

INFORMATION SHEET

SPEED MANAGEMENT

1. Road Safety Strategy

The purpose of the Road Safety Commission (Commission) is to eliminate life-changing road trauma in Western Australia. The vision of the Commission is a future without road trauma, a future where no one thinks that road trauma is acceptable.

In 2008, the State Government released its 12-year road safety strategy, *Towards Zero*, which set out the target of 11,000 fewer people killed or seriously injured (KSI) by 2020. The strategy is based on the Safe System approach to road safety, which involves a holistic view of the road transport system. *Towards Zero* is underpinned by the four cornerstones of the Safe System.

- Safe Roads and Roadsides
- Safe Vehicles
- Safe Speed
- Safe Road Use

Speed is a key risk factor in road traffic injuries. Lower speeds result in fewer crashes, fewer deaths, and fewer serious injuries in Western Australia.

2. Definition

Speeding is defined by *excessive* speed (driving above the speed limit) or *inappropriate* speed (driving too fast for the conditions, but within the limits) (OECD-ECMT, 2006).

3. What is the problem?

In 2019, 52 people died in speed related crashes in WA (Road Safety Commission, 2020). Moreover, for every person who is killed on Australian roads, approximately 30 are hospitalised and survive with ongoing trauma (CARRS-Q).

Speeding is made up of two elements: excessive and inappropriate speeds. Excessive speed is defined as driving above stated speed limits and inappropriate speed is driving at a speed unsuitable for the prevailing road and traffic conditions.

The first element is primarily the choice of the driver, although in some cases driving at excessive speed can be unintentional, for instance in the event of a faulty speedometer or failing to see speed signage. The second element is more complex and consists of human error and natural conditions, such as prevailing weather, road conditions and other road users.

Western Australia has an extensive road network – around 186,000 km – of which approximately two thirds is unsealed (Main Roads WA, 2017). The network spans highly urbanised roads through to extremely remote rural roads. Open and rural roads in WA are prone to large amounts of sand and dust collecting on road surfaces. When this sand is mixed

with water or motor oil the driving conditions become more dangerous. Under these conditions, the additional element of speed puts drivers and other road users at considerable risk.

There are at least eight different speed limits across WA and speeding and speed related crashes continue to feature heavily in annual KSI figures.

4. What is the supporting research and evidence?

It is difficult to pinpoint one specific cause for excessive and inappropriate speed related crashes. Environmental factors that can affect driver speed include:

- Driver distraction (fatigue, stress levels, etc.)
- Road geometry (road surface, narrow road, etc.)
- Roadside environment (objects next to roads, road access points, etc.)
- Temporary environmental factors (lighting conditions, other road users, etc.)
- Road signs and markings (static signs may have little effect) (Edquist, Rudin-Brown, & Lenne, 2009).

Driver attitudes to speeding and what is considered an appropriate speed vary (Fildes, Rumbold, & Leening, 1991; Souwe, Gates, & Bishop, 2018). For more people to survive on the roads – taking human faults and frailties into account – road management systems need to reduce speed (Mooren, Grzebietaa, & Soames-Joba, 2014).

Regional and metropolitan/urban areas have different types of road systems and consequently differing speed restrictions. Regional roads tend to be more open with roadside verges, higher speed limits and fewer road signs, markings, and furniture. In contrast, metropolitan/urban areas have delineated roads and highly regulated speed measures including, road signs, markings, and furniture.

In this context, there are issues with speeds driven on regional roads and relatively high levels of regional road trauma.

In 2019, 45% (74) of fatalities occurred in 110km/h speed zones, as compared with 15% (24) on 60km/h zones. Consistent with historical trends, the majority (60%, 99) of 2019 road fatalities were a result of crashes in regional WA and 63 of those deaths on 110km/h regional roads. In 2019, more fatalities were recorded in 100km/h and 110km/h speed zones compared to the preceding five-year average (Road Safety Commission, 2020).

In addition to the emotional and social costs of road trauma, the financial costs associated with speeding are huge. These costs represent a significant burden on the economy and society, and these costs are felt most in times of economic pressure. The economic cost of each fatality has been estimated at \$4.34 million, and the cost of each hospitalised injury, including disabled persons is \$239,000 (Australian Automobile Association, 2017).^{1 2}

Speed is globally recognised as a key factor in crash outcomes and Nilsson's 'Power Model' demonstrated the clear relationship between changes in mean speed³ and crash outcomes. The

¹ For the reference year 2015.

² This figure includes, but is not limited to, the associated costs of on-going care, funeral costs, ambulance and in-patient treatments, loss of income to the casualty and the local economy, repairs to and/or replacement of vehicles and property involved in the crash.

³ Mean speed: the distance an object moves under uniform acceleration is equal to the width of the time interval multiplied by its velocity at the at the midpoint of the interval – its mean speed.

Power Model shows that a 5% increase in mean speed leads to around a 10% increase in all injury crashes and a 20% increase in fatal crashes. Conversely, a 5% decrease in mean speed leads to 10% fewer injury crashes and 20% fewer fatal crashes (G. Nilsson, 1981).

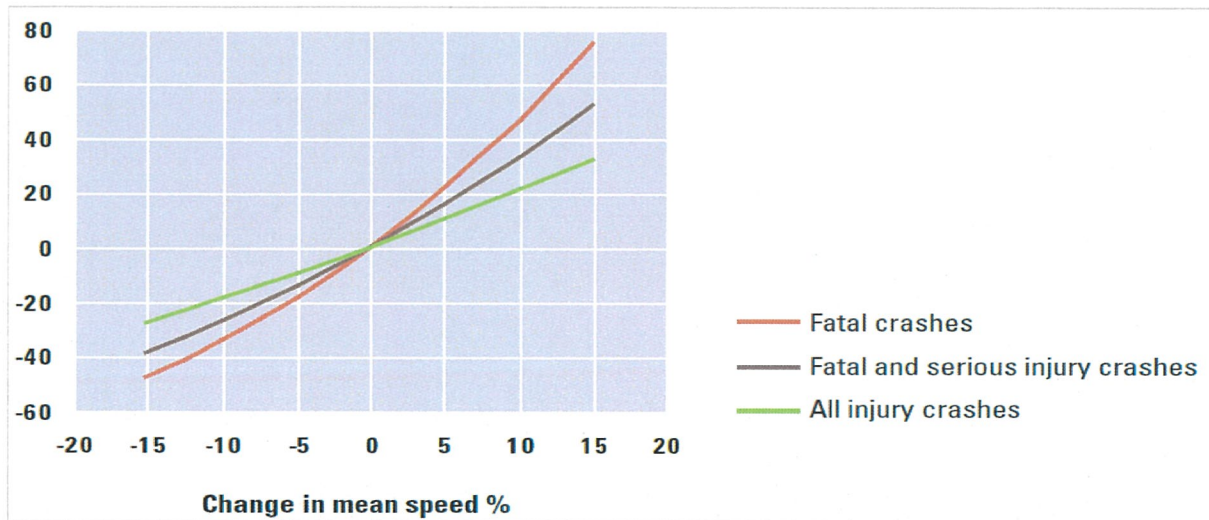


Figure 1: Relationship between change in mean speed and crashes (G. Nilsson, 2004).

To prevent death and serious injury, impact speeds must be within the limits of human tolerance. Maximum, survivable vehicle speeds in a Safe System for different crash types are:⁴

- Locations with possible conflicts between motor vehicles and unprotected users (pedestrians, cyclists) – 30km/h.
- Intersections with possible side-on impacts between cars – 50km/h.
- Roads with possible frontal impacts between cars – 70km/h.
- Roads with no possible frontal or side-on impacts between road users - >100km/h (Mooren et al., 2014).

Speed Limits on Regional and Remote Roads

At a national level, researchers estimate that 14% of fatal crashes in Australia occur on unsealed roads, and in remote WA this figure is considerably higher at 23% (Goodsell & Roberts, 2019). In 2017, 57% of road fatalities in WA were recorded on regional roads and in 2018, 62% of fatalities were recorded on regional roads (Road Safety Commission, 2018, 2019). This is disproportionate to the population distribution of the State.

Regional roads⁵ tend to be more open with roadside verges, have higher speed limits and fewer road signs, marking and furniture. Distractions and speeding are shown to be higher in regional areas due to the lack of counter-speeding measures, signage, or enforcement.

Two-thirds of all road crash deaths occur in regional and remote areas, mostly in 100 km/h or higher zones. Regional roads have historically suffered from a lack of major upgrades in comparison to metropolitan areas. Due to low population densities and relatively low traffic

⁴ Assuming safest vehicle design and 100% restraint use.

⁵ 2018 Preliminary summary of fatalities on Western Australian roads; regional roads include any road not within a metropolitan boundary

volumes, spending on the rural road network has been limited and, in many cases, it is not feasible to address road safety risks with infrastructure improvements alone.

Currently the default speed limit on non-residential roads in Western Australia is 110km/h. This applies regardless of the quality of the road.

Evidence shows that changing the speed of vehicles from 100 km/h to 90 km/h can be expected to produce a 35% reduction in fatal crashes and a 31% reduction in serious injury crashes (Transport and Infrastructure Council, 2018).

5. What are the countermeasures?

Legislation

In Western Australia, the *Road Traffic Act 1974* (the Act) and *Road Traffic Code 2000* (the Code) establish a framework for speed regulation and enforcement; they are regularly evaluated and updated to ensure provisions are contemporary and relevant.

Recent Legislative Changes

Various amendments to the Act and Code have been implemented in recent years to improve compliance with posted speed limits, ensure that non-compliance is appropriately penalised, and reduce speed in certain circumstances, including:

- January 2017: Amendments to the Act created a separate offence of driving at reckless speed (≥ 5 km/h or ≥ 45 km/h over speed limit) and gave Police power to impound and/or confiscate vehicles used in such offences and arrest drivers involved without warrant;
- September 2017: The Code was amended to increase penalties for drivers exceeding the speed limit by more than 40 km/h and for drivers of heavy vehicles exceeding the speed limit by more than 29 km/h;
- December 2017: A new regulation was inserted into the Code making it an offence to take action to evade speed cameras. The offence includes the manner of driving as well as the use of devices such as radar jammers;
- March 2018: The Code was amended to require drivers to slow down to 40km/h when approaching stationary incident response vehicles and move into an adjoining lane if possible; and
- November 2018: Provisions of the Act relating to dangerous driving were amended to make driving more than 30 km/h above the speed limit a 'circumstance of aggravation' (rather than the previous 45 km/h) and therefore attract the higher penalty.

Enforcement

Research carried out by Curtin-Monash Accident Research Centre in 2015, estimated that the increased use of mobile speed cameras in various metropolitan and rural areas across WA was associated with an overall reduction in serious casualty crashes of 5.6% (Newstead, Diamantopolou, Lawrence, Clark, & Palamara, 2015). The researchers observed that crash reductions could be considerably higher – with average reductions between 20 and 25% and maximum reductions more than 50% – with greater enforcement, including at night, when speed related crashes are more prevalent due to lower traffic volumes (Newstead et al., 2015).

Evidence shows that the deterrent effect of speed enforcement slows down drivers and subsequently calms the speed environment on the road network (Lawrence & Newstead, 2017; Wegman & Goldenbeld, 2006).

Police enforcement of traffic laws is intended to influence the behaviour of road users in ways that reduce their risk of becoming involved in, or causing a crash (Wegman & Goldenbeld, 2006). Evidence also shows that the preventative effects of enforcement are generally higher when the subjective risk of being caught is higher, the penalty is more severe, the certainty of punishment is increased and the penalty is quickly imposed (Adminaite, Graziella, Stipdonk, & Ward, 2016; Mäkinen et al., 2003; Zaal, 1994).

Current WA enforcement options include:

- Covert mobile speed cameras on urban highways (arterial roads);
- Randomly scheduled overt mobile speed cameras on urban and rural highways;
- Covert mobile speed cameras on publicly announced routes;
- Moving mode (Foundation for the Automobile and Society) radar units on rural highways (undivided) and rural local roads;
- Hand-held laser speed detectors operated overtly on urban local roads;
- Fixed speed cameras on Perth freeways; and
- Point-to-point speed camera systems on Perth freeways and urban and rural highways (Cameron & Delaney, 2008).

Evidence shows that a relationship exists between enforcement level and percentage change in the number of crashes (Elvik, 2001).

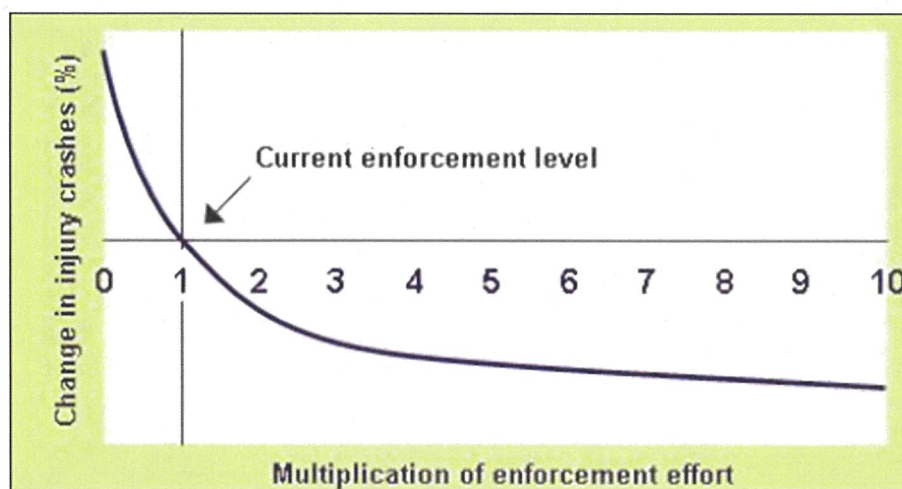


Fig 7: Relationship between speed enforcement surveillance and change in the number of injury accidents.

WA Police Force continue to operate the Automated Traffic Enforcement Program in Western Australia, which includes the recent introduction of Automatic Number Plate Recognition (ANPR).

Another recent enforcement tool being used in WA is Average Speed Safety Cameras (ASSC), also known as point-to-point cameras. Average Speed Safety Cameras use number plate recognition to determine the time taken by a vehicle to pass through two or more fixed points

to calculate the average speed travelled between these points. In doing so the ASSC determines whether the vehicle exceeded the posted speed limit within the points.

Further to being recommended as a potential site for the installation of ASSC, based on crash history and road environment based on crash history and infrastructure cameras were installed along a 26km length of Forrest Highway, south of Mandurah, in October 2016, and operate on the northbound and southbound carriageways (Lawrence & Newstead, 2017). In 2017, the Australian Road Research Board (ARRB) carried out an evaluation of the initial unenforced six-month trial of the ASSC system, which included data collected before the cameras were installed, which enabled a comparison of speed data before and after the installation of the point-to-point cameras. Subsequently, the ARRB compared results from the previous two analysis periods (before installation and during the unenforced period) to now, when the cameras have been turned on and police enforcement is occurring (the enforced period) (Bekavac, Ahmed, & Mak, 2020).

A key finding from the ARRB evaluation was the decrease in mean spot speeds within the ASSC, as compared with control sites, which suggests that the ASSC system is having the desired effect of reducing driver speed through the ASSC (Bekavac et al., 2020).

Monitoring

Speed monitoring surveys are a valuable tool in assessing high speed stretches of road and driver behaviour. The tables below demonstrate the trends in driver speed behaviours across both metropolitan and rural road network.

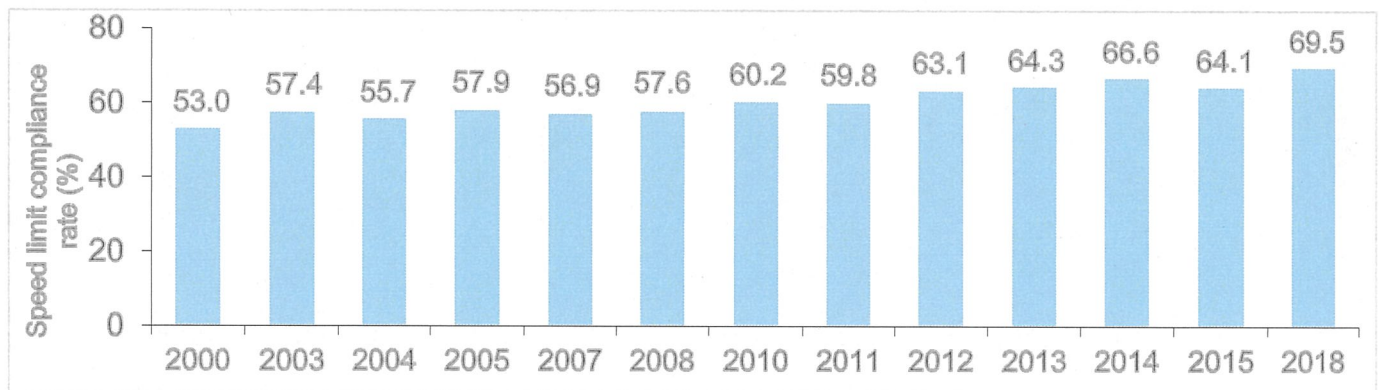


Fig 2: Driver speed compliance to speed limits across the metropolitan road network 2000 to 2018 (Sultana, 2018)

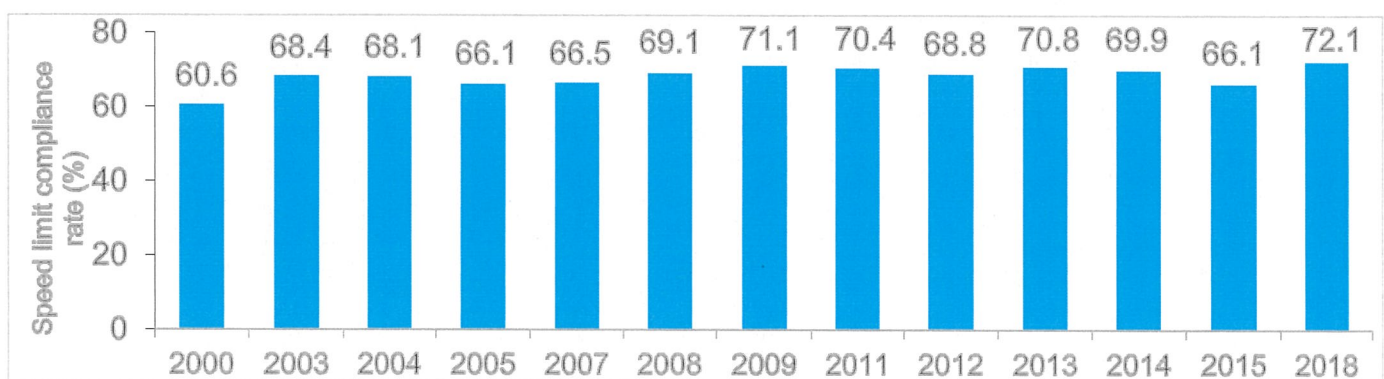


Fig 3: Driver speed compliance to speed limits across the rural road network 2000 to 2018 (Sultana, 2019)

The Commission conducts annual surveys that look at the trends in driver speed behaviours on WA's metropolitan and rural road networks. These surveys inform the Commission's work on speed-related programmes and research, as well as informing the direction of road safety strategies.

The compliance rate (percentage of vehicles travelling at or below posted speed limits) on state and local road network of all speed limits in 2000 was 60.6% on rural roads and 53.0% on metropolitan roads. The compliance rates recorded on rural roads in 2018 – 72.1%, and 69.5% on metropolitan roads – are 11.5% and 16.5% higher, respectively, than in the 2000 survey.

The average network compliance for the most recent three surveys over the five-year period 2014 to 2018, was estimated at 67.2% (state roads) and 71.0% (local roads), 5.2% and 19.3% higher than in the baseline survey conducted in 2000, respectively. Whilst these increases in compliance are encouraging, they nonetheless underline a significant percentage of drivers – between 29% to 33% on average across WA – are still speeding across all speed zones on state and local roads, respectively (Sultana, 2019).

One of the most significant and immediate ways of producing road safety benefits and reducing road trauma is to reduce the average travel speed across the network.

Self-Explaining Roads

Self-explaining roads (SERs) encourage drivers to naturally adopt safer driving behaviour by creating a traffic environment with simple and consistent design (Theeuwes & Godthelp, 1995). By incorporating distinctive features, including carriageway width, road markings, signing, and use of street lighting, that are consistent throughout the route, drivers perceive the type of road (SER) and 'instinctively' know how to behave. Using simple and consistent design, SERs aim to reduce driver stress and potential for error. Features of a SER aimed at reducing driver speed include well-positioned street art, landscaping, wider pathways, different road surfaces and cycle lanes; these all contribute to the impression of a busy, well used area.

Drawing on learning from the Netherlands (Theeuwes & Godthelp, 1995), these types of roads have been successfully installed in New Zealand, the United States, Colombia and Australia.

In Western Australia, the Safe Active Street program incorporates aspects of SERs in the redesigning and operation of 30km/h speed limits in various locations across the city of Perth. Safe Active Streets link intensive localised street redesigns with existing bike networks and 40km/h traffic speed zones, to reduce vehicle speeds, improve uptake of active transport modes and reduce deaths and serious injuries (Egli & Field, 2020).

Areas with Safe Active Street designs include Robertson Road Cycleway in Joondalup, and the Bayswater to Morley Safe Active Street.⁶

Reductions in Speed Limits in Areas used by Pedestrians and Cyclists

The Commission led a multi-agency working group that supported and evaluated the City of Vincent's 40km/h speed zone trial in the council's Southern suburban areas. This trial began in April 2019, partly in response to community feedback calling for safer streets and a more welcoming neighbourhood environment. The City of Vincent trial is in line with Action 6 of the *National Road Safety Action Plan 2018-2020*,⁷ which aims to reduce speed limits to 40km/h or lower in places with a high volume of pedestrians and cyclists. A key part of this

⁶ For information on the Safe Active Streets Programme, including current and planned routes, visit <https://www.transport.wa.gov.au/activetransport/safe-active-streets-program.asp>

⁷ For further information see: https://www.roadsafety.gov.au/action-plan/2018-2020/priority_actions

work is the development of a 'blueprint' for speed management initiatives in local government areas to improve the safety and amenity of local roads and communities; this guide can be used by advocates and local government.

Other urban areas whose Local Government have introduced 40km/h speed reductions include:

- Bayswater Town Centre,
- Victoria Park,
- Subiaco,
- Boyanup
- Donnybrook
- Balingup
- Bridgetown

Walking and cycling are a clean and healthy way to travel; they both have enormous benefits, including better health, cleaner air quality and reduced traffic congestion.

Cyclists are among the most vulnerable road users, with almost no physical protection. Thirty-eight cyclists died on WA roads in the ten years from 2005 to 2014 and the number of cyclist fatalities rose from three in 2012 to eight in 2014 (Office of the Auditor General Western Australia, 2015).

Similarly, pedestrians are a vulnerable road user group and among this, the elderly, children and people with learning difficulties or disabilities are at increased risk. As noted above regarding Nilsson's Power Model, maximum survivable speeds in locations with possible conflicts between motor vehicles and unprotected users must be within the limits of human tolerance.

Areas surrounding schools are subject to speed limits which are reduced to 40km per hour during times surrounding drop off and pick up during term times.

The Department of Transport's Your Move program promotes and facilitates active travel throughout communities, schools and workplaces.⁸

Even at low speeds, vulnerable road users are at risk. There is a large increase in deaths resulting from collision speeds above approximately 30 km/h.

Possible solutions include:

- Lower speed environments;
- Separation of pedestrians and cyclists from other road users; and
- The provision of appropriate crossing facilities.

There is also evidence to suggest that improved vehicle design and technology, as well as metropolitan intersection sensors, are useful countermeasures (Hobday, 2019).

Vehicle Technology

Intelligent Speed Adaption (ISA) technology automatically adjusts the speed of the vehicle to ensure speed limits are not exceeded. There is strong evidence to support the mandating of

⁸ For more information about Your Move see <https://www.yourmove.org.au/>

speed limiters as an effective road safety speed management measure, which could result in up to a 50% reduction of fatal crashes (Hyden, 2019).

Education & Campaigns

There are several resources available to the community, industry, and targeted groups. These include the School Drug Education and Road Aware (SDERA) programme, which runs evidence-based road safety awareness training and 'Keys for Life', which helps to educate young people who are preparing for their Learner's Permit about safer road use.⁹

The National Road Safety Partnership Program (NRSPP) supports Australian business in developing and a positive road safety culture, including information on driving to conditions and safer stopping distances.¹⁰

RoadWise works with Local Government and the community to advocate for a range of road safety initiatives and outcomes including speed management measures¹¹.

Campaigns targeting the effects of speeding and speed management continue to be developed and run by the Road Safety Commission. Recent examples *We're watching your speed. Are you?* (November 2017-February 2018), *Average Speed Safety Camera Zone* (September 2017) can be located at the Commission's website [Campaigns](#) Page.



Figure 2. We're Watching Your Speed – Are You? Road Safety Commission, 2018

Community Engagement

The Commission and other stakeholders participate in a range of ongoing community engagement and awareness-raising campaigns. These include working with communities across WA through the Road Trauma Trust Account (RTTA) Grants Programme¹² and via social media platforms. To inform the new WA Road Safety Strategy 2020-2030, the Commission has engaged extensively in dialogue with groups across WA, including vulnerable road users. Feedback from public engagement informs the strategic direction and content of the Commission's work.

Research

As of 2020, the Commission manages a program of research through the Western Australian Centre for Road Safety Research (WACRSR), within the University of Western Australia (UWA). Previously the Commission worked with the Curtin-Monash Accident Research

⁹ For more information about SDERA and Keys for Life see: <https://www.sdera.wa.edu.au/>

¹⁰ For more information about the NRSPP see: <https://www.nrspp.org.au/>

¹¹ For more information on RoadWise see: <https://www.roadwise.asn.au/>

¹² For more information on the RTTA Grants Programme visit <https://www.rsc.wa.gov.au/About/Community-Grants>

Centre (CMARC). WACRSR undertake research into all aspects of the Safe System, including speed management.

Recent research and evaluation projects include ‘the relationship between speed management and projected traffic volumes on major WA roads’ (Albrecht & Brameld, 2019), ‘the development of a regional and remote road safety action plan for WA’ (Goodsell & Roberts, 2019) and ‘trends in driver speed behaviour on WA rural roads’ (Sultana, 2019).

6. What is the Future Focus?

The evidence is clear – lower speeds equal fewer crashes, fewer deaths, and fewer serious injuries in WA.

Research undertaken internationally, nationally and in Western Australia shows that speed reduction would be the most successful of all possible initiatives to cut deaths and serious injuries on our roads.

Research has also indicated that mobile ASSC can provide a similar road safety effect as fixed ASSC when placed at locations for an average of 34.5 hours a year, and could be considered on a number of both metropolitan and regional roads (Cameron & Newstead, 2018).

The Commission will work with other agencies across WA and nationally to align speed management with other policies and actions. These agencies include, but are not limited to, the Department of Health, Department of Education, Main Roads WA, Department of Justice, and the Department of Transport.

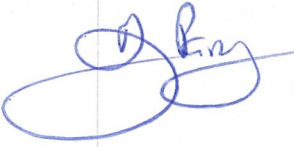
The Commission will continue to support a range of evidence-based community education programs, as well as prioritising campaigns for the young and learner drivers.

The Commission will continue to support and guide research into issues relevant to speed management and related road trauma towards informing policy and practice. We will also work with other agencies and stakeholders to foster greater knowledge sharing and synergy in all areas of road safety research – including speed management – across WA.

Road Safety Strategy

A new road safety strategy is being developed for Western Australia towards shaping and progressing our shared goal of zero deaths resulting from a road crash. Speed Management will be addressed within the new strategy which will continue to be based on the safe system approach and will be underpinned by its four guiding principles;

- people make mistakes that can lead to road crashes,
- the human body has a limited physical ability to tolerate crash forces before harm occurs,
- a shared responsibility to prevent crashes resulting in serious injury or death,
- all parts of the system must be strengthened to multiply their effects.

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