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Editorial

Rob Smith PE, SE, CEng, MICE
Associate Principal/Advanced Technology & Research, Arup, San Francisco, CA, USA

I recently attended a conference in California, USA, where an eminent seismologist stated that the San Andreas Fault is "locked, loaded and ready to roll". The conference focused on a number of different ways that California can prepare for a large earthquake, and seismic engineering was at the heart of that. Seismic engineering plays a key role in this month's journal, and three out of the five papers contribute to the advancement of this field.

The first paper by Kiani *et al*. (2016) compares the predicted performance under seismic loading of a number of model buildings designed to the European, Japanese and Iranian seismic code. The study was limited to steel moment frame buildings. These model buildings were checked using the non-linear static analysis method (also known as a pushover analysis). While this latter method does not accurately simulate an earthquake, it provides a better basis for understanding seismic performance than the linear methods that are used by default in the three seismic codes mentioned. Comparing the relative performance of buildings to different codes is often difficult since the methods used in each code are often very different. In this case, the method used is 'performance-based' and uses assumptions made in the US ATC-40 document. It is found that the European code meets 'life safety' targets set in US codes, but that the Iranian code fails to meet these targets in a number of different scenarios. For the building designed to the Japanese code, the answers are mixed.

Pozza *et al*. (2016) continue the seismic theme with a study of ductility in cross-laminated-timber (CLT) panels. More specifically, they have performed a series of cyclic loading tests to determine the behaviour modification factor (q) that can be used in the design of a structure using CLT panels. This form of construction has been gaining popularity in recent years, but its use in seismic applications has been impaired by a lack of appropriate data that can be incorporated into seismic design codes.

Another relatively uncommon form of construction is the concrete-filled steel tube. While it has been in use for many years, there is still much to learn. A review of existing data is provided by Jegadesh and Jayalekshmi (2016). The authors have reviewed the results of 311 test specimens, based on previous research. The results are compared with previous simplified predictors of capacity, in particular by Eurocode 4 (BS EN 1994-1-1:2004, BSI, 2004) and the theoretical equations by Mander *et al*. (1988) and by Lu and Zhao (2008).

A further study related to seismic engineering is presented by Ahmad *et al*. (2016). This focuses on the bond between reinforcement and concrete for low-strength concrete. While this has been extensively studied for 'normal'-strength concrete, less data exists for low-strength concrete. This is of particular concern in developing countries with high seismic risk. In these locations, poor quality concrete is often used, and its performance is not well understood. The paper expands on testing performed by the main author (Ahmad, 2011).

The last paper presents a practical method of calculating the load in temporary supports (shores) during construction of concrete slabs. Buitrago *et al*. (2016) review previous methods of performing this calculation and suggest that a simple method proposed by others is most appropriate. They go on to compare its accuracy against other more complex methods, with good results.

REFERENCES

Ahmad S (2011) *Seismic Vulnerability of Non-ductile Reinforced Concrete Structures in Developing Countries.* PhD Thesis, The University of Sheffield, Sheffield, UK.

Ahmad S, Rafi MM, Pilakoutas K *et al.* (2016) Bond–slip behaviour of steel bars in low-strength concrete. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **169(7)**: 524–537, http://dx.doi.org/10.1680/jstbu.15.00067.

Buitrago M, Adam JM, Alvarado YA, Calderón PA and Gasch I (2016) Maximum loads on shores during the construction of buildings. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **169(7)**: 538–545, http://dx.doi.org/10.1680/jstbu.15.00089.

Jegadesh S and Jayalekshmi S (2016) Load-bearing capacity of axially loaded circular concrete-filled steel tubular columns. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **169(7)**: 508–523, http://dx.doi.org/10.1680/jstbu.14.00097.

Kiani A, Manie S and Mansouri B (2016) Comparison of code-specific non-linear seismic performance. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **169(7)**: 471–491, http://dx.doi.org/10.1680/jstbu.14.00028.

Lu ZH and Zhao YG (2008) Mechanical behaviour and ultimate strength of circular CFT columns subjected to axial compression loads. *Proceedings of the 14th World Conference on Earthquake Engineering, Beijing, China*, pp. 20–28.

Mander JB, Priestley MJN and Park R (1988) Theoretical stress–strain model for confined concrete. *Journal of Structural Engineering* **114(8)**: 1804–1826.

Pozza L, Scotta R, Trutalli D, Polastri A and Smith I (2016) Experimentally based *q*-factor estimation of cross-laminated timber walls. *Proceedings of the Institution of Civil Engineers – Structures and Buildings* **169(7)**: 492–507, http://dx.doi.org/10.1680/jstbu.15.00009.