

Editorial

Philippe Bouillard MSc, PhD, Hab, CEng, FICE, SFHEA
Université Libre de Bruxelles, Brussels, Belgium

Welcome to the first issue of *Civil Engineering* in 2021. I hope this finds you all well and bearing up under the new environment created by the Covid-19 pandemic. For me, one of the outstanding revelations of the past year is that resilience is one of the key characteristics of today's civil engineering profession.

Originally used in the context of engineering materials, 'resilience' was defined by the ability of a material to absorb energy. But like other engineering words and concepts, it was soon adopted by psychologists to quantify an individual's ability to adapt in the face of adverse conditions. It has since been extended to many other contexts, including ecology, where it now refers to the capacity of an ecosystem to absorb and recover from damage. This is where we are now.

Civil engineers along with everyone else are facing unprecedented challenges relating to climate change, pandemics, water scarcity and resource shortages. The ultimate objective now is to demonstrate our own ecosystem resilience to recover from the disruptions associated with all those challenges.

The profession and the Institution of Civil Engineers (ICE) are at the forefront of promoting resilience. For example, the editorial panel of ICE's *Engineering Sustainability* journal is planning a themed issue on climate change and resilient infrastructure. This issue of *Civil Engineering* too has some excellent examples of resilient infrastructure solutions.

We start with the inaugural address from ICE president Rachel Skinner (2021), who explains that we can only be truly safe from the effects of climate change when we reach net-zero carbon dioxide emissions – the point when we only emit as much as the world can absorb. She says, 'ICE will be the "go-to place" for net-zero-carbon infrastructure. We will be valued partners and influencers, recognised and respected for our role in actually addressing the number one existential issue on the planet right now' (Skinner, 2021: p. 6).

Last year when the Covid-19 pandemic started, we were all impressed at how the Chinese government was able to build specialised emergency field hospitals in record time. Zhou *et al.* (2021) have given us one of the first detailed accounts of the Huoshenshan Hospital in Wuhan, showing that modularity is the key to post-disaster emergency construction. This is an area of research where we need to invest more to be prepared for future crises.

Another major ongoing crisis is increased flood risk, with many countries and cities currently re-evaluating their tidal defences. Kuhn *et al.* (2021) analyse the UK Environment Agency's critically important Thames Estuary Asset Management 2100 plan to secure the tidal Thames. They describe an interesting systems-level approach to

asset management and underline the importance of strong collaboration with the supply chain.

The resilience of society would not be possible, however, without sustainable infrastructure and transport, of which railways are a key part. Manis and Richardson (2021) give us an example where a bridge in poor condition in south Wales had to be replaced to enable electrification of the Great Western mainline railway between London and Cardiff. The recent switch from diesel trains has cut greenhouse gas emissions by a third.

Finally, Muneeswaran *et al.* (2021) analyse new construction approaches for long-span bridge projects in India, including a temporary bamboo pile jetty system to cope with monsoon flood flows.

I hope that you enjoy this issue and my thanks go to the authors for sharing their experiences with us and to the referees for their peer reviews. The papers all demonstrate that civil engineers have a central role to play in overcoming the world's current challenges, building society's resilience to face an increasingly uncertain future. But as our new president says, our over-riding priority is to do all this with a much, much lower carbon footprint.

References

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