Minimising Pedestrian-Cyclist Conflict on Paths

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Abstract

Increasing conflict between users on pathways, which is self defeating when we are trying to increase the use of expensive infrastructure and make cycling an easy and accessible modal option. Presentation provides a series of tools to minimise the conflict before it arises:
Is the path the problem?

- Integrated policy, strategy and planning
- Urban design and place making
- Infrastructure planning
- Infrastructure design
- Infrastructure construction and maintenance
- Information
- Education and awareness-raising
- Regulation and enforcement
- Travel behaviour Change
- Resources

Introduction

We, the cycle path developers and users, are becoming victims of our own success when it comes to pedestrian and bicycle shared pathways. Everyone is using them . . . recreational cyclists, commuter cyclists, learner cyclists, mobility aid vehicles, rollerblade users, walkers, joggers . . . . varying abilities, at varying speeds with various needs and in far higher volumes than originally anticipated. Thus, the conflict occurs.

The Austroads Research report, Minimising Pedestrian-Cyclist Conflict on Paths, was prepared by ARRB in 2006. The report was reviewed emerging conflict issues and provided a suite of solutions to avoid future conflict and minimise current conflict situations.

This paper updates the original research report with specific recent research technology information to further enhance the cycling experience, whilst minimising any potential conflict with other users of the path. However, no network plan or physical design alone can guarantee that negative interactions between users will be eliminated.

Reasons for Active Transport

The three major drivers to increasing active transport participation are reduction in greenhouse gases, improvements in health outcomes through reductions in obesity and urban congestion. Increasing the community's participation in regular cycling for transport or

pleasure can have its greatest impact in the area of obesity reduction and its flow-on effects to community health and wellbeing.

> *The obesity rate for (Australian) children increased from 5% in 1995 to 8% in 2007–08 with the proportion overweight remaining around 17% over this time period. This shows a shift towards the higher and heavier end of the body mass index.*
>
> *The rates were much higher for adults, with 61% of Australian adults overweight or obese in 2007–08.*
>
> *In 2008, the total annual cost of obesity for both children and adults in Australia, including health system costs, productivity and carers costs, was estimated to be around $58 billion.*

(http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features20Sep+2009)

The obesity rate for (New Zealand) children was 8.3% in 2006–07 with the proportion of overweight being 20.9% over this time period. There was no change in the average body mass index since 2002. The obesity rate for adults was 26.5% of New Zealand adults in 2007–08. (http://www.moh.govt.nz/moh.nsf/indexmh/obesity-key-facts)

The discrepancy in obesity rates between Australia and New Zealand could be partly due to the greater rates of regular activity (including active transport) undertaken by New Zealanders (adults 50.5%, children 47%) (http://www.moh.govt.nz/moh.nsf/indexmh/obesity-key-facts) as compared to Australian's (adults 35%, children approx. 25%). (http://www.aihw.gov.au/publications/cvd/papaa/papaa-c02.pdf & http://www.deakin.edu.au/hmnbs/cpan/summaries/walking-cycling-to-school.pdf)

Well planned, designed and constructed infrastructure has minimal user conflicts and provides greater opportunities for communities to integrate active transport into their lives and provide them with an activity level that will help reduce or eliminate obesity.

On-road Lanes & Off-road Paths

Part of having a well planned and designed cycling infrastructure is the implementation of pathways that are the correct width for the numbers of users and their types (walkers, commuter riders etc.). The amount of 'space' provided to each user type on shared paths and lanes is very important in the design process to minimise conflicts. Particularly off-road shared pedestrian cycle ways that are regular cycle commuter routes, and where commuter cyclists may be expected to be travelling at fairly high speed.

Shared path design has been quiet topical in the media recently, for all the wrong reasons. Robert Graham died on 27 February 2008, in Victoria after being injured while riding his bike on a shared path giving rise to this comment:

> *Coroner Dyson Hore-Lacy said he assumed that when bike/pedestrian paths were first built they were intended for leisurely strolls or rides . . . . it appeared that they had not been designed to cope with the dramatic increase in the popularity of cycling and walking since then. (http://www.heraldsun.com.au/news/victoria/death-traps-on-bike-paths/story-e6frf7kx-1111114997982)*

The Pedestrian Council of Australian has also seen cause to solicit a legal opinion regarding shared paths, after a pedestrian was seriously injured in New South Wales in 2002. The advice given (http://www.walk.com.au/pedestriancouncil/Page.asp?PageID=3125) suggests that –

> *It would not be in doubt that a local council would owe a duty of care to take reasonable steps to avert any risk of injury arising from conflict or collisions with*

bicyclists on the part of pedestrians using Shared Bicycle Paths as a "matter of law" in its capacity of the relevant roads authority under the Roads Act. This would also be the case with the RTA in relation to bridges, major roads or other gazetted roads that it has control over as the relevant roads authority under the Roads Act. The RTA may also owe a duty of care to pedestrians using Shared Bicycle Paths that is co-extensive to any such duty of care owed by the local council through its involvement in the approval, planning or design of Shared Bicycle Paths through participation in Local Government Traffic Committees.

With these issues in mind the new Austroads Guides have updated their design information on exclusive, shared and separated pathways. The recommended path widths have all been increased. The new Austroads Guide to Road Design Part 6A – Pedestrian and Cyclists Paths states that:

Table 7.4 shows desirable widths and acceptable ranges of width for shared use paths. As for bicycle paths, the upper limit of the acceptable range in the table should not discourage designers from providing a greater width where it is needed (e.g. very high demand that may also result in overtaking in both directions).

Table 7.4: Shared path widths

	Path width (m)		
	Local access path	*Commuter path*	*Recreational path*
Desirable minimum width	*2.5*	*3.0*	*3.5*
Minimum width – typical maximum	*2.51 – 3.02*	*2.51 – 4.02*	*3.01 – 4.02*

1. A lesser width should only to be adopted where cyclist volumes and operational speeds will remain low.
2. A greater width may be required where the numbers of cyclists and pedestrians are very high or there is a high probability of conflict between users (e.g. people walking dogs, roller bladers and skaters etc.).

Figure 1 Shared path widths
page 44 Austroads Road Design Part 6A

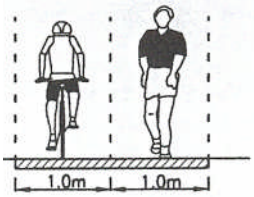
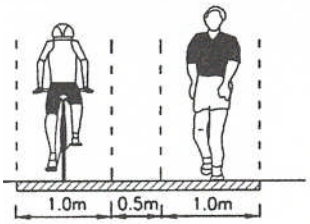
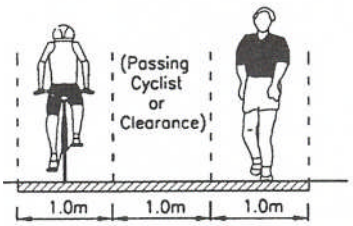
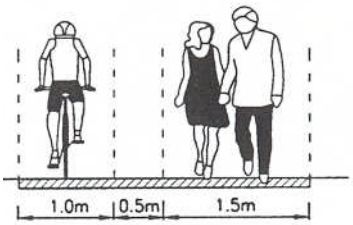
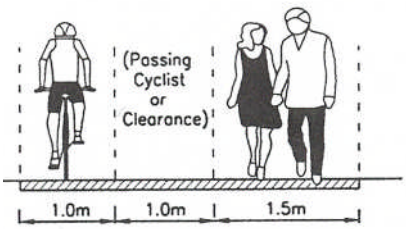
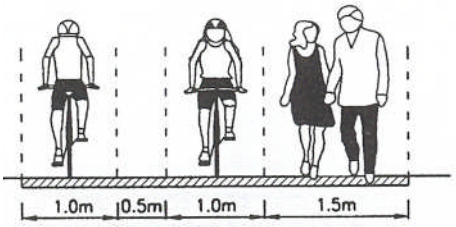
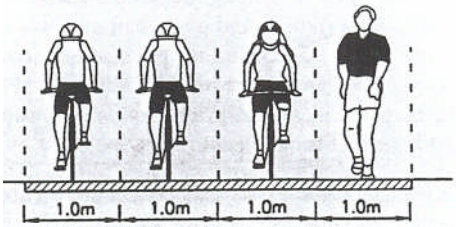
Scenario	Overall width of path	Predominant path purpose • Typical circumstances of use	
A	2.0 m	Local access •Constrained conditions •'Tidal flow' •Low use	
B	2.5 m	•Commuting and local access •Regular use •20 km/h	
C	3.0 m	Commuting •Frequent and concurrent use in both directions •30 km/h+	
D	3.0 m	Recreation •Regular use •20 km/h	
E	3.5 m	•Commuting and recreation (concurrent) •Frequent and concurrent use in both directions •30 km/h+	
F	4.0 m	Major recreational path •20 km/h •Heavy and concurrent use in both directions	
G	4.0 m	Major recreational path •Regular group rides •Heavy and concurrent use in both directions •Generally low speed due to congestion	

Figure 2 Shared use path operation
page 84 Austroads Road Design Part 6A

Debate on the 'value' of separated on-road cycle lanes, (how separated is separated?) has also emerged. The ability to attract novice cyclists, and regain cyclists previously lost is often down to the quality of the infrastructure and how 'safe' and 'un-conflicted' people feel in on-

road situations. In an on-road situation the cyclist is one of the more the vulnerable user s. This has led various agencies to want to separate the cyclists from motorised vehicles. Ways of achieving this varies from lashings of green paint on the road often disappearing at intersections leaving the novice rider no better off, through to wholly separated lanes adjacent to the public footpath, often called “Copenhagen Lanes” refer to figure 3

Figure 3 Copenhagen Lane in Perth CBD
Photo by Fiona MacColl

However, even with marked on-road cycle lanes there seems to be conflict between motorists and cyclists. Research undertaken by University of Leeds Institute for Transport Studies researched roads with and without cycle lanes.

> *The analysis shows that significantly wider passing distances are adopted by motorists on a 9.5 metre wide carriageway without a 1.45 metre cycle lane with posted speed limits of 40mph and 50mph."*

(http://www.leeds.ac.uk/news/article/128/motorists_drive_closer_to_cyclists_on_cycle_lanes)

Therefore, it would seem that unmarked and informal on-road cycling is safer for the cyclist, than formalised cycle lanes of 1.45 metres.

The “Copenhagen Lanes” are also not without issues. Designs without the separating median as seen above, or less generous separations have led to issues with car doors being opened into the path of oncoming cyclists, with often painful results. There is also the issue of conflicts with pedestrians. Here again the on-road lane width of the cycle lane is of paramount importance in reducing user conflicts and increasing safety.

Integration cyclists with other users

Often cyclists are removed from the road environment as it is deemed safer for the cyclists. However, this is where cyclist s are often ‘integrated’ with pedestrians on shared paths causing conflicts to occur if the infrastructure is not planned, designed and installed correctly.

Before integrating cyclists with pedestrians into off-road shared paths an assessment of the likely volumes of each type of user, probable numbers of active and passive 'meeting's' and 'passing's' needs to be undertaken. To determine the probable level of service or capacity of the infrastructure required needs to be determined by assessing the catchment of the facility, the land uses surrounding the facility that will generate the users.

Trip generation is assessed using tools that predict numbers of trips generated by particular land use types per unit area. Katz assessed the various trip generation models available in "Forecasting Demand for Bicycle Facilities" (Katz, 2001) and Taylor et al in "Traffic Flow Models Allowing for Pedestrians and Cyclists" (Austroads 2001).

The Highway Capacity Manual 2000 (TRB, 2004) provides a methodology for estimating the level of service, or capacity required by off-road shared paths for both pedestrians and cyclists. The 4th edition is due out in 2010 and has been significantly upgraded, especially Chapter 11 – pedestrian and bicycle concepts and Chapter 19 – bicycles.

Once the issue of probable capacity required has been determined then these factors can be incorporated into the design parameters of the infrastructure to minimise conflicts.

Conflict Issues

There is often no single conflict generating issue on shared paths, it is often a mix of behaviours, physical environment and perceptions or expectations by the users. Therefore, there is no single cure-all to resolve conflicts and each locations issues needs to be resolved individually.

Common causes of conflict include:

- Unpredictable and unexpected actions
- Lack of protocol for dealing with conflict
- Perceived clashes of values between users
- Negative experience
- Mutually exclusive norms / values
- Manner or purpose of use
- Competition for scares resources
- Poor planning &/or design –
    a. Signage
    b. Lighting
    c. Path width or capacity
    d. Access
    e. Visibility or sightlines
    f. Poor location
- Poor maintenance
- Way finding – maps, directories

The first six points rely on community education, promotion and shared pathway etiquette development; point's eight to ten require well developed design criteria for the development of shared pathways to allow more pathways to be developed to overcome the scarcity of resources in active transport.

Current Practice

Design

The Austroads Guides have recently been upgraded, the previous Guide to Engineering Practice Part 13 Pedestrians and Part 14 Bicycles, have now been integrated throughout the Austroads Guide to Traffic Management, Guide to Road Design and Guide to Road Safety, see table 1. The LTSA's Cycle network and route planning guide (2004) focuses on cycling infrastructure as a mode of transport and a best practice guide. The use of all these guides in the planning, design and development of pedestrian and cyclist infrastructure; exclusive use, shared and separated pathways should alleviate most of the conflicts due to infrastructure design on and off road.

Road Rules

To reduce conflicts due to users actions, user perceptions etc. all users should follow the road rules applicable to their jurisdiction.

Australian Road Rules – (http://www.austlii.edu.au/au/legis/sa/consol_reg/arr210/)

153—Bicycle lanes

(1) A driver (except the rider of a bicycle) must not drive in a bicycle lane, unless the driver is permitted to drive in the bicycle lane under this rule or rule 158.

242—Travelling in or on a wheeled recreational device or toy on a footpath or shared path

(1) A person travelling in or on a wheeled recreational device or wheeled toy on a footpath or shared path must:

(a) keep to the left of the footpath or shared path unless it is impracticable to do so; and
(b) give way to any pedestrian (except a person travelling in or on a wheeled recreational device or wheeled toy) who is on the footpath or shared path.

243—Travelling on rollerblades etc on a bicycle path or separated footpath

(1) A person travelling on roller-blades, roller-skates, or a similar wheeled recreational device, must not be on a part of a separated footpath designated for the use of pedestrians unless the person:

(a) is crossing the separated footpath by the shortest safe route; and
(b) does not stay on the separated footpath for longer than necessary to cross the separated footpath safely.

247—Riding in a bicycle lane on a road

(1) The rider of a bicycle riding on a length of road with a bicycle lane designed for bicycles travelling in the same direction as the rider must ride in the bicycle lane unless it is impracticable to do so.

249—Riding on a separated footpath

The rider of a bicycle must not ride on a part of a separated footpath designated for the use of pedestrians.

250—Riding on a footpath or shared path

(1) The rider of a bicycle who is 12 years old or older must not ride on a footpath if another law of this jurisdiction prohibits the rider from riding on the footpath.

251—Riding to the left of oncoming bicycle riders on a path

The rider of a bicycle riding on a bicycle path, footpath, separated footpath or shared path must keep to the left of any oncoming bicycle rider on the path.

252—No bicycles signs and markings
(1) The rider of a bicycle must not ride on a length of road or footpath to which a no bicycles sign, or a no bicycles road marking, applies.

253—Bicycle riders not to cause a traffic hazard
The rider of a bicycle must not cause a traffic hazard by moving into the path of a driver or pedestrian.

New Zealand Road Rules – (http://www.ltsa.govt.nz/roadcode/about-other-road-users/information-for-cyclists.html)

Safety rules for cyclists:

- Cyclists must wear an approved safety helmet. Always fasten it securely, by following the manufacturer's instructions.
- It's a good idea to wear brightly coloured or reflective clothing when cycling. That way you'll be easier to see.
- Don't ride your bicycle on a footpath unless you are delivering newspapers, mail or leaflets, or there is a sign indicating it is a shared pedestrian and cycle path.
- At intersections, you must:
- follow the rules for motor vehicles, or
- get off your cycle and walk across.
- You can only ride alongside another cyclist or moped. You must not ride alongside a car, truck or other motor vehicle.
- Always ride in single file if passing another vehicle.
- Your cycle must not be towed by another vehicle.
- Your cycle can only tow a trailer (one designed to be towed by a cycle) and must not be fitted with a sidecar.
- You must not carry a pillion passenger on your cycle unless you have a pillion seat and footrest. If you are carrying a child, the pillion seat must protect the child's legs from the wheels.
- You must not leave a cycle blocking a footpath.
- Where there is an adequate cycle path or cycle lane, cyclists should use it.
- You must ride with lights on when it is dark (from 30 minutes after sunset until 30 minutes before sunrise).
- You must keep your cycle in good working condition.

Cyclists must not ride on a foot path unless:
- Delivering to letter boxes
- The path has been declared and signed as a cycle path
- The bicycle is so small that it does not meet the definition of a bicycle

Better dissemination of road rules applying to cycling; to new and returning cyclists would be advantageous and reduce the incidence of conflict due to ignorance. Knowledge of cycling road rules by all road users also helps in the general acceptance, etiquette and professionalism of cyclists and cycling by other road users.

Key Strategies

Initial planning, design and construction of shared paths must always be done in a holistic approach so that no one user type is excluded or given less access than another or at the expense of another. It is far less successful and far more expensive trying to retrofit or overcome poor planning, design and/or construction.
Key conflict minimisation strategies:

- Integrated policy, strategy and planning
- Urban design and place-making
- Infrastructure planning
- Infrastructure design
- Infrastructure construction and maintenance
- Information
- Regulation
- Enforcement
- Education and awareness-raising
- Travel behaviour change

With the above issues in mind a series of facts sheets was developed to accompany this research document to help pre-empt conflicts on new shared paths and overcome conflict issues arising on existing shared path infrastructure. The fact sheets are available on the Australian Bicycle Council website – (http://www.austroads.com.au/abc/index.php?type=main&id=7)

Acknowledgements

The Australian Bicycle Council members and ARRB Group

Appendices

Table 1 – Austroads Guides with Table 1 Pedestrian and Bicycle Information

Guide to Road Design				
Part 2: Design Considerations	Chapter 1 Design Objectives	1.9 Provision for cyclists and pedestrians		p6
Part 4: Intersections and Crossings – General	Chapter 9 Cyclist Crossings			pp76 - 94
Part 4A: Unsignalised and Signalised Intersections	Chapter 8 Left-turn Treatments			pp127 & 137
Part 4B: Roundabouts	Chapter 5 Pedestrian and Cyclist Treatments			pp48 - 59
Part 4C: Interchanges	Chapter 4 Structures	4.4 Pedestrian/Cyclist Grade Separations		p25
	Chapter 14 Cyclists			pp77-80
Part 6A: Pedestrian & Cyclist Paths	Entire document			
Part 6B: Roadside Environment	Chapter 4 Roadside Infrastructure	4.4 Off-street Parking	4.4.8 Bicycle Parking Facilities	p85
Guide to Traffic Management				
Part 3: Traffic Studies & Analysis	Chapter 2 Traffic Studies & Surveys	2.5. Traffic Surveys	2.5.5 Pedestrian & Bicycle Surveys	p22
	Chapter 3 Traffic Analysis – capacity & level of service	3.3 Factors Affecting Capacity, Level of Service, Degree of Saturation	3.3.5 Pedestrians & Cyclists	p32
Part 4: Network Management	Chapter 4.6 Bicycle Networks			pp33-38
Part 6: Intersections, Interchanges & Crossings	Chapter 4 Roundabouts	4.5 Road space allocation & lane management	4.5.2 Cyclists	p43
	Chapter 6 Interchanges	6.4 Road space allocation & lane management	6.4.4 Pedestrians & cyclists	p89
	Chapter 7 Rail Crossings	7.6 Path crossings of railways	7.6.2 Paths – shared	p132
	Chapter 8 Pedestrian & cyclist crossings of Roads			pp139-144
Part 7: Traffic Management in Activity Centres	Chapter 3 Techniques for traffic management in activity centres	3.8 Providing for Pedestrians & Cyclists	pp41-46	
Part 8: Local Area Traffic	Chapter 7 Selection of LATM	7.5 Signs, Linemarking &	7.5.11 Bicycle Facilities	p120

Management	Schemes & Treatments	Other Treatments		
	Chapter 8 Design Considerations for LATM Schemes	8.12 Catering for Cyclists & Pedestrians		pp132-138
Part 10: Traffic Control & Communication Devices	Chapter 8 Traffic Signals	8.1 Types of Displays & their Meanings	8.1.4 Bicycle Aspects	p116
		8.3 Display Sequences	8.3.7 Bicycle Signals	p132
		8.5 Special Uses	8.5.5 Bicycle Facilities	p152
Part 11: Parking	Chapter 6 Off-Street Parking	6.8 Parking Provisions for Other Road Users	6.8.5 Bicycles	p36
	Chapter 7 On-Street Parking	7.8 Provision for Other Road Users	7.8.5 Bicycles	p51
Part 12: Traffic Impacts of Development	Chapter 3 Traffic Management for Developments	3.2 Road User Considerations	3.2.7 Cyclists	p19
Guide to Project Evaluation				
Part 8: Examples	Chapter 3 Examples	3.10 Bicycle network evaluation		pp33-37
Guide to Road Safety				
Part 6: Road Safety Audit	Chapter 7 Case Studies	7.7 Road User Group Audit		p95

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Australian Social Trends, Sep 2009	http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features20Sep+2009
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Land Transport Safety Authority (2004) Cycle network and route planning guide, LTSA, Wellington New Zealand, 92 pages	http://www.ltsa.govt.nz/road-user-safety/walking-and-cycling/cycle-network/index.html
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Obesity in New Zealand - Key facts and statistics	http://www.moh.govt.nz/moh.nsf/indexmh/obesity-key-facts
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What influences children's walking and cycling to school?	http://www.deakin.edu.au/hmnbs/cpan/summaries/walking-cycling-to-school.pdf