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Editorial

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This edition of *Engineering Sustainability* includes four papers that all have a focus on, or application related to, infrastructure – a complex interdependent system of artefacts and processes that provide the services to enhance economic growth and quality of life. Globally, infrastructure systems face a number of challenges and pressures from population growth, changing demands, financial constraints, technological developments, and climate change adaptation and mitigation targets. There is a growing need both to retrofit existing infrastructure and to design and build new infrastructure to tackle challenges such as meeting the needs of an ageing population, strategies for carbon dioxide reduction and increasing resilience of systems to extreme weather events. Understanding infrastructure systems from a number of perspectives, measuring and monitoring performance and making strategic management and investment decisions based on robust evidence are common themes in this edition.

The first paper, from Blom and Guthrie (2019a), follows on from their recent contribution (Blom and Guthrie, 2019b). Continuing to focus on the New Zealand land transport system, this edition's paper develops and demonstrates the use of a methodological framework that is of value to both academics and practitioners in the insights it provides into the understanding of how to approach the complexity of infrastructure systems from a research perspective. The framework can also offer a whole-of-system road map and highlights the meaning of a system-level approach to infrastructure administration, a means of sense-making and socialising the issues found at the whole-of-system level, such as collating shared understanding and learning among stakeholders and plausible outcomes, and a diagnostic tool.

Also applied in New Zealand, to the Newmarket Viaduct Replacement Project, the second paper (Griffiths *et al*. 2019) presents and compares four industry-based infrastructure sustainability rating tools for how they assess and recognise performance: Ceequal, Envision, Infrastructure Sustainability and Greenroads. Although not exhaustive, these four tools are available for public use and related information is easy to access; their use on infrastructure projects is growing. Results and analysis show that comparison of rating tools should be avoided and that placing emphasis on the results can lead to elements of sustainability and the wider context of the project being overlooked.

The third paper (Ozarisoy and Altan, 2019) focuses on understanding energy demand related to thermal comfort to identify viable, cost-effective retrofit scenarios for residential buildings. A prototype house was constructed in Cyprus to examine the energy performance of the building before and after different retrofitting scenarios, designed based on features from policy instruments and retrofitting initiatives that are common among EU member states, in particular other southern EU member states that have both similar building regulations and climatic conditions, to promote transferability of findings.

The final paper (Mathews and Hardman, 2019) describes a risk-based strategy to manage the monitoring and repair for bridges damaged during 2016–2017 in Cumbria, UK. The majority of Cumbria's bridges are between 150 and 200 years old and are typically stone masonry arch structures. In November 2009, three bridges were destroyed; in December 2015, storms resulted in a repair bill of £25 million, which included replacement of five bridges, minor repairs and scour protection. The strategy presented in the paper combines engineering assessment of the bridges with river level information to provide duty engineers with timely warning of rivers flows that may be described as a risk. This approach could be valuable to ensuring public safety by closing bridges at risk.

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