

## Editorial

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It is a great pleasure to once again write the Editorial for the latest issue of *Construction Materials*. Since I have served as a member of the Editorial Panel for the journal, a key aim has always been to publish research that encompasses the broad range of materials used in building and civil engineering projects from around the world. The case study and four papers presented herein indeed cover various construction materials, present research of high quality and reflect the current concerns of the industry round the world. Developing practical solutions and supporting new technologies to meet legislative drivers is common to many of the papers presented here. The effects of legislation to ensure carbon dioxide and energy reduction is still a key driver for the construction industry. In meeting these targets, cost-effective, durable and structurally resilient solutions are also required, which must be supported by design guidance and robust data to facilitate uptake by end users.

Composite materials such as glass-fibre-reinforced concrete (GRC) panels are gaining rapid recognition in the construction industry in recent years. In their case study, Watts and Kunchev (2019) detail the background, testing connections, safety and performed tasks on the Grand Théâtre de Rabat in Morocco, which was designed by Zaha Hadid Architects and features a large number of GRC panels. In the Bouregreg Valley at the heart of Rabat, the Grand Théâtre, with its innovative design and cutting-edge infrastructure, will surely be a landmark for the city and the region. The main envelope system for this structure is based on an opaque GRC rain-screen cladding fixed to the primary structure, which is a mix of reinforced concrete and steel. The main driving parameter for the design of the GRC system was the required 60 years life span of the envelope system. Material testing of the GRC was undertaken to obtain mechanical properties, which were used as input for all the structural calculations. The characteristic flexural strength obtained through testing was set as a minimum target characteristic strength to be

achieved by the GRC fabricators. Computational fluid dynamics analysis for preliminary cladding pressures was also undertaken and subsequently validated by an early-stage wind tunnel test. This analysis allowed the use of precise values for wind loads, which drove the stress analysis of the panels while taking the effects of the geometry of the building into full account. Structural calculations for each component were undertaken for each project-specific configuration using finite-element modelling and scripting to automate the structural analysis process for all panels. A single fixing detail was used, serving as a ‘universal’ connection detail to minimise the time required for both fabrication and installation.

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 published in *Construction Materials* have highlighted the need to deliver low-carbon dioxide solutions in order to limit the effect of the built environment on climate change. The second paper, involving modelling the early strength of alkali-activated cement composites containing palm oil fuel ash (Pofa), covers this goal (Salami *et al.*, 2019). The effect of the alkaline activator/Pofa ratio on the early compressive strength of Pofa-engineered alkali-activated cementitious composite (EACC) mortar using a support vector regression (SVR) model is investigated. The results from the model show that the mortar strength increased as the sodium silicate–sodium hydroxide solution/Pofa ratio increased up to an optimum, after which the strength declined considerably. The SVR-based model accurately estimated the early strength of Pofa–EACC mortar. The sodium hydroxide molarity and added water were also found to have a significant effect on strength.

The third paper by Anagnostopoulos and Patsios (2019) considers the effect of acrylic latex on the properties of cement grouts. Admixtures play an important role in the production of more durable grouts. Various chemical admixtures such as superplasticisers, accelerators, anti-freezes, air-entraining agents, stabilisers and many others are utilised to modify grout properties according to the in situ conditions and the grouting purpose. The use of polymer additives in cement grout was investigated in their study, and the effect of acrylic latex emulsion, along with a new-generation superplasticiser, on the rheological properties, setting time, bleeding, resistance to acid attack and strength development of thick, superplasticised cement grouts made with different water/cement ratios were investigated. The results indicated that the addition of acrylic latex of up to 5% significantly increased strength, despite an extension of the setting time. The bleeding and resistance to acid attack of acrylic latex-modified grouts were significantly improved.

The last two papers in this issue cover the theme of pavement materials. The work of Imaninasab and Joodaki (2019) is focussed on anti-stripping additives in asphalt mixes. The effect of two proprietary polyamine-based anti-strippers on moisture susceptibility, the resilient modulus and rutting performance were evaluated by them. Prevention of stripping in asphaltic layers is important because it intensifies other forms of distress, such as fatigue cracks, rutting, corrugations, shoving and ravelling. Their results indicated that 0.5% was the optimum dosage for both additives with respect to all performed tests. Overall, it was found that the impact of the anti-stripping agents on moisture susceptibility was significant.

Cold bituminous emulsion mixes (CBEMs) modified with aluminium dross (AD) and ordinary Portland cement (OPC) are considered as pavement materials by Jadhav and Kakade (2019). AD is a by-product of the aluminium smelting process. The recycled AD contains some volume fraction of toxic materials and landfilling these substances is problematic. This study investigates the effect of the addition of recycled AD in CBEMs for the first time. Due to their low cost, CBEMs are preferred for the construction of low-volume roads in developing countries. The strength of CBEMs is generally increased

by the addition of OPC and hydrated lime. In this study, the proportions of AD and OPC were varied from 0 to 3% at increments of 1%. Marshall stability, indirect tensile strength, indirect tensile stiffness modulus and retained stability tests were performed on mixes prepared with different proportions of AD and OPC. Interestingly, the stability and indirect tensile strength values of the mixes containing AD were higher than those of the mixes containing OPC. The retained stability ratio indicated that addition of AD and OPC resulted in a reduction in moisture damage.

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.

#### REFERENCES

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