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Editorial

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This month's issue of *Structures and Buildings* is an exciting mix of theoretical and experimental studies which aim to improve either performance of new structures or our ability to predict their behaviour more accurately. The topics range from enhancing durability and mechanical properties of concrete material via improving performance of buildings elements subject to compressive loading, to improving resistance of multi-story buildings in seismic regions.

The first paper (Kumar *et al.*, 2019) is a pure experimental study that pursues our continuous quest for improving structural concrete. The authors investigated the effects of using different amounts of nanosilica (from 1–5%, by mass) to partially replace cement and compared the results with the benchmark sample of no nanosilica. They found that addition of nanosilica can improve both splitting tensile and compressive strength as well as durability (by reducing water permeability and carbonisation depth), especially in samples with 3% nanosilica. This confirms that designing concrete is a fine balancing act between achieving target properties and having a workable technology for realising required mixes.

On the other end of the spectrum, the second paper by Rezaiee-Pajand *et al.*, (2019) is a pure theoretical study. It derives stiffness matrix for a non-prismatic line element and accounts for the second order effects as well as finite flexibility of the joints connecting the element to the rest of the structure. The derived matrix paves the way for more effective analysis of two-dimensional frames with semi-rigid connections and/or support conditions. The authors demonstrate this on examples of calculating buckling load with different boundary and joint stiffnesses.

Next contribution from Brazil (Castanheira *et al.*, 2019) looks at buckling capacity of cold-formed rectangular hollow steel and composite (i.e. concrete filled) columns. A finite element model was developed and calibrated using experimental data collected by the same group (Castanheira *et al.*, 2018). Further parametric studies were preformed resulting in a proposal for updating buckling curves and relevant coefficients in BS EN 1993-1-1 (BSI, 2005). These are expected to reduce conservativeness embedded in the contemporary design codes and we look forward to hearing about further examination of their performance.

The penultimate paper (Hansapinyo *et al.*, 2019) in this issue is a result of international collaboration between research groups from Chiang Mai University, Thailand and Curtin University, Australia. It provides numerical means of calculating effects of collisions between reinforced concrete frame buildings exposed to earthquakes. Lighter buildings were particularly affected by these collisions. A possible extension of this investigation would be to perform experimental verification and develop methods for minimising the damage, perhaps by reducing overall displacement and inter-story drift. This is very much what the final study in this issue (Manchalwar and Bakre, 2019) has potential to achieve. Namely, a numerical study of effects of eight earthquakes on a seven-storey moment resistant frame building with square base (consisting of two bays in each direction) was conducted to develop effective measures of control of seismic response by employing two types of metallic dampers (i.e. an accordion metallic damper and X-plate damper). Location-based optimisation to identify most effective damper locations was successfully performed using a genetic algorithm. Again, an experimental verification of these results could provide a step closer to the design of buildings in seismically active regions.

I hope that you will enjoy reading these papers and find them useful for your own structural design and research work. Moreover, I would like to mention that, apart from the classical printed and electronic version, *Structures and Buildings* publishes the most recent articles online Ahead of Print on the Virtual Library homepage of the journal at https://www.icevirtuallibrary.com/toc/jstbu/current.

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