Editorial

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Welcome to the inaugural issue of the *Proceedings of the Institution of Civil Engineers – Smart Infrastructure and Construction*.

This journal aims to create a space for professionals working in the area of smart infrastructure and construction (SmIC) to share ideas, and ultimately to generate a professional community of academics and practitioners to apply and adopt the technologies, concepts and solutions to deliver smarter infrastructure construction and management at all levels, from individual assets to city- and national-scale systems.

The economic potential and social wellbeing of cities rely heavily on physical infrastructure, including buildings, water, energy, transport and communication networks. Although many of our physical infrastructure is constructed to last for many years (e.g. engineering design life of more than 100 years), their usage is linked to individual preferences and community needs, which can change dramatically every decade. That is, existing infrastructure is challenged by the need to increase load and usage – be that number of passengers carried, numbers of vehicles or volume of water used – and the requirement to maintain the existing infrastructure while operating at current capacity. Increased usage is not the sole concern; a demographic change towards an older population will alter the way we use our infrastructure. We need to assess the resilience of our infrastructure against rapid changes in social networks, interactions and policies.

The journal is launching at an opportune moment – digital tools and data from sensors are becoming ever more available and more familiar in the construction and infrastructure environments. In the UK, BIM Level 2 is becoming embedded in practice, and the government has recently announced its intention to take this to Level 3 with its ‘Digital Built Britain’ programme, which will bring together smart/digital approaches across the scales from individual buildings (building information modelling) to wider geospatial approaches (geographic information systems) and smart cities.

However, the field is still young. Terminology is evolving (Ogie *et al.*, 2017), and we are still learning how best to use data from sensors, fuse it into our analytical models and approaches, and use it. At its simplest, the vision of ‘smart’ infrastructure is to

intrinsically weave together physical infrastructure (space, transport, energy or water) and virtual infrastructure (telecoms, the Internet or data from sensors and smart phones) in order to achieve optimal growth and maintenance. At present, it is difficult to inspect the condition of infrastructure while it is being used. The fragility of old infrastructure presents a challenge for new construction in congested urban environments. Little is also known of the long-term performance of such infrastructure. There are many cases around the world of continuous retrofit/renovation of infrastructure during its lifetime. We need to significantly improve our capability to predict and manage the life expectancy of large infrastructure.

And this is occurring in the context of a global commitment to reduce carbon dioxide emissions in order to maintain global warming to 2°C (Clarke, 2017). This presents engineers and planners with a moral responsibility to use all the tools available – including, and importantly, smart infrastructure solutions – to deliver infrastructure solutions that serve our cities and communities while adapting to climate change impacts and mitigating carbon emissions.

It is our ambition that this SmIC journal will contribute to these debates and learning. It aims to facilitate the development of a professional community of academics and practitioners to apply and adopt the technologies, concepts and solutions to deliver smarter infrastructure construction and management.

We are planning a number of themed issues that will bring specific focus on particular challenges. We are keen to receive feedback on topics for which readers would appreciate a themed issue – please contact Sam Hall (sam.hall@icepublishing.com) if you have suggestions.

We hope that you find the journal insightful and look forward to developing it with you.

REFERENCES

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