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ROAD SAFETY STRATEGY

In 2008, the state government, released its 12-year road safety strategy, *Towards Zero: Getting There Together* (Towards Zero), in which ambitious targets for reductions in people killed or seriously injured (KSI) on our roads, 40% or 11,000 people, across all road users were outlined. Targets of a 40% reduction were calculated on a baseline figure, using crash data across the years 2005-2007.

The baseline figure for cyclist KSI was 100. Using a 40% reduction, a figure of 60 KSI is the government's target for 2020.

Cycling safety remains a major priority for road safety authorities, within Western Australia and nationally.

DEFINITION

Cyclists are considered a **vulnerable road user group** and as such are treated as a distinct group of road users.

Stichting Wetenschappelijk Onderzoek Verkeersveiligheid (SWOV – Dutch Institute for Road Safety Research) defines vulnerable users 'in a number of ways, such as by the amount of protection in traffic (e.g., pedestrians and cyclists) or by the amount of task capability (e.g., the young and the elderly) (SWOV 2012).

This highlights the two most common problems of being a cyclist: interaction with fast moving traffic and a distinct lack of protection: using this analogy, cycling issues could be tackled by viewing cyclists as either:

- A transport user
- A recreational user.

WHAT IS THE PROBLEM?

The estimated figure of WA cyclists KSI for 2016 was 138. This number exceeds the 2020 KSI reduction target (n=60) by 78.

The first cycling plan for Perth was released in 1975, *Cycleways for Perth*, however, many of the issues recognised in the report were still extant in 2015. In 2009, Main Roads investigated options to redesign the Causeway, one of the findings identified in *Cycleways for Perth*.

In 2015, the Auditor General (A-G) released a report into cycling within the Perth metropolitan area. The report stated that in a typical week, around 25% of Western Australians ride a bicycle with almost half riding at least once a year, and that bicycle sales exceeded car sales for more than a decade in Australia, with over 1.3 million bicycle imports reported in 2013-14 (A-G, 2015).

Cycling attracts people of varying ages, skills and abilities and therefore the infrastructure required to cater for this needs to include facilities to ensure cycling is safe, convenient and a viable mode of transport.

Thirty-eight cyclists died on the roads between 2005-2014, with eight fatalities being recorded in 2014 alone; cyclists constituted 4% of the total road deaths but made only 2% of trips (A-G, 2015).

The Auditor General's report recognised that many issues affecting cycling have previously been reported and are still outstanding. In conclusion, the A-G found that a lack of planning, sustained funding and a lack of cooperation from local governments contributed to the cycling network remaining incomplete, unsafe and becoming a less than desirable transport option. A series of findings and recommendations were made which the transport portfolio undertook to progress several actions (details on the progress in Appendix 1).

The Western Australia Bicycle Network Plan (2014-2031) states that a recreational user typically uses their bicycle for journeys of varying length, between 30km and above. This group of riders encompasses the serious cyclists who typically ride on the road network. A rider who uses their bicycle for transport typically rides journeys of less than 30km and normally utilises the principal shared path (PSP) or dedicated cycle paths.

Both user groups present unique problems from a road safety perspective; the recreation cyclists tend to utilise the road network and the transport cyclist tends to use the cycling infrastructure and pedestrian pathways. Infrastructure upgrades and solutions can be tailored to suit specific needs.

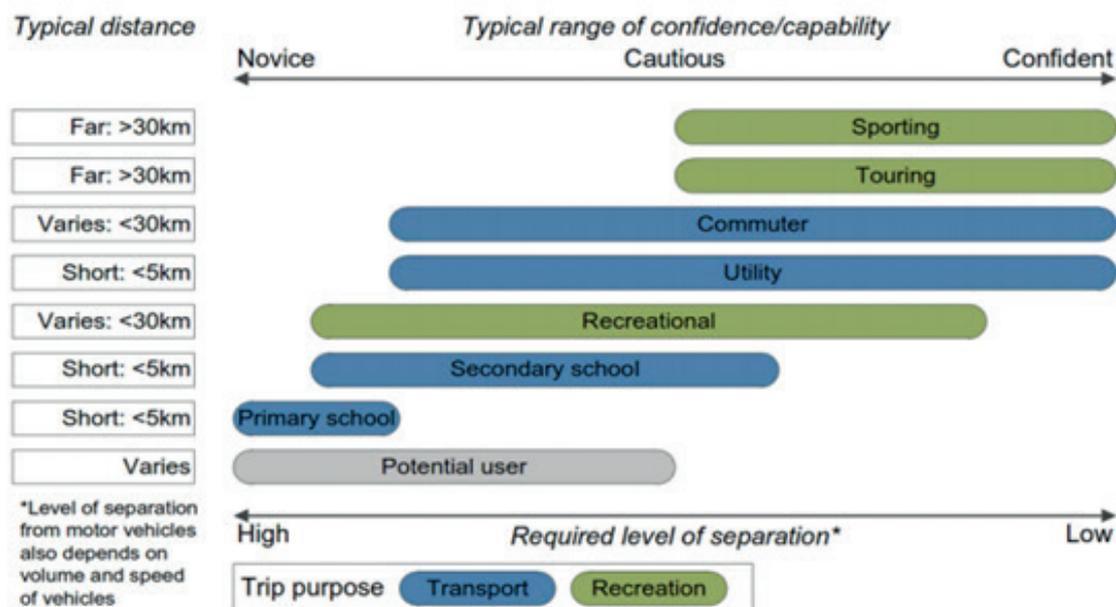


Fig 1: Types of cyclists, their confidence level and required level of separation

Figure 1 highlights the difference in confidence levels between the difference cyclists. It is important to also note the correlation between the rise in confidence levels and the potential age groups of the users. In the mid confidence level group, secondary school users and commuters comprise a range of ages, between 12 years old up to middle age. This poses more problems from a road safety perspective, as young children’s cognitive skills will not be fully developed, whilst adults are better able to assess situations and make better informed decisions.

The cycling community in Western Australia (WA) has significantly increased over the past 15 years and as numbers continue to grow cyclists are increasingly coming into contact with motorists as road infrastructure struggles to keep up with the upward trends. The Western Australia Bicycle Network Plan (WABN) 2017 Update, states that cycling participation is 42%, significantly higher than the national average of 34% (WABN 2017).

Research predicts that by 2031 Perth’s population will have grown to 3.3 million (WABN 2017), an increase of 77%. This brings obvious transport infrastructure problems, such as increased congestion, increased environmental issues, increased funding requirements for road building projects, etc., and the fact that more people will cycle alongside road traffic.

SUPPORTING RESEARCH AND EVIDENCE

The WABN identifies the benefits of an increase in community cycling:

Easing transport difficulties

Travel demand management attempts to influence travel choices of people by challenging the: why; when; where and how they travel. Danish research calculated total costs and benefits (from an individual and societal perspective) and found that the cost of cars was 0.50 euros/km compared to 0.08 euros/km for cycling.

Providing economic benefits

Measurable financial returns for cyclists and government that are nearly twice the costs incurred, with two-thirds of the benefits accruing to individuals and households in the form of reduced car operating costs and car parking charges.

Improving health

Cycling, as a form of physical exercise can help to reduce the effects of several mental health conditions, such as anxiety and depression.

Reducing environmental impacts

Reduced air and noise pollution – cycling can help reduce air and noise pollution in dense urban centres.

Societal gains

Access for all – cycling facilities, particularly shared use paths, help meet the needs of pedestrians and people with disabilities and improve accessibility for everyone, including the elderly and children.

Figure 2 shows how the benefits mentioned above inter-relate with each other.



Fig 2: Benefits of cycling

Infrastructure as a problem

Most cyclist crashes occur in urban areas and involve motor vehicles. The risk of death for a cyclist is 4.5 times greater than a car occupant, and a cyclist's risk of serious injury is 3.6 times greater in a collision with a vehicle compared with all other non-vehicle cyclist crash types. Motor vehicle crashes account for 86% of cyclist deaths, while 75% of cyclist serious injuries occur with a motor vehicle crash (Stevenson, et al 2014).

Most research into Australian cycling safety has concerned behaviours rather than the impact of urban transport. The effect of this is translated into the built environment and can be seen when cycle lanes parallel parking bays exposing cyclists to opening door injuries (Johnson et al 2013), or painted bike boxes at intersections which are not observed by drivers (Johnson, et al 2010). It is widely recognised that a significant proportion of crashes occur at intersections and this has led to substantial European research into how the urban environment can be enhanced to improve cyclist

safety. Cyclist inclusive road networks in Europe, including cycling infrastructure which physically separates cyclists from motorised vehicles, have been considered critical to the success of cycling participation and cyclist safety in many European countries (Pucher, J., Buehler, R. 2008) (Pucher, J, Dijkstra, L. 2003).

Australia has relatively high road speeds while there is a general reluctance by some to accept lower speeds as this is seen as a measure which adds to journey times (NRSS 2011). Cyclists tend to support lower speeds as sharing of roads becomes safer and less stressful. Crash statistics show that cyclists survival rate decreases dramatically as vehicle speed increases. At 30 km/h, a cyclist has a 90% chance of surviving a collision, however, at 50km/h the rate drops to less than 20%. Every 1.6 km/h reduction in speed on urban streets results in a 6% decrease in traffic fatalities (Sharpin et al. 2017). Figure 3 shows the increase in speed versus decrease in survival rates for cyclists.

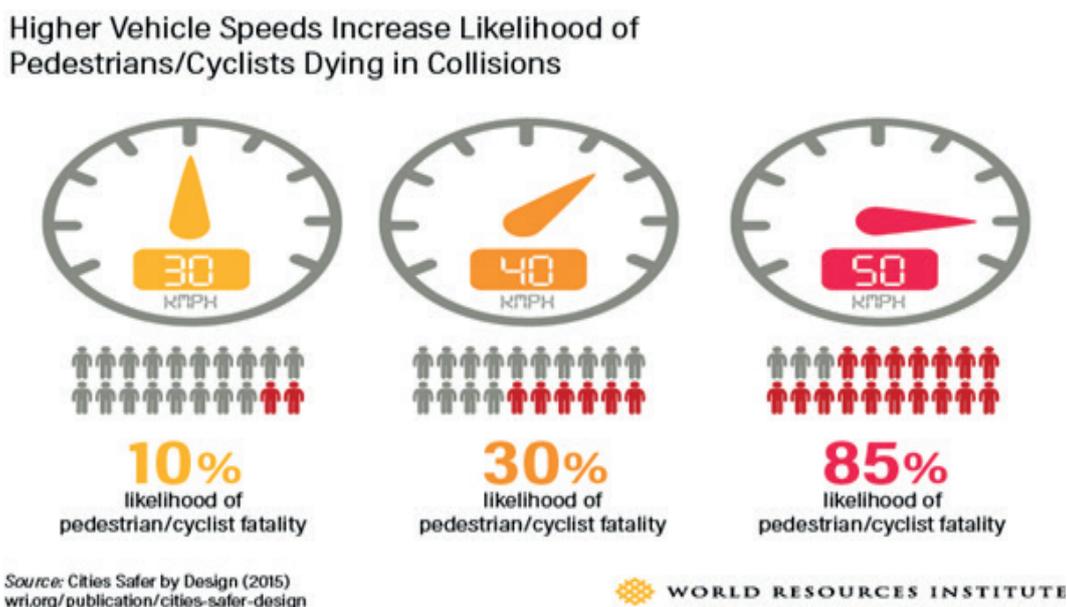


Fig 3: Cyclist survival rates after collision with a vehicle at indicated speeds

In the United Kingdom, 50% of collisions between a cyclist and motorist were the fault of the driver, while 42% was attributed to the cyclist; both parties had failed to look properly (RoSPA 2017). Between 2009-13, 30% of cyclists KSI were hit by vehicles at the following types of infrastructure: crossroads; staggered junctions or by vehicles turning across the cyclist. A further 13% of cyclists KSI were hit by overtaking vehicles.

According to SWOV, infrastructure quality and layout play a role in the occurrence and outcome of bicycle crashes. Road surface that suffers from pits, trenches, drain covers, tree root encroachments, etc., is often the reason for a single-bicycle crash (SWOV 2017). Visibility of obstacles, the road course and the width of bicycle paths and lanes also add to the crash risk.

Vehicle limitations also add to the danger faced by cyclists. A study into blind spots in mirrors by SWOV in Holland found that between 2005-13, an average of nine cyclists were killed in blind spot crashes where a truck driver wanted to turn right, and the cyclists were going straight ahead. Crashes with large trucks presents a greater risk of fatality for the cyclist, 36% of truck crashes resulting in death as opposed to 8% for passenger cars (SWOV 2015). These crashes, recorded in Holland, tend to happen at intersections, roundabouts and where the priority road crosses a priority cycle path (cyclist has right of way).

Helmets

Prior to the introduction of the compulsory wearing of helmets in Australia, over 700 cyclists per year were being hospitalised through bicycle related accidents, with over 40% of those injured suffering head injuries. In WA, the law was introduced in 1992 (infringements were applied as of 01 January 1993) and further reviewed in 1994 which resulted in a recommendation by a Parliamentary Select Committee to continue the compulsory wearing of a helmet.

Australia is one of only a handful of countries who enforce a helmet requirement. More traditional cycling nations (e.g., Holland and Denmark) have a much higher percentage of cyclists but no helmet legislation. Certain factors help to increase the cycling numbers in Holland, such as cycling infrastructure (Holland has 33 – 35,000 km of dedicated cycling routes and over 70% of all urban streets have a 30 km/h speed limit, many of which also have traffic calming measures, thereby reducing the risk to cyclists). Wearing a helmet does not protect you as much as a good cycling infrastructure. In Holland, only 0.1% of cyclists wear a helmet; the Dutch have fewer than 20 fatal accidents per 1 000 000 000 kilometers cycled. However, in Finland where 20% of all cyclists wear a helmet there are 50 fatal accidents per 1 000 000 000 kilometers cycled. One of the reasons for this is a phenomenon known as ‘safety in numbers’ and is a relationship between numbers of cyclists and casualties caused by motorists. The more cyclists on the road the more obvious and visible they are. Motorists are less likely to hit groups of cyclists and so an inverse relationship exists between number of cyclists and number of casualties between amongst them (Hyden, C, Nilson, A., Risser, R 1998).

Helmet use in Norway is voluntary but is relatively high in take up. In 2006, a study showed that the risk of sustaining a fatal or severe injury was reduced by 25% when a helmet was worn (ERSO 2015). In 86% of cases, a head injury also includes a brain injury. A bicycle helmet reduces the risk of severe head injury by more than 65% (SWOV 2016). It is often stated that serious brain injuries are caused by rotation, which helmets are not designed to absorb, however, a report by TRL found no evidence of increased risk of rotational injury when wearing a helmet (RoSPA 2017).

Education and safety campaigns play a large part in convincing people to use a helmet. The use of safety data doesn't seem to play a large part in this process, however the use of recognised people seems to have more of an impact. In 2004, Handicap International launched a series of helmet-use awareness campaigns in collaboration with the Cambodian Ministry of Health, WHO, UNICEF, UNESCO and the Belgian Cooperation. The campaign targeted young people, approximately 50% of road traffic casualties in Phnom Penh and used Jackie Chan to advertise his use of a safety helmet. Prior to the campaign the use of a helmet was assessed as 8% and following the campaign this had risen to 14.7% (18 months after the campaign) (WHO n.d.).

As well as motorists abiding by laws to protect cyclists the burden of public safety needs to be borne by all road users. Cyclists need to invest in their own safety and it is imperative that road laws are obeyed. Consideration needs to be reciprocated by cyclists if the road system is to become a safe place for all users.

WHAT ARE THE COUNTERMEASURES?

Legislation

General

Road Traffic Act 1974

Road Traffic Code 2000

In November 2017, the government introduced the Minimum Passing Distance rule which specifies motorists must leave at least 1 meter between themselves and a cyclist when overtaking at 60km/h or under. Over 60km/h, the minimum distance required is 1.5 meters when overtaking.

- July 1992 *Road Traffic Code 2000* – Compulsory bicycle helmet wearing legislation – penalty \$50
- November 2001 *Road Traffic Code 2000* - Default built-up area speed limit reduced from 60km/h to 50km/h. Applied to all roads in a built-up area except within a speed zone in which another speed limit is signed
- September 2014 *Road Traffic Code 2000* – Penalties increased for various offences, including speeding
- July 2017 *Road Traffic Code 2000* – Penalties increased for speeding where the driver is more than 29km/h but not over 40km/h and over 40km/h above the speed limit
- November 2018 – Amendment to the *Road Traffic Act 1974* – s.49AB(1) dangerous driving. Reducing the current circumstances of aggravation from driving 45km/h above the speed limit to 30km/h and increase in penalty.

Enforcement

As part of the Automated Traffic Enforcement program (ATE), WA Police Force operate several traffic light enforcement measures; five red-light cameras have been installed and two new fixed camera sites in regional areas have added to the countermeasures to stop fast moving traffic from travelling through traffic lights when not allowed to do so. This benefits cyclists by adding a degree of protection in forcing traffic to slow down and regulating movement at known accident sites.

In 2017, the WA Government committed to \$129m of funding for the state's cycling network, over four years (WABN 2017). The Cycling Operations Reference Group (CORG) has been initiated through the WABN and has a strategic focus in implementing the WABN outcomes. Membership of the group consists of:

- Department of Transport (DoT)
- Main Roads
- Perth Transport Authority (PTA)
- Road Safety Commission (RSC)
- Department of Planning, Lands and Heritage
- WA Police Force
- Department of Local Government, Sport and Cultural Industries
- Western Australian Local Government Association (WALGA)
- WestCycle
- Institute of Public Works Engineers Australasia.

Vehicle design safety features

Vehicle manufacturers have been quite proactive in helping to design vehicles to minimise cyclist/pedestrian injuries in the event of a crash. Some of the standard safety features included in new cars now include:

Reversing Collision Avoidance

Driver aids, such as reversing cameras or sensors are used to help identify objects in the path of a reversing vehicle.

Autonomous Emergency Braking (AEB)

A system of sensors detects speed and distance of objects in the vehicle's path and automatically brakes if the driver does not respond to avoid or minimise the severity of an accident.

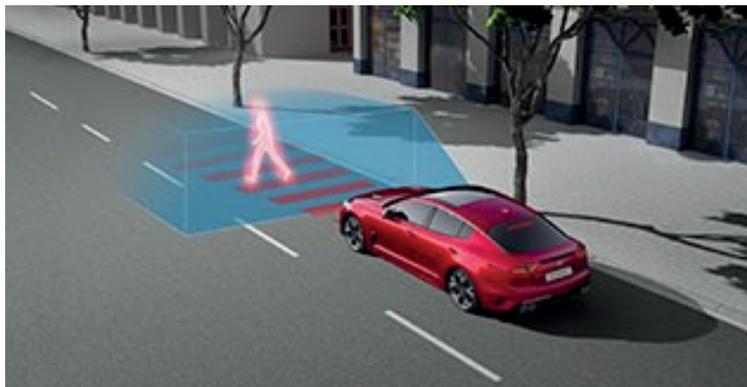


Fig 4: Autonomous Emergency Braking Sensor Detection

Blind Spot Monitoring

Blind Spot Monitoring (BSM) monitors the driver's 'blind spot' in adjacent lanes and warns the driver if a vehicle is present through either a visual or audible alarm or vibration of the steering wheel. A series of sensors within the vehicles scan the local area and either send out radar waves or a computer takes an image of the area and analyses it. When something is detected getting too close to the vehicle, either an audible alarm sounds within the vehicle, a flashing light in the driver's periphery (e.g., in the wing mirror) or often both. The more advanced systems may even try to steer the vehicle back into a safe lane.



Fig 5: Blind Spot Monitoring

Pedestrian Airbags

A world first, helps to reduce the consequences of a frontal collision between a car and pedestrian and cyclist. Sensors in the bumper register an impact with a pedestrian and release the rear end of the bonnet, together with an airbag that covers the area under the bonnet, one third of the windscreen and the lower part of the windscreen pillars. Together, the energy absorbing front and bonnet design helps reduce the severity of pedestrian injury in an impact. The airbag is active at speeds from 20-50km/h.



Fig 6: Volvo's Pedestrian Collision Airbag System

Intersection Collision Warning

Radar systems or similar, detect if vehicles are approaching from the side at intersections and alert the driver of a possible collision. If it detects a collision is imminent the vehicle applies brakes automatically.



Fig 7: Intersection Collision Warning System

Head Airbag

Swedish company, Hovding, have designed an inflatable helmet for use by cyclists. The system consists of a collar and cover and has embedded gyroscopes and accelerometers which tell the system a crash is taking place.

The collar contains the inflatable fabric and a 'black box' which records a cyclist's movements 200 times a second. In the event of an abnormal movement, the airbag inflates. The inflated fabric can withstand harsh scraping and is also able to sustain multiple impacts. The airbag slowly deflates after the incident. The whole system is controlled by a battery and needs to be charged fully prior to any journey.

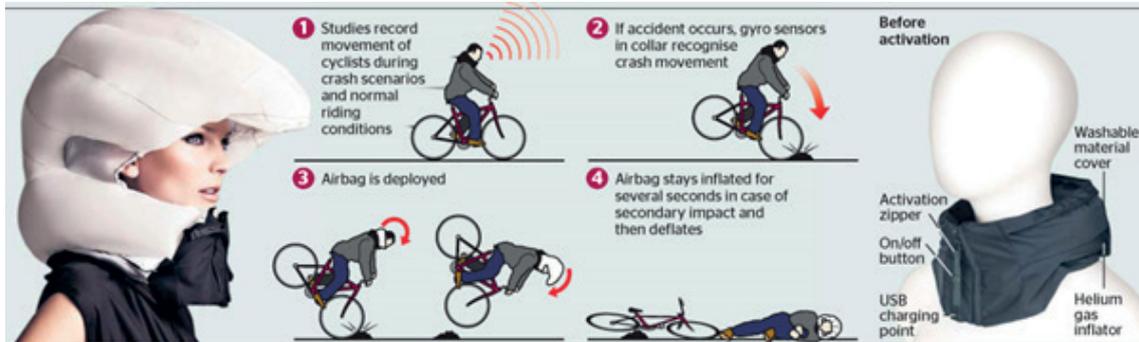


Fig 8: Hovding Airbag

Principal Shared Path upgrades

In 2017, the WA Government committed to \$55m investment to increase the PSP network, adding at least a further 95km of new pathway to the network. A further \$29m has been allocated to local governments to develop bike plans and the delivery of new shared path and bike boulevard infrastructure. As well as dedicated pathway projects, all new major road projects will also consider PSP infrastructure.

PSP extensions or new builds are currently underway or planned for:

- Mitchell Freeway PSP – Glendalough to Hutton Street (expected construction 2018-19)
- Fremantle Railway PSP – Grant Street to Jarrad Street (expected construction 2018-19)
- Roe Highway – Kalamunda Road Intersection (expected construction 2020)
- Armadale Road PSP – Tapper Road to Anstey Road (expected completion 2019-20).

The above-mentioned works are a selection of planned or ongoing works and form part of the committed funding for the PSP Program 2017-22 program of works being undertaken by the Department of Transport.

As well as improvements to metropolitan facilities, regional upgrades are planned, such as the Millstream Road shared path in the Pilbara (\$345,040) and over \$500,000 investment in the Great South Region.

Self-explaining roads

As cities grow and become more crowded, innovative ideas are required to improve the road infrastructure whilst causing the least amount of disruption to the flow of traffic. Low cost improvements, which remove the onus of the driver having to concentrate on road signs or markings (which are often ineffective) and impart a more conceptual notion of a driver's surroundings, are now becoming more commonplace. Roads specifically designed to look different to other roads and are designed to give the impression of a busy pedestrian area which naturally activates a driver's instinct to slow down, are a solution to address speeding in built up areas; in other words, roads should be 'self-explaining', or such that the traffic environment "elicits safe behaviour simply by its design (Jan Theeuwes & Godthelp, 1995)."

Simply installing features such as roadside street art, landscaping the surrounding area, installing furniture to create pinch points, laying different road surfaces, widening pathways and introducing cycle lanes all help to give the impression of a busy, well used area.

These types of roads are not new and have been successfully installed in the United Kingdom, New Zealand and Australia. They are user friendly and the local community is often involved in the design. In 2014, the City of Stirling trialed self-explaining roads in Innaloo Precinct.

Other design solutions to reduce speed focus on drivers accommodating pedestrians and cyclists using the road infrastructure. Bike Boulevards, part of the Safe Active Streets Program managed by the Department of Transport (DoT), converts quiet local streets, by reducing vehicle speed limits to 30 km/h, into areas where pedestrians and cyclists can share the road space equally and safely with motorists. The Bike Boulevard concept is a Dutch initiative and to ensure Perth cyclists and pedestrian could fully utilise the boulevards, Dutch planning expertise was consulted prior to development. Bike Boulevards allow mums, dads, children, seniors and others to make short trips to schools, railway stations or shops. Bike Boulevards are developed around the self-explaining road concept whereby street signage is kept to a minimum and encourages courteous interaction between street users (Department of Transport: www.transport.wa.gov.au/activetransport/safe-active-streets-program.asp).

Under the Safe Active Streets program the following streets have been transitioned into a safe area for cyclists and road users:

- Robertson Road Cycleway, Joondalup
- Bayswater to Morley
- Shakespeare Street, Mount Hawthorn.

The Department of Transport has commenced work with several other local governments on safe active street projects, which include:

- City of Canning
- City of Nedlands
- Town of Claremont
- Town of Bassendean
- City of Stirling
- Town of Victoria Park
- City of Melville
- City of Kalgoorlie-Boulder.

Connecting Schools

The decline of children cycling to school in WA has occurred for a variety of reasons. Funding provided for the Connecting Schools Program (DoT), aims to enable children to cycle to school by providing end of trip facilities (bicycle racks, scooter racks, bicycle sheds, etc.) and innovative cycling infrastructure projects.

Another initiative designed to engage with children is the Constable Care program. Children of primary school age are delivered personal safety, community safety and other exciting challenges to provide an alternative education method.

METRONET

All new METRONET (PTA) stations will include bicycle storage and end of trip facilities. The provision of secure bicycle parking is seen as a space and cost saving measure.

Local government area speed reduction trials

Main Roads Western Australia, in conjunction with various local governments, have been jointly implementing 40km/h speed limits in areas of high pedestrian and cyclist activity. Dual purpose engineering treatments to reduce speed and increase pedestrian and cyclist safety, are implemented in places such as shopping precincts.

The City of Charles Sturt in South Australia implemented a 40 km/h limit in multiple areas throughout the city in 2001 (Bowden/Brompton and 10 sites in Woodville West). An evaluation of the sites in 2006 showed an overall reduction in average speeds, volumes of traffic and accident rates. Selected data for the trial is shown in table 1:

Location	Crash Type	
	Fatal	Minor
Bowden/Brompton (pre 40km/h)	7	42
Bowden/Brompton (post 40km/h)	2	33
Total Reduction	29%	
Woodville West (pre 40km/h)	5	24
Woodville West (pre 40km/h)	1	5
Total Reduction	79%	

Table 1: Evaluation data from two sites for City of Sturt 40km/h reduction trial

In 2001, a total of 8,026 vehicles were recorded in the areas and this had reduced to 6,604 in 2006, a total reduction of 17.7%. The report concluded that the reduction in traffic numbers was choosing to avoid the area since the inception of the 40km/h introduction.

Perth Central Business District, Northbridge, South Terrace, Fremantle and the City of Vincent have all implemented speed reduction zones.

Education

Various education schemes are in place, to address both children and adults. Programs, such as Road Safety Around Schools, Safe Routes to School and Walk Safely to School Day are run by RoadWise, in partnership with the Commission.

School Drug Education and Road Aware (SDERA) run the Smart Steps for Parents aims to promote safe road use for parents to use with their children. The program is focused for very young children and is based on an intuitive learning process of safe road behaviours and cycling awareness on roads, cycle paths and on footpaths.

To further highlight the difference in cycling acceptance and culture of more traditional cycling countries, Dutch motorists are taught the Dutch Reach, a safety measure aimed at preventing drivers opening car doors into the path of oncoming cyclists (adopted by South Australia in 2017 and Victoria 2013) and every Dutch child must pass a bicycle exam when still at school.

The Road Safety Commission hosts a variety of cycling safety information and runs continuous road safety television advertising. Recent campaigns include:

- Might be a Mate – aimed at increasing awareness of cyclist safety across the community
- Must be a Meter – aimed at reminding motorists of the recently introduced minimum passing distance law.

Community Engagement

The School Drug Education and Aware program (SDERA) Keys for Life program aims to promote positive driving attitudes for young people and their parents as part of their pre-driver education program. As part of their road safety package, they are reminded of how to share the road and to be courteous to other road users¹.

The Royal Automobile Club WA (RACWA) fund three community education programs, aimed at primary school children, young adults and community groups:

- RAC Little Legends club promotes programs, such as Around the Roads, to teach children (pre-primary to year 6) about road safety. An interactive program, children become involved in various activities which impress upon them different road safety themes, such as bicycle safety, crash scene investigators, importance of seatbelts, etc.
- On the Roads program, aimed at young adults, teaches about road safety from a driving perspective. Subjects include information about speeding, distractions, etc.
- Community group programs are aimed at the senior community. Towards Zero focuses on explaining the governments road safety strategy and what individuals can do as a road user to reduce trauma.

Best practice overseas

In many European countries, the cyclist is seen as the priority road user and infrastructure is built to remove motorised traffic from cyclists, rather than removing the cyclist from the motorised traffic.

The perception of cyclists in Australia isn't quite as positive as it could be whereas the general perception of cycling in Holland is overwhelmingly positive. Most people either ride or own a bicycle (17 million residents, 23 million bicycles – Netherlands Institute for Transport Policy Analysis 2018). It is therefore easier to instigate big building projects for the safety of cyclists. To remove cyclists from the road network, Dutch engineers simply build cycling infrastructure to go around/over or under the road network.



Fig 9: The Hovenring Cycling Roundabout

¹ SDERA Fact Sheet 2: Sharing the Road

The Hovenring in Eindhoven is a roundabout that was built due to the old system of cyclists having to wait to cross roads at intersections with traffic lights being considered too dangerous. New housing brought children, schools and more congestion to the area and so the decision to build the Hovenring was taken. The structure is held in place by a 70-meter-tall bridge pylon, which have 24 steel cables attached to provide stability. The roundabout is 72 meters in diameter and appears to float when viewed from road level. The whole structure was presented as an iconic landmark and signaled the towns acceptance of cycling. If this type of thinking and infrastructure was applied in Australia, the cyclists would be removed from the road network and perhaps the negative perception could be lifted.

CIVITAS Handshake (Combined European Venture)



THE CIVITAS INITIATIVE
IS CO-FINANCED BY THE
EUROPEAN UNION

In its early stages, the Handshake project aims to employ innovative approaches to inspire the creation and refinement of holistic cycling visions and foster the consolidation of cycling solutions and investments. It will include capacity building and knowledge transfer between European cities with a strong cycling culture (Amsterdam, Copenhagen and Munich) and impart this knowledge to other willing cities (Bordeaux, Bruges, Cadiz, Dublin, Helsinki, Krakow, Manchester, Riga, Rome and Turin) in development of cycling policies (Isinnova 2018). Methodologies will include:

- Socio-economic cost benefit analysis of investments in cycling
- Administration of immersive study tours
- Transition management
- Identification of cycling innovations
- Road safety.

Intelligent infrastructure (Denmark)

Copenhagen is about to start testing a new system of diode lights aimed at reducing the danger of bike-vehicle collisions at four particularly dangerous intersections. Blinking diodes are placed in the road surface on the final stretch towards the intersection and, when a cyclist passes a sensor, the lights start to blink and warn drivers to the fact that a cyclist is present.



Fig 10: Intelligent Sensors Copenhagen

Lane Lights and the Green Wave (Denmark)

A series of LED lights, installed at street surface level, on poles or countdown signals, mark the cycle lane. If the cyclist remains within the green lights, they will get to the next traffic light during the green phase. The system is controlled by traffic light control units, which can be coordinated with adjacent signal-controlled intersections for a steady flow through subsequent intersections.



Fig 11: LED Lane Lights

For more information regarding European best practice measures for cycling safety, see Appendix 2

Further reading is available through the following links:

- <https://ecf.com/what-we-do/road-safety>
- https://ec.europa.eu/transport/road_safety/users/cyclists_en
- <http://www.prospect-project.eu/>
- <https://etsc.eu/projects/bike-pal/>
- <http://www.xcycle-h2020.eu/>
- https://www.indev-project.eu/InDeV/EN/Home/home_node.html
- <https://www.walk21.com>
- <http://h2020-flow.eu/#>
- http://www.walk.com.au/pedestriancouncil/images/elements/media/MAA_PedSeminar_breen1.pdf

WHAT IS THE FUTURE FOCUS?

The Commission will continue to focus on improving cyclist safety through evidence-based research, policy design, education and continued engagement with cycling advocacy groups. Areas of focus will include:

- Continued investment in the PSP program will see delivery of new infrastructure from 2023-31
- Continued monitoring of the Minimum Passing Distance legislation
- Cycling fatality rates will continue to be monitored and reported with Commission campaigns and policy targeted to address any increase
- Continued monitoring and promotion of vehicle safety features, such as the pedestrian crash avoidance systems, via ANCAP

- Input, as necessary, to relevant statutes governing cycling and cycling safety
- Progressing realistic and achievable road safety research recommendations, including demonstration projects or trials to improve cyclist safety.

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Owner:	Melissa Watts - Assistant Director Policy

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DATE	DETAILS	ENDORSED BY
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References

Collins Dictionary. <https://www.collinsdictionary.com/dictionary/english/cyclist>

Western Australia Bicycle Network Plan 2017 update

SWOV Institute for Road Safety Research. SWOV Fact sheet – Vulnerable road users. Link

Auditor General's Report, Safe and Viable Cycling in the Perth Metropolitan Area 2015 - <https://audit.wa.gov.au/reports-and-publications/reports/safe-viable-cycling-perth-metropolitan-area/auditor-generals-overview/>

Stevenson, M., Johnson, M., Oxley, J., Meuleners, L., Gabbe, B., Rose, G., 2014. Safe cycling in the urban road environment: study approach and protocols guiding an Australian study

Johnson, M., Charlton, J., Newstead, S., Oxley, J., 2010. Painting a designated space: cyclist and driver compliance

Johnson M, Newstead S, Oxley J, et al. Cyclists and open vehicle doors: crash characteristics and risk factors. Saf Sci 2013;59:135–40

Pucher J, Buehler R. Making cycling irresistible: lessons from the Netherlands, Denmark, and Germany. Transport Rev 2008;28;4:495–528

National Road Safety Strategy 2011 - 2020

Pucher J, Dijkstra L. Promoting safe walking and cycling to improve public health: lessons from the Netherlands and Germany. Am J Public Health 2003;93:1509–16

Royal Society for the Prevention of Accidents (RoSPA): RoSPA Policy Paper: Cycling 2017

SWOV (2017). Cyclists. SWOV Fact sheet, June 2017. SWOV, The Hague.

Sharpin, A.B., Banerjee, S.R., Adriaola, C., Welle, B. World Resources Institute: <https://www.wri.org/blog/2017/05/need-safe-speed-4-surprising-ways-slower-driving-creates-better-cities>

SWOV Institute for Road Safety Research. SWOV Fact Sheet Blind spot crashes

SWOV Institute for Road Safety Research. <https://www.swov.nl/en/facts-figures/factsheet/bicycle-helmets>

European Road Safety Observatory 2015: Pedestrians and Cyclists

The potential for cycle helmets to prevent injury - A review of the evidence, Hynd, Cuerden, Reid and Adams, TRL published report PPR446, 2009

Jackie Chan promotes helmet use in Cambodia (Press release, Phnom Penh, 25 April 2005). (www.handicapinternational.be/downloads/Jackie_Chan_promotes_helmet_use.pdf).

Source: C. Hydén, A.Nilson, R. Risser, 1998, quoted in the report "Implementing sustainable urban travel policies: moving ahead national policies to promote cycling" (http://www.ecf.com/3500_1)

Road Safety Strategy 2008-2020, Towards Zero. Road Safety Council

Theeuwes, J., & Godthelp, H. (1995). Self-explaining roads. Safety Science, 19(2-3), 217-225. doi: [http://dx.doi.org/10.1016/0925-7535\(94\)00022-U](http://dx.doi.org/10.1016/0925-7535(94)00022-U)

Netherlands Institute for Transport Policy Analysis 2018: Cycling Facts

Isinnova: <http://www.isinnova.org/handshake-creating-cycling-friendly-cities/>

Appendices

Appendix 1 – Safe and Viable Cycling in the Metropolitan Area



Appendix 2 – Best Practice Examples of Safe Cycling in Europe

