Editorial

Gang Shi BEng, BEco, PhD

Professor, Department of Civil Engineering, Tsinghua University, Beijing, China

This issue of *Structures and Buildings* presents seven papers by international authors originating from South Africa, Pakistan, Saudi Arabia, Jordan, United Arab Emirates, Turkey, India and the UK. The studies cover the fundamental behaviour and the strengthening and refurbishment of concrete members and structures, with one paper about cement-stabilised rammed-earth columns.

The first paper is from Arslan *et al.* (2016). In previous research, the author has studied the shear strength of reinforced-concrete slender beams and proposed a new design expression for cracking shear strength (Arslan, 2010). Now this paper uses a failure probability based on a second moment probabilistic analysis procedure to compute the strength reduction factor in predicting the contribution of concrete to the shear strength of reinforced-concrete beams according to the American Concrete Institute code ACI 318. It is found that a strength reduction factor of 0.75 for shear is valid in design according to ACI 318, but the shear strength reduction factors in ACI 318 are non-conservative for the flexural reinforcement ratio $\rho < 1.0\%$.

In the second paper by Rizwan *et al.* (2016), the behaviour of steel-strip-confined columns is presented and the experimentally achieved backbone curves are modelled in Drain-3DX through simple calibration. The research result indicates improvement in the response of columns confined with steel strip transverse reinforcement.

The third paper by Al-Rousan (2016) conducts non-linear finite-element analysis to study the effect of concrete compressive strength, ratio of tensile steel reinforcement, ratio of compression steel reinforcement and slab thickness on the flexural performance of lightweight reinforced-concrete slabs. The results show that the current ACI 318-08 provisions for the serviceability requirements of ultimate strength and maximum deflection are underestimated, although they are adequate for cracking load requirements.

In the fourth paper by Arya (2016), the crack control provision in BS EN 1992-2 is examined and compared with the now 'withdrawn' equivalent British Standard, BS 5400: Part 4. The conclusions are that the measures in BS EN 1992-2 may reduce the corrosion of reinforcement that crosses cracks, but increasing the level of reinforcement that follows the line of cracks and adopting the BS EN 1992-2 recommendations could potentially increase the net amount of corrosion in reinforced-concrete bridges.

With the development of society and the economy, more and more structures need to be strengthened. Therefore, the corresponding research is of significant sense. In the fifth paper by Qureshi *et al.* (2016), the experimental study on the effect of carbon fibre-reinforced polymers (CFRP) on the flexural and shear capacity, crack pattern, failure behaviour, deflection and energy dissipation of hollow-core slabs is presented. It is concluded that CFRP can enhance the flexural and shear capacity of hollow-core units by up to 40%. Durability is always a concern when strengthening structures, and for reinforced-concrete slabs strengthened with CFRP, the effect of steel reinforcement corrosion has been previously studied in a *Structures and Buildings* paper by Zhuang *et al.* (2016).

For existing buildings, not only is strengthening required, but refurbishment and retrofitting are also increasingly demanded. The sixth paper by Rowe *et al.* (2016) gives a case study of the Simon Building, University of Manchester (Manchester, UK), including the removal of four columns from the basement. An innovative clamping system was used, and the paper details the design and implementation.

The final and seventh paper by Tripura and Singh (2016) presents a novel experimental investigation, comprising tests on cement-stabilised rammed-earth prisms and columns of varying slenderness ratios. The results show that tangent modulus theory underestimates the ultimate compressive strength, and the experimental reduction factors are found to be more conservative than the masonry code provisions.

I hope you find these papers stimulating and informative. Discussions and comments on the papers are always welcome. The journal publishes its most recent articles Ahead of Print on its Virtual Library homepage: <http://www.icevirtuallibrary.com/loi/jstbu>, which allows the community quicker access to fresh content.

REFERENCES

- Al-Rousan RZ (2016) Flexural performance of lightweight reinforced-concrete slabs. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **169**(4): 257–269, <http://dx.doi.org/10.1680/jstbu.14.00068>.
- Arslan G (2010) Shear strength of reinforced-concrete slender beams. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **163**(3): 195–205, <http://dx.doi.org/10.1680/stbu.2010.163.3.195>.

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- Arslan G, Alacali S and Sagioglu A (2016) Assessing reduction in concrete shear strength contribution. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **169(4)**: 237–244, <http://dx.doi.org/10.1680/jstbu.14.00102>.
- Arya C (2016) An examination of the crack control provision in BS EN 1992-2. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **169(4)**: 270–277, <http://dx.doi.org/10.1680/jstbu.14.00116>.
- Qureshi LA, Jawad M, Elahi A and Ajwad A (2016) Effect of carbon fibre-reinforced polymers on structural behaviour of hollow-core slabs. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **169(4)**: 278–289, <http://dx.doi.org/10.1680/jstbu.14.00067>.
- Rizwan M, Khan SA, Ilyas M and Hussain RR (2016) Modelling steel-strip-confined reinforced-concrete columns. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **169(4)**: 245–256, <http://dx.doi.org/10.1680/jstbu.14.00084>.
- Rowe J, McElhinney J and Smith N (2016) Temporary support of five-storey building by column clamping. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **169(4)**: 290–297, <http://dx.doi.org/10.1680/jstbu.14.00045>.
- Tripura DD and Singh KD (2016) Cement-stabilised rammed-earth square column in compression. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **169(4)**: 298–311, <http://dx.doi.org/10.1680/jstbu.14.00122>.
- Zhuang N, Zhou Y and Sun H (2016) Effects of steel reinforcement corrosion on carbon-fibre-reinforced polymer repaired slabs. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **169(1)**: 46–53, <http://dx.doi.org/10.1680/stbu.14.00105>.