

Editorial

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This September issue of *Water Management* brings forward a number of novel ideas generated by young civil engineers. Although many of the topics, such as flood mitigation or optimisation of water supply systems may seem traditional, the approaches to these topics are novel.

It is widely believed that the impact of engineers on public health in western Europe has been more significant than that of the medical profession. These advances in public health have not extended, however, to developing countries, due in part to the difficulty and cost of providing clean water supplies. The paper in this issue by Ahmed *et al.* (2010) is a significant step towards demonstrating that effective water treatment can be achieved in some parts of the world using locally-sourced natural materials instead of imported, expensive chemicals.

Following water treatment it is necessary to deliver water via a water distribution system. Tanyimboh and Templeman (2010) discuss the problem of analysing water distribution systems in pressure-deficient conditions. Such conditions can arise as a result of, for example, pump failures, pipe bursts or when major pipes are taken out of service for maintenance or repair. The authors present a new pressure-dependent demand function to help improve the simulation of pressure-deficient conditions.

The water delivered by such water distribution systems can sometimes be discoloured. This should not be regarded as purely an aesthetic problem as the particles associated with discolouration can provide a site for precipitation, aggregation and microbial activity. Husband *et al.* (2010) consider the role of trunk mains as a source of such discolouration. Based on field work they conclude that trunk mains can act as a reservoir of material with an inherent discolouration risk that can affect the downstream distribution network. Cleaning of such trunk mains may provide a strategy for reducing the risk of discolouration.

The provision of water invariably requires the provision of some form of reservoir and increasingly a system of reservoirs. Piantadosi *et al.* (2010) propose a novel approach to the modelling of a system of three reservoirs using Markov chains. A traditional approach would lead to large matrices that are time-consuming to solve. The analysis by Piantadosi *et al.* shows that the nature of the problem results in a specific structure for these matrices that can be used to simplify and

hence speed up the analysis of such systems. Although the method has been demonstrated on a system of three reservoirs, it seems likely that the method could be extended to four or more reservoirs.

There is a growing awareness that in order to be effective, flood management must be studied and implemented on a catchment-wide scale, rather than on a reach-by-reach basis. The challenge to modellers is how to model river systems on such a catchment scale. The paper by Khuat Duy *et al.* (2010) describes one such approach to this challenge that has been applied to a catchment in Belgium. It is interesting to note in this case the sparseness of the data that was used.

A fundamental quality for any study in the field of water management is the quantity of water that is moving. Thus, flow measurement is central to virtually all aspects of water management. Despite this central role there are a limited number of methods available to measure flow and our understanding of them is far from complete. Sterling *et al.* (2010) address the problem of assessing the discharge at a free overfall. Although this is in many ways a classic problem, the approach taken by the authors is novel for this problem. Using experimental data they use principal component analysis to determine the principal variables that describe the problem. In the field of water management there are many areas in which we have an incomplete understanding of the principal variables that describe a given problem and so it seems likely that this type of approach may have wider applications within the field.

I am pleased that this issue contains a discussion by Laycock of a paper by Chahar and Basu on the optimal design of curved bed trapezoidal canal sections (Chahar and Basu, 2010). The journal welcomes discussions on papers as this is an excellent way of airing issues and exploring different aspects of a topic. I would encourage readers to contribute discussions to papers within the journal.

In this issue of *Water Management* you will find aspects and solutions of civil engineering or water management which will make you think anew about the well-established issues of the two disciplines.

REFERENCES

- Ahmed T, Kanwal R, Hassan M, Ayub N, Scholz M and McMin W (2010) Coagulation and disinfection in water

- treatment using *Moringa*. *Proceedings of the Institution of Civil Engineers, Water Management* 163(8): 381–388, doi: 10.1680/wama.900080.
- Chahar BR and Basu S (2010) Discussion: Optimal design of curved bed trapezoidal canal sections. *Proceedings of the Institution of Civil Engineers, Water Management* 163(8): 431–432, doi: 10.1680/wama.900061.
- Husband PS, Whitehead J and Boxall JB (2010) The role of trunk mains in discolouration. *Proceedings of the Institution of Civil Engineers, Water Management* 163(8): 397–406, doi: 10.1680/wama.900063.
- Khuat Duy B, Archambeau P, Dewals BJ, Erpicum S and Pirotton M (2010) River modelling and flood mitigation in a Belgian catchment. *Proceedings of the Institution of Civil Engineers, Water Management* 163(8): 417–423, doi: 10.1680/wama.900042.
- Piantadosi J, Howlett PG, Bean NG and Beecham S (2010) Modelling systems of reservoirs using structured Markov chains. *Proceedings of the Institution of Civil Engineers, Water Management* 163(8): 407–416, doi: 10.1680/wama.900053.
- Sterling M, Sharifi S and Knight DW (2010) The end depth ratio and principal component analysis. *Proceedings of the Institution of Civil Engineers, Water Management* 163(8): 425–430, doi: 10.1680/wama.900068.
- Tanyimboh TT and Templeman AB (2010) Seamless pressure-deficient water distribution system model. *Proceedings of the Institution of Civil Engineers, Water Management* 163(8): 389–396, doi: 10.1680/wama.900013.