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Editorial

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Editorial

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The December issue of *Structures and Buildings* covers a wide range of topics, proving once again the commitment of the authors of this journal to civil engineering structures at 360°, from concrete bridges to steel structures and masonry buildings, from design to monitoring and assessment, from analytical approaches to numerical modelling and structural testing. It is therefore a pleasure to write this month's editorial.

In the first paper, from the UK, Xu and Brownjohn (2018) investigate the potentialities of adopting vision-based monitoring systems for structural applications. Taking direct measurements on bridges is not always an easy task and consequently monitoring systems, that can be operated from remote and that allow multipoint measurements with a single device, could prove greatly beneficial. Three different tracking methods (i.e. correlation-based template matching, Lucas-Kanade optical flow estimation and scale-invariant feature transform) are tested by the authors in the laboratory environment as well as onsite. A short-span railway bridge in Somerset and the Humber Bridge are the two case studies selected for the field-testing. Among the studied parameters are: estimation error in projection transformation, camera-to-target distance, distinctiveness of target patterns, changes of target patterns and changes in lighting conditions. A quite useful table, summarizing the working performance of the three tracking methods observed from the field-testing, is provided by the authors.

Bridges are also the focus of the second paper, by Akbari *et al.* (2018), where the dynamic behaviour of bridge decks is studied. The paper presents a state of the art review of empirical and theoretical formulas to predict the fundamental natural frequency of bridge decks. Many formulations are available in literature with different relations expressing the dependency of the natural period/fundamental frequency on the span length. Such formulations are compared by referring to experimental data from ambient vibration testing performed by the authors on 6 Iranian bridges and also by using literature data pertaining to 22 bridges. Regression analysis helps the authors shed light on the rules governing the dependency of the natural period on the span length and propose a new formula to be applied to a wide range of decks. Then an empirical formula for the preliminary cross-section design of simple-span bridge decks is introduced and tested on a case study bridge-widening project.

In the third paper, also from Iran, Maghsoudi and Maghsoudi (2018) analyse the tendon stress level of two-span continuous post-tensioned I-beams at ultimate conditions, addressing both non-strengthened beams and elements strengthened with carbon-fibre-reinforced polymersheets. To this purpose, the authors report on experimental flexural testing of six specimens 9 m long. The authors observe that at the beam failure the tendon stress approached the yield point, resulting in moment redistribution and ductility demand higher than expected. Finite Element FE modelling is also used to predict the experimental results and to investigate the effect on the tendon stress produced by variations in the most relevant parameters. A large number of existing formulations that are available in literature to predict the stress level in unbonded tendons, are also examined and the analytical predictions are compared to the experimental and numerical results. The authors conclude that code/standard equations produce highly scattered values of tendon stress that are on the safe side from a practical design point of view.

The last two contributions are from China and both deal with the earthquake hazards and the seismic response of structures. Qin *et al.* (2018), present the outcomes of a thorough experimental campaign aimed at defining the seismic behaviour of self-heat-preserving shale masonry walls. The research work starts with the mechanical characterization of the masonry constituents (i.e. the shale blocks and the mortar) to continue with the testing of masonry prisms and end with the full-scale testing of wall specimens with and without openings. It is observed that the dense hole-arrangement of the perforated blocks, which ensures the good thermal performance of the self-heat-preserving shale masonry, negatively affects the ductility. Because the mortar bed-joints are only 1–3 mm thick and cannot accommodate reinforcing steel bars or meshes, reinforced binding bands and concrete confining columns are introduced. The test results reported in the paper demonstrate that the addition of horizontal reinforced binding bands and concrete columns significantly improves both the lateral capacity and the energy dissipation. Expectedly, the presence of openings is shown to have a detrimental impact over the seismic response of the walls.

In the fifth paper, Enhe *et al.* (2018), focus their attention on the dynamic performance of low-rise steel frames characterized by having exposed columns at the base and approximately constant size of the column cross-sections over the building height. Such construction typology is quite common among low-rise steel structures and often presents a strong concentration of deformation in the ground storey when subjected to lateral loading. To determine the influence of a variation in the base column capacity over the building dynamic response and the failure mechanism, a strength coefficient (γ) is defined as the ratio between the yield moment of the exposed column at the base (where the base plate is connected to the foundation through anchor bolts) and the yield moment of the column at the first floor level. Non-linear time-history analysis is performed on 16 models, designed to reproduce three storey buildings with regular geometry layout. A capacity based approach with a strong-column/weak-beam relation is adopted for designing the numerical models. The authors explain that, based on the outcomes of the numerical study, by increasing the ratio of the shear capacity at the first floor level over the structure weight by 5% (from the reference value of 0·30 to 0·35), 50% of the plastic deformation energy dissipates at the second and third floor levels, thus reducing the plastic deformation concentration at the first floor. This effect however becomes less evident as the strength coefficient gets smaller.

I am confident that the readers of *Structures & Buildings* will find this month's issue interesting and inspiring. Discussions or comments on any of the papers are welcomed and 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 want to thank all the authors for their effort and wish all our the readers a happy 2018 ending and a successful 2019.

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