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Editorial

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Welcome to the seventh issue of 2021 of *Proceedings of the Institution of Civil Engineers – Transport*. This is my first editorial for the journal, and I am honoured to get the chance to promote this issue. On behalf of the editorial panel, I hope that the published papers are of interest to the transport community.

Studies in the field of transportation can include many subthemes, such as developing technology and changes in transportation needs or the desire to find solutions to problems encountered which result in innovative research. In this context, it would be difficult when reading the papers presented in this issue not to consider the issues, discussions and promises that emerged during the recent COP26 summit. The debate highlighted the role engineers must take and are taking to make a positive difference.

This issue includes articles that aim to develop innovative approaches and solutions to problems in the field. A brief overview of all the papers can be found below.

The first paper, 'Implications of different road pricing schemes in urban areas: a case study for Budapest' by Zefreh *et al.* (2021), considers the implications of different road pricing schemes in the city of Budapest, Hungary, and identifies the best-performing system with respect to travel time, delay time, average speed and carbon dioxide emissions.

The authors first investigated the functional relationship between pricing schemes and road transport demand. Using a macroscopic model, the authors were then able to demonstrate that a distance-based system (revenue generated in proportion to the distance travelled within a priced area) showed good performance both inside and out of that area, whereas a time-based system (revenue generated in proportion to the length of time within a priced area), gave the best performance within the pricing area but generated heavy congestion on non-priced roads bordering the area, causing increased travel times, carbon dioxide emissions and a decrease in average speed on the surrounding network. The cordon-based system (fee paid when crossing into an area) was the least effective system for most of the studied parameters.

The second paper, 'Follower behavioural change based on natural patterns in traffic oscillation' by Salehikalam and Kordani (2021), explores the influence of driver behaviour on traffic flow. The authors propose that a change in follower behaviour due to traffic acceleration and deceleration waves can be classified according to different behavioural patterns. The method of analysis was based on an artificial neural network model which was used to determine the extent to which follower behaviour deviated from Newell's car-following model.

The authors were able to determine the most influential parameters of the proposed behavioural patterns, which could support the application of behavioural change to an intelligent transportation system, and which has the potential to improve safety and travel efficiency.

The third paper, 'Naturalistic measurement of driver eye height and object height using photogrammetry' by Llewellyn *et al.* (2021), explores the theme of road traffic safety. For many years, driver eye height and object height have been key parameters in ensuring safe and efficient highway design, forming the basis for safe stopping distances. Research into whether the values used are appropriate for current road use has, however, been minimal. The authors' approach was to develop a new way of measuring the values of object and eye height using the principles of photogrammetry. This involved sampling vehicles on a typical single-carriageway UK trunk road and recording the driver eye and object heights using a naturalistic recording, which overcame the limitations of accuracy and coverage exhibited by previous studies. The authors confirmed an increase in driver eye height and object height resulting from a trend towards larger vehicles and a generational increase in stature. Fortunately, this means that the values used in current design standards are conservative and safe. The authors highlight the potential for reviewing standards both in the UK and internationally to determine whether a change is appropriate.

The fourth paper, 'Proposing new traffic operation index to improve interchange type selection procedure' by Behbahani *et al.* (2021), proposes that traffic problems and decreasing level of service and safety are best avoided by ensuring that an appropriate interchange type is selected.

The performance of traffic using an interchange is proposed as the key criterion for selection of design alternatives for highway interchanges, whereas the authors consider that design alternatives are usually heavily influenced by an engineer's experience and preference. This may result in the exclusion of more appropriate solutions. In this paper, the authors' proposal is to minimise the bias towards a particular design by introducing an algorithm to auto-generate design alternatives. A fuzzy-based method is used to investigate traffic performance and to compare and prioritise the interchange design alternatives. The method is applied to two existing interchanges.

The investigation concluded that traffic performance could be improved by choosing an appropriate placement for loops and ramps and that project costs could be reduced by using the proposed method of analysis.

The final paper, 'Changing accessibility and connectivity from high-speed rail development in metropolitan China' by Wang and Huang (2021), explores the social and economic impact of high-speed rail (HSR). The study focuses on establishing the pattern of change in accessibility and connectivity that has resulted from the development of the HSR network in the Yangtze River delta (YRD). Since 2007, there has been rapid and extensive development of China's HSR network that has brought about huge improvements in spatial accessibility for some centres of population. Using official train timetables the authors developed a weighted method to assess network accessibility and connectivity for provincial, regional and urban cities in the YRD region, which represents one of the most densely populated regions of China. The study found that expansion of the HSR network emphasised existing uneven patterns of accessibility and connectivity. The less-developed peripheral cities were found to have gained greater accessibility, whilst more developed cities benefited more from increased connectivity.

The paper advances understanding of the impacts of HSR development and provides evidence to show an increase in gross domestic product for cities that lie along an HSR route with greater accessibility and connectivity.

On behalf of the editorial panel, I hope that you enjoy reading this issue of the *Proceedings of the Institution of Civil Engineers – Transport*. I would like to thank the authors for sharing their study findings with transportation researchers, and the journal's reviewers for their contributions to ensuring quality peer-reviewed publications in this issue.

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