Construction Materials
Volume 167 Issue CM5
Editorial
Pedreschi

Proceedings of the Institution of Civil Engineers
Construction Materials 167 October 2014 Issue CM5
Pages 235–236 http://dx.doi.org/10.1680/coma.2014.167.5.235

ice | proceedings

ice Institution of Civil Engineers publishing

Editorial

Remo Pedreschi BSc, PhD, CEng, MICE
Professor, University of Edinburgh, UK

I am happy to welcome readers to the latest issue of *Construction Materials*. I have served as a member of the editorial board for the journal from its inception and a key concern has always been to publish research that encompasses the broad range of materials used in the construction of buildings and in civil engineering projects. The selection of papers should also present research of high quality and, where appropriate, reflect the current concerns of the industry. The predominance of papers on concrete and cement technologies has been noted in previous editorials, perhaps reflecting the ubiquitous use of this particular material. Many efforts have been made to encourage diversity of publication.

One particularly effective approach has been the use of themed issues, which have included: the use of stone, low impact materials, architectural approaches to materials, and the use of timber. These particular issues provide the reader with an excellent insight into current activity and I have generally found them very informative, although they did not necessarily relate to my own particular research interests. Such is the nature of materials and construction; a very tangible and expressive aspect of civil engineering. Although this is not a themed issue, I have the same feeling with the papers selected here and found each one interesting and informative.

The issue comprises one briefing and four papers on quite diverse subjects. The materials include road surfaces, sabkhas soils, fibre-reinforced concrete, masonry and timber composites. The underlying driver for the research in each paper also represents a diversity of issues that face practising engineers, such as selecting materials for durability and extended life, working with difficult materials and the effective specification of materials.

Thomas and Fan (2014) have prepared a briefing on the punching shear resistance of oriented strand board, often used in roof and floor systems, by comparing experimental evidence with a recently developed design equation. They show that the equation is effective for a wider range of panel configurations and loading plates and can also be applied to medium-density fibreboard.

The important problem of how to extend the serviceable life of road surfaces given the increase in traffic flows in recent years is considered in the paper by Widyatmoko and Elliott (2014). The authors report on an experimental evaluation of the use of epoxy binders in mastic asphalts. Samples were tested for stiffness, tensile strength, fatigue resistance and moisture-induced damage. The results of the modified asphalts were compared with conventional mastic asphalts and significant improvements in performance were obtained for all of the criteria considered. A 40-year service life target has been set for the 'new' asphalts, which are currently being field tested.

Soils incorporating gypsum (sabkhas are soils which include soluble salts) often occur in arid climates. When dry these soils can exhibit adequate strength but when soaked for prolonged periods the gypsum salts can revert to a solution and drain, thus weakening the soil and leading to severe damage to roads and foundations. In their paper Estabragh *et al.* (2014) have studied this phenomenon by undertaking tests on two disturbed soil samples taken from different sites in Iran. The samples were mixed with different proportions of ground, natural gypsum rock, saturated and then subjected to a series of tests to determine rates of compaction, settlement and strength. The paper provides very useful empirical evidence on the deleterious effect of gypsum in soils.

These two papers together highlight an important concern in materials research, namely the correlation between laboratory practice with in situ or field evaluations.

Concrete is a brittle material with limited tensile strength. Throughout its history different methods have evolved to counter this limitation, notably by adding reinforcement of one form or another, most commonly steel bars or mesh. The discrete nature of these components means that they are placed and surrounded by the wet concrete. An alternative is dispersed reinforcement in the form of fibres added during concrete mixing. While much research has been undertaken on the use of fibres in concrete this has been predicated on the basis of the fibres being viewed as reinforcement added to the mix in a similar way to conventional steel bars. The paper by Vasanelli *et al.* (2014) presents an alternative approach, considering the fibres as a constituent of the mix, similar to aggregate and sand. They present the results of an extensive experimental study that examines the effects varying dosages of steel and polyester fibres have on the mix itself in both the wet and hardened states. A particularly interesting conclusion is the reduction in compressive strength of samples using steel fibres in mixes with water cement ratios of 0·55 and above, which is attributed to a loss of bond between the steel fibres and the concrete matrix caused by increased entrained air.

Specifying structural materials for building requires assurance and confidence that the materials actually supplied match those on which the design is based. The paper by Nelson and Malumbela (2014) shows that this may not always be straightforward. They report on a study into the specification of masonry in Botswana in which tests were carried out to compare the compressive strength of concrete blocks and clay bricks with the manufacturers' claims. In a number of cases the strength of the bricks were certified for compliance by the Botswana Bureau of Standards. The majority of samples failed to comply and some were considerably weaker than claimed.

This volume concludes with two erudite book reviews by Ian Sims, former editor of *Construction Materials*. Both are collections of papers under the titles: *Eco-efficient Concrete* and *The Stone Cycle and Conservation of Historic Buildings*.

REFERENCES

Estabragh AR, Kargar S and Javadi AA (2014) Investigation on the mechanical properties of gypsum soil. *Proceedings of the Institution of Civil Engineers – Construction Materials* **167(5)**: 251–257, http://dx.doi.org/10.1680/coma.12.00045.

Nelson C and Malumbela G (2014) On the compressive strength of Botswana masonry units. *Proceedings of the Institution of Civil Engineers – Construction Materials* **167(5)**: 271–276, http://dx.doi.org/10.1680/coma.13.00017.

Thomas WH and Fan M (2014) Design punching shear capacity of wood-based panels. *Proceedings of the Institution of Civil Engineers – Construction Materials* **167(5)**: 237–240, http://dx.doi.org/10.1680/coma.13.00013.

Vasanelli E, Micelli F and Aiello MA (2014) Influence of matrix grade on the mechanical behaviour of fibre-reinforced concrete. *Proceedings of the Institution of Civil Engineers – Construction Materials* **167(5)**: 258–270, http://dx.doi.org/10.1680/coma.13.00028.

Widyatmoko I and Elliott RC (2014) Strength characteristics and durability of epoxy asphalts. *Proceedings of the Institution of Civil Engineers – Construction Materials* **167(5)**: 241–250, http://dx.doi.org/10.1680/coma.13.00029.