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Editorial

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It is a great pleasure for me to welcome readers to this themed issue of *Construction Materials* on the Fifth International Conference on Sustainable Construction Materials and Technology (SCMT5). 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.

SCMT5 was conducted by Coventry University and Kingston University London on 14–17 July 2019 at Kingston University, London. Approximately 200 papers were presented, and 250 delegates attended. SCMT5 was planned after four previous successful events in: Coventry, UK in 2007 (which had over 160 delegates), Ancona, Italy in 2010 (which had over 270 delegates), Kyoto, Japan in 2013 (which had 450 delegates) and Las Vegas, USA in 2016 (which had close to 250 delegates). These conferences are attended by government officials, engineers from the government and private industry, engineering faculty and students, materials suppliers, construction companies and others. While the first four conferences highlighted current practice and research in sustainable construction materials, they also showed that more research and implementation activities remain to be carried out in this area. Therefore, the fifth international conference took place in July 2019 to continue this technology transfer effort.

The conference was sponsored by the Institution of Civil Engineers (ICE), American Concrete Institute (ACI), American Society of Civil Engineers (ASCE), Canadian Society of Civil Engineers (CSCE) and International Union of Laboratories and Experts in Construction Materials, Systems and Structures (RILEM) in addition to Coventry University and Kingston University, UK. The awards committee for the conference selected papers to be considered for publication in this journal. The five papers contained in this themed issue were selected from those presented at the conference. They were reviewed in accordance with the standard *Construction Materials* publication guidelines.

The five 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 couple of decades, 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 Romano *et al.* (2021), presents findings on their study on sustainable bio-based earth mortar with self-healing capacity. This paper describes the hygrothermal and mechanical properties and self-healing capacity of a sustainable bio-based mortar repair system for earth construction. There is currently limited characterisation of materials that directly compare earth, bio-fibres and self-healing behaviour. The paper shows that bio-saw mill residue (SMR) provided the best environmental conditions for the bio-agent used.

The second paper, by Assi *et al.* (2021), investigates fly-ash-based geopolymer concrete with an activating solution of a mixture of silica fume, sodium hydroxide and water. The effects of the Portland cement replacement on the early geopolymerisation process, compressive strength, modulus of elasticity and Poisson's ratio are investigated. The Portland cement replacement enhanced the early geopolymerisation process. The compressive strength and modulus of elasticity were significantly increased when the Portland cement ratio increased, while Poisson's ratio was adversely affected.

The thermal performances of an earth-masonry shell house in South Africa are considered by Bradley *et al.* (2021). This paper presents some in situ experimental results from a long-term thermal evaluation of the prototype house. The effectiveness of several passive design strategies was also examined. Natural

ventilation and painting external surfaces white were especially effective at reducing late afternoon and evening temperatures during summer. Another important finding was that the shading of the shell's surface resulted in a significant reduction of indoor temperatures during the winter months. Specifically, the temperature within the north vault was regularly 3–5°C warmer than in the partially shaded south vault between 5.00 p.m. and 9.00 p.m. Several performance recommendations are presented for unreinforced earth-masonry shells.

The fourth paper, by Elahi *et al.* (2021), presents findings on aluminate phase hydration for sulfate resistance of Portland–limestone cements (PLCs). Sulfate optimisation of the aluminate phase (C3A) in PLCs is critical for improving their hydration performance. This paper reports the changes in the sulfate attack performance of an undersulfated interground PLC through the addition of gypsum. Sulfate expansion and strength loss of the undersulfated and optimised PLC in combination with fly ash is measured in both sodium sulfate and magnesium sulfate solutions. Sulfate optimisation of the PLC reduced its expansion to a greater extent in magnesium sulfate and improved strength at later ages to a greater extent in sodium sulfate. Optimised samples underwent less sulfate attack as indicated by their higher calcium hydroxide contents at later ages. This research study highlights the importance of sulfate optimisation in achieving PLCs with greater sulfate attack resistance.

Global awareness of climate change and sustainability has attracted research into the use of natural materials in construction. Recent studies on the ribs of the leaflets of the oil palm tree (known as oil palm broom fibre (OPBF)) have reported impressive physico-mechanical properties. The fifth paper, by Momoh *et al.* (2021), reports on bond behaviour of OPBFs in concrete for eco-friendly construction. The study investigates the bond strength of single and combined OPBF in concrete through direct pull-out tests. The influences of the age of the sample and the diameter of OPBF tendons on the bond strength are assessed. The authors concluded that the potential use of OPBF combined in the form of tendons as longitudinal reinforcement in concrete for lightly loaded structural elements is environmentally friendly and can reduce construction costs and could reduce materials importation for developing countries with huge housing deficits.

The next conference, SCMT6, will be held in 2023 at a venue yet to be decided. Details can be found at http://www.scmt.org.uk.

On behalf of the editorial panel, I hope that this issue of *Construction Materials* will be of interest and value to our readers. As always, we welcome your feedback and thank you for your support.

I would also draw the attention of the readers to the fact that the journal publishes its most recent articles ahead of print on its Virtual Library homepage. This allows the community quicker access to fresh content.

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