Editorial

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The recent Global Engineering Congress (GEC), held in London, UK on 22–26 October 2018, highlighted a range of challenges faced across the world and some great engineering solutions developed to meet these. In many ways, the GEC showcased the great breadth and scale of work undertaken by engineers and underlined the important role we have in shaping our future, not in isolation but rather in conjunction with other professions, bodies and governments. The event included sessions on a broad spectrum of topics relating to water, climate and resilience, with the papers tackling issues across the world.

This year's GEC focus was on mobilising the global engineering community to deliver the United Nation's Sustainable Development Goals. These goals are a component of the 2030 Agenda for Sustainable Development (UN, 2015). There are 17 goals in total and engineering – including water management – contributes to many of the goals to a greater or lesser extent. The goals remind us of our responsibilities as engineers to push the boundaries of conventional practice and develop new ways to solve problems and better understand our environment.

The congress highlighted, as do the Institution of Civil Engineer's engineering journals, the importance of our work as a community, whether through academic research or engineering practice. This issue of *Water Management* brings four contrasting papers that cover a broad spectrum of topics that can affect communities and the environment across the globe. These include understanding landslides better, the design of spillways, erosion around bridge piers and treating polluted highway runoff. Like the information presented at the GEC, they all contribute important knowledge that helps us step forward in our engineering application.

The first paper (Shu *et al.*, 2018) outlines the work to investigate and improve our understanding of natural debris events such as landslides by studying the behaviours of two phases; the liquid phase (containing water and silts) and solid phase

(coarser particles from sand to large cobbles). Improving our understanding of the interactions of the two phases could help to predict natural debris flow events, thus avoiding damage and loss of life. This work included extensive field work and experimental observations of debris flow, which is difficult to undertake. It tackles two issues; the first determining the critical grain size for the solid and liquid phases and secondly presenting equations to develop a two-phase velocity model of the non-homogenous debris flow.

The destructive power of water continues in our second paper by Bai *et al.* (2018). It explores how the angle of the horizontal face, whether traditional (flat), V-shaped or inverted V-shaped, of a stepped spillway changes the pressure distribution. Understanding the implications can help designers balance the need for energy dissipation with the potential damage to spillway steps caused by cavitation and, hence, where mitigation measures should be focused. The paper, through numerical models and physical tests, demonstrates the advantages and disadvantages of each shape.

The third paper studies the scouring effects of flow around two in-line bridge piers (Keshavarzi *et al.*, 2018). A common cause of bridge failure is related to a scour mechanism; however, where two bridge piers are used in-line, there is a complex interaction between the structure around it which changes (depending upon the size and shape of the pier) and the length between piers. The paper highlights that the spacing influences the flow characteristics particularly towards the rear of the piers, and when with a certain gap, the scour increases behind the first pier.

The final paper of this issue (Nejad *et al.*, 2018) investigates how porous concrete with zeolite can treat urban stormwater. Pollutant loads, particularly those from runoff from highways surfaces, can lead to a substantial environmental impact in receiving water bodies. A number of countries globally place tight standards on the discharging stormwater or the quality of the water body itself. The paper compares the performance of

porous concrete with and without zeolite and with and without a sand filter, demonstrating significant improved pollutant reduction with zeolite.

The contributions within this issue, as with other issues of *Water Management*, provide new steps on the journey in addressing the types of challenges and goals discussed at the GEC. We thank our authors and reviewers for their work in developing this knowledge that can be shared with you.

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