

Editorial

Xian-Xun (Arnold) Yuan

Associate Professor, Department of Civil Engineering, Ryerson University,
 Toronto, ON, Canada



Planning for infrastructure resilience in the face of disastrous events, such as extreme weather, earthquake, tsunami, terrorist attack, and so on, has emerged to be a pressing concern of infrastructure asset managers. *Infrastructure Asset Management* has published a few articles on this subject (Bristow, 2015; Hay, 2014, 2016; Phillips and Hay, 2017; Shah *et al.*, 2014). In the first paper of this issue, Phillips and Hay (2019) continue to develop the network operational resilience (NOR) framework, first presented in Phillips and Hay (2017), by focusing on a case study for an emergency services network partnered with a digital response network. The NOR framework can be a useful tool for understanding the complexities of and interdependency between the physical and virtual networks in the development of network resilience into infrastructure systems.

Conditional assessment is a fundamental element of infrastructure asset management. In the second paper of this issue, Taylor *et al.* (2019) present an innovative method for the assessment of pavement condition and cyclists' riding comfort by using hand-arm vibration exposure data collected by an instrumented probe bicycle. Similar to the development of the International Roughness Index (IRI) for highway pavements (Gillespie *et al.*, 1980), which has taken several decades to be standardised, this low-cost cycle path surface quality assessment method demands further extensive studies before it is accepted as a standard test.

The next two papers of this issue focus on communications in asset management. Getting the terminology clear is important. As Stan Kaplan, a pioneering researcher in risk analysis says, '50% of the problems in the world result from people using the same words with different meanings; the other 50% comes from people using different words with the same meaning' (Kaplan, 1995). Woodhouse (2019) takes 'value' as the focal point of the discussion. Although the title seems to suggest that the paper would discuss mainly the question of what the value of asset management is, the author actually extends to discuss how the value should be and, through empirical cases, has been quantified, materialised and demonstrated. The author also points out the deficiencies in the accounting and bottom-up approaches to value quantification. The research needs highlighted by the author should be heeded by researchers.

Another common communication barrier derives from the mismatching level of detail of information in communication. Infrastructure asset management is a team effort that requires effective communication between engineers and managers. However, many suboptimal infrastructure management decisions were made simply because engineers failed to communicate their technical concerns in a way that managers could understand. To remedy this situation, Adey *et al.* (2019) present, with the help of a fictive and yet realistic railway network example, how engineers should summarise and present their engineering analysis results to managers and enable the latter to make risk-informed decisions. The authors suggest presenting the results as four basic steps

- provide a complete description of the infrastructure
- define clearly who and what is important
- explain clearly how the system is modelled
- display results clearly.

In each step, the authors keep emphasising that engineers should focus on things that matter to managers rather than themselves. Specifically, engineers must place the arguments and discussions around the services that the infrastructure under analysis is expected to provide. As the authors point out, this approach is so intuitive because this is the simple application of the golden rule of communication – put one's feet into the other's shoes. The paper is a timely contribution to the infrastructure asset management community. Infrastructure management engineers, whether they are at a junior or senior level, will obviously benefit from reading the article. Instructors who teach infrastructure asset management will also find the fictive example useful for their lectures. In addition, software developers can also learn from the article how they can improve their dashboard in product design. Furthermore, the paper may also help asset managers – the recipients of the communication and the decision-makers – develop an empathy for engineers so that the managers can avoid the technical traps and proactively ask for information that would truly facilitate their decision-making. As a caution, the article does not discuss much about how the services should be defined and quantified. The authors use availability, reliability and safety as the examples of proxy for the service measure. Readers may freely disagree with these measures. However, the service-centred principle of communication must be honoured.

Infrastructure asset management planning is a long-term strategic endeavour that requires sophisticated modelling of multiple complex and dynamic infrastructure systems working under a deeply uncertain world. In the last paper of this issue, Havelaar *et al.* (2019) presents a novel simulation method that integrates traditional system dynamics and Monte Carlo simulation-type ‘exploratory modelling and analysis’ into the dynamic adaptive policy pathways approach for the development of an adaptive and robust set of asset intervention policies. This work represents an important extension of recent development begun by the work of Rehan *et al.* (2011).

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