

ACRI Rail Knowledge Bank Update.

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Freight

2018-06

[Australian code for the transport of dangerous goods by road and rail ; 7.6](#)

Australia. National Transport Commission

This Australian Code for the Transport of Dangerous Goods by Road & Rail, commonly known as the Australian Dangerous Goods Code (edition 7.5, 2017) sets out the requirements for transporting dangerous goods by road and rail. The Code can be used from 1 July 2018 and is compulsory from 1 July 2019. The Code is an important technical resource to help Australia's transport and logistics industry to operate safely when carrying dangerous goods.

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High Speed Rail

2018-06

[Policy on sustainable transport in England: the case of High Speed 2](#)

Banister, D

This paper outlines the nature of sustainable transport arguing for a strategic approach that takes account of the means to reduce travel through substitution and shorter trips, as well as making best use of all modes and reducing reliance on carbon-based energy sources. It takes the case of High Speed 2 and identifies five main narratives in the debates over the arguments in support of this huge investment. It seems that sustainable transport has not been a central part of that debate, and there is a need to reframe the discussion on HS2, as part of a National Sustainable Transport Strategy.

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Infrastructure

2018-08

[Megaprojects in transportation networks](#)

Rothengatter, W

Megaprojects are characterized by large investment volumes, high complexity and ambitious goals of their promoters with respect to technological, economic or aesthetic performance. There are a number of cases which show massive failures with planning, procurement, construction and operation of megaprojects in the transport sector. But there are also positive cases which underline that it is not a natural law that megaprojects fail rather than in the first instance a missing accountability of the planning and decision processes. In this context the criteria for success or failure have to be defined appropriately, because the widely used time and cost overruns are only rough indicators. Furthermore, the methods of evaluation have to be extended to allow for an integrated assessment of all sustainability aspects. Long planning and construction times imply that coping with uncertainty is a crucial issue such that risk and change management, stable legal, financial and political framework, and wide acceptance by stakeholders are essential requirements for a successful planning and implementation process.

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Level Crossing

2018-05

Are gates at rail grade crossings always safe? Examining motorist gate-violation behaviors using path analysis

Liu, J; Khattak, A

Gates are installed at highway-rail grade crossings to prevent collisions between highway users and trains. However, sometimes motorists may intentionally go around or through the lowered gates and this behavior often causes severe crashes. The behavior of violating gates is one of the most dangerous actions a motorist might take at gated crossings; it may compromise the intended safety improvement made by adding gates at crossings. This study answers an important research question – what factors are associated with gate-violation at rail grade crossings.

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Maintenance

2018-10

A decision support approach for condition-based maintenance of rails based on big data analysis

Jamshidi, A et al

In this paper, a decision support approach is proposed for condition-based maintenance of rails relying on expert-based systems. The methodology takes into account both the actual conditions of the rails (using axle box acceleration measurements and rail video images) and the prior knowledge of the railway track. The approach provides an integrated estimation of the rail health conditions to support the maintenance decisions for a given time period.

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Planning Policy & Infrastructure

2018-04

The impact of economic regulation on the efficiency of European railway systems

Smith, ASJ; Benedetto, V; Nash, C

In recent years, European railway regulation has been subject to major reform, with the powers, independence, and responsibilities of rail regulators across Europe strengthened considerably. We study the impact of these reforms on the efficiency levels of a panel of 17 European railways (2002–10). The novelty lies in the incorporation of a multi-dimensional rail regulation index — capturing the complexity of regulatory powers and activities — into an econometric framework alongside other reform variables. Our results suggest that the cost-reducing benefits of regulatory reform depend on the degree of (actual or desired) market openness, vertical structure, and the intensity of network usage.

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Public Transport

2018-05

Optimal design of intersecting bimodal transit networks in a grid city

Fan, W; ; Mei, Y; Gu, W

The urban transit system in a real city usually has two major components: a sparse express (e.g. rail) network and a dense local (e.g. bus) network. The two networks intersect and interweave with each other throughout the city to furnish various route options for serving transit patrons with distinct ODs. The optimal design problem of this bimodal transit system, however, has not been well explored in the literature, partly due to the difficulty of modeling the patrons' complex route choice behavior in the bimodal networks. In light of this, the authors formulate parsimonious continuum models for minimizing the total cost of the patrons and the transit agency for an intersecting bimodal

transit network in a grid city, where the perpendicular local and express lines intersect at transfer stops. The authors also show that the conventional practice of designing the local and express networks separately would greatly undermine the benefit of the bimodal system.

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Timetable

2018-05

Train timetable design under elastic passenger demand

Robenek, T et al

A passenger centric timetable is such a timetable that the satisfaction of the passengers is maximized. However, these timetables only maximize the probability of a passenger to take the train, but provide no insight on the actual choices of the passengers. Therefore, in this manuscript the authors replace the deterministic passenger satisfaction function with a probabilistic demand forecasting model inside of the passenger centric train timetable design. The actual forecasts lead to a realistic train occupation. Knowing the train occupation, the authors can estimate the revenue and to use pricing as a mobility management to further improve the level-of-service.

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Train

2018-05

Considering a dynamic impact zone for real-time railway traffic management

Van Thielen, S; Corman, F; Vansteenwegen, P

In a railway system, a conflict occurs when two trains require the same part of the infrastructure at the same time. Currently, such conflicts are typically resolved manually by experienced dispatchers. However, it is impossible for them to fully anticipate the impact of their actions on the entire network. This paper proposes a conflict prevention strategy which focuses only on the relevant part of the network and traffic and, consequently, proposes a solution for that part only.

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2018-05

The two-train separation problem on non-level track: driving strategies that minimize total required tractive energy subject to prescribed section clearance times

Albrecht, A et al

When two trains travel along the same track in the same direction it is a common safety requirement with three-aspect signalling that the trains must be separated by at least two signals if they wish to continue following the planned schedule. Under these separation conditions there will always be at least one clear section of track between the two trains. When these conditions are violated the following train must adopt a revised strategy that will enable it to stop at the next signal if required. In this paper the authors find necessary conditions on non-level track to minimize the total tractive energy required for both trains to complete their respective journeys within the allowed time subject to safety-compatible separation constraints in the form of a prescribed set of latest allowed section exit times for the leading train and a corresponding prescribed set of earliest allowed section entry times for the following train.

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Transit

2018-10

An incentive-based optimizing strategy of service frequency for an urban rail transit system

Li, C et al

The service level of urban rail transit is very much affected by the service frequency. This paper proposes an optimizing strategy of service frequency to achieve a tradeoff between service quality and operating cost. Then, an incentive strategy is introduced into the optimizing process of service frequency, to motivate part of passengers to shift their trips from peak to off-peak periods, eventually mitigating the crowdedness and discomfort. Finally, numerical experiments based on a city's metro in China are performed and the results demonstrate that the proposed strategy can significantly improve the riding experience and decrease the operating cost.

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2018-11

Unobserved heterogeneity analysis of rail transit incident delays

Bismark, A; Libnao, K

Passenger rail transit systems are frequently subjected to disruptions from incidents resulting in increased passenger waiting times, and loss of revenue to operators. The

objective of the present study is to investigate the impacts of rail transit-related factors on the duration of delay, if an incident takes place. In order to account for the unobserved heterogeneity for each factor and the data generation process, a random-parameters hazard-based duration approach that accounts for these heterogeneities was employed in the present study. Out of the fourteen estimated parameters found to be statistically significant at the 1% significance level, seven parameters were found to vary across observations. This indicates that if the model was restricted and only fixed parameters were estimated, the inferences from the seven random parameters will not be accurate.

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2018-10

The determinants of travel demand between rail stations: a direct transit demand model using multilevel analysis for the Washington D.C. Metrorail system

Iseki, H; Liu, C; Knaap, G

Transit demand models have become indispensable tools for transit planners and managers in the 21st century. By quantifying the relationship between transit ridership, the cost of travel, the character of the built environment, and the socio-economic characteristics of riders, such models enable transit planners and managers to make more informed decisions regarding transit routes, levels of service, transit fares, transit oriented development (TOD) and other transit supply parameters. Direct ridership models (DRMs) are now able to address transit ridership at each station directly with higher sensitivity to built environmental characteristics in well-defined station areas. More recently Origin-Destination DRMs have begun to use data on ridership between each origin and destination pair to facilitate more precise estimation of transit demand by origin-destination pair. In this study, we developed a time-of-day Origin-Destination Direct Transit Demand Model (OD-DTDM) that uses fare-card data from the Washington DC Metrorail system, applying a multilevel (or hierarchical) model to address the statistical problem due to the presence of groups or clusters of observations.

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