



## ACRI Rail Knowledge Bank Update.

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## High Speed Rail

*February 2018*

### [Can high-speed rail have a transformative effect on the economy?](#)

Vickerman, R

In this paper, the authors address the question as to whether there is a clear and robust economic theory of the transformational impact of high-speed rail and if there is any consistent evidence to support it? The paper uses evidence from the North-west European High-Speed Rail network and a more detailed study of the UK's first high-speed line, HS1. This is followed by a discussion of the various claims and counter-claims for the impact of the proposed HS2 that will link London with Birmingham, Leeds and Manchester. On the basis of this some of the implications for the appraisal of such projects are considered. The main conclusion from the paper is that transport infrastructure by itself is not likely to be transformative, but coupled with other policy interventions it can contribute to such an effect.

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2017

### [High-speed rail and manufacturing agglomeration: evidence from Beijing–Guangzhou high-speed rail in China](#)

Sun, B et al

This paper aims to discuss HSR's role in shaping urban economic development by tracing links from HSR to manufacturing agglomeration with panel data from the Beijing–Guangzhou HSR network in China from 2000 to 2015.

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## Intelligent Transportation Systems

*2017*

### [Regional multimodal approach for improving intelligent transportation systems in the Western Balkans](#)

Vukanovic, S; Begovic, N; El Araby, K

With a budget of €24.05 billion until 2020, the Trans-European Transport Networks (TEN-T) are an ambitious infrastructure policy of the European Union adopted in 2014 with the goal of connecting

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the continent between east and west, north and south. This policy aims to close the gaps between member states' transport networks, remove bottlenecks still hampering the smooth functioning of the internal market, and overcome technical barriers, such as incompatible standards for railway traffic.

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## Level Crossing

*November 2017*

### [Video analytics for the detection of near-miss incidents at railway level crossings and signal passed at danger events](#)

Aminmansour, S

Railway collisions remain a significant safety and financial concern for the Australian railway industry. Collecting data about events which could potentially lead to collisions helps to better understand the causal factors of railway collisions. In this thesis, we introduced Artificial Intelligence and Computer Vision algorithms which use cameras installed on trains to automatically detect Near-miss incidents at railway level crossings, and Signal Passed at Danger (SPAD) events. A SPAD is an event when a train passes a red signal without authority due to technical or human errors. Our experimental results demonstrate that it is possible to reliably detect these events.

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## Planning, Policy and Infrastructure

*February 2018*

### [Eliciting the regulation of an economic system: the case of the French rail industry](#)

Ivaldi, M; Pouyet, J

Based on the modern theory of regulation, the analysis aims to characterize the effective economic regulation of the French railway industry. The methodology consists in econometrically testing various scenarios of regulation and determining which of these best fits the data.

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## Rail

*2017*

### [Railroads, volume 2](#)

Transportation Research Board

This issue contains fifteen papers concerned with railroads. Specific topics addressed in this issue

include the following: railway human factors and operational issues; future railroad operations and the role of automation; highway–rail grade crossing hazard-ranking and project development; and crash frequency, crash injury severity and visualization of accidents at highway–railway crossings. Other topics addressed in this issue include: North American high-speed passenger rail ridership forecasting; benefit–cost analysis of an intercity passenger rail service; reliability and cost in passenger rail system design; train data collection and arrival time prediction system for highway–rail grade crossings; the railway engineering education symposium; short-haul and short-line railway intermodal service; railway capacity allocation; macrolevel classification yard capacity modeling; and risk comparison of transporting hazardous materials in unit trains versus mixed trains.

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## Station

*March 2018*

### [Railway station choice modelling: a review of methods and evidence](#)

Young, M; Blainey, S

Since the first railway station choice studies of the 1970s, a substantial body of research on the topic has been completed, primarily in North America, the U.K. and the Netherlands. With many countries seeing sustained growth in rail passenger numbers, which is forecast to continue, station choice models have an important role to play in assessing proposals for new stations or service changes. This paper reviews the modelling approaches adopted, the factors found to influence station choice and the application of models to real-world demand forecasting scenarios

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## Train

*January 2018*

### [Integrated optimization for train operation zone and stop plan with passenger distributions](#)

Qi, J et al

With the aim of generating system-optimal operation strategies, this paper proposes a new integrated optimization method for train operation zone, stop plan and passenger distribution optimization problems on the basis of a train stop planning model. Through the introduction of a set of critical system constraints, the problem is rigorously formulated as a two-objective mixed-integer linear programming problem with the objectives of minimizing the total running distance of unoccupied seats and the total number of stops for all involved trains. Finally, two sets of numerical experiments are implemented using GAMS to demonstrate the performance of the proposed approach.

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January 2018

### [Longitudinal train dynamics model for a rail transit simulation system](#)

Wang, J; Rakha, H

The paper develops a longitudinal train dynamics model in support of microscopic railway transportation simulation. The model can be calibrated without any mechanical data making it ideal for implementation in transportation simulators.

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January 2018

### [Optimal switched control design for automatic train regulation of metro lines with time-varying passengers arrival flow](#)

Li, S; Yang, L; Gao, Z

This paper investigates the optimal switched control design problem for automatic train regulation of metro lines with time-varying passengers arrival flow. Numerical examples are given to illustrate the effectiveness of the proposed methods.

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May 2018

### [Passenger arrival and waiting time distributions dependent on train service frequency and station characteristics: a smart card data analysis](#)

Ingvardson, JB et al

Waiting time at public transport stops is perceived by passengers to be more onerous than in-vehicle time, hence it strongly influences the attractiveness and use of public transport. Transport models traditionally assume that average waiting times are half the service headway by assuming random passenger arrivals. However, research agree that two distinct passenger behaviour types exist: one group arrives randomly, whereas another group actively tries to minimise their waiting time by arriving in a timely manner at the scheduled departure time. This study proposes a general framework for estimating passenger waiting times which incorporates the arrival patterns of these two groups explicitly, namely by using a mixture distribution consisting of a uniform and a beta distribution.

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## Transit

January 2018

### [The integrated rolling stock circulation and depot location problem in railway rapid transit systems](#)

Canca, D; Barrena, E

Rolling stock management is one of the key operational issues for a railway transportation company. It constitutes the fourth phase of the classical Railway Planning Process, after Network design, Line Planning and Services Scheduling/Timetabling. Rolling stock circulation consists of

defining individual train paths over the network accomplishing pre-defined services. Those services are previously designed in order to attend certain passengers' demand, and fulfilling some design criteria. In this paper the authors propose, in the context of Railway Rapid Transit Systems, a general mixed integer programming model in order to design rolling stock circulation plans and simultaneously considering the problem of determining the number and location of rest facilities.

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