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Book Review

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Book review

ICE Themes Low Carbon Concrete

RK Dhir and K Paine (eds). ICE Publishing, London, UK, 2019,
ISBN 978-0-7277-6459-1, eISBN 978-0-7277-6460-7, £125, 498 pp.

This is the seventh book in the *ICE Themes* collection, which was started in 2018 and covers some of the most relevant topics, with the fourth book focusing on concrete-related topics. Like the others, it is a collection of papers previously published in the Institution of Civil Engineers' journals, which have been selected and ordered by the editors.

The subject is low-carbon concrete, a very fitting area nowadays, since concrete gives a major contribution to worldwide carbon dioxide emissions and that aspect can be greatly improved. It is therefore an interesting contribution to practitioners and researchers of this area. The six sections comprise 20 contributions (plus the foreword), which are unequally distributed (one of the sections comprises a single contribution and another one features seven). The table of contents would gain from including the names of the authors of the various chapters.

The first section concerns the use of waste products for the generation of cementitious materials. With three chapters, it starts with a study on the use of waste materials as products in the cement industry, followed by two other studies that are more focused on sewage sludge ash and ceramic tile waste. The absence of the construction and demolition waste stream is noted.

The next topic concerns blended cements. It comprises two chapters; the first one dedicated to the heat evolution of blended cements (Portland cement, ground granulated blast-furnace slag and fly ash) and the second one to the properties and microstructure of pastes of ground granulated blast-furnace slag activated by magnesia. Both contributions being of great quality and would have benefitted by being mentioned in the foreword.

The next five chapters comprise a section dedicated to emerging cements. These include calcium sulfoaluminate cements (in three instances), belite–ye'elimite–ferrite cements, and supersulfated cements. The choice of cements is somewhat limited and other types of cement might have qualified for inclusion.

The fourth section, concerning the use of nano-materials, comprises two chapters and only deals with nanosilica and nano-calcium carbonate (ground limestone), out of the many nano-materials now available with potential use in concrete. The foreword comments on this choice but doesn't state whether these are the nano-materials with the highest potential to reduce carbon dioxide emissions.

Section 5, with a single chapter dedicated to geopolymers, provides a general overview of the potential of the use of geopolymer concrete in the UK. This being such a hot topic nowadays, further development was expected.

The last and longest section is dedicated to the durability and sustainability performance and comprises seven contributions. The contributions on durability cover a range of topics from durability-related specifications (focusing on the role of cement type and aggregate type) to carbonation resistance (in ground granulated blast-furnace slag concrete and fly ash concrete), and the contributions on sustainability discuss life-cycle assessment use, carbon footprint and carbon dioxide pricing. The section would gain in clarity if the two parts were independent.

All of the sections are improved with many black and white figures and tabulated data. Presentation is of a high quality and comprehensive. All in all, these *Proceedings* papers present a wide scope of possible developments of concrete in the near-future towards nearly-zero carbon dioxide emissions and should appeal to concrete technologists and practicing engineers, as well as consultants and researchers.

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