



People for Ecologically Sustainable Transport

Director: Alan A. Parker, 12 Webster Street,  
Sorrento, VIC 3943, Phone (03) 5984 3578  
Email alanpar@labyrinth.net.au

## Bullbars Should be Banned in all Urban Areas as in the United Kingdom

PEST Submission to the NTC proposal for Australian Vehicle Standards Rules Amendment for Bullbars; 2008 Draft Regulatory Impact Statement: 10-9-08

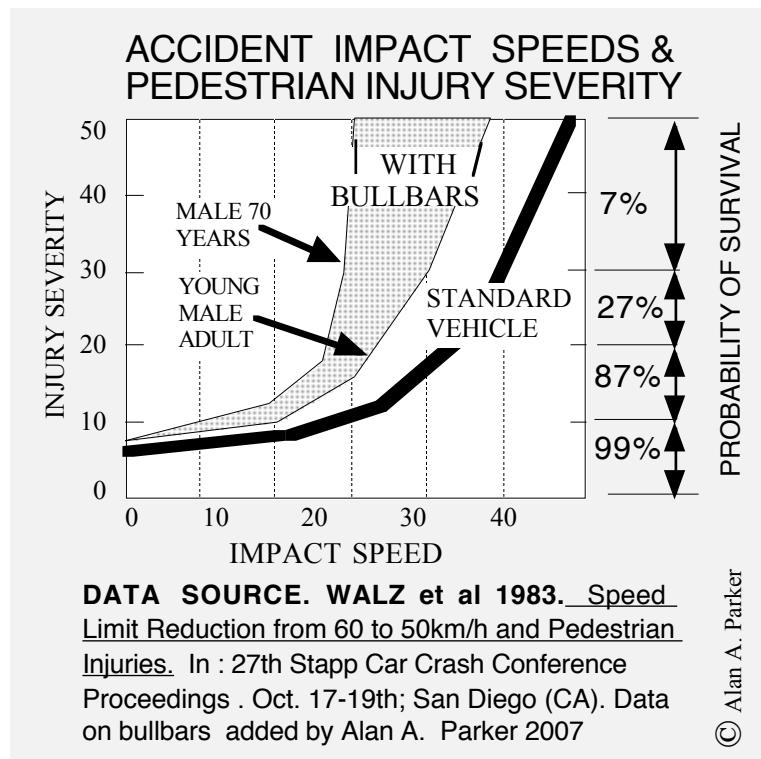


Figure 1

## INTRODUCTION

In 1995 I presented a paper at an International Conference on Accident Investigation and the Law entitled "Bullbars should be banned".(Parker 1995 B) There was support for that paper from many delegates and especially from four state groups of traffic police who investigate serious road accidents. They said that bullbars were dangerous for pedestrians but that too few had been killed to convince politicians to act. They had seen the effects of bullbars on the human body; it was gruesome and could only get worse and they should be banned.

The experience of the police accident investigators was confirmed by a German accident researcher who stated in 1994 that:-

*"Due to the fact that bullbars represent a new trend in road traffic accident data are hardly available now. But these few data indicate an extreme risk to pedestrians, especially for the femur , pelvis and abdomen of adults and the head and neck of children, but also for motorcyclists and bicyclists." (FHRI 1994)*

Contrary to the NTC press release which states "*the current requirements for "pedestrian-friendly" bull bars on new vehicles are outlined in a proposal submitted by the National Transport Commission (NTC) for public consultation*" there are no pedestrian friendly bullbars available in Australia.

In marked contrast the EU accepts that additional frontal protection to reduce damage to motor vehicles has been increasingly used in recent years and accepts that some of these systems constitute a risk to the safety of pedestrians and other road users in the event of a collision. They are introducing measures required in order to safeguard the public against such risks. The need is to follow the leadership of the EU in this matter and do what they are proposing to do. (Anderson et al 2006).

Today accident data are available from developed countries - not so different from Australia - to justify following the EU lead but these data are not presented in the NTC impact statement. There are papers with hard data from the UK and the EU proving beyond any shadow of doubt that vehicles with bullbars will kill and injure at lower speeds because they concentrate the force of impact and increase injury severity.(Ballesteros et al 2004) (Henary et al (2003) Child cyclists who would otherwise survive accidents with sore heads and a damaged bicycle helmet may be killed.

Those over 60 are more than four times as likely to die if injured by a car than younger people (Sklar et al 1989) in a pattern repeated around the developed world. The WHO has recognised protection of older pedestrians as the key safety measure for this age group.(Hakamies-Blomqvist O'Neill 2004)

There has been a sharp rise of 44% in the deaths of elderly pedestrians 70 years and over in Victoria this year. If a car hit a pedestrian at 30 km per hour there would be a 20% likelihood of death, This compares to an 80% likely hood of death if a car hit a pedestrian at 40 km per hour (Russell 2008).

The NTC press release about the impact statement is grossly misleading "*The amended standard will ensure bull bar designs minimise frontal impact damage to the vehicle and help reduce pedestrian injuries at the same time.*" However there are no hard data to suggest any reduction in pedestrian injuries in the NTC Impact Statement or anything of substance about how they greatly increase serious injuries. Thirteen years after two peer reviewed papers were presented at a conference in Australia, stating the need to collect data on bullbar injuries, there is no recent research in the NTC Impact Statement. (Bowd 1995)(Parker 1995)

The former Office of Road Safety allowed the most dangerous designs of bullbars to proliferate. In every state backyard workshops have been making these bullbars which are quite literally at the "cutting edge" of bad design. The report "Bullbars and Road Trauma" (ATSB 2000) relied on incomplete data sets, is now out of date and is the basis of nearly all the data in the NTC Impact Statement. The NTC references to later reports are misleading and do not quote the serious concerns of their authors that Australia is not learning from world best practice.

The UK, the EU and Japan have banned or are about to ban bullbars. If you fitted an Australian metal bull on the front of a car or SUV in the UK you could be up for a 12 month prison sentence or \$50,000 fine. In the UK there is a real commitment to pedestrian safety; if pedestrians are safer so are cyclists and, to a lesser extent, motor cyclists and car drivers. In the UK in 2004 the road death rate per 100,000 population was 5.6 and heading downwards but in Australia in 2006 and 2007 it was 7.7 per 100,000 population. The UK has a better road safety record and is going to keep it that way.

### **Why is there no recent injury data presented in the NTC Impact Statement**

We agree with the NTC Impact Statement that, overall, steel bull bars are significantly more hazardous for a pedestrian in the event of a collision than the front of the vehicle, as are the aluminium/alloy bull bars, but to a lesser extent than the steel bull bars. Overall, the polymer bull bars slightly improve the safety of the front of (some) SUVs. However adopting the EU model is what is really needed and that is well documented (Anderson et al 2006).

The Australian New Car Assessment Program (ANCAP) is changing its car testing procedures in 2009 to put greater emphasis on the protection of pedestrians of all ages; that may include the testing and rating of bullbars.

A key mitigating factor in injury severity is the relatively peripheral nature of the primary impact of the bumper to the lower legs . This affords a degree of protection

to the critical upper body regions in the first impact and the resulting body rotation onto the bonnet tends to further diminish the impact, often called 'wrap and carry'. (Cesari 1994) (Aldman 1985)

Most pedestrian injuries from cars are tibia/fibula fractures and/or knee cruciate injury with collateral damage to ligaments from the first contact with the bumper followed by the body being thrown onto the bonnet and producing head injuries from the impact with the bonnet or windscreens. (Mizuno, 2002)(Mizuno, Kajzer 2000)

When a SUV hits a pedestrian the injuries are even more serious because the SUVs bonnet is higher than that of a car. This is more critical because the upper leg and pelvis are hit first (Matsui 2004) and there is less rotation of the body because the impact is closer to the body centre of mass, resulting in more impact energy transfer. For example, raising the bonnet leading edge height from 600 mm to 850 mm increases the impulse by a factor of about two (Lawrence 1989) This results in a doubling of injuries to vulnerable regions such as the head, thorax and abdomen (Ballesteros 2004). Femur/thigh loading occurs from contact with the bonnet leading edge during the rotation phase, especially if the bonnet is raised. (Lawrence 1989)

Another group of vulnerable road users are small children, in particular in accidents in driveways in which SUVs and light trucks are over-represented. This is probably due to the increased height of the SUV and poor visibility to the rear and over the bonnet. (Holland et al 2000)(Nadler et al)

The data on serious injuries in Australia show that at least 3,000 cyclists were seriously injured in collisions with motor vehicles and that at least 2,900 pedestrians but what percentage of these 5,900 serious injuries was made worse by bull bars on cars, SUVs and commercial vehicles is unknown. It is unlikely to be less than 600 a year and possibly 1,500 a year.(Berry & Harrison 2008)

The immediate post crash cost of the average serious injury is \$432,000 so the cost is somewhere between \$260 million and \$650 million a year. How much of that is attributable to the bullbar is unknown, as are the long term costs which grow exponentially as the average age of the population increases.

### **The high long term costs of bullbar and SUV front end injuries**

Even minor injuries may have significant long term costs as sports medicine researchers have discovered. Even a small amount of damage to ligaments and cartilage in minor collision with a vehicle can prematurely age a joint many years later. Bone and joint damage of the spine, knees and hips are very costly to treat but in the long term can accelerate the ageing process in the damaged tissue leading to a much earlier onset of osteoarthritis and similar ailments that reduce mobility and, after many painful years, may require major surgery.

The worst effects of some road accidents often appear 20 or so years later. Even if the injury is not fatal the increased bone, nerve and joint damage of spine , knee and hip injuries is very costly and can accelerate the ageing process in the injured part. If people live long enough nearly everyone will have osteo arthritis because it is a natural consequence of ageing; a few people have it in their forties, many in their sixties and most in their eighties. Today around 2 million Australians are afflicted with osteo arthritis. In many cases road accidents lead to a much earlier onset of osteo arthritis and similar ailments giving decades of pain, loss of mobility and, when it becomes intolerable, major surgery.

Two costly surgical procedures can be taken as examples. Around 35,000 people had a hip or knee replacement in 2003; in a few years this will increase to 60,000 per year. This surely is a matter of concern for Australia with its rapidly ageing population and escalating health costs. Indeed, with the evolution of drug resistant bacteria as a major threat to human health early in the next 30 years (Garrett 1994) there may be a need to reduce both immediate and long term road trauma induced surgery. Road accident victims are getting post operative complications now due to Golden Staph and this is just the beginning of an era in which the bugs bite back.

One reason for the high costs of road accident induced ageing is that artificial joints do not last even half a lifetime. For example artificial hips now have a life of around 15 to 18 years. A person with a hip replacement in his or her fifties will may need a second hip replacement before they die and the other hip may need replacing as well. To make matters worse artificial hips are not as resilient to shock loading as the natural hip, as the father of hip replacement Sir John Charnley explains:-

*“Neither surgeons or engineers will ever make an artificial hip joint which will last 30 years and at some time in this period enable the patient to play a game football.” Quoted by Mayer and Collier (1994)*

A friend of this writer who had a minor knee operation as result of a collision with a car, studied the possible consequences if the car had been fitted with bullbars level with top of the bonnet and the knee had hit the square edged vertical bar. That collision could have resulted in an amputation of the leg at worst or a knee so badly damaged as to need a series of operations, or an artificial knee. Orthopaedic surgeons can provide hundreds of credible “What if ?” scenarios.

When the long term external accident costs of bullbars do get reliably estimated it will prove the need to design vehicles with more pedestrian friendly front ends and to reduce vehicle speeds in residential streets and shopping streets with high levels of pedestrian use. In the year 2030 there will be three million more Australians over 65 years of age than in 1992 (AURDR 1994) and around two million Australians will have vulnerable artificial joints, spinal braces and reinforcements. The last thing these seniors will need is to be hit by a vehicle that splinters the bones to which the artificial hip and knee joints are anchored.

## **The uncontrolled growth of a vehicle fleet which is not pedestrian friendly**

In 1994 85,000 four wheel drives were sold in Australia with half of these vehicles fitted with bullbars and motoring magazines predicting increases in sales for years to come; and increase they did with 200,000 being sold in 2007. Four wheel drives are the trendy suburban choice for child chauffeuring and shopping, and most of them will never leave the suburbs. There were 11.5 million registered motor vehicles in Australia in 2007 of which approximately 1.8 million are SUVs with higher and more damaging front ends than cars and about 80 % of them with some kind of bull bar. Some of these bullbars protrude above the bonnet and do a great deal of damage in a collision with a cyclist or pedestrian.

The success of vehicle designers in the last 50 years has been to make vehicles much safer. Between 1945 and 1970 the death rate increased with car use in Australia but since then it has declined and removing dangerous projections on the front of cars was an important contribution to that achievement. Prior to this sharp and rigid car mascots on the bonnet often disembowelled, pedestrians, cyclists and motorcyclists which provides us with a historic reminder of the need to abide by sound vehicle design rules. (Crandall et all 2002)

It is a shame that the failure to resist the pressures of the self interested and greedy manufacturers by negligent regulators has resulted in a motor vehicle fleet that is not as pedestrian friendly as it could have been. The recommendations of the NTC impact statement if implemented will not contribute to reducing the overall road death rate to 5.6 per 100,000 population by 2010 and would assist in keeping it around 7.0 deaths per 100,000. Nor does it indicate how much lower the death and serious injury rate could be if nearly all the cars and vans in our cities did not have bullbars and there were very few SUVs with or without bullbars.

In Europe, with 4,458 pedestrian deaths - 15 per cent of the total road fatalities during 2002 - vehicle manufacturers became increasingly aware of the need for enhanced pedestrian safety systems. In the expanded EU in 2007 there are over 9,000 deaths and 200,000 injured victims in road accidents each year in which pedestrians and cyclists collide with a car. There are new forms of pedestrian protection emerging that honour the intent of Australian Design Rule 30. Further an end-user study conducted recently in five European countries revealed that approximately 30 per cent of respondents were willing to pay for the pedestrian safety systems.

A European independent crash testing organisation Euro NCAP is changing its car testing procedures in 2009 to put greater emphasis on the protection of pedestrians of all ages. The Australian New Car Assessment Program (ANCAP) declared in September 2008 that it will be following suit and replicating NCAP's testing programs of pedestrian safety ratings.(Colquhoun, 2008)

Several car makers have already responded to building pedestrian safety features

into their cars. Honda has shifted its engines lower in the body so that there is more clearance between the bonnet and the engine block, allowing the bonnet to absorb more of the energy of a pedestrian hitting the bonnet. Jaguar has fitted a pop-up bonnet on its new FX model so that the bonnet automatically lifts up a few centimetres away from the hard and pointy bits under the bonnet. Other makers are expected to follow suit with softer bumpers and break away wipers and a blunter front styling to roll the pedestrian away from hitting the windscreen. (Colquhoun,S. 2008)

Australia's national road safety strategy set a target to reduce the number of road fatalities from 9.3 per 100,000 population in 1999 to no more than 5.6 fatalities per 100,000 in 2010. the reason this target is not going to be achieved is partly due to the growth in proportion of SUVs in the car fleet . (Breen 2004) We know that high ownership levels of SUVs in the US contributed to 43,000 road deaths in 2005. Furthermore the US road death rate of 14.5 per 100,000 population is nearly twice that of Australia . The high death rate is mostly due to a combination of teen driving (16 to 19 years ), the high proportion of SUVs on the roads and the absence of safer forms public transport.

The proliferation of these large 4-wheel-drive vehicles being used for private transport are battering rams, disguised as glorified shopping carts and used to chauffeur children instead of school buses. To make matters worse, their 'bullbars' increase the risk to other road users. In accidents where 4-wheel-drives contributed to the cause of the crash fatigue, alcohol or other drugs were major factors. Four-wheel-drivers were more likely to be affected by alcohol than drivers of any other class of vehicle. (ATSB 2001)

It is important that the Australian car and car parts industry can adopt this new pedestrian safety technology that is being developed in Europe and Japan and really contribute to reducing road accidents and reduce CO2 emissions at the same time. Bullbars used on vehicles cruising at between 80 and 110 km per hour produce a greatly increased aerodynamic drag which increases fuel consumption. This applies particularly to SUVs whose height and shape increase aerodynamic drag compared to recent model cars. This why there is a need to hugely increase the purchase tax on SUVs and discourage their use in other ways in urban areas. The NTC impact statement needs to be rewritten. It should be recommended that Australia approach the EU to be part of their program to introduce passive pedestrian safety solutions such as energy absorption at the front end by installing deployment solutions (airbags, deploying bonnets or bumpers). (EU 2005)

The Irish Medical Organisation has recently adopted a policy calling on motor manufacturers and distributors to display warning notices on SUVs which advise potential vehicle purchasers of the increased risk of severe injury and death to pedestrians associated with these vehicles. Resistance from the industry to such initiatives is likely to be strong, just as it has been from the tobacco industry for warnings on cigarette packaging. (Chapman& Carter 2003)

## **Legal rights of non-motorised road users**

The growing use of bullbars undermines the internationally accepted legal rights of non-motorised road users by endangering the lives of cyclists and pedestrians. This is of concern to PEST which believes that the primary aim of planning must be to improve the quality of people's lives and the environment in which they live. The principles of ecological sustainability be applied to existing and new settlements, road and rail networks and the vehicles that use them. Walking and cycling are the only non-polluting modes. Furthermore, all Australian governments committed themselves to encourage walking and bicycling when they ratified the Climate Treaty (Agenda 21) but persist in the pursuit of many road safety practices that predate the Rudd government's commitment to encourage these modes. (Parker 2008).

We are particularly concerned with the rights of pedestrians and support the Pedestrian Council of Australia's long standing opposition to bullbars . We believe that the European Charter of Pedestrians' Rights adopted by the European Parliament of 1988 is a sound and reliable guide to what should be done for pedestrians and cyclists in Australia. We note that the Charter's definition of a pedestrian embraces the bicycle and the wheel chair as pedestrian vehicles. The Charter includes the following clauses:-

1. Children, the elderly and the disabled have the right to expect towns to be places of easy social contact and not places that aggravate their inherent weakness.
2. The pedestrian has a particular right to expect: the fixing of speed limits and modifications to the layout of roads and junctions, as a way of effectively safeguarding pedestrian and bicycle traffic; and the banning of advertising which encourages an improper and dangerous use of the motor car.

According to the Australian Consumers Association, the Institute of Engineers Australia, the Royal Automobile Association of Victoria, the Pedestrian Council of Australia, the Bicycle Federation of Australia and the Town and Country Planning Association bullbars can be lethal for pedestrians and cyclists. (ACA. 1994)(RACV 1994)and (IEA 1994)

In the UK in May 2007, the Minister of State for Transport confirmed that it is illegal to continue to manufacture and sell metal bull bars that do not comply with the new EU legislation (Directive 2005/66/EC) for pedestrian protection. The maximum penalty to be imposed within the UK is 12 months in prison or a substantial £20,000 fine. The new legislation requires Frontal Protection Systems (FPS) to enhance the safety of vehicles and applies to products either fitted as original equipment or sold via the 'after market', It will be impossible for "wrap around" metal bull bars to meet the strict new standards, so the legislation will effectively ban these products while endorsing new energy absorbing FPS products.

Banning bullbar use in urban areas is now being translated into practical action in the EU and Australia should do the same. Furthermore, the The World Health Organisation has recognised protection of pedestrians over 60 years of age as the key safety measure for this age group (Hakamies-Blomqvist O'Neill 2004)

It is unethical to sit around and wait until the pile of body bags gets so high that the bullbar issue finishes up in the political arena. It is important that accident analysts talk to surgeons and consumers when the first intimation of dangerous trends show then they should be able to make timely recommendations to government. Choice, formerly known as the Australian Consumers Association because of its proven record of research into consumer problems, is the appropriate organisation to coordinate potential and actual victim input to the working group.

Accident analysts have a duty of care to consider the legal rights of non-motorised road users and they expect that consumer groups and surgeons who repair the damage done by bullbars are involved as stake holders to counter the unwarranted influence of bullbar manufacturers. Experience in Europe and Japan shows that vehicle designers of the world's safest cars appreciate quality medical input in defining what needs to be done.

### **The regulations for SUVs in urban areas also needs to be considered**

As most SUVs are fitted with bullbars no paper it is important to consider the unsafe features of the front end of SUVs and bullbars at the same time. SUVs with high front ends endanger pedestrians and putting bullbars on them simply makes them more dangerous.

The Australian Transport Safety Bureau Monograph No. 11, of September 2003, includes the following findings:

1. Four-wheel-drives involved in fatal accidents increased by 85% between 1990 and 1998, while the overall number of fatal road accidents decreased by a quarter over the same period. This is likely to be because of the increased distances driven by 4-wheel-drives on Australian roads as an overall percentage.
2. Four-wheel-drives were far more likely to roll over in a crash than a standard passenger car (35% compared with 13%).

The ATSB monograph No 11(2003) relies on the research contained in the ATSB Road Safety Research Report CR 200 (2000) and the latest research shows that it is now out of date. It makes no reference at all to the fact that those over 60 are more than four times as likely to die if injured by a car than younger people (Sklar et al 1989) in a pattern repeated around the developed world. Older people in Australia represent 30% of pedestrian fatalities while accounting for only 11% of the population.

A senior US journalist, Keith Bradsher, has published an excellent book, *High and Mighty: SUVs the world's most dangerous vehicles and how they got that way*. This book is about the American experience but much of it applies to Australia. He says about rollovers:-

*"Most of the nation's guardrails were built for low-riding cars, and may flip an SUV on impact instead of deflecting it safely back into its lane of traffic. US federal crash statistics show rollovers are less than one per cent of US vehicle accidents, but result in 25% of all vehicle deaths. SUVs roll over five times per 100 crashes, compared with 1.7 times for cars. The 1999 US insurance surveys found that large SUVs, such as Ford Explorers, resulted in 39 deaths per million registered vehicles. Bigger mid-sized cars accounted for 14 deaths. Large family sized passenger cars accounted for only nine per million registered vehicles. (Bradsher 2002)"*

And when SUVs hit pedestrians, they strike them high on the body, inflicting worse injuries than cars, which have low bumpers that flip pedestrians onto the relatively soft hood. An SUV will not allow you to swerve around a hazard as handily as a car.

The truck like brakes and suspensions of SUVs mean that their stopping distances are longer than for a family car, making it less likely that an SUV driver will be able to stop before hitting a car. SUVs typically weigh half a ton more than a car of similar seating, which by itself makes them harder to stop.

While the urban SUV driver might be irresponsible, the real villains are the car manufacturers who market ever bigger, heavier, and more polluting cars so totally unsuited to the urban environment in which they are predominantly used. Vehicles designed for off-road terrain consume 300% more fuel, emit 300% more pollution and, in an accident, are three times more likely to kill a pedestrian than an ordinary passenger car. They are also twice as likely to cause severe traumatic brain and abdominal injuries and 50% more likely to kill the passenger of another vehicle. (Wells P 2006)

One specific accident illustrates how bullbars can increase the death rate and the serious injury rate. The father of a researcher referred to in the NTC impact statement was killed walking across the road by a vehicle travelling at only 35 km per hour. The Coroner's report indicated that, if the vehicle had not been fitted with bullbars, he would have survived and stated that the use of bullbars contravenes the intended meaning of Australian Design Rule 42.9.1.1:-

*"...no vehicle shall be equipped with any object or fitting , which protrudes from any part of the vehicle so that it is likely to increase the risk of bodily injury to any person", and recommended that legislation be implemented in Victoria to "ensure that the intended meaning of the design rule... is fulfilled. Design Rule 42.9.1.1:*

## **The use of bullbars in the southern states is not necessary**

The only vehicles that need bullbars are those which frequently travel in remote rural areas and encounter large animals which could strand the vehicle in a collision and, in some cases, injure occupants as animals smash through the wind screen. Swerving trying avoid a large animal has resulted in rollover accident and collisions with solid objects. The bullbar has saved some drivers from dying from heat or dehydration in the remoter parts of central and northern Australia.

In the southern states bullbars are not needed on SUVs to reduce damage to vehicles from collisions with large animals but to ensure that the owner survives a collision with another vehicle and, in the case of a SUV collision, with a car in which the driver may be killed or injured.

In Victoria reliable insurance data about cars being damaged in collisions with animals are available. In Victoria RACV animal collision insurance claims accounted for 3% of all claims and 7% of highway claims. Table 1 shows the animal related collision claims in 2006-07.

**Table 1 RACV Animal related collision claims in 2006-07**

Kangaroos	2638
Dogs	338
Wombats	186
Cattle	81
Horses	48
Foxes	34
Deer	31
Sheep	29
Koalas	22
Emus	12
Small animals and birds	150

There were only 160 claims for damage by large animals that is cattle, horses and deer. These figures do not suggest that bullbars are really justified in the southern states and its only on the cattle stations in Northern Australia that have enough cattle to give bull bars their name. The RACV data show that there is no significant risk of collisions with cattle in Victoria so it is not surprising that a study by the NSW Road Traffic Authority (1992) states

*“Contrary to the probable expectations of van owners, bullbars generally served no beneficial purpose.”*

The study concluded that bullbars would not reduce serious injuries or death. Indeed, GMH, Mitsubishi and some other car manufacturers will not fit bullbars because they can cause an airbag to misfire at the wrong time.

Wild animal and birds are tough creatures and being hit by vehicles with bullbars means that more of them will die than in collisions with sloping and smooth surfaced bonnets from which they may bounce and survive. Thousands of native animals and birds, some of which are protected species, are killed every year in collisions with cars. Some short sections of road are known to produce very large numbers of animal and bird kills; it would make more sense to reduce speed limits, just as is done along short sections of road abutting schools in rural areas than to continue to allow bull bar use. (See figure 2).



**Figure 2**

(Source Magnus 2006)

There is a need to identify not only the numbers of animals hit but also which species are hit, where they are hit and why they are hit. Research projects aimed at reducing roadkill have been few, poorly replicated and inconclusive. There has been a research vacuum on wildlife-vehicle collisions in Australia. Filling that vacuum will result in safer roads for us and our wildlife.  
(Ramp and Croft 2002)

It is possible that an electronic device could become available to warn wildlife off the road. A research report (Bender 2001) did a detailed study of a Wildlife Early Warning System, designed in conjunction with Queensland University of Technology. The unit is about the size of a carton of cigarettes and fits at the number plate level. It emits a changing pattern of high frequency sound which it was thought would enable wildlife and birds hear vehicles far enough away to let them get out of the way. The unit was called the Shu Roo; it was found not to work as it should as it produced a noise that was too weak and not suited act to as a warning system to kangaroos.

More research was needed to perfect this Australian invention however cooperation and funding from the FORs and the ATSB was not forthcoming. The research report (Bender 2001) clearly indicates the areas of future research that would need to be undertaken to make the Shu Roo more effective but that is beyond the resources

of the small company that sold it. There is potential overseas for such devices, for example to avoid collisions with deer in the US which has around 150 such collisions reported each year. The concept could also be applied to wind turbines as a means reducing bird kills.

Another idea, from chartered engineer Peter Jones, is that bullbars be redesigned to be detachable and conform to a safety standard so that they can be removed when entering urban areas. He suggests that the existing network of weigh bridge stations could be used as the locations for bullbar removal. For city people taking an annual holiday in the out back or the 'grey nomads' this could perhaps be a practical alternative in the future.

Meanwhile its important to remove the 'after market' bullbars on cars in the cities, where most people live, and prohibit the use of bull bars on new cars.

## **CONCLUSION AND RECOMMENDATIONS**

Australia's per capita emissions of CO 2 are the worst in the world; to reduce those emissions our cities need safer, lighter more energy efficient passenger cars and light commercial vehicles. Steel and aluminium bullbars on the front of 'Toorak tractors' is not the way to go and now that funds are available for technical innovations in the car industry there is no excuse for cheap, nasty and lethal solutions.

Solutions are required which maximise pedestrian and cyclist safety. The NTC impact statement needs to be rewritten.

Australia should follow EU best practice in adopting solutions.

### **Recommendations**

1. In the short term the existing standard should be changed so that only plastic bull bars can be fitted to new cars and the use of existing vehicles with steel or aluminium bullbars that are removable and not an integral part of vehicle should be banned in urban areas. A deadline should be set for the removal of these dangerous bolt-on bull bars unless they are made of plastic and comply with the existing standard.
1. The NTC impact statement needs to be rewritten and Australia should approach the EU to be part of their program to introduce passive pedestrian safety solutions such as energy absorption front end, installing deployment solutions (airbags, deploying bonnets or bumpers) (EU 2005)
2. A ban be placed on the advertising bullbars by State road safety agencies as soon as it is practicable.

Although Australia is not a signatory to the European Charter of Pedestrian Rights, it would be prudent to be guided by that Charter in regard to recommendations 1 and 2.

3. The National Transport Commission should acknowledge the serious ethical issue involved in allowing more urban vehicles to be fitted with bullbars. Those data that are available indicate such an extreme risk to cyclists and pedestrians that a moratorium on the sale of bullbars is now an ethical imperative.

4. Consumers associations representing actual and potential victims and a surgeon, particularly a surgeon with a long experience of the orthopaedic consequences of road trauma, be involved in the working group on bull bars.

## REFERENCES.

ACA (1994). "These bars are bull". Choice magazine. June 1994. Australia Consumers Association

Aldman B, Kajzer J, Anderlind T, Malmqvist M, Mellander H, Turbell T. Load transfer from the striking vehicle in side and pedestrian impacts. Proceedings of the 10th International Technical Conference on Experimental Safety Vehicles. Oxford: U.S. Dept. of Transportation, National Highway Traffic Safety Administration, 1985:620-637.

AURDA (1994)"New homes for old: strategy paper #1" Australian Urban and Regional Development Review. Department of Housing and Regional Development.

Ballesteros et al (2004). Pedestrian injuries and vehicle type in Maryland, 1995-1999. *Accid Anal Prev* 2004;36(1):73-81.

Bender, H. (2001). "*Deterrence of Kangaroos From Roadways Using Ultrasonic Frequencies – efficacy of the Shu Roo*", University of Melbourne, Department of Zoology.

Berry,J.G. & Harrison, J.E.. (2008) "*Serious injury data due to land transport accidents, Australia, 2005-06 No 42, Cat no, INJCCAT 113*", Adelaide AIHW.

Bowd, D (1995)"Impact of bull-bars on Pedestrians". AIRIL 95, The Inaugural Conference on Accident investigation and the Law. 16-19 October 1995, Gold Coast Australia.

Bradsher, K. (2002) *High and Mighty: SUV' the world's most dangerous vehicles and how they got that way*. published by Public Affairs™, New York, 2002.

Breen J. (2002) "Protecting pedestrians". *BMJ* 2002;324(7346):1109-10.

Breen J. (2004) Road safety advocacy. *BMJ* 2004;328(7444):888-90.

Chapman S, Carter SM (2003). "Avoid health warnings on all tobacco products for just as long as we can": a history of Australian tobacco industry efforts to avoid, delay and dilute health warnings on cigarettes. *Tob Control* 2003;12 Suppl 3:iii13-22.

Cesari D, Bouquet R, Clare Y, Bermond, F.(1994) Protection of Pedestrians against leg injuries. Proceedings 14th International Technical Conference on Experimental Safety Vehicles; 1994; Munich: U.S. Dept. of Transportation, National Highway Traffic Safety Administration, 1994: 1131-1138.

Colquhoun,S. (2008) "Pedestrians' Peril; with pedestrian safety at historical high level , the focus moves to saving pedestrians lives", AGE Drive Page 2, 3-9-08.

Crandall JR, Bhalla KS, Madeley NJ.(2002) "Designing road vehicles for pedestrian protection", *BMJ* 2002;324(7346):1145-8.

EU (2005) Directive 2005/66/EC of the European Parliament and the Council of the 26 October relating to the use of frontal protection systems on motor vehicles and amending Council Directive 70/156/EEC

FHRI (1994) "Potential Risk for Vulnerable Road Users from crash bar equipped of road vehicles" . Harold Zellmar and Bernd Friedel. Federal Highway Research Institute Paper no 942233 38th Stapp Car Crash Conference Proceedings.

FORS (1994)"Road Fatality Statistics Australia. September Monthly Report." Federal Office of Road Safety.

Garrett, L (1994) "Newly emerging diseases in a world out of balance". New York: Farrar, Straus, Giroux.

Hakamies-Blomqvist L, O'Neill D (2004) . Older people and road traffic injury. *World Report on Traffic Injury Prevention*. Geneva: WHO, p:47.

Henary BY, Crandall J, Bhalla K, Mock CN, Roudsari BS. (2003) "Child and adult pedestrian impact: the influence of vehicle type on injury severity," *Annu Proc Assoc Adv Automot Med* 2003;47:105-26.

IEA (1994). "Meet the killer in our suburb". Engineering Times. No 20 Nov. 1994. The journal of the Institute of Engineers, Australia.

Magnus, Zoe (2006) "Wildlife Roadkill Mitigation Information Kit A guide for local government and land managers" Environmental Consultant for Tasmanian Wildlife Roadkill Collective 2004, convened by Sustainable Living Tasmania, Hobart 7000.

Mayor, M, B.& Collier, J.( 1994) "The Technology of Hip Replacement". Scientific American SCIENCE AND MEDICINE May/June 1994.

Nadler EP, Courcoulas AP, Gardner MJ, Ford HR.(2001) Driveway injuries in children: risk factors, morbidity, and mortality. *Pediatrics* 2001;108(2):326-8.

NHMRC (1994). "Vehicle Travel Speeds and the incidence of Fatal pedestrian Collisions". Vol. 1. CR 146 1994. National Health and Medical Research Council Road Accident Research Unit

Parker, A.A. (1995 A). "Governments too slow on lowering speeds" Australian Cyclist :journal of the Bicycle Federation of Australia June -July 1995.

Parker, A.A. (1995 B), "Bullbars should be banned", The Inaugural Conference on Accident Investigation and the Law. Gold Coast 16-19 October.

RACV (1994). Brochure on bullbars for RACV members outlining Policy.

Ramp, D and Croft, D (2002), "Saving Wildlife: Saving people on our roads". Annual Report 2002. University of New South Wales.

RTA (1992). "Road Traffic Accidents in NSW 1992 Statistical Statement".

Russell, M (2008) "Sharp rise in deaths of elderly pedestrians: Sunday Age p 10 7-9-08

Sklar, DP, Demarest, G.B., McFeeley P.(1989) "Increased pedestrian mortality among elderly". *American Journal of Emergency Medicine* 1989;7(4):387-390.

Sparke L, J. (1994). "Bull bars, kangaroos and Holden Cars- Uniquely an Australian Challenge". RTA Bull-bar Safety Workshop on 4th May 1994.

TCPA (1995) "The Town and Country Planning Association Submission in Response to the proposed Australian Road Rules: draft for Comment." February 1995,

Walz, et al (1983). "Speed Limit Reduction from 60 to 50km/h and Pedestrian Injuries". In : 27th Stapp Car Crash Conference Proceedings Oct. 17th-19th; San Diego (CA)

Wells, P ( 2006) "The suitability of off-road vehicles for urban environment" Centre for Automotive Industry Research Cardiff Business School, Wales