Curtin University of Technology

MONASH University

CURTIN - MONASH ACCIDENT RESEARCH CENTRE

C-MARC

FACT SHEET NO. 1

TOWARDS ZERO: UNDERSTANDING A SAFE SYSTEM APPROACH TO ROAD SAFETY

Prepared by: Jim Langford

1. Purpose of this Fact Sheet

This paper has a two-fold purpose:

- to provide an overview of Safe System strategies in use around the world; and
- to describe Western Australia's *Towards Zero* strategy.

2. What is a Safe System approach to road safety?

Sweden's Vis*ion Zero* and the Netherlands' *Sustainable Safety* represent the longest established Safe System approaches. In November 2003 Australia and New Zealand joined this group when transport authorities in both countries accepted that further road safety gains would best be achieved by adopting a Safe System strategy[1].

Safe Systems around the world have common key features[2]:

- they recognise that the human body has a limited tolerance of violent forces and when crash energies exceed this tolerance, death or serious injury will be a probable outcome;
- they accept that crashes will continue to occur, prevention efforts notwithstanding, given that humans make mistakes when using the road system;
- the challenge for any Safe System in the event of a crash is to ensure that no fatalities will occur (and that serious injuries will be reduced) for road users behaving appropriately; and
- this challenge can be best met by managing the road infrastructure, vehicles and speeds to reduce crash energies to levels that can be tolerated by the human body.

Safe System approaches offer a different view of road users than has traditionally been the case.

The Netherlands' *Sustainable Safety* for example, describes the road user as the weakest link in the transport chain: the individual road user is largely unpredictable and cannot be relied upon to behave safely over the long term, all of his or her best intentions notwithstanding[3]. People make mistakes. Training, education and even enforcement measures which rely upon correcting road user behaviour will not succeed in achieving Safe Systems' ambitious goals.

This view does not excuse road users from behaving responsibly. They are expected to obey road rules, demonstrate adequate skills and can expect fines and even loss of licence if they behave inappropriately (for example, by speeding or drink-driving). However Safe System approaches argue that for as long as mistakes are likely, all road users need to be protected – and this protection is best provided by safer roads, speeds and vehicles.

3. Why do we need a new road safety strategy?

Figure 1 shows the numbers of road deaths in Australia from 1950 to 2008[4].

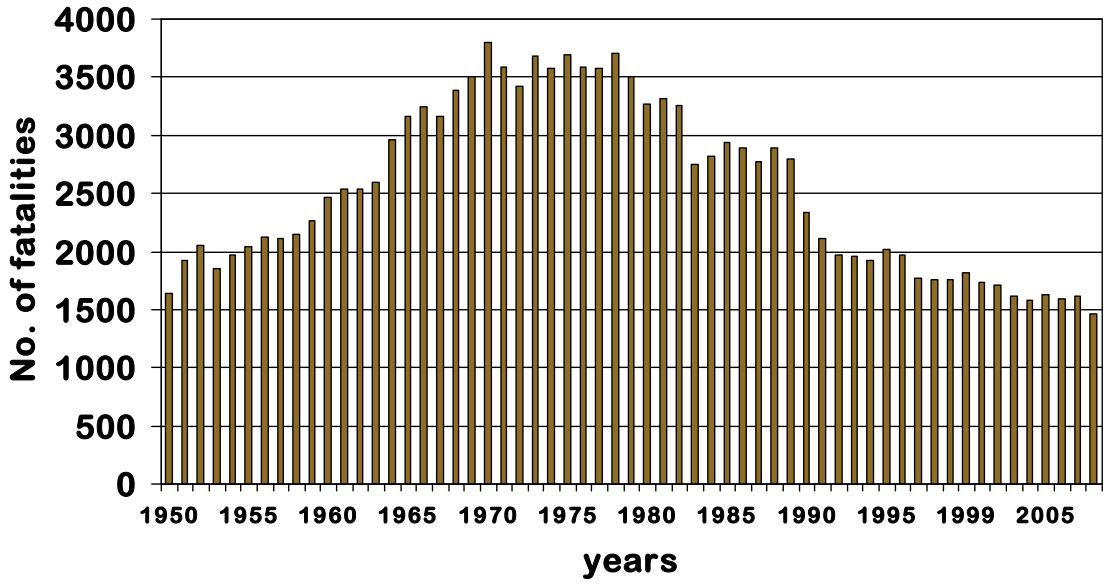

Figure 1: Road deaths in Australia, 1950-2008.

Road safety achievements in Australia from around 1980 to the mid 1990s represent an outstanding success story. However, the rapid decline in serious road trauma that saw the numbers of fatalities more than halved, has slowed down in the most recent ten or so years - a slow-down which is common to many transport jurisdictions around the world and within Australia. In Western Australia for example, the annual numbers of deaths and serious injuries have shown little reduction over the past twenty-five years[5].

Road safety practitioners are increasingly arguing that further improvements in serious road trauma (both deaths and serious injuries) will require a new strategy in the form of a Safe System approach, to be built upon those existing countermeasures which have already been shown to be effective.

4. What do Safe System countermeasures look like?

The specific countermeasures that come from a Safe System strategy differ between jurisdictions. However as a broad summary, Safe System countermeasures aim either to prevent a crash from occurring or to reduce the severity of that crash, *while minimising the possible role of human error in precipitating the crash.*

Countermeasures from jurisdictions around the world that consistent with Safe System principles include:

- Road related
  - flexible wire barriers along the centre and sides of roads, to prevent run-off-road and head-on crashes;
  - flexible wire barriers to separate vulnerable road user groups (pedestrians, cyclists) from vehicles;
  - roundabouts, to reduce possible impact speeds and to alter crash types, and in so doing to simplify the decisions drivers have to make;

- Vehicle related
  - numerous in-vehicle crash-avoidance technologies, ranging from alcohol and seatbelt interlocks to various crash-warning devices, to automated vehicle control in pre-crash circumstances (for example, Electronic Stability Control);
  - other technologies which serve to reduce injuries in the event of a crash, including vehicle design features such as crumple zones to absorb crash energies and improvements to seat belts and air bags to provide improved occupant protection; and
- Speed related
  - reduced speed limits particularly where high numbers of vulnerable road users can be expected (for example, shopping areas and school zones) and along high-risk road sections where there are no apparent or immediate engineering solutions.

These examples present the road, vehicle and speed components as separate categories. A basic principle of a Safe System approach is that the interactions between road, vehicle and speed (and user) also need to be considered if true system solutions are to be achieved. For example, a so-called 'safe speed' can be determined only by also considering road circumstances: a road with numerous safety features allows higher speeds than a road with hazards. Intelligent speed adaptation is an emerging countermeasure based on the road-vehicle interaction. As a further example, the value of a vehicle's occupant protection features partly depends on the nature of the occupant: older drivers have a different injury vulnerability than younger drivers and may need to be better protected by different protective features.

5. WA adopts *Towards Zero* as its new road safety strategy

On the 19th of March 2009 the Western Australian Minister for Road Safety announced to Parliament[6]:

> (Today) will mark the point at which we redefined the way we approach road safety in our state. … Towards Zero is our bold new road safety strategy for Western Australia, and its core theme is that we should never accept road trauma as a fact of life. It will challenge us to strive for zero deaths and serious injuries on our roads. … Towards Zero recognises that although crashes will always occur, no-one needs to die as a result of a crash.

With the Minister's statement, Western Australia became the first Australian State to commit politically to a Safe System approach to road safety.

Figure 2 shows the key components of *Towards Zero*[7].

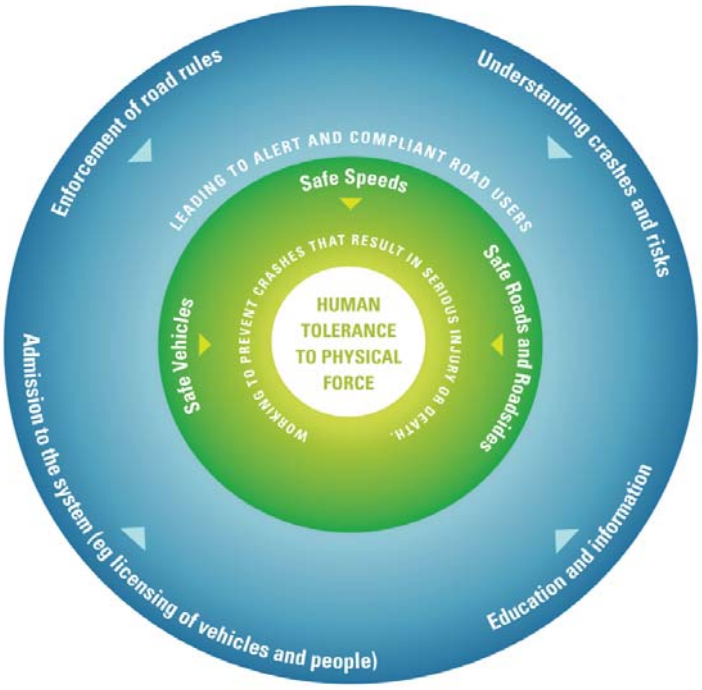

Figure 2: Western Australia's *Towards Zero* approach to road safety.

The four cornerstones and associated road safety programs for the different regions of the State are summarised in Table 1[7].

Table 1. The four cornerstones of Western Australia's Towards Zero and associated road safety programs

Regions	Safe roads and roadsides	Safe speeds	Safe vehicles	Safe road use
All of Western Australia	Accident Black Spot and Safer Roads Programs	Enhanced enforcement	Crash avoidance and occupant protection countermeasures	Ongoing behaviour change programs
Metropolitan Perth	Safe System intersection transformation	Specific speed limit adjustments to match geographic priorities	Specific crash avoidance countermeasures to match geographic priorities	Targeted behaviour change programs to match geographic priorities
Regional Western Australia	Safe System transformation on key rural routes			
Remote Western Australia				

For further details about *Towards Zero*, see:
http://www.officeofroadsafety.wa.gov.au/index.cfm?event=strategiesNewStrategy2008-2020

The specific countermeasures to be implemented as part of the new strategy have yet to be announced. However based on likely options, it has been estimated that programs for each cornerstone may collectively save over 15,000 deaths and serious injuries in the next twelve years, equivalent to approximately one-half of the current level[8]. It has been further estimated that each cornerstone will contribute to the following reductions.

Proportion of reduction in deaths and serious injuries:

- Safe roads and road sides 25%;
- Safe speeds 29%;
- Safe vehicles 26%;
- Safe road use 20%.

Achieving these reductions will depend not only upon the specific countermeasures selected and their relevance to the underlying road safety programs but also upon the commitment of adequate financial resources to ensure their effective implementation.

6. Summary and conclusions

Western Australia's *Towards Zero* represents a Safe System road safety strategy, versions of which are in place in Sweden and the Netherlands. While the interpretation and application of Safe System principles vary across different countries, common elements include:

- the aim to prevent all road crashes which result in deaths and serious injuries;
- an acceptance that despite best efforts, road users make mistakes; and
- the contention that death or serious injury should not be the price paid for these mistakes.

Safe Systems commonly aim to achieve a road system better able to forgive road users' errors – either by preventing crashes altogether or in the event of a crash, by keeping crash energies below the levels likely to result in death or serious injury. Safer road systems will come about through improved management of roads, vehicles and speeds and through managing the interaction of these three components and their impact on road users.

Western Australia's *Towards Zero* is the first Safe System approach to achieve political commitment in Australia, with its impact on deaths and serious injuries over the next twelve years depending upon a range of factors, not the least being adequate funding.

7. References

[1] Australian Transport Council National Road Safety Action Plan 2005 and 2006. Australian Transport Safety Bureau, Canberra. (undated).

[2] Fildes, B and Langford, J (2002). ''Vision Zero' and 'Sustainable Safety'', Volume 1 of the Austroads Road Safety Handbook, (pp 61-68). See: http://www.austroads.com.au/handbook.html.

[3] Van Vilet, P and Schermers, G (2000). Sustainable Safety a New Approach to Safety in the Netherlands. Ministry of Transport, Public Works and Water Management, Rotterdam.

[4] Department of Infrastructure, Transport, Regional Development and Local Government. Road deaths Australia: 2007 statistical summary. See: http://www.infrastructure.gov.au/roads/safety/publications/2008/pdf/Ann_Stats_2007.pdf.

[5] Annual crash data provided by the Office of Road Safety, Department of Premier and Cabinet, Western Australia, 22 July 2009.

[6] Extract from Hansard, Legislative Assembly, Parliament of Western Australia, Thursday, 19 March 2009, pp 2178b-2182a.

[7] Road Safety Council's Recommendations to Government for Actions to Support and Assist the Implementation of Various Elements in the Proposed Road Safety Strategy Towards Zero – Recommended Implementation Plan 2009-2011, August 2008. See: http://www.officeofroadsafety.wa.gov.au/index.cfm?event=strategiesNewStrategy2008-2020

[8] Corben, B, Logan, D, Johnston, I and Vulcan, P (2008). Development of a New Road Safety Strategy for Western Australia 2008-2020. Report to the Office of Road Safety, Department of Premier and Cabinet, Western Australia, Monash University Accident Research Centre, Clayton, Victoria.

Acknowledgement

This fact sheet has been produced with funding from the Road Safety Council in the interest of saving lives on our roads.

C-MARC

Curtin - Monash Accident Research Centre

School of Public Health, Faculty of Health Sciences, Curtin University of Technology
GPO Box U1987, PERTH 6845, Western Australia
Ph: (08) 9266 2304
See www.c-marc.curtin.edu.au for more information