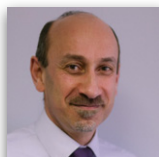


Editorial

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Providing cost-effective sustainable transport infrastructure is a key to economic growth and betterment of society.

This issue of *Transport* includes five high-quality papers that provide practical solutions to benefit the transportation industry. The papers cover service efficiency improvement across most modes of transportation – bus, cycle, air and rail – and include experience from different countries. Optimisation tools and computer algorithms are used in four papers to improve bus and rail route selection and to model cycle speed-flow and an airport security control system. The fifth paper details the development of a novel, self-powered light railcar to enhance whole-life cost and sustainability.

Due to limited available funds, transportation agencies must justify and optimise their infrastructure investment programme. A balance between maintaining existing assets and investing in new infrastructure is important in order to provide a reliable transport system. The paper by Zhu *et al.* (2017) describes a cost-effective measurement model of bus routes to help decision makers prioritising funding and considering subsidy mechanisms. The model is based on stochastic frontier analysis and considers four factors that can affect the efficiency of bus routes. Assessment of 39 routes in China concluded that vehicle-kilometres has the biggest impact on total operating cost followed by average bus stop density and percentage of bus lanes compared with fuel price. The model allows the comparison between the actual and efficient operating cost to help agencies set reasonable cost benchmarks.

In order to analyse transport infrastructure capacity and level of services to meet users' satisfaction, a vehicle speed-flow model is commonly used. Jin *et al.* (2017) develop a speed-flow model for bicycle traffic. The model considers heterogeneous traffic of different bicycle types and assesses the impact of percentage of electric bicycles, male cyclists, elderly cyclists and cyclists carrying loads on capacity. The model shows that bicycle speed increases with the percentage of electric bicycles on the cycleway, while the proportion of elderly cyclists has no significant effect on bicycle speed. Cyclists

carrying loads and male cyclists have negative impacts on bicycle speed for a narrow cycleway.

Due to increased air traffic volume and the requirements for a more stringent security checks at airports, passenger delays and airport operators' costs have become significant in recent years. An efficient management approach to optimise passenger movements is desirable. Kierzkowski (2017) proposes a practical systematic method to manage an airport security system in combination with the check-in system. The data from check-in and security control systems are analysed and optimised to improve efficiency. A model based on seven steps is recommended. Parameters such as density, lane capacity and the hierarchy of the security control lanes are considered in the model in order to determine the number of open security checkpoints. The efficiency approach reduces passenger queues and improves the airport operator's cost.

Railway route optimisation is an important factor in the project construction cost. However, the process is complex due to the number of variables and constraints such as topography, geology, access, materials availability and forbidden zones. Mohammad Hasany and Shafahi (2017) propose an optimisation technique to account for all parameters in a systematic approach so as to eliminate the inconsistency of different agencies. The model simulates the behaviour of ants to obtain the optimum solution. It uses a geographical information system database to obtain data and estimate the total cost for various routes. The model outputs are compared with common algorithms to demonstrate effectiveness and to help in model validation.

Winnett *et al.* (2017) propose a novel, very light sustainable railcar to revolutionise the rail industry. A self-powered diesel-electric series hybrid drive system is considered, to help reduce carbon dioxide emission and improve sustainability. The light weight is achieved through standardised modular components, materials and structural design. The light weight will lead to reduced propulsion and infrastructure installation and maintenance costs.

I hope you enjoy reading these five interesting technical papers which cover a wide range of transport modes: bus, cycle, rail and air. If you would like to comment on any of the papers, please feel free to contact the journal by email or join the conversation online.

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