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Editorial
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Editorial

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This issue of *Water Management* brings you five inspiring papers on a broad spectrum of topics, ranging from weirs to innovative fish pass, water intakes, urban drainage networks and rockfill dams. These papers showcase the variety of tools and methods deployed in hydraulic engineering, such as advanced laboratory measurements, complex three-dimensional (3D) numerical simulations and optimisation techniques, as well as good practice derived from field experience. These tools and methods synergistically combine to make our profession, water management, uniquely stimulating from both the practical and the scientific perspectives.

In their Briefing article, Kitchen *et al*. (2018) draw attention to a recently published technical guide that provides guidance on the design and management of weirs. Weirs are common structures in the UK as well as overseas. They provide a number of services by enabling water level management for shipping, flood control, flow measurement, channel stabilisation, or hydropower, among others. However, weirs raise safety issues for water- and land-users; they may induce geomorphological impacts and they impede fish migration. Therefore, the design, operation, maintenance and adaptation of weirs require a holistic approach addressing the hydraulic, structural, environmental and safety components of weir performance. Such an approach is presented in the new guide, together with guidance on alternatives to weirs (for example, rock ramps) as well as on weir removal, which may be considered as an option for weirs that have ceased to function properly or are not needed anymore. Weir removal is beneficial in terms of fish pass, sediment continuity and river restoration as a whole; but caution must be taken in assessing and mitigating possible geomorphological consequences such as bed degradation and bank undermining upstream.

Fish migration in a regulated water course may be enhanced by means of fish pass. Kucukali and Hassinger (2018) present rigorous flow and turbulence measurements in an innovative and cost-effective fish pass, which enables migration for a wide range of fish species characterised by high to low swimming capacity. The fish pass combines the features of traditional baffle fishways with those of brush-furnished fishways, without the need for resting pools (Kucukali and Hassinger, 2015). Unlike previous model tests conducted at a reduced scale, those presented by Kucukali and Hassinger (2018) were performed at a scale of 1:1 to avoid viscosity scale effects. In the tested fish pass with a bed slope of 4%, multiple continuous migration corridors were found, without obstructions for the fish to overcome or flow regime changes.

Complementary to laboratory experiments, advanced 3D numerical modelling was used by Khadem Rabe *et al*. (2018) to simulate the flow near an anti-vortex system at a water intake. Although avoiding vortices at water intakes is of utmost importance (as they can suck surface debris and air into the pressurised flow system), considerable gaps in knowledge remain regarding the prediction and characterisation of vortex generation. The numerical model set up by Khadem Rabe *et al*. (2018) is based on a Cartesian grid; it includes a large eddy simulation turbulence model and was verified against a comprehensive dataset of published experimental observations. Accurate predictions were obtained for both the radial velocity (5% accuracy) and the vortex type. The model was next applied to compare the effectiveness of two anti-vortex systems, namely a Prosser disc and a funnel device, revealing the comparatively higher effectiveness of the latter.

The impact of growing urbanisation on runoff is another timely topic. As new developments need to be managed so that increases in runoff and peak flow rates remain under control, De Paola *et al*. (2018) propose an original procedure of practical relevance for the automated calibration of a dynamic rainfall-runoff simulation model. The procedure involves an evolutionary algorithm coupled to the widely used Stormwater Management Model software. De Paola *et al*. (2018) detail its application to an urban catchment in Bologna, Italy, for which robust results were obtained.

Finally, Sarkhosh *et al*. (2018) present an attempt of one-dimensional hydraulic modelling of the flow through a rockfill dam, considering non-standard boundary conditions and building upon earlier work by Hansen *et al*. (2005).

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