



Public Transport Research @ Monash

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Public Transport Research Group
Institute of Transport Studies
Monash University, Australia

TSV Visit 07-03-2016



**PTRG is part of a wider collaborative framework in
transport research across multiple groups/ faculties**

Key Research Groups



Institute of Transport Studies



Institute of Railway Technology



MONASH ART DESIGN & ARCHITECTURE



Key Research Themes

Railway
Engineering
& Technology

Public Transport
Policy &
Operations

Traffic &
Transport
Systems

Intelligent
Transport
Systems

Design in
Public
Transport

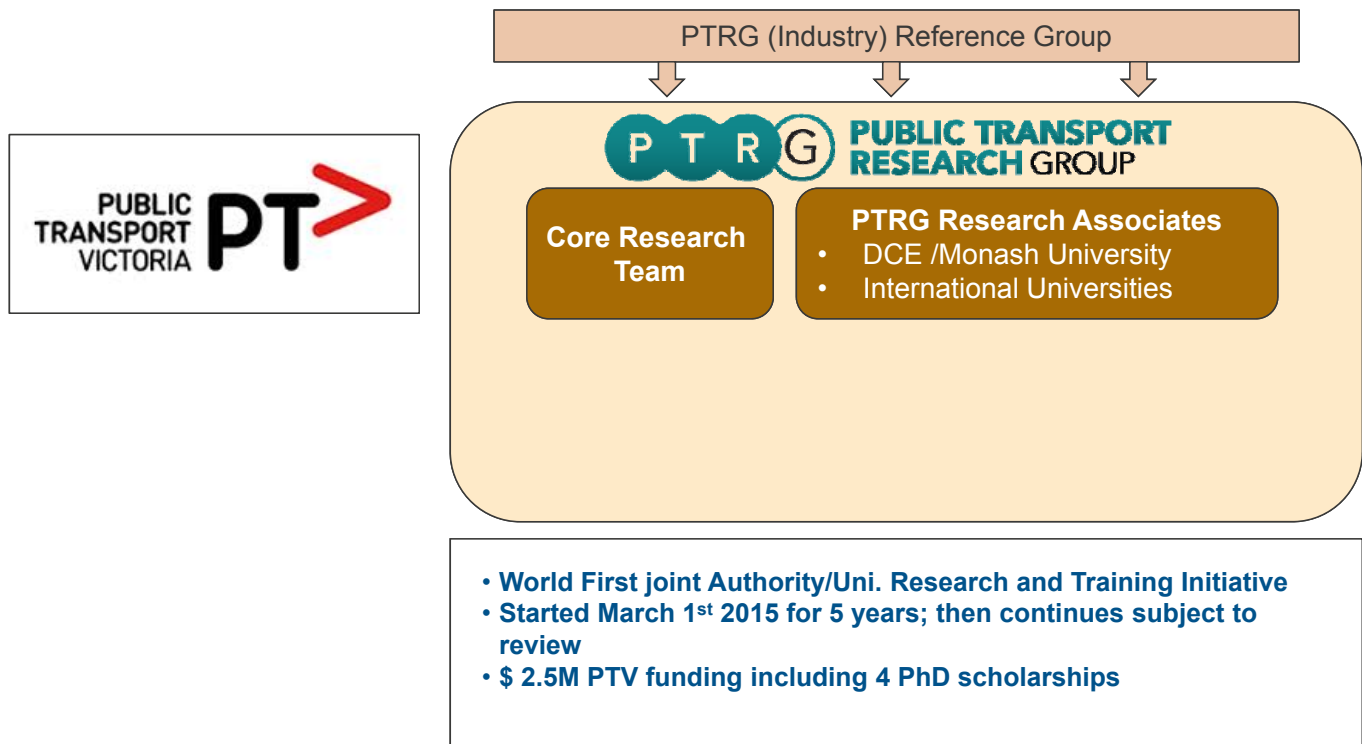
Model
Data
Fusion

Light
Weight
Vehicles

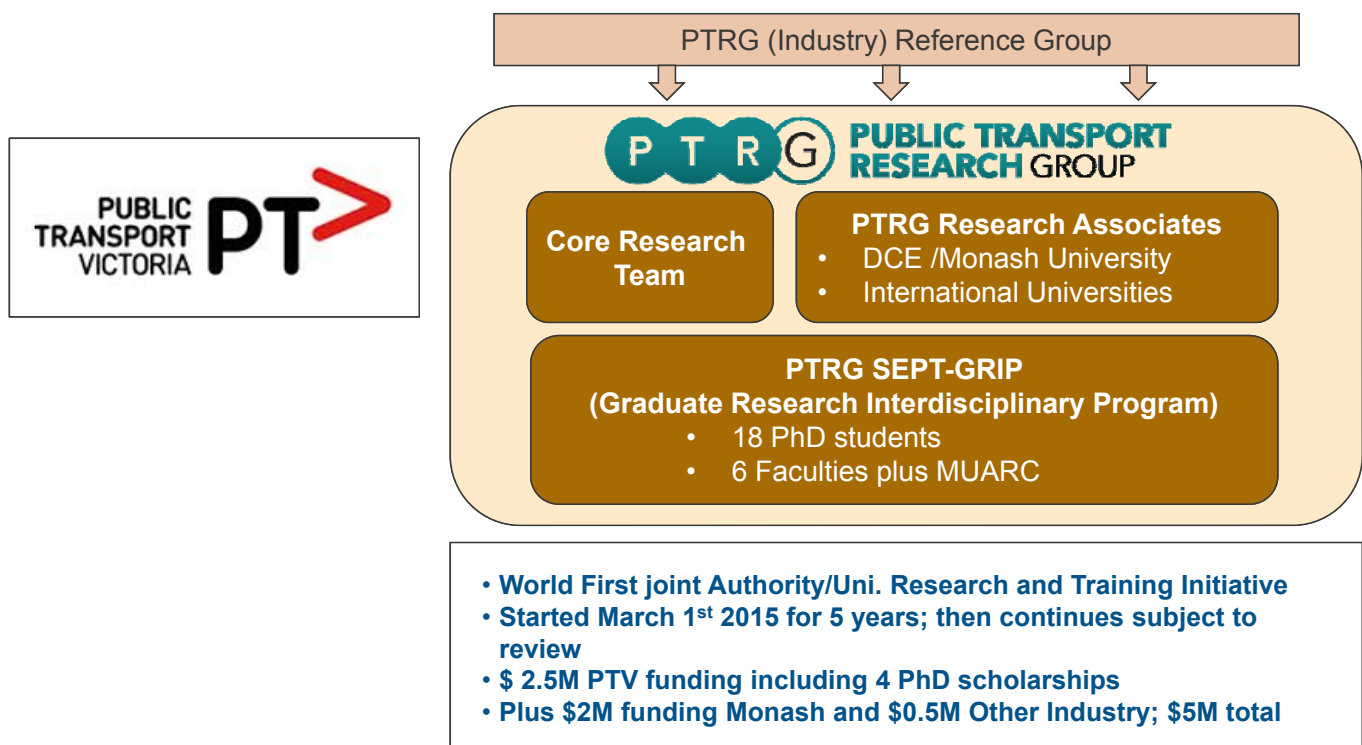
Aerodynamics

Transport
Safety

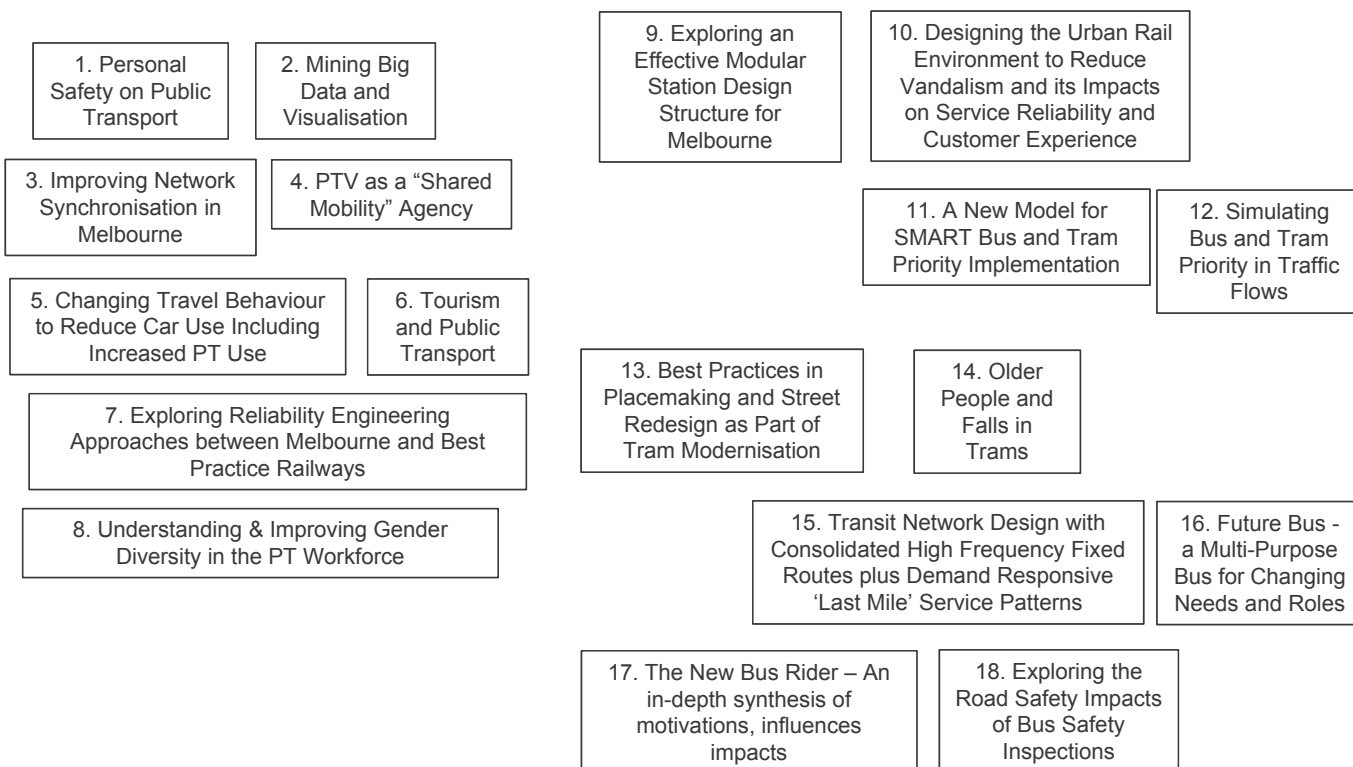
The new PTV-Monash Public Transport Research Group (PTRG) commenced on March 1st 2015



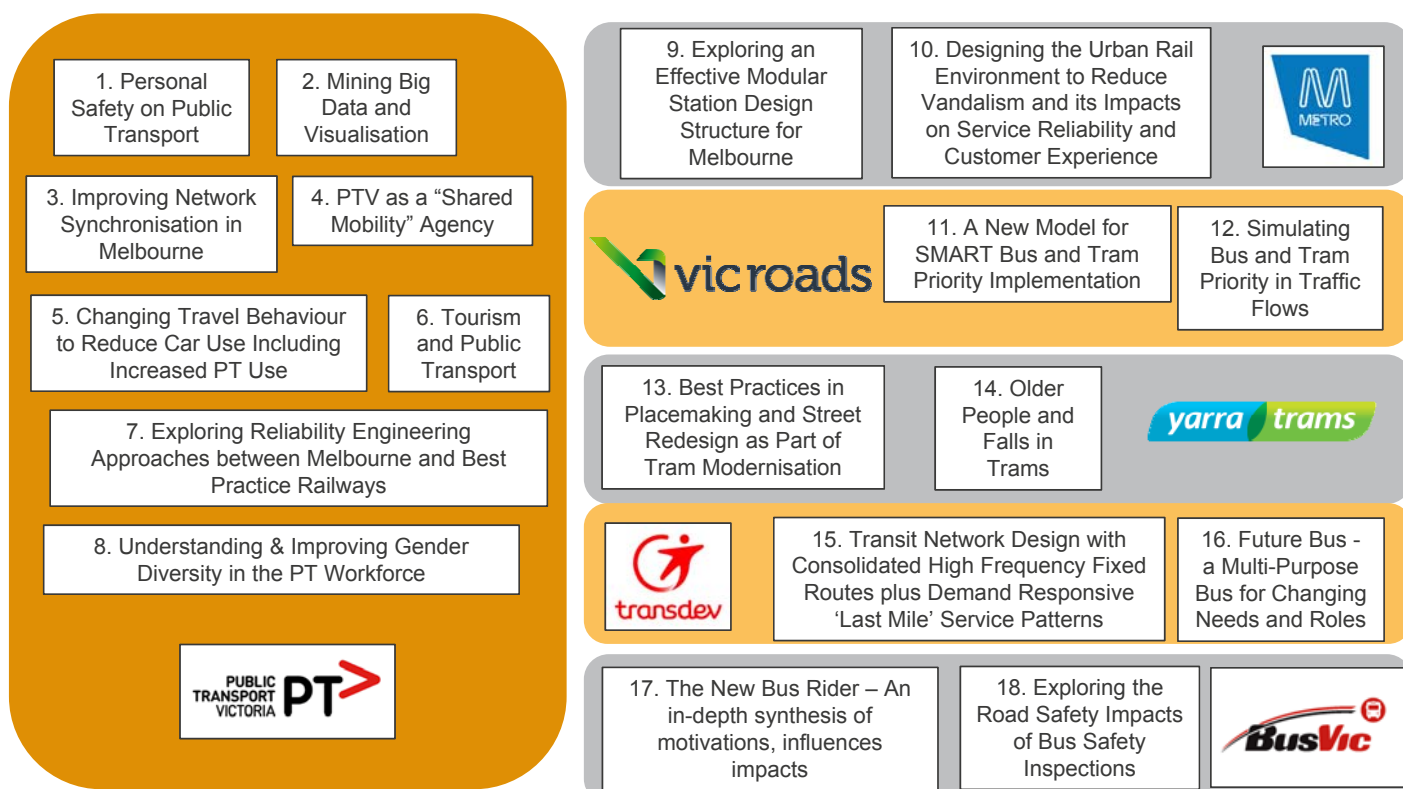
SEPT-GRIP is its first initiative – it doubled funding leveraging the Monash GRIP program and industry support



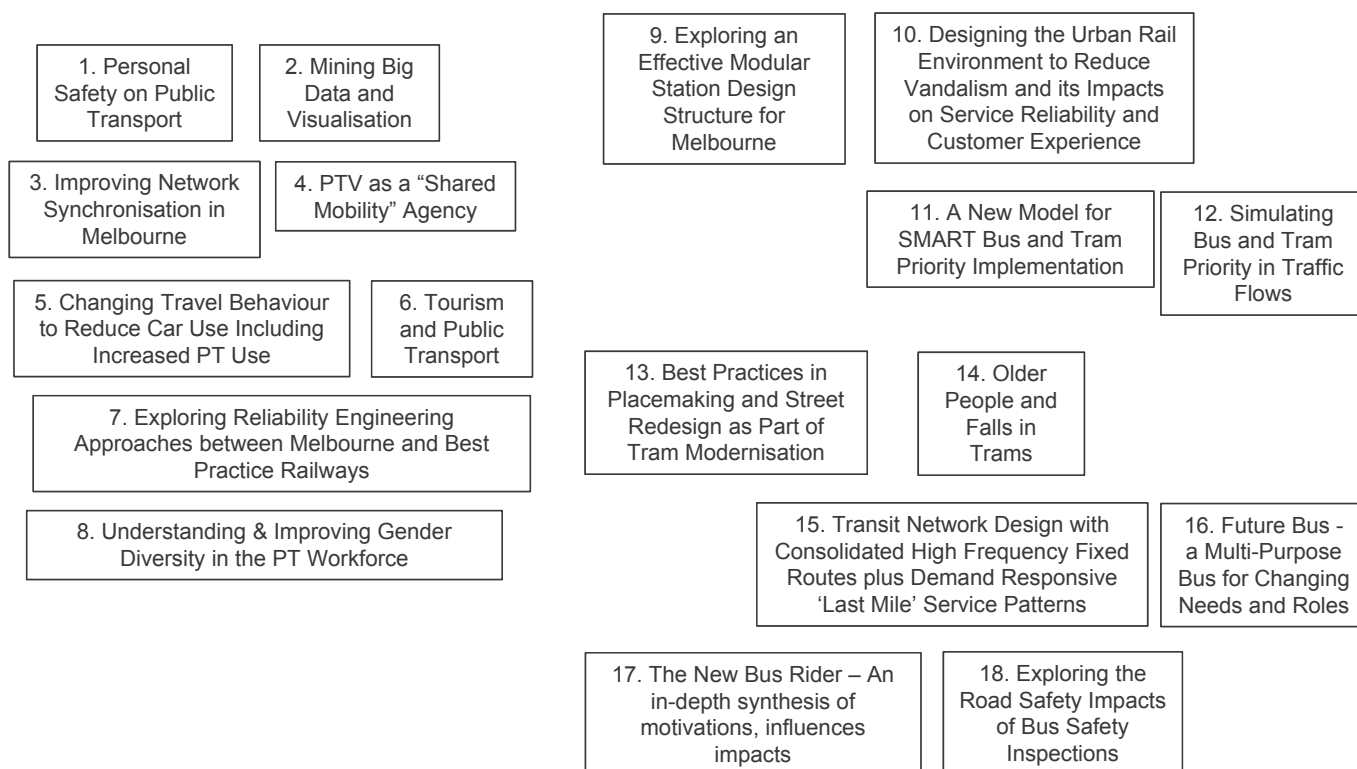
There are 18 topics...



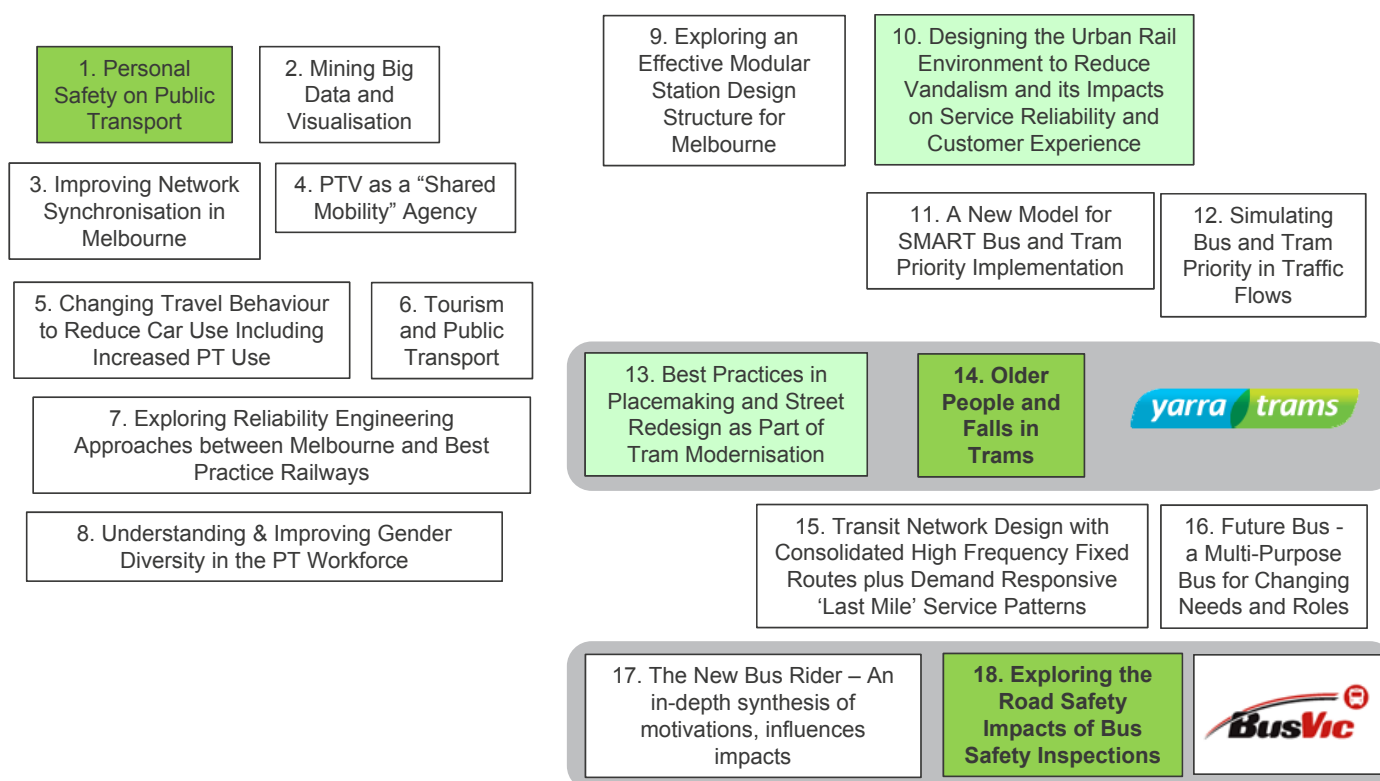
...with 6 Industry Partners...



In several theme sub-clusters...



...including transport safety



14. Older Passengers and Falls in Trams



Student 14



Sangeeta Singh



Student 14

Luke Valenza (tbc)

**Associate Professor
Judith Charlton**

Associate Director,
Behavioural Science for
Transport Safety,
Monash University
Accident Research
Centre

Project Outline

Trams have superior ride quality to buses and can also accelerate and decelerate at a quicker rate. This and the frequent need for braking due to traffic interference has been one of the many causal factors said to have generated increasing rates of passenger falls within trams. This a major concern with an aging population and increased use of trams. This project seeks to better understand the extent, conditions and causal influences of incidence of passenger falls in trams by older passengers. Its central aim is to identify and test mitigation strategies to reduce the rates of these incidents and their impact including specific redesign concepts for the interior of trams. This project is paired with project 9 and 16 (which also concern aspects of design for an aging population); these students will work together to identify mitigation strategies for trams.

18. Exploring the Road Safety Impacts of Bus Safety Inspections



Student 18



**Chris
Lowe**



Student 18

Jianrong Qiu (tbc)

Dr David Logan

Monash University
Accident Research
Centre

Project Outline

The Victorian bus industry, like other Australian jurisdictions, must meet safety regulation requirements including mandatory bus safety inspections with both annual independent inspections and more regular documented self-inspection processes. This project aims to understand the road safety impacts of these regulatory standards through a review of current crash records and their links to bus safety issues and a comparative analysis of bus safety in other regulatory contexts. The project will contrast bus and coach crash records against those of other transport industries including the Australian truck and heavy vehicle industry who do not have mandatory independent safety inspection regulations. The project will also seek to understand general risk factors for bus crashes to better understand safety standards in the context of other risks. It will also seek to better understand what aspects of safety inspections are having greater impacts on road safety than others.

Engineering

Public Transport Safety Research



PTRG related road safety research papers - Tram

- Currie, G., & Reynolds, J. (2010). **Vehicle and Pedestrian Safety at Light Rail Stops in Mixed Traffic**. TRANSPORTATION RESEARCH RECORD, Vol. 2146, pp. 26-34
- Currie, G. and Reynolds J (2011) '**Managing Trams and Traffic at Intersections with Hook Turns – Safety and Operational Impacts**' TRANSPORTATION RESEARCH RECORD No 2219 No 4 pp 10-19
- Currie, G., Tivendale K and Scott R (2011) '**Analysis and Mitigation of Safety Issues at Kerbside Tram Stops**' TRANSPORTATION RESEARCH RECORD No 2219 No 4 pp 20-29
- Naznin F Currie G Sarvi M and Logan D (2016) '**Exploring the Road Safety Impact of Tram/Streetcar Lane and Signal Priority Measures: An Empirical Bayes Before-After Study**' TRAFFIC INJURY AND PREVENTION Traffic Injury Prevention , 17 (1) pp. 91 – 97
- Naznin, F., Currie, G., Logan, D., Sarvi, M (2016) '**Safety impacts of platform tram stops on pedestrians in mixed traffic operation: A comparison group before-after crash study**' ACCIDENT ANALYSIS AND PREVENTION ,86 pp. 1 - 8 .
- Naznin F, Currie G, Logan D and Sarvi M (Under review) '**Application of a Random Effects Negative Binomial Model to Examine Tram-Involved Crash Frequency on Route Sections in Melbourne, Australia**' ACCIDENT ANALYSIS AND PREVENTION submitted 10-2015
- Naznin F, Currie G, Logan D and Sarvi M (Under review) '**Exploring the impacts of factors contributing to tram-involved serious injury crashes on Melbourne tram route**' ACCIDENT ANALYSIS AND PREVENTION submitted 2-2016



PTRG related road safety research papers - Bus

- Goh K, Currie G, Sarvi M and Logan D (2014) **'Experimental Micro-Simulation Modelling of Road Safety Impacts of Bus Priority'** TRANSPORTATION RESEARCH RECORD, Volume 2402 / Truck and Bus Safety; Roundabouts 2014, pp 9-14
- Goh K, Currie G, Sarvi M and Logan D (2013) **'Road Safety Benefits from Bus Priority? – An Empirical Study'** TRANSPORTATION RESEARCH RECORD, No. 2352, Transportation Research Board of the National Academies, Washington, D.C., 2013, pp. 41–49
- Goh, K, Currie, G, Sarvi M and Logan, D (2014) **'Bus Accident Analysis of Routes With/Without Bus Priority'** ACCIDENT ANALYSIS AND PREVENTION Volume 65, April 2014, Pages 18-27
- Goh, K, Currie, G, Sarvi M and Logan, D (2014) **'Factors Affecting the Probability of Bus Drivers Being At-Fault In Bus-Involved Accidents'** ACCIDENT ANALYSIS AND PREVENTION Volume 66, May 2014, Pages 20-26

Personal Safety (Crime)

- Rahaman M Currie G Muir C (2016) **Development and Application of a Scale to Measure Station Design Quality for Personal Safety'** Transportation Research Board 95th Annual Meeting January 2016
- Delbosc, A. and Currie, G. (2012) **'Modelling the drivers and impacts of personal safety perceptions on public transport ridership'**, TRANSPORT POLICY, Volume 24, November 2012 pp. 302-309



- to better evaluate pedestrian safety at platform stops through the adoption of a more advanced before–after crash analysis method, the comparison group (CG) method.
- In addition, a modified crash analysis will be conducted to consider differences in passenger volume between new and older design stops, aiming to test the effect of passenger exposure on safety impacts.

Source: Naznin, F., Currie, G., Logan, D., Sarvi, M (2016) 'Safety impacts of platform tram stops on pedestrians in mixed traffic operation: A comparison group before-after crash study' ACCIDENT ANALYSIS AND PREVENTION ,86 pp. 1 - 8

Safety Zone Stops

Platform Stops



Fig. 1. Old and new tram stops in Melbourne at Spencer street and Collins Street, respectively: (a) a distinctive yellow 'safety zone' traffic island sign at safety zone stop, (b) wide and safe platforms for passengers at platform stop, (c) safety zone stop with narrow waiting area, (d) zebra crossing for pedestrian at the end of platform stop, (e) typical layout of safety zone stop with gap in metal barriers, and (f) platform stops with narrow side traffic lane and on-street parking near platforms.

Treatment /Comparison Group Stops

Table 1

Platform tram stops selected for this study.

No.	Tram routes	Stop number	Location	Implementation date
1	109	6	Collins St at Swanston St	October 2001
2	109	9	Collins St at Spring St	April 2002
3	109	5	Collins St at Elizabeth St	October 2005
4	96	122	Spencer St at Collins St	December 2005
5	86	55	Plenty Rd at Albert St	June 2007
6	96	134	Fitzroy at Park St	July 2007
7	48, 75	8	Flinders St at Spring St	May 2008
8	86, 96	10	Nicholson St at Albert St	May 2008
9	55, 59	14	Flemington Rd at Grattan St	June 2008
10	55, 59	14	Flemington Rd at Park Dr	June 2008
11	57	23	Racecourse St at Stubbs St	July 2008
12	57	15	Abbotsford St at Arden St	June 2009
13	Multiple	25	St Kilda Rd at Commercial St	June 2010
14	Multiple	27	St Kilda Rd at High St	June 2010
15	Multiple	29	St Kilda Rd at Union St	October 2010

Table 2

Descriptive statistics of crash counts, AADT and pedestrian volume for treatment and comparison groups.

Sites	Parameters	Before	After	% Change
Treatment group	Pedestrian-involved all injury crashes per year	17	8	-52.9%
	Pedestrian-involved FSI crashes per year	7	3	-57.1%
	Average AADT per site	14,907	13,600	-8.76%
	Average passenger volume per site per week (2011)	34,503		
Comparison group	Pedestrian-involved all injury crashes	14	12	-14.3%
	Pedestrian-involved FSI crashes	6	4	-33.33%
	Average AADT per site	16,044	14,348	-10.57%
	Average passenger volume per site per week (2011)	26,678		

Results

Table 4
Results of before–after crash analysis using the CG method.

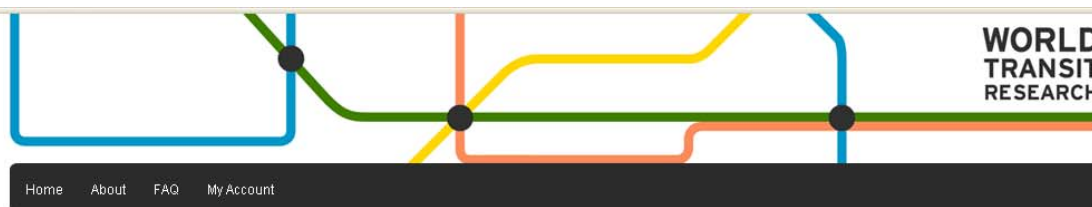
Crash types	Crash change factor, $\hat{\theta}$	Standard deviation, \hat{s}_{θ}	Safety effectiveness
Pedestrian-involved all injury crashes	0.571	0.14	+42.9%*
Pedestrian-involved FSI crashes		Outcomes are insignificant at 95% level	

* Significant at the 95% level.

Table 5
Results of the CG before–after crash analysis using the modified crash counts.

Crash types	Parameters		
	Crash changing factor, $\hat{\theta}$	Standard deviation, \hat{s}_{θ}	Safety effectiveness
Considering passenger increment			
Pedestrian-involved all injury crashes	0.191	0.076	+80.9%*
Pedestrian-involved FSI crashes	0.142	0.063	+85.8%*
Without considering passenger increment			
Pedestrian-involved all injury crashes	0.193	0.075	+80.7%*
Pedestrian-involved FSI crashes	0.159	0.067	+84.1%*

* Significant at the 95% level.



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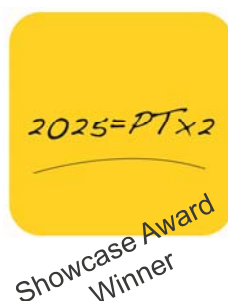
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The Public Transport Research Group is the name for researchers at the Institute of Transport Studies, Monash University who are engaged in research on public transport systems. The group is run by Professor Graham Currie, the Chair in Public Transport at Monash University. Research interests of the group are varied but loosely focus on research associated with public transport and strategic planning, travel demand management, travel behaviour, transport economics, land use and transit, travel modelling, operations modelling and planning for major special events.

ALSO:

NEW PTRG WEBSITE



PTRG.INFO