Editorial

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I am pleased to welcome readers to this *themed issue of the Fourth International Conference on Sustainable Construction Materials and Technology (SCMT4)*. The construction materials industry is a major user of the world's resources. Whilst enormous progress has been made towards sustainability, the scope and opportunities for future improvements are significant. The focus of this conference series was to highlight case studies and research that displays new and innovative ways of achieving sustainability of construction materials and technologies.

SCMT4 was conducted by Coventry University, UK and the University of Nevada Las Vegas in August 2016 in Las Vegas, USA. About 200 papers were presented and 250 delegates attended. SCMT4 was planned after the three successful events in 2007 Coventry, UK, in 2010 Ancona, Italy and in 2013 Kyoto, Japan with over 160, 270 and 450 delegates respectively. These conferences were attended by government officials, engineers from government and private industry, engineering faculty and students, materials suppliers, construction companies, and others. Whilst the first three conferences highlighted current practice and research in sustainable construction materials, they also showed that more research and implementation activities remain to be explored in this area. Therefore, the fourth international conference took place in to continue this technology transfer effort.

The conference was sponsored by ICE, ACI, ASCE, CSCE, EA, and JSCE in addition to Coventry University and University of Nevada – Las Vegas. The awards committee for the conference selected papers to be considered for publication in this journal. The four papers contained in this special issue were selected from those presented at the conference. They were reviewed in accordance with standard Construction Materials publication guideline.

The four papers presented herein indeed cover a wide range of topics which contribute to the sustainability of the built environment. Sustainability has dominated construction materials research over the last decade, and is likely to do so for some considerable time in the future. While there is some

way to go, sustainability has become an integral part of construction practice and material research.

In particular, papers in *Construction Materials* have highlighted this need. The first paper, by Porter *et al.* (2018) presents findings on their study on sustainable road bases with microbial precipitation. Cement stabilisation is a practice commonly used to improve durability and reduce inspection and repair costs. However, due to the sheer length of the road network, a huge quantity of cement is consumed in stabilisation work, making this practice unsustainable. This paper explores a sustainable alternative through augmentation of the traditional cement-based stabilisation with microbial carbonate precipitation. The paper shows that microbial precipitation is able to increase the strength of cement-stabilised and road base materials significantly and can considerably improve the technological, economic and social sustainability of road bases.

The second paper, by El-Dieb *et al.* (2018), considers using ceramic waste powder for production of sustainable concretes. Incorporating solid waste materials in concrete has three advantages – the immediate environmental benefit of recycling a material from landfills, reducing the negative impact of cement production and preserving natural resources. Ceramic waste powder (CWP), produced during the process of polishing ceramic tiles, is dumped in landfills and can cause soil, air and groundwater pollution leading to serious environmental problems. This study investigates the use of CWP in producing conventional (CV) concrete and self-compacting concrete (SCC). Fresh properties, compressive strength development and durability characteristics of the different concretes showed that CWP could be successfully used as a partial cement replacement.

Energy benefits of cement-based plaster containing hybrid phase-change material (PMC) is considered by Kheradmand *et al.* (2018). The indoor heating and cooling systems used in buildings are among the most energy-demanding uses, in the built environment (about 30% of energy used in this sector). Therefore, it is relevant to develop systems that can assist in maintaining indoor temperature within comfort levels, while helping in the reduction of energy consumption for such

purpose. The storage of energy improves the energy efficiency in buildings by allowing the energy to be used more rationally. The paper presents the thermal characterisation of mortars containing incorporated PCMs targeted for thermal comfort in buildings. The study encompasses a reference mortar termed REFM, as well as a mortar containing hybrid PCMs (called HPCMM) with mass fraction of 18.34% of PCM with melting temperatures of 10, 26 and 28°C. The hybrid blend of three distinct types of PCMs has proved advantageous for improved efficiency in the thermal comfort assurance in buildings. The energy consumption in the box rendered with hybrid mortar was nearly 20% less than that of the box rendered with standard mortar.

The fourth paper, by Zhao *et al.* (2018), reports on improving the properties of recycled concrete aggregates (RCA) by accelerated carbonation. The possibility of improving the properties of RCA by accelerated carbonation was studied in this work. Non-carbonated RCA (RCAI_{nc}), well-carbonated RCA (RCAI_{wc}) and industrial RCA (RCAi) were tested for mass loss (measured by TGA), density, porosity and water absorption. The results showed that, after accelerated carbonation, the density of the RCA increased due to the transformation of portlandite into calcite and the water absorption and porosity of the RCA decreased after carbonation. They concluded that

carbon dioxide could be used to improve the properties of RCA for reuse in new concretes.

The next conference, SCMT5, will be held at Kingston University, London, UK on the 14–17 July 2019 (<http://www.scmto.org.uk>).

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