ROAD SAFETY AND LOCAL GOVERNMENT - FRAMEWORKS FOR IMPROVING ROAD SAFETY OVER THE NEXT DECADE

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INTRODUCTION

Road safety is an issue that affects the whole community and South Australia has made good progress in reducing death and injury on the road network in past decades. We now have a more thorough understanding of crashes and how they may be prevented based on extensive scientific research and lessons from elsewhere in the world. Given this knowledge, initiatives to accelerate the rate of injury reduction are being adopted in Australia and leading road safety countries overseas.

This paper discusses the framework in which road safety will be managed in Australia over the next decade and highlights what is currently regarded as best practice. It highlights the road safety challenges that lie ahead and the most feasible and effective options available to local government authorities to contribute to a safer road transport system.

Current best practice adopts a new philosophy where rather than heavily focusing on influencing driver behaviours, we also seek solutions in road design, vehicles used and consider the role of the speed at which these interactions occur. In this regard, people other than the road users have a key role to play in the development of a safe road system as a whole. This in itself is not entirely new and we have been seeking improvements to roads and vehicles over past decades. The difference is that we now realise in order to make significant progress, we must acknowledge the fact that no matter how skilled or well trained people are, mistakes are inevitable. We need to ensure that the road system does not punish individuals with death or injury as the result of predictable errors.

Road safety is one of the few areas where we have become accustomed to focusing on the individuals involved in a crash rather than looking at the bigger picture. An analogy might be how we handle safety in the workplace taking the example of construction workers on high rise buildings. We do not rely only on education and balancing skills to ensure that these people do not fall off buildings. Instead we manage the environment in which they work and put barriers in place so that they cannot fall off the buildings in the first place. We acknowledge that no matter the circumstances, a fall from the building is possible and we do all we can to prevent that from occurring via education, changing the workspace environment, and through the provision of safety equipment. The emphasis in these circumstances is a "duty of care" by the employer to ensure the safety of the workers.

Safe System is a term used to describe this philosophy now being adopted in Australia and internationally in road safety. The concept acknowledges that crashes are predictable and therefore preventable. There is recognition that mistakes will occur and solutions exist beyond a focus on the driver and there is a shared responsibility to achieving safer outcomes.

This means that road designers, traffic managers, urban planners, educators, the police, chief executives and fleet purchasers (amongst many others) all have a role to play in making our roads safer. Simply put, instead of asking who or what caused a crash when it occurs, the question now becomes how could this crash have been allowed to occur. This broadens the range of how the road safety problem is dealt with beyond the traditional focus on the road user. We are trying to move away from a blame mentality to thinking about how everyone can collectively prevent the same crashes from occurring again, no matter the circumstances.

Current road safety philosophy has moved away from the traditional three "E"s (Education, Enforcement and Engineering) towards four key cornerstones:

- safer roads and roadsides;
- safer speeds;
- safer vehicles; and
- safer people.

There are opportunities for Local Government to contribute to these areas and this paper highlights some of the key issues that need to be considered in the South Australian context.

APPROACHES ADOPTED BY THE LEADING ROAD SAFETY COUNTRIES

The Centre for Automotive Safety Research (CASR) conducted a review of 30 international and interstate road safety strategies. Differing visions were adopted but all had the common thread that the level of road trauma is unacceptable and it is the responsibility of the community to change this and not just the individual road user. The leading nations have adopted visions of virtually no death or injury on their road networks using Safe System type philosophies. Common names for strategies include Vision Zero, Sustainable Safety and Towards Zero.

Priority areas for road safety countermeasures most commonly included:

- infrastructure improvements to roadsides and intersections;
- speed management with an emphasis on lower speed limits;
- alcohol impaired driving;
- young drivers;
- vulnerable road users;
- obtaining benefits from vehicle technology;
- enforcement; and
- engaging the community.

Variations between countries are not the issues that are identified but the extent to which the actions are embraced.

NATIONAL FRAMEWORK FOR ROAD SAFETY OVER NEXT 10 YEARS

A National Road Safety Strategy covering the years 2011 to 2020 was released by the Australian Transport Council on 20 May 2011. The strategy is based on Safe System principles, namely, that no person should be killed or seriously injured on Australia's roads. The strategy outlines broad directions for road safety in Australia including 59 planned actions for the first three years and a target of a 30% reduction in deaths and serious injuries over its 10 year lifespan.

Under the safe system framework, the table below outlines the strategic intent of each of the cornerstone areas (NRSS 2011 Table 6):

Safe Roads	Roads and roadsides designed and maintained to reduce the risk of crashes occurring and to lessen the severity of injury if a crash does occur. Safe roads prevent unintended use through design and encourage safe behaviour by users.
Safe Speeds	Speed limits complementing the road environment to manage crash impact forces to within human tolerance; and all road users complying with the speed limits.
Safe Vehicles	Vehicles which not only lessen the likelihood of a crash and protect occupants, but also simplify the driving task and protect vulnerable users. Increasingly this will involve vehicles that communicate with roads and other vehicles, while automating protective systems when crash risk is elevated.
Safe People	Encourage safe, consistent and compliant behaviour through well-informed and educated road users. Licensing, education, road rules, enforcement and sanctions are all part of the Safe System.

The strategy highlights where the most substantial benefits are likely to occur under the four cornerstone areas based on extensive modelling work by road safety researchers given what we have learnt from road safety interventions over past decades. Significantly, the most substantial benefits reside in the areas of improving roads and managing speeds. These are also the areas that Local Government can influence directly on their own road networks.

In the context of safer roads, the strategy aims to achieve by 2020:

- adoption of improved standards for road design, construction and operation to reflect Safe System principles;
- all new roads and road upgrades will be in accordance with the Safe System principles;
- a substantial reduction in serious casualties due to run-off-road, head-on and intersection crashes;
- all levels of government to:
    - have assessed risk on their road network and re-focused road investment programs to treat higher risk section of the road network in addition to more targeted black spot programs; and
    - have accepted accountability and responsibility for the road safety performance of their networks in accordance with Safe System principles.

Seven actions were identified for Safer Roads for the first three years of the strategy consistent with the previously listed aims. An additional aim that was not listed as it is outside the scope of this discussion was to achieve a nationally consistent means for valuing road safety projects.

Safer speeds are a critical component of the strategy and it is noted that community acceptance is a major issue.

Achieving further substantial change in this area will require ongoing public engagement to build sufficient acceptance of new initiatives.

This will include:

- an ongoing dialogue with motoring organisations and other key stakeholder groups;
- a focus on improving community understanding of the importance of speed limit compliance, including an appreciation of the social costs associated with 'low-level' speed offences, while the risk for individuals may be relatively small, the aggregate contribution to road trauma is large; and
- a national community dialogue explaining the safety rationale for speed management actions and the complementary environmental and economic benefits relating to reduced emissions, fuel consumption and noise.

By 2020 the strategy aims to achieve:

- speed limits that reflect a better balance between safety and mobility objectives;
- a substantial improvement in overall compliance with speed limits, particularly on highly trafficked and / or higher-risk sections of the road network; and
- network-wide alignment of speed limits with the inherent risk and function of the road and roadside environment.

Seven actions were identified for Safer Speed for the first three years of the strategy.

The bulk of safer vehicles actions can only be dealt with at the Federal or State Government levels. No specific role for Local Government is mentioned however, some of the broad actions can be adopted, such as encouraging the use of the safest vehicles amongst the community and in fleet purchasing decisions.

Safer people is divided between responsible and irresponsible road use. Again, the role of Local Government is not made explicit, however some supporting roles that reinforce education, enforcement and community engagement could be adopted.

STATE FRAMEWORK FOR ROAD SAFETY OVER NEXT 10 YEARS

The South Australian State Road Safety Strategy 2020 - Towards ZERO Together was released in October 2011. In similarity with other States and the National Strategy, Safe Systems forms the basis for the strategy which states that:

> *"No death or serious injury on our roads is acceptable or inevitable, and the whole South Australian community must work together to address the trauma caused by everyday use of the roads - regardless of the circumstances or the people involved".*

The strategy has a target of at least a 30% reduction in death and serious injuries over the next decade. This means a reduction to 80 fatalities and 800 serious injuries per year by 2020.

It is acknowledged that different mixes of intervention are possible, however infrastructure safety improvements, speed management and improved driver behaviour and compliance are regarded as having the greatest potential to significantly influence casualty reductions. The increased uptake of new vehicle technologies is also recognised as an area where efforts should be made.

Local government is acknowledged as having an important role in road safety as both a manager of 85% of South Australia's road network and also as representatives of and advocates of road safety in their community.

In relation to safer roads, as with the national strategy, there is a focus on run-off-road crashes and crashes at intersections. It is acknowledged that infrastructure investment is expensive and it is important that funding is applied where it is likely to achieve the most benefits.

Key strategies for safer roads include:

- integrate safety into all stages of urban / rural and transport / corridor planning processes;
- form stronger partnerships between State and Local Government to apply safe system principles to South Australia's road network; and
- target infrastructure safety investment with the most effective safe system treatments at locations with the highest volumes or greatest risk of crashes.

Speed management has been regarded in the context of a framework for safe and credible speeds, something that will require a stronger functional approach to the management of the road network. Within this scope was consideration of appropriate speed limits in rural and metropolitan areas and improvement in overall compliance with speed limits.

The 2011/12 action plan contains the following actions:

- align speed limits to the function, standard and use of the road, and increase consistency in their application across the state;
- strengthen public information explaining the impact of speed and speed limits on crashes;
- target speed limit reductions for roads according to crash rates and a functional road hierarchy;
- increase the use of new technologies to boost speed limit compliance; and
- increase the penalties for speeding to better match the risk posed.

A plan of priority actions and complementary measures was also released to accompany the strategy. Several actions were outlined in relation to speed management, the actions listed in bold were to be developed jointly by DPTI and local government:

- align speed limits to Safe System principles and a functional road hierarchy by;
    - consistent application of the 100 km/h default speed limit on more rural roads;
    - consistent application of the 50 km/h default speed limit on more urban roads;
    - **supporting a demonstration project of 80 km/h on unsealed rural roads;**
- **develop Safe System guidelines for setting speed zones in residential areas;**
- review speed offences and penalties to better reflect the risks; and
- introduce an awareness campaign to increase community understanding of speed issues.

As with the national strategy, there are no specific actions highlighted for Local Government in relation to Safer People and Safer Vehicles however a supporting role could be played for several of the broad actions mentioned.

Another major influence on the South Australian road safety was the Thinker in Residence program. Professor Fred Wegman was invited to be Adelaide Thinker in Residence on road safety between 2010 and 2012. Professor Wegman is an internationally recognised road safety expert and serves on several international road safety committees. He was closely associated with the Sustainable Safety Strategy that has been adopted in his home country in the Netherlands which is now amongst the top three best performing road safety countries in the world. Professor Wegman's final report was released in July 2012 and his body of work was used as key input to development of the South Australian Towards Zero strategy.

The report emphasises the benefits of a Safe System characterised by the following:

- a traffic system with considerably lower casualty levels, if not zero, for the next generation;
- a proactive approach using our growing knowledge and understanding of road crashes;
- integration of people, vehicles and roads into one Safe System addressing the whole network - all vehicles and all road users - instead of only high risk groups and high risk locations;
- integration of road safety with other policy areas;
- accommodating human capacities and limitations;
- understanding that the prevention of crashes is not wholly dependent on road user mistake or error; and
- based on the assumption that road crashes are to a large extent preventable, begin with interventions which are the most effective and cost-efficient.

Professor Wegman highlighted the importance of speed management and the need to strive for safe and credible speed limits as reflected in the state strategy. He suggested a range of metropolitan and rural demonstration projects be conducted on major roads and in local areas. He proposes a review of procedures for current speed limit setting in South Australia with the aim of providing a more transparent process and also more support to local government initiatives. He identified that knowledge transfer and capacity building around credible speed limits is also required.

Professor Wegman made several recommendations in his report in relation to local government and commented on the need for them to become more involved in road safety in general.

ROAD SAFETY AS A LOCAL GOVERNMENT RESPONSIBILITY

The current road safety situation can be summarised as follows:

- infrastructure changes can bring high gains but take significant money and time to implement;
- changing vehicle technology has great potential but due to the slow turnover of the fleet in South Australia we do not reap the benefits for many years to come;
- enforcement and regulation are essential to a Safe System and efforts in this area need to be maintained;
- lower speeds and speed limits provide the best opportunity for an immediate reduction in trauma; and
- we need to aspire to the perfect system where predictable mistakes do not result in death and injury but we also need to minimise trauma while we make the transition.

The national and state road safety strategies provide the framework in which road safety will be managed over the next decade. Local Government is recognised as playing a key role in improving road safety.

Safer Roads

The most significant challenge that lies ahead is the creation of more forgiving roads and roadside environments. This primarily involves the retrofitting of the existing road network and will require investment in the treatment of intersections in metro and rural areas. Run-off-road crashes constitute the main problem in rural areas and ongoing efforts to deal with vehicle lane departures and roadside hazards need to be increased. Over the next decade it is likely that barriers in the centre of the road will also be adopted as a countermeasure on an increasing proportion of the Australian road network, including Local Government roads.

Safer Speeds

Speed management remains a contentious issue amongst the community. There is ample international scientific evidence that proves beyond doubt that speed management reduces deaths and injuries. Speed management has significant advantages over other road safety approaches because:

- it has been proven to work and even small changes can be beneficial;
- it's is relatively cheap to implement and maintain;
- it can be implemented in a relatively short timeframe;
- road safety benefits can be achieved immediately;
- lower speed limits can lead to reductions across most crash types and all road user types; and
- lower speed limits can achieve much greater reductions in crashes and injury than most other countermeasures and at a fraction of the cost.

The benefits from lower speed limits can be enhanced if coordinated with adequate enforcement and supporting mass media activity. Some also propose the need for self-explaining roads where the speed limit is supported by infrastructure design. While this is a desirable concept there would be significant difficulties in adopting this approach on a widespread basis on the Australian road network, especially given the lack of a well articulated functional road hierarchy. It is also noted that the previously reported benefits from lower speed limits were generally achieved without significant alterations to infrastructure.

Infrastructure improvements are constantly being made to the road network, however they are costly and take time to implement. Australia has one of the lowest GDP per kilometre of road in the developed world and roads altered to accommodate driver mistakes and errors are unlikely to be achieved for many parts of the road network. The bulk of local government roads will never receive the funding required to bring them to a standard suitable for high speed travel as is the case with divided freeways. To achieve the equivalent crash reductions when compared to reducing speed limits, hundreds of millions of dollars of investment is required to upgrade roads via shoulder sealing, hazard removal and crash barriers. Clearly this magnitude of funding is not available to Local Government.

Reduction in speed limits remains the single most effective countermeasure that can be adopted to improve road safety over the next decade. There is a need for strong leadership in convincing the community that speed management plays a crucial role in improving road safety and that this option will be far more effective than relying on driver behaviour or infrastructure improvement programs.

Evidence of the relationship between speed and crashes and the pros and cons of adopting lower speed limits are outlined in the Appendix.

Safer Vehicles

Occupant protection has improved dramatically in the past decade. Vehicle structures have been refined to keep the occupant area as intact as possible in crashes and absorb impact energy in a manner that causes less injury to occupants. Other safety features such as airbags and pre-tensioning seat belts are also reducing injury severity in crashes. These technologies, known as passive safety features, work to reduce the severity of crashes should they occur.

There has now been a significant shift towards active safety features: technologies which seek to avoid and prevent crashes from occurring in the first place. The most significant of

these include Electronic Stability Control and Forward Collision Avoidance system and these are also likely to have a large influence on future crashes.

Improvements in vehicle technology have considerable potential to influence road safety however it takes approximately 20 years to turn over the South Australian vehicle fleet so safety benefits are not realised for a considerable amount of time. It is therefore vital that the safest vehicle technologies are adopted as soon as possible to maximise fleet penetration. Almost half of the vehicles in South Australia originate from government and private fleets so there is a significant opportunity for organisations such as local government to contribute to future safety with fleet purchasing decisions. This not only benefits employees while the vehicle is in the organisation's fleet but also to the community when the vehicle is resold at a later stage.

The Australasian New Car Assessment Program (ANCAP) advocates for vehicle safety and tests cars to apply a star rating where five stars is the safest vehicle and one star the least safe. Local Government could advocate the adoption of ANCAP five star vehicles amongst the community and in its own vehicle fleets.

Safer People

Influencing road user behaviour has been a key part of road safety management in past decades. Australia is actually one of the most successful countries in achieving road safety gains from influencing road user behaviour. This has largely been accomplished via a safety focused legislative framework backed up with enforcement and mass media. These efforts need to continue, however modelling work has shown that future gains with behavioural measures will be more difficult when compared with the equivalent gains likely to be made in the other areas of Safer Speeds and Safer Roads.

Current road safety strategies acknowledge the link that local government has with the community and there is certainly a role for road safety promotion and advocacy. There is a need for Local Government to engage in knowledge transfer and capacity building in relation to road safety. Informed engagement with the community is required based on the scientific evidence and lessons learnt elsewhere. The current road safety strategies support the use of demonstration or pilot projects to demonstrate to the community the potential benefits of road safety measures. Local Government could play a key role in leading these projects.

APPENDIX

The science behind benefits of lower speed limits
There is now ample scientific evidence and real world experience that demonstrates when speed limits are lowered, reductions in crashes and casualties are achieved.

In summary, the scientific research on speed and road safety suggests:

- crash risk increases with increasing speed;
- travelling speeds observed on our road networks are closely related to the speed limit;
- in a 60 km/h speed limit area, the risk of involvement in a casualty crash doubles with each 5 km/h increase in travelling speed above 60 km/h;
- reducing urban speed limits would lead to a considerable reduction in pedestrian crashes and injuries;
- reducing rural speeds by 5 km/h would lead to a reduction in rural casualty crashes by about 30%; and
- reducing urban speeds by 5 km/h would lead to a reduction in urban casualty crashes by about 26%.

Much of the compelling evidence for speed limit changes have come from internationally recognised work conducted in South Australia by CASR and has since been supported by work elsewhere in Australia and Internationally.

Past initiatives to lower speed limits in the state have demonstrated very favourable outcomes. When the default urban speed limit was changed from 60 to 50 km/h in 2003, reductions of over 20% were achieved and sustained in urban crashes. Similar benefits were achieved when speed limits were lowered to 80 km/h in the Adelaide Hills and from 110 to 100 km/h on selected rural roads. This pattern has also been repeated in other jurisdictions where speed limits have been lowered.

What are the Safe Speeds?
The following speed thresholds are often referenced within Australia and internationally as those that minimise harm to road users given current road and vehicle design.

Crash Configuration	Impact Speed below which death or injury is unlikely
Car vs pedestrian, cyclist or motorcyclist	30 km/h
Car vs tree or pole - side impact collision	30 km/h
Car vs car - right angle collision	50 km/h
Car vs car - head on collision	70 km/h

Although there are many caveats associated with these speeds, they are generally indicative of the levels at which a safe road system could be achieved. It can be seen that the threshold speeds for injury do not correspond well to the speed limits currently adopted throughout our road network. It is also apparent that throughout the road network there is a large variation in the standard of roads that have the same speed limit. For example, most of us can relate to the fact that there are many roads where a 100 km/h speed limit would apply but their quality ranges from an unsealed surface with poor alignment through to freeway standard with good levels of hazard protection. These inconsistencies will need to be addressed over the next decade.

Implications of lower speed limits on travel times, operating costs and the environment

Given the considerable benefits that lower travelling speeds can achieve for reductions in crashes and death and injury, there are also additional benefits to the community:

- reducing speed limits has environmental benefits in terms of pollution, emissions and fuel consumption; and
- reducing speed limits leads to less wear and tear on vehicles and lower operating, fuel and maintenance costs.

There is no doubt that reduced speed limits will lead to increases in travel times, however this effect is often overestimated by the public. In metropolitan areas traffic is largely regulated by traffic signals and these can be fine tuned to minimise delay for any adopted speed limit. Travel time in rural areas is a more contentious issue. CASR has conducted simulation modelling to test theoretical differences between speed limits. If a speed limit is reduced from 110 to 100 km/h, the theoretical maximum increase in travel time is 10% (ie six minutes per hour). However, given interactions with other traffic, overtaking opportunities, sections of road with bends, townships, intersections and roadworks, the difference was actually much lower than 10%.

Some freight transport companies have realised the advantages of running their vehicles at 90 km/h instead of 100 km/h and have reported considerable benefits in terms of cost savings to the company. Travel time has not proven to be a significant issue and one company has reported that for their typical routes, the lower travelling speed only hindered their drivers for 30% of the journey. The additional benefits outweighed the extra travel time in terms of fuel savings, insurance premiums and driver retention.

Several companies in the resource sector also have strict guidelines for their staff relating to vehicle use and impose maximum speeds in rural and remote areas below that of the applicable legal speed limit. The "duty of care" towards employees is regarded as more important than the marginal benefits of travel time saved.

REFERENCES

Government of Australia (2011) National Road Safety Strategy 2011-2020. Canberra: Australian Transport Council.

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