Editorial

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I couldn't have asked for a better issue to write my first Editorial for *Structures and Buildings*. This month's six technical papers cover a wide range of topics, from concrete technology to earthquake engineering, from steel–concrete composite structures to the computational reliability analysis of structures. All of these topics are actually close to my own research interests, so I've particularly enjoyed writing this Editorial. Interestingly, the affiliation of the authors in this issue, from Greece, India, Iran, Malaysia and South Korea, demonstrates once again the international reach of the journal.

The first paper by Giti *et al.* (2017) presents the results of an experimental investigation on the stress–strain constitutive law for self-curing self-compacting concrete (SCC) with various levels of confinement. The study is motivated by the increasing popularity of SCC mixes in the construction industry, and the need to use internal curing techniques to improve the hydration in such mixes. The research is focussed on the use of polyethylene glycol and the results show that the behaviour of self-curing SCC samples is similar to that of wet-cured samples and better than that of non-cured samples. Furthermore, the higher the confinement, the larger the percentile increase in the peak strength of the confined SCC and the larger the ductility. These findings provide useful indications for further research and practical applications in industry.

In the second paper, Kotsovos (2017) proposes a method – alternative to current Eurocode 8 provisions – to design the amount of transverse reinforcement required in the regions of plastic hinge formation of reinforced-concrete (RC) members, so that the overall requirements of seismic safety are satisfied without resorting to unpractical solutions with large-diameter, closely-spaced stirrups. The derivation of the new design formulae is presented and the validity is verified through comparisons with experimental data extracted from the existing literature. The simplification of highly complicated reinforcement cages in newly-designed earthquake-resistant structures is certainly worth pursuing.

The third paper by Cho and Yi (2017) presents a numerical study to quantify the effects of shape and spacing of inclined

shear studs in composite steel–concrete walls under axial and shear forces. The composite walls consist of a thick concrete core, typically without any conventional reinforcement, and two relatively thin steel faceplates, connected through regularly-spaced shear studs. Due to its performance and ease of construction, this type of structural element can find a variety of practical applications, including nuclear power plants. The results of the research show that spacing has a more critical effect than the shape of the connectors. In particular, irrespective of their shape, widely-spaced shear studs may significantly reduce the composite action, inducing premature yielding in the steel. Interestingly, inclined studs appear to be more effective in controlling the local buckling of the steel plates. These findings offer useful suggestions for designers.

In the fourth paper, Choi *et al.* (2017) present the results of an experimental campaign aimed at investigating the seismic performance of exterior beam-to-column connections in RC frame structures without proper seismic reinforcement details. This is an important area of research, as non-seismically-designed beam-to-column joints are one of the major sources of vulnerability to earthquakes in existing building stocks globally. In this study, six half-scale beam-to-column specimens have been designed according to the 1982 Korean building code (AIK, 1982) and tested by applying lateral cyclic loads up to 5% of drift. It was found that failure mode, hysteretic behaviour, drift capacity and energy dissipation of the connections are all affected by the amount of longitudinal reinforcement in the beams. Furthermore, the presence of transverse hoops inside the connections has little effect, apart from reducing the shear deformations within the panel zone. The results of this paper can be used to quantify the seismic vulnerability of existing RC buildings, designed and built without proper earthquake engineering considerations, as well as to calibrate computational models for predicting the seismic behaviour of this type of connections. The readers could also find interesting the paper recently published in *Structures and Buildings* by Dhake *et al.* (2015), which reports the results of a similar experimental investigation, looking in this case at the role of joint hoops in the shear strength of

exterior RC beam-to-column joints when headed bars are used for the longitudinal reinforcement of the beams.

Earthquake engineering is also the focus of the fourth paper by Jamshidi and Majid (2017), in which new, simplified design equations are proposed for the retrofitting of seismically-deficient slab-on-girder bridges with the addition of transverse steel infill plates. The latter act as ductile bracing diaphragms and as such improve the response modification factor (R or q , respectively, in the American and European notation). To achieve the desired structural behaviour in the retrofitted bridge, the design must ensure that the shear elastic buckling precedes the shear yielding of the plate, which in turn precedes the yielding of the bare girders. The proposed design procedure is validated with the finite-element analysis of three case-study single-span bridges, with spans from 20 to 60 m.

Last but not least, the sixth and final paper of this issue by Shayanfar *et al.* (2017) presents a hybrid method that combines first-order reliability method (FORM) and Monte Carlo simulation (MCS) for structural problems with non-linear limit-state functions. The proposed approach is validated with applications that include planar multi-storey concentric and eccentric braced steel frames subjected to lateral forces, which demonstrate the relevance to civil and structural engineers. Researchers in the field might find similarly interesting the work published in *Structures and Buildings* by Arab and Ghasemi (2015), where the synergistic use of FORM and MCS is also explored.

On behalf of the whole Editorial Panel, let me conclude by thanking all the authors for their excellent contributions, which I am sure the readers will find interesting and stimulating. As always, comments and discussions on any of the papers are welcome (details about the procedure are offered in the last page of each paper), as well as the submission of technical papers that advance theory and practice in any field in the remit of the journal.

I would also like to draw to the attention of the readers the themed issue on 'Wind energy structures', co-edited by

Professor Charalampos Baniotopoulos and myself, which we aim to publish in 2018 (more details, including the call for papers, are available on the Institution of Civil Engineers' Virtual Library website). Watch this space!

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