ACRI Rail Knowledge Bank Update.

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Audit

August 2017

V/Line passenger services
Victoria. Auditor General's Office

This audit assessed whether V/Line (Victoria, Australia) regional passenger services are efficient and meet the needs of public transport users, and whether it is adequately prepared to sustain and improve performance in the future. Its performance and how it is managing current and future challenges was assessed. Public Transport Victoria's (PTV) and the Department of Economic Development, Jobs, Transport and Resources' (DEDJTR) roles in overseeing and monitoring V/Line's operational performance and the Department of Treasury and Finance's role in monitoring V/Line's financial performance were also examined.

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Big Data

2017

Integration of national long-distance passenger travel demand model with Tennessee statewide model and calibration to big data
Bernardin, V et al

This project integrates the national long-distance model (tour-based simulation model developed from FHWA research on long-distance travel behavior and patterns) with the new Tennessee statewide model, and processes big data for use as a calibration target for long-distance travel in a statewide model. The paper demonstrates the feasibility of integrating the national model with statewide models, the ability of the national model to be

calibrated to new data sources, the ability to combine multiple big data sources, and the value of big data on long-distance travel, as well as important lessons on its expansion.

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Derailment

July 2017

Assessment of road-rail crossing collision derailments on curved tracks

Ling, L; Dhanasekar, M; Thambiratnam, DP

Existing studies of train collision derailments mainly focus on the rail vehicles running on straight tracks, while the derailments induced by train-truck collision at a road-rail crossing in curved tracks are rarely investigated, although such crossings are more common. This paper presents a study of the derailment assessment of passenger trains due to the collision with heavy road trucks stuck across the curved road-rail crossing by means of train-track dynamics simulations.

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Environment

August 2017

A carbon footprint analysis of renewable energy technology adoption in the modal substitution of high-speed rail for short-haul air travel in Australia

Robertson, S

This study presents a carbon footprint analysis of renewable energy technology adoption in the modal substitution of high-speed rail for short-haul air travel in Australia. The carbon footprint analysis of renewable energy technology adoption in such modal substitution establishes the efficacy of various renewable energy technologies in assisting CO_2 emissions reduction on the Sydney–Melbourne city pair.

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2017

Climate risks and adaptation pathways for coastal transport infrastructure: guidelines for planning and adaptive responses

Fisk, G

These Guidelines were prepared to provide coastal transport infrastructure authorities and organisations with targeted information about climate risks for both assets and operations (including workforces). Key risks examined include cyclones, storm surges, flooding, high wind events and increased lightning strikes as well as changes to rainfall patterns (leading to drought and water supply shortages), fog events, increased extreme hot days, temperature increases and long term sea-level rise implications. The Guidelines also contain practical information pertaining to strategies and measures for building resilience of assets and operations to climate risks and undertaking adaptation planning. This includes information to guide timing and triggers for adaptation responses and information on an adaptive pathways approach. This desktop review also showcases current strategies, plans and practices being undertaken by road, rail, airport and seaport authorities across Australia.

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June 2017

A crossing-line between transportation evaluation and natural capital assessment: perspectives on ecological economics and project evaluation
Lee, HK; Kim, HY

This study presents a thorough review on project evaluation and transport externalities, especially in terms of ecological valuations. After that, a case study on a high-speed rail in the state of Texas, USA is examined to elaborate suggested solutions in sustainable transportation decision-making.

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Design

October 2017

A straddle monorail running gear with single-axle and rotating arm axle box suspension
Zhang, R et al

In this study, a new type of single-axle bogie of straddle-type monorail vehicle is designed. The tumbler structures are adopted in the vertical suspension system. One end of the tumbler is fixed to the framework, while the other end supports the framework via air springs. In addition, the lateral suspension utilizes the suspender way, with longitudinal force transmitted via single pull rods. Guide wheels and steady wheels are connected to

the end support arms of the framework through spindles around the horizontal direction. Rubber springs, the pre-compressed magnitudes of which could be adjusted, are set between the spindles and support arms. The multi-body dynamics software UM is adopted to construct a dynamic model and simulate related dynamic performance. The results of the simulation indicate that this new kind of bogie has a favorable performance when passing through curves and has a greater riding stability. The flexibility factor equation of this new monorail vehicle is deduced, with its flexibility factor obtained.

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2017

Proposed AASHTO LRFD bridge design specifications for light rail transit loads

Kim, YJ

This report provides proposed AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications for bridges carrying light rail transit loading, including those subjected to both light rail and highway traffic loadings. The proposed specifications and design examples are based on comprehensive response monitoring of five bridges carrying light rail transit vehicles in Denver, Colorado, and analytical programs for investigating the behavior of light rail bridges, live loads and associated forces, rail–train–structure interaction, and load factor calibration to implement the Load and Resistance Factor Design (LRFD) method. A standard live load model was developed to generate uniform design outcomes, regardless of transit agency. Load factors are calibrated, particularly for the strength and fatigue limit states of light rail bridges.

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Freight Services

June 2017

Urban intermodal terminals: the entropy maximising facility location problem

Teye, C; Bell, M; Bliemer, M

An important problem confronting port cities is where and how to accommodate port growth. Larger ships combined with increased container throughput require more yard space and generate more traffic, straining the urban fabric in the vicinity of the port. A promising solution to this problem is the development of urban intermodal container

terminals (IMTs) that interface with both road and rail (or possibly inland waterway) networks.

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Metro

August 2017

Design of energy-efficient timetables in two-way railway rapid transit lines
Canca, D; Zarza, A

A methodology to design energy-efficient timetables in Rapid Railway Transit Networks is presented. Using an empirical description of the train energy consumption as a function of running times, the timetable design problem is modelled as a Mixed Integer Non-Linear optimization problem (MINLP) for a complete two-way line. In doing so, all the services in both directions along a certain planning horizon are considered while attending a known passengers' demand.

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August 2017

Measuring fine-grained metro interchange time via smartphones
Gu, W et al

High variability interchange times often significantly affect the reliability of metro travels. Fine-grained measurements of interchange times during metro transfers can provide valuable insights on the crowdedness of stations, usage of station facilities and efficiency of metro lines. Measuring interchange times in metro systems is challenging since agent-operated systems like automatic fare collection systems only provide coarse-grained trip information and popular localization services like global positioning system (GPS) are often inaccessible underground. In this paper, the authors propose a smartphone-based interchange time measuring method from the passengers' perspective.

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August 2017

Real-time automatic rescheduling strategy for an urban rail line by integrating the information of fault handling
Gao, L; Yang, L; Gao, Z

In this paper, the authors develop a real-time automatic rescheduling strategy, which integrates the dynamic information of fault handling. The rescheduled timetable is obtained

by a mathematical optimization model, the constraints set of which is automatically generated and adjusted as more information of fault handling is feedback.

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