ACRI Rail Knowledge Bank Update.

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Environment

March 2018

On particulate emissions from moving trains in a tunnel environment
Cha, Y et al

Increasing attention is being paid to airborne particles in railway environments because of their potential to adversely affect health. In this study, the authors investigate the contribution of moving trains to both the concentration and size distribution of particles in tunnel environments.View item

Infrastructure

April 2018

Preservation of foundation systems on railway upgrades
Neves, M et al

The upgrade and improvement of existing railway lines across the UK has been and still is a priority of the existing administration, as they carry 50% more passengers than they did 10 years ago. This paper focuses on the design and construction of a number of interfaces, from platform extensions to bridge reconstructions and changes to existing tunnels, with the goal of having the main line between Edinburgh and Glasgow electrified and with train capacity significantly enhanced. In order to minimise any negative impact that the proposed electrification could have on biodiversity, as well as from a suitability point of view, an attempt was made in the design, whenever possible, to accommodate and reuse existing structures as opposed to rendering the existing infrastructure completely obsolete. View item

Level Crossing

March 2018

Is it safe to cross? Identification of trains and their approach speed at level crossings
Larue, G et al

Improving the safety at passive rail crossings is an ongoing issue worldwide. These crossings have no active warning systems to assist drivers' decision-making and are completely reliant on the road user perceiving the approach of a train to decide whether to enter a crossing or not. This study aimed to better understand drivers' judgements regarding approaching trains and their perceptions of safe crossing. View item

April 2018

Walking the talk: comparing pedestrian 'activity as imagined' with 'activity as done'

Read, GJM et al

The safety of vulnerable road users, including pedestrians, is an important issue worldwide. The aim of this study was to compare the normal performance of pedestrians as they navigate the road system with that imagined by road system managers to gain insights into how safety management can be improved for this vulnerable road user group. The Event Analysis of Systemic Teamwork framework was used to compare pedestrian activity 'as imagined' and 'as done' at signalised road intersections and railway level crossings.View item

Public Transport

May 2018

Do preferences for BRT and LRT change as a voter, citizen, tax payer, or self-interested resident?
Balbontin, C et al

Interest in modal preferences remains a topic of high interest as governments make infrastructure decisions that often favour one mode over the other. In this paper we assess how the preferences for bus rapid transit (BRT) and light rail transit (LRT) change with different roles the residents may play: a citizen or altruistic resident, a self-interested resident, a tax-payer, and as a voter. View item

April 2018

Integrating urban public transport systems and cycling: summary and conclusions of the ITF Roundtable on Integrated and Sustainable Urban Transport, 24-25 April 2017, Tokyo
Veryard, D; Perkins, S

Sustainable urban transport systems require alternatives to the use of private cars that are competitive in terms of convenience and flexibility as well as cost. Mass transit systems are the central component but extension of heavy rail and metro systems is costly and these can never reach every part of the city. This report examines other options for improving public transport and extending network coverage.View item

Safety

April 2018

How can we improve safety culture in transport organizations? A review of interventions, effects and influencing factors
Nævestad, T; Hesjevoll, I; Phillips, R

The main objectives of the present study are to (a) map interventions that can be used to develop good safety culture in transport companies within road, sea, air and rail transport, (b) assess expected effects of interventions on safety culture and safety outcomes and (c) identify factors influencing safety culture change. By systematically reviewing the scientific literature, the authors identify 20 studies that describe and evaluate interventions to improve safety culture in road, rail, sea and air transport organizations. View item

Signal

June 2018

A Weibull approach for enabling safety-oriented decision-making for electronic railway signaling systems

Pascale, E et al

This paper presents the advantages of using Weibull distributions, within the context of railway signaling systems, for enabling safety-oriented decision-making. View item

Station

November 2017

Addressing future uncertainties of Perth at 3.5 million: 'what-if' scenarios for mass transit

Olaru, D et al

This report presents the results of a detailed analysis of the train station precincts with respect to their Place, Node, and Background Traffic characteristics. This is stage 1 of the project, which has as a key overall objective to determine what actions/interventions should be undertaken (and at which stations), to improve the stations precincts as high quality TODs and to increase train patronage. A secondary objective relates specifically to stations with current low patronage levels, i.e. less than 1,000 boardings per day. View item

May 2018

Slips, trips and falls on trains and at railway stations: stage 2

Larue, G et al

The key objective of Stage 2 was to identify underlying causes of slips, trips and falls, both from the rail user and the stations/train characteristics, and to evaluate the potential for increasing rail users' compliance with safety rules. This document presents the report of Stage 2 of the project Slips, trips and falls on trains and at railway stations, detailing the findings from this study. Upon completion of Stage 3 an integrated report (Stages 1-3) including recommendations will be submitted. View item

Track

March 2018

Operational vertical bending stresses in rail: real-life case study

Nafari, S et al

Train-mounted vertical track deflection (VTD) measurements offer new opportunities for estimating rail bending stresses over long distances. Previous numerical studies conducted by the authors resulted in a methodology that suggests the use of finite-element models to develop the correlations. These models facilitate the simulation of a stochastically varying track modulus along the track and provide a strong basis for interpreting the deflection data. In this study, data sets collected from a study site were used to validate this methodology for estimating rail bending stresses under passing train loads. View item

March 2018

Quantifying bending moments in rail-transit concrete sleepers
Edwards, J et al

With use of concrete sleepers increasing for rail-transit applications in the United States, it is becoming more critical to quantify their revenue service flexural demands to improve sleeper design and maintenance practices. Rail-transit concrete sleeper bending moment field data were collected and processed to address topic areas relating to (1) overall field bending moment magnitude relative to design moments; (2) moment variation from sleeper to sleeper resulting from support conditions; and (3) seasonal variations in moments. View item

March 2018

Tamping and renewal optimization of ballasted track using track measurement data and genetic algorithm
Lee, J et al

Although reliability centered maintenance (RCM) has been used widely in the maintenance and renewal (M&R) of railway infrastructures, M&R methods and maintenance frequencies still require considerable study to obtain information on optimum decisions. Recently, various attempts have been made to optimize the maintenance works in railway engineering, although a decision support system on selecting the maintenance or renewal works has not been suggested distinctly. Therefore, a genetic algorithm on the basis of the nondominated sorting method (NSGA) was used in this study to optimize the biobjective functions on M&R interventions and costs. View item

Train

March 2018

Managing the timing and speed of vehicles reduces wildlife-transport collision risk
Visintin, C et al

Understanding wildlife-vehicle collision risk is critical to mitigating its negative impacts on wildlife conservation, human health and economy. Research often focuses on collisions between wildlife and road vehicles, but collision risk factors for other types of vehicles, less examined in the literature, may also be informative. The authors studied spatial and temporal variation in wildlife-train collision risk in the state of Victoria, Australia. View item

Transit

2017

Conducting onboard transit rider surveys with electronic handheld tablets: an agencywide consolidated approach
McHugh, B et al

Transit agencies rely on onboard rider surveys to produce data in support of planning initiatives, as well as Title VI and FTA reports. The findings and statistical analysis provide valuable information about riders; travel patterns; and the effects of new rail alignments, services, and fare changes. Historically, onboard surveys have been conducted with paper

methods. However, as technology has become increasingly accessible, transit agencies have started turning to electronic methods for gathering information. View item

March 2018

Reinforcement learning approach for coordinated passenger inflow control of urban rail transit in peak hours
Jiang, Z

In peak hours, when the limited transportation capacity of urban rail transit is not adequate enough to meet the travel demands, the density of the passengers waiting at the platform can exceed the critical density of the platform. In this paper, a new reinforcement learning-based method is developed to optimize the inflow volume during a certain period of time at each station with the aim of minimizing the safety risks imposed on passengers at the metro stations. Basic principles and fundamental components of the reinforcement learning, as well as the reinforcement learning-based problem-specific algorithm are presented. View item

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