Editorial

Rob Smith MEng, CEng, MICE

We start this issue with some historically important research into the engineering properties of dry-stone retaining wall structures (Mundell *et al.*, 2010). By historical, perhaps I should say rare; until 2004, no research work on purpose-built, dry-stone retaining walls had been done since 1834. This must be one of the oldest references to a research report made in this journal. According to this paper, over 9000 km of roads and rails were lined by such walls in the 19th and 20th centuries, leaving UK agencies with a significant asset to maintain. This research work is long overdue.

Another directly useful paper looks at the restraining effects caused by friction in steel grating (Gohnert and Sithole, 2010). The researchers examined the hypothesis that friction forces from the grating give sufficient restraint to allow development of the plastic moment. For the tests made, the full plastic moment was reached, and the restraining force was measured as being similar to the 2.5% required by BS 5950.

Two papers (Ng *et al.*, 2010; Lam *et al.*, 2010) look at tension stiffening in concrete beams, specifically looking at beams in bending. A new tensile stress block is proposed, examined in some detail and compared against existing models.

El Debs *et al.* (2010) present a study into semi-rigid moment connections in pre-cast concrete. The researchers have modified a typical pinned connection in use in Brazil and tested its performance. Semi-rigid connections have the advantage of being much easier to construct than fully-rigid connections, but are also not as well understood. Typical construction methods in Brazil employ pinned beam-column connections, which increase the bending moment at the base of the columns. By using the semi-rigid beam-column connections, it is possible to reduce this bending moment by frame action, thus making taller buildings more economic.

Finally, a short paper by Heyman (2010) revisiting some structural theory, re-emphasising the unknowns in the calculation of a stress state in a hyperstatic (statically indeterminate) structure. The defects from manufacturing of structural elements and their support conditions remain a critical factor in determining the real stress state. Anybody engaged in structural analysis should heed the warning in the abstract for this paper.

REFERENCES

- El Debs KM, Nohito MA and El Debs ALHC (2010) Analysis of a semi-rigid connection for precast concrete. *Proceedings of the Institution of Civil Engineers, Structures and Buildings* 163(1): 41–51.
- Gohnert M and Sithole H (2010) Frictional effects of steel grating on I-beams. *Proceedings of the Institution of Civil Engineers, Structures and Buildings* 163(1): 13–18.
- Heyman J (2010) Design of a simple steel truss. *Proceedings of the Institution of Civil Engineers, Structures and Buildings* 163(1): 53–56.
- Lam JYK, Ng PL and Kwan AKH (2010) Tension stiffening in concrete beams. Part 2: section and member analysis. *Proceedings of the Institution of Civil Engineers, Structures and Buildings* 163(1): 29–39.
- Mundell C, McCombie P, Heath A, Harkness J and Walker P (2010) Behaviour of drystone retaining structures. *Proceedings of the Institution of Civil Engineers, Structures and Buildings* 163(1): 3–12.
- Ng PL, Lam JYK and Kwan AKH (2010) Tension stiffening in concrete beams. Part 1: FE analysis. *Proceedings of the Institution of Civil Engineers, Structures and Buildings* 163(1): 19–28.