



ACRI Rail Knowledge Bank Update.



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Australasian Transport Research Forum (ATRF) 2016

Below is a selection of ATRF conference papers, November 2016.

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[A comparative study of the CPTED design quality of train stations based on crime rate in Melbourne](#)

Rahaman, M et al

Crime on public transport is a longstanding issue that negatively impacts the perceptions of passengers. Although much research has occurred on this topic, little has examined transit using the framework of Crime Prevention Through Environmental Design (CPTED). This paper presents a comparative study of train stations in terms of design quality for personal safety and security. Three types of train stations are considered for comparison: stations with high, low and moderate crime rate, located in Melbourne, Australia.

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[Exploring passengers' behaviour in an underground train station under emergency condition](#)

Shiwakoti, N et al

Passenger crowd behaviours and safety under emergency situation in train stations have been a major challenge in theory and practice. In past, several natural or man-made disasters in major train stations have prompted the mass evacuation of passengers, resulting in fatalities and injuries. This paper explores the behaviours of train passengers in an emergency evacuation and examines two crucial theoretical issues on the passengers' evacuation that includes reactive vs. proactive behaviours and cooperative vs. competitive

behaviours.

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[Exploring the key challenges in tram driving and crash risk factors on the Melbourne tram network: tram driver focus groups](#)

Naznin, F Currie, G Logan, D

Tram drivers have a difficult task in controlling one of the heaviest vehicles on the road whilst negotiating in a complex road environment. In Melbourne, Australia this includes operating trams on the largest tram network in the world. Very little research has been conducted on evaluating tram driving tasks and even less on relating route and road user factors with road safety from the tram drivers' viewpoint. The aim of this study is to investigate the key tram driving challenges as well as to identify crash risk factors along different tram routes, signal and stop settings from the tram drivers' point of view.

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[Evaluating accessibility provisions for existing rail station platforms in Melbourne, Australia](#)

Moug, V Coxon, S Napper, R

This paper documents current measures to understand and address station platform accessibility compliance for Melbourne's metropolitan rail network. Compliance is set by the Australian Disability Standards for Accessible Public Transport (DSAPT, 2002). In particular, this paper focuses on the maximum allowable provision under the standards of a platform to door gap of 40 mm horizontal length x 12 mm vertical step height. Beyond these dimensions, driver assistance is required.

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[How close the models are to the reality? Comparison of transit origin-destination estimates with automatic fare collection data](#)

Tavassoli, A et al

There is a consensus on the importance and value of automatic fare collection (AFC) data in analysing different aspects of public transport. As such combining other data sources such as the General Transit Feed Specification (GTFS) can greatly improve the quality of the analyses and ultimately provide a better understanding of public transport performance. This paper presents a methodology for data processing and analysis to acquire a public transport Origin Destination (OD) matrix. The case study uses a very large dataset on passenger boarding and alighting of all three transit modes, namely bus, rail

and ferry, in South-East Queensland (SEQ), Australia.

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Light rail development in Australia 2012 – 2016

Keys, E

The beginning of the 21st century has revealed a strong resurgence in light rail as a popular investment for the renewal of Australian cities. All states and territories are considering a role for light rail, either in response to inner urban growth, or to facilitate it. This paper surveys light rail developments in Australia since 2012 and covers both projects completed, as well as those still in various stages of planning or delivery. It examines the drivers of these initiatives to understand the perceived role of light rail in contemporary Australian urban planning. More particularly the paper reflects on the decision making process and the role of 'rational' planning. The paper examines the available evidence to assess whether or not the expected outcomes are being or are likely to be realised.

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Modelling the net traffic congestion impact of street car networks: a Melbourne, Australia case study

Phuoc, QDN et al

Streetcars (trams) operating with other public transport modes such as train and bus has contributed to reduce urban traffic congestion in many cities around the world, particularly in inner cities. However, there has been no attempt to examine the net network-wide impacts of streetcar networks on vehicular traffic and congestion. This paper presents a new method for assessing the net traffic congestion effects associated with tram operations in Melbourne, Australia. These impacts are determined by comparing congestion measures in two scenarios: "with tram" and "without tram".

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Of skyrails and skytrains: elevated rail in the Australasian urban transport environment

Woodcock, I Martin, S

This paper investigates claims of elevated rail's lower capital costs compared to trenched and tunnelled alternatives using evidence from benchmarked costings from over 20 years of Australian and international transport projects. Beyond construction costs, a range of other costs and benefits associated with the physical outcomes that may be linked to each

corridor type are also considered, including: construction disruption, ground level severance and connectivity, future modal interchange opportunities, creation of new public open space, transit-oriented development opportunities and value capture.

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Passenger preferences for surface versus underground rail travel

Douglas, N

Mature city development has forced metropolitan rail line construction underground. Despite this trend, a review of the literature was unable to find any studies that have estimated the preference for surface versus underground travel amongst rail passengers. This paper reports the results of a 2014 survey of 347 Sydney rail users using services with some underground track. The survey asked about preferences for surface versus underground travel and found that 46% preferred surface travel, 39% were indifferent and 16% preferred underground travel.

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Peak spreading forecast in urban rail transit demand

Li, R Rushton, L Jones, M

Peak spreading in the public transport system is a behavioural response to crowded trains and increased peak fares. Some passengers may shift their travel departure times to slightly before or after the peak period. Peak spreading is usually defined as a decrease in the proportion of 24-hour rail patronage during the peak hour. Understanding whether this proportion will remain constant or will change in response to these factors is critical to railway planning and timetable design. This study collected five years of Magnetic Stripe Ticket (MST) data from 2011 to 2016 and Opal card data from its introduction to the Sydney network in 2013.

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Real-time information system for spreading rail passengers across train carriages: agent-based simulation study

Ahn, SH

Commuter trains with multiple carriages tend to have varying distribution of passengers. At peak times, this can cause disproportionate occupancy rates of carriages, as well as crowding within the train and along the platform. As a result, passenger satisfaction is

negatively affected as indicated by high sectional density and seat unavailability. This study, thus, aims to improve Queensland Rail passenger satisfaction in the boarding, riding, and alighting of trains.

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Supply chain coordination in Queensland's agriculture sector

Hall, M Frew, J

Improving the economic efficiency of freight networks is key to unlocking productivity gains and improving the competitiveness of the freight industry. Supply chain coordination can play an integral role in unlocking the latent potential of Queensland's freight network. This paper explores the challenges and opportunities facing Queensland's agriculture freight sector, particularly rail freight, and the potential economic benefits derived from supply chain coordination.

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Freight

December 2016

The role of intermodal terminals in the development of non-bulk rail freight market in Australia

Ghaderi, H et al

The Australian domestic freight activity has doubled in size over the past 20 years, averaging growth of 3.5% per annum with the intermodal sector measuring the fastest growth rate. Thus, as the movement of freight by a variety of modes becomes a dominant model and pressure mounts to ensure that the integration of these modes is efficient and effective the role of intermodal terminals in sustaining the distribution systems becomes more prominent. This paper provides an analysis of the trends in the Australian rail freight task and evaluates the current infrastructure in terms of capacity and efficiency to accommodate this trend, particularly in different sub-markets.

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Infrastructure

October 2016

[Assessing the risks to infrastructure from coastal storms in a changing climate](#)

Milne, FD et al

Sea levels are projected to rise around the British coast due to climate change, increasing the likelihood of coastal flooding occurring and potentially impacting on road and other infrastructure. The results from this type of risk assessment can help to inform the adaptation actions of infrastructure owners, providing them with information on the scale of the problem and how this is likely to change due to climate change. This can provide the evidence required to prioritise resources, plan budgets and form a business case for action. The methodology developed is considered to be broadly applicable also to the rest of the UK, and potentially beyond, and to other types of infrastructure in the coastal hinterland, such as railways.

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Policy

January 2017

[ITF transport outlook 2017](#)

International Transport Forum

The ITF Transport Outlook provides an overview of recent trends and near-term prospects for the transport sector at a global level, as well as long-term prospects for transport demand to 2050, for freight (maritime, air and surface), passenger transport (car, rail and air) and CO2 emissions. This edition looks at how the main policy, economic and technological changes since 2015, along with other international developments (such as the Sustainable Development Goals), are shaping the future of mobility, and presents alternative policy scenarios for long-term trends in transport demand and CO2 emissions from all transport modes, freight and passenger. A special focus on accessibility in cities also highlights the role of policies in shaping sustainable transport systems that provide equal access to all.

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Public Transport

December 2016

[Stochastic seat allocation models for passenger rail transportation under customer choice](#)

Wang, X et al

The authors study the seat allocation problem for passenger rail revenue management, in which a rail operator attempts to determine the optimal quantity of seats to be allocated to each cabin class for each train service. They formulate the problem with single-stage and multi-stage decisions as two stochastic programming models that incorporate passengers' choice behavior. The authors transform the stochastic models into equivalent deterministic mathematical programs that are easy to solve. Then, they form a variety of seat allocation policies from the optimal solutions to the seat allocation models. A number of simulation tests are offered to test the policies.

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April 2017

[Understanding urban rail in-vehicle activities: an activity theory approach](#)

Camacho, T et al

Public transport in-vehicle activities are activities undertaken by passengers while en-route to their destination. Through the use of a qualitative approach, we put forward a model that allows for the systematic structuring of in-vehicle activities and the identification of the elements that define and influence such activities. Additionally, in this research we explore how in-vehicle activities are undertaken by passengers and how they impact their subjective perception of the journey. Our results show that our approach is useful in gaining both a high level understanding of urban rail in-vehicle activities, as well as enabling to identify and analyse the individual factors that can impact these activities. We see this study as a step forward in shaping urban rail as a method of transport that promotes activity undertaking so as to better align with passengers' subjective and dynamic needs.

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Track

December 2016

[Continuous vertical track deflection measurements to map subgrade condition along a railway line: methodology and case studies](#)

Roghani, A Hendry, M

This paper presents the methodology developed for the use of continuous vertical track deflection measurements from a moving loaded rail car to map the subgrade condition

along a railway line. It was evident from collected data that unprocessed deflection measurements are heavily affected by the track surface condition such as joints and geometry irregularities so as to obscure the deflections because of poor subgrade support. The resulting processed data are compared with the geology over two study railway subdivisions to demonstrate that the processed vertical track deflection measurements are representative of the subgrade conditions. The filtering process, examples of the effect of track surface on the deflection measurements, and the limitations of the resulting data are also discussed.

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