Editorial

Luciano Rodrigues Ornelas de Lima BSc, MSc, DSc

Professor, Structural Engineering Department, UERJ – State University of Rio de Janeiro, Rio de Janeiro, Brazil

This issue of *Structures and Buildings* consists of five technical papers. Research investigations concerning flexural strength of reinforced concrete (RC) beams with corroded compression bars, seismic analysis of cable-stayed bridges, behaviour of bolted T-stubs joints, structures subjected to blast-induced vibrations and effect of soil–structure interaction on a masonry structure under train-induced vibrations are covered.

The first paper by Jnaid and Aboutaha (2019) presented an investigation of RC beams with corroded compression bars. The authors used non-linear finite-element analysis (FEA) to simulate the behaviour of these RC beams and to estimate the stress and strain in the compression steel reinforcement at failure. The authors mentioned that the corrosion of the compression steel reinforcement led to a maximum flexural strength reduction of 20%, of which 14–15% was due to spalling of the concrete cover on the compression side of the cross-section. Based on the FEA results, the authors successfully developed an analytical model to compute the flexural strength of RC beams with corroded compression reinforcement that demonstrated good agreement with the limited experimental data.

In the second paper, Heyrani Moghaddam and Shooshtari (2019) investigated a cable-stayed bridge based on the energy balance concept through a non-linear modal pushover analysis (MPA). First, the cable-stayed bridge was modelled. Then, the energy balance method, MPA and non-linear response history analysis (NRHA) were employed. Finally, the obtained seismic demands were compared with the NRHA results. The authors have concluded that the energy balance method accurately estimated the exact values of the displacements of deck nodes obtained using NRHA for all selected ground motions. On the other hand, MPA did not predict exact values, especially for the side spans.

The next paper (Haouas *et al.*, 2019) presents a numerical evaluation of joints with four bolts per row characterised by T-Stubs mechanical behaviour. This type of T-Stub joint is not covered by the design codes. The authors developed a 3D finite element (FE) model considering two sources of

non-linearity, namely the plastic behaviour of the material and the evolution of the contact area between the flange-to-rigid foundation and between the flange and the bolt as well. Analytical formulas proposed by others authors were applied delivering satisfactory results when compared to the numerical ones.

In the fourth paper, Kangda and Bakre (2019) investigated the response reduction efficiency of passive control viscous dampers installed between adjacent structures subjected to blast-induced vibrations. The blast-induced vibrations studied were mainly due to mining activities along with the accidental explosions in underground storage chambers. Equations of motion formulated by different researchers in examining the performance of damper-connected structures were reviewed. A parametric study was also conducted to determine the optimum damper placement locations along with optimum damper properties for the similar buildings connected with viscous dampers. The results showed the efficiency of viscous dampers for the case of similar buildings where the optimum damper coefficient was obtained at a damping ratio of 35%. For dissimilar buildings, the peak responses were found to be almost equivalent for both connected and unconnected structures.

In the last paper, Khan *et al.*, 2019 presented an experimental investigation to assess the influence of soil–structure interaction (SSI) on an unreinforced masonry structure under train-induced vibrations. For this issue, a structure near a railway line was instrumented and monitored when subjected to five railway traffic vibrations. The measured vibrations were used to estimate the modal properties using a frequency domain decomposition technique. The authors also developed FE models and updated through manual tuning, one with a fixed base and the other with a flexible base accounting for SSI. The results indicated that the effect of SSI on the fundamental mode shape and in the prediction of accurate response time histories of the investigated structure was significant. Furthermore, the effect on modal frequencies, base input force, base moment and peak displacement of the investigated structure under train-induced vibrations was observed to be very low.

REFERENCES

- Haouas S, Abidelah A, Kerdal DE and Bouchaïr A (2019) The mechanical behaviour of T-stubs with four bolts per row. *Proceedings of the Institution of Civil Engineering – Structures and Buildings* **172(12)**: 882–901, <https://doi.org/10.1680/jstbu.18.00055>.
- Heyrani Moghaddam S and Shooshtari A (2019) An energy balance method for seismic analysis of cable-stayed bridges. *Proceedings of the Institution of Civil Engineering – Structures and Buildings* **172(12)**: 871–881, <https://doi.org/10.1680/jstbu.18.00016>.
- Jnaid F and Aboutaha RS (2019) Numerical and analytical models of RC beams with corroded compression reinforcement. *Proceedings of the Institution of Civil Engineering – Structures and Buildings* **172(12)**: 859–870, <https://doi.org/10.1680/jstbu.18.00010>.
- Kangda MZ and Bakre S (2019) Response control of adjacent structures subjected to blast-induced vibrations. *Proceedings of the Institution of Civil Engineering – Structures and Buildings* **172(12)**: 902–921, <https://doi.org/10.1680/jstbu.18.00071>.
- Khan BL, Farooq H, Usman M, Butt F, Khan AQ and Hanif A. (2019) Effect of soil–structure interaction on a masonry structure under train-induced vibrations. *Proceedings of the Institution of Civil Engineering – Structures and Buildings* **172(12)**: 922–934, <https://doi.org/10.1680/jstbu.18.00131>.