

Cycle & motorcycle crash trends on Auckland City bus lane routes



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Introduction

- National strategies encourage both public transport & cycling
- Study assesses whether increased interaction of cyclists & buses creates a new hazard counter to road safety aims
- 'Before' and 'after' crash statistics for four bus lane routes (plus one control route) are analysed

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Study origins

- Prompted by personal experience as a commuter cyclist on Dominion Rd bus lane and witnessing frequent near-misses
- Queued motorists tend to leave a gap at side streets, but turning motorists have reduced visibility into the bus lane
- Bus lane cyclists/motorcyclists conflict with turning vehicles
- Anecdotal feedback that many at-fault drivers were 'looking for buses' and not cyclists or motorcyclists

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Queued vehicles leave a gap



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Driver cannot see on-coming motorcyclist



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Bus lanes can be busy even without buses



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Auckland cycle safety statistics

- Cyclists make up 1-2% of road users but 8% of casualties
- Other vehicle - cars (91%), bus (4%), truck (3%)
- Crossing/turning crashes 33% of movement types
- Poor observation (45%) and failure to give way (33%) most common contributing factors in cycle crashes
- "Cyclist factors" contribute to less than 5%

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Auckland City cycle crashes (2000-09)



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Other relevant studies

- >90% of Auckland cycle crashes occur within 20m of an intersection, reducing exponentially as the distance is increased. Few mid-block crashes. Crash frequency greatest in CBD, and busy intersections near shops
- Overseas bus lane study found that many vehicles failed to give way to pedestrians and cyclists, with cyclists noted as having difficulty navigating among vehicles during lane changes

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Cycle crash factors

- Turner (2006) found 'traffic failed to notice me' (48%), or 'traffic failed to give way to me' (28%) identified by cyclists as the main causal factor in reported crashes
- Christchurch Hospital survey of injured cyclists found 76% stated that other traffic failed to notice them or failed to give way
- International studies found that 'failed to look properly' was a key contributory factor for crashes at intersections (car drivers in 57% of cases, cyclists in 43%)

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Study route selection

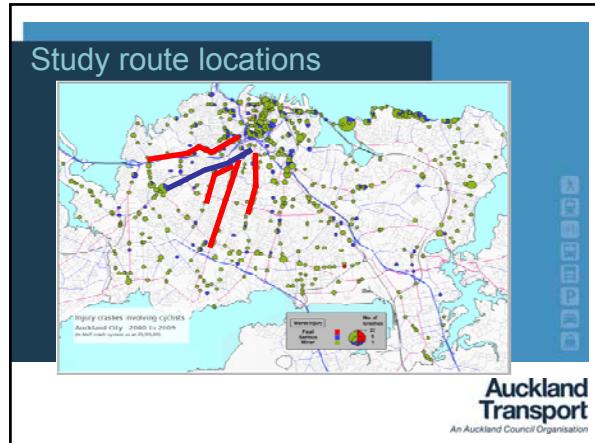
- 4 bus lane routes were selected, based on:
 - Full 5-year post-implementation crash record available
 - Urban route on CBD fringe, with multiple side streets (i.e. not a CBD or motorway location)
 - Generally 4-lane arrangement (2 bus lanes, 2 traffic lanes)
- 'Control' route without a bus lane also selected

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Selected routes

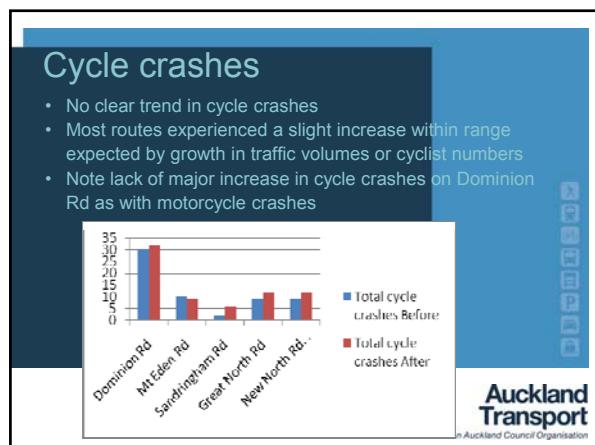
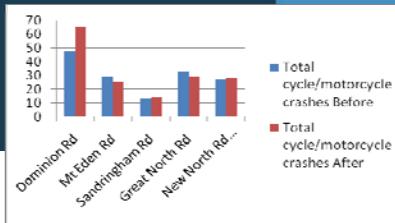
Bus Lane Route and Location	Year completed	Approx Length (km)	Typical bus lane width
Dominion Rd – from Memorial Ave to View Rd	1998	3.7	3.0m
Mt Eden Rd – from Wairiki Rd to Symonds St	1998	3.1	3.25m
Sandringham Rd – from Grove Rd to New North Rd	1999	2.0	3.25m
Great North Rd – from Point Chevalier Rd to Newton Rd	2000	4.2	4.5m
New North Rd (Control) – from Symonds St to Kitenui Rd	"2000"	3.9	3.3m

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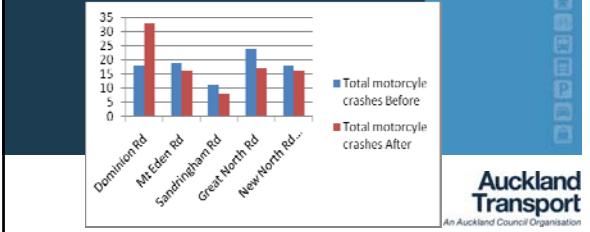
Total cycle or motorcycle crashes

- No discernable change in cycle or motorcycle crashes following implementation of bus lanes
- Sole exception of Dominion Rd – 30% increase recorded
- Results indicate bus lanes have little, if any, overall effect on the safety of cyclists or motorcyclists – pending Dominion Rd assessment



Motorcycle crashes

- Motorcycle crashes decreased in every route – except Dominion Rd (which increased by 80%)
- No current data available on the proportion of motorcycle traffic on individual routes but unlikely that Dominion Rd is significantly different to other routes

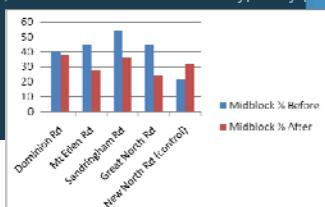


Fatal motorcycle crash

Dominion Rd, late 2010

Midblock vs. intersection crashes

- Consistent decrease in midblock cycle or motorcycle crashes after bus lanes had been installed
- Control route had a substantial increase in midblock crashes
- May be due to reduction in conflicting interaction between cyclists/motorcyclists and general traffic along midblock locations, where bus lanes are more typically present



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Day versus night crashes

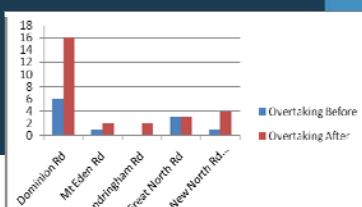
- Moderate increase in daytime cycle or motorcycle crashes for all bus lane routes
- Control route experienced minor decrease

Location	Light % Before	Light % After
Dominion Rd	~75	~80
Mt Eden Rd	~78	~82
Sandringham Rd	~65	~70
Great North Rd	~68	~72
New North Rd...	~68	~65

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Overtaking as a crash cause

- Overtaking crashes not expected to vary, however results show an increase in proportion of cycles and motorcycles involved in overtaking crashes
- Major increase on Dominion Rd, so bus lanes have somehow made overtaking crashes more prevalent there



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Route	Midblk. rates	Int. rates	Combined results	Actual rates	Ratio actual/typical
Dominion Rd	2.158	0.114	2.272	4.98	2.19 ≈ 2.2
Great Nth Rd	2.590	0.199	2.789	1.49	0.53 ≈ 0.5
New North Rd	1.319	0.128	1.447	1.49	1.03 ≈ 1.0

Cycle accident rate assessment

- Economic Evaluation Manual used to assess relative accident rates of routes with sufficient cyclist data
- Expected or typical crash rates were assessed using "Conflict – urban mid-block pedestrian and cyclist facilities" and "Conflict – urban signalised crossroads" models
- Simplistically, combined midblock/intersection results represents typical cycle crash rates for comparison to actual crash rates

Results analysis

- Likely explanation is that Dominion Rd bus lanes are 3.0m, whereas Great North Rd's typically closer to 4.5m
- New North Rd lanes vary but are typically 3.25-3.5m
- Indication that more generous bus lane widths result in lower cyclist crash rates, whereas narrower than standard bus lanes can increase cyclist crash rates
- Little else to differentiate the routes from each other in a way that aligns with the ratio of actual versus typical crash rates

Results summary (1)

- No discernable increase in cycle or motorcycle crash rates on bus lane routes (except for Dominion Rd, which appears to have a standalone problem with motorcycle crashes)
- Almost no change in terms of cycle crashes, and an overall decrease in reported motorcycle crashes (bar Dominion Rd)
- Overall, the results indicate bus lanes have little, if any, effect on the safety of cyclists or motorcyclists

Results summary (2)

- Bus lanes decreased midblock cycle or motorcycle crashes
- Increase in daytime cycle or motorcycle crashes
- The presence of buses does not appear to cause a safety issue for cyclists and motorcyclists (very low numbers)
- Bus lanes increased overtaking crashes, particularly at Dominion Rd

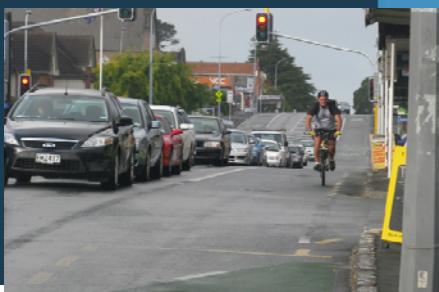
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Recommendations

- Make new bus lanes as wide as standards allow (4.5m max width)
- Avoid narrower than standard bus lane widths
- Investigate motorcycle and overtaking crash causes on Dominion Rd
- Dispel myth that cyclists in bus lanes should be worried about buses. Turning vehicles pose the greatest risk

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Questions?



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