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Editorial

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Welcome to this rail-themed edition of *Transport*. This edition is produced in conjunction with the Rail Research UK Association (RRUKA) and presents nine papers selected from those presented at their 4th annual RRUKA conference held in London in November 2015.

For those unfamiliar with RRUKA, it is a partnership between the UK railway industry and UK universities. Established in 2010, RRUKA aims to build on the resurgence of university-based railway research, and seeks to form collaborative relationships between academia and the railway industry, with wide participation across the university and railway industry sectors. The core activities of RRUKA are funded by the Rail Safety and Standards Board (RSSB).

The invited papers have been chosen for publication by RRUKA and the *Transport* editorial panel and were subject to the journal's usual rigorous peer-review process. They have been grouped into three broad themes: firstly, railway planning, management and operation; secondly, railway sustainability (and in particular two papers on energy sustainability); and finally, three technical papers on rail vehicle/infrastructure interfaces.

The first paper is by Blumenfeld *et al.* (2016), on the issues related to planning metro systems in large and expanding cities. It proposes a method within planning to balance out the dichotomy of providing quick and easy access to stops for passengers (necessitating frequent and closely spaced stops) against fast travel times over increasing distances (requiring limited stops), and the operational issues this presents. This is done by way of a systems approach to planning with autonomous vehicles.

The second paper in this group (Lovell and Nightingale, 2016) uses business research methodologies to evaluate rail policy and how this may act as both a barrier and catalyst for innovation. This considers both economic and transport policy models to look at how they interface within a business context, concluding that the ownership of the policy is fundamental to how it can exert influence.

The final paper in the management theme (Evans *et al.*, 2016) presents ongoing research into information management related to railway strategy and technical documents. This assesses how different approaches to the production of these documents and their ongoing communication by different stakeholders can lead to contradiction and barriers between strategies that affect their implementation. A whole-system approach is proposed to overcome these barriers.

The first in the second suite of papers is by Douglas *et al.* (2016). This looks at the consumption of energy in railways, and identifies that although much work has been done to reduce and optimise energy consumption in vehicles, infrastructure and operations, these tend to be case-specific. This paper therefore proposes a unified method that can be applied across the sector allowing for the many different issues across complex rail systems.

The second paper in this group (Pritchard and Preston, 2016) looks at the life-cycle balance between embedded carbon dioxide used during the construction of a railway system, against the carbon dioxide used during the operation of the system. Their research attempts to balance the trade-off between spending more carbon dioxide in design/construction against potential savings in operational carbon dioxide and vice versa. A case study using tunnelling is presented to demonstrate the proposed methodology.

The final paper in the section (Binti Sa'adin *et al.*, 2016) considered the effect of climate change on high-speed line development in South-east Asia, where extremes of rainfall, wind and tropical storms can significantly affect infrastructure. With predicted climate impacts, the nature of these events may change and a means for accommodating such impacts in broader design and planning is presented by the authors.

The last group of papers is more technical in nature. The first (Chapman *et al.*, 2016) looks at issues related to poor wheel–rail interface conditions, and presents a methodology and simple instrumentation that can be installed and linked, by way of the internet of things, to a model, to help forecast, manage and identify low-adhesion locations and occurrences.

Following on from the last paper, one of the consequences of poor rail–wheel interface is vehicle wheel tread damage. Such wheel damage, if not identified and dealt with quickly, can have significant knock-on effects on the wider infrastructure. Rail and component damage can quickly propagate from high wheel impact loads. Additionally, defects in the wheels themselves can affect the integrity and wear rates of the wheels. This is obviously safety-critical. The penultimate paper in this edition (Bevan and Kelcha, 2016) proposes the use of a magnetic flux assessment to assess the condition of rail wheels non-destructively.

The final paper (Beagles *et al.*, 2016) presents a practical application of research in a trial of a model of overhead line electrification (OHLE) dynamics to predict component behaviour and wear to allow resilience to be improved. This is an important innovation as component performance in OHLE often presents single points of failure that can lead to significant issues for rail networks.

We trust that you find this collection of state-of-the-art papers interesting and thought-provoking. We feel it illustrates just a small sample of the complexities, challenges and interfaces that have to be managed and controlled by railway system stakeholders, something often taken for granted by those outside the sector.

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