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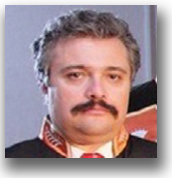
# Editorial

**Georgios E. Stavroulakis** Dr.-Ing. habil.
Professor, School of Production Engineering and Management, Technical University of Crete, Chania, Greece



The March issue of *Structures and Buildings* provides useful information on different topics relevant to civil engineering. Both classical and nonclassical structures have been considered, indicating that our scientific area remains full of interesting research topics and open questions with practical importance for society.

Structural analysis starts from foundations. Saeed Ahmad *et al.* (2019) consider pile caps with different effective depths using strut-and-tie modelling (STM). Scaled pile caps were cast and tested under monotonic concentrated load until failure to observe the ultimate shear strength. Additional pile caps, strengthened with carbon fibre reinforced polymer (CFRP), were cast to observe the shear strength enhancement in comparison with the control specimens. STM proved to be a reliable solution for predicting the shear strength of the pile caps where, due to very small shear span to depth ratio, the classical flexural theory for reinforced concrete structures cannot be applied. The application of CFRP resulted in an enhancement in the shear strength of the pile caps.

Analysis and safety issues arise during construction phase. João André *et al.* (2019) present numerical studies of bridge falsework systems, which are temporary structures used in construction industry to support formwork during the construction of cast-in-place concrete bridges. This paper presents the results of advanced numerical studies of selected structural systems using a novel joint finite element and information gathered from an extensive experimental campaign of various types of joints commonly found in Cuplok falsework structures. Different hazardous scenarios identified as being critical to the structural performance of bridge falsework systems are analysed, such as ground settlements, bracing configurations and falsework systems using steel beam girders. From the results, relevant practical information was obtained that can be used to reduce the risks associated with bridge falsework systems. It was found that even a small value of isolated differential ground settlements with inappropriate bracing of falsework towers, and also for falsework systems using steel beam girders with inappropriate bracing of falsework towers, could reduce system resistance.

The moment capacity ratio (MCR) used to ensure a preferred collapse mechanicm in multi-story buildings is critically investigated by Mistri *et al.* (2019). The results suggest that MCR criteria need not be imposed for buildings located in low-seismicity zones as other design criteria ensure an acceptable level of safety for buildings in these seismic zones. On the other hand, it was found that even a very high MCR cannot ensure a preferred collapse mechanism for buildings in zones of higher seismicity. Therefore code recommendations must be considered in connection with other investigations.

A new type of octagonal partially encased composite column was tested and analysed under compressive loads in order to resist progressive collapse by Ebadi Jamkhaneh *et al.* (2019). A comprehensive finite-element analysis was then conducted to estimate the structural behaviour of composite steel and concrete frames under the loss of a column. The analysis showed that making use of partially encased composite columns can provide alternative paths for transferring loads originally supported only by the beams, thus improving the collapse-resistance capacity of the steel frame. The partially encased column, however, may reduce the ductility of the steel frame, may change the failure mode of the frame and make the beam–column connections fail to meet plastic rotation criteria.

Concrete reinforced by short glass fibres is studied experimentally by Kasagani and Rao (2019). It is known that losely spaced fibres can then provide effective reinforcement at the micro-cracking level, prevent the coalescence of micro-cracks into unstable macro-cracks and increase the strength. Strain softening in compression and strain hardening in tension is observed in the stress-strain behaviour. Various parameters are investigated on the damaged specimens by using an optical microscope.

Failure of a post-tensioning tendon or a stay cable on a cable supported structure is investigated experimentally by Tang *et al.* (2019). The specimens, with damages introduced by notches, were tested under tension at different loading strain rates in order to determine the influence on the load–time history and the rupture time. Experimental results show that

the loading rate has little influence on the rupture time for both undamaged and damaged strands, but has an obvious influence on the ultimate load of undamaged strands. The results presented provide a basis for analysing the post-breakage dynamic response of a cable supported structure.

A book review by Ashour (2019), gives information on a recent monograph dealing with structural concrete strut-and-tie models.

I am sure that the readers of *Structures and Buildings* will find the present issue interesting. Discussions or comments on any of the papers are welcomed. Instructions on how to contribute can be found on the Virtual Library (https://www.icevirtuallibrary.com/page/authors). On behalf of the editorial board I would like to thank all the authors for their efforts.

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