, that is like being hit by a vehicle travelling at 60 kph or what have you. So people obviously do not perceptualise when they are crossing the road that this is the scenario they are facing but that is the reality.

Ms FORREST - The depth of the hole would be related to the speed of the vehicle, wouldn't it?

Dr WOOLLEY - Yes, that's right. Likewise, on the open road, we have trees by the side of the road and various hazards which, if struck, could impose injury or death, and that is the equivalent to driving on an open road like this. Again, if motorists had this in front of them, I do not think they would driving at the speeds they drive at and, likewise, pedestrians would not just be darting in front of cars if they perceived it in that manner. Yet the reality in terms of energy transfer is that that is the situation.

So what we have to do is really provide an environment which eliminates injury or death should things go wrong. The Australian response to Vision Zero and the attempt to try to adopt this philosophy is what they call the 'safe systems' approach. In effect, at the core of this is a human tolerance to physical force and that has to be the thing that underpins everything. If you exceed that, of course people are going to get injured, and that is factored into the speed limits we set on our roads, the way we design vehicles to protect the occupants of those vehicles and the road environment itself, so, should vehicles get into trouble, the road environment is far more forgiving than it is at present.

As a condition of that, we expect legal behaviour from people; we expect motorists to be law-abiding and do the right thing. But having said that, the benefits of going to this approach that even those who are not always doing the right thing will benefit from it as well. But of course we do expect compliance from road users.

Allied to this, of course, is an understanding of crashes and crash risks, which is where organisations such as ourselves come in. We have a degree of control over admittance to the system and whole registration and licensing side of things there. There is education and information supporting road users and there is mass education and marketing and so on, and of course the enforcement of the use of the system as well.

So this is what we call a safe road system and that is what has been proposed by Austroads and adopted by many of the jurisdictions in Australia. This now is beginning to underpin the way the road authorities are managing the road network, but you will see there that it goes across many borders. So it is not just the road authority involved here, there are other people who are involved in the responsibility of that.

What do we mean by safer road environments? A very good example is roundabouts; I think they are the unsung heroes of the past few decades. Roundabouts are more or less accepted as part of our everyday road system yet there was a time when we did not have roundabouts and these have certainly made our road environment safer.

From practices in Sweden we see things such as barriers down the centre of roads in addition to the side of the roads and so on. Again, we are just catching up with those practices and starting to have a serious think about whether we should be doing the same thing.

This is a success story, I guess - the driver fell asleep, veered off the road, struck a W-beam barrier, woke up and wondered what happened, but he was fine and the car was not too badly damaged either. So this is what we would like to see more of, a more forgiving roadside environment when people make mistakes.

The final point I want to make is about the biggest challenge in road safety because naturally what we have done in the past is take whatever comes our way. We will grab benefit wherever we can and we have sort of done all the easy things and we are reaching a plateau now where there are diminishing returns and it is harder and harder to make bigger reductions in road trauma. On the left is a slide from the first indepth study, I think, showing that over a period of 35-odd years not a lot has changed because in our recent metro study we still have vehicles hitting utility poles and with similar outcomes. So with some things, it seems we cannot make inroads.

In a report for the RACV, Ian Johnson summed it up quite nicely. A lot of things in road safety still do not have community and political salience. The diversity objectives from the different people involved in maintaining the road environment creates conflicting priorities, so safety is not necessarily a priority for the electricity company but it might be for the road authority. The lines of accountability are ill-defined, and that relates to the first point, and there are also some technical shortcomings about the way we apply protective measures and so-called warrants or circumstances under which we would apply those.

So I see that as the next biggest challenge and step forward for road safety. Now, one would think, okay, that is across agencies, because you might have electricity or water authorities, a road agency and other arms. But even within road agencies you can see these problems, and here is an example of where they put down barriers to stop rocks falling onto the road, so it obviously served its purpose in that regard, but it seems like they really did not give much consideration to the safety of motorists travelling along there. There we see the bare end of a concrete wall and if a motorist were to hit that, the outcomes would be dire.

Finally, the last point I would like to emphasise is that whilst engineering solutions and trying to tackle human behaviour and all these sorts of issues have been successful in the past, the real so-called gold or silver bullet I think is in speed management. I really do feel that we need to lower speeds on our roads, if nothing else, until we can improve the road network and make it more forgiving. Whilst we are having the debate and pondering what we will do next and how we can reduce road trauma, the key to everything is really to lower speeds on our roads first and then see what we can do about it.

Here is an example of some surveys from our lowering of the speed limit from 60 kph to 50 kph on our roads. These are speed distributions. What is important to note here is that the distributions have shifted to the left, so the red line represents where they were at originally. On the bottom axis we have the mean speed of vehicles on those roads. What is interesting, at least from our point of view, is that the distributions have shifted to the left, which shows that the mass of drivers have slowed down - at least, the drivers we observed during the surveys.

Probably what is most meaningful to you - and this is the bottom line, I guess, in many ways - is that this is showing casualty crashes on roads where the speed limit went from 60 kph to 50 kph, and I guess I will not be giving any prizes for guessing when the introduction occurred. So it is very obvious and marked that I think lowering speed limits is certainly the best thing we have in our arsenal for reducing road trauma into the future. I'll leave it at that.

CHAIR - Thank you very much, Jeremy. I think we would probably like to ask more questions but unfortunately we do not have the time. The taxi will be there in about two minutes and we need to clean up. We were wondering if it could be possible to have the presentations sent by e-mail to Nathan at a later stage, Robert and Jeremy?

Dr WOOLLEY - Yes.

CHAIR - Good. While we are cleaning up we can have some informal discussion but it will not be recorded. We would like to thank you very much, Professor McLean, for joining us here and Robert, for your presentation and Jeremy, for yours and Craig for being with us and being involved in the informal discussions we've had. It has been very interesting and helpful. Thank you and we hope we might see you in Tassie, Jeremy, and anybody else who can come across.

Dr WOOLLEY - I would like that.

THE DISCUSSIONS CONCLUDED.