Editorial

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The *Transport* journal of necessity spans a wide range of areas, disciplines and approaches, as engineering in transport demands both tactical and strategic understanding – and real sensitivity to the impacts on the various populations affected by transport initiatives. The different segments of infrastructure, operations, standards and impacts are all represented in this issue.

A common factor which has long been emerging is the shift from static data collection and analysis to dynamic data, and with it an underlying shift in modes of operation from static selections of options to dynamic integration of real-time information and systems management.

Another has been the increasing use of standard simulation tools, and the common confusion between calibration and validation that is apparent in at least one of the papers here. The temptation is to calibrate a system (i.e., fit the variable parameters to the observations available) and then to assume that variations on the outputs and the broader observations comprise a validation (of the underlying representations) rather than just the parameters required to achieve a fit. This temptation grows as the use of standard tools as a common starting point grows.

None of these observations undermines the papers here, but they are trends that require careful thought as increasing numbers of papers begin to integrate management, operations and analysis.

As sensors, geographic information systems (such as the global positioning system (GPS)) and dynamic communications become the norm in more and more areas of transport operations the shift towards operational management as an intrinsic part of transport engineering analysis becomes progressively more important.

These trends are apparent in several of the papers in the present issue.

Cano *et al.* (2016) specifically address the role that dynamic measurement (using train-mounted sensors) can play in identifying when intervention may be indicated for railway tracks.

Zhao *et al.* (2016) integrate several types of real-time data acquisition for a vehicle safety warning system when lane changes are needed, and then use analytic simulation to assess

the effectiveness of the scheme. This mix of design and simulation evaluation of proposals is the other emergent theme we have drawn the readers' attention to. This overall safety state assessment system depends on a dedicated short-range communications system, as well as GPS positioning.

Reliance on a mix of real-time data and management is evident.

de Santos-Bervel and Castro (2016) focus on a static design analysis to determine a safe sight distance design index for sections of road. The method is reliant on a precision digital terrain model and reduced to an index that conservatively identifies the safety of the road sections in terms of sight-hidden dips without prior knowledge of the sight distances.

Li and Wang (2016) examine passenger car equivalents (variously termed PCU or PCE depending on the literature) for heavy vehicles in over-saturated conditions. Using the backward wave speed as the key factor, a mix of data and the results of simulations from a standard microsimulation program (Vissim) was used to assess the PCE values under various proportions of heavy traffic.

The use of well-calibrated agent-based models making less predictable movements through traffic and determining PCU equivalents has been successful using video-tracked movements and calibrated decision models for between-lane movement (e.g., Tzu-Chang *et al.* (2010, 2012) – covering the motorcycle simulation component available for but, appropriately, not included by Li and Wang). Li and Wang go further, starting from the assumption that the simulation models used were already calibrated (and indeed by implication validated by wide previous use) and so the data gathering and validation stages no longer need to be considered in detail. This characteristic mix of simulation tools (albeit assumed to be validated adequately for the tasks in hand) and other approaches is growing, and reflects the developments in computational physics and other fields where simulation models and simulated data are becoming basic and essential tools.

It is now possible to replace 'measured' values in many studies by probability distributions instead of single observed values as both the computational overheads of multiple or iterative model runs and the adoption of 'standard' pre-built generic simulation systems reduce the time and effort required.

Lantieri *et al.* (2015) used a broadly similar approach to their simulation analysis of airport noise abatement. The aircraft movements are probabilistic, based on observed distributions, and the uncertainties addressed are all embodied in the populations affected and the levels of impact that they need to assess.

Yousefikia *et al.* (2015) also use a standard traffic simulation model (Visum) iteratively to re-assign origin–destination matrices of traffic flows, recognising that the individual traffic counts against which the fit is measured are fuzzy variables, drawn from a range of possible values at the instant that they were measured. In this case the computational and set-up costs have similarly been reduced, making the approach viable, and produced considerably improved results.

The rising fraction of research that embodies both communications and dynamic interactions will see the use of ‘standard’ simulation tools and probability functions of various kinds in place of fixed values grow further in transport and traffic research and applications. The barriers to such more nuanced representations of the systems under study will continue to fall.

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