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Editorial: Selected Papers from the 36th Cement and Concrete Science Conference, Cardiff University, September 2016.

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This Special Issue of Advances in Cement Research presents a selection of the papers presented at the 36th Cement and Concrete Science Conference, held on the 5-6th September 2016, at Cardiff University. The meeting was organised by Gary Perkins of The University of South Wales and Mark Tyrer of Coventry University on behalf of the Cementitious Materials Group of the Institute of Materials, Minerals and Mining (IOM3).

The annual conference brought together a mix of academic and industrial partners with a number of papers presented over the two days, and while having a UK focus, the conference has grown over the years into a truly international event. As every year, the 2016 conference was a friendly affair, with a wide range of topics covered. This breadth is reflected in the contributions to this Special Issue, with papers on applications in the nuclear industry, concrete durability and recycled geopolymers all featuring.

There are three papers related to nuclear aspects, all from the group at the University of Sheffield. Collier et al. (Collier 2018) followed up their earlier work into retardation of deep borehole disposal grouts by looking at the retarding effects of sodium phosphate and borate, tin chloride and zinc nitrate at high temperature and pressure. Only sodium borate was found to be an appropriate retarder, at 0.75 wt% addition at 90^{o}C.

The papers by Sanderson et al. (Sanderson, 2018) and Prentice et al. (Prentice, 2018) both considered the performance of cement-GGBS blends as used for intermediate level nuclear waste encapsulation. Sanderson et al. built on their earlier use of calorimetry to examine cement-ggbs blends (Sanderson, 2017) and examined the hydration of cement-slag blends, considering the effect of calumite, a coarse-ground slag used in nuclear waste encapsulation to modify rheology, on hydration and rheology. Prentice et al. (Prentice, 2018) meanwhile used thermodynamic modelling supported by NMR and XRD applied to cement-GGBS blends. While ^{29}Si NMR was found to accurately follow the degree of hydration, there is still room to improve the structural characteristics of the C-A-S-H gel using thermodynamic modelling.

Meanwhile, Chaliasou et al. (Chaliasou, 2018) examined a topic of potentially growing importance, namely what to do with geopolymers at the end of their service life. While there has been work looking at the use of geopolymer concrete made with recycled concrete aggregate, (such as Nuaklong et al., 2016) and the use of recycled concrete in Portland cement concrete (for example Collery et al. 2015), there does not appear to have been any previous work examining how recycled geopolymers may affect concrete durability within a Portland cement matrix. Their work suggests that concerns over alkali silica reaction, when recycling geopolymers, are unfounded.

The remaining two papers concern more traditional applications of Portland cement, both being focused on the durability of composite cements. Ukpata et al. examined the effects of temperature, slag composition and curing duration on the performance of cement-GGBS blends exposed to a combined sodium sulphate sodium chloride solution (Ukpata, 2018). The work builds on work on the same systems exposed to just chloride ions (Ogirigbo & Black, in press, Ogirigbo & Black, 2016). Using a range of analytical techniques, they have shown that slag cement outperforms CEM I in tropical environments and that the effects of sulphate attack are mitigated by the presence of chlorides.

Freeze-thaw resistance is the topic of the final paper. Using a combination of phase characterisation and microstructural investigation, Adu-Amankwah et al. have looked at the freeze-thaw resistance of ternary cement-slag-limestone mixes (Adu-Amankwah et al. 2018). It is known that composite cements can show reduced resistance to freeze-thaw testing, and having previously characterised the microstructures and phase assemblages of such systems (Adu-Amankwah et al. 2017), this paper goes on to show how the poor performance under laboratory-based freeze-thaw testing may be related to leaching of portlandite. This goes some way to explaining why composite cements may perform poorly in standardised freeze-thaw tests.

Finally, it remains for us to say thank you to everyone involved in producing this Special Issue. Thanks go to the authors, many of whom were PhD students during the conference, the anonymous referees for their valuable comments, and to the staff at Thomas Telford and ICE Publishing. We hope that you enjoy reading this Special Issue as much as we enjoyed collating it.

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