Editorial

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I am very pleased to have this opportunity of welcoming you to the April issue of the *Proceedings of the Institution of Civil Engineers, Construction Materials*. This journal is recognised and valued by industry and academic professionals alike for its contributions to the worldwide knowledge and development of construction materials. It also succeeds in attracting research papers that encompass some of the most topical issues. This issue is no exception with work relating to both cement replacement and alternative aggregates – both areas that environmental and legislative drivers are currently promoting. The strong emphasis on concrete-related research is perhaps not unexpected considering the continued annual increase in global cement consumption.

The first paper in the issue is an excellent critical overview of the early-age properties of concrete. It is perhaps well known that the early-age properties of concrete can have a direct influence on its long-term performance. Nehdi and Soliman (2011) critically review several of the fundamental aspects of early-age properties that are not yet fully understood. The paper covers the aspects of heat of hydration and thermo-physical properties including conductivity, diffusivity and expansion coefficient. It also includes mechanical properties including compressive and tensile strength, modulus of elasticity and Poisson's ratio, as well as early-age shrinkage of which thermal dilation phenomena, drying and autogenous shrinkage mechanisms are a key part. The paper concludes with a review of creep phenomena, and also numerical modelling approaches to cement hydration and predictions of development in the early-age properties.

The second paper, an experimental research paper by Al-Akhras (2011), presents the results of an interesting investigation into the enhancement of freeze–thaw durability of concrete modified by partial cement replacement using wheat straw ash (WSA). In terms of the relative dynamic modulus of elasticity and durability factor, the freeze–thaw durability was found to be significantly enhanced over that of plain concrete. The influence of water/binder ratio and aggregate selection, in terms of size and type, were also investigated. The findings of

this research will be very useful to applied researchers working in a related field, and also presents an alternative and renewable material for Portland cement replacement that provides measurable performance enhancements as well as potential reductions in the embodied carbon dioxide of the concrete.

The experimental research paper by El Euch Khay *et al.* (2011) covers an interesting and topical study on the potential use of compacted Saharan dune sand concrete for application as a base layer in pavement structures. The growing need for sustainable infrastructure, combined with the issue of region-specific deficits in quarried aggregates, means that the use of abundant resources such as dune sand could present a viable alternative. The paper presents useful results on the mechanical performance and fatigue testing of dune sand concrete.

One of the most rapidly expanding economies in the world is that of India, where new-build construction projects and urban expansion are abundant. The Indian construction industry consumes 40–50% of the national 5-year plan outlay and contributes 20% of the country's gross domestic product. The final paper by Maran *et al.* (2011) presents a very timely study on the material cost and escalation clauses associated with large-scale Indian construction contracts. The study includes a background to the topic and also analysis of the results from a detailed survey of client and contractor representatives.

I trust that you will find the research papers featured in this issue to be of value and interest. I am sure that you will also appreciate the authors' efforts in producing these papers and undertaking the extensive research behind them.

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