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Editorial

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In the research arena there appears to be an inexorable trend towards specialisation, with new journal titles appearing frequently to disseminate activity in niche areas. On the one hand such new journals provide convenient ‘one-stop shops’ for interested researchers and practitioners; on the other hand, there is a danger that they may foster ‘silos’ of expertise, operating largely in isolation from the wider scientific and engineering community. My view is that maintaining a wider view almost always pays dividends, and in this sense *Engineering and Computational Mechanics* has, since its inception in 2008, been bucking the trend towards specialisation. For example, this issue of the journal encompasses a wide variety of analytical and numerical techniques, and also a diverse range of engineering applications, from space antenna design and sloshing in tanks through to the dynamic performance of (terrestrial) reinforced concrete structures.

The first paper, by Kuang and Yuen (2013), tackles the topic of modelling failure of masonry-infilled reinforced concrete frames. This is particularly challenging as it involves modelling both reinforced concrete and masonry elements, and their interaction. In the case of masonry elements, it is fair to say that modern masonry research has been heavily influenced by work undertaken in the Netherlands in the 1990s (Lourenço, 1996; Rots, 1997). One innovation was the proposed use of the ‘cohesive crack model’ to enable mesh-independent finite-element results to be obtained. However, this model was originated by Hillerborg *et al.* (1976) for application to concrete structures many years earlier; perhaps had more researchers had a wider view, adoption of this concept in the field of masonry might have been accelerated. In this issue, Kuang and Yuen make use of a modified, damage-based, cohesive crack model and propose a discrete formulation, such that individual masonry units are modelled explicitly, and interactions between units are controlled by a contact formulation rather than interface elements. This is a promising approach, which has also been explored by others (e.g. Burnett *et al.* (2007)). The formulation is verified against various in-plane and out-of-plane problems, the first being a benchmark test undertaken in the Netherlands in the 1990s by Raijmakers and Vermeltfoort (1992).

In the second paper, by Isaac *et al.* (2013), a simplified means of simulating the behaviour of reinforced-concrete members subject to varying loading rates is proposed. The key point made by the authors is that a relatively simple analysis incorporating inertia effects can potentially be used to indicate whether a brittle shear failure is likely to occur for a particular loading scenario. Illuminating ‘shear demand’ and ‘bending moment demand’ plots are provided in the paper, which graphically illustrate the fact that it takes a finite time for the effects of an applied force to spread outwards from the point of impact to the supports. The authors appear to attribute this latter finding to Cotsovos *et al.* (2008), although researchers investigating the performance of steel beams were certainly aware of this phenomenon as early as the 1950s (Parkes, 1955; Symonds, 1967). Perhaps this is another example of subject-specific ‘silos’ delaying wider dissemination?

The third paper is a relatively short but potentially important contribution by Lundberg and Nilsson (2013), who use analytical methods to predict sloshing in half-cylindrical tanks. Specifically, they observe that for this application a variant of the Boussinesq wave equation is the easiest to apply and gives the best predictions. In this probably much credit is due to Joseph Boussinesq who, like many of his nineteenth and early twentieth century contemporaries, was happy to apply his considerable analytical skills to a wide range of both fluid and solid mechanics problems. If still alive, he would no doubt be surprised by the degree to which researchers specialise in narrow areas of study today.

In the fourth paper, by Queguineur *et al.* (2013), attention moves to numerical modelling of a vortex flow control (VFC), an increasingly popular flow regulation device used in urban drainage networks. With a VFC, gravitational effects are dominant for low flow velocities, leading to normal orifice-type flow patterns. However as the flow rate increases, a vortex forms, leading to a substantial increase in head loss in the system. In the paper VFC devices are modelled at low flow rates by solving the Reynolds-averaged Navier–Stokes equations, with the simulations each taking around 44 hours using a powerful desktop PC. Good agreement with experimental data is reported, opening up the possibility that models of this sort could in the future be used to design more efficient VFC devices.

In the final paper, by Jiang and Li (2013), the focus is on very different subject matter: the design of membrane reflectors used in space antennae. Such antennae are frequently deployed through inflation after entering orbit. This means that they are generally made of very flexible material and can easily suffer from thermal deformation. In this paper the idea explored is to apply patches with different coefficients of thermal expansion to the rear face of a membrane in order to passively control the reflector profile. A finite-element representation of a membrane reflector is developed and numerical examples presented. However, it is concluded that there remain further issues to resolve before the concept can be applied in practice.

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