

Editorial

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It gives me great pleasure to present the editorial of *Structures and Buildings* for the November 2021 issue. There are five excellent papers in this issue and the papers presents new information on the behavior, as well as on design and analysis concepts, under the broad theme of performance of concrete structures. The papers cover various topics ranging from new design and analysis approaches for reinforced concrete slabs, plates, and concrete-filled glass-fibre-reinforced polymer (GFRP) tube columns, to seismic demands of reinforced concrete frames and joints.

The first paper, by De Filippo and Kuang (2021), proposes a new pseudo-lower bound method for the assessment of load-bearing capacity of concrete slabs. The proposed technique is based on a linear-elastic finite-element method, taking in to account the moment redistributions due to yielding and this method overcomes some of the short comings in the existing approaches. The authors, through numerical examples, illustrate the application of the proposed method for estimating load causing global failure of the slab.

The second paper evaluates a new system of punching shear reinforcement consisting of top and bottom steel cages connected through small inclined bars, called swimmer bars, in reinforced concrete flat plates. Najmi *et al.*, (2021) apply a non-linear finite-element based model to evaluate the effectiveness of the new system in enhancing the punching shear capacity. Based on a series of parametric studies, the authors infer that the swimmer bars located at the corners to be more effective than the middle bars; and recommend that the middle bars could be eliminated and larger corner bars could be used to achieve good performance under punching shear.

The third paper, by Jiang *et al.*, (2021), investigates the influence of an expansive admixture (EA) and fly ash on the axial compressive behaviour of concrete-filled GFRP tube columns. The authors present results from experiments on a set of circular concrete-filled GFRP tube columns, fabricated with varying design parameters. The analysis of the experimental results clearly shows that an increase in the thickness of the

GFRP tube, together with an increase in EA content, enhances the axial capacity of circular concrete-filled GFRP tube columns.

The next two papers deal with the seismic performance of reinforced concrete frames and joints. In the fourth paper, Salimbahrami and Gholhaki (2021) propose an advanced analysis approach to modify the conventional non-linear static method. This approach, based on displacement-based adaptive pushover algorithm and an adaptive pushover analysis method, can consider the effects of higher modes and thus better assess the seismic demands of structures at different performance levels.

In the last paper, Mogili and Kuang (2021) assess the seismic vulnerability of reinforced concrete knee joints under reversed cyclic loading. The authors present results from experiments on three full-scale knee joint specimens that were subjected to varying closing and opening joint shear stresses produced from the variation of relative closing and opening moment capacities. Using the results, a detailed discussion is presented on the effect of closing and opening actions on the overall performance of knee joints subjected to reversed cyclic loading.

These five papers draw on the experience and special knowledge of academics and the practitioners both in the public and private sectors in Hong Kong, Jordan, China, Iran and Taiwan. The efforts of these authors and the critical assessment of the papers by reviewers, whose time and expertise are reflected in the quality of this edition, are gratefully acknowledged. Also, the efforts of the Editor-in-Chief (Dr. Sebastian, Wendel), ICE Journals Editor (Miss. Kirsten Buchanan), Production Editor (Mr. Hassan Akhtar) and the journal staff, in bringing out this issue to the readers is much appreciated.

I hope that the papers will enrich the knowledge of the readers and will be useful in their research and practice. I strongly encourage the readers to send their comments and

discussions on these papers to the *Structures and Buildings* editorial staff.

REFERENCES

- De Filippo M and Kuang JS (2021) Pseudo-lower bound method for assessing concrete slabs. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **174(11)**: 903–919, <https://doi.org/10.1680/jstbu.18.00130>.
- Jiang H, Cao Q, Wang R, Qu Y and Li D (2021) Effects of two admixtures on the axial compression of concrete-filled GFRP tubes. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **174(11)**: 934–948, <https://doi.org/10.1680/jstbu.18.00139>.
- Mogili S and Kuang JS (2021), Seismic vulnerability of reinforced concrete knee joints under reversed cyclic loading. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **174(11)**: 965–978, <https://doi.org/10.1680/jstbu.18.00170>.
- Najmi AQ, Allouzi R and Al-Ateyat A (2021) Analysis of reinforced concrete plates with swimmer bars as punching shear reinforcement. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **174(11)**: 920–933, <https://doi.org/10.1680/jstbu.18.00135>.
- Salimbahrami SR and Gholhaki M (2021) Evaluation of seismic demands of reinforced concrete frames with steel plate shear wall. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **174(11)**: 949–964, <https://doi.org/10.1680/jstbu.18.00155>.