

# Achieving the National Strategy Target – A role for Vision Zero?

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## INTRODUCTION

The National Road Safety Strategy (2001-2010) was released in Launceston, Tasmania by the Australian Transport Council towards the end of 2000. The Strategy calls for a 40% reduction in the number of fatalities per 100,000 population by 2010. Amongst other things, the National Road Safety Action Plan calls for continuing existing successful road safety initiatives.

The 2001 Road Safety Research, Policing and Education conference has as its theme the need to *'Regain The Momentum'*. This is apt in view of the relatively stable and yet unacceptably high level of death and serious injuries on Australian roads during the latter half of the previous decade, and in particular, a 3.5% increase in fatalities across Australia during last year. While it is sensible to pursue current and past policies that lead to crash reduction, there seems to be a need for a more radical approach to road safety if the benefits rightly sought in the National Strategy are to be achieved.

This paper discusses of the challenge facing Australia in achieving the Strategy targets and the need for a fresh look at road safety philosophy and practice. It reviews various alternative methods currently being pursued in Europe and their benefits if adopted in Australia.

## History of Road Safety over last 30-40 years

Figure 1 shows the safety record in a number of western countries over the last 40 years. During this period, the fatality rate has fallen dramatically. In Australia, for instance, the fatality rate reduced from 30.4 fatalities per 100,000 population in 1970 to 9.3 fatalities in 1999. This is a remarkable reduction in the fatality rate over these 30 or so years. There have also been similar, albeit less, impressive reductions in serious casualties.

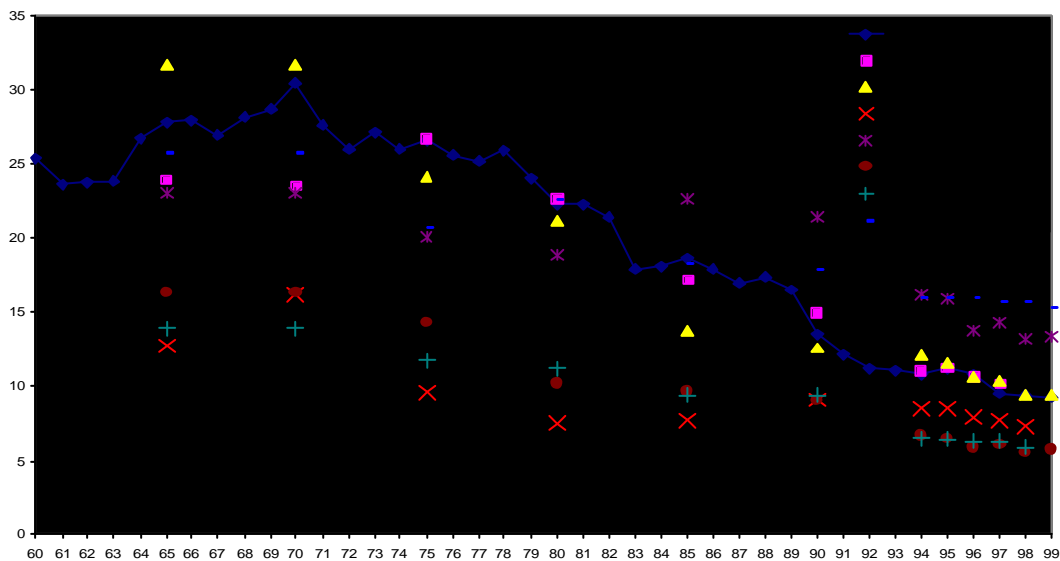
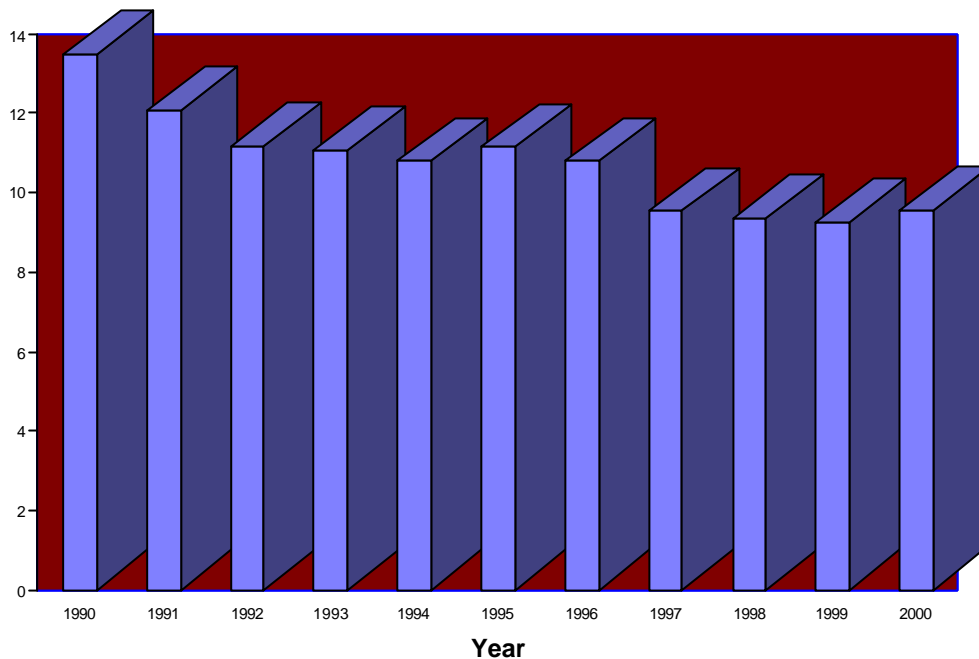


Figure 1 International road fatalities per 100,000 population – 1960-1999



**Figure 2 Australian road fatalities per 100,000 population – 1990-2000 (ATSB 2001)**

Indeed, the absolute number of people killed annually on Australian roads has even fallen from over 3000 in the nineteen sixties to less than 2000 in the late nineties, in spite of a large increase in the level of motorisation. This is quite a success story for road safety. These improvements have been associated with a number of successful road safety interventions such as seatbelt wearing, better roads, safer cars, less drink-driving, reduced travel speeds, fewer accident black-spots, and so on.

In recent years, however, the fatality rate has flattened out considerably and shows signs of being on the increase again (see Figure 2). Moreover, there are not an abundance of new safety improvement programs on the horizon and the continuing effectiveness of some current measures is questionable. In the light of this trauma acquiescence, then, how will we achieve tomorrow's road safety expectations? How can we *"regain the momentum"*?

## **THE TRADITIONAL ROAD SAFETY APPROACH**

Safety philosophy has for many years adopted a transportation model. Under this model, safety is seen as a trade-able commodity against mobility. We accept that mobility is important and desirable within our society and that safety must be traded-off against allowing people access to an unlimited range of mobility options. Indeed, the community clearly desires the right to move around in our environment unimpeded.

The transportation model stresses the need to find the right balance between safety and mobility. Benefit-cost analysis is the means by which we achieve this balance. We discount potential savings in human trauma against losses in mobility. We cost safety benefits and mobility losses in terms of dollars and cents. If a potential safety countermeasure does not produce a sufficiently high Benefit-Cost-Ratio, discounted of course for traffic delays, the safety initiative is generally overlooked. Underlying this model, whether we believe it or not, is the implicit assumption that a degree of road trauma is acceptable.

As shown clearly in Figure 1, road safety under a the transportation model has indeed been very successful in reducing the road toll over the last 30 or so years and has widespread acceptance in this country by politicians, industry, government agencies, researchers and indeed the community itself. I have to say that even my own research and safety philosophy has been heavily influenced and directed by the transportation model. However, with the road toll stabilized over the last 4 or 5 years (average over 1800 deaths annually), one must question whether the transportation model is still the most appropriate approach for road safety if we are serious about meeting the target set by the national road safety strategy.

## **THE VISION ZERO APPROACH**

An alternative road safety philosophy is “*Vision Zero*” which emanates from Sweden. This is essentially a health model, placing absolute emphasis on the value of human life and suffering. The Vision Zero approach was first developed by Claes Tingvall and his colleagues at the Swedish National Road Administration (Elvik 1999). They argued for the need to radically change the current traffic system to achieve a zero road toll. They see the present road transport system as a global public health problem, claiming that compared to other man/machine systems, traffic safety systems around the world are under-developed.

Vision Zero adopts a strong ethical stance on the issue of serious injury. It maintains that it is totally unethical to consider that human life is tradable. The system must place priority on preventing death and serious injury ahead of all other considerations. Another point of departure from traditional road safety theory is the issue of blame or fault. Tingvall states that it is all too easy to simply attribute fault to the driver when in fact the system may well have contributed to the crash. He claims that blaming the driver glosses over the real fault, which is more likely to be the system or environment in which the human operates.

Vision Zero relies very heavily on adopting a ‘*systems-wide*’ approach to road safety; the system as a whole must be more forgiving to the likely mistakes of drivers. This raises the notion of a “*crashworthy system*” where improving road safety means examining the complete driving environment (vehicles, roads, the surrounding environment, traffic mix, and so on) and ensuring that crash energy is optimally managed within the system.

Vision Zero accepts that there will always be crashes as a consequence of mobility. However, it stresses that crashes should only be allowed if they do not lead to severe trauma. Managing crash energy must consider the biomechanical tolerance of humans. This introduces the notion of a dose/response approach to safety, where the exposure to violence or dose must never exceed levels beyond which the human can tolerate.

## **Relevance of Vision Zero**

Opponents to the Vision Zero philosophy maintain that the community will not accept it, that it is impossible to achieve and therefore misleading to set such unachievable targets. They argue the restrictions placed on personal mobility and freedom will not be accepted in our highly mobile society. Besides, individuals still believe that a road crash will never happen to me – I’m a safe driver. Furthermore, the levels of spending required to achieve a zero road toll will not come easily and will require a radical rethink of spending priorities within government budgets.

On the other hand, those who support Vision Zero argue that is ethically unacceptable to trade human life against the joys of speeding or rushing to get to your next meeting on time. Yet this is a common practice in today’s society. Furthermore, they claim that the benefits of mobility are over-stated. While it is possible to place monetary values on lost time due to

lower speeds and delays, time losses on individual trips do tend to be rather small. Travel time surveys conducted by motoring organizations and other researchers have shown that these losses are only minimal in urban areas and only of consequence generally on longer rural journeys. Importantly, also, Vision Zero argues that one cannot continue to blame the individual for the errors of the system. It is all too easy to deflect mistakes due to planning, construction and management of the road system by attributing blame to “human error”.

## **WHAT VISION ZERO HAS TO OFFER**

Whether Vision Zero is achievable or not really misses the point. What it does offer, though, is an alternative approach to thinking about road safety improvements. Importantly, are we able to gain greater insights into reducing the road toll by examining what Vision Zero philosophy and practice has to offer?

### **Systems-Wide Approach**

Perhaps the greatest lesson to be learned from the Vision Zero approach is the value of adopting a multidimensional or systems-wide approach to road safety intervention. This calls for all relevant authorities and the community to work together to adopt a more innovative and co-operative approach to addressing road safety problems. Transport authorities, the police, insurance agents, industry, service providers, researchers, councils and the community need to tackle road safety problems together in a coordinated and collaborative manner.

We need to examine road safety problems using a multidisciplinary approach involving road and traffic engineers, enforcement agents, vehicle designers, medical specialists, educationalists and trainers, behaviourists, researchers, sociologists, the community and media, government officials and many other professionals. We need to learn from each other in formulating new countermeasures and programs that address the various causes of road trauma.

We need comprehensive crash data to assess the likely factors associated with the crash and to review ways in which crashes could be avoided from a multidisciplinary perspective. Finally, governments need to be committed to this new approach and where necessary, commit more resources to road safety programs.

This will require all of us to re-examine our long-held views and approaches to road safety improvements and commit us to trying a different approach to addressing the road toll.

### **Stop Blaming the Driver**

It is easy to simply blame inappropriate behaviour on the part of the driver as the cause of road crashes, thereby alleviating responsibility for other parts of the system. It is true that drivers' behaviour and attitudes to safe mobility are associated with many crashes on our roads. Yet, you could question whether we have an appropriate system if we do not assume that drivers will misbehave.

Johnston (1983) set out to examine ways in which road delineation could be improved to suit drink-drivers. This approach assumed that a proportion of drivers will drive under the influence of alcohol and other impairments and he set about examining ways in which the road environment could be modified to take account of this. Sure, we need programs need to stop drivers from drinking and other inappropriate behaviour (eg; speeding, driving while fatigued, under the influence of performance disabling drugs, etc), but we also need to protect drivers in spite of themselves.

Much of the states natural forests are in roadside plantations which apart from their environmental benefits and importance help to beautify our travels. Yet, the consequences of a vehicle colliding with roadside trees and poles often lead to catastrophic injury and death for the occupants of the vehicle. Vehicle safety has improved dramatically over the last 20 or 30 years by up to 50% (Newstead, Cameron & Le, 1997) through improved vehicle design and the inclusion of new safety technology such as airbags. While vehicle crashworthiness can provide benefits to occupants in most crashes, it is ambitious with today's technology to expect the car to absorb the extremely high levels of impact energy associated with an impact with a tree or pole at highway speeds.

An equally important approach is to focus on preventing these impacts through providing wider set backs of trees and poles from the roadway and/or the provision of suitable barriers between the vegetation and the roadway. This is what Tingvall and his colleagues proposed when they argued for a *'crashworthy environment'*. However, it appears that current barrier designs may not be optimal for providing this level of protection and further research and development is necessary to address this potentially important safety countermeasure (Ydenius, Kullgren & Tingvall, 2001).

## **Excessive Speeding**

Supporters argue that there is really only two approaches possible to achieve Vision Zero – either by improving the infrastructure to prevent crashes or alleviate violence or by reducing impact speed. The first approach means creating a safer travel environment; that is, an improved crashworthy environment. These include such measures as safer roadways, more forgiving roadside settings, complimentary designs between cars and roadside barriers, passenger vehicles offering high levels of crashworthiness and crash avoidance, and vehicle fleets that are less aggressive to each other and to vulnerable road users.

Infrastructure improvements allow vehicles to continue to travel at current speed levels as they are aimed effectively at preventing the crash or preventing injuries. It must be stressed, however, that this approach comes at a price, as infrastructure costs can be substantial. Programs aimed at extensive infrastructure improvements, while allowing for continuing high levels of mobility, nevertheless do require significant resources. This does require a strong commitment by governments and policy makers to Vision Zero philosophies, which in turn means a strong commitment by the community at large.

Another, lower cost, approach is simply to reduce travel speed to levels where road users will not experience life-threatening injuries in the event of a crash. Here we can take a lead from what is happening in Europe. The Dutch have adopted a *"sustainable safety"* approach to reduce fatalities and serious injuries. They have typically introduced THREE speed zones in residential and rural areas. Pure residential streets are restricted to 30km/h, connecting (collector) roads have a 50km/h speed limit, while the third and top undivided road speed limit for arterial roads is 70km/h. Divided roads do have higher speed limits in recognition of the inherent safety of these roadways.

Sustainable safety is a good example of a system-wide approach to road design and traffic management aimed at achieving a Zero road toll. Enforcement is necessary of course to ensure motorists keep to these limits. Police operated radar and speed cameras are commonly used to target speeding motorists. In residential areas, often the residents themselves help to enforce speed limits in their streets through intimidation of speeding motorists. They expect their living areas to be safe for themselves and their families. Loss of mobility cost is minimal on these streets, as journeys are typically short.

## Technological Solutions

Vision Zero also calls for substantial technological solutions. For instance, it is unlikely that permanent speed reductions of the level required for a zero toll will be achieved through behaviour change alone. “Intelematic” speed control systems like those used in the Tilburg trial in the Netherlands and headway control devices to reduce tailgating are examples of technological solutions that can be used to reduce severe crashes.

## EN ROUTE TO VISION ZERO

The city of Trollättan, near Göteborg on the West Coast of Sweden is currently involved in an innovative demonstration program applying many of the principles espoused by Vision Zero. They have established a road circuit comprising 33km of main roads and 6km of local streets in and around Trollättan utilising a number of infrastructure improvements and mobility changes. Saab in Sweden also provided a number of their vehicles fitted out with alcohol interlocks, intelligent speed adaptation devices and seat belt reminder systems as part of the trial. In addition, the City of Trollättan established an extensive hands-on exhibition aimed at informing and educating policy makers, school children and the public generally on relevant road safety issues.

The program was developed using a system-wide approach where key stakeholders and experts were brought together to develop the program. In addition, the public was involved through extensive consultation processes on what was proposed to be introduced as the program management committee realised that their support was vital for the success of the program. Examples of some of the key strategies and interventions are listed below:

- ?? The extensive use of wire rope barriers to divide undivided main roads to reduce head-on collisions and on the side of the road to minimise run-off-the-road contacts with trees and rollovers.
- ?? Reduced speed limits to reduce impact energy of collisions. These limits include 90km on major highways, 70km on major collectors, 50km on other main streets and 30km on local streets. Enforcement on main roads supported by police and camera technology while lower speed limits are also supported with LATM on-road measures.
- ?? Extensive use of roundabouts on all road classes to minimise the number of crashes and the outcome consequences of side impact collisions at intersections.
- ?? Local street design changed to restrict vehicle movements and provide more provision for pedestrians and unprotected road users over vehicle traffic. This includes the provision of pedestrian-only precincts, bike paths, pedestrian crossing and centre road refuges.
- ?? A change in priority from vehicles to public transport and pedestrians. On local streets, novel bus stops have been introduced where curbs have been extended to provide sufficient space for a bus only. Thus, when bus stops, the road is effectively blocked and other traffic must stop until the bus moves on (see Figure 3).

These are only a few examples of what is a significant attempt to make substantial reductions in crashes and injuries on Swedish roads, *en route to achieving Vision Zero*. The program is being comprehensively evaluated to illustrate not only what can be done, but also the relative effectiveness of each of the measures, in terms of reducing crashes and public acceptance.



**Figure 3** Example of a bus-stop from the en route to Vision Zero demonstration track

### **Fatalities and Harm**

A final point relates to the absolute focus of the National Strategy and other safety programs on reducing fatalities. Road trauma more commonly involves survivable injury with associated pain and suffering. Severe head injury sustained in a road crash can lead to death but also to some level of permanent and severe disability or impairment. We must shift our focus to Harm reduction, which includes not only fatalities, but also all levels of injury. For every death on our roads, there is likely to be around 15 survivable hospital admissions and approximately 85 non-hospitalized injured survivors. We should not focus exclusively on road safety programs aimed at stopping fatalities at the expense of the more common, painful and often debilitating injuries from road trauma on Australian roads.

### **FUTURE CHALLENGES**

One of the biggest challenges over the next 30 or so years towards reducing road trauma will come from the ageing of the population and the particular road safety problems associated with older road users. There is an expected 3-fold increase in older driver trauma over the next 20-30 years especially among those aged 80 years and above (Fildes, Charlton, Fitzharris & Pronk, 2001). Trauma among older pedestrians, too, is likely to increase dramatically over current statistics. The ageing of the population will present us with a major challenge to overcome in future. We still have a long way to understand how best to address this rapidly emerging safety issue which will clearly work against achieving the National Road Safety Strategy.

## CONCLUSION

Achieving the National Road Safety Strategy target of a 40% reduction in the road toll will require radical thinking in future and a concerted effort by us all. As noted by the Australian Transport Safety Bureau, “*achievement of this target [that set down by the National Road Safety Strategy] would require considerable commitment by all stakeholders*” (ATSB 2001).

I have outlined some of the challenges that face us if we are serious about achieving these targets. Our success in even getting close to this desirable outcome I believe will mean a substantial change in our thinking and approach to road safety, a new collaborative or systems-wide approach to addressing road safety issues and problems and a massive change in professional and community attitude and current approach to road safety.

I hope for the sake of our children and future generations that we are able to achieve these targets and more importantly, similar reductions in community Harm generally. We will need to be more innovative in the way we approach road safety improvement over the coming decade. Some of the Vision Zero initiatives, I have argued, do offer promise for helping to achieve the National Road Safety targets. Whether these initiatives are exclusively those of Vision Zero is of less relevance than what their value is for addressing road trauma. It will be important to monitor the outcomes of the *en route to Vision Zero* program in the City of Trollättan in Sweden to provide direction for future road safety programs and initiatives.

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