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# Editorial

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It is a great pleasure for me to deliver the editorial of *Structures and Buildings* for the March 2021 issue, the third online-only issue of the journal. I am hoping that this new delivery method allows the community a quicker access to the fresh content of the selected papers.

This issue covers a wide range of topics from materials and structures, to fundamental research on buckling and vibrations, soil-structure interaction, and to experimental investigation of reinforced concrete structures. Furthermore, the six contributions to this issue reflect the global impact of the journal, as they come from different parts of the world, counting four continents, from Brazil to Australia, including contributions from China, Algeria, Iran and India.

The first paper in this issue comes from Australia (Petrusma *et al.*, 2021) and deals with the buckling of steel tubes with large imperfections under compressive loads. It describes a very relevant numerical study, tails the vast experience of this team on the previous assessment of dents in pipes submitted to different loading conditions, and has been motivated by the limited information about the effect of geometrical damage on the capacity of thin-walled tubes. This time the authors deal with a novel perspective, as they report the effect of dents with different geometries in the axial capacity of shells with various diameter to thickness ratios. It was found that these dents may significantly change the behaviour of pipes, and the results from this study were verified by experiments and compared to reduction factors from other studies.

Iran is the origin of the second contribution to this issue (Sabermahany *et al.*, 2021). It deals with rectangular plan concrete shallow funicular shells, specifically with their vibration analysis under impulse loads. Due to their geometry, these shells are subjected to pure compression under its dead weight. The authors proposed an analytical method based in a geometrically non-linear vibration analysis to understand the response of these shells under dynamic loads. They have concluded that internal moments and consequentially tensile stresses are formed and the shell does not behave purely as a funicular element when dynamic loads are concerned.

The third paper is a contribution from Brazilian researchers (Nzambi *et al.*, 2021) and encompasses a very nice experimental study on the bond behaviour of steel reinforcing bars embedded in steel-fibre-reinforced concrete. The paper follows some relevant studies undertaken in the past concerning the need to enhance the use of steel reinforcing bars in concrete or to strengthen concrete structures. In this experimental campaign, the amount of incorporated fibres, the diameter of the reinforcing bars and the anchorage length of the steel bars were the key variables, and the study closes with the proposal of a modified design equation based on the Brazilian code equation that the authors have shown to perform better in predicting the concrete failure load.

The fourth paper is produced in Tongji University from Shanghai, China (Li *et al.*, 2021) and describes a study on the load-carrying capacity of partially exposed reinforced concrete beams. Starting from the assumption that defects may occur during construction of reinforced concrete structures – and that that the concrete in a beam can be damaged during construction – its repair involves the removal of the damaged concrete, exposing the embedded rebar. As a consequence, this invalidates the harmonising relation between the deformation of rebar and the deformation of concrete, and the extensively applied calculation method for the ultimate load-carrying capacity of ordinary reinforced concrete beams is not applicable. The authors tackle this issue by analysing a large quantity of test data, using theoretical analysis and numerical simulations. Besides the evaluation of the load carrying capacity, the observation in the changing patterns of the load-carrying capacity allowed the identification of two typical failure modes of the exposed reinforcement concrete. Furthermore, they have identified changes in the steel stress distribution and cracking pattern, influenced mainly by the extension of the exposed rebar.

The fifth contribution to this issue comes from India (Tolani *et al.*, 2021) and focuses on the estimation of the effect of surface blast on buildings. The authors stress the considerable interest of the topic at the present time owing to the frequent occurrence of terrorist attacks or accidental bomb blasts. Recognising the fact that the blast may take place in the air, on the ground surface or

even be an underground blast, both effects of the ground shock and air pressures are taken into account. The study encompasses the consideration of four reinforced concrete building frames of different heights and performed under different blast scenarios by varying the standoff distance and explosive charge weight. The relative importance of ground shock, surface blast and free air blast is evaluated for each scenario, revealing some very interesting conclusions that tie the features of each blast to the features of the building typologies and the effect the blast has on them.

The sixth paper is an interesting research from Algeria (Widad *et al.*, 2021) that deals with a classic but still not fully explored theme: the soil-structure interaction. The authors studied the soil non-homogeneity and soil-structure interaction effects on beam vibrations. The motivation for this study was the wide range of applications such as transportation, marine and petroleum engineering, among others. Authors have used the Euler–Bernoulli theory of beam vibration to quantify the effects of soil foundation non-homogeneity and the soil–structure interaction on the fundamental frequency parameters of simply supported beams, and have shown the importance of these effects on the free vibration of beams.

I wish that you take full advantage of the quality and diversity of these papers. As usual, comments and discussions from our readers are most welcome. Finally, we desire that all our readers may stay safe during these troubled times, and that both their private and professional lives may quickly and fully come back to normal.

**REFERENCES**

Darvishi R and Abdollahzadeh G (2021) Cyclic behaviour of triple friction pendulum isolators with elliptical surfaces. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **174(3)**: 225–235, https://doi.org/10.1680/jstbu.18.00186.

Li F, Li W, Cui Y, Wu P and Shen Y (2021) Study on load-carrying capacity of partially exposed reinforced concrete beams. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **174(3)**: 190–201, https://doi.org/10.1680/jstbu.18.00051.

Nzambi AKLL, Oliveira DRC, Oliveira AM and Picanço MS (2021) Pull-out tests of ribbed steel reinforcing bars embedded in concrete with steel fibres. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **174(3)**: 181–189, https://doi.org/10.1680/jstbu.17.00180.

Petrusma J, Ghanbari-Ghazijahani T and Jiao H (2021) Buckling of steel cylindrical hollow sections with large imperfections under compression. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **174(3)**: 159–168, https://doi.org/10.1680/jstbu.17.00181.

Sabermahany H, Mofid M and Daneshmand N (2021) Geometrically non-linear vibration of concrete shallow funicular shells. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **174(3)**: 169–180, https://doi.org/10.1680/jstbu.18.00115.

Tolani S, Bharti SD, Shrimali MK and Datta TK (2021) Estimation of the effect of surface blast on buildings. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **174(3)**: 202–214, https://doi.org/10.1680/jstbu.19.00055.

Widad B, Salah K and Souad B (2021) Soil non-homogeneity and soil-structure interaction effects on beam vibrations. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **174(3)**: 215–224, https://doi.org/10.1680/jstbu.18.00091.